SAW Section 603 Report

September 30, 2019

Display bookmarks to see an alphabetical listing of Round 3 SAW Grantee Names.

Alternatively, click “edit” and “find” in Adobe Reader to search by Grantee Name.

Adrian Charter Township

SAW Grant Project No. 1647-01

EXECUTIVE SUMMARY

Prepared By: **Spicer Group, Inc.**
125 Helle Blvd. Suite 2
Dundee, MI 48131

Owner: **Adrian Charter Township**
2907 Tipton Highway
Adrian, MI 49221

The Charter Township of Adrian has entered into an agreement with the Michigan Department of Environmental Quality and the Michigan Finance Authority for grant funds issued under Public Act No. 511 of 2012 for the *Stormwater, Asset Management, and Wastewater (SAW)* program. Adrian Charter Township received the following grant:

Wastewater Asset Management Plan (WWAMP) – 100% Grant	***$342,910***
LESS Local Match (10%)	$34,291
Total Grant Amount	$308,619

The Asset Management Plan (AMP) was required to be completed within three years of the date of the agreement; November 2018.

Each AMP has the following key components:

1. Asset Inventory and Condition Assessment
2. Level of Service Determination
3. Critical Assets / Risk Management
4. Capital Improvement Plan
5. Revenue Structure
6. Operation & Maintenance Strategies
7. GIS & Mapping System

WASTEWATER ASSET INVENTORY AND CONDITION ASSESSMENT

The Township's wastewater system consists of two components: The collection system and the pump stations. The collection system can be broken down into manholes and pipes.

The Township currently has 710 sanitary manholes and nearly 36 miles of gravity sewer pipes ranging in size from 8 to 30 inches. All the manholes were inventoried and assessed by Spicer inspectors trained in the NASSCO Manhole/Pipeline Assessment Certification Programs (MACP/PACP). Based on evidence of surcharge and other defects observed during manhole inspections, Spicer Group selected 94 pipe runs to be cleaned and televised. PACP inspections were performed by a third-party sewer televising company.

Table 2.2: Manholes by Quick Rating

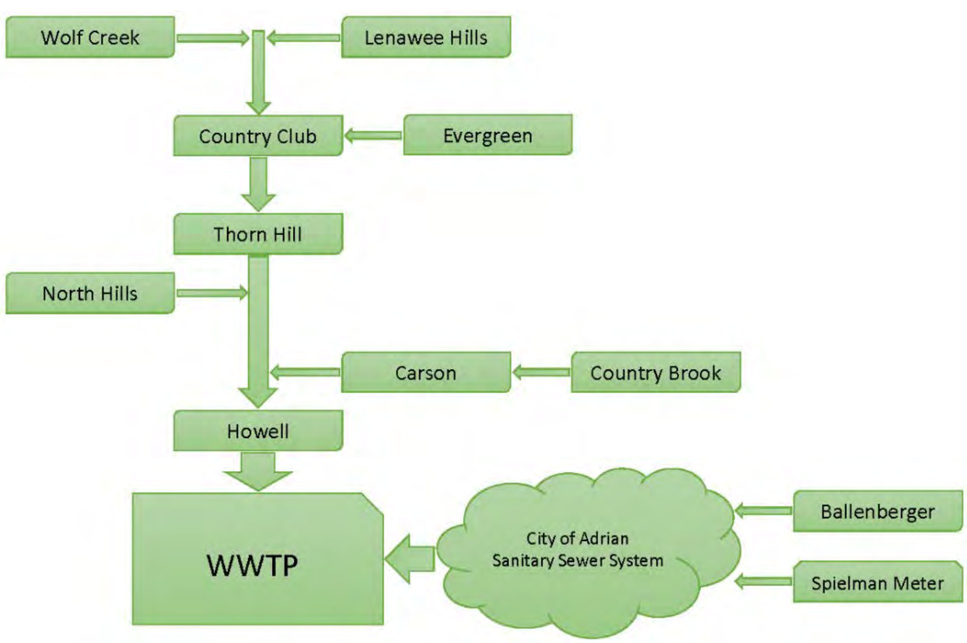
Highest Rating	Structural		O&M		Combined	
	Number	Percent	Number	Percent	Number	Percent
5	15	2%	5	1%	20	3%
4	17	2%	33	5%	45	6%
3	91	13%	105	15%	103	15%
2	15	2%	467	66%	442	62%
1	475	67%	7	1%	7	1%
0	97	14%	93	13%	93	13%

Table 2.3: Pipe Defects

Defect	Quick Rating
Joint Offset – Medium	1.1
Intruding Seal Material – Sealing Ring	2.1
Crack – Spiral	2.1
Crack – Longitudinal	2.2
Joint Separated & Joint Offset (Two defects in one pipe run)	2.2
Infiltration – Runner	4.1
Root Ball – Lateral	4.1

The second component of the Township's wastewater system is pump stations. Adrian Charter Township's system includes ten pump stations. Spicer Group completed an inspection and condition assessment for each station and provided recommendations for improvements.

Figure 2.1: Schematic Layout of Pump Stations



LEVEL OF SERVICE

For the Level of Service, the Township prioritized projects in their Capital Improvement Plan (CIP) and rate structure based on the level of service they feel is affordable. The levels of service have been ranked as low, medium, and high, defined as:

1. Low LOS: The project is the minimum needed to conform with applicable regulations etc.
2. Medium LOS: Expands the project to include work that is not critical to conform to regulations, but that makes sense for a long-term sustainable result.
3. High LOS: Includes complete replacement of equipment or infrastructure that could be repaired instead.

Adrian Charter Township has selected a Medium Level of Service as their target. This level of service was the basis for determining the extent of repairs and replacements to be included in the Capital Improvement Plan.

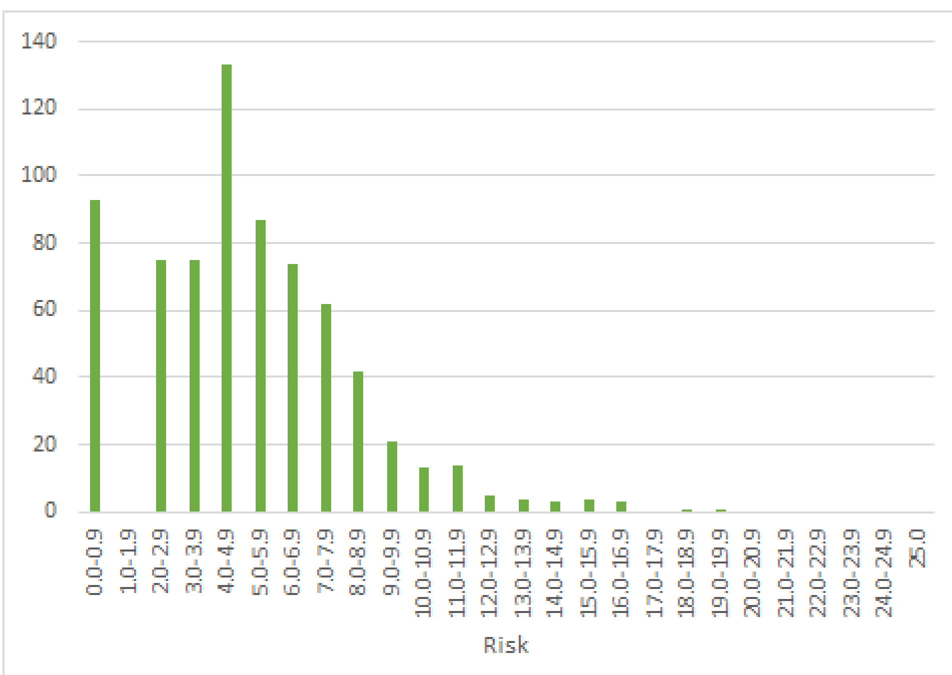
CRITICAL ASSETS / RISK MANAGEMENT

For each asset in the Township's wastewater system, a criticality/risk assessment was performed to determine and prioritize the Township's key components. Based on the condition assessments and the field inspections, the Likelihood of Failure (LoF) was calculated for every asset including all pipes, manholes, and pump station components. Next, the Consequence of Failure (CoF) was calculated and scored for each asset based on economic, social, and environmental consequences. Finally, the Risk assessment was calculated using the following equation:

$$Risk = LoF\ x\ CoF$$

Risk is represented on a scale from 0 to 25. Over 50% of manholes in the Township's wastewater collection system had a risk rating less than 5. The highest risk manhole in the system had a risk rating of 19.4.

Figure 4.3: Risk



Due to the high cost of cleaning, televising, and inspecting sewer pipes, only about 11% of the gravity mains in the system were inspected. Of those pipes, only 7 pipes were found to have defects. Risk in these pipes range from 1.43 to 15.99 on a scale of 1 to 25.

Table 4.1: Pipe Risk Assessment

Pipe Segment	Structural QR	O&M QR	Overall QR	CoF	LoF	Risk
305 to 304	1100	0000	1100	1.3	1.1	1.43
301 to 300	0000	2100	2100	2.0	2.1	4.2
381 to 380	2100	0000	2100	1.7	2.1	3.57
795 to 794	2100	2100	2200	3.4	2.2	2.64
439 to 438	2200	0000	2200	1.2	2.2	2.64
296 to 822	0000	4100	4100	3.9	4.1	15.99
727 to 728	0000	4100	4100	1.9	4.1	7.79

Risk for each pump station was also calculated on a scale of 0 to 25. Pump station risk in Adrian Charter Township ranged from 0 to 20, with three pump stations having a risk of 20. These three high-risk stations are Howell Highway, Thorn Hill, and Country Club. They are some of the oldest in the system, and they are dry-can triplex applications.

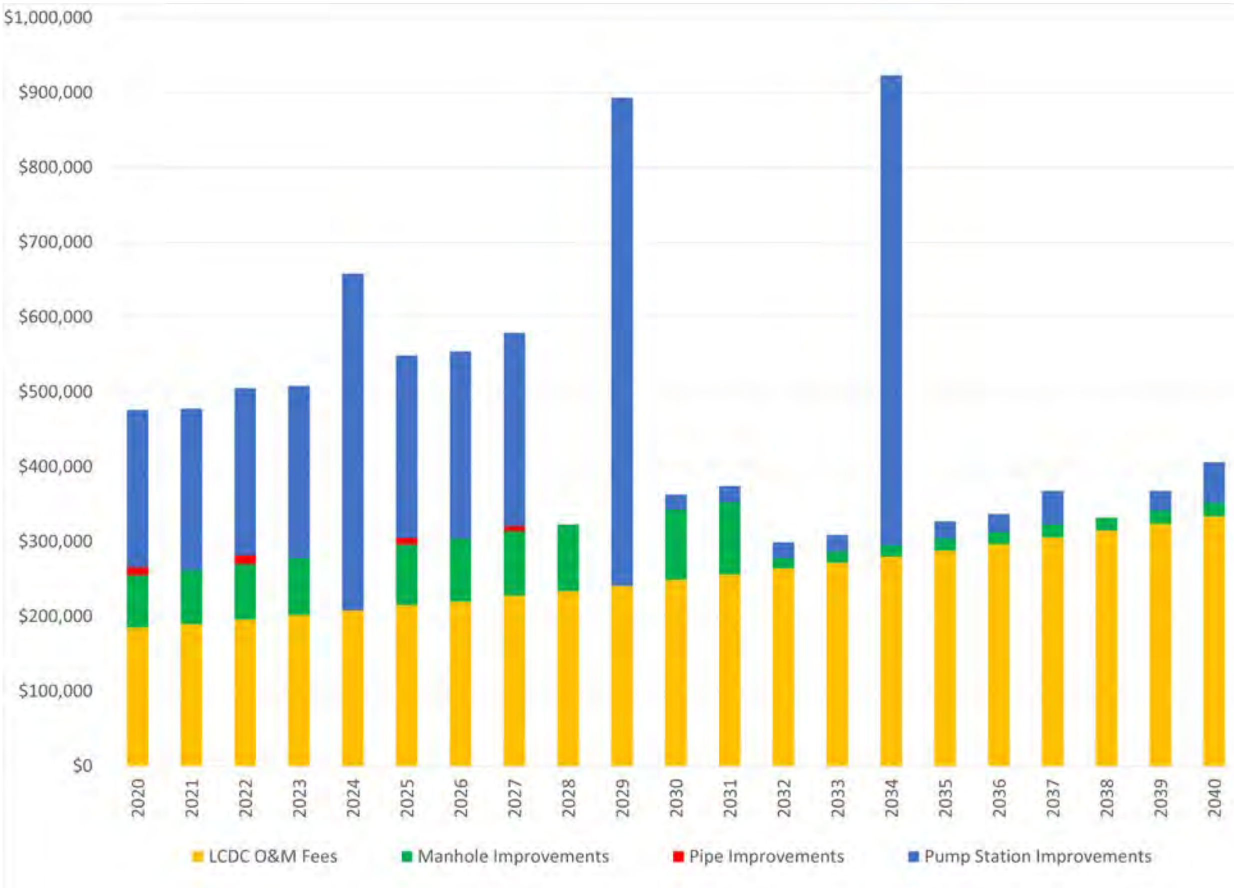
Table 4.2: Pump Station Risk Assessment

Station Name	Age	Pumps	LoF	Proximity to Open Water	Service Area Size	Number of Pumps	CoF	Risk
Howell Hwy	3	1	4	1	2	2	5	20
Carson Creek	3	0	3	1	1	1	3	9
Ballenburger	3	0	3	1	0	1	2	6
Thorn Hill	3	1	4	1	2	2	5	20
Wolfcreek	3	0	3	0	0	1	1	3
Northhills	3	0	3	0	0	1	1	3
Country Club	3	1	4	1	2	2	5	20
Evergreen	2	0	2	0	0	1	1	2
Lenawee Hills	2	0	2	1	0	1	2	4
Country Brook	1	0	1	0	0	1	1	1

CAPITAL IMPROVEMENT PLAN

The Capital Improvement Plan (CIP) is the culmination of all other parts of the Asset Management Plan (AMP). Reviewing the results of the wastewater system Inventory & Condition Assessment, Level of Service determination, Criticality, and preliminary CIP project lists, a process was worked out to categorize and prioritize the final CIP. A 20-year CIP was developed that includes various collection system improvements. 210 out of the 710 manholes in the system are planned for rehabilitation, spread out over ten years. By spreading the rehabilitations over 10 years, the costs per year can be kept down to an average of $70,700 per year. Because there are so few pipe repairs to be made, they will be integrated with the manhole rehabilitation projects based on geographic location. In addition to the manhole and pipe repairs, each of the pump stations have planned rehabilitations. Several pump station replacements and improvements are scheduled through the year 2027, which should update all pump station components to be within their expected service lives. At this point, the CIP includes a more routine improvement schedule that should reduce failures and spread out costs of future improvements over time.

Table 5.11: 20-Year Capital Improvements Estimate of Costs



Revenue Structure / Long Term Funding

Municipal Analytics was engaged to perform a sewer rate gap analysis (Appendix I) and sewer rate sufficiency analysis (Appendix J). The rate gap analysis compared current revenues and expenditures and determined that the Township has no sewer fund debt obligations and there is no rate gap. The sewer rate sufficiency analysis accounts for the proposed operations, maintenance, and repair (OM&R) costs from the Capital Improvement Plan. This analysis resulted in a recommendation that the Township raise rates approximately 6% per year for the next eleven years. This recommendation is based on a few assumptions that should be considered: change in customer base will be negligible, there will be a small increase in volume of wastewater discharge to the City for treatment, City of Adrian will increase treatment costs by 5% per year, and inflation will be 2% per year. It is important that these assumptions be compared to actual conditions, as variations will impact the required sewer rate increases.

Operation & Maintenance Strategies

Wastewater collection systems require constant maintenance to keep them functioning. The recommended operation and maintenance strategies include the following:

Routine Cleaning

Lenawee County Drain Commissioner's Operations and Maintenance (O&M) staff currently performs routine cleaning of the Adrian Township sewer lines on a rotating schedule, making sure to prioritize sewers that have a history of backing up. Routine jetting and cleaning will help to prevent deposits such as calcium, ragging, and grease from accumulating in the collection system. Consistent jetting of the system will reduce the potential for blockage and will maintain maximum flow capacity.

Routine Television Inspections

LCDC staff does not currently implement a sewer televising routine. CCTV inspections will allow O&M staff to evaluate the condition of the sewer mains and effectively plan repairs. Televising the entire system would be an expensive undertaking but televising a small amount at a time and prioritizing suspect areas may provide insight into what causes any backups or blockages.

For the creation of this Asset Management Plan, a small portion of the sanitary sewer lines were televised and inspected in Spring of 2018. These CCTV inspections were completed based on NASSCO PACP standards. The inspection data is stored in the sewer system GIS, which should be continually updated with new inspections as they are performed.

Routine Manhole Inspections

Manhole inspections were performed in 2017 through 2018 of the entire Adrian Charter Township sanitary sewer system, which includes about 700 manholes. After completion of the inspections, a risk assessment was determined for each manhole based on consequence and likelihood of failure. This is risk assessment is the basis for prioritizing future manhole repairs.

Manhole inspections should be performed any time field staff opens or enters a manhole. By adding manhole inspections as an additional step to other tasks, field staff will not need to dedicate time specifically for manhole inspections. These inspections can be completed using paper forms or electronically by using an electronic device equipped with ESRI Collector, depending on staff preference. Regardless of means of collection, the sewer GIS should be updated with inspection data as it is collected.

Routine manhole inspections are necessary to be completed a minimum of every ten years. To make this task feasible for LCDC O&M staff to complete, it is recommended that about 10% of manholes – approximately 70 – be inspected each year. As mentioned previously, by inspecting manholes as they are opened for other tasks, the number of manholes targeted for inspection can be reduced.

Continual Monitoring Procedures and Processes

Adrian Charter Township and Lenawee County Drain Commissioner's O&M staff currently do not have a method to track the conditions of their assets. To address this, a sewer system GIS was created as a repository of all data collected for the creation of this Asset Management Plan. The GIS is intended to not only provide insight for the Capital Improvement Plan, but to be updated and utilized on a continual basis by the Township and LCDC O&M staff. The GIS map can be used to accurately locate features, and the attribute tables can be used to refer to and update data relevant to each feature.

By using electronic devices such as iPads, GIS can be utilized in the field to update attributes in real time. This system will allow O&M staff to be able to track all assets and will inform them of ones that are critical in the system that should be prioritized for inspection.

Pump Station O&M

Lenawee County Drain Commissioner's O&M staff inspects the pump stations on a regular basis, which should continue as the ongoing Operation & Maintenance Strategy. The current staff has a thorough knowledge of the system, as they work with and inspect it regularly. However, it is recommended that this thorough knowledge be recorded in such a way that it can be passed down in the event of staff turnover. The O&M manuals that are currently available have been digitized and are accessible from GIS via hyperlinks in the pump stations layer. The missing manuals should be replaced, digitized, and stored accordingly. It is also recommended that a digital maintenance record be maintained and accessible via GIS. This is something that should be continually updated as staff performs routine checks on the pump stations.

GIS & Mapping System

A Geographic Information System (GIS) was created for Adrian Charter Township's collection system. The GIS was created by recording locations of collection system components using GPS during field inspections. Manhole inspection data was collected in the field using the ESRI Collector application and the attributes were populated during inspection. Sewer pipes were drafted later using field notes and as-built records.

Pump station features were also created at the wet wells. These features include basic information about the pump stations as well as hyperlinks to the maintenance documents that were made available by the Lenawee County Drain Commissioner's staff.

Conclusion

The condition of Adrian Charter Township's wastewater system is typical of a system of its age. The system is nearing 40 years of age at the time of this publication. The manholes and pipes are, for the most part, in good condition. The pump stations, on the other hand, have experienced more frequent failures in recent years and it is expected that more failures are soon to come. Because of the high cost of pump station replacements and rehabilitations, the Capital Improvement Plan developed under this Asset Management Plan calls for the Township to replace a pump station every five years and spread out the manhole and pipe repairs over ten years. This should adequately balance the need for improvements with the associated costs to the Township.

In accordance with the SAW Grant requirements, the Township's Wastewater Asset Management Plan (WWAMP) shall be kept available for citizen review for 15 years. The WWAMP should be reviewed annually and the components updated and included in the Township's annual budget process.

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date 10-12-2018
(no later than 3 years from executed grant date)

The Charter Township of Adrian *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1647-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or No
   If No - Date of the rate methodology approval letter: June 21, 2018.
2) Significant Progress Made: Yes or No
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: __________.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on __________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Name	Phone Number	Email
James Koehn	at 517-263-7920	jkoehn@adriantownship.com

Signature of Authorized Representative (Original Signature Required)   Date: 11-29-18

James Koehn, Supervisor
Print Name and Title of Authorized Representative

April 2017

EXECUTIVE SUMMARY

Prepared by: **SPICER GROUP, INC.**
230 S. Washington Avenue
Saginaw, MI 48607

Owner: **Village of Akron**
4380 Beach Street PO Box 295,
Akron, MI 48701
Jim Dickinson, Village President

On September 14, 2015, The Village of Akron received a Notice of Grant Application Approval as a Round 3 SAW Grant awardee from the Michigan Department of Environmental Quality (MDEQ) the Village received the following grants:

Wastewater Asset Management Plan (WWAMP) 100%	$278,800
Storm Water Asset Management Plan (SWAMP) 100%	$146,200
LESS Local Match*	($0.00)
Total Grant Amount	$425,000

*Disadvantaged for Wastewater Asset Management & Stormwater Asset Management Plans; no match required

The Asset Management Plans (AMPs) needed to be completed within three years of the date of the Michigan Finance Authority (MFA) agreement; November 2018.

Each AMP has the following key components:

- Asset Inventory and Condition Assessment
- Critical Assets (Risk)
- Level of Service Determination
- Revenue Structure
- Capital Improvement Plan

Wastewater Asset Inventory and Condition Assessment

The Village's wastewater system consists of two main components: The collection system (pipes and manholes), and pump station/forcemain.

For the collection system, Spicer Group, Inc. completed a mobile mapping LiDAR survey of the entire Township and used the survey information to develop a comprehensive Geographic Information System (GIS). This GIS is located on a new computer in the Village office and is a detailed "smart" mapping system with databases, using the ArcGIS/Arc Online by ESRI platform. This system can be accessed and updated in the field by DPW staff from new iPads supplied as part of the SAW grant project. From the GIS, as-built plans, pipe/manhole condition ratings, materials, year installed, inspection records, CCTV video inspections etc. can be accessed. This information can also be modified to provide specific lists and maps, and can be updated easily when future improvements are made.

The Village currently has 17,042 feet of sanitary sewer pipes in the entire sanitary sewer collection system ranging in size from 8”-12”, 78 sanitary sewer manholes and 1 pumping station. City Sewer Cleaners, from Saginaw completed a comprehensive cleaning and televising program of the sanitary sewer pipes using the NASSCO Pipeline Assessment Certification Program (PACP) to identify features and defects within the collection system. Spicer Group, Inc. completed a comprehensive inspection of the manholes using the NASSCO Manhole Assessment Certification Program (MACP) standards to identify features and defects within the manholes. The MACP/PACP system is used to standardize the scoring and to quantify the condition of the wastewater assets.

Criticality (Risk)

For each asset in the Villages’ wastewater system, a criticality/risk analysis was performed to determine and prioritize the Village’s key components. Based on the condition assessments and the field inspections, the Likelihood of Failure (LoF) was calculated for every asset; including all pipes, manholes and pumping stations. Next, the Consequence of Failure (CoF) was calculated and scored for each asset based on the economic, social, and environmental consequences if that asset failed. Finally, the Criticality (Risk) score was calculated using:

LoF x CoF = RISK

Overall the Village of Akron’s collection system is in very good condition. Most of the pipes had likelihood of failure scores under 3 indicating good condition. This contributed to low consequence of failure scores and overall low risk scores. The manholes were also in overall good condition, however a total of 4 structures were unable to be inspected therefore they received high LoF values due to current condition being unknown. Also, 29 manholes are below grade and need to be raised to grade so they are accessible for maintenance and emergency situations. Overall CoF and Risk values for the manholes were also very low for the majority of the manholes due to being in good condition. The pump station was critically assessed and was found to have many components receiving high LoF scores indicating near failure. Since the pump station handles wastewater flow for the entire system, most components received very high CoF scores. The high CoF and LoF scores for many of the pump station components led to an overall high-risk value for the pump station.

Level of Service (LOS)

The next phase of the AMP is a Level of Service determination. What level of service does the Village want to provide to its wastewater customers? How are projects going to be prioritized and included in the Capital Improvement Plan (CIP)? What cost is the Village willing to endure to provide that level of service? These are all questions that were discussed as a part of the overall asset management plan. The Villages’ Level of Service Goals are as follows:

Mission Statement

The Village of Akron strives to develop a financially stable, high performing wastewater collection, pumping and treatment service that addresses the customer's wants and needs and upholds the local, State, and Federal regulatory requirements at a minimum cost to our customers.

One of the basic goals is to review the capital improvement projects to determine the best value options for the Villages’ customers based on life cycle costs and overall benefits to the community:

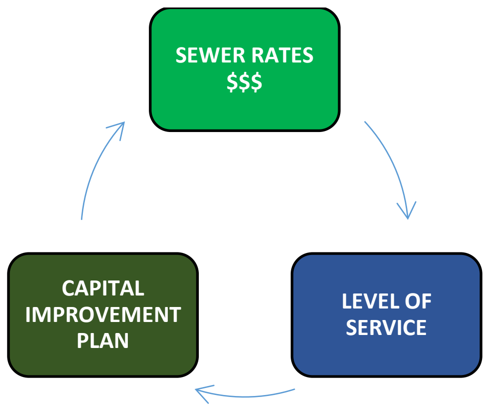
- “**MINIMUM**” Level of Service – Priority projects to meet the minimum local, State, and/or Federal regulations. Typically to be completed within the next 5 years.

- "**MEDIUM**" Level of Service – Projects that will need to be done eventually; typically when other infrastructure projects are happening.
- "**HIGH**" Level of Service – Projects that are on the long range radar that could spur future development and growth for the Township.

Generally, the "high" level of service projects will have a higher construction/initial cost but would provide a better long-term or life cycle cost for the Village. The "minimum" level of service projects would have a lower initial cost, but would also have a shorter life span and higher overall life cycle costs.

As the AMP progressed, different scenarios were evaluated to show the relationship between the Villages' desired Level of Service and the costs of the capital improvement projects associated with that LOS, and the effect of that LOS on sewer rates.

Asset Management Plan Evaluation Process



The resulting capital improvement plan and revenue structure was one that met the Villages' goals, addressed the improvements that need to be made, and is a sustainable rate structure for the Township's customers.

The Village chose to adopt a minimum Level of Service.

Revenue Structure

Spicer Group teamed with Municipal Analytics for the revenue structure analysis for the AMP. Wastewater account balances, expenditures, revenues, etc. were reviewed and inputted into financial software to perform a gap analysis to determine if there were any deficiencies in the rates. The Villages' current rate structure was found to have no deficiencies meaning the Village could fund current and future operations and maintenance of the system. However, the gap analysis did not consider any capital improvement project required to maintain the selected LOS.

The Capital Improvement Plan (CIP) projects were evaluated and allocated to various years of completion, and the rate structure to support those improvements was determined. Many iterations/scenarios were performed to come up with a rate structure that met the Villages' Level of Service goals, completed the CIP projects that are needed, and had sustainable rates for the Village's customers. The result was a recommendation for an annual increase of 8% for the next 3 years. This should be reviewed annually as a part of the Villages' normal budgeting process. Exact amounts of annual rate increase by year can be seen in the table below.

Recommended Annual Rate Increases	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023
Readiness to Serve Charges	8.00%	8.00%	8.00%	3.00%	2.00%
Usage Charges	8.00%	8.00%	8.00%	3.00%	2.00%

Capital Improvement Plan

The Capital Improvement Plan (CIP) is the culmination of all the parts of the Asset Management Plan (AMP). Reviewing the results of the wastewater system Inventory & Condition Assessment, Level of Service (LOS) determination, Criticality (Risk), Revenue Structure, and preliminary CIP project lists, a process was worked through to categorize and prioritize the final CIP. Various degrees of Level of Service and the associated CIP projects were evaluated and plugged into the Revenue Structure model, and the resulting sewer rates for that set of scenarios were reviewed. If the projected rates were too high, a lower LOS was chosen and those CIP projects were plugged into the Revenue Structure model and the resulting rates were then reviewed. The process then continued with different CIP projects at varying LOS's until an acceptable rate structure, level of service, and capital improvement plan was developed. A 5-year CIP was developed that includes various collection system improvements. The table below summarizes the minimum service level projects that were included in the 5-year capital improvement plan.

Village of Akron Sanitary Sewer Capital Improvement Plan

Annual Maintenance

Annual Operation and Maintenance - Continue Cleaning and Televising	$5,000.00

Pump Station

Project Number		Year	Project Location	Project Description	Defect(s)	Estimated Cost
5	Min.	2020	Pump Station	Pump Station Replacement	Past Useful Service Life	$482,000.00

Forcemain

Project Number		Year	Project Location	Project Description	Defect(s)	Estimated Cost
6	Min.	2020	Air Relief Valves on Forcemain	Locate, Inspect, and Replace Air Relief Valves as Necessary	Unknown, Operating Past Useful Life	$155,000.00

Akron USDA Rural Development Application

Project Number		Year	Project Description	Estimated Cost
7	Min.	2018	Preliminary Engineering Report and Full Application Submittal Assistance For Pump Station and Air Relief Valve Replacement	$10,000.00
8	Min.	2018	Easement ROW Verification For USDA Application	$20,000.00

Annual Maintenance	$5,000.00
Grand Total Minimum Level of Service	$667,000.00

Conclusion

The Village of Akron's wastewater system is a typical, aging municipal infrastructure system. The DPW staff have taken a proactive approach to routine operation and maintenance of the system. Structurally, the system is very sound. Routine maintenance has allowed the pump station to successfully function until now, but due to many of the components operating near failure it is recommended that the Village replace the pump station in the next 5 years. As a result of replacing the pump station it is recommended that the Village replaces the air relief valves on the Village owned force main to extend the overall life of both the force main and pump station. It was recommended that the Village starts budgeting money for the pump station and air relief valve replacement. It was also recommended the manholes which were unable to be in an 8% annual rate increase is recommended to cover the planned operating expenses, capital improvement projects, and inflation for the next three years. This will need to be reviewed annually during the Villages' normal budgeting process.

In accordance with the SAW Grant requirements, the Villages' Wastewater Asset Management Plan (WWAMP) needs to be kept available for citizen review for 15 years. The WWAMP should be reviewed annually, and the components updated and included in the Villages' annual budget process.

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date November 2018
(no later than 3 years from executed grant date)

The Village of Akron certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1231-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: ~~Yes or~~ **No**

   If No - Date of the rate methodology approval letter: 5-03-18.

2) Significant Progress Made: Yes or No

   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)

3) Date of rate methodology review letter identifying the gap: ______________.

4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ______________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

James Dickinson at (989) 439-2619 jdickinson48701@gmail.com
Name | Phone Number | Email

James Dickinson 11/13/2018
Signature of Authorized Representative (Original Signature Required) Date

James Dickinson Village President
Print Name and Title of Authorized Representative

VILLAGE OF AKRON
SAW Grant Project No. 1231-01

EXECUTIVE SUMMARY

Prepared by: **SPICER GROUP, INC.**
230 S. Washington
Saginaw, MI 48607

Owner: **VILLAGE OF AKRON**
4380 Beach Street
Akron, MI 48701
(989)-691-5770
Jim Dickinson, Village President

On September 14, 2015, The Village of Akron received a Notice of Grant Application Approval as a Round 3 SAW Grant awardee from the Michigan Department of Environmental Quality (MDEQ) the Village received the following grants:

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Each AMP has the following key components:

- Asset Inventory and Condition Assessment
- Critical Assets (Risk)
- Level of Service Determination
- Revenue Structure
- Capital Improvement Plan

Storm Water Asset Inventory and Condition Assessment

The Village of Akron's storm water collection system consists of a series of 4", 6", 8", 10", 12", and 15"pipes. These pipes or "storm sewers" collect storm water from "catch basins", footing drains/sump systems (sump leads), open inlets, roadside drainage, roof drains, groundwater infiltration etc. A base map of the system is included in Appendix 2.

There are several County Drains within the Village limits that are owned, operated, and maintained by the Drainage District through the Tuscola County Drain Commissioner's office. These County Drains benefit the residents within each respective drainage district, but are not considered to be Village-owned storm water assets. The County Drains are as follows:

- Allbertson Drain
- Allen Drain
- Davis Street Drain
- Hover Drain
- North Street Drain
- Beech Tile Drain
- Pine Court Drain

The Michigan Department of Transportation MDOT is responsible for all the storm water assets in the right-of-way of M-138 which intersects the Village of Akron.

For the collection system, Spicer Group, Inc. completed a mobile mapping LiDAR survey of the entire Village, and used the survey information to develop a comprehensive Geographic Information System (GIS). This GIS is located on a new computer in the Village office, and is detailed "smart" mapping system with databases, using the ArcGIS/Arc Online by ESRI platform. This system can be accessed and updated in the field by DPW staff from a new iPad supplied as part of the SAW grant project. From the GIS< as-built plans, pipe/manhole condition ratings, materials, year installed, inspection records, CCTV video inspection etc. can be accessed. This information can also be queried to provide specific lists and maps, and updated easily when future improvements are made.

The Village currently has around 10,117.6 feet of storm sewer pipes ranging in size from 4"-35". Below is a table showing the diameter and materials of the storm water piping:

Table ES-1: Village-Owned Storm Water Pipes by Diameter and Material

Village Owned Storm Sewer						
Pipe Diameter	PE	PVC	RCP	VCP	Unknown	**Total**
4"		164.8		33.1		197.9
6"	108.6	1146.4		1232.8	12.4	2500.2
8"	275.9	395.1	520.7	1121.9		2313.6
10"		157.1	1117.4	298.6		1573.1
12"			464.9	1739.2		2204.1
15"			742.3			742.3
Unknown					586.4	586.4
Total	384.5	1863.4	2845.3	4425.6	598.8	**10117.6**
Percent by Material	3.8%	18.4%	28.1%	43.7%	5.9%	100.0%

City Sewer Cleaners from Saginaw completed a cleaning and televising program for the storm sewer pipes. Spicer Group, Inc. completed a comprehensive inspection of all the storm water structures owned by the Village. The NASSCO Manhole/Pipeline Assessment Certification Program (MACP/PACP) standards were used to identify and code the defects and was used to standardize the scoring and quantify the condition of the storm water assets.

Criticality (Risk)

For each asset in the Village's storm water system, a criticality/risk analysis was performed to determine and prioritize the Village's key components. Based on the condition assessments and the field inspections, the Likelihood of Failure (LoF) was calculated for every asset; including all pipes, manholes, drainage structures, etc. Next, the Consequence of Failure (CoF) was calculated and scored for each asset based on the economic, social, and environmental consequences, if that asset failed. Finally, the Criticality (Risk) score was calculated using:

RISK = LoF x CoF

The Village collection system had 4 pipes with a LoF score of 5 or above. These locations were:

- ST3-TEE Pipe that runs from the basing in front of Village Hall and ties into 12"
- ST8-East Eastern most pipe that runs on south side of M-138 into drain
- ST68.1-ST67 Emery Street ties into Lynn Street

There were 11 drainage structures with a QR of 5000 or higher. There were also a total of 8 structures that had a QR above 4000.

The overall Village stormwater collection system for both the manholes and pipes had very low CoF values. All assets had ratings 3.7 and less than indicating moderate disruption. This is due to several reasons. Many of the pipes are small in diameter and if service was interrupted would not cause a major-catastrophic disruption of service. Many of the larger size pipes and interceptor storm sewers are either county drains or part of MDOT in the Village limits. These pipes have much larger CoF values because if they failed would exhibit disruption to many more customers. It is important for the Village to understand that in many areas it is crucial for these storm sewers to stay in service as Village assets are connected to them.

Overall, 6 storm water structures fell into the medium risk category. The rest of the storm water structures fell into the low risk with scores of 11.3-1.7 The spreadsheet in Appendix 3A shows the breakdown of scores for each individual structure. Also found in Appendix 3A, DS-4941-08 sows the exact location of the assets that fell into each of the differing risk categories.

Critical assets for storm sewer pipes where determined in a similar method to how the drainage structures where analyzed. LoF was determined based on the CCTV inspection observations of defects and CoF was determined based on formulas that account for factors such as location of the pipe, the number of users that would be affected, along with other economic and environmental factors. Then multiplying the LoF times the CoF calculates the overall risk for each pipe. The overall risk of each pipe is prioritized on a high, medium and low scale.

In total, 11 of the storm water pipes fell into the medium risk category however only 7 of these are owned by the Village of Akron. The pipe ST-68.1-ST-67 had the highest calculated risk score of 20.4. All of the other pipes fell into the low risk category with scores of 11.99 or lower.

Level of Service

Mission Statement

The Village of Akron strives to maintain a basic storm water collection system service that addresses the residents' wants and needs and upholds the local, State, and Federal regulatory requirements at a minimum cost to our residents.

4.1 Basic goals:

- Operate and maintain the storm water system to minimize flooding and property damage.
- Provide rapid and effective emergency response service.
- Review the condition of storm water assets as a part of other infrastructure construction projects.
- Seek a funding source for operation & maintenance and repair/replacement of storm water assets.
- Review the maintenance and capital improvement plans/projects annually to determine the lowest cost options for our residents:
    - **"MINIMUM"** Level of Service – Address resident complaints as they come in.
    - **"MEDIUM"** Level of Service – Point repairs to the existing system that have been identified. Mainly projects that the cleaning and televising crew had to abandon the inspection due to obstructions, collapses, holes etc.
    - **"HIGH"** Level of Service – Lining or replacement projects to be completed with other infrastructure improvement projects.

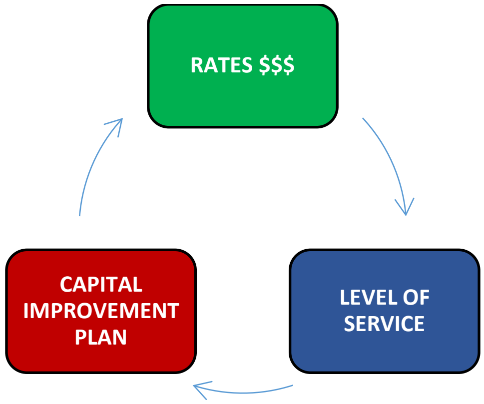
4.2 Performance Measurements:

- Review annual performance goals for storm sewer system operation & maintenance, rehabilitation, and capital improvements.
- Annually review the number and severity of resident complaints.
- Annually review the amount of storm sewer assets that have been repaired or replaced.
- Review and update the Storm Water Asset Management Plan, GIS, and Capital Improvement Plan annually.

4.3 Summary:

The Village of Akron has chosen to adopt a minimum Level of Service for their storm water system**.**

ES-2: Asset Management Plan Evaluation Process



Since Michigan has not created a climate which would allow municipalities to create either an enterprise fund or a utility fee for storm water asset improvements, funding comes from the Village's Local and Major Street Funds. The Village has fixed sources of revenues from a combination of State, County, Township and Village Taxes. These limited founds in some ways restricted on their use in that they are primarily designated for road improvements.

Since there is no real funding mechanism for storm water assets, the Village has been maintaining a minimum Level of Service. The storm sewer system is cleaned annually and repairs to pipes or catch basins are made as needed. When residents notify the Village of flooding or drainage issues, the DPW will address the issue on case-by-case basis. When the Village has street resurfacing or replacement projects, the storm water system is inspected, evaluated, and appropriate repairs and/or replacement is done based on the funding available.

Revenue Structure

Spicer Group teamed with Municipal Analytics for the revenue structure analysis for the AMP. Since Michigan has not created a climate which would allow municipalities to create either an enterprise fund or a utility fee for storm water asset improvements, funding comes from the Village's general fund. Act 51 funds received from the State for street/road improvements could also be used for storm water improvements that affect the street projects directly. However, Act 51 funding is very limited. Another mechanism for funding large storm water improvements is through the Shiawassee County Drain Commissioner's office, using the Drain Code, PA 40 of 1956.

The financial impact analysis found that the Village's general fund does not have sufficient revenue to meet identified storm water capital improvement projects, and does not have a mechanism to collect rates/fees to provide storm water collection services. The Village will continue to strive to maintain a minimum level of service and seek outside grants and funding for storm water infrastructure capital improvements. This will include a reactionary operation and maintenance practice. When residents notify the Village of flooding or drainage issues, the DPW will address the issue on a case-by-case basis. When the Village has street resurfacing or replacement projects, the storm water system is inspected, evaluated, and appropriate repairs and/or replacement is done based on the funding available. The Village should continue to update this analysis on an annual basis to determine if funds become available to address the proposed capital improvement projects.

Capital Improvement Plan

The Capital Improvement Plan (CIP) is the culmination of all the parts of the Asset Management Plan (AMP). Reviewing the results of the stormwater system Inventory & Condition Assessment, Level of Service (LOS) determination, Criticality (Risk), Revenue Structure, and preliminary CIP project lists, a process was worked through to categorize and prioritize the final CIP.

Until a funding mechanism for storm water improvements is found, the Village is forced to continue its *reactionary* policy. In order to have some sort of financial mechanism for the Village to *proactively* improve the storm water system, we recommended a minimal discretionary budgetary line item of $3,500.00 per year for the Village to continue cleaning & televising, lining, root treatment, and misc. repairs. With this discretionary budget line item, many smaller "Minimum" Level of Service projects can be slowly completed. Below is a listing of the Low Level Service projects that are top priority. These projects had abandoned CCTV inspections due to obstructions, roots, offset joints, protruding taps etc.

Village of Akron Storm Sewer Capital Improvement Plan

Annual Maintenance

Annual Operation and Maintenance/Reactive Repairs	$3,500.00

Project Number

Project Number	Level of Service	Year	Project Name	Project Description	Estimated Cost
1	Min.	2018	Akron N. School Street	Repair Failing Storm Sewer on N. School Connecting into the Beech Tile Drain	$130,000.00
2	High	?	Akron Outlet Storm Sewer Improvements	From School Street to Drain	$352,000.00
3	High	?	Main Street Storm Sewer Improvements	250' North and South of Lynn Street	$148,000.00
4	High	?	School Street Storm Sewer Improvements	From Lynn Street to Center Street	$77,500.00
5	High	?	Lynn Street Storm Sewer Improvements	From School Street to Main Street	$135,000.00
6	High	?	Center Street Storm Sewer Improvements	From School Street to Main Street	$127,000.00

Annual Maintenance	$3,500.00
Grand Total Minimum Level of Service	$130,000.00
Grand Total High Level of Service	$969,500.00

Conclusion

The Village of Akron's storm water system is a typical, aging municipal infrastructure system. Since there is no real funding mechanism for storm water assets, the Village has been maintaining a very minimum Level of Service for its residents. This has resulted in a reactionary operation and maintenance practice. When residents notify the Village of flooding or drainage issues, the DPW will address the issue on a case-by-case basis. When the Village is planning for street resurfacing or replacement projects, the storm water system is inspected, evaluated, and appropriate repairs and/or replacement is done based on the funding available.

In order to have some sort of financial mechanism for the Village to proactively improve the storm water system, we recommended a minimal discretionary budgetary line item of $3,500.00 per year for the Village to continue cleaning & televising, lining, root treatment, and misc. repairs.

Until a funding mechanism for storm water improvements is found, the Village is forced to continue this reactionary policy. The Village should continue to urge its State legislators to develop a plan to fund municipal storm water improvements, such as supporting HB 5991.

In accordance with the SAW Grant requirements, the Village's Storm Water Asset Management Plan (SWAMP) needs to be kept available for citizen review for 15 years. The SWAMP should be reviewed annually, and the components updated and included in the Village's annual budget process.

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Due Date **November 2018**
(no later than 3 years from executed grant date)

The Village of Akron certifies that all storm water asset management plan (SWAMP) activities specified in SAW Grant No. 1231-01 have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SWAMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

James Dickinson at (989) 439-2619 jdickinson48701@gmail.com
Name Phone Number Email

James Dickinson 11/13/2018
Signature of Authorized Representative (Original Signature Required) Date

James Dickinson Village President
Print Name and Title of Authorized Representative

Protecting our Infrastructure Investment

ASSET MANAGEMENT PLAN

Wastewater Executive Summary Report

Prepared for:

Allendale Charter Township

SAW Project No. 1622-01

Allendale Charter Township est. 1849

November 2018

FLEIS&VANDENBRINK
DESIGN. BUILD. OPERATE.

Executive Summary

Overview

Public Act 562 of 2012 authorized money for Stormwater, Asset Management, and Wastewater (SAW) Grant Program. In November of 2015, The Township received a Stormwater, Asset Management, and Wastewater (SAW) Grant from the Michigan Department of Environmental Quality (MDEQ), project no. 1622-01, to provide financial assistance for the development of a wastewater asset management plan (AMP) for the Township's publicly owned wastewater utility. This AMP is intended to be a living document that is updated as assets continue to wear and age, and as additional inspection/condition results are found and incorporated into the plan.

The contact person for the Allendale Charter Township AMP is:

Chad Doornbos, Superintendent of Public Utilities
Address: 6676 Lake Michigan Drive, PO Box 539, Allendale, MI 49401
Phone number: (616) 895.6295
Email: chaddoornbos@allendale-twp.org

Asset Inventory & Condition Assessment

A list of the major assets in the Township's wastewater system, described further below, include:

- Collection system piping system and manholes
- Wastewater Treatment Facility (WWTP)
- Sanitary sewer lift stations in the collection system

The wastewater collection system assets include approximately 281,155 feet of sanitary sewers (gravity pipe and force mains) and 1,079 wastewater manholes connecting the gravity pipe. These assets are located in existing street rights-of-way or in easements dedicated for the assets use and maintenance.

The WWTP currently includes the following treatment processes:

- Coarse Screening
- Grit Basin
- Two Primary Sedimentation Basins
- Four Rotating Biological Contactors
- Chemical Phosphorus Removal
- Two Secondary Clarification Basins
- Chlorine Contact Chamber
- De-Chlorination Pond
- Sludge Storage Tank
- Flow Meters
- The existing facultative lagoons were converted into sludge storage lagoons

In 1989 a parallel treatment system was constructed to treat waste from Leprino Foods. This consists of

- Influent metering structure
- Holding lagoon
- Sampling and chemical addition structure

In 1991, a second major expansion project provided the following upgrades

- Influent Grinder and Mechanical Screening
- Vortex Grit Removal System
- Installation of two additional Primary Sedimentation Basins
- Installation of four additional Rotating Biological Contactors
- Installation of two, 55-foot Diameter Secondary Clarifiers
- Conversion of the existing rectangular secondary clarifiers into additional chlorine contact tanks
- Installation of a second sludge storage tank

The most recent improvements to the plant took place during the 2012 odor control improvements project which included

- Conversion of the two existing sludge storage tanks into anaerobic digesters
- Hydronic heating loops
- Biogas Collection System
- Fine Mechanical Screening in the headworks

WWTP
There are 7 sanitary sewer lift stations located throughout Allendale's wastewater collection system. The lift stations are controlled by a SCADA system that can be monitored through the internet or on a monitoring screen at the wastewater treatment plant.

Asset Identification & Location
A comprehensive wastewater system asset inventory was developed from operation and maintenance (O&M) manuals included a review of existing record drawings, field notes, staff knowledge, and site visits, supplemented with field survey work. Asset material, size and age were identified through the review of available historical record documents and Closed Circuit Televising (CCTV) data. Spatial orientation (pipe location), pipe depth and invert elevations were determined through GPS field survey and a comprehensive evaluation of the gravity system. This information was organized into a new or updated (GIS) database and piping network for archiving, mapping and further evaluation purposes. The inventory includes 506 WWTP assets, 87 lift station assets, 54 miles of sanitary sewer and 1079 sanitary sewer structures.

Condition Assessment and Expected Useful Life
A comprehensive evaluation of the collection system was performed. NASSCO-MACP manhole field-based assessments were completed on all 1079 manhole structures. Pipeline cleaning and NASSCO-PACP CCTV field-based inspections were conducted on 66% (CCTV WORK DONE EVERY YEAR OF THE SAW PROJECT) of the gravity pipe. Smoke Testing was performed on 10% of system to disclose location of inflow or infiltration. Capacity Analysis was modeled for average day and peak hour conditions to identify capacity concerns. Recommendations identified the need for maintenance with 52.5% of the system tagged for inspection and/or cleaning. Rehabilitation for short-term (1-5 year) and long term (6-20 year) accounted for 6% of the system identifying the need for repairs, lining and replacement. The remaining 41.5% of assets were placed in the 20+ year category.

Overall, the condition of the assets at the WWTP range from excellent to poor. Ongoing repairs have helped to maintain the condition of many assets while some assets that were installed during the 1980 expansion and the 1999 expansion and have not been replaced are now near the end of their useful life due to age or deterioration caused by harsh conditions associated with wastewater treatment. The WWTP is also approaching plant capacity and multiple development projects are currently in construction. Below is a description of some of the immediate concerns:

- Increased treatment capacity
- Replacement of assets beyond expected useful life
- Replace leaking roofs

The condition of the assets at the lift stations range from poor to good. Ongoing maintenance has maintained the condition of many assets while other assets have deteriorated due to age and the harsh conditions associated with typical wastewater collection systems. The recommendations for short- and long-term improvements are relatively extensive.

Level of Service

Defining the Expected Level of Service (LOS)

The overall objective of the Township Wastewater Department is to provide reliable wastewater collection and treatment services at a minimum cost, consistent with applicable environmental and health regulations. To achieve this, the following Level of Service (LOS) goals are followed:

WASTEWATER UTILITY - LEVEL OF SERVICE STATEMENT

The overall objective of the Allendale Charter Township Public Utilities Department is to provide reliable wastewater collection and treatment services at a minimum cost, consistent with applicable environmental and health regulations. To achieve this the following Level of Service (LOS) goals are proposed:

- Provide adequate collection system and treatment capacity for all service areas.
- Comply with all local, state and federal regulations at all times for treated effluent from the WWTP.
- Actively maintain collection and treatment system assets in reliable working condition.
- Reduce inflow/infiltration (I/I) flow volumes to mitigate potential for sanitary overflows, water in basements, and overloading of treatment facility.
- Provide rapid and effective emergency response services to customers.
- Ensure operations staff are properly certified.
- Regularly review health and safety procedures for operations staff to provide proper worker safety.
- Regularly review projected O&M and capital expenditures. Adjust user rates, as necessary, to ensure sound financial management of wastewater system.

The LOS goals may need to be adjusted from time to time as the utility ages, the needs of community change or new rules or regulations require a change in operation. For this reason, the LOS goals should be reviewed by the Township from time to time to make sure they accurately reflect the desired operation of the utility.

Measuring Performance

While performance measurements are not a required component of this AMP report, the identification and implementation of performance measurement is recommended. Performance measurements are specific metrics designed to assess whether Level of Service objectives are being met. If implemented, an evaluation of goals should be completed at least annually to determine if, the provided resources are being used appropriately. Level of Service requirements can be updated to account for changes due to growth, regulatory requirements, and technology.

Critical Assets

Determining Criticality

Business Risk is the determination of criticality of each asset in the wastewater system. Criticality is based on two factors; Likelihood (Probability) of Failure and Consequence of Failure using the following formula:

Business Risk = Consequence of Failure Score x Likelihood of Failure Score

Defining an asset's Business Risk allows for management of risk and aids in decision making for where to allocate operation and maintenance and capital improvement funds.

Likelihood of Failure (LoF) is a measure of how likely an asset is to fail. The following categories have been developed to quantify how likely an asset is to fail:

- Condition of the asset
- Remaining useful life (Age)

- Service History
- Operational status

Consequence of Failure (CoF) is a measure of the social, economic, financial or environmental impact of failure of an asset and the utilities ability to respond, convey and treat wastewater. CoF categories of the collection system include:

- Proximity to critical environmental features
- Location (Central Business District) of asset
- Facilities served by asset
- Size and location of asset within the utility network
- Type of asset.

The WWTP and lift station categories for CoF are:

- Process
- Financial Impact
- Safety
- Environmental Impact
- Disruption to the Community
- Ability to Respond

Criticality Results

Using the strategy outlined above, a Business Risk Evaluation (BRE) was performed for each asset using a graphical ArcGIS-based sewer asset management and capital planning software that compiles, analyzes and assesses Business Risk for each asset and develops a Capital Improvement Plan. The results of the BRE are provided in easily understood tabular and graphical output.

Figure 1 provides the risk rating for gravity and force main pipe by number of pipe segments. Thirty pipe segments in the collection system had an extreme risk rating and are recommended to be replaced, lined or point repaired. Much of the collection system's gravity pipes, 76 percent as shown in Figure 1, have a low to negligible risk rating and are indicative of pipes in relatively good condition.

Figure 2 provides the risk rating for the collection system manholes. Twenty-three manholes are identified as extreme risk, and are recommended to be cleaned, lined and/or repaired. Many manholes are at low to negligible risk are indicative of manholes in relatively good condition (89 percent).

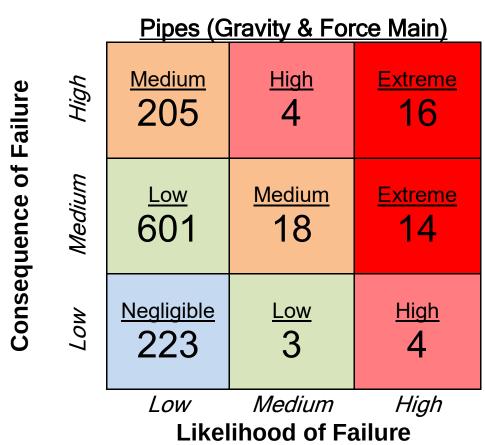


Figure 1. Business Risk Matric (Risk Rating) by Number of Gravity and Force Main Pipes

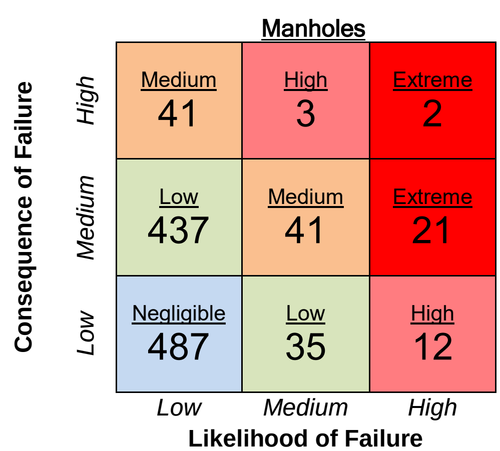


Figure 2. Business Risk Matrix (Risk Rating) by Number of Manholes

Figure 3 provides the risk ratings for the WWTP assets. Four assets are identified as extreme risk and shall be planned for rehabilitation or replacement in the near term. Approximately half of the WWTP assets, 53 percent as shown in Figure 3, are considered to be low risk and medium risk (with Low COF), which recommends a strategy of running the asset to failure. In general, the assets that are low risk, 34 percent as shown in Figure 3, are considered to be good to excellent condition.

Figure 4 provides the risk ratings for the lift station assets. No assets are identified as extreme risk. The twenty assets with high risk ratings should be rehabilitated or replaced in the near term, for the most critical assets, and rehabilitated or replaced in the long term for those assets with a medium consequence of failure. Much of the lift station assets, 67 percent as shown in Figure 4, are considered to be low risk and medium risk (with Low COF), which recommends a strategy of running the asset to failure. In general, the assets that are low risk, 39 percent as shown in Figure 4, are considered to be good to excellent condition.

WWTP Assets

Consequence of Failure	Low	Medium	High
High	High 27	High 11	Extreme 4
Medium	Low 106	Medium 98	High 97
Low	Low 18	Low 50	Medium 95

Likelihood of Failure (columns: *Low*, *Medium*, *High*)

Figure 3. WWTP Assets by Risk Rating

Lift Station Assets

Consequence of Failure	Low	Medium	High
High	High 7	High 1	Extreme 0
Medium	Low 19	Medium 9	High 12
Low	Low 5	Low 10	Medium 24

Likelihood of Failure (columns: *Low*, *Medium*, *High*)

Figure 4. Lift Station Assets by Risk Rating

A spreadsheet providing asset criticality for each utility asset has been included in the AMP detailed report for the collection and treatment systems.

CAPITAL IMPROVEMENT PLAN

A Capital Improvement Plan with recommendations was prepared for the Township's assets based on the Business Risk evaluation. Data-driven information from the business risk assessment and condition assessment was used to identify and prioritize the capital improvement projects. The information was also used to schedule inspections to evaluate the condition of high business risk assets. Short Term 1-5 year and Long Term 6-20-year Capital Improvement Plan (CIP) was prepared to address the projected needs for each asset in the system.

CIP DEVELOPMENT

Collection System assets were grouped by strategy and assigned costs from a unit database. This database includes unit construction values in 2018 construction dollars based on a survey of recent projects in Michigan and includes engineering and administrative rates where applicable. Opinions of probable project costs for the WWTP and Lift Station assets were prepared and are based on conceptual layouts of new facilities, or price quotes from material and equipment representatives. Assets were categorized and prioritized by year based on risk rating and criticality score to develop the CIP.

The CIP was developed by assigning each project to a CIP year (1-5) based on several factors. In addition to Risk Rating, other factors used to assign CIP year include:

- Asset rehabilitation grouping (i.e. the type of repair/construction recommended)
- Coordination with other planned projects to achieve economies of scale or limiting disruption (an example is a street reconstruction project where identified utility recommendations can be included)

The 5-Year CIP must also consider project cost when assigned to a CIP year to balance capital requirements with generated utility revenues. The recommended 5-Year Capital Improvement Plan for the wastewater collection system is included in Table 3a. Recommendations for the long term 6-20 year CIP are included in Table 3b.

Table 3a. Capital Improvement Plan Summary by Year

Rehabilitation Action	Total Cost (Current Year Dollars)	2019	2020	2021	2022	2023
Pipe Replacement	$ 400,854	$ -	$ 412,879	$ -	$ -	$ -
Pipe Lining	$ 40,154	$ -	$ 20,476	$ -	$ 22,154	$ -
Pipe Point Repair	$ 168,890	$ 139,831	$ -	$ 30,829	$ -	$ -
Manhole Clean, Line, Repair and Adjust	$ 8,055	$ -	$ -	$ -	$ 8,802	$ -
Manhole Clean, Line and Repair	$ 64,529	$ -	$ 38,771	$ -	$ 29,380	$ -
Manhole Repair and Line	$ 54,888	$ -	$ 37,690	$ -	$ 19,993	$ -
Manhole Clean and Line	$ 16,154	$ -	$ 4,160	$ -	$ 13,239	$ -
Total	$ 753,524	$ 139,831	$ 513,976	$ 30,829	$ 93,568	$ -

Assumes 3% Inflation per Year

Table 3b: Capital Improvement Plan 6-20 Year

Description	6-20 Year
Collection System	
Known Collection System Rehabilitation	$ 308,924.18
Projected Collection System Rehabilitation	$ 3,214,783.82
Total Rehabilitation Cost	***$ 3,523,708.00***

**Costs based on 2018 construction dollars*

Table 4 shows detailed recommendations for the WWTP and lift station system assets needing rehabilitation in the short-term CIP

Table 4. Recommended Capital Improvements for WWTP and Lift Stations

Asset Description	Anticipated Year of Implementation	Project Cost (2018 Dollars)	Replacement Cost (Inflated 3%/yr)
1 – 5 YEAR CIP PROJECTS			
West Sludge Lagoon Biosolids Removal	2018	$ 282,000	$ 282,000
WWTP Expansion	2020	$ 25,013,000	$ 26,537,000
Pierce Street Trunk Line Lift Station Construction	2020	$ 1,834,000	$ 1,946,000
Lift Station Improvements	2020	$ 322,000	$ 342,000
Primary Clarifier Improvements	2020	$ 61,000	$ 65,000
Secondary Clarifier Improvements	2020	$ 168,000	$ 179,000
Leprino Foods Improvements	2020	$ 51,000	$ 55,000
Electrical Improvements	2020	$ 401,000	$ 426,000
Building Improvements	2020	$ 853,000	$ 905,000

6 – 20 YEAR CIP PROJECTS			
Blower Improvements	2024	$ 139,000	$ 166,000
Lift Station Portable Generator Improvements	2024	$ 126,000	$ 151,000
Lift Station Standby Generator Upgrade	2024	$ 290,000	$ 347,000
Solids Handling Improvements	2025	$ 184,000	$ 227,000
GVSU Lift Station Construction	2026	$ 585,000	$ 742,000
Headwork Improvements	2032	$ 295,000	$ 447,000
Primary Treatment Improvements	2032	$ 463,000	$ 701,000
Chemical Feed System Improvements	2032	$ 61,000	$ 93,000
Hydronic Heating System Improvements	2032	$ 38,000	$ 58,000
Biogas Collection System Improvements	2032	$ 224,000	$ 339,000
Electrical Improvements	2032	$ 111,000	$ 168,000
Secondary Clarifier Improvements	2035	$ 168,000	$ 278,000
Anaerobic Digester Improvements	2035	$ 238,000	$ 394,000
Sludge Storage Lagoon Improvements	2035	$ 436,000	$ 721,000
Lift Station Improvements	2038	$ 418,000	$ 755,000
Sampling System Improvements	2038	$ 65,000	$ 118,000
RBC Improvements	2038	$ 1,542,000	$ 2,786,000
Building Improvements	2038	$ 43,000	$ 78,000

Note: This table represents budgetary estimates for planning purposes. Further definition of the scope of the projects through preliminary and final design will provide details necessary to improve the accuracy of the costs.

OPERATIONS, MAINTENANCE & REPLACEMENT

Regular operation, maintenance and replacement (OM&R) is essential in the management of a wastewater collection system. The collection system is subject to a variety of operational problems and can suffer from clogging, scour, corrosion, and collapse. Inspection, cleaning, and rehabilitation are important for optimizing the proper functioning of the collection system. By optimizing the performance infiltration/inflow are reduced and sanitary sewer overflows (SSO) are minimized or eliminated preserving the substantial investment the community has in its collection system.

Table 5a identifies the recommended maintenance actions items for the wastewater collection system in a five-year summary. The total cost, as shown in the 'Total' column below, is taken and divided by five and then disbursed between 2019 to 2023, where each increasing year is multiplied by a 3% inflation factor starting at year 2 (2020).

Table 5a. Collection System Maintenance Summary Table: Year by Year

Maintenance Action	Total Cost (Current Year Dollars)	2019	2020	2021	2022	2023
Manhole Assessment	$ 367,422	$ 536	$ -	$ 67,050	$ 31,845	$ -
Manhole Cleaning	$ 3,214	$ -	$ -	$ -	$ -	$ 3,617
CCTV	$ 351,997	$ -	$ -	$ 272,914	$ 103,535	$ -
CCTV - Heavy Cleaning	$ 5,782	$ -	$ -	$ 5,228	$ 933	$ -
Total Project Cost	***$ 728,414***	***$ 536***	***$ -***	***$ 45,192***	***$ 36,313***	***$ 3,617***

Assumes 3% Inflation per Year

A list of WWTP and lift (pump) station assets requiring replacement in the next 20 years was generated based on the expected useful life of assets included in the asset inventory. Assets addressed in the CIP were not included in the replacement cost table. Table 5b provides the results of the analysis.

Table 5b. Allendale Charter Township

Equipment Replacement Budget

Item		Rehab/ Replacement Cost	Life Years		Annual Budget
Lift Station					
60th Street North Lift Station Pumps	$	19,200	20	$	960
60th Street North Lift Station Controls	$	30,000	30	$	1,000
Park Lift Station Pumps	$	39,800	20	$	1,990
Park Lift Station Controls/Generator	$	50,000	30	$	1,667
60th Street South Lift Station Pumps	$	23,800	20	$	1,190
60th Street South Lift Station Controls	$	30,000	30	$	1,000
Brown Lift Station Pumps	$	19,200	20	$	960
Brown Street Lift Station Controls	$	30,000	30	$	1,000
Timber Creek Lift Station Pumps	$	27,600	20	$	1,380
Timber Creek Lift Station Controls/Generator	$	50,000	30	$	1,667
Hidden Shores Lift Station Pumps	$	39,800	20	$	1,990
Hidden Shores Street Lift Station Controls/Generator	$	50,000	30	$	1,667
64th Ave Lift Station Pumps	$	16,800	20	$	840
64th Ave Lift Station Controls	$	30,000	30	$	1,000
WWTP					
Lagoon Repairs	$	200,000	100	$	2,000
Valves	$	337,500	30	$	11,250
WWTP Blowers	$	28,000	25	$	1,120
WWTP HVAC	$	10,000	25	$	400
Chemicals	$	45,600	1	$	45,600
Biosolids Removal	$	500,000	5	$	100,000
Small Pumps (Scum,	$	15,000	10	$	1,500
Flow Meters	$	15,000	10	$	1,500
Digester Level Transmitter	$	1,500	10	$	150
Ancillary Equipment	$	30,000	30	$	1,000
Total	**$**	**1,638,800**		**$**	**182,830**

An annual equipment replacement fund should be developed to replace disposable equipment. These are items that can be financially accounted for through operation, maintenance and replacement (OM&R) funds and can be replaced by WWTP staff without bringing in an outside contractor. Existing disposable materials include chemicals, wear parts in pumps and motors, laboratory instruments, etc. The existing OM&R fund is sufficient for the current operations.

REVENUE STRUCTURE

The revenue and rate methodology is an instrument to determine user rates and charges that will provide sufficient revenues to pay for utility operating costs. The rate methodology that is required by the MDEQ for the SAW Grant Asset Management Plans requires an analysis of the current rate structure to determine if there is a revenue gap. A revenue gap occurs when the municipality's expenses exceed their revenue. In the event that there is a revenue gap, municipalities are required to develop an action plan for correcting the problem. The Allendale Charter Township's rate study was completed by Raftelis Financial Consultants, Inc. in 2017. The study found revenues in excess of expenditures (i.e.; no gap). The financial rate study suggested that the Township increases their rates by 2.00% each year through 2032. The rate study further recommended restructuring the frontage and trunkage feed to a new connection fee schedule. On January 22, 2018, the Township board adopted a new rate schedule consistent with the recommendations from the rate study. A follow-up rate analysis is planned for 2019.

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
LANSING

RICK SNYDER
GOVERNOR

C. HEIDI GRETHER
DIRECTOR

July 20, 2018

Mr. Adam Elenbaas
Allendale Charter Township
6676 Lake Michigan Drive
P.O. Box 539
Allendale, Michigan 49401

Dear Mr. Elenbaas:

SUBJECT: Stormwater, Asset Management, Wastewater (SAW)
Allendale Charter Township
SAW Grant Project Number 1622-01

We have reviewed the information contained in the rate methodology dated April 30, 2018. It has been demonstrated that significant progress has been made, as determined by the department, toward achieving the funding structure necessary to implement the program.

Accordingly, the applicant has fulfilled the significant progress requirement and complies with Section 5204e(3)(a), Part 52, Clean Water Assistance, of the Natural Resource and Environmental Protection Act, 1994 PA 451, as amended.

If there are any questions regarding approval of the rate methodology, please contact Mr. Robert Schneider in the Revolving Loan Section, Drinking Water and Municipal Assistance Division, by phone at 517-388-6466, or by mail at DEQ, P.O. Box 30817, Lansing, Michigan 48909-8311.

Sincerely,

Sonya T. Butler

Sonya T. Butler, Section Manager
Revolving Loan Section
Drinking Water and Municipal Assistance Division
517-284-5433

cc: Ms. Mary G. Martin, Executive Director, Michigan Finance Authority
Ms. Valorie White, DEQ

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date November 30, 2018
(no later than 3 years from executed grant date)

The Allendale Charter Township *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1622-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 11,0784, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or **No**
   If No - Date of the rate methodology approval letter: July 20, 2018.
2) Significant Progress Made: Yes or No
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: ________________________.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ____________________________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Chad Doornbos	at 616-895-6295	chaddoornbos@allendale-twp.org
Name	Phone Number	Email

11/30/2018

Signature of Authorized Representative (Original Signature Required) Date

Adam Elenbaas, Township Supervisor
Print Name and Title of Authorized Representative

VILLAGE OF ALPHA
SAW GRANT ASSET MANAGEMENT PROJECT
ASSET MANAGEMENT PLAN SUMMARY

Village of Alpha
SAW Grant Asset Management Plan
Grant No. 1363-01
Steven Martin, Village President
404 Main Street
Alpha, MI 49902
906.828.4209

Executive Summary

This Sanitary Sewer Asset Management Plan (AMP) is intended to provide an assessment of routine maintenance staffing requirements, and to provide an opinion of asset conditions and future needs. Operating, maintenance, and replacement costs are reviewed for all system assets, to provide a defined level of service for the utility.

The goal of an asset management plan is to use system-wide information to determine the lowest life cycle cost for maintenance, repair, and replacements to maintain that level of service. By performing pre-emptive maintenance on the system, and timing repairs before they become emergencies, the Village can make the most of their funds over the long term.

A summary of the sanitary sewer system assets is listed in Table 1.1 below:

Table 1.1: Sanitary Sewer System Asset Summary		
Total Sanitary Gravity Sewer	23,441	LFT
Total Force-Main Piping	755	LFT
Total Manholes	75	EACH
Lift Stations	1	EACH
Primary Lagoon Cell Volume	20	ACRE-FEET
Seepage Cell	1.3	ACRE

The breakdown of pipe sizing for the system is shown in Table 1.2:

Table 1.2: Sanitary Gravity Sewer Sizing Breakdown		
Pipe Diameter	**Gravity Sewer Length**	
6"	630	LFT
8"	20,787	LFT
10"	2,024	LFT
Totals ➔	23,441	LFT

The Village has a minor amount of undersized sewer main remaining, with approximately 3% of their system measuring 6-inch. Typically, new mains are not placed with smaller than 8-inch pipe due to the propensity for plugging issues and regulatory rules and regulations require sewer mains to be at least 8-inch in diameter. The makeup of the sanitary sewer sizing is reflected in Figure 1.1 below:

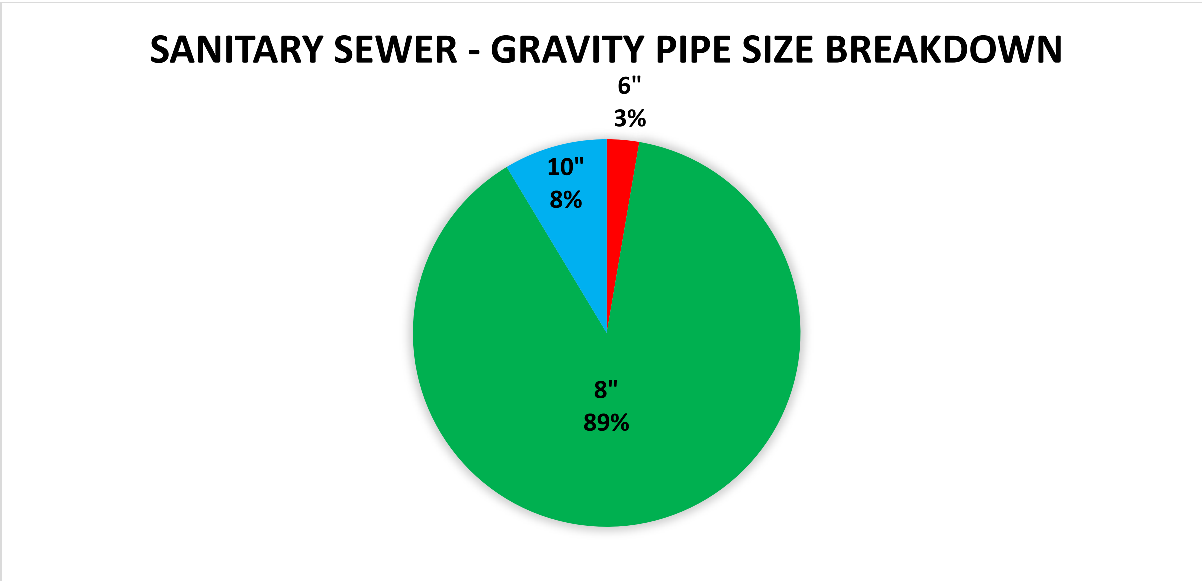


Figure 1.1: Sanitary Gravity Sewer Pipe Size

Table 1.3 indicates the quantity of each material making up the Village's sanitary sewer system:

Table 1.3: Sanitary Gravity Sewer Material Breakdown		
Pipe Material	**Length**	
Polyvinyl Chloride Pipe (PVC)	8,367	LFT
Vitrified Clay Pipe (VCP)	9,880	LFT
Concrete Pipe (CP)	3,680	LFT
Reinforced Concrete Pipe (RCP)	1,300	LFT
Orangeburg	115	LFT
PVC/VCP/CP	48	LFT
Cast Iron (CI)	51	LFT

Approximately one third of the Village's system (35%) has been upgraded to plastic products, primarily during the 2008 Sewer Replacement Project. Plastic piping has a lower possibility of catastrophic failure from collapse or breakage resulting in a longer service life. A majority of the remaining portion of the Village's system consists of vitrified clay (43%). This type of pipe is significantly older than the plastic piping and much more prone to failure at this age. The Village's system also contains concrete pipe installed in the 1960's and 1970's that comprises 22% of the system. There are also small sections of Cast Iron and Orangeburg remaining in the system, comprising less than 1% of the total pipe length. Figure 1.2 provides a visual breakdown of the materials within the system.

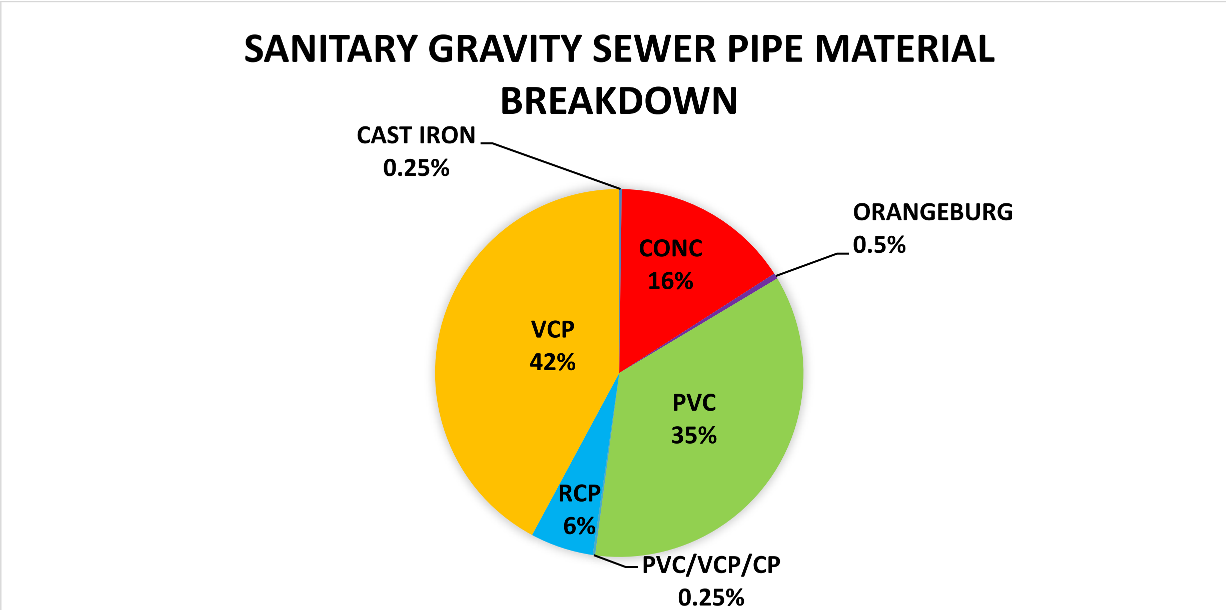


Figure 1.2: Sanitary Gravity Sewer Material

As part of the sanitary sewer system study, a risk assessment was performed for each of the system assets. This risk assessment was completed using a combination of the asset's condition, criticality, and consequence of failure. This number will vary between 1 and 5 with 1 being a minor defect grade and 5 being the most significant defect grade. The resulting condition rating allows the Village to prioritize those items where both condition and consequence make it expedient to perform proactive maintenance of the asset. Condition assessments were performed where possible by manual and televising inspections and ratings were performed. For those assets which were not televised or not reachable from the surface, assessments of probable condition were made based on material, age, and history of the asset, or assigned the same ratings as adjacent assets that could be assessed. Table 1.4 summarizes the condition range of system assets.

Table 1.4: Condition Ratings - System Assets

Asset Type	Rated Condition				
	1	2	3	4	5
Sanitary Gravity Sewer (LFT)	8,833	3,435	5,986	3,556	1,631
Force-Main (LFT)		755			
Manholes	37	7	23	5	3
Lift Stations		1			
Wastewater Stabilization Lagoons		1			

As the table above shows, the majority of the Village's sewer system assets are in average to above average condition. Assets that have been rated at 4 and 5 will be the focus of the Village over the next 20 years to address and included in the Village's 20-year Capital Improvements Plan, which is discussed further in Section 7.

Wastewater Asset Inventory

A complete inventory and condition assessment of all components of the Village's Sanitary Sewer System was conducted to gather information on the assets of the system. These assets are broken down into three categories: manholes, pipes, lift stations, and treatment systems. The inventory and condition assessments were performed through multiple methods. Records research was performed on existing drawings to get a general idea of system layout and asset locations and where feasible manual surveys were performed.

A Level 1 Manhole Assessment and Certification Program (MACP) inspection was performed on most of the manholes in the Village's system, with some additional Level 2 data logged. A Level 1 inspection provides basic condition assessment information to evaluate the general condition of a manhole, while Level 2 inspections gather and record detailed information to fully document all defects, determine condition of the asset, and provide the specific information needed to recommend corrective action. Data was logged using a custom tool for tablets, allowing for generation of a final inspection report for each manhole. GPS equipment was used to collect the location of each manhole for mapping. Measurements were made within each manhole to establish invert elevations of connecting pipes.

Sewer main evaluations were performed using the Pipe Assessment and Certification Program (PACP) methods for televising pipes. Reports and videos for each of the televised sections of pipe were prepared by PACP certified televising contractors and reviewed by GEI. Information gathered from televising along with information from record drawings, and other historical records were used to determine the condition of each section of pipe.

The Village's single Lift Station was evaluated through various methods. Records research was performed to collect and determine existing information for the lift station and a visual inspection of the lift station was made. A review of the past operation performance and a review of the history of repairs was also completed. Vibration and infrared monitoring was performed initially to create baseline readings and to identify imminent potential failures. Subsequent readings were recorded yearly and changes and trends were noted and evaluated. These readings allowed DPW staff to find and diagnose potential problems and to avoid future failures.

The Village's wastewater stabilization lagoon system was evaluated through various methods. Records research was performed to collect and determine existing information for the wastewater stabilization lagoons. The sludge in the lagoons was measured to determine accumulation depth, and sludge samples were analyzed to assess the overall health of the treatment lagoons. A review of the past operation performance and a review of the history of repairs was also completed.

Table 1.5 below is a summary of the condition ratings that were used for all assets. After the asset was evaluated a condition rating was assigned to each asset. The Asset Inventory Tables Table D-1: Sanitary Sewer Manhole Inventory, Table D-2: Sanitary Gravity Sewer Inventory, Table D-3: Sanitary Sewer Forcemain Inventory; Table D-4: Sanitary Sewer Lift Station Inventory, Table D-5: Parshall Flume Metering Structure Inventory; and Table D-6: Wastewater Stabilization Lagoons Inventory are enclosed with this summary include the condition ratings that were assigned to each asset.

Table 1.5 Condition Assessment Ratings

Condition Rating	Description
5	Asset Unserviceable - Over 50% of asset requires replacement
4	Significant deterioration - significant renewal/upgrade required (20 -40%)
3	Moderate deterioration - Significant maintenance required (10 -20%)
2	Minor Deterioration - Minor maintenance required (5%)
1	New or Excellent Condition - Only normal maintenance required

In addition to the above Condition Rating, a Business Risk Factor rating was also assigned to each asset. This rating combines the condition and criticality ratings described above to give a business risk factor, which scales from 1 (least risk) to 25 (highest risk). A Business Risk Factor of one is an asset that has a low probability of failure and has a low criticality that poses an insignificant disruption to the System, while a Business Risk Factor of 25 is an asset that has a significant chance of failure and would cause a significant disruption in the system if it did fail. The Village has identified any items with a Business Risk Factor of greater than 16 to be of sufficient risk to require a plan for repair or replacement. The Business Risk Factor for each asset is also listed in Tables D-1, D-2, D-3, D-4, D-5, and D-6 at the end of this summary.

Criticality of Assets

The Village's Sewer System was evaluated and a criticality rating was given to all sections of the system. The Criticality Ratings are based on a scale of 1 to 5, with 5 being the most critical. High criticality indicates that the system component is essential to the operation of the system and/or serves a critical customer or part of the system. Low criticality ratings indicate that the system component would cause minor disruptions if something were to happen and service was interrupted.

Table 1.6 Criticality of Asset	
Performance Rating	**Description**
5	Catastrophic disruption
4	Major disruption
3	Moderate disruption
2	Minor disruption
1	Insignificant disruption

The most critical sections of the Village's system are the sewer mains located on the downstream sections of the system, and the sewer main leading to the wastewater stabilization lagoons. As you progress from the farther outstretches of the system towards the main collectors there is typically more wastewater flow due to large portions of the system draining to these areas. Therefore, a disruption to sewer mains in these areas are likely to cause more significant disruptions and affect more customers. The Village's sewage lift station, parshall flume metering station, and wastewater stabilization lagoon system were also given higher criticality ratings as disruptions to these components typically are more expensive and difficult to repair and have the potential for environmental contamination if they fail. Areas of this system that were rated with lower criticality ratings are typically located on the outer edges and serve fewer customers and disruptions to these areas would affect less people.

Level of Service Determination

The minimum level of service for the Village's Sanitary Sewer System has been set at being able to provide functional wastewater collection for flows from the Village's residents without disruption, overflow, discharge events, or violations of standard wastewater collection practices. Potential violations include sewer backups that cause wastewater to either come to surface or to back up into individual service lines and basements. In order to prevent sewer backups, the Village must maintain their lines in a minimum condition by repairing collapsed pipes, jetting and cleaning lines that pose additional risk due to sizing, slope, or condition concerns. In addition, the lift station must be kept operational and be capable of pumping the necessary flows to avoid backups. Proper provisions for backup power or bypass pumping must be maintained to avoid backups during extensive power outages.

Revenue Structure

The Village's current sanitary sewer rate is $34.00 per customer per month for up to 4,000 gallons (Basic Monthly Charge) of use and $8.50 per 1,000 gallons (Supplemental Monthly Charge) of use after 4,000.

As can be seen by the Village's current budget and past audits, the Village's sanitary sewer rates are sufficient to cover their sewer system costs and allows them to currently make system improvements on an annual basis with the budgeted revenue. The rates are sufficient to cover operating costs, debt retirement for their Rural Development loan, bond interest, short-lived depreciation, and other non-operating costs. The Village regularly analyzes their sewer rates and charges to assure that all costs of the system will be recovered from the users of the system and makes adjustments as necessary to cover their costs.

Projected annual revenues for the Village's Sewer System are based on a projection of income from the Village's sewer rates and charges as described in previous sections. Table 1.7 below is a summary of the revenues collected by the Village from the system's Residential and Commercial users. A total of 133 Equivalent Dwelling Units (EDU's) were used in the revenue projections. An EDU is based on the average single family residential consumption rate of 4,000 gallons per month as measured by the user's water meter. Residential users are assumed to be one EDU while the EDU count for Other users is based on average water use during the past year.

Table 1.7: Annual Revenue Calculations

Established EDU Rate ==> **4,000**

Proposed Customer Info - Users:

Customer Type	*Users*	*EDU's*
Residential	121	121
Commercial	3	12
	124	**133**

Existing Rate Structure

	Monthly Rate	*EDU's*	*Monthly Gallons*	*Monthly Revenue*	*Annual Revenue*
Residential	$ 34.00	121	484,000	$ 4,114	$ 49,000
Commercial	$ 34.00	12	46,800	$ 408	$ 5,000
Interest Income					$ 360
	Totals ==>	**133**	**530,000**	**$ 4,522**	**$ 54,360**

Capital Improvement Plan

As previously stated, the City has been making sanitary sewer system improvements on an as needed basis as issues arise. Based on the 20-Year Capital Improvements plan presented in

Section 7.4 of the Village's Asset Management Plan, the Village needs to complete $739,000 over the next 20 years which equates to an annual cost of approximately $36,950. The Village needs to begin capital improvements plan so they will be able to address all these needs and any unanticipated needs that may arise. Again, the Village will need to continue to evaluate their sewer fund rates on a regular basis and make any adjustments necessary to stay on track with sewer system improvements. Based on the results of this sewer system evaluation, at this time it is not anticipated that the Village will need to take on any long-term debt to address any critical sewer system improvements. Table 1.8 below summarizes the proposed 20 Year Capital Improvements identified by this study.

Table 1.8: Capital Improvements Summary	
10-Year Capital Improvements Summary	
Location	**Estimated Construction Cost**
Manhole Replacement	$ 18,000
Sewer Main Replacement	$ 170,000
1-10 Year Total ==>	**$ 188,000**
20-Year Capital Improvements Summary	
Location	**Estimated Construction Cost**
Manhole Replacement	$ 36,000
Sewer Main Replacement	$ 515,000
11-20 Year Total ==>	**$ 551,000**
Total ==>	**$ 739,000**

Recommendations

In general, the Village's Sanitary Sewer System is in good condition with nearly 80% of the gravity sewer, manholes, and forcemain piping being in good condition. The sanitary sewer lift station which was reconstructed in 2006 is in good condition and the older cast-iron forcemain is also determined to be in good condition. Portions of the wastewater stabilization lagoons were rehabilitated in 2008 and sludge testing indicated these facilities are also in good condition. The system components that are older than 20 years generally appear to be in good condition, with some minor exceptions noted and repair/replacement noted in the Capital Improvements Plan. The Village needs to prioritize the replacement of sections of sewer main and manholes which contribute infiltration and inflow in order to be in compliance with their groundwater discharge permit.

Additionally, the Village's rate structure provides sufficient funds for proper operation and maintenance of the system and future rate increases as the Village deems necessary based on their routine analysis of their sewer fund should keep sufficient monies in the sewer fund. It is recommended the Village continue to review past and future expenses when examining future rate increases to determine if they are sufficient to meet the expected future expenditures.

This Asset Management Plan should be considered a working plan and updated annually to reflect changes in the Village's Sewer System, rate structures, budgets, or other facets of the plan.

List of Major Assets

See the following enclosed tables for a list of the Village's major assets:

- Table D-1: Sanitary Sewer Manhole Inventory
- Table D-2: Sanitary Gravity Sewer Inventory
- Table D-3: Sanitary Sewer Forcemain Inventory
- Table D-4: Sanitary Sewer Lift Station Inventory
- Table D-5: Parshall Flume Metering Structure Inventory
- Table D-6: Wastewater Stabilization Lagoons Inventory

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date <u>**October 30, 2018**</u>
(no later than 3 years from executed grant date)

The **<u>Village of Alpha</u>** *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. **<u>1363-01</u>** have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or No

   If No - Date of the rate methodology approval letter: <u>May 3, 2018</u>.

2) Significant Progress Made: Yes or No

   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)

3) Date of rate methodology review letter identifying the gap: ______________________.

4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ______________________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

<u>Steven Martin, Village President</u> at <u>906.828.4209</u> <u>villageofalpha@yahoo.com</u>
Name | Phone Number | Email

11-8-2018
Signature of Authorized Representative (Original Signature Required) | Date

<u>Steven Martin, Village President</u>
Print Name and Title of Authorized Representative

Certification of Project Completeness Summary

Village of Ashley
114 S. Sterling St., PO Box 158
Ashley, MI 48806
(989) 847-3050

SAW Grant Project No. 1086-01

In November 2015, the Village of Ashley entered into an agreement with the Department of Environmental Quality and the Michigan Finance Authority for grant funds issued under Public Act No. 511 of 2012 for the *Stormwater, Asset Management, and Wastewater (SAW)* program. The Village received the following:

Wastewater Asset Management Plan (WWAMP) Project Cost	$276,025
Stormwater Asset Management Plan (SWAMP) Project Cost	$148,975
LESS Local Match – 10%	($42,500)
Total Grant Amount – 90% Grant	$382,500

Wastewater Asset Inventory

The Village's wastewater collection system has been inventoried, including 25,150 feet of gravity sewer, 2,225 feet of force main, 77 manholes, 2 pump stations, and a 2-cell wastewater lagoon system with surface water disposal.

Each asset was identified and accounted for using existing as-built information that was provided by the Village. These assets can be located using the ESRI GIS base map that has been created as part of the Asset Management Plan. This base map was populated using survey grade geospatial data which shows structures, pump stations, pipelines, and the lagoon system in the Michigan State Plane coordinate system. In addition to the geospatial data, each asset was populated with asset management information based on field observations of existing conditions. The Village will be able to facilitate an asset management program by updating the asset information as repairs and maintenance activities take place.

Using this data, the total asset value in 2018 dollars is estimated at $4.5 million dollars.

Condition Assessment

Topographic survey, field inspections, and condition assessments were performed on the manholes, pipelines, pump stations, and lagoon system. Manholes, cleanouts, valves, and lagoon system structures were inspected using NASSCO's MACP standards for field inspections. A sewer televising company was retained to televise the pipes and perform a condition assessment of the pipes to identify defects and obvious issues. All pipe lines were televised using NASSCO's PACP standards for pipeline inspections. Using the inspection data, spreadsheets were created to document and perform condition assessment calculations using NASSCO's MACP/PACP Quick Rating System.

For manholes and pipelines, the quick rating system is the sum of all defect grades divided by the number of defects. This quick rating is broken down into two categories: structural and operation and maintenance. The two scores are then combined to generate a Combined quick rating, which was then used to calculate the Likelihood of Failure for the risk assessment.

At this time, the greatest need within the system is the lagoon treatment system where the existing cells are in need of rehabilitation and a new cell is recommended for more reliable treatment.

Overall, most of the Village's manholes are in fair to good condition, having either medium or low severity defect(s). The results of the condition assessment are summarized in the following tables:

SANITARY MANHOLE OVERALL DEFECTS	
Defect Category	Number of Manholes
Structural	42
O&M	73

SANITARY MANHOLE COMBINED DEFECTS		
Combined Quick Rating	Number of Manholes	Percent of System (%)
High - Grade 5	6	8%
Medium - Grade 3-4	39	51%
Low - Grade 1-2	30	39%
No Defects - 0000	2	3%
Total	**77**	**100%**

Overall, most of the Village's pipes are in fair to good condition, having either medium or low severity defect(s). The results of the condition assessment are summarized in the following tables:

SANITARY PIPE OVERALL DEFECTS	
Defect Category	Number of Pipe Segments
Structural	33
O&M	55

SANITARY PIPE COMBINED DEFECTS		
Combined Quick Rating	Number of Pipe Segments	Percent of System
High - Grade 5	9	12%
Medium - Grade 3-4	20	26%
Low - Grade 1-2	30	39%
No Defects - 0000	18	23%
Total	**77**	**100%**

This inventory and condition assessment of the Village's system is the base of the entire AMP. It was used to determine a current need for repair, the priority of repair projects, and a future O&M plan. The inventory, as-built data, and condition assessments were used to create and populate an ESRI ArcGIS base map.

Additionally, the GIS base map was used to create a system flow model in Autodesk Storm and Sanitary Analysis (SSA) and flow meters were placed in various locations around the Village for a period of 6 months. The results were that model that has been prepared is calibrated for dry weather flows. It was prepared using customer water meter data provided by the Village, and sanitary sewer flow meter data gathered in the field by Spicer Group. The flow was further defined using diurnal curves, which were developed from flow meter data, to simulate times of peak water use. The resulting sanitary flows mimic the peak flows that are seen throughout a 24-hour period, while still maintaining the appropriate volume to match metered sales.

Level of Service Determination

For the Level of Service, the Village prioritized projects in their CIP and rate structure based on the level of service that they feel is affordable and achieves their Mission Statement:

The Village of Ashley commits to operating a financially sustainable, safe, efficient, and environmentally responsible wastewater collection and treatment system to provide the community with reliable service, and strives to meet the local, state, and federal regulatory requirements at a fair and reasonable cost to its customers through the implementation of asset management. The Village's asset management program strives for effective maintenance planning, capital improvement planning and budgeting.

Based on a Rate Methodology Decision Meeting held on October 1, 2018, the Village chose a level of service that they felt best fit the Village's needs from both a risk management standpoint and rate standpoint. From there, the financial consultant entered the costs into the financial model, along with operating expense minimums and bonded project considerations. The Village of Ashley set their target level of service as Low Level of Service and plan to implement the recommended rate increases from the financial model. The pump station improvements, lagoon system improvements, and the pipe and manhole repairs identified from the inspections will be accomplished in years 1 through 10.

Criticality (Risk)

For each asset in the Village's wastewater system, a criticality/risk analysis was developed. The calculation that determined overall risk was defined as:

Likelihood of Failure (LoF) * Consequence of Failure (CoF) = Risk

The LoF for assets is primarily based on the physical condition of the asset as inspected in the field. Using the quick rating developed from NASSCO standards, a LoF value between 1000 and 5999 was found for each sewer and manhole asset. A LoF value between 1 and 5 was determined for each pump station and lagoon asset, by assessing the age of the asset, performing a visual inspection, interviewing operators for maintenance records, and performing flow rate tests on the pumps. The following table shows the grading scale definitions for all assets throughout the Village:

Likelihood of Failure (LoF)		
Description	Grade	Failure of Asset
Immediate	5	Asset has failed or will likely fail within 5 years
Poor	4	Asset will probably fail in 5-10 years
Fair	3	Asset may fail in 10-20 years
Good	2	Asset unlikely to fail for at least 20 years
Excellent	1	Failure unlikely in foreseeable future

The Consequence of Failure (CoF) aggregates the empirical value associated with failure of an asset as it directly and indirectly pertains to social, environmental, and cost implications. A percentage of the carried weight between the social, environment, and cost factors must be assigned by the Owner and Engineer. The factors established are for this system evaluation, and are not finite. The underlying components contributing to the social, environmental, and cost factors are described below. One (1) has the least CoF implications, where six (6) has the highest.

Factors:

1. Position of Pipe/Sewer/Manhole Relative to System Network
   a. Position of main trunk / interceptor sewers have greater CoF as opposed to small tributary sewers.
   b. Weighting can be population based or service area based.

2. Pipe Diameter
   a. Generally larger diameter sewers carry larger amounts of flow and typically constitute trunk sewers.
   b. Weighting is relative to the system's range of pipe diameter sizes.

3. Depth of Sewer/Manhole
   a. Sewers constructed at deeper elevations typically require more costs to excavate and repair/replace.
   b. Weighting is relative to the system's range of depths.

4. Locations of Sewer/Manhole
   a. Location will have social, economic, and environmental impacts.
   b. Factors have been established on PACP criteria.
   c. Example, a sewer in a resident's "yard" will carry less CoF for the same sewer in a "Major Highway" such as an MDOT trunk line.

5. Proximity to a Waterway.
   a. This is primarily an environmental consideration.
   b. Failure directly or indirectly to environmentally sensitive areas like rivers, lakes, streams, and or wetlands are associated with this factor.

6. Accessibility Standards
   a. Ease of access is vital to timely repairs.
   b. Impacts include cost, social, and potentially environmental

The following table summarizes the CoF scale definitions:

Consequence of Failure (CoF)		
Description	Grade	Failure of Asset
Catastrophic Disruption	6	Massive system failure - severe health effect, extensive damages, LOS severely compromised
Major Disruption	5	Major effect - major capacity loss, health effects, and costs, LOS compromised
Moderate to Major Disruption	4	Major effect - moderate to major loss of system capacity, costs, and health effects, LOS may be compromised
Moderate Disruption	3	Moderate effect - moderate loss of system capacity, health effects, and costs, LOS still achieved
Minor Disruption	2	Minor effect - minor capacity loss, costs, and health effects
Insignificant Disruption	1	Slight effect - slight loss of system capacity, minor health effects, minor costs

Using the aforementioned formula, the risk for each asset was calculated. The assets were ranked based on the nature of the defects found and the CoF. The results for the Village of Ashley were 8 manholes, 8 pipe segments, and 1 pump station were found to be high risk assets in the system. Using LoF and risk information, a capital improvement plan (CIP) was developed to reduce the overall risk of the system. The CIP involves a systematic approach to address all assets in the system over the span of the next 10-20 years.

Capital Improvement Plan

The Capital Improvement Plan is a prioritized list of all the projects that need to be completed to meet the level of service goals of the system. The asset inventory, condition assessment, critical assets and level of service sections were taken into consideration to form the capital improvement plan.

After selecting the desired level of service for each scope of work, the total cost of manhole repairs is approximately $138,000 over the next 10 years, the total cost of pipe repairs is approximately $370,000 over the next 10 years, and the total cost of the pump stations improvements is approximately $530,000.

For the lagoon system, some portions of the system are in good condition, but some items need attention. Valves need to be replaced, the sideslopes of the cells are sloughing off and falling into the lagoon, the system is at its operable capacity and an expansion is necessary, and the Village had elected to install a composite liner system to increase the Level of Service because the current thickness of native clay does not meet today's regulatory standards. The total cost of these improvements is approximately $2.3M.

Revenue Structure

Wastewater account balances, expenditures, revenues, etc. were reviewed and entered into a financial software model. The model was used initially to determine if there was a gap the operating funds compared to generated revenue. After reviewing the financial data, rate structure, and operating budgets, the Village was found to have no deficiencies in the 2.5-year gap analysis.

Following the 2.5-year gap analysis, the capital improvement plan (CIP) was added to the financial model. By reviewing the Village's reserve funds, current rate structure, and cost estimates for the CIP, various rate structure iterations were developed. The result was a recommendation for various increases to the Village's sanitary sewer rates in a 10-year planning period.

List of Major Assets

The following is a breakdown of the assets of the Village of Ashley's wastewater system:

- 25,150 feet of gravity pipe
    - 248 feet of 6" VCP
    - 14,070 feet of 8" VCP
    - 3,095 feet of 8" PVC
    - 7,737 feet of 10" VCP
- 2,225 feet of forcemain
    - 600 feet of 4"
    - 1,625 feet of 6"
- 77 manholes
- 2 pump stations
- 2-cell facultative lagoon treatment system with surface water discharge

DEQ

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date November 30, 2018
(no later than 3 years from executed grant date)

The Village of Ashley *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1086-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or No
   If No - Date of the rate methodology approval letter: May 3, 2018.
2) Significant Progress Made: Yes or No
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: __________.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on __________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Michelle Fitzpatrick, Clerk at (989)847-3050 ashleyvillage@bearnet.net
Name Phone Number Email

Ann Paksi 11-20-18
Signature of Authorized Representative (Original Signature Required) Date

Ann Paksi, Village President
Print Name and Title of Authorized Representative

Certification of Project Completeness Summary

Village of Ashley
114 S. Sterling St., PO Box 158
Ashley, MI 48806
(989) 847-3050

SAW Grant Project No. 1086-01

In November 2015, the Village of Ashley entered into an agreement with the Department of Environmental Quality and the Michigan Finance Authority for grant funds issued under Public Act No. 511 of 2012 for the *Stormwater, Asset Management, and Wastewater (SAW)* program. The Village received the following:

Wastewater Asset Management Plan (WWAMP) Project Cost	$276,025
Stormwater Asset Management Plan (SWAMP) Project Cost	$148,975
LESS Local Match – 10%	($42,500)
Total Grant Amount – 90% Grant	$382,500

Stormwater Asset Inventory

The Village's stormwater system has been inventoried, including 23,811 feet of storm sewer and 181 catch basins and storm manholes.

Each asset was identified and accounted for using existing as-built information that was provided by the Village. These assets can be located using the ESRI GIS base map that has been created as part of the Asset Management Plan. This base map was populated using survey grade geospatial data which shows stormwater pipelines and structures in the Michigan State Plane coordinate system. In addition to the geospatial data, each asset was populated with asset management information based on field observations of existing conditions. The Village will be able to facilitate an asset management program by updating the asset information as repairs and maintenance activities take place.

Using this data, the total asset value in 2018 dollars is estimated at $2.8 million dollars.

Condition Assessment

Topographic survey, field inspections, and condition assessments were performed on the stormwater pipelines, structures, and outfalls. The structures and outfalls were inspected using NASSCO's MACP standards for field inspections. A sewer televising company was retained to televise the pipes and perform a condition assessment of the pipes to identify defects and obvious issues. All pipes were televised using NASSCO's PACP standards for pipeline inspections. Using the inspection data, spreadsheets were created to document and perform condition assessment calculations using NASSCO's MACP/PACP Quick Rating System.

For the assets, the quick rating system is the sum of all defect grades divided by the number of defects. This quick rating is broken down into two categories: structural and operation and maintenance. The two scores are then combined to generate a Combined quick rating, which was then used to calculate the Likelihood of Failure for the risk assessment.

At this time, the greatest deficiency within the Village's stormwater collection system is the piping failures, undersized pipe diameters, and the numerous restrictions such as roots and debris. It is recommended that higher diameter piping be installed throughout the Village to increase reliability for stormwater drainage.

The majority of the storm system pipes are too small to be televised, and of the ones that were able to be televised, many pipes have medium and high grade defect(s). The results of the condition assessment are summarized in the following tables:

STORM PIPE OVERALL DEFECTS	
Defect Category	Number of Pipe Segments
Structural	37
O&M	38
No Data	136

STORM PIPE COMBINED DEFECTS		
Combined Quick Rating	Number of Pipe Segments	Percent of System
High - Grade 5	25	13%
Medium - Grade 3-4	12	6%
Low - Grade 1-2	11	6%
No Defects - 0000	5	3%
No Data	136	72%
Total	**189**	**100%**

Overall, the Village's storm structures are in good condition, but with about 23% having medium to high grade defects. The results of the condition assessment are summarized in the following tables:

STORM STRUCTURE OVERALL DEFECTS	
Defect Category	Number of Structures
Structural	52
O&M	17

STORM STRUCTURE COMBINED DEFECTS		
Combined Quick Rating	Number of Structures	Percent of System (%)
High - Grade 5	16	9%
Medium - Grade 3-4	25	14%
Low - Grade 1-2	13	7%
No Defects - 0000	127	70%
Total	**181**	**100%**

This inventory and condition assessment of the Village's system is the base of the entire AMP. It was used to determine a current need for repair, the priority of repair projects, and a future O&M plan for the existing infrastructure. The inventory and condition assessments were used to create and populate an ESRI ArcGIS base map.

Additionally, the Village of Ashley's existing storm sewer infrastructure is not adequate to meet the Village's needs for a standard 10-year storm. Therefore, in order to size a system that does meet the Village's needs, hydrologic and hydraulic (H/H) calculations were performed. Recommendations were provided for infrastructure sizing, layout, and drainage districts should the Village choose to pursue installing a new storm sewer system.

Criticality (Risk)

For each asset in the Village's storm water system, a criticality/risk analysis was developed. The calculation that determined overall risk was defined as:

Likelihood of Failure (LoF) * Consequence of Failure (CoF) = Risk

The LoF for assets is primarily based on the physical condition of the asset as inspected in the field. Using the quick rating developed from NASSCO standards, a LoF value between 1000 and 5999 was found for each pipe and structure asset. The following table shows the grading scale definitions for all assets throughout the Village:

Likelihood of Failure (LoF)		
Description	Grade	Failure of Asset
Immediate	5	Asset has failed or will likely fail within 5 years
Poor	4	Asset will probably fail in 5-10 years
Fair	3	Asset may fail in 10-20 years
Good	2	Asset unlikely to fail for at least 20 years
Excellent	1	Failure unlikely in foreseeable future

The Consequence of Failure (CoF) aggregates the empirical value associated with failure of an asset as it directly and indirectly pertains to social, environmental, and cost implications. A percentage of the carried weight between the social, environment, and cost factors must be assigned by the Owner and Engineer. The factors established are for this system evaluation and are not finite. The underlying components contributing to the social, environmental, and cost factors are described below. One (1) has the least CoF implications, where six (6) has the highest.

Factors:

1. Position of Pipe/Structure Relative to System Network
    a. Position of main trunk / interceptor sewers have greater CoF as opposed to small tributary sewers.
    b. Weighting can be population based or service area based.

2. Pipe Diameter
    a. Generally larger diameter sewers carry larger amounts of flow and typically constitute trunk sewers.
    b. Weighting is relative to the system's range of pipe diameter sizes.

3. Depth of Sewer/Manhole
    a. Sewers constructed at deeper elevations typically require more costs to excavate and repair/replace.
    b. Weighting is relative to the system's range of depths.

4. Locations of Sewer/Manhole
    a. Location will have social, economic, and environmental impacts.
    b. Factors have been established on PACP criteria.
    c. Example, a sewer in a resident's "yard" will carry less CoF for the same sewer in a "Major Highway" such as an MDOT trunk line.

5. Proximity to a Waterway.
    a. This is primarily an environmental consideration.
    b. Failure directly or indirectly to environmentally sensitive areas like rivers, lakes, streams, and or wetlands are associated with this factor.

6. Accessibility Standards
    a. Ease of access is vital to timely repairs.
    b. Impacts include cost, social, and potentially environmental

The following table summarizes the CoF scale definitions:

Consequence of Failure (CoF)		
Description	Grade	Failure of Asset
Catastrophic Disruption	6	Massive system failure - severe health effect, extensive damages, LOS severely compromised
Major Disruption	5	Major effect - major capacity loss, health effects, and costs, LOS compromised
Moderate to Major Disruption	4	Major effect - moderate to major loss of system capacity, costs, and health effects, LOS may be compromised
Moderate Disruption	3	Moderate effect - moderate loss of system capacity, health effects, and costs, LOS still achieved
Minor Disruption	2	Minor effect - minor capacity loss, costs, and health effects
Insignificant Disruption	1	Slight effect - slight loss of system capacity, minor health effects, minor costs

Using the aforementioned formula, the risk for each asset was calculated. The assets were ranked based on the nature of the defects found and the CoF. Using LoF and risk information, a capital improvement plan (CIP) was developed to reduce the overall risk of the system.

Capital Improvement Plan

The Capital Improvement Plan is a prioritized list of all the projects that need to be completed to meet the level of service goals of the system. The asset inventory, condition assessment, critical assets and level of service sections were taken into consideration to form the capital improvement plan.

Two options for capital improvements were presented to the Village.

1. Repair/maintenance of the existing system, however it is undersized for the Village's needs.
2. Recommendations for infrastructure sizing, layout, and drainage districts, should the Village choose to pursue installing a new storm sewer system that meets their needs for a 10-year storm.

The total cost of repair to the existing system is approximately $372,000 over the next 10 years. The total cost for a storm system that meets the Village's needs for a 10-year storm is approximately 11.5M.

Level of Service Discussion

For the Level of Service, the Village met with the financial consultant on October 1, 2018 and discussed the two options above for CIP and the levels of service that each would provide and how they fit the Village's needs from a risk management standpoint. From there, the financial consultant entered costs into the financial model of the General Fund. It was also discussed that the storm sewer capital improvements could be funded through a special assessment or through a Village-wide millage, but currently there is funding mechanism in place that allows for the Village to complete any CIP projects.

Revenue Structure

Since the Village does not have a stormwater utility nor the ability to set stormwater rates for that utility, the impacts of integrating any projects were quantified through an analysis of the Village's General Fund. The projected future cash flows for the Village's General Fund only allow the Village to reactively respond to emergency needs of its stormwater system. There is no funding mechanism that would allow the Village to complete the recommended repair projects without a special assessment or a millage. Therefore, currently, the Village is unable to fund and implement any recommendation for repair or upgrade to the storm system.

List of Major Assets

The following is a breakdown of the assets of the Village of Ashley's stormwater system:

- 181 catch basins and manholes
- 23,811 feet of pipe
  - 2,685 feet of 4"
  - 7,623 feet of 6"
  - 6,612 feet of 8"
  - 2,759 feet of 10"
  - 3,788 feet of 12"
  - 315 feet of 15"
  - 29 feet of 18"

DEQ

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Due Date November 30, 2018
(no later than 3 years from executed grant date)

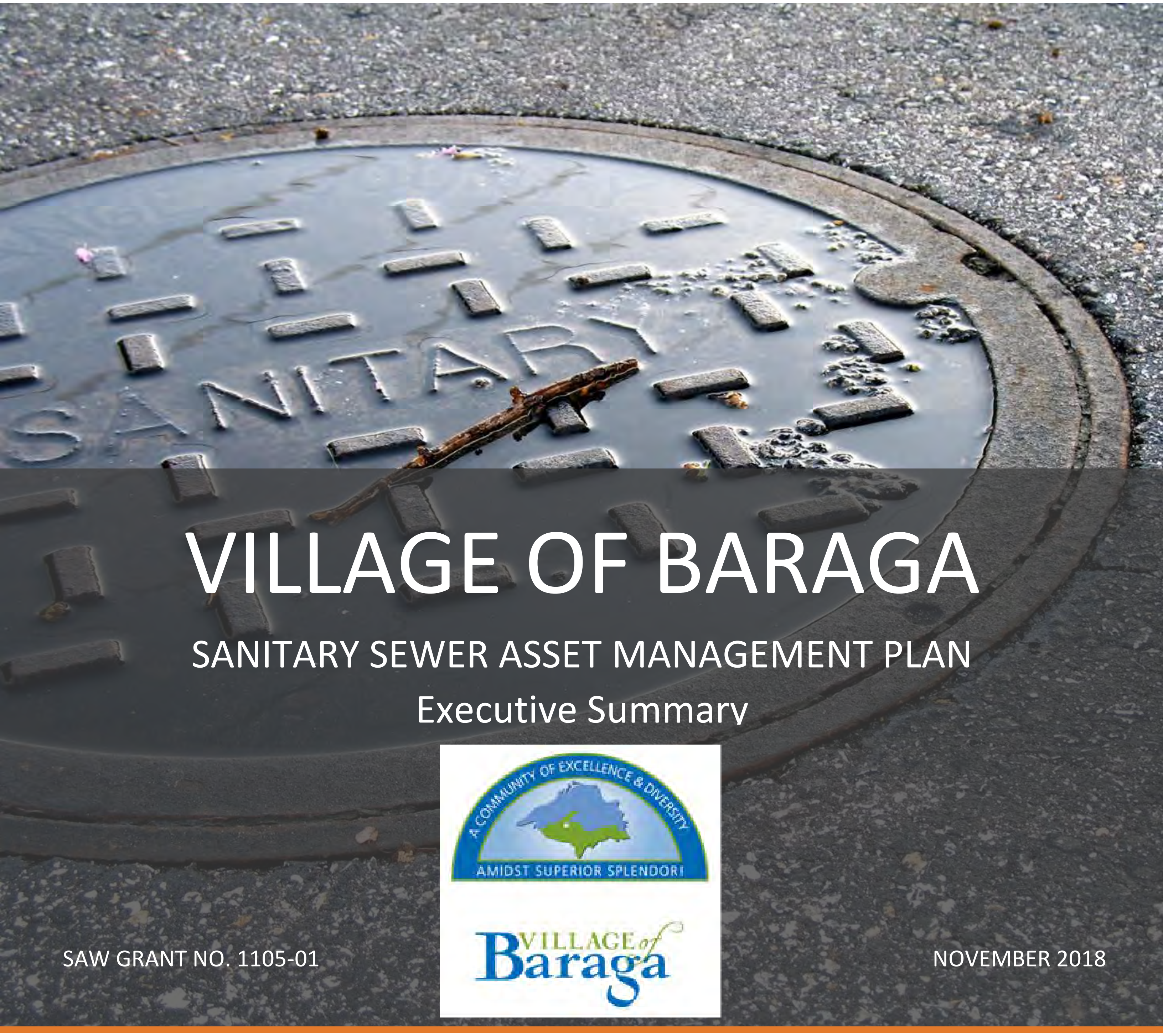
The Village of Ashley *(legal name of grantee)* certifies that all stormwater asset management plan (SWAMP) activities specified in SAW Grant No. 1086-01 have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SWAMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

Michelle Fitzpatrick, Clerk at (989)847-3050 ashleyvillage@bearnet.net
Name Phone Number Email

Ann Paksi 11-20-18
Signature of Authorized Representative (Original Signature Required) Date

Ann Paksi, Village President
Print Name and Title of Authorized Representative



VILLAGE OF BARAGA

SANITARY SEWER ASSET MANAGEMENT PLAN

Executive Summary

A COMMUNITY OF EXCELLENCE & DIVERSITY

AMIDST SUPERIOR SPLENDOR!

VILLAGE of Baraga

SAW GRANT NO. 1105-01

NOVEMBER 2018

OHM
Advancing Communities®

Executive Summary

This document summarizes the Asset Management Plan (AMP) for the Village of Baraga's sanitary sewer system. It includes key recommendations for future funding levels and details on the assessments completed by OHM Advisors with collaboration from the Village. The AMP was prepared using grant funding from the State of Michigan Stormwater, Asset Management and Wastewater (SAW) Grant Program in which $449,154 was awarded to accomplish the following key goals:

- Provide the Village with a new framework for collecting, organizing, and storing data for their wastewater collection system using the latest available hardware and software.
- Survey key system components to develop a Geographic Information System (GIS) database and to allow future generations to access infrastructure data with greater ease.
- Add information for sewer material type, size, and age to the GIS database.
- Evaluate the structural condition of various system components and store the data in the GIS database.
- Identify long-term operations and maintenance strategies to maintain a reasonable structural condition into perpetuity, including:
  - Regularly-scheduled sewer inspection (televising) and cleaning
  - Repair and rehabilitation to address structural problems resulting from aging infrastructure
- Provide recommendations for developing a prioritized Capital Improvement Plan.
- Analyze operating budgets and recommend revenue structure changes to facilitate the Village's long-term capital improvements plans.

The contact person for the Village of Baraga Sanitary Sewer AMP is:

LeAnn M. LeClaire, Village Manager
100 Hemlock Street
Baraga, Michigan 49908
Phone: 906-353-6237
Email: vobmgr@up.net

Asset Inventory

An asset inventory is a list of the Village's assets and their attributes. The majority of the Village's sanitary sewer infrastructure, including manholes, gravity sewers, force mains, and pump stations has been inventoried and digitized. Other treatment assets include the lagoon system, grinder pumps, and valves. The GIS framework was developed as part of this effort, making it easier to store critical data for the location, size, material, install date, and condition of each wastewater asset.

List of Assets

The following lists the major assets of the sanitary sewer and treatment system.

- 444 manholes
- 21 miles of sanitary sewers, ranging in diameter from 4-24 inches
- 5 miles of force main, ranging in diameter from 4-10 inches
- 5 pump stations
- 3 grinder pumps
- 5 lagoons

Condition Assessment

Through a methodical sampling procedure, a representative sample of the Village of Baraga's sanitary sewer infrastructure has been physically assessed. Sanitary manholes and gravity mains were assessed using the National Association of Sewer Service Companies (NASSCO) condition grading systems, which uses a scale of zero to five. Zero indicates the infrastructure is in very good condition, while five indicates the infrastructure is in very poor condition or has already failed. The two primary scoring metrics commonly used to describe asset conditions are the Rating Index and the Quick Rating. The Rating Index is an average of defect grades within an asset, and the Quick Rating describes the asset's highest defect grades. These metrics and their derivation are further described in Section II of the AMP. Figure 1 describes the portion of the sanitary sewer system that has been inspected by this method.

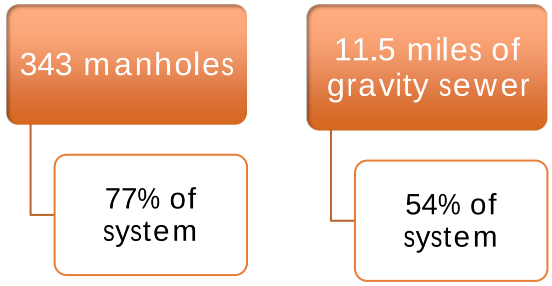


Figure 1: Portion of Sewer System Assessed

Experienced facility design engineers inspected the Village's wastewater pump stations and treatment facilities. Force mains were not physically inspected and remaining useful life was estimated by age. From these condition assessments, it was observed that:

- The Village's sanitary manholes are in overall good condition with an average Overall Structure Rating Index of 1.55. The average Operational and Maintenance (O&M) Rating Index of 1.52 is higher, or worse, than the average Structural Rating Index of 0.33. Deposits and infiltration mainly effect O&M.
- The Village's sanitary gravity mains are primarily comprised of reinforced plastic (truss pipe) and polyvinyl chloride (PVC). The average O&M Rating Index for the inspected sewers is 0.69 and the average Structural Rating Index is 0.97. Eighty-nine percent (89%) of inspected segments have an Overall Rating Index of three or lower. Common structural defects were fractures and cracks and common O&M defects were infiltration and roots.
- The Village's pump stations and treatment assets are generally in good condition, but approximately $2.3 million in asset replacements are anticipated throughout the 20-year planning horizon. In addition to the asset replacements identified by remaining useful life estimates and criticality, the Village has identified approximately $1.5 million in long-term facilities improvements that would improve system operations.
- The Village's old 6-inch and 4-inch force mains were installed in 1973 and should be considered for a detailed physical assessment and possible replacement in the next 5 years. Six valves along the old 6-inch force main are 10 years beyond their expected useful life and should be considered for replacement immediately. The valve replacements provide an opportunity for physical inspection of the adjacent force main. The 10-inch force main was installed in 1991 and is expected to remain operable for another 23 years. However, five valves along the 10-inch main should be considered for replacement in 2025.

Level of Service

The Village has identified Level of Service (LOS) goals that will be used to guide the AMP and establish critical performance parameters. The LOS is bounded by the minimum regulatory requirements and the maximum capabilities of the assets.

Table 1: Level of Service Criteria

Key Service Criteria	Performance Indicator	Target Level of Service

Collection System Asset Condition Assessment and Frequent Maintenance	PACP and MACP inspections per year	Clean and inspect gravity main and manholes on the following schedule: • 20% every 5-years. Approx. 84 manholes Approx. 23,500 feet of sewer • 50% every 10-years. Approx. 209 manholes Approx. 59,000 feet of sewer
Regulatory Compliance	Compliance with MDEQ Sanitary Sewer Overflow (SSO) Policy and The Clean Water Act	• Comply with the MDEQ SSO policy of no more than 10% probability of an SSO in any given year, excluding unusual natural events or man-made disasters • Meet the treatment lagoon permit requirements
Service Delivery and Customer Communication	Customer complaint/request response time	• Acknowledge customer complaints and requests within 24 hours of receipt • Respond to customer complaints and requests within three business days
Service Lateral Condition Assessment	LACP inspections and service lateral replacements per year	Implement a Service Lateral Condition Assessment Program
GIS Asset Inventory	Tracking asset conditions in the GIS geodatabase	Maintain a continuously updated GIS geodatabase
Capital Improvement Planning	Customer complaints per year, unexpected repair costs per year	Update the CIP annually
Smart Sewer Asset Management	Monthly wastewater flows	• Deploy Smart Sewer Asset Management Tools • Identify sources of Infiltration and Inflow (I&I) • Reduce I&I peak flows

Criticality and Risk

The investigation leading to the identification of critical sewer infrastructure involved the determination of business risk, which considers the probability of the infrastructure failing as well as the consequence of its failure as shown in Figure 2.

Figure 2: Risk Equation

The probability of failure is related to the physical condition of an asset. The consequence of failure focuses on the economic losses and impacts to society due to an asset's failure. The following factors were combined to determine the consequence of failure for manholes and sanitary sewers:

- Network Position – the sum of upstream sewers discharging to a structure
- Diameter/Size – the relative size of the asset with respect to the rest of the system
- Location – the cost to restore the surface above the asset and if traffic control is needed. Uses average daily traffic (ADT) data.
- Environment – proximity to sensitive environmental features like rivers, lakes and railroad.

Revenue Structure and Capital Improvement Plan

The Village's sewer rates were analyzed and long-term revenue structure adjustments were proposed to accommodate estimated future capital and operational spending. Increasing the commodity charge by 4.0% per year from 2019 to 2022 will provide adequate revenue to sustainably fund expenses related to sanitary sewer system operation, maintenance, and capital improvement. Annual inflationary rate adjustments will likely be required to maintain the Village's sewer into perpetuity.

The Village of Baraga's Capital Improvement Plan (CIP) will aide in identifying, prioritizing, and implementing capital projects for the community's sanitary sewer system over a five (5) year and twenty (20) year planning period. Additional recommendations for operational enhancements and other system improvements have been included for revenue structure planning. A project schedule was developed based on asset risk. The Village may opt to combine projects at their discretion to optimize cost efficiencies by reducing mobilization costs. The current twenty-year estimate for the Village's sanitary sewer system CIP is approximately $6,134,000**.** Table 2 below summarizes the projected sewer maintenance and capital expenditures.

Table 2: Summary of Anticipated Expenses

Project Need	Estimated Cost
5-Year Rehabilitation	$876,000.00
20-Year Rehabilitation	$1,903,000.00
Ongoing Cleaning and Inspection	$1,174,000.00
Long-Term Facility Improvements	$1,521,000.00

O&M Account Expenditures	$660,000.00
Total	$6,134,000.00

The Village's CIP has been integrated into a cash flow analysis of the sewer fund to facilitate effective financial planning. Because of the variability of annual project expenditures, it would be unreasonable to increase the commodity charge to sufficiently cash fund the CIP. A combination of cash and debt funding will provide adequate funding with the lowest possible increase in rate charges. The Village's twenty-year CIP and revenue structure include $660,000 dedicated to the Village's sanitary sewer operations, maintenance, and replacement (OM&R) account, $718,800 in cash funded capital improvements, and a total debt of $4,755,200 spread across three bond issues. The proposed revenue structure represents a decrease in the Village's current set aside for sanitary sewer repairs, and three consecutive annual commodity charge increases of 4.0%.

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date 11/30/2018
(no later than 3 years from executed grant date)

The Village of Baraga *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1105-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or No

   If No - Date of the rate methodology approval letter: 05/03/2018.

2) Significant Progress Made: Yes or No

   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)

3) Date of rate methodology review letter identifying the gap: __________.

4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on __________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Cherie Koski at (906)353-6237 vobadmin@up.net

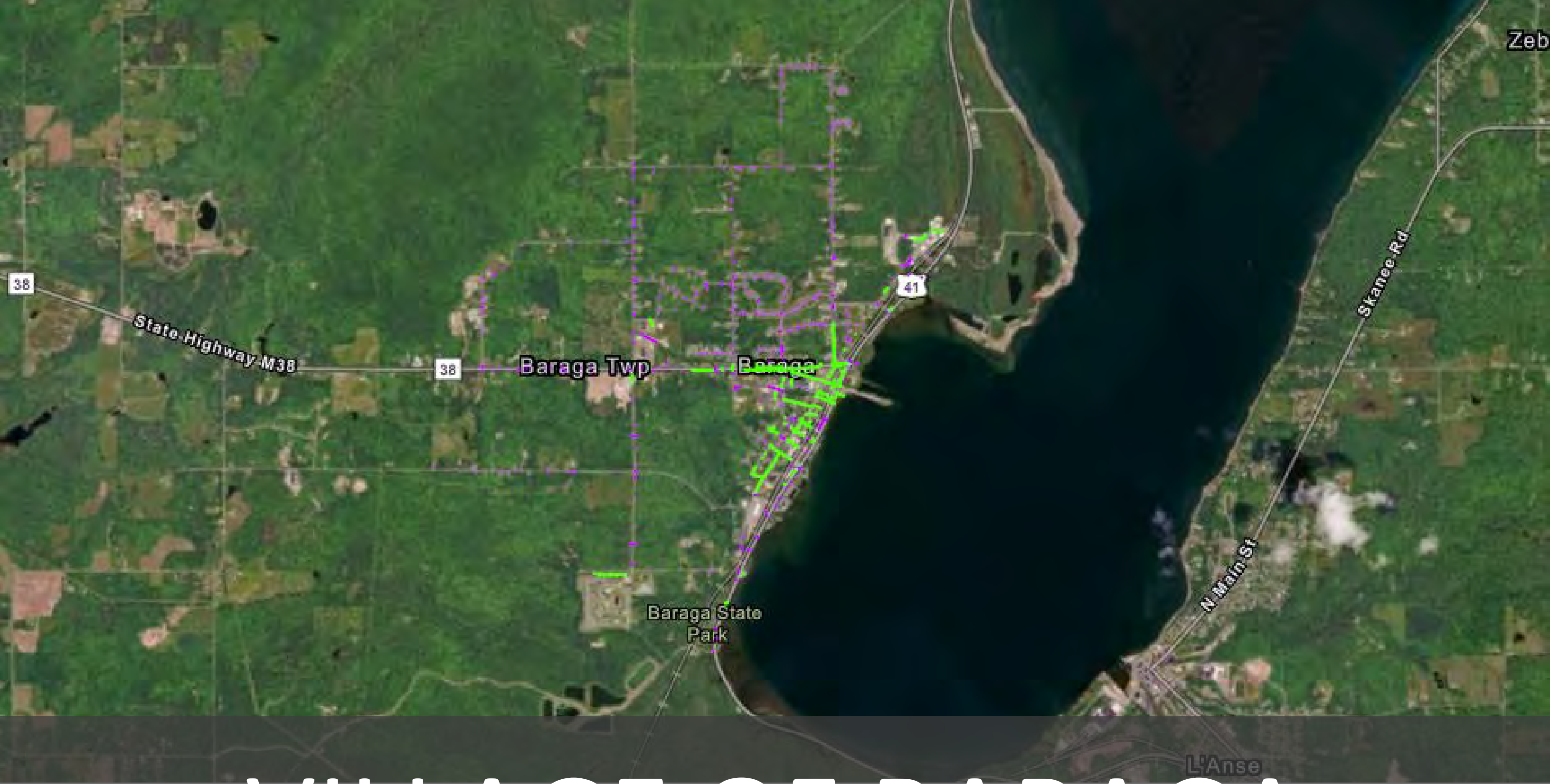
Name | Phone Number | Email

Diane M. Mayo 11-29-18

Signature of Authorized Representative (Original Signature Required) Date

Diane Mayo, Village Clerk

Print Name and Title of Authorized Representative



VILLAGE OF BARAGA

STORM SEWER ASSET MANAGEMENT PLAN

Executive Summary

A COMMUNITY OF EXCELLENCE & DIVERSITY
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VILLAGE of Baraga

SAW Grant No. 1105-01

NOVEMBER 2018

OHM
Advancing Communities®

Executive Summary

This document summarizes the Asset Management Plan (AMP) for the Village of Baraga stormwater collection system. It includes key recommendations for future funding levels and details the assessments completed by OHM Advisors with collaboration from the Village. The AMP was prepared using grant funding from the State of Michigan Stormwater, Asset Management and Wastewater (SAW) Grant Program in which $216,420 was awarded to the Village to accomplish the following key goals:

- Provide the Village with a new framework for collecting, organizing, and storing data for their stormwater colleciton system using the latest available hardware and software.
- Survey key system components to develop a Geographic Information System (GIS) database and to allow future generations to access infrastructure data with greater ease.
- Add information for sewer material type, size, and age to the GIS database.
- Evaluate the structural condition of various system components and store the data in the GIS database.
- Identify long-term operations and maintenance strategies to maintain a reasonable structural condition into perpetuity, including:
    - Regularly-scheduled sewer inspection (televising) and cleaning
    - Repair and rehabilitation to address structural problems resulting from aging infrastructure
- Provide recommendations for developing a prioritized Capital Improvement Plan.
- Analyze operating budgets and recommend revenue structure changes to facilitate the Village's long-term capital improvements plans.

The contact person for the Village of Baraga Storm Sewer AMP is:

LeAnn M. LeClaire, Village Manager
100 Hemlock Street
Baraga, Michigan 49908
Phone: 906-353-6237
Email: vobmgr@up.net

Asset Inventory

An asset inventory is a list of the Village's assets and their attributes. The majority of the Village's storm sewer infrastructure, including manholes, catch basins, gravity main, and culverts has been inventoried and digitized. The GIS framework was developed as part of this effort, making it easier to store critical data for the location, size, material, install date, and condition of each stormwater asset.

List of Assets

The following lists the major assets of the storm sewer system that are owned by the Village of Baraga. Note that the system is comprised of assets that are not all owned by the Village of Baraga. There are some assets owned by other entities including MDOT, KBIC, Baraga County Road Commission, and Canadian National. The condition assessments and long-term planning were focused on assets owned by the Village of Baraga.

- 43 stormwater manholes
- 235 stormwater catch basins
- 3.4 miles of stormwater gravity main
- 135 stormwater culverts

Condition Assessment

Through a methodical sampling procedure, a representative sample of the Village of Baraga's storm sewer infrastructure has been physically assessed using the National Association of Sewer Service Companies (NASSCO) MACP and PACP condition grading systems, which use a scale of zero to five. Zero indicates the infrastructure is in very good condition, while five indicates the infrastructure is in very poor condition or has already failed. A basic non-MACP rating system, using the same 0-5 scale, was used for low-criticality structures that have little to no upstream impact.

The two primary NASSCO scoring metrics commonly used to describe asset conditions are the Rating Index and the Quick Rating. The Rating Index is an average of defect grades within an asset, and the Quick Rating describes the asset's highest defect grades. These metrics and their derivation are further described in Section II of the AMP. Figure 1 describes the portion of the storm sewer system that has been inspected by this method.

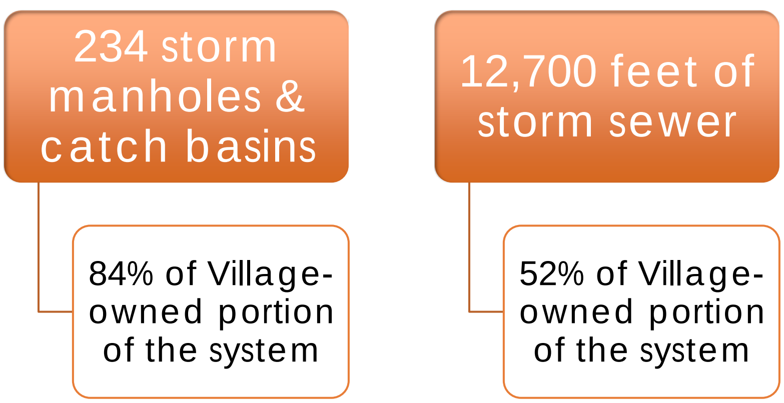


Figure 1: Portion of Sewer System Assessed

From this condition assessment, it was observed that:

- The Village's MACP rated manholes and catch basins are in good condition with an average Overall Rating Index of 1.81. The O&M Rating Index average of 0.88 is lower, or better, than the Structural Rating Index average of 1.31. The O&M Rating Index is most effected by deposits and infiltration, while the Structural Rating Index is most effected by brickwork defects and cracks.
- The Village's non-MACP rated catch basins are also in good condition with an overall structure rating average of 2.22. The most influential defects are brickwork defects and deposits.

- The Village's PACP rated storm sewers, primarily comprised of reinforced concrete pipe, have an average O&M Rating Index of 0.56 and an average Structural Rating Index of 0.76. Overall, 97% of inspected segments have an Overall Rating Index of three or lower. Twelve (12) sewers have at least one Grade 5 structural defect requiring immediate attention. The most frequent structural defects were cracks and pipe failures (breaks and holes), and the most frequent O&M defects were infiltration and roots.

Hydrologic and Hydraulic Modeling

The modeling program EPA SWMM was used to estimate existing and proposed peak flows and runoff volumes for the Village of Baraga's stormwater collection system. EPA SWMM is a physically-based storm event simulation model capable of simulating runoff from various land uses and soil types. Outfalls that enter Keweenaw Bay from the Village's collection system were tabulated for peak flows and total runoff volumes. The model was developed using data provided by the existing GIS database from the Village of Baraga and data from the storm sewer survey that was a part of the Asset Inventory portion of the Asset Management Plan SAW Grant. An *Existing Conditions* model was used to determine the portion of the stormwater system most likely to experience hydraulic surcharge during a 10-year, 24-hour recurrence interval event.

The *Proposed Conditions* model was modified to enlarge targeted storm sewers so that they could convey the 10-year design storm without surcharging to or above the ground elevations. Table 1 below details the proposed diameter adjustments to the sewers previously mentioned. These recommendations may be adjusted by the Village in the future to accommodate varying expectations for Levels of Service in specific neighborhoods. Note, the bolded storm sewer indicates upgrades are needed to prevent surface flooding.

Table 1: Proposed Hydraulic Diameter Upgrades

Storm Sewer ID	Exiting Diameter (in)	Proposed Diameter (in)	Length (ft)
DRG-387	**36**	**48**	**83**
DRG-372	54	72	77
DRG-305	54	60	46
CUL-195	36	42	118
CUL-196	36	42	118
DRG-107	24	30	135
DRG-002	30	36	161
CUL-079	48	54	96
DRG-160	24	30	77

Although replacing undersized storm sewers is not necessarily an immediate priority, many of these sewers were identified for rehab due to sewer defects found during the field inspections in 2016. The Village does not anticipate to have many road projects in the near future. However, the Village should use these recommendations as a road map to take advantage of strategic utility enhancements when road projects provide the opportunity to replace storm sewers. The full modeling report is available as Appendix C.

Level of Service

The Village has identified Level of Service (LOS) goals that will be used to guide the AMP and establish critical performance parameters. The LOS is bounded by the minimum regulatory requirements and the maximum capabilities of the assets. The goals are outlined in Table 2.

Table 2: Level of Service Criteria

Key Service Criteria	Performance Indicator	Target Level of Service
Collection System Asset Condition Assessment and Frequent Maintenance	PACP and MACP inspections per year	Clean and inspect 8% of the gravity main and manholes per year, 4% will be from the frequent maintenance inventory* • Approx. 19 catch basins • Approx. 4 manholes • Approx. 1,400 feet of gravity main • Approx. 11 culverts (~ 540 feet)
Regulatory Compliance	Compliance with MDEQ Policy and The Clean Water Act	Comply with MDEQ Policy and The Clean Water Act
Service Delivery and Customer Communication	Customer complaint/request response time	• Acknowledge customer complaints and requests within 24 hours of receipt • Respond to customer complaints and requests within three business days
GIS Asset Inventory	Tracking asset conditions in the GIS geodatabase	Maintain a continuously updated GIS geodatabase
Capital Improvement Planning	Customer complaints per year, unexpected repair costs per year	Update the CIP annually

*The frequent maintenance inventory is provided in Appendix D, Table D-8.

Criticality and Risk

The investigation leading to the identification of critical sewer infrastructure involved the determination of business risk, which is identified as the combination of the probability of the infrastructure failing as well as the consequence of its failure as shown in Figure 2.

Figure 2: Risk Equation

The probability of failure is related to the physical condition of an asset. The consequence of failure focuses on the economic losses and impacts to society due to an asset's failure. The following factors were combined to determine the consequence of failure:

- Diameter/Size – the relative size of the asset with respect to the rest of the system
- Location – the cost to restore the surface above the asset and if traffic control is needed. Uses average daily traffic (ADT) data.
- Environment – proximity to sensitive environmental features like rivers and lakes.

The Probability of Failure and Consequence of Failure scores, Business Risk Exposure, and rehabilitation recommendations for critical assets are tabulated in Appendix D.

Revenue Structure and Capital Improvement Plan

Like most Michigan communities, the Village of Baraga does not have a revenue structure in place for its stormwater infrastructure. Implementing a stormwater utility fee is legally complex, and only a handful of Michigan communities have done so successfully. The controversy is centered around how landowners are charged for stormwater infrastructure usage based on property size or by the combined area of impervious surfaces on their property. This rate structure too closely resembles an unlawful property tax, which has led to multiple lawsuits against municipalities across the State. Because of this, stormwater infrastructure is systematically underfunded. Until new state legislation is passed, it will be difficult, or even impossible, for the Village to implement a stormwater utility, and capital improvements may be challenging to fund. Nonetheless, the Village's storm sewer system is aging.

The Village of Baraga's Capital Improvement Plan will aide in identifying, prioritizing, and implementing capital projects for the community's storm sewer system over a five (5) year and twenty (20) year planning period. Additional recommendations for operational enhancements and other system improvements have been included for revenue structure planning. A project schedule was developed based on asset risk. The Village may opt to combine projects at their discretion to optimize cost efficiencies by reducing mobilization costs. The current twenty-year estimate for the Village's storm sewer system CIP is approximately $2,702,000**.** Table 3 below summarizes the projected sewer maintenance and capital expenditures.

Table 3: Summary of Anticipated Expenses

Project Need	Estimated Cost
5-Year Rehabilitation (2019-2023)	$915,000

20-Year Rehabilitation (2024-2038)	$1,369,000
Ongoing Cleaning and Inspection (2019-2038)	$418,000
Total (2019-2038)	$2,702,000

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Due Date 11/30/2018
(no later than 3 years from executed grant date)

The Village of Baraga *(legal name of grantee)* certifies that all stormwater asset management plan (SWAMP) activities specified in SAW Grant No. 1105-01 have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SWAMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

Cherie Koski at (906)353-6237 vobadmin@up.net
Name Phone Number Email

Diane M. Mayo 11-29-18
Signature of Authorized Representative (Original Signature Required) Date

Diane Mayo, Village Clerk
Print Name and Title of Authorized Representative

Stormwater, Asset Management, and Wastewater (SAW)
Asset Management Plan Executive Summary Guidance

City of Battle Creek – Department of Public Services
150 S. Kendall Street
Battle Creek, MI 49014
http://battlecreekmi.gov/
Contact: Chris Dopp, P.E., Director
269.966.3343
SAW Grant Project Number: 1051-01

Wastewater Executive Summary

The Wastewater Asset Management Plan (AMP) summarizes the existing physical condition of the City's wastewater infrastructure and includes key recommendations for future funding levels. This document was prepared using grant funding from the State of Michigan SAW Grant Program, with a total budget of $1,409,695 for the Wastewater AMP, which is inclusive of grant proceeds and local match.

The AMP was intended to accomplish the following key goals:

- Provide the City with a new framework for collecting, organizing, and storing data for their wastewater collection system using the latest available hardware and software.
- Survey key system components to augment the City's existing Geographic Information System (GIS) database and to make it easier for future generations to access infrastructure data with greater ease.
- Add information for sewer material type, size, age, and depth to the GIS database.
- Physically evaluate the structural condition of all publicly-owned system components, including sanitary sewer pipes, manholes, pump stations, and force mains. Store the data in the City's GIS database.
- Identify long-term operations and maintenance strategies to maintain a reasonable structural condition into perpetuity, including:
    - Regularly-scheduled sewer inspection (televising)
    - Repair and rehabilitation to address structural problems resulting from aging infrastructure
- Provide recommendations for developing a prioritized Capital Improvement Plan to be funded through the City's wastewater enterprise fund.

Wastewater Asset Inventory

This AMP includes the wastewater collection system, including manholes, sewer pipes and pump stations. Although the City had an existing geodatabase for its wastewater system, this AMP included efforts to enhance the database with additional information on sewer rim/invert elevations, sewer size, sewer age, and structural condition.

Sewer sizes and invert elevations were verified during field survey and manhole inspections that were part of this AMP.

The City uses ArcGIS (ESRI) to maintain its inventory of wastewater assets and to store asset condition data.

Condition Assessment

Approximately 30% of the sewer system was televised as part of this AMP. NASSCO PACP and MACP methodologies were used to assign structural and O&M conditions for inspected manholes and sewer segments. The PACP and MACP data were added to the GIS geodatabase.

For sewer pipes, the average structural rating is 2.18 and 2.31 for the average O&M rating, on a scale of 0 to 5. The average age of the system was not determined since nearly all of the pipes had missing installation dates. Approximately 34% of the system has a PACP structural score of 3 or greater.

For manholes, the average structural rating is 1.81 and 2.30 for the average O&M rating, on a scale of 0 to 5. The average age of the system was not determined since nearly all of the manholes had missing installation dates. Approximately 27% of the system has a MACP structural score of 3 or greater.

In general, the City's wastewater collection system is in good shape, with most sewers well within their expected service lives.

Level of Service Determination

The City's Level of Service criteria for its wastewater collection system are listed in the following table:

Key Service Criteria	Performance Indicator	Target Level of Service
Asset Condition Assessment	PACP & MACP Inspections per Year*	• MACP inspect a minimum of 10% of the System per year • PACP inspect a minimum of 10% of the sewer pipes every year in accordance with sewer cleaning & televised inspection project schedule
Regulatory Compliance	Compliance with MDEQ Sanitary Sewer Overflow (SSO) Policy and the Clean Water Act	Continue to comply with the MDEQ SSO policy and The Clean Water Act
Service Delivery and Customer Communication	Utilize Software to aid in utility management and promote customer communication, increase effort to reduce number of sewer calls and response time	Respond to customer complaints and requests within one business day
O&M Optimization	Regular cleaning and maintenance of the collection system	• Clean and maintain 10% of the manholes per year • Clean and maintain 10% of the sewer pipes per year

** Pipe Assessment Certification Program (PACP), to assess sanitary sewer condition & Manhole Assessment Certification Program (MACP), to assess manhole condition*

Criticality of Assets

Determining the assets most critical to system operation allows a community to manage risk, support Capital Improvement Plans (CIP), and efficiently allocate O&M funds. The three key factors used to determine criticality are Probability of Failure (PoF), Consequence of Failure (CoF) and Level of Service (LoS). The average of CoF and LoS is multiplied by PoF to determine the Business Risk Exposure (BRE) as shown in the following figure.

$$BRE = \frac{CoF + LoS}{2} * PoF$$

PoF considers the physical condition or age of an asset and is often based on the Structural MACP or PACP Highest Rated Defect. If an asset was not inspected, remaining useful life can be used a proxy for condition. A standardized rating of one through five was assigned to each asset with a score of five indicating worst condition as shown in the following table.

Probability of Failure

Score	Description
1	Improbable
2	Remote, unlikely but possible
3	Possible
4	Probable, likely
5	Imminent, likely in near future

CoF encourages a focus on social, environmental, and economic cost impacts. The economic CoF encompasses the impacts of direct and indirect economic losses to the affected organization and third parties due to asset failure. The social consequence represents the impact of society due to asset failure and the environmental consequence of failure considers the impact to ecological conditions occurring as a result of asset failure.

The factors were rated on a one through five scale for each asset. If one factor is deemed more important, the weighting was skewed to give that factor more influence.

The following factors were combined to determine the final CoF:

- Proximity to Water – the direct distance that an asset lies from a waterbody
- Pipe Diameter – the relative size of the asset with respect to the rest of the system
- Pipe Type – refers to the type of sere (e.g. collector, interceptor, force main)

Revenue Structure

The City currently has an annual budget of approximately $12 million for its wastewater collection and treatment costs, this does not include capital expenditures. The recommendations in this Asset Management Plan include significant capital investments in collection system rehabilitation and replacement and pump station improvements. The costs of these recommendations fit within the recommend fee structure framework of the November 2016 *Wastewater Rate Study* (Jones & Henry). The primary reasons for the increased sewer rates (see Table 27 from the 2016 Jones & Henry Study) are due to the following needs:

1. Increased investment in sewer/manhole rehabilitation, repair, and/or replacement for the City's aging infrastructure, including the sewer system, pump stations, and wastewater treatment (this AMP addresses the collection system and pump stations only; long-term costs for the City's wastewater treatment plant are detailed in the 2016 Jones & Henry Study.
2. Increased attention to sewer/manhole inspections and ongoing updates to this Asset Management Plan.
3. Keep up with inflationary pressures by staying ahead of the Construction Cost Index (CCI) curve.
4. Avoid larger rate hikes (i.e. 30%-40%) that are necessary when rates are held for 5-10 years.
5. Maintain an adequate cash balance.

Capital Improvement Plan

The Capital Improvement Plan (CIP) focuses on projects that are known based on current structural conditions. CIP tables are detailed in the Appendix of the AMP document. These tables include recommended projects for the first five (5) years and include repair and replacement of assets. The CIP tables and maps are intended to be used for high level planning; the City will further evaluate the wastewater infrastructure before beginning the CIP design process.

The CIP was developed with the first projects reflecting those with the highest BRE scores. Some projects were manually moved higher on the list if a similar rehabilitation method was recommended to reduce costs. The CIP tables are intended to be used for high level planning; the City will further evaluate the stormwater infrastructure before beginning the CIP design process.

Recommendations

The recommendations in this AMP are to:

- Adjust user fees, as recommended in the 2016 *Wastewater Rate Study* (Jones & Henry) to provide enough funding for recommended capital projects.
- Implement the capital improvements as recommended in the CIP.
- Continue the AMP process in future years through systematic system inspection and updates of the City's GIS data to re-prioritize projects in future years.

List of Major Assets

The major assets are simplified in the text below. The full AMP report contains additional detail on the distribution of sizes, ages, and conditions.

- *380 miles of sanitary sewer gravity main*
- *7,000 manholes*
- *49 Pump Stations*

The City discharges into the Battle Creek Wastewater Treatment Plant (the treatment plant assets were not included in this AMP).

DEQ

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date November 30, 2018
(no later than 3 years from executed grant date)

The City of Battle Creek *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1051-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or **No**
   If No - Date of the rate methodology approval letter: May 3, 2018.
2) Significant Progress Made: Yes or No
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: ____________.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ____________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Kurt Tribbett	at	269-966-3480	KRTribbett@battlecreekmi.gov
Name		Phone Number	Email

Form Approved
JHS 11/29/18
City Attorney

Rebecca L. Fleury 11/30/18

Signature of Authorized Representative (Original Signature Required) Date

Rebecca L. Fleury, City Manager

Print Name and Title of Authorized Representative

Stormwater, Asset Management, and Wastewater (SAW)
Asset Management Plan Executive Summary Guidance

City of Battle Creek – Department of Public Services
150 S. Kendall Street
Battle Creek, MI 49014
http://battlecreekmi.gov/
Contact: Chris Dopp, P.E., Director
269.966.3343
SAW Grant Project Number: 1051-01

Executive Summary

The Stormwater Asset Management Plan (AMP) summarizes the existing physical condition of the City's stormwater infrastructure and includes key recommendations for future funding levels and alternatives for funding mechanisms. This document was prepared using grant funding from the State of Michigan SAW Grant Program, with a total budget of $1,034,749 for the Stormwater AMP, which is inclusive of grant proceeds and local match.

The AMP was intended to accomplish the following key goals:

- Provide the City with a new framework for collecting, organizing, and storing data for their stormwater collection system using the latest available hardware and software.
- Survey key system components to augment the City's existing GIS database and to make it easier for future generations to access infrastructure data.
- Add information for sewer material type, age, and depth to the GIS database.
- Physically evaluate the structural condition of all publicly-owned system components, including storm sewer pipes, manholes, catch basins, and outfalls. Store the data in the City's GIS database.
- Analyze the flow capacity of the City's storm sewer pipes and identify where pipes should be enlarged to minimize flood potential to a reasonable level.
- Identify other capital improvements that will allow the City to reduce annual flow volumes and pollutant loadings to the Kalamazoo River and Battle Creek River.
- Identify long-term operations and maintenance strategies to maintain a reasonable structural condition into perpetuity, including:
  - Regularly-scheduled sewer inspection (televising), similar to what is done for wastewater infrastructure
  - Repairs and rehabilitation to address structural problems resulting from aging infrastructure
- Provide recommendations on developing a sustainable funding source for stormwater, similar to that of enterprise funds that already exist for the City's water and wastewater systems.

Stormwater Asset Inventory

This AMP includes the stormwater collection system, including manholes and sewer pipes. Although the City had an existing geodatabase for its storm sewer system, this AMP included efforts to enhance the database with additional information on sewer rim/invert elevations, sewer size, sewer age, and structural condition.

Sewer sizes and invert elevations were verified during field survey and manhole inspections that were part of this AMP.

The City uses ArcGIS (ESRI) to maintain its inventory of storm sewer assets and to store asset condition data, manage work orders, and track work order status.

Condition Assessment

Over 12% of the sewer system was televised as part of this AMP. NASSCO PACP and MACP methodologies were used to assign structural and O&M conditions for inspected manholes and sewer segments. The PACP and MACP data were added to the GIS geodatabase.

For sewer pipes, the average structural rating is 1.61 and 1.65 for the average O&M rating, on a scale of 0 to 5. Approximately 20% of the system has a PACP structural score of 3 or greater, although this AMP focused primarily on the City's older sewers.

For manholes, the average structural rating is 2.2 and 2.0 for the average O&M rating, on a scale of 0 to 5. The average age of the system was not determined since nearly 97% of the manholes had missing installation dates. Approximately 40% of the system has a MACP structural score of 3 or greater, although this AMP focused primarily on the City's older manholes.

Outfalls, dams, and stormwater BMPs were not evaluated for structural condition, although they were considered for identifying future funding needs.

Level of Service

Level of Service (LoS) for a stormwater system is traditionally defined as the storm magnitude (i.e. annual exceedance interval) that the collection system can convey without causing surface flooding that may negatively impact residents, businesses, and institutions. This is often referred to in terms of inches of rainfall or annual recurrence interval, such as the 10-year storm (also known as the 10% storm, as it has a one-in-ten chance of being exceeded in any given year).

As part of the SAW Grant, the City of Battle Creek, with assistance from Calhoun County stakeholders, updated their *Stormwater Management Program: Technical Reference Manual* (TRM), which includes rule changes to meet the new Post Construction Runoff requirements in the MDEQ's NPDES Permit for municipal stormwater systems. The return interval design criteria for stormwater-related facilities depends on the drainage area and outlet type, and ranges from a 10-year storm to a 100-year storm. The TRM further describes the required LoS as follows:

"The selection of the design storm for the sizing of any component of the stormwater system should consider the existence and adequacy of an emergency overland flow path and the risks to public safety and property should a storm event of greater intensity and duration occur. If the emergency overland flow path is inadequate, nonexistent, or the risks to public safety and property resulting from the emergency overflow cannot be adequately defined, then the design engineer should consider a more appropriate and conservative design storm than the minimum storms suggested in this TRM."

Criticality of Assets

Determining the assets most critical to system operation allows a community to manage risk, support Capital Improvement Plans (CIP), and efficiently allocate O&M funds. The three key factors used to determine criticality are Probability of Failure (PoF), Consequence of Failure (CoF) and Level of Service (LoS). The average of CoF and LoS is multiplied by PoF to determine the Business Risk Exposure (BRE) as shown in the following figure.

$$BRE = \frac{CoF \ + \ LoS}{2} * PoF$$

PoF considers the physical condition or age of an asset and is often based on the Structural MACP or PACP Highest Rated Defect. If an asset was not inspected, remaining useful life can be used a proxy for condition. A standardized rating of one through five was assigned to each asset with a score of five indicating worst condition as shown in the following table.

Probability of Failure

Score	Description
1	Improbable
2	Remote, unlikely but possible
3	Possible
4	Probable, likely
5	Imminent, likely in near future

CoF encourages a focus on social, environmental, and economic cost impacts. The economic CoF encompasses the impacts of direct and indirect economic losses to the affected organization and third parties due to asset failure. The social consequence represents the impact of society due to asset failure and the environmental consequence of failure considers the impact to ecological conditions occurring as a result of asset failure.

The factors were rated on a one through five scale for each asset. If one factor is deemed more important, the weighting was skewed to give that factor more influence.

The following factors were combined to determine the final CoF:

- Proximity to a body of water
- Pipe diameter
- Accessibility/Location – refers to the cost to restore the surface above the asset and if traffic control is needed

Revenue Structure

A Stormwater Advisory Group (SAG) was formed in 2017 and met four times to discuss the prospect of long term funding for the City's stormwater system. There is currently no dedicated funding source for Battle Creek's stormwater system, unlike water and wastewater systems. A Funding Feasibility Study with revenue analysis was developed as part of this AMP. The results are described in the following paragraphs.

The total spent annually by the City for all stormwater-related activities is approximately $1,350,000. Any additional costs are generally taken from the City's General Fund or from the Streets budget, if available. Existing funding is primarily linked to keeping the system clean and conducting emergency repairs. Any additional costs, such as repair or replacement of catch basins, and structural repair or replacement of aging or undersized manholes and sewers, are generally taken from the City's Streets budget. This creates an unnecessary strain on the Streets budget, as that money is needed to repair and replace the City's roadways. This further underscores the need for a dedicated funding source for stormwater assets.

The inventory and condition assessment completed for this AMP include several new O&M and CIP costs that are crucial to meeting the City's goals of effective management and maintenance of stormwater infrastructure. As shown in the following table, there is a funding gap of $2.9-$3.5 million between the $4.2-4.8 million proposed annually and the $1,350,000 currently allocated to stormwater in the City's current budget.

	Existing Program (based on FY 2017)	TRUE Costs (Low End)	TRUE Costs (Upper End)
Drainage Budget	$735,000	$200,000	$200,000
Retention Basin Maintenance	$90,000	$90,000	$120,000
Sweeping/Maintenance	$410,000	$410,000	$410,000
GIS (Mapping) Maintenance	$50,000	$50,000	$50,000
Drainage Assessments	$65,000	$75,000	$100,000
Manhole Inspection		$52,000	$52,000
Manhole Rehab and Maintenance		$81,000	$81,000
Storm Sewer Inspection/Cleaning		$360,000	$360,000
Storm Sewer Rehab		$800,000	$900,000
Flood Control Capital Projects		$600,000	$1,000,000
Catch Basin Cleaning/Inspection		$110,000	$110,000
Catch Basin Replacement		$300,000	$300,000
MS4 Compliance, Spill Response		$50,000	$50,000
Transportation Project (Drainage)		$750,000	$750,000
Personnel Costs		$200,000	$300,000
Totals	$1,350,000	$4,200,000	$4,800,000

To address this funding gap, the SAG explored options, including additional taxes or dedicated revenue (i.e. stormwater utility).

Based on preliminary data, the City can generate approximately $1,880,000 annually for every one dollar per month charged to an ERU. In other words, a monthly charge of about $2.25-$2.50 for a typical R1A/R1B residential parcel would reduce the stormwater infrastructure funding gap.

In this scenario, the stormwater fee would generate about $2.8 million per year, which would require that the City continue to fund the remainder of the program ($1.35 million) through existing means. In future years, the City can adjust the fee upward so all stormwater budget needs can be achieved through the user fee.

Capital Improvement Plan

A Capital Improvement Plan (CIP) was developed using the Business Risk Exposure (BRE) described above. CIP tables are detailed in the Appendix of the AMP document. These tables include recommended projects for the first twenty (20) years and include repair (i.e. lining or spot repair) and replacement of assets.

The CIP was developed with the first projects reflecting those with the highest BRE scores. Some projects were manually moved higher on the list if a similar rehabilitation method was recommended to reduce costs. The CIP tables are intended to be used for high level planning; the City will further evaluate the stormwater infrastructure before beginning the CIP design process.

It was assumed that the annual investment in the CIP would ramp up, given that it will take some time to establish a new funding source and to be fully-engaged in a CIP program. The actual implementation of the CIP will depend on the establishment of an adequate funding source.

Recommendations

The recommendations in this AMP are to:

- Establish a dedicated funding source for stormwater management; ideally through a stormwater utility. The City should start with a fee large enough to address the existing funding gap, and, over a period of 3-5 years, adjust the fee upward to fully fund the CIP as recommended in this AMP.
- Implement the capital improvements as recommended in the CIP; this will be possible once the stormwater utility is fully funded (see first bullet).
- Continue the AMP process in future years through systematic system inspection and updates of the City's GIS data to re-prioritize projects in future years.
- Focus on water quality management, including reducing runoff volumes to the Kalamazoo River and Battle Creek River, as part of the ongoing capital improvement efforts and enforcement of the updated stormwater rules (TRM).

List of Major Assets

The major assets are simplified in the text below. The full AMP report contains additional detail on the distribution of sizes, ages, and conditions.

- *167 miles of storm sewer pipe, ranging from 4-inch to 72-inch diameter*
- *3,371 manholes*
- *8,600 catch basins*
- *30+ miles of open channel*
- *3 dams*
- *Stormwater quality BMPs (various swirl chambers, detention ponds, bioretention cells)*

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Due Date **November 30, 2018**
(no later than 3 years from executed grant date)

The City of Battle Creek *(legal name of grantee)* certifies that all stormwater asset management plan (SWAMP) activities specified in SAW Grant No. 1051-01 have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SWAMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

Kurt Tribbett at 269-966-3480 KRTribbett@battlecreekmi.gov
Name Phone Number Email

Form Approved
GHS 11/29/18
City Attorney

Rebecca L. Fleury 11/30/18
Signature of Authorized Representative (Original Signature Required) Date

Rebecca L. Fleury, City Manager
Print Name and Title of Authorized Representative

MEMORANDUM

SAW Grant Executive Summary

To:	Bear Creek Township	Date:	November 28, 2018
From:	Robert Verschaeve, P.E. Doug Coates, P.E.	Re:	SAW Grant Executive Summary

GRANTEE:	Bear Creek Township
GRANT NUMBER:	1424-01
AUTHORIZED REPRESENTATIVE:	Denis Keiser, Township Supervisor
PLAN LOCATION:	Bear Creek Township Hall
	373 N. Division
	Petoskey, MI 49770
PHONE:	(231) 347-1311

1.0 INTRODUCTION

Bear Creek Township is a member of two sewer Authorities. The Township's "north" system is owned and operated by the Harbor Springs Area Sewage Disposal Authority (HSASDA). The "north" system is not part of this grant. The Township's "south" collection system is owned by the Springvale-Bear Creek Sewage Disposal Authority (SBCSDA). Wastewater treatment is provided through a service agreement between the Authority and the City of Petoskey. The vast majority of customers are Bear Creek Township customers and the Township is responsible for setting sewer rates and administering sewer billing and repair and replacement funding.

While the Authority technically owns the collection system infrastructure, the Township handles the day to day operations and administration of the system (operations are contracted through the HSASDA). For these reasons, the Township applied for and received a Stormwater, Asset Management and Wastewater (SAW) grant from the Michigan Department of Environmental Quality. An asset management plan (AMP) for the Township's "south" sanitary sewer system was developed and is available for review by the public. The AMP was developed in accordance with the grant application and the requirements of the grant agreement. The following Scope of Work was proposed in the grant application:

1. Collection System Map
   a) Compile and develop a map of the sewer collection system.
   b) Field locate system components with GPS equipment for inclusion in the county GIS database.

2. Inventory of fixed assets
   a) Develop an asset management database using MDEQ spreadsheets.
   b) Prepare a description of the asset, its required capacity, level of redundancy, and ID number
   c) Describe the location of the asset
   d) Identify the year the asset was installed and any other significant product information

3. Engineering Management for Televised Sewer Inspection
   a) Prepare maps and specifications for television inspection of the sanitary sewer system
   b) Prepare a bid package and advertisements, answer bidders' questions, review bids, and make a recommendation for award
   c) Perform necessary preconstruction tasks, coordinate with the contractor, make site visits, and review pay requests
   d) Review the video and reports submitted by the cleaning and televising contractor

4. Condition assessment of fixed assets
   a) Conduct an asset condition assessment (manhole inventory, cleaning and televising)
   b) Describe present condition of the asset (e.g. excellent, good, fair, poor)
   c) Estimate the depreciated value of the asset
   d) Estimate the current asset replacement cost
   e) Perform a Risk Evaluation that combines the probability of failure and criticality of the asset

5. Level of Service

   a) Establish a Level of Service guidance, including service agreement development and public meetings with stakeholders

To complete this work, Bear Creek Township was awarded a grant totaling $228,391, with 10% ($25,377) local match to equal a total eligible grant cost of $253,768. As required by the grant agreement, this summary report has been prepared to meet the requirements of Section 603 of Public Act 84 of 2015 and includes the following information:

1. Contact Information
2. Review of the five major AMP components
3. List of major assets

2.0 MAJOR AMP COMPONENTS

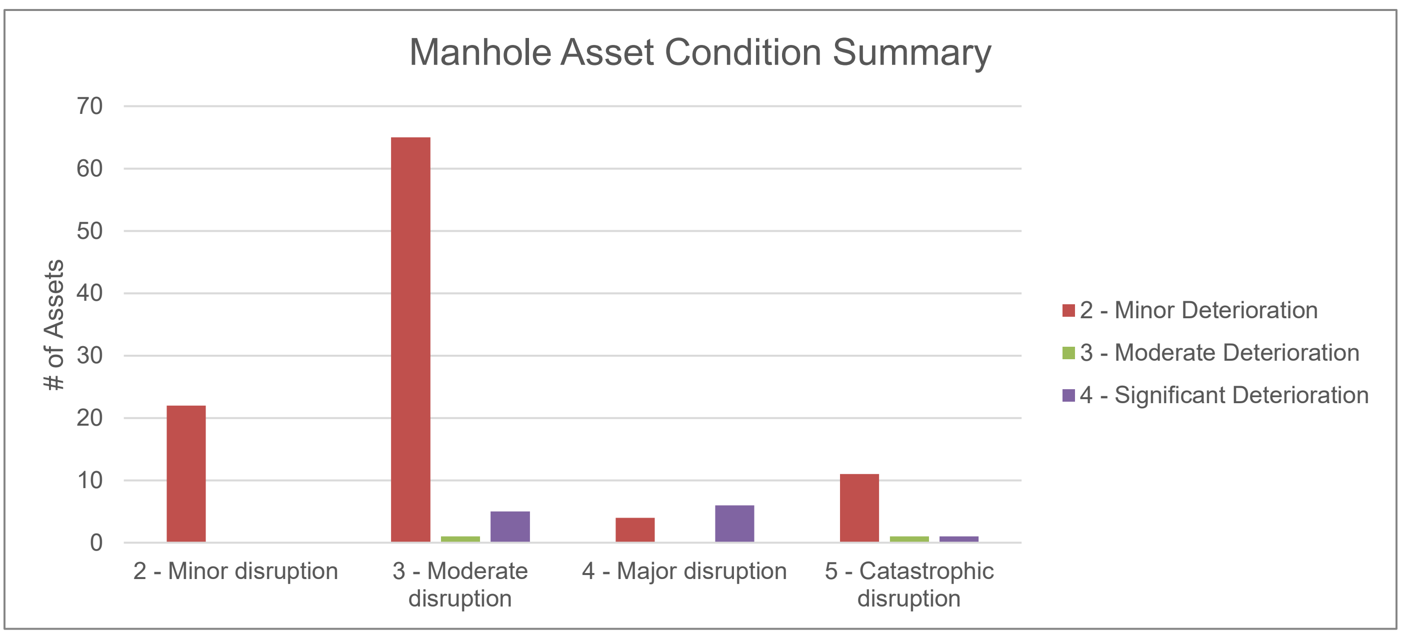
Bear Creek Township and SBCSDA elected to utilize a spreadsheet-based AMP platform to record and track asset data. The AMP includes sanitary sewer system components utilized in the collection, treatment, and analysis of sanitary sewer flows and equipment utilized to maintain those systems. The five major components of the AMP, identified below, are summarized in the following subsections.

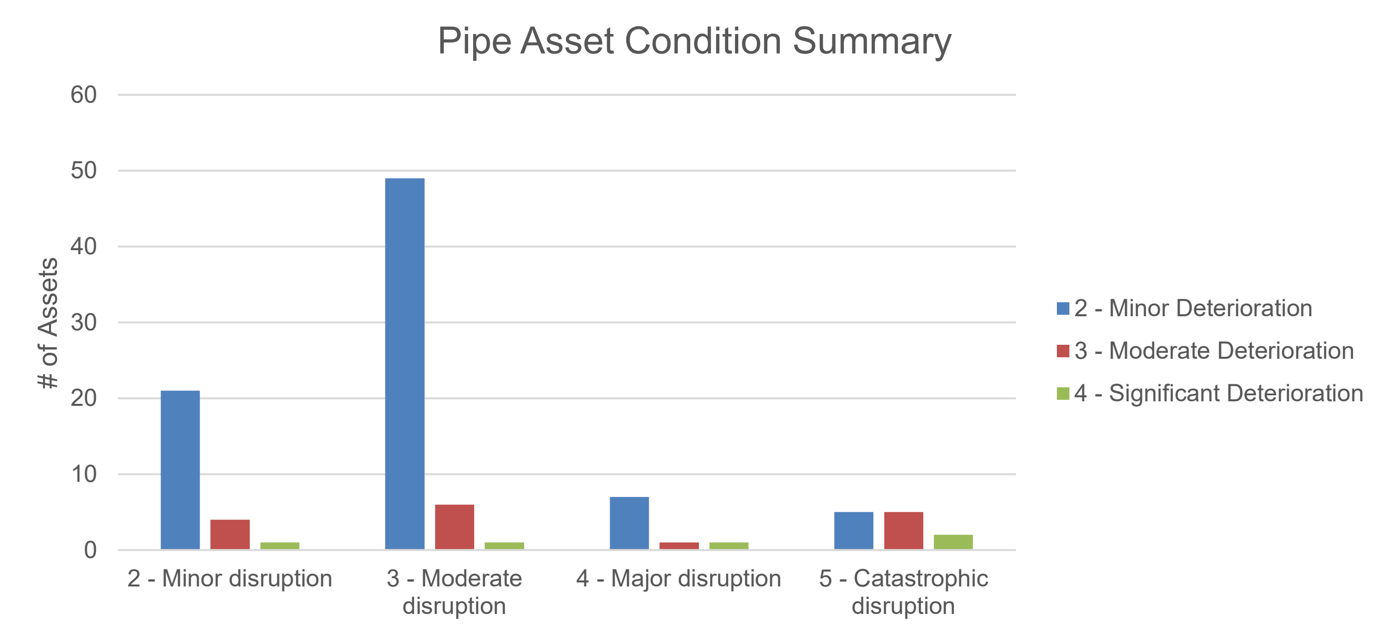
1. Asset Inventory and Condition Assessment
2. Level of Service
3. Criticality of Assets
4. Operation and Maintenance Strategies / Revenue Structure; and,
5. Long-term Funding / Capital Improvement Plan

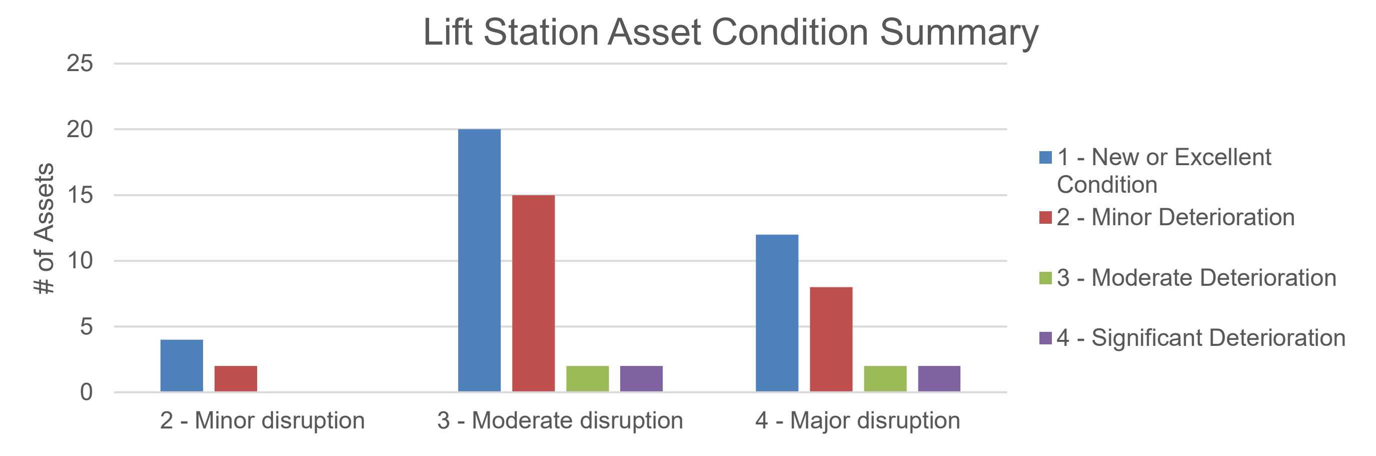
2.1 Asset Inventory and Condition Assessment

An asset inventory and condition assessment for the SBCSDA sewer system was compiled by the HSASDA and Gosling Czubak Engineering Sciences (GCES) personnel. Collection and treatment assets were categorized as Lift Station; Manhole; or, Pipe assets and populated into the AMP spreadsheet. Conditions were assigned on a 1 (very good) to 5 (very poor) rating scale based upon visual inspections and operational experience of HSASDA personnel. Qualifying gravity sewer pipes were inspected using CCTV techniques in accordance with the National Association of Sewer Service Companies (NASSCO) pipe standard. Manholes inspections were completed in accordance with the NASSCO level 1 standard.

The observed conditions grouped by criticality for each of the three asset types are summarized in the following charts.







# of Assets include the various individual components of each lift station

2.2 Level of Service

Bear Creek Township and SBCSDA have established the Level of Service for the sewer utility. The Level of Service Statement was developed by to SBCSDA and Township Board members during an October 2018 public meeting.

Springvale - Bear Creek Sewage Disposal Authority

Level of Service Statement

October 23, 2018

The SBCSDA owns and contracts out operations for a wastewater collection system and has developed a "Level of Service Statement" to guide the long-term sustainability of this community asset. The goal of the Authority is to provide a Level of Service that:

1. Meets all minimum State and Federal regulatory requirements and operates in a manner that is protective of the environment and public health.

2. Has adequate staffing to conduct routine operations and maintenance, as well as respond to emergency situations.

3. Customer and system emergency response time within 60 minutes to 24 hours depending on type of emergency.

4. Has adequately trained staff with the proper certifications to keep the utility within regulatory compliance and conduct day to day operations safely.

5. Generates sufficient revenue to cover all costs, including operations and supplies, labor, training, and annual savings for future repair and replacement of equipment.

6. Generates sufficient revenue to fund periodic Capital Improvements to insure system assets have adequate capacity, redundancy, and are in proper working order.

7. Be available to help customers with questions regarding billing, new services, and complaints.

8. Provides efficient operations and makes prudent decisions to keep user costs as low as possible while maintaining the Level of Service desired.

9. To provide a safe and injury free work place.

2.3 Criticality of Assets

The criticality of each asset was assigned based on how much disruption the assets failure may cause to the system. Criticality ratings were assigned on a scale of 1 (insignificant) to 5 (catastrophic). Factors considered during the criticality evaluations include:

1. Redundancy of asset
2. Proximity to surface waterbody
3. Proximity to sensitive populations (i.e. hospital, jail)
4. Current use status (i.e. backup or active)

2.4 Operation and Maintenance Strategies / Revenue Structure

A financial analysis of the sewer fund 2018/2019 budget was completed and it was determined that a funding gap did not exist based on the anticipated revenue and expenses. This analysis was submitted by H.J. Umbaugh and Associates at the 2.5-year mark of the grant. The MDEQ approved the rate methodology in a letter dated May 14, 2018.

Each asset in the AMP is classified as either a Capital or Repair, Replace and Improve (RRI) asset. The RRI assets are generally considered to be assets with less than a 20-year lifespan that are typically repaired or replaced with funds from the sewer fund. RRI cost projects for the next 20 years, based upon the anticipated replacement year, were added to the revenue structure review for consideration by the SBCSDA.

2.5 Long-term Funding / Capital Improvement Plan

Capital assets generally have a longer lifespan and may require the use of another funding source to implement repair or replacement. Potential capital improvement projects identified during preparation of the AMP include:

1. Replacing two lift station vaults
2. Replacing eight sections of gravity sewer
3. Replacing nineteen manholes

Some potential long-term funding scenarios were presented to the Township and SBCSDA councils for evaluation by H.J. Umbaugh and Associates. It is the councils' responsibility to review and evaluate the funding scenarios presented and determine the best course of action as it relates to user rates, capital and repair projects and the sewer fund cash balance.

3.0 MAJOR ASSETS

The major assets for each of the five asset categories are summarized in the following tables.

MANHOLE ASSETS
Gravity Sewer Manholes (130)
Lift Station Wet Wells (4)
Lift Station Valve Chambers (2)

PIPE ASSETS
6” Gravity (350’ +/-)
8” Gravity (21,500’ +/-)
12” Gravity (1,500’ +/-)
6” Forcemain (10,900’ +/-)
2” Forcemain (500’ +/-)

LIFT STATION ASSETS
#4 – Main Lift
#8 – Lincoln Place
#13 – Wal-Mart
#14 – Strathmore

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date November 29, 2018
(no later than 3 years from executed grant date)

The Bear Creek Township *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1424-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or No
   If No - Date of the rate methodology approval letter: May 14, 2018.
2) Significant Progress Made: Yes or No
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: ________.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Dennis Keiser at 231-347-1311 supervisor@bearcreektownship.com
Name | Phone Number | Email

Dennis Keiser 11-29-18
Signature of Authorized Representative (Original Signature Required) Date

Dennis Keiser, Township Supervisor
Print Name and Title of Authorized Representative

Protecting our Infrastructure Investment

ASSET MANAGEMENT PLAN

Wastewater Executive Summary Report

Prepared for:

Beecher Metropolitan District

SAW Project No. 1662-01

FINAL
November 2018

FLEIS&VANDENBRINK
DESIGN. BUILD. OPERATE.

Executive Summary

Overview

Public Act 562 of 2012 authorized money for Stormwater, Asset Management, and Wastewater (SAW) Grant Program. In November 2015, The Beecher Metropolitan District received a Stormwater, Asset Management, and Wastewater (SAW) Grant from the Michigan Department of Environmental Quality (MDEQ), Project No. 1662-01 to provide financial assistance for the development of a wastewater asset management plan (AMP) for the District's publicly owned wastewater utility. This AMP is intended to be a living document that is updated as assets continue to wear and age, and as additional inspection/condition results are found and incorporated into the plan.

The SAW Grant AMP awarded to the Beecher Metropolitan District was $1,453,164. There was no local match as the District was determined to be disadvantaged.

The contact person for the Beecher Metropolitan District AMP is:

Kevin Forbes, Administrative Water Superintendent
1057 Louis Ave, Flint, MI 48505-1298
Phone number: 810.787.6526
Email: Kevin @beecherwater.us

Major Asset Inventory & Condition Assessment

A list of the major assets in the District's wastewater system, described further below, include:

- Collection system piping system and manholes
- Sanitary sewer pump stations in the collection system

The following is a list of the major assets identified in the Asset Management Plan:

List of Major Assets		
Asset	**Quantity**	**Unit**
6" Dia. Sanitary Sewer	162	LFT
8" Dia. Sanitary Sewer	196,528	LFT
10" Dia. Sanitary Sewer	51,842	LFT
12" Dia. Sanitary Sewer	16,438	LFT
15" Dia. Sanitary Sewer	10,014	LFT
16" Dia. Sanitary Sewer	10	LFT
18" Dia. Sanitary Sewer	18,279	LFT
21" Dia. Sanitary Sewer	3,803	LFT
24" Dia. Sanitary Sewer	2,520	LFT
Sanitary Sewer Manholes	1,118	EACH
8" Dia. Forcemain	85	LFT
10" Dia. Forcemain	3,951	LFT
12" Dia. Forcemain	8,778	LFT
14" Dia. Forcemain	12,648	LFT
18" Dia. Forcemain	5,044	LFT
Pump Station	5	EACH

Asset Identification, Location & other Available Information

A comprehensive wastewater system asset inventory was developed from operation and maintenance (O&M) manuals including a review of existing record drawings, field notes, staff knowledge, and site visits, supplemented with field survey work. Asset material, size and age were identified through the review of available historical record documents and Closed-Circuit Televising (CCTV) data. Spatial orientation (pipe location), pipe depth and invert elevations were determined through GPS field survey and a comprehensive evaluation of the gravity system. This information was organized into a new (GIS) database and piping network for archiving, mapping and further evaluation purposes. The inventory includes 5 Pump Station Assets, and 2,290 Collection System Assets.

The Beecher Metropolitan District is located in the north central area of Genesee County just north of the City of Flint in southeast Lower Michigan. The Beecher Metropolitan District was established in 1938 under the Metropolitan District Act of 1929. This Act allows a combination of cities, villages, or townships to establish a district between their municipal limits to acquire, own and operate parks or public utilities such as water supply or wastewater disposal, etc. The Beecher Metropolitan District was established in parts of Sections 17, 18, 19 and 20 of Genesee Township and parts of Sections 14, 15, 23 and 24 of Mount Morris Township. The boundary limits of the District are generally Carpenter Road to the south; Dupont Street, Clubok Street and Ballard Drive to the west; Stanley Road to the north; and approximately one-half mile to the east of Dort Highway. Initially, the District provided public water supply and then in the early 1950’s the District’s charter was amended so that the District could provide wastewater collection and disposal services. The Beecher Metropolitan District is the only metropolitan district in the state that owns, operates and maintains both a WaterWorks System and WasteWater Collection System. West of Dort Highway, the Beecher Metropolitan District has five pump stations, approximately 5.77 miles of forcemains (10” to 18” in diameter), over 56.64 miles of gravity sewers (8” to 24” in diameter), and approximately 1,118 manholes.

Pump Station (PS) No.1 is located on the south side of I-475 just west of Saginaw Street. Please see attached Figure A-1 for pump station locations. PS No. 4 is located on the north side of Flamingo just west of Detroit Street. PS No. 5 is located on the south side of Coldwater Road just west of O’Brien Street and PS No.6 is located just west of I-475 at Selby Street and Holtslander Avenue. PS No. 1, No. 4, No. 5 and No.6 pump wastewater to gravity pipes which drain to Pump Station No. 3, which is located near the southwest corner of the District just south of Carpenter Road at Dupont and Bundy. PS No. 3 discharges to the City of Flint’s wastewater collection system near Dupont and Pierson Road. Pump Station No. 2 is located at Harry Street and Holtslander Avenue just east of I-475 and Carpenter Road. PS No.2 was abandoned in 1987 when a gravity sewer was built along Premier Street in the City of Flint, which was connected to the City of Flint’s wastewater collection system at the southerly end of Premier Street at Osceola Avenue. The wastewater to both of the City of Flint’s connections is ultimately treated at the City of Flint’s wastewater treatment plant, which discharges the treated effluent to the Flint River.

The District has a history of wastewater backing up into basements and overflowing into storm drains. These backups and overflows are a result of excessive rainwater entering the wastewater collection system during rain events. This is referred to as Rainfall Derived Inflow and Infiltration (RDII). In 2011, the State of Michigan, through the Michigan Department of Environmental Quality (MDEQ), made grant funds available for utilities to apply for to study their wastewater systems. These grant funds were referred to as S2 grants. The Beecher Metropolitan District with assistance from Fleis & VandenBrink, applied for and received S2 grant funds to perform an Inflow and Infiltration (I&I) study to quantify the excessive rainwater entering the wastewater collection system. The total S2 grants amounts were $959,429 with a local match of $106,603. Flow meters were installed near each of the Pump Stations to monitor the flows in the system during rain events. A rain gauge was also installed to determine the amount of rain that fell during the rain events. The District was monitored from March of 2012 to June of 2013. The data collected was quantified and it was determined that the I&I entering the wastewater collection system was exceeding the MDEQ’s levels for excessive I&I. As a result of the I&I study, additional S2 grant funds were obtained to perform a Sanitary Sewer Evaluation Study (SSES) on the wastewater collection system subareas of Pump Station No.5. This SSES was performed to identify how the I&I was entering the wastewater collection system. It was determined that the main source of the I&I was coming from basement footing drains connected to the sanitary leads from the buildings throughout the subareas of Pump Station No.5. The buildings in these subareas were built in the early 1960’s and it was common at that time to connect basement footing drains to the sanitary leads. At that time, the footing drains were not considered to be adding excessive I&I to the wastewater collection system. However, due to basement backups and overflows to storm drains, many I&I studies were conducted throughout the State of Michigan and the United States since the 1980's. These studies have determined that basement footing drains do contribute excessive I&I to the wastewater collection system. A condition of the S2 grant required the District to construct a project to address a problem of the wastewater collection system. The District, with assistance from Fleis & VandenBrink, evaluated funding options and construction project options to satisfy the S2 grant requirements. The District consulted with the United States Department of Agriculture – Rural Development (USDA-RD) program to determine the District's eligibility for low interest loans and grant funding. It was determined that the District was eligible for USDA-RD loans and grants.

In 2016, the District, with assistance from Fleis & VandenBrink, applied for and received a low interest loan along with grant assistance from the USDA-RD to construct a project to satisfy the S2 grant requirements. The low interest loan amount was $3,168,00 along with a grant amount of $3,000,00. A preliminary engineering report was prepared and submitted for a project to address the excessive I&I including other necessary improvements to the District's wastewater collection system. It was determined that a detention facility was the cost-effective option to address the excessive rain water entering the wastewater collection system near PS No.3. This facility would store the excessive I&I and reduce the basement backups and overflows in the area up to the required 25-year, 24-hour design storm event. The other improvements to the system included an overhaul of Pump Station No.3, which was direly needed since the station was originally constructed back in 1952. PS No.3 is 66 years old and still had its original piping and pumps, which have only been maintained over the years. Both the detention facility and the PS No.3 upgrades are currently being constructed in 2018 with final completion expected in 2019. Earlier this year, the District, with assistance from Fleis & VandenBrink, applied for another low interest loan from the USDA-RD and received it along with grant assistance. The low interest loan amount is $1,290,000 with a grant amount of $2,825,000. This loan and grant will allow the District to make additional improvements to the wastewater collection system including improvements to some of the other pump stations and point repairs, lining, or replacements of failed parts of the gravity piping system.

Condition Assessment and Expected Useful Life

A comprehensive evaluation of the collection system was performed. NASSCO-MACP manhole field-based assessments were completed on 1,044 manhole structures. Pipeline cleaning and NASSCO-PACP CCTV field-based inspections were conducted on 25% of the gravity pipe. A low interest loan and grant was received from the United States Department of Agriculture – Rural Development (USDA-RD) program to make improvements to the District's collection system upstream from Pump Station No. 3, including improvements to Pump Station No. 3. A capacity analysis was completed on major assets during this USDA-RD work. Recommendations for short-term (1-5 year) and long term (6-20 year) identified the need for maintenance with 57% of the system tagged for inspection and/or cleaning. Rehabilitation accounted for 29% of the system identifying the need for point repairs, lining and replacement. The remaining 14% of assets were placed in the 20+ year category. The condition of the assets at the pump stations range from fair to poor. Ongoing maintenance has also upheld the condition of many assets while other assets have deteriorated due to age and the harsh conditions associated with typical wastewater collection systems. The recommendations for short- and long-term improvements are relatively extensive.

LEVEL OF SERVICE

Defining the Expected Level of Service (LOS)

The overall objective of the District Wastewater Department is to provide reliable wastewater collection and treatment services at a minimum cost, consistent with applicable environmental and health regulations. To achieve this, the following Level of Service (LOS) goals are proposed:

LEVEL OF SERVICE STATEMENT

- Provide adequate collection system capacity for all service areas.
- Maintain capacity for community development and redevelopment.
- Comply with regulatory requirements.
- Provide for the health and safety of all employees and customers.
- Actively maintain collection system assets in reliable working condition.
- Reduce overflows and basement backups.
- Have adequate staffing to conduct routine operations and maintenance, as well as respond to emergency situations.
- Perform routine cleaning and rehabilitation of system problem areas and defects.
- Regularly review projected operations & maintenance (O&M) and capital expenditures budget.
- Maintain sound financial management to generate sufficient revenue and adequate financial reserves for O&M and periodic capital improvements.
- Provide efficient operations to keep user costs as low as possible while maintaining level of service desired.

The LOS goals may need to be adjusted from time to time as the utility ages, the needs of the community change or new rules or regulations require a change in operation. For this reason, the LOS goals should be reviewed by the District from time to time to make sure they accurately reflect the desired operation of the utility.

Measuring Performance
In order to assure that LOS goals are met, performance measurements may need to be implemented. During the LOS review with the community, the need for performance measurements was discussed.

Critical Assets

Determining Criticality
Business Risk is the determination of the criticality of each asset in the wastewater system. Criticality is based on two factors; Likelihood (Probability) of Failure and Consequence of Failure using the following formula:

Business Risk = Consequence of Failure Score x Likelihood of Failure Score

Defining an asset's Business Risk allows for management of risk and aids in decision making for where to allocate operation and maintenance and capital improvement funds.
Likelihood of Failure (LoF) is a measure of how likely an asset is to fail. The following categories have been developed to quantify how likely an asset is to fail:

- Condition of the asset
- Remaining useful life (Age)
- Service History
- Operational status

Consequence of Failure (CoF) is a measure of the social, economic, financial or environmental impact of failure of an asset and the utilities ability to respond, convey and treat wastewater. CoF categories of the collection system include:

- Proximity to critical environmental features
- Location (Zoning District) of asset
- Facilities served by asset
- Size and location of asset within the utility network
- Type of asset.

The pump station categories for CoF are:

- Process
- Financial Impact
- Safety
- Environmental Impact
- Disruption to the Community
- Ability to Respond

<u>Criticality Results</u>
Using the strategy outlined above, a Business Risk Evaluation (BRE) was performed for each asset using a graphical ArcGIS-based sewer asset management and capital planning software that compiles, analyzes and assesses Business Risk for each asset and develops a Capital Improvement Plan. The results of the BRE are provided in easily understood tabular and graphical output.

Figure 1 provides the risk rating for gravity and forcemain pipe by number of pipe segments. One hundred and one (101) pipe segments in the collection system have an extreme risk rating and are recommended to be replaced. Much of the collection system's gravity pipes, 68 percent as shown in Figure 1, have a low to negligible risk rating and are indicative of pipes or manholes in relatively good condition.

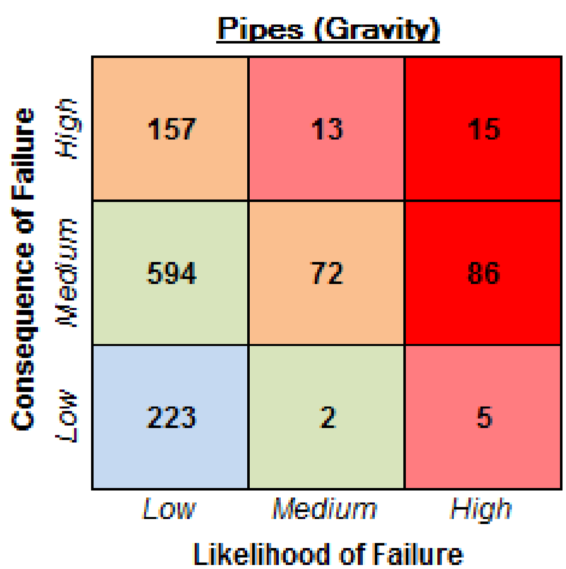


Figure 1. Business Risk Matric (Risk Rating) by Number of Gravity Pipes

Figure 2 provides the risk rating for the collection system manholes. Nine (9) manholes are identified as extreme risk. Many manholes are at low to medium risk and recommended to be included in a long-term 6-20-year rehabilitation strategy (91 percent).

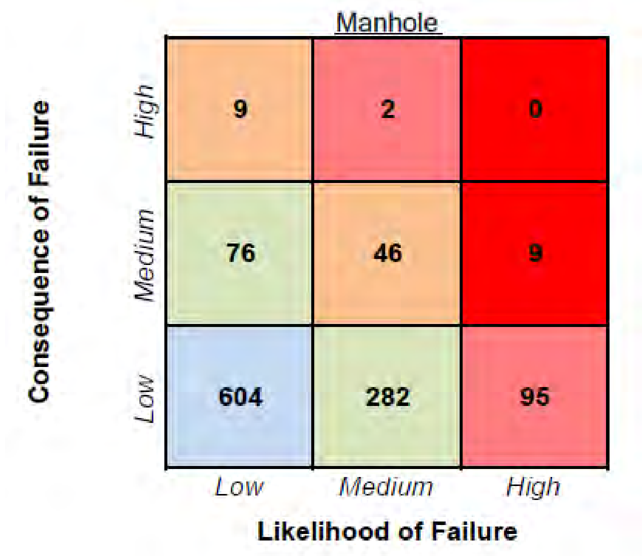


Figure 2. Business Risk Matrix (Risk Rating) by Number of Manholes

Figure 3 provides the risk ratings for the pump station assets. No assets are identified as extreme risk. The twenty-seven (27) assets with high risk ratings should be inspected at regular intervals.

Consequence of Failure		Low	Medium	High
	High	0 *(High)*	0 *(High)*	0 *(Extreme)*
	Medium	5 *(Low)*	17 *(Medium)*	27 *(High)*
	Low	15 *(Low)*	1 *(Low)*	52 *(Medium)*

Probability of Failure

Figure 3. Business Risk Matrix (Risk Rating) for Pump Station Assets

A spreadsheet providing asset criticality for each utility asset has been included in the AMP detailed report for the collection and treatment systems.

CAPITAL IMPROVEMENT PLAN

A Capital Improvement Plan (CIP) with rehabilitation recommendations was prepared for the Beecher Metropolitan District's wastewater utility assets based on the Business Risk evaluation. The CIP recommendations are provided for the collection system, and pump stations/force mains. From the BRE, a short-term (1-5-year CIP) and long-term (6-20-year) CIP was developed for the utility.

Table 4a. shows detailed recommendations of the collection system and pump station assets needing rehabilitation in the short-term CIP (1-5-year CIP).

Table 4a: Capital Improvement Plan Summary by Year

Project Description	Rehabilitation Fiscal Year					Total
	2019	2020	2021	2022	2023	
Collection System Improvements						
Gravity Sewer Replacement	$	$	$	$	$	$
Gravity Sewer Point Repair	$400,000	$	$	$	$	$400,000
Gravity Sewer Lining	$	$	$	$	$	$
Gravity Sewer Lead Disconnect	$1,000,000					$1,000,000
Manhole Rehabilitation	$250,000	$	$	$	$	$250,000
Subtotal Collection System Improvements	$1,650,000	$	$	$	$	$1,650,000
Pump Station Improvements						
Pump Station Improvements	$1,750,000	$	$	$	$	$1,750,000
Subtotal Pump Station Improvements	$1,750,000`	$	$	$	$	
Total Project Cost	$3,400,000*	$	$	$	$	$3,400,000*

*Funding being provided by a USDA-Rural Development low interest loan and grant project.

Table 4b. shows the recommendations of the collection system and pump station assets needing rehabilitation in the long-term (6-20-year CIP).

Table 4b: Capital Improvement Plan 6-20 Year	
Description	**6-20 Year**
Collection System	
Known Collection System Rehabilitation	$2,382,339
Known Manhole Rehabilitation	$153,616
Known Pump Station Rehabilitation	$232,000
Projected Collection System Rehabilitation	$2,591,851
Projected Manhole Rehabilitation	$405,411
Total Rehabilitation Cost	**$5,765,217****

*Costs based on 2018 construction dollars
** Projects will only be completed if funding becomes available in the form of a low interest loan and 75% grant.

OPERATIONS, MAINTENANCE & REPLACEMENT

Regular operation, maintenance and replacement (OM&R) is essential in the management of a wastewater collection system. The collection system is subject to a variety of operational problems and can suffer from clogging, scour, corrosion, and collapse. Inspection, cleaning, and rehabilitation are important for optimizing the proper functioning of the collection system. By optimizing the performance, infiltration/inflow are reduced and sanitary sewer overflows (SSO) are minimized or eliminated preserving the substantial investment the community has in its collection system.

Table 5 summarizes the recommended preventative maintenance inspections to be considered in the short-term (1-5 years) with recommended cost over the 5-year period.

Table 5 Collection System Maintenance Summary Table: Year by Year						
Maintenance Assessment	**Total Cost (Current Year Dollars)**	**2019**	**2020**	**2021**	**2022**	**2023**
Manhole Assessment	$60,255	$	$	$	$65,842	$
Manhole Cleaning	$70,699	$5,624	$	$	$	$73,243
CCTV – Cleaning	$704,175	$	$	$10,000	$10,000	$10,000
CCTV – Heavy Cleaning	$28,191	$	$	$	$	$

Beecher will need to add a budget line item to complete additional CCTV work or secure a low interest loan with a 75% match.

An annual equipment replacement fund should be developed to replace disposable equipment. These are items that can be financially accounted for through operation, maintenance and replacement (OM&R) funds and can be replaced by the District's staff without bringing in an outside contractor. Existing disposable materials include chemicals, wear parts in pumps and motors, laboratory instruments, etc. The existing OM&R fund is sufficient for the current operations.

REVENUE STRUCTURE

The revenue and rate methodology is an instrument to determine user rates and charges that will provide sufficient revenues to pay for utility operating costs. A rate methodology dated April 5, 2018 was completed and it was determined that the existing rates provide sufficient funds for the day-to-day maintenance and operations of the wastewater system. The MDEQ reviewed the information contained in the rate methodology and determined in a letter dated May 3, 2018 that significant progress has been made toward achieving the funding structure necessary to implement the program.

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date **November 24, 2018**
(no later than 3 years from executed grant date)

The **Beecher Metropolitan District** certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. **1662-01** have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e (3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: No
   If No - Date of the rate methodology approval letter: **May 3, 2018** ____________.
2) Significant Progress Made: Yes or No
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: ____________.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ____________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Kevin Forbes	at **810-787-6526**	**kevin@beecherwater.us**
Name	Phone Number	Email

[signature] 11-27-2018
Signature of Authorized Representative (Original Signature Required) Date

Kevin Forbes Administrative Superintendent
Print Name and Title of Authorized Representative

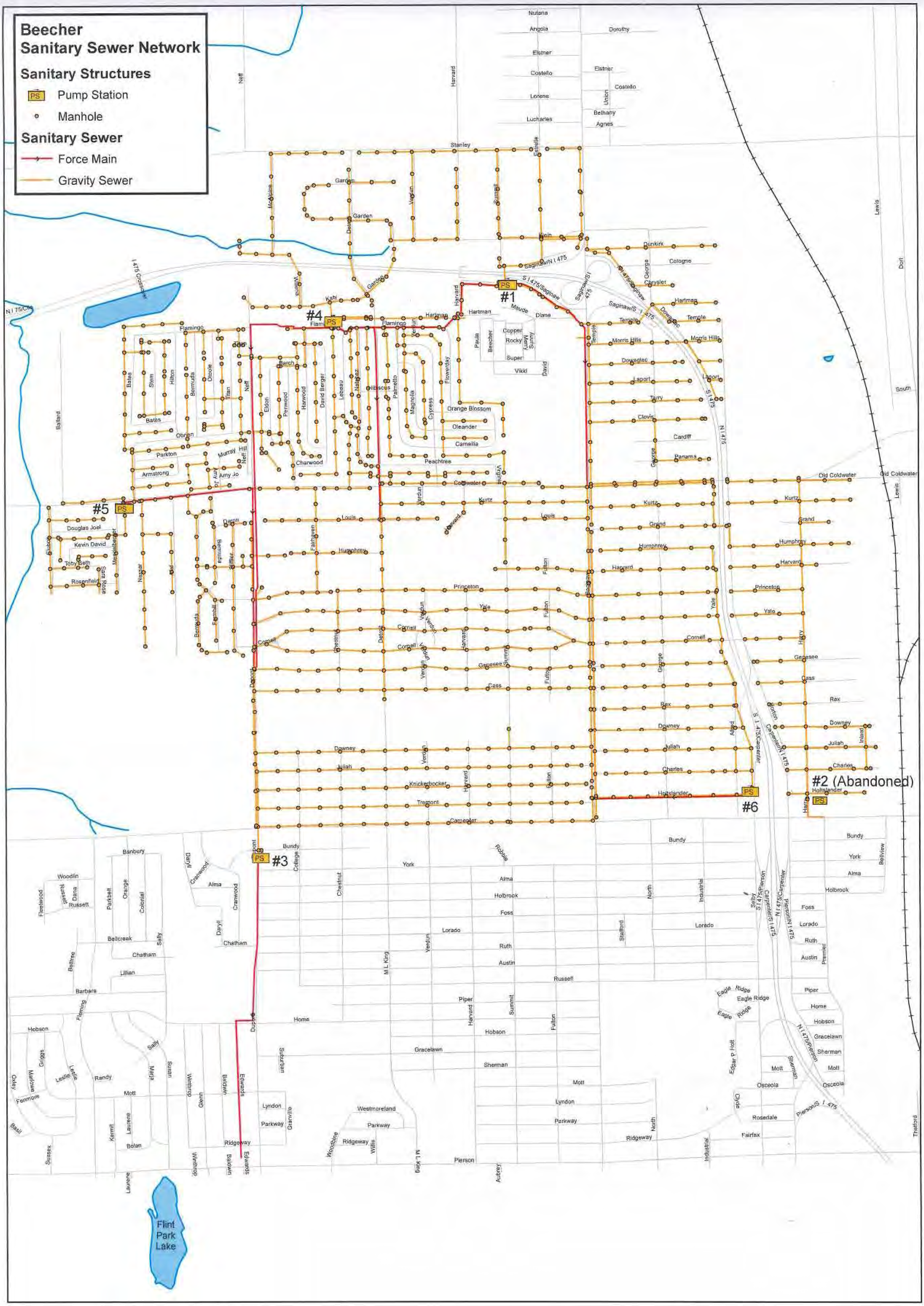


FIGURE	DRAWN BY	DATE
A-1	AFB	10/2/2018
	PROJECT NO.	SCALE
	817260	1:16,000
	FILE LOCATION	
	SOURCES	

Beecher Metropolitan District

Sanitary Collection System

FLEIS&VANDENBRINK
DESIGN. BUILD. OPERATE.

Township of Bergland
101 Pine Street
Bergland, MI 49910
Mr. Dave Roberts, Township Supervisor
SAW Grant Project No. 1351-01

SANITARY SEWER EXECUTIVE SUMMARY

Executive Summary

The Township of Bergland (Township) received $162,391 in funding through the Michigan SAW grant program in November of 2015 to develop an Asset Management Plan for their sanitary sewer system. The following is a summary of the findings:

An Asset Management Plan is a long-range planning document used to provide a rational framework for understanding and documenting Township-owned assets, service levels, risks and financial investments. The intent of asset management is to ensure the long-term sustainability of the City. By assisting the City to make better decisions when to repair, replace or rehabilitate particular assets and by developing a long-term funding strategy, the City can ensure its ability to deliver the required level of service perpetually.

The major components of the Asset Management Plan includes the following:

- Asset Inventory and Condition Assessment
- Level of Service
- Criticality (Consequence of Failure) of Assets
- Operation and Maintenance Strategies/Revenue Structure
- Long-term Funding/Capital Improvement Plan

Wastewater Asset Inventory

The Township wastewater system components consist of the following:

- Collection System (force mains, gravity pipes, manholes)
- Collection System Mechanical (lift stations, grinder stations)
- Wastewater Storage Lagoons (WSL's)
- Mobile Assets

The collection system assets were GPS located in the field and their location inserted on an aerial map to show the asset location in relation to easily referenced locations. Component specific information such as size, elevation, year constructed, material, condition rating, notes, etc. is in Excel spreadsheet format.

Asset components, such as lift station components and WSL asset components are located in Excel spreadsheets that are readily updated by the Township.

Condition Assessment

The sanitary sewer system asset condition was measured by the following ranking system:

Condition Rating	Description
5	Unserviceable
4	Significant Deterioration
3	Moderate Deterioration
2	Minor Deterioration
1	New or Excellent Condition

The condition of the sanitary sewer gravity pipe is based on televising, smoke testing, and assumed condition. The assessed condition rating of Township sanitary sewer gravity pipe within the collection system ranges from one to five. The weighted average condition rating of the collection system gravity pipe is 3.3, indicating moderate to mild deterioration of sanitary sewer gravity pipe within the collection system. The condition rating of sanitary sewer forcemain within the collection system is assumed to have a condition rating of 2.1, indicating minor deterioration.

The sanitary sewer manholes within the gravity collection system ranged from 2 to 5, with a weighted average condition rating of 2.9. This indicates an overall condition of moderate deterioration. The sanitary sewer manholes within the force-main collection system ranged from 2 to 4, with a weighted average condition rating of 2.7. This indicates an overall condition of minor to moderate deterioration. The weighted condition rating of the Bergland Lift Station assets is 1.4 indicating new or excellent condition to minor deterioration. The weighted condition rating of the Merriweather Lift Station assets is 1.6 indicating new or excellent condition to minor deterioration. The weighted condition rating of the Grinder Pump Stations is 3.0 indicating moderate deterioration.

The weighted condition rating of the Lagoon assets is 2.3 indicating minor deterioration. The weighted condition rating of the WSL piping is 1.9 indicating minor deterioration. The weighted condition rating of the WSL structures is 2.2 indicating minor deterioration.

<u>Level of Service Determination</u>

Level of service defines the way in which the utility owners, managers and operators want the utility to perform over the long-term. The level of service includes technical, managerial and financial components. The level of service is a fundamental part of how the utility is operated.

The level of service needs to be evaluated and adjusted with time to match system performance, funding, and changes in regulations.

The Township's level of service statement is as follows:

- Regularly inspect all components of the sewer system to ensure proper operation and maintenance.
- Include a System Maintenance budgetary item which will cover routine maintenance, repair and replacement of existing sanitary sewer system components.
- Include a Capital Improvement Fund in the budget to allow for total system replacement in the future.
- Require that all new development which is located within the service area shall comply with applicable County, State, and Federal design and construction standards and the level of service as presented in this AMP.

Criticality (Consequence of Failure) of Assets

To determine the consequence of failure, all possible costs must be considered. These costs include: cost of repair, social cost associated with loss of the asset, repair/replacement costs related to collateral damage caused by the failure, legal costs related to additional damage caused by failure, environmental costs created by the failure, loss of business revenue to the community, and other associated costs or asset losses. The consequence of failure can be high if any one of these costs are significant or the accumulation of several costs occur with failure.

Consequence of failure levels found in the table below shows the ranking system used for the consequence of failure. The description shown for each consequence will be a best fit of one of the items noted. Not all of the description items need to apply.

Consequence	Level	Description
Catastrophic disruption	5	Massive failure, severe health affect, or persistent and extensive damage
Major disruption	4	Major effect, major loss of system capacity, major health effects, major costs or important level of service compromised
Moderate disruption	3	Moderate effect, moderate loss of system capacity, moderate health effects or moderate costs, but important level of service still achieved
Minor disruption	2	Minor effect, minor loss of system capacity, minor health effects or minor costs
Insignificant disruption	1	Slight effect, slight loss of system capacity or slight health effects

Assessing business risk requires examination of the probability of failure, the consequence of the failure and condition. The assets that have the greatest probability of failure and the greatest consequences associated with the failure will be the assets that have the most business risk. An analysis of different assets will reveal which asset has the highest business risk and, therefore, which asset will require the most attention for either repair or replacement.

Business risk is the multiplication of the Probability of Failure number to the Consequence of Failure number and to the Condition of the asset. The resulting number provides a numeric value to business risk. Typically, an asset falling in the range of 1 to 41 would be considered low risk. An asset falling in the business risk range of 42 to 83 will be medium risk. An asset above 84 would be considered high risk. All of the components fall within the low risk range.

Tables B1, B2, B3, B4, B5, B6 and B7 have the criticality of all of the different sanitary sewer systems.

Revenue Structure

It was determined that the current rate structure provides sufficient funds to cover operation, maintenance, replacement and debt costs. The Township operates with a surplus and this trend will continue assuming no change in population. The township does not intend to implement a rate increase, but may want to investigate an increase based on inflation in the future. Potential future capital improvement projects will be funded through a program such as USDA-Rural Development or similar loan. The Township should investigate having 1 rate structure for all users in the system.

Capital Improvement Plan

The Township does not plan to perform any Capital Improvement Project within the next twenty years on their current system or for expanding for new development. The Township is interested in expanding their current system along the west side of Lake Gogebic, possibly as part of LGASA (see Appendix E for that discussion). However the following potential projects have been identified should the need arise or funding become available:

Project	Estimated Replacement Cost (2018 Dollars)
Gravity Sewer System Repairs	$600,000
Gravity Sanitary Sewer Manhole Repairs	$ 62,000
Water Stabilization Lagoons Dredging	$1,320,000
Water Stabilization Lagoons Repairs	$ 365,000

Lake Gogebic Sewer System Expansion

Appendix E is an in depth analysis of options of expanding the Merriweather System along the west shore of Lake Gogebic. This would consist of extending a pressurized sewer line south along the west shore or Lake Gogebic and hooking up individual homes with individual grinder pumps tied into the main pressurized sewer line. The main pressurized sewer line would run north and tie into the Bergland system which runs to the lagoons on the east side of Bergland. Depending on the number of users tied onto the system, there will need to be a lagoon expansion at approximately 182 additional users. The different options

- Original LGASA Plan (South to Gogebic Lodge): 262 EDU's, $10.7MIL project cost
- Project to maximize the sewage lagoons capacity: 182 EDU's, $7.7MIL project cost
- Project to County Line: 101 EDU's, $4.9MIL project cost
- Small Project for 20 users: 20 EDU's, $1.3MIL project cost

USDA Rural Development has taken the stance that in order to provide poverty rate interest rates and grants, that Bergland Township or LGASA must prove that the project area is of poverty income level. Based on past experience, the Township leadership have elected to not perform this costly income survey, due to likely unfavorable results. The monthly costs for all of the different interest rate options are spelled out in Appendix E. They vary greatly from as low as $56/month (would need a favorable income survey for this low interest, high grant scenario) to as high as $500/month for a small project with market interest rates. The median monthly rate is around $200/month (for just sewer), which has been deemed as too high to ask residents to support at this time. Bergland Township will continue to seek other funding opportunities to fund a Lake Gogebic sewer extension project in order to work towards improving water quality of the lake.

List of Major Assets

The Township wastewater system components consist of the following:

- Sanitary Sewer Gravity Pipe: 16,100 Feet
- Sanitary Sewer Forcemain: 76,850 Feet
- Sanitary Sewer Gravity Manholes: 58
- Lift Stations: 2

- Grinder Stations: 199
- Water Stabilization Lagoons (WSL): 3.7 MCF Total Volume Treatment (3 cells)

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date 11/21/18
(no later than 3 years from executed grant date)

The Bergland Township *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1351-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or No
   If No - Date of the rate methodology approval letter: 6/20/18.
2) Significant Progress Made: Yes or No
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: ________.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Paul Anderson at 906 932 5048 panderson@coleman-engineering.com
Name | Phone Number | Email

Paul [signature] 11-21-18
Signature of Authorized Representative (Original Signature Required) Date

Dave Roberts, Township Supervisor
Print Name and Title of Authorized Representative

Township of Bergland
101 Pine Street
Bergland, MI 49910
Mr. Dave Roberts, Township Supervisor
SAW Grant Project No. 1351-01

STORM SEWER EXECUTIVE SUMMARY

Executive Summary

The Township of Bergland (Township) received $162,391 in funding through the Michigan SAW grant program in November of 2015 to develop an Asset Management Plan for their sanitary and stormwater system and to put together planning information for a sewer extension project. Of that $162,391, approximately $8,000 was used to analyze the storm sewer system and prepare the stormwater Asset Management Plan. Field work on the storm system included a visual condition assessment NAASCO MACP inspection of the storm sewer structures. Smoke testing and pipe videoing efforts were primarily focused on the sanitary sewer system, however by smoke testing the sanitary sewer system we were able to confirm that there were not cross-ties into the storm system: which is what is desired. The following compilation of information is the result from the analysis of the storm sewer system.

An Asset Management Plan is a long-range planning document used to provide a rational framework for understanding and documenting Township-owned assets, service levels, risks and financial investments. The intent of asset management is to ensure the long-term sustainability of the Township. By assisting the Township to make better decisions when to repair, replace or rehabilitate particular assets and by developing a long-term funding strategy, the Township can ensure its ability to deliver the required level of service perpetually.

The major components of the Asset Management Plan include the following:

- Asset Inventory and Condition Assessment
- Level of Service
- Critical Assets
- Revenue Structure
- System Maintenance
- Long-term Funding/Capital Improvement Plan

Stormwater Asset Inventory

The Township's stormwater system major assets consist of the following:

- Stormwater Gravity Pipe: 3,000 Feet
- Stormwater Gravity Manholes: 23
- Stormwater Outfalls: 6

The collection system assets were GPS located in the field and their location inserted on an aerial map to show the asset location in relation to easily referenced locations. Component specific information such as size, elevation, year constructed, material, condition rating, notes, etc. is located in an Excel spreadsheet format.

Condition Assessment

The stormwater manholes were inspected by manhole inspectors certified under the Pipeline Assessment Certification Program (PACP) and the Manhole Assessment and Certification Program (MACP) by the National Association of Sewer Service Companies (NASSCO). Each of the manhole components were given a rating of 1 to 5 using the ranking system noted above. An overall rating was given to the manhole based on the worst rating of the components evaluated. The stormwater manholes ranged from 2 to 5, with a weighted average condition rating of 3.2. This indicates an overall condition of moderate deterioration.

Level of Service Determination

Level of service defines the way in which the utility owners, managers and operators want the utility to perform over the long-term. The level of service includes technical, managerial and financial components. The level of service is a fundamental part of how the utility is operated.

The level of service needs to be evaluated and adjusted with time to match system performance, funding and changes in regulations.

The Township's level of service statement is as follows:

- Comply with all State and Federal regulatory requirements at all times.
- Provide for the health and safety of all employees and customers.
- Provide for staff to attend workshops that will educate and present grant opportunities available to the City.
- Customers will receive written notice 24 hours in advance of any planned work that will affect service or access.
- Keep spare components and repair materials available at all times for critical assets.
- Respond to customer complaints within 24 hours of receipt 95% of the time.
- Track customer complaints and locations to identify trouble spots.

Revenue Structure

All maintenance, repairs and replacement of components of the stormwater system is completed within the Township as part of the roadway system. As such, no assessment, user fee or separate fund is setup for maintenance, repairs, or replacement of the stormwater system. All work associated with the stormwater system is considered part of Township streets.

The stormwater system is essentially treated as a component of the roadway and follows that same funding mechanism as a road. Money needed for stormwater system repair, rehabilitation or replacement is budgeted in the local streets fund or major streets fund and typically is derived from taxes levied by the Township.

Funding of stormwater replacement projects may also come from Michigan Department of Transportation (MDOT) Local Agency Program for local streets.

Capital Improvement Plan

The Township does not plan to perform any Capital Improvement Project within the next twenty years. However, the value of the current system has been identified at approximately $450,000 in today's value. Should funding become available for road replacement as part of sewer and water replacement or other project financing, replacement of the storm sewer should be performed at the same time.

List of Major Assets

The Township's storm sewer system major assets consist of the following:

- Stormwater Gravity Pipe: 3,000 Feet
- Stormwater Gravity Manholes: 23
- Stormwater Outfalls: 6

DEQ

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Due Date: November 30, 2018
(no later than 3 years from executed grant date)

The Bergland Township *(legal name of grantee)* certifies that all stormwater asset management plan (SWAMP) activities specified in SAW Grant No. 1351-01 have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SWAMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

Dave Roberts, Township Supervisor at 906-575-3522 township@berglandmi.org, lwsavola@att.net
Name Phone Number Email

David Roberts 11/30/18
Signature of Authorized Representative (Original Signature Required) Date

Dave Roberts, Township Supervisor
Print Name and Title of Authorized Representative

1211 Ludington St.
Escanaba, MI 49829
O: 906.233.9360
www.c2ae.com

BESSEMER AREA SEWER AUTHORITY
ASSET MANAGEMENT PROGRAM SUMMARY

Grantee Information

Bessemer Area Sewer Authority (BASA) SAW Grant
411 S. Sophie St. Bessemer, MI 49911
NPDES: MI0021067

Contact Information for the Grantee

Mr. James Trudgeon
Address: 411 S. Sophie, Bessemer, MI 49911
Phone: 906-667-0900
Email: james.trudgeon@bessemer.mi

SAW Grant Project Number: 1314-01

Executive Summary

The Bessemer Area Sewer Authority (BASA) Asset Management Program (AMP) was created through funding from the Michigan Department of Environmental Quality's SAW Program.

The applicant has formed a SAW team which is composed of Authority officials and board members. The purpose of the team is to develop a mission statement and to discuss and decide upon the Level of Service the system should provide, this impacts cost. The team will meet annually before the Authority's budget process begins.

BASA treats all the sewage from the City of Bessemer, Bessemer Township west of the City and the Powderhorn Area Utility District (PAUD).

The other major components of the program include the asset management spreadsheet (AMS), financial advice recommendations, and filing system.

The AMS utilizes the MDEQ/WEF recommended spreadsheet which is the master compilation tool for the program. It includes worksheets as follow:

1. System information and personnel worksheet
2. Summary- worksheet; listing all assets and calculating the business risk
3. Asset Inventory Sheets
4. Asset Rating Definitions- worksheet
5. Level of Service Statement- worksheet

6. Criticality Calculation – worksheet
7. Probability of Failure - worksheet
8. Budget and Rate formulation worksheet
9. Replacement – worksheet
10. Priority Capital Needs list
11. Timing –of Capital- worksheet labeled RRI
12. Capital Improvement Projects – worksheet
13. Allocation of Capital impacts to the budget
14. Ten Year Forecast – worksheet

A. The System Information and Personnel worksheet contains system basic data.
B. The Summary worksheet lists all system assets, with accompanying data related to asset type, location, capacity or size, material type, estimate of original installation year and costs, expected remaining life and value, the cost of replacement in today's dollars, and data from items 6 and 7 above, plus redundancy due to number of units, which leads to a calculation of business risk observation.
C. The inventory sheets for the various assets are included for detail.
D. The 1-5 rating scales for condition, probability of failure and criticality of asset is found in the asset rating definitions.
E. Level of service statement for the system is developed by the SAW team committee and along with the mission statement is on 5. above.
F. Worksheets 6 and 7 are the calculator worksheets for criticality and probability of failure of a particular asset. These worksheets were only used for major assets where additional documentation was felt necessary. Most cases utilize engineering judgment for the rating decision.
G. The budget and rate sheet is another calculator which includes the operating budget for the system as well as required capital commitment. It makes an assessment of needed operating reserves based on the planned short term replacements needs as well as future capital needs. It also indicates what is being put away to satisfy these requirements.
H. The replacement worksheet derives the depreciated value of the system as well as a calculation of the replacement value.
I. The Capital Improvement sheet is a listing of items suggested by the operations staff.
J. The RRI-Capital worksheet attempts to identify whether an asset needs replacing and when to consider and formulate future capital improvement projects. The timing of improvements.
K. Capital Project Summary indicating future recommended and grouped projects. This is a forecast based on current data, debt retirement, and typical funding agency grouping of project value.
L. Capital forecast to budget assessing the actual budget amounts for future projects.
M. Ten year budget worksheet attempts to identify the work of inflation on the plan over "10 years".

Finally is the data filing system which will include the above and other relevant data.

The Bessemer Area Sewer Authority (BASA) received third round grants as follows:

WAMP

Grant	Local Share	Total
$288,100	$0.00	$288,100

The asset management development procedure generally followed this path:

A. Identifying and numbering all the assets before field efforts begin.
B. The inventory data is used in the construction of a production data base which helps populate the Asset Management Data Base and subsequent Spreadsheet (AMS) as described above.
C. The AMS is the calculating tool for assessing the future viability of the delineated assets and the criticality and future impact on the system overall.
D. The criteria of Business Risk and remaining useful life are used to determine what assets need attention and the cost impact of that attention.
E. This data also leads to the formulation of future capital improvement projects.
F. The data is combined into the system's current operating budget to determine whether sufficient financial reserves are being collected.
G. Membership allocation are calculated.
H. The process is to be revisited annually.

Wastewater

The Wastewater Asset Management Program is call the WAMP.

The WAMP includes all assets found at

A. Wastewater Treatment Facility

The inventory was performed by records research, field visitation, and inspection. Briefly it included;

Treatment Facility

a) Identifying the assets to be tracked
b) An assessment of the effectiveness of the system currently
c) An assessment of the condition of the identified assets through
   i. Testing
   ii. Visual inspection
   iii. Installation and maintenance records
   iv. Age of the asset

The sanitary sewers feeding the plant were completed under the Bessemer, Bessemer Township and Powderhorn Area Utility District (PAUD) AMPs.

The decision was made to utilize the MDEQ offered spreadsheet for compiling and analyzing the data.

The process evaluation for the Wastewater Treatment Facility determined whether the equipment in place was functioning as is needed to maintain regulatory compliance.

The results of the BASA WAMP assessment were as follows.

General

WAMP

The treatment process assessment indicated that the process line is preforming in line with the basis of design and is meeting expected discharge results.

Of the 81 identified treatment assets;

16% were considered low business risk
76% were considered average business risk
8% were considered in need of effort

Criticality of Assets

The criticality of assets was determined based on the following factors;

Treatment Facility

Highly Critical (5 rating)

a) Failure of a component would result in a permit violation.
b) Failure of component would cause another component to fail.

Moderately Critical (3-4 rating)

a) Failure of an asset would result in temporary process upset.
b) Failure of an asset would result in a SCADA system warning.
c) Failure of an asset would result in additional budget impact.

Slightly Critical (1-2 rating)

a) Failure of an asset can be addressed when personnel are available.

Slightly Critical (1-2 rating)

Failure will develop slowly and can be dealt with when personnel are available.

The ranking of an asset has a component of criticality involved but it is only one factor in determining business risk, the other two being redundancy (i.e. back up of the asset) and probability of failure (the condition) of the asset. Our methodology utilizes business risk (ranking 1 to 25) and depreciation (age) of the asset to rank its need for attention and subsequent budget set aside for maintenance or replacement.

Level of Service Determination

The level of services that the system is to offer was determined by the SAW Team to prioritize what the system should offer and how it should respond. Typically four or five major goals were determined and then subdivided into items that should be or not be pursued to meet the goals. These items are placed in a level of service statement with reference in the asset management database. The Level of Services statement is provided in the User Charge Report.

Revenue Structure

The MDEQ spreadsheet was utilized to list and prioritize items which required short term or long term capital infusion. The long term items were grouped into project groups and targeted as future projects under the Capital Improvement Plan, which follows. The intent for these projects is future borrowing with monies being added to the current operating budget for future borrowing applications.

The short term capital needs were identified for operating budget inclusion annually. They may include annual maintenance needs or small replacement items along with large project needs in the first seven years after the project is created.

BASA generates revenue from it two members, the City of Bessemer and Bessemer Township. The Authority bills its member monthly. The SAW system indicates a small annual increase should be implemented. The Board implemented the first increase on September 19, 2018 with four subsequent increases as outlined in the accompanying User Charge Report.

Capital Improvement Plan

BASA has identified three future wastewater capital improvement projects. The first to be pursued in 10 years with others implemented in 10 to 15 year increment. The amounts are large enough to peruse funding through USDA-RD for each increments. Borrowing through the SRF should also be considered.

Project 1 (2020)

Headworks HVAC	$32,000
SCADA Upgrade	$112,000
Excess Flow transmitter & flume	$20,000
Excess return meter & upgrade	$33,000
Aeration Diffuser Replace	$31,000
Clarifier paint	$85,000
Upflow Clarifier baffle	$35,000
New UV Disinfection	$449,000
Upflow Clarifier Test	$15,800

Project 2 (2030)

Duplex Sump Pump, Control Building	\$34,000
Flow Split Structure	\$67,000
Algae Control Cover	\$719,000
Aeration Improvements	\$75,000
Fence	\$9,000
Lagoon effluent booster pumping	\$219,000

Project 3 (2040)

Capacity Increase Biological Treatment	\$770,000

List of Major Assets

Wastewater:

The Wastewater Treatment Facility is an aerated lagoon with headworks and grit removal, final clarifiers, administrative building, and laboratory facilities. The disinfection method is UV. The Plant is rated at 1.5 mgd A 10 million gallon excess flow lagoon is also in line for inflow events.

System Value: $4,660,642
Replacement Value: $7,400,160

RESOLUTION NO. 2018-01

BESSEMER ARE SEWER AUTHORITY (BASA)

RESOLUTION TO IMPLEMENT RATE INCREASES

WHEREAS, The Michigan Department of Environmental Quality awarded a Stormwater/Asset Management /Wastewater (SAW) Grant to the Bessemer Area Sewer Authority (BASA) in the amount of $288,100;

WHEREAS, the BASA was to utilize the SAW Grant monies to make an extensive assessment of all the assets of the BASA sewer plant;

WHEREAS, the said assessment was to be completed over a three-year period and designed to identify all assets of the Authority, to quantify the condition of all assets by assessing the remaining useful lives of assets, future replacement costs and the criticality of all assets, for the purpose of developing an asset management plan;

WHEREAS, the assessment of BASA has been completed and BASA has received the documented results of the assessment, and an asset management and replacement plan was developed;

NOW THEREFORE BE IT RESOLVED, the Bessemer Area Sewer Authority accepts the results of the SAW Grant assessment and will implement a rate structure, to assure funds are set aside for future replacement of assets.

It was moved by _Olsen_ and supported by _Zak_ to adopt BASA Resolution No. 2018-01 and implement the suggested annual rate structure as a result of the SAW Grant assessment, over a 5 year period as follows:

2019/2020: City of Bessemer $343,419; Bessemer Township $59,157
2020/2021: City of Bessemer $344,082; Bessemer Township $59,977
2021/2022: City of Bessemer $344,746; Bessemer Township $60,796
2022/2023: City of Bessemer $345,410; Bessemer Township $61,616
2023/2024: City of Bessemer $346,075; Bessemer Township $62,436

Approved on November 14, 2018.

AYES: Members Olsen, Zak, Ikola

NAYS: Members NONE

RESOLUTION DECLARED ADOPTED.

James K. Trudgeon
BASA Administrator/Clerk

CERTIFICATION

I hereby certify the foregoing is a true and complete copy of a resolution adopted by the Board of Directors of the Bessemer Area Sewer Authority, County of Gogebic, State of Michigan, at a regular meeting held November 14, 2018, and that said meeting was conducted and public notice of said meeting was given pursuant to and in full compliance with the Open Meetings Act, being Act 267, Public Acts of Michigan, 1976, and that the minutes of said meeting were kept and will be or have been made available as required by said Act

James K. Trudgeon
BASA Administrator/Clerk

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date _November 20, 2018________________
(no later than 3 years from executed grant date)

The Bessemer Area Sewer Authority _____ *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1314-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or ~~No~~
   If No - Date of the rate methodology approval letter: ______________________.
2) Significant Progress Made: Yes or ~~No~~
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: May 3, 2018.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on November 14, 2018.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Douglas Olsen ____________ at ______ 906-285-2675 _____ **olsendouglas@sbcglobal.net** ___
Name | Phone Number | Email

Douglas E Olsen 12/21/2018
Signature of Authorized Representative (Original Signature Required) | Date

Douglas Olsen, Chairman
Print Name and Title of Authorized Representative

1211 Ludington St.
Escanaba, MI 49829
O: 906.233.9360
www.c2ae.com

CITY OF BESSEMER
ASSET MANAGEMENT PROGRAM SUMMARY

Grantee Information

City of Bessemer SAW Grant
411 S. Sophie Street, Bessemer, MI 49911
www.cityofbessemer.org

Contact Information for the Grantee

Ms. Charly Loper
Address: 411 S. Sophie Street, Bessemer, MI 49911
Phone: 906-663-4311
Email: charly.loper@bessemermi.org

SAW Grant Project Number: 1087-01

Executive Summary

The City of Bessemer Asset Management Program (AMP) was created through funding from the Michigan Department of Environmental Quality's SAW Program.

The applicant has formed a SAW team which is composed of City officials and members of the public. The purpose of the team is to develop a mission statement and to discuss and decide upon the Level of Service the system should provide, this impacts cost. The team will meet annually before the City's budget process begins.

The program is GIS based which provides a digital map background of the Bessemer sanitary and storm collection systems. The City treats its own sewage and the treatment facility is also included.

The other major components of the program include the asset management spreadsheet (AMS), financial advice recommendations, and filing system; the filing system is accessed through the GIS system.

The AMS utilizes the MDEQ/WEF recommended spreadsheet which is the master compilation tool for the program. It includes (worksheet ordered as follows):

1. System information and personnel worksheet
2. Summary- worksheet; listing all assets and calculating the business risk
3. Asset Rating Definitions- worksheet
4. Level of Service Statement- worksheet
5. Criticality Calculation – worksheet

6. Probability of Failure - worksheet
7. Budget and Rate formulation worksheet
8. Replacement - worksheet
9. Timing - worksheet
10. Capital Improvement Project – worksheet
11. Ten Year Forecast – worksheet

A. The System Information and Personnel worksheet contains system basic data.
B. The Summary worksheet lists all system assets, with accompanying data related to asset type, location, capacity or size, material type, estimate of original installation year and costs, expected remaining life and value, the cost of replacement in today's dollars, and data from items E and F above, plus redundancy due to number of units, which leads to a calculation of business risk observation.
C. The 1-5 rating scales for condition, probability of failure and criticality of asset is found in the asset rating definitions.
D. Level of service statement for the system is developed by the SAW team committee and along with the mission statement is on D. above.
E. Worksheets E and F are the calculator worksheets for criticality and probability of failure of a particular asset. These worksheets were only used for major assets where additional documentation was felt necessary. Most cases utilize engineering judgment for the rating decision.
G. The budget and rate sheet is another calculator which includes the operating budget for the system as well as required capital commitment. It makes an assessment of needed operating reserves based on the planned short term replacements needs as well as future capital needs. It also indicates what is being put away to satisfy these requirements.
H. The replacement worksheet derives the depreciated value of the system as well as a calculation of the replacement value.
I. The timing worksheet attempts to identify whether an asset needs replacing and when to consider and formulate future capital improvement projects.
J. Capital Improvement Plan indicating future possible projects. This is a forecast based on current data, debt retirement, and typical funding agency grouping of project value
K. Ten year budget worksheet attempts to identify the work of inflation on the plan over "10 years".
L. A twenty year cash flow forecast is included to assist in the formulation of utility rates. It also includes the detailed level of service statement and detailed capital improvement forecast.

Finally is the data filing system which will include items such as, the system televising data, the hydraulic model, easements, user information and other relevant data.

The City of Bessemer received third round grants as follows:

WAMP

Grant	Local Share	Total
$535,260	$0	$535,260

SAMP

Grant	Local Share	Total
$262,880	$29,210	$292,090

The asset management development procedure generally followed this path:

A. Identifying and numbering all the assets before field efforts begin.
B. A survey team gathered all GPS coordinates of items such as manholes in the field.
C. A digital orthographic photo was developed using aerial photography to create a GIS system background.
D. A Sewer system layer was created in the GIS system to locate the various assets.
E. A field team inspected and using the NASSCO rating system inventoried and detailed the in-ground assets. Field inspections, records research, capacity testing where needed, and management/staff interviews were used to inventory pump stations and treatment facility components.
F. The inventory data is used in the construction of a production data base which helps populate the Asset Management Data Base and subsequent Spreadsheet (AMS) as described above.
G. The AMS is the calculating tool for assessing the future viability of the delineated assets and the criticality and future impact on the system overall.
H. The criteria of Business Risk and remaining useful life are used to determine what assets need attention and the cost impact of that attention.
I. This data also leads to the formulation of future capital improvement projects.
J. The data is combined into the system's current operating budget to determine whether sufficient financial reserves are being collected.
K. Rate impacts are then considered.
L. The system operators are then trained by IGI in the GIS system use and maintenance
M. The process is to be revisited annually.

Wastewater and Stormwater Asset Inventory

The program included two components under different grant offers. The Wastewater Asset Management Program is call the WAMP and the corresponding Stormwater Asset Management Program is called the SAMP.

The WAMP includes:

A. All collection system components

The SAMP includes all assets making up

A. The stormwater collection system
B. The ditches, culverts, and drainage structures

The inventory was performed by records research, field visitation, and inspection. Briefly it included;

Collection systems both sanitary and storm

a) Name and label all manholes
b) Acquire GPS coordinates of all these structures
c) Visually inspect all manholes structures as per NASSCO dictated methodology.
d) Televise selected portions of the collection piping and rate per NASSCO
e) Acquire the age (installation year) of all the elements as close as possible.

The decision was made to utilize the MDEQ offered spreadsheet for compiling and analyzing the data.

The manholes condition assessment was gleaned from the field inventories. The NASSCO rating system was utilized to develop a quick rating of the components. In some circumstances engineering judgement was necessary. The process evaluation for the Wastewater Treatment Facility went a step further determining whether the equipment in place was functioning as is needed to maintain regulatory compliance.

The results of the Bessemer WAMP assessment were as follows.

General

WAMP

In ground (1,354 assets)
- 53% were considered low business risk
- 36% were considered average business risk
- 11% were considered in need of effort

SAMP

In ground (1,466 assets)
- 65% were considered low business risk
- 18% were considered average business risk
- 17% were considered in need of effort

Criticality of Assets

The criticality of assets was determined based on the following factors;

Collection System (WAMP & SAMP)

Highly Critical (5 rating)
: Failure of an asset would result in flooding, severe adverse environmental impact, or impede an activity.

Moderately Critical (3-4 rating)
: Failure of an asset would damage properties in high value areas or a large number of users

Slightly Critical (1-2 rating)
: Failure will develop slowly and can be dealt with when personnel are available.

The ranking of an asset has a component of criticality involved but it is only one factor in determining business risk, the other two being redundancy (i.e. back up of the asset) and probability of failure (the condition) of the asset. Our methodology utilizes business risk (ranking 1 to 25) and depreciation (age) of the asset to rank its need for attention and subsequent budget set aside for maintenance or replacement.

Level of Service Determination

The level of services that the system is to offer was determined by the SAW Team to prioritize what the system should offer and how it should respond. Typically four or five major goals were determined and then subdivided into items that should be or not be pursued to meet the goals. These items are placed in a level of service statement with reference in the asset management database.

Revenue Structure

The MDEQ spreadsheet was utilized to list and prioritize items which required short term or long term capital infusion. The long term items were grouped into project groups and targeted as future projects under the Capital Improvement Plan, which follows. The intent for these projects is future borrowing with monies being added to the current operating budget for future borrowing applications.

The short term capital needs were identified for operating budget inclusion annually. They may include annual maintenance needs or small replacement items along with large project needs in the first seven years after the project is created.

We found the operating budget and rate support is current and meets the needs outlined by the WAMP.

The SAMP identified budget considerations which have been delivered to the City's management to determine what should be done and when to align with other possible future utility or street improvements. A twenty year cash flow statement is attached.

Capital Improvement Plan

Bessemer currently has an application before USDA-RD for incorporate of all three capital improvement projects for funding due to very attractive terms. Future capital improvement project scheduling s very dependent on financing this applicate.

Project 1 (2021)

Sanitary Pipe and Manholes $2,400,000

Project 2 (2035)

Sanitary Pipe and Manholes $3,200,000

Project3 (2048)

Sanitary Pipe and Manholes $4,300,000

The SAMP has identified three priority project areas. The City will attempt to pursue these improvements with other utility and street projects.

Project 1 (2028)

Storm Pipe and Manholes	$632,000

Project 2 (2038)

Sanitary Pipe and Manholes	$1,200,000

Project3 (2048)

Sanitary Pipe and Manholes	$2,600,000

List of Major Assets

Wastewater:

The City of Bessemer system does not include pump stations or a treatment facility the piping breakdown is as follows

Mainline Gravity Sewer

	4 inch	1,327 feet
	6 inch	5,179 feet
	8 inch	73,721 feet
	10 inch	25,349 feet
	12 inch	25,598 feet
	15 inch	10,276 feet
	18 inch	9,456 feet
	20 inch	3,049 feet
Total		153,955 feet

System Value: $8,936,491
Replacement Value: $26,186,225

Stormwater:

Sewer & Culverts

3 inch	1,070 feet
4 inch	506 feet
6 inch	1,053 feet
8 inch	2,384 feet
10 inch	1,872 feet
12 inch	15,110 feet
14 inch	64 feet
15 inch	7,287 feet
16 inch	77 feet
18 inch	2,708 feet
21 inch	407 feet
24 inch	21,500 feet
27 inch	0 feet
30 inch	3,675 feet
36 inch	488 feet
45 inch	105 feet
48 inch	299 feet
54 inch	58 feet
60 inch	197 feet

Total 41,205 feet

System Value: $3,019,870

Replacement Value: $8,121,971

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date 11/20/18
(no later than 3 years from executed grant date)

The City of Bessemer *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1087-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: ~~Yes~~ or No

   If No - Date of the rate methodology approval letter: June 21,2018.

2) Significant Progress Made: Yes or No

   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)

3) Date of rate methodology review letter identifying the gap: ________.

4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Charly Loper at (906) 663-4311 charly.loper@bessemermi.org

Name | Phone Number | Email

[signature] 11/20/18

Signature of Authorized Representative (Original Signature Required) | Date

Charly Loper – City Manager

Print Name and Title of Authorized Representative

DEQ

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Due Date 11/20/18
(no later than 3 years from executed grant date)

The City of Bessemer *(legal name of grantee)* certifies that all stormwater asset management plan (SWAMP) activities specified in SAW Grant No. 1087-01 have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SWAMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

Charly Loper at (906) 663-4311 charly.loper@bessemermi.org
Name / Phone Number / Email

[signature] 11/20/18
Signature of Authorized Representative (Original Signature Required) / Date

Charly Loper – City Manager
Print Name and Title of Authorized Representative

SANITARY SEWER SYSTEM ASSET MANAGEMENT PLAN FOR SAW GRANT NO. 1389-01

BLACKMAN CHARTER TOWNSHIP

PETE JANCEK, SUPERVISOR
1990 W. PARNALL ROAD,
JACKSON, MICHIGAN 49201
(517) 788-4345

PREPARED BY:
RIPSTRA & SCHEPPELMAN, INC.
2535 SPRING ARBOR ROAD
JACKSON, MICHIGAN 49203
(517) 789-9898

PROJECT NO: 1311

NOVEMBER 30, 2018

TABLE OF CONTENTS:

Executive Summary:

Public Act 562 of 2012 authorized funding for the Storm Water and Wastewater Asset Management (SAW) Grant Program. In November of 2013, Blackman Charter Township filed a SAW Grant Application with the Michigan Department of Environmental Quality. In November of 2015, Blackman Charter Township was awarded SAW Grant No. 1389-01 for $408,587.00 with a local match of $45,399.00.

This grant covered the following main activities:

1. Clean and televise 281,074 lineal feet of gravity sewer

   267,874 lineal feet of gravity sanitary sewer was cleaned and televised by M & K Jetting &Televising LLC. As a result of this televising there has been 48 manhole repairs, 55 joint repairs and 5,033 lineal feet of gravity sewer lined with fiberglass. There is 5,263 lineal feet of gravity sewer scheduled to be lined with fiberglass in 2019, see pages 2 - 6 for details.

2. Install a flow meter on the Blackman sewer outletting to Leoni Township

   The Leoni Area Sewer Authority has not been able to adopt a standard for sanitary sewer flow meters to be used in their service area. The installation of this proposed flow meter is on hold and will not be funded by the SAW Grant.

3. Purchase Asset Management Software

   After much research, Blackman Charter Township decided their existing ArcView GIS Software was more than adequate for their sanitary sewer asset management. This software was purchased prior to the period of time covered by the Saw Grant.

4. Prepare an Asset Management Plan

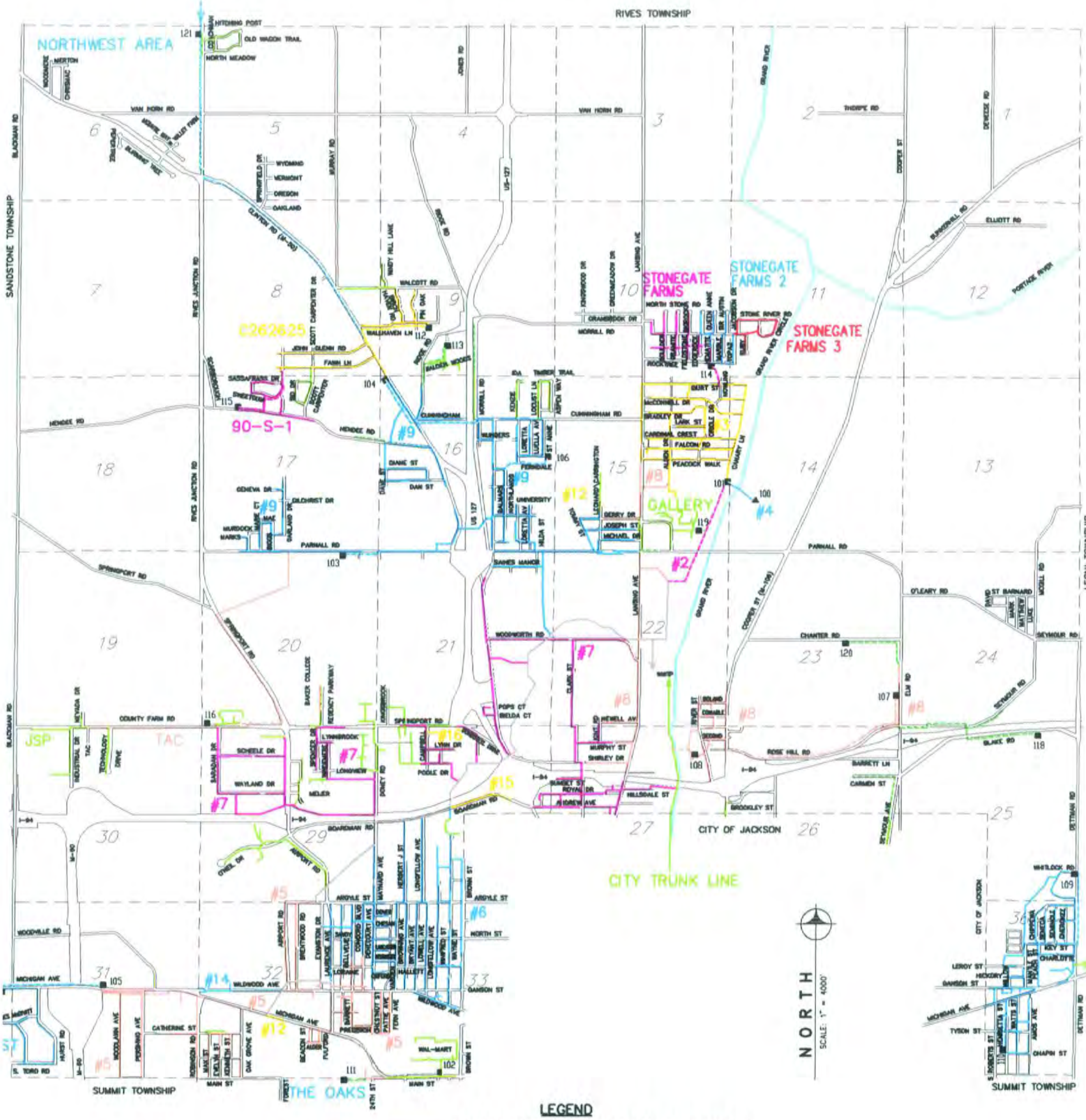
Wastewater Asset Inventory:

Blackman Charter Township has their own sanitary sewer collection system which outlets into the City of Jackson's Wastewater Treatment Facility. As built plans, contracts, inventory records and purchase records were all reviewed to determine the wastewater collection system assets which include air release chambers, bypass pump, cleanout chambers, gravity sewers, manholes, forcemains, generators, grinder stations, manholes and pressure sewers.

A map of the wastewater collection system is shown on page 2.

The summary of wastewater collection system assets are listed on pages 3 – 11.

BLACKMAN TOWNSHIP SANITARY SEWER MAP



LEGEND

GRAVITY SEWER (NO CONTRACT NUMBER)

FORCEMAIN (NO CONTRACT)

GRAVITY SEWER TRUNK LINE (1-R)

#5 SEWER CONTRACT NUMBER

102 LIFT STATION

100 PRISON SCREEN

SECTION LINE

27 SECTION

REVISED: DECEMBER 10, 2014
(S:CAD\93\93001\93001SA1.DWG)

RIPSTRA & SCHEPPELMAN, INC.
CIVIL ENGINEERING - LAND SURVEYING
2535 SPRING ARBOR ROAD
JACKSON, MI 49203
OFFICE 517-789-9898 FAX 517-789-6085

BLACKMAN CHARTER TOWNSHIP FORCEMAIN AND PRESSURE SEWERS

CONTRACT NUMBER	AIR RELEASE CHAMBER	CLEANOUT CHAMBER	FEET OF 3" PIPE	FEET OF 4" PIPE	FEET OF 6" PIPE	FEET OF 8" PIPE	FEET OF 10" PIPE	FEET OF 16" PIPE	YEAR BUILT
1R	0	0	0	0	0	0	2,520	0	1974
2	1	2	0	0	0	0	0	3,886	1973
5	0	1	0	0	0	1,844	0	0	1972
8	3	1	0	0	0	5,343	0	0	1974
9	0	0	0	1,693	0	1,505	1,686	0	1975
10	0	0	0	0	0	2,118	0	0	1974
90-S-1	0	1	0	2,514	0	0	0	0	1990
Blake	1	1	0	0	491	0	0	0	2000
Carmen Drive	2	0	1,472	0	0	0	0	0	1995
Chanter Road	1	0	0	2,285	0	0	0	0	2003
Cooper Street	3	2	1,235	3,252	0	0	0	0	1996
Hendee Road	2	0	880	0	0	0	0	0	1996
Faith Haven	3	4	0	8,500	0	0	0	0	2011
Hurst Park	1	1	0	3,406	0	0	0	0	1996
Morrill Road	1	1	1,400	0	0	0	0	0	1998
Northwest	5	6	0	0	0	11,269	0	0	2007
Oaks	0	0	0	170	0	0	0	0	1975
Parnall Road	2	1	1,472	0	0	0	0	0	1995
Stonegate 1	0	0	0	0	710	0	0	0	1980
TAC	1	2	0	0	0	0	2,495	0	1992
Walden Woods	1	0	0	0	1,564	0	0	0	1981
TOTALS =	**27**	**23**	**6,459**	**21,820**	**2,765**	**22,079**	**6,701**	**3,886**	

BLACKMAN CHARTER TOWNSHIP GRAVITY SEWERS

CONTRACT NUMBER	MH'S	FEET OF 8" PIPE	FEET OF 10" PIPE	FEET OF 12" PIPE	FEET OF 15" PIPE	FEET OF 18" PIPE	FEET OF 21" PIPE	FEET OF 27" PIPE	FEET OF 30" PIPE	FEET OF 36" PIPE	YEAR BUILT	YEAR VIDEO
1R	60	0	0	0	271	2,454	0	5,911	8,556	908	1974	1974
3	62	20,104	0	0	504	1,821	1,797	0	0	0	1973	2014
5	120	34,322	2,066	0	470	1,234	0	0	0	0	1972	2015
6	131	45,982	1,900	0	0	0	0	0	0	0	1974	2017
7	146	30,136	3,585	14,312	0	0	0	0	0	0	1974	2016
8	108	21,950	5,410	0	0	0	0	0	0	0	1974	2016
9	162	35,189	1,202	8,489	6,094	2,266	2,003	0	0	0	1975	2013
10	113	21,503	3,841	583	4,507	0	0	0	0	0	1974	2018
12	3	657	0	0	0	0	0	0	0	0	1974	1974
13	3	947	0	0	0	0	0	0	0	0	1975	1975
14	7	1,246	1,789	0	0	0	0	0	0	0	1974	1974
15	6	1,918	0	0	0	0	0	0	0	0	1987	1987
16	1	397	0	0	0	0	0	0	0	0	1975	1975
90-S-1	19	1,939	0	0	0	0	0	0	0	0	1990	2017
C262625	55	12,682	0	0	0	0	0	0	0	0	1978	2017
Aspen Way	2	880	0	0	0	0	0	0	0	0	1990	2018
Carrington Dr.	3	990	0	0	0	0	0	0	0	0	1995	2018
Cunningham Rd.	3	990	0	510	0	0	0	0	0	0	1996	1996
Hurst Park	29	7,798	0	0	0	0	0	0	0	0	1996	2018
Industrial Dr.	8	0	0	2,622	0	0	0	0	0	0	2001	2001
JSP	5	1,175	0	0	0	0	0	0	0	0	2014	2014
Kingsbrook	5	200	876	0	0	0	0	0	0	0	1975	2018

BLACKMAN CHARTER TOWNSHIP GRAVITY SEWERS CONTINUED

CONTRACT NUMBER	MH'S	FEET OF 8" PIPE	FEET OF 10" PIPE	FEET OF 12" PIPE	FEET OF 15" PIPE	FEET OF 18" PIPE	FEET OF 21" PIPE	FEET OF 27" PIPE	FEET OF 30" PIPE	FEET OF 36" PIPE	YEAR BUILT	YEAR VIDEO
Nevada Dr.	2	485	0	0	0	0	0	0	0	0	1996	1996
North Meadow	11	3,182	0	0	0	0	0	0	0	0	2007	2007
Morrill Road	5	0	1,625	0	0	0	0	0	0	0	1996	1996
Oak Tree Sub.	11	2,764	1,302	0	0	0	0	0	0	0	1979	2018
O'Neil Drive	25	528	4,160	0	0	0	0	0	0	0	1991	2018
Stonegate 1	28	5,542	2,499	0	0	0	0	0	0	0	1980	2018
Stonegate 2	19	3,911	1,649	0	0	0	0	0	0	0	2000	2018
Stonegate 3	14	4,056	0	0	0	0	0	0	0	0	2006	2006
TAC	35	474	0	9,235	0	0	0	0	0	0	1992	1992
Technology Dr.	5	1,428	0	0	0	0	0	0	0	0	2010	2010
Walcott Road	13	3,312	0	0	0	0	0	0	0	0	1998	1998
Walden Woods	16	2,541	0	0	0	0	0	0	0	0	1981	1981
Walmart	12	2,112	0	0	0	0	0	0	0	0	2003	2003
Westwood Mall	6	0	1520	0	0	0	0	0	0	0	1972	2003
TOTALS	**1,253**	**271,340**	**33,424**	**35,751**	**11,846**	**7,775**	**3,800**	**5,911**	**8,556**	**908**		

BLACKMAN CHARTER TOWNSHIP GRINDER STATIONS

(ALL STATIONS ARE HYDROMATIC FIBERGLASS CANS WITH 2 HORSEPOWER SPG-200 PUMPS)

STATION NUMBER	ADDRESS	TYPE	YEAR BUILT	LAST INSPECTION	CONDITION	REPLACEMENT COST
G-1	4710 Pin Oak Trail	Simplex	1990	2018	Fair	$3,000
G-3	2420 W. Michigan Avenue	Simplex	1993	2018	Fair	$3,000
G-4	2911 Walcott Road	Simplex	1995	2018	Fair	$3,000
G-5	2416 W. Michigan Avenue	Simplex	1995	2018	Fair	$3,000
G-6	1100 W. Parnall Road	Simplex	1996	2018	Fair	$3,000
G-7	2300 Seymour Road	Duplex	1996	2018	Fair	$15,000
G-8	2775 Blake Road	Simplex	1997	2018	Fair	$3,000
G-9	3135 Hendee Road	Duplex	1997	2018	Fair	$15,000
G-10	3600 Wayland Drive	Simplex	1997	2018	Fair	$3,000
G-11	4055 Morrill Road	Simplex	1998	2018	Fair	$3,000
G-12	3780 Hendee Road	Simplex	1999	2018	Fair	$3,000
G-13	300 Rosehill Road	Simplex	2001	2018	Fair	$3,000
G-14	2200 Seymour Road	Duplex	2001	2018	Fair	$15,000
G-15	1515 Carmen Drive	Simplex	2002	2018	Fair	$3,000
G-16	2999 W. Michigan Avenue	Simplex	2006	2018	Good	$3,000
G-17	2999 W. Michigan Avenue	Simplex	2007	2018	Good	$3,000
G-18	5591 Morrill Road	Simplex	2002	2018	Fair	$3,000
G-19	2300 Seymour Road	Simplex	2002	2018	Fair	$3,000
G-20	5116 Clinton Road	Simplex	2004	2018	Good	$3,000
G-21	3000 Picture Place	Duplex	2004	2018	Fair	$15,000
G-22	4144 Ridge Road	Simplex	2004	2018	Good	$3,000
G-23	5126 Clinton Road	Simplex	2005	2018	Good	$3,000
G-24	5535 Clinton Road	Simplex	2005	2018	Good	$3,000

BLACKMAN CHARTER TOWNSHIP GRINDER STATIONS CONTINUED

(ALL STATIONS ARE HYDROMATIC FIBERGLASS CANS WITH 2 HORSEPOWER SPG-200 PUMPS)

STATION NUMBER	ADDRESS	TYPE	YEAR BUILT	LAST INSPECTION	CONDITION	REPLACEMENT COST
G-25	3101 Hendee Road	Simplex	2005	2018	Good	$3,000
G-26	2601 Seymour Road	Simplex	2005	2018	Good	$3,000
G-27	4851 Clinton Road	Simplex	2006	2018	Good	$3,000
G-28	6252 Rives Junction Road	Simplex	2006	2018	Good	$3,000
G-29	2418 W. Michigan Avenue	Simplex	2006	2018	Good	$3,000
G-30	2400 Seymour Road	Simplex	2006	2018	Good	$3,000
G-31	2495 Seymour Road	Simplex	2006	2018	Good	$3,000
G-32	2410 Main Street	Simplex	2007	2018	Good	$3,000
G-33	1300 Seymour Road	Duplex	2008	2018	Good	$15,000
G-34	4911 Clinton Road	Simplex	2009	2018	Good	$3,000
G-35	5060 Clinton Road	Simplex	2009	2018	Good	$3,000
G-36	6590 Rives Junction Road	Simplex	2009	2018	Good	$3,000
G-37	6361 W. Michigan Avenue	Simplex	2011	2018	Good	$3,000
G-38	2060 University Street	Simplex	2012	2018	Good	$3,000
G-39	4601 Lansing Avenue	Simplex	3013	2018	Good	$3,000
G-40	2853 Walcott Road	Simplex	3013	2018	Good	$3,000
G-41	2601 Seymour Road	Simplex	2013	2018	Good	$3,000
G-42	5840 Clinton Road	Simplex	2015	2018	Good	$3,000
G-43	4910 Clinton Road	Simplex	2016	2018	Good	$3,000
G-44	2700 Cooper Road	Duplex	2017	2018	Good	$15,000
G-45	4841 Clinton Road	Simplex	2017	2018	Good	$3,000
G-46	6217 Rives Junction Road	Simplex	2017	2018	Good	$3,000
				TOTAL REPLACEMENT COST =		**$207,000**

BLACKMAN CHARTER TOWNSHIP LIFT STATIONS

STATION NUMBER	ADDRESS	GPM	TDH	HP	YEAR BUILT	LAST INSPECTION	CONDITION	REPLACEMENT COST
101	105 Peacock Walk	1700	62	50	1974	2018	Good	$200,000
102	1630 W. Michigan Avenue	1100	75	30	1974	2018	Good	$140,000
103	3335 W. Parnall Road	1224	64	40	1974	2018	Fair	$150,000
104	4190 Clinton Road	730	59	30	1974	2018	Fair	$100,000
105	4241 W. Michigan Avenue	250	60	15	1974	2018	Good	$90,000
106	1175 Ferndale Street	240	50	10	1974	2018	Good	$80,000
107	2200 N. Elm Road	320	81	15	1974	2018	Good	$90,000
108	1850 River Street	500	16	15	1974	2018	Fair	$120,000
109	720 N. Dettman Road	500	58	15	1974	2018	Fair	$120,000
110	330 Henrietta Street	200	75	10	1974	2018	Fair	$100,000
111	2440 W. Washington Road	92	34	5	1974	2018	Good	$80,000
112	2817 Wolhaven Road	100	64	10	1978	2018	Good	$90,000
113	5145 Ridge Road	241	36	5	1981	2018	Good	$80,000
114	4651 Lansing Avenue	300	32	5	1981	2018	Good	$80,000
115	3728 Hendee Road	100	74	15	1990	2018	Good	$80,000
116	3580 County Farm Road	640	64	25	1993	2018	Fair	$120,000
117	4891 W. Michigan Avenue	120	94	13	1996	2018	Good	$100,000
118	2901 Blake Road	193	38	8	2000	2018	Good	$80,000
119	1240 W. Parnall Road	230	27	5	2000	2018	Good	$80,000
120	1995 Chanter Road	138	72	10	2000	2018	Good	$90,000
121	6752 Rives Junction Road	313	78	15	2000	2018	Good	$90,000
122	6525 W. Michigan Avenue	77	58	8	2010	2018	Fair	$80,000
							TOTAL REPLACEMENT COST=	**$2,240,000**

BLACKMAN CHARTER TOWNSHIP LIFT STATION GENERATORS

STATION NUMBER	ADDRESS	KW	YEAR BUILT	YEAR INSPECTED	CONDITION	REPLACEMENT COST
101	105 Peacock Walk	125	2006	2018	Fair	$45,000.00
102	1630 W. Michigan Avenue	80	2006	2018	Fair	$40,000.00
103	3335 W. Parnall Road	125	2008	2018	Good	$45,000.00
104	4190 Clinton Road	80	2008	2018	Good	$40,000.00
105	4241 W. Michigan Avenue	50	2008	2018	Good	$35,000.00
106	1175 Ferndale Street	50	2008	2018	Good	$35,000.00
107	2200 N. Elm Road	50	2008	2018	Good	$35,000.00
108	1850 River Street	50	2006	2018	Fair	$35,000.00
109	720 N. Dettman Road	50	2006	2018	Fair	$35,000.00
110	330 Henrietta Street	50	2008	2018	Good	$35,000.00
111	2440 W. Washington Road	30	2008	2018	Good	$30,000.00
112	2817 Wolhaven Road	30	2008	2018	Good	$30,000.00
113	5145 Ridge Road	30	2008	2018	Good	$30,000.00
114	4651 Lansing Avenue	30	2008	2018	Good	$30,000.00
115	3728 Hendee Road	50	2008	2018	Good	$35,000.00
116	3580 County Farm Road	80	2008	2018	Good	$40,000.00
117	4891 W. Michigan Avenue	30	2008	2018	Good	$30,000.00
118	2901 Blake Road	30	2008	2018	Good	$30,000.00
119	1240 W. Parnall Road	30	2008	2018	Good	$30,000.00
121	6752 Rives Junction Road	50	2008	2018	Good	$35,000.00
122	6525 W. Michigan Avenue	30	2010	2018	Good	$30,000.00
				TOTAL VALUE =		**$730,000.00**

BLACKMAN CHARTER TOWNSHIP TRAILER MOUNTED GENERATORS AND PUMPS

GENERATOR NUMBER	FUEL	KW	SINGLE PHASE	THREE PHASE	240 VOLT	480 VOLT	YEAR BUILT	YEAR SERVICED	REPLACEMENT COST
AA	Diesel	100	Yes	Yes	Yes	Yes	1991	2018	$25,000.00
BB	Diesel	100	Yes	Yes	Yes	Yes	1998	2018	$25,000.00
						TOTAL REPLACEMENT COST =			**$50,000.00**

PUMP NUMBER	FUEL	GPM	TDH	HP	FLOAT CONTROL	AUTO START	YEAR BUILT	YEAR SERVICED	REPLACEMENT COST
CC	Diesel	1700	62	50	Yes	Yes	2017	2018	$45,000.00

As a result of the televising program funded in part by the SAW Grant, all observed gravity sewer joints, manholes and pipes in poor condition were repaired or scheduled to be repaired in 2019.

The summary of those repairs are listed on pages 12 – 16.

Air release chambers, cleanout chambers, gravity sewers, grinder stations, forcemains, lift stations, manholes and pressure sewers were recorded by GPS in the field and entered in the Arc View GIS Program. Contractors, date installed, maintenance records and type of material used was entered for the individual components listed in in the Arc View GIS Program.

MAINTENANCE WORK PERFORMED FROM SAW GRANT TELEVISING
GRAVITY CONCRETE MANHOLES REPAIRED DUE TO DETERIORATION

YEAR	CONTRACTOR	CONTRACT NUMBER	MANHOLE NUMBER	COST
2014	Pipe Repair Systems, LLC	9	26	$884
2014	Pipe Repair Systems, LLC	9	72	$310
2014	Pipe Repair Systems, LLC	9	73	$310
2014	Pipe Repair Systems, LLC	9	74	$674
2014	Pipe Repair Systems, LLC	9	75	$310
2014	Pipe Repair Systems, LLC	9	77	$310
2014	Pipe Repair Systems, LLC	9	78	$310
2014	Pipe Repair Systems, LLC	9	74	$674
2014	Pipe Repair Systems, LLC	9	77	$310
2014	Pipe Repair Systems, LLC	9	78	$310
2014	Pipe Repair Systems, LLC	9	84	$418
2014	Pipe Repair Systems, LLC	9	119	$312
2014	Pipe Repair Systems, LLC	9	135	$564
2014	Pipe Repair Systems, LLC	9	138	$600
2014	Pipe Repair Systems, LLC	9	139	$537
2017	IR Construction LLC	6	3	$565
2017	IR Construction LLC	6	6	$415
2017	IR Construction LLC	6	12	$415
2017	IR Construction LLC	6	48	$367
2017	IR Construction LLC	6	49	$367
2017	IR Construction LLC	6	66	$367
2017	IR Construction LLC	6	91	$415
2017	IR Construction LLC	6	82	$415
2017	IR Construction LLC	6	107	$367
2017	IR Construction LLC	6	125	$565
2017	IR Construction LLC	6	127	$565
2017	IR Construction LLC	7	3	$662
2017	IR Construction LLC	7	4	$663
2017	IR Construction LLC	7	19	$343
2017	IR Construction LLC	7	23	$344
2017	IR Construction LLC	7	24	$344

MAINTENANCE WORK PERFORMED FROM SAW GRANT TELEVISING GRAVITY CONCRETE MANHOLES REPAIRED DUE TO DETERIORATION CONTINUED

YEAR	CONTRACTOR	CONTRACT NUMBER	MANHOLE NUMBER	COST
2017	IR Construction	7	25	$344
2017	RJT Construction	7	72	$980
2017	RJT Construction	7	73	$980
2017	RJT Construction	7	74	$980
2017	IR Construction LLC	9	2	$450
2017	IR Construction LLC	9	26	$375
2017	IR Construction LLC	9	30	$561
2017	IR Construction LLC	9	73	$312
2017	IR Construction LLC	9	74	$312
2017	IR Construction LLC	9	115	$450
2017	IR Construction LLC	9	126	$562
2017	IR Construction LLC	9	127	$563
2017	IR Construction LLC	9	129	$367
2017	IR Construction LLC	9	130	$312
2017	IR Construction LLC	9	131	$375
2017	IR Construction LLC	9	133	$375
2017	IR Construction LLC	9	142	$312
			TOTAL	**$22,622**

MAINTENANCE WORK PERFORMED FROM SAW GRANT TELEVISING
GRAVITY SEWER POINT REPAIRS ON LEAKS

YEAR	CONTRACTOR	CONTRACT NUMBER	MANHOLE NUMBERS	PIPE SIZE	COST
2014	Pipe Repair Systems, LLC	9	26 - 29	8"	$1,250
2014	Pipe Repair Systems, LLC	9	42 - 43	8"	$1,250
2014	Pipe Repair Systems, LLC	9	42 - 43	8"	$1,250
2014	Pipe Repair Systems, LLC	9	42 - 43	8"	$1,250
2014	Pipe Repair Systems, LLC	9	65 - 66	15"	$1,250
2014	Pipe Repair Systems, LLC	9	72 - 73	8"	$1,250
2014	Pipe Repair Systems, LLC	9	72 - 73	8"	$1,250
2014	Pipe Repair Systems, LLC	9	74 - 79	8"	$1,250
2014	Pipe Repair Systems, LLC	9	80 - 81	8"	$1,250
2014	Pipe Repair Systems, LLC	9	134 - 135	12"	$1,300
2014	Pipe Repair Systems, LLC	9	137 - 138	12"	$1,300
2014	Pipe Repair Systems, LLC	9	138 - 139	8"	$1,250
2016	RJT Construction	5	63 - 64	18"	$3,500
2016	RJT Construction	5	63 - 64	18"	$3,500
2016	RJT Construction	5	65 - 66	18"	$3,500
2017	RJT Construction	7	2 - 3	12"	$3,000
2017	RJT Construction	7	2 - 3	12"	$3,000
2017	RJT Construction	7	3 - 4	12"	$3,000
2017	RJT Construction	7	3 - 4	12"	$3,000
2017	RJT Construction	7	3 - 4	12"	$3,000
2017	RJT Construction	7	3 - 4	12"	$3,000
2017	RJT Construction	7	3 - 4	12"	$3,000
2017	RJT Construction	7	3 - 4	12"	$3,000
2017	RJT Construction	7	5 - 6	12"	$3,000
2017	RJT Construction	7	5 - 6	12"	$3,000
2017	RJT Construction	7	5 - 6	12"	$3,000
2017	RJT Construction	7	5 - 6	12"	$3,000
2017	RJT Construction	7	5 - 6	12"	$3,000
2017	RJT Construction	7	5 - 6	12"	$3,000
2017	RJT Construction	7	8 - 9	12"	$3,000
2017	RJT Construction	7	8 - 9	12"	$3,000

MAINTENANCE WORK PERFORMED FROM SAW GRANT TELEVISING
GRAVITY SEWER POINT REPAIRS ON LEAKS CONTINUED

YEAR	CONTRACTOR	CONTRACT NUMBER	MANHOLE NUMBERS	PIPE SIZE	COST
2017	IR Construction LLC	7	9 - 10	8"	$2,370
2017	RJT Construction	7	26 - 27	8"	$2,370
2017	IR Construction LLC	7	58- 59	8"	$2,370
2017	IR Construction LLC	7	58- 59	8"	$2,370
2017	IR Construction LLC	7	58- 59	8"	$2,370
2017	IR Construction LLC	7	58- 59	8"	$2,370
2017	RJT Construction	7	66 - 67	8"	$2,370
2017	RJT Construction	7	127 - 128	8"	$2,370
2017	RJT Construction	8	3 - 4	8"	$2,370
2017	RJT Construction	8	3 - 4	8"	$2,370
2017	RJT Construction	8	3 - 4	8"	$2,370
2017	RJT Construction	8	3 - 4	8"	$2,370
2017	RJT Construction	8	3 - 4	8"	$2,370
2017	RJT Construction	8	3 - 4	8"	$2,370
2017	RJT Construction	8	3 - 4	8"	$2,370
2017	RJT Construction	8	3 - 4	8"	$2,370
2017	RJT Construction	8	42 - 43	8"	$2,370
2017	RJT Construction	8	62 - 69	8"	$2,370
2017	RJT Construction	8	64 - 65	8"	$2,370
2017	RJT Construction	8	65 - 65	8"	$2,370
2017	RJT Construction	Kingsbrook	A - B	10"	$2,570
2017	RJT Construction	Kingsbrook	A - B	10"	$2,570
2017	RJT Construction	Kingsbrook	A - B	10"	$2,570
			TOTAL		**$128,710**

MAINTENANCE WORK PERFORMED FROM SAW GRANT TELEVISING GRAVITY CONCRETE SANITARY SEWER LINED WITH FIBERGLASS

YEAR	CONTRACTOR	PIPE SIZE	LENGTH FEET	CONTRACT NUMBER	COST
2014	Insituform Technologies	8"	594	9	$17,243
2014	Insituform Technologies	15"	4,439	9	$184,598
		TOTAL	**5,033**		**$201,841**

PROPOSED MAINTENANCE WORK PERFORMED FROM SAW GRANT TELEVISING GRAVITY CONCRETE SANITARY SEWER TO BE LINED WITH FIBERGLASS

YEAR	CONTRACTOR	PIPE SIZE	LENGTH FEET	CONTRACT NUMBER	ESTIMATED COST
2019	Not Bid at this Time	27"	1,341	1R	$107,280
2019	Not Bid at this Time	15"	326	5	$13,040
2019	Not Bid at this Time	12"	3,596	7	$125,860
2019	Not Bid at this Time	15"	804	10	$32,160
		TOTAL	**5,263**		**$278,340**

PROPOSED MAINTENANCE WORK PERFORMED FROM SAW GRANT TELEVISING PIPE PATCHING ON JOINTS AND CRACKS ON CONTRACT 10 SANITARY SEWER

YEAR	CONTRACTOR	PIPE SIZE	NUMBER PATCHES	LOCATION	ESTIMATED COST
2019	Not Bid at this Time	15"	1	MH0 - MH2	$4,000
2019	Not Bid at this Time	15"	1	MH14A - MH15	$4,000
2019	Not Bid at this Time	15"	1	MH15 - MH16	$4,000
2019	Not Bid at this Time	15"	2	MH20 - MH24	$8,000
2019	Not Bid at this Time	15"	1	MH26 - MH27	$4,000
2019	Not Bid at this Time	8"	2	MH30 - MH32	$5,000
2019	Not Bid at this Time	8"	1	MH36 - MH40	$2,500
2019	Not Bid at this Time	8"	1	MH75 - MH77	$2,500
2019	Not Bid at this Time	8"	2	MH79 - MH80	$5,000
2019	Not Bid at this Time	8"	1	MH91 - MH92	$2,500
		TOTAL	**13**		**$41,500**

Wastewater Asset Rating:

A visual inspection and review of maintenance records was performed on the wastewater assets and they were giving a rating of their condition as good, fair or poor. The following is a summary of those ratings.

ITEM	NUMBER	GOOD	FAIR	POOR
Air Release Chamber	27	81.5%	18.5%	0.0%
Cleanout Chamber	23	69.6%	30.4%	0.0%
Forcemains and Pressure Sewers	63,710’	100.0%	0.0%	0.0%
Gravity Sewers	380,564’	85.9%	12.8%	1.3%
Gravity Manholes	1,253	43.2%	56.8%	0.0%
Grinder Stations	46	65.3%	34.7%	0.0%
Lift Stations	22	68.2%	31.8%	0.0%
Lift Station Generators	21	81.0%	19.0%	0.0%
Lift Station Telemetry	22	100.0%	0.0%	0.0%
Portable Generators	2	0.0%	100.0%	0.0%
Portable Pump	1	100.0%	0.0%	0.0%

Note: Forcemains and pressure sewers cannot be inspected without bypass pumping to allow for cleaning and televising. The expense to perform this operation almost exceeds the cost of installing new forcemains and pressure sewers. Since 1972 Blackman Charter Township has not experienced a failure of a forcemain or pressure sewer due to corrosion or pipe breakage. Where forcemains and pressure sewers have had the interior exposed for connections or relocations the inside of the pipes have always been in good condition. Based upon this experience this entire pipe is being rated as good.

Criticality of Wastewater Assets:

Criticality is an integer value one through five regarding the consequences of failure related to that asset. Based upon this review, the assets were given a critically score based on the following chart:

SCORE	CRITICALLY OF ASSET
5	Catastrophic Disruption
4	Major Disruption
3	Moderate Disruption
2	Minor Disruption
1	Insignificant Disruption

The assets were also given a condition rating with an integer value of one to five. Based upon this review, the assets were given a condition score based upon the following chart:

SCORE	CONDITION ASSESMENT
5	Asset Not Serviceable
4	Significant Deterioration
3	Moderate Deterioration
2	Minor Deterioration
1	New or Excellent Condition

A business risk factor is calculated by multiply the criticality of asset score by the condition score, which scales from 1 (least risk) to 25 (highest Risk). One of the objectives of the Asset Management Plan is to ensure that all of the critical assets have been identified and that Blackman Township has sufficient revenue available to ensure the timely replacement prior to failure. Blackman Township has identified any item with a calculated business risk factors of greater than 15 to be of sufficient risk to require repair or replacement.

The summary of those business risk factor are listed on pages 19.

The only asset scoring above 15 was the 12", 15" and 27" diameter concrete gravity sewer pipe that is badly deteriorated. Those concrete sanitary sewers are scheduled to be cleaned and lined with fiberglass in 2019 at an estimated cost of $278,340.00.

CALCULATED BUSINESS RISK FACTORS

ITEM	QUANTITY	CONDITION SCORE	CRITICALLY SCORE	RISK CALCULATION
Air Release Chambers	5	3	2	6
Air Release Chambers	22	2	2	4
Cleanout Chambers	7	3	2	6
Cleanout Chambers	16	2	2	4
Forcemain & Pressure Sewers	63,710'	2	4	8
Gravity Manholes	176	3	4	12
Gravity Manholes	1,077	2	4	8
Gravity Sewers	4,947'	4	4	16
Gravity Sewers	48,712'	3	4	12
Gravity Sewers	326,905'	2	4	8
Grinder Stations	16	3	3	9
Grinder Stations	30	2	3	6
Lift Stations	6	3	4	12
Lift Stations	16	2	4	8
Lift Generators	6	2	3	6
Lift Generators	17	2	2	4
Lift Telemetry	22	1	3	3
Portable Generators	2	2	2	4
Portable Bypass Pump	1	1	2	2

Level of Service:

The minimum level of service for Blackman Charter Township's sanitary sewer collection system has been set to provide functional wastewater collection from township residents without disruption, discharge events or violations of standard wastewater collection practices. Potential violations include sewage backups on either the surface of the ground, basements or buildings. In order to prevent backups, Blackman Township must maintain the sewer lines by repairing collapsed pipes, removing obstructions from manholes and cleaning sanitary sewer pipes that pose risks due to sizing, slopes or other conditions. Grinder pumps and lift stations must be kept operational and capable of pumping the necessary flows to avoid backups. Proper provisions for backup power must be maintained to avoid backups during electric outages.

The customers of the system are kept informed of maintenance and improvements to the wastewater collection system through the Blackman Township web site, door hangers and first class mailings. A copy of this asset management plan will be available at the Blackman Township office and posted on the website.

Revenue Structure:

Blackman Charter Township uses a flat billing rate for residential customers and a metered billing rate for non-residential users. All users of the Blackman Charter Sanitary Collection System are billed at the monthly rate of $15.00 per residential equivalent unit which is equal to 190 gallons per day, per unit for non-residential users and is broke down as follows:

$6.00 – Treatment Costs
$5.00 – Operation and Maintenance Costs
$4.00 – Replacement Costs
$15.00 – TOTAL MONTHLY RATE

At the beginning of 2018, Blackman Charter Township had $12,849,901.00 in its sanitary sewer account. The past eight years this fund has grown an average of $387,305 per year from interest on investments and sanitary sewer usage revenue.

Maintenance Schedule:

The following is the maintenance schedule used by Blackman Charter Township on their sanitary sewer collection system.

ITEM	MAINTENANCE PROCEDURE	FREQUENCY
Air Release Chambers	Visual Inspection	Once a Year
Cleanout Chambers	Visual Inspection	Once a Year
Forcemain	Visual Inspection	Once a Year
Pressure Sewer	Visual Inspection	Once a Year
Gravity Sewer (Problem)	Cleaning	Every 3 Months
Gravity Sewer	Cleaning	Every 5 years
Gravity Sewer	Televising	Every 20 Years
Manholes (Problem)	Visual Inspection	Every 6 Months
Manholes	Visual Inspection	Every 5 Years
Grinder Stations	Clean & Inspection	Once A Year
Lift Stations	Visual Inspection	Twice a Week
Lift Stations	Maintenance	Every 6 Months
Lift Station Generators	Visual Inspection	Twice a Week
Lift Station Generators	Visual Inspection	Twice a Week
Lift Station Telemetry	Visual Inspection	Twice a Day
Portable Generators	Maintenance	Every 6 Months
Portable Pump	Maintenance	Every 6 Months

25 YEAR CAPITAL IMPROVEMENT PLAN FOR THE BLACKMAN CHARTER TOWNSHIP SANITARY SEWER COLLECTION SYSTEM

$12,849,901	2017 Sewer Fund Balance
$5,000,000	Projected Growth of $200,000 per year for 25 Years
($212,650)	Bid to Replace the Lift Station Telemetry in 2018
($278,340)	Estimated 2019 Pipe Lining Costs
($568,966)	Estimated 2036 - 2040 Sewer Cleaning & Televising Costs
($1,840,000)	Estimated Lift Station Repair or Replacement Costs
($730,000)	Estimated Lift Station Generator Replacement Costs
($207,000)	Estimated Grinder Station Repair or Replacement Costs
($200,000)	Estimated Air Release & Cleanout Chamber Replacement Costs
($25,000)	Estimated Manhole Repair Costs
($200,000)	Estimated Gravity Sewer Point Repairs on Leaks
$13,587,945	**PROJECTED FUND BALANCE IN 2041**

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date November 30, 2018
(no later than 3 years from executed grant date)

The Blackman Charter Township *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1389-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or No NO

   If No - Date of the rate methodology approval letter: July 20, 2018.

2) Significant Progress Made: Yes or No

   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)

3) Date of rate methodology review letter identifying the gap: ________.

4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Jack L. Ripstra at (517) 789-9898 ext.1 jack@ripstra-scheppelman.com
Name | Phone Number | Email

Pete Jancek
Signature of Authorized Representative (Original Signature Required)

November 30, 2018
Date

Pete Jancek Blackman Charter Township Supervisor
Print Name and Title of Authorized Representative

April 2017

City of
BRIGHTON
MICHIGAN

WASTEWATER AND STORMWATER ASSET MANAGEMENT PLAN

NOVEMBER 2018

City of
BRIGHTON
MICHIGAN

WASTEWATER AND STORMWATER ASSET MANAGEMENT PLAN

November 2018
SAW Grant Project Number 1195-01
Tetra Tech Project Number 200-12766-13005

PRESENTED TO

City of Brighton
200 North First Street
Brighton, MI 48116
P +1-810-227-1911

PRESENTED BY

Tetra Tech
7927 Nemco Way, Ste.100
Brighton, MI 48116
P +1-810-225-8400
tetratech.com

EXECUTIVE SUMMARY

In 2015, the City of Brighton was awarded a State of Michigan Stormwater, Asset Management, and Wastewater (SAW) Grant to complete design and management services for the sanitary sewer and stormwater system. The City's SAW Grant provided financial assistance for numerous planning and design services associated with stormwater management, sanitary sewers, and wastewater treatment.

This asset management plan (AMP) is the final item completed as part of the SAW. This AMP has been designed to provide the City with a proactive and sustainable long-term plan to help ensure the well-being of the community and environment.

The AMP approach centers on the following five core elements:

1. Asset Inventory
2. Level of Service
3. Critical Assets
4. Capital Improvement Plan
5. Revenue Structure

Asset Inventory

Existing City Geographic Information System (GIS) information was used as a basis for the plan, and was augmented with survey data, detailed equipment and collection system asset inventories and condition assessments, risk analysis and cost development. To aid in this analysis, as well as simplify annual reporting needs, the system information has been integrated with Lucity™ which was purchased and implemented as part of this program. The Lucity™ software operates as an extension of the GIS and is primarily a work order and capital improvement planning tool aimed to help the City streamline administrative processes and simplify mandatory reporting.

The current replacement value of the City's sanitary sewer collection system is estimated at approximately $30,500,000, with approximately 79 percent of the system cost associated with gravity mains and manholes with the remaining cost attributed to pump station and force mains. ***Table ES-1*** summarizes the quantity and baseline system replacement value (in 2018 $).

Table ES-1. Sanitary Sewer Collection System Asset Summary and Cost

System Component	Quantity (unit)	Baseline System Value (Current Replacement Cost)
Gravity Mains	238,046 feet	$16,500,000
Manholes	1,112 each	$7,300,000
Pressurized Mains	46,536 feet	$3,700,000
Pump Stations	13 each	$3,000,000
Total		**$30,500,000**

The City's Wastewater Treatment Plant (WWTP) includes a collection of 714 assets that represent the total facility processes and are currently estimated to have a replacement value of approximately $30.5 million.

The WWTP and pump station assets are organized by building or treatment process. The buildings or tanks included in the inventory are designated as follows:

- Service Building
  - Laboratory
  - Mechanical Bar Screen
  - Grit Tanks
  - Scum System
  - Ferric Chloride Feed System
  - Chlorine Disinfection System
  - Polymer Feed System for Sludge Handling
  - Sludge Pumping
  - Blowers for Sludge Handling
  - Centrifuges for Sludge Dewatering
  - Plant Effluent Water System
- Oxidation Ditches
- Secondary Clarifiers
- Return Sludge Pump Station
- Tertiary Clarifiers
- Sludge Thickening Tanks
- Sludge Storage Tanks
- Sludge Drying Beds
- Filter Cells
- Irrigation Area
- Irrigation Pump Station

Table ES-2 summarizes the various WWTP elements and the associated replacement value of those assets (in 2018 Dollars).

Table ES-2. WWTP Asset Summary and Cost

Process Location	Assets	Baseline System Replacement Cost
Service Building	376	$5,900,000
Equalization Tank Pump Building	133	$2,800,000
Oxidation Ditches	26	$8,600,000
Secondary Clarifiers	13	$4,400,000
Return Sludge Pump Station	16	$1,400,000
Tertiary Clarifiers	12	$3,200,000
Filter Cells, Irrigation Area, & Pump Station	80	$1,200,000
Sludge Tanks and Drying Beds	23	$2,000,000
Miscellaneous Site Assets	35	$500,000
Total	**714**	**$30,000,000**

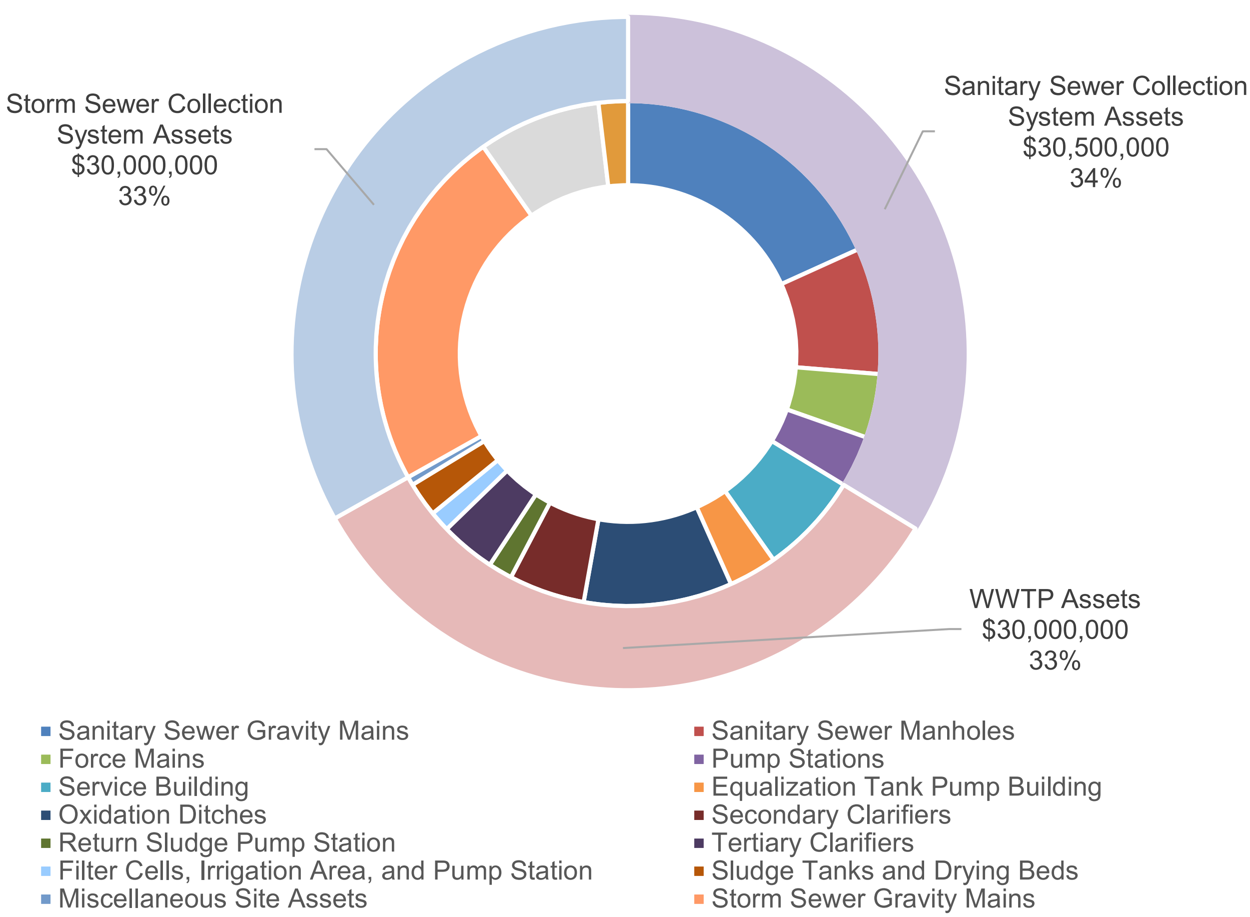
The current replacement value of the City's stormwater collection system is estimated at approximately $30.0 million, with approximately 70 percent of the system cost associated with gravity mains with the remaining cost attributed to manholes and inlets. ***Table ES-3*** summarizes the quantity and baseline system replacement value (in 2018 dollars).

Table ES-3. Storm Sewer Collection System Asset Summary and Cost

System Component	Quantity (unit)	Baseline System Value (Current Replacement Cost)
Gravity Mains	182,869 feet	$21,200,000
Manholes	1,113 each	$7,100,000
Inlets	581 each	$1,700,000
Total		**$30,000,000**

The asset replacement values are summarized in ***Figure ES-1***.

Figure ES-1. Replacement Value for All Assets



Level of Service

A major factor in the quality of community life is the quality of the community's facilities, services and amenities. Level of service is a measure of the amount and/or quality of the public facility which must be provided to meet that community's basic needs and expectations. The City developed a list of key performance indicators to hold as goals for the Level of Service for their sanitary sewer and stormwater facilities, which can be seen below in ***Tables ES-4 and ES-5***. The City currently is meeting all of the listed performance goals and will focus on maintaining this high Level of Service.

Table ES-4. Sanitary Sewer Level of Service Key Performance Indicators

Level of Service Key Performance Indicators
Reduce basement backups
Reduce I/I rates and volumes
Capacity to convey MDEQ design storm / Reduce basement backups
No odor complaints
Clean all sewers at least once in 5-year period
Replace underperforming pump stations
Meet requirements of National Pollutant Discharge Elimination System (NPDES) permit
Implement equipment inventory and maintenance tracking system

Table ES-5. Storm Sewer Level of Service Key Performance Indicators

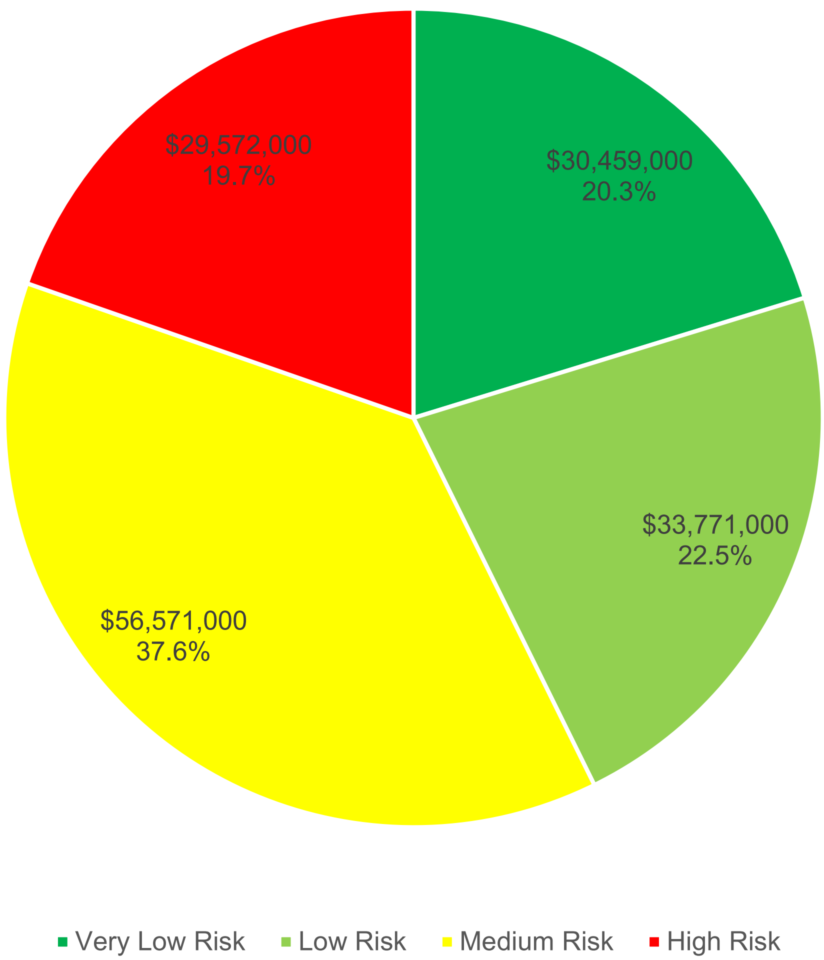
Level of Service Key Performance Indicators
Reduce building or residential home flooding
Reduce extended roadway flooding
Capacity to convey City required design storm
Reduce pollution / Dumping
Clean all sewers at least once in 4-year period
Implement Equipment Inventory and Maintenance Tracking System

Critical Assets

The evaluation of risk and consequence of failure is based on condition assessment information collected as part of this AMP. In many cases, inspections of assets were conducted to prepare condition assessment. However, the available budget did not support inspecting every asset. When an asset was not inspected, the condition was inferred based on the age of the asset and the condition of similar assets that were inspected. The intent is to transition all assets in the GIS model from an age-based system to a condition-based system as additional investigation and assessment information is collected.

Critical assets were developed by determining the Consequence of Failure (COF) and the Probability of Failure (POF) for each asset. The Business Risk Exposure (BRE) was calculated by multiplying the COF by the POF. A summary of the BRE values for all sanitary collection system, WWTP and stormwater collection system assets is presented in ***Figure ES-2***.

Figure ES-2. BRE Summary for All Assets by Replacement Value



Capital Improvement Plan

A 20-year capital improvement plan was developed for both the sanitary sewer collection system, WWTP, and stormwater collection system using the results of the business risk evaluation conducted in this AMP. The capital improvement plan shown in ***Table ES-6*** identifies areas in the sanitary collection system and specific parts of the WWTP processes where funding should be spent on the sanitary sewer infrastructure over the next 20-years. Similarly, the capital improvement plan shown in ***Table ES-7*** identifies areas in the stormwater collection system where funding should be spent on the stormwater system infrastructure over the next 20-years. These capital improvement plans should be routinely updated to ensure that it includes short- and long-term needs and will provide the City with defensible documentation for setting aside and safeguarding funds for projects.

Table ES-6. City of Brighton Sanitary 20-Year Capital Improvement Plan (2019-2038)

City of Brighton Sanitary 20-year Capital Improvement Plan (2019-2038)				
Project Number	Description	Project Year	Project Cost	Funding Source
CIP_PS_7	Rickett Road PS Impellor Upgrades (PS-4)	2019	$9,000	Capital Outlays[1]
CIP_PS_1	Brighton Cove Lift Station Replacement (PS-1)	2019-2020	$350,000	Capital Outlays[1]
CIP_PS_4	Third Street PS Rehabilitation (PS-13)	2020-2023	$15,000	Capital Outlays[1]
CIP_PS_5	Pine Creek PS 1 Rehabilitation (PS-6)	2020-2023	$315,000	Capital Outlays[1]
CIP_PS_6	Brighton Lake Rd PS Impellor Upgrade (PS-3)	2020-2023	$15,000	Capital Outlays[1]
CIP_SAN_1	Flint and N East Street Sewer Replacement	2020-2023	$995,000	Capital Outlays[1]
CIP_SAN_2	O'Doherty Rd Sanitary Sewer Lining	2020-2023	$195,000	Capital Outlays[1]
CIP_SAN_7	Northwest Neighborhood Street Improvements	2020-2023	$3,180,000	To Be Determined
CIP_SAN_9	Rickett Road Sanitary Sewer Replacement	2019-2020	$680,000	Capital Outlays[1]
CIP_WWTP_1	Replace 2 Air Compressors	2019	$40,000	Capital Outlays[1]
CIP_WWTP_2	Plant Lighting	2019	$11,000	Capital Outlays[1]
CIP_WWTP_3	Sand Bed Replacement ($100,000/yr)	2020-2023	$300,000	Capital Outlays[1]
CIP_WWTP_4	New WAS Pump and Centrifuge Feed Pump	2020-2023	$50,000	Capital Outlays[1]
CIP_WWTP_5	Screw Pump - Rebuild and Paint	2021-2023	$200,000	Capital Outlays[1]
CIP_WWTP_6	Replace Grit and Screen Conveyor Belt	2019-2020	$12,000	Capital Outlays[1]
CIP_WWTP_7	Replace Generator Switch Gear	2020-2023	$60,000	Capital Outlays[1]
CIP_WWTP_8	Irrigation Bed Improvements	2019	$100,000	Capital Outlays[1]
CIP_WWTP_9	Oxidation Ditch No.1 - 2 Rotor Plate Rehab.	2020-2023	$125,000	Capital Outlays[1]
CIP_WWTP_10	Rebuild Grit Pump	2020-2023	$5,000	Capital Outlays[1]
CIP_WWTP_12	Roof Replacement - WWTP	2023	$190,000	Capital Outlays[1]
CIP_WWTP_13	Replace Flow Meters	2020-2023	$90,000	Capital Outlays[1]
CIP_WWTP_16	Ox Ditch 3 Rotor Plate Rehab & Grit Removal	2021-2023	$60,000	Capital Outlays[1]
CIP_WWTP_17	Refurbish Tertiary Clarifiers No. 1-2	2021-2023	$270,000	Capital Outlays[1]
CIP_PS_2	Pine Creek PS 2 Rehabilitation (PS-10)	2024-2028	$140,000	Capital Outlays[1]

City of Brighton Sanitary 20-year Capital Improvement Plan (2019-2038)				
Project Number	Description	Project Year	Project Cost	Funding Source
CIP_PS_3	Pine Creek PS 3 Impellor Upgrades (PS-11)	2024-2028	$15,000	Capital Outlays[1]
CIP_SAN_3	Kissane Rd Sanitary Sewer Rehabilitation	2024-2028	$420,000	Capital Outlays[1]
CIP_SAN_4	Washington St Sanitary Sewer Replacement	2024-2028	$730,000	Capital Outlays[1]
CIP_SAN_5	Robertson St Sanitary Sewer Replacement	2024-2028	$520,000	Capital Outlays[1]
CIP_SAN_6	Main St Alley Sanitary Sewer Replacement	2028-2033	$370,000	Capital Outlays[1]
CIP_SAN_8	Advance St Utility Improvements	2028-2033	$750,000	Capital Outlays[1]
CIP_SAN_10	Brighton Lake and 3rd St Sewer Replacement	2028-2033	$650,000	Capital Outlays[1]
CIP_WWTP_11	Rebuild Sludge Blower No. 1	2026-2028	$20,000	Capital Outlays[1]
CIP_WWTP_14	Replace Drive Mechanisms in Clarifiers 1-2	2024-2028	$385,000	Capital Outlays[1]
CIP_WWTP_15	Centrifuge Replacement No.1-2 ($570,000/yr)	2024-2028	$1,140,000	To Be Determined
CIP_WWTP_18	Replace Generator/Transformers at the WWTP	2028-2033	$1,000,000	To Be Determined
	5-year (2019-2023)	**Subtotal**	**$7,267,000**	
	Remaining (2024-2038)	**Subtotal**	**$6,140,000**	
		Total	**$13,407,000**	

[1] Capital Outlays include existing funds that can be used for fixed purchase a fixed asset or to extend its useful life.
[2] Bonds are registered physical certificates that describe the terms of debt and include interest payments.

Table ES-7. City of Brighton Stormwater 20-Year Capital Improvement Plan (2019-2038)

City of Brighton Storm Sewer Collection 20-year Capital Improvement Plan (2019-2038)				
Project Number	Description	Project Year	Project Cost	Funding Source
CIP_STRM_1	N East St Storm Sewer Rehabilitation	2020-2023	$545,000	Capital Outlays[1]
CIP_STRM_4	Northwest Neighborhood Street Improvements	2020-2023	$2,635,000	To Be Determined
CIP_STRM_6	Library Dr and Challis Rd Flooding	2019	$30,000	Capital Outlays[1]
CIP_STRM_7	Sisu Knoll Drive Flooding	2019	$20,000	Capital Outlays[1]
CIP_STRM_2	E St Paul St Storm Sewer Rehabilitation	2024-2028	$485,000	Capital Outlays[1]
CIP_STRM_3	Spencer St Storm Sewer Replacement	2028-2033	$465,000	Capital Outlays[1]
CIP_STRM_5	Advance St Utility Improvements	2028-2033	$750,000	Capital Outlays[1]
	5-year (2019-2023)	**Subtotal**	**$3,260,000**	
	Remaining (2024-2038)	**Subtotal**	**$1,700,000**	
		Total	**$4,960,000**	

[1] Capital Outlays include existing funds that can be used for fixed purchase a fixed asset or to extend its useful life.
[2] Bonds are registered physical certificates that describe the terms of debt and include interest payments.

Revenue Structure

As required by the SAW Grant, the City submitted a revenue structure to MDEQ on April 30, 2018 and received MDEQ approval on May 3, 2018. Sewer revenue adequacy using fiscal year 2017-18 (July 1, 2017 to June 30, 2018) shows here is no anticipated revenue gap in the 2018-2019 fiscal year.

Specifically, the total revenue generated by the FY 2017-18 sewer rates ($1,989,293) and the revenue generated from sources other than sewer rates ($1,333,103) for a total sewer revenue of $3,322,396. This exceeds the total projected FY 2017-18 sewer expenses of $3,282,668. Therefore, the projected fiscal year 2017-18 sewer revenue exceeds expenses by $39,728, proving that the adopted fiscal year 2017-18 sewer rates are adequate and that there is no revenue gap for the current fiscal year.

City Plans for Asset Management Program

The City of Brighton submitted an application to renew their NPDES permit in April 2018. The current NPDES Permit contains the asset management requirements in Section I.A.5. In addition to requiring an asset management program, the City must submit an annual report on the status of the City's WWTP and collection system assets. The Lucity™ software is designed to provide detailed reports regarding specific performance measures which will be essential to completing annual MDEQ reporting requirements. The City is required through their permit to submit reports including specific information regarding what capital improvement projects were completed, how much was spent on sewer cleaning, preventative maintenance and other measures as needed.

This asset management plan, inclusive of the GIS model of the sewer system, stormwater system, and Lucity™ are intended to be worked as a unit to assist City staff in operating, maintaining and upgrading the City's wastewater and stormwater infrastructure efficiently and cost effectively. It will be a living set of documents that will require an on-going process of recording information to help the decision makers best manage the needs of the City's wastewater and stormwater infrastructure.

Preventative and predictive maintenance activities will tracked in the Lucity™ software Work Order System. Lucity™ is a comprehensive suite of integrated software solutions that enables the City to meet their demands for management of assets, customer requests and work orders, preventive maintenance, resources and inventory, best practices and regulatory compliance. The City began utilizing Lucity™ in September 2018.

TETRA TECH, INC.

7927 Nemco Way, Suite 100, Brighton, MI 48116
Telephone: 810.220.2112
Fax: 810.225.8458

TRANSMITTAL

Date: November 29, 2018

To: Mr. Eric Pocan, Project Manager
Revolving Loan Section
P.O. Box 30817
Lansing, MI 48909-8311

Re: City of Brighton SAW Grant No. 1195-01
Wastewater and Stormwater Asset Management Plan

Project No.: 200-12766-13005

We are enclosing: Executive Summary & Certification of Project Completeness

Remarks: Please find the Executive Summary and signed Certification of Project Completeness for the City of Brighton Wastewater and Stormwater Asset Management Plan.

If you need any additional information or have questions, please contact me at 810.225.8439 or email at kari.jozwik@tetratech.com

copy: Tim Krugh, City of Brighton
Gary Markstrom, Tetra Tech

By: Kari L. Jozwik, P.E.
Project Engineer

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date 11-29-2018
(no later than 3 years from executed grant date)

The City of Brighton *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1195-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: **No**

   If No - Date of the rate methodology approval letter: **May 3, 2018.**

2) Significant Progress Made: **N/A**

   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)

3) Date of rate methodology review letter identifying the gap: **N/A.**

4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on N/A.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Nate Geinzer	at	810-225-8022	geinzern@BrightonCity.org
Name		Phone Number	Email

11/20/18

Signature of Authorized Representative (Original Signature Required) Date

Nate Geinzer, City of Brighton Manager
Print Name and Title of Authorized Representative

DEQ

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Due Date **11-29-2018**
(no later than 3 years from executed grant date)

The **City of Brighton** *(legal name of grantee)* certifies that all stormwater asset management plan (SWAMP) activities specified in **SAW Grant No. 1195-01** have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SWAMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

Nate Geinzer at 810-225-8022 geinzern@BrightonCity.org
Name Phone Number Email

11/30/18
Signature of Authorized Representative (Original Signature Required) Date

Nate Geinzer, City of Brighton Manager
Print Name and Title of Authorized Representative

Prein&Newhof
Engineers ▪ Surveyors ▪ Environmental ▪ Laboratory

Memorandum

Date:	November 30, 2018
To:	Clarence Jones
Company:	Michigan Department of Environmental Quality
From:	Prein&Newhof
Project #:	2130386
Re:	City of Buchanan SAW Grant: Summary of Wastewater Asset Management Plan

This memorandum provides the summary of the City of Buchanan wastewater asset management plan SAW grant activities required under Section 603 of Public Act 84 of 2015. Headings and italicized quotes are from recent MDEQ guidance.

Grantee Information

Grantee:
City of Buchanan
302 North Red Bud Trail
Buchanan, MI 49107
http://www.cityofbuchanan.com

Contact: Mr. William Marx, City Manager
Phone: 269-695-3844

SAW Grant Project Number: 1480-01

Executive Summary

The City of Buchanan received a SAW Grant in November 2015 to prepare Wastewater and Stormwater Asset Management Plans. The Grant agreement indicated the following amounts:

Project Total	Grant Amount	Local Match
$1,806,753	$1,639,980	$166,773
Project Total	Wastewater Costs	Stormwater Costs
$1,806,753	$1,139,662	$667,091

The Key components in the Asset Management Plan include:

1. Asset Inventory and Condition Assessment
2. Criticality of Assets
3. Level of Service
4. Operation and Maintenance Strategies/Revenue Structure
5. Long-term Funding/Capital Improvement Plan

Asset Inventory

"Describe the system components included in the AMP. Discuss how they were located and identified, if applicable. Describe the platform used to develop and maintain the inventory of assets."

All assets that are functionally or financially significant to the wastewater system have been inventoried. Manhole, gravity sewer main, force main, and lift station locations were plotted in a Geographic Information System (GIS) using record drawings. Manhole and lift station locations were field verified and locations adjusted with survey grade Global Positioning System (GPS) coordinates.

Asset inventory data including year of installation, material, sizes, pipe inverts and manhole rim elevations were cataloged from record drawing and visually verified where needed. Asset inventory data is managed using GIS databases.

Location of non-pipe assets, such as, lift station components, building components, and other equipment is compiled in a package of inventory spreadsheets. These assets are not mapped in GIS.

Condition Assessment

Discuss the condition assessment process, including what methods were used. Summarize the results of the assessment for each asset category.

Gravity Sewer Mains: Inspections were made using either a pole mounted zoom camera (looking up or down each pipe from the manholes) or with in-line closed circuit television (CCTV) cameras. Pipes inspected with zoom camera methods were rated considering any observable roots, deposits, joint conditions, pipe wall condition, infiltration, or other defect observations. Pipes inspected with CCTV were rated using the Pipeline Assessment Certification Program (PACP) system condition grading system. Composite Risk of Failure ratings of 1-5 were derived for each pipe.

Percentage of gravity sewer pipes in each rating category

1	2	3	4	5
37.9%	16.7%	16.6%	11.8%	17.0%

Force Mains: Force main conditions were estimated using pipe age, material, and break history records. Buchanan's force main data was compared with that of several other municipalities to establish a comparative reference. Ratings of 1-5 were developed for each force main.

Percentage of force main pipes in each rating category

1	2	3	4	5
0.3%	58.2%	33.2%	8.3%	0.0%

Manholes: Manholes were visually inspected and rated on a scale of 1-5 based on factors related to the condition of castings, steps, structures, and infiltration.

Percentage of manholes in each rating category

1	2	3	4	5
52.8%	31.8%	12.6%	1.9%	0.9%

Lift Stations: Visual inspection and performance testing were completed to evaluate asset condition. Lift station assets, including pumps, valves, piping, structures, electrical, controls, and other assets, were rated on a scale of 1-5. Composite ratings for the station as a whole were developed.

Number of lift stations in each rating category

1	2	3	4	5
0	1	3	3	0

Wastewater Treatment Plant: The treatment plant was broken down into an inventory of 166 assets and the assets were grouped by 12 treatment process. Visual inspection, performance testing, and discussions with maintenance staff were completed to rate the asset conditions.

Percentage of treatment plant assets in each rating category

1	2	3	4	5
62.0%	13.9%	14.5%	9.0%	0.6%

Criticality of Assets

"A summary of the method used to assess the criticality of assets considering the likelihood and consequence of failure. Discussion may include the method used to assess the criticality of assets considering the likelihood and consequence of failure and based on the condition of the assets and the determined risk tolerance, how were the assets ranked."

Assets were given a Risk of Failure (RoF) rating of 1-5 (5 being the worst) based on factors related to both physical and functional conditions as determined through condition assessments. Assets were given a Consequence of Failure (CoF) rating of 1-5 (5 being the worst) based on potential damage to adjacent utilities, transportation network, and the surrounding property/environment. The magnitude of the potential service disruption was also a factor.

Assets with the higher rankings for Consequence of Failure were those that:

- Provide service to a significant portion of the system
- Serve schools/hospitals/major industry
- Are under major roads or are adjacent to other major utilities
- Are adjacent to waterways or significant wetlands

Criticality ratings were calculated as the product of an asset's RoF and CoF, producing criticality ratings ranging from 1-25 (25 being the most critical). The most critical assets were found to be gravity sewers primarily along Arctic Street, Oak Street, River Street, Third Street, Main Street, Front Street and Red Bud Trail.

Level of Service Determination

"A summary of the level of service goals the municipality has determined that it wants to provide its customers based on the municipality's ability to provide the service and customer expectations. Discussion may include the procedures used to involve stakeholders in the level of service discussion. The trade-offs for the service to be provided. This could include any technical, managerial, health standard, safety, or financial restraints, as long as all regulatory requirements are met. How the level of service goals were determined"

The City recognizes that the people served by the system are more than customers, they are the system owners. City staff acts as stewards of the system. The City has held numerous public meetings and workshops with the City Staff and Council Members. At these meetings, the results of the condition assessments were discussed, the costs for various operations, maintenance and replacement strategies affecting the levels of service were reviewed along with potential rate impacts. Based on the input received during these meetings, the following Level of Service Goals has been established:

1. Meet Regulatory Requirements
2. Minimize Service Interruptions
3. Minimize Public Hazards
4. Manage Storm Water Inflow and Ground Water Infiltration
5. Provide Capacity for Community Growth
6. Minimize Life Cycle Costs

Revenue Structure

"A summary of the funding structure and rate methodology that provides sufficient resources to implement the asset management program. Discussion may include the rates, charges, or other means of revenue were reviewed to determine if there will be sufficient funds to cover system operation, maintenance, replacement, capital improvement projects, and debt costs, identified in the AMP. If the current rate structure was not sufficient, discuss what increases were needed to ensure the desired level of service is sustainable and if any changes were made."

Historical operating expenses were reviewed using current audit and budget information. Based on that information, a "Test Year" was developed that reflected a baseline cost. The baseline costs included currently budgeted expenses, debt service, and leveling for base operating cost.

The customer base was reviewed, including the number of residential equivalent units in the system. Other operating and non-operating revenues were also evaluated. Prediction of customer connections was made including trending in system utilization, projection of operating costs, and anticipated inflation by expense category.

A forecasting system was developed and used to identify the estimated replacement investment for the remaining lifecycle of all assets, based on the asset inventory and condition assessment data. Project costs were estimated for capital improvements within the first 10 years. The annual investment cost was evaluated and scenarios developed for cash funding and debt financing. Based on this analysis, it is expected that a combination of future rate increases and debt financing will be needed to fund capital projects.

Capital Improvement Plan

"A summary or the long-term Capital Improvement Plan that was developed to address system needs identified in the AMP."

A capital improvement plan showing project descriptions, cost estimates, and project timelines, was developed for the capital improvements needed within a ten year planning period. The major wastewater system projects identified in the CIP are:

- Increase Pipe Capacity from WWTP to Red Bud Trail / 3rd Street
- Increase Pipe Capacity in Red Bud Trail (3rd Street to Fulton)
- Increase Pipe Capacity in Days (Chicago to Red Bud Trail / 3rd Street)
- Remove Existing Utility Obstructions & Penetrations (2 locations)
- Separate Combined Storm/Sanitary Sewers (3 streets)
- Inflow and Infiltration Removal (private and public)
- Localized Point Repair of Pipes with RoF of 4 or 5 (9 locations)
- Replacement of Pipes with RoF of 4 or 5 (numerous locations)
- Glaser Street Lift Station and Force Main Replacement
- Schirmer Lift Station Force Main Replacement
- Schirmer Lift Station Improvements
- Post and River Shores Lift Stations Improvements
- Construct WWTP Oxidation Ditch
- WWTP Miscellaneous Improvements

List of Major Assets

"Provide a general list of the major assets identified in the AMP."

Buchanan's major assets include:

- 7 lift stations
- 122,955 feet of 6" to 18" diameter gravity sewer
- 6,577 feet of 4" to 12" diameter force main
- 446 manholes
- Wastewater treatment plant

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date November 30, 2018
(no later than 3 years from executed grant date)

The City of Buchanan *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1480-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or No
   If No - Date of the rate methodology approval letter: May 3, 2018.
2) Significant Progress Made: Yes or No
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: __________.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on __________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

William Marx at 269-695-3844 wmarx@cityofbuchanan.com
Name | Phone Number | Email

[signature] November 30, 2018
Signature of Authorized Representative (Original Signature Required) | Date

William Marx, City Manager
Print Name and Title of Authorized Representative

April 2017

Prein&Newhof
Engineers ▪ Surveyors ▪ Environmental ▪ Laboratory

Memorandum

Date:	November 30, 2018
To:	Clarence Jones
Company:	Michigan Department of Environmental Quality
From:	Prein&Newhof
Project #:	2130386
Re:	City of Buchanan SAW Grant: Summary of Stormwater Asset Management Plan

This memorandum provides the summary of the City of Buchanan stormwater asset management plan SAW grant activities required under Section 603 of Public Act 84 of 2015. Headings and italicized quotes are from recent MDEQ guidance.

Grantee Information

Grantee:
City of Buchanan
302 North Red Bud Trail
Buchanan, MI 49107
http://www.cityofbuchanan.com

Contact: Mr. William Marx, City Manager
Phone: 269-695-3844

SAW Grant Project Number: 1480-01

Executive Summary

The City of Buchanan received a SAW Grant in November 2015 to prepare Wastewater and Stormwater Asset Management Plans. The Grant agreement indicated the following amounts:

Project Total	Grant Amount	Local Match
$1,806,753	$1,639,980	$166,773
Project Total	Wastewater Costs	Stormwater Costs
$1,806,753	$1,139,662	$667,091

The Key components in the Asset Management Plan include:

1. Asset Inventory and Condition Assessment
2. Criticality of Assets
3. Level of Service
4. Operation and Maintenance Strategies/Revenue Structure
5. Long-term Funding/Capital Improvement Plan

Asset Inventory

"Describe the system components included in the AMP. Discuss how they were located and identified, if applicable. Describe the platform used to develop and maintain the inventory of assets."

All assets that are functionally or financially significant to the stormwater system have been inventoried. Manhole, catch basin, sewer pipe and leaching basins locations were plotted in a Geographic Information System (GIS) using record drawings, aerial imagery, and land contours. Locations were field verified and locations adjusted with survey grade Global Positioning System (GPS) coordinates.

Asset inventory data for storm sewers, including year of installation, material, sizes, pipe inverts and manhole rim elevations were cataloged from record drawing and visually verified where needed. Asset inventory data is managed using GIS databases.

Condition Assessment

Discuss the condition assessment process, including what methods were used. Summarize the results of the assessment for each asset category.

Storm Sewer Pipes: Inspections were made using either a pole mounted zoom camera (looking up or down each pipe from the manholes) or with in-line closed circuit television (CCTV) cameras. Pipes inspected with zoom camera methods were rated considering any observable roots, deposits, joint conditions, pipe wall condition, or other defect observations. Pipes inspected with CCTV were rated using the Pipeline Assessment Certification Program (PACP) system condition grading system. Composite Risk of Failure ratings of 1-5 were derived for each pipe.

Percentage of gravity sewer pipes in each rating category

1	2	3	4	5
59.6%	15.6%	13.1%	1.6%	10.1%

Manholes and Catch Basins: Manholes and catch basins were visually inspected and rated on a scale of 1-5 based on factors related to the condition of castings, steps, structures, and sediment.

Percentage of structures in each rating category

1	2	3	4	5
68.0%	23.8%	6.4%	1.0%	0.9%

Criticality of Assets

"A summary of the method used to assess the criticality of assets considering the likelihood and consequence of failure. Discussion may include the method used to assess the criticality of assets considering the likelihood and consequence of failure and based on the condition of the assets and the determined risk tolerance, how were the assets ranked."

Assets were given a Risk of Failure (RoF) rating of 1-5 (5 being the worst) based on factors related to both physical and functional conditions as determined through condition assessments. Assets were given a Consequence of Failure (CoF) rating of 1-5 (5 being the worst) based on potential damage to adjacent utilities, transportation network, and the surrounding property/environment.

Criticality ratings were calculated as the product of an asset's RoF and CoF, producing criticality ratings ranging from 1-25 (25 being the most critical). The most critical assets were generally found to be storm sewers along Front Street, Red Bud Trail, Third Street, Dewey and Main Street.

Level of Service Determination

"A summary of the level of service goals the municipality has determined that it wants to provide its customers based on the municipality's ability to provide the service and customer expectations. Discussion may include the procedures used to involve stakeholders in the level of service discussion. The trade-offs for the service to be provided. This could include any technical, managerial, health standard, safety, or financial restraints, as long as all regulatory requirements are met. How the level of service goals were determined"

The City recognizes that the people served by the system are more than customers, they are the system owners. City staff acts as stewards of the system. The City has held a series of public meetings and workshops with the City staff. At these meetings, the results of the condition assessments were discussed, the costs for various operations, maintenance and replacement strategies affecting the levels of service were reviewed along with potential costs. Based on the input received during these meetings, the following Level of Service Goals has been established:

1. Meet Regulatory Requirements
2. Minimize Flood Risk
3. Minimize Public Hazards
4. Manage Stormwater Discharges into the Wastewater System
5. Support Community Growth and Development
6. Maintain Water Quality
7. Minimize Life Cycle Costs

Revenue Structure

"A summary of the funding structure and rate methodology that provides sufficient resources to implement the asset management program. Discussion may include the rates, charges, or other means of revenue were reviewed to determine if there will be sufficient funds to cover system operation, maintenance, replacement, capital improvement projects, and debt costs, identified in the AMP. If the current rate structure was not sufficient, discuss what increases were needed to ensure the desired level of service is sustainable and if any changes were made."

Stormwater system improvements are funded with street improvements through the City's general fund. Project costs were estimated for capital improvements within the first 10 years. Future costs beyond the 10 year capital improvement plan were projected using inventory and condition assessment data. Based on this analysis, the City is considering property tax millage rate increases to begin increasing general fund revenues.

Capital Improvement Plan

"A summary or the long-term Capital Improvement Plan that was developed to address system needs identified in the AMP."

A capital improvement plan showing project descriptions, cost estimates, and project timelines, was developed for the capital improvements needed within a ten year planning period. The stormwater system projects identified in the CIP are:

- Remove utility penetrations from 12 pipes and 3 manholes
- Reconstruct storm sewer on Ottawa Street and West Front Street
- Reconstruct storm sewer on West Front Street
- Reconstruct storm sewer on South Red Bud Trail
- Reconstruct storm sewer on North Red Bud Trail
- Reconstruct storm sewer on Victory Street and Fulton Street
- Install storm sewer in Main Street (Dewey to Third) to separate storm/sanitary connections
- Install storm sewer in E. Third Street (Main to Red Bud Trail) to separate storm/sanitary connections
- Install storm sewer in W. Fifth Street (Moccasin to Main) to separate storm/sanitary connections
- Reconstruct storm sewer on Chicago Avenue (near Park Court)
- Reconstruct storm sewer on Chicago Avenue (Detroit to Phelps)
- Reconstruct storm sewer on Phelps Street (Chicago, south to McCoy Creek)
- Reconstruct storm sewer on Oak Street (Chicago, south to McCoy Creek)
- Reconstruct storm sewer on Days Street (Roe to Chicago)
- Reconstruct storm sewer on Liberty Street (near Smith Street)
- Reconstruct storm sewer on Third Street (Red Bud Trail, east to McCoy Creek)
- Reconstruct storm sewer on River Road (west of WWTP driveway)
- Disconnect 23 storm catch basins from sanitary sewer (various streets)
- Complete 11 point repairs at various locations (broken pipes)

Prein&Newhof
Engineers ▪ Surveyors ▪ Environmental ▪ Laboratory

List of Major Assets

"Provide a general list of the major assets identified in the AMP."

Buchanan's major assets include:

- 104,392 feet of 6" to 48" diameter storm sewer
- 1,019 storm structures
- 99 outfalls to the St. Joe River, McCoy creek and adjoining wetlands

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Due Date November 30, 2018
(no later than 3 years from executed grant date)

The City of Buchanan *(legal name of grantee)* certifies that all stormwater asset management plan (SWAMP) activities specified in SAW Grant No. 1480-01 have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SWAMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

William Marx at 269-695-3844 wmarx@cityofbuchanan.com
Name Phone Number Email

Signature of Authorized Representative (Original Signature Required)

November 30, 2018
Date

William Marx, City Manager
Print Name and Title of Authorized Representative

CALEDONIA CHARTER TOWNSHIP
ASSET MANAGEMENT PLAN – SAW GRANT 1397-01
WASTEWATER COLLECTION SYSTEM
EXECUTUVE SUMMARY

1. INTRODUCTION

The Charter Township of Caledonia applied for and received a grant to develop an Asset Management Plan for its sanitary sewer system through the Michigan Department of Environmental Quality's (MDEQ) Stormwater, Wastewater and Asset Management (SAW) program. Caledonia Township received the SAW Grant in November of 2015 for project number 1397-01. The SAW Grant amount awarded to Caledonia Township for Wastewater was $554,999.00 less the 10% local match.

2. TEAM MEMBERS

The Township Administrator (also the Treasurer) oversees the utilities and both the operator and engineer report to him. The Township also has a Utility Committee, which includes the Township Supervisor, Clerk and Administrator. The Utility Committee meets on an as-needed basis.

Infrastructure Alternatives is the operator of Caledonia Township's sewer. With the implementation of an asset management plan (AMP), the system operators are now able to more accurately track asset information including the consequence of failure and probability of failure analysis. Both the operators and decision-makers have access to the most important needs and vulnerabilities of the wastewater collection system.

Vriesman & Korhorn Civil Engineers provides engineering services to the Township, including for the sanitary sewer system. They work together with Infrastructure Alternatives to ensure that connections and additions to the sanitary sewer system meet the master plan and that the construction methods and materials meet the standards set by the Township.

3. SYSTEM HISTORY

The Caledonia community has been served by sanitary sewer since the 1930s. It was confined to the Village of Caledonia until the 1990s, when the wastewater treatment plant capacity was expanded to accommodate development in the Village and the surrounding Caledonia Township. At that time, the Village and the Township entered into an agreement for Caledonia Township to be served and charged a fair rate for operation and infrastructure of the treatment plant. The Township maintained a separate sewer rate, billing department, and operations team. By the mid-2000s, the Township had become the larger partner. In 2015, the Township and the Village entered into an agreement in which the Township is responsible for all of the administration of the sanitary sewer in both the Village and the Township. The Village remains the owner of sanitary sewer within the Village limits and the treatment plant, but they have delegated all authority to the Township. The system now operates as a single system that serves the Caledonia community whether or not the customer resides within the Village.

The Village WWTP was nearing its 500,000-gallon per day capacity in 2013-2014 and the Township reached out to its neighbors to redirect a portion of its collection system to the City of Grand Rapids through Gaines Township sewer. A gravity connection was constructed to existing Gaines Township sewer, eliminating a pump station that pumped sewer to the Village of Caledonia Waste Water Treatment Plant. By doing this, Caledonia was able to extend the capacity life of the Village WWTP. Due to the higher expense of treatment, customers served by this connection (Northwest District) pay a higher sewer rate. Currently, the Northwest sewer district serves 165 primarily commercial customers and the combined Village/Township district services approximately 2200 customers.

A separate sewer system was constructed in the late 1980s and expanded in the mid-1990s to serve the community around Campau Lake. This is a collection district system with the Campau Lake Treatment Plant serving approximately 370 customers. The system is miles away and is completely separate from the system that is served by the Village treatment plant. The primary purpose of the system was to improve the condition of Campau Lake, although the system has also supported some development in the area as well.

The asset management plan has been employed to consider the entire system as one. The Village assets were part of a separate asset management plan but are being combined with the Township's to reflect this new reality.

4. WASTEWATER ASSET INVENTORY

Assets within the Township sanitary sewer system have been inventoried and located with a Trimble Geo 7 Centimeter GPS unit. The following assets were located: manholes, pump stations, cleanouts, grinder stations, air releases and forcemain valves. The data was entered into ESRI ArcGIS software in State Plane coordinates and gravity sewer and forcemain piping networks were drawn using these points and record drawing information.

Within ESRI ArcGIS, record drawings were linked to each asset. The size, year constructed, length and material were also added to the inventory. All of the information was then exported to the SEMS asset management software to allow for integration with the asset management features of the software.

The SEMS asset management software allows for live integration between the asset management system, the operator in the field, and GIS. This allows work orders to be updated, tracked, and completed in real time. The database is geographically referenced so that each asset and all of its records can be accessed through the mapping. The condition and risk were assigned and a Capitol Improvements plan was generated through the software.

Infrastructure Alternatives stores data on each sewer, manhole, pump station, forcemain, cleanout, air release and grinder station within the SEMS system. It houses records of routine maintenance and other important notes for these system assets. It is used to produce work orders specific to the assets to assign to Infrastructure Alternatives staff. Record plan sheets are linked to the mapping and asset management software so that staff can quickly see what infrastructure is present. Recorded easements were also linked with each corresponding asset with the SEMS system so that they can be readily reviewed as well.

Other sanitary sewer system assets, including treatment plants and the meter station, are indexed within the SEMS software database allowing for ease of inventory, maintenance record tracking and asset management. Each asset and appurtenance within the treatment plant is indexed within the SEMS software as well providing a valuable resource for maintenance, repair, and inventory management of treatment plant appurtenances. The level of detail for each asset within these plants and stations will increase in the future as determined useful by Infrastructure Alternatives.

The Township wastewater collection and treatment system includes:

1 Treatment Plant

641 Manholes

172,700 lineal feet Gravity Sewer (63,200 feet were televised)

- 230 lineal feet of 6”
- 11,990 lineal feet of 8”
- 21,261 lineal feet of 12”
- 14,095 lineal feet of 15”
- 10,806 lineal feet of 18”
- 5,933 lineal feet of 21”

16 Pump Stations

44,400 lineal feet Forcemain

65 Grinder Stations

10 Air Releases

19 Cleanouts

The Village wastewater collection and treatment system includes:

1 Treatment Plant

211 Manholes

46,400 lineal feet Gravity Sewer

5. CONDITION ASSESSMENT

As described above, the sewer system is young with the oldest pipes not yet 25 years old. It consists primarily of SDR-26 PVC pipe, along with some ductile iron forcemain, with remaining life that extends well into the future. The system is very well cared for with efforts made to maximize the expected life of the system. Pumps are routinely exercised and checked and manholes in areas of concern have regular maintenance programs. These efforts produce a sewer system that does not face significant or frequent problems. When a problem is identified, it receives a prompt and complete response to solve the issue.

Each manhole within the Caledonia Township sewer system was field inspected by a National Association of Sewer Service Companies (NASSCO) Pipe/Manhole Assessment and Certification Program (PACP, MACP) certified inspector using Level 1 inspection techniques. Some level 2 category information obtainable without entering the manhole was also gathered. A total of 641 manholes within the township were inspected.

Sewer older than 20 years was televised and assessed by a NASSCO PACP certified inspector and the condition rating added to the SEMS asset management software. Sewer less than 20 years old was given the condition rating of the visual inspection of the manhole at the upstream end of the pipe section.

A section of forcemain with known failure history was inspected by exploratory digging in two locations to assess the condition of the pipe. The pipe was constructed of ductile iron but was pitted and in poor condition. Through this inspection the segment of forcemain was replaced with HDPE pipe in 2017.

Pump stations, grinder station, forcemain, cleanouts and air releases were evaluated and scored with historical information and system knowledge of the Township, the operators and the Township Engineer with higher ratings given to assets with known history of failure or defect.

Each of these ratings were associated to each asset within the SEMS software system. Due to the relatively young age of much of the sewer system, and the quality inspection and maintenance practices of the Township, most assets are in reasonable condition. An overall condition rating of 1 to 5 was assigned to each sanitary sewer asset with a rating of 1 being excellent or like new condition and 5 being unserviceable. Ninety percent of all manholes were rated as having a condition of either a 1 or a 2 and only one percent have a condition rating of 4 or 5.

6. CRITICAL ASSETS

Each asset was assigned with scores to assess the Probability of Failure and the Consequence of Failure. These results are multiplied to produce a Business Risk (BR) score. The BR score is useful in the prioritization of potential projects to be funded and implemented.

Consequence of Failure is a measure of the impact of the failure of a certain asset from a financial, economic, environmental and social perspective. These are also rated 1 through 5, with a 1 being a slight loss of system capacity or slight disruption to a limited number of customers and a 5 being massive system failure with persistent and extensive damage and cost.

The Consequence of Failure rating for the Caledonia Township collection system as a whole is very robust. Eighty six percent of the manholes and gravity sewer were rated as either a 1 or 2 and five percent were rated higher than a 4.

The Business Risk of each asset is determined by how likely each asset is to fail and the significance of the asset failure. Each asset was assigned with scores to assess the likelihood of failure and the consequence of failure as described above. These results are multiplied to produce a Business Risk (BR) score ranging from 1 to 25. A rating of 1 represents an asset unlikely to fail and minimal disruption to repair. A rating of 25 represents an asset very likely to fail and will cause a massive failure of the system. The BR score is useful in the prioritization of potential projects to be funded and implemented to keep the sanitary sewer collection system operating smoothly into the future.

The results of the condition assessments and Business Risk of each asset have been tabulated in a spreadsheet and a summary table of the data is included in the appendix of this report. A map detailing the collection network and identifying the assets with the highest Business Risk score has also been included.

There are very few assets with a high risk in the Caledonia Township wastewater system. Eighty two percent of the assets have a risk lower than a 5 and only four percent have a risk higher than 10.

The asset management plan will become more important as the system continues to age in order to identify and address issues systematically. The implemented plan applies the probability and consequence of failure, to existing databases. This approach provides a useful tool for the system operators while also encouraging updates to ratings as new asset information is encountered.

7. METERING AND MODELING

Caledonia Township purchased through the SAW Grant funding two methods of measuring flow in its collection system. The Township had long identified that inflow and infiltration was a costly expense that needed more important analysis. Along with manhole inspections, monitoring was needed.

The first was the addition of Mission dialers to each of the 17 pump stations in the collection system. The dialers were installed in early 2013. The dialers, which also provide emergency communication, provide instantaneous data along with historical flows at the fingertips of the engineers and operators. The Mission system logs the run times of each pump, which, along with the flow rate, provides the information needed to quantify rising flows related to rainfall.

Two Hach Companies FloDAR portable flow monitors were also purchased to assess the source of inflow and infiltration in specific areas in the collection system not served by a pump station. The two flow meters were relocated periodically to trace back to where issues could be identified. Smoke testing was also performed in areas targeted by the flow monitors to help determine specific points within manholes or pipe segments of infiltration and inflow locations. By identifying areas where stormwater is entering the system, the Township has been able to more precisely target areas of concern for future rehabilitation and replacement.

Combined with the field inspections of the manholes, areas of greater inflow and infiltration have been identified. The condition ratings of these assets was adjusted accordingly.

Lastly, an OdaLog wireless H2S sensor was installed at various locations within the collection system. It was primarily positioned within a manhole near the downstream end of the Northwest Sewer District to assist in determining the levels of H2S generated in this district. The goal has been to determine what actions, if any, would be necessary to protect the sewer infrastructure of the district. Through the monitoring of this device along with the manhole inspections performed, it was determined that the pump station from the Farmers Insurance campus was one of the leading causes of H2S generation for the district. Therefore, a construction project funded outside of this grant was completed in 2018 to mitigate the H2S generation and protect and preserve the life of the sewer system.

8. CAMPAU SBR TANK INSPECTION

The Campau Lake Wastewater Treatment Plant is more than 20 years old and had never been inspected. The tanks were cleaned and then inspected by a structural engineer and a report produced assessing the condition of the tanks. The two main tanks were reported to be in very good condition with no noticeable cracks or spalling. The two EQ tanks were also inspected as they were built prior to 1980. These tanks have significant concrete erosion issues with some exposed and rusted rebar.

9. INTERMUNICIPAL AGREEMENTS

In 2013 and 2014, Caledonia Township negotiated with the City of Grand Rapids to take a portion of their sewer collection system (the Northwest District) and direct it to the City of Grand Rapids WWTP instead of the Village WWTP. Caledonia was not previously a customer community of Grand Rapids. Caledonia evaluated the application of Grand Rapids sewer rates to Caledonia customers along with other implications, such as district restrictions and the Grand Rapids IPP program. Additionally, Caledonia needed to connect to the City sewer system by constructing sewer through Gaines Township and utilize existing sewer pipe. This involved a separate agreement with Gaines Township and the Byron-Gaines utility agreement. There was much effort spent by the respective engineers and attorneys to make this shift happen. As a result, capacity was realized at the Village WWTP that has delayed an expansion by a number of years. Additionally, a large pump station in Caledonia Township was able to be abandoned because between the communities is gravity.

In 2015, Caledonia Township and the Village of Caledonia decided that it was time to update their sewer service agreement which had last been updated approximately 15 years ago. Since that time, the Township had gone from being the smaller partner to the larger partner. The Village was finding that their aging sewer system was becoming more of a liability than what their customer base could handle. There was also a recognition by the leadership of both communities that the Village residents are also Township residents. The Township leadership represents the customers of both communities, and therefore there was no advantage to having two separate utility operations. Through many meetings, negotiations, and attorney drafts, an agreement was made that established the Township as the cost center and decision-maker for sewer utilities in the Township and the Village. The Village retains ownership of the facilities within the Village and serves as an advisory for utility operations and capital improvements. As a result of the agreement, the sewer rate is calculated yearly according to expenses. The sewer rate method was also modified in order better accommodate the existing Village users. The result of the agreement has realized many efficiencies and cost savings.

SAW Grant funds were utilized for the work on the Township agreements with both communities. They were also utilized in order to evaluate and modify the sewer rates in both circumstances. Lastly, the Village Sewer Asset Management Plan was incorporated into the Township asset management plan using Village SAW funds because they remained Village assets. When the SAW Grant was applied for in 2013, the new agreement with the Village of Caledonia was not anticipated, so it was added with MDEQ approval prior to the work performed, utilizing cost savings from other categories of the SAW Grant.

10. LEVEL OF SERVICE

A Level of Service Plan (LOS) was developed by the Township with input from the Utility Administrator, the operators from Infrastructure Alternatives and the engineers. The Charter Township of Caledonia has identified the following as their level of service goals:

- Provide adequate system capacity for all service areas.
- Comply with all local, state and federal regulations at all times for treated effluent from the WWTF.
- Actively maintain collection and treatment system assets in a reliable working condition.
- Reduce inflow/infiltration (I/I) flow volumes to mitigate the potential for sanitary overflows, sewage in basements, and overloading of the collection system.
- Provide rapid and effective emergency response services to customers.
- Regularly review projected O&M and capital expenditures. Adjust user rates as necessary to ensure sound financial management of the wastewater system.
- Hold developers and contractors to a high standard of quality for sewer system extensions to assure a maintainable and sustainable system.
- Maintain the combined average water and sewer bill at less than 1.0% percent of the community's median household income. (Caledonia: $81,132. Currently 0.75%).

Infrastructure Alternatives has developed procedures and systems with the purpose of maintaining a high level of service. Their system documents each asset and associated activities. With the implementation of an asset management plan (AMP), Infrastructure Alternatives has added the ability to identify and address deficiencies in assets in an organized manner. By adding consequence and probability of failure analysis, both the operators and decision-makers can easily assess the most important needs and vulnerabilities.

11. REVENUE STRUCTURE

A revenue and rate methodology review was conducted as part of the SAW grant activities for Caledonia Township. This review was used to examine if user rates and charges provide sufficient funding to pay for utility operating costs. This review was conducted by the Township and approved by the DEQ in early 2018 at the two-and-a-half-year mark of the grant as required by the DEQ. The existing rates and revenues were determined to be adequate to ensure the funding of operations and maintenance costs of the sanitary sewer collection system.

12. CAPITAL IMPROVEMENTS PLAN

As noted, the Township and Infrastructure Alternatives has implemented a rating system that has been executed to incorporate consequence of failure and probability of failure into future Capital Improvement Plan analysis. The BR (Business Risk) ratings are a product of the consequence of failure rating (1-5) and the probability of failure (1-5) for an overall BR score (1-25).

Although the assessment and rating of existing assets will assist in prioritizing projects in the future, the capital improvements reflect the need for expansion and redundancy rather than replacement of assets. Identified high-risk assets were already identified in past reviews and reliability studies, so these priority projects have not changed. Rates are being evaluated to incorporate the recommended capital improvements. The major expense in the projected improvements is the expansion of the Village Wastewater Treatment plant which will be bonded for and paid through connection fees and cash on hand.

The Capital Improvements Plan was developed to outline operations, maintenance, repair and replacement of the wastewater collection system for gravity sewer, manholes, forcemain and pump stations. The plan is broken into short-term and long-term segments over the next twenty years.

Short-Term Projected Improvements

Project	Projected Cost
Gravity Sewer and Manhole Repairs	$80,000
Campau Wastewater Treatment Plant EQ Tank Repairs	$102,000
Pump Station Maintenance and Repairs	$50,000

Long-Term Projected Improvements

Project	Projected Cost
Gravity Sewer and Manhole Repairs	$400,000
Pump Station Maintenance and Repairs	$150,000
Village Wastewater Treatment Plant Expansion	$5,500,000

13. CONTACT INFORMATION

Charter Township of Caledonia
Mr. Richard Robertson, Township Administrator
Ph: 616-891-0070, rrobertson@caledoniatownship.org

Vriesman & Korhorn Civil Engineers
Mr. Todd Boerman, P.E.
Ph: 616-277-2185, todd@vkcivil.com

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date November 21, 2018
(no later than 3 years from executed grant date)

The Charter Township of Caledonia *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1397-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or $\boxed{\text{No}}$
   If No - Date of the rate methodology approval letter: April 30, 2018.
2) Significant Progress Made: Yes or No
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: ________.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Richard Robertson	at 616-891-0070	rrobertson@caledoniatownship.org
Name	Phone Number	Email

[signature] 11/30/18

Signature of Authorized Representative (Original Signature Required) Date

Richard Robertson, Township Administrator

Print Name and Title of Authorized Representative

Protecting our Infrastructure Investment

ASSET MANAGEMENT PLAN

Wastewater Executive Summary Report

Prepared for:

Village of Caledonia

SAW Project No. 1639-01

Caledonia

FINAL
October 2018

FLEIS&VANDENBRINK
DESIGN. BUILD. OPERATE.

EXECUTIVE SUMMARY

OVERVIEW

Public Act 562 of 2012 authorized money for Stormwater, Asset Management, and Wastewater (SAW) Grant Program. In December 2015, The Village received a Stormwater, Asset Management, and Wastewater (SAW) Grant from the Michigan Department of Environmental Quality (MDEQ), project no. 1639-01, to provide financial assistance for the development of a wastewater asset management plan (AMP) for the Village's publicly owned wastewater utility. This AMP is intended to be a living document that is updated as assets continue to wear and age, and as additional inspection/condition results are found and incorporated into the plan.

The contact person for the Village of Caledonia AMP is:

Sandy Stelma, Village Manager
250 S. Maple Street
Caledonia, MI 49316
Phone number: 616.891.9384
Email: sandya@villageofcaledonia.org

ASSET INVENTORY AND CONDITION ASSESSMENT

A list of the major assets in the Village's wastewater system, described further below, include:

- Collection system piping system and manholes
- Wastewater Treatment Plant (WWTP)
- Sanitary sewer lift stations in the collection system

The wastewater collection system assets consist of approximately 47,564 feet (9.0 miles) of sanitary sewers (gravity pipe) and 202 wastewater manholes connecting the gravity pipe. These assets are located in existing street rights-of-way or in easements dedicated for the assets use and maintenance.

The WWTP currently includes the following treatment processes:

- Two SBR tanks
- Influent equalization tank (since converted to a sludge storage tank)
- Two aerobic digester tanks
- Chemical feed system
- Blower room with three SBR blowers and two aerobic digester blowers
- Laboratory and office facility
- Maintenance garage
- Backup power system
- Irrigation pump structure for existing irrigation pump station

Treated effluent is continually discharged to the Rapid Infiltration Basins in accordance with the MDEQ Groundwater Discharge Permit No. GW1810026. The average daily flow design capacity of the WWTP is 0.50 million gallons per day (mgd). The current annual average flow received by the facility is approximately 0.40 mgd.

There is one sanitary sewer lift station included as part of the wastewater collection system, located at the WWTP.

<u>Asset Identification and Location</u>

A comprehensive wastewater system asset inventory was developed from operation and maintenance manuals included a review of existing record drawings, field notes, staff knowledge, and site visits, supplemented with field survey work. Asset material, size and age were identified through the review of available historical record documents and Closed Circuit Televising (CCTV) data. Spatial orientation (pipe location), pipe depth and invert elevations were determined through GPS field survey and a comprehensive evaluation of the gravity system. This information was organized into a new (GIS) database and piping network for archiving, mapping and further evaluation purposes. The inventory includes over 163 WWTP and Lift Station assets, and 396 Collection System Assets.

Condition Assessment and Expected Useful Life

A comprehensive evaluation of the collection system was performed. NASSCO-MACP manhole field based assessments were completed on all 202 manhole structures. Pipeline cleaning and NASSCO-PACP CCTV field based inspections were conducted 48% all of the gravity pipes. Smoke Testing performed on the entirety of system to disclose location of inflow or infiltration and Capacity Analysis was modeled for average day and peak hour conditions to identify capacity concerns.

Overall, the condition of the collection system range from good to poor. Recommendations for short-term (1-5 year) and long term (6-20 year) identified the need for maintenance with 52% of the system was tagged for inspection and/or cleaning. Rehabilitation accounted for 13% of the system identifying the need for point repairs and lining. The remaining 35% of assets were placed in the 20+ year category.

Overall, the condition of the assets at the WWTP range from good to poor. Ongoing repairs have helped to maintain the condition of many assets while some assets that were installed during the 1994 construction of the SBRs have not been replaced are now near the end of their useful life due to age or deterioration caused by harsh conditions associated with wastewater treatment.

The condition of the assets at the lift station range from good to poor. Ongoing maintenance has helped maintain a satisfactory operating condition for many assets while other assets have deteriorated due to age and the harsh conditions associated with typical wastewater collection systems.

The recommendations for short- and long-term improvements for the WWTP and lift station are extensive.

Level of Service

Defining the Expected Level of Service (LOS)

The overall objective of the Village is to provide reliable wastewater collection and treatment services at a minimum cost, consistent with applicable environmental and health regulations. To achieve this, the following Level of Service (LOS) goals are proposed:

WASTEWATER UTILITY - LEVEL OF SERVICE STATEMENT

The overall objective of the Village of Caledonia is to provide reliable wastewater collection and treatment services at a minimum cost, consistent with applicable environmental and health regulations. To achieve this the following Level of Service (LOS) goals are proposed:

- Provide adequate collection system and treatment capacity for all service areas.
- Comply with all local, state and federal regulations at all times for treated effluent from the WWTP.
- Actively maintain collection and treatment system assets in reliable working condition.
- Reduce inflow/infiltration (I/I) flow volumes to mitigate potential for sanitary overflows, water in basements, and overloading of treatment plant.
- Provide rapid and effective emergency response services to customers.
- Regularly review projected O&M and capital expenditures. Adjust user rates, as necessary, to ensure sound financial management of wastewater system.
- Maintain the combined average water and sewer bill at less than 1.0% percent of the community's median household income. (Caledonia: $81,132. Currently 0.75%).
- Hold developers and contractors to a high standard of quality for sewer system extensions to assure a maintainable and sustainable system.

The LOS goals may need to be adjusted from time to time as the utility ages, the needs of community change or new rules or regulations require a change in operation. For this reason, the LOS goals should be reviewed by the Village from time to time to make sure they accurately reflect the desired operation of the utility.

Measuring Performance

While performance measurements are not a required component of this AMP report, the identification and implementation of performance measurement is recommended. Performance measurements are specific metrics designed to assess whether Level of Service objectives are being met. If implemented, an evaluation of goals should be completed at least annually to determine if, the provided resources are being used appropriately. Level of Service requirements can be updated to account for changes due to growth, regulatory requirements, and technology.

Critical Assets

Determining Criticality

Business Risk is the determination of criticality of each asset in the wastewater system. Criticality is based on two factors; Likelihood (Probability) of Failure and Consequence of Failure using the following formula:

Business Risk = Consequence of Failure Score x Likelihood of Failure Score

Defining an asset's Business Risk allows for management of risk and aids in decision making for where to allocate operation and maintenance and capital improvement funds.

Likelihood of Failure (LoF) is a measure of how likely an asset is to fail. The following categories have been developed to quantify how likely an asset is to fail:

- Condition of the asset
- Remaining useful life (Age)
- Service History
- Operational status

Consequence of Failure (CoF) is a measure of the social, economic, financial or environmental impact of failure of an asset and the utilities ability to respond, convey and treat wastewater. CoF categories of the collection system include:

- Proximity to critical environmental features
- Location (Zoning District) of asset
- Facilities served by asset
- Size and location of asset within the utility network
- Type of asset.

The WWTP and Lift Station categories for CoF are:

- Process
- Financial Impact
- Safety
- Environmental Impact
- Disruption to the Community
- Ability to Respond

Criticality Results

Using the strategy outlined above, a Business Risk Evaluation (BRE) was performed for each asset using a graphical ArcGIS-based sewer asset management and capital planning software that compiles, analyzes and assesses Business Risk for each asset and develops a Capital Improvement Plan. The results of the BRE are provided in easily understood tabular and graphical output.

Figure 1 provides the risk rating for gravity pipe by number of pipe segments. Eleven (11) pipe segments in the collection system are identified as having an extreme risk rating. Three pipes have been identified for replacement, three pipes for lining, two for point repairs, and three for no action.

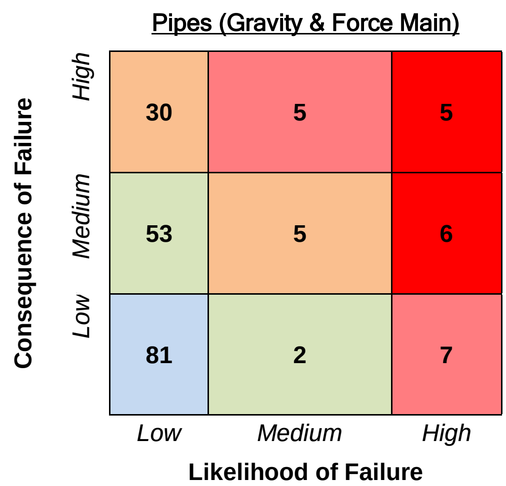


Figure 1. Business Risk Matric (Risk Rating) by Number of Gravity and Force Main Pipes

Figure 2 provides the risk rating for the collection system manholes. Two (2) manholes are identified as extreme risk and are recommended to be replaced in the next 1-2 years. Many manholes are at low to medium risk (92%) and are recommended to be included in a long-term rehabilitation strategy.

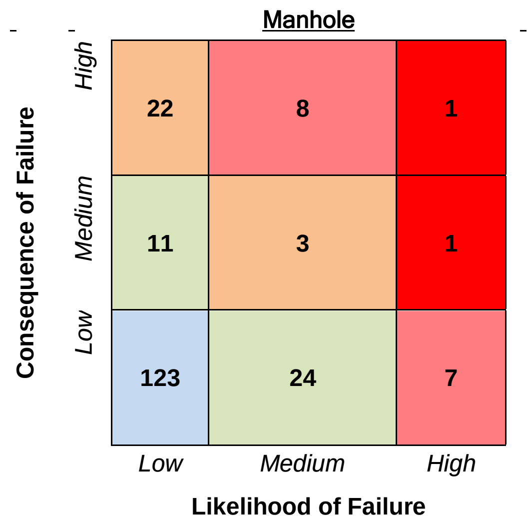


Figure 2. Business Risk Matrix (Risk Rating) by Number of Manholes

Figure 3 provides the risk ratings for the WWTP and lift station assets. One asset is identified as extreme risk and should be replaced and the fifteen assets with high risk rating should be inspected at regular intervals.

WWTP & Lift Station

Consequence of Failure	High	Medium	Low
High	High 0	High 0	Extreme 1
Medium	Low 28	Medium 23	High 15
Low	Low 41	Low 55	Medium 0
	Low	Medium	High

Probability of Failure

Figure 3. Business Risk Matrix (Risk Rating) for WWTP and Lift Station assets

A spreadsheet providing asset criticality for each utility asset has been included in the detailed report for the collection and treatment systems.

Capital Improvement Plan

A Capital Improvement Plan (CIP) with rehabilitation recommendations was prepared for the Village's wastewater utility assets based on the Business Risk evaluation. The CIP recommendations are provided for the collection system, wastewater treatment facility and pumping stations/force mains. From the BRE, a short-term (1-5 year CIP) and long-term (6-20 year CIP) was developed for the utility. Table 4 shows detailed recommendations of the collection system assets needing rehabilitation in the short-term.

Table 4. Collection System Rehabilitation Summary Table: Year by Year

Rehabilitation Action	Total Cost (Current Year Dollars)	2019	2020	2021	2022	2023
Pipe Replacement	$ 188,087	$ -	$ 193,730	$ -	$ -	$ -
Pipe Lining	$ 84,317	$ -	$ 19,555	$ -	$ 71,390	$ -
Pipe Point Repair	$ 19,823	$ 13,233	$ -	$ 6,992	$ -	$ -
Upsize	$ 21,856	$ 21,856	$ -	$ -	$ -	$ -
Manhole Cover Replacement	$ 1,500	$ -	$ -	$ 1,591	$ -	$ -
Manhole Repair, Line, and Replace Cover	$ 10,148	$ -	$ -	$ 10,766	$ -	$ -
Manhole Replacement	$ 42,848	$ -	$ 11,033	$ -	$ -	$ 36,169
Manhole Repair and Line	$ 13,722	$ -	$ -	$ -	$ 14,994	$ -
Manhole Clean and Line	$ 4,038	$ -	$ -	$ -	$ 4,413	$ -
Total	$ 386,340	$ 35,089	$ 224,318	$ 19,349	$ 90,797	$ 36,169

Table 5 shows recommendations for the WWTP and lift station assets needing to be addressed in the following 20-year period.

Table 5. Recommended Capital Improvements for the WWTP			
Asset Description	Anticipated Year of Replacement	Project Cost (2018 Dollars)	Replacemen (Inflated 3
1-5-YEAR CIP PROJECTS			
SBR Expansion, Surface Water Discharge	2021	$ 5,210,000	$ 5,69
Aeration System Improvements	2021	$ 220,000	$ 24
		Total	$ 5,93
6-20-YEAR CIP PROJECTS			
Equalization Pond Biosolids Removal and Repairs	2024	$ 1,228,000	$ 1,46
Polishing Pond Biosolids Removal and Repairs	2024	$ 889,000	$ 1,06
Building Upgrades	2024	$ 220,000	$ 26
Bypass Pump	2024	$ 39,000	$ 4
Pump Station No. 1 Improvements	2024	$ 126,000	$ 15
SBR Pumping Improvements	2024	$ 51,000	$ 6
Electrical Improvements	2024	$ 305,000	$ 36
Digester Tank Coatings	2025	$ 341,000	$ 42
SCADA Upgrades	2027	$ 42,000	$ 5
Chemical Feed Improvements	2032	$ 29,000	$ 4
Pump Station No. 1 Pump Improvements	2033	$ 80,000	$ 12
Digester Aeration Improvements	2033	$ 67,000	$ 10
SBR Improvements	2034	$ 340,000	$ 54
SBR Aeration System Improvements	2038	$ 106,000	$ 19
		Total	$ 4,90

Note: This table represents budgetary estimates for planning purposes. Further definition of the scope of the projects through preliminary a
design will provide details necessary to improve the accuracy of the costs.

OPERATIONS, MAINTENANCE AND REPLACEMENT

Regular operation, maintenance and replacement (OM&R) is essential in the management of a wastewater collection system. The collection system is subject to a variety of operational problems and can suffer from clogging, scour, corrosion, and collapse. Inspection, cleaning, and rehabilitation are important for optimizing the proper functioning of the collection system. By optimizing the performance infiltration/inflow are reduced and sanitary sewer overflows (SSO) are minimized or eliminated preserving the substantial investment the community has in its collection system.

Table 6 summarizes the recommended preventative maintenance actions to be considered in the short term (1-5 years) with recommended cost over the 5-year period.

Table 6. Collection System Maintenance Summary Table: Year by Year						
Maintenance Action	Total Cost (Current Year Dollars)	2019	2020	2021	2022	2023
Manhole Assessment	$ 4,820	$ -	$ -	$ -	$ 5,267	$ -
Manhole Cleaning	$ 4,820	$ -	$ -	$ -	$ -	$ 5,425
CCTV	$ 93,488	$ -	$ -	$ 99,182	$ -	$ -

For the WWTP, an annual equipment replacement fund should be developed to replace disposable equipment. These are items that can be financially accounted for through operation, maintenance and replacement (OM&R) funds and can be replaced by WWTP staff without bringing in an outside contractor. Existing disposable materials include chemicals, wear parts in pumps and motors, laboratory instruments, etc. The existing OM&R fund is sufficient for the current operations. Table 7 shows the current equipment replacement budget for the WWTP and Lift Station.

Table 7. Village of Caledonia						
Equipment Replacement Budget						
Item		Rehab/ Replacement Cost	Life Years		Annual Budget
Lift Station Pumps/Controls	$	50,000	10	$	5,000
SBR Mixers and Decanters	$	20,000	10	$	2,000
Blowers	$	20,000	15	$	1,333
Instrumentation and Controls	$	25,000	10	$	2,500
Chemical Feed System	$	10,000	10	$	1,000
Lab Equipment	$	15,000	15	$	1,000
HVAC System	$	15,000	15	$	1,000
Total	**$**	**155,000**		**$**	**13,800**

REVENUE STRUCTURE

The final component of the AMP is to evaluate projected user rates that will provide sufficient revenues to cover operation, maintenance, capital improvement projects and debt costs.

The MDEQ rate methodology requires and analysis of the current budget on a cash basis to determine if there is a revenue gap. The rate methodology calculated under the MDEQ requirements compared to the current approved rates confirm there is not a revenue gap. The MDEQ approved rate study report and a copy of that approval letter and report is contained in Appendix A of the AMP – LOS, CIP Summary, Rate Structure document.

Department of Environmental Quality
SAW Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date October 31, 2018
(no later than 3 years from executed grant date)

The Village of Caledonia *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1639-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant. The Department of Environmental Quality (DEQ) defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gap in revenue needed to meet expenses, as identified in a
5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.

Attached to this certification is a summary of the AMP that identifies major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Jon Moxey, Village Engineer	at 616-977-1000	jmoxey@fveng.com
Name	Phone Number	Email

Rate Methodology was submitted to DEQ on: April 30, 2018
(within 2 ½ years from date of executed grant)

An initial rate increase of * % of a $ * gap was adopted on December 20, 2017

October 31, 2018

Signature of Authorized Representative (Original Signature Required) Date

Todd Grinage, Village President

Print Name and Title of Authorized Representative

* Note: Rates are adjusted annually in accordance with the Village's operating agreement with Caledonia Township. See attached resolution.

Protecting our Infrastructure Investment

ASSET MANAGEMENT PLAN

Stormwater Executive Summary Report



Prepared for:

Village of Caledonia

SAW Project No. 1639-01

Caledonia

FINAL

October 2018

FLEIS&VANDENBRINK

DESIGN. BUILD. OPERATE.

1.0 EXECUTIVE SUMMARY

OVERVIEW

Public Act 562 of 2012 authorized money for Stormwater, Asset Management, and Wastewater (SAW) Grant Program. In 2015, The Village of Caledonia received a SAW Grant from the Michigan Department of Environmental Quality (MDEQ) to provide financial assistance for the development of this Asset Management Plan (AMP). This report provides the Asset Management Plan (AMP) for the Village's stormwater collection system. Working with Village staff, Fleis and VandenBrink (F&V) provided technical assistance for asset identification, condition assessment, and capital improvement planning of the stormwater collection system.

This AMP is intended to be a living document that is updated as assets continue to wear and age, and as additional inspection/condition results are found and incorporated into the plan.

The contact person for the Village of Caledonia AMP is:

Sandy Stelma, Village Manager
250 S. Maple Street
Caledonia, MI 49316
Phone number: 616.891.9384
Email: sandya@villageofcaledonia.org

ASSET INVENTORY AND CONDITION ASSESSMENT

The stormwater collection system assets consist of approximately 44,949 feet (8.5 miles) of storm sewers and 442 stormwater structures connecting the gravity pipe. These assets are located in existing street rights-of-way or in easements dedicated for the assets use and maintenance.

ASSET IDENTIFICATION AND LOCATION

A comprehensive stormwater system asset inventory was developed from available record drawings, field notes, staff knowledge, and site visits; supplemented with field survey work. Asset material, size and age were identified through the review of available historical record documents. Spatial orientation (pipe location), pipe depth and invert elevations were determined through GPS field survey and a comprehensive evaluation of the gravity system. This information was organized into a new or updated (GIS) database and piping network for archiving, mapping, and further evaluation purposes.

CONDITION ASSESSMENT AND EXPECTED USEFUL LIFE

For the Village of Caledonia, a comprehensive evaluation of the collection system was performed. NASSCO-MACP structure field-based assessments were completed on 401 of the total 442 identified structures in the storm sewer utility, or 91% of the stormwater system structures. Pipeline cleaning and NASSCO-PACP CCTV field-based inspections were conducted on 51% of the gravity pipe. In areas where stormwater system pipeline capacity concerns have been identified by historical information, hydraulic modeling and analysis (HM&A) is used to identify the scope and extent of the system capacity issues. Recommendations for short-term (1-5 year) and long term (6-20 year) identified the need for maintenance: 36% of the system was tagged for inspection and/or cleaning. Rehabilitation accounted for 11% of the of the system identifying the need for point repairs and lining. The remaining assets (53%) were placed in the beyond 20 year planning category.

Level of Service

Defining the Expected Level of Service (LOS)

The LOS for the Village stormwater system is stated as follows:

STORMWATER – LEVEL OF SERVICE STATEMENT
"To provide appropriate stormwater collection, diversion, and conveyance at a minimum cost, consistent with applicable environmental regulations. To achieve this the following Level of Service (LOS) goals are proposed for the Village of Caledonia: ▪ *Provide adequate stormwater collection system and conveyance capacity for all service areas* ▪ *Actively maintain stormwater collection and conveyance system assets in reliable working condition.* ▪ *Provide rapid and effective emergency response services to customers.* ▪ *Maintenance and operations staff are to be properly trained."*

Measuring Performance

Performance measurements are specific metrics designed to assess whether Level of Service objectives are being met. Evaluations of goals should be completed at least annually to determine if the provided resources are being used appropriately. Level of Service requirements can be updated to account for changes due to growth, regulatory requirements, and technology.

Critical Assets

Determining Criticality

Business Risk is the determination of criticality of each asset in the wastewater system. Criticality is based on two factors: 1.) Likelihood (Probability) of Failure and 2.) Consequence of Failure. Defining an asset's Business Risk allows for management of risk and aids in decision making for where to allocate operation, maintenance, and capital improvement funds.

Likelihood of Failure (LoF) is a measure of how likely an asset is to fail. The following categories have been developed to quantify how likely an asset is to fail:

- Condition of the asset
- Remaining useful life (Age)
- Service History
- Operational status

Consequence of Failure (CoF) is a measure of the social, economic or environmental impact of failure of an asset and the utility's ability to convey stormwater. CoF categories of the stormwater collection system include:

- Location of asset
- Facilities served by asset
- Size

Assessing Criticality

Using the strategy outlined above, a Business Risk Evaluation (BRE) was performed for each asset of the Village of Hopkins using Innovyze-InfoMaster software. InfoMaster is an ArcGIS-based sewer asset management and capital planning software that compiles, analyzes and assesses Business Risk for each asset and develops a Capital Improvement Plan.

The Business Risk score, also known as Criticality, is calculated for each asset using the following equation:
Business Risk = Consequence of Failure Score x *Likelihood of Failure Score*

Figure 1 provides the risk rating for storm sewer pipes by number of pipe segments. Eight (8) pipe segments in the stormwater collection system have an extreme risk rating and are recommended to be for near-term rehabilitation or replacement.

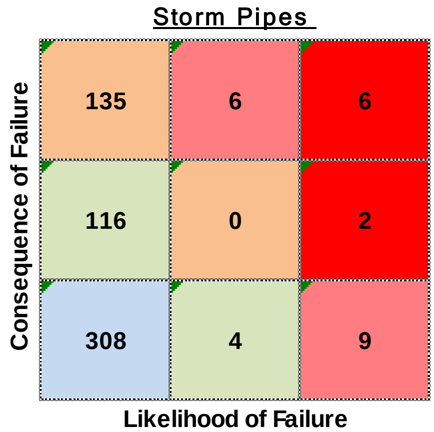


Figure 1: Business Risk Matrix (Risk Rating) by Number of Gravity Pipes

Figure 2 provides the risk rating for the storm sewer structures. Thirty-eight (38) structures are identified as extreme risk and are recommended for replacement or rehabilitation.

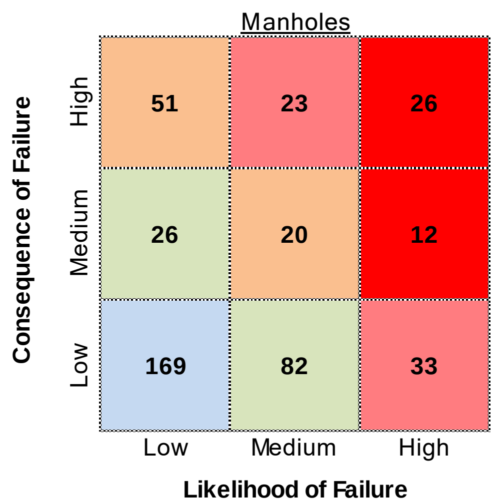


Figure 2: Business Risk Matrix (Risk Rating) by Number of Structures

A spreadsheet providing asset criticality for each utility asset is included in the AMP detailed report for the stormwater collection system.

Capital Improvement Plan

A Capital Improvement Plan with recommendations was prepared for the Village's assets based on the Business Risk evaluation. Data-driven information from the business risk assessment and condition assessment was used to identify and prioritize the capital improvement projects. The information was also used to schedule inspections to evaluate the condition of high business risk assets. Short-Term 1-5 year and Long-Term 6-20 year Capital Improvement Plan (CIP) was prepared to address the projected needs for each asset in the system. The 5-year CIP rehabilitation total is $716,576.

CIP Development

In order to prepare the CIP, collection system assets were grouped by strategy and assigned costs from a unit database. This database includes unit construction values in 2018 construction dollars based on a survey of recent projects in Michigan and includes engineering and administrative rates where applicable. Assets were categorized and prioritized by year based on risk rating and criticality score to develop the CIP.

The CIP was developed by assigning each project to a CIP year (1-5) based on several factors. In addition to Risk Rating, other factors used to assign CIP year include:

- Asset rehabilitation grouping (i.e. the type of repair/construction recommended)

The recommended 5-Year Capital Improvement Plan for the Village-owned stormwater collection system is included in Table 4 below.

Table 4. 5-Year Capital Improvement Plan: Rehabilitation						
Rehabilitation Action	Total Cost (Current Year Dollars)	2019	2020	2021	2022	2023
Pipe Lining	$ 33,910	$ -	$ -	$ -	$ 37,054	$ -
Pipe Point Repair	$ 173,568	$ 80,683	$ -	$ 98,542	$ -	$ -
Manhole Replacement	$ 32,136	$ -	$ 22,067	$ -	$ -	$ 12,056
Upsize	$ 201,504	$ 30,986	$ -	$ 180,903	$ -	$ -
Manhole Clean, Line and Repair	$ 75,284	$ -	$ 49,849	$ -	$ 29,380	$ -
Manhole Repair and Line	$ 164,665	$ -	$ 80,091	$ -	$ 94,965	$ -
Total	$ 681,067	$ 111,668	$ 152,007	$ 279,445	$ 161,400	$ 12,056

Operations and Maintenance

A preventative maintenance program to systematically clean and inspect pipelines to NASSCO-certified standards is critical for a sound stormwater system. The process of cleaning and CCTV inspection of pipelines either with equipment owned by the community or contracted is a relatively inexpensive maintenance effort when compared to rehabilitation efforts. It is recommended that at a minimum, all pipelines be cleaned and televised every five years, or that 20% of the system be cleaned and televised annually. Available budget will dictate the frequency or size of yearly projects. The 5-year CIP maintenance total is $128,894.

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Due Date October 31, 2018
(no later than 3 years from executed grant date)

The Village of Caledonia *(legal name of grantee)* certifies that all stormwater asset management plan (SWAMP) activities specified in SAW Grant No. 1639-01 have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SWAMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

Jon Moxey, Village Engineer	at 616-977-1000	jmoxey@fveng.com
Name	Phone Number	Email

	October 31, 2018
Signature of Authorized Representative (Original Signature Required)	Date

Todd Grinage, Village President
Print Name and Title of Authorized Representative

EXECUTIVE SUMMARY

Prepared by: **SPICER GROUP, INC.**
230 S. Washington Avenue
Saginaw, MI 48607

Owner: **VILLAGE OF CAPAC**
131 North Main Street
Capac, MI 48014
John Grzyb, President

On September 16, 2015, the Village of Capac entered into an agreement with the Michigan Finance Authority for grant funds issued under Public Act No. 511 of 2012 for the *Stormwater, Asset Management, and Wastewater (SAW)* program. The Village received the follow grants:

Wastewater Asset Management Plan (WWAMP) – 100% Grant	$279,750
Stormwater Asset Management Plan (SWAMP) – 90% Grant	$220,250
Eligible Cost Subtotal	$500,000
LESS Local Match	($22,025)
Total Grant Amount	$477,975

The Asset Management Plans (AMPs) needed to be completed within three years of the date of agreement; November 2018.

Each AMP has the following key components:

- Asset Inventory and Condition Assessment
- Critical Assets (Risk)
- Level of Service Determination
- Revenue Structure
- Capital Improvement Plan

Wastewater Asset Inventory and Condition Assessment

The Village's wastewater system consists of three main components: The collection system (pipes and manholes), pump station, and the wastewater treatment facility lagoon.

For the collection system, Spicer Group, Inc. completed a mobile mapping LiDAR survey of the entire Village, and used the survey information to develop a comprehensive Geographic Information System (GIS). This GIS is located on a new computer in the Village office, and is a detailed "smart" mapping system with databases, using the ArcGIS/Arc Online by ESRI platform. From the GIS, as-built plans, pipe/manhole condition ratings, materials, year installed, inspection records, CCTV video inspections etc. can be accessed. This information can also be queried to provide specific lists and maps, and updated easily when future improvements are made.

The Village currently owns 64,317.6 feet of sanitary sewer pipes in the entire sanitary sewer collection system ranging in size from 6"-21", 247 manholes, serving a total of 697 customers. The table below provides a breakdown of the sanitary sewer system by ownership. The Village of Capac provides sewer collection to a few customers that own and maintain their own collection system. Hunter's Crossing, is a large housing development is located on the southeast quadrant of the Village limits near the lagoon. The mains and manholes here are owned and maintained by the development. All the sewage is collected via gravity in the development and flows north to tie into the Village interceptor sewer before being discharged to the lagoon.

Table ES-1 – Sanitary Sewer Inventory by Ownership

Ownership	Length (Feet)	% of System
Village of Capac	64,317.6	80.1%
Hunters Crossing	8,099.3	10.1%
MDOT	6,858.4	8.5%
School	991.6	1.2%
Total	80,266.9	100.0%

The Michigan Department of Transportation (MDOT) Owns and maintains a 2 pump stations, force main, and several thousand feet of sanitary sewer originating from the Rest Area on I-69. From the rest area, the sewage is pumped via force main north along Watson Rd. Where it then turns into gravity sewer. The gravity sewer runs on the north side of Donald Rd. where it flows to another pump station just before Capac Rd. The MDOT owned force main discharges the waste water to the Village owned sewer that flows to the north.

Capac area schools also owns and maintains about a thousand feet of sanitary sewer collection for the schools on North Glassford Street. The School's sewer connects to the Village owned sewer at manhole 188 on the east side of Glassford. The picture below shows the sanitary sewer system that is owned and maintained by the school. The manholes with the "P" in front of the number indicate privately owned by the school.

Michigan Pipe Inspection, from Port Huron completed a comprehensive cleaning and televising program of the sanitary sewer pipes, and Spicer Group, Inc. completed a comprehensive inspection of the manholes using the NASSCO Manhole/Pipeline Assessment Certification Program (MACP/PACP) standards to identify and code the defects. The MACP/PACP system is used to standardize the scoring and to quantify the condition of the wastewater assets.

The second main component of the Village's wastewater system are the pumping stations. They are as follows:

Polo Homes – Constructed 1996

McDonalds – Constructed 2000

Lagoon – Constructed 2000

West Mills – Constructed 1977

These four pump stations are maintained by the DPW staff. Spicer Group completed an inspection and condition assessment of the four pump stations and provided recommendations for future improvements.

Many of the components of the pump stations were past their useful life. It was recommended that the Village start budgeting for these future improvements.

The third main component of the Village's wastewater system is the wastewater treatment lagoon located on the east side of the Village. Spicer Group completed an inspection and assessment of the lagoon. Biotech Agronomics, Inc performed a sludge judge and chemical analysis of the bio solids. Results from the lab found the material meets the MDEQ requirements for a Residuals Management Plan (RMP) and the material can be recycled in a beneficial reuse program such as land application.

The original two pond lagoon system was put into service in 1963. Each pond was approximately 7.5 acres. The third pond was constructed in 1981 and is approximately 21 acres.

Criticality (Risk)

For each asset in the Villages wastewater system, a criticality/risk analysis was performed to determine and prioritize the Village's key components. Based on the condition assessments and the field inspections, the Likelihood of Failure (LoF) was calculated for every asset; including all pipes, manholes, pumping stations, and WWTPL components. Next, the Consequence of Failure (CoF) was calculated and scored for each asset based on the economic, social, and environmental consequences, if that asset failed. Finally, the Criticality (Risk) score was calculated using:

RISK = LoF x CoF

Overall, the collection system had 10 different pipes with LoF scores of 5.1 or above indicating pipe is near failure. The collection system also had 37 pipe segments with scores of 4.1 to 4.4 indicating poor condition. There was a total of 34 manholes that had LoF scores of 5.1-5.2 indicating they are near failure. Another 43 manholes received LoF scores of 4.1-4.2 indicating they are in poor condition. It is important to note not all manholes were able to be inspected, more information is provided on the uninspected manholes condition assessment portion of the report.

The highest CoF score generated for a pipe was 5.0 indicating a major disruption. Another 9 pipes had CoF scores ranging from 4-4.6 indicating Moderate to Major Disruption. The remaining pipes fell into moderate to insignificant disruption categories with scores ranging from 3.9 to 1.1.
The highest CoF score generated for a manhole was 4.7. The remaining manholes had CoF scores ranging from 3.5 to 0.9.

Overall, no pipe segments or manholes fell into the high-risk category. A total of 50 pipe segments fell into the medium risk category with the remaining pipe segments all falling into the low risk category. A total of 16 manholes fell into the medium risk category with the remaining manholes all falling into the low risk category.

All components of the lagoon pump station were given LoF values of 2 or 3 signifying not likely failure to 50/50 chance of failure. Although all aspects are currently functioning properly it is important to note that due to all the components operating at to significantly over their useful life failure could occur at any time. Therefore, the LoF is very hard to assign to these individual components. The West Mills pump station is functioning properly. It is 41 years old and all components were given LoF scores ranging from 3-5. The pumps received the larges LoF score. The Polo Homes pump station is functioning properly. It is important to note that all components are 22 years old. LoF scores for this pump station ranged from 2-3. The McDonalds pump station was constructed in 2000. It is a Gorman Rupp duplex pump station that serves only McDonalds. The station is functioning properly it is important to note that all components are

18 years old. LoF scores assigned to the components of the McDonalds pump station ranged from 2-4. Overall, CoF values for the pump stations were high due to components such as the wet well and control panels. If these components were to fail, the entire station would not function causing a sewer backup. The highest scoring risk pump station components were as follows: control panel at Mcdonald's pump station and pumps 1 & 2 from the West Mills Pump Station. These components should take immediate priority for rehab/replacement. Many of the other components fell into the medium to low risk categories.

Generally, the lagoon was in "2 - Good" condition contributing to LoF scores of "2" meaning failure is unlikely. Bank erosion was starting to occur in some locations. There was no rip-rap on interior slopes which is contributing to these increased erosion rates. Therefore, it is recommended the Village monitor this erosion. A few of the components such as the Staff Gauge in Cell 1, emergency flap gate, perimeter fencing received LoF scores of 5. Overall when looking at CoF, there were many components whose Consequence of Failure were rated 4 (Bad) and 5 (Very Bad). If berms and or components like crossover pipes were to fail, the lagoon could possibly overflow causing serious environmental consequences. Other components such as a clay liner failure could result in polluted groundwater. When looking at the overall risk for the lagoon, most of the components that make up the lagoon system fall into the medium to low risk categories. The berms and clay liners received the highest risk scores.

Level of Service (LOS)

The next phase of the AMP is a Level of Service determination. What level of service does the Village want to provide to its wastewater customers? How are projects going to be prioritized and included in the CIP? What cost is the Village willing to endure to provide that level of service? These are all questions that were discussed as a part of the overall asset management plan. The Villages Level of Service Goals are as follows:

Mission Statement

The Village of Capac strives to develop a financially stable, high performing wastewater collection, pumping and treatment service that addresses the customer's wants and needs and upholds the local, State, and Federal regulatory requirements at a minimum cost to our customers.

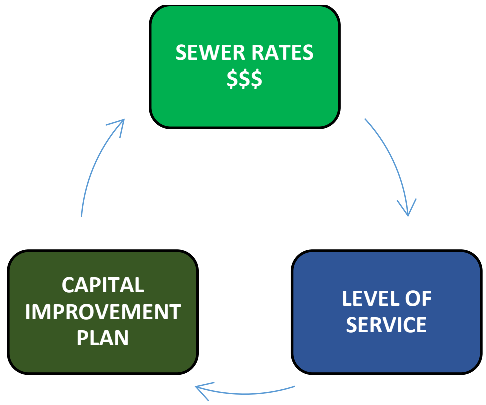
One of the basic goals is to review the capital improvement projects to determine the best value options for the Villages' customers based on life cycle costs and overall benefits to the community:

- "**MINIMUM**" Level of Service – Priority projects to meet the minimum local, State, and/or Federal regulations. Typically to be completed within the next 5 years.
- "**MEDIUM**" Level of Service – Projects that will need to be done eventually; typically when other infrastructure projects are happening.
- "**HIGH**" Level of Service – Projects that are on the long range radar that could spur future development and growth for the Village.

Generally, the "high" level of service projects will have a higher construction/initial cost, but would provide a better long-term or life cycle cost for the Village. The "minimum" level of service projects would have a lower initial cost, but would also have a shorter life span and higher overall life cycle costs.

As the AMP progressed, different scenarios were evaluated, to provide the Villages desired Level of Service, the costs of the capital improvement projects associated with that LOS, and the effect on sewer rates.

Asset Management Plan Evaluation Process



The resulting capital improvement plan and revenue structure was one that met the Villages goals, addressed the improvements that need to be made, and is a sustainable rate structure for the Villages customers. The Village chose to adopt a minimum level of service.

Revenue Structure

Spicer Group teamed with Municipal Analytics for the revenue structure analysis for the AMP. Wastewater account balances, expenditures, revenues, etc. were reviewed and inputted into Municipal Analytics financial software to determine if there were any deficiencies in the rates. The Villages current rate structure was found to have no deficiencies meaning the Village could fund current and future operations and maintenance of the system. However, the gap analysis did not consider any capital improvement projects required to maintain the selected LOS.

Next, the Capital Improvement Plan (CIP) projects were evaluated and allocated to various years of completion, and the rate structure to support those improvements was determined. Many iterations/scenarios were performed to come up with a rate structure that met the Villages Level of Service goals, completed the CIP projects that are needed, and had sustainable rates for the Villages customers. The result was a recommendation for an increase of 8% per year through 2024 followed by a 4% annual increase. This rate increase will allow the Village to meet the minimum level of service developed. This should be reviewed annually as a part of the Villages normal budgeting process.

Capital Improvement Plan

The Capital Improvement Plan (CIP) is the culmination of all the parts of the Asset Management Plan (AMP). Reviewing the results of the wastewater system Inventory & Condition Assessment, Level of Service (LOS) determination, Criticality (Risk), Revenue Structure, and preliminary CIP project lists, a process was worked through to categorize and prioritize the final CIP. Various degrees of Level of Service and the associated CIP projects were evaluated and plugged into the Revenue Structure model, and the resulting sewer rates for that set of scenarios were reviewed. If the projected rates were too high, a lower LOS was chosen and those CIP projects were plugged into the Revenue Structure model and the resulting rates were then reviewed. The process then continued with different CIP projects at varying LOS's until an acceptable rate structure, level of service, and capital improvement plan was developed.

A comprehensive CIP was developed that includes various collection system improvements. The table below summarizes the minimum service level projects that were included in the capital improvement plan.

Village of Capac Sanitary Sewer Capital Improvement Plan

Annual Maintenance

Annual Operation and Reactionary Maintenance	$10,000.00

Collection System

Project Number	Level of Service	Year	Project Location	Project Description	Defect(s)	Total Estimated Cost
1	Min.	2025	Various Areas	Root Cut or Dig Up Then Heavy Cleaning/Televise	Areas That Were Previously Not Completed	$100,000.00
2	Min.	2020	Hill Street Sanitary Sewer Replacement	Replacement of the Gravity Interceptor Line to the Lagoon Pump Station	Pipe is in Poor Condition and has many Sags & Defects	$806,000.00
3	Min.	2025	East Meier Street Sewer Replacement	From Walker Street to Hunter Street	Pipe is in Poor Condition and has many Sags & Defects	$143,000.00
4	Min.	2025	Mill Street Sanitary Sewer Replacement	Lester Street to East 980'	Pipe is in Poor Condition and has many Sags & Defects	$253,000.00
5	Min.	2025	Mill Street Sanitary Sewer Replacement	South Walker Street to North Hunter Street	Pipe is in Poor Condition and has many Sags & Defects	$139,000.00
6	Min.	2025	Meier Avenue Sanitary Sewer Replacement	Main Street to South 171' then North 253'	Pipe is in Poor Condition and has many Sags & Defects	$125,000.00
7	Min.	2025	Mill Street,Alley,Neeper Street,Glassford	Mill from Glassford Street to East,Alley South to Mill,Neeper from Church to Mill,Glassford at Church Street	Pipe is in Poor Condition and has many Sags & Defects	$434,000.00
8	Min.	2025	Various Areas	Intruding Tap Cutting (Assume 67 Taps)	Various	$48,000.00
9	Min.	2025	Various Areas	Defective Tap Repairs (Assume 48 Taps)	Various	$288,000.00
10	Min.	2025	Various Areas	Sanitary Spot Repairs (Assume 53 Point Repairs)	Various	$478,000.00
					Total Collection System Rehab	**$2,814,000.00**

Conclusion

The Village of Capac wastewater system is a typical, aging municipal infrastructure system. The DPW staff have completed routine operation and maintenance of the components, but many of the pipes are past their expected service life and are in need of replacement. An 8% per year rate increase through 2024 followed by a 4% annual increase is needed for the Village to meet the minimum level of service they have chosen for the wastewater collection system. This will need to be reviewed annually during the Villages normal budgeting process.

In accordance with the SAW Grant requirements, the Village's Wastewater Asset Management Plan (WWAMP) needs to be kept available for citizen review for 15 years. The WWAMP should be reviewed annually, and the components updated and included in the Village's annual budget process.

WASTEWATER ASSET MANAGEMENT PLAN

VILLAGE OF CAPAC

ST. CLAIR COUNTY, MICHIGAN

OCTOBER 2018

BASED ON:

***ASSET MANAGEMENT GUIDANCE FOR WASTEWATER AND STORMWATER SYSTEMS*, MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY, JULY 2013**

STORMWATER, ASSET MANAGEMENT, AND WASTEWATER (SAW) GRANT

PROJECT NUMBER: 1211-01

PREPARED BY:

230 S. Washington Avenue
Saginaw, MI 48607

PROJECT ID NUMBER: **122913SG2015**

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date November 30, 2018
(no later than 3 years from executed grant date)

The Village of Capac *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1211-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or No
   If No - Date of the rate methodology approval letter: ______________________.
2) Significant Progress Made: Yes or No
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: ______________________.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ______________________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Marylyn Price	at 810-395-4355	marilynprice20@yahoo.com
Name	Phone Number	Email

Marilyn Price — 11.28.18

Signature of Authorized Representative (Original Signature Required) — Date

Marilyn Price, Village Treasurer

Print Name and Title of Authorized Representative

VILLAGE OF CAPAC
SAW Grant Project No. 1211-01

EXECUTIVE SUMMARY

Prepared by: **SPICER GROUP, INC.**
230 S. Washington
Saginaw, MI 48607

Owner: **VILLAGE OF CAPAC**
131 N. Main Street
Capac, MI 48014
(810) 395-4355
John Grzyb, President

On September 16, 2015, the Village of Capac received a Notice of Grant Application Approval as a Round 3 SAW Grant awardee from the Michigan Department of Environmental Quality and the Michigan Finance Authority for grant funds issued under Public Act No. 511 of 2012 for the *Stormwater, Asset Management, and Wastewater (SAW)* program. The Village received the follow grants:

Wastewater Asset Management Plan (WWAMP) – 100% Grant	$279,750
Stormwater Asset Management Plan (SWAMP) – 90% Grant	***$220,250***
Eligible Cost Subtotal	$500,000
LESS Local Match	($22,025)
Total Grant Amount	$477,975

The Asset Management Plans (AMPs) needed to be completed within three years of the date of agreement; November 2018.

Each AMP has the following key components:

- Asset Inventory and Condition Assessment
- Level of Service Determination
- Critical Assets (Risk)
- Revenue Structure
- Capital Improvement Plan

Storm Water Asset Inventory and Condition Assessment

The Village of Capac's storm water collection system consists of a series of 6"- 42" These pipes or "storm sewers" collect storm water from "catch basins", footing drains/sump systems (sump leads), open inlets, roadside drainage, roof drains, groundwater infiltration etc. A base map of the system is included in Appendix A.

For the collection system, Spicer Group, Inc. completed a mobile mapping LiDAR survey of the entire Village and used the survey information to develop a comprehensive Geographic Information System

(GIS). This GIS is located on a new computer in the Village office, and is detailed "smart" mapping system with databases, using the ArcGIS/Arc Online by ESRI platform. The GIS as-built plans, pipe/manhole condition ratings, materials, year installed, inspection records, CCTV video inspection etc. can be easily accessed. This information can also be queried to provide specific lists and maps, and updated easily when future improvements are made.

The Village currently maintains 40,082 feet of storm sewer pipes ranging in size from 6" to 42". Below is a table showing the diameter and materials of the storm water piping:

Table ES-1: Village-Owned Storm Water Pipes by Diameter and Material

Village Owned Storm Sewer						
Pipe Diameter	VCP	RCP	PVC	PE	CMP	**Total**
6"	113.4	21.2	174.6			309.2
8"	66.6	112.3	35.3	69.9	204.9	489
10"		1369.6	127.5	20.7	62.3	1580.1
12"		17294.4		384.3	130.9	17809.6
15"		5003		75.2	158.9	5237.1
18"		3363.6		169.2		3532.8
21"		473.8				473.8
24"		2950.1		181.1		3131.2
30"		4647.4				4647.4
36"		2129.3				2129.3
42"		742.6				742.6
Total	180	38107.3	337.4	900.4	557	**40082.1**
Percent by Material	0.4%	95.1%	0.8%	2.2%	1.4%	100.0%

Spicer Group, Inc. completed a comprehensive inspection of all the storm water structures owned by the Village. The NASSCO Manhole Assessment Certification Program (MACP) standards were used to identify and code the defects and was used to standardize the scoring and quantify the condition of the storm water assets. A series of condition matrices were used to assign LoF, and CoF values to the storm pipes because they were not televised.

There are several County Drains within the Village limits that are owned, operated, and maintained by drainage districts through the St. Clair County Drain Commissioner's office. These County Drains benefit the residents within each respective drainage district, but are not considered to be Village-owned storm water assets. The County Drains are as follows:

- Railroad Drain and Branches
- Lemon Drain and Branches
- East Branch of the Walker Drain
- Capac Drain

All of the storm water in the Village eventually drains to the North Branch of the Belle River. The Belle River meanders toward the southeast through Lapeer and St. Clair Counties, and discharges to the St. Clair River in Marine City, just north of Lake St. Clair.

Criticality (Risk)

For each asset in the Village's storm water system, a criticality/risk analysis was performed to determine and prioritize the Village's key components. Based on the condition assessments and the field inspections, the Likelihood of Failure (LoF) was calculated for every asset; including all pipes, manholes, drainage structures, etc. Next, the Consequence of Failure (CoF) was calculated and scored for each asset based on the economic, social, and environmental consequences, if that asset failed. Finally, the Criticality (Risk) score was calculated using:

RISK = LoF x CoF

The overall collection system had a total of 8 pipes with LoF scores from 6.0-5.0. these pipes are the oldest pipes in the collection system and are recommended to be televised before new paving work is completed if they fall under roadways.

There were a total of 79 drainage structures with high QR score, 5000 or higher. It is recommended that the DPW keeps an eye on these structures and if new CIP projects are taking place near these structures, the rehab or replacement of these structures should be included in the project.

Overall, the collection system had 10 pipes with a CoF scores from 5.00 to 6.00. These pipes were generally large diameter pipes located in Main Highway-Urban areas. If these pipes were to fail, they would impact the most people and cause the most damage. There were only three manholes that were assigned high CoF Scores.

There was only one structure that was considered high risk. This was storm structure I15 with an overall risk score of 25.5. The remaining storm structures all had medium to low risk values.

There was only one pipe segment (F35-F34) that was high risk with an overall score of 25.9. All the remaining pipe segments fell into the medium and low risk categories

Level of Service

Mission Statement

The Village of Capac strives to maintain a basic storm water collection system service that *addresses* the residents' wants and needs and upholds the local, State, and Federal regulatory requirements at a minimum cost to our residents.

Basic goals:

- Operate and maintain the storm water system to minimize flooding and property damage.
- Provide rapid and effective emergency response service.
- Review the condition of storm water assets as a part of other infrastructure construction projects.
- Seek a funding source for operation & maintenance and repair/replacement of storm water assets.
- Review the maintenance and capital improvement plans/projects annually to determine the lowest cost options for our residents:
    - "**MINIMUM**" Level of Service – Address resident complaints as they come in.

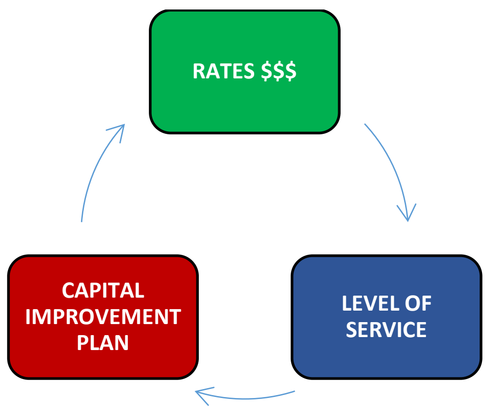
- "MEDIUM" Level of Service – Point repairs to the existing system that have been identified. Mainly projects that the cleaning and televising crew had to abandon the inspection due to obstructions, collapses, holes etc.

- "HIGH" Level of Service – Lining or replacement projects to be completed with other infrastructure improvement projects.

Performance Measurements:

- Review annual performance goals for storm sewer system operation & maintenance, rehabilitation, and capital improvements.
- Annually review the number and severity of resident complaints.
- Annually review the amount of storm sewer assets that have been repaired or replaced.
- Review and update the Storm Water Asset Management Plan, GIS, and Capital Improvement Plan annually.

ES-2: Asset Management Plan Evaluation Process



Since Michigan has not created a climate which would allow municipalities to create either an enterprise fund or a utility fee for storm water asset improvements, funding comes from the Village's Local and Major Street funds. The Village has fixed sources of revenues from a combination of State, County, Township and Village taxes. These limited funds are in some ways restricted on their use in that they are primarily designated for road improvements.

Since there is no real funding mechanism for storm water assets, the Village has been maintaining a very minimum Level of Service. This has resulted in a reactionary operation and maintenance practice. When residents notify the Village of flooding or drainage issues, the DPW will address the issue on a case-by-case basis. When the Village has street resurfacing or replacement projects, the storm water system is inspected, evaluated, and appropriate repairs and/or replacement is done based on the funding available.

Revenue Structure

Spicer Group teamed with Municipal Analytics for the revenue structure analysis for the AMP. Since Michigan has not created a climate which would allow municipalities to create either an enterprise fund or a utility fee for storm water asset improvements, funding comes from the Village's general fund. Act 51 funds received from the State for street/road improvements could also be used for storm water improvements that affect the street projects directly. However, Act 51 funding is very limited. Another mechanism for funding large storm water improvements is through the St. Clair County Drain Commissioner's office, using the Drain Code, PA 40 of 1956.

The financial impact analysis found that the Village's general fund does not have sufficient revenue to meet identified storm water capital improvement projects, and does not have a mechanism to collect rates/fees to provide storm water collection services. The Village will strive to maintain a minimum level of service and seek outside grants and funding for storm water infrastructure capital improvements. The Village should continue to update this analysis on an annual basis to determine if funds become available to address the proposed capital improvement projects.

Capital Improvement Plan

The Capital Improvement Plan (CIP) is the culmination of all the parts of the Asset Management Plan (AMP). Reviewing the results of the stormwater system Inventory & Condition Assessment, Level of Service (LOS) determination, Criticality (Risk), Revenue Structure, and preliminary CIP project lists, a process was worked through to categorize and prioritize the final CIP.

Until a funding mechanism for storm water improvements is found, the Village is forced to continue its *reactionary* policy. In order to have some sort of financial mechanism for the Village to *proactively* improve the storm water system, we recommended a minimal discretionary budgetary line item of $10,000 per year for the Village to clean, televise, root treat and complete misc. repairs. With this discretionary budget line item, many smaller operation and maintenance projects can be completed overtime.

Conclusion

The Village of Capac's storm water system is a typical, aging municipal infrastructure system. Since there is no real funding mechanism for storm water assets, the Village has been maintaining a very minimum Level of Service for its residents. This has resulted in a reactionary operation and maintenance practice. When residents notify the Village of flooding or drainage issues, the DPW will address the issue on a case-by-case basis. When the Village is planning for street resurfacing or replacement projects, the storm water system is inspected, evaluated, and appropriate repairs and/or replacement is done based on the funding available.

In order to have some sort of financial mechanism for the Village to proactively improve the storm water system, we recommended a minimal discretionary budgetary line item of $10,000 per year for the Village to clean, televise, root treat and complete misc. repairs.

Until a funding mechanism for storm water improvements is found, the Village is forced to continue this reactionary policy. The Village should continue to urge its State legislators to develop a plan to fund municipal storm water improvements, such as supporting HB 5991.

In accordance with the SAW Grant requirements, the Village's Storm Water Asset Management Plan (SWAMP) needs to be kept available for citizen review for 15 years. The SWAMP should be reviewed annually, and the components updated and included in the Village's annual budget process.

STORMWATER ASSET MANAGEMENT PLAN

VILLAGE OF CAPAC

ST. CLAIR COUNTY, MICHIGAN

NOVEMBER 2018

BASED ON:

***ASSET MANAGEMENT GUIDANCE FOR WASTEWATER AND STORMWATER SYSTEMS*, MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY, JULY 2013**

STORMWATER, ASSET MANAGEMENT, AND WASTEWATER (SAW) GRANT

PROJECT NUMBER: 1211-01

PREPARED BY:

230 S. Washington Avenue
Saginaw, MI 48607

PROJECT ID NUMBER: **122913SG2015**

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Due Date November 30, 2018
(no later than 3 years from executed grant date)

The Village of Capac *(legal name of grantee)* certifies that all stormwater asset management plan (SWAMP) activities specified in SAW Grant No.1211-01 have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SWAMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

Marilyn Price at 810-395-4355 marilynprice20@yahoo.com
Name Phone Number Email

Marilyn Price 11.26.18
Signature of Authorized Representative (Original Signature Required) Date

Marilyn Price, Village Treasurer
Print Name and Title of Authorized Representative

City of Center Line
7070 E. Ten Mile Road
Center Line, Michigan 48015
(586) 757-6800
Dennis Champine, dchampine@centerline.gov
http://www.centerline.gov/

Overview

The City of Center Line is home to over 8,300 residents in an area comprising 1.7 square miles. The City has a separated wastewater and stormwater system for which the condition is not readily known. This led City Council to apply for a grant through the Michigan Department of Environmental Quality (MDEQ) Stormwater, Asset Management, and Wastewater (SAW) Program.

The City of Center Line was awarded a grant to investigate and evaluate the City's stormwater assets. With the grant the City engaged Anderson, Eckstein and Westrick (AEW) to investigate and develop a Stormwater Asset Management Plan (AMP). Through development and implementation of this plan, the insight and understanding of the stormwater system can be significantly improved. A comprehensive investigation included inventory and inspection of stormwater assets, condition assessment of assets, capital improvement needs, and enhancement of the existing Geographic Information System (GIS) which includes mapping, database, and system information.

Asset Inventory/Condition Assessment

Center Line's stormwater assets include over 25.6 miles of enclosed sewer and 1,521 stormwater structures. A condition assessment was performed on the City's stormwater sewers and structures. The condition assessment for the storm sewer was performed by means of Closed Circuit Television (CCTV) while investigation of stormwater structures was performed by means of visual assessment.

Criticality Analysis

Assets were then analyzed to determine their Probability of Failure (POF) and Consequence of Failure (COF). The POF of an asset takes into account the condition rating while the COF takes into account the size, location, and surrounding. POF and COF scores were determined for each asset and then multiplied together resulting in the Business Risk Exposure (BRE) score, also known as the criticality score. The BRE score is used to prioritize what assets are most critically in need of repair. Any asset with a BRE score of 16 or greater is considered critical by the MDEQ.

Based on the current assessments, the following assets are considered critical:

- 28 stormwater sewer segments (almost 4,000 feet)
- 56 stormwater structures

Level of Service

To reasonably serve the City of Center Line a desired LOS must be established. In terms of the City's stormwater system, the LOS would be the satisfaction of the residents, business owners and property owners. There are many factors that can affect the perceived LOS of the system including sewer backups, which can result in both street, yard and basement flooding.

Center Line's stormwater system is currently operating at a satisfactory LOS and will continue to do so through continued maintenance, rehabilitation and replacement of its assets as presented in the Asset Management Plan and Capital Improvement Plan.

Capital Improvement Plan

Based on the condition assessment and criticality analysis, a cost estimate was created for all sewer pipes and structures. The estimated cost to repair all of the critical stormwater assets in the City is $839,000, or approximately $170,000 per year for 5 years. Contingency costs, as well as costs to keep the AMP updated, have been included in the annual cost.

City of Center Line
7070 E. Ten Mile Road
Center Line, Michigan 48015
(586) 757-6800
Dennis Champine, dchampine@centerline.gov
http://www.centerline.gov/

SAW Grant No. 1412-01

This summary provides a brief overview of the investigation, and evaluation of the system assets, condition, operation and needs. A more comprehensive discussion can be found in the Stormwater Asset Management Plan.

November 2018

City of Center Line
7070 E. Ten Mile Road
Center Line, Michigan 48015
(586) 757-6800
Dennis Champine, dchampine@centerline.gov
http://www.centerline.gov/

Center Line Critical Assets

No.	Asset I.D.	Asset Type
1	STM0384	Buried Pipe
2	STM0716	Buried Pipe
3	STM0532	Buried Pipe
4	STM0537	Buried Pipe
5	STM0576	Buried Pipe
6	STM0641	Buried Pipe
7	STM0870	Buried Pipe
8	STM0065	Buried Pipe
9	STM1561	Buried Pipe
10	STM1552	Buried Pipe
11	STM0009	Buried Pipe
12	STM1567	Buried Pipe
13	STM0052	Buried Pipe
14	STM0050	Buried Pipe
15	STM1071	Buried Pipe
16	STM1088	Buried Pipe
17	STM1167	Buried Pipe
18	STM1165	Buried Pipe
19	STM0206	Buried Pipe
20	STM0205	Buried Pipe
21	STM1802	Buried Pipe
22	STM1298	Buried Pipe
23	STM1466	Buried Pipe
24	STM1467	Buried Pipe
25	STM1468	Buried Pipe
26	STM1355	Buried Pipe
27	STM1357	Buried Pipe
28	STM1354	Buried Pipe
29	2-40	Storm Manhole
30	3-6-4	Storm Manhole
31	3-6-2	Storm Manhole
32	KMD04062016-4	Storm Manhole
33	KMD06062016	Storm Manhole
34	2-7-4-3N	Catch Basin
35	2-7-4-3NNE	Catch Basin
36	2-7-2-1-0NE	Catch Basin
37	2-14-4S	Catch Basin
38	1-6-2NE	Catch Basin
39	1-7-2NE	Catch Basin
40	1-7-2SE	Catch Basin
41	2-1-7-5-1S	Catch Basin
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43	2-1-7-5S	Catch Basin
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45	1-17-2N	Catch Basin
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57	2-10-10NE	Catch Basin
58	2-26-4-3NW	Catch Basin
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61	3-17-6W	Catch Basin
62	3-17-5SE	Catch Basin
63	3-17-5-2E	Catch Basin
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69	3-13-4-1NW	Catch Basin
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74	2-26-12-2SSW	Catch Basin
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77	2-26-8-2S	Catch Basin
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79	2-37SW	Catch Basin
80	3-1-1-1	Catch Basin
81	KMD04062016-3	Catch Basin
82	KMD04062016-6	Catch Basin
83	1-18-4N	Catch Basin
84	KMD06072016-1	Catch Basin

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Due Date Novemeber 30, 2018
(no later than 3 years from executed grant date)

The City of Center Line *(legal name of grantee)* certifies that all stormwater asset management plan (SWAMP) activities specified in SAW Grant No. 1412-01 have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SWAMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

Dennis Champine at	(586) 757-6800	Dchampine@centerline.gov
Name	Phone Number	Email

11/28/18

Signature of Authorized Representative (Original Signature Required) Date

Dennis Champine, City Manager
Print Name and Title of Authorized Representative

Memorandum

Date:	November 28, 2018
To:	Mr. David Worthington
Company:	Michigan Department of Environmental Quality
From:	Prein&Newhof
Project #:	2130529
Re:	City of Charlevoix SAW Grant Wastewater Asset Management Plan Summary

Mr.Worthington:

This memorandum provides the summary of the City of Charlevoix wastewater asset management plan SAW grant activities required under Section 603 of Public Act 84 of 2015. Headings and italicized quotes are from MDEQ guidance.

Grantee Information

SAW Grant Project Number: 1438-01

Grantee:

City of Charlevoix

210 State Street

Charlevoix, MI 49720

http://www.cityofcharlevoix.org/

Contact: Mr. Mark Heydlauff, City Manager

Phone: 231-547-3270

Executive Summary

The City of Charlevoix received a SAW Grant in 2015 to prepare Waste Water and Storm Water Asset Management Plans. The Grant agreement indicated the following amounts:

Project Total	Grant Amount	Local Match
$957,824	$862,042	$95,782

Project Total	Wastewater Costs	Stormwater Costs
$957,824	$662,048	$295,776

The Key components in the Asset Management Plan include:

1. Asset Inventory and Condition Assessment
2. Level of Service
3. Criticality of Assets
4. Operation and Maintenance Strategies/Revenue Structure
5. Long-term Funding/Capital Improvement Plan

Wastewater Asset Inventory

Components Included in the AMP

The system components included in the wastewater asset management plan include gravity sewer pipes, manholes, force mains, lift stations, and the wastewater treatment plant.

How assets were located and identified

Manholes and lift station were identified using record drawings and field located with Global Positioning System (GPS) coordinates. An inventory of lift station and wastewater treatment plant assets was compiled from site visits and available documentation including bases of design, record plans, operations and maintenance manuals, and maintenance records.

Collection system asset inventory data, including year of installation, material, sizes, pipe inverts and manhole rim elevations, were cataloged from record drawings and visually verified where needed. Lift station and treatment asset inventory information, including size, capacity, manufacturer, model number, serial number etc. was compiled from available documentation.

Platform used to maintain the inventory

Manhole, gravity sewer main, and force main inventory data is maintained in a Geographic Information System (GIS). Lift station and treatment plant asset inventory data is maintained using spreadsheet tables.

Condition Assessment

Gravity Sewer Mains: Inspections were made using either a pole mounted zoom camera (looking up or down each pipe from the manholes) or with in-line closed circuit television

(CCTV) cameras. Pipes inspected with zoom camera methods were rated considering any observable roots, deposits, joint conditions, pipe wall condition, infiltration, or other defect observations. Pipes inspected with CCTV were rated using the PACP system condition grading system. Composite Risk of Failure ratings of 1-5 were derived for each pipe.

Percentage of gravity sewer pipes in each rating category

1	2	3	4	5
69%	5%	6%	6%	14%

Force Mains: Force main conditions were estimated using pipe age, material, and break history records. Charlevoix's force main data was compared with that of several other systems to establish a comparative reference. Ratings of 1-5 were developed for each force main.

Percentage of force main pipes in each rating category

1	2	3	4	5
21%	0%	19%	37%	23%

Manholes: Manholes were visually inspected and rated on a scale of 1-5 based factors related to the condition of castings, steps, structures, and infiltration.

Percentage of manholes in each rating category

1	2	3	4	5
34%	52%	13%	1%	0%

Lift Stations: Visual inspection and performance testing were completed to evaluate asset condition. Lift station assets, including pumps, valves, piping, structures, electrical, controls, and other assets, were rated on a scale of 1-5. Composite ratings for the station as a whole were developed.

Number of lift stations in each rating category

0-1	1-2	2-3	3-4	4-5
0	0	3	13	1

Wastewater Treatment Plant: The treatment plant was broken down into an inventory of 773 assets and the assets were grouped by 32 treatment process . Visual inspection, performance testing, and discussions with maintenance staff were completed to rate the asset conditions.

Percentage of treatment plant assets in each rating category

1	2	3	4	5
73%	11%	11%	4%	0%

Criticality of Assets

"A summary of the method used to assess the criticality of assets considering the likelihood and consequence of failure"

Assets were given a Consequence of Failure (CoF) rating of 1-5 (5 being the worst) based on potential social, economic, and environmental impacts which can result from wastewater system failures. Collection system lines (gravity sewers and force mains) were rated based the size of the lines and potential impacts to transportation infrastructure. Lift stations were rated based on average day flow rates and the available time to respond to an emergency condition prior to a wastewater overflow. Treatment plant assets were rated based on how an asset failure might affect the overall process.

Criticality ratings were calculated as the product of an asset's RoF and CoF, producing criticality ratings ranging from 1-25 (25 being the most critical).

Level of Service Determination

"A summary of the level of service goals the municipality has determined that it wants to provide its customers based on the municipality's ability to provide the service and the customer expectations."

The City recognizes that the people served by the system are more than customers, they are the system owners. City staff act as stewards of the system. The level of service goals were considered in City Council workshop where condition assessment results were discussed along with capital improvement strategies and the tradeoffs of rate impacts. Based on the input received, the following Level of Service Goals have been established:

1. Minimize Service Interruptions
2. Meet Regulatory Discharge Requirements
3. Minimize Public Hazards
4. Manage Storm Water Inflow and Ground Water Infiltration
5. Support Community Growth and Development
6. Minimize Life Cycle Costs

Revenue Structure

"A summary of the funding structure and rate methodology that provides sufficient resources to implement the asset management program."

Historical revenue and expenses were analyzed, and a test year was determined for a baseline. A financial projection was completed using inflationary adjustments and known changes. The capital improvement program was included in the projection. The projection includes:

1. Determination of revenue requirements for each year
2. Development and identification of financial targets related to debt coverage ratio, minimum cash reserves, and operating income.
3. Identification of long-term rate track to maintain financial stability of utility and help ensure funding of the capital improvement program
4. An incremental rate plan to help minimize the potential rate impacts on customers

Capital Improvement Plan

"A summary of the long-term Capital Improvement Plan that was developed to address system needs identified in the AMP."

The capital improvement plan is designed to pursue lowest life cycle costs for the citizens through a combination of strategies. Sewers with severe continuous or repeating structural deficiencies are planned for reconstruction with the timing to coincide with road and water system improvements. Sewers with isolated but severe structural defects are planned for localized spot repairs. Sewers with moderate structural defects under streets with significant remaining pavement life are planned for condition monitoring to maintain the CIP prioritization. Lift station and treatment plant improvements are prioritized with timing dependent on cash flow.

List of Major Assets

"Provide a general list of the major assets identified in the AMP."

The City of Charlevoix wastewater system major assets include:

- 17 lift stations
- 175,500 feet of 4" to 24" diameter gravity sewer
- 74,100 feet of 2" to 16" diameter force main
- 796 manholes
- Wastewater treatment plant

November 28, 2018 *sent via email to: WORTHINGTOND@michigan.gov*
2130529

Mr. David J. Worthington, Project Manager
MDEQ
Office of Drinking Water and Municipal Assistance
P.O. Box 30241
Lansing, MI 48909-7741

RE: SAW Grant Project No. 1438-01
Wastewater and Stormwater Asset Management Plans
City of Charlevoix, Charlevoix County

Dear Mr. Worthington:

Enclosed are the City of Charlevoix's required SAW Grant deliverables as follows:

1. Two (2) Certifications of Project Completeness (one wastewater, one stormwater) signed by Mr. Mark Heydlauff, City Manager
2. Two (s) Project executive summaries (one wastewater, one stormwater) as required under Section 603 of Public Act 84 of 2015, including contact information for the grantee, a brief discussion of each of the five major components of the Asset Management Plan, and a list of the major identified assets. The summary has been prepared in accordance with recent MDEQ guidance.

The City of Charlevoix has completed the Asset Management Plans, which will be made available to the MDEQ upon request and available to the public for at least fifteen years.

We are submitting these documents prior to the November 30, 2018, grant deliverable deadline. Final grant-eligible expenses will be incurred prior to November 30, 2018, and final disbursement requests will be submitted by January 29, 2019 (60 days after grant end date). It is our understanding that this will complete the City of Charlevoix's obligations under the grant.

If you have any questions, please contact our office.

Sincerely,

Prein&Newhof

Steve Oosting

Steve Oosting, P.E.

Enclosures

c. Mr. Mark Heydlauff, City of Charlevoix

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date November 30, 2018
(no later than 3 years from executed grant date)

The City of Charlevoix *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1438-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or No

   If No - Date of the rate methodology approval letter: May 3, 2018.

2) Significant Progress Made: Yes or No

   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)

3) Date of rate methodology review letter identifying the gap: ________.

4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Name		Phone Number	Email
Mark Heydlauff, City Manager	at	(231) 547-3270	markh@charlevoixmi.gov

Signature of Authorized Representative (Original Signature Required) — Date: 11/27/18

Mark Heydlauff, City Manager
Print Name and Title of Authorized Representative

April 2017

Memorandum

Date:	November 28, 2018
To:	Mr. David Worthington
Company:	Michigan Department of Environmental Quality
From:	Prein&Newhof
Project #:	2130529
Re:	City of Charlevoix SAW Grant Stormwater Asset Management Plan Summary

Mr.Worthington:

This memorandum provides the summary of the City of Charlevoix stormwater asset management plan SAW grant activities required under Section 603 of Public Act 84 of 2015. Headings and italicized quotes are from MDEQ guidance.

Grantee Information

SAW Grant Project Number: 1438-01

Grantee:

City of Charlevoix

210 State Street

Charlevoix, MI 49720

http://www.cityofcharlevoix.org/

Contact: Mr. Mark Heydlauff, City Manager

Phone: 231-547-3270

Executive Summary

The City of Charlevoix received a SAW Grant in 2015 to prepare Waste Water and Storm Water Asset Management Plans. The Grant agreement indicated the following amounts:

Project Total	Grant Amount	Local Match
$957,824	$862,042	$95,782

Project Total	Wastewater Costs	Stormwater Costs
$957,824	$662,048	$295,776

The Key components in the Asset Management Plan include:

1. Asset Inventory and Condition Assessment
2. Level of Service
3. Criticality of Assets
4. Operation and Maintenance Strategies/Revenue Structure
5. Long-term Funding/Capital Improvement Plan

Stormwater Asset Inventory

Components Included in the AMP

The system components included in the stormwater asset management plan include gravity sewer mains, manholes, catch basins, and culverts.

How assets were located and identified

Assets were identified using record drawings and field located with Global Positioning System (GPS) coordinates. Asset inventory data, including year of installation, material, sizes, pipe inverts and manhole rim elevations, were cataloged from record drawings where available.

Platform used to maintain the inventory

Asset inventory data is maintained in a Geographic Information System (GIS).

Condition Assessment

Sewer and culvert pipe: Inspections were made using either a pole mounted zoom camera (looking up or down each pipe from the manholes) or with in-line closed circuit television (CCTV) cameras. Pipes inspected with zoom camera methods were rated considering any observable roots, deposits, joint conditions, pipe wall condition, infiltration, or other defect observations. Pipes inspected with CCTV were rated using the PACP system condition grading system. Composite Risk of Failure ratings of 1-5 were derived for each pipe.

Percentage of gravity sewer pipes in each rating category

1	2	3	4	5
67%	29%	3%	1%	0%

Manholes and Catch Basins: Manholes and catch basins were visually inspected and rated on a scale of 1-5 based factors related to the condition of castings, steps, structures, and infiltration.

Percentage of manholes in each rating category

1	2	3	4	5
17%	80%	3%	0%	0%

Criticality of Assets

"A summary of the method used to assess the criticality of assets considering the likelihood and consequence of failure"

Assets were given a Consequence of Failure (CoF) rating of 1-5 (5 being the worst) based on potential social, economic, and environmental impacts which can result from wastewater system failures. Collection system lines (gravity sewers and force mains) were rated based the size of the lines and potential impacts to transportation infrastructure. Lift stations were rated based on average day flow rates and the available time to respond to an emergency condition prior to a wastewater overflow. Treatment plant assets were rated based on how an asset failure might affect the overall process.

Criticality ratings were calculated as the product of an asset's RoF and CoF, producing criticality ratings ranging from 1-25 (25 being the most critical).

Level of Service Determination

"A summary of the level of service goals the municipality has determined that it wants to provide its customers based on the municipality's ability to provide the service and the customer expectations."

The City recognizes that the people served by the system are more than customers, they are the system owners. City staff act as stewards of the system. The level of service goals were considered in City Council workshop where condition assessment results were discussed along with capital improvement strategies and the tradeoffs of rate impacts. Based on the input received, the following Level of Service Goals have been established:

1. Minimize Flood Risk
2. Minimize Public Hazards
3. Manage Storm Water Discharges into the Waste Water System

4. Support Community Growth and Development
5. Maintain Water Quality
6. Minimize Life Cycle Costs

Revenue Structure

"A summary of the funding structure and rate methodology that provides sufficient resources to implement the asset management program."

Storm water system improvements are funded with street improvements through the City's general fund. Project costs were estimated for improvements in the capital improvement plan. Based on this analysis, the City expects to be able to continue funding storm sewer improvements as part of streets.

Capital Improvement Plan

"A summary of the long-term Capital Improvement Plan that was developed to address system needs identified in the AMP."

The capital improvement plan is designed to pursue lowest life cycle costs for the citizens by coordinating planned improvements for multiple utilities and streets together. Very few storm sewers were found in critical condition. As a result, storm sewer improvements are planned primarily for locations where necessary to accommodate street and other utility work.

List of Major Assets

"Provide a general list of the major assets identified in the AMP."

The City of Charlevoix wastewater system major assets include:

- 55,500 feet of 4" to 60" diameter gravity sewer and culvert pipe
- 246 manholes
- 439 catch basins

DEQ

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Due Date November 30, 2018
(no later than 3 years from executed grant date)

The City of Charlevoix *(legal name of grantee)* certifies that all stormwater asset management plan (SWAMP) activities specified in SAW Grant No. 1438-01 have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SWAMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

Mark Heydlauff, City Manager at (231) 547-3270 markh@charlevoixmi.gov
Name Phone Number Email

11/27/18
Signature of Authorized Representative (Original Signature Required) Date

Mark Heydlauff, City Manager
Print Name and Title of Authorized Representative

City of Clio

MDEQ AMP Summary

October 2018

15C0177 1275-01

Prepared By:

ROWE Professional Services Company

REPRESENTATIVE: Eric Wiederhold

ADDRESS: 505 West Vienna Street, Clio, MI 48420

PHONE #: (810) 686-5850

EMAIL: clio.ericwiederhold@gmail.com

PROJECT #: 1275-01

TABLE OF CONTENTS

LIST OF TABLES

ACRONYMS

AMP	Asset Management Plan
CIP	Capital Improvement Plan
MDEQ	Michigan Department of Environmental Quality
PACP	Pipeline Assessment Certification Program
SAW	Stormwater, Asset Management, and Wastewater
SRF	State Revolving Fund
USDA-RD	United States Department of Agriculture's Rural Development

EXECUTIVE SUMMARY

In accordance with the Michigan Department of Environmental Quality (MDEQ), the City of Clio has prepared an Asset Management Plan (AMP) for their wastewater system. The purpose of the AMP is to define a method of cataloging, evaluating, and maintaining the wastewater system.

Extensive investigations and analysis over the past decade show the city's system to be in good condition overall. With that, deficiencies throughout the system have been identified as short- and long-term needs. The city's rate structure will adequately address future improvements that have been identified

The City of Clio is committed to improving and maintaining protection of the public health and performance of their wastewater collection utility assets, while minimizing the long-term cost of operating those assets. The city will strive to make the most cost-effective renewal and replacement investments and provide the highest quality customer service possible.

I. ASSET INVENTORY

The City of Clio's wastewater system is comprised of a collection of gravity sewer lines along with one lift station and force main. The city discharges their wastewater into the county-owned interceptor at multiple locations throughout the city to be treated by the county treatment plant.

Records indicate the city began televising and making repairs to their sanitary system as far back as 2007. In 2011, approximately 17,000 feet of pipe and 100 manholes of the sanitary collection system were inspected as part of a State Revolving Fund (SRF) application. An additional 21,575 feet of the sanitary collection system was televised in preparation of the AMP. The condition of the pipes was rated utilizing PACP standards during the televising process.

A. Collection System

The city's sanitary sewer collection system is composed of the follow list of assets:

- 43,379 feet of 8-inch sewer pipe
- 7,289 feet of 10-inch sewer pipe
- 2,111 feet of 15-inch sewer pipe
- 2,104 feet of 18-inch sewer pipe
- 250 manholes
- 1 lift station and 550 feet of 4-inch force main

1. Sewer

Including SRF televising records, 38,575 feet (70%) of the sanitary collection sewer has been televised and its conditions assessed for use in preparation of the AMP. The remaining portion of the collection system not televised was constructed after 1965 or was previously televised within the past ten years.

Reviewing the sewer reports from the videos shows a system in good working order overall. However, as determined in the inflow and infiltration study, the collection system is susceptible to infiltration. Therefore, the proposed improvement project was designed to increase capacity to convey a 25-year storm event without backups.

2. Manholes

Between the system metering project, inflow and infiltration study, and the SAW program over the past decade, all 250 manholes have been accessed and visually inspected. However, these inspections went undocumented because no serious defects were observed by personnel. Since 2008, 133 (53%) of the city's sanitary manholes have had documented inspections performed on them.

Documented inspections performed on the city's manholes show 80 percent of the manholes have minor or no deterioration, 18 percent have moderate deterioration, and 2 percent have significant deterioration. The balance of the city's manholes was given a minor deterioration rating based on lack any noted defects observed during the various sanitary system evaluation program activities. The primary maintenance needs vary from structure to structure and includes items such as replacing covers, tuck pointing mortar, replacing missing bricks, and, in one case, replacement of the manhole. Other minor issues discovered were some root intrusion, weeping infiltration around joints, and cleanup of debris that has entered the structures

Due to unforeseen circumstances, structures may have to be repaired and replaced periodically, as needed. However, considering the current condition and maintenance being performed on the structures, most of them should be operational for another 50 years or more.

B. Lift Station

The station was originally installed in 1974 and, through scheduled maintenance and repair, it still functions as the design intended. The lift station collects flows from nearby developments and transports them through 550 feet of 4-inch force main to the gravity sewer on Mill Street.

The pump vault, pumps, and piping/valves were evaluated and found to have minor to moderate deterioration. The electrical was replaced in 2002 and is in excellent condition. With continued monitoring and regular maintenance, the life of the lift station is estimated to be eight years or more.

II. REVENUE STRUCTURE

It is important to Clio to maintain and improve their assets. The city's sewer system is no exception. To do this, the costs associated to own and operate the sewer system, both collection and treatment, must be fully understood. To cover these costs, rates must be structured to meet current and future expenditures. Although the future cannot be predicted, goals can be set and plans put into place to prepare for the city's future needs.

Establishing a rate structure to meet short- and long-term needs as well as customer expectations is a priority of the city. With that in mind, the financial management goals are as follows:

- Identify funding level necessary to meet level of service needs.
- Forecast schedule of when financial resources will be required.
- Establish user fees that will generate adequate revenue for financing future improvements.

Attached you will find the city's rate structure which was submitted and approved by MDEQ in June of 2018.

III. CAPITAL IMPROVEMENT PROJECT PLAN

Maintaining a municipal system means always planning for future needs. The wastewater system is no exception with growing and/or changing needs of the population it serves and the constant wear and tear of the system it undergoes providing its service.

A. Five-Year Plan

Currently, the five-year plan consists of constructing improvements that were identified in the city's SRF project plan. The SRF project plan called for the replacement of structurally damaged sanitary sewer. In addition, the project plan recommended replacement of undersized sanitary sewer pipes. The replacement portion of the proposed project was developed to convey a 25-year storm event without backups. Construction plans and specifications were prepared for the proposed five-year capital improvement projects as part of this AMP project.

The five-year capital improvement plan (CIP) will include replacement projects throughout various areas of the city. The estimated budget for this work is $1,720,000. The city anticipates utilizing a combination of grant and low-interest loan through the United States Department of Agriculture's Rural Development (USDA-RD) program to fund the improvements. The city has successfully used this program on past projects where they have qualified for as much as 45 percent grant funding. The terms of this loan typically include a 4 percent interest rate financed over a 40-year period.

B. Twenty-Year Plan

A business risk between 9 and 16 qualifies an asset for the 20-year CIP. These are assets that are important to the system's operations that have fallen out of their prime condition. These can vary from more deteriorated assets playing less critical roles in the system to minor deteriorated assets in critical roles. As assets fall into this category, the city will have time to budget for the improvements.

The 20-year CIP is currently valued at $800,000 and includes evaluations and repair work. A breakdown of the projects is summarized below.

Maintenance Cost

Year 8 Lift Station
Repair pump vault/equipment $100,000

Year 10
Conduct a manhole evaluation/rehabilitation project $200,000

Year 15
Evaluation and rehabilitation of moderate deteriorated pipes $500,000

TWENTY-YEAR PLAN TOTAL $800,000

Developing a financial strategy to accommodate all short- and long-term needs of the sewer collection system is a priority of the city. The 5- and 20-year capital improvement budgets are summarized in Table III-1.

Table III-1: Capital Improvement Plan (CIP)		
Project	**Cost**	**Years Until Project Begins**
Collection System Improvement Project	$1,720,000	3
Lift Station Rehabilitation	$100,000	8
Manhole Rehabilitation	$200,000	10
Collection Rehabilitation	$500,000	15

It is recommended the city revisit their rate structure in advance of future capital improvements to establish revenue needs for financing the anticipated 20-year CIP work.

R:\Projects\15C0177\Docs\Report\MDEQ Amp Summary.docx

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LETTER OF TRANSMITTAL

TO: Revolving Loan Section
Office of Drinking Water & Municipal Assistance - MDEQ
Constitution Hall, 4th Floor South
525 W. Allegan Street
Lansing, MI 48933

Attn: Mr. Eric Pocan

DATE: October 19, 2018

JOB NO.: 15C0177
1275-01

RE: Sanitary Sewer Asset Management Plan

Shipped via: ☐ By 10:30am next business day
☐ By end of next business day
☒ Standard delivery

WE ARE SENDING YOU:

☒ Attached ☐ Under separate cover via _____

COPIES	DATE	NO	DESCRIPTION
1		10	Asset Management Plan Executive Summary
1		4	Rate Methodology
1		1	MDEQ Approval of Rate Methodology
1		1	Signed Certification of Project Completeness Form

THESE ARE TRANSMITTED:

☒ For your use ☐ As requested ☐ Other: ______

REMARKS:

Eric,

Please find enclosed the above referenced items for your use. Thanks

Signed: ____________

Dean A. Oparka, PE
Project Manager

Engineering | Surveying | Aerial Photography/Mapping | Landscape Architecture | Planning
Corporate: The ROWE Building, 540 S. Saginaw Street, Ste. 200; P.O. Box 3748 • Flint, MI 48502 • O (810) 341-7500 • F (810) 341-7573
With Offices In: Lapeer, MI • Mt. Pleasant, MI • Grayling, MI • Tri-Cities, MI • Myrtle Beach, SC
www.rowepsc.com

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
LANSING

RICK SNYDER
GOVERNOR

C. HEIDI GRETHER
DIRECTOR

June 19, 2018

Mr. Eric Wiederhold
City of Clio
505 West Vienna Street
Clio, Michigan 48420

Dear Mr. Wiederhold:

SUBJECT: Stormwater, Asset Management, Wastewater (SAW)
City of Clio
SAW Grant Project Number 1275-01

We have reviewed the information contained in the rate methodology dated April 19, 2018. It has been demonstrated that significant progress has been made, as determined by the department, toward achieving the funding structure necessary to implement the program.

Accordingly, the applicant has fulfilled the significant progress requirement and complies with Section 5204e(3)(a), Part 52, Clean Water Assistance, of the Natural Resource and Environmental Protection Act, 1994 PA 451, as amended.

If there are any questions regarding approval of the rate methodology, please contact Mr. Robert Schneider in the Revolving Loan Section, Drinking Water and Municipal Assistance Division, by phone at 517-388-6466, or by mail at DEQ, P.O. Box 30817, Lansing, Michigan 48909-8311.

Sincerely,

Sonya T. Butler

Sonya T. Butler, Section Manager
Revolving Loan Section
Drinking Water and Municipal Assistance Division
517-284-5433

cc: Ms. Mary G. Martin, Executive Director, Michigan Finance Authority
Mr. Eric Pocan, DEQ

Rate Methodology Table 4

Calculate Operating Reserve (optional if creating budget for only OM&R)	
$ 497,926	Total OM&R from Expenditures in table below
$ 248,963	Targeted Operating Reserve Amount (this is 50% of OM&R)
$ 404,650	<<< Enter amount of cash or equivalents
$ (155,687)	Additional Operating Reserves Needed (If negative number, stop here)
	<<< Enter # of years to accumulate reserves (rule of thumb is 5 years)
$ -	Annual Contribution To Achieve Targeted Operating Reserve Amount

Expenditures	**Budget**	**Option 1**	**Option 2**	**Option 3**		**Option 4**		**Option 5**		
		Variable	Fixed	Variable	Fixed	Variable	Fixed		Variable	Fixed
		100%	100%	80%	20%	20%	80%	%	0%	0%
Operation, Maintenance and Repair (OM&R)										
Cost of Sewer Treatment	$ 230,008	$ 230,008	$ 230,008	$ 184,006	$ 46,002	$ 46,002	$ 184,006	0%	$ -	$ -
Other Operations and Maintenance	$ 267,918	$ 267,918	$ 267,918	$ 214,334	$ 53,584	$ 53,584	$ 214,334	0%	$ -	$ -
Total OM&R	**$ 497,926**	**$ 497,926**	**$ 497,926**	**$ 398,341**	**$ 99,585**	**$ 99,585**	**$ 398,341**		$ -	$ -
Capital Improvement (See Table 6)	$ 31,000	$ 31,000	$ 31,000	$ 24,800	$ 6,200	$ 6,200	$ 24,800	0%	$ -	$ 31,000
Operating Reserves	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0%	$ -	$ -
Debt Expenses	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0%	$ -	$ -
Miscellaneous	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0%	$ -	$ -
Total Water System Expenses	**$ 528,926**	**$ 528,926**	**$ 528,926**	**$ 423,141**	**$ 105,785**	**$ 105,785**	**$ 423,141**		**$ -**	**$ 31,000**

City of Clio Operating Budget
Sanitary Sewer System

Community Name: City of Clio **County:** Genesee

Address: 505 W. Vieneea St
Clio, MI 48420

A. Applicant Fiscal Year: **From:** 6/30/2016 **To:** 6/30/2017

B. Operating Income:	**From Sewer Rates & Charges:**	$544,094
	Other (e.g. hydrant rentals, etc)	$153,873
	Total Operating Income:	$697,967
C. Operating Expenses:		
	Cost of Sewage Treatments	$230,008
	Other Operation and Maintenance	$267,918
	Total Operating Expenses:	$497,926
D.	**Net Operating Income:**	$200,041
E. Non Operating Income:		
	Investment Income	$152
	Interest Expense	-$4,458
	Total Non Operating Income:	-$4,306
F.	**Net Income**	$195,735
G. Expenditures/Transfers		
	Total Expenditures/Transfers:	$0
	Excess/Deficit over net income:	$195,735

Existing System Sewer Summary

Community Name: City of Clio

NPDES Discharge Permit No.

Collection Sewer:

Type: (gravity, pressure, STED, vacuum)

Sewers	Footage	Material	Age
6-inch	450		
8-inch	43,200	Clay	40+ yrs
10-inch	7,300	Clay	40+ yrs
	225	Clay	40+ yrs
	2,150	Clay	40+ yrs
12-Inch	2,125	Clay	40+ yrs

Lift Stations:

L.S. No.	Type	Pumping Capacity	Age	Condition
1	Flooded Suction/Wet Well		40+ yrs	good
2				
3				

Treatment Type and Description: Treatment Plant GCDC-WWS (lagoon, mech plant, etc)

Lagoons	Storage Volume (MG)	Sludge (ft)	No. of Aerators	Hp

Discharge Type/Outfall:

Discharge Frequency:

Discharge Volume:

Discharge Effluent Criteria:

Sewer Customer Information:

	No. of Existing Customers	Monthly Usage (gallons)	No. of Users after Project	Projected Total Usage
Residential Dwellings	826	1,784,000	**826**	1,784,000
Other Users	169	2,552,000	**169**	2,552,000
Totals	995	4,336,000	**995**	4,336,000

Existing Rate Structure:

Ready to Serve Fee	$16.50	**Average Monthly Billing at Current Rates (all customers)***
Consumption Fee (per 1000 gallons)	$4.33	**$35,192.38**

*** See attached sheet for a breakdown of this calculation**

	No. of cutomers	Monthly Usage in Gallons	Ready to Serve Rates	Consumption Fee (per 1000 Gallons)	Total Monthly Billing at Current Rates*
Residential dwellings	826	1784000	$16.50	$4.33	$21,353.72
Other Users	169	2552000	$16.50	$4.33	$13,838.66
TOTAL	995	4336000	-	-	$35,192.38

***Equal to (No. of Existing Customers* Ready to Serve Fee)+ (Monthly Usuage in Gallons*Consumption Fee per 1000 Gallons/1000)**

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date October 9, 2018
(no later than 3 years from executed grant date)

The City of Clio *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1275-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or No
   If No - Date of the rate methodology approval letter: ____________.
2) Significant Progress Made: Yes or No
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: ____________.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ____________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Dean A. Oparka, PE	at 810-341-7500	doparka@rowepsc.com
Name	Phone Number	Email

______________________________ 10/ 15 / 18
Signature of Authorized Representative (Original Signature Required) Date

Eric Wiederhold, City Administrator
Print Name and Title of Authorized Representative

Stormwater, Asset Management, and Wastewater Grant
Wastewater Asset Management Program
Executive Summary

Coldwater Board of Public Utilities
1 Grand Street
Coldwater, MI 49036
Jeff Budd, Director of Board of Public Utilities, 517.279.9501
SAW Grant 1175-01

Executive Summary

Coldwater Board of Public Utilities (Board) was awarded a grant by the Michigan Department of Environmental Quality (MDEQ) under the Stormwater, Asset Management, and Wastewater (SAW) Program. The Board has determined it to be in its best interest to use a portion of the grant money to implement an Asset Management Program (AMP) for its wastewater collection system. The scope of the AMP was to inventory, assess, and identify areas of deficiency in the system to develop recommendations for prioritizing and budgeting improvements and maintenance.

The objective of an AMP is to meet the required Level of Service (LOS) in the most cost-effective manner through the proper maintenance of the assets. For the Board, this includes providing a summary of the condition of the sewer and manhole assets, a basis for prioritizing the rehabilitation/replacement of the assets, and an updated Operation and Maintenance Program to routinely maintain the assets. According to the requirements of the MDEQ, a wastewater AMP should include at a minimum the following components:

1. Asset Inventory and Condition Assessment
2. Level of Service
3. Asset Criticality
4. Revenue Structure
5. Capital Improvement Plan

The approach for this AMP followed MDEQ's outlined grant components listed above. The work completed under the SAW Grant included the components described below.

Wastewater Asset Inventory

The Board owns and operates the wastewater collection and treatment systems. The system consists of approximately 414,532 feet of sanitary sewer ranging from 4-inch to 24-inch diameter; 358,708 feet of this sewer is gravity sewer main and 55,823 feet is pressurized sewer main. The Board owns and maintains 14 pump stations; 11 of which are submersible and 3 dry pit/ wet pit stations. The system also includes 1,443 manholes and a 3.2 million gallon per day wastewater treatment plant (WWTP). The WWTP discharges to the Sauk River. The existing Geographic Information System (GIS) database was utilized to develop and maintain the inventory of assets.

5913 Executive Drive, Suite 100 | 517.882.0383 | Fishbeck, Thompson, Carr & Huber, Inc.
Lansing, Michigan 48911 | www.ftch.com | engineers I scientists I architects I constructors

Condition Assessment

To identify areas of potential deficiency in the system, the physical condition of the sanitary sewers, manholes, pump stations, and WWTP were assessed. Assessments were based on National Association of Sewer Service Companies (NASSCO) standards for sewer pipe and manholes to ensure consistency with future evaluations. Manhole inspections in accordance with Level 1 surface inspection criteria were performed on the majority of the manholes in the system. Sewers were inspected by closed circuit television (CCTV). Sewer televising was prioritized in critical areas and any areas of concern expressed by the Board. Assets were assigned Probability of Failure (POF) ratings based on their current condition. The manhole inspection forms, CCTV pipe logs, and the results of these inspections were incorporated into the GIS database. The following tables present a summary breakdown of the condition of the inspected sanitary sewer and manhole assets.

Sewer Condition Summary

Probability of Failure (POF) Rating	Percentage of Sewers Televised
1	6%
2	11%
3	13%
4	14%
5	9%

Manhole Condition Summary

Probability of Failure (POF) Rating	Percentage of Manholes Inspected
1	23%
2	17%
3	25%
4	13%
5	19%

Pump Station Condition Summary

Probability of Failure (POF) Rating	Percentage of Pump Stations Inspected
1	14%
2	0%
3	28%
4	29%
5	29%

WWTP Condition Summary

Probability of Failure (POF) Rating	Percentage of WWTP Assets Inspected
1	30%
2	27%
3	30%
4	10%
5	3%

Level of Service Determination

The Board established a list of attainable goals it intends to meet regarding its wastewater system, which include:

1. Meet all federal and state regulations;
2. Re-televise all sanitary sewers rated 4 and 5 within the collection system in years 10 through 15;
3. Address sanitary sewer defects (spot repairs) rated with a structural Probability of Failure (PoF) of 5 that require immediate attention within ten years;
4. Address manhole defects rated with a structural PoF of 5 within ten years;
5. Replace all brick and block manholes and fix manhole chimneys during road projects;
6. Develop and maintain a sewer cleaning program that cleans the entire system every three years;
7. Continue implementation of Lucity™ at the WWTP and track preventive maintenance.

Criticality of Assets

The criticality of wastewater assets was determined by assigning ratings based on their importance in the operation and reliability of the system. The Consequence of Failure (COF) rating addresses the impact a failure of an asset would have on the community. It represents the criticality of a specific component to the successful operation of the entire system. The COF score also reflects the potential difficulty in addressing a failure if it were to occur. Three factors were considered when determining COF scores: pipe diameter, which is representative of the size of the tributary area the pipe or structure serves; physical location, which represents how difficult the pipe will be to rehabilitate if there is a sudden failure (major road, under railway, etc.); and service area, representing what type of zoning will be affected by a failure (high sensitivity assigned to heavy industry. Assets were assigned a final COF score based on an average of these three factors. The most critical assets were generally those found under major roads (causing the most disruption to repair), with the largest diameter (serving the largest area), and serving heavy industry located within the City.

The Business Risk Exposure (BRE) scores for each asset were developed by multiplying the POF and the COF ratings. The BRE represents the asset's criticality on a scale of 1 to 25 and serves as a tool for prioritizing repair/replacement.

Revenue Structure

A detailed review of the Board's sewer rate and funding structure was completed by Utility Financial Services for the 2018 fiscal year. The report found that the Board's funding structure is adequate to cover expenses. The Board plans to set aside money for the projects outlined in the Capital Improvement Plan. The Board has equipment and staff available to self-perform some of the recommended repairs and maintenance activities.

Capital Improvement Plan

Guided by the LOS goals established by the Board, a Capital Improvement Plan (CIP) for the wastewater system was developed using tools such as the BRE, condition assessments, and knowledge of past CIPs. Recommendations were prepared for assets that were determined to be most critical. Improvements to the system include sewer and manhole rehabilitation, spot repairs, pump station replacement, and sewer improvements on Jefferson Street.

5-Year Capital Improvement Plan

Year	Repair
2018	Manhole Lining (Phases 1-3)
2018	Sewer Lining (6,890 ft)
2019	Jefferson Street Sewer Improvements

5-Year Capital Improvement Plan

Year	Repair
2019	Big Boy Pump Station
2020-2022	Spot Repairs, Sewer Lining, Manhole Lining

Recommendations

The Board plans to continue with wastewater asset condition assessments by setting aside budget annually for further televising and manhole inspection. The Board plans to clean and televise the sewers which were not included in the initial inspection program during SAW. After the remaining inspections are completed, sewers which received POF ratings of 3 or 4 during the initial inspection program will be re-televised. Condition assessments will be conducted on manholes which were unable to be located or were buried at the time of inspection. Manholes with high POF scores that were not addressed in the initial CIP will be re-assessed. All repairs and maintenance will be tracked in Lucity™ and in GIS.

Implementation of the recommended repairs and maintenance activities to the wastewater system should be prioritized and scheduled based upon the calculated BRE score and the Board's selected LOS. The Board plans to address any high priority repairs which require immediate attention. Most of the repairs will be performed internally. The remainder of the repairs will be addressed under future or pending street projects.

List of Major Assets

- 68 miles of gravity sanitary sewer
- 1,443 manholes
- 10.6 miles of force main
- 14 pump stations
- 1 WWTP

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date _11/30/18_____________
(no later than 3 years from executed grant date)

The City of Coldwater *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1175-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or No

   If No - Date of the rate methodology approval letter: May 3, 2018.

2) Significant Progress Made: Yes or No

   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)

3) Date of rate methodology review letter identifying the gap: ______________________.

4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ____________________________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Jeff Budd____________________ at _____517-279-9501______________jbudd@coldwater.org__
Name Phone Number Email

____ 10/26/18
Signature of Authorized Representative (Original Signature Required) Date

Jeffrey W. Budd, Director of Board of Public Utilities
____
Print Name and Title of Authorized Representative

Stormwater, Asset Management, and Wastewater Grant
Stormwater Asset Management Plan
Executive Summary

City of Coldwater
1 Grand Street
Coldwater, MI 49036
Keith Baker, City Manager, 517.279.6911
SAW Grant 1175-01

Executive Summary

The City of Coldwater (City), was awarded a grant by the Michigan Department of Environmental Quality (MDEQ) under the Stormwater, Asset Management, and Wastewater (SAW) Program. The City has determined it to be in its best interest to use a portion of the grant money to implement an Asset Management Plan (AMP) for its storm sewer collection system in addition to a Stormwater Management Plan (SMP). The scope of the AMP was to inventory, assess, and identify areas of deficiency in the system to develop recommendations for prioritizing and budgeting improvements and maintenance.

The objective of an AMP is to meet the required Level of Service (LOS) in the most cost-effective manner through the proper maintenance of the assets. For the City, this includes providing a summary of the condition of the sewer and manhole assets, a basis for prioritizing the rehabilitation/replacement of the assets, and an updated Operation and Maintenance (OM) Program to routinely maintain the assets. According to the requirements of the MDEQ, a stormwater AMP should include at a minimum the following components:

1. Asset Inventory and Condition Assessment
2. Level of Service
3. Asset Criticality
4. Revenue Structure
5. Capital Improvement Plan

The approach for this AMP followed MDEQ's outlined grant components listed above. The work completed under the SAW Grant included the components described below.

Stormwater Asset Inventory

The City owns and operates a storm sewer system consisting of approximately 207,285 feet of storm sewer ranging from 6-inch to 84-inch diameter. The system includes 723 manholes and 1,140 catch basin structures. Most of the storm sewers discharge at several outlets located along Sauk River, which drains to South Lake, located near the southern boundary of the Hodunk-Messenger Chain of Lakes Watershed. The locations of storm structures were initially established from old mapping and confirmed with survey. The connectivity of the storm sewer was confirmed from manhole inspections. The City's existing Geographic Information System (GIS) database was utilized to develop and maintain the inventory of assets.

Condition Assessment

To identify areas of potential deficiency in the system, the physical condition of storm sewers and manholes was assessed. Assessments were based on National Association of Sewer Service Companies (NASSCO) standards for sewer pipe and manholes to ensure consistency with future evaluations. Manhole inspections in accordance with Level 1 surface inspection criteria were performed on the majority of the manholes in the system. Sewers were inspected by closed circuit television (CCTV). Sewer televising was prioritized in critical areas and any areas of concern expressed by the City. Assets were assigned Probability of Failure (POF) ratings based on their current condition. The manhole inspection forms, CCTV pipe logs, and the results of these inspections were incorporated into the City's GIS database. The following tables present a summary breakdown of the condition of the inspected storm sewer and manhole assets.

Sewer Condition Summary

Probability of Failure (POF) Rating	Percentage of Sewers Televised
1	32%
2	21%
3	19%
4	16%
5	12%

Manhole Condition Summary

Probability of Failure (POF) Rating	Percentage of Manholes Inspected
1	5%
2	8%
3	66%
4	19%
5	2%

Level of Service Determination

The City established a list of attainable goals it intends to meet regarding its storm sewer system, which include:

1. Address sewers and manholes with a POF score of 5 that require immediate attention.
2. Address sewers and manholes with a POF score of 4 or 5 in conjunction with future road projects.
3. Clean the entire storm sewer system once every 10 years and televise the remaining sewers within the next 10 years.
4. Clean and inspect all catch basin sumps on a 10-year basis.
5. Coordinate all recommended storm repairs due to intruding utilities with the appropriate utility company.

Criticality of Assets

The criticality of storm sewer and manhole assets was determined by assigning ratings based on their importance in the operation and reliability of the system. The Consequence of Failure (COF) rating addresses the impact a failure of an asset would have on the community. It represents the criticality of a specific component to the successful operation of the entire system. The COF score also reflects the potential difficulty in addressing a failure if it were to occur. Three factors were considered when determining COF scores: pipe diameter, which is representative of the size of the tributary area the pipe or structure serves; physical location, which represents how difficult the pipe will be to rehabilitate if there is a sudden failure (major road, under railway, etc.); and service area, representing what type of zoning will be affected by a failure (high sensitivity assigned to heavy industry. Assets were assigned a final COF score based on an average of these three factors. The most critical assets were generally those found under major roads (causing the most disruption to repair), with the largest diameter (serving the largest area), and serving heavy industry located within the City.

The Business Risk Exposure (BRE) scores for each asset were developed by multiplying the POF and the COF ratings. The BRE represents the asset's criticality on a scale of 1 to 25 and serves as a tool for prioritizing repair/replacement.

Revenue Structure

The City plans to set aside money each year from its operating budget to address recommended projects, cleaning, televising, and operation and maintenance activities identified to meet its LOS goals. The City has equipment and staff available to self-perform many of the recommended repairs and maintenance activities.

Capital Improvement Plan

Guided by the LOS goals established by the City, a Capital Improvement Plan (CIP) for the City's stormwater system was developed using the tools such as the BRE, condition assessments, and knowledge of past CIPs. Recommendations were prepared for sewers and manholes that were determined to be most critical. Improvements to the system include sewer and manhole rehabilitation. Detailed recommendations were prepared for 31 pipes, summarized in the table below. Sewers requiring repairs due to intruding utilities were provided separately to allow the City to work with utility companies as needed to perform repairs.

Sewer Repair Recommendations

Type	Repair	Estimated Cost
Excavation Required	Spot Repair	$110,000
	Replace Pipe	75,000
Trenchless Repairs	Spot Line	70,000
	CIPP Line	45,000
	Total Estimated Cost	**$300,000**

Recommendations were prepared for 14 manholes, a majority of which are to address old block or brick structures in poor condition.

Manhole Repair Recommendations

Repair	Estimated Cost
Replace Structure (13)	$116,000
Chimney/Frame Repair (1)	2,000
Total Estimated Cost	**$118,000**

Costs presented in the tables above represent estimates if the work were to be contracted out; however, the City plans to address many of these repairs internally. The City has equipment and staff available to perform several of the recommended repairs.

Recommendations

The City plans to continue with storm asset condition assessments by setting aside budget annually for further televising and manhole inspection. The City plans to clean and televise the sewers which were not included in the initial inspection program during SAW. After the remaining inspections are completed, sewers which received POF ratings of 3 or 4 during the initial inspection program will be re-televised. Condition assessments will be conducted on manholes which were unable to be located or were buried at the time of inspection. Manholes with high POF scores that were not addressed in the initial CIP will be re-assessed. An appropriate timeline for catch basin maintenance was established with the City based on available staffing and resources. One tenth of the catch basin sumps will be cleaned by the City annually.

Implementation of the recommended repairs and maintenance activities to the stormwater system should be prioritized and scheduled based upon the calculated BRE score and the City's selected LOS. The City plans to address any high priority repairs which require immediate attention. Most of the repairs will be performed internally. The remainder of the repairs will be addressed under future or pending street projects. Grand Street from Hanchett Street to Cardinal Street is being resurfaced during the summer of 2018. Jefferson Street reconstruction from the limits of Chicago Street to Park Avenue is proposed for 2019. Broken or blocked sewers due to intruding utilities will be coordinated by the City with the appropriate utility company.

List of Major Assets

- 207,285 feet (40 miles) of storm sewer ranging from 6-inch to 84-inch diameter
- 723 storm manholes

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Due Date 11/30/18___________
(no later than 3 years from executed grant date)

The City of Coldwater *(legal name of grantee)* certifies that all stormwater asset management plan (SWAMP) activities specified in SAW Grant No. 1175-01 have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SWAMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

_Jeff Budd____________at____517-279-9501_______ jbudd@coldwater.org____________________
Name Phone Number Email

10/26/18
Signature of Authorized Representative (Original Signature Required) Date

Jeffrey W. Budd, Director of Board of Public Utilities

Print Name and Title of Authorized Representative

Protecting our Infrastructure Investment

ASSET MANAGEMENT PLAN

Wastewater Executive Summary Report



Prepared for:

Village of Colon

SAW Project No. 1637-01

October 2018

FLEIS&VANDENBRINK
DESIGN. BUILD. OPERATE.

EXECUTIVE SUMMARY

OVERVIEW

Public Act 562 of 2012 authorized money for a Stormwater, Asset Management, and Wastewater (SAW) Grant Program. In May 2014, the Village of Colon (Village) received a Stormwater, Asset Management, and Wastewater (SAW) Grant from the Michigan Department of Environmental Quality (MDEQ), project no. 1637-01, to provide financial assistance for the development of a wastewater asset management plan (AMP) for the Village's publicly owned wastewater utility. This AMP is intended to be a living document that is updated as assets continue to wear and age, and as additional inspection/condition results are found and incorporated into the plan.

The contact person for the Village of Colon AMP is:

Jim Weinberg, DPW Supervisor
126 S. Swan Street, Colon, MI 49040
Phone number: (269) 432-2009
Email: j.weinberg@colonmi.com

ASSET INVENTORY AND CONDITION ASSESSMENT

A list of the major assets in the Village's wastewater system, described further below, include:

- Collection system piping system and manholes
- Wastewater Treatment Facility (WWTF)
- Sanitary sewer lift stations in the collection system

The wastewater collection system assets consist of approximately 55,810 feet (10.6 miles) of sanitary sewers (gravity pipe and force mains), and 176 wastewater manholes connecting the gravity pipe. These assets are located in existing street right-of-ways or in easements dedicated for the assets use and maintenance.

The WWTF currently consists of two facultative lagoons operated in series. Treated effluent is discharged either 1) to groundwater in the St. Joseph River watershed via spray irrigation, or 2) to surface water via force main to the St. Joseph River Outfall. Effluent is discharged in accordance with the Wastewater Stabilization General Permit No. MIG580000 with the exceptions stated in the Village's COC (No. MIG580415) or in accordance with the Village's Groundwater Discharge Permit (GW1810053). The current annual average flow received by the facility is approximately 0.087 mgd.

There are seven sanitary sewer lift stations located throughout the wastewater collection system. The stations are either wet well/dry well style or submersible style stations.

Asset Identification and Location

A comprehensive wastewater system asset inventory was developed from operation and maintenance (O&M) manuals, record drawings, field notes, staff knowledge, and site visits, supplemented with field survey work. Asset material, size and age were identified through the review of available historical record documents and Closed Circuit Televising (CCTV) data. Spatial orientation (pipe location), pipe depth and invert elevations were determined through GPS field survey and a comprehensive evaluation of the gravity system. This information was organized into a new, or updated GIS database and piping network for archiving, mapping and further evaluation purposes. The inventory includes 56 WWTF assets, 109 Lift Station Assets, and 350 Collection System Assets.

Condition Assessment and Expected Useful Life

A comprehensive evaluation of the collection system was performed. NASSCO-MACP manhole field based assessments were completed on all 176 manhole structures. Pipeline cleaning and NASSCO-PACP CCTV field based inspections were conducted on 95% of the gravity pipe. Recommendations for short-term (1-5 year) and long term (6-20 year) identified the need for maintenance with 9.4% of the system being tagged for inspection and/or cleaning. Rehabilitation accounted for 13.4% of the system, identifying the need for point repairs and lining. The remaining 77.2% of assets were placed in the 20+ year category.

Overall, the condition of the assets at the WWTF and lift stations range from good to poor. Ongoing repairs have helped to maintain the condition of many assets while some assets have not been replaced and are now near the end of their useful life due to age or deterioration caused by harsh conditions associated with typical wastewater collection and treatment systems. The recommendations for short- and long-term improvements are relatively extensive. Below is a description of some of the immediate concerns:

- The Main Lift Station and Catherine Lift Station are the Village's two most critical stations. Due to aging equipment both are in need of rehabilitation work to maintain reliable operation.
- The Village's can style lift stations have controls located below grade in the drywell that were installed during the original construction in 1972.
- At the WWTF, the 3-way valve at the inlet structure is inoperable so flow can only be directed to Lagoon No. 1. This valve should be replaced to allow influent to also be directed to Lagoon No. 2.
- The Chlorine Building and the Irrigation Control Building at the WWTF are extremely deteriorated. The Chlorine Building is abandoned but the Irrigation Control Building houses the electrical service entrance for the site. The electrical equipment is in poor condition.
- The Village installed the irrigation pumps at the WWTF in 1993 and they have exceeded their expected useful life.

Level of Service

Defining the Expected Level of Service (LOS)

The overall objective of the Village Wastewater Department is to provide reliable wastewater collection and treatment services at a minimum cost, consistent with applicable environmental and health regulations. To achieve this, the following Level of Service (LOS) goals are proposed:

WASTEWATER UTILITY - LEVEL OF SERVICE STATEMENT

The overall objective of the Village of Colon Wastewater Department is to provide reliable wastewater collection and treatment services at a minimum cost, consistent with applicable environmental and health regulations. To achieve this the following Level of Service (LOS) goals are proposed:

- Provide adequate collection system and treatment capacity for all service areas.
- Comply with all local, state and federal regulations at all times for treated effluent from the WWTF.
- Actively maintain collection and treatment system assets in reliable working condition.
- Reduce inflow/infiltration (I&I) flow volumes to mitigate potential for sanitary overflows, water in basements, and overloading of treatment plant.
- Provide rapid and effective emergency response services to customers.
- Ensure operations staff are properly certified.
- Regularly review health and safety procedures for operations staff to provide proper worker safety.
- Regularly review projected O&M and capital expenditures. Adjust user rates, as necessary, to ensure sound financial management of wastewater system.

The LOS goals may need to be adjusted from time to time as the utility ages, the needs of the community change, or new rules or regulations require a change in operation. For this reason, the LOS goals should be reviewed by the Village from time to time to make sure they accurately reflect the desired operation of the utility.

Measuring Performance

In order to assure that LOS goals are met, performance measurements may need to be implemented. During the LOS review with the community the need for performance measurements was discussed.

CRITICAL ASSETS

Determining Criticality

Business Risk is the determination of criticality of each asset in the wastewater system. Criticality is based on two factors; Likelihood (Probability) of Failure and Consequence of Failure using the following formula:

Business Risk = Consequence of Failure Score x Likelihood of Failure Score

Defining an asset's Business Risk allows for management of risk and aids in decision making for where to allocate operation and maintenance and capital improvement funds.

Likelihood of Failure (LoF) is a measure of how likely an asset is to fail. The following categories have been developed to quantify how likely an asset is to fail:

- Condition of the asset
- Remaining useful life (Age)
- Service History
- Operational status

Consequence of Failure (CoF) is a measure of the social, economic, financial or environmental impact of failure of an asset and the utilities ability to respond, convey and treat wastewater. CoF categories of the collection system include:

- Proximity to critical environmental features
- Location (Zoning District) of asset
- Facilities served by asset
- Size and location of asset within the utility network
- Type of asset.

The WWTF and Lift Station categories for CoF are:

- Process
- Financial Impact
- Safety
- Environmental Impact
- Disruption to the Community
- Ability to Respond

Criticality Results

Using the strategy outlined above, a Business Risk Evaluation (BRE) was performed for each asset using a graphical ArcGIS-based sewer asset management and capital planning software that compiles, analyzes and assesses Business Risk for each asset and develops a Capital Improvement Plan. The results of the BRE are provided in easily understood tabular and graphical output.

Figure 1 provides the risk rating for gravity and force main pipe by number of pipe segments. Twelve pipe segments in the collection system have an extreme risk rating, five need to be fully lined, six need point repair and one requires no action.

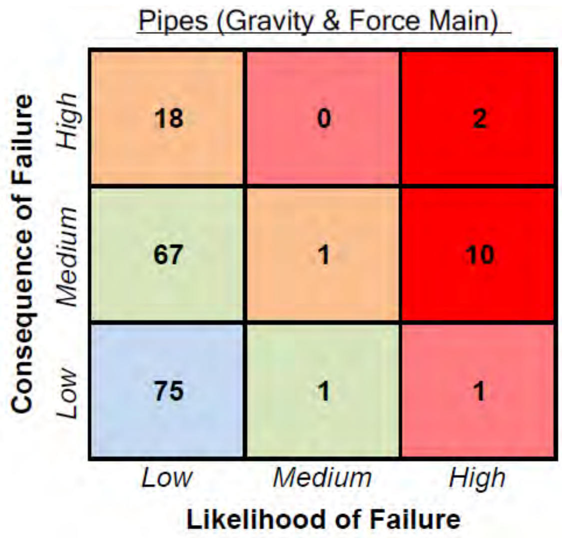


Figure 1. Business Risk Matric (Risk Rating) by Number of Gravity and Force Main Pipes

Figure 2 provides the risk rating for the collection system manholes. Fourteen manholes are identified as extreme risk; one needs lining, one needs cleaning and twelve need repair.

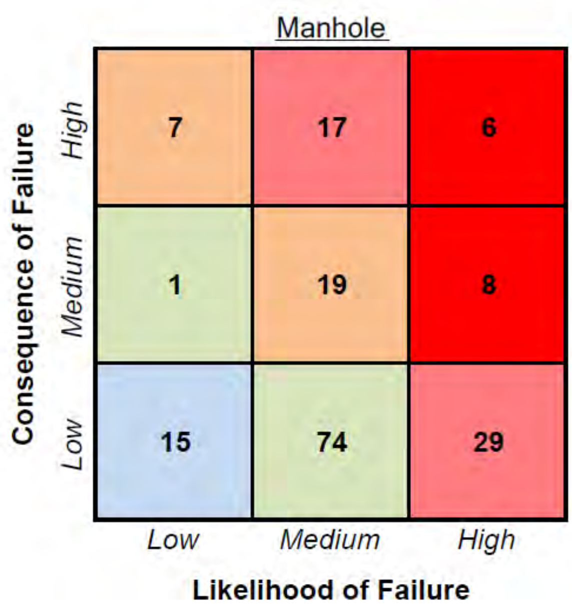


Figure 2. Business Risk Matrix (Risk Rating) by Number of Manholes

Figure 3 provides the risk ratings for the WWTF and lift station assets. No assets are identified as extreme risk. The 21 assets with high risk ratings should be inspected or replaced in the near term.

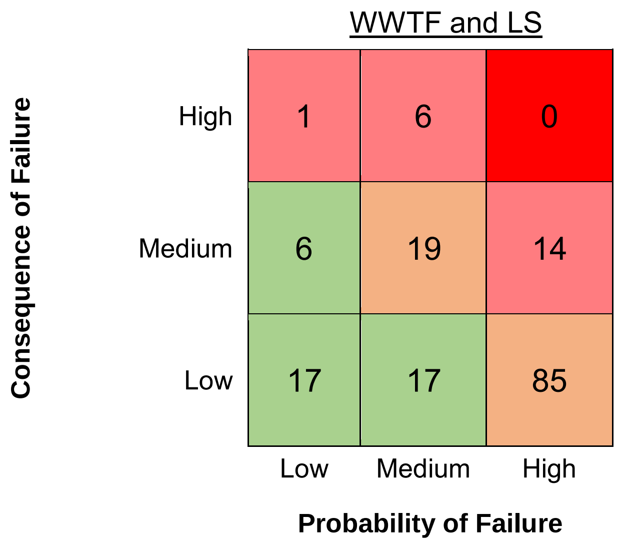


Figure 3. Business Risk Matrix (Risk Rating) for WWTF and Lift Station assets

A spreadsheet providing asset criticality for each utility asset has been included in the AMP detailed report for the collection and treatment systems.

CAPITAL IMPROVEMENT PLAN

A Capital Improvement Plan (CIP) with rehabilitation recommendations was prepared for the Village's wastewater utility assets based on the Business Risk evaluation. The CIP recommendations are provided for the collection system, wastewater treatment facility and lift stations/force mains. From the BRE, a short-term (1-5 year CIP) and long-term (6-20 year CIP) was developed for the utility. Table 4 shows detailed recommendations of the collection system assets needing rehabilitation in the short-term CIP.

Table 4. 5-Year Capital Improvement Plan: Rehabilitation

Year	Asset	ID	Address	Rehab Actions	Cost	2019	2020	2021	2022	2023
1	Gravity Main	503 - 502	716 E STATE ST	Point Repair	$ 10,556	$ 10,556	$ -	$ -	$ -	$ -
1	Gravity Main	107 - 106	BLACKSTONE AV	Point Repair	$ 5,288	$ 5,288	$ -	$ -	$ -	$ -
1	Gravity Main	108-A - 108	121 FRANKLIN AV	Point Repair	$ 5,278	$ 5,278	$ -	$ -	$ -	$ -
1	Manhole	702	541 WILLOW DR	MH Clean + Repair	$ 2,060	$ 2,060	$ -	$ -	$ -	$ -
1	Manhole	509	1000 E STATE ST	MH Clean + Repair	$ 2,060	$ 2,060	$ -	$ -	$ -	$ -
1	Gravity Main	506 - 502	733 E STATE ST	Point Repair	$ 5,278	$ 5,278	$ -	$ -	$ -	$ -
1	Gravity Main	505 - 503	CHARLES ST	Point Repair	$ 5,278	$ 5,278	$ -	$ -	$ -	$ -
1	Gravity Main	420-1 - 420	600 E STATE ST	Point Repair	$ 5,278	$ 5,278	$ -	$ -	$ -	$ -
1	Manhole	202-3	134 ST JOSEPH ST	MH Clean + Repair	$ 2,060	$ 2,060	$ -	$ -	$ -	$ -
1	Manhole	106-1	212 S BLACKSTONE AVE	MH Clean + Repair	$ 2,060	$ 2,060	$ -	$ -	$ -	$ -
1	Manhole	301-2	111 ST JOSEPH ST	MH Clean + Repair	$ 2,060	$ 2,060	$ -	$ -	$ -	$ -
1	Manhole	104-1	N BLACKSTONE PARK LOT	MH Clean + Repair	$ 2,060	$ 2,060	$ -	$ -	$ -	$ -
1	Manhole	419-3	107 BROADWAY ST	MH Clean + Repair	$ 2,060	$ 2,060	$ -	$ -	$ -	$ -
2	Manhole	302	681 STATE ST	MH Clean + Repair	$ 2,060	$ -	$ 2,122	$ -	$ -	$ -
2	Manhole	501-5	896 LAUREL DR	MH Clean + Repair	$ 2,060	$ -	$ 2,122	$ -	$ -	$ -
2	Manhole	105	220 E STATE ST	MH Clean + Repair	$ 2,060	$ -	$ 2,122	$ -	$ -	$ -
2	Gravity Main	105 - 106	208 E STATE ST	Full Lining	$ 6,936	$ -	$ 7,144	$ -	$ -	$ -
2	Gravity Main	508-1 - East L.S.	899 E STATE ST	Full Lining	$ 17,250	$ -	$ 17,768	$ -	$ -	$ -
2	Gravity Main	501 - 508	490 BURR OAK RD	Full Lining	$ 9,015	$ -	$ 9,285	$ -	$ -	$ -
2	Gravity Main	509 - 508	490 BURR OAK RD	Full Lining	$ 14,313	$ -	$ 14,743	$ -	$ -	$ -
2	Gravity Main	508-3 - 508-1	892 GRACE ST	Full Lining	$ 10,528	$ -	$ 10,844	$ -	$ -	$ -
2	Manhole	202-5	128 BLACKSTONE AV	MH Clean + Repair	$ 2,060	$ -	$ 2,122	$ -	$ -	$ -
2	Manhole	408	407 BARRY ST	MH Clean + Line + Repair	$ 5,171	$ -	$ 5,326	$ -	$ -	$ -
2	Manhole	202-7	308 S BLACKSTONE AV	MH Clean + Repair	$ 2,060	$ -	$ 2,122	$ -	$ -	$ -
3	Gravity Main	211 - 210	904 ELM ST	Point Repair	$ 5,278	$ -	$ -	$ 5,600	$ -	$ -
3	Manhole	416	207 BROADWAY ST	MH Repair	$ 1,288	$ -	$ -	$ 1,366	$ -	$ -
3	Manhole	213	117 FRANK AV	MH Repair	$ 1,288	$ -	$ -	$ 1,366	$ -	$ -
3	Manhole	501-7	1000 E STATE ST	MH Clean + Repair	$ 2,060	$ -	$ -	$ 2,185	$ -	$ -
3	Manhole	602	255 JOHN ST	MH Clean + Repair	$ 2,060	$ -	$ -	$ 2,185	$ -	$ -
3	Manhole	806	1151 WILLOW DR	MH Clean + Repair	$ 2,060	$ -	$ -	$ 2,185	$ -	$ -
3	Manhole	101-A	220 SWAN ST	MH Clean + Repair	$ 2,060	$ -	$ -	$ 2,185	$ -	$ -
3	Manhole	206-4	641 MAPLE ST	MH Clean + Repair	$ 2,060	$ -	$ -	$ 2,185	$ -	$ -
3	Manhole	405-2	133 PALMER AVE	MH Repair	$ 1,288	$ -	$ -	$ 1,366	$ -	$ -
4	Manhole	505	140 CHARLES ST	MH Clean + Line	$ 3,883	$ -	$ -	$ -	$ 4,243	$ -
4	Manhole	418-1	304 DALLAS ST	MH Clean + Repair	$ 2,060	$ -	$ -	$ -	$ 2,251	$ -
4	Manhole	418-2	312 DALLAS ST	MH Clean + Repair	$ 2,060	$ -	$ -	$ -	$ 2,251	$ -
4	Manhole	234	215 EDWIN	MH Clean + Repair	$ 2,060	$ -	$ -	$ -	$ 2,251	$ -
4	Manhole	210	901 ELM ST	MH Repair	$ 1,288	$ -	$ -	$ -	$ 1,407	$ -
4	Manhole	211	907 ELM ST	MH Repair	$ 1,288	$ -	$ -	$ -	$ 1,407	$ -
4	Manhole	Catherine L.S.	305 S CATHERINE ST	MH Clean + Line	$ 3,883	$ -	$ -	$ -	$ 4,243	$ -
4	Manhole	901	1101 E M 86	MH Clean + Line	$ 3,883	$ -	$ -	$ -	$ 4,243	$ -
5	Manhole	404-8	400 DALLAS ST	MH Clean + Repair	$ 2,060	$ -	$ -	$ -	$ -	$ 2,319
5	Manhole	418-5	348 DALLAS ST	MH Clean + Repair	$ 2,060	$ -	$ -	$ -	$ -	$ 2,319
5	Manhole	418-8	348 DALLAS ST	MH Clean + Repair	$ 2,060	$ -	$ -	$ -	$ -	$ 2,319
5	Manhole	418-6	348 DALLAS ST	MH Clean + Repair	$ 2,060	$ -	$ -	$ -	$ -	$ 2,319
5	Manhole	418-7	348 DALLAS ST	MH Repair	$ 1,288	$ -	$ -	$ -	$ -	$ 1,449
5	Manhole	202-6	308 S BLACKSTONE AV	MH Clean + Repair	$ 2,060	$ -	$ -	$ -	$ -	$ 2,319
5	Manhole	501-2	484 BURR OAK RD	MH Clean + Repair	$ 2,060	$ -	$ -	$ -	$ -	$ 2,319
5	Manhole	508-1	511 N BURR OAK RD	MH Clean + Repair	$ 2,060	$ -	$ -	$ -	$ -	$ 2,319
5	Manhole	808	1281 WILLOW DR	MH Clean + Repair	$ 2,060	$ -	$ -	$ -	$ -	$ 2,319
TOTAL:						$51,377	$75,719	$20,625	$22,296	$19,997

Table 5 shows detailed recommendations for WWTF and lift station assets needing rehabilitation in the short-term and long-term CIP.

Table 5. Recommended Short-Term Capital Improvements for WWTF and Lift Stations

Improvement Description	Year Installed	Expected Useful Life (Years)	Proposed Year of Replacement	Replacement Cost (2018 Dollars)	Replacement Cost (Inflated 3%/yr)
1 – 5 Year Capital Improvement Projects					
Inlet Structure Replacement	1971	30	2019	$125,700	$129,500
Catherine Lift Station Rehabilitation	1971	30	2020	$360,600	$382,600
Main Lift Station Rehabilitation	1971	30	2020	$418,500	$444,000
Lift Station Electrical and Controls Improvements	1971	30	2021	$631,000	$689,500
WWTP Electrical Upgrades and Irrigation Pump Station Improvements	1971 / 1993	20	2023	$425,200	$492,900
6 - 20 Year Capital Improvement Projects					
Lift Station Rehabilitation (all LS except Main and Catherine)	1971 / 1998	30	2024	$822,400	$982,000
Center Pivot Irrigation System Improvements	1993	20	2025	$289,400	$366,600
Lagoon Biosolids Removal	1993	20-30	2028	$635,900	$880,200

OPERATIONS, MAINTENANCE AND REPLACEMENT

Regular operation, maintenance and replacement (OM&R) is essential in the management of a wastewater collection system. The collection system is subject to a variety of operational problems and can suffer from clogging, scour, corrosion, and collapse. Inspection, cleaning, and rehabilitation are important for optimizing proper functioning of the collection system. By optimizing performance, infiltration/inflow are reduced and sanitary sewer overflows (SSO) are minimized or eliminated thus preserving the substantial investment the community has in its collection system.

An annual equipment replacement fund should be developed to replace disposable equipment. These are items that can be financially accounted for through operation, maintenance and replacement (OM&R) funds and can be replaced by WWTF staff without bringing in an outside contractor. Existing disposable materials include wear parts in pumps and motors and flow meters. The existing OM&R fund is sufficient for the current operations.

Table 6 shows operation and maintenance costs for the collection system.

Table 6. Collection System Maintenance Summary Table: Year by Year

Maintenance Action	Total Cost (Current Year Dollars)	2019	2020	2021	2022	2023
Manhole Assessment	$ 6,180	$ -	$ -	$ -	$ 6,753	$ -
Manhole Cleaning	$ 10,815	$ 6,180	$ -	$ -	$ -	$ 5,217
CCTV	$ 6,686	$ -	$ -	$ 7,093	$ -	$ -

Revenue Structure

The revenue and rate methodology is an instrument to determine user rates and charges that will provide sufficient revenues to pay for utility operating costs.

A study was conducted by an independent municipal financial advisor (H.J. Umbaugh & Associates) to develop a 5-year financial projection to meet the Michigan Department of Environmental Quality SAW Grant requirements.

The rate methodology required by the MDEQ for SAW Grant Asset Management Plans requires an analysis of the current budget on a cash basis to determine if there is a revenue gap. The analysis performed by H.J. Umbaugh shows no revenue gap.

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date November 30, 2018
(no later than 3 years from executed grant date)

The Village of Colon *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1637-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or **No**

   If No - Date of the rate methodology approval letter: May 3, 2018.

2) Significant Progress Made: Yes or No

   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)

3) Date of rate methodology review letter identifying the gap: ________________________.

4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ______________________________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Jim Weinberg	(269) 432-2009	j.weinberg@colonmi.net
Name	Phone Number	Email

	11-15-2018
Signature of Authorized Representative (Original Signature Required)	Date

Carl Thornton, Village President
Print Name and Title of Authorized Representative

Protecting our Infrastructure Investment

ASSET MANAGEMENT PLAN

Stormwater Executive Summary Report

Prepared for:

Village of Colon

SAW Project No. 1637-01

FLEIS & VANDENBRINK
DESIGN. BUILD. OPERATE.

October 2018

1.0 EXECUTIVE SUMMARY

OVERVIEW

Public Act 562 of 2012 authorized money for Stormwater, Asset Management, and Wastewater (SAW) Grant Program. In 2015, The Village of Colon received a SAW Grant from the Michigan Department of Environmental Quality (MDEQ) to provide financial assistance for the development of this Asset Management Plan (AMP). This report provides the Asset Management Plan (AMP) for the Village's stormwater collection system. Working with Village staff, Fleis and VandenBrink (F&V) provided technical assistance for asset identification, condition assessment, and capital improvement planning of the stormwater collection system.

This AMP is intended to be a living document that is updated as assets continue to wear and age, and as additional inspection/condition results are found and incorporated into the plan.

The contact person for the Village of Colon AMP is:

Jim Weinberg, DPW Supervisor
126 S. Swan Street, Colon, MI 49040
Phone number: (269) 432-2009
Email: j.weinberg@colonmi.com

ASSET INVENTORY AND CONDITION ASSESSMENT

The stormwater collection system assets consist of approximately 12,613 feet (2.39 miles) of storm sewers and 182 stormwater structures connecting the gravity pipe. These assets are in existing street rights-of-way or in easements dedicated for the assets use and maintenance.

ASSET IDENTIFICATION AND LOCATION

A comprehensive stormwater system asset inventory was developed from available record drawings, field notes, staff knowledge, and site visits; supplemented with field survey work. Asset material, size and age were identified through the review of available historical record documents. Spatial orientation (pipe location), pipe depth and invert elevations were determined through GPS field survey and a comprehensive evaluation of the gravity system. This information was organized into a new (GIS) database and piping network for archiving, mapping, and further evaluation purposes.

CONDITION ASSESSMENT AND EXPECTED USEFUL LIFE

For the Village of Colon, a comprehensive evaluation of the collection system was performed. NASSCO-MACP structure field-based assessments were completed on 179 of the 182 structures. Pipeline cleaning and NASSCO-PACP CCTV field-based inspections were conducted on 36.9% of the gravity pipe. Based on discussions with the stormwater system operations staff, there are no known capacity issues with the Village-owned stormwater system. For this reason, a capacity analysis was not completed for the Village of Colon. Recommendations for short-term (1-5 year) and long term (6-20 year) identified the need for maintenance: 35.7% of the system was tagged for inspection and/or cleaning. Rehabilitation accounted for 7.3% of the of the system identifying the need for point repairs, lining or replacement. The remaining assets (57%) were placed in the beyond 20-year planning category.

LEVEL OF SERVICE

DEFINING THE EXPECTED LEVEL OF SERVICE (LOS)

The LOS for the Village stormwater system is stated as follows:

STORMWATER – LEVEL OF SERVICE STATEMENT

"To provide appropriate stormwater collection, diversion, and conveyance at a minimum cost, consistent with applicable environmental regulations. To achieve this the following Level of Service (LOS) goals are proposed for the Village of Colon:

- *Provide adequate stormwater collection system and conveyance capacity for all service areas*
- *Actively maintain stormwater collection and conveyance system assets in reliable working condition.*
- *Provide rapid and effective emergency response services to customers.*
- *Maintenance and operations staff are to be properly trained.*
- *Provide properly trained maintenance and operations staff*

MEASURING PERFORMANCE

Performance measurements are specific metrics designed to assess whether Level of Service objectives are being met. Evaluations of goals should be completed at least annually to determine if the provided resources are being used appropriately. Level of Service requirements can be updated to account for changes due to growth, regulatory requirements, and technology.

CRITICAL ASSETS

DETERMINING CRITICALITY

Business Risk is the determination of criticality of each asset in the wastewater system. Criticality is based on two factors: 1.) Likelihood (Probability) of Failure and 2.) Consequence of Failure. Defining an asset's Business Risk allows for management of risk and aids in decision making for where to allocate operation, maintenance, and capital improvement funds.

Likelihood of Failure (LoF) is a measure of how likely an asset is to fail. The following categories have been developed to quantify how likely an asset is to fail:

- Condition of the asset
- Remaining useful life (Age)
- Service History
- Operational status

Consequence of Failure (CoF) is a measure of the social, economic or environmental impact of failure of an asset and the utility's ability to convey stormwater. CoF categories of the stormwater collection system include:

- Location of asset
- Facilities served by asset
- Size

ASSESSING CRITICALITY

Using the strategy outlined above, a Business Risk Evaluation (BRE) was performed for each asset of the Village of Colon using Innovyze-InfoMaster software. InfoMaster is an ArcGIS-based sewer asset management and capital planning software that compiles, analyzes and assesses Business Risk for each asset and develops a Capital Improvement Plan.

The Business Risk score, also known as Criticality, is calculated for each asset using the following equation:

Business Risk = Consequence of Failure Score x *Likelihood of Failure Score*

Figure 1 provides the risk rating for storm sewer pipes by number of pipe segments. Two pipe segments in the stormwater collection system have an extreme risk rating and are recommended to be replaced.

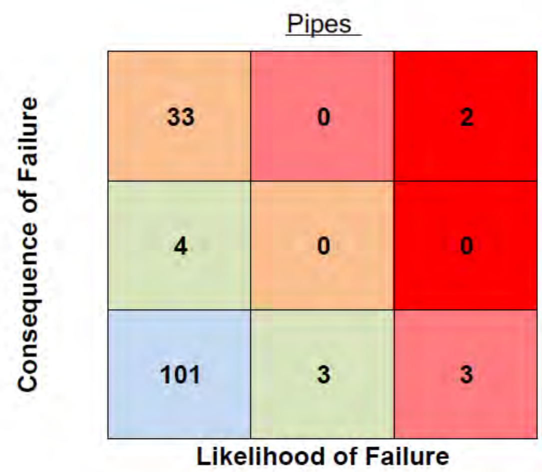


Figure 1: Business Risk Matrix (Risk Rating) by Number of Gravity Pipes

Figure 2 provides the risk rating for the storm sewer structures. Twenty-five require no action, five are recommended for replacement, two for repair, and two for lining.

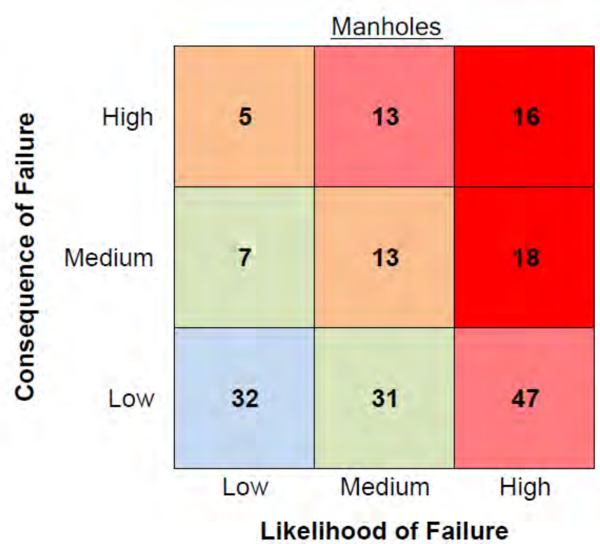


Figure 2: Business Risk Matrix (Risk Rating) by Number of Structures

A spreadsheet providing asset criticality for each utility asset is included in the AMP detailed report for the stormwater collection system.

Capital Improvement Plan

A Capital Improvement Plan with recommendations was prepared for the Village's assets based on the Business Risk evaluation. Data-driven information from the business risk assessment and condition assessment was used to identify and prioritize the capital improvement projects. The information was also used to schedule inspections to evaluate the condition of high business risk assets. Short-Term 1-5 year and Long-Term 6-20-year Capital Improvement Plan (CIP) was prepared to address the projected needs for each asset in the system. The 5-year CIP rehabilitation total is $180,544.

CIP Development

The Village of Colon identifies assets of $5,000 or more to be capital expenditures. Collection System assets were grouped by strategy and assigned costs from a unit database. This database includes unit construction values in 2018 construction dollars based on a survey of recent projects in Michigan and includes engineering and administrative rates where applicable. Assets were categorized and prioritized by year based on risk rating and criticality score to develop the CIP.

The CIP was developed by assigning each project to a CIP year (1-5). Based on Risk Rating and asset rehabilitation grouping (i.e. the type of repair/construction recommended), the recommended 5-Year Capital Improvement Plan for the Village-owned stormwater collection system is shown in Table 4 below.

Table 4. 5-Year Capital Improvement Plan: Rehabilitation

Rehabilitation Action	Total Cost (Current Year Dollars)	2019	2020	2021	2022	2023
Pipe Replacement	$ 107,258	$ 53,191	$ -	$ -	$ -	$ 60,852
Pipe Point Repair	$ 5,500	$ -	$ -	$ 5,835	$ -	$ -
Manhole Replacement	$ 42,848	$ -	$ 27,583	$ -	$ -	$ 18,085
Outfall Repair and Reset	$ 3,321	$ 3,321	$ -	$ -	$ -	$ -
Outfall Replace	$ 3,321	$ -	$ -	$ 3,523	$ -	$ -
Manhole Repair and Line	$ 18,296	$ 4,574	$ 4,711	$ -	$ 9,996	$ -
Total	$ 180,544	$ 61,086	$ 32,295	$ 9,358	$ 9,996	$ 78,937

Operations and Maintenance

A preventative maintenance program to systematically clean and inspect pipelines to NASSCO-certified standards is critical for a sound stormwater system. The process of cleaning and CCTV inspection of pipelines either with equipment owned by the community or contracted is a relatively inexpensive maintenance effort when compared to rehabilitation efforts. It is recommended that at a minimum, all pipelines be cleaned and televised every five years, or that 20% of the system be cleaned and televised annually. Available budget will dictate the frequency or size of yearly projects. The 5-year CIP maintenance total is $37,366. The system maintenance plan for the Village and stormwater system is included in Table 5 below.

Table 5. 5-Year Capital Improvement Plan: Maintenance

Maintenance Action	Total Cost (Current Year Dollars)	2019	2020	2021	2022	2023
Manhole Inspection	$ 1,607	$ 536	$ -	$ -	$ 1,171	$ -
Manhole Cleaning	$ 4,820	$ 1,607	$ -	$ -	$ -	$ 3,617
Outfall Clean	$ 1,071	$ 536	$ -	$ -	$ -	$ 603
CCTV	$ 29,868	$ -	$ -	$ 31,687	$ -	$ -
Total	$ 37,366	$ 2,678	$ -	$ 31,687	$ 1,171	$ 4,220

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date November 30, 2018
(no later than 3 years from executed grant date)

The Village of Colon *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1637-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or **No**

   If No - Date of the rate methodology approval letter: May 3, 2018.

2) Significant Progress Made: Yes or No

   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)

3) Date of rate methodology review letter identifying the gap: ______________________.

4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ___________________________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Jim Weinberg	(269) 432-2009	j.weinberg@colonmi.net
Name	Phone Number	Email

11-13-2018
Signature of Authorized Representative (Original Signature Required) Date

Carl Thornton, Village President
Print Name and Title of Authorized Representative

F&V

106 W. Allegan St. Suite 500
Lansing, MI 48933
O: 517.371.1200
www.c2ae.com

CITY OF CORUNNA WASTEWATER ASSET MANAGEMENT PLAN
EXECUTIVE SUMMARY

City of Corunna
402 North Shiawassee Street
Corunna, Michigan 48817
Joe Sawyer, City Manager, (989)743-4417
SAW GRANT PROJECT NUMBER 1517-01

Executive Summary

The SAW agreement with the State of Michigan was signed On December 4, 2018 which began the overall SAW program.

The Grant agreement included the following funding amounts:

- Total Cost = $1,091,565
  - Grant Value = $1,030,913 (485,045 of which is WAMP)
  - Local Match = $0 (due to Disadvantaged Community Status)

The City of Corunna is located within Caledonia Charter Township in Shiawassee County. Corunna's sanitary sewer collection system has approximately 90,866 feet of sanitary sewer and approximately 377 sanitary manholes.

Wastewater Asset Inventory

This item which initiated the work included:

- Identifying and locating all assets.
  - A list of all assets to be monitored was obtained using a combination of historical system records, field data collection.
  - The GPS coordinates of the field assets were gathered.
  - An ESRI ArcGIS data set was completed to index the locations and attributes of assets.
  - Physical inspections were conducted for each asset.
    - Manholes – Field inventories and conditional assessments were completed in accordance with NASSCO MACP standards by NASSCO Certified personnel.
    - Sewers - Survey was completed by CCTV review in accordance with NASSCO PACP standards by NASSCO Certified personnel.
    - Pump Stations – Field inventories were completed for each pump station recording and evaluating condition for the sub-parts of the lift station within the Pump Station Database. The sub-parts contained, but were not limited to, pumps, VFDs, wet well, electrical, and process piping.
  - The asset information was included in the Asset Management Spreadsheet (AMS).
  - The AMS is used to quantify and sort the system asset information.

Condition Assessment

The City of Corunna's sanitary collection system is in good condition overall, mostly due to the system assessments and maintenance done consistently in recent years.

- Structure assessment and inventories were graded in the field on a 1 to 5 scale (5 being the worst condition) for the various key components of the structure (casting, chimney, cone, wall, flow channel)
- Sewer pipe assessment and inventories followed NASSCO PACP guidelines.
- Asset age and material data was collected using historical project drawings.
- Sanitary Pump Stations were visually inspected and conditionally graded for the major components (superstructure, pump room and pumps, wet well, valve vault, control building, instrumentation, electrical service and controls, and lighting); data was compiled in an Access Database.
- The results of the assessment yielded the following percentages:
    - 61% of pipes are 1's
    - 1% of pipes are 2's
    - 6% of pipes are 3's
    - 15% of pipes are 4's
    - 17% of pipes are 5's
    - 5% of manholes are 1's
    - 80% of manholes are 2's
    - 14% of manholes are 3's
    - 1% of manholes are 4's
    - 1% of manholes are 5's

Criticality of Assets

- The Asset Management Spreadsheet (AMS) was used to organize the asset classes. Several parameters were used to determine asset Consequence of Failure (CoF) and Probability of Failure (PoF), rating each on a 1 to 5 scale (5 being the worst). These factors included:
    - Redundancy: Does the unit or asset have system backup?
    - Criticality of the asset to the system and what level of impact to the system occurs in the event that the asset fails.
    - Location and surrounding service area(s) of each asset were also incorporated in determining the criticality. Assets that service a larger portion of the system typically had higher levels of CoF.
    - Probability of Failure for each asset was based on its current physical and functional condition. Factors varied depending on the asset being evaluated as noted in the Conditional Assessment section of this summary.
    - The Consequence of Failure and Probability of Failure together result in a parameter identified as Business Risk.
- The AMS was used to prioritize the Criticality, which ranged from 1-25 (25 having the highest priority) and determine the need for short term repair or maintenance, short term replacement, or long term maintenance. These ratings were utilized with other factors to create a Capital Improvement Plan.

Level of Service Determination

- A SAW Team was created to discuss the wastewater system direction.
- The SAW Team met and discussed a mission statement and desired Level of Service statement, which was then converted to a succinct list of items to follow for the future.
- The SAW Team will meet once a year to assess the system's service record and recommend improvements to the Level of Service Statement, if needed.

Revenue Structure

- The user charge report and the AMS are identified as the Rate Methodology and have been submitted previously to MDEQ and approved.
- No rate increase was required per the grant agreement.
- The Rate Methodology was updated to forecast future budgeting needs. The current budget information is included.

Capital Improvement Plan

- The AMS identifies capital improvement projects for the future.
- The long term projects may be achieved through a combination of grants or future rate adjustments to support project funding.
- An estimate of project year and financial cost is generated for each capital improvement project.
- A List of recommended projects to be completed within the next five (5) years is as follows:
    - *Sanitary Structure repairs with a Business Risk greater than 16 or Probability of Failure of 4 or Wall grade below "D" to be lined or replaced (MH Project #1) – Five (5) structures in the sanitary sewer system is identified with Level 4 wall conditions mostly due to hydrogen gas attack and should be lined or replaced at a cost of approximately $9,000 in today's dollars and $10,000 in three years with a 3% inflation rate.*
    - *Sanitary Structure with a Flow Channel grade "D" or 4 to be rehabilitated (MH Project #2) – one (1) structure is recommended to have the flow channel reconstructed at a total project cost of $2,500 in today's dollars and $3,000 in year 3 with a 3% inflation rate.*
    - *Sanitary Structure repairs with a Business Risk greater than 16 or Probability of Failure of 4 or Wall, Cone, Chimney grade below "D" to be replaced (MH Project #3) – six (6) structures were selected to have the Cone and Chimney replaced totaling $14,000 in today's dollars and $15,000 in year 3 with a 3% inflation rate.*
    - *Sanitary System Sewer Repairs with a Business Risk of 16+ or likely sewer collapse (Sewer Project # 1) – Twelve (12) sanitary pipe reaches have defects that could result in a sewer collapse or disruption of service. These sanitary sewer rehabilitation methods consist of spot lining. The total project cost for these sewer repairs is $31,000 in today's dollars and $34,000 in year 3 with a 3% inflation rate.*
    - *No Sanitary Collection System Pump Station repairs will be required during this timeframe beyond normal maintenance.*

Additional projects recommended in the next 6 to 10 years and 11 to 20 years are included in the Capital Improvement Plan.

List of Major Assets

- 90,866 feet of sanitary sewer
- 8,892 feet of force main
- 595 sanitary manholes
- 4 lift stations

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date: November 30, 2018 (End date established by MDEQ in May 16, 2018 letter to be November 30, 2018)
(no later than 3 years from executed grant date)

The City of Corunna certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1517-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes; A determination letter was received August 8, 2018, but further review demonstrated that there is no gap, so action is not required
   If No - Date of the rate methodology approval letter: (see attached statement for reference).
2) Significant Progress Made: Yes , complete on the basis of further review; no action required
3) Date of rate methodology review letter identifying the gap: August 8, 2018
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on N/A (see attached statement for reference).

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:
Mr. Joe Sawyer (989) 743-4422 and email citymanager@corunna-mi.gov

Joseph R. Sawyer November 28, 2018

Signature of Authorized Representative (Original Signature Required) Date

Joe Sawyer, City Manager

Print Name and Title of Authorized Representative

106 W. Allegan St. Suite 500
Lansing, MI 48933
O: 517.371.1200
www.c2ae.com

CITY OF CORUNNA STORMWATER ASSET MANAGEMENT PLAN EXECUTIVE SUMMARY

City of Corunna
402 North Shiawassee Street
Corunna, Michigan 48817
Joe Sawyer, City Manager, (989)743-4417
SAW GRANT PROJECT NUMBER 1517-01

Executive Summary

The SAW agreement with the State of Michigan was signed On December 4, 2018 which began the overall SAW program.

The Grant agreement included the following funding amounts:

- Total Cost = $1,091,565
  - Grant Value = $1,030,913 (545,868 of which is SWAMP)
  - Local Match = $60,652 (all of which is SWAMP)

The City of Corunna is located within Caledonia Charter Township in Shiawassee County. Corunna's storm sewer collection system has approximately 58,784 feet of storm sewer and approximately 595 storm manholes, catch basins and outfalls.

Stormwater Asset Inventory

This item which initiated the work included:

- Identifying and locating all assets.
  - A list of all assets to be monitored was obtained using a combination of historical system records and field data collection.
  - The GPS coordinates of the field assets were gathered.
  - An ESRI ArcGIS data set was completed to index the locations and attributes of assets.
  - Physical inspections were conducted for each asset.
    - Manholes – Field inventories and conditional assessments were completed in accordance with NASSCO MACP standards by NASSCO Certified personnel.
    - Sewers - Survey was completed by CCTV review in accordance with NASSCO PACP standards by NASSCO Certified personnel.
  - The asset information was included in the Asset Management Spreadsheet (AMS).
  - The AMS is used to quantify and sort the system asset information.

Condition Assessment

Overall, the system was in serviceable condition. A number of pipe segments were found to be laid at very flat grades and in some cases using very small diameter pipe. The stormwater system outfalls to the Shiawassee River were found to be in fair condition with some over vegetation. During the latter course of this study, it was concluded that additional investigation was warranted in the wastewater collection system to know the current condition, so better information has become available to help keep stormwater in the stormwater collection system. The capital improvements will become even more necessary in this system as the wastewater collection system is improved, sending more stormwater to the stormwater collection piping.

- Structures assessment and inventories follow NASSCO MACP guidelines.
- Sewer pipe assessment and inventories follow NASSCO PACP guidelines.
- Asset age and material data was collected using historical project drawings.
- The results of the assessment yielded the following:
    - 75% of pipes are 1’s
    - 1% of pipes are 2’s
    - 7% of pipes are 3’s
    - 6% of pipes are 4’s
    - 11% of pipes are 5’s
    - 13% of structures are 1’s
    - 67% of structures are 2’s
    - 16% of structures are 3’s
    - 3% of structures are 4’s
    - 1% of structures are 5’s

Criticality of Assets

- The Asset Management Spreadsheet (AMS) was used to organize the asset classes. Several parameters were used to determine asset Consequence of Failure (CoF) and Probability of Failure (PoF), rating each on a 1 to 5 scale (5 being the worst). These factors included:
    - Redundancy: Does the unit or asset have a backup?
    - Criticality of the asset to the system and what level of impact to the system occurs in the event that the asset fails.
    - Location and surrounding service area(s) of each asset were also incorporated in determining the criticality. Assets that service a larger portion of the system typically had higher levels of CoF.
    - Probability of Failure for each asset was based on its current physical and functional condition. Factors varied depending on the asset being evaluated as noted in the Conditional Assessment section of this summary.
    - The Consequence of Failure and Probability of Failure together result in a parameter identified as Business Risk.
- The AMS was used to prioritize the Criticality, which ranged from 1-25 (25 having the highest priority) and determine the need for short term repair or maintenance, short term replacement, or long term maintenance. These ratings were utilized with other factors to create a Capital Improvement Plan.

Level of Service Determination

- A SAW Team was created to discuss the storm system direction.
- The SAW Team met and discussed a mission statement and desired Level of Service statement, which was then converted to a succinct list of items to follow for the future.
- The SAW Team will meet once a year to assess the system’s service record and recommend improvements to the Level of Service Statement, if needed.

Revenue Structure

- The City drainage system is operated and maintained using City street funds.
- The current funding consists of a combination of Act 51 state tax funds and a local millage.

Capital Improvement Plan and Recommendations

- The AMS identifies capital improvement projects for the future.
- The long term projects may be achieved through grants or future public borrowings.
- An estimate of project year and financial cost is generated from each capital improvement project.
- The following is the recommended project to be completed within the next five (5) years are as follow:
    - *Storm Structure repairs with a Business Risk greater than 16 or Probability of Failure of 4 or Wall, Cone, Chimney grade below "D" or 4 to be replaced (MH Project #4) – fifty (50) structures have been identified in this category with a cost totaling $48,000 in today's dollars and $52,000 in year 3 with a 3% inflation rate.*

  Projects recommended in the next 6 to 10 years and 11 to 20 years are included in the Capital Improvement Plan.

List of Major Assets

- 58,784 feet of storm sewer
- 595 storm structures

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Due Date: November 28, 2018 (End date established by MDEQ in May 16, 2018 letter to be November 30, 2018)
(no later than 3 years from executed grant date)

The City of Corunna certifies that all stormwater asset management plan (SWAMP) activities specified in SAW Grant No. 1517-01 have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SWAMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

Mr. Joe Sawyer (989) 743-4422 and email citymanager@corunna-mi.gov

November 28, 2018

Signature of Authorized Representative (Original Signature Required) Date

Joe Sawyer, City Manager

Print Name and Title of Authorized Representative

Courtland Township
7450 14 Mile Rd NE
Rockford, MI 49341
www.courtlandtwp.org
Mike Krygier, Township Supervisor
(616) 866-0622
SAW Grant Number 1347-01

September 18, 2019

Re: Wastewater AMP Summary
SAW Grant Project Number 1347-01

Dear Sir or Madam:

The following letter is a summary of the work completed to prepare an asset management plan (AMP) and capital improvement plan (CIP) for Courtland Township, Michigan. The sections are based on MDEQ guidance provided for this project.

Asset Inventory

Courtland Township was awarded a Stormwater, Asset Management, and Wastewater (SAW) Grant in 2014. This money was used to make an asset management plan and capital improvement plan for the sanitary sewer system in the township. The sanitary sewer system consists of laterals, manholes, gravity sewer pipe, sanitary pump stations, and force mains located around Myers Lake, Little Myers Lake, Brower Lake, and Little Brower Lake. The sewer serves houses on the roads encircling the lakes as well as some subdivisions adjacent. Using satellite images and record plans, the system assets were imported into ArcGIS. A map was created to show a representation of the sanitary sewer system. The assets of the system and their approximate replacement value are summarized in Table A1 attached to this report.

Certain sections of the system that were old and had known problems were televised to give an indication of their condition. This included most of the pipes installed in 1978, some manholes, and all the pump stations. The pipes were rated on a scale of 1-5 based on the Pipe Assessment Certification Program (PACP) standards. The manholes located upstream and downstream of the pump stations were rated on a scale of 1-5 based on Manhole Assessment Certification Program (MACP) standards. The pump stations were inspected and a report was written about each. Assuming all structures not inspected are in good condition, the results show that 3.5% of the sewer system is in poor condition, 7.5% is in fair condition, and 89.0% is in good condition.

Criticality of Assets

Each asset was also assigned a criticality rating. The first step to assigning these ratings was to determine the importance of each pipe to the overall system. This was done by rating all the pipes on a 1-5 scale. Sewer pipes that serve less than 10 properties were assigned a 1 rating. Pipes that serve more than about 25% of the system were assigned a 5 rating. The importance rating of the manholes or pump stations was determined by the pipe downstream or upstream, respectively. To assign assets a criticality rating, the asset's condition and importance were multiplied. In this way, both the likelihood and consequence of failure were considered. The assets with the highest criticality rating were given priority in the capital improvement plan.

Level of Service

The sanitary sewer system in Courtland Township operates 24 hours per day, 7 days per week, 365 days per year. In order to make sure this is possible, specific measures have been put into place. Each pump station has a generator connection, so a generator can be hooked up to run the pump station when power is out. Each pump station has a known amount of storage capacity, so if the downstream system is shut down, the pump station can be shut off for a known amount of time before backups begin. The pump stations also have valve vaults with bypass connections. Spare parts are kept by the sewer operator to ensure fast repairs. If a pump station is inoperable due to a component failure, bypass pumps or tanker trucks can be used to keep the system functional. Each pump station is equipped with a high-level alarm and is inspected weekly by Main-Tech Services, the contract operator. Main-Tech is on call at all times if there is a problem.

Revenue Structure

The revenue for the sanitary sewer fund comes from sewer rates charged to township residents who are sewer users. The township sewer board reviews these rates on yearly basis. When reviewing the rates, the board keeps in mind the annual costs of running the system and paying Main-Tech services to operate and maintain it. They also look at future growth and expansion and save money for future projects and ongoing maintenance costs. Table 1 shows the current rates and fees for Courtland Township Sewer.

Table 1: Courtland Township Sewer Fees—2018

Trunkage (Hook-up)	$2,600 per unit plus $3,420 North Kent Sewer Authority Fee
Availability	$3,700 per unit
DPW Inspection Fee	$74 per hour
Quarterly Usage	$165 per quarter (in advance)

All money collected from these rates and fees goes into the sanitary sewer fund. The fund is used to pay for sewer system operation and maintenance, debt service, and capital improvements. In the 2016-2017 budget, $152,098 was paid to operation and maintenance, $33,577 was paid to debt service, and $152,000 was paid to capital improvements.

Capital Improvement Plan

Using the data collected in this study, a capital improvement plan was created. It breaks down work that needs to be done in the next 1-3 years, 3-5 years, 5-10 years, 10-15 years, and 15-20 years. The overall cost of the 1-3 year plan is $76,000. This includes fixing all the structural problems with the gravity pipe in the township and repairing manholes in poor condition. The 3-5 year plan will cost about $108,000 and will fix all sewers in fair condition and repair some known problems with pump stations. The 5-10 year plan will cost about $172,000 and will resolve any operation and maintenance deficiencies of the gravity sewer. It will also repair any manholes not in good condition as well as repair the rest of the pump stations. The 10-15 year plan includes televising the rest of the sewer that was built before 1992. This plan will cost about $54,000. The 15-20 year plan will cost about $64,000 and will cover inspecting the rest of the sanitary sewer in the township. The current funding source should be adequate to pay for these improvements within the time frames specified.

Because of the funding provided from the SAW Grant, Courtland Township was able to inventory, inspect, and plan to improve its sanitary sewer system. The township now has a strategy to maintain its system over the next 20 years and plan for future improvements. The approximate cost of the 20-year improvement plan is $474,000. These improvements will help the sanitary sewer to last and continue to serve the residents of Courtland Township.

Sincerely,

Williams & Works

Nathan Breese

Nathan Breese, E.I.T.
Project Engineer

Enclosures: WWAMP Certification of Completeness
List of Major Assets

Cc: Brandon Mieras, P.E. – Williams & Works
Mike Krygier – Courtland Township
File

List of Major Assets

Courtland Township, MI

Sanitary Sewer System

SAW Grant 1347-01

Table A1: List of Courtland Township Sanitary Sewer Major Assets

Type	Amount	Unit	Price	Value
1.25-inch Force Main	3869	ft	$30	$116,000
2-inch Force Main	3174	ft	$30	$95,000
2.5-inch Force Main	689	ft	$30	$21,000
3-inch Force Main	1333	ft	$35	$47,000
4-inch Force Main	6738	ft	$40	$270,000
6-inch Force Main	3927	ft	$50	$196,000
8-inch Force Main	6241	ft	$60	$374,000
8-inch Sanitary	41316	ft	$50	$2,066,000
Sanitary Laterals	19536	ft	$40	$781,000
Manholes	206	ea	$3,000	$618,000
Force Main Valve/Clean Out	13	ea	$4,000	$52,000
Pump stations	10	ea	$400,000	$4,000,000
Grinder Pump Stations	3	ea	$200,000	$600,000
House Grinder Pumps	44	ea	$50,000	$2,200,000
*All values in 2018 dollars			**Total**	**$11,436,000**

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date September 18, 2018
(no later than 3 years from executed grant date)

The Courtland Township *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1347-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or $\boxed{\text{No}}$
   If No - Date of the rate methodology approval letter: June 28, 2018.
2) Significant Progress Made: Yes or No
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: ______________.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ______________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Name	Phone Number	Email
Nathan Breese	at (616) 225-1500	breese@williams-works.com

Signature of Authorized Representative (Original Signature Required) — Date: 9-25-18

Mike Krygier, Courtland Township Supervisor
Print Name and Title of Authorized Representative

Protecting our Infrastructure Investment

ASSET MANAGEMENT PLAN

Wastewater Executive Summary Report

Prepared for:

City of Croswell

SAW Project No. 1664-01

City of Croswell
Michigan

November 2018

FLEIS&VANDENBRINK
DESIGN. BUILD. OPERATE.

Executive Summary

Overview

Public Act 562 of 2012 authorized money for the Storm water, Asset Management, and Wastewater (SAW) Grant Program. In November of 2018, the City of Croswell received a SAW Grant from the Michigan Department of Environmental Quality (MDEQ), project no. 1664-01, to provide financial assistance for the development of a wastewater asset management plan (AMP) for the City's publicly owned wastewater utility. The assets that comprise the utility include collection system piping and manholes, lift station/pump stations and force mains.

The SAW Grant amount awarded to the City of Croswell was $761,648.00
The Local Match provided by the City of Croswell was $84,628.00

This AMP is intended to be a living document that is updated as assets continue to wear and age, and as additional inspection/condition results are found and incorporated into the plan.

Questions regarding the Asset Management Plan should be directed to:
Sam Moore
City Administrator
City of Croswell
100 North Howard Avenue
Croswell, MI 48422
(810) 679-2299
Email: smoore@croswell.us

Asset Inventory and Condition Assessment

The wastewater collection system assets consist of approximately:

- Gravity Sewer (4 inch thru 30 Inch): 82,531 feet (15.6 miles)
- Manhole Structures: 290 in the gravity system, 7 in the forcemain system
- Force Main (3 inch thru 18 inch): 16,445 feet (3.1 miles)
- Sewer Lift Stations: 7 Each
- WWTP: 0.5 mgd

These assets are in existing street rights-of-way or in easements dedicated for the assets use and maintenance.

The treatment of wastewater for the City of Croswell is completed by a WWTP owned and operated by the City.

Asset Identification and Location

A comprehensive wastewater system asset inventory was developed from operation and maintenance manuals, which included a review of the existing record drawings, field notes, staff knowledge, site visits and supplemented with field survey work.

Asset material, size and age were identified through the review of available historical record documents and Closed Circuit Televising (CCTV) data.

Spatial orientation (pipe location), pipe depth and invert elevations were determined through survey grade GPS equipment and a comprehensive evaluation of the gravity system.

This information was organized into new PDF and GIS databases and a piping network for archiving, mapping and future evaluation purposes.

Condition Assessment and Expected Useful Life

A comprehensive evaluation of the collection system was performed.

NASSCO-MACP Level 1 manhole field-based assessments were completed on the manhole structures that were assessible.

Pipeline cleaning and NASSCO-PACP CCTV field-based inspections were conducted on a majority of the gravity pipe collection system.

The condition of the collection system assets reviewed ranged from Fair to Good, with only a few minor deficiencies.

There are a few locations throughout the City that smoke testing provided evidence of cross connections with stormwater catchbasins. The City will work to separate the two systems in these locations.

Flow Analysis was analyzed for average day and peak hour conditions in areas of concern.

Recommendations for short-term (1-5 year) and long term (6-20 year) system maintenance and improvements were identified. It is recommended to clean and televise the collection system on a 7 to 10-year rotating basis.

The condition of the assets at the lift stations range from Fair to Good. Ongoing maintenance has upheld the condition of many assets while other assets have deteriorated due to age and the harsh conditions associated with typical wastewater collection systems. The recommendations for short term and long-term improvements are listed in detail in the WWTP and Lift Station AMP.

The condition of the assets at the Waste Water Treatment Plant (WWTP) range from Fair to Good. Ongoing maintenance has upheld the condition of many assets while other assets have deteriorated due to age and the harsh conditions associated with typical wastewater collection systems. At this time, all of the assets that are listed as extreme business risks are included in a rehabilitation project that is scheduled to be started in the summer of 2019.

Level of Service

Defining the Expected Level of Service (LOS)

The overall objective of the City of Croswell as it relates to their wastewater collection system is to adopt the following Level of Service (LOS) goals:

LEVEL OF SERVICE STATEMENT

The overall objective of the City of Croswell is to provide reliable wastewater collection services at a minimum cost, consistent with applicable environmental and health regulations. To achieve this the following Level of Service (LOS) goals are proposed:

- Provide adequate collection system and treatment capacity for all service areas.
- Comply with local, state and federal regulations.
- Actively maintain collection system assets in reliable working condition.
- Reduce inflow/infiltration (I/I) flow volumes to mitigate potential for sanitary overflows, water in basements, and overloading of treatment plant.
- Provide rapid and effective emergency response services to customers.
- Ensure operations staff are properly certified.
- Regularly review health and safety procedures for operations staff to provide proper worker safety.
- Regularly review projected O&M and capital expenditures. Adjust user rates, as necessary, to ensure sound financial management of wastewater system.

The LOS goals may need to be adjusted from time to time as the utility ages, the needs of the community change or new rules or regulations require a change in operation. For this reason, the LOS goals should be reviewed by the City annually to make sure they accurately reflect the desired operation of the utility.

Measuring Performance

To assure that LOS goals are met, performance measurements may need to be implemented. During the LOS review with the community the need for performance measurements was discussed.

Critical Assets

Determining Criticality

Business Risk is the determination of criticality of each asset in the wastewater system. Criticality is based on two factors; Likelihood (Probability) of Failure and Consequence of Failure using the following formula:

Business Risk = Consequence of Failure Score X Likelihood of Failure Score

Defining an asset's Business Risk allows for management of risk and aids in decision making for where to allocate operation and maintenance and capital improvement funds.

Likelihood of Failure (LoF) is a measure of how likely an asset is to fail. The following categories have been developed to quantify how likely an asset is to fail:

- Condition of the asset
- Remaining useful life (Age)
- Service History
- Operational status

Consequence of Failure (CoF) is a measure of the social, economic, financial or environmental impact of failure of an asset and the utilities ability to respond, convey and treat wastewater. CoF categories of the collection system include:

- Proximity to critical environmental features
- Location (Zoning District) of asset
- Facilities served by asset
- Size and location of asset within the utility network
- Type of asset

Criticality Results

Using the strategy outlined above, a Business Risk Evaluation (BRE) was performed for each asset using a capital planning template that compiles, analyzes and assesses Business Risk for each asset and develops a Capital Improvement Plan. The results of the BRE are provided in easily understood tabular and graphical output.

A spreadsheet providing asset criticality for each utility asset has been included in the AMP detailed report for the collection system.

Figure 1 provides the risk rating for gravity pipe by number of pipe segments. 28 pipe segments in the collection system have been identified with a high or extreme risk rating. Most of these defects are holes in the pipe or a broken pipe with a visible void. These sections of pipe are placed in the 1-5 year CIP. A majority of the collection system's gravity pipes, 70 percent as shown in Figure 1, have a low to negligible risk rating and are indicative of pipes in relatively good condition.

Figure 2 provides the risk rating for the collection system manholes. There is a total of 50 manholes that have a have been identified with a high or extreme risk rating when compared to the other structures within the system, most of which need mortaring of the chimneys and replacing castings. There are also numerous cross connections to stormwater catchbasins that need to be addressed. These items are placed in the 1-5 year CIP. Much of the collection system's manholes, 72 percent as shown in Figure 2, have a low to negligible risk rating and are indicative of manholes in relatively good condition.

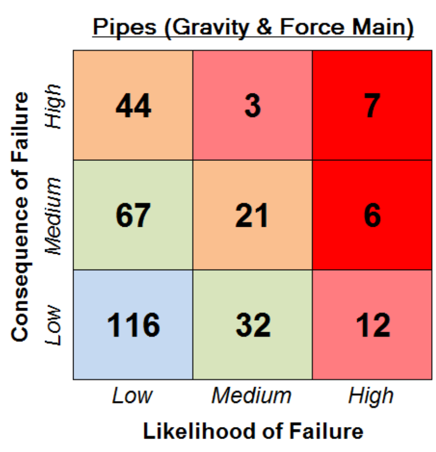


Figure 1. Business Risk Matrix (Risk Rating) by Number of Gravity Pipes

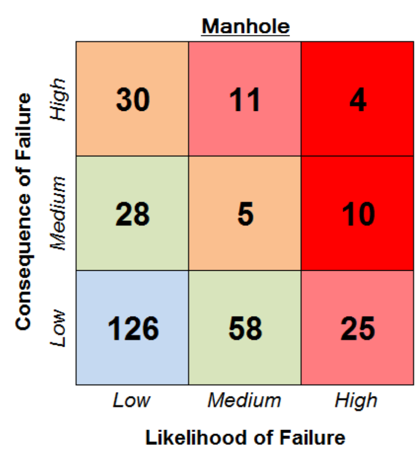


Figure 2. Business Risk Matrix (Risk Rating) by Number of Manholes

Figure 3 provides the risk ratings for the lift station assets. One asset is identified as an extreme risk which is the control panel at the main lift station. Most of the assets that are High risk are pumps in the other lift stations, primarily due to age.

Consequence of Failure		Probability of Failure: Low	Medium	High
	High	1 *(High)*	0 *(High)*	1 *(Extreme)*
	Medium	14 *(Low)*	6 *(Med)*	14 *(High)*
	Low	4 *(Low)*	19 *(Low)*	30 *(Med)*

Figure 3. Business Risk Matrix (Risk Rating) by Number of Lift Station Assets

Figure 4 provides the risk ratings for the WWTP assets. 10 assets are identified as an extreme risk. There are 10 assets of different varieties that fall into the extreme risk category. Refer to the WWTP AMP for specific assets.

Consequence of Failure		Probability of Failure: Low	Medium	High
	High	3 *(High)*	4 *(High)*	10 *(Extreme)*
	Medium	17 *(Low)*	26 *(Med)*	55 *(High)*
	Low	12 *(Low)*	13 *(Low)*	66 *(Med)*

Figure 4. Business Risk Matrix (Risk Rating) by Number of WWTP Assets

CAPITAL IMPROVEMENT PLAN

A Capital Improvement Plan (CIP) with rehabilitation recommendations was prepared for the City's wastewater utility assets based on the Business Risk evaluation. The CIP recommendations are provided for the collection system, pumping stations and force mains. From the BRE, a short-term (1-5 year) and long-term (6-20 year) CIP's were developed for the utility.

This AMP included a detailed condition assessment of the collection system including televising of pipe, and field condition assessments of all accessible sanitary manholes and lift stations.

Based on the AMP condition assessment of the sanitary sewer system, the City has identified assets of the collection system and lift stations for improvement. These improvements can be completed with funding from Federal and State Grants.

(1-5 Year) Capital Improvements include:

- Make repairs to structures and pipes that are the highest likelihood of failure. These are listed in more detail in the Wastewater Collection System AMP.
- Install new sanitary main in areas of cross connections with stormwater catchbasins.
- Make improvements at the WWTP as identified in the WWTP AMP.
- Replace Lift Station Assets with a high-risk rating as identified in the Lift Station AMP.

(6-20 Year) Capital Improvements include:

- Continue to repair structures and pipe defects that correlate to scheduled road work.
- Repair or replace lift stations per the AMP as components reach their useful life.
- Repair or replace WWTP assets per the AMP as components reach their useful life.

Operations, Maintenance and Replacement

Regular operation, maintenance and replacement (OM&R) is essential in the management of a wastewater collection system. The collection system is subject to a variety of operational problems and can suffer from clogging, scour, corrosion, and collapse. Inspection, cleaning, and rehabilitation are important for optimizing the function of the collection system. By optimizing the performance infiltration/inflow are reduced and sanitary sewer overflows (SSO) are minimized or eliminated preserving the substantial investment the community has in its collection system.

An annual lift station equipment replacement fund should be developed to replace disposable equipment. These are items that can be financially accounted for through operation, maintenance and replacement (OM&R) funds and can be replaced by outside contractors. Existing disposable materials include, wear parts in pumps and motors, etc. The existing OM&R fund is sufficient for the current equipment and operations.

Revenue Structure

The revenue and rate methodology is an instrument to determine user rates and charges that will provide sufficient revenues to pay for utility operating costs.

The existing rates were determined to create sufficient funds to fulfill the day-to-day maintenance and operations of the entire sanitary collection system.

The MDEQ approved the City’s rate methodology on November 30, 2018.

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date: November 30, 2108
(no later than 3 years from executed grant date)

City of Croswell *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. **1664-01** have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e (3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: No

   If No - Date of the rate methodology approval letter: 11-30-18

2) Significant Progress Made: Yes or No

   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)

3) Date of rate methodology review letter identifying the gap: ______________________.

4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ____________________________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

City of Croswell	810 679-2299	Smoore@croswellus
Name	Phone Number	Email

Signature of Authorized Representative (Original Signature Required) — Date: 11-28-2018

Samuel Moore City Admin

Print Name and Title of Authorized Representative

Protecting our Infrastructure Investment

ASSET MANAGEMENT PLAN

Stormwater Executive Summary Report

Prepared for:

City of Croswell

SAW Project No. 1664-01

November 2018

FLEIS&VANDENBRINK
DESIGN. BUILD. OPERATE.

EXECUTIVE SUMMARY

OVERVIEW

Public Act 562 of 2012 authorized money for the Stormwater, Asset Management, and Wastewater (SAW) Grant Program. In November of 2015, the City of Croswell received a (SAW) Grant from the Michigan Department of Environmental Quality (MDEQ), project no.1664-01, to provide financial assistance for the development of this asset management plan (AMP). This report provides the Asset Management Plan (AMP) for the City's Stormwater collection system. Working with City staff, Fleis & VandenBrink (F&V) provided technical assistance for asset identification, condition assessment, and capital improvement planning of the Stormwater collection system.

The SAW Grant Amount awarded to the City of Croswell was $237,766.00
The Local Match provided by the City of Croswell was $26,419.00

This AMP is intended to be a living document that is updated as assets continue to wear and age, and as additional inspection/condition results are found and incorporated into the plan.

Questions regarding the Asset Management Plan should be directed to:
Sam Moore
City Administrator
City of Croswell
100 North Howard Avenue
Croswell, MI 48422
(810) 679-2299
Email: smoore@croswell.us

ASSET INVENTORY AND CONDITION ASSESSMENT

The Stormwater collection system assets consist of approximately 38,759 feet (7.3 miles) of storm sewers and 395 stormwater structures and 35 outlet structures connecting the gravity pipe. These assets are located in existing street rights-of-way or in easements dedicated for the assets use and maintenance.

Asset Identification and Location

A comprehensive Stormwater system asset inventory was developed from available record drawings, field notes, staff knowledge, and site visits, supplemented with field survey work. Asset material, size and age were identified through the review of available historical record documents.

Spatial orientation (pipe location), pipe depth and invert elevations were determined with GPS field equipment. This information was organized into a new PDF/GIS database and piping network for archiving, mapping and further evaluation purpose.

Condition Assessment and Expected Useful Life

For the City of Croswell, a comprehensive evaluation of the collection system structures were performed. NASSCO-MACP Level 1 manhole field-based assessments were completed on 395 structures.

Based on discussions with the DPW staff, there have been limited capacity issues with the City-owned Stormwater system.

Recommendations for short-term (1-5 year) and long-term (6-20 year) system maintenance and improvements have been identified and can be found in the Stormwater AMP Report.

LEVEL OF SERVICE

Defining the Expected Level of Service (LOS)

The LOS for the City Stormwater system is stated as follows:

STORMWATER- LEVEL OF SERVICE STATEMENT

To provide appropriate Stormwater collection, diversion, and conveyance at a minimum cost, consistent with applicable environmental regulations. To achieve this the following Level of Service (LOS) goals are proposed for the City of Croswell:

- Provide adequate Stormwater collection system and conveyance capacity for all service areas.
- Actively maintain Stormwater collection and conveyance system assets in reliable working conditions.
- Provide rapid and effective emergency response services to customers.
- Maintenance and operations staff are to be properly trained.

MEASURING PERFORMANCE

Performance measurements are specific metrics designed to assess whether Level of Service objectives are being met. Evaluations of goals should be completed at least annually to determine if the provided resources are being used appropriately. Level of Service requirements can be updated to account for changes due to growth, regulatory requirements, and technology.

CRITICAL ASSETS

DETERMINING CRITICALITY

Business Risk is the determination of criticality of each asset in the Stormwater system. Criticality is based on two factors: 1) Likelihood (Probability) of Failure and 2) Consequence of Failure. Defining an asset's Business Risk allows for management of risk and aids in decision making for where to allocate operation and maintenance and capital improvement funds.

Likelihood of Failure (LoF) is a measure of how likely an asset is to fail. The following categories have been developed to quantify how likely an asset is to fail:

- Condition of the asset
- Remaining useful life (Age)
- Service History
- Operational status

Consequence of Failure (CoF) is a measure of the social, economic, or environmental impact of failure of an asset and the utilities ability to convey and treat Stormwater. CoF categories of the Stormwater collection system include:

- Location of asset.
- Facilities served by asset.
- Size

ASSESSING CRITICALITY

Using the strategy outlined above, a Business Risk Evaluation (BRE) was performed for each asset of the City of Croswell using a storm sewer asset management and capital planning template that will compile, analyze and assess Business Risk for each asset and develop a Capital Improvement Plan.

The Business Risk score, also known as Criticality, is calculated for each asset using the following equation.

Business Risk = Consequence of Failure Score X Likelihood of Failure Score

Figure 1 provides the risk rating for storm sewer pipes by number of pipe segments. 27 VCP pipe segments in the Stormwater collection system have an extreme risk rating. 18 VCP Pipe segments in the Stormwater collection system have high risk ratings. 39 CMP pipe segments need to be monitored for future deterioration.

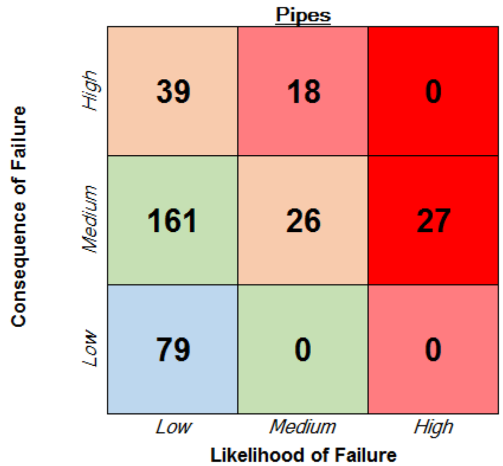


Figure 1: Business Risk Matrix (Risk Rating) by Number of Pipes

Figure 2 provides the risk rating for the storm sewer structures. Six structures are identified as "Extreme Risk", these being a mix of casting replacements and mortaring chimneys. More than 88% of the structures are in the low or negligible risk and are indicative of a system in good condition.

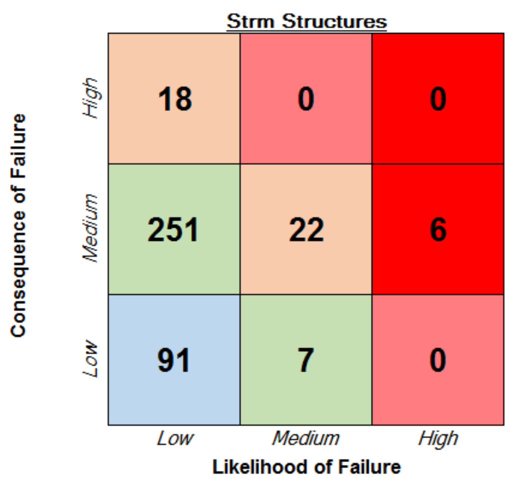


Figure 2: Business Risk Matrix (Risk Rating) by Number of Structures

A spreadsheet providing asset criticality for each utility asset has been included in the AMP detailed report for the Stormwater collection system.

Capital Improvement Plan

A Capital Improvement Plan with recommendations was prepared for the City's assets based on the Business Risk evaluation. Data-driven information from the business risk assessment and condition assessment was used to identify and prioritize the capital improvement projects. The information was also used to schedule inspections to evaluate the condition of high business risk assets. A short-term (1-5 year) and long-term (6-20 year) Capital Improvement Plan (CIP) was prepared to address the projected needs for each asset in the system.

1-5 year Capital Improvements include:

- Rehabilitate structures and pipes in the high or extreme risk categories.

6-20 year Capital Improvements include:

- Rehabilitate sections of storm sewer that are found to be an extreme risk of the system and have been identified in the AMP.
- Continue to monitor known high risk and extreme risk assets and incorporate rehabilitation or replacement into future street projects as funding allows.
- Continue catch basin and manhole rehabilitation throughout the collection system as identified in the AMP.

CIP Development

The City of Croswell identifies assets of $10,000 or more to be capital expenditures. Collection system assets were grouped by strategy and assigned costs from a unit database. This database includes unit construction values in 2018 construction dollars based on a survey of recent projects in Michigan and includes engineering and administrative rates where applicable. Assets were categorized and prioritized by year based on risk rating and criticality score to develop the CIP.

The CIP was developed by assigning each project to a CIP year (1-5) based on several factors. In addition to Risk Rating, other factors used to assign CIP year include:

- Asset rehabilitation grouping (i.e. the type of repair/construction recommended)
- Coordination with other planned projects to achieve economies of scale or limiting disruption (an example is a street reconstruction project where identified utility recommendations can be included)

The City will be considering funding options to make the needed improvements that have been identified as an "Extreme Risk" in the 1-5 year CIP. The City will preplan storm drain improvements and incorporate those improvements into street projects instead of cutting into streets and patching them.

Operations and Maintenance

A preventative maintenance program to systematically clean and CCTV inspect pipelines to NASSCO-certified standards is critical for a sound Stormwater system. The process of cleaning and CCTV inspection of pipelines, either with equipment owned by the community or contracted, is a relatively inexpensive maintenance effort when compared to rehabilitation efforts. For this reason, it is recommended that at a minimum, all pipelines be cleaned and televised every 7-10 years. Available budget will dictate the frequency or size of yearly projects.

Revenue Structure

The revenue for storm sewer maintenance currently comes from the City's Major and Local Street Funds or the City's General Fund.

DEQ

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Date: November 30, 2018
(no later than 3 years from executed grant date)

The City of Croswell certifies that all stormwater asset management plan (SWAMP) activities specified in SAW Grant No. **1664-01** have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SW AMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

City of Croswell — 810 679-2299 — Smoore@croswell.us
Name — Phone Number — Email

[signature] — 11-28-2018
Signature of Authorized Representative (Original Signature Required) — Date

Samuel Moore City Admin
Print Name and Title of Authorized Representative

106 W. Allegan St. Suite 500
Lansing, MI 48933
O: 517.371.1200
www.c2ae.com

CITY OF DEWITT WASTEWATER ASSET MANAGEMENT PLAN
EXECUTIVE SUMMARY

City of DeWitt
414 East Main Street
DeWitt, MI 48820
Dan Coss, City Manager, (517) 669-2441
SAW GRANT PROJECT NUMBER 1521-01

Executive Summary
The SAW agreement with the State of Michigan was signed On December 4, 2015 which began the overall SAW program.

The Grant agreement included the following funding amounts:

- Total Cost = $537,832
    - Grant Value = $419,693
    - Local Match = $118,139

- The City of DeWitt is located in the southern portion of Clinton County in south central Michigan, approximately one mile north of I-69. The City contracts with the Southern Clinton County Municipal Utilities Authority (SCCMUA) for its Wastewater Treatment Plant. The treatment plant discharges to Looking Glass River. DeWitt's sanitary collection system has approximately 114,312 feet of sanitary sewer, 4,084 feet of force main, approximately 450 sanitary manholes, and 4 lift stations that provides sewer services to the City.

Wastewater Asset Inventory
This item which initiated the work included:

- Identifying and locating all assets.
    - A list of all assets to be monitored was obtained using a combination of historical system records, field data collection.
    - The GPS coordinates of the field assets were gathered.
    - An ESRI ArcGIS data set was completed to index the locations and attributes of assets.
    - Physical inspections were conducted for each asset.
        - Manholes – Field inventories and conditional assessments were completed in accordance with NASSCO MACP standards by NASSCO Certified personnel.
        - Sewers - Survey was completed by CCTV review in accordance with NASSCO PACP standards by NASSCO Certified personnel.
        - Pump Stations – Field inventories were completed for each pump station recording and evaluating condition for the sub-parts of the lift station within the Pump Station Database. The sub-parts contained, but were not limited to, pumps, VFDs, wet well, electrical, and process piping.
    - The asset information was included in the Asset Management Spreadsheet (AMS).
    - The AMS is used to quantify and sort the system asset information.

Condition Assessment

The City of DeWitt's sanitary collection system is in good condition overall, mostly due to the system assessments and maintenance done in cooperation with SCCMUA over time.

- Structure assessment and inventories were graded in the field on a 1 to 5 scale (5 being the worst condition) for the various key components of the structure (casting, chimney, cone, wall, flow channel)
- Sewer pipe assessment and inventories followed NASSCO PACP guidelines.
- Asset age and material data was collected using historical project drawings.
- Sanitary Pump Stations were visually inspected and conditionally graded for the major components (superstructure, pump room and pumps, wet well, valve vault, control building, instrumentation, electrical service and controls, and lighting); data was compiled in an Access Database.
- The results of the assessment yielded the following percentages:
    - 48% of pipes are 1's
    - 10% of pipes are 2's
    - 17% of pipes are 3's
    - 10% of pipes are 4's
    - 14% of pipes are 5's
    - 4% of manholes are 1's
    - 93% of manholes are 2's
    - 2% of manholes are 3's
    - 0% of manholes are 4's
    - 0% of manholes are 5's

Criticality of Assets

- The Asset Management Spreadsheet (AMS) was used to organize the asset classes. Several parameters were used to determine asset Consequence of Failure (CoF) and Probability of Failure (PoF), rating each on a 1 to 5 scale (5 being the worst). These factors included:
    - Redundancy: Does the unit or asset have system backup?
    - Criticality of the asset to the system and what level of impact to the system occurs in the event that the asset fails.
    - Location and surrounding service area(s) of each asset were also incorporated in determining the criticality. Assets that service a larger portion of the system typically had higher levels of CoF.
    - Probability of Failure for each asset was based on its current physical and functional condition. Factors varied depending on the asset being evaluated as noted in the Conditional Assessment section of this summary.
    - The Consequence of Failure and Probability of Failure together result in a parameter identified as Business Risk.
- The AMS was used to prioritize the Criticality, which ranged from 1-25 (25 having the highest priority) and determine the need for short term repair or maintenance, short term replacement, or long term maintenance. These ratings were utilized with other factors to create a Capital Improvement Plan.

Level of Service Determination

- A SAW Team was created to discuss the wastewater system direction.
- The SAW Team met and discussed a mission statement and desired Level of Service statement, which was then converted to a succinct list of items to follow for the future.
- The SAW Team will meet once a year to assess the system's service record and recommend improvements to the Level of Service Statement, if needed.

Revenue Structure

- The user charge report and the AMS are identified as the Rate Methodology and have been submitted previously to MDEQ and approved.
- No rate increase was required per the grant agreement.
- The Rate Methodology was updated to forecast future budgeting needs. The current budget information is included.

Capital Improvement Plan

- The AMS identifies capital improvement projects for the future.
- The long term projects may be achieved through a combination of grants or future rate adjustments to support project funding.
- An estimate of project year and financial cost is generated for each capital improvement project.
- A List of recommended projects to be completed within the next five (5) years is as follows:
  - *Sanitary Structure repairs with a Business Risk greater than 16 or Probability of Failure of 4 or Wall grade below "D" to be lined or replaced (MH Project #1) – One structure in the sanitary sewer system is identified with Level 4 wall conditions due to hydrogen gas attack and should be lined or replaced at a cost of approximately $10,600 in today's dollars and $11,500 in three years with a 3% inflation rate.*
  - *Sanitary Structure with a Flow Channel grade "D" or 4 to be rehabilitated (MH Project #2) – two (2) structures were recommended to have their flow channels reconstructed at a total project cost of $700 in today's dollars and $765 in year 3 with a 3% inflation rate.*
  - *Sanitary Structure repairs with a Business Risk greater than 16 or Probability of Failure of 4 or Wall, Cone, Chimney grade below "D" to be replaced (MH Project #3) – one (1) structure was selected to have the Cone and Chimney replaced totaling $4,500 in today's dollars and $4,900 in year 3 with a 3% inflation rate.*
  - *Sanitary System Sewer Repairs with a Business Risk of 16+ or likely sewer collapse (Sewer Project # 1) – sixteen sanitary pipe reaches have defects that could result in a sewer collapse or disruption of service. These sanitary sewer rehabilitation methods include spot lining and total length lining to eliminate the noted defects. The total project cost for these sewer repairs is $64,000 in today's dollars and $70,000 in year 3 with a 3% inflation rate.*
  - *No Sanitary Collection System Pump Station repairs will be required during this timeframe beyond normal maintenance.*
- Additional projects recommended in the next 6 to 10 years and 11 to 20 years are included in the Capital Improvement Plan.

List of Major Assets

- 114,312 feet of sanitary sewer
- 4,084 feet of force main
- 450 sanitary manholes
- 4 lift stations

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date: November 28, 2018 (End date established by MDEQ in May 16, 2018 letter to be November 30, 2018)
(no later than 3 years from executed grant date)

Mr. Daniel Coss, City Manager DeWitt certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1521-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: ~~Yes or~~ No

   If No - Date of the rate methodology approval letter: June 27, 2018.

2) Significant Progress Made: N/A

   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)

3) Date of rate methodology review letter identifying the gap: N/A

4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on N/A.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:
Mr. Daniel Coss at (517) 669-2441 and email dcoss@dewittmi.org

D Coss — November 28, 2018

Signature of Authorized Representative (Original Signature Required) — Date

Daniel Coss, City Manager

106 W. Allegan St. Suite 500
Lansing, MI 48933
O: 517.371.1200
www.c2ae.com

CITY OF DEWITT STORMWATER ASSET MANAGEMENT PLAN
EXECUTIVE SUMMARY

City of DeWitt
414 East Main Street
DeWitt, MI 48820
Dan Coss, City Manager, (517) 669-2441
SAW GRANT PROJECT NUMBER 1521-01

Executive Summary

The SAW agreement with the State of Michigan was signed On December 4, 2015 which began the overall SAW program.

The Grant agreement included the following funding amounts:

- Total Cost = $1,002,317
  - Grant Value = $902,085
  - Local Match = $100,232

The City of DeWitt is located in the southern portion of Clinton County in south central Michigan, approximately one mile north of I-69. DeWitt's storm sewer collection system has approximately 81,347 feet of storm sewer and approximately 1,028 storm manholes, catch basins and outfalls.

Stormwater Asset Inventory

This item which initiated the work included:

- Identifying and locating all assets.
  - A list of all assets to be monitored was obtained using a combination of historical system records, field data collection.
  - The GPS coordinates of the field assets were gathered.
  - An ESRI ArcGIS data set was completed to index the locations and attributes of assets.
  - Physical inspections were conducted for each asset.
    - Manholes – Field inventories and conditional assessments were completed in accordance with NASSCO MACP standards by NASSCO Certified personnel.
    - Sewers - Survey was completed by CCTV review in accordance with NASSCO PACP standards by NASSCO Certified personnel.
  - The asset information was included in the Asset Management Spreadsheet (AMS).
  - The AMS is used to quantify and sort the system asset information.

Condition Assessment

Overall, the system was in serviceable condition. A number of reaches were found to be laid at very flat grades and in some casing using very small diameter pipe. The stormwater system outfalls to the Looking Glass River were found to be in poor condition and stifled the final flow of the system due to over vegetation, and bank erosion causing too much wandering of the channel. During the course of this study, a separate river cleaning and clearing project was completed, improving the area outflow significantly.

- Structures assessment and inventories follow NASSCO MACP guidelines.
- Sewer pipe assessment and inventories follow NASSCO PACP guidelines.
- Asset age and material data was collected using historical project drawings.
- The results of the assessment yielded the following:
  - 78% of pipes are 1's
  - 10% of pipes are 2's
  - 4% of pipes are 3's
  - 4% of pipes are 4's
  - 4% of pipes are 5's
  - 20% of structures are 1's
  - 77% of structures are 2's
  - 3% of structures are 3's
  - 0% of structures are 4's
  - 0% of structures are 5's

Criticality of Assets

- The Asset Management Spreadsheet (AMS) was used to organize the asset classes. Several parameters were used to determine asset Consequence of Failure (CoF) and Probability of Failure (PoF), rating each on a 1 to 5 scale (5 being the worst). These factors included:
  - Redundancy: Does the unit or asset have a backup?
  - Criticality of the asset to the system and what level of impact to the system occurs in the event that the asset fails.
  - Location and surrounding service area(s) of each asset were also incorporated in determining the criticality. Assets that service a larger portion of the system typically had higher levels of CoF.
  - Probability of Failure for each asset was based on its current physical and functional condition. Factors varied depending on the asset being evaluated as noted in the Conditional Assessment section of this summary.
  - The Consequence of Failure and Probability of Failure together result in a parameter identified as Business Risk.
- The AMS was used to prioritize the Criticality, which ranged from 1-25 (25 having the highest priority) and determine the need for short term repair or maintenance, short term replacement, or long term maintenance. These ratings were utilized with other factors to create a Capital Improvement Plan.

Level of Service Determination

- A SAW Team was created to discuss the storm system direction.
- The SAW Team met and discussed a mission statement and desired Level of Service statement, which was then converted to a succinct list of items to follow for the future.
- The SAW Team will meet once a year to assess the system's service record and recommend improvements to the Level of Service Statement, if needed.

Revenue Structure

- The City drainage system is operated and maintained using City street funds.
- The current funding consists of a combination of Act 51 state tax funds and a local millage.

Capital Improvement Plan and Recommendations

- The AMS identifies capital improvement projects for the future.
- The long term projects may be achieved through grants or future public borrowings.
- An estimate of project year and financial cost is generated from each capital improvement project.
- The following is the recommended project to be completed within the next five (5) years are as follow:
    - *Storm Structure repairs with a Business Risk greater than 16 or Probability of Failure of 4 or Wall, Cone, Chimney grade below "D" or 4 to be replaced (MH Project #4) – twenty-eight (28) structures have been identified in this category with a cost totaling $15,000 in today's dollars and $16,400 in year 3 with a 3% inflation rate.*
    - *Storm System Sewer Repairs with a Business Risk of 16+ or likely sewer collapses (Sewer Project # 2) - There are eleven (11) such segments. These Stormwater sewer rehabilitation methods include spot repair, spot lining, and total length lining to eliminate the noted defects. The total project cost for these sewer repairs is $29,300 in today's dollars and $32,000 in year 3 with a 3% inflation rate.*

  Projects recommended in the next 6 to 10 years and 11 to 20 years are included in the Capital Improvement Plan.

List of Major Assets

- 81,347 feet of storm sewer
- 1,028 storm structures

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Due Date: November 28, 2018 (End date established by MDEQ in May 16, 2018 letter to be November 30, 2018)
(no later than 3 years from executed grant date)

Mr. Daniel Coss, City Manager DeWitt certifies that all stormwater asset management plan (SWAMP) activities specified in SAW Grant No. 1521-01 have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SWAMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

Mr. Daniel Coss at (517) 669-2441 and email dcoss@dewittmi.org

D Coss November 28, 2018

Signature of Authorized Representative (Original Signature Required) Date

Daniel Coss, City Manager

Print Name and Title of Authorized Representative

Stormwater, Asset Management, and Wastewater (SAW)
Asset Management Plan Executive Summary Guidance
City of Dowagiac, Cass County, Michigan

Wastewater Sewer System

Date: November 23, 2018
To: Mr. David Worthington
Organization: Michigan Department of Environmental Quality
From: Wightman & Associates, Inc.
Re: City of Dowagiac, MI - Summary of Wastewater Asset Management Plan

Grantee Information:
City of Dowagiac, MI., Cass County, Michigan
241 S. Front St. 49047
Dowagiac, MI
ctyrakowski@dowagiac.org
Mr. Chad Tyrakowski
Ph: (269) 782-8200
SAW Project #: 1202-01

Executive Summary: *Summary of the project scope, and grant and match amount, if applicable. List the key components that make up an Asset Management Plan (AMP).*

An asset management program is a tool for community leaders and utility managers to proactively decide when to repair, replace or rehabilitate assets and how those improvements will be funded to maintain a perpetual level of service. The Key Components of the Asset Management Program (AMP) are:

1) Asset Inventory and Condition Assessment.
2) Level of Service.
3) Criticality of Assets.
4) Capital Improvement Plan.
5) Asset Management Financial Plan and Revenue Structure.

The program is organized into three components that answer the following questions:

Asset Management Program (AMP):

- What level of service will be provided?
- What improvements need to be made and when?
- What changes to operations need to be made?
- How will these improvements and changes be funded?
- How is the plan implemented?

Geographic Information System (GIS):

- What do we own, where is it, what is the condition and what is the remaining life?
- What are the most critical assets?
- Where was maintenance performed and what was done?
- Where are improvements needed?

System User Manual:

- How will the asset management program tools be used?
- How will the asset management program be maintained and updated?
- How will the asset management program provide a guide for planning decisions?

		Sanitary	Total
1)	Total Grant:	$1,500,000	$1,500,000
2)	Less: Match	$ 0	$ 0
3)	Net Grant:	$1,500,000	$1,500,000

Wastewater Asset Inventory: *Describe the system components included in the AMP. Discuss how they were located and identified, if applicable. Describe the platform used to develop and maintain the inventory of assets.*

The City of Dowagiac (City) operates a wastewater collection and treatment system consisting of approximately 33 miles of gravity sewer, 660 manholes, 3-1/2 miles of force main, 10 lift stations, 6 grinder stations that convey the wastewater from the collection system to the Dowagiac Wastewater Treatment Plant for treatment.

With a thorough knowledge of the basic layout of the collection system, a comprehensive inventory of all wastewater system assets was performed using as-built utility drawings and on-site Global Positioning System (GPS) field locations. Using the data collected, detailed maps of the wastewater collection system were prepared using Geographical Information System (GIS) software. The mapping was prepared using the state plane coordinate system, allowing the operator to obtain coordinates for and accurately locate system assets in the field utilizing handheld GPS equipment.

Table 1 contains a summary of the wastewater system assets identified.

Item	Quantity	Units
48-inch Sanitary Sewer	3,040	LF
42-inch Sanitary Sewer	4,421	LF
36-inch Sanitary Sewer	472	LF
30-inch Sanitary Sewer	3,026	LF
24-inch Sanitary Sewer	3,938	LF
20-inch Sanitary Sewer	925	LF
18-inch Sanitary Sewer	4,438	LF
15-inch Sanitary Sewer	9,823	LF
12-inch Sanitary Sewer	18,853	LF
10-inch Sanitary Sewer	25,706	LF
8-inch Sanitary Sewer	92,753	LF
6-inch Sanitary Sewer	5,906	LF
4 foot Diameter Sanitary Manhole	661	EA
Service Lead, Complete	2,073	EA
Lift Station – Less Than 500 gpm	10	EA

Grinder Pump Station	6	EA
10-inch Force Main	5,970	LF
8-inch Force Main	1,037	LF
6-inch Force Main	4,203	LF
4-inch Force Main	5,531	LF
2-inch Force Main	990	LF

Table 1 - Wastewater System Assets

Condition Assessment: *Discuss the condition assessment process, including what methods were used. Summarize the results of the assessment for each asset category. The percentage of good, fair, and poor for each category can be used, if preferred.*

After completing the comprehensive inventory of the utility system assets, conditional assessments of all asset components were performed. The condition assessment provides the critical information needed to assess the physical condition and functionality of the assets in the collection system and estimate their remaining service life. The gravity sanitary sewer piping was televised by City staff and Corby Energy Services (CES) utilizing closed circuit televising (CCTV) equipment to remotely view the interior of the pipe in place. The manholes were each visited by Wightman technicians where they could be located and a GPS location recorded. Manhole covers were opened and interior photographs taken and a visual assessment of the in-situ conditions performed of the various manhole components.

During the field inspections, any manhole, pipe, and/or equipment defects were noted and classified using a standard coding system based on the National Association of Sewer Service Companies (NASSCO) numerical grading system, which defines the severity of observed defects. Grades for both structural and operation and maintenance defects were assigned based on the severity of the immediate defect and the likelihood of further defect deterioration or asset failure. The numerical grading system uses numbers ranging from 1 (new asset, no or minor defects) to 5 (defect requiring immediate action).

Once field inspections were completed for each asset and individual defects were graded, an overall condition rating was applied to each asset, again using a numerical system ranging from 1 (very good condition) to 5 (very poor condition). Overall condition ratings for pipes were based on NASSCO Pipeline Assessment Certification Program methodology. Overall condition ratings for manholes were based on NASSCO Manhole Assessment Certification Program Level 1 inspection methodology. Overall condition ratings for lift stations were based on physical inspection of the major components and drawdown testing to determine the performance of the pumping equipment.

The numerical system uses numbers ranging from 1 to 5 as shown in Table 1 below.

Condition Rating	Condition Description	Defect/Deterioration Description
1	Very Good	New asset, no or minor defects
2	Good	Defects that have not begun to deteriorate
3	Fair	Moderate defects that will continue to deteriorate
4	Poor	Severe defects with significant deterioration
5	Very Poor	Defect requires immediate action

Both entities conducting CCTV inspections utilized the same process and any noted defects were graded according to the guidelines of the NASSCO Pipeline Assessment Certification Program (PACP) to provide a uniform evaluation. Once the individual defects were graded, an overall condition rating was applied to each pipe based on NASSCO PACP methodology. The manholes were rated by Wightman technicians using NASSCO Manhole Assessment Certification Program (MACP) Level 1 inspection methodology. Figure 2 and Figure 3 below show the condition ratings for the wastewater gravity main piping and wastewater manholes (respectively).

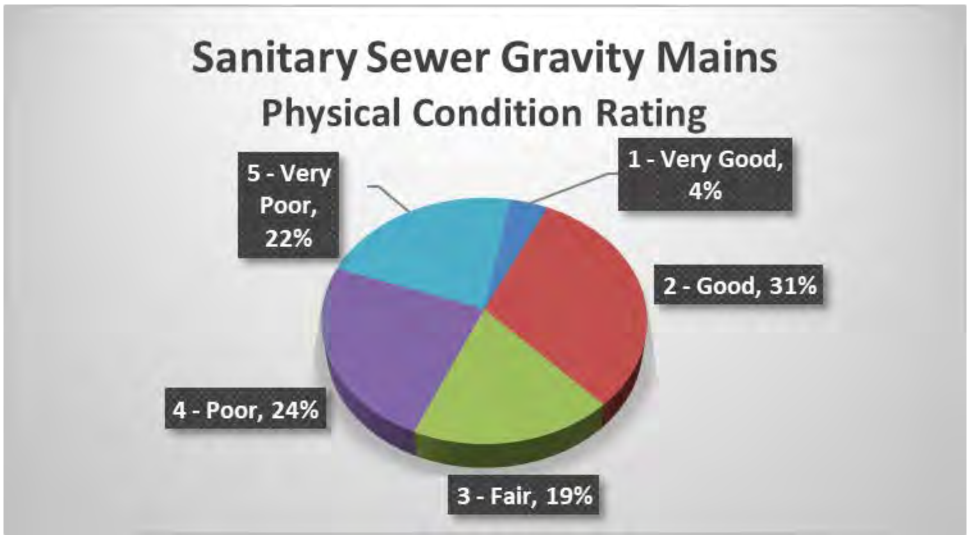


Figure 1 - Sanitary sewer gravity main physical condition rating

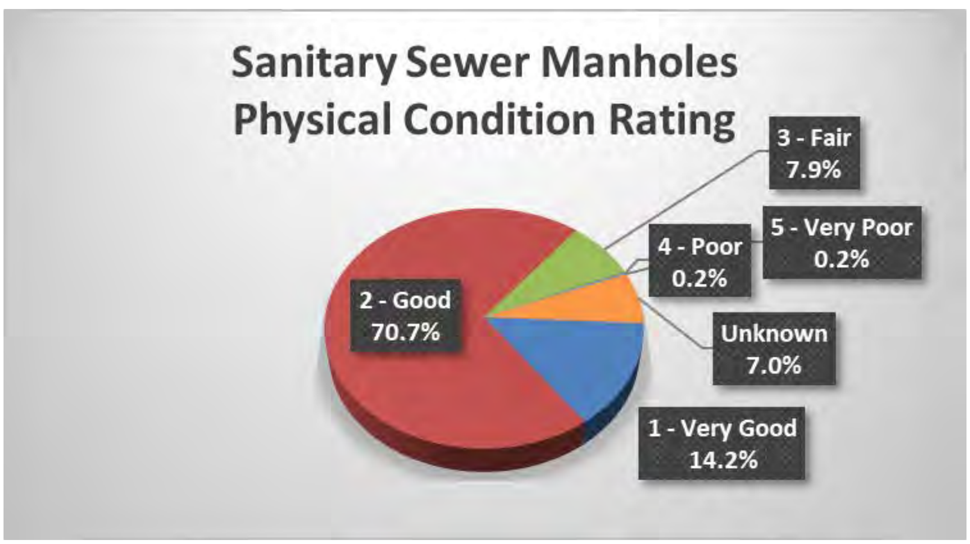


Figure 2 - Sanitary sewer manhole physical condition rating

In addition to the pipe and manhole assessments, the lift stations were inspected and assessed. The lift station inspections included physical and visual inspection of the major components and drawdown tests to determine the performance of the pumping equipment. Table 3 shows the condition of the individual components of the lift stations.

Station	Pump Design Capacity (gpm)	Pump 1 Test Rate (gpm)	Pump 2 Test Rate (gpm)	Design Head (ft)	Wet Well Condition	Pump Condition	Electrical & Controls Condition	Generator Condition
Chestnut Street	40	45.3	38.5	20.00	Good	Good	Good	N/A
Michigan Avenue	36	37.7	36.25	20.00	Very Good	Good	Good	N/A
Walnut Street	36	49.5	47.6	20.00	Good	Good	Good	N/A
Woodhouse Drive	180	217.1	194.9	27.30	Good	Very Good	Fair	N/A
M-51 South	115	122.9	130.4	25.90	Good	Good	Good	N/A
Pokagon Street	145	95.2	80.5	14.60	Good	Poor	Good	N/A
Wolf Street	120	140.9	140.0	29.00	Good	Good	Good	N/A
Green Street	200	273.4	246	18.80	Good	Good	Good	N/A
Indian Hills	100	152.6	162.4	32.00	Good	Good	Good	N/A
Pizza Hut	50	57.1	53.4	15.00	Poor	Very Good	Good	N/A
Florence Avenue	36	-	48.9	20.00	Good	Good	Very Good	N/A
Rudy Road	80	72.4	68.6	37.20	Good	Fair	Good	N/A
Vineyard Place	320	404.2	445.9	32.10	Good	Good	Good	N/A
Middle School	180	228.7	223.1	45.50	Good	Very Good	Good	N/A
Cass Avenue	36	46.3	44.8	20.00	Good	Good	Good	N/A
Premier Drive	80	86.3	72.5	24.70	Good	Good	Fair	N/A

Table 2 - Wastewater system lift station condition ratings

Level of Service Determination: *Discuss the level of service the municipality has determined that it wants to provide its customers based on the municipality's ability to provide the service and customer expectations. Discuss the procedures used to involve stakeholders in the AMP discussion. What are the trade-offs for the service to be provided? This may include any technical, managerial, health standard, safety, or financial restraints, as long as all regulatory requirements are met. Discuss how this was determined.*

The level of service defines the way in which the Owner desires the facility or utility to perform over the long term. The level of service should ensure that all regulatory requirements are met and should include any technical, managerial, health and safety, or financial components the Owner deems necessary to meet customer expectations. The level of service is a fundamental part in defining how the wastewater system will be operated and maintained in the future. As with all components of the AMP, defining the desired level of service will be an ongoing process.

The Asset Management Team developed the statements in Table 5 to define the desired level of service for the wastewater system:

Major Area	Goals and Objectives	Level of Service Statements
Clean Effluent Water	All federal and state water quality regulations will be complied with.	Provide customers a system that meets the federal and state requirements.
Health and Safety	Provide a safe and injury free work place. Protect the public health. Protect the environment.	Regular safety meetings – Weekly at a minimum.
Security	Secure all wastewater facilities from unauthorized access and intrusions.	All control panels and vaults will be padlocked at all times. WWTP will be fenced and gates will be secured when the plant is not staffed.
Operator Certification	Provisions for appropriately credentialed and experienced operators.	Contract operator shall maintain appropriately licensed operators and shall make provisions for back-up operators in all instances where primary operator is unable to fulfill required duties.
Administrative	Provide excellent customer service.	Produce accurate, timely billing.
Customer Complaints	Provide excellent customer service.	Respond to customer complaints within two working hours and communicate through close of issue.
Response Time	Provide excellent customer service.	Respond to emergency calls within two hours at all times and non-emergency calls within twenty-four hours during normal business hours.
Regulatory Changes	Be aware of regulatory changes and be in position to comply with changes as they occur.	Attend continuing education programs. Route applicable correspondence from the MDEQ to all affected staff.

Table 3 - Level of service statements

Major Area	Goals and Objectives	Level of Service Statements
Rules and Regulations	Monitor and enforce all wastewater ordinances.	Review wastewater ordinances periodically – Bi-annually at a minimum. Enforce provisions of wastewater ordinances.
Treatment Facility		Maintain all mechanical equipment in accordance with manufacturer's recommendations including replacing consumable equipment. Implement regular preventative maintenance program.
Collection System	Maintain the following in good operating condition and prevent overflows and system back-ups: Gravity sewers. Force mains.	Gravity sanitary sewers will be cleaned on a rotational basis such that a minimum of 15% of the system is cleaned annually resulting in the entire system being cleaned every seven years. Force mains shall be operated annually with both pumps in operation and supplemented with water from hydrant or truck to provide a vigorous flush of the force main where practical.
Lift Stations	Maintain all pumps and related equipment – focus on preventative maintenance to prevent unscheduled breakdown. Lift station valve maintenance.	Maintain all mechanical and electrical equipment as needed. Visually inspect all components of each lift station monthly. Clean the equipment and verify it functions. Clean lift station wet wells annually or more frequently as needed to remove grease and sediment. Exercise check valves and gate valves annually (at a minimum).
Financial	Maintain a financial plan to generate sufficient revenue to operate and maintain the wastewater system.	Confirm wastewater revenues are sufficient to meet wastewater budget annually. Review sewer rates every year.
Operating Reserves	Maintain sufficient reserves to cover anticipated major expense and potential unexpected breakdowns.	Maintain a minimum of six months' operating expenses in reserve accounts.

Table 5 - Level of service statements (cont.)

<u>**Criticality of Assets:**</u> *Provide a summary of the method used to assess the criticality of assets considering the likelihood and consequence of failure. Based on the condition of the assets, and the determined risk tolerance, how were the assets ranked? What assets were considered most critical?*

Criticality is determined by multiplying the likelihood of failure by the consequence of failure and is a significant factor in prioritizing capital improvements. In general, the higher the criticality of an asset, the more resources that should be allocated to maintain the asset, or the higher the priority that repairs to that asset should take.

However, criticality is only one tool that can be utilized to analyze and prioritize capital improvements and its use is subject to careful evaluation of the asset(s) in question and sound engineering judgement.

A. Likelihood of Failure

For assets that were physically inspected, including wastewater gravity sewers, sanitary manholes, and lift station components, the likelihood of failure was determined by the conditional rating of the asset with consideration given to the remaining asset life as shown below in Table 6. The methodology of examining the asset conditions and assigning conditional ratings to noted defects was discussed previously. For the remaining assets that were not physically inspected, the likelihood of failure was determined according to the remaining asset life with consideration given to the history of emergency repairs required on that asset. The likelihood of failure ratings were assigned in accordance with Table 6.

Likelihood of Failure Rating	Asset Condition/ Description	Remaining Useful Life
1	Very Good	More than 90%
2	Good	60 to 89.9%
3	Fair	30 to 59.9%
4	Poor	10 to 29.9%
5	Very Poor	Less than 10%

Table 4 – Likelihood of failure assessment methodology

It should be noted, however, that the condition descriptions are carried over in the GIS model as the likelihood of failure. In other words, if an asset's condition is rated as a "4" (Poor) or "5" (Very Poor), that same description carries over as the likelihood of failure indicating that the asset is in "Poor" or "Very Poor" condition rather than that the likelihood of failure is "Poor" or "Very Poor". The opposite applies as well, with assets whose condition is rated as a "1" (Very Good) or "2" (Good) showing a likelihood of failure of "Very Good" or "Good", again describing the condition of the asset rather than the likelihood that it will fail.

B. Consequence of Failure

To determine the consequence of failure, it is important to consider the significant costs of failure. These costs include not only the monetary cost of the repair, but could also include:

- Social costs associated with the failure of the asset.
- Repair/replacement costs related to collateral damage caused by the failure.
- Legal costs related to damage caused by the failure.
- Regulatory fines resulting from a Sanitary Sewage Overflow (SSO) related to the failure.
- Environmental costs (and possible environmental cleanup costs) created by the failure.
- Loss of business revenue to the community caused by the failure.
- Other miscellaneous costs associated with the asset failure.

The consequence of failure can be high if any one of these costs is significant or if the accumulation of several costs occurs due to a failure. In the case of the failure of a wastewater asset, the environmental, social, and legal costs can outweigh the costs of collateral damage and even the cost of repairing the failure itself. The consequence of failure was assessed using the criteria presented in Table 7.

Consequence of Failure Rating	Social, Human, and Environmental Effects[1]	Collateral Damage Effects
1 (Insignificant)	< 10% loss of service, limited potential for human contact with sewage, minimal property damage	Structure/pipe outside of road right-of-way (ROW), no impact to traffic or other structures
2 (Minor)	10% to 24% loss of service, potential for human contact with sewage, minimal property damage	Structure/pipe located under the pavement or curb of a residential or minor local road
3 (Moderate)	25% to 49% loss of service, potential for human contact with sewage, limited property damage, disruption to essential services/major industry	Structure/pipe located under the pavement or curb of a major collector roadway
4 (Major)	50% to 89% loss of service, likely human contact with sewage, moderate property damage, disruption to multiple industries/essential services	Structure/pipe located along state roadways, interstate highways, railroad ROW, or close enough to a building to cause collateral damage
5 (Catastrophic)	90+% loss of service, high potential of human contact with sewage, extensive property damage	Structure/pipe located under the pavement or curb of state roadways or interstate highways, under railroad tracks, or underneath a building

Table 5 - Consequence of failure rating scheme for wastewater assets

Utilizing the above ranking system, a thorough knowledge of the service area, and sound engineering judgement, a consequence of failure was assigned to each asset in the wastewater system. These consequence of failure values for each asset are included as an attribute for that asset in the GIS mapping database. The consequence of failure for the various asset classes in the wastewater collection system is shown in Figure 9 through Figure 10 below and on the following page.

[1] Loss of service for the wastewater system refers to the number of service connections impacted due to a single failure.

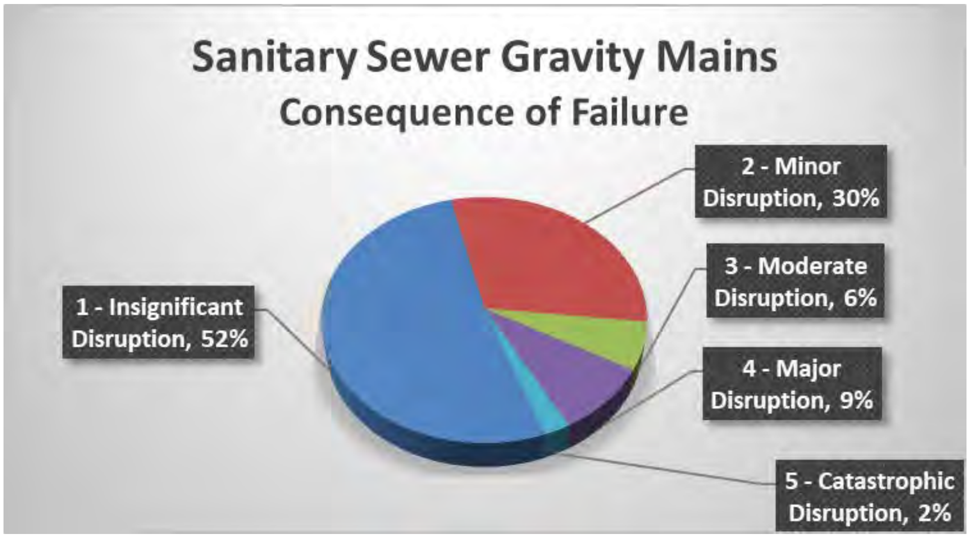


Figure 3 - Sanitary sewer gravity main consequence of failure rating

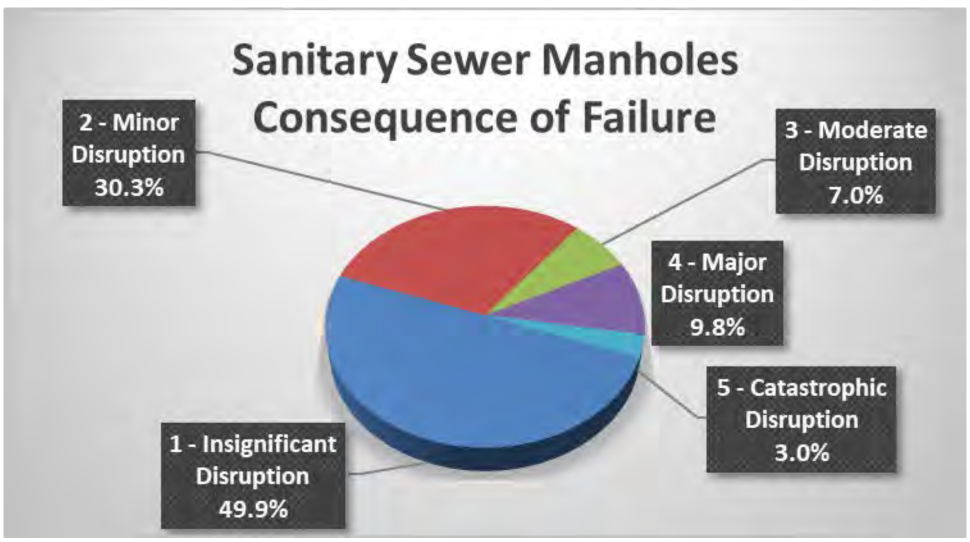


Figure 4 - Sanitary sewer manhole consequence of failure rating

C. Criticality Maps

As previously discussed, the criticality of each asset was calculated by multiplying the condition rating corresponding to the likelihood of failure of the asset by the consequence of failure rating of the asset. As such, the range of criticality numbers that can be assigned to an asset is 1 to 25 with the criticality of the asset increasing the higher the number assigned to it, as shown in Table 8. The resulting criticality of each asset is included as an attribute for that asset in the GIS mapping database. A map of the wastewater collection system showing asset criticality is included in the AMP in Appendix D.

Criticality Rating	Criticality Description
1 to 5	Very Low
6 to 10	Low
11 to 15	Moderate
16 to 20	High
21 to 25	Very High

Table 6 - Criticality rating descriptions

While the criticality ratings provide a point of reference to help in determining issues that may need to be addressed, it is only a tool. Sound engineering judgement still needs to be applied to determine if there is an issue with an asset that needs to be addressed by a capital improvement project. A low criticality number does not necessarily mean that there is not an issue that should be addressed by a capital improvement project. For example, if a segment of pipe has a hole in it with soil visible, it is graded as a Level 5 defect with a likelihood of failure of Very Poor. If this defect occurred on a segment of pipe with a Level 1 consequence of failure, it would result in a criticality rating of 5, Very Low. That does not mean, however, that this defect does not need to be addressed. It may just be a lower priority for being addressed than other defects with higher criticality ratings.

<u>Revenue Structure:</u> *Discuss how the rates, charges, or other means of revenue were reviewed to determine if there will be sufficient funds to cover system operation, maintenance, replacement, capital improvement projects, and debt costs, identified in the AMP. If the current rate structure was not sufficient, discuss what increases were needed to ensure the desired level of service is sustainable and if any changes were made.*

A primary goal of Asset Management is to develop a long-term plan for revenue support of capital improvements, as well as operating cost. An Asset Management Financial Plan (AMFP) was developed and is intended to help Dowagiac formulate policy in the areas of rate management, capital spending, and fund balance. *The AMFP is a living document. It is most effective as a tool used annually for budget and user rate decisions.*

<u>AMFP Methodology</u>

A significant effort has been made by Dowagiac to inventory assets, evaluate the infrastructure, and determine asset criticality. The result is the identification of asset investment cost by project and by year. The AMFP covers an extended forecast period to take this asset evaluation into account. The AMFP is a four-step process:

1) Historical comparison with audits and budgets.
2) Test year, or normalized budget year, along with inflation assumptions for purposes of forecasting.
3) Proof of rate to revenue for reliance on customer data.
4) Cash flow forecast including revenue, operating expense, capital spending, debt, and fund balance (i.e., actual cash and investment balance).

The analysis is “cash basis” approach as described in the AWWA Manual of Rate Making Practices. From year to year, this AMFP may be used to implement policy regarding rate management and budgeting.

Audit Comparison

One key indicator of financial health is found in the State of Net Positions. “Cash and Investments”. The City has a decreasing cash balance. The cash balance is declining over the past few years. Management of the cash balance will be discussed further under Cash Flow Forecast. The Sewer Fund audited Revenues, Expenses and Changes in Net Position comparison reveals consistency in annual revenues and in annual operating expenses when grant revenue and expenditures are removed.

Budget Comparison / Test Year

The majority of the current year budget has been adopted as the Test Year as it aligns with the Test Year development criteria (other than one-time expenditures). This has been utilized to develop the Test Year budget including expected percent inflation factors.

Proof of Rate to Revenue

The City bills its customers based on widely used and accepted methods. Customers are charged a ready-to-serve rate plus a commodity rate. Wholesale users are billed for their commodity usage using a formula based on agreements. The amount of customers billed a ready-to-serve rate and the commodity billed at the current rates tie out to the revenue reflected in the audit and budget, such that we can rely on the numbers in forecasting.

Forecast - Capital Cost

Annual cost has been forecasted based on an engineering evaluation of asset inventory, condition assessment, and criticality. The forecast reflects debt issuance to fund capital and also an increase in operating and maintenance costs. Given projected revenues and cash balance, as well as the dollar amount of anticipated capital spending, new debt issuance has been modeled. An inflation factor of 2% per year was used to forecast costs.

Model Forecast - Cash Balance

Our financial partners recommend that a standard minimum target of cash and investment to operating expenses of six months. It would not be advisable to bring the ongoing cash balance any lower than six months given the potential variation in the amount and timing of capital cost. Multiple rate increase are imperative to keep a positive cash and investment balance. A bonding scenario has been provided for policy making decisions, to fund the increase in annual operating costs and the increase in capital spending.

Model Forecast - Rate Management

The revenue support based on current rates, does not support immediate, operations, debt, and capital cost, cash balance. The cash flow forecast demonstrates a rate track with a moderate rate increase the first year. The second and third years will also require a slightly more moderate rate increases.

Management Summary

1) Rate Increases - Annual:
    a. 2019/20: 10%
    b. 2020/21-2012/22: 8.2%
    c. 2022/23-2027/28: 5.0%

2) Cash Balance: Build to a cash balances above six months of average, annual Operating Expenditure.

3) Capital Cost: Debt financing of the following:
    a. $5,437,000, 40 Year USDA Loan: 2019/20
    b. $5,979,000, 40 Year USDA Loan: 2027/28

Capital Improvement Plan: *Describe the long-term Capital Improvement Plan that was developed to address system needs identified in the AMP. Provide a list of the identified improvements/projects.*

A. Description

Capital improvement projects are projects that a utility has an extended period of time to plan for and are typically projects that cover high-cost, non-recurring expenditures. To ensure that the desired level of service can be maintained, a long-term plan for required capital improvements, known as a Capital Improvement Plan (CIP), is required as part of an AMP. The CIP helps to ensure that the long-term reliability needs of the utility are met. The CIP is based upon planning for those capital improvements determined to be required or likely to be required due to the likelihood of failure of the assets and their criticality. The planning period for a CIP is 20 years to allow for the development of a rate structure adequate to finance those projects that can reasonably be predicted to be needed during that period.

D. Recommended Wastewater System Projects

Table 9 lists the recommended capital improvement projects as well as cyclical improvement projects (i.e. equipment replacement) over the next 20 years for the wastewater collection system. Detailed descriptions and cost estimates for each project listed can be found in Appendix E. Where appropriate, the estimated project costs shown in Table 9 include engineering, construction observation, and contingency costs, thus representing the total estimated cost for the project. All costs shown in Table 9 are in current costs (no inflation) unless otherwise noted.

Priority	CIP Year	Project Name	Estimated Cost
1	2019	2019 DPS Identified Items	$489,000
2	2019	2019 Manhole Lining	$45,000
3	2019	2019 Pump Replacement	$6,000
4	2019	2019 WWTP Equipment	$1,000
5	2019	Add Emergency Shower to Hypochlorite Room	$3,000
6	2019	Chlorine Contact Tank Baffle	$1,000
7	2019	Division Street CIPP from Riverside to Colby	$83,000
8	2019	Front St between Merchant and Telegraph CIPP	$52,000
9	2019	Hendryx Spot Repair	$12,000
10	2019	Influent Slide Gate and Actuator	$32,000
11	2019	Install Low Level Float and Alarms	$23,000
12	2019	Redundant Ferrous Pump	$11,000
13	2019	Replace Hypochlorite Feed Pump	$5,000
14	2019	Replace North Bisulfite Feed Pump	$3,000
15	2019	Sludge Pump Building Structural Repairs	$36,000
16	2019	Spruce St Spot Repairs	$23,000
17	2019	USDA Plant Improvements and Headworks Facility	$1,420,000
18	2020	2020 Manhole Lining	$45,000
19	2020	2020 Mission Systems	$15,000
20	2020	2020 Pump Replacement	$6,000
21	2020	2020 WWTP Equipment	$13,000
22	2020	Aerobic Digester Stairs	$25,000
23	2020	Effluent Separator Box Slide Gate	$10,000
24	2020	Lab and Filter Building Structural Repairs	$23,000
25	2020	Lift Station Safety Grates	$40,000

26	2020	Post Aeration Flow Metering	$7,000
27	2020	Replace Alley Sewer at Beckwith Park	$138,000
28	2020	Replace Excavator	$190,000
29	2021	2021 Manhole Lining	$45,000
30	2021	2021 Mission Systems	$20,000
31	2021	2021 Pump Replacement	$6,000
32	2021	2021 WWTP Equipment	$48,000
33	2021	Division Street CIPP from Railroad to Riverside	$174,000
34	2021	Front St from Main to Commercial Rehab	$52,000
35	2021	New York Pennsylvania Alley Main to Commercial CIPP	$34,000
36	2022	2022 Manhole Lining	$45,000
37	2022	2022 Pump Replacement	$6,000
38	2022	2022 WWTP Equipment	$5,000
39	2022	Aeration Basin and Blower Building Structural Repairs	$74,000
40	2022	Lowe CIPP from High to Dowagiac Creek	$204,000
41	2023	2023 Manhole Lining	$45,000
42	2023	2023 Pump Replacement	$6,000
43	2023	Pizza Hut Lift Station Wet Well Lining	$10,000
44	2023	WWTP Repaving Project	$255,000
45	2024	2024 Manhole Lining	$45,000
46	2024	2024 Pump Replacement	$6,000
47	2024	Division Street Railroad Crossing Rehabilitation	$138,000
48	2024	Generators	$25,000
49	2024	Lift Station Site Lighting Upgrades	$42,000
50	2024	Sludge Processing Building Coating	$63,000
51	2024	Vactor	$240,000
52	2025	2025 Manhole Lining	$45,000
53	2025	2025 Pump Replacement	$6,000
54	2025	2025 WWTP Equipment	$143,000
55	2025	Keene Gray Bradley CIPP	$300,000
56	2025	Multi Use Trucks	$115,000
57	2026	2026 Manhole Lining	$45,000
58	2026	2026 Pump Replacement	$6,000
59	2026	2026 WWTP Equipment	$357,000
60	2026	Prairie Ronde Railroad Crossing Replacement	$124,000
61	2027	2027 Manhole Lining	$45,000
62	2027	2027 Pump Replacement	$6,000
63	2027	2027 WWTP Equipment	$30,000
64	2027	Grove CIPP	$61,000
65	2027	Halstead Railroad Crossing Rehabilitation	$199,000
66	2028	2028 Manhole Lining	$45,000
67	2028	2028 Pump Replacement	$6,000
68	2028	High Street Railroad Crossing	$189,000
69	2028	Hill and Riverside CIPP Spot Lining	$35,000
70	2028	Lift Station Control and Telemetry Upgrades	$274,000
71	2029	2029 Manhole Lining	$45,000
72	2029	2029 Pump Replacement	$6,000
73	2029	2029 WWTP Equipment	$1,000
74	2029	LaGrange CIPP from Railroad to Mill	$58,000
75	2029	Telegraph St CIPP	$181,000
76	2029	Telegraph Street Railroad Crossing CIPP	$110,000

77	2030	2030 Manhole Lining	$45,000
78	2030	2030 Pump Replacement	$6,000
79	2030	2030 WWTP Equipment	$364,000
80	2030	Chestnut Pennsylvania CIPP	$78,000
81	2030	Hendryx CIPP	$45,000
82	2031	2031 Manhole Lining	$45,000
83	2031	2031 Pump Replacement	$6,000
84	2031	2031 WWTP Equipment	$681,000
85	2032	2032 Manhole Lining	$45,000
86	2032	2032 Pump Replacement	$6,000
87	2032	2032 WWTP Equipment	$14,000
88	2032	Cass Avenue CIPP	$60,000
89	2032	Jefferson St between Cass and Paris CIPP	$162,000
90	2033	2033 Manhole Lining	$42,000
91	2033	2033 Pump Replacement	$6,000
92	2033	2033 WWTP Equipment	$97,000
93	2033	Pokagon St from Lowe St to Front St CIPP	$58,000
94	2034	2034 Manhole Lining	$60,000
95	2034	2034 Pump Replacement	$6,000
96	2035	2035 Manhole Lining	$60,000
97	2035	2035 Pump Replacement	$6,000
98	2036	2036 Manhole Lining	$45,000
99	2036	2036 Pump Replacement	$6,000
100	2036	2036 WWTP Equipment	$765,000
101	2037	2037 Pump Replacement	$6,000
102	2037	2037 WWTP Equipment	$482,000
103	2038	2038 Pump Replacement	$6,000
104	2038	2038 WWTP Equipment	$114,000
		Total Estimated Project Cost for 20 Year CIP (current dollars) =	$10,093,000
		Total Estimated Project Cost for 20 Year CIP (inflation adjusted[2] costs) =	$11,756,000

Table 7 - Recommended Wastewater System Capital Improvement Projects

[2] Twenty-year inflation adjusted calculations assumed a compounded annual inflation rate of 2% per year.

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date **November 30, 2018**
(no later than 3 years from executed grant date)

The City of Dowagiac, Michigan *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1202-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or **No**

   If No - Date of the rate methodology approval letter: 5/14/2018

2) Significant Progress Made: Yes or No

   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)

3) Date of rate methodology review letter identifying the gap: ______________.

4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ______________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Mr. Chad Tyrakowski	at	**(269) 782-8200**	ctyrawoski@dowagiac.org
Name		Phone Number	Email

11-29-18

Signature of Authorized Representative (Original Signature Required) Date

Mr. Kevin Anderson, City Manager
Print Name and Title of Authorized Representative

MEMORANDUM

SAW Grant Executive Summary

To:	City of East Jordan	Date:	November 29, 2018
From:	Glenna Wood, P.E. Mark Hurley, P.E.	Re:	SAW Grant Executive Summary

GRANTEE:	City of East Jordan
GRANT NUMBER:	1075-01
AUTHORIZED REPRESENTATIVE:	Tom Cannon, City Administrator
PLAN LOCATION:	City of East Jordan City Hall 201 Main Street P.O. Box 499 East Jordan, MI 49727
PHONE:	(231) 536-3381

1.0 INTRODUCTION

The City of East Jordan was the recipient of a Stormwater, Asset Management and Wastewater (SAW) grant from the Michigan Department of Environmental Quality. An asset management plan (AMP) for the City's sanitary sewer system was developed and is available for review by the public. The AMP was developed in accordance with the grant application and the requirements of the grant agreement. The following Scope of Work was proposed in the grant application:

1. Inventory of fixed assets
   - Compile and develop a map of the sewer collection system.
   - Field locate system components with GPS equipment for inclusion in a system GIS database.
   - Prepare a description of the asset, its required capacity, level of redundancy, and ID number.
   - Describe the location of the asset.
   - Identify the year the asset was installed and any other significant product information.
2. Condition assessment of fixed assets
   - Conduct an asset condition assessment (manhole inventory, cleaning and televising).
   - Describe present condition of the asset (e.g. excellent, good, fair, poor).
   - Estimate the depreciated value of the asset.
   - Estimate the current asset replacement cost.
   - Perform a Risk Evaluation that combines the probability of failure and criticality of the asset.

3. Level of Service

- Establishing a Level of Service guidance, including service agreement development, public meeting costs, and ordinance costs.

To complete this work, the City of East Jordan was awarded a grant totaling $73,764, with 10% ($8,196) local match to equal a total eligible grant cost of $81,960. As required by the grant agreement, this summary report has been prepared to meet the requirements of Section 603 of Public Act 84 of 2015 and includes the following information:

1. Contact Information
2. Review of the five major AMP components
3. List of major assets

2.0 MAJOR AMP COMPONENTS

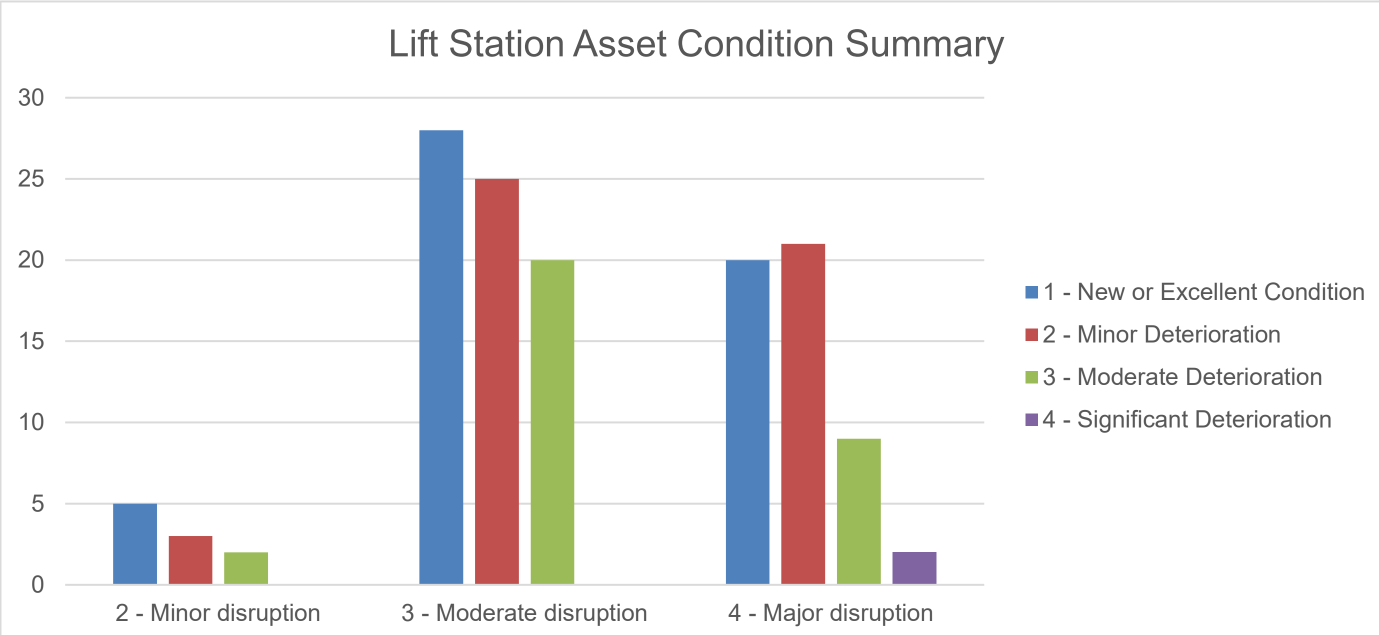
The City of East Jordan elected to utilize a spreadsheet-based AMP platform to record and track asset data. The AMP includes sanitary sewer system components utilized in the collection, treatment, and analysis of sanitary sewer flows and equipment utilized to maintain those systems. The five major components of the AMP, identified below, are summarized in the following subsections.

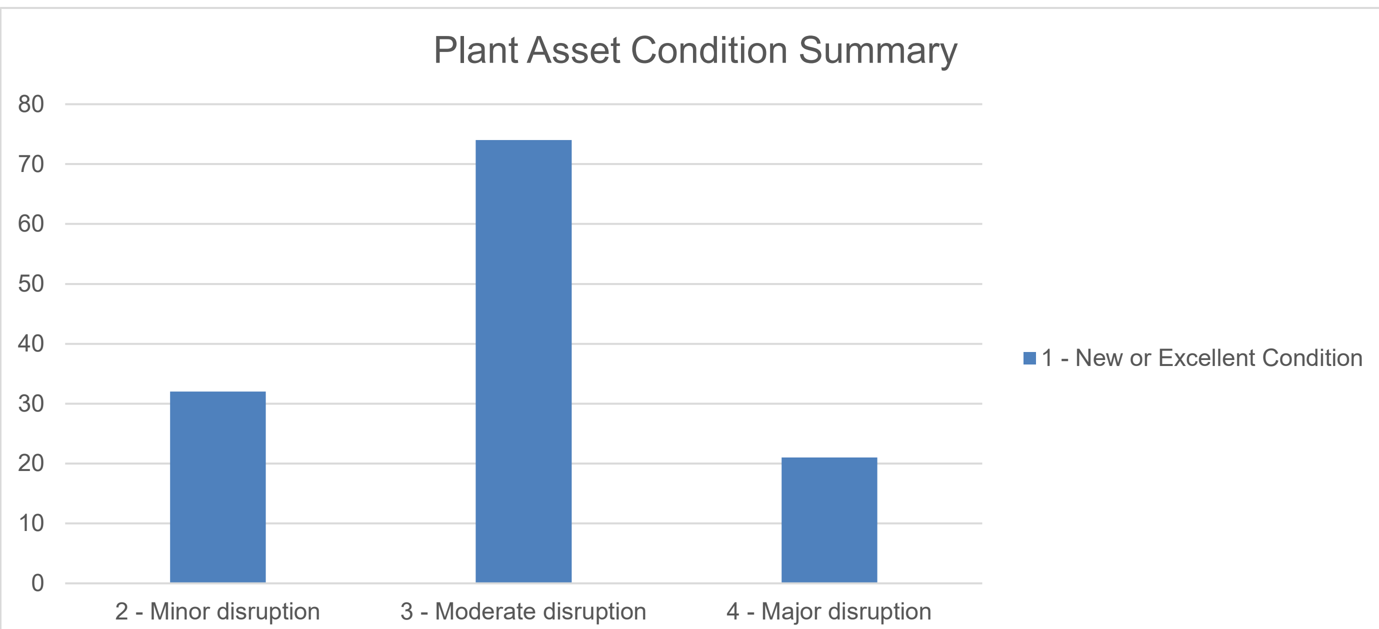
1. Asset Inventory and Condition Assessment
2. Level of Service
3. Criticality of Assets
4. Operation and Maintenance Strategies / Revenue Structure
5. Long-term Funding / Capital Improvement Plan

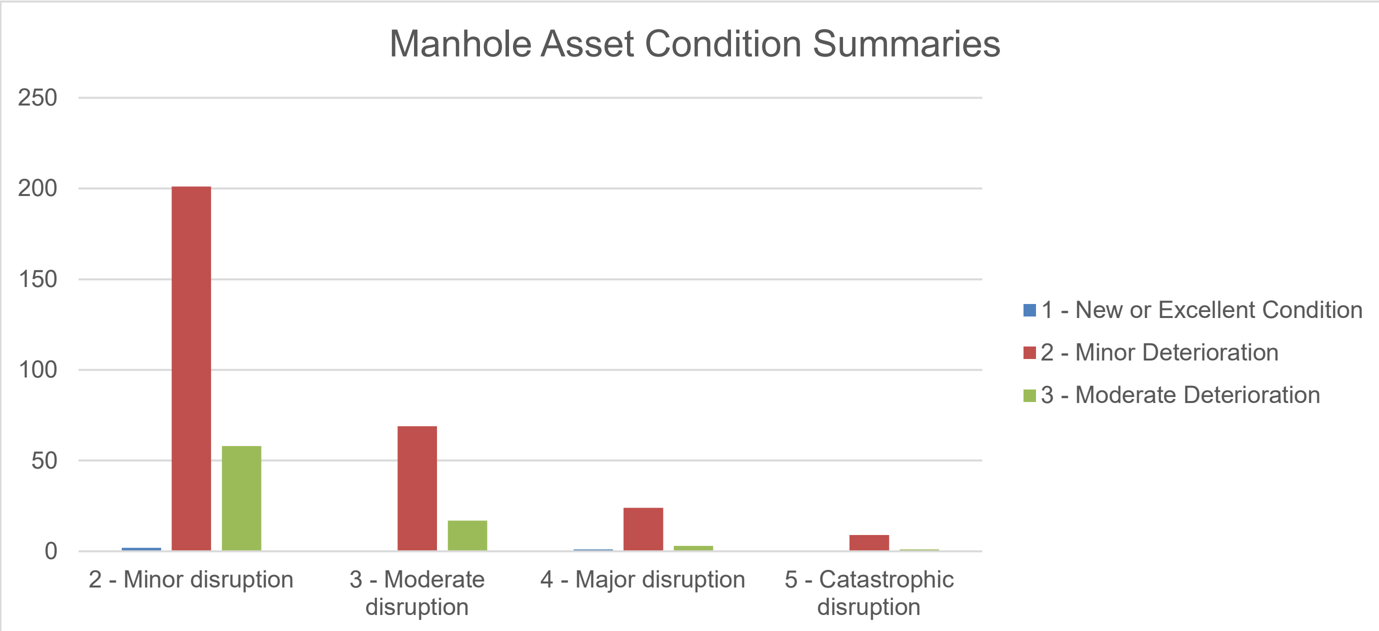
2.1 Asset Inventory and Condition Assessment

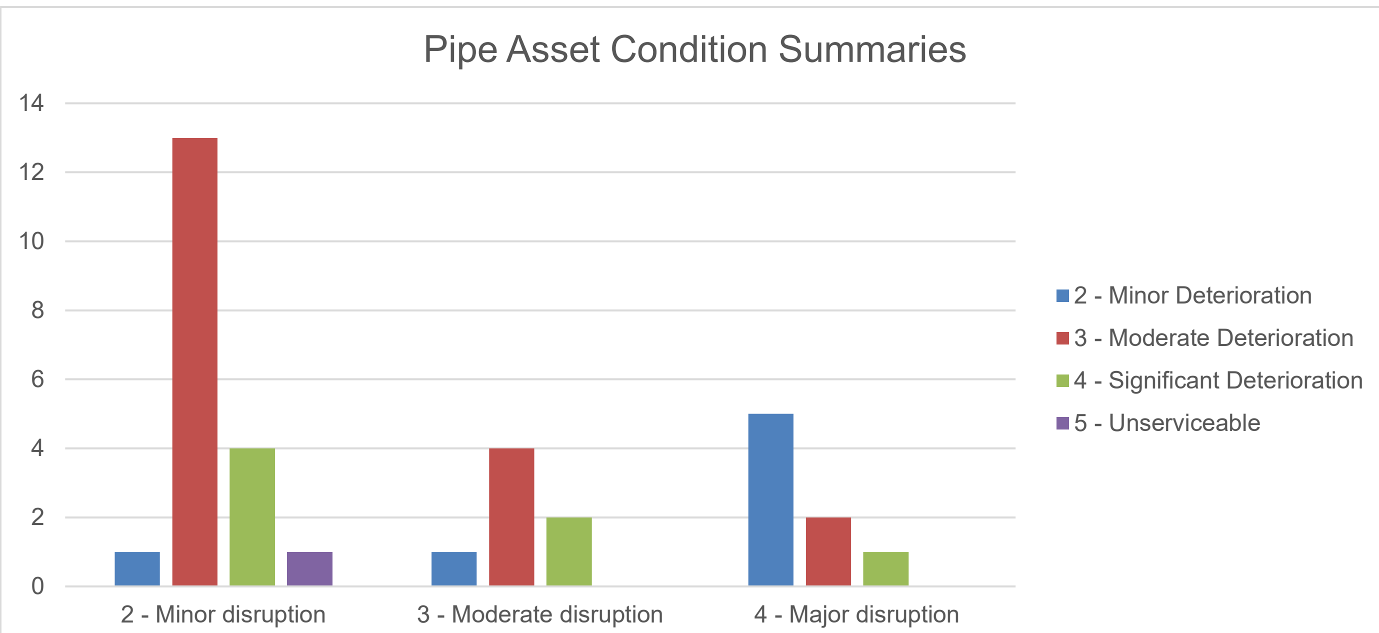
An asset inventory and condition assessments for the City of East Jordan sewer system was compiled by City and Gosling personnel. Collection and treatment assets were categorized as Lift Station; Plant; Manhole; or Pipe assets and populated into the AMP spreadsheet. Conditions were assigned on a 1 (very good) to 5 (very poor) rating scale based upon visual inspections and operational experience of the City personnel. Qualifying gravity sewer pipes were inspected using CCTV techniques in accordance with the National Association of Sewer Service Companies (NASSCO) pipe standard. Manholes inspections were completed in accordance with the NASSCO level 1 standard.

Condition and criticality for each asset category are summarized in the following charts.









2.2 Level of Service

The City of East Jordan established the Level of Service for the sewer utility. The Level of Service was presented to team members of the sewer utility during an October 24, 2018 meeting.

City of East Jordan

Level of Service Statement

October 24, 2018

The City of East Jordan owns and operates a wastewater collection and treatment system and has developed a "Level of Service Statement" to guide the long-term sustainability of this community asset. The goal of the City is to provide a Level of Service that:

1. Meets all minimum State and Federal regulatory requirements and operates in a manner that is protective of the environment and public health.
2. Has adequate staffing to conduct routine operations and maintenance, as well as respond to emergency situations.
3. Customer and system emergency response time within 60 minutes to 24 hours depending on type of emergency.
4. Has adequately trained staff with the proper certifications to keep the utility within regulatory compliance and conduct day to day operations safely.
5. Generates sufficient revenue to cover all costs, including operations and supplies, labor, training, and annual savings for future repair and replacement of equipment.
6. Generates sufficient revenue to fund periodic Capital Improvements to insure system assets have adequate capacity, redundancy, and are in proper working order.
7. Be available to help customers with questions regarding billing, new services, and complaints.
8. Provides efficient operations and makes prudent decisions to keep user costs as low as possible while maintaining the Level of Service desired.
9. To provide a safe and injury free work place

2.3 Criticality of Assets

The criticality of each asset was assigned based on how much disruption the assets failure may cause to the system. Criticality ratings were assigned on a scale of 1 (insignificant) to 5 (catastrophic). Factors considered during the criticality evaluations include:

1. Redundancy of asset
2. Proximity to surface waterbody
3. Proximity to sensitive populations (i.e. hospital, jail)
4. Current use status (i.e. backup or active)

2.4 Operation and Maintenance Strategies / Revenue Structure

A financial analysis of the 2017 budget was completed and it was determined that a funding gap did not exist based on their revenue and expenses. This analysis was submitted by H.J. Umbaugh and Associates at the 2.5-year mark of the grant. The MDEQ approved the rate methodology in a letter dated May 3, 2018.

Each asset in the AMP is classified as either a Capital or Repair, Replace and Improve (RRI) asset. The RRI assets are generally considered to be assets with less than a 20-year lifespan that are typically repaired or replaced with funds from the sewer fund. RRI cost projects for the next 20 years, based upon the anticipated replacement year, were added to the revenue structure review for consideration by the City.

2.5 Long-term Funding / Capital Improvement Plan

Capital assets generally have a longer lifespan and may require the use of another funding source to implement repair or replacement. Potential capital improvement projects identified during preparation of the AMP include:

1. Replacing lift station buildings and wet wells
2. Replacing numerous manholes
3. Replacing some sections of gravity sewer

Some potential long-term funding scenarios were presented to the City Council for evaluation by H.J. Umbaugh and Associates. It is the City's responsibility to review and evaluate the funding scenarios presented and determine the best course of action as it relates to user rates, capital and repair projects and the sewer fund cash balance.

3.0 MAJOR ASSETS

The major assets for each of the five asset categories are summarized in the following tables.

LIFT STATION ASSETS
Lift Station #1 - EJ
Lift Station #2 – Memorial Park
Lift Station #3 – Water Street
Lift Station #4 – Tourist Park
Lift Station #5 – Industrial Park
Lift Station #6 – Bartlett Street
Lift Station #7 – Main Lift

PIPE ASSETS
4” Force Main (1,250’ +/-)
6” Force Main (10,600’ +/-)
12” Force Main (15,000’ +/-)
4” Gravity (580’ +/-)
6” Gravity (5,700’ +/-)
8” Gravity (60,000’ +/-)
10” Gravity (3,850’ +/-)
12” Gravity (9,500’ +/-)
15” Gravity (2,500’ +/-)

PLANT ASSETS
Reactor/Clarifier #1
Reactor/Clarifier #2
Lab Building
Headworks Building
Chemical/Equipment Building
Ferric Chloride System
Plant Piping
Plant Valves
Final Effluent Water System
RAS/WAS System

MANHOLE ASSETS
Gravity Sewer Manholes (394)
Force main Structures (17)
Lift Station Wet Wells (7)
Lift Station Valve Chambers (1)

Gosling Czubak
engineering sciences, inc.

Engineers • Surveyors
Landscape Architects
Environmental Services

1280 Business Park Drive, Traverse City, MI 49686-8607
231-946-9191 • 800-968-1062 • Fax: 231-941-4603

TRANSMITTAL FORM

Company Name: MDEQ, Drinking Water and Municpal Divisions, SAW Grant
Street Address: Constitution Hall, 525 West Allegan Street, P.O. Box 30473
City: Lansing **State:** MI **Zip:** 48909-7973

Project: SAW Grant No. 1075-01 **Attention:** Valorie White
Job Number: 2016510002.00 **Date:** 11-30-18

Sending: ☒ Attached ☐ Under separate cover via ______

The Following Items:
☐ Report ☐ Copy of Letter ☐ Property Survey
☐ Specifications ☐ Prints ☐ Plans
☒ Other: Certification of Project Completeness, Summary of AMP

COPIES	DATE	NUMBER	DESCRIPTION
1	11-30-18	1	Certification of Project Completeness
1	11-29-18		SAW Grant Executive Summary

Remarks: **Included is the required documents to certify that all asset management activies as specified in the SAW Grant No. 1075-01 have been completed. Please do not hesitate to contact me with any questions. Thank you.**

Copies To:
file

Signed: Glen L Wood
Glenna L. Wood, P.E.
Project Engineer

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Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date 11/30/18
(no later than 3 years from executed grant date)

The City of East Jordan *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1075-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or No
   If No - Date of the rate methodology approval letter: 05/07/18.
2) Significant Progress Made: Yes or No
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: ______.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ______.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Mr. Thomas Cannon	at 231-536-3381	tcannon@eastjordancity.org
Name	Phone Number	Email

______ 11/30/18
Signature of Authorized Representative (Original Signature Required) Date

Mr. Thomas Cannon, City Administrator
Print Name and Title of Authorized Representative

April 2017

Protecting our Infrastructure Investment

ASSET MANAGEMENT PLAN

Wastewater System Executive Summary

Prepared for:

Village of Edmore

SAW Project No. 1634-01

EDMORE

October 2018

FLEIS&VANDENBRINK

DESIGN. BUILD. OPERATE.

EXECUTIVE SUMMARY

OVERVIEW

Public Act 562 of 2012 authorized money for Stormwater, Asset Management, and Wastewater (SAW) Grant Program. In September of 2015, The Village of Edmore received a Stormwater, Asset Management, and Wastewater (SAW) Grant from the Michigan Department of Environmental Quality (MDEQ), project no. 1634-01, to provide financial assistance for the development of a wastewater asset management plan (AMP) for the Village's publicly owned wastewater utility.

This AMP is intended to be a living document that is updated as assets continue to wear and age, and as additional inspection/condition results are found and incorporated into the plan.

The contact person for the Village of Edmore AMP is:

Neil Rankin, Village Manager
Address: 209 Sheldon St. P.O. Box 170, Edmore, MI 48829
Phone number: (989) 427-5641
Email: villagemanager@edmore.com

ASSET INVENTORY AND CONDITION ASSESSMENT

The wastewater collection system assets consist of approximately 56,612 feet (10.7 miles) of sanitary sewers (gravity pipe and force mains) and 205 wastewater manholes connecting the gravity pipe. These assets are located in existing street rights-of-way or in easements dedicated for the assets use and maintenance.

The WWTF currently includes the following treatment processes: 1 acre covered anaerobic lagoon, and two storage lagoons with a combined storage capacity of 5.4 million gallons. Treated effluent is seasonally discharged to rapid infiltration basins adjacent to the treatment lagoons in accordance with Groundwater Discharge Permit No. GW1810159. The design capacity of the WWTF is 0.21 million gallons per day (mgd). The current annual average flow received by the facility is approximately 0.13 mgd.

There are 5 sanitary sewer lift stations located throughout the wastewater collection system. The stations are either wet well/dry well style or submersible style stations.

ASSET IDENTIFICATION AND LOCATION

A comprehensive wastewater system asset inventory was developed from operation and maintenance manuals included a review of existing record drawings, field notes, staff knowledge, and site visits, supplemented with field survey work. Asset material, size and age were identified through the review of available historical record documents. Spatial orientation (pipe location), pipe depth and invert elevations were determined through GPS field survey and a comprehensive evaluation of the gravity system. This information was organized into a new (GIS) database and piping network for archiving, mapping and further evaluation purposes. The inventory includes over 50 WWTF assets, 80 Lift Station Assets, and 403 Collection System Assets.

CONDITION ASSESSMENT AND EXPECTED USEFUL LIFE

For the Village of Edmore, a comprehensive evaluation of the collection system was performed. NASSCO-MACP manhole field based assessments were completed on all 205 manhole structures. Pipeline cleaning and NASSCO-PACP CCTV field based inspections were conducted on 60% of the gravity pipe. Smoke Testing performed on the entire system to disclose location of inflow or infiltration and Capacity Analysis was modeled for average day and peak hour conditions to identify capacity concerns. Recommendations identified the need for maintenance with 14% of the system tagged for inspection and/or cleaning. Rehabilitation for short-term (1-5 year) and long term (6-20 year) accounted for 16% of the system identifying the need for repairs, lining and replacement. The remaining 70% of assets were placed in the 20+ year category.

Overall, the condition of the assets at the WWTF ranged from good to excellent. The WWTF was completely reconstructed in 2012, and the facility has very few mechanical components that require significant maintenance.

The condition of the assets at the lift stations range from good to poor. Ongoing maintenance has sustained the condition of many assets while other assets have deteriorated due to age and the harsh conditions associated with typical wastewater collection systems.

LEVEL OF SERVICE

DEFINING THE EXPECTED LEVEL OF SERVICE (LOS)

The overall objective of the Village of Edmore Wastewater Department is to provide reliable wastewater collection and treatment services at a minimum cost, consistent with applicable environmental and health regulations. To achieve this the following Level of Service (LOS) goals are proposed:

WASTEWATER UTILITY - LEVEL OF SERVICE STATEMENT

The overall objective of the Village of Edmore Wastewater System is to provide reliable wastewater collection and treatment services at a minimum cost, consistent with applicable environmental and health regulations. To achieve this, the following Level of Service (LOS) goals are proposed:

- Provide adequate collection system and treatment capacity for all service areas.
- Comply with all local, state and federal regulations at all times for treated effluent from the WWTP.
- Actively maintain collection and treatment system assets in reliable working condition.
- Reduce inflow/infiltration (I/I) flow volumes to mitigate potential for sanitary overflows, water in basements, and overloading of the treatment plant.
- Provide rapid and effective emergency response services to customers.
- Ensure operations staff are properly certified.
- Regularly review health and safety procedures for operations staff to provide proper worker safety.
- Regularly review projected O&M and capital expenditures. Adjust user rates, as necessary, to ensure sound financial management of the wastewater system.

The LOS goals may need to be adjusted from time to time as the utility ages, the needs of community change or new rules or regulations require a change in operation. For this reason, the LOS goals should be reviewed by the Village from time to time to make sure they accurately reflect the desired operation of the utility.

MEASURING PERFORMANCE

Performance measurements are specific metrics designed to assess whether Level of Service objectives are being met. Evaluations of goals should be completed at least annually to determine if, the provided resources are being used appropriately. Level of Service requirements can be updated to account for changes due to growth, regulatory requirements, and technology.

CRITICAL ASSETS

DETERMINING CRITICALITY

Business Risk is the determination of criticality of each asset in the wastewater system. Criticality is based on two factors; Likelihood (Probability) of Failure and Consequence of Failure using the following formula:

Business Risk = Consequence of Failure Score x Likelihood of Failure Score

Defining an asset's Business Risk allows for management of risk and aids in decision making for where to allocate operation and maintenance and capital improvement funds.

Likelihood of Failure (LoF) is a measure of how likely an asset is to fail. The following categories have been developed to quantify how likely an asset is to fail:

- Condition of the asset
- Remaining useful life (Age)
- Service History
- Operational status

Consequence of Failure (CoF) is a measure of the social, economic, financial or environmental impact of failure of an asset and the utilities ability to respond, convey and treat wastewater. CoF categories of the collection system include:

- Proximity to critical environmental features
- Location (Zoning District) of asset
- Facilities served by asset
- Size and location of asset within the utility network
- Type of asset.

The WWTP and lift station categories for CoF are:

- Process
- Financial Impact
- Safety
- Environmental Impact
- Disruption to the Community
- Ability to Respond

CRITICALITY RESULTS

Using the strategy outlined above, a Business Risk Evaluation (BRE) was performed for each asset using a graphical ArcGIS-based sewer asset management and capital planning software that compiles, analyzes and assesses Business Risk for each asset and develops a Capital Improvement Plan. The results of the BRE are provided in easily understood tabular and graphical output.

Figure 1 provides the risk rating for gravity and force main pipe by number of pipe segments. Sixteen pipe segments in the collection system had an extreme risk rating and are recommended to be replaced, lined or point repaired. Much of the collection system's gravity pipes, 80 percent as shown in Figure 1, have a low to negligible risk rating and are indicative of pipes in relatively good condition.

Figure 2 provides the risk rating for the collection system manholes. Thirteen manholes are identified as extreme risk, and are recommended to be cleaned, lined and/or repaired. Many manholes are at low to negligible risk are indicative of manholes in relatively good condition (76 percent).

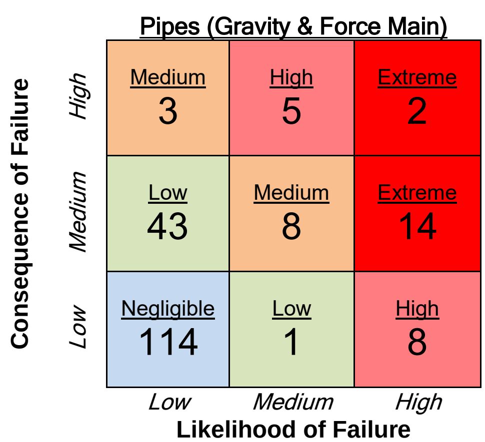

Figure 1. Business Risk Matric (Risk Rating) by Number of Gravity and Force Main Pipes

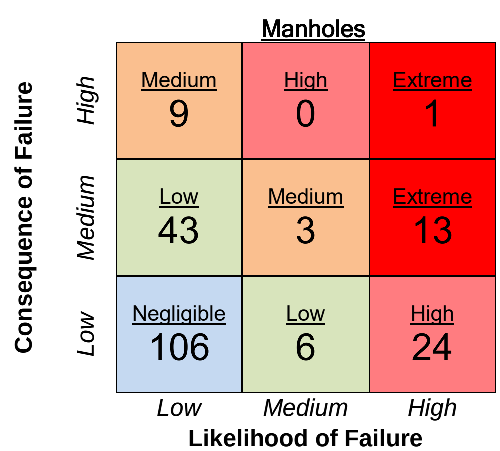

Figure 2. Business Risk Matrix (Risk Rating) by Number of Manholes

A summary of the risk ratings for WWTF assets is provided in Figure 3. No assets scored in the "Extreme Risk" category which would require a plan for very short-term asset renewal or risk mitigation. The assets shown in the "High Risk" category are only listed as high risk due to their consequence of failure. The probability of failure is low. An example of these assets is the treatment lagoons. Therefore, it is important to monitor these assets, and evaluate their rehabilitation or replacement for the 20 - year CIP. Overall, the condition of the WWTF remained in good condition following the completion of the 2012 Improvements Project.

A summary of the Lift Station assets is shown graphically in Figure 4. The Lift Stations had several assets in the "High Risk" category that require a plan for asset renewal or risk mitigation. Overall the lift stations were in good to fair condition. The pumps at the Main Lift Station were the most critical assets, and plans to replace the pumps have already been put into action. The remaining high risk assets are still functioning properly, but are approaching the end of their expected useful life. These assets are addressed in the Capital Improvement Plan section below.

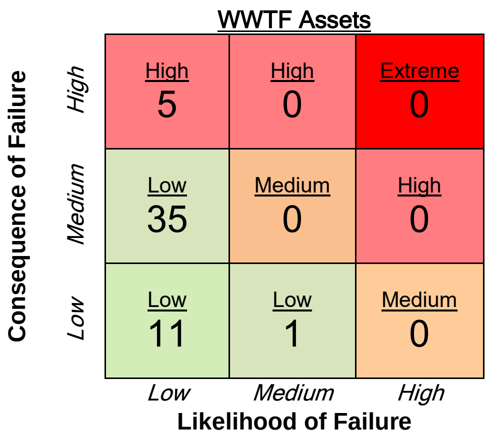

Figure 3. WWTF Assets by Risk Rating

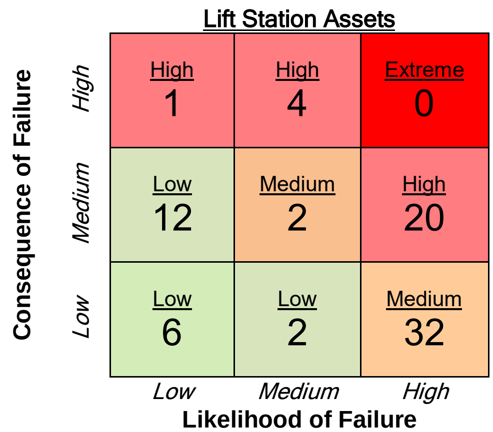

Figure 4. Lift Station Assets by Risk Rating

A spreadsheet providing asset criticality for each utility asset has been included in the AMP detailed report for the collection and treatment systems.

Capital Improvement Project Plan (Long-term Funding Plan)

A Capital Improvement Plan with recommendations was prepared for the Village's assets based on the Business Risk evaluation. Data-driven information from the business risk assessment and condition assessment was used to identify and prioritize the capital improvement projects. The information was also used to schedule inspections to evaluate the condition of high business risk assets. A Short-Term 1-5 year and Long-Term 6-20 year Capital Improvement Plan (CIP) was prepared to address the projected needs for each asset in the system.

CIP Development

Collection System assets were grouped by strategy and assigned costs from a unit database. This database includes unit construction values in 2018 construction dollars based on a survey of recent projects in Michigan and includes engineering and administrative rates where applicable. Opinions of probable project costs for the WWTF and Lift Station assets were prepared and are based on conceptual layouts of new facilities, or price quotes from material and equipment representatives. Assets were categorized and prioritized by year based on risk rating and criticality score to develop the CIP.

The CIP was developed by assigning each project to a CIP year (1-5) based on several factors. In addition to Risk Rating, other factors used to assign CIP year include:

• Asset rehabilitation grouping (i.e. the type of repair/construction recommended)
• Coordination with other planned projects to achieve economies of scale or limiting disruption (an example is a street reconstruction project where identified utility recommendations can be included)

The 5-Year CIP must also consider project cost when assigned to a CIP year to balance capital requirements with generated utility revenues. The recommended 5-Year Capital Improvement Plan for the wastewater collection system is included in Table 3a. Recommendations for the long term 6-20 year CIP are included in Table 3b.

Table 3a. Capital Improvement Plan Summary by Year

Maintenance Action	Total Cost (Current Year Dollars)	2018	2019	2020	2021	2022
Pipe Replacement	$ 102,204	$ -	$ 105,270	$ -	$ -	$ -
Pipe Lining	$ 202,752	$ -	$ 123,829	$ -	$ 90,182	$ -
Pipe Point Repair	$ 87,504	$ 47,905	$ -	$ 42,010	$ -	$ -
Total	$ 392,460	$ 47,905	$ 229,100	$ 42,010	$ 90,182	$ -

Assumes 3% Inflation per Year

Table 3b: Capital Improvement Plan 6-20 Year

Description	6-20 Year
Collection System	
Known Collection System Rehabilitation	$ 458,667.79
Projected Collection System Rehabilitation	$ 439,097.46
Total Rehabilitation Cost	***$ 897,765.25***

**Costs based on 2018 construction dollars*

Table 4 shows the short-term and long-term recommendations for the WWTF and lift station system assets.

Table 4: Recommended Capital Improvements for WWTF and Lift Stations

Asset Description	Year Installed	Expected Useful Life (Years)	Anticipated Year of Replacement	Replacement Cost (2018 Dollars)	Replacement Cost (Inflated 3%/yr)
5-YEAR CIP PROJECTS					
Main Lift Station Pump Rehabilitation	1999	20	2018	$100,000	$100,000
Remove Biosolids from Lagoon No. 1	2012	10	2022	$80,000	$90,000
6-20-YEAR CIP PROJECTS					
Main Lift Station Electrical and Controls	1999	20	2024	$60,000	$71,600
East Lift Station Rehabilitation	2006	20	2026	$106,900	$135,000
South Lift Station Rehabilitation	2006	20	2026	$106,900	$135,000
Replace Lagoon Circulators	2012	20	2032	$165,000	$250,000
Remove Biosolids from Lagoon No. 2	2012	20	2032	$160,000	$242,000
Remove Biosolids from Lagoon No. 3	2012	20	2032	$160,000	$242,000
Replace Floating Cover (Lagoon No. 1)	2012	20	2032	$175,000	$265,000

OPERATIONS, MAINTENANCE & REPLACEMENT

Regular operation, maintenance and replacement (OM&R) is essential in the management of a wastewater collection system. The collection system is subject to a variety of operational problems and can suffer from clogging, scour, corrosion, and collapse. Inspection, cleaning, and rehabilitation are important for optimizing the proper functioning of the collection system. By optimizing the performance infiltration/inflow are reduced and sanitary sewer overflows (SSO) are minimized or eliminated preserving the substantial investment the community has in its collection system.

Table 5a identifies the recommended maintenance actions items for the wastewater collection system in a five-year summary. The total cost, as shown in the 'Total' column below, is taken and divided by five and then disbursed between 2019 to 2023, where each increasing year is multiplied by a 3% inflation factor starting at year 2 (2020).

Table 5a. Collection System Maintenance Summary Table: Year by Year

Maintenance Action	Total Cost (Current Year Dollars)	2019	2020	2021	2022	2023
Manhole Assessment	$ 13,926	$ -	$ -	$ -	$ 15,217	$ -
Manhole Cleaning	$ 9,373	$ 8,837	$ -	$ -	$ -	$ 603
CCTV	$ 12,099	$ -	$ -	$ 13,044	$ -	$ -
CCTV - Heavy Cleaning	$ 5,782	$ -	$ -	$ 5,228	$	$ -
Total Project Cost	***$ 35,920***	***$ 8,837***	***$ -***	***$ 13,599***	***$ 15,217***	***$ 603***

Assumes 3% Inflation per Year

In addition to the capital improvements, an annual equipment replacement fund should be developed to replace disposable equipment. These are items that can be financially accounted for through operation, maintenance and replacement (OM&R) funds and can be replaced by WWTF staff without bringing in an outside contractor. Existing disposable materials include wear parts in pumps and motors, laboratory instruments, etc. A list of WWTF and lift station assets requiring replacement in the next 20 years was generated based on the expected useful life of assets included in the asset inventory. Table 5b provides the results of the analysis.

Table 5b: WWTF and Lift Stations Equipment Replacement Budget

Asset Description	Rehab/Replacement Cost	Expected Useful Life (Years)	Annual Budget
Main (North) Lift Station Pumps/Controls	$20,000	15	$1,300
Sunrise St. Lift Station Pumps/Controls	$15,000	15	$1,000
East Lift Station Pumps/Controls	$15,000	15	$1,000
South Lift Station Pumps/Controls	$15,000	15	$1,000
Influent Flow Meter	$3,000	15	$200
Effluent Flow Meter	$3,000	15	$200
HVAC/misc.	$4,500	15	$300
Lagoon Biosolids	$8,000	20	$8,000
	Total:		**$13,000**

REVENUE STRUCTURE (MINIMUM LIFE CYCLE COSTS)

The revenue and rate methodology is an instrument to determine rates and charges that will provide sufficient revenues to cover operation, maintenance, capital replacement, and debt costs.

A study was completed on a cash basis that demonstrated sufficient revenues to meet the Michigan Department of Environmental Quality SAW Grant requirements. The study results were approved by MDEQ on July 20, 2018.

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date 11-19-18
(no later than 3 years from executed grant date)

The Village of Edmore *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1634-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or $\boxed{\text{No}}$
   If No - Date of the rate methodology approval letter: July 20, 2018.
2) Significant Progress Made: Yes or No
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: ______________.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ______________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Neil Rankin at (989) 427-5641 villagemanager@edmore.com

Name | Phone Number | Email

[signature] 11/19/18

Signature of Authorized Representative (Original Signature Required) Date

Neil Rankin village manager

Print Name and Title of Authorized Representative

April 2017

DEQ

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Due Date 11-19-18
(no later than 3 years from executed grant date)

The __Village of Edmore_____ *(legal name of grantee)* certifies that all stormwater asset management plan (SWAMP) activities specified in SAW Grant No. __1634-01__ have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SWAMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

Print Name and Title of Authorized Representative

Neil Rankin at (989) 427-5641 villagemanager@edmore.com
Name Phone Number Email

Signature of Authorized Representative (Original Signature Required) 11/19/18
Date

Neil Rankin village manager
Print Name and Title of Authorized Representative

1211 Ludington St.
Escanaba, MI 49829
O: 906.233.9360
www.c2ae.com

CITY OF ESCANABA
ASSET MANAGEMENT PROGRAM SUMMARY

Grantee Information

City of Escanaba SAW Grant
410 Ludington Street, Escanaba, MI 49829
www.Escanaba.org

Contact Information for the Grantee

Mr. Jeff Lampi
Address: 410 Ludington, Escanaba, MI 49829
Phone: 906-786-1301
Email: jlampi@escanaba.org

SAW Grant Project Number: 1072-01

Executive Summary

The City of Escanaba Asset Management Program (AMP) was created through funding from the Michigan Department of Environmental Quality's SAW Program.

The applicant has formed a SAW team which is composed of City officials and members of the public. The purpose of the team is to develop a mission statement and to discuss and decide upon the Level of Service the system should provide, this impacts cost. The team will meet annually before the City's budget process begins.

The program is GIS based which provides a digital map background of the Escanaba sanitary and storm collection systems. The City treats its own sewage and the treatment facility is also included.

The other major components of the program include the asset management spreadsheet (AMS), financial advice recommendations, and filing system; the filing system is accessed through the GIS system.

The AMS utilizes the MDEQ/WEF recommended spreadsheet which is the master compilation tool for the program. It includes:

1. System information and personnel worksheet
2. Summary- worksheet; listing all assets and calculating the business risk
3. Asset Rating Definitions- worksheet
4. Level of Service Statement- worksheet

5. Criticality Calculation – worksheet
6. Probability of Failure - worksheet
7. Budget and Rate formulation worksheet
8. Replacement - worksheet
9. Timing - worksheet
10. Capital Improvement Project – worksheet
11. Ten Year Forecast – worksheet

A. The System Information and Personnel worksheet contains system basic data.
B. The Summary worksheet lists all system assets, with accompanying data related to asset type, location, capacity or size, material type, estimate of original installation year and costs, expected remaining life and value, the cost of replacement in today's dollars, and data from items E and F above, plus redundancy due to number of units, which leads to a calculation of business risk observation.
C. The 1-5 rating scales for condition, probability of failure and criticality of asset is found in the asset rating definitions.
D. Level of service statement for the system is developed by the SAW team committee and along with the mission statement is on D. above.
E. Worksheets E and F are the calculator worksheets for criticality and probability of failure of a particular asset. These worksheets were only used for major assets where additional documentation was felt necessary. Most cases utilize engineering judgment for the rating decision.
G. The budget and rate sheet is another calculator which includes the operating budget for the system as well as required capital commitment. It makes an assessment of needed operating reserves based on the planned short term replacements needs as well as future capital needs. It also indicates what is being put away to satisfy these requirements.
H. The replacement worksheet derives the depreciated value of the system as well as a calculation of the replacement value.
I. The timing worksheet attempts to identify whether an asset needs replacing and when to consider and formulate future capital improvement projects.
J. Capital Improvement Plan indicating future possible projects. This is a forecast based on current data, debt retirement, and typical funding agency grouping of project value
K. Ten year budget worksheet attempts to identify the work of inflation on the plan over "10 years".
L. A twenty year cash flow forecast is included to assist in the formulation of utility rates. It also includes the detailed level of service statement and detailed capital improvement forecast.

Finally is the data filing system which will include items such as, the system televising data, the hydraulic model, easements, user information and other relevant data.

The City of Escanaba received third round grants as follows:

WAMP

Grant	Local Share	Total
$618,700	$61,870	$680,570

SAMP

Grant	Local Share	Total
$340,000	$37,300	$377,300

The asset management development procedure generally followed this path:

A. Identifying and numbering all the assets before field efforts begin.
B. A survey team gathered all GPS coordinates of items such as manholes in the field.
C. A digital orthographic photo was developed using aerial photography to create a GIS system background.
D. A Sewer system layer was created in the GIS system to locate the various assets.
E. A field team inspected and using the NASSCO rating system inventoried and detailed the in-ground assets. Field inspections, records research, capacity testing where needed, and management/staff interviews were used to inventory pump stations and treatment facility components.
F. The inventory data is used in the construction of a production data base which helps populate the Asset Management Data Base and subsequent Spreadsheet (AMS) as described above.
G. The AMS is the calculating tool for assessing the future viability of the delineated assets and the criticality and future impact on the system overall.
H. The criteria of Business Risk and remaining useful life are used to determine what assets need attention and the cost impact of that attention.
I. This data also leads to the formulation of future capital improvement projects.
J. The data is combined into the system's current operating budget to determine whether sufficient financial reserves are being collected.
K. Rate impacts are then considered.
L. The system operators are then trained by M Power in the GIS system use and maintenance
M. The process is to be revisited annually.

Wastewater and Stormwater Asset Inventory

The program included two components under different grant offers. The Wastewater Asset Management Program is call the WAMP and the corresponding Stormwater Asset Management Program is called the SAMP.

The WAMP includes all assets found

A. Wastewater Treatment Facility
B. All pump stations and force mains
C. All collection system components

The SAMP includes all assets making up

A. The stormwater collection system
B. The ditches, culverts, and drainage structures

The inventory was performed by records research, field visitation, and inspection. Briefly it included;

Treatment Facility

a) Identifying the assets to be tracked
b) An assessment of the effectiveness of the system currently
c) An assessment of the condition of the identified assets through
    i. Testing
    ii. Visual inspection
    iii. Installation and maintenance records
    iv. Age of the asset

Pump stations (PS) followed the method as completed for the treatment facilities.

Collection systems both sanitary and storm

a) Name and label all manholes
b) Acquire GPS coordinates of all these structures
c) Visually inspect all manholes structures as per NASSCO dictated methodology.
d) Televise selected portions of the collection piping and rate per NASSCO
e) Acquire the age (installation year) of all the elements as close as possible.

The decision was made to utilize the MDEQ offered spreadsheet for compiling and analyzing the data.

The manholes condition assessment was gleaned from the field inventories. The NASSCO rating system was utilized to develop a quick rating of the components. In some circumstances engineering judgement was necessary. The process evaluation for the Wastewater Treatment Facility went a step further determining whether the equipment in place was functioning as is needed to maintain regulatory compliance.

The results of the Escanaba WAMP assessment were as follows.

General

WAMP

The treatment process assessment indicated that the process line is preforming in line with the basis of design and is meeting expected discharge results.

Of the 150 identified treatment and pump station (PS) assets;

67.7% were considered low business risk
25% were considered average business risk
7.3% were considered in need of effort

In ground (3,922 assets)

71% were considered low business risk
23% were considered average business risk
6% were considered in need of effort

SAMP

In ground (5,027 assets)

49% were considered low business risk
20% were considered average business risk
31% were considered in need of effort

Criticality of Assets

The criticality of assets was determined based on the following factors;

Treatment Facility

Highly Critical (5 rating)

a) Failure of a component would result in a permit violation.
b) Failure of component would cause another component to fail.

Moderately Critical (3-4 rating)

a) Failure of an asset would result in temporary process upset.
b) Failure of an asset would result in a SCADA system warning.
c) Failure of an asset would result in additional budget impact.

Slightly Critical (1-2 rating)

a) Failure of an asset can be addressed when personnel are available.

Pump Stations

Highly Critical (5 rating)

Failure of an asset disables the station resulting in sewer backup affecting customers or the environment.

Moderately Critical (3-4 rating)

Failure of an asset would results in system disruption requiring immediate attention.

Slightly Critical (1-2 rating)

Failure can be dealt with when personnel are available.

Collection System (WAMP & SAMP)

Highly Critical (5 rating)

Failure of an asset would result in flooding, severe adverse environmental impact, or impede an activity.

Moderately Critical (3-4 rating)

Failure of an asset would damage properties in high value areas or a large number of users

Slightly Critical (1-2 rating)

Failure will develop slowly and can be dealt with when personnel are available.

The ranking of an asset has a component of criticality involved but it is only one factor in determining business risk, the other two being redundancy (i.e. back up of the asset) and probability of failure (the condition) of the asset. Our methodology utilizes business risk (ranking 1 to 25) and depreciation (age) of the asset to rank its need for attention and subsequent budget set aside for maintenance or replacement.

Level of Service Determination

The level of services that the system is to offer was determined by the SAW Team to prioritize what the system should offer and how it should respond. Typically four or five major goals were determined and then subdivided into items that should be or not be pursued to meet the goals. These items are placed in a level of service statement with reference in the asset management database.

Revenue Structure

The MDEQ spreadsheet was utilized to list and prioritize items which required short term or long term capital infusion. The long term items were grouped into project groups and targeted as future projects under the Capital Improvement Plan, which follows. The intent for these projects is future borrowing with monies being added to the current operating budget for future borrowing applications.

The short term capital needs were identified for operating budget inclusion annually. They may include annual maintenance needs or small replacement items along with large project needs in the first seven years after the project is created.

We found the operating budget and rate support is current and meets the needs outlined by the WAMP.A twenty year cash flow statement is attached.

The SAMP identified budget considerations which have been delivered to the City's Utility Department and Engineering to determine what should be done and when to align with other possible future utility or street improvements.

Capital Improvement Plan

Escanaba has identified three future wastewater capital improvement projects. The first project focuses on the wastewater treatment plant. The debt involved with this project is already incorporated into the cash flow statement. Short term smaller projects are also incorporated, these are anticipated to be budgeted under the replacement line item under the spreadsheet budget and rate tab.
Escanaba's Capital Improvement Plan follows major debit retirement milestones replacing expiring debt with new debt when working on depreciating assets. Three capital projects are listed.

Project 1 WWTP (2022)

SCADA	$137,000
Headworks	$140,000
Screen Replacement	$743,000
Sewage Pumps	$221,000
Grit Equipment	$852,000
Primary / Tank Improvements	$6,761,000
Final Tanks	$210,000
Chlorine Feed Equip	$78,000
Roofs	$53,000
Sludge Equipment	$400,000
Utility Truck	$40,000

Project 2 Collection (2030)

Pump Station 2505	$350,000
Sanitary Sewer	$4,955,000

Project 3 Collection (2042)

Sanitary Sewer	$5,210,000

The SAMP has identified three priority project areas and a fourth of faulty structures. The City will attempt to pursue these improvements with other utility and street projects.

Project 1 Collection (2020)

Piping & manholes	$2,220,000

Project 2 Collection (2042)

Piping & manholes	$570,000

Project 3 Collection (2062)

Piping & manholes	$8,850,000
Critical Structures (2020-2030)	$1,100,000

List of Major Assets

Wastewater:

The Wastewater Treatment Facility is an activated sludge plant with headworks and grit removal, primary settling, actuated secondary treatment, final clarifies, sludge storage and handling, administrative building, and laboratory facilities. The disinfection method is gas chlorination. The Plant is rated at 2 mgd.

Five major pump stations and three grinder stations are included in the system also.

Force Main

1 inch	201 ft.
2 inch	469 ft.
4 inch	82 ft.
6 inch	181 ft.
16 inch	4,278 ft.

Mainline Gravity Sewer

	4 inch	7,117 feet
	6 inch	13,662 feet
	8 inch	244,549 feet
	10 inch	33,048 feet
	12 inch	36,668 feet
	15 inch	16,428 feet
	18 inch	23,507 feet
	20 inch	1,810 feet
	21 inch	6,222 feet
	24 inch	7,826 feet
	27 inch	2,908 feet
	30 inch	12,188 feet
	36 inch	8,365 feet
	48 inch	244 feet
Total		414,541 feet

System Value: $10,323,796
Replacement Value: $90,719,011

Stormwater:

Sewer & Culverts

3 inch	100 feet
4 inch	500 feet
6 inch	3,200 feet
8 inch	80,200 feet
10 inch	34,300 feet
12 inch	59,400 feet
15 inch	27,500 feet
18 inch	20,500 feet
21 inch	5,800 feet
24 inch	21,500 feet
27 inch	900 feet
30 inch	12,800 feet
36 inch	4,700 feet
42 inch	100 feet
48 inch	6,700t

Total 278,200 feet

System Value: $3,242,146
Replacement Value: $55,867,755

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date _November 20, 2018_______
(no later than 3 years from executed grant date)

The ____City of Escanaba_____________ *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. _1072-01_ have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: ~~Yes~~ or No

   If No - Date of the rate methodology approval letter: _May 3, 2018_____________.

2) Significant Progress Made: Yes or No

   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)

3) Date of rate methodology review letter identifying the gap: ________________________.

4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ____________________________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

__Jeff Lampi______________________at__(906) 786 - 1301____jlampi@escanaba.org__________

Name | Phone Number | Email

Patrick S Jordan   Nov 20, 2018

Signature of Authorized Representative (Original Signature Required)   Date

___Patrick Jordan – City Manager_________________________________

Print Name and Title of Authorized Representative

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Due Date _November 20, 2018_______
(no later than 3 years from executed grant date)

The ___City of Escanaba_____________ *(legal name of grantee)* certifies that all stormwater asset management plan (SWAMP) activities specified in SAW Grant No. _1072-01___ have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SWAMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

Terry Flower________________________at__(906) 789 - 7311________tflower@escanaba.org_____
Name Phone Number Email

Patrick Jordan ____________________________________ Nov. 20, 2018
Signature of Authorized Representative (Original Signature Required) Date

___Patrick Jordan- City Manager_______________________________________
Print Name and Title of Authorized Representative

Memorandum

To:	Karen Nickols, Project Manager Michigan Department of Environmental Quality (MDEQ) Revolving Loan Section
From:	John Michalski, P.E.; Eric Wahrman, E.I.T
CC:	Oakland County Water Resource Commission
Date:	February 15, 2019
Subject:	Evergreen-Farmington Sewage Disposal System MDEQ Stormwater, Asset Management and Wastewater (SAW) Grant #1297-01 Summary of Wastewater Asset Management Plan

The following is a summary of the work completed under the MDEQ SAW Grant work performed by ASI. It includes a summary of the project scope, results and findings of activities covered by the grant, grant amount spent and match amount, and contact information. It has been prepared as required under Section 603 of Public Act 84 of 2015, and follows recent MDEQ guidance.

GRANTEE INFORMATION

Evergreen-Farmington Sewage Disposal System, SAW Grant Project #1297-01

Project Grant Amount: $2,000,000

Applicant Match Amount $444,444

Jim Nash	Tim Prince, P.E.	Carrie Cox, P.E.	Karyn Stickel, P.E.
1 Public Works Dr.	1 Public Works Dr.	1 Public Works Dr.	555 Hulet Dr.
Waterford, MI 48328	Waterford, MI 48328	Waterford, MI 48328	Bloomfield Hills, MI 48302
248-858-0958	248-858-0958	248-858-0958	248-454-6300

EXECUTIVE SUMMARY

The Evergreen-Farmington Sewage Disposal System (EFSDS) applied for and received a grant to further develop an Asset Management Plan (AMP) for its sanitary system through the Michigan Department of Environmental Quality's (MDEQ) Stormwater, Wastewater and Asset Management (SAW) program.

Because the SAW program was funded through monies appropriated for water quality, other related infrastructure systems, such as drinking water, were not eligible for funding through the grant, but are considered in analysis and recommendations where appropriate.

The EFSDS is owned, operated, and maintained by the Oakland County Water Resources Commissioner (WRC) under the jurisdiction of the Michigan Public Act 342. The WRC has various tools used to manage the assets it owns or operates and maintains, including a GIS geodatabase, collaborative asset management system, hydraulic models, condition assessment methods, risk and prioritization models, capacity studies, asset deterioration models, and an operating and capital improvement project prioritization model. These tools are used to guide the short and long-term strategies for WRC to operate the various systems in a sustainable manner that meets the desired level of service, with a focus on prioritizing assets that are most critical and being cost-effective. The funding strategy for each fund is also evaluated annually through WRC's "Long Range Plan" (LRP) process that includes a review of the current rate structure, fund balances and anticipated future funding needs.

The WRC "Common to All" approach was generally followed with in development of the asset management plan for this system. The following is a summary of the AMP, as required by the grant, which includes a brief discussion of the five major AMP components, a list of the plan's major identified assets, and contact information for the grant.

WASTEWATER INVENTORY

WRC uses its existing Geographic Information System (GIS) geodatabase as the primary means to inventory and map the assets in the system. The geodatabase includes key attributes associated with each asset, such as installation date (age), size, material, along with other information as needed for a given asset type.

WRC currently uses the Cityworks software package for its Computer Maintenance Management System (CMMS,) which then collaborates with the GIS to present a single interface to the user via the Collaborative Asset Management System (CAMS.) CAMS assists in managing inspections and maintenance work by generating and tracking work orders, collecting inspection and condition data, and compiling costs and hours spent on each asset. Maintenance history and costs can be tracked on an asset and/or fund level.

Condition assessment tools and protocols were developed by WRC to allow for efficient and consistent recording of asset condition. For sanitary assets, a National Association of Sewer Service Companies (NASSCO) compliant software program stores data collected during sewer televising. The data stored can be shared with the existing CAMS system. Inspection work orders in the CAMS system are used for evaluation of other types of assets, such as manholes and other collection system structures, and for most vertical asset types, such as pumps, valves, structures, etc.

As part of the grant for EFSDS, the GIS geodatabase inventory was reviewed for completeness and to ensure critical attributes were populated. Approximately 795,056 lineal feet of sanitary sewer underwent condition assessment via cleaning and televising. Approximately 946 manholes and other related structures were evaluated and documented using the CAMS inspection work orders. Vertical assets, including pump stations, flow regulators, and flow level monitors, were inventoried using a WRC hierarchy template and condition assessment data was collected and input into the CAMS system.

Over 70% of the assets in the EFSDS are in good condition and less than 15% of the assets were determined to be in poor condition. The assets that were poor have been incorporated into rehabilitation or replacement programs.

CRITICALITY OF ASSETS

WRC implemented PowerPlan Asset Optimization software as part of the “Common to All” Program. Baseline Probability of Failure (POF) and Consequence of Failure (COF) factors were configured into the software as part of that Program, and were used to estimate the overall risk of the horizontal assets (sewers and associated structures.) For pump stations and storage and treatment facilities, individual assets were reviewed by staff as part of the grant work, and POF and COF factors determined and input into the software.

Both the POF and COF were scored on a scale of 1 to 5, with 1 being the lowest probability or consequence of failure, and 5 corresponding to the highest probability or consequence of failure. The Business Risk Evaluation (BRE or Risk) score is the product of the POF score and the COF score (POF times COF equals Risk,) and has a scale of 1 to 25. Higher BRE scores identify the assets with the greatest overall risk.

The POF and COF for horizontal assets are determined using scoring values developed uniquely for each asset type, such as gravity main, non-gravity main, manhole, etc. The POF and COF scores for each asset type are calculated using attribute data from the GIS geodatabase, inspection data from the CAMS system, and NASSCO Pipeline and Manhole Assessment and Certification Program ratings. The primary attribute for determining the POF of gravity mains (sanitary and storm sewers) was the PACP Structural Quick Score. The PACP Maintenance Quick Score and age are also incorporated into the POF rating. Where PACP scores were not available, the POF score was based on the age-based assumed condition.

For force mains, the POF was based on age, normal operating pressure, quantity of repairs tracked in the CMMS, and velocity. For manholes and other access structures, the POF is based primarily on the MACP fields cover condition, frame condition, chimney condition, cone condition, wall condition, bench condition, and channel condition along with age. If the MACP data was not available, the score was based on only age-based assumed condition.

The COF for mains and access points (sanitary sewers, force mains, siphons and related structures) was determined based on asset depth, size, proximity to groundwater and flood zones, and proximity to roads and intersections.

The POF and COF of vertical assets were calculated using a scoring matrix. The POF for vertical assets was calculated using a combination of age and physical condition collected from inspections performed using work orders through the CAMS system. O&M protocol and performance factors were also scored and used in the calculation. In the absence of any other data, age was used to estimate POF. The COF for vertical assets was scored using a matrix of factors including: safety of public and employees, financial impact, public confidence, regulatory compliance, and firm capacity.

LEVEL OF SERVICE DETERMINATION

At the strategic level, the Level of Service (LOS) identifies the long-term goals and strategies of the organization. An overall LOS guiding matrix was developed to document the goals and strategies of the WRC organization. The WRC Mission Statement and the annual LRP rate process form additional elements of the LOS.

The WRC's current Mission Statement is:

> *The Oakland County Water Resources Commissioner's Office is dedicated to the preservation and protection of our water environments, public health, welfare, convenience and the citizen's right to quality water. We are committed to acting with integrity and professionalism and will always seek collaboration among our Oakland County communities and regional partners.*
>
> *We commit ourselves to providing our customers with high value services that are fairly priced, environmentally sound and sustainable in the long term. We are committed to an open dialogue with our communities and promise to keep lines of communication open.*
>
> *In our pursuit of excellence and continuous improvement, every member of our staff will respond to issues of the public promptly, safely, respectfully and with sensitivity to their individual needs. Our office will always endeavor to provide an appropriate resource when an issue is not within our authority.*
>
> *We will install a culture that perpetuates an environment promoting trust, respect and teamwork, both within our organization and among our communities and region.*

Table 1: Common to All Level of Service Goals

	WRC Base Level of Service Goals	**Measurables**
Financial Viability and Impact	Emergency repairs can be performed within Utility Reserve Budgets of the system	Exceedances of reserve budgets
Public Confidence / System Service Impact	Minimal to some loss of service or impact on other services for less than four hours. No sewer system or basement backups. Minor disruption (e.g., traffic, dust, noise).	Number of service interruptions, complaints, and backups
Regulatory Compliance	No state permit violations. Comply with All MDEQ policies.	Number of violations
Safety of Public and Employees	Non-reportable injuries. No lost-time injuries or medical attention required. No impact to public health	Number of injuries and any public health advisories
Redundancy	Comply with 10 State Standards	Number of violations
BRE score	Critical assets will have the goal of a probability of failure score below 3.2 and non-critical assets have the goal of a probability of failure below 4.0	System risk score
Staffing	Staffing levels and training maintained to meet level of service	Number of open positions, annual training hours

At the tactical level, the LOS focuses on the prioritization in the medium-term and identification of factors and indicators related to performance, cost, risk, and failure probability. The POF and COF scoring matrices used in the criticality and risk analysis were developed using the strategic LOS guidance. Progress toward the goals are measured through the CAMS analytic data, and is reviewed as part of the LRP process with internal staff and customers.

At the operational level, the LOS is related to procedures and information related to the short-term, day-to-day operation. Performance is measured at the asset level using work orders to collect data, and annual reporting of measurables and progress toward goals with operational staff.

REVENUE STRUCTURE

The annual operation and maintenance budget includes the typical costs spent each year to operate the system and to perform normal maintenance activities. This baseline O&M budget does not include major capital improvements that are required to increase capacity, meet new regulatory requirements, or replace items that have failed or reached the end of their useful service life.

The asset optimization software assisted WRC staff by developing recommended strategies for inspection, rehabilitation and replacement needs over the long-term for each system based on condition and risk. WRC project management staff then reviewed the recommendations generated by the software and rationalized the recommendations to "real world" needs, including any improvements required due to capacity or regulation changes. The WRC uses this information as part of its existing LRP rate process to prioritize projects and ensure adequate funding is available.

The LRP rate methodology is a tool to determine utility rates and charges to provide sufficient revenues to cover the anticipated operation, maintenance, replacement, capital improvement projects, and debt costs associated with a given system, as well as to maintain a reserve balance for emergencies or a significant one-time charge. It ensures adequate revenues are collected for budgeted needs in the current year, and over the long term.

The LRP includes multiple reserve accounts that are used to fund activities above and beyond the normal annual operation and maintenance costs. The reserve accounts include:

- Emergency Repair Reserve for unexpected repairs due to system failure or catastrophic events.
- Capital Improvement Plan (CIP) Reserve for replacement of equipment or facilities in kind or with alternate technology.
- Major Maintenance Reserve which is used to minimize fluctuations of expenses not accounted for in annual operating budgets.

WRC worked with its internal fiscal staff to determine if the system's current rate structures were sufficient to meet the current needs for the management of the wastewater system, and to plan for any adjustments that may be required to meet anticipated future expenses. A demonstration of sufficiency of the system's current rate structure was made, as required by the SAW Grant Program, and submitted to the MDEQ six months prior to the SAW grant end date.

CAPITAL IMPROVEMENT PLAN

The asset optimization software forecasts and prioritizes assets that require replacement in the planning period. The individual replacements can be combined into projects and scheduled with budget amounts established. This information is then used in the LRP process to determine rate needs for funding the project established. A list of capital projects was developed for EFSDS, using recommendations from the asset optimization software, and consideration of other system needs.

The recommended projects are summarized below. Projects listed for implementation in the 0 to 5 year range include cost estimates prepared on data available at the study/feasibility level. Projects in the 5 to 20 year range are based on broad concepts only and costs are based on cost curves and other general tools. All projects are listed for financial and resource planning purposes only. Changes to project inclusion, scope, cost and/or timing are expected as resources are allocated and changes occur in prioritization, regulations, technology, cost and other data becomes available.

Capital Projects, 0 to 5 years:

- Horizontal Asset Repairs, $7,965,083.60, 2018
- Vertical Asset Repairs, $2,911,000.00, 2018
- Manhole Repairs, $5,033,000.00, 2018

Capital Projects, 6 to 10 years:

- Horizontal Asset and Manhole Repairs, $8,246,000.00, 2023
- Vertical Asset Repairs, $1,754,000.00, 2023

Capital Projects, 10 to 20 years:

- Horizontal Asset and Manhole Repairs, $15,624,000.00, 2028
- Vertical Asset Repairs, $4,376,000.00, 2028

RECOMMENDATIONS

In order to keep this AMP sustainable into the future, the LRP process will be undertaken annually to review existing recommendations, status of current projects, and forecasted needs against available reserves and anticipated funding. The asset optimization tool will be regularly synced with CAMS to incorporate any new GIS and operational and condition data. The software will then automatically update recommended events, treatment and replacement strategies, and capital projects. The updated recommendations will be reviewed quarterly and as part of the annual LRP to ensure the availability of required funds for the projects.

LIST OF MAJOR ASSETS

The EFSDS major assets include:

Table 1 – Asset Summary

WRC
WATER RESOURCES COMMISSIONER

ASSET SUMMARY
Evergreen Farmington S.D.S. - 58410

Structures

Type	Count
Sewer Access Point	45
Sewer Cleanout	16
Sewer Manhole	3,250
Sewer System Valve	39

Sites

Type	Count
Sewage Lift Station	12
Sewer Flow Meter	115
Sewer Flow Regulator	10
Sewer Level Monitoring Site	11

Line Assets Summary

	Total Length (FT)	Total Segments
Gravity	824,178	3,378
Non-Gravity	50,821	114
Totals:	**874,999**	**3,492**

Line Assets by Type

Material	Length (FT)	Segment Count
Gravity		
Cast Iron	62	1
Clay or VCP	21,697	93
Concrete	27,961	135
Corrugated Metal	2,709	15
Ductile Iron	1,148	13
Non-reinforced Concrete	14,319	64
PVC	20,054	101
Reinforced Concrete	527,566	2,021
Truss	17,727	101
Unknown	190,934	834
Non-Gravity		
Cast Iron	882	1
Concrete	95	2
Ductile Iron	8,710	25
HDPE	22,185	22
Reinforced Concrete	6,537	8
Unknown	12,411	56

Report Date: 09/05/2018

Table 1 – Asset Summary (continued)

WRC WATER RESOURCES COMMISSIONER

ASSET SUMMARY

Evergreen Farmington S.D.S. - 58410

Line Assets by Diameter

Diameter	Length (FT)	Segment Count
Gravity		
Unknown	449	3
<=8	4,053	29
>8 and <= 12	157,879	726
>12 and <=16	148,368	657
>16 and <=24	278,457	1,177
>24 and <=36	130,491	516
>36	104,480	270
Non-Gravity		
<=8	6,077	18
>8 and <= 12	1,626	37
>12 and <=16	1,335	6
>16 and <=24	34,311	40
>24 and <=36	7,452	12
>36	21	1

PROJECT HIGHLIGHTS

The development of this Asset Management Program for the EFSDS was led by ASI with assistance from HRC and WRC. The following highlights some of the more tangible outcomes from the Program development:

- An updated PowerPlan inventory of the system
- Over the past 15 years 795,056ft (97.8%) of the system has been cleaned and televised
- Inspected 946 manholes
- Inspected 11 pump station, 5 flow regulators, 7 flow level monitors, and an overflow chamber
- Reviewed FOG ordinance
- Made recommendations for project planning

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date November 30, 2018
(no later than 3 years from executed grant date)

The Evergreen-Farmington Sewage Disposal System (EFSDS) certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1297-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: No

   If No - Date of the rate methodology approval letter: May 16, 2018.

2) Significant Progress Made: Yes or No

   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)

3) Date of rate methodology review letter identifying the gap: ________________________.

4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ____________________________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Carrie Ricker Cox	at	248-470-1314	or	coxc@oakgov.com
Name		Phone Number		Email

[signature] 11/27/18

Signature of Authorized Representative (Original Signature Required) Date

Jim Nash, Water Resource Commissioner, Oakland County Water Resources Commission
Print Name and Title of Authorized Representative

Memorandum

Date:	November 29, 2018
To:	Mr. Clarence Jones
Company:	Michigan Department of Environmental Quality
From:	Prein&Newhof
Project #:	2130526
Re:	City of Fennville SAW Grant: Summary of Wastewater Asset Management Plan

Mr. Jones:

This memorandum provides the summary of the City of Fennville wastewater asset management plan SAW grant activities required under Section 603 of Public Act 84 of 2015. Headings and italicized quotes are from recent MDEQ guidance.

Grantee Information

Grantee:
City of Fennville
222 S. Maple Street
Fennville, MI 49408
www.fennville.com

Contact: Mr. Tom Pantelleria, Mayor
Phone: 269-561-8321

SAW Grant Project Number: 1472-01

Executive Summary

The City of Fennville received a SAW Grant in November 2015 to prepare a Wastewater and Stormwater Asset Management Plans. The Grant agreement indicated the following amounts:

Project Total	Grant Amount	Local Match
$427,891	$416,156	$11,735
Project Total	Wastewater Costs	Stormwater Costs
$427,891	$310,544	$117,347

The Key components in the Asset Management Plan include:

1. Asset Inventory and Condition Assessment
2. Criticality of Assets
3. Level of Service
4. Operation and Maintenance Strategies/Revenue Structure
5. Long-term Funding/Capital Improvement Plan

Asset Inventory

"Describe the system components included in the AMP. Discuss how they were located and identified, if applicable. Describe the platform used to develop and maintain the inventory of assets."

All assets that are functionally or financially significant to the wastewater system have been inventories. Manhole, gravity sewer main, force main, wastewater plant external assets, and lift station locations were plotted in a Geographic Information System (GIS) using record drawings. Manhole and lift station locations were field verified and locations adjusted with survey grade Global Positioning System (GPS) coordinates.

Asset inventory data including year of installation, material, sizes, pipe inverts and manhole rim elevations were cataloged from record drawing and visually verified where needed. Asset inventory data is managed using GIS databases.

Location of non-pipe assets, such as, lift station components, wastewater plant internal assets, building components, and other equipment is compiled in a package of inventory spreadsheets. These assets are not mapped in GIS.

Condition Assessment

Discuss the condition assessment process, including what methods were used. Summarize the results of the assessment for each asset category.

Gravity Sewer Mains: Inspections were made using either a pole mounted zoom camera (looking up or down each pipe from the manholes) or with in-line closed circuit television (CCTV) cameras. Pipes inspected with zoom camera methods were rated considering any observable roots, deposits, joint conditions, pipe wall condition, infiltration, or other defect observations. Pipes inspected with CCTV were rated using the Pipeline Assessment Certification Program (PACP) system condition grading system. Composite Risk of Failure ratings of 1-5 (5 being the worst) were derived for each pipe.

Percentage of gravity sewer pipes in each rating category

1	2	3	4	5
47%	30.5%	14%	4.5%	4%

Force Mains: Force main conditions were estimated using pipe age, material, and break history records. Fennville's force main data was compared with that of several other municipalities to establish a comparative reference. Ratings of 1-5 were developed for each force main.

Percentage of force main pipes in each rating category

1	2	3	4	5
0%	0%	100%	0%	0%

Manholes: Manholes were visually inspected and rated on a scale of 1-5 based factors related to the condition of castings, steps, structures, and infiltration.

Percentage of manholes in each rating category

1	2	3	4	5
2%	55%	21%	8%	2%

No rating= 12%

Lift Stations: Visual inspection and performance testing were completed to evaluate asset condition. Lift station assets, including pumps, valves, piping, structures, electrical, controls, and other assets, were rated on a scale of 1-5. Composite ratings for the station as a whole were developed. Generally, the Main Lift Station is in poor structural condition and in need of capacity improvements to handle peak flows. The Main Lift Station was indicated as in need of replacement. The Third Street Lift Station was indicated as in need of some mechanical and structural improvements.

Number of lift stations in each rating category

1	2	3	4	5
0	0	1	0	1

Wastewater Treatment Plan: Equipment within the WWTP was rated on a scale of 1-5 based on factors relating to physical condition and operating condition. Composite ratings for each component as a whole were developed. The inlet structure, aeration process, ponds, berms, and transfer piping are generally in fair to poor condition. Structural repairs, replacements, and improvements were indicated as necessary to these processes and plant components.

Percentage of WWTP Asset Components within each rating category

1	2	3	4	5
0	0	38%	37%	25%

Criticality of Assets

"A summary of the method used to assess the criticality of assets considering the likelihood and consequence of failure. Discussion may include the method used to assess the criticality of assets considering the likelihood and consequence of failure and based on the condition of the assets and the determined risk tolerance, how were the assets ranked."

Assets were given a Risk of Failure (RoF) rating of 1-5 (5 being the worst) based on factors related to both physical and functional conditions as determined through condition assessments. Assets were given a Consequence of Failure (CoF) rating of 1-5 (5 being the worst) based on potential damage to adjacent utilities, transportation network, and the surrounding property/environment. The magnitude of the potential service disruption was also a factor.

Assets with the higher rankings for Consequence of Failure were those that:

- Provide service to a significant portion of the system
- Serve schools/hospitals/major industry
- Are under major roads or are adjacent to other major utilities
- Are adjacent to waterways or significant wetlands

Criticality ratings were calculated as the product of an asset's RoF and CoF, producing criticality ratings ranging from 1-25 (25 being the most critical). The most critical assets were found to be gravity sewers primarily along Wilson Street, Main Street, Maple Street, and Walter Street.

Level of Service Determination

"A summary of the level of service goals the municipality has determined that it wants to provide its customers based on the municipality's ability to provide the service and customer expectations. Discussion may include the procedures used to involve stakeholders in the level of service discussion. The trade-offs for the service to be provided. This could include any

technical, managerial, health standard, safety, or financial restraints, as long as all regulatory requirements are met. How the level of service goals were determined"

The City recognizes that the people served by the system are more than customers, they are the system owners. City staff acts as stewards of the system. The City has held a numerous public meetings and workshops with the City Staff and Council members. At these meetings, the results of the condition assessments were discussed, the costs for various OM&R strategies affecting the levels of service were reviewed along with potential rate impacts. Based on the input received during these meetings, the following Level of Service Goals has been established:

1. Meet Regulatory Requirements
2. Minimize Service Interruptions
3. Minimize Public Hazards
4. Manage Storm Water Inflow and Ground Water Infiltration
5. Provide Capacity for Community Growth
6. Minimize Life Cycle Costs

Revenue Structure

"A summary of the funding structure and rate methodology that provides sufficient resources to implement the asset management program. Discussion may include the rates, charges, or other means of revenue were reviewed to determine if there will be sufficient funds to cover system operation, maintenance, replacement, capital improvement projects, and debt costs, identified in the AMP. If the current rate structure was not sufficient, discuss what increases were needed to ensure the desired level of service is sustainable and if any changes were made."

Historical operating expenses were reviewed using current audit and budget information. Based on that information, a "Test Year" was developed that reflected a baseline cost. The baseline costs included currently budgeted expenses, debt service, and leveling for base operating cost.

The customer base was reviewed, including the number of billable customers and volumetric sales for our system. Other operating and non-operating revenues were also evaluated. Prediction of customer and volume counts were made including trending in system utilization, projection of operating costs, and anticipated inflation by expense category.

A capital improvement plan provided refined cost projections for the first 10 years of the financial analysis. The annual investment cost was evaluated and scenarios developed for cash funding and debt financing. It was determined the current rate structure was sufficient to cover operations and maintenance activities but increases were needed to implement the desired capital improvements. Based on this analysis, it is expected that a combination of future rate increases and debt financing will be needed to fund capital projects.

Capital Improvement Plan

"A summary or the long-term Capital Improvement Plan that was developed to address system needs identified in the AMP."

A capital improvement plan showing project descriptions, cost estimates, and project timelines, was developed for the capital improvements needed within a ten year planning period. The major wastewater system projects identified in the CIP are:

- Sewer Reconstruction, Sewer Lining, and Point Repairs (with emphasis on structural deficiencies and reduction of direct sources of I&I)
- Sewer Replacements include segments on: Walter Street, South Maple Street, East Main Street (M-89), and a re-alignment on Fennville Street
- Separation of MDOT Storm Catch Basins in M-89 (MDOT project)
- Main Lift Station Replacement
- WWTP Improvements (including lagoon berm repairs, slope protection, aerator and transfer pipe replacement)
- Third Street Lift Station Improvements
- Sanitary Sewer Yearly Cleaning and Televising

List of Major Assets

"Provide a general list of the major assets identified in the AMP."

Fennville's major assets include:

- 2 lift stations (Main Lift Station and Third Street Lift Station)
- 29,900 feet of 8" to 18" diameter gravity sewer
- 2,300 feet of 4" to 6" diameter force main
- 132 manholes
- A Wastewater Treatment Plant with an inlet structure, an aerated pond, and four stabilization ponds with intermediate control structures and piping, and an outlet structure

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date November 29, 2018
(no later than 3 years from executed grant date)

The City of Fennville *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1472-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or No
   If No - Date of the rate methodology approval letter: May 3, 2018.
2) Significant Progress Made: Yes or No
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: ______.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ______.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Amanda Morgan, City Adminstrator at 269-561-8321 amorgan@fennville.com

Name | Phone Number | Email

Thomas Pantelleria

November 27, 2018

Signature of Authorized Representative (Original Signature Required) Date

Thomas Pantelleria, Mayor of City of Fennville

Print Name and Title of Authorized Representative

Memorandum

Date:	November 29, 2018
To:	Mr. Clarence Jones
Company:	Michigan Department of Environmental Quality
From:	Prein&Newhof
Project #:	2130526
Re:	City of Fennville SAW Grant: Summary of Storm water Asset Management Plan

Mr. Jones:

This memorandum provides the summary of the City of Fennville storm water asset management plan SAW grant activities required under Section 603 of Public Act 84 of 2015. Headings and italicized quotes are from recent MDEQ guidance.

Grantee Information

Grantee:
City of Fennville
222 S. Maple Street
Fennville, MI 49408
www.fennville.com

Contact: Mr. Tom Pantelleria, Mayor
Phone: 269-561-8321

SAW Grant Project Number: 1472-01

Executive Summary

The City of Fennville received a SAW Grant in November 2015 to prepare a Wastewater and Storm Water Asset Management Plans. The Grant agreement indicated the following amounts:

Project Total	Grant Amount	Local Match
$427,891	$416,156	$11,735
Project Total	Wastewater Costs	Storm water Costs
$427,891	$310,544	$117,347

The Key components in the Asset Management Plan include:

1. Asset Inventory and Condition Assessment
2. Criticality of Assets
3. Level of Service
4. Operation and Maintenance Strategies/Revenue Structure
5. Long-term Funding/Capital Improvement Plan

Asset Inventory

"Describe the system components included in the AMP. Discuss how they were located and identified, if applicable. Describe the platform used to develop and maintain the inventory of assets."

All assets that are functionally or financially significant to the storm water system have been inventoried. Manhole, catch basin, sewer pipe, and retention/detention basin locations were plotted in a Geographic Information System (GIS) using record drawings, aerial imagery, and land contours. Locations were field verified and locations adjusted with survey grade Global Positioning System (GPS) coordinates.

Asset inventory including year of installation, material, sizes, pipe inverts and manhole rim elevations were cataloged from record drawing and visually verified where needed. Asset inventory data is managed using GIS databases.

Condition Assessment

Discuss the condition assessment process, including what methods were used. Summarize the results of the assessment for each asset category.

Storm Sewer Pipes: Inspections were made using either a pole mounted zoom camera (looking up or down each pipe from the manholes) or with in-line closed circuit television (CCTV) cameras. Pipes inspected with zoom camera methods were rated considering any observable roots, deposits, joint conditions, pipe wall condition, or other defect observations. Pipes inspected with CCTV were rated using the Pipeline Assessment Certification Program (PACP) system condition grading system. Composite Risk of Failure ratings of 1-5 were derived for each pipe.

Percentage of gravity sewer pipes in each rating category

1	2	3	4	5
58%	17%	10%	1%	3%

No rating= 11%

Manholes and Catch Basins: Manholes and catch basins were visually inspected and rated on a scale of 1-5 based factors related to the condition of castings, steps, structures, and sediment.

Percentage of structures in each rating category

1	2	3	4	5
26%	46%	9%	8%	2%

No rating= 9%

Criticality of Assets

"A summary of the method used to assess the criticality of assets considering the likelihood and consequence of failure. Discussion may include the method used to assess the criticality of assets considering the likelihood and consequence of failure and based on the condition of the assets and the determined risk tolerance, how were the assets ranked."

Assets were given a Risk of Failure (RoF) rating of 1-5 (5 being the worst) based on factors related to both physical and functional conditions as determined through condition assessments. Assets were given a Consequence of Failure (CoF) rating of 1-5 (5 being the worst) based on potential damage to adjacent utilities, transportation network, and the surrounding property/environment. The magnitude of the potential service disruption was also a factor.

Criticality ratings were calculated as the product of an asset's RoF and CoF, producing criticality ratings ranging from 1-25 (25 being the most critical). The most critical assets were generally found to be storm sewers along South 58th Street, Elizabeth Street, and the North Alley.

Level of Service Determination

"A summary of the level of service goals the municipality has determined that it wants to provide its customers based on the municipality's ability to provide the service and customer expectations. Discussion may include the procedures used to involve stakeholders in the level of service discussion. The trade-offs for the service to be provided. This could include any technical, managerial, health standard, safety, or financial restraints, as long as all regulatory requirements are met. How the level of service goals were determined"

The City recognizes that the people served by the system are more than customers, they are the system owners. City staff acts as stewards of the system. The City has held a series of public meetings where the results of our condition assessments were presented, and costs for meeting various Levels of Service and OM&R strategies were discussed. Budget impacts of those options were reviewed and discussed at public meetings. Based on the input received the following Level of Service Goals have been established:

1. Meet Regulatory Requirements
2. Minimize Flooding and Public Hazards
3. Manage Storm Water Inflow our Wastewater System
4. Provide Capacity for Community Growth
5. Minimize Life Cycle Costs
6. Maintain Water Quality

Revenue Structure

"A summary of the funding structure and rate methodology that provides sufficient resources to implement the asset management program. Discussion may include the rates, charges, or other means of revenue were reviewed to determine if there will be sufficient funds to cover system operation, maintenance, replacement, capital improvement projects, and debt costs, identified in the AMP. If the current rate structure was not sufficient, discuss what increases were needed to ensure the desired level of service is sustainable and if any changes were made."

Storm water system improvements are funded with street improvements through the City's General Fund. Project costs were estimated for capital improvements within the first 10 years. Future costs beyond the 10 year capital improvement plan were projected using inventory and condition assessment data. Based on this analysis, the City is considering property tax millage rate increases (by vote of the people) to begin increasing General Fund revenues in combination with potential bond issues.

Capital Improvement Plan

"A summary or the long-term Capital Improvement Plan that was developed to address system needs identified in the AMP."

A capital improvement plan showing project descriptions, cost estimates, and project timelines, was developed for the capital improvements needed within a ten year planning period. The storm water system projects identified in the CIP are:

- Storm Sewer Reconstruction and Point Repairs (including: the North Alley, South Alley, Elizabeth Street, M-89 Catch Basins)
- Storm Sewer Yearly Cleaning & Televising
- Surface Drainage and Outlet Improvements (including: the IRP Surface Drainage Improvements, Landsburg Road and Wilson Street Outlet and Ditch Improvements, Center St. & Sherman St. Storm Sewer Reroute)

- Sewer Reconstruction and Capacity Improvements (including Third, Elm, Second, and First Streets Sewer Replacement)

List of Major Assets

"Provide a general list of the major assets identified in the AMP."

Fennville's major assets include:

- 15,854 feet of 6" to 36" diameter storm sewer
- 23 manholes
- 131 catch basins / inlets
- DDA parking lot storm basin

November 5, 2018
City of Fennville

The regularly scheduled meeting of the City of Fennville was called to order in City Hall at 7:00 p.m. by Mayor Pantelleria.

Commissioners Present: Almquist, Hageman, Hayden, Pantelleria, Machan, Suerth
Absent: Brien

Public present: Amanda Morgan, City Administrator; Dana Burd, Prein & Newhof; Angela Holmes, West MI Blue Star COC; Adrian Willauer; Melanie Sowers.

The pledge of allegiance was recited.

APPROVAL OF AGENDA: Approved as printed.

PUBLIC COMMENTS: Angela Holmes of the West MI Blue Star COC invited the Commission to the annual banquet/fundraiser on Jan 19, 2019 at the Cut Above Event Center in Saugatuck, MI, and she updated the Commission on other upcoming Chamber events.

APPROVAL OF MINUTES: **Moved by Suerth, seconded by Almquist, to approve the minutes of the October 15, 2018 meeting as printed.** Voted Yes: All. Motion carried.

COMMUNICATIONS: Reviewed the "Pavement Warranty Program" received from MML.

UNFINISHED BUSINESS: The City Commission received an update on the SAW Grant Project from Dana Burd of Prein & Newhof. The 3-year, $400k Stormwater and Wastewater Grant is wrapping-up and the Commission was provided with two summary memos.

The City Commission was asked to approve the Stormwater and Wastewater Asset Management Plans.

Moved by Pantelleria, seconded by Machan, to approve the Stormwater and Wastewater Asset Management Plans as presented with the assistance of Prein & Newhof. Voted Yes: All. Motion carried.

NEW BUSINESS:

The City Commission was asked to authorize the City Administrator to begin work with contractors on items related to the USDA Water projects including survey and right-of-way work. Discussion regarding the projects and timing of the projects, as well as funding sources (USDA, SRF, City's General Fund). The Mayor requested project summaries from Prein & Newhof to be distributed to the Commission members.

Moved by Machan, seconded by Almquist, to authorize the City Administrator to begin work with contractors on items related to the USDA Water projects including survey and right-of-way work. Voted Yes: All. Motion carried.

The City Commission was asked to approve the Holiday Celebration Special Event scheduled for Saturday, December 1, 2018. Discussion regarding the event; security has been increased this year to assist with the road closure/blockage for the parade.

Moved by Suerth, seconded by Almquist, to approve the Holiday Celebration Special Event scheduled for Saturday, December 1, 2018. Voted Yes; All. Motion carried.

REPORTS OF STANDING COMMITTEES:

Finance/Personnel:
- Mayor Pantelleria presented a quarterly financial update; budgets are at the 35-40% mark.
- DPW position has been posted in-house and a contract as an "independent contractor" has been given to Tuhacek for his review.
- Personnel Policy update is still in progress.

City Services:
- Suerth reported the FAFB updated the job descriptions for the Deputy Chief and Sergeants positions.

City Properties:
- Pantelleria reported the City needs to grind the tree stumps on 56th Street and a bid has been received to remove two more trees on 56th Street.

Ordinances/Community Relations:
- Hayden reported he is continuing to work on street signage in honor of Patty Birkholz.

Planning:
- No report.

Administrative/DDA:
- Pantelleria reported the DDA will meet on Wednesday November 7, 2018. The Holiday Celebration, Lakeshore Network Event, new signage for the City and extension of the Streetscape will be discussed.

MISCELLANEOUS:

Machan reported a street light out near the intersection of M89 and 58th Street.

CITY ADMINISTRATOR REPORT:
- Morgan reminded the Commission the Voting Polls are open from 7:00 am to 8:00 pm on Tuesday November 6, 2018.

APPROVAL OF BILLS: **Moved by Machan, seconded by Almquist, to approve payment of the bills as printed in the amount of $32,960.73.** Voted Yes: All. Motion carried.

Meeting adjourned at 8:03 p.m. The next meeting of the City Commission will be held on Monday, November 19, 2018 at 7:00 p.m.

Respectfully submitted,

Deborah Perez
Clerk/Treasurer

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
LANSING

RICK SNYDER
GOVERNOR

C. HEIDI GRETHER
DIRECTOR

May 16, 2018

Mr. Tom Pantelleria, City Commissioner
City of Fennville
222 Maple Street, P.O. Box 666
Fennville, Michigan 49040

Dear Mr. Pantelleria:

SUBJECT: Stormwater, Asset Management, Wastewater (SAW)
City of Fennville
Wastewater and Stormwater Asset Management Plans
SAW Grant No. 1472-01

This letter is a helpful reminder regarding your SAW grant deliverables, which are due at the end of the grant period. This letter extends all third round SAW grant budget periods from January 2013 to November 2018. The grant deliverables are due at the end of the month in which the grant was signed (i.e., November 30, 2018, for third round SAW grants). Eligible expenses must be incurred prior to the grant end date (i.e., November 30, 2018). Final Disbursement Requests should be submitted within 60 days of this grant end date. The grant deliverables are as follows:

Asset Management Plan: The asset management plan (AMP) grant deliverables include:

1) A signed Certification of Project Completeness form, and

2) An AMP summary as required under Section 603 of Public Act 84 of 2015. The summary must include:
    a. A brief discussion of each of the five major components. See enclosed SAW AMP Executive Summary Guidance for suggested format and content.
    b. A list of the plan's major identified assets.
    c. Contact information for the grantee including name, address, and phone number, with the SAW grant number at the top of the document.

3) In addition, the AMP must be available to the Department of Environmental Quality (DEQ) upon request, and a copy of the plan must be available to the public for at least 15 years. Please note that the SAW wastewater AMP is intended to comply with the requirements of an asset management program under the DEQ National Pollutant Discharge Elimination System permit program, if applicable.

If you have any questions, please contact me by phone at the number listed below, by email at Jonesc13@michigan.gov, or by mail at DEQ, P.O. Box 30817, Lansing, Michigan 48909-8311.

Sincerely,

Clarence Jones, Project Manager
Revolving Loan Section
Drinking Water and Municipal Assistance Division
517-284-5410

Enclosures (Certification of Project Completeness for WWAMP and SWAMP; AMP Summary Guidance)

cc: Mr. Jim Hegarty, Prein & Newhof, Grand Rapids
Mr. Dana Burd, Prein & Newhof, Holland
Mr. Marcus Tironi, DEQ-Water Resource Division, Kalamazoo District Office

DEQ

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Due Date November 29, 2018
(no later than 3 years from executed grant date)

The City of Fennville *(legal name of grantee)* certifies that all stormwater asset management plan (SWAMP) activities specified in SAW Grant No. 1472-01 have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SWAMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

Amanda Morgan, City Adminstrator at 269-561-8321 amorgan@fennville.com

Name | Phone Number | Email

Thomas Pantelleria November 27, 2018

Signature of Authorized Representative (Original Signature Required) Date

Thomas Pantelleria, Mayor of City of Fennville

Print Name and Title of Authorized Representative

MEMORANDUM

To: Michigan Department of Environmental Quality (MDEQ)
Revolving Loan Section
Attn: Karol Patton

From: Hubbell, Roth and Clark, Inc.

CC: Flint WPCF

Date: November 30, 2018

Re: City of Flint WPCF
MDEQ Stormwater, Asset Management and Wastewater (SAW) Grant #1384-01
Summary of Wastewater Asset Management Plan

The following is a summary of the work completed under the MDEQ SAW Grant work performed by the City of Flint's Water Pollution Control Facility (WPCF). It includes a summary of the project scope, results and findings of activities covered by the grant, grant amount spent and match amount, and contact information. It has been prepared as required under Section 603 of Public Act 84 of 2015, and follows recent MDEQ guidance.

GRANTEE INFORMATION

City of Flint, SAW Grant Project #1384-01

Project Grant Amount: $2,000,000

Applicant Match Amount $0 (Flint qualified as a disadvantaged community)

SAW Authorized Representative
Hughey Newsome, Flint CFO
(810) 766-7266

Flint WPCF Project Manager
Robert Case
rcase@cityofflint.com
(810) 766-7210

WPCF Consulting Engineer
Hubbell, Roth & Clark, Inc.
Trevor Wagenmaker, PE
(248) 454-3564
twagenmaker@hrcengr.com

WPCF Consulting Engineer
WadeTrim, Inc.
Tiffany Harrison, PE
(810) 235-2555
tharrison@wadetrim.com

EXECUTIVE SUMMARY

The City of Flint applied for and received a grant to develop an Asset Management Plan (AMP) for its sanitary and storm sewerage and treatment systems through the Michigan Department of Environmental Quality's (MDEQ) Stormwater, Wastewater and Asset Management (SAW) program. Because the SAW program was funded through monies appropriated for water quality, other related infrastructure systems, such as drinking water, were not eligible for funding through the grant, but are considered in analysis and recommendations where appropriate.

The following is a summary of the AMP, as required by the grant, which includes a brief discussion of the five major AMP components, a list of the plan's major identified assets, and contact information for the grant.

WASTEWATER INVENTORY AND CONDITION ASSESSMENT

For the Flint PCF, the inventory defined an asset as any equipment or structures shown on one of the facility's process flow schematics. For piping systems, this generally included valves and other ancillary equipment greater than 4" in diameter. For chemical systems, assets were included for smaller diameter systems due to their criticality. The inventory was generated on a spreadsheet that included basic attribution including asset type, description, year of installation, replacement cost, and basic attribution such as size, material of construction, manufacturer, model number and other nameplate data. This information was initially entered into a spreadsheet that was then uploaded into the WPCF's Computerized Maintenance Management System (CMMS.) The inventory process resulted in approximately 2,552 individual assets being identified.

The WPCF's current CMMS software is Anterro by AllMax Software. The WPCF is also using e.RIS by Eramosa to provide additional support and reporting capabilities. The inventory will provide the basis for leveraging the software to provide a scheduled maintenance and work order tracking system as the WPCF continues to implement its asset management program.

Unfortunately, the facility had limited record drawings available and many historical records had been lost or destroyed. As part of the inventory work, 3D laser scans were made on the interior and exterior of all major structures to create spatial models of the facility. These can be used in lieu of record drawings to provide a basis for future improvement projects to be planned, designed and constructed.

The current condition of each asset was estimated based on age, input from staff, industry standards, review of record installation and repair data, and in some cases, detailed inspections. An estimate of remaining useful life was made for each asset based on its condition, typical expected life for the type of equipment, and other factors. The condition data was added to the overall asset inventory as a score on a scale of 1 to 5.

Asset Condition	Rating
Unserviceable - Over 50% of asset requires replacement	5
Significant deterioration - significant renewal/upgrade required (20 -40%)	4
Moderate deterioration -Significant maintenance required (10 -20%)	3
Minor Deterioration - Minor maintenance required (5%)	2
New or Excellent Condition - Only normal maintenance required	1

The pricing for the equipment when it was installed was reviewed along with typical industry cost data, and in some cases, vendor quotations. The estimated replacement costs for the individual assets were used to calculate the total system replacement value.

Due to the age of the facility, an emphasis was placed on determining the condition of many of the structures at the WPCF. Unlike equipment that may be determined to be failing based on observations made by staff during the normal course of operation, the deterioration of structures may not be overlooked for an extended period. There was also sufficient budget in the SAW grant to perform a more detailed assessment of certain facilities deemed to be more critical. Technical memos were prepared to document the state of existing structures, and to give each structure inspected an overall condition rating as well as an associated estimated cost for repair. Detailed assessments were made for the following structures/systems:

- Battery A & Battery B Grit Tanks
- Battery A & Battery B Primary Settling Tanks
- Battery A & Battery B Aeration Tanks
- Chlorine Contact Tank
- Final Settling Tanks
- North & South Digester Tanks
- Sludge Storage Tank
- Conditioned Sludge Decant Tanks
- Influent Box
- 3rd Ave Pump Station
- Retention Basins
- Above-grade piping systems (thickness testing) for the Grit A and Grit B influent pipes; 3rd Ave Pump Station discharge header; 3rd Ave Force Main (west exposed section); Battery A and Battery B aeration header; and Battery B aeration tank influent pipe

CRITICALITY OF ASSETS

To determine the Probability of Failure (PoF), the following table was used to rank each asset.

Description	Performance Rating	Failure of Individual Item	Type of Failure
Imminent	5	Likely to occur in the life of the item	Continuously experienced
Probable	4	Will occur several times in the life of an item	Will occur frequently
Occasional	3	Likely to occur sometime in the life of an item	Will occur a few times
Remote	2	Unlikely but possible to occur in the life of an item	Unlikely, but can reasonably be expected to occur
Improbable	1	So unlikely, it can be assumed occurrence may not be experienced	Unlikely to occur, but possible

To determine the Consequence of Failure (CoF), the following table was used to rank each asset.

Description	Performance Rating	Impact
Catastrophic disruption	5	Massive system failure, severe health affect, persistent and extensive damage
Major disruption	4	Major effect, major loss of system capacity, major health effects, major costs, important LOS compromised
Moderate disruption	3	Moderate effect, moderate loss of system capacity, moderate health effects, moderate costs, important LOS still achieved
Minor disruption	2	Minor effect, minor loss of system capacity, minor health effects, minor costs
Insignificant disruption	1	Slight effect, slight loss of system capacity, slight health effects

The assets that have the greatest probability of failure and the greatest consequences associated with the failure will be the assets that are the most critical. The Business Risk Evaluation (BRE) score takes into account the PoF, the CoF, shown below. Adjustments are then made to take into account any redundancy available that would mitigate the consequence of failure.

BRE = PoF × CoF

LEVEL OF SERVICE DETERMINATION

The City of Flint Department of Public Works (DPW) oversees the Transportation Department and the Utilities Department, which includes the WPCF. The DPW is continually striving to provide efficient services for the public that are both measurable and transparent.

DPW Vision

The vision of the Public Works Department is to be a well-managed and well-trained workforce that utilizes all available resources, technology, and collaborative means to maintain the City's above and underground infrastructure and facilities.

DPW Mission

The Flint DPW is committed to the development of qualified managers and workers with consistent ongoing training, data driven decisions, and the improved ability to measure job performance. The DPW will aggressively engage in strategic local and state level partnerships while continuously implementing new and improved technologies, procedures, and policies.

The WPCF's draft Level of Service Goals are summarized in the following table. These goals may be modified as the WPCF's AMP continues to be developed and updated as part of its NPDES permit requirements:

Attribute	Objective	Goal	Measurable
Regulatory Compliance	• Protect Flint River	• No exceedances	• NPDES permit limits
	• Convey all sewage generated by customers to WWTP	• Zero overflows due to pump stations for less than 25 yr/24 hr storm	• Basement backups/SSOs
Operational	• Manage biosolids inventory	• Annually haul adequate volume	• Yes or No
	• Manage Industrial User accounts	• Monitor and respond per ordinance	• # of violations
	• Be aware of collection system changes	• Annually review new connections/uses	• Yes or No
Employees and Safety	• Employee staffing	• Less than six months to fill a vacant position	• Number of vacancies & duration to fill positions
	• Employee training	• All staff earn required CECs in license renewal cycle	• Continuing education credits
	• Employee utilization	• 90% of time shall be related to the Department*	• % of Work Time
	• Safe work place	• Less than 5 incidents requiring employee down time	• Annual worker downtime
		• Zero OSHA violations	• OSHA violations
		• Monitor frequency and address deficiencies	• Injury reports
Security	• Maintain secure site and facilities	• Monitor frequency and address deficiencies	• # of vandalism/theft incidents
Customer Relations and Business Practices	• Minimize WWTP/pump station odors	• Less than 5 incidents per year	• # of incidents
	• Correct Billing of Accounts	• Less than 5 errant bills per year	• # of errant bills
	• Engage customers and decision makers	• Four outreach events/publications per year	• # of outreach events/ publications
	• Maintain relationship with engineering consultant with institutional knowledge of the plant	• Have an engineer "on call" for issues that may arise	• Yes or no
Revenue	• Ensure revenue meets budget requirements	• Maintain rate structure sufficient for OM&R and CIP	• Yes or no
	• Maintain efficient hauled waste operation for haulers	• Maintain or increase haulers utilizing the receiving facility and volume received year-to-year	• # of haulers using the facility and volume (gallons) received per year

REVENUE STRUCTURE

The City of Flint staff worked with its internal fiscal staff to determine if the system's current rate structures were sufficient to meet the current needs for the management of the system, and to plan for any adjustments that may be required to meet anticipated future expenses. As part of the SAW Grant Program, a rate sufficiency determination was sent to the MDEQ for review on April 27, 2018. The City received a response letter from the MDEQ dated, June 19, 2018, that indicated the City had fulfilled the significant progress toward achieving the funding structure necessary to implement the asset management program.

CAPITAL IMPROVEMENT PLAN

A list of capital projects was developed for Flint's WPCF, using the asset risk data, as well as consideration of other regulatory, capacity and operational needs.

The recommended projects are summarized below. All projects are listed for financial and resource planning purposes only. Changes to project inclusion, scope, cost and/or timing are expected as resources are allocated and changes occur in prioritization, regulations, technology, cost and other data becomes available.

ENGINEER'S OPINION OF PROBABLE PROJECT COST

Bloomfield Hills, MI — Telephone: (248) 454-6300

PROJECT:	**Flint Asset Management Plan**	DATE:	**10/22/2018**
LOCATION:	**Flint, MI**	PROJECT NO.	**20151005**
BASIS FOR ESTIMATE:	[x] CONCEPTUAL [ ] PRELIMINARY [ ] FINAL	ESTIMATOR:	**DMH**
WORK:	**Total CIP Cost and Ranking**	CHECKED BY:	**TSW**
		CURRENT ENR:	**11116**

PRIORITY RANK	DESCRIPTION	QUANT.	UNIT	UNIT AMOUNT	TOTAL AMOUNT
1	East Pump Station Pump Replacement	1	LS	$ 1,500,000	$ 1,500,000
2	3rd Ave Pump Station Improvements	1	LS	$ 4,300,000	$ 4,300,000
3	Grit Battery A	1	LS	$ 1,500,000	$ 1,500,000
4	NW Pump Station Improvements	1	LS	$ 3,000,000	$ 3,000,000
5	Aeration Process Modifications	1	LS	$ 13,700,000	$ 13,700,000
6	Grit and Screening Battery B	1	LS	$ 5,300,000	$ 5,300,000
7	Sludge Dewatering Improvements	1	LS	$ 2,600,000	$ 2,600,000
8	UV Disinfection	1	LS	$ 5,200,000	$ 5,200,000
9	Primary Electrical Switchgear Upgrade	1	LS	$ 5,900,000	$ 5,900,000
10	Influent Structure Replacement	1	LS	$ 4,500,000	$ 4,500,000
11	Primary Tank Rehabilitaiton	1	LS	$ 5,400,000	$ 5,400,000
12	RAS Flow Control Battery B	1	LS	$ 650,000	$ 650,000
13	Final Clarifier Rehabilitation	1	LS	$ 6,000,000	$ 6,000,000
14	3rd Ave Force Mains	1	LS	$ 45,000,000	$ 45,000,000
15	Waste Unloading Station	1	LS	$ 750,000	$ 750,000
	TOTAL CIP PROJECT COST				***$ 105,300,000***

A schedule for implementation will be developed as part of the City's overall budgetary process, and after review of potential funding and financing sources.

RECOMMENDATIONS

In order to keep this AMP sustainable into the future, the WPCF will be complying with the MDEQ's regulatory asset management requirements identified in its NPDES permit. Recommendations for and timing for implementation of capital projects will be reviewed annually to ensure the availability of required funds for the projects.

The NPDES permit also requires an annual reporting of:

- A written report that summarizes asset management activities completed during the previous year and planned for the upcoming year. The written report shall include:
- A description of the staffing levels maintained during the year
- A description of inspections and maintenance activities conducted and corrective actions taken during the previous year
- Expenditures for collection system maintenance activities, treatment works maintenance activities, corrective actions, and capital improvement during the previous year
- A summary of assets/areas identified for inspection/action (including capital improvement) in the upcoming year based on the five (5) core elements and the Business Risk Factors
- A maintenance budget and capital improvement budget for the upcoming year that take into account implementation of an effective Asset Management Program that meets the five (5) core elements
- An updated asset inventory based on the original submission
- An updated OM&R budget with an updated rate schedule that includes the amount of insufficient revenues, if any LIST OF MAJOR ASSETS

SUMMARY OF ASSETS

- A percentage-based breakdown describing the condition of Flint's WPCF assets:
  - Condition ranking of 1 (best) – 12.2%
  - Condition ranking of 2 – 27.6%
  - Condition ranking of 3 – 34.9%
  - Condition ranking of 4 – 12.5%
  - Condition ranking of 5 (worst) – 12.8%

- Quantity of assets based on location in treatment process:
  - 3rd Avenue Pump Station – 125 (4.9%)
  - East Pump Station – 121 (4.7%)
  - Northwest Pump Station – 71 (2.8%)
  - Lift Stations – 258 (10.1%)
  - Influent Box – 13 (0.5%)
  - Grit A – 59 (2.3%)
  - Grit B – 50 (2.0%)
  - Primary Tanks A – 141 (5.5%)
  - Primary Tanks B – 99 (3.9%)
  - Aeration Tanks A – 303 (11.9%)
  - Aeration Tanks B – 268 (10.5%)
  - Equipment Building – 40 (1.6%)
  - Blower Building – 36 (1.4%)
  - Final Tanks A – 38 (1.5%)

- Final Tanks B – 47 (1.8%)
- Disinfection – 107 (4.2%)
- Phosphorus Control – 47 (1.8%)
- Building Components – 93 (3.6%)
- Digestion – 318 (12.4%)
- Solids Dewatering – 186 (7.3%)
- Retention Treatment Basin – 90 (3.5%)

- Quantity of exposed pipe (greater or equal to 4" diameter) at the Flint WPCF:
  - Aeration – 5,450 ft
  - Cake – 300 ft
  - Digestate – 1,560 ft
  - Drain – 1,890 ft
  - Final Effluent Water – 7,840 ft
  - Grit – 540 ft
  - Heating Water – 280 ft
  - Return Activated Sludge – 1,735 ft
  - Scum – 650 ft
  - Waste Activated Sludge – 1,250 ft
  - Wastewater – 2,340 ft

- Quantity of buried pipe (greater or equal to 4" diameter) at the Flint WPCF:
  - Aeration – 4,060 ft
  - Drain – 832 ft
  - Potable Water – 3,802 ft
  - Grit – 566 ft
  - Storm – 12,902 ft
  - Sludge – 8,568 ft
  - Scum – 6,792 ft
  - Wastewater – 12,705 ft

EXECUTIVE SUMMARY

INTRODUCTION

The City of Flint (City) applied for and was subsequently awarded a Stormwater Asset Management and Wastewater Asset Management (SAW) Grant for $2,000,000, with a local match of $0, from the Michigan Department of Environmental Quality (MDEQ) for the purposes of development and implementation of a Stormwater and Wastewater Asset Management Plan (SWAMP and WWAMP). A total of $1,400,000 was allocated for the Wastewater Asset Management Plan (WWAMP) development costs and a total of $600,000 was allocated for the Stormwater Asset Management Plan (SWAMP) development costs. A Grant Agreement between the City and the MDEQ was entered into on November 30, 2015 with an effective grant period from January 2013 to November 2018. Of the $1,400,000 wastewater collection system and wastewater treatment grant total, $350,000 was allocated for wastewater treatment and pumping station initiatives with a contract being awarded to Hubbell, Roth & Clark, Inc. (HRC) for completion of the work. The remaining $1,050,000 of the grant was allocated for wastewater collection system with a contract being awarded to Johnson & Anderson, Inc. (J&A) to complete the wastewater collection system portion of the AMP.

A project team consisting of pertinent City staff as well as engineering and financial consultants undertook the mission of developing and implementing the WWAMP with the final goal of receiving approval from the MDEQ. The final WWAMP report will be placed on file at the City Office and made available to the public for a period of 15 years, beginning in December 2018.

Mr. Mark Adas, P.E., City Engineer, has been assigned as the Authorized Representative for the SAW Grant project. His contact information is as follows: 1101 S. Saginaw Street, North Building N102, Flint, Michigan, 48502; (810) 766-7135.

The City's wastewater collection system consists of approximately 573 miles of 6-inch to 108-inch gravity mains, 7 miles of pressure mains, 12,846 manholes, approximately 47,600 service laterals, and 11 pumping stations. Storage facilities include an 8.5 feet diameter deep tunnel (10MG of storage), and a 10 MG Retention Treatment Basin (RTB). The deep tunnel was constructed of concrete in the late 1970's as part of the RTB project.

The City's wastewater flow is transported through a series of interceptors to 3 main feeder pumping stations (East Pumping Station, Third Avenue Pumping Station, and Northwest Pumping Station). These 3 main pumping stations pump flow to the WPCF for treatment and discharge into the Flint River. Both the East Pumping Station and the Northwest Pumping station are located adjacent to the WPCF. The Third Avenue Pumping Station is located southeast of the WPCF and requires 18,181 ft of force main to convey station flow to the WPCF.

The 8.5 feet diameter tunnel is upstream of the East Pumping Station and discharges to the pumping station. Even though the wastewater and stormwater systems are separated, wet weather can significantly increase flow into the wastewater collection system and, ultimately, the WPCF.

If the flows from the Northwest and Third Avenue Pumping Stations exceed the capacity of the WPCF, the excess flow is diverted to the tunnel through the same 48" pipe that normally conveys flow from the East Pumping Station to the WPCF. Should the rain event be large enough to fill the tunnel, the flow from the tunnel will overflow to the 10 MG RTB for temporary storage. The RTB provides skimming and disinfection if its capacity is exceeded prior to discharging any flow into the Flint River. Since April of 2008, the City has experienced 39 partially treated discharges.

Most of the gravity sewer mains in the wastewater collection system were constructed in the 1920's and 1950's and consist mostly of vitrified clay, concrete and some newer PVC segments. The wastewater collection system manholes are either block or precast concrete.

BACKGROUND

The City's strategic timeframe for the WWAMP is for planning years 2019-2038. It outlines the framework to provide proactive asset management guidance and planning of the wastewater collection system. It was developed to meet the MDEQ SAW grant program outline requirements over a twenty (20) year planning and operational period to ensure optimal asset management and Capital Improvement Planning (CIP) for the City's wastewater collection system infrastructure.

The five (5) core components of an MDEQ approvable WWAMP are listed as follows:

1) Asset Inventory
2) Level of Service
3) Asset Criticality
4) Revenue Structure
5) Capital Improvement Project Plan

ASSET INVENTORY

The entire City is served with a wastewater collection system that consists of sewer main, pressure main, manhole, and pumping station assets.

A total of 8,635 sewer manholes were inventoried and located with a GPS and Robotic Total Station to establish State Plan Coordinates (northing, easting, and elevation of rims and inverts). These asset types and locations were then incorporated into the City's GIS. The City's base GIS information includes parcels, road centerline, and other feature layers.

Several manholes that were initially in the City's GIS were located but could not be inspected due to: vehicles parked over the structures, structures within the roadway that were eventually paved over, lids that were bolted down, etc. Of the manholes that were GPS located and assessed, 101 manholes were buried and 110 manholes were found to be surcharging and/or with significant debris.

Due to limited project funding, SAW Grant funds were not used to televise and clean the City's sanitary sewers. Since specific areas of sewer main and interceptor structural issues that may need repairs or lining were not identified during the development of the WWAMP, it is recommended that as project limits for water main replacement projects or street rehabilitation projects are determined, that sewer main within these project limits are inspected via televising to identify potential problems. This will allow for the sewer main in the project areas to be analyzed to determine how best to correct them and, if replacement or rehabilitation is needed, these tasks can be completed in advance of completion of new road work or during other infrastructure upgrades.

Condition Assessment/Remaining Useful Life

Because grant funds were limited and the City wanted to make sure that as many manholes as possible were GPS located, approximately 8,193 manholes were inspected using a Level 1 modified system (including measuring invert elevations) per National Association of Sewer Service Companies (NASSCO) standards. This procedure was approved by MDEQ.

This NASSCO system is the North American standard for pipeline and manhole defect identification and assessment providing standardization and consistency to methods in which conditions are identified, evaluated, and managed.

An asset reaches the end of its useful life when it is physically non-functioning, no longer performs as it was intended, and/or is no longer the most cost-effective solution to maintain a certain level of performance. The estimated remaining useful life is different for every type of asset. For the purpose of the SAW grant project evaluation, the wastewater collection system sewer mains were estimated to have a useful life of approximately 80 years.

LEVEL OF SERVICE

A Level of Service (LOS) plan was developed by the team members, which defines how the City wants the wastewater collection system to perform against established operational, planning, and best management practices. The LOS standards and goals were developed with review and additional input from the City DPW and Engineering staff including the Environmental Compliance Supervisor, City Engineer, WPC Supervisor, and Accounting & Administration Coordinator. Issues addressed in the development of the LOS included:

- Is the City ever out of compliance with regulations? If so, how often?
- How does the City track and respond to customer needs and complaints?
- Are current staffing levels sufficient to provide proper customer service?
- Are current O&M activities cost-effective and are they being maximized?
- How can current processes be improved?
- Are assets being properly maintained to insure reliability and sustainability?
- How will improvement costs be funded?

During this review, it was identified that:

- the City is anticipated to decrease in population by 31% between now and 2040, which means future wastewater collection system <u>capacity</u> is not a major concern because it was designed and built for a much larger service population even though I/I reduction efforts need to continue; and

- The Public Works Department is currently understaffed and underfunded to properly provide the desired LOS to its residents and businesses.

The analytical framework for the LOS is a triple bottom line approach that incorporates social, environmental, and economic criteria. The social component was divided into four indicators including customer service, reliability, health/safety and administration/organizational development. The environmental component was divided into two (2) indicators that included environmental stewardship and regulatory compliance. The economic component was centered on financial criteria. The LOS impetus was determined to be either self, customer, or regulatory driven with current and future targets identified with their respective performance measures, data, and reporting procedure.

For social indicators, customer service LOS goals focus primarily on the City's responsiveness and efficiency (how effectively operations, maintenance, and daily tasks are performed with limited staff and budget). Reliability was determined to be the dependability of the wastewater collection system to convey flow throughout the system without sewer backups. The health and safety indicator includes the protection of the community's health and the health of City staff maintaining the system in accordance with local, state, and federal safety standards. The administration/organizational development indicator considered the optimization of resources and reduction of overall O&M, planning, and engineering costs.

The Environmental LOS goals include environmental stewardship and regulatory compliance.

The regulatory compliance component focuses on complying with all the local, state, and federal regulations regarding the wastewater collection system. The City has already taken measures to reduce overflows of wastewater into local rivers, creeks and lakes through feasibility studies, planning, and project implementation.

LOS goals for the financial indicator have been developed to ensure adequate funding is available to maintain the wastewater collection system.

A rating or color code system was developed to identify strategic areas that do not need improvement (green), are acceptable with additional improvement needed (yellow), and those that require improvement (red).

As part of its mission, the City strives to provide reliable wastewater services at the minimum cost necessary to meet environmental and health regulations. The LOS plan has also been developed to reinforce the Mission Statement developed by the City, which is outlined below:

Ensure customer confidence through the delivery of high quality and cost-effective services to our residents. Our 6 core themes are: Social Equity and Sustainability, Reshaping the Economy, Quality of Life, Adapting to Change, Youth, and Civic Life.

By instituting a WWAMP, which includes conducting condition assessments and determining the criticality of assets, the City can embark on a proactive approach to managing wastewater collection system assets. The effort will also assist the DPW to prioritize project development, reduce overall project costs and improve project planning and management. The City's approach to wastewater collection system improvements will now also include assessments of other City owned and operated utilities including water main, roads and storm sewer in the planning areas to optimize infrastructure improvements, which will lower individual stand-alone project costs and disruption to residents and businesses.

ASSET CRITICALITY

The criticality of wastewater collection system assets including sewer main, sewer manholes, force mains, pumping stations, and the WPCF were examined in regard to their overall functional importance to the operation of the wastewater collection system and their impacts if they failed. To determine the criticality of system assets, a Business Risk Evaluation (BRE) was performed by analyzing the Consequence of Failure (COF) and Probability of Failure (POF) for each asset.

The COF was determined for sewer mains and manholes using the following factors:

- Economic Impacts (Diameter of Asset, Surface Type Above Asset)
- Environmental/Regulatory Compliance (Distance to Surface Water)
- Social/Community Disruption (Number of Customers, Roadway Impact, Critical Infrastructure)

The COF for the sewer mains and manholes were determined based upon factor and weighting percentages outlined in Table 8 on the following page.

Each of the weighting factors were reviewed and agreed upon by City staff. Social/Community Disruption was scored at 55% of the COF determination for manholes and sewer mains. The more customers out of service due to a wastewater collection system failure, the more severe the situation. As service is disrupted to a larger number of residents and businesses, additional costs are also incurred to reroute and bypass sewer mains, set up temporary pumping equipment, and to notify the public in an expedient manner. Sewer mains associated with critical business facilities and roadway areas are also an important component of this analysis.

Environmental/Regulatory Compliance was established as 10% of the COF. It is assumed that, if community disruptions are kept to a minimum, the City will remain in compliance with environmental and regulatory standards. Non-compliance can result in the need for public notification, fines and consent orders to eliminate the problem from reoccurring. Additionally, a wastewater collection system asset further away from surface water is less critical because there is more time to contain and mitigate a Sanitary Sewer Overflow (SOS) if one occurs.

Replacement costs of a section of sewer main and a sewer manhole are directly related to the diameter of the sewer main or manhole and the type of surface above the asset. The factors for each have been assigned scores of 30% and 5% respectively in the COF analysis. Each sewer main and manhole were assigned an overall COF rating of 1 to 5, with a rating of 1 being a slight effect to 5 being a severe disruption to the wastewater collection system.

The POF was determined for sewer mains using the following factor:

- Structural Condition Rating – Condition ratings were assigned to wastewater mains based on the structural scores of the attached manholes

The POF was determined for sewer manholes using the following factor:

- NASSCO Structural Rating of the manhole

The structural condition of a sewer main is important given that the wastewater collection system infrastructure is designed to be a sealed system with breaks, or openings, in the sealed system resulting in increased I/I and greater costs to convey and treat the resultant flows. Sewer main structural condition scoring was utilized for the POF to account for the increased likelihood of catastrophic failure for assets in poor condition. An overall POF rating of 1 to 5 was assigned to each sewer main based on structural condition with a rating of 1 being excellent condition and 5 being unserviceable.

The structural condition of a sewer manhole is directly related to the remaining useful life. As the greater amount of structural damage to a structure, the sooner the manhole is likely to fail. An overall POF rating of 1 to 5 was assigned to each sewer manhole based on asset NASSCO structural score with a rating of 1 being excellent condition and 5 being unserviceable.

An overall POF rating of 1 to 5 was assigned to each force main and pumping station, as well as the WPCF, with a rating of 1 being excellent condition and 5 being unserviceable.

Comprehensive BRE's were developed for sewer main and manholes. The BRE's were created using sewer main age and NASSCO ratings for the sewer manholes and a COF and POF scoring matrix model. Based on asset scoring, a total BRE score was developed, which is the mathematical product of COF and POF. The BRE score was utilized to overall rank wastewater collection system assets, determine areas of concern, and to guide operation and maintenance and timing of CIP project development.

Based on BRE analysis, there were fifteen (15) sewer mains and seven (7) sewer manholes that were rated critical. Additionally, twelve-hundred ninety-three (1,293) sewer mains and seventeen-hundred twenty-three (1,723) manholes were rated high risk. The critical and high-risk sewer mains are scheduled for rehabilitation or continued inspection as part of the City's twenty (20) year CIP program. Manhole rehabilitation funding and scheduling will need to be created during the twenty (20) year planning period and has been outlined in the CIP.

REVENUE STRUCTURE

As required by the SAW Grant Implementation Project guidelines, a non-detailed wastewater collection system revenue/expense budget review was developed and submitted to the MDEQ prior to the April 2018 deadline. The review was conducted by financial consultant, Umbaugh. Umbaugh submitted a "*Schedule of 2017/18 Budgeted Operating Expenses and Adjustments*" to the MDEQ for review and approval. The required review indicated no wastewater collection system revenue gap and the City subsequently received a June 19, 2018 letter from the MDEQ affirming the City had successfully fulfilled the significant progress requirement and that they were in compliance with Section 5204e(3)(a), Part 52, Clean Water Assistance, of the Natural Resource and Environmental Protection Act, 1994, PA 451, as amended.

In addition, in June 2017, the City adopted a Biennial Master Fee Schedule Resolution to defray costs of services through collection of user fees. The new fee system went into effect on July 1, 2017.

Projected twenty (20) year planning period wastewater collection system annual capital projects are $3,415,000 in 2019 and as high as $19,000,000 in 2024 and almost always between $5,300,000 and $11,200,000 with the exceptions of 2034, 2036, and 2037, where it is projected to be $2,800,000. It must be pointed out that the CIP funding outline over the twenty (20) year planning period does not include unforeseen infrastructure projects, emergencies or repairs and rehabilitations that will be needed as the sanitary sewer main system is inspected and continues to age.

A financial forecasting model was also developed using City budget information and the WWAMP developed CIP as part of the SAW Grant to review City funding and financing alternatives over the twenty (20) year planning period. As part of the forecasting model development, it is recommended, and a best management practice, to review the water and sewer rates every 2-3 years to determine their ability to provide the necessary funding for wastewater collection system O&M, CIP activities and debt retirement obligations. As these reviews are completed, the information can be updated into the forecasting model over the twenty (20) year planning period to provide an accurate and comprehensive financing dashboard that outlines the City's alternatives for funding necessary O&M, CIP, and debt retirement.

CAPITAL IMPROVEMENT PROJECT PLAN

Using the information obtained during the SAW grant asset inventory and assessment phases, a recommended CIP outline for the twenty (20) year planning period was developed to identify and outline cost and timelines related to the repair and replacement of sewer main, manhole, and pumping station equipment to ensure reliable operation of the wastewater collection system and to meet new and existing LOS goals.

The largest recurring component of the annual budget costs for the wastewater collection system CIP is sewer main lining, which through careful review of the known conditions of the existing system, was determined to be the most cost effect rehabilitation method. It is recommended that the City develop a comprehensive Infrastructure Management Plan (IMP) that encompasses coordinating road, water, and sewer infrastructure repairs and replacements for the entire City. Coordination efforts and planning with other City infrastructure work over the twenty (20) year planning period will also need to be completed on an as-needed basis. Much of the project coordination can be completed using the City's GIS along with Road Pavement Surface Evaluation and Rating (PASER) ratings, S2/SRF and SAW work that has been completed. As the remaining portion of the City wastewater collection system infrastructure is inspected over the twenty (20) year planning period, this information should also be implemented into the GIS and evaluated to further enhance CIP and wastewater asset planning and coordination.

Table 2 contains a summary of costs associated with each asset class for the CIP projects identified over the twenty (20) year planning period.

Table 2 Capital Improvements & O&M

Item Description	Cost
Capital Improvement Costs	
Manhole Rehabilitation	$6,000,000
Sewer Main Repairs	$49,994,000
Force Main Rehabilitation / Replacement	$26,000,000
Pumping Station Refurbishment	$6,615,000
Water Pollution Control Facility Repairs	$52,000,000
Capital Improvement Sub-Total	**$140,609,000**
Operation & Maintenance Costs	
Clean & Inspect Wastewater Collection System (20 Year Cycle)	$12,000,000
Root Control	$7,000,000
FOG Program	$1,500,000
Operations & Maintenance Sub-Total	**$20,500,000**
Wastewater System Total	**$161,109,000**

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date __**November 30, 2018**__
(no later than 3 years from executed grant date)

The __**City of Flint**__ *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. __**1384-01**__ have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or No

   If No - Date of the rate methodology approval letter: __**June 19, 2018**__.

2) Significant Progress Made: Yes or No

   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)

3) Date of rate methodology review letter identifying the gap: ________________________.

4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ____________________________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Mark Adas, P.E.	at **(810) 766-7135**	**madas@cityofflint.com**
Name	Phone Number	Email

_______________________________ 11/21/18
Signature of Authorized Representative (Original Signature Required) Date

__**Mark Adas, P.E., City Engineer**__

EXECUTIVE SUMMARY

INTRODUCTION

The City of Flint (City) applied for and was subsequently awarded a Stormwater Asset Management and Wastewater Asset Management (SAW) Grant for $2,000,000 (with a local match of $0.00) from the Michigan Department of Environmental Quality (MDEQ) for the purposes of development and implementation of a Stormwater and Wastewater Asset Management Plan. A total of $1,400,000 was allocated for Wastewater Asset Management Plan (WWAMP) costs and a total of $600,000 was allocated for Stormwater Asset Management Plan (SWAMP) costs. A Grant Agreement was entered into in November 30, 2015 with an effective grant period from January 2013 to November 2018. The final stormwater SWAMP report will be placed on file at the City Hall and made available to the public for a period of 15 years, beginning in December 2018.

Johnson & Anderson, Inc. (J&A) was retained to implement the stormwater system grant scope and develop the SWAMP for the City. As part of the project, an asset management team was developed to oversee development and implementation of the Plan. Mr. Mark Adas, P.E., City Engineer, has been assigned as the Authorized Representative for the SAW Grant project. His contact information is as follows: 1101 S. Saginaw Street, North Building N102, Flint, Michigan, 48502; (810) 766-7135.

The City of Flint's stormwater system consists of approximately 14,862 catch basins, 8,490 manholes, 404 miles of stormwater main, and 345 outfalls. All catch basins and manholes were catalogued, GPS located and stored in the City's ESRI GIS Geodatabase as part of this grant. Due to the limited grant budget, basic stormwater catch basins and manhole deficiencies were recorded but not subjected to NASSCO condition assessments and the stormwater mains were not televised or assessed.

Due to a lack of stormwater funding, the City has only been able to place limited emphasis on repair or replacement of stormwater infrastructure. In the past, stormwater infrastructure has only been rehabilitated as part of an overall road reconstruction project.

The City's strategic timeframe for the SWAMP is for planning years 2019-2038. It outlines the framework to provide proactive asset management guidance and planning of the stormwater system. It was developed to meet the MDEQ SAW grant program outline requirements over the twenty (20) year planning and operational period to ensure optimal asset management and Capital Improvement Planning (CIP) for the City's stormwater system infrastructure.

The five (5) core components of an MDEQ approvable SWAMP are listed as follows:

1) Asset Inventory
2) Level of Service
3) Asset Criticality
4) Operation & Maintenance Strategy

5) Capital Improvement Project Plan

ASSET INVENTORY

The entire City is served with a stormwater system that consists of stormwater main, catch basins, storm manhole and outfall assets.

A total of 6,269 stormwater manholes (approximately 74% of all City-owned manhole structures) and 14,556 catch basins (approximately 97% of all City-owned catch basins) were inventoried and located with a GPS and Robotic Total Station to establish State Plan Coordinates (northing, easting, and elevation of rims and inverts). These asset types and locations were then incorporated into the City's GIS. The City's base GIS information includes parcels, road centerline, and other feature layers.

Outfall Investigations & Conditions Assessment

As part of the SAW Grant project, all 345 of the City's stormwater outfalls were geospatially located, referenced in the City's ESRI GIS, and condition assessed. The following outfall information was gathered and integrated into GIS geodatabase:

- GPS coordinates
- Outfall ID (each outfall was assigned an ID number by City staff prior to our investigations)
- Location (cross streets or address)
- Waterbody to which the outfall drains to
- Outfall material (concrete, metal, plastic, etc.)
- Outfall diameter
- Outfall condition (root intrusion, amount of sediment/debris, pipe/outlet deterioration)
- Is dry weather flow present (Y/N)?
- Presence of pipe staining
- Presence of abnormal colors and odors, foam, algae, etc. in the water column
- Photo documentation

All outfalls were rated as 'Good', 'Fair', or 'Poor', based on the condition of storm main and surrounding banks, presence of root intrusions, unnatural odors, colors, turbidity, algae and staining.

Condition Assessment/Remaining Useful Life

Due to limited project funding, SAW Grant funds were not used to clean and televise the City's stormwater mains. The primary objective of the budget was used for Field Survey Operations and to GPS locate as many stormwater structures (manholes, catch basins, and outfalls) as possible in the City and implement them into the City's ESRI GIS geodatabase to provide a long term tool for better management.

Approximately 1,300 manholes were inspected and assessed using a Level 1 modified field-inspection (with MDEQ approval), which included measuring invert elevations. Unfortunately, due to budget constraints, the remaining manholes were only able to be GPS located. If surface deficiencies with the manholes were identified (cracked lid, evidence of surcharging, deterioration of the surrounding concrete or asphalt), it was identified and incorporated into the GIS and Cityworks.

Approximately 14,556 catch basins were GPS located, and a surface evaluation was conducted, identifying any deficiencies (cracked lid, deterioration of the surrounding concrete or asphalt, etc.). All catch basin ratings collected were catalogued into a master data base for review and analysis and integration into GIS and Cityworks.

All asset ratings have been catalogued into the stormwater GIS for retrieval, review, and analysis as well as Cityworks CMMS.

In the future, using the GPS located structures, a future National Association of Sewer Service Companies (NASSCO) Pipe/Manhole Assessment and Certification Program (PACP/MACP) inspection of the catch basins and manholes should be completed to more accurately determine the necessary repair and replacement locations for existing stormwater structures. This system is the North American standard for pipeline and manhole defect identification and assessment to provide standardization and consistency to methods in which asset conditions are identified, evaluated, and managed. At a minimum, NASSCO Level 1 inspections should be performed on all storm structures preferred.

Asset Management Hardware & Software Tools

All stormwater system manholes, catch basins, and outfall assets inventoried in the City, as part of this project, were located using Global Positioning System (GPS) equipment and have latitude and longitude coordinates. Those coordinates were then utilized to map the assets and connect the associated stormwater catch basins, manholes, and mains into the City's stormwater GIS. In addition, existing construction plans and other record drawings of the City's stormwater system were scanned and integrated into the City's stormwater GIS system infrastructure layers as well as any stormwater main CCTV inspection videos for quick retrieval and review by City staff. Please refer to Figure 5 for a screenshot of a catch basin photo and associated pipe segment information in the City's GIS and Cityworks system.

A SAW grant total of $101,509 was allocated for hardware - software purchases and training for Public Works staff per SAW grant population guidelines. The total amount of $101,509 was used for both stormwater and wastewater AMP development.

Several Dell laptops and Galaxy tablets were purchased for the purpose of records retrieval, access of GIS, Cityworks Computer Maintenance Management System (CMMS) implementation, and SAW grant implementation. Tablets were equipped with cell modems to provide staff with remote field capability to access and record information from the field.

A GIS-Centric CMMS software application, Cityworks by Azteca Systems, was procured and implemented to manage service requests and work orders and to aid in the development of the stormwater system CIP. This software application allows the City to optimize staff resources through the reduction of manual paperwork and scheduling by logging in resident complaints and work processes through customer service requests and work orders to ensure staff are focused on doing the right things at the right times while capturing labor, equipment, and materials needed to complete the work. The CMMS application was developed and implemented to work with the mobile capable tablets and laptops that were purchased for the City under the grant.

An application software program, Dig-Smart, was also purchased and implemented, which will allow the Public Works Department to more effectively administer its stormwater one call ticket management system. Dig-Smart leverages the investment in ESRI GIS through easy-to-use, off-the-shelf software that supports all aspects of underground utility locating including: spatial analysis, data overlays, field inspections, site meet scheduling, damage investigations, frequency analysis, as well as positive response compliance for staking requests.

LEVEL OF SERVICE

A LOS plan was developed by the asset management team members, which defines how the City wants the stormwater system to perform against established operational and planning best management practices. The LOS standards and goals were developed with review and additional input from the City Engineer and staff from the Public Works and Water Pollution Control departments. Questions addressed in the development of the LOS included:

- Is the City ever out of compliance with regulations? If so, how often?
- How does the City track and respond to customer needs and complaints?
- Are current O&M activities cost-effective and are they being maximized?
- How can current processes be improved?
- Are assets being properly maintained to insure reliability and sustainability?
- How will improvement costs be funded?

During this review, it was identified that:

- the City is comprised of a good mixture of residential, commercial, and open space land uses;
- the City is anticipated to decrease in population by 31% between now and 2040, which means future stormwater capacity is not a concern, since the City’s stormwater capacity is more than adequate to serve the City; and
- additional staff and monetary resources are necessary to help maintain and improve level of service goals.

The framework for the LOS is a triple bottom line approach that incorporates social, environmental, and economic criteria. The social component was divided into four indicators including: customer service, reliability, health and safety, and administration/organizational development. The environmental component was divided into two indicators that included environmental stewardship and regulatory compliance. The economic component was centered on the financial area. The LOS impetus was determined to be either self, customer, or regulatory driven with current and future targets identified with their respective performance measures, data, and reporting procedure.

For the social indicators, customer service LOS goals focus primarily on the City's responsiveness and efficiency (how effectively operations, maintenance, and daily tasks are performed with limited staff and budget). The administration / organizational development indicator considered the optimization of resources and reduction of overall O&M, planning, and engineering costs.

The Environmental LOS goals include environmental stewardship and regulatory compliance. The City and its residents are committed to protecting these waterways.

The regulatory compliance component focuses on complying with all of the local, state, and federal regulations regarding stormwater systems.

LOS goals for the financial indicator have been developed to ensure adequate funding is available to maintain the stormwater system.

A rating or color code system was developed to identify strategic areas that do not need improvement (green), are acceptable with additional improvement needed (yellow), and those that require improvement (red).

As part of its mission, the City strives to provide reliable stormwater removal at the minimum cost necessary to meet environmental and health regulations. The LOS plan has also been developed to reinforce the Mission Statement developed by the City, which is outlined below:

Ensure customer confidence through the delivery of high quality and cost-effective services to our residents. Our 6 core themes are: Social Equity and Sustainability, Reshaping the Economy, Quality of Life, Adapting to Change, Youth, and Civic Life.

Through the development of the LOS goals, the asset management team identified that the Public Works Department currently has insufficient staff and funding to properly administer its stormwater system. The City is working to improve upon their limited O&M initiatives and inspections through the use of tools including Cityworks and GIS. The City has applied for and has been successful at acquiring grants and loans for system planning an implementation and will continue to seek local, state, and federal funding, and will coordinate utility and road projects to maintain efficiency and potentially reduce costs.

By instituting a SWAMP, conducting condition assessments and determining the criticality of assets, the City can now move to a more proactive approach to managing the stormwater system assets. This will assist the DPW in achieving reduced project costs and improved project management. The City's approach to stormwater system improvements will now also include assessments of other utilities including water main, roads and sanitary sewer in the same areas to allow for a single upgrade and a reduction in improvement costs and to minimize disruption to residents and businesses.

ASSET CRITICALITY

The criticality of stormwater system assets including main, catch basins and manholes was examined in regard to their overall functional importance to the operation of the stormwater system and their impacts if they failed. To determine the criticality of system assets, a BRE was performed by analyzing the Consequence of Failure (COF) and Probability of Failure (POF) for each asset.

The COF was determined for stormwater mains using the following factors:

- Economic Impacts (Diameter of Asset, Type of Surface above Asset)
- Social/Community Disruption (Roadway Impact)

The COF was determined for catch basins and manholes using the following factors:

- Economic Impacts (Type of Surface above Asset)
- Social/Community Disruption (Roadway Impact)

Each of the weighting factors were reviewed and agreed upon by City staff. Social/Community Disruption was scored at 25% of the COF determination for catch basins, manholes, and stormwater mains. The more customer disruption due to a stormwater system failure, the more severe the situation. As a larger number of users are disrupted, additional costs are also incurred to reroute traffic on major roads and to notify the public in an expedient manner.

Replacement costs of a section of stormwater main are directly related to the diameter of the stormwater main and the type of surface under where it is located. Scores for these factors have been assigned scores of 50% and 25% in the COF analysis. Replacement cost for the catch basins and storm manholes is related to the type of surface under which the asset is located and has been assigned a score of 75% in the COF analysis. Each stormwater main, catch basin, and manhole was assigned an overall COF rating of 1 to 5, with a rating of 1 being a slight effect to 5 being a severe disruption to the stormwater system.

The POF was determined for stormwater mains, catch basins and manholes using the following factors:

- Catch Basins and Manholes Structural Condition – based on a condition assessment from the surface
- Stormwater Main Structural Condition – based on the structural condition of the attached stormwater structures

The structural condition of stormwater main, catch basins and manholes is an important indicator for failure probability. Each segment of stormwater main was assigned a structural condition score based on the structural condition of the catch basins and manholes located at each end of the segment. Due to project grant budget limitations, stormwater system infrastructure was unable to be inspected to the level desired. An overall POF rating of 1 to 5 was assigned to each stormwater main, catch basin and manhole with a rating of 1 being excellent condition and 5 being unserviceable.

A comprehensive BRE was developed for the stormwater main, catch basins and manholes. The BREs were created using a COF and POF scoring matrix model. Based on the asset scoring, a total BRE score was developed, which is a mathematical product of COF and POF. The BRE score was utilized to rank stormwater system assets, determine areas of concern, and to guide operation and maintenance and timing of CIP project development. Table 1 provides an outline of the BRE scale.

Table 1 Business Risk Evaluation (BRE) Scale

Business Risk Evaluation (BRE) Total Score	
Business Risk Evaluation Scoring	
Business Risk	Total BRE Score
Critical / Intolerable Risk	16.00 - 25.00
High Risk – Tolerable and Manageable – Aggressive Monitoring	10.00 - 15.99
Medium Risk –Tolerable and Manageable – Monitoring	5.00 - 9.99
Low Risk –Failure is Tolerable	0.00 - 4.99

Based on the BRE, there were 196 stormwater main segments, 952 catch basins, and 102 storm manholes that were rated as critical. These are scheduled for rehabilitation or inspection as part of the City's twenty (20) year CIP program.

OPERATION & MAINTENANCE STRATEGIES

As required by the SAW Grant Implementation Project guidelines, a non-detailed stormwater system operation and maintenance strategy needed to be developed. The current O&M strategy of the stormwater system is limited, due to inadequate funding. Investigation of the condition of the stormwater system assets is performed primarily when a complaint is received. Other than street sweeping and catch basin cleaning, maintenance of these assets is typically only performed when a failure is observed. Prior to the SAW Grant Implementation project, there were no identified short-term or long-term plans for stormwater system capital improvements, large maintenance expenditures to correct unexpected failures, or regular maintenance for the stormwater assets as part of the ongoing asset management plan. It should be noted, that all MS4 required tasks and initiatives are funded through the General Fund and the MDEQ does not currently provide grants or loans to assist with program compliance.

Projected stormwater system annual capital projects are over $3,850,000 in 2019 and as high as $10,068,000 in 2038 and almost always between $3,000,000 and $5,500,000 during the twenty (20) year planning period. It must be pointed out that the CIP funding outline over the twenty (20) year planning period is an estimation based on the calculated remaining useful life, and does not include unforeseen infrastructure projects, emergencies or repairs and rehabilitations that will be needed as the stormwater system is more thoroughly inspected over the next several years.

Annual O&M costs included in the report are annual maintenance activities that need to be performed. The list is not all inclusive and does not include other recurring annual expenses such as labor, retirement, insurance, administrative payments, power, and other expenses in the general budget.

Annual maintenance activities in the SWAMP that are comprised of stormwater main cleaning, inspection, and outfall repairs are expected to be $600,000 annually. There are also many other maintenance and expense items that are part of the annual budget, but not included in this analysis. It must also be noted that the DPW operates at a lower staffing level than in the 1980's with increased regulatory and other stormwater system obligations to meet. As a result, it is recommended that once the comprehensive financial review is completed, the information is used to update the annual O&M expense projections over the twenty (20) year planning period.

CAPITAL IMPROVEMENT PLAN PROJECT PLAN

Using the information obtained during the SAW grant asset inventory and assessment phases, a recommended CIP for the twenty (20) year planning period was developed to identify and outline cost and timelines related to the repair and replacement of stormwater main, catch basin, and manhole assets to ensure reliable operation of the stormwater system and to meet new and existing LOS goals.

The largest recurring component of the annual budget costs for the stormwater system CIP is stormwater main reconstruction. It is recommended that the City develop a comprehensive Infrastructure Management Plan (IMP) that encompasses coordinating road, water, and sewer infrastructure repairs and replacements for the entire City. Coordination efforts and planning with other City infrastructure work over the twenty (20) year planning period will also need to be completed on an as-needed basis. Much of the project coordination can be completed using the GIS road Pavement Surface Evaluation and Rating (PASER) rating and SAW work that has been completed. As the City stormwater system infrastructure is inspected over the twenty (20) year planning period, this information should be included in the GIS and evaluated to further enhance CIP planning and coordination.

Table 2 contains a summary of costs associated with each asset class for the CIP projects identified over the twenty (20) year planning period.

Table 2 Capital Improvements & O&M Costs

Item Description	Cost
Capital Improvement Costs	
Catch Basin and Storm Manhole Rehabilitation	$6,000,000
Stormwater Main Repair Costs	$65,923,000
Operations & Maintenance Costs	
Clean and CCTV the Stormwater System	$12,000,000
Dam Repairs, Inspections & Maintenance*	$10,000,000
Capital Improvement Total	**$93,923,000**

*****Dam repairs, inspections, and maintenance are funded from the City's Water Department Fund, not the General Fund.

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Due Date __**November 30, 2018**__
(no later than 3 years from executed grant date)

The __**City of Flint**__ *(legal name of grantee)* certifies that all stormwater asset management plan (SWAMP) activities specified in SAW Grant No. __**1384-01**__ have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SWAMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

Mark Adas,P.E.	at **(810) 766-7135**	**madas@cityofflint.com**
Name	Phone Number	Email

11/21/18

Signature of Authorized Representative (Original Signature Required) Date

Mark Adas, P.E.
Print Name and Title of Authorized Representative

Frankfort Wastewater Asset Management Plan
Executive Summary
SAW Grant No. 1138-01

City of Frankfort
412 Main St.
Frankfort, Michigan 49635

Joshua Mills
City Superintendent
231-352-7117

The City of Frankfort was awarded a Stormwater, Asset Management, and Wastewater (SAW) Grant from the Michigan Department of Environmental Quality (MDEQ) in November 2015. The grant provided funds for the creation of this Asset Management Plan (AMP) for its wastewater collection system. The intent of the asset management process is to maintain a desired level of service at the lowest life cycle cost for the defined infrastructure asset.

Within its limits, the City manages approximately 11.8 miles of gravity pipe, 3,700 feet of force main, 262 manholes, and three (3) lift stations in the wastewater system.

At the beginning of the project, existing information on the conditions of the assets was very limited. To obtain condition information on the gravity sewers, Closed Circuit Television (CCTV) work was performed to allow for review and evaluation of the network. Over 11 miles (94%) of the sewer system was assessed based on established budgets. To obtain condition information of manholes, National Association of Sewer Service Companies (NASSCO) Manhole Assessment Certification Program (MACP) assessments were performed by field inspectors, noting the details and conditions of each structure. Approximately 92% of structures were inspected.

The Level of Service (LOS) defines the way in which utility stakeholders want the utility to perform over a period of time. Based upon discussions with City staff, goals were developed within the report such as cleaning and inspecting structures over a 10-year period and responding to 80% of reported problems within an hour. Measurable data will be collected and reviewed to determine if the goals are being met. These goals will be reviewed annually to determine if they are still relevant or need to be updated and whether changes in the system have resulted in the need to add, delete, or modify goals.

Criticality and Level of Risk were evaluated for each asset. Assets that have the greatest Probability of Failure (POF) and the greatest Consequence of Failure (COF) associated with them are the most critical assets and are the most likely candidates for immediate action of rehabilitation or replacement. Assets with lower scores should continue to be analyzed to develop the best life cycle strategy. Most of the assets within the system fall into manageable and tolerable risk levels.

The annual operation and maintenance (O&M) budget includes typical costs associated with operating and maintaining the system for a year. It is recommended that the City continue cleaning and televising wastewater sewers on an annual basis and budget for the work accordingly. This cost is estimated to be around $21,809 per year.

Excluded from the normal operating budget are any major capital improvements that are needed to increase capacity or replace items with a useful life of more than 20 years. Capital Improvement Plan (CIP) projects are proposed for sewer pipes that were found to have significant structural defects. While these pipes currently fall into manageable levels of risk, it is recommended that these rehabilitation projects be addressed as the assets near the end of their useful life. A cost estimate is provided for each project, amounting to approximately $2,300,000 in rehabilitation projects over a 20 year period.

List of Wastewater Assets

- 62,310 feet of gravity sewer
- 262 manholes
- 2,989 feet of force mains
- 3 lift stations

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date November 30, 2018
(no later than 3 years from executed grant date)

The City of Frankfort *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1138-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or $\boxed{\text{No}}$
   If No - Date of the rate methodology approval letter: July 12, 2018.
2) Significant Progress Made: Yes or No
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: ________.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Name	Phone Number	Email
Joshua Mills	at (231) 352-7117	JMills@cofrankfort.net

Joshua J. Mills — 11/26/18
Signature of Authorized Representative (Original Signature Required) — Date

Joshua J. Mills City Superintendent
Print Name and Title of Authorized Representative

Frankfort Stormwater Asset Management Plan
Executive Summary
SAW Grant No. 1138-01

City of Frankfort
412 Main St.
Frankfort, Michigan 49635

Joshua Mills
City Superintendent
231-352-7117

The City of Frankfort was awarded a Stormwater, Asset Management, and Wastewater (SAW) Grant from the Michigan Department of Environmental Quality (MDEQ) in November 2015. The grant provided funds for the creation of this Asset Management Plan (AMP) for its stormwater drainage system. The intent of the asset management process is to maintain a desired level of service at the lowest life cycle cost for the defined infrastructure asset. Within its limits, the City manages approximately 5.8 miles of gravity pipe, 119 manholes, 193 catch basins, and 12 outfalls in the stormwater system.

At the beginning of the project, existing information on the conditions of the assets was very limited. To obtain condition information on the gravity sewers, Closed Circuit Television (CCTV) work was performed to allow for review and evaluation of the network. Over 4.6 miles (81%) of the sewer system was assessed based on established budgets. To obtain condition information of manholes and catch basins, National Association of Sewer Service Companies (NASSCO) Manhole Assessment Certification Program (MACP) assessments were performed by field inspectors, noting the details and conditions of each structure. Approximately 92% of structures were inspected.

The Level of Service (LOS) defines the way in which utility stakeholders want the utility to perform over a period of time. Based upon discussions with City staff, goals were developed within the report such as cleaning and inspecting structures over a 10-year period, responding to 80% of reported problems within an hour, and having less than three (3) flooding instances per year. Measurable data will be collected and reviewed to determine if the goals are being met. These goals will be reviewed annually to determine if they are still relevant or need to be updated and whether changes in the system have resulted in the need to add, delete, or modify goals.

Criticality and Level of Risk were evaluated for each asset. Assets that have the greatest Probability of Failure (POF) and the greatest Consequence of Failure (COF) associated with them are the most critical assets and are the most likely candidates for immediate action of rehabilitation or replacement. Assets with lower scores should continue to be analyzed to develop the best life cycle strategy. Most of the assets within the system fall into manageable and tolerable risk levels.

The annual operation and maintenance (O&M) budget includes typical costs associated with operating and maintaining the system for a year. It is recommended that the City continue cleaning and televising storm sewers on an annual basis and budget for the work accordingly. This cost is estimated to be around $13,680 per year.

Excluded from the normal operating budget are any major capital improvements that are needed to increase capacity or replace items with a useful life of more than 20 years. As the City's stormwater system was generally found to be in low criticality and levels of risk, no Capital Improvement Plan (CIP) projects were proposed based on results of the analysis. However, CIP projects are proposed for wastewater sewer pipes that were found to have significant structural defects. While these pipes currently fall into manageable levels of risk, it is recommended that these rehabilitation projects be addressed as the assets near the end of their useful life. A cost estimate is provided for each project, which includes replacing stormwater structures at the same time. The estimates amount to approximately $2,300,000 in rehabilitation projects over a 20 year period.

List of Stormwater Assets

- 30,404 feet of gravity sewer
- 120 manholes
- 193 inlets
- 12 outfalls

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Due Date November 30, 2018
(no later than 3 years from executed grant date)

The City of Frankfort *(legal name of grantee)* certifies that all stormwater asset management plan (SWAMP) activities specified in SAW Grant No. 1138-01 have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SWAMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

Joshua Mills	at (231) 352-7117	JMills@cofrankfort.net
Name	Phone Number	Email

Joshua J. Mills 11/26/18
Signature of Authorized Representative (Original Signature Required) Date

Joshua J. Mills City Superintendent
Print Name and Title of Authorized Representative

City of Fraser
33000 Garfield Road
Fraser, Michigan 48026
(586) 293-3100
Wayne O'Neal, wayneo@micityoffraser.com
http://www.ci.fraser.mi.us/

Overview

The City of Fraser is home to about 15,000 residents in an area of 4.16 square miles. The City has a separated stormwater system for which the condition is not readily known. This led the City to apply for a grant through the Michigan Department of Environmental Quality (MDEQ) Stormwater, Asset Management, and Wastewater (SAW) Program.

The City of Fraser was awarded a grant to investigate and evaluate the City's stormwater assets. With the grant the City engaged Anderson, Eckstein and Westrick, Inc. (AEW) to investigate and develop a Stormwater Asset Management Plan (AMP). Through development and implementation of this plan, the insight and understanding of the stormwater system can be significantly improved. A comprehensive investigation included inventory and inspection, condition assessment, capital improvement needs, and enhancement of the existing Geographic Information System (GIS) which includes mapping, database, and system information.

Asset Inventory/Condition Assessment

The City's stormwater assets includes 46.8 miles of storm sewer lines, 1,486 catch basins, 837 manholes, 2 pump stations, and 4 detention basins. A condition assessment was performed on the storm sewer lines by means of Closed Circuit Television (CCTV), a condition assessment was performed for the rest of the assets by means of visual inspection.

Criticality Analysis

Assets were then analyzed to determine their Probability of Failure (POF) and Consequence of Failure (COF). The POF of an asset takes into account the condition rating while the COF takes into account the size, location, and surrounding. POF and COF scores were determined for each asset and then multiplied together resulting in the Business Risk Exposure (BRE) score, also known as the criticality score. The BRE score is used to prioritize what assets are most critically in need of repair. Any asset with a BRE score of 16 or greater is considered critical by the MDEQ.

Based on the current assessments, the following assets are considered critical:

- 11 stormwater sewer segments (approximately 1,120 feet)
- 136 stormwater structures

Level of Service

To reasonably serve the City of Fraser a desired LOS must be established. In terms of the City's stormwater system, the LOS would be the satisfaction of the residents, business owners and property owners. There are many factors that can affect the perceived LOS of the system including sewer backups, which can result in both street, yard and basement flooding.

Fraser's stormwater system is currently operating at a satisfactory LOS and will continue to do so through continued maintenance, rehabilitation and replacement of its assets as presented in the Asset Management Plan and Capital Improvement Plan.

Capital Improvement Plan

Based on the condition assessment and criticality analysis, a cost estimate was created for all sewer pipes, structures, detention basins, and pump stations. The estimated cost to repair all of the critical stormwater assets in the City is $3,520,000, or approximately $708,000 per year for 5 years. Contingency costs, as well as costs to keep the AMP updated, have been included in the annual cost.

City of Fraser
33000 Garfield Road
Fraser, Michigan 48026
(586) 293-3100
Wayne O'Neal, wayneo@micityoffraser.com
http://www.ci.fraser.mi.us/

SAW Grant No. 1416-01

This summary provides a brief overview of the investigation, and evaluation of the system assets, condition, operation and needs. A more comprehensive discussion can be found in the Stormwater Asset Management Plan.

November 2018

City of Fraser
33000 Garfield Road
Fraser, Michigan 48026
(586) 293-3100
Wayne O'Neal, wayneo@micityoffraser.com
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Fraser Critical Assets

No.	Asset I.D.	Asset Type
1	SW1938	Buried Pipe
2	SW1902	Buried Pipe
3	SW3154	Buried Pipe
4	SW2748	Buried Pipe
5	SW6618	Buried Pipe
6	SW2737	Buried Pipe
7	SW1884	Buried Pipe
8	SW1913	Buried Pipe
9	SW3213	Buried Pipe
10	SW3519	Buried Pipe
11	SW4267	Buried Pipe
12	R-2-1-9S	Catch Basin
13	13-2-4	Catch Basin
14	13-2-5	Catch Basin
15	R-2-1-13-1	Catch Basin
16	R-2-1-15-1	Catch Basin
17	SW-6-1-2	Catch Basin
18	R-2-1-7SE	Catch Basin
19	R-2-1-7SW	Catch Basin
20	SW-42-2-8-3E	Catch Basin
21	HR-4-1SE	Catch Basin
22	PR-41-11SE	Catch Basin
23	PR-41-11SW	Catch Basin
24	R-13-1SW	Catch Basin
25	R-2-13SW	Catch Basin
26	R-2-13SSW	Catch Basin
27	R-2-1-11-2W	Catch Basin
28	R-2-1-11-2SW	Catch Basin
29	HR-8-5-1	Catch Basin
30	TS-12-16S	Catch Basin
31	SW-42-2-9N	Catch Basin
32	SW-42-2-9NE	Catch Basin
33	SW-42-7S	Catch Basin
34	SW-43-7S	Catch Basin
35	SW-43-7SE	Catch Basin
36	SW-43-4E	Catch Basin
37	SW-43-4SE	Catch Basin
38	SW-43-2SW	Catch Basin
39	SW-43-1S	Catch Basin
40	SW-50-4-1SE	Catch Basin

41	SW-45-2W	Catch Basin
42	SW-47-5S	Catch Basin
43	SW-47-5SE	Catch Basin
44	SW-47-3E	Catch Basin
45	SW-55-6-2W	Catch Basin
46	SW-55-6-2SW	Catch Basin
47	SW-55-6-3W	Catch Basin
48	SW-55-6-1W	Catch Basin
49	TS-12-12W	Catch Basin
50	TS-12-10SW	Catch Basin
51	TS-12-6-1E	Catch Basin
52	TS-12-6-3NE	Catch Basin
53	SW-55-11NE	Catch Basin
54	SW-55-11E	Catch Basin
55	SW-55-10E	Catch Basin
56	SW-55-10SE	Catch Basin
57	TS-14-6	Catch Basin
58	TS-14-6SE	Catch Basin
59	TS-14-2-1SW	Catch Basin
60	TS-14-2E	Catch Basin
61	TS-15-1NW	Catch Basin
62	TS-11-1N	Catch Basin
63	TS-3-2-4W	Catch Basin
64	TS-3-2-4SW	Catch Basin
65	TS-3-3S	Catch Basin
66	TS-3-8NE	Catch Basin
67	SW-55-9E	Catch Basin
68	SW-55-7NW	Catch Basin
69	SW-56-3S	Catch Basin
70	SW-54-4SW	Catch Basin
71	SW-54-4S	Catch Basin
72	SW-54-2SE	Catch Basin
73	SW-54-2E	Catch Basin
74	SW-63-1	Catch Basin
75	SW-62-2-1E	Catch Basin
76	SW-62-2-1SE	Catch Basin
77	SW-62-2SE	Catch Basin
78	SW-62-3E	Catch Basin
79	SW-62-5E	Catch Basin
80	FL-4-3S	Catch Basin
81	HR-19-5-2-3E	Catch Basin
82	HR-19-5-2SE	Catch Basin
83	HR-19-6-1E	Catch Basin

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84	HR-19-7SW	Catch Basin
85	HR-19-13-3	Catch Basin
86	HR-19-13-2	Catch Basin
87	R-3-2-3	Catch Basin
88	R-3-1-4N	Catch Basin
89	R-3-1-6	Catch Basin
90	HR-14-11NW	Catch Basin
91	HR-14-11SE	Catch Basin
92	R2-8	Catch Basin
93	R2-2-5-2	Catch Basin
94	R-3-1-10	Catch Basin
95	HR-19-5-5-1	Catch Basin
96	HR-19-5-4-1	Catch Basin
97	HR-13-1-2	Catch Basin
98	HR-18-3-3	Catch Basin
99	R-4-13-7-2	Catch Basin
100	R-4-13-8-2	Catch Basin
101	R-4-10-1	Catch Basin
102	R-4-10-2	Catch Basin
103	R-4-7-7-3	Catch Basin
104	R-4-18-1	Catch Basin
105	R-4-7N	Catch Basin
106	R-4-7NNW	Catch Basin
107	PR-29-3	Catch Basin
108	SW-42-2-6E	Catch Basin
109	TS-12-9SW	Catch Basin
110	SW-56-2SE	Catch Basin
111	HR-19-10SE	Catch Basin
112	SW-12-7-2	Catch Basin
113	SW-12-13	Catch Basin
114	SW-12-13-1	Catch Basin
115	13-3-1E	Catch Basin
116	13-3	Catch Basin
117	SW-20-3-6W	Catch Basin
118	SW-20-3-6NW	Catch Basin
119	HR-11-8N	Catch Basin
120	SW-56-4S	Catch Basin
121	PR-41-11S	Catch Basin
122	R-05-1B	Catch Basin
123	R-05-1BW	Catch Basin
124	R-05-1BSW	Catch Basin
125	R-13-1SSW	Catch Basin
126	R-4-28-1S	Catch Basin

127	R-4-28-1E	Catch Basin
128	R-3-5-2-1NW	Catch Basin
129	R-4-13-7-2E	Catch Basin
130	R-4-13-7-3E	Catch Basin
131	R-4-8-5-6E	Catch Basin
132	SW-49-1	Catch Basin
133	R-4-30SE	Catch Basin
134	R-4-28-1SE	Catch Basin
135	R-2-1-11-2NW	Catch Basin
136	SW-18-7-1	Catch Basin
137	SW-19-1-2	Catch Basin
138	HR-14-9	Storm Manhole
139	SW-55-3	Storm Manhole
140	TS-12-13	Storm Manhole
141	PR-41-11	Storm Manhole
142	SW-42-2-8-3	Storm Manhole
143	13-2-1	Storm Manhole
144	R-2-1-11-2	Storm Manhole
145	R-2-14	Storm Manhole
146	SW-22-6	Storm Manhole
147	SW-21-7	Storm Manhole

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Due Date Novemeber 30, 2018
(no later than 3 years from executed grant date)

The City of Fraser *(legal name of grantee)* certifies that all stormwater asset management plan (SWAMP) activities specified in SAW Grant No. 1416-01 have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SWAMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

D. Wayne O'Neal at (586) 293-3100 wayneo@micityoffraser.com
Name Phone Number Email

D. Wayne O'Neal
Signature of Authorized Representative (Original Signature Required)

November 30, 2018
Date

D. Wayne O'Neal, City Manager
Print Name and Title of Authorized Representative

Stormwater, Asset Management, and Wastewater
Asset Management Plan
Wastewater Executive Summary

City of Gibraltar
29450 Munro Avenue, Gibraltar, MI 48173
Derek M. Thiel, City Administrator and DDA Director
734.676.3900
SAW Grant Project Number 1184-01

Executive Summary

The City of Gibraltar (City) was awarded a grant by the Michigan Department of Environmental Quality (MDEQ) under the Stormwater, Asset Management, and Wastewater (SAW) Grant Program to develop both a wastewater and a stormwater Asset Management Plan (AMP). The total eligible cost was $2,066,654, less a local match of $349,997, for a total grant amount of $1,716,657. The grant was divided into two components: wastewater AMP cost ($1,058,954) and stormwater AMP cost ($1,007,700). The wastewater AMP is discussed below. A separate summary is available for the stormwater AMP.

The AMP was developed by Fishbeck, Thompson, Carr & Huber, Inc. (FTCH) and the City Engineer, C.E. Raines Company (CERCO), working closely with City staff in accordance with the five MDEQ AMP components:

1. Asset Inventory and Condition Assessment
2. Level of Service (LOS)
3. Asset Criticality
4. Revenue Structure
5. Capital Improvement Plan (CIP)

The objective of an AMP is to meet the required LOS in the most cost-effective manner through proper maintenance of the assets. For the City, this includes providing a summary of the condition of the assets owned by the City, a basis for prioritizing the rehabilitation/replacement of the assets, an updated operation and maintenance (O&M) program to routinely maintain the assets, and an assessment of the effect of implementing these tasks on the rates. The work completed as part of the SAW Grant included the components described below.

Asset Inventory

The City's sanitary system consists of approximately 101,207 feet of pipe ranging in size from 8 inches to 36 inches. The system also includes one sanitary pump station, Pump Station No. 1 off of Stoeflet Street. The City is a customer of the South Huron Valley Utility Authority (SHVUA). The City's sanitary collection system discharges into the SHVUA system through the Trenton Arm Lift Station located on the north side of the City, 1,300 feet south of Vreeland Road on West Jefferson Avenue.

The following steps were taken in an effort to locate and identify the system's horizontal and vertical assets:

1. Created a Geographic Information System (GIS) database for the City using the Wayne County GIS database as a background.
2. Collected 53 sanitary system record drawings, scanned them, and incorporated them into the GIS database.
3. Developed a total of 23 different asset classes to represent the City's asset types, including pump station equipment, manholes, catch basins, and pipes.

4. Reviewed existing records and conducted site visits to develop an inventory of the City assets, including:
    a. 398 sanitary manholes.
    b. 422 sanitary pipe segments.
    c. 17 vertical assets.
5. Developed a unique naming convention for the assets that incorporated the type of asset and a three-digit numerical number.
6. Developed an inventory of the City's asset information, including equipment and process descriptions, critical attribute information, age, remaining useful life, and replacement costs. Incorporated the information into the GIS database.

Condition Assessment

1. Manhole inspections were performed in 2016 and 2018 on the majority of the sanitary manholes in the system in accordance with the Manhole Assessment and Certification Program (MACP). The inspection forms, as well as the results of the inspection, were incorporated into the City's GIS database.
2. Closed-circuit television (CCTV) inspection of the sanitary sewers was performed in 2017. The work was completed in accordance with the Pipeline Assessment and Certification Program (PACP). The inspection forms, and the results of the inspection, were incorporated into the City's GIS database.
3. Site visits were conducted to visually inspect and assess the condition of each vertical asset, based on criteria established for each asset class. The condition assessment forms and resulting 1 through 5 condition ratings were incorporated into the City's GIS database.
4. The results of the assessment indicated:
    a. The sanitary sewers are generally in good condition; however, 7 pipe segments have a structural condition rating above 4.00, and 20 pipe segments have an O&M rating above 4.00.
    b. There are 4 sanitary manholes with a composite (structural and O&M) rating above 4.00.

Level of Service Determination

The City developed an LOS based on commitments to their customers and the MDEQ, which included:

1. Safeguarding public health and the environment.
2. Operating the system to ensure it has sufficient capacity to reduce the chances of sanitary sewer overflows.
3. Maintaining the equipment and assets at a level that meets customer and regulatory needs and requirements.

Criticality of Assets

1. Assigned a Probability of Failure (POF) rating for each asset based on the condition of the asset, and its age or remaining life. The rating criteria was different for pipes, manholes, and vertical assets as displayed in Tables 1 through 3.

Table 1 – Pipe Probability of Failure

		Weighting Factor	5 Imminent	4 Probable	3 Occasional	2 Remote	1 Improbable
POF	O&M Quick Rating (PACP)	50%	If there are no defects noted and the quick score is 0, Score = 1. If the quick score is denoted by a letter, letter = 9. Multiply the 4-digit quick score by 0.00085 = Score If resulting score ≥ 5, Score = 5. If resulting score ≤ 1, Score = 1				
	Structural Quick Rating (PACP)	50%	If there are no defects noted and the quick score is 0, Score = 1. If the quick score is denoted by a letter, letter = 9. Multiply the 4-digit quick score by 0.00085 = Score If resulting score ≥ 5, Score = 5. If resulting score ≤ 1, Score = 1				
Remaining Useful Life (used only when pipe not PACP-inspected)		100%	Useful Life Remaining: 0%	Useful Life Remaining: 1-20%	Useful Life Remaining: 21-50%	Useful Life Remaining: 51-70%	Useful Life Remaining: 71-100%

Table 2 – Manhole Probability of Failure

		Weighting Factor	5 Imminent	4 Probable	3 Occasional	2 Remote	1 Improbable
POF	Structural and O&M Quick Rating (MACP)	100%	If there are no defects noted and the quick score is 0, Score = 1. If the quick score is denoted by a letter, letter = 9. Multiply the 4-digit quick score by 0.00085 = Score If resulting score ≥ 5, Score = 5. If resulting score ≤ 1, Score = 1				
Remaining Useful Life (used only when pipe not MACP-inspected)		100%	Useful Life Remaining: 0%	Useful Life Remaining: 1-20%	Useful Life Remaining: 21-50%	Useful Life Remaining: 51-70%	Useful Life Remaining: 71-100%

Table 3 – Vertical Asset Probability of Failure

	Weighting Factor	5 Imminent	4 Probable	3 Occasional	2 Remote	1 Improbable
Physical Condition (based on visual inspection)	80%	Very Poor	Poor	Fair	Good	Very Good
Remaining Useful Life	20%	Useful Life Remaining: 0%	Useful Life Remaining: 1-10%	Useful Life Remaining: 11-20%	Useful Life Remaining: 21-40%	Useful Life Remaining: 41-100%

2. Assigned a Consequence of Failure (COF) rating for each asset to reflect its importance to the system and the resulting disruption or difficulty of repair/replacement if failure occurs, based on the criteria in Tables 4 and 5.

Table 4 – Consequence of Failure for Pipes and Manholes

		Weighting Factor	5 Catastrophic Disruption	4 Major Disruption	3 Moderate Disruption	2 Minor Disruption	1 Insignificant Disruption
COF	Diameter Score	33%	≥ 24-inch	18-inch to 21-inch	15-inch	10-inch to 12-inch	≤ 8-inch
COF	Physical Location Score	33%	State Trunklines, Railroad Crossings, Water Crossings		Primary County Roads and Major City Roads		Minor City Roads
COF	Service Area Score	33%	Schools, Water Crossings		Churches, City Facilities, Industrial, Commercial		Single Family Residential and Multi-Family Residential

Table 5 – Consequence of Failure for Vertical Assets

		Weighting Factor	5 Catastrophic Disruption	4 Major Disruption	3 Moderate Disruption	2 Minor Disruption	1 Insignificant Disruption
COF	Process	25%	Mission critical: unable to accomplish mission	Process shutdown	Loss of redundancy or temporary process upset	Potential process upset	No impact on process
COF	Financial Impact	25%	May require new borrowing or impact rates	May require transfer from reserves	Absorbed within current budget	Absorbed within applicable line item	Budgeted expense
COF	Disruption to the Community	25%	Long-term impact, area-wide disruption	Short-term impact, but substantial disruption	Sporadic service disruptions	Minor disruption	No disruption
COF	Required Response Time	25%	< 1 hour	1 to 4 hours	> 4 to 8 hours	> 8 to 48 hours	> 48 hours

3. Multiplied the POF and the COF to compute the Business Risk Exposure (BRE) score for each asset, representing the asset's criticality on a scale of 1 through 25. The BRE score serves as a tool for prioritizing repair/replacement.

There were no horizontal sanitary assets that were inspected with BRE scores greater than 16. The City should monitor the condition of the sewers and manholes during the next round of inspections and update the BRE scores accordingly.

The pump station vertical assets for the sanitary system all had BRE values below 12. There are no major repairs or upgrades necessary at this time. However, the City should continue to perform preventative maintenance to keep the pump station in good working order.

Operation and Maintenance Strategies

1. Reviewed current preventative maintenance history and system operations.
2. Identified gaps in the preventative maintenance program and in system operations.
3. Developed a revised preventative maintenance program outlining tasks by asset.

Revenue Considerations

The City's fiscal year is from July to June. For each fiscal year, the water and sewer budget is developed and includes the typical costs needed to operate the sanitary system as well as perform normal maintenance activities. The associated water and sewer rates for the fiscal year 2017/2018 were developed to cover the budget.

A 20-year financial projection was completed for the City to determine how they would implement the proposed tasks and projects included in the AMP. Plante Moran was contracted to provide the financial projection for the City. The purpose of the projection was to help the City determine the revenue requirements for fiscal years 2019-2038 and project rate adjustments required to work toward targeted revenue requirements. The complete financial report prepared by Plante Moran includes a long-term rate track for the City, which incorporates the AMP to help ensure the financial stability of the City's utility in future years.

Capital Improvement Plan

A 20-year CIP was developed for the City using the remaining useful life, repair/replacement costs, condition assessments, BRE, and flow monitoring results. The CIP included:

1. Grouping projects based on the type of work and asset class.
2. A schedule for repair/replacement projects through the year 2038.
3. Anticipated project costs and annual system costs through the year 2038.

Major projects anticipated to begin in the next few years are:

- Raising buried manholes to grade to provide access for maintenance.
- Rehabilitating manholes and sewers that have high POF/BRE ratings.
- Rehabilitating components of the sanitary pump station.
- Continuing inspection of sanitary manholes over a 1-year period, repeating the inspection cycle every 7 years.
- Continuing inspection of sanitary sewers over a 1-year period, repeating the inspection cycle every 7 years.

List of Major Assets

Sanitary Assets:

- 101,207 feet of 8-inch to 36-inch diameter pipe.
- 398 sanitary manholes.
- 1 sanitary pump station.

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date November 26, 2018
(no later than 3 years from executed grant date)

The City of Gibraltar *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1184-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or No

   If No - Date of the rate methodology approval letter: May 22, 2018.

2) Significant Progress Made: Yes or No

   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)

3) Date of rate methodology review letter identifying the gap: ________________.

4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ________________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Derek M. Thiel at 734-676-9021 dthiel@cityofgibraltar.net

Name | Phone Number | Email

[signature] 11/26/18

Signature of Authorized Representative (Original Signature Required) | Date

Derek M. Thiel, M.P.A, City Administrator and DDA Director

Print Name and Title of Authorized Representative

Stormwater, Asset Management, and Wastewater
Asset Management Plan
Stormwater Executive Summary

City of Gibraltar
29450 Munro Avenue, Gibraltar, MI 48173
Derek M. Thiel, City Administrator and DDA Director
734.676.3900
SAW Grant Project Number 1184-01

Executive Summary

The City of Gibraltar (City) was awarded a grant by the Michigan Department of Environmental Quality (MDEQ) under the Stormwater, Asset Management, and Wastewater (SAW) Grant Program to develop both a wastewater and a stormwater Asset Management Plan (AMP). The total eligible cost was $2,066,654, less a local match of $349,997, for a total grant amount of $1,716,657. The grant was divided into two components: wastewater AMP cost ($1,058,954) and stormwater AMP cost ($1,007,700). The stormwater AMP is discussed below. A separate summary is available for the wastewater AMP.

The AMP was developed by Fishbeck, Thompson, Carr & Huber, Inc. (FTCH) and the City Engineer, C.E. Raines Company (CERCO), working closely with City staff in accordance with the following MDEQ AMP components:

1. Asset Inventory and Condition Assessment
2. Level of Service (LOS)
3. Asset Criticality
4. Capital Improvement Plan (CIP)

The objective of an AMP is to meet the required LOS in the most cost-effective manner through proper maintenance of the assets. For the City, this includes providing a summary of the condition of the assets owned by the City, a basis for prioritizing the rehabilitation/replacement of the assets, and an updated operation and maintenance (O&M) program to routinely maintain the assets. The work completed as part of the SAW Grant included the components described below.

Asset Inventory

The City's stormwater system consists of approximately 76,830 feet of pipe ranging in size from 4 inches to 42 inches. The system also includes three stormwater pump stations: Pump Station No. 19 on Middle Gibraltar Road, Pump Station No. 20 on Bayview Drive, and Bayview/Leslie Pump Station. The stormwater system discharges its flow to local drains as well as the Detroit River.

The following steps were taken in an effort to locate and identify the system's horizontal and vertical assets:

1. Created a Geographic Information System (GIS) database for the City using the Wayne County GIS database as a background.
2. Collected 66 stormwater system record drawings, scanned them, and incorporated them into the GIS database.
3. Developed a total of 23 different asset classes to represent the City's asset types, including pump station equipment, manholes, catch basins, and pipes.
4. Reviewed existing records and conducted site visits to develop an inventory of the City assets, including:
    a. 250 storm manholes.
    b. 950 storm pipe segments.
    c. 20 vertical assets.

   d. 613 catch basins.
   e. 63 storm outfalls.
5. Developed a unique naming convention for the assets that incorporated the type of asset, an island/mainland identifier, and a three-digit numerical number.
6. Developed an inventory of the City's asset information, including equipment and process descriptions, critical attribute information, age, remaining useful life, and replacement costs. Incorporated the information into the GIS database.

Condition Assessment

1. Manhole inspections were performed in 2016, 2017, and 2018 on the majority of the storm manholes in the system in accordance with the Manhole Assessment and Certification Program (MACP). Only some catch basins, located along main line sewer, were inspected at that time. The inspection forms, as well as the results of the inspection, were incorporated into the City's GIS database.
2. Closed-circuit television (CCTV) inspection of the storm sewers was performed in 2017. The work was completed in accordance with the Pipeline Assessment and Certification Program (PACP). The inspection forms, and the results of the inspection, were incorporated into the City's GIS database.
3. Site visits were conducted to visually inspect and assess the condition of each vertical asset, based on criteria established for each asset class. The condition assessment forms and resulting 1 through 5 condition ratings were incorporated into the City's GIS database.
4. The results of the assessment indicated:
   a. The storm sewers are generally in good condition; however, 70 pipe segments have a structural condition rating above 4.00, and 21 pipe segments have an O&M rating above 4.00.
   b. There are no manholes and 1 catch basin with a composite (structural and O&M) rating above 4.00.

Level of Service Determination

The City developed an LOS based on commitments to their customers and the MDEQ, which included:

1. Safeguarding public health and the environment.
2. Operating the system to ensure it has sufficient capacity to reduce the chances of surface flooding.
3. Maintaining the equipment and assets at a level that meets customer and regulatory needs and requirements.

Criticality of Assets

1. Assigned a Probability of Failure (POF) rating for each asset based on the condition of the asset, and its age or remaining life. The rating criteria was different for pipes, manholes, and vertical assets as displayed in Tables 1 through 3.

Table 1 – Pipe Probability of Failure

<table>
<tr><th colspan="2" rowspan="2"></th><th rowspan="2">Weighting Factor</th><th>5</th><th>4</th><th>3</th><th>2</th><th>1</th></tr>
<tr><th>Imminent</th><th>Probable</th><th>Occasional</th><th>Remote</th><th>Improbable</th></tr>
<tr><td rowspan="2">POF</td><td>O&M Quick Rating (PACP)</td><td>50%</td><td colspan="5">If there are no defects noted and the quick score is 0, Score = 1.
If the quick score is denoted by a letter, letter = 9.
Multiply the 4-digit quick score by 0.00085 = Score
If resulting score ≥ 5, Score = 5.
If resulting score ≤ 1, Score = 1</td></tr>
<tr><td>Structural Quick Rating (PACP)</td><td>50%</td><td colspan="5">If there are no defects noted and the quick score is 0, Score = 1.
If the quick score is denoted by a letter, letter = 9.
Multiply the 4-digit quick score by 0.00085 = Score
If resulting score ≥ 5, Score = 5.
If resulting score ≤ 1, Score = 1</td></tr>
<tr><td colspan="2">Remaining Useful Life (used only when pipe not PACP-inspected)</td><td>100%</td><td>Useful Life Remaining: 0%</td><td>Useful Life Remaining: 1-20%</td><td>Useful Life Remaining: 21-50%</td><td>Useful Life Remaining: 51-70%</td><td>Useful Life Remaining: 71-100%</td></tr>
</table>

Table 2 – Manhole Probability of Failure

<table>
<tr><th colspan="2" rowspan="2"></th><th rowspan="2">Weighting Factor</th><th>5</th><th>4</th><th>3</th><th>2</th><th>1</th></tr>
<tr><th>Imminent</th><th>Probable</th><th>Occasional</th><th>Remote</th><th>Improbable</th></tr>
<tr><td>POF</td><td>Structural and O&M Quick Rating (MACP)</td><td>100%</td><td colspan="5">If there are no defects noted and the quick score is 0, Score = 1.
If the quick score is denoted by a letter, letter = 9.
Multiply the 4-digit quick score by 0.00085 = Score
If resulting score ≥ 5, Score = 5.
If resulting score ≤ 1, Score = 1</td></tr>
<tr><td colspan="2">Remaining Useful Life (used only when pipe not MACP-inspected)</td><td>100%</td><td>Useful Life Remaining: 0%</td><td>Useful Life Remaining: 1-20%</td><td>Useful Life Remaining: 21-50%</td><td>Useful Life Remaining: 51-70%</td><td>Useful Life Remaining: 71-100%</td></tr>
</table>

Table 3 – Vertical Asset Probability of Failure

<table>
<tr><th rowspan="2"></th><th rowspan="2">Weighting Factor</th><th>5</th><th>4</th><th>3</th><th>2</th><th>1</th></tr>
<tr><th>Imminent</th><th>Probable</th><th>Occasional</th><th>Remote</th><th>Improbable</th></tr>
<tr><td>Physical Condition (based on visual inspection)</td><td>80%</td><td>Very Poor</td><td>Poor</td><td>Fair</td><td>Good</td><td>Very Good</td></tr>
<tr><td>Remaining Useful Life</td><td>20%</td><td>Useful Life Remaining: 0%</td><td>Useful Life Remaining: 1-10%</td><td>Useful Life Remaining: 11-20%</td><td>Useful Life Remaining: 21-40%</td><td>Useful Life Remaining: 41-100%</td></tr>
</table>

2. Assigned a Consequence of Failure (COF) rating for each asset to reflect its importance to the system and the resulting disruption or difficulty of repair/replacement if failure occurs, based on the criteria in Tables 4 and 5.

Table 4 – Consequence of Failure for Pipes and Manholes

		Weighting Factor	5 Catastrophic Disruption	4 Major Disruption	3 Moderate Disruption	2 Minor Disruption	1 Insignificant Disruption
COF	Diameter Score	33%	≥ 30-inch	18-inch to 27-inch	15-inch	10-inch to 12-inch	≤ 8-inch
COF	Physical Location Score	33%	State Trunklines, Railroad Crossings, Water Crossings		Primary County Roads and Major City Roads		Minor City Roads
COF	Service Area Score	33%	Schools, Water Crossings		Churches, City Facilities, Industrial, Commercial		Single Family Residential and Multi-Family Residential

Table 5 – Consequence of Failure for Vertical Assets

		Weighting Factor	5 Catastrophic Disruption	4 Major Disruption	3 Moderate Disruption	2 Minor Disruption	1 Insignificant Disruption
COF	Process	25%	Mission critical: unable to accomplish mission	Process shutdown	Loss of redundancy or temporary process upset	Potential process upset	No impact on process
COF	Financial Impact	25%	May require new borrowing or impact rates	May require transfer from reserves	Absorbed within current budget	Absorbed within applicable line item	Budgeted expense
COF	Disruption to the Community	25%	Long-term impact, area-wide disruption	Short-term impact, but substantial disruption	Sporadic service disruptions	Minor disruption	No disruption
COF	Required Response Time	25%	< 1 hour	1 to 4 hours	> 4 to 8 hours	> 8 to 48 hours	> 48 hours

3. Multiplied the POF and the COF to compute the Business Risk Exposure (BRE) score for each asset, representing the asset's criticality on a scale of 1 through 25. The BRE score serves as a tool for prioritizing repair/replacement.

The sewers and manholes that were inspected all had BRE scores less than 16. The City should monitor the condition of the sewers and manholes during the next round of inspections and update the BRE scores accordingly.

The pump station vertical assets for the stormwater system all had BRE values below 10. The City should continue to perform preventative maintenance to keep the pump stations in good working order.

Operation and Maintenance Strategies

1. Reviewed current preventative maintenance history and system operations.
2. Identified gaps in the preventative maintenance program and in system operations.
3. Developed a revised preventative maintenance program outlining tasks by asset.

Capital Improvement Plan

A 20-year CIP was developed for the City using the remaining useful life, repair/replacement costs, condition assessments, and BRE results. The CIP included:

1. Grouping projects based on the type of work and asset class.
2. A schedule for repair/replacement projects through the year 2038.
3. Anticipated project costs and annual system costs through the year 2038.

Major projects anticipated to begin in the next few years are:
- Raising buried manholes to grade to provide access for maintenance.
- Rehabilitating manholes and sewers that have high POF/BRE ratings.
- Continuing inspection of storm manholes over a 1-year period, repeating the inspection cycle every 7 years.
- Continuing inspection of storm sewers over a 1-year period, repeating the inspection cycle every 7 years.
- Constructing a new Bayview Storm Pump Station.
- Designing and constructing 6 permanent pump stations to replace the existing portable/temporary pumps.
- Dredging outfall locations, stabilizing outfall banks, and replacing outfall tide flex valves.

List of Major Assets

Stormwater Assets:
- 76,830 feet of 4-inch to 42-inch diameter pipe.
- 250 storm manholes.
- 613 catch basins.
- 63 storm outfalls.
- 3 storm pump stations.

DEQ

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Due Date November 26, 2018
(no later than 3 years from executed grant date)

The City of Gibraltar *(legal name of grantee)* certifies that all stormwater asset management plan (SWAMP) activities specified in SAW Grant No. 1184-01 have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SWAMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

Derek M. Thiel	at	734-676-9021	dthiel@cityofgibraltar.net
Name		Phone Number	Email

11/26/18

Signature of Authorized Representative (Original Signature Required) — Date

Derek M. Thiel, M.P.A, City Administrator and DDA Director
Print Name and Title of Authorized Representative

ASSET MANAGEMENT PLAN

EXECUTIVE SUMMARY

SAW GRANT No. 1085-01

FINAL – NOVEMBER 2018

Gogebic-Iron Wastewater Authority
Mark Bowman – Plant Manager
700 West Cloverland Drive
Ironwood, WI 49338-1013

Superior Engineering, LLC
S75W13139 Oxford Court
Muskego, WI 53150
(414) 232-1520
joan@superior-eng.com

EXECUTIVE SUMMARY

Gogebic-Iron Wastewater Authority (GIWA or Authority) received funds from Public Act 562 of 2012 for a Stormwater Asset Management Wastewater (SAW) Grant from the Michigan Department of Environmental Quality. The grant funds were used to update and complete an Asset Management Plan for the wastewater treatment plant to quantify, prioritize and fund the improvements to the GIWA wastewater treatment plant for the next 20 years.

The Authority completed a Master Plan for the Facility in 2005 and was updated in 2010. This has been the guidance for the treatment plant upgrades including the recent headworks improvement project completed in 2014.

SAW GRANT ASSET MANAGEMENT PLAN INFORMATION
Gogebic-Iron Wastewater Authority
Grant 1085-01 - $235,600 for AM Plan November 24th, 2015

Mark Bowman, Plant Manager	Robert Tervonen, Authority Board Chairman
700 Cloverland Drive	700 Cloverland Drive
Ironwood, MI 48838	Ironwood, MI 48838
(906) 932-5322 - Bowman.m@giwa.org	(906) 932-5050

ASSET INVENTORY AND CONDITION ASSESSMENT

An asset inventory and condition assessment for all the major pieces of equipment was updated from the 2010 Asset Management Plan.

Figure 1 GIWA Treatment Plant

GIWA does not own or operate the collection systems except for a short interceptor segment that discharges flow from its customers (City of Hurley WI, City of Ironwood, MI and Town of Ironwood, MI). The interceptor is located on GIWA grounds.

GIWA also owns and operates the outfall pipe from GIWA final effluent cascade to the Montreal River (Permit Outfall 001.) Outfall 001 is approximately a mile long and was installed in 1985. On October 5th,2016, the outfall easement, manholes and outfall structure were visually inspected. Based on this inspection, it was recommended to not inspect the outfall interceptor at this time. It is recommended to inspect the easements, manholes and outfall structure on an annual basis.

LEVEL OF SERVICE

Level of Service can be defined as the service quality for a given activity. Levels of service are often documented as a commitment to carry out a given action or actions within a specified time frame in response to an event or asset condition data. GIWA level of service is defined on:

- Meet the NPDES permit
- Have a cost-effective maintenance program
- Ensure that assets are properly maintained
- Provide adequate funding to maintain the assets.
- Provide a long-term rate methodology strategy

CRITICALITY OF ASSETS

Criticality of assets were developed for each piece of equipment based on and Probability of Failure and Consequence of Failure ratings were assigned for each asset and were used to develop a 20-year equipment replacement fund (ERF) OM&R budgets and GIWA Capital Improvements Plan (CIP).

REVENUE STRUCTURE AND LONG-TERM PLANNING

Financial planning, including operation, maintenance, & replacement (OM&R), user rates and rate structure are critical for the AM Program. Per Permit Part I, Section A.7.a.4) GIWA shall complete: an assessment of its user rates and revenue structure; update the equipment replacement fund and develop a long-term funding and CIP. ***As part of the AM plan, a 20- year***

budget was developed, and it was determined that the budget for 2017-2018 was adequate and there is no funding gap.

GIWA has followed an established methodology to maintain wastewater user rates adequate to cover wastewater O&M, debt, and replacement. As part of the development of the AM Plan, it was determined to adequately fund the ERF for the projected equipment replacements, rates needed to be increased to fund the future capital improvements. GIWA Board approved a rate increase to fund future capital projects.

GIWA currently has an OM&R budget. The budget was reviewed, and it was determined that the O&M portion of the budget is predictable based on historical data. The replacement portion of the OM&R is discussed above in the ERF.

A rate methodology strategy was developed and approved the Board and submitted to DEQ on May 24th, 2018 to comply with the SAW grant requirements. The Board also approved a resolution (2017-18(04) to accept the rate strategy.

The AM Plan also identified future capital improvements based on the 20-year projected budget.

TABLE 1 - Summary of Gogebic-Iron Wastewater Authority Major Equipment Assets

							Manufacturer's Budget Estimates 2016-2017			BUSINESS RISK SCORING SHEET		
Building Number	**Equipment Description**	**Original Cost**	**Year Installed (YYYY)**	**Age**	**Expected useful life**	**Remaining Useful Life**	**Replacement Cost**	**Rehabilitation Cost**	**Total Cost**	**Consequence of Failure**	**Probability of Failure (P) (see back-up sheets)**	**Criticality - Business Risk (BRE=PxC)**
10	Influent Sampler	$ 3,230	2002	17	15	-2	$8,000		$8,000	5.0	4.0	20.0
10	Influent Flow Meter	$ 5,000	2013	6	15	9	$5,000		$5,000	2.2	2.2	4.8
10	Parshall Flume		1985	34	45	11	$5,000		$5,000	2.3	2.2	5.1
10	Trash Rack - Fixed		2015	4	35	31	$4,000		$4,000	2.0	3.0	6.0
10	Fine Screen	$ 60,000	2014	5	25	20	$240,000		$240,000	4.0	1.5	6.0
10	Mechical Bar Screen (Climber Screen)	$ 50,000	1985	34	35	1	$35,000		$35,000	3.0	3.0	9.0
10	Pista Grit Pump No. 1	$ 25,000	2015	4	15	11	$25,000	$13,000	$13,000	5.0	2.2	11.0
10	Grit Pump No. 2 - Lower	$ 25,000	2015	4	15	11	$25,000	$13,000	$13,000	2.2	2.2	4.8
10	Grit Pump No. 2 Motor- North	$ 20,000	2015	4	15	11	$25,000		$25,000	5.0	2.2	11.0
10	Hydrogritter No. 1	$ 38,224	2003	16	25	9	$60,000		$60,000	3.2	2.2	7.0
10	Hydrogritter No. 2	$ 30,000	1991	28	25	-3	$60,000		$60,000	4.0	4.0	16.0
10	Influent Screw Pump No. 1 (Raw Sewage)	$ 67,667	1985	34	35	1	$230,000	$120,000	$120,000	4.0	4.0	16.0
10	Influent Screw Drive No. 1 (Raw Sewage)		1985	34	35	1	$50,000	$25,000	$25,000	4.0	4.0	16.0
10	Influent Screw Pump No. 2 (Raw Sewage)	$ 67,667	1985	34	35	1	$230,000	$120,000	$120,000	3.5	3.5	12.3
10	Influent Screw Drive No. 2 (Raw Sewage)		1985	34	35	1	$50,000	$25,000	$25,000	3.5	3.5	12.3
10	Influent Screw Pump No. 3 (Raw Sewage)	$ 67,667	1985	34	35	1	$230,000	$120,000	$120,000	3.5	3.5	12.3
10	Influent Screw Drive No. 3 (Raw Sewage)		1985	34	35	1	$50,000	$25,000	$25,000	3.5	3.5	12.3
10	Influent Screw Pump Soft Start	$ 2,676	2007	12	15	3	$3,000	$0	$3,000	3.0	2.0	6.0
10	Sewage Ejector Pump (sump to headworks)		1985	34	30	-4	$2,000	$1,300	$1,300	3.0	3.0	9.0
10	Pista Grit	$ 222,000	2014	5	25	20	$225,000		$225,000	4.0	2.0	8.0
15	Primary Clarifier No. 1 rakes and assembly (west)		1985	34	30	-4	$360,000	$ 150,000	$150,000	5.0	4.0	20.0
15	Primary Clarifier Drive No. 1 Drive		1985	34	30	-4	$42,000	$ 17,000	$17,000	5.0	4.0	20.0
15	Primary Clarifier No. 2 rakes and assembly (east)		1985	34	30	-4	$360,000	$ 150,000	$150,000	5.0	4.0	20.0
15	Primary Clarifier Drive No. 2 Drive		1985	34	30	-4	$42,000	$ 17,000	$17,000	5.0	4.0	20.0
15	Primary Sludge Pump No. 1 (Raw Sludge)		1985	34	35	1	$40,000	$ 20,000	$20,000	4.0	4.0	16.0
15	Primary Sludge Motor No. 1 (Raw Sludge)		1985	34	35	1	$10,000	$ 5,000	$5,000	4.0	4.0	16.0
15	Primary Sludge Pump No. 2 (Raw Sludge)		1985	34	35	1	$40,000	$ 20,000	$20,000	3.0	3.0	9.0
15	Primary Sludge Motor No. 2 (Raw Sludge)		1985	34	35	1	$10,000	$ 5,000	$5,000	3.0	3.0	9.0
15	Rapid Mixer - Primary Influent (not used)		1985	34	40	6	$0		$0	0.0	5.0	0.0
15	Scum Mixer -No. 2 east pit		1985	34	35	1	$9,000		$9,000	4.0	4.0	16.0
15	Scum Mixer - No. 1 west pit	$ 5,513	1985	34	35	1	$9,000		$9,000	2.5	4.0	10.0
15	Primary Effluent Sample Pump	$ 3,900	2013	6	15	9	$4,100		$4,100	2.0	2.0	4.0
15	Primary Effluent Sampler	$ 2,900	2014	5	15	10	$3,100		$3,100	2.0	2.0	4.0
20	Disc Aerator No. 1		1985	34	45	11	$200,000		$200,000	3.0	4.0	12.0
20	Disc Aerator Gear Reducer No. 1		1985	34	35	1	$8,000	$0	$8,000	4.0	4.0	16.0
20	Disc Drive Bearings & Couplings No. 1		1985	34	35	1	$4,000		$4,000	4.0	4.0	16.0
20	Disc Aerator No. 2		1985	34	45	11	$200,000		$200,000	3.0	4.0	12.0
20	Disc Aerator Gear Reducer No. 2		1985	34	35	1	$8,000	$0	$8,000	4.0	4.0	16.0
20	Disc Drive Bearings & Couplings No. 2		1985	34	35	1	$4,000		$4,000	4.0	4.0	16.0

TABLE 1 - Summary of Gogebic-Iron Wastewater Authority Major Equipment Assets

							Manufacturer's Budget Estimates 2016-2017			BUSINESS RISK SCORING SHEET		
Building Number	**Equipment Description**	**Original Cost**	**Year Installed (YYYY)**	**Age**	**Expected useful life**	**Remaining Useful Life**	**Replacement Cost**	**Rehabilitation Cost**	**Total Cost**	**Consequence of Failure**	**Probability of Failure (P) (see back-up sheets)**	**Criticality - Business Risk (BRE=PxC)**
20	Disc Aerator No. 3		1985	34	45	11	$200,000		$200,000	3.0	4.0	12.0
20	Disc Aerator Gear Reducer No. 3		1985	34	35	1	$8,000	$0	$8,000	4.0	4.0	16.0
20	Disc Drive Bearings & Couplings No. 3		1985	34	35	1	$4,000		$4,000	4.0	4.0	16.0
20	Disc Aerator No. 4		1985	34	45	11	$200,000		$200,000	3.0	4.0	12.0
20	Disc Aerator Gear Reducer No. 4		1985	34	35	1	$8,000	$0	$8,000	4.0	5.0	20.0
20	Disc Drive Bearings & Couplings No. 4		1985	34	35	1	$4,000		$4,000	4.0	5.0	20.0
20	Disc Aerator No. 5		1985	34	45	11	$200,000		$200,000	3.0	4.0	12.0
20	Disc Aerator Gear Reducer No. 5		1985	34	35	1	$8,000	$0	$8,000	4.0	4.0	16.0
20	Disc Drive Bearings & Couplings No. 5		1985	34	35	1	$4,000		$4,000	4.0	4.0	16.0
20	Disc Aerator No. 6		1985	34	45	11	$200,000		$200,000	3.0	4.0	12.0
20	Disc Aerator Gear Reducer No. 6		1985	34	35	1	$8,000	$0	$8,000	4.0	4.0	16.0
20	Disc Drive Bearings & Couplings No. 6		1985	34	35	1	$4,000		$4,000	4.0	4.0	16.0
20	VFDs for aerators (Qty 4)	$ 25,374	2004	15	20	5	$4,000		$4,000	3.0	3.0	9.0
20	DO Probe	$ 2,703	2000	19	15	-4	$3,000		$3,000	3.0	3.0	9.0
25	Final Clarifier No. 1 Two Bro		1995	24	30	6	$400,000	$170,000	$170,000	4.0	3.5	14.0
25	Final Clarifier Drive No. 1		1995	24	30	6	$42,000	$17,000	$17,000	4.0	3.5	14.0
25	Final Clarifier No. 2 Two Bro		1995	24	30	6	$400,000	$170,000	$170,000	4.0	3.5	14.0
25	Final Clarifier Drive No. 2		1995	24	30	6	$42,000	$17,000	$17,000	4.0	3.5	14.0
25	R.A.S. Pump No. 1		1985	34	35	1	$22,000	$10,000	$10,000	4.0	4.0	16.0
25	R.A.S. Motor No. 1 & VFD	$ 4,846	2008	11	25	14	$10,000	$5,000	$5,000	2.0	2.0	4.0
25	R.A.S. Pump No. 2		1985	34	35	1	$22,000	$10,000	$10,000	3.0	4.0	12.0
25	R.A.S. Motor No. 2		1985	34	25	-9	$10,000	$5,000	$5,000	3.0	4.0	12.0
25	R.A.S. Pump No. 3		1985	34	35	1	$22,000	$10,000	$10,000	4.0	3.0	12.0
25	R.A.S. Motor No. 3 & VFD	$ 4,846	2008	11	25	14	$10,000	$5,000	$5,000	2.0	2.0	4.0
25	Scum Pump 1		1985	34	38	4	$9,500	$5,500	$5,500	3.0	4.0	12.0
25	W.A.S. Pump 1		1985	34	35	1	$9,500	$5,500	$5,500	4.0	4.0	16.0
25	W.A.S. Motor 1		1985	34	25	-9	$6,500	$3,800	$3,800	4.0	4.0	16.0
25	W.A.S. Pump 2		1985	34	35	1	$9,500	$3,800	$3,800	3.0	4.0	12.0
25	W.A.S. Motor 2		1985	34	25	-9	$6,500	$3,800	$3,800	3.0	4.0	12.0
25	Floc Blowers 1		1985	34	35	1	$6,500		$6,500	4.0	4.0	16.0
25	Floc Blowers 2	$ 3,491	2007	12	35	23	$6,000		$6,000	2.0	2.0	4.0
35	Cl2 (Chlorine) Mixer		1985	34	30	-4	$6,000		$6,000	4.0	4.0	16.0
35	Cl2 (Chlorine) Injectors	$ 9,928	2006	13	30	17	$15,000		$15,000	4.0	2.0	8.0
35	Cl2 Chlorinator		1995	24	30	6	$10,000		$10,000	4.0	2.5	10.0
35	Sulfonator		1995	24	30	6	$42,000		$42,000	4.0	2.2	8.8
35	Dechlorinator Mixer (Not Used)		2005	14	20	6	$6,500		$0	4.0	4.0	16.0
35	Chlorine Leak Detector	$ 2,150	2012	7	15	8	$2,500		$2,500	4.0	4.0	16.0
35	Chlorine Sample Pump		2005	14	15	1	$6,500		$6,500	3.0	3.0	9.0
35	Effluent Sampler	$ 3,265	2002	17	15	-2	$8,000		$8,000	5.0	3.5	17.5
35	Effluent Level Indicator Cascade	$ 3,531	2005	14	15	1	$5,500		$0	4.0	2.0	8.0

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Building Number	**Equipment Description**	**Original Cost**	**Year Installed (YYYY)**	**Age**	**Expected useful life**	**Remaining Useful Life**	**Replacement Cost**	**Rehabilitation Cost**	**Total Cost**	**Consequence of Failure**	**Probability of Failure (P) (see back-up sheets)**	**Criticality - Business Risk (BRE=PxC)**
35	Disinfection Water Pump No. 1		1985	34	35	1	$6,500	$3,800	$3,800	3.0	2.2	**6.6**
35	Disinfection Water Motor No. 1		1985	34	25	-9	$6,500	$3,800	$3,800	3.0	2.2	**6.6**
35	Disinfection Water Pump No. 2		1985	34	38	4	$6,500	$3,800	$3,800	4.0	4.0	**16.0**
35	Disinfection Water Motor No. 1		1985	34	25	-9	$6,500	$3,800	$3,800	4.0	4.0	**16.0**
35	Flushing Pump No. 1 (FE)	$ 3,497	2015	4	38	34	$6,500	$3,500	$3,500	1.0	2.0	**2.0**
35	Flushing Water Motor No. 1		1985	34	25	-9	$4,000	$2,500	$2,500	1.0	2.0	**2.0**
35	Flushing Pump No. 2		1985	34	35	1	$6,500	$3,500	$3,500	3.0	3.0	**9.0**
35	Flushing Water Motor No. 2		1985	34	25	-9	$4,000	$2,500	$2,500	3.0	3.0	**9.0**
35	Belt Washwater Pump No. 1		1985	34	35	1	$12,000	$8,500	$8,500	4.0	4.0	**16.0**
35	Belt Washwater Motor No. 1		1985	34	25	-9	$8,000	$5,000	$5,000	4.0	4.0	**16.0**
35	Belt Washwater Pump No. 2		1985	34	35	1	$12,000	$8,500	$8,500	4.0	3.0	**12.0**
35	Belt Washwater Motor No. 2		1985	34	25	-9	$8,000	$5,000	$5,000	4.0	3.0	**12.0**
35	Tank Drain Pump		1985	34	35	1	$9,500	$6,000	$6,000	4.0	4.0	**16.0**
35	Tank Drain Motor		1985	34	25	-9	$7,000	$4,000	$4,000	4.0	4.0	**16.0**
35	Site Dewatering Pump No. 1 (Groundwater)		1985	34	35	1	$6,500	$3,500	$3,500	4.0	3.0	**12.0**
35	Site Dewatering Motor No. 1		1985	34	25	-9	$6,500	$3,500	$3,500	4.0	3.0	**12.0**
35	Site Dewatering Pump No. 2 (Groundwater)		1985	34	35	1	$6,500	$3,500	$3,500	4.0	4.0	**16.0**
35	Site Dewatering Motor No. 2		1985	34	25	-9	$6,500	$3,500	$3,500	4.0	4.0	**16.0**
35	Service Air Compressors		1985	34	35	1	$0		$0			**0.0**
35	Air Handling Unit - Chlorination		1985	34	40	6	$10,000		$10,000	3.0	3.0	**9.0**
35	Air Handling Unit - Dechlorination		1985	34	40	6	$10,000		$10,000	2.8	2.2	**6.2**
40	Digester Mixer System No. 1	$ 84,419	2002	17	25	8	$90,000	$60,000	$60,000	3.0	4.0	**12.0**
40	Digester Mixer System No. 2	$ 114,299	2006	13	25	12	$125,000	$80,000	$80,000	3.0	3.0	**9.0**
40	Secondary Digester Mixer System No. 3	$ 97,000	1996	23	25	2	$100,000	$70,000	$70,000	3.0	3.0	**9.0**
40	Recirculation Pump No. 1	$ 4,434	2010	9	35	26	$6,500	$3,800	$3,800	3.0	3.0	**9.0**
40	Recirculation Motor No. 1		1985	34	25	-9	$6,500		$6,500	3.0	3.0	**9.0**
40	Recirculation Pump No. 2	$ 4,434	2010	9	35	26	$6,500		$6,500	4.0	4.0	**16.0**
40	Recirculation Motor No. 2		1985	34	25	-9	$6,500		$6,500	4.0	4.0	**16.0**
40	Recirculation Pump No. 3	$ 12,530	2010	9	35	26	$15,000		$15,000	2.0	2.0	**4.0**
40	Recirculation Motor No. 3		1985	34	25	-9	$6,500		$6,500	2.0	2.0	**4.0**
40	Heat Exchanger No. 1		1985	34	50	16	$200,000		$200,000	3.0	3.0	**9.0**
40	Heat Exchanger No. 2		1985	34	50	16	$200,000	$50,000	$50,000	4.0	4.0	**16.0**
40	Heater Blower		1985	34	40	6	$10,000		$10,000	3.0	2.0	**6.0**
40	Beltpress Sludge Pump No. 1		1985	34	38	4	$40,000	$20,000	$20,000	4.0	4.0	**16.0**
40	Beltpress Sludge Motor No. 1		1985	34	38	4	$20,000	$10,000	$10,000	4.0	4.0	**16.0**
40	Beltpress Sludge Pump No. 2		1985	34	38	4	$40,000	$20,000	$20,000	2.8	2.2	**6.2**
40	Beltpress Sludge Motor No. 2		1985	34	38	4	$20,000	$10,000	$10,000	3.3	2.2	**7.3**
40	Digester Heater Booster Water Pump		1985	34	30	-4	$5,000		$5,000	3.0	3.0	**9.0**
40	Digester Heater Burner Fireeye		1985	34	30	-4	$6,500		$6,500	3.0	3.0	**9.0**
40	Drip Traps and Auxilliary Equipment		1985	34	38	4	$6,500		$6,500	3.0	3.0	**9.0**

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Building Number	**Equipment Description**	**Original Cost**	**Year Installed (YYYY)**	**Age**	**Expected useful life**	**Remaining Useful Life**	**Replacement Cost**	**Rehabilitation Cost**	**Total Cost**	**Consequence of Failure**	**Probability of Failure (P) (see back-up sheets)**	**Criticality - Business Risk (BRE=PxC)**
40	Waste Gas Burner, Regulator, Flame Arrestor	$ 12,891	2012	7	20	13	$15,000		$15,000	2.0	2.0	**4.0**
40	Water Accumulator		1985	34	30	-4	$6,500		$6,500	3.0	3.0	**9.0**
40	Gas Detector System - Digestor	$ 1,834	2015	4	15	11	$2,000		$2,000	4.0	2.0	**8.0**
40	Gas Detector System - Methane	$ 4,132	2006	13	15	2	$4,500		$4,500	4.0	2.0	**8.0**
50	Belt Press No. 1	$ 187,000	1985	34	40	6	$400,000	$200,000	$200,000	3.5	3.5	**12.3**
50	Belt Press No. 2		1985	34	40	6	$400,000	$200,000	$200,000	3.5	3.5	**12.3**
50	Belt Press No. 1 Hydraulic drive		1985	34	20	-14	$5,000		$5,000	4.0	4.0	**16.0**
50	Belt Press No. 2 Hydraulic drive		1985	34	20	-14	$5,000		$5,000	4.0	4.0	**16.0**
50	Belt Press Conveyor		1985	34	30	-4	$20,000		$20,000	4.0	4.0	**16.0**
50	Polymer Pump No. 1	$ 4,211	2008	11	15	4	$4,700		$4,700	2.0	2.0	**4.0**
50	Polymer Pump No. 2	$ 4,211	2008	11	15	4	$4,700		$4,700	2.0	2.0	**4.0**
50	Polymer Pump No. 3		1985	34	15	-19	$4,700		$4,700	2.8	2.2	**6.2**
50	Polymer Mixer No. 1		1985	34	20	-14	$8,000		$8,000	3.0	3.0	**9.0**
50	Polymer Mixer No. 2		1985	34	38	4	$8,000		$8,000	4.0	4.0	**16.0**
50	Polymer Mixer No. 3		1985	34	15	-19	$0		$0	1.0	5.0	**5.0**
50	Sidestream Pump No. 1		1985	34	35	1	$6,500		$6,500	2.0	2.0	**4.0**
50	Sidestream Motor No. 1		1985	34	25	-9	$6,500		$6,500	2.0	2.0	**4.0**
50	Sidestream Pump No. 2		1985	34	38	4	$6,500		$6,500	3.0	3.0	**9.0**
50	Sidestream Motor No. 1		1985	34	25	-9	$6,500		$6,500	3.0	3.0	**9.0**
50	Ferric Pump & Strainer (Ferric Rm)	$ 3,600	2007	12	15	3	$5,000		$5,000	5.0	3.0	**15.0**
50	Ferric Tank		1985	34	45	11	$15,000		$15,000	3.3	2.2	**7.3**
70	Bypass Return Pump		1958	61	38	-23	$6,500		$6,500	3.0	3.0	**9.0**
70	Bypass Return Motor		2007	12	25	13	$6,500		$6,500	3.0	3.0	**9.0**
70	Flow Equalization Blower		1958	61	40	-21	$6,500		$6,500	3.0	3.0	**9.0**
10	Slide Gate - Handwheel (bypass control)		1985	34	35	1	$8,000		$8,000	4.0	3.0	**12.0**
10	Slide Gate - Handwheel		1985	34	38	4	$8,000		$8,000	5.0	2.2	**11.0**
10	Slide Gate - Handwheel		1985	34	38	4	$8,000		$8,000	3.0	3.0	**9.0**
10	Slide Gate - Handwheel		1985	34	38	4	$8,000		$8,000	3.0	3.0	**9.0**
10	Slide Gate - Handwheel		1985	34	38	4	$8,000		$8,000	3.0	3.0	**9.0**
10	Slide Gate - Handwheel		1985	34	38	4	$8,000		$8,000	3.0	3.0	**9.0**
10	Slide Gate - Handwheel		1985	34	38	4	$8,000		$8,000	3.0	3.0	**9.0**
10	Sluice Gate Handwheel		1985	34	38	4	$8,000		$8,000	3.0	3.0	**9.0**
10	Sluice Gate Non-rising Stem		1985	34	38	4	$8,000		$8,000	3.0	3.0	**9.0**
10	Slide Gate Non-rising Stem		1985	34	38	4	$8,000		$8,000	3.3	3.0	**9.9**
15	Slide Gate - Handwheel (bypass control)		1985	34	15	-19	$8,000		$8,000	4.0	4.0	**16.0**
15	Slide Gate - Handwheel (bypass control)		1985	34	15	-19	$8,000		$8,000	4.0	4.0	**16.0**
15	Stop Gate - Handle		1985	34	38	4	$8,000		$8,000	5.0	3.0	**15.0**
15	Stop Gate - Handle		1985	34	38	4	$8,000		$8,000	5.0	2.2	**11.0**
20	Sluice Gate Non-rising Stem		1985	34	35	1	$8,000		$8,000	5.0	3.0	**15.0**
20	Sluice Gate Non-rising Stem		1985	34	35	1	$8,000		$8,000	5.0	3.0	**15.0**

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20	Sluice Gate Non-rising Stem		1985	34	35	1	$8,000		$8,000	5.0	2.2	**11.0**
20	Sluice Gate Non-rising Stem		1985	34	35	1	$8,000		$8,000	5.0	2.2	**11.0**
20	Sluice Gate Non-rising Stem		1985	34	35	1	$8,000		$8,000	5.0	2.2	**11.0**
20	Sluice Gate Non-rising Stem		1985	34	35	1	$8,000		$8,000	5.0	2.2	**11.0**
20	Slide Gate - Handwheel		1985	34	35	1	$8,000		$8,000	5.0	2.2	**11.0**
20	Slide Gate - Handwheel		1985	34	35	1	$8,000		$8,000	5.0	2.2	**11.0**
20	Slide Gate - Handwheel		1985	34	35	1	$8,000		$8,000	5.0	2.2	**11.0**
20	Stop Gate - Handle		1985	34	35	1	$8,000		$8,000	5.0	2.2	**11.0**
20	Stop Gate - Handle		1985	34	35	1	$8,000		$8,000	5.0	2.2	**11.0**
25	Slide Gate - Handwheel		1985	34	38	4	$8,000		$8,000	5.0	2.2	**11.0**
25	Slide Gate - Handwheel		1985	34	38	4	$8,000		$8,000	5.0	2.2	**11.0**
25	Stop Gate - Handle		1985	34	38	4	$8,000		$8,000	5.0	2.2	**11.0**
25	Stop Gate - Handle		1985	34	38	4	$8,000		$8,000	5.0	2.2	**11.0**
26	Sluice Gate Non-rising Stem		1985	34	38	4	$8,000		$8,000	3.3	2.2	**7.3**
35	Sluice Gate Non-rising Stem		1985	34	38	4	$8,000		$8,000	3.3	2.2	**7.3**
70	Slide Gate - Handwheel		1958	61	38	-23	$8,000		$8,000	5.0	2.2	**11.0**
10	Multi-Plexer (MCC) Headworks D		1985	34	36	2	$200,000		$200,000	5.0	3.5	**17.5**
25	Multi-Plexer (MCC) Final Clarifier E		1985	34	36	2	$200,000		$200,000	5.0	4.0	**20.0**
35	Multi-Plexer (MCC) Chemical F		1985	34	36	2	$200,000		$200,000	5.0	4.0	**20.0**
40	Multi-Plexer (MCC) Digester G		1985	34	36	2	$200,000		$200,000	5.0	4.0	**20.0**
50	Multi-Plexer (MCC) Administration H		1985	34	36	2	$200,000		$200,000	5.0	4.0	**20.0**
70	Multi-Plexer (MCC Flow Equalization J		1985	34	36	2	$200,000		$200,000	5.0	4.0	**20.0**
50	Main Breaker to Plant from Xcel Transformer		1985	34	36	2	$20,000		$20,000	5.0	4.0	**20.0**
50	Main Breaker to Building 10		1985	34	36	2	$20,000		$20,000	5.0	4.0	**20.0**
50	Main Breaker to Building 20		1985	34	36	2	$20,000		$20,000	5.0	4.0	**20.0**
50	Main Breaker to Building 25		1985	34	36	2	$20,000		$20,000	5.0	4.0	**20.0**
50	Main Breaker to Building 35		1985	34	36	2	$20,000		$20,000	5.0	4.0	**20.0**
50	Main Breaker to Building 40		1985	34	36	2	$20,000		$20,000	5.0	4.0	**20.0**
50	Main Breaker to Building 50		1985	34	36	2	$20,000		$20,000	5.0	4.0	**20.0**
50	Main Breaker to Building 60		1985	34	36	2	$20,000		$20,000	5.0	4.0	**20.0**
50	Main Breaker to Building 70		1985	34	36	2	$20,000		$20,000	5.0	4.0	**20.0**
50	Main Breaker to Building 80		1985	34	36	2	$20,000		$20,000	5.0	4.0	**20.0**
50	Main Breaker to Building 85		1985	34	36	2	$20,000		$20,000	5.0	4.0	**20.0**
Yard	Conduits to Each Building (encased in concrete)		1985	34	40	6	$800,000		$800,000	5.0	4.0	**20.0**
Misc	Lighting Panels (Qty 20)		1985	34	35	1	$30,000		$30,000	3.0	4.0	**12.0**
10	Control Panel - Pista Grit		2014	5	15	10	$10,000		$10,000	2.0	3.0	**6.0**
Misc	SCADA	$ 94,289	1999	20	20	0	$200,000		$200,000	2.0	3.0	**6.0**
Misc	PLC Hardware	$ 40,000	2017	2	15	13	$15,000		$15,000	2.0	3.0	**6.0**
Misc	Instruments throughout Plant		2010	9	15	6	$100,000		$100,000	2.0	3.0	**6.0**
50	Emergency Generator		1985	34	30	-4	$200,000		$200,000	5.0	4.0	**20.0**

TABLE 1 - Summary of Gogebic-Iron Wastewater Authority Major Equipment Assets

							Manufacturer's Budget Estimates 2016-2017			**BUSINESS RISK SCORING SHEET**		
Building Number	**Equipment Description**	**Original Cost**	**Year Installed (YYYY)**	**Age**	**Expected useful life**	**Remaining Useful Life**	**Replacement Cost**	**Rehabilitation Cost**	**Total Cost**	**Consequence of Failure**	**Probability of Failure (P) (see back-up sheets)**	**Criticality - Business Risk (BRE=PxC)**
50	Switchgear - Emergency Generator		1985	34	30	-4	$50,000		$50,000	5.0	4.0	**20.0**
50	Hot Water Boiler No. 1		1995	24	35	11	$15,000		$15,000	3.0	2.2	**6.6**
50	Hot Water Boiler No. 2		1985	34	35	1	$15,000		$15,000	4.0	4.0	**16.0**
50	HVAC - Administration		1985	34	25	-9	$20,000		$20,000	3.0	3.0	**9.0**
50	HVAC - Wastewater Plant		1985	34	40	6	$20,000		$20,000	2.0	2.0	**4.0**
50	Ejector Pumps (9)		1985	34	38	4	$18,000		$18,000	3.0	3.0	**9.0**
50	D.A.F.T. Air Compressor No. 1 In Use???		1985	34	38	4	$10,000		$10,000	3.0	2.2	**6.6**
50	D.A.F.T. Air Compressor No. 2		1985	34	15	40	$10,000		$10,000	3.0	2.2	**6.6**
50	Waste Sludge Blower No. 1		1985	34	40	6	$10,000		$10,000	3.0	2.2	**6.6**
50	Waste Sludge Blower No. 2		1985	34	40	6	$10,000		$10,000	3.3	2.2	**7.3**
Misc	Eye Wash Stations		1985	34	30	-4	$6,000		$6,000	4.0	4.0	**16.0**
Misc	Eye Wash Stations		1985	34	38	4	$6,000		$6,000	4.0	2.0	**8.0**
Misc	Flow Meter - Ironwood Township	$ 1,168	2013	6	15	9	$5,000		$5,000	4.0	1.0	**4.0**
Misc	VFDs for Lift Station Ironwood Township	$ 19,245	2005	14	15	1	$25,000		$25,000	2.0	2.0	**4.0**
Misc	Flow Meter - Ironwood Township	$ 1,168	2013	6	15	9	$5,000		$5,000	4.0	1.0	**4.0**
Misc	Flow Meter - Ironwood Township - Level	$ 2,375	2004	15	15	0	$1,500		$1,500	3.0	3.0	**9.0**
Misc	Telemetry - Lift Station	$ 16,641	2004	15	15	0	$20,000		$20,000	3.5	3.5	**12.3**
Misc	Flow Meter - Hurley	$ 3,295	2015	4	15	11	$5,000		$5,000	3.0	1.0	**3.0**
50	Laboratory Equipment for the Lab	$ 50,000	2000	19	15	-4	$50,000		$50,000	3.0	1.0	**3.0**
Misc	Flow Meter - Portable	$ 3,522	2011	8	15	7	$5,000		$5,000	4.0	1.0	**4.0**
Misc	Sampler - Portable	$ 2,861	2014	5	15	10	$5,000		$5,000	3.0	3.0	**9.0**
Yard	Grating - Miscelleneous Locations		1985	34	40	6	$15,000		$15,000	3.0	2.0	**6.0**
Yard	Grating - Miscelleneous Locations		1985	34	50	16	$15,000		$15,000	4.0	4.0	**16.0**
Misc	Check Valves - 6 inch (Est Qty 20)		1985	34	35	1	$80,000		$80,000	5.0	2.2	**11.0**
Misc	Check Valves - 8 inch (Est Qty 2)		1985	34	35	1	$10,000		$10,000	5.0	4.0	**20.0**
Misc	Mud Valves		1985	34	40	6	$14,000		$14,000	5.0	2.2	**11.0**
Misc	Plug Valves- 4 inch		1985	34	40	6	$10,000		$10,000	3.3	2.2	**7.3**
Misc	Plug Valves - 6 inch		1985	34	40	6	$22,000		$22,000	5.0	2.2	**11.0**
Misc	Plug Valves - 8-inch		1985	34	40	6	$24,000		$24,000	5.0	4.0	**20.0**
Misc	Gate Valves - 4 inch		1985	34	40	6	$4,000		$4,000	5.0	2.2	**11.0**
Misc	Gate Valves - 6 inch		1985	34	40	6	$4,400		$4,400	5.0	2.2	**11.0**
Misc	Actuators		1985	34	30	-4	$28,000		$28,000	5.0	2	**11.0**
Vehicle	Cat 924 Wheel Loader	$ 129,965	2013	6	15	9	$135,000		$135,000	4.0	2.5	**10.0**
Vehicle	Ford Pickup 2002	$ 27,492	2001	18	15	-3	$35,000		$35,000	4.0	2.5	**10.0**
Vehicle	JD Tractor (Lawn Mower/Snow Blower)	$ 19,853	2001	18	20	2	$25,000		$25,000	4.0	2.5	**10.0**
Vehicle	Biosolids Haul Truck, IH w/ Knight Spreader		1985	34	25	-9	$125,000		$125,000	4.0	3.0	**12.0**
Vehicle	Snow Blower	$ 1,168	2013	6	10	4	$1,400		$1,400	4.0	2.5	**10.0**
Yard	Sludge Pipe 6-inch from Headworks to Digestor		1985	34	35	1	$200,000		$200,000	5.0	4.0	**20.0**
Yard	Sludge Pipe X-inch from Digestor to Dewatering		1985	34	38	4	$200,000		$200,000	4.0	3.0	**12.0**
Yard	Ductile Iron		1985	34	50	16	$300,000		$300,000	4.0	2.2	**8.8**

TABLE 1 - Summary of Gogebic-Iron Wastewater Authority Major Equipment Assets

							Manufacturer's Budget Estimates 2016-2017			**BUSINESS RISK SCORING SHEET**		
Building Number	**Equipment Description**	**Original Cost**	**Year Installed (YYYY)**	**Age**	**Expected useful life**	**Remaining Useful Life**	**Replacement Cost**	**Rehabilitation Cost**	**Total Cost**	**Consequence of Failure**	**Probability of Failure (P) (see back-up sheets)**	**Criticality - Business Risk (BRE=PxC)**
Buildings	Concrete Structures Phase I Rehabilitation		1985	34	32	-2	$2,000,000	$210,000	$210,000	4.0	4.0	**16.0**
Buildings	Concrete Structures Phase II Rehabilitation		1985	34	36	2	$2,000,000	$200,000	$200,000	4.0	4.0	**16.0**
40	Digester Covers		1985	34	45	11	$3,000,000	$500,000	$500,000	3.5	4.0	**14.0**
10	Primary Clarifier Covers		1985	34	45	11	$400,000		$400,000	3.0	3.0	**9.0**
15	Secondary Clarifier Covers		1996	23	45	22	$400,000		$400,000	3.0	2.0	**6.0**
TOTAL							**$19,310,100**	**$2,999,700**	**$10,909,300**			

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date 11/24/2018
(no later than 3 years from executed grant date)

The Gogebic-Iron Wastewater Authority (legal name *grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1085-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or ***No***

   If No - Date of the rate methodology approval letter: ***June 20th, 2018***

2) Significant Progress Made: ***Yes*** or No

   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.) ***DEQ defined that GIWA made significant progress.***

3) Date of rate methodology review letter identifying the gap: Gap was not identified.

4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was

   adopted on: ***The rate increase was not required to meet the funding gap. Based on the assessment, the equipment replacement fund was increased from $62,000 to $125,000 to address equipment replacement requirements.***

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Name: Mark Bowman Phone Number: 906 932-5322 Email: bowman.m@giwa.org

Robert J Tervonen November 16th, 2018

Signature of Authorized Representative (Original Signature Required) Date

Robert Tervonen, Chariman

Print Name and Title of Authorized Representative

DEQ

Department of Environmental Quality
Stormwater, Asset Management and Wastewater (SAW) Grant
Innovative Technology
Certification of Project Completeness

SAW Grant No.: 1085-01

Completion Due Date: 11/30/2018
(no later than 3 years from executed grant date)

The SAW Grant for Innovative Wastewater and Stormwater Technology requires the grant recipient to determine, through testing and demonstration of the technology, if the water quality issue identified in the grant can be successfully and feasibly addressed with full scale implementation of the project. This determination must be made within 3 years of the executed grant date.

Select one of the following:

The ______________________________ *(legal name of grantee)* certifies that project testing and demonstration show that the water quality issue identified in the SAW Grant can be successfully and feasibly addressed, and the project will be implemented.

Or

The **Gogebic-Iron Wastewater Authority** *(legal name of grantee)* certifies that project testing and demonstration show that full scale implementation of the project to address the water quality issue identified in the SAW Grant is not financially or technically feasible.

Copies of the innovative technology results and other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality upon request.

Gogebic-Iron Wastewater Authority ______________ 11-29-18
Legal Name of Grant Recipient — Date

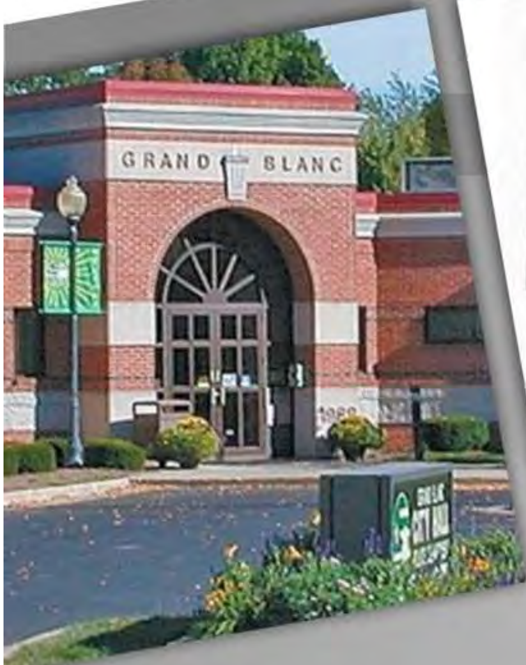
Signature of Authorized Representative (Original Signature Required)

Robert J. Tervonen
Print Name and Title of Authorized Representative

Protecting our Infrastructure Investment

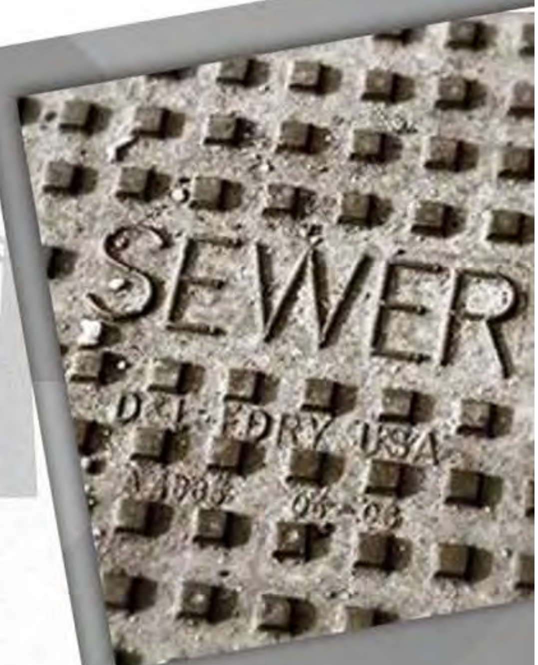
ASSET MANAGEMENT PLAN

Wastewater Executive Summary Report



WELCOME

CITY OF
GRAND BLANC
CONNECT · GROW · BECOME



Prepared for:

City of Grand Blanc

SAW Project No. 1616-01

FINAL
November 2018

FLEIS&VANDENBRINK
DESIGN. BUILD. OPERATE.

EXECUTIVE SUMMARY

OVERVIEW

Public Act 562 of 2012 authorized money for a Stormwater, Asset Management, and Wastewater (SAW) Grant Program. In November of 2015, the City of Grand Blanc received a SAW Grant from the Michigan Department of Environmental Quality (MDEQ), Project No. 1616-01, to provide financial assistance for the development of a wastewater asset management plan (AMP) for the City's publicly owned wastewater collection system. The approved project cost for the wastewater asset management plan was $209,825, with a grant amount of $188,842.50 and a local match of $20,982.50. This AMP is intended to be a living document that is updated as assets continue to wear and age, and as additional inspection/condition results are found and incorporated into the plan.

The contact person for the City of Grand Blanc AMP is:

Matthew Wurtz, DPW Director
203 E. Grand Blanc Road
Phone: 810.694.5420
Email: dpwdirector@cityofgrandblanc.com

MAJOR ASSET INVENTORY & CONDITION ASSESSMENT

Below is a list of the major assets in the City's wastewater collection system identified in the AMP.

List of Major Assets

- Gravity Sewer (8" to 18" diameter)……. 163,571 feet
- Force Main (4" to 6" diameter)………… 1,485 feet
- Manholes………………………………… 805
- Lift Stations……………………………… 2

These wastewater collection system assets are operated and maintained by the City's Department of Public Works (DPW) and are located in existing street rights-of-way or in easements dedicated for the assets use and maintenance.

The City's wastewater collection system discharges at various locations to the Genesee County Drain Commissioner – Water & Waste Services (GCDC-WWS) trunk sewer, which transports the wastewater to the County's wastewater treatment facility.

Asset Identification and Location

A comprehensive wastewater collection system asset inventory was developed from existing record drawings, field notes, staff knowledge, site visits, and field survey work. An existing Geographic Information System (GIS) provided the framework for the wastewater collection asset inventory. Although the existing framework was incomplete and based on available information and record drawings, it provided a general context of where the infrastructure was located.

Pipe material, size, and age were identified through the review of available historical record documents and Closed Circuit Televising (CCTV) data. Manhole and invert elevations were determined through GPS field survey and a comprehensive evaluation of the gravity system.

This new wastewater collection system inventory and database was integrated with the City's GIS for efficient management infrastructure assets.

Condition Assessment and Expected Useful Life

NASSCO-MACP manhole field based assessments were completed on a large representative sample of the City's wastewater collection infrastructure. Approximately 75% of the 805 manhole structures have been assessed. Preventative maintenance pipeline cleaning and NASSCO-PACP CCTV field based assessments were completed in recent years on approximately 6% of the gravity pipe. This cleaning and televising were completed in areas which had a past service history or other indication of a potential defect. Smoke testing and an inflow and infiltration (I&I) study was performed in the past on problem areas in the system to disclose locations of I&I and was not needed to be completed again as part of the SAW grant. Capacity analysis and evaluation have also been completed on a large percentage of the system during site and development plan reviews.

The collection system pipes and manholes assessed were generally found to be in good condition with only a few minor defects. From the representative sampling of pipe assessments, the condition of the sewer remained fairly consistent throughout the city. Structural defects such as cracks, fractures, and offset pipe joints were limited. O&M defects such as encrustation, grease deposits, and infiltration were more prominent but few require action in this planning period. The manhole assessments identified a small number of structures with signs of infiltration of varying degree. Based on the assessments completed, recommendations for short-term (1-5 year) and long term (6-20 year) system maintenance and improvements were identified. Maintenance recommendations include cleaning and televising the remainder of the system. These additional assessments will be used to further evaluate structural and O&M defects in the system and establish a comprehensive short and long term maintenance and improvement plan.

The condition of the lift stations ranged from good to poor. The Worthington Court lift station is a an approximately 10-years old submersible style and is in good condition. Ongoing maintenance has upheld the condition of the approximately 50-year old Reid Road wet well/dry well style lift station, but this station has deteriorated due to its age and the harsh conditions associated with wastewater collection systems. This station requires significant maintenance and cleaning and replacement and/or major rehabilitation is recommended in the short-term. The cast iron force main for this lift station is also reaching the end of its expected service life, although the overall condition of this force main is not well known. This force main has experienced 6 to 8 breaks over the course of its service life.

Level of Service

Defining the Expected Level of Service

The overall objective of the City's Department of Public Works is to provide reliable wastewater collection services at a minimum cost, consistent with applicable environmental and health regulations. To achieve this, the following Level of Service (LOS) goals have been maintained:

LEVEL OF SERVICE STATEMENT

- Provide adequate collection system capacity for all service areas.
- Maintain capacity for community development and redevelopment.
- Comply with regulatory requirements.
- Provide for the health and safety of all employees and customers.
- Actively maintain collection system assets in reliable working condition.
- Reduce overflows and basement backups.
- Have adequate staffing to conduct routine operations and maintenance, as well as respond to emergency situations.
- Perform routine cleaning and rehabilitation of system problem areas and defects.
- Regularly review projected operations & maintenance (O&M) and capital expenditures budget.
- Maintain sound financial management to generate sufficient revenue and adequate financial reserves for O&M and periodic capital improvements.
- Provide efficient operations to keep user costs as low as possible while maintaining level of service desired.
- Utilize ArcGIS to provide efficient and sustainable management of the wastewater collection infrastructure.

Measuring Performance

The LOS goals may need to be adjusted from time to time as the utility ages, the needs of the community change, or new rules or regulations require a change in operation. For this reason, the LOS goals should be reviewed from time to time to make sure they accurately reflect the desired operation of the utility. In order to assure that LOS goals are met, performance measurements may need to be implemented. The City plans to monitor the LOS goals and implement performance measurements as necessary.

CRITICAL ASSETS

Determining Criticality

Business Risk is the determination of the criticality of each asset in the wastewater collection system. Criticality is based on two factors: 1) Likelihood (Probability) of Failure, and 2) Consequence of Failure. Defining an asset's Business Risk allows for management of risk and aids in decision making for where to allocate operation, maintenance, and capital improvement funds.

Likelihood of Failure (LoF) is a measure of how likely an asset is to fail. The following categories have been developed to quantify how likely an asset is to fail:

- Condition of the asset
- Remaining useful life (Age)
- Service History
- Operational status

Consequence of Failure (CoF) is a measure of the social, economic, financial or environmental impact of the failure of an asset and the utility's ability to respond, convey and treat wastewater. CoF categories of the collection system include:

- Proximity to critical environmental features
- Location (Zoning District) of asset
- Facilities served by asset
- Size and location of asset within the utility network
- Type of asset.

Criticality Results

Using the strategy outlined above, a Business Risk Evaluation (BRE) was performed for each asset using Innovyze-InfoMaster software. InfoMaster is an ArcGIS-based sewer asset management and capital planning software that compiles, analyzes and assesses Business Risk for each asset and aids in developing a Capital Improvement Plan.

The Business Risk score, which is an informative indicator to help prioritize infrastructure improvements, is calculated for each asset using the following equation:

Business Risk = Consequence of Failure Score x Likelihood of Failure Score

Assets with the greatest consequence of failure and the greatest likelihood of failure will be assets that are the most critical. Assets with the highest business risk score are likely candidates for near-term rehabilitation and replacement. Assets with lower scores should be monitored and analyzed to develop the best life cycle strategy.

Because only a portion of the wastewater collection system has been televised and assessed, likelihood of failure scores may continue to be developed as more sewers are cleaned and televised.

A 3x3 Business Risk Matrix identifies the relative "Criticality" of each asset based on their CoF and LoF scores to establish a "Risk Rating" for each asset. Asset rating categories range from *Negligible* to *Extreme* criticality based on position within the matrix and are color coded to better identify significance. Upper and lower CoF and LoF score "boundaries" are set for each matrix box to establish the Risk Rating for each asset and place each asset in the proper rating category. Business Risk is depicted visually in the risk matrix shown in Figure 1, and the Business Risk of each asset determines the appropriate strategy for risk management as shown in Table 1.

Consequence of Failure	Low	Medium	High
High	**Medium Risk**	**High Risk**	**Extreme Risk**
Medium	**Low Risk**	**Medium Risk**	**Extreme Risk**
Low	**Negligible Risk**	**Low Risk**	**High Risk**

Likelihood of Failure

Figure 1. Business Risk Matrix (Risk Rating)

Table 1. Strategies for Asset Rehabilitation and Replacement	
Risk Rating	**Strategies for Asset Rehabilitation or Replacement**
Extreme	Inspect immediately and develop 1-2 year rehabilitation plan
High	Inspect immediately and develop short to medium term rehabilitation plan
Medium	Inspect immediately and develop long term rehabilitation plan
Low	Develop short term inspection strategy and develop long term rehabilitation plan
Negligible	Develop long term inspection strategy

Risk ratings can also be thought of as priorities since they are only relevant to the City of Grand Blanc. An extreme risk in one community could be a low risk in another depending on the overall condition of their infrastructure. Below is a simple correlation between risk rating and priority.

Risk Rating	Priority
High / Extreme	Essential
Medium	Desirable
Low	Acceptable
Negligible	Deferrable

Figure 2 below provides the risk rating for gravity and force main pipe by number of pipe segments. Pipes not televised and assessed use only age and material as a preliminary likelihood of failure score, since the condition of the pipe is unknown. Most of these pipes received an initial risk rating of negligible based on their remaining service life and the known condition of other pipes in the collection system. This risk rating will be further evaluated as more pipe segments are cleaned and assessed.

The majority of the pipes have a medium, low, or negligible risk rating. The pipes with a high risk rating are recommended for rehabilitation in the short term.

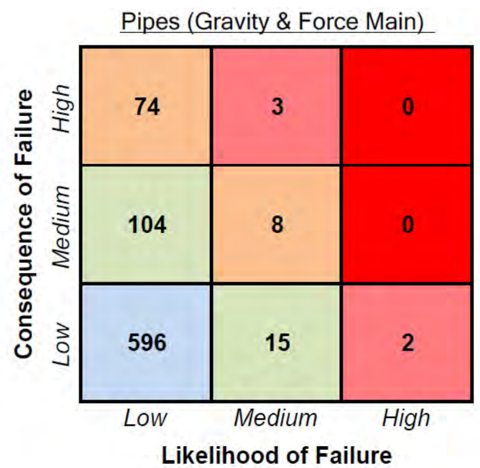


Figure 2. Business Risk Matric (Risk Rating) by Number of Gravity and Force Main Pipes

Figure 3 below provides the risk rating for the collection system manholes. The majority of the manholes have a medium, low, or negligible risk rating. The two manholes with an extreme risk rating are recommended for rehabilitation in the short term.

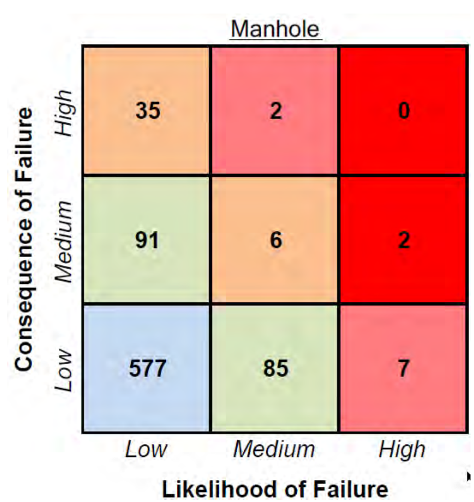


Figure 3. Business Risk Matrix (Risk Rating) by Number of Manholes

The risk rating, or criticality of the lift stations were based on the LoF measures described above, along with CoF measures of safety, environmental impact, disruption to the community, and ability to respond.

The aging and deteriorating Reid Road lift station has a high risk rating due to its remaining useful life, service and maintenance history, and service area. This station is warranted for major rehabilitation or replacement. The cast iron force main for this lift station is also reaching the end of its expected service life, although the overall condition of this force main is not well known.

The Worthington Court station has a low risk rating. Short term inspection and preventative maintenance and a long-term rehabilitation plan is warranted for this station.

A spreadsheet providing asset criticality for each utility asset has been included in the AMP detailed report for the wastewater collection system.

Capital Improvement Plan

A Capital Improvement Plan (CIP) with rehabilitation recommendations was prepared for the City's wastewater collection utility assets based on the Business Risk evaluation which prioritized the capital improvement projects. The CIP consists of short-term (1-5 year) and long-term (6-20 year) improvements to address the needs of the utility.

Table 2 below summarizes the recommended improvements in the short-term CIP. The primary project in the short term is the replacement of the Reid Road Lift Station. Detailed asset identification, rehabilitation measures, and costs of the recommended short and long term capital improvements are provided in the AMP.

Table 2. 5-Year Capital Improvement Plan Summary

Rehabilitation Action
Replace/Rehabilitate of Reid Road Lift Station
Replace Reid Road Force Main
Pipe Lining
Pipe Point Repair
Manhole Lining and Repairs

Operations, Maintenance & Replacement

Regular operation, maintenance and replacement (OM&R) is essential in the management of a wastewater collection system. The collection system is subject to a variety of operational problems and can suffer from clogging, scour, corrosion, and collapse. Inspection, cleaning, and rehabilitation are important for optimizing the proper functioning of the collection system. By optimizing the performance, infiltration/inflow are reduced and sanitary sewer overflows (SSO) are minimized or eliminated, preserving the substantial investment the community has in its collection system.

A preventative maintenance program to systematically clean and assess pipelines to NASSCO-certified standards is critical for a sound wastewater collection system. The process of cleaning and CCTV assessment of pipelines, either with equipment owned by the City or contracted, is a relatively inexpensive maintenance effort when compared to rehabilitation and replacement. It is recommended that the remaining collection system be cleaned and televised over the next 5 years. This would require approximately 20% of the system be cleaned and televised annually. Available budget will dictate the frequency or size of yearly projects. The schedule for cleaning and televising shall also be coordinated with other capital improvement projects, such as road rehabilitation and reconstruction, to ensure that sound infrastructure exists beneath the other capital investments being completed. Once the entire system has been cleaned and televised, it is recommended that a maintenance schedule be set for future cleaning and televising. The required frequency of cleaning and televising over the next 6-20 years may depend on what is discovered in the initial assessment. The City may desire to clean and televise certain areas more than others.

Table 3 below summarizes the recommended preventative maintenance in the short-term (1-5 years). Detailed asset identification, maintenance measures, and costs of the recommended preventative maintenance program are provided in the AMP.

Table 3. 5-Year Maintenance Summary

Maintenance Action
Manhole Cleaning
Continue Manhole Assessments
Continue Cleaning and CCTV Pipe Assessments

An annual equipment replacement budget should be developed to replace disposable equipment. These are items that can be financially accounted for through operation, maintenance and replacement (OM&R) funds and can be replaced by DPW staff without bringing in an outside contractor. Existing disposable materials include wear parts in pumps and motors associated with the lift stations. The City's wastewater fund is evaluated on a yearly basis and is sufficient for current OM&R needs.

Revenue Structure

The revenue and rate methodology is an instrument to determine user rates and charges that will provide sufficient revenues to pay for utility operating costs. A rate methodology dated March 28, 2018 was completed and it was determined that the existing rates provide sufficient funds for the day-to-day maintenance and operations of the wastewater system. The MDEQ reviewed the information contained in the rate methodology and determined in a letter dated May 15, 2018 that significant progress has been made toward achieving the funding structure necessary to implement the program.

DEQ

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date: November 30, 2018
(no later than 3 years from executed grant date)

The City of Grand Blanc *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1616-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: No
   If No - Date of the rate methodology approval letter: May 15, 2018.
2) Significant Progress Made: Yes or No
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: ________________.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ________________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Wendy Jean-Buhrer at 810.694.1118 citymanager@cityofgrandblanc.com
Name Phone Number Email

Wendy Jean-Buhrer 11-30-2018
Signature of Authorized Representative (Original Signature Required) Date

Wendy Jean-Buhrer, City Manager
Print Name and Title of Authorized Representative

Protecting our Infrastructure Investment

ASSET MANAGEMENT PLAN

Stormwater Executive Summary Report

CITY OF GRAND BLANC

CONNECT · GROW · BECOME

Prepared for:

City of Grand Blanc

SAW Project No. 1616-01

FINAL
November 2018

FLEIS&VANDENBRINK
DESIGN. BUILD. OPERATE.

1.0 EXECUTIVE SUMMARY

OVERVIEW

Public Act 562 of 2012 authorized money for a Stormwater, Asset Management, and Wastewater (SAW) Grant Program. In November of 2015, the City of Grand Blanc received a SAW Grant from the Michigan Department of Environmental Quality (MDEQ), Project No. 1616-01, to provide financial assistance for the development of a stormwater asset management plan (AMP) for the City's stormwater system. The approved project cost for the stormwater asset management plan was $317,925, with a grant amount of $286,132.50 and a local match of $31,792.50. This AMP is intended to be a living document that is updated as assets continue to wear and age, and as additional inspection/condition results are found and incorporated into the plan.

The contact person for the City of Grand Blanc AMP is:

Matthew Wurtz, DPW Director
203 E. Grand Blanc Road
Phone: 810.694.5420
Email: dpwdirector@cityofgrandblanc.com

ASSET INVENTORY AND CONDITION ASSESSMENT

Below is a list of the major assets in the City's stormwater collection system identified in the AMP.

LIST OF MAJOR ASSETS

- Gravity Sewer (6" to 54" diameter)……. 175,417 feet
- Drainage Structures…………………….. 1870

These assets are operated and maintained by the City's Department of Public Works and are located in existing street rights-of-way or in easements dedicated for the assets use and maintenance.

The City's stormwater collection system discharges at various locations to drains, rivers, or other water courses under the jurisdiction of the Genesee County Drain Commissioner – Surface Water Management Division (GCDC-SWM) or State of Michigan.

Asset Identification and Location

A comprehensive stormwater system asset inventory was developed from existing record drawings, field notes, staff knowledge, site visits, and field survey work. An existing Geographic Information System (GIS) provided the framework for the stormwater asset inventory. Although the existing framework was incomplete and based on available information and record drawings, it provided a general context of where the infrastructure was located.

Pipe material, size, and age were identified through the review of available historical record documents and Closed Circuit Televising (CCTV) data. Manhole and invert elevations were determined through GPS field survey and a comprehensive evaluation of the stormwater system.

This new stormwater system inventory and database was integrated with the City's GIS for efficient management of infrastructure assets.

Condition Assessment and Expected Useful Life

NASSCO-MACP structure field based assessments were completed on a representative sample of the City's stormwater infrastructure. Approximately 20% of the 1870 stormwater structures have been assessed, with the mainline manholes being the primary focus over catch basins. Pipeline cleaning and NASSCO-PACP CCTV field based assessments were conducted on approximately 3% of the stormwater system as part of this grant program. These areas, selected by the DPW, represented storm sewers constructed in different eras that had a past service history or other indication of a potential defect.

Based on discussions with the City DPW, there are no known significant capacity issues with the City's stormwater system. Drainage issues that have occurred in the past have been addressed over the years by improvements to the system. The most significant remaining drainage concern is at the railroad viaduct crossing of Saginaw Street. Flooding occurs for a short period of time beneath the viaduct as a result of heavy rain events. A PACP assessment was planned for the downstream conveyance pipe from this area, however an obstruction in the pipe only a few feet downstream of the manhole prevented the camera from continuing. Additional cleaning and evaluation of this storm network is recommended. With a minimal amount of capacity issues known in the remainder of the system, a capacity analysis was not completed for the City of Grand Blanc.

The collection system pipes and manholes assessed were generally found to be in good condition with only a few minor defects. The representative sampling of pipe assessments included both reinforced concrete pipe (RCP) and vitrified clay pipe (VCP). The condition of the RCP sewers assessed remained fairly consistent throughout the city and found to be in good condition. Longitudinal and circumferential cracks were the predominant structural defects found. O&M defects of encrustation, roots in joints, and rocks and other minor obstruction were more prominent that structural defects. The small diameter VCP sewers installed in the 1960s had significantly more structural defects than the RCP sewers, including multiple cracks, fractures, joint separations, joint offsets, deformation, and collapse. O&M defects noted in the VCP sewers included encrustation, roots in joints, and root balls. The condition of the VCP sewers assessed had common structural and O&M defects and was found to be in poor condition. The manhole assessments identified a small number of structures in need of cleaning and minor rehabilitation to replace missing block, brick, and mortar, or in need of lining. Based on the assessments completed, recommendations for short-term (1-5 year) and long-term (6-20 year) system maintenance and improvements were identified. Maintenance recommendations include cleaning and televising the remainder of the system. These additional assessments will be used to further evaluate structural and O&M defects in the system and establish a comprehensive short and long term maintenance and improvement plan.

LEVEL OF SERVICE

Defining the Expected Level of Service

The City's Department of Public Works has maintained the following Level of Service (LOS) goals for the long-term sustainability of the stormwater collection system:

LEVEL OF SERVICE STATEMENT

- Provide adequate stormwater collection system capacity for all service areas.
- Have minimal negative impact on receiving waters.
- Comply with NPDES discharge requirements.
- Provide for the health and safety of all employees and customers.
- Actively maintain stormwater collection system assets in reliable working condition.
- Regulate stormwater and flood control management requirements for new development and re-development to meet the goals and objectives outlined in the City's Storm Water Ordinance.
- Ensure compliance of private stormwater management system maintenance agreements to assure that long term maintenance of private stormwater BMPs are being undertaken adequately.
- Have adequate staffing to conduct routine operations and maintenance, as well as respond to emergency situations.
- Perform routine cleaning and rehabilitation of system problem areas and defects.
- Regularly review projected O&M and capital expenditures to ensure sound financial management of the stormwater system.
- Utilize ArcGIS to provide efficient and sustainable management of the stormwater collection infrastructure.

Measuring Performance

The LOS goals may need to be adjusted from time to time as the utility ages and the needs of the community change. Evaluations of goals should be completed at least annually to determine if the provided resources are being used appropriately. Level of Service requirements can be updated to account for changes due to growth, regulatory requirements, and technology.

Critical Assets

Determining Criticality

Business Risk is the determination of criticality of each asset in the stormwater system. Criticality is based on two factors: 1) Likelihood (Probability) of Failure, and 2) Consequence of Failure. Defining an asset's Business Risk allows for management of risk and aids in decision making for where to allocate operation, maintenance, and capital improvement funds.

Likelihood of Failure (LoF) is a measure of how likely an asset is to fail. The following categories have been developed to quantify how likely an asset is to fail:

- Condition of the asset
- Remaining useful life (Age)
- Service History
- Operational status

Consequence of Failure (CoF) is a measure of the social, economic or environmental impact of failure of an asset and the utility's ability to convey stormwater. CoF categories of the stormwater collection system include:

- Location of asset
- Facilities served by asset
- Size

Criticality Results

Using the strategy outlined above, a Business Risk Evaluation (BRE) was performed for each asset using Innovyze-InfoMaster software. InfoMaster is an ArcGIS-based sewer asset management and capital planning software that compiles, analyzes and assesses Business Risk for each asset and aids in developing a Capital Improvement Plan.

The Business Risk score, which is an informative indicator to help prioritize infrastructure improvements, is calculated for each asset using the following equation:

Business Risk = Consequence of Failure Score x *Likelihood of Failure Score*

Assets with the greatest consequence of failure and the greatest likelihood of failure will be assets that are the most critical. Assets with the highest business risk score are likely candidates for near-term rehabilitation and replacement. Assets with lower scores should be monitored and analyzed to develop the best life cycle strategy.

Because only a portion of the stormwater system has been televised and assessed, likelihood of failure scores may continue to be developed as more sewers are cleaned and televised.

A 3x3 Business Risk Matrix identifies the relative "Criticality" of each asset based on their CoF and LoF scores to establish a "Risk Rating" for each asset. Asset rating categories range from *Negligible* to *Extreme* criticality based on position within the matrix and are color coded to better identify significance. Upper and lower CoF and LoF score "boundaries" are set for each matrix box to establish the Risk Rating for each asset and place each asset in the proper rating category. Business Risk is depicted visually in the risk matrix shown in Figure 1, and the Business Risk of each asset determines the appropriate strategy for risk management as shown in Table 1.

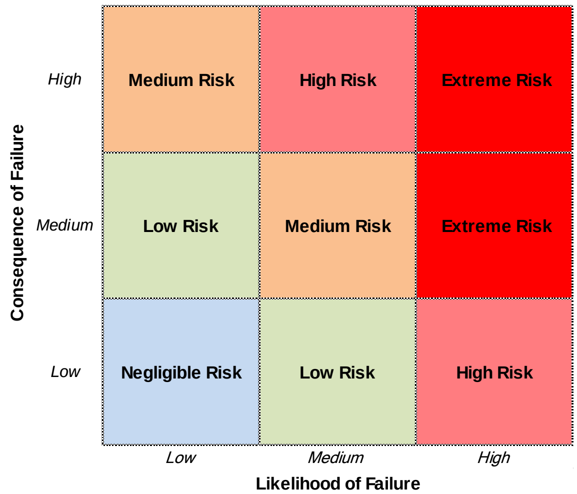


Figure 1. Business Risk Matrix (Risk Rating)

Table 1. Strategies for Asset Rehabilitation and Replacement	
Risk Rating	**Strategies for Asset Rehabilitation or Replacement**
Extreme	Inspect immediately and develop 1-2 year rehabilitation plan
High	Inspect immediately and develop short to medium term rehabilitation plan
Medium	Inspect immediately and develop long term rehabilitation plan
Low	Develop short term inspection strategy and develop long term rehabilitation plan
Negligible	Develop long term inspection strategy

Risk ratings can also be thought of as priorities since they are only relevant to the City of Grand Blanc. An extreme risk in one community could be a low risk in another depending on the overall condition of their infrastructure. Below is a simple correlation between risk rating and priority.

Risk Rating	Priority
High / Extreme	Essential
Medium	Desirable
Low	Acceptable
Negligible	Deferrable

Figure 2 below provides the risk rating for storm sewer pipes by number of pipe segments. Pipes not televised and assessed use only age and material as a preliminary likelihood of failure score, since the condition of the pipe is unknown. Most of these pipes received an initial risk rating of negligible based on their remaining service life. This risk rating will be further evaluated as more pipe segments are cleaned and assessed.

The majority of the pipes in the stormwater system have a medium, low, or negligible risk rating. The two pipe segments with a high risk rating are recommended for rehabilitation in the short term.   These two pipe segments are part of the VCP sewer installed in the 1960's and there may be additional small diameter VCP in the area in similar condition in need of replacement.

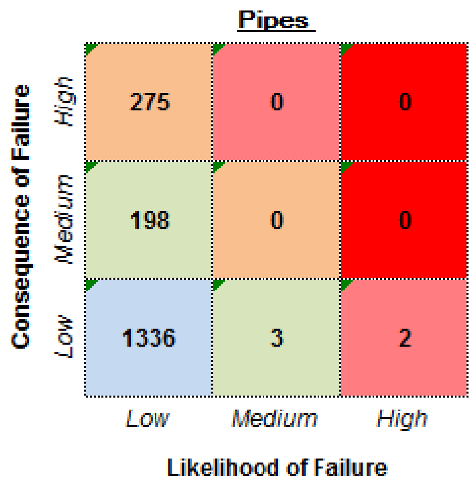


Figure 2: Business Risk Matrix (Risk Rating)
by Number of Pipes

Figure 3 below provides the risk rating for the storm sewer structures. The majority of the structures have a medium or low risk rating. The structures with a high risk rating are recommended for rehabilitation in the short term.

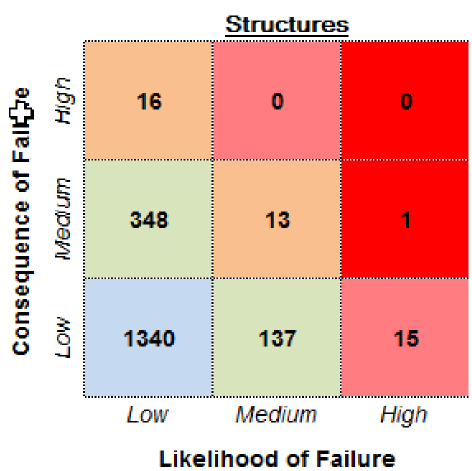


Figure 3: Business Risk Matrix (Risk Rating)
by Number of Structures

A spreadsheet providing asset criticality for each utility asset is included in the AMP detailed report for the stormwater collection system.

Capital Improvement Plan

A Capital Improvement Plan (CIP) with rehabilitation recommendations was prepared for the City's stormwater assets based on the Business Risk evaluation, which prioritized the capital improvement projects. Additional consideration was given to infrastructure improvements to be coordinated with other planned projects to achieve economy of scale or limit future disturbance. The CIP consists of short-term (1-5 year) and long-term (6-20 year) improvements to address the needs for each asset in the system.

Table 2 below summarizes the recommended improvements in the short-term CIP. Detailed asset identification, rehabilitation measures, and costs of the recommended short and long term capital improvements are provided in the AMP.

Table 2. 5-Year Capital Improvement Plan Summary
Rehabilitation Action
Pipe Replacement
Manhole Lining and Repairs

Operations and Maintenance

A preventative maintenance program to systematically clean and assess pipelines to NASSCO-certified standards is critical for a sound stormwater system. The process of cleaning and CCTV assessment of pipelines, either with equipment owned by the City or contracted, is a relatively inexpensive maintenance effort when compared to rehabilitation and replacement. It is recommended that the remaining stormwater system be cleaned and televised over the next 5 years. This would require approximately 20% of the system be cleaned and televised annually. Available budget will dictate the frequency or size of yearly projects. The schedule for cleaning and televising shall also be coordinated with other capital improvement projects, such as road rehabilitation and reconstruction, to ensure that sound infrastructure exists beneath the other capital investments being completed. Once the entire system has been cleaned and televised, it is recommended that a maintenance schedule be set for future cleaning and televising. The required frequency of cleaning and televising over the next 6-20 years may depend on what is discovered in the initial assessment. The City may desire to clean and televise certain areas more than others.

Table 3 below summarizes the recommended preventative maintenance in the short-term (1-5 years). Detailed asset identification, maintenance measures, and costs of the recommended preventative maintenance program are provided in the AMP.

Table 3. 5-Year Maintenance Summary
Maintenance Action
Manhole Cleaning
Continue Manhole Assessments
Continue Cleaning and CCTV Pipe Assessments

DEQ

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Due Date: November 30, 2018
(no later than 3 years from executed grant date)

The City of Grand Blanc *(legal name of grantee)* certifies that all stormwater asset management plan (SWAMP) activities specified in SAW Grant No. 1616-01 have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SWAMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

Name	Phone Number	Email
Wendy Jean-Buhrer	at 810.694.1118	citymanager@cityofgrandblanc.com

Wendy Jean Buhrer — 11-30-2018

Signature of Authorized Representative (Original Signature Required) — Date

Wendy Jean-Buhrer, City Manager
Print Name and Title of Authorized Representative

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517.627.8086
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City of Grand Ledge 310
Greenwood Street
Grand Ledge, MI 48837
http://cityofgrandledge.com/
Mr. Adam R. Smith, City Administrator
517-627-2149
asmith@cityofgrandledge.com
SAW Grant Project Number 1614-01

Executive Summary

In November 2013, the City of Grand Ledge applied for a Stormwater, Asset Management, and Wastewater (SAW) Grant.

The SAW Grant application focused on the wastewater collection asset management area of the State program with the goal of producing an AMP for the City's wastewater collection system. When the application was submitted, 5 key areas were presented. These areas include:

1. Field survey of all sanitary manholes, pump stations, and key portions of the collection system.
2. Convert collected survey field data into a usable base plan in Geographic Information System (GIS).
3. Conduct a closed-circuit television survey of key portions of the collection system using in-house and hired contractor.
4. Assist in preparing an Asset Management Plan.
    a. Asset Inventory
    b. Criticality of Assets
    c. Level of Service (LOS)
    d. Funding Structure
    e. Capital Improvement Planning
5. Provide a construction project to help relieve sanitary sewer system surcharges in the Clinton Sanitary Sewer District (Edwards and Tulip Street Reconstruction Project).

The City was awarded a Saw Grant in November of 2015 and is working with Ziemnick Foster Engineering, LLC to provide professional services for data collection, mapping, and the AMP. The City was approved for a grant amount of $675,000 with the City providing an additional $75,000 in local match.

Wastewater Asset Inventory

The City owns, operates, and maintains a wastewater collection system and treatment facility that serves the City of Grand Ledge residents and a portion of Oneida Township in Eaton County and Eagle Township in Clinton County. The system consists of manholes, gravity pipes, forcemains and lift stations that feed the Grand Ledge Wastewater Treatment Plant. Key assets of the collection system were identified, located, evaluated, rated and ranked for future capital outlay projects. Conditions of the assets are ranked based on a 5 point scale. Scale ranges from 1 being new or in excellent condition to 5 being unserviceable. The collection sewers, force mains, manholes, and pump stations were plotted in a geographic Information System (GIS) using record drawings and survey grade Global Positioning System (GPS) coordinates.

Sewer Collection System

The sanitary sewer collection system contains nearly 46 miles of gravity and forcemain systems that range in size from 2-inch to 36-inch. The collection system is comprised of several types of pipe materials. Generally, all older pipe materials are vitrified clay, cast iron, or reinforced concrete pipe (RCP). More recently, the City specifies polyvinyl chloride (PVC) or ductile iron (DIP) pipe materials.

Televising of the older sections and main trunk sewers of the collection system was completed as part of this project. Closed-circuit television (CCTV) operators reported in National Association of Sewer service Companies (NASSCO) format for underground pipes using the Pipeline Assessment Certification Program (PACP). Risk of Failure ratings of 1 – 5 were given for each pipe segment. It should also be noted that not all sewer lines were televised. In addition to CCTV, age, material type, and location also were used in determining ratings for gravity sewers. Sandstone Creek Interceptor (concrete pipe) and E. Scott Street & North Bank West Interceptor (clay pipe) are starting to show light concrete deterioration and joint deflections / root intrusions respectfully.

Forcemains conditions were estimated using pipe age, material, and historical service records. All forcemains were considered good to fair condition (2-3).

Manholes were visually inspected and rated based on factors related to the conditions of the casting, chimney, joints, steps, structure, pipe penetrations, and infiltration. Age and structure material type was also a key component in the rating of 1 to 5. 70 percent of manholes are in good condition (1-2) while 6 percent are in poor condition (4-5) and can use some quick attention by re-plastering inside, raising casting to grade, rehabilitation, or replacement.

Pump Station conditions were estimated using age, service history, existing and future flow as a whole. Most pump stations are new or have been re-built in the last 10 years and were found to be in good condition overall.

Waste Water Treatment Plant - The City Wastewater Treatment Plant is located on the west side of town adjacent to the south bank of the Grand River just upstream of the dam. The plant is located within what is now known as Fitzgerald Park and dates back to the 1930's for the original plant. Since that time several updates have taken place at the plant, with the last being in 2009. Although the

Wastewater Treatment plant is part of the Sanitary Sewer System, for this project, emphasis has been placed more on the collection side of the system.

Mobile Assets - The City also owns, operates, and maintains equipment assets that are mobile in nature. Items in this category include a service vehicle truck with hoist and crane, generator, camera truck and vactor truck. For this project, emphasis has been placed more on the collection side of the system.

Level of Service Determination

The City has developed overall level of service goals that it should be providing to their customers. Level of service includes technical, managerial, and financial components. The following are guideline criteria that outline the major goals and reasonable targets for the Level of Service.

- Comply with all regulatory requirements at the local, state and federal levels.
- Provide reliable service to the City's customers.
- Provide adequate capacity to the City's customers.
- Maintain the health and safety of the customers and City staff.
- Maintain required education and certifications to City staff.
- Respond to customer complaints within 24 hours.
- Provide record management of complaints and historical trouble areas.
- Reduce I & I within the system by continually evaluating the system by means of televising, flow monitoring, technological advancements within the system.
- Preventive maintenance.
- Cost of Service to be fully funded through the customer at a fair and equitable rate.

Level of Service continually needs to be evaluated and adjusted to meet changes in regulations, system inputs, and funding sources.

Business Risk ("Criticality")

Critical assets create a business risk to the Owner. The following section describes how these critical assets are evaluated for business risk.

Business risk of assets is "how likely" the asset could fail and then the resulting ramifications should the asset truly fail. The evaluation requires the examination of probability of failure, consequence of failure and any redundancy.

Probability of Failure (PoF) reviews factors such as age, condition, failure history, maintenance records, and experience as how the asset is likely to fail. Assets were given a PoF rating of 1-5 (5 being worst) based on condition and physical function.

Consequence of Failure (CoF) reviews the costs associated to the failure of an asset. These costs could include the following: repair cost, replacement cost should item not be repairable, environmental costs due to failure, reduced reliability, downtime or outages, collateral damage, greater financial hardships, inefficiencies, fines, litigation, increases in social stress. Assets were given a CoF rating of 1-5 (5 being worst) based on above or additionally the environment, surroundings, utilities, or roadway condition.

Business risk is the multiplication of the PoF and CoF and the redundancy factor, if applicable. The resulting number provides a numeric value of the risk involved from 1-25 (25 being the most critical) with that component of the system. The most critical assets were found to be clay gravity sewers near the Grand River and under major roadways (approximately 2% of the clay sewers). The Whitney Street Pump Station forcemain also rated high as it is a metal pipe, near the Grand River, and was unable to be televised due to fitting configurations. Six (6%) percent of the manholes yielded a higher risk value due to age, construction materials, and locations either at hard to reach locations near the Grand River or in state trunkline roadways. Pump stations within the collection system all ranked as a medium risk.

A summary of business risk for each of the asset groups is shown in the table below:

Asset Group	Risk Level		
	Low Risk	Medium Risk	High Risk
Collection Pipes	79%	19%	2%
Manholes	70%	24%	6%
Lift Stations		100%	

Revenue Structure

To provide long-term sustainability of the wastewater utility to the customers, a viable rate structure must be developed and maintained. The City rates must be structured to provide adequate income to cover the operations, maintenance, replacement, capital improvements, and debt costs.

Current City wastewater rates are based on charges per 1,000 gallons of water used. The rate per 1,000 gallons is the same regardless of who the customer is or how much they use. Each customer pays the same rate starting from the first gallon used. Below is a table of the current 2017 rates based on the meter size.

Meter Size (in)	Current Base Rate	Number of Units (Rate Class 1)	Number of Units (Rate Class 2)	Number of Units (Rate Class 3)	Freq. of Invoice	Annual Income
3/4	$7.97	2705	5	386	12	$288,300
1	$7.97	28	7	16	12	$4,749
1-1/4	$7.97	0	0	0	12	$0
1-1/2	$7.97	16	11	0	12	$2,514
2	$7.97	15	27	2	12	$4,097
3	$7.97	1	7	0	12	$745
4	$7.97	0	3	0	12	$279
6	$7.97	0	1	0	12	$93
	Totals	**2,765**	**61**	**404**		**$300,777**

The current City budget is shown in the table below. For the purpose of this asset management report, budget items not directly related to collection system will not be addressed in detail. While necessary for the operation of the utility, the items not directly related to the management of assets is out of the scope of this report. It should also be noted that sewer maintenance and repair that is contracted outside the City for sewer work is charged to the sewer fund. Budget is as follows:

GL Sewer Monthly	Annual Budget	Base Fixed	Cost per ¾" Meter	Consumption Portion	Cost / Unit of Water
Labor & Benefits	$575,747	$69,090	$1.78	$506,657	$2.53
Operations & Maintenance Expenses	$630,462	$73,764	$1.90	$556,698	$2.78
Loans, Bonds, Interest, Annual Payment	$442,631	$88,526	$2.28	$354,105	$1.77
Asset Replacement & Rehabilitation	$101,353	$18,750	$0.48	$82,603	$0.41
Capital Improvement + 163,000	$307,478	$60,266	$1.55	$247,212	$1.23
	$2,057,671	**$310,396**	**$8.01**	**$1,747,275**	**$8.72**
		15%		85%	
Non Operating Income Reduction			0.04		0.04
Calculated Rate – For ¾" Meter / REU per Month			**$7.97**	**1,000 Gal**	**$8.68**
Total Annual Equivalent REU's – 38,760		Current Rates	$7.76	1,000 Gal	$8.68
Est. Water / Sewer Sold – 200,317,417		Increase of	$0.21		$0.23
Reserve Portion of Budget 20%		GL Sewer Monthly	$7.97		$8.68

Current system rates were reviewed and found to be running shy of the cost of business at the current level of service. Reviewers included City staff, Public Service Director, Finance Director, and the City Administrator. New rates were determined and recommended to City Council for review and approval.

Capital Improvement Plan

A long-term Capital Improvement Plan (CIP) looks at the utility's needs into the future. A capital improvement project are projects that the utility has an extended period of time to plan for and are projects that usually cover higher cost, non-recurring items with anticipated life expectancy of greater than 20 years.

Several pipe projects in the 0-5 year bracket are past the intended life span for clay sewers. This does not mean the pipe needs to be replaced immediately or there is any significant deterioration but simply score higher due to the expected life span. Sections of clay pipe indicating replacement due to age should be monitored in smaller time intervals to maintain system stability. Alternate solutions to replacement or rehabilitation should always be considered as value engineering. Smaller projects can be prioritized to be built in conjunction with selected larger construction / rehabilitation / pipe lining projects.

Manholes have not specifically been indicated as a Capital Improvement. These assets typically go hand in hand with pipe replacement / rehabilitation projects. Individual manhole replacements are typically more a maintenance cost instead of a capital cost. A budget figure should include a minimum of 10 additional manholes to be replaced or rehabilitated each year, outside of regularly scheduled system replacements.

Capital improvements to pump stations include $148,000 in the next 5 years for controls, motors, pumps, and valves for the seven listed stations.

We understand that the costs indicated or timeline for projects may vary as needs change or larger multi utility projects are reviewed and implemented.

Recommendations

The City of Grand Ledge finds its sanitary sewer system assets in a moderate to low business risk due to good maintenance and quality construction practices employed by employees and contractors in the past and today. Much of the existing infrastructure has already outlived its life expectancy. There is room for improvement and eyes need to be focused on the future system needs as this community continues to grow and age.

The City should continue to review the ratings of this report and combine this with water, storm, and roadway projects that the City undertakes. Areas that have been identified as more risky assets should be visited more frequently to asses any progression of deterioration. Special attention should be considered in areas where clay pipe is still in use. Clay pipe, while an excellent material for sewers, tends to produce more pipe deflections, cracks, and joints for infiltration than other manufactured pipe materials if not installed and maintained properly.

It is our opinion that future studies take place to ensure that major trunk interceptor sewers continue to serve the system in a safe capacity. Many of these sewers are located in difficult locations to service along steep river / creek banks or back yards. Studies could include rehabilitation techniques to prolong the life of the existing asset, relocation / rerouting of the sewer, lining, or replacement of the sewer in place. These studies would better describe the needs and cost for such a major capital project.

With continued yearly monitoring, maintenance, and execution of the asset management plan in conjunction with the rate reviews, the long-term stability of the sanitary sewer collection system can be ensured.

Summary of Assets

Below is a summary of the assets within the Grand Ledge collection system:

Sanitary Sewer Size (Gravity)	Length (ft)
6-inch	4,387
8-inch	122,996
10-inch	33,673
12-inch	27,207
15-inch	14,970
16-inch	357
18-inch	10,116
20-inch	286
21-inch	4,962
24-inch	8,263
36-inch	219
TOTAL	**227,436 FT**

Sanitary Sewer Size (Forcemain)	Length (ft)
2-inch	4,712
4-inch	757
6-inch	5,122
12-inch	2,644
TOTAL	**13,235 FT**

Manhole Style	Number	Percentage
Brick	76	8
Block	74	8
Precast	851	81
Combination (brick, block, and precast)	26	3
TOTAL	**1,027**	

A total of 7 vertical sanitary sewer lift stations are within the collection system prior to the City of Grand Ledge Wastewater Treatment Plant.

DEQ

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date 10/30/2018
(no later than 3 years from executed grant date)

The City of Grand Ledge *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1614-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or No
   If No - Date of the rate methodology approval letter: 5/14/2018.
2) Significant Progress Made: Yes or No
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: ____________.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ____________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

City of Grand Ledge at (517) 627-2149 Kristow@cityofgrandledge.com
Name | Phone Number | Email

Kurt D. Ristow 11/16/2018
Signature of Authorized Representative (Original Signature Required) Date

Kurt D. Ristow Utilities Superintendent
Print Name and Title of Authorized Representative

City of Greenville
Wastewater Asset Management Plan Summary

City of Greenville SAW Grant

411 S Lafayette St, Greenville, MI 48838

greenvillemi.org

Contact Information for the grantee:

Ms. Norice Rasmussen, Clerk/Treasurer

Address: 411 S Lafayette St, Greenville, MI 48838

Phone: 616-754-5645

SAW Grant Project Number: 1474-01

Executive Summary

The City of Greenville received a SAW Grant in 2015 to prepare a Wastewater Asset Management Plan.

The Grant agreement indicated the following amounts:

Total Plan Cost	Approved Grant Amount	Local Match
$2,000,000	Wastewater up to $1,460,801* Stormwater up to $1,078,819*	$0

*Total grant amount cannot exceed $2,000,000

The Key components in their Asset Management Plan include:

a. Asset Inventory and Condition Assessment
b. Level of Service
c. Criticality of Assets
d. Operation and Maintenance Strategies/Revenue Structure
e. Long-term Funding/Capital Improvement Plan

City of Greenville
Wastewater Asset Management Plan Summary

Asset Inventory

Describe the system components included in the AMP. Discuss how they were located and identified, if applicable. Describe the platform used to develop and maintain the inventory of assets.

All assets that are functionally or financially significant to the wastewater system have been inventoried.

- Collection system manholes were located using survey quality GPS.
- Lift stations and buildings were located using hand held GPS equipment.
- Fixed assets within the wastewater treatment plant (WWTP) were mapped based on plant schematic and record drawings.

Locations for assets that have fixed geographic locations such as pipes, manholes, buildings, and major fixed equipment are recorded in a GIS. Data regarding date of installation, material, and other physical characteristics for each asset is incorporated into the GIS geodatabase.
Location of non-pipe assets such as lift station components, WWTP components, building components, and other equipment is compiled in a package of inventory spreadsheets and CMMS database. These assets were not mapped in GIS.
The GIS, asset spreadsheets, and CMMS will all be used to maintain asset data in the future.

Condition Assessment

Discuss the condition assessment process, including what methods were used. Summarize the results of the assessment for each asset category.

The condition of collection system piping was documented with either a pole mounted zoom camera (looking down each pipe from the manholes) or with in-line closed circuit television (CCTV) from manhole to manhole. The zoom camera method provided a very economical initial condition assessment of the pipes. Pipes noted to have potentially significant deficiencies were flagged and follow-up inspections were performed with full in-line CCTV.

City of Greenville
Wastewater Asset Management Plan Summary

Using the zoom camera data, pipes were rated based on several factors such as joint conditions, wall corrosion, and infiltration. Composite Risk of Failure ratings of 1-5 (5 being the worst) were assigned to each pipe segment.

Pipes inspected with CCTV were rated using the PACP system (Pipeline Assessment Certification Program). The PACP ratings were then used to derive a composite Risk of Failure rating of 1-5 for each pipe.

Percentage of pipes within each rating category

1	2	3	4	5
29%	40%	23%	5%	3%

Manholes were visually inspected and rated on a scale of 1-5 based factors related to the condition of castings, steps, and structures.

Percentage of manholes within each rating category

No Rating	1	2	3	4	5
3%	24%	60%	11%	1%	1%

Equipment within lift stations and the WWTP were rated on a scale of 1-5 based on factors relating to physical condition and operating condition. Generally the lift stations are in fair condition, with several equipment upgrades recommended within the CIP timeline. Much of the WWTP equipment is in fair to poor condition and operating near or above capacity, with secondary treatment process assets requiring significant improvements or replacement. Capital improvement recommendations were made for the preliminary treatment processes, and a reassessment of the long term approach to wastewater treatment was recommended.

City of Greenville
Wastewater Asset Management Plan Summary

Level of Service Determination

Discuss the level of service the municipality has determined that it wants to provide its customers based on the municipality's ability to provide the service and customer expectations. Discuss the procedures used to involve stakeholders in the AMP discussion. What are the trade-offs for the service to be provided? This may include any technical, managerial, health standard, safety, or financial restraints, as long as all regulatory requirements are met. Discuss how this was determined.

We recognize that the people served by our system are more than customers, they are the system owners. Our staff acts as stewards of the system. We have held a series of public meetings and workshops to present the results of our condition assessments, review the costs for meeting various Levels of Service, and reviewed the rate impacts of those options. Based on the input received during those meetings, we have established the following Level of Service Goals:

1. Meet Regulatory Requirements
    a. Maintain a specified number of Certified Operators
    b. Maintain our in-house testing abilities
    c. Continue our Industrial Pretreatment Program
2. Minimize Service Interruptions
    a. Staff/equip crews sufficiently to perform specific routine maintenance items
    b. Repair/replace assets as required to limit emergency responses to 15 per year
3. Minimize Public Hazards
    a. Staff/equip emergency response services for 24 hour per day service and 60 minute response times
    b. Limit service interruptions to less than 6 hours
4. Manage Storm Water Inflow and Ground Water Infiltration
    a. Monitor I/I and implement CIP projects to meet EPA guidelines
5. Provide Capacity for Community Growth
6. Minimize Life Cycle Costs
7. Maintain Active Relationships with our Partner Communities
    a. Establish a Partnering Board that meet twice a year to review O&M demands, CIP, and rate structure

City of Greenville
Wastewater Asset Management Plan Summary

Criticality of Assets

Provide a summary of the method used to assess the criticality of assets considering the likelihood and consequence of failure. Based on the condition of the assets, and the determined risk tolerance, how were the assets ranked? What assets were considered most critical?

Assets were given a Risk of Failure (RoF) rating of 1-5 (5 being the worst) based on factors related to both physical and functional conditions. The factors considered varied by the asset type and were tailored to identify both physical and functional deficiencies. For example, pipe ratings considered factors such as joint offsets and structural cracking while lift station pumps considered factors such as design pumping rate vs actual pumping rate.

Assets were given a Consequence of Failure (CoF) of 1-5 (5 being the worst) based on potential damage to adjacent utilities, transportation network, and the surrounding property/environment. The magnitude of the potential service disruption was also a factor.

Assets with the higher rankings for Consequence of Failure were those that:

- Provide service to a significant portion of the system
- Serve schools/hospitals/major industry
- Are under major roads
- Are adjacent to waterways or significant wetlands

Consequence of Failure and Criticality should not be confused. Criticality is the product of as asset's Risk of Failure (RoF) and Consequence of Failure (CoF). Criticality drives an asset's action priority.

Criticality ratings were calculated and ranged from 1-25 (25 being the highest priority). We then ran a Jenks Optimization to create 5 primary groupings, each with a rank of 1-5 (5 being highest priority). The final Criticality ratings were considered when the comprehensive Capital Improvement Plan was generated.

City of Greenville
Wastewater Asset Management Plan Summary

Revenue Structure

Discuss how the rates, charges, or other means of revenue were reviewed to determine if there will be sufficient funds to cover system operation, maintenance, replacement, capital improvement projects, and debt costs, identified in the AMP. If the current rate structure was not sufficient, discuss what increases were needed to ensure the desired level of service is sustainable and if any changes were made.

Historical operating expenses were reviewed using current audit and budget information. Based on that information, a "Test Year" was developed that reflected a baseline cost. The baseline costs included currently budgeted expenses, debt service, and leveling for base operating cost.
The customer base was reviewed, including the number of billable customers and volumetric sales. Other operating and non-operating revenues were also evaluated. Prediction of customer and volume counts were made including trending in system utilization, projection of operating costs, and anticipated inflation by expense category. Refinancing and/or restructuring possibilities were also explored.
The CIP provided refined cost projections for the first 10 years of the financial analysis. The Asset Management System identified the estimated asset investment cost by year for the remaining lifecycle of all assets. The annual investment cost was evaluated and scenarios developed for cash funding and debt financing. Based on that analysis, rate adjustment options were identified. It was determined that the current rate structure was sufficient to cover O&M activities but increases were needed to fully implement the desired CIP. Public meetings were held to convey the results of the asset evaluation (RoF and Criticality) along with the financial evaluation. We are moving forward with the rate changes required to provide our desired Level of Service.

Capital Improvement Plan

Describe the long-term Capital Improvement Plan that was developed to address system needs identified in the AMP. Provide a list of the identified improvements/projects.

Once assets RoF ratings were assigned and actions prioritized using the Criticality ratings, action timelines were predicted for maintenance/repair/replacement. Because the wastewater collection system assets share physical space with other asset systems such as storm water, roadway, and drinking water, it was imperative that the CIP process coordinated actions on these systems.

Scope of work and action timelines for the other asset systems were incorporated based on:

- Storm Water – based on Asset Management Plan work as part of SAW
- Roadway - based on roadway PASER (Pavement Surface Evaluation and Rating) evaluations
- Drinking Water – based on the most recent water reliability study

Individual project scopes for the comprehensive CIP were created to maximize coordination of work on various assets and minimize overall costs. The CIP projects include improvements to the wastewater system (both collection and treatment), storm water system, drinking water system (distribution and treatment), and road system. The CIP costs were incorporated into the revenue structure review. A 10-year CIP document was created which will be available to the public once the final rate structure has been adopted.

List of the plan's major identified assets

- 1.75 MGD Average Daily Flow Wastewater Treatment Plant
  - Current replacement value of $27,629,000 (2.9 MGD upgrade)
- 4 lift stations
  - Current replacement value of $1,300,000
- 18,270 feet of sanitary force main
  - Current replacement value of $1,938,000
- 271,500 feet of gravity sanitary sewer
  - Current replacement value of $51,925,000

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date November 30, 2018
(no later than 3 years from executed grant date)

The City of Greenville *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1471-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or No
   If No - Date of the rate methodology approval letter: May 18, 2018.
2) Significant Progress Made: Yes or No
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: N/A.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on N/A.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Doug Hinken - City Engineer at 616-754-5645 dhinken@greenvillemi.org

Name | Phone Number | Email

NJRasmussen November 28, 2018

Signature of Authorized Representative (Original Signature Required) Date

Norice Rasmussen - City Clerk

Print Name and Title of Authorized Representative

City of Greenville
Storm Water Asset Management Plan Summary

City of Greenville SAW Grant

411 S Lafayette St, Greenville, MI 48838

greenvillemi.org

Contact Information for the grantee:

Ms. Norice Rasmussen, Clerk/Treasurer

Address: 411 S Lafayette St, Greenville, MI 48838

Phone: 616-754-5645

SAW Grant Project Number: 1474-01

Executive Summary

The City of Greenville received a SAW Grant in 2015 to prepare a Storm Water Asset Management Plan.

The Grant agreement indicated the following amounts:

Total Plan Cost	Approved Grant Amount	Local Match
$2,000,000	Wastewater up to $1,460,801* Stormwater up to $1,078,819*	$0

*Total grant amount cannot exceed $2,000,000

The Key components in their Asset Management Plan include:

a. Asset Inventory and Condition Assessment
b. Level of Service
c. Criticality of Assets
d. Operation and Maintenance Strategies/Revenue Structure
e. Long-term Funding/Capital Improvement Plan

City of Greenville
Storm Water Asset Management Plan Summary

Asset Inventory

Describe the system components included in the AMP. Discuss how they were located and identified, if applicable. Describe the platform used to develop and maintain the inventory of assets.

All assets that are functionally or financially significant to the storm water system have been inventoried.

- Collection system manholes, catch basins, and outlets were located using survey quality GPS.
- Detention basins and buildings were located using hand held GPS equipment.

Locations for all assets are recorded in a GIS. Data regarding date of installation, material, and other physical characteristics for each asset is incorporated into the GIS geodatabase.
Location of non-pipe assets such as building components and other equipment is compiled in a package of inventory spreadsheets and CMMS database. These assets were not mapped in GIS.
The GIS, asset spreadsheets, and CMMS will all be used to maintain asset data in the future.

Condition Assessment

Discuss the condition assessment process, including what methods were used. Summarize the results of the assessment for each asset category.

The condition of collection system piping was documented with either a pole mounted zoom camera (looking down each pipe from the manholes) or with in-line closed circuit television (CCTV) from manhole to manhole. The zoom camera method provided a very economical initial condition assessment of the pipes. Pipes noted to have potentially significant deficiencies were flagged and follow-up inspections were performed with full in-line CCTV.

Using the zoom camera data, pipes were rated based on several factors such as joint conditions, wall corrosion, and infiltration. Composite Risk of Failure ratings of 1-5 (5 being the worst) were assigned to each pipe segment.

City of Greenville
Storm Water Asset Management Plan Summary

Pipes inspected with CCTV were rated using the PACP system (Pipeline Assessment Certification Program). The PACP ratings were then used to derive a composite Risk of Failure rating of 1-5 for each pipe.

Percentage of pipes within each rating category

1	2	3	4	5
44%	47%	7%	1%	1%

Manholes, catch basins, outlets, culverts, and detention basins were visually inspected and rated on a scale of 1-5 based factors related to the condition of castings, steps, and structures.

Percentage of manholes/catch basins within each rating category

No Rating	1	2	3	4	5
7%	48%	38%	5%	1%	1%

Level of Service Determination

Discuss the level of service the municipality has determined that it wants to provide its customers based on the municipality's ability to provide the service and customer expectations. Discuss the procedures used to involve stakeholders in the AMP discussion. What are the trade-offs for the service to be provided? This may include any technical, managerial, health standard, safety, or financial restraints, as long as all regulatory requirements are met. Discuss how this was determined.

We recognize that the people served by our system are more than customers, they are the system owners. Our staff acts as stewards of the system. We have held a series of public meetings and workshops to present the results of our condition assessments, review the costs for meeting various Levels of Service, and reviewed the budget impacts of those options. Based on the input received during those meetings, we have established the following Level of Service Goals:

1. Meet Regulatory Requirements
    a. Maintain a specified number of Certified Operators
    b. Continue our Illicit Discharge Program

2. Minimize Flooding and Public Hazards
    a. Staff/equip crews sufficiently to perform specific routine maintenance items
    b. Perform regularly scheduled monitoring and maintenance on all of our storm water system assets
    c. Adopt a baseline 10-year 24 hour design storm
3. Provide Capacity for Community Growth
4. Minimize Life Cycle Costs
5. Maintain Active Water Quality
    a. Establish a street sweeping and catch basin cleaning program
    b. Maintain our Illicit Discharge Program

Criticality of Assets

Provide a summary of the method used to assess the criticality of assets considering the likelihood and consequence of failure. Based on the condition of the assets, and the determined risk tolerance, how were the assets ranked? What assets were considered most critical?

Assets were given a Risk of Failure (RoF) rating of 1-5 (5 being the worst) based on factors related to both physical and functional conditions. The factors considered varied by the asset type and were tailored to identify both physical and functional deficiencies. For example, pipe ratings considered factors such as joint offsets and structural cracking while detention basin ratings considered factors such as sediment accumulation and remaining working volume.

Assets were given a Consequence of Failure (CoF) of 1-5 (5 being the worst) based on potential damage to adjacent utilities, transportation network, and the surrounding property/environment. The magnitude of the potential service disruption was also a factor.

Assets with the higher rankings for Consequence of Failure were those that:

- Provide service to a significant portion of the system
- Serve schools/hospitals/major industry
- Are under major roads
- Are adjacent to waterways or significant wetlands

Consequence of Failure and Criticality should not be confused. Criticality is the product of an asset's Risk of Failure (RoF) and Consequence of Failure (CoF). Criticality drives an asset's action priority.

Criticality ratings were calculated and ranged from 1-25 (25 being the highest priority). We then ran a Jenks Optimization to create 5 primary groupings, each with a rank of 1-5 (5 being highest priority). The final Criticality ratings were considered when the comprehensive Capital Improvement Plan was generated.

Revenue Structure

Discuss how the rates, charges, or other means of revenue were reviewed to determine if there will be sufficient funds to cover system operation, maintenance, replacement, capital improvement projects, and debt costs, identified in the AMP. If the current rate structure was not sufficient, discuss what increases were needed to ensure the desired level of service is sustainable and if any changes were made.

The CIP provided refined cost projections for the first 10 years of the financial analysis. The Asset Management System identified the estimated asset investment cost by year for the remaining lifecycle of all assets. The annual investment cost was evaluated and demands on the City's General Fund were reviewed.

Based on that analysis, the CIP was adjusted and funding allocations in the General Fund were adjusted so that both O&M activities and CIP actions could be funded. Public meetings were held to convey the results of the asset evaluation (RoF and Criticality) along with the financial evaluation. We are moving forward with the budget adjustments required to provide our desired Level of Service.

City of Greenville
Storm Water Asset Management Plan Summary

Capital Improvement Plan

Describe the long-term Capital Improvement Plan that was developed to address system needs identified in the AMP. Provide a list of the identified improvements/projects.

Once assets RoF ratings were assigned and actions prioritized using the Criticality ratings, action timelines were predicted for maintenance/repair/replacement. Because the storm water collection system assets share physical space with other asset systems such as waste water, roadway, and drinking water, it was imperative that the CIP process coordinated actions on these systems.

Scope of work and action timelines for the other asset systems were incorporated based on:

- Waste Water – based on Asset Management Plan work as part of SAW
- Roadway - based on roadway PASER (Pavement Surface Evaluation and Rating) evaluations
- Drinking Water – based on the most recent water reliability study

Individual project scopes for the comprehensive CIP were created to maximize coordination of work on various assets and minimize overall costs. The CIP projects include improvements to the storm water system, waste water system (collection and treatment), drinking water system (distribution and treatment), and road system. The CIP costs were incorporated into the revenue structure review. A 10-year CIP document was created which will be available to the public once the final rate structure has been adopted.

List of the plan's major identified assets

- 168,650 feet of gravity storm sewer
    - Current replacement value of $36,488,000
- 646 manholes and 1,060 catch basins
    - Current replacement value of $4,100,000
- 13 culverts
- 83 storm water outlets

DEQ

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Due Date November 30, 2018
(no later than 3 years from executed grant date)

The City of Greenville *(legal name of grantee)* certifies that all stormwater asset management plan (SWAMP) activities specified in SAW Grant No. 1471-01 have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SWAMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

Name		Phone Number	Email
Doug Hinken - City Engineer	at	616-754-5645	dhinken@greenvillemi.org

N Rasmussen

Signature of Authorized Representative (Original Signature Required)

November 28, 2018

Date

Norice Rasmussen - City Clerk

Print Name and Title of Authorized Representative

Memorandum

Date:	November 27, 2018
To:	Mr. Clarence Jones
Company:	Michigan Department of Environmental Quality
From:	Prein&Newhof
Project #:	2130563
Re:	GRSD Sewer Authority SAW Grant Wastewater Asset Management Plan Summary

Mr.Jones:

This memorandum provides the summary of the GRSD Sewer Authority wastewater asset management plan SAW grant activities required under Section 603 of Public Act 84 of 2015. Headings and italicized quotes are from MDEQ guidance.

Grantee Information

SAW Grant Project Number: 1490-01

Grantee:

GRSD Sewer Authority

10831 Kruger Road

New Buffalo, MI 49117

www.grsdsa.com

Contact: Mr. Warren Histed, Assistant Manager

Phone: 269-469-3434

Executive Summary

The GRSD Sewer Authority received a SAW Grant in 2015 to prepare a Waste Water Asset Management Plan for its collection and treatment systems. The Grant agreement indicated the following amounts:

Project Total	Grant Amount	Local Match
$559,228	$503,305	$55,923

The Key components in the Asset Management Plan include:

1. Asset Inventory and Condition Assessment
2. Level of Service
3. Criticality of Assets
4. Operation and Maintenance Strategies/Revenue Structure
5. Long-term Funding/Capital Improvement Plan

Asset Inventory

"Describe the system components included in the AMP. Discuss how they were located and identified, if applicable. Describe the platform used to develop and maintain the inventory of assets."

Manhole, gravity sewer main, force main, meter, and lift station locations were plotted in a Geographic Information System (GIS) using record drawings. Manhole and lift station locations were field verified and locations adjusted with Global Positioning System (GPS) coordinates. An inventory of wastewater treatment plant assets was compiled from site visits and available documentation including bases of design, record plans, operations and maintenance manuals, and maintenance records. The treatment plant was divided into processes to organize the inventory and subsequent condition assessment data.

Collection system asset inventory data, including year of installation, material, sizes, pipe inverts and manhole rim elevations, were cataloged from record drawings and visually verified where needed. Lift station and treatment asset inventory information, including size, capacity, manufacturer, model number, serial number etc. was compiled from available documentation.

Asset inventory data is managed using GIS databases and spreadsheet tables.

Condition Assessment

Discuss the condition assessment process, including what methods were used. Summarize the results of the assessment for each asset category.

Gravity Sewer Mains: Inspections were made using either a pole mounted zoom camera (looking up or down each pipe from the manholes) or with in-line closed circuit television (CCTV) cameras. Pipes inspected with zoom camera methods were rated considering any observable roots, deposits, joint conditions, pipe wall condition, infiltration, or other defect observations. Pipes inspected with CCTV were rated using the PACP system condition grading system. Composite Risk of Failure ratings of 1-5 were derived for each pipe.

Percentage of gravity sewer pipes in each rating category

1	2	3	4	5
58%	39%	1%	1%	1%

Force Mains: Force main conditions were estimated using pipe age, material, and break history records. GRSD's force main data was compared with that of several other systems to establish a comparative reference. Ratings of 1-5 were developed for each force main.

Percentage of force main pipes in each rating category

1	2	3	4	5
21%	0%	19%	37%	23%

Manholes: Manholes were visually inspected and rated on a scale of 1-5 based factors related to the condition of castings, steps, structures, and infiltration.

Percentage of manholes in each rating category

1	2	3	4	5
44%	35%	8%	10%	3%

Lift Stations: Visual inspection and performance testing were completed to evaluate asset condition. Lift station assets, including pumps, valves, piping, structures, electrical, controls, and other assets, were rated on a scale of 1-5. Composite ratings for the station as a whole were developed.

Number of lift stations in each rating category

0-1	1-2	2-3	3-4	4-5
0	0	2	4	0

Wastewater Treatment Plant: The treatment plant was broken down into an inventory of 1,172 assets and the assets were grouped by 27 treatment process . Visual inspection, performance testing, and discussions with maintenance staff were completed to rate the asset conditions.

Percentage of treatment plant assets in each rating category

1	2	3	4	5
15%	48%	24%	11%	2%

Level of Service Determination

"Discuss the level of service the municipality has determined that it wants to provide its customers based on the municipality's ability to provide the service and customer expectations. Discuss the procedures used to involve stakeholders in the AMP discussion. What are the trade-offs for the service to be provided? This may include any technical, managerial, health standard, safety, or financial restraints, as long as all regulatory requirements are met. Discuss how this was determined."

The GRSD Sewer Authority is governed by a contract between the Authority and the 5 local government units (cities and townships) which are parties to the contract. The parties have collectively considered their goals for the system, the levels of service they desire, and have agreed upon the terms and conditions to the contract. The contract serves as the level of service determination for the GRSD wastewater system.

Criticality of Assets

"Provide a summary of the method used to assess the criticality of assets considering the likelihood and consequence of failure. Based on the condition of the assets, and the determined risk tolerance, how were the assets ranked? What assets were considered most critical?"

Assets were given a Consequence of Failure (CoF) rating of 1-5 (5 being the worst) based on potential social, economic, and environmental impacts which can result from wastewater system failures. Collection system lines (gravity sewers and force mains) were rated based the size of the lines and potential impacts to transportation infrastructure. Lift stations were rated based on average day flow rates and the available time to respond to an emergency condition prior to a wastewater overflow. Treatment plant assets were rated based on how an asset failure might affect the overall process.

Criticality ratings were calculated as the product of an asset's RoF and CoF, producing criticality ratings ranging from 1-25 (25 being the most critical). The most critical assets were found to be Lift Station 6 force main, Lift Station 1 force main, gravity sewer on Berrien Street, Lift Station 79, primary clarifier tanks, influent channels, sludge handling pumps, aeration blower #1, disinfection west baffle wall, and the ferrous chloride tanks.

Revenue Structure

"Discuss how the rates, charges, or other means of revenue were reviewed to determine if there will be sufficient funds to cover system operation, maintenance, replacement, capital improvement projects, and debt costs, identified in the AMP. If the current rate structure was not sufficient, discuss what increases were needed to ensure the desired level of service is sustainable and if any changes were made."

Historical operating expenses were reviewed using current audit and budget information. Based on that information, a "Test Year" was developed that reflected a baseline cost. The baseline costs included currently budgeted expenses, debt service, and leveling for base operating cost.

A forecasting system was developed and used to identify the estimated replacement investment for the remaining lifecycle of assets based on the asset inventory and condition assessment data. Project costs were estimated for foreseeable capital improvements included in the 2018 Capital Improvement Plan. The annual investment cost was evaluated and scenarios developed for cash funding and debt financing. Based on this analysis, it is expected that a combination of future rate increases and debt financing will be needed to fund capital projects.

Capital Improvement Plan

"Describe the long-term Capital Improvement Plan that was developed to address system needs identified in the AMP. Provide a list of the identified improvements/projects."

A capital improvement plan showing project descriptions, cost estimates, and project timelines was developed for the needed capital improvements. The projects identified in the CIP are:

- Berrien Street sewer lining
- Snow Lane and Floral Lane manhole lining
- Flynn Road and Weechik Road manhole lining
- Lift Station 79 channel grating, generator, fuel tank, and electrical improvement
- Capacity Master Plan update
- North end equalization storage *(possible consideration)*
- LS-10 force main replacement
- LS-6 force main replacement
- Union Pier relief sewer
- LS-1 capacity improvement *(possible consideration)*
- LS-1 equalization storage *(possible consideration)*
- LS-6 coatings and 3rd pump
- Red Arrow Highway sewer replacements
- LS-8 coatings, generator, ATS, and VFDs
- Red Arrow Hwy manhole lining (Meadow Lane to Berrien St)
- Oselka Drive manhole lining
- Siphon chamber and relief chamber coatings
- LS-8 force main replacement
- LS-30 force main replacement
- LS-10 force main replacement
- LS-1 force main replacement
- LS-79 firm capacity improvement

- WWTP – duplex sludge pump replacement
- WWTP – alarm communications
- WWTP – secondary effluent sewer
- WWTP – sludge drying bed disconnection
- WWTP – flow meter installation
- WWTP – ferrous chloride feed improvements
- WWTP – influent channel repair
- WWTP – aeration diffuser replacement
- WWTP – digester improvements
- WWTP – addition of clarifier no. 3
- WWTP – auto sampler replacement
- WWTP – replace sludge handling pumps
- WWTP – Disinfection improvements
- WWTP – blower no. 1 replacement
- WWTP – SCADA system
- WWTP – non-potable water system improvements
- WWTP – sludge storage improvements
- WWTP – control building boiler/HVAC improvements
- WWTP – site and building lighting improvements
- WWTP – tertiary filter demolition
- WWTP – building electrical improvements
- WWTP – demo unused equipment
- WWTP – admin building
- WWTP – plant electrical improvements

List of Major Assets

"Provide a general list of the major assets identified in the AMP."

The GRSD Sewer Authority wastewater system major assets include:

- 6 lift stations
- 52,200 feet of 8" to 42" diameter gravity sewer
- 46,000 feet of 10" to 24" diameter force main
- 160 manholes
- Wastewater treatment plant consisting of screening and grit removal, primary clarification, activated sludge treatment, secondary clarification, tertiary filtration, and chemical disinfection processes

November 27, 2018
2130563

Mr. Clarence Jones, Project Manager *transmitted via email to: JONESC13@michigan.gov*
MDEQ
Office of Drinking Water and Municipal Assistance
P.O. Box 30241
Lansing, MI 48909-7741

RE: SAW Grant Project No. 1490-01
Wastewater Asset Management Plan
GRSD Sewer Authority, Berrien County

Dear Mr. Jones:

Enclosed are GRSD Sewer Authority's required SAW Grant deliverables as follows:

1. Certification of Project Completeness signed by Mr. Franklin W. Histed, GRSD Sewer Authority Assistant Manager
2. Project executive summary as required under Section 603 of Public Act 84 of 2015, including contact information for the grantee, a brief discussion of each of the five major components of the Asset Management Plan, and a list of the City's major identified assets. The summary has been prepared in accordance with recent MDEQ guidance.

The GRSD Sewer Authority has completed the Asset Management Plan, which will be made available to the MDEQ upon request and available to the public for at least fifteen years.

We are submitting these documents prior to the November 30, 2018, grant deliverable deadline. Final grant-eligible expenses will be incurred prior to November 30, 2018, and final disbursement requests will be submitted by January 29, 2019 (60 days after grant end date). It is our understanding that this will complete the GRSD Sewer Authority's obligations under the grant.

If you have any questions, please contact our office.

Sincerely,

Prein&Newhof

Steve Oosting

Steve Oosting, P.E.

Enclosures

c. Mr. Franklin W. Histed, GRSD Sewer Authority

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date November 31, 2018
(no later than 3 years from executed grant date)

The GRSD Sewer Authority *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1490-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or No
   If No - Date of the rate methodology approval letter: May 14, 2018.
2) Significant Progress Made: Yes or No
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: __________.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on __________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Franklin W. Histed at (269) 469-3434 whisted@grsdsa.com

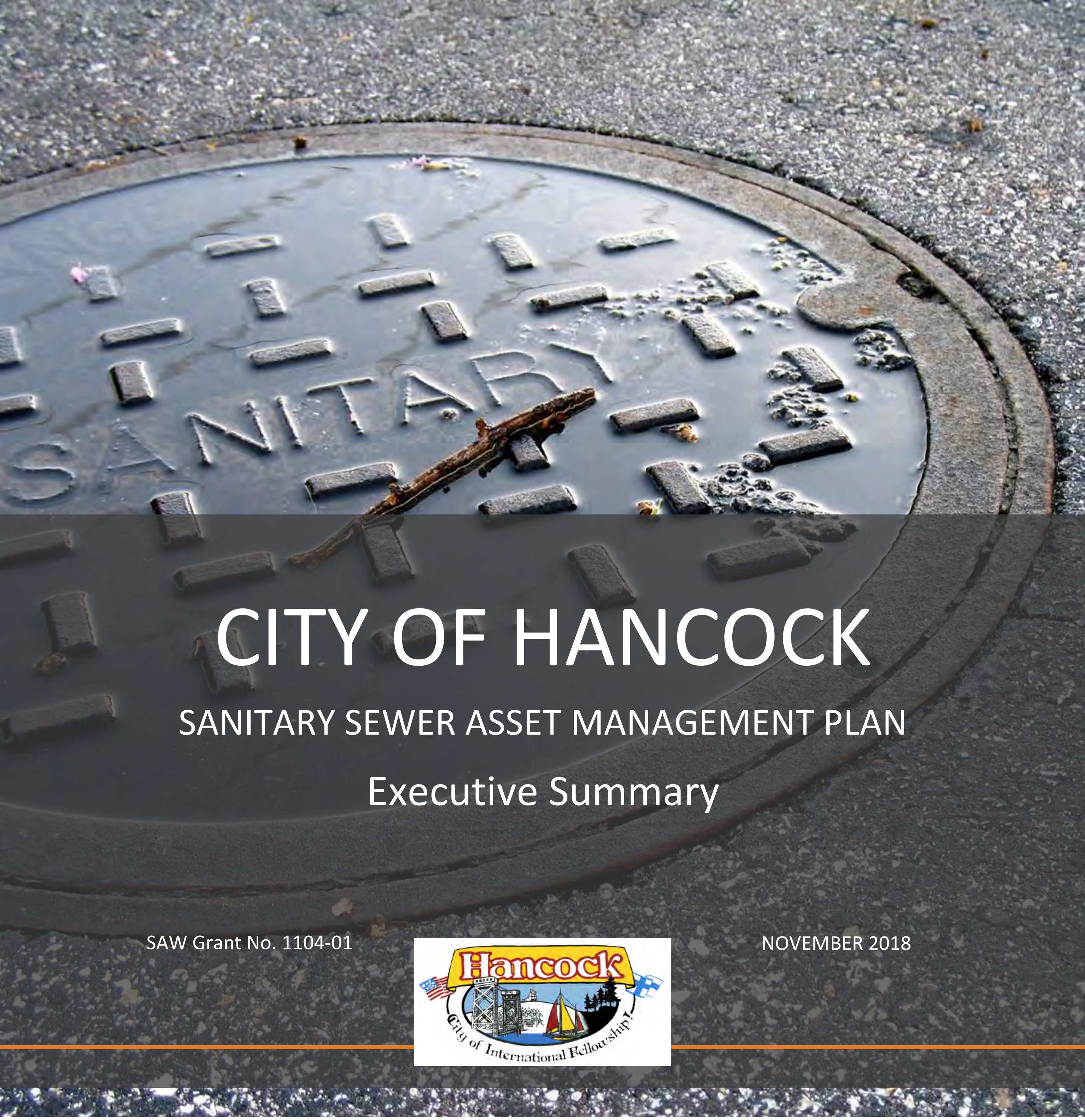
Name | Phone Number | Email

Franklin W. Histed — 11-20-18

Signature of Authorized Representative (Original Signature Required) | Date

Franklin W. Histed, Assistant Manager

Print Name and Title of Authorized Representative



CITY OF HANCOCK

SANITARY SEWER ASSET MANAGEMENT PLAN

Executive Summary

SAW Grant No. 1104-01

NOVEMBER 2018

Hancock
City of International Fellowship!

OHM
Advancing Communities®

Executive Summary

This document summarizes the Asset Management Plan (AMP) for the City of Hancock's sanitary sewer system and includes key recommendations for future funding levels. It includes details on the assessments completed by OHM Advisors with collaboration from the City. The AMP was prepared using grant funding from the State of Michigan Stormwater, Asset Management and Wastewater (SAW) Grant Program. $1,074,372.00 was awarded through the SAW Grant Program. Activities completed with these funds were intended to accomplish the following key goals:

- Provide the City with a new framework for collecting, organizing, and storing data for their wastewater collection system using the latest available hardware and software.
- Survey key system components to develop a Geographic Information System (GIS) database and to allow future generations to access infrastructure data with greater ease.
- Add information for sewer material type, size, and age to the GIS database.
- Evaluate the structural and operational condition of various system components and store the data in the GIS database.
- Identify long-term operations and maintenance strategies to maintain a reasonable structural condition into perpetuity, including:
    - Regularly-scheduled sewer inspection (televising) and cleaning
    - Repair and rehabilitation to address structural problems resulting from aging infrastructure
- Provide recommendations for developing a prioritized Capital Improvement Plan.
- Analyze operating budgets and recommend revenue structure changes to facilitate the City's long-term capital improvements plans.

The contact person for the City of Hancock Sanitary Sewer AMP is:

Glenn Anderson, City Manager
399 Quincy Street
Hancock, MI 49930
Phone: 906-482-2720
Email: manager@cityofhancock.net

Asset Inventory

An asset inventory is a list of the City's assets and their attributes. The City and OHM Advisors have inventoried and digitized the majority of its sanitary sewer infrastructure, including manholes, sanitary gravity mains, lateral service lines, force main, and grinder pumps. The GIS framework was developed as part of this effort, making it easier to store critical data for the location, size, material, install date, and condition of each wastewater asset.

List of Assets

The following lists the major assets of the sanitary sewer system.

- 763 manholes
- 30 miles of collector sewers, ranging in diameter from 4-24 inches.
- 1.5 miles of interceptor sewer, ranging in diameter from 12-30 inches
- 3,140 estimated lateral service lines
- 5,500 feet of force main
- 10 grinder pumps
- 10 valve manholes

Condition Assessment

Through a methodical sampling procedure, a representative sample of the City of Hancock's sanitary sewer infrastructure (sanitary sewer pipes and manholes) has been physically assessed. The condition of the infrastructure was assessed using the National Association of Sewer Service Companies (NASSCO) condition grading system, which uses a scale of zero to five. Zero indicates the infrastructure is in very good condition, while five indicates the infrastructure is in very poor condition or has already failed. The two primary scoring metrics commonly used to describe asset conditions are the Structure Ratings Index and the Quick Rating. The Structure Ratings Index is an average of defect grades within an asset, and the Quick Rating describes the asset's highest defect grades. These metrics and their derivation are further described in Section II of the AMP. Figure 1 describes the portion of the sanitary sewer system that has been inspected.

Figure 1: Portion of Sewer System Assessed

From this condition assessment, it was observed that:

- The City's sanitary manhole infrastructure is in overall good condition. Ninety percent (90%) of inspected structures have an Overall Structure Ratings Index of 2.0 or lower. The Operational and Maintenance (O&M) average Structure Ratings Index is 0.9, which is higher than the Structural average Structure Ratings Index of 0.5, and is mainly effected by deposits and infiltration.
- The City's sanitary gravity main, primarily comprised of reinforced plastic and vitrified clay pipes, has an average O&M Ratings Index of 1.2 and an average Structural Ratings Index of 2.1. Overall, 46% of inspected sanitary sewer segments have at least one grade 4 or higher defect which suggests there is significant need for rehabilitation.
- Lateral service lines are in poor condition. Approximately 85% of the inspected laterals have at least one Grade 4 or Grade 5 defect and the Overall Ratings Index was 3.1 for all inspected laterals. The average highest rated defect for O&M was 4 and only 2 for Structural. Roots and deposits were commonly observed, as well as breaks and offset joints. 28% of the inspected lateral lines have at least one Grade 5 defect and require immediate attention.

Additional assets including force mains, grinder pumps, and control valves were evaluated based on expected service life. These assets serve smaller capillary areas that developed in the 1990s and 2000s that could not be serviced by gravity main. All of the pressurized sewer assets are estimated to require replacement at the end of their useful life, which is estimated to be 20 years for grinder pumps, 35 years for valves, and 50 years for force main. The grinder pumps on M-203 are operating beyond their anticipated service life, the fairgrounds grinder pump may need replacement in 2022, and the control valves on M-203 may require replacement in 2028.

Hydrologic and Hydraulic Modeling

The City of Hancock's sanitary sewer system was evaluated using hydrologic and hydraulic modeling to quantify the extent of inflow and infiltration to system flows and determine the likelihood of sanitary sewer overflows (SSOs). The Michigan Department of Environmental Quality (MDEQ) 2002 Sanitary Sewer Overflow Policy states that communities experiencing SSOs must implement corrective action programs to be eligible for enforcement discretion. The corrective action programs must comply with remedial design standards equivalent to the 25-year/24-hour storm that would result in an SSO frequency of less than one discharge per ten years on average. Hydrologic and hydraulic models were developed to assess the likelihood of SSO in the City's sanitary interceptor sewer and to develop recommendations for an SSO corrective actions. A detailed report of the modeling methods, findings, and recommendations is included in Appendix D. Below is a summary of findings from the study.

1. **The predicted peak flow exceeds the system's capacity -** The predicted 10-year peak hourly flow at the Portage Lake Water and Sewage Authority (PLWSA) lift station is 12.16 cfs. The maximum operational capacity of the lift station 8.91 cfs, and the average capacity of the interceptor sewer is 7 cfs. The predicted peak flow exceeds the capacity of both the interceptor sewer and the PLWSA lift station.
2. **The City's capacity problem is inflow dependent –** The predicted peak flow is dependent on inflow. This means that directly connected storm water sources contribute significantly to the City's peak flows. Directly connected sources include residual combined sewer catch basins, roof drains, and footing drains.
3. **Public and private directly connected storm water sources are present –** Multiple direct inflow sources were identified during the 2012 flow study and the 2016/2017 CCTV inspections. Disconnecting these sources from the sanitary sewer should be prioritized.
4. **Basement surveys are required –** The ability to surcharge the interceptor sewer affects the need for system expansion. It may be possible that source reduction and interceptor surcharging will meet the MDEQ SSO Policy requirements. Basement surveys are required to determine acceptable levels of surcharge in the interceptor sewer.
5. **A footing drain flow study is required –** The extent of footing drains that are connected to the City's sanitary sewer is unknown. Basement plumbing inspections are required to determine the quantity of footing drain connections in the City, and a sump pump flow study is required to determine the average contribution of footing drains to peak flows.
6. **Transportation and storage expansion may be required in the future –** Source reduction efforts often do not provide enough inflow and infiltration (I&I) removal to solve capacity problems. An expansion of the interceptor sewer and PLWSA lift station capacity will likely be required in the future. The City should include a planning level allowance of $2,000,000 for future expansion. This allowance should be updated later as more information is collected.

Level of Service

The City has identified Level of Service (LOS) goals that will be used to guide the AMP and establish critical performance parameters. The LOS is bounded by the minimum regulatory requirements and the maximum capabilities of the assets.

Table 1: Summary of Level of Service Criteria

Key Service Criteria	Performance Indicator	Target Level of Service
Collection System Asset Condition Assessment and Frequent Maintenance	PACP and MACP inspections per year	Clean and inspect 8% of the gravity main and manholes per year, 4% will be from the frequent maintenance inventory • Approx. 60 Manholes • Approx. 13,500 feet of Gravity Main
Regulatory Compliance	Compliance with MDEQ Sanitary Sewer Overflow (SSO) Policy and The Clean Water Act	Comply with the MDEQ SSO policy of no more than 10% probability of an SSO in any given year, excluding unusual natural events or man-made disasters
Service Lateral Condition Assessment	LACP inspections and service lateral replacements per year	Implement a Service Lateral Condition Assessment and Replacement Program
GIS Asset Inventory	Tracking asset conditions in the GIS geodatabase	Maintain a continuously updated GIS geodatabase
Capital Improvement Planning	Customer complaints per year, unexpected repair costs per year	Update the CIP annually
Smart Sewer Asset Management	Monthly wastewater flows to the PLWSA treatment facility	• Deploy Smart Sewer Asset Management Tools • Identify sources of Infiltration and Inflow • Reduce average flows to the national average of 100 gpd

Criticality and Risk

The investigation leading to the identification of critical sewer infrastructure involved the determination of business risk, which is identified as the combination of the probability of the infrastructure failing as well as the consequence of its failure as shown in Figure 2.

Figure 2: Risk Equation

The probability of failure is related to the physical condition of an asset. The consequence of failure focuses on the economic losses and impacts to society due to an asset's failure. The following factors were combined to determine the consequence of failure for manholes and sanitary gravity mains:

- Network Position – the sum of upstream sewers discharging to a structure.
- Diameter/Size – the relative size of the asset with respect to the rest of the system.
- Location –the cost to restore the surface above the asset and if traffic control is needed. Uses average daily traffic (ADT) data.
- Environment – proximity to sensitive environmental features like rivers and lakes.

The PoF and CoF scores, other metrics, and rehabilitation recommendations for each assessed asset are tabulated in Appendix F.

Revenue Structure and Capital Improvement Plan

The City's sewer rates were analyzed and compared to the anticipated long-term operating expenses and capital improvements. Rate increases will be required to sustainably fund expenses related to sanitary sewer system capital improvements. Annual inflationary rate adjustments will also be required to maintain the City's sewer into perpetuity. The City is considering alternative rate tracks to facilitate future system operation, rehabilitation, and improvement. Rate adjustments are dependent on the funding mechanisms employed for upcoming capital improvements. Due to the scope and schedule of proposed capital improvements, cash funding would require dramatic fluctuations in rates, while debt financing may provide more rate stability. A combination of debt and cash funding will likely provide the most cost effective solution.

The Capital Improvement Plan (CIP) outlines the immediate/critical needs of the system as well as anticipated future needs over five-year, ten-year, and twenty-year horizons. Associated rehabilitation and replacement cost estimates are provided along with potential funding sources. The total estimated cost of the CIP is **$9,634,000** and is broken down in Table 2.

Table 2: CIP Cost Summary

Project Need	Estimated Cost
Immediate Rehabilitation	$ 269,000
5-Year Rehabilitation	$ 2,697,000
10-Year Rehabilitation	$ 1,512,000
20-year Rehabilitation	$ 3,716,000
Ongoing O&M Strategies	$ 1,440,000
Total	$ 9,634,000

For the purposes of long-term financial modeling, five new bond issuances were assumed (2021, 2023, 2026, 2029, and 2033) totaling approximately $8.1 million. It was assumed that the remaining $1.5 million in anticipated capital improvements will be funded by a combination of grants, sewer fund balance, and rate increases. Table 3 describes the anticipated funding schedule. A draft cash-flow analysis table for the years 2019 through 2038 is provided in Appendix E of the AMP.

Table 3: Anticipated Funding Schedule

Funding Source	Timeframe	Estimated Total
Cash – Sewer Fund	2019 - 2038	$ 1,546,000
Bond Issue #1	2021	$ 2,037,000

Bond Issue #2	2023/2024	$ 1,292,000
Bond Issue #3	2026/2027	$ 1,043,000
Bond Issue #4	2029	$ 2,000,000
Bond Issue #5	2033	$ 1,716,000

DEQ

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date 11/30/2018
(no later than 3 years from executed grant date)

The City of Hancock *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1104-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

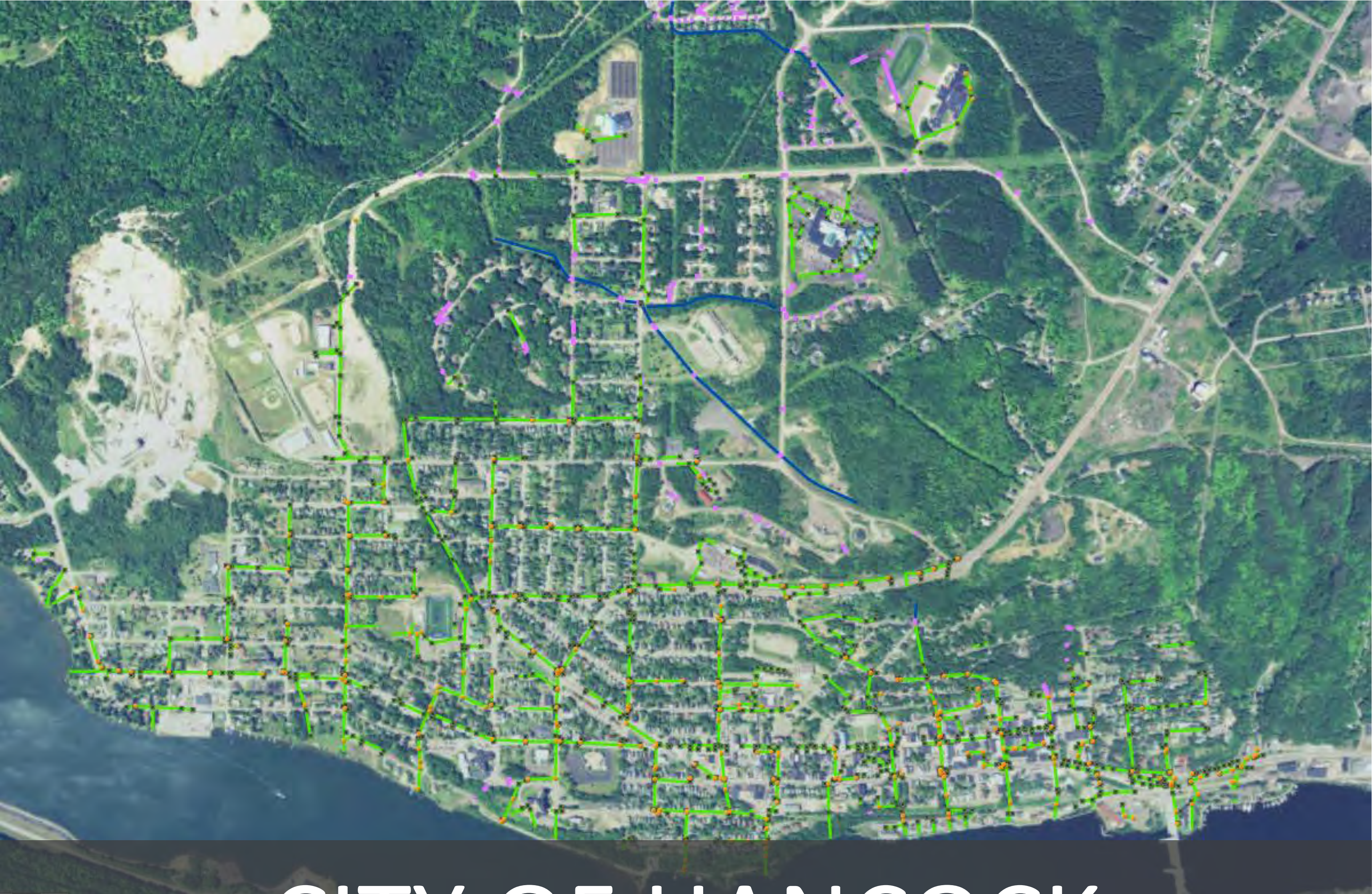
1) Funding Gap Identified: Yes or No
   If No - Date of the rate methodology approval letter: 6/28/2018.
2) Significant Progress Made: Yes or No
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: ______.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ______.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Mary Babcock at (906)482-2720 clerk@cityofhancock.net
Name Phone Number Email

John Haeussler 11/29/18
Signature of Authorized Representative (Original Signature Required) Date

John Haeussler, Mayor
Print Name and Title of Authorized Representative



CITY OF HANCOCK

STORM SEWER ASSET MANAGEMENT PLAN

Executive Summary

SAW GRANT NO. 1104-01

NOVEMBER 2018

OHM
Advancing Communities®

Executive Summary

The City of Hancock has initiated a comprehensive assessment of its stormwater infrastructure using funding from the State of Michigan Stormwater, Asset Management, and Wastewater (SAW) Grant Program. This report details the results of that assessment and contains recommendations for future stormwater projects as well as potential funding sources for those proposed projects. As evidenced in Figure 3 to Figure 1, the stormwater infrastructure is deteriorating. This Asset Management Plan (AMP) has been created in order to address existing concerns and prevent future issues within the stormwater system.

Figure 3: Collapsing Clay Pipe

Figure 4: Deformed Culvert

Figure 2: Deteriorated Stormwater Inlet

Figure 1: Roots and Deposits in Pipe

The key goals for the Asset Management Plan are:

- Provide the City with a new framework for collecting, organizing, and storing data for their stormwater collection system using the latest available hardware and software.
- Survey key system components to develop a Geographic Information System (GIS) database and to allow future generations to access infrastructure data with greater ease.
- Add information for storm sewer material type, size, and age to the GIS database.

- Evaluate the structural and operational condition of various system components and store the data in the GIS database.
- Identify long-term operations and maintenance strategies to maintain a reasonable structural condition into perpetuity, including:
    - Regularly-scheduled sewer inspection (televising) and cleaning
    - Repair and rehabilitation to address structural problems resulting from aging infrastructure
- Provide recommendations for developing a prioritized Capital Improvement Plan.
- Analyze operating budgets and recommend revenue structure changes to facilitate the City's long-term capital improvement plans.

The contact person for the City of Hancock Sanitary Sewer AMP is:

Glenn Anderson, City Manager
399 Quincy Street
Hancock, MI 49930
Phone: 906-482-2720
Email: manager@cityofhancock.net

Asset Inventory

This asset management plan includes an inventory of the City's existing stormwater infrastructure and compiles that information into a GIS geodatabase for ease of access. Each pipe, culvert, manhole, and catch basin in the system was assigned a unique identifier that is used to track its physical attributes and any assessments performed on it as part of this study. The GIS geodatabase includes information for each asset such as installation year, material of construction, size, ownership, and inspection status. The asset inventory also contains the scores assigned to each asset based on their current condition.

Condition Assessment

Through a methodical sampling procedure, a representative sample of the City of Hancock's storm sewer infrastructure (storm sewer pipes, culverts, manholes, and inlets) was physically assessed. The condition of the infrastructure was assessed using the National Association of Sewer Service Companies (NASSCO) condition grading system, which uses a scale of zero to five. Zero indicates the infrastructure is in very good condition, while five indicates the infrastructure is in very poor condition or has already failed. The two primary scoring metrics commonly used to describe asset conditions are the Ratings Index and the Quick Rating. The Ratings Index is an average of defect grades within an asset, and the Quick Rating describes the asset's highest defect grades. Figure 5 describes the portion of the storm sewer system that has been inspected. In addition to the NASSCO inspections, a select number of storm structures were assessed using a non-MACP inspection method, which obtained less detailed inspection information in order to save costs on low-criticality catch basins. The non-MACP condition assessment also used a general grading system on a scale of zero to five.

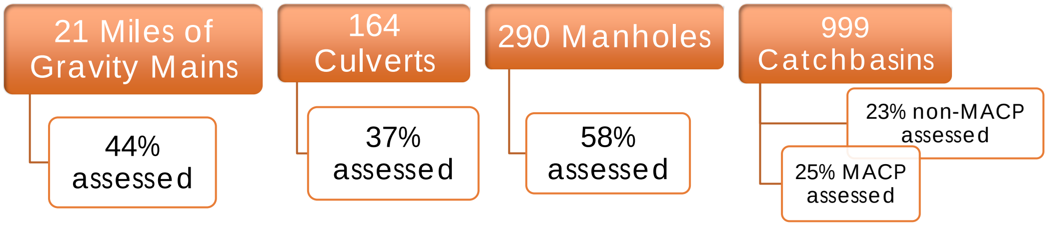


Figure 5: Condition Assessment Summary

From this condition assessment, it was observed that:

- The City's storm manholes are in moderate condition: 72% of inspected structures have an Overall Ratings Index of two or lower. A small portion of the storm sewer manholes are in poor condition: 7% of inspected structures have an Overall Ratings Index of four or five.
- The City's storm sewer pipes are in moderate condition: 63% of inspected sewer segments have an Overall Ratings Index of two or lower. A small portion of the storm sewer pipes are in poor condition: 9% of inspected sewer segments have an Overall Ratings Index of four or five.

Hydrologic and Hydraulic Modeling

The City of Hancock's storm sewer system was evaluated using hydrologic and hydraulic (H&H) modeling to quantify the system's capability of safely conveying a 10-year storm. Using a 10-year recurrence interval storm event to model a collection system is the most common level of protection for municipal stormwater systems. The entire Hydrologic and Hydraulic Modeling Report is provided in Appendix C.

The major finding of the H&H analysis was undersized pipes. Three sections of the sewer system are unable to convey 10-year peak flows without surcharging to or above the surface elevation. In addition, eight sections of the sewer system are unable to convey 10-year peak flows without exceeding the capacity of the pipe. The segments are identified in Appendix C, Figure C-3 and Table C-3.

Level of Service

The city has identified target Level of Service goals to serve as benchmarks for the performance of the stormwater collection system. This includes five categories of information, which will be tracked over time to improve the operation of the system: Inspection, Service Delivery and Customer Communication, Regulatory Compliance, GIS, and Capital Improvement Planning. Table 1 shows the parameters that will be used to guide the development of the Hancock stormwater system into the future.

Table 1: Summary of Level of Service Criteria

Key Service Criteria	Performance Indicator	Target Level of Service

Collection System Asset Condition Assessment and Frequent Maintenance	PACP and MACP inspections per year	Clean and inspect 8% of the gravity main and manholes per year, 4% will be from the frequent maintenance inventory; per-year quantities below: • Approx. 80 catch basins • Approx. 23 Manholes • Approx. 8,900 feet of gravity main • Approx. 13 culverts
Regulatory Compliance	Compliance with MDEQ Policy and The Clean Water Act	Comply with MDEQ Policy and The Clean Water Act
Service Delivery and Customer Communication	Customer complaint/request response time	• Acknowledge customer complaints and requests within 24 hours of receipt • Respond to customer complaints and requests within three business days
GIS Asset Inventory	Tracking asset conditions in the GIS geodatabase	Maintain a continuously updated GIS geodatabase. Update key attributes, including, but not limited to, material, condition, age, elevations, install date, and size.
Capital Improvement Planning	Customer complaints per year, unexpected repair costs per year	Update the CIP annually using gathered information from customer complaints, history of emergency repairs, and inspection data. At minimum 20% of customer complaints and 20% of emergency repairs should be added to the CIP.

Criticality and Risk

A physical inspection was performed on around 44% of the storm sewer pipes and 37% of the storm manholes to determine current structural and O&M condition. NASSCO standards were used to document and control this inspection and ensure its consistency with accepted standards. This method of assessment provides a rating of an asset's condition. This condition score is used to estimate of an asset's Likelihood of Failure (LoF). System assets were also scored based on their Consequence of Failure (CoF), or how important the assets are to the system overall. The LoF and CoF are scored from one to five, and then multiplied to determine the Business Risk Exposure as shown in Figure 6. Assets that have severe defects and that are critical to the overall storm system operation have high Business Risk Exposure scores, and projects in the CIP are prioritized to rehabilitate or replace these assets first.

Figure 6: Risk Equation

Revenue Structure and Capital Improvement Plan

The Capital Improvement Plan (CIP) outlines the immediate/critical needs of the system as well as anticipated future needs over five-year, ten-year, and twenty-year horizons. Associated rehabilitation and replacement cost estimates are provided along with potential funding sources. The total estimated cost of the CIP is **$11,819,000** and is broken down in Table 2.

Table 2: CIP Cost Breakdown

Project Need	Planning Level Cost
5-Year Sum	$ 1,470,000
10-Year Sum	$ 4,804,000
20-Year Sum	$ 5,545,000

List of Assets

The following lists the major assets of the storm sewer system.

- 21 miles of storm sewer (110,800 feet)
- 164 culverts (9,200 feet)
- 290 manholes
- 999 catch basins

DEQ

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Due Date 11/30/2018
(no later than 3 years from executed grant date)

The City of Hancock *(legal name of grantee)* certifies that all stormwater asset management plan (SWAMP) activities specified in SAW Grant No. 1104-01 have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SWAMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

Mary Babcock at (906)482-2720 clerk@cityofhancock.net
Name Phone Number Email

John Haeussler 11/29/18
Signature of Authorized Representative (Original Signature Required) Date

John Haeussler, Mayor
Print Name and Title of Authorized Representative

HANCOCK CITY COUNCIL SPECIAL
ORGANIZATIONAL MEETING
WEDNESDAY, NOVEMBER 14, 2018, 5:00 pm
MEETING MINUTES

Call to order and Pledge of Allegiance
Roll Call and verification of a quorum

Present: Councilors Blau, LaBine, Lytle, Warstler, Seguin, Slivon, Haeussler
Absent: None

Also Present: John Zurcher, Laverne Roos, , Barry Givens, Mitch Lake, Jodi Bigden, Tracie Williams, Missy Goulette, Carol Freeman, Kevin Mackey

Newly elected officials; Whitney Warstler, Will Lytle, John Slivon, Paul LaBine and John Haeussler were sworn in by Mary Babcock, City Clerk.

Nomination were accepted for the Mayor.

Motion by Councilor Slivon and seconded by Councilor LaBine to elect John Haeussler as the new Mayor for a 1-year term.

No other nominations

Roll Call
Yes: LaBine, Haeussler, Seguin, Slivon, Warstler, Lytle, Blau
No: None
Motion carried

Motion by Councilor Blau and seconded by Councilor Lytle to elect Paul LaBine as Mayor Pro-tem for a 1 year term.

Roll Call
Yes: Blau, Lytle, Warstler, Slivon, Seguin, Haeussler, LaBine
Non: None
Motion Carried

Public Comment:
Carol Freeman – 39th Annual Christmas walk will be held on November 23rd from 6 to 8 pm.
John Zurcher – Veteran's discount card should be honored
Missy Goulette, The Flower Shop- Issues with snow in front of her shop on Quincy Street.

Motion by Councilor Seguin and seconded by Counilor LaBine to change John Slivon's term end date to November 11, 2020.

Yes: All
No: None

Motion Carried

Motion by Councilor Slivon and supported by Councilor Seguin to approve the seating chart.

Yes: All
No: None
Motion Carried

Motion by Councilor LaBine and supported by Councilor Slivon to adopt the current edition (11^{th}) of Roberts Rules of Order for conducting City Council meetings.

Yes: All
No: None
Motion Carried

Motion by Councilor Slivon and supported by Councilor LaBine to adopt resolution #18-14 adopting MDOT Contract #18-5487 for preliminary engineering work on flood damaged FHWA streets located in the City of Hancock

Roll Call
Yes: LaBine, Haeussler, Seguin, Slivon, Warstler, Lytle, Blau
No: None
Motion carried

Motion by Councilor LaBine and supported by Councilor Warstler to approve a special City Council meeting on Wednesday, December 5, 2018 at 6:00 p.m. for a joint City Council meeting with the City of Houghton at the Carnegie Museum, 105 Huron St., Houghton, MI

Yes: All
No: None
Motion Carried

Motion by Councilor LaBine and supported by Councilor Blau to approve the payment of current accounts payable in the amount of $795,796.65.

Roll Call
Yes: Blau, Lytle, Warstler, Slivon, Seguin, Haeussler, LaBine
No: None
Motion Carried

Motion by Councilor Blau and supported by Councilor Haeussler to approve the bid for Montezuma St. Reconstruction project.

Roll Call
Yes: LaBine, Haeussler, Seguin, Slivon, Warstler, Lytle, Blau
No: None
Motion carried

Motion by Councilor LaBine and supported by Councilor Slivon to adopt Resolution #18-16 adopting MDOT Contract #18-5498 for emergency flood repairs on Montezuma Street.

Roll Call
Yes: Blau, Lytle, Warstler, Slivon, Seguin, Haeussler, LaBine
No: None
Motion Carried

Motion by Councilor LaBine and supported by Councilor Seguin to approve MDOT Contract #18-5500 for flood damaged Campus Drive.

Roll Call
Yes: LaBine, Haeussler, Seguin, Slivon, Warstler, Lytle, Blau
No: None
Motion carried

Motion by Councilor LaBine and supported by Councilor Seguin to approve the emergency ordinance #301 to prohibit marihuana establishments pursuant to the Michigan Regulation and Taxation of Marihuana Act, Ballot Proposal 1 of 2018 with an effective date of November 14, 2018.

Roll Call
Yes: Blau, Warstler, Slivon, Seguin, Haeussler, LaBine
Non: Lytle
Motion Carried

Motion by Councilor Lytle and supported by Councilor LaBine to adopt Resolution 18-18 opposing Michigan Senate bills 637 and 694.

Yes: All
No: None
Motion Carried

Motion by Councilor Blau and supported by Councilor LaBine to adjourn at 6:25 p.m.

Yes: All
No: None
Motion Carried

Rescheduled November monthly meeting to be held on Wednesday, November 28th at 6:30 p.m.

Mary Babcock

Mary Babcock, Clerk

John Haeussler

John Haeussler, Mayor

Stormwater, Asset Management, and Wastewater (SAW)
Asset Management Plan Executive Summary Guidance
City of Hartford, Michigan

Wastewater Sewer System

Date: November 15, 2018
To: Mr. Clarence Jones
Re: Organization: Michigan Department of Environmental Quality
From: Wightman & Associates, Inc.
Re: City of Hartford SAW Grant: Summary of Wastewater Asset Management Plan

Grantee Information:
City of Hartford
19 West Main Street,
Hartford, MI 49057
citymanager@cityofhartfordmi.org
Mr. Yemi Akinwale; Manager
Ph: (269) 621-2477
SAW Project #: 1408-01

Executive Summary: *Summary of the project scope, and grant and match amount, if applicable. List the key components that make up an Asset Management Plan (AMP).*

An asset management program is a tool for community leaders and utility managers to proactively decide when to repair, replace or rehabilitate assets and how those improvements will be funded to maintain a perpetual level of service. The Key Components of the Asset Management Program (AMP) are:

1) Asset Inventory and Condition Assessment.
2) Level of Service.
3) Criticality of Assets.
4) Capital Improvement Plan.
5) Asset Management Financial Plan and Revenue Structure.

The program is organized into three components that answer the following questions:

Asset Management Program (AMP):

- What level of service will be provided?
- What improvements need to be made and when?
- What changes to operations need to be made?
- How will these improvements and changes be funded?
- How is the plan implemented?

Geographic Information System (GIS):

- What do we own, where is it, what is the condition and what is the remaining life?
- What are the most critical assets?
- Where was maintenance performed and what was done?
- Where are improvements needed?

System User Manual:

- How will the asset management program tools be used?
- How will the asset management program be maintained and updated?
- How will the asset management program provide a guide for planning decisions?

	Sanitary	Storm	Total
1) Total Grant:	$627,800	$612,200	$1,240,000
2) Less: Match	$ 72,568	$ 70,765	$ 143,333
3) Net Grant:	$555,232	$541,435	$1,096,667

Wastewater Asset Inventory: *Describe the system components included in the AMP. Discuss how they were located and identified, if applicable. Describe the platform used to develop and maintain the inventory of assets.*

The City of Hartford (Hartford or the City) operates a wastewater collection and treatment system consisting of nearly 14.5 miles of gravity sewer pipe, over 250 manholes, and nearly 4.5 miles of pressurized force mains that convey the wastewater from the City to the Hartford Wastewater Treatment Plant (WWTP) for treatment. In addition to the pipes in the collection system, Hartford relies on a series of sewage lift (pump) stations to convey the wastewater through the system. There are two smaller lift stations serving various neighborhoods and two large lift stations that operate in series to convey the wastewater from the City to the WWTP. In addition, the City maintains one privately owned lift station that conveys wastewater from the Four Winds Casino, Hartford (the Casino) to the WWTP.

With a thorough knowledge of the basic layout of the collection system, a comprehensive inventory of all wastewater system assets was performed using as-built utility drawings and on-site Global Positioning System (GPS) field locations. Using the data collected, detailed maps of the wastewater collection system were prepared using Geographical Information System (GIS) software. The mapping was prepared using the state plane coordinate system, allowing the operator to obtain coordinates for and accurately locate system assets in the field utilizing handheld GPS equipment. Information collected about all identified wastewater assets is also maintained within the GIS model.

Table 1 contains a summary of the wastewater system assets identified.

Item	Quantity	Units
18-inch Sanitary Sewer	5,268	LF
16-inch Sanitary Sewer	28	LF
15-inch Sanitary Sewer	5,632	LF
12-inch Sanitary Sewer	7,756	LF
10-inch Sanitary Sewer	10,956	LF
8-inch Sanitary Sewer	45,883	LF
4-foot Diameter Sanitary Manhole	251	EA
Service Lead, Complete	1,049	EA
Lift Station – 500 gpm or Larger	2	EA
Lift Station – Less than 500 gpm	2	EA
Backup Generator – 60 kW to 75 kW	2	EA
10-inch Force Main	4,262	LF
8-inch Force Main	1,419	LF
6-inch Force Main	17,619	LF
4-inch Force Main	374	LF
Air Release Valve with Manhole	10	EA
Force Main Cleanout with Manhole	14	EA
0.75 mgd Wastewater Treatment Plant[1]	1	EA

Table 1 - Wastewater System Assets

<u>Condition Assessment:</u> *Discuss the condition assessment process, including what methods were used. Summarize the results of the assessment for each asset category. The percentage of good, fair, and poor for each category can be used, if preferred.*

After completing the comprehensive inventory of the utility system assets, conditional assessments of most of the asset components were performed. Condition assessments provide the critical information needed to assess the physical condition and functionality of the assets in the collection system and estimate their remaining service life. Manholes were visually assessed and photographed by Wightman employees as depicted in Figure 1. Most of the gravity sanitary sewer piping was inspected using closed-circuit televising (CCTV) equipment designed for use in sewer pipes[2]. CCTV services were provided by Clean Earth Environmental Contracting Services (Clean Earth) and Corby Energy Services, Inc (CES). All the CCTV videos and pipe reports and the manhole pictures are attached to those assets in the GIS map and are accessible via the computer and tablets discussed above.

All the equipment at the WWTP was also inspected in detail by Wightman employees including photographing the various assets comprising the treatment system. Examples of some of these pictures are shown in Figure 10 through Figure 15. As with the lift stations and manholes, all photographs taken by Wightman employees are

[1] The component processes of the wastewater treatment plant are broken down in detail in Appendix B.

[2] Pipes with severe structural issues that could be exacerbated or cause complete failure due to the cleaning associated with CCTV activities and pipes younger than 20 years old were not televised.

attached to the treatment plant assets in the GIS map and are accessible via the computer and tablets discussed previously.

The conditional assessments of individual defects and overall asset conditions for all assets that were physically inspected were based on the National Association of Sewer Service Companies (NASSCO) numerical grading system, which defines the severity of observed defects and the condition of the asset. Condition grades for both structural and O&M defects were assigned based on the condition of the immediate defect and the likelihood of further defect deterioration or asset failure. The numerical system uses numbers ranging from 1 to 5 as shown in Table 2.

Condition Rating	Condition Description	Defect/Deterioration Description
1	Very Good	New asset, no or minor defects
2	Good	Defects that have not begun to deteriorate
3	Fair	Moderate defects that will continue to deteriorate
4	Poor	Severe defects with significant deterioration
5	Very Poor	Defect requires immediate action

Table 2 - NASSCO conditional assessment system

As previously mentioned, the gravity sanitary sewer piping was televised by Clean Earth and CES. They graded any noted defects according to the guidelines of the NASSCO Pipeline Assessment Certification Program (PACP). Once the individual defects were graded, Wightman employees applied an overall condition rating to each pipe based on NASSCO PACP methodology. The manholes were rated by Wightman employees using NASSCO Manhole Assessment Certification Program (MACP) Level 1 inspection methodology. Figure 16 and Figure 17 show the condition ratings for the sanitary sewer gravity main piping and the sanitary sewer manholes (respectively).

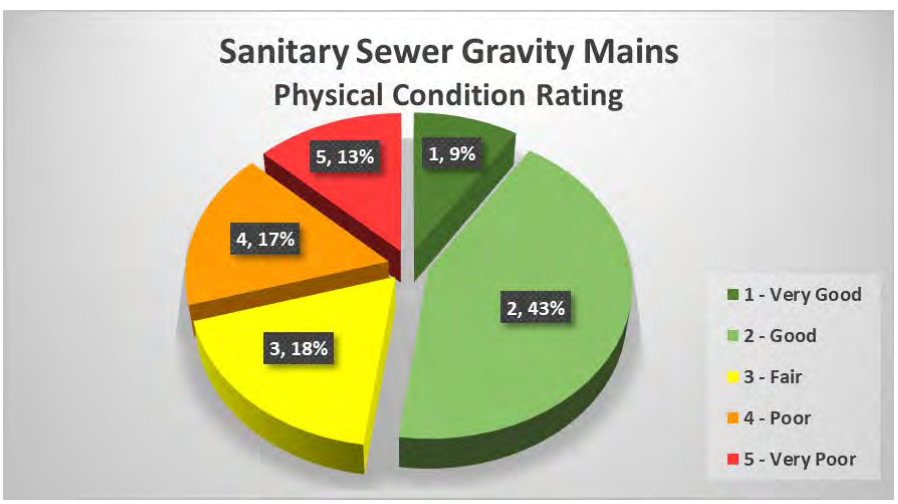


Figure 1 - Sanitary sewer gravity main physical condition rating

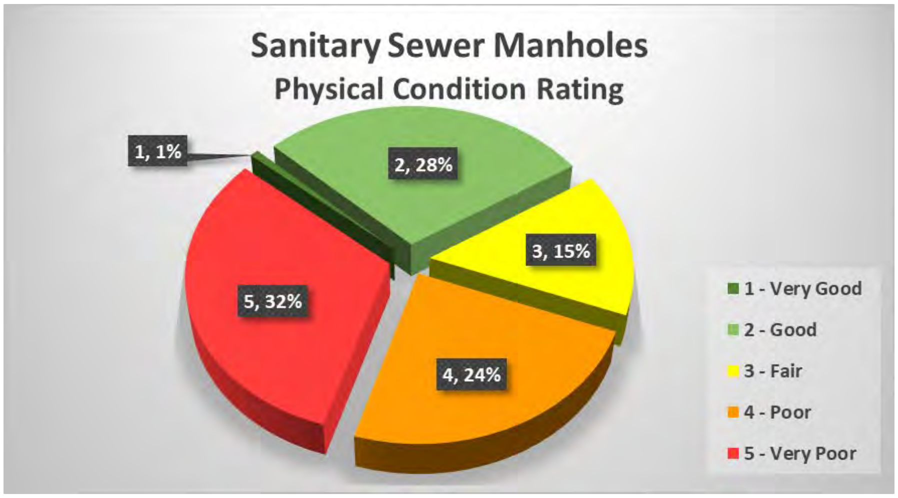


Figure 2 - Sanitary sewer manhole physical condition rating

Inspection at the lift stations included physical and visual inspection of all the major components along with drawdown tests to determine the performance of the pumping equipment. Table 3 shows the design capacity, current pump rates, and the condition of the individual components of the lift stations.

Station	Pump Design Capacity (gpm)	Pump 1 Test Rate (gpm)	Pump 2 Test Rate (gpm)	Design Head (ft)	Wet Well Condition	Pump Condition	Electrical & Controls Condition	Generator Condition
Bennett	80	83.4	84.3	24.0	Fair	Good	Good	N/A
Woda	50	61.1	60.9	34.0	Good	Good	Good	N/A
687 LS	900	809.5	816.0	64.1	Fair	Good	Good	Very Good
372 LS	900	802.5	777.3	74.9	Fair	Good	Good	Good

Table 3 - Lift station asset condition ratings

Level of Service Determination: *Discuss the level of service the municipality has determined that it wants to provide its customers based on the municipality's ability to provide the service and customer expectations. Discuss the procedures used to involve stakeholders in the AMP discussion. What are the trade-offs for the service to be provided? This may include any technical, managerial, health standard, safety, or financial restraints, as long as all regulatory requirements are met. Discuss how this was determined.*

The level of service defines the way in which the Owner desires the facility or utility to perform over the long term. The level of service should ensure that all regulatory requirements are met and should include any technical, managerial, health and safety, or financial components the Owner deems necessary to meet customer expectations. The level of service is a fundamental part in defining how the wastewater system will be operated and maintained in the future. As with all components of the AMP, defining the desired level of service will be an ongoing process.

The Asset Management Team developed the statements in Table 6 to define the desired level of service for the wastewater system:

Major Area	Goals and Objectives	Level of Service Statements
Clean Effluent Water	All federal and state water quality regulations will be complied with.	
Health and Safety	Provide a safe and injury free work place. Protect the public health. Protect the environment.	Adhere to the Michigan Municipal League's "Risk Management Is Good Management" document at all times. No MIOSHA safety violations.
Security	Secure all wastewater facilities from unauthorized access and intrusions.	All control panels and vaults will be padlocked at all times. WWTP gate and all buildings will be locked at all times when operators are not present. We will strive to improve upon our security system by utilizing new technology.
Operator Certification	Provisions for appropriately credentialed and experienced operators.	We will maintain the minimum licenses required by the State for our collection and treatment system. The City will have one licensed operator for the wastewater treatment plant at all times.

Table 4 - Level of service statements

Major Area	Goals and Objectives	Level of Service Statements
Administrative	Provide excellent customer service.	Produce accurate, timely billing. Review all discrepancies within 3 business days. Have someone available between 8:00 a.m. and 5:00 p.m. Monday through Thursday and 8:00 a.m. and 4:00 p.m. on Friday.
Customer Complaints	Provide excellent customer service.	Respond to customer complaints within 3 business days and communicate through close of issue.
Response Time	Provide excellent customer service.	Respond to emergency calls within 24 hours at all times and non-emergency calls within 3 business days.
Reporting	Meet all required State of Michigan guidelines for required reporting.	
Regulatory Changes	Be aware of regulatory changes and be in position to comply with changes as they occur.	Attend continuing education programs as required by the State. Route applicable correspondence from the MDEQ to all affected staff.
Rules and Regulations	Monitor and enforce all wastewater ordinances.	Review wastewater ordinances periodically – bi-annually at a minimum. Enforce provisions of wastewater ordinances.
Wastewater Treatment Plant	Maintain all mechanical equipment – focus on preventative maintenance to prevent unscheduled breakdown. Treatment plant valve maintenance.	Maintain all mechanical equipment in accordance with Manufacturer recommendations. Implement regular preventative maintenance program. Exercise all valves annually (at a minimum).
Emergency Power Source	Provide adequate emergency power in necessary locations.	Treatment plant shall have provisions for emergency power. Backup generators shall be provided at all lift stations. Generators shall be maintained under an annual maintenance contract.

Table 6 - Level of service statements (cont.)

Major Area	Goals and Objectives	Level of Service Statements
Collection System	Maintain the following in good operating condition and prevent overflows and system back-ups: Gravity sewers. Air release valves.	Gravity sanitary sewers will be cleaned on a rotational basis such that 20% of the system is cleaned annually resulting in the entire system being cleaned every 5 years. Air release valves shall be maintained in accordance with Manufacturer recommendations.
Lift Stations	Maintain all pumps and related equipment – focus on preventative maintenance to prevent unscheduled breakdown. Lift station valve maintenance.	Maintain all mechanical and electrical equipment daily during normal work week. Visually inspect all components of each lift station daily during normal work week. Clean the equipment and verify it functions. Clean lift station wet wells annually to remove grease and sediment. Exercise check valves and gate valves weekly (at a minimum).
Financial	Maintain a financial plan to generate sufficient revenue to operate and maintain the wastewater system.	Confirm wastewater revenues are sufficient to meet wastewater budget annually. Review sewer rates every five years.
Operating Reserves	Maintain sufficient reserves to cover anticipated major expense and potential unexpected breakdowns.	Maintain a minimum of twelve months' operating expenses in reserve accounts.

Table 6 - Level of service statements

Criticality of Assets: *Provide a summary of the method used to assess the criticality of assets considering the likelihood and consequence of failure. Based on the condition of the assets, and the determined risk tolerance, how were the assets ranked? What assets were considered most critical?*

Criticality is determined by multiplying the likelihood of failure by the consequence of failure and is a significant factor in prioritizing capital improvements. In general, the higher the criticality of an asset, the more resources that should be allocated to maintain the asset, or the higher the priority that repairs to that asset should take. However, criticality is only one tool that can be utilized to analyze and prioritize capital improvements and its use is subject to careful evaluation of the asset(s) in question and sound engineering judgement.

A. Likelihood of Failure

For assets that were physically inspected, including gravity sanitary sewers, sanitary manholes, lift station components, and WWTP equipment, the likelihood of failure was determined by the conditional rating of the asset with consideration given to the remaining asset life as shown below in Table 7. The methodology of examining the asset conditions and assigning conditional ratings to noted defects was discussed previously in

Section II.C. The likelihood of failure for all assets assessed based only on the remaining asset life was determined in accordance with Table 7 below.

Likelihood of Failure Rating	Asset Condition/ Description	Remaining Useful Life
1	Very Good	More than 90%
2	Good	60 to 89.9%
3	Fair	30 to 59.9%
4	Poor	10 to 29.9%
5	Very Poor	Less than 10%

Table 5 – Likelihood of failure assessment methodology

It should be noted, however, that the condition descriptions are carried over in the GIS model as the likelihood of failure. In other words, if an asset's condition is rated as a "4" (Poor) or "5" (Very Poor), that same description carries over as the likelihood of failure indicating that the asset is in "Poor" or "Very Poor" condition rather than that the likelihood of failure is "Poor" or "Very Poor". The opposite applies as well, with assets whose condition is rated as a "1" (Very Good) or "2" (Good) showing a likelihood of failure of "Very Good" or "Good", again describing the condition of the asset rather than the likelihood that it will fail.

B. Consequence of Failure

To determine the consequence of failure, it is important to consider the significant costs of failure. These costs include not only the monetary cost of the repair, but could also include:

- Social costs associated with the failure of the asset.
- Repair/replacement costs related to collateral damage caused by the failure.
- Legal costs related to damage caused by the failure.
- Regulatory fines resulting from a Sanitary Sewage Overflow (SSO) related to the failure.
- Environmental costs (and possible environmental cleanup costs) created by the failure.
- Loss of business revenue to the community caused by the failure.
- Other miscellaneous costs associated with the asset failure.

The consequence of failure can be high if any one of these costs is significant or if the accumulation of several costs occurs due to a failure. In the case of the failure of a wastewater asset, the environmental, social, and legal costs can outweigh the costs of collateral damage and even the cost of repairing the failure itself. The consequence of failure was assessed using the criteria presented in Table 8.

Consequence of Failure Rating	Social, Human, and Environmental Effects[3]	Collateral Damage Effects
1 (Insignificant)	< 10% loss of service, limited potential for human contact with sewage, minimal property damage	Structure/pipe outside of road right-of-way (ROW), no impact to traffic or other structures
2 (Minor)	10% to 24% loss of service, potential for human contact with sewage, minimal property damage	Structure/pipe located under the pavement or curb of a residential or minor local road
3 (Moderate)	25% to 49% loss of service, potential for human contact with sewage, limited property damage, disruption to essential services/major industry	Structure/pipe located under the pavement or curb of a major collector roadway
4 (Major)	50% to 89% loss of service, likely human contact with sewage, moderate property damage, disruption to multiple industries/essential services	Structure/pipe located along state roadways, interstate highways, railroad ROW, or close enough to a building to cause collateral damage

[3] Loss of service for the wastewater system refers to the number of service connections impacted due to a single failure.

5 (Catastrophic)	90+% loss of service, high potential of human contact with sewage, extensive property damage	Structure/pipe located under the pavement or curb of state roadways or interstate highways, under railroad tracks, or underneath a building

Table 6 - Consequence of failure rating scheme for wastewater assets

Utilizing the above ranking system, a thorough knowledge of the service area, and sound engineering judgement, a consequence of failure was assigned to each asset in the wastewater system. These consequence of failure values for each asset are included as an attribute for that asset in the GIS mapping database. The consequence of failure for the various asset classes in the wastewater collection system is shown in Figure 23 through Figure 25 below.

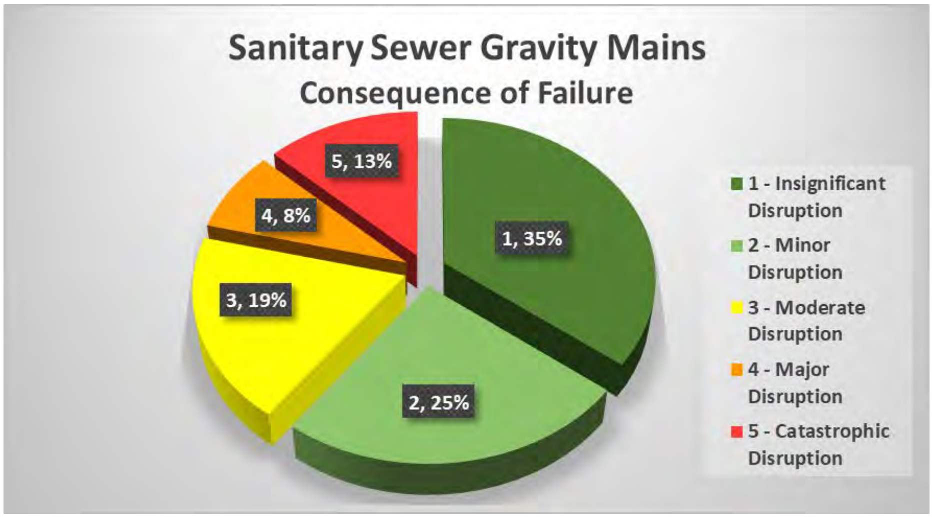


Figure 3 - Sanitary sewer gravity main consequence of failure rating

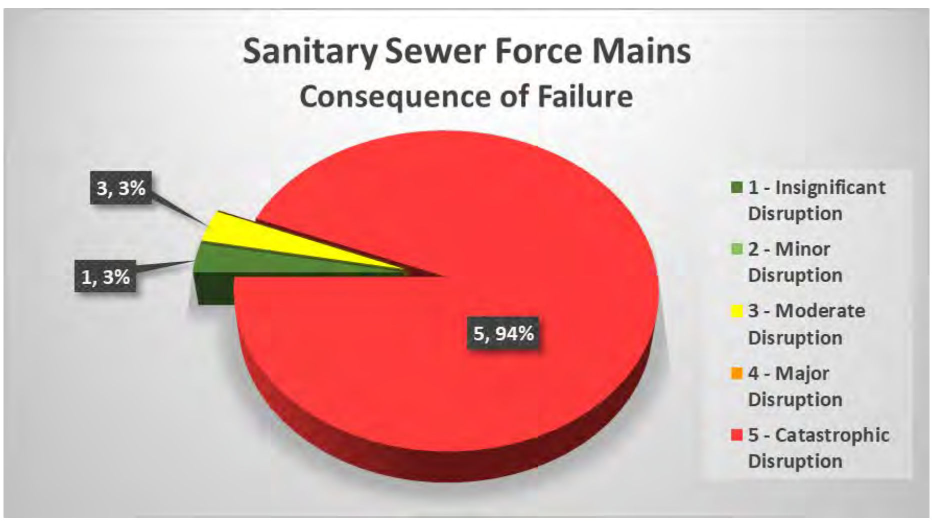


Figure 4 - Sanitary sewer force main consequence of failure rating

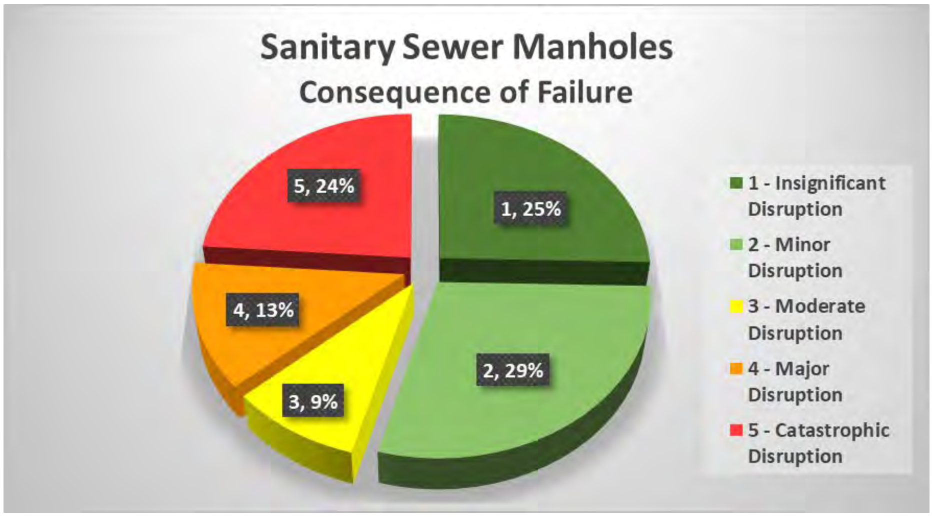


Figure 5 - Sanitary sewer manhole consequence of failure rating

While Figure 24 may appear alarming, due to the large amount of force main that shows as red ("Catastrophic Disruption"), it is noted that this is due to the layout of the Hartford sanitary sewer system. Most of the force main length in the system is on the 687 Lift Station and the 372 Lift Station, which convey the sewage from the entire City to the WWTP. These two force mains combined represent 94% of the total force main length in the Hartford sanitary sewer system and, as such, 94% of the force main shows as having a catastrophic consequence of failure. It is further stressed that consequence of failure does not suggest in any way whether an asset is likely to fail, only the consequences of a failure.

C. Criticality Maps

As previously discussed, the criticality of each asset was calculated by multiplying the condition rating corresponding to the likelihood of failure of the asset by the consequence of failure rating of the asset. As such, the range of criticality numbers that can be assigned to an asset is 1 to 25 with the criticality of the asset increasing the higher the number assigned to it, as shown in Table 9. The resulting criticality of each asset is included as an attribute for that asset in the GIS mapping database. A map of the wastewater collection system showing asset criticality is included in Appendix D.

Criticality Rating	Criticality Description
1 to 5	Very Low
6 to 10	Low
11 to 15	Moderate
16 to 20	High
21 to 25	Very High

Table 7 - Criticality rating descriptions

While the criticality ratings provide a point of reference to help in determining issues that may need to be addressed, it is only a tool. Sound engineering judgement still needs to be applied to determine if there is an issue with an asset that needs to be addressed by a capital improvement project. A low criticality number does not necessarily mean that there is not an issue that should be addressed by a capital improvement project. For example, if a segment of pipe has a hole in it with soil visible, it is graded as a Level 5 defect with a likelihood of failure of Very Poor. If this defect occurred on a segment of pipe with a Level 1 consequence of failure, it would result in a criticality rating of 5, Very Low.

Revenue Structure: *Discuss how the rates, charges, or other means of revenue were reviewed to determine if there will be sufficient funds to cover system operation, maintenance, replacement, capital improvement projects, and debt costs, identified in the AMP. If the current rate structure was not sufficient, discuss what increases were needed to ensure the desired level of service is sustainable and if any changes were made.*

A. Methodology – Asset Management Financial Plan:

A significant effort has been made by the City to inventory assets, evaluate the infrastructure, and determine asset criticality. The result is the identification of asset investment cost by project and by year. The AMFP covers an extended forecast period to take this asset evaluation into account. The AMFP is a four-step process:

1) Historical comparison with audits and budgets.
2) Test year, or normalized budget year, along with inflation assumptions for purposes of forecasting.
3) Proof of rate to revenue for reliance on customer data.
4) Cash flow forecast including revenue, operating expense, capital spending, debt, and fund balance (i.e., actual cash and investment balance).

The analysis is "cash basis" approach as described in the AWWA Manual of Rate Making Practices. From year to year, this AMFP may be used to implement policy regarding rate management and budgeting.

B. Management Summary

1. Rates: After initial implemented increases, increase service ready fee by $0.75 per year and commodity charge by $0.25 per year.
2. Cash Balance: Target of 9-12 months compared to cash operating expenses over forecast period.
3. Capital Improvements: A mix of cash and debt funding in order to manage rates and cash effectively over time.

Capital Improvement Plan: *Describe the long-term Capital Improvement Plan that was developed to address system needs identified in the AMP. Provide a list of the identified improvements/projects.*

A. Description

Capital improvement projects are projects that a utility has an extended period of time to plan for and are typically projects that cover high-cost, non-recurring expenditures or high-cost recurring equipment replacement. To ensure that the desired level of service can be maintained, a long-term plan for required capital improvements, known as a Capital Improvement Plan (CIP), is required as part of an AMP. The CIP helps to ensure that the long-term reliability needs of the utility are met. The CIP is based upon planning for those capital improvements determined to be required or likely to be required due to the likelihood of failure of the assets and their criticality. There are two planning periods for a CIP:

- A 5-year planning period, generally consisting of projects on assets with high criticalities or that need to be completed in the immediate future to allow the utility to continue to meet its level of service goals.
- A 20-year planning period, consisting of projects that can be reasonably forecast to be needed in the foreseeable future to allow for the development of a rate structure adequate to finance those projects.

or the purposes of this AMP, both planning periods have been rolled together into a single CIP as shown below.

a. Recommended Wastewater System Projects

The following lists the recommended capital improvement projects as well as cyclical improvement projects (i.e. equipment replacement) over the next 20 years for the wastewater collection system. Detailed descriptions and cost estimates for each project listed can be found in Appendix E. Where appropriate, the estimated project costs shown in Table 10 include engineering, construction observation, and contingency costs, thus representing the total estimated cost for the project. All costs shown are in current costs (no inflation) unless otherwise noted.

Summary of Wastewater Capital Improvement Projects

City of Hartford

Year	Project Name	Estimated Cost
2021	Engineering, application, and legal fees for 2022 bond	$102,000
2022	S. Haver Street south of Lincoln Street	$46,000
2022	Clark Street between Spaulding Street and Wendell Avenue	$232,000
2022	Pleasant Street between W. Shepard Street and W. South Street	$26,000
2022	Line west half of CR-372 Interceptor Sewer, Phase 1	$161,000
2022	E. Linden Street east of Spaulding Street	$289,000
2022	WWTP Polymer Transfer Pump	$4,000
2022	WWTP Lift Station Wet Well	$97,000
2022	Siphon under river to CR-687 Lift Station inlet	$368,000
2022	WWTP site pavement	$168,000
2022	WWTP potable water system	$4,000
2024	Spaulding Street between E. Linden Street and Oak Street	$84,000
2024	Oak Street west of Spaulding Street	$30,000
2024	Miscellaneous WWTP equipment	$44,000
2026	Pleasant Street between W. Main Street and W. Shepard Street	$96,000
2026	Sanitary sewer point repairs and manhole repairs - 2026	$169,000
2026	Bennett Lift Station electrical and controls	$38,000
2027	Sanitary sewer point repairs and manhole repairs - 2027	$110,000
2027	CR-372 Lift Station generator	$49,000
2027	Replace WWTP polymer tanks	$36,000
2028	Line west half of CR-372 Interceptor Sewer, Phase 2	$482,000
2028	Sanitary sewer point repairs and manhole repairs - 2028	$62,000
2028	Bennett Lift Station Pump 1	$4,000
2028	WWTP Lift Station east pump and valves	$22,000
2028	Engineering, application, and legal fees for 2029 bond	$105,000
2029	Line CR-687 Interceptor Sewer	$222,000
2029	Red Arrow Highway between ssMH-1119 and ssMH-1120	$65,000
2029	Lincoln Street between S. Center Street and S. East Street	$43,000
2029	Oak Street between 63rd Street and ssMH-1068	$241,000

2029	Line east half of CR-372 Interceptor Sewer	$574,000
2029	Sanitary sewer point repairs and manhole repairs - 2030, Phase 1	$98,000
2029	Oak Street from Spaulding Street west to ssMH-1193	$50,000
2029	N. Edwin Street from E. Olds Street north to ssMH-1107	$22,000

Capital Improvement Project List Continued On Next Page

2029	S. East Street from Oak Street to Reynolds Street	$25,000
2029	E. Linden Street from Spaulding Street west to ssMH-1191	$14,000
2029	Service alley from Church Street to Spaulding Street	$14,000
2029	Sanitary sewer point repairs and manhole repairs - 2030, Phase 2	$141,000
2031	Bennett Lift Station Pump 2	$4,000
2031	WWTP Sludge Storage Tank decant valves and site valves	$166,000
2032	WWTP non-potable water system	$4,000
2033	Sanitary sewer point repairs and manhole repairs - 2033	$55,000
2033	WWTP Lift Station controls and WWTP Headworks	$324,000
2034	WWTP electrical, controls, and Backup Generator	$169,000
2035	687 Lift Station pumps, electrical and controls, and generator	$159,000
2035	372 Lift Station pumps and electrical and controls	$124,000
2036	WWTP Primary Clarifiers and pumps	$223,000
2037	WWTP Rotating Biological Contactors	$397,000
2038	WWTP Secondary Clarifiers, disinfection, and effluent	$254,000

Total Estimated Project Cost for Twenty Year Wastewater CIP =	**$6,216,000**

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date **November 30, 2018**
(no later than 3 years from executed grant date)

The City of Hartford, Michigan *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1408-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or **No**

   If No - Date of the rate methodology approval letter: 5/14/18

2) Significant Progress Made: Yes or No

   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)

3) Date of rate methodology review letter identifying the gap: ____________.

4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ____________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Mr. Yemi Akinwale at **(269) 621-2477** **citymanager@cityofhartfordmi.org**

Name | Phone Number | Email

[signature] 11/19/2018

Signature of Authorized Representative (Original Signature Required) | Date

Mr. Yemi Akinwale, City Manager

Print Name and Title of Authorized Representative

Stormwater, Asset Management, and Wastewater (SAW)
Asset Management Plan Executive Summary Guidance
City of Hartford, Michigan

Stormwater Sewer System

Date: November 15, 2018
To: Mr. Clarence Jones
Re: Organization: Michigan Department of Environmental Quality
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Grantee Information:
City of Hartford
19 West Main Street,
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The program is organized into three components that answer the following questions:

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- What level of service will be provided?
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- How is the plan implemented?

Geographic Information System (GIS):

- What do we own, where is it, what is the condition and what is the remaining life?
- What are the most critical assets?
- Where was maintenance performed and what was done?
- Where are improvements needed?

System User Manual:

- How will the asset management program tools be used?
- How will the asset management program be maintained and updated?
- How will the asset management program provide a guide for planning decisions?

	Sanitary	Storm	Total
1) Total Grant:	$627,800	$612,200	$1,240,000
2) Less: Match	$ 72,568	$ 70,765	$ 143,333
3) Net Grant:	$555,232	$541,435	$1,096,667

Stormwater Asset Inventory: *Describe the system components included in the AMP. Discuss how they were located and identified, if applicable. Describe the platform used to develop and maintain the inventory of assets.*

The City of Hartford operates a storm water collection and retention system consisting of 57,620 feet of gravity storm sewer, over 603 structures (inlet structures and storm manholes), 12 storm water discharge points, and four retention basins. The total approximate value of the storm water collection and retention system is $8,790,000.

The first step in developing an AMP is to identify the equipment, infrastructure, personnel, tools, and anything else that comprises or services the utility in question. A GIS location and mapping software system was used to pinpoint the location and inventory of the system assets. The inventory of system assets will be continuously updated in this GIS locating and mapping software.

Table 1 contains a summary of the storm water system assets identified.

Item	Quantity	Units
48-inch Storm Sewer	776	LF
36-inch Storm Sewer	1,719	LF
24-inch Storm Sewer	6,959	LF
18-inch Storm Sewer	11,528	LF
15-inch Storm Sewer	6,050	LF
12-inch Storm Sewer	16,069	LF
10-inch Storm Sewer	2,966	LF
8-inch Storm Sewer	8,891	LF
6-inch Storm Sewer	2,662	LF
4-foot Diameter Storm Manhole	196	EA
Storm Water Inlet Structure	407	EA
Storm Water Discharge Point	12	EA
Storm Water Detention Pond - swDT-10	0.082	ACRE
Storm Water Detention Pond – swDT-11	0.102	ACRE
Storm Water Detention Pond – swDT-12	0.130	ACRE
Storm Water Detention Pond – swDT-13	0.106	ACRE

Table 1 - Storm Water System Assets

Condition Assessment: *Discuss the condition assessment process, including what methods were used. Summarize the results of the assessment for each asset category. The percentage of good, fair, and poor for each category can be used, if preferred.*

After completing the comprehensive inventory of the utility system assets, conditional assessments of all asset components were performed. The condition assessment provides the critical information needed to assess the physical condition and functionality of the assets in the collection system and estimate their remaining service life. Wightman and Associates, Inc performed limited conditional assessments on the retention ponds, manholes, and inlet structures within the storm water collection system. In addition, a large portion the gravity storm pipe in the storm water system as well as all the manholes were videoed using closed-circuit televising (CCTV) equipment designed for internal pipe inspection and imaging. The CCTV service was provided by either CES or Clean Earth.

The conditional assessments for assets that were physically inspected were based on the National Association of Sewer Service Companies (NASSCO) numerical grading system, which defines the severity of observed defects and the condition of the asset. Condition grades for both structural and O&M defects were assigned based on the condition of the immediate defect and the likelihood of further defect deterioration or asset failure. The numerical system uses numbers ranging from 1 to 5 as shown in Table 2 below.

Condition Rating	Condition Description	Defect/Deterioration Description
1	Very Good	New asset, no or minor defects
2	Good	Defects that have not begun to deteriorate
3	Fair	Moderate defects that will continue to deteriorate
4	Poor	Severe defects with significant deterioration
5	Very Poor	Defect requires immediate action

Table 2 - NASSCO conditional assessment system

Level of Service Determination: *Discuss the level of service the municipality has determined that it wants to provide its customers based on the municipality's ability to provide the service and customer expectations. Discuss the procedures used to involve stakeholders in the AMP discussion. What are the trade-offs for the service to be provided? This may include any technical, managerial, health standard, safety, or financial re constraints, as long as all regulatory requirements are met. Discuss how this was determined.*

The Level of Service (LOS) defines the way in which the Owner desires the facility or utility to perform over the long term. The LOS should ensure that all regulatory requirements are met and should include any technical, managerial, or financial components the Owner deems necessary to meet customer expectations. The LOS is a fundamental part in defining how the City of Hartford storm water system will be operated and maintained in the future. As with all components of the AMP, defining the desired LOS will be an ongoing process.

The Asset Management Team selected the following statements to define the desired LOS for the City of Hartford stormwater system:

1. We will strive to maintain compliance with all regulatory requirements at all times.

2. Should a blockage or break occur, we will correct the problem as soon as possible to minimize any future flooding.

3. We will develop and implement a preventative maintenance program to reduce the likelihood of the occurrence of a blockage or breakage.

4. We will respond to customer complaints during normal business hours. Communication with the complainant or customers affected will occur.

5. We will maintain an asset management program for the system and provide reports on an as needed basis.

6. We will develop a work order system to identify, assign, and track preventative and reactive work on the system and report on the status of work orders to the City on an as needed basis.

7. We will inform the customers of our desired level of service and report on the compliance with the level of service to the City on an as needed basis.

Criticality of Assets: *Provide a summary of the method used to assess the criticality of assets considering the likelihood and consequence of failure. Based on the condition of the assets, and the determined risk tolerance, how were the assets ranked? What assets were considered most critical?*

Criticality is determined by multiplying the likelihood of failure by the consequence of failure and is a significant factor in prioritizing capital improvements. In general, the higher the criticality of an asset, the more resources that should be allocated to maintain the asset, or the higher the priority that repairs to that asset should take. However, criticality is only one tool that can be utilized to analyze and prioritize capital improvements and its use is subject to careful evaluation of the asset(s) in question and sound engineering judgement.

A. Likelihood of Failure

For assets in the storm water collection and retention system, the likelihood of failure was determined according to the conditional rating of the asset using criterial listed in Table 2 on page **Error! Bookmark not defined.** with consideration given to the remaining asset life. The methodology of examining the asset conditions and assigning conditional ratings to the assets was discussed previously in Sections II.C and II.D.

It should be noted, however, that the condition descriptions are carried over in the GIS model as the likelihood of failure. In other words, if an asset's condition is rated as a "4" (Poor) or "5" (Very Poor), that same description carries over as the likelihood of failure indicating that the asset is in "Poor" or "Very Poor" condition rather than that the likelihood of failure is "Poor" or "Very Poor". The opposite applies as well, with assets whose condition is rated as a "1" (Very Good) or "2" (Good) showing a likelihood of failure of "Very Good" or "Good", again describing the condition of the asset rather than the likelihood that it will fail.

B. Consequence of Failure

To determine the consequence of failure, it is important to consider the significant costs of failure. These costs include not only the monetary cost of the repair, but could also include:

- Social costs associated with the failure of the asset.
- Repair/replacement costs related to collateral damage caused by the failure.
- Legal costs related to damage caused by the failure.
- Regulatory fines resulting from a Storm Sewage Overflow (SSO) related to the failure.

- Environmental costs (and possible environmental cleanup costs) created by the failure.
- Loss of business revenue to the community caused by the failure.
- Other miscellaneous costs associated with the asset failure.

The consequence of failure can be high if any one of these costs is significant or if the accumulation of several costs occurs due to a failure. In the case of the failure of a storm water asset, social costs and/or the costs of collateral damage caused by the failure can even outweigh the cost of repairing the failure itself. The consequence of failure was assessed using the criteria presented in Table 5.

Consequence of Failure Rating	Social Effects	Collateral Damage Effects
1 (Insignificant)	Minimal property damage	Structure/pipe outside of road right-of-way (ROW), no impact to traffic or other structures
2 (Minor)	Minimal property damage	Structure/pipe located under the pavement or curb of a residential or minor local road
3 (Moderate)	Limited property damage, disruption to essential services/major industry	Structure/pipe located under the pavement or curb of a major collector roadway
4 (Major)	Moderate property damage, disruption to multiple industries/essential services	Structure/pipe located along state roadways, interstate highways, railroad ROW, or close enough to a building to cause collateral damage
5 (Catastrophic)	Extensive property damage	Structure/pipe located under the pavement or curb of state roadways or interstate highways, under railroad tracks, or underneath a building

Table 3 - Consequence of failure rating scheme for storm water assets

Utilizing the above ranking system, a thorough knowledge of the service area, and sound engineering judgement, a consequence of failure was assigned to each asset in the storm water system. These consequence of failure values for each asset are included as an attribute for that asset in the GIS mapping database. The consequence of failure for the various asset classes in the storm water collection system is shown in Figure 7 and Figure 8 below and on the following page.

C. Criticality Maps

As previously discussed, the criticality of each asset was calculated by multiplying the condition rating corresponding to the likelihood of failure of the asset by the consequence of failure rating of the asset. As such, the range of criticality numbers that can be assigned to an asset is 1 to 25 with the criticality of the asset increasing the higher the number assigned to it, as shown in Table 8. The resulting criticality of each asset is included as an attribute for that asset in the GIS mapping database. A map of the storm water collection system showing asset criticality is included in Appendix D.

Criticality Rating	Criticality Description
1 to 5	Very Low
6 to 10	Low
11 to 15	Moderate
16 to 20	High
21 to 25	Very High

Table 4 - Criticality rating descriptions

While the criticality ratings provide a point of reference to help in determining issues that may need to be addressed, it is only a tool. Sound engineering judgement still needs to be applied to determine if there is an issue with an asset that needs to be addressed by a capital improvement project. A low criticality number does not necessarily mean that there is not an issue that should be addressed by a capital improvement project. For example, if a segment of pipe has a hole in it with soil visible, it is graded as a Level 5 defect with a likelihood of failure of Very Poor. If this defect occurred on a segment of pipe with a Level 1 consequence of failure, it would result in a criticality rating of 5, Very Low. That does not mean, however, that this defect does not need to be addressed. It may just be a lower priority for being addressed than other defects with higher criticality ratings.

Revenue Structure: *Discuss how the rates, charges, or other means of revenue were reviewed to determine if there will be sufficient funds to cover system operation, maintenance, replacement, capital improvement projects, and debt costs, identified in the AMP. If the current rate structure was not sufficient, discuss what increases were needed to ensure the desired level of service is sustainable and if any changes were made.*

As previously mentioned, one of the primary goals of an AMP is to develop a long-term plan for revenues capable of supporting the required capital improvements in addition to routine O&M costs. However, unlike a sanitary sewer AMP, where a source of revenue exists from sanitary sewer user fees, stormwater systems have no separate stream of revenue. Improvements to the stormwater system are usually funded as a part of a street improvement project and routine O&M costs are covered in the day-to-day operations of the City. As such, an in-depth asset management financial review (AMFR) cannot be conducted and a revenue structure cannot be developed for the stormwater system.

Capital Improvement Plan: *Describe the long-term Capital Improvement Plan that was developed to address system needs identified in the AMP. Provide a list of the identified improvements/projects.*

A. Description

Capital improvement projects are projects that a utility has an extended period of time to plan for and are typically projects that cover high-cost, non-recurring expenditures. To ensure that the desired level of service can be maintained, a long-term plan for required capital improvements, known as a Capital Improvement Plan (CIP), is required as part of an AMP. The CIP helps to ensure that the long-term reliability needs of the utility are met. The CIP is based upon planning for those capital improvements determined to be required or likely to be required due to the likelihood of failure of the assets and their criticality. The planning period for a CIP is 20 years to allow for the development of a rate structure adequate to finance those projects that can reasonably be predicted to be needed during that period.

B. Recommended Storm Water System Projects

Table 7 lists the recommended capital improvement projects for the next 20 years for the storm water collection system. Detailed descriptions and cost estimates for each project listed can be found in The AMP. Where appropriate, the estimated project costs shown in Table 7 include engineering, construction observation, and contingency costs, thus representing the total estimated cost for the project. All costs shown in Table 7 are in current costs (no inflation) unless otherwise noted.

Priority	CIP Year	Project Name	Estimated Cost
1	2019	Replace W Bernard between S Maple and S Center	$ 84,000
2	2020	Replace W Bernard between S Maple and Mary	$ 121,000
3	2021	Replace Hart from N Haver to 530 feet west of N Edwin	$ 98,000
4	2022	Replace E Linden between Spaulding and Olds	$ 96,000
5	2023	Line Washington 235 to 350 feet west of N Haver	$ 19,000
6	2024	Replace Spaulding between Oaks and E. Linden	$ 62,000
7	2025	Replace N Edwin from Washington towards the outlet	$ 61,000
8	2026	Grade 5 Point Replace	$ 16,000
9	2027	Replace Michigan between Railroad and N. Maple	$ 13,000
10	2028	Replace Reynolds between S. Center and S. East	$ 46,000
11	2029	Replace Red Arrow between Marion and railroad tracks	$ 12,000
12	2030	Grade 4 Replace Part 1	$ 72,000
13	2031	Grade 4 Replace Part 2	$ 75,000
14	2032	Grade 4 Liner, Spot Replace, and Manhole Liner	$ 54,000
15	2033	Replace Red Arrow between Wendell and Olds	$ 104,000
16	2034	Replace W. South between Franklin and railroad tracks	$ 32,000
17	2035	Replace Mary between W. Shepard and W. Main	$ 48,000
18	2036	Grade 3 Spot Replace	$ 33,000
19	2037	Grade 3 Liners	$ 50,000
20	2038	Replace N. Center between Michigan and Hilliard	$ 367,000
		Total Estimated Project Cost for 20 Year CIP (current dollars) =	$ 1,463,000
		Total Estimated Project Cost for 20 Year CIP (inflation adjusted[1] costs) =	$ 1,834,000

Table 5 - Recommended Storm Water System Capital Improvement Projects

There are several projects listed within the CIP that involve another utility crossing through the storm pipes. Several of these conflicts appear to be gas or other conduits. Other conflicts appear to involve City of Hartford sanitary pipes or water mains. All utility pipes/conduits running through the storm system and the leads or storm pipe should be relocated to avoid these conflicts. The solution to the conflicts will need to be investigated further to determine the best course of action, however the most likely solution is relocating the leads over or under the storm sewer to avoid the conflict. It is worth noting that repairs of conflicts with City of Hartford sanitary or water systems will likely be funded from those respective City funds. For conflicts with private utilities, Hartford will likely not be responsible for funding the repair.

[1] Twenty-year inflation adjusted calculations assumed a compounded annual inflation rate of 2% per year.

DEQ

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Due Date **11/30/18**
(no later than 3 years from executed grant date)

The City of Hartford, Michigan *(legal name of grantee)* certifies that all stormwater asset management plan (SWAMP) activities specified in SAW Grant No. **1408-01** have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SWAMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

Mr. Yemi Akinwale at *(269) 621-2477* **citymanager@cityofhartfordmi.org**
Phone Number Email

11/19/2018
Signature of Authorized Representative (Original Signature Required) Date

Yemi Akinwale; City Manager

Print Name and Title of Authorized Representative

HERRON CREEK CONSOLIDATED DRAIN DRAINAGE DISTRICT
SAW Grant Project No. 1233-01

EXECUTIVE SUMMARY

Prepared by: **SPICER GROUP, INC.**
416 N. Homer, Ste. 109
Lansing, MI 48912
(989) 513-4494
Max Clever, P.E., P.S., Project Manager

Owner: **HERRON CREEK DRAIN DRAINAGE DISTRICT**
707 Buhl Ave.
Mason, MI 48854
(517) 676-8395
Patrick Lindemann, Drain Commissioner

On November 24, 2015, the Herron Creek Drain Drainage District entered into an agreement with the Michigan Finance Authority for grant funds issued under Public Act No. 511 of 2012 for the *Stormwater, Asset Management, and Wastewater (SAW)* program. The District received the follow grant:

Stormwater Asset Management Plan (SWAMP) – 90% Grant	***$698,000***
Eligible Cost Subtotal	$698,000
LESS Local Match	($69,800)
Total Grant Amount	$628,200

The Asset Management Plans (AMPs) needed to be completed within three years of the date of agreement; November 2018.

Each AMP has the following key components:

- Asset Inventory and Condition Assessment
- Level of Service Determination
- Critical Assets (Risk)
- Revenue Structure
- Capital Improvement Plan

Part 1: Stormwater Asset Inventory and Condition Assessment

For the District's stormwater collection system, Spicer Group, Inc. completed a mobile mapping LiDAR survey of the entire drainage district area. The survey information was used to develop a comprehensive Geographic Information System (GIS) including all stormwater assets (manholes, catchbasins, culvert outlets, etc.). The GIS information is utilized via iPads and desktop computers in the Drain Office, and is a detailed "smart" mapping system, using the ArcMap and ArcGIS Pro software by ESRI. This system can be accessed and updated in the field by DPW staff from new iPads supplied as part of the SAW grant project. From the GIS, as-built plans, pipe/manhole condition ratings, materials, year installed, inspection records, CCTV video inspections, ownership information etc. can be accessed. This information can also be queried to provide specific lists, maps, and reports. It is updated easily when future improvements are made.

The county drain storm sewer collection system within the Herron Creek Drain Drainage District is approximately 17.12 miles in length and includes approximately 9.23 miles of storm sewer pipes ranging in diameter size from 4”- 72”. The collection system consists of mainline sewer, catchbasin leads, and culverts. In addition, the District has approximately 456 structures consisting of manholes, catchbasins, cleanouts, and outlets. The District’s storm sewers discharge into several detention basins and designed wetlands that flow to the main open channel before ultimately discharging into the Red Cedar River. Summary tables are listed below for District owned and operated pipes and structures.

Table 1: PIPE DIAMETER BY LENGTH

Diameter	Length (ft)	Percent	Length (miles)
4”	117	0.024%	0.02
6”	138	0.28%	0.03
8"	2,035	4.18%	0.39
10"	5,615	11.53%	1.06
12"	15,914	32.67%	3.01
15"	8,511	17.47%	1.61
18”	5,798	11.90%	1.10
21”	255	0.52%	0.05
24”	6,402	13.14	1.21
36”	845	1.73%	0.16
48”	321	0.66%	0.06
60”	367	0.75%	0.07
72”	738	1.51%	0.14
Unknown	1658	3.41%	0.31
TOTAL	48714	**100%**	9.23

Table 2: STRUCTURE TYPES

Structure Type	Number
Catchbasins	236
Manholes	125
Outlets	77
Other	18
TOTAL	456

Not every pipe and structure owned and operated by the District could be investigated/inventoried due to perpetual water in the system and access limitations. Emphasis was placed on performing condition assessments for the mainline sewers and mainline manholes and catchbasins.

The Drain Office Staff completed a cleaning and televising program on 176 of the storm pipe segments in the collection system. Spicer Group performed comprehensive inspection for all the District's mainline stormwater manholes and catchbasins. The NASSCO Manhole/Pipeline Assessment Certification Program (MACP/PACP) standards were used to identify and code defects and apply standardized grading/scoring to provide overall condition ratings of the stormwater assets.

Part 2: Level of Service (LOS)

The next phase of the AMP is a Level of Service determination. What level of stormwater service does the Drain Office want to provide to its customers? How are projects going to be prioritized and included in the CIP? What cost is the District willing to endure to provide that level of service? These are all questions that were discussed as a part of the overall asset management plan.

The Drain Commissioner has published *Rules of the Ingham County Drain Commissioner*, which provide the standards required for engineering of storm sewer systems. The following rules are key requirements in the rulebook for evaluating the enclosed drainage systems:

- Enclosed storm drain systems will be sized to accommodate the 10-year storm, with the hydraulic gradient kept below the top of the pipe.
- For residential developments and commercial projects smaller than 10 acres in size, a time of concentration of 15 minutes shall be used. Other situations may require that the time of concentration be calculated using TR-55 or equivalent method.

Part 3: Criticality (Risk)

For each asset in the District's stormwater collection system, a criticality/risk analysis was performed to determine and prioritize the District's key components. Based on the condition assessments and the field inspections, the Likelihood of Failure (LoF) was calculated for assets; including pipes, manholes, and drainage structures, etc. Next, the Consequence of Failure (CoF) was calculated and scored for each asset based on the economic and hydraulic impacts. Finally, the Criticality (Risk) score was calculated using:

RISK = LoF x CoF

For the District's stormwater collection system, no pipe or structure locations were identified with a high Risk score. 13 pipes and 7 structure locations with medium Risk scores. These scores were evaluated and incorporated into the resulting Capital Improvement Plan.

Part 4: Revenue Structure

Yearly Maintenance Budget
The yearly maintenance budget of county drains is established from Section 280.196 Subsection 4 of the Drain Code of 1956 as $5,000 per mile of drain. The Herron Creek Drainage District contains a total of 17 maintenance miles of county drains. Therefore, in a given year, the Drainage Districts within the Herron Creek Drain Drainage District are able to assess a maximum of $85,000 to the assessment rolls on record for work defined as maintenance under said section of the Drain Code.

Equipment Costs
Non-personnel related costs are recorded on a per unit basis of use during maintenance and inspection activities in order to recoup costs. This includes vehicles, excavators, cleaning trucks and televising equipment.

Part 5: Capital Improvement Plan

The Capital Improvement Plan (CIP) is the culmination of all the parts of the Asset Management Plan (AMP). Reviewing the results of the stormwater system Inventory & Condition Assessment, Level of Service (LOS) determination, Criticality (Risk), Revenue Structure, and preliminary CIP project lists, a process was worked through to categorize and prioritize the final CIP. The Drain Office is limited to maintenance and inspection activities by the Drain Code of 1956. The bulk of the cost estimates listed in the capital improvement plan were based on the Ingham County Drain maintenance personnel performing the repairs. It should be noted that there are areas of the storm sewer with high risk scores that present a problem that can only be resolved with a petition to the Drain Office.

This results in the CIP plan over the next 5 years are summarized as follows:

1. Misc. Catchbasin and Manhole Repairs ($7,700)
2. Misc. Sewer Repairs, Root removals, Spot Liners Projects. ($36,950)

The full 5-year capital improvement plan from Appendix L of the Asset Management Plan and its associated map is attached to this summary.

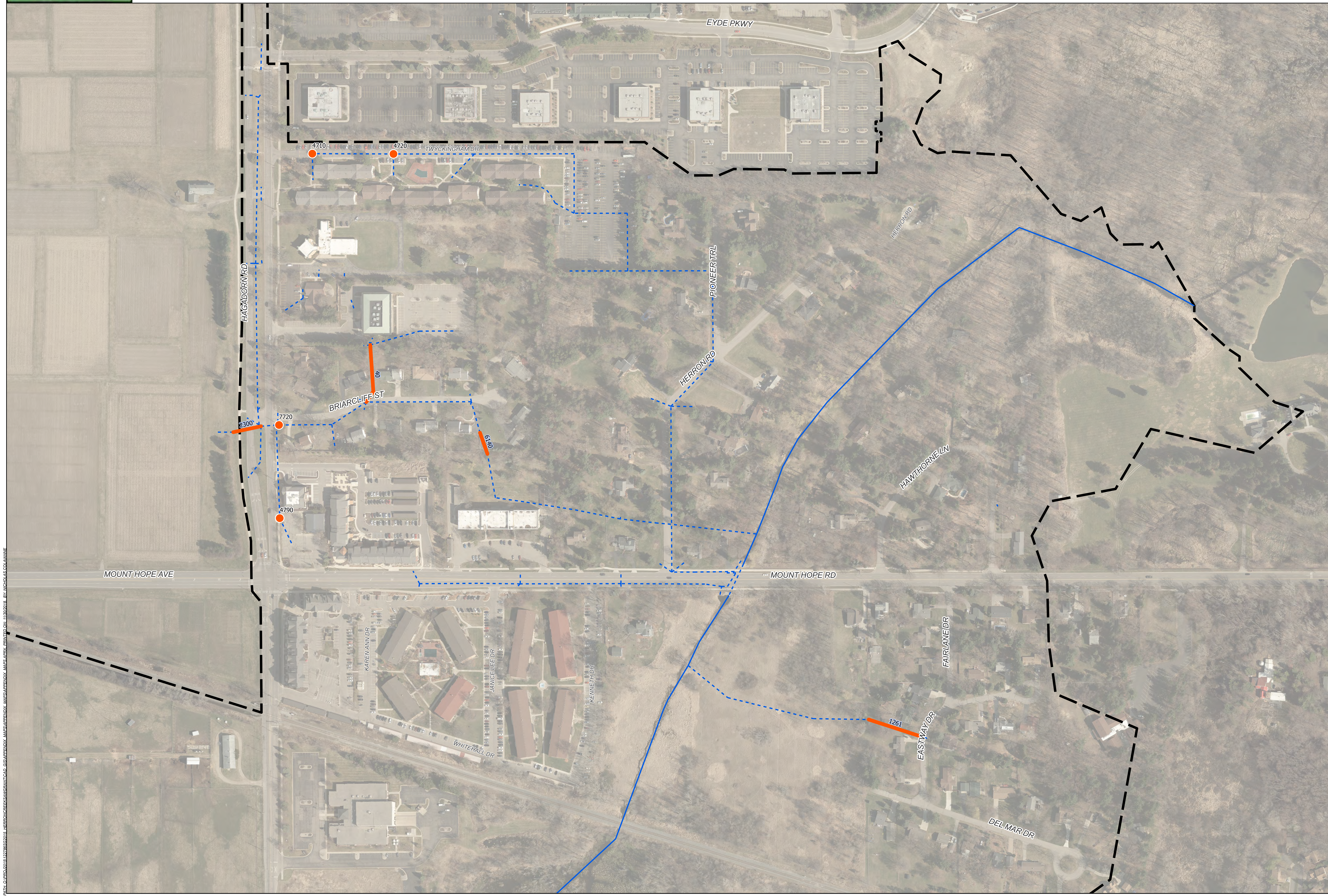
Conclusion

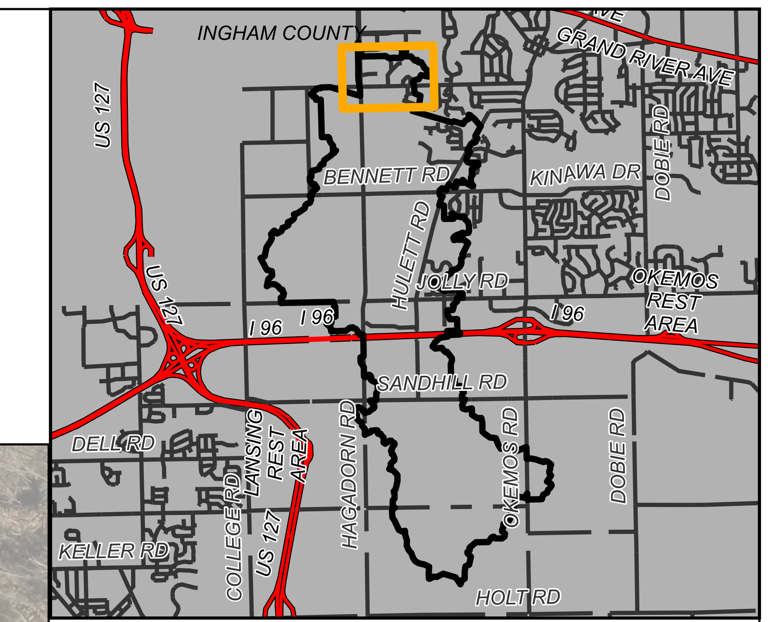
The Herron Creek Drain Drainage District stormwater system is relatively new with an average remaining life of approximately 50 years on most of the storm sewer. Since its establishment it has been regularly maintained and therefore most pipes and structures in the system are in good condition. Outside of the short list of pipes in the capital improvement plan.

In accordance with the SAW Grant requirements, the District's Stormwater Asset Management Plan (SWAMP) needs to be kept available for citizen review for 15 years. The SWAMP should be reviewed annually, and the components updated and included in the District's annual budget process.

APPENDIX L: CAPITAL IMPROVEMENT PLAN
HERRON CREEK

INGHAM COUNTY- MICHIGAN





AREA MAP

NOT TO SCALE

N

0 75 150 300 FEET

Legend

- Capital Improvement Plan Structures
- Capital Improvement Plan Pipes

BY	MARK	REVISIONS	DATE

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SAW PROGRAM
INGHAM, MICHIGAN

STORM SEWER SYSTEM

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Tel. 517-325-9977
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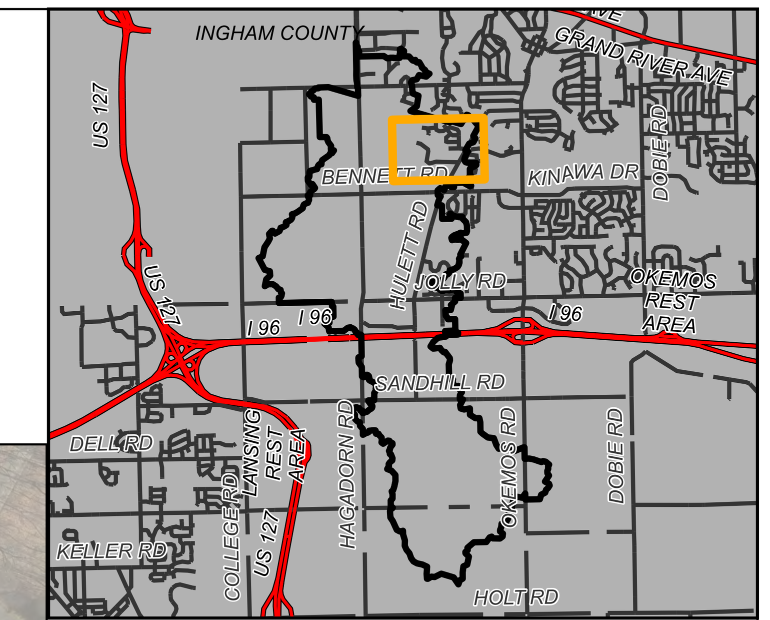
DR. BY: NJC
CH. BY:
APP. BY:
PROJECT NO. 122786SG2015

STDS.
SHEET 1 OF 5
DATE: NOVEMBER 2018
SCALE: AS SHOWN
FILE NO. JDR-3277

DR 1

APPENDIX L: CAPITAL IMPROVEMENT PLAN
HERRON CREEK

INGHAM COUNTY- MICHIGAN



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SAW PROGRAM
INGHAM, MICHIGAN

STORM SEWER SYSTEM

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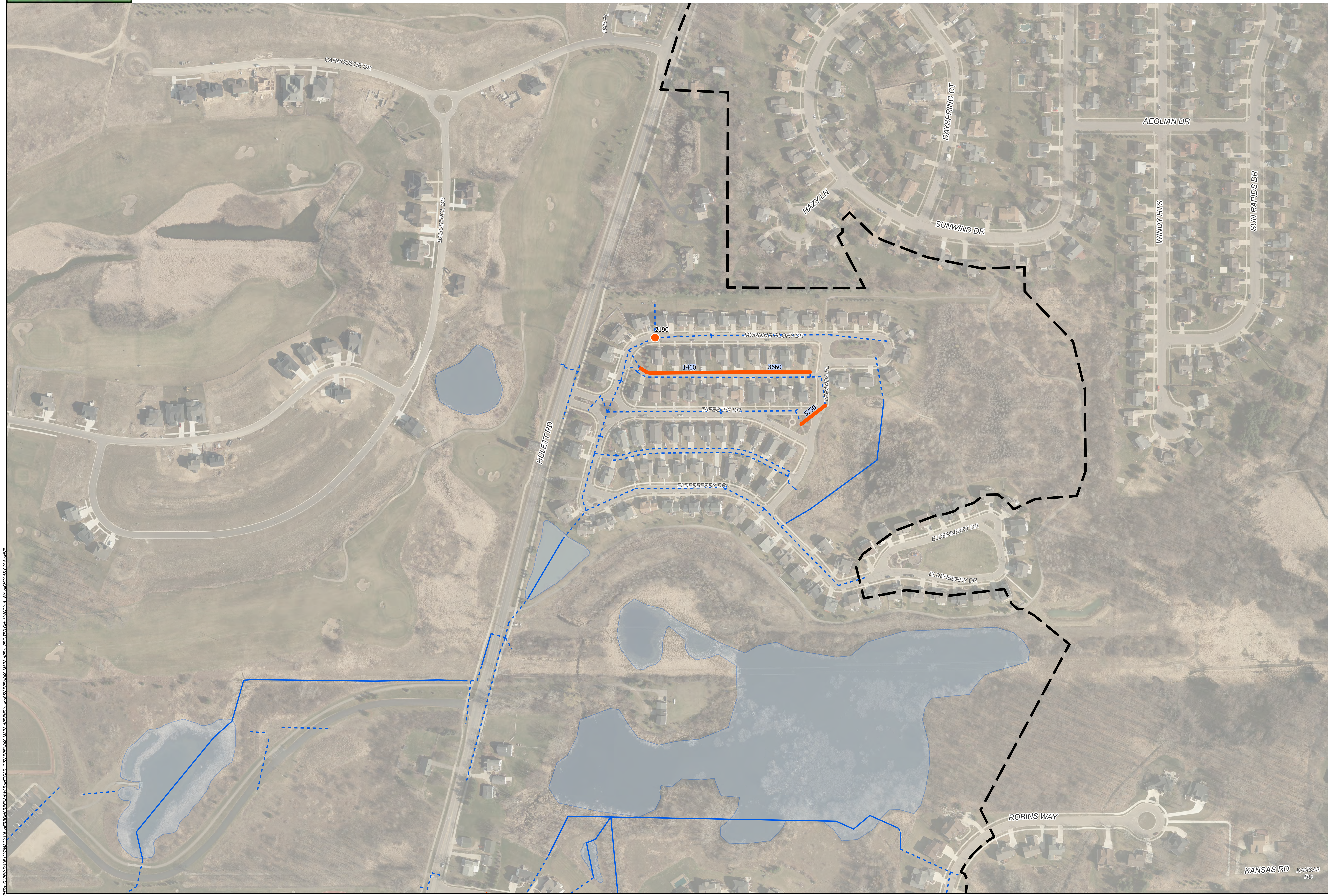
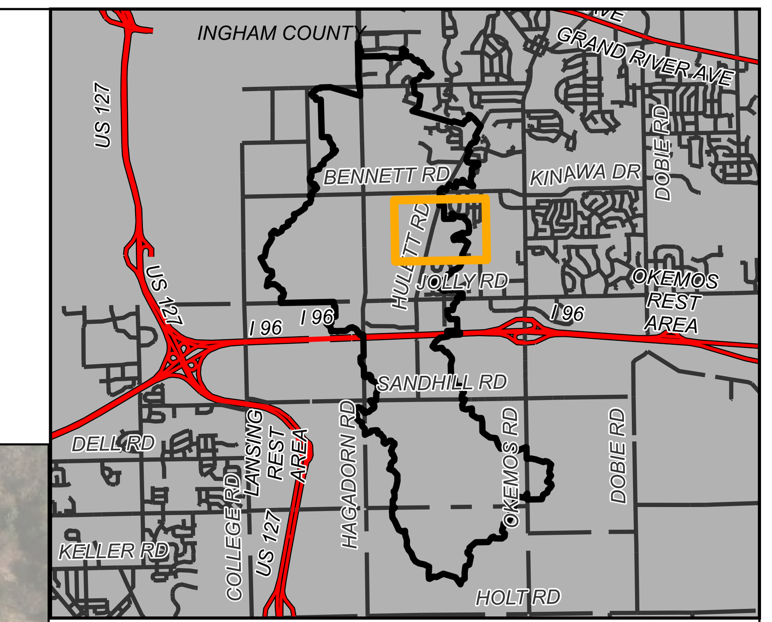
INGHAM COUNTY CLEAN WATER
DRAIN COMMISSIONER PATRICK E. LINDEMANN

APPENDIX L: CAPITAL IMPROVEMENT PLAN
HERRON CREEK

INGHAM COUNTY- MICHIGAN





AREA MAP
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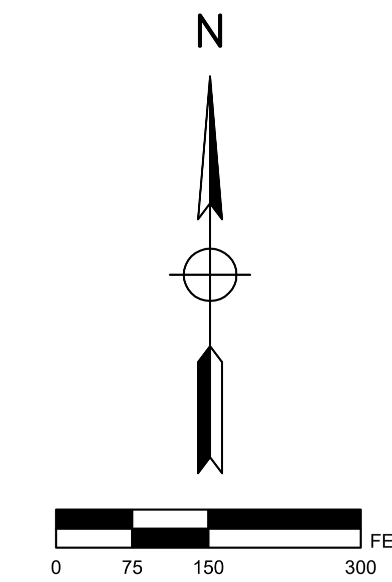

Legend

- Capital Improvement Plan Structures
- Capital Improvement Plan Pipes

BY	MARK	REVISIONS	DATE

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SAW PROGRAM
INGHAM, MICHIGAN

STORM SEWER SYSTEM

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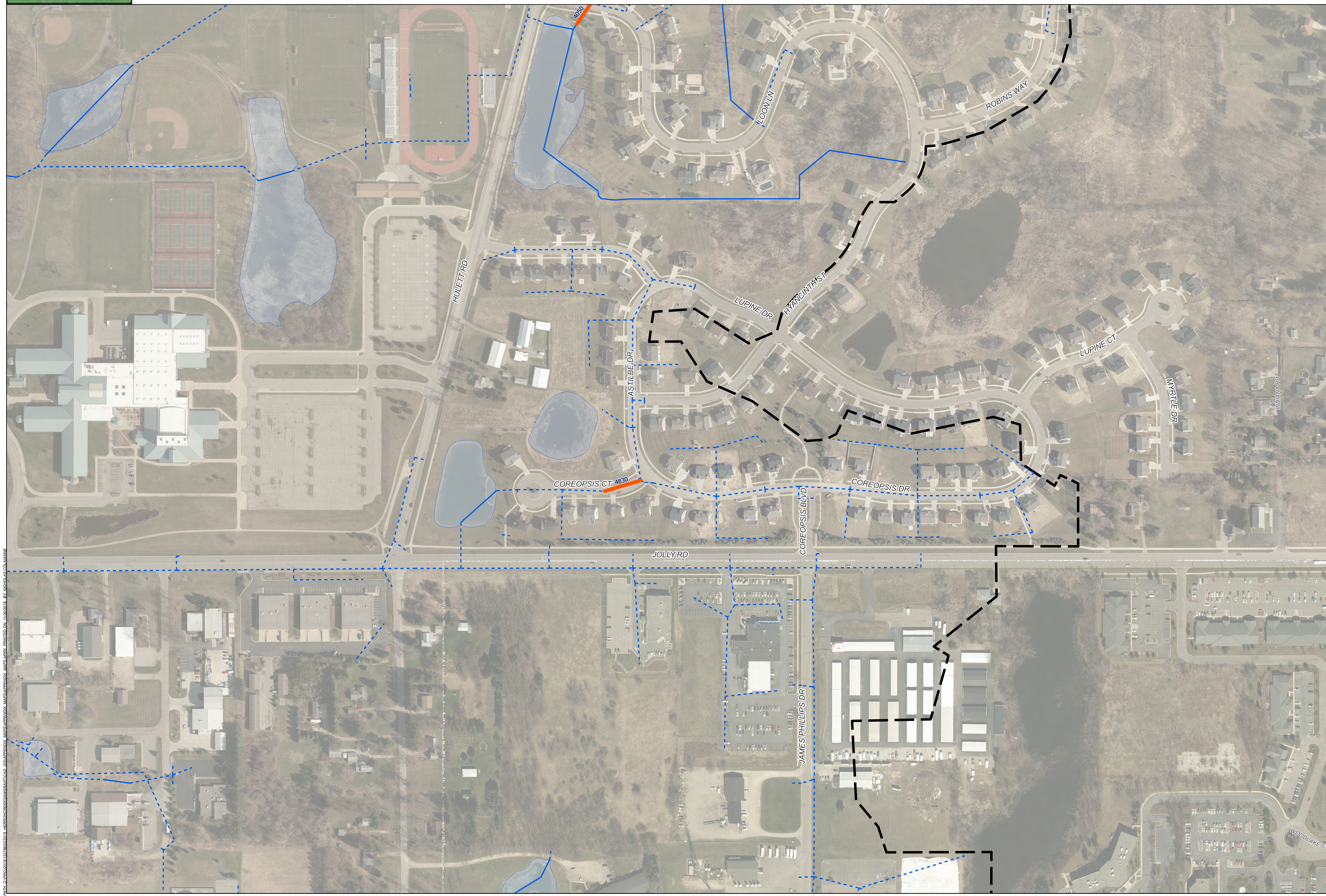
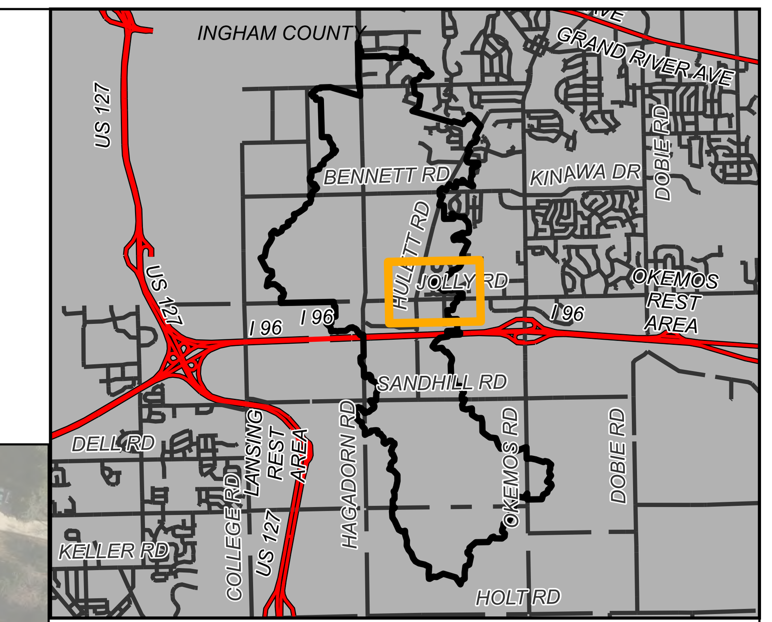
SHEET 3 OF 5
DATE: *NOVEMBER 2018*
SCALE: *AS SHOWN*
FILE NO. *JDR-3277*
DR 3

APPENDIX L: CAPITAL IMPROVEMENT PLAN
HERRON CREEK

INGHAM COUNTY- MICHIGAN





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Legend

- Capital Improvement Plan Structures
- Capital Improvement Plan Pipes

BY	MARK	REVISIONS	DATE

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SAW PROGRAM
INGHAM, MICHIGAN

STORM SEWER SYSTEM

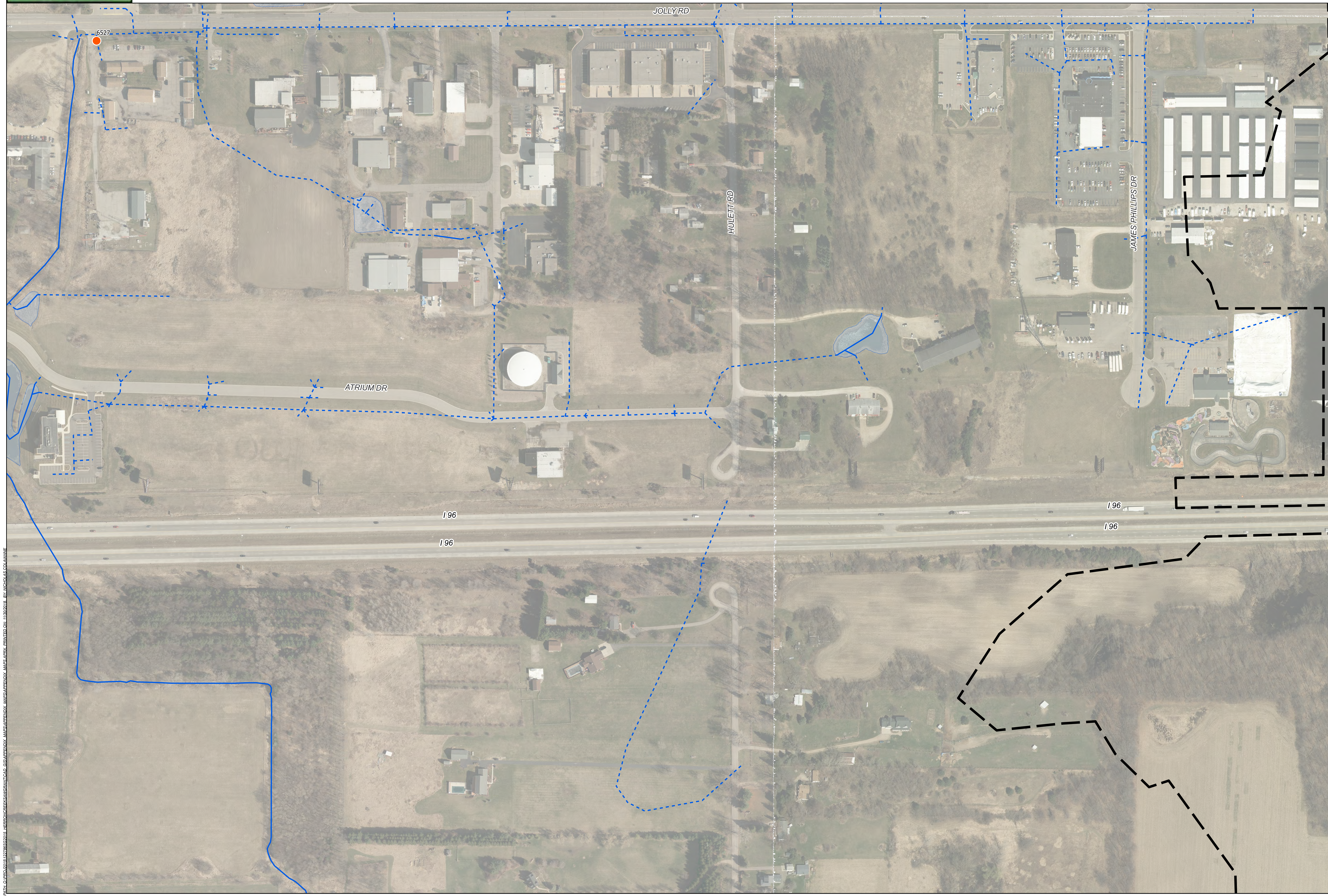
LANSING'S OFFICE
416 N Homer St #109
Lansing, MI 48912
Tel. 517-325-9977
www.SpicerGroup.com

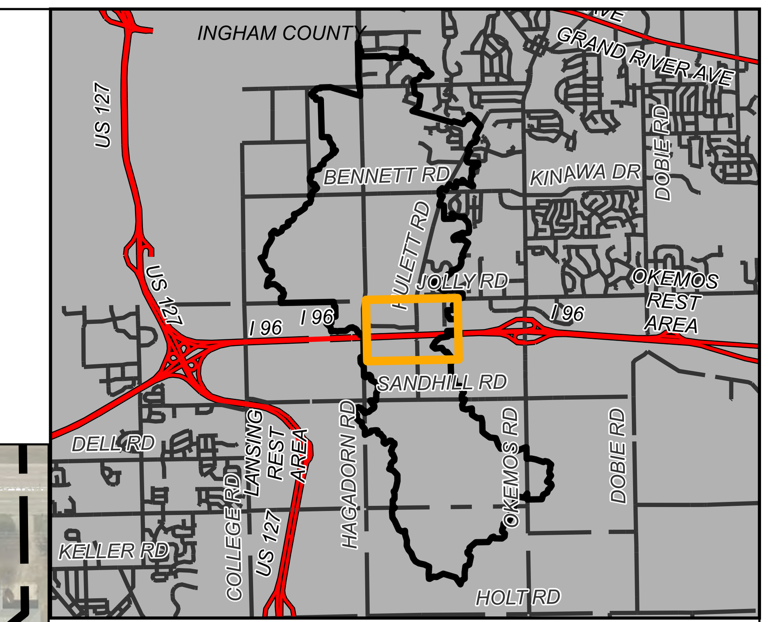
DE. BY: PL
DR. BY: NJC
CH. BY:
APP. BY:
PROJECT NO. 122786SG2015

STDS.
SHEET 4 OF 5
DATE: NOVEMBER 2018
SCALE: AS SHOWN
FILE NO. JDR-3277
DR 4

APPENDIX L: CAPITAL IMPROVEMENT PLAN
HERRON CREEK

INGHAM COUNTY- MICHIGAN





AREA MAP
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Legend

- Capital Improvement Plan Structures
- Capital Improvement Plan Pipes

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STDS.
SHEET 5 OF 5
DATE: NOVEMBER 2018
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FILE NO. JDR-3277

DR 5

DEQ

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Due Date __November 30, 2018________________
(no later than 3 years from executed grant date)

The Herron Creek Drain Drainage District *(legal name of grantee)* certifies that all stormwater asset management plan (SWAMP) activities specified in SAW Grant No. 1233-01 have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SWAMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

Patrick Lindemann, Drain Commissioner at (517) 676-8395 patricklindemann@me.com
Name Phone Number Email

11/30/2018
Signature of Authorized Representative (Original Signature Required) Date

PATRICK E. LINDEMANN — INGHAM COUNTY DRAIN COMMISSIONER
Print Name and Title of Authorized Representative

Protecting our Infrastructure Investment

ASSET MANAGEMENT PLAN

Wastewater Executive Summary Report

Prepared for:

City of Hudson

SAW Project No. 1571-01

October 2018

FLEIS&VANDENBRINK
DESIGN. BUILD. OPERATE.

Executive Summary

Overview

Public Act 562 of 2012 authorized money for Stormwater, Asset Management, and Wastewater (SAW) Grant Program. In May 2014, the City of Hudson received a Stormwater, Asset Management, and Wastewater (SAW) Grant from the Michigan Department of Environmental Quality (MDEQ), project no. 1571-01, to provide financial assistance for the development of a wastewater asset management plan (AMP) for the City's publicly owned wastewater utility. This AMP is intended to be a living document that is updated as assets continue to wear and age, and as additional inspection/condition results are found and incorporated into the plan.

The contact person for the City of Hudson AMP is:

Steven Hartsel, City Manager
121 North Church Street
Phone number: 517-448-8983
Email: manager@ci.hudson.mi.us

Asset Inventory & Condition Assessment

A list of the major assets in the City's wastewater system, described further below, include:

- Collection system piping system and manholes
- Sanitary sewer lift stations in the collection system
- Wastewater Treatment Facility (WWTF)

The wastewater collection system assets include approximately 86,703 feet (16.42 miles) of sanitary sewers (gravity pipe and force mains) and 440 wastewater manholes connecting the gravity pipe. These assets are located in existing street rights-of-way or in easements dedicated for the assets use and maintenance.

There are four sanitary sewer lift stations located throughout the wastewater collection system. The stations are all duplex submersible style stations.

The WWTF currently includes the following processes:

- Fine screening
- Influent pumping and metering
- Oxidation ditch
- Secondary clarification
- UV disinfection
- Cascade aeration
- Phosphorus removal
- Anaerobic digestion
- Biosolids storage

Treated effluent is discharged to Bean Creek in accordance with National Pollutant Discharge Elimination System (NPDES) permit No. MI0021377. The design capacity of the WWTF is 0.42 million gallons per day (mgd). The current annual average flow received by the facility is approximately 0.38 mgd.

<u>Asset Identification & Location</u>

A comprehensive wastewater system asset inventory was developed from operation and maintenance (O&M) manuals included a review of existing record drawings, field notes, staff knowledge, and site visits, supplemented with field survey work. Asset material, size and age were identified through the review of available historical record documents and Closed-Circuit Televising (CCTV) data. Spatial orientation (pipe location), pipe depth and invert elevations were determined through GPS field survey and a comprehensive evaluation of the gravity system. This information was organized into a new (GIS) database and piping network for archiving, mapping and further evaluation purposes. The inventory includes 180 WWTF assets, 47 Lift Station Assets, and 873 Collection System Assets.

Condition Assessment and Expected Useful Life

A comprehensive evaluation of the collection system was performed. NASSCO-MACP manhole field-based assessments were completed on 343 of the 440 manhole structures. Pipeline cleaning and NASSCO-PACP CCTV field-based inspections were conducted on 85.1% of the gravity pipe. Smoke Testing was performed on 100% of system to disclose location of inflow or infiltration. Capacity Analysis was modeled for average day and peak hour conditions to identify capacity concerns. Recommendations for short-term (1-5 year) and long term (6-20 year) identified the need for maintenance with 20% of the system tagged for inspection and/or cleaning. Rehabilitation accounted for 30% of the system identifying the need for replacement or rehabilitation. The remaining 60% of assets were placed in the 20+ year category.

Overall, the condition of the assets at the WWTF range from excellent to poor. At the time of the condition assessment, the plant was undergoing a large improvements project. The assets associated with the project were considered to be in excellent condition. Ongoing repairs have helped to maintain the condition of many assets, but some assets installed during the 1970 and the 1985 improvements project are now near the end of their useful life due to age, deterioration and harsh conditions associated with wastewater treatment. Below is a description of some of the immediate concerns:

- The Secondary Clarifiers are undersized to handle the 20-year design flow. Additionally, the drive on Secondary Clarifier No. 2 is original and operating beyond its expected useful life.
- The existing electrical and control systems, besides those installed in the most recent improvements project, have exceeded their useful life making it difficult to find parts to maintain the system.
- The existing anaerobic digestion system is inefficient and is comprised of equipment that is either inoperable or operating beyond its useful life.
- There is no redundancy in the solids handling treatment process.
- The return activated sludge pumps were installed in 1985 and are operating beyond their expected useful life.

The condition of the assets at the lift stations range from good to poor. Ongoing maintenance has also upheld the condition of many assets while other assets have deteriorated due to age and the harsh conditions associated with typical wastewater collection systems. The recommendations for short- and long-term improvements are relatively extensive.

Level of Service

Defining the Expected Level of Service (LOS)

The overall objective of the City Wastewater Department is to provide reliable wastewater collection and treatment services at a minimum cost, consistent with applicable environmental and health regulations. To achieve this, the following Level of Service (LOS) goals are proposed:

WASTEWATER UTILITY - LEVEL OF SERVICE STATEMENT

The overall objective of the City of Hudson Wastewater Department is to provide reliable wastewater collection and treatment services at a minimum cost, consistent with applicable environmental and health regulations. To achieve this the following Level of Service (LOS) goals are proposed:

- Provide adequate collection system and treatment capacity for all service areas.
- Comply with all local, state and federal regulations at all times for treated effluent from the WWTF.
- Actively maintain collection and treatment system assets in reliable working condition.
- Reduce inflow/infiltration (I&I) flow volumes to mitigate potential for sanitary overflows, water in basements, and overloading of treatment facility.
- Provide rapid and effective emergency response services to customers.
- Ensure operations staff are properly certified.
- Regularly review health and safety procedures for operations staff to provide proper worker safety.
- Regularly review projected O&M and capital expenditures. Adjust user rates, as necessary, to ensure sound financial management of wastewater system.

The LOS goals may need to be adjusted from time to time as the utility ages, the needs of community change or new rules or regulations require a change in operation. For this reason, the LOS goals should be reviewed by the City from time to time to make sure they accurately reflect the desired operation of the utility.

Measuring Performance

In order to assure that LOS goals are met performance measurements may need to be implemented. During the LOS review with the community the need for performance measurements was discussed.

Critical Assets

Determining Criticality

Business Risk is the determination of criticality of each asset in the wastewater system. Criticality is based on two factors; Likelihood (Probability) of Failure and Consequence of Failure using the following formula:

Business Risk = Consequence of Failure Score x Likelihood of Failure Score

Defining an asset's Business Risk allows for management of risk and aids in decision making for where to allocate operation and maintenance and capital improvement funds.

Likelihood of Failure (LoF) is a measure of how likely an asset is to fail. The following categories have been developed to quantify how likely an asset is to fail:

- Condition of the asset
- Remaining useful life (Age)
- Service History
- Operational status

Consequence of Failure (CoF) is a measure of the social, economic, financial or environmental impact of failure of an asset and the utilities ability to respond, convey and treat wastewater. CoF categories of the collection system include:

- Proximity to critical environmental features
- Location (Zoning District) of asset
- Facilities served by asset
- Size and location of asset within the utility network
- Type of asset.

The WWTF and lift station categories for CoF are:

- Process
- Financial Impact
- Safety
- Environmental Impact
- Disruption to the Community
- Ability to Respond

Criticality Results

Using the strategy outlined above, a Business Risk Evaluation (BRE) was performed for each asset using a graphical ArcGIS-based sewer asset management and capital planning software that compiles, analyzes and assesses Business Risk for each asset and develops a Capital Improvement Plan. The results of the BRE are provided in easily understood tabular and graphical output.

Figure 1 provides the risk rating for gravity and force main pipe by number of pipe segments. Twenty-nine pipe segments in the collection system have an extreme risk rating and are recommended to be replaced or rehabilitated. Much of the collection system's gravity pipes, 69 percent as shown in Figure 1, have a low to negligible risk rating and are indicative of pipes or manholes in relatively good condition.

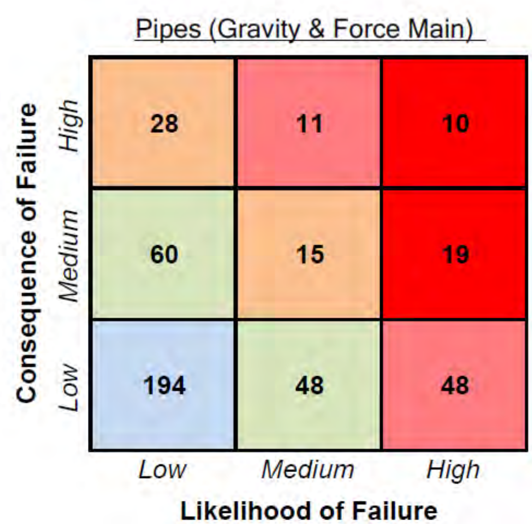


Figure 1. Business Risk Matrix (Risk Rating) by Number of Gravity and Force Main Pipes

Figure 2 provides the risk rating for the collection system manholes. Fourteen manholes are identified as extreme risk and are recommended for replacement or rehabilitation. Many manholes are at low to medium risk and recommended to be included in a long-term 6-20-year rehabilitation strategy (74 percent).

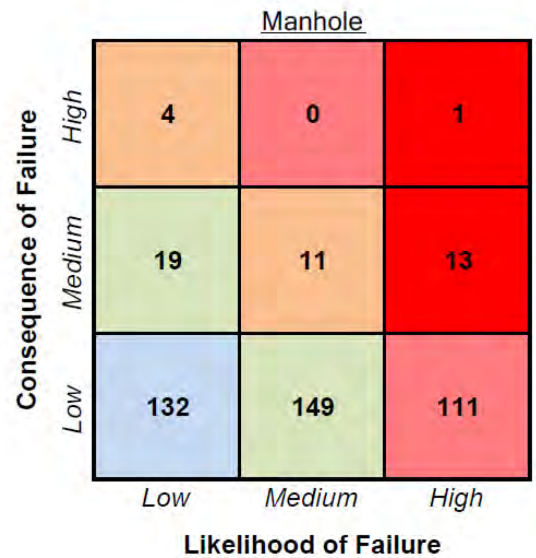


Figure 2. Business Risk Matrix (Risk Rating) by Number of Manholes

Figure 3 provides the risk ratings for the WWTF and lift station assets. No assets are identified as extreme risk. The twenty-five assets with high risk ratings should be inspected at regular intervals.

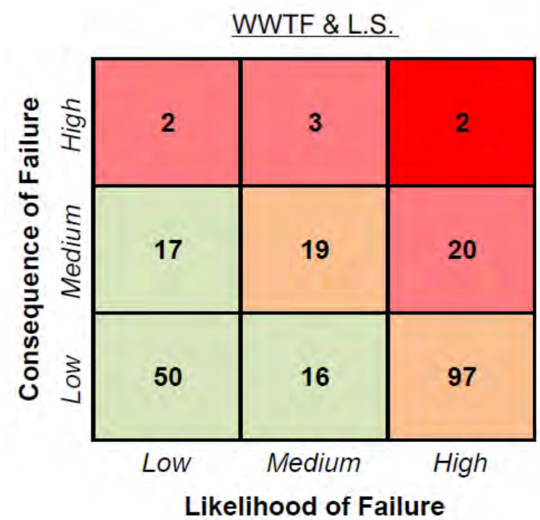


Figure 3. Business Risk Matrix (Risk Rating) for WWTF and Lift Station Assets

Tables providing asset criticality for each utility asset have been included in the AMP detailed reports for the collection and treatment systems.

Capital Improvement Plan

A Capital Improvement Plan (CIP) with rehabilitation recommendations was prepared for the City's wastewater utility assets based on the Business Risk evaluation. The CIP recommendations are provided for the collection system, WWTF and lift stations/force mains. From the BRE, a short-term (1-5-year CIP) and long-term (6-20 year CIP) was developed for the utility. Table 4 shows detailed recommendations of the collection system assets needing rehabilitation in the short-term CIP.

Table 4. 5-Year Collection System Rehabilitation Summary Table: Year by Year

Maintenance Action	Total Cost (Current Year Dollars)	2019	2020	2021	2022	2023
Pipe Replacement	$ 1,014,432	$ -	$ 504,895	$ -	$ -	$ 590,040
Pipe Lining	$ 433,263	$ -	$ 116,493	$ -	$ 349,850	$ -
Pipe Point Repair	$ 159,423	$ 71,478	$ -	$ 93,301	$ -	$ -
Manhole Replacement	$ 632,008	$ -	$ 71,717	$ -	$ -	$ 632,964
Manhole Clean, Line and Repair	$ 5,377	$ -	$ -	$ -	$ 5,876	$ -
Manhole Repair, Line and Adjust	$ 7,252	$ -	$ -	$ -	$ 7,924	$ -
Manhole Repair and Line	$ 22,870	$ -	$ 4,711	$ -	$ 19,993	$ -
Total	$ 2,274,626	$ 71,478	$ 697,816	$ 93,301	$ 383,643	$ 1,223,004

Table 5 shows detailed recommendations for the WWTF lift station system assets needing rehabilitation in the short and long-term CIP.

Table 5. Recommended Capital Improvements for WWTF and Lift Stations

Asset Description	Year Installed	Expected Useful Life (Years)	Recommended Year of Replacement	Replacement Cost (2017 Dollars)	Replacement Cost (Inflated 3%/yr)
5-YEAR CIP PROJECTS					
Sunrise Meadows Lift Station Rehabilitation	1970	20-30	2019	$301,400	$310,400
Jackson Street Lift Station Automatic Transfer Switch	2011	20	2019	$18,500	$19,100
Church Street Lift Station Rehabilitation	1990	20-30	2020	$312,900	$332,000
WWTP Electrical and Control Upgrades	Varies	20	2021	$896,000	$979,100
Solids Stabilization & Storage	1970 / 1985	30	2023	$1,804,000*	$2,091,300*
6-20-YEAR CIP PROJECTS					
Secondary Clarifiers No.1 and No. 2 Rehabilitation	1985	30	2024	$662,820	$791,400
Raw Sewage Pumping Improvements	1985	20	2025	$324,200	$398,700
Industrial Drive Lift Station Rehabilitation	1990	20-30	2026	$224,300	$284,100
New Secondary Clarifier No. 3	N/A	20	2028	$1,400,000	$1,881,500
Jackson Street Lift Station Rehabilitation	1985 / 2011	20-30	2036	$283,300	$482,300

** Cost for Solids Stabilization and Storage CIP is an average between the cost to renovate the existing anaerobic digestion system and the cost to perform aerobic digestion upgrades.*

Operations, Maintenance & Replacement

Regular operation, maintenance and replacement (OM&R) is essential in the management of a wastewater collection system. The collection system is subject to a variety of operational problems and can suffer from clogging, scour, corrosion, and collapse. Inspection, cleaning, and rehabilitation are important for optimizing the proper functioning of the collection system. By optimizing the performance infiltration/inflow are reduced and sanitary sewer overflows (SSO) are minimized or eliminated preserving the substantial investment the community has in its collection system.

Table 6 summarizes the recommended preventative maintenance inspections to be considered in the short term (1-5 years) with recommended cost over the 5-year period.

Table 6. Collection System Maintenance Summary Table: Year by Year

Maintenance Action	Total Cost (Current Year Dollars)	2019	2020	2021	2022	2023
Manhole Assessment	$ 51,953	$ 1,071	$ 7,172	$ -	$ 47,992	$ -
Manhole Cleaning	$ 1,607	$ -	$ 828	$ -	$ 878	$ -
CCTV	$ 23,346	$ -	$ -	$ 5,936	$ -	$ 19,978
CCTV - Heavy Cleaning	$ 50,594	$ 5,628	$ -	$ 20,887	$ -	$ 28,451

Table 7 summarizes the annual equipment replacement budget that has been developed to replace disposable equipment. These are items that can be financially accounted for through operation, maintenance and replacement (OM&R) funds and can be replaced by WWTF staff without bringing in an outside contractor.

Item	Rehab/ Replacement Cost	Life (years)	Annual Budget
Lift Stations			
Jackson St. Lift Station Pumps/Controls	$ 20,000	15	$ 1,333
Church St. Lift Station Pumps/Controls	$ 15,000	15	$ 1,000
Industrial Drive Lift Station Pumps/Controls	$ 15,000	15	$ 1,000
Sunrise Meadows Drive Lift Station Pumps/Controls	$ 15,000	15	$ 1,000
Wastewater Treatment Plant			
Influent Pumps/Controls (2)	$ 40,000	15	$ 2,667
Raw Sewage Pumps (3)	$ 45,000	15	$ 3,000
Oxidation Ditch Rotors	$ 100,000	10	$ 10,000
Chemical Feed Pumps	$ 500	15	$ 33
RAS and WAS Flow Meters	$ 10,000	10	$ 1,000
RAS Pumps (3)	$ 45,000	15	$ 3,000
Sludge Pumps (2)	$ 30,000	15	$ 2,000
HVAC/misc.	$ 15,000	15	$ 1,000
UV Lamps (4)	$ 42,000	20	$ 2,100
		Total	**$ 29,133**

Revenue Structure

The revenue and rate methodology is an instrument to determine user rates and charges that will provide sufficient revenues to pay for utility operating costs.

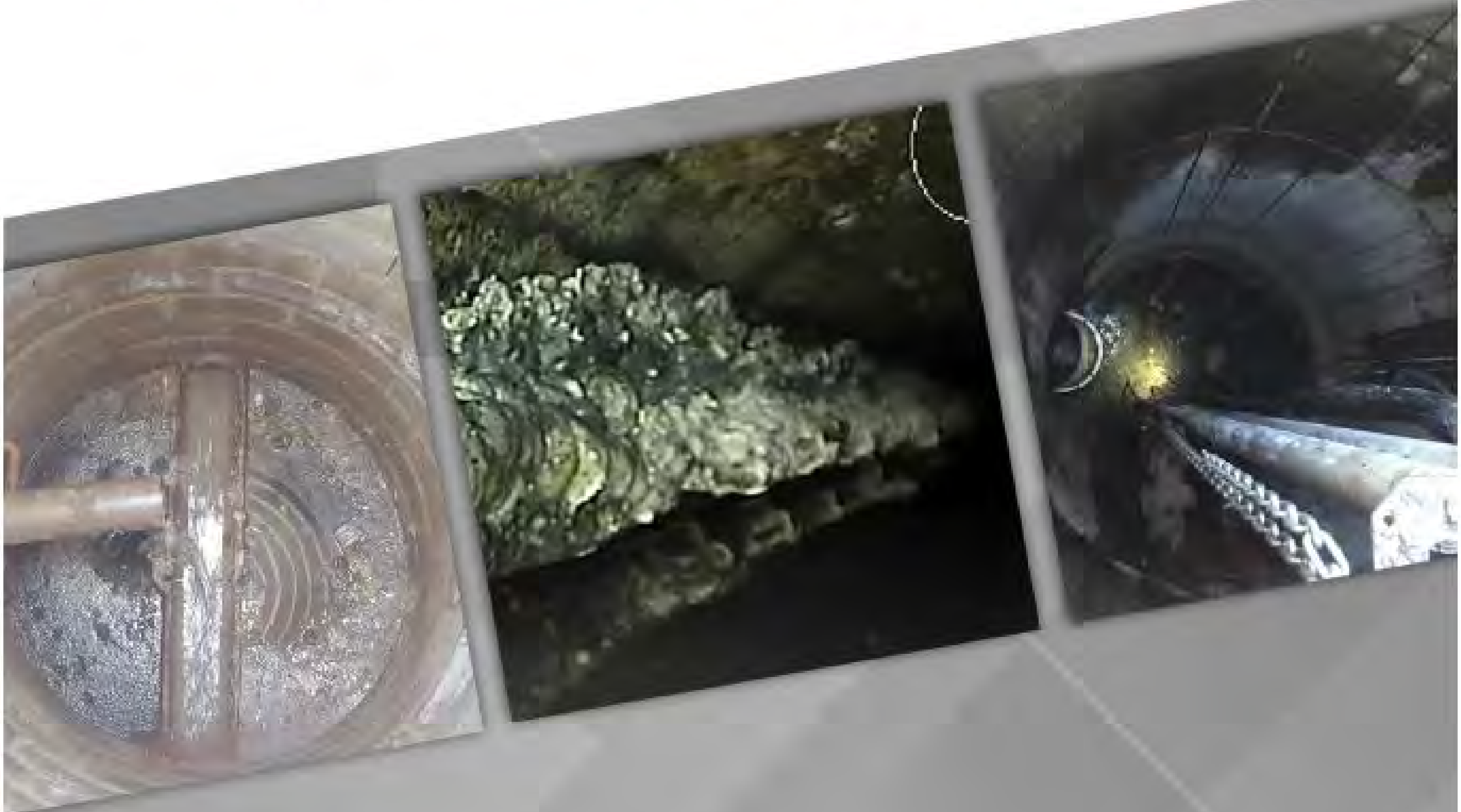
A study was conducted by an independent municipal financial advisor (H.J. Umbaugh & Associates) to develop a 5-year financial projection to meet the Michigan Department of Environmental Quality SAW Grant requirements.

The rate methodology required by the MDEQ for SAW Grant Asset Management Plans requires an analysis of the current budget on a cash basis to determine if there is a revenue gap. The analysis performed by H.J. Umbaugh & Associates shows no revenue gap.

Protecting our Infrastructure Investment

ASSET MANAGEMENT PLAN

Summary Report of Wastewater System – LOS, CIP, & Rate Structure



Prepared for:

City of Hudson

SAW Project No. 1571-01

October 2018

FLEIS & VANDENBRINK
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CONTENTS

List of Appendices for Wastewater System

1.0 INTRODUCTION AND BACKGROUND

Public Act 562 of 2012 authorized money for Stormwater, Asset Management, and Wastewater (SAW) Grant Program. In May 2014, The City received a Stormwater, Asset Management, and Wastewater (SAW) Grant from the Michigan Department of Environmental Quality (MDEQ), project no. 1571-07, to provide financial assistance for the development of a wastewater asset management plan (AMP) for the Cities publicly owned wastewater utility. The assets that comprise the utility include collection system piping and manholes, a wastewater treatment facility, lift station/pump stations and force mains.

This AMP is intended to be a living document that is updated as assets continue to wear and age, and as additional inspection/condition results are found and incorporated into the plan.

1.1 OVERVIEW OF ASSET MANAGEMENT PLAN

The goal of asset management is to meet an accepted Level of Service (LOS) in the most cost-effective way. This is done through the proper operation, maintenance and replacement/rehabilitation of assets to provide consistent wastewater collection, treatment and environmental compliance for the Cities current and future customers.

There are five core components of an AMP, as defined by the MDEQ:

1. **Asset Inventory:** This step included identification, location, condition assessment, estimation of remaining useful life, and replacement value of each treatment asset.

2. **Level of Service:** The level of service focuses the Asset Management Plan on providing cost effective improvements to sustain the system while providing the intended level of service to customers. It also considers any system deficiencies and sets goal for the improvements.

3. **Critical Assets:** The criticality assessment evaluates both how likely an asset will fail (Probability or Likelihood of Failure) and the extent of the impact or consequence of the potential failure (Consequence of Failure) on system performance. This is also referred to as the Business Risk.

4. **Capital Improvement Plan (CIP):** A CIP identifies project costs as well as prioritizes projects based on criticality when each improvement item should be completed. A 20-year plan is provided focusing on the immediate 5-year improvements.

5. **Revenue and Rate Structure:** This is a tool to determine rates that will provide sufficient revenues to cover operation, maintenance, capital improvement projects and debt costs. A revenue rate structure is also needed to include equipment replacement revenue to cover costs of equipment with moving parts that typically wear out in less than 20 years.

The system includes assets of the sanitary collection system and wastewater treatment plant for the City. This report looks at each of the five core components and provides the approach used to create an AMP for the publicly owned wastewater system. The outline of the AMP report contains three segments, two segments address the Asset Inventory, Critical Assets and CIP of the collection system and WWTP/Lift Stations. The general contents of each of these reports is presented in Figure 1.

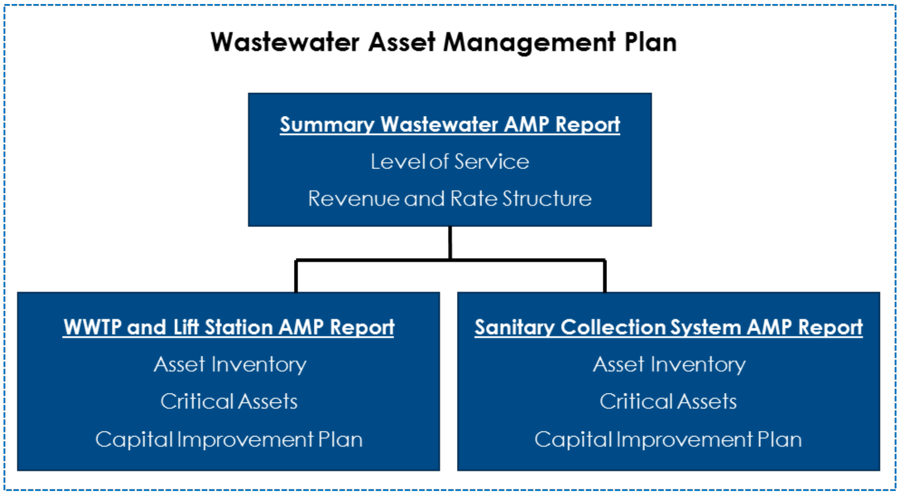


Figure 1. Overview of Asset Management Plan Reports

This report contains a summary of the AMP components including an overview of asset management planning, a community profile, a summary of existing utility components and future demands on the utility. The City approved Level of Service (LOS) statement of expectations for the utility, a summary Capital Improvement Plans and Rate Analysis recommendations to ensure there are sufficient funds to provide the expected LOS is also included in this summary report.

The MDEQ requires that a Certificate of Project Completeness be completed by the City as a statement that all grant requirements for this project have been met. A draft copy of this certificate is included in Appendix C. The certificate will need to be submitted to the MDEQ and will be accompanied by an executive summary to meet the public notice requirements of this grant program.

1.2 Mission Statement

We commit to improving and maintaining the public health protection and performance of our wastewater plant and collection utility assets, while minimizing the long-term cost of operating those assets. We strive to make the most cost-effective renewal and replacement investments and provide the highest-quality customer service possible.

1.3 Asset Management Team

City of Hudson			
121 N Church Street	Hudson	MI	49247
(517) 448-8983			

Contact Person	Department/Role
Steve Hartsel	City Manager
Jay Best	DPW Superintendent
Ted Hutchison	Waste Water Treatment Superintendent
Matthew Johnson	Fleis & VandenBrink Engineering
Tyler Sutkowi	Fleis & VandenBrink Engineering
Tom Traciak	H.J. Umbaugh & Associates

Figure 2. Asset Management Team Organizational Chart

1.4 Community Profile

The City is in Lenawee County and is bisected by the Bean Creek. The City is located within Hudson Township. The City comprises of 2.2 square miles of the County's 761 square mile area. The greatest distance from the northern boundary to the southern boundary is approximately 1.48 miles, and the greatest east-west distance is approximately 1.94 miles. M-34 and US-127 passes through the City Limits, with the City of Hillsdale approximately 16 miles to the west and the City of Adrian approximately 18.5 miles to the East.

Population and household characteristics are essential components in determining the requirements of the wastewater system. Per the 2010 census, there were 2,307 people, 861 households, and 5997 families residing in the City. The population density was 1,053.4 inhabitants per square mile. There were 1,019 housing units at an average of 465.3 per square mile. The average household size was 2.63 and the average family size was 3.16. Table 1 shows the population change for the Village from 1970 to 2010.

Table 1: Population Change 1970-2010

	1970	% Change	1980	% Change	1990	% Change	2000	% Change	2010
City of Hudson	2,618	-2.8 %	2,545	1.4 %	2,580	-3.7%	2,499	-7.7 %	2,307
Cumulative Change Since 1970		-2.8 %		-1.5 %		-4.5 %		-11.9 %	
Source: U.S. Bureau of Census of Population and Housing									

The topography of the City is gently rolling to hilly. Elevations range from lows of 900 feet along Bean Creek to a high of 950 near the City limits.

1.5 Existing Wastewater Utility Systems

1.5.1 Wastewater Collection System

The City wastewater collection system assets consists of approximately 86,703 feet (16.42 miles) of sanitary sewers (gravity pipe and force mains) and 440 wastewater manholes connecting the gravity pipe. These assets are located in existing street rights-of-way or in easements dedicated for the assets use and maintenance.

The initial collection system was installed in the early 1900's, this system included a combination of both gravity and forcemain sanitary sewer. The forcemain system consist of 4 lift stations and 5,723 feet of 2, 4 and 6-inch Ductile Iron pipe. The gravity system accounted for 80,980 feet of predominantly 8-inch Vitrified Clay Pipe. The pipe network is connected with a total of 440 wastewater manholes.

1.5.2 Wastewater Treatment Facility

The City of Hudson WWTP currently includes the following treatment processes: influent pumping, fine screening, an oxidation ditch, secondary clarification, UV disinfection, and phosphorus removal. Treated effluent is discharged to Bean Creek in accordance with NPDES permit No. MI0021377. The average design capacity of the WWTP is 0.42 million gallons per day (mgd). The current annual average flow received by the facility is approximately 0.38 mgd.

The WWTP went through two major improvement projects in 1970 and 1985. The 2017 Wastewater System Improvements project was the most recent major upgrade for the facility which included the addition of:

- A duplex influent pump station,
- Fine screening,
- A new oxidation ditch,
- UV disinfection, and
- Cascade aeration.

For stabilization of WWTP solids, the City uses high-rate mesophilic anaerobic digestion. Stabilized biosolids are stored in a sludge holding tank until they are used for land application.

1.5.3 LIFT STATIONS

The City operates and maintains 4 sanitary sewer lift stations located throughout the wastewater collection system. The stations are submersible style stations and range from good to poor condition.

Of the four lift stations, Jackson Street Lift Station has had the most upgrades and is currently in the best condition. In 1985, the valve chamber was replaced and in 2011 the wet well was replaced and new pumps, controls, electrical, and ancillary equipment was installed. The pumps at Church Street and Industrial Drive Lift Stations were rebuilt in 2008. In 2017, the pumps at Sunrise Meadows Lift Station were rebuilt.

1.6 Future Systems Demands

In December 2016, the City Council adopted the “Master Plan 2017”. In this master plan the City identifies the community goals and policies as well as future land use.

Community Goals and Policies
Planning Commission members identified community assets worth preserving, problem areas and community vision. Among the most important items are the City’s historic image and the creation of more recreational areas to encourage community interaction. A vision list of items included the continuing development of industrial areas along the eastern portion of the City.

In developing community goals and policies, it is important to analyze existing community conditions such as the Socioeconomic Profile, Natural Resources, Existing Land Use and Community Facilities. The general City goals include:

- Protect the unique history of the City by specifying design standards, setbacks and building materials for new downtown and neighborhood development.
- Promote safe and efficient vehicular travel, along with enhancing the City’s natural beauty by creating a complete road and trail network.
- Promote attractively designed retail, service, and industrial establishments at appropriate locations by providing flexible zoning mechanisms and emphasizing the development of retail and service providers downtown.
- Preserve existing parks and enhance access to recreational opportunities by maintaining and preserving existing park space.
- Ensure ongoing community planning and the implantation of the Master Plan by reviewing and updating the Master Plan every five years.

Section 2 of the “Master Plan 2017” identifies a complete set of Goals and Objectives for the City.

Future Land Use
A future land use plan was developed by the City Planning Commission, with the assistance of a planning consultant. Proposed were seven general categories:

- Downtown Core
- Highway Commercial
- Residential
- Industrial
- Office
- Agriculture, Open Space & Parks
- Civic

Future land use categories and locations are based on an analysis of several factors, including the pattern of existing land use, local social and economic characteristics, environmental conditions, available community services and facilities, the existing patterns of land divisions, and community goals.

Most of the planned future growth is along the Main Street corridor, identifying a considerable amount of this property as commercial or industrial. Development of this type has the potential to create an impact on the wastewater collection system.

2.0 LEVEL OF SERVICE

Level of Service (LOS) defines the way in which the utility stakeholders want the utility to perform over the long term. The LOS can include any technical, managerial, or financial components the utility wishes, as long as all regulatory requirements are met. The LOS is a significant part of the development of your Asset Management Plan and will become a fundamental part of how the utility is operated.

Items may be included so the utility can communicate its intentions with its customers. Measure its performance, and determine critical assets. It is important for the utility to communicate with its customers to avoid confusion, bad feelings, accusations of improper operation, and to make clear what the customer's expectations should be. Defining the LOS sets the goals for the utility. Understanding the desired LOS will help to prioritize and characterize the system's assets, as well as how to manage finances to reach the LOS goals.

2.1 LEVEL OF SERVICE

Throughout the development of this AMP, F&V worked with the City Asset Management Team to develop the following LOS statement and goals.

LEVEL OF SERVICE STATEMENT

The overall objective of the City of Hudson Wastewater Department is to provide reliable wastewater collection and treatment services at a minimum cost, consistent with applicable environmental and health regulations. To achieve this the following Level of Service (LOS) goals are proposed:

- Provide adequate collection system and treatment capacity for all service areas.
- Comply with all local, state and federal regulations at all times for treated effluent from the WWTP.
- Actively maintain collection and treatment system assets in reliable working condition.
- Reduce inflow/infiltration (I&I) flow volumes to mitigate potential for sanitary overflows, water in basements, and overloading of treatment plant.
- Provide rapid and effective emergency response services to customers.
- Ensure operations staff are properly certified.
- Regularly review health and safety procedures for operations staff to provide proper worker safety.
- Regularly review projected O&M and capital expenditures. Adjust user rates, as necessary, to ensure sound financial management of wastewater system.

The LOS goals may need to be adjusted from time to time as the utility ages, the needs of community change or new rules or regulations require a change in operation. For this reason, the LOS goals should be reviewed by the Village from time to time to make sure they accurately reflect the desired operation of the utility.

2.2 PERFORMANCE MEASUREMENTS

In order to assure that LOS goals are met performance measurements may need to be implemented. During the LOS review with the community the need for performance measurements was discussed.

3.0 Summary of Capital Improvement Plan and Recommendations

The Capital Improvement Plan (CIP) looks at the utility's needs for the future over a period of 20 years. It will identify recommended projects, the anticipated timeframe in which the projects should occur, and the anticipated cost of the projects.

An inventory list was developed of the assets for the City. Each asset was located and assessed for condition, then graded on the Likelihood of Failure and the Consequence of Failure. This data was evaluated for criticality (Business Risk) then categorized based on the Business Risk Score for replacement, rehabilitation, or ongoing inspection and/or cleaning. Asset recommendations and the Business Risk Score was used to determine urgency in prioritizing the time frame for completing projects.

The Capital Improvement Plan (CIP) looks at the utility's needs for the future over a period of 20 years. It will identify recommended projects, the anticipated timeframe in which the projects should occur, and the anticipated cost of the projects.

An inventory list of wastewater utility assets was developed for the City. Each asset was identified and assessed for its condition. A criticality (business risk) evaluation was then performed and a risk rating was identified for each asset based on the likelihood (or probability) of failure and consequence of failure. Each asset was then assigned a rehabilitation strategy using a "decision tree" model and a rehabilitation plan with anticipated rehabilitation costs was developed. The risk rating and rehabilitation plan was used to prioritize the timing of the projects and the Capital Improvement Plan was developed.

The City CIP addresses critical assets in a short-term (1-5 year) plan, and less critical assets in a long-term (6-20 year) plan. It will identify the projects, the anticipated timeframe in which the project will occur, and the anticipated cost of the project

Table 3a provides a summary of the 1-5 year CIP, Table 3b provides a summary of the 6-20 year CIP. Specific details for each CIP element are contained with the detailed AMP reports.

Table 3a. Capital Improvement Plan Summary by Year

Project Description	Rehabilitation Fiscal Year					Total
	2019	2020	2021	2022	2023	
Collection System Improvements						
Gravity Sewer Replacement	$ -	$ 504,895	$ -	$ -	$ 590,040	$ 1,094,935
Gravity Sewer Point Repair	$ 71,478	$ -	$ 93,301		$ -	$ 164,779
Gravity Sewer Lining	$ -	$ 116,493	$ -	$ 349,850	$ -	$ 466,343
Manhole Replacement	$ -	$ 71,717	$ -	$ -	$ 632,964	$ 704,681
Manhole Lining	$ -	$ 4,711	$ -	$ 33,793	$ -	$ 38,504
SubTotal Collection System Improvements	**$ 71,478**	**$ 697,816**	**$ 93,301**	**$ 383,643**	**$ 1,223,004**	**$ 2,469,242**
WWTP & Lift Station Improvements						
Sunrise Meadows Lift Station Replacement	$ 357,500	$ -	$ -	$ -	$ -	$ 357,500
Jackson Street Lift Station Automatic Transfer Switch	$ 19,100	$ -	$ -	$ -	$ -	$ 19,100
Church Street Lift Station Rehabilitation	$ -	$ 332,000	$ -	$ -	$ -	$ 332,000
WWTP Electrical and Controls Upgrades	$ -	$ -	$ 979,100	$ -	$ -	$ 979,100
Solids Stabilization & Storage Improvements	$ -	$ -	$ -	$ -	$ 2,091,300	$ 2,091,300
SubTotal WWTP & Lift Station Improvements	**$ 376,600**	**$ 332,000**	**$ 979,100**	**$ -**	**$ 2,091,300**	**$ 3,779,000**
Total Project Cost	***$ 448,078***	***$ 1,029,816***	***$ 1,072,401***	***$ 383,643***	***$ 3,314,304***	***$ 6,248,242***

**Assumes 3% Inflation per Year*

Table 3b: Capital Improvement Plan 6-20 Year		
Description		**6-20 Year**
Collection System		
Known Collection System Rehabilitation	$	204,563
Projected Collection System Rehabilitation	$	1,086,385
Wastewater Treatement System		
Known Wastewater Treatement Rehabilitation	$	3,838,000
Total Rehabilitation Cost	***$***	***5,128,948***

**Costs based on 2016 construction dollars*

4.0 OPERATION, MAINTENANCE AND REPLACEMENT RECOMMENDATIONS

4.1 OPERATIONS AND MAINTENANCE COSTS

Regular operation, maintenance and replacement (OM&R) is essential in the management of a wastewater collection system. The collection system is subject to a variety of operational problems and can suffer from clogging, scour, corrosion, and collapse. Inspection, cleaning, and rehabilitation are important for optimizing the proper functioning of the collection system. By enhancing the performance infiltration/inflow are reduced and sanitary sewer overflows (SSO) are minimized or eliminated preserving the substantial investment the community has in its collection system. Table 4A identifies the recommended maintenance actions items in a five-year summary.

Table 4a. Collection System Maintenance Summary Table: Year by Year

Maintenance Action	Total Cost (Current Year Dollars)	2019	2020	2021	2022	2023
Manhole Assessment	$ 51,953	$ 1,071	$ 7,172	$ -	$ 47,992	$ -
Manhole Cleaning	$ 1,607	$ -	$ 828	$ -	$ 878	$ -
CCTV	$ 23,346	$ -	$ -	$ 5,936	$ -	$ 19,978
CCTV - Heavy Cleaning	$ 50,594	$ 5,628	$ -	$ 20,887	$ -	$ 28,451

4.2 REPLACEMENT COSTS

Operating pieces of equipment generally have a useful life of 20 years or less with values of more than $500, contain moving parts, and would include such things as vehicles, generators, pumps motors, and computers. For assets identified as replacement items, a remaining useful life and replacement cost is identified. The replacement cost is divided by the remaining useful life to calculate an annual contribution to the replacement fund for each item.

Items in the asset inventory fall into one of three categories when considering repair or replacement:

- Repair or replacement cost estimated to be at least $5,000 and bundled into a construction project described above,
- Repair or replacement cost estimated to be less than $5,000 are not funded in the CIP budget, and
- Repair or replacement cost estimated to be at least $5,000 and anticipated for the facility maintenance staff to replace

A list of WWTP and Lift Station assets requiring replacement in the next 20 years was generated based on the expected useful life of assets included in the asset inventory. Assets addressed in the CIP were not included in the replacement cost table.

In addition to the capital improvements listed above, an annual equipment replacement fund should be developed to replace disposable equipment. These are items that can be financially accounted for through OM&R funds and can be replaced by WWTP staff without bringing in an outside contractor. Existing disposable materials include chemicals, wear parts in pumps and motors, laboratory instruments, etc. Table 4b provides a summary of the items that fall into this category. The existing OM&R fund is sufficient for the current operations.

Table 4b. Replacement Costs for WWTP and Lift Stations

Item	Rehab/ Replacement Cost	Life (years)	Annual Budget
Lift Stations			
Jackson St. Lift Station Pumps/Controls	$ 20,000	15	$ 1,333
Church St. Lift Station Pumps/Controls	$ 15,000	15	$ 1,000
Industrial Drive Lift Station Pumps/Controls	$ 15,000	15	$ 1,000
Sunrise Meadows Drive Lift Station Pumps/Controls	$ 15,000	15	$ 1,000
Wastewater Treatment Plant			
Influent Pumps/Controls (2)	$ 40,000	15	$ 2,667
Raw Sewage Pumps (3)	$ 45,000	15	$ 3,000
Oxidation Ditch Rotors	$ 100,000	10	$ 10,000
Chemical Feed Pumps	$ 500	15	$ 33
RAS and WAS Flow Meters	$ 10,000	10	$ 1,000
RAS Pumps (3)	$ 45,000	15	$ 3,000
Sludge Pumps (2)	$ 30,000	15	$ 2,000
HVAC/misc.	$ 15,000	15	$ 1,000
UV Lamps (4)	$ 42,000	20	$ 2,100
		Total	**$ 29,133**

5.0 Revenue and Rate Structure Recommendations

The final component of the AMP is to evaluate projected user rates that will provide sufficient revenues to cover operation, maintenance, capital improvement projects and debt costs. A study was conducted by an independent municipal financial advisor, H.J. Umbaugh & Associates. The wastewater utility rate study report includes two components:

1. The MDEQ rate methodology requires and analysis of the current budget on a cash basis to determine if there is a revenue gap. The rate methodology calculated under the MDEQ requirements compared to the current approved rates confirm there should not be a revenue gap. The MDEQ approved rate study report and a copy of that approval letter and report is contained in Appendix A.

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

November 2018 November 2018 (no later than 3 years from executed grant date)

The City of Hudson *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1571-01 has been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or **No**

   If No - Date of the rate methodology approval letter: MAY 3, 2018.

2) Significant Progress Made: Yes or No

   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)

3) Date of rate methodology review letter identifying the gap: ______.

4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ______.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Steve Hartsel	at 517-488-8983	manager@ci.hudson.mi.us
Name	Phone Number	Email

______ 29 NOV 2018

Signature of Authorized Representative (Original Signature Required) Date

Steve Hartsel, City Manager

Print Name and Title of Authorized Representative

Protecting our Infrastructure Investment

ASSET MANAGEMENT PLAN

Stormwater Executive Summary Report



Prepared for:

City of Hudson

SAW Project No. 1571-01

FLEIS&VANDENBRINK
DESIGN. BUILD. OPERATE.

October 2018

1.0 Executive Summary

Overview

Public Act 562 of 2012 authorized money for Stormwater, Asset Management, and Wastewater (SAW) Grant Program. In 2015, The City of Hudson received a SAW Grant from the Michigan Department of Environmental Quality (MDEQ) to provide financial assistance for the development of this Asset Management Plan (AMP). This report provides the Asset Management Plan (AMP) for the Cities stormwater collection system. Working with City staff, Fleis and VandenBrink (F&V) provided technical assistance for asset identification, condition assessment, and capital improvement planning of the stormwater collection system.

This AMP is intended to be a living document that is updated as assets continue to wear and age, and as additional inspection/condition results are found and incorporated into the plan.

The contact person for the City of Hudson AMP is:

Steve Hartsel, City Manager
121 N Church Street
Hudson MI, 49247
Phone number: 517.488.8983
Email: manager@ci.hudson.mi.us.

Asset Inventory and Condition Assessment

The stormwater collection system assets consist of approximately 61,844 feet (11.7 miles) of storm sewers and 841 stormwater structures connecting the gravity pipe. These assets are located in existing street rights-of-way or in easements dedicated for the assets use and maintenance. There are MDOT owned stormwater manholes catch basins and gravity pipes interconnected with the Cities stormwater system. These assets were mapped to show the completeness of the system, but were not evaluated as part of this Capital Improvement Plan.

Asset Identification and Location

A comprehensive stormwater system asset inventory was developed from available record drawings, field notes, staff knowledge, and site visits; supplemented with field survey work. Asset material, size and age were identified through the review of available historical record documents. Spatial orientation (pipe location), pipe depth and invert elevations were determined through GPS field survey and a comprehensive evaluation of the gravity system. This information was organized into a new (GIS) database and piping network for archiving, mapping, and further evaluation purposes.

Condition Assessment and Expected Useful Life

For the City of Hudson, a comprehensive evaluation of the collection system was performed. NASSCO-MACP structure field-based assessments were completed on 611 of the 841 structures. Pipeline cleaning and NASSCO-PACP CCTV field-based inspections were conducted on 75.5% of the gravity pipe. Based on discussions with the stormwater system operations staff, there are no known capacity issues with the City-owned stormwater system. For this reason, a capacity analysis was not completed for the City of Hudson. Recommendations for short-term (1-5 year) and long term (6-20 year) identified the need for maintenance: 43.3% of the system was tagged for inspection and/or cleaning. Rehabilitation accounted for 15% of the system identifying the need for point repairs and lining. The remaining assets (41.7%) were placed in the beyond 20-year planning category.

Level of Service

Defining the Expected Level of Service (LOS)

The LOS for the City stormwater system is stated as follows:

STORMWATER – LEVEL OF SERVICE STATEMENT

"To provide appropriate stormwater collection, diversion, and conveyance at a minimum cost, consistent with applicable environmental regulations. To achieve this the following Level of Service (LOS) goals are proposed for the City of Hudson:

- *Provide adequate stormwater collection system and conveyance capacity for all service areas*
- *Actively maintain stormwater collection and conveyance system assets in reliable working condition.*
- *Provide rapid and effective emergency response services to customers.*
- *Maintenance and operations staff are to be properly trained.*

Measuring Performance

Performance measurements are specific metrics designed to assess whether Level of Service objectives are being met. Evaluations of goals should be completed at least annually to determine if the provided resources are being used appropriately. Level of Service requirements can be updated to account for changes due to growth, regulatory requirements, and technology.

Critical Assets

Determining Criticality

Business Risk is the determination of criticality of each asset in the wastewater system. Criticality is based on two factors: 1.) Likelihood (Probability) of Failure and 2.) Consequence of Failure. Defining an asset's Business Risk allows for management of risk and aids in decision making for where to allocate operation, maintenance, and capital improvement funds.

Likelihood of Failure (LoF) is a measure of how likely an asset is to fail. The following categories have been developed to quantify how likely an asset is to fail:

- Condition of the asset
- Remaining useful life (Age)
- Service History
- Operational status

Consequence of Failure (CoF) is a measure of the social, economic or environmental impact of failure of an asset and the utility's ability to convey stormwater. CoF categories of the stormwater collection system include:

- Location of asset
- Facilities served by asset
- Size

Assessing Criticality

Using the strategy outlined above, a Business Risk Evaluation (BRE) was performed for each asset of the City of Hudson using Innovyze-InfoMaster software. InfoMaster is an ArcGIS-based sewer asset management and capital planning software that compiles, analyzes and assesses Business Risk for each asset and develops a Capital Improvement Plan.

The Business Risk score, also known as Criticality, is calculated for each asset using the following equation:

Business Risk = Consequence of Failure Score x *Likelihood of Failure Score*

Figure 1 provides the risk rating for storm sewer pipes by number of pipe segments. Four pipe segments in the stormwater collection system have an extreme risk rating and are recommended to be for near-term rehabilitation or replacement.

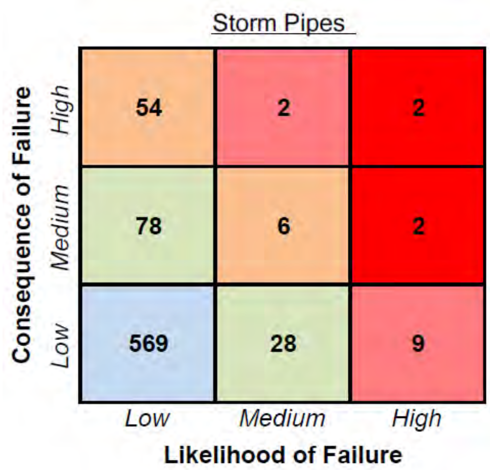


Figure 1: Business Risk Matrix (Risk Rating) by Number of Gravity Pipes

Figure 2 provides the risk rating for the storm sewer structures. Forty-four structures are identified as extreme risk and are recommended for replacement or rehabilitation.

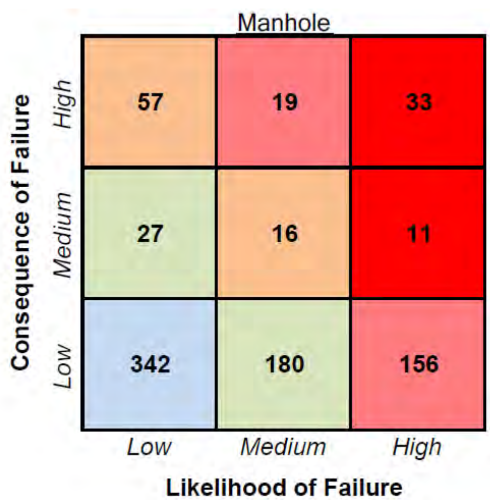


Figure 2: Business Risk Matrix (Risk Rating) by Number of Structures

A spreadsheet providing asset criticality for each utility asset is included in the AMP detailed report for the stormwater collection system.

CAPITAL IMPROVEMENT PLAN

A Capital Improvement Plan with recommendations was prepared for the Cities assets based on the Business Risk evaluation. Data-driven information from the business risk assessment and condition assessment was used to identify and prioritize the capital improvement projects. The information was also used to schedule inspections to evaluate the condition of high business risk assets. Short-Term 1-5 year and Long-Term 6-20-year Capital Improvement Plan (CIP) was prepared to address the projected needs for each asset in the system. The 5-year CIP rehabilitation total is $1,423,348.

CIP DEVELOPMENT

The City of Hudson identifies assets of $5,000 or more to be capital expenditures. Collection System assets were grouped by strategy and assigned costs from a unit database. This database includes unit construction values in 2018 construction dollars based on a survey of recent projects in Michigan and includes engineering and administrative rates where applicable. Assets were categorized and prioritized by year based on risk rating and criticality score to develop the CIP.

The recommended 5-Year Capital Improvement Plan for the City-owned stormwater collection system is included in Table 4 below.

Table 4. 5-Year Capital Improvement Plan: Rehabilitation

Rehabilitation Action	Total Cost (Current Year Dollars)	2019	2020	2021	2022	2023
Pipe Replacement	$ 72,500	$ -	$ 35,977	$ -	$ -	$ 42,286
Pipe Point Repair	$ 117,612	$ 34,115	$ -	$ 88,581	$ -	$ -
Manhole Replacement	$ 353,496	$ -	$ 49,650	$ -	$ -	$ 343,609
Manhole Clean, Line and Repair	$ 742,085	$ -	$ 188,317	$ -	$ 611,110	$ -
Manhole Repair and Line	$ 27,444	$ -	$ 4,711	$ -	$ 24,991	$ -
Total	$ 1,313,136	$ 34,115	$ 278,656	$ 88,581	$ 636,101	$ 385,895

OPERATIONS AND MAINTENANCE

A preventative maintenance program to systematically clean and inspect pipelines to NASSCO-certified standards is critical for a sound stormwater system. The process of cleaning and CCTV inspection of pipelines either with equipment owned by the community or contracted is a relatively inexpensive maintenance effort when compared to rehabilitation efforts. It is recommended that at a minimum, all pipelines be cleaned and televised every five years, or that 20% of the system be cleaned and televised annually. Available budget will dictate the frequency or size of yearly projects. The 5-year CIP maintenance total is $368,162.

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Due Date November 2018
(no later than 3 years from executed grant date)

The City of Hudson *(legal name of grantee)* certifies that all stormwater asset management plan (SWAMP) activities specified in SAW Grant No. 1571-01 have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SWAMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

Steve Hartsel	at 517-488-8983	manager@ci.hudson.mi.us
Name	Phone Number	Email

Steve Hartsel — 29 NOV 2018
Signature of Authorized Representative (Original Signature Required) — Date

Steve Hartsel, City Manager
Print Name and Title of Authorized Representative

Mr. Jeffrey Hinojosa, Director of Public Works
Huron Charter Township
22950 Huron River Drive
New Boston, Michigan 48164
Phone – 734-753-4466
SAW Grant Project Number 1611-01

Executive Summary

1. Overview of SAW Grant Program

Huron Charter Township, Wayne County, Michigan was successful in obtaining a Storm Water, Asset Management and Wastewater (SAW) grant from the Michigan Department of Environmental Quality (MDEQ) in the amount of $1,460,879.00 to complete a thorough, detailed, conditional analysis of the existing sanitary sewer collection system throughout the entire Township, develop capital improvement planning for the next 20 years and to develop a comprehensive asset management plan. The SAW grant study was managed by the Township's engineering consultant, Hennessey Engineers, Inc. (HEI) of Southgate, Michigan. The following items of work were completed as a part of the SAW grant study:

- Cleaning and televising of all sanitary sewers installed prior to 1994 to identify any structural defects within the sewer system and identify structural defects and/or locations of infiltration through pipe joints.
- Cleaning and televising of all sanitary sewers installed in 1994 or later were also analyzed in conjunction with the SAW grant program however were not included in the cost of the SAW grant program.
- Inspection of all manholes along the sewers cleaned and televised to collect data on the structural components of each structure and rate the condition of each component in addition to noting any inflow and infiltration entering the sewer system through manhole structures.
- Developed a Geographic Information System (GIS) geodatabase of the entire sanitary sewer system.
- Conduct flow monitoring of the entire sanitary sewer system to identify districts of the Township experiencing higher amounts of flow during wet weather events and to identify areas of the system that may be exceeding capacity.
-

- Conduct hydraulic modeling of the system to identify any capacity issues that exist within the sanitary sewer system.

Results of the SAW grant program were as follows:

- During the cleaning and television investigation, several pipe segments were identified with longitudinal, circumferential and/or multiple cracking, offset joints, holes within the pipe, deformed pipe or broken pipe.
- Several locations during the cleaning and television investigation were identified as having moderate to heavy infiltration through pipe joints.
- Manholes were identified as being in overall good to fair condition with minor structural defects and/or minor infiltration entering the sanitary sewer system.
- Several manholes were identified as being buried, most of them underneath gravel streets in the New Boston area of the Township.
- Based upon the cleaning and televising of the sewer system, it was identified that constant clear water was flowing from service leads leading to the assumption that several service leads are either broken, cracked or allowing groundwater infiltration through the pipe joints contributing to significant increases in wet weather flows.
- Flow monitoring of the sanitary sewer system at 14 specific locations throughout the system provided results of specific locations throughout the Township where higher infiltration and inflow exists and provided results to be able to hydraulically model the operation of the sanitary sewer system.
- The hydraulic modeling of the system provided the result that the predicted flow rate for a 25 year, 24 hour design storm event does not exceed local sewer capacity and no sewer surcharging currently exists within the system. The Township during wet weather events is within the contractual capacity with the South Huron Valley Utility Authority (SHVUA).

This report provides a summary of the Asset Management Plan (AMP) for the Township's sanitary collection system. HEI with assistance from Township staff prepared the asset management plan for the sanitary sewer collection system. The goal of asset management is to meet a required level of service for the Township's current and future users in the most cost effective and economical way through proper operation and maintenance techniques and the rehabilitation and/or replacement of assets within the sanitary sewer system to comply with State and Federal regulations.

2. Asset Inventory and Condition Assessment

Huron Charter Township has municipal water service throughout the majority of the Township and sanitary sewer service in certain areas of the Township where industrial and commercial properties exist, within the three (3) unincorporated Villages within the Township and where mobile home parks and relatively newer residential subdivisions exist. The water distribution and wastewater collection systems within the Township are owned and maintained by the Township's Department of Public

Works. Water is purchased through the Great Lakes Water Authority (GLWA), formerly the Detroit Water and Sewerage Department (DWSD).

Sewage is discharged into the SHVUA collection system by discharge at several locations along their trunk line running parallel along the Huron River within the Township. Sewage is treated at SHVUA's wastewater treatment plant located in Brownstown Township, Wayne County. The sewage collection system within Huron Charter Township was first established in the early 1970's in the Villages of New Boston, Willow and Waltz and over time has expanded to other developed areas of the Township and continues to expand when new developments come into the Township.

The wastewater collection system assets consist of 273,680.67 lineal feet (51.83 miles) of gravity sewers ranging in size from eight (8) inches to thirty-six (36) inches in diameter and 1,004 sanitary manholes. These assets are located in existing road right-of-ways owned and maintained by Wayne County or in dedicated utility easements to allow the Township to access the facilities for continued maintenance and operation purposes. A summary of the pipe inventory is as follows:

Pipe Size (in.)	Pipe Length (ft.)				
	Concrete	Clay	Truss	PVC	Total
8	35,811.04	4,182.18	3,174.33	24,011.56	67,179.11
10	20,277.97	1,714.45	9,168.82	15,147.47	46,308.73
12	45,356.85	0	2,074.16	7,271.51	54,702.52
15	23,453.11	0	1,890.43	934.89	26,278.44
18	21,384.95	0	0	262.00	21,646.95
21	32,008.80	0	0	0	32,008.80
24	2,482.99	0	0	0	2,482.99
27	1,840.22	0	0	0	1,840.22
30	6,750.71	0	0	0	6,750.71
36	14,482.22	0	0	0	14,482.22
Total	203,848.86	5,896.63	16,307.74	47,627.43	273,680.67
				Total Pipe Length (Miles)	***51.83***

Asset Identification and Location

A comprehensive sanitary sewer system asset inventory was developed from operation and maintenance manuals, including a review of existing record drawings, field notes, staff knowledge and site visits, in addition to field reconnaissance, cleaning and television investigation of sewers, visual inspections of manholes and flow monitoring. Information such as age, size and material were identified as best as possible from the cleaning and television investigation programs, as-built drawings and archived records. The physical location of assets with the sanitary collection system were collected with the use of Global Positioning System (GPS) technology and the pipe depth and invert elevations collected and compiled into a Geographic Information System (GIS) geodatabase. The GIS geodatabase will allow for better organization and record keeping, allow Township personnel to better track required maintenance and allow the Township to better prepare capital improvement programs and identify projects for the future. The GIS geodatabase for the entire sanitary sewer system consists of 1,910 total assets.

Condition Assessment

As part of the SAW grant study, a comprehensive, detailed evaluation of the sanitary collection system was completed consisting of cleaning and televising of sewers and inspections of manholes. Evaluations were based on the National Association of Sewer Service Companies (NASSCO) Pipeline Assessment Certification Program (PACP) and Manhole Assessment Certification Program (MACP) rating assets one (1) through five (5), with five (5) being a severe rating. The cleaning and televising investigation included the entire sanitary collection system (100.0% of overall system) and 1,004 manholes (100.0% of all manholes). Overall, the structural condition of the collection system was found to be in good to fair condition with structural defects such as cracked and broken pipe found sporadically throughout the system; however, there were several locations where infiltration and inflow was entering the system through pipe joints, manholes and service leads.

Based upon the results of the SAW grant study, the Township has elected to proceed with applying for Clean Water State Revolving Fund (SRF) Loan to assist with the funding of rehabilitating the collection system where structural defects rated a 4 or a 5 or where severe infiltration through pipe joints were identified at an estimated cost of $1,050,000. The Township is preparing to submit a project plan to the MDEQ no later than June 29, 2019 to hopefully be placed on the project priority list for fiscal year 2020 for construction of the project to start in the Spring of 2020. The loan will allow the Township to complete this project and pay back the loan over a 20 year period at approximately 2.5 percent interest.

3. Level of Service

Huron Charter Township has developed overall level of service goals that the sanitary sewer collection system should provide. The primary objective is to provide a reliable and well maintained sanitary sewer collection system in the most cost effective means and in compliance with State and Federal regulations. To meet these requirements, the level of service goals are proposed as the following:

- Provide adequate capacity within the sewer system and meet contractual capacity with the South Huron Valley Utility Authority (SHVUA) system
- Provide continued maintenance of the collection system to provide for a reliable working condition at all times
- Comply with all County, State and Federal health and environmental regulations
- Continually reduce or eliminate infiltration and inflow sources into the collection system to prevent sewer surcharging and potential basement backups
- Provide adequate customer service and have an effective emergency response plan in place

- Ensure that all Department of Public Works staff are regularly trained and certified to operate sanitary sewer facilities
- Regularly review safety procedures and provide necessary training to Township staff
- Routinely review and evaluate the sanitary sewer system including pipes and manholes and update the asset management plan and capital improvement plan on an annual basis to allow the proper adjustment of water and sewer rates to fund future capital expenditures required to continually maintain a reliably working system
- Regularly maintain and update the GIS geodatabase and utilize this software to track maintenance and repairs of the system

Level of service requirements can be updated regularly to account for changes to the sanitary sewer system, changes in regulatory requirements, technology upgrades, significant population growth or significant decrease in population, staffing levels and financial capabilities.

4. Criticality of Assets

Determining Criticality of Assets

Business risk is the determination of criticality of each asset in the sanitary sewer system. Business Risk, also referred to as criticality, is determined based on two factors; the probability of failure and the consequence of failure. Defining an asset's business risk provides assistance to Township staff in making important, cost effective decisions on how to allocate funds for the operation and maintenance of the sanitary sewer system and for future capital improvements.

The Probability of Failure is a measure of how likely an asset is to fail. Probability of Failure is based on weighted factors such as the physical or operational condition of the asset, age, service history and operational status.

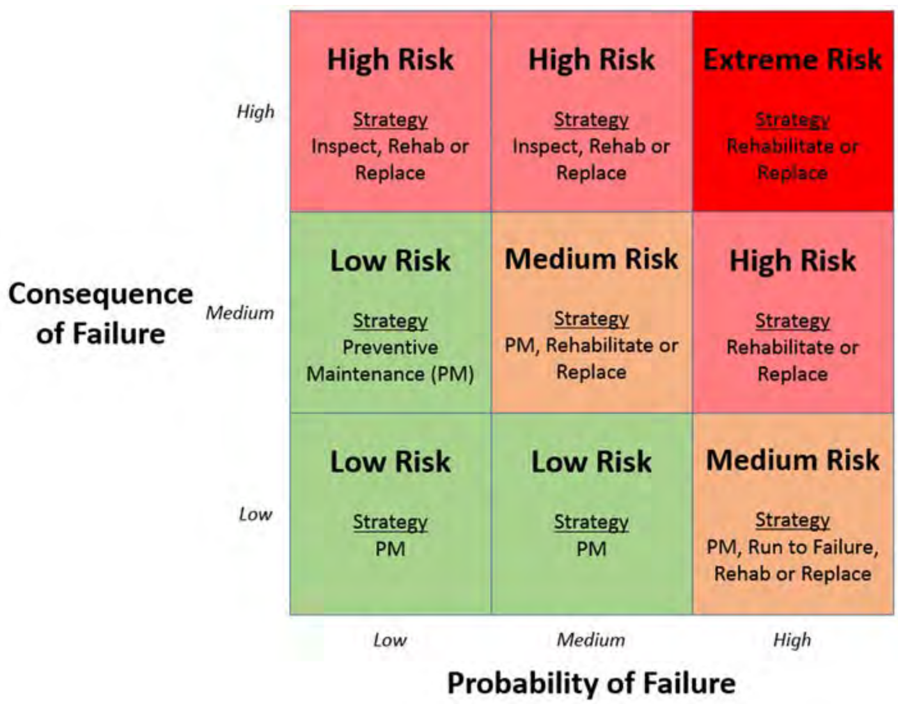
The Consequence of Failure is a measure of the impact of failure for an asset on the sanitary system's ability to convey and treat wastewater. Consequence of Failure is based on weighted factors such as location of asset, facilities or population served by the asset, size of the asset and ability to respond to emergencies for the collection system.

Assessing Criticality of Assets

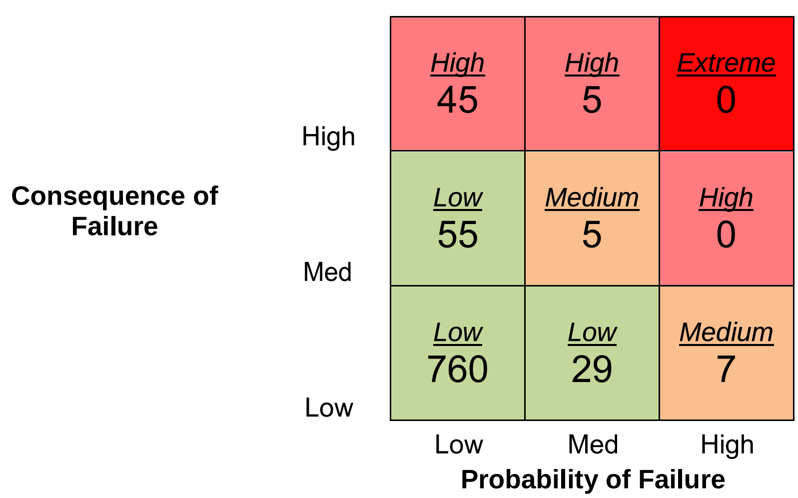
The criticality of assets is assessed by calculating the "Business Risk Score", also known as Criticality, for each asset and is calculated by the following:

Business Risk = Probability of Failure Score x Consequence of Failure Score

Risk ratings are assigned to each asset based upon the above calculations and placed into the matrix to identify the risk of each asset. Risk ratings were calculated and compiled into a spreadsheet co to be able to analyze and assess business risk for each asset and assists with developing a capital improvement plan.



For the collection system, the pipe network and manholes currently have business risks ranging from low risk to high risk. The risk rating of an asset can be used to develop a risk-based strategy for asset rehabilitation or replacement. A summary of the business risk analysis for the 906 pipe assets within the collection system is shown below:



A summary of the business risk analysis for the 1,004 manhole assets within the collection system is shown below:

Consequence of Failure	Low	Med	High
High	High 3	High 1	Extreme 0
Med	Low 73	Medium 2	High 0
Low	Low 916	Low 9	Medium 0

Probability of Failure

5. Capital Improvement Project Planning

Based upon the business risk evaluation, the Township has developed short term (5 year) and long term (20 year) capital improvement plans providing recommendations for improvements to the sanitary sewer collection and treatment system. The business risk evaluation assisted the Township to prioritize all future capital improvement projects and develop a rate structure to fund these projects. For the collection system, immediate needs are to address those structural defects that were rated in poor to severe condition and to eliminate severe infiltration through pipe joints to eliminate the future risk of sewer surcharging and potential basement backups through the SRF rehabilitation program in 2020. The Township will also work with property owners to address broken or leaking service leads allowing constant groundwater flow into the system. In the future however, it is recommended to inspect the collection system; both sewers and manholes every five (5) years to identify any new or potential problems and identify ways to address these problems. It is estimated based upon the sewer cleaning and televising completed as part of the SAW grant program, that it would cost $750,000 to complete the entire Township. Therefore, every five (5) years the maintenance and capital costs are estimated to be approximately $150,000 per year.

6. Revenue Structure

A rate methodology report was submitted to the MDEQ on April 19, 2018 and approved by MDEQ staff on May 3, 2018. Costs for the proposed SRF improvements project, future improvement projects; in addition to future investigative work and frequency of routine maintenance such as cleaning and television investigation and manhole inspections are figured into future rate adjustments.

Township staff; along with the Engineering consultant, determine if the rate structures are sufficient to meet the current needs of the Township's sanitary sewer system. Over the course of time, adjustments may need to be made to the rate structure in order to fund future projects.

The asset management plan developed will allow the Township to calculate estimated costs for future projects and assist with future rate adjustments. Based upon the SAW grant study, there is an immediate need to rehabilitate sewers with poor to severe structural defects and eliminate severe infiltration through pipe joints. These immediate needs will be addressed through the SRF loan program with construction anticipated to begin in 2020. The estimated cost for this project is $1,050,000 with an expected annual payment of $67,355 for 20 years. In addition to the current needs, there will be additional needs in the future for the system within the next 20 years.

The Township's current sewer rate structure will be modified prior to the construction start of the SRF improvements project. The costs for the proposed project was estimated based upon similar projects recently completed for other communities and also used to determine the required funds needed for future projects. All projects will be funded through future rate increases.

Therefore, the total increase in rates to support the SRF improvements project for the sanitary sewer system would be estimated at $1.75 per REU per month. Based upon $150,000 of cleaning and televising each year and an estimates $150,000 of sewer rehabilitation in future years, the total increase in rates to support the asset management plan and 20 year capital improvement plan for future improvement projects and investigative work for the sanitary sewer system would be $7.81 per REU per month.

This asset management plan along with the rate methodology should be revisited on an annual basis and the asset management plan and rate methodology updated as needed on an annual basis to account for maintenance and rehabilitative work completed within the given year and to update cost estimates for future projects.

HENNESSEY
ENGINEERS, INC

December 17, 2018

Michigan Department of Environmental Quality
Drinking Water and Municipal Assistance Division
Revolving Loan Section
PO Box 30817
Lansing, Michigan 48909-8311

Re: Notice of Intent to Apply for SRF Loan Funding
Huron Charter Township
Hennessey Project No. 83077

To Whom It May Concern:

Please find attached an Intent to Apply Form on behalf of Huron Charter Township for potential SRF loan funding in FY2020. Huron Charter Township proposes to complete sewer rehabilitation utilizing cured-in-place pipe lining installations throughout the entire Township where sanitary sewers were recently cleaned and investigated through the SAW grant program.

Huron Charter Township intends to submit a final SRF project plan for the MDEQ to consider for FY2020 loan assistance no later than June 30, 2019.

If you have any questions or require any additional documentation, please do not hesitate to contact me at any time.

Very Truly Yours,

HENNESSEY ENGINEERS, INC

R. Ryan Kern, P.E.
Project Manager

cc: John Kozuh, Director of Public Services, City of Lincoln Park
Matt Coppler, City Manager, City of Lincoln Park
James D. Hollandsworth, P.E., P.S., Hennessey Engineers, Inc.

File B.4

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
DRINKING WATER AND MUNICIPAL ASSISTANCE DIVISION
CLEAN WATER STATE REVOLVING FUND/STRATEGIC WATER QUALITY INITIATIVES FUND

INTENT TO APPLY FORM

This Intent to Apply (ITA) form is REQUIRED of applicants who intend to apply for funding through the Clean Water State Revolving Fund (SRF) or Strategic Water Quality Initiatives Fund (SWQIF).

Deadlines: This form may be submitted at any time. This form must be submitted on or before December 31, for consideration for funding the following fiscal year (final project plan due July 1). The ITA expires in one year and must be resubmitted each year by December 31 if the project(s) did not get ranked on the previous Project Priority List (PPL), or did not proceed with funding. If changes (scope, cost, etc.) are made to project(s) submitted with the initial ITA (including projects listed as future on the PPL), an updated form is required by the following December 31 to remain on the PPL.

Pre-Application Meeting: The Applicant Contact will be contacted by the assigned Revolving Loan Section (RLS) project manager within 14 days of receipt of this ITA to discuss scheduling a pre-application meeting. This meeting is mandatory in most cases and may be held in person (preferred) or via conference call. Required attendees will include the RLS project manager, MDEQ district engineer, and applicant representative(s). Optional attendees may include the consulting engineer, public works staff and/or certified operator, RLS technical support staff, MDEQ enforcement staff (if applicable) and/or district compliance staff, other funding agencies, or other interested parties.

Questions: Please visit our website at www.michigan.gov/cleanwaterrevolvingfund or call 517-284-5433.

DEQ Use Only: RLS Project Manager ______________________________

District Engineer ______________________________ Project Number ______________

CONTACT INFORMATION

Applicant Legal Name: Huron Charter Township

Mailing Address (street, city, state, zip+4): 22950 Huron River Drive, New Boston, Michigan 48164

Applicant Contact Name: Click here to enter text. Title: Jeff Hinojosa, Director of Public Works

Mailing Address (street, city, state, zip+4): 22950 Huron River Drive, New Boston, Michigan 48164

Phone No.: 734-753-4466 Email: jhinojosa@hurontownship-mi.gov

Consulting Engineer Name* (if applicable): R. Ryan Kern, P.E. Firm: Hennessey Engineers, Inc.

Mailing Address (street, city, state, zip+4): 13500 Reeck Road

Phone: 734-759-1600 Email: rrkern@hengineers.com

*Qualifications-Based Selection (QBS) Process Disclaimer – The SRF requires a community to use a QBS process for selecting an architectural/engineering consultant for those costs to be included in an SRF loan. This applies to all planning, design, and construction activities, including costs related to a pre-application meeting and preparation of project planning documents. Please refer to the QBS guidance documents for further information.

PROJECT INFORMATION

Project Need (check all that apply): ☒Public Health Issue ☐Water Quality Issue ☐Discharge Permit Violations ☐Capacity ☐Structural Integrity ☐CSO Separation ☐Infiltration/Inflow Removal ☐Enforcement Action ☐Total Maximum Daily Load ☐Other: Click here to enter text.

Project Description (Please attach planning area map): Rehabilitation of Sewers with Structural Defects Based Upon Results of SAW Grant Sewer Cleaning and Televising Study

Project Location (street address or nearest cross streets): Throughout Huron Township

City/Village/Township: Huron Charter Township

County: Wayne

Borrower Population: 15,845

Population Served by Project: Approx. 8,500

Treatment Facility Name (if applicable): South Huron Valley Utility Authority (SHVUA)

NPDES or Groundwater Discharge Permit No. (if applicable): N/A

Name of Watershed Management Plan (if applicable): N/A

Estimated Total Project Cost: $1,580,000 Estimated SRF Loan Amount: $1,360,000

Other Funding Sources (check all that apply): ☐None ☒Cash ☐ Bond ☐MDOT ☐MEDC ☐USDA Rural Development ☐Other: Click here to enter text.

Proposed Construction Start Date (mm/yyyy): April 2020 Proposed Construction End Date (mm/yyyy): November 2020

In which fiscal year do you intend to apply? 2020

Is this a multi-segmented project (multiple loans or projects)? ☐Yes XNo If yes, describe: Click here to enter text.

Existing Planning Documents (check all that apply; do not need to submit at this time): ☐None ☒Capital Improvements Plan ☒Asset Management Plan ☐Preliminary Engineering Report ☐Environmental Report ☒Project Plan ☒Infiltration & Inflow Study ☐Sanitary Sewer Evaluation Study ☒NASSCO Report ☐Watershed Management Plan ☐Master Plan ☐Other: Click here to enter text.

Will this project be combined with other projects? ☐Yes ☒No If yes, describe: Click here to enter text.

ADDITIONAL INFORMATION

Disadvantaged Community?** ☐Yes ☒No ☐Unknown
**For a preliminary determination from the MDEQ, complete and attach Form EQP 3530.

Does the proposed project include any green infrastructure, water or energy efficiency improvements, or other environmentally innovative activities that may quality for Green Project Reserve (GPR) funding?
☐Yes ☒No ☐Unknown
If yes, please describe: Click here to enter text.

Additional Information: Click here to enter text.

Form Completed By: R. Ryan Kern, P.E.

Title: Project Manager, Hennessey Engineers, Inc. Date: 12/14/18

Please submit the form and any applicable attachments by email to DEQ-DWMAD-Revolving LoanSection@michigan.gov or by mail to:

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
DRINKING WATER AND MUNICIPAL ASSISTANCE DIVISION
REVOLVING LOAN SECTION
Mailing Address:
PO BOX 30817
LANSING MI 48909-8311
Delivery Address:
CONSTITUTION HALL 4TH FLOOR SOUTH
525 W ALLEGAN STREET
LANSING MI 48933

SANITARY CONVEYANCE SYSTEM

Huron Charter Township

Wayne County, Michigan

Source: Data provided by the State of Michigan and Orchard, Hiltz and McCliment. Orchard, Hiltz and McCliment does not warrant the accuracy of the data and/or the map. This document is intended to depict the approximate spatial location of the mapped features within the Community and all use is strictly at the user's own risk.

Coordinate System: Michigan South NAD 1983 State Plane International Feet

OHM 888.522.6711 | ohm-advisors.com

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date **November 30, 2018**
(no later than 3 years from executed grant date)

Huron Charter Township certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. **1611-01** have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: **No**
   If No - Date of the rate methodology approval letter: **May 3, 2018**.
2) Significant Progress Made: Yes or No
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: ____________________.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ____________________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

R. Ryan Kern, P.E.	734-759-1600	rrkern@hengineers.com
Name	**Phone Number**	**Email**

______________________________ 11-28-18
Signature of Authorized Representative (Original Signature Required) **Date**

Jeff Hinojosa, Director of Public Works
Print Name and Title of Authorized Representative

Stormwater Asset Management Plan
Executive Summary

Intra-County Drainage Board for the Eleven and One-Half Mile Relief Drain
21777 Dunham Road, Clinton Township, MI 48036
Brian Baker, Chief Deputy Macomb County Public Works Commissioner
586.307.8210
SAW Grant Project Number 1133-01

Executive Summary

The Macomb County Publics Works Office (MCPWO), on behalf of the Eleven and One-Half Mile Relief Drain Drainage District (District), was awarded a grant by the Michigan Department of Environmental Quality (MDEQ) under the Stormwater, Asset Management, and Wastewater (SAW) Grant Program to develop a stormwater Asset Management Plan (AMP) for the Eleven and One-Half Mile Relief Drain (Drain). The AMP Report was developed by Fishbeck, Thompson, Carr & Huber, Inc. (FTCH), working closely with MCPWO staff and in accordance with the five MDEQ AMP components:

1. Asset Inventory and Condition Assessment
2. Level of Service (LOS)
3. Asset Criticality
4. Operation and Maintenance (O&M) Strategies
5. Capital Improvement Plan (CIP)

The total eligible cost was $859,935, less a local match of $85,994, for a total grant amount of $773,941.

The objective of an AMP is to meet the required LOS in the most cost-effective manner through proper maintenance of the assets. For MCPWO this includes providing a summary of the condition of the assets within the District, a basis for prioritizing the rehabilitation/replacement of the assets, and an updated O&M program to routinely maintain the assets. The work completed under the SAW Grant included the components described in the following sections.

Asset Inventory

The Drain is an enclosed stormwater system that discharges directly to Lake St. Clair.

The following steps were taken in an effort to locate and identify the system's horizontal and other assets:

1. Update MCPWO's existing Geographic Information System (GIS) database.
2. Utilize and update, as necessary, the existing unique naming convention for the MCPWO assets that incorporate the District.
3. Perform sewer inspections via onsite walkthroughs as well as remote televising to determine the condition of each asset. Incorporate results and findings into the GIS database.
4. Perform manhole surveying and inspections to determine the condition of each structure. Incorporate results and findings into the GIS database.
5. Develop an inventory of District's assets, including critical attribute information, age, remaining useful life, and replacement costs. Incorporate the information into the GIS database.

Condition Assessment

1. Manhole inspections were performed in 2016 and 2017 by FTCH in accordance with the Manhole Assessment and Certification Program (MACP) standards on the majority (93%) of the manholes in the system. The inspection forms, and the results of the inspections, were incorporated into MCPWO's GIS database.
2. The storm sewers were remotely closed-circuit television (CCTV) inspected and walked in 2017 by Doetsch Environmental Services in accordance with Pipeline Assessment and Certification Program (PACP) standards. The inspection forms, and the results of the inspections, were incorporated into MCPWO's GIS database.
3. The results of the inspections indicated:
   a. The storm sewers are generally in good condition; however, 4 pipe segments have a structural condition rating above 4.00, and 30 pipe segments have an O&M rating above 4.00, with 10 of those segments with an O&M rating of 5.00 due to heavy sediment deposits.
      - The presence of heavy sediment deposits indicated potential Drain capacity issues. FTCH was tasked to develop a hydraulic model of the Drain to assess whether the sediment was creating significant capacity issues.
         - The capacity analysis results indicated the Drain does not have capacity for a 10-year, 24-hour design storm and will experience surface flooding under these conditions. The capacity analysis also revealed the Drain will experience pipe surcharging and surface flooding for the 5-year, 24-hour event, but would not for 1- or 2-year, 24-hour storm events.
         - The sediment analysis results indicated the removal of the sediment will produce very little change in the hydraulic grade line throughout the Drain for the 1-, 2-, 5-, and 10-year, 24-hour storm events.

   b. The manholes are in good condition as well. There are no manholes with a composite (structural and O&M) rating above 4.0, and only 5 manholes with a composite rating between 3.00 and 4.00.

Level of Service Determination

The MCPWO developed an LOS for the District based on commitments to their customers and the MDEQ, which included:

1. Safeguarding public health and the environment.
2. Operating the system to maintain stormwater conveyance to prevent damage to public and private property and other hazards due to stormwater flooding.

Criticality of Assets

1. Assigned a Probability of Failure (POF) rating for each asset based on the condition of the asset, and its age or remaining life. The rating criteria was different for pipes and manholes as follows:

Pipe Probability of Failure

		Weighting Factor	5	4	3	2	1
			Imminent	Probable	Occasional	Remote	Improbable
POF	Physical Condition	80%	PACP Structural Quick Rating Score (50%) PACP O&M Quick Rating Score (30%)				
	Useful Life Expended	20%	≥ 100%	90-99%	80-89%	60-79%	< 59%

Manhole Probability of Failure

		Weighting Factor	5 Imminent	4 Probable	3 Occasional	2 Remote	1 Improbable
POF	Physical Condition	80%	MACP Composite Rating (80%) Assets not inspected were given a Composite Rating Score = 3.00				
	Useful Life Expended	20%	≥100%	90-99%	80-89%	60-79%	< 59%

2. Assigned a Consequence of Failure (COF) rating for each asset to reflect its importance to the system and the resulting disruption or difficulty of repair/replacement if failure occurs, based on the following criteria:

Consequence of Failure for Pipes and Manholes

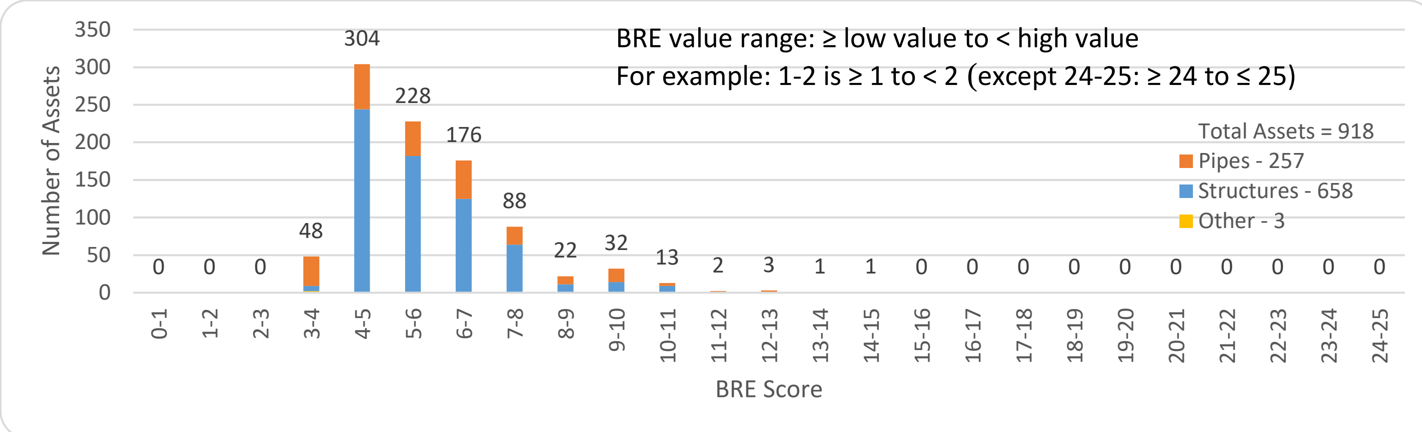
	Category	Weighting Factor	5 Catastrophic Disruption	4 Major Disruption	3 Moderate Disruption	2 Minor Disruption	1 Insignificant Disruption
COF	Process Impact	25%	Mission critical: unable to accomplish mission	Process shutdown	Loss of redundancy or temporary process upset	Potential process upset	No impact on process
	Financial Impact	25%	Major Cost (> $250,001)	Significant Cost ($50,001 - $250,000)	Moderate Cost ($10,001 - $50,000)	Minor Cost ($1,001 - $10,000)	Insignificant ($1 - 1,000)
	Safety	25%	High risk of loss of life	Severe injury to employees or public	Minor injury requiring treatment offsite or lost time	Minor injury requiring no medical treatment with no lost time	Little to no risk of injury
	Disruption to the Community	25%	Long-term impact; area-wide disruption	Short-term impact, but substantial disruption	Sporadic service disruptions	Minor disruption	No disruption

3. Multiplied the POF and the COF to compute the Business Risk Exposure (BRE) score for each asset, representing the asset's criticality on a scale of 1 to 25. The BRE score serves as a tool for prioritizing repair/replacement.

   MDEQ guidelines for determining criticality state a BRE score above 16.00 is deemed high and should warrant rehabilitation action. The BRE scores of the Drain assets are presented in the following figure. The sewers and manholes that were inspected all had BRE scores less than 16.00.

   MCPWO should monitor the condition of the sewers and manholes during the next round of inspections and update the BRE scores accordingly.

Overall 11.5 Mile Relief Drain BRE Summary



Operation and Maintenance Strategies

1. Reviewed current preventative maintenance history and system operations.
2. Identified gaps in the preventative maintenance program and in system operations.
3. Developed a revised preventative maintenance program outlining tasks by asset.

Capital Improvement Plan

A 20-year CIP was developed for the District using the results of the condition assessments, the BRE, remaining useful life, and repair/replacement costs. The CIP included:

1. Grouping projects based on work requiring the Drain to be dewatered.
2. A schedule for repair/replacement projects through the year 2037.
3. Anticipated project costs and annual system costs through the year 2037.

Major projects anticipated to begin in the next few years are:

- MCPWO staff to remove debris in Pipe Segment 097M047-097M046.
- MCPWO staff to replace manhole cover at Manhole 097M061.
- MCPWO staff to replace cracked manhole cover at Manhole 097M298.

List of Major Assets

Stormwater Assets:

- 71,506 feet of pipe ranging in size from a 12-inch diameter to a 12- by 14-foot double box system.
- 280 manholes.
- 370 catch basins.
- 5 junction chambers.
- 1 outfall.

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Due Date **November 26, 2018**
(no later than 3 years from executed grant date)

The Intra-County Drainage Board for the Eleven and One-Half Mile Relief Drain *(legal name of grantee)* certifies that all stormwater asset management plan (SWAMP) activities specified in SAW Grant No. 113301 have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SWAMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

Brian Baker at 586.307.8210 brian.baker@macombgov.org
Name Phone Number Email

11/26/18
Signature of Authorized Representative (Original Signature Required) Date

Brian Baker, Chief Deputy Macomb County Public Works
Print Name and Title of Authorized Representative

Stormwater Asset Management Plan
Executive Summary

Intra-County Drainage Board for the Stephens Relief Drain
21777 Dunham Road, Clinton Township, MI 48036
Brian Baker, Chief Deputy Macomb County Public Works Commissioner
586.307.8210
SAW Grant Project Number 1182-01

Executive Summary

The Macomb County Publics Works Office (MCPWO), on behalf of the Stephens Relief Drain Drainage District (District), was awarded a grant by the Michigan Department of Environmental Quality (MDEQ) under the Stormwater, Asset Management, and Wastewater (SAW) Grant Program to develop a stormwater Asset Management Plan (AMP) for the Stephens Relief Drain (Drain). The AMP Report was developed by Fishbeck, Thompson, Carr & Huber, Inc. (FTCH), working closely with MCPWO staff and in accordance with the five MDEQ AMP components:

1. Asset Inventory and Condition Assessment
2. Level of Service (LOS)
3. Asset Criticality
4. Operation and Maintenance (O&M) Strategies
5. Capital Improvement Plan (CIP)

The total eligible cost was $708,185, less a local match of $70,819, for a total grant amount of $637,366.

The objective of an AMP is to meet the required LOS in the most cost-effective manner through proper maintenance of the assets. For MCPWO this includes providing a summary of the condition of the assets within the District, a basis for prioritizing the rehabilitation/replacement of the assets, and an updated O&M program to routinely maintain the assets. The work completed under the SAW Grant included the components described in the following sections.

Asset Inventory

The Drain is an enclosed stormwater system that discharges directly to Lake St. Clair.

The following steps were taken in an effort to locate and identify the system's horizontal and other assets:

1. Update MCPWO's existing Geographic Information System (GIS) database.
2. Utilize and update, as necessary, the existing unique naming convention for the MCPWO assets that incorporate the District.
3. Perform sewer inspections via onsite walkthroughs as well as remote televising to determine the condition of each asset. Incorporate results and findings into the GIS database.
4. Perform manhole surveying and inspections to determine the condition of each structure. Incorporate results and findings into the GIS database.
5. Develop an inventory of District's assets, including critical attribute information, age, remaining useful life, and replacement costs. Incorporate the information into the GIS database.

Condition Assessment

1. Manhole inspections were performed in 2016 and 2017 by FTCH in accordance with the Manhole Assessment and Certification Program (MACP) standards on the majority (92%) of the manholes in the system. The inspection forms, and the results of the inspections, were incorporated into MCPWO's GIS database.
2. The storm sewers were remotely closed-circuit television (CCTV) inspected and walked in 2017 by Doetsch Environmental Services in accordance with Pipeline Assessment and Certification Program (PACP) standards. The inspection forms, and the results of the inspections, were incorporated into MCPWO's GIS database.
3. The results of the inspections indicated:
   a. The storm sewers are generally in good condition; however, 14 pipe segments have a structural condition rating above 4.00, and 20 pipe segments have an O&M rating above 4.00, with 4 of those segments with an O&M rating of 5.00 due to heavy sediment deposits.
      - The presence of heavy sediment deposits indicated potential Drain capacity issues. FTCH was tasked to develop a hydraulic model of the Drain to assess whether the sediment was creating significant capacity issues.
        - The capacity analysis results indicated the Drain does not have capacity for a 10-year, 24-hour design storm and will experience surface flooding under these conditions. The capacity analysis also revealed the Drain will experience pipe surcharging and surface flooding for the 5-year, 24-hour event, but would not for 1- or 2-year, 24-hour storm events.
        - The sediment analysis results indicated the removal of the sediment will greatly alleviate the impacts of surface flooding and reduce the hydraulic grade line within the affected areas throughout the Drain for the 1-, 2-, 5-, and 10-year, 24-hour storm events.

   b. The manholes are in good condition as well. There are 6 manholes with a composite (structural and O&M) rating above 4.00, with 1 of those manholes with a composite rating of 5.00.

Level of Service Determination

The MCPWO developed an LOS for the District based on commitments to their customers and the MDEQ, which included:

1. Safeguarding public health and the environment.
2. Operating the system to maintain stormwater conveyance to prevent damage to public and private property and other hazards due to stormwater flooding.

Criticality of Assets

1. Assigned a Probability of Failure (POF) rating for each asset based on the condition of the asset, and its age or remaining life. The rating criteria was different for pipes and manholes as follows:

Pipe Probability of Failure

		Weighting Factor	5 Imminent	4 Probable	3 Occasional	2 Remote	1 Improbable
POF	Physical Condition	80%	PACP Structural Quick Rating Score (50%) PACP O&M Quick Rating Score (30%)				
	Useful Life Expended	20%	≥ 100%	90-99%	80-89%	60-79%	< 59%

Manhole Probability of Failure

		Weighting Factor	5 Imminent	4 Probable	3 Occasional	2 Remote	1 Improbable
POF	Physical Condition	80%	MACP Composite Rating (80%) Assets not inspected were given a Composite Rating Score = 3.00				
	Useful Life Expended	20%	≥100%	90-99%	80-89%	60-79%	< 59%

2. Assigned a Consequence of Failure (COF) rating for each asset to reflect its importance to the system and the resulting disruption or difficulty of repair/replacement if failure occurs, based on the following criteria:

Consequence of Failure for Pipes and Manholes

	Category	Weighting Factor	5 Catastrophic Disruption	4 Major Disruption	3 Moderate Disruption	2 Minor Disruption	1 Insignificant Disruption
COF	Process Impact	25%	Mission critical: unable to accomplish mission	Process shutdown	Loss of redundancy or temporary process upset	Potential process upset	No impact on process
	Financial Impact	25%	Major Cost (> $250,001)	Significant Cost ($50,001 - $250,000)	Moderate Cost ($10,001 - $50,000)	Minor Cost ($1,001 - $10,000)	Insignificant ($1 - 1,000)
	Safety	25%	High risk of loss of life	Severe injury to employees or public	Minor injury requiring treatment offsite or lost time	Minor injury requiring no medical treatment with no lost time	Little to no risk of injury
	Disruption to the Community	25%	Long-term impact; area-wide disruption	Short-term impact, but substantial disruption	Sporadic service disruptions	Minor disruption	No disruption

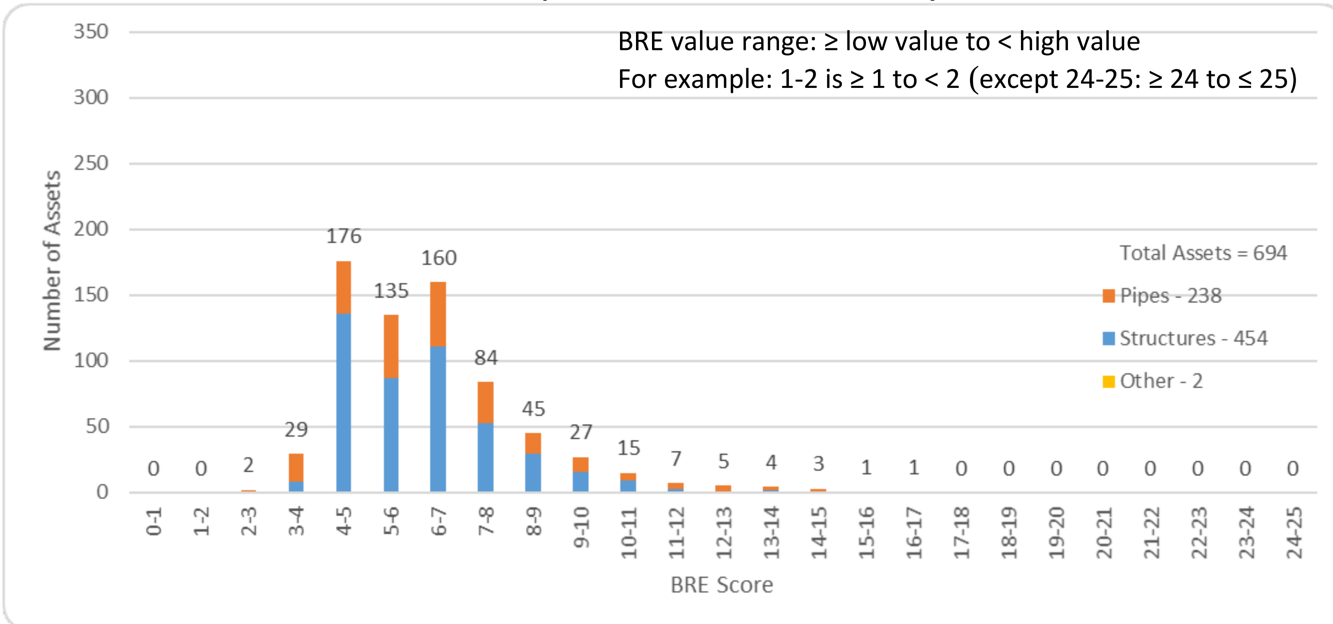
3. Multiplied the POF and the COF to compute the Business Risk Exposure (BRE) score for each asset, representing the asset's criticality on a scale of 1 to 25. The BRE score serves as a tool for prioritizing repair/replacement.

   MDEQ guidelines for determining criticality state a BRE score above 16.00 is deemed high and should warrant rehabilitation action. The BRE scores of the Drain assets are presented in the following figure.

   Of the 694 storm assets inspected, only 1 asset (Pipe Segment 381M136-381M137) was identified with a BRE score greater than 16.00. The high BRE score is due to the high COF score driven by the location of the pipe within the I-94 right-of-way.

   MCPWO should monitor the condition of the sewers and manholes during the next round of inspections and update the BRE scores accordingly.

Overall Stephens Relief Drain BRE Summary



Operation and Maintenance Strategies

1. Reviewed current preventative maintenance history and system operations.
2. Identified gaps in the preventative maintenance program and in system operations.
3. Developed a revised preventative maintenance program outlining tasks by asset.

Capital Improvement Plan

A 20-year CIP was developed for the District using the results of the condition assessments, the BRE, remaining useful life, and repair/replacement costs. The CIP included:

1. Grouping projects based on work requiring the Drain in to be dewatered.
2. A schedule for repair/replacement projects through the year 2037.
3. Anticipated project costs and annual system costs through the year 2037.

MCPWO staff plan to rehabilitate Manholes 381M088, 381M092, 381M135, 381M136, 381M146, 381M148, 381M167, and 381M191in the next few years.

List of Major Assets

Stormwater Assets:

- 63,791 feet of pipe ranging in size from a 12-inch diameter to a 12- by 14-foot double box system.
- 237 manholes.
- 210 catch basins.
- 4 junction chambers.
- 1 outfall.

DEQ

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Due Date **November 26, 2018**
(no later than 3 years from executed grant date)

The Intra-County Drainage Board for the Stephens Relief Drain *(legal name of grantee)* certifies that all stormwater asset management plan (SWAMP) activities specified in SAW Grant No. 118201 have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SWAMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

Brian Baker	at	586.307.8210	brian.baker@macombgov.org
Name		Phone Number	Email

BB 11/26/18

Signature of Authorized Representative (Original Signature Required) Date

Brian Baker, Chief Deputy Macomb County Public Works
Print Name and Title of Authorized Representative

IRA TOWNSHIP
STORMWATER, ASSET MANAGEMENT, AND WASTEWATER (SAW) GRANT 1243-01
GRANT COMPLETION SUMMARY - ABRIDGED VERSION
11/24/2018

Ira Township
Supervisor Jim Endres
supervisor@iratownship.org
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Fair Haven, MI 48023
Phone: (586) 725 - 0263
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Project Control Engineering
Anthony Theodorou, P.E., M.S.
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2420 Pointe Tremble Road
Algonac, MI 48001
Phone: (810) 794 - 1931
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SUMMARY

Ira Township (Ira), with the assistance of Project Control Engineering (PCE), has completed the requirements of the Stormwater, Asset Management, and Wastewater (SAW) Grant for its Sanitary Collection system, awarded by the State of Michigan Department of Environmental Quality (MDEQ). The Grant was awarded on November 24, 2015, in the amount of $1,107,700, a total reimbursement of costs totaling $996,930, and with a timeline of 3 years to complete the requirement by November 24, 2018.

Beginning in 2015 with the SAW Grant award, Ira and PCE began working on the main activities of the Asset Management Plan (AMP. The activities were categorized and are as follows:

1. Inventory and Condition Assessment of Assets
2. Sanitary Flow Metering and Modeling
3. Geographic Information System (GIS) building
4. Capital Improvement Cost Estimation and Rate Development

Our activities started with a study of the system and deployment of Flow Monitoring equipment in order to capture the magnitude of flows, both normally and due to surges, in order to prioritize condition assessment tasks. The four major categories are further described in the following pages, along with the tasks and experiences encountered when performing them. Finally, a summary of the findings and conclusions are provided, in order to inform the township's Capital Improvement Plan.

Project Control Engineering, Inc.
Professional Engineers, Surveyors, and Consultants
2420 Pointe Tremble Road ● P.O. Box 307 ● Algonac, MI 48001 ● Tel (810) 794-1931 ● Fax (810) 794-3331

LEVEL OF SERVICE AGREEEMENT

The level of service agreement defines the procedures, depth and methods used to provide service to the customers. The goal of the Ira Sanitary System is to confirm wastewater is treated effectively and efficiently by providing services that meet or exceed customer expectations and comply with federal regulations. This section describes the utility's Level of Service goals and the key performance targets for each of the level of service goal for present and future performance. The level of service describes the characteristics of utility's performance such as "how much", "of what nature", and "how frequently" about the service and the performance target define how each level of service will be measured The utility's progress toward meeting those goals will be reported annually.

The levels of service determine the amount of funding that is required to maintain, renew and upgrade the sewer infrastructure to provide the customers with the levels of service specified. The Level of Service goals are defined across the service areas identified below and a performance target is defined for each goal as a measure for the Level of Service goal. Changes to the levels of service goals and how the utility addresses the issues will affect funding requirements and how well the utility can provide the proper service to the community. The target levels of service that the utility has chosen to meet are presented in Table 1-1. This table lists the Level of Service goals and measures the success of each goal.

Service Area	Levels of Service		Achieved
	Goal	Performance Targets	
Asset Preservation and Condition	Rehabilitate Pump Stations	Upgrade Pumps and Equipment	Considerable performance deficiencies
Asset Preservation and Condition	Rehabilitate Pump Stations	Renovate Lift Station Structures	Minor performance deficiencies
Asset Preservation and Condition	Rehabilitate Sanitary Pipeline	Repair Joint and Segment Defects	Considerable performance deficiencies
Asset Preservation and Condition	Rehabilitate Sanitary Pipeline	Repair Service tap locations	Considerable performance deficiencies
Asset Preservation and Condition	Rehabilitate Sanitary Manholes	Raise Rim locations and seal from Inflow	Considerable performance deficiencies
Asset Preservation and Condition	Rehabilitate Sanitary Manholes	Repair Infiltration in structure and seal from Inflow	Minor performance deficiencies

To support the above Level of Service goals the utility has identified the following costs to help improve overall service to the community:

- Implementing the O&M will require an additional $18,900 with the current 3 full time employees.

- It is estimated that the utility will spend a total of $1,310,157 on various sewer system improvement projects over the next 10 years.

The utility's action plan for improving the overall management of this utility and supporting the above level of service goals (including addressing the financial management, environmental management and specific issues) is found in Table 4-1 of this report.

ASSET INVENTORY AND CONDITION ASSESSMENT

Ira operates and maintains a waste water collection system that was initially constructed in 1975 under the authority of the St. Clair County Department of Public Works. An inventory of the system assets was commenced in early December of 2015 and all plans, documents and records where studied to develop a prioritized consequence of failure for the system. A table summarizing the consequences of failure (ie. Risk Level) is found in Table 1-1 and the method used to determine this is described in Sections 1A&1B.

Table 1-2. Ira Township Sanitary System Consequence of Failure Summary, Quick Rated, QR from 1(lowest) - 6(highest). This table only shows QR 3-6.

Quantity	Size	Material	Consequence of Failure
2	4 in.	Force Mains Under Canals	6
9	Various	Pump Stations	6
250.8 ft.	18 in.	Reinforced Concrete Pipe under M-29 Highway	6
80.7 ft.	12 in.	ABS Truss Pipe under M-29 Highway	6
1,867.7 ft.	10 in.	ABS Truss Pipe under M-29 Highway	6
93.7 ft.	8 in.	ABS Truss Pipe under M-29 Highway	6
467	Various	Sanitary Manhole Structures	5
26,400 ft.	18 in.	Reinforced Conc Pipe (interceptor along M-29)	5
14,438 ft.	10 in.	ABS Pipe South of M-29 along Lake St. Clair	Various (5 and down)
438.9 ft.	8 in.	ABS Pipe South of M-29 along Lake St. Clair	Various (5 and down)
5,166 ft.	12 in.	ABS Pipe Streets South of M-29	Various (5 and down)
21,302 ft.	12 in.	ABS Pipe Streets North of M-29	Various (5 and down)
1,413 ft.	15 in.	ABS Pipe Northside of M-29	Various (4 and down)
6,035 ft.	10 in.	ABS Pipe North of M-29	Various (4 and down)
7,270 ft.	10 in.	ABS Pipe Streets South of M-29	Various (4 and down)
9,105 ft.	10 in.	ABS Pipe Streets North of M-29	Various (4 and down)
4,528 ft.	8 in.	ABS Pipe Streets South of M-29	Various (3 and down)
4,266 ft.	8 in.	ABS Pipe Streets North of M-29	Various (3 and down)

A. Wet Well Scanning, Manhole Inspection and Summary of Findings:

Ira township has (9) nine pump stations, which constitute the highest risk priority in the collection system if failure occurred. Thus, PCE camera team developed a system to use terrestrial scanning technology in the vertical and inverted position to perform high level inspections of the pump station structures. A Leica ScanStation P40 was inverted on its base and used to 3D laser scan the inside of each of the wet wells in high definition. The results of these scans were processed in a program called TruView and the resulting allows the inspection of each defect in the wet well structure without physically entering. The NASSCO standards, called the Manhole Assessment Certification Program (MACP) was used for both the wet wells and a selection of buried manholes.

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B. Pipeline Televising and Summary of Findings

The cleaning of the sewer system was performed by Tri-County Vac services ahead of the PCE camera crew. The cleaning and televising of the system commenced October 2017 and continued until July 2018.

The cleaning crew was required to utilize a special anti-blast nozzle in order to prevent back pressure into service lines. Additionally, several locations had major calcium deposit build up, which required the cleaning crew to utilize a cutting tool, just to allow the camera to pass through the pipe. Cutting and Heaving cleaning was identified but not performed as it would have required extensive costs beyond the scope of the SAW grant.

The camera crew implemented two different camera technologies to assess all sewer pipe older than 40 years in age. The first method used an iBAK Panoramo 2 digital pipeline scanner that can travel up to 60 ft. per minute without needing to stop, increasing production and allowing for post-inspection in an office setting. This was implemented in the fall of 2017 and post-inspection was completed over the winter 2017-2018. The digital scanner was implemented on a continuous length of 18" Reinforced concrete pipe that constitutes the main trunk-line interceptor running from Bethuy Road to Zobl Court Pump Station.

The second method utilized a MiniCAM Proteus CRP150 6-wheel drive crawler, which allowed for quick and maneuverable televising due to its light weight and extremely powerful yet compact design. If cleaning resulted in a less than ideal situation, the MiniCAM was able to climb and get past debris and deposits in the bottom of the pipe and keep televising without a delay. All pipe other than the interceptor was televised by the MiniCAM from April - July, 2018. Inspection was done at the same time as televising.

All pipeline inspection utilized the NASSCO standards, called the Pipeline Assessment Certification Program (PACP).

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SANITARY FLOW METERING AND MODELING

A. Discussion of Causes of I&I and their consequences

The risk of Infiltration and Inflow (I&I) is very high in Ira township due to several geographic and systemic factors. By definition, Infiltration is groundwater entering sewers through defective pipe joints and broken pipes. Conversely, Inflow is water entering sewers from illicit connections and deficiencies in sanitary manholes. The sources of I&I can be rain water, surface water and ground water.

In the past three years, the lake level has been steadily climbing and is at record levels in 2018. The effect of higher lake levels is a risk for lake water infiltration into any compromised pipe. During the inspection of the sewer pipe, several locations showed signs of lake water infiltration, which would be continuous and independent of rain events and season. The most susceptible locations are 8" and 10" Truss pipe (TP) that are along Lake St. Clair. These have been given an elevated total risk category.

Rain-derived I&I is another major source of illicit sewer flow. The major sources of RDII are improperly constructed manholes, which drain areas of ponding water and illegal connections to house drains and sump pumps. To properly characterized these sources, an analysis of the flow monitoring data, acquired as a part of this grant program, is necessary. Long trailing peaks after a rain event in the flows passing a metered location would indicate a corresponding flow from drains and sump pumps.

B. Summary of Flow Monitoring Program and Conclusions

A comprehensive flow monitoring program was undertaken in the sanitary collection system in Ira Township from February 1st, 2016 through March 1st, 2018, a period of 25 months. A total of thirteen (13) locations were selected and monitored for pre-determined intervals of time, to characterize the flow through those locations. Three flow meter types were selected, based on the most appropriate and cost effective flow meter for the designated locations. The most common flow meter used was the MACE FloPro Xci with Doppler ultrasonic area/velocity sensor. A total of eight (8) locations utilized this technology. A total of two (2) locations were already equipped with ABB Magnetic Flow meters, thus data-loggers where installed and read throughout the flow monitoring period. One (1) new Seametrics Magnetic flow meter was installed and data was recorded with a data logger. One (1) existing Doppler flow meter in a flume was rehabilitated and the flow was recorded by data-logger for a period of time. And finally, One (1) location utilized a HACH Flo-Dar AV sensor portable unit for a period of time.

The locations, flow meter types and durations of flow monitoring are summarized in table 2-1. The normal flow, called the Base Sanitary Flow(BSF), was calculated using the number of Residential Equivalent Units(REU's) and a value of 2.56 persons per REU and 100 GPD per person (ref. SEMCOG).

Table 2-1. Locations of flow meters

Region	Location	Flow Meter Type	Flow Monitoring Start	Flow Monitoring End
6	Church Rd. Pump Station, PS1	MACE FloPro XCi w/Doppler AV Sensor	2/15/2016	9/18/2017
8	Ira Rd. Pump Station, PS2	MACE FloPro XCi w/Doppler AV Sensor	2/15/2016	9/18/2017
9	Swan Creek Pump Station, PS3	MACE FloPro XCi w/Doppler AV Sensor	2/15/2016	9/18/2017
10	Palms Rd. Pump Station, PS4	MACE FloPro XCi w/Doppler AV Sensor	2/15/2016	8/18/2017
1	Andrews Park Pump Station, PS8	MACE FloPro XCi w/Doppler AV Sensor	2/15/2016	7/28/2017
12	Stier Road Subdivision	MACE FloPro XCi w/Doppler AV Sensor	2/15/2016	6/20/2016
2	Trailer Park North	MACE FloPro XCi w/Doppler AV Sensor	5/8/2017	9/12/2017
11	Zobl Court MH2	MACE FloPro XCi w/Doppler AV Sensor	1/12/2017	8/18/2017
4	Trailer Park A	Greyline Doppler Sensor in a Flume	2/22/2016	8/03/2016
3	Bethuy Rd. Pump Station, PS7	ABB Magnetic Meter	2/22/2016	9/12/2017
7	Long Island Ct. Pump Station, PS6	Seametrics Magnetic Meter	2/22/2016	9/12/2017
13	Zobl Court Pump Station, PS5	ABB Magnetic Meter	2/22/2016	8/18/2017
5	Church Rd. Anchorville MH76	HACH Flo-Dar AV Sensor	2/16/2016	8/15/2016

The results of the flow monitoring program can be focused into three parts, Infiltration, Short-term Inflow and Delayed-Inflow. In order to compare the expected flow magnitudes to the flows observed in the flow meter data, one must calculate the anticipated flows using REU's and water usage values in the designated regions that the flow meters measure. A summary of the monitored regions of the collection system is found in table 2-2.

Table 2-2. Summary of the regions under flow monitoring.

Region	Serving	Location of Meter
1	Andrews Industrial Park, Anchor Bay HS and Rock Church	Andrews Park (Bethuy Woods) Pump Station
2	Bethuy Road from 24 Mile Rd to the Chateau Trailer Park	Bethuy Road at north end of the Chateau Trailer Park
3	Chateau Trailer Park East (B) North of Marsac Creek	Bethuy South Pump Station
4	Chateau Trailer Park West (A).	23 Mile Road, West of Bethuy Rd
5	Chateau Trailer Park East (B) force main, Ch23 Mile Road (M-29) from New Baltimore limits to Church Road	Anchorville, M-29 west of Church Road, MH76
6	Church Road, Short Cut Road and a portion of M-29 between Church Rd and Pump Station	Church Road Pump Station on M-29
7	Long Island Court and Waterworks Drive	Long Island Court Pump Station
8	M-29 just East of Church Rd to the Swan Creek Bridge, Meldrum Road, West Fair Haven, Ira Road to BroadBridge Road	Ira Road Pump Station
9	East Fair Haven, Swan Creek Rd	Swan Creek Pump Station
10	M-29 from East of Swan Creek Rd to Palms, including Palms Rd.	Palms Road Pump Station
11	Bouvier Marina, Old Dyke Rd.	Zobl Court MH2
12	Stier Subdivision (Clay Twp)	Zobl Court Pump Station
13	Zobl Court North, Kershaw Rd and Zobl Court South (Clay Twp)	Zobl Court Pump Station

WINTER FLOW MONITORING PERIOD: 2016-2017

Due to the lower water usage in the winter months, infiltration estimates are made using characteristic winter sewer flows. A graph of the winter flows for the sanitary system is presented in Figure 2-1.

RAIN EVENT FLOW MONITORING PERIOD: 2016

One of the Major Rain Events during the monitoring Period: 2/15/16 - 9/18/17 was experienced on:

3/24/16 14:30 - 23:30 **0.48 in max.**

A Major Rain Event is defined as an event with enough duration and volume of rainfall to cause a sustained impact (ie. enough to cause diversion of flow to equalization tanks) on the influent flow to the wastewater treatment plant, as measured by the flow meter and recorded rain data at the New Baltimore Wastewater Treatment Plant, 2.5 miles from the Ira Township limits. No similar measurement instrumentation is installed at the Algonac wastewater treatment plant, as no equalization tanks exist. The results of the flow monitoring during this rain event is presented in Figure 2-2.

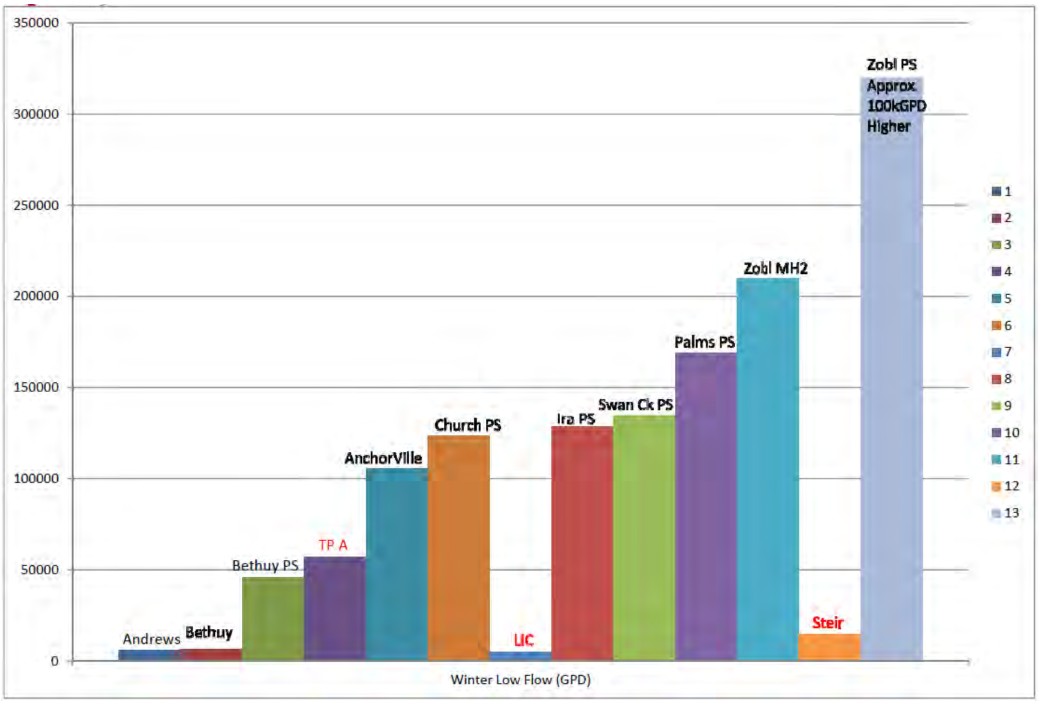


Figure 2-1. Graph of Infiltration Issue measured during Winter Period 2016-2017.

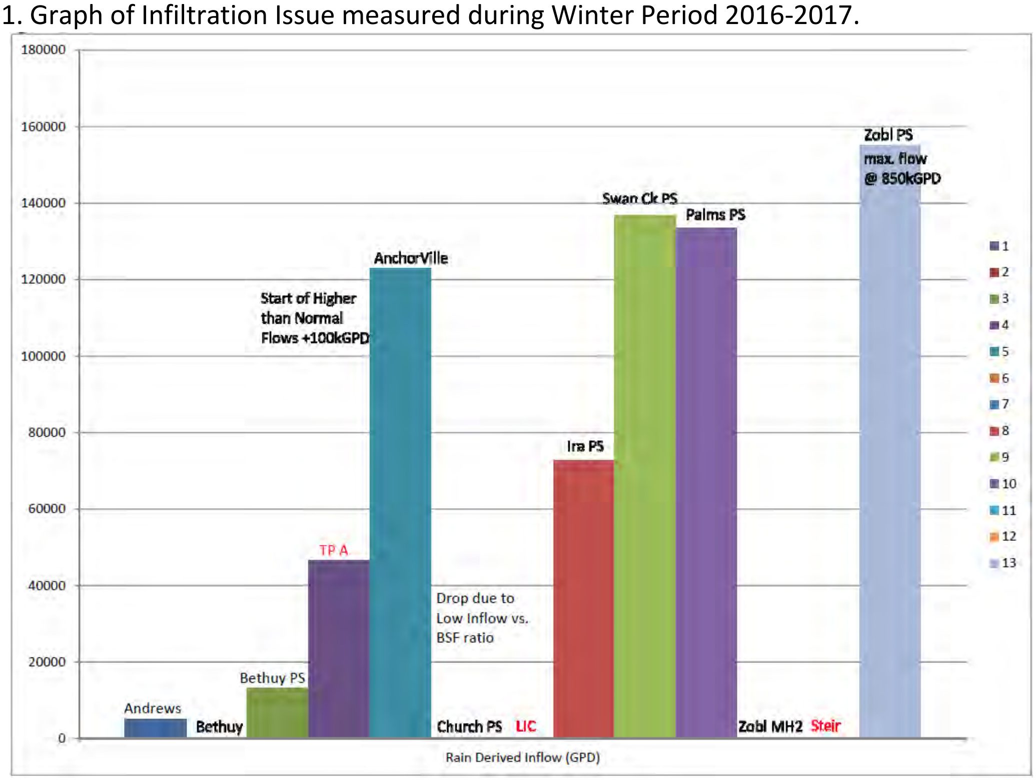


Figure 2-2. Graph of RD Inflow Issue measured during Rain Event of 3/24/16.

DEVELOPMENT OF THE GIS SYSTEM

The GIS system for Ira Township serves two major purposes to the township staff and engineering support team. Firstly, the GIS system allows the township staff to know where the sanitary structures are (mainly manhole structures) relative to other township utilities. This is mainly used during MISS Dig locating and locating during emergency response. Secondly, the GIS system serves as a record of the condition of each sanitary structure, indicating if the structure is buried or exposed and assigning a unique asset ID number for asset management purposes.

In order to create the GIS system, the PCE surveying crew (from the engineering support team) located each sanitary manhole and surveyed the point using a Leica Handheld GPS unit. Many of the manholes were buried, both in the greenbelt and in the roadway. If the structures were buried in the roadway, the PCE surveying crew also performed a MACP level 1 inspection on the structure while at the location to GPS the point, before the township staff re-buried it to prevent traffic disturbances. The resulting points were assembled using Leica GeoOffice software into a .kmz file for viewing in Google Earth. This format was found to be quick, inexpensive and convenient for the township staff to use and distribute. The master copy of the file is saved with the engineering support team and can be added to and edited in Google Earth. The elevations of the points are indicated on the file and the unique asset ID number is also stored in an excel table, produced by Leica GeoOffice.

The .kmz file format was also easily converted into a shape file, for use in a Leica Zeno 20 handheld GPS unit by the township staff. The unit was field tested in the month of August and found to be exceptionally user-friendly and reasonably accurate (within one foot from the sanitary manhole point). Previous survey data from water system upgrades has also been transformed into a shape file and can be used by the township staff to determine where the sanitary system assets are relative to water system assets.

Finally, the asset ID table has been used to generate an inventory of the sanitary manhole structures and a condition assessment of each structure based on the ground elevation, lid elevation and, in some instances, a MACP level one inspection report. This ties back into the Asset Management Program, which has a Capital Improvement budget based on the number of structures that need repair. A Capital Improvement budget of $98,880.00 has been assigned for Manhole Rehabilitation costs, based on the results of the GIS surveying.

CAPITAL IMPROVEMENT COST ESTIMATE AND RATE DEVELOPMENT

A. Capital Improvement Plan

The utility's action plan for implementing the Capital Improvement issues and supporting the Level of Service goals (including addressing the financial management, environmental management and specific issues) is shown in Table 4-1.

Table 4-1. ENFORCEABLE SCHEDULE FOR IMPROVEMENTS

Urgency	Issue	Corrective Action Plan	Target Date for Completion
1	Pumps, Forcemain Pipework and Instrumentation failing.	(6) new pumps, (17) new force main pw and 5 instruments to be replaced. Cost: $285,120	May-2021
2	Pump Station Structures have deteriorated.	Repair (6) Wet Well structure's deficiencies, lining where necessary. Cost: $320,220	May-2021
3	Heavy cleaning needed in sewer main to remove deposits and expose pipe.	Hire cleaning and cutting to flail and cut with high pressure (336) locations. Cost $129,911	May-2021
4	Low Manholes and Illicit connections causing surges during rain events.	Repair (100) manhole locations and revise ordinance to eliminate illicit connections. Cost: $106,790	May-2021
5	Major Sources of Infiltration causing surges and unpredictability.	CIPP line (15) pipe segments, Repair (132) lateral locations, and patch (204) pipe locations. $1,765,508	Part A: CIPP (15) and associated Liners. Cost: $468,115 May-2021 Part B: Remaining T-Liners and (204) Point Patches. Cost: $1,297,393 May-2033
The five most important actions			

Most issues require attention immediately, however addressing the rate methodology and procuring the funding source/s to finance the improvements is a concern. The target dates have therefore been assigned a conservative way to achieve these goals while addressing the most pressing corrective actions as soon as possible.

The Revenue and Expenditures of the Township in the Sewer Fund have been studied to provide an estimation of the rate charges necessary to fund the Capital Improvement needs identified.

B. Preliminary Rate Study - Projected Gap

Based on the Revenue and number of customers for the Sewer System, Ira will have a Gap in funding in order to implement the capital improvement needs. The current rate structure and methodology utilizes a "Base Fee for Capital Improvement/Bond Debit", which is used to pay bond debt payments.

This is the area of the rate that will require an increase. It will be required of the township to determine the method of increase prior to procurement of funding, and as a pre-requisite of any funding approvals.

C. Conclusion of the Grant - Adoption of the Asset Management Plan

To complete the SAW grant program, the township board approved the resolution adopting the Asset Management Plan as presented herein on October 1, 2018. The draft resolution was made record by the township clerk.

The Certification of Project Completeness and Township Board Adoption of Asset Management Plan are deliverables due before the grant completion, dated November 24, 2018.

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date November 24, 2018
(no later than 3 years from executed grant date)

The Township of Ira *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1243-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or No
   If No - Date of the rate methodology approval letter: October 1, 2018.
2) Significant Progress Made: Yes or No
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: __________.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on __________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Chris Hiltunen	at	(586) 557-0822	chrish@iratownship.org
Name		Phone Number	Email

11-19-18

Signature of Authorized Representative (Original Signature Required) — Date

Chris Hiltunen, Superintendent of DPS

Print Name and Title of Authorized Representative

April 2017

JAMESTOWN CHARTER TOWNSHIP
ASSET MANAGEMENT PLAN – SAW GRANT 1268-01
WASTEWATER SYSTEM
EXECUTUVE SUMMARY

1. INTRODUCTION

Jamestown Charter Township applied for and received a grant to develop an Asset Management Plan for its sanitary sewer system through the Michigan Department of Environmental Quality's (MDEQ) Stormwater, Wastewater and Asset Management (SAW) program. Jamestown Township received the SAW Grant in November of 2015 for project number 1268-01. The SAW Grant amount awarded to Jamestown Charter Township for Wastewater was $303,396.00 less the 10% local match.

2. TEAM MEMBERS

Jamestown Charter Township owns the sanitary sewer system within its borders. They have an agreement with Georgetown Charter Township and Ottawa County to send the Township's wastewater through Georgetown Township's sewer system on its way to the Grandville Clean Water Plant. The Township Supervisor oversees the utilities and both the operator and engineer report to him.

Boss and Sons Environmental has been operating the sewer system since 2012. With the implementation of an asset management plan (AMP), the system operators are now able to more accurately track asset information including the consequence of failure and probability of failure analysis. Both the operators and decision-makers have access to the most important needs and vulnerabilities of the wastewater collection system.

Vriesman & Korhorn Civil Engineers provides engineering services to the Township, including for the sanitary sewer system. They work together with Boss and Sons Environmental to ensure that connections and additions to the sanitary sewer system meet the master plan and that the construction methods and materials meet the standards set by the Township.

3. SYSTEM HISTORY

Jamestown Township began serving the community with a sewer system in 1990. It was initially in downtown Jamestown near the intersection of Riley Street and 24th Avenue. The original system included a network of small diameter sanitary sewers that collected the effluent from septic tanks at each residence and piped it to one of three small pump stations. The sewage was pumped through a 6" diameter, 3-mile forcemain north along 32nd Avenue to a chemical feed station at Highland Drive and into the City of Hudsonville's sanitary sewer system. The sewage was ultimately treated at the City of Grandville's Clean Water Plant. In the past lateral connections to the 6" forcemain have been allowed using grinder pumps.

Over the next decade, the sewer system was expanded to include gravity sewer from new residential developments. In 2000 a new commercial/industrial center was developed near Quincy Street and 32nd Avenue. This included the addition of a new pump station and forcemain that connected to the original 6" forcemain to the City of Hudsonville.

That same year, as part of an apartment complex development, a 21" trunk gravity sanitary sewer was installed in the northeast part of the Township to direct a portion of Jamestown's sewer to Georgetown Township and ultimately to the Grandville Clean Water Plant. The available capacity for the Hudsonville connection was nearing its limit, so the plan was to eventually redirect most of Jamestown's sewer through the 21" gravity line to Georgetown Township.

In 2013, the original 6" forcemain was re-directed into the 21" trunk sanitary sewer. The remaining Jamestown areas discharging to Hudsonville were redirected to the 21" trunk sewer in 2017, and the chemical feed station and associated forcemain were abandoned.

In the summer of 2016, a cross-country gravity sanitary sewer was installed to replace two of the original three pump stations in downtown Jamestown. The gravity system followed a creek to Greenly Street, where a new pump station was installed. The forcemain out of this new pump station connected with the original 6" forcemain that now connects to the 21" trunk sanitary sewer.

In 2018 the sewer system serves 932 customers, including 895 residential, 36 commercial/industrial and 1 mobile home park. The system includes:

Three pump stations:

24th Avenue Pump Station – The only remaining original pump station. Collects septic tank effluent from small diameter gravity sewer and pumps a quarter mile to a gravity sanitary sewer manhole.

Greenly Street Pump Station – The newest pump station installed in 2016 as part of the Spring Grove sanitary sewer project. Forcemain pumps up along Greenly Street west to 24th Avenue where it travels through the existing 6" forcemain to the outlet with the head-end of the 21" trunk sanitary sewer.

Royal Court Pump Station – Installed in 2000 as part of the Jamestown Commerce Center, the pump station has recently undergone upgrades to handle future increased flows.

One Meter Station on 22nd Avenue at the Jamestown/Georgetown Township border.

407 Manholes

Gravity Sewer Pipes:

9,875 feet of 21" gravity

3,925 feet of 18" gravity

6,123 feet of 15" gravity

870 feet of 12" gravity

10,689 feet of 10" gravity

55,237 feet of 8" gravity

9,055 feet of 4” small diameter gravity

Forcemain Sewer Pipe

4,380 feet of 12” forcemain

2,985 feet of 10” forcemain

7,834 feet of 6” forcemain

Small Diameter Sewer Pipe

1,123 feet of 4” sewer

4,994 feet of 3” sewer

The sanitary sewer system is less than 30 years old, and the pipe, manholes and pump stations, have a remaining life that extends well into the future. Only the one remaining original pump station is nearing the end of its useful service life. The system is well cared for with efforts made to maximize the expected life of the system. These efforts, in addition to the young age of the system, results in a sanitary sewer system that does not face significant or frequent problems. When a problem does arise, it is identified, and the issue is solved in a timely manner.

4. WASTEWATER ASSET INVENTORY

Assets within the Township’s sanitary sewer system were inventoried and located with a Trimble Geo 7 Centimeter GPS unit. The following items were located: manholes, pump stations, cleanouts, air releases and forcemain valves. This information was exported to ESRI ArcGIS software in State Plane coordinates and gravity sewer and forcemain piping networks were drawn using these points as well as record drawing information.

The size, year constructed, length, material and record plan index number were added to the inventory within the GIS software.

A record plan linked static map was also created to allow for quick reference to record plans for operator and Township staff to quickly be able to view record plans of assets geographically.

The ArcGIS database is geographically referenced so that each asset and all of its records can be accessed through the mapping. Each asset’s condition and risk are assigned within the database so that they can be tracked geographically and problem areas can be grouped for regular inspection, maintenance, rehabilitation or replacement.

Boss and Sons Environmental stores data on each sewer, manhole, pump station, forcemain, cleanout and valve within their tracking software and the ArcGIS system is regularly updated. This allows the GIS system to tabulate records of routine maintenance and other important notes for these system assets.

Along with the asset inventory, an inventory was also made of the recorded easements over the assets to determine where gaps were located and create an organized system for keeping these records. A linked map was created to allow the Township to quickly find utility easements within the township geographically.

5. CONDITION ASSESSMENT

Each manhole within the Jamestown Township sewer system was field inspected by a National Association of Sewer Service Companies (NASSCO) Pipe/Manhole Assessment and Certification Program (PACP, MACP) certified inspector using Level 1 inspection techniques. Some level 2 category information obtainable without entering the manhole was also gathered. Defects were noted and a scoring system developed to rate the condition of all manholes within the system. A total of 407 manholes were inspected.

Grant funding was not provided for sewer pipe inspection due to the relatively young age of the system, so the sewers were given the condition rating of the visual inspection of the manhole at the upstream end of the pipe section.

Pump stations and forcemain were evaluated and scored utilizing historical information and knowledge of the the operators and the Township Engineer. Higher ratings were given to assets with a known history of failure or defect.

The remaining useful life was estimated for each asset based on when it was installed and an assumed useful life which is different for each asset. The final probability of failure rating for each asset was then determined based on its condition assessment score and the remaining useful life of the asset. The condition of nearly all the wastewater collection system assets was “good” or “excellent” with only a few assets having minor issues. For example, 90% of all manholes and pipes within the collection system were rated as either a 1 or a 2 meaning they have a low probability of failure. No manholes or gravity sewer were rated a 5 meaning that failure is likely to occur.

6. CRITICAL ASSETS

Each asset was assigned with scores to assess the Probability of Failure and the Consequence of Failure. These results are multiplied to produce a Business Risk (BR) score. The BR score is useful in the prioritization of potential projects to be funded and implemented.

Consequence of Failure is a measure of the impact of the failure of a certain asset from a financial, economic, environmental and social perspective. These are also rated 1 through 5, with a 1 being a slight loss of system capacity or slight disruption to a limited number of customers and a 5 being massive system failure with persistent and extensive damage and cost.

The Business Risk of the system was then determined by multiplying the Probability of Failure Rating by the Consequence of Failure Rating to reach a score ranging from 1 to 25 with 1 being very low risk of failure and 25 being an extremely high risk of failure. The BR scores were then used to determine areas of concern within the collection system and to develop the Capital Improvements Plan.

The results of the condition assessments and Business Risk of each asset have been tabulated in a spreadsheet, and a summary table of the data is included in the appendix of this report. A map detailing the collection network and identifying the assets with the highest Business Risk score has also been included.

The Jamestown Township wastewater collection system has a very low business risk. Ninety three percent of the assets have a business risk score lower than a 5 and no asset has a risk higher than a 13 which is still only a medium level of business risk.

7. LEVEL OF SERVICE

The overall objective of the Jamestown Township Wastewater Utility is to provide reliable wastewater collection and treatment services at a minimum cost, consistent with applicable environmental and health regulations. To achieve this, the following are Jamestown Township's Level of Service (LOS) goals:

- Provide adequate system capacity for all service areas.
- Actively maintain collection system assets in a reliable working condition.
- Reduce inflow/infiltration (I/I) flow volumes to mitigate the potential for sanitary overflows, sewage in basements, and overloading of the collection system.
- Provide rapid and effective emergency response services to customers.
- Regularly review projected O&M and capital expenditures. Adjust user rates as necessary to ensure sound financial management of the wastewater system.
- Hold developers and contractors to a high standard of quality for sewer system extensions to assure a maintainable and sustainable system.

8. REVENUE STRUCTURE

A revenue and rate methodology review was conducted as part of the SAW grant activities for Jamestown Township. This review was used to examine if user rates and charges provide sufficient funding to pay for utility operating costs. This review was conducted by the Township and approved by the DEQ in early 2018 at the two-and-a-half-year mark of the grant as required by the DEQ. The existing rates and revenues were determined to be adequate to ensure the funding of operations and maintenance costs of the sanitary sewer collection system.

Jamestown Township bills its sewer customers based on their metered water usage. A 2013 random review of customer's meters revealed that at least twenty-percent of the meters had stopped working. Usage had been estimated every quarter. The working meters were 12 to 16 years old. Therefore, all meters in the Township were replaced with Sensus electronic iPERL meters in order to accurately bill customers for their water and sewer usage. Properly billing customers is of utmost importance to determine accurate rates and appropriate revenue for the system.

9. CAPITAL IMPROVEMENTS PLAN

A Capital Improvements Plan was developed for Jamestown Charter Township with recommendations for maintenance, rehabilitation, and reconstruction based on the Business Risk scores of each asset.

Future plans include the removal of the third original pump station, elimination of all old 3" and 4" small diameter gravity mains and septic tanks, abatement of H2S issues within the wastewater system and the extension of the gravity sewer system to serve new future developments.

The Capital Improvements Plan was developed to outline operations, maintenance, repair and replacement of the wastewater collection system for gravity sewer, manholes, forcemain and pump stations. The plan is broken into short-term and long-term segments.

Short-Term Projected Improvements

Project	Projected Cost
Gravity Sewer Cleaning – 21" Trunk line from Quincy Street to 22nd Ave	$35,000
Quincy Street Forcemain Residential Service Replacement east of Suntree Avenue	$50,000
Riley Street Gravity Sewer Extension	$690,000
Lotus, Franklin and Lincoln Street small diameter sewer and septic tank removal and replacement with gravity main	$450,000

Long-Term Projected Improvements

Project	Projected Cost
Gravity Sewer and Manhole Repairs	$30,000
Gravity Trunk Sewer Extension and 24th Ave Pump Station Abandonment	$475,000
Small Diameter Sewer and Septic Tank Removal Projects: 24th Ave south of Riley, 24th Ave between Franklin and Greenly and Riley Court	$1,300,000
Replace existing 6" Forcemain with 10" or 12" Forcemain: 24th Ave from Greenly to Quincy Streets and Quincy Street from 24th Ave to Valley Vista	$750,000

10. CONTACT INFORMATION

Jamestown Charter Township
2380 Riley Street
Hudsonville, MI 49426
Mr. Ken Bergwerff, Township Supervisor
Ph: 616-896-8376, kbergwerff@twp.jamestown.mi.us

Vriesman & Korhorn Civil Engineers
Mr. Colin Finch, P.E.
Ph: 616-277-2185, colin@vkcivil.com

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date November 28, 2018
(no later than 3 years from executed grant date)

The Jamestown Charter Township *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1268-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or No
   If No - Date of the rate methodology approval letter: May 18, 2018.
2) Significant Progress Made: Yes or No
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: ______________.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ______________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Ken Bergwerff at 616-896-8376 kbergwerff@twp.jamestown.mi.us.
Name | Phone Number | Email

11-29-18
Signature of Authorized Representative (Original Signature Required) | Date

Ken Bergwerff, Township Supervisor
Print Name and Title of Authorized Representative

April 2017

MEMORANDUM

SAW Grant Executive Summary

To:	City of Lake City	Date:	November 29, 2018
From:	Adam Segerlind, P.E. Darren Graham, P.E.	Re:	SAW Grant Executive Summary

GRANTEE:	City of Lake City
GRANT NUMBER:	1338-01
AUTHORIZED REPRESENTATIVE:	Brad Seger, Mayor
PLAN LOCATION:	City of Lake City Hall 115 John Street P.O. Box 1 Lake City, MI 48651
PHONE:	(231) 839-4561

1.0 INTRODUCTION

The City of Lake City was the recipient of a Stormwater, Asset Management and Wastewater (SAW) grant from the Michigan Department of Environmental Quality. An asset management plan (AMP) for the City's sanitary sewer system was developed and is available for review by the public. The AMP was developed in accordance with the grant application and the requirements of the grant agreement. The following Scope of Work was proposed in the grant application:

1. Collection System Map
    - Compile and develop a map of the sewer collection system.
    - Field locate system components with GPS equipment for inclusion in a system GIS database.
    - Develop a new AM/Geographic Information System (GIS) system to manage the assets of the system, including mapping software, hardware and training
2. Inventory and assessment of fixed assets
    - Brief description of the asset, its required capacity, level of redundancy, and ID number
    - Location of the asset
    - Year the asset was installed (when available)
    - Complete an asset condition assessment (manhole inventory, cleaning and televising).
    - Describe present condition of the asset (e.g. excellent, good, fair, poor)
    - Depreciated value of the asset

- Current asset replacement cost
- Risk Evaluation that combines the probability of failure and criticality of the asset
- Force account costs associated with the direct implementation of the AMP/GIS software and hardware, including locating manholes, assistance during mapping and televising efforts, asset assessment and data entry.

3. OM&R Budget and Rate Sufficiency
   - Complete an assessment of user rates and replacement fund.
   - Technical, legal, and financial costs to develop a funding structure and implementation schedule necessary to implement an AMP.
4. Level of Service
   - Establishing a Level of Service guidance, including service agreement development, public meeting costs, and ordinance costs.

To complete this work, the City of Lake City was awarded a grant totaling $515,565.00, with a 10% ($57,285.00) local match due to their Disadvantaged Community Status. As required by the grant agreement, this summary report has been prepared to meet the requirements of Section 603 of Public Act 84 of 2015 and includes the following information:

1. Contact Information
2. Review of the five major AMP components
3. List of major assets

2.0 MAJOR AMP COMPONENTS

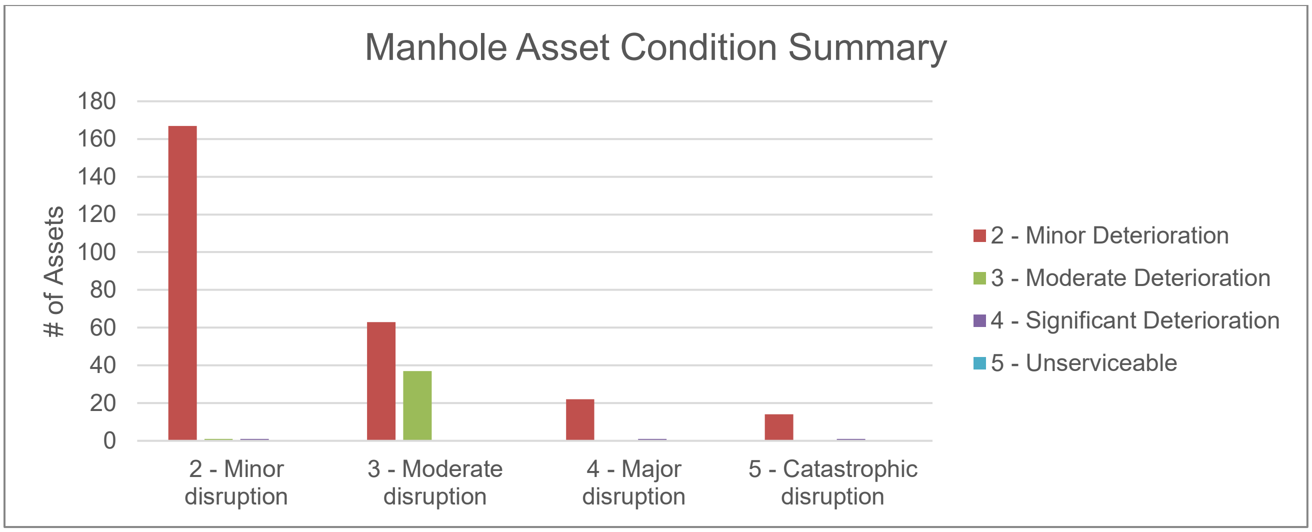
The City of Lake City elected to utilize a spreadsheet-based AMP platform to record and track asset data. The AMP includes sanitary sewer system components used in the collection, treatment, and analysis of sanitary sewer flows, and maintenance equipment for those systems. The five major components of the AMP, identified below, are summarized in the following subsections.

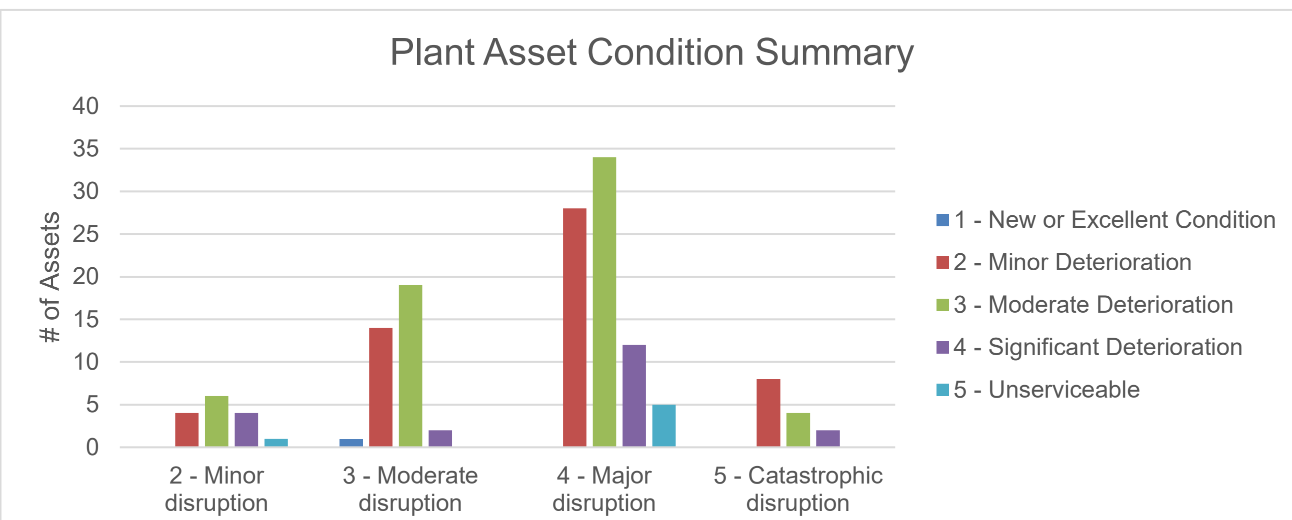
1. Asset Inventory and Condition Assessment
2. Level of Service
3. Criticality of Assets
4. Operation and Maintenance Strategies / Revenue Structure; and,
5. Long-term Funding / Capital Improvement Plan

2.1 Asset Inventory and Condition Assessment

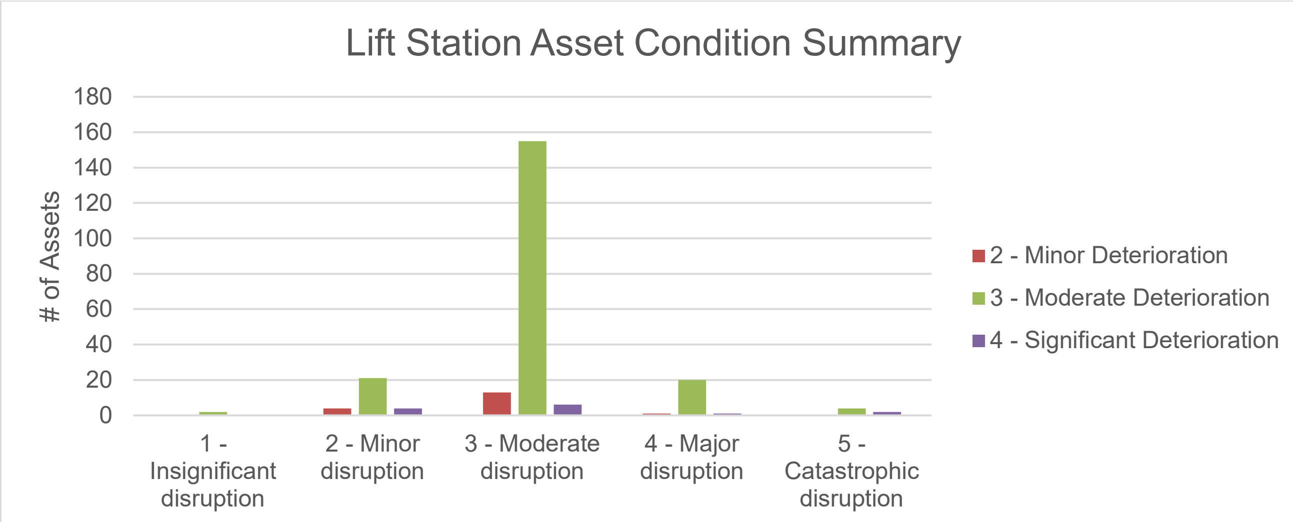
An asset inventory and condition assessments for the City of Lake City sewer system were compiled by City personnel and Gosling Czubak. Collection and treatment assets were categorized as Equipment; Lift Station; Plant; Manhole; or, Pipe assets and populated into the AMP spreadsheet. Conditions were assigned on a 1 (very good) to 5 (very poor) rating scale based upon visual inspections and operational experience of the City personnel. Qualifying gravity sewer pipes were inspected using CCTV techniques in accordance with the National Association of Sewer Service Companies (NASSCO) pipe standard. Manholes inspections were completed in accordance with the NASSCO level 1 standard.

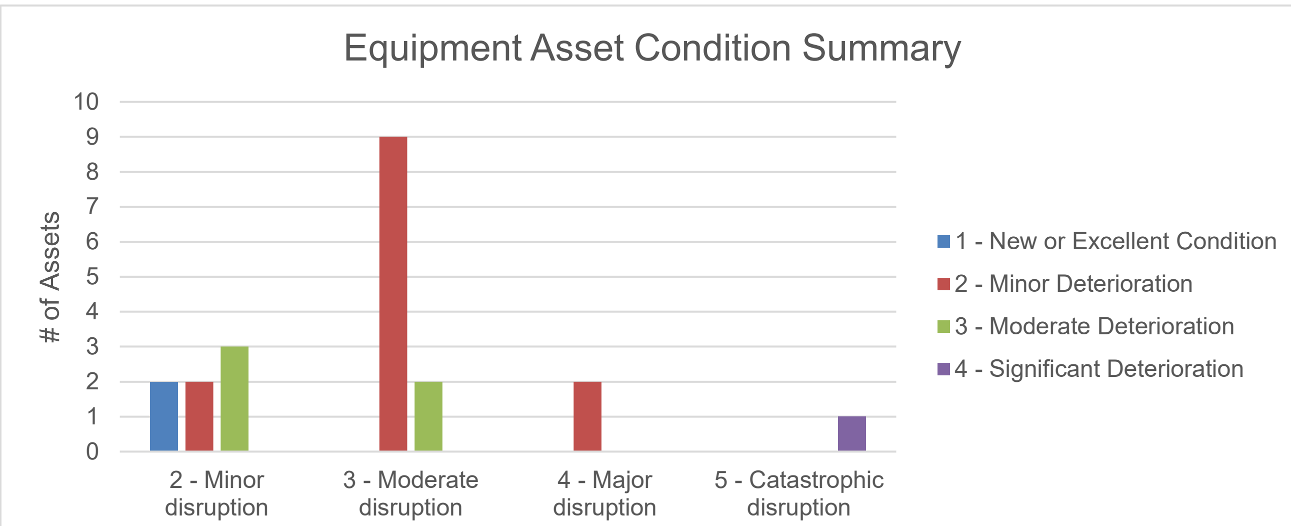
Condition and criticality for each asset category are summarized in the following charts.

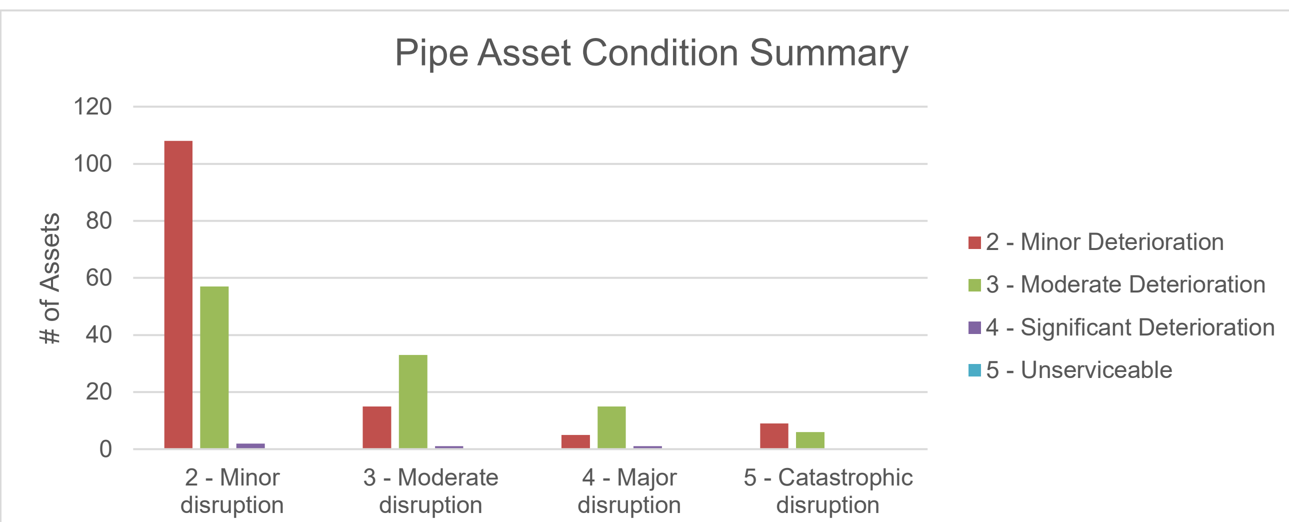




Gosling Czubak engineering sciences, inc.


Lift Station Asset Condition Summary
# of Assets
180
160
140
120
100
80
60
40
20
0
1 - Insignificant disruption
2 - Minor disruption
3 - Moderate disruption
4 - Major disruption
5 - Catastrophic disruption
2 - Minor Deterioration
3 - Moderate Deterioration
4 - Significant Deterioration


Equipment Asset Condition Summary
# of Assets
10
9
8
7
6
5
4
3
2
1
0
2 - Minor disruption
3 - Moderate disruption
4 - Major disruption
5 - Catastrophic disruption
1 - New or Excellent Condition
2 - Minor Deterioration
3 - Moderate Deterioration
4 - Significant Deterioration


Pipe Asset Condition Summary
# of Assets
120
100
80
60
40
20
0
2 - Minor disruption
3 - Moderate disruption
4 - Major disruption
5 - Catastrophic disruption
2 - Minor Deterioration
3 - Moderate Deterioration
4 - Significant Deterioration
5 - Unserviceable

2.2 Level of Service

The City of Lake City's Infrastructure Committee established the Level of Service for the sewer utility. The Level of Service was presented to the Council, and members of the community, during an October 25, 2018 City Council work session.

AREA OF SERVICE	GOAL	ACTION STEPS
Regulatory	Meets all minimum State and Federal regulatory requirements and operates in a manner that is protective of the environment and public health.	Follow all State and Federal permit requirements. Report violations promptly. Develop an action plan to prevent future violations.
Staffing	Has adequate staffing to conduct routine operations and maintenance, as well as respond to emergency situations.	Annual operating budgets will support the staffing levels recommended by the system operator.
Emergency Response Time	Customer and system emergency response time within 60 minutes to 24 hours depending on type of emergency.	Staffing levels will support on call time and staff "off time". Customers will receive written notice 24 hours in advance of any planned interruption in service.
Training	Has adequately trained staff with the proper certifications to keep the utility within regulatory compliance and conduct day-to-day operations safely.	Must have operator in charge & backup operator on staff.

AREA OF SERVICE	GOAL	ACTION STEPS
Funding	Generates revenue to cover all costs, including operations and supplies, labor, training, and annual savings for future repair and replacement of equipment.	Follow MDEQ Asset Management Guidelines and re-evaluate sewer rates every year through the budgeting process.
Master Planning	Generates revenue to fund periodic Capital Improvements to ensure system assets have adequate capacity, redundancy, and are in proper working order.	Budgeting process will anticipate CIP needs and funding.
Customer Service	Be available to help customers with questions regarding billing, new services, and complaints.	Responds to customer questions, requests, and complaints in a prompt and professional manner.
Efficiency	Provides efficient operations and make prudent decisions to keep user costs as low as possible while maintaining the Level of Service desired.	Annual review of operating budget and user rates will balance the need of system assets with reasonable rates and charges.
Health & Safety	To provide a safe and injury free work place	Conduct regular safety meetings and in-house safety inspections.

2.3 Criticality of Assets

The criticality of each asset was assigned based on how much disruption an asset's failure may cause to the system. Criticality ratings were assigned on a scale of 1 (insignificant) to 5 (catastrophic). Factors considered during the criticality evaluations include:

1. Redundancy of asset
2. Proximity to surface waterbody

3. Proximity to sensitive populations (i.e. hospital, jail)
4. Current use status (i.e. backup or active)

2.4 Operation and Maintenance Strategies / Revenue Structure

A financial analysis of the 2018/2019 budget was submitted by H.J. Umbaugh and Associates at the 2.5-year mark of the grant. It was determined that a funding gap did not exist based on their current revenue and expenses. The MDEQ approved the rate methodology in a letter dated June 27, 2018.

Each asset in the AMP is classified as either a Capital or Repair, Replace and Improve (RRI) asset. The RRI assets are generally considered to be assets with less than a 20-year lifespan that are typically repaired or replaced with funds from the sewer fund. RRI cost projects for the next 20 years, based upon the anticipated replacement year, were added to the revenue structure review for consideration by the City.

2.5 Long-term Funding / Capital Improvement Plan

Capital assets generally have a longer lifespan and may require the use of another funding source to implement repair or replacement. Potential capital improvement projects identified during preparation of the AMP include:

1. Replacing Truck #1
2. Replacing the Air Break Structure
3. Replacing Irrigation Rig #4 and its controls
4. Replacing two manholes and one section of gravity pipe

Some potential long-term funding scenarios were presented to the City Council for evaluation by H.J. Umbaugh and Associates. It is the City's responsibility to review and evaluate the funding scenarios presented and determine the best course of action as it relates to user rates, capital and repair projects, and the sewer fund cash balance.

3.0 MAJOR ASSETS

The major assets for each of the five asset categories are summarized in the following tables.

EQUIPMENT ASSETS
Vactor Truck
Truck #1
Tractor
Portable Generator
Well Pump #1
WWTP – Main Building

PLANT ASSETS
Irrigation Rig #1
Irrigation Rig #2
Irrigation Rig #3
Irrigation Rig #4
Irrigation Rig #5
Irrigation Rig #6
Irrigation Rig #7
Irrigation Rig #8
Lagoon #1
Lagoon #2
Lagoon #3
Lagoon #4
Irrigation Pressure Piping
Air Break Structure
Main Plant Building

LIFT STATION ASSETS
Lift Station A – Main Lift Station
Lift Station B – S Houghton Street
Lift Station C – WESCO Parking Lot
Lift Station D – W Logan Street
Lift Station E – E Broadway Street
Lift Station F – W Broadway Street

MANHOLE ASSETS
Gravity Sewer Manholes (252)
Force Main Structures (7)
Lift Station Wet Wells (5)
Lift Station Valve Chambers (5)
Timber Wolf Force Main Assets (59)

PIPE ASSETS
6” Force main (3,420’ +/-)
8” Force main (785’ +/-)
12” Force main (8,500’ +/-)
Irrigation Force main (11,650’ +/-)
STEP Force main (19,675’ +/-)
6” Gravity (1,075’ +/-)
8” Gravity (54,650’ +/-)
10” Gravity (3,200’ +/-)
12” Gravity (600’ +/-)

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date November 30, 2018
(no later than 3 years from executed grant date)

The City of Lake City *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1338-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: ~~Yes or~~ No
   If No - Date of the rate methodology approval letter: June 27, 2018.
2) Significant Progress Made: Yes or No
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: ____________.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ____________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Ray Vasser at 231-839-4469 lakecityservice@centurytel.net
Name Phone Number Email

Brad A. Seger 11-30-18
Signature of Authorized Representative (Original Signature Required) Date

Brad Seger, Mayor
Print Name and Title of Authorized Representative

HUBBELL, ROTH & CLARK, INC
CONSULTING ENGINEERS SINCE 1915

MEMORANDUM

To: Michigan Department of Environmental Quality (MDEQ)
Revolving Loan Section, Attn: Mr. Jonathan Berman

From: Hubbell, Roth and Clark, Inc.

CC: Village of Lake Orion/WRC

Date: November 30, 2018

Re: Village of Lake Orion Sanitary Sewer System
MDEQ Stormwater, Asset Management and Wastewater (SAW) Grant #1146-01
Summary of Wastewater (and Stormwater) Asset Management Plan

The following is a summary of the work completed under the MDEQ SAW Grant work performed by the Village of Lake Orion (VLO). It includes a summary of the project scope, results and findings of activities covered by the grant, grant amount spent and match amount, and contact information. It has been prepared as required under Section 603 of Public Act 84 of 2015, and follows recent MDEQ guidance.

GRANTEE INFORMATION

Village of Lake Orion, SAW Grant Project #1146-01

Project Grant Amount: $596,970

Applicant Match Amount $66,330

Village of Lake Orion
Jeremy Richert, Public Works Director
richertj@lakeorion.org
248-693-8391 ext. 106

Hubbell, Roth & Clark, Inc.
Karyn Stickel, PE, Associate
kstickel@hrcengr.com
248-454-6566

WRC Project Manager
Rick DeVisch, PE, Civil Engineer
devischr@oakgov.com>
248-858-4939

EXECUTIVE SUMMARY

The Oakland County Resources Commissioner (WRC) on behalf of the Village of Lake Orion (Village) applied for and received a grant to further develop an Asset Management Plan (AMP) for its sanitary system through the Michigan Department of Environmental Quality's (MDEQ) Stormwater, Wastewater and Asset Management (SAW) program. Because the SAW program was funded through monies appropriated for water quality, other related infrastructure systems, such as drinking water, were not eligible for funding through the grant, but are considered in analysis and recommendations where appropriate.

The Village's sanitary sewer system is owned by the Village and is operated and maintained by the Oakland County Water Resources Commissioner (WRC.) The WRC has various tools used to manage the assets it owns or operates and maintains, including a GIS geodatabase, collaborative asset management system, hydraulic models, condition assessment methods, risk and prioritization models, capacity studies, asset deterioration models, and an operating and capital improvement project prioritization model. These tools are used to guide the short and long-term strategies for WRC to operate the various systems in a sustainable manner that meets the required level of service, with a focus on prioritizing assets that are most critical and being cost-effective. The funding strategy for each fund is also evaluated annually through WRC's "Long-Term Plan" (LRP) process that includes a review of the current rate structure, fund balances and anticipated future funding needs.

The WRC "Common to All" approach was generally followed with in development of the asset management plan for this system. The following is a summary of the AMP, as required by the grant, which includes a brief discussion of the five major AMP components, a list of the plan's major identified assets, and contact information for the grant.

WASTEWATER INVENTORY

WRC uses its existing Geographic Information System (GIS) geodatabase as the primary means to inventory and map the assets in the system. The geodatabase includes key attributes associated with each asset, such as installation date (age), size, material, along with other information as needed for a given asset type.

WRC currently uses the Cityworks software package for its Computer Maintenance Management System (CMMS,) which then collaborates with the GIS to present a single interface to the user via the Collaborative Asset Management System (CAMS.) CAMS assists in managing inspections and maintenance work by generating and tracking work orders, collecting inspection and condition data, and compiling costs and hours spent on each asset. Maintenance history and costs can be tracked on an asset and/or fund level.

Condition assessment tools and protocols were developed by WRC to allow for efficient and consistent recording of asset condition. For sanitary, combined, and stormwater sewer assets, a NASSCO-compliant software program stores data collected during sewer televising. The data stored can be shared with the existing CAMS system. Inspection work orders in the CAMS system are used for evaluation of other types of assets, such as manholes and other collection system structures, and for most vertical asset types, such as pumps, valves, structures, etc.

As part of the grant for VLO, the GIS geodatabase inventory was reviewed for completeness and to ensure critical attributes were populated. Approximately 56,593 lineal feet of gravity sewer underwent condition assessment via cleaning and televising. Approximately 347 manholes were evaluated using the using MACP Level 1 plus form through the CAMS inspection work orders process. Vertical assets, including pump stations, were inventoried using a WRC hierarchy template and condition assessment data was collected and input into the CAMS system.

CRITICALITY OF ASSETS

WRC implemented PowerPlan asset optimization software as part of the “Common to All” Program. Baseline Probability of Failure (POF) and Consequence of Failure (COF) factors were configured into the software as part of that Program, and were used to estimate the overall risk of the horizontal assets (sewers and associated structures.) For pump stations and storage and treatment facilities, individual assets were reviewed by staff as part of the grant work, and POF and COF factors determined and input into the software.

Both the POF and COF were scored on a scale of 1 to 5, with 1 being the lowest probability or consequence of failure, and 5 corresponding to the highest probability or consequence of failure. The Business Risk Evaluation (BRE or Risk) score is the product of the POF score and the COF score (POF times COF equals Risk,) and has a scale of 1 to 25. Higher BRE scores identify the assets with the greatest overall risk.

The POF and COF for horizontal assets are determined using scoring values developed uniquely for each asset type, such as gravity main, non-gravity main, manhole, etc. The POF and COF scores for each asset type are calculated using attribute data from the GIS geodatabase, inspection data from the CAMS system, and NASSCO PACP and MACP ratings. The primary attribute for determining the POF of gravity mains (sanitary and storm sewers) was the PACP Structural Quick Score. The PACP Maintenance Quick Score and age are also incorporated into the POF rating. Where PACP scores were not available, the POF score was based on the age-based assumed condition.

For force mains, the POF was based on age, normal operating pressure, quantity of repairs tracked in the CMMS, and velocity. For manholes and other access structures, the POF is based primarily on the MACP fields cover condition, frame condition, chimney condition, cone condition, wall condition, bench condition, and channel condition along with age. If the MACP data was not available, the score was based on just age.

The COF for mains and access points (storm and sanitary sewers, force mains, siphons and related structures) was determined based on asset depth, size, proximity to groundwater and flood zones, and proximity to roads and intersections.

The POF and COF of vertical assets were calculated using a scoring matrix. The POF for vertical assets was calculated using a combination of age and physical condition collected from inspections performed using work orders through the CAMS system. O&M protocol and performance factors were also scored and used in the calculation. In the absence of any other data, age was used to estimate POF. The COF for vertical assets was scored using a matrix of factors including: safety of public and employees, financial impact, public confidence, regulatory compliance, and firm capacity.

LEVEL OF SERVICE DETERMINATION

At the strategic level, the Level of Service (LOS) identifies the long-term goals and strategies of the organization. An overall LOS guiding matrix was developed to document the goals and strategies of the WRC organization. The WRC Mission Statement and the annual LRP rate process form additional elements of the LOS.

The WRC’s current Mission Statement is:

> *The Oakland County Water Resources Commissioner's Office is dedicated to the preservation and protection of our water environments, public health, welfare, convenience and the citizen's right*

to quality water. We are committed to acting with integrity and professionalism and will always seek collaboration among our Oakland County communities and regional partners.

We commit ourselves to providing our customers with high value services that are fairly priced, environmentally sound and sustainable in the long term. We are committed to an open dialogue with our communities and promise to keep lines of communication open.

In our pursuit of excellence and continuous improvement, every member of our staff will respond to issues of the public promptly, safely, respectfully and with sensitivity to their individual needs. Our office will always endeavor to provide an appropriate resource when an issue is not within our authority.

We will install a culture that perpetuates an environment promoting trust, respect and teamwork, both within our organization and among our communities and region.

The WRC strategic Level of Service Goals included:

- Financial Viability and Impact. Goal: Emergency repairs can be repaired within Utility Reserve Budgets of the system. Measurable: Exceedances of reserve budgets
- Public Confidence and System Service Impact. Goal: Minimal to some loss of service or impact on other services for less than four hours. No sewer system or basement backups. Minor disruption (e.g., traffic, dust, noise.) Measurable: Number of service interruptions, complaints, and backups.
- Regulatory Compliance. Goal: No state permit violations and comply with all MDEQ policies. Measurable: Number of violations
- Safety of Public and Employees. Goal: Non-reportable injuries, no lost-time injuries or medical attention required. No impact to public health. Measurable: Number of injuries and any public health advisories.
- Redundancy. Goal: Comply with 10 State Standards. Measurable: Number of violations.
- Risk and BRE score: Goal: 70% of assets have a BRE less than 15. Measurable: System risk score.
- Staffing. Goal: Staffing levels and training maintained to meet level of service. Measurable: Number of open positions, training hours.

At the tactical level, the LOS focuses on the prioritization in the medium-term and identification of factors and indicators related to performance, cost, risk, and failure probability. The Probability of Failure and Consequence of Failure scoring matrices used in the criticality and risk analysis were developed using the strategic LOS guidance. Progress toward the goals are measured through the CAMS analytic data, and is reviewed as part of the LRP process with internal staff and customers.

At the operational level, the LOS is related to procedures and information related to the short-term, day-to-day operation. Performance is measured at the asset level using work orders to collect data, and annual reporting of measurables and progress toward goals with operational staff.

REVENUE STRUCTURE

The annual operation and maintenance budget includes the typical costs spent each year to operate the system and to perform normal maintenance activities. This baseline O&M budget does not include major capital improvements that are required to increase capacity, meet new regulatory requirements, or replace items that have failed or reached the end of their useful service life.

The asset optimization software assisted WRC staff by developing recommended strategies for inspection, rehabilitation and replacement needs over the long-term for each system based on condition and risk. WRC project management staff then reviewed the recommendations generated by the software and rationalized the recommendations to “real world” needs, including any improvements required due to capacity or regulation changes. The WRC uses this information as part of its existing LRP rate process to prioritize projects and ensure adequate funding is available.

The LRP rate methodology is a tool to determine utility rates and charges to provide sufficient revenues to cover the anticipated operation, maintenance, replacement, capital improvement projects, and debt costs associated with a given system, as well as to maintain a reserve balance for emergencies or a significant one-time charge. It ensures adequate revenues are collected for budgeted needs in the current year, and over the long term.

The LRP includes multiple reserve accounts that are used to fund activities above and beyond the normal annual operation and maintenance costs. The reserve accounts include:

- Emergency Repair Reserve for unexpected repairs due to system failure or catastrophic events.
- Capital Improvement Plan (CIP) Reserve for replacement of equipment or facilities in kind or with alternate technology.
- Major Maintenance Reserve which is used to minimize fluctuations of expenses not accounted for in annual operating budgets.

WRC worked with its internal fiscal staff to determine if the system’s current rate structures were sufficient to meet the current needs for the management of the wastewater system, and to plan for any adjustments that may be required to meet anticipated future expenses. A demonstration of sufficiency of the system’s current rate structure was made, as required by the SAW Grant Program, and submitted to the MDEQ six months prior to the SAW grant end date.

CAPITAL IMPROVEMENT PLAN

The asset optimization software forecasts and prioritizes assets that require replacement in the planning period. The individual replacements can be combined into projects and scheduled with budget amounts established. This information is then used in the LRP process to determine rate needs for funding the project established. A list of capital projects was developed for VLO’s sanitary sewer system, using recommendations from the asset optimization software, and consideration of other system needs.

The recommended projects are summarized below. Projects listed for implementation in the 0 to 5-year range include cost estimates prepared on data available at the study/feasibility level. Projects in the 5 to 20-year range are based on broad concepts only and costs are based on cost curves and other general tools. All projects are listed for financial and resource planning purposes only. Changes to project inclusion, scope, cost and/or timing are expected as resources are allocated and changes occur in prioritization, regulations, technology, cost and other data becomes available. Cost are not included for SCADA updates in years 6 to 10 because of rapid changes in technology

Capital Projects, 0 to 5 years:

- Sewer Open Cut: $ 69,000
- Sewer Point Repair: $ 30,000
- Sewer Spot Liner: $ 46,000
- Sewer Pressure Test: $ 16,000
- Sewer Seal Joints: $ 10,000
- Sewer Tap Repair: $ 1,000
- *Sewer Heavy Clean, Pre CCTV, Post CCTV: $ 32,000
- Manhole Repair (Cover, Joints, Adjust): $ 25,000

SUBTOTAL Collection System **$ 229,000**

- Lift Station – Site Access: $ 140,000
- Lift Station – Mechanical: $ 645,000
- Lift Station – Electrical: $ 2,415,000
- Lift Station – Structural: $ 830,000
- Lift Station – Construction: $ 1,009,000
- Lift Station – Engineering: $ 1,009,000

SUBTOTAL Lift Stations **$ 6,048,000**

Capital Projects, 6 to 10 years:

- Sewer Line Pipe: $ 69,000
- Sewer Spot Liner: $ 51,000
- Sewer Pressure Test: $ 46,000
- Sewer Seal Joints: $ 22,000
- Sewer Tap Repair: $ 6,000
- *Sewer Heavy Clean, Pre CCTV, Post CCTV: $ 84,000
- Lift Station - On Going SCADA Upgrades TBD

SUBTOTAL Collection System **$6,048,000**

*Funding could come from OMR budget.

TOTAL 10-year CIP **$ 6,555,000**

Capital Projects, 10 to 20 years:

There were no CIP sewer projects identified for this period; however, in accordance with WRC's Asset Management Program ongoing inspections will be made and future projects will be identified as need arises.

For the lift stations, if the above CIP is implemented no additional CIP projects will be required during this period.

RECOMMENDATIONS

In order to keep this AMP sustainable into the future, the LRP process will be undertaken annually to review existing recommendations, status of current projects, and forecasted needs against available reserves and anticipated funding. The asset optimization tool will be regularly synced with CAMS to incorporate any new GIS and operational and condition data. The software will then automatically update recommended events, treatment and replacement strategies, and capital projects. The updated recommendations will be reviewed quarterly and as part of the annual LRP to ensure the availability of required funds for the projects.

LIST OF MAJOR ASSETS

The VLO sanitary sewer system major assets include:

- 65,329 feet of gravity sewer
    - 44,459 feet of 8” inch or smaller diameter
    - 15,045 feet of 8” to 12” inch diameter
    - 5,106 feet of 12” to 16” inch diameter
    - 720 feet of 16” to 24” inch diameter
- 7,078 feet of non-gravity sewer
- 391 manholes
- 16 lift stations

PROJECT HIGHLIGHTS

The development of this Asset Management Program for the system name was led by WRC with assistance from the VLO and HRC. The following highlights some of the more tangible outcomes from the Program development:

- The GIS was updated with age, material, size and depth information.
- Televised 58,861 lft (90%) of the system.
- Inspected 346 manholes
- Inspected 16 lift stations including ultrasonic testing
- Model of the system developed to determine areas of flow restrictions
- Reviewed of frequently cleaned sewers and made recommendations for FOG public education.

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Certification of Project Completeness

Completion Date November 30, 2018
(no later than 3 years from executed grant date)

The Village of Lake Orion *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1146-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or ***No***

   If No - Date of the rate methodology approval letter: June 19, 2018.

2) Significant Progress Made: Yes or No

   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)

3) Date of rate methodology review letter identifying the gap: ________________.

4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ________________________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

K. Joseph Young, at 248-693-8391, ext. 101 youngj@lakeorion.org

Name | Phone Number | Email

K. Joseph Young Nov. 26, 2018

Signature of Authorized Representative (Original Signature Required) | Date

K. Joseph Young, Village Manager

Print Name and Title of Authorized Representative

Stormwater, Asset Management, and Wastewater (SAW)

Asset Management Plan Executive Summary

SAW Grant No. 1396-01

Village of L'Anse
101 N. Main Street
P.O. Box 157
L'Anse, MI 49946
Robert LaFave, Village Manager
(906)524-6116

Executive Summary

Village of L'Anse was awarded the SAW Grant in 2015. The Village of L'Anse Sewer System consists of sewer collection mains, seven lift stations, one treatment facility and maintenance equipment. Maintenance is performed by the Village of L'Anse Waste Water Treatment Plant Operators & the Department of Public Works personnel. The Village of L'Anse was established in 1861, and some of the existing sewer collection system is well over 100 years old. The bulk of the existing system was constructed as a combined sewer/storm collection system discharging directly to the Keweenaw Bay/Lake Superior prior to development of wastewater treatment facilities.

Continuous efforts have been made to improve the sanitary sewer collection & treatment systems and to reduce inflow and infiltration (I&I) into the Village of L'Anse sewer collection system. However, due to the age & construction of the system, there is continual I&I from ground water, building drain connections, and storm water into the sewer collection system.

This SAW Grant includes compiling an inventory of all sewer system assets and developing an Asset Management Plan (AMP) and developing a Geographical Information System (GIS). The AMP provides proposed 20-year capital improvements, maintenance recording platform, system replacement budgeting, and financial budget planning.

The Village of L'Anse sewer system consists of approximately 95,000' of sewer main and 360 man holes. Sewer mains that were not previously televised in the last 15 years and were older than 20 years of age were televised. All manholes found were televised regardless of age. All found manholes were surveyed and this survey data was used to create the master mapping. All of this information was gathered and put into ESRI mapping/GIS system.

The final project total was $352,461.43 of the grant (100% grant, no local match).

Wastewater and/or Stormwater Asset Inventory

The system components included in the asset management include the 95,000' of sanitary sewer and 360 man holes, seven lift stations, and the treatment facility. It also includes the sewer maintenance equipment operated by the Village of L'Anse DPW. All system components were gathered in the field using surveying methods. That information was then drafted using AutoCAD then exported into the GIS mapping system to compile a complete map of the sanitary sewer. Pipeline televising and manhole inspection information linked to the various components in the master sewer system.

The GIS mapping system is then linked to the Asset Management database, a program developed by UPEA to meet the specific needs of the Village of L'Anse. The program is easily updated and modified by Village of L'Anse staff when changes are made within the system. The database also includes budget information, replacement plans, capital improvement plans, and maintenance plans.

Condition Assessment

The condition assessment was completed by applying the condition rating per the PACP/ MACP standard pipeline reviewing protocol for coding defects and construction features. This information was sufficient to assess the condition of the system components. Analysis was then performed on the location and criticality of the components so a failure criticality rating could be designated for each component. Overall the system is in good condition with the following percentages of component conditions; good (53%), fair (22%) and poor (25%)

Level of Service Determination

The Village of L'Anse desires to meet all DEQ requirements in regards to level of service expected from a Municipal Sewer Collection and Treatment System. The goal is to provide a system that effectively transmits all of the sewage within the system. This is achieved by preventing direct discharges of untreated sewage into the environment. By completing past and future sewer separation projects and sewer improvement projects, they have taken the appropriate steps toward ensuring this goal is obtained.

Criticality of Assets

The criticality level of the assets was determined by reviewing the entire collection system and determining the severity of defects to each pipe segment. The televising and grading by the PACP/ MACP standard provided an initial rating for structural condition and maintenance condition. This rating was further refined based on reviewing the televising video and adjusting for severity of defect, taking into account the sewer operators first-hand accounts of known issues, and also by applying the Village of L'Anse's priority level on various areas of the system.

This review/rating process required a strong understanding of the existing sewer system, which was developed during the review of the system information throughout the course of the SAW grant project.

Revenue Structure

Rates, charges, expenditures, capital improvements, replacement costs, maintenance cost and debt payments are all taken into consideration in the asset management database that was developed by UPEA. This information was then shared with a financial consultant who reviewed and updated the current and projected necessary revenues.

Capital Improvement Plan

The Village of L'Anse intends to undertake a series of improvement projects over the next 20 years to address deficiencies in their sewer collection and treatment system. These projects will be funded by USDA RD loan/ grant funding.

Phase 1:

Proposed Construction 2019-2023
Miscellaneous sewer segment repairs throughout the system primarily on N Main Street & Plant Headworks.

Construction:	$ 1,655,000
Contingency:	$ 120,000
Engineering/ Administration:	$ 200,000
Bonding/ Legal:	$ 25,000
Total:	$ 2,000,000

Phase 2:

Proposed Construction 2024-2028:
Miscellaneous sewer segment repairs throughout the system at the plant, lift stations and mainline sewer.

Construction:	$ 1,525,000
Contingency:	$ 180,000
Engineering/ Administration:	$ 270,000
Bonding/ Legal:	$ 25,000
Total:	$ 2,000,000

Phase 3:

Proposed Construction 2029-2033:
Miscellaneous sewer segment repairs throughout the system Primarily plant and Manhole Rehab.

Construction:	$ 1,190,000
Contingency:	$ 120,000
Engineering/ Administration:	$ 240,000
Bonding/ Legal:	$ 25,000
Total:	$ 1,575,000

Phase 4:

Proposed Construction 2034-2038:
Miscellaneous sewer segment repairs throughout the system, Primarily Collection and UV Disinfection.

Construction:	$ 1,535,000
Contingency:	$ 170,000
Engineering/ Administration:	$ 270,000
Bonding/ Legal:	$ 25,000
Total:	$ 2,000,000

Recommendations:

We recommend the continued use of the GIS mapping and Asset Management Database. These items should be useful tools for everyone involved with the sewer system. The systems should be updated as aspects of the sewer system changes.

List of Major Assets

Below is a general list of the major assets identified in the AMP.

- Approx. 95,000 *feet Sanitary Main of 6 - 15 inch pipe*
- Approx. 360 *manholes*
- *7 lift stations*
- 1 *treatment facility*
- Approx. 976 *sewer service lines*

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date 11/16/2018
(no later than 3 years from executed grant date)

The Village of L'Anse *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1396-1 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or No

   If No - Date of the rate methodology approval letter: 5/14/18.

2) Significant Progress Made: Yes or No N/A

   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)

3) Date of rate methodology review letter identifying the gap: N/A.

4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on N/A.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Village of L'Anse	at (906) 524-6116	manager@lansemi.org
Name	Phone Number	Email

Robert Alan La Fave | 10-29-2018

Signature of Authorized Representative (Original Signature Required) | Date

Robert LaFave, Village Manager

Print Name and Title of Authorized Representative

City of Leslie SAW Grant

106 East Bellevue Street

Leslie, MI 49251

www.cityofleslie.org

City of Leslie Contact Information:

Ron Bogart – (517) 589-5115

SAW Grant No. 1001-01

Executive Summary

The City of Leslie received a SAW Grant in 2015 to prepare a Waste Water Asset Management Plan. The grant agreement indicated the following amounts:

Plan Cost	Grant Amount	Local Match
$131,806.00	$113,703.00	$18,103.00

The Key components in their Asset Management Plan include:

a. Asset Inventory and Condition Assessment
b. Level of Service
c. Criticality of Assets
d. Operation and Maintenance Strategies/Revenue Structure
e. Long-term Funding/Capital Improvement Plan

Asset Inventory

Describe the system components included in the AMP. Discuss how they were located and identified, if applicable. Describe the platform used to develop and maintain the inventory of assets.

All assets that are functionally or financially significant to the waste water system have been inventoried.

- Collection system manholes, catch basins, and outlets were located using survey quality GPS.

- Lift stations were located using record drawings and satellite imagery.

Locations for all assets (with fixed location) are documented in AutoCAD files. The location of all non-pipe assets such as building components and other equipment is compiled in an inventory spreadsheet, which are not mapped in GIS. The GIS and asset spreadsheet will be used to maintain asset data in the future.

Condition Assessment

Discuss the condition assessment process, including what methods were used. Summarize the results of the assessment for each asset category.

The condition of the sanitary sewer network was evaluated and documented using a camera televising service. The televising service was utilized to travel from one manhole to another noting cracking, taps, joint offsets, backfall, infiltration, etc.

Using the televising data, the pipe segments between each manhole were rated based on several factors including joint conditions, wall corrosion, and infiltration. Composite Risk of Failure ratings of 1-5 (5 being the worst) were assigned to each pipe segment.

Percentage of mainline pipes within each rating category

1	2	3	4	5
30%	20%	17%	15%	18%

Manholes were visually inspected and rated on a scale of 1-5 (5 being the worst) based on factors related to the condition of castings, steps, and structures.

Percentages of manholes within each rating category

1	2	3	4	5
68%	8%	7%	14%	3%

Lift station inspections included in field observation of equipment and structure along with review of remaining useful life of each component. The Washington Street Life Station after review was determined to require replacement (this asset has been deleted from the inventory as the City of Leslie has opted to install gravity sewer in its place).

Level of Service Determination

Discuss the level of service the municipality has determined that it wants to provide its customers based on the municipality's ability to provide the service and customer expectations. Discuss the procedures used to involve stakeholders in the AMP discussion. What are the trade-offs for the service to be provided? This may include any technical, managerial, health standard, safety, or financial restraints, as long as all regulatory requirements are met. Discuss how this was determined.

The overall objective of the City of Leslie is to provide a reliable wastewater collection service at minimal cost, while maintaining applicable environmental and health regulations. To meet said objective the following basic Level of Service goals have been established:

- Provide adequate collection system capacity for all service areas.
- Comply with all governmental regulations (local, state, and federal)
  - Maintain at least 2 Certified Operators
  - Meet NPDES discharge requirements
  - Minimize opportunities for sanitary sewer overflows
- Maintain sanitary sewer system network in reliable working condition.
  - Staff/equip crews adequately to perform routine maintenance items.
  - Repair/replace assets as required to limit emergency responses.
- Maintain capacity for community growth.
- Review health and safety procedures for operations staff to provide proper worker safety.
- Review rates annually to maintain adequate financial reserves.
- Review Asset Management Plan annually.

The Level of Service goals shall be reviewed and modified annually to reflect the desired operation of the utility with relation to the systems age, needs of the community, and changes in rules or regulations that may require a change in operation.

Criticality of Assets

Provide a summary of the method used to assess the criticality of assets considering the likelihood and consequence of failure. Based on the condition of the assets, and the determined risk tolerance, how were the assets ranked? What assets were considered most critical?

The criticality of system assets was examined regarding the importance to the overall operation of the system. To determine the criticality of system assets a Business Risk Evaluation (BRE) was performed by analyzing the Consequence of Failure (CoF) and Risk of Failure (RoF) of each asset.

The CoF was determined for the gravity mains and manholes using the following factors:

- Economic Impacts (Diameter of Asset, Depth of Asset, and Surface Type)
- Regulatory Compliance (Distance to Surface Water)
- Community Disruption (Number of Customers)

The CoF of the pump stations was determined by analyzing the overall effect in the event a pump station was out of service. Each gravity main, manhole and pump station was assigned an overall CoF rating of 1 to 5. A rating of 1 being a slight effect to 5 being a severe disruption to the system.

The RoF was determined for the gravity mains and manholes using the following factors:

- Structural Condition
- Operation & Maintenance Performance

The RoF for the gravity mains, manholes and pump stations were determined to be directly related to the structural condition and operation and maintenance performance. Gravity mains and manholes with structural problems such as breaks, holes, chemical surface spalling, or fractures are most in danger of failure. Structural ratings contribute 60% of determining the RoF. Operational and maintenance problems contribute 40% to determining the RoF of a gravity main failure. As part of the pump station RoF, the project team reviewed the age and existing condition of each pump station component. An overall RoF rating of 1 to 5 was assigned to each gravity main, manhole and pump station. A rating of 1 being excellent condition to 5 being unserviceable.

Consequence of Failure and Criticality should not be confused. Criticality is the product of an asset's Risk of Failure (RoF) and Consequence of Failure (CoF). Criticality drives an asset's action priority.

Assets with the higher rankings for Consequence of Failure were those that:

- *Provide service to a significant portion of the system.*
- *Serve schools/hospitals/major industry*
- *Are under major roads*
- *Are adjacent to waterways or significant wetlands*

The final criticality ratings were considered when the comprehensive Capital Improvement Plan was generated.

Revenue Structure/Operations and Maintenance Strategies

Discuss how the rates, charges, or other means of revenue were reviewed to determine if there will be sufficient funds to cover system operation, maintenance, replacement, capital improvement projects, and debt costs, identified in the AMP. If the current rate structure was not sufficient, discuss what increases were needed to ensure the desired level of service is sustainable and if any changes were made.

Regular operation, maintenance and replacement (OM&R) is essential in the management of a wastewater collection system. The collection system is subject to a variety of operational problems and can suffer from clogging, scour, corrosion, and collapse. Inspection, cleaning, and rehabilitation are important for optimizing the proper functioning of the collection system. By optimizing the performance, infiltration/inflow are reduced and sanitary sewer overflows (SSO) are minimized or eliminated preserving the substantial investment the community has in its collection system.

An annual lift station replacement fund should be developed to replace disposable (end of life) equipment. These are items that can be financially accounted for through operation, maintenance and replacement (OM&R) funds can be replaced by City staff without bringing in an outside contractor. Existing disposable materials include wear parts in pumps and motors, etc.

The revenue and rate methodology is an instrument to determine user rates and charges that will provide sufficient revenues to pay for utility operating costs. The existing rates were determined to create sufficient funds to fulfill day-to-day maintenance and operations of the entire sanitary collection system.

Capital Improvement Plan/Long-term Funding

Describe the long-term Capital Improvement Plan that was developed to address system needs identified in the AMP. Provide a list of the identified improvements/projects.

A Capital Improvement Plan (CIP) was developed to outline operation, system maintenance, repairs, replacement and rehabilitation of pipes, manholes, and pump stations for a period of 20 years. No improvements in roadways are being planned at this time but if they are then other projects such as road and drinking water system work should be coordinated and considered in the process.

Based on the AMP condition assessment of the sanitary system, the City has identified assets for improvement. The repair/replacement of the aging sewer piping will have to be completed through sewer rates/government grant/loan programs such as USDA Rural Development of the State Revolving Loan Program.

1-5 year Capital Improvements include:

- Reconstruct and replace broken castings on manholes
- Repair/replace manholes that are in immediate need or correction
- Repair/replace segments of pipe that are in immediate need or correction

6-20 year Capital Improvements include:

- Repair/replace segments of pipe that need attention based on additional monitoring of the system
- Cleaning of gravity sewer
- Replace/improve Churchill Road Lift Station
- Disconnect any residential sump pumps from the wastewater collection system and connect to the stormwater collection system as needed to reduce the inflow of the system.

List of plan's Major Assets:

- 59,495 feet of 6-15 inch sanitary sewer pipe (per televising inventory documentation)
- 529 sewer service leads
- 240 sanitary sewer manholes
- 2 sanitary sewer lift stations (1 to be converted to gravity sewer)
- Extended air oxidation ditch treatment plant

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date November 5, 2018
(no later than 3 years from executed grant date)

The City of Leslie *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1001-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or No

   If No - Date of the rate methodology approval letter: May 14, 2018.

2) Significant Progress Made: Yes or No

   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)

3) Date of rate methodology review letter identifying the gap: ______________________.

4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ____________________________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Ron Bogart – DPW Director	at	517-589-5115	bogart@cityofleslie.org
Name		Phone Number	Email

Susan Montenegro — 11-6-2018

Signature of Authorized Representative (Original Signature Required) — Date

Susan Montenegro – City Manager

Print Name and Title of Authorized Representative

Lincoln Charter Township
2055 W. John Beers Rd
Stevensville, MI 49127
www.lctberrien.org
Dick Stauffer, Township Supervisor
(269) 429-1589
SAW Grant Number 1339-01

September 19, 2019

Re: Wastewater AMP Summary
SAW Grant Project Number 1339-01

The following letter is a summary of the work completed to prepare an asset management plan (AMP) and capital improvement plan (CIP) for Lincoln Charter Township, Michigan. The sections of this letter are based on MDEQ guidance provided for this project.

In 2013, the Township applied for and received a $180,000 Stormwater, Asset Management Plan, and Wastewater (SAW) Grant which it used to locate, inspect, and inventory portions of its wastewater system. Specifically, 86,000 ft. of sanitary sewer and 200 manholes, all of which were constructed before 1993, were inspected, as well as all 19 of the Township's lift stations. The Township provided a matching amount of $21,733 or approximately 11% towards the total eligible project cost of $210,733.

Asset Inventory

The SAW Grant work began with creating a Geographical Information System (GIS) map of the wastewater collection system based on construction record drawings and aerial images. The information was imported into and maintained by ArcGIS. Maps were created to illustrate different properties of the system such as pipe size and material. The maps were updated throughout the project to organize and compile all information collected and was provided to the Township for reference and to aid in future projects.

The Lincoln Charter Township wastewater collection system consists of manholes, gravity sewers, service laterals, lift stations, and force mains.

Gravity Sewer and Force Mains

The entire collection system contains approximately 75 miles of gravity sanitary sewer ranging from 8 inch to 18 inches in diameter. Most of it was installed in 1968, 1978, 1978, 1979, and 1980. Various projects since then have added sections of sewer around the Township. The majority of the gravity sewers are vitrified clay pipe (VCP), with the newer sewers (installed after 1990) being polyvinyl chloride pipe (PVC). Some of the VCP sewers have been have been previously repaired with a cured-in-place pipe liner.

There are approximately 30,000 ft. of force main in the system, ranging from 2.5" to 8"in diameter.

Manholes

There are 1552 manholes in the township collection system. There is a manhole every 400 feet of gravity pipe on average and on every change in direction of gravity pipe. 200 of these manholes are in the Village of Stevensville and the rest are located around the township. All manholes are made from reinforced concrete and were installed over a range of years with the gravity sewer.

Lift Stations

There are 19 sanitary sewage lift stations located throughout the township collection system. The oldest lift stations were installed in 1979, and the newest was installed in 2006. The 13 stations built in 1979 are all Smith & Loveless dry pit packaged lift stations with precast concrete wet wells. Three more lift stations were added to the system in 1991. One of those was a Smith & Loveless dry pit packaged lift station, very similar to the stations installed in 1979, but the other two were Smith & Loveless wet well mounted vacuum primed packaged lift stations. In 1997, two more Smith & Loveless dry pit packaged lift stations were added, each with a slightly larger pump chamber than the stations installed in 1979. The last station added to the system is a small duplex submersible grinder pump station on Lake Grove Path installed in 2006.

Condition Assessment

Gravity Sewer

As part of this project, 86,000 ft. of the oldest, unlined vitrified clay pipe in the Township's wastewater system was cleaned and televised using CCTV. The inspected area is located east of the Village of Stevensville between W. Rocky Weed Rd., Cleveland Ave., and Marquette Woods Rd. (See Figure 1)

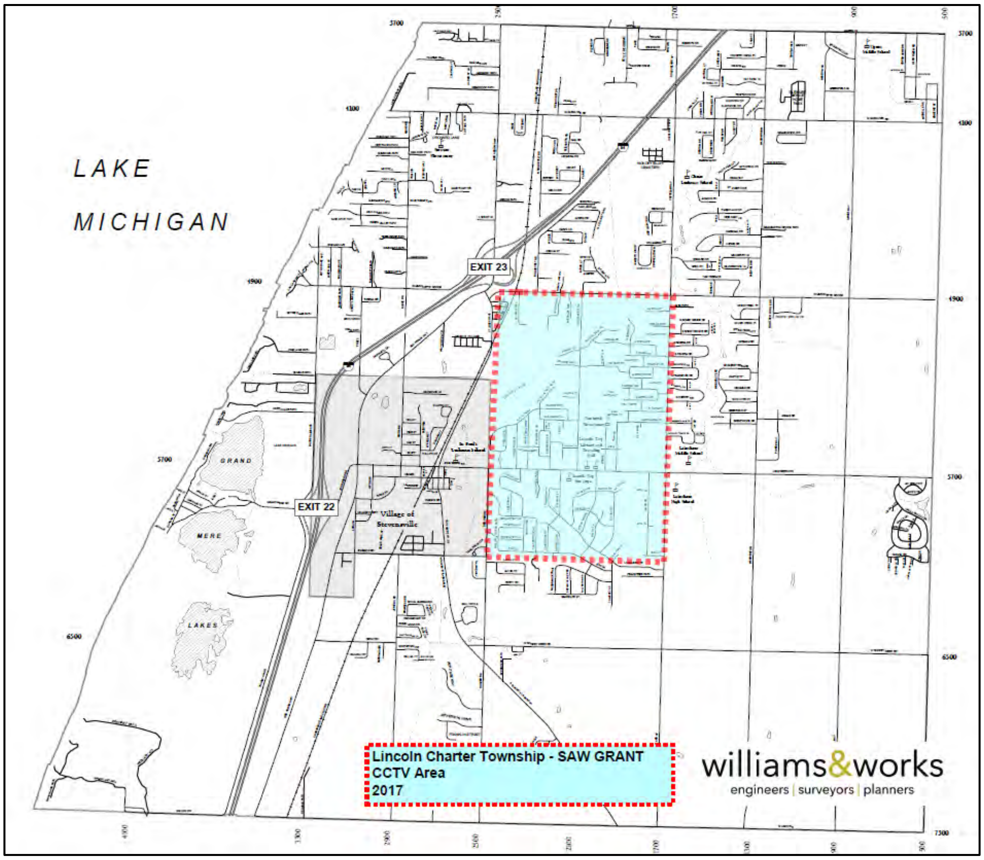


Figure 1 - 2017 Inspection Area

Based on the inspections, the condition of each asset was recorded. The pipes were rated using NASSCO PACP standards. The information was compiled and displayed in GIS. Table 1 summarized the results of the condition assessment.

Table 1 - Condition Assessment of Wastewater Collection System

Condition	Number of Pipes	Length of Pipe [ft]
Not Inspected	1,225	319,792
0 (like new)	105	24,095
1	27	6,311
2	125	37,045
3	26	6,855
4	4	1,528
5 (failed)	2	553
Total	1,514	396,178

Manhole Condition
As part of this project, 200 manholes were visually inspected. Each manhole was given a condition rating based on NASSCO MACP standards. This information was imported into the mapping system. None of the manholes inspected were deemed to be in a failure situation.

Lift Station Condition
The lift stations were visually inspected by representatives from Williams & Works. During inspection, notes were structural, electrical, and mechanical aspects of the station. Pump station reports were written for each pump station and provided to the Township.

Critical Assets

An assessment was performed to determine which parts of the system are critical. This assessment started with assigning each component that was inspected in this study an “importance” factor based on the consequence associated with its failure. The rating system was extended to the manholes, pump stations, and force mains. The assignment system has been designed for specifically for this Township.

When evaluating the condition of the assets in the system, the importance of the asset was taken into account. A pipe, manhole or lift station with a lower importance was given less priority to be fixed. Often, this meant moving the proposed improvement to the next time schedule in the capital improvement plan. In this way, both the likelihood and failure of each asset was considered.

Level of Service Required

The sewer system operates 24 hours per day, 7 days per week, 365 days per year. Each part of the system is functional at all times except when it is down for maintenance. The goal of the Township is to maintain the system well enough and monitor it so that backups never occur. In order to make sure this is possible, specific measures have been put into place.

There are integral redundancies such as floats, spare pumps, and bypass chambers to keep sewer operable in the case of a component failure. The Township also keeps inventory of extra pump parts, valves, etc. to use for quick repairs. In the case of a power loss to a lift station, there is emergency power to keep the station running. This is in the form of either a permanent generator at the lift station or a generator connection at the station and a portable generator owned by the township.

There is always a DPW employee on call in case of an emergency. Lift stations are equipped with emergency dialers to alert the DPW when something is malfunctioning. Overall, the sanitary sewer collection system is well maintained by Lincoln Charter Township’s DPW staff. They keep the utility operating effectively and maintain it to a level that maximizes the useful life of the system beyond its anticipated life expectancy.

Revenue Structure

The revenue for the wastewater system fund comes from rates charged to Township residents who are sewer users. The Township board reviews these rates on yearly basis. In reviewing the rates, the board considers the annual costs of operation and maintenance required to provide the desired level of service, any debt service and any necessary capital improvements for upgrades to the system and any projected expansions. The sewer rates are based on water meter size and water usage per quarter.

Capital Improvement Plan

Based on the results of this study, a recommended capital improvement plan (CIP) was created. It breaks down the recommended work to be done based on the likelihood and consequence of failure. When creating the improvement schedule, structural defects in structures and stopping infiltration were more crucial than operation and maintenance improvements. Furthermore, the assets with a higher importance factor were given priority to get fixed first. The CIP proposes the following work for the next 20 years: $1,206,000 in 0-2 years, $1,243,000 in 2-5 years, $2,626,000 in 5-10 years, $2,906,000 in 10-15 years, and $57,000 in 15-20 years. It includes continued review and lining of the existing vitrified clay sewers, replacement of a major lift station and miscellaneous lift station upgrades.

The Township should plan to budget at least $500,000 per year in order to make capital improvements to its wastewater collection system. This will allow the recommended improvements to be completed in the time frames suggested. The current funding source for the Township should be adequate to complete this capital improvement plan.

Sincerely,

Williams & Works

David Austin, P.E.
Project Engineer

Enclosures: WWAMP Certification of Completeness
List of Major Assets

Cc: Nathan Breese, E.I.T. – Williams & Works
Dick Stauffer – Lincoln Charter Township
File

List of Major Assets

Lincoln Charter Township, MI

Wastewater Collection System

SAW Grant 1339-01

Table 2: Lincoln Charter Township List of Major Assets

Type	Amount	Unit
8 inch Sanitary	310,782	ft
10 inch Sanitary	32,864	ft
12 inch Sanitary	30,558	ft
15 inch Sanitary	20,230	ft
18 inch Sanitary	1,744	ft
Manholes	1,552	ea
2.5" Force Main	394	ft
4" Force Main	20,118	ft
6" Force Main	6,698	ft
8" Force Main	2,977	ft
Lift Stations	19	ea

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date November 30, 2018
(no later than 3 years from executed grant date)

The Lincoln Charter Township *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1339-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or $\boxed{\text{No}}$
   If No - Date of the rate methodology approval letter: June 19, 2018.
2) Significant Progress Made: Yes or No
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: ______________.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ______________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

David Austin, P.E.	at 616-224-1500	austin@williams-work.com
Name	Phone Number	Email

Richard Stauffer — 11.29.18

Signature of Authorized Representative (Original Signature Required) — Date

Richard Stauffer, Lincoln Charter Township Supervisor

Print Name and Title of Authorized Representative

Protecting our Infrastructure Investment

ASSET MANAGEMENT PLAN

Wastewater Executive Summary Report

Prepared for:

Village of Lincoln

SAW Project No. 1038-01

October 2018

FLEIS&VANDENBRINK
DESIGN. BUILD. OPERATE.

EXECUTIVE SUMMARY

OVERVIEW

Public Act 562 of 2012 authorized money for the Storm water, Asset Management, and Wastewater (SAW) Grant Program. In November of 2015, the Village of Lincoln received a SAW Grant from the Michigan Department of Environmental Quality (MDEQ), project no. 1038-01, to provide financial assistance for the development of a wastewater asset management plan (AMP) for the Village's publicly owned wastewater utility. The assets that comprise the utility include collection system piping and manhole/cleanouts, septic tanks, pump station, drain field and a force main.

The SAW Grant amount awarded to the Village of Lincoln was $331,680
There was no local match required as the Village was determined to be Disadvantaged.

This AMP is intended to be a living document that is updated as assets continue to wear and age, and as additional inspection/condition results are found and incorporated into the plan.

Questions regarding the Asset Management Plan should be directed to:
Mr. Phillip Jordan
Village President
Village of Lincoln
117 Fiske St.
Lincoln, MI 48742
(989) 736-8713

ASSET INVENTORY AND CONDITION ASSESSMENT

The wastewater collection system assets consist of approximately:

- Gravity Sewer (6 inch): 3,705 feet (0.7 miles)
- Force Main (6 inch): 2,005 feet (0.4 miles)
- Manhole/ Cleanout Structures: 11
- Sewer Lift Stations: 1 Each
- Septic Tanks: 42

These assets are located in existing street rights-of-way or in easements dedicated for the assets use and maintenance.

The treatment of wastewater for the Village of Lincoln is provided by the Village.

Asset Identification and Location

A comprehensive wastewater system asset inventory was developed from operation and maintenance manuals, which included a review of the existing record drawings, field notes, staff knowledge, site visits and supplemented with field survey work.

Asset material, size and age were identified through the review of available historical record documents and Closed Circuit Televising (CCTV) data.

Spatial orientation (pipe location), pipe depth and invert elevations were determined through survey grade GPS equipment and a comprehensive evaluation of the gravity system.

This information was organized into a new PDF database and piping network for archiving, mapping and future evaluation purposes.

Condition Assessment and Expected Useful Life

A comprehensive evaluation of the collection system was performed.

NASSCO-MACP Level 1 manhole field-based assessments were completed on cleanout and manhole structures that were assessible.

Pipeline cleaning and NASSCO-PACP CCTV field-based inspections were conducted on the gravity pipe.

The condition of the collection system assets reviewed ranged from Good to Excellent, with only a few minor deficiencies.

Capacity Analysis was analyzed for average day and peak hour conditions. The analysis concluded the capacity of the system was adequate.

Recommendations for short-term (1-5 year) and long term (6-20 year) system maintenance and improvements were identified. It is recommended to clean and televise the collection system on a 5 year basis and to clean 8 septic tanks every year.

The condition of the assets at the lift stations range from Good to Excellent. Ongoing maintenance has upheld the condition of many assets. The recommendations for short term and long-term improvements are relatively minor.

Level of Service

Defining the Expected Level of Service (LOS)

The overall objective of the Village of Lincoln as it relates to their wastewater collection system is to adopt the following Level of Service (LOS) goals:

LEVEL OF SERVICE STATEMENT

The overall objective of the Village of Lincoln is to provide reliable wastewater collection services at a minimum cost, consistent with applicable environmental and health regulations. To achieve this the following Level of Service (LOS) goals are proposed:

- Provide adequate collection system and treatment capacity for all service areas.
- Comply with local, state and federal regulations.
- Actively maintain collection system assets in reliable working condition.
- Reduce inflow/infiltration (I/I) flow volumes to mitigate potential for sanitary overflows and overloading of the treatment system.
- Provide rapid and effective emergency response services to customers.
- Ensure operations staff are properly certified.
- Regularly review health and safety procedures for operations staff to provide proper worker safety.
- Regularly review projected O&M and capital expenditures. Adjust user rates, as necessary, to ensure sound financial management of wastewater system.

The LOS goals may need to be adjusted from time to time as the utility ages, the needs of the community change or new rules or regulations require a change in operation. For this reason, the LOS goals should be reviewed by the Village annually to make sure they accurately reflect the desired operation of the utility.

Measuring Performance

To assure that LOS goals are met, performance measurements may need to be implemented. During the LOS review with the community, the need for performance measurements was discussed.

Critical Assets

Determining Criticality

Business Risk is the determination of criticality of each asset in the wastewater system. Criticality is based on two factors; Likelihood (Probability) of Failure and Consequence of Failure using the following formula:

Business Risk = Consequence of Failure Score X Likelihood of Failure Score

Defining an asset's Business Risk allows for management of risk and aids in decision making for where to allocate operation and maintenance and capital improvement funds.

Likelihood of Failure (LoF) is a measure of how likely an asset is to fail. The following categories have been developed to quantify how likely an asset is to fail:

- Condition of the asset
- Remaining useful life (Age)
- Service History
- Operational status

Consequence of Failure (CoF) is a measure of the social, economic, financial or environmental impact of failure of an asset and the utilities ability to respond, convey and treat wastewater. CoF categories of the collection system include:

- Proximity to critical environmental features
- Location (Zoning District) of asset
- Facilities served by asset
- Size and location of asset within the utility network
- Type of asset

Criticality Results

Using the strategy outlined above, a Business Risk Evaluation (BRE) was performed for each asset using a capital planning template that compiles, analyzes and assesses Business Risk for each asset and develops a Capital Improvement Plan. The results of the BRE are provided in easily understood tabular and graphical output.

A spreadsheet providing asset criticality for each utility asset has been included in the AMP detailed report for the collection system.

Figure 1 provides the risk rating for gravity pipe by number of pipe segments. No pipe segments in the collection system have been identified with a high risk rating. All of the collection system's gravity pipes, 100 percent as shown in Figure 1, have a low to negligible risk rating and are indicative of pipes in relatively good condition.

Figure 2 provides the risk rating for the collection system manhole and cleanouts. There are no manholes or cleanouts that have a high likelihood of failure. The manhole and cleanouts, as shown in Figure 2, have a low to negligible risk rating and are indicative of manholes and cleanouts in relatively good condition.

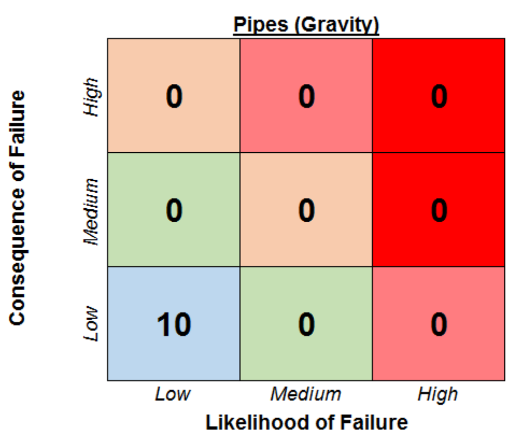


Figure 1. Business Risk Matrix (Risk Rating) by Number of Gravity Pipes

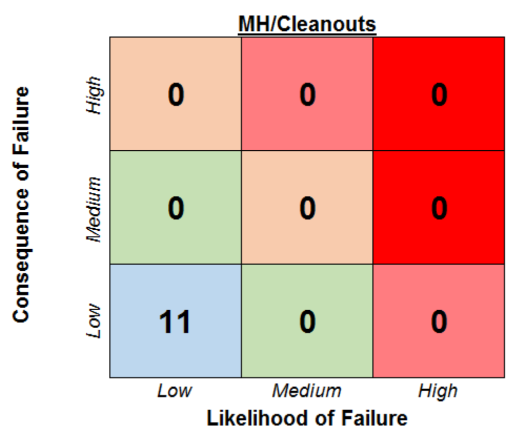


Figure 2. Business Risk Matrix by Number of Manholes/Cleanouts

Figure 3 provides the risk ratings for the lift station and septic field assets. No assets were identified as an extreme risk. Figure 3A provides the risk ratings for septic tanks.

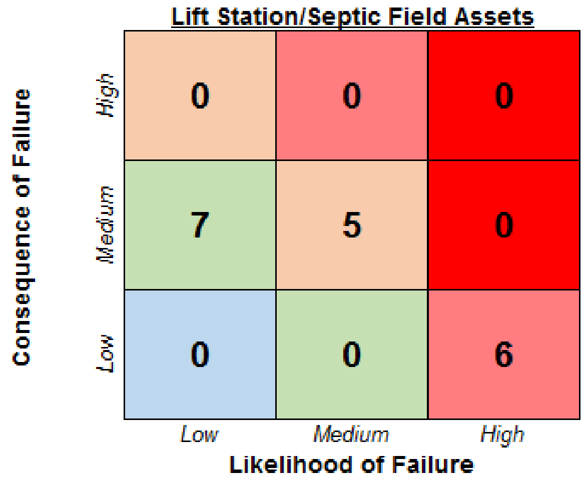


Figure 3. Business Risk Matrix (Risk Rating) by Number of Lift Station Assets

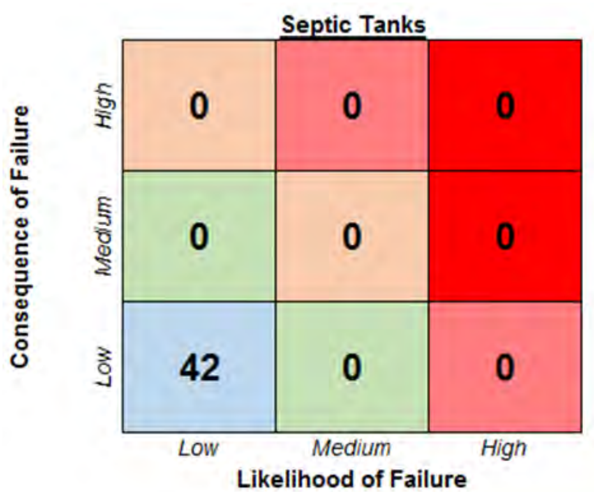


Figure 3A. Business Risk Matrix (Risk Rating) by Number of Septic Tanks

Capital Improvement Plan

A Capital Improvement Plan (CIP) with rehabilitation recommendations was prepared for the Village's wastewater utility assets based on the Business Risk evaluation. The CIP recommendations are provided for the collection system, lift stations and force mains. From the BRE, short-term (1-5 year) and long-term (6-20 year) CIP's were developed for the utility.

This AMP included a detailed condition assessment of the collection system including televising of pipe, septic tanks, and field condition assessments of all accessible sanitary cleanouts, manholes and the lift station.

Based on the AMP condition assessment of the sanitary sewer system, the Village has identified assets of the collection system and lift stations for improvement. These improvements can be completed with funding from the Village's sewer reserve account.

(1-5 Year) Capital Improvements include:

- Locate and raise the 3 buried cleanout structures.

(6-20 Year) Capital Improvements include:

- General Lift Station Rehabilitation
- Pump Slide Rail Replacement

Operations, Maintenance and Replacement

Regular operation, maintenance and replacement (OM&R) is essential in the management of a wastewater collection system. The collection system is subject to a variety of operational problems and can suffer from clogging, scour, corrosion, and collapse. Inspection, cleaning, and rehabilitation are important for optimizing the function of the collection system. By optimizing the performance, infiltration/inflow are reduced and sanitary sewer overflows (SSO) are minimized or eliminated preserving the substantial investment the community has in its collection system.

An annual lift station equipment replacement fund should be developed to replace disposable equipment. These are items that can be financially accounted for through operation, maintenance and replacement (OM&R) funds, and can be replaced by outside contractors. Existing disposable materials include, wear parts in pumps and motors, etc.

Revenue Structure

The revenue and rate methodology is an instrument to determine user rates and charges that will provide sufficient revenues to pay for utility operating costs.

The existing rates were determined to create sufficient funds to fulfill the day-to-day maintenance and operations of the entire sanitary collection system.

The MDEQ approved the Village's rate methodology on June 27,2018.

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date: November 15, 2018
(no later than 3 years from executed grant date)

The Village of Lincoln *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. **1038-01** have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e (3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: No

   If No - Date of the rate methodology approval letter: June 27,2018

2) Significant Progress Made: Yes or No

   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)

3) Date of rate methodology review letter identifying the gap: ________________________.

4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ____________________________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

LINDA Somers Clerk | 989-736-8713 | LindaSomers74@yahoo.com
Name | Phone Number | Email

Phillip S. Jordan | 11-6-18
Signature of Authorized Representative (Original Signature Required) | Date

Philip S. Jordan / Village President
Print Name and Title of Authorized Representative

Protecting our Infrastructure Investment

ASSET MANAGEMENT PLAN

Executive Summary of Stormwater Collection System

Prepared for:

Village of Lincoln

SAW Project No. 1038-01

FLEIS&VANDENBRINK
DESIGN. BUILD. OPERATE.

October 2018

EXECUTIVE SUMMARY

OVERVIEW

Public Act 562 of 2012 authorized money for the Stormwater, Asset Management, and Wastewater (SAW) Grant Program. In November of 2015, the Village of Lincoln received a (SAW) Grant from the Michigan Department of Environmental Quality (MDEQ), project no.1038-01, to provide financial assistance for the development of this asset management plan (AMP). This report provides the Asset Management Plan (AMP) for the Village's Stormwater collection system. Working with Village staff, Fleis and VandenBrink (F&V) provided technical assistance for asset identification, condition assessment, and capital improvement planning of the Stormwater collection system.

The SAW Grant Amount awarded to the Village of Lincoln was $331,680.
There was no local match required as the Village was determined to be Disadvantaged.

This AMP is intended to be a living document that is updated as assets continue to wear and age, and as additional inspection/condition results are found and incorporated into the plan.

Questions regarding the Asset Management Plan should be directed to:
Mr. Phillip Jordan
Village President
Village of Lincoln
117 Fiske St.
Lincoln, MI 48742
(989) 736-8713

ASSET INVENTORY AND CONDITION ASSESSMENT

The Stormwater collection system assets consist of approximately 5,848 feet (1.1 miles) of storm sewers and 66 stormwater structures and 4 outlet structures connecting the gravity pipe. These assets are located in existing street rights-of-way or in easements dedicated for the assets use and maintenance.

Asset Identification and Location

A comprehensive Stormwater system asset inventory was developed from available record drawings, field notes, staff knowledge, and site visits, supplemented with field survey work. Asset material, size and age were identified through the review of available historical record documents. Spatial orientation (pipe location), pipe depth and invert elevations were determined through GPS field survey and a comprehensive evaluation of the gravity system. This information was organized into a new PDF database and piping network for archiving, mapping and further evaluation purpose.

Condition Assessment and Expected Useful Life

For the Village of Lincoln, a comprehensive evaluation of the collection system was performed. NASSCO-MACP manhole field based assessments were completed on 66 structures. Based on discussions with the DPW staff, there have been limited capacity issues with the Village-owned Stormwater system. For this reason, a capacity analysis was only completed for areas with known issues. Recommendations for short-term (1-5 year) and long-term (6-20 year) system maintenance and improvements have been identified and discussed with the Village Council.

LEVEL OF SERVICE

Defining the Expected Level of Service (LOS)

The LOS for the Village Stormwater system is stated as follows:

STORMWATER- LEVEL OF SERVICE STATEMENT

To provide appropriate Stormwater collection, diversion, and conveyance at a minimum cost, consistent with applicable environmental regulations. To achieve this the following Level of Service (LOS) goals are proposed for the Village of Lincoln:

- Provide adequate Stormwater collection system and conveyance capacity for all service areas.
- Actively maintain Stormwater collection and conveyance system assets in reliable working conditions.
- Provide rapid and effective emergency response services to customers.
- Maintenance and operations staff are to be properly trained.

MEASURING PERFORMANCE

Performance measurements are specific metrics designed to assess whether Level of Service objectives are being met. Evaluations of goals should be completed at least annually to determine if the provided resources are being used appropriately. Level of Service requirements can be updated to account for changes due to growth, regulatory requirements, and technology.

CRITICAL ASSETS

DETERMINING CRITICALITY

Business Risk is the determination of criticality of each asset in the Stormwater system. Criticality is based on two factors: 1) Likelihood (Probability) of Failure and 2) Consequence of Failure. Defining an asset's Business Risk allows for management of risk and aids in decision making for where to allocate operation and maintenance and capital improvement funds.

Likelihood of Failure (LoF) is a measure of how likely an asset is to fail. The following categories have been developed to quantify how likely an asset is to fail:

- Condition of the asset
- Remaining useful life (Age)
- Service History
- Operational status

Consequence of Failure (CoF) is a measure of the social, economic, or environmental impact of failure of an asset and the utilities ability to convey and treat Stormwater. CoF categories of the Stormwater collection system include:

- Location of asset.
- Facilities served by asset.
- Size

ASSESSING CRITICALITY

Using the strategy outlined above, a Business Risk Evaluation (BRE) was performed for each asset of the Village of Lincoln using a storm sewer asset management and capital planning template that will compile, analyze and assess Business Risk for each asset and develop a Capital Improvement Plan.

The Business Risk score, also known as Criticality, is calculated for each asset using the following equation.

Business Risk = Consequence of Failure Score X Likelihood of Failure Score

Figure 1 provides the risk rating for storm sewer pipes by number of pipe segments. 1 pipe segment in the Stormwater collection system has an extreme risk rating. The pipe segment is CMP and the bottom of the pipe is rusting. 3 Pipe segments in the Stormwater collection system have high risk ratings. The pipe segments are CMP and are beginning to show signs of rusting along the pipe bottom.

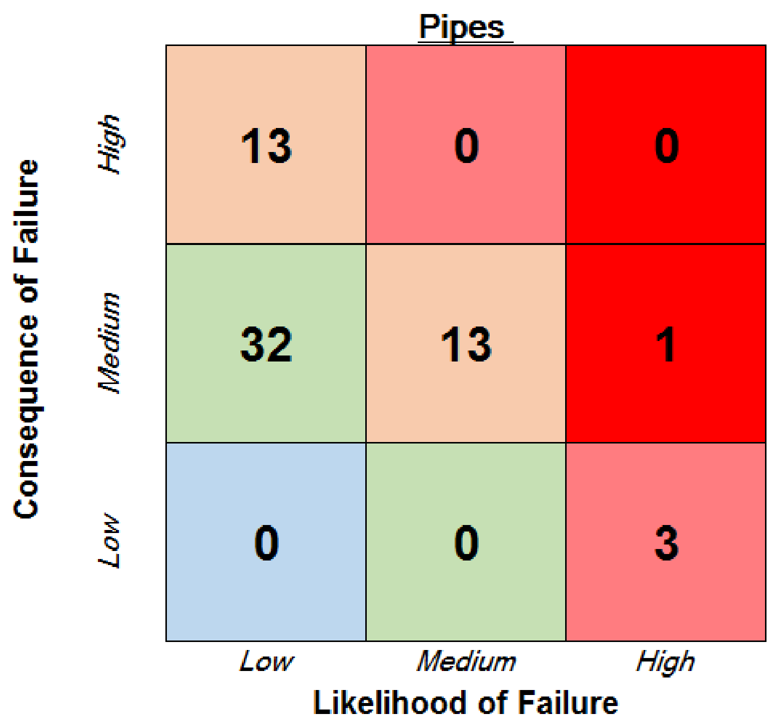


Figure 1: Business Risk Matrix (Risk Rating) by Number of Gravity Pipes

Figure 2 provides the risk rating for the storm sewer structures. Four structures are identified as "Extreme Risk", three need to be replaced or rehabilitated and one is private.

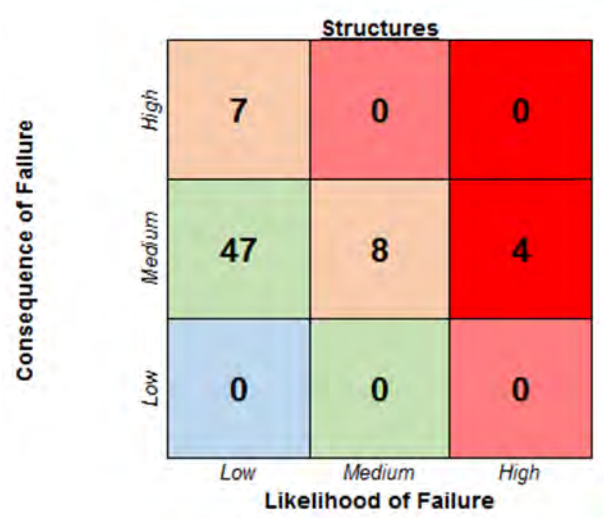


Figure 2: Business Risk Matrix (Risk Rating) by Number of Structures

A spreadsheet providing asset criticality for each utility asset has been included in the AMP detailed report for the Stormwater collection system.

CAPITAL IMPROVEMENT PLAN

A Capital Improvement Plan with recommendations was prepared for the Village's assets based on the Business Risk evaluation. Data-driven information from the business risk assessment and condition assessment was used to identify and prioritize the capital improvement projects. The information was also used to schedule inspections to evaluate the condition of high business risk assets. A short-term (1-5 year) and long-term (6-20 year) Capital Improvement Plan (CIP) was prepared to address the projected needs for each asset in the system.

1-5 year Capital Improvements include:

- Replace or reline a section of CMP pipe located at Main Street and 2nd Street that is corroded.
- Replace or rehabilitate structures in three locations as identified in AMP.

6-20 year Capital Improvements include:

- Various sections of storm sewer to be replaced or lined as identified in the AMP
- Continue to monitor known issues and incorporate into street projects as funding allows.
- Continue catch basin and manhole rehabilitation throughout the collection system as identified in the AMP.

CIP DEVELOPMENT

The Village of Lincoln identifies assets of $5,000 or more to be capital expenditures. Collection system assets were grouped by strategy and assigned costs from a unit database. This database includes unit construction values in 2018 construction dollars based on a survey of recent projects in Michigan and includes engineering and administrative rates where applicable. Assets were categorized and prioritized by year based on risk rating and criticality score to develop the CIP.

The CIP was developed by assigning each project to a CIP year (1-5) based on several factors. In addition to Risk Rating, other factors used to assign CIP year include:

- Asset rehabilitation grouping (i.e. the type of repair/construction recommended)
- Coordination with other planned projects to achieve economies of scale or limiting disruption (an example is a street reconstruction project where identified utility recommendations can be included)

OPERATIONS AND MAINTENANCE

A preventative maintenance program to systematically clean and CCTV inspect pipelines to NASSCO-certified standards is critical for a sound Stormwater system. The process of cleaning and CCTV inspection of pipelines will be by an outside contractor. It is recommended that at a minimum, all pipelines be cleaned and televised every 7-10 years. Available budget will dictate the frequency or size of yearly projects.

REVENUE STRUCTURE

The revenue for storm sewer maintenance currently comes from the Village's Major and Local Street Funds, the DDA, or the Village's General Fund.

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Date: November 15, 2018
(no later than 3 years from executed grant date)

The Village of Lincoln certifies that all stormwater asset management plan (SWAMP) activities specified in SAW Grant No. **1038-01** have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SW AMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

LINDA SOMERS 989-736-8713 Lindasomers74@
Name Clerk Phone Number Email yahoo.com

Phillip S. Jordan 11-06-18
Signature of Authorized Representative (Original Signature Required) Date

Phillip S. Jordan / Village President
Print Name and Title of Authorized Representative

October 2018

F&V

Stormwater, Asset Management, and Wastewater
Asset Management Plan
Wastewater Executive Summary

Township of Macomb
54111 Broughton Road, Macomb, MI 48042
Janet Dunn, Township Supervisor
586.992.0710
SAW Grant Project Number 1171-01

Executive Summary

Macomb Township (Township) was awarded a grant by the Michigan Department of Environmental Quality (MDEQ) under the Stormwater, Asset Management, and Wastewater (SAW) Grant Program to develop a wastewater Asset Management Plan (AMP). The total eligible cost was $2,443,992, less a local match of $444,331, for a total grant amount of $1,999,661.

The AMP was developed by Fishbeck, Thompson, Carr & Huber, Inc. (FTCH) with assistance from Anderson, Eckstein & Westrick, Inc. (AEW), working closely with Township staff and in accordance with the five MDEQ AMP components:

1. Asset Inventory and Condition Assessment
2. Level of Service (LOS)
3. Asset Criticality
4. Revenue Structure
5. Capital Improvement Plan (CIP)

The objective of an AMP is to meet the required LOS in the most cost-effective manner through proper maintenance of the assets. For the Township this includes providing a summary of the condition of the assets owned by the Township, a basis for prioritizing the rehabilitation/replacement of the assets, an updated operation and maintenance (O&M) program to routinely maintain the assets, and an assessment of the effect of implementing these tasks on the rates. The work completed as part of the SAW Grant included the components described below.

Asset Inventory

The Township's sanitary system consists of approximately 1,602,000 feet of pipe ranging in size from 8 inches to 48 inches. The system also includes 8 sanitary pump stations. The Township discharges its flows into the Macomb Interceptor Drain Drainage District (MIDDD) which is operated by the Macomb County Public Works Office (MCPWO). The flows then discharge into the Oakland-Macomb Interceptor Drain Drainage District (OMIDDD) and eventually into the Great Lakes Water Authority's (GLWA's) Wastewater Resource Recovery Facility (WRRF) for treatment.

The following steps were taken in an effort to locate and identify the system's horizontal and vertical assets:

1. Created a Geographic Information System (GIS) database for the Township using the Macomb County GIS database as a background.
2. Collected 489 record drawings, 707 approved engineering drawings, and 689 field plans. The drawings and field plans were scanned and incorporated into the GIS database.
3. Developed a total of 19 different asset classes to represent the Township's asset types, including sewer pipes; manholes; process equipment; pumps; structures; buildings; electrical systems; and heating, ventilation, and air conditioning equipment.

4. Reviewed existing records and conducted site visits to develop an inventory of the Township assets, including:
   a. 7,952 sanitary manholes.
   b. 8,147 sanitary sewers.
   c. 124 vertical assets.
5. Developed a unique naming convention for the assets that incorporated the Township's section numbering system and the type of asset.
6. Developed an inventory of the Township's asset information, including equipment and process descriptions, critical attribute information, age, remaining useful life, and replacement costs. Incorporated the information into the GIS database.
7. Performed a flow metering program and developed a hydraulic model of the sanitary system that the Township can use in the future for permit tracking.
8. Updated the permit tracking spreadsheet and worked with MDEQ to approve the revisions.

Condition Assessment

1. Manhole inspections were performed from 2015 through 2018 on the majority of the sanitary manholes in the system. The inspection forms, as well as the results of the inspection, were incorporated into the Township's GIS database.
2. Closed-circuit television (CCTV) inspection of 351,270 feet of sanitary sewers was performed from 2016 through 2018. The work was completed in accordance with the Pipeline Assessment and Certification Program (PACP). The inspection forms, and the results of the inspection, were incorporated into the Township's GIS database.
3. Site visits were conducted to visually inspect and assess the condition of each pump station, based on criteria established for each asset class. The condition assessment forms and resulting 1 through 5 condition ratings were incorporated into the Township's GIS database.
4. Performed a detailed analysis of Pump Station No. 1 to determine the ultimate capacity needed to upsize the pump station.
5. The results of the assessment indicated:
   a. The sanitary sewers are generally in good condition; however, 131 pipe segments have a structural condition rating above 4.0, and 8 pipe segments have an O&M rating above 4.0.
   b. There are 45 sanitary manholes with a composite (structural and O&M) rating above 4.0.

Level of Service Determination

The Township developed a LOS based on commitments to their customers and the MDEQ, which included:

1. Safeguarding public health and the environment.
2. Operating the system to ensure it has sufficient capacity to reduce the chances of sanitary sewer overflows.
3. Maintaining the equipment and assets at a level that meets customer and regulatory needs and requirements.

Criticality of Assets

1. Assigned a Probability of Failure (POF) rating for each asset based on the condition of the asset, and its age or remaining life. The rating criteria was different for pipes, manholes, and vertical assets. The POF for pipes starts with determining the Overall Pipe Rating, which is calculated separately for O&M and structural defects. The Overall Pipe Rating is a summation of the individual segment grade scores. A sample calculation is provided in Table 1. Tables 2, 3, and 4 show the POF calculation for pipes, manholes, and vertical assets, respectively.

Table 1 – Sample Pipe Rating Index Calculation

Condition Grade	No. of Defects		Segment Grade	
	Structural	O&M	Structural	O&M
5	2	0	10	0
4	0	0	0	0
3	1	3	3	9
2	3	2	6	4
1	0	0	0	0
Total Defects	6	5		
		Overall Pipe Rating	19	13
		Pipe Rating Index	3.2	2.6

Table 2 – Pipe Probability of Failure

		Weighting Factor	5	4	3	2	1
			Imminent	Probable	Occasional	Remote	Improbable
POF	O&M Pipe Rating Index (PACP)	50%	Calculate the O&M Overall Pipe Rating as shown in Table 1 Calculate the O&M Pipe Rating Index* = $\frac{Overall\ Pipe\ Rating}{Total\ number\ of\ O\&M\ Defects}$ If resulting score ≤ 1, Score = 1				
	Structural Pipe Rating Index (PACP)	50%	Calculate the Structural Overall Pipe Rating as shown in Table 1 Calculate the Structural Pipe Rating Index* = $\frac{Overall\ Pipe\ Rating}{Total\ number\ of\ Struct.Defects}$ If resulting score ≤ 1, Score = 1				
Remaining Useful Life (used only when pipe not PACP inspected)		100%	Useful Life Remaining: 0%	Useful Life Remaining: 1-20%	Useful Life Remaining: 21-50%	Useful Life Remaining: 51-70%	Useful Life Remaining: 71-100%

*Since the Pipe Rating Index represents an average of the segment grade scores, it does not indicate whether there are defects with high or low condition grade scores. In the case of high condition grade scores, the Rating Index was adjusted based on engineering judgement.

Table 3 – Manhole Probability of Failure

		Weighting Factor	5	4	3	2	1
			Imminent	Probable	Occasional	Remote	Improbable
POF	Structural and O&M Quick Rating (MACP)	100%	If there are no defects noted and the quick score is 0, Score = 1. If the quick score is denoted by a letter, letter = 9. Multiply the 4-digit quick score by 0.00085 = Score If resulting score ≥ 5, Score = 5. If resulting score ≤ 1, Score = 1				
Remaining Useful Life (used only when pipe not MACP inspected)		100%	Useful Life Remaining: 0%	Useful Life Remaining: 1-20%	Useful Life Remaining: 21-50%	Useful Life Remaining: 51-70%	Useful Life Remaining: 71-100%

Table 4 – Vertical Asset Probability of Failure

	Weighting Factor	5	4	3	2	1
		Imminent	Probable	Occasional	Remote	Improbable
Physical Condition (based on visual inspection)	80%	Very Poor	Poor	Fair	Good	Very Good
Remaining Useful Life	20%	Useful Life Remaining: 0%	Useful Life Remaining: 1-10%	Useful Life Remaining: 11-20%	Useful Life Remaining: 21-40%	Useful Life Remaining: 41-100%

2. Assigned a Consequence of Failure (COF) rating for each asset to reflect its importance to the system and the resulting disruption or difficulty of repair/replacement if failure occurs, based on the criteria in Tables 5 and 6.

Table 5 – Consequence of Failure for Pipes and Manholes

		Weighting Factor	5	4	3	2	1
			Catastrophic Disruption	Major Disruption	Moderate Disruption	Minor Disruption	Insignificant Disruption
COF	Diameter Score	33%	≥ 36-inch	24-inch to 30-inch	18-inch to 21-inch	12-inch to 15-inch	≤ 8-inch to 10-inch
	Physical Location Score	33%	State Trunklines, Railroad Crossings, Water Crossing		Primary County Roads and Major Township Roads		Minor Township Roads
	Service Area Score	33%	Schools, Water Crossings		Churches, Township Facilities, Industrial, Commercial		Single-Family Residential and Multi-Family Residential

Table 6 – Consequence of Failure for Vertical Assets

		Weighting Factor	5	4	3	2	1
			Catastrophic Disruption	Major Disruption	Moderate Disruption	Minor Disruption	Insignificant Disruption
COF	Process	20%	Mission critical: unable to accomplish mission	Process shutdown	Loss of redundancy or temporary process upset	Potential process upset	No impact on process
	Financial Impact	16%	May require new borrowing or impact rates (> $100,000)	May require transfer from reserves (>$25,000 - $100,000)	Absorbed within current budget (>$10,000 - $25,000)	Absorbed within applicable line item ($1,000 - $10,000)	Budgeted expense (< $1,000)
	Safety	16%	Loss of life	Severe injury to employees or public	Minor injury requiring treatment offsite or lost time	Minor injury requiring no medical treatment with no lost time	No injury
	Environmental/ Regulatory Impact	16%	Enforcement action with fines or Administrative Consent Order	Violation with minor enforcement action	Technical violation, but no enforcement action	Localized and minimal impact on the environment and ecosystem	100% compliance with permits
	Disruption to the Community	16%	Long-term impact; area-wide disruption	Short-term impact, but substantial disruption	Sporadic service disruptions	Minor disruption	No disruption
	Required Response Time	16%	< 1 hour	1 to 4 hours	> 4 to 8 hours	>8 to 48 hours	> 48 hours

3. Multiplied the POF and the COF to compute the Business Risk Exposure (BRE) score for each asset, representing the asset's criticality on a scale of 1 through 25. The BRE score serves as a tool for prioritizing repair/replacement.

There were 7 inspected sanitary sewers and 1 inspected sanitary manhole identified with a BRE greater than 16.0. No pump station assets had a BRE greater than 16.0.

Operation and Maintenance Strategies

1. Reviewed current preventative maintenance history and system operations.
2. Identified gaps in the preventative maintenance program and in system operations.
3. Developed a revised preventative maintenance program outlining tasks by asset.
4. Reviewed current staffing plan and updated it based on the hours and staff needed to comply with the revised preventative maintenance program.

Revenue Considerations

The Township's fiscal year is from July to June. For each fiscal year, the water and sewer budget is developed and includes the typical costs needed to operate the sanitary and water systems as well as perform normal maintenance activities. The associated water and sewer rates for the fiscal year 2018/19 were developed to cover the budget.

A 20-year financial projection was completed for the Township to determine how they would implement the proposed tasks and projects included in the AMP. Utility Financial Solutions, LLC (UFS) was contracted to provide the financial projection for the Township. The purpose of the projection was to help the Township determine the revenue requirements for fiscal years 2019-2038 and project rate adjustments required to work toward targeted revenue requirements. The complete financial report prepared by UFS includes a long-term rate track for the Township, which incorporates the AMP to help ensure the financial stability of the Township's utility in future years.

Capital Improvement Plan

A 20-year CIP was developed for the Township using the results of the metering, condition assessments, BRE, remaining useful life, and repair/replacement costs. The CIP included:

1. Grouping projects based on the type of work and asset classes.
2. A schedule for repair/replacement projects through the year 2038.
3. Anticipated project costs and annual system costs through the year 2038.

Major projects anticipated to begin in the next few years are:

- Raising buried manholes to grade to provide access for maintenance.
- Rehabilitating manholes and sewers that have high POF/BRE ratings.
- Continuing inspection of manholes on a 7-year cycle.
- Continuing inspection of sewers on a 7-year cycle for trunk sewers and a 12-year cycle for local sewers.
- 23 Mile Road Sewer and Pump Station Replacement.

List of Major Assets

Sanitary Assets:

- 1,602,000 feet of 8-inch to 48-inch diameter pipe.
- 7,952 sanitary manholes.
- 8 sanitary Pump stations:
    1. Pump Station No. 1 (Hall Road and Gratiot Avenue)
    2. Pump Station No. 2 (21 Mile Road and North Avenue)
    3. Pump Station No. 3 (23 Mile Road and North Avenue)
    4. Pump Station No. 7 (23 Mile Road and Romeo Plank Road)
    5. Pump Station No. 8 (21 Mile Road and Romeo Plank Road)
    6. Pump Station No. 9 (21 Mile Road, east of Romeo Plank Road)
    7. Pump Station No. 10 (23 Mile Road, west of Card Road)
    8. Pump Station No. 11 (23 Mile Road and Heydenreich Road)

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date November 26, 2018
(no later than 3 years from executed grant date)

The Township of Macomb *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1171-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or No

   If No - Date of the rate methodology approval letter: May 26, 2018.

2) Significant Progress Made: Yes or No

   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)

3) Date of rate methodology review letter identifying the gap: ________________.

4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ________________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Janet Dunn	at	586-992-0710	supervisor@macomb-mi.gov
Name		Phone Number	Email

Janet L Dunn — 11-13-18

Signature of Authorized Representative (Original Signature Required) — Date

Janet Dunn, Township Supervisor

Print Name and Title of Authorized Representative

CITY OF MANISTEE
SAW Grant Project No. 1234-01

EXECUTIVE SUMMARY

Prepared by: SPICER GROUP, INC.
302 River Street
Manistee, MI 49660

Owner: **CITY OF MANISTEE**
70 Maple Street
Manistee, MI 49660
(231) 398-2801
Thad Taylor, City Manager

On November 5, 2015, the City of Manistee entered into an agreement with the Michigan Finance Authority for grant funds issued under Public Act No. 511 of 2012 for the *Stormwater, Asset Management, and Wastewater (SAW)* program. The City received the follow grants:

Wastewater Asset Management Plan (WWAMP) – 100% Grant*	***$1,315,000***
Stormwater Asset Management Plan (SWAMP) – 75% Grant**	$590,000
Eligible Cost Subtotal	$1,905,000
LESS Local Match	($147,500)
Total Grant Amount	$1,757,500

*Disadvantaged for Wastewater Asset Management Plan; no local match required

**25% match for grants over $1,000,000

The Asset Management Plans (AMPs) needed to be completed within three years of the date of agreement; November 2018.

Each AMP has the following key components:

- Asset Inventory and Condition Assessment
- Level of Service Determination
- Critical Assets (Risk)
- Revenue Structure
- Capital Improvement Plan

Part 1: Wastewater Asset Inventory and Condition Assessment

The City's wastewater system consists of three main components: The collection system (pipes and manholes), pump stations, and the wastewater treatment facility (WWTF).

For the City's wastewater collection system, Spicer Group, Inc. completed LiDAR survey of the entire City. The survey information, in conjunction with City as-builts, was utilized to develop a comprehensive Geographic Information System (GIS) including all wastewater assets (pipes, manholes, pump stations, etc.). From the GIS, as-built plans, pipe/manhole condition ratings, materials, year installed, inspection records, CCTV video inspections, ownership information etc. can be accessed. This information can also be queried to provide specific lists and maps and updated easily when future improvements are made.

The GIS information is located on a new computer in City Hall and is a detailed "smart" mapping system with databases. The City is employing ArcMap software from ESRI as the backbone of the GIS system. The City is currently operating with ArcGIS Online from ESRI to access the information online. In addition, the City has purchased asset management software from Lucity and will be incorporating the GIS information from ESRI. Lucity will maintain all existing asset inventory and condition assessment records and will allow future records to be added for subsequent inspections of the assets. This system can be accessed and updated in the in the office via computer, or the field by City staff with new iPads supplied as part of the SAW grant project.

***Collection System**:*

The collection system consists of approximately 41.3 miles of gravity sanitary sewer (2" to 36" Diameter), 970 Manholes, and 5.5 mile of force main (3" to 10" diameter). A summary of the City's gravity sewers by diameter and length is included in Table ES-1.

Table ES-1: City-Owned Sanitary Sewer Pipes By Diameter

Diameter	Total Segments	Total Percentage	Total Length(ft)
2”	2	0.1%	272
3”	5	0.1%	225
4”	2	0.1%	29
6”	32	1.9%	4,092
8”	338	30.5%	66,442
9”	59	6.2%	13,455
10”	236	22.1%	48,198
12”	175	16.5%	35,673
15”	73	6.8%	14,906
18”	42	4.3%	9,422
20”	9	1.2%	2,577
21”	14	1.6%	3,415
22”	2	0.1%	308
24”	27	3.0A%	6,537
27”	34	3.6%	7,882
30”	4	0.3%	706
36”	18	1.7%	3,709
TOTAL	1,073	100%	217,849

Plummer's Environmental Services (PES), located, in Byron Center MI, completed a comprehensive cleaning and televising program of the sanitary sewer pipes. The condition assessment was completed in NASSCO's (National Association of Sewer Service Companies) Pipeline Assessment Certification Program (PACP) standards.

Spicer Group completed a comprehensive inspection of the manholes. Manholes were inventoried and assessed manually or by use of remote inspection equipment which was deployed from the ground surface. The condition assessment was completed in NASSCO's Manhole Assessment Certification Program (MACP) standards.

***Pump Stations**:*

The City owns, operates, and maintains fourteen (14) wastewater pumping / lift stations. Field inspections were conducted on each station with assistance from City staff. All assets associated with the stations were observed, documented, and given a condition rating score. Some of the electrical and instrumentation features, pumps, piping, valves, and standby generators are past their useful life. However, due to regular maintenance over the years, everything is currently operating well.

A summary of the City's pump station's is included in Table ES-2. Key items shown include: install date, station type, location, pump capabilities, etc.

Table ES-2: Pump Station Information

Station Name	Station Address	Install Date	Station Type	Pump HP	Pump Type	Pump Capacity (gpm)	Power Supply	Standby Power
First Street	81 Lakeshore Drive	2011	Duplex	7.5	Submersible	130	3 PH 460V	Yes
Harbor Village	99 Marina Drive	1996	Duplex	3	Submersible	61	3 PH 480V	No
Industrial Park	229 Glocheski Drive	1976	Duplex	5	Submersible	176	3 PH 480V	Yes
Jerumbo Street	313 Jerumbo Street	1992	Duplex	25	Submersible	190	3 PH 460V	Yes
Joslin Cove	144 Joslin Cove	2007	Duplex	2	Submersible	34	Single PH 230V	Yes
Lakeshore	207 Lakeshore Drive North	1996	Duplex	5.0	Submersible	108	3 PH 460V	No
Oaks	1575 Pine Creek Road	1992	Duplex	7.5	Submersible	314	3 PH 480V	Yes
Renaissance Park	621 Renaissance Park Drive	1999	Duplex	50	Submersible	718	3 PH 460V	Yes
6th Avenue	225 6th Avenue	2016	Duplex	20	Submersible	1,200	3 PH 460V	Yes
Sweetnam	2065 Reigle Street	1984	Duplex	3.8	Submersible	23	3 PH 480V	No
Third Street	644 Third Street	1999	Duplex	5	Submersible	250	3 PH 460V	No
Cherry Street	401 Cherry Street #2	1940	Duplex	5	Submersible	75?	3 PH 460V	No
Arthur Street	27 Arthur Street	1954	Duplex	7.5	Submersible	396	3 PH 480V	No
Eighth and Vine	Corner of Vine Street & 8th Street	1967	Duplex w/storm pump	7.5	Drypit Submersible & submersible	926 / 1,728	3 PH 480V	No

WWTF:

The WWTF is located approximately at 15 Ninth St., on the southeast portion of the City, along the western shore of Manistee Lake. The original wastewater treatment facility (WWTF) was constructed as a 1.0 million gallon per day (MGD) primary treatment facility in 1938. In 1973, a phosphorus removal system was added. Construction of the existing WWTF started in 1988 (Phase I) by upgrading the primary treatment facility. In 1990, construction Phases II and III upgraded the facility to a secondary treatment facility with activated sludge. An expansion project in 2006 increased the facility capacity to 1.3 MGD. This expansion included upgrading the activated sludge basins, providing for biological phosphorus removal, increasing sludge storage capacity, and upgrading the UV disinfection system. The WWTF support system includes chemical feed, laboratory facilities, non-potable water system, electrical distribution and control, and HVAC system.

Field investigations of the WWTF were conducted with the help of City Staff. All assets associated with the treatment facility were reviewed, documented, and given a condition rating score. Several recommendations for improvement projects were provided to the City for evaluation. In general, the WWTF's tanks, buildings, and equipment are in fair condition.

Part 2: Level of Service (LOS)

The next phase of the AMP is a Level of Service determination. What level of service does the City want to provide to its wastewater customers? How are projects going to be prioritized and included in the CIP? What cost is the City willing to endure to provide that level of service? These are all questions that were discussed as a part of the overall asset management plan. The City's Level of Service Statement/Goals are as follows:

> *The City of Manistee is committed to improving and maintaining the public health protection and performance of our wastewater system, while minimizing the long-term cost of operating those assets. We strive to make the most cost-effective renewal and replacement investments and provide the highest-quality customer service possible.*

LOS - Basic Goals**:**

- Ensure adequate system capacity to customers
- Operate and maintain the system to minimize service disruptions to customers
- Mitigate inflow/infiltration (I/I) entering the system, therefore reducing pumping and treatment costs
- Review operations & maintenance practices and capital improvement projects to determine the lowest cost options for our residents.

Level of Service criteria includes the following categories:

1. "MINIMUM" Level of Service
    - Priority projects to meet the minimum local, Stae, and/or Federal regulations.
    - Actions taken may maintain service life of asset
    - Typically, the least cost option
2. "MEDIUM" Level of Service
    - Projects completed as when other infrastructure projects are occuring or if monies become available earlier than anticipated
    - Actions taken can keep up with depreciation of asset
    - Asset's service life is maintained, and possibly improved
3. "HIGH" Level of Service
    - Projects that are forecasted long range, some of which the current asset may have a considerable amount of remaining useful life
    - Most proactive service level
    - Typically the greatest cost option

As the AMP progressed, different scenarios were evaluated, to determine the City's desired Level of Service based on project costs, associated LOS, and the implication to current and future sewer rates.

Part 3: Criticality (Risk)

For each asset in the City's wastewater system, a criticality/risk analysis was performed to determine and prioritize the City's wastewater components. Key components included the collection system (sewer piping and manholes), pump stations (structures, pumps, electrical, standby power generation), and the WWTF (structures, equipment, processes, electrical, standby power generation, etc). Risk is the product of the Likelihood of Failure (LoF) and Consequence of Failure (CoF), as shown below.

RISK = LoF x CoF

Likelihood of Failue (LoF) is the structural and physical condition assessment of the asset. Based on the field inspections and condition assessment, a resulting the Likelihood of Failure (LoF) was calculated for each asset. A system was developed to address the LoF for each asset in the system (sewers, manholes, pump stations, WWTF). A brief summary of criteria is outlined below.

LoF - Sewer Piping and Manhole Structure

The grading system for these assets are on NASSCO's PACP (pipes) and MACP (manholes). The grading system is based on a scale of 1 -5. The lowest grade of 1 is an unlikely probability of failure, with the highest grade of 5 being imminent probability of failure. Table ES-3 and Table ES-4 provide a summary of the system as it relates to a low, medium, or high probability of failure of the mainline sewers and manholes in the system.

Table ES-3: Likelihood of Failure (LoF) - Mainline Sanitary Sewers

LoF	Pipe Segments	Length	Percent
Low	303	55,900	25.7%
Medium	512	99,378	45.6%
High	258	62,571	28.7%
Total	1073	217,849	100.0%

Table ES-4: Likelihood of Failure (LoF) - Manholes

LoF	No. of Manholes	Percent
Low	211	21.4%
Medium	672	68.2%
High	102	10.4%
Total	985	100.0%

LoF - Pump Stations and WWTF

Each of the assets at the City of Manistee pump stations and WWTF were given a likelihood of failure score. The likelihood of failure score was based on the field condition score given, the remaining useful life of the asset, and comments from City Staff. Table ES-5 shows a summary of the rating system.

Table ES-5: Likelihood of Failure (LoF) – Pump Stations & WWTF

Rating	Description
1	Very Low Probability
2	Not Likely – No maintenance issues so far
3	50/50 – Asset is passed its expected service life / some maintenance issues
4	Likely to Fail – Asset is passed expected service life / many recorded maintenance issues
5	Asset will fail soon
6	Asset has already failed

Next, the Consequence of Failure (CoF) was calculated and scored for each asset. The Consequence of Failure (CoF) is aggregating the empirical value associated with failure of an asset as it directly and indirectly pertains to social, environmental, and economic (cost) implications. Table ES-6 and ES-7 summarize the CoF failure scale grade and definitions for the collection system (pipes and manholes) and the pump stations / WWTF.

Table ES-6: Consequence of Failure (CoF) – Sewers & Manholes

Description	Grade	Failure of Asset
Catastrophic Disruption	6	Massive system failure - severe health effect, extensive damages, LOS severely compromised
Major Disruption	5	Major effect - major capacity loss, health effects, and costs, LOS compromised
Moderate to Major Disruption	4	Major effect - moderate to major loss of system capacity, costs, and health effects, LOS may be compromised
Moderate Disruption	3	Moderate effect - moderate loss of system capacity, health effects, and costs, LOS still achieved
Minor Disruption	2	Minor effect - minor capacity loss, costs, and health effects
Insignificant Disruption	1	Slight effect - slight loss of system capacity, minor health effects, minor costs

Table ES-7: Consequence of Failure (CoF) – Pump Stations & WWTF

Rating	Description
1	Inconvenience – Equipment is used but not essential to operation
2	OK – 100% redundant system / no issues if equipment fails during peak flows
3	Marginal – redundant systems can handle daily average flow / equipment can be down for a short time period
4	Bad – backup systems are not reliable / short down time will cause problems / high potential for flooding or permit violation
5	Very Bad – no backup systems / flooding or permit violation will happen
6	Catastrophic – lives will be lost

Finally, the Risk was calculated for each asset in the system. Table ES-8 and ES-9 provides a summary of the system as it relates to low, medium, or high-Risk prioritization for the mainline sewers and manholes in the system.

Risk - Collection System

Table ES-8 and Table ES-9 provide a summary of the system as it relates to a low, medium, or high probability of failure of the mainline sewers and manholes in the system.

Table ES-8: Risk – Mainline Sanitary Sewers

Risk	Pipe Segments	Length	Percent
Low	456	80,935	37.2%
Medium	511	109,475	50.3%
High	106	27,440	12.6%
Total	1073	217,849	100.0%

Table ES-8: Risk – Manholes

Risk	No. of Manholes	Percent
Low	526	53.4%
Medium	444	45.1%
High	15	1.5%
Total	985	100.0%

Risk - Pump Stations

In general, most of the pump stations within the City of Manistee sewer system are in the low range of the medium risk zone, receiving an average score between 10 and 12. This is due to their high consequence of failure scores. The Arthur St. and Cherry St. pump stations are in the high range of the medium risk zone due to their age.

Risk - WWTF

Most assets at the WWTF are in the low risk category due to low likelihood of failure scores and because most systems at the facility have backup/redundant equipment. Disinfection and blower facilities risk scores calculated out to a 15 due to high consequence of failure scores. If these facilities were to fail, permit violations would certainly occur. Sludge recirculation pumping, sludge heating, and the primary digesters are in the medium risk zone mainly due to higher likelihood of failure scores based on age and lack of redundant systems.

Part 4: Capital Improvement Plan

A Capital Improvement Plan (CIP) has been developed based on the results asset management (AM) process. Reviewing the results of the wastewater system inventory & condition assessment, level of service (LOS) determination, criticality (risk), and revenue Structure, categorization and prioritization of CIP projects was generated. This section contains recommendations for capital improvement projects and annual operations & maintenance practices.

MDEQ Corrective Action Program (CAP)

City is working on approval from MDEQ for a basis of design (BOD) approval to meet current NPDES requirement. These requirements broadly include elimination of the existing SSO 018 Regulator by, constructing a new sanitary sewer to the WWTF for conveyance, providing above ground storage at the WWTF, and completing sanitary sewer pipe rehabilitation to eliminate excessive infiltration into the collection system. Low interest loans are being pursued by the City from USDA-RD to pay for the project(s) cost(s). The projects in total are estimated at approximately $15,000,000 to $20,000,000.

CIP Projects - Collection System

The wastewater sewers have been reviewed to determine rehabilitation needs. Criteria was established to review the most structurally deficient sewers based on a LoF score of 4 and 5. Once determined, the sewers identified to be rehabilitated as part the MDEQ CAP project were removed from the list. The remainder of these sewers were then prioritized by the greatest risk condition. This list becomes the starting point for the City to evaluate future CIP projects. It is recommended that sewers with significant structural deficiencies involving spot repairs or replacement be given first priority. The next priority would be those sewers that can be repaired by trenchless means (cured in place pipe lining).

CIP Projects - Pump Stations

- Arthur St. pump station – replace pumps and add a backup generator
- Cherry St. pump station – complete rehabilitation and add a backup generator
- Oaks Prison pump station – replace manual bar screen with automatic screen
- 8th and Vine pump station – replace wet well and pumps
- Joslin Cove pump station – convert to 3phase power, replace pumps, new control panel and add a backup generator

CIP Projects – WWTF

- Replacement of automatic screen
- New influent flow measurement system
- Redundant channel and stand-by ultraviolet disinfection unit
- Install an effluent flow measurement systemOper
- Replacement of the primary sludge pump and provide a redundant pump
- Redundant sludge recirculation pump
- Rehabilitation of the primary digester tanks and covers
- Electrical and Control upgrades for older processes
- Installation of a vactor truck/septage receiving station

Operations and Maintenance

Spicer recommends that the City evaluate the following items for their future annual operations and maintenance (O&M) budget.

1. Sewer Cleaning and Televising
    a. Clean and Televise system within a 10-year to 15-year cycle. Cleaning and Televising performed in the City's SAW and Corrective Action Program (CAP) projects commenced in 2015 and were completed in 2018.
    b. Provide heavy cleaning for those areas prone to back-ups, roots, heavy debris
2. Maintenance and Revision of GIS system
    a. Incorporate new record drawings
    b. Update collection system maps based on development
    c. Update collection system media (videos and reports) for sewer rehabilitation / improvements performed
    d. Include costs for software annual technical subscription / updates
3. Training and Development
    a. Continuing Education for City Staff
    b. Software training
    c. NASSCO PACP/MACP/LACP certification

Part 5: Revenue Structure

The City contracted Stantec (formally Burton & Associates in 2014 to perform a comprehensive sewer and water rate study. The primary objectives of the study were as follows: perform a cost of service allocation; perform a rate structure analysis, perform a revenue sufficiency analysis, assist the City in updating and developing other user charges.

The City ultimately adopted and implemented the rate structure developed by Burton & Associates. The adopted rate structure is itemized in Table ES-9 for Fiscal Year (FY) percentage increases. Table ES-10 denotes the monthly user charges for the City's sewer and water customers base for FY 2017.

Table ES-9: Recommended / Adopted Water & Sewer Rate Increases

Table 1. Recommended Plan of Water and Sewer Rate Revenue Increases

	FY 15*	FY 16	FY 17	FY 18	FY 19
Effective Date	7/1/14	7/1/15	7/1/16	7/1/17	7/1/18
Water Rate Revenue Increases	8.50%	8.50%	3.50%	3.50%	3.50%
Sewer Rate Revenue Increases	8.50%	8.50%	3.50%	3.50%	3.50%
Combined Rate Revenue Increase	8.50%	8.50%	3.50%	3.50%	3.50%

* FY 2015 increase achieved within recommended rate structure adjustments identified in Section 3 of this report, which significantly reduces the impact to average/typical users

Table ES-10: Customer Water & Sewer User Charges – FY 2017

Service	Monthly - Rate
Water (Per 1,000 gal.)	$2.93
Sewer (Per 1,000 gal	$8.03
Water Ready to Serve Fee 5/8 & 3/4 meter	$4.15
Sewer Ready to Serve Fee 5/8 & 3/4 meter	$11.94
Typical Residential Bill (Per 6,000 gal. – average)	$81.85

Since the implementation of the rate structure adjustments in fiscal year 2015, the City has undergone several reviews of their revenue structure as a result of recent development and proposed future development to the collection system. These very specific items include the following

1. Filer Township - Now a bulk user of the City's sanitary sewer collection system. Filer Township recently installed a new gravity sewer system in 2017. The City and Filer Township have entered into an agreement for operations & maintenance of that system as well as capacity provided by the City at the WWTF.

2. Manistee Township – City and Township review of selling City assets within the Township directly to the Township. Negotiations are currently ongoing. Stantec is providing financial analysis for rate and revenue consideration

3. MDEQ Corrective Action Program (CAP) – City is working on approval from MDEQ for a basis of design (BOD) approval to meet current NPDES requirement. (See Part 4)

Each of these items have an impact on the City's ability to fund and forecast the recommended projects in the CIP in Part 4 of the executive summary. It is the City's intent to perform another rate sufficiency analysis once the MDEQ CAP's projects are awarded in 2019 to determine how to proceed with the remainder of the CIP.

Conclusions

The City of Manistee's wastewater system is a typical, aging municipal infrastructure system. The City performs routine operation and maintenance of the components, and the system is in relatively good working order. The SAW grant has identified deficiencies in the collection system, pump stations, and WWTF assets. Resulting CIP projects have been developed, prioritized, and evaluated by the City. The current rate structure, adopted by the City in 2015, and will likely not sustain the proposed projects in the CIP. The City anticipates performing an additional rate study in 2019 to evaluate the current financial conditions as well as the future conditions for CIP planning purposes.

In accordance with the SAW Grant requirements, the City's Wastewater Asset Management Plan (WWAMP) needs to be kept available for citizen review for 15 years. The WWAMP should be reviewed annually, and the components updated and included in the City's annual budget process.

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date November 30, 2018
(no later than 3 years from executed grant date)

The City of Manistee *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1234-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or No

   If No - Date of the rate methodology approval letter: 5/16/2018.

2) Significant Progress Made: Yes or No

   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)

3) Date of rate methodology review letter identifying the gap: ________.

4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Thad Taylor, City Manager	at (231) 398-2801	ttaylor@manisteemi.gov
Name	Phone Number	Email

11/26/2018

Signature of Authorized Representative (Original Signature Required) Date

Thad Taylor, City Manager
Print Name and Title of Authorized Representative

CITY OF MANISTEE
SAW Grant Project No. 1234-01

EXECUTIVE SUMMARY

Prepared by: **SPICER GROUP, INC.**
302 River Street
Manistee, MI 49660

Owner: **CITY OF MANISTEE**
70 Maple Street
Manistee, MI 49660
(231) 398-2801
Thad Taylor, City Manager

On November 5, 2015, the City of Manistee entered into an agreement with the Michigan Finance Authority for grant funds issued under Public Act No. 511 of 2012 for the *Stormwater, Asset Management, and Wastewater (SAW)* program. The City received the follow grants:

Stormwater Asset Management Plan (SWAMP) – 75% Grant*	***$590,000***
Wastewater Asset Management Plan (SWAMP) – 100% Grant**	$1,315,000
Eligible Cost Subtotal	$1,905,000
LESS Local Match	($147,500)
Total Grant Amount	$1,757,500

*25% match for grants over $1,00,000

**Disadvantaged for Wastewater Asset Management Plan; no local match required

The Asset Management Plans (AMPs) needed to be completed within three years of the date of agreement; November 2018.

Each AMP has the following key components:

- Asset Inventory and Condition Assessment
- Level of Service Determination
- Critical Assets (Risk)
- Revenue Structure
- Capital Improvement Plan

Part 1: Asset Inventory and Condition Assessment

For the City's storm water collection system, Spicer Group, Inc. completed LiDAR survey of the entire City. The survey information, in conjunction with City as-builts, was utilized to develop a comprehensive Geographic Information System (GIS) including all storm water assets (manholes, catch basins, stormwater outfalls, etc.). From the G/IS, as-built plans, pipe/manhole condition ratings, materials, year installed, inspection records, CCTV video inspections, ownership information etc. can be accessed. This information can also be queried to provide specific lists and maps and updated easily when future improvements are made.

The GIS information is located on a new computer in City Hall and is a detailed "smart" mapping system with databases. The City is employing ArcMap software from ESRI as the backbone of the GIS system. The City is currently operating with ArcGIS Online from ESRI to access the information online. In addition, the City has purchased asset management software from Lucity and will be incorporating the GIS information from ESRI. Lucity will maintain all existing asset inventory and condition assessment records and will allow future records to be added for subsequent inspections of the assets. This system can be accessed and updated in the in the office via computer, or the field by City staff with new iPads supplied as part of the SAW grant project.

The City owned, and operated storm water collection system consists of approximately 24 miles of mainline storm sewer, and 7 miles of catch basin leads. The storm sewers range in diameter size from 6"-66". The City has approximately 2080 structures consisting of manholes and catch basins. There are approximately 45 stormwater outlets in the City. The City's storm sewers discharge into Manistee Lake and Manistee River. Several of the City's storm sewers discharge into sewer systems owned by MDOT along US-31 before discharging in Manistee Lake and Manistee River. Ultimate stormwater discharge is to Lake Michigan.

Every storm sewer pipe and structure owned and operated by the City could not be investigated/inventoried due to budget constraints within the SAW. Emphasis was placed on performing condition assessments for the mainline sewers and mainline manholes. Catch basin structures and their associated leads (pipes) will be evaluated in the future. The sewers which were investigated / inventoried are included in Table ES-1 below.

Plummer's Environmental Services (PES), located in Byron Center, MI completed a cleaning and televising program of approximately 15% (3.5 miles) of the City owned storm sewer pipes. Spicer Group performed a comprehensive inspection for the City's mainline stormwater manholes. The National Association of Sanitary Sewerage Companies (NASSCO) Manhole/Pipeline Assessment Certification Program (MACP/PACP) standards was used to identify and code defects and apply standardized grading/scoring to provide overall condition ratings of the stormwater assets. A summary table of the City's existing storm sewer pipes and those sewers which were assessed in the SAW Grant is included on Table ES-1 below.

Table ES-1: City-Owned Storm Water Pipes by Diameter and Material

Diameter	Total Segments	Total Percentage	Total Length(ft)	Sewers Televised Number of Segments	Sewers Televised Percentage of Total Length by Diameter	Sewers Televised Length (ft)
6"	3	0.05%	52	0	0	0
8"	13	1.5%	1,894	1	15.6%	295
10"	7	1.4%	1,747	2	31.5%	550
12"	240	27.2%	34,077	14	10.0%	3,415
15"	98	15.2%	19,032	9	12.4%	2,364
18"	101	14.3%	17,905	13	15.5%	2,783
21"	6	1.3%	1,609	1	9.7%	155
24"	97	12.8%	15,963	14	20.7%	3,308
27	1	0.3%	317	1	100%	317
30"	21	3.7%	4,709	7	41.6%	1,957
36"	42	7.3%	9,074	3	3.9%	357
42	15	3.0%	3,751	1	9.4%	352
48"	40	7.9%	9,926	6	20%	1,985
54	13	3.3%	4,177	1	9.3%	346
60	1	0.05%	59	0	0	0
66	2	0.7%	876	0	0	0
TOTAL	700	100.00%	125,169	73	-	18,184

Part 2: Level of Service (LOS)

The next phase of the AMP is a Level of Service determination. What level of storm water service does the City want to provide to its residents? How are projects going to be prioritized and included in a CIP? What cost is the City willing to endure to provide that level of service? These are all questions that were discussed as a part of the overall asset management plan. The City's Level of Service Statement/Goals are as follows:

> *The City of Manistee strives to maintain a basic storm water collection system that addresses the residents' wants and needs and upholds the local, State, and Federal regulatory requirements at a minimum cost to our residents.*

LOS - Basic Goals**:**

1. Operate and maintain the stormwater system to minimize flooding and property damage.
2. Review the condition of storm water assets as a part of other infrastructure construction projects.
3. Seek a funding source for operation & maintenance and repair/replacement of storm water assets.
4. Review the maintenance and capital improvement plans/projects annually to determine the lowest cost options for our residents.

Level of Service criteria includes the following categories:

1. "MINIMUM" Level of Service
   - Address resident complaints as they come in.
   - Rehabilitation to storm sewers or structures (manholes, catch basins) with isoloated structural deficiencies
2. "MEDIUM" Level of Service
   - Rehabilitation of storm sewers with significant structural and/or operations deficiencies involving trenchless rehabilitation (CIPP/CIPM Lining)
   - Replacement of existing storm sewers or structures which cannot be rehabilitated by trenchless means
3. "HIGH" Level of Service
   - Address areas in the City with historic flooding or drainage issues where current stormwater infrastructure exists
   - Address areas in the City with historic flooding or drainage issues where stormwater infrastructure does not exist
   - Increase capacity of existing stormwater infrastructure

Generally, the "high" level of service projects will have a higher construction/initial cost but would provide a better long-term or life cycle cost for the City. The "minimum" level of service projects would address the immediate concerns that residents bring to the City's attention as well as placing emphasis on the rehabilitating those structures and sewer pipes in need of limited repair that would generally be of a lower construction cost.

The City will deliberate the findings and recommendations from the SAW to solidify the desired Level of Service, based upon the criteria above. Since there is no real funding mechanism for stormwater assets currently, the City has been maintaining a *Minimum* Level of Service, due to financial constraints.

Part 3: Criticality (Risk)

For each asset in the City's storm water system, a criticality/risk analysis was performed to determine and prioritize the City's key components. Risk is the product of the Likelihood of Failure (LoF) and Consequence of Failure (CoF), as shown below.

RISK = LoF x CoF

Likelihood of Failure (LoF) for sewer and manhole assets is primarily based on the physical condition of the asset as inspected in the field. The grading system is based on a scale of 1 -5. The lowest grade of 1 is an unlikely probability of failure, with the highest grade of 5 being imminent probability of failure. Based on the condition assessments and the field inspections, the Likelihood of Failure (LoF) was calculated for pipes and manholes. For those pipes and manholes which could not be inspected, and estimated LoF was determined. Table ES-2 provides a summary of the system as it relates to a low, medium, or high probability of failure of the mainline storm sewers in the system.

Table ES-2: Likelihood of Failure (LoF) – Mainline Storm Sewers

LoF	Pipe Segments	Length	Percent
Low	564	95,982	76.7%
Medium	103	20,969	16.7%
High	33	8,218	6.6%
Total	700	125,169	100%

Next, the Consequence of Failure (CoF) was calculated and scored for each asset. The Consequence of Failure (CoF) is aggregating the empirical value associated with failure of an asset as it directly and indirectly pertains to social, environmental, and economic (cost) implications.

Finally, the Risk was calculated for each sewer and manhole in the system. Table ES-3 provides a summary of the system as it relates to low, medium, or high-Risk prioritization for the mainline storm sewers in the system.

Table ES-3: Risk – Mainline Storm Sewers

Risk	Pipe Segments	Length	Percent
Low	197	34,955	28.0%
Medium	411	66,882	53.4%
High	92	23,332	18.6%
Total	700	125,169	100%

Part 4: Capital Improvement Plan

The Capital Improvement Plan (CIP) is the culmination of all the parts of the Asset Management Plan (AMP). Reviewing the results of the storm water system Inventory & Condition Assessment, Level of Service (LOS) determination, Criticality (Risk), Revenue Structure, and preliminary CIP project lists, a process was worked through to categorize and prioritize the final CIP. The resulting CIP plan includes the following projects:

1. Storm Sewer & Catch Basin Lead Cleaning and Televising
   Level of Service - Minimum to Medium
   Construction Cost - $640,000 to $1,100,000

   To completely evaluate the City's storm system, we recommend that cleaning and televising be incorporated of the remaining system not captured in the SAW Grant. This includes remaining mainline storm sewer and all catch basin leads. The construction costs associated below were developed from unit pricing in the SAW grant and do not include design or construction engineering. It is anticipated that this project will be performed on a long term incremental basis as funding allows. The cycle and frequency of this program has not been determined to date. Costs to clean and televise the mainline storm sewer (ES-4) and the catch basin leads (ES-5) are shown below.

Table ES-4: Cleaning & Televising Costs - Mainline Storm Sewer

Diameter (in)	Length (ft)	CCTV $/ft	CCTV Cost	$/ft for Light Cleaning	$/ft for Heavy Cleaning	75% Light 25% Heavy Clean Cost	75% Heavy 25% Light Clean Cost
4-12	34150	$1.05	$35,858	$1.15	$3.00	$51,118	$86,656
15-21	33244	$1.05	$34,906	$2.00	$4.70	$83,318	$133,808
24-36	24152	$1.05	$25,359	$4.20	$16.50	$157,138	$324,238
42-48	11340	$1.05	$11,907	$4.75	$22.00	$90,543	$200,576
54-66	4767	$1.05	$5,005	$5.50	$27.50	$45,881	$104,872
Total	107653	$1.05	$113,036	-	-	$427,998	$850,149
			Total Cleaning & Televising Cost =			$540,000	$960,000

Table ES-5: Cleaning & Televising Costs – Catch Basin Leads

Diameter (in)	Length (ft)	CCTV $/ft	CCTV Cost	$/ft for Light Cleaning	$/ft for Heavy Cleaning	75% Light 25% Heavy Clean Cost	75% Heavy 25% Light Clean Cost
4-12	34161	$1.05	$35,869	$1.15	$3.00	$51,134	$86,683
15-21	1394	$1.05	$1,464	$2.00	$4.70	$3,494	$5,611
24-36	475	$1.05	$499	$4.20	$16.50	$3,092	$6,381
Total	36030	$1.05	$37,831	-	-	$57,720	$98,674
			Total Cleaning & Televising Cost =			$100,000	$140,000

2. Storm Sewer Rehabilitation
   Level of Service - Minimum to Medium
   Construction Cost - $670,000

   The following factors were evaluated to prioritize CIP projects: structural defects, LoF (4 or greater), CoF, and Risk. Once all factors were accounted for, the sewer pipes where placed into categories of replacement, trenchless rehabilitation, and/or pipe repair. Recommendations were then established and discussed with the City. A comprehensive Summary Table (Table ES-6) is included below for the storm sewer televised in the SAW which exhibited structural deficiencies and should be rehabilitated. Construction costs do not include contingency or engineering fees.

Table ES-6: Storm Sewer Rehabilitation Costs

Segment Reference ID	Upstream Manhole ID	Downstream Manhole ID	LOF	Risk	Rehab Type	Construction Cost
6970	3560	3559	4.1	16.7	CIPP	$70,916
6063	3361	3360	4	14.7	CIPP	$38,275
7333	3115	3116	4.1	14.0	CIPP	$23,480
7382	3120	3119	4.1	12.6	CIPP	$21,160
6087	3366	3363	4	12.3	CIPP	$18,302
7526	3541	5575	4	12.3	CIPP	$38,276
7054	3559	3389	3	12.3	CIPP	$240,736
7225	3100	3102	4.2	11.9	CIPP	$15,789
7220	3102	3101	4.1	11.6	CIPP	$15,901
7515	3551	3549	4.1	10.9	CIPP	$3,190
7532	3537	3540	4.1	10.9	CIPP	$10,131
7337	3118	3117	3	10.3	CIPP	$9,195
7349	3046	3047	3.1	10.1	CIPP	$8,535
7336	3116	3118	3	9.8	CIPP	$9,774
6032	3385	4900	4.1	9.2	CIPP	$16,639
7089	3548	3574	3.2	9.9	SR	$28,407
7485	3247	3251	5.1	13.6	SR - CIPP	$14,228
7211	3096	3095	5.1	16.6	SR - Possible CIPP	$13,109
7232	3099	3100	5.1	10.2	SR - multiple	$10,981
7505	3555	3558	4	13.0	SR & CIPP	$32,634
7509	3549	3555	3.1	8.8	SR & CIPP	$20,277
6099	3351	3350	4	8.0	SR & CIPP	$12,259
					Total =	**$670,000**

Note: CIPP = Cured In Place Pipe Lining. SR = Spot Repair.

3. Storm Sewer Master Plan – Expand Collection System
   Level of Service – Medium to High
   Construction Cost – $2,880,000

   There are several areas throughout the City which currently have limited or no storm sewer facilities available. The City has further identified the locations within these areas where significant ponding and/or flooding historically occur. A feasibility analysis was performed to identify which locations could be readily serviced by gravity to existing storm sewers adjacent to the problematic locations. A summary of proposed storm sewer infrastructure improvements for each locations and associated costs is in Table ES-7.

   There are several locations where the existing drainage structures have been altered to become infiltration basins during the City's Combined sewer separation project. A possible solution to constructing new storm sewers at these locations would be to replace the failing infiltration basins with larger infiltration basins to provide more capacity. New infiltration basins will likely require additional O&M to maintain their functionality. The replacement of infiltration basins versus installing new storm sewers will be evaluated on a case by base basis as the final design at each location is completed.

   For project cost estimating purposes, a unit cost of $150/ft was developed based on current industry costs. Design and construction engineering have also included at 20% of the construction estimate.

Table ES-7: Proposed Storm Sewer Improvements

Street	From	To	Sewer Main Length	Estimated Cost of Storm Sewer Construction
8th	US-31	Davis	1,000	$180,000
Hopkins	6th	8th	660	$119,000
6th	Hancock	Hopkins	120	$22,000
Koscuisk o	12th	14th	540	$97,000
14th	Koscuisko	Maywood	300	$54,000
Maywood	14th	Grand	600	$108,000
15th	Maywood	Vine	340	$61,000
Grand	Maywood	Vine	320	$58,000
Vine	Grand	14th	960	$173,000
14th	Vine	Manistee	300	$54,000
Manistee	14th	13th	320	$58,000
Lincoln	US-31	Jefferson	270	$49,000
Jefferson	Van Buren	Jackson	280	$50,000
Jackson	Jefferson	Washington	320	$58,000
Quincy	Cleveland	Washington	310	$56,000
5th Ave.	Short	Fremont	1,050	$189,000
4th Ave.	Franklin	Fremont	280	$50,000
2nd Ave.	Ford	Franklin	300	$54,000
Hughes	Ford	Melitzer	940	$169,000
Saint Marys Pky	Duffy	Dead End	1,600	$288,000
Ford	Groves	Saint Marys Pky	320	$58,000
Duffy	Groves	Saint Marys Pky	140	$25,000
Fremont	Saint Marys Pky	Hughes	320	$58,000
Melitzer	Hughes	3rd Ave.	710	$128,000
1st Ave.	Melitzer	Dead End	460	$83,000
2nd Ave.	Fremont	Dead End	950	$171,000
5th Ave.	Melitzer	Monroe	900	$162,000
4th Ave.	Melitzer	Monroe	900	$162,000
3rd Ave.	Hastings	Dead End	360	$65,000
Hastings	4th Ave.	3rd Ave.	130	$23,000

4. Feasibility Study / Analysis
   Level of Service – Medium to High
   Construction Cost – Unknown

   There are several locations within the City with historic flooding and/or ponding at locations were current stormwater infrastructure exists. The City has identified the following locations.

   - Maple Street & River Street
   - 6th Street and US-31 (Cypress Street)
   - 7th Street and Ramsdell Street
   - Vine Streetand 16th Street
   - US-31 (Arthur Street) near the Super 8 hotel

These locations are frequently monitored by the City during precipitation events. A study at each location should be performed to determine capacity/hydraulic constraints and include recommendations from mitigating the flooding issues. Locations along US-31 will need to be coordinated with MDOT along with cost sharing considerations for the study and construction improvements.

5. Annual Operations and Maintenance

   We recommended the City incorporate sufficient funds for the annual operations and maintenance budget for the following O&M activities.

   1. Cleaning Catch Basins
      a. Continue cleaning system catch basins program. Currently the City performs cleaning of approximately 1/3 of drainage structures annually.
   2. Catch Basin investigations
      a. Perform investigations of catch basins, which were not completed in the SAW Grant. The investigation should include capturing video of the structure in the 360-degree format including a measurement device similar to a surveyors Philadelphia rod.
      b. Incorporate video media into GIS / Asset Management software system
   3. Maintenance of GIS / Asset Management software system
      a. Incorporate new record drawings
      b. General updates of GIS system and feature attributes
      c. Update collection system maps based on development
      d. Include costs for software annual technical subscription / updates
   4. Training and Development
      a. Continuing Education for City Staff
      b. Software training
      c. NASSCO PACP/MACP/LACP certification

Part 5: Revenue Structure

The City contracted Stantec (formally Burton & Associates in 2014 to perform a comprehensive sewer and water rate study. This study was related to wastewater rates only. The City does not have a separate stormwater funding source, other than their street fund, grant funds or in association with other capital improvement projects.

There is a potential for limited stormwater rehabilitation projects or stormwater master plan projects to be performed, but it is dependent of available funding from the City's current Transportation Improvement Program (TIP) if directly impacting the streets in question. There is also a possibility of storm sewer improvements to be performed within the City's MDEQ NPDES project using eligible funding from USDA-RD program. Future stormwater improvements will need to be funded as part of other capital improvement projects or with other grant or loan programs.

Ultimately, there is currently no revenue structure established for stormwater improvements. Financial review of the City's General Fund indicates that the City cannot fund standalone stormwater improvements. The capital improvement plan (CIP) projects developed in Part 4 herein cannot be sustainably funded by the City's General Fund without outside resources.

Conclusions

The City of Manistee storm water system is a typical, aging municipal infrastructure system. Since there has been no funding mechanism for storm water assets, the City had been maintaining a Minimum Level of Service for its residents. At this time, the CIP projects have not been included into the current fiscal year budget or forecasted in future FY's. The City will evaluate where these projects should be included in future FY's if funding becomes available.

In accordance with the SAW Grant requirements, the City's Storm Water Asset Management Plan (SWAMP) needs to be kept available for citizen review for 15 years. The SWAMP should be reviewed annually, and the components updated and included in the City's annual budget process.

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Due Date **November 30, 2018**
(no later than 3 years from executed grant date)

The City of Manistee *(legal name of grantee)* certifies that all stormwater asset management plan (SWAMP) activities specified in SAW Grant No. 1234-01 have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SWAMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

Thad Taylor, City Manager	at (231) 398-2801,	ttaylor@manisteemi.gov
Name	Phone Number	Email

11/26/2018

Signature of Authorized Representative (Original Signature Required) Date

Thad Taylor, City Manager
Print Name and Title of Authorized Representative

Protecting our Infrastructure Investment

ASSET MANAGEMENT PLAN

Executive Summary of Wastewater Treatment System

Prepared for:

City of Manton

SAW Project No. 1655-01

CITY OF MANTON Est. 1872

October 2018

FLEIS&VANDENBRINK
DESIGN. BUILD. OPERATE.

EXECUTIVE SUMMARY

OVERVIEW

Public Act 562 of 2012 authorized money for Stormwater, Asset Management, and Wastewater (SAW) Grant Program. In November 2015, The City of Manton received a Stormwater, Asset Management, and Wastewater (SAW) Grant from the Michigan Department of Environmental Quality (MDEQ), project no. 1655-01, to provide financial assistance for the development of an asset management plan (AMP) for the City's publicly owned wastewater utility. This AMP is intended to be a living document that is updated as assets continue to wear and age, and as additional inspection/condition results are found and incorporated into the plan.

The contact person for the City of Manton AMP is:

Jessica Schisser, City Clerk
306 West Main Street
Manton, MI 48663
Phone number: 231-824-3572
Email: jschisser@mantonmichigan.us

ASSET INVENTORY AND CONDITION ASSESSMENT

A list of the major assets in the City's wastewater system, described further below, include:

- Collection system piping system and manholes
- Wastewater Treatment Facility (WWTF)
- Sanitary sewer lift stations in the collection system

The wastewater collection system assets consist of 49,070 feet (9.29 miles) of sanitary sewers (gravity pipe and force mains) and 164 wastewater manholes connecting the gravity pipe. These assets are located in existing street rights-of-way or in easements dedicated for the assets use and maintenance.

Wastewater from the collection system is screened at and pumped from Lift Station No.1 to the WWTP. Aspirating aerators are utilized in the aeration cells to provide oxygen and mixing. Waste stabilization is continued by physical settling and a combination of aerobic, anaerobic, and facultative bacteria in the subsequent lagoons. Lagoon effluent is pumped from the two storage lagoons to the irrigation fields.

Treated effluent is seasonally discharged to spray irrigation fields in accordance with NPDES permit No. GW1810172. The permitted capacity of the WWTF is 43.8 million gallons per year (mgy). The annual average flow received by the facility in 2017 is approximately 27.4 mgy.

The City of Manton operates and maintains four sanitary sewer lift stations throughout the wastewater collection system. The stations are submersible style stations.

Asset Identification and Location

A comprehensive wastewater system asset inventory was developed from operation and maintenance manuals included a review of existing record drawings, field notes, staff knowledge, and site visits, supplemented with field survey work. Asset material, size and age were identified through the review of available historical record documents and Closed-Circuit Televising (CCTV) data. Spatial orientation (pipe location), pipe depth and invert elevations were determined through GPS field survey and a comprehensive evaluation of the gravity system. This information was organized into a new, (GIS) database and piping network for archiving, mapping and further evaluation purposes. The inventory includes over 87 WWTF assets, 41 Lift Station Assets, and 330 Collection System Assets.

Condition Assessment and Expected Useful Life

A comprehensive evaluation of the collection system was performed. NASSCO-MACP manhole field-based assessments were completed on 155 of the 164 total (9 were buried/paved over) manhole structures. Pipeline cleaning and NASSCO-PACP CCTV field-based inspections were conducted on 93% of the gravity pipe. Capacity Analysis was modeled for average day and peak hour conditions to identify capacity concerns. Recommendations for short-term (1-5 year) and long term (6-20 year) identified the need for maintenance with 6% of the system tagged for inspection and/or cleaning. Rehabilitation accounted for 8% of the system identifying the need for point repairs and lining. The remaining 86% of assets were placed in the 20+ year category.

The condition of the assets at the WWTP ranges from good to fair. Ongoing repairs have helped to maintain the condition of many assets as well as the work completed during the 2006 Wastewater System Improvements project. Some assets are now near the end of their useful life and are deteriorated due to use and the harsh conditions associated with wastewater treatment. The follow items were listed as immediate concerns.

- Lagoon No. 4 was covered in thick weeds consistent across the entire lagoon area. Excessive vegetation decreases effluent quality because of the reduction in detention time due to the decreased volume. Additionally, the roots of the vegetation have the potential to penetrate the lagoon liner.
- Lagoon No. 1 had pockets of thick layers of sludge up to six feet deep. This was not observed throughout the entire lagoon; other areas contained approximately two to three feet of sludge.
- The flow meters for each irrigation area are approaching the end of their expected useful life.

The condition of the assets at the lift stations ranges from good to poor. Ongoing maintenance has maintained the condition of most assets. Some assets have deteriorated due to use and the harsh conditions associated with typical wastewater collection systems.

Level of Service

Defining the Expected Level of Service (LOS)

LEVEL OF SERVICE STATEMENT

The objective of the City of Manton is to provide reliable wastewater collection and treatment services at a minimum cost, consistent with applicable environmental and health regulations. To achieve this the following Level of Service (LOS) goals are proposed for the utility and are to be reviewed and revised if necessary annually:

- Provide adequate collection system and treatment capacity for all service areas.
- Implement and fund a capital improvements plan to address system deficiencies.
- Comply with all local, state and federal regulations at all times for treated effluent from the Wastewater Treatment Facility (WWTF).
- Actively maintain collection and treatment system assets in reliable working condition.
- Reduce peak flow volumes through inflow/infiltration (I/I) controls to MDEQ acceptable levels.
- Provide rapid and effective emergency response services to customers.
- Operations staff are properly certified.
- Health and safety of operations staff will be addressed at least annually to determine if any changes or additional resources are needed.

The LOS goals may need to be adjusted from time to time as the utility ages, the needs of community change or new rules or regulations require a change in operation. For this reason, the LOS goals should be reviewed by the City from time to time to make sure they accurately reflect the desired operation of the utility.

Measuring Performance

In order to assure that LOS goals are met performance measurements may need to be implemented. During the LOS review with the community the need for performance measurements was discussed.

CRITICAL ASSETS

Determining Criticality

Business Risk is the determination of criticality of each asset in the wastewater system. Criticality is based on two factors; Likelihood (Probability) of Failure and Consequence of Failure using the following formula:

Business Risk = Consequence of Failure Score x Likelihood of Failure Score

Defining an asset's Business Risk allows for management of risk and aids in decision making for where to allocate operation and maintenance and capital improvement funds.

Likelihood of Failure (LoF) is a measure of how likely an asset is to fail. The following categories have been developed to quantify how likely an asset is to fail:

- Condition of the asset
- Remaining useful life (Age)
- Service History
- Operational status

Consequence of Failure (CoF) is a measure of the social, economic, financial or environmental impact of failure of an asset and the utilities ability to respond, convey and treat wastewater. CoF categories of the collection system include:

- Proximity to critical environmental features
- Location (Zoning District) of asset
- Facilities served by asset
- Size and location of asset within the utility network
- Type of asset.

The WWTF and Lift Station categories for CoF are:

- Process
- Financial Impact
- Safety
- Environmental Impact
- Disruption to the Community
- Ability to Respond

Criticality Results

Using the strategy outlined above, a Business Risk Evaluation (BRE) was performed for each asset using a graphical ArcGIS-based sewer asset management and capital planning software that compiles, analyzes and assesses Business Risk for each asset and develops a Capital Improvement Plan. The results of the BRE are provided in easily understood tabular and graphical output.

Figure 1 provides the risk rating for gravity and force main pipe by number of pipe segments.

- Five pipe segments in the collection system have an extreme risk rating. Two segments are recommended for point repairs and the other three segments are recommended for no action, all are included in the 1-2 Year Rehabilitation Plan.
- Eight pipe segments in the collection system have a high-risk rating and three are recommended for replacement in the 3-5 Year Rehabilitation Plan.
- Nineteen pipe segments have a medium risk rating and are included in the 6-20 Year Rehabilitation Plan. Nine of the pipe segments have point repair recommendations and one pipe segment has a full lining recommendation.

Much of the collection system's gravity pipes, have a low to negligible risk rating and are indicative of pipes or manholes in relatively good condition.

Figure 2 provides the risk rating for the collection system manholes.

- Four manholes are identified as extreme risk and are recommended for cleaning, repair and lining in the 1-2 Year Rehabilitation Plan.

- Seventeen manholes have a high-risk rating and are included in the 3-5 Year Rehabilitation Plan. They have recommendations that may include cleaning, repair, lining and/or adjustment.

Many manholes are at low to medium risk and recommended to be included in a long-term rehabilitation or operation & maintenance strategy.

Consequence of Failure \ Likelihood of Failure	Low	Medium	High
High	Medium 10	High 4	Extreme 3
Medium	Low 35	Medium 9	Extreme 2
Low	Negligible 94	Low 5	High 4

Figure 1. Business Risk Matric (Risk Rating) by Number of Gravity and Force Main Pipes

Consequence of Failure \ Likelihood of Failure	Low	Medium	High
High	Medium 0	High 2	Extreme 1
Medium	Low 9	Medium 10	Extreme 3
Low	Negligible 103	Low 21	High 15

Figure 2. Business Risk Matrix (Risk Rating) by Number of Manholes

Figure 3 provides the risk ratings for the WWTF assets. There were twelve WWTP assets in the "Extreme or High Risk" category, which would require a plan for asset renewal or risk mitigation in the immediate term.

Figure 4 provides the risk ratings for the lift station assets. No assets are identified as extreme risk. The ten assets with high risk ratings should be inspected at regular intervals. The City has identified replacement/repairs/improvements to one of the lift stations in the proposed plans for system improvements.

Consequence of Failure \ Likelihood of Failure	Low	Medium	High
High	High 7	High 0	Extreme 0
Medium	Low 26	Medium 18	High 5
Low	Low 19	Low 11	Medium 1

Figure 3. WWTF Assets by Risk Rating

Consequence of Failure \ Likelihood of Failure	Low	Medium	High
High	High 0	High 4	Extreme 0
Medium	Low 1	Medium 16	High 6
Low	Low 0	Low 4	Medium 10

Figure 4. Lift Station Assets by Risk Rating

A spreadsheet providing asset criticality for each utility asset has been included in the AMP detailed report for the collection and treatment systems.

Capital Improvement Plan

A Capital Improvement Plan (CIP) with rehabilitation recommendations was prepared for the Cities' wastewater utility assets based on the Business Risk evaluation. The CIP recommendations are provided for the collection system, wastewater treatment facility and pumping stations/force mains. From the BRE, a short-term (1-5 year CIP) and long-term (6-20 year CIP) was developed for the utility.

Operations, Maintenance and Replacement

Regular operation, maintenance and replacement (OM&R) is essential in the management of a wastewater collection system. The collection system is subject to a variety of operational problems and can suffer from clogging, scour, corrosion, and collapse. Inspection, cleaning, and rehabilitation are important for optimizing the proper functioning of the collection system. By optimizing the performance infiltration/inflow are reduced and sanitary sewer overflows (SSO) are minimized or eliminated preserving the substantial investment the community has in its collection system.

An annual equipment replacement fund should be developed to replace disposable equipment. These are items that can be financially accounted for through operation, maintenance and replacement (OM&R) funds and can be replaced by WWTF staff without bringing in an outside contractor. Existing disposable materials include chemicals, wear parts in pumps and motors, laboratory instruments, etc. The existing OM&R fund is sufficient for the current operations.

Revenue Structure

The revenue and rate methodology is an instrument to determine user rates and charges that will provide sufficient revenues to pay for utility operating costs.

A study was conducted by an independent municipal financial advisor H.J. Umbaugh & Associates to develop a 5-year financial projection to meet the Michigan Department of Environmental Quality SAW Grant requirements.

List of Major Assets

The following is a general list of the major assets identified in the AMP for the City of Manton:

- 41,298 lineal feet of 8” to 12” diameter gravity main
- 7,772 lineal feet of 4” to 8” diameter force main
- 164 manhole structures
- Four (4) lift stations: Main, Stockwell, Division, Industrial Park
- WWTF with influent capacity of 140,000 gallons per day
- Three (3) storage lagoons with 30 million gallon working volume
- Spray irrigation discharge system

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date: November 26, 2018
(no later than 3 years from executed grant date)

The City of Manton certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1655-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: No

   If No - Date of the rate methodology approval letter: May 14, 2018

2) Significant Progress Made: NA

   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)

3) Date of rate methodology review letter identifying the gap: NA

4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on: NA

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Jessica Schisser, City Clerk	(231) 824-3572	jschisser@mantonmichigan.us
Name	Phone Number	Email

Jessica Schisser — 11/28/2018

Signature of Authorized Representative (Original Signature Required) — Date

Jessica Schisser, City Clerk

Print Name and Title of Authorized Representative

Protecting our Infrastructure Investment

ASSET MANAGEMENT PLAN

for Stormwater Collection

Prepared for:

City of Manton

SAW Project No. 1655-01

October 2018

FLEIS&VANDENBRINK
DESIGN. BUILD. OPERATE.

1.0 Executive Summary

Overview

Public Act 562 of 2012 authorized money for Stormwater, Asset Management, and Wastewater (SAW) Grant Program. In November 2015, the City of Manton received a Stormwater, Asset Management, and Wastewater (SAW) Grant from the Michigan Department of Environmental Quality (MDEQ) Project No. 1655-01. The grant provided 100% funding based on the SAW grant application submitted in November 2013.

This report provides the Asset Management Plan (AMP) for the City's stormwater collection system. Working with City staff, Fleis and VandenBrink (F&V) provided technical assistance for asset identification, condition assessment, and capital improvement planning of the stormwater collection system.

This AMP is intended to be a living document that is updated as assets continue to wear and age, and as additional inspection/condition results are found and incorporated into the plan.

The contact person for the City of Manton AMP is:

Jessica Schisser, City Clerk
306 West Main Street
Manton, MI 48663
Phone number: 231-824-3572
Email: jschisser@Mantonmichigan.us

Asset Inventory and Condition Assessment

The stormwater collection system assets consist of approximately 4,283 feet of storm sewers, 46 stormwater structures connecting the gravity pipe, and 29 outfall structures. The system was initially installed in the 1950's with improvements made as the system required repair/expansion. Eighty-four percent of the stormwater collection system is 12 inch and Reinforced Concrete Pipe (RCP). These assets are located in existing street rights-of-way or in easements dedicated for the assets use and maintenance.

Asset Identification and Location

A comprehensive stormwater system asset inventory was developed from available record drawings, field notes, staff knowledge, and site visits; supplemented with field survey work. Asset material, size and age were identified through the review of available historical record documents. Spatial orientation (pipe location), pipe depth and invert elevations were determined through GPS field survey and a comprehensive evaluation of the gravity system. This information was organized into a new, or updated (GIS) database and piping network for archiving, mapping and further evaluation purposes.

Condition Assessment and Expected Useful Life

For the City of Manton, a comprehensive evaluation of the collection system manholes was performed. NASSCO-MACP structure field-based assessments were performed on all identified structures along with Underground Infrastructure Condition Assessment using Closed Circuit Televising (CCTV). Based on discussions with the stormwater system operations staff, there have not been any known capacity issues with the City-owned stormwater system.

Recommendations for long term (6-20 year) identifies the need for maintenance. Rehabilitation accounted for 18% of the system identifying the need for point repairs, lining, and replacement. The remaining assets 82%, were placed in the beyond 20-year planning category.

CRITICAL ASSETS

DETERMINING CRITICALITY

Business Risk is the determination of criticality of each asset in the wastewater system. Criticality is based on two factors; Likelihood (Probability) of Failure and Consequence of Failure using the following formula:

Business Risk = Consequence of Failure Score x Likelihood of Failure Score

Defining an asset's Business Risk allows for management of risk and aids in decision making for where to allocate operation and maintenance and capital improvement funds.

Likelihood of Failure (LoF) is a measure of how likely an asset is to fail. The following categories have been developed to quantify how likely an asset is to fail:

- Condition of the asset
- Remaining useful life (Age)
- Service History
- Operational status

Consequence of Failure (CoF) is a measure of the social, economic or environmental impact of failure of an asset and on the utility's ability to convey stormwater. CoF categories of the stormwater collection system include:

- Location of asset
- Facilities served by asset
- Size

CRITICALITY RESULTS

Using the strategy outlined above, a Business Risk Evaluation (BRE) was performed for each asset using a graphical ArcGIS-based sewer asset management and capital planning software that compiles, analyzes and assesses Business Risk for each asset and develops a Capital Improvement Plan. The results of the BRE are provided in easily understood tabular and graphical output.

Figure 1 provides the risk rating for storm sewer pipes by number of pipe segments. 4 pipe segments in the stormwater collection system have an extreme risk rating. One of these was repaired in October 2018. The other three are included in the 6-10 year CIP recommending point repairs, lining and replacement.

Figure 2 provides the risk rating for the storm sewer structures. 1 structure was identified as extreme risk and is recommended for replacement or rehabilitation. This manhole is included in the 6-10 year CIP recommending point repairs, lining, and replacement.

Consequence of Failure \ Likelihood of Failure	Low	Medium	High
High	Medium **13**	High **0**	Extreme **2**
Medium	Low **10**	Medium **1**	Extreme **2**
Low	Negligible **25**	Low **1**	High **2**

Figure 1: Business Risk Matrix (Risk Rating) by Number of Gravity Pipes

Consequence of Failure \ Likelihood of Failure	Low	Medium	High
High	Medium **0**	High **3**	Extreme **0**
Medium	Low **3**	Medium **3**	Extreme **1**
Low	Negligible **19**	Low **16**	High **1**

Figure 2: Business Risk Matrix (Risk Rating) by Number of Structures

A spreadsheet providing asset criticality for each utility asset has been included in the AMP detailed report for the stormwater collection system.

Capital Improvement Plan

A Capital Improvement Plan with recommendations was prepared for the City's assets based on the Business Risk evaluation. Data-driven information from the business risk assessment and condition assessment was used to identify and prioritize the capital improvement projects. The information was also used to schedule inspections to evaluate the condition of high business risk assets. Long-Term 6-20 year Capital Improvement Plan (CIP) was prepared to address the projected needs for each asset in the system. The 6-20-year CIP rehabilitation total is $354,021.

Operations and Maintenance

A preventative maintenance program to systematically clean and CCTV inspect pipelines to NASSCO-certified standards is critical for a sound stormwater system. The process of cleaning and CCTV inspection of pipelines either with equipment owned by the community or contracted is a relatively inexpensive maintenance effort when compared to rehabilitation efforts. For this reason, it is recommended that at a minimum, all pipelines be cleaned and televised every five years, or that 20% of the system be cleaned and televised annually. Available budget will dictate the frequency or size of yearly projects. The 5-year CIP maintenance total is $8,965.

List of Major Assets

The following is a general list of the major assets identified in the AMP for the City of Manton:

- 4,283 lineal feet of 4” to 24” diameter storm sewer
- 46 storm sewer structures
- 29 storm sewer outfall structures

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Date: November 26, 2018
(no later than 3 years from executed grant date)

The City of Manton certifies that all stormwater asset management plan (SWAMP) activities specified in SAW Grant No. 1655-01 have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SWAMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

Jessica Schisser, City Clerk	(231) 824-3572	jschisser@mantonmichigan.us
Name	Phone Number	Email

Jessica Schisser — 11/28/2018

Signature of Authorized Representative (Original Signature Required) — Date

Jessica Schisser, City Clerk

Print Name and Title of Authorized Representative

VILLAGE OF MAPLE RAPIDS
SAW Grant Project No. 1059-1

EXECUTIVE SUMMARY

Prepared by: SPICER GROUP, INC.
1400 Zeeb Drive
St. John's MI, 48879

Owner: **VILLAGE OF MAPLE RAPIDS**
118 West Adelaide Street
Maple Rapids, MI 48853
(989) 682-9227
Daryl Trefil, Village President

On November 24, 2015, the Village of Maple Rapids entered into an agreement with the Michigan Finance Authority for grant funds issued under Public Act No. 511 of 2012 for the *Stormwater, Asset Management, and Wastewater (SAW)* program. The Village received the follow grants:

Wastewater Asset Management Plan (WWAMP) – 100% Grant*	***$260,000***
Stormwater Asset Management Plan (SWAMP) – 90% Grant	$153,000
Eligible Cost Subtotal	$413,000
LESS Local Match	($15,300)
Total Grant Amount	$397,700

*Disadvantaged for Wastewater Asset Management Plan; no local match required

The Asset Management Plans (AMPs) needed to be completed within three years of the date of agreement; November 2018.

Each AMP has the following key components:

- Asset Inventory and Condition Assessment
- Level of Service Determination
- Critical Assets (Risk)
- Revenue Structure
- Capital Improvement Plan

Part 1: Asset Inventory and Condition Assessment

The Village's wastewater system consists of three main components: The collection system (pipes and manholes), a pumping facility, and the wastewater stabilization lagoons (WWSL).

For the collection system, Spicer Group, Inc. completed conventual survey of the entire Village, and used the survey information to develop a comprehensive Geographic Information System (GIS). This GIS is located on a new computer in the Village Hall office. It is considered a detailed "smart" mapping system with databases, utilizing the ArcGIS/Arc Online platform by ESRI (Environmental Systems Research Institute). This system can be accessed and updated in the field by DPW staff from new iPads supplied as part of the SAW grant project. From the GIS, as-built plans, pipe/manhole condition ratings, materials, year installed, inspection records, CCTV (closed circuit television) pipe inspections etc. can be accessed. This information can also be queried to provide specific lists and maps and updated easily when future improvements are made.

The Village has approximately 24,068 feet (4.5 miles) of 8-inch vitrified clay gravity sewer, 4,015 feet (0.8 miles) of 6-inch ductile iron force main, and 97 manholes, serving approximately 280 active customers. The majority of the sanitary sewer system was constructed between 1971 and 1972. Plummer's Environmental Services (PES), located in Byron Center MI, completed a comprehensive cleaning and televising program of the sanitary sewer pipes, and Spicer Group, Inc. completed a comprehensive inspection of the manholes using NASSCO (National Association of Sewer Service Companies) Manhole/Pipeline Assessment Certification Program (MACP/PACP) standards to identify and code the observations/defects. The MACP/PACP system is used to standardize the scoring and to quantify the condition of the wastewater assets.

The second main component of the Village's wastewater system is the main pumping station, located at the intersection of Maple Avenue and Mill Street. Spicer Group, Inc. completed an inspection and condition assessment for the station and provided recommendations to the Village for future improvements.

The third main component of the Village's wastewater system is the wastewater stabilization lagoons (WWSL) located at the north end of Garfield Street. The WWSL consists of a lagoon system with three total lagoons. Spicer Group completed an inspection and assessment of the WWSL and recommended several improvements to the facility. The recommended improvement projects are that are included in the Capital Improvement Plan (CIP).

Part 2: Level of Service (LOS)

The next phase of the AMP is a Level of Service determination. What level of service does the City want to provide to its wastewater customers? How are projects going to be prioritized and included in the CIP? What cost is the City willing to endure to provide that level of service? These are all questions that were discussed as a part of the overall asset management plan. The City's Level of Service Statement/Goals are as follows:

> *The City of Manistee is committed to improving and maintaining the public health protection and performance of our wastewater system, while minimizing the long-term cost of operating those assets. We strive to make the most cost-effective renewal and replacement investments and provide the highest-quality customer service possible.*

LOS - Basic Goals**:**

- Ensure adequate system capacity to customers
- Operate and maintain the system to minimize service disruptions to customers
- Mitigate inflow/infiltration (I/I) entering the system, therefore reducing pumping and treatment costs
- Review operations & maintenance practices and capital improvement projects to determine the lowest cost options for our residents.

Level of Service criteria includes the following categories:

1. "MINIMUM" Level of Service
   - Priority projects to meet the minimum local, Stae, and/or Federal regulations.
   - Actions taken may maintain service life of asset
   - Typically, the least cost option
2. "MEDIUM" Level of Service
   - Projects completed as when other infrastructure projects are occuring or if monies become available earlier than anticipated
   - Actions taken can keep up with depreciation of asset
   - Asset's service life is maintained, and possibly improved
3. "HIGH" Level of Service
   - Projects that are forecasted long range, some of which the current asset may have a considerable amount of remaining useful life
   - Most proactive service level
   - Typically the greatest cost option

As the AMP progressed, different scenarios were evaluated, to determine the City's desired Level of Service based on project costs, associated LOS, and the implication to current and future sewer rates.

Part 3: Criticality (Risk)

For each asset in the Village's wastewater system, a criticality/risk analysis was performed to determine and prioritize the Village's key components. Risk is the product of the Likelihood of Failure (LoF) and Consequence of Failure (CoF), as shown below.

RISK = LoF x CoF

Likelihood of Failure (LoF) for sewer and manhole assets is primarily based on the physical condition of the asset as inspected in the field. The grading system is based on a scale of 1 -5. The lowest grade of 1 is an unlikely probability of failure, with the highest grade of 5 being imminent probability of failure. Based on the condition assessments and the field inspections, the Likelihood of Failure (LoF) was calculated for sewers, manholes, pump stations and lagoons. For those pipes and manholes which could not be inspected, and estimated LoF was determined. Table ES-1 and ES-2 provides a summary of the system as it relates to a low, medium, or high probability of failure of the mainline sanitary sewers in the system.

LoF – Sanitary Sewer and Manholes

Table ES-1: Likelihood of Failure (LoF) – Mainline Sanitary Sewers

LoF	Pipe Segments	Length	Percent
Low	1	240	1.0%
Medium	75	19,679	81.8%
High	18	4,150	17.2%
Total	94	24,068	100.0%

Table ES-2: Likelihood of Failure (LoF) – Sanitary Manholes

LoF	Pipe Segments	Percent
Low	3	3.2%
Medium	73	76.8%
High	19	20.0%
Total	95	100.0%

LoF - Pump Station and WWSL

Each of the assets at the Village of Maple Rapids pump station and WWSL were given a likelihood of failure score. The likelihood of failure score was based on the field condition score given, the remaining useful life of the asset, and comments from Village Staff. Table ES-3 shows a summary of the rating system.

Table ES-3: Likelihood of Failure (LoF) – Pump Stations & WWSL

Rating	Description
1	Very Low Probability
2	Not Likely – No maintenance issues so far
3	50/50 – Asset is passed its expected service life / some maintenance issues
4	Likely to Fail – Asset is passed expected service life / many recorded maintenance issues
5	Asset will fail soon
6	Asset has already failed

The pumps and the electrical and instrumentation within the Pump Station received a score of 3. This was mainly due to the age of the equipment. All other assets had a score of 2.

Generally, the assets at the WWSL were given a likelihood of failure score of 1 or 2. Some components were still operating fine but are close to the end of their expected service life. These included the following:

- The entrance drive
- The outfall headwall
- The original fencing and gates

No assets received a score higher than 2.

CoF – Sanitary Sewer, Manholes, Pump Station and WWSL

Next, the Consequence of Failure (CoF) was calculated and scored for each asset. The Consequence of Failure (CoF) is aggregating the empirical value associated with failure of an asset as it directly and indirectly pertains to social, environmental, and economic (cost) implications. Table ES-4 and ES-5 summarize the CoF failure scale grade and definitions for the collection system (pipes and manholes) and the pump stations / WWSL.

Table ES-4: Consequence of Failure (CoF) – Sewers & Manholes

Description	Grade	Failure of Asset
Catastrophic Disruption	6	Massive system failure - severe health effect, extensive damages, LOS severely compromised
Major Disruption	5	Major effect - major capacity loss, health effects, and costs, LOS compromised
Moderate to Major Disruption	4	Major effect - moderate to major loss of system capacity, costs, and health effects, LOS may be compromised
Moderate Disruption	3	Moderate effect - moderate loss of system capacity, health effects, and costs, LOS still achieved
Minor Disruption	2	Minor effect - minor capacity loss, costs, and health effects
Insignificant Disruption	1	Slight effect - slight loss of system capacity, minor health effects, minor costs

Table ES-5: Consequence of Failure (CoF) – Pump Stations & WWSL

Rating	Description
1	Inconvenience – Equipment is used but not essential to operation
2	OK – 100% redundant system / no issues if equipment fails during peak flows
3	Marginal – redundant systems can handle daily average flow / equipment can be down for a short time period
4	Bad – backup systems are not reliable / short down time will cause problems / high potential for flooding or permit violation
5	Very Bad – no backup systems / flooding or permit violation will happen
6	Catastrophic – lives will be lost

Risk – Sanitary Sewer and Manholes

Finally, the Risk was calculated for asset in the system. Table ES-6 and ES-7 provides a summary of the system as it relates to low, medium, or high-Risk prioritization for the mainline sanitary sewers and manholes in the system.

Table ES-6: Risk – Mainline Sanitary Sewers

Risk	Pipe Segments	Length	Percent
Low	31	8653.2	36.0%
Medium	61	15269.9	63.4%
High	2	145.1	0.6%
Total	94	24,068	100.0%

Table ES-7: Risk – Sanitary Manholes

Risk	Pipe Segments	Percent
Low	13	13.7%
Medium	79	83.2%
High	3	3.2%
Total	95	100.0%

Risk - Pump Station

The pump station within the Village of Maple sewer system is in the low range of the medium risk zone. The exterior of the station and the valves Risk was calculated to be Low Risk. The pumps, electrical/instrumentation, standby generator, and force main air release valves were considered Medium Risk. All other assets are on the border line of Low to Medium Risk. This is due to the high consequence of failure scores.

Risk - WWSL

Most assets at the WWSL are in the low to medium risk category. The entrance drive, fences and gates, flow control structure #1, and outfall headwall had a calculated Low Risk score. The Risk computed for all the lagoon berms, the remainder of the lagoon structures, and all of the buried piping at the facility was a 10, on the border of Low to Medium Risk. This is mainly due to the high consequence of failure scores they received.

Part 4: Capital Improvement Plan

The Capital Improvement Plan (CIP) is the culmination of all the parts of the Asset Management Plan (AMP). Reviewing the results of the wastewater system Inventory & Condition Assessment, Level of Service (LOS) determination, Criticality (Risk), Revenue Structure, and preliminary CIP project lists, a process was worked through to categorize and prioritize the final CIP. Various degrees of Level of Service and the associated CIP projects were evaluated and plugged into the Revenue Structure model, and the resulting sewer rates for that set of scenarios were reviewed. If the projected rates were too high, a lower LOS was chosen and those CIP projects were plugged into the Revenue Structure model and the resulting rates were then reviewed. The process then continued with different CIP projects at varying LOS's until an acceptable rate structure, level of service, and capital improvement plan was developed.

A 10-year CIP was developed that includes various wastewater system improvements including. The proposed improvements are summarized below:

Project	Payment	LOS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
CIPP 9500 LFT of 8-inch sanitary sewer	Bond	Minimum								410,000			
Upgrade Control Panel	Bond	Minimum								35,000			
Upgrade Level Controls	Cash	Minimum						17,500					
New Pump Motors	Bond	Medium								22,000			
New Pumps	Bond	Medium								25,500			
Install Pump Station Flow Meter	Cash	Minimum		7,500									
Install Auto-dialer	Cash	Minimum	6,000										
Upgrade back-up pump building	Cash	High					6,000						
Paint Interior of PS drywell	Cash	High				4,500							
Valve replacement	Cash	Medium	7,500										
Sludge testing	Cash	High								5,000			
Replace Lagoon Outfall Headwall	Cash	Minimum			23,000								
TOTAL			13,500	7,500	23,000	4,500	6,000	17,500		497,500			

In total, $569,500 worth of projects are recommended. An additional $720,000 worth of lateral connection sealing is recommended however this is a high level of service with a low urgency. The Village also may need to expend $100,000 for sludge removal and $24,000 for gravel on the lagoon berm drives. The Village has deferred these projects until there is a greater need, cost and timing determined.

The largest number of projects and project costs will be occuring in or after 2026. The purpose of this is to allow for existing debt payment of a previous CIP project to sunset and free up revenue to support the identified projects in 2026.

Sanitary Sewer Improvements

1. **Cure in Place Pipe (CIPP) Lining. (Minimum to Medium Level of Service)**
   Description: CIPP Line the remaining sewers in the system which require CIPP that have not been completed in that past. There is currently 9,500 LFT of 8-inch sanitary sewer in the system that has not had trenchless rehabilitation performed.
   Cost: $410,000
   - This project will also include sewer spot repairs and sewer spot CIPP lining
   - The minimum cost of sewer rehabilitation is included in Item #2.

2. **Sewer Rehabilitation (Minimum Level of Service)**
   Description: Perform only required rehabilitation of defective sewers by CIPP lining.
   Cost: $263,750
   - Cost includes the minimum amount of sewer requiring rehabilitation identified through televising review
   - The project also includes limited sewer lateral sealing and sewer spot CIPP lining

Pump Station Improvements

3. **Upgrade Control Panel (Minimum Level of Service)**
   Description: Upgrade existing control panel inside of the drywell (can). Panel upgrades include electrical, logic for controls, pump starters, transfer switch for generator etc. The new control panel would be stainless / lockable / weatherproof / and explosion proof.
   Cost: $35,000.
   - Cost based on Spicer Group projects performed in the past 4 (four) years.

4. **Upgrade Level Controls (Minimum Level of Service)**
   Description: This project was driven by the age of the equipment. The level controls are past their useful life. The Installation date was approximately 1986.
   Cost: $17,500
   - Current system is an air-bubbler
   - Alternate choices include Pressure-Transducer with float backup system or Ultrasonic with a float backup system.
   - Spicer recommends a Pressure-Transducer with float backup system

5. **New Pump Motors (Medium Level of Service)**
   Description: This project was driven by the age of the equipment. The pump motors are past their useful life. Replacement of pump motors is typically 20 years. The Installation date was approximately 1986.
   Cost: $22,000
   - Current Pump Motors are Allis-Chalmers

6. **New Pumps (Medium Level of Service)**
   Description: This project was driven by the age of the equipment. The pumps are past their useful life. Replacement of pumps is typically 20 years. The Installation date was approximately 1986.
   Cost: $25,500
   - Costs are in line with removal and replacement of 2 (two) 10hp dry-pit vertical centrifugal pumps.
   - Current Pumps are Allis-Chalmers

7. **Replace Pump Station Flow Meter (Minimum Level of Service)**
   Description: Existing flow meter is not in operation. Replace with magnetic flowmeter
   Cost: $7,500
   - Recommended manufacturers include: ABB, Emerson/Rosemount, Foxboro, and Krone

8. **Install Auto-dialer (Minimum Level of Service)**
   Description: Install Auto-dialer to supplement the current light alarm by contacting Village and DPW staffing
   Cost: $6,000
   - $1,500 Auto-Dialer
   - $1,000 New Phone Service
   - $1,000 Wiring for various alarms / sensors (low water alarm, high water alarm, pump seal failure, sump pump failure, pump over temperature)
   - $2,500 Labor/Install by licensed electrician

9. Upgrade Back-up Pump Building (High Level of Service)
Description: Improvements could include the following:
- New ventilation system. Remove existing wood doors that open to induce air flow with a louver
- Paint interior drywall
- Paint exterior wood siding or reside with vinyl siding
- Paint exterior exhaust piping

Cost: $6,000

10. Paint Drywell Interior (High Level of Service)
Description: Paint / Coat the drywell floor. The interior walls are in good to fair condition
Cost: $4,500

11. Replace Valves (Medium Level of Service)
Description: Remove and Replace Pump Station valves
Cost: $7,500

Lagoon Improvements

12. Sludge Testing
Description: Sludge will be tested to determine approximate volume, location, and heavy metal contamination. A Residual Management Plan (RMP) will be prepared and submitted to the MDEQ.
Cost: $23,000
- Residual Management Plan (RMP) will be developed and submitted to the MDEQ under the Village's current COC permit

13. Replace Lagoon Outfall Headwall (Minimum Level of Service)
Description: Erosion around the existing headwall has forced the last section of pipe and attached headwall to detach itself.
Cost: $23,000
- Remove failed pipe and headwall
- Stabilize soil and replace pipe and headwall
- Install animal guard

Annual O&M Recommendations

14. Sewer Cleaning and Televising Program. (Minimum Level of Service)
Description: Clean and Televise the entire collection system within a 15 year rotation.
Cost: $75,000

Part 5: Revenue Structure

Spicer Group teamed with Municipal Analytics for the revenue structure analysis for the AMP. Wastewater account balances, expenditures, revenues, etc. were reviewed and inputted into Municipal Analytics financial software to determine if there were any deficiencies in the rates. The Village's current rate structure was found to have no deficiencies.

Next, the Capital Improvement Plan (CIP) projects were evaluated and allocated to various years of completion, and the rate structure to support those improvements was determined. Many iterations/scenarios were performed to come up with a rate structure that met the Village's Level of Service goals, and address CIP needs. The result was a recommendation for an annual increase of $3.00 to the Village's sanitary sewer rates.

The Village adopted the recommended rate structure with resolution of Ordinance No. 85 on November 7th, 2018. The yearly sewer rates charged on a quarterly basis are summarized below in Table ES-8. This should be reviewed annually as a part of the Village's normal budgeting process.

Table ES-8: The Adopted 10-Year Annual Sewer Rates

Current	Jan 19	Jan 20	Jan 21	Jan 22	Jan 23	Jan 24	Jan 25	Jan 26	Jan 27	Jan 28	Jan 29
$64.00	$67.00	$70.00	$73.00	$76.00	$79.00	$82.00	$85.00	$88.00	$91.00	$94.00	$97.00

Conclusion

The Village of Maple Rapid's wastewater system is a typical, aging municipal infrastructure system. The DPW staff have completed routine operation and maintenance of the components, and the system is in relatively good shape. There are a few areas that need attention, and there are many areas that can be monitored and left alone for years to come. A $3.00 annual rate increase is recommended to cover the planned operating expenses, capital improvement projects, and inflation for the next ten years. This should be reviewed annually during the Village's normal budgeting process.

In accordance with the SAW Grant requirements, the Village's Wastewater Asset Management Plan (WWAMP) needs to be kept available for citizen review for 15 years. The WWAMP should be reviewed annually, and the components updated and included in the Village's annual budget process.

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date November 30, 2018
(no later than 3 years from executed grant date)

The Village of Maple Rapids *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1059-0 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or No

   If No - Date of the rate methodology approval letter: May 2018.

2) Significant Progress Made: Yes or No

   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)

3) Date of rate methodology review letter identifying the gap: _________.

4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Daryl Trefil, Village President	at 517-930-3200,	trefild@fultonpirates.net
Name	Phone Number	Email

Daryl J. Trefil 11/27/18

Signature of Authorized Representative (Original Signature Required) Date

Daryl Trefil, Village President

Print Name and Title of Authorized Representative

VILLAGE OF MAPLE RAPIDS
SAW Grant Project No. 1059-1

EXECUTIVE SUMMARY

Prepared by: **SPICER GROUP, INC.**
1400 Zeeb Drive
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Owner: **VILLAGE OF MAPLE RAPIDS**
118 West Adelaide Street
Maple Rapids, MI 48853
(989) 682-9227
Daryl Trefil, Village President

On November 24, 2015, the Village of Maple Rapids entered into an agreement with the Michigan Finance Authority for grant funds issued under Public Act No. 511 of 2012 for the *Stormwater, Asset Management, and Stormwater (SAW)* program. The Village received the follow grants:

Stormwater Asset Management Plan (SWAMP) – 90% Grant	***$153,000***
Stormwater Asset Management Plan (SWAMP) – 100% Grant*	$260,000
Eligible Cost Subtotal	$413,000
LESS Local Match	($15,300)
Total Grant Amount	$397,700

*Disadvantaged for Stormwater Asset Management Plan; no local match required

The Asset Management Plans (AMPs) needed to be completed within three years of the date of agreement; November 2018.

Each AMP has the following key components:

- Asset Inventory and Condition Assessment
- Level of Service Determination
- Critical Assets (Risk)
- Capital Improvement Plan
- Revenue Structure

Part 1: Stormwater Asset Inventory and Condition Assessment

For the Village's stormwater collection system, Spicer Group, Inc. completed conventual survey of the entire Village. The survey information, in conjunction with Village as-builts, was utilized to develop a comprehensive Geographic Information System (GIS) including all stormwater assets (manholes, catch basins, stormwater outfalls, etc.). From the GIS, as-built plans, pipe/manhole condition ratings, materials, year installed, inspection records, CCTV video inspections, ownership information etc. can be accessed. This information can also be queried to provide specific lists and maps and updated easily when future improvements are made.

The GIS information is located on a new computer in Village Hall and is a detailed "smart" mapping system with databases. The Village is employing ArcMap software from ESRI as the backbone of the GIS system. The Village is currently operating with ArcGIS Online from ESRI to access the information online. This system can be accessed and updated in the in the office via computer, or the field by Village staff with new iPads supplied as part of the SAW grant project.

The Village's stormwater collection system is approximately 6,254 feet (1.2 miles) in length and consists of storm sewer pipes ranging in diameter size from 6-inch to 18-inch. The storm sewer pipes consist of mainline sewer, catch basin leads, and culverts. In addition, the Village has approximately 43 structures consisting of manholes, catch basins, and leaching basins. A summary of the Village's storm sewer pipes by diameter and length is included in Table ES-1.

Table ES-1: Village - Stormwater Pipes by Diameter and Material

Diameter	Number of Pipes	Percent	Length(ft)
6"	16	2,673	42.7%
8"	9	1,686	27.0%
10"	1	123	2.0%
12"	6	1,294	20.7%
15"	1	93	1.5%
18"	1	39	0.6%
TOTAL	37	6,254	100.0%

The Village's storm sewers discharge into the Maple River. There is one County Drain, Peck Drain, which runs through the Village and conveys stormwater to the Maple River as well.

Plummer's Environmental Services (PES), located, in Byron Center MI, completed a comprehensive cleaning and televising program of the storm sewer pipes. The condition assessment was completed in NASSCO's (National Association of Sewer Service Companies) Pipeline Assessment Certification Program (PACP) standards.

Spicer Group completed a comprehensive inspection of the manholes. Manholes were inventoried and assessed manually or by use of remote inspection equipment which was deployed from the ground surface. The condition assessment was completed in NASSCO's Manhole Assessment Certification Program (MACP) standards.

Part 2: Level of Service (LOS)

The next phase of the AMP is a Level of Service determination. What level of stormwater service does the Village want to provide to its residents? How are projects going to be prioritized and included in the CIP? What cost is the Village willing to endure to provide that level of service? These are all questions that were discussed as a part of the overall asset management plan. The Village's Level of Service Statement/Goals are as follows:

> *The Village of Maple Rapids strives to maintain a basic stormwater collection system that addresses the residents' wants and needs and upholds the local, State, and Federal regulatory requirements at a minimum cost to our residents.*

LOS - Basic Goals**:**

- Operate and maintain the stormwater system to minimize flooding and property damage.
- Review the condition of stormwater assets as a part of other infrastructure construction projects.
- Seek a funding source for operation & maintenance and repair/replacement of stormwater assets.
- Review the maintenance and capital improvement plans/projects annually to determine the lowest cost options for our residents.

Level of Service criteria includes the following categories:

1. "MINIMUM" Level of Service
   - Address resident complaints as they come in.
   - Rehabilitation to storm sewers or structures (manholes, catch basins) with isoloated structural deficiencies
2. "MEDIUM" Level of Service
   - Rehabilitation of storm sewers with significant structural and/or operations deficiencies involving trenchless rehabilitation (CIPP/CIPM Lining)
   - Replacement of existing storm sewers or structures which cannot be rehabilitated by trenchless means
3. "HIGH" Level of Service
   - Address areas in the Village with historic flooding or drainage issues
   - Increase capaVillage of existing stormwater infrastructure

Generally, the "high" level of service projects will have a higher construction/initial cost but would provide a better long-term or life cycle cost for the Village. The "minimum" level of service projects would address the immediate concerns that residents bring to the Village's attention as well as placing emphasis on the rehabilitating those structures and sewer pipes in need of limited repair that would generally be of a lower construction cost.

The Village will deliberate the findings and recommendations from the SAW to solidify the desired Level of Service, based upon the criteria above. Since there is no funding mechanism for stormwater assets currently, the Village has been maintaining a *Minimum* Level of Service, due to financial constraints.

Part 3: Criticality (Risk)

For each asset in the Village's stormwater system, a criticality/risk analysis was performed to determine and prioritize the Village's stormwater components. The components evaluated include the pipes (sewers) and manholes. Risk is the product of the Likelihood of Failure (LoF) and Consequence of Failure (CoF), as shown below.

RISK = LoF x CoF

Likelihood of Failue (LoF) is the structural and physical condition assessment of the asset. Based on the field inspections and condition assessment, a resulting the Likelihood of Failure (LoF) was calculated for each pipes and manholes.

The grading system for these assets are on NASSCO's PACP (pipes) and MACP (manholes). The grading system is based on a scale of 1 -5. The lowest grade of 1 is an unlikely probability of failure, with the highest grade of 5 being imminent probability of failure. Table ES-2 and Table ES-3 provide a summary of the system as it relates to a low, medium, or high probability of failure of the mainline sewers and manholes in the system.

Table ES-2: Likelihood of Failure (LoF) - Mainline Sanitary Sewers

LoF	Pipe Segments	Length	Percent
Low	0	0	0.0%
Medium	23	4,037	64.5%
High	14	2,217	35.5%
Total	37	6,254	100.0%

Table ES-3: Likelihood of Failure (LoF) - Manholes

LoF	No. of Manholes	Percent
Low	1	2.3%
Medium	40	93.0%
High	2	4.7%
Total	43	100.0%

Next, the Consequence of Failure (CoF) was calculated and scored for each asset. The Consequence of Failure (CoF) is aggregating the empirical value associated with failure of an asset as it directly and indirectly pertains to social, environmental, and economic (cost) implications. Table ES-4 summarize the CoF failure scale grade and definitions for the collection system (pipes and manholes).

Table ES-4: Consequence of Failure (CoF) – Sewers & Manholes

Description	Grade	Failure of Asset
Catastrophic Disruption	6	Massive system failure - severe health effect, extensive damages, LOS severely compromised
Major Disruption	5	Major effect - major capacity loss, health effects, and costs, LOS compromised
Moderate to Major Disruption	4	Major effect - moderate to major loss of system capacity, costs, and health effects, LOS may be compromised
Moderate Disruption	3	Moderate effect - moderate loss of system capacity, health effects, and costs, LOS still achieved
Minor Disruption	2	Minor effect - minor capacity loss, costs, and health effects
Insignificant Disruption	1	Slight effect - slight loss of system capacity, minor health effects, minor costs

Finally, the Risk was calculated for each asset in the system. Table ES-5 and ES-6 provides a summary of the system as it relates to low, medium, or high-Risk prioritization for the pipes and manholes in the system. Table ES-8 and Table ES-9 provide a summary of the system as it relates to a low, medium, or high probability of failure of the mainline sewers and manholes in the system.

Table ES-5: Risk – Mainline Sanitary Sewers

Risk	Pipe Segments	Length	Percent
Low	11	1,884	30.1%
Medium	23	3,844	61.5%
High	3	527	8.4%
Total	37	6,254	100.0%

Table ES-6: Risk – Manholes

Risk	No. of Manholes	Percent
Low	5	11.6%
Medium	30	69.8%
High	8	18.6%
Total	43	100.0%

Part 4: Capital Improvement Plan

The Capital Improvement Plan (CIP) is the culmination of all the parts of the Asset Management Plan (AMP). Reviewing the results of the storm water system Inventory & Condition Assessment, Level of Service (LOS) determination, Criticality (Risk), Revenue Structure, and preliminary CIP project lists, a process was worked through to categorize and prioritize the final CIP. The resulting CIP plan includes the following projects:

1. Storm Sewer Cleaning and Televising Program
   Level of Service - Minimum to Medium
   Construction Cost - $40,000 to $60,000

   Create a long-term storm sewer cleaning and televising program. The frequency of this program should be every 10 to 15 years. Assets should include any storm sewer piping (culverts, mainline storm sewer, catch basin leads)

2. Storm Sewer Rehabilitation
   Level of Service - Minimum to Medium
   Construction Cost - $320,000

   Recommendations for rehabilitation are included on Table ES-7 below for the storm sewer televised in the SAW which exhibited structural deficiencies. Construction costs do not include contingency or engineering fees.

Table ES-7: Storm Sewer Rehabilitation Costs

PSR (Pipe)	Street	US MH	DS MH	Diam. (in)	Length	Rehab Option Selected	Selected Rehab Cost
5010	Main St.	110	210	15	93	Suggested	$931
5020	Main St.	120	1420	12	305	CIPP	$12,797
5030	Main St.	1420	130	12	433	Suggested	$4,330
5080	Main St.	1170	1180	8	133	Suggested	$15,723
5090	Main St.	2000	1230	10	123	Suggested	$18,167
6000	Main St.	1230	1250	12	183	Replace	$54,960
6010	Main St.	1250	240	12	220	Replace	$66,030
6030	Main St.	1440	1220	6	265	Suggested	$2,647
6040	Main St.	1220	1240	8	182	Suggested	$10,000
6050	Main St.	1290	1270	6	415	Suggested	$4,150
6070	Main St.	1300	1280	8	70	Replace	$20,880
6080	Main St.	1280	260	8	335	Suggested	$20,000
7000	Main St.	1240	1260	8	287	Replace	$86,100
8010	Main St.	1340	1430	6	333	Suggested	$3,329
						Total:	**$320,000**

3. Annual Operations and Maintenance
   We recommended the Village consider incorporation of sufficient funds for the annual operations and maintenance budget for the following O&M activities.

   1. Catch Basin and Manhole Cleaning. ($2,000 - $3,000)
      a. 43 structures in the system
      b. Assume $50 to $70 / Structure to Clean

   2. Maintenance of GIS software system ($1,500 - $2,000)
      a. Revisions to GIS system and feature attributes
      b. Update collection system maps based on GIS revisions
      c. Work can be performed by the Village or 3rd Party

   3. Training and Development ($1,500)
      a. NASSCO PACP/MACP/LACP certification for pipe and manhole assessment
      b. NASSCO certification lasts 3 years, then the user must be recertified

Part 5: Revenue Structure

Spicer Group teamed with Municipal Analytics for the stormwater funding analysis. The primary goal of the study was to determine the financial resources available to fund the capital and operating costs of the Village's stormwater system, as identified in the Asset Management Plan (AMP) and Capital Improvement Plan (CIP) developed by Spicer Group.

In summary, the Village has limited financial resources to fund capital investments in the stormwater system. Any money used to pay for stormwater system maintenance will reduce the funds available to maintain and improve Village streets. Of the existing funds operated by the Village, the General Fund, Major Streets Fund, and Local Streets Fund are the primary stormwater funding options available. The Major and Local Streets funds are expected to have only minimal capacity for additional outlays for stormwater, and the Village's General Fund is forecasted to operate at a loss each year without any expenditures for stormwater maintenance. These financial realities restrict any ability to invest in capital improvements in the Maple Rapids stormwater system.

The Village is encouraged to include in future budgets, funds designated for stormwater maintenance. Annually, the financial forecasting model developed for the Village by Municipal Analytics should be reviewed and updated to understand the projected finances in each of the included funds. Village leaders should work to identify funding options for the future potential capital needs in the stormwater system.

Conclusion

The Village of Maple Rapids stormwater system is a typical, aging municipal infrastructure system. Since there has been no funding mechanism for stormwater assets, the Village had been maintaining a Minimum Level of Service for its residents. At this time, the CIP projects have not been included into the current fiscal year budget or forecasted in future FY's. The Village will evaluate where these projects should be included in future FY's when funding becomes available.

In accordance with the SAW Grant requirements, the Village's Stormwater Asset Management Plan (SWAMP) needs to be kept available for citizen review for 15 years. The SWAMP should be reviewed annually, and the components updated and included in the Village's annual budget process.

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Due Date **November 30, 2018**
(no later than 3 years from executed grant date)

The Village of Maple Rapids *(legal name of grantee)* certifies that all stormwater asset management plan (SWAMP) activities specified in SAW Grant No. 1059-0 have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SWAMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

Daryl Trefil, Village President	at 517-930-3200,	trefild@fultonpirates.net
Name	Phone Number	Email

Daryl J. Trefil 11/27/18

Signature of Authorized Representative (Original Signature Required) Date

Daryl Trefil, Village President

Print Name and Title of Authorized Representative

City of Marquette
Marquette, MI | 300 W Baraga Ave, MI 49855

City of Marquette
Wastewater System
Asset Management Plan (SAW Grant No. 1235-01)

November 2018

Submitted by:
Curt Goodman
Director of Municipal Utilities
cgoodman@marquettemi.gov
(906) 225-4055

CHAPTER 1 – EXECUTIVE SUMMARY

1.1 INTRODUCTION

The City of Marquette (City) is implementing an asset management program as part of their National Pollution Discharge Elimination System (NPDES) permit. The asset management planning process aligns with guidance from the Michigan Department of Environmental Quality (MDEQ) including the Asset Management Program Checklist – 2017. The MDEQ supports the asset management program through Stormwater, Asset Management, Wastewater (SAW) grants. The City's SAW grant is made up of several components including collection system assessments and wastewater system asset management.

1.1.1 HOW DID THE CITY USE THE SAW GRANT FUNDING?

Key elements of the City's SAW grant are summarized in Table 1-1. The table includes the total SAW grant and local matching funds.

Sanitary sewer and manhole inspections updated critical attribute information in GIS and supported the transition to condition based improvements to the collection system. The City invested in a computerized maintenance management system (CMMS) provided by Lucity. The CMMS is integrated with GIS and supports the workflow and management of the collection system and wastewater treatment assets. The City also invested in a rate analysis that used the information developed as part of the asset management planning process to provide a roadmap to meet future funding needs.

Table 1-1 SAW Grant Components (SAW Grant No. 1235-01)

Description	Sum
Asset Management Planning	\$97,680
Sewer System Rate Study	\$19,572
Storm and Sanitary Inspections	\$584,107
Computerized Maintenance Management System	\$162,050
Sanitary/Storm System Ordinance Review	\$17,370
Tablets	\$35,329
Storm Water Rate Study[1]	\$29,960
Miscellaneous	\$113,486
Stormwater Mgmt. Plan[1]	\$120,000
CMMS Additional Components	\$39,116
Grand Subtotal	\$1,218,670
City Matching Funds	\$138,001
SAW Grant Total	\$1,080,669

Note 1. Related to stormwater asset management.

1.1.2 WHAT DID THE CITY LEARN?

Many gaps in the collection system attributes were resolved as part of the project. The use of maintenance management systems and GIS to manage workflow and repair/replacement requires good data. The investments also integrated the CCTV work with the maintenance management system. The integration improves the ability to develop a business case for improvements. A key element of the asset management process was defining the level of service objectives. The City used the information from the planning process and the sewer system rate study to align future rates with asset repair and replacement and capital improvements that support the level of service expectations.

1.2 ASSET MANAGEMENT PLANNING

Asset Management Plans (AMPs) are long-term plans that outline the management strategies for each service area and the necessary investments required to provide a defined level of service in the most cost effective way. The time frame for development and implementation of the asset management program is three to five years.

The City's objectives for the asset management program are:

- Make decisions that are based on data, sound principles, and an ethical framework
- Maintain infrastructure assets that are up-to-date, reliable, and suited for purpose
- Maintain regulatory compliance
- Continue a reputation for high quality and responsive customer service
- Provide transparency where citizens and customers are informed and involved
- Maintain the highest regard for the health and welfare
- Encourage economic growth and vitality
- Maintain rates that are stable and affordable.

The concept is to integrate CMMS and GIS (as well as other systems) into the City's asset management plan, workflow and business processes. Data and information from the City's systems are used to balance costs, risks, opportunities and performance to achieve the City's level of service objectives.

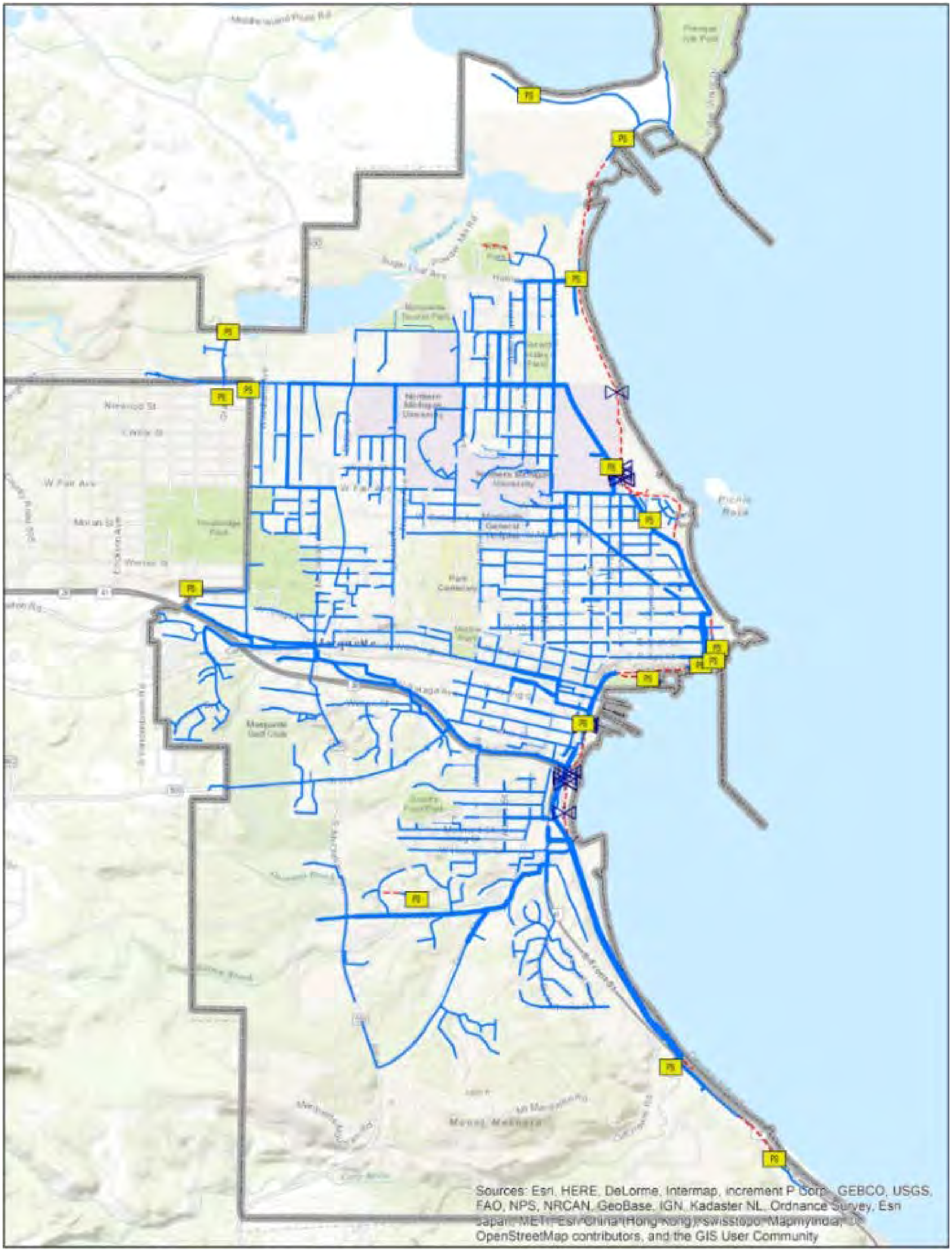
The goal is to position the City's staff over time to address the following questions: (taken from EPA Simple):

- What is the current state of my assets?
- What is my required level of service?
- Which assets are critical to sustained performance?
- What are the minimum life cycle costs capital improvement program (CIP) and operation and maintenance (O&M) strategies?
- What are my best O&M and CIP investment strategies?

1.3 WASTEWATER SYSTEM INVENTORY

The City of Marquette, Michigan is located in Michigan's Upper Peninsula, on the shore of Lake Superior. The City serves approximately 23,500 people and manages approximately 500 fixed assets (as defined by the City) at the wastewater treatment facility and lift stations. Linear assets in the wastewater and stormwater collection system are currently managed using Esri ArcGIS (GIS). The geodatabase is integrated with the computerized maintenance management system. BS&A Software is used to manage the City's finances, including purchasing and inventory. Marquette's service area is illustrated in Figure 1-1.

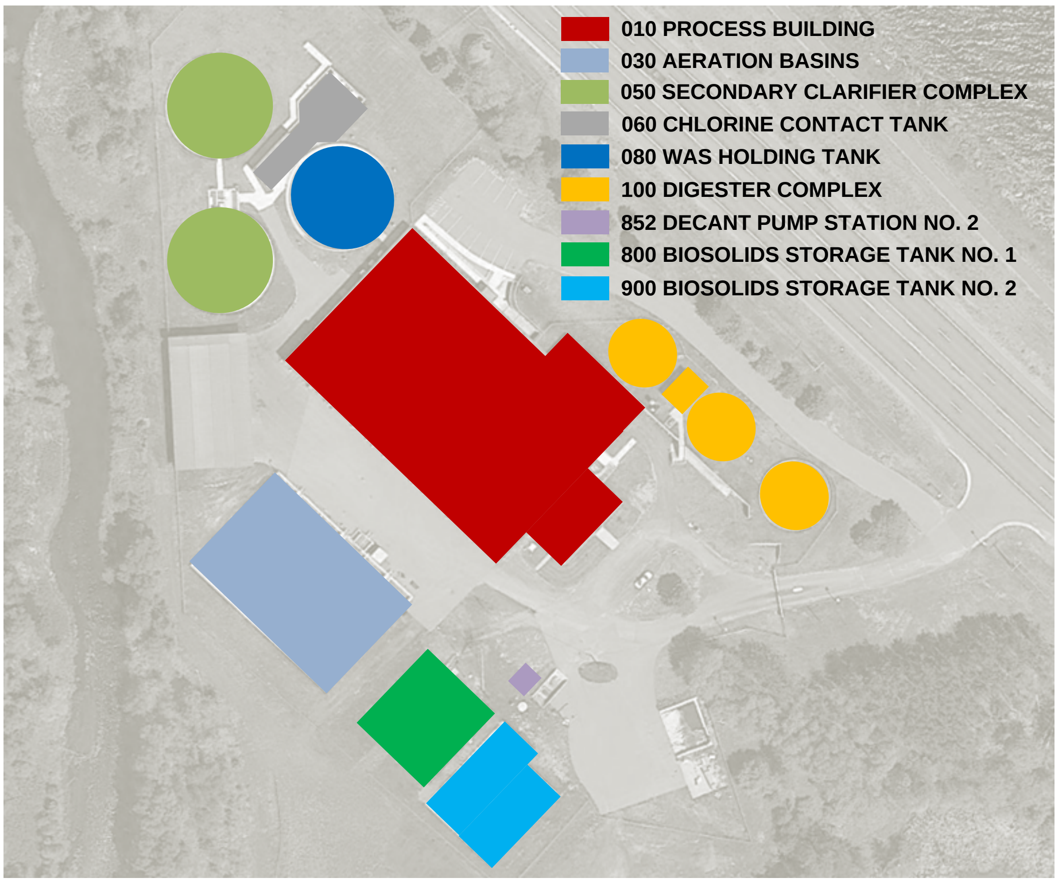
Figure 1-1 City of Marquette Service Area



1.3.1 WASTEWATER TREATMENT PLANT AND LIFT STATIONS

The City of Marquette Wastewater Treatment Facility (WWTF) is a regional facility located south of the City of Marquette, MI. The WWTF consists of a main process building, six primary clarifiers, three aeration basins, two secondary clarifiers, a WAS holding tank, a digestion complex including three anaerobic digesters, two biosolids storage tanks, a dewatering wet well, and chlorine contact tanks. A site diagram illustrating the wastewater treatment unit processes is illustrated in Figure 1-2. Wastewater treatment and lift station assets are included at the end of this section.

Figure 1-2 City of Marquette Regional Wastewater Treatment Facility Site Diagram



1.3.2 SANITARY SEWER COLLECTION SYSTEM

The City of Marquette sanitary sewer collection system is comprised of 87.5 miles of sewer lines, approximately 6,061 sewer laterals, 1,979 manholes, 22 control/regulating sewer line valves, and 11 pump stations that deliver wastewater to the treatment facility.

This collection system transports on average 3.2 million gallons of sewage to the Marquette Area WWTF on a daily basis. The facility is operated by the City of Marquette and is owned by the City of Marquette (85%), Marquette Township (10%), and Chocolay Township (5%).

1.4 ASSET INVENTORY AND LEVELS OF SERVICE

The fixed asset inventory for the WWTF and lift stations were developed to support the City's maintenance and asset management requirements. The fixed asset inventory is managed in the computerized maintenance management system (CMMS).

The collection system asset inventory is managed in GIS and integrated with CMMS. The inventory includes multiple attributes used to locate, identify and manage the individual assets as part of the system.

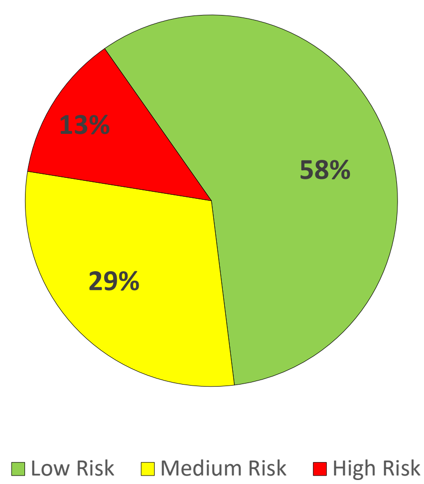
1.4.1 LEVELS OF SERVICE

The City's level of service (LOS) objectives are primarily focused on regulatory compliance with the National Pollution Discharge Elimination System (NPDES) permit. The level of service objectives are managed as part of a business risk evaluation process that considers the condition, criticality and probability of failure.

1.5 ASSET ASSESSMENT

The asset management plan incorporates a fixed asset assessment based on a business risk evaluation. By assessing an asset's criticality and probability of failure, a business risk factor is calculated to identify asset risks. A summary of the fixed asset risks are illustrated in Figure 1-3.

Figure 1-3 Asset Risk



Linear assets are evaluated as part of the televising and inspection program to manage the repair and replacement of the collection system pipes, manholes and other assets. The analysis considers the National Association of Sewer Service Companies (NASSCO) system rating. The City incorporates additional elements including engineering judgement and coordination with other City projects to determine the need and priority for repair/replacement.

1.6 BUDGET SUFFICIENCY

The objectives of the asset management plan are as follows:

- Develop financial plans that properly fund operation and maintenance (O&M) expenses, capital repair and replacement and provide for prudent levels of operating reserves.
- Review current rate structures for the water and sewer enterprises and make recommendations regarding increasing fixed cost recovery

The plans goals are to achieve independent financial sustainability for the sewer funds over the next five years. This includes developing positive cash flow (i.e. the minimum requirement for the SAW grant) as well as building an appropriate level of operating reserves and developing the capacity to cash fund certain capital projects.

1.7 CAPITAL PLANNING

The City has developed a repair and replacement/capital improvement plan to support the asset management goals and objectives. The five year plan for the sewer system is summarized in Table 1-2.

Table 1-2 Wastewater System Capital Plan

Description	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023
Wright Street Reconstruction				$134,476		
Presque Isle Avenue Reconstruction	$864,634					
SIMP and Sewer Lateral Replacements	$425,000		$355,000	$465,000	$330,000	
Fifth Street Reconstruction (Fisher to Spring)	$158,074					
Homestead Street Upgrade (Ward to Grove)	$94,420					
Cured in Place Pipe Lining				$400,000		
Lift Stations						$175,000
Sanitary Sewer System (based on 90 year life)						$850,000
Altamont Street Reconstruction (Blemhuber to McMillan)		$89,604				
Front Street Reconstruction		$286,294	$278,001			
Kaye Avenue Reconstruction (Presque Isle to Third)		$111,458				
Park Street Reconstruction (Lee to Fourth)		$232,751				
Marquette Drive Upgrade (Lakeview Dr. to North End)		$102,716				
Lakeview Drive Upgrade (Marquette Dr. to South End)		$71,027				
Third Street Reconstruction (Fisher to Baraga)		$114,736				
SCADA Computer System Replacement		$36,667				
Hewitt Avenue Reconstruction			$367,591			
Allouez Road Upgrade			$228,478			
College Avenue Reconstruction			$218,349	$169,254		
Jefferson Street Storm Sewer Upgrade				$7,000		
Shiras Drive Street Upgrade (U.S. 41 to Radisson)			$21,385			
Ohio Street Upgrade/Reconstruction			$51,773		$85,972	
Newberry Street Upgrade (Division to East End)			$50,648			
Center Street Reconstruction (Wilkson to Schaffer)			$79,911			
Lidar, Orthophotography, and Elevation Contours Aerial Map			$10,000			
Nicolet Boulevard Upgrade				$62,601		
Meeske Avenue Reconstruction (Washington to Ridge)				$44,052		
Spruce Street Reconstruction				$137,954		
Fitch Avenue Reconstruction (Union to Harlow)				$45,212		
Morgan Street Reconstruction (Washington to Bluff)				$54,486		
Altamont Street Upgrade (Grandview to Pioneer)				$25,504		
Kildalhl Reconstruction (McClellan to West)				$85,786		
Gravel Street Upgrades (Washington Street Alley)				$5,796		
Division Street Reconstruction					$273,438	
Oak Street Reconstruction (Ridge to Ohio)					$192,242	
Park Street Reconstruction (Pine to Spruce)					$199,407	
Cedar Street Reconstruction (Prospect to Crescent)					$68,061	
Summit Street Reconstruction (Longyear to Presque Isle)					$204,183	
Fern Place Upgrade (Michigan to Ohio)					$74,031	
Sherman Street Upgrade (Sheridan to Lincoln)					$160,003	
Total	**$1,542,128**	**$1,045,253**	**$1,661,136**	**$1,637,121**	**$1,587,337**	**$1,025,000**

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date November 30, 2018
(no later than 3 years from executed grant date)

The City of Marquette, MI *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1235-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or No

   If No - Date of the rate methodology approval letter: ____________________.

2) Significant Progress Made: Yes or No

   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)

3) Date of rate methodology review letter identifying the gap: May 3, 2018.

4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on December 1, 2018.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Curt Goodman at 906-225-4055 cgoodman@marquettemi.gov

Name | Phone Number | Email

L. M. Angeli 11/28/18

Signature of Authorized Representative (Original Signature Required) Date

L. Michael Angeli, City Manager

City of Marquette
Marquette, MI | 300 W Baraga Ave, MI 49855

City of Marquette
Stormwater System
Asset Management Plan (SAW Grant No. 1235-01)

November 2018

Submitted by:
Curt Goodman
Director of Municipal Utilities
cgoodman@marquettemi.gov
(906) 225-4055

CHAPTER 1 – EXECUTIVE SUMMARY

1.1 INTRODUCTION

The City of Marquette (City) is implementing an asset management program as part of their National Pollution Discharge Elimination System (NPDES) permit. The asset management planning process aligns with guidance from the Michigan Department of Environmental Quality (MDEQ) including the Asset Management Program Checklist – 2017. The MDEQ supports the asset management program through Stormwater, Asset Management, Wastewater (SAW) grants. The City's SAW grant is made up of several components including storm water management planning, pipe assessments, and stormwater system asset management.

1.1.1 HOW DID THE CITY USE THE SAW GRANT FUNDING?

The key components of the City's SAW grant are summarized in Table 1-1. The table includes the total SAW grant and local matching funds. The City used the grant funding to update stormwater pipe and structure data stored in GIS. The funding was also used to invest in a maintenance management system (Lucity) that is integrated with GIS and supports the City's workflow and work management requirements. Additionally the City invested in a Stormwater Management Plan and stormwater rate study.

Table 1-1 SAW Grant Components (SAW Grant No. 1235-01)

Description	Sum
Asset Management Planning	$97,680
Sewer System Rate Study[1]	$19,572
Storm and Sanitary Inspections	$584,107
Computerized Maintenance Management System	$162,050
Sanitary/Storm System Ordinance Review	$17,370
Tablets	$35,329
Storm Water Rate Study	$29,960
Miscellaneous	$113,486
Stormwater Mgmt. Plan	$120,000
CMMS Additional Components	$39,116
Grand Subtotal	$1,218,670
City Matching Funds	$138,001
SAW Grant Total	$1,080,669

Note 1. Related to wastewater asset management only.

1.1.2 WHAT DID THE CITY LEARN?

Investments in data management and the computerized maintenance management system integrated with GIS are improving decision making processes and supporting maintenance efficiency. The Stormwater Management Plan and rate study provided information to better manage and fund the City's stormwater system and maintain regulatory compliance. The investments in systems and mapping support the City's goal to continuously improve over time. The additional information also aligned capital and repair/replacement planning with level of service objectives.

1.2 ASSET MANAGEMENT PLANNING

Asset Management Plans (AMPs) are long-term plans that outline the management strategies for each service area and the necessary investments required to provide a defined level of service in the most cost effective way. The time frame for development and implementation of the asset management program is three to five years.

The City's objectives for the asset management program are:

- Make decisions that are based on data, sound principles, and an ethical framework
- Maintain infrastructure assets that are up-to-date, reliable, and suited for purpose
- Maintain regulatory compliance
- Continue a reputation for high quality and responsive customer service
- Provide transparency where citizens and customers are informed and involved
- Maintain the highest regard for the health and welfare
- Encourage economic growth and vitality
- Maintain rates that are stable and affordable.

The concept is to integrate CMMS and GIS (as well as other systems) into the City's asset management plan, workflow and business processes. Data and information from the City's systems are used to balance costs, risks, opportunities and performance to achieve the City's level of service objectives.

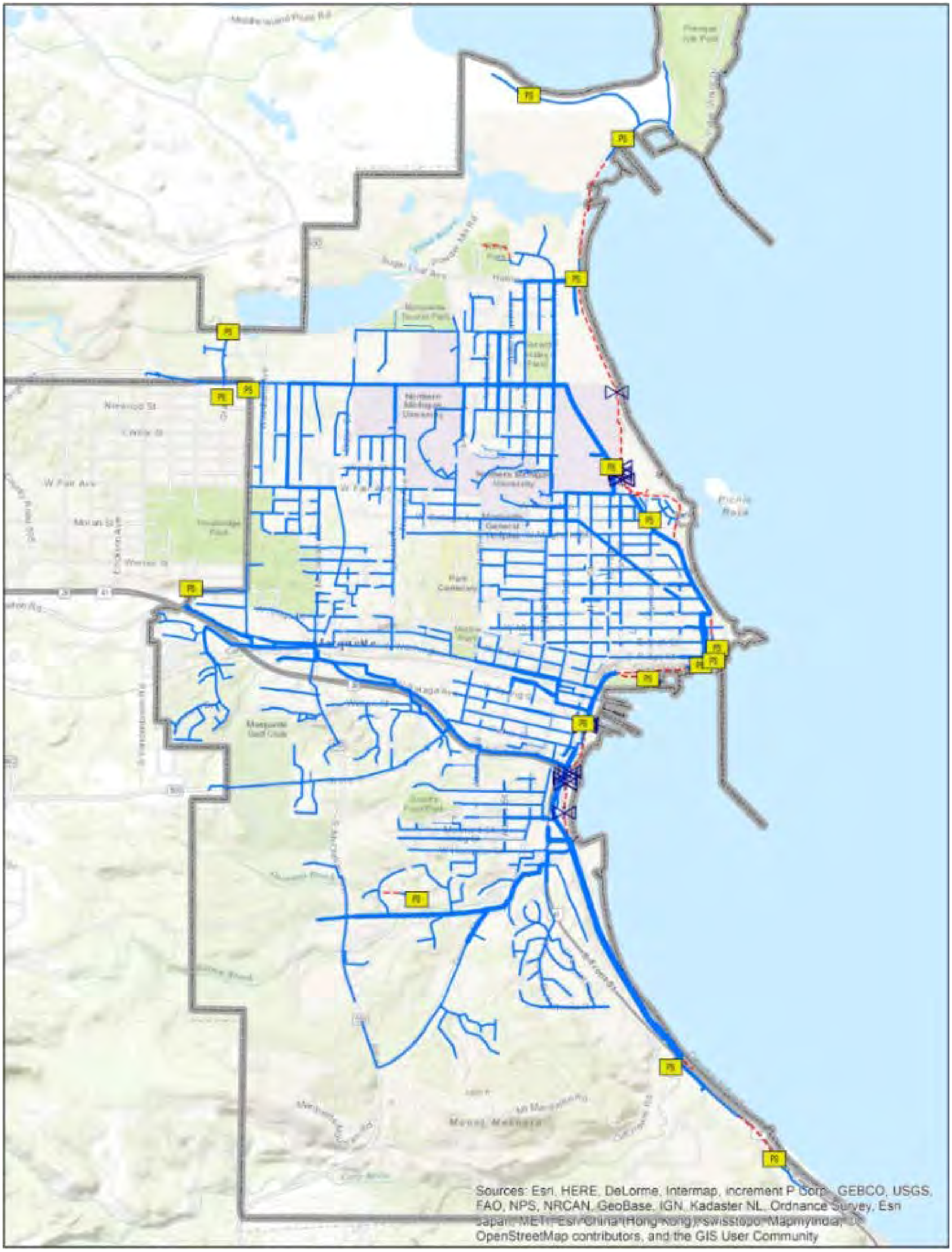
The goal is to position the City's staff over time to address the following questions: (taken from EPA Simple):

- What is the current state of my assets?
- What is my required level of service?
- Which assets are critical to sustained performance?
- What are the minimum life cycle costs capital improvement program (CIP) and operation and maintenance (O&M) strategies?
- What are my best O&M and CIP investment strategies?

1.3 STORM WATER ASSET INVENTORY

The City of Marquette, Michigan is located in Michigan's Upper Peninsula, on the shore of Lake Superior. The City serves approximately 23,500 people and manages a diverse group of assets including administrative facilities, treatment facilities and linear below ground assets. Linear assets in the wastewater and stormwater collection system are currently managed using Esri ArcGIS (GIS). The geodatabase is integrated with the computerized maintenance management system. BS&A Software is used to manage the City's finances, including purchasing and inventory. Marquette's service area is illustrated in Figure 1-1.

Figure 1-1 City of Marquette Service Area



1.3.1 STORM WATER COLLECTION SYSTEM

The City's storm sewer infrastructure consists of 54.3 miles of piping, 1,352 manholes, 7 treatment structures, 2,468 catch basins, and 224.2 miles of curbing. In addition, the City owns or is responsible for 11 detention ponds and approximately 2.6 miles of ditches. There are 18 discharge outlets to Lake Superior from the storm sewer system.

1.4 ASSET INVENTORY AND LEVELS OF SERVICE

The stormwater asset inventory is managed in GIS and integrated with CMMS. The inventory includes multiple attributes used to locate, identify and manage the individual assets as part of the system.

1.4.1 LEVELS OF SERVICE

The City's level of service (LOS) objectives are primarily focused on regulatory compliance. The level of service objectives are managed as part of a business risk evaluation process that considers the condition, criticality and probability of failure.

1.5 ASSET ASSESSMENT

Linear assets are evaluated as part of the televising and inspection program to manage the repair and replacement of the stormwater system pipes, manholes and other assets. The analysis considers the National Association of Sewer Service Companies (NASSCO) system rating. The City incorporates additional elements including engineering judgement and coordination with other City projects to determine the need and priority for repair/replacement.

1.6 BUDGET SUFFICIENCY

The objectives of the asset management plan are as follows:

- Develop financial plans that properly fund operation and maintenance (O&M) expenses, capital repair and replacement and provide for prudent levels of operating reserves.
- Review current rate structures for the water and sewer enterprises and make recommendations regarding increasing fixed cost recovery

The plans goals are to achieve independent financial sustainability for the stormwater funds over the next five years. This includes developing positive cash flow (i.e. the minimum requirement for the SAW grant) as well as building an appropriate level of operating reserves and developing the capacity to cash fund certain capital projects.

1.7 CAPITAL PLANNING

The City has developed a repair/replacement capital improvement plan to support the asset management goals and objectives. The five year plan for the stormwater system is summarized in Table 1-2.

Table 1-2 Stormwater Capital Plan

Description	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023
Storm Sewer (based on 90 year life)						$500,000
Curb Replacement		$100,000	$100,000	$100,000	$100,000	$100,000
Presque Isle Avenue Reconstruction (Fair to Wright)	$929,467					
SIMP and Sanitary Sewer Lateral Replacements	$50,000		$80,000	$80,000	$90,000	
Fifth Street Reconstruction (Fisher to Spring)	$235,520					
Homestead Street Upgrade (Ward to Grove)	$194,145					
Altamont Street Reconstruction (Blemhuber to McMillan)		$160,631				
Front Street Reconstruction		$265,533	$218,349			
Kaye Avenue Reconstruction (Presque Isle to Third)		$88,511				
Park Street Reconstruction (Lee to Fourth)		$268,811				
Marquette Drive Upgrade (Lakeview Dr. to North End)		$278,645				
Lakeview Drive Upgrade (Marquette Dr. to South End)		$121,293				
Third Street Reconstruction (Fisher to Baraga)		$155,167				
Hewitt Avenue Reconstruction			$266,745			
Allouez Road Upgrade			$407,434			
College Avenue Reconstruction			$193,588	$133,317		
Jefferson Street Storm Sewer Upgrade				$93,000		
Shiras Drive Street Upgrade (U.S. 41 to Radisson)			$185,709			
Ohio Street Upgrade/Reconstruction			$149,693		$75,225	
Newberry Street Upgrade (Division to East End)			$37,142			
Center Street Reconstruction (Wilkson to Schaffer)			$172,203			
Lidar, Orthophotography, and Elevation Contours Aerial Map			$10,000			
Wright Street Reconstruction				$234,173		
Nicolet Boulevard Upgrade				$303,730		
Meeske Avenue Reconstruction (Washington to Ridge)				$143,750		
Spruce Street Reconstruction				$188,962		
Fitch Avenue Reconstruction (Union to Harlow)				$56,804		
Morgan Street Reconstruction (Washington to Bluff)				$74,194		
Altamont Street Upgrade (Grandview to Pioneer)				$114,768		
Kildalhl Reconstruction (McClellan to West)				$98,538		
Gravel Street Upgrades (Washington Street Alley)				$222,581		
Division Street Reconstruction					$452,546	
Oak Street Reconstruction (Ridge to Ohio)					$76,419	
Park Street Reconstruction (Pine to Spruce)					$109,853	
Cedar Street Reconstruction (Prospect to Crescent)					$70,449	
Summit Street Reconstruction (Longyear to Presque Isle)					$169,555	
Fern Place Upgrade (Michigan to Ohio)					$111,047	
Sherman Street Upgrade (Sheridan to Lincoln)					$200,601	
Total	**$1,409,132**	**$1,438,591**	**$1,820,863**	**$1,843,817**	**$1,455,695**	**$600,000**

RICK SNYDER
GOVERNOR

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
LANSING

C. HEIDI GRETHER
DIRECTOR

May 11, 2018

Mr. L. Michael Angeli, City Manager
City of Marquette
300 West Baraga
Marquette, Michigan 49855

Dear Mr. Angeli:

SUBJECT: Stormwater, Asset Management, Wastewater (SAW)
City of Marquette
Stormwater Management Plan
SAW Grant No. 1235-01

This letter is a helpful reminder regarding your SAW grant award for SAW Stormwater Management Plan (SWMP) development. By this letter, all third-round grant budget periods are set from January 2013 through November 30, 2018. Eligible expenses must be incurred within the budget period (i.e., November 30, 2018). Final disbursement requests should be submitted within 60 days of the grant end date. At this point in time, you should be making progress towards completion of your SWMP.

As explained in the December 3, 2015 letter from our office, the awardee needs to submit the SWMP to the Department of Environmental Quality (DEQ) within three years of the executed grant. We request that you submit one hardcopy of the final plan and one electronic copy. Email is acceptable if the document is less than 25 MB, otherwise please use a CD. As a reminder, refer to the SWMP requirements and work activities detailed in your SAW Grant Application for the components that should go into your SAW SWMP.

The submittal of a draft SWMP for our review is highly recommended to help produce a quality SWMP that meets the objectives established in the grant application. If you need assistance at any point in the SWMP process, please contact me by phone at the number listed below; email at Whitev1@michigan.gov; or by mail at DEQ, P.O. Box 30817, Lansing, Michigan 48909-8311.

Sincerely,

Valorie White

Valorie White, Project Manager
Revolving Loan Section
Drinking Water and Municipal Assistance Division
517-284-5420

cc: Mr. Curt Goodman, City of Marquette

DEQ

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Due Date _November 30, 2018_____________
(no later than 3 years from executed grant date)

The __City of Marquette______________________________ *(legal name of grantee)* certifies that all stormwater asset management plan (SWAMP) activities specified in SAW Grant No. 1235-01___ have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SWAMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

_Curt Goodman______________________ at_ (906) 225-4055 cgoodman@marquettemi.gov_____
Name Phone Number Email

L. M. Angeli 11/12/18
Signature of Authorized Representative (Original Signature Required) Date

_L. Michael Angeli, City Manager_______________________________
Print Name and Title of Authorized Representative

21777 Dunham Road
Clinton Township, Michigan 48036
(586) 469-5325
Brian Baker - MCPWO, brian.baker@macombgov.org

Stormwater, Asset Management, and Wastewater (SAW)

Wastewater Asset Management Plan

Executive Summary

Overview

The Martin Sanitary Diversion Drainage District, located in the City of St. Clair Shores, owns a Retention Treatment Basin which services areas directly tributary to the Martin Drain in the Cities of Roseville and St. Clair Shores. Macomb County Public Works Office (MCPWO) maintains and operates MSDDD's assets.

MCPWO was awarded a grant to investigate and evaluate the MSDDD wastewater assets. With $325,016 in funding from the State including a 10% local match, the intent of this Wastewater Asset Management Plan was to identify assets, establish a level of service, determine relative criticality, analyze capital investments and ensure long-term funding strategies in order to preserve the longevity of MSDDD assets.

Wastewater Asset Inventory

Asset data was compiled from engineering plans, MSDDD operational plans, correspondence from MCPWO representatives, and field inspections. The data was then consolidated into a computerized maintenance management system and asset management plan software, called NEXGEN. There are 361 major assets owned by the MSDDD that are included in this evaluation and can be categorized as follows:

1. Martin RTB
    - Ventilation
    - Gates
    - Piping

- Vaults, Chambers, Wet Wells and Miscellaneous Buildings

2. Martin Service Building
    - Sampling System
    - Disinfection System
    - Flushing System (Obsolete)
    - 300 kW Indoor Building Generator
3. Martin Chlorine Storage Building
    - Two Magnetic Transfer Pumps and Motors
    - Two Sodium Hypochlorite Storage Tanks

Condition Assessment

A condition assessment was performed on an asset by asset basis, considering key elements for each particular asset class. Of these unique tangibles for each asset class, a weighting factor was assigned for each item considered and converted to an overall 1 to 5 rating scale. Whereby 1 indicates new or excellent condition and 5 indicates imminent failure. The below table summarizes the condition of all assets investigated. For simplistic purposes, the condition assessments listed in the below table were rounded to the nearest whole number. On average, the condition assessment rating for the MSDDD was 2.55.

Informal Nonmenclature	Condition Assessment Rating	No. of Assets (Each)	Percentage
Excellent	1	0	0%
Good	2	149	41%
Fair	3	159	44%
Poor	4	14	4%
Failure	5	1	0%
Not Assessed		38	11%
Total		**361**	**100%**

Note, assets that were not assessed primarily pertain to the obsolete flushing system for the Martin RTB.

Level of Service

MCPWO defined level of service as cost effectively improving the condition and reliability of the Drainage District. As a result, MCPWO hopes to safeguard public health and the environment, meet MDEQ requirements for effluent discharge loading limits, operate the system to reduce the number of discharges to the minimum necessary, and maintain the equipment and assets at a level that meets customer and regulatory needs and requirements. AEW believes that this can be achieved with continual monitoring, necessary maintenance and rehabilitation of the MSDDD assets as outlined in accordance with the recommended Capital Improvement Plan and NEXGEN maintenance schedule, as provided on the MCPWO's NEXGEN's website.

Criticality Analysis

Assets were then analyzed to determine their Probability of Failure (POF) and Consequence of Failure (COF). Both the probability of failure (POF) and consequence of failure (COF) are analyzed on a 1 to 5 rating scale. Whereby for POF, 1 indicates new or excellent condition and 5 indicated failure or imminent failure and whereby for COF, 1 indicates an insignificant disruption and 5 indicates a catastrophic disruption.

An assets likelihood to fail was determined by analyzing two factors: the physical condition of an asset and useful expended life of an asset. An 80% to 20% weighting scale was then applied to convert back to a 1 to 5 scale. The following table displays the thought process for determining POF.

Probability of Failure Rating	Condition Assessment (80% of Total)	Useful Life Expended (20% of Total)
1	Excellent (ACI = 1)	Percent of Useful Life: <60%
2	Good (ACI = 2)	Percent of Useful Life: 60-80%
3	Fair (ACI = 3)	Percent of Useful Life: 80-90%
4	Poor (ACI = 4)	Percent of Useful Life: 90-100%
5	Failure (ACI = 5)	Percent of Useful Life: 100%

$$POF = 0.8 * Condition\ Assessment + 0.2 * Useful\ Life\ Expended$$

An assets COF was determined by analyzing six factors: 1) the impact on the collection process, 2) financial impact, 3) safety concerns, 4) environmental/regulatory impacts, 5) disruption to the community and 6) required response time. The impact on the sewer collection process was decided to be 1.25 times more critical than the five other factors, therefore a 20%, 16%, 16%, 16%, 16%, 16% weighting scale was applied prior to converting to an overall 1 to 5 scale. The table below displays the thought process for determining consequence of failure.

Consequence of Failure Rating	Process Impact (20% of Total)	Financial Impact (16% of Total)	Safety (16% of Total)	Environmental / Regualtory Impact (16% of Total)	Disruption to the Community (16% of Total)	Required Response Time (16% of Total)
1	No impact on process	Insignificant ($1-$10,000)	No injury	100% compliance with permits	No disruption	>8 hours
2	Potential process upset	Minor Cost ($10,000-$500,000)	Minor injury requiring no medical treatment with no lost time	Localized and minimal impact on the environment and ecosystem	Minor Disruption	4 to 8 hours
3	Loss of redundancy	Moderate Cost ($500,000-$1,000,000)	Minor injury requiring treatment off-site or lost time	Techincal violation, but no enforcement action	Sporadic service disruptions	2 to 4 hours
4	Process shutdown	Significant Cost ($1,000,000-$10,000,000)	Severe Injury to employees or public	Violation with minor enforcement action	Short term impact but substantial disruption	1/2 hour to 2 hours
5	Mission Critical - Unable to accomplish mission	Major Cost (> $10Million)	Loss of Life	Enforcement action with fines or ACO	Long term impact; area-wide disruption	1/2 hour

$$COF = 0.2 * Process\ Impact + 0.16 * Financial\ Impact + 0.16 * Safety + 0.16 * Env.Impact + 0.16 * Disruption\ to\ the\ Community + 0.16 * Required\ Response\ Time$$

The POF of an asset takes into account the condition rating while the COF takes into account the size, location, and surrounding. POF and COF scores were determined for each asset and then multiplied together resulting in the Business Risk Exposure (BRE) score, also known as the criticality score. The BRE score is used to prioritize what assets are most critically in need of repair. Any asset with a BRE score of 16 or greater is considered critical by the MDEQ.

It was found that the MSDDD had two assets that scored over 16 points when analyzing assets critical to sustained performance. Both assets are recommended to be replaced in the Five Year Capital Improvement Plan. The following table summarizes the poorest BRE ratings found for the MSDDD.

NEXGEN Asset Name	Asset Description	Business Risk Exposure (1-25)
MAR-RTB-MDV-G-MD1	4'x2' Martin Drain Dry Weather Gate 1, North	18.6
MAR-RTB-MDV-G-MD2	4'x2' Martin Drain Dry Weather Gate 2, South	18.6
MAR-RTB-G-IN1	9'x5' Martin RTB Influent Sluice Gate 1, East	14.2
MAR-RTB-G-IN2	9'x5' Martin RTB Influent Sluice Gate 2, West	14.2
MAR-RTB-G-EF1	9'x5' Martin RTB Effluent Sluice Gate 1, East	14.2
MAR-RTB-G-EF2	9'x5' Martin RTB Effluent Sluice Gate 2, West	14.2
MAR-RTB-MDV	Martin Drain Vault (Under Bon Heur St)	13.8
MAR-RTB-HTC-MD-IN	Manhole at Influent to Martin Drain	12.6
MAR-RTB-HTC-MD-EF	Manhole at Effluent to Martin Drain	12.6
MAR-RTB-HTC-NE	Manhole Access to RTB - Northeast	12.6
MAR-RTB-HTC-N	Manhole Access to RTB - North	12.6
MAR-RTB-HTC-NW	Manhole Access to RTB - Northwest	12.6
MAR-RTB-HTC-SW	Manhole Access to RTB - Southwest	12.6
MAR-RTB-HTC-S	Manhole Access to RTB - Southwest	12.6
MAR-RTB-HTC-SE	Manhole Access to RTB - Southeast	12.6
MAR-RTB-HTC-E	Manhole Access to RTB - East	12.6
MAR-SB-CRANE-RTB	Equipment Crane for RTB, 4 Ton Capacity	12.0
MAR-RTB-MDV-HTC-EQP-1	2.5'x3' Neenah Model No. R-6665-3MH, North	11.8
MAR-RTB-MDV-HTC-EQP-2	2.5'x3' Neenah Model No. R-6665-3MH, South	11.8
MAR-RTB-PIPE-D-2	NaOCl Disinfection Pipe, 2" PVC	10.5
MAR-SB-TRNF	Main Transformer, Outside	10.4
MAR-RTB-GA-DWTR	Martin RTB Dewatering Gate Solenoid	10.1
MAR-RTB-RTB	8.6 Million Gallon Martin RTB	10.0

<u>Revenue Structure</u>

The legal formation of the MSDDD was governed by Public Act 40 of 1946, Chapter 20 Drain Apportionments. The original construction of the Martin RTB was funded through federal grants and issued bonds. The bond payments were apportioned based on the contributing servicing areas of the participating entities according to the Final Order of Apportionment approved by the Drainage Board on March 8, 1963. The apportionments are as follows:

Entity	Apportionment
St. Clair Shores	21.90669%
Roseville	78.09331%

Since the Drainage District is necessary for public health and serviced entities are in agreeance with the original apportionments, there are no gaps in the funding structure. Projects identified in the Capital Improvement Plan will be annually incorporated into the budget for approval by the District Board.

Capital Improvement Plan

Based on the condition assessment and criticality analysis, the following capital improvement plan has been prepared. The estimated rehabilitation, replacement, and associated costs included in the five (5) year Capital Improvement Plan (CIP) are shown below. The plan will be updated annually with the MSDDD's budget. A twenty year capital improvement plan has also been completed and is included in the complete Wastewater Asset Management Plan.

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Fiscal Year	Projects	Project Cost[1]	Total Project Costs
2019-20	Design for Upgrades to RTB Blower and Ductwork[2]	$ 106,090	$ 1,324,331
	CCTV of Dewatering Line and Influent/Effluent Box Culverts[3]	$ 2,582	
	Replace RTB and Dewatering Ultrasonic Level Sensors, LS 380 & 390	$ 5,305	
	Chlorine Storage Building Repairs[4]	$ 21,218	
	Service Building Repairs[4]	$ 42,436	
	Rehabilitation of RTB Equipment Crane[5]	$ 63,654	
	Design for Replacement of Dewatering Accumulator and Motor Starter[6]	$ 90,840	
	Replace N-Con Sampler	$ 9,548	
	Install Permanent Gates for New Flushing System[8]	$ 795,675	
	Upgrades to Disinfection System[7]	$ 186,984	
2020-21	Upgrades to RTB Blower and Ductwork[2]	$ 437,091	$ 840,034
	Replace 1 Chlorine Storage Tank Level Sensor and Storage Tanks Flow Meter	$ 24,586	
	Replacement of Dewatering Accumulator and Motor Starter[6]	$ 374,259	
	Design of Miscellaneous Sewer Repairs as a result of 2019-20 CCTV Investigations[3]	$ 4,098	
2021-22	Design for Replacement of RTB Equipment Hatch	$ 5,628	$ 241,984
	Replace Electrical Disconnects for Overflow Sampling Pumps and Sampling Pumps (4 total)	$ 45,020	
	Replace Groundwater Sump Pump in Old Basement	$ 28,138	
	Replace Overflow and Sampling Pumps, Motors and Valves	$ 16,883	
	Miscellaneous Sewer Repairs as a result of 2019-20 CCTV Investigations[3]	$ 16,883	
	Design for Replacement of Martin Drain Vault[9]	$ 129,434	
2022-23	Cleaning of Electrical Components[10]	$ 20,867	$ 682,639
	Design for Replacement of Dewatering Gate and Solenoid[11]	$ 19,418	
	Replacement of RTB Equipment Hatch	$ 23,185	
	Replace Chlorine Storage Building Ladders and Fire Extinguishers	$ 1,449	
	Replace Drop Ceiling in Service Building	$ 3,478	
	Replace Quarry Tile Floor in Service Building	$ 9,274	
	Replace Overhead Garage Door in Service Building	$ 20,287	
	Replace Unit Heaters and Overhead Dampers in Service Building (7 Total)	$ 20,287	
	Replace Ladders in Service Building	$ 406	
	Replace Interior and Exterior Lighting Fixtures of Service Building	$ 19,128	
	Replace Unit Heater Electrical Disconnect in Generator Room of Service Building	$ 11,593	
	Replacement of Martin Drain Vault[9]	$ 533,266	
2023-24	Replacement of Dewatering Gate and Solenoid[11]	$ 80,002	$ 170,600
	Replacement of Interior and Exterior Lighting Fixtures of Chlorine Storage Building	$ 4,179	
	Replacement of Service Building Roof	$ 35,822	
	Design for Site Pavement Replacement	$ 50,598	
5 Year Total			**$ 3,259,588**

Note:

[1]Project Costs are based on CY 2018 and include 3% inflation for each subsequent year.

[2]Upgrades to RTB Blower and Ductwork include installation of additional ductwork and blowers to allow for 6 air changes per hour. The current blower setup is estimated to provide 1 air change per hour.

[3]CCTV of the RTB Dewatering Line includes 555 LF of 42" Sewer and 330 LF of 12'x7' box culvert sewer. Design services are estimated at 25% of the approximate repair cost.

[4]Building Repairs include addressing defects as outlined in August 2018 AEW Report "MSDDDD - Structural Analysis of the Service Building & Chlorine Storage Building".

[5]Rehabilitation of the RTB Equipment Crane includes sand blasting the crane rail, replacing structural bolts, powder coating the crane rail and replacing the 4 Ton Crane Hoist.

[6]Replacement of the Dewatering Accumulator and Motor Starter includes the replacement of just those items listed. Replacement of the Dewatering Gate is not included with this project. Design services are estimated at 25% of the approximate replacement cost.

[7]Upgrades to the Disinfection System are estimated. A study for the Disinfection System is currently being performed by Wade Trim.

[8]Installation of Permanent Gates for the New RTB Flusing System includes the items outlined in Alternative 1 of AEW's August 2015 Martin RTB Flushing System Evaluation Report. Design services are estimated at 25% of the approximate installation cost.

[9]Replacement of the Martin Drain Vault consists of replacement of the actual vault and all contents within. Design services are estimated at 25% of the approximate installation cost.

[10]Cleaning of electrical Components includes cleaning the inside of panels, cleaning of terminal connections and greasing of electrical connections within the panel. Applicable for all electrical panels within Martin Service Building and Chlorine Storage Building.

[11]Replacement of the RTB Dewatering Gate and Solenoid includes replacement of the hydraulic sluice gate, solenoid and dewatering structures covers. Design services are estimated at 25% of the approximate replacement cost.

Martin Sanitary Diversion Drainage District - Major Asset List		
No.	Asset Name	Asset Type
1	MAR-RTB-DUCT	Ductwork
2	MAR-RTB-BLOW	Blower
3	MAR-RTB-G-IN1	Sluice Gate
4	MAR-RTB-G-IN2	Sluice Gate
5	MAR-RTB-G-EF1	Sluice Gate
6	MAR-RTB-G-EF2	Sluice Gate
7	MAR-RTB-GA-IN1	Valve Actuator
8	MAR-RTB-GA-IN2	Valve Actuator
9	MAR-RTB-GA-EF1	Valve Actuator
10	MAR-RTB-GA-EF2	Valve Actuator
11	MAR-RTB-MDV-G-MD1	Sluice Gate
12	MAR-RTB-MDV-G-MD2	Sluice Gate
13	MAR-RTB-PIPE-F-16	Process Piping
14	MAR-RTB-PIPE-F-24	Buried Pipe
15	MAR-RTB-PIPE-F-4	Process Piping
16	MAR-RTB-FLSH-NOZ	Nozzle
17	MAR-RTB-PIPE-DWTR-42	Buried Pipe
18	MAR-RTB-BOX-IN	Buried Pipe
19	MAR-RTB-BOX-EF	Buried Pipe
20	MAR-RTB-SAMP-2	Process Piping
21	MAR-RTB-SAMP-7	Process Piping
22	MAR-RTB-PIPE-D-2	Process Piping
23	MAR-RTB-BLDGA-V-F-7	Knife Gate Valve
24	MAR-RTB-BLDGA-VA-F-7	Valve Actuator
25	MAR-RTB-BLDGA-V-F-4	Knife Gate Valve
26	MAR-RTB-BLDGA-VA-F-4	Valve Actuator
27	MAR-RTB-BLDGA-V-F-10	Knife Gate Valve
28	MAR-RTB-BLDGA-VA-F-10	Valve Actuator
29	MAR-RTB-BLDGA-VA-F-9	Valve Actuator
30	MAR-RTB-BLDGA-V-F-9	Knife Gate Valve
31	MAR-RTB-BLDGA-VA-F-3	Valve Actuator
32	MAR-RTB-BLDGA-V-F-3	Knife Gate Valve
33	MAR-RTB-BLDGA-VA-F-6	Valve Actuator
34	MAR-RTB-BLDGA-V-F-6	Knife Gate Valve
35	MAR-RTB-BLDGA-DR-MTL	Door
36	MAR-RTB-BLDGA-EXTWALL	Exterior Walls
37	MAR-RTB-BLDGA-ROOF	Roof
38	MAR-RTB-BLDGA-FOUND	Foundation
39	MAR-RTB-BLDGA-SLAB	Floor Slab
40	MAR-RTB-BLDGA-INTWALL	Finish
41	MAR-RTB-BLDGA-CEIL	Finish
42	MAR-RTB-BLDGA-LT-EX	Outside Lighting
43	MAR-RTB-BLDGA-P-SUMP	Pump
44	MAR-RTB-BLDGA-DEHUMID	Dehumidifer
45	MAR-RTB-BLDGA-FEXT-1	Fire Extinguisher
46	MAR-RTB-BLDGA-FEXT-2	Fire Extinguisher
47	MAR-RTB-BLDGA-PLT	Platform
48	MAR-RTB-BLDGA-DSC-VA-F-7	Disconnect
49	MAR-RTB-BLDGA-DSC-VA-F-4	Disconnect
50	MAR-RTB-BLDGA-DSC-VA-F-10	Disconnect
51	MAR-RTB-BLDGA-DSC-VA-F-9	Disconnect
52	MAR-RTB-BLDGA-DSC-VA-F-3	Disconnect
53	MAR-RTB-BLDGA-DSC-VA-F-6	Disconnect

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Martin Sanitary Diversion Drainage District - Major Asset List		
No.	**Asset Name**	**Asset Type**
54	MAR-RTB-BLDGA-UH	Heater
55	MAR-RTB-BLDGA-DSC-UH	Disconnect
56	MAR-RTB-BLDGA-TRNF	Transformer
57	MAR-RTB-BLDGA-LP	Distribution Panel
58	MAR-RTB-BLDGA-CRANE	Crane
59	MAR-RTB-BLDGA-LT-IN	Inside Lighting
60	MAR-RTB-VLTB-VA-F-5A	Valve Actuator
61	MAR-RTB-VLTB-V-F-5A	Knife Gate Valve
62	MAR-RTB-VLTB-VA-F-12	Valve Actuator
63	MAR-RTB-VLTB-V-F-12	Knife Gate Valve
64	MAR-RTB-VLTB-VA-F-5	Valve Actuator
65	MAR-RTB-VLTB-V-F-5	Knife Gate Valve
66	MAR-RTB-VLTB-DSC-VA-F-5A	Disconnect
67	MAR-RTB-VLTB-DSC-VA-F-12	Disconnect
68	MAR-RTB-VLTB-DSC-VA-F-5	Disconnect
69	MAR-RTB-VLTB-DEHUMID	Dehumidifer
70	MAR-RTB-VLTB-P-SUMP	Pump
71	MAR-RTB-VLTB-UH	Heater
72	MAR-RTB-VLTB-SF	Fan
73	MAR-RTB-VLTB-SFMOT	Motor
74	MAR-RTB-VLTB-DSC-UH	Disconnect
75	MAR-RTB-VLTB-LT-IN	Inside Lighting
76	MAR-RTB-VLTB	Vault
77	MAR-RTB-VLTB-HTC-EQP-1	Hatch
78	MAR-RTB-VLTB-HTC-EQP-2	Hatch
79	MAR-RTB-VLTB-HTC-EQP-3	Hatch
80	MAR-RTB-VLTB-HTC	Hatch
81	MAR-RTB-VLTC-VA-F-2A	Valve Actuator
82	MAR-RTB-VLTC-V-F-2A	Knife Gate Valve
83	MAR-RTB-VLTC	Vault
84	MAR-RTB-VLTC-HTC	Hatch
85	MAR-RTB-VLTC-HTC-EQP	Hatch
86	MAR-RTB-VLTC-DEHUMID	Dehumidifer
87	MAR-RTB-VLTC-UH	Heater
88	MAR-RTB-VLTC-DSC-UH	Disconnect
89	MAR-RTB-VLTC-DSC-VA-F-2A	Disconnect
90	MAR-RTB-VLTC-SF	Fan
91	MAR-RTB-VLTC-SFMOT	Motor
92	MAR-RTB-VLTC-P-SUMP	Pump
93	MAR-RTB-VLTC-LT-IN	Inside Lighting
94	MAR-RTB-VLTD-VA-F-11	Valve Actuator
95	MAR-RTB-VLTD-V-F-11	Knife Gate Valve
96	MAR-RTB-VLTD-VA-F-2	Valve Actuator
97	MAR-RTB-VLTD-V-F-2	Knife Gate Valve
98	MAR-RTB-VLTD-VA-F-8	Valve Actuator
99	MAR-RTB-VLTD-V-F-8	Knife Gate Valve
100	MAR-RTB-VLTD-VA-F-13	Valve Actuator
101	MAR-RTB-VLTD-V-F-13	Knife Gate Valve
102	MAR-RTB-VLTD-VA-F-8A	Valve Actuator
103	MAR-RTB-VLTD-V-F-8A	Knife Gate Valve
104	MAR-RTB-VLTD	Vault
105	MAR-RTB-VLTD-V-OF	Valve
106	MAR-RTB-VLTD-DSC-VA-F-11	Disconnect

Martin Sanitary Diversion Drainage District - Major Asset List		
No.	Asset Name	Asset Type
107	MAR-RTB-VLTD-DSC-VA-F-2	Disconnect
108	MAR-RTB-VLTD-DSC-VA-F-8	Disconnect
109	MAR-RTB-VLTD-DSC-VA-F-13	Disconnect
110	MAR-RTB-VLTD-DSC-VA-F-8A	Disconnect
111	MAR-RTB-VLTD-DEHUMID	Dehumidifer
112	MAR-RTB-VLTD-SF	Fan
113	MAR-RTB-VLTD-SFMOT	Motor
114	MAR-RTB-VLTD-UH	Heater
115	MAR-RTB-VLTD-P-SUMP	Pump
116	MAR-RTB-VLTD-LT-IN	Inside Lighting
117	MAR-RTB-VLTD-HTC-EQP-1	Hatch
118	MAR-RTB-VLTD-HTC-EQP-2	Hatch
119	MAR-RTB-VLTD-HTC-EQP-3	Hatch
120	MAR-RTB-VLTD-HTC-EQP-4	Hatch
121	MAR-RTB-VLTD-HTC-EQP-5	Hatch
122	MAR-RTB-VLTD-HTC	Hatch
123	MAR-RTB-MDV-GA-MD1	Valve Actuator
124	MAR-RTB-MDV-GA-MD2	Valve Actuator
125	MAR-RTB-MDV-DEHUMID	Dehumidifer
126	MAR-RTB-MDV-P-SUMP	Pump
127	MAR-RTB-MDV	Vault
128	MAR-RTB-MDV-HTC-EQP-1	Hatch
129	MAR-RTB-MDV-HTC-EQP-2	Hatch
130	MAR-RTB-MDV-HTC	Hatch
131	MAR-RTB-MDV-DSC-GA-MD1	Disconnect
132	MAR-RTB-MDV-DSC-GA-MD2	Disconnect
133	MAR-RTB-MDV-UH	Heater
134	MAR-RTB-MDV-DSC-UH	Disconnect
135	MAR-RTB-CHA-DRAIN-HTC	Hatch
136	MAR-RTB-CHA-DRAIN-DSC-P-SUMP	Disconnect
137	MAR-RTB-CHA-DRAIN	Chamber
138	MAR-RTB-CHA-DRAIN-P-SUMP	Pump
139	MAR-RTB-CHA-DWTR	Chamber
140	MAR-RTB-CHA-DWTR-HTC-EQP	Hatch
141	MAR-RTB-CHA-DWTR-HTC	Hatch
142	MAR-RTB-GA-DWTR	Valve Actuator
143	MAR-RTB-G-DWTR	Sluice Gate
144	MAR-RTB-FWW-V-F-23	Sluice Gate
145	MAR-RTB-FWW-V-F-24	Sluice Gate
146	MAR-RTB-FWW	Wet Well
147	MAR-RTB-FWW-HTC	Hatch
148	MAR-RTB-WW-RESUS	Wet Well
149	MAR-RTB-WW-RESUS-HTC	Hatch
150	MAR-RTB-WW-RESUS-BSCRN	Bar Screen
151	MAR-RTB-LS	Ultrasonic Level Instrument
152	MAR-RTB-DWTR-LS	Ultrasonic Level Instrument
153	MAR-RTB-MD-LS-E	Ultrasonic Level Instrument
154	MAR-RTB-MD-LS-W	Ultrasonic Level Instrument
155	MAR-RTB-RTB	Retention Treatment Basin
156	MAR-RTB-HTC-EQP	Hatch
157	MAR-RTB-HTC-MD-IN	Hatch
158	MAR-RTB-HTC-MD-EF	Hatch
159	MAR-RTB-HTC-NE	Hatch

Martin Sanitary Diversion Drainage District - Major Asset List		
No.	**Asset Name**	**Asset Type**
160	MAR-RTB-HTC-N	Hatch
161	MAR-RTB-HTC-NW	Hatch
162	MAR-RTB-HTC-SW	Hatch
163	MAR-RTB-HTC-S	Hatch
164	MAR-RTB-HTC-SE	Hatch
165	MAR-RTB-HTC-E	Hatch
166	MAR-RTB-SKM-1	Baffle Wall
167	MAR-RTB-SKM-2	Baffle Wall
168	MAR-RTB-SKM-3	Baffle Wall
169	MAR-RTB-SKM-4	Baffle Wall
170	MAR-RTB-SKM-5	Baffle Wall
171	MAR-RTB-WEIR	Dam/Weir
172	MAR-CSB-DR-MTL	Door
173	MAR-CSB-EXTWALL	Exterior Walls
174	MAR-CSB-ROOF	Roof
175	MAR-CSB-FOUND	Foundation
176	MAR-CSB-SCON	Secondary Containment
177	MAR-CSB-INTWALL	Finish
178	MAR-CSB-CEIL	Finish
179	MAR-CSB-STR	Stairs
180	MAR-CSB-FLR-UP	Platform
181	MAR-CSB-TNK-1	Tank
182	MAR-CSB-TNK-2	Tank
183	MAR-CSB-EMSH	Eyewash/Shower
184	MAR-CSB-PIPE-WTR-D	Plumbing Piping
185	MAR-CSB-PIPE-WTR	Plumbing Piping
186	MAR-CSB-LDR-8	Ladder
187	MAR-CSB-LDR-16	Ladder
188	MAR-CSB-FEXT-N	Fire Extinguisher
189	MAR-CSB-FEXT-W	Fire Extinguisher
190	MAR-CSB-UH	Heater
191	MAR-CSB-FAN	Fan
192	MAR-CSB-LUV	Damper/Louver
193	MAR-CSB-TNK-LS-1	Ultrasonic Level Instrument
194	MAR-CSB-TNK-LS-2	Ultrasonic Level Instrument
195	MAR-CSB-TNK-FE	Flow Meter
196	MAR-CSB-LT-IN	Inside Lighting
197	MAR-CSB-LT-EX	Outside Lighting
198	MAR-CSB-TNK-MSTRT-1	Motor Starter
199	MAR-CSB-TNK-MSTRT-2	Motor Starter
200	MAR-CSB-PIPE-D-2	Process Piping
201	MAR-CSB-LS-STUBE	Process Piping
202	MAR-CSB-P-CT-1	Pump
203	MAR-CSB-PMOT-CT-1	Motor
204	MAR-CSB-P-CT-2	Pump
205	MAR-CSB-PMOT-CT-2	Motor
206	MAR-SB-HTC-NB	Hatch
207	MAR-SB-STR-SPIRAL	Stairs
208	MAR-SB-STR-M	Stairs
209	MAR-SB-HTC-OB	Hatch
210	MAR-SB-HTC-GEN	Hatch
211	MAR-SB-EXTWALL-LUV	Damper/Louver
212	MAR-SB-SCON-HT	Secondary Containment

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Martin Sanitary Diversion Drainage District - Major Asset List		
No.	**Asset Name**	**Asset Type**
213	MAR-SB-DR-MTL	Door
214	MAR-SB-EXTWALL	Exterior Walls
215	MAR-SB-FNSH-CEIL	Finish
216	MAR-SB-FNSH-TILE	Finish
217	MAR-SB-SLAB-NB	Floor Slab
218	MAR-SB-SSTACK	Ventillation Stack
219	MAR-SB-SLAB-OB	Floor Slab
220	MAR-SB-FOUND	Foundation
221	MAR-SB-ROOF	Roof
222	MAR-SB-WND-IN	Window
223	MAR-SB-SLAB-MF	Floor Slab
224	MAR-SB-OHD-GAR	Overhead Door
225	MAR-SB-FNCE	Fence
226	MAR-SB-FURN	Furnace
227	MAR-SB-UH-GAR	Heater
228	MAR-SB-UH-GEN	Heater
229	MAR-SB-LUV-GAR-E	Damper/Louver
230	MAR-SB-LUV-GAR-W	Damper/Louver
231	MAR-SB-BOIL	Boiler
232	MAR-SB-UH-OB	Heater
233	MAR-SB-DUCT-OB	Ductwork
234	MAR-SB-LUV-HT-E	Damper/Louver
235	MAR-SB-LUV-HT-W	Damper/Louver
236	MAR-SB-CRANE-RTB	Crane
237	MAR-SB-LDR-12	Ladder
238	MAR-SB-LDR-6	Ladder
239	MAR-SB-FEXT-NB	Fire Extinguisher
240	MAR-SB-FEXT-GAR-E	Fire Extinguisher
241	MAR-SB-FEXT-GAR-W	Fire Extinguisher
242	MAR-SB-FEXT-MECH	Fire Extinguisher
243	MAR-SB-FEXT-HT	Fire Extinguisher
244	MAR-SB-FEXT-GEN	Fire Extinguisher
245	MAR-SB-CRANE-GEN	Crane
246	MAR-SB-PICK	Crane
247	MAR-SB-ACCUM-1	Hydraulic Pressure Accumulator
248	MAR-SB-ACCUM-1-MOT-1	Motor
249	MAR-SB-ACCUM-1-MOT-2	Motor
250	MAR-SB-ACCUM-1-MOT-3	Motor
251	MAR-SB-ACCUM-2	Hydraulic Pressure Accumulator
252	MAR-SB-CRANE-HT	Crane
253	MAR-SB-PAV	Pavement
254	MAR-SB-EMSH-GEN	Eyewash/Shower
255	MAR-SB-LS-STUBE	Process Piping
256	MAR-SB-RPZ	Pressure Regulating Valve
257	MAR-SB-SINK-NB	Sink
258	MAR-SB-EMSH-HT	Eyewash/Shower
259	MAR-SB-SINK-HT	Sink
260	MAR-SB-SINK-SAMP	Sink
261	MAR-SB-SHWR-GAR	Eyewash/Shower
262	MAR-SB-TOLIET-GAR	Toliet
263	MAR-SB-SINK-GAR-2	Sink
264	MAR-SB-SINK-GAR	Sink
265	MAR-SB-LP-A	Distribution Panel

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Martin Sanitary Diversion Drainage District - Major Asset List		
No.	**Asset Name**	**Asset Type**
266	MAR-SB-LP-B	Distribution Panel
267	MAR-SB-LP-C	Distribution Panel
268	MAR-SB-LP-D	Distribution Panel
269	MAR-SB-LT-IN	Inside Lighting
270	MAR-SB-LT-EX	Outside Lighting
271	MAR-SB-MCC	Motor Control Center
272	MAR-SB-OS-P-D	
273	MAR-SB-CP-P-D1	Control Panel
274	MAR-SB-CP-P-D2	Control Panel
275	MAR-SB-OS-G-RTB	
276	MAR-SB-OS-P-F	
277	MAR-SB-ATS	Automatic Transfer Switch
278	MAR-SB-METER	Meter
279	MAR-SB-MDSC	Disconnect
280	MAR-SB-LVSG	Low Voltage Switchgear
281	MAR-SB-DSC-VA-F-15	Disconnect
282	MAR-SB-DSC-VA-F-22	Disconnect
283	MAR-SB-DSC-VA-F-18	Disconnect
284	MAR-SB-DSC-VA-F-21	Disconnect
285	MAR-SB-MSTRT-P-F1	Motor Starter
286	MAR-SB-MSTRT-P-F2	Motor Starter
287	MAR-SB-MSTRT-ACCUM-1	Motor Starter
288	MAR-SB-MSTRT-P-OB-F1	Motor Starter
289	MAR-SB-MSTRT-P-OB-F2	Motor Starter
290	MAR-SB-MSTRT-P-OB-F3	Motor Starter
291	MAR-SB-DSC-PMOT-SAMP-NB-N	Disconnect
292	MAR-SB-DSC-PMOT-SAMP-NB-S	Disconnect
293	MAR-SB-DSC-UH-GEN	Disconnect
294	MAR-SB-DSC-P-OB-SAMP-7	Disconnect
295	MAR-SB-DSC-P-OB-SAMP-2	Disconnect
296	MAR-SB-MSTRT-P-D3	Motor Starter
297	MAR-SB-TRNF-30-MECH	Transformer
298	MAR-SB-TRNF-15-GAR	Transformer
299	MAR-SB-TRNF	Transformer
300	MAR-SB-GEN	Generator
301	MAR-SB-PIPE-D-3	Process Piping
302	MAR-SB-P-D1	Pump
303	MAR-SB-P-D2	Pump
304	MAR-SB-P-D3	Pump
305	MAR-SB-PMOT-D1	Motor
306	MAR-SB-PMOT-D2	Motor
307	MAR-SB-PMOT-D3	Motor
308	MAR-SB-TNK-H-1	Tank
309	MAR-SB-TNK-H-2	Tank
310	MAR-SB-V-D	Valve
311	MAR-SB-P-F1	Pump
312	MAR-SB-P-F2	Pump
313	MAR-SB-PMOT-F1	Motor
314	MAR-SB-PMOT-F2	Motor
315	MAR-SB-P-SUMP-NB-SE	Pump
316	MAR-SB-P-SUMP-NB-PG	Pump
317	MAR-SB-P-SUMP-OB	Pump
318	MAR-SB-P-O-F1	Pump

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Martin Sanitary Diversion Drainage District - Major Asset List		
No.	**Asset Name**	**Asset Type**
319	MAR-SB-P-O-F2	Pump
320	MAR-SB-P-O-F3	Pump
321	MAR-SB-PMOT-O-F1	Motor
322	MAR-SB-PMOT-O-F2	Motor
323	MAR-SB-PMOT-O-F3	Motor
324	MAR-SB-V-F-14	Valve
325	MAR-SB-VA-F-15	Valve Actuator
326	MAR-SB-V-F-15	Valve
327	MAR-SB-V-F-16	Valve
328	MAR-SB-V-F-17	Valve
329	MAR-SB-VA-F-18	Valve Actuator
330	MAR-SB-V-F-18	Valve
331	MAR-SB-V-F-19	Valve
332	MAR-SB-V-F-20	Valve
333	MAR-SB-V-F-21	Valve
334	MAR-SB-VA-F-21	Valve Actuator
335	MAR-SB-VA-F-22	Valve Actuator
336	MAR-SB-V-F-22	Valve
337	MAR-SB-PIPE-F-24	Process Piping
338	MAR-SB-PIPE-F-20	Process Piping
339	MAR-SB-PIPE-F-16	Process Piping
340	MAR-SB-PIPE-F-4	Process Piping
341	MAR-SB-OIT	Control Panel
342	MAR-SB-CP-SCADA	Control Panel
343	MAR-SB-CP-GEN	Control Panel
344	MAR-SB-PM-GAR-1	Power Monitor
345	MAR-SB-PM-GAR-2	Power Monitor
346	MAR-SB-PM-HT	Power Monitor
347	MAR-SB-RAIN	Rain Gauge
348	MAR-SB-FE-HT	Flow Meter
349	MAR-SB-LS-HT-1	Ultrasonic Level Instrument
350	MAR-SB-LS-HT-2	Ultrasonic Level Instrument
351	MAR-SB-SAMP-1	Sampler
352	MAR-SB-SAMP-2	Sampler
353	MAR-SB-V-S	Valve
354	MAR-SB-P-SAMP-NB-N	Pump
355	MAR-SB-P-SAMP-NB-S	Pump
356	MAR-SB-PMOT-SAMP-NB-N	Motor
357	MAR-SB-PMOT-SAMP-NB-S	Motor
358	MAR-SB-P-SAMP-2	Pump
359	MAR-SB-PMOT-SAMP-2	Motor
360	MAR-SB-PMOT-SAMP-7	Motor
361	MAR-SB-P-SAMP-7	Pump

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date November 30, 2018
(no later than 3 years from executed grant date)

Martin Sanitary Diversion Drainage District *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1411-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or No

   If No - Date of the rate methodology approval letter: **May 24, 2018**.

2) Significant Progress Made: Yes or No

   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)

3) Date of rate methodology review letter identifying the gap: ________________.

4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ________________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Brian Baker	at	(586) 469-5325	brian.baker@macombgov.org
Name		Phone Number	Email

[signature] 11-29-18

Signature of Authorized Representative (Original Signature Required) Date

Brian Baker, Chief Deputy - MCPWO

Print Name and Title of Authorized Representative

Stormwater, Asset Management, and Wastewater (SAW)
Asset Management Plan Executive Summary Guidance
Village of Martin, Michigan

Wastewater Sewer System

Date: November 11, 2018
To: Mr. Clarence Jones
Re: Organization: Michigan Department of Environmental Quality
From: Wightman & Associates, Inc.
Re: Village of Martin SAW Grant: Summary of Wastewater Asset Management Plan

Grantee Information:
The Village of Martin
1609 North Main
Martin, MI 49070
Martinm49070@gmail.com
Mr. Gary Brinkhuis; President
Ph: (269) 672-7777
SAW Project #: 1200-01

Executive Summary: *Summary of the project scope, and grant and match amount, if applicable. List the key components that make up an Asset Management Plan (AMP).*

An asset management program is a tool for community leaders and utility managers to proactively decide when to repair, replace or rehabilitate assets and how those improvements will be funded to maintain a perpetual level of service. The Key Components of the Asset Management Program (AMP) are:

1) Asset Inventory and Condition Assessment.
2) Level of Service.
3) Criticality of Assets.
4) Capital Improvement Plan.
5) Asset Management Financial Plan and Revenue Structure.

The program is organized into three components that answer the following questions:

Asset Management Program (AMP):

- What level of service will be provided?
- What improvements need to be made and when?
- What changes to operations need to be made?
- How will these improvements and changes be funded?
- How is the plan implemented?

Geographic Information System (GIS):

- What do we own, where is it, what is the condition and what is the remaining life?
- What are the most critical assets?
- Where was maintenance performed and what was done?
- Where are improvements needed?

System User Manual:

- How will the asset management program tools be used?
- How will the asset management program be maintained and updated?
- How will the asset management program provide a guide for planning decisions?

		Sanitary	Total
1)	Total Grant:	$945,000	$945,000
2)	Less: Match	$ 30,000	30,000
3)	Net Grant:	$915,000	$915,000

Wastewater Asset Inventory: *Describe the system components included in the AMP. Discuss how they were located and identified, if applicable. Describe the platform used to develop and maintain the inventory of assets.*

The Village of Martin (Martin or the Village) operates a wastewater collection system consisting of about two and a quarter miles of gravity sewer pipe and over six miles of pressurized force mains that convey the wastewater from the Village and one manufactured housing community and car wash in Martin Township to the City of Plainwell (Plainwell) Water Renewal Plant (WRP) for treatment. In addition to the pipes in the collection system, Martin relies on a series of sewage lift (pump) stations to convey the wastewater through the system. There are two smaller lift stations serving sewer sub-districts, and one main lift station that conveys all the wastewater from Martin and Martin Township to Plainwell for treatment.

With a thorough knowledge of the basic layout of the collection system, a comprehensive inventory of all wastewater system assets was performed using as-built utility drawings and on-site Global Positioning System (GPS) field locations. Using the data collected, detailed maps of the wastewater collection system were prepared using Geographical Information System (GIS) software. The mapping was prepared using the state plane coordinate system, allowing the operator to obtain coordinates for and accurately locate system assets in the field utilizing handheld GPS equipment.

Condition Assessment: *Discuss the condition assessment process, including what methods were used. Summarize the results of the assessment for each asset category. The percentage of good, fair, and poor for each category can be used, if preferred.*

After completing the comprehensive inventory of the utility system assets, conditional assessments of all asset components were performed. The condition assessment provides the critical information needed to assess the physical condition and functionality of the assets in the collection system and estimate their remaining service life. Wightman staff performed conditional assessments beginning with complete visual and physical inspection of all the sanitary manholes in the wastewater collection system and visual and physical inspection coupled with performance testing at two of the three wastewater lift stations (the third was already scheduled for replacement). In addition, all the gravity sewer pipe in the wastewater system as well as all the manholes were videoed using closed-circuit televising (CCTV) equipment designed for internal pipe inspection and imaging. The CCTV service was provided by Perceptive Service and Operations.

During the field inspections, any manhole, pipe, and/or equipment defects were noted and classified using a standard coding system based on the National Association of Sewer Service Companies (NASSCO) numerical grading system, which defines the severity of observed defects. Grades for both structural and operation and maintenance defects were assigned based on the severity of the immediate defect and the likelihood of further defect deterioration or asset failure. The numerical grading system uses numbers ranging from 1 (new asset, no or minor defects) to 5 (defect requiring immediate action).

Once field inspections were completed for each asset and individual defects were graded, an overall condition rating was applied to each asset, again using a numerical system ranging from 1 (very good condition) to 5 (very poor condition). Overall condition ratings for pipes were based on NASSCO Pipeline Assessment Certification Program methodology. Overall condition ratings for manholes were based on NASSCO Manhole Assessment Certification Program Level 1 inspection methodology. Overall condition ratings for lift stations were based on physical inspection of the major components and drawdown testing to determine the performance of the pumping equipment.

Condition Rating	Condition Description	Defect/Deterioration Description
1	Very Good	New asset, no or minor defects
2	Good	Defects that have not begun to deteriorate
3	Fair	Moderate defects that will continue to deteriorate
4	Poor	Severe defects with significant deterioration
5	Very Poor	Defect requires immediate action

Table 1 - NASSCO conditional assessment system

As previously mentioned, the gravity sanitary sewer piping was televised by Perceptive. Any defects were graded according to the guidelines of the NASSCO Pipeline Assessment Certification Program (PACP). Once the individual defects were graded, an overall condition rating was applied to each pipe based on NASSCO PACP methodology. The manholes were rated using NASSCO Manhole Assessment Certification Program (MACP) Level 1 inspection methodology. Figure 7 and Figure 8 show the condition ratings for the wastewater gravity main piping and wastewater manholes (respectively).

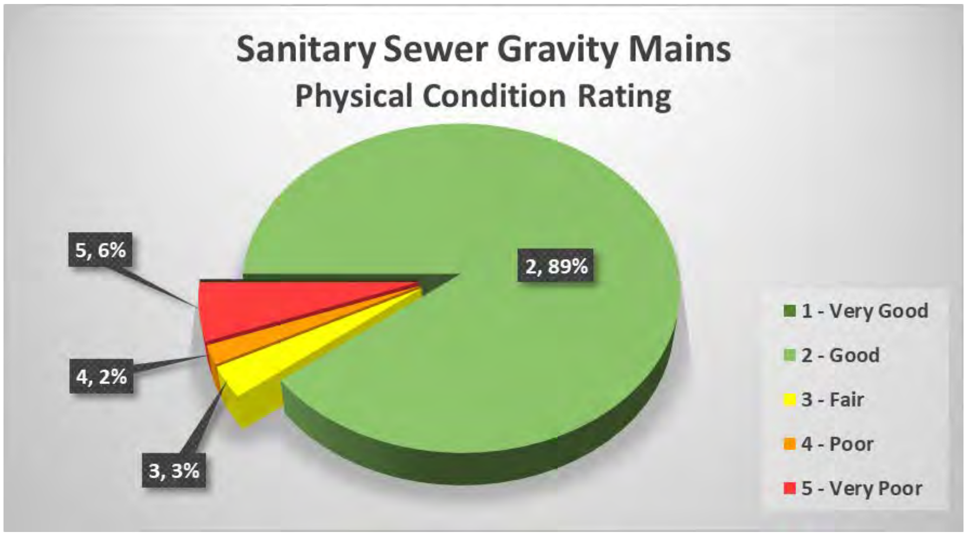


Figure 1 - Sanitary sewer gravity main physical condition rating

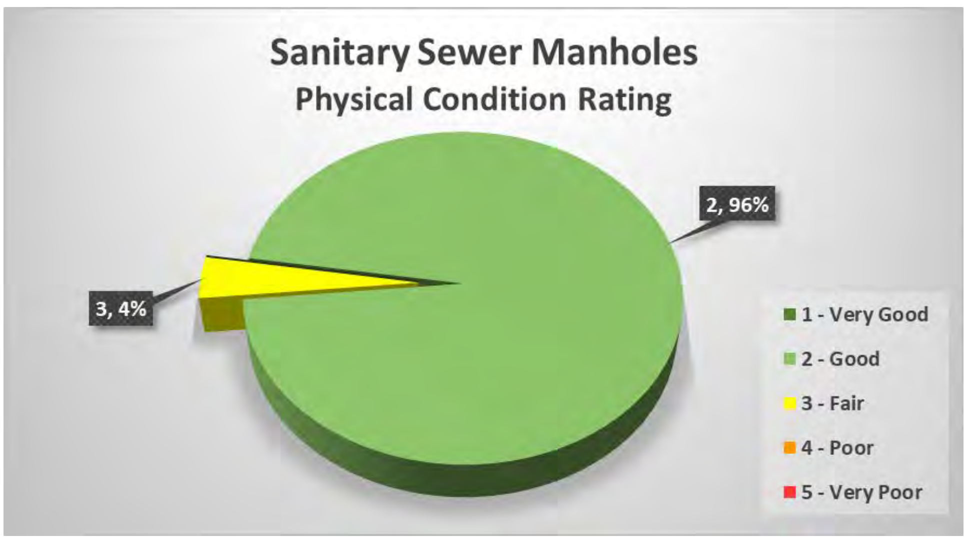


Figure 2 - Sanitary sewer manhole physical condition rating

As discussed previously, the lift station inspections included physical and visual inspection of the major components and drawdown tests to determine the performance of the pumping equipment. Table 3 shows the condition of the individual components of the lift stations that were assessed (the Main Lift Station was not assessed because it is being replaced as part of the SAW grant and will be a new asset (with all components rated as “Very Good”) at the end of this project.

Level of Service Determination: *Discuss the level of service the municipality has determined that it wants to provide its customers based on the municipality’s ability to provide the service and customer expectations. Discuss the procedures used to involve stakeholders in the AMP discussion. What are the trade-offs for the service to be provided? This may include any technical, managerial, health standard, safety, or financial restraints, as long as all regulatory requirements are met. Discuss how this was determined.*

The Level of Service (LOS) defines the way in which the Owner desires the facility or utility to perform over the long term. The LOS should ensure that all regulatory requirements are met and should include any technical, managerial, or financial components the Owner deems necessary to meet customer expectations. The LOS is a fundamental part in defining how the Village of Martin wastewater system will be operated and maintained in the future. As with all components of the AMP, defining the desired LOS will be an ongoing process.

The Asset Management Team developed the statements in the following Table to define the desired level of service for the wastewater system:

Major Area	Goals and Objectives	Level of Service Statements
Clean Effluent Water	All federal and state water quality regulations will be complied with.	
Health and Safety	Provide a safe and injury free work place. Protect the public health and the environment.	Regular safety meetings – monthly at a minimum. Repair issues in accordance with statements in the Response Time Area below.
Security	Secure all wastewater facilities from unauthorized access and intrusions.	All control panels and vaults will be padlocked at all times.
Operator Certification	Provisions for appropriately credentialed and experienced operators.	We will request annual documentation from Plainwell as to their WRP operator's levels of certification.
Administrative	Provide excellent customer service.	Produce accurate, timely billing.
Customer Complaints	Provide excellent customer service.	Respond to customer complaints in a timely manner and communicate through close of issue.
Response Time	Provide excellent customer service.	Respond to emergency calls within 1 hour at all times and non-emergency calls in a timely manner during normal business hours.
Rules and Regulations	Monitor and enforce all wastewater ordinances.	Review wastewater ordinances periodically in accordance with Plainwell's directives. Enforce provisions of wastewater ordinances.
Regulatory Changes	Be aware of regulatory changes and be in position to comply with changes as they occur.	Attend continuing education programs. Route applicable correspondence from the MDEQ to all affected staff.

Table 2 - Level of service statements

Major Area	Goals and Objectives	Level of Service Statements
Emergency Power Source	Provide adequate emergency power in necessary locations.	A permanent back-up generator shall be provided the Main Village lift station (Lift Station 3). A portable back-up generator shall be provided for all other Village lift stations. Generators shall be maintained under an annual maintenance contract.
Collection System	Maintain gravity sewers in good operating condition and prevent overflows and system back-ups. Maintain force mains in good operating condition and prevent overflows and system back-ups. Maintain air release valves in good operating condition and prevent overflows and system back-ups.	Gravity sanitary sewers will be reactively cleaned as needed to address issues that develop. Force mains will be reactively cleaned as needed to address issues that develop. Exercise and maintain air release valves in accordance with Manufacturer's recommendations.
Lift Stations	Maintain all pumps and related equipment – focus on preventative maintenance to prevent unscheduled breakdown. Lift station valve maintenance.	Maintain all mechanical and electrical equipment at least quarterly. Visually inspect all components of each lift station monthly. Clean the equipment and verify it functions. Clean lift station wet wells as needed to remove grease and sediment. Exercise check valves and gate valves annually (at a minimum).
Financial	Maintain a financial plan to generate sufficient revenue to operate and maintain the wastewater system.	Confirm wastewater revenues are sufficient to meet wastewater budget annually. Review sewer rates every year.
Operating Reserves	Maintain sufficient reserves to cover anticipated major expense and potential unexpected breakdowns.	Maintain a minimum of six months' operating expenses in reserve accounts.

Table 5 - Level of service statements (cont.)

Criticality of Assets: *Provide a summary of the method used to assess the criticality of assets considering the likelihood and consequence of failure. Based on the condition of the assets, and the determined risk tolerance, how were the assets ranked? What assets were considered most critical?*

Criticality is determined by multiplying the likelihood of failure by the consequence of failure and is a significant factor in prioritizing capital improvements. In general, the higher the criticality of an asset, the more resources that should be allocated to maintain the asset. However, criticality is only one tool that can be utilized to analyze and prioritize capital improvements and its use is subject to careful evaluation of the asset(s) in question and sound engineering judgement.

A. Likelihood of Failure

The likelihood of failure is determined by the condition rating. Below is the ranking system for likelihood of failure that was used to analyze the system. Accordance with Table 6 below.

Likelihood of Failure Rating	Asset Condition/ Description	Remaining Useful Life
1	Very Good	More than 90%
2	Good	60 to 89.9%
3	Fair	30 to 59.9%
4	Poor	10 to 29.9%
5	Very Poor	Less than 10%

Table 3 – Likelihood of failure assessment methodology

B. Consequence of Failure

To determine the consequence of failure, it is important to consider the significant costs of failure. These costs include not only the monetary cost of the repair, but could also include:

- Social cost associated with the loss of the asset.
- Repair/replacement costs related to collateral damage caused by the failure.
- Legal costs related to additional damage caused by the failure.
- Environmental costs (and possible environmental cleanup costs) created by the failure.
- Loss of business revenue to the community caused by the failure.
- Other miscellaneous costs associated with the asset failure.

The consequence of failure can be high if any one of these costs is significant or if the accumulation of several costs occurs due to a failure. In the event of the failure of a wastewater asset, the environmental, social, and legal costs can outweigh the costs of collateral damage and even the cost of repairing the failure itself. The consequence of failure for Cassopolis wastewater assets was assessed using the criteria presented in the table below:

Consequence of Failure Rating	Social, Human, and Environmental Effects[1]	Collateral Damage Effects
1 (Insignificant)	< 10% loss of service, limited potential for human contact with sewage, minimal property damage	Structure/pipe outside of road right-of-way (ROW), no impact to traffic or other structures
2 (Minor)	10% to 24% loss of service, potential for human contact with sewage, minimal property damage	Structure/pipe located under the pavement or curb of a residential or minor local road
3 (Moderate)	25% to 49% loss of service, potential for human contact with sewage, limited property damage, disruption to essential services/major industry	Structure/pipe located under the pavement or curb of a major collector roadway
4 (Major)	50% to 89% loss of service, likely human contact with sewage, moderate property damage, disruption to multiple industries/essential services	Structure/pipe located along state roadways, interstate highways, railroad ROW, or close enough to a building to cause collateral damage
5 (Catastrophic)	90+% loss of service, high potential of human contact with sewage, extensive property damage	Structure/pipe located under the pavement or curb of state roadways or interstate highways, under railroad tracks, or underneath a building

C. Criticality

As previously discussed, the criticality of each asset was calculated by multiplying the condition rating corresponding to the likelihood of failure of the asset by the consequence of failure rating of the asset. As such, the range of criticality numbers that can be assigned to an asset is 1 to 25 with the criticality of the asset increasing the higher the number assigned to it, as shown in the table below. The resulting criticality of each asset is included as an attribute for that asset in the GIS mapping database.

Criticality Rating	Criticality Description
1 to 5	Very Low
6 to 10	Low
11 to 15	Moderate
16 to 20	High
21 to 25	Very High

Revenue Structure: *Discuss how the rates, charges, or other means of revenue were reviewed to determine if there will be sufficient funds to cover system operation, maintenance, replacement, capital improvement projects, and debt costs, identified in the AMP. If the current rate structure was not sufficient, discuss what increases were needed to ensure the desired level of service is sustainable and if any changes were made.*

A. Methodology – Asset Management Financial Plan:

A significant effort has been made by the Village to inventory assets, evaluate the infrastructure, and determine asset criticality. The result is the identification of asset investment cost by project and by year. The AMFP covers an extended forecast period to take this asset evaluation into account. The AMFP is a four-step process:

[1] Loss of service for the wastewater system refers to the number of service connections impacted due to a single failure.

1) Historical comparison with audits and budgets.
2) Test year, or normalized budget year, along with inflation assumptions for purposes of forecasting.
3) Proof of rate to revenue for reliance on customer data.
4) Cash flow forecast including revenue, operating expense, capital spending, debt, and fund balance (i.e., actual cash and investment balance).

The analysis is "cash basis" approach as described in the AWWA Manual of Rate Making Practices. From year to year, this AMFP may be used to implement policy regarding rate management and budgeting.

B. Management Summary

1. Rates: Increase by 2.35% yearly.
2. USDA Loan: $772,000, 40-Year USDA bond at 3.25% in 2019.
3. Cash Balance: Target of twelve months compared to cash operating expenses over forecast period.
4. Capital Improvements: A mix of cash and debt funding in order to manage rates and cash effectively over time.

AMFP – Management Tool: The AMFP is a living document. It is most effective as a tool used annually for budget and user rate decisions.

Capital Improvement Plan: *Describe the long-term Capital Improvement Plan that was developed to address system needs identified in the AMP. Provide a list of the identified improvements/projects.*

Capital improvement projects are projects that a utility has an extended period of time to plan for and are typically projects that cover high-cost, non-recurring expenditures. To ensure that the desired LOS can be maintained, a long-term plan for required capital improvements, known as a Capital Improvement Plan (CIP), is required as part of an AMP. The CIP helps to ensure that the long-term reliability needs of the utility are met. The CIP is based upon planning for those capital improvements determined to be required or likely to be required due to the likelihood of failure of the assets and their criticality. The planning period for a CIP is 20 years to allow for the development of a rate structure adequate to finance those projects that can reasonably be predicted to be needed during that period.

The table below lists the recommended capital improvement projects as well as cyclical improvement projects (i.e. equipment replacement) over the next twenty years for the wastewater collection system.

Priority	CIP Year	Project Name	Estimated Cost
1	2018	Additional sanitary sewer maintenance	$ 5,000
2	2018	Repair concrete obstruction in sewer	$ 13,000
3	2019	Upgrade North Lift Station and West Lift Station	$ 772,000
4	2022	Manhole Lining	$ 50,000
5	2023	Miscellaneous manhole repairs	$ 12,000
		Total Estimated Project Cost for 20 Year CIP (current dollars) =	$ 852,000
		Total Estimated Project Cost for 20 Year CIP (inflation adjusted[2] costs) =	$ 875,000

[2] Twenty-year inflation adjusted calculations assume a compounded annual inflation rate of 2% per year for each project from 2018 until the year the project is forecast to be completed.

List of Major Assets: *Provide a general list of the major assets identified in the AMP.*

The table on the following page contains a summary of the Village's Assets:

Item	Quantity	Units
10-inch Sanitary Sewer	483	LF
8-inch Sanitary Sewer	11,784	LF
4-foot Diameter Sanitary Manhole	50	EA
Service Lead, Complete	175	EA
Lift Station - 500 gpm or Larger	1	EA
Lift Station - Less Than 500 gpm	2	EA
Backup Generator – 60 kW	1	EA
10-inch Force Main	30,593	LF
6-inch Force Main	3,040	LF
4-inch Force Main	1,989	LF
Hydrogen Peroxide Metering Vault	1	EA
Air Release Valve with Vault	9	EA
Force Main Cleanout Station	26	EA

Table 4 - Wastewater System Assets

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date **November 30, 2018**
(no later than 3 years from executed grant date)

The Village of Martin, Michigan *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1200-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or **No**

   If No - Date of the rate methodology approval letter: 5/17/18

2) Significant Progress Made: Yes or No

   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)

3) Date of rate methodology review letter identifying the gap: ______________________.

4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ___________________________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Mr. Don Flower at **(269) 672-7777** **martinmi49070@gmail.com**
Name Phone Number Email

Gary Brinkhuis 11-29-18
Signature of Authorized Representative (Original Signature Required) Date

Mr. Gary Brinkhuis, President
Print Name and Title of Authorized Representative

EXECUTIVE SUMMARY

Prepared by: **SPICER GROUP, INC.**
230 S. Washington Avenue
Saginaw, MI 48607

Owner: **VILLAGE OF MAYVILLE**
6043 Fulton Street
Mayville, MI 48744
Barbara Valentine, President
989-843-6423

On September 14, 2015, the Village of Mayville entered into an agreement with the Michigan Finance Authority for grant funds issued under Public Act No. 511 of 2012 for the *Stormwater, Asset Management, and Wastewater (SAW)* program. The Village received the follow grants:

Wastewater Asset Management Plan (WWAMP) – 90% Grant	$323,750
Stormwater Asset Management Plan (SWAMP) – 90% Grant	$276,250
Eligible Cost Subtotal	$600,000
LESS Local Match	($60,000)
Total Grant Amount	$540,000

The Asset Management Plans (AMPs) needed to be completed within three years of the date of agreement; November 2018

Each AMP has the following key components:

- Asset Inventory and Condition Assessment
- Critical Assets (Risk)
- Level of Service Determination
- Revenue Structure
- Capital Improvement Plan

List of Major Assets

- 6.8 miles of sanitary sewer pipes ranging in size from 6”-12”
- 172 Sanitary Sewer Manholes
- 4 pumping stations
- 2-cell lagoon treatment facility

Wastewater Asset Inventory and Condition Assessment

The Village’s wastewater system consists of three main components: The collection system (pipes and manholes), pump station, and the wastewater treatment facility lagoon.

For the collection system, Spicer Group, Inc. completed a mobile mapping LiDAR survey of the entire Village, and used the survey information to develop a comprehensive Geographic Information System

(GIS). This GIS is located on a new computer in the Village office, and is a detailed "smart" mapping system with databases, using the ArcGIS/Arc Online by ESRI platform. This system can be accessed and updated in the field by DPW staff from a new iPad supplied as part of the SAW grant project. From the GIS, as-built plans, pipe/manhole condition ratings, materials, year installed, inspection records, CCTV video inspections etc. can be accessed. This information can also be queried to provide specific lists and maps, and updated easily when future improvements are made.

The Village currently has 6.8 miles of sanitary sewer pipes in the entire sanitary sewer collection system ranging in size from 6"-12", and 408 sewer service connections, serving a total of 243 customers. City Sewer Cleaners, from Saginaw completed a comprehensive cleaning and televising program of the sanitary sewer pipes, and Spicer Group, Inc. completed a comprehensive inspection of the manholes using the NASSCO Manhole/Pipeline Assessment Certification Program (MACP/PACP) standards to identify and code the defects. The MACP/PACP system is used to standardize the scoring and to quantify the condition of the wastewater assets.

The next main component of the Village's wastewater system is four (4) pumping stations. Spicer Group completed an inspection and condition assessment of all the stations, and provided recommendations for future improvements. Many of the components of the pump station were past their useful life, but appeared to be working. It was recommended that the Village start budgeting for these future upgrades.

The last main component of the Village's wastewater system is the wastewater treatment plant lagoon (WWTPL) located northeast of the Village limits. Spicer Group completed an inspection and assessment of the lagoon. Biotech Agronomics, Inc performed a sludge judge and chemical analysis of the bio solids. Results from the lab found the material meets the MDEQ requirements for a Residuals Management Plan (RMP) and the material can be recycled in a beneficial reuse program such as land application.

Criticality (Risk)

For each asset in the Villages wastewater system, a criticality/risk analysis was performed to determine and prioritize the Village's key components. Based on the condition assessments and the field inspections, the Likelihood of Failure (LoF) was calculated for every asset; including all pipes, manholes, pumping stations, and WWTPL components. Next, the Consequence of Failure (CoF) was calculated and scored for each asset based on the economic, social, and environmental consequences, if that asset failed. Finally, the Criticality (Risk) score was calculated using:

RISK = LoF x CoF

The collection system had 24 pipes with a LoF score of 5 or above. The collection system also had 45 manholes with a LoF scores of 5.2-5.1. The collection system only had 2 pipes that fell into the Moderate to Major Disruption CoF category. Pipe segment 14-13 had the highest overall CoF value of 4.5 followed by pipe segment 36.1-13 with a CoF score of 4.4. All other pipe segments had CoF scores of 3.5 and below which puts them into the moderate disruption category. The majority of the highest CoF scores in the Village were the large diameter RCP pipes that transmit the majority of the sewage. There was one manhole with a score of 16.4 which indicates medium risk. This manhole (SA4) is located on the transmission sewer to the lagoon and had a poor condition rating contributing to a high LoF and due to its location also has a high CoF. These factors cause the overall risk to be moderately high. All the Village's other manholes are considered to be "low" risk assets. Overall, no pipes in the Village of Mayville fell into the high-risk category. Pipe segment 14-13 was close however with an overall risk score of 23.3. A total of 24 pipe segments fell into the medium risk category. The remaining pipe segments all fell into the low risk category.

Level of Service (LOS)

The next phase of the AMP is a Level of Service determination. What level of service does the Village want to provide to its wastewater customers? How are projects going to be prioritized and included in the CIP? What cost is the Village willing to endure to provide that level of service? These are all questions that were discussed as a part of the overall asset management plan. The Villages Level of Service Goals are as follows:

Mission Statement

The Village of Mayville strives to develop a financially stable, high performing wastewater collection, pumping and treatment service that addresses the customer's wants and needs and upholds the local, State, and Federal regulatory requirements at a minimum cost to our customers.

One of the basic goals is to review the capital improvement projects to determine the best value options for the Villages' customers based on life cycle costs and overall benefits to the community:

- "**MINIMUM**" Level of Service – Priority projects to meet the minimum local, State, and/or Federal regulations. Typically to be completed within the next 5 years.

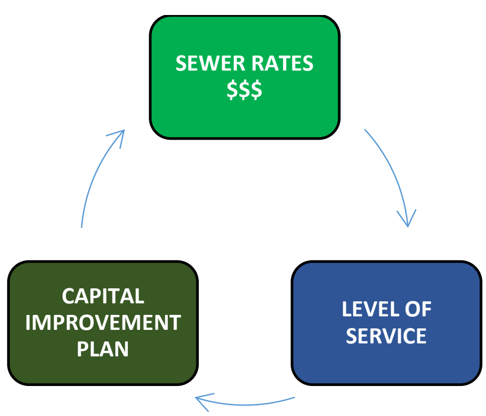
- "**MEDIUM**" Level of Service – Projects that will need to be done eventually; typically when other infrastructure projects are happening.

- "**HIGH**" Level of Service – Projects that are on the long range radar that could spur future development and growth for the Village.

Generally, the "high" level of service projects will have a higher construction/initial cost, but would provide a better long-term or life cycle cost for the Village. The "minimum" level of service projects would have a lower initial cost, but would also have a shorter life span and higher overall life cycle costs.

As the AMP progressed, different scenarios were evaluated, to provide the Villages desired Level of Service, the costs of the capital improvement projects associated with that LOS, and the effect on sewer rates.

Asset Management Plan Evaluation Process

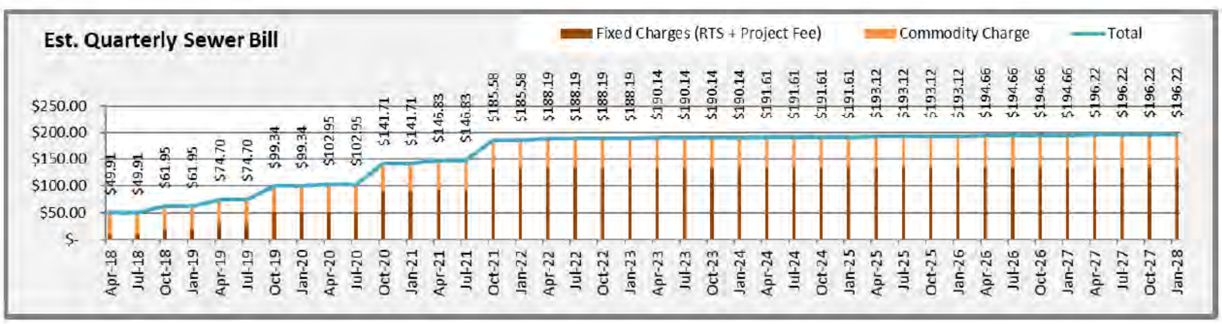


The resulting capital improvement plan and revenue structure was one that met the Villages goals, addressed the improvements that need to be made, and is a sustainable rate structure for the Villages customers. The Village chose to adopt a minimum Level of Service.

Revenue Structure

Spicer Group teamed with Municipal Analytics for the revenue structure analysis for the AMP. Wastewater account balances, expenditures, revenues, etc. were reviewed and inputted into Municipal Analytics financial software to determine if there were any deficiencies in the rates. The Villages current rate structure was found to have no deficiencies meaning the Village could fund current and future operations and maintenance of the system. However, the gap analysis did not consider any capital improvement project required to maintain the selected LOS.

The Capital Improvement Plan (CIP) projects were evaluated and allocated to various years of completion, and the rate structure to support those improvements was determined. Many iterations/scenarios were performed to come up with a rate structure that met the Villages Level of Service goals, completed the CIP projects that are needed, and had sustainable rates for the Villages customers. The result was a recommendation to obtain a 40 year low interest loan to pay for these improvements needed in 2020. In order to pay for the low interest loan a project fee is being added to cover expenses related to the project. Additionally, the current ready to serve and commodity rates to cover general operations and maintenance of the system are also being increased. A graph of the estimated quarterly sewer bill for the next 10 years is shown below. This rate increase will allow the Village to meet the minimum level of service developed. This should be reviewed annually as a part of the Villages normal budgeting process.



Capital Improvement Plan

The Capital Improvement Plan (CIP) is the culmination of all the parts of the Asset Management Plan (AMP). Reviewing the results of the wastewater system Inventory & Condition Assessment, Level of Service (LOS) determination, Criticality (Risk), Revenue Structure, and preliminary CIP project lists, a process was worked through to categorize and prioritize the final CIP. Various degrees of Level of Service and the associated CIP projects were evaluated and plugged into the Revenue Structure model, and the resulting sewer rates for that set of scenarios were reviewed. If the projected rates were too high, a lower LOS was chosen and those CIP projects were plugged into the Revenue Structure model and the resulting rates were then reviewed. The process then continued with different CIP projects at varying LOS's until an acceptable rate structure, level of service, and capital improvement plan was developed.

A 5-year CIP was developed that includes various collection system improvements. The following table summarizes the minimum service level projects that were included in the 5 year capital improvement plan.

Village of Mayville Sanitary Sewer Capital Improvement Plan

Annual Maintenance

Annual Operation and Maintenance - Continue Cleaning and Televising (Know Problem Areas)					$5,000.00
				Total Cost	$5,000.00

Collection System Pipe Repairs

Project Number	Level of Service	Project Location	Project Description	Defect(s)	Estimated Cost
1-4 & 9	Minimum	Various	Open Cut Point Repairs	Pipes Broken, Broken Joint, Plugged Drop Connection, Gusher	$80,000.00
5	Minimum	Easement East and West Manhole #126	Replace Pipe Connecting and Pipe Sag	Broken Pipe Connection and 70%-75% Pipe Sag	$68,000.00
6	Minimum	Turner and Pine Street Intersection	Replacement of Entire Section That is Not Graded Properly	Sag in Line/Deformed, Joint Offset Large in PVC Pipe	$465,000.00
7	Minimum	Fulton Street Sewer Replacement	Sewer is Running Uphill to High Point then Downhill	Sag/Joint Offset Large	$80,000.00
8	Minimum	2nd Street Between Manhole #8 & #9	CIPP Liner From Manhole #8 to Manhole #9	Surface Reinforcements Projecting	$2,100.00

Manhole Repair/Rehabilitation

Project Number	Level of Service	Project Location	Project Description	Defect(s)	Estimated Cost
M1	Minimum	Various Manholes in Village	Raise Structures to Grade, Inspect, and Verify Locations (11 Manholes Total)	Buried under Asphalt or Concrete	$20,000.00
M2	Minimum	Manhole #73 & Manhole #25	Remove Ragging/Debris From Structure	Ragging and Deposits	$5,000.00

Additional Heavy Cleaning/Calcium Cutting

Project Number	Level of Service	Project Location	Project Description	Defect(s)	Estimated Cost
11	Minimum	M-24 and Main Street Easement	Calcium & Root Cutting Near Tap (If Tap Inactive Bulkhead)	Calcium & Root Cutting (Channel is Blocked)	$1,500.00
12	Minimum	M-24 East Manhole #25	Confined Space Entry w/ Manhole Step & Obstacle Removal	Calcium/Grease Build Up At Manhole Step in Structure	$500.00

Pump Station

Project Number	Level of Service	Project Location	Project Description	Defect(s)	Estimated Cost
P1	Minimum	Bulkhead Overflow Pipe at Ohmer Rd. Pump	Bulkhead Overflow Pipe at Ohmer Rd. Pump w/Concrete	Illicit Overflow Connection Into Woods Near Creek	$500.00
P2	Minimum	Rollerway Pump Station	Repair Leaking Valve	Valve is leaking Sewage into Structure	$15,000.00
P3	Minimum	Emergency Fox Street Pump Replacement	Pump Replacement	Pump is Operating in Damaged Condition and is Beyond Repair	$15,000.00
P5	Minimum	Ohmer Rd Pump Station Replacement	Replace Entire Pump Station w/Submersible	Pump Station is Operating Past Useful Service Life	$366,000.00
P6	Minimum	Fox Street Pump Station Replacement	Replace Entire Pump Station w/Submersible	Pump Station is Operating Past Useful Service Life	$351,000.00
P8	Minimum	Fifth Street Pump Station Rehab	Rehab existing Pump Station	Pump Station is Operating Past Useful Service Life	$152,000.00

Lagoon

Project Number	Level of Service	Project Location	Project Description	Defect(s)	Estimated Cost
L1	Minimum	Mayville Lagoon Site	Cell Reshape & Lining, and New Cell Expansion	MDEQ Permit Requirement	$5,625,000.00

Annual Maintenance	$5,000.00
Grand Total Minimum Level Service	$7,246,600.00

Conclusion

The Village of Mayville's wastewater system is a typical aging municipal infrastructure system. The DPW for many years has only engaged in reactive maintenance. This has caused the system to fall in to a dire state of disrepair necessitating 7.2 million dollars' worth of improvements to be made in order to maintain a minimum Level of Service. Since it is unreasonable for the Village to obtain this amount of money in a short period of time, we are recommending the Village to bond for 40 years to pay for these improvements. After these improvements are made to the system the asset management plan should be updated to show these improvements. Also, the rates should be reviewed annually during the Village's normal budgeting process.

In accordance with the SAW Grant requirements, the Village's Wastewater Asset Management Plan (WWAMP) needs to be kept available for citizen review for 15 years. The WWAMP should be reviewed annually, and the components updated and included in the Village's annual budget process.

WASTEWATER ASSET MANAGEMENT PLAN

VILLAGE OF MAYVILLE

TUSCOLA COUNTY, MICHIGAN

NOVEMBER 2018

BASED ON:

***ASSET MANAGEMENT GUIDANCE FOR WASTEWATER AND STORMWATER SYSTEMS*, MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY, JULY 2013**

STORMWATER, ASSET MANAGEMENT, AND WASTEWATER (SAW) GRANT

PROJECT NUMBER: 1210-01

PREPARED BY:

Spicer group

230 S. Washington Avenue
Saginaw, MI 48607

PROJECT ID NUMBER: 122928SG2015

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date November 30, 2018
(no later than 3 years from executed grant date)

The Village of Mayville *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1210-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or No

   If No - Date of the rate methodology approval letter: ________________.

2) Significant Progress Made: Yes or No

   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)

3) Date of rate methodology review letter identifying the gap: ________________.

4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ________________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Barbara Valentine	at 989-843-0159	bvalentine@villageofmayville.org
Name	Phone Number	Email

Barbara Valentine 11/20/18

Signature of Authorized Representative (Original Signature Required) Date

Barbara Valentine, Village President

Print Name and Title of Authorized Representative

VILLAGE OF MAYVILLE
SAW Grant Project No. 1210-01

EXECUTIVE SUMMARY

Prepared by: **SPICER GROUP, INC.**
230 S. Washington
Saginaw, MI 48607

Owner: **VILLAGE OF MAYVILLE**
6043 Fulton Street
Mayville, MI
Barbara Valentine, President

The Village of Mayville entered into an agreement with the Michigan Department of Environmental Quality and the Michigan Finance Authority for grant funds issued under Public Act No. 511 of 2012 for the *Stormwater, Asset Management, and Wastewater (SAW)* program. The Village received the following grants:

Wastewater Asset Management Plan (WWAMP) – 90% Grant	$323,750
Stormwater Asset Management Plan (SWAMP) – 90% Grant	***$276,250***
Eligible Cost Subtotal	$600,000
LESS Local Match	($60,000)
Total Grant Amount	$540,000

The Asset Management Plans (AMPs) needed to be completed within three years of the date of agreement; November 2018.

Each AMP has the following key components:

- Asset Inventory and Condition Assessment
- Level of Service Determination
- Critical Assets (Risk)
- Revenue Structure
- Capital Improvement Plan

List of Major Assets

- 15, 663 feet of storm sewer ranging in size from 4” to 48”
- 150 Storm Water Structures

Storm Water Asset Inventory and Condition Assessment

The Village of Mayville’s storm water collection system consists of a series of 4”, 6”, 8”, 10”, 12”, 15”, 18”, 24”, 30”, and 48” pipes. These pipes or “storm sewers” collect storm water from “catch basins”, footing drains/sump systems (sump leads), open inlets, roadside drainage, roof drains, groundwater infiltration etc. A base map of the system is included in Appendix 2.

For the collection system, Spicer Group, Inc. completed a mobile mapping LiDAR survey of the entire Village and used the survey information to develop a comprehensive Geographic Information System (GIS). This GIS is located on a new computer in the Village office, and is detailed "smart" mapping system with databases, using the ArcGIS/Arc Online by ESRI platform. This system can be accessed and updated in the field by DPW staff from a new iPad supplied as part of the SAW grant project. From the GIS as-built plans, pipe/manhole condition ratings, materials, year installed, inspection records, CCTV video inspection etc. can be accessed. This information can also be queried to provide specific lists and maps, and updated easily when future improvements are made.

The Village currently has around 15,663 feet of storm sewer pipes ranging in size from 4"-48". The table below shows a detailed breakdown of size and material for all Village owned storm sewer. The larger sizes from 18" to 48" are primarily all RCP. The majority of the RCP storm sewer was installed at the same point in time during a large special assessment project.

Table ES-1: Village Storm Sewer by Diameter and Material

Village Owned Storm Sewer							
Pipe Diameter	PE	PVC	RCP	VCP	CMP	Unknown	**Total**
4"	124.4	137.1		94.3		204.4	560.2
6"	65.1	824.9		628.2		13.2	1531.4
8"	489.5	1153.1		401.5		382.9	2427
10"		66.3	43.1			49.4	158.8
12"	278.4	460	1462.9	559.5		282.9	3043.7
15"		429.7	794.2				1223.9
18"			190				190
21"			349.8				349.8
24"			2348.4		98.2		2446.6
27"			131.9				131.9
30"			1097.5				1097.5
42"			650.4				650.4
48"			1851.6				1851.6
Total	957.4	3071.1	8919.8	1683.5	98.2	932.8	**15662.8**
Percent by Material	6.1%	19.6%	56.9%	10.7%	0.6%	6.0%	100.0%

CMP – Corrugated Metal Pipe

PE – Polyethylene Pipe

PVC – Polyvinyl Chloride Pipe

RCP – Reinforced Concrete Pipe

VCP – Vitrified Clay Pipe

Below is a table showing a breakdown of ownership for storm water assets located inside the Village limits of Mayville. The Tuscola County Drain Commissioner has an enclosed drain inside the Village limits. This drain is known as the Fulton Street Drain which flows down Trend St. before turning and flowing to the West on Railroad St. The Michigan Department of Transportation has storm water drainage along Mayville Road (M-24). Mayville area schools owns and maintains a few different small systems that provides both parking lot and drainage for low lying greenbelt areas on the school properties. The majority of the Village, MDOT, school, and, private storm water systems flow to the Cox Drain which is located on the eastern Village limits. This is an open ditch county drain.

Table ES-2: Storm Water Assets by Owner

Ownership	Length (Feet)	% of System
Village of Mayville	15,662.60	72.7%
County Drain	1,603.00	7.4%
MDOT	967.90	4.5%
Privately Owned	1,172.80	5.4%
School	2,129.10	9.9%
Total	21,535.40	100.0%

City Sewer Cleaners from Saginaw completed a cleaning and televising program for the storm sewer pipes. Spicer Group, Inc. completed a comprehensive inspection of all the storm water structures owned by the Village. The NASSCO Manhole/Pipeline Assessment Certification Program (MACP/PACP) standards were used to identify and code the defects and was used to standardize the scoring and quantify the condition of the storm water assets.

Criticality (Risk)

For each asset in the Village's storm water system, a criticality/risk analysis was performed to determine and prioritize the Village's key components. Based on the condition assessments and the field inspections, the Likelihood of Failure (LoF) was calculated for every asset; including all pipes, manholes, drainage structures, etc. Next, the Consequence of Failure (CoF) was calculated and scored for each asset based on the economic, social, and environmental consequences, if that asset failed. Finally, the Criticality (Risk) score was calculated using:

RISK = LoF x CoF

The collection system had 2 pipes with a LoF score of 5 or above. These locations were:

- ST73-ST73.1 Fulton and W. Main Street
- ST68-ST70 Easement North Fire Dept. From Trend Street to East.

There were three drainage structures with LoF score of 5 or higher, located at:

- ST.002 Southern most storm structure on 1st Street
- ST.044 Southwestern most storm structure on Lincoln Street
- ST.051 Lincoln Street South of W Main Street

The collection system had 6 pipes with a CoF score of 4.7 or above, which would indicate a "moderate disruption to major disruption". The pipes exhibiting this score can be seen in the list below.

- ST22-ST101
- ST94-ST96
- ST96-ST98
- ST99-101
- ST117-ST118
- ST118-Ditch

The majority of the other storm water pipes had moderate to minor disruption CoF values. As for the storm water structures, there were 23 structures that had CoF scores of 4 or higher. These structures all fell into the Moderate to Major Disruption CoF category. The remaining structures fell into the Moderate to Minor disruption CoF category.

The highest risk score generated for a storm water structure was 5.1. This is below 11.99 so it is considered low risk. All the remaining structures fell into the low risk category. Overall, there were a total of 8 pipes that fell into the medium risk category. These pipes all exhibited risk sores of 11.99 or larger. The highest risk score generated was 17.8 for pipe segment ST-98-ST99. Besides the 8 pipes segments that were determined to be medium risk, the remaining pipe segments all fell into the low risk category.

Level of Service

Mission Statement

The Village of Mayville strives to maintain a basic storm water collection system service that *addresses* the residents' wants and needs and upholds the local, State, and Federal regulatory requirements at a minimum cost to our residents.

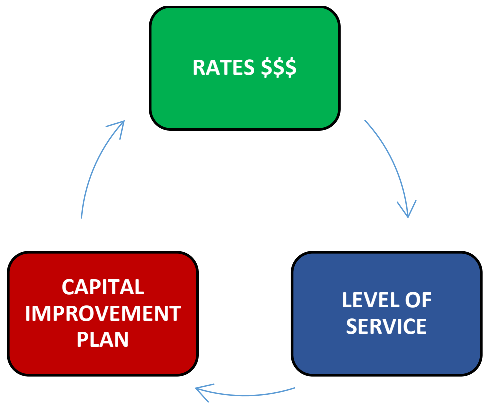
Basic goals:

- Operate and maintain the storm water system to minimize flooding and property damage.
- Provide rapid and effective emergency response service.
- Review the condition of storm water assets as a part of other infrastructure construction projects.
- Seek a funding source for operation & maintenance and repair/replacement of storm water assets.
- Review the maintenance and capital improvement plans/projects annually to determine the lowest cost options for our residents:
    - **"MINIMUM"** Level of Service – Address resident complaints as they come in.
    - **"MEDIUM"** Level of Service – Point repairs to the existing system that have been identified. Mainly projects that the cleaning and televising crew had to abandon the inspection due to obstructions, collapses, holes etc.
    - **"HIGH"** Level of Service – Lining or replacement projects to be completed with other infrastructure improvement projects.

Performance Measurements:

- Review annual performance goals for storm sewer system operation & maintenance, rehabilitation, and capital improvements.
- Annually review the number and severity of resident complaints.
- Annually review the amount of storm sewer assets that have been repaired or replaced.
- Review and update the Storm Water Asset Management Plan, GIS, and Capital Improvement Plan annually.

ES-3: Asset Management Plan Evaluation Process



Since Michigan has not created a climate which would allow municipalities to create either an enterprise fund or a utility fee for storm water asset improvements, funding comes from the Village's Local and Major Street funds. The Village has fixed sources of revenues from a combination of State, County, Township and Village taxes. These limited funds are in some ways restricted on their use in that they are primarily designated for road improvements.

Since there is no real funding mechanism for storm water assets, the Village has been maintaining a minimum Level of Service. The storm sewer system is cleaned annually and repairs to pipes or catch basins are made as needed. When residents notify the Village of flooding or drainage issues, the DPW will address the issue on a case-by-case basis. When the Village has street resurfacing or replacement projects, the storm water system is inspected, evaluated, and appropriate repairs and/or replacement is done based on the funding available.

Revenue Structure

Spicer Group teamed with Municipal Analytics for the revenue structure analysis for the AMP. Since Michigan has not created a climate which would allow municipalities to create either an enterprise fund or a utility fee for storm water asset improvements, funding comes from the Village's general fund. Act 51 monies received from the State for street/road improvements could also be used for storm water improvements that affect the street projects directly. However, Act 51 funding is very limited. Another mechanism for funding large storm water improvements is through the Tuscola County Drain Commissioner's office, using the Drain Code, PA 40 of 1956.

The financial impact analysis found that the Village's general fund does not have sufficient revenue to meet identified storm water capital improvement projects, and does not have a mechanism to collect rates/fees to provide storm water collection services. The Village will strive to maintain a minimum level of service and seek outside grants and funding for storm water infrastructure capital improvements. The Village should continue to update this analysis on an annual basis to determine if funds become available to address the proposed capital improvement projects.

Capital Improvement Plan

The Capital Improvement Plan (CIP) is the culmination of all the parts of the Asset Management Plan (AMP). Reviewing the results of the stormwater system Inventory & Condition Assessment, Level of Service (LOS) determination, Criticality (Risk), Revenue Structure, and preliminary CIP project lists, a process was worked through to categorize and prioritize the final CIP.

Until a funding mechanism for storm water improvements is found, the Village is forced to continue its *reactionary* policy. In order to have some sort of financial mechanism for the Village to *proactively* improve the storm water system, we recommended a minimal discretionary budgetary line item of $5,000 per year for the Village to continue cleaning & televising, lining, root treatment, and misc. repairs. With this discretionary budget line item, many smaller “Minimum” Level of Service projects can be slowly completed.

Conclusion

The Village of Mayville’s storm water system is a typical, aging municipal infrastructure system. Since there is no real funding mechanism for storm water assets, the Village has been maintaining a very minimum Level of Service for its residents. This has resulted in a reactionary operation and maintenance practice. When residents notify the Village of flooding or drainage issues, the DPW will address the issue on a case-by-case basis. When the Village is planning for street resurfacing or replacement projects, the storm water system is inspected, evaluated, and appropriate repairs and/or replacement is done based on the funding available.

In order to have some sort of financial mechanism for the Village to proactively improve the storm water system, we recommended a minimal discretionary budgetary line item of $5,000 per year for the Village to continue cleaning & televising, lining, root treatment, and misc. repairs.

Until a funding mechanism for storm water improvements is found, the Village is forced to continue this reactionary policy. The Village should continue to urge its State legislators to develop a plan to fund municipal storm water improvements, such as supporting HB 5991.

In accordance with the SAW Grant requirements, the Village’s Storm Water Asset Management Plan (SWAMP) needs to be kept available for citizen review for 15 years. The SWAMP should be reviewed annually, and the components updated and included in the Village’s annual budget process.

STORMWATER ASSET MANAGEMENT PLAN

VILLAGE OF MAYVILLE

TUSCOLA COUNTY, MICHIGAN

NOVEMBER 2018

BASED ON:

***ASSET MANAGEMENT GUIDANCE FOR WASTEWATER AND STORMWATER SYSTEMS*, MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY, JULY 2013**

STORMWATER, ASSET MANAGEMENT, AND WASTEWATER (SAW) GRANT

PROJECT NUMBER: 1210-01

PREPARED BY:

Spicer group

230 S. Washington Avenue
Saginaw, MI 48607

PROJECT ID NUMBER: 122928SG2015

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Due Date November 30, 2018
(no later than 3 years from executed grant date)

The Village of Mayville *(legal name of grantee)* certifies that all stormwater asset management plan (SWAMP) activities specified in SAW Grant No.1210-01 have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SWAMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

Barbara Valentine at 989-843-0159 bvalentine@villageofmayville.org
Name Phone Number Email

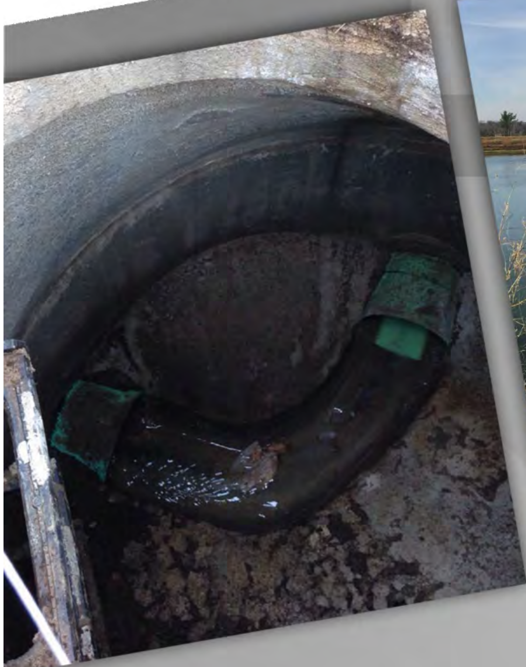
Barbara Valentine 11/20/18
Signature of Authorized Representative (Original Signature Required) Date

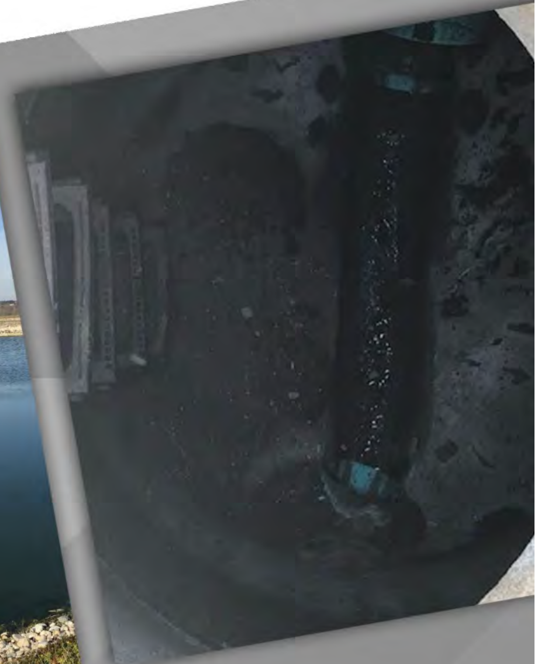
Barbara Valentine, Village President
Print Name and Title of Authorized Representative

Protecting our Infrastructure Investment

ASSET MANAGEMENT PLAN

Wastewater Executive Summary Report





Prepared for:

Village of Mesick

SAW Project No. 1578-01

October 2018

FLEIS&VANDENBRINK

DESIGN. BUILD. OPERATE.

EXECUTIVE SUMMARY

OVERVIEW

Public Act 562 of 2012 authorized money for Stormwater, Asset Management, and Wastewater (SAW) Grant Program. In November 2015, The Village of Mesick received a Stormwater, Asset Management, and Wastewater (SAW) Grant from the Michigan Department of Environmental Quality (MDEQ), project no. 1578-01, to provide financial assistance for the development of a wastewater asset management plan (AMP) for the Village's publicly owned wastewater utility. This AMP is intended to be a living document that is updated as assets continue to wear and age, and as additional inspection/condition results are found and incorporated into the plan.

The contact person for the Village of Mesick's AMP is:

Lorene McLeod, Village Treasurer
119 W. Mesick Avenue
Mesick, MI 49601
Phone number: 231.885.1646
Email: lmcleod11@villageofmesick.com

ASSET INVENTORY & CONDITION ASSESSMENT

A list of the major assets in the Village's wastewater system, described further below, include:

- Collection system piping system and manholes
- Wastewater Treatment Facility (WWTF)
- Sanitary sewer lift stations in the collection system

The wastewater collection system assets include 13,868 feet (2.6 miles) of sanitary sewers (gravity pipe and force mains) and 52 wastewater manholes connecting the gravity pipe. These assets are located in existing street rights-of-way or in easements dedicated for the assets use and maintenance.

The WWTF currently includes the following treatment processes:

- Three facultative lagoon cells
- Spray irrigation system

Treated effluent is seasonally discharged to the groundwater of the State of Michigan in accordance with NPDES permit No. GW1810121. The design capacity of the WWTF is 0.088 million gallons per day (mgd). The current annual average flow received by the facility is approximately 0.030 mgd.

There is 1 sanitary sewer lift station located within the wastewater collection system. The station is a submersible style station.

Asset Identification & Location

A comprehensive wastewater system asset inventory was developed from operation and maintenance (O&M) manuals included a review of existing record drawings, field notes, staff knowledge, and site visits, supplemented with field survey work. Asset material, size and age were identified through the review of available historical record documents. Spatial orientation (pipe location), pipe depth and invert elevations were determined through GPS field survey and a comprehensive evaluation of the gravity system. This information was organized into a new (GIS) database and piping network for archiving, mapping and further evaluation purposes. The inventory includes over 59 WWTF assets, 15 Lift Station Assets, and 108 Collection System Assets.

Condition Assessment and Expected Useful Life

A comprehensive evaluation of the collection system was performed. NASSCO-MACP manhole field-based assessments were completed on all 52 manhole structures. Pipeline cleaning and NASSCO-PACP CCTV field-based inspections were not conducted on the gravity pipe. Capacity Analysis was modeled for average day and peak hour conditions to identify capacity concerns. Recommendations for short-term (1-5 year) and long term (6-20 year) identified the need for maintenance with 49% of the system tagged for

inspection and/or cleaning. Rehabilitation accounted for 2% of the system identifying the need for two manhole repairs. The remaining 49% of assets were placed in the 20+ year category.
Overall, the condition of the assets at the WWTF range from good to fair. The WWTF was constructed in 1995, except for additional erosion control gravel placed along the berm of cell #3, the facility has remained unchanged since its original construction.

The condition of the assets at the lift stations range from good to fair. Lift stations are rated in 8 areas which consist of wet well, discharge piping, pumps, valve chamber, valves, generator, telemetry & controls and the site. All areas of the lift station rated good during the assessment except for controls and telemetry which rated fair.

Level of Service

Defining the Expected Level of Service (LOS)

The overall objective of the Village Wastewater Department is to provide reliable wastewater collection and treatment services at a minimum cost, consistent with applicable environmental and health regulations. To achieve this, the following Level of Service (LOS) goals are proposed:

WASTEWATER UTILITY - LEVEL OF SERVICE STATEMENT

- Provide adequate collection system and treatment capacity for all service areas.
- Comply with all local, state and federal regulations at all times for treated effluent from the WWTF.
- Actively maintain collection and treatment system assets in reliable working condition.
- Reduce inflow/infiltration (I/I) flow volumes to mitigate potential for sanitary overflows, and overloading of treatment facility.
- Provide rapid and effective emergency response services to customers.
- Ensure operations staff are properly certified.
- Regularly review health and safety procedures for operations staff to provide proper worker safety.
- Regularly review projected O&M and capital expenditures. Adjust user rates, as necessary, to ensure sound financial management of wastewater system.

The LOS goals may need to be adjusted from time to time as the utility ages, the needs of community change or new rules or regulations require a change in operation. For this reason, the LOS goals should be reviewed by the Village from time to time to make sure they accurately reflect the desired operation of the utility.

Measuring Performance

In order to assure that LOS goals are met performance measurements may need to be implemented. During the LOS review with the community the need for performance measurements were discussed.

Critical Assets

Determining Criticality

Business Risk is the determination of criticality of each asset in the wastewater system. Criticality is based on two factors; Likelihood (Probability) of Failure and Consequence of Failure using the following formula:

Business Risk = Consequence of Failure Score x Likelihood of Failure Score

Defining an asset's Business Risk allows for management of risk and aids in decision making for where to allocate operation and maintenance and capital improvement funds.

Likelihood of Failure (LoF) is a measure of how likely an asset is to fail. The following categories have been developed to quantify how likely an asset is to fail:

- Condition of the asset
- Remaining useful life (Age)

- Service History
- Operational status

Consequence of Failure (CoF) is a measure of the social, economic, financial or environmental impact of failure of an asset and the utilities ability to respond, convey and treat wastewater. CoF categories of the collection system include:

- Proximity to critical environmental features
- Location (Zoning District) of asset
- Facilities served by asset
- Size and location of asset within the utility network
- Type of asset.

The WWTF and lift station categories for CoF are:

- Process
- Financial Impact
- Safety
- Environmental Impact
- Disruption to the Community
- Ability to Respond

Criticality Results

Using the strategy outlined above, a Business Risk Evaluation (BRE) was performed for each asset using a graphical ArcGIS-based sewer asset management and capital planning software that compiles, analyzes and assesses Business Risk for each asset and develops a Capital Improvement Plan. The results of the BRE are provided in easily understood tabular and graphical output.

Figure 1 provides the risk rating for gravity and force main pipe by number of pipe segments. CCTV was not completed as part of this AMP, for that reason no pipes were identified with structural concerns. Because of that, all pipes were considered for CCTV as part of the 1-5 year Operation and Maintenance Plan.

Figure 2 provides the risk rating for the collection system manholes. Two manholes have a high-risk rating, they are included in the 3-5 Year Rehabilitation Plan and have recommendations for repair. Ninety-four percent of the manholes are at medium to negligible risk and recommended to be included in a long-term rehabilitation or operation & maintenance strategy.

Consequence of Failure	Low	Medium	High
High	Medium **0**	High **0**	Extreme **1**
Medium	Low **0**	Medium **11**	Extreme **0**
Low	Negligible **0**	Low **29**	High **15**
	Likelihood of Failure		

Figure 1. Business Risk Matric (Risk Rating) by Number of Gravity and Force Main Pipes

Consequence of Failure	Low	Medium	High
High	Medium **1**	High **0**	Extreme **0**
Medium	Low **0**	Medium **0**	Extreme **0**
Low	Negligible **46**	Low **3**	High **2**
	Likelihood of Failure		

Figure 2. Business Risk Matrix (Risk Rating) by Number of Manholes

Figure 3 provides the risk ratings for the WWTF assets. Five assets were identified in the high-risk category, included are the 3 lagoon cells, irrigation pumphouse control panel and the irrigation pump house wet well. This rating is mainly due to the consequence should a failure occur. Armoring of the lagoon banks scheduled for completion by the end of 2019 should help reduce the possible likelihood of failure in the future.

Figure 4 provides the risk ratings for the lift station assets. Three assets were identified in the high-risk category, included are the control panel/electrical, wet well and valve vault. This rating is mainly due to the consequence should a failure occur. A new lift station planned as part of a USDA Wastewater Systems Improvement project scheduled for completion by the end of 2019.

Consequence of Failure	Low	Medium	High
High	High 1	High 4	Extreme 0
Medium	Low 13	Medium 4	High 0
Low	Low 11	Low 18	Medium 8

Likelihood of Failure (columns: Low, Medium, High)

Figure 3. WWTF Assets by Risk Rating

Consequence of Failure	Low	Medium	High
High	High 2	High 1	Extreme 0
Medium	Low 2	Medium 0	High 0
Low	Low 2	Low 5	Medium 3

Likelihood of Failure (columns: Low, Medium, High)

Figure 4. Lift Station Assets by Risk Rating

A spreadsheet providing asset criticality for each utility asset has been included in the AMP detailed report for the collection and treatment systems.

Capital Improvement Plan

A Capital Improvement Plan (CIP) with rehabilitation recommendations was prepared for the Village's wastewater utility assets based on the Business Risk evaluation. The CIP recommendations are provided for the collection system, WWTF and lift stations/force mains. From the BRE, a short-term (1-5 year CIP) and long-term (6-20 year CIP) was developed for the utility. Table 1 shows a detailed recommendation of the collection system assets needing rehabilitation in the short-term CIP.

Table 1: 1-5 Year Collection System CIP Summary Table by Rehab Action

Rehab Action	Total Cost (Current Year Dollars)	2019	2020	2021	2022	2023
Manhole Repair	$ 2,575	$ 0	$ 0	$ 2,732	$ 0	$ 0
Totals	**$ 2,575**	**$ 0**	**$ 0**	**$ 2,732**	**$ 0**	**$ 0**

Table 2 shows a detailed recommendation for the WWTF and lift station assets needing rehabilitation in the short-term and long-term CIP.

Table 2: Recommended Capital Improvements for WWTF and Lift Stations				
Asset Description	**Year Installed**	**Expected Useful Life (Years)**	**Anticipated Year of Replacement**	**Replacement Cost (2018 Dollars)**
5-YEAR CIP PROJECTS				
2018 Sanitary Sewer System Improvements Project	**1995**	**20**	**2018**	**$ 759,900**
Lagoon Cell Berm Repairs				
Effluent Pump Station Strainer				
Main Lift Station Replacement				
6-20 YEAR CIP PROJECTS				
Irrigation Pump Improvements	**1995**	**30**	**2025**	**$ 172,000**
Biosolids Removal	**1995**	**30**	**2025**	**$ 427,000**

OPERATIONS, MAINTENANCE & REPLACEMENT

Regular operation, maintenance and replacement (OM&R) is essential in the management of a wastewater collection system. The collection system is subject to a variety of operational problems and can suffer from clogging, scour, corrosion, and collapse. Inspection, cleaning, and rehabilitation are important for optimizing the proper functioning of the collection system. By optimizing the performance infiltration/inflow are reduced and sanitary sewer overflows (SSO) are minimized or eliminated preserving the substantial investment the community has in its collection system.

Table 3 summarizes the recommended preventative maintenance inspections to be considered in the short term (1-5 years) with recommended cost over the 5-year period.

Table 3: 1-5 Year Collection System Maintenance Summary Table by Rehab Action						
Rehab Action	**Total Cost (Current Year Dollars)**	**2019**	**2020**	**2021**	**2022**	**2023**
Manhole Assessment	$ 515	$ 0	$ 0	$ 0	$ 563	$ 0
CCTV	$ 46,369	$ 0	$ 15,447	$ 33,283	$ 0	$ 0
Totals	**$ 46,884**	**$ 0**	**$ 15,447**	**$ 33,283**	**$ 563**	**$ 0**

Table 4: Recommended Equipment Replacement Budget for WWTF and Lift Stations				
Asset Description	**Number of Units**	**Rehab/ Replacement Cost**	**Expected Useful Life (Years)**	**Annual Budget**
Main Lift Station Pumps	2	$ 10,500	15	$ 1,400
Irrigation Pump Station	2	$ 28,500	15	$ 3,800
Lift Station Controls	2	$ 7,500	15	$ 1,000
Total				**$ 6,200**

An annual equipment replacement fund should be developed to replace disposable equipment. These are items that can be financially accounted for through operation, maintenance and replacement (OM&R) funds and can be replaced by WWTF staff without bringing in an outside contractor. Existing disposable materials include chemicals, wear parts in pumps and motors, laboratory instruments, etc. The existing OM&R fund is sufficient for the current operations. Table 4 summarizes the recommended equipment replacement budget.

REVENUE STRUCTURE

The revenue and rate methodology is an instrument to determine user rates and charges that will provide sufficient revenues to pay for utility operating costs.

A study was conducted by an independent municipal financial advisor (H.J. Umbaugh & Associates) to develop a 5-year financial projection to meet the Michigan Department of Environmental Quality SAW Grant requirements.

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date 11-29-2018
(no later than 3 years from executed grant date)

The Village of Mesick certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1578-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: No
   If No - Date of the rate methodology approval letter: May 3, 2018.
2) Significant Progress Made: N/A.
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: N/A.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on N/A.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Lorene McLeod at (231) 885-1646 lmcleod11@villageofmesick.com
Name Phone Number Email

Lorene McLeod 11-29-2018
Signature of Authorized Representative (Original Signature Required) Date

Lorene McLeod, Village Treasurer
Print Name and Title of Authorized Representative

MEYER TOWNSHIP
SAW Grant Asset Management Project
Asset Management Plan Summary

Meyer Township
SAW Grant Asset Management Plan
Grant No. 1366-01
Robert Smith, Township Supervisor
W5480 First Street
Hermansville, MI 49847
906.498.2251

Executive Summary

This sanitary sewer asset management plan (AMP) is intended to provide an assessment of the sanitary sewer system assets and to provide an opinion of asset conditions and future needs. Operating, maintenance, and replacement costs are reviewed for system assets and the desired level of service of the major assets is defined for the utility.

The goal of an AMP is to use system-wide information to determine the life cycle cost for maintenance, repair, and replacements to maintain the desired level of service. By performing pre-emptive maintenance on the system, and timing repairs before they become emergencies, the Township can make the most of their funds over the long term.

A summary of the sanitary sewer system assets is listed in Table 1 below:

Table 1: System Asset Summary		
Total Gravity Sewer	23,888	LFT
Total Force-Main Sewer	6,167	LFT
Total Manholes	81	EACH
Lift Stations	3	EACH

The breakdown of pipe sizing for the system is shown in Table 2:

Table 2: Sanitary Sewer Sizing Breakdown		
Pipe Diameter	Length	
1 1/2" Forcemain	625	LFT
4" Forcemain	1,778	LFT
6" Forcemain	3,764	LFT
6" Sewer Main	138	LFT
8" Sewer Main	21,897	LFT
10" Sewer Main	1,853	LFT

Meyer Township's gravity system is composed of entirely 8" PVC in the residential area and 10" PVC in the Industrial Park. The Township has no undersized sewer main. The makeup of the sanitary sewer sizing is reflected in Figure 1 below:

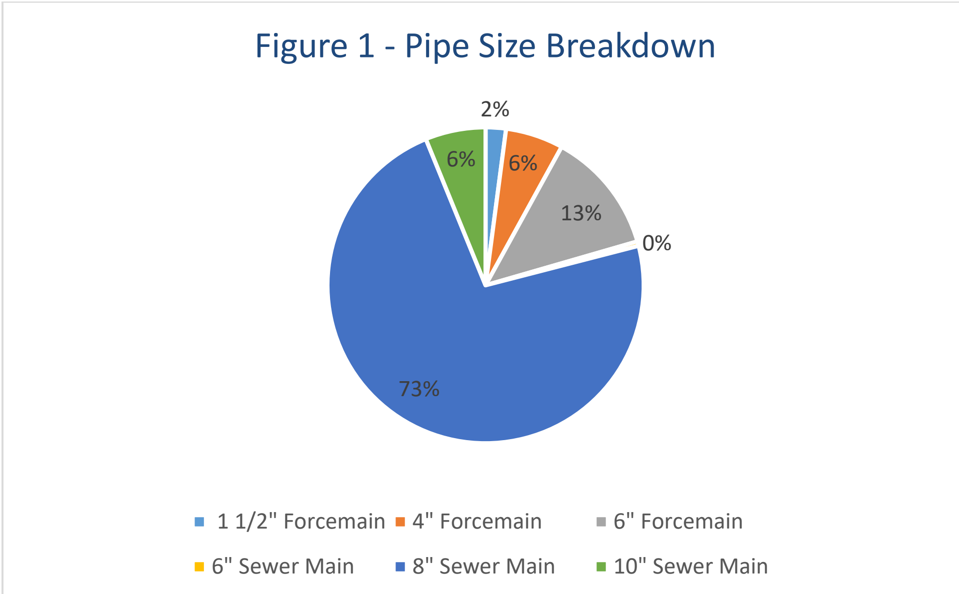
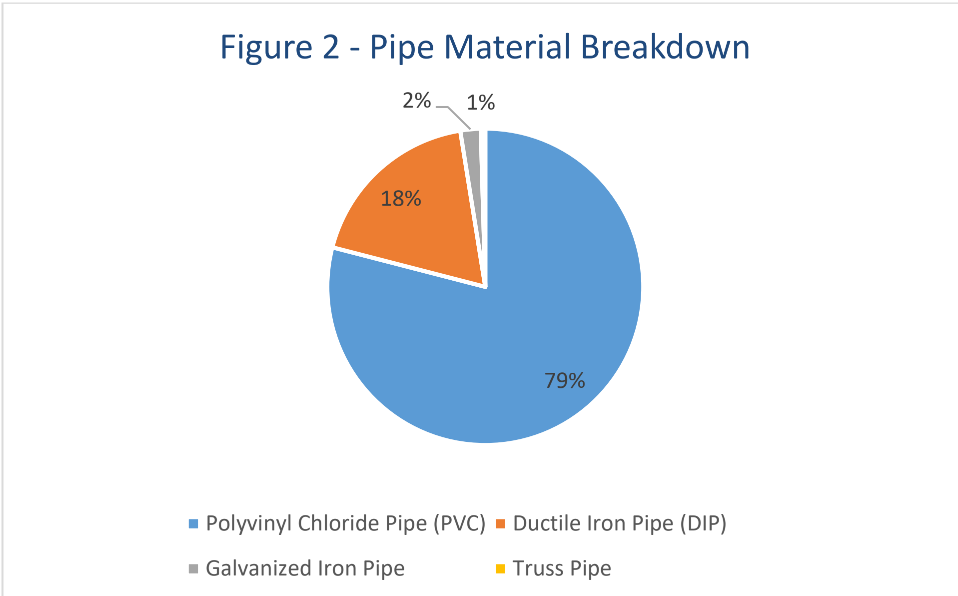


Table 3 indicates the quantity of each material making up the Township's sanitary sewer system:

Table 3: Sanitary Sewer Material Breakdown		
Pipe Material	Length	
Polyvinyl Chloride Pipe (PVC)	23,750	LFT
Ductile Iron Pipe (DIP)	5,542	LFT
Galvanized Iron Pipe	625	LFT
Truss Pipe	138	LFT

The Township's gravity collection system is comprised of almost entirely PVC pipe, while the lift station force main piping is galvanized iron and ductile iron. These newer plastic pipes generally have a longer service life and the possibility of catastrophic failure is low. Figure 2 provides a visual breakdown of the materials within the system.



Wastewater Collection System Asset Inventory

A complete inventory and condition assessment of all components of the Township's Sanitary Sewer System was conducted to gather information on the assets. These assets are broken down into three categories: manholes, pipes, and lift stations. The inventory and condition assessments were performed through multiple methods. Records research was performed on existing drawings to get a general idea of system layout and asset locations, and where feasible, manual surveys were performed.

A Level 1 Manhole Assessment and Certification Program (MACP) inspection was performed on all manholes in the Township's system, with some additional Level 2 data logged. A Level 1 inspection provides basic condition assessment information to evaluate the general condition of a manhole, while Level 2 inspections gather and record detailed information to fully document all defects, determine condition of the asset, and provide the specific information needed to recommend corrective action. Data was logged using a custom tool for tablets, allowing for generation of a final inspection report for each manhole. GPS equipment was used to collect the location of each manhole for mapping. Measurements were made within each manhole to establish invert elevations of connecting pipes.

Sewer main evaluations were performed using the Pipe Assessment and Certification Program (PACP) methods for televising pipes. Reports and videos for each of the televised sections of pipe were prepared by PACP certified televising contractors and reviewed by GEI. Information gathered from televising, along with information from record drawings and other historical records was used to determine the condition of each section of pipe.

Lift stations were inspected and evaluated through various visual and analytical means. Records research was performed to collect and determine existing information for each of the lift stations and a visual inspection of each lift station was made. A review of the past operation performance and a review of the history of repairs was also completed. Vibration and infrared monitoring was performed initially to create baseline readings and to identify imminent potential failures. Subsequent readings were recorded yearly and changes and trends were noted and evaluated. These readings allowed DPW staff to find and diagnose potential problems and to avoid future failures.

Table 4 provides a summary of the condition ratings that were used for all assets. After the asset was evaluated a condition rating was assigned to each asset. Asset Inventory tables for Sanitary Sewer Manholes, Sanitary Sewer Pipes, and Sanitary Sewer Lift Stations are enclosed with this summary in Tables C-1, C-2, and C-3. These tables show the condition ratings that were assigned to each asset.

Table 4: Condition Assessment Ratings

Condition Rating	Description
5	Asset Unserviceable - Over 50% of asset requires replacement
4	Significant deterioration - significant renewal/upgrade required (20 -40%)
3	Moderate deterioration - Significant maintenance required (10 -20%)
2	Minor Deterioration - Minor maintenance required (5%)
1	New or Excellent Condition - Only normal maintenance required

As part of the system study, a risk assessment was performed for each of the system assets. This risk assessment was completed using a combination of the asset's condition rating, as well as the asset's criticality, or consequence of failure rating. The Condition Rating number assigned varied between 1 and 5, with 1 being a minor defect grade and 5 being the most significant defect grade. The resulting condition rating allows the Township to prioritize those items where both condition and consequence of failure are used to determine areas of concern and prioritize maintenance schedules.

The table below summarizes the condition rating assigned to the asset types listed:

Table 5: Condition Ratings - System Assets					
Asset Type	Rated Condition				
	1	2	3	4	5
Sanitary Sewer Main (LFT)	24,642	5,255	138	-	-
Manholes	67	12	1	-	-
Lift Stations (overall)	1	2	-	-	-

The table above shows all of the Township's sewer system assets are in average to above average condition.

In addition to the above Condition Assessment Rating, a Business Risk Factor Rating is produced for each asset. This rating is the product of the condition and criticality ratings described above to give a Business Risk Factor Rating, which scales from 1 (least risk) to 25 (highest risk). A Business Risk Factor of one is an asset that has a low probability of failure and has a low criticality that poses an insignificant disruption to the System, while a Business Risk Factor of 25 is an asset that has a significant chance of failure and would cause a significant disruption in the system if it did fail. The Township has identified any items with a Business Risk Factor Rating of greater than 16 to be of sufficient risk to require a plan for repair or replacement. The Business Risk Factor for each asset is also listed in Tables C-1, C-2, and C-3 at the end of this summary.

Criticality of Assets

The Township's Sewer System was evaluated and a criticality rating was given to all sections of the system. The Criticality Ratings are based on a scale of 1 to 5, with 5 being the most critical. High criticality indicates that the system component is essential to the operation of the system and/or serves a critical customer or part of the system. Low criticality ratings indicate that the system component would cause minor disruptions if something were to happen and service was interrupted.

Table 6: Criticality of Asset	
Performance Rating	Description
5	Catastrophic disruption
4	Major disruption
3	Moderate disruption
2	Minor disruption
1	Insignificant disruption

The most critical sections of the Township's system are located on the downstream sections of the system on Linden Street, Railroad Avenue and N-4 Lane. As you progress from the outstretches of the system, downstream, to the southern central area, there is typically more wastewater flow due to large portions of the system draining to these areas. Therefore, a disruption to sewer mains in these areas are likely to cause more significant disruptions and affect more customers. The Township's three sewer lift stations were also given higher criticality ratings as disruptions to these components typically are more expensive and difficult to repair. Areas of this system that were rated with lower criticality ratings are typically located on the outer edges, serve fewer customers, and have lower flows. Disruptions to these areas would affect less people and are generally easier to correct.

Level of Service Determination

The minimum level of service for the Township's Sewer System has been set at being able to provide functional wastewater collection for flows from the Township's residents without disruption, overflow, discharge events, or violations of standard wastewater collection practices. Potential violations include sewer backups that cause wastewater to either come to surface or to back up into individual service lines and basements. In order to prevent sewer backups, the Township must maintain their lines in a minimum condition by repairing collapsed pipes, jetting and cleaning lines that pose additional risk due to solids build-up, slope, or condition concerns. In addition, lift stations must be kept operational and be capable of pumping the necessary flows to avoid backups. Proper provisions for backup power or bypass pumping must be maintained to avoid backups during extensive power outages.

Revenue Structure

The Township's current sanitary sewer rate is $22.00 per month for each residential customer. Commercial rates are also $22.00 per month but are adjusted based on a Usage Factor that takes into account the type of facility and the expected water use from these facilities. Higher Usage Factors increase the monthly charge (Base Rate x Usage Factor = Commercial Rate). A Resolution by the Township establishing the current sewer rate which was passed on July 8, 2008 along with a copy of the Township's Current Sewer Rate is included along with this submittal.

Table 7: 2018-19 Revenue Calculations				
Customer Type	*Users*	*Total Unit Factors*		
Residential Users	167	167.00		
Other Users	23	65.70		
	190	**233.70**		
2018-19 Sewer System Revenue	*Monthly Rate*	*Total Unit Factor*	*Monthly Revenue*	*Annual Revenue*
Residential	$ 22.00	167.00	$ 3,674	$ 44,088
Other Users	$ 22.00	65.70	$ 1,445	$ 17,345
	Totals →	**233.70**	**$ 5,119**	**$ 61,443**

The Township submitted their Sewer System Rate Methodology to the MDEQ on April 17, 2018. The submittal was reviewed and approved by the MDEQ in a letter to the Township on May 3, 2018.

Capital Improvement Plan

Table 8 below is a summary of the capital improvements that the Township intends to complete over the next twenty years. Note that the larger capital improvements are expected to be done through the assistance of one of the available grant/loan programs. This would reduce the annual cost for each by using grant funds and/or spreading out the expected costs over a longer period of time.

Table 7.4.3: Capital Improvements Summary		
10-Year Capital Improvements Summary		
Location	Estimated Construction Cost	
Sewer Main Repair/Replacement (0-10 Years)	$	47,000.00
Manhole Rehabilitation	$	31,000.00
0-10 Year Total➔	**$**	**78,000.00**
20-Year Capital Improvements Summary		
Location	Estimated Construction Cost	
Sewer Main Repair/Replacement (11-20 Years)	$	113,000.00
Lift Station Upgrades	$	198,000.00
Lift Station SCADA Upgrades	$	117,000.00
Lagoon Improvements	$	160,000.00
11-20 Year Total ➔	**$**	**588,000.00**
Total ➔	**$**	**666,000.00**

Recommendations

In general, the Township's Sanitary Sewer System is in fair to good condition. Recent upgrades and repairs at the lift stations including the total replacement of Lift Station #1 should allow the lift stations to continue to operate reliably for the next several years. The majority of the collection system piping and manholes were determined to be in above average condition, which should also allow reliable operation in the upcoming years. The Township's Treatment lagoons are operating efficiently and have adequate capacity for the expected flows.

The Township's rate structure currently provides sufficient funds to cover the expected operation and maintenance costs of the system, however, without some type of rate increase, it can be expected that operation and maintenance costs will exceed revenues in the coming years. It is advised that the Township review the current rate system and evaluate a rate increase. It is recommended the Township review past and future expenses, including capital improvements projects outlined above, when examining future rate increases to determine if they are sufficient to meet the expected future expenditures.

This Asset Management Plan should be considered a working plan and updated annually to reflect changes in the Township's Sewer System, rate structures, budgets, or other facets of the plan.

List of Major Assets

See the following enclosed tables for a list of the Township's major assets:

- Figure 1: Sanitary Sewer System
- Table C-1: Sanitary Sewer Manhole Inventory
- Table C-2: Sanitary Sewer Pipe Inventory
- Table C-3: Sanitary Sewer Lift Station Inventory

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date November 30, 2018
(no later than 3 years from executed grant date)

The Meyer Township *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1366-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or **No**

   If No - Date of the rate methodology approval letter: **May 3, 2018**.

2) Significant Progress Made: **Yes** or No

   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)

3) Date of rate methodology review letter identifying the gap: **N/A**.

4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on **N/A.**

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Robert Smith at 906-498-2251

Name | Phone Number | Email

Robert M Smith 11-29-18

Signature of Authorized Representative (Original Signature Required) | Date

Robert Smith - Supervisor

Print Name and Title of Authorized Representative

Stormwater, Asset Management, and Wastewater (SAW)
Asset Management Plan
Wastewater Executive Summary

Michigan State University
Infrastructure Planning & Facilities
1147 Chestnut Road
East Lansing, MI 48824
Marc Trotter, PE – 517.353.3073
SAW Grant Project No. 1132-01

Executive Summary

Michigan State University (University) received a SAW Grant in October 2015 to prepare a Wastewater Asset Management Plan (AMP). The grant was awarded in the following amount:

	Amount
Wastewater AMP	$1,044,405
Stormwater AMP	$1,136,419
Stormwater MP	$258,000
Match	$443,039
Grant Amount	$1,995,785

The University has determined it to be in its best interest to implement a Wastewater AMP for its wastewater collection system. The scope of the AMP was to inventory, assess, and identify areas of deficiency in the system to develop recommendations for prioritizing and budgeting improvements and maintenance.

Wastewater Asset Inventory

The University owns and operates a wastewater collection system consisting of approximately 40 miles of gravity sewers and 955 manholes. The University co-owns with East Lansing approximately 2 miles of gravity sewers and 95 manholes. The University does not have its own wastewater treatment plant. It currently sends the flow from its collection system to the City of East Lansing Water Resource Recovery Facility (WRRF). Meridian Charter Township also sends its flows to the East Lansing WRRF and connects into the University's system at Hagadorn Road and Shaw Lane.

The University maintains the master record of its engineering utility maps in AutoCAD© drawing file format. The endeavor began as a conversion of as-built record drawings. The University continues to refine its utility mapping by collecting Global Positioning System (GPS) coordinates on assets that are added or modified in utility layers. However, asset information is not stored in the AutoCAD drawing file but in a shared spatial database in Open Geographic Information System (GIS) format. The Munsys© Asset Information System is used as a single database for engineering, GIS, and asset management. It is used to validate and share the spatial database between AutoCAD and ESRI ArcGIS© geodatabase format. Map revisions are managed in AutoCAD. GIS is used to publish maps and web services for use by University staff. Likewise, information that is collected in GIS can be transferred to the shared system through Munsys.

Condition Assessment

To identify areas of potential deficiency in the system, manholes and sewers were inspected. Under the SAW Grant, approximately 43% of the sewers were televised in accordance with National Association of Sewer Service Companies (NASSCO) Pipeline Assessment Certification Program (PACP) standards, utilizing closed circuit television (CCTV). Pipes noted to have significant deficiencies were identified for Capital Improvement Projects (CIP). Manholes were inspected utilizing NASSCO Manhole Assessment Certification Program (MACP) Level 1. Visual inspections were performed from the top of the manholes. Level 1 inspections were completed on 625 manholes of the University-owned system out of approximately 955, which is approximately 65% of the system. Level 1 inspections were completed on 39 manholes of the co-owned system out of approximately 95, which is approximately 41% of the system. MACP Level 2 inspections were performed on some critical manholes utilizing a SPiDER Manhole Scanner from CUES for a more detailed inventory. These manholes were identified to be located on critical sewers within a critical service area. A Probability of Failure (POF) rating of 1 to 5 was assigned to each pipe and manhole. A summary of the condition of the inspected assets is presented in the following tables.

Sewer Condition Summary

POF Rating	Percentage of Televised System
1	54.6%
2	11.6%
3	16.0%
4	9.8%
5	8.1%

Manhole Condition Summary – University Owned

POF Rating	Percentage of Inspected System
1	0.2%
2	20.8%
3	66.1%
4	11.2%
5	1.8%

Manhole Condition Summary – University/ East Lansing Co-owned

POF Rating	Percentage of Inspected System
1	7.7%
2	15.4%
3	53.8%
4	23.1%
5	0.0%

Criticality of Assets

The POF rating represents the likelihood of the asset failing based on defects and deficiencies identified in the condition assessments. Each pipe segment and manhole was assigned a final POF score based on results from sewer televising and visual inspections based on PACP and MACP standard ratings.

The Consequence of Failure (COF) rating addresses the impact a failure of a component would have on the community. It represents the criticality of a specific component to the successful operation of the entire system or the potential difficulty in addressing a failure if it were to occur. The two factors considered when calculating the COF score include pipe diameter and service area impact. Each pipe segment and structure were assigned a final COF score based on the average of these two factors.

The pipe diameter is a general measure of the size of the tributary area the pipe or structure serves. Therefore, it can be used as an indicator of the population or number of facilities affected by a failure. Larger pipes typically service larger tributary areas.

The service area score indicates the sensitivity of the area that could be affected by a failure in the collection system. Some parts of campus, such as the research corridor and clinical center, would likely experience greater disruption in the event of a sanitary sewer failure. Care was taken to ensure proper classification of each building within the University.

The Business Risk Exposure (BRE) score considers how critical each component is within the system if the component fails. The BRE then factors in the consequence of such failure combined with the probability of the component failing based on the condition assessment. The *BRE* is calculated by the formula:

$$BRE = POF \times COF$$

The *POF* and *COF* scores are both on a 1 to 5 rating scale, and therefore, *BRE* scores range from 1 to 25. If an asset has been physically inspected and given a POF rating of 5, it is assumed that the asset is near failure and is considered high priority regardless of the COF rating. The calculated BRE score is then used to prioritize the rehabilitation or replacement tasks.

Level of Service Determination

As a part of the Wastewater AMP, Level of Service (LOS) goals were established for cost effectively maintaining and improving the system. These goals were developed to set achievable objectives for operation and maintenance and capital improvement projects. The LOS selected considers budgetary constraints, customer expectations, and condition of the system. The University has established a list of attainable goals it intends to meet regarding its sanitary sewer system. These LOS goals include:

1. Meet all federal and state sanitary collection system regulations;
2. Clean and televise remaining sanitary sewers not televised during the SAW Grant over the next 10 years;
3. Re-televise all sanitary sewer PACP-rated 3, plus any rated 4 and 5 that were not repaired within the sanitary collection system in years 10-20;
4. Address all sanitary sewer defects rated with a structural Probability of Failure (POF) of 4 or 5 that require immediate attention in years 1-5;

5. Address all manhole defects (excluding chimneys) rated with a structural POF of a 4 or 5 that require immediate attention in years 1-5;
6. Address all manhole chimneys with road projects.

Revenue Structure

As required by the MDEQ, the University was required to provide an analysis of its revenue structure. The rate methodology report shows, according to the budget, no revenue gap is projected for the fiscal year 2017/2018. In the University's case, there are no separate rate payers for utilities, so revenue requirement is reviewed and approved by the Associate Vice President of Strategic Infrastructure Planning and Facilities every spring. The funding level is based on past experience and future projections of work required to maintain the level of service to the sewer systems. The University has been able to meet that funding requirement in the past and anticipates it will be able to meet it in the future.

Capital Improvement Plan

Based on the LOS goals and the condition of the wastewater system discovered during condition assessments, recommendations for repairs or maintenance needs were given for sewers and manholes. One of the interceptors through the University rose to the top of the priority list during sewer televising review with a BRE rating of 25. The Red Cedar Interceptor on the south side of the Red Cedar River had severe fractures through several reaches along with sheet piling from a steam vault installation several years ago. The University rehabilitated portions of this sewer this past summer. The remaining priority repairs for the sewers identified during sewer televising are recommended to be completed sometime during years 1-5.

For manholes, eight recommendations were prepared that scored 4 or 5 on the MACP scale that are owned by the University. An additional four manholes are recommended for repair that are co-owned with the City of East Lansing. The University plans to rehabilitate these manholes over the next five years. Based on the condition assessments of both the sewers and the manholes, it was decided to prioritize the sewer repairs over the manhole repairs.

Type	Repair
Farm Lane – MSU Dairy Store, Trout Food Sciences	Sewer Replacement, Sewer Lining
Breslin Center	Spot Liner, Sewer Lining
Wharton Center	Spot Repair, Sewer Lining, Spot Liner
Spartan Stadium	Spot Repair, Sewer Lining
Benefactor's Plaza, Power Plant	Sewer Lining

Recommendations

Based on the University's desired LOS goals, it was determined that necessary improvements to defective sewers and manholes will be phased over the course of 5 years. Improvements to the system include sewer and manhole rehabilitation. A feasible maintenance schedule was established that aligns with the University's needs and available resources for sewer televising, manhole location, and assessment.

List of Major Assets

The University's major assets include:

- 40 miles of gravity sanitary sewer
- 955 manholes

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date _11/30/18_____________
(no later than 3 years from executed grant date)

Michigan State University certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1132-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or No

   If No - Date of the rate methodology approval letter: May 16, 2018.

2) Significant Progress Made: Yes or No

   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)

3) Date of rate methodology review letter identifying the gap: ________________________.

4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ____________________________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Marc Trotter________________at_____517-353-3073_____________trotter5@msu.edu
Name Phone Number Email

Daniel B Bollman 11-19-18
Signature of Authorized Representative (Original Signature Required) Date

Dan Bollman Associate Vice President for Strategic Infrastructure Planning & Facilities

Print Name and Title of Authorized Representative

Stormwater, Asset Management, and Wastewater Grant
Stormwater Asset Management Program
Executive Summary

Michigan State University
Infrastructure Planning & Facilities
1147 Chestnut Road
East Lansing, MI 48824
Marc Trotter, PE – 517.353.3073
SAW Grant 1132-01

Executive Summary

Michigan State University (University) was awarded a grant by the Michigan Department of Environmental Quality (MDEQ) under the Stormwater, Asset Management, and Wastewater (SAW) Program. The University has determined it to be in its best interest to use a portion of the grant money to implement an Asset Management Program (AMP) for its storm sewer collection system. The scope of the AMP was to inventory, assess, and identify areas of deficiency in the system to develop recommendations for prioritizing and budgeting improvements and maintenance.

The objective of an AMP is to meet the required Level of Service (LOS) in the most cost-effective manner through the proper maintenance of the assets. For the University, this includes providing a summary of the condition of the sewer, manhole, and outfall assets; a basis for prioritizing the rehabilitation/replacement of the assets; and an updated Operation and Maintenance (OM) Program to routinely maintain the assets. According to the requirements of the MDEQ, a stormwater AMP should include at a minimum the following components:

1. Asset Inventory and Condition Assessment
2. Level of Service
3. Asset Criticality
4. Revenue Structure
5. Capital Improvement Plan

The approach for this AMP followed MDEQ's outlined grant components listed above. The work completed under the SAW Grant included the components described below.

Stormwater Asset Inventory

The University owns and operates a storm sewer system consisting of approximately 757,703 feet of storm sewer. The system includes 1,759 manholes, 2,480 curb/drop inlets, and 64 outfalls. Most of the storm sewers discharge at outfalls located along the Red Cedar River, which then enters the Grand River.

The University maintains the master record of its engineering utility maps in AutoCAD© drawing file format. The endeavor began as a conversion of as-built record drawings. The University continues to refine its utility mapping by collecting GPS coordinates on assets that are added or modified in utility layers. However, asset information is not stored in the AutoCAD drawing file but in a shared spatial database in Open Geographic Information System (GIS) format. The Munsys© Asset Information System is used as a single database for engineering, GIS, and asset management. It is used to validate and share the spatial database between AutoCAD and ESRI ArcGIS© geodatabase format. Map revisions are managed in AutoCAD. GIS is used to publish maps and web services for use by University staff. Likewise, information that is collected in GIS can be transferred to the shared system through Munsys.

Condition Assessment

To identify areas of potential deficiency in the system, the physical condition of storm sewers, manholes, and outfalls was assessed. Assessments were based on National Association of Sewer Service Companies (NASSCO) standards for sewer pipe and manholes to ensure consistency with future evaluations. Manhole structures were physically inspected in accordance with Level 1 surface inspection criteria, while pipes were inspected by closed circuit television (CCTV). Outfalls were inspected from the river using Level 1 surface inspection criteria. Sewer televising was prioritized in critical areas and any areas of concern expressed by the University. Assets were assigned Probability of Failure (POF) ratings based on their current condition. The manhole inspection forms, CCTV pipe logs, and the results of these inspections were incorporated into the University's GIS database. The following tables present a summary breakdown of the condition of the inspected storm sewer, manhole, and outfall assets.

Sewer Condition Summary

Probability of Failure (POF) Rating	Percentage of Sewers Televised
1	38%
2	23%
3	29%
4	5%
5	5%

Manhole Condition Summary

Probability of Failure (POF) Rating	Percentage of Manholes Inspected
1	3.6%
2	33.1%
3	49.9%
4	8.7%
5	4.6%

Outfall Condition Summary

Probability of Failure (POF) Rating	Percentage of Outfalls Inspected
1	16%
2	3%
3	30%
4	19%
5	32%

Level of Service Determination

The University established a list of attainable goals it intends to meet regarding its storm sewer system, which include:

1. Meet all Federal and State Stormwater regulations.
2. Clean and televise annually a portion of the remaining storm sewers not televised during SAW.
3. Re-televise all sewers with a POF of 4 or greater and a COF greater than 15 after storm sewers not televised during SAW have been televised.

4. Address all manholes (excluding chimneys) and storm sewers rated with a structure POF of 4 or greater that require immediate attention in the next 5 years.
5. Address all manhole chimneys with road projects.
6. Inspect all catch basin sumps on a yearly basis, cleaning any basins that are greater than 50% full of debris.

Criticality of Assets

The criticality of storm sewer and manhole assets was determined by assigning ratings based on their importance in the operation and reliability of the system. The Consequence of Failure (COF) rating addresses the impact a failure of an asset would have on the community. It represents the criticality of a specific component to the successful operation of the entire system. The COF score also reflects the potential difficulty in addressing a failure if it were to occur. Two factors were considered when determining COF scores: pipe diameter, which is representative of the size of the tributary area the pipe or structure serves; and service area, representing what type of building use will be affected by a failure. Assets were assigned a final COF score based on an average of these two factors. The most critical assets were generally those with the largest diameter (serving the largest area), serving areas with the highest sensitivity (research corridor, power plant, or clinical center) within the University.

The Business Risk Exposure (BRE) scores for each asset were developed by multiplying the POF and the COF ratings. The BRE represents the asset's criticality on a scale of 1 to 25 and serves as a tool for prioritizing repair/replacement.

Revenue Structure

The University plans to set aside money each year to address recommended projects, cleaning, televising, and OM activities identified to meet its LOS goals.

Capital Improvement Plan

Guided by the LOS goals established by the University, a Capital Improvement Plan (CIP) for the University's stormwater system was developed using the tools such as the BRE, condition assessments, and knowledge of past CIPs. Recommendations were prepared for sewers and manholes that were determined to be most critical. Improvements to the system include sewer and manhole rehabilitation. A total of 56 reaches of sewer are recommended for replacement or rehabilitation activities, summarized in the table below.

Sewer Repair Recommendations

Repair Type	Spot Repair	Spot Line	CIPP Line	Replace
No. of Repairs	7	28	18	3

The table below summarizes the 15 recommended repairs for the system's manholes. In addition to these 15 repairs, there are 71 manholes recommended for chimney replacement at the time of local road projects.

Manhole Repair Recommendations

Repair Type	Replace Cover/ Frame	Reset Manhole Frame	Rebuild Chimney	Replace Structure	Build Bench/ Channel	Install Interior Chimney Band
No. of Manholes	3	4	1	5	1	1

Outfall repairs will not be outlined at this time; the University will repair outfalls as funding becomes available.

Recommendations

The University will continue with storm asset condition assessments, cleaning, and televising annually a portion of the remaining storm sewers not televised during SAW. After the remaining inspections are completed, sewers which received POF rating of 4 or greater and a COF greater than 15 during the initial inspection program should be re-televised. An appropriate timeline for catch basin maintenance was established by the University based on available staffing and resources; the University will continue to complete visual inspections of all its catch basins annually, cleaning any basins greater than 50% full of debris.

Implementation of the recommended repairs and maintenance activities to the stormwater system should be prioritized and scheduled based upon the calculated BRE score, the University's selected LOS, and the University's priorities. The University plans to address any high priority repairs immediately. The remainder of the repairs will be addressed in the future as funding is available.

List of Major Assets

- 757,703 feet (144 miles) of storm sewer
- 582,483 feet (110 miles) of catch basin leads
- 1,759 storm manholes
- 2,480 curb/drop inlets
- 64 outfalls

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Due Date 11/30/18___________
(no later than 3 years from executed grant date)

Michigan State University certifies that all stormwater asset management plan (SWAMP) activities specified in SAW Grant No. 1132-01 have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SWAMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

Marc Trotter_________at____517-353-3073______________ trotter5@msu.edu___________
Name Phone Number Email

Daniel B. Bollman 11-19-18
Signature of Authorized Representative (Original Signature Required) Date

Dan Bollman Associate Vice President for Strategic Infrastructure Planning & Facilities

Print Name and Title of Authorized Representative

City of Milan

Sanitary Sewer System

Asset Management Plan

SAW Grant No. 1549-01

Jade Smith
147 Wabash Street, Milan, MI 48160
(734) 439-1501

November 2018

OHM Advisors®

Table of Contents

EXECUTIVE SUMMARY

The wastewater infrastructure system of Milan provides a critical service to its residents and businesses, providing the collection and treatment of wastewater and protecting the Saline River by discharging clean water through an advanced treatment process. Recognizing the importance of this wastewater system, Milan initiated a comprehensive assessment of its wastewater infrastructure.

This Asset Management Plan summarizes this assessment and includes key recommendations for future funding levels. This document was prepared using grant funding from the State of Michigan Stormwater, Asset Management and Wastewater (SAW) Grant Program, with a total budget of $606,512 and a ten percent local match required by the City.

The AMP was intended to accomplish the following key goals:

- Provide the City with a new framework for collecting, organizing, and storing data for their wastewater collection system using the latest available hardware and software.
- Survey key system components to create the City's Geographic Information System (GIS) database and to make it easy for future generations to access infrastructure data.
- Add information for sewer material type, size, and depth to the newly created GIS database.
- Physically evaluate the structural condition of the majority of publicly owned system components, including wastewater sewer pipes and manholes. Store the data in the City's GIS database.
- Identify long-term operations and maintenance strategies to maintain a reasonable structural condition into perpetuity, including:
  - Regularly-scheduled sewer inspection (televising)
  - Repair and rehabilitation to address structural problems resulting from aging infrastructure
- Provide recommendations for developing a prioritized Capital Improvement Plan (CIP) to be funded through the City's water and sewer fund.

A. Mission Statement

One important element to an Asset Management Program (AMP) is a mission statement, which identifies the overarching purpose of the City's AMP. The purpose of the City's asset management program is summarized by the following mission statement:

We are committed to providing and maintaining high quality wastewater sewer collection services to our existing and future customers in a cost effective manner while protecting human health and the environment.

B. Asset Management Team Leaders

The Asset Management Team listed in Figure 1 is committed to the asset management mission statement and were instrumental in the progress made and findings outlined in this report. Further questions on the City's AMP can be directed to these team members.

Stanley Kirton
- stanleyk@milanmich.org

Jade Smith
- jades@milanmich.org

Steven Warren
- steve.warren@ohm-advisors.com

Figure 1: Asset Management Team Leader

C. Infrastructure Technology & Know-How

The City has made investments to create a GIS database mapping their wastewater system with the intent of making it easier for future generations to access infrastructure knowledge. These GIS database investments included the following:

- Located key system components and created the City's GIS database;
- Added information for sewer material type, size, and depth to the created GIS database;
- Purchased tablets to improve access to real-time asset information and enhance field data collection;
- Provided staff training on new hardware and software.

D. Asset Inventory

An asset inventory is a list of the City's assets and their attributes. The majority of the City's wastewater sewer infrastructure, including manholes and wastewater sewers were inventoried and digitized. The City has populated the attributes of the inventory using observations in the field while performing condition assessment. This inventory resides in the City's newly created GIS. The GIS framework was created as part of this effort, making it easier for the City to store critical data for the location, size, material, and condition of each wastewater asset.

E. Condition Assessment

With the intent of assessing the majority of the wastewater system, the City's wastewater sewer infrastructure (wastewater sewer pipes and manholes) has been assessed. The condition of the infrastructure is based on the National Association of Sewer Service Companies (NASSCO) condition grading system, which uses a scale of zero to five. Zero indicates the infrastructure is in very good condition or new, while five indicates the infrastructure is in very poor condition or has already failed. About 96% of the 611-structure manhole network and about 44% of the approximately 27 miles of wastewater sewer pipe infrastructure has been condition assessed. The assets within the City's pumping stations and wastewater treatment plant were not inventoried or assessed as part of this asset management plan.

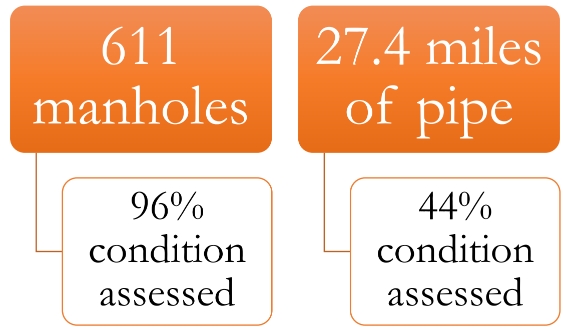


Figure 2 : Portion of Sewer System Assessed

It was also observed that:

- Model results predict that no pipes should experience capacity constraints during a 10-year rain event. The existing pipes should have capacity to handle the expected flows. The pipes with the least available capacity were shown to be about 67% full during the design storm
- Manhole infrastructure has an average structural rating of approximately 2.22 and average O&M rating of 1.81. Structural manhole defects were predominately related to brickwork. O&M manhole issues were driven by deposits and infiltration.
- Sewer infrastructure has an average structural rating 2.54 and average O&M rating of 2.97. Overall the wastewater sewer system shows higher than average wear for the age of the system.
- The infrastructure will continue to degrade over time, for example, even though the average condition of the manhole infrastructure is between a score of 2 (moderate wear but still functional) and 3 (failure unlikely in near future) per the 2017-2018 assessment data, a small percent of the infrastructure has a condition rating of 5; this percentage will grow over time.

F. Criticality and Risk

The investigation leading to the identification of critical sewer infrastructure involved the determination of Business Risk Exposure (BRE), which is identified as the combination of the Probability of Failure (PoF) as well as the Consequence of Failure (CoF) as shown in Figure 3.

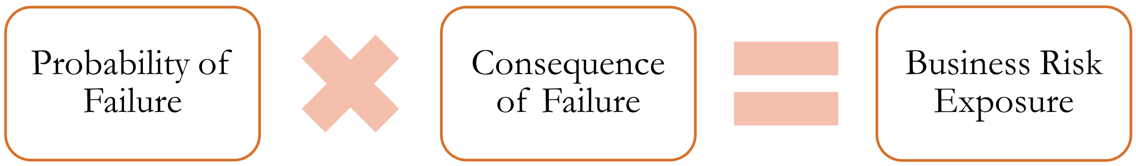


Figure 3 : Risk Equation

The PoF is related to the physical condition of an asset. The CoF focuses on the economic losses and impacts to society due to an asset's failure. The following factors were combined to determine the consequence of failure for manholes and wastewater sewer:

- Diameter/Size – the relative size of the asset with respect to the rest of the system
- High consequence crossings – refers to pipes that cross over major roads, railroads, or water bodies
- Environment – proximity to sensitive environmental features like Ford Lake and the Saline River

G. Level of Service

The City, in line with its mission statement outlined earlier, adopted Level of Service (LOS) criteria, which it plans to use as guidelines to manage the wastewater sewer system. These LOS criteria's are summarized in Table 1.

Table 1: Summary of Level of Service Criteria

Key Service Criteria	Performance Indicator	Target Level of Service
Asset Condition Assessment	PACP & MACP Inspections per Year*	• MACP inspect a minimum of 5% of the system per year. • PACP inspect a minimum of 5% of the system per year.
Asset Inventory	GIS Completion Level	• Update GIS data when pipes are repaired or replaced • Estimate pipe installation dates within next 2 years
Regulatory Compliance	Compliance with MDEQ Sanitary Sewer Overflow (SSO) Policy and the Clean Water Act	Continue to comply with the MDEQ SSO policy and The Clean Water Act
Service Delivery and Customer Communication	Response to Sanitary Sewer Complaints	Respond to customer complaints and requests within one business day
O&M Optimization	Regular cleaning and maintenance of the collection system	• Clean and maintain 5% of the manholes per year • Clean and maintain 5% of the sewer pipes per year

*Pipe Assessment Certification Program (PACP), to assess wastewater sewer condition, Manholes Assessment Certification Program (MACP), to assess manhole condition

H. Revenue Structure and Capital Improvement Plan

The condition assessment helped identify capital improvements that will allow the City to operate at its maximum potential. Additional long-term operations and maintenance strategies will provide the means to maintain a sound structural condition into perpetuity, including:

- Regularly-scheduled sewer and manhole inspection
- Repair and rehabilitation to address structural problems resulting from aging infrastructure

As communities like Milan have developed and aged, the buried infrastructure is deteriorating. The City should begin to systematically repair, rehabilitate, and/or replace these aging components so that City residents and businesses experience a consistent level of service and avoid the following:

- Increased threat of property damage, public health and safety.
- Increased potential for environmental damage.
- Increased potential for impassable roadways due to failed infrastructure

The revenue structure analysis identified that an initial rate increase of 12 percent for the first year of the CIP followed by an annual rate increase of 5 percent per year is needed to support the rising expenses over time. The revenue structure analysis and associated capital improvement projects and O&M strategies, which will continue the City's AMP, are detailed in a separate document and can be made available to the public upon request.

I. List of Major Assets

The major assets included in this report are approximated in the text below. The full AMP report contains additional details on the distribution of sizes and conditions.

- 611 manholes
- 27.4 miles of wastewater sewer ranging from 6 to 24-inch in diameter

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date November 30, 2018
(no later than 3 years from executed grant date)

The City of Milan *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1549-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or No
   If No - Date of the rate methodology approval letter: July 20, 2018.
2) Significant Progress Made: Yes or No
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: __________.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on __________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Jade Smith	at 734-439-1501	jades@milanmich.org
Name	Phone Number	Email

[signature] 11/30/18

Signature of Authorized Representative (Original Signature Required) Date

Dominic Hamden, Mayor

Print Name and Title of Authorized Representative

City of Milan

Storm Sewer System

Asset Management Plan

SAW Grant No. 1549-01

Jade Smith
147 Wabash Street, Milan, MI 48160
(734) 439-1501

November 2018

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EXECUTIVE SUMMARY

The stormwater infrastructure system of Milan provides a critical service to its residents and businesses, providing the collection and conveyance of stormwater and protecting the Saline River by discharging clean water. Recognizing the importance of this stormwater system, the City of Milan initiated a comprehensive assessment of its stormwater infrastructure.

This Asset Management Plan summarizes this assessment and includes key recommendations for future funding levels. This document was prepared using grant funding from the State of Michigan Stormwater, Asset Management and Wastewater (SAW) Grant Program, with a total budget of $491,628 and a ten percent local match required by the City.

The AMP was intended to accomplish the following key goals:

- Provide the City with a new framework for collecting, organizing, and storing data for their stormwater collection system using the latest available hardware and software.
- Survey key system components to create the City's Geographic Information System (GIS) database and to make it easy for future generations to access infrastructure data.
- Add information for sewer material type, size, and depth to the newly created GIS database.
- Physically evaluate the structural condition of the majority of publicly owned system components, including stormwater sewer pipes and manholes. Store the data in the City's GIS database.
- Identify long-term operations and maintenance strategies to maintain a reasonable structural condition into perpetuity, including:
  - Regularly-scheduled sewer inspection (televising)
  - Repair and rehabilitation to address structural problems resulting from aging infrastructure
- Provide recommendations for developing a prioritized Capital Improvement Plan (CIP).

A. Mission Statement

One important element to an Asset Management Program (AMP) is a mission statement, which identifies the overarching purpose of the City's AMP. The purpose of the City's asset management program is summarized by the following mission statement:

We are committed to providing and maintaining high quality stormwater sewer collection services to our existing and future customers in a cost effective manner while protecting human health and the environment.

B. Asset Management Team Leaders

The Asset Management Team listed in Figure 1 is committed to the asset management mission statement and were instrumental in the progress made and findings outlined in this report. Further questions on the City's AMP can be directed to these team members.

Stanley Kirton

- stanleyk@milanmich.org

Jade Smith

- jades@milanmich.org

Steven Warren

- steve.warren@ohm-advisors.com

Figure 1: Asset Management Team Leader

C. Infrastructure Technology & Know-How

The City has made investments to create a GIS database mapping their stormwater system with the intent of making it easier for future generations to access infrastructure knowledge. These GIS database investments included the following:

- Located key system components and created the City's GIS database;
- Added information for sewer material type, size, and depth to the created GIS database;
- Purchased tablets to improve access to real-time asset information and enhance field data collection;
- Provided staff training on new hardware and software.

D. Asset Inventory

An asset inventory is a list of the City's assets and their attributes. A portion of the City's stormwater sewer infrastructure, including manholes and storm sewers, were inventoried and digitized. The City has populated the attributes of the inventory using observations in the field while performing condition assessment. This inventory resides in the City's newly created GIS. The GIS framework was created as part of this effort, making it easier for the City to store critical data for the location, size, material, and condition of each stormwater asset.

E. Condition Assessment

With the intent of assessing the majority of the stormwater system, the City's stormwater sewer infrastructure (storm sewer pipes and manholes) has been assessed. The condition of the infrastructure is based on the National Association of Sewer Service Companies (NASSCO) condition grading system, which uses a scale of zero to five. Zero indicates the infrastructure is in very good condition or new, while five indicates the infrastructure is in very poor condition or has already failed. About 81% of the 448-structure manhole network, 90% of the 943 catch basins, and about 25% of the approximately 27.7 miles of stormwater sewer pipe infrastructure has been condition assessed.

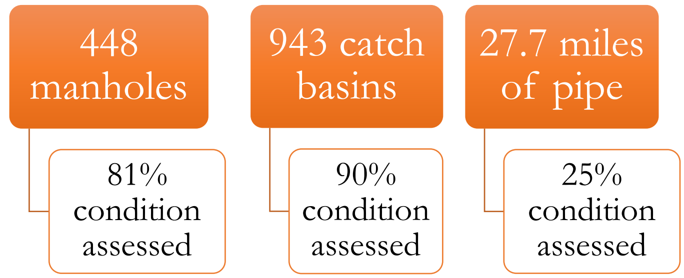


Figure 2 : Portion of Sewer System Assessed

It was also observed that:

- Manhole infrastructure exhibits age-appropriate wear with an average structural rating of approximately 2.78 and average O&M rating of 1.44. Structural manhole defects were predominately related to brickwork. O&M manhole issues were driven by deposits and infiltration.
- Sewer infrastructure has an average structural rating 1.89 and average O&M rating of 2.63.
- The infrastructure will continue to degrade over time, for example, even though the average condition of the manhole infrastructure is between a score of 2 (moderate wear but still functional) and 3 (failure unlikely in near future) per the 2017-2018 assessment data, a small percent of the infrastructure has a condition rating of 5; this percentage will grow over time.

F. Criticality and Risk

The investigation leading to the identification of critical sewer infrastructure involved the determination of Business Risk Exposure (BRE), which is identified as the combination of the Probability of Failure (PoF) as well as the Consequence of Failure (CoF) as shown in Figure 3.

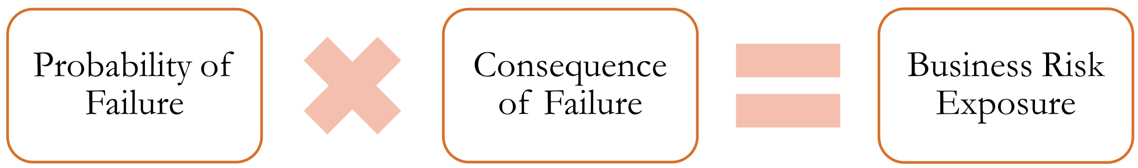


Figure 3 : Risk Equation

The PoF is related to the physical condition of an asset. The CoF focuses on the economic losses and impacts to society due to an asset's failure. The following factors were combined to determine the consequence of failure for manholes and storm sewer:

- Diameter/Size – the relative size of the asset with respect to the rest of the system
- High consequence crossings – refers to pipes that cross over major roads, railroads, or water bodies
- Environment – proximity to sensitive environmental features like Ford Lake and the Saline River

G. Level of Service

The City, in line with its mission statement outlined earlier, adopted Level of Service (LOS) criteria, which it plans to use as guidelines to manage the stormwater sewer system. These LOS criteria are summarized in Table 1.

Table 1: Summary of Level of Service Criteria

Key Service Criteria	Performance Indicator	Target Level of Service
Asset Condition Assessment	PACP & MACP Inspections per Year*	• MACP inspect a minimum of 5% of the system per year. • PACP inspect a minimum of 5% of the system per year.
Asset Inventory	GIS Completion Level	• Update GIS data when pipes are repaired or replaced • Estimate pipe installation dates within next 2 years
Regulatory Compliance	Compliance with MDEQ Sanitary Sewer Overflow (SSO) Policy and the Clean Water Act	Continue to comply with the MDEQ SSO policy and The Clean Water Act
Service Delivery and Customer Communication	Response to Storm Sewer Complaints	Respond to customer complaints and requests within one business day
O&M Optimization	Regular cleaning and maintenance of the collection system	• Clean and maintain 5% of the manholes per year • Clean and maintain 5% of the sewer pipes per year

*Pipe Assessment Certification Program (PACP), to assess stormwater sewer condition, Manhole Assessment Certification Program (MACP), to assess manhole condition

H. Revenue Structure and Capital Improvement Plan

The condition assessment helped identify capital improvements that will allow the City to operate at its maximum potential. Additional long-term operations and maintenance strategies will provide the means to maintain a sound structural condition into perpetuity, including:

- Regularly-scheduled sewer and manhole inspection
- Repair and rehabilitation to address structural problems resulting from aging infrastructure

As communities like Milan have developed and aged, the buried infrastructure is deteriorating. The City should begin to systematically repair, rehabilitate, and/or replace these aging components so that City residents and businesses experience a consistent level of service and avoid the following:

- Increased threat of property damage, public health and safety.
- Increased potential for environmental damage.
- Increased potential for impassable roadways due to failed infrastructure

There is currently no dedicated funding source for the City of Milan's stormwater system, unlike water and wastewater systems. The City is able to address its stormwater-related activities using funds from its general fund or additional funding from street budgets if available. A summary of the estimated costs of the proposed stormwater rehabilitation projects is provided below.

MACP Rehabilitation Recommendations:	$929,900
PACP Rehabilitation Recommendations:	$836,100
Total PACP & MACP Rehab Costs:	$1,766,000

I. List of Major Assets

The major assets included in this report are approximated in the text below. The full AMP report contains additional details on the distribution of sizes and conditions.

- 448 manhole structures
- 943 catch basins
- 27.7 miles of storm sewer ranging in size from 6-inch to 48-inch

DEQ

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Due Date November 30, 2018
(no later than 3 years from executed grant date)

The City of Milan *(legal name of grantee)* certifies that all stormwater asset management plan (SWAMP) activities specified in SAW Grant No. 1549-01 have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SWAMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

Jade Smith at 734-439-1501 jades@milanmich.org
Name Phone Number Email

11/30/18
Signature of Authorized Representative (Original Signature Required) Date

Dominic Hamden, Mayor
Print Name and Title of Authorized Representative

CITY OF MONROE Michigan

Monroe Metropolitan Wastewater System

Sanitary Asset Management Program Executive Summary

2205 East Front St. Monroe, MI 48161
Barry LaRoy
734-384-9122
SAW Grant # 1008-01

11/12/2018

1 Executive Summary

The Monroe Metropolitan Wastewater System's (MMWWS) Asset Management Program is centered on the following five (5) core elements: current state of assets; the required sustainable level of service; assets critical to sustained performance; the minimum life-cycle costs; and the best available long term funding strategy. The asset management program is iterative. Over time assumptions are replaced with better assumptions, observations, or improved data.

The MMWWS was awarded a $1,998,809 grant, including a $444,048 grant match, in order to complete the Asset Management Program. The MMWWS utilized the grant funds to update its Computerized Maintenance Management System (CMMS), develop a Business Risk Factor (BRF) Tool and Financial Decision Support (FDS) Tool, as well as complete a rate methodology evaluation. Using these tools, the MMWWS developed Level of Service (LoS) goals, an inventory of wastewater assets owned and/or operated by the MMWWS, Probability of Failure (PoF) scores, Consequence of Failure (CoF) scores, BRF scores, and select projects to include in their Capital Improvement Plan (CIP). Additionally, tagging of all essential assets, condition assessment of those assets, and CCTV inspection of sewers and manholes took place under the grant.

2 Wastewater Asset Inventory and Condition Assessment

The MMWWS's CMMS contains a comprehensive list of assets located at the treatment plant and throughout the collection system. All essential assets have been assigned unique identifiers (IDs). Barcodes have been placed on assets located at the treatment plant and pump stations, while collection system assets have been assigned IDs based on the MMWWS's existing GIS standards.

The condition of assets located at the treatment plant and pump stations are scored based on weighted criteria such as corrosion, noise, heat, etc. The condition of sewers and manholes were assessed based on the National Association of Sewer Service Companies (NASSCO) Pipeline Assessment Certification Program (PACP) and Manhole Assessment Certification Program (MACP). Level II MACP inspections were completed under the grant.

The PoF of an asset is calculated primarily using condition scores, but also takes into account an asset's age and remaining useful life. The PoF score has a range of one (1) through five (5). A score of one (1) indicates an asset is in very good condition and has a low probability of failure. A score of five (5) indicates an asset is in extremely poor condition and has a high probability of failure. **Figure 1** illustrates

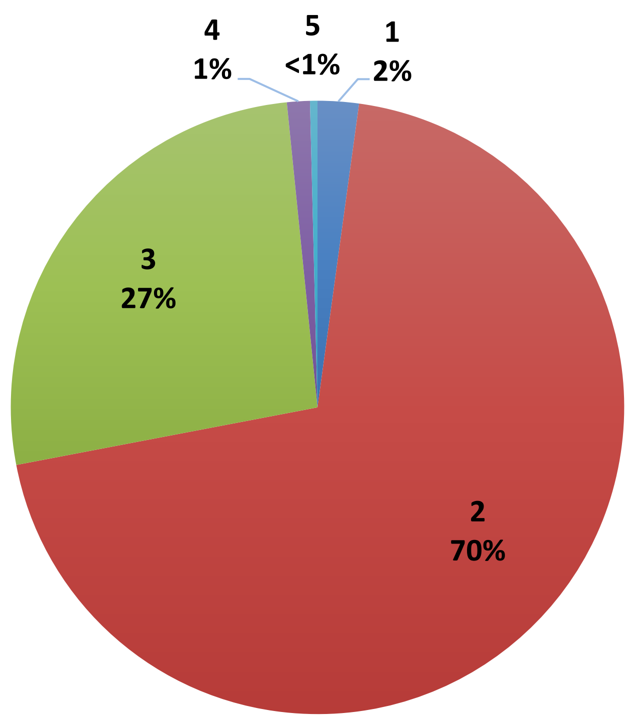


Figure 1 – Probability of Failure Scores of System Assets

the distribution of the MMWWS's asset PoF scores.

3 Criticality of Assets

CoF scores are assigned to assets using weighted criteria such as percentage of population served, replacement cost, maximum allowable service outage, impact on capacity, etc. The CoF score has a range of one (1) through five (5). A score of one (1) indicates an asset's failure has a low consequence. A score of five (5) indicates an asset's failure has a high consequence. **Figure 2** illustrates the distribution of the MMWWS's asset CoF scores.

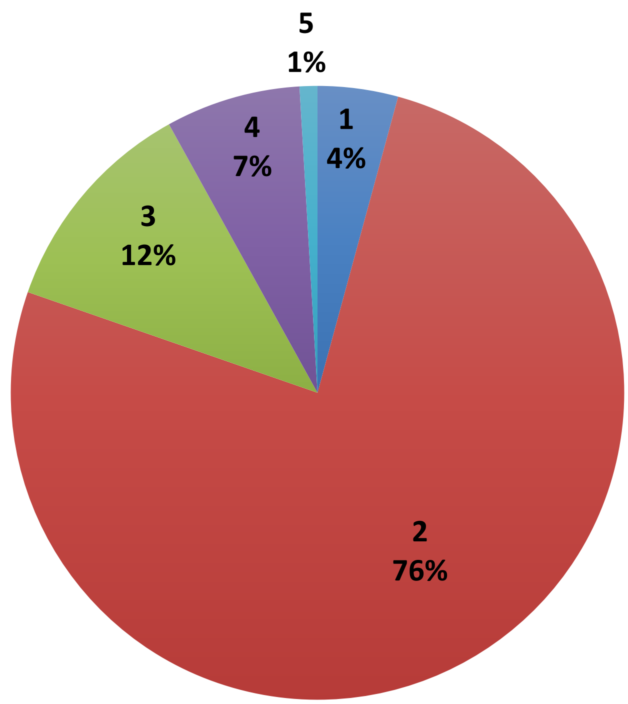


Figure 2 – Consequence of Failure Scores of System Assets

The MMWWS calculates Business Risk Factor using the following equation:

BRF = PoF x CoF x Redundancy

The Redundancy of an asset has the possible range of 0.1 to 1. The "EPA Method" is used to determine the redundancy factor of an asset. If an asset is fully redundant, meaning there is another asset that fulfills its function if it fails, it's assigned a redundancy factor of "0.1". If another asset partially fulfills the function (if the asset fails), it's assigned a redundancy factor of "0.5". If the asset has no redundancy, it's assigned a redundancy factor of "1".

Table 1 breaks down the level of risk for system assets. Currently, low risk assets have a BRF score below 4. High risk assets have a BRF score above 7.

Table 1 – The MMWWS's Asset Risk Scores

Risk Classification	Risk Score Range	Percentage of Total Assets
Low	0-4	74.6%
Medium	4-7	19.5%
High	7-25	5.9%

4 Level of Service

The MMWWS has chosen LoS goals defined to meet customer expectations and relate to the following:

- Meet service requirements with economic efficiency
- Protect the environment
- Provide a safe and productive workplace
- Provide adequate capacity
- Provide good customer service
- Provide reliable service and infrastructure

The LoS goals are formalized and supported through key performance measures (KPM) and key performance indicators (KPI). The objective of the formalized LoS goals and the establishment of KPM and KPI are to assess if the existing infrastructure and funding are able to meet the desired LoS over the planning period, or identify where actions are needed to enable the assets to provide the desired LoS.

5 Revenue Structure

As part of MMWWS's sanitary sewer Asset Management Program, the MMWWS completed a rate methodology evaluation to ensure there will be adequate revenue to cover operation, maintenance and replacement costs. The rate methodology evaluation determined there was no gap in revenue and was approved by the MDEQ on 6/28/2018.

6 Capital Improvement Plan

The MMWWS utilizes a Financial Decision Support (FDS) Tool, developed by AECOM, when developing its annual CIP. The FDS Tool uses the asset BRF scores and replacement costs to determine if an asset should be repaired, rehabilitated, replaced or left alone. The action is selected in order to maximize the risk reduction within a set budget. The MMWWS is then able to decide which year to take action, allowing for capital improvement planning over any planning horizon.

Table 2 provides a list of Capital Improvement projects slated to take place during the next 5 years.

Table 2 – 5-Year Capital Improvement Plan

Project Name	2018-19	2019-20	2020-21	2021-22	2022-23
Sanitary Sewer System Rehabilitation / Replacement	500,000	235,000	130,000	135,000	250,000
Lift Station Truck Replacement	125,000				
Detroit Beach Pump Station Barscreen Replacement	100,000				
MCC Replacement - Sludge Loading Bay & Lighting Panel	150,000				
Valve Replacement-Secondary System & Splitter Box		275,000			
Air Compressor Replacement		45,000			
Portable Generator-Dual Voltage		70,000			
Scum Well Grease Collector		100,000			
Vactor Replacement			500,000		
Cathodic Protection-Underground Pump Stations			150,000		
Pump Station Rehabilitation - Keegan			75,000		
Pump Station Rehabilitation-Stony Pointe #2				125,000	
Sunset and Detroit Beach MCC/Distribution Panel & Transfer Switch Replacement				300,000	
Transformer Replacement (T-3)				40,000	
Ventilator - Barscreen Lower Level				20,000	
Polebarn Repairs (Roof, Overhead Doors, Drains & Walls				50,000	
Building Repair-Tuck Pointing & Soffit Replacement				125,000	
Sludge Tank Ventilation Fan				30,000	
North Custer Motor Replacement					30,000
Primary Tanks #3 & #4 Rehabilitation					450,000

7 List of Major Assets

- 1,338,340 LF of sanitary sewer gravity main
- 45,103 LF of sanitary sewer force main
- 5,311 sanitary sewer manholes
- 38 sanitary sewer pump stations
- Wastewater Treatment Plant
    - 3 – Bar Screens
    - 2 – Vortex Grit Separators
    - 8 – Raw Sewage Pumps
    - 4 – Primary Clarifiers
    - 8 – Aeration Tanks
    - 3 – Blowers
    - 4 – Final Clarifiers
    - 4 – Settled Waste Pumps
    - 6 – Return Activated Sludge Pumps
    - 3 – Screw Presses
    - 2 – Wet Weather Clarifiers
    - 1 – Equalization Basin

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date 11-14-2018
(no later than 3 years from executed grant date)

The CITY OF MONROE *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1008-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or No
   If No - Date of the rate methodology approval letter: 6-28-2018.
2) Significant Progress Made: Yes or No
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: N/A.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on N/A.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Barry S. LaRoy at 734/384-9122 barry.laroy@monroemi.gov
Name Phone Number Email

[signature] 11-14-2018
Signature of Authorized Representative (Original Signature Required) Date

Barry S. LaRoy, Director of Water & Wastewater Utilities
Print Name and Title of Authorized Representative

City of Mount Clemens
SAW Grant Asset Management Plan Executive Summary

Overview

The City of Mt. Clemens is home to over 16,000 residents in a total area comprising 4.20 square miles, of which 4.07 square miles is land and 0.13 square miles is water. The City of Mount Clemens owns and operates a wastewater sewer collection system, including a wastewater treatment plant and retention treatment basin. The majority of the sanitary sewers in the wastewater system were constructed prior to 1950, and have received little to no maintenance since the original installation.

The City of Mt. Clemens was awarded a Stormwater, Asset Management, and Wastewater (SAW) Grant totaling $1,821,382 to investigate and evaluate the City's wastewater assets. Qualifying as a disadvantaged community, no local match was required for this SAW Grant. Through development and implementation of a wastewater asset management plan, the insight and understanding of the system's wastewater sewer system has significantly improved. This comprehensive investigation included an asset inventory and inspection, a condition assessment, a capital improvement plan, and development of a Graphical Information System (GIS) which includes mapping, database and system information.

Wastewater Asset Inventory

In compiling the wastewater asset management plan, an asset inventory was performed by means of examining construction plans, GPS location, and visual observation. The inventory verified that Mt. Clemens wastewater sewer line assets include over 78 miles (416,128 ft.) of enclosed sanitary sewer lines, combined sewer lines, and storm sewer lines connected to the combined sewer system. In association with the discovered sewer lines, 2,027 sanitary, combined and storm structures were discovered. Additionally, the wastewater collection system includes six pump stations, a Retention Treatment Basin (RTB), and a Wastewater Treatment Plant.

Condition Assessment

Based on funding limitations, a condition assessment was performed on 1,606 sewer segments (total length 352,923 ft.) out of 2,254 sewer segments (total length 416,128 ft.), 1,304 structures out of 2027 in total, and all of the sewer collection pump stations. The condition assessment for the sanitary sewer was performed by means of Closed Circuit Television (CCTV), while investigation of wastewater structures and pump stations were performed by means of visual assessment.

The condition assessment consists of an overall rating scale from 1 to 5. Whereby 1 indicates new or excellent condition and 5 indicates imminent failure. The below tables summarize the condition of all assets investigated.

Diameter (in)	Sewer Line Condition Assessment (feet)				
	1	2	3	4	5
3	0	0	0	0	0
4	0	0	0	0	0
6	243	0	0	0	14
8	3,165	1,729	105	92	126
10	3,651	2,061	964	612	331
12	45,838	83,531	40,648	16,062	24,394
15	5,917	10,823	11,521	4,274	5,494
16	0	0	0	0	0
18	5,415	13,537	11,969	4,574	3,741
20	0	270	798	0	0
21	0	0	0	0	0
24	4,638	4,250	8,412	1,347	1,386
27	0	0	28	0	0
30	2,657	189	3,056	268	206
33	139	0	0	0	0
36	2,974	363	1,725	0	0
42	933	0	0	0	0
48	1,128	0	0	0	0
54	1,307	468	0	0	0
72	1,128	0	0	792	0
108	987	4,054	0	0	0
114	0	0	0	0	0
3'x4'	8,031	0	557	0	0

Rating	Sanitary Manhole	Combined Manhole	Storm Manhole	Catch Basin	Total
5	13	8	0	21	42
4	153	87	2	73	315
3	346	225	0	89	660
2	147	85	2	51	285
1	2	0	0	0	2
Unknown	278	151	63	231	723
Total	939	556	67	465	2027

Pump Station #	Condition Assessment
N. Wilson	2
N. Rose	3
Gratiot	2
Breitmeyer	2
Sugarbeet	4
M-97	3

Level of Service

For the City's wastewater system, the level of service is the satisfaction of the residents, business owners and property owners. There is one key factor that can affect the perceived Level of Service of the system - Sewer Backups, which can result in both street, yard and basement flooding. Mt. Clemens' wastewater system is currently operating a satisfactory level of service and will continue to do so through the continued maintenance, rehabilitation and replacement of its assets as presented in the Capital Improvement Plan.

Criticality of Assets

Assets were then analyzed to determine their Probability of Failure (POF) and Consequence of Failure (COF). The POF takes into account the condition assessment rating, and the useful life expended. The COF takes into account financial, safety and environmental impacts. Both the POF and COF are analyzed on a 1 to 5 rating scale. The POF and COF scores are then multiplied together resulting in the criticality score or the Business Risk Exposure (BRE) score. The BRE score is used to prioritize what assets are most critically in need of repair. The MDEQ guidelines state that any asset with a BRE score of 16 or greater is considered critical.

Asset	Business Risk Exposure Score		
	Minimum	Maximum	Average
Pipes	1.88	21.88	8.9
Manholes	3.4	22	11.1

The Mt. Clemens waste water system has numerous wastewater sewers and structures and one pump station where the BRE scores exceed the MDEQ critical rating of 16. Based on the current assessments and projections, the following exceeds the BRE of 16:

81 wastewater sewer line segments

65 sanitary structures

1 pump station

Revenue Structure

The City has a two part rate structure comprised of a service charge and a consumption charge, as outlined by 1993 City Ordinance No. 25.110. The service charge is a fixed fee that is designed to recover fixed costs of operating, maintaining and repairing the system. The consumption charge or usage charge is a rate applied to the amount of water used and this charge covers the remaining cost of operation, maintenance and repair expenses not collected by the Service Charge. On September 17, 2018, the City of Mount Clemens adopted a 4% rate increase, as follows:

Fee Category	Old Rates		FY 2019 - Adopted		Quarterly Difference		Monthly Difference	
Water								
Service Charge - Quarterly Fixed	$	27.44	$	27.44				
Commodity Charge - Per CCF	$	3.51	$	3.35				
Total Water Charge (18.6 CCF/Quarter Use)	**$**	**92.63**	**$**	**89.66**	**$**	**(2.97)**	**$**	**(0.99)**
Sewer								
Service Charge - Quarterly Fixed	$	21.01	$	21.01				
Commodity Charge - Per CCF	$	4.60	$	5.19				
Total Sewer Charge (18.6 CCF/Quarter Use)	**$**	**106.44**	**$**	**117.40**	**$**	**10.96**	**$**	**3.65**
Overall								
Total (18.6 CCF/Quarter Use)	**$**	**199.07**	**$**	**207.06**	**$**	**7.99**	**$**	**2.66**

Note: A meter size of 5/8" and water usage of 18.6 CCF/Quarter were used in determining the above quarterly bill amounts.

The current rate structure supports the current needs of the below, presented capital improvement plan. Projects identified in the capital improvement plan will be annually incorporated into the budget for approval by the City Commission.

Capital Improvement Plan

The 20-Year Capital Improvement Plan (CIP) is shown in the below table. This plan will be updated every year when the budget is completed.

20-Year Capital Improvement Plan

Fiscal Year	Projects	Project Cost[1]	Total Project Costs
2019-20	Influent Sampler	$ 10,000	$ 89,000
	Tertiary Effluent Sampler	$ 10,000	
	RTB Joint Repairs	$ 30,000	
	Ferric Chloride Pump	$ 5,000	
	Catonic Polymer Pump 1 & 2	$ 13,000	
	UV Disinfection System Lights	$ 21,000	
2020-21	Influent Isolation Valves (E & W)	$ 50,000	$ 1,216,000
	Ferric Chloride Pump	$ 5,000	
	Raw Sewage Valves & Piping	$ 15,000	
	Centrifuge Feed Pump 1 & 2	$ 60,000	
	VFDs for Centrifuge Feed Pump 1 & 2	$ 30,000	
	2 Oxidation Ditch Rotor & Motor	$ 120,000	
	Sand Filter Payback	$ 550,000	
	UV Disinfection System Lights	$ 21,000	
	Sludge Transfer Pump 2	$ 30,000	
	Groundwater Pump Station Repairs	$ 35,000	
	Dewatering Vault Repairs	$ 300,000	
2021-22	2 Oxidation Ditch Rotor & Motor	$ 120,000	$ 1,246,000
	Sand Filter Payback	$ 550,000	
	John Deere Skid-Steer Loader	$ 25,000	
	Collection Pipe & MH Repairs	$ 500,000	
	VFDs for Raw Sewage Pump 1 & 2	$ 30,000	
	UV Disinfection System Lights	$ 21,000	

Continued: 20-Year Capital Improvement Plan

Fiscal Year	Projects	Project Cost[1]	Total Project Costs
2022-23	2 Oxidation Ditch Rotor & Motor	$ 120,000	$ 1,291,000
	Sand Filter Payback	$ 550,000	
	UV Disinfection System Lights	$ 21,000	
	Collection Pipe & MH Repairs	$ 500,000	
	Basin Bleach Pumps & Piping	$ 60,000	
	Centrifuge	$ 25,000	
	Scum Ejector 1	$ 10,000	
	Automatic Scum Strainer	$ 5,000	
2023-24	2 Oxidation Ditch Rotor & Motor	$ 120,000	$ 1,288,000
	Sand Filter Payback	$ 550,000	
	Clark HiLo	$ 30,000	
	Collection Pipe & MH Repairs	$ 500,000	
	Sludge Aeration Blower	$ 12,000	
	Ditch Sludge Valves & Piping	$ 50,000	
	UV Disinfection System Lights	$ 21,000	
	PEW Pump 1	$ 5,000	
2024-25	2 Oxidation Ditch Rotor & Motor	$ 120,000	$ 1,441,000
	UV Disinfection System Lights	$ 21,000	
	Oxidation Ditch Joint Repairs	$ 50,000	
	CCTV of Collection System	$ 1,200,000	
	Grit Chamber & Washer 1 & 2	$ 50,000	
2025-26	UV Disinfection System Lights	$ 21,000	$ 1,253,000
	MACP Inspection of Manholes	$ 175,000	
	John Deere Gator	$ 7,000	
	Vactor Dumping Station Upgrades	$ 150,000	
	Site Pavement Upgrades	$ 200,000	
	Collection Pipe & MH Repairs	$ 500,000	
	HVAC - Entire Facility	$ 200,000	
2026-27	UV Disinfection System Lights	$ 21,000	$ 1,271,000
	Groesbeck PS Upgrades	$ 350,000	
	N Rose PS Upgrades	$ 350,000	
	RTB Aerator Blowers (3 Total)	$ 50,000	
	Collection Pipe & MH Repairs	$ 500,000	

Continued: 20-Year Capital Improvement Plan

Fiscal Year	Projects	Project Cost[1]	Total Project Costs
2027-28	UV Disinfection System Lights	$ 21,000	$ 1,136,000
	Breitmeyer PS Upgrades	$ 200,000	
	Sugarbeet PS Upgrades	$ 100,000	
	N Wilson PS Upgrades	$ 50,000	
	Replace Doors All Buildings	$ 150,000	
	Replace Roofs All Buildings	$ 75,000	
	Power Washer	$ 5,000	
	Centrifuge	$ 25,000	
	Collection Pipe & MH Repairs	$ 500,000	
	Chariot Lawn Mower w/ trailer	$ 10,000	
2028-29	Sludge Aeration Blower	$ 12,000	$ 1,393,000
	UV Disinfection System Lights	$ 21,000	
	Paint All Buildings	$ 100,000	
	Replace Windows All Buildings	$ 150,000	
	SCADA Upgrades	$ 100,000	
	Collection Pipe & MH Repairs	$ 500,000	
	Automatic Wet Well Bar Screen	$ 500,000	
	R.A.S. Pump Speed Control No. 2	$ 10,000	
2029-30	UV Disinfection System Lights	$ 21,000	$ 1,021,000
	Secondary Clarifiers 1 & 2	$ 1,000,000	
2030-31	UV Disinfection System Lights	$ 21,000	$ 1,521,000
	WWTP & RTB Electrical Upgrades	$ 1,000,000	
	Collection Pipe & MH Repairs	$ 500,000	
2031-32	UV Disinfection System Lights	$ 21,000	$ 1,221,000
	CCTV of Collection System	$ 1,200,000	
2032-33	UV Disinfection System Lights	$ 21,000	$ 1,221,000
	MACP Inspection of Manholes	$ 175,000	
	Centrifuge	$ 25,000	
	Collection Pipe & MH Repairs	$ 1,000,000	
2033-34	Sludge Aeration Blower	$ 12,000	$ 1,333,000
	RTB Centrifugal Pump Major Overhaul (1 of 5)	$ 300,000	
	UV Disinfection System Lights	$ 21,000	
	Collection Pipe & MH Repairs	$ 1,000,000	

Continued: 20-Year Capital Improvement Plan

Fiscal Year	Projects	Project Cost[1]	Total Project Costs
2034-35	UV Disinfection System Lights	$ 21,000	$ 1,321,000
	RTB Centrifugal Pump Major Overhaul (2 of 5)	$ 300,000	
	Collection Pipe & MH Repairs	$ 1,000,000	
2035-36	UV Disinfection System Lights	$ 21,000	$ 1,321,000
	RTB Centrifugal Pump Major Overhaul (3 of 5)	$ 300,000	
	Collection Pipe & MH Repairs	$ 1,000,000	
2036-37	UV Disinfection System Lights	$ 21,000	$ 1,321,000
	RTB Centrifugal Pump Major Overhaul (4 of 5)	$ 300,000	
	Collection Pipe & MH Repairs	$ 1,000,000	
2037-38	UV Disinfection System Lights	$ 21,000	$ 1,346,000
	RTB Centrifugal Pump Major Overhaul (5 of 5)	$ 300,000	
	Centrifuge	$ 25,000	
	Collection Pipe & MH Repairs	$ 1,000,000	
2038-39	UV Disinfection System Lights	$ 21,000	$ 1,321,000
	SCADA Upgrades	$ 100,000	
	CCTV of Collection System	$ 1,200,000	

Note: [1]Project Cost is shown in 2018 costs. It is assumed that future rate increases will offset inflation.

20 Year Capital Improvement Costs vs. Anticipated Budget

Fiscal Year	Anticipated Capital Budget[1]	Planned Project Costs	Difference	Cash On Hand[2]
2019-20	$ 118,659	$ 89,000	$ 29,659	$ 1,029,659
2020-21	$ 1,288,940	$ 1,216,000	$ 72,940	$ 1,102,599
2021-22	$ 1,290,440	$ 1,246,000	$ 44,440	$ 1,147,039
2022-23	$ 1,287,003	$ 1,291,000	$ (3,997)	$ 1,143,042
2023-24	$ 1,288,628	$ 1,288,000	$ 628	$ 1,143,670
2024-25	$ 1,290,253	$ 1,441,000	$ (150,747)	$ 992,923
2025-26	$ 1,286,940	$ 1,253,000	$ 33,940	$ 1,026,863
2026-27	$ 1,288,690	$ 1,271,000	$ 17,690	$ 1,044,553
2027-28	$ 1,290,440	$ 1,136,000	$ 154,440	$ 1,198,993
2028-29	$ 1,287,253	$ 1,393,000	$ (105,747)	$ 1,093,246
2029-30	$ 1,289,128	$ 1,021,000	$ 268,128	$ 1,361,374
2030-31	$ 1,290,422	$ 1,521,000	$ (230,578)	$ 1,130,796
2031-32	$ 1,365,778	$ 1,221,000	$ 144,778	$ 1,275,574
2032-33	$ 1,365,778	$ 1,221,000	$ 144,778	$ 1,420,352
2033-34	$ 1,365,778	$ 1,333,000	$ 32,778	$ 1,453,130
2034-35	$ 1,365,778	$ 1,321,000	$ 44,778	$ 1,497,908
2035-36	$ 1,365,778	$ 1,321,000	$ 44,778	$ 1,542,686
2036-37	$ 1,365,778	$ 1,321,000	$ 44,778	$ 1,587,464
2037-38	$ 1,365,778	$ 1,346,000	$ 19,778	$ 1,607,242
2038-39	$ 1,365,778	$ 1,321,000	$ 44,778	$ 1,652,020
Total	**$ 25,223,020**	**$ 24,571,000**	**$ 652,020**	**$ 1,652,020**

Notes: [1] Anticipated Capital Budget is tabulated from the existing rate structure, effective October 1, 2018.
[2] In 2016, Cash on Hand was reported to be approximately $1,000,000.

This summary provides a brief overview of the evaluation, investigation, and offers initial insight into the Mt. Clemens Wastewater Sewer System, its assets, condition, operation, needs and the cost to maintain a good working condition for the entire wastewater system. A more comprehensive discussion can be found in the Wastewater Asset Management Plan which can be obtained by contacting Lisa Borgacz, Interim City Manager at (586)469-6818 or lborgacz@cityofmountclemens.com.

List of Major Assets

- 416,128 feet of 3-114 inch sewer collection pipe
- 2,027 sanitary, combined and storm structures
- 6 collection pump stations
- Wastewater Treatment Plant
    - Oxidation Ditch
    - Final Clarifiers
    - Preliminary Treatment and Tertiary Filter Building
    - Blower Building
    - Control Building
    - Sludge Digester Building
    - Primary and Secondary Digesters
    - Sludge Handling Building
    - Sludge Storage Tanks
    - Maintenance Building
    - Pole Barn
    - Generator Building
- Retention Treatment Basin
    - Dewatering Pump Station
    - Groundwater Pump Station
    - Chlorination Basin
    - Sedimentation Resuspension Chambers
    - Main Pumping Building
    - Generator Building

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date November 30, 2018
(No later than 3 years from executed grant date)

The City of Mount Clemens *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1596-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or No

   If No - Date of the rate methodology approval letter: July 19, 2018.

2) Significant Progress Made: Yes or No

   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)

3) Date of rate methodology review letter identifying the gap: ______________________.

4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ____________________________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Lisa Borgacz, Interim City Manager at (586) 469-6818 or lborgacz@cityofmountclemens.com

Name | Phone Number | Email

Lisa Borgacz 11/30/18

Signature of Authorized Representative (Original Signature Required) | Date

Lisa Borgacz, Interim City Manager

Print Name and Title of Authorized Representative

Stormwater Asset Management and Wastewater (SAW)
Sanitary Sewer System Asset Management Plan Summary

City of Munising
301 East Superior St.
Munising, MI 49862
https://cityofmunising.org/

Mr. Devin Olson, City Manager
Phone: (906) 387-2095

SAW Grant Project No. 1281-01

Executive Summary

The City of Munising (City) received $445,379 in funding through the Michigan SAW grant program in November of 2015 to develop an Asset Management Plan for their sanitary sewer system.

An Asset Management Plan is a long-range planning document used to provide a rational framework for understanding and documenting City-owned assets, service levels, risks and financial investments. The intent of asset management is to ensure the long-term sustainability of the City. By assisting the City to make better decisions when to repair, replace or rehabilitate particular assets and by developing a long-term funding strategy, the City can ensure its ability to deliver the required level of service perpetually.

The major components of the Asset Management Plan includes the following:

- Asset Inventory and Condition Assessment
- Level of Service
- Criticality (Consequence of Failure) of Assets
- Operation and Maintenance Strategies/Revenue Structure
- Long-term Funding/Capital Improvement Plan

Wastewater Asset Inventory

The City wastewater system components consist of the following:

- Collection System (force mains, gravity pipes, manholes)
- Collection System Mechanical (lift stations)
- Wastewater Treatment Plant (WWTP)
- Mobile Assets

The collection system assets were GPS located in the field and their location inserted on an aerial map to show the asset location in relation to easily referenced locations. Component specific information such as size, elevation, year constructed, material, condition rating, notes, etc. is located within the GIS system as well as in Excel spreadsheet format. Information modified or updated within the GIS system is readily available by users.

Asset components, such as lift station components, WWTP asset components and mobile assets are located in Excel spreadsheets that are readily updated by the City.

Condition Assessment

The sanitary sewer system asset condition was measured by the following ranking system:

Condition Rating	Description
5	Unserviceable
4	Significant Deterioration
3	Moderate Deterioration
2	Minor Deterioration
1	New or Excellent Condition

The condition of the sanitary sewer gravity pipe is based on televising, smoke testing, flow metering and assumed condition. The assessed condition rating of City sanitary sewer gravity pipe within the collection system ranges from 1 to 5. The weighted average condition rating of the collection system gravity pipe is 1.8, indicating minor deterioration of sanitary sewer gravity pipe within the collection system.

The condition rating of sanitary sewer forcemain within the collection system is assumed to have a condition rating of either 1 or 2, indicating new or excellent condition. Since televising of the force main and material testing of sections of force main is outside the scope of the project, assumptions were made regarding the condition of the force main based on material and age.

The sanitary sewer manholes were inspected by manhole inspectors certified under the Pipeline Assessment Certification Program (PACP) and the Manhole Assessment and Certification Program (MACP) by the National Association of Sewer Service Companies (NASSCO). Each of the manhole components were given a rating of 1 to 5 using the ranking system noted above. An overall rating was given to the manhole based on the worst rating of the components evaluated. The sanitary sewer manholes within the collection system ranged from 2 to 4, with an average condition rating of 2.8. This indicates an overall condition between minor deterioration and moderate deterioration.

Sanitary system mechanical or lift station condition was ranked by individual components rather than the lift station as a whole since lift station individual components are replaced or reconditioned at different timeframes. A spreadsheet listing the individual component ratings is included in the report. The weighted condition rating of the lift station assets is 2.0 indicating minor to moderate deterioration.

WWTP condition was ranked by individual components rather than the WWTP as a whole since individual components are replaced or reconditioned at different timeframes. A spreadsheet listing the individual component ratings is included in the report. The condition rating and business risk was used to determine the repair, replacement and capital improvement projects. The weighted condition rating of the WWTP assets is 2.3 indicating minor to moderate deterioration.

A spreadsheet listing the individual component ratings of the mobile assets is included in the report. The weighted condition rating of the mobile assets is 2.0 indicating minor deterioration.

Level of Service Determination

Level of service defines the way in which the utility owners, managers and operators want the utility to perform over the long-term. The level of service includes technical, managerial and financial components. The level of service is a fundamental part of how the utility is operated.

The level of service needs to be evaluated and adjusted with time to match system performance, funding, and changes in regulations.

The City's level of service statement is as follows:

- Comply with all State and Federal regulatory requirements at all times.
- Maintain proper operator certification.

- Provide for the health and safety of all employees and customers.
- Provide for regular operator training to be made aware of new regulations, take advantage of advances in new technology and system troubleshooting.
- Provide for staff to attend workshops that will educate and present grant opportunities available to the City.
- Customers will receive written notice 24 hours in advance of any planned work that will affect service or access.
- Keep spare pumps and parts available at all times for critical assets.
- Respond to customer complaints within 24 hours of receipt 95% of the time.
- Track customer complaints and locations to identify trouble spots.
- Rates will be reviewed and raised on an annual basis to keep rates in line with inflation and to avoid steady declines in revenue followed by massive rate increases.
- Identify areas of high infiltration and inflow (I&I) on a yearly basis by evaluating lift station data, flow monitoring, and/or televising. Follow-up with projects to reduce I&I.

Criticality (Consequence of Failure) of Assets

To determine the consequence of failure, all possible costs must be considered. These costs include: cost of repair, social cost associated with loss of the asset, repair/replacement costs related to collateral damage caused by the failure, legal costs related to additional damage caused by failure, environmental costs created by the failure, loss of business revenue to the community, and other associated costs or asset losses. The consequence of failure can be high if any one of these costs are significant or the accumulation of several costs occur with failure.

Consequence of failure levels found in the table below shows the ranking system used for the consequence of failure. The description shown for each consequence will be a best fit of one of the items noted. Not all of the description items need to apply.

Consequence	Level	Description
Catastrophic disruption	5	Massive failure, severe health affect, or persistent and extensive damage
Major disruption	4	Major effect, major loss of system capacity, major health effects, major costs or important level of service compromised
Moderate disruption	3	Moderate effect, moderate loss of system capacity, moderate health effects or moderate costs, but important level of service still achieved
Minor disruption	2	Minor effect, minor loss of system capacity, minor health effects or minor costs
Insignificant disruption	1	Slight effect, slight loss of system capacity or slight health effects

Assessing business risk requires examination of the probability of failure, the consequence of the failure and redundancy. The assets that have the greatest probability of failure and the greatest consequences associated with the failure will be the assets that have the most business risk. An analysis of different assets will reveal which asset has the highest business risk and, therefore, which asset will require the most attention for either repair or replacement.

Business risk is the multiplication of the Probability of Failure number to the Consequence of Failure number and to the Redundancy Factor. The resulting number provides a numeric value to business risk. Typically, an asset falling in the range of 1 to 8 would be considered low risk. An asset falling in the business risk range of 9 to 16 will be medium risk. An asset above 16 would be considered high risk.

A summary of business risk for each of the asset groups is shown in the table below:

Asset Group	Risk Level		
	Low Risk	Medium Risk	High Risk
Gravity Pipe	75.1%	23.0%	1.9%
Force main	100.0%	-	-
Manholes	60.7%	38.1%	1.2%
Lift Stations	22.9%	77.1%	-
WWTP	49.7%	50.3%	-
Mobile Assets	100.0%	-	-
Sanitary Sewer System	68.3%	30.6%	1.1%

As can be seen in the table, the majority of the sanitary sewer system in the low risk category.

Revenue Structure

A funding projection worksheet was developed to evaluate current and future projections based on operating income, operating expenses, non-operating income, non-operating expenses (including principal and interest payments, bond reserve payments and restricted fund payments), planned project dedicated fund expenditures and existing fund balances. It was determined that the current rate structure provides sufficient funds to cover operation, maintenance, replacement and debt costs. The City has implemented annual sewer rate reviews to keep pace with operating expenses. At a minimum, the rate review implements annual sewer rate inflation adjustments based on the consumer price index to keep pace with operating expenses. Future capital improvement projects will be funded through unrestricted funds or USDA-Rural Development. The City will be increasing rates as required for future planned USDA-RD wastewater capital improvement projects. A full rate analysis will be required by USDA-RD for any future projects.

Capital Improvement Plan

The following capital improvement projects are planned for years 0-5:

Project	**Planned Project Year**	**Estimated Replacement Cost**	**Funding Source**
WWTP Replace (1) Aeration Blower	2018-2019	$65,000	RD RR&I Fund
WWTP Aeration Diffusers – EQ Basin	2018-2019	$20,000	RD RR&I Fund
WWTP Replace 2nd Aeration Blower	2019-2020	$65,000	RD RR&I Fund
WWTP Thickener Aeration Grid	2019-2020	$100,000	RD RR&I Fund
MDOT M28 Project – Sanitary Sewer	2020	$360,000	Unrestricted Funds
WWTP Effluent Flow Meter	2021-2022	$27,000	RD RR&I Fund
WWTP UV System Expansion	2021-2022	$120,000	Unrestricted Funds
WWTP Sludge Storage Tank Covers	2022-2023	$80,000	RD RR&I Fund

* Estimated replacement cost is calculated for the current year and does not reflect the year of construction cost.

The following capital improvement projects are planned for years 6-20:

Project	Estimated Replacement Cost	Funding Source
Washington Street (MH 2218 – MH 2219) Sanitary Sewer	$75,000	Unrestricted Funds
M-28 (MH 2496 – MH 2501) Sanitary Sewer	$62,000	Unrestricted Funds
Upgrade Tannery Lift Station, Generator Building Addition & Wetwell	$100,000	Unrestricted Funds
Upgrade Anna Lift Station	$25,000	Unrestricted Funds
WWTP Fine Screen Replacement	$580,000	USDA-RD
WWTP Automatic Dissolved Oxygen Control	$27,000	Unrestricted Funds
WWTP Dissolved Oxygen Control in EQ Basin & Oxidation Ditches	$40,000	Unrestricted Funds
Elm Street (MH 1140 – MH 9064) Sanitary Sewer	$34,000	Unrestricted Funds
Birch Street (MH 1149 – MH 9045) Sanitary Sewer	$28,000	Unrestricted Funds
Bypass Pumping Provisions for all Lift Stations	$50,000	Unrestricted Funds
WWTP RAS/WAS Control & Metering	$27,000	Unrestricted Funds
WWTP Clarifier Domes	$400,000	USDA-RD
WWTP Polymer Feed System	$33,000	Unrestricted Funds
WWTP Level Control in Sludge Storage Tanks	$10,000	Unrestricted Funds

* Estimated replacement cost is calculated for the current year and does not reflect the year of construction cost.

The funding source noted may change depending on funding grant/loan ratios, interest rates or RR&I fund balances available for eligible projects.

List of Major Assets

The City's sanitary sewer system major assets consist of the following:

- Sanitary Sewer Gravity Pipe: 87,937 Feet
- Sanitary Sewer Force main: 8,212 Feet
- Sanitary Sewer Manholes: 340
- Lift Stations: 6
- Wastewater Treatment Plant: 0.9 MGD Activated Sludge Plant

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date November 28, 2018
(no later than 3 years from executed grant date)

The City of Munising *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1281-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or No

   If No - Date of the rate methodology approval letter: June 19, 2018.

2) Significant Progress Made: Yes or No

   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)

3) Date of rate methodology review letter identifying the gap: ______________________.

4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ______________________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Devin Olson, City Manager at 906-387-2095 citymanager@cityofmunising.org

Name Phone Number Email

______________________ 11/28/2018

Signature of Authorized Representative (Original Signature Required) Date

Devin Olson, City Manager

Print Name and Title of Authorized Representative

City of Munising
301 East Superior Street
Munising, MI 49862
https://cityofmunising.org/

Mr. Devin Olson, City Manager
Phone: (906) 387-2095

SAW Grant Project No. 1281-01

Executive Summary

The City of Munising (City) received $98,760 in funding through the Michigan SAW grant program in January of 2013 to develop an Asset Management Plan for their storm sewer system.

An Asset Management Plan is a long-range planning document used to provide a rational framework for understanding and documenting City-owned assets, service levels, risks and financial investments. The intent of asset management is to ensure the long-term sustainability of the City. By assisting the City to make better decisions when to repair, replace or rehabilitate particular assets and by developing a long-term funding strategy, the City can ensure its ability to deliver the required level of service perpetually.

The major components of the Asset Management Plan include the following:

- Asset Inventory and Condition Assessment
- Level of Service
- Criticality (Consequence of Failure) of Assets
- Operation and Maintenance Strategies/Revenue Structure
- Long-term Funding/Capital Improvement Plan

Storm Sewer Asset Inventory

The City storm sewer system components consist of the following:

- Storm Sewer Pipe
- Catch Basins
- Manholes

The collection system assets were GPS located in the field and their location inserted on an aerial map to show the asset location in relation to easily referenced locations. Component specific information such as size, elevation, year constructed, material, condition rating, notes, etc. is located within the GIS system as well as in Excel spreadsheet format. Information modified or updated within the GIS system is readily available by users.

Condition Assessment

The storm sewer system asset condition was measured by the following ranking system:

Condition Rating	Description
5	Unserviceable
4	Significant Deterioration
3	Moderate Deterioration
2	Minor Deterioration
1	New or Excellent Condition

The assessed condition rating of City storm sewer pipe within the system ranges from 1 to 4. The weighted average condition rating of the storm sewer system pipe is 1.6, indicating excellent condition or minor deterioration of storm sewer pipe. The condition is based primarily on assumed condition. Assumed condition is based on other pipes with similar material, age and underground conditions.

The storm sewer manholes were inspected by manhole inspectors certified under the Pipeline Assessment Certification Program (PACP) and the Manhole Assessment and Certification Program (MACP) by the National Association of Sewer Service Companies (NASSCO). Each of the manhole components were given a rating of 1 to 5 using the ranking system noted above. An overall rating was given to the manhole based on the worst rating of the components evaluated. The storm sewer manholes within the collection system ranged from 2 to 5, with an average condition rating of 2.8. This indicates an overall condition between minor deterioration and moderate deterioration.

The storm sewer catch basins within the collection system ranged from 2 to 4, with an average condition rating of 2.9. This indicates an overall condition between minor deterioration and moderate deterioration.

Level of Service Determination

Level of service defines the way in which the utility owners, managers and operators want the utility to perform over the long-term. The level of service includes technical, managerial and financial components. The level of service is a fundamental part of how the utility is operated.

The level of service needs to be evaluated and adjusted with time to match system performance, funding and changes in regulations.

The City's level of service statement is as follows:

- Comply with all State and Federal regulatory requirements at all times.
- Provide for the health and safety of all employees and customers.
- Provide for staff to attend workshops that will educate and present grant opportunities available to the City.
- Customers will receive written notice 24 hours in advance of any planned work that will affect service or access.
- Keep spare components and repair materials available at all times for critical assets.
- Respond to customer complaints within 24 hours of receipt 95% of the time.
- Track customer complaints and locations to identify trouble spots.

Criticality (Consequence of Failure) of Assets

To determine the consequence of failure, all possible costs must be considered. These costs include: cost of repair, social cost associated with loss of the asset, repair/replacement costs related to collateral damage caused by the failure, legal costs related to additional damage caused by failure, environmental costs created by the failure, loss of business revenue to the community and other associated costs or asset losses. The consequence of failure can be high if any one of these costs are significant or the accumulation of several costs occur with failure.

Consequence of failure levels found in the table below shows the ranking system used for the consequence of failure. The description shown for each consequence will be a best fit of one of the items noted. Not all of the description items need to apply.

Consequence	Level	Description
Catastrophic disruption	5	Massive failure, severe health affect, or persistent and extensive damage
Major disruption	4	Major effect, major loss of system capacity, major health effects, major costs or important level of service compromised
Moderate disruption	3	Moderate effect, moderate loss of system capacity, moderate health effects or moderate costs, but important level of service still achieved
Minor disruption	2	Minor effect, minor loss of system capacity, minor health effects or minor costs
Insignificant disruption	1	Slight effect, slight loss of system capacity or slight health effects

Assessing business risk requires examination of the probability of failure, the consequence of the failure and redundancy. The assets that have the greatest probability of failure and the greatest consequences associated with the failure will be the assets that have the most business risk. An analysis of different assets will reveal which asset has the highest business risk and, therefore, which asset will require the most attention for either repair or replacement.

Business risk is the multiplication of the Probability of Failure number to the Consequence of Failure number and to the Redundancy Factor. The resulting number provides a numeric value to business risk. Typically, an asset falling in the range of 1 to 8 would be considered low risk. An asset falling in the business risk range of 9 to 16 will be medium risk. An asset above 16 would be considered high risk.

A summary of business risk for each of the asset groups is shown in the table below:

	Risk Level		
Asset Group	Low Risk	Medium Risk	High Risk
Pipe	97.6%	2.4%	-
Catch Basins	86.2%	13.8%	-
Manholes	89.3%	10.7%	-
Storm Sewer System	**95.4%**	**4.6%**	**-**

As can be seen in the table, none of the system contains any asset components that are considered high risk, with the majority of the system in the low risk category.

Revenue Structure

In order to provide for long-term sustainability of storm sewer system, a viable funding structure must be developed. City funding must be structured to provide adequate income to cover operation, maintenance, replacement, capital improvement projects and debt costs.

All maintenance, repairs and replacement of components of the storm sewer system is completed within the Department of Public Works. As such, no separate assessment, user fee or specific fund is setup for maintenance, repairs or replacement of only the storm sewer system. All work associated with the storm sewer system is considered part of the City streets.

Typically, when storm sewer components are replaced, it is completed in conjunction with a road project or sanitary sewer separation project and road funds or sanitary sewer funds are used to pay for storm sewer system work. The storm sewer system is essentially treated as a component of the roadway and follows that same funding mechanism as a road. Money needed for storm sewer system repair, rehabilitation or replacement is budgeted in the local streets fund or major streets fund and typically is derived from taxes levied by the City.

Funding of storm sewer replacement projects may also come from MDOT Local Agency Program for local streets. These projects are typically 80% funded by MDOT and 20% by the City.

Capital Improvement Plan

The City currently has no plans for storm sewer capital improvement projects.

List of Major Assets

The City's storm sewer system major assets consist of the following:

- Storm Sewer Pipe Total: 54,102 Feet
- Storm Sewer Catch Basins: 452
- Storm Sewer Manholes: 143

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Due Date: **November 30, 2018**
(no later than 3 years from executed grant date)

The City of Munising *(legal name of grantee)* certifies that all stormwater asset management plan (SWAMP) activities specified in SAW Grant No. 1281-01 have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SWAMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

Devin Olson, City Manager	at	906-387-2095	citymanager@cityofmunising.org
Name		Phone Number	Email

11/28/2018

Signature of Authorized Representative (Original Signature Required) Date

Devin Olson, City Manager
Print Name and Title of Authorized Representative

Executive Summary

Stormwater, Asset Management, and Wastewater (SAW) Plan

The Village of Napoleon and YMCA Storer Camp

Napoleon Township
Dan Wymer, Supervisor
517-536-8694 ext. 210
124 S. Brooklyn Rd, Napoleon, MI 49261
www.napoleontownship.us

SAW Grant Project Number: 1426-01

A. Executive Summary

The Wastewater Asset Management Plan (AMP) summarizes the existing physical condition of the YMCA Storer Camp and Napoleon Village (called the Village) wastewater infrastructure and includes key recommendations for future funding levels. This document was prepared using grant funding from the State of Michigan SAW Grant Program, with a total budget of $122,388 for the Wastewater AMP, which is inclusive of grant amount and local match.

The AMP was intended to accomplish the following key goals:

1. Provide the Village with a new framework for collecting, organizing, and storing data for their wastewater collection system using the latest available hardware and software
2. Survey key system components to establish the location and condition of the Village assets
3. Identify long-term operations and maintenance strategies to maintain a reasonable structural condition into perpetuity, including:
   a. Regularly-scheduled sewer inspections
   b. Repair and rehabilitation to address structural problems resulting from aging infrastructure
4. Provide recommendations on future rate adjustments necessary to maintain the recommended budget

B. Wastewater Asset Inventory

This wastewater collection system AMP includes a condition assessment of three lift stations. The inspections physically located and inventoried 3 lift stations and summarized the components in the MDEQ spreadsheet.

The Village also investigated installing permanent magnetic flow meters on the force main at their YMCA Storer Camp, Cady Lift Stations owned and operated by Columbia Twp. The flow meters will provide the Village with continuous data from each of the tributary areas. The data will be monitored to ensure a high level of service of the system. Data from the flow meters and area rain gauge can be combined to determine the amount of infiltration in the network.

C. Condition Assessment

The lift stations were condition assessed, their remaining useful life estimated and replacement costs were provided for the individual components. The lift station components have an overall condition rating of 2.6 indicating minor deterioration.

The majority of the sewer system was installed between 1999 and 2002. Additional residential connections are continuously added and are all less than 20 years old. The manholes and the pipes were not physically inspected and therefore no MACP or PACP score was given to their structural rating.

The air release valves were not assessed because all of the valves encountered on maintenance calls have failed or failure is imminent. Therefore, replacement of the air release valves was added to the Capital Improvement Plan (CIP).

The Level of Service criteria for its wastewater collection system are listed in **Table 1**:

Table 1: Level of Service

Key Service Criteria	Performance Indicator	Target Level of Service	Measurement Frequency
Asset Condition	MACP Inspections	MACP inspect manholes every 10 years	Every 10 Years
Flow Capacity	Monitor flow at Lift Stations	Install flow meter at Lift stations to measure the flow sent to the Leoni Treatment Plant.	None
Health and Safety	Maintain the NIOSH recommended 10-minute ceiling level of 10 ppm Hydrogen Sulfide in ambient air	Maintain safe Hydrogen Sulfide Concentrations in ambient air outside the Lift Stations	Annual
Regulatory Compliance	Compliance with MDEQ Sanitary Sewer Overflow (SSO) Policy	Reduce the frequency of SSO events to comply with the MDEQ SSO policy of no more than 10% of a chance of SSO in any given year, excluding unusual natural events	Annual
Service Delivery	Implement and Utilize Mobile 311 Software to Aide in Utility Management and Promote Customer Communication	Track service and replacement records to support maintenance and invoicing needs	Ongoing
	Response to Sanitary Sewer Complaints	Reduce response time to sanitary sewer complaints efficiently	Annual
O&M Optimization	Provide Cost Effective Service to Minimize Rate Increases	Proactively inspect and maintain infrastructure to minimize repair costs	Annual

D. Criticality of Assets

Determining the assets most critical to system operation allows a community to manage risk, support Capital Improvement Plans, and efficiently allocate Operations and Maintenance (O&M) funds. The two key factors used to determine criticality are Probability of Failure (PoF) and Consequence of Failure (CoF). PoF and CoF are multiplied to determine the Business Risk Exposure (BRE) as shown in **Figure 1**.

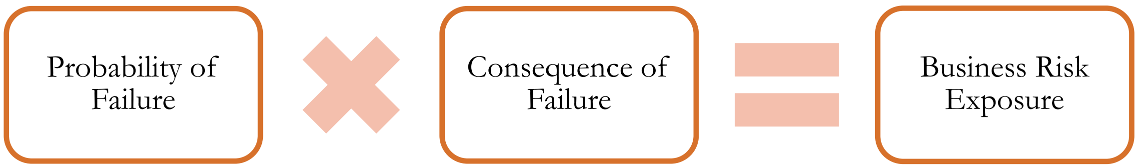


Figure 1: BRE Equation

PoF considers the physical condition or age of an asset. If the condition is not immediately apparent remaining useful life can be used as a proxy for condition. A standardized rating of one through five was assigned to each asset with a score of five indicating worst condition as shown in the **Table 2**.

Table 2: Probability of Failure

Score	Description
1	Improbable
2	Remote, unlikely but possible
3	Possible
4	Probable, likely
5	Imminent, likely in near future

CoF incorporates environmental and economic cost impacts. The economic CoF encompasses the impacts of direct and indirect economic losses to the affected organization and third parties due to asset failure. The environmental consequence of failure considers the risk of sewer overflows to rivers, lakes and wetlands as a result of asset failure.

The factors were rated on a one through five scale for each asset. These factors are weighed relative to their importance in the system. This analysis weighed economic factors at 75%, and environmental factors at 25%.

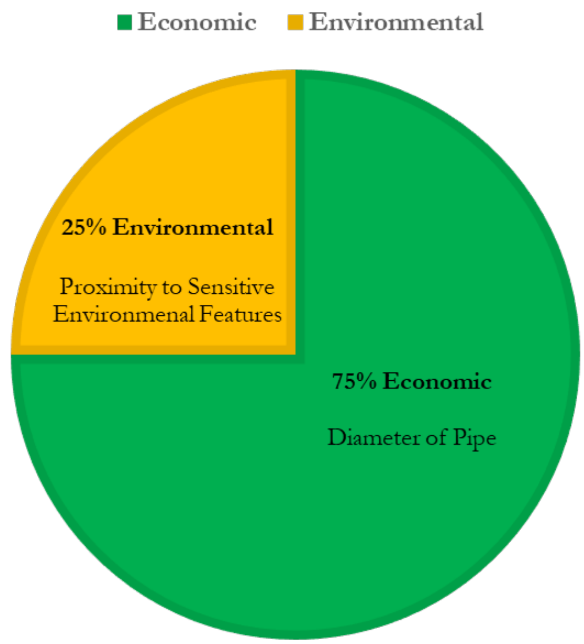


Figure 2: Components of the CoF Calculations

The following factors were combined to determine the final CoF:

- Relative Network Position – the sum of upstream sewers discharging to a structure
- Restoration Type/Accessibility – refers to the cost to restore the surface above the asset and if traffic control is needed
- Environment – proximity to sensitive environmental features like the Stony Lake, wetlands and streams

A BRE value was calculated for each asset and all components receiving a BRE ranking of 16 or greater were added to the Capital Improvement Plan.

A more detailed explanation of the criticality assessment can be found in **Appendix A: Collection System Criticality, Business Risk and Fiscal Calculations**.

E. Revenue Structure

The Village receives payment for wastewater transport and treatment from 280 REUs. The REU fees include two types of charges. The Village collects $42.03 per REU that are passed through to cover the costs of administration fees, maintenance, and waste transport and treatment. The Village collects an additional $1.90 that are available to cover operating costs. This $1.90 fee provides an annual budget of $6,384. The annual costs for supplies, insurance, and utilities total $14,272 resulting in a net loss of $7,891, which is funded from cash reserves.

The Village has cash on hand to cover anticipated capital improvements. However, The Village does not appear to be covering operating costs with the current $1.90 fee, and this fee should be raised to $4.25.

The primary reasons for this planned annual increase are:

1. Collected sufficient fees to cover operating costs
2. Increased investment in infrastructure rehabilitation, repair, and/or replacement
3. Increased attention to asset inspections
4. Keep up with inflationary pressures by staying ahead of the Construction Cost Index (CCI) curve
5. Avoid larger rate hikes (i.e. 30%-40%) that are necessary when rates are held constant over 5-10 years

The initial rate increase is recommended for fiscal year 2018, after which a 5% annual rate is recommended to provide a reasonable source of revenue for the Fund's wastewater system and should reduce the need for much larger rate increases that are often necessary when the rates are static for more than 5 years.

F. Capital Improvement Plan

The Capital Improvement Plan (CIP) focuses on repairing assets that have a Business Risk Exposure (BRE) of 16 or greater. Assets with a BRE score of 16 or greater are critical assets and have failed or are at risk of failing. These assets were ranked by their respective BRE scores.

The CIP details can be can be found in **Appendix B: Napoleon and YMCA Camp Storer Lift Station Inventory** and the MDEQ Asset Management Spreadsheet. The CIP tables are intended to be used for high level planning. The Village will further evaluate the projects identified in the CIP tables relative to system knowledge to determine the actual implementation schedule.

G. Recommendations

The recommendations in this AMP are to:

1. Adjust user fees to keep the wastewater budget in line with maintenance costs and inflation.
2. Implement the capital improvements as recommended in the CIP.

H. List of Major Assets

The major assets are detailed in the text below and in the MDEQ Asset Management Spreadsheet. This spreadsheet also contains additional detail on the distribution of sizes, ages, and conditions.

- *3 Lift Stations*
- *10 Manholes*
- *10 Sewer Cleanouts*
- *13 Air Release Valves*
- *4.3 miles of Force Main and Gravity*

The Village of Napoleon and YMCA Camp Storer systems discharge to the Leoni Township wastewater treatment plant (WWTP), which ultimately discharges to the Grand River. As such, the assets are limited to local and collector sewers.

I. Appendixes

Appendix A: Collection System Criticality, Business Risk and Fiscal Calculations

Appendix B: Napoleon and YMCA Camp Storer Lift Station Inventory

DEQ

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date **November 30, 2018**
(no later than 3 years from executed grant date)

The **Napoleon Township** *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. **1426-01** have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or No
   If No - Date of the rate methodology approval letter: **May 3, 2018**.
2) Significant Progress Made: Yes or No
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: ________________.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ________________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Dan Wymer	at **517-536-8694 ext.210**	**supervisor@napoleontownship.us**
Name	Phone Number	Email

Dan Wymer 19 Dec 2018

Signature of Authorized Representative (Original Signature Required) Date

Dan Wymer Napoleon Township Supervisor

Print Name and Title of Authorized Representative

April 2017

STORMWATER AND ASSET MANAGEMENT

SUMMARY REPORT

SAW GRANT PROJECT NO. 1005-01

VILLAGE OF NEW HAVEN
MACOMB COUNTY, Ml

PREPARED FOR:

VILLAGE OF NEW HAVEN
57775 MAIN STREET
NEW HAVEN, Ml 48048
CONTACT: MR. CHRIS DILBERT, VILLAGE PRESIDENT
CONTACT PHONE NUMBER: 586-749-5301

Prepared by:
Fazal Khan & Associates, Inc
43279 Schoenherr
Sterling Heights, MI 48313
(586) 739-8007

October 30, 2018

1.0 Executive Summary

The Village of New Haven under took the development of an Asset Management Program for the stormwater systems owned and/or operated by the Village. The Village applied for and received a grant to develop a Program through the Michigan Department of Environmental Quality's (MDEQ) Stormwater, Wastewater and Asset Management (SAW) program. This grant provides 90% grant funding for costs related to developing an asset management program. The Village of New Haven received grant funding in the amount of $303,677.00. In addition, a $33,742.00 funding match was required to be provided by The Village of New Haven for a total project cost of $337,419.00. The SAW program was established by the MDEQ to help communities move toward financial sustainability in maintaining their wastewater and stormwater assets. Outside funding sources for wastewater and stormwater systems are typically no longer available and, therefore, the MDEQ is encouraging municipalities to move toward becoming self-sustaining enterprises for these utility systems.

What is an Asset Management Program?

The International Infrastructure Management Manual defines the goal of asset management as meeting a required level of service in the most cost-effective way through the creation, acquisition, operation, maintenance, rehabilitation, and disposal of assets to provide for present and future customers.

Asset Management is a set of procedures to manage assets through their life cycles based on principles of life cycle costing. These procedures must be implemented in a programmatic way. The intent of asset management is to verify the long-term sustainability of the utility. By helping a utility manager make better decisions on when it is most appropriate to repair, replace, or rehabilitate particular assets and by developing a long-term funding strategy, the utility can ensure its ability to deliver the required level of service perpetually.

Effective asset management implementation is comprehensive. It may involve integrating several tools along with other existing systems (accounting, financial reporting, purchasing and stores, payroll, etc.) to create a comprehensive information system that will support an integrated Asset Management Program. Properly practiced, it involves all parts of the organization and entails a living set of performance goals.

A good Asset Management Program is not prepared and put on a shelf, rather it provides a framework of tools that may be continuously used for decision making. It is an active, on-going process that provides information to managers in order to make sound decisions about their capital assets and allows decision makers to better identify and manage needed investments in their utility's infrastructure. The Program tools may be used for tasks such as reviewing and establishing annual budgets, planning improvements, determining required staffing, and communicating performance with the public and regulatory agencies.

What is an Asset Management Plan?

An Asset Management Plan ("AMP") is a tool to help the utility implement its Asset Management Program. The purpose of this report is to focus on the AMP developed for the stormwater system with a focus on the next 20 years. The goal of the AMP is to provide the Village with a cost-effective and results oriented program.

The AMP provides the Village of New Haven with a guide to continue to provide the desired level of service to the community at the lowest lifecycle costs for the stormwater system. This will be achieved by developing a strategic process to perform proactive maintenance and investment in the system, rather than just reacting to failures. The AMP will be re-visited at periodic intervals to confirm that priorities and objectives are being addressed and updated.

The scope of work for this AMP consists of addressing the five core components as described in the Michigan Department of Environmental Quality's (MDEQ) document, "Asset Management Guidance for Wastewater and Stormwater Systems." These include:

- Asset Inventory
- Critical Assets
- Level of Service
- Capital Improvement Project Plan
- Revenue Structure

Inventory of Assets and Condition Assessment

The assets that are the focus of this AMP includes the storm water system, more specifically, the pipe networks and structures associated with the system. The primary means of condition assessment for enclosed sewers and manholes was to use criteria developed under the National Association of Sewer Service Companies (NASSCO) Pipeline Assessment Certification Program (PACP) and the Manhole Assessment Certification Program (MACP). These programs provide standards for defect identification and assessment using a consistent and repeatable method to identify, evaluate and manage pipelines and manholes.

The use of Closed-Circuit Televising (CCTV) for obtaining videos was used to allow the interior condition of enclosed pipes to be observed and defects noted. The use of NASSCO's PACP/MACP assessment program system identifies pipe and manhole features and defects using specific identifiers so that terms such as "crack" or "fracture" are used consistently by staff certified under the Program.

Defects that are found are weighted with scores on a severity scale of 0 to 5, with a "0" meaning the defect is minor and a "5" indicating the defect is significant. Defects are classified into two primary categories — Structural and Operation and Maintenance. Overall pipe grades are provided in several ways, including a "Quick Structural Rating" (QSR), a Quick Maintenance Rating (QMR), and an Overall Quick Rating (QPR). These ratings are scored as a four-digit number (i.e. 5Z5Z to 0000; the higher the rating the worse the condition).

CCTV data collected during assessments made by contractors was tracked using unique asset IDs. The unique asset IDs for each asset being assessed are used during the inspection process to ensure any collected data can be directly imported into the GIS geodatabase.

As part of the Village of New Haven’s program, manhole inspections are made by opening the manholes or structures and collecting limited data that is visible from the surface without entering the manhole.

The Village, through its Contractor, D.V.M Utilities, Inc. cleaned and televised 23,084 linear feet of storm sewer. Further inspected by its Engineering Consultant, Fazal Khan & Associates Inc., were 228 storm manholes and 507 storm catch basins.

The Village of New Haven utilized their new Geographic Information System (GIS) geodatabase as the foundation to implement the work scope approved through the SAW grant. GIS was the primary means to record and map the assets in each utility system. This geodatabase is part of the overall Village GIS system, which was operated and maintained by the Village's GIS consultant, Ritter GIS. The software used as the platform is ESRI ArcGlS. The geodatabase provides a means to record the attributes associated with each asset, such as installation date (age), size and material.

As part of the SAW grant, the GIS system was created by incorporating new structure and pipe data acquired through the inspection and videotaping of select sections of the Village for stormwater. All relevant fields were populated and linked to the GIS system. With this information, Village staff can quickly determine sizes, lengths, condition, location, etc. of the pipes or structures within the selected set areas.

Each run of pipe that was televised using Closed Circuit Television (CCTV) was categorized based on ID number, street/easement location and condition with feature classes for each as well as pipe diameter, lengths, etc. This information has been added to the Village's GIS geodatabase and is in spreadsheet format as well. Approximately 38% of the storm sewer system was televised as a part of the SAW Grant.

Each manhole that was physically inspected was categorized based on ID number, street/easement location and condition with feature classes for each. This information has been added to the Village's GIS geodatabase and is in spreadsheet format as well. Approximately 97% of the storm manholes and 97% of the storm inlets were inspected as a part of the SAW Grant.

Level of Service Determination

As part of preparing the AMP, the Village of New Haven considered what an appropriate level of service should be for their storm sewer system.

From the perspective of a Village of New Haven resident the expected performance criteria are that the storm sewer system takes away run-off in a reasonable amount of time with little or no flooding or back-ups in the streets, backyards, or basements.

From the Department of Public Works perspective, the criteria also included a functional system with limited required maintenance or heavy cleaning and no costly emergency repairs.

It is important to note that within the last three years the Village of New Haven has replaced and upsized 1883 linear feet of existing 8” – 12” storm sewers to 12” – 24” storm sewer to provide additional flow capacity at a cost of $436,000. The cost included the installation of 22 new storm sewer structures, relocation of existing utilities, and installation of 6” underdrain where required. An additional 1210 linear feet of failing and deteriorating 18” storm sewer was replaced at a cost of $338,000. The cost included the installation of 12 new storm sewer structures, relocation of existing utilities and pavement repair and restoration. In doing so, the Village proactively corrected critical areas of concern that were evident based on the information derived from the manhole inspections and the 2017 Storm Sewer Cleaning and CCTV Inspection Program, as well as previous CCTV inspections. This effort was not eligible for grant funding and was paid for by the Village of New Haven.

Criticality and Risk Evaluation

Not all assets are equally important to the utility's operation. Some assets are highly critical to maintaining operations, and others could be out of service for a period of time without negative consequences. Certain types of assets may be critical in one location, but not critical in another. For example, a storm sewer serving a very large commercial and residential area may be deemed more critical than a storm sewer servicing a neighborhood park or undeveloped land. A public agency must examine its assets very carefully to determine which assets are critical and why.

In determining criticality, two questions are important. The first is how likely it is that the asset will fail and, the second is, what is the consequence of failure. By developing a scoring scale for these two measures, and then combining the two results, the overall risk of an individual asset can be quantified. Determining an asset's overall risk will allow a public agency to manage its risk and aid in determining where to spend operation and maintenance dollars and plan capital expenditures.

Probability of Failure (POF)

To estimate the Probability of Failure (POF) of a given asset, the Village of New Haven looked at several factors such as asset age, condition of asset, failure history, historical knowledge, experiences with that type of asset in general, maintenance records, and other knowledge regarding how that type of asset is likely to fail. POF ratings were weighted using significant factors of that asset type with scoring values from 0 to 5, with "0" being the least likely to fail and "5" being the most likely to fail and assigned to each assessed asset (storm sewers, and associated structures).

Probability of failure typically increases as an asset ages or continues to operate. Risk associated with assets with high probabilities of failure may be reduced, if warranted, by increasing the level of maintenance, frequency of replacement, or by providing redundancy.

Consequence of Failure (COF)

To estimate the potential Consequence of Failure (COF) of a given asset, it is important to attempt to consider all potential costs associated with failure of that asset. These can include not only costs to repair and/or replace the asset, but also social costs associated with the loss of the asset, repair/replacement costs and legal costs related to collateral damage caused by the failure, environmental costs, loss of business revenue to the community, impacts to the public, and other types of losses. The consequence of failure can be high if any one of these costs is significant or the accumulation of several costs occur with a failure. The Village of New Haven used weighted COF ratings using significant factors of that asset type with scoring values from 1 to 5, with "1" having the lowest potential cost impacts due to failure and "5" having the highest potential cost impacts. Each asset type within the study group (storm sewers and associated structures) was rated.

The consequence of failure typically is established when the asset is placed into operation and remains the same over the asset's lifecycle. Risk associated with assets with high consequences of failure is primarily managed by reducing the probability of sudden failure through increased maintenance and replacement.

Risk Evaluation/Criticality

The assets that have the greatest probability of failure and the greatest consequences associated with the failure will be the assets that are the most critical. The Risk Evaluation score takes into account the

POF and COF shown below. Adjustments are then made to take into account any redundancy available that would mitigate the consequence of failure.

Assets with the highest Risk scores are likely candidates for immediate rehabilitation or replacement. Assets with lower scores should be analyzed to develop the best lifecycle strategy. If an asset's potential modes of failure and risks of failure are understood, it is possible to leverage use of the asset for a longer period and try to ensure the useful life is maximized before investing in replacement.
For some assets with a low consequence of failure, it may be most cost effective to operate in a "run to failure" mode where the asset is operated until it can no longer function. Preventive and predictive maintenance programs are most cost effective for assets with higher consequences of failure.

Risk should be managed in any decision-making process. The utility should analyze and document acceptable risk tolerance for all critical assets. The condition of the asset will change over time as will the consequences related to failure. It will be necessary to periodically review the criticality analysis and make adjustments to account for changes in the probability and consequence of any asset failures. As with all the components of the Asset Management Program, the criticality analysis is an on-going process.

Exhibit 5 identifies those assets with the highest criticality (COF x POF) and lists those assets from the highest criticality to the lowest. From Exhibit 5 we were able to determine that there were thirty-eight (38) “Runs” of storm sewer which had a criticality score of 10 or higher and should be programmed to be replaced/repaired over the next ten (10) years. Using the criticality scores and the “Cost of Repairs” (Exhibit 6) we were able to prepare a storm sewer “Capital Improvement Program Plan” for the next ten (10) years (Exhibit 7). The total funding required over the next ten (10) years based on current dollars would be $1,241,824.00.

Revenue Structure

At this time, there is no funding mechanism in place for storm sewer maintenance and rehabilitation. Storm pipe and storm manhole rehabilitation are anticipated to continue to occur in conjunction with ongoing maintenance and reconstruction efforts associated with pavement rehabilitation and replacement.

It is important to emphasize that annual maintenance for storm assets is budgeted and conducted by Village staff independent of the CIP program.

Capital Improvement Planning

Capital Improvement Plans (CIP) identify system upgrades, rehabilitation, and replacement needs for the future, typically over a period of 10-20 years, with greater emphasis on the first five years of the plan. The improvements planned at this time were based on the inspection completed. As additional inspection is completed, the CIP may change to reflect new information. The need to upsize portions of the storm sewer system in the future could be reduced by requiring on-site retention for future developments within the Village. Lining of existing sewer in view of replacement should also be considered where applicable. Included with this summary (Exhibit 7) are the currently anticipated CIP projects for the next 10 years. Determination of projects included in the capital improvement plan were generally based on the higher criticality ratings included in Exhibit 5. In some cases projects of lower criticality were included to complete the storm improvements in a given area of the Village.

The replacement costs listed are in current dollars for storm sewer improvements only and do not include repaving etc. and restoration costs. As such, it is recommended that the storm sewer improvements, in the capital improvement plan, be coordinated with any street paving projects under consideration by the Village of New Haven.

The CCW inspection of the storm sewer pipe network included the review of 229 pipe segments (24,083 linear feet) out of 538 existing segments (62,472 linear feet). Of the 244 existing manholes, 228 were inspected. Of the 538 storm catch basins, 507 were inspected.

List of Major Assets

The major assets that comprise the Village of New Haven Storm Water System consist of the following:

- 62,472 linear feet of storm sewer
- 244 storm manholes
- 538 storm catch basins

For SAW Required Reporting

This AMP includes a certification of project completion for the MDEQ's SAW Grant Program. In addition, we understand a summary of this report will be posted on MDEQ's website and materials made available to the public upon request. We also understand the AMP shall be available for public review for 15 years from submission.

Attachments

Attachments for this summary report include the following Exhibits:

Exhibit 1: Summary maps identifying the condition of storm sewer pipe

Exhibit 2: Summary maps identifying the consequence of failure of the storm sewer pipe

Exhibit 3: Tables identifying 20-year pipe condition based on PACP scores (Probability of Failure (POF))

Exhibit 4: Tables identifying 20-year pipe scores based on consequence of failure (COF)

Exhibit 5: Tables identifying criticality & risk evaluation (COF x POF)

Exhibit 6: Anticipated cost of replacement for 20-year storm sewer

Exhibit 7: Capital Improvement Plan (20-year)

Exhibit 8: Manhole Rating and ID

Exhibit 9: Catch Basin Rating and ID

DEQ

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Due Date October 25, 2018
(no later than 3 years from executed grant date)

The Village of New Haven *(legal name of grantee)* certifies that all stormwater asset management plan (SWAMP) activities specified in SAW Grant No.1005-01 have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SWAMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

Chris Dilbert at 586-749-5301 presidentdilbert@gmail.com

Name | Phone Number | Email

Chris Dilbert 11-8-18

Signature of Authorized Representative (Original Signature Required) | Date

Chris Dilbert, Village President

Print Name and Title of Authorized Representative

Prein&Newhof
Engineers ▪ Surveyors ▪ Environmental ▪ Laboratory

Memorandum

Date:	November 30, 2018
To:	Clarence Jones
Company:	Michigan Department of Environmental Quality
From:	Prein&Newhof
Project #:	2130309
Re:	Niles Charter Township SAW Grant: Summary of Wastewater Asset Management Plan

This memorandum provides the summary of the Niles Charter Township wastewater asset management plan SAW grant activities required under Section 603 of Public Act 84 of 2015. Headings and italicized quotes are from recent MDEQ guidance.

Grantee Information

Grantee:
Niles Charter Township
320 Bell Road
Niles, MI 49120-4063
http://www.nilestwpmi.gov/

Contact: Mr. James Stover, Township Supervisor
Phone: 269-684-0870

SAW Grant Project Number: 1469-01

Executive Summary

The Niles Charter Township received a SAW Grant in November 2015 to prepare Wastewater and Stormwater Asset Management Plans. The Grant agreement indicated the following amounts:

Project Total	Grant Amount	Local Match
$1,111,111	$1,000,000	$111,111
Project Total	Wastewater Costs	Stormwater Costs
$1,111,111	$941,339	$169,772

The Key components in the Asset Management Plan include:

1. Asset Inventory and Condition Assessment
2. Criticality of Assets
3. Level of Service
4. Operation and Maintenance Strategies/Revenue Structure
5. Long-term Funding/Capital Improvement Plan

Asset Inventory

"Describe the system components included in the AMP. Discuss how they were located and identified, if applicable. Describe the platform used to develop and maintain the inventory of assets."

All assets that are functionally or financially significant to the wastewater system have been inventoried. Manhole, gravity sewer main, force main, and lift station locations were plotted in a Geographic Information System (GIS) using record drawings. Manhole and lift station locations were field verified and locations adjusted with survey grade Global Positioning System (GPS) coordinates.

Asset inventory data including year of installation, material, sizes, pipe inverts and manhole rim elevations were cataloged from record drawing and visually verified where needed. Asset inventory data is managed using GIS databases.

Location of non-pipe assets, such as, lift station components, building components, and other equipment is compiled in a package of inventory spreadsheets. These assets are not mapped in GIS.

Condition Assessment

Discuss the condition assessment process, including what methods were used. Summarize the results of the assessment for each asset category.

Gravity Sewer Mains: Inspections were made using either a pole mounted zoom camera (looking up or down each pipe from the manholes) or with in-line closed circuit television (CCTV) cameras. Pipes inspected with zoom camera methods were rated considering any observable roots, deposits, joint conditions, pipe wall condition, infiltration, or other defect observations. Pipes inspected with CCTV were rated using the Pipeline Assessment Certification Program (PACP) system condition grading system. Composite Risk of Failure ratings of 1-5 were derived for each pipe.

Percentage of gravity sewer pipes in each rating category

1	2	3	4	5
82.3%	12.3%	2.3%	2.1%	1.0%

Force Mains: Force main conditions were estimated using pipe age, material, and break history records. Niles Township's force main data was compared with that of several other municipalities to establish a comparative reference. Ratings of 1-5 were developed for each force main.

Percentage of force main pipes in each rating category

1	2	3	4	5
22.9%	2.8%	74.3%	0%	0%

Manholes: Manholes were visually inspected and rated on a scale of 1-5 based on factors related to the condition of castings, steps, structures, and infiltration.

Percentage of manholes in each rating category

1	2	3	4	5
70%	29%	1%	0%	0%

Lift Stations: Visual inspection and performance testing were completed to evaluate asset condition. Lift station assets, including pumps, valves, piping, structures, electrical, controls, and other assets, were rated on a scale of 1-5. Composite ratings for the station as a whole were developed.

Number of lift stations in each rating category

1	2	3	4	5
0	0	5	11	0

Criticality of Assets

"A summary of the method used to assess the criticality of assets considering the likelihood and consequence of failure. Discussion may include the method used to assess the criticality of assets considering the likelihood and consequence of failure and based on the condition of the assets and the determined risk tolerance, how were the assets ranked."

Assets were given a Risk of Failure (RoF) rating of 1-5 (5 being the worst) based on factors related to both physical and functional conditions as determined through condition assessments. Assets were given a Consequence of Failure (CoF) rating of 1-5 (5 being the worst) based on potential damage to adjacent utilities, transportation network, and the surrounding property/environment. The magnitude of the potential service disruption was also a factor.

Assets with the higher rankings for Consequence of Failure were those that:

- Provide service to a significant portion of the system
- Serve schools / hospitals / major industry
- Are under major roads or are adjacent to other major utilities
- Are adjacent to waterways or significant wetlands

Criticality ratings were calculated as the product of an asset's RoF and CoF, producing criticality ratings ranging from 1-25 (25 being the most critical). The most critical assets were found to be gravity sewers primarily along Bond Street, Fort Street and Niles Buchanan Road.

Level of Service Determination

"A summary of the level of service goals the municipality has determined that it wants to provide its customers based on the municipality's ability to provide the service and customer expectations. Discussion may include the procedures used to involve stakeholders in the level of service discussion. The trade-offs for the service to be provided. This could include any technical, managerial, health standard, safety, or financial restraints, as long as all regulatory requirements are met. How the level of service goals were determined"

The Township recognizes that the people served by the system are more than customers, they are the system owners. Township staff acts as stewards of the system. The Township has held numerous public meetings and workshops with the Township Staff and Board Members. At these meetings, the results of the condition assessments were discussed, the costs for various operations, maintenance and replacement strategies affecting the levels of service were reviewed along with potential rate impacts. Based on the input received during these meetings, the following Level of Service Goals has been established:

1. Meet Regulatory Requirements
2. Minimize Service Interruptions
3. Minimize Public Hazards
4. Manage Storm Water Inflow and Ground Water Infiltration
5. Provide Capacity for Community Growth
6. Minimize Life Cycle Costs

Revenue Structure

"A summary of the funding structure and rate methodology that provides sufficient resources to implement the asset management program. Discussion may include the rates, charges, or other means of revenue were reviewed to determine if there will be sufficient funds to cover system operation, maintenance, replacement, capital improvement projects, and debt costs, identified in the AMP. If the current rate structure was not sufficient, discuss what increases were needed to ensure the desired level of service is sustainable and if any changes were made."

Historical operating expenses were reviewed using current audit and budget information. Based on that information, a "Test Year" was developed that reflected a baseline cost. The baseline costs included currently budgeted expenses, debt service, and leveling for base operating cost.

The customer base was reviewed, including the number of residential equivalent units in the system. Other operating and non-operating revenues were also evaluated. Prediction of customer connections was made including trending in system utilization, projection of operating costs, and anticipated inflation by expense category.

A forecasting system was developed and used to identify the estimated replacement investment for the remaining lifecycle of all assets, based on the asset inventory and condition assessment data. Project costs were estimated for capital improvements within the first 10 years. The annual investment cost was evaluated and scenarios developed for cash funding and debt financing. Based on this analysis, it is expected that a combination of future rate increases and debt financing will be needed to fund capital projects.

Capital Improvement Plan

"A summary or the long-term Capital Improvement Plan that was developed to address system needs identified in the AMP."

A capital improvement plan showing project descriptions, cost estimates, and project timelines, was developed for the capital improvements needed within a ten year planning period. The major wastewater system projects identified in the CIP are:

- Fifteen (15) point repairs at various locations across the system
- CIPP / Replace Gravity Sewer in Fort Street
- CIPP / Replace Gravity Sewer in Bond Street
- Prepare for the replacement of nine (9) force mains from 1976
- Retrofit / Replace 12 lift stations from 1976
- Vehicle replacement of two (2) sewer department vehicles
- Replacement of two (2) trailer-mounted generators

List of Major Assets

"Provide a general list of the major assets identified in the AMP."

Niles Township's major assets include:

- 370,568 feet of 8" to 30" diameter gravity sewer
- 1,185 manholes
- 16 lift stations
- 29,910 feet of 4" to 20" diameter force main
- Four (4) trailer mounted generators
- Vactor Truck
- Three (3) trucks used by the sewer department staff

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date November 30, 2018
(no later than 3 years from executed grant date)

The Niles Charter Township *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1469-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or No
   If No - Date of the rate methodology approval letter: May 14, 2018.
2) Significant Progress Made: Yes or No
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: ____________.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ____________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

James Stover at 269-684-0870 jstover@nilestwpmi.gov
Name Phone Number Email

James W. Stover November 30, 2018
Signature of Authorized Representative (Original Signature Required) Date

James Stover, Township Supervisor
Print Name and Title of Authorized Representative

April 2017

Prein&Newhof
Engineers ▪ Surveyors ▪ Environmental ▪ Laboratory

Memorandum

Date:	November 30, 2018
To:	Clarence Jones
Company:	Michigan Department of Environmental Quality
From:	Prein&Newhof
Project #:	2130309
Re:	Niles Charter Township SAW Grant: Summary of Stormwater Asset Management Plan

This memorandum provides the summary of the Niles Charter Township stormwater asset management plan SAW grant activities required under Section 603 of Public Act 84 of 2015. Headings and italicized quotes are from recent MDEQ guidance.

Grantee Information

Grantee:
Niles Charter Township
320 Bell Road
Niles, MI 49120-4063
http://www.nilestwpmi.gov/

Contact: Mr. James Stover, Township Supervisor
Phone: 269-684-0870

SAW Grant Project Number: 1469-01

Executive Summary

The Niles Charter Township received a SAW Grant in November 2015 to prepare Wastewater and Stormwater Asset Management Plans. The Grant agreement indicated the following amounts:

Project Total	Grant Amount	Local Match
$1,111,111	$1,000,000	$111,111
Project Total	Wastewater Costs	Stormwater Costs
$1,111,111	$941,339	$169,772

The Key components in the Asset Management Plan include:

1. Asset Inventory and Condition Assessment
2. Criticality of Assets
3. Level of Service
4. Operation and Maintenance Strategies/Revenue Structure
5. Long-term Funding/Capital Improvement Plan

Asset Inventory

"Describe the system components included in the AMP. Discuss how they were located and identified, if applicable. Describe the platform used to develop and maintain the inventory of assets."

All assets that are functionally or financially significant to the stormwater system have been inventoried. Manhole, catch basin, sewer pipe, leaching basins, and retention/detention basin locations were plotted in a Geographic Information System (GIS) using record drawings, aerial imagery, and land contours. Locations were field verified and locations adjusted with survey grade Global Positioning System (GPS) coordinates.

Asset inventory data for storm sewers, including year of installation, material, sizes, pipe inverts and manhole rim elevations were cataloged from record drawing and visually verified where needed. Asset inventory data is managed using GIS databases.

Condition Assessment

Discuss the condition assessment process, including what methods were used. Summarize the results of the assessment for each asset category.

Storm Sewer Pipes: Inspections were made using either a pole mounted zoom camera (looking up or down each pipe from the manholes) or with in-line closed circuit television (CCTV) cameras. Pipes inspected with zoom camera methods were rated considering any observable roots, deposits, joint conditions, pipe wall condition, or other defect observations. Pipes inspected with CCTV were rated using the Pipeline Assessment Certification Program (PACP) system condition grading system. Composite Risk of Failure ratings of 1-5 were derived for each pipe.

Percentage of gravity sewer pipes in each rating category

1	2	3	4	5
67.6%	30.5%	1.5%	0.4%	8%

Manholes and Catch Basins: Manholes and catch basins were visually inspected and rated on a scale of 1-5 based on factors related to the condition of castings, steps, structures, and sediment.

Percentage of structures in each rating category

1	2	3	4	5
94.4%	4.5%	1.1%	0%	0%

Criticality of Assets

"A summary of the method used to assess the criticality of assets considering the likelihood and consequence of failure. Discussion may include the method used to assess the criticality of assets considering the likelihood and consequence of failure and based on the condition of the assets and the determined risk tolerance, how were the assets ranked."

Assets were given a Risk of Failure (RoF) rating of 1-5 (5 being the worst) based on factors related to both physical and functional conditions as determined through condition assessments. Assets were given a Consequence of Failure (CoF) rating of 1-5 (5 being the worst) based on potential damage to adjacent utilities, transportation network, and the surrounding property/environment.

Criticality ratings were calculated as the product of an asset's RoF and CoF, producing criticality ratings ranging from 1-25 (25 being the most critical). The most critical assets were generally found to be storm sewers along Fulkerson Street.

Level of Service Determination

"A summary of the level of service goals the municipality has determined that it wants to provide its customers based on the municipality's ability to provide the service and customer expectations. Discussion may include the procedures used to involve stakeholders in the level of service discussion. The trade-offs for the service to be provided. This could include any technical, managerial, health standard, safety, or financial restraints, as long as all regulatory requirements are met. How the level of service goals were determined"

The Township recognizes that the people served by the system are more than customers, they are the system owners. Township staff acts as stewards of the system. The Township has held a series of public meetings and workshops with the Township staff. At these meetings, the results of the condition assessments were discussed, the costs for various operations, maintenance and replacement strategies affecting the levels of service were reviewed along with potential costs. Based on the input received during these meetings, the following Level of Service Goals has been established:

1. Meet Regulatory Requirements
2. Minimize Flood Risk
3. Minimize Public Hazards
4. Manage Stormwater Discharges into the Wastewater System
5. Support Community Growth and Development
6. Maintain Water Quality
7. Minimize Life Cycle Costs

Revenue Structure

"A summary of the funding structure and rate methodology that provides sufficient resources to implement the asset management program. Discussion may include the rates, charges, or other means of revenue were reviewed to determine if there will be sufficient funds to cover system operation, maintenance, replacement, capital improvement projects, and debt costs, identified in the AMP. If the current rate structure was not sufficient, discuss what increases were needed to ensure the desired level of service is sustainable and if any changes were made."

Stormwater system improvements are funded with street improvements through the Township's general fund. Project costs were estimated for capital improvements within the first 10 years. Future costs beyond the 10 year capital improvement plan were projected using inventory and condition assessment data.

Capital Improvement Plan

"A summary or the long-term Capital Improvement Plan that was developed to address system needs identified in the AMP."

A capital improvement plan showing project descriptions, cost estimates, and project timelines, was developed for the capital improvements needed within a ten year planning period. The stormwater system projects identified in the CIP are maintenance in nature:

- Routine Cleaning of gravity mains
- Routine Cleaning of Storm Structures
- Routine Root Cutting within various pipe segments
- Periodic CCTV of Storm sewer to re-evaluate conditions

List of Major Assets

"Provide a general list of the major assets identified in the AMP."

Niles Township's major assets include:

- 2,620 feet of 8" to 18" diameter storm sewer
- 20 storm structures (manholes / catch basins / inlets)

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Due Date November 30, 2018
(no later than 3 years from executed grant date)

The Niles Charter Township *(legal name of grantee)* certifies that all stormwater asset management plan (SWAMP) activities specified in SAW Grant No. 1469-01 have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SWAMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

James Stover at 269-684-0870 jstover@nilestwpmi.gov

Name / Phone Number / Email

James W. Stover

November 30, 2018

Signature of Authorized Representative (Original Signature Required) / Date

James Stover, Township Supervisor

Print Name and Title of Authorized Representative

Memorandum

Date:	November 29, 2018
To:	Mr. Eric Pocan
Company:	Michigan Department of Environmental Quality
From:	Prein&Newhof
Project #:	2130453
Re:	North Kent Sewer Authority SAW Grant Wastewater Asset Management Plan Summary

Mr.Pocan:

This memorandum provides the summary of the North Kent Sewer Authority wastewater asset management plan SAW grant activities required under Section 603 of Public Act 84 of 2015. Headings and italicized quotes are from MDEQ guidance.

Grantee Information

SAW Grant Project Number: 1464-01

Grantee:

North Kent Sewer Authority

4775 Coit Ave, NE

Grand Rapids, MI 49525

http://www.nksa.us/

Contact: Mr. James "Scott" Schoolcraft, Director

Phone: 616-363-0702

Executive Summary

The North Kent Sewer Authority received a SAW Grant in 2015 to prepare a Wastewater Asset Management Plan. The Grant agreement indicated the following amounts:

Project Total	Grant Amount	Local Match
$569,494	$512,545	$56,949

The Key components in the Asset Management Plan include:

1. Asset Inventory and Condition Assessment
2. Level of Service
3. Criticality of Assets
4. Operation and Maintenance Strategies/Revenue Structure
5. Long-term Funding/Capital Improvement Plan

Wastewater Asset Inventory

Components included in the AMP

The system components included in the wastewater asset management plan include gravity sewer pipes, manholes, force mains, lift stations, and the Clean Water Plant.

How assets were located and identified

Manholes and lift stations were identified using record drawings and field located with Global Positioning System (GPS) coordinates. An inventory of lift station and Clean Water Plant assets was compiled from site visits and available documentation including bases of design, record plans, operations and maintenance manuals, and maintenance records.

Collection system asset inventory data, including year of installation, material, sizes, pipe inverts and manhole rim elevations, were cataloged from record drawings and visually verified where needed. Lift station and treatment asset inventory information, including size, capacity, manufacturer, model number, serial number etc. was compiled from available documentation.

Platform used to maintain the inventory

Manhole, gravity sewer main, and force main inventory data is maintained in a Geographic Information System (GIS). Lift station and clean water plant asset inventory data is maintained using spreadsheet tables.

Condition Assessment

Gravity Sewer Mains: Inspections were made using closed circuit television (CCTV) cameras. Pipe conditions were rated using the PACP system condition grading system. Composite Risk of Failure ratings of 1-5 were derived for each pipe.

Percentage of gravity sewer pipes in each rating category

1	2	3	4	5
81%	11%	5%	3%	0%

Force Mains: Force main conditions were estimated using pipe age, material, and break history records. North Kent Sewer Authority's force main data was compared with that of several other systems to establish a comparative reference. Ratings of 1-5 were developed for each force main.

Percentage of force main pipes in each rating category

1	2	3	4	5
24%	0%	76%	0%	0%

Manholes: Manholes were visually inspected and rated on a scale of 1-5 based factors related to the condition of castings, steps, structures, and infiltration.

Percentage of manholes in each rating category

1	2	3	4	5
86%	14%	0%	0%	0%

Lift Stations: Visual inspection and performance testing were completed to evaluate asset condition. Lift station assets, including pumps, valves, piping, structures, electrical, controls, and other assets, were rated on a scale of 1-5. Composite ratings for the station as a whole were developed.

Number of lift stations in each rating category

0-1	1-2	2-3	3-4	4-5
0	0	2	1	0

Clean Water Plant: The Clean Water Plant was broken down into an inventory of 1,247 assets which are grouped by 33 treatment processes. Visual inspection, performance testing, and discussions with maintenance staff were completed to rate the asset conditions.

Percentage of clean water plant assets in each rating category

1	2	3	4	5
78.5%	10.8%	5.5%	0.3%	4.3%

Criticality of Assets

"A summary of the method used to assess the criticality of assets considering the likelihood and consequence of failure"

Assets were given a Consequence of Failure (CoF) rating of 1-5 (5 being the worst) based on potential social, economic, and environmental impacts which can result from wastewater system failures. Collection system lines (gravity sewers and force mains) were rated based the size of the lines and potential impacts to transportation infrastructure. Lift stations were rated based on average day flow rates and the available time to respond to an emergency condition prior to a wastewater overflow. Clean water plant assets were rated based on how an asset failure might affect the overall process.

Criticality ratings were calculated as the product of an asset's RoF and CoF, producing criticality ratings ranging from 1-25 (25 being the most critical).

Level of Service Determination

"A summary of the level of service goals the municipality has determined that it wants to provide its customers based on the municipality's ability to provide the service and the customer expectations."

The level of service goals were considered at the local level as part of asset management planning within the member communities. The level of service goals established at the local level were used to establish the following level of service goals for the North Kent Sewer Authority.:

1. Minimize Service Interruptions
2. Meet Regulatory Discharge Requirements
3. Minimize Public Hazards
4. Manage Storm Water Inflow and Ground Water Infiltration
5. Support Community Growth and Development
6. Minimize Life Cycle Costs

Revenue Structure

"A summary of the funding structure and rate methodology that provides sufficient resources to implement the asset management program."

Historical operating expenses were reviewed using current audit and budget information. Based on that information, a "Test Year" was developed that reflected a baseline cost. The baseline costs included currently budgeted expenses, debt service, and leveling for base operating cost.

The revenue support is derived from direct payments based on expense allocation to the local units served.

Capital costs were estimated from the capital improvement plan and asset life cycles. The annual investment cost was evaluated and scenarios developed for cash funding and debt financing. Based on this analysis, the current expense allocation to the local units is expected to continue providing sufficient resources to implement the asset management program.

Capital Improvement Plan

"A summary of the long-term Capital Improvement Plan that was developed to address system needs identified in the AMP."

The capital improvement plan includes the following projects:

- PARCC Side Clean Water Plant
    - Odor Control Improvements
    - Fine Screen Replacement
    - UV System Improvements
    - Machine Building Electrical, Instrumentation, and Controls Improvements
    - Influent Screw Pump Replacement
    - Computer System Upgrade
    - Installation of Coarse Screens
    - Chemical Feed Improvements
    - Membrane Process Improvements
    - Bioreactor Mixing Improvements
    - Solids Handling Improvements
    - Site Lighting Improvements
    - Equalization Storage and Blended Discharge
    - Process Conversion to LEAP
- 4 Mile Lift Station Improvements

List of Major Assets

"Provide a general list of the major assets identified in the AMP."

The North Kent Sewer Authority wastewater system major assets include:

- 14.6 miles of 12" to 48" diameter gravity sewer
- 2.6 miles of 12" to 30" diameter force main
- 243 manholes
- 3 lift stations (4 Mile LS, Rogue River LS, Grass Lake LS)
- Clean Water Plant

Prein&Newhof
Engineers ■ Surveyors ■ Environmental ■ Laboratory

November 29, 2018 *sent via email to: POCANE@michigan.gov*
2130453

Mr. Eric Pocan, Project Manager
MDEQ
Office of Drinking Water and Municipal Assistance
P.O. Box 30241
Lansing, MI 48909-7741

RE: SAW Grant Project No. 1464-01
Wastewater Asset Management Plan
North Kent Sewer Authority, Kent County

Dear Mr. Pocan:

Enclosed are North Kent Sewer Authority's required SAW Grant deliverables as follows:

1. Certification of Project Completeness signed by Mr. James Scott Schoolcraft, North Kent Sewer Authority Director
2. Project executive summary as required under Section 603 of Public Act 84 of 2015, including contact information for the grantee, a brief discussion of each of the five major components of the Asset Management Plan, and a list of major identified assets. The summary has been prepared in accordance with recent MDEQ guidance.

The North Kent Sewer Authority has completed the Asset Management Plan, which will be made available to the MDEQ upon request and available to the public for at least fifteen years.

We are submitting these documents prior to the November 30, 2018, grant deliverable deadline. Final grant-eligible expenses will be incurred prior to November 30, 2018, and final disbursement requests will be submitted by January 29, 2019 (60 days after grant end date). It is our understanding that this will complete the North Kent Sewer Authority's obligations under the grant.

If you have any questions, please contact our office.

Sincerely,

Prein&Newhof

Steve Oosting

Steve Oosting, P.E.

Enclosures

c. Scott Schoolcraft, North Kent Sewer Authority

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date November 30, 2018
(no later than 3 years from executed grant date)

The North Kent Sewer Authority *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1464-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or No
   If No - Date of the rate methodology approval letter: May 14, 2018.
2) Significant Progress Made: Yes or No
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: ______.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ______.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Name		Phone Number	Email
Scott Schoolcraft	at	(616) 363-0702	jschoolcraft@nksa.us

[signature] 11/29/2018

Signature of Authorized Representative (Original Signature Required) Date

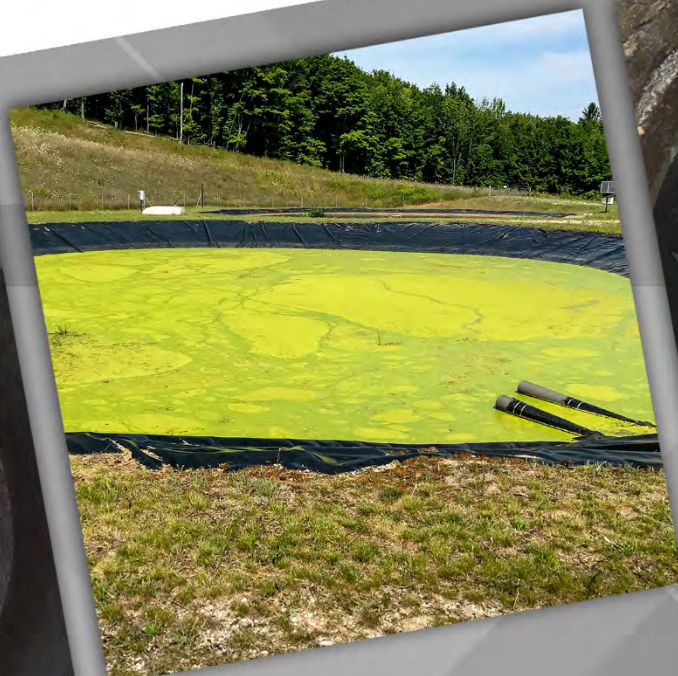
James Scott Schoolcraft, Director

Print Name and Title of Authorized Representative

Protecting our Infrastructure Investment

ASSET MANAGEMENT PLAN

Wastewater Executive Summary Report



Prepared for:

Northport Leelanau Township Utilities Authority

SAW Project No. 1658-01

NORTHPORT/LEELANAU TOWNSHIP
UTILITIES AUTHORITY
116 West Nagonaba· P.O. Box 158· Northport, MI 49670
Phone (231) 386-5182 ext 15 · Fax (231) 386-5184

October 2018

FLEIS&VANDENBRINK
DESIGN. BUILD. OPERATE.

EXECUTIVE SUMMARY

OVERVIEW

Public Act 562 of 2012 authorized money for Stormwater, Asset Management, and Wastewater (SAW) Grant Program. In November 2015, The NLTUA received a Stormwater, Asset Management, and Wastewater (SAW) Grant from the Michigan Department of Environmental Quality (MDEQ), project no. 1658-01, to provide financial assistance for the development of a wastewater asset management plan (AMP) for NLTUA's publicly owned wastewater utility. This AMP is intended to be a living document that is updated as assets continue to wear and age, and as additional inspection/condition results are found and incorporated into the plan.

The contact person for the NLTUA AMP is:

Chris Holton, NLTUA Superintendent
P.O. Box 336
Phone number: 231.432.0351
Email: cdhkrs@gmail.com

ASSET INVENTORY & CONDITION ASSESSMENT

A list of the major assets in NLTUA's wastewater system, described further below, include:

- Collection system piping system and manholes
- Wastewater Treatment Plant (WWTP)
- Sanitary sewer lift stations in the collection system
- Grinder stations and low pressure forcemain

The wastewater collection system assets include approximately 68,767 feet (13.0 miles) of sanitary sewers (gravity pipe, low pressure mains, and force mains), 151 wastewater manholes connecting the gravity pipe, 44 wastewater clean outs and air release valves, 151 grinder stations, and 3 duplex submersible stations. These assets are located in existing street rights-of-way or in easements dedicated for the assets use and maintenance.

The WWTP currently includes the following treatment processes:

- fine screening
- primary anoxic basin
- moving bed biological reactor
- settling basin
- polishing filters
- rapid infiltration beds

Treated effluent is discharged to rapid infiltration beds in accordance with NPDES permit No. GW1810138. The design capacity of the WWTP is 0.132 million gallons per day (mgd). The current annual average flow received by the facility is approximately 0.059 mgd.

Asset Identification & Location

A comprehensive wastewater system asset inventory was developed from operation and maintenance (O&M) manuals included a review of existing record drawings, field notes, staff knowledge, and site visits, supplemented with field survey work. Asset material, size and age were identified through the review of available historical record documents from when the system was design and constructed in 2008. Spatial orientation (pipe location), pipe depth and invert elevations were determined through GPS field survey and a comprehensive evaluation of the gravity system. This information was organized into a new GIS database and piping network for archiving, mapping and further evaluation purposes. The inventory includes over 192 WWTP assets, 196 Lift Station Assets, and 364 Collection System Assets.

Condition Assessment and Expected Useful Life

A comprehensive evaluation of the collection system was performed. NASSCO-MACP manhole field-based assessments were completed on all 195 manhole structures with exception to Manhole #4 on M-22 (S Shabwasung Street). Manhole #4 was inaccessible and could not be found as it appeared to be buried in the shoulder. Field based assessments were completed on 28 of the 44 low pressure main structures (clean outs and air release valves). Various structures were inaccessible or not found under buried gravel road, and these assets will be inspected at a later date by Jacobs. The following was not performed due to the age of the system: pipeline cleaning and inspections, smoke testing, and capacity analysis model. Recommendations for short-term (1-5 year) and long term (6-20 year) identified the need for maintenance with 57% of the system tagged for inspection, CCTV and/or cleaning. Rehabilitation accounted for 11% of the system identifying the need for clean/line, repair, or rim adjustment.

Overall, the condition of the assets at the WWTP range from good to poor. Ongoing repairs have helped to maintain the condition of many assets. Some assets that were installed in 2006 have not been replaced and are now at the end of their useful life. The equipment might fail due to age or deterioration caused by harsh conditions associated with wastewater treatment. Below are some of the immediate concerns:

- Vertical Fine Screen wet well rehabilitation
- Vertical Fine Screen auger replacement
- Broken Solar Bee mixer in the sludge storage lagoon.

The condition of the assets at the lift stations range from good to poor. Ongoing maintenance has preserved the condition of many assets while other assets have deteriorated due to age and the harsh conditions associated with typical wastewater collection systems. The recommendations for short- and long-term improvements are discussed in the Pump Station Condition Assessment.

LEVEL OF SERVICE

Defining the Expected Level of Service (LOS)

The overall objective of the NLTUA Wastewater Department is to provide reliable wastewater collection and treatment services at a minimum cost, consistent with applicable environmental and health regulations. To achieve this, the following Level of Service (LOS) goals are proposed:

WASTEWATER UTILITY - LEVEL OF SERVICE STATEMENT

- Provide adequate collection system and treatment capacity for all service areas.
- Comply with all local, state and federal regulations at all times for treated effluent from the WWTP.
- Actively maintain collection and treatment system assets in reliable working condition.
- Prevent inflow/infiltration (I/I) flow to mitigate potential for sanitary overflows, and overloading of treatment facility.
- Provide rapid and effective emergency response services to customers.
- Ensure operations staff are properly certified.
- Regularly review health and safety procedures for operations staff to provide proper worker safety.
- Regularly review projected O&M and capital expenditures. Adjust user rates, as necessary, to ensure sound financial management of wastewater system.

The LOS goals may need to be adjusted from time to time as the utility ages, the needs of community change or new rules or regulations require a change in operation. For this reason, the LOS goals should be reviewed by NLTUA from time to time to make sure they accurately reflect the desired operation of the utility.

Measuring Performance

In order to assure that LOS goals are met performance measurements may need to be implemented. During the LOS review with the community the need for performance measurements was discussed.

CRITICAL ASSETS

Determining Criticality

Business Risk is the determination of criticality of each asset in the wastewater system. Criticality is based on two factors; Likelihood (Probability) of Failure and Consequence of Failure using the following formula:

Business Risk = Consequence of Failure Score x Likelihood of Failure Score

Defining an asset's Business Risk allows for management of risk and aids in decision making for where to allocate operation and maintenance and capital improvement funds.

Likelihood of Failure (LoF) is a measure of how likely an asset is to fail. The following categories have been developed to quantify how likely an asset is to fail:

- Condition of the asset
- Remaining useful life (Age)
- Service History
- Operational status

Consequence of Failure (CoF) is a measure of the social, economic, financial or environmental impact of failure of an asset and the utilities ability to respond, convey and treat wastewater. CoF categories of the collection system include:

- Proximity to critical environmental features
- Location (Zoning District) of asset
- Facilities served by asset
- Size and location of asset within the utility network
- Type of asset.

The WWTP and lift station categories for CoF are:

- Process
- Financial Impact
- Safety
- Environmental Impact
- Disruption to the Community
- Ability to Respond

Criticality Results

Using the strategy outlined above, a Business Risk Evaluation (BRE) was performed for each asset using a graphical ArcGIS-based sewer asset management and capital planning software that compiles, analyzes and assesses Business Risk for each asset and develops a Capital Improvement Plan. The results of the BRE are provided in easily understood tabular and graphical output.

Figure 1 provides the risk rating for gravity and force main pipe by number of pipe segments. Much of the collection system's pipes, as shown in Figure 1, have a low to negligible risk rating and are indicative of pipes in relatively good condition.

Figure 2 provides the risk rating for the collection system manholes. Eight manholes are identified as extreme risk and are recommended for immediate clean and/or lining. One of the eight manholes (MH #35) was already addressed and cleaned in the summer of 2018. Many manholes are at low to medium risk and recommended to be included in a long-term 6-20-year rehabilitation strategy.

Consequence of Failure	Low	Medium	High
High	Medium 11	High 0	Extreme 0
Medium	Low 46	Medium 0	Extreme 0
Low	Negligible 113	Low 0	High 0

Likelihood of Failure

Figure 1. Business Risk Matric (Risk Rating) by Number of Gravity and Force Main Pipes

Consequence of Failure	Low	Medium	High
High	Medium 37	High 9	Extreme 5
Medium	Low 38	Medium 3	Extreme 3
Low	Negligible 98	Low 0	High 1

Likelihood of Failure

Figure 2. Business Risk Matrix (Risk Rating) by Number of Manholes

Figures 3 and 4 provide the risk ratings for the WWTP and lift station assets. One asset is identified as extreme risk and should be addressed immediately. The ten assets with high risk ratings should be inspected at regular intervals.

Consequence of Failure	Low	Medium	High
High	High 2	High 3	Extreme 1
Medium	Low 38	Medium 33	High 3
Low	Low 57	Low 53	Medium 2

Likelihood of Failure

Figure 3. WWTP Assets by Risk Rating

Consequence of Failure	Low	Medium	High
High	High 1	High 1	Extreme 0
Medium	Low 8	Medium 18	High 0
Low	Low 1	Low 167	Medium 0

Likelihood of Failure

Figure 4. Lift Station Assets by Risk Rating

A spreadsheet providing asset criticality for each utility asset has been included in the AMP detailed report for the collection and treatment systems.

Capital Improvement Plan

A Capital Improvement Plan (CIP) with rehabilitation recommendations was prepared for the NLTUA wastewater utility assets based on the Business Risk evaluation. The CIP recommendations are provided for the collection system, WWTP and lift stations/force mains. From the BRE, a short-term (1-5 year CIP) and long-term (6-20 year CIP) was developed for the utility. The short-term CIP rehabilitations for the collection system include cleaning and lining thirteen (13) manholes. The short-term CIP rehabilitations for the WWTP and lift stations include WWTP headworks improvements and WWTP sludge handing evaluation.

Operations, Maintenance & Replacement

Regular operation, maintenance and replacement (OM&R) is essential in the management of a wastewater collection system. The collection system is subject to a variety of operational problems and can suffer from clogging, scour, corrosion, and collapse. Inspection, cleaning, and rehabilitation are important for optimizing the proper functioning of the collection system. By optimizing the performance infiltration/inflow are reduced and sanitary sewer overflows (SSO) are minimized or eliminated preserving the substantial investment the community has in its collection system.

An annual equipment replacement fund should be developed to replace disposable equipment. These are items that can be financially accounted for through operation, maintenance and replacement (OM&R) funds and can be replaced by WWTP staff without bringing in an outside contractor. Existing disposable materials include chemicals, wear parts in pumps and motors, laboratory instruments, etc. The existing OM&R fund is sufficient for the current operations.

Preventative maintenance and operations were identified in the short-term CIP that include manhole inspections and cleaning for twenty-eight (28) structures. These include eleven (11) sanitary gravity manholes and seventeen (17) forcemain structures.

Revenue Structure

The revenue and rate methodology is an instrument to determine user rates and charges that will provide sufficient revenues to pay for utility operating costs.

A study was conducted by an independent municipal financial advisor H.J. Umbaugh & Associates to complete a gap analysis to meet the Michigan Department of Environmental Quality SAW Grant requirements. It was found that no gap between operating expenses on revenue currently exists.

The letter dated June 19, 2018 from the Michigan Department of Environmental Quality, states, the Northport/Leelanau Township Utilities Authority has fulfilled the significant progress requirement and complies with section 5204e(3)(a), Part 52, Clean Water Assistance, of the Natural Resource and Environmental Protection Act, 1994 PA 451, as amended.

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date November 28, 2018
(no later than 3 years from executed grant date)

The Northport/Leelanau Township Utilities Authority *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1658-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or No

   If No - Date of the rate methodology approval letter: June 19, 2018.

2) Significant Progress Made: Yes or No

   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)

3) Date of rate methodology review letter identifying the gap: ________________________.

4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ____________________________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Name	Phone Number	Email
Barb Von Voigtlander at	231-386-518	administrativecoordinator@villageofnorthport.net

Barbara Von Voigtlander 11/28/2018
Signature of Authorized Representative (Original Signature Required) Date

Barbara Von Voigtlander, NLTUA Chair
Print Name and Title of Authorized Representative

Charter Township of Northville

Sanitary Sewer System

Asset Management Plan

SAW Grant No. 1350-01

44405 Six Mile Road, Northville, MI 48168

248.348.5800

November 2018

OHM Advisors®

Table of Contents

EXECUTIVE SUMMARY

The wastewater infrastructure system of Northville Township provides a critical service to its residents and businesses, providing the collection and conveyance of wastewater and protecting the local streams and Rouge River by discharging to Western Townships Utilities Authority (WTUA) pipes. Recognizing the importance of this wastewater system, Northville Township initiated a comprehensive assessment of its wastewater infrastructure.

This Asset Management Plan summarizes this assessment and includes key recommendations for future funding levels. This document was prepared using grant funding from the State of Michigan Stormwater, Asset Management and Wastewater (SAW) Grant Program, SAW Grant 1350-01, with a total budget of $1,358,000 (with an additional Township matching contribution of $230,000).

The AMP was intended to accomplish the following key goals:

- Provide the Township with a new framework for collecting, organizing, and storing data for their wastewater collection system using the latest available hardware and software.
- Survey key system components to create the Township's Geographic Information System (GIS) database and to make it easy for future generations to access infrastructure data.
- Add information for sewer material type, size, age, and depth to the newly created GIS database.
- Physically evaluate the structural condition of the majority of publicly owned system components, including wastewater sewer pipes, manholes, and pump stations. Store the data in the Township's GIS database.
- Identify long-term operations and maintenance strategies to maintain a reasonable structural condition into perpetuity, including:
    - Regularly-scheduled sewer inspection (televising)
    - Repair and rehabilitation to address structural problems resulting from aging infrastructure
- Provide recommendations for developing a prioritized Capital Improvement Plan (CIP) to be funded through the Township's water and sewer fund.

A. Mission Statement

One important element to an Asset Management Program (AMP) is a mission statement, which identifies the overarching purpose of the Township's AMP. The purpose of the Township's asset management program is summarized by the following mission statement:

We are committed to providing and maintaining high quality wastewater sewer collection services to our existing and future customers in a cost effective manner while protecting human health and the environment.

B. Asset Management Team Leaders

The Asset Management Team listed in Figure 1 is committed to the asset management mission statement and were instrumental in the progress made and findings outlined in this report. Further questions on the Township's AMP can be directed to these team members.

Tom Casari
- tcasari@twp.northville.mi.us

Karl Gorham
- kgorham@twp.northville.mi.us

Jill Rickard
- jrickard@twp.northville.mi.us

Shaun Nicoloff
- snicoloff@twp.northville.mi.us

Figure 1: Asset Management Team

C. Infrastructure Technology & Know-How

The Township has made investments to improve the GIS database mapping their wastewater system with the intent of making it easier for future generations to access infrastructure knowledge.

D. Asset Inventory

An asset inventory is a list of the Township's assets and their attributes. The majority of the Township's wastewater sewer infrastructure, including manholes, wastewater sewers, and pumping stations were inventoried and digitized. The Township has populated the attributes of the inventory using observations in the field while performing condition assessment. This inventory resides in the Township's GIS, along with critical data for the location, size, material, install date, and condition of each wastewater asset.

3616 manholes
- 44% condition assessed

126 miles of pipe
- 41% condition assessed

Figure 2 : Portion of Sewer System Assessed

E. Condition Assessment

With the intent of assessing the majority of the wastewater system, the Township's wastewater sewer infrastructure (wastewater sewer pipes, manholes and pump stations) has been assessed. The condition of the infrastructure is based on the National Association of Sewer Service Companies (NASSCO) condition grading system, which uses a scale of zero to five. Zero indicates the infrastructure is in very good condition or new, while five indicates the infrastructure is in very poor condition or has already failed. About 44 percent of the 3616-

structure manhole network and about 41% of the approximately 126 miles of wastewater pipe infrastructure has been condition assessed. The assets within the Township's two pumping stations also inventoried and assessed. The major components inventoried within each station include but are not limited to pumps, check/control valves, motors, level control systems, backup power, structure, wet well, valve vault, and telemetry.

It was also observed that:

- Manhole infrastructure exhibits age-appropriate wear with an average structural rating of 2.1 and an average O&M rating of 1.8. The overall average Probability of Failure is 2.7. Structural manhole defects were predominately related to brickwork. O&M manhole issues were driven by infiltration.
- Sewer infrastructure has an average structural rating 1.8 and average O&M rating of 2.1. Overall the wastewater sewer system exhibits age appropriate wear.
- The infrastructure will continue to degrade over time, for example, even though the average condition of the manhole infrastructure is between a score of one (minimal wear and good working) and two (moderate wear but still functional) per the 2016-2018 assessment data, a small percent of the infrastructure has a condition rating of five; this percentage will grow over time.

F. Criticality and Risk

The investigation leading to the identification of critical sewer infrastructure involved the determination of Business Risk Exposure (BRE), which is identified as the combination of the Probability of Failure (PoF) as well as the Consequence of Failure (CoF) as shown in Figure 3.

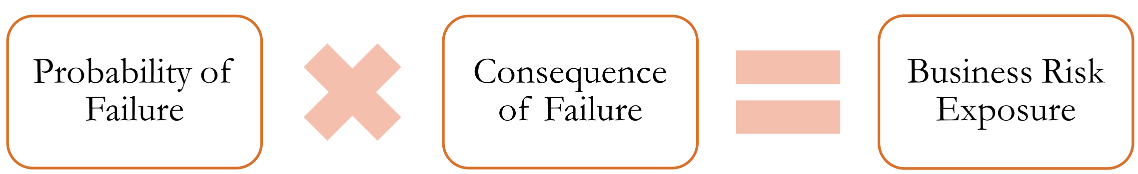


Figure 3 : Risk Equation

The PoF is related to the physical condition of an asset. The CoF focuses on the economic losses and impacts to society due to an asset's failure. The following factors were combined to determine the consequence of failure for manholes and wastewater sewer:

- Diameter/Size – the relative size of the asset with respect to the rest of the system
- Environment – proximity to sensitive environmental features like Johnson Creek and Middle River Rouge.

For pumping station assets, PoF was based on the condition of the asset while the CoF was determined by the effect of an individual asset failure on system operations.

G. Level of Service

The Township, in line with its mission statement outlined earlier, adopted Level of Service (LOS) criteria, which it plans to use as guidelines to manage the wastewater sewer system. These LOS criteria's are summarized in Table 1.

Table 1: Summary of Level of Service Criteria

Key Service Criteria	Performance Indicator	Target Level of Service
Flow Capacity	Active Flow Monitoring of the Service Provider Meter	Continue to be consistently below the contractual flow limit with Service Provider Meter
O&M Optimization	Regular Cleaning and Maintenance of the Collection System	Clean and maintain 20% of the system per year
Service Delivery and Customer Communication	Continue to utilize Cityworks Software to Aide in Utility Management and Promote Customer Communication	Respond to customer complaints and requests within one (1) business day
Staff Training	Continue to Hold Regular Training for O&M Staff	Offer five (5) or more different training sessions each year

H. Revenue Structure and Capital Improvement Plan

The condition assessment helped identify capital improvements that will allow the Township to operate at its maximum potential. Additional long-term operations and maintenance strategies will provide the means to maintain a sound structural condition into perpetuity, including:

- Regularly-scheduled sewer, manhole, and pump station inspection
- Repair and rehabilitation to address structural problems resulting from aging infrastructure

As communities like Northville Township develop and age, the buried infrastructure is deteriorating. The Township should continue to systematically repair, rehabilitate, and/or replace these aging components so that Township residents and businesses experience a consistent level of service and avoid the following:

- Increased threat of property damage, public health and safety.
- Increased potential for environmental damage.
- Increased potential for impassable roadways due to failed infrastructure.

The revenue structure analysis identified that an initial rate increase of zero percent (0%) for the first year of the CIP followed by an annual rate increase of two percent (2%) per year is needed to support the rising expenses over time. The revenue structure analysis and associated capital improvement projects and O&M strategies, which will continue the Township's AMP, are detailed in a separate document and can be made available to the public upon request.

I. List of Major Assets

The major assets are approximated in the text below. The full AMP report contains additional details on the distribution of sizes and conditions.

- 3,616 manholes
- 126 miles of wastewater sewer ranging from 8 to 24-inch in diameter
- 2 package pump stations

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
LANSING

RICK SNYDER
GOVERNOR

C. HEIDI GRETHER
DIRECTOR

June 20, 2018

RECEIVED
JUN 25 2018
CHARTER TWP OF NORTHVILLE
BUILDING DEPARTMENT

Mr. Thomas Casari
Charter Township of Northville
44405 Six Mile Road
Northville, Michigan 48168

Dear Mr. Casari:

SUBJECT: Stormwater, Asset Management, Wastewater (SAW)
Charter Township of Northville
SAW Grant Project Number 1350-01

We have reviewed the information contained in the rate methodology dated May 24, 2018. It has been demonstrated that significant progress has been made, as determined by the department, toward achieving the funding structure necessary to implement the program.

Accordingly, the applicant has fulfilled the significant progress requirement and complies with Section 5204e(3)(a), Part 52, Clean Water Assistance, of the Natural Resource and Environmental Protection Act, 1994 PA 451, as amended.

If there are any questions regarding approval of the rate methodology, please contact Mr. Robert Schneider in the Revolving Loan Section, Drinking Water and Municipal Assistance Division, by phone at 517-388-6466, or by mail at DEQ, P.O. Box 30817, Lansing, Michigan 48909-8311.

Sincerely,

Sonya T. Butler

Sonya T. Butler, Section Manager
Revolving Loan Section
Drinking Water and Municipal Assistance Division
517-284-5433

cc: Ms. Mary G. Martin, Executive Director, Michigan Finance Authority
Ms. Karen Nickols, DEQ

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date November 21, 2018
(no later than 3 years from executed grant date)

The Charter Township of Northville *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1350-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or No
   If No - Date of the rate methodology approval letter: June 20, 2018.
2) Significant Progress Made: Yes or No N/A
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: N/A.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on N/A.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Shaun Nicoloff at 248-662-0496 snicoloff@twp.northville.mi.us

Name | Phone Number | Email

11/21/2018

Signature of Authorized Representative (Original Signature Required) | Date

Tom Casari, Director of Public Services for Northville Township

Print Name and Title of Authorized Representative

MEMORANDUM

To: Michigan Department of Environmental Quality (MDEQ)
Revolving Loan Section, Attn: Jonathan Berman

From: OHM Advisors

CC: City of Novi
Oakland County Water Resources Commissioner

Date: November 26, 2018

Re: City of Novi
MDEQ Stormwater, Asset Management and Wastewater (SAW) Grant #1147-01
Summary of Wastewater Asset Management Plan

The following is a summary of the work completed under the MDEQ SAW Grant work performed by the Oakland County Water Resources Commissioner on behalf of the City of Novi. It includes a summary of the project scope, results and findings of activities covered by the grant, grant amount spent and match amount, and contact information. It has been prepared as required under Section 603 of Public Act 84 of 2015, and follows recent MDEQ guidance.

GRANTEE INFORMATION

City of Novi, SAW Grant Project #1147-01

Project Grant Amount: $675,000

Applicant Match Amount $75,000

Ben Croy, P.E.
City of Novi
Water and Sewer Senior Manager
26300 Lee BeGole Drive,
Novi, MI, 48375
(248) 735-5661
bcroy@cityofnovi.org

Lindsey Kerkez, P.E.
OHM Advisors
Project Manager
(734) 466-4474
Lindsey.Kerkez@ohm-advisors.com

Karen Warren, P.E.
Oakland County Water Resources Commissioner's Office
WRC Project Manager
(248) 858-0958
warrenk@oakgov.com

EXECUTIVE SUMMARY

The City of Novi (City) applied for and received a grant to further develop an Asset Management Plan (AMP) for its sanitary system through the Michigan Department of Environmental Quality's (MDEQ) Stormwater, Wastewater and Asset Management (SAW) program. Because the SAW program was funded through monies appropriated for water quality, other related infrastructure systems, such as drinking water, were not eligible for funding through the grant, but are considered in analysis and recommendations where appropriate.

The City's wastewater system is owned by the City of Novi, and is operated and maintained by the Oakland County Water Resources Commissioner (WRC). The WRC has various tools used to manage the assets it owns or operates and maintains, including a GIS geodatabase, collaborative asset management system, hydraulic models, condition assessment methods, risk and prioritization models, capacity studies, asset deterioration models, and an operating and capital improvement project prioritization model. These tools are used to guide the short and long-term strategies for WRC to operate the various systems in a sustainable manner that meets the required level of service, with a focus on prioritizing assets that are most critical and being cost-effective. The funding strategy for each fund is also evaluated annually through WRC's "Long-Term Plan" (LRP) process that includes a review of the current rate structure, fund balances and anticipated future funding needs.

The WRC "Common to All" approach was generally followed with in development of the asset management plan for this system. The following is a summary of the AMP, as required by the grant, which includes a brief discussion of the five major AMP components, a list of the plan's major identified assets, and contact information for the grant.

WASTEWATER ASSET INVENTORY

WRC uses its existing Geographic Information System (GIS) geodatabase as the primary means to inventory and map the assets in the system. The geodatabase includes key attributes associated with each asset, such as installation date (age), size, material, along with other information as needed for a given asset type.

WRC currently uses the Cityworks software package for its Computer Maintenance Management System (CMMS,) which then collaborates with the GIS to present a single interface to the user via the Collaborative Asset Management System (CAMS.) CAMS assists in managing inspections and maintenance work by generating and tracking work orders, collecting inspection and condition data, and compiling costs and hours spent on each asset. Maintenance history and costs can be tracked on an asset and/or fund level.

Condition assessment tools and protocols were developed by WRC to allow for efficient and consistent recording of asset condition. For sanitary sewer assets, a NASSCO-compliant software program stores data collected during sewer televising. The data stored can be shared with the existing CAMS system. Inspection work orders in the CAMS system are used for evaluation of other types of assets, such as manholes and other collection system structures, and for most vertical asset types, such as pumps, valves, structures, etc.

As part of the grant for the City of Novi, the GIS geodatabase inventory was reviewed for completeness and to ensure critical attributes were populated. Approximately 99,000 lineal feet of sanitary sewer underwent condition assessment via cleaning and televising. Approximately 400 manholes were evaluated using the CAMS inspection work orders. Vertical assets, including four pump stations, were inventoried using a WRC hierarchy template and condition assessment data was collected and input into the CAMS system.

CRITICALITY OF ASSETS

WRC implemented PowerPlan asset optimization software as part of the "Common to All" Program. Baseline Probability of Failure (POF) and Consequence of Failure (COF) factors were configured into the software as part of that Program, and were used to estimate the overall risk of the horizontal assets (sewers and associated structures.) For pump stations, individual assets were reviewed by staff as part of the grant work, and POF and COF factors determined and input into the software.

Both the POF and COF were scored on a scale of 1 to 5, with 1 being the lowest probability or consequence of failure, and 5 corresponding to the highest probability or consequence of failure. The Business Risk Evaluation (BRE or Risk) score is the product of the POF score and the COF score (POF times COF equals Risk,) and has a scale of 1 to 25. Higher BRE scores identify the assets with the greatest overall risk.

The POF and COF for horizontal assets are determined using scoring values developed uniquely for each asset type, such as gravity main, non-gravity main, manhole, etc. The POF and COF scores for each asset type are calculated using attribute data from the GIS geodatabase, inspection data from the CAMS system, and NASSCO PACP and MACP ratings. The primary attribute for determining the POF of gravity mains (sanitary sewers) was the PACP Structural Quick Score. The PACP Maintenance Quick Score and age are also incorporated into the POF rating. Where PACP scores were not available, the POF score was based on the age-based assumed condition.

For manholes, the POF is based primarily on the MACP fields cover condition, frame condition, chimney condition, cone condition, wall condition, bench condition, and channel condition along with age. If the MACP data was not available, the score was based on just age.

The COF for mains and access points was determined based on asset depth, size, proximity to groundwater and flood zones, and proximity to roads and intersections.

The POF and COF of vertical assets were calculated using a scoring matrix. The POF for vertical assets was calculated using a combination of age and physical condition collected from inspections performed using work orders through the CAMS system. O&M protocol and performance factors were also scored and used in the calculation. In the absence of any other data, age was used to estimate POF. The COF for vertical assets was scored using a matrix of factors including: safety of public and employees, financial impact, public confidence, regulatory compliance, and firm capacity.

LEVEL OF SERVICE DETERMINATION

At the strategic level, the Level of Service (LOS) identifies the long-term goals and strategies of the organization. An overall LOS guiding matrix was developed to document the goals and strategies of the WRC organization. The WRC Mission Statement and the annual LRP rate process form additional elements of the LOS.

The WRC's current Mission Statement is:

> *The Oakland County Water Resources Commissioner's Office is dedicated to the preservation and protection of our water environments, public health, welfare, convenience and the citizen's right to quality water. We are committed to acting with integrity and professionalism and will always seek collaboration among our Oakland County communities and regional partners.*
>
> *We commit ourselves to providing our customers with high value services that are fairly priced, environmentally sound and sustainable in the long term. We are committed to an open dialogue with our communities and promise to keep lines of communication open.*
>
> *In our pursuit of excellence and continuous improvement, every member of our staff will respond to issues of the public promptly, safely, respectfully and with sensitivity to their individual needs. Our office will always endeavor to provide an appropriate resource when an issue is not within our authority.*
>
> *We will install a culture that perpetuates an environment promoting trust, respect and teamwork, both within our organization and among our communities and region.*

The City of Novi's current Mission Statement is:

> *The City of Novi is committed to enhancing the safety, health, and quality of life for the people serviced by the water system through effective management and maintenance of its infrastructure. The City of Novi's overall goal is to have appropriate capital reserves to ensure service to all of their customers.*

The WRC strategic Level of Service Goals included:

- Financial Viability and Impact. Goal: Emergency repairs can be repaired within Utility Reserve Budgets of the system. Measurable: Exceedances of reserve budgets.
- Public Confidence and System Service Impact. Goal: Minimal to some loss of service or impact on other services for less than four hours. No sewer system or basement backups. Minor disruption (e.g., traffic, dust, noise.) Measurable: Number of service interruptions, complaints, and backups.
- Regulatory Compliance. Goal: No state permit violations and comply with all MDEQ policies. Measurable: Number of violations.

- Safety of Public and Employees. Goal: Non-reportable injuries, no lost-time injuries or medical attention required. No impact to public health. Measurable: Number of injuries and any public health advisories.
- Redundancy. Goal: Comply with 10 State Standards. Measurable: Number of violations.
- Risk and BRE score: Goal: 70% of assets have a BRE less than 15. Measurable: System risk score.
- Staffing. Goal: Staffing levels and training maintained to meet level of service. Measurable: Number of open positions, training hours.

At the tactical level, the LOS focuses on the prioritization in the medium-term and identification of factors and indicators related to performance, cost, risk, and failure probability. The Probability of Failure and Consequence of Failure scoring matrices used in the criticality and risk analysis were developed using the strategic LOS guidance. Progress toward the goals are measured through the CAMS analytic data, and is reviewed as part of the LRP process with internal staff and customers.

At the operational level, the LOS is related to procedures and information related to the short-term, day-to-day operation. Performance is measured at the asset level using work orders to collect data, and annual reporting of measurables and progress toward goals with operational staff.

REVENUE STRUCTURE

The annual operation and maintenance budget includes the typical costs spent each year to operate the system and to perform normal maintenance activities. This baseline O&M budget does not include major capital improvements that are required to increase capacity, meet new regulatory requirements, or replace items that have failed or reached the end of their useful service life.

The asset optimization software assisted WRC staff by developing recommended strategies for inspection, rehabilitation and replacement needs over the long-term for each system based on condition and risk. WRC project management staff then reviewed the recommendations generated by the software and rationalized the recommendations to “real world” needs, including any improvements required due to capacity or regulation changes. The WRC uses this information as part of its existing LRP rate process to prioritize projects and ensure adequate funding is available.

The LRP rate methodology is a tool to determine utility rates and charges to provide sufficient revenues to cover the anticipated operation, maintenance, replacement, capital improvement projects, and debt costs associated with a given system, as well as to maintain a reserve balance for emergencies or a significant one-time charge. It ensures adequate revenues are collected for budgeted needs in the current year, and over the long term.

The LRP includes multiple reserve accounts that are used to fund activities above and beyond the normal annual operation and maintenance costs. The reserve accounts include:

- Emergency Repair Reserve for unexpected repairs due to system failure or catastrophic events.
- Capital Improvement Plan (CIP) Reserve for replacement of equipment or facilities in kind or with alternate technology.

- Major Maintenance Reserve which is used to minimize fluctuations of expenses not accounted for in annual operating budgets.

WRC worked with its internal fiscal staff to determine if the system's current rate structures were sufficient to meet the current needs for the management of the wastewater system, and to plan for any adjustments that may be required to meet anticipated future expenses. A demonstration of sufficiency of the system's current rate structure was made, as required by the SAW Grant Program, and submitted to the MDEQ six months prior to the SAW grant end date.

CAPITAL IMPROVEMENT PLAN

The asset optimization software forecasts and prioritizes assets that require replacement in the planning period. The individual replacements can be combined into projects and scheduled with budget amounts established. This information is then used in the LRP process to determine rate needs for funding the project established. A list of capital projects was developed for the Novi wastewater system using recommendations from the asset optimization software and consideration of other system needs.

The recommended projects are summarized below. Projects listed for implementation in the 0 to 5 year range include cost estimates prepared on data available at the study/feasibility level. Projects in the 5 to 20 year range are based on broad concepts only and costs are based on cost curves and other general tools. All projects are listed for financial and resource planning purposes only. Changes to project inclusion, scope, cost and/or timing are expected as resources are allocated and changes occur in prioritization, regulations, technology, cost and other data becomes available.

Capital Projects, 0 to 5 years:

- Phase I Trunk Sewer Lining; $412,433; 2019
- Phase II Trunk Sewer Lining; $215,726; 2019

Capital Projects, 6 to 20 years:

- Remove and Replace; $22,151; 2025
- Lining Projects; $255,137; 2020

RECOMMENDATIONS

In order to keep this AMP sustainable into the future, the LRP process will be undertaken annually to review existing recommendations, status of current projects, and forecasted needs against available reserves and anticipated funding. The asset optimization tool will be regularly synced with CAMS to incorporate any new GIS and operational and condition data. The software will then automatically update recommended events, treatment and replacement strategies, and capital projects. The updated recommendations will be reviewed quarterly and as part of the annual LRP to ensure the availability of required funds for the projects.

LIST OF MAJOR ASSETS

The City of Novi's major wastewater assets that are maintained by the WRC include:

- Approximately 36 miles of gravity sanitary sewer ranging from 8- to 18-inch in diameter
- 1,051 manholes
- 4 lift stations

Below is a summary of the horizontal and vertical wastewater assets within the portion of the system maintained by the WRC.

Table 1: Gravity and Non-Gravity Sewer Assets by Material

Sewer Assets by Material	Gravity or Non-Gravity Sewer Pipe	Total Length (ft)	Number of Assets
ABS	Gravity	7,797	50
ABS Truss	Gravity	27,177	156
Cast Iron	Non-Gravity	11	1
Ductile Iron	Gravity	10	1
Ductile Iron	Non-Gravity	3,006	4
HDPE	Non-Gravity	1,259	8
Non-reinforced Concrete	Gravity	9,629	46
PVC	Gravity	27,165	160
PVC	Non-Gravity	3,442	3
Reinforced Concrete	Gravity	47,157	235
Transite	Gravity	2,178	10
Truss	Gravity	43,908	257
Vitrified Clay	Gravity	26,097	132
Unknown	Gravity	834	8
Unknown	Non-Gravity	2,805	8
Total		**202,475**	**1,079**

Table 2: Gravity and Non-Gravity Sewer Assets by Size

Sewer Assets by Diameter	Total Length (ft)	Number of Assets
1.25"	375	1
4"	6	2
6"	798	3
8"	131,689	758
10"	24,014	126
12"	15,835	69
15"	13,136	59
16"	6,003	8
18"	10,614	52
Unknown	5	1
Total	**202,475**	**1,079**

Table 3: Additional Assets

Asset Description	Horizontal or Vertical	Number of Assets
Gravity Sewer Manhole	Horizontal	1,051
Sanitary Sewer Lift Station	Vertical	4

PROJECT HIGHLIGHTS

The development of this Asset Management Program for the City of Novi was led by the Oakland County Water Resources Commissioner with assistance from HRC and OHM Advisors. The following highlights some of the more tangible outcomes from the Program development:

- Updated GIS inventory of system
- Cleaned and televised 99,000 lft (52%) of the system.
- Inspected 406 manholes
- Inspected 4 pump stations
- Made recommendations for asset rehabilitation

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date November 30, 2018
(no later than 3 years from executed grant date)

The City of Novi *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1147-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or No

   If No - Date of the rate methodology approval letter: May 17, 2018.

2) Significant Progress Made: Yes or No

   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)

3) Date of rate methodology review letter identifying the gap: N/A.

4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on N/A.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Ben Croy	at	248-735-5661	bcroy@cityofnovi.org
Name		Phone Number	Email

11 21 2018

Signature of Authorized Representative (Original Signature Required) Date

Peter Auger, City Manager
Print Name and Title of Authorized Representative

Stormwater, Asset Management, and Wastewater (SAW) Asset Management Plan Executive Summary Guidance

City of Oak Park – Department of Public Works
10600 Capital
Oak Park, MI 48237
http://www.oakparkmi.gov/

Contact: Kevin J. Yee, Assistant City Manager, Public Works Director, City Engineer
(248) 691-7497
SAW Grant Project Number: 1177-01

EXECUTIVE SUMMARY

The wastewater infrastructure system of Oak Park provides a critical service to its residents and businesses. This system provides a combination of wastewater and stormwater collection and transports it to the Great Lakes Water Authority (GLWA) in the City of Detroit. The collection of stormwater protects the downstream waters of the Clinton River and the Rouge River. Recognizing the importance of this system, Oak Park initiated a comprehensive assessment of its combined infrastructure.

This Asset Management Plan summarizes this assessment and includes key recommendations for future funding levels. The City of Oak Park was awarded $689,000 in grant funding from the State of Michigan Stormwater, Asset Management and Wastewater (SAW) Grant Program, which the City was required to contribute a ten percent match.

The AMP was intended to accomplish the following key goals:

- Improve the City's framework for collecting, organizing, and storing data for their wastewater collection system using the latest available hardware and software.
- Survey key system components to update and enhance the City's Geographic Information System (GIS) database to assist with future infrastructure maintenance and inventory projects.
- Add information for sewer material type, size, age, and depth to the GIS wastewater system inventory database.
- Physically evaluate the structural condition of a representative portion of publicly owned system components, including wastewater sewer pipes, and manholes. Store the data in the City's GIS database.
- Identify long-term operations and maintenance strategies to maintain a reasonable structural condition into perpetuity, including:
    - Regularly-scheduled sewer inspection (televising)
    - Repair and rehabilitation to address structural problems resulting from aging infrastructure
- Provide recommendations for developing a prioritized Capital Improvement Plan (CIP) to be funded through the City's wastewater enterprise fund.

Mission Statement

One important element to an Asset Management Program (AMP) is a mission statement, which identifies the overarching purpose of the City's AMP. The following mission statement summarizes the purpose of the City's asset management program:

We are committed to providing and maintaining high quality wastewater and stormwater sewer collection services to our existing and future customers in a cost effective manner while protecting human health and the environment.

Asset Management Team Leaders

The team leader listed in Figure 1 is committed to the asset management mission statement and was instrumental in the progress made and findings outlined in this report. Further questions on the City's AMP can be directed to this team member.

Kevin J. Yee, P.E.

- Assistant City Manager of Oak Park
- kyee@OakParkMI.gov
- 248.691.7497

Figure 1: Asset Management Team Leader

Infrastructure Technology & Know-How

The City has made investments to create a GIS database mapping their combined system with the intent of making it easier for future generations to access infrastructure knowledge. These GIS database investments include the following:

- Surveyed key system components to augment the City's created GIS database
- Add information for sewer material type, size, age, and depth to the created GIS database
- Purchased a Trimble R10GNNS System to improve accuracy of asset spatial location
- Purchased tablets and mobile devices to improve access to real-time asset information and enhance field data collection
- Provide staff training on new hardware and software

Asset Inventory

An asset inventory is a list of the City's assets and their attributes. The majority of the City's combined sewer infrastructure, including sewers, manholes, and catch basins, were inventoried and digitized. The City has populated the attributes of the inventory using observations in the field while performing condition assessment. This inventory resides in the City's newly created GIS. The GIS framework was created as part of this effort, making it easier for the City to store critical data for the location, size, material, install date, and condition of each wastewater asset.

List of Major Assets

The major assets are approximated in the text below. The full AMP report contains additional details on the distribution of sizes and conditions.

- 2,200 manholes
- 95 miles of City owned and 18 miles County owned combined sewer pipes ranging from 8 to 108 inches in diameter

The City discharges into the George W. Kuhn Drain (GWK), which ultimately discharges to the City of Detroit WWTP for treatment during normal conditions and the Red Run Drain via the GWK Retention Treatment Basin during heavy rainfall high flow conditions. As such, the City's assets are limited to local and collector sewers.

Condition Assessment

With the intent of evaluating a representative portion of the combined system, the City's sewer infrastructure (wastewater and stormwater sewer pipes, manholes, and catch basins) has been assessed. The condition of the infrastructure is based on the National Association of Sewer Service Companies (NASSCO) condition grading system, which uses a scale of zero to five. Zero indicates the infrastructure is in very good condition or new, while five indicates the infrastructure is in very poor condition or has already failed. About 55% of the approximately 2,200-structure manhole network and about 55% of the approximately 95 miles of combined sewer pipes has been condition assessed, as shown in Figure 2.

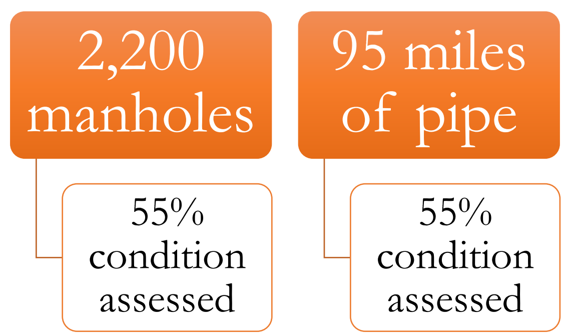


Figure 2: Portion of Sewer System Assessed

It was also observed that:

- Manhole infrastructure exhibits age-appropriate wear with an average structural rating of approximately 2.5 and average O&M rating of 1.7. Structural manhole defects were predominately related to cracks and brickwork. Deposits, infiltration, and obstructions drove O&M manhole issues.
- Of the inspected portion of sewer infrastructure, the system average structural rating is 2.86 and the system average O&M rating is 3.18. More than 60% of the inspected sewer was found to have an Overall rating of 4 or 5.

- The infrastructure will continue to degrade over time, for example, even though the average condition of the manhole infrastructure is between a score of 1 (minimal wear and good working) and 2 (moderate wear but still functional) per the 2018 inspection data, the percent of the system with a condition rating of 4 and 5 will grow over time.

Criticality and Risk

The investigation leading to the identification of critical sewer infrastructure involved the determination of Business Risk Exposure (BRE), which is identified as the combination of the Probability of Failure (PoF) and Consequence of Failure (CoF) as shown in Figure 3.

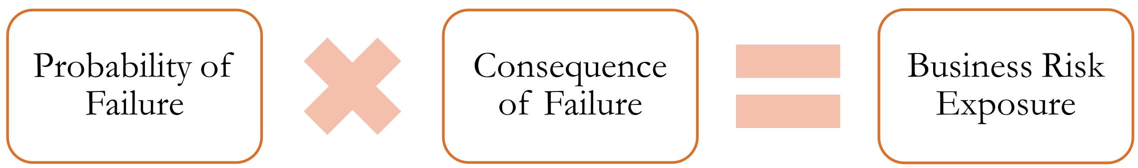


Figure 3: Risk Equation

The PoF is related to the physical condition of an asset. The CoF focuses on the economic losses and impacts to society due to an asset's failure. The following factors were combined to determine the consequence of failure for manholes and the combined sewer:

- Diameter/Size – the relative size of the asset with respect to the rest of the system
- Asset Location/Accessibility – refers to the cost to restore the surface above the asset and if traffic control is needed

Level of Service

The City, in line with its mission statement outlined earlier, adopted a Level of Service (LOS) criteria, which it plans to use as guidelines to manage the combined sewer system. These LOS criteria are summarized in Table 1.

Table 1: Summary of Level of Service Criteria

Key Service Criteria	Performance Indicator	Target Level of Service
Asset Condition Assessment	PACP & MACP Inspections per Year*	• MACP inspect a minimum of 400 manholes per year or 18% of the System • PACP inspect a minimum of 25% every year in accordance with sewer cleaning & televised inspection project schedule
Regulatory Compliance	Compliance with MDEQ Sanitary Sewer Overflow (SSO) Policy and the Clean Water Act	Continue to comply with the MDEQ SSO policy and The Clean Water Act
Service Delivery and Customer Communication	Utilize Software to aid in utility management and promote customer communication, increase effort to reduce number of sewer calls and response time	Respond to customer complaints and requests within one business day
O&M Optimization	Regular cleaning and maintenance of the collection system	• Clean and maintain 10% of the manholes per year • Clean and maintain 25% every 4-years

*Pipe Assessment Certification Program (PACP), to assess combined sewer condition, Manholes Assessment Certification Program (MACP), to assess manhole condition

Revenue Structure and Capital Improvement Plan

The condition assessment helped identify capital improvements that will allow the City to operate at its maximum potential. Additional long-term operations and maintenance strategies will provide the means to maintain a sound structural condition into perpetuity, including:

- Regularly-scheduled sewer, manhole, and inspection
- Repair and rehabilitation to address structural problems resulting from aging infrastructure

As communities like Oak Park have developed and aged, the buried infrastructure has deteriorated. The City has done a good job with having a routine televising and rehab program. However, in the future, the City will likely need to increase the size of the rehabilitation program to systematically repair, rehabilitate, and/or replace these aging components. Otherwise, City residents and businesses will experience a decreased level of service, which could result in the following:

- Increased threat of property damage, public health and safety.
- Increased potential for environmental damage.
- Increased potential for impassable roadways due to failed infrastructure

The revenue structure analysis identified that the City has the current funding structure necessary to support the current system. Currently, the City has approximately $600,000/yr available for repairs and rehabilitation. However, as the City's infrastructure continues to degrade, it is anticipated that the City will need to take a more aggressive approach to repair and rehabilitation. This AMP has estimated that approximately $700,000 per year, in 2018 dollars, in repairs and rehabilitation could be anticipated over the next 25 years. The City will evaluate repairs and rehabilitation required along with associated revenues on an annual basis.

The Capital Improvement Plan (CIP) focuses on projects that are known based on the current conditions if the inspected assets. This includes repairing pipes and manholes that have been inspected and have known defects, especially those with a structural rating of 4 or 5 indicating they have failed or are at risk of failing. These assets were ranked by their Business Risk Exposure (BRE). The tables for the CIP are in the AMP document, Appendix C. The CIP tables are intended to be used for high level planning; the City will need to further evaluate the wastewater infrastructure before beginning the CIP design process. The actual implementation of the CIP will depend on the results of the continued CCTV effort and manhole inspections.

Recommendations

The recommendations in this AMP are to:

- Continue the AMP process in future years through systematic inspection and updates of the City's GIS data to re-prioritize future CIP projects.
- Implement the capital improvements as recommended in the CIP.
- Adjust user fees as necessary to implement the future capital improvements as prioritized through the ongoing AMP process.

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date 11/29/18
(no later than 3 years from executed grant date)

The CITY OF OAK PARK *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1177-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or No
   If No - Date of the rate methodology approval letter: MAY 14, 2018.
2) Significant Progress Made: Yes or No
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: ______________.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ______________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

KEVIN YEE at (248) 691-7498 Kyee@oakparkmi.gov
Name Phone Number Email

[signature] 11/29/18
Signature of Authorized Representative (Original Signature Required) Date

KEVIN YEE, ASSISTANT CITY MANAGER/DIRECTOR OF PUBLIC WORKS/CITY ENGINEER
Print Name and Title of Authorized Representative

April 2017

SAW Grant 1099-01 Summary
Asset Management Plan for Oakland Macomb Interceptor Drain Drainage District (OMIDDD) Sewers
PCI-5, PCI-6, PCI-7, PCI-8, PCI-9, PCI-10A, PCI-10B, PCI-11A

The purpose of this document is to provide a summary of engineering Services conducted to assist the Oakland Macomb Interceptor Drain Drainage District (OMIDDD) in establishing an Asset Management Plan (AMP) for the Oakland Macomb Interceptor Drain (OMID). The purpose of the AMP and the efforts conducted as part of this SAW Grant funded project, are to minimize overall risk and cost to the system and to the rate payers. Specifically, this document provides a summary of the asset inventory and current conditions, an assessment of criticality of assets, summary of the level of service that is to be maintained, operations and maintenance (O&M) strategies and revenue structure, as well as short and long-term funding needs.

This summary is essentially the same as the Executive Summary of the final detailed report for this project, dated November 30, 2018 (hereafter referred to as "OMID AMP Final Report").

On September 30, 2015, the OMIDDD was awarded a grant (SAW Grant 1099-01) as part of Michigan Department of Environmental Quality's (MDEQ) Stormwater, Asset Management, and Wastewater (SAW) program. The SAW program was established by the MDEQ in order to help communities have access to affordable funding sources for wastewater and stormwater rehabilitation. The amount of the SAW grant was $1,580,436 (after local match). The required local match amount is $304,589, which corresponds to a total necessary expenditure (eligible amount) of $1,885,025.

The OMIDDD is a Chapter 21 drainage district managed by a drainage board that is comprised of the Oakland County Water Resources Commissioner (WRC), the Macomb County Public Works Commissioner (MCPWC), and a representative of the Michigan Department of Agriculture and Rural Development (DARD). The WRC managed the recently completed rehabilitation program for the OMID, and currently manages the ongoing operation and maintenance of the system; as well as the now-complete SAW program.

Included in the original SAW Grant application were tasks that were to be performed as part of the Wastewater AMP, which would be reimbursable under the award. These include:

Task 1 – AMP Project Initiation;
Task 2 – AMP/GIS Software, Hardware, and Training;
Task 3 – Asset Inventory and Data Collection;
Task 4 – Asset Criticality and Risk Assessment; and
Task 5 – Investment Prioritization and Future Planning

In addition, a Budget Increase Request for Grant 1099-01 (dated June 7, 2018), detailed two additional Tasks, related to Tasks 3, 4, and 5, above:

- **Incorporation of New Information Related to Level of Service (under Tasks 3&4)**
- **Future Planning for Optimization of Flow Storage and Management (under Task 5)**

As the above tasks have now been completed, this report is intended to summarize the AMP methodologies and findings as they relate to the entire OMID system, as defined in Figure 1 of Appendix C of the SAW Grant application, including PCI-5, PCI-6, PCI-7, PCI-8, PCI-9, PCI-10A/B, PCI-11, and the Northeast Sewage Pumping Station (NESPS).

1.1 Asset Inventory and Conditions Assessment

A summary of the assets included in the OMID, broken down by original construction contract number, is provided in Table 1A, below. A summary of current conditions of interceptor and vertical assets is provided in Table 1B, below. These condition ratings are based on National Association of Sewer Service Companies (NASSCO) ratings. A detailed summary of these assets, including their condition as of the most recent inspection is provided in Appendix B – Asset Inventory, of the OMID AMP final report.

Table 1A: Asset Inventory Overview

Original Construction Contract No.	Diameter (ft) of Horizontal Assets	Length (ft) of Horizontal Assets	MH Qty (4' ID)	Other Assets
PCI-5	10	14,571	8	MH-104A @ 10' ID
PCI-6	10 to 12.75	13,028	8	CS-9 @ 29' ID
PCI-7	8 to 12.75	13,627	12	CS-4 @ 11' ID CS-5 @ 30' ID MH-108A @ 10' ID
PCI-8	8 to 9.5	17,564	12	CS-6 @ 46.5ft ID CS-7 @ 25'x13'
PCI-9	8.75	17,922	11	CS-8 @ 8.9'x11.9'
PCI-10A/B	8	21,892	12	AS-1 at 8' ID, AS-2 @ 8' ID, MH-10B-104 @ 10' ID
PCI-11/11A	2.6 to 4	14,116	36	--

Table 1B: Asset Conditions Overview Based on Summer/Fall 2018 Inspection

	PC-11A	PCI-10A/B	PCI-9	PCI-8	PCI-7	PCI-6	PCI-5
Overall PACP Condition (1-5)	2.7	3.0/3.0	2.7	2.7	3.2	3.4	1.8
Overall MACP Condition (1-5)	1.8	3.2/1.8	2.0	2.2	3.5	3.0	2.3
Prior Inspection	2018	2018	2018	2018	2018	2018	2018
Recommended Inspection (unlined)	2021	2021	2021	2021	2021	2021	2021
Recommended Inspection (lined)	2024	2024	2024	2024	2024	2024	2024

1.2 Level of Service

Several meetings were held with strategic staff to determine what goals and measurable indicators would be established for the OMID system. The following Table 2 presents the level of service (LOS) goals for the OMID system.

Table 2: Level of Service Goals

Attribute	Objective	Goal	Measurable
Customer Community Satisfaction	• Continuous service and no surcharging	• No submergence of meters or surcharging into upstream sewers	• Reporting from customer communities
Operational	• Assess condition of OMID assets	• Inspect assets on a defined schedule	• Regular inspection reports
	• Have a proactive maintenance program	• Spend 50% of maintenance time on preventative maintenance	• 50% of time on preventative maintenance
Employees and Safety	• Employee staffing	• 2 full time positions	• HR Reports
	• Employee training	• Confined space entry	• Computer program
Security	• Maintain secure site and facilities	• Monthly inspections to address deficiencies	• No. of vandalism or theft incidents
Revenue	• Ensure revenue meets budget requirements	• Maintain sufficient budget for O&M and CIP	• Yes or No

1.3 Criticality of Assets

The OMID system serves more than 800,000 residents and businesses in 23 communities spread across Oakland and Macomb Counties. Due to the lack of redundancy in the OMID system generally, asset risk management is necessary for the entire system in the form of thorough O&M procedures, regular inspections of all components of the system, and strategic capital investments where required to maintain the integrity of the OMID system as a whole. The specific steps necessary to achieve this asset risk management are discussed more fully in Section 7 of the OMID AMP final report, and are summarized within this Executive Summary, below. The asset inventory contained in Appendix B of the OMID AMP final report details the "Probability of Failure", "Consequence of Failure", and "Asset Criticality" for all OMID assets.

1.4 Operation and Maintenance Strategies and Revenue Structure

OMIDDD is different from other forms of government given its Michigan Drain Code; Chapter 21 Status. Under those provisions communities can be directly assessed for charges related to the end users benefit. Since this system is also a sanitary sewer, sewer rates can also be used as a revenue stream to pay for operations and maintenance, repairs and capital improvements. It is up the local municipalities to decide how to pass on the OMIDDD rates to their end users using current system reserves, variable flow methodology or the fixed charge methodology, where residential equivalent units are used as the charge basis.

OMIDDD has used grants and direct apportionments to its 23 communities in two counties to pay for most of the capital improvements to date; and will continue to fund capital expenditures in a similar manner. Direct apportionments are based on commodity charges for ongoing operations, major maintenance, and Great Lakes Water Authority (GLWA) charges.

As indicated in the MDEQ's letter dated May 3, 2018 (approval of OMIDDD's rate methodology), OMIDDD has in place the funding structure necessary to implement the OMIDDD AMP program. We have reviewed the current costs and most recent inspection information related to system operation and confirm that the rate methodology is sufficient to provide funding for all currently contemplated operation and maintenance costs.

1.5 Summary of Current/Projected Costs and Related Planning

As part of the AMP, the consultant team developed detailed recommendations including estimated costs for the future operation, maintenance, and potential improvements to the OMID. Chapter 8.0 of the OMID AMP final report provides further detail about these recommendations. Technical details regarding required repairs, including specific locations of identified issues and estimated costs for repair, are included in Appendix C – Recommended Repair Items, of the OMID AMP final report.

1.5.1 Recommended Inspection Protocols and Estimated Costs

The recommended inspection schedule is intended to keep OMIDDD aware of conditions in all reaches of the OMID system, such that necessary maintenance and repairs can be conducted.

In general, the consultant team recommends that all OMID assets with mechanical components be regularly inspected and exercised. Inspection of interceptors, manholes, and other structures should be scheduled depending on condition, age, type of components, etc. A 3-year and 6-year inspection schedule is recommended depending on the specific components of the system. The details of the recommended inspection program are in the OMID AMP final report and summarized in Table 3A, below, as well as in the body and Appendix C of the OMID AMP final report. On the basis of Table 3A, and in consideration of recent inspection costs projected forward, we estimate an equivalent annual inspection cost of $400,000 per year.

Table 3A: Asset Inspection Recommendation

Recommended 3-Year Inspection		
Asset	**Issues Identified in Recent Inspection***	**Recommended Inspection Action**
PCI-6	Dripping infiltration, aggregate missing/projecting, surface spalls	Laser Profiling and Reassessment
PCI-7	Dripping infiltration, aggregate missing/projecting, surface spalls	Laser Profiling and Reassessment
PCI-8	Dripping infiltration, aggregate missing/projecting, surface spalls	Laser Profiling and Reassessment
PCI-9	Dripping infiltration	Monitoring and reassessment
PCI-10A	Dripping infiltration	Monitoring and reassessment
PCI-10B	Dripping infiltration	Monitoring and reassessment
PCI-11A	Dripping infiltration	Monitoring and reassessment
Recommended 6-Year Inspection		
PCI-5	Dripping infiltration	Monitoring and reassessment
All MHs	Weeping infiltration, reinforcement visible	Monitoring and reassessment
CS 4, 5, 6, 9	Weeping infiltration	Monitoring and reassessment
CS-77	Weeping infiltration, surface roughness	Monitoring and reassessment
CS-8	Weeping infiltration, aggregate visible	Monitoring and reassessment

* Terms taken from the PACP and MACP standards established by NASSCO

1.5.1.1 Immediate Maintenance Needs

Table 3B summarizes immediate maintenance needs as recommended following recent inspections. Immediate maintenance needs are those repairs which the consultant team, as a result of inspection, strongly recommends in the next 0 to 6 months. Further documentation of these recommendations is available in the OMID AMP final report.

Table 3B: Immediate Maintenance Needs

Asset	Issues Identified in Recent Inspection*	Recommended Action
PCI-6 Pipe	Gushing and Running Infiltration; core holes	Chemical Grout Leak Sealing, patch repair
PCI-7 Pipe	Gushing and Running Infiltration; core holes	Chemical Grout Leak Sealing, patch repair
PCI-8	Running Infiltration	Chemical Grout Leak Sealing
PCI-9	Running Infiltration	Chemical Grout Leak Sealing
PCI-10A	Gushing and Running Infiltration	Chemical Grout Leak Sealing
PCI-10B	Running Infiltration	Chemical Grout Leak Sealing, deep conc repair
PCI-11A	Running Infiltration	Chemical Grout Leak Sealing, deep conc repair
PCI-5 MHs	Running Infiltration	Chemical Grout Leak Sealing
PCI-6 MHs	Running Infiltration	Chemical Grout Leak Sealing
PCI-7 MHs	Running Infiltration	Chemical Grout Leak Sealing, deep conc repair
PCI-8 MHs	Running Infiltration	Chemical Grout Leak Sealing
PCI-10A MHs	Running Infiltration	Chemical Grout Leak Sealing, deep conc repair
PCI-11A MHs	Reinforcement visible	Deep conc repair

* Terms taken from the PACP and MACP standards established by NASSCO

1.5.2 Estimated System Operations and Maintenance Costs.

The existing control structures in the OMID system consist of new shaft structures, stop/sluice gates, pumps, hydraulic controls, PLCs, SCADA, sensors, and other appurtenant controls, constructed under various OMID contracts to provide access to and control flow in the system. For the purposes of our cost evaluation, the consultant team examined the O&M Manual for the OMID System (currently under revision) and summarized the expected maintenance costs for these components. Such costs are expected to be approximately $105,000 per year.

In addition, it is currently estimated that the system will require two equivalent full-time personnel to operate the system (flow monitoring and control, AMP implementation, etc.) and provide typical in-house maintenance activities (grass cutting at selected sites, fence inspections, etc.). The estimated annual cost for such activities is estimated to be in the range of $315,000.

1.5.3 Summary of Reoccurring Annual Costs

On the basis of the above, the reoccurring annual costs, including inspections and regular operations & maintenance is $820,000. Annualized cost by section is summarized in Table 4. Additional detail is provided in the OMID AMP final report.

Table 4: Summary of Estimated Annual Cost by Section

Section/Reach	Lineal footage	Estimated Annualized Cost (2018 Dollars)
PCI-5	14,571	$105,999
PCI-6	13,028	$94,774
PCI-7	13,627	$99,132
PCI-8	17,564	$127,772
PCI-9	17,922	$130,377
PCI-10A/B	21,892	$159,257
PCI-11/11A	14,116	$102,689
Total	**112,720**	**$820,000**

1.5.4 Short and Long Term Projected Projects and Costs

Stakeholders in the operation of the OMID system, including the consultant team, have considered a variety of potential system upgrades to meet the current and expected near-future needs of the system; and developed a summary of recommended longer term capital improvements. These upgrades and investments are expected to improve the operation of mechanical components, provide system operators with more effective control of the system, reduce odor and/or corrosion, improve the reliability of system operations, and/or enhance other aspects of the OMID.

Table 5A below summarizes the recommended near-term Capital Improvements as developed by the OMID-AMP consultant team and others. Further details about these projects and improvements can be found in the OMID AMP final report, (Appendices E, F, and G)

Many recommended Capital Improvements address operational challenges currently affecting the system. These challenges, as identified by system operators, relate to reliability of both mechanical and structural components, communications (speed, reliability, redundancy), and cost control. As such, some of the upgrades and improvements recommended by the consultant team are intended to provide more useful data about system operations, provide for more reliable and effective control of system components, and reduce obstacles to maintenance operations (i.e. improve access to specific facilities).

Recommended capital improvements are divided into immediate and near-term needs; and longer term (10-year CIP) needs. The immediate and near-term needs are summarized in Table 5A, below. The control upgrades (first 7 items) are based on recommendations from the OMID Flow Control Work Group, which met several times over the last month to develop operational protocols to increase the reliability, improve fail-safe operations, maintain flow rates to less than the contractual capacity of 423-cfs at the NESPS, and minimize the occurrence of air blow-offs and surges in the OMID and MID systems. The recommended immediate repairs (eighth item) are based on internal inspections completed recently (per Table 3B, above).

Table 5A: Immediate and Near-Term Needs

Item	Location	Improvement	Estimated Project Cost*
1	All Control Structures	Access Improvements	$264,000
2	All Control Structures	Radar Level Sensors	$78,000
3	CS-5	New Release Curves	$6,000
4	NESPS	Level Sensor Improvements	$25,000
5	System	Communications/Carrier Improvements	$22,000
6	System	SCADA & Operational Improvements	$14,000
7	System	Update O&M Manual	$8,000
8	PCI-6, 7, 8, 9, 10A/B, 11A	Immediate Repairs per Table 3	$1,500,000
9	**Total**		**$1,917,000**

* Estimated project Cost includes 50% increase over direct cost to account for Engineering and Administration

Longer term needs would be part of a 10-year CIP (yet to be formally adopted), and although not yet approved, are summarized in Table 4B, below. The first two items are related to the recommendations of the flow control work group discussed above. The third item, Bio-Trickling

Filter, is necessary per a separate study by Jacobs Engineering, and will provide for reduced corrosion benefits upstream in the OMID, as well as to protect various equipment within and surrounding the NESPS from ongoing hydrogen sulfide damage. The remaining three items presented on Table 4B are based on identified enhancements to the system that are dependent on issues that are not yet determined, such as future rate structures that may make the improvements more cost effective.

For example, the 10-year CIP should consider the potential for implementation of long-term flow control, potentially providing for regional benefits and efficiencies that could result in OMID rate reductions. Specifically, existing flow control structures could be used to provide storage within the excess capacity in the OMID upstream of the NESPS. To accomplish such long-term flow control and storage, several technical and hydraulic issues would need to be addressed, which would involve capital expenditure.

The increased use of sluice gates would likely lead to higher O&M costs, and increased corrosion. Hydraulically, the system would require the installation of several level sensors in strategic locations as well as lining downstream of existing control structures CS-5 and CS-8 to address long term turbulence-induced corrosion. Further, a dry weather bypass (around the CS-7 high point) may be considered to reduce backups and stagnation in the system related to long term flow management and storage. These issues would certainly be impacted by the potential transfer of operations (or other modification of controls) of the NESPS and downstream North Interceptor-East Arm (NIEA), from GLWA to OMIDDD (this transfer is currently on hold). Additional details and discussion are provided in the OMID AMP final report.

Table 4B: Longer-Term and/or Capital Improvement Needs (Suggested 10-Year CIP)

Item	Location	Improvement	Estimated Project Cost (1)	Time Frame
1	CS-All	New PLCs and Hydraulic Cylinders	$1,200,000 (2)	1 Year
2	CS-All	Modify Part 41 Permit for Long Term Use	$30,000 (2)	6 months
3	NESPS	Bio-Trickling Filter and Ventilation Upgrades	$8,600.000 (3)	1 Year
4	PCI-6	Lining 1500' Downstream of CS-5	$5,625,000 (2)	TBD
5	PCI-8	Lining 1500' Downstream of CS-8	$5,100,000 (2)	TBD
6	PCI-7	Dry Weather Bypass (3000' around CS-7 hump	$14,500,000 (2)	TBD
7	**Total**		**TBD**	

(1) Estimated project Cost includes 50% increase over direct cost to account for Engineering and Administration
(2) Item is uncertain; need and scope will depend on results of future studies
(3) Cost based on Engineer opinion of probable cost prior to bid

OMID ASSET MANAGEMENT TEAM

Utility Name:	Oakland-Macomb Interceptor Drain (OMID)
Street Address:	One Public Works Drive, Building 95 West
City:	Waterford, MI
Zip Code:	48328-1907
Phone Number:	(248) 858-0958
Grant No.:	#1099-01

Number of Connections:	5 meters
Number of Customers:	2 (Oakland County and Macomb County)

Contact Information

Contact Person:	Sid Lockhart, P.E.
Title:	Special Projects Manager
Role:	Primary Contact
Phone:	(248) 858-1082
Email:	lockharts@oakgov.com

Team Member:	Evans Bantios, P.E.
Title:	Construction & Maintenance Manager
Role:	Authorized Representative
Phone:	(586) 469-6134
Email:	Evans.bantios@macombgov.org

Team Member:	Fritz Klingler, P.E. – FK Engineering Associates
Role:	Consulting Engineer
Phone:	(313) 218-9961
Email:	fklingler@fkengineering.com

Team Member:	Saju Sachidanandan, P.E. - NTH Consultants, Ltd.
Role:	Consulting Engineer
Phone:	(248) 662-2723
Email:	ssachi@nthconsultants.com

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date November 30, 2018
(no later than 3 years from executed grant date)

The Oakland Macomb Interceptor Drainage District *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1099-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or No
   If No - Date of the rate methodology approval letter: May 3, 2018.
2) Significant Progress Made: Yes or No
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: ________.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

George P. Nichols at 248-975-9571 nicholsg@oakgov.com
Name Phone Number Email

[signature] 11/27/18
Signature of Authorized Representative (Original Signature Required) Date

Jim Nash, Water Resources Comm.
Print Name and Title of Authorized Representative

VILLAGE OF ONTONAGON

SANITARY SEWER ASSET MANAGEMENT PLAN

Executive Summary

SAW GRANT NO. 1254-01

Ontonagon
Harbor Town
Gateway to the Porcupine Mountains

NOVEMBER 2018

OHM
Advancing Communities®

Executive Summary

This document summarizes the Asset Management Plan (AMP) for the Village of Ontonagon's sanitary sewer system and includes key recommendations for future funding levels. It includes details on the assessments completed by OHM Advisors with collaboration from the Village. The AMP was prepared using grant funding from the State of Michigan Stormwater, Asset Management and Wastewater (SAW) Grant Program. $688,551 was awarded through the SAW Grant Program to accomplish the following key goals:

- Provide the Village with a new framework for collecting, organizing, and storing data for their wastewater collection system using the latest available hardware and software.
- Survey key system components to develop a Geographic Information System (GIS) database and to allow future generations to access infrastructure data with greater ease.
- Add information for sewer material type, size, and age to the GIS database.
- Evaluate the structural and operational condition of various system components and store the data in the GIS database.
- Identify long-term operations and maintenance strategies to maintain a reasonable structural condition into perpetuity, including:
    - Regularly-scheduled sewer inspection (televising) and cleaning
    - Repair and rehabilitation to address structural problems resulting from aging infrastructure
- Provide recommendations for developing a prioritized Capital Improvement Plan (CIP).
- Analyze operating budgets and recommend revenue structure changes to facilitate the Village's long-term capital improvements plans.

The contact person for the Village of Ontonagon Sanitary Sewer AMP is:

Joseph Erickson, Village Manager
315 Quartz Street
Ontonagon, Michigan 49953
Phone: 906-884-2305
Email: ontmgr@jamadots.com

Asset Inventory

An asset inventory is a list of the Village's assets and their attributes. The Village and OHM Advisors have inventoried and digitized the majority of its sanitary sewer infrastructure, including manholes, sanitary gravity mains, lift stations, force main, and treatment lagoons. The GIS framework was developed as part of this effort, making it easier to store critical data for the location, size, material, install date, and condition of each wastewater asset.

List of Assets

The following lists the major assets of the Village's sanitary sewer system.

- 476 manholes
- 23 miles of gravity main ranging in diameter from 4-24 inches.
- 2.5 miles of force main with 3 known valve manholes
- 4 pump stations
- 4 facultative treatment lagoons

Condition Assessment

Through a methodical sampling procedure, a representative sample of the Village of Ontonagon's sanitary sewer infrastructure has been physically assessed. Sanitary manholes and gravity mains were assessed using the National Association of Sewer Service Companies (NASSCO) condition grading system, which uses a scale of zero to five. Zero indicates the infrastructure is in very good condition, while five indicates the infrastructure is in very poor condition or has already failed. The two primary scoring metrics commonly used to describe asset conditions are the Structure Rating Index and the Quick Rating. The Structure Rating Index is an average of defect grades within an asset, and the Quick Rating describes the asset's highest defect grades. These metrics and their derivation are further described in Section II of the AMP. Figure 1 describes the portion of the sanitary sewer system that has been inspected.

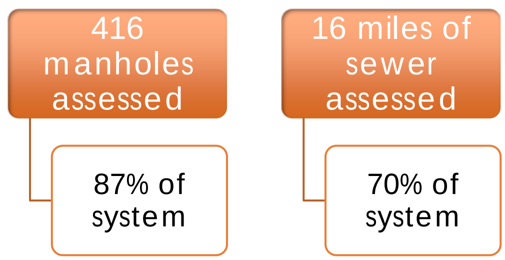


Figure 1: Portion of Sewer System Assessed

Experienced facility design engineers inspected the Village's wastewater pump stations and treatment facilities. Force mains were not physically inspected and their remaining useful life was estimated by age. From this condition assessment, it was observed that:

- The Village's sanitary manholes are in overall good condition. 98% of inspected manholes have an Overall Rating Index of 3 or lower. The average Operational and Maintenance (O&M) Rating Index is 1.6, which is slightly higher (worse) than the Structural Rating Index of 1.5 and is mainly effected by deposits and infiltration. Eight manholes have at least one Grade 5 structural defect and 18 manholes have at least one Grade 5 O&M defect.
- The Village's sanitary gravity mains are primarily comprised of reinforced plastic (truss) pipe and vitrified clay pipe. The average O&M Rating Index for inspected sewers is 1.0 and the average Structural Rating Index is 1.2. Overall, 25% of inspected segments have at least one Grade 4 or Grade 5 defect.
- The Village's pump stations are aging and the main pump station does not have adequate capacity. Immediate improvements to the main pump station are recommended to meet the Ten State Standards firm capacity requirements, and various components in the Village's other stations will require immediate attention as well. Approximately $2.8 million in asset replacements for pump station and treatment facility components are anticipated throughout the planning horizon.
- The Village's treatment lagoons have been in service since 1998 and sludge removal may be required within the five-year planning horizon. Additionally, $2 million should be budgeted for long-term treatment lagoon modifications to increase treatment capacity.
- The Village's old force main near Zinc Street was installed in 1968 and is already operating beyond the lower estimate of its expected useful life. The force main near River and Lake was

installed in 1987 and is expected to reach the end of its useful life in 2037. No valves (air-release or other) were identified along these segments. Additional assets include three valve manholes installed in 1996 along the 14-inch force main, which may need to be replaced in 2031.

Hydrologic and Hydraulic Modeling

Hydrologic and hydraulic modeling of the system's main collection trunk was conducted to supplement physical condition assessments. An antecedent moisture model (AMM) was developed to quantify the influence of rainfall dependent inflow and infiltration (RDII) on sanitary flows. The system was modeled in EPA SWMM to identify capacity inadequacies and inform the capital improvement plan. The following are the key findings of the hydrologic and hydraulic modeling:

1. **The Village's sanitary system constraint is treatment volume, not peak flow.** The predicted 10-year peak hourly flow, 6.8 cfs, can be handled by the sewer system, but the annual spring melt often exceeds the capacity of the treatment lagoons resulting in out-of-season discharges.
2. **The Village anticipates significant population growth and industrial development with the construction of a proposed biofuel refinery in the Village.** The Village would like to have treatment capacity for double the current population of approximately 1,300 people.
3. **The treatment lagoons do not have capacity for the Village's desired population growth**. A doubling of the current population could result in increased treatment demand of approximately 47 MGY.
4. **The firm capacity of the main lift station is inadequate.** The firm capacity of the main lift station, which represents the capacity of the station with the largest pump out of operation, is 2,200 gpm, and the predicted 10-year peak hourly flow to the lift station is approximately 3,060 gpm.
5. **Sewer flows are correlated with Lake Superior water levels.** Over a mile of sanitary sewer is below the 2001-2017 average Lake Superior water elevation, 601.3 feet.
6. **There were suspected connections to system bypasses.** Two sanitary sewer system bypasses, which are residual combined sewer overflows, were suspected to still be active during the temporary flow monitoring period. The Village has since disconnected them from the sanitary sewer.
7. **The Village's peak flow is inflow dependent.** The hydrographs show sharp responses to wet-weather events.
8. **Surcharging is anticipated and basement surveys should be conducted.** Surcharging is predicted to occur in the gravity mains on Michigan Ave near the ice arena and on Quartz St near the Village offices.

Level of Service

The Village has identified Level of Service (LOS) goals that will be used to guide the AMP and establish critical performance parameters. The LOS is bounded by the minimum regulatory requirements and the maximum capabilities of the assets.

Table 1: Summary of Level of Service Criteria

Key Service Criteria	Performance Indicator	Target Level of Service
Collection System Asset Condition Assessment and Frequent Maintenance	PACP and MACP inspections per year	Clean and inspect 8% of the gravity main and manholes per year, 4% will be from the frequent maintenance inventory • Approx. 38 manholes • Approx. 9,700 feet of gravity main
Regulatory Compliance	Compliance with MDEQ Sanitary Sewer Overflow (SSO) Policy and The Clean Water Act	• Comply with the MDEQ SSO policy of no more than 10% probability of an SSO in any given year, excluding unusual natural events or man-made disasters • Comply with the Village's NPDES permit
Service Delivery and Customer Communication	Customer complaint/request response time	• Acknowledge customer complaints and requests within 24 hours of receipt • Respond to customer complaints and requests within three business days
Service Lateral Condition Assessment	LACP inspections and service lateral replacements per year	Implement a Service Lateral Condition Assessment and Replacement Program
GIS Asset Inventory	Tracking asset conditions in the GIS geodatabase	Maintain a continuously updated GIS geodatabase
Capital Improvement Planning	Customer complaints per year, unexpected repair costs per year	Update the CIP annually
Smart Sewer Asset Management	Monthly wastewater flows to the treatment facility	• Deploy Smart Sewer Asset Management Tools • Identify sources of Infiltration and Inflow • Reduce average wastewater flows

Criticality and Risk

The investigation leading to the identification of critical sewer infrastructure involved the determination of business risk, which is identified as the combination of the probability of the infrastructure failing as well as the consequence of its failure as shown in Figure 2.

Figure 2: Risk Equation

The probability of failure is related to the physical condition of an asset. The consequence of failure focuses on the economic losses and impacts to society due to an asset's failure. The following factors were combined to determine the consequence of failure for manholes and sanitary gravity mains:

- Network Position – the sum of upstream sewers discharging to a structure
- Diameter/Size – the relative size of the asset with respect to the rest of the system
- Location –the cost to restore the surface above the asset and if traffic control is needed. Uses average daily traffic (ADT) data.
- Environment – proximity to sensitive environmental features like rivers and lakes.

Revenue Structure and Capital Improvement Plan

The Village's sewer rates were analyzed and long-term revenue structure adjustments were proposed to accommodate estimated future capital and operational spending. The Village plans to adjust the commodity charge (billable flow) as necessary to cover the sewer operating expenses, and adjust the debt fee (fixed charge) as necessary to cover the debt service fees incurred for capital improvement projects. Annual inflationary rate adjustments will be required to maintain the fund into perpetuity. Due to the scope and schedule of recommended capital projects, none have been identified for cash funding. Cash funding can be challenging to stabilize and the Village can improve long-term rate consistency by debt financing. The Village is currently eligible for USDA Rural Development loans and grants for sanitary sewer improvements, and all recommended projects will likely be funded through this program. The Village anticipates four new 40-year bond issues through USDA beginning in 2019/2020 to fund wastewater capital improvement projects. Two long-term cash flow scenarios were modeled to determine the most cost-effective funding solution. The scenarios assume different grant contributions to the bond issues, the first scenario models 25% grant and the second scenario models 50% grant. The cash flow analyses and revenue structure analysis are provided in Appendix E.

The Capital Improvement Plan (CIP) outlines the immediate/critical needs of the system as well as anticipated future needs over five-year, ten-year, and twenty-year horizons. Associated rehabilitation and replacement cost estimates are provided along with potential funding sources. The current twenty-year estimate for the Village's sanitary sewer system CIP is approximately $10,128,300 and is broken down in Table 2 below.

Table 2: CIP Cost Summary

Project Need	Years Scheduled	Planning-Level Cost
Immediate	2019	$1,720,100

5-year	2020-2023	$2,780,300
10-year	2024-2028	$1,296,500
20-year	2029-2038	$3,457,800
Ongoing O&M Enhancements	2019-2038	$873,000
Total	2019-2038	$10,128,300

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date 11/30/2018
(no later than 3 years from executed grant date)

The Village of Ontonagon *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1254-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or No
   If No - Date of the rate methodology approval letter: 05/03/2018.
2) Significant Progress Made: Yes or No
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: ____________.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ____________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Joseph Erickson at (906)884-2305 ontmgr@jamadots.com
Name Phone Number Email

11-27-18
Signature of Authorized Representative (Original Signature Required) Date

Ken Waldrop, Village President
Print Name and Title of Authorized Representative

April 2017

VILLAGE OF ONTONAGON

STORM SEWER ASSET MANAGEMENT PLAN

Executive Summary

SAW GRANT NO. 1254-01

Ontonagon
Harbor Town
Gateway to the Porcupine Mountains

NOVEMBER 2018

OHM
Advancing Communities®

Executive Summary

This document summarizes the Asset Management Plan (AMP) for the Village of Ontonagon stormwater collection system. It includes key recommendations for future funding levels and details the assessments completed by OHM Advisors with collaboration from the Village. The AMP was prepared using grant funding from the State of Michigan Stormwater, Asset Management and Wastewater (SAW) Grant Program in which $250,320 was awarded to the Village to accomplish the following key goals:

- Provide the Village with a new framework for collecting, organizing, and storing data for their stormwater colleciton system using the latest available hardware and software.
- Survey key system components to develop a Geographic Information System (GIS) database and to allow future generations to access infrastructure data with greater ease.
- Add information for sewer material type, size, and age to the GIS database.
- Evaluate the structural condition of various system components and store the data in the GIS database.
- Identify long-term operations and maintenance strategies to maintain a reasonable structural condition into perpetuity, including:
    - Regularly-scheduled sewer inspection (televising) and cleaning
    - Repair and rehabilitation to address structural problems resulting from aging infrastructure
- Provide recommendations for developing a prioritized Capital Improvement Plan.

The contact person for the Village of Ontonagon Storm Sewer AMP is:

Joseph Erickson, Village Manager
315 Quartz Street
Ontonagon, Michigan 49953
Phone: 906-884-2305
Email: ontmgr@jamadots.com

Asset Inventory

An asset inventory is a list of the Village's assets and their attributes. The majority of the Village's storm sewer infrastructure, including manholes, catch basins, gravity main, and culverts has been inventoried and digitized. The GIS framework was developed as part of this effort, making it easier to store critical data for the location, size, material, install date, and condition of each stormwater asset. The stormwater collection system is comprised of assets that are not all owned by the Village of Ontonagon. The condition assessments and long-term planning were focused on assets owned by the Village of Ontonagon.

List of Assets

The following lists the major assets of the storm sewer system that are owned by the Village of Ontonagon. MDOT owns approximately 70 manholes, 22 catch basins, and 2.1 miles of gravity main in addition to the inventory listed below.

- 5.2 miles of stormwater gravity main
- 316 culverts
- 106 stormwater manholes
- 285 stormwater catch basins

Condition Assessment

Three methods were used to assess the condition of the assets in the Ontonagon storm system:

1. Physical inspection
2. Remaining useful life (RUL) analysis
3. Hydraulic modeling

Physical inspections were conducted in accordance with the National Association of Sewer Service Companies (NASSCO) Manhole Assessment Certification Program (MACP) and Pipeline Assessment Certification Program (PACP). For a selected group of low-criticality catch basins located at upstream terminals of the storm sewer, a less involved structure inspection method was performed. In total, around one-fifth of the storm sewer and _ of the Village's stormwater structures were physically inspected. Figure 1 describes the portion of the storm sewer system that has been inspected.

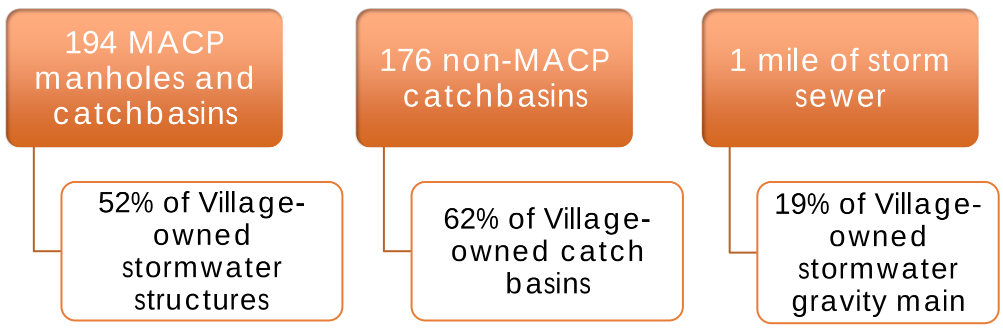


Figure 1: Portion of System Assessed

The condition of the remainder of the system was estimated using information about the age, material of construction, and other known physical attributes. Business Risk Exposure (BRE) was determined based on the Consequence of Failure (COF) and Probability of Failure (POF) ratings for each asset. The final method of analysis was the development of a hydraulic model using PCSWMM software. The following conclusions can be drawn from each of the above methods of analysis:

- Inspected storm sewers had an average Overall Rating Index of 1.6. MACP rated structures had an average Overall Rating Index of 2.1.
- The RUL based assessment indicates that 95% of storm sewers should have a POF score of 3, meaning moderate condition, or better. However, the RUL assessment may differ from the condition established by physical inspection and the Village should consider RUL only as an estimate in the absence of inspection data.
- All infrastructure degrades over time. Older assets are more prone to develop Grade 4 and Grade 5 defects. The oldest sewers are also typically more critical due to their central location. The combination of deteriorations and central network position leads to higher BRE.

Level of Service

The village has identified a target level of service to serve as a benchmark for its stormwater collection performance.

Table 1: Level of Service

Key Service Criteria	Performance Indicator	Target Level of Service
Collection System Asset Condition Assessment and Frequent Maintenance	PACP and MACP inspections per year	Clean and inspect 8% of the gravity main and manholes per year, 4% will be from the frequent maintenance inventory • Approx. 28 catch basins • Approx. 10 Manholes • Approx. 3,100 feet of gravity main • Approx. 25 culverts
Regulatory Compliance	Compliance with MDEQ Policy and The Clean Water Act	Comply with MDEQ Policy and The Clean Water Act
Service Delivery and Customer Communication	Customer complaint/request response time	• Acknowledge customer complaints and requests within 24 hours of receipt • Respond to customer complaints and requests within three business days
GIS Asset Inventory	Tracking asset conditions in the GIS geodatabase	Maintain a continuously updated GIS geodatabase
Capital Improvement Planning	Customer complaints per year, unexpected repair costs per year	Update the CIP annually

Criticality and Risk

The investigation leading to the identification of critical sewer infrastructure involved the determination of business risk, which is identified as the combination of the probability of the infrastructure failing as well as the consequence of its failure as shown in Figure 2.

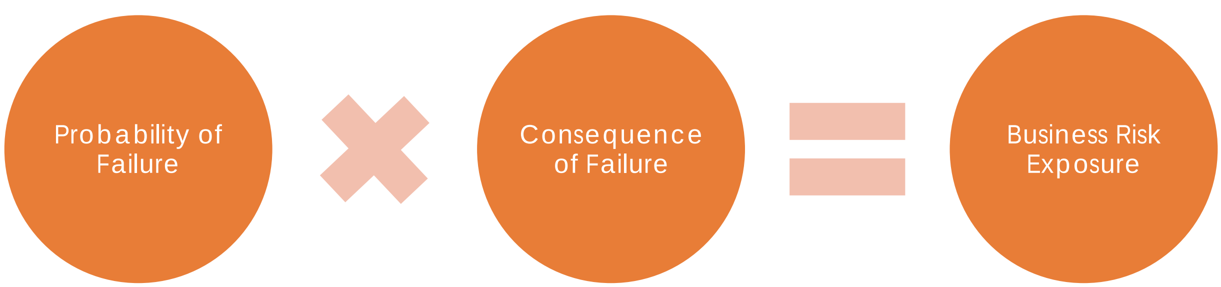


Figure 2: Risk Equation

The probability of failure is related to the physical condition of an asset. The consequence of failure focuses on the economic losses and impacts to society due to an asset's failure. The following factors were combined to determine the consequence of failure:

- Diameter/Size – the relative size of the asset with respect to the rest of the system
- Location – the cost to restore the surface above the asset and if traffic control is needed. Uses average daily traffic (ADT) data.
- Environment – proximity to sensitive environmental features like rivers and lakes.

Capital Improvement Plan

The above analyses inform the recommendations contained in the Capital Improvement Plan (CIP). The CIP identifies and prioritizes stormwater infrastructure improvements over 5-year, 10-year, and 20-year planning horizons. Recommended capital improvements and operations and maintenance enhancements total over $4 million over the next twenty years. Lower cost, high impact projects are recommended for the short term to address the most glaring deficiencies in the system. Higher cost projects are slated for the ten-year horizon to allow for planning to address funding shortfalls. The projects in the twenty-year category address less critical deficiencies and budgetary estimates are included for rehabilitation of uninspected stormwater assets. The CIP, provided in Appendix C, outlines the anticipated project needs, scopes, and schedule. The CIP should be updated annually.

Revenue Structure

Like most Michigan communities, the Village of Ontonagon does not have a revenue structure in place for its stormwater infrastructure. Implementing a stormwater utility fee is legally complex, and only a handful of Michigan communities have done so successfully. The controversy is centered around how landowners are charged for stormwater infrastructure usage based on property size or by the combined area of impervious surfaces on their property. This rate structure too closely resembles an unlawful property tax, which has led to multiple lawsuits against municipalities across the State. Because of this, stormwater infrastructure is systematically underfunded. Until new State legislation is passed, it will be difficult, or even impossible, for the Village to implement a stormwater utility, and capital improvements may be challenging to fund. Nonetheless, the Village's storm sewer system is aging.

DEQ

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Due Date 11/30/2018
(no later than 3 years from executed grant date)

The Village of Ontonagon *(legal name of grantee)* certifies that all stormwater asset management plan (SWAMP) activities specified in SAW Grant No. 1254-01 have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SWAMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

Joseph Erickson at (906)884-2305 ontmgr@jamadots.com
Name Phone Number Email

[signature] 11-27-18
Signature of Authorized Representative (Original Signature Required) Date

Ken Waldrop, Village President
Print Name and Title of Authorized Representative

Certification of Project Completeness Summary

Oscoda Charter Township
110 State Street
Oscoda, MI 48750
(989) 739-3211

SAW Grant Project No. 1393-01

In November 2015, Oscoda Charter Township entered into an agreement with the Department of Environmental Quality and the Michigan Finance Authority for grant funds issued under Public Act No. 511 of 2012 for the *Stormwater, Asset Management, and Wastewater (SAW)* program. The Township received the following:

Design Engineering Costs	$ 72,433
User Charge System Development Costs	$ 6,500
Wastewater Asset Management Plan (WWAMP) Project Cost	$850,000
LESS Local Match – 0%	($ 0)
Total Grant Amount – 100% Grant	$928,933

Wastewater Asset Inventory

The Charter Township of Oscoda's wastewater system has been inventoried, including 166,818 feet of gravity sewer, approximately 57,000 feet of force main, 652 manholes and cleanouts, 23 pump stations, and a 3-cell wastewater lagoon system with groundwater discharge via rapid infiltration basins.

Each asset was identified and accounted for using existing as-built information that was provided by the Township. These assets can be located using the ESRI GIS base map that has been created as part of the Asset Management Plan. This base map was populated using survey grade geospatial data which shows structures, pump stations, pipelines, and the lagoon system in the Michigan State Plane coordinate system. In addition to the geospatial data, each asset was populated with asset management information based on field observations of existing conditions. The Township will be able to facilitate an asset management program by updating the asset information as repairs and maintenance activities take place.

Using this data, the total asset value in 2018 dollars is estimated at $35 million dollars.

Condition Assessment

Topographic survey, field inspections, and condition assessments were performed on the manholes, pipelines, pump stations, and lagoon system. Accessible manholes, cleanouts, valves, and the lagoon system structures were inspected using NASSCO's MACP standards for field inspections. A sewer televising company was retained to televise the pipes and perform a condition assessment of the pipes to identify defects and obvious issues. All pipe lines were televised using NASSCO's PACP standards for pipeline inspections. Using the inspection data, spreadsheets were created to document and perform condition assessment calculations using NASSCO's MACP/PACP Quick Rating System.

For manholes and pipelines, the quick rating system is the sum of all defect grades divided by the number of defects. This quick rating is broken down into two categories: structural and operation and maintenance. The two scores are then combined to generate a Combined quick rating, which was then used to calculate the Likelihood of Failure for the risk assessment.

At this time, the greatest deficiency within the Township's wastewater collection system is the condition of the sanitary sewer pump stations.

Overall, most of the Township's manholes are in fair to good condition, having either medium or low severity defect(s). The results of the condition assessment are summarized in the following tables:

SANITARY MANHOLE OVERALL DEFECTS	
Defect Category	Number of Manholes
Structural	305
O&M	468

SANITARY MANHOLE COMBINED DEFECTS		
Combined Quick Rating	Number of Manholes	Percent of System (%)
High - Grade 5	97	15%
Medium - Grade 3-4	234	36%
Low - Grade 1-2	272	42%
No Defects - 0000	49	8%
Total	**77**	**100%**

Overall, most of the Township's pipes are in fair to good condition, having either medium or low severity defect(s), or no defects. About 110 of the No Defects pipes had no data collected for lack of access or were too small of diameter to televise, and therefore received no score. The results of the condition assessment are summarized in the following tables:

SANITARY PIPE OVERALL DEFECTS	
Defect Category	Number of Pipe Segments
Structural	201
O&M	426

SANITARY PIPE COMBINED DEFECTS		
Combined Quick Rating	Number of Pipe Segments	Percent of System
High - Grade 5	33	5%
Medium - Grade 3-4	167	25%
Low - Grade 1-2	267	40%
No Defects - 0000	199	30%
Total	**666**	**100%**

This inventory and condition assessment of the Township's system is the base of the entire AMP. It was used to determine a current need for repair, the priority of repair projects, and a future O&M plan. The inventory and condition assessments were used to create and populate an ESRI ArcGIS base map.

Additionally, the GIS base map was used to create a system flow model in Autodesk Storm and Sanitary Analysis (SSA) and flow meters were placed in various locations around the Township for a period of 6 months. Two SSA models were prepared during this project. The first describes the system as surveyed and investigated during the preparation of this study. The second models the system FIRM capacity which assumes that the largest capacity pump at each pump/lift station is disabled.

- The SSA model that has been prepared is calibrated for dry weather flows, as well as having initial parameters set to describe RDII unit hydrographs from rainfall events received during the monitoring period. The model includes customer water meter data provided by the Township, and sanitary sewer flow meter data gathered in the field by Spicer Group. The modeled dry-weather flow (purchased water), was further defined using standard diurnal curves to simulate times of peak water use. The resulting sanitary flows mimic the peak flows that are seen throughout a 24-hour dry-weather period, while still maintaining the appropriate volume to match metered sales. The RDII component of sanitary flow was introduced in the SSA model by using design rainfall data for a particular 24-hour design event to drive the aforementioned unit hydrographs to mimic the additional flow associated with RDII. The model was then run under various design rainfall events and the associated model output examined to estimate the capabilities of the sanitary system.

- The FIRM model, while considering some limitations in available RDII calibration data, suggest that the sanitary conveyance system is capable of handling purchased water along with inflow and infiltration associated with the 24-hour 25-year design event.

Criticality (Risk)

For each asset in the Township's wastewater system, a criticality/risk analysis was developed. The calculation that determined overall risk was defined as:

Likelihood of Failure (LoF) * Consequence of Failure (CoF) = Risk

The LoF for assets is primarily based on the physical condition of the asset as inspected in the field. Using the quick rating developed from NASSCO standards, a LoF value between 1000 and 5999 was found for each sewer and manhole asset. A LoF value between 1 and 5 was determined for each pump station and lagoon asset, by assessing the age of the asset, performing a visual inspection, interviewing operators for maintenance records, and performing flow rate tests on the pumps. The following table shows the grading scale definitions for all assets throughout the Township:

Likelihood of Failure (LoF)		
Description	Grade	Failure of Asset
Immediate	5	Asset has failed or will likely fail within 5 years
Poor	4	Asset will probably fail in 5-10 years
Fair	3	Asset may fail in 10-20 years
Good	2	Asset unlikely to fail for at least 20 years
Excellent	1	Failure unlikely in foreseeable future

The Consequence of Failure (CoF) aggregates the empirical value associated with failure of an asset as it directly and indirectly pertains to social, environmental, and cost implications. A percentage of the carried weight between the social, environment, and cost factors must be assigned by the Owner and Engineer. The factors established are for this system evaluation, and are not finite. The underlying components contributing to the social, environmental, and cost factors are described below. One (1) has the least CoF implications, where six (6) has the highest.

Factors:

1. Position of Pipe/Sewer/Manhole Relative to System Network
   a. Position of main trunk / interceptor sewers have greater CoF as opposed to small tributary sewers.
   b. Weighting can be population based or service area based.

2. Pipe Diameter
   a. Generally larger diameter sewers carry larger amounts of flow and typically constitute trunk sewers.
   b. Weighting is relative to the system's range of pipe diameter sizes.

3. Depth of Sewer/Manhole
   a. Sewers constructed at deeper elevations typically require more costs to excavate and repair/replace.
   b. Weighting is relative to the system's range of depths.

4. Locations of Sewer/Manhole
   a. Location will have social, economic, and environmental impacts.
   b. Factors have been established on PACP criteria.

c. Example, a sewer in a resident's "yard" will carry less CoF for the same sewer in a "Major Highway" such as an MDOT trunk line.

5. Proximity to a Waterway.
   a. This is primarily an environmental consideration.
   b. Failure directly or indirectly to environmentally sensitive areas like rivers, lakes, streams, and or wetlands are associated with this factor.

6. Accessibility Standards
   a. Ease of access is vital to timely repairs.
   b. Impacts include cost, social, and potentially environmental

The following table summarizes the CoF scale definitions:

Consequence of Failure (CoF)		
Description	Grade	Failure of Asset
Catastrophic Disruption	6	Massive system failure - severe health effect, extensive damages, LOS severely compromised
Major Disruption	5	Major effect - major capacity loss, health effects, and costs, LOS compromised
Moderate to Major Disruption	4	Major effect - moderate to major loss of system capacity, costs, and health effects, LOS may be compromised
Moderate Disruption	3	Moderate effect - moderate loss of system capacity, health effects, and costs, LOS still achieved
Minor Disruption	2	Minor effect - minor capacity loss, costs, and health effects
Insignificant Disruption	1	Slight effect - slight loss of system capacity, minor health effects, minor costs

Using the aforementioned formula, the risk for each asset was calculated. The assets were ranked based on the nature of the defects found and the CoF. The results for the Township of Ashley were 8 manholes, 8 pipe segments, and 1 pump station were found to be high risk assets in the system. Using LoF and risk information, a capital improvement plan (CIP) was developed to reduce the overall risk of the system. The CIP involves a systematic approach to address all assets in the system over the span of the next 10-20 years.

Level of Service Determination

For the Level of Service, the Township prioritized projects in their CIP and rate structure based on the level of service that they feel is affordable and achieves their Mission Statement:

> *The Charter Township of Oscoda commits to operating a financially sustainable, safe, efficient, and environmentally responsible wastewater collection and treatment system to provide the community with reliable service, and strives to meet the local, state, and federal regulatory requirements at a fair and reasonable cost to its customers through the implementation of asset management. The Township's asset management program strives for effective maintenance planning, capital improvement planning and budgeting.*

Based on several Rate Methodology Decision Meetings held in October and November 2018, the Township choses various levels of service for each area of assets that they felt best fit the Township's needs from both a risk management standpoint and rate standpoint. From there, the financial consultant entered the costs into the financial model, along with operating expense minimums and bonded project considerations. Oscoda Charter Township chose different Low, Medium, and High Levels of Service for various assets and plan to implement the recommended rate increases from the financial model.

Capital Improvement Plan

The Capital Improvement Plan is a prioritized list of all the projects that need to be completed to meet the level of service goals of the system. The asset inventory, condition assessment, critical assets and level of service sections were taken into consideration to form the capital improvement plan.

At the levels of service selected by the Township for each scope of work, the total cost of manhole repairs is approximately $1.37M, the total cost of pipe repairs is approximately $3.2M, and the total cost of pump station improvements is approximately $8.86M, over the next 20 years.

For the lagoon system, overall the system is in good condition, but some items will need attention. The ferric chloride system will need to be replaced, control structure #2 valves and grating need to be replaced, and the Township wants to install fine screening at the headworks of the facility for an increased level of service. The total cost of these improvements is approximately $400,000.

Revenue Structure

Wastewater account balances, expenditures, revenues, etc. were reviewed and entered into a financial software model. The model was used initially to determine if there was a gap the operating funds compared to generated revenue. After reviewing the financial data, rate structure, and operating budgets, the Township was found to have no deficiencies in the 2.5-year gap analysis.

Following the 2.5-year gap analysis, the capital improvement plan (CIP) was added to the financial model. To date, two Rate Methodology Study Meetings have been held (October 15, 2018 and November 9, 2018) with members of the Township, Umbaugh, and Spicer Group, Inc. For the discussions, Umbaugh entered the chosen levels of service costs into their financial model and have performed some initial analysis on the rate structure. Another consideration for the Township is to examine the rate structure involving their major user, AuSable Township. A Rate Methodology Workshop will be held in early 2019 to again discuss the issues and decide on a rate structure to present to the Township Board for consideration. A complete copy of the Sewer Revenue Sufficiency Rate Study will be available in 2019

List of Major Assets

The following is a breakdown of the assets of Oscoda Charter Township's wastewater system:

- 166,818 feet of gravity pipe
    - 737 feet of 4”
    - 6,828 feet of 6”
    - 122,271 feet of 8”
    - 5,533 feet of 10”
    - 13,724 feet of 12”
    - 5,735 feet of 15”
    - 1,890 feet of 18”
    - 10,071 feet of 21”
    - 29 feet of 24”
- 57,000 feet of forcemain
- 652 manholes
- 23 pump stations
- 3-cell aerated lagoon treatment system with groundwater discharge via rapid infiltration basins

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date November 30, 2018
(no later than 3 years from executed grant date)

The Oscoda Charter Township *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1393-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or No

   If No - Date of the rate methodology approval letter: May 14, 2018.

2) Significant Progress Made: Yes or No

   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)

3) Date of rate methodology review letter identifying the gap: __________.

4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on __________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Dave Schaeffer, Superintendent at (989) 739-3211 superintendent@oscodatownshipmi.gov

Name Phone Number Email

Dave Schaeffer 11/27/18

Signature of Authorized Representative (Original Signature Required) Date

Dave Schaeffer, Superintendent

Print Name and Title of Authorized Representative

Prein&Newhof
Engineers ▪ Surveyors ▪ Environmental ▪ Laboratory

Memorandum

Date:	November 30, 2018
To:	Valorie White
Company:	Michigan Department of Environmental Quality
From:	Prein&Newhof
Project #:	2130281
Re:	Otsego Township SAW Grant: Summary of Wastewater Asset Management Plan

This memorandum provides the summary of the Otsego Township wastewater asset management plan SAW grant activities required under Section 603 of Public Act 84 of 2015. Headings and italicized quotes are from recent MDEQ guidance.

Grantee Information

Grantee:
Otsego Township
400 North 16th Street
P.O. Box 257
Otsego, MI 49078
http://otsegotownship.org

Contact: Mr. Bryan Winn, Township Supervisor
Phone: 269-694-9434

SAW Grant Project Number: 1465-01

Executive Summary

Otsego Township received a SAW Grant in November 2015 to prepare Wastewater and Stormwater Asset Management Plans. The Grant agreement indicated the following amounts:

	Project Total	Grant Amount	Local Match
Wastewater AMP	$260,930	$234,837	$26,093

The Key components in the Asset Management Plan include:

1. Asset Inventory and Condition Assessment
2. Criticality of Assets
3. Level of Service
4. Operation and Maintenance Strategies/Revenue Structure
5. Long-term Funding/Capital Improvement Plan

Asset Inventory

"Describe the system components included in the AMP. Discuss how they were located and identified, if applicable. Describe the platform used to develop and maintain the inventory of assets."

All assets that are functionally or financially significant to the wastewater system have been inventoried. Manhole, gravity sewer main, force main, and lift station locations were plotted in a Geographic Information System (GIS) using record drawings. Manhole and lift station locations were field verified and locations adjusted with survey grade Global Positioning System (GPS) coordinates.

Asset inventory data including year of installation, material, sizes, pipe inverts and manhole rim elevations were cataloged from record drawing and visually verified where needed. Asset inventory data is managed using GIS databases.

Location of non-pipe assets, such as, lift station components, building components, and other equipment is compiled in a package of inventory spreadsheets. These assets are not mapped in GIS.

Condition Assessment

Discuss the condition assessment process, including what methods were used. Summarize the results of the assessment for each asset category.

Gravity Sewer Mains: Inspections were made using either a pole mounted zoom camera (looking up or down each pipe from the manholes) or with in-line closed circuit television (CCTV) cameras. Pipes inspected with zoom camera methods were rated considering any observable roots, deposits, joint conditions, pipe wall condition, infiltration, or other defect observations. Pipes inspected with CCTV were rated using the Pipeline Assessment Certification Program (PACP) system condition grading system. Composite Risk of Failure ratings of 1-5 were derived for each pipe.

Percentage of gravity sewer pipes in each rating category

1	2	3	4	5
83%	10%	1%	4%	2%

Force Mains: Force main conditions were estimated using pipe age, material, and break history records. Otsego Township's force main data was compared with that of several other municipalities to establish a comparative reference. Ratings of 1-5 were developed for each force main.

Percentage of force main pipes in each rating category

1	2	3	4	5
100%	0%	0%	0%	0%

Manholes: Manholes were visually inspected and rated on a scale of 1-5 based on factors related to the condition of castings, steps, structures, and infiltration.

Percentage of manholes in each rating category

1	2	3	4	5
65%	24%	8%	1%	2%

Lift Stations: Visual inspection and performance testing were completed to evaluate asset condition. Lift station assets, including pumps, valves, piping, structures, electrical, controls, and other assets, were rated on a scale of 1-5. Composite ratings for the station as a whole were developed.

Number of lift stations in each rating category

1	2	3	4	5
0	0	2	0	0

Criticality of Assets

"A summary of the method used to assess the criticality of assets considering the likelihood and consequence of failure. Discussion may include the method used to assess the criticality of assets considering the likelihood and consequence of failure and based on the condition of the assets and the determined risk tolerance, how were the assets ranked."

Assets were given a Risk of Failure (RoF) rating of 1-5 (5 being the worst) based on factors related to both physical and functional conditions as determined through condition assessments. Assets were given a Consequence of Failure (CoF) rating of 1-5 (5 being the worst) based on potential damage to adjacent utilities, transportation network, and the surrounding property/environment. The magnitude of the potential service disruption was also a factor.

Assets with the higher rankings for Consequence of Failure were those that:

- Provide service to a significant portion of the system
- Serve schools/hospitals/major industry
- Are under major roads or are adjacent to other major utilities
- Are adjacent to waterways or significant wetlands

Criticality ratings were calculated as the product of an asset's RoF and CoF, producing criticality ratings ranging from 1-25 (25 being the most critical). The most critical assets were found to be gravity sewers primarily along M-89.

Level of Service Determination

"A summary of the level of service goals the municipality has determined that it wants to provide its customers based on the municipality's ability to provide the service and customer expectations. Discussion may include the procedures used to involve stakeholders in the level of service discussion. The trade-offs for the service to be provided. This could include any technical, managerial, health standard, safety, or financial restraints, as long as all regulatory requirements are met. How the level of service goals were determined"

The Township recognizes that the people served by the system are more than customers, they are the system owners. Township staff acts as stewards of the system. The Township has held numerous public meetings and workshops with the Township Staff and Board Members. At these meetings, the results of the condition assessments were discussed, the costs for various operations, maintenance and replacement strategies affecting the levels of service were reviewed along with potential rate impacts. Based on the input received during these meetings, the following Level of Service Goals has been established:

1. Meet Regulatory Requirements
2. Minimize Service Interruptions
3. Minimize Public Hazards
4. Manage Storm Water Inflow and Ground Water Infiltration
5. Provide Capacity for Community Growth
6. Minimize Life Cycle Costs

Revenue Structure

"A summary of the funding structure and rate methodology that provides sufficient resources to implement the asset management program. Discussion may include the rates, charges, or other means of revenue were reviewed to determine if there will be sufficient funds to cover system operation, maintenance, replacement, capital improvement projects, and debt costs, identified in the AMP. If the current rate structure was not sufficient, discuss what increases were needed to ensure the desired level of service is sustainable and if any changes were made."

Historical operating expenses were reviewed using current audit and budget information. Based on that information, a "Test Year" was developed that reflected a baseline cost. The baseline costs included currently budgeted expenses, debt service, and leveling for base operating cost.

The customer base was reviewed, including the number of residential equivalent units in the system. Other operating and non-operating revenues were also evaluated. Prediction of customer connections was made including trending in system utilization, projection of operating costs, and anticipated inflation by expense category.

A forecasting system was developed and used to identify the estimated replacement investment for the remaining lifecycle of all assets, based on the asset inventory and condition assessment data. Project costs were estimated for capital improvements within the first 10 years. The annual investment cost was evaluated and scenarios developed for cash funding and debt financing. Based on this analysis, it is expected that a combination of future rate increases and debt financing will be needed to fund capital projects.

Capital Improvement Plan

"A summary or the long-term Capital Improvement Plan that was developed to address system needs identified in the AMP."

A capital improvement plan showing project descriptions, cost estimates, and project timelines, was developed for the capital improvements needed within a ten year planning period. The major wastewater system projects identified in the CIP are:

- Four (4) Sanitary Point Repairs
- Various MH Rehabilitation
- 13th Street Lift Station Improvements (Cathodic Protection)
- Lift Station Alarm Communication Upgrades
- 12th Street Lift Station Improvements
- Meijer Lift Station Maintenance Improvements
- Replacement of 2008 Truck

List of Major Assets

"Provide a general list of the major assets identified in the AMP."

Otsego Township's major assets include:

- 2 lift stations
- 32,404 feet of 8" to 16" diameter gravity sewer
- 3,508 feet of 6" to 8" diameter force main
- 138 manholes
- 2008 Truck
- Pole barn with office building

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date November 30, 2018
(no later than 3 years from executed grant date)

The Otsego Township *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1465-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

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   If No - Date of the rate methodology approval letter: May 14, 2018.
2) Significant Progress Made: Yes or No
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: ______________.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ______________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Bryan Winn at 269-694-9434 bwinn@otsegotownship.com
Name Phone Number Email

November 30, 2018
Signature of Authorized Representative (Original Signature Required) Date

Bryan Winn, Township Supervisor
Print Name and Title of Authorized Representative

April 2017

INFRASTRUCTURE ALTERNATIVES, INC.

VILLAGE OF PARMA ASSET MANAGEMENT PLAN

EXECUTIVE SUMMARY

SAW GRANT NO. 1555-01

NOVEMBER 2018

This Asset Management Plan (AMP) serves as an interactive planning tool for the community to manage current system needs, as well as project preventative maintenance and capital improvements, in order to provide continuous reliable service to its customers. Each of the major components of the Village of Parma's wastewater and stormwater systems has been inspected and evaluated as to its current condition, capability to perform its desired function, criticality, and service life expectancy. The following is a summary of findings and work completed under the Village of Parma SAW Grant.

CONTACT INFORMATOIN

Address	PO Box 127 117 W. Main St. Parma, MI 49269
Web Address	http://villageofparma.org/
Contact	Village offices (517) 531-4785 *Jim Jenkins, Village of Parma* Village President jenks07@wowway.biz *Joanne Havican, Village of Parma* Village Clerk, Authorized SAW Grant Representative parmaclerk@wowway.biz

WASTEWATER AND STORMWATER ASSET INVENTORY

Data was obtained on assets from the Village of Parma Wastewater Collection and Treatment System and Stormwater Collection System for assembling the AMP. The AMP tracked assets represent over 75% of the current systems. Assets were located using GPS receiver and identified by available record drawings.

Arc GIS was used to develop and maintain the inventory of assets, and the equipment lists and condition ratings were exported to Excel for data review and Criticality calculations.

The Village previously had the sanitary system televised in 2011. The videos, spanning the majority of the sanitary system piping, excluding manholes, were reviewed and determined to be of good quality and recent enough to provide adequate system data. Therefore, a two pronged approach was determined the best course for providing asset condition assessments. First, the original videos were reviewed by Pipeline Assessment and Certification Program/Manhole Assessment Certification Program (PACP/MACP) certified personnel and coded in accordance with National Association of Sewer Service Companies (NASSCO) Pipeline Assessment standards. Next, the majority of stormwater system and the remainder of the sanitary system, including any non-viable video sections, omitted piping, and all manholes, were televised and coded in accordance with NASSCO and PACP/MACP. Visual inspections were performed on the two sanitary treatment lagoons and valve structures, which were completely rehabilitated in 2008. Results of these sanitary asset condition assessments are summarized as follows.

	1 - Very Good	2 - Good	3 - Fair	4 - Poor	5 - Very Poor
Sanitary Sewer Manholes	76.4%	12.4%	9.0%	2.2%	0.0%
Sanitary Sewer Pump Stations	50.0%	0.0%	0.0%	50.0%	0.0%
Sanitary Sewer Piping	37.0%	51.4%	10.8%	2.2%	0.0%
Stormwater Inlets and Manholes	22.5%	43.1%	18.6%	11.8%	3.9%
Stormwater Piping	9.5%	28.8%	61.6%	0.0%	0.0%

Ongoing tracking and maintenance of the Village's utilities will be completed by the Village and operations staff through Arc GIS and the paired WAI Application, which organizes assets, work orders, and repair and maintenance activities.

CRITICALITY OF ASSETS

An assessment of each asset within the wastewater collection and treatment system and stormwater collection system was collected through operator input, supplier input, and field knowledge. Asset data considered in the assessment includes installation date (if known), typical useful life, current condition, probability of failure (1 – Improbable to 5 – Imminent), consequence of failure (1 – Insignificant to 5 – Catastrophic), and estimated cost of replacement. Criticality is a rating based on probability of failure and consequence of failure and is calculated by multiplying the two ratings. Planned replacements over the 20 year planning period were used for creating the budget. The planned replacement items were those scoring above 12 on Criticality Factor. Scores of 13-16 represent long term planned replacements within the 20 year planning period; scores of 17+ are of more immediate need.

The following table summarizes the criticality ratings for the sanitary sewer collection and treatment and stormwater systems. While the majority of the system is not in immediate need of repair or replacement, it is evident that the primary concern at this point is the condition and viability of continued operations at the sanitary pump stations at South Union Street and Grove Street. These 1971 can-style lift stations have far exceeded their service life expectancy and internal equipment is showing wear or even failure conditions. The outdated equipment is difficult and timely to repair. Replacement of both stations is necessary in order to avoid a catastrophic failure.

	Criticality 0-12	Criticality 13-16	Criticality 17-25
Sanitary Sewer Manholes	93.3%	5.6%	1.1%
Sanitary Sewer Pump Stations	50.0%	0.0%	50.0%
Sanitary Sewer Piping	91.5%	7.6%	1.0%
Stormwater Inlets and Manholes	94.1%	2.9%	2.9%
Stormwater Piping	79.8%	15.5%	4.7%

The following charts summarize the remaining useful life for the wastewater collection and treatment and stormwater collection systems.

	0-10 Years	11-20 Years	21-30 Years	31-40 Years	41-50 Years	51+ Years
Sanitary Sewer Manholes	1.1%	5.5%	0.0%	91.2%	0.0%	2.2%
Sanitary Sewer Pump Stations	50.0%	0.0%	0.0%	0.0%	0.0%	50.0%
Sanitary Sewer Piping	2.9%	7.6%	14.0%	0.0%	0.0%	75.4%
Stormwater Inlets and Manholes	2.9%	2.9%	94.1%	0.0%	0.0%	0.0%
Stormwater Piping	4.7%	15.5%	0.0%	70.8%	0.0%	9.0%

LEVEL OF SERVICE DETERMINATION

The Village of Parma seeks to provide quality sanitary sewer service and proper stormwater system management for residents of the community. The asset management team built the LOS to provide definition of each goal and tangible methods by which to measure its validity. Goals were determined based on maintaining satisfaction and safety for residents of the community, Village staff, and operations personnel.

INFRASTRUCTURE ALTERNATIVES, INC.

System operations and asset maintenance requirements were reviewed, and the following measurable operation and maintenance strategies and goals were identified for each wastewater service determinant:

Goal	***Operation and Maintenance Strategy***
• *To provide a safe working environment*	• Conduct regular safety meetings
• *To secure all assets from break ins or intrusions*	• Lockable closure on treatment plant, lift stations and wastewater collection assets
• *To have a certified operator accountable for system operations*	• Operator must have a State Wastewater Certification appropriate to the facility
• *To provide excellent customer service*	• All customer complaints to be investigated within 2 business days of reporting
• *To be aware of and comply with regulatory changes*	• Attend industry conferences and training, maintain relationship with regulatory staff
• *To provide excellent customer service*	• All customer complaints to be investigated within 2 business days of reporting
• *To retain enough reserves to cover anticipated expenses*	• Adequate budget for annual inspections, repair, maintenance
• *To provide continuous wastewater collection*	• Perform maintenance and inspections at lift stations and plant in order to prevent unscheduled repairs
• *To provide high quality discharge and avoid contamination*	• Perform effluent testing per discharge permit

The following measurable operation and maintenance strategies and goals were identified for each stormwater collection system determinant:

Goal	***Operations and Maintenance Strategy***
• *To provide a safe working environment*	• Conduct regular safety meetings
• *To secure all assets from break ins or intrusions*	• Secure closure on stormwater structures
• *To have a DPW department accountable for system operations*	• Operator must have experience appropriate to the system
• *To provide excellent customer service*	• All customer complaints to be investigated within 2 business days of reporting
• *To be aware of and comply with regulatory changes*	• Attend industry conferences and training, maintain relationship with regulatory staff
• *To provide excellent customer service*	• All customer complaints to be investigated within 2 business days of reporting
• *To retain enough reserves in the General Fund to cover*	• Adequate budget for annual inspections, repair, maintenance
• *To provide reliable stormwater management*	• Perform maintenance and inspections at stormwater structures to prevent unscheduled repairs

The asset management team worked through an iterative process, reviewing customer service requirements, operational field knowledge, Village staffing, and funding capabilities. The predominant focus of the asset management program is to identify current service needs, as well as plan for operating reserves to continue the desired service on an ongoing basis.

REVENUE STRUCTURE

Wastewater Collection and Treatment System

Historical financial data was populated from the 2017 fiscal year. Planned pump station replacement, CIP project costs, and existing bond payments were taken into account, and five user rate options were generated and reviewed by the Village. An initial funding gap of $67,984.91 was identified for the 2019 funding year, and made whole by the planned $70,000 General Fund Transfer. Parma has outlined a plan to close the gap in order to bring the Village into compliance with both SAW and the terms of the existing SRF loans. The balance of the funding gap will be closed over 5 years in accordance with SAW requirements. Effective September 1, 2018, the approved sanitary sewer rate increases are identified as follows:

		Increase Per REU	Rate Per REU	Quarterly Rate Per REU	Annual Projected System-Wide Increase (354 REUs)
	Present Day		$ 56.00	$ 168.00	
Year 1	September 2018	$ 7.50	$ 63.50	$ 190.50	$ 31,860.00
Year 2	September 2019	$ 7.00	$ 70.50	$ 211.50	$ 29,736.00
Year 3	September 2020	$ 7.00	$ 77.50	$ 232.50	$ 29,736.00
Year 4	September 2021	$ 7.00	$ 84.50	$ 253.50	$ 29,736.00
Year 5	September 2022	$ -	$ 84.50	$ 253.50	$ -

Stormwater Collection System

The Village maintains the stormwater collection system through the General Fund. In the absence of dedicated stormwater revenue fund information, a stormwater system budget was constructed, accounting for all expenditures relating to operations and maintenance of the system.

INFRASTRUCTURE ALTERNATIVES, INC.

CAPITAL IMPROVEMENT PLAN

Wastewater Collection and Treatment System

The CIP outlines the multiyear scheduling of improvements the Village of Parma is planning to pursue. Development of these projects is to be over the 20 year planning period, and the specific timeline of each of these projects is reflected in the following table. The replacement of the South Union Street pump station and Grove Street pump station is of immediate need; project funding through USDA Rural Development is planned.

Projects	Years Until Project Must Begin	CIP Year	Cost
Grove Street Pump Station	1	2019	$ 300,000
S. Union Pump Station	1	2019	$ 300,000
ssMH-2: Manhole Rehabilitation	2	2020	$ 5,000
ssGM-34: Pipe Relining	2	2020	$ 13,079
Replace/Repair All Corrugated Metal Gravity Main with PVC	3	2021	$ 39,315
N. Union Pump Station: Pump 1 Replacement	17	2035	$ 65,000
Fulton Street Pump Station: Pump 1 Replacement	17	2035	$ 55,000
N. Union Pump Station: Pump 2 Replacement	18	2036	$ 65,000
Fulton Street Pump Station: Pump 2 Replacement	18	2036	$ 55,000
Replace/Rehabilitate 34 Manholes with Criticality >12	20	2038	$ 25,000
Replace/Repair Gravity Main with Criticality >12	20	2038	$ 128,791
Replace Pressurized Main with Criticality > 12	20	2038	$ 1,276

Stormwater Collection System

Development of stormwater projects is to be over the 20 year planning period, and the specific timeline of each of these projects is reflected in the following table.

Projects	Years Until Project Must Begin	CIP Year	Cost
ssMH-2: Manhole Rehabilitation	2	2020	$ 5,000
ssGM-34: Pipe Relining	2	2020	$ 13,079
Replace/Repair All Corrugated Metal Gravity Main with PVC	3	2021	$ 39,315
N. Union Pump Station: Pump 1 Replacement	17	2035	$ 65,000
Fulton Street Pump Station: Pump 1 Replacement	17	2035	$ 55,000
N. Union Pump Station: Pump 2 Replacement	18	2036	$ 65,000
Fulton Street Pump Station: Pump 2 Replacement	18	2036	$ 55,000
Replace/Rehabilitate 34 Manholes with Criticality >12	20	2038	$ 25,000
Replace/Repair Gravity Main with Criticality >12	20	2038	$ 128,791
Replace Pressurized Main with Criticality > 12	20	2038	$ 1,276

RECOMMENDATIONS

Replace Wastewater Pump Stations

The South Union Street pump station and Grove Street pump station, can-style stations built in 1971, have far exceeded their service life expectancy and internal equipment is showing wear or even failure conditions. The outdated equipment is difficult and timely to repair. Replacement of both stations is necessary in order to avoid a catastrophic failure. The Village has prioritized this replacement project at the forefront of the CIP and is working through USDA Rural Development for funding procurement.

Mitigate Cross Connections

The wastewater system continues to experience extreme high flow conditions during rain events. This is indicative of a system with residential sump pumps discharging stormwater to the sanitary sewers. The system is able to accommodate moderate excess flow during a traditional rain event. However, excess flows logged during a large rain event combined with spring snow melt, have nearly overwhelmed the system in recent years. The metered stations at North Union Street pump station and Fulton Street pump station recorded flows in April and May 2018 of up to three times the average flow; these high flows washed sand and debris into the station causing undue wear on the pumps. We recommend a Combined Sewer Overflow assessment and management program to be implemented in the future to mitigate further damage to the collection system and avoid overflow to the collection system and treatment lagoons.

Stormwater Televising

The stormwater system televised for this study appears to be in good operating condition. During this effort the majority of the stormwater system identified, including known stormwater manholes, catch basins, half of presumed piping, discharge points, and cleanouts, was televised or visually inspected. The televised portion was coded in accordance with NASSCO and PACP/MACP. Due to budget restrictions at this time, the Village elected to postpone televising the remaining portion of the piping for a later date. It is recommended that the televising and inspections of the final portion of the stormwater system be completed within 5 years.

INFRASTRUCTURE
ALTERNATIVES, INC.

LIST OF MAJOR ASSETS

Wastewater Collection and Treatment System Assets

- Sanitary Taps (271)
- Sanitary Manholes (90)
- New Pump Stations (2)
- 1971 Can Pump Stations (2)
- 4" Pressurized Main (1000 L.F.)
- 6" Pressurized Main (2233 L.F.)
- 8" Pressurized Main (4220 L.F.)
- Unknown size Gravity Main (179 L.F.)
- 8" Gravity Main (21170 L.F.)
- 10" Gravity Main (3300 L.F.)
- 12" Gravity Main (36 L.F.)
- Unknown Gravity Main (163 L.F.)
- Wastewater Stabilization Lagoons (2)
- Control Valve (1)

Stormwater Collection System Assets

- Stormwater Manholes (28)
- Stormwater Inlets (74)
- 12” Gravity Main (6140 L.F.)
- 15” Gravity Main (1500 L.F.)
- 24” Gravity Main (870 L.F.)
- Unknown Size Gravity Main (8480 L.F.)
- Stormwater Discharge Points (7)
- Stormwater Clean Outs (4)

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date November 30, 2018
(no later than 3 years from executed grant date)

The Village of Parma _(legal name of grantee)_ certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1555-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or No

   If No - Date of the rate methodology approval letter: ______________.

2) Significant Progress Made: Yes or No

   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)

3) Date of rate methodology review letter identifying the gap: May 31, 2018, revised August 3, 2018.

4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on July 25, 2018.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Joanne Havican at (517) 531-4785 parmaclerk@wowway.biz
Name Phone Number Email

Joanne Havican 11-27-18
Signature of Authorized Representative (Original Signature Required) Date

Joanne Havican, Village Clerk
Print Name and Title of Authorized Representative

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Due Date November 30, 2018
(no later than 3 years from executed grant date)

The Village of Parma *(legal name of grantee)* certifies that all stormwater asset management plan (SWAMP) activities specified in SAW Grant No. 1555-01 have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SWAMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

Joanne Havican at (517) 531-4785 parmaclerk@wowway.biz
Name | Phone Number | Email

Joanne Havican 11-27-18
Signature of Authorized Representative (Original Signature Required) | Date

Joanne Havican, Village Clerk
Print Name and Title of Authorized Representative

WASTEWATER ASSET MANAGEMENT PLAN

VILLAGE OF PECK

SANILAC COUNTY, MICHIGAN

NOVEMBER 2018

BASED ON:

***ASSET MANAGEMENT GUIDANCE FOR WASTEWATER AND STORMWATER SYSTEMS*, MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY, JULY 2013**

STORMWATER, ASSET MANAGEMENT, AND WASTEWATER (SAW) GRANT

PROJECT NUMBER: 1261-01

PREPARED BY:

Spicer group

230 S. Washington Avenue
Saginaw, MI 48607

PROJECT ID NUMBER: **122915SG2015**

VILLAGE OF PECK
SAW Grant Project No. 1261-01

EXECUTIVE SUMMARY

Prepared By: **Spicer Group, Inc.**
230 S. Washington
Saginaw, MI 48607
Phone: (989)-754-4717

Owner: **Village of Peck**
30 East Lapeer Street
P.O. Box 317
Peck, MI 48466
Belinda Hill-Ureel, President
Phone: (810)-378-5131

The Village of Peck has entered into an agreement with the Michigan Department of Environmental Quality and the Michigan Finance Authority for grant funds issued under Public Act No. 511 of 2012 for the *Stormwater, Asset Management, and Wastewater (SAW)* program. The Village of Peck received the following grant:

Wastewater Asset Management Plan (WWAMP) – 100% Grant	***$242,000***
Storm Water Asset Management Plan (SWAMP) – 90% Grant	***$183,000***
Eligible Cost Subtotal	*$425,000*
LESS Local Match (10%)	*($18,300)*
Total Grant Amount	***$406,700***

The Asset Management Plan (AMP) was required to be completed within three years of the date of the agreement, November 2018.

Each AMP has the following key components:

- Asset Inventory and Condition Assessment
- Critical Assets / Risk Management
- Level of Service Determination
- Revenue Structure
- Capital Improvement Plan

List of Major Assets

- 4.8 Miles of Gravity Sewer Pipes, all 8 or 10-inch Diameter
- 88 Sanitary Manholes
- Rebecca Street Pump Station
- 3-cell Lagoon Treatment Facility

Wastewater Asset Inventory and Condition Assessment

The Village's wastewater system consists of three components: The collection system, the pump station, and the lagoon treatment facility. The collection system can be broken down further into manholes and pipes.

For the collection system, Spicer Group, Inc. completed a mobile mapping LiDAR survey of the entire Village and used the survey information to develop a comprehensive Geographic Information System (GIS). This GIS is located on a new computer in the Village office and is a detailed "smart" mapping system with databases, using the ArcGIS/Arc Online by ESRI platform. This system can be accessed and updated in the field by DPW staff from new iPads supplied as part of the SAW grant project. From the GIS, as-built plans, pipe/manhole condition ratings, materials, year installed, inspection records, CCTV video inspections etc. can be accessed. This information can also be queried to provide specific lists and maps and updated easily when future improvements are made.

The Village currently has 88 sanitary manholes and 4.8 miles of gravity sewer pipes, all 8 or 10 inch diameter. All the manholes were inventoried and assessed by Spicer Group inspectors trained in the NASSCO Manhole/Pipeline Assessment Certification Programs (MACP/PACP). All gravity sewer pipes were cleaned, televised, and inspected by R.B. Satkowiak's City Sewer Cleaners.

The second component of the Village's wastewater system is the pump station. There is one pump station in the Village of Peck, which pumps all the flow collected by the gravity sewer from Rebecca St directly to the treatment lagoons. The station was constructed in 1982 and has been maintained by DPW. Spicer Group completed an inspection and condition assessment of this station and provided recommendations for future improvements. Many of the components of the pump station are past their useful life but appear to be working. It is recommended that the Village starts budgeting for these future upgrades.

The third and final component of the wastewater system is the lagoon treatment facility, located northeast of the Village limits. The Village of Peck utilizes lagoon treatment facility consisting of two primary lagoon cells and one secondary lagoon cell. Spicer Group completed an inspection and assessment of the lagoon. Biotech Agronomic, Inc. performed a sludge judge and chemical analysis of the bio-solids. Results from the lab found the material meets the MDEQ requirements for a Residuals Management Plan (RMP) and the material can be recycled in a beneficial reuse program such as land application.

Critical Assets and Risk Management

For each asset in the Village's wastewater system, a criticality/risk assessment was performed to determine and prioritize the Village's key components. Based on the condition assessment and the field inspections, the Likelihood of Failure (LoF) was calculated for every asset including all pipes, manholes, pump station components, and lagoon components. Next, the Consequence of Failure (CoF) was calculated and scored for each asset based on economic, social, and environmental consequences. Finally, the Risk assessment was calculated using the following equation:

$$Risk = LoF\ x\ CoF$$

Risk is represented on a scale from 0 to 36. Over 50% of manholes in the Village's wastewater collection system had a risk rating less than 8, meaning the fall into the low risk category.

Much like the manhole conditions, the pipe conditions overall show a medium-low level of risk. The highest risk pipe segment was assigned a risk score of 12.6. The majority of the pipe risk scores are below 9, meaning low risk.

The one and only pump station in the Village of Peck is the Rebecca St. Pump Station. The inspection report, however, shows several components that are due for replacement. In fact, nearly every component is well past its typically expected service life.

The treatment lagoon is in good condition, but the facility is in need of a new fence with two new gates. This has been included in the Capital Improvement Plan

Level of Service (LOS)

The next phase of the AMP is a Level of Service determination. What level of service does the Village want to provide to its wastewater customers? How are projects going to be prioritized and included in the CIP? What cost is the Village willing to endure to provide that level of service? These are all questions that were discussed as a part of the overall asset management plan. The Villages Level of Service Goals are as follows:

Mission Statement

The Village of Peck strives to develop a financially stable, high performing wastewater collection, pumping and treatment service that addresses the customer's wants and needs and upholds the local, State, and Federal regulatory requirements at a minimum cost to our customers.

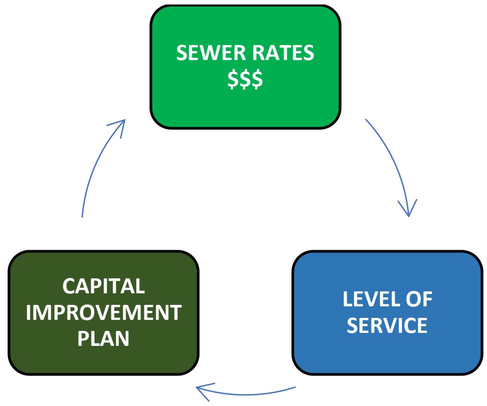
One of the basic goals is to review the capital improvement projects to determine the best value options for the Villages' customers based on life cycle costs and overall benefits to the community:

- "**MINIMUM**" Level of Service – Priority projects to meet the minimum local, State, and/or Federal regulations. Typically to be completed within the next 5 years.
- "**MEDIUM**" Level of Service – Projects that will need to be done eventually; typically when other infrastructure projects are happening.
- "**HIGH**" Level of Service – Projects that are on the long range radar that could spur future development and growth for the Village.

Generally, the "high" level of service projects will have a higher construction/initial cost, but would provide a better long-term or life cycle cost for the Village. The "minimum" level of service projects would have a lower initial cost, but would also have a shorter life span and higher overall life cycle costs.

As the AMP progressed, different scenarios were evaluated, to provide the Village's desired Level of Service, the costs of the capital improvement projects associated with that LOS, and the effect on sewer rates.

Asset Management Plan Evaluation Process



The resulting capital improvement plan and revenue structure was one that met the Village's goals, addressed the improvements that need to be made, and is a sustainable rate structure for the Villages customers. The Village chose to adopt a minimum Level of Service.

Revenue Structure

Spicer Group teamed with Municipal Analytics for the revenue structure analysis for the AMP. Wastewater account balances, expenditures, revenues, etc. were reviewed and inputted into Municipal Analytics financial software to determine if there were any deficiencies in the rates. The Villages current rate structure was found to have no deficiencies.

Next, the Capital Improvement Plan (CIP) projects were evaluated and allocated to various years of completion, and the rate structure to support those improvements was determined. Many iterations/scenarios were performed to come up with a rate structure that met the Villages Level of Service goals, completed the CIP projects that are needed, and had sustainable rates for the Villages customers. The result was a recommendation for an annual increase of 7% through the year 2030. This rate increase will allow the Village to meet the minimum level of service. This should be reviewed annually as a part of the Villages normal budgeting process.

Capital Improvement Plan

The Capital Improvement Plan (CIP) is the culmination of all the parts of the Asset Management Plan (AMP). Reviewing the results of the wastewater system Inventory & Condition Assessment, Level of Service (LOS) determination, Criticality (Risk), Revenue Structure, and preliminary CIP project lists, a process was worked through to categorize and prioritize the final CIP. Various degrees of Level of Service and the associated CIP projects were evaluated and plugged into the Revenue Structure model, and the resulting sewer rates for that set of scenarios were reviewed. If the projected rates were too high, a lower LOS was chosen and those CIP projects were plugged into the Revenue Structure model and the resulting rates were then reviewed. The process then continued with different CIP projects at varying LOS's until an acceptable rate structure, level of service, and capital improvement plan was developed. The table below summarizes the annual operation and maintenance, and the medium, and high level of service projects that we included in the plan.

Table ES-3: Capital Improvement Plan

Annual Maintenance

Annual Operation and Maintenance - Continue Cleaning and Televising	$5,000.00

Projects

Project Number	Level of Service	Year	Project Location	Project Description	Defect(s)	Estimated Cost
1	Med.	2028	Rebecca Street	Main Pump Station Upgrade	Existing Station is Operating Past Useful Service Life	$262,000.00
2	High	20\32	Lagoon Site	Lagoon Chain Link Fence	Existing Fence is in Poor Condition	$150,000.00
					Total	**$412,000.00**

Operation and Maintenance Strategies

Wastewater systems require constant maintenance to keep them functioning. The recommended operation and maintenance strategies include the following:

Routine Manhole Inspections

Manhole inspections should be performed any time field staff opens a manhole – particularly every time a manhole is improved or repaired. These inspections should be completed every ten years, at a minimum. A convenient way of accomplishing this would be to perform manhole inspections immediately following the repairs in the Capital Improvement Plan. However, should the Capital Improvement Plan not be followed, manhole inspections should still be performed every ten years.

Routine Cleaning

There is no record of there ever having been a sewer cleaning program in the Village of Peck. A comprehensive sewer cleaning program can provide extra assurance that the level of service remains high. However, sewer cleaning is expensive and if the pipes are not in need of cleaning, it can provide little to no benefit. It is recommended that the Village plan on cleaning sewers only on an as-needed basis. For example, if DPW discovers an indication that a sewer line may have debris partially blocking flow, pipes and manholes in that vicinity should be cleaned to prevent further obstruction. For budgeting purposes, the Village should plan on spending $5,000 per year on sewer cleaning to be performed at the discretion of the DPW Superintendent.

Pump Station Inspection

The Rebecca St pump station receives regular inspection by the DPW Superintendent. Maintenance for the pump station should be as directed by the Operations and Maintenance Manual. Of course, when a failure occurs, reactive maintenance must take place immediately, as all sewage in the system is conveyed through this pump station.

Treatment Lagoons Inspection

The treatment lagoons are inspected annually; this inspection program is to continue in perpetuity. Nu System provides Village of Peck with a polymer that is added to the lagoons to decrease the amount of sludge that accumulates. This should also be continued unless inspection shows that a change is warranted.

GIS & Mapping

A Geographic Information System (GIS) was created for the Village of Peck's wastewater system. The GIS was created by utilizing Mobile LiDAR, field inspection, and as-constructed records. It was developed in ESRI ArcGIS Pro and includes basic information about each component of the wastewater system.

The GIS should be continuously updated as physical conditions change. DPW staff should update the feature attributes as necessary. This should be done, as a minimum, yearly after improvement projects are completed.

Conclusion

The condition of Village of Peck's wastewater system is generally good. Because the DPW staff have completed routine maintenance of the pipes and manholes, they are in good condition. The pump station, however, is past due for several upgrades. We recommend the Village starts budgeting money for future pump station upgrades. The lagoon system is functioning well and requires minimal improvements. We recommend the Village starts budgeting money for the replacement of the fence around the lagoon.

In accordance with the SAW Grant requirements, the Village's Wastewater Asset Management Plan (WWAMP) shall be kept available for citizen review for 15 years. The WWAMP should be reviewed annually and the components updated and included in the Village's annual budget process.

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date November 2018
(no later than 3 years from executed grant date)

The Village of Peck *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1261-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or No
   If No - Date of the rate methodology approval letter: 5/03/2018.
2) Significant Progress Made: Yes or No
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: ____________.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ____________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Belinda Hill-Ureel at 810-837-3423 BHill@sanilacisd.org
Name | Phone Number | Email

Belinda Hill-Ureel 11-7-2018
Signature of Authorized Representative (Original Signature Required) | Date

Belinda Hill-Ureel Village President
Print Name and Title of Authorized Representative

April 2017

STORMWATER ASSET MANAGEMENT PLAN

VILLAGE OF PECK

SANILAC COUNTY, MICHIGAN

NOVEMBER 2018

BASED ON:

***ASSET MANAGEMENT GUIDANCE FOR WASTEWATER AND STORMWATER SYSTEMS*, MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY, JULY 2013**

STORMWATER, ASSET MANAGEMENT, AND WASTEWATER (SAW) GRANT

PROJECT NUMBER: 1261-01

PREPARED BY:

Spicer group

230 S. Washington Avenue
Saginaw, MI 48607

PROJECT ID NUMBER: **122915SG2015**

VILLAGE OF PECK
SAW Grant Project No. 1261-01

EXECUTIVE SUMMARY

Prepared by: **SPICER GROUP, INC.**
230 S. Washington
Saginaw, MI 48607
Phone: (989)-754-4717

Owner: **VILLAGE OF PECK**
30 East Lapeer Street
P.O. Box 317
Peck, MI 48466
Phone: (810) 378-5131
Belinda Hill-Ureel, President

The Village of Peck entered into an agreement with the Michigan Department of Environmental Quality and the Michigan Finance Authority for grant funds issued under Public Act No. 511 of 2012 for the *Stormwater, Asset Management, and Wastewater (SAW)* program. The Village received the follow grants:

Wastewater Asset Management Plan (WWAMP) – 100% Grant	$242,000
Stormwater Asset Management Plan (SWAMP) – 90% Grant	***$183,000***
Eligible Cost Subtotal	$425,000
LESS Local Match	($18,300)
Total Grant Amount	$406,700

The Asset Management Plans (AMPs) needed to be completed within three years of the date of agreement; November 2018.

Each AMP has the following key components:

- Asset Inventory and Condition Assessment
- Level of Service Determination
- Critical Assets (Risk)
- Revenue Structure
- Capital Improvement Plan

List of Major Assets

- 11,908 feet of storm sewer ranging in size from 6” to 18”
- 96 Village Storm Structures

Storm Water Asset Inventory and Condition Assessment

The Village of Peck’s storm water collection system consists of a series of 6”, 8”, 10”, 12”, 15”, and 18” pipes. These pipes or “storm sewers” collect storm water from “catch basins”, footing drains/sump systems (sump leads), open inlets, roadside drainage, roof drains, groundwater infiltration etc. A base map of the system is included in Appendix 2.

For the collection system, Spicer Group, Inc. completed a mobile mapping LiDAR survey of the entire Village and used the survey information to develop a comprehensive Geographic Information System (GIS). This GIS is located on a new computer in the Village office, and is detailed "smart" mapping system with databases, using the ArcGIS/Arc Online by ESRI platform. This system can be accessed and updated in the field by DPW staff from any of three new iPads or two new desktop computers supplied as part of the SAW grant project. From the GIS, as-built plans, pipe/manhole condition ratings, materials, year installed, inspection records, CCTV video inspection etc. can be accessed. This information can also be queried to provide specific lists and maps, and updated easily when future improvements are made.

The Village currently has around 2.26 miles of storm sewer pipes ranging in size from 6"-18". Below is a table showing the diameter and materials of the storm sewer piping:

Table ES-1 – Village-Owned Storm Water Pipes by Diameter and Material

	CMP	PE	PVC	RCP	VCP	UNKNOWN	TOTAL
6"		561	228		63	282	**1135**
8"		619	248	51	263	220	**1401**
10"	259	566	350	362	162	90	**1789**
12"	697	2730	888	1266	340	736	**5922**
15"	37	766			83		**886**
18"		419					**419**
Unknown			159		54	143	**356**
TOTAL (ft):	**993**	**5662**	**1874**	**1679**	**965**	**735**	**11908**
Percent By Material:	***8%***	***48%***	***16%***	***14%***	***8%***	***6%***	***100.00%***

City Sewer Cleaners from Saginaw completed a cleaning and televising program for the storm sewer pipes. Spicer Group, Inc. completed a comprehensive inspection of all the storm water structures owned by the Village. The NASSCO Manhole/Pipeline Assessment Certification Program (MACP/PACP) standards were used to identify and code the defects and was used to standardize the scoring and quantify the condition of the storm water assets.

There are several County Drains within the Village limits that are owned, operated, and maintained by drainage districts through the Sanilac County Drain Commissioner's office. These County Drains benefit the residents within each respective drainage district, but are not considered to be Village-owned storm water assets. The County Drains are as follows:

- Spring Creek Drain
- Tenniswood Drain
- McCauley Drain
- Branch 1 Drain

All storm sewers in the Village discharge to either Tenniswood Drain or Spring Creek Drain. From there, storm water flows through a series of drains to Elk River, Black River and St. Claire River.

Criticality (Risk)

For each asset in the Village's storm water system, a criticality/risk analysis was performed to determine and prioritize the Village's key components. Based on the condition assessments and the field inspections, the Likelihood of Failure (LoF) was calculated for every asset; including all pipes, manholes, drainage structures, etc. Next, the Consequence of Failure (CoF) was calculated and scored for each asset based on the economic, social, and environmental consequences, if that asset failed. Finally, the Criticality (Risk) score was calculated using:

RISK = LoF x CoF

For the Village's storm water collection system, there were 8 pipe locations and 6 structure locations identified with high LoF scores. A total of 7 pipes locations had somewhat medium COF scores. When analyzing the overall risk, 6 pipe locations had a medium risk. 6 storm structures locations had a medium risk level. These scores were evaluated and incorporated into the resulting Capital Improvement Plan.

Level of Service

Mission Statement

The Village of Peck strives to maintain a basic storm water collection system service that *addresses* the residents' wants and needs and upholds the local, State, and Federal regulatory requirements at a minimum cost to our residents.

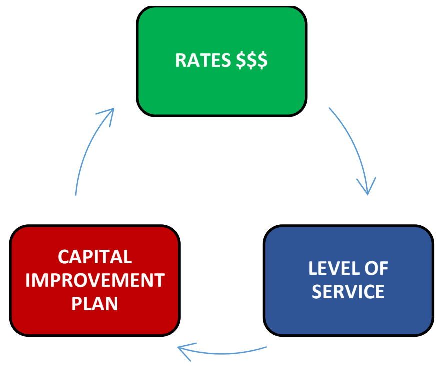
Basic goals:

- Operate and maintain the storm water system to minimize flooding and property damage.
- Provide rapid and effective emergency response service.
- Review the condition of storm water assets as a part of other infrastructure construction projects.
- Seek a funding source for operation & maintenance and repair/replacement of storm water assets.
- Review the maintenance and capital improvement plans/projects annually to determine the lowest cost options for our residents:
    - **"MINIMUM"** Level of Service – Address resident complaints as they come in.
    - **"MEDIUM"** Level of Service – Point repairs to the existing system that have been identified. Mainly projects that the cleaning and televising crew had to abandon the inspection due to obstructions, collapses, holes etc.
    - **"HIGH"** Level of Service – Lining or replacement projects to be completed with other infrastructure improvement projects.

Performance Measurements:

- Review annual performance goals for storm sewer system operation & maintenance, rehabilitation, and capital improvements.
- Annually review the number and severity of resident complaints.
- Annually review the amount of storm sewer assets that have been repaired or replaced.
- Review and update the Storm Water Asset Management Plan, GIS, and Capital Improvement Plan annually.

ES-2: Asset Management Plan Evaluation Process



Since Michigan has not created a climate which would allow municipalities to create either an enterprise fund or a utility fee for storm water asset improvements, funding comes from the Village's Local and Major Street funds. The Village has fixed sources of revenues from a combination of State, County, Township, and Village taxes. These limited funds are in some ways restricted on their use in that they are primarily designated for road improvements.

Since there is no real funding mechanism for storm water assets, the Village has been maintaining a minimum Level of Service. The storm sewer system is cleaned annually and repairs to pipes or catch basins are made as needed. When residents notify the Village of flooding or drainage issues, the DPW will address the issue on a case-by-case basis. When the Village has street resurfacing or replacement projects, the storm water system is inspected, evaluated, and appropriate repairs and/or replacement is done based on the funding available.

Revenue Structure

Spicer Group teamed with Municipal Analytics for the revenue structure analysis for the AMP. Since Michigan has not created a climate which would allow municipalities to create either an enterprise fund or a utility fee for storm water asset improvements, funding comes from the Village's general fund. Act 51 funds received from the State for street/road improvements could also be used for storm water improvements that affect the street projects directly. However, Act 51 funding is very limited. Another mechanism for funding large storm water improvements is through the Sanilac County Drain Commissioner's office, using the Drain Code, PA 40 of 1956.

The financial impact analysis found that the Village's general fund does not have sufficient revenue to meet identified storm water capital improvement projects and does not have a mechanism to collect rates/fees to provide storm water collection services. The Village will strive to maintain a minimum level of service and seek outside grants and funding for storm water infrastructure capital improvements. The Village should continue to update this analysis on an annual basis to determine if funds become available to address the proposed capital improvement projects.

Capital Improvement Plan

The Capital Improvement Plan (CIP) is the culmination of all the parts of the Asset Management Plan (AMP). Reviewing the results of the stormwater system Inventory & Condition Assessment, Level of Service (LOS) determination, Criticality (Risk), Revenue Structure, and preliminary CIP project lists, a process was worked through to categorize and prioritize the final CIP.

Until a funding mechanism for storm water improvements is found, the Village is forced to continue its *reactionary* policy. In order to have some sort of financial mechanism for the Village to *proactively* improve the storm water system, we recommended a minimal discretionary budgetary line item of $6,000 per year for the Village to continue cleaning & televising, lining, root treatment, and misc. repairs. With this discretionary budget line item, many smaller “Minimum” Level of Service projects can be slowly completed.

Conclusion

The Village of Peck’s storm water system is a typical, aging municipal infrastructure system. Since there is no real funding mechanism for storm water assets, the Village has been maintaining a very minimum Level of Service for its residents. This has resulted in a reactionary operation and maintenance practice. When residents notify the Village of flooding or drainage issues, the DPW will address the issue on a case-by-case basis. When the Village is planning for street resurfacing or replacement projects, the storm water system is inspected, evaluated, and appropriate repairs and/or replacement is done based on the funding available.

In order to have some sort of financial mechanism for the Village to proactively improve the storm water system, we recommend a minimal discretionary budgetary line item of $6,000 per year for the Village to continue cleaning & televising, lining, root treatment, and misc. repairs.

Until a funding mechanism for storm water improvements is found, the Village is forced to continue this reactionary policy. The Village should continue to urge its State legislators to develop a plan to fund municipal storm water improvements, such as supporting HB 5991.

In accordance with the SAW Grant requirements, the Village’s Storm Water Asset Management Plan (SWAMP) needs to be kept available for citizen review for 15 years. The SWAMP should be reviewed annually, and the components updated and included in the Village’s annual budget process.

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Due Date November 2018
(no later than 3 years from executed grant date)

The Village of Peck *(legal name of grantee)* certifies that all stormwater asset management plan (SWAMP) activities specified in SAW Grant No. 1261-01 have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SWAMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

Belinda Hill-Ureel	at 810-837-3423	BHill@sanilacisd.org
Name	Phone Number	Email

Belinda Hill-Ureel	11-7-2018
Signature of Authorized Representative (Original Signature Required)	Date

Belinda Hill-Ureel Village President
Print Name and Title of Authorized Representative

123 W. Main St. Suite 200
Gaylord, MI 49735
O: 989.732.8131
www.c2ae.com

PETOSKEY STORMWATER ASSET MANAGEMENT PLAN
EXECUTIVE SUMMARY

City of Petoskey
101 East Lake Street
Petoskey, MI 49770
Michael Robbins – Public Works Director, (231) 347-2500
SAW GRANT PROJECT NUMBER 1516-01

Executive Summary

The SAW agreement with the State of Michigan was signed in November, 2015 which began the overall SAW program.

The Grant agreement included the following funding amounts:

- Total Cost = $896,516
  - Grant Value = $806,864
  - Local Match = $89,652

The City of Petoskey is located in the southwest portion of Emmet County in the northwest lower peninsula of Michigan, approximately 40 miles south of the Mackinac Bridge. It is located at the crossroads of US-31 and US-131. Petoskey's storm sewer collection system has approximately 139,850 feet of storm sewer and approximately 1,690 storm manholes, catch basins and outfalls.

Stormwater Asset Inventory

This item which initiated the work included:

- Identifying and locating all of the manhole and mainline sewer assets.
  - A list of all assets to be monitored was obtained using a combination of historical system records, field data collection.
  - The GPS coordinates of the field assets were gathered.
  - An ESRI ArcGIS data set was completed to index the locations and attributes of assets.
  - Physical inspections were conducted for each asset.
    - Manholes – Field inventories and conditional assessments were completed in accordance with NASSCO MACP standards by NASSCO Certified personnel.
    - Sewers - Survey was completed by CCTV review in accordance with NASSCO PACP standards by NASSCO Certified personnel.
  - The asset information was included in the Asset Management Spreadsheet (AMS).
  - The AMS is used to quantify and sort the system asset information.
- The results of the assessment yielded the following percentages (1 being best and 5 being worst condition):
  - 17.4% of assets are 1's
  - 61.3% of assets are 2's
  - 13.3% of assets are 3's
  - 2.9% of assets are 4's
  - 5.2% of assets are 5's

Condition Assessment

Overall, the Petoskey storm sewer system is in very good condition. There are a few recommendations for improvements in the Storm Sewer Capital Improvements Plan, but none are critical or urgent at this time. The City continues to upgrade its storm sewer system through its annual street/infrastructure improvement program and does a very good job of system maintenance.

- Structures assessment and inventories follow NASSCO MACP guidelines.
- Sewer pipe assessment and inventories follow NASSCO PACP guidelines.
- Asset age and material data was collected using historical project drawings.

Criticality of Assets

- The AMS was used to organize the asset classes. Several parameters were used to determine asset consequence of failure and probability of failure, rating each on a 1 to 5 scale.
    - Redundancy: Does the unit have system backup?
    - Criticality of the asset to the system and what level of impact to the system occurs in the event that the asset fails
    - Location of the asset and surrounding service areas were incorporated in determining the criticality of the asset
    - Probability of failure based on its age and condition
    - These items together result in a parameter identified as Business Risk.
- The AMS was used to prioritize the need for short term repair or maintenance, short term replacement, or long term maintenance.

Level of Service Determination

- A SAW Team was created to discuss the storm system direction.
- The SAW Team met and discussed a mission statement and desired Level of Service statement, which was then converted to a succinct list of items to follow for the future.
- The SAW Team will meet once a year to assess the system's service record and recommend improvements to the Level of Service Statement, if needed.

Revenue Structure

- The City storm drainage system is operated and maintained using City street funds.
- The current funding consists of a combination of Act 51 state tax funds and a local street funds. The future will require continued use of City and MDOT street funds, possible increase in MDOT transportation funds, and possible strategic pursuit of state and federal grant funds to continue system improvements.

Capital Improvement Plan

- The AMS identifies capital improvement projects for the future.
- The long term projects may be achieved through existing street funding sources, grants or future public borrowings.
- An estimate of project year and financial cost is generated from each capital improvement project.
- The following is the recommended project to be completed within the next five (5) years are as follow:
    - *Storm Structure repairs with a Business Risk greater than 16 or Probability of Failure of 4 or Wall, Cone, Chimney grade below "D" to be replaced (MH Project #4)*
    - *Storm System Sewer Repairs with a Business Risk of 16+ or likely sewer collapse (Sewer Project # 2)*

- Additional projects recommended in the next 6 to 20 years are included in the Capital Improvement Plan.

List of Major Assets
- 1,690 Storm Manholes, Catch Basins, and Outfalls
- 139,851 feet of storm sewer

DEQ

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Due Date **November 30, 2018**
(no later than 3 years from executed grant date)

The **City of Petoskey** *(legal name of grantee)* certifies that all stormwater asset management plan (SWAMP) activities specified in SAW Grant No. 1516.01 have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SWAMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

Robert Straebel	at	**231-347-2500**	**rstraebel@petoskey.us**
Name		Phone Number	Email

Rob Straebel 11/26/18

Signature of Authorized Representative (Original Signature Required) Date

ROB STRAEBEL CITY MANAGER

Print Name and Title of Authorized Representative

Protecting our Infrastructure Investment

ASSET MANAGEMENT PLAN

Wastewater Executive Summary Report

Prepared for:

Village of Pewamo

SAW Project No. 1649-01

Village of Pewamo
Est. 1859

November 2018

FLEIS&VANDENBRINK
DESIGN. BUILD. OPERATE.

EXECUTIVE SUMMARY

OVERVIEW

Public Act 562 of 2012 authorized money for Stormwater, Asset Management, and Wastewater (SAW) Grant Program. In December 2015, The Village of Pewamo received a Stormwater, Asset Management, and Wastewater (SAW) Grant from the Michigan Department of Environmental Quality (MDEQ), project no. 1649-01, to provide financial assistance for the development of a wastewater asset management plan (AMP) for the Village's publicly owned wastewater utility. Working with Village staff, Fleis and VandenBrink (F&V) provided technical assistance for asset identification, condition assessment, and capital improvement planning of the wastewater collection system. The utilities assets include collection system piping and manholes, a wastewater treatment facility, lift station/pump stations and force mains.

This report is intended to be a living document that is updated as assets continue to wear and age, and as additional inspection/condition results are found and incorporated into the plan.

The Village of Pewamo has executed the "Certification of Project Completeness" for the wastewater asset management plan and a copy has been provided at the end of this Executive Summary.

The contact person for the Village of Pewamo AMP is:

Mike Scollon, Chief of DPW and Zoning
130 East Main Street
P.O. Box 385
Pewamo MI, 48873-5102
Phone number: 989.640.4014
Email: PullerMike@hotmail.com

Dan Heckman, Mayor, Pro-Tem
Village of Pewamo
P.O. Box 385
Pewamo MI, 48873-5102
Phone number: 989.590.2009

ASSET INVENTORY AND CONDITION ASSESSMENT

A list of the major assets in the Village's wastewater system, described further below, include:

- Collection system piping system and manholes
- Wastewater Stabilization Lagoon (WWSL)
- Sanitary sewer lift stations in the collection system

The wastewater collection system assets consist of approximately 23,472 feet (4.4 miles) of sanitary sewers (gravity pipe and force mains detailed in Table 1) and 67 wastewater manholes connecting the gravity pipe. These assets are located in existing street rights-of-way or in easements dedicated for the assets use and maintenance.

Table 1. Collection System Asset List

Pipe Size (inches)	Gravity Main Length (ft)	Force Main Length (ft)
6	60	665
8	15,867	0
10	4,618	0
15	2,262	0

The WWTF currently includes the following treatment processes:

- Two facultative lagoons

Treated effluent is discharged to Stoney Creek in accordance with NPDES permit No. MIG580132. The design capacity of the WWSL is 69,500 gallons per day (gpd). The Village discharges semi-annually and discharges anywhere from 3 to 5 million gallons per discharge. The Certificate of Coverage allows the Village to discharge 26.5 million gallons annually.

The Village of Pewamo operates and maintains two sanitary sewer lift stations located throughout the wastewater collection system. The two lift stations utilize a wet well with submersible pumps. Since their construction, the lift stations have had minimal maintenance and upgrades as many assets are approaching or beyond their useful life. The Wastewater Treatment Facility (WWTF) and Lift Station (LS) AMP report further elaborates the Lift Stations assessment.

Asset Identification and Location

A comprehensive wastewater system asset inventory was developed based on existing record drawings, operation and maintenance manuals, field notes, staff knowledge, and site visits, supplemented with field survey work. Asset material, size and age were identified through the review of available historical record documents and Close Circuit Televising (CCTV) for pipelines greater than 20 years of age.

Spatial orientation (pipe location), pipe depth and invert elevations were determined through GPS field survey and a comprehensive evaluation of the gravity system. This information was organized into a new (GIS) database and piping network for archiving, mapping and further operations and maintenance uses by the Village. The asset inventory includes 23 WWTF assets, 31 lift station assets, and 136 collection system assets (pipelines and manholes).

Condition Assessment and Expected Useful Life

A comprehensive condition assessment of the collection system was performed. NASSCO-MACP manhole field-based assessments were completed for all 67 manhole structures. Pipeline cleaning and NASSCO-PACP CCTV field-based inspections were conducted on 41% of the gravity pipe.

A collection system wide hydraulic model was created and average day and peak hour capacity analysis was performed to identify pipeline capacity problems. Results of the hydraulic model capacity analysis are included in the criticality results and CIP recommendations.

The assets of the wastewater collection system are in good condition. Recommended rehabilitation for 9% of the system includes the need for point repairs and sewer lining. Nearly 38% of assets were identified for rehabilitation in the future, beyond five years. Continued maintenance is recommended for the remaining 53% of the system and includes both additional inspection and/or cleaning.

Overall, the condition of the assets at the WWTF range from good to poor. Ongoing repairs have helped to maintain the condition of many assets while some assets that were installed during the 1980 construction and subsequent renovation projects and have not been replaced are now near the end of their useful life due to age or deterioration caused by harsh conditions associated with wastewater treatment.

The condition of the assets at the lift stations range from fair to good. Ongoing maintenance and major lift station renovation projects have maintained the condition of many assets while other assets are worn due to age and the harsh conditions associated with typical wastewater collection systems.

LEVEL OF SERVICE

Defining the Expected Level of Service (LOS)

A LOS service statement was developed with DPW and Village Administrative Staff. The following is the LOS for the Village of Pewamo:

WASTEWATER UTILITY - LEVEL OF SERVICE STATEMENT

The overall objective of the Village of Pewamo Wastewater Department is to provide reliable wastewater collection and treatment services at a minimum cost, consistent with applicable environmental and health regulations. To achieve this the following Level of Service (LOS) goals are proposed:

- Provide adequate collection system and treatment capacity for all service areas.
- Comply with all local, state and federal regulations at all times for treated effluent from the WWTF.
- Actively maintain collection and treatment system assets in reliable working condition.
- Reduce inflow/infiltration (I/I) flow volumes to mitigate potential for sanitary overflows, water in basements, and overloading of treatment plant.
- Provide rapid and effective emergency response services to customers.
- Ensure operations staff are properly certified.
- Regularly review health and safety procedures for operations staff to provide proper worker safety.
- Regularly review projected O&M and capital expenditures. Adjust user rates, as necessary, to ensure sound financial management of wastewater system.

The LOS goals may need to be adjusted from time to time as the utility ages, the needs of community change or new rules or regulations require a change in operation. For this reason, the LOS goals should be reviewed by the Village from time to time to make sure they accurately reflect the desired operation of the utility.

Measuring Performance

While performance measurements are not a required component of this AMP report, the identification and implementation of performance measurement is recommended. Performance measurements are specific metrics designed to assess whether Level of Service objectives are being met. If implemented, an evaluation of goals should be completed at least annually to determine if, the provided resources are being used appropriately. Level of Service requirements can be updated to account for changes due to growth, regulatory requirements, and technology.

CRITICAL ASSETS

Determining Criticality

Business Risk is the determination of criticality of each asset in the wastewater system. Criticality is based on two factors; Likelihood (Probability) of Failure and Consequence of Failure using the following formula:

Business Risk = Consequence of Failure Score x Likelihood of Failure Score

Defining an asset's Business Risk allows for management of risk and aids in decision making for where to allocate operation and maintenance and capital improvement funds.

Likelihood of Failure (LoF) is a measure of how likely an asset is to fail. The following categories have been developed to quantify how likely an asset is to fail:

- Condition of the asset
- Remaining useful life (Age)
- Service History
- Operational status

Consequence of Failure (CoF) is a measure of the social, economic, financial and environmental impact of failure of an asset and the utilities ability to respond, convey and treat wastewater. CoF categories of the collection system include:

- Proximity to critical environmental features

- Location (Zoning District) of asset
- Facilities served by asset
- Size and location of asset within the utility network
- Type of asset.

The WWTF and Lift Station categories for CoF are:

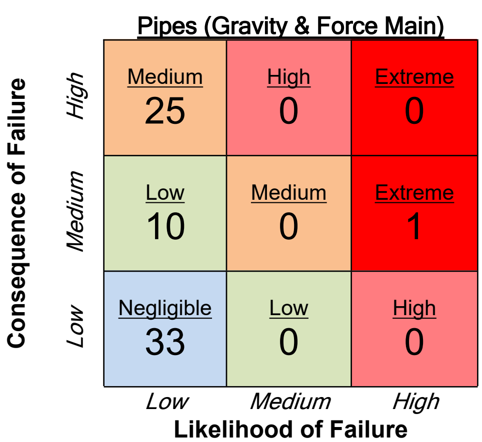
- Process
- Financial Impact
- Safety
- Environmental Impact
- Disruption to the Community
- Ability to Respond

Criticality Results

Using the strategy outlined above, a Business Risk Evaluation (BRE) was performed for each asset using a graphical ArcGIS-based sewer asset management and capital planning software that compiles, analyzes and assesses Business Risk for each asset and develops a Capital Improvement Plan. The results of the BRE are provided in easily understood tabular and graphical output.

Figure 1 provides the risk rating for gravity and force main pipe by number of pipe segments. One pipe segment in the collection system had an extreme risk rating and is recommended to be replaced or point repaired. Much of the collection system's gravity pipes, 62 percent as shown in Figure 1, have a low to negligible risk rating and are indicative of pipes in relatively good condition.

Figure 2 provides the risk rating for the collection system manholes. No manholes are identified as extreme risk, and are recommended for replacement or to be cleaned, lined and repaired. Many manholes are at low to negligible risk are indicative of manholes in relatively good condition (78 percent).



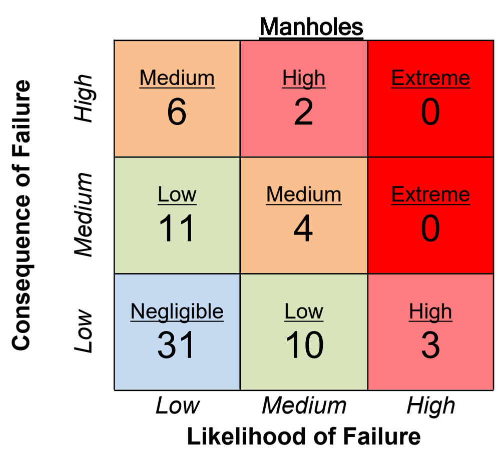


Figure 2. Business Risk Matrix (Risk Rating) by Number of Manholes

Figure 1. Business Risk Matric (Risk Rating) by Number of Gravity and Force Main Pipes

Figure 3 provides the risk ratings for the WWSL assets. One asset is identified as extreme risk and is recommended to be replaced or point repaired. The eleven assets with high risk ratings should be inspected at regular intervals. The Village has identified replacement/repairs/improvements of WWSL assets in the proposed plans for system improvements.

Figure 4 provides the risk ratings for the lift station assets. No assets are identified as extreme risk. The ten assets with medium risk ratings should be inspected at regular intervals. The Village has identified replacement/repairs/improvements of Lift Station assets in the long-term proposed plans for system improvements.

WWSL Assets

Consequence of Failure \ Likelihood of Failure	Low	Medium	High
High	High 0	High 1	Extreme 1
Medium	Low 0	Medium 3	High 10
Low	Low 0	Low 7	Medium 1

Lift Station Assets

Consequence of Failure \ Likelihood of Failure	Low	Medium	High
High	High 1	High 2	Extreme 0
Medium	Low 1	Medium 2	High 10
Low	Low 0	Low 0	Medium 15

Figure 3. WWSL Assets by Risk Rating *Figure 4. Lift Station Assets by Risk Rating*

A spreadsheet providing asset criticality for each utility asset has been included in the AMP detailed report for the collection and treatment systems.

Capital Improvement Plan

A Capital Improvement Plan with recommendations was prepared for the Village's assets based on the Business Risk evaluation. Data-driven information from the business risk assessment and condition assessment was used to identify and prioritize the capital improvement projects. The information was also used to schedule inspections to evaluate the condition of high business risk assets. Short Term 1-5 year and Long Term 6-20-year Capital Improvement Plan (CIP) was prepared to address the projected needs for each asset in the system.

CIP Development

Collection System assets were grouped by strategy and assigned costs from a unit database. This database includes unit construction values in 2017 construction dollars based on a survey of recent projects in Michigan and includes engineering and administrative rates where applicable. Opinions of probable project costs for the WWSL and Lift Station assets were prepared and are based on conceptual layouts of new facilities, or price quotes from material and equipment representatives. Assets were categorized and prioritized by year based on risk rating and criticality score to develop the CIP.

The CIP was developed by assigning each project to a CIP year (1-5) based on several factors. In addition
to Risk Rating, other factors used to assign CIP year include:

- Asset rehabilitation grouping (i.e. the type of repair/construction recommended)
- Coordination with other planned projects to achieve economies of scale or limiting disruption (an example is a street reconstruction project where identified utility recommendations can be included)

The 5-Year CIP must also consider project cost when assigned to a CIP year to balance capital requirements with generated utility revenues. The recommended 5-Year Capital Improvement Plan for the wastewater collection system and WWSL/lift stations is included in Table 2a. Recommendations for the long term 6-20 year CIP are included in Table 2b.

Table 2a: Capital Improvement Plan Summary by Year

Project Description	Rehabilitation Fiscal Year					Total
	2019	2020	2021	2022	2023	
Collection System Improvements						
Gravity Sewer Full Lining	-	$15,919	-	-	-	$15,919
Manhole Clean and Lining	-	-	-	$8,826	-	$8,826
Manhole Repair and Lining	-	-	-	$9,996	-	$9,996
Manhole Replacement	-	-	-	-	$6,028	$6,028
Subtotal Collection System Improvements	**$0**	**$15,919**	**$0**	**$18,822**	**$6,028**	**$40,769**
WWTF & Lift Station Improvements						
WWSL Structure Replacement and Pipe Lining	-	-	$493,000	-	-	$493,000
Main Lift Station Improvements	-	-	$257,000	-	-	$257,000
Subtotal WWTF & Lift Station Improvements	**$0**	**$0**	**$750,000**	**$0**	**$0**	**$750,000**
Total Project Cost	**$0**	**$15,919**	**$750,000**	**$18,822**	**$6,028**	**$790,769**

Assumes 3% Inflation per Year

Table 2b: Capital Improvement Plan 6-20 Year

Description	6-20 Year
Collection System	
Known Collection System Rehabilitation	$ 18,007
Projected Collection System Rehabilitation	$ 273,582
Wastewater Treatment System	
WWTF and Lift Station Rehabilitation	$ 1,202,000
Total Rehabilitation Cost	**$ 1,493,589**

**Costs based on 2018 construction dollars*

Operations, Maintenance and Replacement

Regular operation, maintenance and replacement (OM&R) is essential in the management of a wastewater collection system. The collection system is subject to a variety of operational problems and can suffer from clogging, scour, corrosion, and collapse. Inspection, cleaning, and rehabilitation are important for optimizing the proper functioning of the collection system. By optimizing the performance infiltration/inflow are reduced and sanitary sewer overflows (SSO) are minimized or eliminated preserving the substantial investment the community has in its collection system.

Table 3a identifies the recommended maintenance actions items for the wastewater collection system in a five-year summary. The total cost, as shown in the 'Total' column below, is taken and divided by five and then disbursed between 2018 to 2022, where each increasing year is multiplied by a 3% inflation factor starting at year 2 (2019).

Table 3a. Collection System Maintenance Summary Table: Year by Year

Project Description	Total (Current Year Dollars)	2019	2020	2021	2022	2023
Manhole Assessment	$1,607	-	-	-	$1,756	-
CCTV	$50,003	-	-	$53,048	-	-
Total Project Cost	**$54,803**	**$0**	**$0**	**$53,048**	**$1,756**	**$0**

**Assumes 3% Inflation per Year*

A list of WWTF and lift (pump) station assets requiring replacement in the next 20 years was generated based on the expected useful life of assets included in the asset inventory. Assets addressed in the CIP were not included in the replacement cost table. Table 3b provides the results of the analysis.

Table 3b. Village of Pewamo

Equipment Replacement Budget

Item		Rehab/ Replacement Cost	Life Years		Annual Budget
Main Lift Station Pumps/Controls	$	30,000	15	$	2,000
Main Lift Station Generator	$	10,000	15	$	667
State Street Lift Station Pumps/Controls	$	20,000	15	$	1,333
State Street Lift Station Generator	$	10,000	15	$	667
Lagoon Repairs	$	30,000	20	$	1,500
Total	**$**	**100,000**		**$**	**6,167**

An annual equipment replacement fund should be developed to replace disposable equipment. These are items that can be financially accounted for through operation, maintenance and replacement (OM&R) funds and can be replaced by WWSL staff without bringing in an outside contractor. Existing disposable materials include chemicals, wear parts in pumps and motors, laboratory instruments, etc. It is strongly recommended that the Village of Pewamo develop an equipment replacement fund to replace disposable equipment.

Revenue Structure

The MDEQ requires that a rate study be performed to assure that there is sufficient revenue to cover current operation, maintenance and replacement costs of the wastewater utility. The Village of Pewamo obtained the services of the Michigan Rural Water Association (MRWA). The analysis performed by MRWA shows a balance between revenues and expenditures. Looking forward over the next 20 years, OM&R costs are estimated at $110,000 while CIP costs are estimated at $2.25 million dollars. Depending on funding mechanisms, the Village may want to consider rate adjustments to stay ahead of anticipated costs.

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
LANSING

RICK SNYDER
GOVERNOR

C. HEIDI GRETHER
DIRECTOR

May 18, 2018

Mr. Dan Heckman
Village of Pewamo
106 East Main Street
P.O. Box 385
Pewamo, Michigan 48873

Dear Mr. Heckman:

SUBJECT: Stormwater, Asset Management, Wastewater (SAW)
Village of Pewamo
SAW Grant Project Number 1649-01

We have reviewed the information contained in the rate methodology dated May 17, 2018. It has been demonstrated that significant progress has been made, as determined by the department, toward achieving the funding structure necessary to implement the program.

Accordingly, the applicant has fulfilled the significant progress requirement and complies with Section 5204e(3)(a), Part 52, Clean Water Assistance, of the Natural Resource and Environmental Protection Act, 1994 PA 451, as amended.

If there are any questions regarding approval of the rate methodology, please contact Mr. Robert Schneider in the Revolving Loan Section, Drinking Water and Municipal Assistance Division, by phone at 517-388-6466, or by mail at DEQ, P.O. Box 30817, Lansing, Michigan 48909-8311.

Sincerely,

Sonya T. Butler

Sonya T. Butler, Section Manager
Revolving Loan Section
Drinking Water and Municipal Assistance Division
517-284-5433

cc: Ms. Mary G. Martin, Executive Director, Michigan Finance Authority
Ms. Karen Nickols, DEQ

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date 11/30/2018
(no later than 3 years from executed grant date)

The Village of Pewamo *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1649-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or No

   If No - Date of the rate methodology approval letter: May 18, 2018.

2) Significant Progress Made: Yes or No

   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)

3) Date of rate methodology review letter identifying the gap: ________.

4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Bruce Pindzia PE at 616 977 1000 bpindzia@fveng.com
Name Phone Number Email

Dan Heckman 11-30-18
Signature of Authorized Representative (Original Signature Required) Date

Dan Heckman, Mayor Pro-Tem
Print Name and Title of Authorized Representative

Protecting our Infrastructure Investment

ASSET MANAGEMENT PLAN

Stormwater Executive Summary Report

Prepared for:

Village of Pewamo

SAW Project No. 1649-01

November 2018

FLEIS&VANDENBRINK

DESIGN. BUILD. OPERATE.

1.0 Executive Summary

Overview

Public Act 562 of 2012 authorized money for Stormwater, Asset Management, and Wastewater (SAW) Grant Program. In December 2015, The Village of Pewamo received a SAW Grant from the Michigan Department of Environmental Quality (MDEQ) to provide financial assistance for the development of this Asset Management Plan (AMP). This report provides the Asset Management Plan (AMP) for the Village's stormwater collection system. Working with Village staff, Fleis and VandenBrink (F&V) provided technical assistance for asset identification, condition assessment, and capital improvement planning of the stormwater collection system.

This AMP is intended to be a living document that is updated as assets continue to wear and age, and as additional inspection/condition results are found and incorporated into the plan.

The Village of Pewamo has executed the "Certification of Project Completeness" for the storm water asset management plan and a copy has been provided at the end of this Executive Summary.

The contact person for the Village of Pewamo AMP is:

Mike Scollon, Chief of DPW and Zoning
130 East Main Street
P.O. Box 385
Pewamo MI, 48873-5102
Phone number: 989.640.4014
Email: PullerMike@hotmail.com

Asset Inventory and Condition Assessment

The stormwater collection system assets consist of approximately 25,816 feet (4.89 miles) of storm sewers (outlined in Table 1) and 192 stormwater structures connecting the gravity pipe. System outfalls are located along Spaulding Rd and are owned/operated by the County Drain Commission. There are also two culverts in the Village limits and are owned and maintained by the Village. These assets are located in existing street rights-of-way or in easements dedicated for the assets use and maintenance.

Table 1. Collection System Asset List

Pipe Size (inches)	Gravity Main Length (ft)
4	225
6	2,478
8	3,352
10	1,983
15	8,998
18	2,277
24	3,037
30	976

Asset Identification and Location

A comprehensive stormwater system asset inventory was developed from available record drawings, field notes, staff knowledge, and site visits; supplemented with field survey work. Asset material, size and age were identified through the review of available historical record documents. Spatial orientation (pipe location), pipe depth and invert elevations were determined through GPS field survey and a comprehensive evaluation of the gravity system. This information was organized into a new or updated (GIS) database and piping network for archiving, mapping, and further evaluation purposes.

The purchase of GIS/GPS equipment provided with the SAW grant program will greatly enhance the Village's ability to physically locate defects in storm water system assets.

CONDITION ASSESSMENT AND EXPECTED USEFUL LIFE

For the Village of Pewamo, a comprehensive evaluation of the collection system was performed. NASSCO-MACP structure field-based assessments were completed on all but 1 of the 192 structures. Pipeline cleaning and NASSCO-PACP CCTV field-based inspections were conducted on 11,604 feet (45 percent) of the gravity pipe. Based on discussions with the stormwater system operations staff, there are no known capacity issues with the Village-owned stormwater system. Flooding or drainage problems occur when County drains are elevated and collected stormwater cannot flow into the County drains through the outfalls. For this reason, a capacity analysis was not completed for the Village of Pewamo.

Recommendations for short-term (1-5 year) and long term (6-20 year) identified the need for maintenance; 11% of the storm structures and 69.5% of the sewer system was tagged for CCTV, inspection, and/or cleaning. Rehabilitation is recommended for approximately 14.5% of the storm structures and 10.5% of the sewer system, mostly point repairs and lining. A few pipe segments with structural problems were identified for complete replacement. The remaining assets (74.5% and 20%, respectively) were placed in the beyond 20-year planning category.

LEVEL OF SERVICE

DEFINING THE EXPECTED LEVEL OF SERVICE (LOS)

Level of Service (LOS) defines the way in which the Village stakeholders want the storm water system to perform over the long term and is an MDEQ required component of an AMP. The LOS can include any technical, managerial, or financial components the Village wishes, if all regulatory requirements are met.

Throughout the development of this AMP, F&V worked with the Village of Pewamo staff to develop the following LOS statement and goals.

STORMWATER – LEVEL OF SERVICE STATEMENT

"To provide appropriate stormwater collection, diversion, and conveyance at a minimum cost, consistent with applicable environmental regulations. To achieve this the following Level of Service (LOS) goals are proposed for the Village of Pewamo:

- *Provide adequate stormwater collection system and conveyance capacity for all service areas*
- *Actively maintain stormwater collection and conveyance system assets in reliable working condition and in compliance with all applicable regulations.*
- *Provide rapid and effective emergency response services to customers.*
- *Provide properly trained maintenance and operations staff*

The LOS goals may need to be adjusted from time to time as the utility ages, the needs of community change or new rules or regulations require a change in operation. For this reason, the LOS goals should be reviewed by the Village of Pewamo from time to time to make sure they accurately reflect the desired operation of the storm water system.

MEASURING PERFORMANCE

Performance measurements are specific metrics designed to assess whether Level of Service objectives are being met. Evaluations of goals should be completed at least annually to determine if the provided resources are being used appropriately. Level of Service requirements can be updated to account for changes due to growth, regulatory requirements, and technology.

CRITICAL ASSETS

Determining Criticality

Business Risk is the determination of criticality of each asset in the wastewater system. Criticality is based on two factors; Likelihood (Probability) of Failure and Consequence of Failure using the following formula:

Business Risk = Consequence of Failure Score x Likelihood of Failure Score

Defining an asset's Business Risk allows for management of risk and aids in decision making for where to allocate operation and maintenance and capital improvement funds.

Likelihood of Failure (LoF) is a measure of how likely an asset is to fail. The following categories have been developed to quantify how likely an asset is to fail:

- Condition of the asset
- Remaining useful life (Age)
- Service History
- Operational status

Consequence of Failure (CoF) is a measure of the social, economic, financial and environmental impact of failure of an asset and the utilities ability to respond, convey and treat wastewater. CoF categories of the collection system include:

- Proximity to critical environmental features
- Location (Zoning District) of asset
- Facilities served by asset
- Size and location of asset within the utility network
- Type of asset.

The WWTP and lift station categories for CoF are:

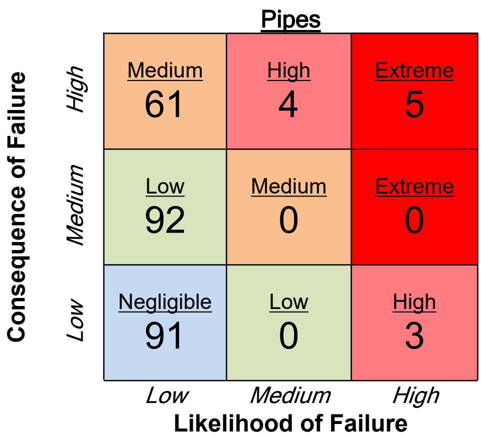
- Process
- Financial Impact
- Safety
- Environmental Impact
- Disruption to the Community
- Ability to Respond

Criticality Results

Using the strategy outlined above, a Business Risk Evaluation (BRE) was performed for each asset using a graphical ArcGIS-based sewer asset management and capital planning software that compiles, analyzes and assesses Business Risk for each asset and develops a Capital Improvement Plan. The results of the BRE are provided in easily understood tabular and graphical output.

Figure 1 provides the risk rating for storm sewer pipes by number of pipe segments. Five pipe segments in the stormwater collection system have an extreme risk rating and are recommended to be for near-term rehabilitation or replacement. Much of the collection system's gravity pipes, 71.5 percent as shown in Figure 1, have a low to negligible risk rating and are indicative of pipes in relatively good condition.

Figure 2 provides the risk rating for the storm sewer structures. Four structures are identified as extreme risk and are recommended for replacement or rehabilitation. Many manholes are at low to negligible risk are indicative of manholes in relatively good condition (68 percent).



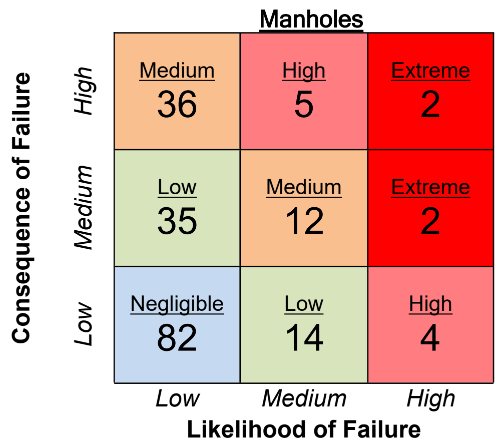


Figure 1. Business Risk Matric (Risk Rating) by Number of Gravity and Force Main Pipes

Figure 2. Business Risk Matrix (Risk Rating) by Number of Manholes

A spreadsheet providing asset criticality for each utility asset is included in the AMP detailed report for the stormwater collection system.

Capital Improvement Plan

A Capital Improvement Plan with recommendations was prepared for the Village's assets based on the Business Risk evaluation. Data-driven information from the business risk assessment and condition assessment was used to identify and prioritize the capital improvement projects. The information was also used to schedule inspections to evaluate the condition of high business risk assets. Short-Term 1-5 year and Long-Term 6-20-year Capital Improvement Plan (CIP) was prepared to address the projected needs for each asset in the system. The 5-year CIP rehabilitation total is $591,745.

CIP Development

The Village of Pewamo identifies assets of $5,000 or more to be capital expenditures. Storm Drain System assets were grouped by strategy and assigned costs from a unit database. This database includes unit construction values in 2018 construction dollars based on a survey of recent projects in Michigan and includes engineering and administrative rates where applicable. Assets were categorized and prioritized by year based on risk rating and criticality score to develop the CIP.

The CIP was developed by assigning each project to a CIP year (1-5) based on several factors. In addition to Risk Rating, other factors used to assign CIP year include:

- Asset rehabilitation grouping (i.e. the type of repair/construction recommended)
- Coordination with other planned projects to achieve economies of scale or limiting disruption (an example is a street reconstruction project where identified utility recommendations can be included)

Table 2a: Capital Improvement Plan Summary by Year

Project Description	Rehabilitation Fiscal Year					Total
	2019	2020	2021	2022	2023	
Collection System Improvements						
Gravity Sewer Point Repair	$ 62,388	-	$ 217,190	-	-	$ 279,578
Gravity Sewer Replacement	-	$ 138,786	-	-	$ 132,215	$ 271,001
Manhole Repair and Line	-	$ 9,422	-	$ 19,992	-	$ 29,414
Manhole Clean and Line and Repair	-	-	-	$ 11,752	-	$ 11,752

Total Project Cost	**$ 62,388**	**$ 148,208**	**$ 217,190**	**$ 31,744**	**$ 132,215**	**$ 591,745**

**Assumes 3% Inflation per Year*

The 5-Year CIP must also consider project cost when assigned to a CIP year to balance capital requirements with generated utility revenues. The recommended 5-Year Capital Improvement Plan for the wastewater collection system is included in Table 2a. Recommendations for the long term 6-20 year CIP are included in Table 2b.

Table 2b: Capital Improvement Plan 6-20 Year		
Description		**6-20 Year**
Collection System		
Known Collection System Rehabilitation	$	32,822
Projected Collection System Rehabilitation	$	338,449
Total Rehabilitation Cost	**$**	**371,271**

**Costs based on 2018 construction dollars*

OPERATIONS AND MAINTENANCE

A preventative maintenance program to systematically clean and inspect pipelines to NASSCO-certified standards is critical for a sound stormwater system. The process of cleaning and CCTV inspection of pipelines either with equipment owned by the community or contracted is a relatively inexpensive maintenance effort when compared to rehabilitation efforts. It is recommended that at a minimum, all pipelines be cleaned and televised every five years, or that 20% of the system be cleaned and televised annually. Available budget will dictate the frequency or size of yearly projects. The 5-year CIP maintenance total is $69,921.

Table 3. Collection System Maintenance Summary Table: Year by Year

Project Description	Total (Current Year Dollars)	2019	2020	2021	2022	2023
Manhole Assessment	$ 536	-	-	-	$ 585	-
Manhole Cleaning	$ 16,068	$ 803	-	-	-	$ 17,180
CCTV	$ 53,317	-	-	$ 56,564	-	-
Total Project Cost	**$ 69,921**	**$ 803**	**$ 0**	**$ 56,564**	**$ 585**	**$ 17,180**

**Assumes 3% Inflation per Year*

DEQ

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Due Date 11/30/2018
(no later than 3 years from executed grant date)

The Village of Pewamo *(legal name of grantee)* certifies that all stormwater asset management plan (SWAMP) activities specified in SAW Grant No. 1649-01 have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SWAMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

Bruce Pindzia PE at 616 977 1000 bpindzia@fveng.com
Name Phone Number Email

Dan Heckman 11-30-18
Signature of Authorized Representative (Original Signature Required) Date

Dan Heckman, Mayor Pro-Tem
Print Name and Title of Authorized Representative

Memo

To:	Mr. Clarence Jones Michigan Department of Environmental Quality	From:	Spencer Cain, PE Dima El-Gamal, Ph.D., PE, LEED® AP Stantec Ann Arbor, Michigan Office
File:	2075128201	Date:	November 29, 2018

Reference: Pittsfield Charter Township SAW – Executive Summary

This document is intended to provide an executive summary of the Stormwater, Asset Management, and Wastewater (SAW) Asset Management Plan (AMP) that was completed for Pittsfield Charter Township (Township).

Grant Recipient
SAW Grant Project# - 1429-01

Pittsfield Charter Township
6201 West Michigan Avenue
Ann Arbor, MI 48108
http://www.pittsfield-mi.gov

Contact Person
Craig Lyon – Director of Utilities and Municipal Services
(734)822-3130
lyonc@pittsfield-mi.gov

EXECUTIVE SUMMARY

The Township was a third round SAW Grant recipient of $1,263,416 with a local match of $198,917. The overall scope of work for this Grant was to: improve upon the baseline inventory, conduct risk assessments of the pump station facilities and eligible components of the sewer system, develop a capital improvement plan, and coordinate the information collected with the Township's asset/work order management software. The Township's AMP addresses (will address) five core components:

1. Asset Inventory
2. Criticality/Risk Assessment
3. Level of Service (LOS)
4. Capital Improvement Plan (CIP)
5. Revenue Structure

TOWNSHIP ASSET MANAGEMNT TEAM (AMT)

This plan was developed in cooperation with the Township's Asset Management Team (AMT), which included:

- Craig Lyon – Director of Utilities and Municipal Services
- Billy Weirich – Utilities Superintendent
- Matt Catanzerite – GIS Manager
- Tracy Watkins – Township Financial Director

- Pittsfield Charter Township Board of Trustees
- Stantec - Asset Management Consultant and Rate Consultant

ASSET INVENTORY

The Township uses Cityworks for their work order management system, which interacts with and displays the asset inventory that they maintain using ESRI's ArcGIS. The inventory includes a record for 100% of the Township-owned sewer lines, manholes, force mains, and pump stations, as well as other appurtenances which may not be fully populated, such as laterals, fittings, etc. A review and update of this database was included in this project to ensure that the information was complete to the extent possible based on readily available information. This included further population of the attribute information for the manholes and pipes (i.e. ownership, material, install date, etc.), as well as updates to reflect the observed system configurations in the field. The pump station asset inventory was also developed further, including a vertical asset data structure for each, with several subsystems and components being related to each station (e.g., structural elements, valves, piping, etc.)

The Township will continue to update its GIS as additional areas develop or when existing wastewater system improvements are implemented. The Township will also continue the population of attributes related to existing assets as information becomes readily available.

LIST OF MAJOR ASSETS

- Approximately 705,500 feet of gravity sewer pipes from 4 to 36-inches in diameter;
- Approximately 3,578 manholes;
- Approximately 40,100 feet of force main pipes from 6 to 12-inches in diameter; and,
- Seven pump stations.

CRITICALITY/RISK ASSESSMENT

CONDITION ASSESSMENT

As part of the AMP development, a series of field visits were made by Stantec and Township operations staff in September of 2017. The goal of the inspections was to assess the condition of the seven pump station facilities. Information on each pump station condition was gathered from visual inspection, conversations with operations staff, and record drawings to assess the condition of the facilities and their equipment, and to advance the population of the asset inventory database as described earlier.

Township staff to carried out the condition assessment of the gravity sewer system in 2016-2017 using Closed Circuit Television (CCTV) inspection. Inspections were completed for approximately 52% of the system (over 376,000 linear feet of pipe and 1,137 manholes), that met the SAW eligibility requirement of being over 20 years old. The inspections were performed using the Pipe Assessment Certification Program (PACP) and Level 2 Manhole Assessment Certification Program (MACP) standards for condition ratings, which were developed by the National Association of Sewer Service

Companies (NASSCO). Stantec evaluated the inspection data that was provided for the Township's system and used it as the basis of the condition assessment for the collection system.

Though the pump station assets were all inspected for the condition assessment, only approximately 52% of the gravity sewer pipes, 30% of the manholes, and none of the force mains were physically inspected. For uninspected assets, the Township elects to track the condition of these items via desktop analysis methods. To assign a condition assessment rating to the uninspected assets, a condition score of 1-5 was assigned based primarily on the age (or elapsed time since last rehab), and capacity deficiency as appropriate. The maximum condition rating between those categories was then assigned as the overall apparent condition rating.

Also considered in evaluating the condition of the wastewater assets was the hydraulic capacity study performed by Stantec for the wastewater system (Pittsfield Charter Township Sanitary Collection System Capacity Study; dated October 17, 2018). The objectives of that study included identifying and evaluating the capacity of the existing sanitary collection system; evaluating Infiltration and Inflow (I/I) impacts on the system; making recommendations for improvements to the system that are necessary to meet present and future needs (20-year planning horizon) of the Township; and using recommendations from that study in the development of a comprehensive AMP.

Condition assessment ratings were used to determine the likelihood of failure for each asset and were assigned to the assets based on a scale from 1-5:

- 1 = Excellent: New or Excellent Condition - Only normal maintenance required;
- 2 = Good: Minor Deterioration - Minor maintenance required;
- 3 = Average: Moderate Deterioration - Moderate maintenance required;
- 4 = Fair: Significant Deterioration - Significant renewal/upgrade required;
- 5 = Poor: Asset Unserviceable - Replacement required OR asset poses safety risk.

Pump Stations

During the field investigations of the Township's pump stations it was found that the facilities are generally well kept and most of the system components range in condition from average to excellent. Each pump station currently contains between 33-48 tracked components, and when considering each pump station as a whole, the average component condition rating ranged between 1.15 and 3.15. The table below provides a depiction of the findings:

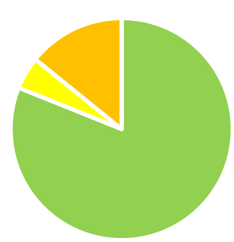
Reference: Pittsfield Charter Township SAW – Executive Summary

			Component Condition Ratings				
			1	2	3	4	5
Pump Station Facility	**Average Condition Rating**	**Total # of Inspected Components**	**%**	**%**	**%**	**%**	**%**
Ashford Village PS	2.7	40	-	27	73	-	-
Lohr Road PS	2.8	48	2	23	73	2	-
Meadowview PS	3.2	33	-	6	73	21	-
Michigan Ave/Saline PS	3.0	48	-	6	92	2	-
Moon Road PS	1.2	40	93	-	7	-	-
Platt and Merritt PS	3.0	48	2	14	67	17	-
Warner Creek PS	2.8	38	-	21	79	-	-

Force Main

Based on desktop analysis methods, the inspected force mains were found to be generally in fair to good condition. Approximately 86% of the sewer pipes had a condition rating of better than 4. The chart below provides a depiction of the findings:

Force Main Condition Rating	Length	%
1	-	-
2	32,508	81%
3	1,901	5%
4	5,683	14%
5	-	-
Total	**40,092**	**100%**

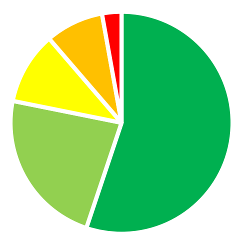


Reference: Pittsfield Charter Township SAW – Executive Summary

Gravity Sewers

Based on the inspection data collected by the Township staff and the desktop analysis, the inspected sewers were found to be generally in average to excellent condition. Approximately 89% of the sewer pipes had an overall condition rating of better than 4 (PACP Structural and/or Operation and Maintenance categories). The chart below provides a depiction of the findings:

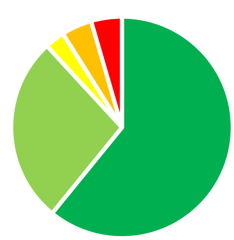
Gravity Sewer Condition Rating	Length	%
1	388,985	55%
2	162,375	23%
3	74,340	11%
4	59,768	8%
5	19,969	3%
Total	**705,438**	**100%**



Manholes

Based on the inspection data collected by the Township staff and the desktop analysis, the inspected manholes were found to be generally in good to excellent condition. Approximately 91% of the manholes had an overall condition rating of better than 4 (MACP Structural and/or Operation and Maintenance categories). The chart below provides a depiction of the findings:

Manhole Condition Rating	Count	%
1	2,178	61%
2	976	27%
3	104	3%
4	159	4%
5	161	4%
Total	**3,578**	**100%**



Reference: Pittsfield Charter Township SAW – Executive Summary

CRITICALITY ASSESSMENT

A criticality rating system was developed to analyze the consequence of failure for the wastewater system assets and to determine the relative importance of the assets for the prioritization of future capital expenses. The criticality analysis was performed separately for the pump stations and the linear assets (gravity sewers/manholes and force mains), and uses a scale of 1-5, with 1 being the least critical, and 5 the most critical. Several key risk criteria were identified:

- Impact on Facility Operation
- Impact on Operator Health and Safety
- Cost of Repair
- Difficulty of Repair
- Pipe Size
- Wastewater Asset Location
- Environmental/Public Health Risk

Each of the criticality criteria were assigned a weighting factor according to their relative importance as determined by the AMT. The consequence of failure for each asset was evaluated within this framework based on the qualities they possess, and an overall criticality rating was assigned to each by summing the weighted criticality scores for each of the risk criteria. For example, a large diameter trunk sewer crossing a freeway would be considered more critical than a small diameter local collection sewer in an unimproved right-of-way. It should be noted that the criticality of the gravity sewer manholes was assigned based on the criticality of the adjacent pipe since those assets are essentially inseparable from the pipe and located in the same general vicinity of the critical features (i.e. major roads, railroads, wetlands, etc.).

LEVEL OF SERVICE (LOS)

LOS can be described as a qualitative measure of the requirements placed on a system or facility by a variety of entities that may be external (e.g. customers, legislators), or internal (management staff). Based on discussions with the Township's AMT, the LOS goal is to maintain all critical assets as well as some less critical assets to provide enhanced reliability, with an emphasis on meeting the regulatory requirements set by the MDEQ. This goal was identified by the AMT as the starting point for guiding CIP and maintenance expenditures.

Qualitatively, LOS can be described in three tiers: Low, Medium and High. With a Low LOS, only the most critical components in the system, or those with the highest risk, would be proactively maintained, and with a High LOS, every asset would be maintained proactively. The Township's LOS goals could be described as a Medium LOS, though in practice the Township consistently endeavors to offer a High LOS. Therefore, for the purposes of projecting CIP expenditures, a Medium LOS has been assumed.

The Township plans to review and update their stated LOS goals regularly and assess the performance of their system against those goals to identify any areas that may need improvement. The Township will also examine the impact of LOS on CIP projections and may alter the LOS goals as deemed necessary.

CAPITAL IMPROVEMENT PLAN (CIP)

A CIP has been developed using the results of the AMP analysis, including the RCT analysis, and Capacity Study, and is divided into Short/Medium-term (0-10 year), and Long-term (10-20 year) initiatives. A summary is provided in the table below with initial conceptual cost opinions in present day (2018) dollars. The source of the CIP recommendation is included in the description within parentheses. The Short/Medium-term projects listed below have been included in a financial analysis, but the Long-term projects may be subject to change as the actual dates and dollar values could vary. The Township will continue to review and refine these findings moving forward.

Timeframe	Project Name	Details	Justification	Year	Conceptual Opinion of Cost	Funding Source
Short/Medium Term Projects (0-10 years)	Meadowview PS	Station Rebuild (Ex. CIP)	Reliability; Nearing End of Service Life	2019	$750,000	Fund Balance
	Force Main O&M	estimated non-specific maintenance and repair costs (Ex. CIP)	Routine Maintenance and Repairs	2019, 2020, 2021	$250,000 annually	Fund Balance
	Gravity Sewer Upgrade	Bicentennial sewer lining by CIPP (AMSAT and Ex. CIP)	Reliability, Structural (H2S) Repair	2019	$470,000	Fund Balance
	Gravity Sewer Upgrade	Technology park cross country sewer lining by CIPP (AMSAT)	Reliability, Structural (H2S) Repair	2019	$200,000	Fund Balance
	Gravity Sewer Upgrade	Replace/upsize trunk sewer along Michigan Ave. from Platt Rd to Munger (Ex. CIP & Capacity Study)	Reliability, Capacity	2020-2025	$10,000,000 total	Debt Funded
	Lohr Road PS	Electrical and Process upgrades (Ex. CIP)	Reliability; Nearing End of Service Life	2021	$500,000	Fund Balance
	Michigan Ave/Saline PS	Process and Structural upgrades (Ex. CIP)	Reliability; Nearing End of Service Life	2022	$550,000	Fund Balance
	Gravity Sewer Upgrade	Concourse Sewer Lining/Replacement (AMSAT, Ex. CIP, Capacity Study)	Reliability, Structural (H2S) Repair	2022, 2023	$630,000 annually	Fund Balance
	Gravity Sewer Upgrade	Boulder Ridge Sewer repairs and lining by CIPP (Ex.CIP)	Reliability, Structural (H2S) Repair	2023	$225,000	Fund Balance

Reference: Pittsfield Charter Township SAW – Executive Summary

	All Pump Stations	Total estimated maintenance and replacement (AMSAT)	Routine Maintenance and Repairs	2023-2028	$1,100,000 total	Fund Balance
	Gravity Sewer Upgrade (I/I and Capacity)	Upsize and/or CIPP line and monitor reduction in flow from Carpenter to Blossom Hill (cost for upsize presented here) (AMSAT and Capacity Study)	Reliability, Capacity, I/I Reduction	2024	$625,000	Fund Balance
	Michigan Ave/Saline Forcemain	Replace 12" force main (from CIP)	Reliability	2024	$1,500,000	Fund Balance
	Gravity Sewer Upgrade (I/I and service life)	Washtenaw Heights Sewer repairs (AMSAT and Capacity study)	Reliability, Nearing End of Service Life, I/I Reduction	2026	$560,000	Fund Balance
	Gravity Sewer Upgrade	Carpenter and Ellsworth area sewer repairs and lining (RCT)	Reliability, Structural Repairs	2026	$170,000	Fund Balance
	Gravity Sewer Upgrade	Oak Park sewer repairs and lining (RCT)	Reliability, Nearing End of Service Life, Structural Repairs	2026	$634,000	Fund Balance
	Gravity Sewer Upgrade	The Pines area sewer repairs and lining (RCT)	Reliability, Structural Repairs	2027	$360,000	Fund Balance
	Gravity Sewer Upgrade (I/I)	Warner Creek area sewer repairs and lining (RCT)	Reliability, Structural Repairs, I/I Reduction	2028	$180,000	Fund Balance
Long Term Projects (10-20 years)	All Pump Stations	Total estimated maintenance and replacement (AMSAT)	Reliability, Service Life, Routine Maintenance	2029-2038 (TBD)	$580,000 total	TBD
	Moon Road Force Main	Replace or rehabilitate the 6-inch forcemain (cost for replacement shown here; from AMSAT)	Reliability, Service Life, Routine Maintenance	2031 (TBD)	$708,000	TBD
	Meadowview Force Main	Replace or rehabilitate the 6-inch force main (cost for	Reliability, Service Life, Routine Maintenance	2031 (TBD)	$252,000	TBD

Reference: Pittsfield Charter Township SAW – Executive Summary

		replacement shown here; from AMSAT)				
	Gravity Sewer Upgrade (I/I)	West Side Sewer repairs and lining (RCT)	Reliability, Routine Maintenance, I/I Reduction	2029 (TBD)	$590,000	TBD
	Gravity Sewer Upgrade (I/I)	Glencoe Sewer repairs and lining (RCT)	Reliability, Routine Maintenance, I/I Reduction	2030 (TBD)	$147,000	TBD
	Gravity Sewer Upgrade (I/I)	Oak Valley area sewer repairs and lining (RCT)	Reliability, Routine Maintenance, I/I Reduction	2032 (TBD)	$400,000	TBD

REVENUE STRUCTURE

To satisfy the requirements of the SAW Grant, the Township has completed and submitted a financial gap analysis. This gap analysis was accepted by the Michigan Department of Environmental Quality (MDEQ) in a letter dated June 27, 2018, and meets the standard set by the MDEQ by showing that the Township's revenue sources currently meet the required expenditures.

Further analysis, to incorporate the CIP projections and ensure the sustainability of the AMP, was also completed with a rate study and evaluation of the Township's funding structure. The review addresses the following:

- Annual operating budget
- Current approved rate structure
- Documentation of legal authority for setting rates
- Discussion of anticipated costs (operations and capital) against revenue
- Documentation showing no funding gap, or a remedy to close gap if one exists.

To maintain the sustainability of the AMP, the Township plans to revisit the funding structure and rate methodology to ensure that the funding is available to meet the requirements of the Township's wastewater system.

Reference: Pittsfield Charter Township SAW – Executive Summary

This Plan will be presented to the Township Board of Trustees as the current recommended plan of action.

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c. Craig Lyon, Pittsfield Charter Township

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date _November 30, 2018___
(no later than 3 years from executed grant date)

The ___Charter Township of Pittsfield_____ *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. _1429-01__ have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: No

   If No - Date of the rate methodology approval letter: ____June 27, 2018_________.

2) Significant Progress Made: Yes or No

   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)

3) Date of rate methodology review letter identifying the gap: ________________________.

4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on _____________________________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Mr. Craig Lyon	at	(734) 822-2109	lyonc@pittsfield-mi.gov
Name		Phone Number	Email

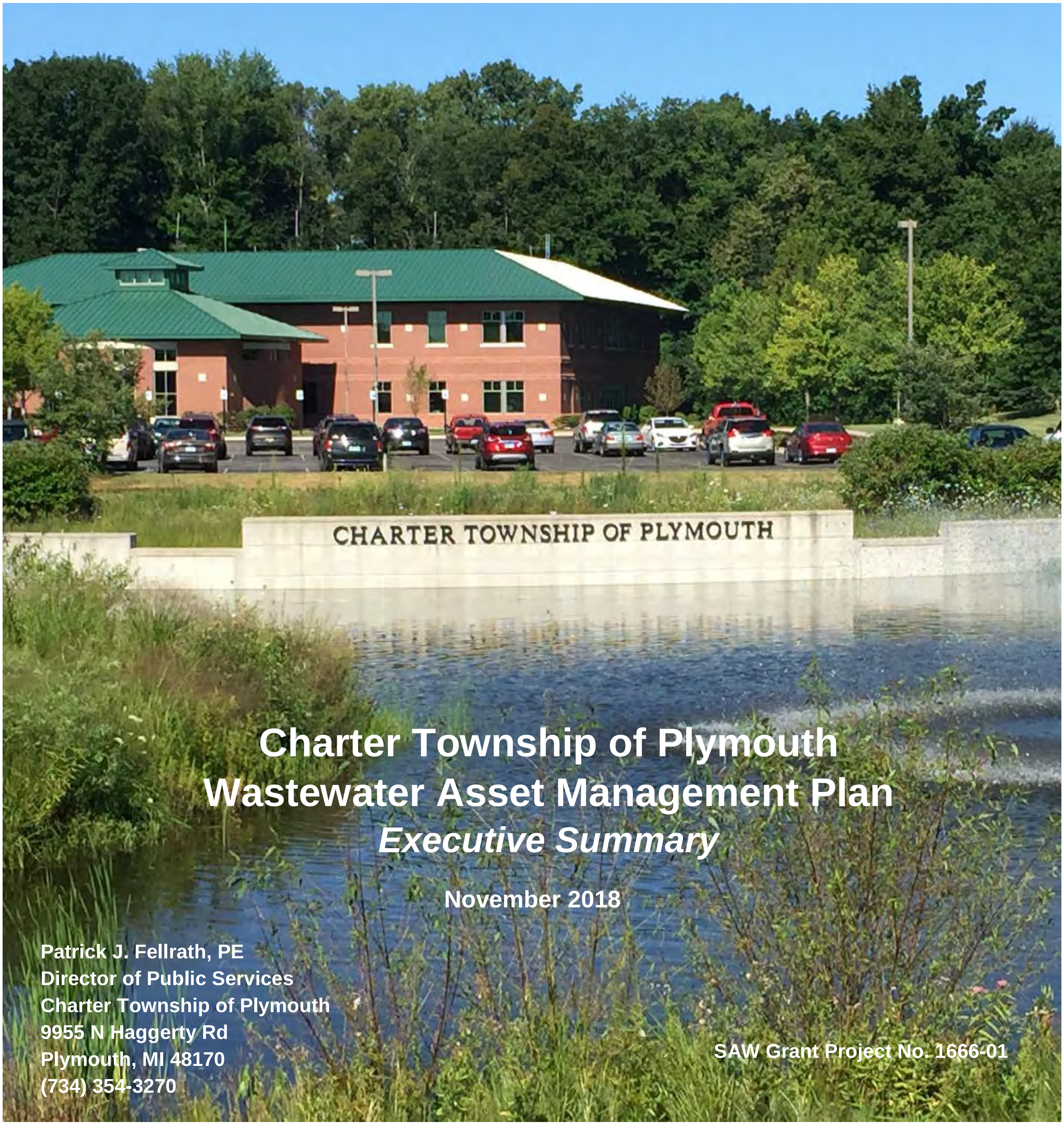
______________________________ 12/5/18

Signature of Authorized Representative (Original Signature Required) — Date

Ms. Mandy Grewal, Township Supervisor

Print Name and Title of Authorized Representative

April 2017



Charter Township of Plymouth Wastewater Asset Management Plan

Executive Summary

November 2018

Patrick J. Fellrath, PE
Director of Public Services
Charter Township of Plymouth
9955 N Haggerty Rd
Plymouth, MI 48170
(734) 354-3270

SAW Grant Project No. 1666-01

GHD WADETRIM

This report: has been prepared by GHD for Plymouth Township and *may only be used and relied on by Plymouth Township for the purpose agreed between GHD and the Plymouth Township as set out in this report.*

GHD otherwise disclaims responsibility to any person other than Plymouth Township arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report. GHD disclaims liability arising from any of the assumptions being incorrect.

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1 Introduction

The Charter Township of Plymouth Michigan (Township) provides sanitary wastewater services to persons and properties within the Township. The Township operates and maintains approximately 145 miles of sanitary sewer pipeline, 3,600 sanitary sewer manholes, and one small wastewater pumping station. The Township applied for and received an MDEQ Stormwater and Wastewater (SAW) grant for developing an asset management plan for the Township's wastewater collection system. The purpose of this document is to summarize the results and findings of activities covered by the grant.

2 Project Scope and Summary of Findings

Plymouth Township's goal for the Wastewater Asset Management Plan (AMP) is to identify the most cost effective method for maintaining the wastewater system at the appropriate level of service, and an acceptable level of risk. The Township desired to implement a robust AMP to move from reactive maintenance to proactive maintenance, and to minimize the risk of failure of critical components. Activities included a Gap Assessment, Asset Management Policy Development, Asset Management Implementation Plan (Roadmap), asset inventory development, field data collection, condition assessment, risk analysis, and determination of future investment profile. Also, as a result of the SAW Grant, the Township is currently implementing the Cityworks® Maintenance Management System in order to track work orders, costs, and maintain the inventory of assets.

List of Major Assets

The following assets are included in the scope of the AMP. Assets were identified and verified via GIS and field inspections. Additional details can be found in Section 4.

- 143.6 miles of gravity sewer collection pipes, ranging in size from 4 inch to 36 inch
- 0.9 miles of 8 inch diameter force main
- 3,590 sanitary sewer manholes
- 1 pumping station (850 gpm)

Summary of Findings

Criticality and Risk

Two parameters were used to calculate criticality: 1) Asset probability of failure (POF), and 2) Asset consequence of failure (COF). These two parameters were multiplied together and the resulting product is referred to as Risk. Probability of failure was determined via CCTV condition assessment and Consequence of failure was determined by considering such factors as the asset's proximity and impact to roads, buildings, hospitals and environmentally sensitive areas.

Capital Improvement Plan Development

Thirteen miles of pipe were identified as having the highest risk. The assets were then ranked and prioritized according to the risk. Thirty-nine collection pipes (2.25 miles) were deemed in need of immediate work and added to the Capital Improvement Plan (CIP) as summarized in Table 8. Critical assets at the pumping station were also identified and added to the CIP. Manhole rehabilitation will be carried out as necessary with pipe rehabilitation. The Township plans to spend $4M on Capital Projects over the next 10 years. Project details can be found in the complete AMP.

3 Asset Management Overview

The AMP was developed using the US Environmental Protection Agency (EPA) Asset Management Framework[1]. This framework, has been widely and successfully used by many utility organizations throughout the U.S. In fact, the EPA framework is the most widely implemented framework among water and wastewater utilities in the U.S. The framework is based on answering Five Core Questions of infrastructure asset management using a process that is comprised of 10 steps (or elements).

3.1 Asset Management Framework

Asset management is often defined as a framework. A framework is a way of thinking that is built around a body of leading practices. This way of thinking and the body of leading practices focuses on seeking the lowest total lifecycle cost of ownership for infrastructure assets while delivering services at a level customers and stakeholders require (and are willing to pay for) at an acceptable level of risk to the organization and community. While asset management is a strategic-level framework that embraces the primary function of the organization, it is only fully effective when also practiced day-to-day at the asset level. In other words, when individual capital investments that support growth, augmentation, or renewal are the right solutions, for the right reasons, at the right time…and when maintenance investment is cost-effective in extending asset life, sustaining performance, and enhancing reliability.

Ultimately, Plymouth Township's AM Program Framework provides the basis for comprehensive and effective management of assets by seeking the right balance between levels of service, cost of service and risk as shown in Figure 1.

Figure 1. Asset Management Balance

3.2 Asset Life Cycle

Asset life begins with the acquisition and installation of the asset. Over an asset's life, the Township will apply different strategies to preserve and extend the asset's life through maintenance and renewal (e.g., rehabilitation and replacement) activities and investments. Interventions in the asset's life, such as

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[1] https://www.epa.gov/sustainable-water-infrastructure/asset-management-water-and-wastewater-utilities

maintenance and renewal activities, should be timed to reduce the likelihood of service failure from deterioration in asset condition, and to minimize risk and overall cost of ownership. Sufficient investment at the right time is critical. An example of investment needs over an asset's life cycle is shown in Figure 2.

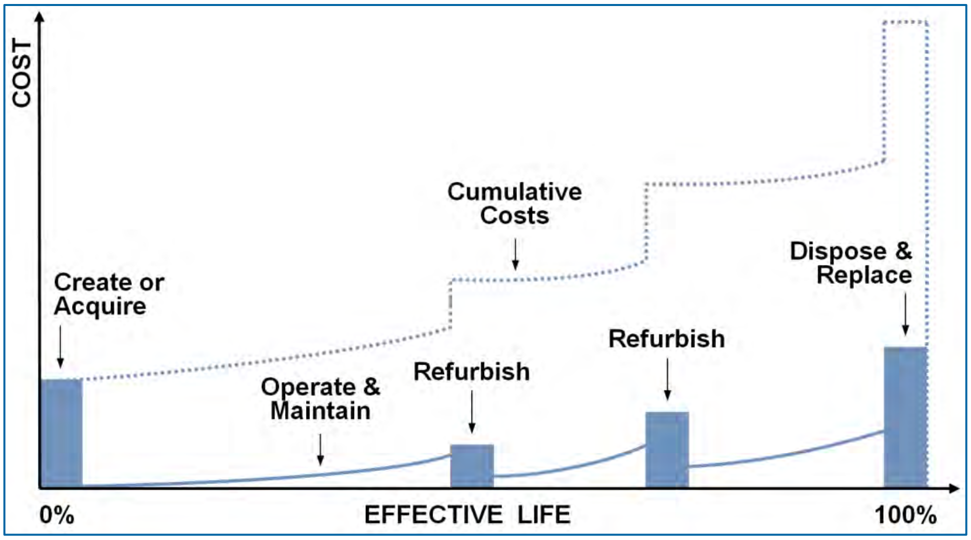

Figure 2. Asset Life Cycle Model – Example of Investment Events

In order to estimate the anticipated planning-level costs of these investment events over an asset's life cycle, the following initial steps are generally followed as part of an asset management approach:

- Develop the asset inventory and asset hierarchy
- Estimate asset replacement, rehabilitation, and other intervention costs
- Determine current asset condition
- Determine timing of intervention options

3.3 Asset Management Practices Gap Assessment

As part of the Wastewater Asset Management Plan (AMP), an Asset Management Maturity Assessment of the Charter Township of Plymouth (Township) was conducted using the GHD TEAMQF-3g (Total Enterprise Asset Management Quality Framework) gap analysis tool to establish the current state of Asset Management (AM) Maturity in the Township. This tool has been developed over many years based on the requirements of asset management, initially from the International Infrastructure Management Manual (IIMM), and was then updated periodically to incorporate the ISO AM Standard (ISO 55000) and most recently the Global Forum for Maintenance and Asset Management's 39 AM elements. As part of the assessment, opportunity gaps were identified, which will provide input into the AMP and form the basis for continuous improvement by the Township. The results of the gap assessment can be found in the Asset Management Plan.

At the outset of the SAW Grant activities, current AM processes and practices employed by the Township were reviewed and assessed to provide a baseline for the Township's AM Strategy. This involved completing a gap assessment of these processes and practices against what is generally regarded as industry leading practices built upon many AM processes, practices, techniques and tools developed over the past several decades. Township will select and implement only those leading practices that are practical and are cost effective given its specific needs and resources to close any identified gaps.

The Township intends to use the gap assessment results to continue developing and improving its Asset Management Program and processes in order to close the gaps.

4 Wastewater Collection Assets – Current State

The Township's wastewater collection system consists of approximately 145 miles of sanitary sewer pipeline, 3,600 sanitary sewer manholes, and one wastewater pumping station. Assets were identified and verified via GIS and field inspections. This section discusses the current state of the Township's assets, including types and numbers of assets, asset age, condition, and replacement costs. The Township is currently implementing the Cityworks® Maintenance Management System in order to track work orders, costs, and maintain the inventory of assets.

4.1 Sanitary Sewer Inventory

Of the approximately 145 miles of sanitary sewer in the Township's collection system, 50% is 8 inch diameter, and 85% are 12 inch and smaller. Figure 3illustrates the distribution of installed sewer according to diameter.

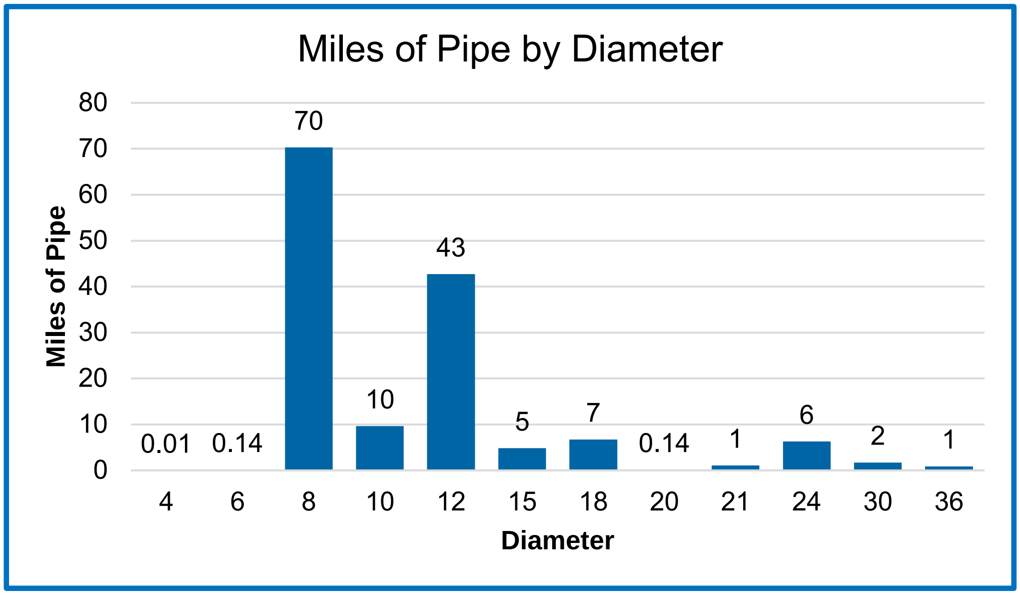

Figure 3. Sanitary Sewer Pipe Installed by Diameter

As shown in Figure 4, the most prevalent material of sewers installed (approximately 42%) is Reinforced Concrete Pipe (RCP), followed closely by plastic pipe (PVC, ABS, or HDPE) at 38% and Vitrified Clay (VC) at 16%. The remaining materials consist of Ductile Iron (DI), Cast Iron (CI), and Concrete (C). Based on CCTV inspections, there are 2.6 miles (62 assets) of CIPP lined sanitary sewer with various host materials.

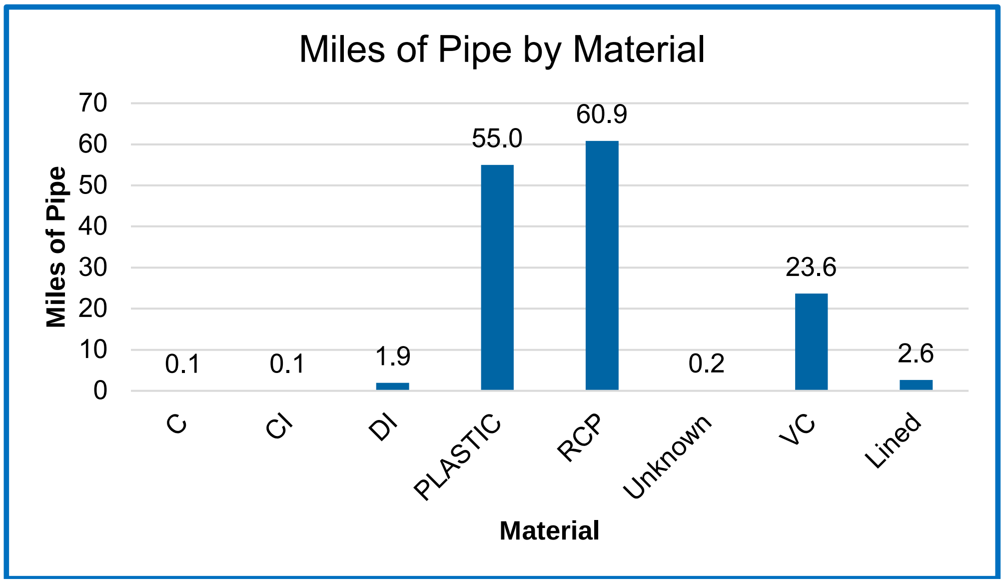

Figure 4. Sanitary Sewer Pipe Installed by Material

As seen in Figure 5, the Township's sanitary sewer assets date to the 1940's, with the majority being installed in the 1960's (29%),1970's (24%), 1980's (16%), and 1990's (22%).

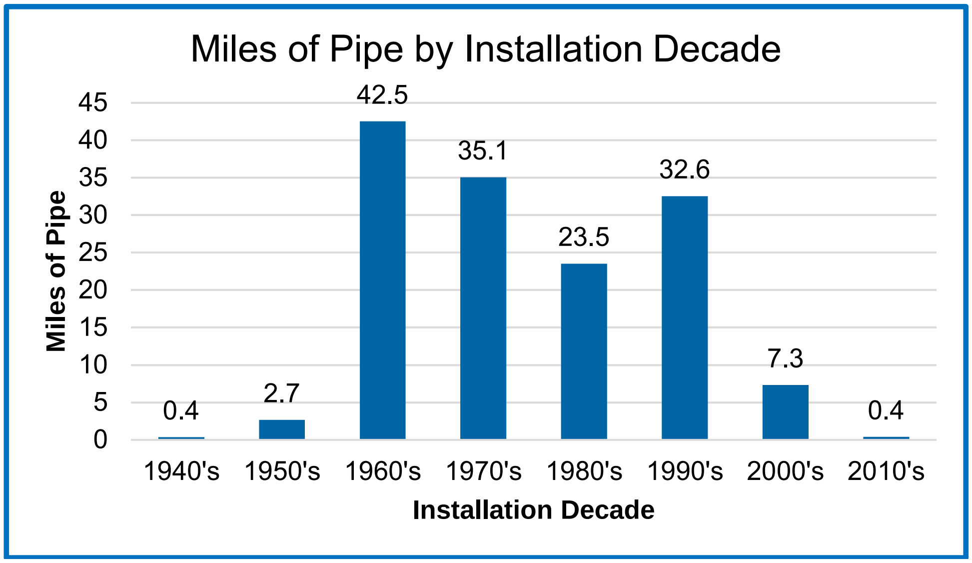

Figure 5. Sanitary Sewer Pipe Installed by Decade

4.2 Manhole Inventory

As would be expected, the installation year of the approximately 3,600 manholes in Plymouth Township generally mirrors that of the pipelines. Dating from the 1940's with peaks in the 1960's (26%), 1970's (24%), 1980's (18%) and 1990's (24%).

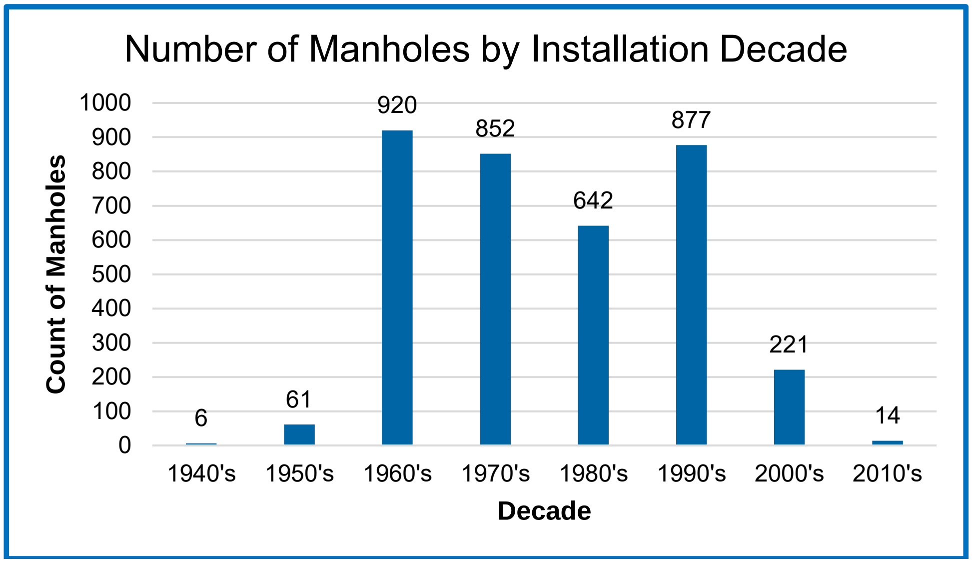

Figure 6. Sanitary Manholes Installed by Decade

Approximately 80% of the Township's sanitary manholes are constructed of Reinforced Concrete. A significant number (16%) of sanitary manhole material is unknown. Based on inspection records, the vast majority of these manholes with unknown material (approximately 80%) could not be inspected because they were inaccessible or could not be located. In some cases, the manhole material could not be determined based on the inspection. The number of sanitary manholes with unknown materials should decrease as manholes are located, inaccessibility issues are addressed, and additional inspections are conducted. Based on inspection data, approximately 230 manholes have cementitious lining. Of these, 75% have reinforced concrete as the host material and the remainder have unknown host material. These manholes are being treated as reinforced concrete for purposes of the analysis.

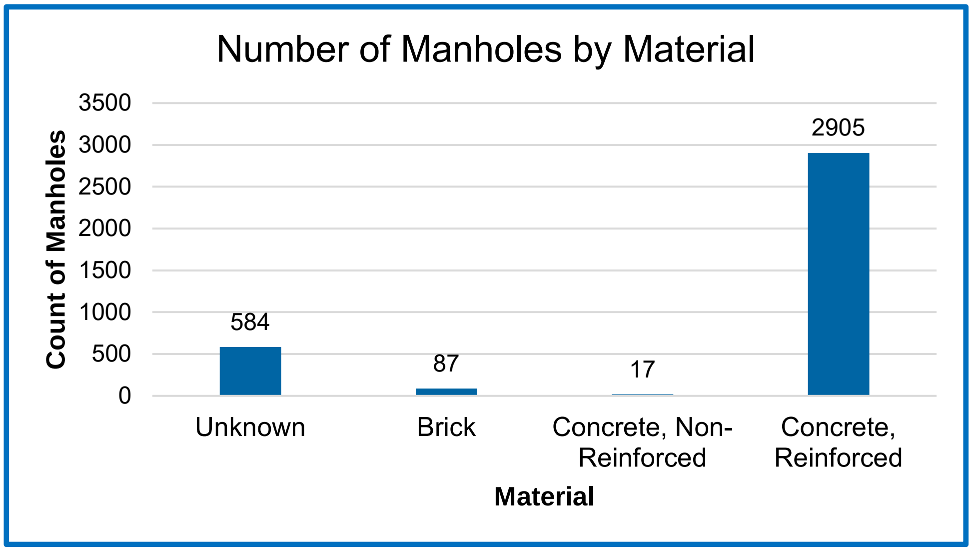

Figure 7. Sanitary Manholes Installed by Material

4.3 Pumping Station Inventory

The Township owns and operates one small wastewater pumping station (approximately 850 GPM peak flow capacity). The pumping station's major assets consist of the following:

- Buildings and Grounds
- Roof
- HVAC
- Building Plumbing
- Emergency Generator
- 3 Pumps - SUBMERSIBLE EXPLOSION PROOF, 425 GPM, 208V

4.4 Asset Condition Assessment

Generally, Asset Management best practice provides for three levels of asset condition assessment as described in Table 1. The condition score is used to inform the asset's probability of failure (POF) based on its physical condition.

Table 1. Levels of Condition Assessment

Condition Assessment Level	Accuracy	Comments
Level 1	Low	Desktop analysis based on staff knowledge, work order history, and asset age. No actual visual inspection of the asset.
Level 2	Moderate	Visual assessment (e.g. CCTV) of the asset in operation and scored according to a defined and standardized scoring protocol (e.g. NASSCO PACP/MACP Standard).
Level 3	High	Application of inspection technologies such as ultrasonic, electro scanning, or other technologies.

4.5 Sanitary Sewer and Manhole Condition Assessment Process

For purposes of this AMP, Level 2 condition assessments were conducted using the NASSCO PACP/MACP standard. Where PACP/MACP data were not available, a desktop Level 1 condition assessment was conducted on each asset using an age-based condition model. At the time of this analysis, PACP data was available for 92% of pipes and MACP data was available for 84% of MHs. The desktop scores were supplemented by hydraulic model data to identify capacity issues within the system. Sanitary sewer assets were assigned separate scores for structural, O&M, and capacity. The highest score was used in the analysis and the condition driver was noted. A 1 to 5 condition rating scale was used as shown in Table 2.

Table 2. Condition Rating Descriptions

Score	Description	Maintenance Level	Percent Replacement
1 - Excellent	Perfect/excellent condition	Normal	0
2 - Good	Minor defects only	Minor	5
3 - Fair	Backlog maintenance required	Significant	10-20
4 - Poor	Major renewal required	Renew	20-40
5 - Very Poor	Asset nearly unserviceable or failed	Replace	>50

Condition scores may range from 1 (New) to 5 (nearly unserviceable or failed). The condition score is used to determine an asset's probability of failure (POF) and translates directly to a 1 – 5 POF scale.

4.5.1 Sanitary Sewer Condition Assessment Results

The Township's sanitary sewer condition ratings are shown in Figure 8. Overall, the sanitary sewers are in fair to good condition with 75% scoring a 3 or better.

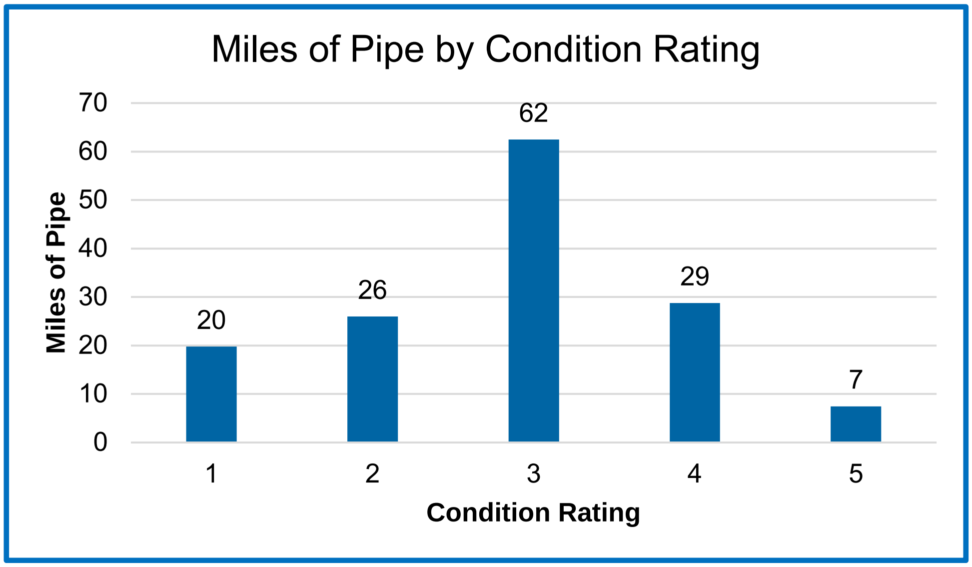

Figure 8. Sanitary Sewer Condition Ratings

4.5.2 Sanitary Manhole Condition Assessment Results

The vast majority of manholes are in very good condition with 68% scoring 2 or better.

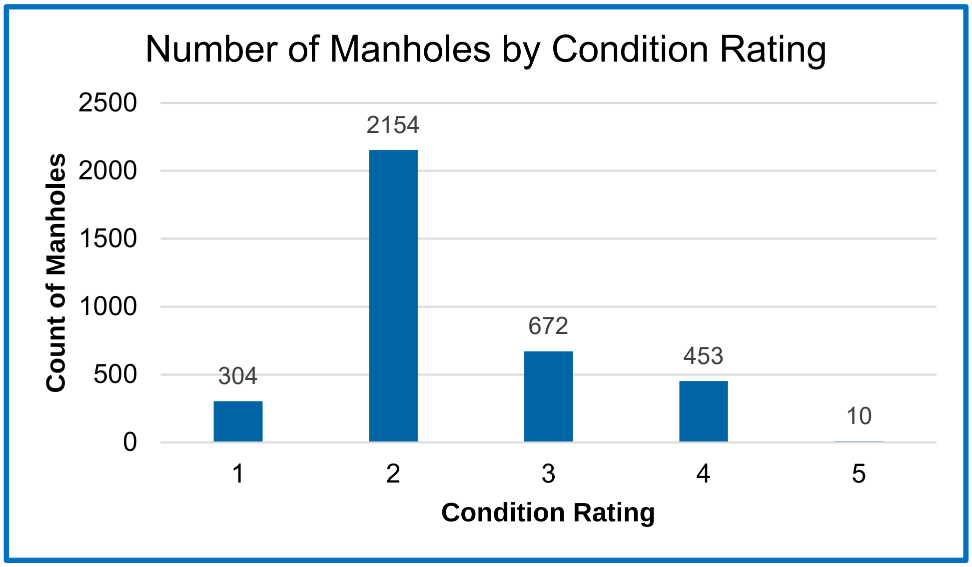

Figure 9. Sanitary Manhole Condition Ratings

4.5.3 Pumping Station Condition Assessment Results

A Level 2 Condition Assessment was conducted on pumping station assets with the following results. Generally, the assets are in fair to poor condition as indicated in Table 3. A project has been identified in the Capital Improvement Plan (CIP) to upgrade the pumping station assets.

Table 3. Pumping Station Condition Assessment Results

Asset	Condition Rating	Comments
Buildings and Grounds	4	Differential settlement is causing the concrete slab to crack on the North side of the building.
Building Roof	4	No visible signs of failure but there are signs that repairs have been previously made. The roof drain guard is in need of replacing. The drain should also be inspected for clogs. The shingles are beginning to delaminate and need to be replaced.

Asset	Condition Rating	Comments
Building HVAC	4	The exhaust fan is original to the building. It is approaching the end of its life and should be replaced during a building renovation project. The lower level of the building needs a heater installed to prevent freezing of incoming water.
Building Plumbing	3	The water supply line has heat trace installed on it but has no insulation. Backflow prevention should be installed on the incoming water line.
Emergency Generator	5	There has been repair work done previously. The generator was not operating during the inspection. Staff indicate the generator is in very poor condition and needs to be replaced.
Pump #1	2	Pump #1 has been replaced within the last four years and has no known issues.
Pump #2	2	The link seal for pump #2 has failed in the past allowing groundwater to enter the building. The pump has been replaced within the last four years and currently has no known issues.
Pump #3	5	Pump #3 appears to be damaged. The chain to remove the pump is missing and the rails to the pump are damaged.

4.6 Total Asset Replacement Cost

The total estimated replacement cost for all Plymouth Township Wastewater Assets is shown in Table 4. These figures represent the full replacement cost on the entire system.

Table 4. Total Replacement Costs

Asset Type	Current Estimated Replacement Cost
Collection Pipes	$586 Million
Manholes	$10.4 Million
Pumping Station	$636K
Total	$597 Million

5 Levels of Service and Performance

One of the key components of asset management is identifying and defining the Levels of Service (LOS) that customers and other stakeholders require. LOS connects the Asset Management Policy of the Township to the performance requirements established within the various parts of the organization. By articulating how the management of assets contributes to the Township's overall vision, mission and guiding principles, LOS and performance measures provide the linkage between assets and the technical and organizational objectives.

5.1 Plymouth Township's Wastewater LOS Performance Measures

Table 5 contains the Township's recommended LOS value statements, performance measures (PMs), and Key Performance Indicator (KPI) targets. The list of LOS PMs and KPIs was developed via consultant facilitated workshops and drew on the Township's existing measures. Targets were identified based on past performance and industry best practice. The PMs are designed to support the Township's overall Asset Management Vision and Policy. Additional PMs will be added as they are identified and data to track them becomes available.

Table 5. LOS Performance Measures

LOS Value Statement	LOS Performance Measure	LOS KPI Target	Comments
Transport Wastewater Flows Reliably	% of Manholes inspected vs. planned	Inspect 20% of sanitary manholes annually	
Transport Wastewater Flows Reliably	% of Pipes Inspected vs. planned	Inspect 20% miles of sanitary sewer annually	
Transport Wastewater Flows Reliably	Perform Pumping Station Inspections as Planned	Perform monthly inspections	The station is operated under contract. Contractor is responsible for maintenance, repair and emergency response
Transport Wastewater Flows Reliably	Rehabilitate manholes	Rehabilitate per CIP/AM Plan.	
Transport Wastewater Flows Reliably	Rehabilitate Pipes	Rehabilitate per CIP/AM Plan.	
Transport Wastewater Flows Reliably	Pipe Major Repair	Repair per CIP/AM Plan.	
Transport Wastewater Flows Reliably	Inspect and Clean FOG/root hotspots	Quarterly	
Transport Wastewater Flows Reliably	Minimize basement backup incidents	<25	Based on 2010 figures. 76 over 3 years.

LOS Value Statement	LOS Performance Measure	LOS KPI Target	Comments
Responsive to Customers and Stakeholders	Respond to Customer Complaints	Within 24 hours	
Support a Sustainable Environment	Stop SSOs Quickly	Within 1 hours	
Support a Sustainable Environment	Minimize SSOs	Zero overflows annually	
Meets or Exceeds Regulatory Requirements	Timely notification of DEQ for SSOs	Within 24 hours or DEQ notification requirement, whichever is less	MDEQ requirement is to report the SSO immediately after discharge begins, but no later than 24 hours.
Services are provided at the lowest life cycle cost and are sustainable	Implement Asset Management	Annually update Asset Management Plan	
Services are provided at the lowest life cycle cost and are sustainable	% completion of Capital Projects vs. Planned	100	

6 Criticality and Risk Management

In the framework used by the Township, there are two primary parameters used for prioritization decision-making: 1) Asset probability of failure (POF), and 2) Asset consequence of failure (COF). These two parameters are multiplied together and the resulting product is referred to as Risk.

This section describes how the Township calculates asset Risk, and how it intends to prioritize operations, maintenance, and capital investment activities based on that risk.

6.1 Probability of Failure

Asset probability of failure is a function of remaining service life and is correlated to the asset's physical condition and other performance considerations such as the asset's ability to meet its required demand (e.g., whether the capacity of a reach of gravity sanitary sewer can meet the hydraulic demand). As mentioned previously, the Township's assets have been assigned a POF score from 1 to 5 based on physical condition, capacity, and/or age.

6.2 Consequence of Failure

Consequence of Failure (COF) is often referred to as "criticality", and these terms (COF and criticality) are used interchangeably in this document. Asset consequence of failure is evaluated based on estimating the environmental/regulatory, financial and social impacts of a defined failure of the asset. These three broad categories of consequence of failure are often referred to as the Triple Bottom Line (TBL) and go beyond simply assessing the direct financial consequences of an asset's failure (e.g. cost to repair or resource impacts). Assets are assigned COF elemental scores from 1 to 5 for each of the elements under the three TBL categories as shown in Table 6. The highest individual score across these elements for each asset is referred to as the ***Dominant COF*** score and is used in the calculation of the asset ***Core Risk*** as discussed in Section 6.3.

Table 6. Triple Bottom Line COF Categories and Elements

TBL Categories	Consequence of Failure Elements
Social / Community	Public Image, Customers Affected/Loss of Service, Health and Safety
Financial	Financial Impact (total cost to fix and mitigate the failure including indirect costs), Operational/Resource Impacts
Environmental / Regulatory	Examples include overflows, basement backups, regulatory (permit) compliance considerations

For vertical assets, such as pumps in a lift station, COF elements can be assessed individually (or in groups of similar assets as long as the consequence of the failures are similar within the group). However, doing so for a vast number of pipe segments can be prohibitively time consuming and is not feasible. Therefore, calculating the impact of pipeline failures for the various elements was performed via a spatial analysis in the Township's Geographic Information System (GIS).

6.3 Core Risk

As mentioned, Core Risk is defined as the product of the ***Dominant*** consequence of failure (COF) and the probability of failure (POF) without adjusting for any risk mitigation measures that may be in place for the asset/system (e.g., redundancy). After the core risk is calculated as a baseline measurement, risk mitigation strategies can be considered and/or developed that can reduce the level of risk, in turn, affecting the level and cost of service. The maximum core risk is 25 (POF = 5 multiplied by COF = 5). Every Plymouth Township wastewater asset has been assigned a core risk score according to the equation shown in Figure 10.

Figure 10. Core Risk Equation

6.4 Business Risk Exposure

Business Risk Exposure (BRE) is an asset management metric used to focus management teams on high-risk assets and issues. The BRE for an asset is the product of the ***full TBL*** consequence of failure and the probability of a failure. And unlike Core Risk, BRE considers adjustments for any available risk mitigation such as redundancy or emergency response plans. Figure 11 is a schematic representation of the key variables of business risk exposure with data and operating considerations for each.

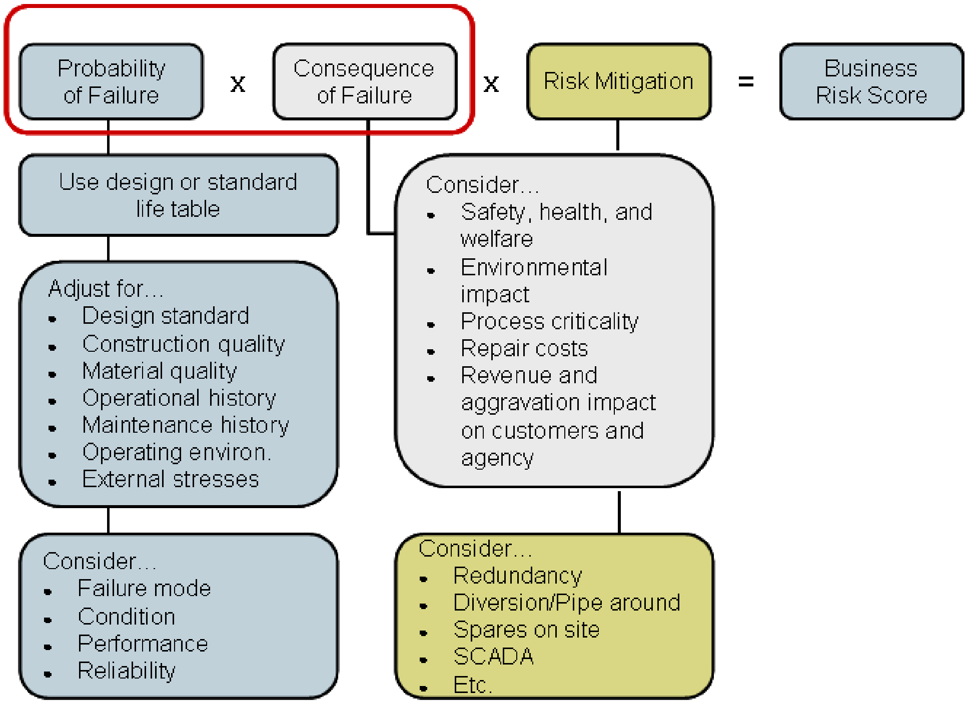

Figure 11. Business Risk Exposure Elements

6.5 Investment Prioritization Based on Risk

Core Risk is the metric used to assign assets to risk management zones. Risk management zones and recommended strategies for each zone are illustrated in Figure 12. The risk management zone establishes the initial prioritization consideration (prioritization bucket) for asset operations & maintenance (O&M) and capital investment needs. Additional prioritization of asset interventions within individual risk management zones is accomplished by establishing priorities within zones and sorting by BRE as discussed below.

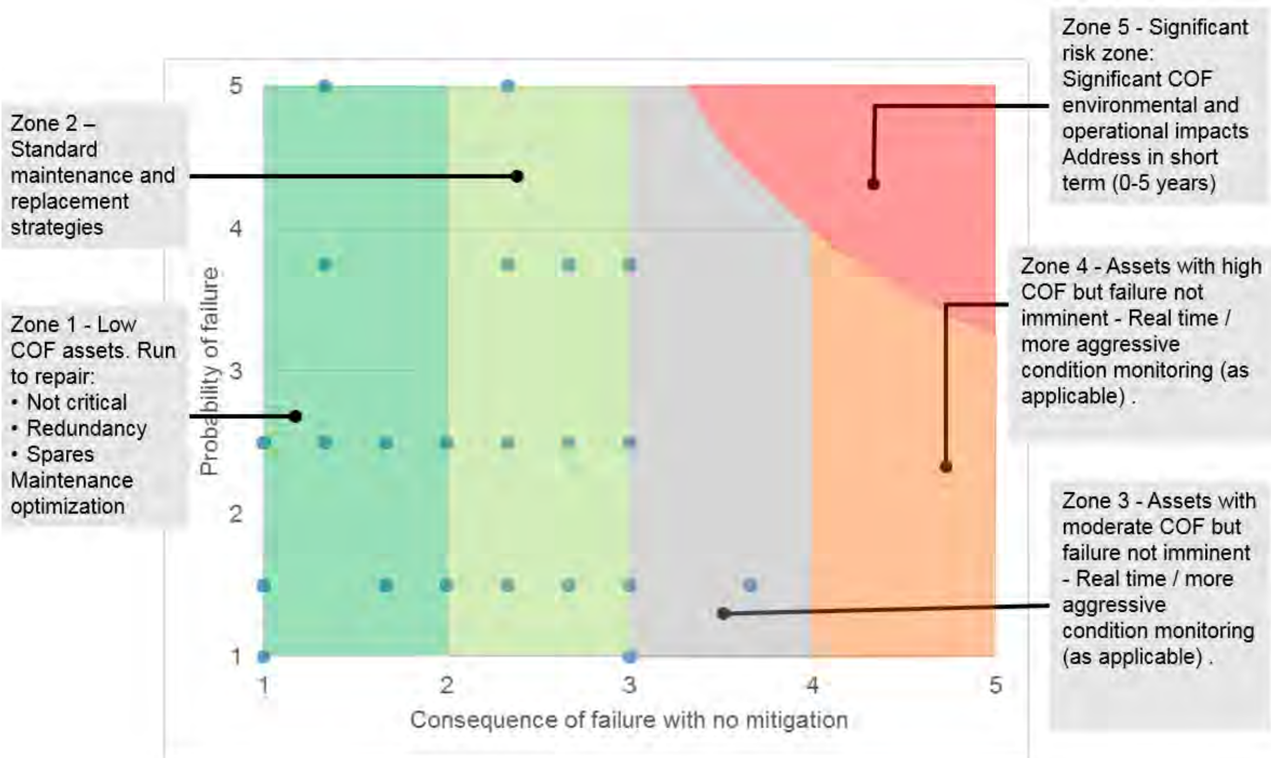

Figure 12. Core Risk Plot with Risk Management Zones

As shown in Figure 12, there are five risk management zones. Zone 5 includes the highest risk assets and zone 1 includes the assets with the lowest COF ratings. The risk management zones can be further explained as follows:

Zone 5: Contains assets that represent significant risk to the organization. In general, these assets are approaching the end of their useful life and upon failure, may cause significant social, financial, and environmental impacts. For purposes of this analysis, a core risk score of 16 (POF=4 and COF=4) has been established threshold of the significant risk zone.

Zone 4: Contains assets that have high consequence of failure but have not deteriorated enough to be included in the significant risk zone (Zone 5). For vertical assets, increased visual and/or predictive condition assessments (thermal scanning, oil analysis, etc.) may be justified as their condition deteriorates and they move vertically in the graph approaching Zone 5. In the case of buried pipes, assets in Zone 4 may be candidates for more frequent inspections than the pipes falling in Zones 3, 2, or 1.

Zone 3: Contains assets that would experience failure consequences that are tolerable. These assets have moderate COF, but failure is not imminent. Some Zone 3 assets also have to potential to migrate into Zone 5 and as such, require additional focus by management.

Zones 1 & 2: Contains assets with lower consequences of failure. Applicable management strategies for these assets may be run or manage to failure, maintenance optimization for assets with very low COF scores, or standard maintenance practices for assets with low to medium COF scores.

6.5.1 Establishing Priority Zones

Once core risk has been calculated, the risk management zones are further refined and assets are prioritized based on "priority zones". Assets are organized into five priority levels, or "buckets" based on the risk management zone into which they fall and their condition ratings. Further sorting of assets is based on BRE score.

Priority 1: Assets falling in Risk Zone 5 (short-term renewal of infrastructure). Core risk is 16 or greater.

Priority 2: Assets with a COF of 3 AND Condition greater than or equal to 4 (or assets with imminent failure due to one of the non-physical mortality failure modes).

Priority 3: Assets with a COF greater than or equal to 3, AND Condition greater than or equal to 3; OR COF equal to 5 and Condition less than 3.

Priority 4: Assets falling in Risk Zone 1 AND Condition equal to 5

Priority 5: All remaining assets with Condition greater than or equal to 4, or COF greater than or equal to 4.

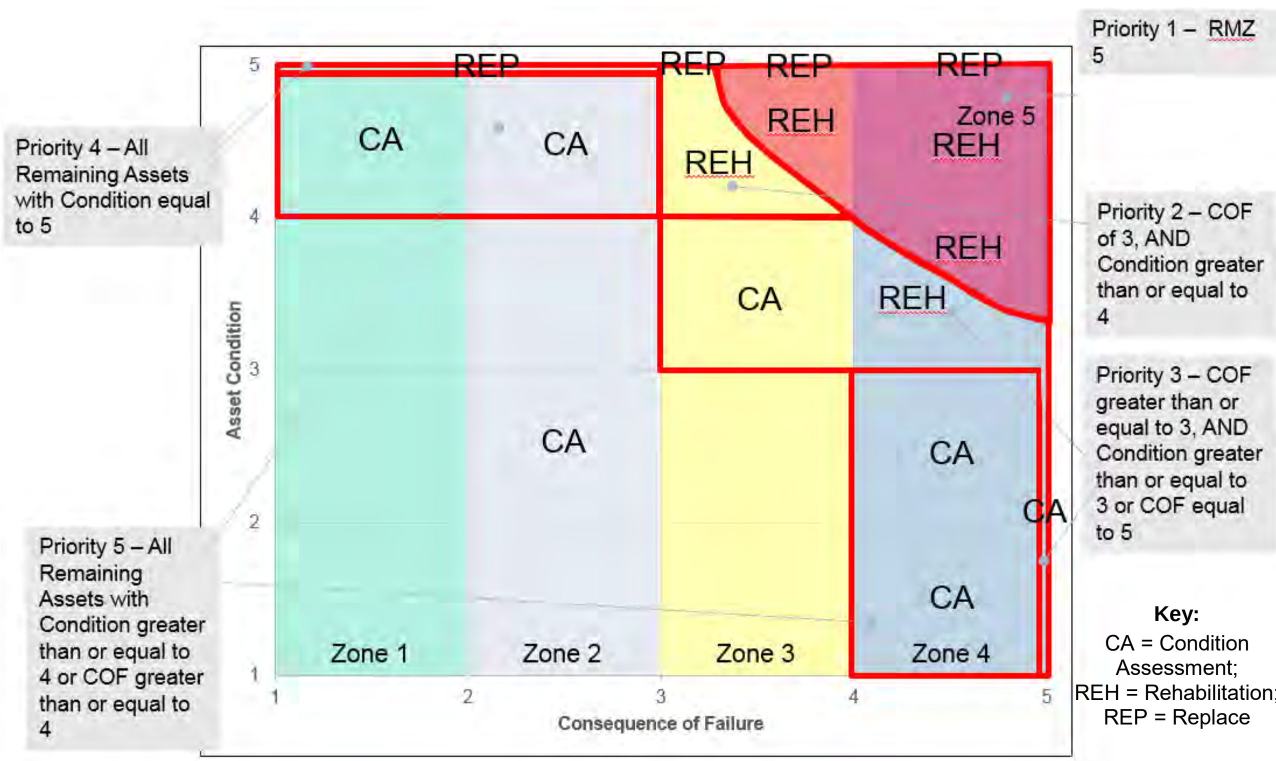

Figure 13. Priority Zones and Recommended Treatment Options

7 Capital Improvement Program

7.1 Identification of Capital Projects

Using the results of the prioritization analysis described in Section 6.5, a 10-year capital plan (including 5-year CIP) was developed consisting of priority 1, 2, and 3 assets. A detailed review of the CCTV inspection reports for the priority 1 and 2 assets was conducted to confirm assets to be included in the 5-year CIP. A total of 2.25 miles of sanitary sewer is included in the 5-year CIP. Estimated costs related to priority 3 assets was distributed over the final 5 years of the 10-year plan. In addition to the pipeline projects, projects to upgrade assets at the pumping station as well as construction of a disposal pad for jetted material removed during cleaning are included in the CIP. The Township plans to spend $4M over the next 10 years on capital projects. Table 8 details costs for the full 10-year plan. Figure 14 illustrates the system-wide distribution of sanitary sewers by priority.

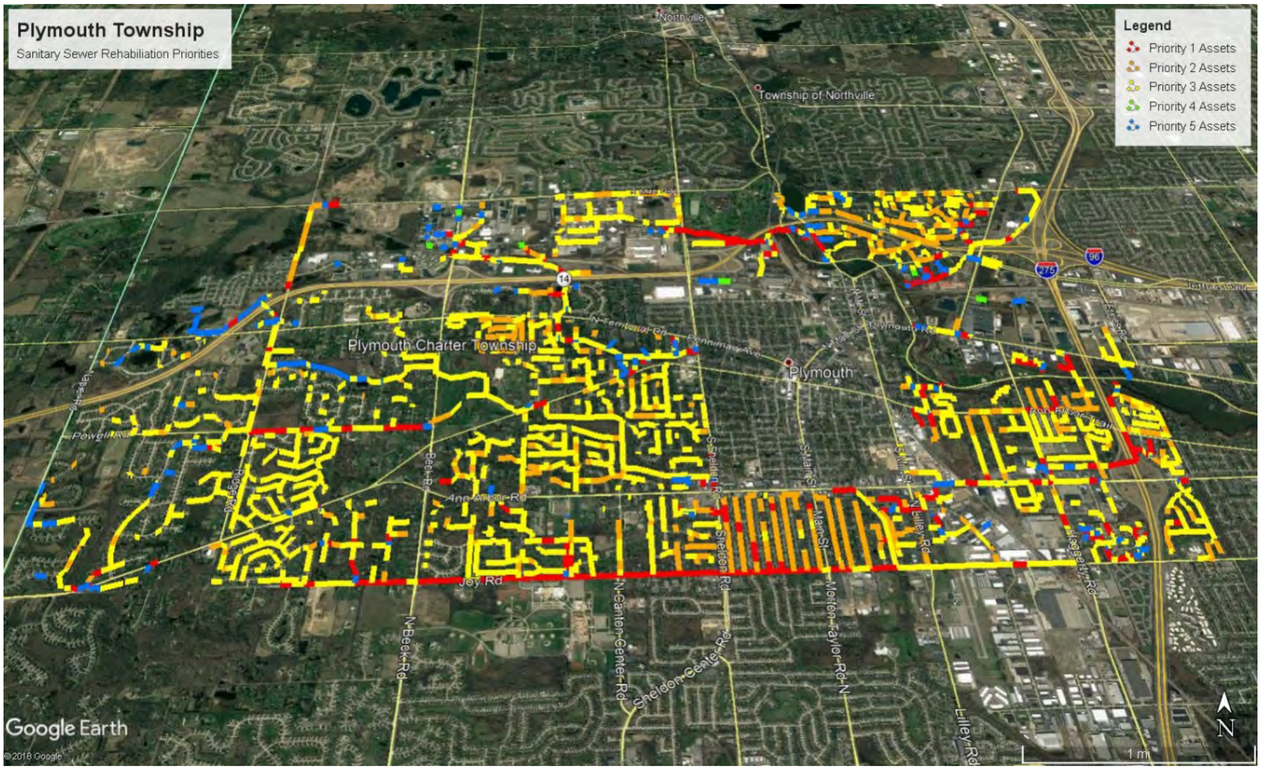

Figure 14. Plymouth Township Distribution of Sanitary Sewers by Priority

8 Operations and Maintenance Recommendations

The recommendations listed in Table 7 are for initial implementation of a proactive O&M Program. The township proposes to spend approximately $4.1M on O&M activities over the next 10 years. Annual costs are detailed in Table 8.

Table 7. Operations and Maintenance Recommendations

Activity	Frequency	Length/Quantity	Notes
Main Line Cleaning	20% of system annually	28.9 miles	Begin at 15%, ramp to 20% by 2025
Gravity Main Inspection (CCTV)	20% of system annually	28.9 miles	Entire system was inspected within last 2 years. In 2023, continue current practice of inspecting 20% of system (5-year cycle)
Force Main Inspection	100% every 5 years	0.9 miles	The Township has one force main consisting of 13 segments (0.9 miles). Recommend 5-year inspection cycle based on best practice.
Manhole Inspection	20% of system annually	718 manholes	All manholes have been inspected within last 2 years. In 2023, begin 20% annually concurrent with sewer main inspections
Root Cutting	1% of system annually	1.5 miles	Based on national average
Air Release Valve Inspection	100% of valves annually	5 Valves	Based on Best Practice

9 10-Year Capital, Operations and Maintenance Plan

The total 10-year planned expenditure is shown in Table 8.

Table 8. Charter Township of Plymouth Wastewater Collection System 10-Year Capital and O&M Plan

	5-Year CIP										
Category	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**10-Year Totals**
Sewer Main Rehabilitation	$446,700	$453,600	$293,200	$256,700	$240,200	$305,000	$305,000	$305,000	$305,000	$305,000	
MH Rehabilitation	$45,000	$45,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	
Pumping Station Asset Upgrades	$163,900	--	--	--	$20,000					$20,000	
Jet-Vac Debris Disposal Pad		$60,000	$140,000								
Annual Capital	$655,600	$558,600	$468,200	$291,700	$295,200	$340,000	$340,000	$340,000	$340,000	$360,000	**$3,989,300**
O&M Budget											
Sewer Main Cleaning	$137,800	$137,800	$160,800	$160,800	$160,800	$183,700	$183,700	$183,700	$183,700	$183,700	
Sewer Main CCTV	--	--	--	$203,600	$203,600	$203,600	$203,600	$203,600	$203,600	$203,600	
Manhole Inspection	--	--	--	$107,700	$107,700	$107,700	$107,700	$107,700	$107,700	$107,700	
Root Control	$20,600	$20,600	$20,600	$20,600	$20,600	$20,600	$20,600	$20,600	$20,600	$20,600	
Force Main Inspection	$20,000	--	--	--	--	$20,000	--	--	--	--	
Air Release Valve Inspection	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500	
Annual O&M	$180,900	$160,900	$183,900	$495,200	$495,200	$538,100	$518,100	$518,100	$518,100	$518,100	**$4,126,600**
Total Annual Capital and O&M	**$836,500**	**$719,500**	**$652,100**	**$786,900**	**$790,400**	**$878,100**	**$858,100**	**$858,100**	**$858,100**	**$878,100**	**$8,115,900**

10 Revenue Structure

The Township submitted to the MDEQ its Sewer System Rate Methodology on February 2, 2018. The submittal was reviewed by the MDEQ and approved in a letter to the Township on May 3, 2018.

The Township has been proactive in reviewing and adjusting the sanitary sewer rates on an annual basis to cover costs for capital needs and operation and maintenance of the system. The December 31, 2017 audited financial statement for the Township's Water and Sewer Fund shows working capital of $7,100,000. Working capital is projected to increase to approximately $9,000,000 by the end of 2018.

Therefore, the Township has a rate structure in place to provide sufficient funds to cover the projected CIP and O&M costs cited in this Plan. The Township will use the aforementioned working capital and/or a portion of it with an appropriate rate increase (2% to 5%) to meet the long term Capital Improvement Plan (CIP) and Operation and Maintenance (O&M) Plan obligations.

GHD, Inc.

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Document Status

Rev No.	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
1	C.Card	J.G. Muckleroy	On file	S. Yoskowitz	On file	

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date <u>**November 30, 2018**</u>
(no later than 3 years from executed grant date)

The **Charter Township of Plymouth, County of Wayne** *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. **1666-01** have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: **No**

   If No - Date of the rate methodology approval letter: **May 3, 2018**.

2) Significant Progress Made: Yes or No

   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)

3) Date of rate methodology review letter identifying the gap: ________________________.

4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ______________________________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Patrick Fellrath	734 414-1450	pfellrath@plymouthtwp.org
Name	**Phone Number**	**Email**

11/30/18

Signature of Authorized Representative (Original Signature Required) Date

Kurt Heise, Supervisor
Print Name and Title of Authorized Representative

Stormwater, Asset Management, and Wastewater (SAW)
Asset Management Plan Executive Summary Guidance
Porter Township, Cass County, Michigan

Wastewater Sewer System – R1

Date: November 22, 2018
To: Ms. Karen Nichols
Organization: Michigan Department of Environmental Quality
From: Wightman & Associates, Inc.
Re: Porter Township SAW Grant: Summary of Wastewater Asset Management Plan

Grantee Information:
Porter Township, Cass County, Michigan
69373 Baldwin Prairie Road
Union, MI 49130
Supervisor@portertownship.org
Mr. Cory Marlow, Supervisor
Ph: (269) 641-2375
SAW Project #: 1599-01

Executive Summary: *Summary of the project scope, and grant and match amount, if applicable. List the key components that make up an Asset Management Plan (AMP).*

An asset management program is a tool for community leaders and utility managers to proactively decide when to repair, replace or rehabilitate assets and how those improvements will be funded to maintain a perpetual level of service. The Key Components of the Asset Management Program (AMP) are:

1) Asset Inventory and Condition Assessment.
2) Level of Service.
3) Criticality of Assets.
4) Capital Improvement Plan.
5) Asset Management Financial Plan and Revenue Structure.

The program is organized into three components that answer the following questions:

Asset Management Program (AMP):

- What level of service will be provided?
- What improvements need to be made and when?
- What changes to operations need to be made?
- How will these improvements and changes be funded?
- How is the plan implemented?

Geographic Information System (GIS):

- What do we own, where is it, what is the condition and what is the remaining life?
- What are the most critical assets?
- Where was maintenance performed and what was done?
- Where are improvements needed?

System User Manual:

- How will the asset management program tools be used?
- How will the asset management program be maintained and updated?
- How will the asset management program provide a guide for planning decisions?

	Sanitary	Total
1) Total Grant:	$443,599	$443,599
2) Less: Match	$ 44,360	$ 44,360
3) Net Grant:	$399,239	$399,239

Wastewater Asset Inventory: *Describe the system components included in the AMP. Discuss how they were located and identified, if applicable. Describe the platform used to develop and maintain the inventory of assets.*

Porter Township operates a wastewater collection and treatment system consisting of almost 25 miles of gravity sewer, over 18 miles of force main, and almost 500 manholes that convey the wastewater from the township service area to the Porter Township Wastewater Treatment Plant for treatment. In addition to the pipes in the collection system, Porter Township relies on a series of sewage lift (pump) stations to convey the wastewater through the system. There are 14 grinder pump lift stations serving individual locations or small areas, 15 smaller lift stations serving various sewer sub-districts or neighborhoods, and one large lift station that operate in series to convey all of the wastewater collected to the Porter Township Wastewater Treatment Plant.

With a thorough knowledge of the basic layout of the collection system, a comprehensive inventory of all wastewater system assets was performed using as-built utility drawings and on-site Global Positioning System (GPS) field locations. Using the data collected, detailed maps of the wastewater collection system were prepared using Geographical Information System (GIS) software. The mapping was prepared using the state plane coordinate system, allowing the operator to obtain coordinates for and accurately locate system assets in the field utilizing handheld GPS equipment.

The following table contains a summary of the wastewater assets identified:

Item	Quantity	Units
15-inch Sanitary Sewer	43	LF
12-inch Sanitary Sewer	1,312	LF
10-inch Sanitary Sewer	32,263	LF
8-inch Sanitary Sewer	97,379	LF
4 foot Diameter Sanitary Manhole	492	EA
Service Lead, Complete	1,645	EA
Lift Station – 500 gpm or Larger	1	EA
Lift Station – Less Than 500 gpm	15	EA
Grinder Pump Station	14	EA
Backup Generators	5	EA
12-inch Force Main	19,752	LF
8-inch Force Main	26,469	LF
6-inch Force Main	23,243	LF
4-inch Force Main	16,437	LF
2.5-inch Force Main	5,108	LF
2-inch Force Main	6,569	LF
Air Release Valve with Vault	40	EA
Force Main Cleanout Station	40	EA

Condition Assessment: *Discuss the condition assessment process, including what methods were used. Summarize the results of the assessment for each asset category. The percentage of good, fair, and poor for each category can be used, if preferred.*

After completing the comprehensive inventory of the utility system assets, conditional assessments of all asset components were performed. The condition assessment provides the critical information needed to assess the physical condition and functionality of the assets in the collection system and estimate their remaining service life. Physical inspections of allowable assets were conducted. Installation date information was gathered to allow age-based review of components to take place. All accessible manhole and lift stations were inspected and documented in the GIS database. Additionally, engineering staff and operations staff inspected the WWTP from influent to effluent discharge. The installation and maintenance records were reviewed to understand the as installed life cycles for the equipment as it is being utilized.

During the field inspections, any manhole, pipe, and/or equipment defects were noted and classified using a standard coding system. The numerical grading system uses numbers ranging from 1 (new asset, no or minor defects) to 5 (defect requiring immediate action).

Once field inspections were completed for each asset and individual defects were graded, an overall condition rating was applied to each asset, again using a numerical system ranging from 1 (very good condition) to 5 (very poor condition). Overall condition ratings for lift stations were based on physical inspection of the major components and drawdown testing to determine the performance of the pumping equipment.

Commented [JE1]: Is the intent to move all of the additional information required by the MDEQ in their executive summary submittal to the end? If so, a semi-complete list of what would be required in this section is:

- Level of Service statements
- CIP project summary table
- Condition assessment summary for each category (percentage of assets with each rating in each category can be used, if preferred – i.e. pipes: 54% very good, 10% good, 35% fair, 0% poor, 1% very poor; manholes: 45% very good, 15% good…etc. – I would think inserting our assessment charts would suffice for pipes/manholes and use a table or something for the rest?)
- Appendix D map (to answer MDEQ question of how the assets were ranked and what assets were considered most critical)

I compiled this list while I was drafting the Executive Summary based on what Frank included in the MDEQ submittal for Cassopolis and the MDEQ questions/descriptions of what they were looking for in each section (again, as included by Frank in the Cassopolis MDEQ submittal). Frank should review this section and comment on any other items he should include and we should develop a "checklist" for him to complete the MDEQ submittal.

The numerical system uses numbers ranging from 1 to 5 as shown in Table 1 below.

Condition Rating	Condition Description	Defect/Deterioration Description
1	Very Good	New asset, no or minor defects
2	Good	Defects that have not begun to deteriorate
3	Fair	Moderate defects that will continue to deteriorate
4	Poor	Severe defects with significant deterioration
5	Very Poor	Defect requires immediate action

Table 1 – NASSCO Figure 2 and Figure 3 below show the condition ratings for the wastewater gravity main piping and wastewater manholes (respectively).

Figure 1 - Sanitary sewer gravity main physical condition rating

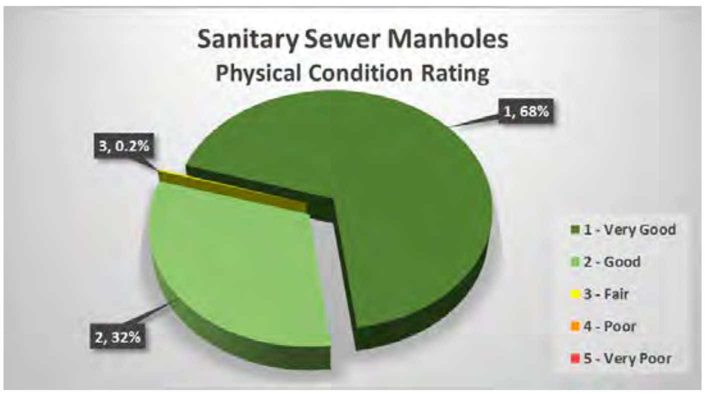

Figure 2 - Sanitary sewer manhole physical condition rating

In addition to the pipe and manhole assessments, the lift stations were inspected and assessed. The lift station inspections included physical and visual inspection of the major components and drawdown tests to determine the performance of the pumping equipment. Table 3 shows the condition of the individual components of the lift stations.

Station	Pump Design Capacity (gpm)	Design Head (ft)	Wet Well Condition	Pump Condition	Electrical & Controls Condition	Generator Condition
B-1	270	195.81	Good	Good	Good	Good
B-2	20	13.66	Good	Good	Good	N/A
B-3	80	42.17	Good	Fair	Good	N/A
B-4	35	61.75	Good	Very Poor	Good	N/A
B-5	415	211.63	Good	Good	Good	Good
B-6	120	43.52	Good	Fair	Good	N/A
B-7	20	15.79	Good	Very Good	Good	N/A
B-8	110	74.38	Good	Good	Good	N/A
B-9	80	26.4	Good	Good	Good	N/A
B-10	40	71.96	Good	Good	Good	N/A
B-11	20	27.19	Good	Good	Good	N/A
B-12	415	51.08	Good	Good	Good	Good
B-13	35	51.92	Good	Good	Good	N/A
C-1	1,010	31.08	Fair	Good	Fair	Good
C-2	120	145.87	Good	Good	Good	N/A
C-3	125	83.40	Good	Good	Good	N/A
C-4	430	54.29	Poor	Fair	Good	Good
C-5	20	20.93	Good	Very Good	Fair	N/A
C-6	80	41.87	Very Good	Poor	Good	N/A
C-7	30	80.76	Fair	Good	Good	N/A
C-8	20	41.67	Good	Good	Good	N/A
C-9	350	47.14	Good	Good	Good	N/A
C-10	20	23.31	Good	Fair	Good	N/A
C-11	300	25.90	Good	Good	Good	N/A
C-12	90	24.69	Good	Very Good	Good	N/A
C-13	80	55.41	Good	Poor	Good	N/A
C-14	20	28.46	Good	Very Good	Good	N/A
C-15	21.5	20.06	Very Good	Good	Good	N/A
C-16	22	22.16	Fair	Good	Good	N/A
C-17	20	56.01	Good	Good	Good	N/A

Table 2 - Wastewater system lift station condition ratings

Level of Service Determination: *Discuss the level of service the municipality has determined that it wants to provide its customers based on the municipality's ability to provide the service and customer expectations. Discuss the procedures used to involve stakeholders in the AMP discussion. What are the trade-offs for the service to be provided? This may include any technical, managerial, health standard, safety, or financial restraints, as long as all regulatory requirements are met. Discuss how this was determined.*

The level of service defines the way in which the Owner desires the facility or utility to perform over the long term. The level of service should ensure that all regulatory requirements are met and should include any technical, managerial, health and safety, or financial components the Owner deems necessary to meet customer expectations. The level of service is a fundamental part in defining how the wastewater system will be operated and maintained in the future. As with all components of the AMP, defining the desired level of service will be an ongoing process. The statements developed by the Asset Management Team to define the desired level of service for the wastewater system are discussed in Section III of this report.

The Asset Management Team developed the statements in Table 5 to define the desired level of service for the wastewater system:

Major Area	Goals and Objectives	Level of Service Statements
Clean Effluent Water	All federal and state water quality regulations will be complied with.	
Health and Safety	Provide a safe and injury free work place. Protect the public health. Protect the environment.	Regular safety meetings.
Security	Secure all wastewater facilities from unauthorized access and intrusions.	All control panels and vaults will be padlocked at all times. Add electronically operated gate at WWTP with coded access for operators and septage haulers.
Operator Certification	Provisions for appropriately credentialed and experienced operators.	Operations provider will continue to maintain licensed operators to meet MDEQ requirements for the WWTP operation for the Township
Administrative	Provide excellent customer service.	Produce accurate, timely billing.
Customer Complaints	Provide excellent customer service.	Respond to customer complaints within eight working hours and communicate through close of issue.
Response Time	Provide excellent customer service.	Respond to emergency calls within one hour at all times and non-emergency calls within eight hours during normal business hours.
Reporting		
Regulatory Changes	Be aware of regulatory changes and be in position to comply with changes as they occur.	Attend continuing education programs. Route applicable correspondence from the MDEQ to all affected staff.

Table 3 - Level of service statements

Major Area	Goals and Objectives	Level of Service Statements
Rules and Regulations	Monitor and enforce all wastewater ordinances.	Review wastewater ordinances periodically – every five years at a minimum. Enforce provisions of wastewater ordinances.
Treatment Facility		Maintain all mechanical equipment.

		Implement regular preventative maintenance program.
Emergency Power Source	Provide adequate emergency power in necessary locations.	Treatment facility shall maintain existing emergency generator in good working condition for emergency power. Backup generators are installed at major lift stations and portable generators are used at remaining lift stations during periods of power loss. Generators shall be maintained under an annual maintenance contract.
Collection System	Maintain the following in good operating condition and prevent overflows and system back-ups: Gravity sewers. Force mains. Air release valves. General System Maintenance.	Gravity sanitary sewers will be cleaned on a rotational basis such that 20% - 25% of the system is cleaned annually resulting in the entire system being cleaned every four to five years.
Lift Stations	Maintain all pumps and related equipment – focus on preventative maintenance to prevent unscheduled breakdown. Lift station valve maintenance.	Maintain all mechanical and electrical equipment weekly. Visually inspect all components of each lift station weekly. Clean the equipment and verify it functions. Clean lift station wet wells annually to remove grease and sediment. Exercise check valves and gate valves annually (at a minimum).
Financial	Maintain a financial plan to generate sufficient revenue to operate and maintain the wastewater system.	Confirm wastewater revenues are sufficient to meet wastewater budget annually. Review sewer rates every four years.
Operating Reserves	Maintain sufficient reserves to cover anticipated major expense and potential unexpected breakdowns.	Maintain a minimum of six months' operating expenses in reserve accounts.

Table 5 - Level of service statements

Criticality of Assets: *Provide a summary of the method used to assess the criticality of assets considering the likelihood and consequence of failure. Based on the condition of the assets, and the determined risk tolerance, how were the assets ranked? What assets were considered most critical?*

Criticality is determined by multiplying the likelihood of failure by the consequence of failure and is a significant factor in prioritizing capital improvements. In general, the higher the criticality of an asset, the more resources that should be allocated to maintain the asset, or the higher the priority that repairs to that asset should take.

However, criticality is only one tool that can be utilized to analyze and prioritize capital improvements and its use is subject to careful evaluation of the asset(s) in question and sound engineering judgement.

A. Likelihood of Failure

For assets that were physically inspected, including sanitary manholes, lift station components and the wastewater treatment plant, the likelihood of failure was determined by the conditional rating of the asset with consideration given to the remaining asset life as shown below in Table 6. The methodology of examining the asset conditions and assigning conditional ratings to noted defects was discussed previously. The likelihood of failure for all assets assessed based only on the remaining asset life was determined in accordance with Table 6 below.

Likelihood of Failure Rating	Asset Condition/ Description	Remaining Useful Life
1	Very Good	More than 90%
2	Good	60 to 89.9%
3	Fair	30 to 59.9%
4	Poor	10 to 29.9%
5	Very Poor	Less than 10%

Table 4 – Likelihood of failure assessment methodology

It should be noted, however, that the condition descriptions are carried over in the GIS model as the likelihood of failure. In other words, if an asset's condition is rated as a "4" (Poor) or "5" (Very Poor), that same description carries over as the likelihood of failure indicating that the asset is in "Poor" or "Very Poor" condition rather than that the likelihood of failure is "Poor" or "Very Poor". The opposite applies as well, with assets whose condition is rated as a "1" (Very Good) or "2" (Good) showing a likelihood of failure of "Very Good" or "Good", again describing the condition of the asset rather than the likelihood that it will fail.

B. Consequence of Failure

To determine the consequence of failure, it is important to consider the significant costs of failure. These costs include not only the monetary cost of the repair, but could also include:

- Social costs associated with the failure of the asset.
- Repair/replacement costs related to collateral damage caused by the failure.
- Legal costs related to damage caused by the failure.
- Regulatory fines resulting from a Sanitary Sewage Overflow (SSO) related to the failure.
- Environmental costs (and possible environmental cleanup costs) created by the failure.
- Loss of business revenue to the community caused by the failure.
- Other miscellaneous costs associated with the asset failure.

The consequence of failure can be high if any one of these costs is significant or if the accumulation of several costs occurs due to a failure. In the case of the failure of a wastewater asset, the environmental, social, and legal costs can outweigh the costs of collateral damage and even the cost of repairing the failure itself. The consequence of failure was assessed using the criteria presented in Table 7.

Consequence of Failure Rating	Social, Human, and Environmental Effects[1]	Collateral Damage Effects
1 (Insignificant)	< 10% loss of service, limited potential for human contact with sewage, minimal property damage	Structure/pipe outside of road right-of-way (ROW), no impact to traffic or other structures
2 (Minor)	10% to 24% loss of service, potential for human contact with sewage, minimal property damage	Structure/pipe located under the pavement or curb of a residential or minor local road
3 (Moderate)	25% to 49% loss of service, potential for human contact with sewage, limited property damage, disruption to essential services/major industry	Structure/pipe located under the pavement or curb of a major collector roadway
4 (Major)	50% to 89% loss of service, likely human contact with sewage, moderate property damage, disruption to multiple industries/essential services	Structure/pipe located along state roadways, interstate highways, railroad ROW, or close enough to a building to cause collateral damage
5 (Catastrophic)	90+% loss of service, high potential of human contact with sewage, extensive property damage	Structure/pipe located under the pavement or curb of state roadways or interstate highways, under railroad tracks, or underneath a building

Table 5 - Consequence of failure rating scheme for wastewater assets

Utilizing the above ranking system, a thorough knowledge of the service area, and sound engineering judgement, a consequence of failure was assigned to each asset in the wastewater system. These consequence of failure values for each asset are included as an attribute for that asset in the GIS mapping database. The consequence of failure for the various asset classes in the wastewater collection system is shown in Figure 8 through Figure 10 below and on the following page.

[1] Loss of service for the wastewater system refers to the number of service connections impacted due to a single failure.

Figure 3 - Sanitary sewer gravity main consequence of failure rating

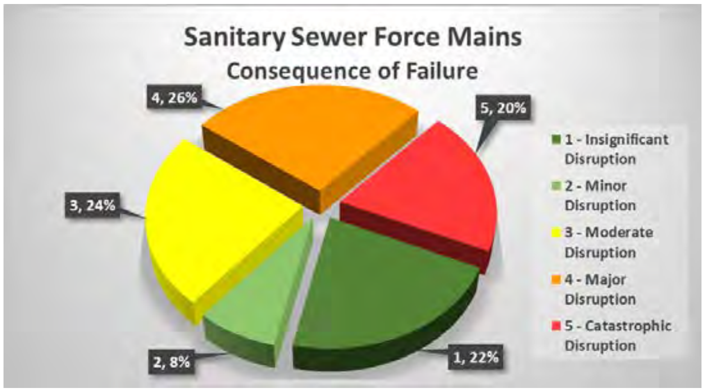

Figure 4 - Sanitary sewer force main consequence of failure rating

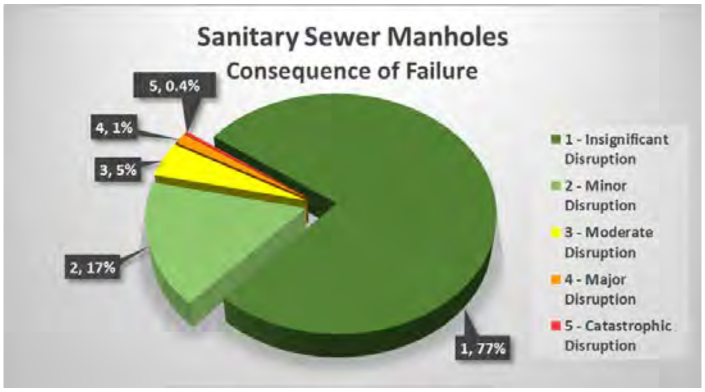

Figure 5 - Sanitary sewer manhole consequence of failure rating

C. Criticality Maps

As previously discussed, the criticality of each asset was calculated by multiplying the condition rating corresponding to the likelihood of failure of the asset by the consequence of failure rating of the asset. As such, the range of criticality numbers that can be assigned to an asset is 1 to 25 with the criticality of the asset increasing the higher the number assigned to it, as shown in Table 8. The resulting criticality of each asset is included as an attribute for that asset in the GIS mapping database. A map of the wastewater collection system showing asset criticality is included in Appendix D.

Criticality Rating	Criticality Description
1 to 5	Very Low
6 to 10	Low
11 to 15	Moderate
16 to 20	High
21 to 25	Very High

Table 6 - Criticality rating descriptions

While the criticality ratings provide a point of reference to help in determining issues that may need to be addressed, it is only a tool. Sound engineering judgement still needs to be applied to determine if there is an issue with an asset that needs to be addressed by a capital improvement project. A low criticality number does not necessarily mean that there is not an issue that should be addressed by a capital improvement project. For example, if a segment of pipe has a hole in it with soil visible, it is graded as a Level 5 defect with a likelihood of failure of Very Poor. If this defect occurred on a segment of pipe with a Level 1 consequence of failure, it would result in a criticality rating of 5, Very Low. That does not mean, however, that this defect does not need to be addressed. It may just be a lower priority for being addressed than other defects with higher criticality ratings.

Wastewater Operating and Maintenance Strategy: *Describe the system operating and maintenance strategies included in the AMP. Discuss how they were applicable.*

System operations were reviewed, and the following process were reviewed and recommendations were made to provide the desired level of service:

- Increase preventative maintenance operations to provide greater proactive care of the system. This includes continuing a regular gravity and force main cleaning program, continued preventative maintenance on the lift stations, and the additional recommendations in Appendix G.
- Track operation and maintenance progress through the GIS-based work order system.
- Use the report generation features of the work order system to notify Township officials and customers on the status of repairs and responses to complaints.
- Consistently update the GIS system as components of the wastewater system are added, removed, repaired, or replaced.
- Attach updated Operation and Maintenance manuals and field drawings to assets within the GIS system.

The current O&M procedures were evaluated during the development of the asset management program to determine if changes are needed to meet the desired level of service. O&M of the wastewater collection system is performed by IAI staff. Calls for emergency repairs are typically taken by the WWTP operator or designated on-call staff, who completes a Work Order. The operations staff typically creates Work Orders for general system maintenance. The completed Work Orders are logged and paper copies filed. IAI oversees the services completed and reports to the wastewater board.

IAI operations staff completes both emergency repairs and conducts preventative maintenance on the wastewater collection system or oversees the completion by outside contractors. Current preventative maintenance tasks include weekly visits to each of the lift stations in the collection system during which several general tasks are completed along with more detailed monthly lift station maintenance visits. The operations staff has done a good job of focusing on preventative maintenance of the wastewater collection system. A complete list of the recommended preventative maintenance tasks for the wastewater system is presented in Appendix G.

In addition to the general O&M procedures discussed above, detailed discussions were carried out with the IAI operations staff about specific O&M tasks, system issues, contract operations, staffing, and record keeping. The following table presents a complete summary of the current routine O&M practices as well as recommendations for future O&M practices to continue to improve the preventative maintenance program.

Revenue Structure: *Discuss how the rates, charges, or other means of revenue were reviewed to determine if there will be sufficient funds to cover system operation, maintenance, replacement, capital improvement projects, and debt costs, identified in the AMP. If the current rate structure was not sufficient, discuss what increases were needed to ensure the desired level of service is sustainable and if any changes were made.*

A primary goal of Asset Management is to develop a long-term plan for revenue support of capital improvements, as well as operating cost. An Asset Management Financial Plan (AMFP) was provided by H.J. UMBAUGH and is intended to help Porter Township formulate policy in the areas of rate management, capital spending, and fund balance. *The AMFP is a living document. It is most effective as a tool used annually for budget and user rate decisions.*

A. AMFP Methodology

A significant effort has been made by Porter Township to inventory assets, evaluate the infrastructure, and determine asset criticality. The result is the identification of asset investment cost by project and by year. The AMFP covers an extended forecast period to take this asset evaluation into account. The AMFP is a four-step process:

1) Historical comparison with audits and budgets.
2) Test year, or normalized budget year, along with inflation assumptions for purposes of forecasting.
3) Proof of rate to revenue for reliance on customer data.
4) Cash flow forecast including revenue, operating expense, capital spending, debt, and fund balance (i.e., actual cash and investment balance).

The analysis is “cash basis” approach as described in the AWWA Manual of Rate Making Practices. From year to year, this AMFP may be used to implement policy regarding rate management and budgeting.

1. Audit Comparison

One key indicator of financial health is found in the Comparative Statement of Net Position of the Sewer Fund: “Cash and cash equivalents.” The Township has maintained this cash and investment balance at around 2 months compared to operating expenses. Management of the cash balance will be discussed further below under Forecast - Cash Balance. The Sewer Fund Audited Revenues, Expenses and Changes in Net Position comparison reveals consistency in annual revenues and in annual operating expenses.

2. Budget Comparison / Test Year

The current year budget is fairly consistent with previous years. Certain adjustments have been made to reflect a normalized year for maintenance expenses. This has been utilized to develop the Test Year budget including expected percent inflation factors.

3. Proof of Rate to Revenue

Porter bills its customers based on widely used and accepted methods. The customer are billed a flat charge every month based on the number of Residential Equivalent Units. The number of REU’s billed at the current rates tie out to the revenue reflected in the audit and budget, such that we can rely on the numbers in forecasting.

4. Forecast - Capital Cost

Annual cost has been forecasted based on an engineering evaluation of asset inventory, condition assessment, and criticality as discussed previously. The forecast reflects cash-funded capital costs not already included in the operating and maintenance budget.

5. Forecast - Cash Balance

UMBAUGH's standard minimum target cash and investment to operating expenses is six months. This minimum target is higher for a system of this size. Due to the size of the system and extent of capital improvements forecasted, the cash balance target is around 12 months. With the projected rate increases, the system will be able to maintain an adequate amount of cash to respond to unforeseen events.

6. Forecast - Rate Management

The revenue needs to support operations, debt, and capital improvements while solving to cash balance. The cash flow forecasts demonstrate 3 possible rate tracks. Annual increases are highly recommended to keep up with expected rising expenses over time.

7. Management Summary

Rates: 3 alternative rate structures are being evaluated.
Cash Balance: Target of 12 months compared to cash operating expenses over forecast period.
Capital Improvements: Cash funded projected capital improvements.

Capital Improvement Plan: *Describe the long-term Capital Improvement Plan that was developed to address system needs identified in the AMP. Provide a list of the identified improvements/projects.*

A. Description

Capital improvement projects are projects that a utility has an extended period of time to plan for and are typically projects that cover high-cost, non-recurring expenditures. To ensure that the desired level of service can be maintained, a long-term plan for required capital improvements, known as a Capital Improvement Plan (CIP), is required as part of an AMP. The CIP helps to ensure that the long-term reliability needs of the utility are met. The CIP is based upon planning for those capital improvements determined to be required or likely to be required due to the likelihood of failure of the assets and their criticality. The planning period for a CIP is 20 years to allow for the development of a rate structure adequate to finance those projects that can reasonably be predicted to be needed during that period.

B. Recommended Wastewater System Projects

Table 9 lists the recommended capital improvement projects as well as cyclical improvement projects (i.e. equipment replacement) over the next 20 years for the wastewater collection system. Detailed descriptions and cost estimates for each project listed can be found in Appendix E. Where appropriate, the estimated project costs shown in Table 9 include engineering, construction observation, and contingency costs, thus representing the total estimated cost for the project. All costs shown in Table 9 are in current costs (no inflation) unless otherwise noted.

Priority	CIP Year	Project Name	Estimated Cost
1	2019	Installation of LDO Sensors	$ 19,000
2	2019	LS B-4 Pump Replacement	$ 6,000
3	2020	LS C-4 Control Panel Upgrade	$ 13,000
4	2020	Influent Sampler Replacement	$ 7,000
5	2020	Lime Feed Repairs	$ 22,000
6	2020	LS C-13 Pump Replacement	$ 20,000
7	2021	Install Fall Protection for Pre-EQ and Sludge Basins	$ 6,000
8	2021	Replace Joint Sealer on Pre-EQ and Sludge Storage Tanks	$ 18,000
9	2022	Upgrade Plan Electronics and Computer Controls	$ 137,000

10	2023	Add Garage Door on West Side of WWTP	$	21,000
11	2023	Blower Room Ventilation Improvements	$	23,000
12	2024	Electronic Gate Entry System	$	20,000
13	2024	Influent Sampler Replacement 2	$	7,000
14	2024	Replace Effluent Sampler	$	11,000
15	2025	Install Lift Station Site Lighting B	$	18,000
16	2025	Laboratory Improvements	$	25,000
17	2025	WWTP Pavement Repairs	$	36,000
18	2026	Install Lift Station Site Lighting C	$	29,000
19	2027	Repaint Lift Station Cabinets	$	30,000
20	2028	Rehabilitate SBR 1	$	60,000
21	2029	Influent Sampler Replacement 3	$	7,000
22	2029	Rehabilitate SBR 2	$	60,000
23	2030	Installation of New Replacement Influent Meter	$	15,000
24	2031	Installation of New LDO Sensors	$	19,000
25	2032	Upgrade Lift Station Monitoring Telemetry B	$	72,000
26	2033	Upgrade Lift Station Monitoring Telemetry C	$	90,000
27	2034	Influent Sampler Replacement 4	$	7,000
28	2035	Install New Roof at WWTP	$	18,000
29	2036	Upgrade WWTP Controls	$	137,000
30	2038	Total Annual Pump Replacement Funding	$	657,000
		Total Estimated Project Cost for 20 Year CIP (current dollars) =	$	1,610,000
		Total Estimated Project Cost for 20 Year CIP (inflation adjusted[2] costs) =	$	2,104,000

Table 7 - Recommended Wastewater System Capital Improvement Projects

[2] Twenty-year inflation adjusted calculations assumed a compounded annual inflation rate of 2% per year.

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date **November 30, 2018**
(no later than 3 years from executed grant date)

The Porter Township, Cass County, Michigan *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1599-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or **No**

   If No - Date of the rate methodology approval letter: 5/3/2018

2) Significant Progress Made: Yes or No

   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)

3) Date of rate methodology review letter identifying the gap: ________________.

4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ________________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Mr. Cory Marlow at **(269) 641-2375** **supervisor@portertownship.org**

Name — Phone Number — Email

11/27/18

Signature of Authorized Representative (Original Signature Required) — Date

Mr. Cory Marlow, Township Supervisor

Print Name and Title of Authorized Representative

Protecting our Infrastructure Investment

ASSET MANAGEMENT PLAN

Wastewater Executive Summary Report

Prepared for:

Village of Quincy

SAW Project No. 1636-01

FINAL
November 2018

FLEIS&VANDENBRINK
DESIGN. BUILD. OPERATE.

EXECUTIVE SUMMARY

OVERVIEW

Public Act 562 of 2012 authorized money for Stormwater, Asset Management, and Wastewater (SAW) Grant Program. In May 2014, The Village of Quincy received a Stormwater, Asset Management, and Wastewater (SAW) Grant from the Michigan Department of Environmental Quality (MDEQ), project no. 1636-01, to provide financial assistance for the development of a wastewater asset management plan (AMP) for the Village's publicly owned wastewater utility. The assets that comprise the utility include collection system piping and manholes, a wastewater treatment facility, lift station/pump stations and force mains.

This AMP is intended to be a living document that is updated as assets continue to wear and age, and as additional inspection/condition results are found and incorporated into the plan.

ASSET INVENTORY AND CONDITION ASSESSMENT

The wastewater collection system assets consist of approximately 77,702 feet (14.72 miles) of sanitary sewers (gravity pipe and force mains) and 244 wastewater manholes connecting the gravity pipe. These assets are located in existing street rights-of-way or in easements dedicated for the assets use and maintenance.

The Village of Quincy WWTP currently includes the following treatment processes: influent screening, one aerated lagoon, a facultative lagoon, and a polishing lagoon with chemically aided phosphorus removal. Final effluent is discharged to the Bagley Creek in accordance with NPDES permit No. MI0055751. The design capacity of the WWTP is 0.22 million gallons per day (mgd).

The WWTP was originally constructed in 1971 and updated in 2005. Improvements in 2005 included the construction of an influent metering manhole, the replacement of 10 valves, and the installation of a ferric chloride feed system. Prior to the 2005 project, the treatment plant discharged effluent to an irrigation field. During the 2005 project, an effluent structure and an effluent sewer were installed to allow for discharge to surface water at the Bagley Creek.

The 2016 Wastewater Treatment Facility Improvements Project provided significant upgrades to the facility. These upgrades included:

- The construction of an influent screening structure with a new vertical fine screen.
- The installation of a new lagoon aeration system.
- The construction of a blower room addition onto the existing service building.
- SCADA system upgrades.
-

There are nine sanitary sewer lift stations located throughout the wastewater collection system. The stations are submersible style stations.

Asset Identification and Location

A comprehensive wastewater system asset inventory was developed from operation and maintenance manuals included a review of existing record drawings, field notes, staff knowledge, and site visits, supplemented with field survey work. Asset material, size and age were identified through the review of available historical record documents and Closed-Circuit Televising (CCTV) data. Spatial orientation (pipe location), pipe depth and invert elevations were determined through review of the existing GPS information, supplemental GPS field survey, and a comprehensive evaluation of the gravity system. This information was organized into an updated (GIS) database and piping network for archiving, mapping and further evaluation purposes. The inventory includes over 96 WWTF assets, 130 Lift Station Assets, and 475 Collection System Assets.

Condition Assessment and Expected Useful Life

A comprehensive evaluation of the collection system was performed. NASSCO-MACP manhole field based assessments were completed on 224 of 244 manhole structures. Pipeline cleaning and NASSCO-PACP

CCTV field based inspections were conducted on 88.5% of the gravity pipe. Smoke Testing was performed on 100% of the system to disclose locations of inflow or infiltration. Recommendations for short-term (1-5 year) and long term (6-20 year) identified the need for maintenance, with 11.5% of the system being tagged for inspection and/or cleaning. Rehabilitation accounted for 21.7% of the system, identifying the need for point repairs and lining. The remaining 57.2% of assets were placed in the 20+ year category.

Overall, the condition of the assets at the WWTP range from excellent to fair (45% excellent, 39% good, 15% fair, 0% poor, 0% very poor). Ongoing repairs have helped to maintain the condition of many assets as well as the work completed during the 2016 project. A few assets installed during 1971 are now near the end of their useful life and have deteriorated due to use and the harsh conditions associated with wastewater treatment. No immediate concerns were noted.

The condition of the assets at the lift stations range from excellent to poor (45% excellent, 40% good, 7% fair, 8% poor, 0% very poor. Five of the nine lift stations are new and are in excellent condition. At other stations, ongoing maintenance has maintained the condition of most assets, but some assets have deteriorated due to use and the harsh conditions associated with typical wastewater collection systems.

LEVEL OF SERVICE

Defining the Expected Level of Service (LOS)
The overall objective of the Village Wastewater Department is to provide reliable wastewater collection and treatment services at a minimum cost, consistent with applicable environmental and health regulations. To achieve this, the following LOS goals are proposed:

LEVEL OF SERVICE STATEMENT

The overall objective of the Village of Quincy Wastewater Department is to provide reliable wastewater collection and treatment services at a minimum cost, consistent with applicable environmental and health regulations. To achieve this the following Level of Service (LOS) goals are proposed:

- Provide adequate collection system and treatment capacity for all service areas.
- Comply with all local, state and federal regulations at all times for treated effluent from the WWTF.
- Actively maintain collection and treatment system assets in reliable working condition.
- Reduce inflow/infiltration (I/I) flow volumes to mitigate potential for sanitary overflows, water in basements, and overloading of treatment plant.
- Provide rapid and effective emergency response services to customers.
- Ensure operations staff are properly certified.
- Regularly review health and safety procedures for operations staff to provide proper worker safety.
- Regularly review projected O&M and capital expenditures. Adjust user rates, as necessary, to ensure sound financial management of wastewater system.

The LOS goals may need to be adjusted from time to time as the utility ages, the needs of community change or new rules or regulations require a change in operation. For this reason, the LOS goals should be reviewed by the Village from time to time to make sure they accurately reflect the desired operation of the utility.

Measuring Performance
In order to assure that LOS goals are met, performance measurements may need to be implemented. During the LOS review with the community the need for performance measurements was discussed.

Critical Assets

Determining Criticality

Business Risk is the determination of criticality for each asset in the wastewater system. Criticality is based on two factors; Likelihood (Probability) of Failure and Consequence of Failure using the following formula:

Business Risk = Consequence of Failure Score x Likelihood of Failure Score

Defining an asset's Business Risk allows for management of risk and aids in decision making for where to allocate O&M and capital improvement funds.

Likelihood of Failure (LoF) is a measure of how likely an asset is to fail. The following categories have been developed to quantify how likely an asset is to fail:

- Condition of the asset
- Remaining useful life (Age)
- Service history
- Operational status

Consequence of Failure (CoF) is a measure of the social, economic, financial or environmental impact of failure of an asset, and the utilities ability to respond, convey and treat wastewater. CoF categories of the collection system include:

- Proximity to critical environmental features
- Location (Zoning District) of asset
- Facilities served by asset
- Size and location of asset within the utility network
- Type of asset. The WWTF and Lift Station categories for

Criticality Results

Using the strategy outlined above, a Business Risk Evaluation (BRE) was performed for each asset using a graphical ArcGIS-based sewer asset management and capital planning software that compiles, analyzes and assesses Business Risk for each asset and develops a Capital Improvement Plan. The results of the BRE are provided in an easily understood tabular and graphical output.

Figure 1 provides the risk rating for gravity and force main pipe by number of pipe segments. 15 pipe segments in the collection system have an extreme risk rating. It is recommended that 1 segment be replaced, 10 segments point repaired, and 4 segments inspected with full lining, in the next 1-2 years. Figure 2 provides the risk rating for the collection system manholes. 12 manholes are identified as extreme risk. 6 manholes are recommended for replacement, 2 covers replaced, 1 cleaned lined and repaired, and 3 have no recommended action in the next 1-2 years. Many manholes are at low to medium risk and recommended to be included in a long-term rehabilitation strategy (80 percent).

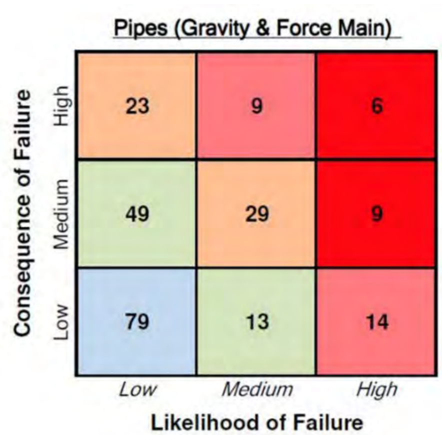

Figure 1. Business Risk Matric (Risk Rating) by Number of Gravity and Force Main Pipes

Figure 2 provides the risk rating for the collection system manholes. 12 manholes are identified as extreme risk. 6 manholes are recommended for replacement, 2 covers replaced, 1 cleaned lined and repaired, and 3 have no recommended action in the next 1-2 years. Many manholes are at low to medium risk and recommended to be included in a long-term rehabilitation strategy (80 percent).

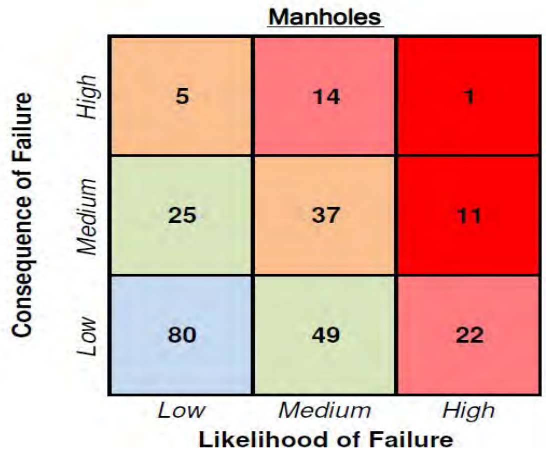

Figure 2. Business Risk Matrix (Risk Rating) by Number of Manholes

A summary of the risk ratings for WWTP assets is provided in Figure 3. The 2016 WWTP Improvements Project addressed all of the short-term needs of the facility. No assets scored in the "Extreme or High Risk" category which would require a plan for short-term asset renewal or risk mitigation. It is important to monitor the WWTP assets, and evaluate their replacement for the 20 - year CIP.

A summary of the risk rating for Lift Station assets is provided in Figure 4. A majority of the critical lift station assets were addressed during the 2016 Improvements projects. The remaining high risk assets are located at the North Main, Cole Street, and Pleasant Street Lift Stations. Plans to address these assets are described in the capital improvement plan.

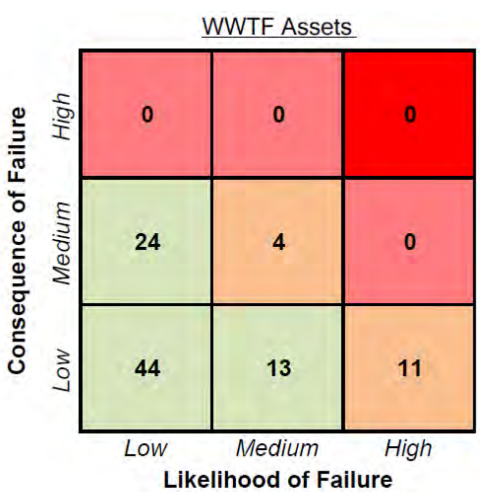

Figure 3. WWTP Assets by Risk Rating

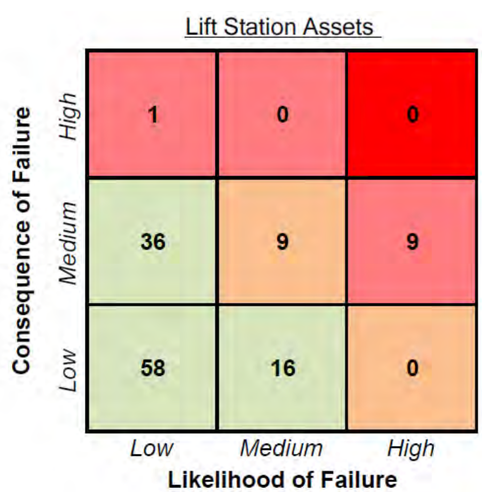

Figure 4. Lift Station Assets by Risk Rating

A spreadsheet providing asset criticality for each utility asset has been included in the AMP detailed report for the collection and treatment systems.

Capital Improvement Plan

A Capital Improvement Plan (CIP) with rehabilitation recommendations was prepared for the Village's wastewater utility assets based on the BRE. The CIP recommendations are provided for the collection system, wastewater treatment facility and pumping stations/force mains. From the BRE, a short-term (1-5 year CIP) and long-term (6-20 year CIP) was developed for each utility. Table 1 shows a detailed recommendations of the collection system assets needing rehabilitation in the short-term CIP.

Table 1. 5-Year Capital Improvement Plan: Rehabilitation Summary

Rehabilitation Action	Total Cost (Current Year Dollars)	2019	2020	2021	2022	2023
Point Repair	$ 261,717	$ 214,813	$ -	$ 28,007	$ 11,506	$ 11,823
Full Lining	$ 317,214	$ -	$ 63,573	$ 78,016	$ 56,028	$ 146,148
Replacement	$ 202,503	$ -	$ 120,726	$ -	$ 92,969	$ -
Manhole Replacement	$ 77,250	$ -	$ 31,827	$ 16,377	$ 16,841	$ 17,304
Cover Replacement	$ 1,000	$ 1,000	$ -	$ -	$ -	$ -
Manhole Lining	$ 29,479	$ -	$ 5,326	$ 10,962	$ 4,794	$ 10,717
	$ 889,162	**$ 215,813**	**$ 221,452**	**$ 133,362**	**$ 182,138**	**$ 185,992**

Table 2 shows the detailed recommendations for the WWTP and lift station assets needing rehabilitation in the long-term planning period.

Table 2. WWTF & Lift Station 20 Year Capital Improvement Plan

Item No.	Improvement Description	Year	Estimated Cost (2018 Dollars)
1-5-YEAR CIP PROJECTS			
	No Projects Identified		
6-20-YEAR CIP PROJECTS			
1	Cole Street Lift Station Improvements	2004	$ 94,200
2	North Main Street Lift Station Improvements	2004	$ 340,000
3	DO Blower control	--	$ 20,000
4	SCADA Monitoring for Influent Screen	--	$ 13,000
5	Replace Lagoon Effluent Structure Gates	2005	$ 33,500
6	Lagoon No. 3 Biosolids	1971	$ 854,000
7	Lagoon No. 1 Biosolids	2016	$ 65,000
8	Lagoon No. 2 Biosolids	2016	$ 65,000

Operations, Maintenance and Replacement

Regular operation, maintenance and replacement (OM&R) is essential in the management of a wastewater collection system. The collection system is subject to a variety of operational problems and can suffer from clogging, scour, corrosion, and collapse. Inspection, cleaning, and rehabilitation are important for optimizing the proper functioning of the collection system. By optimizing the performance, I&I are reduced and sanitary sewer overflows (SSO) are minimized or eliminated thus preserving the substantial investment the community has in its collection system.

An annual equipment replacement fund should be developed to replace disposable equipment. These are items that can be financially accounted for through OM&R funds and can be replaced by WWTF staff without bringing in an outside contractor. Existing disposable materials include chemicals, wear parts in pumps and motors, laboratory instruments, etc. The existing OM&R fund is sufficient for the current operations. Table 3 shows a summary of maintenance recommendations of the collection system assets.

Table 3. Collection System Maintenance Summary Table: Year by Year						
Maintenance Action	Total Cost (Current Year Dollars)	2019	2020	2021	2022	2023
Manhole Assessment	$ 10,300	$ 2,060	$ 2,122	$ 2,185	$ 2,251	$ 2,319
Manhole Cleaning	$ 20,085	$ 4,017	$ 4,138	$ 4,262	$ 4,389	$ 4,521
CCTV	$ 22,009	$ 4,402	$ 4,534	$ 4,670	$ 4,810	$ 4,954
CCTV - Heavy Cleaning	$ 5,083	$ 1,017	$ 1,047	$ 1,079	$ 1,111	$ 1,144

REVENUE STRUCTURE

The revenue and rate methodology is an instrument to determine user rates and charges that will provide sufficient revenues to pay for utility operating costs.

The Village of Quincy's gap analysis for the 30-month SAW grant suggests that there is a very small gap in rates, relative to the estimated 2019 budget and customer base. The identified gap is $1,870, or 0.39% of the current user charge revenue. The Village has already adopted a rate increase, effective for the next FY (4/1/19), which is estimated to generate user charges 5.4% higher than current rates. This adopted rate increase will fully cover the gap identified.

Department of Environmental Quality
SAW Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date November 2018
(no later than 3 years from executed grant date)

The Village of Quincy *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1636-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant. The Department of Environmental Quality (DEQ) defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gap in revenue needed to meet expenses, as identified in a
5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.

Attached to this certification is a summary of the AMP that identifies major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Eric Zuzga____________________________at (517) 639-9065________Eric.Zuzga@quincy-mi.org__
Name Phone Number Email

Rate Methodology was submitted to DEQ on: April 18, 2019___________________________________
(within 2 ½ years from date of executed grant)

An initial rate increase of 5.4% of a $1,870.00 gap was adopted on April 1, 2019 __________________

____
Signature of Authorized Representative (Original Signature Required) Date

Eric Zuzga, Village Manager____
Print Name and Title of Authorized Representative

DEQ

Department of Environmental Quality
SAW Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date November 2018
(no later than 3 years from executed grant date)

The Village of Quincy *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1636-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant. The Department of Environmental Quality (DEQ) defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gap in revenue needed to meet expenses, as identified in a
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Eric Zuzga	at (517) 639-9065	Eric.Zuzga@quincy-mi.org
Name	Phone Number	Email

Rate Methodology was submitted to DEQ on: April 18, 2019
(within 2 ½ years from date of executed grant)

An initial rate increase of 5.4% of a $1,870.00 gap was adopted on April 1, 2019

11-26-18

Signature of Authorized Representative (Original Signature Required) Date

Eric Zuzga, Village Manager
Print Name and Title of Authorized Representative

Protecting our Infrastructure Investment

ASSET MANAGEMENT PLAN

Stormwater Executive Summary Report

Prepared for:

Village of Quincy

SAW Project No. 1636-01

FINAL
November 2018

FLEIS&VANDENBRINK
DESIGN. BUILD. OPERATE.

1.0 EXECUTIVE SUMMARY

OVERVIEW

Public Act 562 of 2012 authorized money for Stormwater, Asset Management, and Wastewater (SAW) Grant Program. In May 2015, The Village of Quincy received a SAW Grant from the Michigan Department of Environmental Quality (MDEQ) to provide financial assistance for the development of this Asset Management Plan (AMP). This report provides the Asset Management Plan (AMP) for the Village's stormwater collection system. Working with Village staff, Fleis and VandenBrink (F&V) provided technical assistance for asset identification, condition assessment, and capital improvement planning of the stormwater collection system.

This AMP is intended to be a living document that is updated as assets continue to wear and age, and as additional inspection/condition results are found and incorporated into the plan.

The contact person for the Village of Quincy AMP is:

Eric Zuzga, Village Manager
47 Cole Street
Quincy, MI 49082
Phone number: 517-639-9065
Email: eric.zuzga@quincy-mi.org

ASSET INVENTORY AND CONDITION ASSESSMENT

The stormwater collection system assets consist of approximately 37,192 feet (7.04 miles) of storm sewers and 347 stormwater structures connecting the gravity pipe. These assets are located in existing street rights-of-way or in easements dedicated for the assets use and maintenance.

ASSET IDENTIFICATION AND LOCATION

A comprehensive stormwater system asset inventory was developed from available record drawings, field notes, staff knowledge, and site visits; supplemented with field survey work. Asset material, size and age were identified through the review of available historical record documents. Spatial orientation (pipe location), pipe depth and invert elevations were determined through GPS field survey and a comprehensive evaluation of the gravity system. This information was organized into a new (GIS) database and piping network for archiving, mapping and further evaluation purposes.

CONDITION ASSESSMENT AND EXPECTED USEFUL LIFE

For the Village of Quincy, a comprehensive evaluation of the collection system was performed. NASSCO-MACP structure field-based assessments were completed on 337 of the total 347 structures. Pipeline cleaning and NASSCO-PACP CCTV field-based inspections were conducted on 54% of the gravity pipe.

LEVEL OF SERVICE

DEFINING THE EXPECTED LEVEL OF SERVICE (LOS)

The overall objective is to provide appropriate stormwater collection, diversion, and conveyance at a minimal cost, consistent with applicable environmental regulation.

STORMWATER – LEVEL OF SERVICE STATEMENT

"To provide appropriate stormwater collection, diversion, and conveyance at a minimum cost, consistent with applicable environmental regulations. To achieve this the following Level of Service (LOS) goals are proposed for the Village of Quincy:

- *Provide adequate stormwater collection system and conveyance capacity for all service areas*
- *Actively maintain stormwater collection and conveyance system assets in reliable working condition.*
- *Provide rapid and effective emergency response services to customers.*
- *Maintenance and operations staff are to be properly trained.*

Measuring Performance

Performance measurements are specific metrics designed to assess whether Level of Service objectives are being met. Evaluations of goals should be completed at least annually to determine if the provided resources are being used appropriately. Level of Service requirements can be updated to account for changes due to growth, regulatory requirements, and technology.

Critical Assets

Determining Criticality

Business Risk is the determination of criticality of each asset in the wastewater system. Criticality is based on two factors: 1) Likelihood (Probability) of Failure and 2) Consequence of Failure. Defining an asset's Business Risk allows for management of risk and aids in decision making for where to allocate operation and maintenance and capital improvement funds.

Likelihood of Failure (LoF) is a measure of how likely an asset is to fail. The following categories have been developed to quantify how likely an asset is to fail:

- Condition of the asset
- Remaining useful life (Age)
- Service History
- Operational status

Consequence of Failure (CoF) is a measure of the social, economic or environmental impact of failure of an asset and on the utility's ability to convey stormwater. CoF categories of the stormwater collection system include:

- Location of asset
- Facilities served by asset
- Size

Assessing Criticality

Using the strategy outlined above, a Business Risk Evaluation (BRE) was performed for each asset of the Village of Quincy using Innovyze-InfoMaster software. InfoMaster is an ArcGIS-based sewer asset management and capital planning software that will compile, analyze and assess Business Risk for each asset and develops a Capital Improvement Plan.

The Business Risk score, also known as Criticality, is calculated for each asset using the following equation:

Business Risk = Consequence of Failure Score x Likelihood of Failure Score

Figure 1 provides the risk rating for storm sewer pipes by number of pipe segments. 10 pipe segments in the stormwater collection system have an extreme risk rating. Of these pipes, one is called for full replacement, one for full lining, and eight for point repairs.

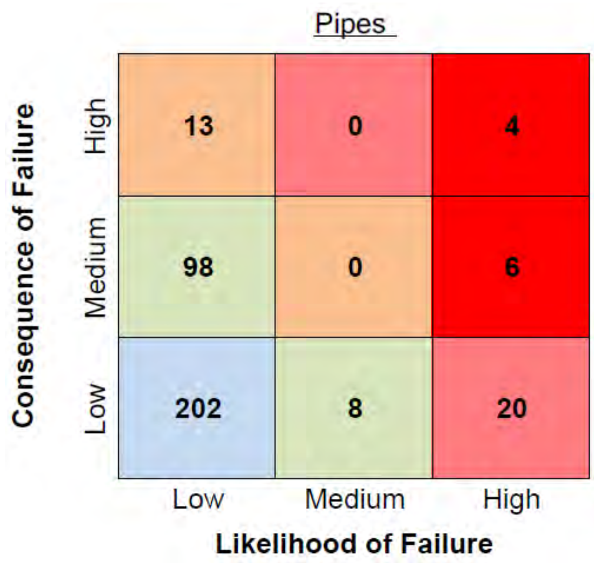

Figure 1: Business Risk Matrix (Risk Rating) by Number of Gravity Pipes

Figure 2 provides the risk rating for the storm sewer structures. Thirty-five structures are identified as extreme risk. Twelve are recommended for replacement and twenty-three are recommended for repair.

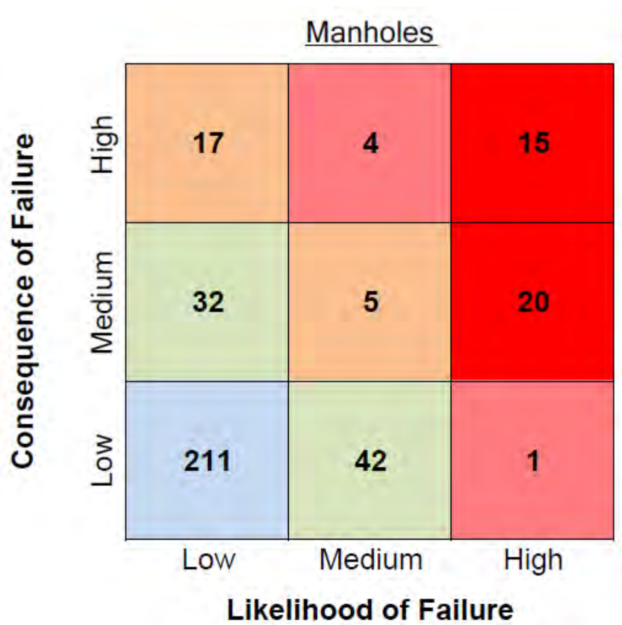

Figure 2: Business Risk Matrix (Risk Rating) by Number of Structures

A spreadsheet providing asset criticality for each utility asset has been included in the AMP detailed report for the stormwater collection system.

Capital Improvement Plan

A Capital Improvement Plan with recommendations was prepared for the Village's assets based on the Business Risk evaluation. Data-driven information from the business risk assessment and condition assessment was used to identify and prioritize the capital improvement projects. The information was also used to schedule inspections to evaluate the condition of high business risk assets. Short-Term 1-5 year

and Long-Term 6-20-year Capital Improvement Plan (CIP) was prepared to address the projected needs for each asset in the system. The 5-year CIP rehabilitation total is $566,340.

CIP DEVELOPMENT

The Village of Quincy identifies assets of $5,000 or more to be capital expenditures. Collection System assets were grouped by strategy and assigned costs from a unit database. This database includes unit construction values in 2017 construction dollars based on a survey of recent projects in Michigan and includes engineering and administrative rates where applicable. Assets were categorized and prioritized by year based on risk rating and criticality score to develop the CIP. The recommended 5-Year Capital Improvement Plan for the Village-owned storm water collection system is included in Table 1 below.

Table 1. 5-Year Capital Improvement Plan: Rehabilitation

Rehabilitation Action	Total Cost (Current Year Dollars)	2019	2020	2021	2022	2023
Pipe Replacement	$ 155,405	$ -	$ 32,377	$ -	$ -	$ 139,530
Pipe Lining	$ 14,198	$ -	$ 14,624	$ -	$ -	$ -
Pipe Point Repair	$ 264,490	$ 79,190	$ -	$ 196,585	$ -	$ -
Manhole Replacement	$ 70,000	$ -	$ 61,800	$ -	$ -	$ 11,255
MH Repair	$ 30,000	$ -	$ 29,613	$ -	$ 1,366	$ -
Total	$ 534,093	$ 79,190	$ 138,414	$ 196,585	$ 1,366	$ 150,785

OPERATIONS AND MAINTENANCE

A preventative maintenance program to systematically clean and CCTV inspect pipelines to NASSCO-certified standards is critical for a sound stormwater system. The process of cleaning and CCTV inspection of pipelines either with equipment owned by the community or contracted is a relatively inexpensive maintenance effort when compared to rehabilitation efforts. For this reason, it is recommended that at a minimum, all pipelines be cleaned and televised every ten years, or that 10% of the system be cleaned and televised annually. Available budget will dictate the frequency or size of yearly projects. The 5-year maintenance total is $245,514.

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Due Date November 2018
(no later than 3 years from executed grant date)

The Village of Quincy *(legal name of grantee)* certifies that all stormwater asset management plan (SWAMP) activities specified in SAW Grant No. 1636-01 have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SWAMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

Eric Zuzga	at 517-639-9065	eric.zuzga@quincy-mi.org
Name	Phone Number	Email

11-26-18

Signature of Authorized Representative (Original Signature Required) Date

Eric Zuzga, Village Manager

Print Name and Title of Authorized Representative

c2ae
architecture • engineering

123 W. Main St. Suite 200
Gaylord, MI 49735
O: 989.732.8131
www.c2ae.com

ROGERS CITY WASTEWATER ASSET MANAGEMENT PLAN
EXECUTIVE SUMMARY

City of Rogers City
193 E. Michigan Avenue
Petoskey, MI 49779
Joe Hefele – City Manager, (989) 734-2191
SAW GRANT PROJECT NUMBER 1518-01

Executive Summary
The SAW agreement with the State of Michigan was signed in November 24, 2015 which began the overall SAW program.

The Grant agreement included the following funding amounts:

- Total Cost = $974,537
  - Grant Value = $943,750
  - Local Match = $30,787

The City of Rogers City is located in the north eastern portion of Presque Isle County in the north eastern lower peninsula of Michigan, approximately 60 miles south of the Mackinac Bridge. It is located at the crossroads of M-68 and US-23. The City owns and operates activated sludge Wastewater Treatment Plant with a rated capacity of 1.0 million gallon per day (MGD) average flow. The treatment plant discharges to Lake Huron under permit MI0057813. Rogers City's sanitary collection system has approximately 129,100 feet of sanitary sewer and force main, approximately 556 sanitary manholes and 9 lift stations that provides sewer services to the City.

Wastewater Asset Inventory
This item which initiated the work included:

- Identifying and locating all assets.
  - A list of all assets to be monitored was obtained using a combination of historical system records, field data collection.
  - The GPS coordinates of the field assets were gathered.
  - An ESRI ArcGIS data set was completed to index the locations and attributes of assets.
  - Physical inspections were conducted for each asset.
    - Manholes – Field inventories and conditional assessments were completed in accordance with NASSCO MACP standards by NASSCO Certified personnel.
    - Sewers - Survey was completed by CCTV review in accordance with NASSCO PACP standards by NASSCO Certified personnel.
    - Pump Stations – Field inventories were completed for each pump station recording and evaluating condition for the sub-parts of the lift station within the Pump Station Database. The sub-parts contained, but were not limited to, pumps, VFDs, wet well, electrical, and process piping.
    - Wastewater Treatment Facilities (WWTF) - Field inventories were completed for the WWTF recording and evaluating condition for the sub-parts of the WWTF within the WWTF workbook. The sub-parts contained, but were not limited to, pumps, VFDs, electrical, and process piping.

- The asset information was included in the Asset Management Spreadsheet (AMS).
- The AMS is used to quantify and sort the system asset information.

- The results of the assessment yielded the following percentages:
    - 12% of assets are 1's
    - 40% of assets are 2's
    - 19% of assets are 3's
    - 9% of assets are 4's
    - 20% of assets are 5's

Condition Assessment

The City of Rogers City's sanitary collection system is in fair condition overall. One of the biggest problems is in root intrusion which will require additional maintenance in the future. There are also some numerous locations of broken pipes or holes with a structural grade of 5, which should require work within the next several years as well as locations of infiltration. The wastewater treatment facility is in good condition, recently being upgraded in 2009. The plant is well maintained. However, there are some longer term upcoming equipment replacement needs and other capital improvements for the future that will help with improving the plant efficiency.

- Structures assessment and inventories follow NASSCO MACP guidelines.
- Sewer pipe assessment and inventories follow NASSCO PACP guidelines.
- WWTP equipment site condition assessment and inventory.
- Wastewater lift stations condition assessments and inventory.
- Asset age and material data was collected using historical project drawings.

Criticality of Assets

- The Asset Management Spreadsheet (AMS) was used to organize the asset classes. Several parameters were used to determine asset consequence of failure and probability of failure, rating each on a 1 to 5 scale.
    - Redundancy: Does the unit have system backup?
    - Criticality of the asset to the system and what level of impact to the system occurs in the event that the asset fails
    - Location of the asset and surrounding service areas were incorporated in determining the criticality of the asset
    - Probability of failure based on its age and condition
    - These items together result in a parameter identified as Business Risk.
- The AMS was used to prioritize the need for short term repair or maintenance, short term replacement, or long term maintenance.

Level of Service Determination

- A SAW Team was created to discuss the wastewater system direction.
- The SAW Team met and discussed a mission statement and desired Level of Service statement, which was then converted to a succinct list of items to follow for the future.
- The SAW Team will meet once a year to assess the system's service record and recommend improvements to the Level of Service Statement, if needed.

Revenue Structure

- The user charge report and the AMS are identified as the Rate Methodology and have been submitted previously to MDEQ and approved.
- No funding gap or rate increase was required per the grant agreement.
- Capital improvements for the sanitary sewer system are currently being funding through fund equity and rates.
- The rates, charges and other means of revenue are sufficient to cover system operation, maintenance, replacement, capital improvement and debt costs identified in the AMP.

Capital Improvement Plan

- The AMS identifies capital improvement projects for the future.
- The long term projects may be achieved through a combination of grants or future rate adjustments to support project funding.
- An estimate of project year and financial cost is generated for each capital improvement project.
- A List of recommended projects to be completed within the next five (5) years is as follows:
  - *Sanitary Structure repairs with a Business Risk greater than 16 or Probability of Failure of 4 or Wall grade below "D" to be lined (MH Project #1)*
  - *Sanitary Structure repairs with a Business Risk greater than 16 or Probability of Failure of 4 or Wall, Cone, Chimney grade below "D" to be replaced* (MH Project #3)
  - *Sanitary System Sewer Repairs with a Business Risk of 16+ or likely sewer collapse* (Sewer Project # 1)
  - *Sanitary Collection System Lift Station repairs.*
- Additional projects recommended in the next 6 to 10 years and 11 to 20 years are included in the Capital Improvement Plan.

List of Major Assets

- 126,638 feet of sanitary sewer
- 2,461 feet of force main
- 556 sanitary manholes
- 9 lift stations
- 1.0 MGD Average Daily Flow Capacity Wastewater Treatment Plant

DEQ

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date November 30, 2018
(no later than 3 years from executed grant date)

The **City of Rogers City** *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. **1518-01** have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: ~~Yes or~~ **No**

   If No - Date of the rate methodology approval letter: **May 22, 2018**.

2) Significant Progress Made: Yes or No

   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)

3) Date of rate methodology review letter identifying the gap: ______________________.

4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ___________________________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Joe Hefele	at 989-734-2191	jhefele@rogerscity.com
Name	Phone Number	Email

Terri Koss ______________________________ 11-28-18
Signature of Authorized Representative (Original Signature Required) Date

TerriKoss Clerk/Treasurer
Print Name and Title of Authorized Representative

123 W. Main St. Suite 200
Gaylord, MI 49735
O: 989.732.8131
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ROGERS CITY STORMWATER ASSET MANAGEMENT PLAN
EXECUTIVE SUMMARY

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The Grant agreement included the following funding amounts:

- Total Cost = $974,537
    - Grant Value = $943,750
    - Local Match = $30,787

The City of Rogers City is located in the north eastern portion of Presque Isle County in the north eastern lower peninsula of Michigan, approximately 60 miles south of the Mackinac Bridge. It is located at the crossroads of M-68 and US-23. Roger City's storm sewer collection system has approximately 96,212 feet of storm sewer and approximately 1,080 storm manholes, catch basins and outfalls.

Stormwater Asset Inventory

This item which initiated the work included:

- Identifying and locating all of the manhole and mainline sewer assets.
    - A list of all assets to be monitored was obtained using a combination of historical system records, field data collection.
    - The GPS coordinates of the field assets were gathered.
    - An ESRI ArcGIS data set was completed to index the locations and attributes of assets.
    - Physical inspections were conducted for each asset.
        - Manholes – Field inventories and conditional assessments were completed in accordance with NASSCO MACP standards by NASSCO Certified personnel.
        - Sewers - Survey was completed by CCTV review in accordance with NASSCO PACP standards by NASSCO Certified personnel.
    - The asset information was included in the Asset Management Spreadsheet (AMS).
    - The AMS is used to quantify and sort the system asset information.
- The results of the assessment yielded the following percentages:
    - 74.14% of assets are 1's
    - 8.76% of assets are 2's
    - 6.19% of assets are 3's
    - 3.87% of assets are 4's

  - 7.04% of assets are 5's

Condition Assessment

Overall, the system was in fair to good condition. There are a number of recommendations for improvements in the Capital Improvements Plan, but only a few are relatively critical or urgent at this time.

- Structures assessment and inventories follow NASSCO MACP guidelines.
- Sewer pipe assessment and inventories follow NASSCO PACP guidelines.
- Asset age and material data was collected using historical project drawings.

Criticality of Assets

- The AMS was used to organize the asset classes. Several parameters were used to determine asset consequence of failure and probability of failure, rating each on a 1 to 5 scale.
  - Redundancy: Does the unit have system backup?
  - Criticality of the asset to the system and what level of impact to the system occurs in the event that the asset fails
  - Location of the asset and surrounding service areas were incorporated in determining the criticality of the asset
  - Probability of failure based on its age and condition
  - These items together result in a parameter identified as Business Risk.
- The AMS was used to prioritize the need for short term repair or maintenance, short term replacement, or long term maintenance.

Level of Service Determination

- A SAW Team was created to discuss the storm system direction.
- The SAW Team met and discussed a mission statement and desired Level of Service statement, which was then converted to a succinct list of items to follow for the future.
- The SAW Team will meet once a year to assess the system's service record and recommend improvements to the Level of Service Statement, if needed.

Revenue Structure

- The City drainage system is operated and maintained using City street funds.
- The current funding consists of a combination of Act 51 state tax funds and local street funds. The future will require an increase in state road funding and/or strategic pursuit of state and federal grant funds to continue system improvements.

Capital Improvement Plan

- The AMS identifies capital improvement projects for the future.
- The long term projects may be achieved through grants or future public borrowings.
- An estimate of project year and financial cost is generated from each capital improvement project.
- The following is the recommended project to be completed within the next five (5) years are as follow:
  - *Storm Structure repairs with a Business Risk greater than 16 or Probability of Failure of 4 or Wall, Cone, Chimney grade below "D" to be replaced (MH Project #4)*
  - *Storm System Sewer Repairs with a Business Risk of 16+ or likely sewer collapse (Sewer Project # 2)*

- Additional projects recommended in the next 6 to 10 years and 11 to 20 years are included in the Capital Improvement Plan.

List of Major Assets

- 1,080 Storm Manholes, Catch Basins and Outfalls
- 96,212 Feet of Storm Sewer

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Due Date **November 30, 2018**
(no later than 3 years from executed grant date)

The **City of Rogers City** *(legal name of grantee)* certifies that all stormwater asset management plan (SWAMP) activities specified in SAW Grant No. **1518-01** have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SWAMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

Name		Phone Number	Email
Joe Hefele	at	989-734-2191	jhefele@rogerscity.com

Terri L Koss — 11-28-18

Signature of Authorized Representative (Original Signature Required) — Date

Terri L. Koss Clerk/Treasurer

Print Name and Title of Authorized Representative

City of Rose City

Sanitary Sewer System

Asset Management Plan

October 2018

OHM Advisors®

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Appendix

Appendix A: Condition Maps

Appendix B: Criticality and Business Risk Assessment

Appendix C: Pump Station Evaluation

Appendix D: Smoke Testing Evaluation

Appendix E: Capital Improvement Plan

Appendix F: Rate Study

Figures

Tables

Acronyms

AMP – Asset Management Plan or Program
BRE – Business Risk Exposure
CIP – Capital Improvement Plan
CoF – Consequence of Failure
GIS – Geographic Information Systems
MACP – Manhole Assessment Certification Program
MDEQ – Michigan Department of Environmental Quality
NASSCO – National Association of Sewer Service Companies
O&M – Operations and Maintenance
PACP – Pipeline Assessment Certification Program
PoF – Probability of Failure
SAW – Stormwater Asset Management and Wastewater Grant
WWTP – Wastewater Treatment Plant

EXECUTIVE SUMMARY

The wastewater infrastructure system of Rose City provides a critical service to its residents and businesses, providing the collection and treatment of wastewater and protecting its local bodies of water by discharging clean water through an advanced treatment process. Recognizing the importance of this wastewater system, Rose City initiated a comprehensive assessment of its wastewater infrastructure. This Asset Management Plan (AMP) summarizes this assessment and includes key recommendations for future funding levels. This document was prepared using grant funding from the State of Michigan Stormwater, Asset Management and Wastewater (SAW) Grant Program, SAW Grant 1165-01, with a total budget of $334,832 with no local match.

The intent of this AMP is to accomplish the following key goals:

- Provide the City with a new framework for collecting, organizing, and storing data for their wastewater collection system using the latest available hardware and software.
- Survey key system components to create the City's Geographic Information System (GIS) database and to make it easy for future generations to access infrastructure data.
- Perform smoke testing to ensure inappropriate connections do not exist.
- Add information for sewer material type, size, age and length to the created GIS database.
- Physically evaluate the structural condition of publicly-owned system components, including sanitary sewer pipes, manholes, pump stations and lagoon system. Store the data in the City's GIS database.
- Identify long-term operations and maintenance strategies to maintain a reasonable structural condition into perpetuity, including:
    - Regularly-scheduled sewer inspection (televising)
    - Repair and rehabilitation to address structural problems resulting from aging infrastructure.
- Provide recommendations for developing a prioritized Capital Improvement Plan (CIP) to be funded through the City's wastewater enterprise fund.

Mission Statement

One important element to an Asset Management Program (AMP) is a mission statement, which identifies the overarching purpose of the City's AMP. The purpose of the City's asset management program is summarized by the following mission statement:

We are committed to providing and maintaining high quality sanitary sewer collection services to our existing and future customers in a cost effective manner while protecting human health and the environment.

Asset Management Team Leaders

The team leaders listed in Figure 1 are committed to the asset management mission statement and were instrumental in the progress made and findings outlined in this report. Further questions on the City's AMP can be directed to these team members.

Howard LaCosse
- Director of Public Works
- 989.305.7986
- rosecityhall279@gmail.com

Cindy Rosebrugh
- City Clerk
- 989.685.2103
- rosecityhall279@gmail.com

Figure 1: Asset Management Team Leaders

Infrastructure Technology & Know-How

The City has made investments to create a GIS database mapping their sanitary system with the intent of making it easier for future generations to access infrastructure knowledge. These GIS database investments include the following:

- Surveyed key system components to augment the City's created GIS database.
- Added information for sewer material type, size, age and depth to the created GIS database.
- Purchased tablets and mobile devices to improve access to real-time asset information and enhance field data collection.
- Provide staff training on new hardware and software.

Asset Inventory

An asset inventory is a list of the City's assets and their attributes. The majority of the City's sanitary sewer infrastructure, including manholes, sanitary sewers and pumping stations were inventoried and digitized. The City has populated the attributes of the inventory using observations in the field while performing condition assessments. This inventory resides in the City's newly created GIS. The GIS framework was created as part of this effort, making it easier for the City to store critical data for the locations, size, material, install date and condition of each wastewater asset.

Condition Assessment

With the intent of assessing the entire sanitary system, the City's sanitary sewer infrastructure (sewer pipes, manholes and pump stations) has been assessed. The condition of the infrastructure is based on the National Association of Sewer Service Companies (NASSCO) condition grading system, which utilizes a zero to five rating scale. Zero indicated the asset is brand new or in very good condition, displaying no defects. While a rating of five indicated the asset has already failed or will likely fail in the imminent future. About 94 percent of the approximately 160 total manholes in the sanitary network were condition assessed while 91 percent of the total 7.5-miles of total sanitary sewer were condition assessed. The assets within the City's three pump stations were also inventoried and assessed. The major components inventoried within each station include but are not limited to pumps, check/control valves, motors, level control systems, backup power, structure, wet well, valve vault and telemetry.

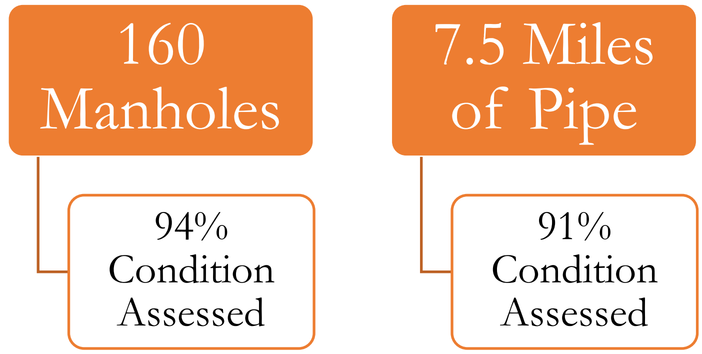

Figure 2: Portion of Sewer System Assessed

It was also observed that:

- Manholes infrastructure exhibits moderate wear with an average structural rating of approximately 2.03 and an average O&M rating of 2.34. Structural manhole defects were predominately related to brickwork. O&M manhole issues were driven by deposits and infiltration. Of the 150 manholes inspected, 130 infiltration defects were recorded. Infiltration allows for water and deposits to infiltrate the structure resulting in high levels of deposits.
- Sewers infrastructure has an average structural rating of 1.94 and an average O&M rating of 2.36. Overall the wastewater sewer system in in average condition. A large majority of the defects coded during sewer inspections were deposits encrusted, resulting from mineral build up due to minor infiltration.
- Pump station infrastructure contains assets which have exceeded or are nearing their manufactures expected lifespan. In the coming years, it is expected that assets will have to be replaced to ensure the pump stations continue to operate in a functional manner.
- The infrastructure will continue to degrade over time, for example, even though the average condition of the manhole infrastructure is near a score of 2 (moderate wear but still functional) per the 2016 assessment data, a small percent of the infrastructure has a condition rating of 5: this percentage will grow over time.

Criticality and Risk

The investigation leading to the identification of critical sewer infrastructure involved the determination of Business Risk Exposure (BRE), which is identified as the combination of the Probability of Failure (PoF) with the Consequence of Failure (CoF) as shown in Figure 3.

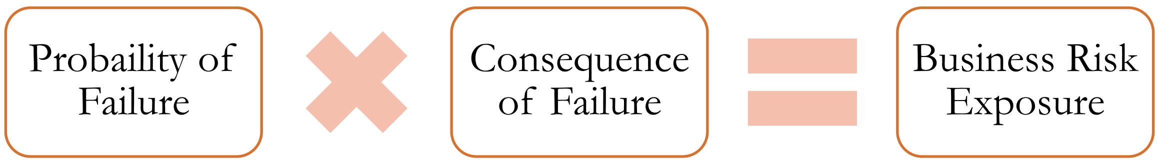

Figure 3: Risk Equation

The PoF is related to the physical condition of an asset. The CoF focuses on the economic losses and impacts to society due to an asset's failure. The following factors were combined to determine the CoF for manholes and sanitary sewers:

- Network Position – the sum of upstream sewers discharging to a pipe or manhole structure.
- Diameter/Size – the relative size of the asset with respect to the rest of the system
- Location – refers to the surface above or around the asset that will be affected if repairs or replacement is needed.
- Sensitive Environmental Features – proximity to sensitive environmental features like Houghton Creek and Sandback Pond.
- Critical User – Customers who are significant to the community's well-being. In Rose City the critical users are the Villa at Rose City, the Rose City Elementary School and the Rose City Fire and Police Station.

For pump station assets, PoF was based on the condition of the asset while the CoF was determined by the effect of an individual asset failure on the system operations.

Level of Service

The City, in line with its mission statement outlined prior, adopted Level of Service (LOS) criteria, which it plans on using as guidelines to manage the sanitary sewer system. These LOS criteria are summarized in Table 1.

Table 1: Summary of Level of Service Criteria

Key Service Criteria	Performance Indicator	Target Level of Service
Asset Condition Assessment	PACP & MACP Inspections per Year*	• MACP inspect a minimum of 20 percent of system per year. • PACP inspect a minimum of 20 percent of system every 5 years and remaining 80 percent every tenth year
Regulatory Compliance	Compliance with MDEQ Sanitary Sewer Overflow (SSO) Policy and the Clean Water Act	Continue to comply with the MDEQ SSO policy and The Clean Water Act
Service Delivery and Customer communication	Utilize Software to aid in utility management and promote customer communication, increase effort to reduce number of sewer calls and response time.	Respond to customer complaints and requests within one hour
O&M Optimization	Regular cleaning and maintenance of the collection system	• Clean and maintain 20 percent of manholes per year • Clean and maintain 20 percent of sewers every 5 years and remaining 80 percent every tenth year

*Pipe Assessment Certification Program (PACP), to assess sanitary sewer condition.

*Manhole Assessment Certification Program (MACP), to assess manhole condition.

Revenue Structure and Capital Improvement Plan

The condition assessment helped identify capital improvements that will allow the City to operate at its maximum potential. Additional long-term operations and maintenance strategies will provide the means to maintain a sound structural condition into perpetuity, including:

- Regularly-scheduled sewer, manhole and pump station inspection.
- Repair and rehabilitation to address structural problems resulting from aging infrastructure.
- Upgrades to the City's wastewater pumping stations, as assets age beyond their useful service lives.

As communities like Rose City have developed and aged, the buried infrastructure is deteriorating. Unless the City begins to systematically repair, rehabilitate and/or replace these aging components, City residents and businesses will experience a decreased level of service which could result in the following:

- Increased threat of property damage, public health and safety.
- Increased potential for environmental damage.
- Increased Potential for impassable roadways due to failed infrastructure.

There are currently three different rate structure scenarios that have been presented to the City and would provide the support of rising expenses. The City will decide which rate structure scenario fits these needs best. The revenue structure analysis and associated capital improvement projects and O&M strategies, which will continue the City's AMP, are detailed in a separate document and can be made available to the public upon request.

List of Major Assets

The major assets are approximated in the text below. The full AMP report contains additional details on the distribution of sizes and conditions.

- 160 manholes
- 7.5 miles of pipe
- 3 pump stations

END EXECUTIVE SUMMARY

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date November 30th, 2018
(no later than 3 years from executed grant date)

The City of Rose City *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1165-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or No
   If No - Date of the rate methodology approval letter: May 3, 2018.
2) Significant Progress Made: Yes or No
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: __________.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on __________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

City of Rose City at 989-685-2103 roseCityhall279@Gmail.com
Name Phone Number Email

[signature] 11-14-18
Signature of Authorized Representative (Original Signature Required) Date

Howard L. LaCosse Supervisor / operator

Rose City

STORMWATER ASSET MANAGEMENT PLAN

Rose City, City Hall
410 N Williams St
Rose City, Mi. 48654

October 2018

OHM
Advancing Communities®

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Tables

Appendix

Acronyms

AMP – Asset Management Plan or Program
BRE – Business Risk Exposure
CIP – Capital Improvement Plan
CoF – Consequence of Failure
GIS – Geographic Information Systems
MACP – Manhole Assessment Certification Program
MDEQ – Michigan Department of Environmental Quality
NASSCO – National Association of Sewer Service Companies
O&M – Operations and Maintenance
PACP – Pipeline Assessment Certification Program
PoF – Probability of Failure
SAW – Stormwater Asset Management and Wastewater Grant

Storm, Asset Management, and Wastewater (SAW) Asset Management Plan Executive Summary

The City of Rose City is responsible for the stormwater systems collection and distribution of surface runoff within City limits. Within the City, there is a network of manholes, catch basins and storm sewers to manage drainage. All stormwater assets owned by the City were included in this Asset Management Program (AMP). The City of Rose City recognizes the importance of preserving the integrity of their assets. This document was prepared using grant funding from the State of Michigan Stormwater Asset Management and Wastewater (SAW) Grant Program, SAW Grant 1165-01, with a total budget of $231,049.

This AMP was intended to accomplish the following key goals:

- Provide the City with a framework for collecting, organizing, and storing data for their stormwater collection system using the latest available hardware and software.
- Survey key system components to create the City's Geographic Information System (GIS) database to make it easier for future generations to access infrastructure data with greater ease.
- Add information including asset size, age, and location to the GIS database.
- Physically evaluate the structural condition of a representative percentage of publicly-owned system components, including manholes, catch basins and storm sewers and to store the collected data in the City's newly created GIS database.
- Identify long-term operations and maintenance strategies to maintain a reasonable structural condition into perpetuity, including:
  - Regularly-scheduled sewer inspection (televising).
  - Repair and rehabilitation to address structural problems resulting from aging infrastructure.
- Provide recommendations for developing a prioritized Capital Improvement Plan (CIP) display the significance of particular assets.

Mission Statement

One important element to an AMP is a mission statement, which identifies the overarching purpose of the City's AMP. The purpose of the City's asset management program is summarized by the following mission Statement:

We are committed to providing and maintaining a high quality storm sewer collection services to our existing and future customers in a cost effective manner while protecting human health and the environment.

Asset Management Team Leaders

The team leaders listed in Figure 1 are committed to the asset management mission statement and were instrumental in the progress made and findings outlined in this report. Further questions on the City's AMP can be directed to these team members.

Howard LaCosse

- Director of Public Works
- 989.305.7986
- rosecityhall279@gmail.com

Cindy Rosebrugh

- City Clerk
- 989.685.2103
- rosecityhall279@gmail.com

Figure 1: Asset Management Team Leaders

Infrastructure Technology & Know-How

The City has made investment to create a GIS database mapping their storm system with the intent of making it easier for future generations to access infrastructure knowledge. These investments to create a new GIS database include the following:

- Survey key system components to augment the City's created GIS database.
- Added information for sewer material type, size, age and depth to the created GIS database
- Purchased tablets and mobile devices to improve access to real-time asset information and enhance field data collection.
- Provide staff training on new hardware and software.

Asset Inventory

An asset inventory is a list of the City's assets and their attributes. The majority of the City's storm sewer infrastructure, including manholes, catch basins or inlets, outfalls and storm sewers was inventoried and digitized. The City is continuing to populate the attributes of the inventory using observations in the field while performing condition assessment. This inventory resides in the City's GIS. The GIS framework was enhanced as part of this effort, making it easier for the City to store critical data for the locations, size, material, install dates and condition of each stormwater asset.

Condition Assessment

With the intent of assessing the entire storm system, the City's storm sewer infrastructure (manholes, inlet and storm pipes) was assessed. The condition of the infrastructure is based on the National Association of Sewer Service Companies (NASSCO) condition grading system, which uses a scale of zero to five. Zero indicates the asset is brand new or in very good condition, displaying no defects. While a rating of five indicates the infrastructure is in very poor condition or has already failed. As displayed in Figure 2, about 98 percent of the storm structures were condition assessed, while 64 percent of the storm sewer pipes were condition assessed.

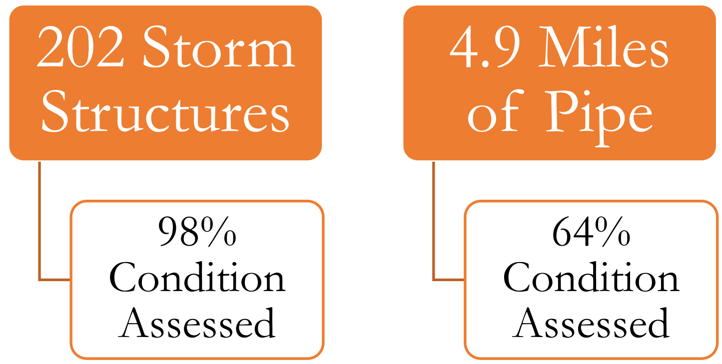

Figure 2: Portion of Storm System Assessed

It was also observed that:

- Manhole infrastructure exhibited moderate wear with an average structural rating of approximately 2.30 and an average Operations and Maintenance rating of approximately 1.75.
- The majority of structural defects in the City's storm structures were related to brickwork where structures were missing mortar or displaced bricks. The leading O&M defects present in structures were deposits and infiltration.
- The storm sewer displayed age appropriate wear with an average structural rating of approximately 2.81 and an average O&M rating of approximately 2.55.
- The primary structural defects found in the storm sewers were cracking while the primary O&M defects where deposits, roots and infiltration.

Criticality and Risk

The investigation leading to the identification of critical sewer infrastructure involved the determination of Business Risk Exposure (BRE), which is identified as the combination of the Probability of Failure (PoF) with the Consequence of Failure (CoF) as shown in Figure 3.

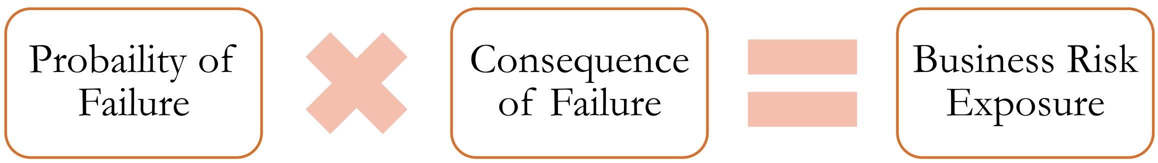

Figure 3: Risk Equation

The PoF is related to the physical condition of an asset. The CoF focuses on the economic losses and impacts to society due to an asset's failure. The following factors were combined to determine the CoF for storm structures and sewers:

- Network Position – the sum of upstream sewers discharging to a storm structure.
- Diameter/Size – the relative size of the asset with respect to the rest of the system
- Location – refers to the surface above or around the asset that will be affected if repairs or replacement is needed.
- Sensitive Environmental Features – proximity to sensitive environmental features like Houghton Creek and Sandback Pond.

Level of Service

The City, in line with its mission statement outlined prior, adopted Level of Service (LOS) criteria's, which it plans on using as guidelines to manage the storm sewer system. These LOS criteria's are summarized in Table 1.

Table 1: Summary of Level of Service Criteria

Key Service Criteria	Performance Indicator
Asset Condition Assessment	Continue asset condition inspection and tracking within GIS, as described in O&M Strategies
Regulatory Compliance	Compliance with MDEQ Policy and The Clean Water Act
Service Delivery and Customer Communication	Respond to customer complaints and requests efficiently
O&M Optimization	Regular Cleaning and Maintenance
Capital Improvements	Continue to upgrade stormwater infrastructure during road rehabilitation and replacement projects.

Revenue Structure and Capital Improvement Plan

The condition assessment helped identify capital improvements that will allow the City to operate at its maximum potential. Additional long-term operations and maintenance strategies will provide the means to maintain a sound structural condition in perpetuity, including:

- Regularly-scheduled pipe, manhole and catch basin inspection
- Repair and rehabilitation to address structural problems resulting from aging infrastructure. These projects should continue to be scheduled during road projects.

As communities like Rose City have developed and aged, the buried infrastructure is deteriorating. Unless the City begins to systematically repair, rehabilitate and/or replace these aging components, City residents and businesses will experience a decreased level of service which could result in the following:

- Increased threat of property damage, public health and safety.
- Increased potential for environmental damage
- Increased potential for impassible roadways due to failed infrastructure.

List of Major Assets

The major assets are approximated in the text below. The full AMP report contains additional details on the distribution of sizes, ages and conditions.

- 5 miles of storm sewer pipe, ranging from 4-inches to 48-inches
- 202 storm structures

END EXECUTIVE SUMMARY

DEQ

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Due Date **November 30th, 2018**
(no later than 3 years from executed grant date)

The City of Rose City *(legal name of grantee)* certifies that all stormwater asset management plan (SWAMP) activities specified in SAW Grant No. 1165-01 have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SWAMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

City of Rose City at 989-685-2103 rosecityhall279@Gmail.com
Name Phone Number Email

[signature] 11-14-18
Signature of Authorized Representative (Original Signature Required) Date

Howard L. LaCosse Supervisor/operator
Print Name and Title of Authorized Representative

SAGOLA TOWNSHIP
SAW Grant Asset Management Project
Asset Management Plan Summary

Sagola Township
SAW Grant Asset Management Plan
Grant No. 1056-01
Donald Minerick, Township Supervisor
PO Box 195
Channing, MI 49815
906.282.6995

Executive Summary

This Sanitary Sewer Asset Management Plan (AMP) is intended to provide an assessment of routine maintenance staffing requirements, and to provide an opinion of asset conditions and future needs. Operating, maintenance, and replacement costs are reviewed for all system assets, to provide a defined level of service for the utility.

The goal of an asset management plan is to use system-wide information to determine the lowest life cycle cost for maintenance, repair, and replacements to maintain that level of service. By performing pre-emptive maintenance on the system, and timing repairs before they become emergencies, the Township can make the most of their funds over the long term.

A summary of the sanitary sewer system assets is listed in Table 1.1 below:

Table 1.1: Sanitary Sewer System Asset Summary		
Total Sanitary Gravity Sewer	18,600	LFT
Total Force-Main Piping	10,100	LFT
Total Forcemain Structures	3	EACH
Total Manholes	74	EACH
Submersible Lift Stations	2	EACH
On-Site Treatment Systems	1	EACH
On-Site Treatment System Drainfield Piping	8,100	LFT
Wastewater Treatment Lagoon	16	ACRE-FEET
Wastewater Treatment Lagoon Structures	7	EACH
Wastewater Treatment Lagoon Piping	1,200	LFT

The breakdown of sizing for the gravity sewer piping for the system is shown in Table 1.2 below:

Table 1.2: Sanitary Gravity Sewer Sizing Breakdown		
Pipe Diameter	Gravity Sewer Length	
8"	18,644	LFT
Totals →	18,644	LFT

The Township's sanitary sewer gravity main system was installed in 1982 and is comprised entirely of 8-inch diameter Polyvinyl Chloride (PVC) pipe. The makeup of the sanitary sewer sizing is reflected in Figure 1.1 below:

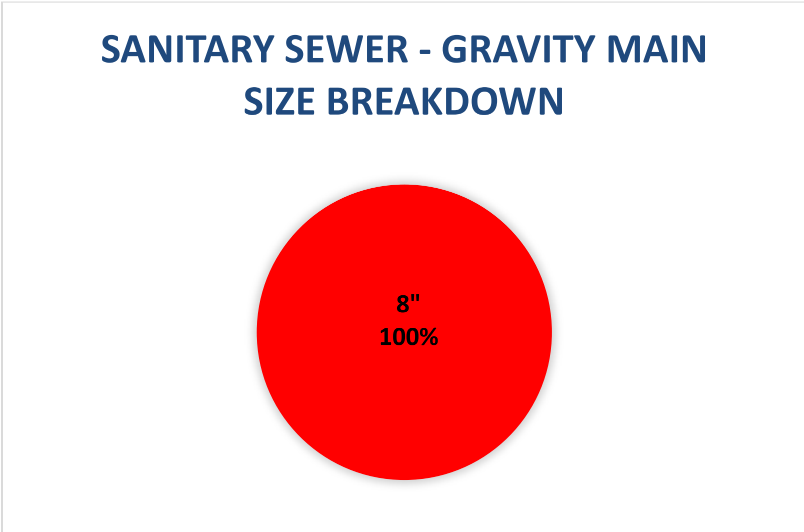

Figure 1.1: Sanitary Gravity Sewer Pipe Size

Table 1.3 indicates the quantity of each material making up the Township's Sanitary Gravity Sewer piping.

Table 1.3: Sanitary Gravity Sewer Material Breakdown		
Pipe Material	Length	
Polyvinyl Chloride Pipe (PVC)	18,644	LFT

All of the Township's gravity sewer piping (100%) has been upgraded to plastic products during the 1982 Sewer Installation Project. Plastic piping has a lower possibility of catastrophic failure from collapse or breakage resulting in a longer service life. Figure 1.2 provides a visual breakdown of the materials within the system.

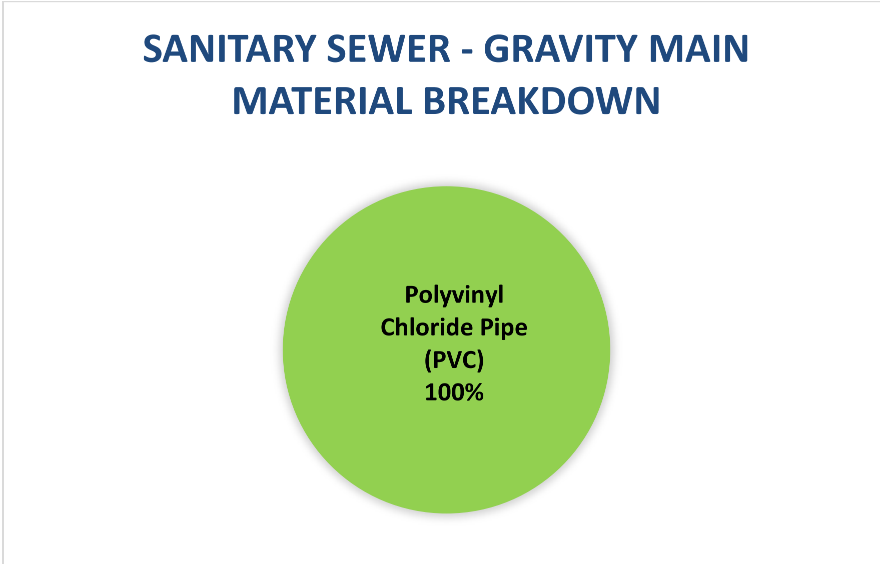

Figure 1.2: Sanitary Gravity Sewer Material

As part of the sanitary sewer system study, a risk assessment was performed for each of the system assets. This risk assessment was completed using a combination of the asset's condition, criticality, and consequence of failure. This number will vary between 1 and 5 with 1 being a minor defect grade and 5 being the most significant defect grade. The resulting condition rating allows the Village to prioritize those items where both condition and consequence make it expedient to perform proactive maintenance of the asset. Condition assessments were performed where possible by manual and televising inspections and ratings were performed. For those assets which were not televised or not reachable from the surface, assessments of probable condition were made based on material, age, and history of the asset, or assigned the same ratings as adjacent assets that could be assessed.

Table 1.4 summarizes the condition range of system assets:

Table 1.4: Condition Ratings - System Assets					
Asset Type	Rated Condition				
	1	2	3	4	5
Sanitary Gravity Sewer (LFT)		15,386	2,974	284	
Force-Main (LFT)		10,123	6		
Manholes	1	49	23	1	
Forcemain Structures		3			
Lift Stations			1	1	
On-Site Treatment Systems		1			
On-Site Treatment System Drainfield Piping (LFT)		8,135			
Wastewater Treatment Lagoon		1			
Wastewater Treatment Lagoon Structures		7			
Wastewater Treatment Lagoon Piping		1,235			

As the table above shows, the majority of the Township's sewer system assets are in average to above average condition. Assets that have been rated at 4 will be the focus of the Township over the next 20 years to address and included in the Township's 20-year Capital Improvements Plan, which is discussed further in Section 7.

Wastewater Asset Inventory

A system-wide inventory and condition assessment of most the components of the Township's Sanitary Sewer System was conducted to gather information on the assets of the system. These assets are broken down into six (6) categories: manholes, pipes, forcemain, lift stations, wastewater stabilization lagoons, and onsite treatment system. The inventory and condition assessments were performed through multiple methods. Records research was performed on existing drawings to get a general idea of system layout and asset locations, and manual surveys were performed on each of the visible assets as feasible.

A Level 1 Manhole Assessment and Certification Program (MACP) inspection was performed on most the manholes in the Township's sewer system. Some manhole locations remain unknown as they have become buried under roadways and lawn areas that were not excavated to inspect. Data was logged using a custom tool for tablets, allowing for generation of a final inspection report for each manhole. GPS equipment was used to collect the location of each manhole for mapping. Measurements were made within each manhole to establish invert elevations, material type, and sizes of connecting pipes.

Sewer main evaluations were performed using the Pipe Assessment and Certification Program (PACP) methods for televising pipes. Reports and videos for each of the televised sections of pipe were prepared by PACP certified televising contractors and reviewed by GEI. Information gathered from televising along with information from record drawings, as-built plans, and other historical records were used to determine the age and condition of each section of pipe.

Forcemain piping was evaluated based on information gathered from plans and historical records that were used to determine the age and condition of each section of forcemain pipe.

Lift stations were evaluated through various methods. Records research was performed to collect and determine existing information for the lift station. Visual inspection of the lift station was made. Vibration and infrared monitoring was performed to create a baseline for monitoring status, to diagnose any problems found, and to allow for trending to determine possible future failures.

The health of the Channing Wastewater Stabilization Lagoons was evaluated by sampling the lagoon cell sludge blanket. The depth and quality of the sludge were compared to industry standards to evaluate the overall health of the lagoons.

The Sagola Onsite Wastewater Treatment System was evaluated through various methods. Records research was performed to collect and determine existing information for this treatment system. Visual inspections of the septic tank and dosing chamber structures were made. The drainfield piping and structures were evaluated based on information gathered from design plans and historical records to determine the age and condition of the piping and structures.

Table 1.5 below is a summary of the condition ratings that were used for all assets. After the asset was evaluated a condition rating was assigned to each asset. The Asset Inventory Tables Table F-1: Sanitary Sewer Manhole Inventory, Table F-2: Sanitary Gravity Sewer Inventory, Table F-3: Sanitary Sewer Forcemain Inventory; Table F-4: Sanitary Sewer Lift Station Inventory, Table F-5: Sagola On-site Wastewater Treatment Inventory; and Table F-6: Channing On-site Wastewater Treatment Inventory are enclosed with this summary include the condition ratings that were assigned to each asset.

Table 1.5 Condition Assessment Ratings	
Condition Rating	Description
5	Asset Unserviceable - Over 50% of asset requires replacement
4	Significant deterioration - significant renewal/upgrade required (20 -40%)
3	Moderate deterioration - Significant maintenance required (10 -20%)
2	Minor Deterioration - Minor maintenance required (5%)
1	New or Excellent Condition - Only normal maintenance required

In addition to the above condition rating, a business risk factor rating was also assigned to each asset. This rating combines the condition and criticality ratings described above to give a business risk factor, which scales from 1 (least risk) to 25 (highest risk). A business risk factor of one is an asset that has a low probability of failure and has a low criticality that poses an insignificant disruption to the System, while a business risk factor of 25 is an asset that has a significant chance of failure and would cause a significant disruption in the system if it did fail. The Township has identified any items with a business risk factor of greater than 16 to be of sufficient risk to require repair or replacement.

Criticality of Assets

The Township's Sewer System was evaluated, and a criticality rating was given to all sections of the system. The Criticality Ratings are based on a scale of 1 to 5, with 5 being the most critical. High criticality indicates that the system component is essential to the operation of the system and/or serves a critical customer or part of the system. Low criticality ratings indicate that the system component would cause minor disruptions if something were to happen and service was interrupted.

Table 1.6 Criticality of Asset	
Performance Rating	Description
5	Catastrophic Disruption
4	Major Disruption
3	Moderate Disruption
2	Minor Disruption
1	Insignificant Disruption

The most critical sections of the Township's system are the Sagola and Channing Lift Stations, Forcemain piping, and wastewater treatment systems as disruptions to these components typically are more expensive and difficult to repair, and failures could result in permit violations. The main collector sewer lines located on the downstream sections of the system, and sewer mains serving larger commercial customers also have a higher criticality rating. As you progress from the farther outstretches of the system towards the main collectors, there is typically more wastewater flow due to large portions of the system draining to these areas. Therefore, a disruption to sewer mains in these areas are likely to cause more significant disruptions and affect more customers. Areas of this system that were rated with lower criticality ratings are typically located on the outer edges and serve fewer customers and disruptions to these areas would affect less people.

Level of Service Determination

The minimum level of service for the Township's Sanitary Sewer System has been set at being able to provide functional wastewater collection for flows from the Township's residents without disruption, overflow, discharge events, or violations of standard wastewater collection treatment practices. Potential violations include sewer backups that cause wastewater to either come to surface or to back up into individual service lines and basements. In order to prevent sewer backups, the Township must maintain their lines in a minimum condition by repairing collapsed pipes, jetting and cleaning lines that pose additional risk due to sizing, slope, or condition concerns. In addition, lift stations must be kept operational and be capable of pumping the necessary flows to avoid backups. Proper provisions for backup power or bypass pumping must be maintained to avoid backups during extensive power outages. The Township must also provide functional wastewater treatment for flows in the sewer system without disruption, overflow or discharge events, or violations of any terms of their wastewater treatment permits. Violations of treatment permit requirements include, but not limited to violations of constituent parameters tested at the monitoring wells and violations of discharge volumes as outlined in their NPDES Permits.

Revenue Structure

The Township's current sanitary sewer rate as of August 2018 is a flat rate of $25.00 per customer per month for Residential users, flat rate of $30.00 per month for Light/Medium Commercial users, and a flat rate of $57.50 per month for Heavy Commercial users.

As can be seen by the Township's current budget and past audits, the Sewer Fund Rates have been sufficient to cover the costs of their sewer system. However, based on the recent assessment of the of the sanitary sewer system and recommended improvements in this report, the Township recently raised rates to fund future system improvements. The Township is also considering another rate increase for all customer classes in 2019 that are proposed to be a flat rate of $32.50 per customer per month for Residential Users, flat rate of $39.00 per month for Light/Medium Commercial users, and a flat rate fee of $75.00 per month for Heavy Commercial users.

Projected annual revenues for the Township's Sewer System are based on a projection of income from the Township's sewer rates and charges. Table 1.7 below is a summary of the revenues collected by the Township from the system's residential and other users. A total of 155 Equivalent Dwelling Units (EDU's) were used in the revenue projections. An EDU is typically based on the average single family residential consumption rate from water usage. Since Sagola Township does not have a public water supply, they have no reasonable means of metering water usage to determine an average for the system users. As a result, all customers are charges a flat rate fee depending upon the classification type as shown in Table 1.7 below.

Table 1.7: Annual User Revenue Calculations

Established EDU Rate ➔ N/A

Proposed Customer Info - Users

Customer Type	*Users*	*EDU's*
Residential	135	135
Other	20	20
	155	**155**

Existing Rate Structure	*Monthly Rate*	*EDU's*	*Monthly Gallons*	*Monthly Revenue*	*Annual Revenue*
Residential	$ 25.00	135	N/A	$ 3,375.00	$ 40,500
Medium Commercial	$ 30.00	19	N/A	$ 570.00	$ 6,840
Heavy Commercial	$ 57.50	1	N/A	$ 57.50	$ 690
	Totals ➔	**155**	**N/A**	**$ 4,002.50**	**$ 48,030**

Capital Improvements Plan

As previously stated, the Township has been making sanitary sewer system repairs on an as needed basis as issues arise. Based on the 20-Year Capital Improvements Plan presented in Section 7.4 of the Township's Asset Management Plan, the Township needs to complete $999,000 over the next 20 years which equates to an annual cost of approximately $49,950. The Township needs to begin budgeting for the Capital Improvements Plan, so they will be able to address all these needs and any unanticipated needs that may arise. Again, the Township will need to continue to evaluate their sewer fund rates on a regular basis and make any adjustments necessary to stay on track with sewer system improvements. Based on the results of this sewer system evaluation, at this time, it is not anticipated that the Township will need to take on significant long-term debt to address any critical sewer system improvements. Table 1.8 below summarizes the proposed 20 Year Capital Improvements identified by this study.

Table 1.8: Capital Improvements Summary	
10-Year Capital Improvements Summary	
Location	Estimated Construction Cost
Sagola Lift Station Replacement	$ 203,000
Channing Lift Station Replacement	$ 208,600
Sagola Onsite Treatment System Improvements	$ 313,000
Channing Wastewater Stabilization Lagoon Improvements	$ 224,600
1-10 Year Total →	**$ 949,200**
20-Year Capital Improvements Summary	
Location	Estimated Construction Cost
Manhole Replacement	$ 8,700
Sewer Main Replacement	$ 41,100
11-20 Year Total →	**$ 49,800**
Total →	**$ 999,000**

Recommendations

In general, the Township's Sanitary Sewer System is in good condition with 99% of the gravity sewer being in average to above average condition, and 99% of the sanitary sewer manholes in average to above average condition. The wastewater treatment systems are in good condition and functioning properly with repairs on some of the structures being recommended for replacement or improvements. The Channing and Sagola sanitary sewer lift stations are in poor condition and in need of replacement. The sanitary sewer lift station forcemains for both the Channing and Sagola lift stations are in good condition. The 20-Year Capital Improvements plan detailed in Section 7.4 identifies $999,000 in system improvements recommended to be completed by the Township over the next 20 years.

Additionally, the Township's rate structure provides sufficient funds for proper operation and maintenance of the system. The Township will need to evaluate potential rate increases based on an annual analysis of their sewer fund to keep sufficient monies in the fund. It is recommended the Township review past and future expenses when examining potential rate increases to determine if they are sufficient to meet the expected future expenditures.

This Asset Management Plan should be considered a working plan and updated annually to reflect changes in the Township's Sewer System, rate structures, budgets, or other facets of the plan.

List of Major Assets

See the following enclosed tables for a list of the Township's major assets:

- Table F-1: Sanitary Sewer Manhole Inventory
- Table F-2: Sanitary Gravity Sewer Inventory
- Table F-3: Sanitary Sewer Forcemain Inventory
- Table F-4: Sanitary Sewer Lift Station Inventory
- Table F-5: Sagola On-site Wastewater Treatment Inventory
- Table F-6: Channing On-site Wastewater Treatment Inventory

SAGOLA TOWNSHIP
SANITARY SEWER SYSTEM ASSET MANAGEMENT PLAN
TABLE F-1: SANITARY SEWER MANHOLE INVENTORY

Inflation Rate ==> 2.50%

Manhole Name	Manhole Diamater (inches)	Material	Location	Manhole Depth (feet)	Replacement Cost	Year Installed	Remaining Useful Life	Useful Life	Condition Rating	Criticality Rating	Risk Factor	Replacement Year Cost
CSMH-01	48	Concrete (Reinforced)	Channing	8.40	$ 6,000	1982	30	100	3	3	9	$ 12,585
CSMH-02	48	Concrete (Reinforced)	Channing	16.07	$ 6,000	1982	50	100	2	3	6	$ 20,623
CSMH-03	48	Concrete (Reinforced)	Channing	15.22	$ 6,000	1982	50	100	2	2	4	$ 20,623
CSMH-04	48	Concrete (Reinforced)	Channing	13.00	$ 6,000	1982	50	100	2	2	4	$ 20,623
CSMH-05	48	Concrete (Reinforced)	Channing	4.50	$ 6,000	1982	50	100	2	1	2	$ 20,623
CSMH-06	48	Concrete (Reinforced)	Channing	7.77	$ 6,000	1982	50	100	2	2	4	$ 20,623
CSMH-07	48	Concrete (Reinforced)	Channing	8.30	$ 6,000	1982	50	100	2	1	2	$ 20,623
CSMH-08	48	Concrete (Reinforced)	Channing	4.49	$ 6,000	1982	50	100	2	1	2	$ 20,623
CSMH-09	48	Concrete (Reinforced)	Channing	12.53	$ 6,000	1982	50	100	2	4	8	$ 20,623
CSMH-10		Concrete (Reinforced)	Channing		$ 6,000	1982	50	100	2	4	8	$ 20,623
CSMH-11	48	Concrete (Reinforced)	Channing	10.20	$ 6,000	1982	50	100	2	4	8	$ 20,623
CSMH-12	48	Concrete (Reinforced)	Channing	9.23	$ 6,000	1982	50	100	2	1	2	$ 20,623
CSMH-13	48	Concrete (Reinforced)	Channing	8.24	$ 6,000	1982	30	100	3	1	3	$ 12,585
CSMH-14	48	Concrete (Reinforced)	Channing	11.81	$ 6,000	1982	50	100	2	4	8	$ 20,623
CSMH-15	48	Concrete (Reinforced)	Channing	14.55	$ 6,000	1982	50	100	2	3	6	$ 20,623
CSMH-16	48	Concrete (Reinforced)	Channing	14.73	$ 6,000	1982	30	100	3	3	9	$ 12,585
CSMH-17	48	Concrete (Reinforced)	Channing	10.49	$ 6,000	1982	50	100	2	2	4	$ 20,623
CSMH-18	48	Concrete (Reinforced)	Channing	11.28	$ 6,000	1982	30	100	3	2	6	$ 12,585
CSMH-19	48	Concrete (Reinforced)	Channing	10.45	$ 6,000	1982	30	100	3	1	3	$ 12,585
CSMH-20	48	Concrete (Reinforced)	Channing	7.25	$ 6,000	1982	50	100	2	1	2	$ 20,623
CSMH-21	48	Concrete (Reinforced)	Channing	9.12	$ 6,000	1982	50	100	2	2	4	$ 20,623
CSMH-22	48	Concrete (Reinforced)	Channing	14.88	$ 6,000	1982	50	100	2	1	2	$ 20,623
CSMH-23	48	Concrete (Reinforced)	Channing	8.90	$ 6,000	1982	50	100	2	1	2	$ 20,623
CSMH-24	48	Concrete (Reinforced)	Channing	11.94	$ 6,000	1982	50	100	2	1	2	$ 20,623
CSMH-25	48	Concrete (Reinforced)	Channing	15.07	$ 6,000	1982	50	100	2	1	2	$ 20,623
CSMH-26	48	Concrete (Reinforced)	Channing	18.95	$ 6,000	1982	30	100	3	2	6	$ 12,585
CSMH-27	48	Concrete (Reinforced)	Channing	11.34	$ 6,000	1982	50	100	2	1	2	$ 20,623
CSMH-28	48	Concrete (Reinforced)	Channing	12.51	$ 6,000	1982	50	100	2	2	4	$ 20,623
CSMH-29	48	Concrete (Reinforced)	Channing	14.55	$ 6,000	1982	50	100	2	3	6	$ 20,623
CSMH-30	48	Concrete (Reinforced)	Channing	13.57	$ 6,000	1982	30	100	3	3	9	$ 12,585
CSMH-31	48	Concrete (Reinforced)	Channing	10.06	$ 6,000	1982	30	100	3	4	12	$ 12,585
CSMH-32	48	Concrete (Reinforced)	Channing	8.57	$ 6,000	1982	30	100	3	3	9	$ 12,585
CSMH-33	48	Concrete (Reinforced)	Channing	14.35	$ 6,000	1982	50	100	2	3	6	$ 20,623
CSMH-34	48	Concrete (Reinforced)	Channing	19.94	$ 6,000	1982	30	100	3	3	9	$ 12,585
CSMH-35	48	Concrete (Reinforced)	Channing	10.79	$ 6,000	1982	30	100	3	2	6	$ 12,585
CSMH-36	48	Concrete (Reinforced)	Channing	10.11	$ 6,000	1982	15	100	4	1	4	$ 8,690
CSMH-37	48	Concrete (Reinforced)	Channing	10.00	$ 6,000	1982	50	100	2	1	2	$ 20,623
CSMH-38	48	Concrete (Reinforced)	Channing	11.11	$ 6,000	1982	50	100	2	1	2	$ 20,623

SAGOLA TOWNSHIP
SANITARY SEWER SYSTEM ASSET MANAGEMENT PLAN
TABLE F-1: SANITARY SEWER MANHOLE INVENTORY

Inflation Rate ==> 2.50%

Manhole Name	Manhole Diamater (inches)	Material	Location	Manhole Depth (feet)	Replacement Cost	Year Installed	Remaining Useful Life	Useful Life	Condition Rating	Criticality Rating	Risk Factor	Replacement Year Cost
CSMH-39	48	Concrete (Reinforced)	Channing	14.55	$ 6,000	1982	50	100	2	2	4	$ 20,623
CSMH-40	48	Concrete (Reinforced)	Channing	14.53	$ 6,000	1982	50	100	2	2	4	$ 20,623
CSMH-41	48	Concrete (Reinforced)	Channing	19.64	$ 6,000	1982	50	100	2	2	4	$ 20,623
CSMH-42	48	Concrete (Reinforced)	Channing	8.97	$ 6,000	1982	50	100	2	1	2	$ 20,623
CSMH-43	48	Concrete (Reinforced)	Channing	12.56	$ 6,000	1982	50	100	2	1	2	$ 20,623
CSMH-44	48	Concrete (Reinforced)	Channing	9.51	$ 6,000	1982	50	100	2	1	2	$ 20,623
CSMH-45	48	Concrete (Reinforced)	Channing	14.25	$ 6,000	1982	50	100	2	1	2	$ 20,623
CSMH-46	48	Concrete (Reinforced)	Channing	9.72	$ 6,000	1982	50	100	2	1	2	$ 20,623
SCOMH-1	48	Concrete (Reinforced)	Sagola	-	$ 6,000	1982	30	100	3	4	12	$ 12,585
SCOMH-2	48	Concrete (Reinforced)	Sagola	5.85	$ 6,000	1982	50	100	2	4	8	$ 20,623
SSMH-01	48	Concrete (Reinforced)	Sagola	16.84	$ 6,000	1982	50	100	2	3	6	$ 20,623
SSMH-02	48	Concrete (Reinforced)	Sagola	10.15	$ 6,000	1982	30	100	3	3	9	$ 12,585
SSMH-03	48	Concrete (Reinforced)	Sagola	10.54	$ 6,000	1982	30	100	3	2	6	$ 12,585
SSMH-04	48	Concrete (Reinforced)	Sagola	11.05	$ 6,000	1982	50	100	2	2	4	$ 20,623
SSMH-04A	48	Concrete (Reinforced)	Sagola	11.21	$ 6,000	1982	30	100	3	2	6	$ 12,585
SSMH-05	48	Concrete (Reinforced)	Sagola	10.97	$ 6,000	1982	50	100	2	1	2	$ 20,623
SSMH-05A	48	Concrete (Reinforced)	Sagola	11.22	$ 6,000	1982	50	100	2	1	2	$ 20,623
SSMH-06	48	Concrete (Reinforced)	Sagola	11.26	$ 6,000	1982	50	100	2	2	4	$ 20,623
SSMH-06A	48	Concrete (Reinforced)	Sagola	12.09	$ 6,000	1982	50	100	2	1	2	$ 20,623
SSMH-07	48	Concrete (Reinforced)	Sagola	10.94	$ 6,000	1982	50	100	2	1	2	$ 20,623
SSMH-09	48	Concrete (Reinforced)	Sagola	16.72	$ 6,000	1982	50	100	2	4	8	$ 20,623
SSMH-09A	48	Concrete (Reinforced)	Sagola	10.43	$ 6,000	1982	50	100	2	4	8	$ 20,623
SSMH-10	48	Concrete (Reinforced)	Sagola	8.25	$ 6,000	1982	50	100	2	1	2	$ 20,623
SSMH-11	48	Concrete (Reinforced)	Sagola	12.41	$ 6,000	1982	50	100	2	2	4	$ 20,623
SSMH-12	48	Concrete (Reinforced)	Sagola	8.72	$ 6,000	1982	30	100	3	2	6	$ 12,585
SSMH-13	48	Concrete (Reinforced)	Sagola	12.43	$ 6,000	1982	50	100	2	2	4	$ 20,623
SSMH-14	48	Concrete (Reinforced)	Sagola	8.85	$ 6,000	1982	30	100	3	1	3	$ 12,585
SSMH-15	48	Concrete (Reinforced)	Sagola	7.10	$ 6,000	1982	50	100	2	1	2	$ 20,623
SSMH-16	48	Concrete (Reinforced)	Sagola	4.90	$ 6,000	1982	80	100	1	1	1	$ 43,257
SSMH-17	48	Concrete (Reinforced)	Sagola	7.39	$ 6,000	1982	30	100	3	1	3	$ 12,585
SSMH-18	48	Concrete (Reinforced)	Sagola	9.80	$ 6,000	1982	30	100	3	3	9	$ 12,585
SSMH-18A	48	Concrete (Reinforced)	Sagola	9.93	$ 6,000	1982	50	100	2	2	4	$ 20,623
SSMH-19	48	Concrete (Reinforced)	Sagola	8.14	$ 6,000	1982	30	100	3	2	6	$ 12,585
SSMH-21	48	Concrete (Reinforced)	Sagola	7.64	$ 6,000	1982	30	100	3	2	6	$ 12,585
SSMH-22		Concrete (Reinforced)	Sagola		$ 6,000	1982	30	100	3	2	6	$ 12,585
SSMH-23	48	Concrete (Reinforced)	Sagola	3.79	$ 6,000	1982	30	100	3	1	3	$ 12,585
				TOTALS ==>	**$ 444,000**							**$ 1,351,921**

1. Manholes without a diameter indicated were not inspected and have an assumed condition.

SAGOLA TOWNSHIP
SANITARY SEWER SYSTEM ASSET MANAGEMENT PLAN
TABLE F-2: SANITARY GRAVITY SEWER INVENTORY

Inflation Rate ==> 2.50%

Pipe Name	Location	Downstream Manhole	Upstream Manhole	Type	Pipe Size (inches)	Pipe Material	Pipe Length (feet)	Replacement Cost	Year Installed	Remaining Useful Life	Useful Life	Condition Rating	Criticality Rating	Risk Factor	Replacement Year Cost
3	Channing	CSMH-19	CSMH-20	Gravity	8	PVC	226	$ 22,568	1982	50	100	2	2	4	$ 77,568
4	Channing	CSMH-18	CSMH-19	Gravity	8	PVC	376	$ 37,559	1982	50	100	2	2	4	$ 129,094
5	Channing	CSMH-18	CSMH-21	Gravity	8	PVC	172	$ 17,236	1982	50	100	2	2	4	$ 59,242
6	Channing	CSMH-17	CSMH-18	Gravity	8	PVC	197	$ 19,685	1982	50	100	2	2	4	$ 67,658
7	Channing	CSMH-16	CSMH-17	Gravity	8	PVC	345	$ 34,479	1982	50	100	2	2	4	$ 118,510
8	Channing	CSMH-15	CSMH-16	Gravity	8	PVC	397	$ 39,725	1982	50	100	2	3	6	$ 136,539
9	Channing	CSMH-14	CSMH-15	Gravity	8	PVC	373	$ 37,312	1982	50	100	2	3	6	$ 128,247
10	Channing	CSMH-11	CSMH-14	Gravity	8	PVC	359	$ 35,881	1982	30	100	3	3	9	$ 75,263
11	Channing	CSMH-12	CSMH-13	Gravity	8	PVC	248	$ 24,758	1982	50	100	2	2	4	$ 85,097
12	Channing	CSMH-11	CSMH-12	Gravity	8	PVC	136	$ 13,648	1982	50	100	2	2	4	$ 46,910
13	Channing	CSMH-10	CSMH-11	Gravity	8	PVC	349	$ 34,931	1982	30	100	3	3	9	$ 73,270
14	Channing	CSMH-9	CSMH-10	Gravity	8	PVC	201	$ 20,138	1982	30	100	3	4	12	$ 42,241
16	Channing	CLSWW-1	CSMH-9	Gravity	8	PVC	53	$ 5,345	1982	50	100	2	4	8	$ 18,371
18	Channing	CLSWW-1	CSMH-1	Gravity	8	PVC	246	$ 24,585	1982	30	100	3	4	12	$ 51,569
19	Channing	CSMH-1	CSMH-2	Gravity	8	PVC	218	$ 21,753	1982	50	100	2	2	4	$ 74,767
20	Channing	CSMH-2	CSMH-3	Gravity	8	PVC	393	$ 39,348	1982	50	100	2	2	4	$ 135,244
21	Channing	CSMH-3	CSMH-4	Gravity	8	PVC	382	$ 38,172	1982	50	100	2	2	4	$ 131,200
22	Channing	CSMH-6	CSMH-5	Gravity	8	PVC	153	$ 15,316	1982	50	100	2	2	4	$ 52,642
23	Channing	CSMH-4	CSMH-6	Gravity	8	PVC	194	$ 19,415	1982	50	100	2	2	4	$ 66,730
24	Channing	CSMH-6	CSMH-7	Gravity	8	PVC	402	$ 40,206	1982	50	100	2	2	4	$ 138,194
25	Channing	CSMH-7	CSMH-8	Gravity	8	PVC	402	$ 40,177	1982	50	100	2	1	2	$ 138,093
26	Channing	CSMH-21	CSMH-22	Gravity	8	PVC	335	$ 33,460	1982	50	100	2	2	4	$ 115,005
27	Channing	CSMH-22	CSMH-23	Gravity	8	PVC	129	$ 12,946	1982	50	100	2	2	4	$ 44,497
29	Channing	CSMH-25	CSMH-24	Gravity	8	PVC	133	$ 13,258	1982	50	100	2	1	2	$ 45,571
30	Channing	CSMH-26	CSMH-25	Gravity	8	PVC	94	$ 9,448	1982	50	100	2	1	2	$ 32,473
31	Channing	CSMH-26	CSMH-27	Gravity	8	PVC	79	$ 7,867	1982	50	100	2	1	2	$ 27,041
32	Channing	CSMH-28	CSMH-26	Gravity	8	PVC	373	$ 37,349	1982	50	100	2	2	4	$ 128,371
33	Channing	CSMH-29	CSMH-28	Gravity	8	PVC	362	$ 36,166	1982	50	100	2	2	4	$ 124,305
34	Channing	CSMH-30	CSMH-29	Gravity	8	PVC	386	$ 38,567	1982	50	100	2	3	6	$ 132,559
35	Channing	CSMH-31	CSMH-30	Gravity	8	PVC	160	$ 15,996	1982	50	100	2	3	6	$ 54,982
36	Channing	CSMH-9	CSMH-31	Gravity	8	PVC	324	$ 32,395	1982	50	100	2	4	8	$ 111,345
37	Channing	CSMH-31	CSMH-32	Gravity	8	PVC	361	$ 36,102	1982	50	100	2	4	8	$ 124,085
38	Channing	CSMH-36	CSMH-37	Gravity	8	PVC	295	$ 29,543	1982	50	100	2	1	2	$ 101,543
39	Channing	CSMH-35	CSMH-36	Gravity	8	PVC	352	$ 35,207	1982	50	100	2	2	4	$ 121,010
40	Channing	CSMH-35	CSMH-38	Gravity	8	PVC	221	$ 22,087	1982	50	100	2	1	2	$ 75,914
41	Channing	CSMH-34	CSMH-35	Gravity	8	PVC	388	$ 38,802	1982	50	100	2	2	4	$ 133,366
42	Channing	CSMH-33	CSMH-34	Gravity	8	PVC	214	$ 21,381	1982	50	100	2	2	4	$ 73,490
43	Channing	CSMH-32	CSMH-33	Gravity	8	PVC	330	$ 32,951	1982	50	100	2	3	6	$ 113,257
44	Channing	CSMH-41	CSMH-42	Gravity	8	PVC	279	$ 27,893	1982	50	100	2	1	2	$ 95,870
45	Channing	CSMH-40	CSMH-41	Gravity	8	PVC	310	$ 30,960	1982	50	100	2	2	4	$ 106,413
46	Channing	CSMH-39	CSMH-40	Gravity	8	PVC	306	$ 30,584	1982	50	100	2	2	4	$ 105,120
47	Channing	CSMH-34	CSMH-39	Gravity	8	PVC	320	$ 31,953	1982	30	100	3	2	6	$ 67,023
48	Channing	CSMH-41	CSMH-43	Gravity	8	PVC	284	$ 28,381	1982	50	100	2	2	4	$ 97,548

SAGOLA TOWNSHIP
SANITARY SEWER SYSTEM ASSET MANAGEMENT PLAN
TABLE F-2: SANITARY GRAVITY SEWER INVENTORY

Inflation Rate ==> 2.50%

Pipe Name	Location	Downstream Manhole	Upstream Manhole	Type	Pipe Size (inches)	Pipe Material	Pipe Length (feet)	Replacement Cost	Year Installed	Remaining Useful Life	Useful Life	Condition Rating	Criticality Rating	Risk Factor	Replacement Year Cost
49	Channing	CSMH-43	CSMH-44	Gravity	8	PVC	276	$ 27,621	1982	50	100	2	2	4	$ 94,936
50	Channing	CSMH-45	CSMH-46	Gravity	8	PVC	210	$ 20,997	1982	50	100	2	1	2	$ 72,169
51	Channing	CSMH-44	CSMH-45	Gravity	8	PVC	384	$ 38,438	1982	50	100	2	2	4	$ 132,117
116	Channing	CSMH-11	CSMH-12	Gravity	8	PVC	62	$ 6,200	1982	50	100	2	4	8	$ 21,310
52	Sagola	SSMH-13	SSMH-14	Gravity	8	PVC	361	$ 36,119	1982	30	100	3	2	6	$ 75,762
53	Sagola	SSMH-18A	SSMH-17	Gravity	8	PVC	74	$ 7,359	1982	50	100	2	3	6	$ 25,292
54	Sagola	SSMH-18	SSMH-18A	Gravity	8	PVC	224	$ 22,434	1982	50	100	2	3	6	$ 77,108
55	Sagola	SSMH-13	SSMH-18	Gravity	8	PVC	74	$ 7,378	1982	50	100	2	4	8	$ 25,358
56	Sagola	SSMH-21	SSMH-23	Gravity	8	PVC	631	$ 63,102	1982	50	100	2	2	4	$ 216,887
57	Sagola	SSMH-19	SSMH-21	Gravity	8	PVC	542	$ 54,161	1982	50	100	2	2	4	$ 186,157
58	Sagola	SSMH-6A	SSMH-7	Gravity	8	PVC	191	$ 19,063	1982	50	100	2	1	2	$ 65,522
59	Sagola	SSMH-6	SSMH-6A	Gravity	8	PVC	202	$ 20,220	1982	50	100	2	2	4	$ 69,498
60	Sagola	SSMH-4	SSMH-6	Gravity	8	PVC	394	$ 39,374	1982	50	100	2	2	4	$ 135,332
61	Sagola	SSMH-4A	SSMH-5	Gravity	8	PVC	128	$ 12,816	1982	50	100	2	1	2	$ 44,052
62	Sagola	SSMH-4	SSMH-4A	Gravity	8	PVC	202	$ 20,201	1982	50	100	2	2	4	$ 69,434
63	Sagola	SSMH-3	SSMH-4	Gravity	8	PVC	274	$ 27,417	1982	30	100	3	2	6	$ 57,508
64	Sagola	SSMH-2	SSMH-3	Gravity	8	PVC	171	$ 17,094	1982	50	100	2	2	4	$ 58,755
65	Sagola	SSMH-9A	SSMH-10	Gravity	8	PVC	178	$ 17,780	1982	50	100	2	1	2	$ 61,113
66	Sagola	SSMH-11	SSMH-12	Gravity	8	PVC	348	$ 34,781	1982	50	100	2	1	2	$ 119,544
67	Sagola	SSMH-9A	SSMH-11	Gravity	8	PVC	350	$ 34,981	1982	50	100	2	3	6	$ 120,235
68	Sagola	SSMH-9	SSMH-9A	Gravity	8	PVC	29	$ 2,944	1982	50	100	2	4	8	$ 10,119
69	Sagola	SSMH-1	SSMH-9	Gravity	8	PVC	36	$ 3,631	1982	50	100	2	4	8	$ 12,481
70	Sagola	SLSWW-1	SSMH-1	Gravity	8	PVC	12	$ 1,167	1982	50	100	2	4	8	$ 4,011
72	Sagola	SSMH-1	SSMH-2	Gravity	8	PVC	236	$ 23,608	1982	50	100	2	3	6	$ 81,142
73	Sagola	SSMH-9A	SSMH-13	Gravity	8	PVC	272	$ 27,173	1982	30	100	3	4	12	$ 56,996
104	Sagola	SSMH-9A	SSMH-13	Gravity	8	PVC	52	$ 5,200	1982	50	100	2	4	8	$ 17,873
200	Sagola	SSMH-14	SSMH-15	Gravity	8	PVC	284	$ 28,400	1982	15	100	4	3	12	$ 41,132
201	Sagola	SSMH-18	SSMH-19	Gravity	8	PVC	203	$ 20,300	1982	30	100	3	3	9	$ 42,581
202	Sagloa	SSMH-17	SSMH-16	Gravity	8	PVC	389	$ 38,900	1982	30	100	3	3	9	$ 81,595
						TOTALS ==>	**18,644**	**$ 1,864,391**							**$ 5,953,256**

SAGOLA TOWNSHIP
SANITARY SEWER SYSTEM ASSET MANAGEMENT PLAN
TABLE F-3: LIFT STATION FORCEMAIN PIPE AND STRUCTURE INVENTORY

Inflation Rate ==> 2.50%

Pipe Name	Downstream Manhole	Upstream Manhole	Location	Type	Pipe Size (inches)	Pipe Material	Pipe Length (feet)	Replacement Cost	Year Installed	Remaining Useful Life	Useful Life	Condition Rating	Criticality Rating	Risk Factor	Replacement Year Cost
17	CLSWW-1	CLSVV-1	Channing	Forcemain	4	DI	6	$ 600	1982	30	100	3	4	12	$ 1,259
97	CCOMH-2	CARMH-1	Channing	Forcemain	6	PVC	2,192	$ 219,163	1982	50	100	2	4	8	$ 753,286
197	CCOMH-1	CLSWW-1	Channing	Forcemain	6	PVC	2,211	$ 221,064	1982	50	100	2	4	8	$ 759,821
198	CARMH-1	CCOMH-1	Channing	Forcemain	6	PVC	1,556	$ 155,574	1982	50	100	2	4	8	$ 534,726
199	Lagoon Effluent MH	CCOMH-2	Channing	Forcemain	6	PVC	1,247	$ 124,741	1982	50	100	2	4	8	$ 428,749
71	SLSVV-1	SLSWW-1	Sagola	Forcemain	3	DI	8	$ 800	1982	50	100	2	4	8	$ 2,750
103	SCOMH-2	SCOMH-1	Sagola	Forcemain	2.5	PVC	1,291	$ 129,109	1982	50	100	2	4	8	$ 443,762
115	SCOMH-1	SLSVV-1	Sagola	Forcemain	2.5	PVC	840	$ 83,983	1982	50	100	2	4	8	$ 288,658
192	Septic Tank	SCOMH-2	Sagola	Forcemain	2.5	PVC	778	$ 77,809	1982	50	100	2	4	8	$ 267,438
						TOTALS ==>	**10,128**	**$ 1,012,843**							**$ 3,480,447**

Inflation Rate ==> 2.50%

Structure Name	Structure Diamater (inches)	Material	Type	Location				Replacement Cost	Year Installed	Remaining Useful Life	Useful Life	Condition Rating	Criticality Rating	Risk Factor	Replacement Year Cost
CARMH-1	48	Concrete (Reinforced)	Air Release	Channing				$ 15,000	1982	50	100	2	4	8	$ 51,557
CCOMH-1	48	Concrete (Reinforced)	Cleanout	Channing				$ 10,000	1982	50	100	2	4	8	$ 34,371
CCOMH-2	48	Concrete (Reinforced)	Cleanout	Channing				$ 10,000	1982	50	100	2	4	8	$ 34,371
SCOMH-1	48	Concrete (Reinforced)	Cleanout	Sagola				$ 10,000	1982	50	100	2	4	8	$ 34,371
SCOMH-2	48	Concrete (Reinforced)	Cleanout	Sagola				$ 10,000	1982	50	100	2	4	8	$ 34,371
							TOTALS ==>	**$ 55,000**							**$ 189,041**

SAGOLA TOWNSHIP
SANITARY SEWER SYSTEM ASSET MANAGEMENT PLAN
TABLE F-4: SANITARY SEWER LIFT STATION INVENTORY

Inflation Rate ==> 2.50%

Name	Description	Type	Model	Year Installed	Design Rated Flow (gpm)	Design Rated Head (feet)	Motor HP	Voltage	Useful Life	Remaining Useful Life	Condition Rating	Criticality Rating	Risk Factor	Replacement Cost	Replacement Year Cost
Sagola Lift Station		Submersible													
Pump 1	Grinder	ABS	Piranha	2008	45	121	6.2	240	10	0	4	5	20	$ 8,500	$ 8,500
Pump 2	Grinder	ABS	Piranha	2014	45	121	6.2	240	10	6	4	5	20	$ 8,500	$ 9,857
SLS-WW1	4' Dia.	Concrete		1982					50	14	3	5	15	$ 25,000	$ 35,324
SLS-VV1	5' Dia.	Concrete		1982					50	14	3	5	15	$ 20,000	$ 28,259
Piping	3" Dia.	Ductile Iron		1982					50	14	4	5	20	$ 10,000	$ 14,130
Knife Valves	3"	Ductile Iron		2014					30	26	2	5	10	$ 10,000	$ 19,003
Check Valves	3"	Ductile Iron	Crispin SWL	2014					30	26	2	5	10	$ 7,500	$ 14,252
Electrical				1982					30	-6	4	5	20	$ 20,000	$ 17,246
Controls		Analog		1982					30	-6	4	5	20	$ 25,000	$ 21,557
													TOTALS ==>	**$ 134,500**	**$ 168,129**

Inflation Rate ==> 2.50%

Name	Description	Type	Model	Year Installed	Rated Flow (gpm)	Rated Head (feet)	Motor HP	Voltage	Useful Life	Remaining Useful Life	Condition Rating	Criticality Rating	Risk Factor	Replacement Cost	Replacement Year Cost
Channing Lift Station		Submersible													
Pump 1				2005	175	40	7.5	240	20	7	4	5	20	$ 10,000	$ 11,887
Pump 2				1982	175	40	7.5	240	20	-16	4	5	20	$ 10,000	$ 6,736
CLSWW-1	6' Dia.	Concrete		1982					50	14	3	5	15	$ 25,000	$ 35,324
CLSVV-1	5' Dia.	Concrete		1982					50	14	3	5	15	$ 20,000	$ 28,259
Piping	4" Dia.	Ductile Iron		1982					50	14	3	5	15	$ 15,000	$ 21,195
Plug Valves	4"			1982					30	-6	4	5	20	$ 12,000	$ 10,348
Check Valves	4"			1982					30	-6	4	5	20	$ 7,500	$ 6,467
Electrical				1982					30	-6	4	5	20	$ 15,000	$ 12,934
Controls		Analog		1982					30	-6	4	5	20	$ 25,000	$ 21,557
													TOTALS ==>	**$ 139,500**	**$ 154,708**

SAGOLA TOWNSHIP
SANITARY SEWER SYSTEM ASSET MANAGEMENT PLAN
TABLE F-5: SAGOLA SANITARY SEWER ONSITE TREATMENT SYSTEM INVENTORY

Inflation Rate ==> 2.50%

Name	Type	Material	Year Installed	Size	Pipe Length (feet)	Useful Life	Remaining Useful Life	Condition Rating	Criticality Rating	Risk Factor	Replacement Cost	Replacement Year Cost
Sagola Onsite Treatment System												
Septic Tank	Septic Tank	Reinf. Concrete	1982	17,904 gallons		80	45	4	5	20	$ 75,000	$ 227,843
Dosing Tank	Dosing Tank	Reinf. Concrete	1982	3,013 gallons		80	45	4	5	20	$ 50,000	$ 151,895
Drainfield Cell No. 1		Washed Stone	1982			80	45	3	5	15	$ 75,000	$ 227,843
Drainfield Cell No. 2		Washed Stone	1982			80	45	3	5	15	$ 75,000	$ 227,843
Distribution Pipe Cell No. 1	Perforated	PVC	1982	6 inch	4,020	80	45	2	5	10	$ 60,300	$ 183,186
Distribution Pipe Cell No. 2	Perforated	PVC	1982	6 inch	4,115	80	45	2	5	10	$ 61,725	$ 187,515
Drop Structure (19)		Concrete	1983	2' Dia.		50	16	3	5	15	$ 47,500	$ 70,514
				TOTALS ==>	**8,135**						$ 444,525	$ 1,276,638

SAGOLA TOWNSHIP
SANITARY SEWER SYSTEM ASSET MANAGEMENT PLAN
TABLE F-6: CHANNING WASTEWATER STABILIZATION LAGOONS INVENTORY

Inflation Rate ==> 2.50%

Name	Structure Diameter (inches)	Structure Material	Structure Type	Quantity	Area (Acres)	Volume (Gallons)	Year Installed	Useful Life	Remaining Useful Life	Condition Rating	Criticality Rating	Risk Factor	Replacement Cost	Replacement Year Cost
Lagoon Cell 1					2	2,610,115	1982	80	45	2	5	10	$ 250,000	$ 759,476
Lagoon Cell 2					2	2,610,115	1982	80	45	2	5	10	$ 250,000	$ 759,476
Influent MH	72	Concrete (Reinforced)	Influent Manhole				1982	40	5	5	5	25	$ 35,000	$ 39,599
Discharge MH-01	48	Concrete (Reinforced)	Discharge Manhole				1982	80	45	2	5	10	$ 25,000	$ 75,948
Discharge MH-02	48	Concrete (Reinforced)	Discharge Manhole				1982	80	45	2	5	10	$ 25,000	$ 75,948
Outfall MH	48	Concrete (Reinforced)	Outfall Manhole				1982	80	45	2	5	10	$ 10,000	$ 30,379
EB-1	24	Concrete (Reinforced)	Effluent Box				1982	80	45	2	5	10	$ 10,000	$ 30,379
EB-2	24	Concrete (Reinforced)	Effluent Box				1982	80	45	2	5	10	$ 10,000	$ 30,379
CID-1	48	Concrete	Influent Dish				1982	80	45	2	5	10	$ 10,000	$ 30,379
CID-2	48	Concrete	Influent Dish				1982	80	45	2	5	10	$ 10,000	$ 30,379
FL-01	72	Concrete (Reinforced)	Flume Metering Structure				1982	80	45	2	5	10	$ 20,000	$ 60,758
PLCS-1	72	Concrete (Reinforced)	Control Structure				1982	40	5	3	5	15	$ 35,000	$ 39,599
Perimeter Fence				2,500			1982	40	5	5	5	25	$ 87,500	$ 98,998
Entry Gate				2			1982	40	5	5	5	25	$ 10,000	$ 11,314
												TOTALS ==>	$ 787,500	$ 2,073,011

Inflation Rate ==> 2.50%

Lagoon Pipe Name	Location	Downstream Manhole	Upstream Manhole	Type	Pipe Size (inches)	Pipe Material	Pipe Length (feet)	Replacement Cost	Year Installed	Remaining Useful Life	Useful Life	Condition Rating	Criticality Rating	Risk Factor	Replacement Year Cost
119	Channing	LD MH-01	LO MH-1	Lagoon	10	DI	380	$ 38,000	1982	50	100	2	4	8	$ 130,610
120	Channing	LD MH-02	LO MH-1	Lagoon	10	DI	341	$ 34,100	1982	50	100	2	4	8	$ 117,205
211	Channing	Cell 1	LI MH-1	Lagoon	10	DI	170	$ 17,000	1982	50	100	2	4	8	$ 58,431
212	Channing	Cell 2	LI MH-1	Lagoon	10	DI	170	$ 17,000	1982	50	100	2	4	8	$ 58,431
209	Channing	LD MH-01	EB-1	Lagoon	8	DI	52	$ 5,200	1982	50	100	2	4	8	$ 17,873
210	Channing	LD MH-02	EB-2	Lagoon	8	DI	52	$ 5,200	1982	50	100	2	4	8	$ 17,873
205	Channing	N/A	N/A	Lagoon	10	DI	35	$ 3,500	1982	50	100	2	2	4	$ 12,030
206	Channing	N/A	N/A	Lagoon	10	DI	35	$ 3,500	1982	50	100	2	2	4	$ 12,030
207	Channing	FL-01	Outfall MH	Lagoon	12	DI	160	$ 16,000	1982	50	100	2	5	10	$ 54,994
208	Channing	Ford River	FL-01	Lagoon	12	PVC	400	$ 40,000	1982	50	100	2	2	4	$ 137,484
						TOTALS ==>	1,795	$ 179,500							$ 616,961

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date 11/30/2018
(no later than 3 years from executed grant date)

The Sagola Township *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1056-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or $\boxed{\text{No}}$
   If No - Date of the rate methodology approval letter: 6/19/2018.
2) Significant Progress Made: Yes or No
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: ______________.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ______________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Mr. Donald Minerick	at 906-282-6995	pminerick@gmail.com
Name	Phone Number	Email

Donald Minerick — 11-30-18

Signature of Authorized Representative (Original Signature Required) — Date

Mr. Donald Minerick, Township Supervisor

Print Name and Title of Authorized Representative

Protecting our Infrastructure Investment

ASSET MANAGEMENT PLAN

Wastewater Executive Summary Report

Prepared for:

Village of Saranac

SAW Project No. 1568-01

FINAL
October 2018

FLEIS&VANDENBRINK
DESIGN. BUILD. OPERATE.

EXECUTIVE SUMMARY

OVERVIEW

Public Act 562 of 2012 authorized money for Stormwater, Asset Management, and Wastewater (SAW) Grant Program. In November 2015, The Village received a Stormwater, Asset Management, and Wastewater (SAW) Grant from the Michigan Department of Environmental Quality (MDEQ), Project No. 1568-01, to provide financial assistance for the development of a wastewater asset management plan (AMP) for the Village's publicly owned wastewater utility. This AMP is intended to be a living document that is updated as assets continue to wear and age, and as additional inspection/condition results are found and incorporated into the plan.

The contact person for the Village of Saranac AMP is:

Becky Straubel, Treasurer
27 North Bridge St., Saranac, MI 48881
Phone number: 616.642.6324
Email: saranacoffice@gmail.com

ASSET INVENTORY & CONDITION ASSESSMENT

A list of the major assets in the Village's wastewater system, described further below, include:

- Collection system piping system and manholes
- Wastewater Treatment Facility (WWTF)
- Sanitary sewer lift station in the collection system

The wastewater collection system assets include approximately 37,458 feet (7.09 miles) of sanitary sewers (gravity pipe and force mains) and 144 wastewater manholes connecting the gravity pipe. These assets are in existing street rights-of-way or in easements dedicated for the assets use and maintenance.

The WWTF currently includes the following treatment processes:

- aerated lagoons
- polishing and stabilization

Treated effluent is seasonally discharged to wetlands adjacent to the Grand River via Mill Creek in accordance with NPDES permit No. MIG580000. The design capacity of the WWTF is 0.16 million gallons per day (mgd). The current annual average flow received by the facility is approximately 0.12 mgd.

There is one sanitary sewer lift station located throughout the wastewater collection system, which is Lift Station No. 1 located at the WWTF. The station is a wet well/dry well style station.

<u>Asset Identification & Location</u>

A comprehensive wastewater system asset inventory was developed from operation and maintenance (O&M) manuals, including a review of existing record drawings, field notes, staff knowledge, and site visits, supplemented with field survey work. Asset material, size and age were identified through the review of available historical record documents and Closed-Circuit Televising (CCTV) data. Spatial orientation (pipe location), pipe depth and invert elevations were determined through GPS field survey and a comprehensive evaluation of the gravity system. This information was organized into a new (GIS) database and piping network for archiving, mapping and further evaluation purposes. The inventory includes 84 WWTF assets, 1 Lift Station Asset, and 352 Collection System Assets.

<u>Condition Assessment and Expected Useful Life</u>

A comprehensive evaluation of the collection system was performed. NASSCO-MACP manhole field-based assessments were completed on all 144 manhole structures. Pipeline cleaning and NASSCO-PACP CCTV field-based inspections were conducted on 100% of the gravity pipe. Smoke Testing was not performed on the system to disclose location of inflow or infiltration. Capacity Analysis was modeled for average day and peak hour conditions to identify capacity concerns. Recommendations for short-term (1-5 year) and long term (6-20 year) improvements identified the need for maintenance with 11% of the system tagged for inspection and/or cleaning. Rehabilitation accounted for 19% of the system identifying the need for point repairs, cleaning and lining or replacement. The remaining 70% of assets were placed in the 20+ year category.

Overall, the condition of the assets at the WWTF range from good to poor. Ongoing repairs have helped to maintain the condition of many assets while some assets that were installed during the 1989 & 1999 expansions that have not been replaced are now near the end of their useful life due to age or deterioration caused by harsh conditions associated with wastewater treatment.

The condition of the assets at the lift stations range from good to poor. Ongoing maintenance has also upheld the condition of many assets while other assets have deteriorated due to age and the harsh conditions associated with typical wastewater collection systems. The recommendations for short- and long-term improvements are relatively extensive.

Level of Service

Defining the Expected Level of Service (LOS)

The overall objective of the Village Wastewater Department is to provide reliable wastewater collection and treatment services at a minimum cost, consistent with applicable environmental and health regulations. To achieve this, the following Level of Service (LOS) goals are proposed:

WASTEWATER UTILITY - LEVEL OF SERVICE STATEMENT

The overall objective of the Village of Saranac Wastewater Department is to provide reliable wastewater collection and treatment services at a minimum cost, consistent with applicable environmental and health regulations. To achieve this the following Level of Service (LOS) goals are proposed:

- Provide adequate collection system and treatment capacity for all service areas.
- Comply with all local, state and federal regulations at all times for treated effluent from the WWTF.
- Actively maintain collection and treatment system assets in reliable working condition.
- Reduce inflow/infiltration (I/I) flow volumes to mitigate potential for sanitary overflows, water in basements, and overloading of treatment facility.
- Provide rapid and effective emergency response services to customers.
- Ensure operations staff are properly certified.
- Regularly review health and safety procedures for operations staff to provide proper worker safety.
- Regularly review projected O&M and capital expenditures. Adjust user rates, as necessary, to ensure sound financial management of wastewater system.

The LOS goals may need to be adjusted from time to time as the utility ages, the needs of community change or new rules or regulations require a change in operation. For this reason, the LOS goals should be reviewed by the Village from time to time to make sure they accurately reflect the desired operation of the utility.

Measuring Performance

To assure that LOS goals are met performance measurements may need to be implemented. During the LOS review with the community the need for performance measurements was discussed.

CRITICAL ASSETS

Determining Criticality

Business Risk is the determination of criticality of each asset in the wastewater system. Criticality is based on two factors; Likelihood (Probability) of Failure and Consequence of Failure using the following formula:

Business Risk = Consequence of Failure Score x Likelihood of Failure Score

Defining an asset's Business Risk allows for management of risk and aids in decision making for where to allocate operation and maintenance and capital improvement funds.

Likelihood of Failure (LoF) is a measure of how likely an asset is to fail. The following categories have been developed to quantify how likely an asset is to fail:

- Condition of the asset
- Remaining useful life (Age)
- Service History
- Operational status

Consequence of Failure (CoF) is a measure of the social, economic, financial or environmental impact of failure of an asset and the utilities ability to respond, convey and treat wastewater. CoF categories of the collection system include:

- Proximity to critical environmental features
- Location (Zoning District) of asset
- Facilities served by asset
- Size and location of asset within the utility network
- Type of asset.

The WWTF and lift station categories for CoF are:

- Process
- Financial Impact
- Safety
- Environmental Impact
- Disruption to the Community
- Ability to Respond

Criticality Results

Using the strategy outlined above, a Business Risk Evaluation (BRE) was performed for each asset using a graphical ArcGIS-based sewer asset management and capital planning software that compiles, analyzes and assesses Business Risk for each asset and develops a Capital Improvement Plan. The results of the BRE are provided in easily understood tabular and graphical output.

Figure 1 provides the risk rating for gravity and force main pipe by number of pipe segments. Ten pipe segments in the collection system has an extreme risk rating and are recommended to be replaced. Much of the collection system's gravity pipes, 73 percent as shown in Figure 1, have a low to negligible risk rating and are indicative of pipes or manholes in relatively good condition.

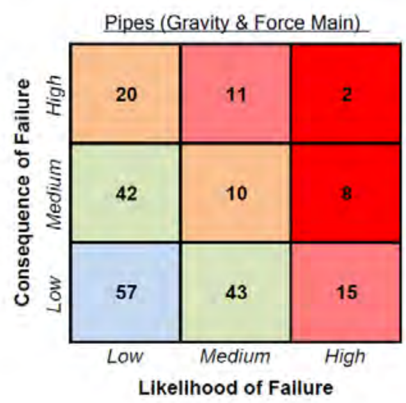

Figure 1. Business Risk Matrix (Risk Rating) by Number of Gravity and Force Main Pipes

Figure 2 provides the risk rating for the collection system manholes. One manhole is identified as extreme risk and is recommended for replacement. Many manholes are at low to medium risk and recommended to be included in a long-term 6-20-year rehabilitation strategy (74 percent).

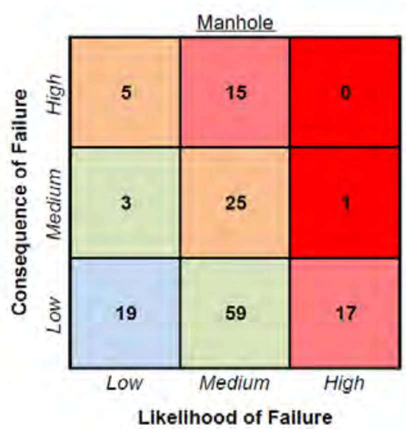

Figure 2. Business Risk Matrix (Risk Rating) by Number of Manholes

Figure 3 provides the risk ratings for the WWTF and lift station assets. No assets are identified as extreme risk. The eight assets with high risk ratings should be inspected at regular intervals.

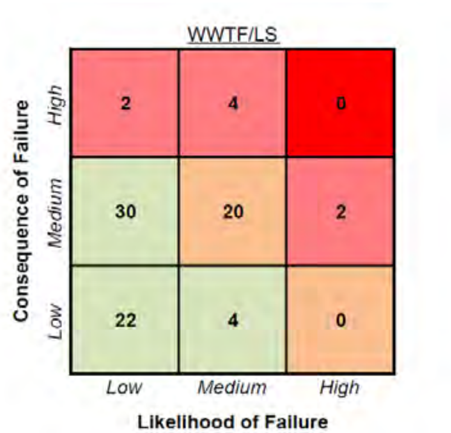

Figure 3. Business Risk Matrix (Risk Rating) for WWTF and Lift Station Assets

A spreadsheet providing asset criticality for each utility asset has been included in the AMP detailed report for the collection and treatment systems.

Capital Improvement Plan

A Capital Improvement Plan (CIP) with rehabilitation recommendations was prepared for the Village's wastewater utility assets based on the Business Risk evaluation. The CIP recommendations are provided for the collection system, WWTF and lift stations/force mains. From the BRE, a short-term (1-5-year CIP) and long-term (6-20-year CIP) was developed for the utility. Table 4 shows a detailed recommendation of the collection system assets needing rehabilitation in the short-term CIP.

Table 4. 5-Year Capital Improvement Plan: Rehabilitation

Year	Asset	ID	Address	Rehab Actions	Cost	2019	2020	2021	2022	2023
2	Gravity Main	S0150 - S0240	129-139 Division St	Replacement	$ 57,535	$ -	$ 59,261	$ -	$ -	$ -
2	Gravity Main	S1340 - S1330	100-120 Pleasant St	Replacement	$ 32,947	$ -	$ 33,936	$ -	$ -	$ -
2	Gravity Main	S1350 - S1340	122-244 Pleasant St	Replacement	$ 80,642	$ -	$ 83,062	$ -	$ -	$ -
2	Gravity Main	S1200 - S1150	241 Vosper St	Replacement	$ 45,564	$ -	$ 46,931	$ -	$ -	$ -
2	Gravity Main	S0610 - S0600	27-99 Center St	Full Lining	$ 6,841	$ -	$ 7,046	$ -	$ -	$ -
2	Gravity Main	S0110 - S0100	39 Irv Taylor Ave	Full Lining	$ 14,549	$ -	$ 14,985	$ -	$ -	$ -
2	Gravity Main	S0550 - S0540	6184-6240 Main St	Replacement	$ 88,442	$ -	$ 91,095	$ -	$ -	$ -
2	Gravity Main	S0100 - S0090	39 Irv Taylor Ave	Full Lining	$ 11,778	$ -	$ 12,131	$ -	$ -	$ -
2	Gravity Main	S0320 - S0310	64 Mill St	Full Lining	$ 12,583	$ -	$ 12,961	$ -	$ -	$ -
2	Manhole	S1190	261 Weeks Rd	MH Clean + Line + Repair	$ 5,377	$ -	$ 5,539	$ -	$ -	$ -
3	Gravity Main	S0950 - S0960	270 South Bridge St	Point Repair	$ 5,489	$ -	$ -	$ 5,824	$ -	$ -
4	Manhole	S0920	204 Jackson St	MH Clean + Line	$ 4,038	$ -	$ -	$ -	$ 4,413	$ -
4	Manhole	S1230	256-398 Cloverlane St	MH Clean + Line + Repair	$ 5,377	$ -	$ -	$ -	$ 5,876	$ -
4	Gravity Main	S1070 - S0640	28-44 Vosper St	Full Lining	$ 8,552	$ -	$ -	$ -	$ 9,345	$ -
4	Gravity Main	S0650 - S0640	224-248 Mill St	Full Lining	$ 15,442	$ -	$ -	$ -	$ 16,874	$ -
4	Gravity Main	S0380 - S0280	86-98 Main St	Full Lining	$ 12,207	$ -	$ -	$ -	$ 13,339	$ -
4	Gravity Main	S0920 - S0930	132-160 Jackson St	Full Lining	$ 13,946	$ -	$ -	$ -	$ 15,239	$ -
4	Gravity Main	S0120 - S0140	61 Dewitt St	Full Lining	$ 18,637	$ -	$ -	$ -	$ 20,365	$ -
4	Gravity Main	N037 - S1170	102 South St	Full Lining	$ 997	$ -	$ -	$ -	$ 1,089	$ -
4	Gravity Main	S1290 - S1280	200-294 Weeks Rd	Full Lining	$ 7,502	$ -	$ -	$ -	$ 8,198	$ -
4	Manhole	S1220	257-399 Cloverlane St	MH Clean + Line + Repair	$ 5,377	$ -	$ -	$ -	$ 5,876	$ -
4	Manhole	S0900	188 Washington St	MH Clean + Line	$ 4,038	$ -	$ -	$ -	$ 4,413	$ -
4	Manhole	S0610	25-27 Center St	MH Clean + Line	$ 4,038	$ -	$ -	$ -	$ 4,413	$ -
4	Manhole	S0260	77 Church St	MH Clean + Line	$ 4,038	$ -	$ -	$ -	$ 4,413	$ -
4	Manhole	S0980	201-399 South Bridge St	MH Repair+Lining	$ 4,574	$ -	$ -	$ -	$ 4,998	$ -
4	Manhole	S0970	230 South Bridge St	MH Repair+Lining	$ 4,574	$ -	$ -	$ -	$ 4,998	$ -
4	Manhole	S0960	250 South Bridge St	MH Repair+Lining	$ 4,574	$ -	$ -	$ -	$ 4,998	$ -
4	Manhole	S0940	372 South Bridge St	MH Repair+Lining	$ 4,574	$ -	$ -	$ -	$ 4,998	$ -
4	Manhole	S0780	52 Summit St	MH Clean + Line	$ 4,038	$ -	$ -	$ -	$ 4,413	$ -
4	Manhole	S0740	176-198 Riverside Dr	MH Clean + Line	$ 4,038	$ -	$ -	$ -	$ 4,413	$ -
4	Manhole	S0540	570 Main St	MH Clean + Line	$ 4,038	$ -	$ -	$ -	$ 4,413	$ -
4	Manhole	S0470	330-398 Main St	MH Clean + Line	$ 4,038	$ -	$ -	$ -	$ 4,413	$ -
4	Manhole	S0560	277 Church St	MH Clean + Line	$ 4,038	$ -	$ -	$ -	$ 4,413	$ -
4	Manhole	S0410	2-22 Vosper St	MH Clean + Line	$ 4,038	$ -	$ -	$ -	$ 4,413	$ -
4	Manhole	S0390	31-65 Center St	MH Clean + Line	$ 4,038	$ -	$ -	$ -	$ 4,413	$ -
4	Manhole	S0110	100-110 Division St	MH Clean + Line	$ 4,038	$ -	$ -	$ -	$ 4,413	$ -
4	Manhole	S0500	400-458 Main St	MH Clean + Line + Repair	$ 5,377	$ -	$ -	$ -	$ 5,876	$ -
4	Manhole	S0550	6261 W Riverside Dr	MH Repair + Line + Adjust Rim	$ 7,252	$ -	$ -	$ -	$ 7,924	$ -
4	Manhole	S1210	200-254 Cloverlane St	MH Clean + Line + Repair	$ 5,377	$ -	$ -	$ -	$ 5,876	$ -
4	Manhole	S0490	55 Fuller St	MH Clean + Line	$ 4,038	$ -	$ -	$ -	$ 4,413	$ -
4	Manhole	S0840	200 Parsonage St	MH Clean + Line	$ 4,038	$ -	$ -	$ -	$ 4,413	$ -
4	Manhole	S0600	101 Church St	MH Clean + Line	$ 4,038	$ -	$ -	$ -	$ 4,413	$ -
4	Manhole	S0590	147 Church St	MH Clean + Line	$ 4,038	$ -	$ -	$ -	$ 4,413	$ -
4	Manhole	S0420	34-68 Vosper St	MH Clean + Line	$ 4,038	$ -	$ -	$ -	$ 4,413	$ -
4	Manhole	S1040	60 South Bridge St	MH Repair+Lining	$ 4,574	$ -	$ -	$ -	$ 4,998	$ -
4	Manhole	S0950	300 South Bridge St	MH Repair+Lining	$ 4,574	$ -	$ -	$ -	$ 4,998	$ -
4	Manhole	S0150	124 Division St	MH Clean + Line	$ 4,038	$ -	$ -	$ -	$ 4,413	$ -
4	Manhole	S1060	38 South Bridge St	MH Clean + Line	$ 4,038	$ -	$ -	$ -	$ 4,413	$ -
4	Manhole	S1050	54 South Bridge St	MH Clean + Line	$ 4,038	$ -	$ -	$ -	$ 4,413	$ -
4	Manhole	S0250	124 Division St	MH Clean + Line	$ 4,038	$ -	$ -	$ -	$ 4,413	$ -
4	Gravity Main	S0870 - S0890	250 Jackson St	Full Lining	$ 13,186	$ -	$ -	$ -	$ 14,409	$ -
4	Gravity Main	S0570 - S0580	207 Church St	Full Lining	$ 13,120	$ -	$ -	$ -	$ 14,336	$ -
4	Gravity Main	S0160 - S0170	1-199 Liberty St	Full Lining	$ 14,815	$ -	$ -	$ -	$ 16,188	$ -
4	Gravity Main	S0140 - S0150	124 Division St	Full Lining	$ 1,812	$ -	$ -	$ -	$ 1,980	$ -
4	Gravity Main	S0130 - S0140	141-207 Division St	Full Lining	$ 20,866	$ -	$ -	$ -	$ 22,801	$ -
4	Gravity Main	S0210 - S0220	244-320 Summit St	Full Lining	$ 13,469	$ -	$ -	$ -	$ 14,718	$ -
4	Gravity Main	S1060 - S0290	81-117 South Bridge St	Full Lining	$ 11,396	$ -	$ -	$ -	$ 12,453	$ -
4	Gravity Main	S0290 - S0110	100-110 Division St	Full Lining	$ 6,195	$ -	$ -	$ -	$ 6,770	$ -
4	Gravity Main	S0480 - S0490	55 Fuller St	Full Lining	$ 15,588	$ -	$ -	$ -	$ 17,033	$ -
4	Gravity Main	S0770 - S0780	52 Summit St	Full Lining	$ 12,703	$ -	$ -	$ -	$ 13,881	$ -
4	Gravity Main	S0540 - S0535	534 Main St	Full Lining	$ 11,894	$ -	$ -	$ -	$ 12,996	$ -
4	Gravity Main	S0310 - S0300	64 Mill St	Full Lining	$ 11,782	$ -	$ -	$ -	$ 12,874	$ -
4	Gravity Main	S0300 - S0290	64 Mill St	Full Lining	$ 4,618	$ -	$ -	$ -	$ 5,046	$ -
4	Gravity Main	S0260 - S0070	60 North Bridge St	Full Lining	$ 13,151	$ -	$ -	$ -	$ 14,371	$ -
5	Gravity Main	S1280 - S1270	278 Weeks Rd	Replacement	$ 85,324	$ -	$ -	$ -	$ -	$ 96,033
5	Gravity Main	S0730 - S0720	Otto Laabs Ln	Replacement	$ 110,858	$ -	$ -	$ -	$ -	$ 124,772
TOTAL:						$ -	$ 366,947	$ 5,824	$ 418,394	$ 220,805

Commented [TS1]: Need Table from Sam

Commented [BPN2R1]: Table inserted from Sydney, need to verify lagoon information before PDF'd and printed

Table 5 shows a detailed recommendation for the WWTF lift station system assets needing rehabilitation in the short-term and long-term CIP.

Table 5: Recommended Capital Improvements for Saranac WWTP

Project Description	Year Installed	Expected Useful Life (Years)	Anticipated Year of Replacement	Replacement Cost (2018 Dollars)	Replacement cost (Inflated 3%/yr)
5-YEAR CIP PROJECTS					
Lagoon Baffle and Aerators Replacement	2007	20	2020	$113,400	$123,900
Lagoon No. 1 Biosolids Removal	2007	20-30	2020	$52,000	$56,800
6-20-YEAR CIP PROJECTS					
Transfer Structure Replacement & Lagoon Repairs	1967	50	2024	$260,000	$319,800
Electrical and Controls Upgrades	Varies	20-30	2025	$298,600	$378,300
Lagoon No. 3 Biosolids Removal	2007	20-30	2025	$156,000	$197,600
Lagoon No. 4 Biosolids Removal	2007	20-30	2025	$151,000	$191,300
Pump Station Rehabilitation	2015	20-30	2038	$156,100	$290,400

Operations, Maintenance & Replacement

Regular operation, maintenance and replacement (OM&R) is essential in the management of a wastewater collection system. The collection system is subject to a variety of operational problems and can suffer from clogging, scour, corrosion, and collapse. Inspection, cleaning, and rehabilitation are important for optimizing the proper functioning of the collection system. By optimizing the performance infiltration/inflow are reduced and sanitary sewer overflows (SSO) are minimized or eliminated preserving the substantial investment the community has in its collection system.

Table 6 summarizes the recommended preventative maintenance inspections to be considered in the short term (1-5 years) with recommended cost over the 5-year period.

Table 6. Collection System Maintenance Summary Table: Year by Year

Maintenance Action	Total Cost (Current Year Dollars)	2019	2020	2021	2022	2023
Manhole Assessment	$ 2,142	$ -	$ -	$ -	$ 2,341	$ -
CCTV	$ 1,438	$ -	$ -	$ 1,525	$ -	$ -
CCTV - Heavy Cleaning	$ 5,755	$ -	$ -	$ 6,105	$ -	$ -

An annual equipment replacement fund should be developed to replace disposable equipment. These are items that can be financially accounted for through operation, maintenance and replacement (OM&R) funds and can be replaced by WWTF staff without bringing in an outside contractor. Existing disposable materials include chemicals, wear parts in pumps and motors, laboratory instruments, etc. The existing OM&R fund is sufficient for the current operations.

Table 7. WWTF Capital Replacement Cost Table

Item		Rehab/ Replacement Cost	Expected Useful Life (Years)		Annual Budget
Main Pump Station Pumps/Controls	$	15,000	15	$	1,000
Generator & Automatic Transfer Switch	$	10,000	15	$	667
Aerator Maintenance (Quantity 8)	$	156,000	20	$	7,800
Lagoon Repairs	$	20,000	20	$	1,000
Gates & Valves	$	60,000	30	$	2,000
HVAC System	$	5,000	25	$	200
Perimeter Fence & Access Gates	$	15,000	20	$	750
Total	**$**	**281,000**		**$**	**13,417**

Revenue Structure

The revenue and rate methodology is an instrument to determine user rates and charges that will provide sufficient revenues to pay for utility operating costs.

A study was conducted by an independent municipal financial advisor (Utility Financial Solutions, LLC) to develop a 5-year financial projection to meet the Michigan Department of Environmental Quality SAW Grant requirements.

The rate methodology required by the MDEQ for SAW Grant Asset Management Plans requires an analysis of the current budget on a cash basis to determine if there is a revenue gap. The analysis performed by UFS shows that there is no revenue gap for 2019.

Village of Saranac │ Asset Management Plan – WW Executive Summary │ October 2018
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DEQ

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date November 30, 2018 (no later than 3 years from executed grant date)

The Village of Saranac certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1568-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: No
   If No - Date of the rate methodology approval letter: May 3, 2018.
2) Significant Progress Made: NA
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: NA.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on NA.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Name		Phone Number	Email
Becky Straubel - Treasurer	at	(616) 642-6324	saranacoffice@gmail.com

Becky Straubel — 11/29/18
Signature of Authorized Representative (Original Signature Required) — Date

Becky Straubel – Treasurer
Print Name and Title of Authorized Representative

ASSET MANAGEMENT PLAN

Stormwater Executive Summary Report

Prepared for:

Village of Saranac

SAW Project No. 1568-01

FINAL
October 2018

FLEIS&VANDENBRINK
DESIGN. BUILD. OPERATE.

1.0 EXECUTIVE SUMMARY

OVERVIEW

Public Act 562 of 2012 authorized money for Stormwater, Asset Management, and Wastewater (SAW) Grant Program. In 2015, the Village of Saranac received a SAW Grant from the Michigan Department of Environmental Quality (MDEQ) to provide financial assistance for the development of this Asset Management Plan (AMP). This report provides the Asset Management Plan (AMP) for the Village's stormwater collection system. Working with Village staff, Fleis and VandenBrink (F&V) provided technical assistance for asset identification, condition assessment, and capital improvement planning of the stormwater collection system.

This AMP is intended to be a living document that is updated as assets continue to wear and age, and as additional inspection/condition results are found and incorporated into the plan.

The contact person for the Village of Saranac AMP is:

Becky Straubel, Treasurer
27 North Bridge St., Saranac, MI 48881
Phone number: 616.642.6324
Email: saranacoffice@gmail.com

ASSET INVENTORY AND CONDITION ASSESSMENT

The stormwater collection system assets consist of approximately 36,867 feet (6.98 miles) of storm sewers and 423 stormwater structures connecting the gravity pipe. These assets are located in existing street rights-of-way or in easements dedicated for the assets use and maintenance.

ASSET IDENTIFICATION AND LOCATION

A comprehensive stormwater system asset inventory was developed from available record drawings, field notes, staff knowledge, and site visits; supplemented with field survey work. Asset material, size and age were identified through the review of available historical record documents. Spatial orientation (pipe location), pipe depth and invert elevations were determined through GPS field survey and a comprehensive evaluation of the gravity system. This information was organized into a new (GIS) database and piping network for archiving, mapping, and further evaluation purposes.

CONDITION ASSESSMENT AND EXPECTED USEFUL LIFE

For the Village of Saranac, a comprehensive evaluation of the collection system was performed. NASSCO-MACP structure field-based assessments were completed on all 423 structures. Pipeline cleaning and NASSCO-PACP CCTV field-based inspections were conducted on 89% of the gravity pipe. Based on discussions with the stormwater system operations staff, there are no known capacity issues with the Village-owned stormwater system. Flooding or drainage problems can occur when County drains are elevated and collected stormwater cannot flow into the County drains through the outfalls. For this reason, a capacity analysis was not completed for the Village of Saranac. Recommendations for short-term (1-5 year) and long term (6-20 year) improvements identified the need for maintenance: 9% of the system was tagged for inspection and/or cleaning. Rehabilitation accounted for 5% of the of the system identifying the need for point repairs and lining. The remaining assets (86%) were placed in the beyond 20-year planning category.

Level of Service

Defining the Expected Level of Service (LOS)

The LOS for the Village stormwater system is stated as follows:

STORMWATER – LEVEL OF SERVICE STATEMENT

"To provide appropriate stormwater collection, diversion, and conveyance at a minimum cost, consistent with applicable environmental regulations. To achieve this the following Level of Service (LOS) goals are proposed for the Village of Saranac*:*

- *Provide adequate stormwater collection system and conveyance capacity for all service areas*
- *Actively maintain stormwater collection and conveyance system assets in reliable working condition.*
- *Provide rapid and effective emergency response services to customers.*
- *Maintenance and operations staff are to be properly trained.*

Measuring Performance

Performance measurements are specific metrics designed to assess whether Level of Service objectives are being met. Evaluations of goals should be completed at least annually to determine if the provided resources are being used appropriately. Level of Service requirements can be updated to account for changes due to growth, regulatory requirements, and technology.

Critical Assets

Determining Criticality

Business Risk is the determination of criticality of each asset in the wastewater system. Criticality is based on two factors: 1.) Likelihood (Probability) of Failure and 2.) Consequence of Failure. Defining an asset's Business Risk allows for management of risk and aids in decision making for where to allocate operation, maintenance, and capital improvement funds.

Likelihood of Failure (LoF) is a measure of how likely an asset is to fail. The following categories have been developed to quantify how likely an asset is to fail:

- Condition of the asset
- Remaining useful life (Age)
- Service History
- Operational status

Consequence of Failure (CoF) is a measure of the social, economic or environmental impact of failure of an asset and the utility's ability to convey stormwater. CoF categories of the stormwater collection system include:

- Location of asset
- Facilities served by asset
- Size

Assessing Criticality

Using the strategy outlined above, a Business Risk Evaluation (BRE) was performed for each asset of the Village of Saranac using Innovyze-InfoMaster software. InfoMaster is an ArcGIS-based sewer asset management and capital planning software that compiles, analyzes and assesses Business Risk for each asset and develops a Capital Improvement Plan.

The Business Risk score, also known as Criticality, is calculated for each asset using the following equation:

Business Risk = Consequence of Failure Score x *Likelihood of Failure Score*

Figure 1 provides the risk rating for storm sewer pipes by number of pipe segments. Eighteen pipe segments in the stormwater collection system have an extreme risk rating and are recommended to be for near-term rehabilitation or replacement.

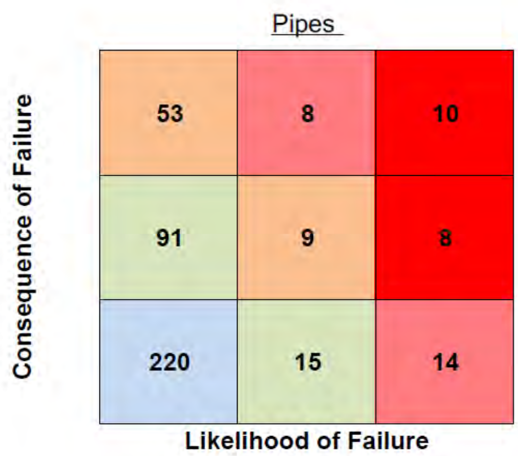


Figure 1: Business Risk Matrix (Risk Rating) by Number of Gravity Pipes

Figure 2 provides the risk rating for the storm sewer structures. Thirty-two structures are identified as extreme risk and are recommended for replacement or rehabilitation.

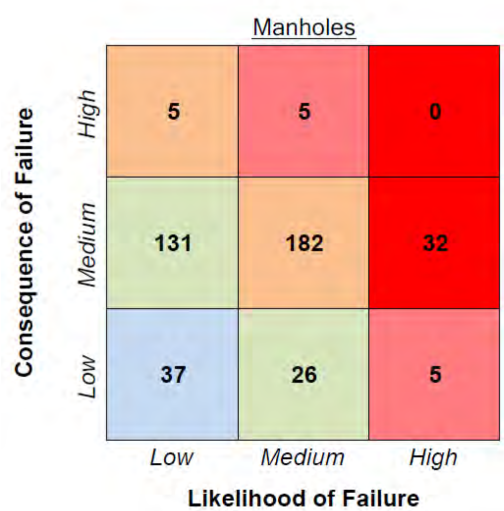


Figure 2: Business Risk Matrix (Risk Rating) by Number of Structures

A spreadsheet providing asset criticality for each utility asset is included in the AMP detailed report for the stormwater collection system.

Capital Improvement Plan

A Capital Improvement Plan with recommendations was prepared for the Village's assets based on the Business Risk evaluation. Data-driven information from the business risk assessment and condition assessment was used to identify and prioritize the capital improvement projects. The information was also used to schedule inspections to evaluate the condition of high business risk assets. Short-Term 1-5 year

and Long-Term 6-20-year Capital Improvement Plan (CIP) was prepared to address the projected needs for each asset in the system. The 5-year CIP rehabilitation total is $1,724,604.

CIP DEVELOPMENT

The Village of Saranac identifies assets of $5,000 or more to be capital expenditures. Collection System assets were grouped by strategy and assigned costs from a unit database. This database includes unit construction values in 2017 construction dollars based on a survey of recent projects in Michigan and includes engineering and administrative rates where applicable. Assets were categorized and prioritized by year based on risk rating and criticality score to develop the CIP.

The CIP was developed by assigning each project to a CIP year (1-5) based on several factors. In addition to Risk Rating, other factors used to assign CIP year include:

- Asset rehabilitation grouping (i.e. the type of repair/construction recommended)
- Coordination with other planned projects to achieve economies of scale or limiting disruption (an example is a street reconstruction project where identified utility recommendations can be included)

The Village has been actively setting aside funds for storm sewer repairs. The Village will preplan storm drain improvements and incorporate those improvements into street projects instead of cutting into streets and patching them.

The recommended 5-Year Capital Improvement Plan for the Village-owned stormwater collection system is included in Table 4 below.

Table 4. 5-Year Capital Improvement Plan: Rehabilitation

Rehabilitation Action	Total Cost (Current Year Dollars)	2019	2020	2021	2022	2023
Pipe Replacement	$ 509,345	$ -	$ 249,417	$ -	$ -	$ 300,728
Upsize	$ 910,077	$ 299,977	$ -	$ -	$ -	$ 686,673
Pipe Point Repair	$ 115,611	$ 29,370	$ -	$ 91,494	$ -	$ -
Manhole Replacement	$ 16,068	$ -	$ 11,033	$ -	$ -	$ 6,028
Manhole Clean, Line and Repair	$ 59,152	$ 53,774	$ -	$ -	$ 5,876	$ -
Manhole Repair and Line	$ 114,351	$ -	$ 94,225	$ -	$ 24,991	$ -
Total	$ 1,724,604	$ 383,121	$ 354,675	$ 91,494	$ 30,867	$ 993,429

OPERATIONS AND MAINTENANCE

A preventative maintenance program to systematically clean and inspect pipelines to NASSCO-certified standards is critical for a sound stormwater system. The process of cleaning and CCTV inspection of pipelines either with equipment owned by the community or contracted is a relatively inexpensive maintenance effort when compared to rehabilitation efforts. It is recommended that at a minimum, all pipelines be cleaned and televised every five years, or that 20% of the system be cleaned and televised annually. Available budget will dictate the frequency or size of yearly projects. The 5-year CIP maintenance total is $60,729.

DEQ

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Due Date November 30, 2018
(no later than 3 years from executed grant date)

The Village of Saranac *(legal name of grantee)* certifies that all stormwater asset management plan (SWAMP) activities specified in SAW Grant No. 1568-01 have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SWAMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

Name		Phone Number	Email
Becky Straubel – Treasurer	at	(616) 642-6324	saranacoffice@gmail.com

Becky Straubel
Signature of Authorized Representative (Original Signature Required)

11/29/18
Date

Becky Straubel – Treasurer
Print Name and Title of Authorized Representative

1211 Ludington Street
Escanaba, MI 49829
O: 906.233.9389
www.c2ae.com

SAULT STE. MARIE WASTEWATER ASSET MANAGEMENT PLAN
EXECUTIVE SUMMARY

City of Sault Ste. Marie
225 East Portage
Sault Ste. Marie, Michigan 49783
Mr. Oliver Turner, City Manager (906) 632-5705
email: oturner@saultcity.com

SAW GRANT PROJECT NUMBER 1273-01

Executive Summary

The SAW agreement with the State of Michigan was signed on December 3, 2015 which began the overall SAW program.

The Grant agreement included the following funding amounts:

- Total Cost = $1,000,000.00
    - Grant Value = $1,000,000.00
    - Local Match = $0.00

The City of Sault Ste. Marie is located in the Chippewa County at the eastern end of the Upper Peninsula of Michigan. The City owns and operates a fixed film Wastewater Treatment Plant with a secondary treatment capacity of 8.0 million gallon per day (MGD) and a firm peak hour hydraulic capacity of 12.0 MGD in the primary treatment only. The treatment plant discharges to the St. Mary's River at Outfall 001. Sault Ste. Marie's sanitary collection system has approximately 373,400 feet (71 miles) of 6- to 36-inch sanitary sewer, 14,600 feet of force main, approximately 1,465 sanitary structures and nine (9) lift stations that provides sewer services to the City and portions of Soo Township. Six (6) of the pump stations are owned by the City.

Over the past 25 years, the City's CSO Control Program has separated storm and sanitary flows via construction of new sanitary sewers and has replaced over 100,000 feet of mainline sanitary sewer, including service laterals.

The Key components of the City's Asset Management Plan included:

- Wastewater Asset Inventory and Condition Assessment
- Criticality of Assets
- Level of Service
- Revenue Structure
- Long-term Funding/Capital Improvement Plan

Wastewater Asset Inventory

An asset inventory was compiled for the wastewater system which included structures, sewers, pump stations and forcemains, wastewater treatment facility major components and other significant items. The process used to complete this task involved:

- Identifying and locating assets.
    - A list of all assets to be evaluated was obtained using a combination of historical system records and field data collection.

- o The GPS coordinates of the field assets were gathered using total station technology.
- o An ESRI ArcGIS data set was completed to index the locations and attributes of each asset.
- o Physical inspections were conducted for each asset.
  - Structures – Field inventories and conditional assessments were completed for the entire system and based on the condition of the structure components.
  - Sewers - Survey was completed by CCTV review in accordance with NASSCO PACP standards by NASSCO Certified personnel for approximately 25% of the system.
- o The asset information was included in the Asset Management Spreadsheet (AMS).
- o The AMS was used to quantify and sort the system asset information.
- o The arcGIS database and AMS information will be incorporated into the City's existing database at the completion of the project.

Condition Assessment

Due to the fact that sewers had to be older than 20 years old, only a portion of the overall system was televised and was found to generally be in serviceable condition. Some of the older sections of sanitary sewer, that were outside one of the separation areas, are in need of repair. Overall the Wastewater Treatment Plant is in good working order with some aging components in need of replacement. Pump Stations have been kept in good working order through regular maintenance activities despite some that are reaching their useful life. During the latter course of this study, it was concluded that additional metering was warranted in the wastewater collection system to more accurately calibrate the system model for the current condition.

- Structure assessment and inventories were graded in the field on a 1 to 5 scale (5 being the worst condition) for the various key components of the structure (casting, chimney, cone, wall, flow channel)
  - The results of the assessment yielded the following percentages for the structures that were assessed:
    - 95% of assets are Good
    - 4% of assets are Fair
    - 1% of assets are Poor

- Sewer pipe assessment and inventories followed NASSCO PACP guidelines.
  - The results of the assessment yielded the following percentages for the sewers that were assessed:
    - 85% of assets are Good
    - 3% of assets are Fair
    - 12% of assets are Poor

- Asset age and material data was collected using historical project drawings.
- Wastewater Treatment Plant major components were visually inspected and conditionally graded; data was compiled in an Excel spreadsheet.
- Sanitary Pump Stations were visually inspected and conditionally graded for the major components (superstructure, pump room and pumps, wet well, valve vault, control building, instrumentation, electrical service and controls, and lighting); data was compiled in an Access Database.

Criticality of Assets

- The Asset Management Spreadsheet (AMS) was used to organize the asset classes. Several parameters were used to determine asset Consequence of Failure (CoF) and Probability of Failure (PoF), rating each on a 1 to 5 scale (5 being the worst). These factors included:
    - Redundancy: Does the unit or asset have system backup?
    - Criticality of the asset to the system and what level of impact to the system occurs in the event that the asset fails.
    - Location and surrounding service area(s) of each asset were also incorporated in determining the criticality. Assets that service a larger portion of the system typically had higher levels of CoF.
    - Probability of Failure for each asset was based on its current physical and functional condition. Factors varied depending on the asset being evaluated as noted in the Conditional Assessment section of this summary.
    - The Consequence of Failure and Probability of Failure together result in a parameter identified as Business Risk.
- The AMS was used to prioritize the Criticality, which ranged from 1-25 (25 having the highest priority) and determine the need for short term repair or maintenance, short term replacement, or long term maintenance. These ratings were utilized with other factors to create a Capital Improvement Plan.

Level of Service Determination

The City of Sault Ste. Marie has a long and successful history of providing safe and efficient collection and treatment at the lowest possible cost, while continuing to plan and budget for system upgrades. The investment by the Citizens of Sault Ste. Marie in their sewer (and water) infrastructure dwarfs any other expenditure made by them. This commitment to the upkeep of our utility systems is driven by our obligation to provide the highest level of service achievable to our fellow citizens.

The Level of Service Goals were determined by the City of Sault Ste. Marie SAW team with significant input from the staffs of the Wastewater Treatment Plant and the Sewer Department. To keep continuous focus on maintaining and improving upon our service levels, we shall strive to achieve the following goals:

- **Avoid any future sewer back-ups in to our Customer's homes or businesses**.
    - The City of Sault Ste. Marie considers this the primary goal of our sewerage system. The remaining goals all contribute to meeting this goal. Staff shall continue to make every effort to avoid sewer back-ups, up to and including the activation of CSO outlets and other relief methods available to us.

- **Respond to any sewer complaint within 2 hours of receiving notification.**
    - Adequate staffing and procedures are in place to meet this goal. In addition to our response, affected customer(s) shall be instructed on how to resolve the problem. In the event of it being a City problem, staff shall immediately address it.

- **Make any and all repairs to the collection system in the shortest possible time.**
    - The City of Sault Ste. Marie maintains adequate staffing, equipment, and supplies to make most repairs to the collection system. In the event of a need for additional resources, we have the ability to perform bypass pumping for extended periods of time until repairs can be made.

- **All operators at the WWTP shall have and maintain a minimum Class D wastewater license.**
  - This requirement is and shall be a condition of employment for the City of Sault Ste. Marie. Adequate funding shall be maintained for continuing education.
- **The City of Sault Ste. Marie shall make every effort to meet all State and Federal water quality, monitoring, and reporting regulations.**
  - In these times of continually more stringent and complex monitoring and reporting requirements, the City shall continue to allocate funds for the staffing and support resources to meet current and future requirements.

- **Continue to plan for the future repair, replacement, and upgrades of the City's collection system, lift stations and WWTP to maintain their operational integrity.**
  - By progressing the Asset Management philosophy and continuing with our preventive maintenance programs, the City of Sault Ste. Marie shall continue meet this goal.

- **Investigate and implement new and proven equipment and practices to ensure that our collection and treatment processes are continuously improving.**

- **Continually monitor and upgrade our metering system to insure maximum revenue from our infrastructure users.**
  - Annual funding is in place to continually replace meters. Additionally, staff reviews all accounts on a monthly basis that show zero consumption or a noticeable drop in water usage. All such accounts are immediately contacted for review and resolution.

- **Continue to investigate sources of inflow and infiltration into our sanitary collection system.**
  - Through televising, flow monitoring and visual inspections, City staff shall continue to lessen sources of Infiltration and Inflow (I&I) in an effort lower surface and ground water influence on system volumes, which would allow for future community growth.

- **Continue to invest in and upgrade the departmental rolling stock.**
  - The City Department of Public Works shall continue to make annual reviews of the rolling stock condition and needs of the sewer and WWTP departments and shall make necessary budget requests as needed to maintain the fleet.

- **The City of Sault Ste. Marie shall establish rates with transparency and concern for the community to operate its collection and treatment systems in a safe, reliable, and cost effective manner while working to maximize cost savings. Budgeting and rate structure shall be adequate to meet our systems' current and future infrastructure needs as determined by City staff.**

- **The SAW Team will meet once a year to assess the system's service record and recommend improvements to the Level of Service Statement, if needed.**

Revenue Structure

- The user charge report and the AMS are identified as the Rate Methodology and have been submitted previously to MDEQ and approved.
- No rate increase was required per the grant agreement, since it was demonstrated that significant progress has been made toward achieving the funding structure necessary to implement the program.
- The Rate Methodology was updated to forecast future budgeting needs including Capital Improvements Projects (CIP) for the next 20 year period. Based on the results, the financial projections indicate that operating revenues (with 2% annual increase in rates) are sufficient to cover system operation, maintenance, replacement, CIP, and debt costs.

Capital Improvement Plan

- The AMS identifies capital improvement projects for the future.
- The projects will be funded by a combination of operating revenues, grants, and bonds.
- An estimate of the project year and financial cost was generated for each capital improvement project.
- A List of recommended projects to be completed within the next five (5) years is as follows:
    - *Sanitary Structure (51) repairs to replace poor flow channels*.
    - *Sanitary Structure (12) repairs with a Business Risk greater than 16 or Probability of Failure of 4 or Wall, Cone, Chimney grade below "D" to be replaced*.
    - *Sanitary System Sewer Repairs with a Business Risk of 16+ or potential sewer collapse.*
- Additional sanitary system, treatment plant, and pump station projects that were recommended in the next 6 to 15 years and 16 to 20 years are included in the Capital Improvement Plan.

List of Major Assets

- 373,416 feet of 6-36 inch sanitary sewer pipe
- 14,600 feet of force main
- 1,465 sanitary structures
- 6 lift stations
- 8 MGD Wastewater Treatment Plant
    - 5 raw sewage screw pumps
    - Grit removal equipment
    - Primary settling tanks
    - 16 Rotating Biological Contactors (RBC)
    - 2 final settling tanks
    - Disinfection
    - 2 primary and secondary sludge digestion tanks
    - Various buildings

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date: November 19, 2018 (End date established by MDEQ in May 16, 2018 letter to be November 30, 2018)
(no later than 3 years from executed grant date)

Mr. Oliver Turner, City Manager Sault Ste. Marie certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1273-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or No

   If No - Date of the rate methodology approval letter: __________________.

2) Significant Progress Made: Yes or No

   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)

3) Date of rate methodology review letter identifying the gap: May 3, 2018

4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on June 4, 2018.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:
Mr. Oliver Turner at (906) 632-5705 and email oturner@saultcity.com

____________________________ 11/19/2018
Signature of Authorized Representative (Original Signature Required) Date

Oliver Turner, City Manager
Print Name and Title of Authorized Representative

April 2017

1211 Ludington Street
Escanaba, MI 49829
O: 906.233.9389
www.c2ae.com

SAULT STE. MARIE STORMWATER ASSET MANAGEMENT PLAN
EXECUTIVE SUMMARY

City of Sault Ste. Marie
225 East Portage
Sault Ste. Marie, Michigan 49783
Mr. Oliver Turner, City Manager (906) 632-5705
email: oturner@saultcity.com

SAW GRANT PROJECT NUMBER 1273-01

Executive Summary

The SAW agreement with the State of Michigan was signed on December 3, 2015 which began the overall SAW program.

The Grant agreement included the following funding amounts:

- Total Cost = $544,445.00
    - Grant Value = $425,000.00
    - Local Match = $119,445.00

The City of Sault Ste. Marie is located in the Chippewa County at the eastern end of the Upper Peninsula of Michigan. Sault Ste. Marie's storm sewer collection system has approximately 191,000 feet (36 miles) of 6- to 60-inch storm sewer and approximately 1,100 storm structures and outfalls and 2,130 catch basins.

Stormwater Asset Inventory

An asset inventory was compiled for the stormwater system which included structures, sewers, outfalls and other significant items. The process used to complete this task involved:

- Identifying and locating assets.
    - A list of all assets to be evaluated was obtained using a combination of historical system records and field data collection.
    - The GPS coordinates of the field assets were gathered using total station technology.
    - An ESRI ArcGIS data set was completed to index the locations and attributes of each asset.
    - Physical inspections were conducted for each asset
        - Structures – Field inventories and conditional assessments were completed for the entire system and based on the condition of the structure components.
        - Sewers - Survey was completed by CCTV review in accordance with NASSCO PACP standards by NASSCO Certified personnel for approximately 5% of the system.
    - The asset information was included in the Asset Management Spreadsheet (AMS).
    - The AMS was used to quantify and sort the system asset information.
    - The arcGIS database and AMS information will be incorporated into the City's existing system database at the completion of the project.

Condition Assessment

Only a portion of the overall system was televised and was found to be in serviceable condition. A few of the older clay pipes were found to have some areas in need of repair. The Sault Ste. Marie system is unique in that there are several outfalls (68) and subsystems because of the St. Mary's River and numerous drains/creeks/rivers that service the area. The portion of the storm system on Ashmun Street (M-129), owned by the Department of Transportation, was not inventoried or assessed even though a portion of the City's stormwater flow is serviced by that system.

- Structures assessment and inventories were graded in the field on a 1 to 5 scale (5 being the worst condition) for the various key components of the structure (casting, chimney, cone, wall, flow channel).
  - The results of the assessment yielded the following percentages for the structures that were assessed:
    - 98.5% of assets are Good
    - 1% of assets are Fair
    - 0.5% of assets are Poor

- Sewer pipe assessment and inventories followed NASSCO PACP guidelines.
  - The results of the assessment yielded the following percentages for the sewers that were assessed:
    - 96% of assets are Good
    - 0.2% of assets are Fair
    - 3.8% of assets are Poor

- Asset age and material data was collected using historical project drawings.

Criticality of Assets

- The Asset Management Spreadsheet (AMS) was used to organize the asset classes. Several parameters were used to determine asset Consequence of Failure (CoF) and Probability of Failure (PoF), rating each on a 1 to 5 scale (5 being the worst). These factors included:
  - Redundancy: Does the unit or asset have a backup?
  - Criticality of the asset to the system and what level of impact to the system occurs in the event that the asset fails.
  - Location and surrounding service area(s) of each asset were also incorporated in determining the criticality. Assets that service a larger portion of the system typically had higher levels of CoF.
  - Probability of Failure for each asset was based on its current physical and functional condition. Factors varied depending on the asset being evaluated as noted in the Conditional Assessment section of this summary.
  - The Consequence of Failure and Probability of Failure together result in a parameter identified as Business Risk.

- The AMS was used to prioritize the Criticality, which ranged from 1-25 (25 having the highest priority) and determine the need for short term repair or maintenance, short term replacement, or long term maintenance. These ratings were utilized with other factors to create a Capital Improvement Plan.

Level of Service Determination

- A SAW Team was created to oversee the stormwater system asset management.
- The Level of Service Goals were determined by the City of Sault Ste. Marie SAW team with input from the staff.
- To keep continuous focus on maintaining and improving upon our service levels, we shall strive to achieve the following goals:
    a. Meet Regulatory Requirements
    b. Minimize Flooding and public hazards
    c. Enforce required stormwater design criteria for new developments
    d. Provide system capacity for Community growth
    e. Minimize life cycle costs

- The SAW Team will meet once a year to assess the system's service record and recommend improvements to the Level of Service Statement, if needed.

Revenue Structure

- The City stormwater drainage system is operated and maintained using City street funds.
- The current funding consists of a combination of Act 51 state tax funds and a local tax revenues.

Capital Improvement Plan

- The AMS identifies capital improvement projects for the future.
- The projects will be funded by general fund revenues, road millage and special assessments.
- An estimate of the project year and financial cost was generated for each capital improvement project.
- A List of recommended projects to be completed within the next five (5) years is as follows:
    - *Storm System Sewer Repairs with a Business Risk of 16+ or potential sewer collapse.*
- Additional storm system projects that were recommended in the next 6 to 15 years and 16 to 20 years are included in the Capital Improvement Plan.

List of Major Assets

- 191,285 feet of 6- to 60-inch storm sewer
- 1,024 storm structures
- 68 stormwater outfalls
- 2,130 catch basins

DEQ

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Due Date: November 19, 2018 (End date established by MDEQ in May 16, 2018 letter to be November 30, 2018)
(no later than 3 years from executed grant date)

Mr. Oliver Turner, City Manager Sault Ste. Marie certifies that all stormwater asset management plan (SWAMP) activities specified in SAW Grant No. 1273-01 have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SWAMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

Mr. Oliver Turner at (906) 632-5705 and email oturner@saultcity.com

11/19/18

Signature of Authorized Representative (Original Signature Required) Date

Oliver Turner, City Manager

Print Name and Title of Authorized Representative

City of Sault Ste. Marie

Historical and Projected Water Supply and Sewage Disposal System Operating Cash Flow and Debt Service Coverage
Fiscal Years Ended or Ending June 30, 2015 Through 2038

Assumed
Rate of Inflation for Revenue & Expenses
2%

	Actual Audited 6/30/2015	Actual Audited 6/30/2016	Actual Audited 6/30/2017	Actual Unaudited 6/30/2018	Year 1 Budget 6/30/2019	Year 2 Budget 6/30/2020	Projected 6/30/2021	Projected 6/30/2022	Projected 6/30/2023	Projected 6/30/2024	Projected 6/30/2025
Operating Revenues (1)											
Water - Charges for Services - Administrative	$ 240,996	$ 245,322	$ 274,065	$ 279,200	$ 289,300	$ 298,200	$ 304,164	$ 310,247	$ 316,452	$ 322,781	$ 329,237
Water - Charges for Services - Commodity	1,385,324	1,299,418	1,336,697	1,569,600	1,609,400	1,651,500	1,684,530	1,718,221	1,752,585	1,787,637	1,823,389
Water - Charges for Services - Capital Charge	1,536,162	1,690,467	1,735,276	1,811,500	1,863,200	1,926,000	1,964,520	2,003,810	2,043,887	2,084,764	2,126,460
Water - Charges for Services - Other	47,883	52,380	56,778	49,900	53,700	54,400	55,488	56,598	57,730	58,884	60,062
Sewer - Charges for Services - Administrative	237,451	241,250	241,945	247,300	259,300	266,300	271,626	277,059	282,600	288,252	294,017
Sewer - Charges for Services - Commodity	1,344,437	1,359,915	1,372,265	1,424,500	1,466,000	1,512,900	1,543,158	1,574,021	1,605,502	1,637,612	1,670,364
Sewer - Charges for Services - Capital Charge	1,709,022	1,741,154	1,798,927	1,848,100	1,895,800	1,958,400	1,997,568	2,037,519	2,078,270	2,119,835	2,162,232
Sewer - Charges for Services - Other	65,290	55,738	53,358	52,100	52,100	52,100	53,142	54,205	55,289	56,395	57,523
Total Operating Revenues	$ 6,566,565	$ 6,685,644	$ 6,869,311	$ 7,282,200	$ 7,488,800	$ 7,719,800	$ 7,874,196	$ 8,031,680	$ 8,192,314	$ 8,356,160	$ 8,523,283
Operating Expenses (2)											
Staff Support - Water	$ 613,642	$ 620,242	$ 603,043	$ 655,856	$ 669,100	$ 692,100	$ 705,900	$ 720,000	$ 734,400	$ 749,100	$ 764,100
Staff Support - Sewer	604,685	596,842	603,343	635,856	646,900	669,500	682,890	696,548	710,479	724,688	739,182
Water Filtration Plant	622,008	607,326	629,134	641,969	673,700	691,200	705,024	719,124	733,507	748,177	763,141
Transmission and Distribution	577,966	537,553	502,974	488,721	569,200	580,700	592,314	604,160	616,243	628,568	641,140
Operating Meters	153,335	160,727	157,249	165,738	183,300	188,900	192,678	196,532	200,462	204,471	208,561
Sewage System	110,947	102,852	118,209	110,197	115,700	118,300	120,666	123,079	125,541	128,052	130,613
Waste Water Treatment	826,977	806,446	831,605	840,546	888,500	908,200	926,364	944,891	963,789	983,065	1,002,726
Miscellaneous	883	708	703	858	1,200	1,200	1,224	1,248	1,273	1,299	1,325
Depreciation (3)	1,502,329	1,487,693	1,532,473	1,685,749	1,719,464	1,753,853	1,788,930	1,824,709	1,861,203	1,898,427	1,936,395
Total Operating Expenses	$ 5,012,772	$ 4,920,389	$ 4,978,732	$ 5,225,490	$ 5,467,064	$ 5,603,953	$ 5,715,990	$ 5,830,292	$ 5,946,898	$ 6,065,848	$ 6,187,183
Operating Income (Loss)	$ 1,553,793	$ 1,765,255	$ 1,890,579	$ 2,056,710	$ 2,021,736	$ 2,115,847	$ 2,158,206	$ 2,201,388	$ 2,245,416	$ 2,290,312	$ 2,336,100
Non-Operating Revenues (Expenses)											
Interest Earnings	17,538	19,986	18,455	33,700	22,300	22,200	22,644	23,097	23,559	24,030	24,511
Special Assessment Revenue	-	-	-	-	-	-	-	-	-	-	-
Federal & State Grant Revenue	39,246	-	-	-	-	-	-	-	-	-	-
Miscellaneous Revenue (4)	230,318	231,090	221,782	239,045	260,200	265,500	270,810	276,226	281,751	287,386	293,133
Local Contribution	-	-	-	-	-	-	-	-	-	-	-
Transfer from (to) Funds on Hand (Rate Stabilization Fund)	-	-	-	239,766	229,471	-	-	-	-	-	-
PayGo Capital Improvements	-	-	-	-	(61,400)	(61,400)	(61,400)	(61,400)	(61,400)	(69,200)	(69,200)
Transfers In *(excluding capital & debt related) (5)*	66,600	-	25,300	29,700	-	-	-	-	-	-	-
Transfers Out *(excluding capital & debt related)*	(74,200)	(73,600)	(50,000)	(22,300)	(22,746)	(23,201)	(23,665)	(24,138)	(24,621)	(25,113)	(25,616)
Other	-	-	-	-	-	-	-	-	-	-	-
Depreciation (add back, non-cash item) (3)	1,502,329	1,487,693	1,532,473	1,685,749	1,719,464	1,753,853	1,788,930	1,824,709	1,861,203	1,898,427	1,936,396
Total Non-Operating Revenues (Expenses)	$ 1,781,831	$ 1,665,169	$ 1,748,010	$ 2,205,660	$ 2,147,289	$ 1,956,952	$ 1,997,319	$ 2,038,494	$ 2,080,492	$ 2,115,529	$ 2,159,224
NET INCOME AVAILABLE FOR DEBT SERVICE	$ 3,335,624	$ 3,430,424	$ 3,638,589	$ 4,262,370	$ 4,169,025	$ 4,072,799	$ 4,155,525	$ 4,239,882	$ 4,325,907	$ 4,405,842	$ 4,495,324
Existing Debt Service Requirements											
1995 SRF Bonds (LT) #903	$ 235,413	$ 240,463	$ 240,288	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
1997 LTGO Bonds #904	65,998	63,083	65,035	66,700	-	-	-	-	-	-	-
1997 PCRF Bonds (LT) #905	38,544	37,756	36,969	36,200	35,400	-	-	-	-	-	-
1998 DWRF Bonds #906	266,625	265,875	265,000	264,000	267,900	266,500	-	-	-	-	-
1998 CSO Bonds #908	239,650	240,038	240,475	240,500	240,500	240,288	-	-	-	-	-
1998 LTGO Bonds (County) (6)	-	-	-	-	-	-	-	-	-	-	-
2001 LTGO Bonds (County) (6)	-	-	-	-	-	-	-	-	-	-	-
2001 DWRF Bonds #909	118,000	115,625	113,250	115,600	113,200	115,875	113,250	115,390	108,247	-	-
2002 CSO Bonds (LT) #913	217,500	218,250	218,875	219,400	219,800	215,000	215,250	215,375	215,375	215,250	-
2003 DWRF Bonds #914	198,875	200,000	201,000	201,900	202,700	203,250	198,750	199,250	199,625	199,875	-
2005B LTGO Bonds #924	58,413	56,925	60,331	58,700	57,000	60,125	58,213	61,100	58,788	56,475	59,047
2010 SRF Bonds #943	329,969	329,531	329,755	329,100	301,000	327,318	326,255	330,005	328,568	327,005	330,255
2011 LTGO County Refunding Bonds #947	612,050	599,550	510,675	754,100	752,300	291,288	277,275	263,438	254,531	-	-
2012 CSO D Refunding Bonds #948	262,000	278,100	277,900	276,600	280,000	279,800	359,250	344,725	333,700	316,200	-
2013 Chippewa County Refunding Bonds #942 (7)	595,631	543,881	547,969	556,400	557,700	561,944	565,769	578,994	585,481	594,044	602,622
2014 CWRF (aka SRF) Bonds #950 (8)	-	50,491	145,122	464,400	464,000	447,414	449,789	446,976	448,976	445,789	447,414
2014 DWRF Bonds #951 (8)	-	36,377	112,459	325,500	325,500	310,551	310,238	309,801	309,238	308,551	312,676
2015 LTGO Capital Improvement Bonds #952	-	154,005	152,081	150,300	153,500	151,581	154,681	152,681	154,681	151,531	153,381
Total Existing Debt Service Requirements	$ 3,238,668	$ 3,429,949	$ 3,517,184	$ 4,059,400	$ 3,970,500	$ 3,470,934	$ 3,028,720	$ 3,017,735	$ 2,997,211	$ 2,614,720	$ 1,905,395
Additional Debt Service Requirements (rough estimates)											
2024 - WWTP and Pump Station Improvements ($10.38MM)	-	-	-	-	-	-	-	-	-	-	797,100
2038 - WWTP Improvements ($4.9MM)	-	-	-	-	-	-	-	-	-	-	-
Total New Debt Service	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 797,100
Total Water and Sewer Supported Debt Service	$ 3,238,668	$ 3,429,949	$ 3,517,184	$ 4,059,400	$ 3,970,500	$ 3,470,934	$ 3,028,720	$ 3,017,735	$ 2,997,211	$ 2,614,720	$ 2,702,495
Total Coverage Ratio	**1.03x**	**1.00x**	**1.03x**	**1.05x**	**1.05x**	**1.17x**	**1.37x**	**1.40x**	**1.44x**	**1.69x**	**1.66x**
Revenue Bonds Coverage Ratio	**4.05x**	**3.78x**	**3.38x**	**2.64x**	**2.58x**	**2.57x**	**3.88x**	**3.96x**	**4.06x**	**4.62x**	**5.91x**
Annual Excess	**$96,956**	**$474**	**$121,405**	**$202,970**	**$198,525**	**$601,865**	**$1,126,805**	**$1,222,147**	**$1,328,697**	**$1,791,122**	**$1,792,830**
Cummulative Excess	**$161,808**	**$162,283**	**$283,688**	**$486,658**	**$685,183**	**$1,287,048**	**$2,413,853**	**$3,636,000**	**$4,964,697**	**$6,755,819**	**$8,548,649**
Annual $ Increase in Revenue Necessary for 1.05x Coverage	**$64,977**	**$171,023**	**$54,454**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
Annual % Increase Necessary to Produce 1.05x Coverage	**0.99%**	**2.56%**	**0.79%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**
Monthly Revenue Increase Per EDU (6,700 Total)	**$0.81**	**$2.13**	**$0.68**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**

(1) For the fiscal years ending June 30, 2018 and beyond, consumption is not assumed to change. Revenues assume inflationary rate increases of 2% annually.
(2) Operating expenses are assumed to grow 2% annually for the fiscal years ending June 30, 2018 and beyond.
(3) Depreciation is included in operating expenses, but added back in non-operating expenses.
(4) Miscellaneous revenues include Water System connection fees, permits, commercial hydrant rentals and municipal hydrant rentals.
(5) Includes various special assessment revenues relating primarily to the Water System.

(6) County issues 1995, 1998, 2001 refinanced and rolled into #947 in 2011.
(7) 2010 Bonds reflect NET debt service for Build America Bonds (35% federal intere
(8) Projected 2014-2016 borrowings relate to the City's proposed CSO Phase 3 Improv
(9) Additional debt is projected for two forseeable projects, estimated repayments sche
Source: City of Sault Ste. Marie

of Sault Ste. Marie

ical and Projected Water Supply and Sewage Disposal S

Years Ended or Ending June 30, 2015 Through 2038

	Projected 6/30/2026	Projected 6/30/2027	Projected 6/30/2028	Projected 6/30/2029	Projected 6/30/2030	Projected 6/30/2031	Projected 6/30/2032	Projected 6/30/2033	Projected 6/30/2034	Projected 6/30/2035	Projected 6/30/2036	Projected 6/30/2037	Projected 6/30/2038
ing Revenues (1)													
Water - Charges for Services - Administrative	$ 335,822	$ 342,538	$ 349,389	$ 356,377	$ 363,504	$ 370,774	$ 378,190	$ 385,753	$ 393,469	$ 401,338	$ 409,365	$ 417,552	$ 425,903
Water - Charges for Services - Commodity	1,859,857	1,897,054	1,934,995	1,973,695	2,013,169	2,053,433	2,094,501	2,136,391	2,179,119	2,222,702	2,267,156	2,312,499	2,358,749
Water - Charges for Services - Capital Charge	2,168,989	2,212,369	2,256,616	2,301,748	2,347,783	2,394,739	2,442,634	2,491,486	2,541,316	2,592,142	2,643,985	2,696,865	2,750,802
Water - Charges for Services - Other	61,263	62,489	63,738	65,013	66,313	67,640	68,992	70,372	71,780	73,215	74,680	76,173	77,697
Sewer - Charges for Services - Administrative	299,897	305,895	312,013	318,253	324,618	331,111	337,733	344,487	351,377	358,405	365,573	372,884	380,342
Sewer - Charges for Services - Commodity	1,703,771	1,737,847	1,772,603	1,808,056	1,844,217	1,881,101	1,918,723	1,957,097	1,996,239	2,036,164	2,076,887	2,118,425	2,160,794
Sewer - Charges for Services - Capital Charge	2,205,476	2,249,586	2,294,578	2,340,469	2,387,279	2,435,024	2,483,725	2,533,399	2,584,067	2,635,749	2,688,464	2,742,233	2,797,077
Sewer - Charges for Services - Other	58,673	59,847	61,043	62,264	63,510	64,780	66,075	67,397	68,745	70,120	71,522	72,953	74,412
)perating Revenues	$ 8,693,749	$ 8,867,624	$ 9,044,976	$ 9,225,876	$ 9,410,393	$ 9,598,601	$ 9,790,573	$ 9,986,384	$ 10,186,112	$ 10,389,834	$ 10,597,631	$ 10,809,584	$ 11,025,775
ing Expenses (2)													
Staff Support - Water	$ 779,400	$ 795,000	$ 810,900	$ 827,100	$ 843,600	$ 860,500	$ 877,700	$ 895,300	$ 913,200	$ 931,500	$ 950,100	$ 969,100	$ 988,500
Staff Support - Sewer	753,966	769,045	784,426	800,114	816,117	832,439	849,088	866,070	883,391	901,059	919,080	937,462	956,211
Water Filtration Plant	778,403	793,972	809,851	826,048	842,569	859,420	876,609	894,141	912,024	930,264	948,869	967,847	987,204
Transmission and Distribution	653,963	667,042	680,383	693,990	707,870	722,027	736,468	751,197	766,221	781,546	797,177	813,120	829,383
Operating Meters	212,732	216,987	221,326	225,753	230,268	234,873	239,571	244,362	249,250	254,235	259,319	264,506	269,796
Sewage System	133,225	135,890	138,607	141,379	144,207	147,091	150,033	153,034	156,094	159,216	162,401	165,649	168,962
Waste Water Treatment	1,022,781	1,043,236	1,064,101	1,085,383	1,107,091	1,129,233	1,151,817	1,174,854	1,198,351	1,222,318	1,246,764	1,271,699	1,297,133
Miscellaneous	1,351	1,378	1,406	1,434	1,463	1,492	1,522	1,552	1,583	1,615	1,647	1,680	1,714
Depreciation (3)	1,975,123	2,014,626	2,054,918	2,096,017	2,137,937	2,180,696	2,224,310	2,268,796	2,314,172	2,360,455	2,407,664	2,455,818	2,504,934
)perating Expenses	$ 6,310,944	$ 6,437,175	$ 6,565,919	$ 6,697,219	$ 6,831,121	$ 6,967,772	$ 7,107,117	$ 7,249,306	$ 7,394,286	$ 7,542,207	$ 7,693,022	$ 7,846,880	$ 8,003,836
ing Income (Loss)	$ 2,382,804	$ 2,430,448	$ 2,479,057	$ 2,528,657	$ 2,579,272	$ 2,630,829	$ 2,683,456	$ 2,737,079	$ 2,791,826	$ 2,847,627	$ 2,904,610	$ 2,962,704	$ 3,021,940
)erating Revenues (Expenses)													
Interest Earnings	25,001	25,501	26,011	26,531	27,062	27,603	28,155	28,718	29,292	29,878	30,476	31,085	31,707
Special Assessment Revenue	-	-	-	-	-	-	-	-	-	-	-	-	-
Federal & State Grant Revenue	-	-	-	-	-	-	-	-	-	-	-	-	-
Miscellaneous Revenue (4)	298,996	304,976	311,076	317,297	323,643	330,116	336,718	343,453	350,322	357,328	364,475	371,764	379,199
Local Contribution	-	-	-	-	-	-	-	-	-	-	-	-	-
Transfer from (to) Funds on Hand (Rate Stabilization Fund)	-	-	-	-	-	-	-	-	-	-	-	-	-
PayGo Capital Improvements	(69,200)	(69,200)	(69,200)	(69,200)	(69,200)	(69,200)	(69,200)	(69,200)	(110,400)	(110,400)	(110,400)	(110,400)	(110,400)
Transfers In *(excluding capital & debt related)* (5)	-	-	-	-	-	-	-	-	-	-	-	-	-
Transfers Out *(excluding capital & debt related)*	(26,128)	(26,651)	(27,184)	(27,727)	(28,282)	(28,847)	(29,424)	(30,013)	(30,613)	(31,225)	(31,850)	(32,487)	(33,137)
Other	-	-	-	-	-	-	-	-	-	-	-	-	-
Depreciation (add back, non-cash item) (3)	1,975,124	2,014,626	2,054,919	2,096,017	2,137,937	2,180,696	2,224,310	2,268,796	2,314,172	2,360,456	2,407,665	2,455,818	2,504,934
'on-Operating Revenues (Expenses)	$ 2,203,793	$ 2,249,252	$ 2,295,621	$ 2,342,918	$ 2,391,160	$ 2,440,367	$ 2,490,559	$ 2,541,754	$ 2,552,773	$ 2,606,037	$ 2,660,365	$ 2,715,781	$ 2,772,304
NCOME AVAILABLE FOR DEBT SERVICE	$ 4,586,597	$ 4,679,701	$ 4,774,679	$ 4,871,574	$ 4,970,432	$ 5,071,197	$ 5,174,015	$ 5,278,833	$ 5,344,599	$ 5,453,663	$ 5,564,975	$ 5,678,484	$ 5,794,244
g Debt Service Requirements													
1995 SRF Bonds (LT) #903	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
1997 LTGO Bonds #904	-	-	-	-	-	-	-	-	-	-	-	-	-
1997 PCRF Bonds (LT) #905	-	-	-	-	-	-	-	-	-	-	-	-	-
1998 DWRF Bonds #906	-	-	-	-	-	-	-	-	-	-	-	-	-
1998 CSO Bonds #908	-	-	-	-	-	-	-	-	-	-	-	-	-
1998 LTGO Bonds (County) (6)	-	-	-	-	-	-	-	-	-	-	-	-	-
2001 LTGO Bonds (County) (6)	-	-	-	-	-	-	-	-	-	-	-	-	-
2001 DWRF Bonds #909	-	-	-	-	-	-	-	-	-	-	-	-	-
2002 CSO Bonds (LT) #913	-	-	-	-	-	-	-	-	-	-	-	-	-
2003 DWRF Bonds #914	-	-	-	-	-	-	-	-	-	-	-	-	-
2005B LTGO Bonds #924	61,388	-	-	-	-	-	-	-	-	-	-	-	-
2010 SRF Bonds #943	328,318	326,255	329,005	326,568	328,943	331,068	328,533	-	-	-	-	-	-
2011 LTGO County Refunding Bonds #947	-	-	-	-	-	-	-	-	-	-	-	-	-
2012 CSO D Refunding Bonds #948	-	-	-	-	-	-	-	-	-	-	-	-	-
2013 Chippewa County Refunding Bonds #942 (7)	610,200	618,938	635,563	649,725	663,000	-	-	-	-	-	-	-	-
2014 CWRF (aka SRF) Bonds #950 (8)	448,789	449,914	450,789	446,476	446,976	447,226	447,226	446,976	446,476	445,726	467,172	465,766	-
2014 DWRF Bonds #951 (8)	311,613	310,426	309,113	312,613	310,926	309,113	312,113	309,926	312,551	309,988	326,938	324,000	-
2015 LTGO Capital Improvement Bonds #952	155,081	151,631	153,181	154,581	150,831	152,081	153,181	153,963	154,588	154,872	-	-	-
Existing Debt Service Requirements	$ 1,915,389	$ 1,857,163	$ 1,877,651	$ 1,889,963	$ 1,900,676	$ 1,239,488	$ 1,241,053	$ 910,865	$ 913,615	$ 910,586	$ 794,110	$ 789,766	$ -
nal Debt Service Requirements (rough estimates)													
2024 - WWTP and Pump Station Improvements ($10.38MM)	797,250	796,725	800,525	798,425	800,650	796,975	797,625	797,375	796,225	799,175	796,000	796,925	796,725
2038 - WWTP Improvements ($4.9MM)	-	-	-	-	-	-	-	-	-	-	-	-	-
'ew Debt Service	$ 797,250	$ 796,725	$ 800,525	$ 798,425	$ 800,650	$ 796,975	$ 797,625	$ 797,375	$ 796,225	$ 799,175	$ 796,000	$ 796,925	$ 796,725
'ater and Sewer Supported Debt Service	$ 2,712,639	$ 2,653,888	$ 2,678,176	$ 2,688,388	$ 2,701,326	$ 2,036,463	$ 2,038,678	$ 1,708,240	$ 1,709,840	$ 1,709,761	$ 1,590,110	$ 1,586,691	$ 796,725
overage Ratio	**1.69x**	**1.76x**	**1.78x**	**1.81x**	**1.84x**	**2.49x**	**2.54x**	**3.09x**	**3.13x**	**3.19x**	**3.50x**	**3.58x**	**7.27x**
e Bonds Coverage Ratio	**6.03x**	**6.15x**	**6.28x**	**6.42x**	**6.56x**	**6.70x**	**6.81x**	**6.97x**	**7.04x**	**7.22x**	**7.01x**	**7.19x**	
Excess	**$1,873,958**	**$2,025,813**	**$2,096,503**	**$2,183,186**	**$2,269,106**	**$3,034,733**	**$3,135,336**	**$3,570,593**	**$3,634,760**	**$3,743,902**	**$3,974,865**	**$4,091,793**	**$4,997,519**
ulative Excess	**$10,422,607**	**$12,448,420**	**$14,544,923**	**$16,728,109**	**$18,997,215**	**$22,031,949**	**$25,167,285**	**$28,737,878**	**$32,372,638**	**$36,116,540**	**$40,091,405**	**$44,183,198**	**$49,180,717**
$ Increase in Revenue Necessary for 1.05x Coverage	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
% Increase Necessary to Produce 1.05x Coverage	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**
y Revenue Increase Per EDU (6,700 Total)	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**

the fiscal years ending June 30, 2018 and beyond, consumption is r

rating expenses are assumed to grow 2% annually for the fiscal yeast subsidy). Chippewa County refunded the 2010 issue in December 2013 with tax-exempt bonds.

reciation is included in operating expenses, but added back in non-vements. SRF and DWRF loans are still drawing, repayment schedule is subject to change.

cellaneous revenues include Water System connection fees, permitsdules assume 4.5% interest rate and even payments over a 20 year bond.

ides various special assessment revenues relating primarily to the V

CITY OF SAULT STE. MARIE, MICHIGAN

CIP

Projects	Years Until Project Will Begin	Cost	Reserve Required Each Year
Sanitary Collection System Pump Station Phase 1	6	$1,900,000	$316,667
Sanitary Collection System Pump Station Phase 2	19	$240,000	$12,540
SS MH Rehab Flow Channel	3	$18,350	$5,867
SS MH Repl Ph 1	3	$49,029	$15,675
SS MH Repl Ph 2	13	$180,162	$13,718
SS Sewer HP BR Repairs Ph 1	3	$196,290	$62,756
SS Sewer MP BR Repairs Ph 2	10	$216,938	$21,408
SS Sewer Repair Ph 3	18	$84,077	$4,635
SS Sewer Repair Ph 4	25	$251,908	$10,076
SS Sewer Repair Ph 5	10	$55,297	$5,457
SW MH Repl Ph 2	13	$26,651	$2,029
SW Sewer HP BR Repairs Ph 1	3	$20,833	$6,661
SW Sewer MP BR Repairs Ph 2	10	$15,203	$1,500
WWTP Improvements Phase 1	6	$6,618,000	$1,103,000
WWTP Improvements Phase 2	20	$2,374,000	$118,700
WWTP Improvements Phase 3	30	$1,070,000	$35,667

TOTAL	$13,316,738	$1,736,356

CITY OF SAULT STE. MARIE, MICHIGAN

Summary

id	Equipment Description	Asset ID	Construction Drawings Sheet Reference	Capacity or Size	Material	Length	Comment	Northing State Plane Ordinate	Easting State Plane Ordinate	Elevation	Original Cost	Year Installed (01/01/YYYY)	Age	Expected useful life (years)	Remaining Useful Life (years)	Depreciated Value	Replacement Cost	Average number of units in service	Total Number of units	Redundancy (Number)	Redundancy (percent)	Redundancy Score (R) (Reduces (C))	Criticality (C) (see back-up sheets)	Probability of Failure (P) (see back-up sheets)	Business Risk (BRE=PxCxR)
1292	Sanitary MH	SAMH_1703	N/A	0.00	CR			631376.752	26911298.225	722.219	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	2.0	2.0	4
1293	Sanitary MH	SAMH_1703A	N/A	0.00	BR			631380.840	26911463.260	722.786	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	2.0	2.0	4
1294	Sanitary MH	SAMH_1704	N/A	0.00	BR			631385.338	26911675.239	722.718	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
1295	Sanitary MH	SAMH_1881	N/A	0.00	BR			631426.145	26911807.447	722.390	$1,000	01/01/1950	68	75	6	$81	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
1296	Sanitary MH	SAMH_1705	N/A	0.00	BR			631375.902	26911900.617	722.092	$1,500	01/01/1950	68	75	6	$121	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1297	Sanitary MH	SAMH_1706	N/A	0.00	BR			631380.819	26912086.812	720.376	$1,500	01/01/1950	68	75	6	$121	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1298	Sanitary MH	SAMH_1707	N/A	0.00	BR			631389.622	26912417.723	714.579	$1,000	01/01/1950	68	75	6	$81	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
1299	Sanitary MH	SAMH_1708	N/A	0.00	CR			631402.479	26912474.213	713.143	$3,500	01/01/2000	18	75	56	$2,618	$4,539	1	1	0.0	0.0	1.0	2.0	2.0	4
1300	Sanitary MH	SAMH_1709	N/A	0.00	CR			631415.397	26912769.250	706.367	$3,500	01/01/2000	18	75	56	$2,618	$4,539	1	1	0.0	0.0	1.0	2.0	2.0	4
1301	Sanitary MH	SAMH_1710	N/A	0.00	CR			631422.289	26913088.810	699.321	$4,500	01/01/2011	7	75	67	$4,027	$5,092	1	1	0.0	0.0	1.0	2.0	2.0	4
1302	Sanitary MH	SAMH_1877A	N/A	0.00	CR			631769.663	26912766.105	707.857	$3,500	01/01/2001	17	75	57	$2,665	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
1303	Sanitary MH	SAMH_1876	N/A	0.00	CN			632091.380	26912762.700	708.811	$4,000	01/01/2001	17	75	57	$3,046	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1304	Sanitary MH	SAMH_1874	N/A	0.00	BR			632186.120	26912755.427	708.460	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1305	Sanitary MH	SAMH_1873	N/A	0.00	BR			632418.160	26912759.641	706.748	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1306	Sanitary MH	SAMH_1872	N/A	0.00	BR			632637.472	26912763.481	704.411	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1307	Sanitary MH	SAMH_1884	N/A	0.00	CR			632392.987	26912399.537	713.264	$3,500	01/01/2001	17	75	57	$2,665	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
1308	Sanitary MH	SAMH_1883	N/A	0.00	CR			632400.104	26912390.001	713.268	$3,500	01/01/2001	17	75	57	$2,665	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
1309	Sanitary MH	SAMH_1885	N/A	0.00	CN			632067.925	26912391.249	715.851	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	1.0	2.0	2
1310	Sanitary MH	SAMH_1888	N/A	0.00	BR			631742.371	26912404.183	713.543	$1,000	01/01/1950	68	75	6	$81	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
1311	Sanitary MH	SAMH_1868	N/A	0.00	CN			632721.155	26912399.077	714.921	$4,000	01/01/2004	14	75	60	$3,206	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
1312	Sanitary MH	SAMH_1867	N/A	0.00	CN			632729.628	26912407.860	714.730	$4,000	01/01/2004	14	75	60	$3,206	$5,092	1	1	0.0	0.0	1.0	2.0	2.0	4
1313	Sanitary MH	SAMH_1864	N/A	0.00	BR			632885.413	26912411.571	713.229	$4,000	01/01/2004	14	75	60	$3,206	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
1314	Sanitary MH	SAMH_1857	N/A	0.00	CR			633049.104	26912414.117	710.240	$4,000	01/01/2004	14	75	60	$3,206	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
1315	Sanitary MH	SAMH_1856	N/A	0.00	BR			633213.335	26912411.659	709.507	$3,500	01/01/2004	14	75	60	$2,805	$4,539	1	1	0.0	0.0	1.0	2.0	1.1	2.2
1316	Sanitary MH	SAMH_1851	N/A	0.00	BR		FRAME 1/2" BELOW GRADE	633375.637	26912406.930	708.325	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	1.0	3.0	3
1317	Sanitary MH	SAMH_1850	N/A	0.00	BR			633540.674	26912405.169	706.764	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	1.0	3.0	3
1318	Sanitary MH	SAMH_1848	N/A	0.00	BR			633718.115	26912401.682	704.754	$4,000	01/01/2004	14	75	60	$3,206	$5,092	1	1	0.0	0.0	1.0	1.0	3.0	3
1319	Sanitary MH	SAMH_1842	N/A	0.00	BR		1/2" ABOVE GRADE	633865.000	26912398.139	705.902	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	1.0	3.0	3
1320	Sanitary MH	SAMH_1846	N/A	0.00	CR			633702.153	26912464.576	703.020	$4,000	01/01/2004	14	75	60	$3,206	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1321	Sanitary MH	SAMH_1847	N/A	0.00				633712.284	26912806.218	691.933	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	1.0	1.1	1.1
1322	Sanitary MH	SAMH_1845	N/A	0.00	BR			633877.442	26912883.682	689.349	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	1.0	3.0	3
1323	Sanitary MH	SAMH_1843	N/A	0.00	CR			633967.357	26912877.618	686.869	$3,500	01/01/2004	14	75	60	$2,805	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
1324	Sanitary MH	SAMH_1865	N/A	0.00	CN			632703.808	26911755.813	719.968	$2,500	01/01/1970	48	75	26	$869	$5,092	1	1	0.0	0.0	1.0	2.0	2.0	4
1325	Sanitary MH	SAMH_1878	N/A	0.00	BR			632377.735	26911768.519	720.449	$1,000	01/01/1950	68	75	6	$81	$4,539	1	1	0.0	0.0	1.0	2.0	2.0	4
1326	Sanitary MH	SAMH_1879	N/A	0.00	BR			632058.211	26911781.803	721.175	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
1327	Sanitary MH	SAMH_1887	N/A	0.00				632060.117	26911833.661	720.932	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	1.0	1.1	1.1
1328	Sanitary MH	SAMH_1880	N/A	0.00	BR			631716.636	26911795.932	721.885	$1,500	01/01/1950	68	75	6	$121	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1329	Sanitary MH	SAMH_1886	N/A	0.00	BR			632063.572	26912045.255	719.771	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	1.0	2.0	2
1330	Sanitary MH	SAMH_1882	N/A	0.00	CR			632388.745	26912044.251	718.924	$4,000	01/01/2001	17	75	57	$3,046	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1331	Sanitary MH	SAMH_1811	N/A	0.00	CN			633845.537	26910494.581	697.834	$1,000	01/01/1950	68	75	6	$81	$4,539	1	1	0.0	0.0	1.0	2.0	2.0	4
1332	Sanitary MH	SAMH_1813	N/A	0.00	CR			633631.958	26910467.078	700.673	$3,500	01/01/2004	14	75	60	$2,805	$4,539	1	1	0.0	0.0	1.0	2.0	2.0	4
1333	Sanitary MH	SAMH_1814	N/A	0.00	CN			633584.055	26910467.078	701.126	$3,500	01/01/2004	14	75	60	$2,805	$4,539	1	1	0.0	0.0	1.0	1.0	2.0	2
1334	Sanitary MH	SAMH_1815	N/A	0.00				633336.798	26910473.733	704.394	$4,000	01/01/2004	14	75	60	$3,206	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1335	Sanitary MH	SAMH_1838	N/A	0.00	CN			632678.658	26910966.032	718.566	$2,000	01/01/1970	48	75	26	$695	$4,539	1	1	0.0	0.0	1.0	2.0	3.0	6
1336	Sanitary MH	SAMH_1839	N/A	0.00	CN			632687.989	26911234.943	721.075	$2,500	01/01/1970	48	75	26	$869	$5,092	1	1	0.0	0.0	1.0	2.0	2.0	4
1337	Sanitary MH	SAMH_1863	N/A	0.00				632866.411	26911750.649	719.787	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	1.0	1.1	1.1
1338	Sanitary MH	SAMH_1831	N/A	0.00	BR			633589.025	26911102.126	714.325	$4,000	01/01/2004	14	75	60	$3,206	$5,092	1	1	0.0	0.0	1.0	1.0	2.0	2
1339	Sanitary MH	SAMH_1830	N/A	0.00	BR			633588.978	26911085.064	713.751	$4,000	01/01/2004	14	75	60	$3,206	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1340	Sanitary MH	SAMH_1832	N/A	0.00	CR			633514.490	26911086.709	714.446	$4,000	01/01/2004	14	75	60	$3,206	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1341	Sanitary MH	SAMH_1835	N/A	0.00	CR			633355.114	26911054.681	715.209	$4,000	01/01/2004	14	75	60	$3,206	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1342	Sanitary MH	SAMH_1834	N/A	0.00	CR			633346.430	26910779.177	707.364	$4,000	01/01/2004	14	75	60	$3,206	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1343	Sanitary MH	SAMH_1829	N/A	0.00	CR			633591.979	26910792.249	705.540	$4,000	01/01/2004	14	75	60	$3,206	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1344	Sanitary MH	SAMH_1875	N/A	0.00	CN			632099.839	26913073.689	696.036	$3,500	01/01/2001	17	75	57	$2,665	$4,539	1	1	0.0	0.0	1.0	1.0	2.0	2
1345	Sanitary MH	SAMH_1871	N/A	0.00	CR			632738.687	26912760.528	700.872	$3,500	01/01/2001	17	75	57	$2,665	$4,539	1	1	0.0	0.0	1.0	1.0	2.0	2
1346	Sanitary MH	SAMH_1870	N/A	0.00	CR			632732.565	26912574.360	709.070	$4,000	01/01/2001	17	75	57	$3,046	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1347	Sanitary MH	SAMH_1859	N/A	0.00	CR			633199.879	26912711.728	689.661	$5,000	01/01/2004	14	75	60	$4,007	$6,017	1	1	0.0	0.0	1.0	3.0	1.0	3
1348	Sanitary MH	SAMH_1858	N/A	0.00	CR			633121.618	26912565.760	700.914	$4,000	01/01/2004	14	75	60	$3,206	$5,092	1	1	0.0	0.0	1.0	3.0	1.0	3
1349	Sanitary MH	SAMH_1861	N/A	0.00	BR			633247.095	26912863.389	674.782	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	3.0	3.0	9
1350	Sanitary MH	SAMH_1860	N/A	0.00	CR			633294.354	26912894.203	664.779	$4,000	01/01/2004	14	75	60	$3,206	$5,092	1	1	0.0	0.0	1.0	3.0	1.0	3
1351	Sanitary MH	SAMH_1854	N/A	0.00				633402.469	26912768.211	675.917	$4,000	01/01/2004	14	75	60	$3,206	$5,092	1	1	0.0	0.0	1.0	2.0	1.1	2.2
1352	Sanitary MH	SAMH_2678	N/A	0.00	CR			631424.702	26913135.433	698.844	$4,500	01/01/2011	7	75	67	$4,027	$5,092	1	1	0.0	0.0	1.0	3.0	1.0	3
1353	Sanitary MH	SAMH_2678A	N/A	0.00	CR			631768.169	26913130.401	697.101	$4,500	01/01/2011	7	75	67	$4,027	$5,092	1	1	0.0	0.0	1.0	3.0	1.0	3
1354	Sanitary MH	SAMH_2678B	N/A	0.00	CR			632099.030	26913119.662	694.479	$4,500	01/01/2011	7	75	67	$4,027	$5,092	1	1	0.0	0.0	1.0	3.0	1.0	3
1355	Sanitary MH	SAMH_2678C	N/A	0.00	CR			632421.084	26913114.715	687.116	$5,500	01/01/2011	7	75	67	$4,922	$6,017	1	1	0.0	0.0	1.0	3.0	1.0	3
1356	Sanitary MH	SAMH_2872	N/A	0.00	CR			632736.145	26913109.219	674.397	$1,000	01/01/1950	68	75	6	$81	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
1357	Sanitary MH	SAMH_2811	N/A	0.00				632844.713	26913097.265	669.837	$1,000	01/01/1950	68	75	6	$81	$4,539	1	1	0.0	0.0	1.0	3.0	2.0	6
1358	Sanitary MH	SAMH_2810	N/A	0.00				633125.140	26913093.305	658.802	$1,000	01/01/1950	68	75	6	$81	$4,539	1	1	0.0	0.0	1.0	3.0	2.0	6
1359	Sanitary MH	SAMH_2809	N/A	0.00				633146.735	26913092.094	657.817	$1,000	01/01/1950	68	75	6	$81	$4,539	1	1	0.0	0.0	1.0	3.0	2.0	6
1360	Sanitary MH	SAMH_2808	N/A	0.00				633374.774	26913085.726	648.835	$1,000	01/01/1950	68	75	6	$81	$4,539	1	1	0.0	0.0	1.0	3.0	2.0	6
1361	Sanitary MH	SAMH_2807	N/A	0.00	BR			633421.194	26913081.848	647.585	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	3.0	1.2	3.6
1362	Sanitary MH	SAMH_1866	N/A	0.00			BURIED UNDER PATCHING	632711.614	26912091.850	718.388	$2,500	01/01/1970	48	75	26	$869	$5,092	1	1	0.0	0.0	1.0	2.0	1.1	2.2
1363	Sanitary MH	SAMH_1833	N/A	0.00	BR			633523.270	26911355.849	718.320	$1,500	01/01/1950	68	75	6	$121	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1364	Sanitary MH	SAMH_1836	N/A	0.00	BR			633201.143	26911359.095	720.393	$2,000	01/01/1939	79	75	0	$0	$6,017	1	1	0.0	0.0	1.0	1.0	1.0	1
1365	Sanitary MH	SAMH_1849	N/A	0.00				633524.505	26911785.615	718.094	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	1.0	1.1	1.1
1366	Sanitary MH	SAMH_1855	N/A	0.00				633198.054	26911807.996	719.473	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	1.0	1.1	1.1
1367	Sanitary MH	SAMH_1869	N/A	0.00	CR			632813.500	26912572.300	710.151	$4,000	01/01/2004	14	75	60	$3,206	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1368	Sanitary MH	SAMH_1853	N/A	0.00	BR		PIPE COMING IN FROM NORTHWEST HAS SMALL TRICKLE BUT THERE IS A COLLA	633467.185	26912693.596	682.171	$4,000	01/01/2004	14	75	60	$3,206	$5,092	1	1	0.0	0.0	1.0	2.0	3.0	6
1369	Sanitary MH	SAMH_1840	N/A	0.00				633851.429	26911777.414	716.917	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	1.0	1.1	1.1
1370	Sanitary MH	SAMH_1723	N/A	0.00	CR			630937.367	26913134.708	700.886	$4,500	01/01/2011	7	75	67	$4,027	$5,092	1	1	0.0	0.0	1.0	3.0	1.0	3
1371	Sanitary MH	SAMH_2653	N/A	0.00	S			631499.997	26915688.723	630.788	$1,000	01/01/1950	68	75	6	$81	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
1372	Sanitary MH	SAMH_2647	N/A	0.00	CN			631460.416	26915370.042	630.514	$4,000	01/01/2001	17	75	57	$3,046	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
1373	Sanitary MH	SAMH_2619	N/A	0.00	CN			630797.248	26913517.485	696.766	$4,000	01/01/2001	17	75	57	$3,046	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
1374	Sanitary MH	SAMH_2620	N/A	0.00	BR			630790.208	26913511.404	697.092	$4,000	01/01/2001	17	75	57	$3,046	$5,092	1	1	0.0	0.0	1.0	2.0	2.0	4
1375	Force Main	SAMH_2609	N/A	0.00	CR	N/A		629814.545	26913377.116	704.979	$3,000	01/01/1982	36	75	38	$1,524	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1376	Sanitary MH	SAMH_2611	N/A	0.00	CR			629818.681	26913520.934	701.458	$3,000	01/01/1982	36	75	38	$1,524	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1377	Sanitary MH	SAMH_2612	N/A	0.00	CR			629818.347	26913566.843	700.871	$3,000	01/01/1982	36	75	38	$1,524	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1378	Sanitary MH	SAMH_2613	N/A	0.00	BR			629820.995	26913798.735	697.084	$2,500	01/01/1950	68	75	6	$202	$6,017	1	1	0.0	0.0	1.0	4.0	3.0	12
1379	Sanitary MH	SAMH_2628	N/A	0.00				629833.542	26914163.640	692.291	$2,500	01/01/1950	68	75	6	$202	$6,017	1	1	0.0	0.0	1.0	1.0	1.1	1.1
1380	Sanitary MH	SAMH_2634	N/A	0.00				629835.834	26914241.295	690.388	$1,000	01/01/1950	68	75	6	$81	$4,539	1	1	0.0	0.0	1.0	1.0	1.1	1.1
1381	Sanitary MH	SAMH_2635	N/A	0.00	CR			629845.441	26914411.000	688.673	$1,500	01/01/1950	68	75	6	$121	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1382	Sanitary MH	SAMH_2636	N/A	0.00	CR			629513.293	26914431.843	696.207	$1,000	01/01/1950	68	75	6	$81	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
1383	Sanitary MH	SAMH_2607	N/A	0.00				629492.533	26913803.051	701.497	$2,500	01/01/1950	68	75	6	$202	$6,017	1	1	0.0	0.0	1.0	4.0	1.1	4.4
1384	Sanitary MH	SAMH_2606	N/A	0.00	CR		1/4" ABOVE GRADE	629332.148	26913804.666	703.846	$2,500	01/01/1950	68	75	6	$202	$6,017	1	1	0.0	0.0	1.0	4.0	2.0	8
1385	Sanitary MH	SAMH_2605	N/A	0.00	CR			629320.297	26913417.488	707.248	$8,500	01/01/1980	38	75	36	$4,091	$13,099	1	1	0.0	0.0	1.0	2.0	1.0	2
1386	Sanitary MH	SAMH_2602	N/A	0.00	CR			628834.113	26913343.751	711.420	$2,500	01/01/1950	68	75	6	$202	$6,017	1	1	0.0	0.0	1.0	3.0	1.0	3
1387	Sanitary MH	SAMH_2661	N/A	0.00				631227.721	26916374.075	631.543	$2,500	01/01/1950	68	75	6	$202	$6,017	1	1	0.0	0.0	1.0	1.0	1.1	1.1
1388	Sanitary MH	SAMH_2660	N/A	0.00	BR			631221.964	26916121.192	630.938	$2,000	01/01/1978	40	75	34	$909	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
1389	Sanitary MH	SAMH_2662	N/A	0.00	CR			631249.696	26916414.940	630.838	$3,500	01/01/1998	20	75	54	$2,525	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1390	Sanitary MH	SAMH_2667	N/A	0.00	CR			630910.163	26917055.343	631.696	$2,000	01/01/1961	57	75	17	$455	$5,092	1	1	0.0	0.0	1.0	2.0	2.0	4
1391	Sanitary MH	SAMH_2668	N/A	0.00	CR			630581.334	26917065.043	632.186	$2,000	01/01/1961	57	75	17	$455	$5,092	1	1	0.0	0.0	1.0	2.0	2.0	4
1392	Sanitary MH	SAMH_2913	N/A	0.00	CR			631502.801	26915054.563	630.972	$4,000	01/01/2001	17	75	57	$3,046	$5,092	1	1	0.0	0.0	1.0	3.0	1.0	3
1393	Sanitary MH	SAMH_2909	N/A	0.00	CR			631473.371	26914721.224	631.269	$3,500	01/01/2001	17	75	57	$2,665	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
1394	Sanitary MH	SAMH_2904	N/A	0.00	CN			631470.934	26914410.827	631.113	$3,500	01/01/2001	17	75	57	$2,665	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
1395	Sanitary MH	SAMH_2903	N/A	0.00	CN			631450.086	26914214.771	637.934	$3,500	01/01/2001	17	75	57	$2,665	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
1396	Sanitary MH	SAMH_2897	N/A	0.00	CN			631464.132	26914136.021	644.045	$3,500	01/01/2001	17	75	57	$2,665	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
1397	Sanitary MH	SAMH_2892	N/A	0.00	CN			631449.451	26913808.942	651.876	$3,500	01/01/2001	17	75	57	$2,665	$4,539	1	1	0.0	0.0	1.0	4.0	1.0	4
1398	Sanitary MH	SAMH_2891	N/A	0.00	CR			631763.257	26913803.949	643.717	$4,000	01/01/2001	17	75	57	$3,046	$5,092	1	1	0.0	0.0	1.0	4.0	1.0	4
1399	Sanitary MH	SAMH_2890	N/A	0.00	CR			632101.808	26913793.018	641.013	$4,000	01/01/2001	17	75	57	$3,046	$5,092	1	1	0.0	0.0	1.0	4.0	1.0	4
1400	Sanitary MH	SAMH_2889	N/A	0.00	CR			632445.132	26913787.323	636.337	$4,000	01/01/2001	17	75	57	$3,046	$5,092	1	1	0.0	0.0	1.0	4.0	1.0	4
1401	Sanitary MH	SAMH_2877	N/A	0.00	CR			632768.928	26913781.382	632.825	$3,500	01/01/2001	17	75	57	$2,665	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
1402	Sanitary MH	SAMH_2831	N/A	0.00	CR			632782.472	26913778.635	632.787	$4,000	01/01/2004	14	75	60	$3,206	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1403	Sanitary MH	SAMH_2878	N/A	0.00	CR			632768.729	26913904.061	631.826	$4,000	01/01/2001	17	75	57	$3,046	$5,092	1	1	0.0	0.0	1.0	5.0	1.0	5
1404	Sanitary MH	SAMH_2879	N/A	0.00	CR			632777.304	26914119.438	629.963	$5,000	01/01/2001	17	75	57	$3,807	$6,017	1	1	0.0	0.0	1.0	5.0	1.0	5
1405	Sanitary MH	SAMH_2880	N/A	0.00	CR			632783.448	26914394.387	628.642	$5,000	01/01/2001	17	75	57	$3,807	$6,017	1	1	0.0	0.0	1.0	5.0	1.0	5
1406	Sanitary MH	SAMH_2898	N/A	0.00	CR			632758.217	26914396.547	628.394	$4,000	01/01/2001	17	75	57	$3,046	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
1407	Sanitary MH	SAMH_2881	N/A	0.00	CR			632793.097	26914693.006	628.461	$5,000	01/01/2001	17	75	57	$3,807	$6,017	1	1	0.0	0.0	1.0	5.0	1.0	5
1408	Sanitary MH	SAMH_2882	N/A	0.00	CR			632794.760	26914798.683	628.632	$5,000	01/01/2001	17	75	57	$3,807	$6,017	1	1	0.0	0.0	1.0	5.0	1.0	5
1409	Sanitary MH	SAMH_2883	N/A	0.00	CR			632799.193	26915038.037	628.488	$5,000	01/01/2001	17	75	57	$3,807	$6,017	1	1	0.0	0.0	1.0	5.0	1.0	5
1410	Sanitary MH	SAMH_2884	N/A	0.00	CR			632811.526	26915351.545	628.761	$5,000	01/01/2001	17	75	57	$3,807	$6,017	1	1	0.0	0.0	1.0	5.0	1.0	5
1411	Sanitary MH	SAMH_2917	N/A	0.00	CR			632466.209	26915678.823	629.632	$4,000	01/01/2001	17	75	57	$3,046	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
1412	Sanitary MH	SAMH_2918	N/A	0.00	CR			632148.753	26915686.604	629.896	$4,000	01/01/2001	17	75	57	$3,046	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
1413	Sanitary MH	SAMH_2921	N/A	0.00	CR			631807.287	26915684.713	630.519	$4,000	01/01/2001	17	75	57	$3,046	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
1414	Sanitary MH	SAMH_2919	N/A	0.00	CR			631821.538	26915691.411	630.658	$4,000	01/01/2001	17	75	57	$3,046	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
1415	Sanitary MH	SAMH_2914	N/A	0.00	CR			632478.813	26915351.986	629.774	$4,000	01/01/2001	17	75	57	$3,046	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
1416	Sanitary MH	SAMH_2673	N/A	0.00				630267.139	26917110.451	633.080	$2,500	01/01/1976	42	75	32	$1,069	$5,092	1	1	0.0	0.0	1.0	1.0	1.1	1.1
1417	Sanitary MH	SAMH_2674	N/A	0.00	CR			630280.114	26917441.362	631.932	$2,500	01/01/1976	42	75	32	$1,069	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1418	Sanitary MH	SAMH_2675	N/A	0.00	CR			630291.008	26917767.762	632.363	$2,500	01/01/1976	42	75	32	$1,069	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1419	Sanitary MH	SAMH_2676	N/A	0.00	CR			630301.082	26918122.888	631.970	$2,500	01/01/1976	42	75	32	$1,069	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1420	Sanitary MH	SAMH_3728	N/A	0.00	CR			630315.977	26918448.464	632.392	$2,500	01/01/1976	42	75	32	$1,069	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
1421	Sanitary MH	SAMH_2672	N/A	0.00	CR			630630.054	26918426.511	631.543	$1,500	01/01/1961	57	75	17	$341	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
1422	Sanitary MH	SAMH_2671	N/A	0.00	CR			630958.853	26918403.891	632.192	$2,000	01/01/1972	46	75	28	$749	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
1423	Sanitary MH	SAMH_2669	N/A	0.00	CN			630593.750	26917405.451	632.071	$2,000	01/01/1961	57	75	17	$455	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1424	Sanitary MH	SAMH_2663	N/A	0.00	N			631268.922	26917044.355	631.256	$2,000	01/01/1961	57	75	17	$455	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
1425	Sanitary MH	SAMH_2664	N/A	0.00	CR			631235.403	26917045.192	631.595	$2,000	01/01/1961	57	75	17	$455	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
1426	Sanitary MH	SAMH_3729	N/A	0.00	CR			630329.123	26918773.590	631.824	$2,500	01/01/1976	42	75	32	$1,069	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
1427	Sanitary MH	SAMH_3730	N/A	0.00	CR			630343.610	26919135.367	631.346	$2,500	01/01/1976	42	75	32	$1,069	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
1428	Sanitary MH	SAMH_3701	N/A	0.00	CR			631724.875	26921056.870	598.435	$3,500	01/01/2009	9	75	65	$3,038	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
1429	Sanitary MH	SAMH_3710	N/A	0.00	CR			631140.598	26921098.252	602.134	$2,500	01/01/1976	42	75	32	$1,069	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1430	Sanitary MH	SAMH_3601	N/A	0.00	CR			629085.548	26921269.062	624.510	$3,500	01/01/1976	42	75	32	$1,497	$6,017	1	1	0.0	0.0	1.0	2.0	1.0	2
1431	Sanitary MH	SAMH_3750	N/A	0.00	CR			629434.639	26921211.873	620.970	$3,500	01/01/1976	42	75	32	$1,497	$6,017	1	1	0.0	0.0	1.0	1.0	2.0	2
1432	Sanitary MH	SAMH_3747	N/A	0.00	CR		FRAME BADLY CHIPPED, 1/2" ABOVE GRADE	629772.356	26921189.536	616.920	$2,500	01/01/1976	42	75	32	$1,069	$5,092	1	1	0.0	0.0	1.0	3.0	2.0	6
1433	Sanitary MH	SAMH_3740	N/A	0.00	CR			630062.235	26921171.355	611.568	$2,500	01/01/1976	42	75	32	$1,069	$5,092	1	1	0.0	0.0	1.0	3.0	2.0	6
1434	Sanitary MH	SAMH_2646	N/A	0.00	CR			630108.601	26915064.178	638.766	$1,000	01/01/1950	68	75	6	$81	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
1435	Sanitary MH	SAMH_2670	N/A	0.00				630605.627	26917744.476	631.607	$2,000	01/01/1961	57	75	17	$455	$5,092	1	1	0.0	0.0	1.0	1.0	1.1	1.1
1436	Sanitary MH	SAMH_2666	N/A	0.00				631259.256	26917722.202	630.746	$1,500	01/01/1950	68	75	6	$121	$5,092	1	1	0.0	0.0	1.0	1.0	1.1	1.1
1437	Sanitary MH	SAMH_3746	N/A	0.00	CR			629732.126	26920519.926	623.124	$2,500	01/01/1978	40	75	34	$1,136	$5,092	1	1	0.0	0.0	1.0	1.0	2.0	2
1438	Sanitary MH	SAMH_2677	N/A	0.00	CR			631110.266	26913137.814	699.983	$4,500	01/01/2011	7	75	67	$4,027	$5,092	1	1	0.0	0.0	1.0	3.0	1.0	3
1439	Sanitary MH	SAMH_1730	N/A	0.00				630770.628	26913130.885	701.753	$4,500	01/01/2011	7	75	67	$4,027	$5,092	1	1	0.0	0.0	1.0	3.0	2.0	6
1440	Sanitary MH	SAMH_1739	N/A	0.00	CR			630433.304	26913123.105	703.072	$1,500	01/01/1950	68	75	6	$121	$5,092	1	1	0.0	0.0	1.0	3.0	1.0	3
1441	Sanitary MH	SAMH_1737	N/A	0.00				630453.172	26913134.158	703.044	$1,500	01/01/1950	68	75	6	$121	$5,092	1	1	0.0	0.0	1.0	3.0	2.0	6
1442	Sanitary MH	SAMH_2915	N/A	0.00	CR			632141.485	26915363.330	629.924	$4,000	01/01/2001	17	75	57	$3,046	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2

CITY OF SAULT STE. MARIE, MICHIGAN

Summary

id	Equipment Description	Asset ID	Construction Drawings Sheet Reference	Capacity or Size	Material	Length	Comment	Northing State Plane Ordinate	Easting State Plane Ordinate	Elevation	Original Cost	Year Installed (01/01/YYYY)	Age	Expected useful life (years)	Remaining Useful Life (years)	Depreciated Value	Replacement Cost	Average number of units in service	Total Number of units	Redundancy (Number)	Redundancy (percent)	Redundancy Score (R) (Reduces (C))	Criticality (C) (see back-up sheets)	Probability of Failure (P) (see back-up sheets)	Business Risk (BRE=PxCxR)
1443	Sanitary MH	SAMH_2916	N/A	0.00	CR			631830.758	26915369.064	630.765	$4,000	01/01/2001	17	75	57	$3,046	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
1444	Sanitary MH	SAMH_2912	N/A	0.00	CR			631820.358	26915051.445	630.816	$4,000	01/01/2001	17	75	57	$3,046	$5,092	1	1	0.0	0.0	1.0	3.0	1.0	3
1445	Sanitary MH	SAMH_2911	N/A	0.00	CR			632144.401	26915047.053	630.034	$5,000	01/01/2001	17	75	57	$3,807	$6,017	1	1	0.0	0.0	1.0	3.0	1.0	3
1446	Sanitary MH	SAMH_2910	N/A	0.00	CR			632476.257	26915040.253	629.617	$5,000	01/01/2001	17	75	57	$3,807	$6,017	1	1	0.0	0.0	1.0	3.0	1.0	3
1447	Sanitary MH	SAMH_2905	N/A	0.00	CR			632461.540	26914696.791	629.551	$4,000	01/01/2001	17	75	57	$3,046	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
1448	Sanitary MH	SAMH_2906	N/A	0.00	CR			632115.751	26914701.148	629.311	$4,000	01/01/2001	17	75	57	$3,046	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
1449	Sanitary MH	SAMH_2907	N/A	0.00				631788.005	26914708.632	630.023	$4,000	01/01/2001	17	75	57	$3,046	$5,092	1	1	0.0	0.0	1.0	2.0	1.1	2.2
1450	Sanitary MH	SAMH_2908	N/A	0.00				631776.746	26914716.719	630.157	$3,500	01/01/2001	17	75	57	$2,665	$4,539	1	1	0.0	0.0	1.0	2.0	1.1	2.2
1451	Sanitary MH	SAMH_2902	N/A	0.00	CR			631795.628	26914404.130	630.700	$3,500	01/01/2001	17	75	57	$2,665	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
1452	Sanitary MH	SAMH_2901	N/A	0.00	CR			632123.503	26914397.596	629.422	$3,500	01/01/2001	17	75	57	$2,665	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
1453	Sanitary MH	SAMH_2900	N/A	0.00	CR			632452.283	26914390.266	628.717	$4,000	01/01/2001	17	75	57	$3,046	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
1454	Sanitary MH	SAMH_2899	N/A	0.00	CR			632731.182	26914384.886	628.320	$4,000	01/01/2001	17	75	57	$3,046	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
1455	Sanitary MH	SAMH_2893	N/A	0.00				632443.418	26914121.198	630.996	$4,000	01/01/2001	17	75	57	$3,046	$5,092	1	1	0.0	0.0	1.0	1.0	1.1	1.1
1456	Sanitary MH	SAMH_2895	N/A	0.00	CR			632097.348	26914120.802	633.151	$4,000	01/01/2001	17	75	57	$3,046	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1457	Sanitary MH	SAMH_2894	N/A	0.00	CR			632108.522	26914132.376	632.877	$4,000	01/01/2001	17	75	57	$3,046	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1458	Sanitary MH	SAMH_2896	N/A	0.00	CR			631766.907	26914124.559	639.302	$4,000	01/01/2001	17	75	57	$3,046	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1459	Sanitary MH	SAMH_2870	N/A	0.00	CR			633229.788	26915667.467	624.808	$4,000	01/01/2001	17	75	57	$3,046	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1460	Sanitary MH	SAMH_2869	N/A	0.00	CR			633450.884	26915665.888	619.354	$4,000	01/01/2001	17	75	57	$3,046	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1461	Sanitary MH	SAMH_2868	N/A	0.00	CR			633683.520	26915661.048	616.782	$4,000	01/01/2001	17	75	57	$3,046	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1462	Sanitary MH	SAMH_2859	N/A	0.00	CR			633944.230	26915326.124	615.535	$4,000	01/01/2001	17	75	57	$3,046	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1463	Sanitary MH	SAMH_2860	N/A	0.00	CR			633669.996	26915330.636	619.438	$4,000	01/01/2004	14	75	60	$3,206	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1464	Sanitary MH	SAMH_2861	N/A	0.00	BR			633546.278	26915334.169	621.112	$4,000	01/01/2001	17	75	57	$3,046	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1465	Sanitary MH	SAMH_2862	N/A	0.00	CR			633439.705	26915334.854	624.166	$4,000	01/01/2001	17	75	57	$3,046	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1466	Sanitary MH	SAMH_2823	N/A	0.00	CR			633622.176	26913734.961	628.371	$4,000	01/01/2004	14	75	60	$3,206	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1467	Sanitary MH	SAMH_2822	N/A	0.00	CR			633625.243	26913761.625	628.430	$4,000	01/01/2004	14	75	60	$3,206	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
1468	Sanitary MH	SAMH_2826	N/A	0.00	CR			633411.605	26913766.563	628.833	$4,000	01/01/2004	14	75	60	$3,206	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1469	Sanitary MH	SAMH_2827	N/A	0.00	CR			633164.596	26913770.433	630.833	$4,000	01/01/2004	14	75	60	$3,206	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1470	Sanitary MH	SAMH_2837	N/A	0.00	CR			633180.709	26914117.555	628.471	$4,000	01/01/2004	14	75	60	$3,206	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1471	Sanitary MH	SAMH_2836	N/A	0.00	CR			633418.021	26914115.715	627.278	$4,000	01/01/2004	14	75	60	$3,206	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1472	Sanitary MH	SAMH_2835	N/A	0.00	CR			633639.414	26914114.140	625.832	$4,000	01/01/2004	14	75	60	$3,206	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1473	Sanitary MH	SAMH_2841	N/A	0.00	CR			633648.116	26914443.113	624.533	$4,000	01/01/2004	14	75	60	$3,206	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1474	Sanitary MH	SAMH_2842	N/A	0.00	CR			633418.695	26914454.472	625.771	$4,000	01/01/2004	14	75	60	$3,206	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1475	Sanitary MH	SAMH_2843	N/A	0.00	CR			633185.202	26914452.909	627.644	$4,000	01/01/2004	14	75	60	$3,206	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1476	Sanitary MH	SAMH_2844	N/A	0.00	CR			632828.402	26914460.454	628.277	$4,000	01/01/2004	14	75	60	$3,206	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1477	Sanitary MH	SAMH_2850	N/A	0.00	CR			632835.536	26914737.235	628.701	$4,000	01/01/2004	14	75	60	$3,206	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1478	Sanitary MH	SAMH_2849	N/A	0.00	CR			633180.963	26914732.908	627.356	$4,000	01/01/2004	14	75	60	$3,206	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1479	Sanitary MH	SAMH_2848	N/A	0.00	CR			633418.969	26914730.405	625.625	$4,000	01/01/2004	14	75	60	$3,206	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1480	Sanitary MH	SAMH_2847	N/A	0.00	CR			633647.452	26914726.674	623.404	$4,000	01/01/2004	14	75	60	$3,206	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1481	Sanitary MH	SAMH_2853	N/A	0.00	CR			633665.445	26915024.322	621.304	$4,000	01/01/2004	14	75	60	$3,206	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1482	Sanitary MH	SAMH_2854	N/A	0.00	CR			633430.494	26915027.748	625.232	$4,000	01/01/2004	14	75	60	$3,206	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1483	Sanitary MH	SAMH_2855	N/A	0.00	CR			633200.049	26915030.872	626.713	$4,000	01/01/2004	14	75	60	$3,206	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1484	Sanitary MH	SAMH_2856	N/A	0.00	CR			632843.782	26915032.648	628.276	$4,000	01/01/2004	14	75	60	$3,206	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1485	Sanitary MH	SAMH_2865	N/A	0.00	CR			632844.365	26915351.583	628.809	$4,000	01/01/2001	17	75	57	$3,046	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1486	Sanitary MH	SAMH_2864	N/A	0.00	CR			633215.010	26915346.059	627.183	$4,000	01/01/2001	17	75	57	$3,046	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1487	Sanitary MH	SAMH_2863	N/A	0.00	CR			633224.034	26915340.648	627.318	$4,000	01/01/2001	17	75	57	$3,046	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1488	Sanitary MH	SAMH_2888	N/A	0.00	CR			632097.646	26913499.729	654.551	$4,000	01/01/2001	17	75	57	$3,046	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1489	Sanitary MH	SAMH_2887	N/A	0.00				632232.492	26913479.194	648.883	$4,000	01/01/2001	17	75	57	$3,046	$5,092	1	1	0.0	0.0	1.0	1.0	1.1	1.1
1490	Sanitary MH	SAMH_2886	N/A	0.00				632413.683	26913450.324	645.119	$5,000	01/01/2001	17	75	57	$3,807	$6,017	1	1	0.0	0.0	1.0	1.0	1.1	1.1
1491	Sanitary MH	SAMH_2876	N/A	0.00	CR			632758.020	26913437.663	641.235	$4,000	01/01/2001	17	75	57	$3,046	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1492	Sanitary MH	SAMH_2830	N/A	0.00	CR			632823.196	26913442.381	640.405	$3,500	01/01/1991	27	75	47	$2,198	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1493	Sanitary MH	SAMH_2829	N/A	0.00				633141.013	26913434.208	638.538	$5,000	01/01/2004	14	75	60	$4,007	$6,017	1	1	0.0	0.0	1.0	1.0	1.1	1.1
1494	Sanitary MH	SAMH_2828	N/A	0.00	CR			633153.069	26913569.747	632.912	$3,500	01/01/2004	14	75	60	$2,805	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
1495	Sanitary MH	SAMH_2821	N/A	0.00	CR			633542.306	26913516.403	630.107	$3,500	01/01/2004	14	75	60	$2,805	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
1496	Sanitary MH	SAMH_2824	N/A	0.00	CR			633620.247	26913583.239	629.716	$3,500	01/01/2004	14	75	60	$2,805	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
1497	Sanitary MH	SAMH_2820	N/A	0.00	CR			633957.115	26913717.231	624.860	$4,000	01/01/2004	14	75	60	$3,206	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1498	Sanitary MH	SAMH_2815	N/A	0.00	BR			633612.130	26913366.590	633.121	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	1.0	3.0	3
1499	Sanitary MH	SAMH_2817	N/A	0.00	BR		RIM 1" BELOW GRADE	633194.511	26913220.732	645.763	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	1.0	3.0	3
1500	Sanitary MH	SAMH_2873	N/A	0.00	BR			632738.026	26913189.043	659.524	$2,000	01/01/1939	79	75	0	$0	$6,017	1	1	0.0	0.0	1.0	1.0	2.0	2
1501	Sanitary MH	SAMH_2874	N/A	0.00	CR			632737.812	26913215.643	648.612	$4,000	01/01/2001	17	75	57	$3,046	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1502	Sanitary MH	SAMH_2875	N/A	0.00	CR			632753.489	26913264.532	647.439	$4,000	01/01/2001	17	75	57	$3,046	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1503	Sanitary MH	SAMH_2866	N/A	0.00	BR			634116.028	26915647.782	611.841	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	4.0	2.0	8
1504	Sanitary MH	SAMH_2867	N/A	0.00	CR			634083.638	26915656.124	611.455	$4,000	01/01/2001	17	75	57	$3,046	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1505	Sanitary MH	SAMH_2858	N/A	0.00	BR		PIPES 2&3 (8" PVC & 6" HDPE) ARE BOTH INSIDE AN OLD 18" CLAY HEADED SOUT	634107.335	26915324.752	614.025	$8,400	01/01/2001	17	75	57	$6,396	$10,213	1	1	0.0	0.0	1.0	4.0	3.0	12
1506	Sanitary MH	SAMH_2857	N/A	0.00	CN		NORTH PIPE CONNECTS TO 8029A. SOUND TRAVELLED.	634104.021	26915192.703	614.811	$3,600	01/01/1939	79	75	0	$0	$10,213	1	1	0.0	0.0	1.0	4.0	3.0	12
1507	Sanitary MH	SAMH_2851	N/A	0.00	BR			634099.588	26915005.773	615.912	$1,700	01/01/1939	79	75	0	$0	$5,767	1	1	0.0	0.0	1.0	4.0	3.0	12
1508	Sanitary MH	SAMH_2852	N/A	0.00	CR			634068.375	26915019.449	615.182	$3,500	01/01/2004	14	75	60	$2,805	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
1509	Sanitary MH	SAMH_2846	N/A	0.00	CR			634058.380	26914722.288	616.987	$4,000	01/01/2004	14	75	60	$3,206	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1510	Sanitary MH	SAMH_2845	N/A	0.00	BR			634091.281	26914720.554	617.499	$1,700	01/01/1939	79	75	0	$0	$5,767	1	1	0.0	0.0	1.0	4.0	4.0	16
1511	Sanitary MH	SAMH_2839	N/A	0.00	BR			634084.355	26914431.679	618.000	$1,700	01/01/1939	79	75	0	$0	$5,767	1	1	0.0	0.0	1.0	4.0	3.0	12
1512	Sanitary MH	SAMH_2840	N/A	0.00	CR			634051.543	26914442.610	618.449	$4,000	01/01/2004	14	75	60	$3,206	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1513	Sanitary MH	SAMH_2832	N/A	0.00	BR			634075.650	26914108.435	620.753	$1,700	01/01/1939	79	75	0	$0	$5,767	1	1	0.0	0.0	1.0	4.0	3.0	12
1514	Sanitary MH	SAMH_2833	N/A	0.00	CR			634043.219	26914109.589	620.504	$4,000	01/01/2004	14	75	60	$3,206	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1515	Sanitary MH	SAMH_2819	N/A	0.00	CR			634026.147	26913754.546	623.055	$4,000	01/01/2004	14	75	60	$3,206	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
1516	Sanitary MH	SAMH_2818	N/A	0.00	BR			634065.674	26913759.148	623.031	$1,700	01/01/1939	79	75	0	$0	$5,767	1	1	0.0	0.0	1.0	4.0	4.0	16
1517	Sanitary MH	SAMH_2814	N/A	0.00	BR			634060.369	26913584.514	625.143	$1,700	01/01/1939	79	75	0	$0	$5,767	1	1	0.0	0.0	1.0	1.0	3.0	3
1518	Sanitary MH	SAMH_2803	N/A	0.00	BR		FRAME 3/4" BELOW GRADE	634055.651	26913389.261	627.586	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	4.0	4.0	16
1519	Sanitary MH	SAMH_2804	N/A	0.00	BR			634023.933	26913374.183	628.130	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	4.0	3.0	12
1520	Sanitary MH	SAMH_2801	N/A	0.00	CR			633980.775	26913165.547	638.398	$4,000	01/01/2004	14	75	60	$3,206	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1521	Sanitary MH	SAMH_2805	N/A	0.00	BR			633803.547	26913267.027	633.429	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	4.0	3.0	12
1522	Sanitary MH	SAMH_2806	N/A	0.00	BR			633622.128	26913178.041	639.631	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	4.0	3.0	12
1523	Sanitary MH	SAMH_2924	N/A	0.00	CR			633703.638	26915991.523	615.125	$4,000	01/01/2001	17	75	57	$3,046	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1524	Sanitary MH	SAMH_2925	N/A	0.00				633470.750	26915997.344	617.118	$4,000	01/01/2001	17	75	57	$3,046	$5,092	1	1	0.0	0.0	1.0	1.0	1.1	1.1
1525	Sanitary MH	SAMH_2926	N/A	0.00	CR			633241.318	26916002.149	620.227	$4,000	01/01/2001	17	75	57	$3,046	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1526	Sanitary MH	SAMH_2927	N/A	0.00	CR			632876.415	26916009.576	627.494	$4,000	01/01/2001	17	75	57	$3,046	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1527	Sanitary MH	SAMH_2946	N/A	0.00	CR			632834.910	26916012.440	628.092	$5,000	01/01/2001	17	75	57	$3,807	$6,017	1	1	0.0	0.0	1.0	5.0	1.0	5
1528	Sanitary MH	SAMH_2950	N/A	0.00	CR			632509.248	26916024.746	629.933	$4,000	01/01/2001	17	75	57	$3,046	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1529	Sanitary MH	SAMH_2951	N/A	0.00	CR			632518.339	26916334.362	629.348	$3,500	01/01/1998	20	75	54	$2,525	$5,092	1	1	0.0	0.0	1.0	3.0	1.0	3
1530	Sanitary MH	SAMH_2952	N/A	0.00	CR			632494.629	26916343.556	629.275	$3,500	01/01/1998	20	75	54	$2,525	$5,092	1	1	0.0	0.0	1.0	3.0	1.0	3
1531	Sanitary MH	SAMH_2947	N/A	0.00				632848.351	26916327.392	627.292	$5,000	01/01/2000	18	75	56	$3,740	$6,017	1	1	0.0	0.0	1.0	5.0	1.0	5
1532	Sanitary MH	SAMH_2934	N/A	0.00	CR			632896.212	26916328.185	625.253	$3,500	01/01/1998	20	75	54	$2,525	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1533	Sanitary MH	SAMH_2933	N/A	0.00	CR			633264.036	26916316.458	617.484	$3,500	01/01/1998	20	75	54	$2,525	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1534	Sanitary MH	SAMH_2931	N/A	0.00	CR			633485.052	26916311.265	615.301	$3,500	01/01/1998	20	75	54	$2,525	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1535	Sanitary MH	SAMH_2930	N/A	0.00	CR			633719.171	26916303.357	612.873	$3,500	01/01/1998	20	75	54	$2,525	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1536	Sanitary MH	SAMH_2960	N/A	0.00	CR			632526.165	26916485.327	628.234	$4,000	01/01/2000	18	75	56	$2,992	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1537	Sanitary MH	SAMH_2961	N/A	0.00	CR			632538.057	26916719.150	628.337	$4,000	01/01/2000	18	75	56	$2,992	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1538	Sanitary MH	SAMH_2948	N/A	0.00	CR			632865.093	26916659.376	619.570	$5,000	01/01/2000	18	75	56	$3,740	$6,017	1	1	0.0	0.0	1.0	5.0	1.0	5
1539	Sanitary MH	SAMH_2940	N/A	0.00	CR			632926.913	26916659.714	618.502	$3,000	01/01/1998	20	75	54	$2,164	$4,539	1	1	0.0	0.0	1.0	1.0	2.0	2
1540	Sanitary MH	SAMH_2939	N/A	0.00	CR			633268.626	26916649.624	614.897	$3,500	01/01/1998	20	75	54	$2,525	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1541	Sanitary MH	SAMH_2938	N/A	0.00	CR			633497.606	26916642.349	612.457	$3,500	01/01/1998	20	75	54	$2,525	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1542	Force Main	SAMH_2937	N/A	0.00	CR	N/A		633718.565	26916633.999	609.811	$3,500	01/01/1998	20	75	54	$2,525	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1543	Sanitary MH	SAMH_2942	N/A	0.00	CR			633893.733	26916977.917	605.038	$3,500	01/01/1998	20	75	54	$2,525	$5,092	1	1	0.0	0.0	1.0	5.0	1.0	5
1544	Sanitary MH	SAMH_2943	N/A	0.00	CR			633740.745	26916981.475	606.716	$3,500	01/01/1998	20	75	54	$2,525	$5,092	1	1	0.0	0.0	1.0	5.0	1.0	5
1545	Sanitary MH	SAMH_2944	N/A	0.00	CR			633497.724	26916982.747	609.647	$3,500	01/01/1998	20	75	54	$2,525	$5,092	1	1	0.0	0.0	1.0	5.0	1.0	5
1546	Sanitary MH	SAMH_2945	N/A	0.00	CR			633281.963	26916990.892	611.489	$3,500	01/01/1998	20	75	54	$2,525	$5,092	1	1	0.0	0.0	1.0	5.0	1.0	5
1547	Sanitary MH	SAMH_2949	N/A	0.00	CR			632871.125	26917007.936	615.052	$3,500	01/01/1998	20	75	54	$2,525	$5,092	1	1	0.0	0.0	1.0	5.0	1.0	5
1548	Sanitary MH	SAMH_2962	N/A	0.00	CR			632549.653	26917014.783	621.062	$3,500	01/01/1998	20	75	54	$2,525	$5,092	1	1	0.0	0.0	1.0	3.0	1.0	3
1549	Sanitary MH	SAMH_2964	N/A	0.00	CR			632218.256	26917018.736	628.906	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	3.0	2.0	6
1550	Sanitary MH	SAMH_2965	N/A	0.00	CR			631886.562	26917027.598	630.368	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	3.0	3.0	9
1551	Sanitary MH	SAMH_2966	N/A	0.00	CR			631563.619	26917036.420	630.943	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	2.0	3.0	6
1552	Sanitary MH	SAMH_2658	N/A	0.00	CR			631553.898	26916809.165	631.457	$3,500	01/01/2003	15	75	59	$2,758	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
1553	Sanitary MH	SAMH_2657	N/A	0.00	BR			631536.307	26916366.875	631.385	$1,500	01/01/1950	68	75	6	$121	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1554	Sanitary MH	SAMH_2656	N/A	0.00	CR			631518.832	26916030.752	630.155	$1,000	01/01/1950	68	75	6	$81	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
1555	Sanitary MH	SAMH_2920	N/A	0.00	CR			631833.446	26915971.439	629.551	$3,500	01/01/2001	17	75	57	$2,665	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
1556	Sanitary MH	SAMH_2957	N/A	0.00	CR			631863.973	26916358.950	630.335	$4,000	01/01/2009	9	75	65	$3,473	$5,092	1	1	0.0	0.0	1.0	3.0	1.0	3
1557	Sanitary MH	SAMH_2958	N/A	0.00	CR			631870.301	26916595.985	630.170	$1,000	01/01/1950	68	75	6	$81	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
1558	Sanitary MH	SAMH_2959	N/A	0.00	CR			631882.468	26916832.735	630.617	$1,000	01/01/1950	68	75	6	$81	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
1559	Sanitary MH	SAMH_2953	N/A	0.00	CR			632184.598	26916349.762	629.914	$4,000	01/01/2009	9	75	65	$3,473	$5,092	1	1	0.0	0.0	1.0	3.0	1.0	3
1560	Sanitary MH	SAMH_2955	N/A	0.00	CR			632203.252	26916760.147	629.794	$4,000	01/01/2010	8	75	66	$3,526	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
1561	Sanitary MH	SAMH_3191	N/A	0.00	CR			634241.899	26918399.925	609.119	$3,500	01/01/1998	20	75	54	$2,525	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1562	Sanitary MH	SAMH_3190	N/A	0.00	CR			634218.069	26917962.056	600.686	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
1563	Sanitary MH	SAMH_3188	N/A	0.00				634209.541	26917566.969	601.431	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	2.0	1.1	2.2
1564	Sanitary MH	SAMH_3184	N/A	0.00				634191.050	26917119.052	605.598	$4,500	01/01/1998	20	75	54	$3,246	$6,017	1	1	0.0	0.0	1.0	5.0	1.1	5.5
1565	Sanitary MH	SAMH_2941	N/A	0.00	CR			634154.062	26917101.880	606.060	$4,500	01/01/1998	20	75	54	$3,246	$6,017	1	1	0.0	0.0	1.0	5.0	2.0	10
1566	Sanitary MH	SAMH_2936	N/A	0.00	CR			634146.312	26916619.917	606.060	$3,500	01/01/1998	20	75	54	$2,525	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
1567	Sanitary MH	SAMH_2929	N/A	0.00	CR			634114.122	26916293.386	607.803	$3,500	01/01/1998	20	75	54	$2,525	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1568	Sanitary MH	SAMH_2923	N/A	0.00	CR			634100.991	26915980.545	609.584	$4,000	01/01/2001	17	75	57	$3,046	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1569	Sanitary MH	SAMH_2922	N/A	0.00	BR		RIM 1" BELOW GRADE	634130.978	26915970.587	609.923	$1,700	01/01/1939	79	75	0	$0	$5,767	1	1	0.0	0.0	1.0	4.0	4.0	16
1570	Sanitary MH	SAMH_2967	N/A	0.00	CR			631576.680	26917341.558	630.591	$2,000	01/01/1962	56	75	18	$482	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1571	Sanitary MH	SAMH_2968	N/A	0.00	CR			631584.603	26917547.372	630.049	$2,000	01/01/1962	56	75	18	$482	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1572	Sanitary MH	SAMH_1732A	N/A	0.00	BR			630435.970	26912198.467	718.634	$2,500	01/01/1980	38	75	36	$1,203	$4,539	1	1	0.0	0.0	1.0	1.0	2.0	2
1573	Sanitary MH	SAMH_1732	N/A	0.00	CN			630428.447	26911916.572	720.169	$2,500	01/01/1980	38	75	36	$1,203	$4,539	1	1	0.0	0.0	1.0	1.0	2.0	2
1574	Sanitary MH	SAMH_1729	N/A	0.00	BR			630762.497	26912840.229	707.650	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
1575	Sanitary MH	SAMH_1728	N/A	0.00	BR			630748.937	26912487.813	712.905	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	1.0	2.0	2
1576	Sanitary MH	SAMH_1727	N/A	0.00	BR			630735.304	26912089.226	719.421	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	1.0	2.0	2
1577	Sanitary MH	SAMH_1725A	N/A	0.00	CN			630732.796	26911824.111	722.382	$3,000	01/01/1987	31	75	43	$1,724	$5,092	1	1	0.0	0.0	1.0	1.0	2.0	2
1578	Sanitary MH	SAMH_1726	N/A	0.00	CN			630726.586	26911845.553	722.505	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	1.0	2.0	2
1579	Sanitary MH	SAMH_1725	N/A	0.00	CN			630719.458	26911464.988	722.025	$3,000	01/01/1987	31	75	43	$1,724	$5,092	1	1	0.0	0.0	1.0	1.0	2.0	2
1580	Sanitary MH	SAMH_1724	N/A	0.00	BR			630702.385	26910778.793	719.196	$2,500	01/01/1987	31	75	43	$1,436	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
1581	Sanitary MH	SAMH_1712	N/A	0.00	CR			631029.566	26911304.216	721.996	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
1582	Sanitary MH	SAMH_1713	N/A	0.00	CR			631036.665	26911515.057	721.775	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
1583	Sanitary MH	SAMH_1714	N/A	0.00	BR			631046.930	26911686.323	721.847	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
1584	Sanitary MH	SAMH_1715	N/A	0.00	BR			631056.332	26911843.157	721.184	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
1585	Sanitary MH	SAMH_1716	N/A	0.00	CR			631086.978	26912209.555	718.356	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	2.0	3.0	6
1586	Sanitary MH	SAMH_1717	N/A	0.00	CN			631098.268	26912468.627	713.210	$3,500	01/01/2001	17	75	57	$2,665	$4,539	1	1	0.0	0.0	1.0	2.0	2.0	4
1587	Sanitary MH	SAMH_4007	N/A	0.00	CR			626129.695	26926490.849	596.406	$2,500	01/01/1976	42	75	32	$1,069	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
1588	Sanitary MH	SAMH_4008	N/A	0.00				626483.694	26926476.774	593.815	$2,500	01/01/1976	42	75	32	$1,069	$5,092	1	1	0.0	0.0	1.0	2.0	1.1	2.2
1589	Sanitary MH	SAMH_4019	N/A	0.00	CR			624234.826	26929134.317	587.369	$6,500	01/01/1976	42	75	32	$2,781	$11,597	1	1	0.0	0.0	1.0	1.0	2.0	2
1590	Sanitary MH	SAMH_4018	N/A	0.00	CR			624483.651	26928885.368	587.665	$2,000	01/01/1976	42	75	32	$855	$4,539	1	1	0.0	0.0	1.0	1.0	3.0	3
1591	Sanitary MH	SAMH_4017	N/A	0.00	CR			624689.361	26928678.374	587.838	$2,000	01/01/1976	42	75	32	$855	$4,539	1	1	0.0	0.0	1.0	1.0	2.0	2
1592	Sanitary MH	SAMH_4016	N/A	0.00	CR			624945.942	26928420.349	588.601	$2,500	01/01/1976	42	75	32	$1,069	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1593	Sanitary MH	SAMH_4015	N/A	0.00	CR			625172.854	26928193.456	589.513	$2,500	01/01/1976	42	75	32	$1,069	$5,092	1	1	0.0	0.0	1.0	1.0	2.0	2

CITY OF SAULT STE. MARIE, MICHIGAN

Summary

id	Equipment Description	Asset ID	Construction Drawings Sheet Reference	Capacity or Size	Material	Length	Comment	Northing State Plane Ordinate	Easting State Plane Ordinate	Elevation	Original Cost	Year Installed (01/01/YYYY)	Age	Expected useful life (years)	Remaining Useful Life (years)	Depreciated Value	Replacement Cost	Average number of units in service	Total Number of units	Redundancy (Number)	Redundancy (percent)	Redundancy Score (R) (Reduces (C))	Criticality (C) (see back-up sheets)	Probability of Failure (P) (see back-up sheets)	Business Risk (BRE=PxCxR)
1594	Sanitary MH	SAMH_4014	N/A	0.00	CR			625436.478	26927951.110	590.068	$2,500	01/01/1976	42	75	32	$1,069	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1595	Sanitary MH	SAMH_4013	N/A	0.00	CR			625701.660	26927713.690	590.158	$2,500	01/01/1976	42	75	32	$1,069	$5,092	1	1	0.0	0.0	1.0	1.0	2.0	2
1596	Sanitary MH	SAMH_4012	N/A	0.00	CR			625944.127	26927474.371	589.645	$2,500	01/01/1976	42	75	32	$1,069	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
1597	Sanitary MH	SAMH_4011	N/A	0.00	CR			626178.441	26927230.712	588.515	$2,500	01/01/1976	42	75	32	$1,069	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
1598	Sanitary MH	SAMH_4109	N/A	0.00	CR			626904.606	26926653.361	587.329	$2,500	01/01/1976	42	75	32	$1,069	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
1599	Sanitary MH	SAMH_4107	N/A	0.00	CR		inc	627185.040	26926453.733	588.353	$8,800	01/01/1976	42	75	32	$3,765	$15,599	1	1	0.0	0.0	1.0	2.0	1.0	2
1600	Sanitary MH	SAMH_4106	N/A	0.00	CR		Frame loose	627457.880	26926221.479	585.444	$2,500	01/01/1976	42	75	32	$1,069	$5,092	1	1	0.0	0.0	1.0	2.0	2.0	4
1601	Sanitary MH	SAMH_4105	N/A	0.00				627727.842	26926082.774	584.658	$2,000	01/01/1976	42	75	32	$855	$4,539	1	1	0.0	0.0	1.0	2.0	1.1	2.2
1602	Sanitary MH	SAMH_4104	N/A	0.00				628005.090	26925967.638	586.857	$2,500	01/01/1976	42	75	32	$1,069	$5,092	1	1	0.0	0.0	1.0	1.0	1.1	1.1
1603	Sanitary MH	SAMH_4103	N/A	0.00	CR			628344.599	26925873.808	586.914	$2,500	01/01/1976	42	75	32	$1,069	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1604	Sanitary MH	SAMH_4101	N/A	0.00	S			629038.353	26925687.864	586.160	$2,000	01/01/1976	42	75	32	$855	$4,539	1	1	0.0	0.0	1.0	1.0	2.0	2
1605	Sanitary MH	SAMH_1718	N/A	0.00	CN			631085.972	26912492.885	713.469	$4,000	01/01/2001	17	75	57	$3,046	$5,092	1	1	0.0	0.0	1.0	2.0	2.0	4
1606	Sanitary MH	SAMH_1719	N/A	0.00	CN			631097.747	26912794.545	707.063	$4,000	01/01/2001	17	75	57	$3,046	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
1607	Sanitary MH	SAMH_1720	N/A	0.00	CN			631107.225	26913083.790	700.448	$1,500	01/01/1965	53	75	21	$421	$4,539	1	1	0.0	0.0	1.0	2.0	2.0	4
1608	Sanitary MH	SAMH_1722	N/A	0.00	CR			630829.713	26912497.195	712.596	$4,000	01/01/2001	17	75	57	$3,046	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1609	Sanitary MH	SAMH_1731	N/A	0.00	CR			630536.209	26912488.649	713.303	$3,500	01/01/2001	17	75	57	$2,665	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
1610	Sanitary MH	SAMH_1738	N/A	0.00	CR			630268.441	26912504.892	714.208	$4,000	01/01/2001	17	75	57	$3,046	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1611	Sanitary MH	SAMH_1755	N/A	0.00	CN			629784.039	26912616.858	713.754	$3,000	01/01/1982	36	75	38	$1,524	$5,092	1	1	0.0	0.0	1.0	1.0	3.0	3
1612	Sanitary MH	SAMH_1756	N/A	0.00	CN			629795.115	26912812.872	711.601	$3,000	01/01/1982	36	75	38	$1,524	$5,092	1	1	0.0	0.0	1.0	1.0	2.0	2
1613	Sanitary MH	SAMH_1757	N/A	0.00	CN			629804.743	26913117.586	708.453	$3,000	01/01/1982	36	75	38	$1,524	$5,092	1	1	0.0	0.0	1.0	1.0	2.0	2
1614	Sanitary MH	SAMH_1763	N/A	0.00	CR			629480.847	26912995.780	713.988	$1,500	01/01/1950	68	75	6	$121	$5,092	1	1	0.0	0.0	1.0	2.0	2.0	4
1615	Sanitary MH	SAMH_1766A	N/A	0.00	CR			629123.732	26912938.036	714.974	$4,500	01/01/2015	3	75	71	$4,267	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
1616	Sanitary MH	SAMH_1766	N/A	0.00	CR			629127.444	26913001.301	714.374	$2,500	01/01/1950	68	75	6	$202	$6,017	1	1	0.0	0.0	1.0	2.0	2.0	4
1617	Sanitary MH	SAMH_1765	N/A	0.00	CN			629271.073	26912528.223	719.072	$1,000	01/01/1950	68	75	6	$81	$4,539	1	1	0.0	0.0	1.0	2.0	2.0	4
1618	Sanitary MH	SAMH_1771	N/A	0.00	CN			628889.657	26912360.321	718.044	$3,000	01/01/1990	28	75	46	$1,844	$4,539	1	1	0.0	0.0	1.0	2.0	2.0	4
1619	Sanitary MH	SAMH_1603	N/A	0.00	CN			628635.767	26912119.544	716.547	$2,500	01/01/1980	38	75	36	$1,203	$4,539	1	1	0.0	0.0	1.0	2.0	2.0	4
1620	Sanitary MH	SAMH_1604	N/A	0.00	CN			628418.364	26911909.836	716.120	$2,500	01/01/1980	38	75	36	$1,203	$4,539	1	1	0.0	0.0	1.0	2.0	2.0	4
1621	Sanitary MH	SAMH_1605	N/A	0.00	CN			628165.474	26911665.948	714.709	$2,500	01/01/1980	38	75	36	$1,203	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
1622	Sanitary MH	SAMH_1606	N/A	0.00	CN			628114.960	26911666.511	714.436	$2,500	01/01/1980	38	75	36	$1,203	$4,539	1	1	0.0	0.0	1.0	2.0	2.0	4
1623	Sanitary MH	SAMH_1611	N/A	0.00	CR			627839.951	26912287.734	713.056	$2,500	01/01/1976	42	75	32	$1,069	$5,092	1	1	0.0	0.0	1.0	3.0	1.2	3.6
1624	Sanitary MH	SAMH_1610	N/A	0.00	CR			627859.522	26912286.882	712.702	$2,500	01/01/1980	38	75	36	$1,203	$4,539	1	1	0.0	0.0	1.0	2.0	2.0	4
1625	Sanitary MH	SAMH_1608	N/A	0.00	CR			627884.127	26912146.465	713.551	$3,000	01/01/1980	38	75	36	$1,443	$5,092	1	1	0.0	0.0	1.0	3.0	2.0	6
1626	Sanitary MH	SAMH_1743	N/A	0.00	CR			629716.316	26910634.551	717.896	$3,500	01/01/2001	17	75	57	$2,665	$4,539	1	1	0.0	0.0	1.0	2.0	2.0	4
1627	Sanitary MH	SAMH_1768	N/A	0.00	CR			629334.493	26911032.721	719.233	$3,500	01/01/2003	15	75	59	$2,758	$4,539	1	1	0.0	0.0	1.0	2.0	2.0	4
1628	Sanitary MH	SAMH_2648	N/A	0.00	CN			631175.329	26915375.252	631.052	$4,000	01/01/2001	17	75	57	$3,046	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1629	Sanitary MH	SAMH_2649	N/A	0.00	CN			630835.325	26915384.233	631.504	$3,500	01/01/1998	20	75	54	$2,525	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1630	Sanitary MH	SAMH_2650	N/A	0.00	CN			630821.337	26915373.406	631.680	$4,000	01/01/2001	17	75	57	$3,046	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1631	Sanitary MH	SAMH_2651	N/A	0.00	CT			630545.582	26915376.851	631.106	$1,000	01/01/1950	68	75	6	$81	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
1632	Sanitary MH	SAMH_2643	N/A	0.00	CR			630820.771	26915066.408	632.261	$4,000	01/01/2001	17	75	57	$3,046	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
1633	Sanitary MH	SAMH_2644	N/A	0.00	CR			630815.310	26915053.898	632.583	$4,000	01/01/2001	17	75	57	$3,046	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
1634	Sanitary MH	SAMH_2642	N/A	0.00	CR			631169.265	26915059.094	631.299	$4,000	01/01/2001	17	75	57	$3,046	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
1635	Sanitary MH	SAMH_2638	N/A	0.00	CN			631159.429	26914721.597	632.404	$3,500	01/01/2001	17	75	57	$2,665	$4,539	1	1	0.0	0.0	1.0	1.0	3.0	3
1636	Sanitary MH	SAMH_1768A	N/A	0.00	CR			629216.199	26911153.949	718.377	$3,500	01/01/2003	15	75	59	$2,758	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
1637	Sanitary MH	SAMH_1769	N/A	0.00	CR			629055.115	26911320.956	718.405	$3,500	01/01/2003	15	75	59	$2,758	$4,539	1	1	0.0	0.0	1.0	2.0	2.0	4
1638	Sanitary MH	SAMH_1770	N/A	0.00	CR			628848.350	26911537.511	718.002	$3,500	01/01/2003	15	75	59	$2,758	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
1639	Sanitary MH	SAMH_1601	N/A	0.00	CR			628744.665	26911648.064	717.869	$3,500	01/01/2003	15	75	59	$2,758	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
1640	Sanitary MH	SAMH_1602	N/A	0.00	CR			628494.655	26911656.381	716.233	$3,500	01/01/2003	15	75	59	$2,758	$4,539	1	1	0.0	0.0	1.0	2.0	2.0	4
1641	Sanitary MH	SAMH_1614	N/A	0.00	BR			627828.585	26912857.649	713.133	$1,500	01/01/1950	68	75	6	$121	$5,092	1	1	0.0	0.0	1.0	3.0	2.0	6
1642	Sanitary MH	SAMH_1616	N/A	0.00				627472.174	26912365.859	711.410	$1,000	01/01/1950	68	75	6	$81	$4,539	1	1	0.0	0.0	1.0	2.0	4.0	8
1643	Sanitary MH	SAMH_1629	N/A	0.00	BR			627474.305	26912549.881	711.852	$1,000	01/01/1950	68	75	6	$81	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
1644	Sanitary MH	SAMH_1518	N/A	0.00	CR		IN MIDDLE OF STREET. 1517 SHOWN TO WEST DOESN'T EXIST. 1518A FOUND A	626115.686	26911339.943	706.750	$2,000	01/01/1966	52	75	22	$589	$5,092	1	1	0.0	0.0	1.0	4.0	3.0	12
1645	Sanitary MH	SAMH_1519	N/A	0.00	CN			626131.347	26911658.723	705.655	$2,000	01/01/1966	52	75	22	$589	$5,092	1	1	0.0	0.0	1.0	4.0	2.0	8
1646	Sanitary MH	SAMH_1520	N/A	0.00	CR			626146.789	26911990.342	705.309	$2,000	01/01/1966	52	75	22	$589	$5,092	1	1	0.0	0.0	1.0	4.0	2.0	8
1647	Sanitary MH	SAMH_1623	N/A	0.00	CN			626473.055	26911972.887	704.503	$2,000	01/01/1966	52	75	22	$589	$5,092	1	1	0.0	0.0	1.0	4.0	2.0	8
1648	Sanitary MH	SAMH_1624	N/A	0.00	CR			626486.016	26912275.911	705.851	$2,000	01/01/1966	52	75	22	$589	$5,092	1	1	0.0	0.0	1.0	4.0	1.0	4
1649	Sanitary MH	SAMH_1625	N/A	0.00	CN			626501.012	26912589.428	705.227	$2,000	01/01/1966	52	75	22	$589	$5,092	1	1	0.0	0.0	1.0	4.0	2.0	8
1650	Sanitary MH	SAMH_1628	N/A	0.00	CR			626533.664	26913266.716	708.124	$2,000	01/01/1966	52	75	22	$589	$5,092	1	1	0.0	0.0	1.0	4.0	1.0	4
1651	Sanitary MH	SAMH_1626	N/A	0.00	CN			626517.753	26912945.809	705.314	$2,000	01/01/1966	52	75	22	$589	$5,092	1	1	0.0	0.0	1.0	4.0	2.0	8
1652	Sanitary MH	SAMH_1515	N/A	0.00	CR			626088.656	26910830.165	705.581	$1,500	01/01/1966	52	75	22	$441	$4,539	1	1	0.0	0.0	1.0	4.0	2.0	8
1653	Sanitary MH	SAMH_1516	N/A	0.00	CR		16" BELOW GRADE	626100.129	26911081.223	707.192	$2,000	01/01/1966	52	75	22	$589	$5,092	1	1	0.0	0.0	1.0	4.0	3.0	12
1654	Sanitary MH	SAMH_1607	N/A	0.00	CR			627878.443	26911909.907	713.475	$2,500	01/01/1980	38	75	36	$1,203	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
1655	Sanitary MH	SAMH_1617	N/A	0.00	BR			627481.186	26912869.888	711.677	$1,500	01/01/1950	68	75	6	$121	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
1656	Sanitary MH	SAMH_1618	N/A	0.00				627506.236	26913189.403	710.364	$1,500	01/01/1950	68	75	6	$121	$5,092	1	1	0.0	0.0	1.0	2.0	1.1	2.2
1657	Sanitary MH	SAMH_1615	N/A	0.00	CR			627842.193	26913180.810	711.633	$1,500	01/01/1950	68	75	6	$121	$5,092	1	1	0.0	0.0	1.0	3.0	2.0	6
1658	Sanitary MH	SAMH_1627	N/A	0.00	CR			626861.523	26913262.536	710.148	$2,000	01/01/1976	42	75	32	$855	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
1659	Sanitary MH	SAMH_2507	N/A	0.00	CR			627517.094	26913510.747	708.600	$3,500	01/01/1994	24	75	50	$2,338	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
1660	Sanitary MH	SAMH_2506	N/A	0.00	ZZZ			627490.784	26913286.086	712.614	$3,000	01/01/1994	24	75	50	$2,004	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
1661	Sanitary MH	SAMH_2508	N/A	0.00	CR		1" ABOVE GRADE	627534.396	26913850.118	706.250	$2,000	01/01/1966	52	75	22	$589	$5,092	1	1	0.0	0.0	1.0	4.0	2.0	8
1662	Sanitary MH	SAMH_2514	N/A	0.00	CR			627531.772	26914132.719	703.717	$2,500	01/01/1988	30	75	44	$1,470	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
1663	Sanitary MH	SAMH_2515	N/A	0.00	CR			627540.870	26914514.204	703.291	$2,500	01/01/1988	30	75	44	$1,470	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
1664	Sanitary MH	SAMH_2516	N/A	0.00	CR			627529.173	26914710.623	704.809	$1,000	01/01/1950	68	75	6	$81	$4,539	1	1	0.0	0.0	1.0	1.0	2.0	2
1665	Sanitary MH	SAMH_2517	N/A	0.00	BR			627913.489	26914720.522	703.602	$1,000	01/01/1953	65	75	9	$121	$4,539	1	1	0.0	0.0	1.0	1.0	2.0	2
1666	Sanitary MH	SAMH_2518	N/A	0.00	BR			628312.199	26915272.208	700.598	$1,000	01/01/1950	68	75	6	$81	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
1667	Sanitary MH	SAMH_2505	N/A	0.00	CR		8" ABOVE GRADE	627208.042	26913858.614	705.180	$2,000	01/01/1966	52	75	22	$589	$5,092	1	1	0.0	0.0	1.0	4.0	2.0	8
1668	Sanitary MH	SAMH_2504	N/A	0.00	CR			626887.677	26913865.320	704.505	$2,000	01/01/1966	52	75	22	$589	$5,092	1	1	0.0	0.0	1.0	4.0	1.0	4
1669	Sanitary MH	SAMH_2502	N/A	0.00	BR			626561.025	26913875.559	706.769	$3,000	01/01/1966	52	75	22	$883	$6,017	1	1	0.0	0.0	1.0	4.0	1.0	4
1670	Sanitary MH	SAMH_2503	N/A	0.00	CR			626546.674	26913557.154	705.645	$2,000	01/01/1966	52	75	22	$589	$5,092	1	1	0.0	0.0	1.0	4.0	1.0	4
1671	Sanitary MH	SAMH_2519	N/A	0.00	BR			628859.244	26915083.534	699.460	$1,000	01/01/1950	68	75	6	$81	$4,539	1	1	0.0	0.0	1.0	2.0	2.0	4
1672	Sanitary MH	SAMH_2639	N/A	0.00	BR			630828.565	26914731.472	634.114	$1,000	01/01/1950	68	75	6	$81	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
1673	Sanitary MH	SAMH_2640	N/A	0.00	CN			630501.900	26914736.861	636.672	$1,500	01/01/1950	68	75	6	$121	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1674	Sanitary MH	SAMH_2641	N/A	0.00	CN			630230.990	26914737.932	641.315	$1,500	01/01/1950	68	75	6	$121	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1675	Sanitary MH	SAMH_2631	N/A	0.00	BR			630484.848	26914423.818	641.435	$1,000	01/01/1950	68	75	6	$81	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
1676	Sanitary MH	SAMH_2630	N/A	0.00	ZZZ			630812.093	26914419.963	636.743	$1,000	01/01/1950	68	75	6	$81	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
1677	Sanitary MH	SAMH_2629	N/A	0.00	BR			631137.204	26914414.801	634.021	$1,000	01/01/1950	68	75	6	$81	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
1678	Sanitary MH	SAMH_2623	N/A	0.00	BR			631027.268	26913808.207	689.256	$2,500	01/01/1950	68	75	6	$202	$6,017	1	1	0.0	0.0	1.0	4.0	1.0	4
1679	Sanitary MH	SAMH_2624	N/A	0.00	BR			630798.393	26913811.314	691.389	$1,500	01/01/1950	68	75	6	$121	$5,092	1	1	0.0	0.0	1.0	4.0	1.0	4
1680	Sanitary MH	SAMH_2625	N/A	0.00				630477.215	26913818.099	693.970	$2,500	01/01/1950	68	75	6	$202	$6,017	1	1	0.0	0.0	1.0	4.0	1.1	4.4
1681	Sanitary MH	SAMH_2626	N/A	0.00				630177.765	26913822.360	696.645	$2,500	01/01/1950	68	75	6	$202	$6,017	1	1	0.0	0.0	1.0	4.0	1.1	4.4
1682	Sanitary MH	SAMH_2627	N/A	0.00				630139.458	26913794.511	697.522	$2,500	01/01/1950	68	75	6	$202	$6,017	1	1	0.0	0.0	1.0	4.0	1.1	4.4
1683	Sanitary MH	SAMH_2621	N/A	0.00	CR			630133.187	26913518.358	701.612	$1,500	01/01/1950	68	75	6	$121	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1684	Sanitary MH	SAMH_3731	N/A	0.00	CR			630355.001	26919459.246	630.073	$3,500	01/01/1976	42	75	32	$1,497	$6,017	1	1	0.0	0.0	1.0	2.0	1.0	2
1685	Sanitary MH	SAMH_3732	N/A	0.00	CR			630370.305	26919822.550	626.042	$2,500	01/01/1976	42	75	32	$1,069	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
1686	Sanitary MH	SAMH_3733	N/A	0.00	CR			630384.749	26920138.945	620.198	$2,500	01/01/1976	42	75	32	$1,069	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
1687	Sanitary MH	SAMH_3734	N/A	0.00	CR			630398.116	26920473.921	615.587	$2,500	01/01/1976	42	75	32	$1,069	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
1688	Sanitary MH	SAMH_3735	N/A	0.00	CR			630412.392	26920813.623	610.824	$2,500	01/01/1976	42	75	32	$1,069	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
1689	Sanitary MH	SAMH_3736	N/A	0.00	CR			630424.912	26921149.258	607.388	$2,500	01/01/1976	42	75	32	$1,069	$5,092	1	1	0.0	0.0	1.0	3.0	2.0	6
1690	Sanitary MH	SAMH_3736A	N/A	0.00	CR			630324.369	26921154.107	607.755	$2,500	01/01/1976	42	75	32	$1,069	$5,092	1	1	0.0	0.0	1.0	3.0	2.0	6
1691	Sanitary MH	SAMH_3723	N/A	0.00	CR			630767.076	26921129.887	604.190	$2,500	01/01/1976	42	75	32	$1,069	$5,092	1	1	0.0	0.0	1.0	4.0	2.0	8
1692	Sanitary MH	SAMH_3713	N/A		CR			631084.614	26921106.381	602.642	$2,500	01/01/1976	42	75	32	$1,069	$5,092	1	1	0.0	0.0	1.0	1.0	2.0	2
1693	Sanitary MH	SAMH_3702	N/A	0.00	CR			631395.345	26921079.244	600.137	$2,500	01/01/1976	42	75	32	$1,069	$5,092	1	1	0.0	0.0	1.0	1.0	2.0	2
1694	Sanitary MH	SAMH_1754	N/A	0.00				630141.896	26913127.344	706.405	$1,500	01/01/1950	68	75	6	$121	$5,092	1	1	0.0	0.0	1.0	2.0	2.0	4
1695	Sanitary MH	SAMH_1759	N/A	0.00	CN			629791.256	26913132.063	708.559	$1,500	01/01/1950	68	75	6	$121	$5,092	1	1	0.0	0.0	1.0	2.0	3.0	6
1696	Sanitary MH	SAMH_1764	N/A	0.00	BR			629491.767	26913134.020	711.587	$1,500	01/01/1950	68	75	6	$121	$5,092	1	1	0.0	0.0	1.0	2.0	2.0	4
1697	Sanitary MH	SAMH_3712	N/A	0.00				631066.394	26920790.107	603.645	$2,500	01/01/1976	42	75	32	$1,069	$5,092	1	1	0.0	0.0	1.0	1.0	1.1	1.1
1698	Sanitary MH	SAMH_3711	N/A	0.00				631050.564	26920466.376	607.580	$2,500	01/01/1976	42	75	32	$1,069	$5,092	1	1	0.0	0.0	1.0	1.0	1.1	1.1
1699	Sanitary MH	SAMH_1746	N/A	0.00	CN			630018.263	26911239.369	720.098	$3,000	01/01/1980	38	75	36	$1,443	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
1700	Sanitary MH	SAMH_1747	N/A	0.00	CR			630031.115	26911564.645	721.628	$3,000	01/01/1980	38	75	36	$1,443	$5,092	1	1	0.0	0.0	1.0	2.0	2.0	4
1701	Sanitary MH	SAMH_1748	N/A	0.00	CN			630039.888	26911896.849	720.219	$3,000	01/01/1980	38	75	36	$1,443	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
1702	Sanitary MH	SAMH_1749	N/A	0.00	CN			630058.850	26911907.834	719.749	$1,500	01/01/1950	68	75	6	$121	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
1703	Sanitary MH	SAMH_1750	N/A	0.00	CN			630069.352	26912188.700	716.996	$1,500	01/01/1950	68	75	6	$121	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
1704	Sanitary MH	SAMH_1751	N/A	0.00	CN			630074.877	26912456.822	714.314	$1,500	01/01/1950	68	75	6	$121	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
1705	Sanitary MH	SAMH_1752	N/A	0.00	CN			630116.556	26912510.126	713.984	$1,500	01/01/1950	68	75	6	$121	$5,092	1	1	0.0	0.0	1.0	2.0	2.0	4
1706	Sanitary MH	SAMH_1753	N/A	0.00	BR			630128.581	26912881.821	708.940	$1,000	01/01/1950	68	75	6	$81	$4,539	1	1	0.0	0.0	1.0	2.0	2.0	4
1707	Sanitary MH	SAMH_1736	N/A	0.00	S			630457.342	26913089.310	703.092	$3,500	01/01/2001	17	75	57	$2,665	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
1708	Sanitary MH	SAMH_1735	N/A	0.00	CR			630449.288	26912783.653	707.702	$4,000	01/01/2001	17	75	57	$3,046	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
1709	Sanitary MH	SAMH_1733	N/A	0.00	CN			630445.222	26912484.156	713.462	$3,500	01/01/2001	17	75	57	$2,665	$4,539	1	1	0.0	0.0	1.0	1.0	2.0	2
1710	Sanitary MH	SAMH_2509	N/A	0.00	CN			627864.704	26913839.418	706.729	$2,000	01/01/1966	52	75	22	$589	$5,092	1	1	0.0	0.0	1.0	4.0	2.0	8
1711	Sanitary MH	SAMH_2510	N/A	0.00	CN			628200.512	26913832.982	706.605	$3,000	01/01/1966	52	75	22	$883	$6,017	1	1	0.0	0.0	1.0	4.0	1.0	4
1712	Sanitary MH	SAMH_2512	N/A	0.00	BR			628163.221	26913363.391	712.176	$1,500	01/01/1950	68	75	6	$121	$5,092	1	1	0.0	0.0	1.0	3.0	1.0	3
1713	Sanitary MH	SAMH_2513	N/A	0.00				628494.879	26913355.598	711.167	$1,500	01/01/1950	68	75	6	$121	$5,092	1	1	0.0	0.0	1.0	3.0	1.1	3.3
1714	Sanitary MH	SAMH_2511	N/A	0.00	CR		3" BELOW GRADE	628528.689	26913823.331	706.361	$2,000	01/01/1966	52	75	22	$589	$5,092	1	1	0.0	0.0	1.0	4.0	3.0	12
1715	Sanitary MH	SAMH_3703	N/A	0.00				631414.227	26921436.711	597.902	$2,500	01/01/1976	42	75	32	$1,069	$5,092	1	1	0.0	0.0	1.0	2.0	1.1	2.2
1716	Sanitary MH	SAMH_3704	N/A	0.00				631429.976	26921783.137	595.647	$2,000	01/01/1976	42	75	32	$855	$4,539	1	1	0.0	0.0	1.0	2.0	1.1	2.2
1717	Sanitary MH	SAMH_3705	N/A	0.00				631444.903	26922107.012	594.501	$2,000	01/01/1976	42	75	32	$855	$4,539	1	1	0.0	0.0	1.0	2.0	1.1	2.2
1718	Sanitary MH	SAMH_3706	N/A	0.00	CR		RIM 2" ABOVE GRADE	631475.075	26922415.486	595.282	$2,500	01/01/1976	42	75	32	$1,069	$5,092	1	1	0.0	0.0	1.0	4.0	2.0	8
1719	Sanitary MH	SAMH_3707	N/A	0.00	CR		6" ABOVE GRADE	631487.038	26922717.940	593.940	$2,500	01/01/1976	42	75	32	$1,069	$5,092	1	1	0.0	0.0	1.0	5.0	2.0	10
1720	Sanitary MH	SAMH_3708	N/A	0.00	CR		6" ABOVE GRADE	631499.983	26923017.372	593.265	$2,500	01/01/1976	42	75	32	$1,069	$5,092	1	1	0.0	0.0	1.0	5.0	2.0	10
1721	Sanitary MH	SAMH_3709	N/A	0.00	CN			631516.957	26923412.127	593.158	$2,500	01/01/1976	42	75	32	$1,069	$5,092	1	1	0.0	0.0	1.0	5.0	2.0	10
1722	Sanitary MH	SAMH_4212	N/A	0.00	CN			631527.300	26923872.092	593.506	$2,500	01/01/1976	42	75	32	$1,069	$5,092	1	1	0.0	0.0	1.0	5.0	2.0	10
1723	Sanitary MH	SAMH_3717	N/A	0.00	CR		RIM 3" BELOW GRADE	631119.091	26922441.682	596.733	$2,500	01/01/1976	42	75	32	$1,069	$5,092	1	1	0.0	0.0	1.0	4.0	2.0	8
1724	Sanitary MH	SAMH_3719	N/A	0.00	CR			631159.615	26922983.484	594.314	$2,000	01/01/1976	42	75	32	$855	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
1725	Sanitary MH	SAMH_3718	N/A	0.00				631143.662	26922708.229	596.144	$2,000	01/01/1976	42	75	32	$855	$4,539	1	1	0.0	0.0	1.0	1.0	1.1	1.1
1726	Sanitary MH	SAMH_3716	N/A	0.00				631122.364	26922099.920	596.423	$2,000	01/01/1976	42	75	32	$855	$4,539	1	1	0.0	0.0	1.0	2.0	1.1	2.2
1727	Sanitary MH	SAMH_3715	N/A	0.00				631110.909	26921801.381	599.002	$2,500	01/01/1976	42	75	32	$1,069	$5,092	1	1	0.0	0.0	1.0	2.0	1.1	2.2
1728	Sanitary MH	SAMH_3714	N/A	0.00				631102.558	26921484.538	598.380	$2,000	01/01/1976	42	75	32	$855	$4,539	1	1	0.0	0.0	1.0	2.0	1.1	2.2
1729	Sanitary MH	SAMH_3727	N/A	0.00	CR		RIM 3" BELOW GRADE	630808.061	26922466.458	594.581	$2,000	01/01/1976	42	75	32	$855	$4,539	1	1	0.0	0.0	1.0	4.0	2.0	8
1730	Sanitary MH	SAMH_3726	N/A	0.00	CR		10" BELOW GRADE	630798.422	26922141.046	597.252	$2,500	01/01/1976	42	75	32	$1,069	$5,092	1	1	0.0	0.0	1.0	4.0	2.0	8
1731	Sanitary MH	SAMH_3725	N/A	0.00	CR		2" ABOVE GRADE	630789.483	26921800.145	596.465	$2,500	01/01/1976	42	75	32	$1,069	$5,092	1	1	0.0	0.0	1.0	4.0	2.0	8
1732	Sanitary MH	SAMH_3724	N/A	0.00	CR			630774.613	26921493.983	601.033	$2,500	01/01/1976	42	75	32	$1,069	$5,092	1	1	0.0	0.0	1.0	4.0	2.0	8
1733	Sanitary MH	SAMH_3737	N/A	0.00	CR			630434.638	26921466.348	603.422	$2,500	01/01/1976	42	75	32	$1,069	$5,092	1	1	0.0	0.0	1.0	1.0	2.0	2
1734	Sanitary MH	SAMH_3751	N/A	0.00				629449.826	26921567.391	617.095	$3,500	01/01/1976	42	75	32	$1,497	$6,017	1	1	0.0	0.0	1.0	1.0	1.1	1.1
1735	Sanitary MH	SAMH_3633	N/A	48.00	CR			629093.554	26921612.720	621.955	$3,500	01/01/1995	23	75	51	$2,385	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
1736	Sanitary MH	SAMH_3602	N/A	0.00	CR			628735.735	26921274.372	627.812	$3,500	01/01/1976	42	75	32	$1,497	$6,017	1	1	0.0	0.0	1.0	3.0	1.0	3
1737	Sanitary MH	SAMH_3603	N/A	0.00	CR			628374.734	26921278.836	630.795	$3,500	01/01/1976	42	75	32	$1,497	$6,017	1	1	0.0	0.0	1.0	3.0	1.0	3
1738	Sanitary MH	SAMH_3604	N/A	0.00	CR			627989.526	26921282.251	628.353	$3,500	01/01/1976	42	75	32	$1,497	$6,017	1	1	0.0	0.0	1.0	3.0	1.0	3
1739	Sanitary MH	SAMH_3608	N/A	0.00	CR			627642.064	26921286.313	630.739	$3,500	01/01/1976	42	75	32	$1,497	$6,017	1	1	0.0	0.0	1.0	2.0	1.0	2
1740	Sanitary MH	SAMH_3609	N/A	0.00	CR			627243.230	26921289.591	631.680	$3,500	01/01/1976	42	75	32	$1,497	$6,017	1	1	0.0	0.0	1.0	2.0	2.0	4
1741	Sanitary MH	SAMH_3611	N/A	0.00	BR			626958.865	26921290.839	630.119	$3,500	01/01/1976	42	75	32	$1,497	$6,017	1	1	0.0	0.0	1.0	2.0	2.0	4
1742	Sanitary MH	SAMH_3613	N/A	0.00	CR			626606.454	26921291.211	628.491	$2,500	01/01/1976	42	75	32	$1,069	$5,092	1	1	0.0	0.0	1.0	2.0	2.0	4
1743	Sanitary MH	SAMH_3500	N/A	0.00	CR			626246.883	26921294.771	630.377	$3,500	01/01/1976	42	75	32	$1,497	$6,017	1	1	0.0	0.0	1.0	2.0	2.0	4
1744	Sanitary MH	SAMH_3501	N/A	0.00	CR			625849.245	26921296.554	632.020	$3,500	01/01/1976	42	75	32	$1,497	$6,017	1	1	0.0	0.0	1.0	2.0	2.0	4

CITY OF SAULT STE. MARIE, MICHIGAN

Summary

id	Equipment Description	Asset ID	Construction Drawings Sheet Reference	Capacity or Size	Material	Length	Comment	Northing State Plane Ordinate	Easting State Plane Ordinate	Elevation	Original Cost	Year Installed (01/01/YYYY)	Age	Expected useful life (years)	Remaining Useful Life (years)	Depreciated Value	Replacement Cost	Average number of units in service	Total Number of units	Redundancy (Number)	Redundancy (percent)	Redundancy Score (R) (Reduces (C))	Criticality (C) (see back-up sheets)	Probability of Failure (P) (see back-up sheets)	Business Risk (BRE=PxCxR)
1745	Sanitary MH	SAMH_3502	N/A	0.00	CR			625449.044	26921299.641	630.407	$2,500	01/01/1976	42	75	32	$1,069	$5,092	1	1	0.0	0.0	1.0	2.0	2.0	4
1746	Sanitary MH	SAMH_3503	N/A	0.00	CR			625055.471	26921302.305	630.939	$2,500	01/01/1976	42	75	32	$1,069	$5,092	1	1	0.0	0.0	1.0	1.0	2.0	2
1747	Sanitary MH	SAMH_3504	N/A	0.00	CR			624661.092	26921305.786	632.339	$2,500	01/01/1976	42	75	32	$1,069	$5,092	1	1	0.0	0.0	1.0	1.0	2.0	2
1748	Sanitary MH	SAMH_3506	N/A	0.00	CR			624261.407	26921308.712	631.213	$2,500	01/01/1976	42	75	32	$1,069	$5,092	1	1	0.0	0.0	1.0	1.0	2.0	2
1749	Sanitary MH	SAMH_3507	N/A	0.00	CR			623870.551	26921319.440	633.779	$2,500	01/01/1976	42	75	32	$1,069	$5,092	1	1	0.0	0.0	1.0	1.0	2.0	2
1750	Sanitary MH	SAMH_3614	N/A	0.00				628672.130	26921587.345	623.250	$3,000	01/01/1980	38	75	36	$1,443	$5,092	1	1	0.0	0.0	1.0	1.0	1.1	1.1
1751	Sanitary MH	SAMH_3616	N/A	0.00	CR			628540.255	26921787.769	622.954	$3,000	01/01/1980	38	75	36	$1,443	$5,092	1	1	0.0	0.0	1.0	1.0	1.2	1.2
1752	Sanitary MH	SAMH_3617	N/A	0.00	CR			628445.411	26921818.503	623.501	$3,000	01/01/1980	38	75	36	$1,443	$5,092	1	1	0.0	0.0	1.0	1.0	2.0	2
1753	Sanitary MH	SAMH_3620	N/A	0.00	CR			628151.055	26921802.110	624.756	$2,500	01/01/1980	38	75	36	$1,203	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
1754	Sanitary MH	SAMH_3621	N/A	0.00	CR			628022.152	26921766.043	626.419	$2,500	01/01/1980	38	75	36	$1,203	$4,539	1	1	0.0	0.0	1.0	1.0	2.0	2
1755	Sanitary MH	SAMH_3622	N/A	0.00	CR			627815.378	26921675.834	628.474	$3,000	01/01/1980	38	75	36	$1,443	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
1756	Sanitary MH	SAMH_3625	N/A	0.00	CR			627710.425	26921623.929	629.219	$3,000	01/01/1980	38	75	36	$1,443	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1757	Sanitary MH	SAMH_3626	N/A	0.00	CR			627551.824	26921585.219	629.181	$3,000	01/01/1980	38	75	36	$1,443	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1758	Sanitary MH	SAMH_3627	N/A	0.00	CR			627294.683	26921562.071	627.507	$2,500	01/01/1980	38	75	36	$1,203	$4,539	1	1	0.0	0.0	1.0	1.0	2.0	2
1759	Sanitary MH	SAMH_3628	N/A	0.00	CR			627284.604	26921736.485	628.840	$2,500	01/01/1980	38	75	36	$1,203	$4,539	1	1	0.0	0.0	1.0	1.0	3.0	3
1760	Sanitary MH	SAMH_3629	N/A	0.00	CR			627167.455	26921549.201	627.774	$2,500	01/01/1980	38	75	36	$1,203	$4,539	1	1	0.0	0.0	1.0	1.0	3.0	3
1761	Sanitary MH	SAMH_3631	N/A	0.00	CR			626931.876	26921576.129	628.146	$3,000	01/01/1980	38	75	36	$1,443	$5,092	1	1	0.0	0.0	1.0	1.0	2.0	2
1762	Sanitary MH	SAMH_3632	N/A	0.00				626848.136	26921714.812	628.559	$2,500	01/01/1980	38	75	36	$1,203	$4,539	1	1	0.0	0.0	1.0	1.0	1.1	1.1
1763	Sanitary MH	SAMH_3630	N/A	0.00	CR			626965.731	26921453.253	628.451	$3,000	01/01/1980	38	75	36	$1,443	$5,092	1	1	0.0	0.0	1.0	1.0	2.0	2
1764	Sanitary MH	SAMH_3623	N/A	0.00	CR			627894.386	26921425.213	629.070	$3,000	01/01/1980	38	75	36	$1,443	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
1765	Sanitary MH	SAMH_3624	N/A	0.00	CR			627857.044	26921577.252	628.956	$3,000	01/01/1980	38	75	36	$1,443	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
1766	Sanitary MH	SAMH_3635	N/A	48.00	CR			628881.721	26922191.668	618.715	$3,000	01/01/1995	23	75	51	$2,044	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
1767	Sanitary MH	SAMH_3615	N/A	0.00	CR			628622.358	26921712.840	622.200	$2,500	01/01/1980	38	75	36	$1,203	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
1768	Sanitary MH	SAMH_3619	N/A	0.00	CR			628332.063	26921817.426	623.794	$3,000	01/01/1980	38	75	36	$1,443	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1769	Sanitary MH	SAMH_3618	N/A	0.00	CR			628442.422	26922008.508	621.813	$2,500	01/01/1980	38	75	36	$1,203	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
1770	Sanitary MH	SAMH_3529	N/A	0.00				625052.174	26922464.201	631.303	$2,500	01/01/1980	38	75	36	$1,203	$4,539	1	1	0.0	0.0	1.0	1.0	1.1	1.1
1771	Sanitary MH	SAMH_3528	N/A	0.00	CR			625042.851	26922130.610	628.385	$2,500	01/01/1980	38	75	36	$1,203	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
1772	Sanitary MH	SAMH_3527	N/A	0.00	CR			625032.986	26921792.335	626.495	$2,500	01/01/1980	38	75	36	$1,203	$4,539	1	1	0.0	0.0	1.0	1.0	2.0	2
1773	Sanitary MH	SAMH_3526	N/A	0.00	CR			625026.632	26921441.154	628.718	$3,000	01/01/1980	38	75	36	$1,443	$5,092	1	1	0.0	0.0	1.0	1.0	2.0	2
1774	Sanitary MH	SAMH_3525	N/A	0.00	CR			625411.170	26921508.641	629.501	$3,000	01/01/1980	38	75	36	$1,443	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
1775	Sanitary MH	SAMH_3524	N/A	0.00	CR			625605.697	26921507.547	631.041	$3,000	01/01/1980	38	75	36	$1,443	$5,092	1	1	0.0	0.0	1.0	1.0	2.0	2
1776	Sanitary MH	SAMH_3523	N/A	0.00	CN			625415.533	26921749.482	628.998	$3,000	01/01/1980	38	75	36	$1,443	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1777	Sanitary MH	SAMH_3521	N/A	0.00	CR			625417.846	26921941.701	628.565	$3,000	01/01/1980	38	75	36	$1,443	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1778	Sanitary MH	SAMH_3520	N/A	0.00	CR			625475.268	26922096.179	627.440	$2,500	01/01/1980	38	75	36	$1,203	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
1779	Sanitary MH	SAMH_3518	N/A	0.00	CR			625509.612	26922327.780	629.971	$2,500	01/01/1980	38	75	36	$1,203	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
1780	Sanitary MH	SAMH_3519	N/A	0.00	CR			625582.596	26922204.115	626.980	$2,500	01/01/1980	38	75	36	$1,203	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
1781	Sanitary MH	SAMH_3517	N/A	0.00				625730.078	26922258.381	628.203	$2,500	01/01/1980	38	75	36	$1,203	$4,539	1	1	0.0	0.0	1.0	1.0	1.1	1.1
1782	Sanitary MH	SAMH_3516	N/A	0.00	CR			625845.738	26922260.481	0.000	$2,500	01/01/1980	38	75	36	$1,203	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
1783	Sanitary MH	SAMH_3515	N/A	0.00	CR			625960.277	26922226.510	628.492	$2,500	01/01/1980	38	75	36	$1,203	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
1784	Sanitary MH	SAMH_3514	N/A	0.00	CR			626162.843	26922148.063	627.709	$2,500	01/01/1980	38	75	36	$1,203	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
1785	Sanitary MH	SAMH_3513	N/A	0.00	CR			626406.314	26922050.169	626.100	$2,500	01/01/1980	38	75	36	$1,203	$4,539	1	1	0.0	0.0	1.0	1.0	2.0	2
1786	Sanitary MH	SAMH_3512	N/A	0.00	CR			626509.871	26921925.663	627.366	$3,000	01/01/1980	38	75	36	$1,443	$5,092	1	1	0.0	0.0	1.0	1.0	2.0	2
1787	Sanitary MH	SAMH_3511	N/A	0.00	CR			626468.157	26921773.839	627.524	$3,000	01/01/1980	38	75	36	$1,443	$5,092	1	1	0.0	0.0	1.0	1.0	1.2	1.2
1788	Sanitary MH	SAMH_3510	N/A	0.00	CR			626293.715	26921533.996	629.228	$3,000	01/01/1980	38	75	36	$1,443	$5,092	1	1	0.0	0.0	1.0	1.0	1.2	1.2
1789	Sanitary MH	SAMH_3509	N/A	0.00	CR			626238.132	26921424.626	629.698	$3,000	01/01/1980	38	75	36	$1,443	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
1790	Sanitary MH	SAMH_3508	N/A	0.00	CR			626050.540	26921495.237	630.263	$3,000	01/01/1980	38	75	36	$1,443	$5,092	1	1	0.0	0.0	1.0	1.0	2.0	2
1791	Sanitary MH	SAMH_3522	N/A	0.00	CR			625758.476	26921852.899	630.229	$2,500	01/01/1980	38	75	36	$1,203	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
1792	Sanitary MH	SAMH_4000	N/A		CR			623969.012	26926592.428	613.898	$2,500	01/01/1976	42	75	32	$1,069	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1793	Sanitary MH	SAMH_4001	N/A	0.00	CR			624232.166	26926575.570	610.691	$2,500	01/01/1976	42	75	32	$1,069	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1794	Sanitary MH	SAMH_4002	N/A	0.00	CR			624533.522	26926559.911	608.592	$2,500	01/01/1976	42	75	32	$1,069	$5,092	1	1	0.0	0.0	1.0	1.0	2.0	2
1795	Sanitary MH	SAMH_4003	N/A	0.00	CR			624834.705	26926545.841	605.396	$2,500	01/01/1976	42	75	32	$1,069	$5,092	1	1	0.0	0.0	1.0	1.0	2.0	2
1796	Sanitary MH	SAMH_4004	N/A	0.00	CR			625137.011	26926534.414	602.274	$2,500	01/01/1976	42	75	32	$1,069	$5,092	1	1	0.0	0.0	1.0	1.0	2.0	2
1797	Sanitary MH	SAMH_4005	N/A	0.00	CR			625479.532	26926516.181	599.641	$2,500	01/01/1976	42	75	32	$1,069	$5,092	1	1	0.0	0.0	1.0	2.0	1.2	2.4
1798	Sanitary MH	SAMH_4006	N/A	0.00	CR			625780.769	26926504.867	597.921	$2,500	01/01/1976	42	75	32	$1,069	$5,092	1	1	0.0	0.0	1.0	2.0	1.2	2.4
1799	Sanitary MH	SAMH_4210	N/A	0.00	CN			629375.009	26925664.496	586.040	$2,000	01/01/1976	42	75	32	$855	$4,539	1	1	0.0	0.0	1.0	1.0	2.0	2
1800	Sanitary MH	SAMH_4209	N/A	0.00	CR			629699.374	26925723.538	587.165	$2,000	01/01/1976	42	75	32	$855	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
1801	Sanitary MH	SAMH_4208	N/A	0.00				630077.837	26925736.062	587.486	$2,000	01/01/1976	42	75	32	$855	$4,539	1	1	0.0	0.0	1.0	3.0	1.1	3.3
1802	Sanitary MH	SAMH_4207	N/A	0.00	CR			630440.812	26925746.376	588.175	$2,000	01/01/1976	42	75	32	$855	$4,539	1	1	0.0	0.0	1.0	3.0	2.0	6
1803	Sanitary MH	SAMH_4206	N/A	0.00	CR			630771.692	26925767.065	589.446	$2,000	01/01/1976	42	75	32	$855	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
1804	Sanitary MH	SAMH_4205	N/A	0.00				630873.253	26925818.334	589.334	$2,000	01/01/1976	42	75	32	$855	$4,539	1	1	0.0	0.0	1.0	3.0	1.1	3.3
1805	Sanitary MH	SAMH_4204	N/A	0.00	CR			631127.237	26926018.079	593.936	$2,500	01/01/1976	42	75	32	$1,069	$5,092	1	1	0.0	0.0	1.0	4.0	1.0	4
1806	Sanitary MH	SAMH_4203	N/A	0.00	CR			631283.301	26926059.389	595.983	$2,000	01/01/1976	42	75	32	$855	$4,539	1	1	0.0	0.0	1.0	4.0	1.0	4
1807	Sanitary MH	SAMH_4202	N/A	0.00				631580.282	26926074.548	590.998	$2,500	01/01/1976	42	75	32	$1,069	$5,092	1	1	0.0	0.0	1.0	4.0	1.1	4.4
1808	Sanitary MH	SAMH_4010	N/A	0.00	CR			626410.720	26927008.505	588.643	$2,500	01/01/1976	42	75	32	$1,069	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
1809	Sanitary MH	SAMH_4009	N/A	0.00	CR			626606.588	26926861.978	587.911	$2,500	01/01/1976	42	75	32	$1,069	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
1810	Sanitary MH	SAMH_3832	N/A	0.00	ZZZ			633433.918	26923195.115	593.054	$1,000	01/01/1950	68	75	6	$81	$4,539	1	1	0.0	0.0	1.0	5.0	1.0	5
1811	Sanitary MH	SAMH_2501	N/A	0.00	CR			626230.717	26913902.588	705.083	$2,500	01/01/1974	44	75	30	$1,003	$5,092	1	1	0.0	0.0	1.0	2.0	2.0	4
1812	Sanitary MH	SAMH_1562	N/A	0.00	CR			626176.639	26913278.713	705.690	$2,500	01/01/1976	42	75	32	$1,069	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
1813	Sanitary MH	SAMH_1563	N/A	0.00	CR			625839.061	26913291.743	707.902	$2,500	01/01/1976	42	75	32	$1,069	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
1814	Sanitary MH	SAMH_1564	N/A	0.00	CR			625153.076	26913214.079	707.039	$3,000	01/01/1994	24	75	50	$2,004	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
1815	Sanitary MH	SAMH_1565	N/A	0.00	CR			625167.898	26913307.745	707.283	$2,500	01/01/1976	42	75	32	$1,069	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
1816	Sanitary MH	SAMH_1566	N/A	0.00	CR			624404.487	26913329.039	704.040	$2,000	01/01/1976	42	75	32	$855	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
1817	Sanitary MH	SAMH_1567	N/A	0.00				624246.876	26913334.351	704.462	$2,000	01/01/1976	42	75	32	$855	$4,539	1	1	0.0	0.0	1.0	2.0	1.1	2.2
1818	Sanitary MH	SAMH_1533	N/A	0.00	CR			625079.372	26909865.066	702.317	$2,000	01/01/1966	52	75	22	$589	$5,092	1	1	0.0	0.0	1.0	2.0	2.0	4
1819	Sanitary MH	SAMH_1528	N/A	0.00	CT			625420.292	26910714.763	703.416	$1,500	01/01/1966	52	75	22	$441	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
1820	Sanitary MH	SAMH_1527	N/A	0.00	CR			625417.078	26910188.869	701.222	$1,500	01/01/1966	52	75	22	$441	$4,539	1	1	0.0	0.0	1.0	2.0	2.0	4
1821	Sanitary MH	SAMH_1530	N/A	0.00	CT			625091.764	26910720.828	702.971	$1,500	01/01/1966	52	75	22	$441	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
1822	Sanitary MH	SAMH_1532	N/A	0.00				625085.366	26910154.351	703.067	$2,000	01/01/1966	52	75	22	$589	$5,092	1	1	0.0	0.0	1.0	1.0	1.1	1.1
1823	Sanitary MH	SAMH_1531	N/A	0.00				625089.198	26910444.435	703.796	$2,000	01/01/1966	52	75	22	$589	$5,092	1	1	0.0	0.0	1.0	1.0	1.1	1.1
1824	Sanitary MH	SAMH_1511	N/A	0.00	ZZZ			625754.070	26910266.819	703.272	$1,500	01/01/1966	52	75	22	$441	$4,539	1	1	0.0	0.0	1.0	2.0	3.0	6
1825	Sanitary MH	SAMH_1511A	N/A	0.00	CR			625739.742	26909840.586	702.870	$2,000	01/01/1966	52	75	22	$589	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
1826	Sanitary MH	SAMH_1510	N/A	0.00	CR			625731.742	26909558.687	701.556	$2,000	01/01/1966	52	75	22	$589	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
1827	Sanitary MH	SAMH_1509	N/A	0.00	CR			625723.038	26909255.716	700.637	$2,000	01/01/1966	52	75	22	$589	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
1828	Sanitary MH	SAMH_1508	N/A	0.00	CR			625715.200	26908989.817	699.282	$2,000	01/01/1966	52	75	22	$589	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
1829	Sanitary MH	SAMH_4201	N/A	0.00	CR			631880.120	26926081.190	586.926	$2,000	01/01/1976	42	75	32	$855	$4,539	1	1	0.0	0.0	1.0	4.0	2.0	8
1830	Sanitary MH	SAMH_4314	N/A	0.00	CR			632068.660	26926002.154	587.592	$2,000	01/01/1976	42	75	32	$855	$4,539	1	1	0.0	0.0	1.0	4.0	1.0	4
1831	Sanitary MH	SAMH_4102	N/A	0.00				628656.066	26925791.771	586.499	$2,000	01/01/1976	42	75	32	$855	$4,539	1	1	0.0	0.0	1.0	1.0	1.1	1.1
1832	Sanitary MH	SAMH_4313	N/A	0.00	CR			632275.331	26925785.400	586.494	$2,000	01/01/1976	42	75	32	$855	$4,539	1	1	0.0	0.0	1.0	4.0	1.0	4
1833	Sanitary MH	SAMH_4312	N/A	0.00	CR			632482.494	26925568.784	587.018	$2,000	01/01/1976	42	75	32	$855	$4,539	1	1	0.0	0.0	1.0	4.0	1.0	4
1834	Sanitary MH	SAMH_4311	N/A	0.00	CR			632679.116	26925301.495	587.257	$2,500	01/01/1976	42	75	32	$1,069	$5,092	1	1	0.0	0.0	1.0	4.0	1.0	4
1835	Sanitary MH	SAMH_4310	N/A	0.00	CR			632822.553	26925002.393	589.202	$2,500	01/01/1976	42	75	32	$1,069	$5,092	1	1	0.0	0.0	1.0	4.0	1.0	4
1836	Sanitary MH	SAMH_4309	N/A	0.00				632957.276	26924688.823	587.268	$2,500	01/01/1976	42	75	32	$1,069	$5,092	1	1	0.0	0.0	1.0	4.0	1.1	4.4
1837	Sanitary MH	SAMH_4305A	N/A	0.00	BR			633111.434	26924306.829	588.984	$2,500	01/01/1976	42	75	32	$1,069	$5,092	1	1	0.0	0.0	1.0	5.0	3.0	15
1838	Sanitary MH	SAMH_4305	N/A	0.00	CR			633232.763	26924036.572	588.927	$2,500	01/01/1976	42	75	32	$1,069	$5,092	1	1	0.0	0.0	1.0	5.0	1.0	5
1839	Sanitary MH	SAMH_4306	N/A	0.00	CR			633238.478	26924041.056	588.871	$2,500	01/01/1976	42	75	32	$1,069	$5,092	1	1	0.0	0.0	1.0	5.0	1.0	5
1840	Sanitary MH	SAMH_4316	N/A	0.00	CR			632476.727	26924032.856	592.641	$2,500	01/01/1978	40	75	34	$1,136	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1841	Sanitary MH	SAMH_4317	N/A	0.00	CR			632081.372	26923882.830	594.882	$2,500	01/01/1978	40	75	34	$1,136	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1842	Sanitary MH	SAMH_4318	N/A	0.00	CN			632976.503	26924292.262	588.791	$2,500	01/01/1976	42	75	32	$1,069	$5,092	1	1	0.0	0.0	1.0	5.0	1.0	5
1843	Sanitary MH	SAMH_4319	N/A	0.00	CN			632821.307	26924344.337	585.165	$2,000	01/01/1976	42	75	32	$855	$4,539	1	1	0.0	0.0	1.0	5.0	2.0	10
1844	Sanitary MH	SAMH_4320	N/A	0.00	CN			632531.596	26924273.164	587.344	$2,000	01/01/1976	42	75	32	$855	$4,539	1	1	0.0	0.0	1.0	5.0	2.0	10
1845	Sanitary MH	SAMH_4321	N/A	0.00	CN			632166.618	26924107.310	591.708	$2,500	01/01/1976	42	75	32	$1,069	$5,092	1	1	0.0	0.0	1.0	5.0	2.0	10
1846	Sanitary MH	SAMH_4211	N/A	0.00	CN			631791.049	26923979.565	588.867	$2,000	01/01/1976	42	75	32	$855	$4,539	1	1	0.0	0.0	1.0	5.0	2.0	10
1847	Sanitary MH	SAMH_4307	N/A	0.00	CR			633097.897	26924360.772	587.345	$2,500	01/01/1976	42	75	32	$1,069	$5,092	1	1	0.0	0.0	1.0	4.0	1.0	4
1848	Sanitary MH	SAMH_4301	N/A	0.00	CR			633370.516	26923704.279	589.069	$5,500	01/01/1950	68	75	6	$445	$13,099	1	1	0.0	0.0	1.0	1.0	1.0	1
1849	Sanitary MH	SAMH_3813	N/A	0.00	CR			633376.418	26923727.482	588.844	$2,500	01/01/1976	42	75	32	$1,069	$5,092	1	1	0.0	0.0	1.0	5.0	1.0	5
1850	Sanitary MH	SAMH_3818	N/A	0.00	BR			633385.092	26923580.935	589.096	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	1.0	3.0	3
1851	Sanitary MH	SAMH_3819	N/A	0.00	BR			633119.530	26923500.241	594.797	$1,500	01/01/1950	68	75	6	$121	$5,092	1	1	0.0	0.0	1.0	1.0	4.0	4
1852	Sanitary MH	SAMH_3820	N/A	0.00	BR			632832.654	26923326.630	599.953	$1,500	01/01/1950	68	75	6	$121	$5,092	1	1	0.0	0.0	1.0	1.0	1.2	1.2
1853	Sanitary MH	SAMH_3809	N/A	0.00	CR			633498.776	26923416.738	589.541	$2,500	01/01/1976	42	75	32	$1,069	$5,092	1	1	0.0	0.0	1.0	5.0	1.0	5
1854	Sanitary MH	SAMH_3807	N/A	0.00	CR			633647.795	26923083.131	590.591	$2,000	01/01/1960	58	75	16	$428	$5,092	1	1	0.0	0.0	1.0	5.0	1.0	5
1855	Sanitary MH	SAMH_3806	N/A	0.00	CR			633788.569	26922765.150	593.016	$3,000	01/01/1961	57	75	17	$683	$6,017	1	1	0.0	0.0	1.0	5.0	1.0	5
1856	Sanitary MH	SAMH_3805	N/A	0.00	S			633969.643	26922359.478	595.031	$3,000	01/01/1961	57	75	17	$683	$6,017	1	1	0.0	0.0	1.0	5.0	1.0	5
1857	Sanitary MH	SAMH_3803	N/A	0.00	CR			634119.429	26921941.020	595.392	$5,500	01/01/1998	20	75	54	$3,968	$7,410	1	1	0.0	0.0	1.0	5.0	1.0	5
1858	Sanitary MH	SAMH_3802	N/A	0.00	CR			634149.191	26921956.562	595.358	$3,000	01/01/1961	57	75	17	$683	$6,017	1	1	0.0	0.0	1.0	5.0	1.0	5
1859	Sanitary MH	SAMH_3814	N/A	0.00	CR		RIM 1/2" BELOW GRADE	634010.824	26922173.339	595.037	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	2.0	3.0	6
1860	Sanitary MH	SAMH_3815	N/A	0.00	BR		1.5' OF CLEAR WATER IN THE BOTTOM, WHICH LOOKS LIKE A SUMP. COULD BE A	633795.638	26922657.215	593.813	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	1.0	4.0	4
1861	Sanitary MH	SAMH_3829	N/A	0.00	CR			633581.903	26922497.139	596.519	$2,500	01/01/1973	45	75	29	$969	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1862	Sanitary MH	SAMH_3830	N/A	0.00				633348.047	26922380.578	597.481	$2,500	01/01/1973	45	75	29	$969	$5,092	1	1	0.0	0.0	1.0	1.0	1.1	1.1
1863	Sanitary MH	SAMH_3831	N/A	0.00	CR			633115.434	26922259.866	598.945	$3,500	01/01/1990	28	75	46	$2,151	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1864	Sanitary MH	SAMH_3828	N/A	0.00				633780.083	26922058.769	596.770	$2,500	01/01/1973	45	75	29	$969	$5,092	1	1	0.0	0.0	1.0	1.0	1.1	1.1
1865	Sanitary MH	SAMH_3823	N/A	0.00	CR			633794.920	26921771.500	598.188	$4,500	01/01/1998	20	75	54	$3,246	$6,017	1	1	0.0	0.0	1.0	5.0	1.0	5
1866	Force Main	SAMH_3825	N/A	0.00	CR	N/A		633492.564	26921613.857	599.564	$3,500	01/01/1998	20	75	54	$2,525	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1867	Sanitary MH	SAMH_3826	N/A	0.00	CR			633491.563	26921606.621	599.842	$3,500	01/01/1998	20	75	54	$2,525	$5,092	1	1	0.0	0.0	1.0	1.0	2.0	2
1868	Sanitary MH	SAMH_3827	N/A	0.00	ZZZ			633271.754	26921510.062	601.276	$1,000	01/01/1950	68	75	6	$81	$4,539	1	1	0.0	0.0	1.0	1.0	2.0	2
1869	Sanitary MH	SAMH_3853	N/A	0.00	CR			633194.027	26921450.883	601.369	$3,500	01/01/2005	13	75	61	$2,852	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
1870	Sanitary MH	SAMH_3852	N/A	0.00	CR			633319.546	26921177.237	601.699	$3,500	01/01/2005	13	75	61	$2,852	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
1871	Sanitary MH	SAMH_3833	N/A	0.00	CR			633070.082	26921724.783	599.075	$3,500	01/01/2005	13	75	61	$2,852	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
1872	Sanitary MH	SAMH_3834	N/A	0.00	CR			632948.071	26921998.797	599.137	$3,500	01/01/2005	13	75	61	$2,852	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
1873	Sanitary MH	SAMH_3835	N/A	0.00	CR			632825.104	26922273.221	598.268	$3,500	01/01/2005	13	75	61	$2,852	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
1874	Sanitary MH	SAMH_3837	N/A	0.00	BR			632578.679	26922826.364	599.036	$1,500	01/01/1950	68	75	6	$121	$5,092	1	1	0.0	0.0	1.0	2.0	3.0	6
1875	Sanitary MH	SAMH_3838	N/A	0.00	BR			632469.029	26923069.732	595.611	$1,000	01/01/1950	68	75	6	$81	$4,539	1	1	0.0	0.0	1.0	2.0	3.0	6
1876	Sanitary MH	SAMH_3839	N/A	0.00	BR			632353.191	26923339.352	596.365	$1,000	01/01/1950	68	75	6	$81	$4,539	1	1	0.0	0.0	1.0	2.0	4.0	8
1877	Sanitary MH	SAMH_3840	N/A	0.00	BR			632224.174	26923612.955	596.467	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	3.0	4.0	12
1878	Sanitary MH	SAMH_3824	N/A	0.00	BR		MAY CONNECT TO 3825, DOES NOT CONNECT TO 3826 AS SHOWN ON MAP.	633707.492	26921138.083	602.005	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	1.0	3.0	3
1879	Sanitary MH	SAMH_3822	N/A	0.00	CR			633948.091	26921432.505	599.645	$4,500	01/01/1998	20	75	54	$3,246	$6,017	1	1	0.0	0.0	1.0	5.0	1.0	5
1880	Sanitary MH	SAMH_3850	N/A	0.00	CR			633609.888	26920551.989	602.358	$4,000	01/01/2006	12	75	62	$3,312	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1881	Sanitary MH	SAMH_3851	N/A	0.00	CR			633468.415	26920867.215	602.276	$4,000	01/01/2006	12	75	62	$3,312	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1882	Sanitary MH	SAMH_3852A	N/A	0.00	CR			633438.833	26920907.346	602.649	$3,500	01/01/2005	13	75	61	$2,852	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
1883	Sanitary MH	SAMH_3847	N/A	0.00	CR			633956.601	26919589.860	603.281	$3,500	01/01/1998	20	75	54	$2,525	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1884	Sanitary MH	SAMH_3844	N/A	0.00	CR			634206.346	26919180.008	605.921	$3,500	01/01/1998	20	75	54	$2,525	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1885	Sanitary MH	SAMH_3845	N/A	0.00	CR			634210.360	26919214.704	604.735	$3,500	01/01/1998	20	75	54	$2,525	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1886	Sanitary MH	SAMH_3940	N/A	0.00				634343.937	26918890.207	609.767	$4,000	01/01/2000	18	75	56	$2,992	$5,092	1	1	0.0	0.0	1.0	1.0	1.1	1.1
1887	Sanitary MH	SAMH_3846	N/A	0.00	CR			634040.861	26919592.070	602.884	$3,500	01/01/1998	20	75	54	$2,525	$5,092	1	1	0.0	0.0	1.0	1.0	2.0	2
1888	Sanitary MH	SAMH_3848	N/A	0.00	CR			633928.705	26919843.047	602.385	$3,500	01/01/1998	20	75	54	$2,525	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
1889	Sanitary MH	SAMH_3856	N/A	0.00	CR			634073.394	26920321.415	601.558	$3,500	01/01/1998	20	75	54	$2,525	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
1890	Force Main	SAMH_3932	N/A	0.00	CR	N/A		634391.813	26920446.863	600.388	$4,500	01/01/1998	20	75	54	$3,246	$6,017	1	1	0.0	0.0	1.0	5.0	1.0	5
1891	Sanitary MH	SAMH_3857	N/A	0.00	CR			633998.708	26920488.334	602.601	$2,000	01/01/1962	56	75	18	$482	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1892	Sanitary MH	SAMH_3857B	N/A	0.00	CR			633869.828	26920781.131	603.618	$3,000	01/01/1993	25	75	49	$1,964	$4,539	1	1	0.0	0.0	1.0	1.0	2.0	2
1893	Sanitary MH	SAMH_3824A	N/A					633850.260	26920819.829	0.000	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	1.0	1.1	1.1
1894	Sanitary MH	SAMH_3842	N/A	0.00	CR			634115.964	26918951.019	605.444	$3,500	01/01/1998	20	75	54	$2,525	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1895	Sanitary MH	SAMH_4108	N/A	0.00			FILLED TO TOP W WATER	626832.585	26926460.649	591.852	$3,500	01/01/1976	42	75	32	$1,497	$6,017	1	1	0.0	0.0	1.0	2.0	1.1	2.2

CITY OF SAULT STE. MARIE, MICHIGAN

Summary

id	Equipment Description	Asset ID	Construction Drawings Sheet Reference	Capacity or Size	Material	Length	Comment	Northing State Plane Ordinate	Easting State Plane Ordinate	Elevation	Original Cost	Year Installed (01/01/YYYY)	Age	Expected useful life (years)	Remaining Useful Life (years)	Depreciated Value	Replacement Cost	Average number of units in service	Total Number of units	Redundancy (Number)	Redundancy (percent)	Redundancy Score (R) (Reduces (C))	Criticality (C) (see back-up sheets)	Probability of Failure (P) (see back-up sheets)	Business Risk (BRE=PxCxR)
1896	Sanitary MH	SAMH_1507	N/A	0.00	CR			625709.023	26908724.392	700.019	$2,000	01/01/1966	52	75	22	$589	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
1897	Sanitary MH	SAMH_1505	N/A	0.00	CR			625886.269	26908722.727	698.985	$2,000	01/01/1970	48	75	26	$695	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
1898	Sanitary MH	SAMH_1503	N/A	0.00	CR			625699.728	26908401.489	697.744	$2,000	01/01/1966	52	75	22	$589	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
1899	Stormwater MH	SAMH_1502	N/A	0.00	CR			625690.625	26908075.539	691.920	$2,000	01/01/1966	52	75	22	$589	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
1900	Sanitary MH	SAMH_1501	N/A	0.00				625685.695	26907833.938	697.376	$3,000	01/01/1966	52	75	22	$883	$6,017	1	1	0.0	0.0	1.0	2.0	1.1	2.2
1901	Sanitary MH	SAMH_1524	N/A	0.00	CR			625385.406	26908733.305	699.925	$3,000	01/01/1966	52	75	22	$883	$6,017	1	1	0.0	0.0	1.0	1.0	1.0	1
1902	Sanitary MH	SAMH_1538	N/A	0.00	ZZZ			625081.124	26909667.277	702.131	$2,000	01/01/1966	52	75	22	$589	$5,092	1	1	0.0	0.0	1.0	2.0	1.2	2.4
1903	Sanitary MH	SAMH_1539	N/A	0.00	CR			625074.190	26909400.773	701.254	$2,000	01/01/1966	52	75	22	$589	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
1904	Sanitary MH	SAMH_1540	N/A	0.00	CR			625064.450	26909080.385	700.716	$2,000	01/01/1966	52	75	22	$589	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
1905	Sanitary MH	SAMH_1541	N/A	0.00	CR			625054.220	26908743.212	700.421	$3,000	01/01/1966	52	75	22	$883	$6,017	1	1	0.0	0.0	1.0	2.0	1.0	2
1906	Sanitary MH	SAMH_1545	N/A	0.00	CR			624724.462	26908752.704	699.534	$2,000	01/01/1966	52	75	22	$589	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
1907	Sanitary MH	SAMH_1542	N/A	0.00	CR			624725.661	26908140.633	696.722	$3,000	01/01/1994	24	75	50	$2,004	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
1908	Sanitary MH	SAMH_1543	N/A	0.00	CR			624727.535	26908312.568	698.226	$3,500	01/01/1994	24	75	50	$2,338	$5,092	1	1	0.0	0.0	1.0	3.0	1.0	3
1909	Sanitary MH	SAMH_1544	N/A	0.00	CR			624734.728	26908612.348	698.641	$3,500	01/01/1994	24	75	50	$2,338	$5,092	1	1	0.0	0.0	1.0	3.0	1.0	3
1910	Sanitary MH	SAMH_1549	N/A	0.00	CR			624517.644	26908766.964	699.233	$3,500	01/01/1994	24	75	50	$2,338	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
1911	Sanitary MH	SAMH_1550	N/A	0.00	CR			624522.579	26909110.747	699.438	$3,500	01/01/1994	24	75	50	$2,338	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
1912	Sanitary MH	SAMH_1547	N/A	0.00	CR			624741.865	26909376.925	701.697	$2,000	01/01/1966	52	75	22	$589	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
1913	Sanitary MH	SAMH_1546	N/A	0.00	CR			624736.078	26909246.634	702.133	$2,000	01/01/1966	52	75	22	$589	$5,092	1	1	0.0	0.0	1.0	3.0	1.0	3
1914	Sanitary MH	SAMH_1548	N/A	0.00	CR			624746.452	26909543.826	702.643	$2,500	01/01/1976	42	75	32	$1,069	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
1915	Sanitary MH	SAMH_1536	N/A	0.00				624748.020	26910087.364	703.269	$2,500	01/01/1976	42	75	32	$1,069	$5,092	1	1	0.0	0.0	1.0	1.0	1.1	1.1
1916	Sanitary MH	SAMH_1612	N/A	0.00	CR			628738.067	26913020.643	715.192	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	2.0	1.2	2.4
1917	Sanitary MH	SAMH_1537A	N/A	0.00	CR			625404.719	26909979.043	701.803	$2,000	01/01/1966	52	75	22	$589	$5,092	1	1	0.0	0.0	1.0	2.0	2.0	4
1918	Sanitary MH	SAMH_1551	N/A	0.00	CR			624416.548	26909297.659	699.870	$4,000	01/01/2008	10	75	64	$3,419	$5,092	1	1	0.0	0.0	1.0	3.0	1.0	3
1919	Sanitary MH	SAMH_1561	N/A	0.00	ZZZ			624257.758	26909021.547	699.463	$2,500	01/01/1974	44	75	30	$1,003	$5,092	1	1	0.0	0.0	1.0	2.0	2.0	4
1920	Sanitary MH	SAMH_1560	N/A	0.00	BR			623752.062	26908713.679	700.236	$2,000	01/01/1974	44	75	30	$802	$4,539	1	1	0.0	0.0	1.0	1.0	3.0	3
1921	Sanitary MH	SAMH_1559	N/A	0.00	CR			623742.179	26908530.179	699.980	$3,500	01/01/1994	24	75	50	$2,338	$5,092	1	1	0.0	0.0	1.0	3.0	1.0	3
1922	Sanitary MH	SAMH_1558	N/A	0.00	CR			623524.290	26908193.553	701.223	$3,500	01/01/1994	24	75	50	$2,338	$5,092	1	1	0.0	0.0	1.0	3.0	1.0	3
1923	Sanitary MH	SAMH_0801	N/A	0.00	CR			623458.337	26907548.723	700.820	$3,500	01/01/1994	24	75	50	$2,338	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
1924	Sanitary MH	SAMH_0802	N/A	0.00	CR			623447.373	26907524.668	699.695	$3,000	01/01/1994	24	75	50	$2,004	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
1925	Sanitary MH	SAMH_0711	N/A	0.00	CR			623300.233	26906858.980	705.996	$4,000	01/01/2001	17	75	57	$3,046	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
1926	Sanitary MH	SAMH_0712	N/A	0.00	CR			623312.309	26907037.896	702.452	$4,000	01/01/2001	17	75	57	$3,046	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
1927	Sanitary MH	SAMH_0713	N/A	0.00	CR			623296.487	26907068.286	702.423	$4,000	01/01/2001	17	75	57	$3,046	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
1928	Sanitary MH	SAMH_0714	N/A	0.00	CR		Incomplete Inspection Still Need Component Assessment	623299.764	26907118.117	703.911	$3,500	01/01/1998	20	75	54	$2,525	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
1929	Sanitary MH	SAMH_0715	N/A	0.00	CR			623309.876	26907501.829	701.806	$3,500	01/01/1998	20	75	54	$2,525	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
1930	Sanitary MH	SAMH_0716	N/A	0.00	CR			623319.959	26907712.844	702.941	$3,500	01/01/1998	20	75	54	$2,525	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
1931	Sanitary MH	SAMH_0718	N/A	0.00	CR			623308.670	26907787.107	703.037	$3,500	01/01/1996	22	75	52	$2,431	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
1932	Sanitary MH	SAMH_0719	N/A	0.00	CR			623314.401	26907895.947	703.569	$3,500	01/01/1994	24	75	50	$2,338	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
1933	Sanitary MH	SAMH_0721	N/A	0.00	CR			623314.304	26908000.597	703.952	$3,500	01/01/1998	20	75	54	$2,525	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1934	Sanitary MH	SAMH_0720	N/A	0.00	CR			623358.128	26908005.572	703.408	$3,500	01/01/1994	24	75	50	$2,338	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
1935	Sanitary MH	SAMH_0800	N/A	0.00	CR			623483.142	26907963.378	701.445	$3,500	01/01/1994	24	75	50	$2,338	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
1936	Sanitary MH	SAMH_0800A	N/A	0.00	CR			623466.606	26907886.078	701.191	$3,500	01/01/1994	24	75	50	$2,338	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
1937	Sanitary MH	SAMH_0803	N/A	0.00	CR			623471.048	26907089.177	703.528	$3,000	01/01/1994	24	75	50	$2,004	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
1938	Sanitary MH	SAMH_2000	N/A	0.00	CR			633952.708	26907867.312	636.074	$2,700	01/01/1960	58	75	16	$579	$5,767	1	1	0.0	0.0	1.0	3.0	1.0	3
1939	Sanitary MH	SAMH_2012	N/A	0.00	CR			635603.354	26910025.190	615.160	$3,500	01/01/2009	9	75	65	$3,038	$4,539	1	1	0.0	0.0	1.0	4.0	1.0	4
1940	Sanitary MH	SAMH_2011	N/A	0.00	CR			635565.899	26909817.928	617.641	$4,000	01/01/2009	9	75	65	$3,473	$5,092	1	1	0.0	0.0	1.0	4.0	1.0	4
1941	Sanitary MH	SAMH_2010	N/A	0.00	CR			635462.942	26909589.774	616.208	$3,500	01/01/2009	9	75	65	$3,038	$4,539	1	1	0.0	0.0	1.0	4.0	1.0	4
1942	Sanitary MH	SAMH_2009	N/A	0.00	CR			635276.498	26909244.205	618.917	$3,500	01/01/2009	9	75	65	$3,038	$4,539	1	1	0.0	0.0	1.0	4.0	1.0	4
1943	Sanitary MH	SAMH_2008	N/A	0.00	CR			635108.115	26909033.350	621.106	$3,500	01/01/2009	9	75	65	$3,038	$4,539	1	1	0.0	0.0	1.0	4.0	1.0	4
1944	Sanitary MH	SAMH_2007	N/A	0.00	CR			634783.624	26908821.574	627.237	$4,000	01/01/2009	9	75	65	$3,473	$5,092	1	1	0.0	0.0	1.0	4.0	1.0	4
1945	Sanitary MH	SAMH_2003	N/A	0.00	ZZZ			634377.829	26908506.281	636.786	$2,000	01/01/1939	79	75	0	$0	$6,017	1	1	0.0	0.0	1.0	3.0	1.0	3
1946	Sanitary MH	SAMH_2002	N/A	0.00	CR			634196.034	26908220.807	637.907	$2,000	01/01/1939	79	75	0	$0	$6,017	1	1	0.0	0.0	1.0	3.0	1.0	3
1947	Sanitary MH	SAMH_1802	N/A	0.00				633474.785	26909040.002	675.473	$3,000	01/01/1969	49	75	25	$1,003	$6,017	1	1	0.0	0.0	1.0	3.0	1.1	3.3
1948	Sanitary MH	SAMH_1827	N/A	0.00	BR			632604.652	26909906.043	702.181	$2,000	01/01/1979	39	75	35	$935	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
1949	Sanitary MH	SAMH_1826	N/A	0.00	BR			632693.262	26909452.216	699.313	$1,000	01/01/1950	68	75	6	$81	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
1950	Sanitary MH	SAMH_1824	N/A	0.00	CN			632614.829	26909003.348	695.517	$5,000	01/01/2000	18	75	56	$3,740	$6,017	1	1	0.0	0.0	1.0	1.0	1.0	1
1951	Sanitary MH	SAMH_2207	N/A	0.00	CR			637131.706	26910064.349	615.754	$5,000	01/01/2004	14	75	60	$4,007	$6,017	1	1	0.0	0.0	1.0	2.0	1.0	2
1952	Sanitary MH	SAMH_2208	N/A	0.00	CR			637148.556	26910360.270	612.690	$4,000	01/01/2004	14	75	60	$3,206	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
1953	Sanitary MH	SAMH_2201	N/A	0.00	CR			636877.752	26909100.529	610.106	$3,500	01/01/2004	14	75	60	$2,805	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
1954	Sanitary MH	SAMH_2202	N/A	0.00	CR			636803.955	26909422.505	611.221	$3,500	01/01/2004	14	75	60	$2,805	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
1955	Sanitary MH	SAMH_2203	N/A	0.00	CR			636862.335	26909775.102	610.656	$4,000	01/01/2004	14	75	60	$3,206	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
1956	Sanitary MH	SAMH_2204	N/A	0.00	CR			636919.771	26909826.541	611.072	$4,000	01/01/2004	14	75	60	$3,206	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
1957	Sanitary MH	SAMH_2205	N/A	0.00	CR			637167.393	26909542.982	609.708	$3,500	01/01/2004	14	75	60	$2,805	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
1958	Sanitary MH	SAMH_1820	N/A	0.00	CR			633128.608	26910506.293	705.917	$1,000	01/01/1950	68	75	6	$81	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
1959	Sanitary MH	SAMH_1819	N/A	0.00	BR			633032.922	26910401.484	704.252	$1,000	01/01/1950	68	75	6	$81	$4,539	1	1	0.0	0.0	1.0	3.0	2.0	6
1960	Sanitary MH	SAMH_1818	N/A	0.00	BR			633057.241	26909884.170	701.148	$3,000	01/01/1998	20	75	54	$2,164	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
1961	Sanitary MH	SAMH_1817	N/A	0.00	CR			633352.486	26909851.478	696.684	$3,000	01/01/1998	20	75	54	$2,164	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
1962	Sanitary MH	SAMH_1816	N/A	0.00	CN			633575.031	26909835.614	696.050	$3,000	01/01/1998	20	75	54	$2,164	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
1963	Sanitary MH	SAMH_1807	N/A	0.00	CR			633567.598	26909538.432	697.279	$3,500	01/01/1998	20	75	54	$2,525	$5,092	1	1	0.0	0.0	1.0	3.0	2.0	6
1964	Sanitary MH	SAMH_1808	N/A	0.00	CN			633843.620	26909768.519	694.720	$2,500	01/01/1988	30	75	44	$1,470	$4,539	1	1	0.0	0.0	1.0	2.0	2.0	4
1965	Sanitary MH	SAMH_1810	N/A	0.00	BR			633840.734	26910281.581	697.915	$1,000	01/01/1950	68	75	6	$81	$4,539	1	1	0.0	0.0	1.0	2.0	2.0	4
1966	Sanitary MH	SAMH_1812	N/A	0.00	CN			633634.551	26910499.169	700.010	$1,000	01/01/1950	68	75	6	$81	$4,539	1	1	0.0	0.0	1.0	2.0	3.0	6
1967	Sanitary MH	SAMH_1828	N/A	0.00	BR			632578.644	26910206.813	704.926	$1,000	01/01/1950	68	75	6	$81	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
1968	Sanitary MH	SAMH_1825	N/A	0.00				632696.824	26909342.972	698.247	$1,500	01/01/1950	68	75	6	$121	$5,092	1	1	0.0	0.0	1.0	3.0	1.1	3.3
1969	Sanitary MH	SAMH_1823	N/A	0.00	CR			632965.499	26909380.881	696.484	$1,000	01/01/1950	68	75	6	$81	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
1970	Sanitary MH	SAMH_1822	N/A	0.00				633113.079	26909191.169	688.028	$3,500	01/01/1995	23	75	51	$2,385	$5,092	1	1	0.0	0.0	1.0	3.0	1.1	3.3
1971	Sanitary MH	SAMH_1821	N/A	0.00	CR			633283.883	26909135.210	677.977	$3,000	01/01/1995	23	75	51	$2,044	$4,539	1	1	0.0	0.0	1.0	3.0	2.0	6
1972	Sanitary MH	SAMH_1803	N/A	0.00	CR			633475.450	26909125.801	677.026	$3,500	01/01/1995	23	75	51	$2,385	$5,092	1	1	0.0	0.0	1.0	3.0	2.0	6
1973	Sanitary MH	SAMH_1804	N/A	0.00	CR			633483.760	26909419.439	680.179	$3,000	01/01/1995	23	75	51	$2,044	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
1974	Sanitary MH	SAMH_1805	N/A	0.00	CR			633498.356	26909473.774	693.543	$3,500	01/01/1995	23	75	51	$2,385	$5,092	1	1	0.0	0.0	1.0	3.0	2.0	6
1975	Sanitary MH	SAMH_1806	N/A	0.00	BR			633565.056	26909485.601	695.378	$4,500	01/01/1998	20	75	54	$3,246	$6,017	1	1	0.0	0.0	1.0	3.0	2.0	6
1976	Sanitary MH	SAMH_1800	N/A	0.00	CR			633843.073	26908922.955	645.841	$1,500	01/01/1969	49	75	25	$501	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
1977	Sanitary MH	SAMH_2005	N/A	0.00	CN			634205.895	26908831.226	638.082	$4,000	01/01/2011	7	75	67	$3,579	$4,539	1	1	0.0	0.0	1.0	3.0	2.0	6
1978	Sanitary MH	SAMH_2206	N/A	0.00				637124.617	26909889.204	611.802	$4,000	01/01/2004	14	75	60	$3,206	$5,092	1	1	0.0	0.0	1.0	2.0	1.1	2.2
1979	Sanitary MH	SAMH_1701	N/A	0.00	CR			631410.699	26910448.802	713.510	$4,000	01/01/1988	30	75	44	$2,352	$6,017	1	1	0.0	0.0	1.0	1.0	1.0	1
1980	Sanitary MH	SAMH_1170	N/A	0.00	CN			633190.086	26907169.200	633.864	$2,500	01/01/1974	44	75	30	$1,003	$5,092	1	1	0.0	0.0	1.0	3.0	2.0	6
1981	Sanitary MH	SAMH_1169	N/A	0.00	CN			633222.588	26907173.716	633.714	$3,000	01/01/1980	38	75	36	$1,443	$5,092	1	1	0.0	0.0	1.0	3.0	2.0	6
1982	Sanitary MH	SAMH_1162	N/A	0.00	CN			633416.974	26907159.173	636.622	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
1983	Sanitary MH	SAMH_1163	N/A	0.00	CN			633603.047	26907163.400	637.721	$3,000	01/01/1980	38	75	36	$1,443	$5,092	1	1	0.0	0.0	1.0	3.0	2.0	6
1984	Sanitary MH	SAMH_1153	N/A	0.00	CN			633619.238	26907145.413	638.251	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	3.0	3.0	9
1985	Sanitary MH	SAMH_1164	N/A	0.00	CN			633758.771	26907482.180	636.023	$3,000	01/01/1980	38	75	36	$1,443	$5,092	1	1	0.0	0.0	1.0	3.0	3.0	9
1986	Sanitary MH	SAMH_1165	N/A	0.00	CR			633834.680	26907638.550	635.463	$3,000	01/01/1980	38	75	36	$1,443	$5,092	1	1	0.0	0.0	1.0	3.0	1.0	3
1987	Sanitary MH	SAMH_1167	N/A	0.00	CR			633895.969	26907793.747	634.994	$3,000	01/01/1980	38	75	36	$1,443	$5,092	1	1	0.0	0.0	1.0	3.0	1.0	3
1988	Sanitary MH	SAMH_1160	N/A	0.00	CR			633222.654	26906530.806	638.695	$3,000	01/01/1980	38	75	36	$1,443	$5,092	1	1	0.0	0.0	1.0	3.0	1.0	3
1989	Sanitary MH	SAMH_1158	N/A	0.00			1032	633027.146	26906194.484	639.947	$3,000	01/01/1980	38	75	36	$1,443	$5,092	1	1	0.0	0.0	1.0	3.0	1.0	3
1990	Sanitary MH	SAMH_1157	N/A	0.00	CR			632830.288	26905860.597	640.376	$3,000	01/01/1980	38	75	36	$1,443	$5,092	1	1	0.0	0.0	1.0	3.0	2.0	6
1991	Sanitary MH	SAMH_1156	N/A	0.00	CN			632641.394	26905526.632	641.560	$3,000	01/01/1980	38	75	36	$1,443	$5,092	1	1	0.0	0.0	1.0	3.0	3.0	9
1992	Sanitary MH	SAMH_1155	N/A	0.00	CR			632491.057	26905280.092	643.449	$3,000	01/01/1980	38	75	36	$1,443	$5,092	1	1	0.0	0.0	1.0	3.0	2.0	6
1993	Sanitary MH	SAMH_1146	N/A	0.00	BR			632534.020	26905224.529	643.484	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	2.0	3.0	6
1994	Sanitary MH	SAMH_1147	N/A	0.00	BR			632736.421	26905566.202	641.867	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
1995	Sanitary MH	SAMH_1148	N/A	0.00	BR			632969.735	26905950.825	640.059	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	2.0	2.0	4
1996	Sanitary MH	SAMH_1150	N/A	0.00	CR		1124	633153.564	26906210.921	639.345	$3,500	01/01/1998	20	75	54	$2,525	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
1997	Sanitary MH	SAMH_1151	N/A	0.00	BR			633201.048	26906333.371	639.444	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	2.0	2.0	4
1998	Sanitary MH	SAMH_1152	N/A	0.00	CN			633387.996	26906673.284	639.706	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	3.0	2.0	6
1999	Sanitary MH	SAMH_1171	N/A	0.00	CN			632891.520	26907180.074	638.635	$2,500	01/01/1974	44	75	30	$1,003	$5,092	1	1	0.0	0.0	1.0	3.0	2.0	6
2000	Sanitary MH	SAMH_1173	N/A	0.00	CN			632844.472	26906499.653	638.822	$2,500	01/01/1974	44	75	30	$1,003	$5,092	1	1	0.0	0.0	1.0	3.0	2.0	6
2001	Sanitary MH	SAMH_1172	N/A	0.00	S			632873.026	26906497.490	638.294	$2,500	01/01/1974	44	75	30	$1,003	$5,092	1	1	0.0	0.0	1.0	3.0	2.0	6
2002	Sanitary MH	SAMH_1174	N/A	0.00	CN			632642.124	26906506.041	639.440	$2,500	01/01/1974	44	75	30	$1,003	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2003	Sanitary MH	SAMH_1175	N/A	0.00	CN			632411.585	26906514.906	639.526	$2,500	01/01/1974	44	75	30	$1,003	$5,092	1	1	0.0	0.0	1.0	2.0	2.0	4
2004	Sanitary MH	SAMH_1176	N/A	0.00	CN			632349.160	26906457.953	639.811	$2,500	01/01/1974	44	75	30	$1,003	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2005	Sanitary MH	SAMH_1177	N/A	0.00	CR			632303.462	26906384.238	638.582	$2,500	01/01/1974	44	75	30	$1,003	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2006	Sanitary MH	SAMH_1180	N/A	0.00	CR			632018.959	26905927.574	639.914	$2,000	01/01/1974	44	75	30	$802	$4,539	1	1	0.0	0.0	1.0	2.0	2.0	4
2007	Sanitary MH	SAMH_1181	N/A	0.00	CR			631933.386	26905878.834	639.542	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	1.0	2.0	2
2008	Sanitary MH	SAMH_1182	N/A	0.00	CR			631684.634	26905889.247	639.778	$2,000	01/01/1974	44	75	30	$802	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2009	Sanitary MH	SAMH_1183	N/A	0.00	CR		IN DRIVEWAY	631435.247	26905896.867	638.765	$2,000	01/01/1974	44	75	30	$802	$4,539	1	1	0.0	0.0	1.0	1.0	2.0	2
2010	Sanitary MH	SAMH_1179	N/A	0.00	CR			632174.198	26906170.628	638.699	$2,000	01/01/1974	44	75	30	$802	$4,539	1	1	0.0	0.0	1.0	2.0	2.0	4
2011	Sanitary MH	SAMH_1185	N/A	0.00	CN			632663.525	26906190.349	641.253	$2,500	01/01/1974	44	75	30	$1,003	$5,092	1	1	0.0	0.0	1.0	3.0	2.0	6
2012	Sanitary MH	SAMH_1186	N/A	0.00	CN			632485.668	26905888.586	643.272	$2,500	01/01/1974	44	75	30	$1,003	$5,092	1	1	0.0	0.0	1.0	3.0	2.0	6
2013	Sanitary MH	SAMH_1187	N/A	0.00	CN			632368.053	26905683.452	641.125	$3,000	01/01/1980	38	75	36	$1,443	$5,092	1	1	0.0	0.0	1.0	2.0	2.0	4
2014	Sanitary MH	SAMH_1188	N/A	0.00	CN			632303.392	26905584.824	640.738	$3,000	01/01/1980	38	75	36	$1,443	$5,092	1	1	0.0	0.0	1.0	2.0	2.0	4
2015	Sanitary MH	SAMH_1189	N/A	0.00	CN			632285.205	26905571.723	642.480	$2,500	01/01/1974	44	75	30	$1,003	$5,092	1	1	0.0	0.0	1.0	3.0	2.0	6
2016	Sanitary MH	SAMH_1190	N/A	0.00	CN			632090.787	26905605.524	640.517	$3,000	01/01/1980	38	75	36	$1,443	$5,092	1	1	0.0	0.0	1.0	3.0	2.0	6
2017	Sanitary MH	SAMH_1168	N/A	0.00	CR			633215.634	26906811.560	637.478	$3,000	01/01/1980	38	75	36	$1,443	$5,092	1	1	0.0	0.0	1.0	3.0	2.0	6
2018	Sanitary MH	SAMH_1161	N/A	0.00				633214.766	26906769.187	637.474	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	3.0	1.1	3.3
2019	Sanitary MH	SAMH_1145	N/A	0.00	CR			631829.472	26905248.882	639.265	$3,000	01/01/1980	38	75	36	$1,443	$5,092	1	1	0.0	0.0	1.0	3.0	2.0	6
2020	Sanitary MH	SAMH_1144	N/A	0.00	ZZZ			631850.629	26905232.216	639.121	$2,500	01/01/1980	38	75	36	$1,203	$4,539	1	1	0.0	0.0	1.0	3.0	2.0	6
2021	Sanitary MH	SAMH_1140	N/A	0.00	BR			632179.083	26905224.373	643.282	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	2.0	2.0	4
2022	Sanitary MH	SAMH_1143	N/A	0.00	BR			631831.847	26904920.617	638.719	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
2023	Sanitary MH	SAMH_1142	N/A	0.00	BR			631815.207	26904589.603	643.703	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
2024	Sanitary MH	SAMH_1137	N/A	0.00	BR			632140.532	26904581.357	644.397	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2025	Sanitary MH	SAMH_1134	N/A	0.00	BR			632303.762	26904574.760	645.122	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2026	Sanitary MH	SAMH_1133	N/A	0.00	BR			632278.651	26904136.346	647.874	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	1.0	3.0	3
2027	Sanitary MH	SAMH_1136	N/A	0.00	BR			632117.103	26904201.715	646.428	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	1.0	3.0	3
2028	Sanitary MH	SAMH_1138	N/A	0.00	BR			632171.941	26904915.042	642.198	$1,500	01/01/1950	68	75	6	$121	$5,092	1	1	0.0	0.0	1.0	1.0	2.0	2
2029	Sanitary MH	SAMH_1139	N/A	0.00	BR			632160.083	26904909.802	642.144	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2030	Sanitary MH	SAMH_1135	N/A	0.00	BR			632323.622	26904908.607	644.341	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	1.0	2.0	2
2031	Sanitary MH	SAMH_1113	N/A	0.00	BR			632505.278	26904878.545	644.067	$1,500	01/01/1961	57	75	17	$341	$4,539	1	1	0.0	0.0	1.0	3.0	2.0	6
2032	Sanitary MH	SAMH_1114	N/A	0.00				632504.729	26904910.073	644.266	$4,500	01/01/2010	8	75	66	$3,967	$5,092	1	1	0.0	0.0	1.0	1.0	1.1	1.1
2033	Sanitary MH	SAMH_1126	N/A	0.00	BR			631447.192	26903950.686	699.198	$1,000	01/01/1950	68	75	6	$81	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2034	Sanitary MH	SAMH_1125	N/A	0.00	BR			631773.479	26903937.295	698.166	$1,500	01/01/1950	68	75	6	$121	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2035	Sanitary MH	SAMH_1124	N/A	0.00	BR			632086.907	26903923.277	697.374	$1,000	01/01/1950	68	75	6	$81	$4,539	1	1	0.0	0.0	1.0	1.0	2.0	2
2036	Sanitary MH	SAMH_1129	N/A	0.00	CR			631465.970	26904281.186	695.558	$1,000	01/01/1950	68	75	6	$81	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
2037	Sanitary MH	SAMH_0617	N/A	0.00	CR			631847.551	26898549.750	621.106	$3,000	01/01/1996	22	75	52	$2,084	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2038	Sanitary MH	SAMH_1760	N/A	0.00				629440.890	26911875.480	721.264	$1,000	01/01/1950	68	75	6	$81	$4,539	1	1	0.0	0.0	1.0	2.0	1.1	2.2
2039	Sanitary MH	SAMH_3754	N/A	48.00	CR			629164.192	26920930.371	629.365	$3,500	01/01/1994	24	75	50	$2,338	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2040	Sanitary MH	SAMH_1007	N/A	0.00	CN			631130.328	26904324.045	701.227	$4,000	01/01/2007	11	75	63	$3,366	$5,092	1	1	0.0	0.0	1.0	1.0	2.0	2
2041	Sanitary MH	SAMH_1131	N/A	0.00	BR			631135.288	26904293.965	701.897	$4,000	01/01/2007	11	75	63	$3,366	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2042	Sanitary MH	SAMH_1130	N/A	0.00	CR			631135.062	26904268.527	701.981	$4,000	01/01/2007	11	75	63	$3,366	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2043	Sanitary MH	SAMH_1132	N/A	0.00	CR			631162.568	26904293.711	702.012	$4,000	01/01/2007	11	75	63	$3,366	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2044	Sanitary MH	SAMH_1006	N/A	0.00	CN			631139.532	26904463.987	698.890	$3,500	01/01/2007	11	75	63	$2,945	$4,539	1	1	0.0	0.0	1.0	1.0	2.0	2
2045	Sanitary MH	SAMH_1005	N/A	0.00	CN			631116.019	26904499.927	698.460	$3,500	01/01/2007	11	75	63	$2,945	$4,539	1	1	0.0	0.0	1.0	1.0	3.0	3
2046	Sanitary MH	SAMH_1004	N/A	0.00	CN			630974.723	26904508.193	699.492	$3,500	01/01/2007	11	75	63	$2,945	$4,539	1	1	0.0	0.0	1.0	1.0	3.0	3

CITY OF SAULT STE. MARIE, MICHIGAN

Summary

id	Equipment Description	Asset ID	Construction Drawings Sheet Reference	Capacity or Size	Material	Length	Comment	Northing State Plane Ordinate	Easting State Plane Ordinate	Elevation	Original Cost	Year Installed (01/01/YYYY)	Age	Expected useful life (years)	Remaining Useful Life (years)	Depreciated Value	Replacement Cost	Average number of units in service	Total Number of units	Redundancy (Number)	Redundancy (percent)	Redundancy Score (R) (Reduces (C))	Criticality (C) (see back-up sheets)	Probability of Failure (P) (see back-up sheets)	Business Risk (BRE=PxCxR)
2047	Sanitary MH	SAMH_1128	N/A	0.00	BR			631793.568	26904253.288	661.674	$3,000	01/01/1991	27	75	47	$1,884	$4,539	1	1	0.0	0.0	1.0	3.0	2.0	6
2048	Sanitary MH	SAMH_1141	N/A	0.00	BR			631799.378	26904316.820	647.692	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
2049	Sanitary MH	SAMH_1112	N/A	0.00				632479.539	26904556.702	644.112	$1,500	01/01/1961	57	75	17	$341	$4,539	1	1	0.0	0.0	1.0	3.0	1.1	3.3
2050	Sanitary MH	SAMH_1111	N/A	0.00				632464.209	26904268.198	645.164	$1,500	01/01/1961	57	75	17	$341	$4,539	1	1	0.0	0.0	1.0	3.0	1.1	3.3
2051	Sanitary MH	SAMH_1110	N/A	0.00	BR			632444.242	26903891.347	647.046	$1,500	01/01/1961	57	75	17	$341	$4,539	1	1	0.0	0.0	1.0	3.0	2.0	6
2052	Sanitary MH	SAMH_1105	N/A	0.00	BR			632647.330	26905089.817	643.024	$1,000	01/01/1950	68	75	6	$81	$4,539	1	1	0.0	0.0	1.0	1.0	3.0	3
2053	Sanitary MH	SAMH_1104	N/A	0.00				632638.947	26904868.643	641.088	$1,000	01/01/1950	68	75	6	$81	$4,539	1	1	0.0	0.0	1.0	1.0	1.1	1.1
2054	Sanitary MH	SAMH_1103	N/A	0.00				632620.545	26904711.781	641.935	$1,000	01/01/1950	68	75	6	$81	$4,539	1	1	0.0	0.0	1.0	1.0	1.1	1.1
2055	Sanitary MH	SAMH_1102	N/A	0.00				632610.440	26904486.372	642.254	$1,000	01/01/1950	68	75	6	$81	$4,539	1	1	0.0	0.0	1.0	1.0	1.1	1.1
2056	Sanitary MH	SAMH_1101	N/A	0.00				632593.066	26904122.737	643.313	$1,000	01/01/1950	68	75	6	$81	$4,539	1	1	0.0	0.0	1.0	1.0	1.1	1.1
2057	Sanitary MH	SAMH_1127	N/A	0.00	BR			631112.341	26903964.101	701.936	$1,000	01/01/1950	68	75	6	$81	$4,539	1	1	0.0	0.0	1.0	1.0	3.0	3
2058	Sanitary MH	SAMH_1109	N/A	0.00	CR			632074.042	26903212.568	645.965	$2,500	01/01/1978	40	75	34	$1,136	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2059	Sanitary MH	SAMH_1108	N/A	0.00	CR			631810.776	26902996.966	639.151	$2,000	01/01/1978	40	75	34	$909	$4,539	1	1	0.0	0.0	1.0	1.0	3.0	3
2060	Sanitary MH	SAMH_1107	N/A	0.00	CR			631797.056	26902978.675	638.455	$2,000	01/01/1978	40	75	34	$909	$4,539	1	1	0.0	0.0	1.0	1.0	2.0	2
2061	Sanitary MH	SAMH_1106	N/A	0.00	CR			631617.513	26902828.885	636.723	$2,000	01/01/1978	40	75	34	$909	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2062	Sanitary MH	SAMH_1117	N/A	0.00	CR			631745.477	26903320.418	648.101	$2,500	01/01/1978	40	75	34	$1,136	$5,092	1	1	0.0	0.0	1.0	1.0	2.0	2
2063	Sanitary MH	SAMH_1116	N/A	0.00	CN			631844.863	26903310.403	647.358	$2,500	01/01/1978	40	75	34	$1,136	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2064	Sanitary MH	SAMH_1118	N/A	0.00	CN			631519.735	26903139.672	648.051	$2,500	01/01/1978	40	75	34	$1,136	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2065	Sanitary MH	SAMH_1119	N/A	0.00	CR			631280.698	26902939.327	646.431	$2,500	01/01/1978	40	75	34	$1,136	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2066	Sanitary MH	SAMH_1120	N/A	0.00	CR			631056.927	26902742.897	644.363	$2,500	01/01/1978	40	75	34	$1,136	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2067	Sanitary MH	SAMH_0647	N/A	0.00	CN			632243.444	26901302.258	622.747	$2,500	01/01/1978	40	75	34	$1,136	$5,092	1	1	0.0	0.0	1.0	3.0	2.0	6
2068	Sanitary MH	SAMH_0649	N/A	0.00	CN			631862.345	26901313.674	626.595	$2,500	01/01/1978	40	75	34	$1,136	$5,092	1	1	0.0	0.0	1.0	3.0	2.0	6
2069	Sanitary MH	SAMH_0650	N/A	0.00				631586.366	26901323.899	627.610	$2,500	01/01/1978	40	75	34	$1,136	$5,092	1	1	0.0	0.0	1.0	3.0	1.1	3.3
2070	Sanitary MH	SAMH_0651	N/A	0.00				631238.154	26901335.215	627.640	$2,500	01/01/1978	40	75	34	$1,136	$5,092	1	1	0.0	0.0	1.0	2.0	1.1	2.2
2071	Sanitary MH	SAMH_0514	N/A	0.00	CN			630895.253	26901337.366	626.815	$2,500	01/01/1978	40	75	34	$1,136	$5,092	1	1	0.0	0.0	1.0	2.0	2.0	4
2072	Sanitary MH	SAMH_0513	N/A	0.00	CN			630644.869	26901347.940	627.202	$2,500	01/01/1978	40	75	34	$1,136	$5,092	1	1	0.0	0.0	1.0	2.0	2.0	4
2073	Sanitary MH	SAMH_0645	N/A	0.00	CN			632621.818	26901293.046	614.356	$2,000	01/01/1978	40	75	34	$909	$4,539	1	1	0.0	0.0	1.0	3.0	2.0	6
2074	Sanitary MH	SAMH_0644	N/A	0.00	CN			632636.381	26901283.788	614.295	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
2075	Sanitary MH	SAMH_0643	N/A	0.00	CN			632634.306	26901260.377	614.354	$3,500	01/01/1978	40	75	34	$1,591	$6,017	1	1	0.0	0.0	1.0	3.0	2.0	6
2076	Sanitary MH	SAMH_0642	N/A	0.00				632618.102	26900972.984	614.734	$1,500	01/01/1961	57	75	17	$341	$4,539	1	1	0.0	0.0	1.0	3.0	1.1	3.3
2077	Sanitary MH	SAMH_0640	N/A	0.00	BR			632606.329	26900612.914	617.658	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2078	Sanitary MH	SAMH_0641	N/A	0.00	CN			632597.351	26900614.178	618.013	$2,000	01/01/1961	57	75	17	$455	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2079	Sanitary MH	SAMH_0639	N/A	0.00	BR			632592.212	26900309.319	617.916	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	1.0	3.0	3
2080	Sanitary MH	SAMH_0638	N/A	0.00	BR			632572.827	26899954.453	617.207	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	1.0	2.0	2
2081	Sanitary MH	SAMH_0635	N/A	0.00	BR			632391.425	26899960.572	618.785	$1,000	01/01/1950	68	75	6	$81	$4,539	1	1	0.0	0.0	1.0	1.0	1.2	1.2
2082	Sanitary MH	SAMH_0634	N/A	0.00	BR			632250.449	26900625.634	621.127	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	3.0	2.0	6
2083	Sanitary MH	SAMH_0637	N/A	0.00	BR			632425.515	26900619.627	619.338	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	1.0	2.0	2
2084	Sanitary MH	SAMH_0636	N/A	0.00				632408.045	26900281.813	618.970	$1,000	01/01/1950	68	75	6	$81	$4,539	1	1	0.0	0.0	1.0	1.0	1.1	1.1
2085	Sanitary MH	SAMH_0623	N/A	0.00	BR			631721.209	26899982.808	624.953	$1,500	01/01/1965	53	75	21	$421	$4,539	1	1	0.0	0.0	1.0	1.0	2.0	2
2086	Sanitary MH	SAMH_0633	N/A	0.00	CR			632069.604	26900633.138	623.185	$3,500	01/01/1991	27	75	47	$2,198	$5,092	1	1	0.0	0.0	1.0	3.0	1.0	3
2087	Sanitary MH	SAMH_0632	N/A	0.00				632056.746	26900312.608	622.971	$3,500	01/01/1991	27	75	47	$2,198	$5,092	1	1	0.0	0.0	1.0	3.0	1.1	3.3
2088	Sanitary MH	SAMH_0631	N/A	0.00				632044.654	26899996.909	622.622	$3,000	01/01/1991	27	75	47	$1,884	$4,539	1	1	0.0	0.0	1.0	3.0	1.1	3.3
2089	Sanitary MH	SAMH_0629	N/A	0.00	BR			631719.784	26900313.703	624.730	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2090	Sanitary MH	SAMH_0630	N/A	0.00				631732.235	26900637.701	626.450	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	1.0	1.1	1.1
2091	Sanitary MH	SAMH_0627	N/A	0.00				631398.890	26900659.057	628.309	$3,000	01/01/1996	22	75	52	$2,084	$4,539	1	1	0.0	0.0	1.0	1.0	1.1	1.1
2092	Sanitary MH	SAMH_0626	N/A	0.00				631390.016	26900341.675	627.165	$3,000	01/01/1996	22	75	52	$2,084	$4,539	1	1	0.0	0.0	1.0	1.0	1.1	1.1
2093	Sanitary MH	SAMH_0625	N/A	0.00	CR			631371.077	26900023.105	627.873	$3,500	01/01/1991	27	75	47	$2,198	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2094	Sanitary MH	SAMH_1003	N/A	0.00	BR			630806.713	26903974.981	703.122	$2,500	01/01/1976	42	75	32	$1,069	$5,092	1	1	0.0	0.0	1.0	1.0	4.0	4
2095	Sanitary MH	SAMH_1002	N/A	0.00	CR			630498.337	26903989.577	706.551	$2,500	01/01/1976	42	75	32	$1,069	$5,092	1	1	0.0	0.0	1.0	1.0	2.0	2
2096	Sanitary MH	SAMH_1001	N/A	0.00	BR			630188.197	26904001.910	712.279	$2,500	01/01/1976	42	75	32	$1,069	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2097	Sanitary MH	SAMH_0500	N/A	0.00	CR			629461.061	26897480.399	633.924	$3,500	01/01/1999	19	75	55	$2,571	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2098	Sanitary MH	SAMH_0501	N/A	0.00	CR			629789.604	26897463.363	632.533	$3,500	01/01/1999	19	75	55	$2,571	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2099	Sanitary MH	SAMH_0502	N/A	0.00	CR			630161.243	26897445.543	631.405	$3,500	01/01/1999	19	75	55	$2,571	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2100	Sanitary MH	SAMH_0503	N/A	0.00	CR			630517.845	26897423.433	625.436	$3,500	01/01/1999	19	75	55	$2,571	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2101	Sanitary MH	SAMH_0600	N/A	0.00	CR			630900.145	26897409.172	628.280	$3,500	01/01/1999	19	75	55	$2,571	$5,092	1	1	0.0	0.0	1.0	2.0	2.0	4
2102	Sanitary MH	SAMH_0601	N/A	0.00	CR			631241.139	26897400.094	624.577	$3,500	01/01/1999	19	75	55	$2,571	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2103	Sanitary MH	SAMH_0622	N/A	0.00	CR			631706.214	26899689.018	625.201	$1,500	01/01/1965	53	75	21	$421	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2104	Sanitary MH	SAMH_0621	N/A	0.00	CR			631694.826	26899501.576	626.479	$1,500	01/01/1965	53	75	21	$421	$4,539	1	1	0.0	0.0	1.0	1.0	2.0	2
2105	Sanitary MH	SAMH_0607	N/A	0.00	CN			632023.816	26897345.348	612.294	$3,500	01/01/1998	20	75	54	$2,525	$5,092	1	1	0.0	0.0	1.0	3.0	1.0	3
2106	Sanitary MH	SAMH_0602	N/A	0.00	CN			631601.039	26897396.944	618.380	$3,500	01/01/1998	20	75	54	$2,525	$5,092	1	1	0.0	0.0	1.0	2.0	2.0	4
2107	Sanitary MH	SAMH_0603A	N/A	0.00	CR			631413.269	26897098.897	618.786	$4,500	01/01/1991	27	75	47	$2,826	$6,017	1	1	0.0	0.0	1.0	1.0	1.0	1
2108	Sanitary MH	SAMH_0624	N/A	0.00				630927.291	26899996.238	628.785	$5,000	01/01/2000	18	75	56	$3,740	$6,017	1	1	0.0	0.0	1.0	1.0	1.1	1.1
2109	Sanitary MH	SAMH_0606	N/A	0.00				632019.412	26897300.381	612.448	$3,500	01/01/1998	20	75	54	$2,525	$5,092	1	1	0.0	0.0	1.0	3.0	1.1	3.3
2110	Sanitary MH	SAMH_1809	N/A	0.00	BR			633841.795	26909967.444	695.413	$1,000	01/01/1950	68	75	6	$81	$4,539	1	1	0.0	0.0	1.0	2.0	2.0	4
2111	Sanitary MH	SAMH_0504	N/A	0.00	CN			630385.270	26902629.656	650.371	$2,500	01/01/1978	40	75	34	$1,136	$5,092	1	1	0.0	0.0	1.0	1.0	1.2	1.2
2112	Sanitary MH	SAMH_0506	N/A	0.00	CN			630360.626	26902019.809	635.913	$2,500	01/01/1978	40	75	34	$1,136	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2113	Sanitary MH	SAMH_0507	N/A	0.00	CN			630349.001	26901766.146	635.682	$2,500	01/01/1978	40	75	34	$1,136	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2114	Sanitary MH	SAMH_0521	N/A	0.00	CR			631022.254	26902621.654	639.387	$2,500	01/01/1978	40	75	34	$1,136	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2115	Sanitary MH	SAMH_0518	N/A	0.00	CR			630829.521	26902179.607	634.557	$2,500	01/01/1978	40	75	34	$1,136	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2116	Sanitary MH	SAMH_0520	N/A	0.00				631012.130	26902486.804	635.130	$2,000	01/01/1978	40	75	34	$909	$4,539	1	1	0.0	0.0	1.0	2.0	1.1	2.2
2117	Sanitary MH	SAMH_0511	N/A	0.00	CN			630176.025	26901248.727	630.784	$2,500	01/01/1978	40	75	34	$1,136	$5,092	1	1	0.0	0.0	1.0	2.0	2.0	4
2118	Sanitary MH	SAMH_0510	N/A	0.00	CN			630032.263	26901430.604	635.784	$3,500	01/01/1978	40	75	34	$1,591	$6,017	1	1	0.0	0.0	1.0	2.0	2.0	4
2119	Sanitary MH	SAMH_0508	N/A	0.00	CN			630186.205	26901633.009	634.202	$2,500	01/01/1978	40	75	34	$1,136	$5,092	1	1	0.0	0.0	1.0	2.0	2.0	4
2120	Sanitary MH	SAMH_0509	N/A	0.00	CN			630020.194	26901499.716	632.576	$2,500	01/01/1978	40	75	34	$1,136	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2121	Sanitary MH	SAMH_0620	N/A	0.00	CN			631393.350	26898577.659	627.891	$3,500	01/01/1996	22	75	52	$2,431	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2122	Sanitary MH	SAMH_0619	N/A	0.00	CN			631437.380	26898223.498	628.717	$3,500	01/01/1996	22	75	52	$2,431	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2123	Sanitary MH	SAMH_0618	N/A	0.00	CN			631335.825	26897997.805	630.037	$3,500	01/01/1996	22	75	52	$2,431	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2124	Sanitary MH	SAMH_0611	N/A	0.00	CN			631283.774	26897786.958	628.474	$3,500	01/01/1996	22	75	52	$2,431	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2125	Sanitary MH	SAMH_0610	N/A	0.00	CN			631077.075	26897803.442	631.303	$3,000	01/01/1996	22	75	52	$2,084	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2126	Sanitary MH	SAMH_0609	N/A	0.00	CR			630993.615	26897765.701	631.407	$3,000	01/01/1996	22	75	52	$2,084	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2127	Sanitary MH	SAMH_0608	N/A	0.00	CN			630942.275	26897694.788	630.724	$3,000	01/01/1996	22	75	52	$2,084	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2128	Sanitary MH	SAMH_0612	N/A	0.00	CN			631622.738	26897764.377	621.503	$3,500	01/01/1996	22	75	52	$2,431	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2129	Sanitary MH	SAMH_0613	N/A	0.00	CN			631848.983	26897810.268	619.232	$3,000	01/01/1996	22	75	52	$2,084	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2130	Sanitary MH	SAMH_0614	N/A	0.00	CR			631929.658	26897996.256	619.514	$3,000	01/01/1996	22	75	52	$2,084	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2131	Sanitary MH	SAMH_0615	N/A	0.00	CR			631783.024	26898272.042	622.441	$3,500	01/01/1996	22	75	52	$2,431	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2132	Sanitary MH	SAMH_0616	N/A	0.00	CR			631806.558	26898423.735	621.547	$3,000	01/01/1996	22	75	52	$2,084	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2133	Sanitary MH	SAMH_3753	N/A	48.00	CR			629163.895	26920868.130	629.530	$3,500	01/01/1994	24	75	50	$2,338	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2134	Sanitary MH	SAMH_2230	N/A	0.00	CR			637214.331	26912462.062	607.722	$11,200	01/01/2010	8	75	66	$9,874	$12,194	1	1	0.0	0.0	1.0	2.0	1.0	2
2135	Sanitary MH	SAMH_3070	N/A	0.00	CR			636663.473	26917163.181	595.578	$5,200	01/01/2011	7	75	67	$4,653	$5,767	1	1	0.0	0.0	1.0	3.0	1.0	3
2136	Sanitary MH	SAMH_2214	N/A	0.00	CR			637594.766	26911003.758	607.422	$3,000	01/01/1995	23	75	51	$2,044	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
2137	Sanitary MH	SAMH_2215	N/A	0.00	CR			637631.123	26911286.030	607.597	$3,000	01/01/1995	23	75	51	$2,044	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
2138	Sanitary MH	SAMH_2216	N/A	0.00	CR			637643.791	26911400.666	607.109	$3,000	01/01/1995	23	75	51	$2,044	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
2139	Sanitary MH	SAMH_0710	N/A	0.00	CR			623198.913	26906790.878	706.673	$4,000	01/01/2001	17	75	57	$3,046	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2140	Sanitary MH	SAMH_0709	N/A	0.00	CR			623177.851	26906634.130	708.810	$4,000	01/01/2001	17	75	57	$3,046	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2141	Sanitary MH	SAMH_0708	N/A	0.00	CR		I	623199.590	26906493.613	709.400	$3,500	01/01/2001	17	75	57	$2,665	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
2142	Sanitary MH	SAMH_0707	N/A	0.00	CR			623215.549	26906289.530	717.880	$4,000	01/01/2001	17	75	57	$3,046	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2143	Sanitary MH	SAMH_0706	N/A	0.00	CR			623193.351	26906026.267	721.560	$5,000	01/01/2001	17	75	57	$3,807	$6,017	1	1	0.0	0.0	1.0	2.0	1.0	2
2144	Sanitary MH	SAMH_0705	N/A	0.00				623173.062	26905800.778	724.542	$5,000	01/01/2001	17	75	57	$3,807	$6,017	1	1	0.0	0.0	1.0	2.0	1.1	2.2
2145	Sanitary MH	SAMH_0704	N/A	0.00	CR			623283.231	26905775.640	731.736	$3,500	01/01/2001	17	75	57	$2,665	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
2146	Sanitary MH	SAMH_0703	N/A	0.00	CR			623274.210	26905372.139	732.955	$3,500	01/01/2001	17	75	57	$2,665	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
2147	Sanitary MH	SAMH_0702	N/A	0.00	CR			623272.257	26905096.735	733.436	$3,500	01/01/2001	17	75	57	$2,665	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
2148	Sanitary MH	SAMH_0701	N/A	0.00	CR			623330.817	26905078.576	733.777	$3,500	01/01/2001	17	75	57	$2,665	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
2149	Sanitary MH	SAMH_3122	N/A	0.00	CR			635228.475	26913937.818	613.513	$2,000	01/01/1960	58	75	16	$428	$5,092	1	1	0.0	0.0	1.0	4.0	1.0	4
2150	Sanitary MH	SAMH_3121	N/A	0.00	CR			635279.458	26913723.018	614.791	$3,000	01/01/1960	58	75	16	$643	$6,017	1	1	0.0	0.0	1.0	4.0	1.0	4
2151	Sanitary MH	SAMH_3142	N/A	0.00	CR			635269.041	26913681.363	614.959	$4,000	01/01/2003	15	75	59	$3,152	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2152	Sanitary MH	SAMH_3165	N/A	0.00	BR			634755.991	26914443.562	613.608	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	2.0	4.0	8
2153	Sanitary MH	SAMH_3166	N/A	0.00	BR			634497.835	26914316.001	614.900	$3,500	01/01/2004	14	75	60	$2,805	$4,539	1	1	0.0	0.0	1.0	2.0	4.0	8
2154	Sanitary MH	SAMH_3167	N/A	0.00	BR		1/2" ABOVE GRADE.SOUND FROM 3168 TRAVELED TO THIS MH. EITHER PIPE 2 O	634273.170	26914206.114	618.254	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	4.0	3.0	12
2155	Sanitary MH	SAMH_3176	N/A	0.00	CR			634131.214	26915058.728	615.128	$4,000	01/01/2004	14	75	60	$3,206	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2156	Sanitary MH	SAMH_3175	N/A	0.00				634158.723	26915005.448	614.908	$4,000	01/01/2004	14	75	60	$3,206	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2157	Sanitary MH	SAMH_2217	N/A	0.00	CR			637694.372	26911796.201	606.710	$3,000	01/01/1995	23	75	51	$2,044	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
2158	Sanitary MH	SAMH_2218	N/A	0.00				637745.466	26912204.757	606.255	$3,000	01/01/1995	23	75	51	$2,044	$4,539	1	1	0.0	0.0	1.0	3.0	1.1	3.3
2159	Sanitary MH	SAMH_2220	N/A	0.00	CR			637791.987	26912563.070	605.777	$3,500	01/01/1997	21	75	53	$2,478	$5,092	1	1	0.0	0.0	1.0	3.0	1.0	3
2160	Sanitary MH	SAMH_2219	N/A	0.00	CR			637775.510	26912525.820	606.057	$3,500	01/01/1997	21	75	53	$2,478	$5,092	1	1	0.0	0.0	1.0	3.0	1.0	3
2161	Sanitary MH	SAMH_2222	N/A	0.00	CR			637459.144	26912508.561	606.122	$4,500	01/01/2011	7	75	67	$4,027	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2162	Sanitary MH	SAMH_2223	N/A	0.00	CR			637420.400	26912503.345	606.163	$4,500	01/01/2011	7	75	67	$4,027	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2163	Sanitary MH	SAMH_2229	N/A	0.00	BR			637206.584	26912169.045	605.688	$3,000	01/01/1985	33	75	41	$1,644	$5,092	1	1	0.0	0.0	1.0	3.0	2.0	6
2164	Sanitary MH	SAMH_2228	N/A	0.00	BR			637201.052	26911899.460	605.816	$3,000	01/01/1985	33	75	41	$1,644	$5,092	1	1	0.0	0.0	1.0	3.0	2.0	6
2165	Sanitary MH	SAMH_2227	N/A	0.00	CN			637193.654	26911674.682	605.599	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	3.0	2.0	6
2166	Sanitary MH	SAMH_2226	N/A	0.00	CN			637187.615	26911450.314	606.201	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	3.0	2.0	6
2167	Sanitary MH	SAMH_2225	N/A	0.00	BR			637178.476	26911108.173	606.126	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	3.0	3.0	9
2168	Sanitary MH	SAMH_2224	N/A	0.00	CR			637170.327	26910759.381	606.714	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	3.0	2.0	6
2169	Sanitary MH	SAMH_2210	N/A	0.00	CR			637162.497	26910409.767	611.061	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	3.0	2.0	6
2170	Sanitary MH	SAMH_2211	N/A	0.00	CR			637328.656	26910490.969	610.068	$3,500	01/01/1995	23	75	51	$2,385	$5,092	1	1	0.0	0.0	1.0	3.0	1.0	3
2171	Sanitary MH	SAMH_3316	N/A	0.00	CR			636871.556	26916776.059	597.472	$5,500	01/01/2011	7	75	67	$4,922	$6,017	1	1	0.0	0.0	1.0	4.0	1.0	4
2172	Sanitary MH	SAMH_3315	N/A	0.00	CR			637028.501	26916443.263	599.105	$5,500	01/01/2011	7	75	67	$4,922	$6,017	1	1	0.0	0.0	1.0	4.0	1.0	4
2173	Sanitary MH	SAMH_3314	N/A	0.00	CR			637134.656	26916213.105	601.086	$5,500	01/01/2011	7	75	67	$4,922	$6,017	1	1	0.0	0.0	1.0	4.0	1.0	4
2174	Sanitary MH	SAMH_3313	N/A	0.00	CR			637184.980	26916099.642	602.358	$5,500	01/01/2011	7	75	67	$4,922	$6,017	1	1	0.0	0.0	1.0	4.0	1.0	4
2175	Sanitary MH	SAMH_3312	N/A	0.00	CR			637283.703	26915868.433	603.529	$5,500	01/01/2011	7	75	67	$4,922	$6,017	1	1	0.0	0.0	1.0	4.0	1.0	4
2176	Sanitary MH	SAMH_3311	N/A	0.00	CR			637367.367	26915666.456	602.997	$5,500	01/01/2011	7	75	67	$4,922	$6,017	1	1	0.0	0.0	1.0	4.0	1.0	4
2177	Sanitary MH	SAMH_3309	N/A	0.00	CR			637382.123	26915632.533	602.960	$5,500	01/01/2011	7	75	67	$4,922	$6,017	1	1	0.0	0.0	1.0	4.0	1.0	4
2178	Sanitary MH	SAMH_3308	N/A	0.00	CR			637474.230	26915413.193	598.660	$5,500	01/01/2011	7	75	67	$4,922	$6,017	1	1	0.0	0.0	1.0	4.0	1.0	4
2179	Sanitary MH	SAMH_3307	N/A	0.00	CR			637586.139	26914968.866	594.058	$4,500	01/01/2011	7	75	67	$4,027	$5,092	1	1	0.0	0.0	1.0	4.0	1.0	4
2180	Sanitary MH	SAMH_3306	N/A	0.00	CR			637660.507	26914658.675	594.012	$4,500	01/01/2011	7	75	67	$4,027	$5,092	1	1	0.0	0.0	1.0	4.0	1.0	4
2181	Sanitary MH	SAMH_3305	N/A	0.00	CR			637752.526	26914320.221	594.822	$4,500	01/01/2011	7	75	67	$4,027	$5,092	1	1	0.0	0.0	1.0	4.0	1.0	4
2182	Sanitary MH	SAMH_3325	N/A	0.00	CR			636982.058	26916000.456	605.100	$4,500	01/01/2011	7	75	67	$4,027	$5,092	1	1	0.0	0.0	1.0	3.0	1.0	3
2183	Sanitary MH	SAMH_3339	N/A	0.00	BR			636937.568	26914563.811	610.560	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2184	Sanitary MH	SAMH_3338	N/A	0.00	BR			636960.241	26914389.449	610.852	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	2.0	4.0	8
2185	Sanitary MH	SAMH_3337	N/A	0.00	BR		HARD TO TELL VISUALLY IF STORM OR SAN. NO FLOW. NO SOUND IN 3337 FRO	636991.327	26914154.162	611.832	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	2.0	4.0	8
2186	Sanitary MH	SAMH_3336	N/A	0.00	CR			637009.541	26914013.936	612.386	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2187	Sanitary MH	SAMH_3335	N/A	0.00	CR			637024.518	26913913.245	612.382	$5,500	01/01/2010	8	75	66	$4,848	$6,017	1	1	0.0	0.0	1.0	4.0	1.0	4
2188	Sanitary MH	SAMH_3334	N/A	0.00	CR			637067.737	26913578.233	609.360	$5,500	01/01/2010	8	75	66	$4,848	$6,017	1	1	0.0	0.0	1.0	4.0	1.0	4
2189	Sanitary MH	SAMH_3333	N/A	0.00	CR			637110.090	26913244.143	607.015	$5,500	01/01/2010	8	75	66	$4,848	$6,017	1	1	0.0	0.0	1.0	4.0	1.0	4
2190	Sanitary MH	SAMH_3329	N/A	0.00	CR			637158.549	26913258.472	606.624	$3,000	01/01/1997	21	75	53	$2,124	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
2191	Sanitary MH	SAMH_3332	N/A	0.00	CR			637136.345	26913045.517	605.327	$5,200	01/01/2010	8	75	66	$4,584	$5,767	1	1	0.0	0.0	1.0	2.0	1.0	2
2192	Sanitary MH	SAMH_2231	N/A	0.00	CR			637176.168	26912753.185	605.983	$4,500	01/01/2010	8	75	66	$3,967	$5,092	1	1	0.0	0.0	1.0	3.0	1.0	3
2193	Sanitary MH	SAMH_2221	N/A	0.00	CR			637826.320	26912836.517	605.387	$3,500	01/01/1997	21	75	53	$2,478	$5,092	1	1	0.0	0.0	1.0	3.0	1.0	3
2194	Sanitary MH	SAMH_3300	N/A	0.00	CR			637766.171	26913141.734	604.008	$3,500	01/01/1997	21	75	53	$2,478	$5,092	1	1	0.0	0.0	1.0	3.0	1.0	3
2195	Sanitary MH	SAMH_3301	N/A	0.00	CR			637709.462	26913445.097	603.751	$3,500	01/01/1997	21	75	53	$2,478	$5,092	1	1	0.0	0.0	1.0	3.0	1.0	3
2196	Sanitary MH	SAMH_3335B	N/A	0.00	CR			637541.597	26914199.579	603.056	$5,500	01/01/2010	8	75	66	$4,848	$6,017	1	1	0.0	0.0	1.0	3.0	1.0	3
2197	Sanitary MH	SAMH_3304	N/A	0.00	CR			637559.744	26914202.125	602.523	$5,500	01/01/2010	8	75	66	$4,848	$6,017	1	1	0.0	0.0	1.0	4.0	1.0	4

CITY OF SAULT STE. MARIE, MICHIGAN

Summary

id	Equipment Description	Asset ID	Construction Drawings Sheet Reference	Capacity or Size	Material	Length	Comment	Northing State Plane Ordinate	Easting State Plane Ordinate	Elevation	Original Cost	Year Installed (01/01/YYYY)	Age	Expected useful life (years)	Remaining Useful Life (years)	Depreciated Value	Replacement Cost	Average number of units in service	Total Number of units	Redundancy (Number)	Redundancy (percent)	Redundancy Score (R) (Reduces (C))	Criticality (C) (see back-up sheets)	Probability of Failure (P) (see back-up sheets)	Business Risk (BRE=PxCxR)
2198	Sanitary MH	SAMH_3317	N/A	0.00	CR			637411.966	26914547.914	604.397	$3,500	01/01/1997	21	75	53	$2,478	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2199	Sanitary MH	SAMH_3319	N/A	0.00	CR			637310.138	26914786.878	605.741	$3,500	01/01/1997	21	75	53	$2,478	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2200	Sanitary MH	SAMH_3330	N/A	0.00	CR			637244.186	26914864.800	606.078	$3,500	01/01/1994	24	75	50	$2,338	$5,092	1	1	0.0	0.0	1.0	4.0	1.0	4
2201	Sanitary MH	SAMH_3320	N/A	0.00	CR			637265.862	26914873.636	606.037	$4,500	01/01/2011	7	75	67	$4,027	$5,092	1	1	0.0	0.0	1.0	4.0	1.0	4
2202	Sanitary MH	SAMH_3321	N/A	0.00	CR			637188.845	26915058.266	605.817	$4,500	01/01/2011	7	75	67	$4,027	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2203	Sanitary MH	SAMH_3331	N/A	0.00	CR			636958.416	26914787.065	609.984	$3,500	01/01/1994	24	75	50	$2,338	$5,092	1	1	0.0	0.0	1.0	4.0	1.0	4
2204	Sanitary MH	SAMH_3347	N/A	0.00	CR			636826.382	26913858.321	612.242	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2205	Sanitary MH	SAMH_3346	N/A	0.00	CR			636849.497	26913561.464	617.316	$4,500	01/01/2010	8	75	66	$3,967	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2206	Sanitary MH	SAMH_3345	N/A	0.00	CR			636859.913	26913549.744	617.187	$5,500	01/01/2010	8	75	66	$4,848	$6,017	1	1	0.0	0.0	1.0	1.0	1.0	1
2207	Sanitary MH	SAMH_3343	N/A	0.00	CR			636892.400	26913018.178	615.240	$4,500	01/01/2011	7	75	67	$4,027	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2208	Sanitary MH	SAMH_3328	N/A	0.00	CR			637414.356	26913343.714	610.451	$3,500	01/01/1997	21	75	53	$2,478	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2209	Sanitary MH	SAMH_3323	N/A	0.00	CR			637002.153	26915471.016	606.244	$5,500	01/01/2011	7	75	67	$4,922	$6,017	1	1	0.0	0.0	1.0	2.0	1.0	2
2210	Sanitary MH	SAMH_2237	N/A	0.00	CR			636911.220	26912369.161	609.419	$4,500	01/01/2011	7	75	67	$4,027	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2211	Sanitary MH	SAMH_2238	N/A	0.00	CR			636893.424	26912395.393	609.599	$4,000	01/01/2011	7	75	67	$3,579	$4,539	1	1	0.0	0.0	1.0	2.0	2.0	4
2212	Sanitary MH	SAMH_2236	N/A	0.00	CR			636926.711	26912413.652	609.328	$4,500	01/01/2011	7	75	67	$4,027	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2213	Sanitary MH	SAMH_2235	N/A	0.00	CR			636906.341	26912189.134	609.896	$4,000	01/01/2015	3	75	71	$3,793	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
2214	Sanitary MH	SAMH_2232	N/A	0.00	CR			637042.136	26911447.020	606.398	$3,000	01/01/1985	33	75	41	$1,644	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2215	Sanitary MH	SAMH_2209	N/A	0.00	CR			636873.437	26910363.763	609.586	$3,500	01/01/1995	23	75	51	$2,385	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2216	Sanitary MH	SAMH_0700	N/A	0.00	CR			623334.225	26904937.141	735.537	$4,000	01/01/2001	17	75	57	$3,046	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2217	Sanitary MH	SAMH_2212	N/A	0.00	CR			637472.411	26910627.541	608.756	$3,500	01/01/1995	23	75	51	$2,385	$5,092	1	1	0.0	0.0	1.0	3.0	1.0	3
2218	Sanitary MH	SAMH_2213	N/A	0.00	CR			637561.722	26910805.983	607.472	$3,000	01/01/1995	23	75	51	$2,044	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
2219	Sanitary MH	SAMH_3118	N/A	0.00	CN			635348.671	26913050.668	617.627	$4,000	01/01/2003	15	75	59	$3,152	$5,092	1	1	0.0	0.0	1.0	3.0	2.0	6
2220	Sanitary MH	SAMH_3117	N/A	0.00	CR			635523.555	26913060.058	613.456	$2,000	01/01/1960	58	75	16	$428	$5,092	1	1	0.0	0.0	1.0	4.0	2.0	8
2221	Sanitary MH	SAMH_3136	N/A	0.00	BR			635022.818	26913063.269	620.977	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	2.0	3.0	6
2222	Sanitary MH	SAMH_3137	N/A	0.00	BR		1/4" ABOVE GRADE. DOES NOT CONNECT TO 3137A. 3137A IS A STORM MH. TI	634752.582	26913072.225	628.958	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	2.0	3.0	6
2223	Sanitary MH	SAMH_3154	N/A	0.00				634086.806	26913116.137	640.213	$2,000	01/01/1939	79	75	0	$0	$6,017	1	1	0.0	0.0	1.0	1.0	1.1	1.1
2224	Sanitary MH	SAMH_3153	N/A	0.00	BR			634308.441	26913224.877	627.556	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	1.0	3.0	3
2225	Sanitary MH	SAMH_3152	N/A	0.00	CR			634486.623	26913310.988	624.910	$4,000	01/01/2003	15	75	59	$3,152	$5,092	1	1	0.0	0.0	1.0	1.0	2.0	2
2226	Sanitary MH	SAMH_3139	N/A	0.00	CR			634683.396	26913229.772	625.373	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	1.0	2.0	2
2227	Sanitary MH	SAMH_3141	N/A	0.00	CR			635028.294	26913372.216	616.137	$4,000	01/01/2003	15	75	59	$3,152	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2228	Sanitary MH	SAMH_3138	N/A	0.00	CR			635028.282	26913219.769	617.372	$4,000	01/01/2003	15	75	59	$3,152	$5,092	1	1	0.0	0.0	1.0	1.0	2.0	2
2229	Sanitary MH	SAMH_3143	N/A	0.00	CR			635034.496	26913565.262	614.450	$4,000	01/01/2003	15	75	59	$3,152	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2230	Sanitary MH	SAMH_3147	N/A	0.00	CR			634964.581	26913706.775	614.881	$4,000	01/01/2003	15	75	59	$3,152	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2231	Sanitary MH	SAMH_3144	N/A	0.00	CR			634930.665	26913541.716	615.784	$4,000	01/01/2003	15	75	59	$3,152	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2232	Sanitary MH	SAMH_3145	N/A	0.00	CR			634850.957	26913545.301	616.723	$4,000	01/01/2003	15	75	59	$3,152	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2233	Sanitary MH	SAMH_3151	N/A	0.00	CR			634628.684	26913482.804	620.706	$4,000	01/01/2003	15	75	59	$3,152	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2234	Sanitary MH	SAMH_3164	N/A	0.00				634425.194	26913934.501	618.352	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	1.0	1.1	1.1
2235	Sanitary MH	SAMH_3170	N/A	0.00	BR			634392.188	26913918.578	618.672	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	4.0	4.0	16
2236	Sanitary MH	SAMH_3163	N/A	0.00	CR			634774.309	26914103.669	615.032	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2237	Sanitary MH	SAMH_3162	N/A	0.00	ZZZ			634887.581	26914159.068	614.537	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2238	Sanitary MH	SAMH_3135	N/A	0.00	CR			634987.328	26914497.015	612.998	$2,000	01/01/1960	58	75	16	$428	$5,092	1	1	0.0	0.0	1.0	5.0	1.0	5
2239	Sanitary MH	SAMH_3127	N/A	0.00	BR			634994.527	26914561.727	612.742	$1,700	01/01/1939	79	75	0	$0	$5,767	1	1	0.0	0.0	1.0	1.0	1.0	1
2240	Sanitary MH	SAMH_3128	N/A	0.00	BR			634976.119	26914552.874	612.450	$1,700	01/01/1939	79	75	0	$0	$5,767	1	1	0.0	0.0	1.0	5.0	1.0	5
2241	Sanitary MH	SAMH_3174	N/A	0.00	CR			634259.543	26914794.450	614.542	$4,000	01/01/2004	14	75	60	$3,206	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2242	Sanitary MH	SAMH_3173	N/A	0.00	CR			634364.765	26914588.554	613.964	$3,500	01/01/2004	14	75	60	$2,805	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2243	Sanitary MH	SAMH_3172	N/A	0.00	CR			634590.897	26914779.895	613.459	$4,000	01/01/2004	14	75	60	$3,206	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2244	Sanitary MH	SAMH_3172A	N/A	0.00	CR			634421.331	26915119.575	613.948	$3,500	01/01/2004	14	75	60	$2,805	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2245	Sanitary MH	SAMH_3177	N/A	0.00	CR			634280.061	26915258.979	613.149	$3,500	01/01/2004	14	75	60	$2,805	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2246	Sanitary MH	SAMH_3130	N/A	0.00	BR			634561.636	26915403.253	610.315	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	5.0	1.0	5
2247	Sanitary MH	SAMH_3129	N/A	0.00	BR			634727.711	26915060.953	611.402	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	5.0	1.0	5
2248	Sanitary MH	SAMH_3134	N/A	0.00				635098.008	26914262.058	612.919	$2,000	01/01/1960	58	75	16	$428	$5,092	1	1	0.0	0.0	1.0	5.0	1.0	5
2249	Sanitary MH	SAMH_3148	N/A	0.00	CR			634945.955	26913821.925	614.993	$4,500	01/01/2015	3	75	71	$4,267	$5,092	1	1	0.0	0.0	1.0	4.0	1.0	4
2250	Sanitary MH	SAMH_3149	N/A	0.00	CR			634753.284	26913728.474	617.166	$4,500	01/01/2015	3	75	71	$4,267	$5,092	1	1	0.0	0.0	1.0	4.0	1.0	4
2251	Sanitary MH	SAMH_3150	N/A	0.00	CR			634556.932	26913632.052	619.469	$4,500	01/01/2015	3	75	71	$4,267	$5,092	1	1	0.0	0.0	1.0	4.0	1.0	4
2252	Sanitary MH	SAMH_3156	N/A	0.00	CR			634306.608	26913510.779	623.708	$4,500	01/01/2015	3	75	71	$4,267	$5,092	1	1	0.0	0.0	1.0	4.0	1.0	4
2253	Sanitary MH	SAMH_3160	N/A	0.00	CR			634300.746	26913702.372	623.483	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	2.0	2.0	4
2254	Sanitary MH	SAMH_3161	N/A	0.00	CR			634287.785	26913707.051	623.430	$4,000	01/01/2008	10	75	64	$3,419	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2255	Sanitary MH	SAMH_3179	N/A	0.00	BR			634421.385	26916061.628	609.609	$2,000	01/01/1939	79	75	0	$0	$6,017	1	1	0.0	0.0	1.0	5.0	2.0	10
2256	Sanitary MH	SAMH_3198	N/A	0.00	ZZZ			634994.209	26917439.997	611.322	$3,500	01/01/1998	20	75	54	$2,525	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2257	Sanitary MH	SAMH_3199	N/A	0.00	CR			634980.432	26917494.759	609.741	$4,500	01/01/1998	20	75	54	$3,246	$6,017	1	1	0.0	0.0	1.0	5.0	1.0	5
2258	Sanitary MH	SAMH_3200	N/A	0.00	CR			634802.123	26917888.788	609.483	$4,500	01/01/1998	20	75	54	$3,246	$6,017	1	1	0.0	0.0	1.0	5.0	1.0	5
2259	Force Main	SAMH_3201	N/A	0.00	CR	N/A		634760.686	26917976.140	610.670	$4,500	01/01/1998	20	75	54	$3,246	$6,017	1	1	0.0	0.0	1.0	5.0	1.0	5
2260	Sanitary MH	SAMH_3938	N/A	0.00	CR			634630.063	26918275.057	611.593	$3,500	01/01/1998	20	75	54	$2,525	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2261	Sanitary MH	SAMH_3939	N/A	0.00	CR			634476.633	26918592.274	611.737	$4,500	01/01/1998	20	75	54	$3,246	$6,017	1	1	0.0	0.0	1.0	2.0	2.0	4
2262	Sanitary MH	SAMH_3197	N/A	0.00	CN			634386.793	26918062.947	608.722	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2263	Sanitary MH	SAMH_3196	N/A	0.00	CR			634524.146	26917753.122	606.386	$3,500	01/01/1995	23	75	51	$2,385	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2264	Sanitary MH	SAMH_3195	N/A	0.00	CR			634538.128	26917742.524	606.169	$3,500	01/01/1998	20	75	54	$2,525	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2265	Sanitary MH	SAMH_3185	N/A	0.00	CR			634344.543	26917194.595	601.711	$3,500	01/01/1998	20	75	54	$2,525	$5,092	1	1	0.0	0.0	1.0	5.0	1.0	5
2266	Sanitary MH	SAMH_3194	N/A	0.00	CR			634711.456	26917361.311	606.675	$4,500	01/01/1998	20	75	54	$3,246	$6,017	1	1	0.0	0.0	1.0	5.0	1.0	5
2267	Sanitary MH	SAMH_3192	N/A	0.00				634668.289	26917344.420	605.752	$4,500	01/01/1998	20	75	54	$3,246	$6,017	1	1	0.0	0.0	1.0	5.0	1.1	5.5
2268	Sanitary MH	SAMH_3193	N/A	0.00				634784.351	26917073.425	607.946	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	1.0	1.1	1.1
2269	Sanitary MH	SAMH_3186	N/A	0.00	CR			634395.843	26917649.824	601.175	$3,500	01/01/1998	20	75	54	$2,525	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2270	Force Main	SAMH_3205	N/A	0.00	CR	N/A		635061.229	26918121.912	607.992	$4,500	01/01/1998	20	75	54	$3,246	$6,017	1	1	0.0	0.0	1.0	5.0	1.0	5
2271	Sanitary MH	SAMH_3083	N/A	0.00	CR			636319.709	26916270.005	608.095	$4,500	01/01/2015	3	75	71	$4,267	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2272	Sanitary MH	SAMH_3073	N/A	0.00	CR			636610.824	26916415.021	606.340	$5,500	01/01/2011	7	75	67	$4,922	$6,017	1	1	0.0	0.0	1.0	2.0	1.0	2
2273	Sanitary MH	SAMH_3072	N/A	0.00	CR			636713.366	26916192.223	606.518	$5,500	01/01/2011	7	75	67	$4,922	$6,017	1	1	0.0	0.0	1.0	2.0	1.0	2
2274	Sanitary MH	SAMH_3326	N/A	0.00	CR			636802.343	26915987.440	607.107	$4,500	01/01/2011	7	75	67	$4,027	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2275	Sanitary MH	SAMH_3327	N/A	0.00	CR			636764.457	26915910.544	606.484	$4,500	01/01/2011	7	75	67	$4,027	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2276	Sanitary MH	SAMH_3071	N/A	0.00	CR			636418.475	26917045.835	603.104	$6,500	01/01/2011	7	75	67	$5,817	$7,410	1	1	0.0	0.0	1.0	3.0	1.0	3
2277	Sanitary MH	SAMH_3203	N/A	0.00	CR			635235.329	26917731.386	607.398	$3,000	01/01/1998	20	75	54	$2,164	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2278	Sanitary MH	SAMH_3090	N/A	0.00	CR			636000.697	26916081.348	609.597	$4,500	01/01/2011	7	75	67	$4,027	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2279	Sanitary MH	SAMH_3089	N/A	0.00	CR			636107.572	26915863.431	610.966	$4,500	01/01/2011	7	75	67	$4,027	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2280	Sanitary MH	SAMH_3025	N/A	0.00	CR			636262.080	26915550.119	611.174	$4,000	01/01/2011	7	75	67	$3,579	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
2281	Sanitary MH	SAMH_3024	N/A	0.00	CR			636395.282	26915279.457	612.437	$4,000	01/01/2011	7	75	67	$3,579	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
2282	Sanitary MH	SAMH_3002	N/A	0.00	CR			636634.871	26913073.686	613.207	$4,000	01/01/2010	8	75	66	$3,526	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
2283	Sanitary MH	SAMH_3003	N/A	0.00	CR			636641.816	26913363.293	612.529	$4,000	01/01/2010	8	75	66	$3,526	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
2284	Sanitary MH	SAMH_3034	N/A	0.00	CR			635974.901	26913351.970	611.467	$4,000	01/01/2011	7	75	67	$3,579	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2285	Sanitary MH	SAMH_3033	N/A	0.00	CR			635977.974	26913337.454	611.336	$4,000	01/01/2011	7	75	67	$3,579	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2286	Sanitary MH	SAMH_3036	N/A	0.00	CR			635878.667	26913542.278	612.213	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2287	Sanitary MH	SAMH_3341	N/A	0.00	BR		RIM IS 1" BELOW GRADE	636875.516	26914792.264	611.363	$2,000	01/01/1939	79	75	0	$0	$6,017	1	1	0.0	0.0	1.0	4.0	4.0	16
2288	Sanitary MH	SAMH_3340	N/A	0.00				636865.774	26914760.165	611.820	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	2.0	1.1	2.2
2289	Sanitary MH	SAMH_3206	N/A	0.00	CR			635042.838	26918168.791	607.978	$3,500	01/01/1998	20	75	54	$2,525	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2290	Sanitary MH	SAMH_3925A	N/A	0.00	CR			635360.937	26918255.944	604.779	$4,500	01/01/1998	20	75	54	$3,246	$6,017	1	1	0.0	0.0	1.0	5.0	1.0	5
2291	Sanitary MH	SAMH_3207	N/A	0.00	BR			635511.232	26917903.661	605.897	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	1.0	3.0	3
2292	Sanitary MH	SAMH_3914A	N/A	0.00	BR		NO VISIBLE PIPES.NO SIGN OF FLOW.	635808.199	26918177.654	607.901	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	1.0	3.0	3
2293	Sanitary MH	SAMH_3031	N/A	0.00	CR			635970.223	26913016.308	612.436	$4,000	01/01/2011	7	75	67	$3,579	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
2294	Sanitary MH	SAMH_3030	N/A	0.00	CR			636003.432	26913015.158	612.124	$4,500	01/01/2011	7	75	67	$4,027	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2295	Sanitary MH	SAMH_3032	N/A	0.00	CR			635972.371	26913046.364	612.021	$4,500	01/01/2011	7	75	67	$4,027	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2296	Sanitary MH	SAMH_3131	N/A	0.00	BR			634625.686	26915434.058	608.511	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	5.0	1.0	5
2297	Sanitary MH	SAMH_3126	N/A	0.00	BR			635131.342	26914285.126	612.122	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	1.0	2.0	2
2298	Sanitary MH	SAMH_3054	N/A	0.00	CR			635410.515	26914414.957	611.812	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2299	Sanitary MH	SAMH_3053	N/A	0.00	CR			635480.674	26914447.123	611.630	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2300	Sanitary MH	SAMH_3051	N/A	0.00	BR			635644.923	26914528.478	612.627	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	1.0	3.0	3
2301	Sanitary MH	SAMH_3050	N/A	0.00	BR		RIM 1/2" ABOVE HMA GRADE	635872.504	26914637.783	612.875	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	1.0	4.0	4
2302	Sanitary MH	SAMH_3014	N/A	0.00	CR		CHANNEL FILLED WITH SAND AND ROCKS	636191.082	26914792.549	612.710	$4,500	01/01/2015	3	75	71	$4,267	$5,092	1	1	0.0	0.0	1.0	3.0	2.0	6
2303	Sanitary MH	SAMH_3342	N/A	0.00	CR		SHOULD BE CLEANED OUT, LOTS OF DEBRIS.	636753.236	26915069.925	610.635	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	2.0	4.0	8
2304	Sanitary MH	SAMH_3018	N/A	0.00	BR			636413.058	26915243.355	612.723	$2,000	01/01/1939	79	75	0	$0	$6,017	1	1	0.0	0.0	1.0	3.0	3.0	9
2305	Sanitary MH	SAMH_3015	N/A	0.00	CR			636061.784	26915080.200	612.450	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	3.0	1.0	3
2306	Sanitary MH	SAMH_3056	N/A	0.00	BR			635715.094	26914911.574	611.966	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	1.0	3.0	3
2307	Sanitary MH	SAMH_3057	N/A	0.00	BR			635486.870	26914794.787	611.895	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	1.0	3.0	3
2308	Sanitary MH	SAMH_3058	N/A	0.00	BR			635265.231	26914686.191	611.609	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	1.0	3.0	3
2309	Sanitary MH	SAMH_3035	N/A	0.00	CR		OUTGOING PIPE GOES UNDER HOSPITAL BUILDING.	636122.826	26913672.487	611.496	$2,000	01/01/1939	79	75	0	$0	$6,017	1	1	0.0	0.0	1.0	1.0	3.0	3
2310	Sanitary MH	SAMH_3042	N/A	0.00	CR			635765.518	26913762.706	611.217	$4,000	01/01/2011	7	75	67	$3,579	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2311	Sanitary MH	SAMH_3040	N/A	0.00	CR			635794.939	26913703.813	611.259	$4,000	01/01/2005	13	75	61	$3,259	$5,092	1	1	0.0	0.0	1.0	1.0	2.0	2
2312	Sanitary MH	SAMH_3039	N/A	0.00	CR			635954.467	26913783.704	612.279	$4,000	01/01/2005	13	75	61	$3,259	$5,092	1	1	0.0	0.0	1.0	3.0	1.0	3
2313	Sanitary MH	SAMH_3038	N/A	0.00	CR			636243.879	26913924.440	611.988	$4,000	01/01/2004	14	75	60	$3,206	$5,092	1	1	0.0	0.0	1.0	3.0	1.0	3
2314	Sanitary MH	SAMH_3037	N/A	0.00	CR			636306.643	26913956.796	612.114	$4,000	01/01/2004	14	75	60	$3,206	$5,092	1	1	0.0	0.0	1.0	3.0	1.0	3
2315	Sanitary MH	SAMH_3007	N/A	0.00	CR		TWO OUT PIPES.	636522.237	26914060.374	612.187	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	3.0	2.0	6
2316	Sanitary MH	SAMH_3006	N/A	0.00	CR			636587.836	26913909.663	612.594	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	3.0	3.0	9
2317	Sanitary MH	SAMH_3005	N/A	0.00	BR			636632.578	26913813.725	611.874	$4,500	01/01/2010	8	75	66	$3,967	$5,092	1	1	0.0	0.0	1.0	3.0	3.0	9
2318	Sanitary MH	SAMH_3004	N/A	0.00	CR			636646.299	26913776.234	611.590	$4,000	01/01/2010	8	75	66	$3,526	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
2319	Sanitary MH	SAMH_3348	N/A	0.00	BR			636824.384	26913915.083	612.363	$2,000	01/01/1939	79	75	0	$0	$6,017	1	1	0.0	0.0	1.0	3.0	4.0	12
2320	Sanitary MH	SAMH_3012	N/A	0.00	BR		RIM IS 1" BELOW GRADE	636715.331	26914248.296	612.979	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	2.0	1.2	2.4
2321	Sanitary MH	SAMH_2028	N/A	0.00	CR			635783.024	26912368.757	612.895	$2,000	01/01/1960	58	75	16	$428	$5,092	1	1	0.0	0.0	1.0	4.0	1.0	4
2322	Sanitary MH	SAMH_2030	N/A	0.00	CR			635688.643	26912624.033	613.742	$2,000	01/01/1960	58	75	16	$428	$5,092	1	1	0.0	0.0	1.0	4.0	1.0	4
2323	Sanitary MH	SAMH_2026	N/A	0.00	BR			635891.803	26911888.285	618.709	$4,000	01/01/1960	58	75	16	$857	$7,410	1	1	0.0	0.0	1.0	4.0	2.0	8
2324	Sanitary MH	SAMH_2025	N/A	0.00	CN			635934.189	26911702.221	614.676	$2,000	01/01/1960	58	75	16	$428	$5,092	1	1	0.0	0.0	1.0	4.0	1.0	4
2325	Sanitary MH	SAMH_2024	N/A	0.00	CN			635928.319	26911406.449	612.507	$2,000	01/01/1960	58	75	16	$428	$5,092	1	1	0.0	0.0	1.0	4.0	1.0	4
2326	Sanitary MH	SAMH_2023	N/A	0.00	CN			635928.271	26911126.081	610.804	$2,000	01/01/1960	58	75	16	$428	$5,092	1	1	0.0	0.0	1.0	4.0	1.0	4
2327	Sanitary MH	SAMH_2022	N/A	0.00	CN			635921.090	26910758.405	607.658	$1,500	01/01/1960	58	75	16	$321	$4,539	1	1	0.0	0.0	1.0	4.0	1.0	4
2328	Sanitary MH	SAMH_2013	N/A	0.00	BR			635913.253	26910386.861	608.229	$1,500	01/01/1960	58	75	16	$321	$4,539	1	1	0.0	0.0	1.0	4.0	2.0	8
2329	Sanitary MH	SAMH_2034	N/A	0.00	CN			635692.969	26910393.692	608.259	$3,500	01/01/2009	9	75	65	$3,038	$4,539	1	1	0.0	0.0	1.0	4.0	1.0	4
2330	Sanitary MH	SAMH_2035	N/A	0.00	BR			635629.448	26910397.269	609.385	$1,500	01/01/1960	58	75	16	$321	$4,539	1	1	0.0	0.0	1.0	4.0	1.0	4
2331	Sanitary MH	SAMH_2036	N/A	0.00	CN			635601.261	26910396.196	609.449	$1,500	01/01/1960	58	75	16	$321	$4,539	1	1	0.0	0.0	1.0	4.0	2.0	8
2332	Sanitary MH	SAMH_2035A	N/A	0.00	CR			635602.363	26910414.023	609.465	$3,500	01/01/2009	9	75	65	$3,038	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
2333	Sanitary MH	SAMH_2043	N/A	0.00	CN			635624.962	26911715.966	625.122	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2334	Sanitary MH	SAMH_2052	N/A	0.00	BR			635591.602	26911891.565	630.700	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2335	Sanitary MH	SAMH_2053	N/A	0.00	BR			635473.552	26911897.101	640.776	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2336	Sanitary MH	SAMH_2077	N/A	0.00	BR			634563.394	26912584.646	686.024	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	1.0	2.0	2
2337	Sanitary MH	SAMH_2076	N/A	0.00	BR			634665.847	26912665.512	692.819	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	1.0	3.0	3
2338	Sanitary MH	SAMH_2079	N/A	0.00	BR			634088.331	26912684.040	692.903	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	1.0	3.0	3
2339	Sanitary MH	SAMH_2078	N/A	0.00	BR			634257.699	26912654.672	693.513	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	1.0	3.0	3
2340	Sanitary MH	SAMH_2054	N/A	0.00	BR			635303.980	26911903.073	656.052	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2341	Sanitary MH	SAMH_2060	N/A	0.00	BR			634811.975	26911910.239	684.931	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2342	Sanitary MH	SAMH_2061	N/A	0.00	CN			634835.131	26912244.681	679.404	$4,000	01/01/2003	15	75	59	$3,152	$5,092	1	1	0.0	0.0	1.0	2.0	2.0	4
2343	Sanitary MH	SAMH_2071	N/A	0.00	CN			634718.957	26912114.449	688.541	$3,500	01/01/2003	15	75	59	$2,758	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2344	Sanitary MH	SAMH_2073	N/A	0.00	CR			634402.456	26912123.812	708.675	$3,500	01/01/2003	15	75	59	$2,758	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2345	Sanitary MH	SAMH_2069	N/A	0.00	CN			634188.815	26912133.286	710.590	$4,000	01/01/2003	15	75	59	$3,152	$5,092	1	1	0.0	0.0	1.0	1.0	2.0	2
2346	Sanitary MH	SAMH_2070	N/A	0.00	CN			634131.374	26912132.703	710.957	$4,000	01/01/2003	15	75	59	$3,152	$5,092	1	1	0.0	0.0	1.0	1.0	2.0	2
2347	Sanitary MH	SAMH_2058	N/A	0.00	CR			635183.930	26912773.000	636.168	$3,500	01/01/2003	15	75	59	$2,758	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
2348	Sanitary MH	SAMH_2075	N/A	0.00	BR		asphalt surface cracking around preimerter of frame	634739.609	26912773.597	656.056	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	1.0	3.0	3

CITY OF SAULT STE. MARIE, MICHIGAN

Summary

id	Equipment Description	Asset ID	Construction Drawings Sheet Reference	Capacity or Size	Material	Length	Comment	Northing State Plane Ordinate	Easting State Plane Ordinate	Elevation	Original Cost	Year Installed (01/01/YYYY)	Age	Expected useful life (years)	Remaining Useful Life (years)	Depreciated Value	Replacement Cost	Average number of units in service	Total Number of units	Redundancy (Number)	Redundancy (percent)	Redundancy Score (R) (Reduces (C))	Criticality (C) (see back-up sheets)	Probability of Failure (P) (see back-up sheets)	Business Risk (BRE=PxCxR)
2349	Sanitary MH	SAMH_2057	N/A	0.00	CR			635039.186	26912510.033	664.368	$4,000	01/01/2003	15	75	59	$3,152	$5,092	1	1	0.0	0.0	1.0	3.0	1.0	3
2350	Sanitary MH	SAMH_2064	N/A	0.00	CN			634827.090	26912492.809	684.806	$3,500	01/01/2003	15	75	59	$2,758	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2351	Sanitary MH	SAMH_2065	N/A	0.00				634707.715	26912543.667	688.005	$4,000	01/01/2003	15	75	59	$3,152	$5,092	1	1	0.0	0.0	1.0	1.0	1.1	1.1
2352	Sanitary MH	SAMH_2067	N/A	0.00				634461.889	26912458.444	694.561	$3,500	01/01/2003	15	75	59	$2,758	$4,539	1	1	0.0	0.0	1.0	1.0	1.1	1.1
2353	Sanitary MH	SAMH_2209A	N/A	0.00	CR			636576.313	26910364.569	609.000	$3,500	01/01/1995	23	75	51	$2,385	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2354	Sanitary MH	SAMH_2014	N/A	0.00	CN			636579.134	26910481.080	607.939	$3,000	01/01/1995	23	75	51	$2,044	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
2355	Sanitary MH	SAMH_2015	N/A	0.00	BR			636600.594	26911439.700	610.717	$3,000	01/01/1985	33	75	41	$1,644	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2356	Sanitary MH	SAMH_2016	N/A	0.00	BR			636609.135	26911882.555	611.295	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2357	Sanitary MH	SAMH_2020	N/A	0.00	CR			636633.297	26912760.316	612.086	$4,500	01/01/2010	8	75	66	$3,967	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2358	Sanitary MH	SAMH_2019	N/A	0.00	CR			636627.564	26912755.671	612.151	$4,500	01/01/2010	8	75	66	$3,967	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2359	Sanitary MH	SAMH_2018	N/A	0.00	CR			636627.213	26912660.077	612.489	$4,500	01/01/2010	8	75	66	$3,967	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2360	Sanitary MH	SAMH_3001	N/A	0.00	CR			636639.246	26912989.706	612.832	$4,500	01/01/2011	7	75	67	$4,027	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2361	Sanitary MH	SAMH_3029	N/A	0.00	CR			636333.176	26913028.603	613.323	$4,500	01/01/2011	7	75	67	$4,027	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2362	Sanitary MH	SAMH_3028	N/A	0.00	CR			636355.817	26912999.846	613.456	$4,500	01/01/2011	7	75	67	$4,027	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2363	Sanitary MH	SAMH_3030A	N/A	0.00	CR			636209.908	26913008.506	613.037	$4,500	01/01/2011	7	75	67	$4,027	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2364	Sanitary MH	SAMH_2021	N/A	0.00	CR			636205.674	26912815.663	611.639	$1,500	01/01/1962	56	75	18	$361	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2365	Sanitary MH	SAMH_2027	N/A	0.00	BR			635925.599	26912025.915	612.832	$2,000	01/01/1939	79	75	0	$0	$6,017	1	1	0.0	0.0	1.0	1.0	2.0	2
2366	Sanitary MH	SAMH_2039	N/A	0.00				635796.599	26911710.694	614.784	$2,000	01/01/1939	79	75	0	$0	$6,017	1	1	0.0	0.0	1.0	2.0	1.1	2.2
2367	Sanitary MH	SAMH_3081	N/A	0.00	CR			636269.946	26916196.744	608.334	$4,500	01/01/2010	8	75	66	$3,967	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2368	Sanitary MH	SAMH_3084	N/A	0.00	CR			636118.360	26916528.441	607.317	$4,500	01/01/2015	3	75	71	$4,267	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2369	Sanitary MH	SAMH_3094	N/A	0.00	CR			635941.982	26916812.938	606.552	$5,500	01/01/2011	7	75	67	$4,922	$6,017	1	1	0.0	0.0	1.0	1.0	1.0	1
2370	Sanitary MH	SAMH_3085	N/A	0.00	CR			635986.904	26916832.512	606.823	$5,500	01/01/2011	7	75	67	$4,922	$6,017	1	1	0.0	0.0	1.0	1.0	1.0	1
2371	Sanitary MH	SAMH_3086	N/A	0.00	CR			635969.663	26916841.695	606.652	$4,500	01/01/2011	7	75	67	$4,027	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2372	Sanitary MH	SAMH_3087	N/A	0.00	CR			635813.163	26917192.654	605.592	$4,500	01/01/2011	7	75	67	$4,027	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2373	Sanitary MH	SAMH_3088	N/A	0.00	CR			635632.395	26917588.041	605.660	$4,500	01/01/2011	7	75	67	$4,027	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2374	Sanitary MH	SAMH_3074	N/A	0.00	CR			636031.686	26917711.946	604.760	$4,500	01/01/2011	7	75	67	$4,027	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2375	Sanitary MH	SAMH_3074A	N/A	0.00	CR			636104.240	26917555.653	603.719	$4,500	01/01/2011	7	75	67	$4,027	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2376	Sanitary MH	SAMH_3074B	N/A	0.00	CR			636224.970	26917290.705	604.219	$4,500	01/01/2011	7	75	67	$4,027	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2377	Sanitary MH	SAMH_3075	N/A	0.00	CR			636340.796	26917008.357	604.863	$6,500	01/01/2011	7	75	67	$5,817	$7,410	1	1	0.0	0.0	1.0	2.0	1.0	2
2378	Sanitary MH	SAMH_3073A	N/A	0.00	CR			636475.634	26916724.164	605.798	$5,500	01/01/2011	7	75	67	$4,922	$6,017	1	1	0.0	0.0	1.0	2.0	1.0	2
2379	Sanitary MH	SAMH_3082	N/A	0.00	CR			636546.358	26916380.471	606.476	$4,500	01/01/2015	3	75	71	$4,267	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2380	Sanitary MH	SAMH_3011	N/A	0.00	BR			636580.339	26914650.126	613.249	$2,000	01/01/1939	79	75	0	$0	$6,017	1	1	0.0	0.0	1.0	4.0	4.0	16
2381	Sanitary MH	SAMH_3010	N/A	0.00	BR			636313.933	26914519.731	613.210	$2,000	01/01/1939	79	75	0	$0	$6,017	1	1	0.0	0.0	1.0	4.0	4.0	16
2382	Sanitary MH	SAMH_3044	N/A	0.00	BR			636092.589	26914409.830	612.493	$4,500	01/01/1994	24	75	50	$3,006	$6,017	1	1	0.0	0.0	1.0	2.0	3.0	6
2383	Sanitary MH	SAMH_3045	N/A	0.00	CR			636053.501	26914373.359	612.621	$3,500	01/01/1994	24	75	50	$2,338	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2384	Sanitary MH	SAMH_3048	N/A	0.00	BR			636014.146	26914371.868	612.542	$2,000	01/01/1939	79	75	0	$0	$6,017	1	1	0.0	0.0	1.0	2.0	4.0	8
2385	Sanitary MH	SAMH_3049	N/A	0.00	BR			635763.255	26914249.687	612.103	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	2.0	4.0	8
2386	Sanitary MH	SAMH_3046	N/A	0.00	CR			635800.261	26914247.963	612.091	$3,500	01/01/1994	24	75	50	$2,338	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2387	Sanitary MH	SAMH_3049A	N/A	0.00	BR			635594.914	26914167.861	611.800	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	2.0	3.0	6
2388	Sanitary MH	SAMH_3047	N/A	0.00	CR			635581.247	26914144.848	611.861	$3,500	01/01/1994	24	75	50	$2,338	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2389	Sanitary MH	SAMH_3043	N/A	0.00	CR			635668.556	26913952.558	611.581	$4,000	01/01/2011	7	75	67	$3,579	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2390	Sanitary MH	SAMH_2046	N/A	0.00	CN			635466.214	26911145.847	624.726	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2391	Sanitary MH	SAMH_2045	N/A	0.00	BR		RIM 1.0' BELOW GRAVEL ALLEY GRADE	635460.114	26910795.224	626.885	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	1.0	4.0	4
2392	Sanitary MH	SAMH_2044	N/A	0.00	BR			635454.081	26910445.523	625.647	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	1.0	3.0	3
2393	Sanitary MH	SAMH_2040	N/A	0.00	BR		DID NOT FIND SAMH_2039 SO ASSUMING THIS CONNECTS TO SAMH_2025.RIM I	635696.569	26911712.508	621.299	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	2.0	3.0	6
2394	Sanitary MH	SAMH_2048	N/A	0.00	CN			635475.982	26911722.198	637.894	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	1.0	2.0	2
2395	Sanitary MH	SAMH_2047	N/A	0.00	BR			635476.837	26911438.321	658.185	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	1.0	2.0	2
2396	Sanitary MH	SAMH_2080	N/A	0.00	CR			635096.685	26910703.267	674.535	$5,000	01/01/2000	18	75	56	$3,740	$6,017	1	1	0.0	0.0	1.0	1.0	1.0	1
2397	Sanitary MH	SAMH_2059	N/A	0.00				635038.532	26911902.924	684.953	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	1.0	1.1	1.1
2398	Sanitary MH	SAMH_2055	N/A	0.00	BR			635142.129	26912115.798	674.323	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2399	Sanitary MH	SAMH_2056	N/A	0.00	BR			635163.822	26912366.318	669.052	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	1.0	4.0	4
2400	Sanitary MH	SAMH_3933	N/A	0.00	CR			634912.725	26918461.529	607.830	$3,500	01/01/1998	20	75	54	$2,525	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2401	Sanitary MH	SAMH_3929	N/A	0.00	CR			634943.165	26919208.297	603.252	$4,500	01/01/1998	20	75	54	$3,246	$6,017	1	1	0.0	0.0	1.0	5.0	1.0	5
2402	Sanitary MH	SAMH_3931	N/A	0.00	CR			634553.647	26920075.533	601.187	$4,500	01/01/1998	20	75	54	$3,246	$6,017	1	1	0.0	0.0	1.0	5.0	1.0	5
2403	Sanitary MH	SAMH_3930A	N/A	0.00	CR			634718.093	26919710.332	602.432	$4,500	01/01/1998	20	75	54	$3,246	$6,017	1	1	0.0	0.0	1.0	5.0	1.0	5
2404	Sanitary MH	SAMH_3936	N/A	0.00	CR			634484.022	26919425.088	603.762	$3,500	01/01/1998	20	75	54	$2,525	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2405	Sanitary MH	SAMH_3854	N/A	0.00	CR			634244.735	26919964.819	601.159	$9,500	01/01/1998	20	75	54	$6,854	$13,099	1	1	0.0	0.0	1.0	1.0	1.0	1
2406	Sanitary MH	SAMH_3923A	N/A	0.00	BR			634541.012	26921021.710	597.699	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	2.0	4.0	8
2407	Sanitary MH	SAMH_3912	N/A	0.00	CR			634557.083	26921039.473	597.375	$3,000	01/01/1961	57	75	17	$683	$6,017	1	1	0.0	0.0	1.0	5.0	1.0	5
2408	Sanitary MH	SAMH_3924	N/A	0.00	BR			634337.327	26921478.282	596.813	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	2.0	4.0	8
2409	Sanitary MH	SAMH_3913	N/A	0.00	CR			634355.397	26921493.615	596.386	$3,000	01/01/1961	57	75	17	$683	$6,017	1	1	0.0	0.0	1.0	5.0	1.0	5
2410	Sanitary MH	SAMH_3904	N/A	0.00	CR			634933.541	26920242.239	597.524	$3,500	01/01/1990	28	75	46	$2,151	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2411	Sanitary MH	SAMH_3903	N/A	0.00	CR			635059.980	26920295.568	596.357	$3,500	01/01/1990	28	75	46	$2,151	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2412	Sanitary MH	SAMH_3902	N/A	0.00	CR			635156.694	26920259.305	595.221	$3,500	01/01/1990	28	75	46	$2,151	$5,092	1	1	0.0	0.0	1.0	1.0	2.0	2
2413	Sanitary MH	SAMH_3901	N/A	0.00				635391.808	26920359.684	591.425	$4,500	01/01/1990	28	75	46	$2,766	$6,017	1	1	0.0	0.0	1.0	1.0	1.1	1.1
2414	Sanitary MH	SAMH_3930	N/A	0.00	CR			634803.202	26919521.568	603.203	$4,500	01/01/1998	20	75	54	$3,246	$6,017	1	1	0.0	0.0	1.0	5.0	1.0	5
2415	Sanitary MH	SAMH_3916	N/A	0.00	CR			635429.232	26919028.310	601.146	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2416	Sanitary MH	SAMH_3917	N/A	0.00	CR			635395.021	26919038.056	600.879	$3,500	01/01/1998	20	75	54	$2,525	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2417	Sanitary MH	SAMH_3918	N/A	0.00	CR			635287.329	26919281.447	600.501	$3,500	01/01/1995	23	75	51	$2,385	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2418	Sanitary MH	SAMH_3909	N/A	0.00	CR			635347.561	26919265.172	600.257	$3,000	01/01/1961	57	75	17	$683	$6,017	1	1	0.0	0.0	1.0	5.0	1.0	5
2419	Sanitary MH	SAMH_3910	N/A	0.00	CR			635160.890	26919680.770	598.971	$3,000	01/01/1961	57	75	17	$683	$6,017	1	1	0.0	0.0	1.0	5.0	1.0	5
2420	Sanitary MH	SAMH_3920	N/A	0.00	CR			635087.192	26919776.263	598.776	$3,500	01/01/1998	20	75	54	$2,525	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2421	Sanitary MH	SAMH_3921	N/A	0.00	CR			634935.431	26920118.699	597.304	$3,500	01/01/1995	23	75	51	$2,385	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2422	Sanitary MH	SAMH_3910A	N/A	0.00	CR			634961.629	26920130.207	597.123	$4,500	01/01/1995	23	75	51	$3,066	$6,017	1	1	0.0	0.0	1.0	5.0	1.0	5
2423	Sanitary MH	SAMH_3905	N/A	0.00	CR			634979.010	26920138.419	597.418	$3,500	01/01/1990	28	75	46	$2,151	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2424	Sanitary MH	SAMH_3922	N/A	0.00	CR			634798.048	26920425.964	598.339	$3,500	01/01/1998	20	75	54	$2,525	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2425	Sanitary MH	SAMH_3911	N/A	0.00	CR			634763.921	26920575.226	598.542	$4,500	01/01/1995	23	75	51	$3,066	$6,017	1	1	0.0	0.0	1.0	5.0	1.0	5
2426	Sanitary MH	SAMH_3932A	N/A	0.00	CR			634699.006	26920557.561	599.072	$4,500	01/01/1998	20	75	54	$3,246	$6,017	1	1	0.0	0.0	1.0	1.0	1.0	1
2427	Sanitary MH	SAMH_3908	N/A	0.00	CR			635527.920	26918857.433	601.186	$3,000	01/01/1961	57	75	17	$683	$6,017	1	1	0.0	0.0	1.0	5.0	2.0	10
2428	Sanitary MH	SAMH_3907	N/A	0.00	CR			635708.484	26918454.269	601.732	$3,000	01/01/1961	57	75	17	$683	$6,017	1	1	0.0	0.0	1.0	5.0	1.0	5
2429	Sanitary MH	SAMH_3906	N/A	0.00	BR		HAS APPX 15" DUCTILE IRON PIPE, LOOKS LIKE A FORCE MAIN, GOING STRAIGHT	635712.280	26918443.637	601.855	$4,000	01/01/1961	57	75	17	$911	$7,410	1	1	0.0	0.0	1.0	5.0	3.0	15
2430	Sanitary MH	SAMH_3914	N/A	0.00	CR			635697.077	26918424.859	602.107	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	1.0	4.0	4
2431	Sanitary MH	SAMH_3906A	N/A	0.00	CR			635830.135	26918177.579	608.172	$2,000	01/01/1961	57	75	17	$455	$5,092	1	1	0.0	0.0	1.0	5.0	1.0	5
2432	Sanitary MH	SAMH_3928	N/A	0.00	CR			635084.433	26918891.953	604.145	$4,500	01/01/1998	20	75	54	$3,246	$6,017	1	1	0.0	0.0	1.0	2.0	1.0	2
2433	Sanitary MH	SAMH_3934	N/A	0.00	CR			634786.017	26918742.948	607.505	$3,500	01/01/1998	20	75	54	$2,525	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2434	Sanitary MH	SAMH_1619	N/A	0.00	ZZZ			626214.917	26910685.517	706.386	$2,000	01/01/1974	44	75	30	$802	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
2435	Sanitary MH	SAMH_1518A	N/A	0.00	CR		NEVER FOUND 1517, BUT FOUND THIS MH 27' EAST OF 1518. 3" BELOW GRADE.	626117.011	26911366.911	0.000	$3,000	01/01/1980	38	75	36	$1,443	$5,092	1	1	0.0	0.0	1.0	4.0	1.0	4
2436	Sanitary MH	SAMH_1620	N/A	0.00	CR			626778.721	26911493.882	708.850	$3,000	01/01/1980	38	75	36	$1,443	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2437	Sanitary MH	SAMH_3098	N/A		CR			635386.311	26917378.809	607.330	$4,500	01/01/2015	3	75	71	$4,267	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2438	Sanitary MH	SAMH_3097	N/A		CR			635533.470	26917046.186	609.230	$4,500	01/01/2015	3	75	71	$4,267	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2439	Sanitary MH	SAMH_3096	N/A	0.00	CR			635699.725	26916682.681	607.780	$6,500	01/01/2015	3	75	71	$6,164	$7,410	1	1	0.0	0.0	1.0	2.0	1.0	2
2440	Sanitary MH	SAMH_3093	N/A	0.00	CR			635781.707	26916500.485	608.170	$5,500	01/01/2015	3	75	71	$5,215	$6,017	1	1	0.0	0.0	1.0	2.0	1.0	2
2441	Sanitary MH	SAMH_3091	N/A	0.00	CR			635985.641	26916109.370	609.460	$6,500	01/01/2015	3	75	71	$6,164	$7,410	1	1	0.0	0.0	1.0	2.0	1.0	2
2442	Sanitary MH	SAMH_3092	N/A	0.00	CR			635878.144	26916288.482	608.560	$5,500	01/01/2015	3	75	71	$5,215	$6,017	1	1	0.0	0.0	1.0	2.0	2.0	4
2443	Sanitary MH	SAMH_3099	N/A	0.00	CR			635743.762	26915991.662	610.530	$5,500	01/01/2015	3	75	71	$5,215	$6,017	1	1	0.0	0.0	1.0	2.0	1.0	2
2444	Sanitary MH	SAMH_3091A	N/A	0.00	CR			636218.018	26916228.205	608.240	$4,500	01/01/2015	3	75	71	$4,267	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2445	Sanitary MH	SAMH_3101	N/A	0.00	CR			635660.731	26915950.344	610.650	$5,500	01/01/2015	3	75	71	$5,215	$6,017	1	1	0.0	0.0	1.0	2.0	1.0	2
2446	Sanitary MH	SAMH_2621A	N/A	0.00				630469.040	26913514.803	0.000	$2,500	01/01/1950	68	75	6	$202	$6,017	1	1	0.0	0.0	1.0	1.0	1.1	1.1
2447	Sanitary MH	SAMH_2517A	N/A	0.00				627974.760	26915016.240	0.000	$2,500	01/01/1953	65	75	9	$302	$6,017	1	1	0.0	0.0	1.0	1.0	1.1	1.1
2448	Sanitary MH	SAMH_2517B	N/A	0.00				628364.193	26915076.066	0.000	$2,500	01/01/1953	65	75	9	$302	$6,017	1	1	0.0	0.0	1.0	1.0	1.1	1.1
2449	Sanitary MH	SAMH_2518C	N/A	0.00	BR			627579.348	26915148.092	0.000	$2,500	01/01/1950	68	75	6	$202	$6,017	1	1	0.0	0.0	1.0	1.0	1.0	1
2450	Sanitary MH	SAMH_2518D	N/A	0.00				627603.059	26915317.882	700.288	$1,000	01/01/1950	68	75	6	$81	$4,539	1	1	0.0	0.0	1.0	1.0	1.1	1.1
2451	Sanitary MH	SAMH_2518E	N/A	0.00	CR			627382.374	26915164.665	704.207	$2,000	01/01/1972	46	75	28	$749	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2452	Sanitary MH	SAMH_3934A	N/A	0.00	CT			634778.171	26918737.338	607.441	$3,500	01/01/1998	20	75	54	$2,525	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2453	Sanitary MH	SAMH_3208	N/A	0.00	CR			635365.601	26918233.629	604.837	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2454	Sanitary MH	SAMH_3925	N/A	0.00	BR		RIM 1\2" ABOVE GRADEFRAME CHIPPED	635604.039	26918391.348	601.976	$3,000	01/01/1939	79	75	0	$0	$7,410	1	1	0.0	0.0	1.0	1.0	4.0	4
2455	Sanitary MH	SAMH_3927	N/A	0.00	CR			635228.048	26918560.864	604.350	$4,500	01/01/1998	20	75	54	$3,246	$6,017	1	1	0.0	0.0	1.0	5.0	1.0	5
2456	Sanitary MH	SAMH_2041	N/A	0.00	CN			635607.732	26910780.692	611.917	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2457	Sanitary MH	SAMH_3069	N/A	0.00	CR			636713.146	26917091.700	593.754	$4,500	01/01/2010	8	75	66	$3,967	$5,092	1	1	0.0	0.0	1.0	5.0	1.0	5
2458	Sanitary MH	SAMH_3325A	N/A	0.00	N			636861.321	26915950.399	606.464	$4,500	01/01/2011	7	75	67	$4,027	$5,092	1	1	0.0	0.0	1.0	3.0	1.0	3
2459	Sanitary MH	SAMH_3344	N/A	0.00	CR			636876.204	26913290.963	611.130	$4,500	01/01/2010	8	75	66	$3,967	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2460	Sanitary MH	SAMH_3324	N/A	0.00	CR			636865.001	26915822.794	607.255	$4,500	01/01/2011	7	75	67	$4,027	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2461	Sanitary MH	SAMH_2885	N/A	0.00	CR			632822.644	26915677.381	628.305	$5,000	01/01/2001	17	75	57	$3,807	$6,017	1	1	0.0	0.0	1.0	5.0	1.0	5
2462	Sanitary MH	SAMH_2615	N/A	0.00	BR			630775.107	26913348.975	699.189	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	1.0	2.0	2
2463	Sanitary MH	SAMH_1734	N/A	0.00	CN			630436.452	26912502.159	713.393	$4,000	01/01/2001	17	75	57	$3,046	$5,092	1	1	0.0	0.0	1.0	1.0	2.0	2
2464	Sanitary MH	SAMH_3120	N/A	0.00	CN			635353.023	26913412.447	615.524	$3,000	01/01/1960	58	75	16	$643	$6,017	1	1	0.0	0.0	1.0	4.0	2.0	8
2465	Sanitary MH	SAMH_2006	N/A	0.00	CN			634648.588	26908819.825	630.386	$4,000	01/01/2009	9	75	65	$3,473	$5,092	1	1	0.0	0.0	1.0	4.0	1.0	4
2466	Sanitary MH	SAMH_2004	N/A	0.00	BR			634462.219	26908593.218	634.893	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	4.0	1.0	4
2467	Sanitary MH	SAMH_2072	N/A	0.00	CN			634702.959	26912115.440	689.495	$3,500	01/01/2003	15	75	59	$2,758	$4,539	1	1	0.0	0.0	1.0	1.0	2.0	2
2468	Stormwater MH	SAMH_3310	N/A	10.00	CR			637374.855	26915645.606	602.968	$5,500	01/01/2011	7	75	67	$4,922	$6,017	1	1	0.0	0.0	1.0	4.0	1.0	4
2469	Sanitary MH	SAMH_3009	N/A	0.00	CR			636408.983	26914308.470	612.867	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	3.0	2.0	6
2470	Sanitary MH	SAMH_3322	N/A	0.00	CR			637152.275	26915115.502	606.146	$4,500	01/01/2011	7	75	67	$4,027	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2471	Sanitary MH	SAMH_3855	N/A	0.00	CR			634084.840	26920326.617	601.378	$3,500	01/01/1998	20	75	54	$2,525	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2472	Sanitary MH	SAMH_2928	N/A	0.00	BR			634145.904	26916300.349	607.777	$3,600	01/01/1939	79	75	0	$0	$10,213	1	1	0.0	0.0	1.0	4.0	4.0	16
2473	Sanitary MH	SAMH_3182	N/A	0.00	BR			634158.039	26916580.582	606.537	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	5.0	3.0	15
2474	Sanitary MH	SAMH_2935	N/A	0.00	BR		RIM 1/4" ABOVE GRADE	634159.912	26916630.136	606.411	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	5.0	3.0	15
2475	Sanitary MH	SAMH_3183	N/A	0.00	BR			634176.871	26916960.727	606.524	$3,600	01/01/1939	79	75	0	$0	$10,213	1	1	0.0	0.0	1.0	5.0	3.0	15
2476	Sanitary MH	SAMH_2963	N/A	0.00	CR		FRAME CHIPPED IN TWO SPOTS	632528.387	26917009.824	621.806	$3,500	01/01/1998	20	75	54	$2,525	$5,092	1	1	0.0	0.0	1.0	3.0	2.0	6
2477	Sanitary MH	SAMH_1862	N/A	0.00	CR			632854.676	26912868.876	695.850	$3,500	01/01/2004	14	75	60	$2,805	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2478	Sanitary MH	SAMH_1841	N/A	0.00				633860.518	26912170.338	714.790	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	1.0	1.1	1.1
2479	Sanitary MH	SAMH_2632	N/A	0.00				630162.275	26914429.588	651.157	$1,500	01/01/1950	68	75	6	$121	$5,092	1	1	0.0	0.0	1.0	1.0	1.1	1.1
2480	Sanitary MH	SAMH_3303	N/A	0.00	CR			637630.257	26913838.819	603.101	$3,500	01/01/1997	21	75	53	$2,478	$5,092	1	1	0.0	0.0	1.0	3.0	1.0	3
2481	Sanitary MH	SAMH_1764A	N/A	0.00	BR			629477.924	26913184.111	711.630	$1,500	01/01/1965	53	75	21	$421	$4,539	1	1	0.0	0.0	1.0	2.0	1.2	2.4
2482	Sanitary MH	SAMH_1744	N/A	0.00	CR			629440.210	26910922.910	719.719	$3,500	01/01/2001	17	75	57	$2,665	$4,539	1	1	0.0	0.0	1.0	2.0	3.0	6
2483	Sanitary MH	SAMH_3720	N/A		CR			630927.507	26921117.251	603.031	$2,500	01/01/1976	42	75	32	$1,069	$5,092	1	1	0.0	0.0	1.0	1.0	2.0	2
2484	Sanitary MH	SAMH_3738	N/A	0.00	CR			630302.446	26921143.352	607.221	$2,500	01/01/1976	42	75	32	$1,069	$5,092	1	1	0.0	0.0	1.0	3.0	3.0	9
2485	Sanitary MH	SAMH_3739	N/A	0.00	CR		SPONGY YELLOW STUFF IN BOTTOM-ROTTED LEAVES MAYBE?	630191.038	26921158.797	608.988	$2,500	01/01/1976	42	75	32	$1,069	$5,092	1	1	0.0	0.0	1.0	3.0	2.0	6
2486	Sanitary MH	SAMH_3755	N/A	0.00				629118.935	26921231.168	624.308	$3,500	01/01/1976	42	75	32	$1,497	$6,017	1	1	0.0	0.0	1.0	1.0	1.1	1.1
2487	Sanitary MH	SAMH_1171A	N/A	0.00	CN			632883.206	26906837.317	638.549	$2,500	01/01/1974	44	75	30	$1,003	$5,092	1	1	0.0	0.0	1.0	3.0	2.0	6
2488	Sanitary MH	SAMH_4302	N/A	0.00				633238.157	26923996.265	588.818	$1,500	01/01/1950	68	75	6	$121	$5,092	1	1	0.0	0.0	1.0	1.0	1.1	1.1
2489	Sanitary MH	SAMH_3505	N/A	0.00				624260.618	26921269.011	631.601	$4,000	01/01/2000	18	75	56	$2,992	$5,092	1	1	0.0	0.0	1.0	1.0	1.1	1.1
2490	Sanitary MH	SAMH_3612	N/A	0.00	CR			626606.096	26921247.159	628.430	$4,000	01/01/2000	18	75	56	$2,992	$5,092	1	1	0.0	0.0	1.0	2.0	1.2	2.4
2491	Sanitary MH	SAMH_3610	N/A	0.00	CR			626959.678	26921247.924	630.251	$4,000	01/01/2000	18	75	56	$2,992	$5,092	1	1	0.0	0.0	1.0	2.0	2.0	4
2492	Sanitary MH	SAMH_3607	N/A	0.00	CR			627643.073	26921239.288	630.406	$4,000	01/01/2000	18	75	56	$2,992	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2493	Sanitary MH	SAMH_3752	N/A	0.00	CR			629162.479	26921230.161	623.704	$3,500	01/01/1976	42	75	32	$1,497	$6,017	1	1	0.0	0.0	1.0	1.0	3.0	3
2494	Sanitary MH	SAMH_4304	N/A	0.00	BR			633217.384	26923963.133	588.722	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	1.0	3.0	3
2495	Sanitary MH	SAMH_4303	N/A	0.00	BR			633223.553	26923991.574	589.162	$1,500	01/01/1950	68	75	6	$121	$5,092	1	1	0.0	0.0	1.0	1.0	3.0	3
2496	Sanitary MH	SAMH_3849	N/A	0.00	CR			633763.708	26920206.483	602.771	$3,500	01/01/1998	20	75	54	$2,525	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2497	Sanitary MH	SAMH_1742	N/A	0.00	CN			629997.949	26910625.149	717.441	$2,500	01/01/1980	38	75	36	$1,203	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
2498	Sanitary MH	SAMH_1745	N/A	0.00	CN			630006.054	26910910.591	719.692	$3,000	01/01/1980	38	75	36	$1,443	$5,092	1	1	0.0	0.0	1.0	2.0	2.0	4
2499	Sanitary MH	SAMH_1115	N/A	0.00	BR			632529.175	26905199.397	643.631	$2,500	01/01/1980	38	75	36	$1,203	$4,539	1	1	0.0	0.0	1.0	3.0	3.0	9

CITY OF SAULT STE. MARIE, MICHIGAN

Summary

id	Equipment Description	Asset ID	Construction Drawings Sheet Reference	Capacity or Size	Material	Length	Comment	Northing State Plane Ordinate	Easting State Plane Ordinate	Elevation	Original Cost	Year Installed (01/01/YYYY)	Age	Expected useful life (years)	Remaining Useful Life (years)	Depreciated Value	Replacement Cost	Average number of units in service	Total Number of units	Redundancy (Number)	Redundancy (percent)	Redundancy Score (R) (Reduces (C))	Criticality (C) (see back-up sheets)	Probability of Failure (P) (see back-up sheets)	Business Risk (BRE=PxCxR)
2500	Sanitary MH	SAMH_2652	N/A	0.00	CR			630245.296	26915382.267	633.997	$1,000	01/01/1950	68	75	6	$81	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2501	Sanitary MH	SAMH_2050	N/A	0.00	BR			635299.878	26911726.227	660.064	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2502	Sanitary MH	SAMH_2001	N/A	0.00				634041.954	26908069.310	634.936	$2,000	01/01/1960	58	75	16	$428	$5,092	1	1	0.0	0.0	1.0	3.0	1.1	3.3
2503	Sanitary MH	SAMH_3008	N/A	0.00	CR			636495.213	26914122.202	611.876	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	3.0	1.0	3
2504	Sanitary MH	SAMH_2871	N/A	0.00				632857.061	26915676.434	628.164	$4,000	01/01/2001	17	75	57	$3,046	$5,092	1	1	0.0	0.0	1.0	1.0	1.1	1.1
2505	Sanitary MH	SAMH_1711	N/A	0.00	CR			631338.622	26912490.384	713.235	$4,000	01/01/2001	17	75	57	$3,046	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2506	Sanitary MH	SAMH_2068	N/A	0.00				634203.018	26912217.881	705.261	$3,500	01/01/2003	15	75	59	$2,758	$4,539	1	1	0.0	0.0	1.0	1.0	1.1	1.1
2507	Sanitary MH	SAMH_1154	N/A	0.00	BR			633790.689	26907492.813	636.091	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	3.0	2.0	6
2508	Sanitary MH	SAMH_1149	N/A	0.00	CR			633298.103	26906121.364	640.257	$3,500	01/01/1998	20	75	54	$2,525	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2509	Sanitary MH	SAMH_1159	N/A	0.00	CR			633065.420	26906260.324	639.728	$3,000	01/01/1980	38	75	36	$1,443	$5,092	1	1	0.0	0.0	1.0	3.0	2.0	6
2510	Sanitary MH	SAMH_0512	N/A	0.00	CN			630333.526	26901358.451	623.839	$2,000	01/01/1978	40	75	34	$909	$4,539	1	1	0.0	0.0	1.0	2.0	2.0	4
2511	Sanitary MH	SAMH_0517	N/A	0.00	CR			630651.160	26902026.654	633.966	$2,500	01/01/1978	40	75	34	$1,136	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2512	Sanitary MH	SAMH_0519	N/A	0.00			BURIED IN DRIVE 1901 OAK	631004.978	26902311.317	635.050	$2,500	01/01/1978	40	75	34	$1,136	$5,092	1	1	0.0	0.0	1.0	2.0	1.1	2.2
2513	Sanitary MH	SAMH_0505	N/A	0.00				630373.725	26902343.956	0.000	$2,500	01/01/1978	40	75	34	$1,136	$5,092	1	1	0.0	0.0	1.0	1.0	1.1	1.1
2514	Sanitary MH	SAMH_0523	N/A	0.00				630664.026	26902204.313	0.000	$3,500	01/01/1978	40	75	34	$1,591	$6,017	1	1	0.0	0.0	1.0	1.0	1.1	1.1
2515	Sanitary MH	SAMH_0516	N/A	0.00				630958.584	26901483.478	0.000	$3,500	01/01/1978	40	75	34	$1,591	$6,017	1	1	0.0	0.0	1.0	2.0	1.1	2.2
2516	Sanitary MH	SAMH_0522	N/A	0.00				630812.211	26902639.617	0.000	$2,500	01/01/1978	40	75	34	$1,136	$5,092	1	1	0.0	0.0	1.0	1.0	1.1	1.1
2517	Sanitary MH	SAMH_0605	N/A	0.00	S			631816.679	26897349.332	615.130	$3,500	01/01/1998	20	75	54	$2,525	$5,092	1	1	0.0	0.0	1.0	3.0	1.0	3
2518	Sanitary MH	SAMH_0603	N/A	0.00	CR			631558.156	26897356.299	617.823	$3,500	01/01/1998	20	75	54	$2,525	$5,092	1	1	0.0	0.0	1.0	1.0	2.0	2
2519	Sanitary MH	SAMH_0604	N/A	0.00	CR			631598.163	26897355.330	617.483	$3,500	01/01/1998	20	75	54	$2,525	$5,092	1	1	0.0	0.0	1.0	3.0	1.0	3
2520	Sanitary MH	SAMH_1537	N/A	0.00	ZZZ			625265.118	26909844.479	702.792	$2,000	01/01/1966	52	75	22	$589	$5,092	1	1	0.0	0.0	1.0	2.0	2.0	4
2521	Sanitary MH	SAMH_1521	N/A	0.00	CR			625668.871	26910423.643	0.000	$3,000	01/01/1966	52	75	22	$883	$6,017	1	1	0.0	0.0	1.0	1.0	2.0	2
2522	Sanitary MH	SAMH_1529	N/A	0.00				625257.890	26910034.160	703.633	$2,000	01/01/1966	52	75	22	$589	$5,092	1	1	0.0	0.0	1.0	2.0	1.1	2.2
2523	Sanitary MH	SAMH_1534	N/A	0.00				624923.595	26909714.755	0.000	$2,000	01/01/1966	52	75	22	$589	$5,092	1	1	0.0	0.0	1.0	2.0	1.1	2.2
2524	Sanitary MH	SAMH_1512	N/A	0.00	ZZZ			625959.451	26910470.121	705.245	$2,000	01/01/1974	44	75	30	$802	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
2525	Sanitary MH	SAMH_1522	N/A	0.00				625366.391	26908084.635	694.237	$2,000	01/01/1966	52	75	22	$589	$5,092	1	1	0.0	0.0	1.0	3.0	1.1	3.3
2526	Sanitary MH	SAMH_1526	N/A	0.00				625397.514	26909391.910	700.956	$2,500	01/01/1976	42	75	32	$1,069	$5,092	1	1	0.0	0.0	1.0	1.0	1.1	1.1
2527	Sanitary MH	SAMH_1523	N/A	0.00				625373.726	26908409.685	698.069	$3,000	01/01/1966	52	75	22	$883	$6,017	1	1	0.0	0.0	1.0	3.0	1.1	3.3
2528	Sanitary MH	SAMH_1622	N/A	0.00				626417.092	26911356.790	707.668	$3,000	01/01/1980	38	75	36	$1,443	$5,092	1	1	0.0	0.0	1.0	2.0	1.1	2.2
2529	Sanitary MH	SAMH_1621	N/A	0.00	CR			626627.894	26911348.323	706.676	$2,500	01/01/1980	38	75	36	$1,203	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
2530	Sanitary MH	SAMH_0515	N/A	0.00	CR			630946.661	26901346.314	626.151	$2,500	01/01/1978	40	75	34	$1,136	$5,092	1	1	0.0	0.0	1.0	2.0	2.0	4
2531	Sanitary MH	SAMH_0628	N/A	0.00	CR			631717.193	26900010.768	624.692	$3,000	01/01/1991	27	75	47	$1,884	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2532	Sanitary MH	SAMH_2617	N/A	0.00	CN			631229.566	26913501.227	675.058	$4,000	01/01/2001	17	75	57	$3,046	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2533	Sanitary MH	SAMH_2618	N/A	0.00	BR			631134.191	26913502.730	691.070	$4,000	01/01/2001	17	75	57	$3,046	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2534	Sanitary MH	SAMH_2622	N/A	0.00	CN			631327.171	26913811.993	657.447	$1,500	01/01/1950	68	75	6	$121	$5,092	1	1	0.0	0.0	1.0	4.0	1.0	4
2535	Sanitary MH	SAMH_2645	N/A	0.00	BR			630507.858	26915058.849	634.169	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	2.0	4.0	8
2536	Sanitary MH	SAMH_2608	N/A	0.00	CR			629616.557	26913380.437	709.783	$3,000	01/01/1982	36	75	38	$1,524	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2537	Sanitary MH	SAMH_3634	N/A	48.00	S			629098.055	26921942.541	617.561	$3,000	01/01/1995	23	75	51	$2,044	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
2538	Sanitary MH	SAMH_3748	N/A	0.00	CT			629418.647	26920841.712	0.000	$2,500	01/01/1976	42	75	32	$1,069	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2539	Sanitary MH	SAMH_3721	N/A	0.00	CR			630738.480	26920446.068	617.770	$2,500	01/01/1976	42	75	32	$1,069	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2540	Sanitary MH	SAMH_3744	N/A	0.00	CR			630049.533	26920971.492	0.000	$2,000	01/01/1976	42	75	32	$855	$4,539	1	1	0.0	0.0	1.0	1.0	2.0	2
2541	Sanitary MH	SAMH_3743	N/A	0.00	CR			630042.773	26920754.727	0.000	$2,500	01/01/1976	42	75	32	$1,069	$5,092	1	1	0.0	0.0	1.0	1.0	2.0	2
2542	Sanitary MH	SAMH_3722	N/A	0.00				630752.359	26920797.478	0.000	$3,500	01/01/1976	42	75	32	$1,497	$6,017	1	1	0.0	0.0	1.0	1.0	1.1	1.1
2543	Sanitary MH	SAMH_3742	N/A	0.00	CR			630038.808	26920493.426	619.141	$2,500	01/01/1976	42	75	32	$1,069	$5,092	1	1	0.0	0.0	1.0	1.0	2.0	2
2544	Sanitary MH	SAMH_3749	N/A	0.00				629425.854	26921007.992	0.000	$3,500	01/01/1976	42	75	32	$1,497	$6,017	1	1	0.0	0.0	1.0	1.0	1.1	1.1
2545	Sanitary MH	SAMH_3810	N/A	0.00	CR			633511.618	26923423.911	589.687	$2,500	01/01/1976	42	75	32	$1,069	$5,092	1	1	0.0	0.0	1.0	5.0	1.0	5
2546	Sanitary MH	SAMH_3804	N/A	0.00	CR			634105.703	26921960.519	595.207	$3,500	01/01/1998	20	75	54	$2,525	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2547	Sanitary MH	SAMH_3801	N/A	0.00	CR			634140.452	26921920.799	595.865	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	2.0	3.0	6
2548	Sanitary MH	SAMH_3821	N/A	0.00	CR			634106.562	26921075.943	600.340	$4,500	01/01/1998	20	75	54	$3,246	$6,017	1	1	0.0	0.0	1.0	5.0	1.0	5
2549	Sanitary MH	SAMH_3808	N/A	0.00				633529.838	26923377.293	590.174	$5,000	01/01/2000	18	75	56	$3,740	$6,017	1	1	0.0	0.0	1.0	1.0	1.1	1.1
2550	Stormwater MH	SAMH_3915	N/A	0.00	BR			635540.501	26918775.709	601.466	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	1.0	4.0	4
2551	Sanitary MH	SAMH_3937	N/A	0.00	CT			634409.454	26919596.595	603.000	$3,500	01/01/1998	20	75	54	$2,525	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2552	Sanitary MH	SAMH_3919	N/A	0.00	CR			635124.750	26919694.034	599.013	$3,500	01/01/1998	20	75	54	$2,525	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2553	Sanitary MH	SAMH_3932B	N/A	0.00	CR			634266.415	26920716.053	599.743	$4,500	01/01/1998	20	75	54	$3,246	$6,017	1	1	0.0	0.0	1.0	5.0	1.0	5
2554	Sanitary MH	SAMH_3843	N/A	0.00	CR			634027.153	26919101.799	605.005	$3,500	01/01/1998	20	75	54	$2,525	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2555	Sanitary MH	SAMH_3204	N/A	0.00	CR			635158.268	26917902.001	607.660	$3,500	01/01/1998	20	75	54	$2,525	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2556	Sanitary MH	SAMH_3189	N/A	0.00				634197.910	26917372.431	603.153	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	2.0	1.1	2.2
2557	Sanitary MH	SAMH_3041	N/A	0.00				636054.762	26914138.201	0.000	$2,000	01/01/1939	79	75	0	$0	$6,017	1	1	0.0	0.0	1.0	1.0	1.1	1.1
2558	Sanitary MH	SAMH_3022	N/A	0.00	CR			636684.526	26915334.933	0.000	$5,500	01/01/2011	7	75	67	$4,922	$6,017	1	1	0.0	0.0	1.0	3.0	2.0	6
2559	Sanitary MH	SAMH_3017	N/A	0.00	BR		MH IS APPX 27' SOUTH OF LOCATION ON MAP. 2" BELOW GRADE	636223.629	26915162.248	0.000	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	3.0	3.0	9
2560	Sanitary MH	SAMH_2063	N/A	0.00				634981.903	26912426.092	672.282	$4,000	01/01/2003	15	75	59	$3,152	$5,092	1	1	0.0	0.0	1.0	2.0	1.1	2.2
2561	Sanitary MH	SAMH_2074	N/A	0.00				634246.571	26911922.618	713.851	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	1.0	1.1	1.1
2562	Sanitary MH	SAMH_2066	N/A	0.00				634564.161	26912475.686	692.290	$4,000	01/01/2003	15	75	59	$3,152	$5,092	1	1	0.0	0.0	1.0	1.0	1.1	1.1
2563	Sanitary MH	SAMH_2032	N/A	0.00	BR			635379.191	26912407.513	640.678	$1,000	01/01/1950	68	75	6	$81	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2564	Sanitary MH	SAMH_2051	N/A	0.00				635857.069	26911897.991	0.000	$5,000	01/01/2000	18	75	56	$3,740	$6,017	1	1	0.0	0.0	1.0	1.0	1.1	1.1
2565	Sanitary MH	SAMH_2816	N/A	0.00	BR		3" BELOW GRADE	633408.094	26913269.680	0.000	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	1.0	4.0	4
2566	Sanitary MH	SAMH_3817	N/A	0.00	BR		1' OF CLEAR WATER SURCHARGE WHEN MH WAS OPENED. WATER LEVEL WENT	633627.096	26923036.358	591.002	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	1.0	2.0	2
2567	Sanitary MH	SAMH_3811	N/A	0.00				633549.070	26923445.881	0.000	$3,500	01/01/1976	42	75	32	$1,497	$6,017	1	1	0.0	0.0	1.0	5.0	1.1	5.5
2568	Sanitary MH	SAMH_3812	N/A	0.00				633576.553	26923398.556	0.000	$3,500	01/01/1976	42	75	32	$1,497	$6,017	1	1	0.0	0.0	1.0	5.0	1.1	5.5
2569	Sanitary MH	SAMH_4315	N/A	0.00	CR			632840.004	26924212.383	589.727	$2,500	01/01/1978	40	75	34	$1,136	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2570	Sanitary MH	SAMH_3841	N/A	0.00	BR		RIM 1/4" ABOVE GRADE	632729.376	26923800.317	0.000	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	3.0	4.0	12
2571	Sanitary MH	SAMH_2610	N/A	0.00				629652.495	26913523.652	702.579	$4,000	01/01/1982	36	75	38	$2,032	$6,017	1	1	0.0	0.0	1.0	1.0	1.1	1.1
2572	Sanitary MH	SAMH_2637	N/A	0.00				629299.965	26914434.139	696.498	$2,500	01/01/1950	68	75	6	$202	$6,017	1	1	0.0	0.0	1.0	1.0	1.1	1.1
2573	Sanitary MH	SAMH_2604	N/A	0.00	BR		Doghouse Manhole 15 in cnrete pipe	629163.881	26913805.806	0.000	$2,500	01/01/1950	68	75	6	$202	$6,017	1	1	0.0	0.0	1.0	4.0	1.0	4
2574	Sanitary MH	SAMH_2603	N/A	0.00	BR		14" BELOW GRADE	628848.236	26913814.026	0.000	$1,500	01/01/1950	68	75	6	$121	$5,092	1	1	0.0	0.0	1.0	4.0	3.0	12
2575	Sanitary MH	SAMH_2601	N/A	0.00	CR			629140.520	26913329.732	708.242	$1,500	01/01/1950	68	75	6	$121	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2576	Sanitary MH	SAMH_2654	N/A	0.00	CN			631178.223	26915693.293	631.127	$1,000	01/01/1950	68	75	6	$81	$4,539	1	1	0.0	0.0	1.0	1.0	2.0	2
2577	Sanitary MH	SAMH_2655	N/A	0.00	BR			630852.003	26915699.813	631.150	$1,000	01/01/1950	68	75	6	$81	$4,539	1	1	0.0	0.0	1.0	1.0	2.0	2
2578	Sanitary MH	SAMH_1613	N/A	0.00	CR			628148.935	26913173.219	712.515	$1,500	01/01/1950	68	75	6	$121	$5,092	1	1	0.0	0.0	1.0	3.0	1.0	3
2579	Sanitary MH	SAMH_2234	N/A	0.00	BR			636901.772	26911888.023	609.524	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	2.0	2.0	4
2580	Sanitary MH	SAMH_3745	N/A	0.00				629723.105	26920108.011	0.000	$3,500	01/01/1978	40	75	34	$1,591	$6,017	1	1	0.0	0.0	1.0	1.0	1.1	1.1
2581	Sanitary MH	SAMH_2956	N/A	0.00	CR			631849.681	26916036.881	629.640	$1,000	01/01/1950	68	75	6	$81	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2582	Sanitary MH	SAMH_1762	N/A	0.00			BURIED UNDER PATCHING	629464.935	26912518.050	0.000	$2,500	01/01/1950	68	75	6	$202	$6,017	1	1	0.0	0.0	1.0	2.0	1.1	2.2
2583	Sanitary MH	SAMH_1761	N/A	0.00				629452.450	26912151.814	0.000	$2,500	01/01/1950	68	75	6	$202	$6,017	1	1	0.0	0.0	1.0	2.0	1.1	2.2
2584	Sanitary MH	SAMH_2659	N/A	0.00				631210.422	26915862.674	630.018	$3,500	01/01/1978	40	75	34	$1,591	$6,017	1	1	0.0	0.0	1.0	1.0	1.1	1.1
2585	Sanitary MH	SAMH_1514	N/A	0.00	CR			625951.995	26910698.815	704.090	$1,500	01/01/1966	52	75	22	$441	$4,539	1	1	0.0	0.0	1.0	4.0	2.0	8
2586	Sanitary MH	SAMH_1504	N/A	0.00	CR			625876.069	26908288.757	697.762	$2,000	01/01/1970	48	75	26	$695	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2587	Sanitary MH	SAMH_1525	N/A	0.00				625388.336	26909067.004	700.702	$2,500	01/01/1976	42	75	32	$1,069	$5,092	1	1	0.0	0.0	1.0	1.0	1.1	1.1
2588	Sanitary MH	SAMH_1609	N/A	0.00	ZZZ			628035.701	26912453.955	714.366	$3,000	01/01/1980	38	75	36	$1,443	$5,092	1	1	0.0	0.0	1.0	2.0	2.0	4
2589	Sanitary MH	SAMH_2038	N/A	0.00				635349.222	26910352.392	639.057	$3,000	01/01/1969	49	75	25	$1,003	$6,017	1	1	0.0	0.0	1.0	3.0	1.1	3.3
2590	Sanitary MH	SAMH_2037	N/A	0.00	CR			635373.199	26910385.094	633.609	$2,000	01/01/1969	49	75	25	$669	$5,092	1	1	0.0	0.0	1.0	3.0	2.0	6
2591	Sanitary MH	SAMH_1801	N/A	0.00				633510.267	26908988.708	0.000	$3,000	01/01/1969	49	75	25	$1,003	$6,017	1	1	0.0	0.0	1.0	3.0	1.1	3.3
2592	Sanitary MH	SAMH_2042	N/A	0.00	CN			635614.295	26911138.605	616.882	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	2.0	2.0	4
2593	Sanitary MH	SAMH_2029	N/A	0.00				635767.180	26912397.398	0.000	$2,000	01/01/1939	79	75	0	$0	$6,017	1	1	0.0	0.0	1.0	4.0	1.1	4.4
2594	Sanitary MH	SAMH_3116	N/A	0.00				635565.832	26913069.247	0.000	$2,000	01/01/1939	79	75	0	$0	$6,017	1	1	0.0	0.0	1.0	1.0	1.1	1.1
2595	Sanitary MH	SAMH_2031	N/A	0.00				635491.257	26912717.865	0.000	$2,000	01/01/1939	79	75	0	$0	$6,017	1	1	0.0	0.0	1.0	1.0	1.1	1.1
2596	Sanitary MH	SAMH_3168	N/A	0.00	BR		MH WAS BURIED 5" BELOW GRADE AND WAS LOCATED APPX. 8' EAST OF LOCAT	634322.078	26914056.638	618.292	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	1.0	4.0	4
2597	Sanitary MH	SAMH_3169	N/A	0.00	BR			634398.800	26913946.109	618.378	$1,000	01/01/1939	79	75	0	$0	$5,053	1	1	0.0	0.0	1.0	4.0	3.0	12
2598	Sanitary MH	SAMH_3159	N/A	0.00	BR		TWO 6" PVC CONDUITS STACKED VERTICALLY RUN THROUGH THIS MH AND MAK	634485.529	26913771.682	0.000	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	2.0	3.0	6
2599	Sanitary MH	SAMH_3158	N/A	0.00	BR			634957.170	26914020.054	616.350	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	2.0	3.0	6
2600	Sanitary MH	SAMH_3157	N/A	0.00	BR			635019.185	26914049.935	615.103	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	2.0	4.0	8
2601	Sanitary MH	SAMH_3133	N/A	0.00	CR			635165.158	26914121.409	613.662	$2,000	01/01/1960	58	75	16	$428	$5,092	1	1	0.0	0.0	1.0	5.0	1.0	5
2602	Sanitary MH	SAMH_3132	N/A	0.00	CN			635207.837	26914019.612	614.091	$3,000	01/01/1960	58	75	16	$643	$6,017	1	1	0.0	0.0	1.0	5.0	3.0	15
2603	Stormwater MH	SAMH_3125	N/A	0.00	BR		COMBINED SEWER OVERFLOW	635219.129	26914102.773	612.302	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	1.0	3.0	3
2604	Sanitary MH	SAMH_2839A	N/A	0.00	BR			634142.666	26914472.825	0.000	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	4.0	3.0	12
2605	Sanitary MH	SAMH_3180	N/A	0.00	BR			634384.250	26916046.959	609.743	$2,000	01/01/1939	79	75	0	$0	$6,017	1	1	0.0	0.0	1.0	5.0	1.0	5
2606	Sanitary MH	SAMH_3178	N/A	0.00	CR			634520.314	26915753.275	0.000	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	5.0	1.0	5
2607	Sanitary MH	SAMH_3935A	N/A	0.00				634585.378	26919206.338	0.000	$5,000	01/01/2000	18	75	56	$3,740	$6,017	1	1	0.0	0.0	1.0	1.0	1.1	1.1
2608	Sanitary MH	SAMH_2825	N/A	0.00				633183.742	26913591.038	632.916	$1,500	01/01/1950	68	75	6	$121	$5,092	1	1	0.0	0.0	1.0	1.0	1.1	1.1
2609	Sanitary MH	SAMH_2834	N/A	0.00	CR			633624.629	26913910.887	627.805	$4,000	01/01/2004	14	75	60	$3,206	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2610	Sanitary MH	SAMH_2838	N/A	0.00	CR			632815.363	26914122.667	629.277	$4,000	01/01/2004	14	75	60	$3,206	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2611	Sanitary MH	SAMH_3124	N/A	0.00	BR			635214.719	26914013.455	614.226	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	1.0	2.0	2
2612	Sanitary MH	SAMH_3123	N/A	0.00				635238.240	26913964.736	0.000	$5,000	01/01/2000	18	75	56	$3,740	$6,017	1	1	0.0	0.0	1.0	1.0	1.1	1.1
2613	Sanitary MH	SAMH_3146	N/A	0.00	CR			635162.371	26913927.509	614.011	$4,500	01/01/2015	3	75	71	$4,267	$5,092	1	1	0.0	0.0	1.0	4.0	1.0	4
2614	Sanitary MH	SAMH_1552	N/A	0.00				624444.181	26909102.750	700.967	$3,500	01/01/1994	24	75	50	$2,338	$5,092	1	1	0.0	0.0	1.0	3.0	1.1	3.3
2615	Sanitary MH	SAMH_1553	N/A	0.00	CR			624286.711	26908989.602	700.600	$3,500	01/01/1994	24	75	50	$2,338	$5,092	1	1	0.0	0.0	1.0	3.0	1.0	3
2616	Sanitary MH	SAMH_1554	N/A	0.00	CR			623991.626	26908811.736	694.614	$3,000	01/01/1994	24	75	50	$2,004	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
2617	Sanitary MH	SAMH_1555	N/A	0.00	CR			623967.482	26908799.602	695.350	$3,000	01/01/1994	24	75	50	$2,004	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
2618	Sanitary MH	SAMH_1557	N/A	0.00	CR			623620.824	26908339.487	701.530	$3,500	01/01/1994	24	75	50	$2,338	$5,092	1	1	0.0	0.0	1.0	3.0	1.0	3
2619	Sanitary MH	SAMH_1556	N/A	0.00				623789.197	26908579.130	0.000	$5,000	01/01/2000	18	75	56	$3,740	$6,017	1	1	0.0	0.0	1.0	3.0	1.1	3.3
2620	Sanitary MH	SAMH_3110	N/A	0.00	CR			635295.145	26915769.344	610.900	$5,200	01/01/2016	2	75	72	$5,000	$5,767	1	1	0.0	0.0	1.0	2.0	1.0	2
2621	Sanitary MH	SAMH_3111	N/A	0.00	CR			635062.364	26915652.332	610.300	$4,500	01/01/2016	2	75	72	$4,327	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2622	Sanitary MH	SAMH_3067	N/A	0.00	CR			634891.791	26915566.089	609.630	$4,500	01/01/2016	2	75	72	$4,327	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2623	Sanitary MH	SAMH_3106	N/A	0.00	CR			635312.905	26915897.612	611.100	$4,500	01/01/2016	2	75	72	$4,327	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2624	Sanitary MH	SAMH_3013	N/A	0.00	CR			636245.668	26914671.268	612.780	$4,500	01/01/2015	3	75	71	$4,267	$5,092	1	1	0.0	0.0	1.0	3.0	1.0	3
2625	Sanitary MH	SAMH_3027	N/A	0.00	CR			636032.210	26915127.716	612.320	$4,500	01/01/2015	3	75	71	$4,267	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2626	Sanitary MH	SAMH_3105	N/A	0.00	CR			635153.849	26917085.820	612.260	$4,500	01/01/2015	3	75	71	$4,267	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2627	Sanitary MH	SAMH_3104	N/A	0.00	CR			635238.552	26916904.663	608.510	$4,500	01/01/2015	3	75	71	$4,267	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2628	Sanitary MH	SAMH_3103	N/A	0.00	CR			635399.835	26916538.941	607.780	$6,500	01/01/2015	3	75	71	$6,164	$7,410	1	1	0.0	0.0	1.0	2.0	1.0	2
2629	Sanitary MH	SAMH_3023	N/A	0.00	CR			636647.929	26915356.438	609.510	$6,500	01/01/2015	3	75	71	$6,164	$7,410	1	1	0.0	0.0	1.0	2.0	1.0	2
2630	Sanitary MH	SAMH_3020	N/A	0.00	CR			636595.392	26915295.818	610.430	$3,000	01/01/1939	79	75	0	$0	$7,410	1	1	0.0	0.0	1.0	3.0	2.0	6
2631	Sanitary MH	SAMH_3019	N/A	0.00	CR			636577.205	26915313.097	610.740	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	3.0	1.0	3
2632	Sanitary MH	SAMH_3077	N/A	0.00	CR			636635.770	26915861.152	608.030	$5,200	01/01/2015	3	75	71	$4,931	$5,767	1	1	0.0	0.0	1.0	3.0	1.0	3
2633	Sanitary MH	SAMH_3078	N/A	0.00	CR			636465.408	26915788.634	610.130	$4,500	01/01/2015	3	75	71	$4,267	$5,092	1	1	0.0	0.0	1.0	3.0	1.0	3
2634	Sanitary MH	SAMH_3079	N/A	0.00	CR			636353.808	26916023.004	609.680	$4,500	01/01/2015	3	75	71	$4,267	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2635	Sanitary MH	SAMH_3080	N/A	0.00	CR			636276.785	26916185.184	608.480	$4,500	01/01/2015	3	75	71	$4,267	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2636	Sanitary MH	SAMH_3061	N/A	0.00	CR			635471.216	26915410.200	611.980	$4,500	01/01/2016	2	75	72	$4,327	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2637	Sanitary MH	SAMH_3060	N/A	0.00	CR			635656.961	26915033.316	0.000	$4,500	01/01/2016	2	75	72	$4,327	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2638	Sanitary MH	SAMH_3107	N/A	0.00	CR			635256.941	26916023.754	610.530	$4,500	01/01/2016	2	75	72	$4,327	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2639	Sanitary MH	SAMH_3109	N/A	0.00	CR			634994.466	26916616.448	608.450	$4,500	01/01/2016	2	75	72	$4,327	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2640	Sanitary MH	SAMH_3108	N/A	0.00	CR			635095.511	26916387.859	608.970	$5,200	01/01/2016	2	75	72	$5,000	$5,767	1	1	0.0	0.0	1.0	1.0	1.0	1
2641	Sanitary MH	SAMH_3026	N/A	0.00	CR			635920.839	26915367.520	611.680	$5,200	01/01/2015	3	75	71	$4,931	$5,767	1	1	0.0	0.0	1.0	1.0	1.0	1
2642	Sanitary MH	SAMH_3100	N/A	0.00	CR			635790.681	26915659.623	611.360	$5,500	01/01/2015	3	75	71	$5,215	$6,017	1	1	0.0	0.0	1.0	1.0	1.0	1
2643	Sanitary MH	SAMH_3102	N/A	0.00	CR			635526.744	26916245.324	609.040	$5,500	01/01/2015	3	75	71	$5,215	$6,017	1	1	0.0	0.0	1.0	2.0	1.0	2
2644	Sanitary MH	SAMH_3059	N/A	0.00	CR			635621.377	26915216.192	612.720	$4,500	01/01/2015	3	75	71	$4,267	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2645	Sanitary MH	SAMH_3016	N/A	0.00	BR		1.5" ABOVE GRADE	636083.065	26915110.077	0.000	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	3.0	3.0	9
2646	Sanitary MH	SAMH_3063	N/A	0.00	CR			635409.455	26914958.837	612.240	$4,500	01/01/2016	2	75	72	$4,327	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2647	Sanitary MH	SAMH_3064	N/A	0.00	CR			635242.499	26915294.620	611.650	$4,500	01/01/2016	2	75	72	$4,327	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2648	Sanitary MH	SAMH_3113	N/A	0.00	CR			635018.022	26915760.751	609.910	$4,500	01/01/2016	2	75	72	$4,327	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2649	Sanitary MH	SAMH_3115	N/A	0.00	CR			634870.566	26916277.524	609.890	$4,500	01/01/2016	2	75	72	$4,327	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2650	Sanitary MH	SAMH_3114	N/A	0.00	CR			634854.448	26916125.040	608.280	$4,500	01/01/2016	2	75	72	$4,327	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1

CITY OF SAULT STE. MARIE, MICHIGAN

Summary

id	Equipment Description	Asset ID	Construction Drawings Sheet Reference	Capacity or Size	Material	Length	Comment	Northing State Plane Ordinate	Easting State Plane Ordinate	Elevation	Original Cost	Year Installed (01/01/YYYY)	Age	Expected useful life (years)	Remaining Useful Life (years)	Depreciated Value	Replacement Cost	Average number of units in service	Total Number of units	Redundancy (Number)	Redundancy (percent)	Redundancy Score (R) (Reduces (C))	Criticality (C) (see back-up sheets)	Probability of Failure (P) (see back-up sheets)	Business Risk (BRE=PxCxR)
2651	Sanitary MH	SAMH_3095	N/A	0.00	CR			635935.638	26916798.673	606.600	$5,500	01/01/2015	3	75	71	$5,215	$6,017	1	1	0.0	0.0	1.0	1.0	1.0	1
2652	Sanitary MH	SAMH_2872A	N/A	0.00				632737.395	26913165.849	670.272	$2,500	01/01/1950	68	75	6	$202	$6,017	1	1	0.0	0.0	1.0	1.0	1.1	1.1
2653	Sanitary MH	SAMH_2872B	N/A	0.00				632855.510	26913148.534	669.685	$2,500	01/01/1950	68	75	6	$202	$6,017	1	1	0.0	0.0	1.0	1.0	1.1	1.1
2654	Sanitary MH	SAMH_2017	N/A	0.00	CR			636619.195	26912345.905	611.891	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	2.0	2.0	4
2655	Sanitary MH	SAMH_3138A	N/A	0.00				635177.924	26913213.812	616.624	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	1.0	1.1	1.1
2656	Sanitary MH	SAMH_3012A	N/A	0.00	BR			636600.561	26914600.298	613.694	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	2.0	4.0	8
2657	Sanitary MH	SAMH_3145A	N/A	0.00				634847.864	26913469.077	620.585	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	1.0	1.1	1.1
2658	Sanitary MH	SAMH_3145B	N/A	0.00				634669.504	26913382.698	0.000	$2,000	01/01/1939	79	75	0	$0	$6,017	1	1	0.0	0.0	1.0	1.0	1.1	1.1
2659	Sanitary MH	SAMH_3065A	N/A	0.00	BR		RIM 1.5" ABOVE GRADE	635245.689	26914725.508	0.000	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	1.0	3.0	3
2660	Sanitary MH	SAMH_3065	N/A	0.00	BR		NO FRAME, COVER SITS ON BRICKS.	635123.012	26914975.377	0.000	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	1.0	3.0	3
2661	Sanitary MH	SAMH_3066	N/A					634977.159	26915269.454	609.460	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	1.0	1.1	1.1
2662	Sanitary MH	SAMH_3014A	N/A	0.00				636450.850	26914920.650	612.410	$5,500	01/01/2015	3	75	71	$5,215	$6,017	1	1	0.0	0.0	1.0	2.0	1.1	2.2
2663	Sanitary MH	SAMH_3128A	N/A	0.00	BR		PORTION OF FRAME LIP MISSING	634852.484	26914805.892	0.000	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	5.0	1.0	5
2664	Sanitary MH	SAMH_3165A	N/A	0.00	CR			634856.979	26914232.391	0.000	$4,000	01/01/2014	4	75	70	$3,739	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2665	Sanitary MH	SAMH_2945A	N/A	0.00				633302.871	26917355.637	0.000	$2,500	01/01/1950	68	75	6	$202	$6,017	1	1	0.0	0.0	1.0	1.0	1.1	1.1
2666	Sanitary MH	SAMH_2662A	N/A	0.00	CR			631259.903	26916642.483	0.000	$3,500	01/01/1998	20	75	54	$2,525	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2667	Sanitary MH	SAMH_3137A	N/A	0.00	BR		APPEARS TO BE PART OF A PRIVATE STORM DRAIN SYSTEM. CONNECTS TO CB'S	634604.270	26912994.366	0.000	$2,000	01/01/1939	79	75	0	$0	$6,017	1	1	0.0	0.0	1.0	1.0	3.0	3
2668	Sanitary MH	SAMH_3156A	N/A	0.00	CR			634101.056	26913411.615	626.567	$4,500	01/01/2015	3	75	71	$4,267	$5,092	1	1	0.0	0.0	1.0	4.0	1.0	4
2669	Sanitary MH	SAMH_3939A	N/A	0.00	CR			634609.923	26918292.698	611.670	$4,000	01/01/2000	18	75	56	$2,992	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2670	Sanitary MH	SAMH_3925B	N/A	0.00				635606.491	26918379.918	601.860	$3,500	01/01/1998	20	75	54	$2,525	$5,092	1	1	0.0	0.0	1.0	1.0	1.1	1.1
2671	Sanitary MH	SAMH_3335A	N/A	0.00	CT			637299.052	26914061.935	605.397	$5,500	01/01/2010	8	75	66	$4,848	$6,017	1	1	0.0	0.0	1.0	4.0	1.0	4
2672	Sanitary MH	SAMH_3342A	N/A	0.00	CR			636675.682	26915274.622	610.110	$2,000	01/01/1939	79	75	0	$0	$6,017	1	1	0.0	0.0	1.0	2.0	1.0	2
2673	Sanitary MH	SAMH_3341A	N/A	0.00				637252.298	26914893.392	606.348	$2,000	01/01/1939	79	75	0	$0	$6,017	1	1	0.0	0.0	1.0	4.0	1.1	4.4
2674	Sanitary MH	SAMH_3310A	N/A	0.00	CR			637006.814	26915490.710	0.000	$4,900	01/01/1939	79	75	0	$0	$15,599	1	1	0.0	0.0	1.0	2.0	1.0	2
2675	Sanitary MH	SAMH_3023A	N/A	0.00	CR			636548.689	26915588.665	609.360	$4,500	01/01/2015	3	75	71	$4,267	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2676	Sanitary MH	SAMH_3923	N/A	0.00	CR			634740.559	26920574.487	598.859	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2677	Sanitary MH	SAMH_3935	N/A	0.00	CN			634686.253	26918942.208	606.459	$4,500	01/01/1939	79	75	0	$0	$13,099	1	1	0.0	0.0	1.0	1.0	1.0	1
2678	Sanitary MH	SAMH_1514A	N/A	0.00	CR		1" ABOVE GRADE	625823.789	26910702.811	705.578	$1,500	01/01/1966	52	75	22	$441	$4,539	1	1	0.0	0.0	1.0	4.0	3.0	12
2679	Sanitary MH	SAMH_1190A	N/A	0.00				631857.532	26905615.885	637.903	$3,000	01/01/1980	38	75	36	$1,443	$5,092	1	1	0.0	0.0	1.0	3.0	1.1	3.3
2680	Sanitary MH	SAMH_1140A	N/A	0.00				632340.687	26905217.245	644.304	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	2.0	1.1	2.2
2681	Sanitary MH	SAMH_1121	N/A	0.00	BR			631782.319	26904130.452	695.637	$1,500	01/01/1950	68	75	6	$121	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2682	Sanitary MH	SAMH_1154A	N/A	0.00	CN			633725.798	26907496.388	636.029	$2,000	01/01/1976	42	75	32	$855	$4,539	1	1	0.0	0.0	1.0	3.0	3.0	9
2683	Sanitary MH	SAMH_2233	N/A	0.00	BR			636894.223	26911445.176	607.560	$3,000	01/01/1985	33	75	41	$1,644	$5,092	1	1	0.0	0.0	1.0	2.0	2.0	4
2684	Sanitary MH	SAMH_1165A	N/A	0.00	CR			633875.229	26907730.016	635.261	$3,000	01/01/1980	38	75	36	$1,443	$5,092	1	1	0.0	0.0	1.0	3.0	1.0	3
2685	Sanitary MH	SAMH_1865A	N/A	0.00	CR			632697.179	26911758.055	719.880	$1,500	01/01/1950	68	75	6	$121	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2686	Sanitary MH	SAMH_1724A	N/A	0.00	CN			630714.251	26911214.233	721.364	$2,500	01/01/1987	31	75	43	$1,436	$4,539	1	1	0.0	0.0	1.0	1.0	2.0	2
2687	Sanitary MH	SAMH_1763A	N/A	0.00	CR			629424.398	26912995.629	714.054	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2688	Sanitary MH	SAMH_2622A	N/A	0.00	CN			631317.086	26913800.596	657.773	$4,000	01/01/2001	17	75	57	$3,046	$5,092	1	1	0.0	0.0	1.0	4.0	1.0	4
2689	Sanitary MH	SAMH_1755A	N/A	0.00				629785.238	26912495.329	714.983	$3,000	01/01/1982	36	75	38	$1,524	$5,092	1	1	0.0	0.0	1.0	1.0	2.0	2
2690	Sanitary MH	SAMH_1760A	N/A	0.00	BR			629277.357	26911876.304	0.000	$1,000	01/01/1950	68	75	6	$81	$4,539	1	1	0.0	0.0	1.0	2.0	2.0	4
2691	Sanitary MH	SAMH_0634A	N/A	0.00				632281.120	26900960.756	621.524	$1,000	01/01/1950	68	75	6	$81	$4,539	1	1	0.0	0.0	1.0	3.0	1.1	3.3
2692	Sanitary MH	SAMH_0624B	N/A	0.00				631174.037	26900032.236	628.831	$4,000	01/01/2000	18	75	56	$2,992	$5,092	1	1	0.0	0.0	1.0	3.0	1.1	3.3
2693	Sanitary MH	SAMH_0624A	N/A	0.00				630708.963	26900009.615	630.214	$1,500	01/01/1950	68	75	6	$121	$5,092	1	1	0.0	0.0	1.0	1.0	1.1	1.1
2694	Sanitary MH	SAMH_0620B	N/A	0.00				631156.866	26898616.376	627.672	$3,000	01/01/1996	22	75	52	$2,084	$4,539	1	1	0.0	0.0	1.0	1.0	1.1	1.1
2695	Sanitary MH	SAMH_0620A	N/A	0.00				631305.936	26898625.897	627.549	$3,000	01/01/1996	22	75	52	$2,084	$4,539	1	1	0.0	0.0	1.0	1.0	1.1	1.1
2696	Sanitary MH	SAMH_2651A	N/A	0.00	CR			630515.020	26915378.578	631.081	$1,000	01/01/1950	68	75	6	$81	$4,539	1	1	0.0	0.0	1.0	1.0	2.0	2
2697	Sanitary MH	SAMH_1827A	N/A	0.00	BR			632655.426	26909950.667	701.919	$5,000	01/01/2000	18	75	56	$3,740	$6,017	1	1	0.0	0.0	1.0	1.0	2.0	2
2698	Sanitary MH	SAMH_1827B	N/A	0.00	CR			632648.488	26909951.086	702.185	$5,000	01/01/2000	18	75	56	$3,740	$6,017	1	1	0.0	0.0	1.0	1.0	1.0	1
2699	Sanitary MH	SAMH_1768B	N/A	0.00	CR			628942.782	26912948.334	714.644	$4,500	01/01/2015	3	75	71	$4,267	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2700	Sanitary MH	SAMH_1768C	N/A	0.00	CR			628939.362	26913004.564	714.342	$4,500	01/01/2015	3	75	71	$4,267	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2701	Sanitary MH	SAMH_1768D	N/A	0.00				628870.946	26913015.855	715.290	$5,500	01/01/2015	3	75	71	$5,215	$6,017	1	1	0.0	0.0	1.0	2.0	1.1	2.2
2702	Sanitary MH	SAMH_1763B	N/A	0.00	CR			629376.831	26912935.029	713.860	$4,500	01/01/2015	3	75	71	$4,267	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2703	Sanitary MH	SAMH_2607A	N/A	0.00				629499.210	26914103.500	698.674	$1,000	01/01/1950	68	75	6	$81	$4,539	1	1	0.0	0.0	1.0	1.0	1.1	1.1
2704	Sanitary MH	SAMH_2670A	N/A	0.00				630618.829	26918092.246	631.725	$3,000	01/01/1961	57	75	17	$683	$6,017	1	1	0.0	0.0	1.0	1.0	1.1	1.1
2705	Sanitary MH	SAMH_2664A	N/A	0.00				631247.528	26917371.836	631.634	$1,500	01/01/1950	68	75	6	$121	$5,092	1	1	0.0	0.0	1.0	1.0	1.1	1.1
2706	Sanitary MH	SAMH_1547A	N/A	0.00	ZZZ			624501.091	26909196.962	700.370	$2,500	01/01/1974	44	75	30	$1,003	$5,092	1	1	0.0	0.0	1.0	2.0	2.0	4
2707	Sanitary MH	SAMH_1612A	N/A	0.00	ZZZ			628491.233	26912887.014	714.920	$1,500	01/01/1969	49	75	25	$501	$4,539	1	1	0.0	0.0	1.0	2.0	1.2	2.4
2708	Sanitary MH	SAMH_1611A	N/A	0.00	BR			627804.545	26912533.055	712.410	$1,500	01/01/1950	68	75	6	$121	$5,092	1	1	0.0	0.0	1.0	3.0	2.0	6
2709	Sanitary MH	SAMH_1560B	N/A	0.00	BR			623814.252	26908901.934	701.598	$3,000	01/01/1996	22	75	52	$2,084	$4,539	1	1	0.0	0.0	1.0	1.0	1.2	1.2
2710	Sanitary MH	SAMH_1560A	N/A	0.00				623911.832	26908804.590	697.619	$2,000	01/01/1974	44	75	30	$802	$4,539	1	1	0.0	0.0	1.0	1.0	1.1	1.1
2711	Sanitary MH	SAMH_2648A	N/A	0.00	CN			631174.720	26915247.103	630.388	$4,000	01/01/2000	18	75	56	$2,992	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2712	Sanitary MH	SAMH_2518B	N/A	0.00				627771.408	26915246.379	702.440	$1,000	01/01/1953	65	75	9	$121	$4,539	1	1	0.0	0.0	1.0	1.0	1.1	1.1
2713	Sanitary MH	SAMH_2646C	N/A	0.00	CR			629374.746	26915082.354	649.032	$3,500	01/01/1999	19	75	55	$2,571	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2714	Sanitary MH	SAMH_2646B	N/A	0.00				629578.264	26915325.807	642.647	$3,000	01/01/1999	19	75	55	$2,204	$4,539	1	1	0.0	0.0	1.0	2.0	1.1	2.2
2715	Sanitary MH	SAMH_2646A	N/A	0.00	CR			629833.166	26915324.297	640.726	$3,000	01/01/1999	19	75	55	$2,204	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
2716	Sanitary MH	SAMH_2652A	N/A	0.00	CR			629935.026	26915385.777	639.945	$3,500	01/01/1999	19	75	55	$2,571	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2717	Sanitary MH	SAMH_2652B	N/A	0.00	CR			629600.313	26915397.192	641.013	$3,500	01/01/1999	19	75	55	$2,571	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2718	Sanitary MH	SAMH_2652C	N/A	0.00	CR			629401.590	26915606.138	634.542	$3,000	01/01/1999	19	75	55	$2,204	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2719	Sanitary MH	SAMH_2518A	N/A	0.00				628011.809	26915320.706	0.000	$2,500	01/01/1953	65	75	9	$302	$6,017	1	1	0.0	0.0	1.0	1.0	1.1	1.1
2720	Sanitary MH	SAMH_2513A	N/A	0.00				628489.067	26913215.432	0.000	$5,000	01/01/2000	18	75	56	$3,740	$6,017	1	1	0.0	0.0	1.0	3.0	1.1	3.3
2721	Sanitary MH	SAMH_1616A	N/A	0.00				627465.284	26912180.074	711.306	$1,000	01/01/1950	68	75	6	$81	$4,539	1	1	0.0	0.0	1.0	2.0	1.1	2.2
2722	Sanitary MH	SAMH_3604A	N/A	0.00				627891.607	26921283.396	0.000	$3,500	01/01/1976	42	75	32	$1,497	$6,017	1	1	0.0	0.0	1.0	2.0	1.1	2.2
2723	Sanitary MH	SAMH_3615A	N/A	0.00				628934.318	26921909.422	0.000	$4,000	01/01/1980	38	75	36	$1,925	$6,017	1	1	0.0	0.0	1.0	1.0	1.1	1.1
2724	Sanitary MH	SAMH_3636	N/A	48.00	CR			628586.300	26922175.268	620.563	$3,000	01/01/1995	23	75	51	$2,044	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2725	Sanitary MH	SAMH_3637	N/A	48.00	CR			628337.070	26922382.494	622.118	$3,000	01/01/1995	23	75	51	$2,044	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2726	Sanitary MH	SAMH_3638	N/A	48.00	CR			628067.698	26922574.995	620.042	$3,000	01/01/1995	23	75	51	$2,044	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2727	Sanitary MH	SAMH_3639	N/A	0.00				627785.031	26922748.471	0.000	$3,000	01/01/1995	23	75	51	$2,044	$4,539	1	1	0.0	0.0	1.0	1.0	1.1	1.1
2728	Sanitary MH	SAMH_3640	N/A	0.00	CR			627474.165	26922643.034	624.505	$3,000	01/01/1995	23	75	51	$2,044	$4,539	1	1	0.0	0.0	1.0	1.0	2.0	2
2729	Sanitary MH	SAMH_3641	N/A	0.00	CR			627197.685	26922464.994	626.474	$3,500	01/01/1995	23	75	51	$2,385	$5,092	1	1	0.0	0.0	1.0	1.0	2.0	2
2730	Sanitary MH	SAMH_3755A	N/A		CN			629147.544	26921595.520	620.399	$2,500	01/01/1976	42	75	32	$1,069	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2731	Sanitary MH	SAMH_3523A	N/A	0.00	CR			625417.312	26921852.805	0.000	$3,000	01/01/1980	38	75	36	$1,443	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2732	Sanitary MH	SAMH_3835A	N/A	0.00	CR			632765.147	26922406.795	597.833	$3,500	01/01/2005	13	75	61	$2,852	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
2733	Sanitary MH	SAMH_3835B	N/A	0.00	CR			632703.145	26922546.444	598.503	$1,000	01/01/1950	68	75	6	$81	$4,539	1	1	0.0	0.0	1.0	2.0	2.0	4
2734	Sanitary MH	SAMH_3161B	N/A	0.00	CR			634122.395	26913621.671	624.851	$4,000	01/01/2008	10	75	64	$3,419	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2735	Sanitary MH	SAMH_3161A	N/A	0.00	CR			634147.325	26913636.255	624.530	$4,000	01/01/2008	10	75	64	$3,419	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2736	Sanitary MH	SAMH_3161C	N/A	0.00	CR			634117.621	26913611.110	625.053	$4,000	01/01/2008	10	75	64	$3,419	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2737	Sanitary MH	SAMH_0804	N/A	0.00	CR			623680.668	26907541.273	699.901	$3,500	01/01/1994	24	75	50	$2,338	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2738	Sanitary MH	SAMH_0803A	N/A	0.00	CR			623461.595	26907263.060	702.820	$3,000	01/01/1994	24	75	50	$2,004	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
2739	Sanitary MH	SAMH_2002A	N/A	0.00	ZZZ			634288.230	26908404.716	0.000	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	3.0	1.0	3
2740	Sanitary MH	SAMH_2004A	N/A	0.00	ZZZ			634341.035	26908705.743	0.000	$2,000	01/01/1969	49	75	25	$669	$5,092	1	1	0.0	0.0	1.0	3.0	1.0	3
2741	Sanitary MH	SAMH_2005A	N/A	0.00				634093.850	26908918.645	0.000	$5,500	01/01/2011	7	75	67	$4,922	$6,017	1	1	0.0	0.0	1.0	3.0	1.1	3.3
2742	Sanitary MH	SAMH_0806	N/A	0.00				623726.261	26904488.857	0.000	$4,500	01/01/2015	3	75	71	$4,267	$5,092	1	1	0.0	0.0	1.0	1.0	1.1	1.1
2743	Sanitary MH	SAMH_0807	N/A	0.00				623728.389	26904563.480	0.000	$5,500	01/01/2015	3	75	71	$5,215	$6,017	1	1	0.0	0.0	1.0	1.0	1.1	1.1
2744	Sanitary MH	SAMH_0808	N/A	0.00				623735.013	26904829.716	0.000	$4,000	01/01/2015	3	75	71	$3,793	$4,539	1	1	0.0	0.0	1.0	1.0	1.1	1.1
2745	Sanitary MH	SAMH_0805	N/A	0.00				623331.046	26904795.254	0.000	$5,500	01/01/2015	3	75	71	$5,215	$6,017	1	1	0.0	0.0	1.0	2.0	1.1	2.2
2746	Sanitary MH	SAMH_2616	N/A	0.00				631172.539	26913336.229	694.621	$4,000	01/01/2015	3	75	71	$3,793	$4,539	1	1	0.0	0.0	1.0	1.0	2.0	2
2747	Sanitary MH	SAMH_2616A	N/A	0.00	CN			631266.940	26913333.842	0.000	$4,000	01/01/2015	3	75	71	$3,793	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2748	Sanitary MH	SAMH_1826A	N/A	0.00				632594.807	26909492.791	0.000	$3,500	01/01/1979	39	75	35	$1,637	$6,017	1	1	0.0	0.0	1.0	3.0	1.1	3.3
2749	Sanitary MH	SAMH_2018A	N/A	0.00	CR			636202.953	26912554.606	0.000	$2,000	01/01/1962	56	75	18	$482	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2750	Sanitary MH	SAMH_0722	N/A	0.00				622948.384	26907998.571	0.000	$4,500	01/01/1999	19	75	55	$3,306	$6,017	1	1	0.0	0.0	1.0	1.0	1.1	1.1
2751	Sanitary MH	SAMH_0723	N/A	0.00	CR			622959.492	26908210.775	705.750	$3,500	01/01/1999	19	75	55	$2,571	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2752	Sanitary MH	SAMH_0724	N/A	0.00	CR			622972.755	26908428.822	707.000	$3,500	01/01/1999	19	75	55	$2,571	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2753	Sanitary MH	SAMH_3066A	N/A	0.00	CR			634963.294	26915271.645	609.300	$4,500	01/01/2016	2	75	72	$4,327	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2754	Sanitary MH	SAMH_3815A	N/A					633955.696	26922297.301	0.000	$2,000	01/01/1939	79	75	0	$0	$6,017	1	1	0.0	0.0	1.0	1.0	1.1	1.1
2755	Sanitary MH	SAMH_3181	N/A	0.00				634272.587	26916310.368	0.000	$2,000	01/01/1939	79	75	0	$0	$6,017	1	1	0.0	0.0	1.0	5.0	1.1	5.5
2756	Sanitary MH	SAMH_3817A	N/A					633720.489	26922826.264	0.000	$2,000	01/01/1939	79	75	0	$0	$6,017	1	1	0.0	0.0	1.0	1.0	1.1	1.1
2757	Sanitary MH	SAMH_1819A	N/A					633042.558	26910196.511	0.000	$2,000	01/01/1939	79	75	0	$0	$6,017	1	1	0.0	0.0	1.0	3.0	1.1	3.3
2758	Sanitary MH	SAMH_0603B	N/A					631526.265	26897077.346	0.000	$5,000	01/01/2000	18	75	56	$3,740	$6,017	1	1	0.0	0.0	1.0	1.0	1.1	1.1
2759	Sanitary MH	SAMH_2635A	N/A					630028.657	26914411.747	0.000	$5,000	01/01/2000	18	75	56	$3,740	$6,017	1	1	0.0	0.0	1.0	1.0	1.1	1.1
2760	Sanitary MH	SAMH_3850	N/A	0.00	CR			633609.888	26920551.989	602.358	$4,000	01/01/2006	12	75	62	$3,312	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2761	Sanitary MH	SAMH_1145	N/A	0.00	CR			631829.472	26905248.882	639.265	$3,000	01/01/1980	38	75	36	$1,443	$5,092	1	1	0.0	0.0	1.0	3.0	1.0	3
2762	Sanitary MH	SAMH_3089	N/A	0.00	CR			636107.572	26915863.431	610.966	$4,500	01/01/2011	7	75	67	$4,027	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2763	Sanitary MH	SAMH_3137A	N/A	0.00	BR		APPEARS TO BE PART OF A PRIVATE STORM DRAIN SYSTEM. CONNECTS TO CB'S	634604.270	26912994.366	0.000	$2,000	01/01/1939	79	75	0	$0	$6,017	1	1	0.0	0.0	1.0	1.0	3.0	3
2764	Sanitary MH	SAMH_2652	N/A	0.00	CR			630245.296	26915382.267	633.997	$1,000	01/01/1950	68	75	6	$81	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2765	Sanitary MH	SAMH_2038	N/A	0.00				635349.222	26910352.392	639.057	$3,000	01/01/1969	49	75	25	$1,003	$6,017	1	1	0.0	0.0	1.0	3.0	1.1	3.3
2766	Sanitary MH	SAMH_3310A	N/A	0.00	CR			637006.814	26915490.710	0.000	$4,900	01/01/1939	79	75	0	$0	$15,599	1	1	0.0	0.0	1.0	2.0	1.0	2
2767	Stormwater MH	STMH_6751	N/A	0.00	CR			631425.993	26912266.954	715.308	$2,000	01/01/1974	44	75	30	$802	$4,539	1	1	0.0	0.0	1.0	1.0	2.0	2
2768	Stormwater MH	STMH_6753	N/A	0.00	CR			631432.910	26912788.020	706.054	$3,500	01/01/2001	17	75	57	$2,665	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
2769	Stormwater MH	STMH_6747	N/A	0.00	CR			631761.841	26912975.831	698.231	$2,000	01/01/1965	53	75	21	$562	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2770	Stormwater MH	STMH_6749	N/A	0.00	CR			631670.400	26912758.236	706.907	$2,000	01/01/1965	53	75	21	$562	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2771	Stormwater MH	STMH_6744	N/A	0.00	CN			632064.640	26912779.590	707.580	$2,000	01/01/1974	44	75	30	$802	$4,539	1	1	0.0	0.0	1.0	1.0	2.0	2
2772	Stormwater MH	STMH_6741	N/A	0.00	CR			632451.240	26912758.925	706.156	$3,500	01/01/2001	17	75	57	$2,665	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2773	Stormwater MH	STMH_6743	N/A	0.00	CN			632048.742	26912406.758	716.177	$3,500	01/01/1974	44	75	30	$1,404	$6,017	1	1	0.0	0.0	1.0	1.0	2.0	2
2774	Stormwater MH	STMH_6740	N/A	0.00	CR			632461.018	26912401.053	713.350	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2775	Stormwater MH	STMH_6734	N/A	0.00	CN			632722.429	26912407.416	714.894	$4,000	01/01/2001	17	75	57	$3,046	$5,092	1	1	0.0	0.0	1.0	1.0	2.0	2
2776	Stormwater MH	STMH_6728	N/A	0.00	CR			633076.439	26912441.454	708.208	$3,500	01/01/2003	15	75	59	$2,758	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2777	Stormwater MH	STMH_6724	N/A	0.00	ZZZ			633393.086	26912403.966	708.128	$2,000	01/01/1974	44	75	30	$802	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2778	Stormwater MH	STMH_6723	N/A	0.00	ZZZ			633672.300	26912398.823	704.854	$2,000	01/01/1974	44	75	30	$802	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2779	Stormwater MH	STMH_6713	N/A	0.00	CR			633719.399	26912837.182	691.306	$3,500	01/01/2004	14	75	60	$2,805	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2780	Stormwater MH	STMH_6712	N/A	0.00	CR			633807.612	26912858.421	689.919	$3,500	01/01/2004	14	75	60	$2,805	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2781	Stormwater MH	STMH_6711	N/A	0.00	CR			633975.883	26912876.272	686.546	$2,000	01/01/1975	43	75	31	$829	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2782	Stormwater MH	STMH_6714	N/A	0.00	CN			633692.844	26910438.616	699.760	$2,000	01/01/1977	41	75	33	$882	$4,539	1	1	0.0	0.0	1.0	2.0	3.0	6
2783	Stormwater MH	STMH_6715	N/A	0.00	BR		0	633593.004	26910439.923	700.529	$2,000	01/01/1977	41	75	33	$882	$4,539	1	1	0.0	0.0	1.0	2.0	3.0	6
2784	Stormwater MH	STMH_6716	N/A	0.00	CR			633535.701	26910440.124	701.053	$2,000	01/01/1977	41	75	33	$882	$4,539	1	1	0.0	0.0	1.0	2.0	3.0	6
2785	Stormwater MH	STMH_6717	N/A	0.00	BR			633430.501	26910442.812	702.520	$2,000	01/01/1977	41	75	33	$882	$4,539	1	1	0.0	0.0	1.0	2.0	3.0	6
2786	Stormwater MH	STMH_6718	N/A	0.00	CR			633105.002	26910453.605	706.322	$2,000	01/01/1977	41	75	33	$882	$4,539	1	1	0.0	0.0	1.0	2.0	2.0	4
2787	Stormwater MH	STMH_6718B	N/A	0.00	CR			632781.153	26910465.957	708.710	$5,000	01/01/2000	18	75	56	$3,740	$6,017	1	1	0.0	0.0	1.0	2.0	1.0	2
2788	Stormwater MH	STMH_6721	N/A	0.00	BR			633604.795	26911100.776	713.847	$4,000	01/01/2016	2	75	72	$3,846	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2789	Stormwater MH	STMH_6722	N/A	0.00	CR			633319.620	26910791.637	708.355	$5,000	01/01/2006	12	75	62	$4,141	$6,017	1	1	0.0	0.0	1.0	2.0	2.0	4
2790	Stormwater MH	STMH_6719	N/A	0.00				633596.032	26910509.594	700.650	$3,500	01/01/2006	12	75	62	$2,898	$4,539	1	1	0.0	0.0	1.0	1.0	1.1	1.1
2791	Stormwater MH	STMH_6720	N/A	0.00	CR			633598.935	26910787.488	705.262	$3,500	01/01/2006	12	75	62	$2,898	$4,539	1	1	0.0	0.0	1.0	1.0	2.0	2
2792	Stormwater MH	STMH_6745	N/A	0.00	CR			632066.523	26912927.391	703.427	$2,000	01/01/1974	44	75	30	$802	$4,539	1	1	0.0	0.0	1.0	1.0	2.0	2
2793	Stormwater MH	STMH_6739	N/A	0.00	ZZZ			632761.852	26913076.993	676.295	$1,500	01/01/1950	68	75	6	$121	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2794	Stormwater MH	STMH_6736	N/A	0.00	CR			632717.074	26912752.254	702.889	$1,500	01/01/1965	53	75	21	$421	$4,539	1	1	0.0	0.0	1.0	2.0	2.0	4
2795	Stormwater MH	STMH_6729	N/A	0.00	CR			633215.301	26912716.411	688.206	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2796	Stormwater MH	STMH_6731	N/A	0.00				633301.868	26912876.932	666.419	$3,500	01/01/2003	15	75	59	$2,758	$4,539	1	1	0.0	0.0	1.0	2.0	1.1	2.2
2797	Stormwater MH	STMH_6727	N/A	0.00	CR			633449.823	26912711.256	685.054	$2,000	01/01/1974	44	75	30	$802	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2798	Stormwater MH	STMH_6755	N/A	0.00	CR			631439.483	26913106.904	698.789	$2,000	01/01/1965	53	75	21	$562	$5,092	1	1	0.0	0.0	1.0	2.0	2.0	4
2799	Stormwater MH	STMH_7614	N/A					631439.288	26913149.804	0.000	$2,000	01/01/1965	53	75	21	$562	$5,092	1	1	0.0	0.0	1.0	4.0	1.1	4.4
2800	Stormwater MH	STMH_6746	N/A					631775.816	26913102.351	0.000	$1,500	01/01/1965	53	75	21	$421	$4,539	1	1	0.0	0.0	1.0	2.0	1.1	2.2
2801	Stormwater MH	STMH_7613	N/A					631776.097	26913146.220	0.000	$2,000	01/01/1965	53	75	21	$562	$5,092	1	1	0.0	0.0	1.0	4.0	1.1	4.4

CITY OF SAULT STE. MARIE, MICHIGAN

Summary

id	Equipment Description	Asset ID	Construction Drawings Sheet Reference	Capacity or Size	Material	Length	Comment	Northing State Plane Ordinate	Easting State Plane Ordinate	Elevation	Original Cost	Year Installed (01/01/YYYY)	Age	Expected useful life (years)	Remaining Useful Life (years)	Depreciated Value	Replacement Cost	Average number of units in service	Total Number of units	Redundancy (Number)	Redundancy (percent)	Redundancy Score (R) (Reduces (C))	Criticality (C) (see back-up sheets)	Probability of Failure (P) (see back-up sheets)	Business Risk (BRE=PxCxR)
2802	Stormwater MH	STMH_7612	N/A					632082.848	26913143.221	0.000	$2,000	01/01/1965	53	75	21	$562	$5,092	1	1	0.0	0.0	1.0	4.0	1.1	4.4
2803	Stormwater MH	STMH_6745A	N/A					632080.157	26913103.111	0.000	$1,500	01/01/1965	53	75	21	$421	$4,539	1	1	0.0	0.0	1.0	1.0	1.1	1.1
2804	Stormwater MH	STMH_7611A	N/A					632411.298	26913099.763	0.000	$3,000	01/01/1965	53	75	21	$843	$6,017	1	1	0.0	0.0	1.0	2.0	1.1	2.2
2805	Stormwater MH	STMH_7611	N/A					632412.780	26913143.004	0.000	$2,000	01/01/1965	53	75	21	$562	$5,092	1	1	0.0	0.0	1.0	4.0	1.1	4.4
2806	Stormwater MH	STMH_7610	N/A					632763.685	26913135.968	0.000	$2,000	01/01/1965	53	75	21	$562	$5,092	1	1	0.0	0.0	1.0	4.0	1.1	4.4
2807	Stormwater MH	STMH_7609	N/A					633121.504	26913133.466	0.000	$2,000	01/01/1965	53	75	21	$562	$5,092	1	1	0.0	0.0	1.0	4.0	1.1	4.4
2808	Stormwater MH	STMH_7608	N/A					633376.819	26913127.512	0.000	$2,000	01/01/1965	53	75	21	$562	$5,092	1	1	0.0	0.0	1.0	5.0	1.1	5.5
2809	Stormwater MH	STMH_6732	N/A					633359.653	26913064.441	0.000	$2,000	01/01/1965	53	75	21	$562	$5,092	1	1	0.0	0.0	1.0	2.0	1.1	2.2
2810	Stormwater MH	STMH_7607B	N/A					633448.184	26913140.897	0.000	$2,000	01/01/1965	53	75	21	$562	$5,092	1	1	0.0	0.0	1.0	5.0	1.1	5.5
2811	Stormwater MH	STMH_6153	N/A	0.00	BR			633995.336	26910462.578	696.685	$4,000	01/01/1986	32	75	42	$2,245	$6,017	1	1	0.0	0.0	1.0	1.0	2.0	2
2812	Stormwater MH	STMH_6154	N/A	0.00	CN			634010.022	26910515.453	697.539	$4,000	01/01/1986	32	75	42	$2,245	$6,017	1	1	0.0	0.0	1.0	1.0	2.0	2
2813	Stormwater MH	STMH_6710	N/A	0.00				633963.869	26911360.977	710.057	$5,000	01/01/2000	18	75	56	$3,740	$6,017	1	1	0.0	0.0	1.0	1.0	1.0	1
2814	Stormwater MH	STMH_6879	N/A	0.00	ZZZ			634030.319	26912110.623	712.598	$2,500	01/01/1975	43	75	31	$1,036	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2815	Stormwater MH	STMH_6880	N/A	0.00	ZZZ			634038.331	26912354.115	708.315	$2,000	01/01/1975	43	75	31	$829	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2816	Stormwater MH	STMH_6881	N/A	0.00	ZZZ			634044.894	26912627.335	696.911	$2,500	01/01/1975	43	75	31	$1,036	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2817	Stormwater MH	STMH_6882	N/A	0.00	ZZZ			634048.921	26912798.597	682.516	$3,500	01/01/1975	43	75	31	$1,451	$6,017	1	1	0.0	0.0	1.0	1.0	1.0	1
2818	Stormwater MH	STMH_6883	N/A	0.00	ZZZ			634050.830	26912873.302	673.596	$2,500	01/01/1975	43	75	31	$1,036	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2819	Stormwater MH	STMH_6884	N/A	0.00	ZZZ			634054.093	26912930.678	666.142	$3,500	01/01/1975	43	75	31	$1,451	$6,017	1	1	0.0	0.0	1.0	2.0	1.0	2
2820	Stormwater MH	STMH_6885	N/A	0.00	ZZZ			634054.484	26912987.326	658.594	$2,500	01/01/1975	43	75	31	$1,036	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2821	Stormwater MH	STMH_6886	N/A	0.00	ZZZ			634056.510	26913062.544	648.718	$2,500	01/01/1975	43	75	31	$1,036	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2822	Stormwater MH	STMH_6726	N/A	0.00				633483.476	26912608.158	0.000	$5,000	01/01/2003	15	75	59	$3,941	$6,017	1	1	0.0	0.0	1.0	1.0	1.1	1.1
2823	Stormwater MH	STMH_6735	N/A	0.00				632732.327	26912740.904	702.921	$1,000	01/01/1950	68	75	6	$81	$4,539	1	1	0.0	0.0	1.0	1.0	1.1	1.1
2824	Stormwater MH	STMH_7547	N/A	0.00	CN			631489.115	26915689.191	630.792	$2,200	01/01/1950	68	75	6	$178	$5,767	1	1	0.0	0.0	1.0	4.0	3.0	12
2825	Stormwater MH	STMH_7527	N/A	0.00	CN			631497.329	26915362.859	630.693	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	1.0	2.0	2
2826	Stormwater MH	STMH_7528	N/A	0.00	BR			631478.474	26915362.896	630.698	$2,500	01/01/1950	68	75	6	$202	$6,017	1	1	0.0	0.0	1.0	4.0	1.0	4
2827	Stormwater MH	STMH_7581	N/A	0.00	CR			631468.951	26915060.593	630.606	$1,000	01/01/1950	68	75	6	$81	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
2828	Stormwater MH	STMH_7580	N/A	0.00	BR			631484.437	26915044.886	630.830	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	3.0	1.0	3
2829	Stormwater MH	STMH_7579	N/A	0.00	CR			631462.696	26914732.519	630.954	$2,500	01/01/1988	30	75	44	$1,470	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
2830	Stormwater MH	STMH_7523	N/A	0.00	CN			631454.579	26914568.438	631.809	$2,500	01/01/1988	30	75	44	$1,470	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2831	Stormwater MH	STMH_7522	N/A	0.00	CN			631449.077	26914421.228	631.010	$4,000	01/01/1988	30	75	44	$2,352	$6,017	1	1	0.0	0.0	1.0	1.0	1.0	1
2832	Stormwater MH	STMH_7639	N/A	0.00	CN			631472.866	26913796.972	650.784	$1,000	01/01/1948	70	75	4	$54	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2833	Stormwater MH	STMH_7638	N/A	0.00	CR			631649.657	26913794.218	644.581	$1,000	01/01/1948	70	75	4	$54	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2834	Stormwater MH	STMH_7637	N/A	0.00	CR			632110.826	26913784.693	640.996	$1,000	01/01/1948	70	75	4	$54	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2835	Stormwater MH	STMH_7636	N/A	0.00	CR			632419.333	26913777.129	636.736	$1,000	01/01/1948	70	75	4	$54	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2836	Stormwater MH	STMH_7635	N/A	0.00	CR			632578.806	26913775.762	634.425	$1,000	01/01/1948	70	75	4	$54	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2837	Stormwater MH	STMH_7634	N/A	0.00	CN			632752.869	26913771.323	633.127	$1,000	01/01/1949	69	75	5	$67	$5,092	1	1	0.0	0.0	1.0	3.0	3.0	9
2838	Stormwater MH	STMH_7644	N/A	0.00	CN			632762.629	26914107.126	630.240	$1,000	01/01/1949	69	75	5	$67	$5,092	1	1	0.0	0.0	1.0	3.0	3.0	9
2839	Stormwater MH	STMH_7651	N/A	0.00	CN			632770.543	26914384.617	628.735	$1,000	01/01/1949	69	75	5	$67	$5,092	1	1	0.0	0.0	1.0	4.0	2.0	8
2840	Stormwater MH	STMH_7660	N/A	0.00	BR			632753.835	26914701.204	628.127	$4,000	01/01/2000	18	75	56	$2,992	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2841	Stormwater MH	STMH_7659	N/A	0.00	CR			632781.026	26914730.748	628.414	$1,000	01/01/1949	69	75	5	$67	$5,092	1	1	0.0	0.0	1.0	4.0	2.0	8
2842	Stormwater MH	STMH_7669	N/A	0.00	CN			632788.426	26915027.975	0.000	$1,700	01/01/1949	69	75	5	$115	$5,767	1	1	0.0	0.0	1.0	4.0	3.0	12
2843	Stormwater MH	STMH_7680	N/A	0.00	CN		RIM 1/4" ABOVE GRADE	632796.086	26915319.861	0.000	$3,000	01/01/1949	69	75	5	$203	$7,410	1	1	0.0	0.0	1.0	4.0	3.0	12
2844	Stormwater MH	STMH_7679	N/A	0.00	CN			632821.024	26915343.245	0.000	$3,000	01/01/1949	69	75	5	$203	$7,410	1	1	0.0	0.0	1.0	5.0	3.0	15
2845	Stormwater MH	STMH_7687	N/A	0.00	CR			632831.816	26915668.353	628.284	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2846	Stormwater MH	STMH_7688	N/A	0.00	BR			632487.453	26915673.832	629.755	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	2.0	2.0	4
2847	Stormwater MH	STMH_7690	N/A	0.00	CR			632158.062	26915679.279	629.953	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2848	Stormwater MH	STMH_7691	N/A	0.00				631838.120	26915683.661	630.706	$2,000	01/01/1939	79	75	0	$0	$6,017	1	1	0.0	0.0	1.0	1.0	1.1	1.1
2849	Stormwater MH	STMH_7681	N/A	0.00	CR			632466.857	26915346.550	629.819	$3,500	01/01/2000	18	75	56	$2,618	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
2850	Stormwater MH	STMH_7682	N/A	0.00	CR			632148.143	26915352.254	630.043	$3,500	01/01/2000	18	75	56	$2,618	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
2851	Stormwater MH	STMH_7683	N/A	0.00	CR			631825.373	26915358.465	630.925	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2852	Stormwater MH	STMH_7672	N/A	0.00	CR			631810.677	26915040.246	630.836	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2853	Stormwater MH	STMH_7671	N/A	0.00	BR			632137.203	26915035.578	630.280	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2854	Stormwater MH	STMH_7670	N/A	0.00	BR			632465.397	26915030.692	629.816	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2855	Stormwater MH	STMH_7664	N/A	0.00				632463.130	26914884.791	630.375	$5,000	01/01/2003	15	75	59	$3,941	$6,017	1	1	0.0	0.0	1.0	1.0	1.1	1.1
2856	Stormwater MH	STMH_7661	N/A	0.00	CR			632456.259	26914704.143	629.531	$4,000	01/01/2000	18	75	56	$2,992	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2857	Stormwater MH	STMH_7662	N/A	0.00	CR			632129.254	26914709.455	629.427	$3,500	01/01/2000	18	75	56	$2,618	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2858	Stormwater MH	STMH_7663	N/A	0.00	CR			631802.906	26914715.900	630.141	$3,500	01/01/2000	18	75	56	$2,618	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2859	Stormwater MH	STMH_7654	N/A	0.00	CR			632151.215	26914402.114	629.328	$3,500	01/01/2000	18	75	56	$2,618	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2860	Stormwater MH	STMH_7653	N/A	0.00	CR			632446.971	26914398.108	628.685	$3,500	01/01/2000	18	75	56	$2,618	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2861	Stormwater MH	STMH_7652	N/A	0.00	CR			632732.549	26914391.069	628.426	$4,000	01/01/2000	18	75	56	$2,992	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2862	Stormwater MH	STMH_7645	N/A	0.00	BR			632467.291	26914111.255	631.073	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2863	Stormwater MH	STMH_7646	N/A	0.00	BR			632111.560	26914120.271	633.243	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2864	Stormwater MH	STMH_7686	N/A	0.00	CR			633219.627	26915663.142	625.306	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2865	Stormwater MH	STMH_7685	N/A	0.00	CR			633678.084	26915654.996	616.971	$4,000	01/01/2000	18	75	56	$2,992	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2866	Stormwater MH	STMH_7674	N/A	0.00	CN			633660.737	26915324.012	619.521	$1,000	01/01/1949	69	75	5	$67	$5,092	1	1	0.0	0.0	1.0	5.0	2.0	10
2867	Stormwater MH	STMH_7675	N/A	0.00	BR		HAS APPX 8" DUCTILE IRON PIPE GOING THROUGH MH. RIM TO INVERT 9.6'	633546.320	26915325.657	621.155	$1,000	01/01/1949	69	75	5	$67	$5,092	1	1	0.0	0.0	1.0	5.0	3.0	15
2868	Stormwater MH	STMH_7676	N/A	0.00	BR			633322.787	26915330.668	626.118	$1,000	01/01/1949	69	75	5	$67	$5,092	1	1	0.0	0.0	1.0	5.0	3.0	15
2869	Stormwater MH	STMH_7631	N/A	0.00	CR			633615.716	26913755.613	628.535	$3,500	01/01/2003	15	75	59	$2,758	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2870	Stormwater MH	STMH_7632	N/A	0.00	CR			633403.979	26913759.522	629.030	$3,500	01/01/2003	15	75	59	$2,758	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2871	Stormwater MH	STMH_7633	N/A	0.00	CR			633157.021	26913762.027	631.010	$3,500	01/01/2003	15	75	59	$2,758	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2872	Stormwater MH	STMH_7643	N/A	0.00	CR			633171.646	26914109.064	628.704	$4,000	01/01/2003	15	75	59	$3,152	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2873	Stormwater MH	STMH_7642	N/A	0.00	CR			633399.542	26914104.271	627.756	$4,000	01/01/2003	15	75	59	$3,152	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2874	Stormwater MH	STMH_7641	N/A	0.00	CR			633631.697	26914103.432	626.051	$4,000	01/01/2003	15	75	59	$3,152	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2875	Stormwater MH	STMH_7648	N/A	0.00	CR			633640.022	26914437.238	624.566	$3,500	01/01/2003	15	75	59	$2,758	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2876	Stormwater MH	STMH_7649	N/A	0.00	CR			633413.667	26914442.997	626.058	$3,500	01/01/2003	15	75	59	$2,758	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2877	Stormwater MH	STMH_7650	N/A	0.00	CR			633182.286	26914446.452	627.591	$3,500	01/01/2003	15	75	59	$2,758	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2878	Stormwater MH	STMH_6648	N/A	0.00	CN			630051.024	26911758.334	720.741	$3,500	01/01/1996	22	75	52	$2,431	$5,092	1	1	0.0	0.0	1.0	1.0	2.0	2
2879	Stormwater MH	STMH_6649	N/A	0.00	CN			630053.659	26911898.745	719.752	$3,500	01/01/1995	23	75	51	$2,385	$5,092	1	1	0.0	0.0	1.0	1.0	2.0	2
2880	Stormwater MH	STMH_6650	N/A	0.00	CN			630063.209	26912198.349	716.872	$3,500	01/01/1995	23	75	51	$2,385	$5,092	1	1	0.0	0.0	1.0	1.0	2.0	2
2881	Stormwater MH	STMH_6652	N/A	0.00	CN			630079.945	26912537.357	714.186	$2,000	01/01/1965	53	75	21	$562	$5,092	1	1	0.0	0.0	1.0	2.0	2.0	4
2882	Stormwater MH	STMH_6651	N/A	0.00	CM			630080.264	26912522.340	713.594	$1,500	01/01/1965	53	75	21	$421	$4,539	1	1	0.0	0.0	1.0	1.0	2.0	2
2883	Stormwater MH	STMH_6640	N/A	0.00	CR			630478.057	26913102.920	703.415	$5,000	01/01/2001	17	75	57	$3,807	$6,017	1	1	0.0	0.0	1.0	1.0	1.0	1
2884	Stormwater MH	STMH_6639	N/A	0.00	CR			630435.816	26912978.056	705.046	$3,000	01/01/1996	22	75	52	$2,084	$4,539	1	1	0.0	0.0	1.0	1.0	2.0	2
2885	Stormwater MH	STMH_6638	N/A	0.00	CR			630428.503	26912739.335	708.741	$3,500	01/01/2000	18	75	56	$2,618	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2886	Stormwater MH	STMH_6637	N/A	0.00	CN			630424.261	26912505.461	713.148	$3,500	01/01/2000	18	75	56	$2,618	$4,539	1	1	0.0	0.0	1.0	1.0	2.0	2
2887	Stormwater MH	STMH_8215	N/A	0.00	CR			628928.938	26921288.789	625.974	$3,500	01/01/2000	18	75	56	$2,618	$4,539	1	1	0.0	0.0	1.0	3.0	2.0	6
2888	Stormwater MH	STMH_8214	N/A	0.00	CR			628743.131	26921289.988	627.811	$3,500	01/01/1990	28	75	46	$2,151	$5,092	1	1	0.0	0.0	1.0	3.0	1.0	3
2889	Stormwater MH	STMH_8212	N/A	0.00	CR			628555.903	26921292.729	629.504	$4,000	01/01/2000	18	75	56	$2,992	$5,092	1	1	0.0	0.0	1.0	3.0	2.0	6
2890	Stormwater MH	STMH_8209	N/A	0.00	CR			628305.247	26921295.939	630.199	$4,000	01/01/2000	18	75	56	$2,992	$5,092	1	1	0.0	0.0	1.0	3.0	1.0	3
2891	Stormwater MH	STMH_8208	N/A	0.00	CR			628153.890	26921295.647	629.767	$3,500	01/01/2000	18	75	56	$2,618	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
2892	Stormwater MH	STMH_8207	N/A	0.00	CR			628023.062	26921297.775	629.643	$3,500	01/01/2000	18	75	56	$2,618	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
2893	Stormwater MH	STMH_8205	N/A	0.00	CR			627695.591	26921301.939	630.212	$3,500	01/01/2000	18	75	56	$2,618	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
2894	Stormwater MH	STMH_8204	N/A	0.00				627483.054	26921303.418	631.486	$5,000	01/01/2000	18	75	56	$3,740	$6,017	1	1	0.0	0.0	1.0	2.0	1.1	2.2
2895	Stormwater MH	STMH_8203	N/A	0.00	CR			627182.731	26921291.889	631.360	$3,500	01/01/2000	18	75	56	$2,618	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2896	Stormwater MH	STMH_8202	N/A	0.00	CR			626980.315	26921295.062	630.343	$3,500	01/01/2000	18	75	56	$2,618	$4,539	1	1	0.0	0.0	1.0	1.0	2.0	2
2897	Stormwater MH	STMH_8201	N/A	0.00	CR			626634.191	26921298.621	629.054	$3,500	01/01/2000	18	75	56	$2,618	$4,539	1	1	0.0	0.0	1.0	1.0	2.0	2
2898	Stormwater MH	STMH_8213A	N/A	0.00	CR			626471.223	26921302.575	630.279	$4,000	01/01/2010	8	75	66	$3,526	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
2899	Stormwater MH	STMH_8227	N/A	0.00	S			626203.162	26921303.328	630.707	$3,500	01/01/2000	18	75	56	$2,618	$4,539	1	1	0.0	0.0	1.0	1.0	3.0	3
2900	Stormwater MH	STMH_8211	N/A	0.00	CR			625984.661	26921304.729	631.710	$3,500	01/01/2000	18	75	56	$2,618	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2901	Stormwater MH	STMH_8226	N/A	0.00	CR			625633.713	26921307.895	631.919	$3,500	01/01/2000	18	75	56	$2,618	$4,539	1	1	0.0	0.0	1.0	1.0	2.0	2
2902	Stormwater MH	STMH_7658	N/A	0.00	CR			633202.257	26914725.233	627.079	$3,500	01/01/2003	15	75	59	$2,758	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2903	Stormwater MH	STMH_7657	N/A	0.00	CR			633423.672	26914724.023	625.560	$3,500	01/01/2003	15	75	59	$2,758	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2904	Stormwater MH	STMH_7656	N/A	0.00	CR			633653.800	26914722.018	623.358	$4,000	01/01/2003	15	75	59	$3,152	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2905	Stormwater MH	STMH_7666	N/A	0.00	CR			633662.870	26915015.327	621.665	$3,500	01/01/2003	15	75	59	$2,758	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2906	Stormwater MH	STMH_7667	N/A	0.00	CR			633426.447	26915017.890	625.263	$3,500	01/01/2003	15	75	59	$2,758	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2907	Stormwater MH	STMH_7668	N/A	0.00				633201.868	26915020.085	626.994	$5,000	01/01/2003	15	75	59	$3,941	$6,017	1	1	0.0	0.0	1.0	1.0	1.1	1.1
2908	Stormwater MH	STMH_7677	N/A	0.00	CR			633219.735	26915332.484	627.191	$1,000	01/01/1949	69	75	5	$67	$5,092	1	1	0.0	0.0	1.0	5.0	1.0	5
2909	Stormwater MH	STMH_7630	N/A	0.00	CR			632405.278	26913458.090	645.262	$3,500	01/01/2001	17	75	57	$2,665	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2910	Stormwater MH	STMH_7629	N/A	0.00	BR			632744.120	26913452.388	641.022	$2,000	01/01/1949	69	75	5	$135	$6,017	1	1	0.0	0.0	1.0	3.0	3.0	9
2911	Stormwater MH	STMH_7626	N/A	0.00	CR			633032.173	26913446.229	637.492	$3,500	01/01/2001	17	75	57	$2,665	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2912	Stormwater MH	STMH_7625	N/A	0.00				633153.539	26913442.806	638.086	$3,500	01/01/2001	17	75	57	$2,665	$4,539	1	1	0.0	0.0	1.0	2.0	1.1	2.2
2913	Stormwater MH	STMH_7623	N/A	0.00	CR			633161.937	26913441.905	638.010	$3,500	01/01/2003	15	75	59	$2,758	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
2914	Stormwater MH	STMH_7622	N/A	0.00	CR			633267.664	26913438.330	633.835	$3,500	01/01/2003	15	75	59	$2,758	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
2915	Stormwater MH	STMH_7621	N/A	0.00	CR			633392.204	26913431.232	632.786	$3,500	01/01/2003	15	75	59	$2,758	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
2916	Stormwater MH	STMH_7620	N/A	0.00	CR			633614.020	26913538.972	630.265	$3,500	01/01/2003	15	75	59	$2,758	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
2917	Stormwater MH	STMH_7619	N/A	0.00	CR			633946.686	26913703.773	625.066	$3,500	01/01/2003	15	75	59	$2,758	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
2918	Stormwater MH	STMH_7624	N/A	0.00	CR			633160.459	26913320.940	642.366	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
2919	Stormwater MH	STMH_8032	N/A	0.00	CR			634129.620	26915642.664	611.662	$3,500	01/01/2001	17	75	57	$2,665	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
2920	Stormwater MH	STMH_7684	N/A	0.00	CT			634083.974	26915647.804	611.406	$3,500	01/01/2000	18	75	56	$2,618	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
2921	Stormwater MH	STMH_7673	N/A	0.00	BR			634099.517	26915317.246	614.021	$2,600	01/01/1949	69	75	5	$176	$9,160	1	1	0.0	0.0	1.0	5.0	3.0	15
2922	Stormwater MH	STMH_8031	N/A	60.00	CR			634113.716	26915297.352	614.056	$1,700	01/01/1949	69	75	5	$115	$5,767	1	1	0.0	0.0	1.0	5.0	1.0	5
2923	Stormwater MH	STMH_8030	N/A	60.00	ZZZ			634112.756	26915225.095	614.446	$1,700	01/01/1949	69	75	5	$115	$5,767	1	1	0.0	0.0	1.0	5.0	1.0	5
2924	Stormwater MH	STMH_8028	N/A	0.00	ZZZ			634120.592	26915198.223	614.549	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	2.0	2.0	4
2925	Stormwater MH	STMH_8027	N/A	0.00	CR			634114.804	26915006.650	615.692	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2926	Stormwater MH	STMH_8027A	N/A	0.00	CR			634106.773	26914999.358	615.727	$3,500	01/01/2003	15	75	59	$2,758	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
2927	Stormwater MH	STMH_7665	N/A	0.00	CR			634091.616	26915003.542	615.533	$3,500	01/01/2003	15	75	59	$2,758	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
2928	Stormwater MH	STMH_7655	N/A	0.00	CR			634055.330	26914711.554	616.599	$3,500	01/01/2003	15	75	59	$2,758	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
2929	Stormwater MH	STMH_8026	N/A	0.00	CR			634100.723	26914732.676	617.282	$3,500	01/01/2003	15	75	59	$2,758	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
2930	Stormwater MH	STMH_8025	N/A	0.00	ZZZ			634108.854	26914719.858	616.800	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2931	Stormwater MH	STMH_8024	N/A	0.00	CR			634104.864	26914549.015	618.014	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2932	Stormwater MH	STMH_8023	N/A	0.00	CR			634095.936	26914494.008	618.283	$4,000	01/01/2003	15	75	59	$3,152	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2933	Stormwater MH	STMH_7647	N/A	0.00	CR			634050.367	26914433.642	618.518	$3,500	01/01/2003	15	75	59	$2,758	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
2934	Stormwater MH	STMH_8225	N/A	0.00	CR			625430.357	26921309.915	630.235	$4,000	01/01/2010	8	75	66	$3,526	$4,539	1	1	0.0	0.0	1.0	1.0	2.0	2
2935	Stormwater MH	STMH_8224	N/A	0.00	CR			625333.062	26921311.299	630.389	$4,000	01/01/2000	18	75	56	$2,992	$5,053	1	1	0.0	0.0	1.0	2.0	2.0	4
2936	Stormwater MH	STMH_8223	N/A	0.00	CR			625171.209	26921309.874	631.101	$4,000	01/01/2010	8	75	66	$3,526	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
2937	Stormwater MH	STMH_8222	N/A	0.00	CR			624960.902	26921313.585	631.955	$4,000	01/01/2000	18	75	56	$2,992	$5,053	1	1	0.0	0.0	1.0	2.0	2.0	4
2938	Stormwater MH	STMH_8221	N/A	0.00	CR			624769.489	26921313.779	632.681	$3,500	01/01/2000	18	75	56	$2,618	$4,539	1	1	0.0	0.0	1.0	2.0	2.0	4
2939	Stormwater MH	STMH_8220	N/A	0.00	CR			624540.040	26921316.496	631.982	$4,000	01/01/2000	18	75	56	$2,992	$5,053	1	1	0.0	0.0	1.0	2.0	2.0	4
2940	Stormwater MH	STMH_8219	N/A	0.00	CR			624334.705	26921318.277	631.693	$4,000	01/01/2000	18	75	56	$2,992	$5,053	1	1	0.0	0.0	1.0	2.0	2.0	4
2941	Stormwater MH	STMH_8218	N/A	0.00	CR			624154.801	26921320.877	632.374	$4,000	01/01/2000	18	75	56	$2,992	$5,053	1	1	0.0	0.0	1.0	2.0	2.0	4
2942	Stormwater MH	STMH_6126	N/A	0.00	CR			633137.585	26906199.063	639.830	$4,500	01/01/1998	20	75	54	$3,246	$6,017	1	1	0.0	0.0	1.0	2.0	1.0	2
2943	Stormwater MH	STMH_6130	N/A	0.00	BR			633328.564	26906584.090	638.767	$2,000	01/01/1970	48	75	26	$695	$4,539	1	1	0.0	0.0	1.0	2.0	3.0	6
2944	Stormwater MH	STMH_6131	N/A	0.00	CN			633406.579	26906739.189	639.365	$2,000	01/01/1970	48	75	26	$695	$4,539	1	1	0.0	0.0	1.0	2.0	2.0	4
2945	Stormwater MH	STMH_6132	N/A	0.00	BR			633535.078	26907001.385	638.667	$2,000	01/01/1970	48	75	26	$695	$4,539	1	1	0.0	0.0	1.0	2.0	3.0	6
2946	Stormwater MH	STMH_8013	N/A	0.00	CR			634092.073	26914106.963	620.250	$3,500	01/01/2003	15	75	59	$2,758	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
2947	Stormwater MH	STMH_7640	N/A	0.00	CR			634040.231	26914097.801	620.776	$3,500	01/01/2003	15	75	59	$2,758	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
2948	Stormwater MH	STMH_7618	N/A	0.00	CR			634034.743	26913749.236	622.979	$3,500	01/01/2003	15	75	59	$2,758	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
2949	Stormwater MH	STMH_8006	N/A	0.00	CR			634106.075	26913789.976	622.185	$3,000	01/01/1991	27	75	47	$1,884	$4,539	1	1	0.0	0.0	1.0	4.0	1.0	4
2950	Stormwater MH	STMH_7604	N/A					634042.564	26913429.423	0.000	$1,500	01/01/1965	53	75	21	$421	$4,539	1	1	0.0	0.0	1.0	5.0	1.1	5.5
2951	Stormwater MH	STMH_7603	N/A					634049.216	26913381.957	0.000	$2,000	01/01/1975	43	75	31	$829	$4,539	1	1	0.0	0.0	1.0	5.0	1.1	5.5
2952	Stormwater MH	STMH_7602	N/A					634064.245	26913352.422	0.000	$2,000	01/01/1975	43	75	31	$829	$4,539	1	1	0.0	0.0	1.0	2.0	1.1	2.2

CITY OF SAULT STE. MARIE, MICHIGAN

Summary

id	Equipment Description	Asset ID	Construction Drawings Sheet Reference	Capacity or Size	Material	Length	Comment	Northing State Plane Ordinate	Easting State Plane Ordinate	Elevation	Original Cost	Year Installed (01/01/YYYY)	Age	Expected useful life (years)	Remaining Useful Life (years)	Depreciated Value	Replacement Cost	Average number of units in service	Total Number of units	Redundancy (Number)	Redundancy (percent)	Redundancy Score (R) (Reduces (C))	Criticality (C) (see back-up sheets)	Probability of Failure (P) (see back-up sheets)	Business Risk (BRE=PxCxR)
2953	Stormwater MH	STMH_7601	N/A	0.00	ZZZ			634060.991	26913224.232	631.747	$2,000	01/01/1975	43	75	31	$829	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
2954	Stormwater MH	STMH_7606	N/A					633823.093	26913262.617	0.000	$5,500	01/01/2011	7	75	67	$4,922	$6,017	1	1	0.0	0.0	1.0	5.0	1.1	5.5
2955	Stormwater MH	STMH_7607	N/A					633785.435	26913303.252	0.000	$2,000	01/01/1965	53	75	21	$562	$5,092	1	1	0.0	0.0	1.0	5.0	1.1	5.5
2956	Stormwater MH	STMH_7607A	N/A					633602.735	26913215.002	0.000	$3,000	01/01/1965	53	75	21	$843	$6,017	1	1	0.0	0.0	1.0	5.0	1.1	5.5
2957	Stormwater MH	STMH_7693	N/A	0.00	BR			633689.889	26915982.168	615.480	$4,000	01/01/2000	18	75	56	$2,992	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2958	Stormwater MH	STMH_7694	N/A	0.00	CR			633230.432	26915995.034	620.515	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2959	Stormwater MH	STMH_7695	N/A	0.00	CR			632847.399	26916004.986	628.027	$4,000	01/01/2000	18	75	56	$2,992	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2960	Stormwater MH	STMH_7696	N/A	0.00	CR			632496.539	26916014.040	630.214	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2961	Stormwater MH	STMH_7715	N/A	0.00	CR			632475.476	26916319.324	629.586	$5,000	01/01/2009	9	75	65	$4,341	$6,017	1	1	0.0	0.0	1.0	1.0	1.0	1
2962	Stormwater MH	STMH_7716	N/A	0.00	CR			632509.297	26916344.805	629.285	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2963	Stormwater MH	STMH_7717	N/A	0.00	CR			632510.381	26916357.819	629.067	$1,500	01/01/1950	68	75	6	$121	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2964	Stormwater MH	STMH_7700	N/A	0.00	CR			632839.327	26916337.210	627.394	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2965	Stormwater MH	STMH_7699	N/A	0.00				633244.693	26916324.461	617.647	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	2.0	1.1	2.2
2966	Stormwater MH	STMH_7698	N/A	0.00	BR			633705.190	26916311.822	612.988	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2967	Stormwater MH	STMH_7718	N/A	0.00	CR			632517.489	26916509.461	628.372	$1,500	01/01/1950	68	75	6	$121	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2968	Stormwater MH	STMH_7719	N/A	0.00	BR			632524.117	26916665.489	628.925	$1,500	01/01/1950	68	75	6	$121	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
2969	Stormwater MH	STMH_7704	N/A	0.00	CR			632869.273	26916666.261	619.422	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2970	Stormwater MH	STMH_7703	N/A	0.00				633258.883	26916654.521	615.043	$2,000	01/01/1939	79	75	0	$0	$6,017	1	1	0.0	0.0	1.0	1.0	1.1	1.1
2971	Stormwater MH	STMH_7702	N/A	0.00				633718.972	26916641.106	609.905	$2,000	01/01/1939	79	75	0	$0	$6,017	1	1	0.0	0.0	1.0	1.0	1.1	1.1
2972	Stormwater MH	STMH_7709	N/A	0.00	CR			633715.180	26916958.749	607.216	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
2973	Stormwater MH	STMH_7711	N/A	0.00	CR			633255.334	26916974.399	611.486	$2,000	01/01/1939	79	75	0	$0	$6,017	1	1	0.0	0.0	1.0	2.0	2.0	4
2974	Stormwater MH	STMH_7710	N/A	0.00	ZZZ			633280.578	26916972.542	611.284	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
2975	Stormwater MH	STMH_7713	N/A	0.00	BR		HAS BROKEN LID IN BOTTOM OF MH	632851.209	26916988.383	0.000	$2,000	01/01/1939	79	75	0	$0	$6,017	1	1	0.0	0.0	1.0	2.0	4.0	8
2976	Stormwater MH	STMH_7720	N/A	0.00	BR			632537.015	26916996.125	0.000	$2,000	01/01/1939	79	75	0	$0	$6,017	1	1	0.0	0.0	1.0	2.0	4.0	8
2977	Stormwater MH	STMH_7721	N/A	0.00	BR		HAD FECAL MATERIAL IN MH NEAR SOUTH PIPE. NO PIPE COMING FROM STCB_	632196.277	26917005.994	0.000	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	1.0	3.0	3
2978	Stormwater MH	STMH_7722	N/A	0.00	BR			631929.389	26917013.714	0.000	$2,000	01/01/1939	79	75	0	$0	$6,017	1	1	0.0	0.0	1.0	1.0	3.0	3
2979	Stormwater MH	STMH_7554	N/A	120.00	CR			631544.943	26917041.821	630.865	$5,500	01/01/1950	68	75	6	$445	$13,099	1	1	0.0	0.0	1.0	5.0	1.0	5
2980	Stormwater MH	STMH_7555	N/A	0.00	CR			631559.038	26917056.080	630.464	$3,500	01/01/2000	18	75	56	$2,618	$4,539	1	1	0.0	0.0	1.0	5.0	1.0	5
2981	Stormwater MH	STMH_7551	N/A	0.00	CR			631527.953	26916387.179	631.274	$3,500	01/01/2003	15	75	59	$2,758	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2982	Stormwater MH	STMH_7727	N/A	0.00	CR			631847.414	26916028.320	629.661	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2983	Stormwater MH	STMH_7728	N/A	0.00	CR			631869.439	26916330.431	630.093	$1,500	01/01/1967	51	75	23	$461	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2984	Stormwater MH	STMH_7729	N/A	0.00	CR			631874.796	26916479.806	629.431	$4,000	01/01/2011	7	75	67	$3,579	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2985	Stormwater MH	STMH_7726	N/A	0.00	CR			631947.524	26916328.073	630.058	$1,500	01/01/1967	51	75	23	$461	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2986	Stormwater MH	STMH_7724	N/A	0.00				632206.760	26916364.541	629.664	$3,500	01/01/1974	44	75	30	$1,404	$6,017	1	1	0.0	0.0	1.0	1.0	1.1	1.1
2987	Stormwater MH	STMH_7725	N/A	0.00	CR			632196.850	26916322.515	630.144	$1,500	01/01/1967	51	75	23	$461	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2988	Stormwater MH	STMH_7714	N/A	0.00	CR			632371.936	26916321.872	629.050	$3,500	01/01/2009	9	75	65	$3,038	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2989	Stormwater MH	STMH_7723	N/A	0.00	CN			632216.017	26916562.862	629.696	$3,000	01/01/1997	21	75	53	$2,124	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2990	Stormwater MH	STMH_7692	N/A	0.00	CR			634101.356	26915969.293	609.611	$3,500	01/01/2000	18	75	56	$2,618	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
2991	Stormwater MH	STMH_8034	N/A	0.00	CR			634149.423	26915970.205	609.786	$1,000	01/01/1939	79	75	0	$0	$5,053	1	1	0.0	0.0	1.0	3.0	1.0	3
2992	Stormwater MH	STMH_8033	N/A	0.00	CR			634137.748	26915958.000	609.904	$3,500	01/01/2001	17	75	57	$2,665	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
2993	Stormwater MH	STMH_6635	N/A	0.00	CR			630784.986	26913112.088	701.841	$1,500	01/01/1965	53	75	21	$421	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
2994	Stormwater MH	STMH_6634	N/A	0.00	CR			630780.755	26912975.179	705.583	$3,500	01/01/1996	22	75	52	$2,431	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
2995	Stormwater MH	STMH_6633	N/A	0.00	CR			630763.115	26912490.331	712.782	$3,500	01/01/2004	14	75	60	$2,805	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2996	Stormwater MH	STMH_6632	N/A	0.00	CN			630758.010	26912217.981	718.165	$3,500	01/01/2008	10	75	64	$2,992	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2997	Stormwater MH	STMH_6631	N/A	0.00	CN			630741.337	26911822.674	722.446	$3,500	01/01/2008	10	75	64	$2,992	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2998	Stormwater MH	STMH_6630	N/A	0.00	CN			630736.227	26911691.281	721.793	$3,500	01/01/2008	10	75	64	$2,992	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
2999	Stormwater MH	STMH_6629	N/A	0.00	CN			630729.710	26911497.818	722.088	$3,500	01/01/2008	10	75	64	$2,992	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3000	Stormwater MH	STMH_6628	N/A	0.00	CN			630723.971	26911262.777	721.066	$3,500	01/01/2008	10	75	64	$2,992	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3001	Stormwater MH	STMH_6623	N/A	0.00	CR			631069.583	26911671.239	722.514	$3,000	01/01/1997	21	75	53	$2,124	$4,539	1	1	0.0	0.0	1.0	1.0	2.0	2
3002	Stormwater MH	STMH_6624	N/A	0.00	CR			631075.526	26911833.672	721.263	$3,000	01/01/1997	21	75	53	$2,124	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3003	Stormwater MH	STMH_6625	N/A	0.00	CN			631080.365	26912486.580	713.399	$3,500	01/01/2000	18	75	56	$2,618	$4,539	1	1	0.0	0.0	1.0	2.0	2.0	4
3004	Stormwater MH	STMH_6626	N/A	0.00	CN			631085.802	26912723.087	708.365	$3,500	01/01/2000	18	75	56	$2,618	$4,539	1	1	0.0	0.0	1.0	2.0	2.0	4
3005	Stormwater MH	STMH_6627	N/A	0.00	CN			631093.767	26912961.460	703.541	$3,500	01/01/2000	18	75	56	$2,618	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3006	Stormwater MH	STMH_6636	N/A	0.00				630614.381	26912978.536	705.599	$4,500	01/01/1996	22	75	52	$3,126	$6,017	1	1	0.0	0.0	1.0	2.0	1.1	2.2
3007	Stormwater MH	STMH_6655	N/A	0.00	CN			629794.109	26912694.613	712.988	$2,000	01/01/1965	53	75	21	$562	$5,092	1	1	0.0	0.0	1.0	2.0	2.0	4
3008	Stormwater MH	STMH_6656	N/A	0.00	BR			629808.139	26912974.625	709.365	$1,500	01/01/1965	53	75	21	$421	$4,539	1	1	0.0	0.0	1.0	2.0	2.0	4
3009	Stormwater MH	STMH_6660	N/A	0.00	CN			629593.940	26912998.095	711.884	$5,000	01/01/2000	18	75	56	$3,740	$6,017	1	1	0.0	0.0	1.0	1.0	1.0	1
3010	Stormwater MH	STMH_6665	N/A	0.00	CR			629126.103	26912827.608	716.164	$1,500	01/01/1966	52	75	22	$441	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3011	Stormwater MH	STMH_6666	N/A	0.00	CR			629133.543	26913018.260	714.253	$1,500	01/01/1966	52	75	22	$441	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3012	Stormwater MH	STMH_6667	N/A					629117.202	26913102.636	0.000	$2,000	01/01/1965	53	75	21	$562	$5,092	1	1	0.0	0.0	1.0	2.0	1.1	2.2
3013	Stormwater MH	STMH_6664	N/A	0.00	CR			629133.546	26912582.710	718.166	$3,500	01/01/2007	11	75	63	$2,945	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3014	Stormwater MH	STMH_6663	N/A	0.00	BR			629113.174	26912533.414	719.194	$2,500	01/01/1980	38	75	36	$1,203	$4,539	1	1	0.0	0.0	1.0	2.0	2.0	4
3015	Stormwater MH	STMH_6662	N/A	0.00	CN			629240.201	26912528.314	719.223	$4,000	01/01/1980	38	75	36	$1,925	$6,017	1	1	0.0	0.0	1.0	2.0	2.0	4
3016	Stormwater MH	STMH_6654	N/A	0.00	CN			629792.926	26912536.528	714.783	$2,000	01/01/1965	53	75	21	$562	$5,092	1	1	0.0	0.0	1.0	2.0	2.0	4
3017	Stormwater MH	STMH_6663A	N/A	0.00	BR			629037.213	26912535.218	718.714	$2,500	01/01/1980	38	75	36	$1,203	$4,539	1	1	0.0	0.0	1.0	2.0	2.0	4
3018	Stormwater MH	STMH_6669	N/A	0.00	BR			628943.899	26912447.564	718.309	$2,500	01/01/1980	38	75	36	$1,203	$4,539	1	1	0.0	0.0	1.0	3.0	2.0	6
3019	Stormwater MH	STMH_6507	N/A	0.00	BR			628741.027	26912253.034	717.195	$2,500	01/01/1980	38	75	36	$1,203	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
3020	Stormwater MH	STMH_6508	N/A	0.00	CN			628612.893	26912131.570	716.459	$2,500	01/01/1980	38	75	36	$1,203	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
3021	Stormwater MH	STMH_6509	N/A	0.00	CN			628542.723	26912062.968	716.119	$2,500	01/01/1980	38	75	36	$1,203	$4,539	1	1	0.0	0.0	1.0	3.0	2.0	6
3022	Stormwater MH	STMH_6510	N/A	0.00	CN			628384.898	26911835.637	716.374	$3,500	01/01/2000	18	75	56	$2,618	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
3023	Stormwater MH	STMH_6511	N/A	0.00	CN			628344.304	26911875.080	714.716	$3,500	01/01/2004	14	75	60	$2,805	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
3024	Stormwater MH	STMH_6512	N/A	0.00	CN			628229.884	26911763.107	713.645	$3,500	01/01/2004	14	75	60	$2,805	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
3025	Stormwater MH	STMH_6506	N/A	0.00	CR			628308.857	26911609.753	715.432	$4,700	01/01/2001	17	75	57	$3,579	$5,767	1	1	0.0	0.0	1.0	2.0	2.0	4
3026	Stormwater MH	STMH_6514	N/A	0.00	CR			628139.744	26911658.515	714.684	$4,000	01/01/2004	14	75	60	$3,206	$5,092	1	1	0.0	0.0	1.0	3.0	1.0	3
3027	Stormwater MH	STMH_6513	N/A	0.00	CR			628138.412	26911677.222	714.494	$4,700	01/01/2004	14	75	60	$3,767	$5,767	1	1	0.0	0.0	1.0	3.0	2.0	6
3028	Stormwater MH	STMH_6515	N/A	0.00	CR			628141.837	26911609.417	714.808	$3,700	01/01/1980	38	75	36	$1,780	$5,767	1	1	0.0	0.0	1.0	4.0	2.0	8
3029	Stormwater MH	STMH_6668	N/A	0.00	CN			628858.050	26912538.332	717.396	$2,500	01/01/1980	38	75	36	$1,203	$4,539	1	1	0.0	0.0	1.0	2.0	2.0	4
3030	Stormwater MH	STMH_6615	N/A	0.00	CN			630010.183	26910549.496	717.232	$3,000	01/01/1996	22	75	52	$2,084	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3031	Stormwater MH	STMH_6616	N/A	0.00	CR			629723.505	26910569.306	719.491	$5,000	01/01/2001	17	75	57	$3,807	$6,017	1	1	0.0	0.0	1.0	1.0	1.0	1
3032	Stormwater MH	STMH_6617	N/A	0.00	CR			629622.456	26910651.298	719.120	$3,500	01/01/2001	17	75	57	$2,665	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3033	Stormwater MH	STMH_6618	N/A	0.00	CR			629395.005	26910889.343	719.744	$5,000	01/01/2001	17	75	57	$3,807	$6,017	1	1	0.0	0.0	1.0	1.0	1.0	1
3034	Stormwater MH	STMH_6619	N/A	0.00	CR			629453.681	26910944.772	719.977	$5,000	01/01/2000	18	75	56	$3,740	$6,017	1	1	0.0	0.0	1.0	1.0	1.0	1
3035	Stormwater MH	STMH_6620	N/A	0.00	CR			629153.768	26911139.847	718.287	$4,000	01/01/2001	17	75	57	$3,046	$5,092	1	1	0.0	0.0	1.0	2.0	2.0	4
3036	Stormwater MH	STMH_7583	N/A	0.00	BR			631168.376	26915365.714	631.175	$1,500	01/01/1950	68	75	6	$121	$5,092	1	1	0.0	0.0	1.0	2.0	3.0	6
3037	Stormwater MH	STMH_7531	N/A	0.00	BR			630844.304	26915372.552	631.703	$1,000	01/01/1950	68	75	6	$81	$4,539	1	1	0.0	0.0	1.0	1.0	2.0	2
3038	Stormwater MH	STMH_7533	N/A	0.00	CR			630498.583	26915068.357	634.131	$3,500	01/01/2001	17	75	57	$2,665	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3039	Stormwater MH	STMH_7530	N/A	0.00	CR			630831.265	26915052.951	632.484	$3,500	01/01/2000	18	75	56	$2,618	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3040	Stormwater MH	STMH_7525	N/A	0.00	CR			631158.761	26915050.303	631.232	$4,000	01/01/2000	18	75	56	$2,992	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
3041	Stormwater MH	STMH_6621	N/A	0.00	CR			628897.186	26911408.291	718.331	$4,000	01/01/2001	17	75	57	$3,046	$5,092	1	1	0.0	0.0	1.0	2.0	2.0	4
3042	Stormwater MH	STMH_6505	N/A	0.00	CR			628703.485	26911588.859	716.631	$4,700	01/01/2001	17	75	57	$3,579	$5,767	1	1	0.0	0.0	1.0	2.0	1.0	2
3043	Stormwater MH	STMH_6437	N/A	0.00	CR			626110.209	26910922.438	707.494	$5,000	01/01/2004	14	75	60	$4,007	$6,017	1	1	0.0	0.0	1.0	2.0	1.0	2
3044	Stormwater MH	STMH_6536	N/A					628757.767	26913124.870	0.000	$3,000	01/01/1965	53	75	21	$843	$6,017	1	1	0.0	0.0	1.0	2.0	1.1	2.2
3045	Stormwater MH	STMH_6537	N/A					628580.609	26913141.762	0.000	$3,000	01/01/1965	53	75	21	$843	$6,017	1	1	0.0	0.0	1.0	2.0	1.1	2.2
3046	Stormwater MH	STMH_6538	N/A					628408.794	26913205.855	0.000	$3,000	01/01/1965	53	75	21	$843	$6,017	1	1	0.0	0.0	1.0	2.0	1.1	2.2
3047	Stormwater MH	STMH_7575	N/A	0.00	CN			630834.356	26914744.701	0.000	$1,000	01/01/1950	68	75	6	$81	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3048	Stormwater MH	STMH_7576	N/A	0.00	CN			630790.372	26914749.094	634.606	$3,000	01/01/1998	20	75	54	$2,164	$4,539	1	1	0.0	0.0	1.0	1.0	2.0	2
3049	Stormwater MH	STMH_7532	N/A	0.00	CN			630546.704	26914741.933	636.067	$4,500	01/01/1998	20	75	54	$3,246	$6,017	1	1	0.0	0.0	1.0	1.0	1.0	1
3050	Stormwater MH	STMH_7524	N/A	0.00	CN			630782.574	26914441.682	0.000	$4,500	01/01/1991	27	75	47	$2,826	$6,017	1	1	0.0	0.0	1.0	1.0	1.0	1
3051	Stormwater MH	STMH_7523A	N/A	0.00	CN			630791.355	26914450.236	636.476	$4,500	01/01/1991	27	75	47	$2,826	$6,017	1	1	0.0	0.0	1.0	1.0	1.0	1
3052	Stormwater MH	STMH_7522B	N/A	0.00	CN			630826.031	26914400.151	636.652	$4,500	01/01/1990	28	75	46	$2,766	$6,017	1	1	0.0	0.0	1.0	1.0	1.0	1
3053	Stormwater MH	STMH_7550	N/A	0.00	CR			630531.060	26915715.195	631.707	$3,500	01/01/1976	42	75	32	$1,497	$6,017	1	1	0.0	0.0	1.0	1.0	1.0	1
3054	Stormwater MH	STMH_7584	N/A	0.00	CN			631173.122	26915480.111	630.637	$1,000	01/01/1950	68	75	6	$81	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3055	Stormwater MH	STMH_7526	N/A	0.00	CN			631165.700	26915278.220	630.568	$1,000	01/01/1950	68	75	6	$81	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3056	Stormwater MH	STMH_7521	N/A	0.00	CR			631327.987	26913800.156	657.396	$1,000	01/01/1948	70	75	4	$54	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
3057	Stormwater MH	STMH_7536	N/A	0.00	CR			630151.086	26913810.917	697.233	$3,500	01/01/2007	11	75	63	$2,945	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3058	Stormwater MH	STMH_7537	N/A	0.00	CR			630152.905	26914034.510	686.882	$3,500	01/01/2007	11	75	63	$2,945	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3059	Stormwater MH	STMH_7538	N/A	0.00	CR			630150.636	26914297.055	660.220	$4,000	01/01/2007	11	75	63	$3,366	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
3060	Stormwater MH	STMH_7535	N/A	0.00	CR			630141.116	26913528.672	701.440	$3,500	01/01/2007	11	75	63	$2,945	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3061	Stormwater MH	STMH_7520	N/A	0.00	CN			630805.562	26913512.634	696.651	$1,500	01/01/1950	68	75	6	$121	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
3062	Stormwater MH	STMH_7557	N/A	0.00	CR			631237.876	26916355.546	631.444	$1,500	01/01/1964	54	75	20	$401	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3063	Stormwater MH	STMH_7556	N/A	0.00	CR			631213.324	26915851.128	629.973	$2,000	01/01/1978	40	75	34	$909	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3064	Stormwater MH	STMH_7564	N/A	0.00	CR			630907.796	26917074.737	630.930	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3065	Stormwater MH	STMH_7569	N/A	0.00				630264.716	26917402.406	631.937	$3,500	01/01/1977	41	75	33	$1,544	$6,017	1	1	0.0	0.0	1.0	1.0	1.1	1.1
3066	Stormwater MH	STMH_7570	N/A	0.00	CR			630268.926	26917542.315	632.364	$2,000	01/01/1977	41	75	33	$882	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3067	Stormwater MH	STMH_7571	N/A	0.00	CR			630274.968	26917646.155	632.839	$2,000	01/01/1977	41	75	33	$882	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3068	Stormwater MH	STMH_7572	N/A	0.00	CR			630277.214	26917757.657	632.416	$2,000	01/01/1977	41	75	33	$882	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3069	Stormwater MH	STMH_7573	N/A	0.00	CR			630286.808	26917973.658	631.720	$2,000	01/01/1977	41	75	33	$882	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3070	Stormwater MH	STMH_8301	N/A	0.00	CR			630304.189	26918450.143	632.352	$2,000	01/01/1977	41	75	33	$882	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3071	Stormwater MH	STMH_7567	N/A	0.00	CR			630428.292	26918426.604	631.621	$4,000	01/01/2010	8	75	66	$3,526	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3072	Stormwater MH	STMH_7566	N/A	0.00	CR			630678.924	26918412.393	0.000	$4,000	01/01/2010	8	75	66	$3,526	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3073	Stormwater MH	STMH_7565	N/A	0.00	CR			630989.073	26918395.558	631.913	$5,000	01/01/2009	9	75	65	$4,341	$6,017	1	1	0.0	0.0	1.0	1.0	1.0	1
3074	Stormwater MH	STMH_8302	N/A	0.00	CR			630311.919	26918626.179	632.145	$2,000	01/01/1977	41	75	33	$882	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3075	Stormwater MH	STMH_8303	N/A	0.00	CR			630315.308	26918750.026	631.892	$2,000	01/01/1977	41	75	33	$882	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3076	Stormwater MH	STMH_8304	N/A	0.00	CR			630321.973	26918914.185	630.999	$2,000	01/01/1977	41	75	33	$882	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3077	Stormwater MH	STMH_8305	N/A	0.00	CR			630329.723	26919092.029	631.396	$2,000	01/01/1977	41	75	33	$882	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3078	Stormwater MH	STMH_8306	N/A	0.00	CR			630342.596	26919442.336	630.194	$2,000	01/01/1977	41	75	33	$882	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3079	Stormwater MH	STMH_8309	N/A	0.00	CR			630356.574	26919776.069	627.305	$2,500	01/01/1977	41	75	33	$1,103	$5,092	1	1	0.0	0.0	1.0	3.0	1.0	3
3080	Stormwater MH	STMH_8310	N/A	0.00	CR			630368.768	26920149.511	620.154	$2,000	01/01/1977	41	75	33	$882	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
3081	Stormwater MH	STMH_8311	N/A	0.00	CR			630383.866	26920458.412	615.893	$2,000	01/01/1977	41	75	33	$882	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
3082	Stormwater MH	STMH_8312	N/A	0.00	CR			630398.097	26920832.168	610.575	$2,000	01/01/1977	41	75	33	$882	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
3083	Stormwater MH	STMH_8321	N/A	0.00	ZZZ			630412.172	26921140.386	607.438	$2,500	01/01/1977	41	75	33	$1,103	$5,092	1	1	0.0	0.0	1.0	3.0	2.0	6
3084	Stormwater MH	STMH_8320	N/A	0.00	CR			630385.594	26921183.004	607.347	$2,500	01/01/1977	41	75	33	$1,103	$5,092	1	1	0.0	0.0	1.0	3.0	2.0	6
3085	Stormwater MH	STMH_8322	N/A	0.00	CR			630465.861	26921172.381	606.883	$3,500	01/01/2000	18	75	56	$2,618	$4,539	1	1	0.0	0.0	1.0	3.0	2.0	6
3086	Stormwater MH	STMH_8323	N/A	0.00	CR			630782.404	26921140.572	604.310	$3,500	01/01/2009	9	75	65	$3,038	$4,539	1	1	0.0	0.0	1.0	1.0	2.0	2
3087	Stormwater MH	STMH_8324	N/A		CR			631032.175	26921125.417	602.774	$3,500	01/01/2009	9	75	65	$3,038	$4,539	1	1	0.0	0.0	1.0	1.0	2.0	2
3088	Stormwater MH	STMH_8325	N/A	0.00	CR			631359.730	26921104.554	600.675	$3,500	01/01/2009	9	75	65	$3,038	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3089	Stormwater MH	STMH_8319	N/A	0.00	CR			630192.551	26921191.388	609.340	$4,000	01/01/2000	18	75	56	$2,992	$5,092	1	1	0.0	0.0	1.0	4.0	2.0	8
3090	Stormwater MH	STMH_8318	N/A	0.00	CR			630124.210	26921194.913	610.552	$4,000	01/01/2000	18	75	56	$2,992	$5,092	1	1	0.0	0.0	1.0	4.0	2.0	8
3091	Stormwater MH	STMH_8316	N/A	0.00	CR			629685.959	26921219.385	618.270	$3,500	01/01/2000	18	75	56	$2,618	$4,539	1	1	0.0	0.0	1.0	4.0	2.0	8
3092	Stormwater MH	STMH_8315	N/A	0.00	CR			629417.750	26921246.753	621.092	$3,500	01/01/2000	18	75	56	$2,618	$4,539	1	1	0.0	0.0	1.0	4.0	2.0	8
3093	Stormwater MH	STMH_8216	N/A	0.00	CR			629100.613	26921278.902	624.466	$4,000	01/01/2000	18	75	56	$2,992	$5,092	1	1	0.0	0.0	1.0	3.0	1.0	3
3094	Stormwater MH	STMH_7561	N/A	0.00	CR			630151.754	26915830.459	635.452	$3,500	01/01/2007	11	75	63	$2,945	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
3095	Stormwater MH	STMH_7562	N/A	0.00	CR			630173.456	26916333.441	634.992	$3,500	01/01/2007	11	75	63	$2,945	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
3096	Stormwater MH	STMH_7563	N/A	0.00	CR			630204.675	26916422.346	633.686	$5,000	01/01/2007	11	75	63	$4,207	$6,017	1	1	0.0	0.0	1.0	1.0	1.0	1
3097	Stormwater MH	STMH_7568	N/A	0.00	CR			630209.563	26917042.049	633.407	$4,000	01/01/2014	4	75	70	$3,739	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3098	Stormwater MH	STMH_7540	N/A	0.00	CR			630114.271	26914586.613	647.686	$4,000	01/01/2007	11	75	63	$3,366	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
3099	Stormwater MH	STMH_7541	N/A	0.00	CR			630114.069	26914734.151	645.236	$4,000	01/01/2007	11	75	63	$3,366	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
3100	Stormwater MH	STMH_7543	N/A	0.00	CR			630127.209	26915026.266	639.742	$4,000	01/01/2007	11	75	63	$3,366	$5,092	1	1	0.0	0.0	1.0	3.0	1.0	3
3101	Stormwater MH	STMH_7542	N/A	0.00	CR			630124.765	26914961.377	642.077	$4,000	01/01/2007	11	75	63	$3,366	$5,092	1	1	0.0	0.0	1.0	3.0	1.0	3
3102	Stormwater MH	STMH_7544	N/A	0.00	CR			630126.557	26915105.846	639.383	$3,500	01/01/2007	11	75	63	$2,945	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
3103	Stormwater MH	STMH_7545	N/A	0.00	CR			630131.372	26915285.851	638.284	$3,500	01/01/2007	11	75	63	$2,945	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3

CITY OF SAULT STE. MARIE, MICHIGAN

Summary

id	Equipment Description	Asset ID	Construction Drawings Sheet Reference	Capacity or Size	Material	Length	Comment	Northing State Plane Ordinate	Easting State Plane Ordinate	Elevation	Original Cost	Year Installed (01/01/YYYY)	Age	Expected useful life (years)	Remaining Useful Life (years)	Depreciated Value	Replacement Cost	Average number of units in service	Total Number of units	Redundancy (Number)	Redundancy (percent)	Redundancy Score (R) (Reduces (C))	Criticality (C) (see back-up sheets)	Probability of Failure (P) (see back-up sheets)	Business Risk (BRE=PxCxR)
3104	Stormwater MH	STMH_7546	N/A	0.00	CR			630136.263	26915393.910	637.676	$3,500	01/01/2007	11	75	63	$2,945	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
3105	Stormwater MH	STMH_7501	N/A					631352.840	26913157.584	0.000	$2,000	01/01/1965	53	75	21	$562	$5,092	1	1	0.0	0.0	1.0	4.0	1.1	4.4
3106	Stormwater MH	STMH_7504	N/A					631097.558	26913162.948	0.000	$2,000	01/01/1965	53	75	21	$562	$5,092	1	1	0.0	0.0	1.0	4.0	1.1	4.4
3107	Stormwater MH	STMH_6627A	N/A					631093.607	26913111.683	0.000	$2,000	01/01/1965	53	75	21	$562	$5,092	1	1	0.0	0.0	1.0	2.0	1.1	2.2
3108	Stormwater MH	STMH_7505	N/A	0.00	CR			630965.590	26913189.720	702.013	$3,000	01/01/1998	20	75	54	$2,164	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3109	Stormwater MH	STMH_7507	N/A					630765.573	26913168.840	0.000	$2,000	01/01/1965	53	75	21	$562	$5,092	1	1	0.0	0.0	1.0	4.0	1.1	4.4
3110	Stormwater MH	STMH_7506	N/A					630785.972	26913167.979	0.000	$2,000	01/01/1965	53	75	21	$562	$5,092	1	1	0.0	0.0	1.0	4.0	1.1	4.4
3111	Stormwater MH	STMH_6642	N/A	0.00	CR		MH DRY	630439.558	26913119.323	702.993	$1,500	01/01/1965	53	75	21	$421	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3112	Stormwater MH	STMH_7508	N/A					630441.400	26913170.740	0.000	$2,000	01/01/1965	53	75	21	$562	$5,092	1	1	0.0	0.0	1.0	4.0	1.1	4.4
3113	Stormwater MH	STMH_7510	N/A					630099.745	26913190.324	0.000	$3,000	01/01/1965	53	75	21	$843	$6,017	1	1	0.0	0.0	1.0	4.0	1.1	4.4
3114	Stormwater MH	STMH_7509	N/A					630113.415	26913177.987	0.000	$2,000	01/01/1965	53	75	21	$562	$5,092	1	1	0.0	0.0	1.0	4.0	1.1	4.4
3115	Stormwater MH	STMH_6653	N/A	0.00				630112.432	26913133.554	706.471	$3,000	01/01/1965	53	75	21	$843	$6,017	1	1	0.0	0.0	1.0	1.0	1.1	1.1
3116	Stormwater MH	STMH_7511	N/A					629893.313	26913179.111	0.000	$2,000	01/01/1965	53	75	21	$562	$5,092	1	1	0.0	0.0	1.0	4.0	1.1	4.4
3117	Stormwater MH	STMH_7512	N/A					629821.450	26913180.694	0.000	$2,000	01/01/1965	53	75	21	$562	$5,092	1	1	0.0	0.0	1.0	4.0	1.1	4.4
3118	Stormwater MH	STMH_7513	N/A					629789.708	26913181.648	0.000	$2,000	01/01/1965	53	75	21	$562	$5,092	1	1	0.0	0.0	1.0	3.0	1.1	3.3
3119	Stormwater MH	STMH_6659	N/A	0.00	CN			629820.856	26913135.818	708.588	$1,500	01/01/1965	53	75	21	$421	$4,539	1	1	0.0	0.0	1.0	2.0	3.0	6
3120	Stormwater MH	STMH_6661	N/A	0.00	BR			629463.122	26913140.856	711.431	$3,000	01/01/1965	53	75	21	$843	$6,017	1	1	0.0	0.0	1.0	1.0	2.0	2
3121	Stormwater MH	STMH_7514	N/A					629463.187	26913187.481	0.000	$2,000	01/01/1965	53	75	21	$562	$5,092	1	1	0.0	0.0	1.0	3.0	1.1	3.3
3122	Stormwater MH	STMH_7515	N/A					629115.941	26913191.520	0.000	$2,000	01/01/1965	53	75	21	$562	$5,092	1	1	0.0	0.0	1.0	3.0	1.1	3.3
3123	Stormwater MH	STMH_6609	N/A	0.00	CT			631245.333	26910511.557	715.280	$3,000	01/01/1996	22	75	52	$2,084	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3124	Stormwater MH	STMH_6611	N/A	0.00	CR			630718.891	26910526.143	717.380	$3,000	01/01/1996	22	75	52	$2,084	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3125	Stormwater MH	STMH_6614	N/A	0.00	CR			630230.686	26910543.467	717.925	$3,000	01/01/1996	22	75	52	$2,084	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3126	Stormwater MH	STMH_6644	N/A	0.00	CN			629984.003	26910648.868	718.605	$5,000	01/01/2000	18	75	56	$3,740	$6,017	1	1	0.0	0.0	1.0	1.0	1.0	1
3127	Stormwater MH	STMH_6643	N/A	0.00	CN			630011.380	26910626.721	717.256	$4,500	01/01/1996	22	75	52	$3,126	$6,017	1	1	0.0	0.0	1.0	1.0	1.0	1
3128	Stormwater MH	STMH_6645	N/A	0.00	CN			630019.859	26910834.413	718.420	$3,000	01/01/1996	22	75	52	$2,084	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3129	Stormwater MH	STMH_6646	N/A	0.00	CN			630031.104	26911209.118	719.670	$3,000	01/01/1996	22	75	52	$2,084	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3130	Stormwater MH	STMH_6647	N/A	0.00	CN			630039.675	26911459.594	720.992	$3,000	01/01/1996	22	75	52	$2,084	$4,539	1	1	0.0	0.0	1.0	1.0	2.0	2
3131	Stormwater MH	STMH_8217	N/A	0.00	CR			623899.486	26921324.578	633.798	$4,000	01/01/2000	18	75	56	$2,992	$5,053	1	1	0.0	0.0	1.0	2.0	1.0	2
3132	Stormwater MH	STMH_8434	N/A	0.00	CR			632907.194	26923877.216	592.063	$3,500	01/01/2004	14	75	60	$2,805	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
3133	Stormwater MH	STMH_8433	N/A	0.00	CR			632729.067	26923803.884	593.816	$3,500	01/01/2004	14	75	60	$2,805	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
3134	Stormwater MH	STMH_8432	N/A	0.00	CR			632632.278	26923776.212	593.844	$3,500	01/01/2004	14	75	60	$2,805	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
3135	Stormwater MH	STMH_8469	N/A	0.00	CR			632474.111	26924020.812	592.474	$3,500	01/01/2006	12	75	62	$2,898	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3136	Stormwater MH	STMH_8470A	N/A					633438.245	26923643.551	0.000	$2,500	01/01/1983	35	75	39	$1,303	$4,539	1	1	0.0	0.0	1.0	3.0	1.1	3.3
3137	Stormwater MH	STMH_8470B	N/A	0.00	CR			633472.864	26923569.405	589.101	$2,500	01/01/1983	35	75	39	$1,303	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
3138	Stormwater MH	STMH_8470C	N/A	0.00	CR			633501.082	26923508.766	589.360	$2,500	01/01/1983	35	75	39	$1,303	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
3139	Stormwater MH	STMH_8455	N/A					634152.295	26921921.352	0.000	$4,500	01/01/1998	20	75	54	$3,246	$6,017	1	1	0.0	0.0	1.0	2.0	1.1	2.2
3140	Stormwater MH	STMH_8458	N/A					634133.653	26921935.477	0.000	$3,000	01/01/1960	58	75	16	$643	$6,017	1	1	0.0	0.0	1.0	2.0	1.1	2.2
3141	Stormwater MH	STMH_8461	N/A	0.00	CR			633502.709	26921614.710	599.582	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3142	Stormwater MH	STMH_8420	N/A	0.00	CR			633222.089	26921417.355	601.287	$3,500	01/01/2005	13	75	61	$2,852	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3143	Stormwater MH	STMH_6112	N/A	0.00	CN			631775.712	26904249.643	663.746	$3,500	01/01/2000	18	75	56	$2,618	$4,539	1	1	0.0	0.0	1.0	1.0	2.0	2
3144	Stormwater MH	STMH_5613	N/A	0.00	CN			632629.321	26901284.485	614.962	$2,500	01/01/1986	32	75	42	$1,403	$4,539	1	1	0.0	0.0	1.0	2.0	2.0	4
3145	Stormwater MH	STMH_5611	N/A	0.00	CN			632207.132	26900153.217	621.523	$3,500	01/01/2002	16	75	58	$2,712	$4,539	1	1	0.0	0.0	1.0	1.0	2.0	2
3146	Stormwater MH	STMH_5616	N/A	0.00	CR			632236.028	26900796.953	622.360	$4,000	01/01/2002	16	75	58	$3,099	$5,092	1	1	0.0	0.0	1.0	1.0	2.0	2
3147	Stormwater MH	STMH_5617	N/A	0.00	CR			632246.386	26901019.175	622.203	$4,000	01/01/2002	16	75	58	$3,099	$5,092	1	1	0.0	0.0	1.0	1.0	3.0	3
3148	Stormwater MH	STMH_5618	N/A	0.00	CR			632252.990	26901150.424	621.168	$5,000	01/01/2002	16	75	58	$3,874	$6,017	1	1	0.0	0.0	1.0	1.0	2.0	2
3149	Stormwater MH	STMH_5608	N/A	0.00	CR			631882.990	26899969.989	623.454	$500	01/01/1949	69	75	5	$33	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3150	Stormwater MH	STMH_5610	N/A	0.00	CR			631549.527	26899982.005	626.833	$500	01/01/1949	69	75	5	$33	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3151	Stormwater MH	STMH_5609	N/A	0.00				631734.442	26899975.844	624.641	$2,000	01/01/1949	69	75	5	$135	$6,017	1	1	0.0	0.0	1.0	1.0	1.1	1.1
3152	Stormwater MH	STMH_5603	N/A	0.00	CN			632090.180	26898004.843	617.393	$3,000	01/01/1984	34	75	40	$1,604	$5,092	1	1	0.0	0.0	1.0	1.0	2.0	2
3153	Stormwater MH	STMH_5601	N/A	0.00	BR			632052.710	26897338.973	611.684	$3,500	01/01/1999	19	75	55	$2,571	$5,053	1	1	0.0	0.0	1.0	2.0	2.0	4
3154	Stormwater MH	STMH_5406	N/A	0.00	CN			632036.548	26897205.843	611.296	$3,500	01/01/2000	18	75	56	$2,618	$4,539	1	1	0.0	0.0	1.0	2.0	2.0	4
3155	Stormwater MH	STMH_5401	N/A	0.00				632246.484	26897190.742	610.137	$5,000	01/01/2000	18	75	56	$3,740	$6,017	1	1	0.0	0.0	1.0	1.0	1.1	1.1
3156	Stormwater MH	STMH_5402	N/A	0.00				632249.903	26897224.981	609.345	$4,000	01/01/2000	18	75	56	$2,992	$5,092	1	1	0.0	0.0	1.0	1.0	1.1	1.1
3157	Stormwater MH	STMH_5404	N/A	0.00	CR			632122.758	26897233.346	611.328	$3,500	01/01/2000	18	75	56	$2,618	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3158	Stormwater MH	STMH_5405	N/A	0.00	CR			632097.437	26897264.695	612.414	$3,000	01/01/1996	22	75	52	$2,084	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3159	Stormwater MH	STMH_8419	N/A	0.00	CR			633325.999	26921187.538	601.575	$3,500	01/01/2005	13	75	61	$2,852	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3160	Stormwater MH	STMH_8418	N/A	0.00	CR			633404.864	26921010.643	602.492	$3,500	01/01/2005	13	75	61	$2,852	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3161	Stormwater MH	STMH_8421	N/A	0.00	CR			633017.105	26921874.532	598.395	$3,500	01/01/2005	13	75	61	$2,852	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3162	Stormwater MH	STMH_8422	N/A	0.00	CR			632945.922	26922034.271	599.015	$3,500	01/01/2005	13	75	61	$2,852	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3163	Stormwater MH	STMH_8423	N/A	0.00	CR			632894.277	26922147.604	598.704	$3,500	01/01/2005	13	75	61	$2,852	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3164	Stormwater MH	STMH_8423A	N/A	0.00	CR			632841.847	26922263.086	598.187	$3,500	01/01/2005	13	75	61	$2,852	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3165	Stormwater MH	STMH_8424	N/A	0.00	CR			632789.508	26922378.457	597.672	$3,500	01/01/2005	13	75	61	$2,852	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3166	Stormwater MH	STMH_8425	N/A	0.00	CR			632735.450	26922502.398	598.238	$3,500	01/01/2004	14	75	60	$2,805	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3167	Stormwater MH	STMH_8426	N/A	0.00	CR			632685.271	26922640.082	599.079	$3,500	01/01/2004	14	75	60	$2,805	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3168	Stormwater MH	STMH_8427	N/A	0.00	CR			632538.630	26922946.552	596.654	$3,500	01/01/2004	14	75	60	$2,805	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3169	Stormwater MH	STMH_8428	N/A	0.00	CR			632498.227	26923032.761	595.438	$3,500	01/01/2004	14	75	60	$2,805	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3170	Stormwater MH	STMH_8429	N/A	0.00	CR			632425.580	26923194.683	594.996	$3,500	01/01/2004	14	75	60	$2,805	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3171	Stormwater MH	STMH_8430	N/A	0.00	CR			632344.383	26923377.271	596.422	$3,500	01/01/2004	14	75	60	$2,805	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3172	Stormwater MH	STMH_8431	N/A	0.00	CR			632315.119	26923443.648	596.201	$3,500	01/01/2004	14	75	60	$2,805	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3173	Stormwater MH	STMH_8462	N/A	0.00	CR			632232.116	26923620.580	596.354	$3,500	01/01/2004	14	75	60	$2,805	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
3174	Stormwater MH	STMH_8463	N/A	0.00	CR			632357.922	26923669.441	595.191	$3,500	01/01/2004	14	75	60	$2,805	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
3175	Stormwater MH	STMH_8414A	N/A	0.00	CR			633812.315	26920213.555	602.385	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3176	Stormwater MH	STMH_8415	N/A	0.00	CR			633664.344	26920409.368	601.919	$3,500	01/01/2006	12	75	62	$2,898	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3177	Stormwater MH	STMH_8416	N/A	0.00	CR			633567.546	26920621.596	602.790	$3,500	01/01/2006	12	75	62	$2,898	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3178	Stormwater MH	STMH_8417	N/A	0.00	CR			633499.698	26920776.260	602.082	$3,500	01/01/2005	13	75	61	$2,852	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3179	Stormwater MH	STMH_8413	N/A	0.00	CR			633835.424	26920026.175	602.648	$3,500	01/01/2006	12	75	62	$2,898	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3180	Stormwater MH	STMH_8412	N/A	0.00	CR			633888.728	26919907.442	602.251	$3,500	01/01/2006	12	75	62	$2,898	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3181	Stormwater MH	STMH_8410	N/A	0.00	CR			633992.716	26919598.822	603.069	$3,500	01/01/2006	12	75	62	$2,898	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3182	Stormwater MH	STMH_8409	N/A	0.00	CR			634044.720	26919565.615	602.966	$3,500	01/01/2006	12	75	62	$2,898	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3183	Stormwater MH	STMH_8408	N/A	0.00	CR			634171.888	26919277.145	604.436	$4,000	01/01/2006	12	75	62	$3,312	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
3184	Stormwater MH	STMH_8407	N/A	0.00	CR			634218.511	26919222.822	604.903	$2,500	01/01/1950	68	75	6	$202	$6,017	1	1	0.0	0.0	1.0	5.0	1.0	5
3185	Stormwater MH	STMH_8411	N/A	0.00				634027.325	26919601.829	603.240	$3,500	01/01/2006	12	75	62	$2,898	$4,539	1	1	0.0	0.0	1.0	1.0	1.1	1.1
3186	Stormwater MH	STMH_8522	N/A	0.00	CR			634383.785	26920431.452	600.581	$2,000	01/01/1939	79	75	0	$0	$6,017	1	1	0.0	0.0	1.0	2.0	1.0	2
3187	Stormwater MH	STMH_6438	N/A					625066.855	26913233.858	0.000	$4,000	01/01/1986	32	75	42	$2,245	$6,017	1	1	0.0	0.0	1.0	1.0	1.1	1.1
3188	Stormwater MH	STMH_6504	N/A	0.00	CR			628773.689	26911656.479	717.727	$5,500	01/01/2011	7	75	67	$4,922	$6,017	1	1	0.0	0.0	1.0	1.0	1.0	1
3189	Stormwater MH	STMH_6434	N/A	0.00	ZZZ			623411.528	26909969.998	702.568	$5,000	01/01/2000	18	75	56	$3,740	$6,017	1	1	0.0	0.0	1.0	1.0	1.0	1
3190	Stormwater MH	STMH_6409	N/A					625742.658	26910338.097	0.000	$3,500	01/01/1976	42	75	32	$1,497	$6,017	1	1	0.0	0.0	1.0	4.0	1.1	4.4
3191	Stormwater MH	STMH_6406	N/A	0.00	CR			625722.500	26909704.720	702.158	$3,500	01/01/2009	9	75	65	$3,038	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3192	Stormwater MH	STMH_6405	N/A	0.00	CR			625713.789	26909395.514	701.004	$3,500	01/01/2009	9	75	65	$3,038	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3193	Stormwater MH	STMH_6404	N/A	0.00	CR			625712.921	26909315.957	700.641	$3,500	01/01/2009	9	75	65	$3,038	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3194	Stormwater MH	STMH_6403	N/A	0.00	CR			625703.874	26908948.380	699.315	$3,500	01/01/2009	9	75	65	$3,038	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3195	Stormwater MH	STMH_6402	N/A	0.00	CR			625695.328	26908753.804	700.532	$3,500	01/01/2009	9	75	65	$3,038	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3196	Stormwater MH	STMH_6401	N/A	0.00	CR			625687.723	26908507.561	698.806	$5,000	01/01/2009	9	75	65	$4,341	$6,017	1	1	0.0	0.0	1.0	2.0	1.0	2
3197	Stormwater MH	STMH_6411	N/A	0.00	CR			625395.069	26908742.883	699.832	$3,500	01/01/2008	10	75	64	$2,992	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3198	Stormwater MH	STMH_6419	N/A	0.00	CR			625047.356	26908680.071	699.992	$3,000	01/01/1997	21	75	53	$2,124	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3199	Stormwater MH	STMH_6418	N/A	0.00	CR			625041.419	26908534.844	699.615	$4,500	01/01/1997	21	75	53	$3,186	$6,017	1	1	0.0	0.0	1.0	2.0	1.0	2
3200	Stormwater MH	STMH_6522	N/A					627816.007	26912332.900	0.000	$3,500	01/01/1976	42	75	32	$1,497	$6,017	1	1	0.0	0.0	1.0	2.0	1.1	2.2
3201	Stormwater MH	STMH_6523	N/A					627814.134	26912324.197	0.000	$3,500	01/01/1976	42	75	32	$1,497	$6,017	1	1	0.0	0.0	1.0	2.0	1.1	2.2
3202	Stormwater MH	STMH_6525	N/A					627437.607	26911963.253	0.000	$3,500	01/01/1976	42	75	32	$1,497	$6,017	1	1	0.0	0.0	1.0	3.0	1.1	3.3
3203	Stormwater MH	STMH_6527	N/A					627238.105	26911772.167	0.000	$3,500	01/01/1976	42	75	32	$1,497	$6,017	1	1	0.0	0.0	1.0	3.0	1.1	3.3
3204	Stormwater MH	STMH_6526	N/A					627240.663	26911781.480	0.000	$3,500	01/01/1976	42	75	32	$1,497	$6,017	1	1	0.0	0.0	1.0	3.0	1.1	3.3
3205	Stormwater MH	STMH_6530	N/A					626643.024	26911203.176	0.000	$3,500	01/01/1976	42	75	32	$1,497	$6,017	1	1	0.0	0.0	1.0	4.0	1.1	4.4
3206	Stormwater MH	STMH_6531	N/A					626554.598	26911233.494	0.000	$3,500	01/01/1976	42	75	32	$1,497	$6,017	1	1	0.0	0.0	1.0	1.0	1.1	1.1
3207	Stormwater MH	STMH_6533	N/A					626441.513	26911103.122	0.000	$3,500	01/01/1976	42	75	32	$1,497	$6,017	1	1	0.0	0.0	1.0	1.0	1.1	1.1
3208	Stormwater MH	STMH_6532	N/A					626486.626	26911049.620	0.000	$3,500	01/01/1976	42	75	32	$1,497	$6,017	1	1	0.0	0.0	1.0	4.0	1.1	4.4
3209	Stormwater MH	STMH_6534	N/A					626314.411	26910888.462	0.000	$3,500	01/01/1976	42	75	32	$1,497	$6,017	1	1	0.0	0.0	1.0	4.0	1.1	4.4
3210	Stormwater MH	STMH_6535	N/A					626147.536	26910722.363	0.000	$3,500	01/01/1976	42	75	32	$1,497	$6,017	1	1	0.0	0.0	1.0	4.0	1.1	4.4
3211	Stormwater MH	STMH_6407	N/A					625992.979	26910580.116	0.000	$3,500	01/01/1976	42	75	32	$1,497	$6,017	1	1	0.0	0.0	1.0	4.0	1.1	4.4
3212	Stormwater MH	STMH_6412	N/A					625503.027	26910109.146	0.000	$3,500	01/01/1976	42	75	32	$1,497	$6,017	1	1	0.0	0.0	1.0	4.0	1.1	4.4
3213	Stormwater MH	STMH_6415	N/A					625349.199	26909960.324	0.000	$3,500	01/01/1976	42	75	32	$1,497	$6,017	1	1	0.0	0.0	1.0	5.0	1.1	5.5
3214	Stormwater MH	STMH_6416	N/A					625306.798	26910015.537	0.000	$3,500	01/01/1976	42	75	32	$1,497	$6,017	1	1	0.0	0.0	1.0	1.0	1.1	1.1
3215	Stormwater MH	STMH_6421	N/A	0.00	CR			624870.264	26909507.352	701.702	$2,000	01/01/1976	42	75	32	$855	$4,539	1	1	0.0	0.0	1.0	5.0	1.0	5
3216	Stormwater MH	STMH_6422	N/A					624646.195	26909299.587	0.000	$3,500	01/01/1976	42	75	32	$1,497	$6,017	1	1	0.0	0.0	1.0	5.0	1.1	5.5
3217	Stormwater MH	STMH_6423	N/A					624402.514	26909114.664	0.000	$3,500	01/01/1976	42	75	32	$1,497	$6,017	1	1	0.0	0.0	1.0	5.0	1.1	5.5
3218	Stormwater MH	STMH_6424	N/A					624171.280	26908954.391	0.000	$3,500	01/01/1976	42	75	32	$1,497	$6,017	1	1	0.0	0.0	1.0	5.0	1.1	5.5
3219	Stormwater MH	STMH_6426	N/A					623918.638	26908778.931	0.000	$3,500	01/01/1976	42	75	32	$1,497	$6,017	1	1	0.0	0.0	1.0	3.0	1.1	3.3
3220	Stormwater MH	STMH_6427	N/A					623677.276	26908519.999	0.000	$3,500	01/01/1976	42	75	32	$1,497	$6,017	1	1	0.0	0.0	1.0	3.0	1.1	3.3
3221	Stormwater MH	STMH_6428	N/A					623543.110	26908162.742	0.000	$3,500	01/01/1976	42	75	32	$1,497	$6,017	1	1	0.0	0.0	1.0	2.0	1.1	2.2
3222	Stormwater MH	STMH_6429	N/A					623469.982	26908516.706	0.000	$3,500	01/01/1976	42	75	32	$1,497	$6,017	1	1	0.0	0.0	1.0	2.0	1.1	2.2
3223	Stormwater MH	STMH_5817	N/A					623414.000	26907525.812	0.000	$3,500	01/01/1976	42	75	32	$1,497	$6,017	1	1	0.0	0.0	1.0	3.0	1.1	3.3
3224	Stormwater MH	STMH_5816A	N/A					623407.314	26907517.578	0.000	$3,500	01/01/1976	42	75	32	$1,497	$6,017	1	1	0.0	0.0	1.0	3.0	1.1	3.3
3225	Stormwater MH	STMH_5818	N/A					623433.125	26907568.415	0.000	$3,500	01/01/1976	42	75	32	$1,497	$6,017	1	1	0.0	0.0	1.0	3.0	1.1	3.3
3226	Stormwater MH	STMH_5822	N/A	0.00	CR			623325.135	26907734.445	702.743	$3,000	01/01/1995	23	75	51	$2,044	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
3227	Stormwater MH	STMH_5823	N/A					623345.677	26907892.005	0.000	$4,500	01/01/1995	23	75	51	$3,066	$6,017	1	1	0.0	0.0	1.0	3.0	1.1	3.3
3228	Stormwater MH	STMH_5824	N/A	0.00	CR			623352.200	26908028.845	703.446	$3,000	01/01/1995	23	75	51	$2,044	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
3229	Stormwater MH	STMH_5820	N/A					623428.981	26907878.154	0.000	$3,500	01/01/1976	42	75	32	$1,497	$6,017	1	1	0.0	0.0	1.0	3.0	1.1	3.3
3230	Stormwater MH	STMH_5821	N/A					623424.263	26907883.256	0.000	$3,500	01/01/1976	42	75	32	$1,497	$6,017	1	1	0.0	0.0	1.0	3.0	1.1	3.3
3231	Stormwater MH	STMH_5819	N/A					623418.320	26907696.874	0.000	$3,500	01/01/1976	42	75	32	$1,497	$6,017	1	1	0.0	0.0	1.0	3.0	1.1	3.3
3232	Stormwater MH	STMH_5816	N/A					623411.387	26907441.193	0.000	$3,500	01/01/1976	42	75	32	$1,497	$6,017	1	1	0.0	0.0	1.0	3.0	1.1	3.3
3233	Stormwater MH	STMH_5815	N/A					623430.458	26907095.651	0.000	$3,500	01/01/1976	42	75	32	$1,497	$6,017	1	1	0.0	0.0	1.0	3.0	1.1	3.3
3234	Stormwater MH	STMH_6833	N/A	0.00	CR			633934.295	26907986.440	636.136	$2,000	01/01/1968	50	75	24	$642	$5,092	1	1	0.0	0.0	1.0	3.0	1.0	3
3235	Stormwater MH	STMH_6834	N/A	0.00	CR			633930.890	26907955.011	636.193	$2,000	01/01/1968	50	75	24	$642	$5,092	1	1	0.0	0.0	1.0	3.0	1.0	3
3236	Stormwater MH	STMH_6827	N/A	0.00	CR			634840.496	26908842.719	625.827	$5,000	01/01/2009	9	75	65	$4,341	$6,017	1	1	0.0	0.0	1.0	1.0	1.0	1
3237	Stormwater MH	STMH_6826	N/A	0.00	CR			635105.960	26909011.190	621.568	$3,500	01/01/2009	9	75	65	$3,038	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3238	Stormwater MH	STMH_6825	N/A	0.00	CR			635278.659	26909223.883	619.219	$3,500	01/01/2009	9	75	65	$3,038	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3239	Stormwater MH	STMH_6824	N/A	0.00	CR			635461.004	26909560.134	616.263	$3,500	01/01/2009	9	75	65	$3,038	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3240	Stormwater MH	STMH_6823	N/A	0.00	CR			635588.534	26909831.635	618.161	$1,500	01/01/1961	57	75	17	$341	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3241	Stormwater MH	STMH_6821	N/A					635637.934	26910014.546	0.000	$2,000	01/01/1961	57	75	17	$455	$5,092	1	1	0.0	0.0	1.0	2.0	1.1	2.2
3242	Stormwater MH	STMH_6840	N/A	0.00	CR			635642.965	26910200.532	612.241	$3,500	01/01/2009	9	75	65	$3,038	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3243	Stormwater MH	STMH_6822	N/A	0.00	CR			635588.734	26909991.875	615.822	$2,000	01/01/1961	57	75	17	$455	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
3244	Stormwater MH	STMH_6831	N/A	0.00				634461.340	26908474.150	633.509	$3,000	01/01/1964	54	75	20	$803	$6,017	1	1	0.0	0.0	1.0	2.0	1.1	2.2
3245	Stormwater MH	STMH_6708	N/A	0.00	BR			633931.981	26910093.371	694.484	$1,500	01/01/1962	56	75	18	$361	$4,539	1	1	0.0	0.0	1.0	3.0	2.0	6
3246	Stormwater MH	STMH_6707	N/A	0.00	BR			633907.318	26909441.096	669.317	$1,500	01/01/1962	56	75	18	$361	$4,539	1	1	0.0	0.0	1.0	3.0	2.0	6
3247	Stormwater MH	STMH_6702	N/A	0.00	BR			633895.037	26909201.014	664.629	$4,500	01/01/1990	28	75	46	$2,766	$6,017	1	1	0.0	0.0	1.0	2.0	1.0	2
3248	Stormwater MH	STMH_6701	N/A	0.00	CR			633879.629	26908527.627	654.426	$4,500	01/01/2011	7	75	67	$4,027	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
3249	Stormwater MH	STMH_6703	N/A	0.00	CR			633830.030	26909155.520	665.516	$4,500	01/01/1990	28	75	46	$2,766	$6,017	1	1	0.0	0.0	1.0	2.0	1.0	2
3250	Stormwater MH	STMH_6704	N/A	0.00	CR			633869.363	26909246.765	665.642	$4,500	01/01/1992	26	75	48	$2,886	$6,017	1	1	0.0	0.0	1.0	3.0	1.0	3
3251	Stormwater MH	STMH_7077	N/A	0.00	CR			637120.767	26910367.381	611.709	$2,000	01/01/1961	57	75	17	$455	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
3252	Stormwater MH	STMH_7020	N/A	0.00	CN			637454.407	26910027.687	606.694	$5,000	01/01/2005	13	75	61	$4,074	$6,017	1	1	0.0	0.0	1.0	2.0	1.0	2
3253	Stormwater MH	STMH_7019	N/A	0.00	CN			637432.196	26909894.583	607.446	$5,000	01/01/2005	13	75	61	$4,074	$6,017	1	1	0.0	0.0	1.0	2.0	1.0	2
3254	Stormwater MH	STMH_7010	N/A	0.00	CN			636804.149	26909129.084	610.482	$4,000	01/01/2005	13	75	61	$3,259	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2

CITY OF SAULT STE. MARIE, MICHIGAN

Summary

id	Equipment Description	Asset ID	Construction Drawings Sheet Reference	Capacity or Size	Material	Length	Comment	Northing State Plane Ordinate	Easting State Plane Ordinate	Elevation	Original Cost	Year Installed (01/01/YYYY)	Age	Expected useful life (years)	Remaining Useful Life (years)	Depreciated Value	Replacement Cost	Average number of units in service	Total Number of units	Redundancy (Number)	Redundancy (percent)	Redundancy Score (R) (Reduces (C))	Criticality (C) (see back-up sheets)	Probability of Failure (P) (see back-up sheets)	Business Risk (BRE=PxCxR)
3255	Stormwater MH	STMH_7011	N/A	0.00	CN			636787.267	26909203.697	610.548	$4,000	01/01/2005	13	75	61	$3,259	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
3256	Stormwater MH	STMH_7012	N/A	0.00	CN			636836.660	26909247.342	611.051	$5,000	01/01/2005	13	75	61	$4,074	$6,017	1	1	0.0	0.0	1.0	2.0	1.0	2
3257	Stormwater MH	STMH_7013	N/A	0.00	CN			636744.996	26909409.050	611.590	$4,000	01/01/2005	13	75	61	$3,259	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
3258	Stormwater MH	STMH_7014	N/A	0.00	CN			636757.057	26909514.156	610.351	$5,000	01/01/2005	13	75	61	$4,074	$6,017	1	1	0.0	0.0	1.0	2.0	1.0	2
3259	Stormwater MH	STMH_7015	N/A	0.00	CN			636828.892	26909821.350	610.344	$5,000	01/01/2005	13	75	61	$4,074	$6,017	1	1	0.0	0.0	1.0	2.0	1.0	2
3260	Stormwater MH	STMH_7016	N/A	0.00	CN			636892.363	26909875.944	610.919	$5,000	01/01/2005	13	75	61	$4,074	$6,017	1	1	0.0	0.0	1.0	2.0	1.0	2
3261	Stormwater MH	STMH_7017	N/A	0.00	CN			637037.729	26909923.768	611.813	$5,000	01/01/2005	13	75	61	$4,074	$6,017	1	1	0.0	0.0	1.0	2.0	1.0	2
3262	Stormwater MH	STMH_7018	N/A	0.00	CN			637276.209	26909896.861	609.861	$5,000	01/01/2005	13	75	61	$4,074	$6,017	1	1	0.0	0.0	1.0	2.0	1.0	2
3263	Stormwater MH	STMH_6816	N/A	0.00				636149.277	26910168.075	612.490	$2,000	01/01/1961	57	75	17	$455	$5,092	1	1	0.0	0.0	1.0	2.0	1.1	2.2
3264	Stormwater MH	STMH_6817	N/A	0.00				636075.940	26910153.152	609.365	$1,500	01/01/1961	57	75	17	$341	$4,539	1	1	0.0	0.0	1.0	2.0	1.1	2.2
3265	Stormwater MH	STMH_6818	N/A	0.00	ZZZ			635968.457	26910129.457	607.825	$1,500	01/01/1961	57	75	17	$341	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3266	Stormwater MH	STMH_6819	N/A	0.00	CR			635892.174	26910109.174	608.074	$1,500	01/01/1961	57	75	17	$341	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3267	Stormwater MH	STMH_6820	N/A	0.00				635778.231	26910070.632	607.927	$3,000	01/01/1961	57	75	17	$683	$6,017	1	1	0.0	0.0	1.0	2.0	1.1	2.2
3268	Stormwater MH	STMH_6136	N/A	0.00	CN			633195.038	26907155.182	634.216	$4,500	01/01/1998	20	75	54	$3,246	$6,017	1	1	0.0	0.0	1.0	2.0	1.0	2
3269	Stormwater MH	STMH_6135	N/A	0.00	CR			633899.653	26907778.847	635.266	$2,000	01/01/1968	50	75	24	$642	$5,092	1	1	0.0	0.0	1.0	3.0	2.0	6
3270	Stormwater MH	STMH_6134	N/A	0.00	CR			633798.247	26907616.926	635.399	$5,000	01/01/2000	18	75	56	$3,740	$6,017	1	1	0.0	0.0	1.0	3.0	1.0	3
3271	Stormwater MH	STMH_6105	N/A	0.00	BR			632478.875	26905229.818	643.540	$2,000	01/01/1949	69	75	5	$135	$6,017	1	1	0.0	0.0	1.0	2.0	2.0	4
3272	Stormwater MH	STMH_6123	N/A	0.00	CR			632703.719	26905528.489	641.610	$3,500	01/01/1970	48	75	26	$1,217	$6,017	1	1	0.0	0.0	1.0	2.0	2.0	4
3273	Stormwater MH	STMH_6124	N/A	0.00	CR			632910.528	26905869.187	640.281	$2,000	01/01/1970	48	75	26	$695	$4,539	1	1	0.0	0.0	1.0	2.0	3.0	6
3274	Stormwater MH	STMH_6125	N/A	0.00	CR			633069.266	26906130.733	639.118	$2,000	01/01/1970	48	75	26	$695	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3275	Stormwater MH	STMH_6127	N/A	0.00	CR			633118.219	26906212.060	638.985	$2,000	01/01/1970	48	75	26	$695	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3276	Stormwater MH	STMH_6139	N/A	0.00	CR			632896.139	26906568.463	638.300	$4,500	01/01/1998	20	75	54	$3,246	$6,017	1	1	0.0	0.0	1.0	2.0	1.0	2
3277	Stormwater MH	STMH_6140	N/A	0.00	CN			632912.859	26906476.989	638.498	$3,000	01/01/1998	20	75	54	$2,164	$4,539	1	1	0.0	0.0	1.0	2.0	2.0	4
3278	Stormwater MH	STMH_6141	N/A	0.00	BR			632707.362	26906493.484	639.612	$3,000	01/01/1998	20	75	54	$2,164	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3279	Stormwater MH	STMH_6142	N/A	0.00	BR			631974.424	26905918.796	640.225	$2,000	01/01/1974	44	75	30	$802	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3280	Stormwater MH	STMH_6143	N/A	0.00	CR			631747.199	26905905.896	609.760	$2,000	01/01/1974	44	75	30	$802	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3281	Stormwater MH	STMH_6144	N/A	0.00	CR			631520.340	26905915.085	609.726	$2,000	01/01/1974	44	75	30	$802	$4,539	1	1	0.0	0.0	1.0	2.0	2.0	4
3282	Stormwater MH	STMH_6121	N/A	0.00	BR			631250.527	26905292.691	639.728	$500	01/01/1948	70	75	4	$27	$4,539	1	1	0.0	0.0	1.0	3.0	2.0	6
3283	Stormwater MH	STMH_6122	N/A	0.00	BR			631238.513	26905303.508	640.257	$1,000	01/01/1948	70	75	4	$54	$5,092	1	1	0.0	0.0	1.0	3.0	2.0	6
3284	Stormwater MH	STMH_6120	N/A	0.00	BR			631533.663	26905280.595	638.641	$500	01/01/1948	70	75	4	$27	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
3285	Stormwater MH	STMH_6116	N/A	0.00	CR			631840.435	26905253.227	639.249	$500	01/01/1948	70	75	4	$27	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3286	Stormwater MH	STMH_6110	N/A	0.00	BR			632178.217	26905240.633	643.079	$500	01/01/1949	69	75	5	$33	$4,539	1	1	0.0	0.0	1.0	2.0	2.0	4
3287	Stormwater MH	STMH_6145	N/A	0.00	BR			631260.763	26905921.231	640.289	$500	01/01/1948	70	75	4	$27	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
3288	Stormwater MH	STMH_6115	N/A	0.00	CN			631823.842	26904914.614	638.641	$500	01/01/1948	70	75	4	$27	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3289	Stormwater MH	STMH_6114	N/A	0.00	BR			631804.489	26904586.906	643.538	$500	01/01/1948	70	75	4	$27	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3290	Stormwater MH	STMH_6111	N/A	0.00	BR			631979.653	26904581.873	643.236	$500	01/01/1949	69	75	5	$33	$4,539	1	1	0.0	0.0	1.0	1.0	2.0	2
3291	Stormwater MH	STMH_6106A	N/A	0.00	BR			632133.733	26904574.997	644.149	$500	01/01/1949	69	75	5	$33	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3292	Stormwater MH	STMH_6102	N/A	0.00				632437.589	26904561.560	644.659	$2,000	01/01/1948	70	75	4	$108	$6,017	1	1	0.0	0.0	1.0	1.0	1.1	1.1
3293	Stormwater MH	STMH_6101	N/A	0.00	CN			632447.819	26904558.713	644.427	$4,000	01/01/2010	8	75	66	$3,526	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3294	Stormwater MH	STMH_6109	N/A	0.00	BR			632130.366	26904902.611	641.364	$500	01/01/1949	69	75	5	$33	$4,539	1	1	0.0	0.0	1.0	2.0	2.0	4
3295	Stormwater MH	STMH_6108	N/A	0.00	BR			632148.862	26904890.167	641.883	$500	01/01/1949	69	75	5	$33	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3296	Stormwater MH	STMH_6107	N/A	0.00	CR			632188.319	26904910.425	642.197	$5,500	01/01/2011	7	75	67	$4,922	$6,017	1	1	0.0	0.0	1.0	1.0	1.0	1
3297	Stormwater MH	STMH_6103	N/A	0.00	CR			632456.204	26904894.282	644.329	$4,000	01/01/2011	7	75	67	$3,579	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3298	Stormwater MH	STMH_6118	N/A	0.00	CR			631481.127	26904286.530	693.759	$500	01/01/1948	70	75	4	$27	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3299	Stormwater MH	STMH_6113	N/A	0.00	CN			631785.746	26904267.563	662.775	$500	01/01/1948	70	75	4	$27	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3300	Stormwater MH	STMH_5403	N/A	0.00	CR			632176.497	26897289.286	609.952	$5,000	01/01/2000	18	75	56	$3,740	$6,017	1	1	0.0	0.0	1.0	1.0	1.0	1
3301	Stormwater MH	STMH_5407	N/A	0.00	CR			631850.349	26897227.618	614.577	$3,000	01/01/1996	22	75	52	$2,084	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3302	Stormwater MH	STMH_5411	N/A	0.00	CN			631527.641	26897211.887	619.686	$4,500	01/01/1991	27	75	47	$2,826	$6,017	1	1	0.0	0.0	1.0	1.0	2.0	2
3303	Stormwater MH	STMH_5410	N/A	0.00				631543.059	26897075.895	618.033	$4,500	01/01/1991	27	75	47	$2,826	$6,017	1	1	0.0	0.0	1.0	1.0	1.1	1.1
3304	Stormwater MH	STMH_5614	N/A	0.00	CN			632632.408	26901293.662	614.288	$2,500	01/01/1986	32	75	42	$1,403	$4,539	1	1	0.0	0.0	1.0	2.0	2.0	4
3305	Stormwater MH	STMH_6703A	N/A	0.00				633749.348	26909077.072	665.516	$4,500	01/01/1990	28	75	46	$2,766	$6,017	1	1	0.0	0.0	1.0	2.0	1.1	2.2
3306	Stormwater MH	STMH_5619	N/A	0.00	CR			632137.811	26902457.142	630.869	$5,000	01/01/2002	16	75	58	$3,874	$6,017	1	1	0.0	0.0	1.0	1.0	2.0	2
3307	Stormwater MH	STMH_5604	N/A	0.00	CR			631847.527	26898638.779	621.803	$3,000	01/01/1996	22	75	52	$2,084	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3308	Stormwater MH	STMH_5604A	N/A	0.00	CR			631443.015	26898642.117	627.596	$3,000	01/01/1996	22	75	52	$2,084	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3309	Stormwater MH	STMH_5602A	N/A	0.00				631881.642	26897994.079	619.551	$3,000	01/01/1996	22	75	52	$2,084	$4,539	1	1	0.0	0.0	1.0	1.0	1.1	1.1
3310	Stormwater MH	STMH_7110	N/A	0.00	CR			637183.852	26912446.194	607.724	$4,000	01/01/2011	7	75	67	$3,579	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3311	Stormwater MH	STMH_7111	N/A	0.00	CR			637198.718	26912482.647	607.404	$4,000	01/01/2011	7	75	67	$3,579	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3312	Stormwater MH	STMH_7880	N/A	0.00	BR			636698.691	26917126.010	594.085	$4,500	01/01/2010	8	75	66	$3,967	$5,092	1	1	0.0	0.0	1.0	5.0	2.0	10
3313	Stormwater MH	STMH_7881	N/A	0.00	CR			636683.666	26917163.749	595.730	$11,500	01/01/2010	8	75	66	$10,138	$13,099	1	1	0.0	0.0	1.0	5.0	1.0	5
3314	Stormwater MH	STMH_7080	N/A	0.00	CR			637595.071	26910853.558	607.287	$3,000	01/01/1995	23	75	51	$2,044	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3315	Stormwater MH	STMH_7081	N/A	0.00	CR			637614.988	26911020.870	607.827	$3,000	01/01/1995	23	75	51	$2,044	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3316	Stormwater MH	STMH_7083	N/A	0.00	CR			637644.795	26911253.201	608.018	$3,000	01/01/1995	23	75	51	$2,044	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3317	Stormwater MH	STMH_7084	N/A	0.00	CR			637668.746	26911453.668	607.436	$3,000	01/01/1995	23	75	51	$2,044	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3318	Stormwater MH	STMH_7085	N/A	0.00	CR			637694.724	26911656.576	606.356	$3,000	01/01/1995	23	75	51	$2,044	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3319	Stormwater MH	STMH_7086	N/A	0.00	CR			637716.171	26911834.269	607.390	$3,000	01/01/1995	23	75	51	$2,044	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
3320	Stormwater MH	STMH_7087	N/A	0.00	CR			637759.227	26912187.477	606.921	$3,000	01/01/1995	23	75	51	$2,044	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3321	Stormwater MH	STMH_7088	N/A	0.00	CR			637796.639	26912508.508	606.827	$3,000	01/01/1995	23	75	51	$2,044	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3322	Stormwater MH	STMH_7089	N/A	0.00	CR			637777.288	26912549.706	605.976	$3,500	01/01/1998	20	75	54	$2,525	$5,092	1	1	0.0	0.0	1.0	3.0	1.0	3
3323	Stormwater MH	STMH_7091	N/A	0.00	CR			637659.715	26912533.274	606.209	$3,500	01/01/1998	20	75	54	$2,525	$5,092	1	1	0.0	0.0	1.0	3.0	1.0	3
3324	Stormwater MH	STMH_7092	N/A	0.00	CR			637470.833	26912501.497	606.396	$3,500	01/01/1998	20	75	54	$2,525	$5,092	1	1	0.0	0.0	1.0	3.0	1.0	3
3325	Stormwater MH	STMH_7106	N/A	0.00	CN			637210.803	26912080.535	605.462	$2,000	01/01/1970	48	75	26	$695	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3326	Stormwater MH	STMH_7105	N/A	0.00				637206.827	26911896.428	605.697	$2,000	01/01/1970	48	75	26	$695	$4,539	1	1	0.0	0.0	1.0	2.0	2.0	4
3327	Stormwater MH	STMH_7098	N/A	0.00	CR			637221.484	26911867.448	605.617	$3,000	01/01/1995	23	75	51	$2,044	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
3328	Stormwater MH	STMH_7104	N/A	0.00	CN			637201.315	26911637.841	605.296	$2,000	01/01/1970	48	75	26	$695	$4,539	1	1	0.0	0.0	1.0	3.0	2.0	6
3329	Stormwater MH	STMH_7099	N/A	0.00				637215.723	26911478.305	605.744	$3,000	01/01/1995	23	75	51	$2,044	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
3330	Stormwater MH	STMH_7102	N/A	0.00	CN			637197.227	26911434.197	606.010	$2,000	01/01/1970	48	75	26	$695	$4,539	1	1	0.0	0.0	1.0	2.0	2.0	4
3331	Stormwater MH	STMH_7103	N/A	0.00				637197.946	26911444.806	605.989	$3,000	01/01/1995	23	75	51	$2,044	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
3332	Stormwater MH	STMH_7101	N/A	0.00	CN			637192.656	26911232.954	605.218	$2,000	01/01/1970	48	75	26	$695	$4,539	1	1	0.0	0.0	1.0	2.0	3.0	6
3333	Stormwater MH	STMH_7100	N/A	0.00	CR			637186.371	26910941.875	605.302	$3,000	01/01/1995	23	75	51	$2,044	$4,539	1	1	0.0	0.0	1.0	2.0	3.0	6
3334	Stormwater MH	STMH_7025	N/A	0.00	CN			637158.736	26910548.748	606.858	$3,500	01/01/1970	48	75	26	$1,217	$6,017	1	1	0.0	0.0	1.0	2.0	3.0	6
3335	Stormwater MH	STMH_7026	N/A	0.00	ZZZ			637155.766	26910423.283	610.510	$2,000	01/01/1970	48	75	26	$695	$4,539	1	1	0.0	0.0	1.0	2.0	1.2	2.4
3336	Stormwater MH	STMH_7078	N/A	0.00	CR			637477.318	26910446.768	608.748	$1,500	01/01/1961	57	75	17	$341	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3337	Stormwater MH	STMH_8117	N/A	0.00	CR			636813.030	26916900.628	596.303	$5,500	01/01/2010	8	75	66	$4,848	$6,017	1	1	0.0	0.0	1.0	2.0	1.0	2
3338	Stormwater MH	STMH_8116	N/A	0.00	CR			636894.394	26916738.262	597.673	$5,500	01/01/2010	8	75	66	$4,848	$6,017	1	1	0.0	0.0	1.0	2.0	1.0	2
3339	Stormwater MH	STMH_8115	N/A	0.00	CR			637001.330	26916513.278	598.763	$4,500	01/01/2010	8	75	66	$3,967	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
3340	Stormwater MH	STMH_8114	N/A	0.00	CR			637125.177	26916249.859	600.664	$5,500	01/01/2010	8	75	66	$4,848	$6,017	1	1	0.0	0.0	1.0	2.0	1.0	2
3341	Stormwater MH	STMH_8113	N/A	0.00	CR			637180.123	26916121.484	602.103	$4,500	01/01/2010	8	75	66	$3,967	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
3342	Stormwater MH	STMH_8112	N/A	0.00	CR			637207.852	26916054.603	602.818	$4,500	01/01/2010	8	75	66	$3,967	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
3343	Stormwater MH	STMH_8111	N/A	0.00	CR			637300.023	26915840.479	603.731	$4,000	01/01/2010	8	75	66	$3,526	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3344	Stormwater MH	STMH_8103	N/A	0.00	CR			637530.295	26915378.054	595.829	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	3.0	1.0	3
3345	Stormwater MH	STMH_8102	N/A	0.00	CR			637545.297	26915712.653	588.235	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	5.0	1.0	5
3346	Stormwater MH	STMH_8101	N/A	0.00				637698.549	26915783.859	588.116	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	5.0	1.1	5.5
3347	Stormwater MH	STMH_8109	N/A	0.00	CR			637543.415	26915167.834	595.111	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	3.0	1.0	3
3348	Stormwater MH	STMH_8107	N/A	0.00	CR			637600.494	26914933.952	593.897	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
3349	Stormwater MH	STMH_8108	N/A	0.00	CR			637585.976	26914992.644	594.179	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
3350	Stormwater MH	STMH_8106	N/A	0.00	CR			637621.268	26914848.960	593.587	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
3351	Stormwater MH	STMH_8105	N/A	0.00	CR			637670.182	26914652.037	0.000	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
3352	Stormwater MH	STMH_8104	N/A	0.00	CR			637751.376	26914348.437	594.761	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
3353	Stormwater MH	STMH_8155	N/A	0.00	CR			636947.646	26914549.354	610.282	$2,000	01/01/1975	43	75	31	$829	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3354	Stormwater MH	STMH_8154	N/A	0.00				636985.088	26914268.396	611.322	$3,500	01/01/1975	43	75	31	$1,451	$6,017	1	1	0.0	0.0	1.0	2.0	1.1	2.2
3355	Stormwater MH	STMH_8153	N/A	0.00	CR			636999.097	26913942.860	612.237	$3,500	01/01/1975	43	75	31	$1,451	$6,017	1	1	0.0	0.0	1.0	2.0	1.0	2
3356	Stormwater MH	STMH_8144	N/A	0.00	CR			637025.331	26913949.640	612.389	$3,500	01/01/1975	43	75	31	$1,451	$6,017	1	1	0.0	0.0	1.0	2.0	1.0	2
3357	Stormwater MH	STMH_8143	N/A	0.00	CR			637057.854	26913946.486	611.859	$2,000	01/01/1939	79	75	0	$0	$6,017	1	1	0.0	0.0	1.0	4.0	1.0	4
3358	Stormwater MH	STMH_8152	N/A	0.00	CR			637016.645	26913923.173	612.414	$5,500	01/01/2010	8	75	66	$4,848	$6,017	1	1	0.0	0.0	1.0	3.0	1.0	3
3359	Stormwater MH	STMH_8150	N/A	0.00				637056.015	26913601.155	609.803	$4,500	01/01/2010	8	75	66	$3,967	$5,092	1	1	0.0	0.0	1.0	3.0	1.1	3.3
3360	Stormwater MH	STMH_8149	N/A	0.00	CR			637101.937	26913232.263	606.857	$4,500	01/01/2010	8	75	66	$3,967	$5,092	1	1	0.0	0.0	1.0	3.0	1.0	3
3361	Stormwater MH	STMH_8148	N/A	0.00	CR			637122.361	26913055.140	605.339	$4,000	01/01/2010	8	75	66	$3,526	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
3362	Stormwater MH	STMH_7112	N/A	0.00	CR			637157.636	26912794.282	605.887	$4,000	01/01/2010	8	75	66	$3,526	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3363	Stormwater MH	STMH_7090	N/A	0.00	CR			637796.350	26912714.464	605.136	$3,000	01/01/1998	20	75	54	$2,164	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
3364	Stormwater MH	STMH_8118	N/A	0.00	CR			637770.247	26913013.261	603.826	$3,000	01/01/1998	20	75	54	$2,164	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
3365	Stormwater MH	STMH_8119	N/A	0.00	CR			637748.807	26913132.535	603.743	$3,000	01/01/1998	20	75	54	$2,164	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
3366	Stormwater MH	STMH_8120	N/A	0.00	CR			637735.372	26913205.361	603.251	$3,000	01/01/1998	20	75	54	$2,164	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
3367	Stormwater MH	STMH_8122	N/A	0.00	CR			637719.561	26913295.590	603.016	$3,000	01/01/1998	20	75	54	$2,164	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
3368	Stormwater MH	STMH_8121	N/A	0.00				637749.159	26913312.846	603.666	$4,500	01/01/1998	20	75	54	$3,246	$6,017	1	1	0.0	0.0	1.0	3.0	1.1	3.3
3369	Stormwater MH	STMH_8125	N/A	0.00	CR			637673.565	26913441.487	603.318	$3,000	01/01/1998	20	75	54	$2,164	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3370	Stormwater MH	STMH_8124	N/A					637679.473	26913418.159	0.000	$4,500	01/01/1998	20	75	54	$3,246	$6,017	1	1	0.0	0.0	1.0	2.0	1.1	2.2
3371	Stormwater MH	STMH_8123	N/A					637690.611	26913458.219	0.000	$4,500	01/01/1998	20	75	54	$3,246	$6,017	1	1	0.0	0.0	1.0	4.0	1.1	4.4
3372	Stormwater MH	STMH_7948	N/A	0.00	CR			635497.185	26914791.954	611.997	$3,200	01/01/1975	43	75	31	$1,326	$5,767	1	1	0.0	0.0	1.0	5.0	1.0	5
3373	Stormwater MH	STMH_7952	N/A	0.00	CR			635254.698	26914673.774	611.666	$3,200	01/01/1975	43	75	31	$1,326	$5,767	1	1	0.0	0.0	1.0	5.0	2.0	10
3374	Stormwater MH	STMH_7953	N/A	0.00	CR			635217.287	26914700.919	611.602	$3,200	01/01/1975	43	75	31	$1,326	$5,767	1	1	0.0	0.0	1.0	5.0	1.0	5
3375	Stormwater MH	STMH_7839	N/A	0.00	CR			636333.550	26913099.732	612.138	$3,000	01/01/1986	32	75	42	$1,684	$5,092	1	1	0.0	0.0	1.0	2.0	2.0	4
3376	Stormwater MH	STMH_7840	N/A	0.00	CR			636336.137	26913259.667	611.183	$2,500	01/01/1986	32	75	42	$1,403	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3377	Stormwater MH	STMH_7841	N/A	0.00	CR			636266.344	26913395.283	610.507	$2,500	01/01/1986	32	75	42	$1,403	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3378	Stormwater MH	STMH_7842	N/A	0.00	CR			636212.207	26913498.479	0.000	$2,500	01/01/1986	32	75	42	$1,403	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3379	Stormwater MH	STMH_7843	N/A	0.00	CR			636122.333	26913661.655	611.460	$2,000	01/01/1975	43	75	31	$829	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3380	Stormwater MH	STMH_7857	N/A	0.00	CR			635754.691	26913817.136	610.594	$2,500	01/01/1975	43	75	31	$1,036	$5,092	1	1	0.0	0.0	1.0	5.0	1.0	5
3381	Stormwater MH	STMH_7855	N/A	0.00	CR			635825.457	26913676.733	611.266	$2,000	01/01/1975	43	75	31	$829	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3382	Stormwater MH	STMH_7856	N/A		CR			635788.286	26913747.638	0.000	$5,000	01/01/1975	43	75	31	$2,073	$9,160	1	1	0.0	0.0	1.0	4.0	1.0	4
3383	Stormwater MH	STMH_7853	N/A	0.00	CR			635910.373	26913775.539	611.797	$2,500	01/01/1975	43	75	31	$1,036	$5,092	1	1	0.0	0.0	1.0	4.0	1.0	4
3384	Stormwater MH	STMH_7852	N/A	0.00	CR			636021.873	26913829.558	612.544	$2,500	01/01/1975	43	75	31	$1,036	$5,092	1	1	0.0	0.0	1.0	4.0	1.0	4
3385	Stormwater MH	STMH_7851	N/A	0.00	CR			636230.859	26913928.983	612.080	$3,200	01/01/1975	43	75	31	$1,326	$5,767	1	1	0.0	0.0	1.0	4.0	2.0	8
3386	Stormwater MH	STMH_7850	N/A	0.00	CR			636293.156	26913959.369	611.973	$3,200	01/01/1975	43	75	31	$1,326	$5,767	1	1	0.0	0.0	1.0	4.0	2.0	8
3387	Stormwater MH	STMH_7849	N/A	0.00	CR			636355.981	26913990.004	612.222	$2,500	01/01/1975	43	75	31	$1,036	$5,092	1	1	0.0	0.0	1.0	4.0	2.0	8
3388	Stormwater MH	STMH_7848	N/A	0.00	CR			636460.841	26914042.091	611.680	$3,500	01/01/2005	13	75	61	$2,852	$4,539	1	1	0.0	0.0	1.0	4.0	1.0	4
3389	Stormwater MH	STMH_7807	N/A	0.00	CR			636530.940	26914014.284	612.376	$2,500	01/01/1975	43	75	31	$1,036	$5,092	1	1	0.0	0.0	1.0	3.0	1.0	3
3390	Stormwater MH	STMH_7806	N/A	0.00	CR			636584.786	26913896.093	612.352	$2,500	01/01/1974	44	75	30	$1,003	$5,092	1	1	0.0	0.0	1.0	3.0	1.0	3
3391	Stormwater MH	STMH_7805	N/A	0.00	CR			636616.990	26913833.006	611.997	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3392	Stormwater MH	STMH_8132	N/A	0.00	CR			637658.496	26913618.056	603.172	$3,500	01/01/1998	20	75	54	$2,525	$5,092	1	1	0.0	0.0	1.0	4.0	1.0	4
3393	Stormwater MH	STMH_8135	N/A					637579.314	26914036.384	0.000	$3,500	01/01/1998	20	75	54	$2,525	$5,092	1	1	0.0	0.0	1.0	4.0	1.1	4.4
3394	Stormwater MH	STMH_8134	N/A					637586.724	26914003.339	0.000	$4,500	01/01/1998	20	75	54	$3,246	$6,017	1	1	0.0	0.0	1.0	4.0	1.1	4.4
3395	Stormwater MH	STMH_8137	N/A	0.00	CR			637551.692	26914168.275	602.726	$3,500	01/01/1998	20	75	54	$2,525	$5,092	1	1	0.0	0.0	1.0	4.0	1.0	4
3396	Stormwater MH	STMH_8138	N/A	0.00				637542.194	26914219.282	602.964	$2,000	01/01/1939	79	75	0	$0	$6,017	1	1	0.0	0.0	1.0	5.0	1.1	5.5
3397	Stormwater MH	STMH_8138A	N/A	0.00	BR			637409.738	26914534.098	604.511	$2,000	01/01/1939	79	75	0	$0	$6,017	1	1	0.0	0.0	1.0	5.0	3.0	15
3398	Stormwater MH	STMH_8129	N/A					637191.532	26915038.349	0.000	$5,500	01/01/2011	7	75	67	$4,922	$6,017	1	1	0.0	0.0	1.0	5.0	1.1	5.5
3399	Stormwater MH	STMH_8145	N/A					637035.399	26914818.044	0.000	$4,500	01/01/1996	22	75	52	$3,126	$6,017	1	1	0.0	0.0	1.0	2.0	1.1	2.2
3400	Stormwater MH	STMH_8161	N/A	0.00	CR			636848.664	26913656.107	617.075	$4,000	01/01/2011	7	75	67	$3,579	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3401	Stormwater MH	STMH_8160	N/A	0.00	CR			636858.317	26913564.432	617.144	$4,000	01/01/2011	7	75	67	$3,579	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3402	Stormwater MH	STMH_8159	N/A	0.00	CR			636849.903	26913556.852	617.334	$4,000	01/01/2011	7	75	67	$3,579	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3403	Stormwater MH	STMH_8158	N/A	0.00	CR			636858.216	26913439.347	616.923	$4,000	01/01/2011	7	75	67	$3,579	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3404	Stormwater MH	STMH_8157	N/A	0.00	CR			636866.289	26913367.509	616.939	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3405	Stormwater MH	STMH_8156	N/A	0.00	CR			636885.815	26913027.478	615.455	$4,500	01/01/2010	8	75	66	$3,967	$5,092	1	1	0.0	0.0	1.0	3.0	1.0	3

CITY OF SAULT STE. MARIE, MICHIGAN

Summary

id	Equipment Description	Asset ID	Construction Drawings Sheet Reference	Capacity or Size	Material	Length	Comment	Northing State Plane Ordinate	Easting State Plane Ordinate	Elevation	Original Cost	Year Installed (01/01/YYYY)	Age	Expected useful life (years)	Remaining Useful Life (years)	Depreciated Value	Replacement Cost	Average number of units in service	Total Number of units	Redundancy (Number)	Redundancy (percent)	Redundancy Score (R) (Reduces (C))	Criticality (C) (see back-up sheets)	Probability of Failure (P) (see back-up sheets)	Business Risk (BRE=PxCxR)
3406	Stormwater MH	STMH_8127	N/A	0.00	CR			637419.741	26913352.498	610.532	$3,000	01/01/1998	20	75	54	$2,164	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3407	Stormwater MH	STMH_8126	N/A	0.00	CR			637449.721	26913364.221	610.148	$3,000	01/01/1998	20	75	54	$2,164	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3408	Stormwater MH	STMH_8130	N/A					637078.380	26915307.845	0.000	$5,500	01/01/2011	7	75	67	$4,922	$6,017	1	1	0.0	0.0	1.0	5.0	1.1	5.5
3409	Stormwater MH	STMH_8130A	N/A					636898.957	26915745.379	0.000	$5,500	01/01/2011	7	75	67	$4,922	$6,017	1	1	0.0	0.0	1.0	2.0	1.1	2.2
3410	Stormwater MH	STMH_7093	N/A	0.00				637467.504	26912331.641	605.112	$3,500	01/01/2009	9	75	65	$3,038	$4,539	1	1	0.0	0.0	1.0	2.0	1.1	2.2
3411	Stormwater MH	STMH_7094	N/A	0.00	CR			637462.143	26912071.773	604.150	$3,500	01/01/2009	9	75	65	$3,038	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3412	Stormwater MH	STMH_7095	N/A	0.00	CR			637426.975	26911879.785	605.862	$3,000	01/01/1995	23	75	51	$2,044	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
3413	Stormwater MH	STMH_7096	N/A	0.00	CR			637300.291	26911900.935	604.484	$3,500	01/01/2009	9	75	65	$3,038	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
3414	Stormwater MH	STMH_7097	N/A	0.00	CR			637277.968	26911871.729	605.794	$3,000	01/01/1995	23	75	51	$2,044	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
3415	Stormwater MH	STMH_7109	N/A	0.00	CR			636910.346	26912397.141	609.397	$4,000	01/01/2011	7	75	67	$3,579	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3416	Stormwater MH	STMH_7024	N/A	0.00	CR			636906.367	26910323.372	608.839	$1,500	01/01/1961	57	75	17	$341	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
3417	Stormwater MH	STMH_7022	N/A	0.00	CR			636647.107	26910270.139	607.196	$1,500	01/01/1961	57	75	17	$341	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
3418	Stormwater MH	STMH_7021	N/A	0.00	ZZZ			636672.155	26910341.233	608.470	$2,000	01/01/1970	48	75	26	$695	$4,539	1	1	0.0	0.0	1.0	3.0	2.0	6
3419	Stormwater MH	STMH_7079	N/A	0.00				637531.647	26910864.417	608.331	$5,000	01/01/2007	11	75	63	$4,207	$6,017	1	1	0.0	0.0	1.0	2.0	1.1	2.2
3420	Stormwater MH	STMH_7969	N/A	0.00	BR			635566.864	26913031.451	613.082	$3,500	01/01/2000	18	75	56	$2,618	$4,539	1	1	0.0	0.0	1.0	3.0	2.0	6
3421	Stormwater MH	STMH_7973	N/A	0.00	CR			635016.102	26913057.118	621.020	$500	01/01/1949	69	75	5	$33	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3422	Stormwater MH	STMH_7976	N/A	0.00				634728.212	26913064.328	629.515	$5,000	01/01/2001	17	75	57	$3,807	$6,017	1	1	0.0	0.0	1.0	2.0	1.1	2.2
3423	Stormwater MH	STMH_7975	N/A	0.00	ZZZ			634757.479	26913065.814	629.079	$3,500	01/01/2001	17	75	57	$2,665	$4,539	1	1	0.0	0.0	1.0	2.0	2.0	4
3424	Stormwater MH	STMH_7989	N/A	0.00	CR			634516.723	26913334.067	624.069	$3,500	01/01/2001	17	75	57	$2,665	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3425	Stormwater MH	STMH_7991	N/A	0.00				634684.634	26913263.637	625.061	$5,000	01/01/2001	17	75	57	$3,807	$6,017	1	1	0.0	0.0	1.0	2.0	1.1	2.2
3426	Stormwater MH	STMH_7981	N/A	0.00	CR			635038.002	26913385.470	615.931	$3,500	01/01/2001	17	75	57	$2,665	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3427	Stormwater MH	STMH_7980	N/A	0.00	CR			635034.110	26913255.349	616.787	$3,500	01/01/2001	17	75	57	$2,665	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3428	Stormwater MH	STMH_7982	N/A	0.00	CR			635037.221	26913578.187	614.670	$3,500	01/01/2001	17	75	57	$2,665	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
3429	Stormwater MH	STMH_7983	N/A	0.00	ZZZ			634973.002	26913695.080	614.819	$3,500	01/01/2001	17	75	57	$2,665	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3430	Stormwater MH	STMH_7984	N/A	0.00				634942.472	26913545.740	615.899	$3,500	01/01/2001	17	75	57	$2,665	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3431	Stormwater MH	STMH_7985	N/A	0.00	CR			634736.319	26913564.975	617.783	$3,500	01/01/2001	17	75	57	$2,665	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3432	Stormwater MH	STMH_7988	N/A	0.00	CR			634640.247	26913490.433	620.469	$3,500	01/01/2001	17	75	57	$2,665	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3433	Stormwater MH	STMH_7986	N/A	0.00				634590.247	26913579.747	619.960	$5,000	01/01/2001	17	75	57	$3,807	$6,017	1	1	0.0	0.0	1.0	2.0	1.1	2.2
3434	Stormwater MH	STMH_7987	N/A	0.00	CR			634553.592	26913600.628	619.873	$5,000	01/01/2001	17	75	57	$3,807	$6,017	1	1	0.0	0.0	1.0	1.0	1.0	1
3435	Stormwater MH	STMH_8005	N/A	0.00	CR			634424.234	26913941.327	618.365	$3,000	01/01/1991	27	75	47	$1,884	$4,539	1	1	0.0	0.0	1.0	4.0	1.0	4
3436	Stormwater MH	STMH_8004	N/A	0.00	CR			634611.295	26914035.232	616.207	$3,000	01/01/1991	27	75	47	$1,884	$4,539	1	1	0.0	0.0	1.0	4.0	1.0	4
3437	Stormwater MH	STMH_8003	N/A	0.00	CR			634880.777	26914165.848	614.457	$3,000	01/01/1991	27	75	47	$1,884	$4,539	1	1	0.0	0.0	1.0	4.0	1.0	4
3438	Stormwater MH	STMH_8002	N/A	0.00	CR			635050.866	26914250.212	613.320	$3,000	01/01/1991	27	75	47	$1,884	$4,539	1	1	0.0	0.0	1.0	4.0	1.0	4
3439	Stormwater MH	STMH_8007	N/A	0.00	CN			634934.831	26914538.272	612.403	$2,000	01/01/1977	41	75	33	$882	$4,539	1	1	0.0	0.0	1.0	3.0	2.0	6
3440	Stormwater MH	STMH_7879	N/A	0.00	CR			635280.155	26913698.230	614.962	$3,500	01/01/2001	17	75	57	$2,665	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
3441	Stormwater MH	STMH_7978	N/A	0.00	CR			635298.337	26913615.515	614.786	$3,500	01/01/2001	17	75	57	$2,665	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3442	Stormwater MH	STMH_7977	N/A	0.00	CN			635357.148	26913367.305	615.322	$3,500	01/01/2001	17	75	57	$2,665	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3443	Stormwater MH	STMH_7971	N/A	0.00	CN			635353.184	26913042.775	617.540	$500	01/01/1949	69	75	5	$33	$4,539	1	1	0.0	0.0	1.0	3.0	3.0	9
3444	Stormwater MH	STMH_8009	N/A	0.00	ZZZ			634737.058	26914440.416	613.376	$2,000	01/01/1977	41	75	33	$882	$4,539	1	1	0.0	0.0	1.0	3.0	2.0	6
3445	Stormwater MH	STMH_8008	N/A	0.00	CR			634757.398	26914453.172	613.512	$3,500	01/01/2000	18	75	56	$2,618	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
3446	Stormwater MH	STMH_8010	N/A	0.00	CR			634480.228	26914319.626	614.794	$2,000	01/01/1977	41	75	33	$882	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
3447	Stormwater MH	STMH_8012	N/A	0.00	CR			634246.738	26914181.067	618.200	$2,000	01/01/1977	41	75	33	$882	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
3448	Stormwater MH	STMH_8011	N/A	0.00				634281.537	26914221.982	618.148	$2,500	01/01/1977	41	75	33	$1,103	$5,092	1	1	0.0	0.0	1.0	3.0	1.1	3.3
3449	Stormwater MH	STMH_8001	N/A	0.00				634478.760	26913787.473	618.746	$4,500	01/01/1995	23	75	51	$3,066	$6,017	1	1	0.0	0.0	1.0	1.0	2.0	2
3450	Stormwater MH	STMH_8022	N/A	0.00	CR			634158.885	26915018.587	614.822	$3,500	01/01/2004	14	75	60	$2,805	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3451	Stormwater MH	STMH_8020	N/A	0.00	CR			634203.773	26914930.255	614.395	$3,500	01/01/2004	14	75	60	$2,805	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3452	Stormwater MH	STMH_8019	N/A	0.00	CR			634349.471	26914630.749	613.762	$3,500	01/01/2004	14	75	60	$2,805	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3453	Stormwater MH	STMH_8014	N/A	0.00	CR			634720.702	26914534.747	612.914	$3,500	01/01/2003	15	75	59	$2,758	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3454	Stormwater MH	STMH_8015	N/A	0.00	CR			634580.588	26914823.373	613.127	$3,500	01/01/2003	15	75	59	$2,758	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3455	Stormwater MH	STMH_8016	N/A	0.00	CR			634460.719	26915060.191	613.998	$4,000	01/01/2003	15	75	59	$3,152	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
3456	Stormwater MH	STMH_8018	N/A	0.00	CR			634344.165	26915295.103	612.392	$4,000	01/01/2003	15	75	59	$3,152	$5,092	1	1	0.0	0.0	1.0	5.0	1.0	5
3457	Stormwater MH	STMH_8017	N/A	0.00	CR			634547.950	26915403.590	610.121	$3,500	01/01/2003	15	75	59	$2,758	$4,539	1	1	0.0	0.0	1.0	5.0	1.0	5
3458	Stormwater MH	STMH_7992	N/A					635158.969	26913972.504	0.000	$2,000	01/01/1965	53	75	21	$562	$5,092	1	1	0.0	0.0	1.0	5.0	1.1	5.5
3459	Stormwater MH	STMH_7993	N/A					634919.958	26913856.029	0.000	$2,000	01/01/1965	53	75	21	$562	$5,092	1	1	0.0	0.0	1.0	5.0	1.1	5.5
3460	Stormwater MH	STMH_7994	N/A					634742.284	26913769.148	0.000	$2,000	01/01/1965	53	75	21	$562	$5,092	1	1	0.0	0.0	1.0	5.0	1.1	5.5
3461	Stormwater MH	STMH_7995	N/A					634547.937	26913674.989	0.000	$2,000	01/01/1965	53	75	21	$562	$5,092	1	1	0.0	0.0	1.0	5.0	1.1	5.5
3462	Stormwater MH	STMH_7997	N/A	0.00	CR			634277.450	26913543.077	623.608	$2,000	01/01/1965	53	75	21	$562	$5,092	1	1	0.0	0.0	1.0	5.0	1.0	5
3463	Stormwater MH	STMH_7996	N/A	0.00	CR			634312.737	26913573.060	623.180	$3,500	01/01/2008	10	75	64	$2,992	$4,539	1	1	0.0	0.0	1.0	5.0	1.0	5
3464	Stormwater MH	STMH_7998	N/A	0.00	CR			634271.504	26913554.538	623.878	$3,500	01/01/2008	10	75	64	$2,992	$4,539	1	1	0.0	0.0	1.0	5.0	1.0	5
3465	Stormwater MH	STMH_7999	N/A	0.00	CR			634210.347	26913523.424	624.667	$3,500	01/01/2008	10	75	64	$2,992	$4,539	1	1	0.0	0.0	1.0	5.0	1.0	5
3466	Stormwater MH	STMH_8000	N/A	0.00	CR			634254.623	26913682.272	623.951	$4,500	01/01/1997	21	75	53	$3,186	$6,017	1	1	0.0	0.0	1.0	1.0	1.0	1
3467	Stormwater MH	STMH_8035	N/A	0.00	CR			634264.875	26915962.577	609.571	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	3.0	2.0	6
3468	Stormwater MH	STMH_8036	N/A	0.00	CR			634328.443	26915952.025	608.675	$5,000	01/01/2006	12	75	62	$4,141	$6,017	1	1	0.0	0.0	1.0	3.0	2.0	6
3469	Stormwater MH	STMH_8037	N/A	0.00	ZZZ			634498.440	26916075.374	609.935	$2,500	01/01/1977	41	75	33	$1,103	$5,092	1	1	0.0	0.0	1.0	3.0	2.0	6
3470	Stormwater MH	STMH_8048	N/A	0.00	CR			634939.777	26917557.614	609.064	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
3471	Stormwater MH	STMH_8050	N/A	0.00				634792.691	26917877.459	609.573	$4,500	01/01/1998	20	75	54	$3,246	$6,017	1	1	0.0	0.0	1.0	1.0	1.0	1
3472	Stormwater MH	STMH_8051	N/A	0.00				634657.012	26918193.040	612.041	$2,000	01/01/1939	79	75	0	$0	$6,017	1	1	0.0	0.0	1.0	1.0	1.0	1
3473	Stormwater MH	STMH_8506	N/A	0.00	CR			634486.143	26918586.434	611.799	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
3474	Stormwater MH	STMH_8402	N/A	0.00	CN			634241.146	26918945.315	609.014	$2,000	01/01/1949	69	75	5	$135	$6,017	1	1	0.0	0.0	1.0	4.0	1.0	4
3475	Stormwater MH	STMH_8403	N/A	0.00	CR			634265.465	26918962.735	608.960	$2,000	01/01/1949	69	75	5	$135	$6,017	1	1	0.0	0.0	1.0	4.0	1.0	4
3476	Stormwater MH	STMH_8046	N/A	0.00	CR			634541.753	26917712.743	605.829	$3,500	01/01/1998	20	75	54	$2,525	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
3477	Stormwater MH	STMH_8040	N/A	0.00	CR			634236.212	26917131.359	604.425	$3,000	01/01/1998	20	75	54	$2,164	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3478	Stormwater MH	STMH_8039	N/A	0.00	CR			634347.573	26917187.165	601.717	$5,000	01/01/2000	18	75	56	$3,740	$6,017	1	1	0.0	0.0	1.0	1.0	2.0	2
3479	Stormwater MH	STMH_8038	N/A	0.00	CR			634430.925	26917223.596	599.900	$3,000	01/01/1998	20	75	54	$2,164	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3480	Stormwater MH	STMH_8045	N/A	0.00				634688.724	26917389.579	606.660	$2,000	01/01/1939	79	75	0	$0	$6,017	1	1	0.0	0.0	1.0	1.0	1.1	1.1
3481	Stormwater MH	STMH_8044	N/A	0.00				634679.568	26917330.235	606.106	$4,500	01/01/1998	20	75	54	$3,246	$6,017	1	1	0.0	0.0	1.0	1.0	1.1	1.1
3482	Stormwater MH	STMH_8043	N/A	0.00				634775.336	26917120.141	607.664	$4,500	01/01/1998	20	75	54	$3,246	$6,017	1	1	0.0	0.0	1.0	1.0	1.1	1.1
3483	Stormwater MH	STMH_8042	N/A	0.00	CR			634305.527	26917599.314	599.855	$3,000	01/01/1994	24	75	50	$2,004	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3484	Stormwater MH	STMH_8052	N/A	0.00				635044.607	26918142.115	607.963	$2,000	01/01/1939	79	75	0	$0	$6,017	1	1	0.0	0.0	1.0	1.0	1.0	1
3485	Stormwater MH	STMH_8502	N/A	0.00	BR			635349.485	26918268.949	604.591	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	2.0	3.0	6
3486	Stormwater MH	STMH_8055	N/A	0.00	BR			635495.401	26917888.347	606.155	$3,000	01/01/1998	20	75	54	$2,164	$4,539	1	1	0.0	0.0	1.0	2.0	2.0	4
3487	Stormwater MH	STMH_7846	N/A	0.00	CR			635983.941	26913061.945	611.807	$4,000	01/01/2010	8	75	66	$3,526	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3488	Stormwater MH	STMH_7845	N/A	0.00	CR			635983.139	26913023.466	611.898	$4,500	01/01/2010	8	75	66	$3,967	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
3489	Stormwater MH	STMH_7877A	N/A	0.00	CR			635368.834	26914400.246	610.949	$2,000	01/01/1974	44	75	30	$802	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3490	Stormwater MH	STMH_7877	N/A	0.00	CR			635450.647	26914440.022	611.816	$2,000	01/01/1974	44	75	30	$802	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3491	Stormwater MH	STMH_7874	N/A	0.00	CR			635629.105	26914528.405	612.943	$2,000	01/01/1974	44	75	30	$802	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3492	Stormwater MH	STMH_7872	N/A	0.00	CR			635709.370	26914566.558	612.284	$2,000	01/01/1974	44	75	30	$802	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3493	Stormwater MH	STMH_7824	N/A	0.00	CR			636172.131	26914807.210	612.747	$2,500	01/01/1975	43	75	31	$1,036	$5,092	1	1	0.0	0.0	1.0	3.0	1.0	3
3494	Stormwater MH	STMH_7830A	N/A	0.00	CR			636453.631	26914948.539	612.678	$2,500	01/01/1975	43	75	31	$1,036	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
3495	Stormwater MH	STMH_7830	N/A	0.00	CR			636707.507	26915070.325	611.514	$2,000	01/01/1975	43	75	31	$829	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3496	Stormwater MH	STMH_7831	N/A	0.00	CR			636752.471	26915091.592	610.388	$2,000	01/01/1975	43	75	31	$829	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3497	Stormwater MH	STMH_7832	N/A	0.00	CR			636672.463	26915290.681	609.506	$4,500	01/01/2010	8	75	66	$3,967	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
3498	Stormwater MH	STMH_7833	N/A	0.00	CR			636653.086	26915344.645	609.628	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
3499	Stormwater MH	STMH_7827	N/A	0.00	CR			636054.312	26915069.203	612.755	$4,200	01/01/1990	28	75	46	$2,581	$5,767	1	1	0.0	0.0	1.0	3.0	1.0	3
3500	Stormwater MH	STMH_7943	N/A	0.00	CR			635727.319	26914909.177	611.890	$3,200	01/01/1975	43	75	31	$1,326	$5,767	1	1	0.0	0.0	1.0	5.0	1.0	5
3501	Stormwater MH	STMH_6815	N/A	0.00	CR			636627.602	26912793.662	612.165	$4,500	01/01/2011	7	75	67	$4,027	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
3502	Stormwater MH	STMH_7802	N/A	0.00	CR			636623.415	26913023.305	613.126	$5,500	01/01/2011	7	75	67	$4,922	$6,017	1	1	0.0	0.0	1.0	2.0	1.0	2
3503	Stormwater MH	STMH_7801	N/A	0.00	CN			636633.418	26913000.313	613.093	$4,500	01/01/2010	8	75	66	$3,967	$5,092	1	1	0.0	0.0	1.0	3.0	1.0	3
3504	Stormwater MH	STMH_7838	N/A	0.00				636371.146	26913057.754	613.803	$2,500	01/01/1956	62	75	12	$402	$6,017	1	1	0.0	0.0	1.0	2.0	1.1	2.2
3505	Stormwater MH	STMH_7837	N/A	0.00	CR			636379.195	26913050.312	613.718	$1,500	01/01/1956	62	75	12	$241	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
3506	Stormwater MH	STMH_7836	N/A	0.00	CR			636335.699	26913009.944	613.585	$4,500	01/01/2011	7	75	67	$4,027	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
3507	Stormwater MH	STMH_7844	N/A	0.00	CR			636280.830	26913014.104	613.371	$4,500	01/01/2010	8	75	66	$3,967	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
3508	Stormwater MH	STMH_7902	N/A	0.00	CR			636254.292	26916245.984	608.183	$5,200	01/01/2010	8	75	66	$4,584	$5,767	1	1	0.0	0.0	1.0	2.0	1.0	2
3509	Stormwater MH	STMH_7903	N/A	0.00	CR			636231.514	26916295.225	607.840	$4,000	01/01/2010	8	75	66	$3,526	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3510	Stormwater MH	STMH_7904	N/A	0.00	CR			636149.302	26916481.032	607.579	$4,000	01/01/2010	8	75	66	$3,526	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3511	Stormwater MH	STMH_7908	N/A	0.00	CR			635960.479	26916811.963	606.815	$4,500	01/01/2011	7	75	67	$4,027	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
3512	Stormwater MH	STMH_7909	N/A	0.00	CR			636004.045	26916832.671	606.913	$5,200	01/01/2011	7	75	67	$4,653	$5,767	1	1	0.0	0.0	1.0	2.0	1.0	2
3513	Stormwater MH	STMH_7910	N/A	0.00	CR			635979.479	26916848.011	606.616	$4,500	01/01/2011	7	75	67	$4,027	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
3514	Stormwater MH	STMH_7911	N/A	0.00	CR			635936.943	26916949.698	606.627	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
3515	Stormwater MH	STMH_7912	N/A	0.00	CR			635799.851	26917255.690	605.107	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
3516	Stormwater MH	STMH_7913	N/A	0.00	CR			635711.234	26917456.144	604.958	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3517	Stormwater MH	STMH_7887	N/A	0.00	CR			636595.892	26916423.846	606.565	$4,500	01/01/2011	7	75	67	$4,027	$5,092	1	1	0.0	0.0	1.0	3.0	1.0	3
3518	Stormwater MH	STMH_7886	N/A	0.00	CR			636631.739	26916356.702	606.235	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
3519	Stormwater MH	STMH_7885	N/A					636703.417	26916191.796	0.000	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	2.0	1.1	2.2
3520	Stormwater MH	STMH_7884	N/A					636750.104	26916087.965	0.000	$2,000	01/01/1939	79	75	0	$0	$6,017	1	1	0.0	0.0	1.0	2.0	1.1	2.2
3521	Stormwater MH	STMH_8166	N/A					636811.578	26915941.846	0.000	$5,500	01/01/2011	7	75	67	$4,922	$6,017	1	1	0.0	0.0	1.0	2.0	1.1	2.2
3522	Stormwater MH	STMH_8167	N/A	0.00	CR			636768.239	26915923.836	606.838	$4,000	01/01/2010	8	75	66	$3,526	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3523	Stormwater MH	STMH_7882	N/A	0.00	CR			636531.313	26917088.268	600.687	$4,500	01/01/2011	7	75	67	$4,027	$5,092	1	1	0.0	0.0	1.0	5.0	1.0	5
3524	Stormwater MH	STMH_7920	N/A	0.00	BR			636008.491	26916076.393	609.506	$500	01/01/1949	69	75	5	$33	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3525	Stormwater MH	STMH_7921	N/A	0.00	CR			635975.615	26916112.803	609.380	$500	01/01/1949	69	75	5	$33	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3526	Stormwater MH	STMH_7919	N/A	0.00	BR			636104.814	26915881.704	610.809	$500	01/01/1949	69	75	5	$33	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3527	Stormwater MH	STMH_7918	N/A	0.00	BR			636180.148	26915730.105	611.490	$500	01/01/1949	69	75	5	$33	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3528	Stormwater MH	STMH_7917	N/A	0.00	CR			636156.379	26915729.313	611.729	$5,500	01/01/2011	7	75	67	$4,922	$6,017	1	1	0.0	0.0	1.0	1.0	1.0	1
3529	Stormwater MH	STMH_7916	N/A	0.00	CR			636254.888	26915581.240	611.065	$500	01/01/1949	69	75	5	$33	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3530	Stormwater MH	STMH_7915	N/A	0.00	BR			636309.212	26915467.712	611.470	$1,000	01/01/1959	59	75	15	$201	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3531	Stormwater MH	STMH_7803	N/A	0.00	CR			636629.346	26913325.423	612.368	$4,500	01/01/2011	7	75	67	$4,027	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
3532	Stormwater MH	STMH_7847	N/A	0.00	CR			635987.543	26913299.968	610.931	$4,000	01/01/2010	8	75	66	$3,526	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3533	Stormwater MH	STMH_7854	N/A	0.00	CR			635890.516	26913542.179	612.347	$2,000	01/01/1975	43	75	31	$829	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3534	Stormwater MH	STMH_7804	N/A	0.00	CR			636635.309	26913786.661	611.632	$3,500	01/01/2005	13	75	61	$2,852	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3535	Stormwater MH	STMH_8162	N/A	0.00				636810.720	26913902.648	612.447	$3,500	01/01/1975	43	75	31	$1,451	$6,017	1	1	0.0	0.0	1.0	3.0	1.1	3.3
3536	Stormwater MH	STMH_8164	N/A	0.00				636819.004	26913953.457	612.479	$3,500	01/01/1975	43	75	31	$1,451	$6,017	1	1	0.0	0.0	1.0	3.0	1.1	3.3
3537	Stormwater MH	STMH_8165	N/A	0.00				636741.223	26914191.761	612.714	$3,500	01/01/1975	43	75	31	$1,451	$6,017	1	1	0.0	0.0	1.0	3.0	1.1	3.3
3538	Stormwater MH	STMH_7810	N/A	0.00				636668.195	26914415.546	613.045	$3,500	01/01/1975	43	75	31	$1,451	$6,017	1	1	0.0	0.0	1.0	3.0	1.1	3.3
3539	Stormwater MH	STMH_7815	N/A	0.00				636603.908	26914469.935	613.353	$2,500	01/01/1950	68	75	6	$202	$6,017	1	1	0.0	0.0	1.0	3.0	1.1	3.3
3540	Stormwater MH	STMH_7817	N/A	0.00	CR			636399.460	26914373.992	613.399	$3,000	01/01/1995	23	75	51	$2,044	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
3541	Stormwater MH	STMH_7818	N/A	0.00				636364.846	26914383.009	613.277	$3,000	01/01/1995	23	75	51	$2,044	$4,539	1	1	0.0	0.0	1.0	3.0	1.1	3.3
3542	Stormwater MH	STMH_7862	N/A	0.00	CR			635821.351	26914020.579	611.638	$2,000	01/01/1975	43	75	31	$829	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
3543	Stormwater MH	STMH_7826	N/A	0.00	CR			636103.915	26914960.148	612.815	$2,500	01/01/1975	43	75	31	$1,036	$5,092	1	1	0.0	0.0	1.0	3.0	1.0	3
3544	Stormwater MH	STMH_7825	N/A	0.00				636149.797	26914858.077	612.635	$2,500	01/01/1975	43	75	31	$1,036	$5,092	1	1	0.0	0.0	1.0	3.0	1.1	3.3
3545	Stormwater MH	STMH_7823	N/A	0.00	CR			636236.051	26914664.175	612.743	$2,500	01/01/1975	43	75	31	$1,036	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
3546	Stormwater MH	STMH_6869	N/A	0.00	CN			635334.593	26912400.186	646.464	$500	01/01/1949	69	75	5	$33	$4,539	1	1	0.0	0.0	1.0	2.0	2.0	4
3547	Stormwater MH	STMH_6868	N/A	0.00	CN			635331.259	26912208.937	654.994	$3,500	01/01/2001	17	75	57	$2,665	$4,539	1	1	0.0	0.0	1.0	2.0	2.0	4
3548	Stormwater MH	STMH_6867	N/A	0.00	BR			635329.214	26912100.674	656.276	$3,500	01/01/2001	17	75	57	$2,665	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3549	Stormwater MH	STMH_6857	N/A	0.00	CN			635856.585	26911873.057	618.968	$3,500	01/01/2004	14	75	60	$2,805	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3550	Stormwater MH	STMH_6855	N/A	0.00	CN			635945.199	26911702.357	614.486	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	4.0	1.0	4
3551	Stormwater MH	STMH_6856	N/A	0.00	CN			635970.150	26911733.013	613.056	$3,500	01/01/2004	14	75	60	$2,805	$4,539	1	1	0.0	0.0	1.0	4.0	1.0	4
3552	Stormwater MH	STMH_6846	N/A	0.00	CR			635933.953	26911135.830	610.827	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3553	Stormwater MH	STMH_6839	N/A	0.00	CR			635923.096	26910569.859	607.340	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	2.0	2.0	4
3554	Stormwater MH	STMH_6837	N/A	0.00	CR		SMELLED LIKE GASOLINE INSIDE MH DURING INSPECTION.	635922.488	26910366.000	607.852	$6,000	01/01/1970	48	75	26	$2,087	$10,213	1	1	0.0	0.0	1.0	3.0	2.0	6
3555	Stormwater MH	STMH_6838	N/A	0.00	CR			635921.194	26910393.675	608.336	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	2.0	2.0	4
3556	Stormwater MH	STMH_6844	N/A	0.00	CN			635589.273	26910386.114	0.000	$2,500	01/01/1970	48	75	26	$869	$5,092	1	1	0.0	0.0	1.0	3.0	1.0	3

CITY OF SAULT STE. MARIE, MICHIGAN																									
Summary																									
id	Equipment Description	Asset ID	Construction Drawings Sheet Reference	Capacity or Size	Material	Length	Comment	Northing State Plane Ordinate	Easting State Plane Ordinate	Elevation	Original Cost	Year Installed (01/01/YYYY)	Age	Expected useful life (years)	Remaining Useful Life (years)	Depreciated Value	Replacement Cost	Average number of units in service	Total Number of units	Redundancy (Number)	Redundancy (percent)	Redundancy Score (R) (Reduces (C))	Criticality (C) (see back-up sheets)	Probability of Failure (P) (see back-up sheets)	Business Risk (BRE=PxCxR)
3557	Stormwater MH	STMH_6858	N/A	0.00	CN			635637.759	26911882.124	627.934	$3,500	01/01/2004	14	75	60	$2,805	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3558	Stormwater MH	STMH_6865	N/A	0.00	BR			634336.430	26911732.786	705.951	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	2.0	3.0	6
3559	Stormwater MH	STMH_6866	N/A	0.00	CR			634183.831	26911700.475	712.462	$3,000	01/01/1984	34	75	40	$1,604	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
3560	Stormwater MH	STMH_6864	N/A	0.00				634461.084	26911693.561	700.308	$4,000	01/01/1984	34	75	40	$2,138	$6,017	1	1	0.0	0.0	1.0	2.0	1.1	2.2
3561	Stormwater MH	STMH_6863	N/A	0.00	BR			634494.774	26911728.808	699.541	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	2.0	3.0	6
3562	Stormwater MH	STMH_6862	N/A	0.00	BR		RIM 1.5" BELOW GRADE	634775.413	26911709.422	690.137	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	3.0	3.0	9
3563	Stormwater MH	STMH_6861	N/A	0.00	BR			635054.664	26911701.406	677.962	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	3.0	3.0	9
3564	Stormwater MH	STMH_6860	N/A	0.00	BR			635274.116	26911697.134	662.790	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	3.0	3.0	9
3565	Stormwater MH	STMH_6874	N/A	0.00	BR			634853.755	26912120.350	682.334	$500	01/01/1949	69	75	5	$33	$4,539	1	1	0.0	0.0	1.0	1.0	3.0	3
3566	Stormwater MH	STMH_6873	N/A	0.00	CN			634857.073	26912237.635	678.707	$500	01/01/1949	69	75	5	$33	$4,539	1	1	0.0	0.0	1.0	1.0	2.0	2
3567	Stormwater MH	STMH_6870	N/A	0.00	CR			635137.922	26912673.445	645.448	$500	01/01/1949	69	75	5	$33	$4,539	1	1	0.0	0.0	1.0	2.0	2.0	4
3568	Stormwater MH	STMH_6877	N/A	0.00				634974.659	26912750.895	645.870	$1,000	01/01/1954	64	75	10	$134	$4,539	1	1	0.0	0.0	1.0	1.0	1.1	1.1
3569	Stormwater MH	STMH_6878	N/A	0.00				634776.661	26912817.395	650.487	$2,500	01/01/1954	64	75	10	$336	$6,017	1	1	0.0	0.0	1.0	1.0	1.1	1.1
3570	Stormwater MH	STMH_6872	N/A	0.00	BR			634951.721	26912427.528	672.631	$500	01/01/1949	69	75	5	$33	$4,539	1	1	0.0	0.0	1.0	1.0	3.0	3
3571	Stormwater MH	STMH_6871	N/A	0.00	CN			635035.685	26912513.244	664.388	$5,000	01/01/2001	17	75	57	$3,807	$6,017	1	1	0.0	0.0	1.0	1.0	1.0	1
3572	Stormwater MH	STMH_6836	N/A	0.00	CR			636173.599	26910360.896	609.440	$6,000	01/01/1970	48	75	26	$2,087	$10,213	1	1	0.0	0.0	1.0	3.0	1.0	3
3573	Stormwater MH	STMH_6801	N/A	0.00				636566.537	26910344.245	608.495	$2,500	01/01/1970	48	75	26	$869	$5,092	1	1	0.0	0.0	1.0	3.0	1.1	3.3
3574	Stormwater MH	STMH_6802	N/A	0.00	CN			636572.720	26910628.557	606.888	$2,000	01/01/1970	48	75	26	$695	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3575	Stormwater MH	STMH_6803	N/A	0.00	CN			636589.053	26911109.181	609.578	$2,500	01/01/1970	48	75	26	$869	$5,092	1	1	0.0	0.0	1.0	4.0	1.0	4
3576	Stormwater MH	STMH_6804	N/A	0.00	CN			636595.125	26911425.237	610.616	$2,500	01/01/1970	48	75	26	$869	$5,092	1	1	0.0	0.0	1.0	4.0	1.0	4
3577	Stormwater MH	STMH_6805	N/A	0.00	BR			636601.936	26911663.547	610.007	$3,500	01/01/1970	48	75	26	$1,217	$6,017	1	1	0.0	0.0	1.0	2.0	1.0	2
3578	Stormwater MH	STMH_6806	N/A	0.00	CR			636605.012	26911813.904	610.703	$3,500	01/01/1970	48	75	26	$1,217	$6,017	1	1	0.0	0.0	1.0	2.0	1.0	2
3579	Stormwater MH	STMH_6807	N/A	0.00	BR			636606.999	26911872.136	611.278	$3,500	01/01/1970	48	75	26	$1,217	$6,017	1	1	0.0	0.0	1.0	2.0	2.0	4
3580	Stormwater MH	STMH_6812	N/A	0.00	CR			636592.942	26912339.561	611.388	$3,500	01/01/1977	41	75	33	$1,544	$6,017	1	1	0.0	0.0	1.0	3.0	2.0	6
3581	Stormwater MH	STMH_6813	N/A	0.00	BR			636421.405	26912344.303	613.077	$2,000	01/01/1977	41	75	33	$882	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
3582	Stormwater MH	STMH_6808	N/A	0.00	CN			636422.226	26911849.771	611.838	$5,000	01/01/2004	14	75	60	$4,007	$6,017	1	1	0.0	0.0	1.0	3.0	1.0	3
3583	Stormwater MH	STMH_6809	N/A	0.00	CR			636361.660	26911851.533	612.827	$3,500	01/01/2004	14	75	60	$2,805	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
3584	Stormwater MH	STMH_6810	N/A	0.00	CR			636268.510	26911855.223	615.837	$4,000	01/01/2004	14	75	60	$3,206	$5,092	1	1	0.0	0.0	1.0	3.0	1.0	3
3585	Stormwater MH	STMH_6814	N/A	0.00				636129.068	26912356.985	612.697	$3,500	01/01/1977	41	75	33	$1,544	$6,017	1	1	0.0	0.0	1.0	3.0	1.1	3.3
3586	Stormwater MH	STMH_7914	N/A	0.00	CR			635656.374	26917623.291	606.229	$5,000	01/01/2000	18	75	56	$3,740	$6,017	1	1	0.0	0.0	1.0	2.0	1.0	2
3587	Stormwater MH	STMH_7895	N/A					635999.507	26917751.889	0.000	$5,500	01/01/2011	7	75	67	$4,922	$6,017	1	1	0.0	0.0	1.0	1.0	1.1	1.1
3588	Stormwater MH	STMH_7894	N/A					636061.277	26917607.990	0.000	$5,500	01/01/2016	2	75	72	$5,289	$6,017	1	1	0.0	0.0	1.0	1.0	1.1	1.1
3589	Stormwater MH	STMH_7893	N/A					636106.390	26917507.060	0.000	$2,000	01/01/1939	79	75	0	$0	$6,017	1	1	0.0	0.0	1.0	1.0	1.1	1.1
3590	Stormwater MH	STMH_7892	N/A					636176.267	26917350.636	0.000	$2,000	01/01/1939	79	75	0	$0	$6,017	1	1	0.0	0.0	1.0	2.0	1.1	2.2
3591	Stormwater MH	STMH_7891	N/A	0.00	CR			636300.330	26917069.623	604.555	$4,500	01/01/2016	2	75	72	$4,327	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
3592	Stormwater MH	STMH_7905	N/A	0.00	CR			636140.809	26916897.135	606.348	$4,500	01/01/2011	7	75	67	$4,027	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
3593	Stormwater MH	STMH_7889	N/A	0.00				636353.392	26916967.040	604.915	$4,500	01/01/2011	7	75	67	$4,027	$5,092	1	1	0.0	0.0	1.0	3.0	1.0	3
3594	Stormwater MH	STMH_7883	N/A	0.00	CR			636353.777	26917001.322	604.813	$11,200	01/01/2011	7	75	67	$10,023	$12,194	1	1	0.0	0.0	1.0	5.0	1.0	5
3595	Stormwater MH	STMH_7890	N/A	0.00	CR			636337.653	26916991.388	604.757	$4,500	01/01/2011	7	75	67	$4,027	$5,092	1	1	0.0	0.0	1.0	5.0	1.0	5
3596	Stormwater MH	STMH_7888	N/A	0.00	CR			636504.006	26916642.913	605.750	$5,500	01/01/2011	7	75	67	$4,922	$6,017	1	1	0.0	0.0	1.0	3.0	1.0	3
3597	Stormwater MH	STMH_7901A	N/A	0.00	CR			636550.515	26916388.332	606.367	$4,500	01/01/2010	8	75	66	$3,967	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
3598	Stormwater MH	STMH_7901	N/A	0.00	CR			636408.813	26916319.421	607.763	$4,500	01/01/2010	8	75	66	$3,967	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
3599	Stormwater MH	STMH_8146	N/A					636840.931	26914761.760	0.000	$4,500	01/01/1996	22	75	52	$3,126	$6,017	1	1	0.0	0.0	1.0	2.0	1.1	2.2
3600	Stormwater MH	STMH_8147	N/A	0.00				636792.550	26914982.334	610.587	$3,500	01/01/1975	43	75	31	$1,451	$6,017	1	1	0.0	0.0	1.0	2.0	1.1	2.2
3601	Stormwater MH	STMH_7812	N/A					636714.398	26914702.884	0.000	$4,500	01/01/1996	22	75	52	$3,126	$6,017	1	1	0.0	0.0	1.0	3.0	1.1	3.3
3602	Stormwater MH	STMH_7813	N/A					636605.151	26914648.960	0.000	$4,500	01/01/1996	22	75	52	$3,126	$6,017	1	1	0.0	0.0	1.0	3.0	1.1	3.3
3603	Stormwater MH	STMH_7814	N/A					636526.738	26914612.149	0.000	$4,500	01/01/1996	22	75	52	$3,126	$6,017	1	1	0.0	0.0	1.0	3.0	1.1	3.3
3604	Stormwater MH	STMH_7820	N/A					636321.161	26914513.156	0.000	$4,500	01/01/1996	22	75	52	$3,126	$6,017	1	1	0.0	0.0	1.0	3.0	1.1	3.3
3605	Stormwater MH	STMH_7866A	N/A					636277.912	26914491.154	0.000	$4,500	01/01/1996	22	75	52	$3,126	$6,017	1	1	0.0	0.0	1.0	4.0	1.1	4.4
3606	Stormwater MH	STMH_7821	N/A					636311.956	26914531.400	0.000	$3,500	01/01/1975	43	75	31	$1,451	$6,017	1	1	0.0	0.0	1.0	2.0	1.1	2.2
3607	Stormwater MH	STMH_7866	N/A					636100.523	26914403.342	0.000	$4,500	01/01/1996	22	75	52	$3,126	$6,017	1	1	0.0	0.0	1.0	4.0	1.1	4.4
3608	Stormwater MH	STMH_7867	N/A					636002.495	26914356.747	0.000	$4,500	01/01/1996	22	75	52	$3,126	$6,017	1	1	0.0	0.0	1.0	4.0	1.1	4.4
3609	Stormwater MH	STMH_7868	N/A					635917.180	26914311.794	0.000	$4,500	01/01/1996	22	75	52	$3,126	$6,017	1	1	0.0	0.0	1.0	4.0	1.1	4.4
3610	Stormwater MH	STMH_7869	N/A					635780.101	26914247.212	0.000	$4,500	01/01/1996	22	75	52	$3,126	$6,017	1	1	0.0	0.0	1.0	4.0	1.1	4.4
3611	Stormwater MH	STMH_7870	N/A					635676.956	26914196.639	0.000	$4,500	01/01/1996	22	75	52	$3,126	$6,017	1	1	0.0	0.0	1.0	4.0	1.1	4.4
3612	Stormwater MH	STMH_7871	N/A					635588.523	26914154.012	0.000	$4,500	01/01/1996	22	75	52	$3,126	$6,017	1	1	0.0	0.0	1.0	4.0	1.1	4.4
3613	Stormwater MH	STMH_7864	N/A	0.00	CR			635658.991	26914015.802	611.082	$2,500	01/01/1975	43	75	31	$1,036	$5,092	1	1	0.0	0.0	1.0	5.0	1.0	5
3614	Stormwater MH	STMH_7865	N/A					635621.547	26914085.513	0.000	$2,500	01/01/1975	43	75	31	$1,036	$5,092	1	1	0.0	0.0	1.0	5.0	1.1	5.5
3615	Stormwater MH	STMH_7863	N/A	0.00				635685.680	26913955.721	611.310	$2,500	01/01/1975	43	75	31	$1,036	$5,092	1	1	0.0	0.0	1.0	5.0	1.1	5.5
3616	Stormwater MH	STMH_6845	N/A	0.00	CN			635295.130	26910404.960	0.000	$4,500	01/01/1970	48	75	26	$1,565	$7,410	1	1	0.0	0.0	1.0	3.0	1.0	3
3617	Stormwater MH	STMH_6848	N/A	0.00	CN			635370.839	26911159.306	633.589	$3,500	01/01/1991	27	75	47	$2,198	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
3618	Stormwater MH	STMH_6849	N/A	0.00				635325.244	26911147.966	638.339	$4,500	01/01/1991	27	75	47	$2,826	$6,017	1	1	0.0	0.0	1.0	1.0	1.1	1.1
3619	Stormwater MH	STMH_6859	N/A	0.00	CN			635500.987	26911719.371	635.037	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	4.0	2.0	8
3620	Stormwater MH	STMH_6850	N/A	0.00	CR			635089.578	26910697.326	674.843	$5,000	01/01/2000	18	75	56	$3,740	$6,017	1	1	0.0	0.0	1.0	1.0	1.0	1
3621	Stormwater MH	STMH_8505	N/A	0.00	BR			634896.949	26918473.377	608.272	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
3622	Stormwater MH	STMH_8512	N/A	0.00	ZZZ			634983.338	26919086.774	603.872	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	1.0	2.0	2
3623	Stormwater MH	STMH_8523	N/A	0.00	CR			634584.640	26919985.720	601.452	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
3624	Stormwater MH	STMH_8509	N/A	0.00	CR			634503.701	26919360.680	604.073	$2,500	01/01/1950	68	75	6	$202	$6,017	1	1	0.0	0.0	1.0	5.0	1.0	5
3625	Stormwater MH	STMH_8524	N/A	0.00	BR			634357.976	26919686.070	602.861	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	1.0	2.0	2
3626	Stormwater MH	STMH_8524A	N/A	0.00	CR			634218.173	26919998.836	601.221	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
3627	Stormwater MH	STMH_8521	N/A					634745.499	26920561.293	0.000	$2,000	01/01/1939	79	75	0	$0	$6,017	1	1	0.0	0.0	1.0	3.0	1.1	3.3
3628	Stormwater MH	STMH_8454B	N/A					634547.514	26921030.963	0.000	$4,500	01/01/1998	20	75	54	$3,246	$6,017	1	1	0.0	0.0	1.0	2.0	1.1	2.2
3629	Stormwater MH	STMH_8454A	N/A					634351.584	26921473.676	0.000	$4,500	01/01/1998	20	75	54	$3,246	$6,017	1	1	0.0	0.0	1.0	2.0	1.1	2.2
3630	Stormwater MH	STMH_8510	N/A	0.00	CR			634797.469	26919509.459	603.337	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	5.0	1.0	5
3631	Stormwater MH	STMH_8515	N/A	0.00	CN			635176.299	26919675.542	598.862	$4,500	01/01/1939	79	75	0	$0	$13,099	1	1	0.0	0.0	1.0	5.0	1.0	5
3632	Stormwater MH	STMH_8516	N/A	0.00				635398.805	26919763.145	593.441	$2,000	01/01/1939	79	75	0	$0	$6,017	1	1	0.0	0.0	1.0	5.0	1.1	5.5
3633	Stormwater MH	STMH_8511	N/A					635422.968	26919040.703	0.000	$2,000	01/01/1939	79	75	0	$0	$6,017	1	1	0.0	0.0	1.0	3.0	1.1	3.3
3634	Stormwater MH	STMH_8513	N/A					635237.749	26919456.206	0.000	$2,000	01/01/1939	79	75	0	$0	$6,017	1	1	0.0	0.0	1.0	3.0	1.1	3.3
3635	Stormwater MH	STMH_8514	N/A					635145.272	26919665.588	0.000	$2,500	01/01/1950	68	75	6	$202	$6,017	1	1	0.0	0.0	1.0	3.0	1.1	3.3
3636	Stormwater MH	STMH_8518	N/A					634931.488	26920142.687	0.000	$2,000	01/01/1939	79	75	0	$0	$6,017	1	1	0.0	0.0	1.0	3.0	1.1	3.3
3637	Stormwater MH	STMH_8519	N/A	0.00	CR			634846.235	26920287.779	598.219	$5,000	01/01/2000	18	75	56	$3,740	$6,017	1	1	0.0	0.0	1.0	3.0	1.0	3
3638	Stormwater MH	STMH_8501	N/A	0.00	CR			635665.396	26918415.150	601.566	$3,000	01/01/1998	20	75	54	$2,164	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3639	Stormwater MH	STMH_8504	N/A	0.00	BR			635076.535	26918878.326	604.284	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	3.0	1.0	3
3640	Stormwater MH	STMH_8507	N/A	0.00	ZZZ			634780.719	26918732.001	607.330	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
3641	Stormwater MH	STMH_8503	N/A	0.00	BR			635208.203	26918584.558	604.591	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	2.0	3.0	6
3642	Stormwater MH	STMH_7712	N/A	0.00	CR			632839.692	26916903.007	615.822	$5,000	01/01/2000	18	75	56	$3,740	$6,017	1	1	0.0	0.0	1.0	1.0	1.0	1
3643	Stormwater MH	STMH_7707A	N/A	0.00	CR			633986.556	26917001.503	605.270	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	2.0	2.0	4
3644	Stormwater MH	STMH_7553	N/A	0.00	ZZZ			631534.873	26916844.840	631.043	$1,500	01/01/1950	68	75	6	$121	$5,092	1	1	0.0	0.0	1.0	5.0	1.0	5
3645	Stormwater MH	STMH_7552	N/A	0.00	CR			631526.711	26916572.241	630.921	$3,500	01/01/2003	15	75	59	$2,758	$4,539	1	1	0.0	0.0	1.0	5.0	3.0	15
3646	Stormwater MH	STMH_7574	N/A	0.00	CR			630332.647	26918410.157	631.908	$4,000	01/01/2010	8	75	66	$3,526	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3647	Stormwater MH	STMH_6435	N/A	0.00	CR			623413.802	26910130.510	700.391	$5,000	01/01/2000	18	75	56	$3,740	$6,017	1	1	0.0	0.0	1.0	1.0	1.0	1
3648	Stormwater MH	STMH_6432	N/A					623422.331	26908705.887	0.000	$3,500	01/01/1976	42	75	32	$1,497	$6,017	1	1	0.0	0.0	1.0	2.0	1.1	2.2
3649	Stormwater MH	STMH_6439	N/A	0.00	CR			623620.626	26913023.802	706.869	$5,000	01/01/2000	18	75	56	$3,740	$6,017	1	1	0.0	0.0	1.0	1.0	1.0	1
3650	Stormwater MH	STMH_6420	N/A	0.00	CR			625029.105	26908699.640	698.217	$3,000	01/01/1997	21	75	53	$2,124	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3651	Stormwater MH	STMH_5809	N/A	0.00				623752.023	26906829.316	694.599	$3,000	01/01/1993	25	75	49	$1,964	$4,539	1	1	0.0	0.0	1.0	4.0	1.1	4.4
3652	Stormwater MH	STMH_5810	N/A	0.00				623756.223	26906981.698	694.838	$3,000	01/01/1993	25	75	49	$1,964	$4,539	1	1	0.0	0.0	1.0	4.0	1.1	4.4
3653	Stormwater MH	STMH_5811	N/A	0.00				623759.814	26907101.997	695.043	$3,000	01/01/1993	25	75	49	$1,964	$4,539	1	1	0.0	0.0	1.0	4.0	1.1	4.4
3654	Stormwater MH	STMH_5812	N/A	0.00				623768.254	26907426.984	697.059	$4,500	01/01/1993	25	75	49	$2,946	$6,017	1	1	0.0	0.0	1.0	4.0	1.1	4.4
3655	Stormwater MH	STMH_5813	N/A	0.00	CR			623772.630	26907525.051	698.238	$2,000	01/01/1976	42	75	32	$855	$4,539	1	1	0.0	0.0	1.0	4.0	1.0	4
3656	Stormwater MH	STMH_6828	N/A	0.00	CR			634678.717	26908687.015	628.973	$5,000	01/01/2009	9	75	65	$4,341	$6,017	1	1	0.0	0.0	1.0	2.0	1.0	2
3657	Stormwater MH	STMH_6832	N/A	0.00	CR			634400.269	26908524.604	635.560	$3,000	01/01/1964	54	75	20	$803	$6,017	1	1	0.0	0.0	1.0	2.0	1.0	2
3658	Stormwater MH	STMH_5612	N/A	0.00	CN			632612.930	26900611.569	617.388	$3,000	01/01/1986	32	75	42	$1,684	$5,092	1	1	0.0	0.0	1.0	1.0	2.0	2
3659	Stormwater MH	STMH_5606	N/A	0.00	CR			631730.625	26899861.752	624.062	$1,500	01/01/1965	53	75	21	$421	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3660	Stormwater MH	STMH_5412	N/A	0.00	CR			631517.004	26897231.997	620.717	$3,500	01/01/1991	27	75	47	$2,198	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
3661	Stormwater MH	STMH_5409	N/A	0.00	CR			631515.205	26897062.189	617.369	$4,500	01/01/1991	27	75	47	$2,826	$6,017	1	1	0.0	0.0	1.0	1.0	1.0	1
3662	Stormwater MH	STMH_5408	N/A	0.00	CR			631536.142	26897016.237	616.653	$4,500	01/01/1991	27	75	47	$2,826	$6,017	1	1	0.0	0.0	1.0	1.0	1.0	1
3663	Stormwater MH	STMH_6605	N/A	0.00	CR			629298.766	26909779.373	707.261	$1,500	01/01/1961	57	75	17	$341	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3664	Stormwater MH	STMH_6606	N/A	0.00	CR			629055.343	26910031.824	710.029	$1,500	01/01/1961	57	75	17	$341	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3665	Stormwater MH	STMH_6607	N/A	0.00	CR			628812.285	26910282.018	711.446	$2,000	01/01/1961	57	75	17	$455	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
3666	Stormwater MH	STMH_6501	N/A	0.00	CR			628464.376	26910643.294	712.947	$1,500	01/01/1961	57	75	17	$341	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3667	Stormwater MH	STMH_6502	N/A	0.00	CR			628222.341	26910893.644	712.458	$1,500	01/01/1961	57	75	17	$341	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3668	Stormwater MH	STMH_6503	N/A	0.00	CR			627930.920	26911196.140	711.454	$1,500	01/01/1961	57	75	17	$341	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3669	Stormwater MH	STMH_6604	N/A	0.00	CR			629425.115	26909647.192	706.055	$1,500	01/01/1961	57	75	17	$341	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3670	Stormwater MH	STMH_6603	N/A	0.00	CR			629645.125	26909420.239	704.889	$1,500	01/01/1961	57	75	17	$341	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3671	Stormwater MH	STMH_6602	N/A	0.00	CR			630306.006	26908735.517	701.618	$1,500	01/01/1961	57	75	17	$341	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3672	Stormwater MH	STMH_6601	N/A	0.00	CR			630550.262	26908486.000	700.080	$3,000	01/01/1961	57	75	17	$683	$6,017	1	1	0.0	0.0	1.0	2.0	1.0	2
3673	Stormwater MH	STMH_7082	N/A	0.00	CR			637633.451	26911163.295	608.278	$3,000	01/01/1995	23	75	51	$2,044	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3674	Stormwater MH	STMH_8145A	N/A					637231.738	26914871.360	0.000	$4,500	01/01/1996	22	75	52	$3,126	$6,017	1	1	0.0	0.0	1.0	2.0	1.1	2.2
3675	Stormwater MH	STMH_7023	N/A	0.00	ZZZ			636776.431	26910295.679	607.459	$1,500	01/01/1961	57	75	17	$341	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
3676	Stormwater MH	STMH_7972	N/A	0.00	CR			635140.232	26913051.956	619.448	$500	01/01/1949	69	75	5	$33	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3677	Stormwater MH	STMH_7816	N/A	0.00	CR			636503.367	26914423.092	612.771	$2,500	01/01/1950	68	75	6	$202	$6,017	1	1	0.0	0.0	1.0	3.0	1.0	3
3678	Stormwater MH	STMH_7858	N/A	0.00	CR			636205.547	26914203.676	613.536	$3,500	01/01/1975	43	75	31	$1,451	$6,017	1	1	0.0	0.0	1.0	3.0	1.0	3
3679	Stormwater MH	STMH_7859	N/A	0.00	CR			636136.885	26914172.830	612.863	$2,000	01/01/1975	43	75	31	$829	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
3680	Stormwater MH	STMH_7860	N/A	0.00	CR			636029.328	26914121.664	612.436	$2,000	01/01/1975	43	75	31	$829	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
3681	Stormwater MH	STMH_7861	N/A	0.00	CR			635864.672	26914043.267	611.379	$2,000	01/01/1975	43	75	31	$829	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
3682	Stormwater MH	STMH_7822	N/A	0.00	CR			636260.316	26914653.028	612.602	$2,500	01/01/1975	43	75	31	$1,036	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
3683	Stormwater MH	STMH_6854	N/A	0.00	CR			635970.152	26911582.562	612.057	$3,500	01/01/2004	14	75	60	$2,805	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3684	Stormwater MH	STMH_8110	N/A	0.00	CR			637504.506	26915328.224	596.432	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	3.0	1.0	3
3685	Stormwater MH	STMH_7819	N/A					636325.497	26914476.898	0.000	$3,000	01/01/1995	23	75	51	$2,044	$4,539	1	1	0.0	0.0	1.0	3.0	1.1	3.3
3686	Stormwater MH	STMH_7689	N/A	0.00	CR			632430.288	26915674.813	629.384	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
3687	Stormwater MH	STMH_7990	N/A	0.00	CR			634685.755	26913317.017	624.377	$3,500	01/01/2001	17	75	57	$2,665	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3688	Stormwater MH	STMH_8163	N/A	0.00				636820.871	26913900.338	612.487	$3,500	01/01/1975	43	75	31	$1,451	$6,017	1	1	0.0	0.0	1.0	3.0	1.1	3.3
3689	Stormwater MH	STMH_7809	N/A	0.00				636416.972	26914279.552	612.722	$2,000	01/01/1939	79	75	0	$0	$6,017	1	1	0.0	0.0	1.0	2.0	1.1	2.2
3690	Stormwater MH	STMH_8457	N/A	0.00				634169.033	26921964.997	595.141	$2,000	01/01/1939	79	75	0	$0	$6,017	1	1	0.0	0.0	1.0	3.0	1.1	3.3
3691	Stormwater MH	STMH_8460	N/A	0.00	CR			633789.337	26921758.253	598.616	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
3692	Stormwater MH	STMH_8459	N/A	0.00	BR			633994.410	26921301.863	598.616	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	2.0	2.0	4
3693	Stormwater MH	STMH_8524B	N/A	0.00	BR			634077.953	26920312.612	601.356	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
3694	Stormwater MH	STMH_8517	N/A					634989.397	26920012.952	0.000	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	3.0	1.1	3.3
3695	Stormwater MH	STMH_7697	N/A	0.00	CR			634137.609	26916300.623	607.662	$1,000	01/01/1949	69	75	5	$67	$5,092	1	1	0.0	0.0	1.0	3.0	1.0	3
3696	Stormwater MH	STMH_7701	N/A	0.00	CR			634151.238	26916629.797	606.145	$1,000	01/01/1949	69	75	5	$67	$5,092	1	1	0.0	0.0	1.0	3.0	1.0	3
3697	Stormwater MH	STMH_7705	N/A	0.00	CR			634162.104	26916854.400	606.319	$1,000	01/01/1949	69	75	5	$67	$5,092	1	1	0.0	0.0	1.0	3.0	1.0	3
3698	Stormwater MH	STMH_7706	N/A	0.00	CR			634172.519	26917091.439	606.298	$1,000	01/01/1949	69	75	5	$67	$5,092	1	1	0.0	0.0	1.0	3.0	1.0	3
3699	Stormwater MH	STMH_7707	N/A	0.00	CR			634159.217	26917084.176	606.378	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	2.0	3.0	6
3700	Stormwater MH	STMH_8404	N/A	0.00	CR			634274.320	26919033.041	607.626	$2,000	01/01/1949	69	75	5	$135	$6,017	1	1	0.0	0.0	1.0	4.0	1.0	4
3701	Stormwater MH	STMH_8049	N/A	0.00	CR			634777.210	26917823.479	609.269	$3,500	01/01/1998	20	75	54	$2,525	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
3702	Stormwater MH	STMH_6752	N/A	0.00	CR		6751	631430.452	26912407.842	714.720	$1,500	01/01/1965	53	75	21	$421	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3703	Stormwater MH	STMH_6748	N/A	0.00	CR			631708.448	26912754.076	707.701	$2,000	01/01/1965	53	75	21	$562	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
3704	Stormwater MH	STMH_6742	N/A	0.00				632094.580	26911766.052	0.000	$4,000	01/01/1984	34	75	40	$2,138	$6,017	1	1	0.0	0.0	1.0	1.0	1.1	1.1
3705	Stormwater MH	STMH_6725	N/A	0.00	CR			633653.214	26912476.189	699.562	$2,000	01/01/1974	44	75	30	$802	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3706	Stormwater MH	STMH_6737	N/A	0.00				632731.735	26912879.814	0.000	$2,500	01/01/1950	68	75	6	$202	$6,017	1	1	0.0	0.0	1.0	2.0	1.1	2.2
3707	Stormwater MH	STMH_6738	N/A	0.00	CR			632735.293	26913077.126	676.887	$1,500	01/01/1950	68	75	6	$121	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2

CITY OF SAULT STE. MARIE, MICHIGAN
Summary

id	Equipment Description	Asset ID	Construction Drawings Sheet Reference	Capacity or Size	Material	Length	Comment	Northing State Plane Ordinate	Easting State Plane Ordinate	Elevation	Original Cost	Year Installed (01/01/YYYY)	Age	Expected useful life (years)	Remaining Useful Life (years)	Depreciated Value	Replacement Cost	Average number of units in service	Total Number of units	Redundancy (Number)	Redundancy (percent)	Redundancy Score (R) (Reduces (C))	Criticality (C) (see back-up sheets)	Probability of Failure (P) (see back-up sheets)	Business Risk (BRE=PxCxR)
3708	Stormwater MH	STMH_6709	N/A	0.00	CN		INSPECTION INCOMPLETE	633941.108	26910445.679	0.000	$1,500	01/01/1962	56	75	18	$361	$4,539	1	1	0.0	0.0	1.0	3.0	3.0	9
3709	Stormwater MH	STMH_7970	N/A	0.00				635309.956	26913014.351	618.267	$5,000	01/01/2001	17	75	57	$3,807	$6,017	1	1	0.0	0.0	1.0	2.0	1.1	2.2
3710	Stormwater MH	STMH_6876	N/A	0.00	CR			634691.159	26912124.056	689.968	$3,500	01/01/2001	17	75	57	$2,665	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3711	Stormwater MH	STMH_6875	N/A	0.00	CR			634825.588	26912120.598	682.786	$3,500	01/01/2001	17	75	57	$2,665	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3712	Stormwater MH	STMH_7828	N/A	0.00	CR			636217.093	26915146.653	612.289	$3,500	01/01/1990	28	75	46	$2,151	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
3713	Stormwater MH	STMH_7829	N/A	0.00	CT			636304.691	26915182.432	612.579	$3,500	01/01/1990	28	75	46	$2,151	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
3714	Stormwater MH	STMH_8133	N/A	0.00	CR			637626.496	26913796.855	603.169	$3,500	01/01/1998	20	75	54	$2,525	$5,092	1	1	0.0	0.0	1.0	4.0	1.0	4
3715	Stormwater MH	STMH_6529	N/A					626846.922	26911393.095	0.000	$3,500	01/01/1976	42	75	32	$1,497	$6,017	1	1	0.0	0.0	1.0	4.0	1.1	4.4
3716	Stormwater MH	STMH_6119	N/A	0.00	CN			631129.334	26904510.324	698.026	$3,500	01/01/2008	10	75	64	$2,992	$4,539	1	1	0.0	0.0	1.0	1.0	2.0	2
3717	Stormwater MH	STMH_7529	N/A	0.00	CR			631144.396	26914733.244	0.000	$3,000	01/01/1990	28	75	46	$1,844	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3718	Stormwater MH	STMH_6138	N/A	0.00	CN			632902.771	26906867.224	638.604	$3,000	01/01/1998	20	75	54	$2,164	$4,539	1	1	0.0	0.0	1.0	2.0	2.0	4
3719	Stormwater MH	STMH_8206	N/A		CR			627860.099	26921299.077	628.701	$3,500	01/01/2000	18	75	56	$2,618	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
3720	Stormwater MH	STMH_8213	N/A	0.00	CR			628699.898	26921290.128	627.885	$4,000	01/01/2000	18	75	56	$2,992	$5,092	1	1	0.0	0.0	1.0	3.0	1.0	3
3721	Stormwater MH	STMH_8314	N/A	0.00	CR			629372.601	26921250.188	621.460	$3,000	01/01/1990	28	75	46	$1,844	$4,539	1	1	0.0	0.0	1.0	4.0	3.0	12
3722	Stormwater MH	STMH_8313	N/A	0.00	CR			629179.281	26921262.273	623.299	$3,500	01/01/2000	18	75	56	$2,618	$4,539	1	1	0.0	0.0	1.0	4.0	2.0	8
3723	Stormwater MH	STMH_8435	N/A	0.00	CR			633197.420	26923985.919	588.824	$4,000	01/01/2014	4	75	70	$3,739	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
3724	Stormwater MH	STMH_8405	N/A	0.00	BR			634217.389	26919167.218	606.144	$2,000	01/01/1949	69	75	5	$135	$6,017	1	1	0.0	0.0	1.0	4.0	2.0	8
3725	Stormwater MH	STMH_8406	N/A	0.00	CR			634234.192	26919174.109	606.566	$2,500	01/01/1989	29	75	45	$1,503	$4,539	1	1	0.0	0.0	1.0	4.0	1.0	4
3726	Stormwater MH	STMH_8414	N/A					633757.718	26920195.233	0.000	$2,000	01/01/1939	79	75	0	$0	$6,017	1	1	0.0	0.0	1.0	1.0	1.1	1.1
3727	Stormwater MH	STMH_5602	N/A	0.00	CN			631806.931	26897761.839	617.749	$3,000	01/01/1996	22	75	52	$2,084	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3728	Stormwater MH	STMH_5607	N/A	0.00	CR			632184.190	26899958.190	620.195	$1,000	01/01/1949	69	75	5	$67	$5,092	1	1	0.0	0.0	1.0	2.0	2.0	4
3729	Stormwater MH	STMH_5615	N/A	0.00				632228.129	26900668.548	620.741	$3,500	01/01/2002	16	75	58	$2,712	$4,539	1	1	0.0	0.0	1.0	1.0	1.1	1.1
3730	Stormwater MH	STMH_6128	N/A	0.00	CR			633078.531	26906235.498	639.064	$3,000	01/01/1991	27	75	47	$1,884	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3731	Stormwater MH	STMH_6129	N/A	0.00	CN			633271.768	26906474.231	639.234	$2,000	01/01/1970	48	75	26	$695	$4,539	1	1	0.0	0.0	1.0	2.0	3.0	6
3732	Stormwater MH	STMH_6133	N/A	0.00				633669.738	26907278.784	636.835	$2,000	01/01/1970	48	75	26	$695	$4,539	1	1	0.0	0.0	1.0	3.0	2.0	6
3733	Stormwater MH	STMH_7808	N/A	0.00				636489.994	26914107.468	611.810	$2,000	01/01/1939	79	75	0	$0	$6,017	1	1	0.0	0.0	1.0	2.0	1.1	2.2
3734	Stormwater MH	STMH_7678	N/A	0.00	CR			633196.917	26915337.531	627.565	$1,000	01/01/1949	69	75	5	$67	$5,092	1	1	0.0	0.0	1.0	5.0	1.0	5
3735	Stormwater MH	STMH_6137	N/A	0.00	CN			632913.720	26907163.919	637.291	$3,000	01/01/1998	20	75	54	$2,164	$4,539	1	1	0.0	0.0	1.0	2.0	2.0	4
3736	Stormwater MH	STMH_6431	N/A					623517.507	26908711.745	0.000	$3,500	01/01/1976	42	75	32	$1,497	$6,017	1	1	0.0	0.0	1.0	2.0	1.1	2.2
3737	Stormwater MH	STMH_6410	N/A					625689.837	26910287.681	0.000	$3,500	01/01/1976	42	75	32	$1,497	$6,017	1	1	0.0	0.0	1.0	4.0	1.1	4.4
3738	Stormwater MH	STMH_6417	N/A					625107.335	26909728.137	0.000	$3,500	01/01/1976	42	75	32	$1,497	$6,017	1	1	0.0	0.0	1.0	5.0	1.1	5.5
3739	Stormwater MH	STMH_6117	N/A	0.00				631815.760	26905276.428	0.000	$500	01/01/1948	70	75	4	$27	$4,539	1	1	0.0	0.0	1.0	3.0	1.1	3.3
3740	Stormwater MH	STMH_6528	N/A					627042.382	26911580.911	0.000	$3,500	01/01/1976	42	75	32	$1,497	$6,017	1	1	0.0	0.0	1.0	3.0	1.1	3.3
3741	Stormwater MH	STMH_6524	N/A					627637.230	26912152.682	0.000	$3,500	01/01/1976	42	75	32	$1,497	$6,017	1	1	0.0	0.0	1.0	3.0	1.1	3.3
3742	Stormwater MH	STMH_6521	N/A					628033.418	26912530.185	0.000	$3,500	01/01/1976	42	75	32	$1,497	$6,017	1	1	0.0	0.0	1.0	2.0	1.1	2.2
3743	Stormwater MH	STMH_6520	N/A					628231.219	26912716.858	0.000	$3,500	01/01/1976	42	75	32	$1,497	$6,017	1	1	0.0	0.0	1.0	2.0	1.1	2.2
3744	Stormwater MH	STMH_7539	N/A	0.00	CR			630108.148	26914455.268	652.070	$4,000	01/01/2007	11	75	63	$3,366	$5,092	1	1	0.0	0.0	1.0	2.0	2.0	4
3745	Stormwater MH	STMH_8317	N/A	0.00				629983.503	26921203.425	0.000	$4,000	01/01/2000	18	75	56	$2,992	$5,092	1	1	0.0	0.0	1.0	4.0	1.1	4.4
3746	Stormwater MH	STMH_8436	N/A	0.00				633024.485	26924402.283	0.000	$4,000	01/01/2014	4	75	70	$3,739	$4,539	1	1	0.0	0.0	1.0	4.0	1.1	4.4
3747	Stormwater MH	STMH_6612	N/A	0.00	CR			630551.765	26910532.246	717.885	$3,000	01/01/1996	22	75	52	$2,084	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3748	Stormwater MH	STMH_6613	N/A	0.00	CR			630404.139	26910537.581	717.861	$3,000	01/01/1996	22	75	52	$2,084	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3749	Stormwater MH	STMH_8456	N/A	0.00				634180.781	26921973.388	0.000	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	3.0	1.1	3.3
3750	Stormwater MH	STMH_8522A	N/A	0.00	CR			634280.477	26920668.154	599.948	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
3751	Stormwater MH	STMH_8522B	N/A	0.00	CN			634198.755	26920845.470	600.213	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
3752	Stormwater MH	STMH_8401	N/A	0.00				634097.015	26918900.821	0.000	$2,000	01/01/1949	69	75	5	$135	$6,017	1	1	0.0	0.0	1.0	4.0	1.1	4.4
3753	Stormwater MH	STMH_7708	N/A	0.00	CR			633874.452	26916957.160	605.359	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3754	Stormwater MH	STMH_6750	N/A	0.00	CR		IS C.B.	631412.418	26911900.158	721.542	$2,000	01/01/1974	44	75	30	$802	$4,539	1	1	0.0	0.0	1.0	1.0	2.0	2
3755	Stormwater MH	STMH_8029	N/A	120.00	ZZZ			634136.044	26915202.728	614.425	$4,500	01/01/1939	79	75	0	$0	$13,099	1	1	0.0	0.0	1.0	5.0	1.0	5
3756	Stormwater MH	STMH_6842	N/A	0.00	CN			635690.579	26910377.826	608.873	$2,000	01/01/1970	48	75	26	$695	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
3757	Stormwater MH	STMH_8467A	N/A	0.00	CR			633702.677	26922976.275	591.228	$3,000	01/01/1992	26	75	48	$1,924	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
3758	Stormwater MH	STMH_8467B	N/A	0.00	CR			633635.565	26923132.455	590.769	$3,000	01/01/1992	26	75	48	$1,924	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
3759	Stormwater MH	STMH_8445	N/A	0.00	CR			633449.039	26923195.134	592.921	$3,000	01/01/1990	28	75	46	$1,844	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3760	Stormwater MH	STMH_8444	N/A	0.00	BR			633478.053	26923316.675	589.873	$3,000	01/01/1990	28	75	46	$1,844	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3761	Stormwater MH	STMH_8443	N/A	0.00				633507.208	26923330.872	589.769	$4,500	01/01/1990	28	75	46	$2,766	$6,017	1	1	0.0	0.0	1.0	2.0	1.1	2.2
3762	Stormwater MH	STMH_8446	N/A	0.00				633532.341	26923107.591	0.000	$4,500	01/01/1990	28	75	46	$2,766	$6,017	1	1	0.0	0.0	1.0	2.0	1.1	2.2
3763	Stormwater MH	STMH_8470	N/A	0.00				633628.583	26923743.524	0.000	$2,500	01/01/1983	35	75	39	$1,303	$4,539	1	1	0.0	0.0	1.0	3.0	1.1	3.3
3764	Stormwater MH	STMH_7548	N/A	0.00				631204.280	26915706.043	630.747	$2,000	01/01/1976	42	75	32	$855	$4,539	1	1	0.0	0.0	1.0	2.0	2.0	4
3765	Stormwater MH	STMH_7549	N/A	0.00	CR			630835.214	26915708.226	631.105	$2,000	01/01/1976	42	75	32	$855	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3766	Stormwater MH	STMH_6622	N/A	0.00				631062.530	26911481.751	721.807	$4,500	01/01/1997	21	75	53	$3,186	$6,017	1	1	0.0	0.0	1.0	1.0	1.1	1.1
3767	Stormwater MH	STMH_6847	N/A	0.00	BR			635660.112	26911149.015	615.847	$4,500	01/01/1991	27	75	47	$2,826	$6,017	1	1	0.0	0.0	1.0	1.0	3.0	3
3768	Stormwater MH	STMH_6516	N/A	0.00				628163.601	26911360.151	0.000	$3,000	01/01/1980	38	75	36	$1,443	$5,092	1	1	0.0	0.0	1.0	4.0	1.1	4.4
3769	Stormwater MH	STMH_6517	N/A	0.00	CR			627914.470	26911350.186	713.867	$3,000	01/01/1980	38	75	36	$1,443	$5,092	1	1	0.0	0.0	1.0	4.0	1.0	4
3770	Stormwater MH	STMH_6518	N/A	0.00	CR			627804.562	26911244.852	715.355	$3,000	01/01/1980	38	75	36	$1,443	$5,092	1	1	0.0	0.0	1.0	4.0	1.0	4
3771	Stormwater MH	STMH_6519	N/A	0.00				627767.870	26911240.140	0.000	$4,000	01/01/1980	38	75	36	$1,925	$6,017	1	1	0.0	0.0	1.0	4.0	1.1	4.4
3772	Stormwater MH	STMH_7929	N/A	0.00	CR			635490.752	26917129.279	606.310	$500	01/01/1949	69	75	5	$33	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
3773	Stormwater MH	STMH_7930	N/A	60.00	CR			635390.724	26917358.385	607.350	$500	01/01/1949	69	75	5	$33	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
3774	Stormwater MH	STMH_7928	N/A	48.00	CR			635536.588	26917025.182	606.210	$500	01/01/1949	69	75	5	$33	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
3775	Stormwater MH	STMH_7927	N/A	0.00	CR			635696.734	26916670.747	608.280	$1,000	01/01/1949	69	75	5	$67	$5,053	1	1	0.0	0.0	1.0	3.0	1.0	3
3776	Stormwater MH	STMH_7938A	N/A	0.00	CR			635655.357	26916650.791	607.350	$4,000	01/01/2016	2	75	72	$3,846	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3777	Stormwater MH	STMH_7926	N/A	0.00	CR			635722.392	26916614.072	607.440	$500	01/01/1949	69	75	5	$33	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3778	Stormwater MH	STMH_7922	N/A	0.00	CR			635960.282	26916140.240	608.840	$500	01/01/1949	69	75	5	$33	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3779	Stormwater MH	STMH_7923	N/A	0.00	CR			635901.529	26916236.606	608.460	$500	01/01/1949	69	75	5	$33	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3780	Stormwater MH	STMH_7924	N/A	0.00	CR			635871.701	26916285.165	608.430	$500	01/01/1949	69	75	5	$33	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3781	Stormwater MH	STMH_7925	N/A	0.00	CR			635836.259	26916363.779	608.080	$500	01/01/1949	69	75	5	$33	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3782	Stormwater MH	STMH_7935	N/A	0.00	CR			635712.163	26915984.927	610.240	$4,000	01/01/2016	2	75	72	$3,846	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3783	Stormwater MH	STMH_8056A	N/A	0.00	CR			635625.971	26915939.429	610.090	$5,500	01/01/2016	2	75	72	$5,289	$6,017	1	1	0.0	0.0	1.0	1.0	1.0	1
3784	Stormwater MH	STMH_7936	N/A	0.00	CR			635666.212	26915962.660	610.600	$4,000	01/01/2016	2	75	72	$3,846	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3785	Stormwater MH	STMH_7934	N/A	0.00	CR			635684.727	26915921.283	610.350	$500	01/01/1949	69	75	5	$33	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3786	Stormwater MH	STMH_8056	N/A	0.00	CR			635522.502	26915889.241	0.000	$4,000	01/01/2016	2	75	72	$3,846	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3787	Stormwater MH	STMH_7962	N/A	0.00	CR			635060.413	26915658.579	610.290	$4,000	01/01/2016	2	75	72	$3,846	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3788	Stormwater MH	STMH_7961	N/A	0.00	CR			635072.281	26915650.519	610.200	$4,000	01/01/2016	2	75	72	$3,846	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3789	Stormwater MH	STMH_7960	N/A	0.00	CR			635296.386	26915776.804	610.820	$4,000	01/01/2016	2	75	72	$3,846	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3790	Stormwater MH	STMH_7959	N/A	0.00	CR			635357.233	26915807.376	611.030	$4,000	01/01/2016	2	75	72	$3,846	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3791	Stormwater MH	STMH_7938	N/A	0.00	CR			635421.761	26916539.398	607.600	$4,000	01/01/2016	2	75	72	$3,846	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3792	Stormwater MH	STMH_7939	N/A	0.00	CR			635414.902	26916521.723	607.640	$4,000	01/01/2015	3	75	71	$3,793	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3793	Stormwater MH	STMH_8454	N/A					634275.522	26921641.826	0.000	$4,500	01/01/1998	20	75	54	$3,246	$6,017	1	1	0.0	0.0	1.0	2.0	1.1	2.2
3794	Stormwater MH	STMH_7932	N/A	0.00	CR			635847.578	26915557.272	611.130	$4,000	01/01/2015	3	75	71	$3,793	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3795	Stormwater MH	STMH_7933	N/A	0.00	CR			635763.717	26915743.530	610.900	$4,000	01/01/2015	3	75	71	$3,793	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3796	Stormwater MH	STMH_7931	N/A	0.00	CR			635927.350	26915379.759	611.410	$4,000	01/01/2015	3	75	71	$3,793	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3797	Stormwater MH	STMH_7937	N/A	0.00	CR			635536.537	26916246.437	608.970	$4,000	01/01/2015	3	75	71	$3,793	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3798	Stormwater MH	STMH_7945	N/A	0.00	CR			635584.792	26915192.116	612.730	$4,000	01/01/2016	2	75	72	$3,846	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3799	Stormwater MH	STMH_7875	N/A	0.00	CR			635583.481	26914622.938	611.950	$4,000	01/01/2015	3	75	71	$3,793	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3800	Stormwater MH	STMH_7873	N/A	0.00	CR			635656.020	26914472.213	612.100	$4,000	01/01/2015	3	75	71	$3,793	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3801	Stormwater MH	STMH_7876	N/A	0.00	CR			635596.970	26914512.440	0.000	$2,000	01/01/1974	44	75	30	$802	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3802	Stormwater MH	STMH_7949	N/A	0.00	CR			635474.448	26914837.372	611.460	$4,000	01/01/2016	2	75	72	$3,846	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3803	Stormwater MH	STMH_7951	N/A	0.00	CR			635241.713	26915307.506	611.630	$4,000	01/01/2016	2	75	72	$3,846	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3804	Stormwater MH	STMH_7950	N/A	0.00	CR			635332.404	26915123.492	612.000	$4,000	01/01/2016	2	75	72	$3,846	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3805	Stormwater MH	STMH_7966	N/A	0.00	CR			634865.452	26916267.158	609.950	$4,000	01/01/2016	2	75	72	$3,846	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3806	Stormwater MH	STMH_7964	N/A	0.00	CR			634849.872	26916124.947	608.250	$4,000	01/01/2016	2	75	72	$3,846	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3807	Stormwater MH	STMH_7963	N/A	0.00	CR			634948.241	26915899.176	609.260	$4,000	01/01/2016	2	75	72	$3,846	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3808	Stormwater MH	STMH_7965	N/A	0.00	CR			634859.322	26916212.385	609.220	$2,000	01/01/1978	40	75	34	$909	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3809	Stormwater MH	STMH_7947	N/A	0.00	CR			635384.198	26915599.146	610.920	$4,000	01/01/2016	2	75	72	$3,846	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3810	Stormwater MH	STMH_7946	N/A	0.00	CR			635512.167	26915338.905	611.810	$4,000	01/01/2016	2	75	72	$3,846	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3811	Stormwater MH	STMH_7944	N/A	0.00	CR			635708.642	26914939.574	611.620	$4,000	01/01/2016	2	75	72	$3,846	$4,539	1	1	0.0	0.0	1.0	5.0	1.0	5
3812	Stormwater MH	STMH_7967	N/A	0.00	CR			635101.077	26916383.905	608.910	$4,000	01/01/2016	2	75	72	$3,846	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3813	Stormwater MH	STMH_7907	N/A	0.00	CR			635953.171	26916795.942	606.540	$4,000	01/01/2015	3	75	71	$3,793	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3814	Stormwater MH	STMH_7906	N/A	0.00	CR			635904.417	26916771.696	606.450	$4,000	01/01/2015	3	75	71	$3,793	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3815	Stormwater MH	STMH_7940	N/A	0.00	CR			635275.285	26916837.080	608.150	$4,000	01/01/2015	3	75	71	$3,793	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3816	Stormwater MH	STMH_7941	N/A	0.00	CR			635168.017	26917073.780	611.350	$4,000	01/01/2015	3	75	71	$3,793	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3817	Stormwater MH	STMH_7942	N/A	0.00	CR			635133.691	26917062.415	611.690	$2,500	01/01/1981	37	75	37	$1,236	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3818	Stormwater MH	STMH_8140	N/A	0.00	CR			637321.357	26914092.919	604.684	$5,500	01/01/2010	8	75	66	$4,848	$6,017	1	1	0.0	0.0	1.0	4.0	1.0	4
3819	Stormwater MH	STMH_8139	N/A	0.00	CR			637369.704	26914122.330	604.461	$5,500	01/01/2010	8	75	66	$4,848	$6,017	1	1	0.0	0.0	1.0	4.0	1.0	4
3820	Stormwater MH	STMH_8142	N/A	0.00	CR			637205.268	26914027.201	607.443	$4,000	01/01/2010	8	75	66	$3,526	$4,539	1	1	0.0	0.0	1.0	4.0	1.0	4
3821	Stormwater MH	STMH_7968	N/A	0.00	CR			635231.035	26916091.903	610.060	$4,000	01/01/2016	2	75	72	$3,846	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3822	Stormwater MH	STMH_7834	N/A	0.00	CR			636652.911	26915372.786	609.410	$4,000	01/01/2015	3	75	71	$3,793	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3823	Stormwater MH	STMH_7835	N/A	0.00	CR			636561.671	26915586.145	609.180	$4,000	01/01/2015	3	75	71	$3,793	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3824	Stormwater MH	STMH_7897	N/A	0.00	CR			636472.853	26915796.970	609.900	$4,000	01/01/2015	3	75	71	$3,793	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3825	Stormwater MH	STMH_7899	N/A	0.00	CR			636414.613	26915918.779	609.360	$5,500	01/01/2015	3	75	71	$5,215	$6,017	1	1	0.0	0.0	1.0	1.0	1.0	1
3826	Stormwater MH	STMH_7900	N/A	0.00	CR			636351.594	26916049.149	609.140	$4,000	01/01/2015	3	75	71	$3,793	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3827	Stormwater MH	STMH_7896	N/A	0.00	CR			636693.494	26915891.734	607.360	$4,000	01/01/2015	3	75	71	$3,793	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3828	Stormwater MH	STMH_8029A	N/A	0.00	CR			634142.160	26915195.897	614.330	$4,000	01/01/2003	15	75	59	$3,152	$5,092	1	1	0.0	0.0	1.0	5.0	1.0	5
3829	Stormwater MH	STMH_8438	N/A	0.00	CR			632638.170	26921022.895	598.634	$3,500	01/01/2009	9	75	65	$3,038	$4,539	1	1	0.0	0.0	1.0	1.0	2.0	2
3830	Stormwater MH	STMH_8439	N/A	0.00	CR			632337.501	26921041.022	597.203	$3,500	01/01/2009	9	75	65	$3,038	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3831	Stormwater MH	STMH_8440	N/A	0.00	CR			632135.972	26921053.532	596.951	$3,500	01/01/2009	9	75	65	$3,038	$4,539	1	1	0.0	0.0	1.0	1.0	2.0	2
3832	Stormwater MH	STMH_8441	N/A	0.00	CR			631981.515	26921064.320	597.137	$3,500	01/01/2009	9	75	65	$3,038	$4,539	1	1	0.0	0.0	1.0	1.0	2.0	2
3833	Stormwater MH	STMH_8442	N/A	0.00	CR			631688.029	26921081.328	598.644	$3,500	01/01/2009	9	75	65	$3,038	$4,539	1	1	0.0	0.0	1.0	1.0	2.0	2
3834	Stormwater MH	STMH_8437	N/A	0.00	CR			632939.231	26921004.652	601.978	$4,000	01/01/2014	4	75	70	$3,739	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3835	Stormwater MH	STMH_6701C	N/A	0.00	BR			633859.304	26908813.633	0.000	$1,500	01/01/1960	58	75	16	$321	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3836	Stormwater MH	STMH_6860A	N/A	0.00	BR			635338.542	26911726.277	658.787	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	3.0	3.0	9
3837	Stormwater MH	STMH_6872A	N/A	0.00	CN			634921.981	26912356.269	673.909	$500	01/01/1949	69	75	5	$33	$4,539	1	1	0.0	0.0	1.0	1.0	2.0	2
3838	Stormwater MH	STMH_6810A	N/A	0.00	CN			636267.543	26911811.759	613.833	$3,500	01/01/2004	14	75	60	$2,805	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
3839	Stormwater MH	STMH_6859A	N/A	0.00	BR		RIM IS 4" BELOW GRAVEL GRADE	635651.484	26911711.974	624.511	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	4.0	3.0	12
3840	Stormwater MH	STMH_6859B	N/A	0.00	CR		RIM IS 5" BELOW GRADE IN GRAVEL	635801.795	26911706.032	613.181	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	4.0	2.0	8
3841	Stormwater MH	STMH_7551A	N/A	0.00	CR			631517.751	26916377.617	631.421	$1,500	01/01/1950	68	75	6	$121	$5,092	1	1	0.0	0.0	1.0	4.0	1.0	4
3842	Stormwater MH	STMH_7555A	N/A	0.00	CR			631590.940	26917708.386	0.000	$1,500	01/01/1950	68	75	6	$121	$5,092	1	1	0.0	0.0	1.0	5.0	2.0	10
3843	Stormwater MH	STMH_6836A	N/A	0.00				636208.907	26910332.374	0.000	$3,500	01/01/1970	48	75	26	$1,217	$6,017	1	1	0.0	0.0	1.0	3.0	1.1	3.3
3844	Stormwater MH	STMH_6812A	N/A	0.00	CN			636656.606	26912377.070	611.397	$5,000	01/01/2000	18	75	56	$3,740	$6,017	1	1	0.0	0.0	1.0	2.0	2.0	4
3845	Stormwater MH	STMH_7557A	N/A	0.00				631237.614	26916600.843	630.264	$4,500	01/01/1998	20	75	54	$3,246	$6,017	1	1	0.0	0.0	1.0	1.0	1.1	1.1
3846	Stormwater MH	STMH_7090A	N/A	0.00				637806.402	26912806.009	604.932	$4,500	01/01/1998	20	75	54	$3,246	$6,017	1	1	0.0	0.0	1.0	3.0	1.1	3.3
3847	Stormwater MH	STMH_6725A	N/A	0.00	CR			633512.334	26912634.229	686.599	$2,000	01/01/1974	44	75	30	$802	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3848	Stormwater MH	STMH_8041	N/A	0.00				634196.249	26917636.458	601.621	$1,000	01/01/1949	69	75	5	$67	$5,092	1	1	0.0	0.0	1.0	4.0	1.0	4
3849	Stormwater MH	STMH_8057	N/A					634203.636	26917576.920	0.000	$500	01/01/1949	69	75	5	$33	$4,539	1	1	0.0	0.0	1.0	3.0	1.1	3.3
3850	Stormwater MH	STMH_8041A	N/A	0.00	CR			634213.359	26918216.586	603.166	$1,000	01/01/1949	69	75	5	$67	$5,092	1	1	0.0	0.0	1.0	4.0	1.0	4
3851	Stormwater MH	STMH_8138B	N/A	0.00	CN			637354.493	26914662.438	605.194	$2,000	01/01/1939	79	75	0	$0	$6,017	1	1	0.0	0.0	1.0	5.0	2.0	10
3852	Stormwater MH	STMH_8401A	N/A	0.00				634099.927	26918935.764	605.391	$2,000	01/01/1949	69	75	5	$135	$6,017	1	1	0.0	0.0	1.0	4.0	1.1	4.4
3853	Stormwater MH	STMH_8041B	N/A	0.00	CR			634083.331	26918515.511	606.230	$1,000	01/01/1949	69	75	5	$67	$5,092	1	1	0.0	0.0	1.0	4.0	1.0	4
3854	Stormwater MH	STMH_6073B	N/A	0.00	ZZZ			633683.022	26909042.184	0.000	$4,500	01/01/1992	26	75	48	$2,886	$6,017	1	1	0.0	0.0	1.0	2.0	1.0	2
3855	Stormwater MH	STMH_6603A	N/A	0.00				629922.122	26909132.481	702.450	$1,500	01/01/1961	57	75	17	$341	$4,539	1	1	0.0	0.0	1.0	3.0	1.1	3.3
3856	Stormwater MH	STMH_6172A	N/A	0.00	CR			633044.264	26907158.599	636.894	$3,500	01/01/1998	20	75	54	$2,525	$5,092	1	1	0.0	0.0	1.0	3.0	2.0	6
3857	Stormwater MH	STMH_6106	N/A	0.00	CR			632112.590	26904209.090	0.000	$2,000	01/01/1949	69	75	5	$135	$6,017	1	1	0.0	0.0	1.0	1.0	1.0	1
3858	Stormwater MH	STMH_6536A	N/A					628793.004	26913027.120	0.000	$3,000	01/01/1965	53	75	21	$843	$6,017	1	1	0.0	0.0	1.0	2.0	1.1	2.2

CITY OF SAULT STE. MARIE, MICHIGAN

Summary

id	Equipment Description	Asset ID	Construction Drawings Sheet Reference	Capacity or Size	Material	Length	Comment	Northing State Plane Ordinate	Easting State Plane Ordinate	Elevation	Original Cost	Year Installed (01/01/YYYY)	Age	Expected useful life (years)	Remaining Useful Life (years)	Depreciated Value	Replacement Cost	Average number of units in service	Total Number of units	Redundancy (Number)	Redundancy (percent)	Redundancy Score (R) (Reduces (C))	Criticality (C) (see back-up sheets)	Probability of Failure (P) (see back-up sheets)	Business Risk (BRE=PxCxR)
3859	Stormwater MH	STMH_7107	N/A	0.00	BR			636884.138	26911428.709	608.153	$2,500	01/01/1970	48	75	26	$869	$5,092	1	1	0.0	0.0	1.0	4.0	1.0	4
3860	Stormwater MH	STMH_6845A	N/A	0.00	CN			635383.798	26910401.446	0.000	$2,500	01/01/1970	48	75	26	$869	$5,092	1	1	0.0	0.0	1.0	3.0	1.0	3
3861	Stormwater MH	STMH_6845B	N/A	0.00	CN			635433.208	26910399.310	0.000	$3,500	01/01/1970	48	75	26	$1,217	$6,017	1	1	0.0	0.0	1.0	3.0	2.0	6
3862	Stormwater MH	STMH_6845C	N/A	0.00	CN			635490.569	26910394.699	0.000	$3,500	01/01/1970	48	75	26	$1,217	$6,017	1	1	0.0	0.0	1.0	3.0	1.0	3
3863	Stormwater MH	STMH_6857A	N/A	0.00	CR			635955.237	26911897.734	618.720	$3,500	01/01/2004	14	75	60	$2,805	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3864	Stormwater MH	STMH_5416	N/A	0.00	CR			631414.382	26897213.194	622.361	$4,500	01/01/1991	27	75	47	$2,826	$6,017	1	1	0.0	0.0	1.0	1.0	1.0	1
3865	Stormwater MH	STMH_5417	N/A	0.00	CR			631412.240	26897230.813	622.685	$4,500	01/01/1991	27	75	47	$2,826	$6,017	1	1	0.0	0.0	1.0	1.0	2.0	2
3866	Stormwater MH	STMH_6828B	N/A	0.00	CN			634599.940	26908721.426	631.843	$4,000	01/01/2009	9	75	65	$3,473	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
3867	Stormwater MH	STMH_6828A	N/A	0.00	CN			634576.115	26908683.613	632.149	$5,000	01/01/2009	9	75	65	$4,341	$6,017	1	1	0.0	0.0	1.0	2.0	1.0	2
3868	Stormwater MH	STMH_6178A	N/A	0.00	CR			632698.305	26910705.809	712.498	$5,500	01/01/2011	7	75	67	$4,922	$6,017	1	1	0.0	0.0	1.0	1.0	1.0	1
3869	Stormwater MH	STMH_6752C	N/A	0.00	CR			631717.045	26912396.398	713.574	$3,000	01/01/1965	53	75	21	$843	$6,017	1	1	0.0	0.0	1.0	2.0	1.0	2
3870	Stormwater MH	STMH_6752B	N/A	0.00	CR			631690.696	26912426.153	712.383	$1,500	01/01/1965	53	75	21	$421	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3871	Stormwater MH	STMH_6752A	N/A	0.00	CR			631652.913	26912430.396	711.802	$1,500	01/01/1965	53	75	21	$421	$4,539	1	1	0.0	0.0	1.0	1.0	2.0	2
3872	Stormwater MH	STMH_7518	N/A	0.00	CN			631226.560	26913492.592	0.000	$1,000	01/01/1948	70	75	4	$54	$5,092	1	1	0.0	0.0	1.0	1.0	1.0	1
3873	Stormwater MH	STMH_5613A	N/A					632281.218	26901296.086	622.798	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	2.0	1.1	2.2
3874	Stormwater MH	STMH_5613B	N/A	0.00	BR		ADJUST ID TO STMH_5613B	632085.452	26901302.568	624.437	$2,000	01/01/1939	79	75	0	$0	$6,017	1	1	0.0	0.0	1.0	1.0	3.0	3
3875	Stormwater MH	STMH_5607A	N/A					632598.029	26899935.955	0.000	$500	01/01/1949	69	75	5	$33	$4,539	1	1	0.0	0.0	1.0	2.0	1.1	2.2
3876	Stormwater MH	STMH_5620	N/A	0.00				631293.493	26898642.168	0.000	$4,500	01/01/1996	22	75	52	$3,126	$6,017	1	1	0.0	0.0	1.0	1.0	1.1	1.1
3877	Stormwater MH	STMH_7576A	N/A	0.00	CR			630787.396	26914714.147	634.347	$3,000	01/01/1990	28	75	46	$1,844	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3878	Stormwater MH	STMH_7522A	N/A	0.00	CN			631445.805	26914386.467	631.355	$4,000	01/01/1988	30	75	44	$2,352	$6,017	1	1	0.0	0.0	1.0	1.0	1.0	1
3879	Stormwater MH	STMH_7577	N/A	0.00				630338.447	26917735.264	630.406	$3,500	01/01/1977	41	75	33	$1,544	$6,017	1	1	0.0	0.0	1.0	1.0	1.1	1.1
3880	Stormwater MH	STMH_7553A	N/A	0.00				631407.893	26916842.912	630.063	$5,000	01/01/2000	18	75	56	$3,740	$6,017	1	1	0.0	0.0	1.0	1.0	1.1	1.1
3881	Stormwater MH	STMH_6425	N/A					624001.012	26908844.002	0.000	$3,500	01/01/1976	42	75	32	$1,497	$6,017	1	1	0.0	0.0	1.0	5.0	1.1	5.5
3882	Stormwater MH	STMH_5822A	N/A	0.00	CR			623306.901	26907102.726	702.832	$4,500	01/01/1996	22	75	52	$3,126	$6,017	1	1	0.0	0.0	1.0	3.0	1.0	3
3883	Stormwater MH	STMH_5825	N/A					623329.687	26907785.945	0.000	$4,500	01/01/1995	23	75	51	$3,066	$6,017	1	1	0.0	0.0	1.0	3.0	1.1	3.3
3884	Stormwater MH	STMH_6664B	N/A	0.00	CR			629010.050	26912783.401	718.020	$3,500	01/01/2007	11	75	63	$2,945	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3885	Stormwater MH	STMH_6664A	N/A	0.00	CR			629002.364	26912578.098	718.442	$3,500	01/01/2007	11	75	63	$2,945	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3886	Stormwater MH	STMH_6639A	N/A	0.00				630284.023	26912979.000	0.000	$4,500	01/01/1996	22	75	52	$3,126	$6,017	1	1	0.0	0.0	1.0	1.0	1.1	1.1
3887	Stormwater MH	STMH_8228	N/A	0.00	CN			628713.905	26921541.574	624.429	$4,000	01/01/2014	4	75	70	$3,739	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3888	Stormwater MH	STMH_8229	N/A	48.00	CR			628653.811	26921718.081	622.568	$4,000	01/01/2014	4	75	70	$3,739	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3889	Stormwater MH	STMH_8230	N/A	0.00	CR			628412.929	26921848.691	624.428	$4,000	01/01/2014	4	75	70	$3,739	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3890	Stormwater MH	STMH_8231	N/A	0.00	CR			628274.921	26921845.547	625.158	$4,000	01/01/2014	4	75	70	$3,739	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3891	Stormwater MH	STMH_8232	N/A	0.00	CR			628095.733	26921818.428	625.193	$4,000	01/01/2014	4	75	70	$3,739	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3892	Stormwater MH	STMH_8233	N/A	0.00	CR			627943.722	26921765.529	626.224	$4,000	01/01/2014	4	75	70	$3,739	$4,539	1	1	0.0	0.0	1.0	1.0	2.0	2
3893	Stormwater MH	STMH_8234	N/A	0.00	CR			627815.968	26921707.679	627.328	$4,000	01/01/2014	4	75	70	$3,739	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3894	Stormwater MH	STMH_8425A	N/A	0.00	CR			632688.061	26922613.845	598.303	$3,500	01/01/2004	14	75	60	$2,805	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3895	Stormwater MH	STMH_8502A	N/A	0.00	CR			635295.002	26918391.174	604.716	$1,000	01/01/1939	79	75	0	$0	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
3896	Stormwater MH	STMH_8466	N/A	0.00				633746.977	26922728.968	594.087	$3,000	01/01/1992	26	75	48	$1,924	$4,539	1	1	0.0	0.0	1.0	2.0	1.1	2.2
3897	Stormwater MH	STMH_8465	N/A	0.00	CR			633644.584	26922677.722	0.000	$3,000	01/01/1992	26	75	48	$1,924	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3898	Stormwater MH	STMH_8464	N/A	0.00	CR			633590.587	26922504.785	596.804	$3,000	01/01/1992	26	75	48	$1,924	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3899	Stormwater MH	STMH_8467	N/A	0.00				633800.036	26922754.396	0.000	$3,000	01/01/1992	26	75	48	$1,924	$4,539	1	1	0.0	0.0	1.0	3.0	1.1	3.3
3900	Stormwater MH	STMH_8035A	N/A	0.00				634327.382	26915991.444	608.810	$2,000	01/01/1939	79	75	0	$0	$6,017	1	1	0.0	0.0	1.0	3.0	1.1	3.3
3901	Stormwater MH	STMH_8238	N/A	0.00	CR			626936.374	26921522.065	0.000	$4,000	01/01/2014	4	75	70	$3,739	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3902	Stormwater MH	STMH_8237	N/A	0.00	CR			627112.647	26921573.219	0.000	$4,000	01/01/2014	4	75	70	$3,739	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3903	Stormwater MH	STMH_8236	N/A	0.00	CR			627300.641	26921593.538	0.000	$5,500	01/01/2014	4	75	70	$5,142	$6,017	1	1	0.0	0.0	1.0	1.0	1.0	1
3904	Stormwater MH	STMH_8235	N/A	0.00	CR			627455.762	26921607.261	628.150	$5,500	01/01/2014	4	75	70	$5,142	$6,017	1	1	0.0	0.0	1.0	1.0	1.0	1
3905	Stormwater MH	STMH_8235A	N/A	0.00	CR			627346.620	26921596.945	0.000	$5,500	01/01/2014	4	75	70	$5,142	$6,017	1	1	0.0	0.0	1.0	1.0	2.0	2
3906	Stormwater MH	STMH_8206A	N/A	0.00	CR			627856.823	26921419.977	628.993	$4,000	01/01/2014	4	75	70	$3,739	$4,539	1	1	0.0	0.0	1.0	2.0	2.0	4
3907	Stormwater MH	STMH_6537B	N/A					628498.447	26912876.485	0.000	$3,000	01/01/1960	58	75	16	$643	$6,017	1	1	0.0	0.0	1.0	2.0	1.1	2.2
3908	Stormwater MH	STMH_6537A	N/A					628496.034	26912900.099	0.000	$3,000	01/01/1960	58	75	16	$643	$6,017	1	1	0.0	0.0	1.0	2.0	1.1	2.2
3909	Stormwater MH	STMH_8132A	N/A	0.00	ZZZ			637675.731	26913620.522	603.314	$4,500	01/01/1998	20	75	54	$3,246	$6,017	1	1	0.0	0.0	1.0	1.0	2.0	2
3910	Stormwater MH	STMH_7078A	N/A					637330.309	26910410.119	0.000	$3,000	01/01/1961	57	75	17	$683	$6,017	1	1	0.0	0.0	1.0	2.0	1.1	2.2
3911	Stormwater MH	STMH_6529A	N/A					626741.605	26911416.199	0.000	$3,500	01/01/1976	42	75	32	$1,497	$6,017	1	1	0.0	0.0	1.0	1.0	1.1	1.1
3912	Stormwater MH	STMH_6421A	N/A					624761.286	26909408.313	0.000	$3,500	01/01/1976	42	75	32	$1,497	$6,017	1	1	0.0	0.0	1.0	5.0	1.1	5.5
3913	Stormwater MH	STMH_6830	N/A	0.00			TURF DRAIN	634480.938	26908282.754	0.000	$4,000	01/01/2001	17	75	57	$3,046	$5,092	1	1	0.0	0.0	1.0	2.0	1.1	2.2
3914	Stormwater MH	STMH_8420B	N/A	0.00	CR			633099.008	26921692.480	599.187	$3,500	01/01/2005	13	75	61	$2,852	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3915	Stormwater MH	STMH_8506A	N/A	0.00				634536.161	26918475.683	0.000	$5,000	01/01/2000	18	75	56	$3,740	$6,017	1	1	0.0	0.0	1.0	1.0	1.1	1.1
3916	Stormwater MH	STMH_6421B	N/A					624931.550	26909722.197	0.000	$3,500	01/01/1976	42	75	32	$1,497	$6,017	1	1	0.0	0.0	1.0	1.0	1.1	1.1
3917	Stormwater MH	STMH_8420A	N/A	0.00				633177.569	26921517.691	0.000	$3,500	01/01/2005	13	75	61	$2,852	$4,539	1	1	0.0	0.0	1.0	1.0	1.1	1.1
3918	Stormwater MH	STCB_5815A	N/A					623409.010	26907367.257	0.000	$3,500	01/01/1976	42	75	32	$1,497	$6,017	1	1	0.0	0.0	1.0	3.0	1.1	3.3
3919	Stormwater MH	STMH_6608	N/A	0.00	CR			631326.235	26910494.241	715.429	$3,000	01/01/1996	22	75	52	$2,084	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
3920	Stormwater MH	STMH_7077A	N/A					637072.047	26910357.381	0.000	$3,000	01/01/1961	57	75	17	$683	$6,017	1	1	0.0	0.0	1.0	3.0	1.1	3.3
3921	Stormwater MH	STMH_6610	N/A	0.00	CR			630979.211	26910516.452	716.728	$3,000	01/01/1996	22	75	52	$2,084	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
3922	Stormwater MH	STMH_6411A	N/A	0.00	CR			625376.665	26907863.383	690.045	$5,000	01/01/2008	10	75	64	$4,274	$6,017	1	1	0.0	0.0	1.0	1.0	1.0	1
3923	Stormwater MH	STMH_6707A	N/A	0.00	CN			633924.399	26909914.313	692.467	$3,000	01/01/1962	56	75	18	$723	$6,017	1	1	0.0	0.0	1.0	3.0	2.0	6
3924	Stormwater MH	STMH_7564A	N/A	0.00				631238.951	26917064.709	630.978	$500	01/01/1939	79	75	0	$0	$4,539	1	1	0.0	0.0	1.0	1.0	1.1	1.1
3925	Stormwater MH	STMH_8170	N/A	0.00	ZZZ			637041.558	26914665.898	610.029	$3,500	01/01/2000	18	75	56	$2,618	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
3926	Stormwater MH	STMH_8171	N/A	0.00	ZZZ			636974.217	26914641.584	610.710	$3,000	01/01/1990	28	75	46	$1,844	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
3927	Stormwater MH	STMH_8169	N/A	0.00	CR			637134.279	26914701.342	609.468	$3,500	01/01/2000	18	75	56	$2,618	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
3928	Stormwater MH	STMH_8168	N/A	0.00	CR			637210.907	26914503.707	606.997	$3,000	01/01/1990	28	75	46	$1,844	$4,539	1	1	0.0	0.0	1.0	3.0	1.0	3
3929	Stormwater MH	STMH_6829	N/A	0.00	CR			634543.365	26908404.161	633.047	$4,000	01/01/2001	17	75	57	$3,046	$5,092	1	1	0.0	0.0	1.0	2.0	1.0	2
3930	Stormwater MH	STMH_7517	N/A	0.00	CR			631148.925	26913341.025	0.000	$500	01/01/1948	70	75	4	$27	$4,539	1	1	0.0	0.0	1.0	1.0	1.0	1
3931	Stormwater MH	STMH_7517A	N/A	0.00	CR			630979.536	26913337.141	0.000	$5,500	01/01/2015	3	75	71	$5,215	$6,017	1	1	0.0	0.0	1.0	1.0	1.0	1
3932	Stormwater MH	STMH_7505A	N/A	0.00	CR			630976.196	26913272.964	0.000	$5,500	01/01/2015	3	75	71	$5,215	$6,017	1	1	0.0	0.0	1.0	1.0	1.0	1
3933	Stormwater MH	STMH_8058	N/A	0.00	CR			634951.963	26916708.575	608.030	$4,000	01/01/2016	2	75	72	$3,846	$4,539	1	1	0.0	0.0	1.0	2.0	1.0	2
1850	Sanitary Sewer	STUB_ABAN	N/A	9.00	VCP	17.78	17	636865.774	26914760.165	0.000	$1,298	01/01/1939	79	75	0	$0	$2,920	1	1	0.0	0.0	1.0	1.0	1.0	1
2154	Sanitary Sewer	STUB_ABAN	N/A	9.00	VCP	20.28		632736.145	26913109.219	0.000	$1,700	01/01/1939	79	75	0	$0	$3,826	1	1	0.0	0.0	1.0	1.0	1.1	1.1
2705	Sanitary Sewer	STUB_ABAN	N/A	9.00	VCP	25.69	Inactive	632697.179	26911758.055	0.000	$667	01/01/1939	79	75	0	$0	$1,143	1	1	0.0	0.0	1.0	1.0	1.1	1.1
2706	Sanitary Sewer	STUB_ABAN	N/A	9.00	VCP	26.57	Inactive	632697.179	26911758.055	0.000	$1,644	01/01/1939	79	75	0	$0	$3,700	1	1	0.0	0.0	1.0	1.0	1.1	1.1
4033	Sanitary Sewer	SAMH_1866 - SAMH_1868	N/A	12.00	CP	307.38	307	632721.155	26912399.077	714.921	$32,274	01/01/1970	48	75	26	$11,228	$47,643	1	1	0.0	0.0	1.0	2.0	1.0	2
4034	Sanitary Sewer	SAMH_1879 - SAMH_1887	N/A	9.00	VCP	51.89	51	632060.117	26911833.661	720.932	$3,736	01/01/1939	79	75	0	$0	$7,888	1	1	0.0	0.0	1.0	1.0	5.0	5
4035	Sanitary Sewer	SAMH_1887 - SAMH_1886	N/A	9.00	VCP	211.62	211	632063.572	26912045.255	719.771	$15,237	01/01/1939	79	75	0	$0	$32,167	1	1	0.0	0.0	1.0	1.0	5.0	5
4036	Sanitary Sewer	SAMH_1886 - SAMH_1885	N/A	8.00	VCP	346.02	346	632067.925	26912391.249	715.851	$24,914	01/01/1939	79	75	0	$0	$52,595	1	1	0.0	0.0	1.0	1.0	1.0	1
4037	Sanitary Sewer	SAMH_1882 - SAMH_1883	N/A	15.00	VCP	345.94	345	632400.104	26912390.001	713.268	$48,085	01/01/2001	17	75	57	$36,618	$55,004	1	1	0.0	0.0	1.0	1.0	1.0	1
4038	Sanitary Sewer	SAMH_1885 - SAMH_1884	N/A	10.00	RCP	325.17	325	632392.987	26912399.537	713.264	$20,811	01/01/1939	79	75	0	$0	$46,824	1	1	0.0	0.0	1.0	1.0	5.0	5
4039	Sanitary Sewer	SAMH_1888 - SAMH_1707	N/A	8.00	VCP	353.01	353	631389.622	26912417.723	714.579	$26,123	01/01/1950	68	75	6	$2,117	$50,833	1	1	0.0	0.0	1.0	1.0	1.0	1
4040	Sanitary Sewer	SAMH_1705 - SAMH_1706	N/A	8.00	CP	186.26	186	631380.819	26912086.812	720.376	$15,273	01/01/1950	68	75	6	$1,238	$28,312	1	1	0.0	0.0	1.0	1.0	1.0	1
4041	Sanitary Sewer	SAMH_1706 - SAMH_1707	N/A	8.00	CP	331.03	331	631389.622	26912417.723	714.579	$27,144	01/01/1950	68	75	6	$2,200	$50,316	1	1	0.0	0.0	1.0	1.0	1.0	1
4042	Sanitary Sewer	SAMH_1843 - SAMH_1845	N/A	8.00	RPM	90.12	90	633877.442	26912883.682	689.349	$11,896	01/01/2004	14	75	60	$9,535	$13,698	1	1	0.0	0.0	1.0	1.0	1.0	1
4043	Sanitary Sewer	SAMH_1532 - SAMH_1533	N/A	8.00	VCP	289.35	289	625079.372	26909865.066	702.317	$26,620	01/01/1966	52	75	22	$7,840	$43,981	1	1	0.0	0.0	1.0	1.0	1.0	1
4044	Sanitary Sewer	SAMH_1531 - SAMH_1532	N/A	8.00	VCP	290.11	290	625085.366	26910154.351	703.067	$26,690	01/01/1966	52	75	22	$7,861	$44,097	1	1	0.0	0.0	1.0	1.0	1.0	1
4045	Sanitary Sewer	SAMH_2032 - SAMH_2028	N/A	10.00	VCP	405.69	294	635783.024	26912368.757	612.895	$30,021	01/01/1950	68	75	6	$2,433	$58,419	1	1	0.0	0.0	1.0	1.0	1.0	1
4046	Sanitary Sewer	SAMH_2673 - SAMH_2674	N/A	8.00	VCP	331.17	331	630280.114	26917441.362	631.932	$33,779	01/01/1976	42	75	32	$14,455	$50,337	1	1	0.0	0.0	1.0	1.0	1.0	1
4047	Sanitary Sewer	SAMH_2669 - SAMH_2668	N/A	8.00	VCP	340.64	340	630581.334	26917065.043	632.186	$31,338	01/01/1961	57	75	17	$7,139	$51,777	1	1	0.0	0.0	1.0	1.0	1.0	1
4048	Sanitary Sewer	SAMH_3328 - SAMH_3301	N/A	8.00	PVC	312.04	312	637709.462	26913445.097	603.751	$38,068	01/01/1997	21	75	53	$26,958	$47,429	1	1	0.0	0.0	1.0	2.0	1.0	2
4049	Sanitary Sewer	SAMH_3038 - SAMH_3037	N/A	12.00	RCP	70.61	70	636306.643	26913956.796	612.114	$9,533	01/01/2004	14	75	60	$7,641	$10,945	1	1	0.0	0.0	1.0	3.0	1.0	3
4050	Sanitary Sewer	SAMH_3039 - SAMH_3038	N/A	10.00	RCP	321.82	321	636243.879	26913924.440	611.988	$42,480	01/01/2005	13	75	61	$34,617	$48,916	1	1	0.0	0.0	1.0	3.0	1.0	3
4051	Sanitary Sewer	SAMH_3005 - SAMH_3348	N/A	15.00	VCP	216.94	216 Old Clay	636824.384	26913915.083	612.363	$19,742	01/01/1939	79	75	0	$0	$37,097	1	1	0.0	0.0	1.0	3.0	5.0	15
4052	Sanitary Sewer	SAMH_1560 - SAMH_1560A	N/A	8.00	VCP	183.83	200	623911.832	26908804.590	697.619	$17,280	01/01/1974	44	75	30	$6,934	$26,471	1	1	0.0	0.0	1.0	1.0	1.0	1
4053	Sanitary Sewer	SAMH_1832 - SAMH_1830	N/A	8.00	PVC	74.51	74	633588.978	26911085.064	713.751	$9,835	01/01/2004	14	75	60	$7,883	$11,325	1	1	0.0	0.0	1.0	1.0	1.0	1
4054	Sanitary Sewer	SAMH_1830 - SAMH_1829	N/A	8.00	PVC	292.83	292	633591.979	26910792.249	705.540	$38,654	01/01/2004	14	75	60	$30,982	$44,510	1	1	0.0	0.0	1.0	1.0	1.0	1
4055	Sanitary Sewer	SAMH_2210 - SAMH_2224	N/A	12.00	VCP	349.70	349	637170.327	26910759.381	606.714	$26,228	01/01/1939	79	75	0	$0	$54,204	1	1	0.0	0.0	1.0	3.0	5.0	15
4056	Sanitary Sewer	SAMH_2224 - SAMH_2225	N/A	12.00	VCP	348.89	348	637178.476	26911108.173	606.126	$26,167	01/01/1939	79	75	0	$0	$54,078	1	1	0.0	0.0	1.0	3.0	1.0	3
4057	Sanitary Sewer	SAMH_2225 - SAMH_2226	N/A	18.00	VCP	342.26	342	637187.615	26911450.314	606.201	$29,777	01/01/1939	79	75	0	$0	$57,158	1	1	0.0	0.0	1.0	3.0	1.0	3
4058	Sanitary Sewer	SAMH_2226 - SAMH_2227	N/A	18.00	RCP	224.45	224	637193.654	26911674.682	605.599	$19,527	01/01/1939	79	75	0	$0	$37,483	1	1	0.0	0.0	1.0	3.0	5.0	15
4059	Sanitary Sewer	SAMH_2227 - SAMH_2228	N/A	24.00	RCP	224.90	224	637201.052	26911899.460	605.816	$21,590	01/01/1939	79	75	0	$0	$39,582	1	1	0.0	0.0	1.0	3.0	5.0	15
4060	Sanitary Sewer	SAMH_2228 - SAMH_2229	N/A	30.00	RCP	269.64	269	637206.584	26912169.045	605.688	$42,064	01/01/1985	33	75	41	$23,053	$58,243	1	1	0.0	0.0	1.0	3.0	1.0	3
4061	Sanitary Sewer	SAMH_2229 - SAMH_2230	N/A	30.00	RCP	293.12	293	637214.331	26912462.062	607.722	$48,951	01/01/1985	33	75	41	$26,827	$66,538	1	1	0.0	0.0	1.0	3.0	1.0	3
4062	Sanitary Sewer	SAMH_2015 - SAMH_2233	N/A	12.00	VCP	293.68	283	636894.223	26911445.176	607.560	$33,773	01/01/1985	33	75	41	$18,509	$45,521	1	1	0.0	0.0	1.0	2.0	1.0	2
4063	Sanitary Sewer	SAMH_2233 - SAMH_2232	N/A	12.00	VCP	147.92	159	637042.136	26911447.020	606.398	$17,011	01/01/1985	33	75	41	$9,322	$22,928	1	1	0.0	0.0	1.0	2.0	1.0	2
4064	Sanitary Sewer	SAMH_2232 - SAMH_2226	N/A	12.00	VCP	145.52	145	637187.615	26911450.314	606.201	$16,734	01/01/1985	33	75	41	$9,171	$22,555	1	1	0.0	0.0	1.0	2.0	1.0	2
4065	Sanitary Sewer	SAMH_2016 - SAMH_2015	N/A	9.00	VCP	442.94	442	636600.594	26911439.700	610.717	$31,892	01/01/1939	79	75	0	$0	$67,327	1	1	0.0	0.0	1.0	2.0	5.0	10
4066	Sanitary Sewer	SAMH_2017 - SAMH_2016	N/A	9.00	VCP	463.46	496	636609.135	26911882.555	611.295	$33,369	01/01/1939	79	75	0	$0	$70,446	1	1	0.0	0.0	1.0	2.0	1.0	2
4067	Sanitary Sewer	SAMH_3336 - SAMH_3337	N/A	9.00	VCP	141.40	141	636991.327	26914154.162	611.832	$10,181	01/01/1939	79	75	0	$0	$21,493	1	1	0.0	0.0	1.0	2.0	5.0	10
4068	Sanitary Sewer	SAMH_3337 - SAMH_3338	N/A	9.00	VCP	237.33	237	636960.241	26914389.449	610.852	$17,088	01/01/1939	79	75	0	$0	$36,075	1	1	0.0	0.0	1.0	2.0	5.0	10
4069	Sanitary Sewer	SAMH_3338 - SAMH_3339	N/A	9.00	VCP	175.83	175	636937.568	26914563.811	610.560	$12,660	01/01/1939	79	75	0	$0	$26,726	1	1	0.0	0.0	1.0	2.0	3.0	6
4070	Sanitary Sewer	SAMH_3339 - SAMH_3340	N/A	12.00	VCP	209.07	209	636865.774	26914760.165	611.820	$15,680	01/01/1939	79	75	0	$0	$32,406	1	1	0.0	0.0	1.0	2.0	3.0	6
4071	Sanitary Sewer	SAMH_2013 - SAMH_2022	N/A	21.00	RCP	371.63	371	635921.090	26910758.405	607.658	$39,021	01/01/1960	58	75	16	$8,368	$61,319	1	1	0.0	0.0	1.0	4.0	1.0	4
4072	Sanitary Sewer	SAMH_2022 - SAMH_2023	N/A	21.00	RCP	367.75	367	635928.271	26911126.081	610.804	$41,923	01/01/1960	58	75	16	$8,991	$63,988	1	1	0.0	0.0	1.0	4.0	1.0	4
4073	Sanitary Sewer	SAMH_2023 - SAMH_2024	N/A	21.00	RCP	280.37	280	635928.319	26911406.449	612.507	$31,962	01/01/1960	58	75	16	$6,854	$48,784	1	1	0.0	0.0	1.0	4.0	1.0	4
4074	Sanitary Sewer	SAMH_2024 - SAMH_2025	N/A	21.00	RCP	295.83	295	635934.189	26911702.221	614.676	$33,725	01/01/1960	58	75	16	$7,232	$51,475	1	1	0.0	0.0	1.0	4.0	1.0	4
4075	Sanitary Sewer	SAMH_2039 - SAMH_2025	N/A	9.00	VCP	137.85	137	635934.189	26911702.221	614.676	$9,925	01/01/1939	79	75	0	$0	$20,953	1	1	0.0	0.0	1.0	2.0	1.0	2
4076	Sanitary Sewer	SAMH_2040 - SAMH_2039	N/A	9.00	VCP	100.05	100	635796.599	26911710.694	614.784	$6,403	01/01/1939	79	75	0	$0	$14,407	1	1	0.0	0.0	1.0	2.0	1.0	2
4078	Sanitary Sewer	SAMH_2048 - SAMH_2043	N/A	12.00	VCP	149.11	149	635624.962	26911715.966	625.122	$11,183	01/01/1939	79	75	0	$0	$23,112	1	1	0.0	0.0	1.0	1.0	4.0	4
4079	Sanitary Sewer	SAMH_2047 - SAMH_2048	N/A	9.00	VCP	283.88	257	635475.982	26911722.198	637.894	$18,168	01/01/1939	79	75	0	$0	$40,879	1	1	0.0	0.0	1.0	1.0	5.0	5
4080	Sanitary Sewer	SAMH_2043 - SAMH_2042	N/A	12.00	VCP	577.46	574	635614.295	26911138.605	616.882	$43,310	01/01/1939	79	75	0	$0	$89,506	1	1	0.0	0.0	1.0	2.0	4.0	8
4081	Sanitary Sewer	SAMH_2046 - SAMH_2042	N/A	9.00	VCP	148.26	144	635614.295	26911138.605	616.882	$10,675	01/01/1939	79	75	0	$0	$22,536	1	1	0.0	0.0	1.0	2.0	5.0	10
4082	Sanitary Sewer	SAMH_2047 - SAMH_2046	N/A	9.00	VCP	292.67	321	635466.214	26911145.847	624.726	$18,731	01/01/1939	79	75	0	$0	$42,144	1	1	0.0	0.0	1.0	1.0	5.0	5
4083	Sanitary Sewer	SAMH_2044 - SAMH_2045	N/A	9.00	VCP	349.75	349	635460.114	26910795.224	626.885	$25,182	01/01/1939	79	75	0	$0	$53,163	1	1	0.0	0.0	1.0	1.0	5.0	5
4084	Sanitary Sewer	SAMH_2045 - SAMH_2046	N/A	9.00	VCP	350.68	350	635466.214	26911145.847	624.726	$25,249	01/01/1939	79	75	0	$0	$53,303	1	1	0.0	0.0	1.0	1.0	5.0	5
4085	Sanitary Sewer	SAMH_2042 - SAMH_2041	N/A	15.00	VCP	357.97	360	635607.732	26910780.692	611.917	$28,280	01/01/1939	79	75	0	$0	$56,918	1	1	0.0	0.0	1.0	2.0	4.0	8
4086	Sanitary Sewer	SAMH_2041 - SAMH_2036	N/A	15.00	VCP	366.71	366	635602.363	26910414.023	609.449	$28,970	01/01/1939	79	75	0	$0	$58,307	1	1	0.0	0.0	1.0	2.0	1.0	2
4087	Sanitary Sewer	SAMH_2035A - SAMH_2035	N/A	18.00	RCP	31.85	31	635629.448	26910397.269	609.385	$4,427	01/01/2009	9	75	65	$3,843	$5,064	1	1	0.0	0.0	1.0	2.0	1.0	2
4088	Sanitary Sewer	SAMH_2036 - SAMH_2035	N/A	21.00	RCP	28.21	28	635629.448	26910397.269	609.385	$2,962	01/01/1960	58	75	16	$635	$4,654	1	1	0.0	0.0	1.0	4.0	1.0	4
4089	Sanitary Sewer	SAMH_2012 - SAMH_2036	N/A	18.00	RCP	371.01	371	635601.261	26910396.196	609.449	$51,571	01/01/2009	9	75	65	$44,777	$58,991	1	1	0.0	0.0	1.0	4.0	1.0	4
4090	Sanitary Sewer	SAMH_2035 - SAMH_2034	N/A	21.00	RCP	63.62	63	635692.969	26910393.692	608.259	$6,680	01/01/1960	58	75	16	$1,432	$10,498	1	1	0.0	0.0	1.0	4.0	1.0	4
4091	Sanitary Sewer	SAMH_2034 - SAMH_2013	N/A	21.00	RCP	220.39	220	635913.253	26910386.861	608.229	$23,141	01/01/1960	58	75	16	$4,962	$36,364	1	1	0.0	0.0	1.0	4.0	1.0	4
4092	Sanitary Sewer	SAMH_2079 - SAMH_2078	N/A	9.00	VCP	171.90	171	634257.699	26912654.672	693.513	$12,376	01/01/1939	79	75	0	$0	$26,128	1	1	0.0	0.0	1.0	1.0	5.0	5
4093	Sanitary Sewer	SAMH_2078 - SAMH_2077	N/A	9.00	VCP	313.61	313	634563.394	26912584.646	686.024	$22,580	01/01/1939	79	75	0	$0	$47,669	1	1	0.0	0.0	1.0	1.0	5.0	5
4094	Sanitary Sewer	SAMH_2077 - SAMH_2076	N/A	9.00	VCP	130.52	130	634665.847	26912665.512	692.819	$9,398	01/01/1939	79	75	0	$0	$19,839	1	1	0.0	0.0	1.0	1.0	5.0	5
4095	Sanitary Sewer	SAMH_2076 - SAMH_2075	N/A	9.00	VCP	130.86	130	634739.609	26912773.597	656.056	$9,422	01/01/1939	79	75	0	$0	$19,890	1	1	0.0	0.0	1.0	1.0	5.0	5
4096	Sanitary Sewer	SAMH_2075 - SAMH_3137	N/A	9.00	VCP	298.91	298	634752.582	26913072.225	628.958	$21,522	01/01/1939	79	75	0	$0	$45,434	1	1	0.0	0.0	1.0	1.0	1.0	1
4097	Sanitary Sewer	SAMH_3137 - SAMH_3136	N/A	12.00	VCP	270.39	270	635022.818	26913063.269	620.977	$20,279	01/01/1939	79	75	0	$0	$41,910	1	1	0.0	0.0	1.0	2.0	5.0	10
4098	Sanitary Sewer	SAMH_2055 - SAMH_2056	N/A	9.00	VCP	251.46	251	635163.822	26912366.318	669.052	$18,105	01/01/1939	79	75	0	$0	$38,222	1	1	0.0	0.0	1.0	1.0	5.0	5
4099	Sanitary Sewer	SAMH_2056 - SAMH_2057	N/A	9.00	VCP	190.23	194	635039.186	26912510.033	664.368	$13,697	01/01/1939	79	75	0	$0	$28,915	1	1	0.0	0.0	1.0	1.0	5.0	5
4100	Sanitary Sewer	SAMH_3071 - SAMH_3070	N/A	15.00	PVC	271.65	271	636663.473	26917163.181	595.578	$43,736	01/01/2011	7	75	67	$39,141	$46,452	1	1	0.0	0.0	1.0	3.0	1.0	3
4101	Sanitary Sewer	SAMH_3314 - SAMH_3315	N/A	18.00	RCP	253.46	253	637028.501	26916443.263	599.105	$41,567	01/01/2011	7	75	67	$37,199	$44,102	1	1	0.0	0.0	1.0	4.0	1.0	4
4102	Sanitary Sewer	SAMH_3315 - SAMH_3316	N/A	18.00	RCP	367.95	367	636871.556	26916776.059	597.472	$60,343	01/01/2011	7	75	67	$54,003	$64,023	1	1	0.0	0.0	1.0	4.0	1.0	4
4103	Sanitary Sewer	SAMH_3316 - SAMH_3069	N/A	18.00	RCP	353.16	353	636713.146	26917091.700	593.754	$57,919	01/01/2011	7	75	67	$51,834	$61,450	1	1	0.0	0.0	1.0	4.0	1.0	4
4104	Sanitary Sewer	SAMH_3069 - PS008	N/A	18.00	PVC	55.96	55	636661.123	26917071.090	0.000	$8,785	01/01/2010	8	75	66	$7,744	$9,345	1	1	0.0	0.0	1.0	5.0	1.0	5
4105	Sanitary Sewer	SAMH_3310 - CSO_007	N/A	47.00	ZZZ	12.84	12	637384.180	26915654.431	0.000	$924	01/01/1939	79	75	0	$0	$4,006	1	1	0.0	0.0	1.0	4.0	1.0	4

CITY OF SAULT STE. MARIE, MICHIGAN

Summary

id	Equipment Description	Asset ID	Construction Drawings Sheet Reference	Capacity or Size	Material	Length	Comment	Northing State Plane Ordinate	Easting State Plane Ordinate	Elevation	Original Cost	Year Installed (01/01/YYYY)	Age	Expected useful life (years)	Remaining Useful Life (years)	Depreciated Value	Replacement Cost	Average number of units in service	Total Number of units	Redundancy (Number)	Redundancy (percent)	Redundancy Score (R) (Reduces (C))	Criticality (C) (see back-up sheets)	Probability of Failure (P) (see back-up sheets)	Business Risk (BRE=PxCxR)
4106	Sanitary Sewer	SAMH_2950 - SAMH_2946	N/A	8.00	PVC	325.89	325	632834.910	26916012.440	628.092	$43,018	01/01/2001	17	75	57	$32,759	$49,536	1	1	0.0	0.0	1.0	1.0	1.0	1
4107	Sanitary Sewer	SAMH_2917 - SAMH_2885	N/A	10.00	PVC	356.44	356	632822.644	26915677.381	628.305	$47,050	01/01/2001	17	75	57	$35,830	$54,179	1	1	0.0	0.0	1.0	2.0	1.0	2
4108	Sanitary Sewer	SAMH_2947 - SAMH_2948	N/A	30.00	RCP	332.41	332	632865.093	26916659.376	619.570	$65,484	01/01/2000	18	75	56	$48,992	$75,456	1	1	0.0	0.0	1.0	5.0	1.0	5
4109	Sanitary Sewer	SAMH_2880 - SAMH_2881	N/A	24.00	RCP	298.78	298	632793.097	26914693.006	628.461	$47,505	01/01/2001	17	75	57	$36,176	$53,481	1	1	0.0	0.0	1.0	5.0	1.0	5
4110	Sanitary Sewer	SAMH_2881 - SAMH_2882	N/A	24.00	RCP	105.69	105	632794.760	26914798.683	628.632	$16,805	01/01/2001	17	75	57	$12,797	$18,919	1	1	0.0	0.0	1.0	5.0	1.0	5
4111	Sanitary Sewer	SAMH_2882 - SAMH_2883	N/A	24.00	RCP	239.40	239	632799.193	26915038.037	628.488	$38,064	01/01/2001	17	75	57	$28,987	$42,852	1	1	0.0	0.0	1.0	5.0	1.0	5
4112	Sanitary Sewer	SAMH_2883 - SAMH_2884	N/A	24.00	RCP	313.75	313	632811.526	26915351.545	628.761	$49,886	01/01/2001	17	75	57	$37,989	$56,161	1	1	0.0	0.0	1.0	5.0	1.0	5
4113	Sanitary Sewer	SAMH_2865 - SAMH_2864	N/A	8.00	PVC	370.69	370	633215.010	26915346.059	627.183	$48,931	01/01/2001	17	75	57	$37,262	$56,344	1	1	0.0	0.0	1.0	1.0	1.0	1
4114	Sanitary Sewer	SAMH_2910 - SAMH_2883	N/A	12.00	PVC	322.94	322	632799.193	26915038.037	628.488	$46,827	01/01/2001	17	75	57	$35,660	$53,286	1	1	0.0	0.0	1.0	3.0	1.0	3
4115	Sanitary Sewer	SAMH_2905 - SAMH_2881	N/A	10.00	PVC	331.58	331	632793.097	26914693.006	628.461	$43,768	01/01/2001	17	75	57	$33,330	$50,400	1	1	0.0	0.0	1.0	2.0	1.0	2
4116	Sanitary Sewer	SAMH_2876 - SAMH_2877	N/A	15.00	CP	343.89	343	632768.928	26913781.382	632.825	$47,801	01/01/2001	17	75	57	$36,402	$54,679	1	1	0.0	0.0	1.0	2.0	1.0	2
4117	Sanitary Sewer	SAMH_2877 - SAMH_2878	N/A	24.00	RCP	122.68	122	632768.729	26913904.061	631.826	$19,138	01/01/2001	17	75	57	$14,574	$21,592	1	1	0.0	0.0	1.0	5.0	1.0	5
4118	Sanitary Sewer	SAMH_3712 - SAMH_3713	N/A	8.00	VCP	316.80	316	631084.614	26921106.381	602.642	$38,615	01/01/1976	42	75	32	$16,525	$57,545	1	1	0.0	0.0	1.0	1.0	1.0	1
4119	Sanitary Sewer	SAMH_3713 - SAMH_3714	N/A	8.00	VCP	378.58	378	631102.558	26921484.538	598.380	$32,329	01/01/1976	42	75	32	$13,835	$48,177	1	1	0.0	0.0	1.0	1.0	1.0	1
4120	Sanitary Sewer	SAMH_3746 - SAMH_3742	N/A	8.00	VCP	307.83	303	630038.807	26920493.426	619.141	$30,497	01/01/1978	40	75	34	$13,865	$45,020	1	1	0.0	0.0	1.0	1.0	1.0	1
4121	Sanitary Sewer	SAMH_3743 - SAMH_3742	N/A	8.00	VCP	261.33	254	630038.807	26920493.426	619.141	$22,121	01/01/1976	42	75	32	$9,466	$32,964	1	1	0.0	0.0	1.0	1.0	1.0	1
4122	Sanitary Sewer	SAMH_3744 - SAMH_3743	N/A	8.00	VCP	216.87	216	630042.773	26920754.727	0.000	$42,026	01/01/1976	42	75	32	$17,984	$62,626	1	1	0.0	0.0	1.0	1.0	1.0	1
4123	Sanitary Sewer	SAMH_3701 - SAMH_3702	N/A	8.00	PVC	330.29	330	631395.345	26921079.244	600.137	$36,513	01/01/2009	9	75	65	$31,703	$54,411	1	1	0.0	0.0	1.0	1.0	1.0	1
4124	Sanitary Sewer	SAMH_3721 - SAMH_3722	N/A	8.00	VCP	351.68	338	630752.359	26920797.478	0.000	$33,939	01/01/1976	42	75	32	$14,524	$50,576	1	1	0.0	0.0	1.0	1.0	1.0	1
4125	Sanitary Sewer	SAMH_3722 - SAMH_3723	N/A	8.00	VCP	332.74	332	630767.076	26921129.887	604.190	$42,608	01/01/1976	42	75	32	$18,233	$60,817	1	1	0.0	0.0	1.0	1.0	1.0	1
4126	Sanitary Sewer	SAMH_4318 - SAMH_4305A	N/A	18.00	RCP	135.72	135	633111.434	26924306.829	588.984	$19,153	01/01/1976	42	75	32	$8,196	$27,338	1	1	0.0	0.0	1.0	5.0	4.0	20
4127	Sanitary Sewer	SAMH_4305A - SAMH_4305	N/A	18.00	CP	296.24	296	633232.763	26924036.572	588.927	$43,164	01/01/1976	42	75	32	$18,471	$60,293	1	1	0.0	0.0	1.0	5.0	1.0	5
4128	Sanitary Sewer	SAMH_4306 - SAMH_3813	N/A	24.00	CP	342.57	342	633376.418	26923727.482	588.844	$9,008	01/01/1976	42	75	32	$3,854	$13,139	1	1	0.0	0.0	1.0	5.0	1.0	5
4129	Sanitary Sewer	SAMH_3308 - SAMH_3309	N/A	18.00	RCP	237.89	237	637382.123	26915632.533	602.960	$39,015	01/01/2011	7	75	67	$34,916	$41,394	1	1	0.0	0.0	1.0	4.0	1.0	4
4130	Sanitary Sewer	SAMH_3310 - SAMH_3311	N/A	18.00	RCP	36.99	37	637367.367	26915666.456	602.997	$6,067	01/01/2011	7	75	67	$5,429	$6,437	1	1	0.0	0.0	1.0	4.0	1.0	4
4131	Sanitary Sewer	SAMH_3323 - SAMH_3309	N/A	12.00	PVC	412.87	412	637382.123	26915632.533	602.960	$63,996	01/01/2011	7	75	67	$57,272	$68,124	1	1	0.0	0.0	1.0	3.0	1.0	3
4132	Sanitary Sewer	SAMH_3311 - SAMH_3312	N/A	18.00	RCP	218.62	218	637283.703	26915868.433	603.529	$35,854	01/01/2011	7	75	67	$32,087	$38,040	1	1	0.0	0.0	1.0	4.0	1.0	4
4133	Sanitary Sewer	SAMH_3312 - SAMH_3313	N/A	18.00	RCP	251.40	251	637184.980	26916099.642	602.358	$41,230	01/01/2011	7	75	67	$36,898	$43,744	1	1	0.0	0.0	1.0	4.0	1.0	4
4134	Sanitary Sewer	SAMH_3313 - SAMH_3314	N/A	18.00	RCP	124.12	124	637134.656	26916213.105	601.086	$20,356	01/01/2011	7	75	67	$18,217	$21,597	1	1	0.0	0.0	1.0	4.0	1.0	4
4135	Sanitary Sewer	SAMH_3307 - SAMH_3308	N/A	18.00	RCP	458.20	458	637474.230	26915413.193	598.660	$75,145	01/01/2011	7	75	67	$67,250	$79,727	1	1	0.0	0.0	1.0	4.0	1.0	4
4136	Sanitary Sewer	SAMH_3306 - SAMH_3307	N/A	15.00	PVC	318.98	318	637586.139	26914968.866	594.058	$47,528	01/01/2011	7	75	67	$42,534	$50,718	1	1	0.0	0.0	1.0	4.0	1.0	4
4137	Sanitary Sewer	SAMH_3320 - SAMH_3307	N/A	12.00	PVC	334.14	334	637586.139	26914968.866	594.058	$48,450	01/01/2011	7	75	67	$43,359	$51,791	1	1	0.0	0.0	1.0	4.0	1.0	4
4138	Sanitary Sewer	SAMH_3305 - SAMH_3306	N/A	15.00	PVC	350.74	350	637660.507	26914658.675	594.012	$52,260	01/01/2011	7	75	67	$46,769	$55,768	1	1	0.0	0.0	1.0	4.0	1.0	4
4139	Sanitary Sewer	SAMH_3304 - SAMH_3305	N/A	15.00	PVC	226.08	226	637752.526	26914320.221	594.822	$36,399	01/01/2010	8	75	66	$32,089	$38,660	1	1	0.0	0.0	1.0	4.0	1.0	4
4140	Sanitary Sewer	SAMH_3335B - SAMH_3304	N/A	15.00	PVC	18.32	18	637559.744	26914202.125	602.523	$2,950	01/01/2010	8	75	66	$2,600	$3,134	1	1	0.0	0.0	1.0	3.0	1.0	3
4141	Sanitary Sewer	SAMH_2223 - SAMH_2230	N/A	12.00	PVC	210.16	210	637214.331	26912462.062	607.722	$30,474	01/01/2011	7	75	67	$27,272	$32,576	1	1	0.0	0.0	1.0	2.0	1.0	2
4142	Sanitary Sewer	SAMH_2236 - SAMH_2230	N/A	12.00	PVC	291.67	291	637214.331	26912462.062	607.722	$42,292	01/01/2011	7	75	67	$37,848	$45,208	1	1	0.0	0.0	1.0	2.0	1.0	2
4143	Sanitary Sewer	SAMH_2230 - SAMH_2231	N/A	12.00	PVC	293.61	293	637176.168	26912753.185	605.983	$45,510	01/01/2010	8	75	66	$40,121	$48,446	1	1	0.0	0.0	1.0	3.0	1.0	3
4144	Sanitary Sewer	SAMH_2231 - SAMH_3332	N/A	15.00	PVC	295.03	295	637136.345	26913045.517	605.327	$43,960	01/01/2010	8	75	66	$38,755	$46,910	1	1	0.0	0.0	1.0	3.0	1.0	3
4145	Sanitary Sewer	SAMH_3332 - SAMH_3333	N/A	12.00	PVC	200.35	200	637110.090	26913244.143	607.015	$31,055	01/01/2010	8	75	66	$27,378	$33,058	1	1	0.0	0.0	1.0	3.0	1.0	3
4146	Sanitary Sewer	SAMH_3343 - SAMH_3332	N/A	8.00	PVC	245.47	245	637136.345	26913045.517	605.327	$34,857	01/01/2011	7	75	67	$31,194	$37,312	1	1	0.0	0.0	1.0	2.0	1.0	2
4147	Sanitary Sewer	SAMH_3329 - SAMH_3333	N/A	8.00	PVC	50.53	50	637110.090	26913244.143	607.015	$6,771	01/01/2010	8	75	66	$5,969	$7,277	1	1	0.0	0.0	1.0	2.0	1.0	2
4148	Sanitary Sewer	SAMH_3333 - SAMH_3334	N/A	12.00	PVC	336.76	336	637067.737	26913578.233	609.360	$52,199	01/01/2010	8	75	66	$46,019	$55,566	1	1	0.0	0.0	1.0	4.0	1.0	4
4149	Sanitary Sewer	SAMH_3329 - SAMH_3328	N/A	8.00	PVC	269.64	269	637414.356	26913343.714	610.451	$32,896	01/01/1997	21	75	53	$23,295	$40,985	1	1	0.0	0.0	1.0	2.0	1.0	2
4150	Sanitary Sewer	SAMH_3334 - SAMH_3335	N/A	12.00	PVC	337.79	337	637024.518	26913913.245	612.382	$52,357	01/01/2010	8	75	66	$46,158	$55,735	1	1	0.0	0.0	1.0	4.0	1.0	4
4151	Sanitary Sewer	SAMH_3336 - SAMH_3335	N/A	15.00	VCP	101.80	101	637024.518	26913913.245	612.382	$9,264	01/01/1939	79	75	0	$0	$17,408	1	1	0.0	0.0	1.0	2.0	1.0	2
4152	Sanitary Sewer	SAMH_U3335 - SAMH_3335A	N/A	15.00	PVC	312.21	591	637299.052	26914061.935	605.397	$23,861	01/01/2010	8	75	66	$21,036	$40,705	1	1	0.0	0.0	1.0	4.0	1.0	4
4153	Sanitary Sewer	SAMH_3028 - SAMH_3001	N/A	8.00	PVC	283.61	283	636639.246	26912989.706	613.456	$40,273	01/01/2011	7	75	67	$36,041	$43,109	1	1	0.0	0.0	1.0	2.0	1.0	2
4154	Sanitary Sewer	SAMH_3321 - SAMH_3320	N/A	8.00	PVC	200.05	200	637265.862	26914873.636	606.037	$28,407	01/01/2011	7	75	67	$25,422	$30,408	1	1	0.0	0.0	1.0	2.0	1.0	2
4155	Sanitary Sewer	SAMH_3331 - SAMH_3330	N/A	12.00	PVC	296.16	296	637244.186	26914864.800	606.078	$37,019	01/01/1994	24	75	50	$24,733	$45,904	1	1	0.0	0.0	1.0	4.0	1.0	4
4156	Sanitary Sewer	SAMH_3330 - SAMH_3320	N/A	12.00	PVC	23.41	23	637265.862	26914873.636	606.037	$2,926	01/01/1994	24	75	50	$1,954	$3,628	1	1	0.0	0.0	1.0	4.0	1.0	4
4157	Sanitary Sewer	SAMH_3083 - SAMH_3082	N/A	8.00	PVC	252.14	252	636546.358	26916380.471	606.476	$35,803	01/01/2015	3	75	71	$33,952	$38,325	1	1	0.0	0.0	1.0	2.0	1.0	2
4158	Sanitary Sewer	SAMH_3088 - SAMH_3087	N/A	8.00	PVC	434.75	434	635813.163	26917192.654	605.592	$61,735	01/01/2011	7	75	67	$55,249	$66,082	1	1	0.0	0.0	1.0	1.0	1.0	1
4159	Sanitary Sewer	SAMH_1560A - SAMH_1561	N/A	8.00	VCP	408.33	392	624257.758	26909021.547	699.463	$41,650	01/01/1974	44	75	30	$16,713	$62,067	1	1	0.0	0.0	1.0	1.0	1.0	1
4160	Sanitary Sewer	SAMH_1534 - SAMH_1548	N/A	8.00	VCP	246.16	246	624746.452	26909543.826	702.643	$22,647	01/01/1966	52	75	22	$6,670	$37,417	1	1	0.0	0.0	1.0	2.0	1.0	2
4161	Sanitary Sewer	SAMH_1538 - SAMH_1539	N/A	8.00	VCP	266.59	266	625074.190	26909400.773	701.254	$24,527	01/01/1966	52	75	22	$7,224	$40,522	1	1	0.0	0.0	1.0	2.0	1.0	2
4162	Sanitary Sewer	SAMH_1539 - SAMH_1540	N/A	8.00	VCP	320.54	320	625064.450	26909080.385	700.716	$29,489	01/01/1966	52	75	22	$8,685	$48,722	1	1	0.0	0.0	1.0	2.0	1.0	2
4163	Sanitary Sewer	SAMH_1511 - SAMH_1511A	N/A	8.00	VCP	426.47	426	625739.742	26909840.586	702.870	$39,236	01/01/1966	52	75	22	$11,556	$64,824	1	1	0.0	0.0	1.0	2.0	1.0	2
4164	Sanitary Sewer	SAMH_3080 - SAMH_3079	N/A	8.00	PVC	179.54	253	636353.808	26916023.004	609.680	$25,495	01/01/2015	3	75	71	$24,177	$27,290	1	1	0.0	0.0	1.0	2.0	1.0	2
4165	Sanitary Sewer	SAMH_3081 - SAMH_3084	N/A	8.00	PVC	364.69	364	636118.360	26916528.441	607.317	$51,787	01/01/2010	8	75	66	$45,655	$55,434	1	1	0.0	0.0	1.0	2.0	1.0	2
4166	Sanitary Sewer	SAMH_1114 - SAMH_1138	N/A	8.00	PVC	332.83	179	632171.941	26904915.042	642.198	$47,261	01/01/2010	8	75	66	$41,665	$50,590	1	1	0.0	0.0	1.0	1.0	1.0	1
4167	Sanitary Sewer	SAMH_1138 - SAMH_1143	N/A	8.00	CP	340.14	340	631831.847	26904920.617	638.719	$27,891	01/01/1950	68	75	6	$2,260	$51,701	1	1	0.0	0.0	1.0	2.0	1.0	2
4168	Sanitary Sewer	SAMH_1144 - SAMH_1145	N/A	12.00	VCP	26.93	26	631829.472	26905248.882	639.265	$3,097	01/01/1980	38	75	36	$1,490	$4,175	1	1	0.0	0.0	1.0	3.0	1.0	3
4169	Sanitary Sewer	SAMH_2885 - SAMH_2946	N/A	24.00	RCP	335.28	335	632834.910	26916012.440	628.092	$53,310	01/01/2001	17	75	57	$40,597	$60,016	1	1	0.0	0.0	1.0	5.0	1.0	5
4170	Sanitary Sewer	SAMH_2946 - SAMH_2947	N/A	30.00	RCP	315.24	315	632848.351	26916327.392	627.292	$62,102	01/01/2001	17	75	57	$47,292	$71,559	1	1	0.0	0.0	1.0	5.0	1.0	5
4171	Sanitary Sewer	SAMH_2951 - SAMH_2947	N/A	8.00	PVC	330.09	330	632848.351	26916327.392	627.292	$40,271	01/01/1998	20	75	54	$29,055	$50,173	1	1	0.0	0.0	1.0	3.0	1.0	3
4172	Sanitary Sewer	SAMH_2927 - SAMH_2926	N/A	8.00	PVC	364.98	364	633241.318	26916002.149	620.227	$48,177	01/01/2001	17	75	57	$36,688	$55,477	1	1	0.0	0.0	1.0	1.0	1.0	1
4173	Sanitary Sewer	SAMH_2878 - SAMH_2879	N/A	24.00	RCP	215.55	215	632777.304	26914119.438	629.963	$34,272	01/01/2001	17	75	57	$26,099	$38,583	1	1	0.0	0.0	1.0	5.0	1.0	5
4174	Sanitary Sewer	SAMH_2879 - SAMH_2880	N/A	24.00	RCP	275.02	275	632783.448	26914394.387	628.642	$43,728	01/01/2001	17	75	57	$33,300	$49,228	1	1	0.0	0.0	1.0	5.0	1.0	5
4175	Sanitary Sewer	SAMH_2898 - SAMH_2880	N/A	12.00	PVC	25.32	25	632783.448	26914394.387	628.642	$3,419	01/01/2001	17	75	57	$2,603	$3,925	1	1	0.0	0.0	1.0	2.0	1.0	2
4176	Sanitary Sewer	SAMH_2899 - SAMH_2898	N/A	12.00	PVC	29.44	29	632758.217	26914396.547	628.394	$3,975	01/01/2001	17	75	57	$3,027	$4,564	1	1	0.0	0.0	1.0	2.0	1.0	2
4177	Sanitary Sewer	SAMH_2900 - SAMH_2899	N/A	12.00	PVC	278.95	278	632731.182	26914384.886	628.320	$37,658	01/01/2001	17	75	57	$28,677	$43,237	1	1	0.0	0.0	1.0	2.0	1.0	2
4178	Sanitary Sewer	SAMH_2893 - SAMH_2879	N/A	10.00	PVC	333.89	333	632777.304	26914119.438	629.963	$44,074	01/01/2001	17	75	57	$33,563	$50,751	1	1	0.0	0.0	1.0	1.0	1.0	1
4179	Sanitary Sewer	SAMH_2889 - SAMH_2877	N/A	24.00	RCP	323.85	323	632768.928	26913781.382	632.825	$50,521	01/01/2001	17	75	57	$38,473	$56,998	1	1	0.0	0.0	1.0	4.0	1.0	4
4180	Sanitary Sewer	SAMH_2874 - SAMH_2875	N/A	15.00	PVC	51.34	51	632753.489	26913264.532	647.439	$7,137	01/01/2001	17	75	57	$5,435	$8,163	1	1	0.0	0.0	1.0	1.0	1.0	1
4181	Sanitary Sewer	SAMH_2875 - SAMH_2876	N/A	15.00	CP	173.19	173	632758.020	26913437.663	641.235	$24,073	01/01/2001	17	75	57	$18,332	$27,537	1	1	0.0	0.0	1.0	1.0	1.0	1
4182	Sanitary Sewer	SAMH_2866 - SAMH_2876	N/A	8.00	PVC	344.57	344	632758.020	26913437.663	641.235	$45,483	01/01/2001	17	75	57	$34,636	$52,375	1	1	0.0	0.0	1.0	1.0	1.0	1
4183	Sanitary Sewer	SAMH_2858 - SAMH_2866	N/A	24.00	VCP	323.15	323	634116.028	26915647.782	611.841	$31,022	01/01/1939	79	75	0	$0	$56,874	1	1	0.0	0.0	1.0	4.0	5.0	20
4184	Sanitary Sewer	SAMH_2866 - SAMH_2922	N/A	24.00	VCP	323.15	323	634130.978	26915970.587	609.923	$31,023	01/01/1939	79	75	0	$0	$56,875	1	1	0.0	0.0	1.0	4.0	5.0	20
4185	Sanitary Sewer	SAMH_2929 - SAMH_2928	N/A	8.00	PVC	32.54	32	634145.904	26916300.349	607.777	$3,969	01/01/1998	20	75	54	$2,863	$4,945	1	1	0.0	0.0	1.0	1.0	1.0	1
4186	Sanitary Sewer	SAMH_2930 - SAMH_2929	N/A	8.00	PVC	395.08	395	634114.122	26916293.386	607.803	$48,200	01/01/1998	20	75	54	$34,776	$60,052	1	1	0.0	0.0	1.0	1.0	1.0	1
4187	Sanitary Sewer	SAMH_2923 - SAMH_2922	N/A	8.00	PVC	31.60	31	634130.978	26915970.587	609.923	$4,171	01/01/2001	17	75	57	$3,176	$4,803	1	1	0.0	0.0	1.0	1.0	1.0	1
4188	Sanitary Sewer	SAMH_2924 - SAMH_2923	N/A	8.00	PVC	397.51	397	634100.991	26915980.545	609.584	$52,471	01/01/2001	17	75	57	$39,958	$60,421	1	1	0.0	0.0	1.0	1.0	1.0	1
4189	Sanitary Sewer	SAMH_2867 - SAMH_2866	N/A	8.00	PVC	33.45	33	634116.028	26915647.782	611.841	$4,415	01/01/2001	17	75	57	$3,362	$5,084	1	1	0.0	0.0	1.0	1.0	1.0	1
4190	Sanitary Sewer	SAMH_2868 - SAMH_2867	N/A	8.00	PVC	400.15	400	634083.638	26915656.124	611.455	$52,820	01/01/2001	17	75	57	$40,224	$60,823	1	1	0.0	0.0	1.0	1.0	1.0	1
4191	Sanitary Sewer	SAMH_2926 - SAMH_2925	N/A	8.00	PVC	229.48	229	633470.750	26915997.344	617.118	$30,292	01/01/2001	17	75	57	$23,068	$34,881	1	1	0.0	0.0	1.0	1.0	1.0	1
4192	Sanitary Sewer	SAMH_2925 - SAMH_2924	N/A	8.00	PVC	232.96	232	633703.638	26915991.523	615.125	$30,751	01/01/2001	17	75	57	$23,417	$35,410	1	1	0.0	0.0	1.0	1.0	1.0	1
4193	Sanitary Sewer	SAMH_2869 - SAMH_2868	N/A	8.00	PVC	232.69	232	633683.520	26915661.048	616.782	$30,715	01/01/2001	17	75	57	$23,390	$35,368	1	1	0.0	0.0	1.0	1.0	1.0	1
4194	Sanitary Sewer	SAMH_2007 - SAMH_2008	N/A	18.00	RCP	387.48	387	635108.115	26909033.350	621.106	$56,960	01/01/2009	9	75	65	$49,456	$64,710	1	1	0.0	0.0	1.0	4.0	1.0	4
4195	Sanitary Sewer	SAMH_2008 - SAMH_2009	N/A	18.00	RCP	269.84	269	635276.498	26909244.205	618.917	$37,508	01/01/2009	9	75	65	$32,567	$42,904	1	1	0.0	0.0	1.0	4.0	1.0	4
4196	Sanitary Sewer	SAMH_2009 - SAMH_2010	N/A	18.00	RCP	392.66	392	635462.942	26909589.774	616.208	$54,579	01/01/2009	9	75	65	$47,389	$62,432	1	1	0.0	0.0	1.0	4.0	1.0	4
4197	Sanitary Sewer	SAMH_2006 - SAMH_2007	N/A	18.00	RCP	135.05	135	634783.624	26908821.574	627.237	$19,852	01/01/2009	9	75	65	$17,236	$22,553	1	1	0.0	0.0	1.0	4.0	1.0	4
4198	Sanitary Sewer	SAMH_2004 - SAMH_2006	N/A	18.00	CP	293.40	293	634648.588	26908819.825	630.386	$25,526	01/01/1939	79	75	0	$0	$48,998	1	1	0.0	0.0	1.0	4.0	4.0	16
4199	Sanitary Sewer	SAMH_2020 - SAMH_3001	N/A	8.00	PVC	229.47	229	636639.246	26912989.706	613.456	$32,584	01/01/2010	8	75	66	$28,726	$34,879	1	1	0.0	0.0	1.0	2.0	1.0	2
4200	Sanitary Sewer	SAMH_3001 - SAMH_3343	N/A	8.00	PVC	254.75	254	636892.400	26913018.178	615.240	$36,175	01/01/2011	7	75	67	$32,374	$38,722	1	1	0.0	0.0	1.0	2.0	1.0	2
4201	Sanitary Sewer	SAMH_3344 - SAMH_3343	N/A	8.00	PVC	273.27	273	636892.400	26913018.178	615.240	$38,804	01/01/2010	8	75	66	$34,209	$41,536	1	1	0.0	0.0	1.0	1.0	1.0	1
4202	Sanitary Sewer	SAMH_3030A - SAMH_3028	N/A	8.00	PVC	146.17	146	636355.817	26912999.846	613.456	$20,756	01/01/2011	7	75	67	$18,575	$22,217	1	1	0.0	0.0	1.0	2.0	1.0	2
4203	Sanitary Sewer	SAMH_3030 - SAMH_3030A	N/A	8.00	PVC	206.58	206	636209.908	26913008.506	613.037	$29,335	01/01/2011	7	75	67	$26,253	$31,401	1	1	0.0	0.0	1.0	2.0	1.0	2
4204	Sanitary Sewer	SAMH_3031 - SAMH_3030	N/A	8.00	PVC	33.23	33	636003.432	26913015.158	612.124	$4,453	01/01/2011	7	75	67	$3,985	$4,785	1	1	0.0	0.0	1.0	2.0	1.0	2
4205	Sanitary Sewer	SAMH_3032 - SAMH_3030	N/A	8.00	PVC	44.03	44	636003.432	26913015.158	612.124	$6,252	01/01/2011	7	75	67	$5,595	$6,692	1	1	0.0	0.0	1.0	1.0	1.0	1
4206	Sanitary Sewer	SAMH_3029 - SAMH_3028	N/A	8.00	PVC	36.60	36	636355.817	26912999.846	613.456	$5,197	01/01/2010	8	75	66	$4,581	$5,563	1	1	0.0	0.0	1.0	1.0	1.0	1
4207	Sanitary Sewer	SAMH_2021 - SAMH_3030A	N/A	8.00	PVC	192.89	192	636209.908	26913008.506	613.037	$17,746	01/01/1962	56	75	18	$4,279	$29,319	1	1	0.0	0.0	1.0	1.0	1.0	1
4208	Sanitary Sewer	SAMH_3033 - SAMH_3032	N/A	8.00	PVC	291.15	291	635972.371	26913046.364	612.021	$41,343	01/01/2011	7	75	67	$36,999	$44,254	1	1	0.0	0.0	1.0	1.0	1.0	1
4209	Sanitary Sewer	SAMH_3034 - SAMH_3036	N/A	8.00	PVC	213.26	213	635878.667	26913542.278	612.213	$28,576	01/01/2011	7	75	67	$25,573	$30,709	1	1	0.0	0.0	1.0	1.0	1.0	1
4210	Sanitary Sewer	SAMH_0340 - SAMH_3036	N/A	8.00	VCP	181.95	181	635878.667	26913542.278	612.213	$13,100	01/01/1939	79	75	0	$0	$27,656	1	1	0.0	0.0	1.0	1.0	1.0	1
4211	Sanitary Sewer	SAMH_3040 - SAMH_3039	N/A	10.00	RCP	178.42	178	635954.467	26913783.704	612.279	$23,551	01/01/2005	13	75	61	$19,191	$27,119	1	1	0.0	0.0	1.0	3.0	1.0	3
4212	Sanitary Sewer	SAMH_3042 - SAMH_3040	N/A	10.00	CP	65.83	65	635794.939	26913703.813	611.259	$7,373	01/01/1980	38	75	36	$3,548	$10,007	1	1	0.0	0.0	1.0	1.0	1.0	1
4213	Sanitary Sewer	SAMH_3043 - SAMH_3042	N/A	8.00	PVC	213.18	213	635765.518	26913762.706	611.217	$28,566	01/01/2011	7	75	67	$25,564	$30,698	1	1	0.0	0.0	1.0	1.0	1.0	1
4214	Sanitary Sewer	SAMH_3043 - SAMH_3047	N/A	12.00	PVC	211.18	211	635581.247	26914144.848	611.861	$28,510	01/01/2011	7	75	67	$25,514	$30,622	1	1	0.0	0.0	1.0	1.0	1.0	1
4215	Sanitary Sewer	SAMH_3047 - SAMH_3046	N/A	12.00	PVC	242.07	242	635800.261	26914247.963	612.091	$30,259	01/01/1994	24	75	50	$20,216	$37,522	1	1	0.0	0.0	1.0	2.0	1.0	2
4216	Sanitary Sewer	SAMH_3325 - SAMH_3213	N/A	8.00	VCP	225.87	225	637184.980	26916099.642	602.358	$16,262	01/01/1939	79	75	0	$0	$34,332	1	1	0.0	0.0	1.0	3.0	1.0	3
4217	Sanitary Sewer	SAMH_3325A - SAMH_3325	N/A	8.00	VCP	130.70	130	636982.058	26916000.456	605.100	$9,411	01/01/1939	79	75	0	$0	$19,867	1	1	0.0	0.0	1.0	3.0	1.0	3
4218	Sanitary Sewer	SAMH_3326 - SAMH_3072	N/A	8.00	PVC	223.28	223	636713.366	26916192.223	606.518	$34,608	01/01/2011	7	75	67	$30,972	$36,841	1	1	0.0	0.0	1.0	2.0	1.0	2
4219	Sanitary Sewer	SAMH_2237 - SAMH_2236	N/A	12.00	PVC	47.11	47	636926.711	26912413.652	609.328	$6,831	01/01/2011	7	75	67	$6,113	$7,302	1	1	0.0	0.0	1.0	2.0	1.0	2
4220	Sanitary Sewer	SAMH_2238 - SAMH_2236	N/A	12.00	PVC	37.97	37	636926.711	26912413.652	609.328	$5,505	01/01/2011	7	75	67	$4,926	$5,885	1	1	0.0	0.0	1.0	2.0	1.0	2
4221	Sanitary Sewer	SAMH_3346 - SAMH_3347	N/A	10.00	PVC	297.76	297	636826.382	26913858.321	612.242	$42,281	01/01/2010	8	75	66	$37,275	$45,259	1	1	0.0	0.0	1.0	1.0	1.0	1
4222	Sanitary Sewer	SAMH_3346 - SAMH_3345	N/A	8.00	PVC	15.68	15	636859.913	26913549.744	617.187	$2,430	01/01/2010	8	75	66	$2,142	$2,587	1	1	0.0	0.0	1.0	1.0	1.0	1
4223	Sanitary Sewer	SAMH_3345 - SAMH_3344	N/A	8.00	PVC	259.29	259	636876.204	26913290.963	611.130	$40,190	01/01/2010	8	75	66	$35,431	$42,783	1	1	0.0	0.0	1.0	1.0	1.0	1
4224	Sanitary Sewer	SAMH_2018 - SAMH_2019	N/A	10.00	PVC	95.59	95	636627.564	26912755.671	612.151	$13,574	01/01/2010	8	75	66	$11,966	$14,530	1	1	0.0	0.0	1.0	2.0	1.0	2
4225	Sanitary Sewer	SAMH_2019 - SAMH_2020	N/A	8.00	PVC	7.38	7	636633.297	26912760.316	612.086	$989	01/01/2010	8	75	66	$871	$1,063	1	1	0.0	0.0	1.0	2.0	1.0	2
4226	Sanitary Sewer	SAMH_3002 - SAMH_3003	N/A	12.00	PVC	289.69	289	636641.816	26913363.293	612.529	$39,108	01/01/2010	8	75	66	$34,477	$42,005	1	1	0.0	0.0	1.0	3.0	1.0	3
4227	Sanitary Sewer	SAMH_3003 - SAMH_3004	N/A	12.00	PVC	412.97	412	636646.299	26913776.234	611.590	$55,750	01/01/2010	8	75	66	$49,149	$59,880	1	1	0.0	0.0	1.0	3.0	1.0	3
4228	Sanitary Sewer	SAMH_3004 - SAMH_3005	N/A	12.00	PVC	39.92	39	636632.578	26913813.725	611.874	$5,789	01/01/2010	8	75	66	$5,103	$6,188	1	1	0.0	0.0	1.0	3.0	1.0	3
4229	Sanitary Sewer	SAMH_3006 - SAMH_3348	N/A	15.00	VCP	236.61	236	636824.384	26913915.083	612.363	$21,532	01/01/1939	79	75	0	$0	$40,460	1	1	0.0	0.0	1.0	3.0	5.0	15
4230	Sanitary Sewer	SAMH_3075 - SAMH_3071	N/A	15.00	PVC	86.25	86	636418.475	26917045.835	603.104	$13,886	01/01/2011	7	75	67	$12,427	$14,748	1	1	0.0	0.0	1.0	3.0	1.0	3
4231	Sanitary Sewer	SAMH_3074B - SAMH_3075	N/A	8.00	PVC	305.18	305	636340.796	26917008.357	604.863	$43,336	01/01/2010	8	75	66	$38,205	$46,388	1	1	0.0	0.0	1.0	2.0	1.0	2
4232	Sanitary Sewer	SAMH_3073A - SAMH_3075	N/A	10.00	PVC	314.56	314	636340.796	26917008.357	604.863	$48,757	01/01/2011	7	75	67	$43,634	$51,902	1	1	0.0	0.0	1.0	2.0	1.0	2
4233	Sanitary Sewer	SAMH_3085 - SAMH_3075	N/A	15.00	PVC	395.17	395	636340.796	26917008.357	604.863	$63,623	01/01/2011	7	75	67	$56,938	$67,575	1	1	0.0	0.0	1.0	3.0	1.0	3
4234	Sanitary Sewer	SAMH_3094 - SAMH_3085	N/A	15.00	PVC	49.00	49	635986.904	26916832.512	606.823	$7,889	01/01/2011	7	75	67	$7,060	$8,379	1	1	0.0	0.0	1.0	1.0	1.0	1
4235	Sanitary Sewer	SAMH_3086 - SAMH_3085	N/A	8.00	PVC	19.53	19	635986.904	26916832.512	606.823	$3,028	01/01/2011	7	75	67	$2,709	$3,223	1	1	0.0	0.0	1.0	1.0	1.0	1
4236	Sanitary Sewer	SAMH_3084 - SAMH_3085	N/A	8.00	PVC	331.27	331	635986.904	26916832.512	606.823	$47,040	01/01/2015	3	75	71	$44,608	$50,353	1	1	0.0	0.0	1.0	2.0	1.0	2
4237	Sanitary Sewer	SAMH_3087 - SAMH_3086	N/A	8.00	PVC	384.27	384	635969.663	26916841.695	606.652	$54,567	01/01/2011	7	75	67	$48,834	$58,409	1	1	0.0	0.0	1.0	1.0	1.0	1
4238	Sanitary Sewer	SAMH_3073 - SAMH_3073A	N/A	10.00	PVC	337.41	337	636475.634	26916724.164	605.798	$52,299	01/01/2011	7	75	67	$46,804	$55,673	1	1	0.0	0.0	1.0	2.0	1.0	2
4239	Sanitary Sewer	SAMH_3082 - SAMH_3073	N/A	12.00	PVC	73.14	73	636610.824	26916415.021	606.340	$10,605	01/01/2015	3	75	71	$10,056	$11,337	1	1	0.0	0.0	1.0	2.0	1.0	2
4240	Sanitary Sewer	SAMH_3072 - SAMH_3073	N/A	8.00	PVC	245.26	245	636610.824	26916415.021	606.340	$38,016	01/01/2011	7	75	67	$34,022	$40,468	1	1	0.0	0.0	1.0	2.0	1.0	2
4241	Sanitary Sewer	SAMH_3324 - SAMH_3323	N/A	8.00	PVC	377.57	377	637002.153	26915471.016	606.244	$53,615	01/01/2011	7	75	67	$47,982	$57,391	1	1	0.0	0.0	1.0	2.0	1.0	2
4242	Sanitary Sewer	SAMH_3074A - SAMH_3074B	N/A	8.00	PVC	291.16	291	636224.970	26917290.705	604.219	$41,345	01/01/2010	8	75	66	$36,450	$44,256	1	1	0.0	0.0	1.0	2.0	1.0	2
4243	Sanitary Sewer	SAMH_3074 - SAMH_3074A	N/A	8.00	PVC	172.31	172	636104.240	26917555.653	603.719	$24,468	01/01/2010	8	75	66	$21,571	$26,192	1	1	0.0	0.0	1.0	2.0	1.0	2
4244	Sanitary Sewer	SAMH_1703 - SAMH_1703A	N/A	9.00	VCP	165.09	165	631380.840	26911463.260	722.786	$10,565	01/01/1939	79	75	0	$0	$23,772	1	1	0.0	0.0	1.0	2.0	1.0	2
4245	Sanitary Sewer	SAMH_1703A - SAMH_1704	N/A	9.00	VCP	212.03	212	631385.338	26911675.239	722.718	$15,266	01/01/1939	79	75	0	$0	$32,228	1	1	0.0	0.0	1.0	2.0	1.0	2
4246	Sanitary Sewer	SAMH_1881 - SAMH_1880	N/A	9.00	VCP	290.72	290	631716.636	26911795.932	721.885	$23,839	01/01/1950	68	75	6	$1,932	$44,189	1	1	0.0	0.0	1.0	1.0	1.0	1
4247	Sanitary Sewer	SAMH_1880 - SAMH_1879	N/A	9.00	VCP	341.87	341	632058.211	26911781.803	721.175	$28,033	01/01/1950	68	75	6	$2,272	$51,964	1	1	0.0	0.0	1.0	1.0	1.0	1
4248	Sanitary Sewer	SAMH_1879 - SAMH_1878	N/A	8.00	VCP	319.80	319	632377.735	26911768.519	720.449	$23,665	01/01/1950	68	75	6	$1,918	$46,051	1	1	0.0	0.0	1.0	2.0	1.0	2
4249	Sanitary Sewer	SAMH_1878 - SAMH_1865	N/A	9.00	VCP	319.62	326	632697.179	26911758.055	719.968	$26,208	01/01/1950	68	75	6	$2,124	$48,582	1	1	0.0	0.0	1.0	2.0	1.0	2
4250	Sanitary Sewer	SAMH_1838 - SAMH_1839	N/A	12.00	CP	269.07	269	632687.989	26911234.943	721.075	$28,253	01/01/1970	48	75	26	$9,829	$41,706	1	1	0.0	0.0	1.0	2.0	1.0	2
4251	Sanitary Sewer	SAMH_1839 - SAMH_1865	N/A	12.00	CP	521.11	521	632703.808	26911755.813	719.968	$54,717	01/01/1970	48	75	26	$19,036	$80,772	1	1	0.0	0.0	1.0	2.0	1.0	2
4252	Sanitary Sewer	SAMH_1863 - SAMH_1864	N/A	8.00	VCP	661.20	661	632885.413	26912411.571	713.229	$47,606	01/01/1939	79	75	0	$0	$100,502	1	1	0.0	0.0	1.0	1.0	1.0	1
4253	Sanitary Sewer	SAMH_1865 - SAMH_1866	N/A	12.00	CP	336.13	336	632711.614	26912091.850	718.388	$35,293	01/01/1970	48	75	26	$12,278	$52,100	1	1	0.0	0.0	1.0	2.0	1.0	2
4254	Sanitary Sewer	SAMH_2872 - SAMH_2872A	N/A	12.00	RCP	56.64	79	632737.479	26913165.848	670.272	$7,647	01/01/2011	7	75	67	$6,843	$8,213	1	1	0.0	0.0	1.0	1.0	1.0	1
4255	Sanitary Sewer	SAMH_1855 - SAMH_1856	N/A	8.00	VCP	603.86	603	633213.335	26912411.659	709.507	$43,478	01/01/1939	79	75	0	$0	$91,786	1	1	0.0	0.0	1.0	1.0	1.0	1
4256	Sanitary Sewer	SAMH_1857 - SAMH_1858	N/A	10.00	RPM	168.09	168	633121.618	26912565.760	700.914	$22,188	01/01/2004	14	75	60	$17,784	$25,550	1	1	0.0	0.0	1.0	3.0	1.0	3

CITY OF SAULT STE. MARIE, MICHIGAN

Summary

id	Equipment Description	Asset ID	Construction Drawings Sheet Reference	Capacity or Size	Material	Length	Comment	Northing State Plane Ordinate	Easting State Plane Ordinate	Elevation	Original Cost	Year Installed (01/01/YYYY)	Age	Expected useful life (years)	Remaining Useful Life (years)	Depreciated Value	Replacement Cost	Average number of units in service	Total Number of units	Redundancy (Number)	Redundancy (percent)	Redundancy Score (R) (Reduces (C))	Criticality (C) (see back-up sheets)	Probability of Failure (P) (see back-up sheets)	Business Risk (BRE=PxCxR)
4257	Sanitary Sewer	SAMH_1869 - SAMH_1858	N/A	8.00	PVC	308.19	308	633121.618	26912565.760	700.914	$37,599	01/01/1998	20	75	54	$27,127	$46,845	1	1	0.0	0.0	1.0	1.0	1.0	1
4258	Sanitary Sewer	SAMH_1858 - SAMH_1859	N/A	10.00	RPM	165.62	165	633199.879	26912711.728	689.661	$24,016	01/01/2004	14	75	60	$19,249	$27,328	1	1	0.0	0.0	1.0	3.0	1.0	3
4259	Sanitary Sewer	SAMH_1859 - SAMH_1860	N/A	10.00	RPM	205.48	205	633294.354	26912894.203	664.779	$29,795	01/01/2004	14	75	60	$23,881	$33,905	1	1	0.0	0.0	1.0	3.0	1.0	3
4260	Sanitary Sewer	SAMH_1854 - SAMH_1860	N/A	12.00	PVC	166.02	166	633294.354	26912894.203	664.779	$22,413	01/01/2004	14	75	60	$17,964	$25,733	1	1	0.0	0.0	1.0	2.0	1.0	2
4261	Sanitary Sewer	SAMH_1862 - SAMH_1861	N/A	8.00	RPM	392.46	392	633247.095	26912863.389	674.782	$48,665	01/01/2004	14	75	60	$39,006	$56,514	1	1	0.0	0.0	1.0	1.0	1.0	1
4262	Sanitary Sewer	SAMH_1861 - SAMH_1860	N/A	9.00	VCP	56.42	56	633294.354	26912894.203	664.779	$4,062	01/01/1939	79	75	0	$0	$8,575	1	1	0.0	0.0	1.0	3.0	2.0	6
4263	Sanitary Sewer	SAMH_1860 - SAMH_2807	N/A	15.00	RPM	226.49	226	633421.194	26913081.848	647.585	$31,482	01/01/2004	14	75	60	$25,233	$36,012	1	1	0.0	0.0	1.0	3.0	1.0	3
4264	Sanitary Sewer	SAMH_2808 - SAMH_2807	N/A	15.00	VCP	46.58	46	633421.194	26913081.848	647.585	$3,680	01/01/1950	68	75	6	$298	$6,941	1	1	0.0	0.0	1.0	3.0	1.0	3
4265	Sanitary Sewer	SAMH_1847 - SAMH_1853	N/A	8.00	RCP	269.74	269	633467.185	26912693.596	682.171	$19,421	01/01/1939	79	75	0	$0	$41,000	1	1	0.0	0.0	1.0	2.0	3.0	6
4266	Sanitary Sewer	SAMH_1853 - SAMH_1854	N/A	12.00	PVC	98.77	98	633402.469	26912768.211	675.917	$13,334	01/01/2004	14	75	60	$10,687	$15,309	1	1	0.0	0.0	1.0	2.0	1.0	2
4267	Sanitary Sewer	SAMH_1848 - SAMH_1853	N/A	12.00	PVC	384.94	384	633467.185	26912693.596	682.171	$51,967	01/01/2004	14	75	60	$41,653	$59,666	1	1	0.0	0.0	1.0	2.0	1.0	2
4268	Sanitary Sewer	SAMH_1850 - SAMH_1848	N/A	8.00	VCP	177.48	177	633718.115	26912401.682	704.754	$12,778	01/01/1939	79	75	0	$0	$26,976	1	1	0.0	0.0	1.0	1.0	4.0	4
4269	Sanitary Sewer	SAMH_1849 - SAMH_1850	N/A	8.00	VCP	619.77	619	633540.674	26912405.169	706.764	$44,623	01/01/1939	79	75	0	$0	$94,204	1	1	0.0	0.0	1.0	1.0	1.0	1
4270	Sanitary Sewer	SAMH_1870 - SAMH_1871	N/A	8.00	PVC	186.27	186	632738.687	26912760.528	700.872	$24,588	01/01/2001	17	75	57	$18,724	$28,313	1	1	0.0	0.0	1.0	1.0	1.0	1
4271	Sanitary Sewer	SAMH_1874 - SAMH_1873	N/A	9.00	VCP	232.08	232	632418.160	26912759.641	706.748	$16,710	01/01/1939	79	75	0	$0	$35,276	1	1	0.0	0.0	1.0	1.0	5.0	5
4272	Sanitary Sewer	SAMH_1873 - SAMH_2867C	N/A	9.00	VCP	355.09	355	632421.084	26913114.715	0.000	$25,566	01/01/1939	79	75	0	$0	$53,973	1	1	0.0	0.0	1.0	1.0	3.0	3
4273	Sanitary Sewer	SAMH_1877A - SAMH_1876	N/A	8.00	PVC	321.74	321	632091.380	26912762.700	708.811	$42,469	01/01/2001	17	75	57	$32,341	$48,904	1	1	0.0	0.0	1.0	1.0	1.0	1
4274	Sanitary Sewer	SAMH_1876 - SAMH_1875	N/A	8.00	PVC	311.10	311	632099.839	26913073.689	696.036	$41,066	01/01/2001	17	75	57	$31,273	$47,288	1	1	0.0	0.0	1.0	1.0	1.0	1
4275	Sanitary Sewer	SAMH_1707 - SAMH_1708	N/A	8.00	CP	57.93	57	631402.479	26912474.213	713.143	$4,287	01/01/1950	68	75	6	$347	$8,343	1	1	0.0	0.0	1.0	2.0	1.0	2
4276	Sanitary Sewer	SAMH_1708 - SAMH_1709	N/A	10.00	PVC	295.32	295	631415.397	26912769.250	706.367	$36,620	01/01/2000	18	75	56	$27,397	$42,526	1	1	0.0	0.0	1.0	2.0	1.0	2
4277	Sanitary Sewer	SAMH_1709 - SAMH_1710	N/A	10.00	PVC	319.63	319	631422.289	26913088.810	699.321	$42,192	01/01/2000	18	75	56	$31,566	$48,584	1	1	0.0	0.0	1.0	2.0	1.0	2
4278	Sanitary Sewer	SAMH_1842 - SAMH_1848	N/A	8.00	VCP	146.93	146	633718.115	26912401.682	704.754	$10,579	01/01/1939	79	75	0	$0	$22,333	1	1	0.0	0.0	1.0	1.0	1.0	1
4279	Sanitary Sewer	SAMH_1840 - SAMH_1841	N/A	9.00	VCP	393.03	622	633860.518	26912170.338	714.790	$28,298	01/01/1939	79	75	0	$0	$59,741	1	1	0.0	0.0	1.0	1.0	1.0	1
4280	Sanitary Sewer	SAMH_1835 - SAMH_1834	N/A	8.00	PVC	275.64	275	633346.430	26910779.177	707.364	$36,385	01/01/2004	14	75	60	$29,163	$41,897	1	1	0.0	0.0	1.0	1.0	1.0	1
4281	Sanitary Sewer	SAMH_1834 - SAMH_1815	N/A	8.00	PVC	305.60	305	633336.798	26910473.733	704.394	$40,339	01/01/2004	14	75	60	$32,333	$46,451	1	1	0.0	0.0	1.0	1.0	1.0	1
4282	Sanitary Sewer	SAMH_1815 - SAMH_1814	N/A	8.00	PVC	247.35	247	633584.055	26910467.078	701.126	$32,650	01/01/2004	14	75	60	$26,170	$37,597	1	1	0.0	0.0	1.0	1.0	1.0	1
4283	Sanitary Sewer	SAMH_1814 - SAMH_1813	N/A	8.00	PVC	47.90	47	633631.958	26910467.078	700.673	$5,940	01/01/2004	14	75	60	$4,761	$6,898	1	1	0.0	0.0	1.0	1.0	1.0	1
4284	Sanitary Sewer	SAMH_1845 - SAMH_1847	N/A	9.00	VCP	182.42	182	633712.284	26912806.218	691.933	$13,134	01/01/1939	79	75	0	$0	$27,728	1	1	0.0	0.0	1.0	1.0	5.0	5
4285	Sanitary Sewer	SACO_1845 - SAMH_1845	N/A	8.00	PVC	311.70	311	633877.442	26912883.682	689.349	$41,144	01/01/2004	14	75	60	$32,978	$47,378	1	1	0.0	0.0	1.0	1.0	1.0	1
4286	Sanitary Sewer	SAMH_1846 - SAMH_1847	N/A	10.00	PVC	341.79	341	633712.284	26912806.218	691.933	$45,117	01/01/2004	14	75	60	$36,162	$51,953	1	1	0.0	0.0	1.0	1.0	1.0	1
4287	Sanitary Sewer	SAMH_1883 - SAMH_1868	N/A	10.00	PVC	321.18	321	632721.155	26912399.077	714.921	$42,396	01/01/2001	17	75	57	$32,286	$48,819	1	1	0.0	0.0	1.0	2.0	1.0	2
4288	Sanitary Sewer	SAMH_1868 - SAMH_1867	N/A	12.00	PVC	12.20	12	632729.628	26912407.860	714.730	$1,648	01/01/2004	14	75	60	$1,320	$1,892	1	1	0.0	0.0	1.0	2.0	1.0	2
4289	Sanitary Sewer	SAMH_1867 - SAMH_1864	N/A	9.00	PVC	155.83	155	632885.413	26912411.571	713.229	$20,570	01/01/2004	14	75	60	$16,487	$23,686	1	1	0.0	0.0	1.0	2.0	1.0	2
4290	Sanitary Sewer	SAMH_1864 - SAMH_1857	N/A	10.00	RPM	163.71	163	633049.104	26912414.117	710.240	$21,610	01/01/2004	14	75	60	$17,321	$24,884	1	1	0.0	0.0	1.0	2.0	1.0	2
4291	Sanitary Sewer	SAMH_1856 - SAMH_1857	N/A	10.00	RPM	164.25	164	633049.104	26912414.117	710.240	$21,681	01/01/2004	14	75	60	$17,378	$24,966	1	1	0.0	0.0	1.0	2.0	1.0	2
4292	Sanitary Sewer	SAMH_1856 - SAMH_1851	N/A	10.00	RCP	162.37	162	633375.637	26912406.930	708.325	$20,134	01/01/2002	16	75	58	$15,601	$23,382	1	1	0.0	0.0	1.0	1.0	1.0	1
4293	Sanitary Sewer	SAMH_1851 - SAMH_1850	N/A	8.00	VCP	165.05	165	633540.674	26912405.169	706.764	$10,563	01/01/1939	79	75	0	$0	$23,767	1	1	0.0	0.0	1.0	1.0	1.0	1
4294	Sanitary Sewer	SAMH_1872 - SAMH_1873	N/A	9.00	VCP	219.35	219	632418.160	26912759.641	706.748	$15,793	01/01/1939	79	75	0	$0	$33,341	1	1	0.0	0.0	1.0	1.0	3.0	3
4295	Sanitary Sewer	SAMH_1871 - SAMH_1872	N/A	8.00	PVC	101.26	101	632637.472	26912763.481	704.411	$13,366	01/01/2001	17	75	57	$10,178	$15,391	1	1	0.0	0.0	1.0	1.0	1.0	1
4296	Sanitary Sewer	SAMH_1829 - SAMH_1814	N/A	8.00	PVC	325.27	325	633584.055	26910467.078	701.126	$42,935	01/01/2004	14	75	60	$34,413	$49,441	1	1	0.0	0.0	1.0	1.0	1.0	1
4297	Sanitary Sewer	SAMH_1831 - SAMH_1830	N/A	8.00	PVC	17.06	17	633588.978	26911085.064	713.751	$2,252	01/01/2004	14	75	60	$1,805	$2,593	1	1	0.0	0.0	1.0	1.0	1.0	1
4298	Sanitary Sewer	SAMH_1833 - SAMH_1832	N/A	8.00	VCP	269.28	269	633514.490	26911086.709	714.446	$22,081	01/01/1950	68	75	6	$1,789	$40,931	1	1	0.0	0.0	1.0	1.0	5.0	5
4299	Sanitary Sewer	SAMH_1723 - SAMH_2677	N/A	12.00	PVC	172.93	172	631110.266	26913137.814	699.983	$25,074	01/01/2011	7	75	67	$22,439	$26,804	1	1	0.0	0.0	1.0	3.0	1.0	3
4300	Sanitary Sewer	SAMH_1720 - SAMH_2677	N/A	12.00	VCP	54.11	54	631110.266	26913137.814	699.983	$5,140	01/01/1965	53	75	21	$1,445	$8,387	1	1	0.0	0.0	1.0	2.0	1.0	2
4301	Sanitary Sewer	SAMH_1710 - SAMH_2678	N/A	10.00	PVC	46.69	46	631424.702	26913135.433	698.844	$6,629	01/01/2011	7	75	67	$5,932	$7,096	1	1	0.0	0.0	1.0	2.0	1.0	2
4302	Sanitary Sewer	SAMH_2677 - SAMH_2678	N/A	12.00	RCP	314.45	314	631424.702	26913135.433	698.844	$45,595	01/01/2011	7	75	67	$40,804	$48,739	1	1	0.0	0.0	1.0	3.0	1.0	3
4303	Sanitary Sewer	SAMH_2678 - SAMH_2678A	N/A	12.00	RCP	343.50	343	631768.169	26913130.401	697.101	$49,808	01/01/2011	7	75	67	$44,575	$53,243	1	1	0.0	0.0	1.0	3.0	1.0	3
4304	Sanitary Sewer	SAMH_2678A - SAMH_2678B	N/A	12.00	RCP	331.04	331	632099.030	26913119.662	694.479	$48,000	01/01/2011	7	75	67	$42,957	$51,311	1	1	0.0	0.0	1.0	3.0	1.0	3
4305	Sanitary Sewer	SAMH_1875 - SAMH_2678B	N/A	8.00	VCP	45.98	45	632099.030	26913119.662	694.479	$3,403	01/01/1950	68	75	6	$275	$6,621	1	1	0.0	0.0	1.0	1.0	1.0	1
4306	Sanitary Sewer	SAMH_2678B - SAMH_2678C	N/A	12.00	RCP	322.09	322	632421.084	26913114.715	687.116	$46,703	01/01/2011	7	75	67	$41,796	$49,924	1	1	0.0	0.0	1.0	3.0	1.0	3
4307	Sanitary Sewer	SAMH_2678C - SAMH_2872	N/A	12.00	RCP	315.11	315	632736.145	26913109.219	674.397	$48,842	01/01/2011	7	75	67	$43,710	$51,993	1	1	0.0	0.0	1.0	3.0	1.0	3
4308	Sanitary Sewer	SAMH_2872 - SAMH_2811	N/A	12.00	VCP	109.23	109	632844.713	26913097.265	669.837	$8,192	01/01/1950	68	75	6	$664	$15,838	1	1	0.0	0.0	1.0	3.0	1.0	3
4309	Sanitary Sewer	SAMH_2811 - SAMH_2810	N/A	12.00	VCP	280.45	280	633125.140	26913093.305	658.802	$21,034	01/01/1950	68	75	6	$1,705	$40,666	1	1	0.0	0.0	1.0	3.0	1.0	3
4310	Sanitary Sewer	SAMH_2810 - SAMH_2809	N/A	12.00	VCP	21.63	21	633146.735	26913092.094	657.817	$1,622	01/01/1950	68	75	6	$131	$3,136	1	1	0.0	0.0	1.0	3.0	1.0	3
4311	Sanitary Sewer	SAMH_2809 - SAMH_2808	N/A	12.00	VCP	228.13	228	633374.774	26913085.726	648.835	$17,110	01/01/1950	68	75	6	$1,386	$33,079	1	1	0.0	0.0	1.0	3.0	1.0	3
4312	Sanitary Sewer	SAMH_2807 - SAMH_2806	N/A	24.00	VCP	222.77	222	633622.128	26913178.041	639.631	$21,386	01/01/1939	79	75	0	$0	$39,208	1	1	0.0	0.0	1.0	4.0	5.0	20
4313	Sanitary Sewer	SAMH_2806 - SAMH_2805	N/A	24.00	VCP	202.07	202	633803.547	26913267.027	633.429	$19,399	01/01/1939	79	75	0	$0	$35,564	1	1	0.0	0.0	1.0	4.0	5.0	20
4314	Sanitary Sewer	SAMH_2805 - SAMH_2804	N/A	24.00	VCP	245.06	245	634023.933	26913374.183	628.130	$23,525	01/01/1939	79	75	0	$0	$43,130	1	1	0.0	0.0	1.0	4.0	4.0	16
4315	Sanitary Sewer	SAMH_2804 - SAMH_2803	N/A	24.00	VCP	35.12	35	634055.651	26913389.261	627.586	$3,371	01/01/1939	79	75	0	$0	$6,181	1	1	0.0	0.0	1.0	4.0	4.0	16
4316	Sanitary Sewer	SAMH_2801 - SAMH_2805	N/A	8.00	RPM	204.23	204	633803.547	26913267.027	633.429	$26,958	01/01/2004	14	75	60	$21,607	$31,042	1	1	0.0	0.0	1.0	1.0	1.0	1
4317	Sanitary Sewer	SAMH_1737 - SAMH_1730	N/A	12.00	VCP	317.47	317	630770.628	26913130.885	701.753	$26,985	01/01/1950	68	75	6	$2,187	$49,208	1	1	0.0	0.0	1.0	3.0	1.0	3
4318	Sanitary Sewer	SAMH_1730 - SAMH_1723	N/A	12.00	PVC	166.78	166	630937.367	26913134.708	700.886	$24,184	01/01/2011	7	75	67	$21,643	$25,852	1	1	0.0	0.0	1.0	3.0	1.0	3
4319	Sanitary Sewer	SAMH_1145 - SAMH_1190A	N/A	12.00	VCP	368.07	370	631857.532	26905615.885	637.903	$42,329	01/01/1980	38	75	36	$20,373	$57,052	1	1	0.0	0.0	1.0	3.0	1.0	3
4320	Sanitary Sewer	SAMH_1143 - SAMH_1144	N/A	10.00	CP	312.17	312	631850.629	26905232.216	639.121	$19,979	01/01/1939	79	75	0	$0	$44,952	1	1	0.0	0.0	1.0	3.0	1.0	3
4321	Sanitary Sewer	SAMH_1140 - SAMH_1144	N/A	12.00	CP	328.55	328	631850.629	26905232.216	639.121	$24,641	01/01/1939	79	75	0	$0	$50,925	1	1	0.0	0.0	1.0	1.0	1.0	1
4322	Sanitary Sewer	SAMH_1139 - SAMH_1140	N/A	12.00	VCP	315.15	315	632179.083	26905224.373	643.282	$23,636	01/01/1939	79	75	0	$0	$48,847	1	1	0.0	0.0	1.0	2.0	5.0	10
4323	Sanitary Sewer	SAMH_2884 - SAMH_2885	N/A	24.00	RCP	326.03	326	632822.644	26915677.381	628.305	$51,838	01/01/2001	17	75	57	$39,476	$58,359	1	1	0.0	0.0	1.0	5.0	1.0	5
4324	Sanitary Sewer	SAMH_2870 - SAMH_2869	N/A	8.00	PVC	221.10	221	633450.884	26915665.888	619.354	$29,186	01/01/2001	17	75	57	$22,226	$33,608	1	1	0.0	0.0	1.0	1.0	1.0	1
4325	Sanitary Sewer	SAMH_2871 - SAMH_2870	N/A	8.00	PVC	372.83	372	633229.788	26915667.467	624.808	$49,214	01/01/2001	17	75	57	$37,478	$56,671	1	1	0.0	0.0	1.0	1.0	1.0	1
4326	Sanitary Sewer	SAMH_2920 - SAMH_2919	N/A	8.00	PVC	280.28	280	631821.538	26915691.411	630.658	$36,997	01/01/2001	17	75	57	$28,174	$42,603	1	1	0.0	0.0	1.0	1.0	1.0	1
4327	Sanitary Sewer	SAMH_2653 - SAMH_2921	N/A	12.00	VCP	307.32	307	631807.287	26915684.713	630.519	$19,976	01/01/1939	79	75	0	$0	$44,561	1	1	0.0	0.0	1.0	2.0	5.0	10
4328	Sanitary Sewer	SAMH_2921 - SAMH_2919	N/A	10.00	PVC	15.75	15	631821.538	26915691.411	630.658	$2,078	01/01/2001	17	75	57	$1,582	$2,393	1	1	0.0	0.0	1.0	2.0	1.0	2
4329	Sanitary Sewer	SAMH_2919 - SAMH_2918	N/A	10.00	PVC	327.25	327	632148.753	26915686.604	629.896	$43,197	01/01/2001	17	75	57	$32,895	$49,742	1	1	0.0	0.0	1.0	2.0	1.0	2
4330	Sanitary Sewer	SAMH_2918 - SAMH_2917	N/A	10.00	PVC	317.55	317	632466.209	26915678.823	629.632	$41,917	01/01/2001	17	75	57	$31,921	$48,268	1	1	0.0	0.0	1.0	2.0	1.0	2
4331	Sanitary Sewer	SAMH_2863 - SAMH_2862	N/A	8.00	PVC	215.75	215	633439.705	26915334.854	624.166	$28,479	01/01/2001	17	75	57	$21,687	$32,794	1	1	0.0	0.0	1.0	1.0	1.0	1
4332	Sanitary Sewer	SAMH_2862 - SAMH_2861	N/A	8.00	PVC	106.58	106	633546.278	26915334.169	621.112	$14,068	01/01/2001	17	75	57	$10,713	$16,199	1	1	0.0	0.0	1.0	1.0	1.0	1
4333	Sanitary Sewer	SAMH_2861 - SAMH_2860	N/A	8.00	PVC	123.08	123	633669.295	26915330.169	619.438	$16,247	01/01/2001	17	75	57	$12,372	$18,709	1	1	0.0	0.0	1.0	1.0	1.0	1
4334	Sanitary Sewer	SAMH_2859 - SAMH_2860	N/A	8.00	PVC	274.27	274	633944.230	26915326.124	619.438	$36,204	01/01/2001	17	75	57	$27,570	$41,689	1	1	0.0	0.0	1.0	1.0	1.0	1
4335	Sanitary Sewer	SAMH_2858 - SAMH_2859	N/A	8.00	PVC	163.11	163	634107.335	26915324.752	615.535	$21,531	01/01/2001	17	75	57	$16,396	$24,793	1	1	0.0	0.0	1.0	1.0	1.0	1
4336	Sanitary Sewer	SAMH_2864 - SAMH_2863	N/A	8.00	PVC	10.52	10	633224.034	26915340.648	627.318	$1,389	01/01/2001	17	75	57	$1,057	$1,599	1	1	0.0	0.0	1.0	1.0	1.0	1
4337	Sanitary Sewer	SAMH_2914 - SAMH_2884	N/A	12.00	PVC	332.71	332	632811.526	26915351.545	628.761	$44,916	01/01/2001	17	75	57	$34,205	$51,571	1	1	0.0	0.0	1.0	2.0	1.0	2
4338	Sanitary Sewer	SAMH_2915 - SAMH_2914	N/A	12.00	PVC	337.52	337	632478.813	26915351.986	629.774	$45,565	01/01/2001	17	75	57	$34,699	$52,316	1	1	0.0	0.0	1.0	2.0	1.0	2
4339	Sanitary Sewer	SAMH_2916 - SAMH_2915	N/A	10.00	PVC	310.78	310	632141.485	26915363.330	629.924	$41,023	01/01/2001	17	75	57	$31,240	$47,239	1	1	0.0	0.0	1.0	2.0	1.0	2
4340	Sanitary Sewer	SAMH_2647 - SAMH_2916	N/A	10.00	PVC	370.34	370	631830.758	26915369.064	630.765	$48,885	01/01/2001	17	75	57	$37,227	$56,292	1	1	0.0	0.0	1.0	2.0	1.0	2
4341	Sanitary Sewer	SAMH_2648 - SAMH_2647	N/A	10.00	PVC	285.14	285	631460.416	26915370.042	630.514	$37,638	01/01/2001	17	75	57	$28,662	$43,341	1	1	0.0	0.0	1.0	2.0	1.0	2
4342	Sanitary Sewer	SAMH_2651 - SAMH_2650	N/A	10.00	VCP	275.78	275	630821.337	26915373.406	631.680	$22,614	01/01/1950	68	75	6	$1,833	$41,918	1	1	0.0	0.0	1.0	1.0	1.0	1
4343	Sanitary Sewer	SAMH_2650 - SAMH_2649	N/A	10.00	PVC	17.69	17	630835.325	26915384.233	631.504	$2,335	01/01/2001	17	75	57	$1,778	$2,689	1	1	0.0	0.0	1.0	1.0	1.0	1
4344	Sanitary Sewer	SAMH_2649 - SAMH_2648	N/A	10.00	PVC	340.12	340	631175.329	26915375.252	631.052	$44,896	01/01/2001	17	75	57	$34,189	$51,699	1	1	0.0	0.0	1.0	1.0	1.0	1
4345	Sanitary Sewer	SAMH_2911 - SAMH_2910	N/A	12.00	PVC	331.93	331	632476.257	26915040.253	629.617	$48,129	01/01/2001	17	75	57	$36,651	$54,768	1	1	0.0	0.0	1.0	3.0	1.0	3
4346	Sanitary Sewer	SAMH_2912 - SAMH_2911	N/A	10.00	PVC	324.07	324	632144.401	26915047.053	630.034	$46,991	01/01/2001	17	75	57	$35,785	$53,472	1	1	0.0	0.0	1.0	3.0	1.0	3
4347	Sanitary Sewer	SAMH_2913 - SAMH_2912	N/A	10.00	PVC	317.57	317	631820.358	26915051.445	630.816	$41,920	01/01/2001	17	75	57	$31,923	$48,271	1	1	0.0	0.0	1.0	3.0	1.0	3
4348	Sanitary Sewer	SAMH_2642 - SAMH_2913	N/A	10.00	PVC	333.57	333	631502.801	26915054.563	630.972	$44,031	01/01/2001	17	75	57	$33,531	$50,702	1	1	0.0	0.0	1.0	3.0	1.0	3
4349	Sanitary Sewer	SAMH_2643 - SAMH_2642	N/A	10.00	PVC	348.57	348	631169.265	26915059.094	631.299	$46,011	01/01/2001	17	75	57	$35,038	$52,983	1	1	0.0	0.0	1.0	2.0	1.0	2
4350	Sanitary Sewer	SAMH_2645 - SAMH_2644	N/A	12.00	VCP	307.49	307	630815.310	26915053.898	632.583	$23,062	01/01/1939	79	75	0	$0	$47,661	1	1	0.0	0.0	1.0	2.0	1.0	2
4351	Sanitary Sewer	SAMH_2644 - SAMH_2643	N/A	10.00	PVC	13.65	13	630820.771	26915066.408	632.261	$1,802	01/01/2001	17	75	57	$1,372	$2,075	1	1	0.0	0.0	1.0	2.0	1.0	2
4352	Sanitary Sewer	SAMH_2906 - SAMH_2905	N/A	10.00	PVC	345.82	345	632461.540	26914696.791	629.551	$45,648	01/01/2001	17	75	57	$34,762	$52,564	1	1	0.0	0.0	1.0	2.0	1.0	2
4353	Sanitary Sewer	SAMH_2907 - SAMH_2906	N/A	10.00	PVC	327.83	327	632115.751	26914701.148	629.311	$43,274	01/01/2001	17	75	57	$32,954	$49,830	1	1	0.0	0.0	1.0	2.0	1.0	2
4354	Sanitary Sewer	SAMH_2908 - SAMH_2907	N/A	10.00	PVC	13.86	13	631788.005	26914708.632	630.023	$1,830	01/01/2001	17	75	57	$1,393	$2,107	1	1	0.0	0.0	1.0	2.0	1.0	2
4355	Sanitary Sewer	SAMH_2909 - SAMH_2908	N/A	10.00	PVC	303.41	303	631776.746	26914716.719	630.157	$37,623	01/01/2001	17	75	57	$28,651	$43,691	1	1	0.0	0.0	1.0	2.0	1.0	2
4356	Sanitary Sewer	SAMH_2638 - SAMH_2909	N/A	10.00	PVC	313.94	313	631473.371	26914721.224	631.269	$38,929	01/01/2001	17	75	57	$29,645	$45,208	1	1	0.0	0.0	1.0	2.0	1.0	2
4357	Sanitary Sewer	SAMH_2901 - SAMH_2900	N/A	12.00	PVC	328.86	328	632452.283	26914390.266	628.717	$44,396	01/01/2001	17	75	57	$33,809	$50,974	1	1	0.0	0.0	1.0	2.0	1.0	2
4358	Sanitary Sewer	SAMH_2902 - SAMH_2901	N/A	10.00	PVC	327.94	327	632123.503	26914397.596	629.422	$40,665	01/01/2001	17	75	57	$30,967	$47,223	1	1	0.0	0.0	1.0	2.0	1.0	2
4359	Sanitary Sewer	SAMH_2903 - SAMH_2904	N/A	8.00	PVC	197.16	197	631470.934	26914410.827	631.113	$24,448	01/01/2001	17	75	57	$18,617	$28,391	1	1	0.0	0.0	1.0	1.0	1.0	1
4360	Sanitary Sewer	SAMH_2904 - SAMH_2901	N/A	10.00	PVC	324.76	324	631795.628	26914404.130	629.422	$40,271	01/01/2001	17	75	57	$30,667	$46,766	1	1	0.0	0.0	1.0	2.0	1.0	2
4361	Sanitary Sewer	SAMH_2629 - SAMH_2904	N/A	10.00	CP	333.75	333	631470.934	26914410.827	631.113	$24,698	01/01/1950	68	75	6	$2,002	$48,061	1	1	0.0	0.0	1.0	2.0	1.0	2
4362	Sanitary Sewer	SAMH_2894 - SAMH_2893	N/A	10.00	PVC	335.08	335	632443.418	26914121.198	630.996	$44,231	01/01/2001	17	75	57	$33,683	$50,933	1	1	0.0	0.0	1.0	1.0	1.0	1
4363	Sanitary Sewer	SAMH_2895 - SAMH_2894	N/A	10.00	PVC	16.09	16	632108.522	26914132.376	632.877	$2,124	01/01/2001	17	75	57	$1,617	$2,445	1	1	0.0	0.0	1.0	1.0	1.0	1
4364	Sanitary Sewer	SAMH_2896 - SAMH_2895	N/A	10.00	PVC	330.46	330	632097.348	26914120.802	633.151	$43,621	01/01/2001	17	75	57	$33,218	$50,230	1	1	0.0	0.0	1.0	1.0	1.0	1
4365	Sanitary Sewer	SAMH_2897 - SAMH_2896	N/A	10.00	PVC	302.99	302	631766.907	26914124.559	639.302	$39,995	01/01/2001	17	75	57	$30,457	$46,055	1	1	0.0	0.0	1.0	1.0	1.0	1
4366	Sanitary Sewer	SAMH_2890 - SAMH_2889	N/A	24.00	RCP	343.37	343	632445.132	26913787.323	636.337	$53,566	01/01/2001	17	75	57	$40,792	$60,433	1	1	0.0	0.0	1.0	4.0	1.0	4
4367	Sanitary Sewer	SAMH_2891 - SAMH_2890	N/A	24.00	RCP	338.73	338	632101.808	26913793.018	641.013	$52,842	01/01/2001	17	75	57	$40,240	$59,616	1	1	0.0	0.0	1.0	4.0	1.0	4
4368	Sanitary Sewer	SAMH_2892 - SAMH_2891	N/A	24.00	RCP	313.85	313	631763.257	26913803.949	643.717	$48,960	01/01/2001	17	75	57	$37,284	$55,237	1	1	0.0	0.0	1.0	4.0	1.0	4
4369	Sanitary Sewer	SAMH_2624 - SAMH_2623	N/A	18.00	CP	228.90	228	631027.268	26913808.207	689.256	$23,805	01/01/1950	68	75	6	$1,929	$39,828	1	1	0.0	0.0	1.0	4.0	4.0	16
4370	Sanitary Sewer	SAMH_2623 - SAMH_2622A	N/A	18.00	CP	289.92	299	631317.087	26913800.596	657.773	$30,152	01/01/1950	68	75	6	$2,444	$50,446	1	1	0.0	0.0	1.0	4.0	5.0	20
4371	Sanitary Sewer	SAMH_2625 - SAMH_2624	N/A	18.00	CP	321.25	321	630798.393	26913811.314	691.389	$33,410	01/01/1950	68	75	6	$2,708	$55,897	1	1	0.0	0.0	1.0	4.0	3.0	12
4372	Sanitary Sewer	SAMH_2621 - SAMH_2621A	N/A	10.00	CP	335.87	657	630469.039	26913514.803	0.000	$27,542	01/01/1950	68	75	6	$2,232	$51,053	1	1	0.0	0.0	1.0	1.0	1.0	1
4373	Sanitary Sewer	SAMH_2620 - SAMH_2619	N/A	10.00	PVC	9.30	9	630797.248	26913517.485	696.766	$1,228	01/01/2001	17	75	57	$935	$1,414	1	1	0.0	0.0	1.0	2.0	1.0	2
4374	Sanitary Sewer	SAMH_2619 - SAMH_2618	N/A	10.00	PVC	337.27	277	631134.191	26913502.730	691.070	$44,519	01/01/2001	17	75	57	$33,902	$51,265	1	1	0.0	0.0	1.0	2.0	1.0	2
4375	Sanitary Sewer	SAMH_2615 - SAMH_2620	N/A	8.00	VCP	163.13	163	630790.208	26913511.404	697.092	$10,440	01/01/1939	79	75	0	$0	$23,491	1	1	0.0	0.0	1.0	2.0	2.0	4
4376	Sanitary Sewer	SAMH_2615 - SAMH_1730	N/A	8.00	VCP	218.14	218	630770.628	26913130.885	701.753	$15,706	01/01/1939	79	75	0	$0	$33,157	1	1	0.0	0.0	1.0	2.0	5.0	10
4377	Sanitary Sewer	SACO_2615 - SAMH_2615	N/A	8.00	VCP	200.50	200	630775.107	26913348.975	699.189	$12,832	01/01/1939	79	75	0	$0	$28,872	1	1	0.0	0.0	1.0	1.0	5.0	5
4378	Sanitary Sewer	SAMH_2887 - SAMH_2886	N/A	8.00	PVC	183.48	183	632413.683	26913450.324	645.119	$24,219	01/01/2001	17	75	57	$18,443	$27,888	1	1	0.0	0.0	1.0	1.0	1.0	1
4379	Sanitary Sewer	SAMH_2888 - SAMH_2887	N/A	8.00	PVC	136.40	136	632232.492	26913479.194	648.883	$18,005	01/01/2001	17	75	57	$13,711	$20,733	1	1	0.0	0.0	1.0	1.0	1.0	1
4380	Sanitary Sewer	SAMH_1884 - SAMH_1883	N/A	10.00	PVC	11.90	11	632400.104	26912390.001	713.268	$1,475	01/01/2001	17	75	57	$1,123	$1,713	1	1	0.0	0.0	1.0	1.0	1.0	1
4381	Sanitary Sewer	SAMH_1711 - SAMH_1718	N/A	8.00	PVC	252.66	252	631085.972	26912492.885	713.469	$33,352	01/01/2001	17	75	57	$25,398	$38,405	1	1	0.0	0.0	1.0	1.0	1.0	1
4382	Sanitary Sewer	SAMH_1722 - SAMH_1718	N/A	8.00	PVC	256.30	256	631085.972	26912492.885	713.469	$33,831	01/01/2001	17	75	57	$25,763	$38,957	1	1	0.0	0.0	1.0	1.0	1.0	1
4383	Sanitary Sewer	SAMH_1716 - SAMH_1717	N/A	9.00	VCP	259.32	259	631098.268	26912468.627	713.210	$16,596	01/01/1939	79	75	0	$0	$37,342	1	1	0.0	0.0	1.0	2.0	2.0	4
4384	Sanitary Sewer	SAMH_1717 - SAMH_1718	N/A	10.00	PVC	27.20	27	631085.972	26912492.885	713.469	$3,590	01/01/2001	17	75	57	$2,733	$4,134	1	1	0.0	0.0	1.0	2.0	1.0	2
4385	Sanitary Sewer	SAMH_1718 - SAMH_1719	N/A	10.00	PVC	301.89	301	631097.747	26912794.545	707.063	$39,850	01/01/2001	17	75	57	$30,347	$45,887	1	1	0.0	0.0	1.0	2.0	1.0	2
4386	Sanitary Sewer	SAMH_1732A - SAMH_1733	N/A	8.00	PVC	285.84	285	630445.222	26912484.156	713.462	$29,727	01/01/1980	38	75	36	$14,308	$41,161	1	1	0.0	0.0	1.0	1.0	1.0	1
4387	Sanitary Sewer	SAMH_1733 - SAMH_1734	N/A	10.00	PVC	20.03	20	630436.452	26912502.159	713.393	$2,643	01/01/2001	17	75	57	$2,012	$3,044	1	1	0.0	0.0	1.0	1.0	1.0	1
4388	Sanitary Sewer	SAMH_1734 - SAMH_1735	N/A	10.00	PVC	281.79	281	630449.288	26912783.653	707.702	$37,196	01/01/2001	17	75	57	$28,326	$42,832	1	1	0.0	0.0	1.0	2.0	1.0	2
4389	Sanitary Sewer	SAMH_1731 - SAMH_1728	N/A	8.00	PVC	212.73	212	630748.937	26912487.813	712.905	$26,378	01/01/2001	17	75	57	$20,087	$30,633	1	1	0.0	0.0	1.0	1.0	1.0	1
4390	Sanitary Sewer	SAMH_1728 - SAMH_1729	N/A	8.00	VCP	352.68	352	630762.497	26912840.229	707.650	$22,571	01/01/1939	79	75	0	$0	$50,786	1	1	0.0	0.0	1.0	2.0	5.0	10
4391	Sanitary Sewer	SAMH_1719 - SAMH_1720	N/A	10.00	PVC	289.40	289	631107.225	26913083.790	700.448	$38,201	01/01/2001	17	75	57	$29,091	$43,989	1	1	0.0	0.0	1.0	2.0	1.0	2
4392	Sanitary Sewer	SAMH_1735 - SAMH_1736	N/A	10.00	PVC	305.76	305	630457.342	26913089.310	703.092	$40,361	01/01/2001	17	75	57	$30,736	$46,476	1	1	0.0	0.0	1.0	2.0	1.0	2
4393	Sanitary Sewer	SAMH_1739 - SAMH_1737	N/A	12.00	VCP	22.74	22	630453.172	26913134.158	703.044	$1,933	01/01/1950	68	75	6	$156	$3,524	1	1	0.0	0.0	1.0	3.0	1.0	3
4394	Sanitary Sewer	SAMH_1736 - SAMH_1737	N/A	10.00	PVC	45.04	45	630453.172	26913134.158	703.044	$5,945	01/01/2001	17	75	57	$4,527	$6,846	1	1	0.0	0.0	1.0	2.0	1.0	2
4395	Sanitary Sewer	SAMH_1738 - SAMH_1734	N/A	8.00	PVC	168.03	168	630436.452	26912502.159	713.393	$22,180	01/01/2001	17	75	57	$16,890	$25,541	1	1	0.0	0.0	1.0	1.0	1.0	1
4396	Sanitary Sewer	SAMH_1729 - SAMH_1730	N/A	8.00	VCP	290.77	290	630770.628	26913130.885	701.753	$20,935	01/01/1939	79	75	0	$0	$44,197	1	1	0.0	0.0	1.0	2.0	5.0	10
4397	Sanitary Sewer	SAMH_3142 - SAMH_3121	N/A	8.00	PVC	42.94	42	635279.458	26913723.018	614.791	$5,668	01/01/2003	15	75	59	$4,467	$6,526	1	1	0.0	0.0	1.0	2.0	1.0	2
4398	Sanitary Sewer	SAMH_3120 - SAMH_3121	N/A	21.00	CP	319.16	319	635279.458	26913723.018	614.791	$37,023	01/01/1960	58	75	16	$7,940	$56,173	1	1	0.0	0.0	1.0	4.0	1.0	4
4399	Sanitary Sewer	SAMH_3118 - SAMH_3120	N/A	8.00	PVC	361.81	361	635353.023	26913412.447	615.524	$47,758	01/01/2003	15	75	59	$37,642	$54,995	1	1	0.0	0.0	1.0	3.0	1.0	3
4400	Sanitary Sewer	SAMH_2058 - SAMH_3118	N/A	8.00	PVC	322.86	322	635348.671	26913050.668	617.627	$42,618	01/01/2003	15	75	59	$33,591	$49,075	1	1	0.0	0.0	1.0	3.0	1.0	3
4401	Sanitary Sewer	SAMH_3143 - SAMH_3142	N/A	8.00	PVC	261.71	261	635269.041	26913681.363	614.959	$34,546	01/01/2003	15	75	59	$27,229	$39,780	1	1	0.0	0.0	1.0	2.0	1.0	2
4402	Sanitary Sewer	SAMH_2057 - SAMH_2058	N/A	8.00	PVC	300.17	299	635183.930	26912773.000	636.168	$39,623	01/01/2003	15	75	59	$31,230	$45,626	1	1	0.0	0.0	1.0	3.0	1.0	3
4403	Sanitary Sewer	SAMH_2063 - SAMH_2057	N/A	8.00	PVC	101.62	102	635039.186	26912510.033	664.368	$13,414	01/01/2003	15	75	59	$10,572	$15,447	1	1	0.0	0.0	1.0	2.0	1.0	2
4404	Sanitary Sewer	SAMH_2064 - SAMH_2063	N/A	8.00	PVC	168.58	177	634981.903	26912426.092	672.282	$20,904	01/01/2003	15	75	59	$16,476	$24,275	1	1	0.0	0.0	1.0	1.0	1.0	1
4405	Sanitary Sewer	SAMH_3018 - SAMH_3019	N/A	12.00	VCP	178.35	297 Behind Curb	636577.204	26915313.097	610.740	$15,160	01/01/1939	79	75	0	$0	$29,427	1	1	0.0	0.0	1.0	3.0	5.0	15
4406	Sanitary Sewer	SAMH_3024 - SAMH_3025	N/A	8.00	PVC	301.66	301	636262.080	26915550.119	611.174	$40,423	01/01/2011	7	75	67	$36,176	$43,440	1	1	0.0	0.0	1.0	2.0	1.0	2
4407	Sanitary Sewer	SAMH_3025 - SAMH_3089	N/A	8.00	PVC	349.34	349	636107.572	26915863.431	610.966	$49,606	01/01/2011	7	75	67	$44,394	$53,100	1	1	0.0	0.0	1.0	2.0	1.0	2

CITY OF SAULT STE. MARIE, MICHIGAN

Summary

id	Equipment Description	Asset ID	Construction Drawings Sheet Reference	Capacity or Size	Material	Length	Comment	Northing State Plane Ordinate	Easting State Plane Ordinate	Elevation	Original Cost	Year Installed (01/01/YYYY)	Age	Expected useful life (years)	Remaining Useful Life (years)	Depreciated Value	Replacement Cost	Average number of units in service	Total Number of units	Redundancy (Number)	Redundancy (percent)	Redundancy Score (R) (Reduces (C))	Criticality (C) (see back-up sheets)	Probability of Failure (P) (see back-up sheets)	Business Risk (BRE=PxCxR)
4408	Sanitary Sewer	SAMH_3089 - SAMH_3090	N/A	8.00	PVC	242.71	242	636000.697	26916081.348	609.597	$34,465	01/01/2011	7	75	67	$30,844	$36,893	1	1	0.0	0.0	1.0	2.0	1.0	2
4409	Sanitary Sewer	SAMH_1724 - SAMH_1724A	N/A	8.00	PVC	435.60	686	630714.251	26911214.233	721.364	$45,303	01/01/1987	31	75	43	$26,036	$62,727	1	1	0.0	0.0	1.0	1.0	1.0	1
4410	Sanitary Sewer	SAMH_1725 - SAMH_1725A	N/A	8.00	PVC	359.37	359	630732.796	26911824.111	722.382	$40,250	01/01/1987	31	75	43	$23,132	$54,624	1	1	0.0	0.0	1.0	1.0	1.0	1
4411	Sanitary Sewer	SAMH_1725A - SAMH_1726	N/A	8.00	PVC	22.32	22	630726.586	26911845.553	722.505	$2,500	01/01/1987	31	75	43	$1,436	$3,393	1	1	0.0	0.0	1.0	1.0	1.0	1
4412	Sanitary Sewer	SAMH_1726 - SAMH_1727	N/A	10.00	VCP	243.83	243	630735.304	26912089.226	719.421	$17,556	01/01/1939	79	75	0	$0	$37,062	1	1	0.0	0.0	1.0	1.0	5.0	5
4413	Sanitary Sewer	SAMH_1727 - SAMH_1728	N/A	10.00	VCP	398.82	398	630748.937	26912487.813	712.905	$25,525	01/01/1939	79	75	0	$0	$57,430	1	1	0.0	0.0	1.0	1.0	5.0	5
4414	Sanitary Sewer	SAMH_3136 - SAMH_3118	N/A	9.00	VCP	326.10	326	635348.671	26913050.668	617.627	$23,479	01/01/1939	79	75	0	$0	$49,567	1	1	0.0	0.0	1.0	2.0	5.0	10
4415	Sanitary Sewer	SAMH_1004 - SAMH_1005	N/A	8.00	PVC	141.54	141	631116.019	26904499.927	698.460	$17,551	01/01/2007	11	75	63	$14,770	$20,381	1	1	0.0	0.0	1.0	1.0	1.0	1
4416	Sanitary Sewer	SAMH_1005 - SAMH_1106	N/A	8.00	PVC	42.95	42	631139.532	26904463.987	636.723	$5,326	01/01/2007	11	75	63	$4,482	$6,185	1	1	0.0	0.0	1.0	1.0	1.0	1
4417	Sanitary Sewer	SAMH_1006 - SAMH_1007	N/A	8.00	PVC	140.24	140	631130.328	26904324.045	701.227	$18,512	01/01/2007	11	75	63	$15,579	$21,317	1	1	0.0	0.0	1.0	1.0	1.0	1
4418	Sanitary Sewer	SAMH_1107 - SAMH_1132	N/A	8.00	PVC	44.27	44	631162.568	26904293.711	702.012	$5,489	01/01/2007	11	75	63	$4,619	$6,374	1	1	0.0	0.0	1.0	1.0	1.0	1
4419	Sanitary Sewer	SAMH_1131 - SAMH_1132	N/A	8.00	PVC	27.28	27	631162.568	26904293.711	702.012	$3,601	01/01/2007	11	75	63	$3,030	$4,147	1	1	0.0	0.0	1.0	1.0	1.0	1
4420	Sanitary Sewer	SAMH_1130 - SAMH_1132	N/A	8.00	PVC	37.29	37	631162.568	26904293.711	702.012	$4,923	01/01/2007	11	75	63	$4,143	$5,669	1	1	0.0	0.0	1.0	2.0	1.0	2
4421	Sanitary Sewer	SAMH_1127 - SAMH_1130	N/A	8.00	PVC	305.27	305	631135.062	26904268.527	701.981	$40,296	01/01/2007	11	75	63	$33,911	$46,402	1	1	0.0	0.0	1.0	2.0	1.0	2
4422	Sanitary Sewer	SAMH_1132 - SAMH_1129	N/A	10.00	PVC	303.66	303	631465.970	26904281.186	695.558	$40,083	01/01/2007	11	75	63	$33,732	$46,157	1	1	0.0	0.0	1.0	2.0	1.0	2
4423	Sanitary Sewer	SAMH_2003 - SAMH_2004	N/A	18.00	CP	121.16	121	634462.219	26908593.218	634.893	$10,541	01/01/1939	79	75	0	$0	$20,234	1	1	0.0	0.0	1.0	3.0	4.0	12
4424	Sanitary Sewer	SAMH_2002 - SAMH_2002A	N/A	18.00	CP	205.72	205	634288.230	26908404.716	0.000	$19,338	01/01/1939	79	75	0	$0	$35,796	1	1	0.0	0.0	1.0	3.0	3.0	9
4425	Sanitary Sewer	SAMH_2002A - SAMH_2003	N/A	18.00	CP	135.44	97	634377.829	26908506.281	636.786	$11,783	01/01/1939	79	75	0	$0	$22,618	1	1	0.0	0.0	1.0	3.0	3.0	9
4426	Sanitary Sewer	SAMH_2010 - SAMH_2011	N/A	18.00	RCP	250.31	250	635565.899	26909817.928	617.641	$36,795	01/01/2009	9	75	65	$31,948	$41,802	1	1	0.0	0.0	1.0	4.0	1.0	4
4427	Sanitary Sewer	SAMH_2011 - SAMH_2012	N/A	18.00	RCP	210.62	210	635603.354	26910025.190	615.160	$30,961	01/01/2009	9	75	65	$26,882	$35,173	1	1	0.0	0.0	1.0	4.0	1.0	4
4428	Sanitary Sewer	SAMH_2071 - SAMH_2061	N/A	8.00	PVC	174.52	174	634835.131	26912244.681	679.404	$23,037	01/01/2003	15	75	59	$18,157	$26,527	1	1	0.0	0.0	1.0	1.0	1.0	1
4429	Sanitary Sewer	SAMH_2061 - SAMH_2063	N/A	8.00	PVC	233.35	141	634981.903	26912426.092	672.282	$30,802	01/01/2003	15	75	59	$24,278	$35,469	1	1	0.0	0.0	1.0	2.0	1.0	2
4430	Sanitary Sewer	SAMH_2073 - SAMH_2072	N/A	8.00	PVC	300.62	300	634702.959	26912115.440	689.495	$37,277	01/01/2003	15	75	59	$29,381	$43,289	1	1	0.0	0.0	1.0	1.0	1.0	1
4431	Sanitary Sewer	SAMH_2072 - SAMH_2071	N/A	8.00	PVC	16.03	16	634718.957	26912114.449	688.541	$1,988	01/01/2003	15	75	59	$1,566	$2,308	1	1	0.0	0.0	1.0	1.0	1.0	1
4432	Sanitary Sewer	SAMH_2069 - SAMH_2068	N/A	8.00	PVC	85.78	85	634203.018	26912217.881	705.261	$11,323	01/01/2003	15	75	59	$8,924	$13,039	1	1	0.0	0.0	1.0	1.0	1.0	1
4433	Sanitary Sewer	SAMH_2068 - SAMH_2067	N/A	8.00	PVC	353.39	353	634461.889	26912458.444	694.561	$43,820	01/01/2003	15	75	59	$34,538	$50,888	1	1	0.0	0.0	1.0	1.0	1.0	1
4434	Sanitary Sewer	SAMH_2067 - SAMH_2066	N/A	8.00	PVC	103.71	104	634564.161	26912475.686	692.290	$13,690	01/01/2003	15	75	59	$10,790	$15,765	1	1	0.0	0.0	1.0	1.0	1.0	1
4435	Sanitary Sewer	SAMH_2065 - SAMH_2064	N/A	8.00	PVC	129.76	129	634827.090	26912492.809	684.806	$17,128	01/01/2003	15	75	59	$13,500	$19,723	1	1	0.0	0.0	1.0	1.0	1.0	1
4436	Sanitary Sewer	SAMH_2054 - SAMH_2053	N/A	8.00	VCP	169.68	169	635473.552	26911897.101	640.776	$10,859	01/01/1939	79	75	0	$0	$24,434	1	1	0.0	0.0	1.0	1.0	5.0	5
4437	Sanitary Sewer	SAMH_2052 - SAMH_2026	N/A	8.00	VCP	300.22	300	635891.803	26911888.285	618.709	$19,214	01/01/1939	79	75	0	$0	$43,232	1	1	0.0	0.0	1.0	1.0	5.0	5
4438	Sanitary Sewer	SAMH_2053 - SAMH_2052	N/A	8.00	VCP	118.18	118	635591.602	26911891.565	630.700	$7,563	01/01/1939	79	75	0	$0	$17,018	1	1	0.0	0.0	1.0	1.0	4.0	4
4439	Sanitary Sewer	SAMH_3121 - SAMH_3122	N/A	21.00	CP	220.77	220	635228.475	26913937.818	613.513	$25,609	01/01/1960	58	75	16	$5,492	$38,855	1	1	0.0	0.0	1.0	4.0	1.0	4
4440	Sanitary Sewer	SAMH_3144 - SAMH_3143	N/A	8.00	PVC	106.47	106	635034.496	26913565.262	614.450	$15,118	01/01/2011	7	75	67	$13,529	$16,183	1	1	0.0	0.0	1.0	1.0	1.0	1
4441	Sanitary Sewer	SAMH_3145 - SAMH_3144	N/A	8.00	PVC	79.79	79	634930.665	26913541.716	615.784	$10,532	01/01/2003	15	75	59	$8,301	$12,128	1	1	0.0	0.0	1.0	1.0	1.0	1
4442	Sanitary Sewer	SAMH_3152 - SAMH_3151	N/A	8.00	PVC	222.94	222	634628.684	26913482.804	620.706	$29,428	01/01/2003	15	75	59	$23,195	$33,887	1	1	0.0	0.0	1.0	1.0	1.0	1
4443	Sanitary Sewer	SAMH_3153 - SAMH_3152	N/A	9.00	VCP	197.90	197	634486.623	26913310.988	624.910	$14,249	01/01/1939	79	75	0	$0	$30,081	1	1	0.0	0.0	1.0	1.0	3.0	3
4444	Sanitary Sewer	SAMH_3151 - SAMH_3150	N/A	8.00	PVC	165.60	165	634556.932	26913632.052	619.469	$21,859	01/01/2003	15	75	59	$17,229	$25,171	1	1	0.0	0.0	1.0	1.0	1.0	1
4445	Sanitary Sewer	SAMH_3147 - SAMH_3143	N/A	8.00	PVC	157.84	157	635034.496	26913565.262	614.450	$20,835	01/01/2003	15	75	59	$16,422	$23,992	1	1	0.0	0.0	1.0	1.0	1.0	1
4446	Sanitary Sewer	SAMH_3141 - SAMH_3143	N/A	8.00	PVC	193.15	193	635034.496	26913565.262	614.450	$25,495	01/01/2003	15	75	59	$20,095	$29,358	1	1	0.0	0.0	1.0	1.0	1.0	1
4447	Sanitary Sewer	SAMH_3149 - SAMH_3148	N/A	24.00	PVC	214.14	180	634945.955	26913821.924	614.993	$35,547	01/01/2015	3	75	71	$33,709	$37,688	1	1	0.0	0.0	1.0	4.0	1.0	4
4448	Sanitary Sewer	SAMH_2942 - SAMH_2941	N/A	30.00	RCP	288.34	288	634154.062	26917101.880	606.060	$52,477	01/01/1998	20	75	54	$37,862	$65,452	1	1	0.0	0.0	1.0	5.0	1.0	5
4449	Sanitary Sewer	SAMH_2943 - SAMH_2942	N/A	30.00	RCP	153.03	153	633893.733	26916977.917	605.038	$26,168	01/01/1998	20	75	54	$18,880	$33,055	1	1	0.0	0.0	1.0	5.0	1.0	5
4450	Sanitary Sewer	SAMH_2944 - SAMH_2943	N/A	30.00	RCP	243.02	243	633740.745	26916981.475	606.716	$41,557	01/01/1998	20	75	54	$29,983	$52,493	1	1	0.0	0.0	1.0	5.0	1.0	5
4451	Sanitary Sewer	SAMH_2945 - SAMH_2944	N/A	30.00	RCP	215.91	215	633497.724	26916982.747	609.647	$36,921	01/01/1998	20	75	54	$26,638	$46,638	1	1	0.0	0.0	1.0	5.0	1.0	5
4452	Sanitary Sewer	SAMH_2649 - SAMH_2945	N/A	30.00	RCP	411.19	411	633281.963	26916990.892	611.489	$74,837	01/01/1998	20	75	54	$53,994	$93,341	1	1	0.0	0.0	1.0	5.0	1.0	5
4453	Sanitary Sewer	SAMH_1129 - SAMH_1128	N/A	10.00	CP	328.78	328	631793.568	26904253.288	661.674	$24,330	01/01/1950	68	75	6	$1,972	$47,345	1	1	0.0	0.0	1.0	2.0	1.0	2
4454	Sanitary Sewer	SAMH_1126 - SAMH_1129	N/A	8.00	CP	331.03	81	631465.970	26904281.186	695.558	$24,497	01/01/1950	68	75	6	$1,985	$47,669	1	1	0.0	0.0	1.0	1.0	1.0	1
4455	Sanitary Sewer	SAMH_1126 - SAMH_1125	N/A	8.00	CP	326.56	326	631773.479	26903937.295	698.166	$24,166	01/01/1950	68	75	6	$1,958	$47,025	1	1	0.0	0.0	1.0	1.0	1.0	1
4456	Sanitary Sewer	SAMH_1127 - SAMH_1126	N/A	8.00	CP	335.12	335	631447.192	26903950.686	699.198	$27,480	01/01/1950	68	75	6	$2,227	$50,938	1	1	0.0	0.0	1.0	1.0	1.0	1
4457	Sanitary Sewer	SAMH_0509 - SAMH_0510	N/A	12.00	PVC	70.16	70	630032.263	26901430.604	635.784	$8,068	01/01/1978	40	75	34	$3,668	$11,576	1	1	0.0	0.0	1.0	2.0	1.0	2
4458	Sanitary Sewer	SAMH_0510 - SAMH_0511	N/A	12.00	PVC	231.83	231	630176.025	26901248.727	630.784	$26,661	01/01/1978	40	75	34	$12,121	$38,253	1	1	0.0	0.0	1.0	2.0	1.0	2
4459	Sanitary Sewer	SAMH_0511 - SAMH_0512	N/A	12.00	PVC	191.95	179	630333.526	26901358.451	623.839	$20,155	01/01/1978	40	75	34	$9,163	$29,753	1	1	0.0	0.0	1.0	2.0	1.0	2
4460	Sanitary Sewer	SAMH_0512 - SAMH_0513	N/A	12.00	PVC	311.52	323	630644.869	26901347.940	627.202	$32,710	01/01/1978	40	75	34	$14,871	$48,286	1	1	0.0	0.0	1.0	2.0	1.0	2
4461	Sanitary Sewer	SAMH_0513 - SAMH_0514	N/A	12.00	PVC	250.61	250	630895.253	26901337.366	626.815	$26,314	01/01/1978	40	75	34	$11,963	$38,844	1	1	0.0	0.0	1.0	2.0	1.0	2
4462	Sanitary Sewer	SAMH_0514 - SAMH_0515	N/A	12.00	PVC	52.18	58	630946.661	26901346.314	626.151	$5,479	01/01/1978	40	75	34	$2,491	$8,088	1	1	0.0	0.0	1.0	2.0	1.0	2
4463	Sanitary Sewer	SAMH_3148 - SAMH_3146	N/A	24.00	PVC	240.80	275	635162.371	26913927.509	614.011	$39,973	01/01/2015	3	75	71	$37,906	$42,381	1	1	0.0	0.0	1.0	4.0	1.0	4
4464	Sanitary Sewer	SAMH_3138 - SAMH_3141	N/A	10.00	PVC	152.45	152	635028.294	26913372.216	616.137	$20,123	01/01/2003	15	75	59	$15,860	$23,172	1	1	0.0	0.0	1.0	1.0	1.0	1
4465	Sanitary Sewer	SAMH_3150 - SAMH_3149	N/A	24.00	PVC	218.75	218	634753.284	26913728.474	617.166	$36,312	01/01/2015	3	75	71	$34,435	$38,500	1	1	0.0	0.0	1.0	4.0	1.0	4
4466	Sanitary Sewer	SAMH_3154 - SAMH_3153	N/A	9.00	VCP	246.87	246	634308.441	26913224.877	627.556	$20,984	01/01/1939	79	75	0	$0	$40,734	1	1	0.0	0.0	1.0	1.0	1.0	1
4467	Sanitary Sewer	SAMH_2074 - SAMH_2073	N/A	9.00	VCP	254.52	251	634402.456	26912123.812	708.675	$18,325	01/01/1939	79	75	0	$0	$38,687	1	1	0.0	0.0	1.0	1.0	1.0	1
4468	Sanitary Sewer	SAMH_0702 - SAMH_0703	N/A	15.00	PVC	275.41	275	623274.210	26905372.139	732.955	$35,528	01/01/2001	17	75	57	$27,055	$41,036	1	1	0.0	0.0	1.0	2.0	1.0	2
4469	Sanitary Sewer	SAMH_0703 - SAMH_0704	N/A	15.00	PVC	403.60	403	623283.231	26905775.640	731.736	$52,065	01/01/2001	17	75	57	$39,649	$60,137	1	1	0.0	0.0	1.0	2.0	1.0	2
4470	Sanitary Sewer	SAMH_0704 - SAMH_0705	N/A	15.00	PVC	113.00	113	623173.062	26905800.778	724.542	$14,577	01/01/2001	17	75	57	$11,100	$16,837	1	1	0.0	0.0	1.0	2.0	1.0	2
4471	Sanitary Sewer	SAMH_0705 - SAMH_0706	N/A	15.00	PVC	226.40	226	623193.351	26906026.267	721.560	$34,186	01/01/2001	17	75	57	$26,033	$38,714	1	1	0.0	0.0	1.0	2.0	1.0	2
4472	Sanitary Sewer	SAMH_0706 - SAMH_0707	N/A	15.00	PVC	264.20	264	623215.549	26906289.530	717.880	$39,894	01/01/2001	17	75	57	$30,380	$45,178	1	1	0.0	0.0	1.0	2.0	1.0	2
4473	Sanitary Sewer	SAMH_0707 - SAMH_0708	N/A	15.00	PVC	204.71	204	623199.590	26906493.613	709.400	$28,454	01/01/2001	17	75	57	$21,668	$32,548	1	1	0.0	0.0	1.0	2.0	1.0	2
4474	Sanitary Sewer	SAMH_0708 - SAMH_0709	N/A	15.00	PVC	142.19	142	623177.851	26906634.130	708.810	$19,764	01/01/2001	17	75	57	$15,050	$22,608	1	1	0.0	0.0	1.0	2.0	1.0	2
4475	Sanitary Sewer	SAMH_0709 - SAMH_0710	N/A	15.00	PVC	158.16	158	623198.913	26906790.878	706.673	$21,984	01/01/2001	17	75	57	$16,741	$25,147	1	1	0.0	0.0	1.0	2.0	1.0	2
4476	Sanitary Sewer	SAMH_0710 - SAMH_0711	N/A	15.00	PVC	122.08	122	623300.233	26906858.980	705.996	$16,969	01/01/2001	17	75	57	$12,922	$19,411	1	1	0.0	0.0	1.0	2.0	1.0	2
4477	Sanitary Sewer	SAMH_0711 - SAMH_0712	N/A	15.00	PVC	179.32	179	623312.309	26907037.896	702.452	$24,926	01/01/2001	17	75	57	$18,982	$28,512	1	1	0.0	0.0	1.0	2.0	1.0	2
4478	Sanitary Sewer	SAMH_0712 - SAMH_0713	N/A	15.00	PVC	34.26	34	623296.487	26907068.286	702.423	$4,762	01/01/2001	17	75	57	$3,626	$5,448	1	1	0.0	0.0	1.0	2.0	1.0	2
4479	Sanitary Sewer	SAMH_0713 - SAMH_0714	N/A	15.00	PVC	49.94	49	623299.764	26907118.117	703.911	$6,941	01/01/2001	17	75	57	$5,285	$7,940	1	1	0.0	0.0	1.0	2.0	1.0	2
4480	Sanitary Sewer	SAMH_0714 - SAMH_0715	N/A	15.00	PVC	383.85	20	623309.876	26907501.829	701.806	$49,516	01/01/1998	20	75	54	$35,725	$61,032	1	1	0.0	0.0	1.0	2.0	1.0	2
4481	Sanitary Sewer	SAMH_3348 - SAMH_3336	N/A	15.00	VCP	209.89	209	637009.541	26914013.936	612.386	$19,100	01/01/1939	79	75	0	$0	$35,892	1	1	0.0	0.0	1.0	3.0	5.0	15
4482	Sanitary Sewer	SAMH_3347 - SAMH_3348	N/A	10.00	VCP	56.80	56	636824.384	26913915.083	612.363	$4,089	01/01/1939	79	75	0	$0	$8,633	1	1	0.0	0.0	1.0	1.0	3.0	3
4483	Sanitary Sewer	SAMH_3036 - SAMH_3035	N/A	8.00	VCP	276.71	276	636122.826	26913672.487	611.496	$19,923	01/01/1939	79	75	0	$0	$42,060	1	1	0.0	0.0	1.0	1.0	4.0	4
4484	Sanitary Sewer	SAMH_3022 - SAMH_3323	N/A	12.00	PVC	345.55	333	637002.153	26915471.016	606.244	$46,649	01/01/2011	7	75	67	$41,748	$50,105	1	1	0.0	0.0	1.0	3.0	1.0	3
4485	Sanitary Sewer	SAMH_2222 - SAMH_2220	N/A	12.00	VCP	337.28	337	637791.987	26912563.070	605.777	$25,296	01/01/1939	79	75	0	$0	$52,278	1	1	0.0	0.0	1.0	2.0	1.0	2
4486	Sanitary Sewer	SAMH_3007 - SAMH_3006	N/A	12.00	RCP	164.37	164	636587.836	26913909.663	612.594	$22,190	01/01/2004	14	75	60	$17,786	$25,477	1	1	0.0	0.0	1.0	3.0	1.0	3
4487	Sanitary Sewer	SAMH_3037 - SAMH_3038	N/A	12.00	RCP	239.18	239	636522.237	26914060.374	611.988	$32,290	01/01/2004	14	75	60	$25,881	$37,074	1	1	0.0	0.0	1.0	3.0	1.0	3
4488	Sanitary Sewer	SAMH_3007 - SAMH_3008	N/A	12.00	PVC	67.48	65	636495.213	26914122.202	611.876	$5,061	01/01/1939	79	75	0	$0	$10,459	1	1	0.0	0.0	1.0	3.0	3.0	9
4489	Sanitary Sewer	SAMH_3008 - SAMH_3009	N/A	12.00	VCP	205.26	207	636408.983	26914308.470	612.867	$15,394	01/01/1939	79	75	0	$0	$31,815	1	1	0.0	0.0	1.0	3.0	5.0	15
4490	Sanitary Sewer	SAMH_3009 - SAMH_3010	N/A	12.00	VCP	231.66	231	636313.933	26914519.731	613.210	$17,374	01/01/1939	79	75	0	$0	$35,907	1	1	0.0	0.0	1.0	3.0	5.0	15
4491	Sanitary Sewer	SAMH_3010 - SAMH_3011	N/A	24.00	VCP	296.61	296	636580.339	26914650.126	613.249	$29,364	01/01/1939	79	75	0	$0	$53,092	1	1	0.0	0.0	1.0	4.0	5.0	20
4492	Sanitary Sewer	SAMH_3044 - SAMH_3010	N/A	20.00	VCP	247.13	247	636313.933	26914519.731	613.210	$23,724	01/01/1939	79	75	0	$0	$43,494	1	1	0.0	0.0	1.0	2.0	5.0	10
4493	Sanitary Sewer	SAMH_3322 - SAMH_3323	N/A	8.00	PVC	385.91	385	637002.153	26915471.016	606.244	$54,799	01/01/2011	7	75	67	$49,041	$58,659	1	1	0.0	0.0	1.0	2.0	1.0	2
4494	Sanitary Sewer	SAMH_1136 - SAMH_1137	N/A	12.00	VCP	380.36	380	632140.532	26904581.357	644.397	$28,527	01/01/1939	79	75	0	$0	$58,956	1	1	0.0	0.0	1.0	1.0	4.0	4
4495	Sanitary Sewer	SAMH_1133 - SAMH_1134	N/A	12.00	VCP	439.13	439	632303.762	26904574.760	645.122	$32,935	01/01/1939	79	75	0	$0	$68,066	1	1	0.0	0.0	1.0	1.0	2.0	2
4496	Sanitary Sewer	SAMH_1104 - SAMH_1114	N/A	8.00	CP	140.47	138	632504.729	26904910.073	644.266	$11,518	01/01/1950	68	75	6	$933	$21,351	1	1	0.0	0.0	1.0	1.0	1.0	1
4497	Sanitary Sewer	SAMH_3923 - SAMH_3924	N/A	18.00	ZZZ	499.95	499	634337.327	26921478.282	596.813	$42,137	01/01/1939	79	75	0	$0	$80,884	1	1	0.0	0.0	1.0	2.0	1.0	2
4498	Sanitary Sewer	SAMH_3923 - SAMH_3923A	N/A	15.00	VCP	489.72	489	634541.012	26921021.710	597.699	$43,495	01/01/1939	79	75	0	$0	$83,491	1	1	0.0	0.0	1.0	1.0	5.0	5
4499	Sanitary Sewer	SAMH_3913 - SAMH_3802	N/A	36.00	RCP	506.80	506	634149.191	26921956.562	595.358	$28,815	01/01/1961	57	75	17	$6,565	$59,552	1	1	0.0	0.0	1.0	5.0	1.0	5
4500	Sanitary Sewer	SAMH_3912 - SAMH_3913	N/A	36.00	RCP	496.91	496	634355.397	26921493.615	596.386	$83,115	01/01/1961	57	75	17	$18,936	$143,930	1	1	0.0	0.0	1.0	5.0	1.0	5
4501	Sanitary Sewer	SAMH_3911 - SAMH_3912	N/A	36.00	RCP	508.24	508	634557.083	26921039.473	597.375	$81,494	01/01/1961	57	75	17	$18,567	$141,123	1	1	0.0	0.0	1.0	5.0	1.0	5
4502	Sanitary Sewer	SAMH_3910A - SAMH_3911	N/A	36.00	RCP	486.96	486	634763.921	26920575.226	598.542	$83,351	01/01/1961	57	75	17	$18,990	$144,340	1	1	0.0	0.0	1.0	5.0	1.0	5
4503	Sanitary Sewer	SAMH_3924 - SAMH_3801	N/A	18.00		484.34	480	634140.452	26921920.800	595.865	$11,901	01/01/1939	79	75	0	$0	$21,517	1	1	0.0	0.0	1.0	2.0	4.0	8
4504	Sanitary Sewer	SAMH_3801 - SAMH_3803	N/A	18.00	VCP	29.17	33	634119.429	26921941.020	595.392	$72,342	01/01/1939	79	75	0	$0	$125,276	1	1	0.0	0.0	1.0	2.0	1.0	2
4505	Sanitary Sewer	SAMH_3853 - SAMH_3825	N/A	12.00	VCP	335.83	335	633491.563	26921606.621	599.564	$37,279	01/01/1950	68	75	6	$3,021	$43,292	1	1	0.0	0.0	1.0	1.0	1.0	1
4506	Sanitary Sewer	SAMH_3826 - SAMH_3825	N/A	12.00	PVC	7.31	7	633492.564	26921613.857	599.564	$18,096	01/01/1998	20	75	54	$13,056	$35,215	1	1	0.0	0.0	1.0	1.0	1.0	1
4507	Sanitary Sewer	SAMH_3826 - SAMH_3823	N/A	12.00	PVC	340.99	340	633794.920	26921771.500	598.188	$913	01/01/1998	20	75	54	$658	$1,132	1	1	0.0	0.0	1.0	2.0	1.0	2
4508	Sanitary Sewer	SAMH_3822 - SAMH_3823	N/A	30.00	RCP	371.99	371	633794.920	26921771.500	598.188	$66,634	01/01/1998	20	75	54	$48,076	$83,109	1	1	0.0	0.0	1.0	5.0	1.0	5
4509	Sanitary Sewer	SAMH_3823 - SAMH_3803	N/A	30.00	RCP	366.12	366	634119.429	26921941.020	595.392	$33,934	01/01/1998	20	75	54	$24,483	$75,700	1	1	0.0	0.0	1.0	5.0	1.0	5
4510	Sanitary Sewer	SAMH_3803 - SAMH_3802	N/A	30.00	RCP	33.58	16	634149.191	26921956.562	595.358	$2,981	01/01/1998	20	75	54	$2,150	$3,696	1	1	0.0	0.0	1.0	5.0	1.0	5
4511	Sanitary Sewer	SAMH_3804 - SAMH_3803	N/A	12.00	PVC	23.85	19	634119.429	26921941.020	595.392	$72,857	01/01/1998	20	75	54	$52,566	$126,167	1	1	0.0	0.0	1.0	2.0	1.0	2
4512	Sanitary Sewer	SAMH_3814 - SAMH_3804	N/A	12.00	VCP	233.01	237	634105.703	26921960.518	595.207	$39,718	01/01/1939	79	75	0	$0	$82,083	1	1	0.0	0.0	1.0	2.0	3.0	6
4513	Sanitary Sewer	SAMH_3821 - SAMH_3822	N/A	30.00	RCP	390.19	393	633948.091	26921432.505	599.645	$67,703	01/01/1998	20	75	54	$48,847	$84,442	1	1	0.0	0.0	1.0	5.0	1.0	5
4514	Sanitary Sewer	SAMH_3932A - SAMH_3821	N/A	30.00	RCP	393.80	388	634106.562	26921075.943	600.340	$39,837	01/01/1998	20	75	54	$28,742	$49,632	1	1	0.0	0.0	1.0	5.0	1.0	5
4515	Sanitary Sewer	SAMH_3932 - SAMH_3932B	N/A	30.00	RCP	296.97	299	634266.415	26920716.053	599.743	$71,671	01/01/1998	20	75	54	$51,710	$89,391	1	1	0.0	0.0	1.0	5.0	1.0	5
4516	Sanitary Sewer	SAMH_3931 - SAMH_3932	N/A	30.00	RCP	405.06	405	634391.813	26920446.863	600.388	$54,048	01/01/1998	20	75	54	$38,995	$67,411	1	1	0.0	0.0	1.0	5.0	1.0	5
4517	Sanitary Sewer	SAMH_3930 - SAMH_3930A	N/A	30.00	RCP	207.06	206	634718.093	26919710.332	602.432	$72,912	01/01/1998	20	75	54	$52,605	$90,940	1	1	0.0	0.0	1.0	5.0	1.0	5
4518	Sanitary Sewer	SAMH_3930A - SAMH_3931	N/A	30.00	RCP	400.62	400	634553.639	26920075.638	601.187	$73,722	01/01/1998	20	75	54	$53,190	$91,950	1	1	0.0	0.0	1.0	5.0	1.0	5
4519	Sanitary Sewer	SAMH_3928 - SAMH_3929	N/A	30.00	RCP	346.45	346	634943.165	26919208.297	603.252	$62,447	01/01/1998	20	75	54	$45,055	$77,888	1	1	0.0	0.0	1.0	5.0	1.0	5
4520	Sanitary Sewer	SAMH_3929 - SAMH_3930	N/A	30.00	RCP	343.12	343	634803.202	26919521.568	603.203	$37,686	01/01/1998	20	75	54	$27,190	$47,004	1	1	0.0	0.0	1.0	5.0	1.0	5
4521	Sanitary Sewer	SAMH_3927 - SAMH_3928	N/A	30.00	RCP	360.90	360	635084.433	26918891.953	604.145	$39,798	01/01/1998	20	75	54	$28,714	$49,584	1	1	0.0	0.0	1.0	5.0	1.0	5
4522	Sanitary Sewer	SAMH_3934 - SAMH_3928	N/A	10.00	PVC	333.55	333	635084.433	26918891.953	604.145	$1,177	01/01/1998	20	75	54	$849	$1,466	1	1	0.0	0.0	1.0	2.0	1.0	2
4523	Sanitary Sewer	SAMH_3934A - SAMH_3934	N/A	10.00	PVC	9.65	9	634786.017	26918742.948	607.505	$16,167	01/01/1998	20	75	54	$11,664	$34,131	1	1	0.0	0.0	1.0	2.0	1.0	2
4524	Sanitary Sewer	SAMH_3208 - SAMH_3925A	N/A	8.00	PVC	22.80	22 Seperated Joints Between M.H.s	635360.937	26918255.943	604.779	$2,781	01/01/1998	20	75	54	$2,006	$3,465	1	1	0.0	0.0	1.0	1.0	1.0	1
4525	Sanitary Sewer	SAMH_3925A - SAMH_3927	N/A	30.00	RCP	332.62	332	635228.048	26918560.864	604.350	$37,135	01/01/1998	20	75	54	$26,792	$45,388	1	1	0.0	0.0	1.0	5.0	1.0	5
4526	Sanitary Sewer	SAMH_3207 - SAMH_3208	N/A	8.00	VCP	360.68	360	635365.601	26918233.629	604.837	$25,969	01/01/1939	79	75	0	$0	$54,823	1	1	0.0	0.0	1.0	1.0	1.0	1
4527	Sanitary Sewer	SAMH_3925 - SAMH_3906	N/A	24.00	VCP	120.21	278	635712.280	26918443.637	601.855	$60,537	01/01/1939	79	75	0	$0	$75,505	1	1	0.0	0.0	1.0	1.0	1.0	1
4528	Sanitary Sewer	SAMH_3907 - SAMH_3908	N/A	30.00	RCP	441.75	441	635527.920	26918857.433	601.186	$61,081	01/01/1961	57	75	17	$13,916	$101,208	1	1	0.0	0.0	1.0	5.0	1.0	5
4529	Sanitary Sewer	SAMH_3906A - SAMH_3907	N/A	15.00	VCP	302.08	302	635708.484	26918454.269	601.732	$60,520	01/01/1961	57	75	17	$13,788	$100,278	1	1	0.0	0.0	1.0	5.0	1.0	5
4530	Sanitary Sewer	SAMH_3205 - SAMH_3925A	N/A	30.00	RCP	328.31	328	635360.937	26918255.943	604.779	$59,753	01/01/1998	20	75	54	$43,111	$74,527	1	1	0.0	0.0	1.0	5.0	1.0	5
4531	Sanitary Sewer	SAMH_3201 - SAMH_3205	N/A	30.00	RCP	334.03	334	635061.229	26918121.912	607.992	$60,793	01/01/1998	20	75	54	$43,862	$75,825	1	1	0.0	0.0	1.0	5.0	1.0	5
4532	Sanitary Sewer	SAMH_3204 - SAMH_3205	N/A	8.00	PVC	240.37	244	635061.229	26918121.912	607.992	$29,325	01/01/1998	20	75	54	$21,157	$36,536	1	1	0.0	0.0	1.0	1.0	1.0	1
4533	Sanitary Sewer	SAMH_3206 - SAMH_3933	N/A	8.00	PVC	320.35	320	634912.725	26918461.529	607.830	$39,083	01/01/1998	20	75	54	$28,198	$48,694	1	1	0.0	0.0	1.0	1.0	1.0	1
4534	Sanitary Sewer	SAMH_3203 - SAMH_3204	N/A	8.00	PVC	187.21	183	635158.268	26917902.001	607.660	$22,840	01/01/1998	20	75	54	$16,479	$28,456	1	1	0.0	0.0	1.0	1.0	1.0	1
4535	Sanitary Sewer	SAMH_3916 - SAMH_3917	N/A	10.00	DIP	35.57	35	635395.021	26919038.056	600.879	$41,875	01/01/1998	20	75	54	$30,212	$52,172	1	1	0.0	0.0	1.0	1.0	1.0	1
4536	Sanitary Sewer	SAMH_3918 - SAMH_3917	N/A	8.00	PVC	266.15	266	635395.021	26919038.056	600.879	$11,029	01/01/1995	23	75	51	$7,515	$13,741	1	1	0.0	0.0	1.0	1.0	1.0	1
4537	Sanitary Sewer	SAMH_3908 - SAMH_3909	N/A	30.00	RCP	445.85	445	635347.561	26919265.172	600.257	$62,417	01/01/1961	57	75	17	$14,220	$103,421	1	1	0.0	0.0	1.0	5.0	1.0	5
4538	Sanitary Sewer	SAMH_3909 - SAMH_3910	N/A	30.00	RCP	455.60	455	635160.890	26919680.770	598.971	$80,627	01/01/1961	57	75	17	$18,369	$139,622	1	1	0.0	0.0	1.0	5.0	1.0	5
4539	Sanitary Sewer	SAMH_3910 - SAMH_3910A	N/A	36.00	RCP	491.63	491	634961.629	26920130.207	597.123	$79,862	01/01/1961	57	75	17	$18,195	$138,297	1	1	0.0	0.0	1.0	5.0	1.0	5
4540	Sanitary Sewer	SAMH_3932A - SAMH_3932	N/A	8.00	PVC	326.53	326	634391.813	26920446.863	600.388	$37,653	01/01/1998	20	75	54	$27,166	$46,912	1	1	0.0	0.0	1.0	1.0	1.0	1
4541	Sanitary Sewer	SAMH_3922 - SAMH_3921	N/A	8.00	PVC	336.58	336	634935.431	26920118.699	597.304	$38,688	01/01/1998	20	75	54	$27,913	$77,866	1	1	0.0	0.0	1.0	1.0	1.0	1
4542	Sanitary Sewer	SAMH_3901 - SAMH_3902	N/A	8.00	PVC	255.65	255	635156.694	26920259.305	595.221	$12,601	01/01/1990	28	75	46	$7,746	$15,700	1	1	0.0	0.0	1.0	1.0	1.0	1
4543	Sanitary Sewer	SAMH_3902 - SAMH_3903	N/A	8.00	PVC	103.29	103	635059.980	26920295.568	596.357	$16,741	01/01/1990	28	75	46	$10,291	$20,858	1	1	0.0	0.0	1.0	1.0	1.0	1
4544	Sanitary Sewer	SAMH_3903 - SAMH_3904	N/A	8.00	PVC	137.23	137	634933.541	26920242.239	597.524	$13,828	01/01/1990	28	75	46	$8,500	$17,228	1	1	0.0	0.0	1.0	1.0	1.0	1
4545	Sanitary Sewer	SAMH_3904 - SAMH_3905	N/A	8.00	PVC	113.34	113	634979.010	26920138.419	597.418	$2,345	01/01/1990	28	75	46	$1,441	$2,922	1	1	0.0	0.0	1.0	1.0	1.0	1
4546	Sanitary Sewer	SAMH_3905 - SAMH_3910A	N/A	8.00	PVC	19.22	19	634961.629	26920130.207	597.123	$29,906	01/01/1990	28	75	46	$18,384	$48,030	1	1	0.0	0.0	1.0	1.0	1.0	1
4547	Sanitary Sewer	SAMH_3921 - SAMH_3910A	N/A	8.00	PVC	28.61	28	634961.629	26920130.207	597.123	$41,063	01/01/1998	20	75	54	$29,626	$51,160	1	1	0.0	0.0	1.0	1.0	1.0	1
4548	Sanitary Sewer	SAMH_3856 - SAMH_3855	N/A	10.00	PVC	12.57	12	634084.840	26920326.617	601.378	$16,824	01/01/1998	20	75	54	$12,138	$27,796	1	1	0.0	0.0	1.0	2.0	1.0	2
4549	Sanitary Sewer	SAMH_3855 - SAMH_3932	N/A	10.00	PVC	329.69	329	634391.813	26920446.863	600.388	$1,534	01/01/1998	20	75	54	$1,106	$1,911	1	1	0.0	0.0	1.0	2.0	1.0	2
4550	Sanitary Sewer	SAMH_3849 - SAMH_3856	N/A	10.00	PVC	330.33	330	634073.394	26920321.415	601.558	$49,922	01/01/1998	20	75	54	$36,018	$57,486	1	1	0.0	0.0	1.0	2.0	1.0	2
4551	Sanitary Sewer	SAMH_3933 - SAMH_3934	N/A	8.00	PVC	308.63	308	634786.017	26918742.948	607.505	$40,693	01/01/1998	20	75	54	$29,359	$50,699	1	1	0.0	0.0	1.0	1.0	1.0	1
4552	Sanitary Sewer	SAMH_3939 - SAMH_3934A	N/A	10.00	PVC	334.62	334	634778.171	26918737.338	607.441	$43,282	01/01/1998	20	75	54	$31,227	$49,839	1	1	0.0	0.0	1.0	2.0	1.0	2
4553	Sanitary Sewer	SAMH_3917 - SAMH_3928	N/A	10.00	PVC	343.24	343	635084.433	26918891.953	604.145	$32,471	01/01/1998	20	75	54	$23,427	$40,455	1	1	0.0	0.0	1.0	2.0	1.0	2
4554	Sanitary Sewer	SAMH_3199 - SAMH_3200	N/A	30.00	RCP	432.50	432	634802.123	26917888.788	609.483	$78,714	01/01/1998	20	75	54	$56,791	$98,177	1	1	0.0	0.0	1.0	5.0	1.0	5
4555	Sanitary Sewer	SAMH_3200 - SAMH_3201	N/A	30.00	RCP	96.68	96	634760.686	26917976.140	610.670	$17,596	01/01/1998	20	75	54	$12,695	$21,947	1	1	0.0	0.0	1.0	5.0	1.0	5
4556	Sanitary Sewer	SAMH_3928 - SAMH_3201	N/A	8.00	PVC	326.21	326	634760.686	26917976.140	610.670	$63,055	01/01/1998	20	75	54	$45,494	$78,645	1	1	0.0	0.0	1.0	1.0	1.0	1
4557	Sanitary Sewer	SAMH_3198 - SAMH_3199	N/A	8.00	PVC	58.94	35	634980.432	26917494.759	609.741	$7,190	01/01/1998	20	75	54	$5,187	$8,958	1	1	0.0	0.0	1.0	1.0	1.0	1
4558	Sanitary Sewer	SAMH_3194 - SAMH_3199	N/A	30.00	RCP	300.26	300	634980.432	26917494.759	609.741	$54,648	01/01/1998	20	75	54	$39,428	$68,159	1	1	0.0	0.0	1.0	5.0	1.0	5

CITY OF SAULT STE. MARIE, MICHIGAN

Summary

id	Equipment Description	Asset ID	Construction Drawings Sheet Reference	Capacity or Size	Material	Length	Comment	Northing State Plane Ordinate	Easting State Plane Ordinate	Elevation	Original Cost	Year Installed (01/01/YYYY)	Age	Expected useful life (years)	Remaining Useful Life (years)	Depreciated Value	Replacement Cost	Average number of units in service	Total Number of units	Redundancy (Number)	Redundancy (percent)	Redundancy Score (R) (Reduces (C))	Criticality (C) (see back-up sheets)	Probability of Failure (P) (see back-up sheets)	Business Risk (BRE=PxCxR)
4559	Sanitary Sewer	SAMH_2941 - SAMH_3184	N/A	30.00	RCP	40.78	40	634191.050	26917119.052	605.598	$7,422	01/01/1998	20	75	54	$5,354	$9,257	1	1	0.0	0.0	1.0	5.0	1.0	5
4560	Sanitary Sewer	SAMH_3184 - SAMH_3185	N/A	30.00	RCP	171.08	171	634344.543	26917194.595	601.711	$31,136	01/01/1998	20	75	54	$22,464	$38,834	1	1	0.0	0.0	1.0	5.0	1.0	5
4561	Sanitary Sewer	SAMH_3185 - SAMH_3192	N/A	30.00	RCP	356.73	356	634668.289	26917344.420	605.752	$64,926	01/01/1998	20	75	54	$46,843	$80,979	1	1	0.0	0.0	1.0	5.0	1.0	5
4562	Sanitary Sewer	SAMH_3192 - SAMH_3194	N/A	30.00	RCP	46.35	46	634711.456	26917361.311	606.675	$8,436	01/01/1998	20	75	54	$6,086	$10,522	1	1	0.0	0.0	1.0	5.0	1.0	5
4563	Sanitary Sewer	SAMH_2962 - SAMH_2949	N/A	12.00	PVC	321.55	321	632871.125	26917007.936	615.052	$40,193	01/01/1998	20	75	54	$28,999	$49,840	1	1	0.0	0.0	1.0	3.0	1.0	3
4564	Sanitary Sewer	SAMH_2963 - SAMH_2962	N/A	12.00	PVC	21.84	21	632549.653	26917014.783	621.062	$2,730	01/01/1998	20	75	54	$1,969	$3,385	1	1	0.0	0.0	1.0	3.0	1.0	3
4565	Sanitary Sewer	SAMH_2964 - SAMH_2963	N/A	12.00	VCP	310.26	310	632528.387	26917009.824	621.806	$23,269	01/01/1939	79	75	0	$0	$48,090	1	1	0.0	0.0	1.0	3.0	5.0	15
4566	Sanitary Sewer	SAMH_2948 - SAMH_2949	N/A	30.00	RCP	348.61	348	632871.125	26917007.936	615.052	$68,677	01/01/2000	18	75	56	$51,381	$79,135	1	1	0.0	0.0	1.0	5.0	1.0	5
4567	Sanitary Sewer	SAMH_2940 - SAMH_2939	N/A	8.00	PVC	341.86	341	633268.626	26916649.624	614.897	$41,707	01/01/1998	20	75	54	$30,091	$51,963	1	1	0.0	0.0	1.0	1.0	1.0	1
4568	Sanitary Sewer	SAMH_2934 - SAMH_2933	N/A	8.00	PVC	368.01	368	633264.036	26916316.458	617.484	$44,897	01/01/1998	20	75	54	$32,393	$55,938	1	1	0.0	0.0	1.0	1.0	1.0	1
4569	Sanitary Sewer	SAMH_3936 - SAMH_3937	N/A	8.00	PVC	187.02	200	634409.454	26919596.595	603.000	$49,214	01/01/1998	20	75	54	$35,507	$61,316	1	1	0.0	0.0	1.0	1.0	1.0	1
4570	Sanitary Sewer	SAMH_3937 - SAMH_3854	N/A	8.00	PVC	403.40	389	634244.735	26919964.819	601.159	$45,173	01/01/1998	20	75	54	$32,592	$55,212	1	1	0.0	0.0	1.0	1.0	1.0	1
4571	Sanitary Sewer	SAMH_3854 - SAMH_3855	N/A	8.00	PVC	395.56	395	634084.840	26920326.617	601.378	$40,222	01/01/1998	20	75	54	$29,020	$50,112	1	1	0.0	0.0	1.0	1.0	1.0	1
4572	Sanitary Sewer	SAMH_3846 - SAMH_3848	N/A	10.00	PVC	274.90	274	633928.705	26919843.047	602.385	$10,283	01/01/1998	20	75	54	$7,419	$12,812	1	1	0.0	0.0	1.0	2.0	1.0	2
4573	Sanitary Sewer	SAMH_3848 - SAMH_3849	N/A	10.00	PVC	399.14	399	633763.708	26920206.483	602.771	$40,300	01/01/1998	20	75	54	$29,076	$50,210	1	1	0.0	0.0	1.0	2.0	1.0	2
4574	Sanitary Sewer	SAMH_3845 - SAMH_3846	N/A	10.00	PVC	413.68	413	634040.861	26919592.070	602.884	$33,538	01/01/1998	20	75	54	$24,197	$41,784	1	1	0.0	0.0	1.0	1.0	1.0	1
4575	Sanitary Sewer	SAMH_3847 - SAMH_3846	N/A	8.00	PVC	84.29	84	634040.861	26919592.070	602.884	$48,695	01/01/1998	20	75	54	$35,133	$60,669	1	1	0.0	0.0	1.0	1.0	1.0	1
4576	Sanitary Sewer	SAMH_3844 - SAMH_3845	N/A	8.00	PVC	34.93	34	634210.360	26919214.704	604.735	$50,470	01/01/1998	20	75	54	$36,413	$62,880	1	1	0.0	0.0	1.0	1.0	1.0	1
4577	Sanitary Sewer	SAMH_3843 - SAMH_3844	N/A	8.00	PVC	195.52	189	634206.346	26919180.008	605.921	$4,261	01/01/1998	20	75	54	$3,074	$5,309	1	1	0.0	0.0	1.0	1.0	1.0	1
4578	Sanitary Sewer	SAMH_3842 - SAMH_3843	N/A	8.00	PVC	174.99	173	634027.153	26919101.799	605.005	$23,853	01/01/1998	20	75	54	$17,209	$29,718	1	1	0.0	0.0	1.0	1.0	1.0	1
4579	Sanitary Sewer	SAMH_3920 - SAMH_3921	N/A	8.00	PVC	374.56	374	634935.431	26920118.699	597.304	$3,491	01/01/1998	20	75	54	$2,518	$4,349	1	1	0.0	0.0	1.0	1.0	1.0	1
4580	Sanitary Sewer	SAMH_3193 - SAMH_3192	N/A	9.00	VCP	294.80	294	634668.289	26917344.420	605.752	$18,867	01/01/1939	79	75	0	$0	$42,452	1	1	0.0	0.0	1.0	1.0	5.0	5
4581	Sanitary Sewer	SAMH_3197 - SAMH_3196	N/A	9.00	VCP	338.91	338	634524.146	26917753.122	606.386	$24,401	01/01/1939	79	75	0	$0	$51,514	1	1	0.0	0.0	1.0	1.0	5.0	5
4582	Sanitary Sewer	SAMH_3196 - SAMH_3195	N/A	8.00	PVC	17.54	17	634538.128	26917742.524	606.169	$2,140	01/01/1998	20	75	54	$1,544	$2,667	1	1	0.0	0.0	1.0	1.0	1.0	1
4583	Sanitary Sewer	SAMH_3195 - SAMH_3194	N/A	8.00	PVC	418.77	418	634711.456	26917361.311	606.675	$56,534	01/01/1998	20	75	54	$40,789	$69,097	1	1	0.0	0.0	1.0	1.0	1.0	1
4584	Sanitary Sewer	SAMH_2933 - SAMH_2931	N/A	8.00	PVC	221.08	221	633485.052	26916311.265	615.301	$26,971	01/01/1998	20	75	54	$19,459	$33,604	1	1	0.0	0.0	1.0	1.0	1.0	1
4585	Sanitary Sewer	SAMH_2931 - SAMH_2930	N/A	8.00	PVC	234.25	234	633719.171	26916303.357	612.873	$28,579	01/01/1998	20	75	54	$20,619	$35,606	1	1	0.0	0.0	1.0	1.0	1.0	1
4586	Sanitary Sewer	SAMH_2953 - SAMH_2952	N/A	12.00	PVC	310.09	310	632494.629	26916343.556	629.275	$41,863	01/01/2009	9	75	65	$36,348	$48,065	1	1	0.0	0.0	1.0	3.0	1.0	3
4587	Sanitary Sewer	SAMH_2952 - SAMH_2951	N/A	8.00	PVC	25.43	25	632518.339	26916334.362	629.348	$3,102	01/01/1998	20	75	54	$2,238	$3,865	1	1	0.0	0.0	1.0	3.0	1.0	3
4588	Sanitary Sewer	SAMH_2960 - SAMH_2961	N/A	8.00	PVC	234.13	234	632538.057	26916719.150	628.337	$30,905	01/01/2000	18	75	56	$23,122	$35,587	1	1	0.0	0.0	1.0	1.0	1.0	1
4589	Sanitary Sewer	SAMH_2961 - SAMH_2962	N/A	8.00	PVC	295.86	295	632549.653	26917014.783	621.062	$39,054	01/01/2000	18	75	56	$29,218	$44,971	1	1	0.0	0.0	1.0	1.0	1.0	1
4590	Sanitary Sewer	SAMH_2957 - SAMH_2953	N/A	12.00	PVC	320.76	320	632184.598	26916349.762	629.914	$43,302	01/01/2009	9	75	65	$37,597	$49,717	1	1	0.0	0.0	1.0	3.0	1.0	3
4591	Sanitary Sewer	SAMH_2662 - SAMH_2662A	N/A	8.00	PVC	227.77	204	631259.903	26916642.483	0.000	$27,788	01/01/1998	20	75	54	$20,048	$34,621	1	1	0.0	0.0	1.0	1.0	1.0	1
4592	Sanitary Sewer	SAMH_2662A - SAMH_2663	N/A	8.00	PVC	401.97	413	631268.922	26917044.355	631.256	$49,041	01/01/1998	20	75	54	$35,382	$61,100	1	1	0.0	0.0	1.0	1.0	1.0	1
4593	Sanitary Sewer	SAMH_2939 - SAMH_2938	N/A	8.00	PVC	229.10	229	633497.606	26916642.349	612.457	$27,950	01/01/1998	20	75	54	$20,165	$34,823	1	1	0.0	0.0	1.0	1.0	1.0	1
4594	Sanitary Sewer	SAMH_2938 - SAMH_2937	N/A	8.00	PVC	221.12	221	633718.565	26916633.999	609.811	$26,976	01/01/1998	20	75	54	$19,463	$33,610	1	1	0.0	0.0	1.0	1.0	1.0	1
4595	Sanitary Sewer	SAMH_2937 - SAMH_2936	N/A	8.00	PVC	427.98	427	634146.312	26916619.917	606.060	$52,214	01/01/1998	20	75	54	$37,672	$65,053	1	1	0.0	0.0	1.0	1.0	1.0	1
4596	Sanitary Sewer	SAMH_2936 - SAMH_2935	N/A	8.00	PVC	17.01	17	634159.912	26916630.136	606.411	$2,075	01/01/1998	20	75	54	$1,497	$2,586	1	1	0.0	0.0	1.0	1.0	1.0	1
4597	Sanitary Sewer	SAMH_3191 - SAMH_3190	N/A	8.00	PVC	438.52	438	634218.069	26917962.056	600.686	$53,499	01/01/1998	20	75	54	$38,599	$66,655	1	1	0.0	0.0	1.0	1.0	1.0	1
4598	Sanitary Sewer	SAMH_3190 - SAMH_3188	N/A	8.00	PVC	395.18	395	634209.541	26917566.969	601.431	$48,212	01/01/1998	20	75	54	$34,784	$60,067	1	1	0.0	0.0	1.0	1.0	1.0	1
4599	Sanitary Sewer	SAMH_3188 - SAMH_3189	N/A	8.00	PVC	194.89	195	634197.910	26917372.431	603.153	$23,776	01/01/1998	20	75	54	$17,154	$29,623	1	1	0.0	0.0	1.0	2.0	1.0	2
4600	Sanitary Sewer	SAMH_3189 - SAMH_3184	N/A	8.00	PVC	253.47	252	634191.050	26917119.052	605.598	$30,924	01/01/1998	20	75	54	$22,311	$38,528	1	1	0.0	0.0	1.0	2.0	1.0	2
4601	Sanitary Sewer	SAMH_2928 - SAMH_3182	N/A	24.00	VCP	280.50	280	634158.039	26916580.582	606.537	$26,928	01/01/1939	79	75	0	$0	$49,367	1	1	0.0	0.0	1.0	4.0	5.0	20
4602	Sanitary Sewer	SAMH_3182 - SAMH_2935	N/A	24.00	VCP	49.59	49	634159.912	26916630.136	606.411	$4,761	01/01/1939	79	75	0	$0	$8,728	1	1	0.0	0.0	1.0	5.0	1.0	5
4603	Sanitary Sewer	SAMH_2935 - SAMH_3183	N/A	24.00	VCP	331.03	331	634176.871	26916960.727	606.524	$31,779	01/01/1939	79	75	0	$0	$58,261	1	1	0.0	0.0	1.0	5.0	5.0	25
4604	Sanitary Sewer	SAMH_3940 - SAMH_3939	N/A	8.00	PVC	326.15	326	634476.633	26918592.274	611.737	$26,897	01/01/2000	18	75	56	$20,123	$40,081	1	1	0.0	0.0	1.0	1.0	1.0	1
4605	Sanitary Sewer	SAMH_3186 - SAMH_3188	N/A	8.00	PVC	203.90	203 Very Dirty Needs Cleaning	634209.541	26917566.969	601.431	$24,875	01/01/1998	20	75	54	$17,947	$30,992	1	1	0.0	0.0	1.0	1.0	1.0	1
4606	Sanitary Sewer	SAMH_3914A - SAMH_3914	N/A	12.00	VCP	271.03	271	635697.077	26918424.859	602.107	$20,760	01/01/1939	79	75	0	$0	$42,904	1	1	0.0	0.0	1.0	1.0	1.0	1
4607	Sanitary Sewer	SAMH_3914 - SAMH_3915	N/A	12.00	VCP	384.20	384	635540.501	26918775.709	601.466	$20,327	01/01/1939	79	75	0	$0	$42,010	1	1	0.0	0.0	1.0	1.0	1.0	1
4608	Sanitary Sewer	SAMH_3939A - SAMH_3939	N/A	8.00	PVC	327.89	114	634476.633	26918592.274	611.737	$47,292	01/01/2000	18	75	56	$35,382	$53,815	1	1	0.0	0.0	1.0	1.0	1.0	1
4609	Sanitary Sewer	SAMH_1704 - SAMH_1714	N/A	9.00	VCP	338.59	338	631046.930	26911686.323	721.847	$24,379	01/01/1939	79	75	0	$0	$51,466	1	1	0.0	0.0	1.0	2.0	5.0	10
4610	Sanitary Sewer	SAMH_1820 - SAMH_1819	N/A	9.00	VCP	141.92	141	633032.922	26910401.484	704.252	$10,502	01/01/1950	68	75	6	$851	$20,436	1	1	0.0	0.0	1.0	3.0	5.0	15
4611	Sanitary Sewer	SAMH_1819 - SAMH_1818	N/A	9.00	VCP	312.69	517	0.000	0.000	701.148	$15,185	01/01/1950	68	75	6	$1,230	$29,549	1	1	0.0	0.0	1.0	3.0	3.0	9
4612	Sanitary Sewer	SAMH_1813 - SAMH_1812	N/A	8.00	PVC	32.20	32	633634.551	26910499.169	700.010	$3,992	01/01/2004	14	75	60	$3,199	$4,636	1	1	0.0	0.0	1.0	1.0	1.0	1
4613	Sanitary Sewer	SAMH_0518 - SAMH_0517	N/A	8.00	PVC	234.96	227	630651.160	26902026.654	633.966	$23,966	01/01/1978	40	75	34	$10,896	$35,714	1	1	0.0	0.0	1.0	2.0	1.0	2
4614	Sanitary Sewer	SAMH_0517 - SAMH_0507	N/A	8.00	PVC	398.95	406	630349.001	26901766.146	635.682	$40,693	01/01/1978	40	75	34	$18,501	$60,641	1	1	0.0	0.0	1.0	2.0	1.0	2
4615	Sanitary Sewer	SAMH_0507 - SAMH_0508	N/A	8.00	PVC	210.31	210	630186.205	26901633.009	634.202	$21,451	01/01/1978	40	75	34	$9,752	$31,967	1	1	0.0	0.0	1.0	2.0	1.0	2
4616	Sanitary Sewer	SAMH_0506 - SAMH_0507	N/A	8.00	PVC	253.93	253	630349.001	26901766.146	635.682	$25,901	01/01/1978	40	75	34	$11,775	$38,597	1	1	0.0	0.0	1.0	1.0	1.0	1
4617	Sanitary Sewer	SAMH_0523 - SAMH_0517	N/A	8.00	PVC	178.12	171	630651.160	26902026.654	633.966	$18,169	01/01/1978	40	75	34	$8,260	$27,075	1	1	0.0	0.0	1.0	1.0	1.0	1
4618	Sanitary Sewer	SAMH_2508 - SAMH_2509	N/A	18.00	CP	330.48	330	627864.704	26913839.418	706.729	$35,362	01/01/1966	52	75	22	$10,415	$55,191	1	1	0.0	0.0	1.0	4.0	3.0	12
4619	Sanitary Sewer	SAMH_2509 - SAMH_2510	N/A	18.00	CP	335.87	335	628200.512	26913832.982	706.605	$38,289	01/01/1966	52	75	22	$11,277	$58,441	1	1	0.0	0.0	1.0	4.0	4.0	16
4620	Sanitary Sewer	SAMH_3633 - SAMH_3601	N/A	10.00	PVC	343.75	343	629085.548	26921269.062	624.510	$40,242	01/01/1995	23	75	51	$27,423	$50,138	1	1	0.0	0.0	1.0	2.0	1.0	2
4621	Sanitary Sewer	SAMH_3635 - SAMH_3634	N/A	10.00	PVC	329.95	331	629098.056	26921942.541	617.561	$33,730	01/01/1995	23	75	51	$22,985	$42,606	1	1	0.0	0.0	1.0	1.0	1.0	1
4622	Sanitary Sewer	SAMH_3636 - SAMH_3635	N/A	10.00	PVC	295.88	298	628881.721	26922191.668	618.715	$36,951	01/01/1995	23	75	51	$25,180	$46,674	1	1	0.0	0.0	1.0	1.0	1.0	1
4623	Sanitary Sewer	SAMH_3637 - SAMH_3636	N/A	10.00	PVC	324.13	332	628586.300	26922175.268	620.563	$37,744	01/01/1995	23	75	51	$25,721	$47,677	1	1	0.0	0.0	1.0	1.0	1.0	1
4624	Sanitary Sewer	SAMH_3638 - SAMH_3637	N/A	10.00	PVC	331.09	327	628337.070	26922382.494	622.118	$37,809	01/01/1995	23	75	51	$25,765	$47,758	1	1	0.0	0.0	1.0	1.0	1.0	1
4625	Sanitary Sewer	SAMH_3639 - SAMH_3638	N/A	10.00	PVC	331.65	331	628067.698	26922574.995	620.042	$37,422	01/01/1995	23	75	51	$25,501	$47,269	1	1	0.0	0.0	1.0	1.0	1.0	1
4626	Sanitary Sewer	SAMH_3640 - SAMH_3639	N/A	10.00	PVC	328.26	329	627785.030	26922748.471	619.389	$40,119	01/01/1995	23	75	51	$27,339	$49,985	1	1	0.0	0.0	1.0	1.0	1.0	1
4627	Sanitary Sewer	SAMH_3641 - SAMH_3640	N/A	8.00	PVC	328.85	327	627474.165	26922643.034	624.505	$4,630	01/01/1995	23	75	51	$3,155	$5,377	1	1	0.0	0.0	1.0	1.0	1.0	1
4628	Sanitary Sewer	SAMH_1812 - SAMH_1811	N/A	9.00	VCP	211.06	211	633845.556	26910494.453	697.834	$15,618	01/01/1950	68	75	6	$1,265	$30,392	1	1	0.0	0.0	1.0	2.0	5.0	10
4629	Sanitary Sewer	SAMH_1811 - SAMH_1810	N/A	9.00	VCP	212.93	212	633840.734	26910281.581	697.915	$15,757	01/01/1950	68	75	6	$1,277	$30,661	1	1	0.0	0.0	1.0	2.0	5.0	10
4630	Sanitary Sewer	SAMH_1810 - SAMH_1809	N/A	9.00	VCP	314.14	314	633841.795	26909967.444	695.413	$23,246	01/01/1950	68	75	6	$1,884	$45,236	1	1	0.0	0.0	1.0	2.0	5.0	10
4631	Sanitary Sewer	SAMH_3117 - SAMH_3120	N/A	21.00	CP	391.48	32	635353.023	26913412.447	615.524	$45,412	01/01/1960	58	75	16	$9,739	$68,901	1	1	0.0	0.0	1.0	4.0	1.0	4
4632	Sanitary Sewer	SAMH_2070 - SAMH_2069	N/A	8.00	PVC	57.44	57	634188.815	26912133.286	710.590	$7,583	01/01/2003	15	75	59	$5,976	$8,731	1	1	0.0	0.0	1.0	1.0	1.0	1
4633	Sanitary Sewer	SAMH_2066 - SAMH_2065	N/A	8.00	PVC	158.84	156	634707.715	26912543.667	688.005	$20,967	01/01/2003	15	75	59	$16,526	$24,143	1	1	0.0	0.0	1.0	1.0	1.0	1
4634	Sanitary Sewer	SAMH_3145A - SAMH_3145	N/A	12.00	PVC	76.29	12	634850.957	26913545.301	616.723	$11,061	01/01/2011	7	75	67	$9,898	$11,824	1	1	0.0	0.0	1.0	1.0	1.0	1
4635	Sanitary Sewer	SAMH_3138A - SAMH_3138	N/A	9.00	PVC	149.76	149	635028.282	26913219.769	617.372	$19,768	01/01/2003	15	75	59	$15,581	$22,764	1	1	0.0	0.0	1.0	1.0	1.0	1
4636	Sanitary Sewer	SAMH_3139 - SAMH_3138	N/A	8.00	PVC	345.03	345	635028.282	26913219.769	617.372	$45,544	01/01/2003	15	75	59	$35,897	$52,445	1	1	0.0	0.0	1.0	1.0	1.0	1
4637	Sanitary Sewer	SAMH_3140 - SAMH_3139	N/A	9.00	VCP	153.94	152	634683.396	26913229.772	625.373	$11,083	01/01/1939	79	75	0	$0	$23,398	1	1	0.0	0.0	1.0	1.0	1.0	1
4638	Sanitary Sewer	SACO_2078 - SAMH_2078	N/A	8.00	VCP	88.50	88	634257.699	26912654.672	693.513	$5,664	01/01/1939	79	75	0	$0	$12,744	1	1	0.0	0.0	1.0	1.0	1.0	1
4639	Sanitary Sewer	SAMH_0700 - SAMH_0701	N/A	15.00	PVC	141.48	141	623330.817	26905078.576	733.777	$19,665	01/01/2001	17	75	57	$14,975	$22,495	1	1	0.0	0.0	1.0	2.0	1.0	2
4640	Sanitary Sewer	SAMH_0701 - SAMH_0702	N/A	15.00	PVC	61.31	61	623272.257	26905096.735	733.436	$7,909	01/01/2001	17	75	57	$6,022	$9,135	1	1	0.0	0.0	1.0	2.0	1.0	2
4641	Sanitary Sewer	SAMH_3046 - SAMH_3045	N/A	12.00	PVC	282.59	282	636053.501	26914373.359	612.621	$35,323	01/01/1994	24	75	50	$23,600	$43,801	1	1	0.0	0.0	1.0	2.0	1.0	2
4642	Sanitary Sewer	SAMH_3045 - SAMH_3044	N/A	12.00	PVC	53.46	53	636092.589	26914409.830	612.493	$6,683	01/01/1994	24	75	50	$4,465	$8,286	1	1	0.0	0.0	1.0	2.0	1.0	2
4643	Sanitary Sewer	SAMH_3049A - SAMH_3049	N/A	20.00	VCP	187.18	187 No Flow	635763.255	26914249.687	612.103	$17,594	01/01/1939	79	75	0	$0	$32,569	1	1	0.0	0.0	1.0	2.0	5.0	10
4644	Sanitary Sewer	SAMH_3049 - SAMH_3048	N/A	20.00	VCP	279.06	279	636014.146	26914371.868	612.542	$26,790	01/01/1939	79	75	0	$0	$49,115	1	1	0.0	0.0	1.0	2.0	1.0	2
4645	Sanitary Sewer	SAMH_3048 - SAMH_3044	N/A	20.00	VCP	87.15	87	636092.589	26914409.830	612.493	$8,366	01/01/1939	79	75	0	$0	$15,338	1	1	0.0	0.0	1.0	2.0	5.0	10
4646	Sanitary Sewer	SAMH_3011 - SAMH_3341	N/A	24.00	VCP	327.62	327	636875.516	26914792.264	611.363	$32,434	01/01/1939	79	75	0	$0	$58,644	1	1	0.0	0.0	1.0	4.0	3.0	12
4647	Sanitary Sewer	SAMH_3341 - SAMH_3341A	N/A	24.00	VCP	390.12	390	637252.298	26914893.392	606.348	$38,622	01/01/1939	79	75	0	$0	$69,831	1	1	0.0	0.0	1.0	4.0	4.0	16
4648	Sanitary Sewer	SAMH_3013 - SAMH_3014	N/A	12.00	PVC	133.00	129	636191.082	26914792.549	612.710	$19,285	01/01/2015	3	75	71	$18,288	$20,615	1	1	0.0	0.0	1.0	3.0	1.0	3
4649	Sanitary Sewer	SAMH_3014 - SAMH_3015	N/A	12.00	PVC	315.37	315	636061.784	26915080.200	612.450	$45,729	01/01/2015	3	75	71	$43,365	$48,883	1	1	0.0	0.0	1.0	3.0	1.0	3
4650	Sanitary Sewer	SAMH_3050 - SAMH_3014	N/A	9.00	VCP	354.18	354	636191.082	26914792.549	612.710	$25,501	01/01/1939	79	75	0	$0	$53,836	1	1	0.0	0.0	1.0	1.0	1.0	1
4651	Sanitary Sewer	SAMH_3056 - SAMH_3015	N/A	15.00	VCP	385.52	385	636061.784	26915080.200	612.450	$30,456	01/01/1939	79	75	0	$0	$61,298	1	1	0.0	0.0	1.0	1.0	5.0	5
4652	Sanitary Sewer	SAMH_3016 - SAMH_3017	N/A	12.00	VCP	149.93	161	636223.629	26915162.248	0.000	$11,245	01/01/1939	79	75	0	$0	$23,240	1	1	0.0	0.0	1.0	3.0	4.0	12
4653	Sanitary Sewer	SAMH_3017 - SAMH_3018	N/A	12.00	VCP	206.06	206	636413.058	26915243.355	612.723	$17,515	01/01/1939	79	75	0	$0	$34,000	1	1	0.0	0.0	1.0	3.0	4.0	12
4654	Sanitary Sewer	SAMH_2627 - SAMH_2626	N/A	18.00	CP	47.36	47	630177.765	26913822.360	696.645	$4,925	01/01/1950	68	75	6	$399	$8,241	1	1	0.0	0.0	1.0	4.0	1.0	4
4655	Sanitary Sewer	SAMH_2613 - SAMH_2627	N/A	18.00	CP	318.49	318	630139.458	26913794.511	697.522	$33,123	01/01/1950	68	75	6	$2,684	$55,417	1	1	0.0	0.0	1.0	4.0	1.0	4
4656	Sanitary Sewer	SAMH_2626 - SAMH_2625	N/A	18.00	CP	299.48	299	630477.215	26913818.099	693.970	$31,146	01/01/1950	68	75	6	$2,524	$52,110	1	1	0.0	0.0	1.0	4.0	5.0	20
4657	Sanitary Sewer	SAMH_2632 - SAMH_2631	N/A	8.00	CP	322.63	322	630484.848	26914423.818	641.435	$26,455	01/01/1950	68	75	6	$2,144	$49,039	1	1	0.0	0.0	1.0	1.0	1.0	1
4658	Sanitary Sewer	SAMH_2646 - SAMH_2645	N/A	8.00	VCP	399.29	399	630507.858	26915058.849	634.169	$29,548	01/01/1950	68	75	6	$2,395	$57,498	1	1	0.0	0.0	1.0	2.0	1.0	2
4659	Sanitary Sewer	SAMH_2668 - SAMH_2667	N/A	12.00	VCP	328.97	328	630910.163	26917055.343	631.696	$31,252	01/01/1961	57	75	17	$7,120	$50,991	1	1	0.0	0.0	1.0	2.0	1.0	2
4660	Sanitary Sewer	SAMH_2667 - SAMH_2664	N/A	12.00	VCP	325.40	325	631235.403	26917045.192	631.595	$30,913	01/01/1961	57	75	17	$7,043	$50,437	1	1	0.0	0.0	1.0	2.0	1.0	2
4661	Sanitary Sewer	SAMH_3319 - SAMH_3317	N/A	8.00	PVC	259.76	259	637411.966	26914547.914	604.397	$31,690	01/01/1997	21	75	53	$22,441	$39,483	1	1	0.0	0.0	1.0	2.0	1.0	2
4662	Sanitary Sewer	SAMH_3317 - SAMH_3335B	N/A	8.00	PVC	371.67	376	637541.597	26914199.579	603.056	$45,344	01/01/1997	21	75	53	$32,111	$56,495	1	1	0.0	0.0	1.0	2.0	1.0	2
4663	Sanitary Sewer	SAMH_3301 - SAMH_3303	N/A	15.00	PVC	401.61	223	637630.257	26913838.819	603.101	$51,808	01/01/1997	21	75	53	$36,688	$63,856	1	1	0.0	0.0	1.0	3.0	1.0	3
4664	Sanitary Sewer	SAMH_3300 - SAMH_3301	N/A	15.00	PVC	308.62	308	637709.462	26913445.097	603.751	$39,812	01/01/1997	21	75	53	$28,193	$49,070	1	1	0.0	0.0	1.0	3.0	1.0	3
4665	Sanitary Sewer	SAMH_3303 - SAMH_3335B	N/A	15.00	PVC	371.50	370	637541.597	26914199.579	603.056	$47,923	01/01/1997	21	75	53	$33,937	$59,068	1	1	0.0	0.0	1.0	3.0	1.0	3
4666	Sanitary Sewer	SAMH_2219 - SAMH_2220	N/A	8.00	PVC	40.73	40	637791.987	26912563.070	605.777	$4,969	01/01/1997	21	75	53	$3,518	$6,191	1	1	0.0	0.0	1.0	3.0	1.0	3
4667	Sanitary Sewer	SAMH_2220 - SAMH_2221	N/A	15.00	PVC	275.60	275	637826.320	26912836.517	605.387	$35,552	01/01/1997	21	75	53	$25,176	$43,820	1	1	0.0	0.0	1.0	3.0	1.0	3
4668	Sanitary Sewer	SAMH_2221 - SAMH_3300	N/A	15.00	PVC	311.09	311	637766.171	26913141.734	604.008	$40,130	01/01/1997	21	75	53	$28,418	$49,463	1	1	0.0	0.0	1.0	3.0	1.0	3
4669	Sanitary Sewer	SAMH_2218 - SAMH_2219	N/A	8.00	PVC	322.47	322	637775.510	26912525.820	606.057	$39,341	01/01/1995	23	75	51	$26,809	$49,015	1	1	0.0	0.0	1.0	3.0	1.0	3
4670	Sanitary Sewer	SAMH_1527 - SAMH_1529	N/A	8.00	VCP	221.98	266	625257.889	26910034.160	703.633	$20,422	01/01/1966	52	75	22	$6,015	$33,741	1	1	0.0	0.0	1.0	2.0	1.0	2
4671	Sanitary Sewer	SAMH_1537 - SAMH_1538	N/A	8.00	VCP	255.49	255	625081.170	26909667.168	702.131	$23,505	01/01/1966	52	75	22	$6,923	$38,835	1	1	0.0	0.0	1.0	2.0	1.0	2
4672	Sanitary Sewer	SAMH_1512 - SAMH_1511	N/A	8.00	VCP	288.99	288	625754.070	26910266.819	703.272	$27,165	01/01/1974	44	75	30	$10,900	$41,614	1	1	0.0	0.0	1.0	2.0	1.0	2
4673	Sanitary Sewer	SAMH_1619 - SAMH_1512	N/A	8.00	VCP	334.15	424	625959.451	26910470.121	705.245	$31,410	01/01/1974	44	75	30	$12,604	$48,118	1	1	0.0	0.0	1.0	2.0	1.0	2
4674	Sanitary Sewer	SAMH_1521 - SAMH_1527	N/A	8.00	VCP	344.27	344	625417.077	26910188.868	701.222	$28,918	01/01/1966	52	75	22	$8,517	$49,575	1	1	0.0	0.0	1.0	1.0	1.0	1
4675	Sanitary Sewer	SAMH_1528 - SAMH_1527	N/A	8.00	VCP	525.90	525	625417.078	26910188.869	701.222	$44,176	01/01/1966	52	75	22	$13,011	$75,730	1	1	0.0	0.0	1.0	1.0	1.0	1
4676	Sanitary Sewer	SAMH_1537A - SAMH_1537	N/A	8.00	VCP	193.90	193	625265.118	26909844.479	702.792	$17,839	01/01/1966	52	75	22	$5,254	$29,472	1	1	0.0	0.0	1.0	2.0	1.0	2
4677	Sanitary Sewer	SAMH_1529 - SAMH_1533	N/A	8.00	VCP	245.89	200	625079.372	26909865.066	702.317	$22,622	01/01/1966	52	75	22	$6,663	$37,375	1	1	0.0	0.0	1.0	2.0	1.0	2
4678	Sanitary Sewer	SAMH_1547 - SAMH_1546	N/A	10.00	VCP	130.42	130	624736.078	26909246.634	702.133	$11,999	01/01/1966	52	75	22	$3,534	$19,824	1	1	0.0	0.0	1.0	3.0	1.0	3
4679	Sanitary Sewer	SAMH_1548 - SAMH_1547	N/A	10.00	VCP	166.96	166	624741.865	26909376.925	701.697	$17,030	01/01/1976	42	75	32	$7,287	$25,379	1	1	0.0	0.0	1.0	2.0	1.0	2
4680	Sanitary Sewer	SAMH_1515 - SAMH_1516	N/A	18.00	RCP	251.32	251	626100.129	26911081.223	707.192	$26,891	01/01/1966	52	75	22	$7,920	$41,970	1	1	0.0	0.0	1.0	4.0	5.0	20
4681	Sanitary Sewer	SAMH_1514 - SAMH_1515	N/A	18.00	RCP	189.55	203	626088.656	26910830.165	705.581	$18,765	01/01/1966	52	75	22	$5,527	$30,138	1	1	0.0	0.0	1.0	4.0	3.0	12
4682	Sanitary Sewer	SAMH_3750 - SAMH_3747	N/A	12.00	VCP	338.46	338	629772.356	26921189.536	616.920	$36,296	01/01/1976	42	75	32	$15,532	$54,088	1	1	0.0	0.0	1.0	3.0	3.0	9
4683	Sanitary Sewer	SAMH_3752 - SAMH_3750	N/A	12.00	VCP	272.77	272	629434.639	26921211.873	620.970	$7,593	01/01/1976	42	75	32	$3,249	$9,461	1	1	0.0	0.0	1.0	3.0	3.0	9
4684	Sanitary Sewer	SAMH_3602 - SAMH_3601	N/A	12.00	VCP	349.85	349	629085.548	26921269.062	624.510	$40,233	01/01/1976	42	75	32	$17,217	$57,726	1	1	0.0	0.0	1.0	3.0	1.0	3
4685	Sanitary Sewer	SAMH_3603 - SAMH_3602	N/A	12.00	VCP	361.03	361	628735.735	26921274.372	627.812	$41,518	01/01/1976	42	75	32	$17,767	$59,570	1	1	0.0	0.0	1.0	3.0	1.0	3
4686	Sanitary Sewer	SAMH_3604 - SAMH_3603	N/A	12.00	VCP	385.22	385	628374.734	26921278.836	630.795	$44,301	01/01/1976	42	75	32	$18,958	$63,562	1	1	0.0	0.0	1.0	3.0	1.0	3
4687	Sanitary Sewer	SAMH_4009 - SAMH_4109	N/A	15.00	VCP	363.78	363	626904.606	26926653.361	587.329	$26,663	01/01/1976	42	75	32	$11,410	$38,893	1	1	0.0	0.0	1.0	2.0	1.0	2
4688	Sanitary Sewer	SAMH_4109 - SAMH_4017	N/A	15.00	VCP	344.23	344	627185.040	26926453.733	587.838	$22,283	01/01/1976	42	75	32	$9,535	$32,505	1	1	0.0	0.0	1.0	2.0	1.0	2
4689	Sanitary Sewer	SAMH_4015 - SAMH_4014	N/A	15.00	VCP	358.09	358	625436.478	26927951.110	590.068	$34,977	01/01/1976	42	75	32	$14,968	$51,021	1	1	0.0	0.0	1.0	1.0	1.0	1
4690	Sanitary Sewer	SAMH_4014 - SAMH_4013	N/A	15.00	VCP	355.94	355	625701.660	26927713.690	590.158	$39,032	01/01/1976	42	75	32	$16,703	$56,937	1	1	0.0	0.0	1.0	1.0	1.0	1
4691	Sanitary Sewer	SAMH_4013 - SAMH_4012	N/A	15.00	VCP	340.68	340	625944.127	26927474.371	589.645	$38,797	01/01/1976	42	75	32	$16,602	$56,594	1	1	0.0	0.0	1.0	2.0	1.0	2
4692	Sanitary Sewer	SAMH_4012 - SAMH_4011	N/A	15.00	VCP	338.04	338	626178.441	26927230.712	588.515	$37,134	01/01/1976	42	75	32	$15,891	$54,169	1	1	0.0	0.0	1.0	2.0	1.0	2
4693	Sanitary Sewer	SAMH_4011 - SAMH_4010	N/A	15.00	VCP	321.45	321	626410.720	26927008.505	588.643	$36,847	01/01/1976	42	75	32	$15,768	$53,749	1	1	0.0	0.0	1.0	2.0	1.0	2
4694	Sanitary Sewer	SAMH_4019 - SAMH_4018	N/A	15.00	VCP	351.98	351	624483.651	26928885.368	587.665	$37,239	01/01/1976	42	75	32	$15,936	$57,047	1	1	0.0	0.0	1.0	1.0	1.0	1
4695	Sanitary Sewer	SAMH_4108 - SAMH_4017	N/A	15.00	VCP	291.83	291	624689.361	26928678.374	587.838	$35,957	01/01/1976	42	75	32	$15,387	$53,583	1	1	0.0	0.0	1.0	1.0	1.0	1
4696	Sanitary Sewer	SAMH_4017 - SAMH_4016	N/A	15.00	VCP	363.88	363	624945.942	26928420.349	588.601	$34,846	01/01/1976	42	75	32	$14,912	$52,445	1	1	0.0	0.0	1.0	1.0	1.0	1
4697	Sanitary Sewer	SAMH_4016 - SAMH_4015	N/A	15.00	VCP	320.89	320	625172.854	26928193.456	589.513	$39,663	01/01/1976	42	75	32	$16,973	$57,857	1	1	0.0	0.0	1.0	1.0	1.0	1
4698	Sanitary Sewer	SAMH_4005 - SAMH_4006	N/A	10.00	VCP	301.45	301	625780.769	26926504.867	597.921	$35,619	01/01/1976	42	75	32	$15,242	$53,080	1	1	0.0	0.0	1.0	2.0	1.0	2
4699	Sanitary Sewer	SAMH_4006 - SAMH_4007	N/A	10.00	VCP	349.21	349	626129.695	26926490.849	596.406	$36,137	01/01/1976	42	75	32	$15,464	$53,851	1	1	0.0	0.0	1.0	2.0	1.0	2
4700	Sanitary Sewer	SAMH_4007 - SAMH_4008	N/A	10.00	VCP	354.28	354	626483.694	26926476.774	593.815	$35,625	01/01/1976	42	75	32	$15,245	$53,088	1	1	0.0	0.0	1.0	2.0	1.0	2
4701	Sanitary Sewer	SAMH_4008 - SAMH_4108	N/A	10.00	VCP	349.26	349	626832.585	26926460.649	591.852	$39,652	01/01/1976	42	75	32	$16,968	$57,841	1	1	0.0	0.0	1.0	2.0	1.0	2
4702	Sanitary Sewer	SAMH_4108 - SAMH_4107	N/A	10.00	VCP	352.52	352	627185.040	26926453.733	588.353	$37,521	01/01/1976	42	75	32	$16,056	$54,733	1	1	0.0	0.0	1.0	2.0	1.0	2
4703	Sanitary Sewer	SAMH_4000 - SAMH_4001	N/A	10.00	VCP	263.69	263	624232.166	26926575.570	610.691	$30,780	01/01/1976	42	75	32	$13,172	$45,868	1	1	0.0	0.0	1.0	1.0	1.0	1
4704	Sanitary Sewer	SAMH_4001 - SAMH_4002	N/A	10.00	VCP	301.76	301	624533.522	26926559.911	608.592	$30,754	01/01/1976	42	75	32	$13,161	$45,830	1	1	0.0	0.0	1.0	1.0	1.0	1
4705	Sanitary Sewer	SAMH_4002 - SAMH_4003	N/A	10.00	VCP	301.51	301	624834.705	26926545.841	605.396	$30,857	01/01/1976	42	75	32	$13,205	$45,983	1	1	0.0	0.0	1.0	1.0	1.0	1
4706	Sanitary Sewer	SAMH_4003 - SAMH_4004	N/A	10.00	VCP	302.52	302	625137.011	26926534.414	602.274	$34,987	01/01/1976	42	75	32	$14,972	$52,137	1	1	0.0	0.0	1.0	1.0	1.0	1
4707	Sanitary Sewer	SAMH_3617 - SAMH_3616	N/A	8.00	VCP	99.70	99	628540.255	26921787.769	622.954	$19,763	01/01/1980	38	75	36	$9,512	$27,364	1	1	0.0	0.0	1.0	1.0	1.0	1
4708	Sanitary Sewer	SAMH_3614 - SAMH_3602	N/A	8.00	VCP	319.37	319	628735.735	26921274.372	627.812	$15,121	01/01/1980	38	75	36	$7,277	$20,521	1	1	0.0	0.0	1.0	1.0	1.0	1
4709	Sanitary Sewer	SAMH_2235 - SAMH_2234	N/A	8.00	PVC	301.15	449	636901.772	26911888.023	609.524	$42,763	01/01/2015	3	75	71	$40,552	$45,774	1	1	0.0	0.0	1.0	2.0	1.0	2

CITY OF SAULT STE. MARIE, MICHIGAN

Summary

id	Equipment Description	Asset ID	Construction Drawings Sheet Reference	Capacity or Size	Material	Length	Comment	Northing State Plane Ordinate	Easting State Plane Ordinate	Elevation	Original Cost	Year Installed (01/01/YYYY)	Age	Expected useful life (years)	Remaining Useful Life (years)	Depreciated Value	Replacement Cost	Average number of units in service	Total Number of units	Redundancy (Number)	Redundancy (percent)	Redundancy Score (R) (Reduces (C))	Criticality (C) (see back-up sheets)	Probability of Failure (P) (see back-up sheets)	Business Risk (BRE=PxCxR)
4710	Sanitary Sewer	SAMH_2234 - SAMH_2233	N/A	9.00	VCP	442.91	459	636894.223	26911445.176	607.560	$31,890	01/01/1939	79	75	0	$0	$67,323	1	1	0.0	0.0	1.0	2.0	5.0	10
4711	Sanitary Sewer	SAMH_3753 - SAMH_3754	N/A	10.00	PVC	62.24	62	629164.192	26920930.371	629.365	$36,575	01/01/1994	24	75	50	$24,436	$45,569	1	1	0.0	0.0	1.0	1.0	1.0	1
4712	Sanitary Sewer	SAMH_1612A - SAMH_1612	N/A	8.00	VCP	280.68	169	628738.067	26913020.643	715.192	$23,578	01/01/1969	49	75	25	$7,888	$40,419	1	1	0.0	0.0	1.0	2.0	1.0	2
4713	Sanitary Sewer	SAMH_1763 - SAMH_1764	N/A	10.00	VCP	138.67	138	629491.767	26913134.020	711.587	$11,371	01/01/1950	68	75	6	$921	$21,078	1	1	0.0	0.0	1.0	2.0	1.0	2
4714	Sanitary Sewer	SAMH_1764A - SAMH_1764	N/A	8.00	VCP	51.97	51	629491.767	26913134.020	711.587	$4,365	01/01/1965	53	75	21	$1,227	$7,483	1	1	0.0	0.0	1.0	2.0	1.0	2
4715	Sanitary Sewer	SAMH_1764 - SAMH_1759	N/A	12.00	VCP	299.50	299	629791.256	26913132.063	708.559	$25,457	01/01/1950	68	75	6	$2,063	$46,422	1	1	0.0	0.0	1.0	2.0	1.0	2
4716	Sanitary Sewer	SAMH_1759 - SAMH_1754	N/A	12.00	VCP	350.67	350	630141.896	26913127.344	706.405	$29,807	01/01/1950	68	75	6	$2,416	$54,354	1	1	0.0	0.0	1.0	2.0	1.0	2
4717	Sanitary Sewer	SAMH_1755 - SAMH_1756	N/A	8.00	PVC	196.33	515	629795.115	26912812.872	711.601	$21,989	01/01/1982	36	75	38	$11,170	$29,842	1	1	0.0	0.0	1.0	1.0	1.0	1
4718	Sanitary Sewer	SAMH_1753 - SAMH_1754	N/A	10.00	VCP	245.88	245	630141.896	26913127.344	706.405	$20,162	01/01/1950	68	75	6	$1,634	$37,374	1	1	0.0	0.0	1.0	2.0	1.0	2
4719	Sanitary Sewer	SAMH_1754 - SAMH_1739	N/A	12.00	VCP	291.44	291	630433.304	26913123.105	703.072	$24,772	01/01/1950	68	75	6	$2,008	$45,173	1	1	0.0	0.0	1.0	3.0	1.0	3
4720	Sanitary Sewer	SAMH_2000 - SAMH_2001	N/A	18.00	RCP	220.83	220	634041.954	26908069.310	634.936	$23,629	01/01/1960	58	75	16	$5,067	$36,879	1	1	0.0	0.0	1.0	3.0	1.0	3
4721	Sanitary Sewer	SAMH_2005 - SAMH_2004A	N/A	12.00	VCP	184.42	349	634341.035	26908705.743	0.000	$15,675	01/01/1963	55	75	19	$3,989	$26,740	1	1	0.0	0.0	1.0	3.0	1.0	3
4722	Sanitary Sewer	SAMH_0515 - SAMH_0651	N/A	12.00	PVC	291.70	285	631238.154	26901335.215	627.640	$30,629	01/01/1978	40	75	34	$13,925	$45,214	1	1	0.0	0.0	1.0	2.0	1.0	2
4723	Sanitary Sewer	SAMH_0516 - SAMH_0515	N/A	8.00	PVC	137.68	136	630946.661	26901346.314	626.151	$12,942	01/01/1978	40	75	34	$5,884	$19,826	1	1	0.0	0.0	1.0	2.0	1.0	2
4724	Sanitary Sewer	SAMH_0508 - SAMH_0509	N/A	8.00	PVC	212.90	212	630020.194	26901499.716	632.576	$21,716	01/01/1978	40	75	34	$9,873	$32,361	1	1	0.0	0.0	1.0	2.0	1.0	2
4725	Sanitary Sewer	SAMH_0520 - SAMH_0519	N/A	8.00	PVC	175.63	175	631004.978	26902311.317	635.050	$17,915	01/01/1978	40	75	34	$8,145	$26,696	1	1	0.0	0.0	1.0	2.0	1.0	2
4726	Sanitary Sewer	SAMH_0519 - SAMH_0518	N/A	8.00	PVC	219.39	214	630829.521	26902179.607	634.557	$22,378	01/01/1978	40	75	34	$10,174	$33,348	1	1	0.0	0.0	1.0	2.0	1.0	2
4727	Sanitary Sewer	SAMH_1108 - SAMH_1107	N/A	8.00	PVC	22.86	22	631797.056	26902978.675	638.455	$2,149	01/01/1978	40	75	34	$977	$3,293	1	1	0.0	0.0	1.0	1.0	1.0	1
4728	Sanitary Sewer	SAMH_1107 - SAMH_1106	N/A	8.00	PVC	233.82	231	631617.513	26902828.885	636.723	$21,979	01/01/1978	40	75	34	$9,992	$33,670	1	1	0.0	0.0	1.0	1.0	1.0	1
4729	Sanitary Sewer	SAMH_1106 - SAMH_0519	N/A	8.00	PVC	801.92	404	631004.978	26902311.317	635.050	$81,796	01/01/1978	40	75	34	$37,188	$121,892	1	1	0.0	0.0	1.0	1.0	1.0	1
4730	Sanitary Sewer	SAMH_1109 - SAMH_1108	N/A	8.00	PVC	340.28	340	631810.776	26902996.966	639.151	$34,709	01/01/1978	40	75	34	$15,780	$51,723	1	1	0.0	0.0	1.0	1.0	1.0	1
4731	Sanitary Sewer	SAMH_0504 - SAMH_0505	N/A	8.00	PVC	285.93	285	630373.725	26902343.956	0.000	$29,165	01/01/1978	40	75	34	$13,259	$43,462	1	1	0.0	0.0	1.0	1.0	1.0	1
4732	Sanitary Sewer	SAMH_0800A - SAMH_0800	N/A	12.00	PVC	79.05	79	623483.142	26907963.378	701.445	$9,881	01/01/1994	24	75	50	$6,601	$12,253	1	1	0.0	0.0	1.0	2.0	1.0	2
4733	Sanitary Sewer	SAMH_0800 - SAMH_1558	N/A	15.00	PVC	233.82	233	623524.290	26908193.553	701.223	$30,163	01/01/1994	24	75	50	$20,152	$37,178	1	1	0.0	0.0	1.0	3.0	1.0	3
4734	Sanitary Sewer	SAMH_0801 - SAMH_0800A	N/A	12.00	PVC	337.46	337	623466.606	26907886.078	701.191	$42,182	01/01/1994	24	75	50	$28,182	$52,306	1	1	0.0	0.0	1.0	2.0	1.0	2
4735	Sanitary Sewer	SAMH_0719 - SAMH_0720	N/A	15.00	PVC	118.02	118	623358.128	26908005.572	703.408	$15,225	01/01/1994	24	75	50	$10,172	$18,766	1	1	0.0	0.0	1.0	2.0	1.0	2
4736	Sanitary Sewer	SAMH_0722 - SAMH_0721	N/A	15.00	PVC	365.93	48	623314.304	26908000.597	703.952	$51,595	01/01/1999	19	75	55	$37,913	$62,573	1	1	0.0	0.0	1.0	1.0	1.0	1
4737	Sanitary Sewer	SAMH_3137A - SAMH_3137	N/A	9.00	VCP	167.51		634752.582	26913072.225	628.958	$10,720	01/01/1939	79	75	0	$0	$24,121	1	1	0.0	0.0	1.0	1.0	1.0	1
4738	Sanitary Sewer	SAMH_3100 - SAMH_3101	N/A	8.00	PVC	318.44		635660.731	26915950.344	610.650	$49,359	01/01/2015	3	75	71	$46,807	$52,543	1	1	0.0	0.0	1.0	1.0	1.0	1
4739	Sanitary Sewer	SAMH_2803 - SAMH_3156A	N/A	24.00	VCP	50.61	278	634101.056	26913411.615	626.567	$4,858	01/01/1939	79	75	0	$0	$8,907	1	1	0.0	0.0	1.0	4.0	4.0	16
4740	Sanitary Sewer	SAMH_4004 - SAMH_4005	N/A	10.00	VCP	343.01	343	625479.532	26926516.181	599.641	$30,748	01/01/1976	42	75	32	$13,158	$45,820	1	1	0.0	0.0	1.0	2.0	1.0	2
4741	Sanitary Sewer	SAMH_3807 - SAMH_3809	N/A	36.00	RCP	365.38	365	633498.776	26923416.738	589.541	$1,353	01/01/1960	58	75	16	$290	$2,236	1	1	0.0	0.0	1.0	5.0	1.0	5
4742	Sanitary Sewer	SAMH_4301 - SAMH_3809	N/A	15.00	VCP	314.85	314	633498.776	26923416.738	589.541	$28,532	01/01/1950	68	75	6	$2,312	$50,973	1	1	0.0	0.0	1.0	1.0	1.0	1
4743	Sanitary Sewer	SAMH_3813 - SAMH_3810	N/A	24.00	CP	332.32	330	633511.618	26923423.911	589.687	$17,476	01/01/1976	42	75	32	$7,478	$36,117	1	1	0.0	0.0	1.0	5.0	1.0	5
4744	Sanitary Sewer	SAMH_4302 - SAMH_4301	N/A	15.00	VCP	320.59	320	633370.516	26923704.279	589.069	$1,365	01/01/1950	68	75	6	$110	$2,439	1	1	0.0	0.0	1.0	1.0	1.0	1
4745	Sanitary Sewer	SAMH_4303 - SAMH_4302	N/A	15.00	VCP	15.34	15	633238.157	26923996.265	588.818	$2,095	01/01/1950	68	75	6	$169	$4,424	1	1	0.0	0.0	1.0	1.0	1.0	1
4746	Sanitary Sewer	SAMH_3831 - SAMH_3830	N/A	8.00	RCP	262.07	262	633348.047	26922380.578	597.481	$9,414	01/01/1991	27	75	47	$5,912	$10,932	1	1	0.0	0.0	1.0	1.0	1.0	1
4747	Sanitary Sewer	SAMH_3830 - SAMH_3829	N/A	8.00	CP	261.30	261	633581.903	26922497.139	596.519	$7,927	01/01/1973	45	75	29	$3,075	$9,206	1	1	0.0	0.0	1.0	1.0	1.0	1
4748	Sanitary Sewer	SAMH_0605 - SAMH_0607	N/A	8.00	PVC	207.18	148	632023.816	26897345.348	612.294	$25,275	01/01/1998	20	75	54	$18,235	$31,491	1	1	0.0	0.0	1.0	3.0	1.0	3
4749	Sanitary Sewer	SAMH_0607 - SAMH_0606	N/A	8.00	PVC	45.18	45	632019.412	26897300.381	612.448	$5,512	01/01/1998	20	75	54	$3,976	$6,868	1	1	0.0	0.0	1.0	3.0	1.0	3
4750	Sanitary Sewer	SAMH_3505 - SAMH_3506	N/A	8.00	PVC	39.71	39	624261.407	26921308.712	631.213	$5,242	01/01/2000	18	75	56	$3,921	$6,036	1	1	0.0	0.0	1.0	1.0	1.0	1
4751	Sanitary Sewer	SAMH_3612 - SAMH_3613	N/A	8.00	PVC	44.05	44	626606.454	26921291.211	628.491	$40,527	01/01/2000	18	75	56	$30,320	$58,148	1	1	0.0	0.0	1.0	2.0	1.0	2
4752	Sanitary Sewer	SAMH_3610 - SAMH_3611	N/A	8.00	PVC	42.92	42	626958.865	26921290.839	630.119	$32,702	01/01/2000	18	75	56	$24,466	$46,921	1	1	0.0	0.0	1.0	2.0	1.0	2
4753	Sanitary Sewer	SAMH_3529 - SAMH_3528	N/A	8.00	VCP	333.72	333	625042.851	26922130.610	628.385	$34,707	01/01/1980	38	75	36	$16,705	$48,056	1	1	0.0	0.0	1.0	1.0	1.0	1
4754	Sanitary Sewer	SAMH_3528 - SAMH_3527	N/A	8.00	VCP	338.42	338	625032.986	26921792.335	626.495	$35,196	01/01/1980	38	75	36	$16,940	$48,732	1	1	0.0	0.0	1.0	1.0	1.0	1
4755	Sanitary Sewer	SAMH_0505 - SAMH_0506	N/A	8.00	PVC	324.41	324	630360.626	26902019.809	635.913	$33,090	01/01/1978	40	75	34	$15,044	$49,311	1	1	0.0	0.0	1.0	1.0	1.0	1
4756	Sanitary Sewer	SAMH_1768 - SAMH_1768A	N/A	8.00	PVC	169.38	169	629216.199	26911153.949	718.377	$21,003	01/01/2003	15	75	59	$16,554	$24,391	1	1	0.0	0.0	1.0	2.0	1.0	2
4757	Sanitary Sewer	SAMH_1768A - SAMH_D1769	N/A	8.00	PVC	232.03	232	629055.115	26911320.956	0.000	$28,772	01/01/2003	15	75	59	$22,678	$33,413	1	1	0.0	0.0	1.0	2.0	1.0	2
4758	Sanitary Sewer	SAMH_1769 - SAMH_1770	N/A	8.00	PVC	299.41	299	628848.350	26911537.511	718.002	$37,127	01/01/2003	15	75	59	$29,263	$43,115	1	1	0.0	0.0	1.0	2.0	1.0	2
4759	Sanitary Sewer	SAMH_1770 - SAMH_1601	N/A	8.00	PVC	151.57	151	628744.665	26911648.064	717.869	$18,794	01/01/2003	15	75	59	$14,813	$21,826	1	1	0.0	0.0	1.0	2.0	1.0	2
4760	Sanitary Sewer	SAMH_1601 - SAMH_1602	N/A	8.00	PVC	250.15	250	628494.655	26911656.381	716.233	$31,018	01/01/2003	15	75	59	$24,448	$36,021	1	1	0.0	0.0	1.0	2.0	1.0	2
4761	Sanitary Sewer	SAMH_1602 - SAMH_1605	N/A	8.00	PVC	329.32	329	628165.474	26911665.948	714.709	$40,836	01/01/2003	15	75	59	$32,186	$47,422	1	1	0.0	0.0	1.0	2.0	1.0	2
4762	Sanitary Sewer	SAMH_1605 - SAMH_1606	N/A	10.00	PVC	50.52	50	628114.960	26911666.511	714.436	$5,254	01/01/1980	38	75	36	$2,528	$7,274	1	1	0.0	0.0	1.0	2.0	1.0	2
4763	Sanitary Sewer	SAMH_1604 - SAMH_1605	N/A	10.00	PVC	351.33	351	628165.474	26911665.948	714.709	$36,539	01/01/1980	38	75	36	$17,586	$50,592	1	1	0.0	0.0	1.0	2.0	1.0	2
4764	Sanitary Sewer	SAMH_1606 - SAMH_1607	N/A	10.00	PVC	339.39	339	627878.443	26911909.907	713.475	$35,296	01/01/1980	38	75	36	$16,988	$48,871	1	1	0.0	0.0	1.0	2.0	1.0	2
4765	Sanitary Sewer	SAMH_1744 - SAMH_1743	N/A	8.00	PVC	399.23	399	629716.316	26910634.551	717.896	$49,505	01/01/2001	17	75	57	$37,699	$57,489	1	1	0.0	0.0	1.0	2.0	1.0	2
4766	Sanitary Sewer	SAMH_1119 - SAMH_1120	N/A	8.00	PVC	297.76	297	631056.927	26902742.897	644.363	$30,371	01/01/1978	40	75	34	$13,808	$45,259	1	1	0.0	0.0	1.0	1.0	1.0	1
4767	Sanitary Sewer	SAMH_1120 - SAMH_0521	N/A	8.00	PVC	126.10	126	631022.254	26902621.654	639.387	$12,863	01/01/1978	40	75	34	$5,848	$19,168	1	1	0.0	0.0	1.0	1.0	1.0	1
4768	Sanitary Sewer	SAMH_0521 - SAMH_0520	N/A	8.00	PVC	135.23	135	631012.130	26902486.804	635.130	$13,793	01/01/1978	40	75	34	$6,270	$20,555	1	1	0.0	0.0	1.0	2.0	1.0	2
4769	Sanitary Sewer	SAMH_0522 - SAMH_0521	N/A	8.00	PVC	210.81	210	631022.254	26902621.654	639.387	$21,503	01/01/1978	40	75	34	$9,776	$32,043	1	1	0.0	0.0	1.0	1.0	1.0	1
4770	Sanitary Sewer	SAMH_1116 - SAMH_1117	N/A	8.00	PVC	99.89	99	631745.477	26903320.418	648.101	$10,189	01/01/1978	40	75	34	$4,632	$15,183	1	1	0.0	0.0	1.0	1.0	1.0	1
4771	Sanitary Sewer	SAMH_1117 - SAMH_1118	N/A	8.00	PVC	289.19	289	631519.735	26903139.672	648.051	$29,497	01/01/1978	40	75	34	$13,410	$43,956	1	1	0.0	0.0	1.0	1.0	1.0	1
4772	Sanitary Sewer	SAMH_1118 - SAMH_1119	N/A	8.00	PVC	311.89	311	631280.698	26902939.327	646.431	$31,813	01/01/1978	40	75	34	$14,463	$47,408	1	1	0.0	0.0	1.0	1.0	1.0	1
4773	Sanitary Sewer	SAMH_2639 - SAMH_2638	N/A	8.00	CP	331.01	331	631159.429	26914721.597	632.404	$24,495	01/01/1950	68	75	6	$1,985	$47,666	1	1	0.0	0.0	1.0	1.0	1.0	1
4774	Sanitary Sewer	SAMH_1622 - SAMH_1518A	N/A	10.00	PVC	300.25	300	626117.011	26911366.911	0.000	$33,628	01/01/1980	38	75	36	$16,185	$45,638	1	1	0.0	0.0	1.0	2.0	1.0	2
4775	Sanitary Sewer	SAMH_1516 - SAMH_1518	N/A	18.00	RCP	259.19	238	626115.686	26911339.943	706.750	$27,734	01/01/1966	52	75	22	$8,168	$43,285	1	1	0.0	0.0	1.0	4.0	3.0	12
4776	Sanitary Sewer	SAMH_1518 - SAMH_1519	N/A	18.00	RCP	292.16	319	626131.347	26911658.723	705.655	$31,262	01/01/1966	52	75	22	$9,207	$48,791	1	1	0.0	0.0	1.0	4.0	5.0	20
4777	Sanitary Sewer	SAMH_1620 - SAMH_1621	N/A	10.00	PVC	209.61	223	626627.894	26911348.323	706.676	$23,476	01/01/1980	38	75	36	$11,299	$31,861	1	1	0.0	0.0	1.0	2.0	1.0	2
4778	Sanitary Sewer	SAMH_1621 - SAMH_1622	N/A	10.00	PVC	210.97	203	626417.092	26911356.790	707.668	$21,941	01/01/1980	38	75	36	$10,560	$30,380	1	1	0.0	0.0	1.0	2.0	1.0	2
4779	Sanitary Sewer	SAMH_1771 - SAMH_1603	N/A	10.00	PVC	349.91	349	628635.767	26912119.544	716.547	$39,889	01/01/1990	28	75	46	$24,522	$50,387	1	1	0.0	0.0	1.0	2.0	1.0	2
4780	Sanitary Sewer	SAMH_1603 - SAMH_1604	N/A	10.00	PVC	302.06	302	628418.364	26911909.836	716.120	$31,414	01/01/1980	38	75	36	$15,120	$43,497	1	1	0.0	0.0	1.0	2.0	1.0	2
4781	Sanitary Sewer	SAMH_4320 - SAMH_4319	N/A	18.00	RCP	298.33	298	632821.307	26924344.337	585.165	$46,905	01/01/1976	42	75	32	$20,072	$66,950	1	1	0.0	0.0	1.0	5.0	1.0	5
4782	Sanitary Sewer	SAMH_4321 - SAMH_4320	N/A	18.00	RCP	400.90	400	632531.596	26924273.164	587.344	$70,267	01/01/1976	42	75	32	$30,070	$99,302	1	1	0.0	0.0	1.0	5.0	5.0	25
4783	Sanitary Sewer	SAMH_4211 - SAMH_4321	N/A	18.00	RCP	396.70	396	632166.618	26924107.310	591.708	$33,322	01/01/1976	42	75	32	$14,259	$47,563	1	1	0.0	0.0	1.0	5.0	5.0	25
4784	Sanitary Sewer	SAMH_4319 - SAMH_4318	N/A	18.00	RCP	163.70	163	632976.503	26924292.262	588.791	$32,518	01/01/1976	42	75	32	$13,915	$47,434	1	1	0.0	0.0	1.0	5.0	1.0	5
4785	Sanitary Sewer	SAMH_4212 - SAMH_4211	N/A	18.00	RCP	284.81	284	631791.049	26923979.565	588.867	$28,022	01/01/1976	42	75	32	$11,991	$50,061	1	1	0.0	0.0	1.0	5.0	1.0	5
4786	Sanitary Sewer	SAMH_3709 - SAMH_4212	N/A	18.00	RCP	460.08	460	631527.300	26923872.092	593.506	$26,057	01/01/1976	42	75	32	$11,150	$38,829	1	1	0.0	0.0	1.0	5.0	1.0	5
4787	Sanitary Sewer	SAMH_3708 - SAMH_3709	N/A	18.00	RCP	395.12	395	631516.957	26923412.127	593.158	$53,830	01/01/1976	42	75	32	$23,036	$76,834	1	1	0.0	0.0	1.0	5.0	5.0	25
4788	Sanitary Sewer	SAMH_3707 - SAMH_3708	N/A	18.00	RCP	299.71	283	631499.983	26923017.372	593.265	$46,229	01/01/1976	42	75	32	$19,783	$65,985	1	1	0.0	0.0	1.0	5.0	5.0	25
4789	Sanitary Sewer	SAMH_3706 - SAMH_3707	N/A	18.00	RCP	302.69	302	631487.038	26922717.940	593.940	$35,066	01/01/1976	42	75	32	$15,006	$50,052	1	1	0.0	0.0	1.0	5.0	5.0	25
4790	Sanitary Sewer	SAMH_3727 - SAMH_3717	N/A	18.00	RCP	312.02	312	631119.091	26922441.682	596.733	$33,190	01/01/1976	42	75	32	$14,203	$49,460	1	1	0.0	0.0	1.0	4.0	4.0	16
4791	Sanitary Sewer	SAMH_3717 - SAMH_3706	N/A	18.00	RCP	356.95	356	631475.075	26922415.486	595.282	$27,303	01/01/1976	42	75	32	$11,684	$40,687	1	1	0.0	0.0	1.0	4.0	3.0	12
4792	Sanitary Sewer	SAMH_3723 - SAMH_3724	N/A	18.00	RCP	364.18	364	630774.613	26921493.983	601.033	$35,863	01/01/1976	42	75	32	$15,347	$51,190	1	1	0.0	0.0	1.0	4.0	5.0	20
4793	Sanitary Sewer	SAMH_3724 - SAMH_3725	N/A	18.00	RCP	306.52	306	630789.483	26921800.145	596.465	$39,899	01/01/1976	42	75	32	$17,074	$56,950	1	1	0.0	0.0	1.0	4.0	3.0	12
4794	Sanitary Sewer	SAMH_3725 - SAMH_3726	N/A	18.00	RCP	341.02	341	630798.422	26922141.046	597.252	$38,090	01/01/1976	42	75	32	$16,300	$54,368	1	1	0.0	0.0	1.0	4.0	3.0	12
4795	Sanitary Sewer	SAMH_3726 - SAMH_3727	N/A	18.00	RCP	325.56	325	630808.061	26922466.458	594.581	$36,506	01/01/1976	42	75	32	$15,622	$52,107	1	1	0.0	0.0	1.0	4.0	3.0	12
4796	Sanitary Sewer	SAMH_3710 - SAMH_3702	N/A	8.00	VCP	255.46	255	631395.345	26921079.244	600.137	$33,060	01/01/1976	42	75	32	$14,147	$49,266	1	1	0.0	0.0	1.0	1.0	1.0	1
4797	Sanitary Sewer	SAMH_3730 - SAMH_3723	N/A	8.00	VCP	160.93	160	630767.076	26921129.887	604.190	$37,269	01/01/1976	42	75	32	$15,949	$53,473	1	1	0.0	0.0	1.0	1.0	1.0	1
4798	Sanitary Sewer	SAMH_3736 - SAMH_3723	N/A	18.00	RCP	342.71	342	630767.076	26921129.887	604.190	$10,569	01/01/1976	42	75	32	$4,522	$15,602	1	1	0.0	0.0	1.0	4.0	1.0	4
4799	Sanitary Sewer	SAMH_3736A - SAMH_3736	N/A	12.00	VCP	100.66	100	630424.912	26921149.258	607.388	$32,358	01/01/1976	42	75	32	$13,847	$48,220	1	1	0.0	0.0	1.0	3.0	1.0	3
4800	Sanitary Sewer	SAMH_3738 - SAMH_3736A	N/A	12.00	VCP	24.42	24	630324.369	26921154.107	607.755	$11,810	01/01/1976	42	75	32	$5,054	$17,433	1	1	0.0	0.0	1.0	3.0	1.0	3
4801	Sanitary Sewer	SAMH_3739 - SAMH_3738	N/A	12.00	VCP	112.47	112	630302.446	26921143.352	607.221	$13,589	01/01/1976	42	75	32	$5,815	$20,059	1	1	0.0	0.0	1.0	3.0	5.0	15
4802	Sanitary Sewer	SAMH_3740 - SAMH_3739	N/A	12.00	VCP	129.41	129	630191.038	26921158.797	608.988	$36,704	01/01/1976	42	75	32	$15,707	$54,695	1	1	0.0	0.0	1.0	3.0	3.0	9
4803	Sanitary Sewer	SAMH_3747 - SAMH_3740	N/A	12.00	VCP	290.45	290	630062.235	26921171.355	611.568	$16,977	01/01/1976	42	75	32	$7,265	$25,298	1	1	0.0	0.0	1.0	3.0	3.0	9
4804	Sanitary Sewer	SAMH_3737 - SAMH_3736	N/A	8.00	VCP	317.24	317	630424.912	26921149.258	607.388	$2,564	01/01/1976	42	75	32	$1,097	$3,785	1	1	0.0	0.0	1.0	1.0	1.0	1
4805	Sanitary Sewer	SAMH_3733 - SAMH_3734	N/A	15.00	RCP	335.24	335	630398.116	26920473.921	615.587	$37,060	01/01/1976	42	75	32	$15,859	$54,060	1	1	0.0	0.0	1.0	2.0	1.0	2
4806	Sanitary Sewer	SAMH_3734 - SAMH_3735	N/A	15.00	RCP	340.00	340	630412.392	26920813.623	610.824	$36,610	01/01/1976	42	75	32	$15,667	$53,403	1	1	0.0	0.0	1.0	2.0	1.0	2
4807	Sanitary Sewer	SAMH_3735 - SAMH_3736	N/A	15.00	RCP	335.87	335	630424.912	26921149.258	607.388	$40,097	01/01/1976	42	75	32	$17,159	$57,233	1	1	0.0	0.0	1.0	3.0	1.0	3
4808	Sanitary Sewer	SAMH_3732 - SAMH_3733	N/A	15.00	RCP	316.72	316	630384.749	26920138.945	620.198	$1,216	01/01/1976	42	75	32	$520	$1,830	1	1	0.0	0.0	1.0	2.0	1.0	2
4809	Sanitary Sewer	SAMH_3742 - SAMH_3734	N/A	8.00	VCP	359.84	364	630398.116	26920473.921	615.587	$26,656	01/01/1976	42	75	32	$11,407	$39,722	1	1	0.0	0.0	1.0	2.0	1.0	2
4810	Sanitary Sewer	SAMH_3728 - SAMH_3729	N/A	8.00	VCP	325.39	325	630329.123	26918773.590	631.824	$41,638	01/01/1976	42	75	32	$17,818	$59,741	1	1	0.0	0.0	1.0	2.0	1.0	2
4811	Sanitary Sewer	SAMH_3729 - SAMH_3730	N/A	8.00	VCP	362.07	362	630343.610	26919135.367	631.346	$16,415	01/01/1976	42	75	32	$7,024	$24,461	1	1	0.0	0.0	1.0	2.0	1.0	2
4812	Sanitary Sewer	SAMH_3730 - SAMH_3731	N/A	8.00	VCP	324.08	324	630355.001	26919459.246	630.073	$41,817	01/01/1976	42	75	32	$17,895	$59,999	1	1	0.0	0.0	1.0	2.0	1.0	2
4813	Sanitary Sewer	SAMH_3731 - SAMH_3732	N/A	8.00	RCP	363.63	363	630370.305	26919822.550	626.042	$34,523	01/01/1976	42	75	32	$14,773	$50,359	1	1	0.0	0.0	1.0	2.0	1.0	2
4814	Sanitary Sewer	SAMH_2674 - SAMH_2675	N/A	8.00	VCP	326.58	326	630291.008	26917767.762	632.363	$33,311	01/01/1976	42	75	32	$14,255	$49,641	1	1	0.0	0.0	1.0	1.0	1.0	1
4815	Sanitary Sewer	SAMH_2675 - SAMH_2676	N/A	8.00	VCP	355.27	355	630301.082	26918122.888	631.970	$36,237	01/01/1976	42	75	32	$15,507	$54,001	1	1	0.0	0.0	1.0	1.0	1.0	1
4816	Sanitary Sewer	SAMH_2676 - SAMH_3728	N/A	8.00	VCP	325.92	325	630315.977	26918448.464	632.392	$33,244	01/01/1976	42	75	32	$14,226	$49,539	1	1	0.0	0.0	1.0	2.0	1.0	2
4817	Sanitary Sewer	SAMH_3702 - SAMH_3703	N/A	8.00	VCP	357.97	357	631414.227	26921436.711	597.902	$35,372	01/01/1976	42	75	32	$15,137	$52,711	1	1	0.0	0.0	1.0	2.0	1.0	2
4818	Sanitary Sewer	SAMH_3703 - SAMH_3704	N/A	8.00	VCP	346.78	354	631429.976	26921783.137	595.647	$30,801	01/01/1976	42	75	32	$13,181	$47,012	1	1	0.0	0.0	1.0	2.0	1.0	2
4819	Sanitary Sewer	SAMH_3704 - SAMH_3705	N/A	12.00	VCP	324.22	324	631444.903	26922107.012	594.501	$32,544	01/01/1976	42	75	32	$13,927	$48,042	1	1	0.0	0.0	1.0	2.0	1.0	2
4820	Sanitary Sewer	SAMH_3705 - SAMH_3706	N/A	12.00	VCP	309.95	309	631475.075	26922415.486	595.282	$35,415	01/01/1976	42	75	32	$15,155	$50,549	1	1	0.0	0.0	1.0	2.0	1.0	2
4821	Sanitary Sewer	SAMH_3716 - SAMH_3717	N/A	8.00	VCP	341.78	341	631119.091	26922441.682	596.733	$41,763	01/01/1976	42	75	32	$17,872	$59,610	1	1	0.0	0.0	1.0	2.0	1.0	2
4822	Sanitary Sewer	SAMH_3714 - SAMH_3715	N/A	8.00	VCP	316.95	316	631110.909	26921801.381	599.002	$30,473	01/01/1976	42	75	32	$13,040	$45,411	1	1	0.0	0.0	1.0	2.0	1.0	2
4823	Sanitary Sewer	SAMH_3715 - SAMH_3716	N/A	8.00	VCP	298.76	298	631122.364	26922099.920	596.423	$34,861	01/01/1976	42	75	32	$14,918	$51,950	1	1	0.0	0.0	1.0	2.0	1.0	2
4824	Sanitary Sewer	SAMH_3719 - SAMH_3718	N/A	8.00	VCP	275.72	275	631143.662	26922708.229	596.144	$35,872	01/01/1976	42	75	32	$15,351	$53,456	1	1	0.0	0.0	1.0	1.0	1.0	1
4825	Sanitary Sewer	SAMH_3718 - SAMH_3717	N/A	8.00	VCP	267.68	267	631119.091	26922441.682	596.733	$25,917	01/01/1976	42	75	32	$11,091	$39,703	1	1	0.0	0.0	1.0	1.0	1.0	1
4826	Sanitary Sewer	SAMH_3711 - SAMH_3712	N/A	8.00	VCP	324.12	324	631066.394	26920790.107	603.645	$32,313	01/01/1976	42	75	32	$13,828	$48,153	1	1	0.0	0.0	1.0	1.0	1.0	1
4827	Sanitary Sewer	SAMH_4305 - SAMH_4306	N/A	18.00	RCP	7.26	7	633238.478	26924041.056	588.927	$34,661	01/01/1976	42	75	32	$14,833	$49,473	1	1	0.0	0.0	1.0	5.0	1.0	5
4828	Sanitary Sewer	SAMH_4307 - SAMH_4306	N/A	18.00	CP	349.26	349	633238.478	26924041.056	588.871	$41,760	01/01/1976	42	75	32	$17,870	$59,606	1	1	0.0	0.0	1.0	4.0	1.0	4
4829	Sanitary Sewer	SAMH_3755A - SAMH_3755	N/A	8.00	VCP	365.47	364	629118.935	26921231.168	624.308	$2,538	01/01/1976	42	75	32	$1,086	$4,872	1	1	0.0	0.0	1.0	1.0	1.0	1
4830	Sanitary Sewer	SAMH_3751 - SAMH_3750	N/A	8.00	VCP	355.84	355	629434.639	26921211.873	620.970	$31,369	01/01/1976	42	75	32	$13,424	$45,008	1	1	0.0	0.0	1.0	1.0	1.0	1
4831	Sanitary Sewer	SAMH_3749 - SAMH_3750	N/A	8.00	VCP	204.07	204	629434.639	26921211.873	620.970	$38,922	01/01/1976	42	75	32	$16,656	$55,845	1	1	0.0	0.0	1.0	1.0	1.0	1
4832	Sanitary Sewer	SAMH_3748 - SAMH_3749	N/A	8.00	VCP	166.44	166	629425.854	26921007.992	0.000	$20,815	01/01/1976	42	75	32	$8,907	$31,019	1	1	0.0	0.0	1.0	1.0	1.0	1
4833	Sanitary Sewer	SAMH_3613 - SAMH_3611	N/A	12.00	VCP	352.41	352	626958.865	26921290.839	630.119	$39,921	01/01/1976	42	75	32	$17,084	$52,696	1	1	0.0	0.0	1.0	2.0	1.0	2
4834	Sanitary Sewer	SAMH_3611 - SAMH_3609	N/A	12.00	VCP	284.37	284	627243.230	26921289.591	631.680	$5,815	01/01/1976	42	75	32	$2,488	$6,696	1	1	0.0	0.0	1.0	2.0	1.0	2
4835	Sanitary Sewer	SAMH_3609 - SAMH_3608	N/A	12.00	VCP	398.85	398	627642.064	26921286.313	630.739	$45,867	01/01/1976	42	75	32	$19,628	$65,810	1	1	0.0	0.0	1.0	2.0	1.0	2
4836	Sanitary Sewer	SAMH_3608 - SAMH_3604A	N/A	12.00	VCP	249.56	347	627891.607	26921283.396	0.000	$28,700	01/01/1976	42	75	32	$12,282	$41,178	1	1	0.0	0.0	1.0	2.0	1.0	2
4837	Sanitary Sewer	SAMH_3500 - SAMH_3613	N/A	12.00	VCP	359.59	359	626606.454	26921291.211	628.491	$41,353	01/01/1976	42	75	32	$17,696	$59,332	1	1	0.0	0.0	1.0	2.0	1.0	2
4838	Sanitary Sewer	SAMH_3502 - SAMH_3501	N/A	12.00	VCP	400.21	400	625849.245	26921296.554	632.020	$46,025	01/01/1976	42	75	32	$19,696	$66,035	1	1	0.0	0.0	1.0	2.0	1.0	2
4839	Sanitary Sewer	SAMH_3501 - SAMH_3500	N/A	12.00	VCP	397.64	397	626246.883	26921294.771	630.377	$45,729	01/01/1976	42	75	32	$19,569	$65,611	1	1	0.0	0.0	1.0	2.0	1.0	2
4840	Sanitary Sewer	SAMH_3503 - SAMH_3502	N/A	12.00	VCP	393.58	393	625449.044	26921299.641	630.407	$41,326	01/01/1976	42	75	32	$17,685	$61,005	1	1	0.0	0.0	1.0	1.0	1.0	1
4841	Sanitary Sewer	SAMH_3504 - SAMH_3503	N/A	12.00	VCP	394.40	394	625055.471	26921302.305	630.939	$41,412	01/01/1976	42	75	32	$17,722	$61,131	1	1	0.0	0.0	1.0	1.0	1.0	1
4842	Sanitary Sewer	SAMH_3507 - SAMH_3506	N/A	12.00	VCP	391.14	391	624261.407	26921308.712	631.213	$41,070	01/01/1976	42	75	32	$17,575	$60,627	1	1	0.0	0.0	1.0	1.0	4.0	4
4843	Sanitary Sewer	SAMH_3506 - SAMH_3504	N/A	12.00	VCP	399.70	399	624661.092	26921305.786	632.339	$41,968	01/01/1976	42	75	32	$17,960	$61,953	1	1	0.0	0.0	1.0	1.0	4.0	4
4844	Sanitary Sewer	SAMH_0721 - SAMH_0720	N/A	15.00	PVC	44.11	44	623358.128	26908005.572	703.408	$5,690	01/01/1998	20	75	54	$4,105	$7,013	1	1	0.0	0.0	1.0	1.0	1.0	1
4845	Sanitary Sewer	SAMH_0720 - SAMH_0800	N/A	15.00	PVC	131.94	131	623483.142	26907963.378	701.445	$17,021	01/01/1994	24	75	50	$11,372	$20,979	1	1	0.0	0.0	1.0	2.0	1.0	2
4846	Sanitary Sewer	SAMH_0715 - SAMH_0716	N/A	15.00	PVC	211.26	211	623319.959	26907712.844	702.941	$27,252	01/01/1998	20	75	54	$19,662	$33,590	1	1	0.0	0.0	1.0	2.0	1.0	2
4847	Sanitary Sewer	SAMH_0716 - SAMH_0718	N/A	15.00	PVC	75.12	73	623308.670	26907787.107	703.037	$9,690	01/01/1998	20	75	54	$6,991	$11,944	1	1	0.0	0.0	1.0	2.0	1.0	2
4848	Sanitary Sewer	SAMH_0718 - SAMH_0719	N/A	15.00	PVC	108.99	29	623314.401	26907895.947	703.569	$14,060	01/01/1996	22	75	52	$9,768	$17,330	1	1	0.0	0.0	1.0	2.0	1.0	2
4849	Sanitary Sewer	SAMH_2507 - SAMH_2508	N/A	8.00	PVC	339.81	339	627534.396	26913850.118	706.250	$41,457	01/01/1994	24	75	50	$27,698	$51,652	1	1	0.0	0.0	1.0	2.0	1.0	2
4850	Sanitary Sewer	SAMH_2506 - SAMH_2507	N/A	8.00	PVC	226.20	226	627517.094	26913510.747	708.600	$27,596	01/01/1994	24	75	50	$18,437	$34,382	1	1	0.0	0.0	1.0	2.0	1.0	2
4851	Sanitary Sewer	SAMH_2515 - SAMH_2514	N/A	8.00	CP	381.59	381	627531.772	26914132.719	703.717	$39,686	01/01/1988	30	75	44	$23,337	$54,950	1	1	0.0	0.0	1.0	1.0	1.0	1
4852	Sanitary Sewer	SAMH_2514 - SAMH_2508	N/A	8.00	CP	282.61	282	627534.396	26913850.118	706.250	$31,653	01/01/1988	30	75	44	$18,613	$42,957	1	1	0.0	0.0	1.0	1.0	1.0	1
4853	Sanitary Sewer	SAMH_2505 - SAMH_2508	N/A	18.00	RCP	326.47	326	627534.396	26913850.118	706.250	$34,932	01/01/1966	52	75	22	$10,288	$54,520	1	1	0.0	0.0	1.0	4.0	4.0	16
4855	Sanitary Sewer	SAMH_3634 - SAMH_3633	N/A	10.00	PVC	329.85	330	629093.554	26921612.720	621.955	$37,614	01/01/1995	23	75	51	$25,632	$47,512	1	1	0.0	0.0	1.0	2.0	1.0	2
4857	Sanitary Sewer	SAMH_3166 - SAMH_3165	N/A	12.00	VCP	287.95	287	634755.991	26914443.562	613.608	$21,596	01/01/1939	79	75	0	$0	$44,633	1	1	0.0	0.0	1.0	2.0	5.0	10
4858	Sanitary Sewer	SAMH_3165 - SAMH_3128	N/A	12.00	VCP	245.78	245	634976.119	26914552.874	612.450	$18,433	01/01/1939	79	75	0	$0	$38,095	1	1	0.0	0.0	1.0	2.0	5.0	10
4859	Sanitary Sewer	SAMH_3127 - SAMH_3128	N/A	24.00	VCP	20.43	20	634976.119	26914552.874	612.450	$1,961	01/01/1939	79	75	0	$0	$3,595	1	1	0.0	0.0	1.0	2.0	1.0	2
4860	Sanitary Sewer	SAMH_3167 - SAMH_2839A	N/A	36.00	VCP	296.93	296	634142.666	26914472.825	618.000	$35,334	01/01/1939	79	75	0	$0	$70,966	1	1	0.0	0.0	1.0	4.0	4.0	16
4861	Sanitary Sewer	SAMH_2818 - SAMH_2832	N/A	24.00	VCP	349.43	349	634075.650	26914108.435	620.753	$33,545	01/01/1939	79	75	0	$0	$61,500	1	1	0.0	0.0	1.0	4.0	4.0	16
4862	Sanitary Sewer	SAMH_2832 - SAMH_2839	N/A	24.00	VCP	323.36	323	634084.355	26914431.679	618.677	$31,043	01/01/1939	79	75	0	$0	$56,912	1	1	0.0	0.0	1.0	4.0	4.0	16

CITY OF SAULT STE. MARIE, MICHIGAN
Summary

id	Equipment Description	Asset ID	Construction Drawings Sheet Reference	Capacity or Size	Material	Length	Comment	Northing State Plane Ordinate	Easting State Plane Ordinate	Elevation	Original Cost	Year Installed (01/01/YYYY)	Age	Expected useful life (years)	Remaining Useful Life (years)	Depreciated Value	Replacement Cost	Average number of units in service	Total Number of units	Redundancy (Number)	Redundancy (percent)	Redundancy Score (R) (Reduces (C))	Criticality (C) (see back-up sheets)	Probability of Failure (P) (see back-up sheets)	Business Risk (BRE=PxCxR)
4863	Sanitary Sewer	SAMH_3172 - SAMH_3165	N/A	8.00	ZZZ	374.67	374	634755.991	26914443.562	613.608	$49,456	01/01/2004	14	75	60	$39,640	$56,950	1	1	0.0	0.0	1.0	1.0	1.0	1
4864	Sanitary Sewer	SAMH_3126 - SAMH_3127	N/A	24.00	VCP	308.59	308	634994.527	26914561.727	612.742	$29,624	01/01/1939	79	75	0	$0	$54,311	1	1	0.0	0.0	1.0	1.0	1.0	1
4865	Sanitary Sewer	SAMH_3058 - SAMH_3057	N/A	9.00	VCP	246.81	246	635486.870	26914794.787	611.895	$17,771	01/01/1939	79	75	0	$0	$37,516	1	1	0.0	0.0	1.0	1.0	5.0	5
4866	Sanitary Sewer	SAMH_3057 - SAMH_3056	N/A	15.00	VCP	256.37	256	635715.094	26914911.574	611.966	$20,253	01/01/1939	79	75	0	$0	$40,763	1	1	0.0	0.0	1.0	1.0	5.0	5
4867	Sanitary Sewer	SAMH_2050 - SAMH_2054	N/A	8.00	VCP	176.89	176	635303.980	26911903.073	656.052	$11,321	01/01/1939	79	75	0	$0	$25,473	1	1	0.0	0.0	1.0	1.0	5.0	5
4868	Sanitary Sewer	SAMH_2025 - SAMH_2026	N/A	21.00	RCP	190.83	190	635891.803	26911888.285	618.709	$21,755	01/01/1960	58	75	16	$4,665	$33,205	1	1	0.0	0.0	1.0	4.0	1.0	4
4869	Sanitary Sewer	SAMH_1183 - SAMH_1182	N/A	8.00	VCP	249.50	249	631684.634	26905889.247	639.778	$23,453	01/01/1974	44	75	30	$9,411	$35,928	1	1	0.0	0.0	1.0	1.0	1.0	1
4870	Sanitary Sewer	SAMH_1182 - SAMH_1181	N/A	8.00	VCP	248.97	248	631933.386	26905878.834	639.542	$23,403	01/01/1974	44	75	30	$9,391	$35,852	1	1	0.0	0.0	1.0	1.0	1.0	1
4871	Sanitary Sewer	SAMH_1181 - SAMH_1180	N/A	8.00	VCP	98.48	98	632018.959	26905927.574	639.914	$6,303	01/01/1939	79	75	0	$0	$14,181	1	1	0.0	0.0	1.0	1.0	1.0	1
4872	Sanitary Sewer	SAMH_1180 - SAMH_1179	N/A	8.00	VCP	288.40	288	632174.198	26906170.628	638.699	$27,110	01/01/1974	44	75	30	$10,878	$41,530	1	1	0.0	0.0	1.0	2.0	1.0	2
4873	Sanitary Sewer	SAMH_1179 - SAMH_1176	N/A	12.00	VCP	249.68	249	632303.462	26906384.238	639.811	$26,216	01/01/1974	44	75	30	$10,519	$38,700	1	1	0.0	0.0	1.0	2.0	1.0	2
4874	Sanitary Sewer	SAMH_1540 - SAMH_1541	N/A	8.00	VCP	337.33	337	625054.220	26908743.212	700.421	$35,420	01/01/1966	52	75	22	$10,432	$55,659	1	1	0.0	0.0	1.0	2.0	1.0	2
4875	Sanitary Sewer	SAMH_1545 - SAMH_1541	N/A	12.00	VCP	329.90	329	625054.220	26908743.212	700.421	$34,639	01/01/1966	52	75	22	$10,202	$54,433	1	1	0.0	0.0	1.0	3.0	1.0	3
4876	Sanitary Sewer	SAMH_1523 - SAMH_1522	N/A	12.00	VCP	325.13	298	625366.391	26908084.635	694.237	$34,139	01/01/1966	52	75	22	$10,055	$53,647	1	1	0.0	0.0	1.0	3.0	1.0	3
4877	Sanitary Sewer	SAMH_1522 - SAMH_1502	N/A	12.00	VCP	324.36	323	625690.625	26908075.539	691.920	$30,814	01/01/1966	52	75	22	$9,075	$50,276	1	1	0.0	0.0	1.0	3.0	1.0	3
4878	Sanitary Sewer	SAMH_2205 - SAMH_2206	N/A	8.00	PE	348.86	Manhole 1" off Sidewalk	637124.617	26909889.204	611.802	$46,049	01/01/2004	14	75	60	$36,909	$53,026	1	1	0.0	0.0	1.0	2.0	1.0	2
4879	Sanitary Sewer	SAMH_2206 - SAMH_2207	N/A	8.00	PVC	175.29	175	637131.706	26910064.349	615.754	$23,138	01/01/2004	14	75	60	$18,545	$26,644	1	1	0.0	0.0	1.0	2.0	1.0	2
4880	Sanitary Sewer	SAMH_2201 - SAMH_2202	N/A	8.00	PVC	330.33	Future Use	636803.955	26909422.505	611.221	$40,960	01/01/2004	14	75	60	$32,830	$47,567	1	1	0.0	0.0	1.0	2.0	1.0	2
4881	Sanitary Sewer	SAMH_2202 - SAMH_2203	N/A	8.00	PVC	357.40	Future Use	636862.335	26909775.102	610.656	$47,177	01/01/2004	14	75	60	$37,813	$54,325	1	1	0.0	0.0	1.0	2.0	1.0	2
4882	Sanitary Sewer	SAMH_2203 - SAMH_2204	N/A	8.00	PVC	77.10	Future Use	636919.771	26909826.541	611.072	$10,178	01/01/2004	14	75	60	$8,158	$11,720	1	1	0.0	0.0	1.0	2.0	1.0	2
4883	Sanitary Sewer	SAMH_2204 - SAMH_2206	N/A	8.00	PVC	214.22	Future Use	637124.617	26909889.204	611.802	$28,277	01/01/2004	14	75	60	$22,664	$32,561	1	1	0.0	0.0	1.0	2.0	1.0	2
4884	Sanitary Sewer	SAMH_2652 - SAMH_2651	N/A	10.00	VCP	269.75	300	630515.020	26915378.578	631.106	$19,961	01/01/1950	68	75	6	$1,618	$38,844	1	1	0.0	0.0	1.0	1.0	1.0	1
4885	Sanitary Sewer	SAMH_3526 - SAMH_3503	N/A	8.00	VCP	141.81	141	625055.471	26921302.305	630.939	$15,883	01/01/1980	38	75	36	$7,644	$21,555	1	1	0.0	0.0	1.0	1.0	1.0	1
4886	Sanitary Sewer	SAMH_2630 - SAMH_2629	N/A	8.00	CP	325.15	325	631137.204	26914414.801	634.021	$24,061	01/01/1950	68	75	6	$1,950	$46,822	1	1	0.0	0.0	1.0	1.0	1.0	1
4887	Sanitary Sewer	SAMH_2631 - SAMH_2630	N/A	8.00	CP	327.27	327	630812.093	26914419.963	636.743	$24,218	01/01/1950	68	75	6	$1,963	$47,127	1	1	0.0	0.0	1.0	1.0	1.0	1
4888	Sanitary Sewer	SAMH_2001 - SAMH_2002	N/A	18.00	RCP	216.08	216	634196.034	26908220.807	637.907	$24,634	01/01/1960	58	75	16	$5,283	$37,599	1	1	0.0	0.0	1.0	3.0	1.0	3
4889	Sanitary Sewer	SAMH_1533 - SAMH_1534	N/A	8.00	VCP	216.47	216	624923.595	26909714.755	0.000	$19,915	01/01/1966	52	75	22	$5,865	$32,904	1	1	0.0	0.0	1.0	2.0	1.0	2
4890	Sanitary Sewer	SAMH_1551 - SAMH_1552	N/A	10.00	CP	196.86	150	624444.180	26909102.750	700.967	$25,985	01/01/2008	10	75	64	$22,214	$29,923	1	1	0.0	0.0	1.0	3.0	1.0	3
4891	Sanitary Sewer	SAMH_1612 - SAMH_1768D	N/A	8.00	VCP	132.97	116	628870.946	26913015.855	715.290	$8,510	01/01/1939	79	75	0	$0	$19,147	1	1	0.0	0.0	1.0	2.0	1.0	2
4892	Sanitary Sewer	SAMH_2618 - SAMH_2617	N/A	10.00	PVC	95.39	155	631229.566	26913501.227	675.058	$12,591	01/01/2001	17	75	57	$9,588	$14,499	1	1	0.0	0.0	1.0	2.0	1.0	2
4893	Sanitary Sewer	SAMH_2617 - SAMH_2622A	N/A	10.00	PVC	311.90	325	631317.087	26913800.596	657.773	$38,676	01/01/2001	17	75	57	$29,453	$44,914	1	1	0.0	0.0	1.0	1.0	1.0	1
4894	Sanitary Sewer	SAMH_1177 - SAMH_1176	N/A	10.00	VCP	86.73	86	632349.160	26906457.953	639.811	$8,847	01/01/1974	44	75	30	$3,550	$13,183	1	1	0.0	0.0	1.0	2.0	1.0	2
4895	Sanitary Sewer	SAMH_1176 - SAMH_1175	N/A	10.00	VCP	84.50	84	632411.585	26906514.906	639.526	$8,619	01/01/1974	44	75	30	$3,458	$12,844	1	1	0.0	0.0	1.0	2.0	1.0	2
4896	Sanitary Sewer	SAMH_1175 - SAMH_1174	N/A	10.00	VCP	230.71	230	632642.124	26906506.041	639.440	$23,532	01/01/1974	44	75	30	$9,442	$35,068	1	1	0.0	0.0	1.0	2.0	1.0	2
4897	Sanitary Sewer	SAMH_1174 - SAMH_1173	N/A	10.00	VCP	202.45	202	632844.472	26906499.653	638.822	$20,650	01/01/1974	44	75	30	$8,286	$30,772	1	1	0.0	0.0	1.0	2.0	1.0	2
4898	Sanitary Sewer	SAMH_1173 - SAMH_1172	N/A	10.00	VCP	28.64	28	632873.026	26906497.490	638.294	$2,921	01/01/1974	44	75	30	$1,172	$4,353	1	1	0.0	0.0	1.0	3.0	1.0	3
4899	Sanitary Sewer	SAMH_1185 - SAMH_1173	N/A	10.00	VCP	358.35	82	632844.472	26906499.653	638.822	$36,551	01/01/1974	44	75	30	$14,667	$54,468	1	1	0.0	0.0	1.0	3.0	1.0	3
4900	Sanitary Sewer	SAMH_1172 - SAMH_1171A	N/A	10.00	VCP	339.98	339	632883.206	26906837.317	638.549	$34,678	01/01/1974	44	75	30	$13,915	$51,677	1	1	0.0	0.0	1.0	3.0	1.0	3
4901	Sanitary Sewer	SAMH_1159 - SAMH_1160	N/A	18.00	RCP	312.86	312	633222.654	26906530.806	638.695	$39,734	01/01/1980	38	75	36	$19,124	$52,248	1	1	0.0	0.0	1.0	3.0	1.0	3
4902	Sanitary Sewer	SAMH_1160 - SAMH_1168	N/A	18.00	RCP	280.84	280	633215.634	26906811.560	637.478	$35,667	01/01/1980	38	75	36	$17,167	$46,901	1	1	0.0	0.0	1.0	3.0	1.0	3
4903	Sanitary Sewer	SAMH_1171A - SAMH_1171	N/A	10.00	VCP	342.86	342	632891.520	26907180.074	638.635	$34,972	01/01/1974	44	75	30	$14,033	$52,114	1	1	0.0	0.0	1.0	3.0	1.0	3
4904	Sanitary Sewer	SAMH_1171 - SAMH_1170	N/A	10.00	VCP	298.76	298	633190.086	26907169.200	633.864	$30,474	01/01/1974	44	75	30	$12,228	$45,412	1	1	0.0	0.0	1.0	3.0	1.0	3
4905	Sanitary Sewer	SAMH_1170 - SAMH_1169	N/A	12.00	VCP	32.81	32	633222.588	26907173.716	633.714	$3,445	01/01/1974	44	75	30	$1,382	$5,086	1	1	0.0	0.0	1.0	3.0	1.0	3
4906	Sanitary Sewer	SAMH_1169 - SAMH_1163	N/A	18.00	RCP	380.60	194	633603.047	26907163.401	637.721	$48,336	01/01/1980	38	75	36	$23,264	$63,560	1	1	0.0	0.0	1.0	3.0	1.0	3
4907	Sanitary Sewer	SAMH_1163 - SAMH_1164	N/A	18.00	RCP	354.78	354	633758.771	26907482.180	636.023	$45,057	01/01/1980	38	75	36	$21,686	$59,249	1	1	0.0	0.0	1.0	3.0	1.0	3
4908	Sanitary Sewer	SAMH_1168 - SAMH_1169	N/A	18.00	RCP	362.22	362	633222.588	26907173.716	633.714	$46,002	01/01/1980	38	75	36	$22,141	$60,491	1	1	0.0	0.0	1.0	3.0	1.0	3
4909	Sanitary Sewer	SAMH_2009A - SAMH_2209	N/A	8.00	PVC	297.13	297	636873.437	26910363.763	609.586	$36,249	01/01/1995	23	75	51	$24,702	$45,163	1	1	0.0	0.0	1.0	2.0	1.0	2
4910	Sanitary Sewer	SAMH_2209 - SAMH_2210	N/A	8.00	PVC	292.70	292	637162.497	26910409.767	611.061	$35,709	01/01/1995	23	75	51	$24,334	$44,490	1	1	0.0	0.0	1.0	2.0	1.0	2
4911	Sanitary Sewer	SAMH_2213 - SAMH_2212	N/A	8.00	PVC	199.55	199	637472.411	26910627.541	608.756	$24,345	01/01/1995	23	75	51	$16,590	$30,331	1	1	0.0	0.0	1.0	3.0	1.0	3
4912	Sanitary Sewer	SAMH_2212 - SAMH_2211	N/A	8.00	PVC	198.29	198	637328.656	26910490.969	610.068	$24,191	01/01/1995	23	75	51	$16,485	$30,140	1	1	0.0	0.0	1.0	3.0	1.0	3
4913	Sanitary Sewer	SAMH_2211 - SAMH_2210	N/A	8.00	PVC	184.94	184	637162.497	26910409.767	611.061	$22,563	01/01/1995	23	75	51	$15,375	$28,111	1	1	0.0	0.0	1.0	3.0	1.0	3
4914	Sanitary Sewer	SAMH_2014 - SAMH_2209A	N/A	8.00	PVC	116.55	116	636576.313	26910364.569	609.000	$14,218	01/01/1995	23	75	51	$9,689	$17,715	1	1	0.0	0.0	1.0	2.0	1.0	2
4915	Sanitary Sewer	SAMH_2208 - SAMH_2210	N/A	8.00	PVC	51.42	51	637162.497	26910409.767	611.061	$6,788	01/01/2004	14	75	60	$5,440	$7,816	1	1	0.0	0.0	1.0	2.0	1.0	2
4916	Sanitary Sewer	SAMH_2214 - SAMH_2213	N/A	8.00	PVC	200.52	200	637561.722	26910805.983	607.472	$22,859	01/01/1995	23	75	51	$15,577	$28,874	1	1	0.0	0.0	1.0	3.0	1.0	3
4917	Sanitary Sewer	SAMH_2215 - SAMH_2214	N/A	8.00	PVC	284.60	284	637594.766	26911003.758	607.422	$32,445	01/01/1995	23	75	51	$22,110	$40,983	1	1	0.0	0.0	1.0	3.0	1.0	3
4918	Sanitary Sewer	SAMH_2216 - SAMH_2217	N/A	8.00	PVC	398.76	398	637694.372	26911796.201	606.710	$45,458	01/01/1995	23	75	51	$30,977	$57,421	1	1	0.0	0.0	1.0	3.0	1.0	3
4919	Sanitary Sewer	SAMH_2217 - SAMH_2218	N/A	8.00	PVC	411.74	411	637745.466	26912204.757	606.255	$46,938	01/01/1995	23	75	51	$31,986	$59,290	1	1	0.0	0.0	1.0	3.0	1.0	3
4920	Sanitary Sewer	SAMH_2207 - SAMH_2208	N/A	8.00	PVC	296.40	296	637148.556	26910360.270	612.690	$42,978	01/01/2004	14	75	60	$34,448	$48,906	1	1	0.0	0.0	1.0	2.0	1.0	2
4921	Sanitary Sewer	SAMH_4311 - SAMH_4310	N/A	18.00	CP	331.72	331	632822.553	26925002.393	589.202	$38,823	01/01/1976	42	75	32	$16,614	$55,414	1	1	0.0	0.0	1.0	4.0	1.0	4
4922	Sanitary Sewer	SAMH_4310 - SAMH_4309	N/A	18.00	CP	341.29	341	632957.276	26924688.823	587.268	$38,811	01/01/1976	42	75	32	$16,608	$55,397	1	1	0.0	0.0	1.0	4.0	1.0	4
4923	Sanitary Sewer	SAMH_4309 - SAMH_4307	N/A	18.00	CP	356.92	356	633097.897	26924360.772	587.345	$39,931	01/01/1976	42	75	32	$17,088	$56,995	1	1	0.0	0.0	1.0	4.0	1.0	4
4924	Sanitary Sewer	SAMH_4312 - SAMH_4311	N/A	18.00	CP	331.82	331	632679.116	26925301.495	587.257	$32,671	01/01/1976	42	75	32	$13,981	$47,658	1	1	0.0	0.0	1.0	4.0	1.0	4
4925	Sanitary Sewer	SAMH_4313 - SAMH_4312	N/A	18.00	CP	299.73	299	632482.494	26925568.784	587.018	$32,645	01/01/1976	42	75	32	$13,970	$47,619	1	1	0.0	0.0	1.0	4.0	1.0	4
4926	Sanitary Sewer	SAMH_4201 - SAMH_4314	N/A	18.00	CP	204.44	204	632068.660	26926002.154	587.592	$35,090	01/01/1976	42	75	32	$15,016	$50,085	1	1	0.0	0.0	1.0	4.0	1.0	4
4927	Sanitary Sewer	SAMH_4314 - SAMH_4313	N/A	18.00	CP	299.49	299	632275.331	26925785.400	586.494	$16,152	01/01/1976	42	75	32	$6,912	$24,070	1	1	0.0	0.0	1.0	4.0	1.0	4
4928	Sanitary Sewer	SAMH_4205 - SAMH_4204	N/A	18.00	CP	323.12	323	631127.237	26926018.079	593.936	$12,401	01/01/1976	42	75	32	$5,306	$18,089	1	1	0.0	0.0	1.0	3.0	1.0	3
4929	Sanitary Sewer	SAMH_4204 - SAMH_4203	N/A	18.00	CP	161.44	161	631283.301	26926059.389	595.983	$37,805	01/01/1976	42	75	32	$16,178	$53,961	1	1	0.0	0.0	1.0	4.0	1.0	4
4930	Sanitary Sewer	SAMH_4203 - SAMH_4202	N/A	18.00	CP	297.37	297	631580.282	26926074.548	590.998	$18,888	01/01/1976	42	75	32	$8,083	$26,960	1	1	0.0	0.0	1.0	4.0	1.0	4
4931	Sanitary Sewer	SAMH_4202 - SAMH_4201	N/A	18.00	CP	299.91	299	631880.120	26926081.190	586.926	$34,792	01/01/1976	42	75	32	$14,889	$49,660	1	1	0.0	0.0	1.0	4.0	1.0	4
4932	Sanitary Sewer	SAMH_4206 - SAMH_4205	N/A	18.00	CP	113.77	113	630873.253	26925818.334	589.334	$36,136	01/01/1976	42	75	32	$15,464	$52,713	1	1	0.0	0.0	1.0	3.0	1.0	3
4933	Sanitary Sewer	SAMH_4209 - SAMH_4208	N/A	18.00	CP	378.67	378	630077.837	26925736.062	587.486	$31,722	01/01/1976	42	75	32	$13,575	$48,595	1	1	0.0	0.0	1.0	3.0	1.0	3
4934	Sanitary Sewer	SAMH_4208 - SAMH_4207	N/A	18.00	CP	363.12	363	630440.812	26925746.376	588.175	$41,275	01/01/1976	42	75	32	$17,663	$60,209	1	1	0.0	0.0	1.0	3.0	1.0	3
4935	Sanitary Sewer	SAMH_4207 - SAMH_4206	N/A	18.00	CP	331.53	331	630771.692	26925767.065	589.446	$39,580	01/01/1976	42	75	32	$16,938	$57,736	1	1	0.0	0.0	1.0	3.0	1.0	3
4936	Sanitary Sewer	SAMH_4210 - SAMH_4101	N/A	10.00	VCP	337.47	337	629038.353	26925687.864	586.160	$46,414	01/01/1976	42	75	32	$19,862	$66,249	1	1	0.0	0.0	1.0	1.0	1.0	1
4937	Sanitary Sewer	SAMH_4101 - SAMH_4102	N/A	10.00	VCP	396.16	396	628656.066	26925791.771	586.499	$32,853	01/01/1976	42	75	32	$14,059	$48,958	1	1	0.0	0.0	1.0	1.0	1.0	1
4938	Sanitary Sewer	SAMH_4102 - SAMH_4103	N/A	10.00	VCP	322.09	322	628344.599	26925873.808	586.914	$35,928	01/01/1976	42	75	32	$15,375	$53,540	1	1	0.0	0.0	1.0	1.0	1.0	1
4939	Sanitary Sewer	SAMH_4103 - SAMH_4104	N/A	10.00	VCP	352.24	352	628005.090	26925967.638	586.857	$30,621	01/01/1976	42	75	32	$13,104	$45,631	1	1	0.0	0.0	1.0	1.0	1.0	1
4940	Sanitary Sewer	SAMH_4104 - SAMH_4105	N/A	10.00	VCP	300.21	300	627727.842	26926082.774	584.658	$30,958	01/01/1976	42	75	32	$13,248	$46,134	1	1	0.0	0.0	1.0	2.0	1.0	2
4941	Sanitary Sewer	SAMH_4105 - SAMH_4106	N/A	10.00	VCP	303.51	303	627457.880	26926221.479	585.444	$36,547	01/01/1976	42	75	32	$15,640	$54,463	1	1	0.0	0.0	1.0	2.0	1.0	2
4942	Sanitary Sewer	SAMH_4106 - SAMH_4107	N/A	10.00	VCP	358.31	358	627185.040	26926453.733	588.353	$2,415	01/01/1976	42	75	32	$1,033	$3,465	1	1	0.0	0.0	1.0	2.0	1.0	2
4943	Sanitary Sewer	SAMH_4010 - SAMH_4009	N/A	15.00	VCP	244.61	244	626606.588	26926861.978	587.911	$35,038	01/01/1976	42	75	32	$14,994	$51,111	1	1	0.0	0.0	1.0	2.0	1.0	2
4944	Sanitary Sewer	SAMH_3754 - SAMH_3752	N/A	10.00	PVC	299.80	304	629162.479	26921230.161	623.704	$5,009	01/01/1994	24	75	50	$3,346	$7,187	1	1	0.0	0.0	1.0	1.0	1.0	1
4945	Sanitary Sewer	SAMH_2872B - SAMH_2872A	N/A	9.00	VCP	119.38		632737.395	26913165.849	670.272	$8,834	01/01/1950	68	75	6	$716	$17,190	1	1	0.0	0.0	1.0	1.0	1.0	1
4946	Sanitary Sewer	SAMH_2017 - SAMH_2238	N/A	12.00	VCP	278.66		636893.424	26912395.393	609.599	$18,113	01/01/1939	79	75	0	$0	$40,406	1	1	0.0	0.0	1.0	2.0	5.0	10
4947	Sanitary Sewer	SACO_2053 - SAMH_2053	N/A	8.00	VCP	313.02		635473.552	26911897.101	640.776	$23,164	01/01/1950	68	75	6	$1,877	$45,075	1	1	0.0	0.0	1.0	1.0	1.0	1
4948	Sanitary Sewer	SAMH_1809 - SAMH_1808	N/A	9.00	VCP	198.93	198	633843.620	26909768.519	694.720	$14,721	01/01/1950	68	75	6	$1,193	$28,646	1	1	0.0	0.0	1.0	2.0	5.0	10
4949	Sanitary Sewer	SAMH_1808 - SAMH_1807	N/A	8.00	PVC	359.35	359	633567.598	26909538.432	697.279	$40,247	01/01/1988	30	75	44	$23,667	$54,621	1	1	0.0	0.0	1.0	2.0	1.0	2
4950	Sanitary Sewer	SAMH_1806 - SAMH_1805	N/A	8.00	PVC	67.74	67	633498.356	26909473.774	693.543	$9,145	01/01/1998	20	75	54	$6,598	$11,177	1	1	0.0	0.0	1.0	3.0	1.0	3
4951	Sanitary Sewer	SAMH_1805 - SAMH_1804	N/A	8.00	PVC	56.26	56	633483.760	26909419.439	680.179	$6,864	01/01/1995	23	75	51	$4,677	$8,552	1	1	0.0	0.0	1.0	3.0	1.0	3
4952	Sanitary Sewer	SAMH_1804 - SAMH_1803	N/A	10.00	PVC	293.76	293	633475.450	26909125.801	677.026	$33,488	01/01/1995	23	75	51	$22,820	$42,301	1	1	0.0	0.0	1.0	3.0	1.0	3
4953	Sanitary Sewer	SAMH_1803 - SAMH_1802	N/A	10.00	PVC	85.80	85	633474.785	26909040.002	675.473	$10,468	01/01/1995	23	75	51	$7,133	$13,042	1	1	0.0	0.0	1.0	3.0	1.0	3
4954	Sanitary Sewer	SAMH_1801 - SAMH_1800	N/A	12.00	CP	339.24	273	633843.073	26908922.955	645.841	$28,835	01/01/1969	49	75	25	$9,647	$49,190	1	1	0.0	0.0	1.0	3.0	1.0	3
4955	Sanitary Sewer	SAMH_1802 - SAMH_1801	N/A	10.00	PVC	62.37	168	633510.267	26908988.708	0.000	$8,420	01/01/1995	23	75	51	$5,737	$10,291	1	1	0.0	0.0	1.0	3.0	1.0	3
4956	Sanitary Sewer	SAMH_3070 - SAMH_3069	N/A	15.00	PVC	87.05	54	636713.146	26917091.700	593.754	$12,970	01/01/2011	7	75	67	$11,607	$13,840	1	1	0.0	0.0	1.0	3.0	1.0	3
4957	Sanitary Sewer	SACO_2055 - SAMH_2055	N/A	9.00	VCP	239.58	239	635142.129	26912115.798	674.323	$15,333	01/01/1939	79	75	0	$0	$34,499	1	1	0.0	0.0	1.0	1.0	5.0	5
4958	Sanitary Sewer	SAMH_2059 - SAMH_2060	N/A	9.00	VCP	226.68	226	634811.975	26911910.239	684.931	$16,321	01/01/1939	79	75	0	$0	$34,455	1	1	0.0	0.0	1.0	1.0	4.0	4
4959	Sanitary Sewer	SAMH_2060 - SAMH_2061	N/A	9.00	VCP	335.24	335	634835.131	26912244.681	679.404	$24,138	01/01/1939	79	75	0	$0	$50,957	1	1	0.0	0.0	1.0	1.0	1.0	1
4960	Sanitary Sewer	SAMH_2026 - SAMH_2028	N/A	21.00	RCP	492.63	141	635783.024	26912368.757	612.895	$56,160	01/01/1960	58	75	16	$12,044	$85,718	1	1	0.0	0.0	1.0	4.0	1.0	4
4961	Sanitary Sewer	SAMH_2030 - SAMH_3117	N/A	21.00	RCP	466.71	461	635523.555	26913060.058	613.456	$53,204	01/01/1960	58	75	16	$11,410	$81,207	1	1	0.0	0.0	1.0	4.0	1.0	4
4962	Sanitary Sewer	SACO_2001 - SAMH_2001	N/A		VCP	215.28	215	635491.257	26912717.865	0.000	$15,931	01/01/1950	68	75	6	$1,291	$31,001	1	1	0.0	0.0	1.0	1.0	1.0	1
4963	Sanitary Sewer	SAMH_2031 -	N/A	8.00	VCP	173.90	173	635664.972	26912709.842	0.000	$12,869	01/01/1950	68	75	6	$1,043	$25,042	1	1	0.0	0.0	1.0	1.0	1.0	1
4964	Sanitary Sewer	SAMH_3164 - SAMH_3163	N/A	9.00	VCP	387.94	387	634774.309	26914103.669	615.032	$27,932	01/01/1939	79	75	0	$0	$58,967	1	1	0.0	0.0	1.0	1.0	1.0	1
4965	Sanitary Sewer	SAMH_3163 - SAMH_3162	N/A	12.00	RCP	126.09	126	634887.581	26914159.068	614.537	$9,457	01/01/1939	79	75	0	$0	$19,545	1	1	0.0	0.0	1.0	1.0	1.0	1
4966	Sanitary Sewer	SAMH_3162 - SAMH_3134	N/A	12.00	RCP	234.28	234	635098.008	26914262.058	612.919	$17,571	01/01/1939	79	75	0	$0	$36,313	1	1	0.0	0.0	1.0	1.0	1.0	1
4967	Sanitary Sewer	SAMH_3134 - SAMH_3135	N/A	24.00	RCP	259.72	259	634987.328	26914497.015	612.998	$30,128	01/01/1960	58	75	16	$6,461	$45,711	1	1	0.0	0.0	1.0	5.0	1.0	5
4968	Sanitary Sewer	SAMH_3135 - SAMH_3128	N/A	24.00	RCP	56.97	56	634976.119	26914552.874	612.450	$6,609	01/01/1960	58	75	16	$1,417	$10,027	1	1	0.0	0.0	1.0	5.0	1.0	5
4969	Sanitary Sewer	SAMH_3170 - SAMH_3169	N/A	36.00	VCP	28.31	28	634398.800	26913946.109	618.378	$3,171	01/01/1939	79	75	0	$0	$6,569	1	1	0.0	0.0	1.0	4.0	1.0	4
4970	Sanitary Sewer	SAMH_3169 - SAMH_3167	N/A	36.00	VCP	288.77	122	634273.170	26914206.114	618.254	$34,363	01/01/1939	79	75	0	$0	$69,015	1	1	0.0	0.0	1.0	4.0	5.0	20
4971	Sanitary Sewer	SAMH_3160 - SAMH_3159	N/A	9.00	VCP	197.35	197	634485.529	26913771.682	0.000	$14,210	01/01/1939	79	75	0	$0	$29,998	1	1	0.0	0.0	1.0	2.0	5.0	10
4972	Sanitary Sewer	SAMH_3159 - SAMH_3158	N/A	9.00	VCP	533.04	514	634957.170	26914020.054	616.350	$38,379	01/01/1939	79	75	0	$0	$81,023	1	1	0.0	0.0	1.0	2.0	5.0	10
4973	Sanitary Sewer	SAMH_1863 - SAMH_1865	N/A	8.00	VCP	162.69		632703.808	26911755.813	719.968	$13,340	01/01/1950	68	75	6	$1,081	$24,728	1	1	0.0	0.0	1.0	1.0	1.0	1
4974	Sanitary Sewer	SAMH_1724A - SAMH_1725	N/A	8.00	PVC	250.81	686	630719.458	26911464.988	722.025	$28,091	01/01/1987	31	75	43	$16,144	$38,123	1	1	0.0	0.0	1.0	1.0	1.0	1
4975	Sanitary Sewer	SAMH_2519 - SAMH_2646C	N/A	8.00	VCP	515.50		629374.746	26915082.354	649.032	$42,271	01/01/1950	68	75	6	$3,426	$78,357	1	1	0.0	0.0	1.0	2.0	1.0	2
4976	Sanitary Sewer	SAMH_0634A - SAMH_0634	N/A	10.00	VCP	336.52		632250.449	26900625.634	621.127	$24,903	01/01/1950	68	75	6	$2,018	$48,459	1	1	0.0	0.0	1.0	3.0	1.0	3
4977	Sanitary Sewer	SAMH_0603B - SAMH_0603	N/A	8.00	PVC	280.77		631558.156	26897356.299	0.000	$32,008	01/01/1998	20	75	54	$23,093	$40,431	1	1	0.0	0.0	1.0	1.0	1.0	1
4978	Sanitary Sewer	SAMH_0620B - SAMH_0620A	N/A	8.00	PVC	149.37		631305.935	26898625.896	627.549	$17,029	01/01/1996	22	75	52	$11,831	$21,510	1	1	0.0	0.0	1.0	1.0	1.0	1
4979	Sanitary Sewer	SAMH_2651A - SAMH_2651	N/A	10.00	VCP	30.61		630545.582	26915376.851	631.106	$2,265	01/01/1950	68	75	6	$183	$4,408	1	1	0.0	0.0	1.0	1.0	1.0	1
4980	Sanitary Sewer	SAMH_0620A - SAMH_0620	N/A	8.00	PVC	99.84		631393.350	26898577.659	627.891	$12,181	01/01/1996	22	75	52	$8,463	$15,176	1	1	0.0	0.0	1.0	1.0	1.0	1
4981	Sanitary Sewer	SAMH_2013 - SAMH_6837	N/A	8.00	PVC	22.81	8" Overflow into Storm MH with 48" RCP	635922.488	26910366.000	0.000	$1,916	01/01/1960	58	75	16	$410	$3,285	1	1	0.0	0.0	1.0	4.0	1.0	4
4982	Sanitary Sewer	SAMH_3012A - SAMH_3012	N/A	12.00	VCP	370.24		636715.331	26914248.296	612.979	$27,768	01/01/1939	79	75	0	$0	$57,387	1	1	0.0	0.0	1.0	2.0	3.0	6
4983	Sanitary Sewer	SAMH_3012 - SAMH_3348	N/A	12.00	VCP	350.61		636824.384	26913915.083	612.363	$29,801	01/01/1939	79	75	0	$0	$57,850	1	1	0.0	0.0	1.0	2.0	1.0	2
4984	Sanitary Sewer	SAMH_3161 - SAMH_3160	N/A	10.00	PVC	13.78		634300.746	26913702.372	623.483	$1,819	01/01/2008	10	75	64	$1,555	$2,095	1	1	0.0	0.0	1.0	2.0	1.0	2
4985	Sanitary Sewer	SAMH_3168 - SAMH_3167	N/A	9.00	VCP	166.14		634273.170	26914206.114	618.254	$10,633	01/01/1939	79	75	0	$0	$23,924	1	1	0.0	0.0	1.0	1.0	1.0	1
4986	Sanitary Sewer	SAMH_3145B - SAMH_3145A	N/A	9.00	VCP	198.18		634847.864	26913469.078	620.585	$26,159	01/01/2003	15	75	59	$20,618	$30,123	1	1	0.0	0.0	1.0	1.0	1.0	1
4987	Sanitary Sewer	SAMH_3065A - SAMH_3058	N/A	9.00	VCP	43.91		635265.231	26914686.191	0.000	$3,161	01/01/1939	79	75	0	$0	$6,674	1	1	0.0	0.0	1.0	1.0	1.0	1
4988	Sanitary Sewer	SAMH_3065 - SAMH_3058	N/A	9.00	VCP	278.36		635245.689	26914725.508	611.609	$20,042	01/01/1939	79	75	0	$0	$42,311	1	1	0.0	0.0	1.0	1.0	5.0	5
4989	Sanitary Sewer	SAMH_3066 - SAMH_3065	N/A	9.00	VCP	328.26		635123.012	26914975.377	0.000	$23,635	01/01/1939	79	75	0	$0	$49,896	1	1	0.0	0.0	1.0	1.0	4.0	4
4990	Sanitary Sewer	SACO_3066 - SAMH_3066	N/A	9.00	VCP	14.04		634963.294	26915271.645	609.460	$898	01/01/1939	79	75	0	$0	$2,021	1	1	0.0	0.0	1.0	1.0	1.0	1
4991	Sanitary Sewer	SAMH_3065A - STOF_035	N/A	12.00	CMP	68.48		635184.122	26914695.524	0.000	$5,821	01/01/1961	57	75	17	$1,326	$9,930	1	1	0.0	0.0	1.0	1.0	1.0	1
4992	Sanitary Sewer	SAMH_3342 - SAMH_3342A	N/A	12.00	VCP	218.90		636675.682	26915274.622	610.110	$16,417	01/01/1939	79	75	0	$0	$33,929	1	1	0.0	0.0	1.0	2.0	1.0	2
4993	Sanitary Sewer	SAMH_3343 - SAMH_3014	N/A	8.00	PVC	289.64		636191.082	26914792.549	612.710	$41,129	01/01/2015	3	75	71	$39,003	$44,025	1	1	0.0	0.0	1.0	2.0	1.0	2
4994	Sanitary Sewer	SAMH_3128A - SAMH_3129	N/A	24.00	VCP	283.95	565	634727.711	26915060.953	611.402	$27,259	01/01/1939	79	75	0	$0	$49,974	1	1	0.0	0.0	1.0	5.0	4.0	20
4995	Sanitary Sewer	SAMH_3165A - SAMH_3165	N/A	12.00	PVC	234.08		634755.991	26914443.562	613.608	$33,941	01/01/2014	4	75	70	$31,734	$36,282	1	1	0.0	0.0	1.0	1.0	1.0	1
4996	Sanitary Sewer	SAMH_2945A - SAMH_D2945	N/A	9.00	VCP	365.34		633281.963	26916990.892	0.000	$34,342	01/01/1976	42	75	32	$14,696	$52,610	1	1	0.0	0.0	1.0	1.0	1.0	1
4997	Sanitary Sewer	SAMH_3527 - SAMH_3526	N/A	8.00	VCP	351.24	351	625026.632	26921441.154	628.718	$39,339	01/01/1980	38	75	36	$18,934	$53,388	1	1	0.0	0.0	1.0	1.0	1.0	1
4998	Sanitary Sewer	SAMH_3607 - SAMH_3608	N/A	8.00	PVC	47.04	47	627642.064	26921286.313	630.739	$6,209	01/01/2000	18	75	56	$4,645	$7,149	1	1	0.0	0.0	1.0	2.0	1.0	2
4999	Sanitary Sewer	SAMH_3755- SAMH_3752	N/A	12.00	VCP	43.56	43	629162.479	26921230.161	623.704	$42,030	01/01/1976	42	75	32	$17,986	$60,303	1	1	0.0	0.0	1.0	1.0	3.0	3
5000	Sanitary Sewer	SAMH_3852A - SAMH_3852	N/A	10.00	PVC	295.08	295	633319.546	26921177.237	601.699	$25,187	01/01/2005	13	75	61	$20,524	$48,696	1	1	0.0	0.0	1.0	1.0	1.0	1
5001	Sanitary Sewer	SAMH_3852 - SAMH_3853	N/A	10.00	PVC	301.06	301	633194.027	26921450.883	601.369	$36,590	01/01/2005	13	75	61	$29,817	$42,491	1	1	0.0	0.0	1.0	1.0	1.0	1
5002	Sanitary Sewer	SAMH_1189 - SAMH_1186	N/A	8.00	VCP	374.95	22	632485.668	26905888.586	643.272	$38,245	01/01/1974	44	75	30	$15,346	$56,993	1	1	0.0	0.0	1.0	3.0	1.0	3
5003	Sanitary Sewer	SAMH_1158 - SAMH_D115	N/A	18.00	RCP	76.16	76	633065.420	26906260.324	0.000	$9,672	01/01/1980	38	75	36	$4,655	$12,718	1	1	0.0	0.0	1.0	3.0	1.0	3
5004	Sanitary Sewer	SAMH_1149 - SAMH_1150	N/A	8.00	PVC	170.04	335	633153.564	26906210.921	639.345	$20,744	01/01/1998	20	75	54	$14,966	$25,846	1	1	0.0	0.0	1.0	1.0	1.0	1
5005	Sanitary Sewer	SAMH_1150 - SAMH_1159	N/A	8.00	PVC	101.04	101	633065.420	26906260.324	639.728	$12,327	01/01/1998	20	75	54	$8,893	$15,359	1	1	0.0	0.0	1.0	3.0	1.0	3
5006	Sanitary Sewer	SAMH_0604 - SAMH_0605	N/A	8.00	PVC	218.60	167	631816.679	26897349.332	615.130	$26,669	01/01/1998	20	75	54	$19,241	$33,227	1	1	0.0	0.0	1.0	3.0	1.0	3
5007	Sanitary Sewer	SAMH_0641 - SAMH_0642	N/A	12.00	VCP	359.41	359	632618.102	26900972.984	614.734	$34,144	01/01/1961	57	75	17	$7,779	$55,708	1	1	0.0	0.0	1.0	3.0	1.0	3
5008	Sanitary Sewer	SAMH_0642 - SAMH_0643	N/A	12.00	VCP	287.85	287	632634.306	26901260.377	614.354	$24,467	01/01/1961	57	75	17	$5,574	$41,738	1	1	0.0	0.0	1.0	3.0	1.0	3
5009	Sanitary Sewer	SAMH_0636 - SAMH_0637	N/A	9.00	VCP	338.27	338	632425.515	26900619.627	619.338	$25,032	01/01/1950	68	75	6	$2,029	$48,710	1	1	0.0	0.0	1.0	1.0	1.0	1
5010	Sanitary Sewer	SAMH_0637 - SAMH_0641	N/A	15.00	VCP	171.92	171	632597.351	26900614.178	618.013	$13,582	01/01/1939	79	75	0	$0	$27,336	1	1	0.0	0.0	1.0	1.0	1.0	1
5011	Sanitary Sewer	SAMH_0651 - SAMH_0650	N/A	12.00	PVC	348.40	348	631586.366	26901323.899	627.610	$36,582	01/01/1978	40	75	34	$16,631	$54,002	1	1	0.0	0.0	1.0	2.0	1.0	2
5012	Sanitary Sewer	SAMH_0650 - SAMH_0649	N/A	12.00	PVC	276.17	276	631862.345	26901313.674	626.595	$28,998	01/01/1978	40	75	34	$13,183	$42,806	1	1	0.0	0.0	1.0	3.0	1.0	3
5013	Sanitary Sewer	SAMH_0649 - SAMH_0647	N/A	12.00	PVC	381.27	223	632243.444	26901302.258	622.747	$40,033	01/01/1978	40	75	34	$18,200	$59,097	1	1	0.0	0.0	1.0	3.0	1.0	3

CITY OF SAULT STE. MARIE, MICHIGAN

Summary

id	Equipment Description	Asset ID	Construction Drawings Sheet Reference	Capacity or Size	Material	Length	Comment	Northing State Plane Ordinate	Easting State Plane Ordinate	Elevation	Original Cost	Year Installed (01/01/YYYY)	Age	Expected useful life (years)	Remaining Useful Life (years)	Depreciated Value	Replacement Cost	Average number of units in service	Total Number of units	Redundancy (Number)	Redundancy (percent)	Redundancy Score (R) (Reduces (C))	Criticality (C) (see back-up sheets)	Probability of Failure (P) (see back-up sheets)	Business Risk (BRE=PxCxR)
5014	Sanitary Sewer	SAMH_0647 - SAMH_0645	N/A	12.00	PVC	378.49	340	632621.818	26901293.046	614.356	$39,741	01/01/1978	40	75	34	$18,068	$58,666	1	1	0.0	0.0	1.0	3.0	1.0	3
5015	Sanitary Sewer	SAMH_0644 - SAMH_0643	N/A	12.00	VCP	23.50	23	632634.306	26901260.377	614.354	$1,998	01/01/1961	57	75	17	$455	$3,408	1	1	0.0	0.0	1.0	3.0	1.0	3
5016	Sanitary Sewer	SAMH_0645 - SAMH_0644	N/A	12.00	PVC	17.26	17	632636.381	26901283.788	614.295	$1,639	01/01/1978	40	75	34	$745	$2,502	1	1	0.0	0.0	1.0	3.0	1.0	3
5017	Sanitary Sewer	SAMH_2830 - SAMH_2829	N/A	8.00	PVC	317.92	317	633141.013	26913434.208	638.538	$38,787	01/01/1991	27	75	47	$24,361	$48,324	1	1	0.0	0.0	1.0	1.0	1.0	1
5018	Sanitary Sewer	SAMH_2829 - SAMH_2828	N/A	8.00	RPM	136.07	136	633153.069	26913569.747	632.912	$16,873	01/01/2004	14	75	60	$13,524	$19,595	1	1	0.0	0.0	1.0	1.0	1.0	1
5019	Sanitary Sewer	SAMH_2828 - SAMH_2827	N/A	8.00	PVC	201.02	201	633164.596	26913770.433	630.833	$26,534	01/01/2004	14	75	60	$21,267	$30,555	1	1	0.0	0.0	1.0	1.0	1.0	1
5020	Sanitary Sewer	SAMH_2827 - SAMH_2826	N/A	8.00	RPM	247.04	247	633411.605	26913766.563	628.833	$32,609	01/01/2004	14	75	60	$26,137	$37,550	1	1	0.0	0.0	1.0	1.0	1.0	1
5021	Sanitary Sewer	SAMH_2831 - SAMH_2827	N/A	8.00	RPM	382.21	382	633164.596	26913770.433	630.833	$50,452	01/01/2004	14	75	60	$40,439	$58,096	1	1	0.0	0.0	1.0	1.0	1.0	1
5022	Sanitary Sewer	SAMH_2825 - SAMH_2824	N/A	10.00	VCP	436.58	436	633620.247	26913583.239	629.716	$35,799	01/01/1950	68	75	6	$2,901	$66,359	1	1	0.0	0.0	1.0	1.0	1.0	1
5023	Sanitary Sewer	SAMH_2824 - SAMH_2823	N/A	8.00	RPM	151.74	151	633622.176	26913734.961	628.371	$18,815	01/01/2004	14	75	60	$15,080	$21,850	1	1	0.0	0.0	1.0	1.0	1.0	1
5024	Sanitary Sewer	SAMH_2823 - SAMH_2822	N/A	8.00	ZZZ	26.84	26	633625.243	26913761.625	628.430	$3,543	01/01/2004	14	75	60	$2,839	$4,080	1	1	0.0	0.0	1.0	1.0	1.0	1
5025	Sanitary Sewer	SAMH_2834 - SAMH_2822	N/A	8.00	PVC	149.26	149	633625.243	26913761.625	628.430	$19,703	01/01/2004	14	75	60	$15,792	$22,688	1	1	0.0	0.0	1.0	1.0	1.0	1
5026	Sanitary Sewer	SAMH_2826 - SAMH_2822	N/A	8.00	RPM	213.70	213	633625.243	26913761.625	628.430	$28,208	01/01/2004	14	75	60	$22,609	$32,482	1	1	0.0	0.0	1.0	1.0	1.0	1
5027	Sanitary Sewer	SAMH_2822 - SAMH_2819	N/A	8.00	RPM	400.97	400	634026.147	26913754.546	623.055	$52,928	01/01/2004	14	75	60	$42,423	$60,947	1	1	0.0	0.0	1.0	2.0	1.0	2
5028	Sanitary Sewer	SAMH_2821 - SAMH_2820	N/A	8.00	RPM	460.87	460	633957.115	26913717.231	624.860	$60,835	01/01/2004	14	75	60	$48,761	$70,052	1	1	0.0	0.0	1.0	1.0	1.0	1
5029	Sanitary Sewer	SAMH_2835 - SAMH_2833	N/A	8.00	RPM	403.83	403	634043.219	26914109.589	620.504	$53,306	01/01/2004	14	75	60	$42,726	$61,382	1	1	0.0	0.0	1.0	1.0	1.0	1
5030	Sanitary Sewer	SAMH_2833 - SAMH_2832	N/A	8.00	RPM	32.45	32	634075.650	26914108.435	620.753	$4,284	01/01/2004	14	75	60	$3,433	$4,933	1	1	0.0	0.0	1.0	1.0	1.0	1
5031	Sanitary Sewer	SAMH_2840 - SAMH_2841	N/A	8.00	RPM	403.43	403	634051.543	26914442.610	624.533	$53,253	01/01/2004	14	75	60	$42,684	$61,321	1	1	0.0	0.0	1.0	1.0	1.0	1
5032	Sanitary Sewer	SAMH_2840 - SAMH_2839	N/A	8.00	RPM	34.58	34	634084.355	26914431.679	618.677	$4,565	01/01/2004	14	75	60	$3,659	$5,257	1	1	0.0	0.0	1.0	1.0	1.0	1
5033	Sanitary Sewer	SAMH_2836 - SAMH_2835	N/A	8.00	RPM	221.40	221	633639.414	26914114.140	625.832	$29,225	01/01/2004	14	75	60	$23,424	$33,653	1	1	0.0	0.0	1.0	1.0	1.0	1
5034	Sanitary Sewer	SAMH_2842 - SAMH_2841	N/A	8.00	RPM	229.70	229	633648.116	26914443.113	624.533	$30,321	01/01/2004	14	75	60	$24,303	$34,915	1	1	0.0	0.0	1.0	1.0	1.0	1
5035	Sanitary Sewer	SAMH_2837 - SAMH_2836	N/A	8.00	RPM	237.32	237	633418.021	26914115.715	627.278	$31,326	01/01/2004	14	75	60	$25,108	$36,073	1	1	0.0	0.0	1.0	1.0	1.0	1
5036	Sanitary Sewer	SAMH_3853 - SAMH_3833	N/A	10.00	PVC	300.64	300	633070.082	26921724.783	599.075	$48,258	01/01/2005	13	75	61	$39,325	$60,125	1	1	0.0	0.0	1.0	2.0	1.0	2
5037	Sanitary Sewer	SAMH_3833 - SAMH_3834	N/A	10.00	PVC	299.95	299	632948.071	26921998.797	599.137	$37,289	01/01/2005	13	75	61	$30,386	$43,303	1	1	0.0	0.0	1.0	2.0	1.0	2
5038	Sanitary Sewer	SAMH_3834 - SAMH_3835	N/A	10.00	PVC	300.72	300	632825.104	26922273.221	598.268	$18,155	01/01/2005	13	75	61	$14,794	$21,084	1	1	0.0	0.0	1.0	2.0	1.0	2
5039	Sanitary Sewer	SAMH_3835 - SAMH_3835A	N/A	10.00	PVC	146.41	367	632765.147	26922406.796	597.833	$18,946	01/01/2005	13	75	61	$15,439	$22,002	1	1	0.0	0.0	1.0	2.0	1.0	2
5040	Sanitary Sewer	SAMH_4304 - SAMH_4303	N/A	6.00	VCP	29.10	29	633223.553	26923991.574	589.162	$792	01/01/1939	79	75	0	$0	$1,155	1	1	0.0	0.0	1.0	1.0	1.0	1
5041	Sanitary Sewer	SAMH_3818 - SAMH_4304	N/A	6.00	VCP	417.38	417	633217.384	26923963.133	588.722	$22,759	01/01/1939	79	75	0	$0	$42,188	1	1	0.0	0.0	1.0	1.0	5.0	5
5042	Sanitary Sewer	SAMH_3841 - SAMH_4303	N/A	12.00	VCP	529.90	588	633223.553	26923991.574	589.162	$21,349	01/01/1939	79	75	0	$0	$26,599	1	1	0.0	0.0	1.0	3.0	5.0	15
5043	Sanitary Sewer	SAMH_3837 - SAMH_3838	N/A	12.00	CP	266.93	266	632469.029	26923069.732	595.611	$22,009	01/01/1950	68	75	6	$1,784	$42,551	1	1	0.0	0.0	1.0	2.0	5.0	10
5044	Sanitary Sewer	SAMH_3838 - SAMH_3839	N/A	12.00	CP	293.45	293	632353.191	26923339.352	596.365	$25,712	01/01/1950	68	75	6	$2,084	$46,887	1	1	0.0	0.0	1.0	2.0	5.0	10
5045	Sanitary Sewer	SAMH_3839 - SAMH_3840	N/A	12.00	CP	302.50	302	632224.174	26923612.955	596.467	$40,412	01/01/1950	68	75	6	$3,275	$83,518	1	1	0.0	0.0	1.0	2.0	5.0	10
5046	Sanitary Sewer	SAMH_3850 - SAMH_3849	N/A	8.00	PVC	378.20	378	633763.708	26920206.483	602.771	$45,608	01/01/2006	12	75	62	$37,774	$52,519	1	1	0.0	0.0	1.0	1.0	1.0	1
5047	Sanitary Sewer	SAMH_3851 - SAMH_3850	N/A	8.00	PVC	345.52	345	633609.888	26920551.989	602.358	$37,332	01/01/2006	12	75	62	$30,919	$43,353	1	1	0.0	0.0	1.0	1.0	1.0	1
5048	Sanitary Sewer	SAMH_0612 - SAMH_0602	N/A	8.00	PVC	368.07	368	631601.039	26897396.944	618.380	$44,905	01/01/1996	22	75	52	$31,199	$55,947	1	1	0.0	0.0	1.0	2.0	1.0	2
5049	Sanitary Sewer	SAMH_0613 - SAMH_0612	N/A	8.00	PVC	230.85	230	631622.738	26897764.377	621.503	$28,164	01/01/1996	22	75	52	$19,568	$35,090	1	1	0.0	0.0	1.0	1.0	1.0	1
5050	Sanitary Sewer	SAMH_0614 - SAMH_0613	N/A	8.00	PVC	202.73	202	631848.983	26897810.268	619.232	$23,111	01/01/1996	22	75	52	$16,057	$29,193	1	1	0.0	0.0	1.0	1.0	1.0	1
5051	Sanitary Sewer	SAMH_0617 - SAMH_0616	N/A	8.00	PVC	132.51	132	631806.558	26898423.735	621.547	$15,107	01/01/1996	22	75	52	$10,496	$19,082	1	1	0.0	0.0	1.0	1.0	1.0	1
5052	Sanitary Sewer	SAMH_0616 - SAMH_0617	N/A	8.00	PVC	153.51	153	631783.024	26898272.042	621.106	$18,728	01/01/1996	22	75	52	$13,012	$23,333	1	1	0.0	0.0	1.0	1.0	1.0	1
5053	Sanitary Sewer	SAMH_0615 - SAMH_0614	N/A	8.00	PVC	312.35	312	631929.658	26897996.256	619.514	$38,106	01/01/1996	22	75	52	$26,475	$47,477	1	1	0.0	0.0	1.0	1.0	1.0	1
5054	Sanitary Sewer	SAMH_0608 - SAMH_0609	N/A	8.00	PVC	87.55	87	630993.615	26897765.701	631.407	$9,980	01/01/1996	22	75	52	$6,934	$12,607	1	1	0.0	0.0	1.0	1.0	1.0	1
5055	Sanitary Sewer	SAMH_0609 - SAMH_0610	N/A	8.00	PVC	91.60	91	631077.075	26897803.442	631.303	$10,442	01/01/1996	22	75	52	$7,255	$13,190	1	1	0.0	0.0	1.0	1.0	1.0	1
5056	Sanitary Sewer	SAMH_0610 - SAMH_0611	N/A	8.00	PVC	207.36	207	631283.774	26897786.958	628.474	$25,297	01/01/1996	22	75	52	$17,576	$31,518	1	1	0.0	0.0	1.0	1.0	1.0	1
5057	Sanitary Sewer	SAMH_0611 - SAMH_0612	N/A	8.00	PVC	339.72	339	631622.738	26897764.377	621.503	$41,445	01/01/1996	22	75	52	$28,795	$51,637	1	1	0.0	0.0	1.0	1.0	1.0	1
5058	Sanitary Sewer	SAMH_0618 - SAMH_0611	N/A	8.00	PVC	217.18	217	631283.774	26897786.958	628.474	$26,496	01/01/1996	22	75	52	$18,409	$33,011	1	1	0.0	0.0	1.0	1.0	1.0	1
5059	Sanitary Sewer	SAMH_0620 - SAMH_0619	N/A	8.00	PVC	356.89	356	631437.380	26898223.498	628.717	$43,540	01/01/1996	22	75	52	$30,251	$54,247	1	1	0.0	0.0	1.0	1.0	1.0	1
5060	Sanitary Sewer	SAMH_0619 - SAMH_0610	N/A	8.00	PVC	247.49	247	631335.825	26897997.805	631.303	$30,194	01/01/1996	22	75	52	$20,978	$37,618	1	1	0.0	0.0	1.0	1.0	1.0	1
5061	Sanitary Sewer	SAMH_0631 - SAMH_0632	N/A	12.00	PVC	315.93	315	632056.746	26900312.608	622.971	$39,491	01/01/1991	27	75	47	$24,803	$48,969	1	1	0.0	0.0	1.0	3.0	1.0	3
5062	Sanitary Sewer	SAMH_0632 - SAMH_0633	N/A	12.00	PVC	320.79	320	632069.604	26900633.138	623.185	$40,098	01/01/1991	27	75	47	$25,185	$49,722	1	1	0.0	0.0	1.0	3.0	1.0	3
5063	Sanitary Sewer	SAMH_0633 - SAMH_0634	N/A	12.00	PVC	181.00	181	632250.449	26900625.634	621.127	$22,625	01/01/1991	27	75	47	$14,210	$28,055	1	1	0.0	0.0	1.0	3.0	1.0	3
5064	Sanitary Sewer	SAMH_0634 - SAMH_0637	N/A	15.00	VCP	175.17	175	632425.515	26900619.627	619.338	$13,838	01/01/1939	79	75	0	$0	$27,852	1	1	0.0	0.0	1.0	3.0	1.0	3
5065	Sanitary Sewer	SAMH_0628 - SAMH_0631	N/A	12.00	PVC	327.75	321	632044.654	26899996.909	622.622	$37,692	01/01/1991	27	75	47	$23,674	$47,524	1	1	0.0	0.0	1.0	3.0	1.0	3
5066	Sanitary Sewer	SAMH_0625 - SAMH_0628	N/A	12.00	PVC	346.34	352	631717.193	26900010.768	624.692	$43,292	01/01/1991	27	75	47	$27,191	$53,682	1	1	0.0	0.0	1.0	3.0	1.0	3
5067	Sanitary Sewer	SAMH_0622 - SAMH_0623	N/A	8.00	VCP	294.17	294	631721.209	26899982.808	624.953	$24,710	01/01/1965	53	75	21	$6,948	$42,361	1	1	0.0	0.0	1.0	1.0	1.0	1
5068	Sanitary Sewer	SAMH_0623 - SAMH_0628	N/A	8.00	VCP	28.25	26	631717.193	26900010.768	624.692	$2,373	01/01/1965	53	75	21	$667	$4,068	1	1	0.0	0.0	1.0	1.0	1.0	1
5069	Sanitary Sewer	SAMH_0624B - SAMH_0625	N/A	12.00	PVC	197.25	197	631371.077	26900023.105	627.873	$24,657	01/01/1991	27	75	47	$15,486	$30,574	1	1	0.0	0.0	1.0	3.0	1.0	3
5070	Sanitary Sewer	SAMH_0624A - SAMH_0624B	N/A	10.00	VCP	465.62	224	631174.037	26900032.236	628.831	$38,181	01/01/1950	68	75	6	$3,094	$70,775	1	1	0.0	0.0	1.0	1.0	1.0	1
5071	Sanitary Sewer	SAMH_0630 - SAMH_0629	N/A	8.00	CP	324.24	324	631719.784	26900313.703	624.730	$20,751	01/01/1939	79	75	0	$0	$46,690	1	1	0.0	0.0	1.0	1.0	5.0	5
5072	Sanitary Sewer	SAMH_0629 - SAMH_0628	N/A	8.00	CP	302.95	305	631717.193	26900010.768	624.692	$19,389	01/01/1939	79	75	0	$0	$43,624	1	1	0.0	0.0	1.0	1.0	5.0	5
5073	Sanitary Sewer	SAMH_0627 - SAMH_0626	N/A	8.00	PVC	317.51	317	631390.016	26900341.675	627.165	$36,196	01/01/1996	22	75	52	$25,148	$45,721	1	1	0.0	0.0	1.0	1.0	1.0	1
5074	Sanitary Sewer	SAMH_0626 - SAMH_0625	N/A	8.00	PVC	319.13	319	631371.077	26900023.105	627.873	$38,934	01/01/1996	22	75	52	$27,051	$48,508	1	1	0.0	0.0	1.0	1.0	1.0	1
5075	Sanitary Sewer	SAMH_0621 - SAMH_0622	N/A	8.00	VCP	187.79	187	631706.214	26899689.018	625.201	$15,774	01/01/1965	53	75	21	$4,435	$27,042	1	1	0.0	0.0	1.0	1.0	1.0	1
5076	Sanitary Sewer	SAMH_1142 - SAMH_1143	N/A	10.00	CP	331.43	331	631831.847	26904920.617	638.719	$21,212	01/01/1939	79	75	0	$0	$47,726	1	1	0.0	0.0	1.0	3.0	1.0	3
5077	Sanitary Sewer	SAMH_1141 - SAMH_1142	N/A	10.00	CP	273.24	273	631815.207	26904589.603	643.703	$17,487	01/01/1939	79	75	0	$0	$39,347	1	1	0.0	0.0	1.0	3.0	5.0	15
5078	Sanitary Sewer	SAMH_1115 - SAMH_1155	N/A	18.00	RCP	89.24	89	632491.057	26905280.092	643.449	$10,620	01/01/1980	38	75	36	$5,111	$14,190	1	1	0.0	0.0	1.0	3.0	1.0	3
5079	Sanitary Sewer	SAMH_1155 - SAMH_1156	N/A	18.00	RCP	288.76	288	632641.394	26905526.632	641.560	$36,673	01/01/1980	38	75	36	$17,651	$48,223	1	1	0.0	0.0	1.0	3.0	1.0	3
5080	Sanitary Sewer	SAMH_1113 - SAMH_1115	N/A	15.00	CP	322.20	229	632529.175	26905199.397	643.631	$28,676	01/01/1961	57	75	17	$6,533	$48,008	1	1	0.0	0.0	1.0	3.0	1.0	3
5081	Sanitary Sewer	SAMH_1146 - SAMH_1147	N/A	12.00	CP	397.12	397	632736.421	26905566.202	641.867	$25,813	01/01/1939	79	75	0	$0	$57,583	1	1	0.0	0.0	1.0	2.0	4.0	8
5082	Sanitary Sewer	SAMH_1156 - SAMH_1157	N/A	18.00	RCP	383.69	383	632830.288	26905860.597	640.376	$48,728	01/01/1980	38	75	36	$23,453	$64,076	1	1	0.0	0.0	1.0	3.0	1.0	3
5083	Sanitary Sewer	SAMH_1157 - SAMH_1158	N/A	18.00	RCP	387.60	387	633027.146	26906194.484	639.947	$49,225	01/01/1980	38	75	36	$23,692	$64,729	1	1	0.0	0.0	1.0	3.0	1.0	3
5084	Sanitary Sewer	SAMH_1147 - SAMH_1148	N/A	12.00	CP	449.86	449	632969.735	26905950.825	640.059	$29,241	01/01/1939	79	75	0	$0	$65,229	1	1	0.0	0.0	1.0	2.0	3.0	6
5085	Sanitary Sewer	SAMH_1148 - SAMH_1151	N/A	12.00	CP	447.04	447	633201.048	26906333.371	639.444	$29,058	01/01/1939	79	75	0	$0	$64,821	1	1	0.0	0.0	1.0	2.0	3.0	6
5086	Sanitary Sewer	SAMH_1151 - SAMH_1152	N/A	12.00	CP	387.93	387	633387.996	26906673.284	639.706	$25,216	01/01/1939	79	75	0	$0	$56,250	1	1	0.0	0.0	1.0	3.0	4.0	12
5087	Sanitary Sewer	SAMH_1152 - SAMH_1153	N/A	12.00	CP	525.72	525	633619.238	26907145.413	638.251	$39,429	01/01/1939	79	75	0	$0	$81,486	1	1	0.0	0.0	1.0	3.0	2.0	6
5088	Sanitary Sewer	SAMH_1162 - SAMH_1153	N/A	8.00	VCP	202.73	97	633619.238	26907145.413	638.251	$14,597	01/01/1939	79	75	0	$0	$30,815	1	1	0.0	0.0	1.0	3.0	3.0	9
5089	Sanitary Sewer	SAMH_1164 - SAMH_1165	N/A	18.00	RCP	173.82	173	633834.680	26907638.550	635.463	$22,075	01/01/1980	38	75	36	$10,625	$29,028	1	1	0.0	0.0	1.0	3.0	1.0	3
5090	Sanitary Sewer	SAMH_1153 - SAMH_1154	N/A	12.00	CP	387.41	339	633790.689	26907492.813	636.091	$29,055	01/01/1939	79	75	0	$0	$60,048	1	1	0.0	0.0	1.0	3.0	1.0	3
5091	Sanitary Sewer	SAMH_1165 - SAMH_1165A	N/A	18.00	RCP	100.05	166	633875.229	26907730.016	635.261	$12,707	01/01/1980	38	75	36	$6,116	$16,709	1	1	0.0	0.0	1.0	3.0	1.0	3
5092	Sanitary Sewer	SAMH_1167 - SAMH_2000	N/A	18.00	RCP	92.90	92	633952.708	26907867.312	636.074	$11,799	01/01/1980	38	75	36	$5,679	$15,515	1	1	0.0	0.0	1.0	3.0	1.0	3
5093	Sanitary Sewer	SAMH_1105 - SAMH_1104	N/A	8.00	CP	221.33	221	632638.947	26904868.643	641.088	$16,379	01/01/1950	68	75	6	$1,327	$31,872	1	1	0.0	0.0	1.0	1.0	1.0	1
5094	Sanitary Sewer	SAMH_1105 - SAMH_1115	N/A	8.00	CP	161.15	161	632529.175	26905199.397	643.631	$11,925	01/01/1950	68	75	6	$966	$23,205	1	1	0.0	0.0	1.0	3.0	1.0	3
5095	Sanitary Sewer	SAMH_1161 - SAMH_1162	N/A	8.00	VCP	439.29	439	633416.974	26907159.173	636.622	$28,115	01/01/1939	79	75	0	$0	$63,258	1	1	0.0	0.0	1.0	3.0	3.0	9
5096	Sanitary Sewer	SACO_1742 - SAMH_1742	N/A	10.00	PVC	169.25	60	629997.949	26910625.149	717.441	$17,602	01/01/1980	38	75	36	$8,472	$24,372	1	1	0.0	0.0	1.0	2.0	1.0	2
5097	Sanitary Sewer	SAMH_1743 - SAMH_1742	N/A	8.00	PVC	281.79	281	629997.949	26910625.149	717.441	$34,942	01/01/2001	17	75	57	$26,609	$40,578	1	1	0.0	0.0	1.0	2.0	1.0	2
5098	Sanitary Sewer	SAMH_1742 - SAMH_1745	N/A	10.00	PVC	285.56	285	630006.054	26910910.591	719.692	$31,982	01/01/1980	38	75	36	$15,393	$43,405	1	1	0.0	0.0	1.0	2.0	1.0	2
5099	Sanitary Sewer	SAMH_1745 - SAMH_1746	N/A	10.00	PVC	329.01	329	630018.263	26911239.369	720.098	$36,849	01/01/1980	38	75	36	$17,735	$50,009	1	1	0.0	0.0	1.0	2.0	1.0	2
5100	Sanitary Sewer	SAMH_1746 - SAMH_1747	N/A	10.00	PVC	325.53	325	630031.115	26911564.645	721.628	$36,459	01/01/1980	38	75	36	$17,548	$49,481	1	1	0.0	0.0	1.0	2.0	1.0	2
5101	Sanitary Sewer	SAMH_17437- SAMH_1748	N/A	10.00	PVC	332.32	332	630039.888	26911896.849	720.219	$37,220	01/01/1980	38	75	36	$17,914	$50,513	1	1	0.0	0.0	1.0	2.0	1.0	2
5102	Sanitary Sewer	SAMH_1748 - SAMH_1749	N/A	10.00	PVC	21.91	21	630058.850	26911907.834	719.749	$2,454	01/01/1980	38	75	36	$1,181	$3,331	1	1	0.0	0.0	1.0	2.0	1.0	2
5103	Sanitary Sewer	SAMH_1154 - SAMH_2000	N/A	12.00	CP	408.04	455	633952.708	26907867.312	636.074	$30,603	01/01/1939	79	75	0	$0	$63,247	1	1	0.0	0.0	1.0	3.0	3.0	9
5104	Sanitary Sewer	SAMH_1190A - SAMH_1190	N/A	12.00	VCP	233.49	220	632090.787	26905605.524	640.517	$26,851	01/01/1980	38	75	36	$12,923	$36,190	1	1	0.0	0.0	1.0	3.0	1.0	3
5105	Sanitary Sewer	SAMH_1190 - SAMH_1188	N/A	12.00	VCP	213.61	213	632303.392	26905584.824	640.738	$24,565	01/01/1980	38	75	36	$11,823	$33,110	1	1	0.0	0.0	1.0	3.0	1.0	3
5106	Sanitary Sewer	SAMH_1188 - SAMH_1187	N/A	12.00	VCP	117.93	117	632368.053	26905683.452	641.125	$13,563	01/01/1980	38	75	36	$6,528	$18,280	1	1	0.0	0.0	1.0	2.0	1.0	2
5107	Sanitary Sewer	SAMH_1187 - SAMH_1156	N/A	12.00	VCP	315.13	315	632641.394	26905526.632	641.560	$36,240	01/01/1980	38	75	36	$17,442	$48,845	1	1	0.0	0.0	1.0	2.0	1.0	2
5108	Sanitary Sewer	SAMH_0500 - SAMH_0501	N/A	8.00	PVC	328.98	328	629789.604	26897463.363	632.533	$40,136	01/01/1999	19	75	55	$29,493	$50,006	1	1	0.0	0.0	1.0	1.0	1.0	1
5109	Sanitary Sewer	SAMH_0501 - SAMH_0502	N/A	8.00	PVC	372.07	372	630161.243	26897445.543	631.405	$45,392	01/01/1999	19	75	55	$33,355	$56,554	1	1	0.0	0.0	1.0	1.0	1.0	1
5110	Sanitary Sewer	SAMH_0502 - SAMH_0503	N/A	8.00	PVC	357.29	357	630517.845	26897423.433	625.436	$43,589	01/01/1999	19	75	55	$32,030	$54,308	1	1	0.0	0.0	1.0	1.0	1.0	1
5111	Sanitary Sewer	SAMH_0503 - SAMH_0600	N/A	8.00	PVC	382.57	382	630900.145	26897409.172	628.280	$46,673	01/01/1999	19	75	55	$34,296	$58,150	1	1	0.0	0.0	1.0	1.0	1.0	1
5112	Sanitary Sewer	SAMH_0600 - SAMH_0601	N/A	8.00	PVC	341.12	341	631241.139	26897400.094	624.577	$41,616	01/01/1999	19	75	55	$30,580	$51,850	1	1	0.0	0.0	1.0	2.0	1.0	2
5113	Sanitary Sewer	SAMH_0601 - SAMH_0602	N/A	8.00	PVC	359.91	359	631601.039	26897396.944	618.380	$43,910	01/01/1999	19	75	55	$32,266	$54,707	1	1	0.0	0.0	1.0	2.0	1.0	2
5114	Sanitary Sewer	SAMH_0602 - SAMH_0604	N/A	8.00	PVC	41.71	80	631598.163	26897355.330	617.483	$5,089	01/01/1998	20	75	54	$3,671	$6,340	1	1	0.0	0.0	1.0	2.0	1.0	2
5115	Sanitary Sewer	SAMH_1526 - SAMH_1525	N/A	8.00	VCP	325.04	373	625388.336	26909067.004	700.702	$33,154	01/01/1976	42	75	32	$14,188	$49,406	1	1	0.0	0.0	1.0	1.0	1.0	1
5116	Sanitary Sewer	SAMH_1524 - SAMH_1523	N/A	12.00	VCP	323.67	337	625373.726	26908409.685	698.069	$33,986	01/01/1966	52	75	22	$10,010	$53,406	1	1	0.0	0.0	1.0	3.0	1.0	3
5117	Sanitary Sewer	SAMH_1541 - SAMH_1524	N/A	12.00	VCP	331.34	331	625385.406	26908733.305	699.925	$34,790	01/01/1966	52	75	22	$10,247	$54,670	1	1	0.0	0.0	1.0	3.0	1.0	3
5118	Sanitary Sewer	SAMH_1507 - SAMH_1503	N/A	8.00	VCP	323.04	323	625699.728	26908401.489	697.744	$29,719	01/01/1966	52	75	22	$8,753	$49,102	1	1	0.0	0.0	1.0	2.0	1.0	2
5119	Sanitary Sewer	SAMH_1508 - SAMH_1507	N/A	8.00	VCP	265.50	265	625709.023	26908724.392	700.019	$24,426	01/01/1966	52	75	22	$7,194	$40,356	1	1	0.0	0.0	1.0	2.0	1.0	2
5120	Sanitary Sewer	SAMH_2609 - SAMH_2611	N/A	8.00	PVC	143.88	143	629818.681	26913520.934	701.458	$16,114	01/01/1982	36	75	38	$8,186	$21,869	1	1	0.0	0.0	1.0	1.0	1.0	1
5121	Sanitary Sewer	SAMH_2611 - SAMH_2612	N/A	8.00	PVC	45.91	45	629818.347	26913566.843	700.871	$5,142	01/01/1982	36	75	38	$2,612	$6,978	1	1	0.0	0.0	1.0	1.0	1.0	1
5122	Sanitary Sewer	SAMH_2612 - SAMH_2613	N/A	8.00	PVC	231.91	231	629820.995	26913798.735	697.084	$25,974	01/01/1982	36	75	38	$13,195	$35,250	1	1	0.0	0.0	1.0	1.0	1.0	1
5123	Sanitary Sewer	SAMH_2608 - SAMH_2609	N/A	8.00	PVC	198.02	197	629814.545	26913377.116	704.979	$22,178	01/01/1982	36	75	38	$11,266	$30,098	1	1	0.0	0.0	1.0	1.0	1.0	1
5124	Sanitary Sewer	SAMH_3809 - SAMH_3810	N/A		VCP	14.71	12	633511.618	26923423.911	589.687	$3,647	01/01/1961	57	75	17	$830	$6,252	1	1	0.0	0.0	1.0	5.0	1.0	5
5125	Sanitary Sewer	SAMH_3810 - SAMH_3811	N/A		VCP	43.42	45	633549.070	26923445.881	0.000	$4,597	01/01/1961	57	75	17	$1,047	$7,881	1	1	0.0	0.0	1.0	5.0	1.0	5
5126	Sanitary Sewer	SAMH_3915 - SAMH_3916	N/A	12.00	VCP	276.80	276	635429.232	26919028.310	601.146	$4,340	01/01/1939	79	75	0	$0	$5,407	1	1	0.0	0.0	1.0	1.0	1.0	1
5127	Sanitary Sewer	SAMH_3919 - SAMH_3920	N/A	8.00	PVC	90.40	91	635087.192	26919776.263	598.776	$45,696	01/01/1998	20	75	54	$32,969	$56,933	1	1	0.0	0.0	1.0	1.0	1.0	1
5128	Sanitary Sewer	SAMH_3041 - SAMH_3009	N/A	9.00	VCP	393.02	393	636408.983	26914308.470	612.867	$28,297	01/01/1939	79	75	0	$0	$59,739	1	1	0.0	0.0	1.0	1.0	1.0	1
5129	Sanitary Sewer	SAMH_2851 - SAMH_2857	N/A	24.00	VCP	186.98	186	634104.021	26915192.703	614.811	$17,950	01/01/1939	79	75	0	$0	$32,909	1	1	0.0	0.0	1.0	4.0	4.0	16
5130	Sanitary Sewer	SAMH_2955 - SAMH_2953	N/A	10.00	PVC	410.81	133	632184.598	26916349.762	629.914	$58,335	01/01/2010	8	75	66	$51,428	$62,443	1	1	0.0	0.0	1.0	1.0	1.0	1
5131	Sanitary Sewer	SAMH_2657 - SAMH_2957	N/A	12.00	VCP	327.76	327	631863.973	26916358.950	630.335	$27,860	01/01/1950	68	75	6	$2,258	$50,803	1	1	0.0	0.0	1.0	2.0	1.0	2
5132	Sanitary Sewer	SAMH_2956 - SAMH_2957	N/A	8.00	CP	322.39	322	631863.973	26916358.950	630.335	$26,436	01/01/1950	68	75	6	$2,142	$49,003	1	1	0.0	0.0	1.0	1.0	1.0	1
5133	Sanitary Sewer	SAMH_2656 - SAMH_2657	N/A	8.00	PVC	336.58	336	631536.307	26916366.875	631.385	$27,599	01/01/1950	68	75	6	$2,237	$51,160	1	1	0.0	0.0	1.0	1.0	1.0	1
5134	Sanitary Sewer	SAMH_2653 - SAMH_2656	N/A	8.00	PVC	342.55	342	631518.832	26916030.752	630.155	$25,349	01/01/1950	68	75	6	$2,054	$49,327	1	1	0.0	0.0	1.0	1.0	1.0	1
5135	Sanitary Sewer	SAMH_1616A - SAMH_1616	N/A	8.00	VCP	185.91		627472.174	26912365.859	711.410	$13,758	01/01/1950	68	75	6	$1,115	$26,772	1	1	0.0	0.0	1.0	2.0	1.0	2
5136	Sanitary Sewer	SAMH_2513A - SAMH_2513	N/A	8.00	PVC	140.29		628494.879	26913355.598	711.167	$12,906	01/01/1967	51	75	23	$3,973	$21,324	1	1	0.0	0.0	1.0	3.0	1.0	3
5137	Sanitary Sewer	SAMH_1756 - SAMH_1757	N/A	8.00	PVC	304.87		629804.743	26913117.586	708.453	$34,145	01/01/1982	36	75	38	$17,346	$46,340	1	1	0.0	0.0	1.0	1.0	1.0	1
5138	Sanitary Sewer	SAMH_1757 - SAMH_1759	N/A	8.00	PVC	19.79		629791.255	26913132.063	708.559	$2,216	01/01/1982	36	75	38	$1,125	$3,008	1	1	0.0	0.0	1.0	1.0	1.0	1
5139	Sanitary Sewer	SAMH_1755A - SAMH_1755	N/A	8.00	PVC	121.58		629784.039	26912616.858	713.754	$13,617	01/01/1982	36	75	38	$6,917	$18,480	1	1	0.0	0.0	1.0	1.0	1.0	1
5140	Sanitary Sewer	SAMH_1760A - SAMH_D1760	N/A	8.00	CP	163.54		629440.890	26911875.480	0.000	$12,102	01/01/1950	68	75	6	$980	$23,549	1	1	0.0	0.0	1.0	2.0	1.0	2
5141	Sanitary Sewer	SAMH_3161A - SAMH_3161	N/A	10.00	PVC	157.29		634287.784	26913707.051	623.430	$20,763	01/01/2008	10	75	64	$17,750	$23,909	1	1	0.0	0.0	1.0	2.0	1.0	2
5142	Sanitary Sewer	SAMH_3161B - SAMH_3161A	N/A	10.00	PVC	28.88		634147.325	26913636.254	624.530	$3,812	01/01/2008	10	75	64	$3,258	$4,390	1	1	0.0	0.0	1.0	2.0	1.0	2
5143	Sanitary Sewer	SAMH_3161C - SAMH_3161B	N/A	10.00	PVC	11.59		634122.395	26913621.671	624.851	$1,530	01/01/2008	10	75	64	$1,308	$1,762	1	1	0.0	0.0	1.0	2.0	1.0	2
5144	Sanitary Sewer	SAMH_4397 - STOF_063	N/A	24.00	CMP	580.72		633605.605	26924671.830	0.000	$8,611	01/01/1976	42	75	32	$3,685	$9,254	1	1	0.0	0.0	1.0	4.0	1.0	4
5145	Sanitary Sewer	SAMH_4307 - CSO15	N/A	18.00	CP	82.64		633073.317	26924439.670	0.000	$40,863	01/01/1976	42	75	32	$17,487	$58,326	1	1	0.0	0.0	1.0	4.0	1.0	4
5146	Sanitary Sewer	SAMH_3601 - SAMH_3755	N/A	12.00	VCP	50.50		629118.935	26921231.167	624.308	$5,808	01/01/1976	42	75	32	$2,485	$8,333	1	1	0.0	0.0	1.0	2.0	1.0	2
5147	Sanitary Sewer	SAMH_3521 - SAMH_3523A	N/A	8.00	VCP	88.90	192	625417.312	26921852.805	628.671	$9,956	01/01/1980	38	75	36	$4,791	$13,512	1	1	0.0	0.0	1.0	1.0	1.0	1
5148	Sanitary Sewer	SAMH_0804 - SAMH_0802	N/A	10.00	PVC	222.46		623458.337	26907548.723	699.695	$27,140	01/01/1994	24	75	50	$18,132	$33,813	1	1	0.0	0.0	1.0	2.0	1.0	2
5149	Sanitary Sewer	SAMH_0803 - SAMH_0803A	N/A	8.00	PVC	174.14		623461.595	26907263.060	702.820	$19,852	01/01/1994	24	75	50	$13,263	$25,076	1	1	0.0	0.0	1.0	2.0	1.0	2
5150	Sanitary Sewer	SAMH_1110 - SAMH_1111	N/A	15.00	CP	377.38		632464.209	26904268.198	645.164	$33,587	01/01/1961	57	75	17	$7,652	$56,230	1	1	0.0	0.0	1.0	3.0	1.0	3
5151	Sanitary Sewer	SAMH_1111 - SAMH_1112	N/A	15.00	CP	288.91		632479.539	26904556.702	644.112	$25,713	01/01/1961	57	75	17	$5,858	$43,048	1	1	0.0	0.0	1.0	3.0	1.0	3
5152	Sanitary Sewer	SAMH_1103 - SAMH_1104	N/A	8.00	CP	157.94		632638.947	26904868.643	641.088	$11,687	01/01/1950	68	75	6	$947	$22,743	1	1	0.0	0.0	1.0	1.0	1.0	1
5153	Sanitary Sewer	SAMH_2004A - SAMH_2004	N/A	12.00	VCP	165.37	349	634462.219	26908593.218	634.893	$15,710	01/01/1963	55	75	19	$3,998	$25,633	1	1	0.0	0.0	1.0	3.0	1.0	3
5154	Stormwater Sewer	STMH_7687 - STMH_7686	N/A	12.00	VCP	387.85		633219.627	26915663.142	625.306	$25,831	01/01/1939	79	75	0	$0	$53,383	1	1	0.0	0.0	1.0	2.0	1.0	2
5155	Stormwater Sewer	STMH_7679 - STMH_7678	N/A	48.00	RCP	375.94		633196.917	26915337.531	627.565	$2,461	01/01/1949	69	75	5	$166	$10,666	1	1	0.0	0.0	1.0	5.0	4.0	20
5156	Stormwater Sewer	STMH_8159 - STMH_8158	N/A	12.00	PVC	117.80		636858.216	26913439.347	616.923	$1,529	01/01/2011	7	75	67	$1,368	$1,642	1	1	0.0	0.0	1.0	2.0	1.0	2
5157	Stormwater Sewer	STMH_8158 - STMH_8157	N/A	12.00	PVC	72.29		636866.289	26913367.509	616.939	$15,903	01/01/2011	7	75	67	$14,232	$17,081	1	1	0.0	0.0	1.0	2.0	1.0	2
5158	Stormwater Sewer	STMH_8161 - STMH_8160	N/A	12.00	PVC	92.18		636858.317	26913564.432	617.144	$31,418	01/01/2011	7	75	67	$28,117	$48,370	1	1	0.0	0.0	1.0	2.0	1.0	2
5159	Sanitary Sewer	SAMH_2857 - SAMH_2858	N/A	24.00	VCP	132.09	132	634107.335	26915324.752	614.025	$12,681	01/01/1939	79	75	0	$0	$23,248	1	1	0.0	0.0	1.0	4.0	5.0	20
5160	Sanitary Sewer	SAMH_3173 - SAMH_3174	N/A	8.00	PVC	231.23	231	634259.543	26914794.450	614.542	$30,522	01/01/2004	14	75	60	$24,464	$35,146	1	1	0.0	0.0	1.0	1.0	1.0	1
5161	Sanitary Sewer	SAMH_3174 - SAMH_3175	N/A	8.00	PVC	233.85	233	634158.723	26915005.448	614.908	$30,868	01/01/2004	14	75	60	$24,741	$35,545	1	1	0.0	0.0	1.0	1.0	1.0	1
5162	Sanitary Sewer	SAMH_3176 - SAMH_3175	N/A	8.00	PVC	59.96	59	634158.723	26915005.448	614.908	$7,915	01/01/2004	14	75	60	$6,344	$9,114	1	1	0.0	0.0	1.0	1.0	1.0	1
5163	Sanitary Sewer	SAMH_3175 - SAMH_2851	N/A	8.00	PVC	59.14	59	634099.588	26915005.773	615.912	$7,806	01/01/2003	15	75	59	$6,152	$8,989	1	1	0.0	0.0	1.0	1.0	1.0	1
5164	Sanitary Sewer	SAMH_2852 - SAMH_2851	N/A	8.00	RPM	34.08	34	634099.588	26915005.773	615.912	$4,498	01/01/2003	15	75	59	$3,545	$5,180	1	1	0.0	0.0	1.0	1.0	1.0	1

CITY OF SAULT STE. MARIE, MICHIGAN

Summary

id	Equipment Description	Asset ID	Construction Drawings Sheet Reference	Capacity or Size	Material	Length	Comment	Northing State Plane Ordinate	Easting State Plane Ordinate	Elevation	Original Cost	Year Installed (01/01/YYYY)	Age	Expected useful life (years)	Remaining Useful Life (years)	Depreciated Value	Replacement Cost	Average number of units in service	Total Number of units	Redundancy (Number)	Redundancy (percent)	Redundancy Score (R) (Reduces (C))	Criticality (C) (see back-up sheets)	Probability of Failure (P) (see back-up sheets)	Business Risk (BRE=PxCxR)
5165	Sanitary Sewer	SAMH_2845 - SAMH_2851	N/A	24.00	VCP	285.34	285	634099.588	26915005.773	615.912	$27,393	01/01/1939	79	75	0	$0	$50,220	1	1	0.0	0.0	1.0	4.0	4.0	16
5166	Sanitary Sewer	SAMH_3177 - SAMH_3130	N/A	8.00	PVC	316.39	316	634561.636	26915403.253	610.315	$39,232	01/01/2004	14	75	60	$31,445	$45,559	1	1	0.0	0.0	1.0	1.0	1.0	1
5167	Sanitary Sewer	SAMH_2852 - SAMH_2853	N/A	8.00	RPM	402.96	402	634068.375	26915019.449	621.304	$53,191	01/01/2004	14	75	60	$42,634	$61,250	1	1	0.0	0.0	1.0	1.0	1.0	1
5168	Sanitary Sewer	SAMH_2839 - SAMH_2845	N/A	24.00	VCP	288.96	288	634091.281	26914720.554	617.499	$27,740	01/01/1939	79	75	0	$0	$50,857	1	1	0.0	0.0	1.0	4.0	5.0	20
5169	Sanitary Sewer	SAMH_2028 - SAMH_2030	N/A	21.00	RCP	272.17	239	635688.643	26912624.033	613.742	$31,027	01/01/1960	58	75	16	$6,654	$47,357	1	1	0.0	0.0	1.0	4.0	1.0	4
5170	Sanitary Sewer	SAMH_2817 - SAMH_2816	N/A	9.00	VCP	219.12	219	633408.094	26913269.680	0.000	$15,777	01/01/1939	79	75	0	$0	$33,306	1	1	0.0	0.0	1.0	1.0	5.0	5
5171	Sanitary Sewer	SAMH_2815 - SAMH_2814	N/A	9.00	VCP	498.41	498	634060.369	26913584.514	625.143	$35,885	01/01/1939	79	75	0	$0	$75,758	1	1	0.0	0.0	1.0	1.0	5.0	5
5172	Sanitary Sewer	SAMH_2814 - SAMH_2818	N/A	24.00	VCP	174.72	174	634065.674	26913759.148	623.031	$16,773	01/01/1939	79	75	0	$0	$30,750	1	1	0.0	0.0	1.0	1.0	1.0	1
5173	Sanitary Sewer	SAMH_3156A - SAMH_3156	N/A	24.00	PVC	228.22	278	634306.608	26913510.779	623.708	$37,885	01/01/2015	3	75	71	$35,926	$40,167	1	1	0.0	0.0	1.0	4.0	1.0	4
5174	Sanitary Sewer	SAMH_3156 - SAMH_3150	N/A	24.00	PVC	278.15	244	634556.932	26913632.052	619.469	$46,173	01/01/2015	3	75	71	$43,786	$48,955	1	1	0.0	0.0	1.0	4.0	1.0	4
5175	Sanitary Sewer	SAMH_2816 - SAMH_2815	N/A	9.00	VCP	225.88	225	633612.130	26913366.590	633.121	$16,263	01/01/1939	79	75	0	$0	$34,334	1	1	0.0	0.0	1.0	1.0	5.0	5
5176	Sanitary Sewer	SAMH_2818 - SAMH_3170	N/A	36.00	VCP	363.36	363	634392.188	26913918.578	618.672	$43,240	01/01/1939	79	75	0	$0	$86,843	1	1	0.0	0.0	1.0	4.0	3.0	12
5177	Sanitary Sewer	SAMH_2820 - SAMH_2819	N/A	8.00	RPM	78.47	78	634026.147	26913754.546	623.055	$10,358	01/01/2004	14	75	60	$8,302	$11,928	1	1	0.0	0.0	1.0	1.0	1.0	1
5178	Sanitary Sewer	SAMH_2819 - SAMH_2818	N/A	8.00	RPM	39.79	39	634065.674	26913759.148	623.031	$5,253	01/01/2004	14	75	60	$4,210	$6,049	1	1	0.0	0.0	1.0	2.0	1.0	2
5179	Sanitary Sewer	SAMH_3815 - SAMH_3814	N/A	12.00	VCP	529.57	529	634010.824	26922173.339	595.037	$26,970	01/01/1939	79	75	0	$0	$60,163	1	1	0.0	0.0	1.0	1.0	1.0	1
5180	Sanitary Sewer	SAMH_3817 - SAMH_3815	N/A	12.00	VCP	414.92	414	633795.638	26922657.215	593.813	$26,712	01/01/1939	79	75	0	$0	$60,102	1	1	0.0	0.0	1.0	1.0	5.0	5
5181	Sanitary Sewer	SAMH_3832 - SAMH_3809	N/A	12.00	RCP	230.92	230	633498.776	26923416.738	589.541	$37,194	01/01/1950	68	75	6	$3,014	$43,193	1	1	0.0	0.0	1.0	5.0	1.0	5
5182	Sanitary Sewer	SAMH_3806 - SAMH_3807	N/A	36.00	RCP	347.75	347	633647.795	26923083.131	590.591	$54,441	01/01/1961	57	75	17	$12,403	$87,325	1	1	0.0	0.0	1.0	5.0	1.0	5
5183	Sanitary Sewer	SAMH_3805 - SAMH_3806	N/A	36.00	RCP	444.25	444	633788.569	26922765.150	593.016	$57,031	01/01/1961	57	75	17	$12,993	$98,761	1	1	0.0	0.0	1.0	5.0	1.0	5
5184	Sanitary Sewer	SAMH_3811 - SAMH_3812	N/A		RCP	54.73	54	633576.553	26923398.556	0.000	$3,179	01/01/1961	57	75	17	$724	$5,450	1	1	0.0	0.0	1.0	5.0	1.0	5
5185	Sanitary Sewer	SAMH_3812 - WWTP	N/A		RCP	37.84	37	633611.105	26923413.994	0.000	$41,872	01/01/1961	57	75	17	$9,539	$58,488	1	1	0.0	0.0	1.0	5.0	1.0	5
5186	Sanitary Sewer	SAMH_3820 - SAMH_3819	N/A	8.00	CP	335.32	335	633119.530	26923500.241	594.797	$71,015	01/01/1950	68	75	6	$5,756	$88,574	1	1	0.0	0.0	1.0	1.0	5.0	5
5187	Sanitary Sewer	SAMH_3819 - SAMH_3818	N/A	8.00	CP	277.55	277	633385.092	26923580.935	589.096	$27,496	01/01/1950	68	75	6	$2,228	$50,968	1	1	0.0	0.0	1.0	1.0	5.0	5
5188	Sanitary Sewer	SAMH_3802 - SAMH_3805	N/A	36.00	RCP	441.11	441	633969.643	26922359.478	595.031	$6,111	01/01/1961	57	75	17	$1,392	$7,622	1	1	0.0	0.0	1.0	5.0	1.0	5
5189	Sanitary Sewer	SAMH_3829 - SAMH_3828	N/A	8.00	CP	481.09	481	633780.083	26922058.769	596.770	$26,652	01/01/1973	45	75	29	$10,339	$39,717	1	1	0.0	0.0	1.0	1.0	1.0	1
5190	Sanitary Sewer	SAMH_3828 - SAMH_3814	N/A	10.00	CP	257.62	257	634010.824	26922173.339	595.037	$49,071	01/01/1973	45	75	29	$19,036	$73,125	1	1	0.0	0.0	1.0	2.0	1.0	2
5191	Sanitary Sewer	SAMH_3824 - SAMH_3825	N/A	12.00	VCP	522.07	515	633492.564	26921613.857	599.564	$22,673	01/01/1939	79	75	0	$0	$50,578	1	1	0.0	0.0	1.0	1.0	5.0	5
5192	Sanitary Sewer	SAMH_4317 - SAMH_4316	N/A	8.00	VCP	422.86	422	632476.727	26924032.856	592.641	$15,879	01/01/1978	40	75	34	$7,219	$22,664	1	1	0.0	0.0	1.0	1.0	1.0	1
5193	Sanitary Sewer	SAMH_4316 - SAMH_4315	N/A	8.00	VCP	405.22	402	632840.004	26924212.384	589.727	$43,132	01/01/1978	40	75	34	$19,609	$64,275	1	1	0.0	0.0	1.0	1.0	1.0	1
5194	Sanitary Sewer	SAMH_4315 - SAMH_4318	N/A	8.00	VCP	158.36	289	632976.503	26924292.262	588.791	$41,332	01/01/1978	40	75	34	$18,791	$61,593	1	1	0.0	0.0	1.0	1.0	1.0	1
5195	Sanitary Sewer	SAMH_3840 - SAMH_3841	N/A	12.00	VCP	538.83	479	632674.444	26923779.057	0.000	$39,742	01/01/1939	79	75	0	$0	$82,134	1	1	0.0	0.0	1.0	3.0	5.0	15
5196	Sanitary Sewer	SAMH_1001 - SAMH_1002	N/A	8.00	VCP	310.39	310	630498.337	26903989.577	706.551	$31,659	01/01/1976	42	75	32	$13,548	$47,179	1	1	0.0	0.0	1.0	1.0	1.0	1
5197	Sanitary Sewer	SAMH_1002 - SAMH_1003	N/A	8.00	VCP	308.72	308	630806.713	26903974.981	703.122	$31,490	01/01/1976	42	75	32	$13,475	$46,926	1	1	0.0	0.0	1.0	1.0	1.0	1
5198	Sanitary Sewer	SAMH_1003 - SAMH_1127	N/A	8.00	VCP	305.82	321	631112.341	26903964.101	701.936	$31,194	01/01/1976	42	75	32	$13,349	$46,485	1	1	0.0	0.0	1.0	1.0	1.0	1
5199	Sanitary Sewer	SAMH_2634 - SAMH_2635	N/A	8.00	CP	169.98	169	629845.441	26914411.000	688.673	$13,938	01/01/1950	68	75	6	$1,129	$25,836	1	1	0.0	0.0	1.0	1.0	1.0	1
5200	Sanitary Sewer	SAMH_2628 - SAMH_2613	N/A	12.00	RCP	365.12	365	629820.995	26913798.735	697.084	$31,035	01/01/1950	68	75	6	$2,515	$56,594	1	1	0.0	0.0	1.0	1.0	1.0	1
5201	Sanitary Sewer	SAMH_2610 - SAMH_2611	N/A	8.00	PVC	166.21	163	629818.681	26913520.934	701.458	$17,286	01/01/1982	36	75	38	$8,781	$23,934	1	1	0.0	0.0	1.0	1.0	1.0	1
5202	Sanitary Sewer	SAMH_2605 - SAMH_2606	N/A	8.00	PVC	387.36	387	629332.148	26913804.666	703.846	$43,384	01/01/1980	38	75	36	$20,881	$58,879	1	1	0.0	0.0	1.0	2.0	1.0	2
5203	Sanitary Sewer	SAMH_2606 - SAMH_2607	N/A	15.00	CP	160.39	160	629492.533	26913803.051	701.497	$12,671	01/01/1950	68	75	6	$1,027	$23,899	1	1	0.0	0.0	1.0	4.0	1.0	4
5204	Sanitary Sewer	SAMH_2607 - SAMH_2613	N/A	18.00	CP	328.49	328	629820.995	26913798.735	697.084	$31,864	01/01/1950	68	75	6	$2,582	$54,858	1	1	0.0	0.0	1.0	4.0	1.0	4
5205	Sanitary Sewer	SAMH_2636 - SAMH_2607	N/A	8.00	CP	328.65	332	629499.210	26914103.500	701.497	$24,320	01/01/1950	68	75	6	$1,971	$47,325	1	1	0.0	0.0	1.0	1.0	1.0	1
5206	Sanitary Sewer	SAMH_2635 - SAMH_2635A	N/A	8.00	CP	183.22	143	630162.275	26914429.588	651.157	$15,024	01/01/1950	68	75	6	$1,217	$27,849	1	1	0.0	0.0	1.0	1.0	1.0	1
5207	Sanitary Sewer	SAMH_2637 - SAMH_2636	N/A		RCP	213.34	240	629513.293	26914431.843	696.207	$15,787	01/01/1950	68	75	6	$1,279	$30,721	1	1	0.0	0.0	1.0	1.0	1.0	1
5208	Sanitary Sewer	SAMH_2601 - SAMH_2602	N/A	8.00	CP	306.73	316	628834.113	26913343.751	711.420	$25,152	01/01/1950	68	75	6	$2,038	$46,623	1	1	0.0	0.0	1.0	2.0	1.0	2
5209	Sanitary Sewer	SAMH_2602 - SAMH_2603	N/A	12.00	CP	470.49	470	628848.236	26913814.026	0.000	$44,696	01/01/1950	68	75	6	$3,623	$77,630	1	1	0.0	0.0	1.0	3.0	1.0	3
5210	Sanitary Sewer	SAMH_2603 - SAMH_2604	N/A	15.00	CP	315.75	315	629163.881	26913805.806	0.000	$31,891	01/01/1950	68	75	6	$2,585	$53,994	1	1	0.0	0.0	1.0	4.0	3.0	12
5211	Sanitary Sewer	SAMH_2604 - SAMH_2606	N/A	15.00	CP	168.27	168	629332.148	26913804.666	703.846	$16,995	01/01/1950	68	75	6	$1,377	$28,774	1	1	0.0	0.0	1.0	4.0	5.0	20
5212	Sanitary Sewer	SAMH_2513 - SAMH_2602	N/A	12.00	CP	339.44	339	628834.113	26913343.751	711.420	$32,247	01/01/1950	68	75	6	$2,613	$56,008	1	1	0.0	0.0	1.0	3.0	1.0	3
5213	Sanitary Sewer	SAMH_2641 - SAMH_2640	N/A	8.00	CP	270.91	270	630501.900	26914736.861	636.672	$22,215	01/01/1950	68	75	6	$1,800	$41,179	1	1	0.0	0.0	1.0	1.0	1.0	1
5214	Sanitary Sewer	SAMH_2640 - SAMH_2639	N/A	8.00	CP	326.71	326	630828.565	26914731.472	634.114	$26,790	01/01/1950	68	75	6	$2,171	$49,660	1	1	0.0	0.0	1.0	1.0	1.0	1
5215	Sanitary Sewer	SAMH_2655 - SAMH_2654	N/A	10.00	VCP	326.29	648	631178.223	26915693.293	631.127	$24,145	01/01/1950	68	75	6	$1,957	$46,985	1	1	0.0	0.0	1.0	1.0	1.0	1
5216	Sanitary Sewer	SAMH_2622 - SAMH_2892	N/A	18.00	CP	122.32	122	631449.451	26913808.942	651.876	$11,865	01/01/1950	68	75	6	$961	$20,427	1	1	0.0	0.0	1.0	4.0	2.0	8
5217	Sanitary Sewer	SAMH_2516 - SAMH_2517	N/A	6.00	VCP	384.44	384	627913.489	26914720.522	703.602	$28,449	01/01/1950	68	75	6	$2,306	$55,360	1	1	0.0	0.0	1.0	1.0	1.0	1
5218	Sanitary Sewer	SAMH_2517 - SAMH_2517	N/A	8.00	VCP	302.00	680	627974.760	26915016.240	703.602	$22,348	01/01/1950	68	75	6	$1,811	$43,488	1	1	0.0	0.0	1.0	1.0	1.0	1
5219	Sanitary Sewer	SAMH_2518 - SAMH_2519	N/A	8.00	VCP	578.67	578	628859.244	26915083.534	699.460	$42,821	01/01/1950	68	75	6	$3,471	$83,328	1	1	0.0	0.0	1.0	2.0	1.0	2
5220	Sanitary Sewer	SAMH_1562 - SAMH_1628	N/A	12.00	VCP	357.23	357	626533.664	26913266.716	708.124	$37,509	01/01/1976	42	75	32	$16,051	$55,370	1	1	0.0	0.0	1.0	2.0	1.0	2
5221	Sanitary Sewer	SAMH_1628 - SAMH_2503	N/A	18.00	RCP	290.73	290	626546.674	26913557.154	705.645	$31,108	01/01/1966	52	75	22	$9,162	$48,552	1	1	0.0	0.0	1.0	4.0	1.0	4
5222	Sanitary Sewer	SAMH_2503 - SAMH_2502	N/A	18.00	RCP	318.73	318	626561.025	26913875.559	706.769	$34,104	01/01/1966	52	75	22	$10,044	$53,228	1	1	0.0	0.0	1.0	4.0	4.0	16
5223	Sanitary Sewer	SAMH_2501 - SAMH_2502	N/A	15.00	RCP	331.41	331	626561.025	26913875.559	706.769	$36,124	01/01/1974	44	75	30	$14,495	$52,695	1	1	0.0	0.0	1.0	2.0	1.0	2
5224	Sanitary Sewer	SAMH_2502 - SAMH_2504	N/A	18.00	RCP	326.81	326	626887.677	26913865.320	704.505	$34,969	01/01/1966	52	75	22	$10,299	$54,578	1	1	0.0	0.0	1.0	4.0	1.0	4
5225	Sanitary Sewer	SAMH_2504 - SAMH_2505	N/A	18.00	RCP	320.44	320	627208.042	26913858.614	705.180	$34,287	01/01/1966	52	75	22	$10,098	$53,513	1	1	0.0	0.0	1.0	4.0	1.0	4
5226	Sanitary Sewer	SAMH_2510 - SAMH_2511	N/A	18.00	CP	328.32	328	628528.689	26913823.331	706.361	$37,428	01/01/1966	52	75	22	$11,023	$57,128	1	1	0.0	0.0	1.0	4.0	3.0	12
5227	Sanitary Sewer	SAMH_1613 - SAMH_2512	N/A	12.00	CP	190.71	182	628163.221	26913363.391	712.176	$16,210	01/01/1950	68	75	6	$1,313	$29,560	1	1	0.0	0.0	1.0	3.0	1.0	3
5228	Sanitary Sewer	SAMH_2512 - SAMH_2513	N/A	12.00	CP	331.75	331	628494.879	26913355.598	711.167	$28,199	01/01/1950	68	75	6	$2,285	$51,421	1	1	0.0	0.0	1.0	3.0	1.0	3
5229	Sanitary Sewer	SAMH_1618 - SAMH_1615	N/A	12.00	CP	336.07	336	627842.193	26913180.810	711.633	$28,566	01/01/1950	68	75	6	$2,315	$52,091	1	1	0.0	0.0	1.0	2.0	1.0	2
5230	Sanitary Sewer	SAMH_1615 - SAMH_1613	N/A	12.00	CP	306.84	317	628148.935	26913173.219	712.515	$26,081	01/01/1950	68	75	6	$2,114	$47,560	1	1	0.0	0.0	1.0	3.0	1.0	3
5231	Sanitary Sewer	SAMH_2511 - SAMH_2603	N/A	18.00	CP	319.68	319	628848.236	26913814.026	0.000	$34,206	01/01/1966	52	75	22	$10,074	$53,387	1	1	0.0	0.0	1.0	4.0	4.0	16
5232	Sanitary Sewer	SAMH_3632 - SAMH_3631	N/A	8.00	VCP	162.00	162	626931.876	26921576.129	628.146	$41,938	01/01/1980	38	75	36	$20,185	$52,250	1	1	0.0	0.0	1.0	1.0	1.0	1
5233	Sanitary Sewer	SAMH_3631 - SAMH_3630	N/A	8.00	VCP	127.45	127	626965.731	26921453.253	628.451	$18,144	01/01/1980	38	75	36	$8,732	$24,625	1	1	0.0	0.0	1.0	1.0	1.0	1
5234	Sanitary Sewer	SAMH_3630 - SAMH_3611	N/A	8.00	VCP	162.56	162	626958.865	26921290.839	630.119	$14,275	01/01/1980	38	75	36	$6,870	$19,373	1	1	0.0	0.0	1.0	1.0	1.0	1
5235	Sanitary Sewer	SAMH_3629 - SAMH_3627	N/A	8.00	VCP	127.88	127	627294.683	26921562.071	627.507	$18,207	01/01/1980	38	75	36	$8,763	$24,709	1	1	0.0	0.0	1.0	1.0	1.0	1
5236	Sanitary Sewer	SAMH_3628 - SAMH_3627	N/A	8.00	VCP	174.71	174	627294.683	26921562.071	627.507	$13,299	01/01/1980	38	75	36	$6,401	$18,414	1	1	0.0	0.0	1.0	1.0	1.0	1
5237	Sanitary Sewer	SAMH_3627 - SAMH_3626	N/A	8.00	VCP	258.18	258	627551.824	26921585.219	629.181	$18,169	01/01/1980	38	75	36	$8,745	$25,158	1	1	0.0	0.0	1.0	1.0	1.0	1
5238	Sanitary Sewer	SAMH_3626 - SAMH_3625	N/A	8.00	VCP	163.26	163	627710.425	26921623.929	629.219	$28,916	01/01/1980	38	75	36	$13,917	$39,243	1	1	0.0	0.0	1.0	1.0	1.0	1
5239	Sanitary Sewer	SAMH_3625 - SAMH_3622	N/A	8.00	VCP	117.09	117	627815.378	26921675.834	628.474	$18,285	01/01/1980	38	75	36	$8,800	$24,815	1	1	0.0	0.0	1.0	1.0	1.0	1
5240	Sanitary Sewer	SAMH_3622 - SAMH_3624	N/A	8.00	VCP	107.03	107	627857.044	26921577.252	628.956	$15,887	01/01/1980	38	75	36	$7,646	$21,560	1	1	0.0	0.0	1.0	2.0	1.0	2
5241	Sanitary Sewer	SAMH_3624 - SAMH_3623	N/A	8.00	VCP	156.56	156	627894.386	26921425.213	629.070	$13,114	01/01/1980	38	75	36	$6,311	$17,797	1	1	0.0	0.0	1.0	2.0	1.0	2
5242	Sanitary Sewer	SAMH_3623 - SAMH_3604A	N/A	8.00	VCP	141.85	171	627891.607	26921283.395	0.000	$17,534	01/01/1980	38	75	36	$8,439	$23,797	1	1	0.0	0.0	1.0	2.0	1.0	2
5243	Sanitary Sewer	SAMH_3620 - SAMH_3621	N/A	8.00	VCP	133.85	133	628022.152	26921766.043	626.419	$25,267	01/01/1980	38	75	36	$12,161	$34,291	1	1	0.0	0.0	1.0	1.0	1.0	1
5244	Sanitary Sewer	SAMH_3621 - SAMH_3622	N/A	8.00	VCP	225.60	225	627815.378	26921675.834	628.474	$11,987	01/01/1980	38	75	36	$5,769	$16,268	1	1	0.0	0.0	1.0	1.0	1.0	1
5245	Sanitary Sewer	SAMH_3615 - SAMH_3614	N/A	8.00	VCP	135.00	135	628672.130	26921587.345	623.250	$38,348	01/01/1980	38	75	36	$18,457	$53,098	1	1	0.0	0.0	1.0	1.0	1.0	1
5246	Sanitary Sewer	SAMH_3619 - SAMH_3617	N/A	8.00	VCP	113.35	113	628445.411	26921818.503	623.501	$13,921	01/01/1980	38	75	36	$6,700	$19,275	1	1	0.0	0.0	1.0	1.0	1.0	1
5247	Sanitary Sewer	SAMH_3616 - SAMH_3615	N/A	8.00	VCP	111.15	111	628622.358	26921712.840	622.200	$11,166	01/01/1980	38	75	36	$5,374	$15,154	1	1	0.0	0.0	1.0	1.0	1.0	1
5248	Sanitary Sewer	SAMH_3618 - SAMH_3617	N/A	8.00	VCP	190.03	190	628445.411	26921818.503	623.501	$12,696	01/01/1980	38	75	36	$6,110	$17,230	1	1	0.0	0.0	1.0	1.0	1.0	1
5249	Sanitary Sewer	SAMH_3745 - SAMH_3746	N/A	8.00	VCP	412.01	412	629732.126	26920519.926	623.124	$31,398	01/01/1978	40	75	34	$14,275	$46,789	1	1	0.0	0.0	1.0	1.0	1.0	1
5250	Sanitary Sewer	SAMH_2671 - SAMH_2672	N/A	8.00	VCP	329.58	329	630630.054	26918426.511	631.543	$30,980	01/01/1972	46	75	28	$11,604	$47,459	1	1	0.0	0.0	1.0	1.0	1.0	1
5251	Sanitary Sewer	SAMH_2607A - SAMH_2670	N/A	8.00	VCP	348.02	682	630605.627	26917744.476	631.607	$32,018	01/01/1961	57	75	17	$7,294	$52,899	1	1	0.0	0.0	1.0	1.0	1.0	1
5252	Sanitary Sewer	SAMH_2965 - SAMH_2964	N/A	12.00	VCP	331.81	331	632218.256	26917018.736	628.906	$24,886	01/01/1939	79	75	0	$0	$51,431	1	1	0.0	0.0	1.0	3.0	5.0	15
5253	Sanitary Sewer	SAMH_2966 - SAMH_2965	N/A	12.00	VCP	323.06	323	631886.562	26917027.598	630.368	$24,230	01/01/1939	79	75	0	$0	$50,075	1	1	0.0	0.0	1.0	3.0	1.0	3
5254	Sanitary Sewer	SAMH_2968 - SAMH_2967	N/A	8.00	VCP	205.97	205	631576.680	26917341.558	630.591	$18,949	01/01/1962	56	75	18	$4,569	$31,307	1	1	0.0	0.0	1.0	1.0	1.0	1
5255	Sanitary Sewer	SAMH_2967 - SAMH_2966	N/A	8.00	VCP	305.42	305	631563.619	26917036.420	630.943	$28,099	01/01/1962	56	75	18	$6,776	$46,424	1	1	0.0	0.0	1.0	1.0	1.0	1
5256	Sanitary Sewer	SAMH_2658 - SAMH_2657	N/A	8.00	PVC	442.64	442	631536.307	26916366.875	631.385	$58,429	01/01/2003	15	75	59	$46,053	$67,281	1	1	0.0	0.0	1.0	1.0	1.0	1
5257	Sanitary Sewer	SAMH_2959 - SAMH_2958	N/A	8.00	CP	237.06	237	631870.301	26916595.985	630.170	$17,543	01/01/1950	68	75	6	$1,422	$34,137	1	1	0.0	0.0	1.0	1.0	1.0	1
5258	Sanitary Sewer	SAMH_2958 - SAMH_2957	N/A	8.00	CP	237.12	237	631863.973	26916358.950	630.335	$19,444	01/01/1950	68	75	6	$1,576	$36,042	1	1	0.0	0.0	1.0	1.0	1.0	1
5259	Sanitary Sewer	SAMH_1760 - SAMH_1761	N/A	8.00	CP	276.58	276	629452.450	26912151.814	0.000	$20,467	01/01/1950	68	75	6	$1,659	$39,827	1	1	0.0	0.0	1.0	2.0	1.0	2
5260	Sanitary Sewer	SAMH_1761 - SAMH_1762	N/A	8.00	CP	366.45	366	629464.935	26912518.050	0.000	$27,117	01/01/1950	68	75	6	$2,198	$52,769	1	1	0.0	0.0	1.0	2.0	1.0	2
5261	Sanitary Sewer	SAMH_1762 - SAMH_1763	N/A	8.00	CP	478.00	477	629480.847	26912995.780	713.988	$39,196	01/01/1950	68	75	6	$3,177	$72,655	1	1	0.0	0.0	1.0	2.0	1.0	2
5262	Sanitary Sewer	SAMH_1765 - SAMH_1762	N/A	8.00	CP	194.13	194	629464.935	26912518.050	0.000	$14,366	01/01/1950	68	75	6	$1,164	$27,955	1	1	0.0	0.0	1.0	2.0	1.0	2
5263	Sanitary Sewer	SAMH_1763B - SAMH_1763A	N/A	10.00	PVC	77.04	353	629424.398	26912995.629	0.000	$10,940	01/01/2015	3	75	71	$10,374	$11,710	1	1	0.0	0.0	1.0	2.0	1.0	2
5264	Sanitary Sewer	SAMH_1752 - SAMH_1753	N/A	10.00	VCP	371.89	371	630128.581	26912881.821	708.940	$30,495	01/01/1950	68	75	6	$2,471	$56,527	1	1	0.0	0.0	1.0	2.0	1.0	2
5265	Sanitary Sewer	SAMH_1751 - SAMH_1752	N/A	10.00	PVC	67.66	67	630116.556	26912510.126	713.984	$5,548	01/01/1950	68	75	6	$449	$10,285	1	1	0.0	0.0	1.0	2.0	1.0	2
5266	Sanitary Sewer	SAMH_1749 - SAMH_1750	N/A	10.00	PVC	281.06	281	630069.352	26912188.700	716.996	$23,047	01/01/1950	68	75	6	$1,868	$42,722	1	1	0.0	0.0	1.0	2.0	1.0	2
5267	Sanitary Sewer	SAMH_1750 - SAMH_1751	N/A	10.00	PVC	268.18	268	630074.877	26912456.822	714.314	$21,991	01/01/1950	68	75	6	$1,782	$40,763	1	1	0.0	0.0	1.0	2.0	1.0	2
5268	Sanitary Sewer	SAMH_1732 - SAMH_1732A	N/A	8.00	PVC	282.00	281	630435.970	26912198.467	718.634	$29,328	01/01/1980	38	75	36	$14,116	$40,607	1	1	0.0	0.0	1.0	1.0	1.0	1
5269	Sanitary Sewer	SAMH_1712 - SAMH_1713	N/A	9.00	VCP	210.96	210	631036.665	26911515.057	721.775	$13,501	01/01/1939	79	75	0	$0	$30,378	1	1	0.0	0.0	1.0	1.0	1.0	1
5270	Sanitary Sewer	SAMH_1713 - SAMH_1714	N/A	9.00	VCP	171.57	171	631046.930	26911686.323	721.847	$12,353	01/01/1939	79	75	0	$0	$26,079	1	1	0.0	0.0	1.0	1.0	2.0	2
5271	Sanitary Sewer	SAMH_1714 - SAMH_1715	N/A	9.00	VCP	157.12	157	631056.332	26911843.157	721.184	$11,312	01/01/1939	79	75	0	$0	$23,882	1	1	0.0	0.0	1.0	2.0	1.0	2
5272	Sanitary Sewer	SAMH_1715 - SAMH_1716	N/A	9.00	VCP	367.68	367	631086.978	26912209.555	718.356	$26,473	01/01/1939	79	75	0	$0	$55,887	1	1	0.0	0.0	1.0	2.0	5.0	10
5273	Sanitary Sewer	SAMH_2670 - SAMH_2669	N/A	8.00	VCP	339.23	339	630593.750	26917405.451	632.071	$31,210	01/01/1961	57	75	17	$7,110	$51,564	1	1	0.0	0.0	1.0	1.0	1.0	1
5274	Sanitary Sewer	SAMH_2666 - SAMH_2664	N/A	8.00	VCP	350.56	677	631247.528	26917371.836	631.595	$28,746	01/01/1950	68	75	6	$2,330	$53,285	1	1	0.0	0.0	1.0	1.0	1.0	1
5275	Sanitary Sewer	SAMH_2664 - SAMH_2663	N/A	12.00	VCP	33.53	33	631268.922	26917044.355	631.256	$3,185	01/01/1961	57	75	17	$725	$5,197	1	1	0.0	0.0	1.0	2.0	1.0	2
5276	Sanitary Sewer	SAMH_2663 - SAMH_2966	N/A	12.00	VCP	294.80	294	631563.619	26917036.420	630.943	$28,006	01/01/1961	57	75	17	$6,380	$45,695	1	1	0.0	0.0	1.0	2.0	1.0	2
5277	Sanitary Sewer	SAMH_2661 - SAMH_2657	N/A	12.00	VCP	308.67	308	631536.307	26916366.875	631.385	$26,237	01/01/1950	68	75	6	$2,126	$47,844	1	1	0.0	0.0	1.0	1.0	1.0	1
5278	Sanitary Sewer	SAMH_2660 - SAMH_2661	N/A	8.00	CP	252.95	252	631227.721	26916374.075	631.543	$23,777	01/01/1978	40	75	34	$10,810	$36,425	1	1	0.0	0.0	1.0	1.0	1.0	1
5279	Sanitary Sewer	SAMH_2659 - SAMH_2660	N/A	8.00	CP	258.78	260	631221.964	26916121.192	630.938	$24,325	01/01/1978	40	75	34	$11,059	$37,264	1	1	0.0	0.0	1.0	1.0	1.0	1
5280	Sanitary Sewer	SAMH_1514A - SAMH_1514	N/A	18.00	RCP	128.27	178	625951.995	26910698.815	704.090	$12,699	01/01/1966	52	75	22	$3,740	$20,395	1	1	0.0	0.0	1.0	4.0	5.0	20
5281	Sanitary Sewer	SAMH_1530 - SAMH_1531	N/A	8.00	VCP	276.41	276	625089.198	26910444.435	703.796	$25,429	01/01/1966	52	75	22	$7,489	$42,014	1	1	0.0	0.0	1.0	1.0	1.0	1
5282	Sanitary Sewer	SAMH_1536 - SAMH_1548	N/A	8.00	VCP	543.54	543	624746.452	26909543.826	702.643	$55,441	01/01/1976	42	75	32	$23,725	$82,618	1	1	0.0	0.0	1.0	1.0	1.0	1
5283	Sanitary Sewer	SAMH_1511A - SAMH_1510	N/A	8.00	VCP	282.01	282	625731.742	26909558.687	701.556	$25,945	01/01/1966	52	75	22	$7,641	$42,866	1	1	0.0	0.0	1.0	2.0	1.0	2
5284	Sanitary Sewer	SAMH_1510 - SAMH_1509	N/A	8.00	VCP	303.10	303	625723.038	26909255.716	700.637	$27,885	01/01/1966	52	75	22	$8,213	$46,071	1	1	0.0	0.0	1.0	2.0	1.0	2
5285	Sanitary Sewer	SAMH_1509 - SAMH_1508	N/A	8.00	VCP	266.01	266	625715.200	26908989.817	699.282	$24,473	01/01/1966	52	75	22	$7,208	$40,434	1	1	0.0	0.0	1.0	2.0	1.0	2
5286	Sanitary Sewer	SAMH_1505 - SAMH_1507	N/A	8.00	VCP	177.25	177	625709.023	26908724.392	700.019	$18,080	01/01/1970	48	75	26	$6,290	$26,943	1	1	0.0	0.0	1.0	1.0	1.0	1
5287	Sanitary Sewer	SAMH_1503 - SAMH_1502	N/A	8.00	VCP	326.08	326	625690.625	26908075.539	691.920	$29,999	01/01/1966	52	75	22	$8,835	$49,564	1	1	0.0	0.0	1.0	2.0	1.0	2
5288	Sanitary Sewer	SAMH_1546 - SAMH_1545	N/A	10.00	VCP	494.07	494	624724.462	26908752.704	699.534	$45,454	01/01/1966	52	75	22	$13,387	$75,098	1	1	0.0	0.0	1.0	3.0	1.0	3
5289	Sanitary Sewer	SAMH_1542 - SAMH_1543	N/A	8.00	PVC	171.95	171	624727.535	26908312.568	698.226	$20,977	01/01/1994	24	75	50	$14,015	$26,136	1	1	0.0	0.0	1.0	3.0	1.0	3
5290	Sanitary Sewer	SAMH_1543 - SAMH_1544	N/A	8.00	PVC	299.87	299	624734.728	26908612.348	698.641	$36,584	01/01/1994	24	75	50	$24,442	$45,580	1	1	0.0	0.0	1.0	3.0	1.0	3
5291	Sanitary Sewer	SAMH_1544 - SAMH_1545	N/A	8.00	PVC	140.73	140	624724.462	26908752.704	699.534	$17,169	01/01/1994	24	75	50	$11,471	$21,391	1	1	0.0	0.0	1.0	3.0	1.0	3
5292	Sanitary Sewer	SAMH_1504 - SAMH_1505	N/A	8.00	VCP	434.09	624	625886.269	26908722.727	698.985	$40,805	01/01/1970	48	75	26	$14,196	$62,509	1	1	0.0	0.0	1.0	1.0	1.0	1
5293	Sanitary Sewer	SACO_1515 - SAMH_1515	N/A	8.00	VCP	179.00	364	625886.269	26908722.727	705.581	$18,258	01/01/1970	48	75	26	$6,352	$27,208	1	1	0.0	0.0	1.0	1.0	1.0	1
5294	Sanitary Sewer	SAMH_1525 - SAMH_1524	N/A	8.00	VCP	333.87	295	625385.441	26908733.144	699.925	$34,055	01/01/1976	42	75	32	$14,573	$50,749	1	1	0.0	0.0	1.0	1.0	1.0	1
5295	Sanitary Sewer	SAMH_1501 - SAMH_1502	N/A	8.00	VCP	241.65	241	625690.625	26908075.539	691.920	$25,373	01/01/1966	52	75	22	$7,473	$39,872	1	1	0.0	0.0	1.0	2.0	1.0	2
5296	Sanitary Sewer	SAMH_1606 - SAMH_1608	N/A	10.00	PVC	236.59	236	627884.242	26912146.430	713.551	$26,499	01/01/1980	38	75	36	$12,754	$35,962	1	1	0.0	0.0	1.0	3.0	1.0	3
5297	Sanitary Sewer	SAMH_1608 - SAMH_1611	N/A	10.00	PVC	148.02	142	627839.951	26912287.734	713.056	$16,578	01/01/1980	38	75	36	$7,979	$22,498	1	1	0.0	0.0	1.0	3.0	1.0	3
5298	Sanitary Sewer	SAMH_1610 - SAMH_1611	N/A	8.00	PVC	19.59	19	627839.951	26912287.734	713.056	$2,194	01/01/1980	38	75	36	$1,056	$2,978	1	1	0.0	0.0	1.0	2.0	1.0	2
5299	Sanitary Sewer	SAMH_1611 - SAMH_1611A	N/A	12.00	VCP	247.86	570	627804.545	26912533.055	712.410	$26,026	01/01/1976	42	75	32	$11,137	$38,419	1	1	0.0	0.0	1.0	3.0	1.0	3
5300	Sanitary Sewer	SAMH_1614 - SAMH_1615	N/A	8.00	VCP	323.45	323	627842.193	26913180.810	711.633	$26,523	01/01/1950	68	75	6	$2,149	$49,164	1	1	0.0	0.0	1.0	3.0	1.0	3
5301	Sanitary Sewer	SAMH_1616 - SAMH_1629	N/A	8.00	VCP	184.03	184	627474.305	26912549.881	711.852	$13,619	01/01/1950	68	75	6	$1,103	$26,501	1	1	0.0	0.0	1.0	2.0	1.0	2
5302	Sanitary Sewer	SAMH_1629 - SAMH_1617	N/A	8.00	VCP	320.08	320	627481.186	26912869.888	711.677	$26,247	01/01/1950	68	75	6	$2,127	$48,652	1	1	0.0	0.0	1.0	2.0	1.0	2
5303	Sanitary Sewer	SAMH_1617 - SAMH_1618	N/A	8.00	VCP	320.50	320	627506.236	26913189.403	710.364	$26,281	01/01/1950	68	75	6	$2,130	$48,715	1	1	0.0	0.0	1.0	2.0	1.0	2
5304	Sanitary Sewer	SAMH_1520 - SAMH_1623	N/A	18.00	RCP	326.73	326	626473.055	26911972.887	704.503	$34,960	01/01/1966	52	75	22	$10,297	$54,565	1	1	0.0	0.0	1.0	4.0	1.0	4
5305	Sanitary Sewer	SAMH_1623 - SAMH_1624	N/A	18.00	RCP	303.30	303	626486.016	26912275.911	705.851	$32,453	01/01/1966	52	75	22	$9,558	$50,651	1	1	0.0	0.0	1.0	4.0	1.0	4
5306	Sanitary Sewer	SAMH_1624 - SAMH_1625	N/A	18.00	RCP	313.88	313	626501.012	26912589.428	705.227	$33,585	01/01/1966	52	75	22	$9,892	$52,417	1	1	0.0	0.0	1.0	4.0	1.0	4
5307	Sanitary Sewer	SAMH_1625 - SAMH_1626	N/A	18.00	RCP	356.78	356	626517.753	26912945.809	705.314	$38,175	01/01/1966	52	75	22	$11,244	$59,581	1	1	0.0	0.0	1.0	4.0	4.0	16
5308	Sanitary Sewer	SAMH_1626 - SAMH_1628	N/A	18.00	RCP	321.30	321	626533.664	26913266.716	708.124	$34,379	01/01/1966	52	75	22	$10,125	$53,657	1	1	0.0	0.0	1.0	4.0	3.0	12
5309	Sanitary Sewer	SAMH_1627 - SAMH_1628	N/A	8.00	VCP	327.89	327	626533.664	26913266.716	708.124	$33,444	01/01/1976	42	75	32	$14,312	$49,839	1	1	0.0	0.0	1.0	1.0	1.0	1
5310	Sanitary Sewer	SAMH_1519 - SAMH_1520	N/A	18.00	RCP	331.98	331	626146.789	26911990.342	705.309	$35,522	01/01/1966	52	75	22	$10,462	$55,441	1	1	0.0	0.0	1.0	4.0	4.0	16
5311	Sanitary Sewer	SAMH_1609 - SAMH_1610	N/A	8.00	PVC	242.80	242	627859.522	26912286.882	712.702	$27,194	01/01/1980	38	75	36	$13,088	$36,906	1	1	0.0	0.0	1.0	2.0	1.0	2
5312	Sanitary Sewer	SAMH_1567 - SAMH_1566	N/A	12.00	VCP	157.70	157	624404.487	26913329.039	704.040	$14,982	01/01/1976	42	75	32	$6,411	$22,867	1	1	0.0	0.0	1.0	2.0	1.0	2
5313	Sanitary Sewer	SAMH_1566 - SAMH_1565	N/A	12.00	VCP	763.71	763	625167.898	26913307.745	707.283	$80,189	01/01/1976	42	75	32	$34,316	$118,375	1	1	0.0	0.0	1.0	2.0	1.0	2
5314	Sanitary Sewer	SAMH_1564 - SAMH_1565	N/A	10.00	PVC	94.83	94	625167.898	26913307.745	707.283	$11,570	01/01/1994	24	75	50	$7,730	$14,415	1	1	0.0	0.0	1.0	2.0	1.0	2
5315	Sanitary Sewer	SAMH_1565 - SAMH_1563	N/A	12.00	VCP	671.36	671	625839.061	26913291.743	707.902	$70,492	01/01/1976	42	75	32	$30,166	$104,060	1	1	0.0	0.0	1.0	2.0	1.0	2

CITY OF SAULT STE. MARIE, MICHIGAN

Summary

id	Equipment Description	Asset ID	Construction Drawings Sheet Reference	Capacity or Size	Material	Length	Comment	Northing State Plane Ordinate	Easting State Plane Ordinate	Elevation	Original Cost	Year Installed (01/01/YYYY)	Age	Expected useful life (years)	Remaining Useful Life (years)	Depreciated Value	Replacement Cost	Average number of units in service	Total Number of units	Redundancy (Number)	Redundancy (percent)	Redundancy Score (R) (Reduces (C))	Criticality (C) (see back-up sheets)	Probability of Failure (P) (see back-up sheets)	Business Risk (BRE=PxCxR)
5316	Sanitary Sewer	SAMH_1563 - SAMH_1562	N/A	12.00	VCP	337.83	337	626176.639	26913278.713	705.690	$35,472	01/01/1976	42	75	32	$15,180	$52,364	1	1	0.0	0.0	1.0	2.0	1.0	2
5317	Sanitary Sewer	SAMH_1800 - SAMH_2005A	N/A	12.00	CP	250.81	374	634093.850	26908918.645	0.000	$21,319	01/01/1969	49	75	25	$7,132	$36,368	1	1	0.0	0.0	1.0	3.0	1.0	3
5318	Sanitary Sewer	SAMH_2038 - SAMH_2037	N/A	8.00	VCP	40.55	143	635373.199	26910385.094	633.609	$3,731	01/01/1969	49	75	25	$1,248	$6,164	1	1	0.0	0.0	1.0	3.0	1.0	3
5319	Sanitary Sewer	SAMH_2037 - SAMH_2036	N/A	9.00	VCP	228.33	157	635601.261	26910396.196	609.449	$21,007	01/01/1969	49	75	25	$7,028	$34,707	1	1	0.0	0.0	1.0	3.0	1.0	3
5320	Sanitary Sewer	SAMH_3508 - SAMH_3509	N/A	8.00	VCP	200.44	200	626238.132	26921424.626	629.698	$22,449	01/01/1980	38	75	36	$10,805	$30,467	1	1	0.0	0.0	1.0	1.0	1.0	1
5321	Sanitary Sewer	SAMH_3518 - SAMH_3519	N/A	8.00	VCP	143.60	143	625582.596	26922204.115	626.980	$14,934	01/01/1980	38	75	36	$7,187	$20,678	1	1	0.0	0.0	1.0	1.0	1.0	1
5322	Sanitary Sewer	SAMH_3516 - SAMH_3517	N/A	8.00	VCP	115.68	115	625730.078	26922258.381	628.203	$12,031	01/01/1980	38	75	36	$5,790	$16,658	1	1	0.0	0.0	1.0	1.0	1.0	1
5323	Sanitary Sewer	SAMH_3517 - SAMH_3519	N/A	8.00	VCP	157.15	157	625582.596	26922204.115	626.980	$16,343	01/01/1980	38	75	36	$7,866	$22,629	1	1	0.0	0.0	1.0	1.0	1.0	1
5324	Sanitary Sewer	SAMH_3515 - SAMH_3514	N/A	8.00	VCP	217.23	217	626162.843	26922148.063	627.709	$22,591	01/01/1980	38	75	36	$10,873	$31,281	1	1	0.0	0.0	1.0	1.0	1.0	1
5325	Sanitary Sewer	SAMH_3514 - SAMH_3513	N/A	8.00	VCP	262.42	262	626406.314	26922050.169	626.100	$27,291	01/01/1980	38	75	36	$13,135	$37,788	1	1	0.0	0.0	1.0	1.0	1.0	1
5326	Sanitary Sewer	SAMH_3513 - SAMH_3512	N/A	8.00	VCP	161.94	161	626509.871	26921925.663	627.366	$18,138	01/01/1980	38	75	36	$8,730	$24,615	1	1	0.0	0.0	1.0	1.0	1.0	1
5327	Sanitary Sewer	SAMH_3512 - SAMH_3511	N/A	8.00	VCP	157.45	157	626468.157	26921773.839	627.524	$17,634	01/01/1980	38	75	36	$8,487	$23,932	1	1	0.0	0.0	1.0	1.0	1.0	1
5328	Sanitary Sewer	SAMH_3511 - SAMH_3510	N/A	8.00	VCP	296.57	296	626293.715	26921533.996	629.228	$33,216	01/01/1980	38	75	36	$15,987	$45,079	1	1	0.0	0.0	1.0	1.0	1.0	1
5329	Sanitary Sewer	SAMH_3510 - SAMH_3509	N/A	8.00	VCP	122.68	122	626238.132	26921424.626	629.698	$13,741	01/01/1980	38	75	36	$6,613	$18,648	1	1	0.0	0.0	1.0	1.0	1.0	1
5330	Sanitary Sewer	SAMH_3509 - SAMH_3500	N/A	8.00	VCP	130.15	130	626246.883	26921294.771	630.377	$16,269	01/01/1980	38	75	36	$7,830	$21,475	1	1	0.0	0.0	1.0	2.0	1.0	2
5331	Sanitary Sewer	SAMH_3519 - SAMH_3520	N/A	8.00	VCP	152.22	152	625475.268	26922096.179	627.440	$15,830	01/01/1980	38	75	36	$7,619	$21,919	1	1	0.0	0.0	1.0	1.0	1.0	1
5332	Sanitary Sewer	SAMH_3520 - SAMH_3521	N/A	8.00	VCP	164.81	164	625417.846	26921941.701	628.565	$18,458	01/01/1980	38	75	36	$8,884	$25,050	1	1	0.0	0.0	1.0	1.0	1.0	1
5333	Sanitary Sewer	SAMH_3523A - SAMH_3523	N/A	8.00	VCP	103.34	192	625415.533	26921749.482	628.998	$11,574	01/01/1980	38	75	36	$5,570	$15,708	1	1	0.0	0.0	1.0	1.0	1.0	1
5334	Sanitary Sewer	SAMH_3523 - SAMH_3525	N/A	8.00	VCP	240.88	240	625411.170	26921508.641	629.501	$26,979	01/01/1980	38	75	36	$12,985	$36,614	1	1	0.0	0.0	1.0	1.0	1.0	1
5335	Sanitary Sewer	SAMH_3525 - SAMH_3502	N/A	8.00	VCP	212.40	212	625449.044	26921299.641	630.407	$23,789	01/01/1980	38	75	36	$11,450	$32,285	1	1	0.0	0.0	1.0	2.0	1.0	2
5336	Sanitary Sewer	SAMH_3524 - SAMH_3525	N/A	8.00	VCP	194.53	194	625411.170	26921508.641	629.501	$21,787	01/01/1980	38	75	36	$10,486	$29,569	1	1	0.0	0.0	1.0	1.0	1.0	1
5337	Sanitary Sewer	SAMH_3522 - SAMH_3523A	N/A	8.00	VCP	341.17	358	625417.312	26921852.805	628.671	$38,211	01/01/1980	38	75	36	$18,391	$51,857	1	1	0.0	0.0	1.0	1.0	1.0	1
5338	Sanitary Sewer	SAMH_1828 - SAMH_1827	N/A	8.00	VCP	301.89	301	632604.652	26909906.043	702.181	$22,340	01/01/1950	68	75	6	$1,810	$43,473	1	1	0.0	0.0	1.0	3.0	3.0	9
5339	Sanitary Sewer	SAMH_1826A - SAMH_1826	N/A	8.00	VCP	106.49	456	632693.262	26909452.216	699.313	$7,880	01/01/1950	68	75	6	$638	$15,334	1	1	0.0	0.0	1.0	3.0	5.0	15
5340	Sanitary Sewer	SAMH_1826 - SAMH_1825	N/A	8.00	VCP	109.30	109	632696.824	26909342.972	698.247	$8,963	01/01/1950	68	75	6	$726	$16,614	1	1	0.0	0.0	1.0	3.0	5.0	15
5341	Sanitary Sewer	SAMH_1825 - SAMH_1822	N/A	8.00	VCP	443.07	271	633113.079	26909191.169	688.028	$36,332	01/01/1950	68	75	6	$2,945	$67,347	1	1	0.0	0.0	1.0	3.0	1.0	3
5342	Sanitary Sewer	SAMH_1823 - SAMH_1822	N/A	8.00	VCP	240.36	240	633113.079	26909191.169	688.028	$19,709	01/01/1950	68	75	6	$1,597	$36,534	1	1	0.0	0.0	1.0	3.0	1.0	3
5343	Sanitary Sewer	SAMH_1822 - SAMH_1821	N/A	10.00	PVC	179.74	179	633283.883	26909135.210	677.977	$21,928	01/01/1995	23	75	51	$14,943	$27,320	1	1	0.0	0.0	1.0	3.0	1.0	3
5344	Sanitary Sewer	SAMH_1821 - SAMH_1803	N/A	10.00	PVC	191.80	191	633475.450	26909125.801	677.026	$21,865	01/01/1995	23	75	51	$14,900	$27,619	1	1	0.0	0.0	1.0	3.0	1.0	3
5345	Sanitary Sewer	SAMH_1818 - SAMH_1817	N/A	8.00	PVC	297.05	297	633352.486	26909851.478	696.684	$33,864	01/01/1998	20	75	54	$24,432	$42,775	1	1	0.0	0.0	1.0	3.0	1.0	3
5346	Sanitary Sewer	SAMH_1817 - SAMH_1816	N/A	8.00	PVC	223.11	223	633575.031	26909835.614	696.050	$25,434	01/01/1998	20	75	54	$18,350	$32,128	1	1	0.0	0.0	1.0	3.0	1.0	3
5347	Sanitary Sewer	SAMH_1816 - SAMH_1807	N/A	8.00	PVC	297.28	297	633567.598	26909538.432	697.279	$36,268	01/01/1998	20	75	54	$26,167	$45,186	1	1	0.0	0.0	1.0	3.0	1.0	3
5348	Sanitary Sewer	SAMH_1807 - SAMH_1806	N/A	8.00	PVC	52.89	52	633565.056	26909485.601	695.378	$7,140	01/01/1998	20	75	54	$5,151	$8,727	1	1	0.0	0.0	1.0	3.0	1.0	3
5349	Sanitary Sewer	SAMH_3158 - SAMH_3157	N/A	9.00	VCP	68.84	173	635019.185	26914049.935	615.103	$4,956	01/01/1939	79	75	0	$0	$10,463	1	1	0.0	0.0	1.0	2.0	5.0	10
5350	Sanitary Sewer	SAMH_3133 - SAMH_3132	N/A	24.00	RCP	110.38	106	635165.159	26914121.409	614.091	$12,252	01/01/1960	58	75	16	$2,627	$18,875	1	1	0.0	0.0	1.0	5.0	1.0	5
5351	Sanitary Sewer	SAMH_3157 - SAMH_3133	N/A	9.00	VCP	162.53	73	635165.159	26914121.409	613.662	$11,702	01/01/1939	79	75	0	$0	$24,705	1	1	0.0	0.0	1.0	2.0	5.0	10
5352	Sanitary Sewer	SAMH_3124 - SAMH_3125	N/A	24.00	VCP	89.43	78	635219.129	26914102.773	612.302	$8,585	01/01/1939	79	75	0	$0	$15,739	1	1	0.0	0.0	1.0	1.0	5.0	5
5353	Sanitary Sewer	SAMH_3125 - SAMH_3126	N/A	24.00	VCP	202.38	202	635131.342	26914285.126	612.122	$18,417	01/01/1939	79	75	0	$0	$34,608	1	1	0.0	0.0	1.0	1.0	1.0	1
5354	Sanitary Sewer	SAMH_3133 - SAMH_3134	N/A	24.00	RCP	155.86	164	635098.008	26914262.058	612.919	$18,079	01/01/1960	58	75	16	$3,877	$27,431	1	1	0.0	0.0	1.0	5.0	1.0	5
5355	Sanitary Sewer	SAMH_2839A - SAMH_2839	N/A	24.00	CP	71.37	71	634084.355	26914431.679	618.677	$11,133	01/01/2004	14	75	60	$8,923	$12,560	1	1	0.0	0.0	1.0	4.0	1.0	4
5356	Sanitary Sewer	SACO_3168 - SAMH_3168	N/A	9.00	VCP	192.81	262	634322.078	26914056.638	618.292	$12,340	01/01/1939	79	75	0	$0	$27,764	1	1	0.0	0.0	1.0	1.0	1.0	1
5357	Sanitary Sewer	SAMH_3166 - SAMH_3173	N/A	8.00	PVC	303.30	257	634364.765	26914588.554	613.964	$37,610	01/01/2004	14	75	60	$30,145	$43,676	1	1	0.0	0.0	1.0	1.0	1.0	1
5358	Sanitary Sewer	SAMH_3172A - SAMH_3172	N/A	8.00	ZZZ	379.65	379	634590.897	26914779.895	613.459	$50,114	01/01/2004	14	75	60	$40,168	$57,707	1	1	0.0	0.0	1.0	1.0	1.0	1
5359	Sanitary Sewer	SAMH_3128 - SAMH_3128A	N/A	24.00	VCP	281.61	565	634852.484	26914805.892	0.000	$27,035	01/01/1939	79	75	0	$0	$49,563	1	1	0.0	0.0	1.0	5.0	5.0	25
5360	Sanitary Sewer	SAMH_3129 - SAMH_3130	N/A	24.00	VCP	380.46	380	634561.636	26915403.253	610.315	$36,524	01/01/1939	79	75	0	$0	$66,961	1	1	0.0	0.0	1.0	5.0	5.0	25
5361	Sanitary Sewer	SAMH_3130 - SAMH_3131	N/A	24.00	VCP	71.07	71	634625.686	26915434.058	608.511	$6,823	01/01/1939	79	75	0	$0	$12,509	1	1	0.0	0.0	1.0	5.0	1.0	5
5362	Sanitary Sewer	SAMH_3131 - SAMH_3178	N/A	24.00	VCP	336.16	336	634520.314	26915753.275	0.000	$32,271	01/01/1939	79	75	0	$0	$59,164	1	1	0.0	0.0	1.0	5.0	5.0	25
5363	Sanitary Sewer	SAMH_3054 - SAMH_3053	N/A	9.00	VCP	77.18	77	635480.674	26914447.123	611.630	$4,940	01/01/1939	79	75	0	$0	$11,114	1	1	0.0	0.0	1.0	1.0	1.0	1
5364	Sanitary Sewer	SAMH_3053 - SAMH_3051	N/A	9.00	VCP	183.29	183	635644.923	26914528.478	612.627	$13,197	01/01/1939	79	75	0	$0	$27,861	1	1	0.0	0.0	1.0	1.0	1.0	1
5365	Sanitary Sewer	SAMH_3051 - SAMH_3050	N/A	9.00	VCP	252.47	252	635872.504	26914637.783	612.875	$18,178	01/01/1939	79	75	0	$0	$38,375	1	1	0.0	0.0	1.0	1.0	5.0	5
5366	Sanitary Sewer	SAMH_2873 - SAMH_2874	N/A	21.00	CP	26.60	26	632737.812	26913215.643	648.612	$2,554	01/01/1939	79	75	0	$0	$4,682	1	1	0.0	0.0	1.0	1.0	1.0	1
5367	Sanitary Sewer	SAMH_3179 - SAMH_3180	N/A	24.00	VCP	39.93	39	634384.250	26916046.959	609.743	$3,953	01/01/1939	79	75	0	$0	$7,147	1	1	0.0	0.0	1.0	5.0	1.0	5
5368	Sanitary Sewer	SAMH_3181 - SAMH_3182	N/A	24.00	VCP	293.49	478	634158.039	26916580.582	606.537	$28,175	01/01/1939	79	75	0	$0	$51,655	1	1	0.0	0.0	1.0	5.0	1.0	5
5369	Sanitary Sewer	SAMH_3178 - SAMH_3179	N/A	24.00	VCP	323.83	323	634421.385	26916061.628	609.609	$32,060	01/01/1939	79	75	0	$0	$57,966	1	1	0.0	0.0	1.0	5.0	4.0	20
5370	Sanitary Sewer	SAMH_3183 - SAMH_3185	N/A	24.00	VCP	287.76	287	634344.543	26917194.595	601.711	$27,625	01/01/1939	79	75	0	$0	$50,647	1	1	0.0	0.0	1.0	5.0	4.0	20
5371	Sanitary Sewer	SAMH_3079 - SAMH_3078	N/A	8.00	PVC	259.58	189	636465.408	26915788.634	610.130	$36,861	01/01/2015	3	75	71	$34,955	$39,457	1	1	0.0	0.0	1.0	2.0	1.0	2
5372	Sanitary Sewer	SAMH_3023A - SAMH_3023	N/A	8.00	PVC	252.54	506	636647.929	26915356.438	609.510	$35,861	01/01/2015	3	75	71	$34,007	$38,387	1	1	0.0	0.0	1.0	2.0	1.0	2
5373	Sanitary Sewer	SAMH_3857 - SAMH_3856	N/A	8.00	VCP	182.87	183	634073.394	26920321.415	601.558	$39,029	01/01/1962	56	75	18	$9,412	$48,626	1	1	0.0	0.0	1.0	1.0	1.0	1
5374	Sanitary Sewer	SAMH_3824A - SAMH_3824	N/A	12.00	VCP	348.81	348	633707.492	26921138.083	602.005	$46,033	01/01/1939	79	75	0	$0	$56,263	1	1	0.0	0.0	1.0	1.0	5.0	5
5375	Sanitary Sewer	SAMH_0638 - SAMH_0639	N/A	12.00	VCP	355.40	355	632592.212	26900309.319	617.916	$23,101	01/01/1939	79	75	0	$0	$51,532	1	1	0.0	0.0	1.0	1.0	5.0	5
5376	Sanitary Sewer	SAMH_0635 - SAMH_0636	N/A	9.00	VCP	321.67	321	632408.045	26900281.813	618.970	$23,804	01/01/1950	68	75	6	$1,929	$46,321	1	1	0.0	0.0	1.0	1.0	1.0	1
5377	Sanitary Sewer	SAMH_0639 - SAMH_0640	N/A	12.00	VCP	303.92	303	632606.329	26900612.914	617.658	$19,755	01/01/1939	79	75	0	$0	$44,069	1	1	0.0	0.0	1.0	1.0	3.0	3
5378	Sanitary Sewer	SAMH_0640 - SAMH_0641	N/A	12.00	VCP	9.07	9	632597.351	26900614.178	618.013	$680	01/01/1939	79	75	0	$0	$1,405	1	1	0.0	0.0	1.0	1.0	1.0	1
5379	Sanitary Sewer	SAMH_2842 - SAMH_2843	N/A	8.00	RPM	233.50	233	633418.695	26914454.472	627.644	$30,822	01/01/2004	14	75	60	$24,704	$35,492	1	1	0.0	0.0	1.0	1.0	1.0	1
5380	Sanitary Sewer	SAMH_2838 - SAMH_2837	N/A	8.00	RPM	365.38	365	633180.709	26914117.555	628.471	$48,230	01/01/2004	14	75	60	$38,657	$55,538	1	1	0.0	0.0	1.0	1.0	1.0	1
5381	Sanitary Sewer	SAMH_2843 - SAMH_2844	N/A	8.00	RPM	356.88	356	633185.202	26914452.909	628.277	$47,108	01/01/2004	14	75	60	$37,758	$54,246	1	1	0.0	0.0	1.0	1.0	1.0	1
5382	Sanitary Sewer	SAMH_2849 - SAMH_2850	N/A	8.00	RPM	345.45	345	633180.963	26914732.908	628.701	$45,600	01/01/2004	14	75	60	$36,549	$52,509	1	1	0.0	0.0	1.0	1.0	1.0	1
5383	Sanitary Sewer	SAMH_2855 - SAMH_2856	N/A	8.00	RPM	356.27	356	633200.049	26915030.872	628.276	$47,028	01/01/2004	14	75	60	$37,694	$54,153	1	1	0.0	0.0	1.0	1.0	1.0	1
5384	Sanitary Sewer	SAMH_2848 - SAMH_2849	N/A	8.00	RPM	238.02	238	633418.969	26914730.405	627.356	$31,419	01/01/2004	14	75	60	$25,183	$36,179	1	1	0.0	0.0	1.0	1.0	1.0	1
5385	Sanitary Sewer	SAMH_2847 - SAMH_2848	N/A	8.00	RPM	228.51	228	633647.452	26914726.674	625.625	$30,164	01/01/2004	14	75	60	$24,177	$34,734	1	1	0.0	0.0	1.0	1.0	1.0	1
5386	Sanitary Sewer	SAMH_2854 - SAMH_2855	N/A	8.00	RPM	230.47	230	633430.494	26915027.748	626.713	$30,422	01/01/2004	14	75	60	$24,384	$35,031	1	1	0.0	0.0	1.0	1.0	1.0	1
5387	Sanitary Sewer	SAMH_2853 - SAMH_2854	N/A	8.00	RPM	234.98	234	633665.445	26915024.322	625.232	$31,017	01/01/2004	14	75	60	$24,861	$35,716	1	1	0.0	0.0	1.0	1.0	1.0	1
5388	Sanitary Sewer	SAMH_2846 - SAMH_2847	N/A	8.00	RPM	410.95	410	634058.380	26914722.288	623.404	$54,246	01/01/2004	14	75	60	$43,480	$62,465	1	1	0.0	0.0	1.0	1.0	1.0	1
5389	Sanitary Sewer	SAMH_2846 - SAMH_2845	N/A	8.00	RPM	32.95	32	634091.281	26914720.554	617.499	$4,349	01/01/2004	14	75	60	$3,485	$5,008	1	1	0.0	0.0	1.0	1.0	1.0	1
5390	Sanitary Sewer	SAMH_3122 - SAMH_3132	N/A	21.00		84.36		635207.837	26914019.612	614.091	$9,786	01/01/1960	58	75	16	$2,098	$14,847	1	1	0.0	0.0	1.0	4.0	1.0	4
5391	Sanitary Sewer	SAMH_3146 - SAMH_3122	N/A	24.00	PVC	66.91		635228.475	26913937.818	613.513	$11,107	01/01/2015	3	75	71	$10,532	$11,776	1	1	0.0	0.0	1.0	4.0	1.0	4
5392	Sanitary Sewer	SAMH_1550 - SAMH_1549	N/A	15.00	PVC	343.82		624517.644	26908766.964	699.233	$44,353	01/01/1994	24	75	50	$29,633	$54,667	1	1	0.0	0.0	1.0	2.0	1.0	2
5393	Sanitary Sewer	SAMH_1549 - SAMH_1545	N/A	15.00	PVC	207.31		624724.462	26908752.704	699.534	$26,743	01/01/1994	24	75	50	$17,867	$32,962	1	1	0.0	0.0	1.0	2.0	1.0	2
5394	Sanitary Sewer	SAMH_1552 - SAMH_1550	N/A	15.00	PVC	78.81		624522.579	26909110.747	699.438	$10,166	01/01/1994	24	75	50	$6,792	$12,530	1	1	0.0	0.0	1.0	3.0	1.0	3
5395	Sanitary Sewer	SAMH_1553 - SAMH_1552	N/A	15.00	PVC	193.90		624444.180	26909102.750	700.967	$25,014	01/01/1994	24	75	50	$16,712	$30,831	1	1	0.0	0.0	1.0	3.0	1.0	3
5396	Sanitary Sewer	SAMH_1554 - SAMH_1553	N/A	15.00	PVC	344.55		624286.711	26908989.602	700.600	$44,446	01/01/1994	24	75	50	$29,695	$54,783	1	1	0.0	0.0	1.0	3.0	1.0	3
5397	Sanitary Sewer	SAMH_1555 - SAMH_1554	N/A	15.00	DIP	27.02		623991.626	26908811.736	694.614	$3,216	01/01/1994	24	75	50	$2,148	$4,026	1	1	0.0	0.0	1.0	3.0	1.0	3
5398	Sanitary Sewer	SAMH_1561 - SAMH_1547A	N/A	8.00	VCP	299.97		624501.091	26909196.962	700.370	$30,597	01/01/1974	44	75	30	$12,277	$45,595	1	1	0.0	0.0	1.0	2.0	1.0	2
5399	Sanitary Sewer	SAMH_1558 - SAMH_1557	N/A	15.00	PVC	174.97		623620.824	26908339.487	701.530	$22,572	01/01/1994	24	75	50	$15,080	$27,821	1	1	0.0	0.0	1.0	3.0	1.0	3
5400	Sanitary Sewer	SAMH_1557 - SAMH_1559	N/A	15.00	PVC	226.03		623742.179	26908530.179	699.980	$29,158	01/01/1994	24	75	50	$19,481	$35,939	1	1	0.0	0.0	1.0	3.0	1.0	3
5401	Sanitary Sewer	SAMH_1559 - SAMH_1555	N/A	15.00	PVC	351.21		623967.482	26908799.602	695.350	$45,307	01/01/1994	24	75	50	$30,270	$55,843	1	1	0.0	0.0	1.0	3.0	1.0	3
5402	Sanitary Sewer	SAMH_0803A - SAMH_0802	N/A	8.00	PVC	261.99		623447.373	26907524.668	699.695	$29,867	01/01/1994	24	75	50	$19,954	$37,727	1	1	0.0	0.0	1.0	2.0	1.0	2
5403	Sanitary Sewer	SAMH_0802 - SAMH_0801	N/A	8.00	PVC	26.44		623458.337	26907548.723	700.820	$3,014	01/01/1994	24	75	50	$2,013	$3,807	1	1	0.0	0.0	1.0	2.0	1.0	2
5404	Sanitary Sewer	SAMH_1102 - SAMH_1103	N/A	8.00	CP	225.64		632620.545	26904711.781	641.935	$16,697	01/01/1950	68	75	6	$1,353	$32,492	1	1	0.0	0.0	1.0	1.0	1.0	1
5405	Sanitary Sewer	SAMH_1112 - SAMH_1113	N/A	15.00	CP	322.87		632505.278	26904878.545	644.067	$28,736	01/01/1961	57	75	17	$6,547	$48,108	1	1	0.0	0.0	1.0	3.0	1.0	3
5406	Sanitary Sewer	SAMH_1134 - SAMH_1135	N/A	12.00	VCP	334.44		632323.622	26904908.607	644.341	$25,083	01/01/1939	79	75	0	$0	$51,838	1	1	0.0	0.0	1.0	1.0	3.0	3
5407	Sanitary Sewer	SAMH_1124 - SAMH_1125	N/A	8.00	CP	313.74		631773.479	26903937.295	698.166	$25,727	01/01/1950	68	75	6	$2,085	$47,689	1	1	0.0	0.0	1.0	1.0	1.0	1
5408	Sanitary Sewer	SAMH_1137 - SAMH_1139	N/A	12.00	VCP	329.03		632160.083	26904909.802	642.144	$21,387	01/01/1939	79	75	0	$0	$47,709	1	1	0.0	0.0	1.0	1.0	3.0	3
5409	Sanitary Sewer	SAMH_3098 - SAMH_3097	N/A	8.00	PVC	363.72		635533.470	26917046.186	609.230	$51,649	01/01/2015	3	75	71	$48,979	$55,286	1	1	0.0	0.0	1.0	1.0	1.0	1
5410	Sanitary Sewer	SAMH_3097 - SAMH_3096	N/A	8.00	PVC	399.72		635699.725	26916682.681	607.780	$56,761	01/01/2015	3	75	71	$53,827	$60,758	1	1	0.0	0.0	1.0	1.0	1.0	1
5411	Sanitary Sewer	SAMH_3093 - SAMH_3096	N/A	10.00	PVC	199.79		635699.725	26916682.681	607.780	$30,968	01/01/2015	3	75	71	$29,367	$32,966	1	1	0.0	0.0	1.0	2.0	1.0	2
5412	Sanitary Sewer	SAMH_3091 - SAMH_3092	N/A	10.00	PVC	208.90		635878.144	26916288.482	608.560	$32,379	01/01/2015	3	75	71	$30,705	$34,468	1	1	0.0	0.0	1.0	2.0	1.0	2
5413	Sanitary Sewer	SAMH_3092 - SAMH_3093	N/A	10.00	PVC	232.91		635781.707	26916500.485	608.170	$36,100	01/01/2015	3	75	71	$34,234	$38,430	1	1	0.0	0.0	1.0	2.0	1.0	2
5414	Sanitary Sewer	SAMH_3090 - SAMH_3091	N/A	8.00	PVC	31.81		635985.641	26916109.370	609.460	$4,517	01/01/2011	7	75	67	$4,042	$4,835	1	1	0.0	0.0	1.0	2.0	1.0	2
5415	Sanitary Sewer	SAMH_3099 - SAMH_3091	N/A	8.00	PVC	269.00		635985.641	26916109.370	609.460	$41,695	01/01/2015	3	75	71	$39,539	$44,385	1	1	0.0	0.0	1.0	2.0	1.0	2
5416	Sanitary Sewer	SAMH_3091A - SAMH_3091	N/A	8.00	PVC	261.00		635985.641	26916109.370	609.460	$40,455	01/01/2015	3	75	71	$38,363	$43,065	1	1	0.0	0.0	1.0	2.0	1.0	2
5417	Sanitary Sewer	SAMH_3110 - SAMH_3101	N/A	8.00	PVC	407.94		635660.731	26915950.344	610.650	$63,231	01/01/2016	2	75	72	$60,805	$67,310	1	1	0.0	0.0	1.0	2.0	1.0	2
5418	Sanitary Sewer	SAMH_3067 - SAMH_3111	N/A	8.00	PVC	191.14		635062.364	26915652.332	610.300	$27,141	01/01/2016	2	75	72	$26,099	$29,053	1	1	0.0	0.0	1.0	2.0	1.0	2
5419	Sanitary Sewer	SAMH_3111 - SAMH_3110	N/A	8.00	PVC	260.54		635295.145	26915769.344	610.900	$36,996	01/01/2016	2	75	72	$35,576	$39,602	1	1	0.0	0.0	1.0	2.0	1.0	2
5420	Sanitary Sewer	SAMH_3105 - SAMH_3104	N/A	8.00	PVC	199.98		635238.552	26916904.663	608.510	$28,397	01/01/2015	3	75	71	$26,929	$30,397	1	1	0.0	0.0	1.0	1.0	1.0	1
5421	Sanitary Sewer	SAMH_3104 - SAMH_3103	N/A	8.00	PVC	399.71		635399.835	26916538.941	607.780	$56,758	01/01/2015	3	75	71	$53,824	$60,755	1	1	0.0	0.0	1.0	1.0	1.0	1
5422	Sanitary Sewer	SAMH_3342A - SAMH_3022	N/A	12.00	VCP	59.33		636684.526	26915334.933	0.000	$5,043	01/01/1939	79	75	0	$0	$9,790	1	1	0.0	0.0	1.0	2.0	1.0	2
5423	Sanitary Sewer	SAMH_3023 - SAMH_3022	N/A	8.00	PVC	42.45		636684.526	26915334.933	0.000	$6,579	01/01/2015	3	75	71	$6,238	$7,004	1	1	0.0	0.0	1.0	2.0	1.0	2
5424	Sanitary Sewer	SAMH_3020 - SAMH_3022	N/A	12.00	VCP	96.80		636684.526	26915334.933	0.000	$8,228	01/01/1939	79	75	0	$0	$15,972	1	1	0.0	0.0	1.0	3.0	1.0	3
5425	Sanitary Sewer	SAMH_3019 - SAMH_3020	N/A	12.00	VCP	25.09		636595.392	26915295.818	610.430	$1,882	01/01/1939	79	75	0	$0	$3,888	1	1	0.0	0.0	1.0	3.0	1.0	3
5426	Sanitary Sewer	SAMH_3340 - SAMH_3342	N/A	12.00	VCP	329.57		636753.236	26915069.925	610.635	$24,718	01/01/1939	79	75	0	$0	$51,083	1	1	0.0	0.0	1.0	2.0	5.0	10
5427	Sanitary Sewer	SAMH_3327 - SAMH_3326	N/A	8.00	PVC	85.72		636802.343	26915987.440	607.107	$12,173	01/01/2011	7	75	67	$10,894	$13,030	1	1	0.0	0.0	1.0	2.0	1.0	2
5428	Sanitary Sewer	SAMH_3077 - SAMH_3078	N/A	8.00	PVC	185.16		636465.408	26915788.634	610.130	$26,292	01/01/2015	3	75	71	$24,932	$28,144	1	1	0.0	0.0	1.0	3.0	1.0	3
5429	Sanitary Sewer	SAMH_3109 - SAMH_3108	N/A	8.00	PVC	249.93		635095.511	26916387.859	608.970	$35,490	01/01/2016	2	75	72	$34,128	$37,989	1	1	0.0	0.0	1.0	1.0	1.0	1
5430	Sanitary Sewer	SAMH_3060 - SAMH_3061	N/A	8.00	PVC	420.17		635471.216	26915410.200	611.980	$59,664	01/01/2016	2	75	72	$57,375	$63,866	1	1	0.0	0.0	1.0	1.0	1.0	1
5431	Sanitary Sewer	SAMH_3061 - SAMH_3110	N/A	8.00	PVC	399.98		635295.145	26915769.344	610.900	$56,798	01/01/2016	2	75	72	$54,619	$60,797	1	1	0.0	0.0	1.0	1.0	1.0	1
5432	Sanitary Sewer	SAMH_3107 - SAMH_3108	N/A	8.00	PVC	398.29		635095.511	26916387.859	608.970	$56,557	01/01/2016	2	75	72	$54,387	$60,540	1	1	0.0	0.0	1.0	1.0	1.0	1
5433	Sanitary Sewer	SAMH_3106 - SAMH_3107	N/A	8.00	PVC	138.00		635256.941	26916023.754	610.530	$19,596	01/01/2016	2	75	72	$18,844	$20,976	1	1	0.0	0.0	1.0	1.0	1.0	1
5434	Sanitary Sewer	SAMH_3027 - SAMH_3026	N/A	8.00	PVC	264.40		635920.839	26915367.520	611.680	$37,545	01/01/2015	3	75	71	$35,604	$40,189	1	1	0.0	0.0	1.0	1.0	1.0	1
5435	Sanitary Sewer	SAMH_3026 - SAMH_3100	N/A	8.00	PVC	319.79		635790.510	26915659.547	611.360	$49,567	01/01/2015	3	75	71	$47,004	$52,765	1	1	0.0	0.0	1.0	1.0	1.0	1
5436	Sanitary Sewer	SAMH_3101 - SAMH_3102	N/A	8.00	PVC	323.99		635526.744	26916245.324	609.040	$50,218	01/01/2015	3	75	71	$47,622	$53,458	1	1	0.0	0.0	1.0	2.0	1.0	2
5437	Sanitary Sewer	SAMH_3102 - SAMH_3103	N/A	8.00	PVC	319.87		635399.835	26916538.941	607.780	$49,580	01/01/2015	3	75	71	$47,017	$52,779	1	1	0.0	0.0	1.0	2.0	1.0	2
5438	Sanitary Sewer	SAMH_3059 - SAMH_3026	N/A	8.00	PVC	335.53		635920.839	26915367.520	611.680	$47,645	01/01/2015	3	75	71	$45,182	$51,000	1	1	0.0	0.0	1.0	1.0	1.0	1
5439	Sanitary Sewer	SAMH_3015 - SAMH_3016	N/A	12.00	VCP	36.68		636083.065	26915110.077	0.000	$2,751	01/01/1939	79	75	0	$0	$5,686	1	1	0.0	0.0	1.0	3.0	1.0	3
5440	Sanitary Sewer	SAMH_3064 - SAMH_3111	N/A	8.00	PVC	400.51		635062.364	26915652.332	610.300	$56,872	01/01/2016	2	75	72	$54,690	$60,877	1	1	0.0	0.0	1.0	1.0	1.0	1
5441	Sanitary Sewer	SAMH_3113 - SAMH_3114	N/A	8.00	PVC	399.33		634854.448	26916125.040	608.280	$56,705	01/01/2016	2	75	72	$54,530	$60,698	1	1	0.0	0.0	1.0	1.0	1.0	1
5442	Sanitary Sewer	SAMH_3114 - SAMH_3115	N/A	8.00	PVC	153.33		634870.566	26916277.524	609.890	$21,773	01/01/2016	2	75	72	$20,937	$23,307	1	1	0.0	0.0	1.0	1.0	1.0	1
5443	Sanitary Sewer	SAMH_3115 - SAMH_3108	N/A	8.00	PVC	250.55		635095.511	26916387.859	608.970	$35,578	01/01/2016	2	75	72	$34,213	$38,083	1	1	0.0	0.0	1.0	1.0	1.0	1
5444	Sanitary Sewer	SAMH_3108 - SAMH_3103	N/A	8.00	PVC	339.76		635399.835	26916538.941	607.780	$48,246	01/01/2016	2	75	72	$46,395	$51,644	1	1	0.0	0.0	1.0	2.0	1.0	2
5445	Sanitary Sewer	SAMH_3103 - SAMH_3096	N/A	15.00	PVC	332.56		635699.725	26916682.681	607.780	$53,542	01/01/2015	3	75	71	$50,774	$56,868	1	1	0.0	0.0	1.0	2.0	1.0	2
5446	Sanitary Sewer	SAMH_3095 - SAMH_3094	N/A	15.00	PVC	15.61		635941.982	26916812.938	606.552	$2,514	01/01/2015	3	75	71	$2,384	$2,670	1	1	0.0	0.0	1.0	1.0	1.0	1
5447	Sanitary Sewer	SAMH_3096 - SAMH_3095	N/A	15.00	PVC	262.89		635935.638	26916798.673	606.600	$42,325	01/01/2015	3	75	71	$40,137	$44,953	1	1	0.0	0.0	1.0	1.0	1.0	1
5448	Sanitary Sewer	SAMH_3310A - SAMH_3310	N/A	47.00	ZZZ	399.31		637374.855	26915645.606	602.968	$46,719	01/01/1939	79	75	0	$0	$174,498	1	1	0.0	0.0	1.0	2.0	4.0	8
5449	Sanitary Sewer	SAMH_1841 - SAMH_1842	N/A	9.00	VCP	227.85	622	633865.000	26912398.139	705.902	$16,405	01/01/1939	79	75	0	$0	$34,633	1	1	0.0	0.0	1.0	1.0	1.0	1
5450	Sanitary Sewer	SAMH_2922 - SAMH_2928	N/A	24.00	VCP	330.10		634145.904	26916300.349	607.777	$31,690	01/01/1939	79	75	0	$0	$58,098	1	1	0.0	0.0	1.0	4.0	5.0	20
5451	Sanitary Sewer	SAMH_2654 - SAMH_2653	N/A	12.00	CP	321.81	648	631499.997	26915688.723	630.788	$24,136	01/01/1950	68	75	6	$1,956	$46,662	1	1	0.0	0.0	1.0	1.0	1.0	1
5452	Sanitary Sewer	SACO_3197 - SAMH_3197	N/A	4.00	PVC	149.19		634386.793	26918062.947	608.722	$19,693	01/01/2005	13	75	61	$16,047	$22,677	1	1	0.0	0.0	1.0	1.0	1.0	1
5453	Sanitary Sewer	SAMH_3925B - SAMH_3925A	N/A	8.00	PVC	275.08		635360.937	26918255.944	604.779	$65,683	01/01/1998	20	75	54	$47,390	$81,923	1	1	0.0	0.0	1.0	1.0	1.0	1
5454	Sanitary Sewer	SAMH_3335A - SAMH_3335B	N/A	15.00	PVC	278.91	591	637541.597	26914199.579	603.056	$44,904	01/01/2010	8	75	66	$39,587	$47,694	1	1	0.0	0.0	1.0	4.0	1.0	4
5455	Sanitary Sewer	SAMH_3341A - SAMH_3310A	N/A	47.00	ZZZ	645.80		637006.814	26915490.710	606.146	$75,558	01/01/1939	79	75	0	$0	$282,213	1	1	0.0	0.0	1.0	4.0	1.0	4
5456	Sanitary Sewer	SAMH_3333 - SAMH_8149	N/A	12.00	RCP	14.41	Sanitary Overflow into Storm	637101.937	26913232.263	0.000	$1,945	01/01/2010	8	75	66	$1,714	$2,089	1	1	0.0	0.0	1.0	4.0	1.0	4
5457	Sanitary Sewer	SAMH_3078 - SAMH_3023A	N/A	8.00	PVC	216.62	506	636548.689	26915588.665	609.360	$30,760	01/01/2015	3	75	71	$29,170	$32,926	1	1	0.0	0.0	1.0	2.0	1.0	2
5458	Sanitary Sewer	SAMH_3935 - SAMH_3934A	N/A	9.00	VCP	224.55		634778.171	26918737.338	607.441	$22,816	01/01/1939	79	75	0	$0	$28,426	1	1	0.0	0.0	1.0	1.0	5.0	5
5459	Sanitary Sewer	SAMH_3857B - SAMH_3857	N/A	8.00	PVC	319.91		633998.708	26920488.334	602.601	$31,189	01/01/1993	25	75	49	$20,422	$38,858	1	1	0.0	0.0	1.0	1.0	1.0	1
5460	Sanitary Sewer	SAMH_1502 - PS004	N/A	12.00	VCP	42.10		625675.231	26908036.353	0.000	$4,000	01/01/1966	52	75	22	$1,178	$6,526	1	1	0.0	0.0	1.0	3.0	1.0	3
5461	Sanitary Sewer	SAMH_1186 - SAMH_1185	N/A	8.00	VCP	350.28		632663.525	26906190.349	641.253	$35,728	01/01/1974	44	75	30	$14,336	$53,242	1	1	0.0	0.0	1.0	3.0	1.0	3
5462	Sanitary Sewer	SAMH_1140A - SAMH_1140	N/A	12.00	CP	161.76		632179.083	26905224.373	643.282	$12,132	01/01/1939	79	75	0	$0	$25,073	1	1	0.0	0.0	1.0	2.0	1.0	2
5463	Sanitary Sewer	SAMH_1125 - SAMH_1121	N/A	8.00	CP	193.36		631782.319	26904130.453	695.637	$15,856	01/01/1950	68	75	6	$1,285	$29,391	1	1	0.0	0.0	1.0	1.0	1.0	1
5464	Sanitary Sewer	SAMH_1121 - SAMH_1128	N/A	8.00	CP	123.35		631793.568	26904253.288	661.674	$10,115	01/01/1950	68	75	6	$819	$18,749	1	1	0.0	0.0	1.0	2.0	1.0	2
5465	Sanitary Sewer	SAMH_1128 - SAMH_1141	N/A	10.00	CP	63.80		631799.378	26904316.820	647.692	$7,273	01/01/1991	27	75	47	$4,568	$9,187	1	1	0.0	0.0	1.0	3.0	1.0	3
5466	Sanitary Sewer	SAMH_1135 - SAMH_1140A	N/A	12.00	VCP	309.11		632340.687	26905217.245	644.304	$23,183	01/01/1939	79	75	0	$0	$47,912	1	1	0.0	0.0	1.0	1.0	3.0	3

CITY OF SAULT STE. MARIE, MICHIGAN

Summary

id	Equipment Description	Asset ID	Construction Drawings Sheet Reference	Capacity or Size	Material	Length	Comment	Northing State Plane Ordinate	Easting State Plane Ordinate	Elevation	Original Cost	Year Installed (01/01/YYYY)	Age	Expected useful life (years)	Remaining Useful Life (years)	Depreciated Value	Replacement Cost	Average number of units in service	Total Number of units	Redundancy (Number)	Redundancy (percent)	Redundancy Score (R) (Reduces (C))	Criticality (C) (see back-up sheets)	Probability of Failure (P) (see back-up sheets)	Business Risk (BRE=PxCxR)
5467	Sanitary Sewer	SAMH_1101 - SAMH_1102	N/A	8.00	CP	364.05		632610.440	26904486.372	642.254	$26,940	01/01/1950	68	75	6	$2,183	$52,423	1	1	0.0	0.0	1.0	1.0	1.0	1
5468	Sanitary Sewer	SAMH_1154A - SAMH_1154	N/A	8.00	VCP	65.13		633790.689	26907492.813	636.091	$7,946	01/01/1991	27	75	47	$4,990	$9,900	1	1	0.0	0.0	1.0	3.0	1.0	3
5469	Sanitary Sewer	SAMH_2034 - SAMH_6842	N/A		PVC	16.05		635690.579	26910377.826	0.000	$1,990	01/01/2009	9	75	65	$1,727	$2,311	1	1	0.0	0.0	1.0	4.0	1.0	4
5470	Sanitary Sewer	SAMH_0643 - PS001	N/A	12.00	VCP	56.35		632578.060	26901263.772	0.000	$5,353	01/01/1978	40	75	34	$2,433	$8,171	1	1	0.0	0.0	1.0	3.0	1.0	3
5471	Sanitary Sewer	SAMH_2042 - SAMH_2023	N/A	15.00	VCP	314.23	No Flow	635928.271	26911126.081	610.804	$21,682	01/01/1939	79	75	0	$0	$46,820	1	1	0.0	0.0	1.0	2.0	1.0	2
5472	Sanitary Sewer	SAMH_0606 - PS006	N/A	8.00	PVC	17.00		632002.507	26897302.150	0.000	$2,074	01/01/1998	20	75	54	$1,496	$2,584	1	1	0.0	0.0	1.0	3.0	1.0	3
5473	Sanitary Sewer	SAMH_0603 - SAMH_0604	N/A	8.00	PVC	40.02		631598.163	26897355.330	617.483	$4,882	01/01/1998	20	75	54	$3,522	$6,083	1	1	0.0	0.0	1.0	1.0	1.0	1
5474	Sanitary Sewer	SAMH_1165A - SAMH_1167	N/A	18.00	RCP	67.02		633895.969	26907793.747	634.994	$8,512	01/01/1980	38	75	36	$4,096	$11,192	1	1	0.0	0.0	1.0	3.0	1.0	3
5475	Sanitary Sewer	SAMH_1865A - SAMH_1865	N/A	8.00	VCP	7.00		632703.808	26911755.813	719.968	$714	01/01/1970	48	75	26	$248	$1,064	1	1	0.0	0.0	1.0	2.0	1.0	2
5476	Sanitary Sewer	SAMH_1768D - SAMH_D1768	N/A	8.00	PVC	69.34		628939.362	26913004.564	0.000	$9,847	01/01/2015	3	75	71	$9,338	$10,540	1	1	0.0	0.0	1.0	2.0	1.0	2
5477	Sanitary Sewer	SAMH_1768C - SAMH_D1768	N/A	8.00	PVC	56.33		628942.782	26912948.334	0.000	$7,999	01/01/2015	3	75	71	$7,585	$8,563	1	1	0.0	0.0	1.0	2.0	1.0	2
5478	Sanitary Sewer	SAMH_1768D - SAMH_1766A	N/A	8.00	PVC	181.24		629123.732	26912938.036	714.974	$25,736	01/01/2015	3	75	71	$24,405	$27,549	1	1	0.0	0.0	1.0	2.0	1.0	2
5479	Sanitary Sewer	SAMH_1766A - SAMH_D1763	N/A	10.00	PVC	253.12		629376.831	26912935.029	0.000	$35,943	01/01/2015	3	75	71	$34,085	$38,474	1	1	0.0	0.0	1.0	2.0	1.0	2
5480	Sanitary Sewer	SAMH_1763A - SAMH_1763	N/A	8.00	VCP	56.45	353	629480.847	26912995.780	0.000	$3,613	01/01/1939	79	75	0	$0	$8,129	1	1	0.0	0.0	1.0	2.0	2.0	4
5481	Sanitary Sewer	SAMH_1611A - SAMH_1614	N/A	8.00	VCP	325.48		627828.585	26912857.649	713.133	$26,690	01/01/1950	68	75	6	$2,163	$49,474	1	1	0.0	0.0	1.0	3.0	1.0	3
5482	Sanitary Sewer	SAMH_2646C - SAMH_2646B	N/A	10.00	PVC	317.32		629578.264	26915325.807	642.647	$41,886	01/01/2000	18	75	56	$31,337	$48,232	1	1	0.0	0.0	1.0	2.0	1.0	2
5483	Sanitary Sewer	SAMH_2646B - SAMH_2646A	N/A	10.00	PVC	254.91		629833.165	26915324.297	640.726	$31,608	01/01/2000	18	75	56	$23,647	$36,706	1	1	0.0	0.0	1.0	2.0	1.0	2
5484	Sanitary Sewer	SAMH_2646A - SAMH_2646	N/A	10.00	PVC	378.85		630108.601	26915064.178	638.766	$46,977	01/01/2000	18	75	56	$35,146	$54,554	1	1	0.0	0.0	1.0	2.0	1.0	2
5485	Sanitary Sewer	SAMH_2652C - SAMH_2652B	N/A	10.00	PVC	288.36		629600.313	26915397.192	641.013	$35,180	01/01/1997	21	75	53	$24,913	$43,830	1	1	0.0	0.0	1.0	1.0	1.0	1
5486	Sanitary Sewer	SAMH_2652B - SAMH_2652A	N/A	10.00	PVC	334.91		629935.026	26915385.777	639.945	$40,859	01/01/1997	21	75	53	$28,934	$50,906	1	1	0.0	0.0	1.0	1.0	1.0	1
5487	Sanitary Sewer	SAMH_2652A - SAMH_2652	N/A	10.00	PVC	310.29		630245.296	26915382.267	633.997	$37,855	01/01/1997	21	75	53	$26,807	$47,164	1	1	0.0	0.0	1.0	1.0	1.0	1
5488	Sanitary Sewer	SAMH_2517 - SAMH_2517B	N/A	8.00	VCP	394.00		628364.193	26915076.066	0.000	$29,156	01/01/1950	68	75	6	$2,363	$56,736	1	1	0.0	0.0	1.0	1.0	1.0	1
5489	Sanitary Sewer	SAMH_2517B - SAMH_2518	N/A	8.00	VCP	202.92		628312.199	26915272.208	700.598	$15,016	01/01/1950	68	75	6	$1,217	$29,220	1	1	0.0	0.0	1.0	1.0	1.0	1
5490	Sanitary Sewer	SAMH_2518A - SAMH_2518	N/A	8.00	VCP	304.28		628312.199	26915272.208	700.598	$22,517	01/01/1950	68	75	6	$1,825	$43,816	1	1	0.0	0.0	1.0	1.0	1.0	1
5491	Stormwater Sewer	STMH_6634 - STMH_6635	N/A	15.00	PE	136.97		630784.949	26913112.085	701.841	$29,197	01/01/1996	22	75	52	$20,285	$44,951	1	1	0.0	0.0	1.0	2.0	1.0	2
5492		STMH_7506 - STMH_7504	N/A	36.00	RCP	311.63		631097.558	26913162.948	699.747	$1,317	01/01/1965	53	75	21	$370	$2,257	1	1	0.0	0.0	1.0	4.0	1.0	4
5493	Stormwater Sewer	STMH_7505 - STMH_7505A	N/A	12.00	RCP	83.92		630976.196	26913272.964	0.000	$46,432	01/01/1998	20	75	54	$33,500	$74,479	1	1	0.0	0.0	1.0	1.0	1.0	1
5494		STMH_6627A - STMH_7504	N/A	21.00	RCP	51.42		631097.558	26913162.948	699.747	$29,154	01/01/1965	53	75	21	$8,198	$33,856	1	1	0.0	0.0	1.0	2.0	1.0	2
5495	Stormwater Sewer	STMH_6627 - STMH_6627A	N/A	12.00	PVC	150.22		631093.607	26913111.683	699.591	$5,862	01/01/2000	18	75	56	$4,385	$8,947	1	1	0.0	0.0	1.0	2.0	1.0	2
5496		STMH_7504 - STMH_7501	N/A	42.00	RCP	255.34		631352.840	26913157.584	698.935	$9,650	01/01/1965	53	75	21	$2,713	$12,168	1	1	0.0	0.0	1.0	4.0	1.0	4
5497		STMH_7501 - STMH_7614	N/A	42.00	RCP	86.80		631439.288	26913149.805	698.849	$42,386	01/01/1965	53	75	21	$11,919	$73,027	1	1	0.0	0.0	1.0	4.0	1.0	4
5498		STMH_7614 - STMH_7613	N/A	42.00	RCP	336.83		631776.097	26913146.220	696.978	$15,107	01/01/1965	53	75	21	$4,248	$17,570	1	1	0.0	0.0	1.0	4.0	1.0	4
5499		STMH_6746 - STMH_7613	N/A	24.00	RCP	43.87		631776.097	26913146.220	696.978	$14,766	01/01/1965	53	75	21	$4,152	$22,403	1	1	0.0	0.0	1.0	2.0	1.0	2
5500	Stormwater Sewer	STMH_6747 - STMH_6746	N/A	24.00	RCP	127.29		631775.816	26913102.350	696.636	$26,459	01/01/1965	53	75	21	$7,440	$40,144	1	1	0.0	0.0	1.0	2.0	1.0	2
5501		STMH_6745A - STMH_7612	N/A	12.00	RCP	40.20		632082.848	26913143.221	694.686	$5,089	01/01/1965	53	75	21	$1,431	$7,721	1	1	0.0	0.0	1.0	1.0	1.0	1
5502		STMH_7613 - STMH_7612	N/A	42.00	RCP	306.77		632082.848	26913143.221	694.686	$55,914	01/01/1965	53	75	21	$15,723	$96,333	1	1	0.0	0.0	1.0	4.0	1.0	4
5503		STMH_7612 - STMH_7611	N/A	42.00	RCP	329.93		632412.780	26913143.004	687.338	$44,481	01/01/1965	53	75	21	$12,508	$81,293	1	1	0.0	0.0	1.0	4.0	1.0	4
5504	Stormwater Sewer	STMH_6731 - STMH_6732	N/A	15.00	RCP	196.21		633359.653	26913064.441	650.676	$7,452	01/01/2003	15	75	59	$5,873	$11,374	1	1	0.0	0.0	1.0	2.0	1.0	2
5505	Stormwater Sewer	STMH_6732 - STMH_7608	N/A	21.00	RCP	65.37		633376.819	26913127.512	648.289	$46,375	01/01/1965	53	75	21	$13,040	$53,048	1	1	0.0	0.0	1.0	2.0	1.0	2
5506		STMH_7608 - STMH_7607B	N/A	42.00	RCP	72.61		633448.184	26913140.897	645.405	$38,052	01/01/1965	53	75	21	$10,700	$61,037	1	1	0.0	0.0	1.0	5.0	1.0	5
5507		STMH_7609 - STMH_7608	N/A	36.00	RCP	255.39		633376.819	26913127.512	648.289	$53,316	01/01/1965	53	75	21	$14,992	$85,521	1	1	0.0	0.0	1.0	4.0	1.0	4
5508	Stormwater Sewer	STCB_11195 - STMH_6725	N/A	12.00	RCP	49.74		633653.214	26912476.189	699.562	$13,246	01/01/1974	44	75	30	$5,315	$20,406	1	1	0.0	0.0	1.0	1.0	1.0	1
5509	Stormwater Sewer	STMH_6725 - STMH_6725A	N/A	15.00	CMP	211.72		633512.334	26912634.229	686.599	$9,821	01/01/1974	44	75	30	$3,940	$14,781	1	1	0.0	0.0	1.0	1.0	1.0	1
5510	Stormwater Sewer	STMH_6726 - STMH_6725A	N/A	12.00	RCP	38.89		633512.334	26912634.229	686.599	$21,990	01/01/2003	15	75	59	$17,332	$33,097	1	1	0.0	0.0	1.0	1.0	1.0	1
5511	Sanitary Sewer	SAMH_2518B - SAMH_2518A	N/A	8.00	VCP	251.63		628011.809	26915320.706	0.000	$18,621	01/01/1950	68	75	6	$1,509	$36,235	1	1	0.0	0.0	1.0	1.0	1.0	1
5512	Sanitary Sewer	SAMH_2518E - SAMH_2518C	N/A	8.00	VCP	197.67		627579.348	26915148.092	0.000	$18,581	01/01/1972	46	75	28	$6,959	$28,464	1	1	0.0	0.0	1.0	1.0	1.0	1
5513	Sanitary Sewer	SAMH_2518D - SAMH_2518C	N/A	8.00	VCP	171.44		627579.348	26915148.092	0.000	$12,686	01/01/1950	68	75	6	$1,028	$24,687	1	1	0.0	0.0	1.0	1.0	1.0	1
5514	Sanitary Sewer	SAMH_2518C - SAMH_2518B	N/A	8.00	VCP	215.75		627771.408	26915246.379	702.440	$15,965	01/01/1950	68	75	6	$1,294	$31,068	1	1	0.0	0.0	1.0	1.0	1.0	1
5515	Sanitary Sewer	SAMH_1560B - SAMH_1560	N/A	8.00	PVC	198.26		623752.061	26908713.678	700.236	$22,602	01/01/1996	22	75	52	$15,703	$28,550	1	1	0.0	0.0	1.0	1.0	1.0	1
5516	Sanitary Sewer	SAMH_1547A - SAMH_1547	N/A	8.00	VCP	300.60		624741.865	26909376.925	701.697	$30,661	01/01/1974	44	75	30	$12,303	$45,691	1	1	0.0	0.0	1.0	2.0	1.0	2
5517	Stormwater Sewer	STMH_8160 - STMH_8159	N/A	12.00	PVC	11.32		636849.903	26913556.852	617.334	$12,445	01/01/2011	7	75	67	$11,137	$13,366	1	1	0.0	0.0	1.0	2.0	1.0	2
5518	Stormwater Sewer	STMH_7804 - STMH_7805	N/A	12.00	PVC	49.83		636616.990	26913833.006	611.997	$4,604	01/01/2005	13	75	61	$3,751	$10,271	1	1	0.0	0.0	1.0	2.0	1.0	2
5519	Stormwater Sewer	STMH_7806 - STMH_7807	N/A	27.00	RCP	129.88		636530.940	26914014.284	612.376	$28,968	01/01/1974	44	75	30	$11,624	$42,216	1	1	0.0	0.0	1.0	3.0	1.0	3
5520	Stormwater Sewer	STMH_7848 - STMH_7849	N/A	12.00	PVC	117.08		636355.981	26913990.004	612.222	$11,463	01/01/2005	13	75	61	$9,341	$16,705	1	1	0.0	0.0	1.0	4.0	1.0	4
5521	Stormwater Sewer	STMH_7809 - STMH_7808	N/A	12.00	VCP	186.94		636489.994	26914107.468	611.810	$23,305	01/01/1939	79	75	0	$0	$35,074	1	1	0.0	0.0	1.0	2.0	1.0	2
5522	Stormwater Sewer	STMH_7816 - STMH_7817	N/A	6.00	XXX	114.92		636399.460	26914373.992	613.399	$6,045	01/01/1950	68	75	6	$490	$7,655	1	1	0.0	0.0	1.0	3.0	1.0	3
5523	Stormwater Sewer	STMH_7817 - STMH_7818	N/A	27.00	RCP	35.77		636364.846	26914383.009	613.277	$17,204	01/01/1995	23	75	51	$11,723	$21,785	1	1	0.0	0.0	1.0	3.0	1.0	3
5524	Stormwater Sewer	STMH_7818 - STMH_7819	N/A	27.00	RCP	101.80		636325.497	26914476.898	613.353	$6,171	01/01/1995	23	75	51	$4,205	$7,814	1	1	0.0	0.0	1.0	3.0	1.0	3
5525	Stormwater Sewer	STMH_7819 - STMH_7820	N/A	27.00	RCP	36.52		636321.161	26914513.156	613.346	$3,453	01/01/1995	23	75	51	$2,353	$4,373	1	1	0.0	0.0	1.0	3.0	1.0	3
5526	Stormwater Sewer	STMH_7814 - STMH_7820	N/A	21.00	RCP	228.17		636321.161	26914513.156	613.346	$8,208	01/01/1996	22	75	52	$5,702	$15,972	1	1	0.0	0.0	1.0	3.0	1.0	3
5527	Stormwater Sewer	STMH_7820 - STMH_7821	N/A	27.00	RCP	20.43		636311.956	26914531.400	613.060	$18,631	01/01/1996	22	75	52	$12,944	$28,542	1	1	0.0	0.0	1.0	3.0	1.0	3
5528	Sanitary Sewer	SAMH_0644 - SAMH_5614	N/A	8.00	VCP	58.12		632693.747	26901293.113	0.000	$3,720	01/01/1939	79	75	0	$0	$8,369	1	1	0.0	0.0	1.0	3.0	2.0	6
5529	Sanitary Sewer	SAMH_3604A - SAMH_3604	N/A	12.00	VCP	97.93	347	627989.526	26921282.251	628.353	$11,261	01/01/1976	42	75	32	$4,819	$16,158	1	1	0.0	0.0	1.0	3.0	1.0	3
5530	Sanitary Sewer	SAMH_3063 - SAMH_3064	N/A	8.00	PVC	375.00		635409.455	26914958.837	611.650	$53,250	01/01/2016	2	75	72	$51,207	$57,000	1	1	0.0	0.0	1.0	1.0	1.0	1
5531	Sanitary Sewer	SAMH_3835B - SAMH_3837	N/A	12.00	CP	306.35		632578.679	26922826.364	599.036	$22,689	01/01/1950	68	75	6	$1,839	$41,374	1	1	0.0	0.0	1.0	2.0	5.0	10
5532	Sanitary Sewer	SAMH_3835A - SAMH_3835B	N/A	10.00	PVC	152.79	367	632703.145	26922546.444	598.503	$26,039	01/01/2005	13	75	61	$21,219	$47,484	1	1	0.0	0.0	1.0	2.0	1.0	2
5533	Sanitary Sewer	SAMH_3827 - SAMH_3826	N/A	8.00	VCP	244.55		633491.563	26921606.621	599.842	$26,277	01/01/1950	68	75	6	$2,129	$39,158	1	1	0.0	0.0	1.0	1.0	1.0	1
5534	Sanitary Sewer	SAMH_2607A - SAMH_2607	N/A	8.00	CP	300.52		629492.533	26913803.051	0.000	$22,239	01/01/1950	68	75	6	$1,802	$43,275	1	1	0.0	0.0	1.0	1.0	1.0	1
5535	Sanitary Sewer	SAMH_2872A - SAMH_2873	N/A	12.00	VCP	23.20	79	632738.026	26913189.043	0.000	$2,204	01/01/1950	68	75	6	$178	$3,828	1	1	0.0	0.0	1.0	1.0	1.0	1
5536	Sanitary Sewer	SAMH_2005A - SAMH_2005	N/A	12.00	RCP	142.11		634205.895	26908831.226	0.000	$19,185	01/01/2011	7	75	67	$17,169	$20,606	1	1	0.0	0.0	1.0	3.0	1.0	3
5537	Sanitary Sewer	SAMH_2648A - SAMH_2648	N/A	8.00	PVC	128.15		631175.329	26915375.252	0.000	$16,916	01/01/2001	17	75	57	$12,882	$19,479	1	1	0.0	0.0	1.0	1.0	1.0	1
5538	Sanitary Sewer	SAMH_2664A - SAMH_2664	N/A	8.00	VCP	326.87	677	631235.403	26917045.192	0.000	$26,803	01/01/1950	68	75	6	$2,172	$49,684	1	1	0.0	0.0	1.0	1.0	1.0	1
5539	Sanitary Sewer	SAMH_2672 - SAMH_2670A	N/A	8.00	VCP	334.45	682	630618.829	26918092.246	631.725	$28,094	01/01/1961	57	75	17	$6,400	$48,161	1	1	0.0	0.0	1.0	1.0	1.0	1
5540	Sanitary Sewer	SAMH_2621A - SAMH_2620	N/A	8.00	CP	321.19	657	630790.208	26913511.404	697.092	$26,337	01/01/1950	68	75	6	$2,134	$48,820	1	1	0.0	0.0	1.0	1.0	1.0	1
5541	Sanitary Sewer	SAMH_0808 - SAMH_0807	N/A	8.00	PVC	266.32		623728.389	26904563.480	730.750	$35,687	01/01/2015	3	75	71	$33,842	$38,350	1	1	0.0	0.0	1.0	1.0	1.0	1
5542	Sanitary Sewer	SAMH_0806 - SAMH_0807	N/A	8.00	PVC	74.65		623728.389	26904563.480	730.750	$11,571	01/01/2015	3	75	71	$10,972	$12,318	1	1	0.0	0.0	1.0	1.0	1.0	1
5543	Sanitary Sewer	SAMH_0807 - PS003	N/A	8.00	PVC	46.26		623682.146	26904564.598	0.000	$7,170	01/01/2015	3	75	71	$6,799	$7,632	1	1	0.0	0.0	1.0	2.0	1.0	2
5544	Sanitary Sewer	SAMH_0805 - SAMH_0700	N/A	10.00	PVC	141.92		623334.225	26904937.141	735.537	$20,153	01/01/2015	3	75	71	$19,111	$21,572	1	1	0.0	0.0	1.0	2.0	1.0	2
5545	Sanitary Sewer	SAMH_3615A - SAMH_3615	N/A	8.00	VCP	368.73		628622.358	26921712.839	622.200	$12,449	01/01/1980	38	75	36	$5,991	$16,895	1	1	0.0	0.0	1.0	1.0	1.0	1
5546	Sanitary Sewer	SAMH_3311 - SAMH_3310	N/A	18.00	RCP	22.15		637374.855	26915645.606	602.968	$3,633	01/01/2011	7	75	67	$3,251	$3,855	1	1	0.0	0.0	1.0	4.0	1.0	4
5547	Sanitary Sewer	SAMH_3335B - STMH_8138	N/A	18.00	RCP	19.71	Sanitary Overflow	637542.194	26914219.282	0.000	$3,095	01/01/2010	8	75	66	$2,728	$3,292	1	1	0.0	0.0	1.0	3.0	1.0	3
5548	Sanitary Sewer	SAMH_2616A - SAMH_2616	N/A	8.00	PVC	94.43		631172.539	26913336.229	694.621	$12,654	01/01/2015	3	75	71	$11,999	$13,598	1	1	0.0	0.0	1.0	1.0	1.0	1
5549	Sanitary Sewer	SAMH_2616 - SAMH_2617	N/A	8.00	PVC	174.58		631229.566	26913501.227	675.058	$23,044	01/01/2001	17	75	57	$17,548	$26,535	1	1	0.0	0.0	1.0	1.0	1.0	1
5550	Sanitary Sewer	SAMH_4107 - PS005	N/A	10.00	DIP	21.00		627167.175	26926442.694	0.000	$28,891	01/01/1976	42	75	32	$12,363	$43,482	1	1	0.0	0.0	1.0	2.0	1.0	2
5551	Sanitary Sewer	SAMH_1827 - SAMH_1826A	N/A	8.00	VCP	413.37		632594.807	26909492.791	0.000	$38,857	01/01/1979	39	75	35	$18,184	$59,525	1	1	0.0	0.0	1.0	3.0	4.0	12
5552	Sanitary Sewer	SAMH_2018A - SAMH_2021	N/A		VCP	261.07		636205.674	26912815.663	611.639	$24,019	01/01/1962	56	75	18	$5,792	$39,683	1	1	0.0	0.0	1.0	1.0	1.0	1
5553	Sanitary Sewer	SAMH_2622A - SAMH_2622	N/A		RCP	15.22		631327.171	26913811.993	657.447	$2,009	01/01/2001	17	75	57	$1,529	$2,313	1	1	0.0	0.0	1.0	4.0	1.0	4
5554	Sanitary Sewer	SAMH_0724 - SAMH_0723	N/A	15.00	PVC	218.45		622959.492	26908210.775	705.750	$28,180	01/01/1999	19	75	55	$20,707	$34,734	1	1	0.0	0.0	1.0	1.0	1.0	1
5555	Sanitary Sewer	SAMH_0723 - SAMH_0722	N/A	15.00	PVC	212.49		622948.384	26907998.571	704.680	$27,412	01/01/1999	19	75	55	$20,143	$33,787	1	1	0.0	0.0	1.0	1.0	1.0	1
5556	Sanitary Sewer	SAMH_1518 - SAMH_1518A	N/A	18.00	RCP	27.00	319	626117.011	26911366.911	0.000	$2,889	01/01/1966	52	75	22	$850	$4,509	1	1	0.0	0.0	1.0	4.0	1.0	4
5557	Sanitary Sewer	SAMH_3066A - SAMH_3067	N/A			303.00		634891.791	26915566.089	609.630	$43,026	01/01/2016	2	75	72	$41,375	$46,056	1	1	0.0	0.0	1.0	1.0	1.0	1
5558	Sanitary Sewer	SAMH_3180 - SAMH_3181	N/A	24.00	VCP	286.10	478	634272.587	26916310.368	0.000	$28,324	01/01/1939	79	75	0	$0	$51,212	1	1	0.0	0.0	1.0	5.0	4.0	20
5559	Sanitary Sewer	SAMH_1819 - SAMH_1818	N/A	9.00	VCP	205.20	517	0.000	0.000	701.148	$15,185	01/01/1950	68	75	6	$1,230	$29,549	1	1	0.0	0.0	1.0	3.0	2.0	6
5560	Sanitary Sewer	SAMH_2635A - SAMH_2632	N/A	8.00	CP	134.80		0.000	0.000	0.000	$9,975	01/01/1950	68	75	6	$808	$19,412	1	1	0.0	0.0	1.0	1.0	1.0	1
5561	Force Main	PS005 - SAMH_4209	N/A	8.00	DIP	2743.07		629699.374	26925723.537	0.000	$340,141	01/01/2000	18	75	56	$254,481	$395,002	1	1	0.0	0.0	1.0	3.0	1.0	3
5562	Force Main	PS006 - SAMH_0624B	N/A	8.00	DIP	3758.49		632002.507	26897302.150	0.000	$428,468	01/01/1993	25	75	49	$280,558	$541,223	1	1	0.0	0.0	1.0	3.0	1.0	3
5563	Force Main	PS001 - SAMH_1110	N/A	10.00	DIP	3322.42		632444.242	26903891.347	0.000	$411,980	01/01/2000	18	75	56	$308,228	$478,429	1	1	0.0	0.0	1.0	3.0	1.0	3
5564	Force Main	PS004 - SAMH_1514A	N/A	8.00	DIP	2700.29		625823.789	26910702.811	0.000	$226,825	01/01/1966	52	75	22	$66,808	$388,842	1	1	0.0	0.0	1.0	4.0	1.0	4
5565	Force Main	PS008 - SAMH_3906A	N/A	12.00	DIP	1649.56		635830.275	26918177.865	0.000	$140,213	01/01/1961	57	75	17	$31,945	$239,186	1	1	0.0	0.0	1.0	5.0	1.0	5
5566	Force Main	PS003 - SAMH_0805	N/A	6.00	DIP	456.10		623331.045	26904795.254	0.000	$61,118	01/01/2015	3	75	71	$57,958	$65,679	1	1	0.0	0.0	1.0	2.0	1.0	2
5567	Stormwater Sewer	STCB_11722 - STCB_11993	N/A	12.00	RCP	76.13		631423.897	26911798.339	0.000	$3,999	01/01/1984	34	75	40	$2,138	$5,536	1	1	0.0	0.0	1.0	1.0	1.0	1
5568	Stormwater Sewer	STMH_6743 - STMH_6744	N/A	12.00	RCP	373.17		632064.640	26912779.590	707.580	$14,042	01/01/1974	44	75	30	$5,634	$21,433	1	1	0.0	0.0	1.0	1.0	1.0	1
5569	Stormwater Sewer	STMH_6744 - STMH_6745	N/A	12.00	RCP	147.81		632066.523	26912927.391	703.427	$16,744	01/01/1974	44	75	30	$6,719	$25,556	1	1	0.0	0.0	1.0	1.0	1.0	1
5570	Stormwater Sewer	STMH_6745 - STMH_6745A	N/A	12.00	RCP	176.25		632080.157	26913103.111	694.590	$3,417	01/01/1974	44	75	30	$1,371	$5,829	1	1	0.0	0.0	1.0	1.0	1.0	1
5571	Stormwater Sewer	STMH_6713 - STMH_6712	N/A	12.00	RCP	90.73		633807.641	26912858.428	689.919	$29,059	01/01/2004	14	75	60	$23,291	$41,477	1	1	0.0	0.0	1.0	1.0	1.0	1
5572	Stormwater Sewer	STMH_6712 - STMH_6711	N/A	12.00	PVC	169.22		633975.883	26912876.272	686.546	$11,342	01/01/2004	14	75	60	$9,091	$13,156	1	1	0.0	0.0	1.0	1.0	1.0	1
5573	Stormwater Sewer	STMH_6740 - STMH_6734	N/A	12.00	RCP	261.49		632722.429	26912407.416	714.894	$33,240	01/01/1939	79	75	0	$0	$38,558	1	1	0.0	0.0	1.0	1.0	1.0	1
5574	Stormwater Sewer	STMH_6734 - STMH_6735	N/A	15.00	PVC	333.64		632732.327	26912740.904	702.921	$11,020	01/01/2001	17	75	57	$8,392	$20,785	1	1	0.0	0.0	1.0	1.0	1.0	1
5575	Stormwater Sewer	STMH_6729 - STMH_6731	N/A	12.00	RCP	182.38		633301.867	26912876.932	666.419	$27,273	01/01/1939	79	75	0	$0	$31,198	1	1	0.0	0.0	1.0	1.0	1.0	1
5576	Stormwater Sewer	STMH_6727 - STMH_6731	N/A	15.00	CMP	222.12		633301.867	26912876.932	666.419	$33,551	01/01/1974	44	75	30	$13,463	$38,919	1	1	0.0	0.0	1.0	1.0	1.0	1
5577	Stormwater Sewer	STMH_6724 - STMH_6723	N/A	12.00	RCP	279.26		633672.300	26912398.823	704.854	$20,960	01/01/1974	44	75	30	$8,410	$31,546	1	1	0.0	0.0	1.0	1.0	1.0	1
5578	Stormwater Sewer	STMH_7507 - STMH_7506	N/A	36.00	RCP	20.42		630785.972	26913167.979	701.575	$46,033	01/01/1965	53	75	21	$12,944	$75,210	1	1	0.0	0.0	1.0	4.0	1.0	4
5579	Stormwater Sewer	STMH_6725A - STMH_6727	N/A	15.00	CMP	99.20		633449.823	26912711.256	685.054	$4,861	01/01/1974	44	75	30	$1,950	$5,639	1	1	0.0	0.0	1.0	1.0	1.0	1
5580	Stormwater Sewer	STMH_6728 - STCB_12020	N/A	12.00	RCP	268.41		633191.898	26912683.760	0.000	$11,854	01/01/2003	15	75	59	$9,343	$26,444	1	1	0.0	0.0	1.0	1.0	1.0	1
5581	Stormwater Sewer	STCB_10508 - STMH_6729	N/A	12.00	RCP	40.17		633215.301	26912716.411	688.206	$11,352	01/01/2003	15	75	59	$8,947	$14,818	1	1	0.0	0.0	1.0	1.0	1.0	1
5582	Stormwater Sewer	STMH_6736 - STMH_6735	N/A	12.00	PVC	19.01		632732.327	26912740.904	702.921	$17,564	01/01/1965	53	75	21	$4,939	$31,378	1	1	0.0	0.0	1.0	2.0	1.0	2
5583	Stormwater Sewer	STMH_7844 - STMH_7836	N/A	12.00	PVC	55.03		636335.699	26913009.944	613.585	$43,187	01/01/2010	8	75	66	$38,073	$46,165	1	1	0.0	0.0	1.0	2.0	1.0	2
5584	Stormwater Sewer	STMH_7836 - STMH_7801	N/A	12.00	PVC	297.87		636633.418	26913000.313	613.093	$5,044	01/01/2011	7	75	67	$4,514	$9,198	1	1	0.0	0.0	1.0	2.0	1.0	2
5585	Stormwater Sewer	STMH_7847 - STMH_7846	N/A	12.00	PVC	238.05		635983.941	26913061.945	611.807	$14,636	01/01/2010	8	75	66	$12,903	$16,977	1	1	0.0	0.0	1.0	1.0	1.0	1
5586	Stormwater Sewer	STMH_7843 - STMH_7854	N/A	15.00	RCP	260.79		635890.516	26913542.179	612.347	$7,979	01/01/1975	43	75	31	$3,308	$8,529	1	1	0.0	0.0	1.0	1.0	1.0	1
5587	Stormwater Sewer	STMH_7854 - STMH_7855	N/A	18.00	RCP	149.46		635825.457	26913676.733	611.266	$8,726	01/01/1975	43	75	31	$3,617	$12,729	1	1	0.0	0.0	1.0	1.0	1.0	1
5588	Stormwater Sewer	STMH_7855 - STMH_7856	N/A	18.00	RCP	80.06		635788.286	26913747.638	611.244	$12,659	01/01/1975	43	75	31	$5,248	$18,449	1	1	0.0	0.0	1.0	1.0	1.0	1
5589	Stormwater Sewer	STMH_7853 - STMH_7856	N/A	36.00	RCP	125.23		635788.286	26913747.638	611.244	$16,291	01/01/1975	43	75	31	$6,754	$23,764	1	1	0.0	0.0	1.0	4.0	1.0	4
5590	Stormwater Sewer	STMH_7856 - STMH_7857	N/A	36.00	RCP	77.19		635754.691	26913817.136	610.594	$25,390	01/01/1975	43	75	31	$10,526	$37,001	1	1	0.0	0.0	1.0	4.0	1.0	4
5591	Stormwater Sewer	STMH_7857 - STMH_7863	N/A	36.00	RCP	154.82		635685.680	26913955.721	611.310	$12,097	01/01/1975	43	75	31	$5,015	$18,671	1	1	0.0	0.0	1.0	5.0	1.0	5
5592	Stormwater Sewer	STMH_7863 - STMH_7864	N/A	36.00	RCP	65.74		635658.991	26914015.802	611.082	$12,977	01/01/1975	43	75	31	$5,380	$18,912	1	1	0.0	0.0	1.0	5.0	1.0	5
5593	Stormwater Sewer	STMH_7864 - STMH_7865	N/A	36.00	RCP	79.13		635621.547	26914085.513	611.610	$21,881	01/01/1975	43	75	31	$9,072	$32,334	1	1	0.0	0.0	1.0	5.0	1.0	5
5594	Stormwater Sewer	STMH_7865 - STOF_025	N/A	36.00	CMP	139.37		635494.049	26914029.223	0.000	$12,482	01/01/1975	43	75	31	$5,175	$15,738	1	1	0.0	0.0	1.0	5.0	1.0	5
5595	Stormwater Sewer	STMH_7871 - STMH_7865	N/A	21.00	RCP	76.04		635621.547	26914085.513	611.610	$3,489	01/01/1996	22	75	52	$2,424	$4,264	1	1	0.0	0.0	1.0	4.0	1.0	4
5596	Stormwater Sewer	STMH_7870 - STMH_7871	N/A	18.00	RCP	98.17		635588.523	26914154.013	611.852	$10,950	01/01/1996	22	75	52	$7,608	$13,232	1	1	0.0	0.0	1.0	4.0	1.0	4
5597	Stormwater Sewer	STMH_8167 - STMH_8166	N/A	18.00	RCP	46.93		636811.578	26915941.846	607.507	$47,508	01/01/2010	8	75	66	$41,883	$59,902	1	1	0.0	0.0	1.0	2.0	1.0	2
5598	Stormwater Sewer	STMH_8166 - STMH_7884	N/A	15.00	RCP	158.52		636750.105	26916087.965	606.933	$6,993	01/01/2011	7	75	67	$6,258	$7,462	1	1	0.0	0.0	1.0	2.0	1.0	2
5599	Stormwater Sewer	STMH_7895 - STMH_7894	N/A	12.00	RCP	156.60		636061.277	26917607.990	603.964	$11,307	01/01/2011	7	75	67	$10,119	$12,121	1	1	0.0	0.0	1.0	1.0	1.0	1
5600	Stormwater Sewer	STMH_7894 - STMH_7893	N/A	18.00	RCP	110.55		636106.390	26917507.060	603.516	$21,141	01/01/2016	2	75	72	$20,330	$22,707	1	1	0.0	0.0	1.0	1.0	1.0	1
5601	Stormwater Sewer	STMH_7893 - STMH_7892	N/A	24.00	RCP	171.32		636176.267	26917350.636	604.110	$16,472	01/01/1939	79	75	0	$0	$17,578	1	1	0.0	0.0	1.0	1.0	1.0	1
5602	Stormwater Sewer	STMH_7892 - STMH_7891	N/A	24.00	RCP	307.18		636300.330	26917069.623	604.555	$15,590	01/01/1939	79	75	0	$0	$29,296	1	1	0.0	0.0	1.0	2.0	1.0	2
5603	Stormwater Sewer	STMH_8145A - SAMH_3341A	N/A	12.00	RCP	30.14		637252.298	26914893.392	0.000	$23,282	01/01/1996	22	75	52	$16,176	$29,355	1	1	0.0	0.0	1.0	2.0	1.0	2
5604	Stormwater Sewer	STMH_8145 - STMH_8145A	N/A	12.00	RCP	203.45		637231.738	26914871.360	606.187	$3,466	01/01/1996	22	75	52	$2,408	$4,370	1	1	0.0	0.0	1.0	2.0	1.0	2
5605	Stormwater Sewer	STMH_8129 - STMH_8130	N/A	24.00	RCP	292.29		637078.380	26915307.845	606.396	$33,187	01/01/2011	7	75	67	$29,700	$35,150	1	1	0.0	0.0	1.0	5.0	1.0	5
5606	Stormwater Sewer	STMH_8130 - SAMH_3310A	N/A	24.00	RCP	196.37		637006.814	26915490.710	0.000	$40,102	01/01/2011	7	75	67	$35,888	$42,868	1	1	0.0	0.0	1.0	5.0	1.0	5
5607	Stormwater Sewer	STMH_7902 - STMH_7901	N/A	15.00	RCP	171.08		636408.813	26916319.421	607.763	$7,867	01/01/2010	8	75	66	$6,935	$8,409	1	1	0.0	0.0	1.0	2.0	1.0	2
5608	Stormwater Sewer	STMH_7901 - STMH_7901A	N/A	15.00	RCP	157.57		636550.515	26916388.332	606.367	$9,047	01/01/2010	8	75	66	$7,975	$9,623	1	1	0.0	0.0	1.0	2.0	1.0	2
5609	Stormwater Sewer	STMH_7903 - STMH_7902	N/A	12.00	PVC	54.25		636254.292	26916245.984	608.183	$27,430	01/01/2010	8	75	66	$24,182	$29,461	1	1	0.0	0.0	1.0	1.0	1.0	1
5610	Stormwater Sewer	STMH_7904 - STMH_7903	N/A	12.00	RCP	203.18		636231.514	26916295.225	607.840	$36,229	01/01/2010	8	75	66	$31,939	$38,411	1	1	0.0	0.0	1.0	1.0	1.0	1
5611	Stormwater Sewer	STMH_6741 - STMH_6736	N/A	12.00	PVC	265.92		632717.074	26912752.254	702.889	$27,288	01/01/2001	17	75	57	$20,780	$37,301	1	1	0.0	0.0	1.0	1.0	1.0	1
5612	Stormwater Sewer	STMH_6750 - STMH_6751	N/A	15.00	RCP	367.05		631425.993	26912266.954	715.308	$13,981	01/01/1974	44	75	30	$5,610	$21,042	1	1	0.0	0.0	1.0	1.0	1.0	1
5613	Stormwater Sewer	STMH_6751 - STMH_6752	N/A	15.00	RCP	141.22		631430.452	26912407.842	714.720	$22,137	01/01/1974	44	75	30	$8,883	$35,553	1	1	0.0	0.0	1.0	1.0	1.0	1
5614	Stormwater Sewer	STMH_6753 - STMH_6755	N/A	10.00	PVC	318.95		631439.483	26913106.904	698.789	$4,247	01/01/2001	17	75	57	$3,234	$6,821	1	1	0.0	0.0	1.0	2.0	1.0	2
5615	Stormwater Sewer	STMH_6879 - STMH_6880	N/A	12.00	RCP	243.63		634038.331	26912354.115	708.315	$28,696	01/01/1975	43	75	31	$11,897	$42,361	1	1	0.0	0.0	1.0	1.0	1.0	1
5616	Stormwater Sewer	STMH_6880 - STMH_6881	N/A	12.00	RCP	273.30		634044.894	26912627.335	696.911	$17,987	01/01/1975	43	75	31	$7,457	$26,553	1	1	0.0	0.0	1.0	1.0	1.0	1
5617	Stormwater Sewer	STMH_6881 - STMH_6882	N/A	12.00	RCP	171.31		634048.921	26912798.596	682.516	$8,594	01/01/1975	43	75	31	$3,563	$12,330	1	1	0.0	0.0	1.0	1.0	1.0	1

CITY OF SAULT STE. MARIE, MICHIGAN

Summary

id	Equipment Description	Asset ID	Construction Drawings Sheet Reference	Capacity or Size	Material	Length	Comment	Northing State Plane Ordinate	Easting State Plane Ordinate	Elevation	Original Cost	Year Installed (01/01/YYYY)	Age	Expected useful life (years)	Remaining Useful Life (years)	Depreciated Value	Replacement Cost	Average number of units in service	Total Number of units	Redundancy (Number)	Redundancy (percent)	Redundancy Score (R) (Reduces (C))	Criticality (C) (see back-up sheets)	Probability of Failure (P) (see back-up sheets)	Business Risk (BRE=PxCxR)
5618	Stormwater Sewer	STMH_6882 - STMH_6883	N/A	12.00	RCP	74.73		634050.830	26912873.302	673.596	$6,264	01/01/1975	43	75	31	$2,597	$9,137	1	1	0.0	0.0	1.0	1.0	1.0	1
5619	Stormwater Sewer	STMH_6883 - STMH_6884	N/A	15.00	RCP	57.47		634054.093	26912930.678	666.142	$6,855	01/01/1975	43	75	31	$2,842	$9,687	1	1	0.0	0.0	1.0	2.0	1.0	2
5620	Stormwater Sewer	STMH_6884 - STMH_6885	N/A	15.00	RCP	56.65		634054.484	26912987.326	658.594	$8,202	01/01/1975	43	75	31	$3,400	$11,964	1	1	0.0	0.0	1.0	2.0	1.0	2
5621	Stormwater Sewer	STMH_6885 - STMH_6886	N/A	15.00	RCP	75.25		634056.510	26913062.544	648.718	$17,631	01/01/1975	43	75	31	$7,310	$25,718	1	1	0.0	0.0	1.0	2.0	1.0	2
5622	Stormwater Sewer	STMH_6755 - STMH_7614	N/A	15.00	RCP	42.90		631439.288	26913149.805	698.849	$7,805	01/01/1965	53	75	21	$2,194	$10,778	1	1	0.0	0.0	1.0	2.0	1.0	2
5623	Stormwater Sewer	STMH_6722 - STCB_11964	N/A	12.00	PVC	259.89		633309.638	26910531.941	0.000	$2,849	01/01/2006	12	75	62	$2,359	$4,349	1	1	0.0	0.0	1.0	2.0	1.0	2
5624	Stormwater Sewer	STCB_10438 - STCB_10435	N/A	12.00	PVC	90.73		633340.729	26910446.706	0.000	$5,022	01/01/2006	12	75	62	$4,159	$5,825	1	1	0.0	0.0	1.0	2.0	1.0	2
5625	Stormwater Sewer	STCB_10435 - STMH_6717	N/A	18.00	RCP	89.86		633430.501	26910442.812	702.520	$11,341	01/01/1977	41	75	33	$5,004	$13,156	1	1	0.0	0.0	1.0	2.0	1.0	2
5626	Stormwater Sewer	STMH_6717 - STMH_6716	N/A	18.00	RCP	105.23		633535.701	26910440.124	701.053	$23,347	01/01/1977	41	75	33	$10,303	$35,139	1	1	0.0	0.0	1.0	2.0	1.0	2
5627	Stormwater Sewer	STMH_6721 - STMH_6720	N/A	15.00	PVC	313.34		633598.935	26910787.488	705.262	$32,486	01/01/2016	2	75	72	$31,239	$37,684	1	1	0.0	0.0	1.0	1.0	1.0	1
5628	Stormwater Sewer	STMH_6720 - STMH_6719	N/A	15.00	PVC	277.91		633596.032	26910509.594	700.650	$43,555	01/01/2006	12	75	62	$36,073	$46,688	1	1	0.0	0.0	1.0	1.0	1.0	1
5629	Stormwater Sewer	STMH_6719 - STMH_6715	N/A	15.00	PVC	69.74		633593.004	26910439.923	700.529	$35,850	01/01/2006	12	75	62	$29,692	$41,409	1	1	0.0	0.0	1.0	1.0	1.0	1
5630	Stormwater Sewer	STMH_6716 - STMH_6715	N/A	18.00	RCP	57.30		633593.004	26910439.923	700.529	$11,471	01/01/1977	41	75	33	$5,062	$16,732	1	1	0.0	0.0	1.0	2.0	1.0	2
5631	Stormwater Sewer	STMH_6715 - STMH_6714	N/A	18.00	RCP	99.85		633692.844	26910438.616	699.760	$6,246	01/01/1977	41	75	33	$2,756	$9,111	1	1	0.0	0.0	1.0	2.0	1.0	2
5632	Stormwater Sewer	STMH_7508 - STMH_7507	N/A	36.00	RCP	324.18		630765.573	26913168.840	701.594	$46,585	01/01/1965	53	75	21	$13,099	$76,111	1	1	0.0	0.0	1.0	4.0	1.0	4
5633	Stormwater Sewer	STMH_7611A - STMH_7611	N/A	15.00	RCP	43.27		632412.780	26913143.004	687.338	$54,769	01/01/1965	53	75	21	$15,401	$94,361	1	1	0.0	0.0	1.0	2.0	1.0	2
5634	Stormwater Sewer	STMH_7611 - STMH_7610	N/A	36.00	RCP	350.98		632763.685	26913135.968	673.290	$4,283	01/01/1965	53	75	21	$1,204	$6,879	1	1	0.0	0.0	1.0	4.0	1.0	4
5635	Stormwater Sewer	STMH_6737 - STMH_6738	N/A	15.00	CP	197.34		632735.293	26913077.126	676.887	$2,258	01/01/1950	68	75	6	$183	$4,117	1	1	0.0	0.0	1.0	2.0	1.0	2
5636	Stormwater Sewer	STMH_6738 - STMH_6739	N/A	12.00	CP	26.56		632761.852	26913076.993	676.295	$5,723	01/01/1950	68	75	6	$463	$9,854	1	1	0.0	0.0	1.0	2.0	1.0	2
5637	Stormwater Sewer	STMH_6739 - STMH_7610	N/A	18.00	CP	59.00		632763.685	26913135.968	673.290	$19,612	01/01/1950	68	75	6	$1,589	$40,531	1	1	0.0	0.0	1.0	2.0	1.0	2
5638	Stormwater Sewer	STMH_7610 - STMH_7609	N/A	36.00	RCP	357.83		633121.504	26913133.466	658.916	$52,295	01/01/1965	53	75	21	$14,705	$83,883	1	1	0.0	0.0	1.0	4.0	1.0	4
5639	Stormwater Sewer	STMH_7607B - STMH_7606A	N/A	42.00	RCP	171.40		633602.735	26913215.001	0.000	$10,528	01/01/1965	53	75	21	$2,960	$19,241	1	1	0.0	0.0	1.0	5.0	1.0	5
5640	Stormwater Sewer	STMH_7607A - STMH_7607	N/A	42.00	RCP	202.90		633785.434	26913303.252	633.286	$28,452	01/01/1965	53	75	21	$8,000	$49,020	1	1	0.0	0.0	1.0	5.0	1.0	5
5641	Stormwater Sewer	STMH_7606 - STMH_7607	N/A	15.00	RCP	55.40		633785.434	26913303.252	633.286	$41,531	01/01/2011	7	75	67	$37,167	$75,901	1	1	0.0	0.0	1.0	5.0	1.0	5
5642	Stormwater Sewer	STMH_7607 - STMH_7604	N/A	42.00	RCP	286.42		634042.564	26913429.423	626.961	$29,420	01/01/1965	53	75	21	$8,273	$53,768	1	1	0.0	0.0	1.0	5.0	1.0	5
5643	Stormwater Sewer	STMH_7605 - STMH_7604	N/A	4.00	RCP	36.66	From Rite Aid	634042.564	26913429.423	626.961	$7,701	01/01/1997	21	75	53	$5,453	$8,255	1	1	0.0	0.0	1.0	1.0	1.0	1
5644	Stormwater Sewer	STMH_7602 - STMH_7603	N/A	15.00	RCP	33.14		634049.216	26913381.957	627.785	$4,745	01/01/1975	43	75	31	$1,967	$7,142	1	1	0.0	0.0	1.0	2.0	1.0	2
5645	Stormwater Sewer	STMH_7603 - STMH_7604	N/A	15.00	RCP	47.93		634042.564	26913429.423	626.961	$66,539	01/01/1975	43	75	31	$27,587	$97,852	1	1	0.0	0.0	1.0	5.0	1.0	5
5646	Stormwater Sewer	STMH_6886 - STMH_7601	N/A	15.00	RCP	161.75		634060.991	26913224.231	631.747	$14,229	01/01/1975	43	75	31	$5,899	$16,524	1	1	0.0	0.0	1.0	2.0	1.0	2
5647	Stormwater Sewer	STMH_7601 - STMH_7602	N/A	15.00	RCP	128.23		634064.245	26913352.422	627.958	$3,281	01/01/1975	43	75	31	$1,360	$4,938	1	1	0.0	0.0	1.0	2.0	1.0	2
5648	Stormwater Sewer	STMH_6718 - STCB_11929	N/A	15.00	RCP	235.83	Conc./CMP	633340.729	26910446.706	0.000	$19,095	01/01/1977	41	75	33	$8,426	$23,536	1	1	0.0	0.0	1.0	2.0	1.0	2
5649	Stormwater Sewer	STMH_6714 - STMH_6709	N/A	18.00	RCP	248.36		633941.108	26910445.679	0.000	$10,884	01/01/1977	41	75	33	$4,803	$15,876	1	1	0.0	0.0	1.0	2.0	1.0	2
5650	Stormwater Sewer	STMH_6803 - STOF_006	N/A	36.00	RCP	245.58		636347.327	26911065.869	0.000	$29,556	01/01/1970	48	75	26	$10,282	$51,008	1	1	0.0	0.0	1.0	4.0	1.0	4
5651	Stormwater Sewer	STMH_6804 - STMH_6803	N/A	36.00	RCP	316.12		636589.053	26911109.181	609.578	$25,986	01/01/1970	48	75	26	$9,040	$37,907	1	1	0.0	0.0	1.0	4.0	1.0	4
5652	Stormwater Sewer	STMH_6802 - STMH_6801	N/A	15.00	RCP	284.38		636566.537	26910344.245	608.495	$40,274	01/01/1970	48	75	26	$14,011	$58,693	1	1	0.0	0.0	1.0	2.0	1.0	2
5653	Stormwater Sewer	STMH_6801 - STOF_003	N/A	21.00	RCP	101.74		636474.472	26910300.953	0.000	$28,154	01/01/1970	48	75	26	$9,795	$42,373	1	1	0.0	0.0	1.0	3.0	1.0	3
5654	Stormwater Sewer	STMH_6812 - STMH_6813	N/A	18.00	RCP	171.60		636421.405	26912344.303	613.077	$6,300	01/01/1977	41	75	33	$2,780	$7,958	1	1	0.0	0.0	1.0	3.0	1.0	3
5655	Stormwater Sewer	STMH_6813 - STMH_6814	N/A	18.00	RCP	292.61		636129.068	26912356.985	612.697	$4,386	01/01/1977	41	75	33	$1,935	$6,397	1	1	0.0	0.0	1.0	3.0	1.0	3
5656	Stormwater Sewer	STMH_6814 - STOF_015	N/A	18.00	RCP	40.24		636088.915	26912354.416	0.000	$29,356	01/01/1977	41	75	33	$12,955	$31,423	1	1	0.0	0.0	1.0	3.0	1.0	3
5657	Stormwater Sewer	STMH_8114 - STMH_8115	N/A	18.00	PVC	291.08		637001.330	26916513.278	598.763	$39,109	01/01/2010	8	75	66	$34,478	$41,600	1	1	0.0	0.0	1.0	2.0	1.0	2
5658	Stormwater Sewer	STMH_8115 - STMH_8116	N/A	18.00	PVC	249.10		636894.394	26916738.261	597.673	$28,513	01/01/2010	8	75	66	$25,137	$30,329	1	1	0.0	0.0	1.0	2.0	1.0	2
5659	Stormwater Sewer	STMH_8116 - STMH_8117	N/A	18.00	PVC	181.61		636813.029	26916900.628	596.303	$37,656	01/01/2010	8	75	66	$33,197	$40,183	1	1	0.0	0.0	1.0	2.0	1.0	2
5660	Stormwater Sewer	STMH_8117 - STMH_7880	N/A	18.00	PVC	252.73		636698.692	26917126.010	594.085	$14,421	01/01/2010	8	75	66	$12,713	$18,057	1	1	0.0	0.0	1.0	2.0	1.0	2
5661	Stormwater Sewer	STMH_7880 - CSO005	N/A	18.00	PVC	6.87		636705.329	26917127.791	0.000	$6,662	01/01/2010	8	75	66	$5,873	$7,068	1	1	0.0	0.0	1.0	5.0	1.0	5
5662	Stormwater Sewer	CSO5 - STTD_13637	N/A	24.00	RCP	16.70		636719.414	26917136.761	0.000	$2,772	01/01/2010	8	75	66	$2,443	$2,939	1	1	0.0	0.0	1.0	5.0	1.0	5
5663	Stormwater Sewer	STMH_7881 - STTD_13637	N/A	36.00	RCP	44.79		636719.414	26917136.761	0.000	$38,086	01/01/2010	8	75	66	$33,576	$40,636	1	1	0.0	0.0	1.0	5.0	1.0	5
5664	Stormwater Sewer	STMH_7882 - STMH_7881	N/A	36.00	RCP	170.03		636683.666	26917163.749	595.730	$9,905	01/01/2011	7	75	67	$8,864	$19,012	1	1	0.0	0.0	1.0	5.0	1.0	5
5665	Stormwater Sewer	STMH_8111 - STMH_8112	N/A	15.00	PVC	233.12		637207.852	26916054.603	602.818	$10,788	01/01/2010	8	75	66	$9,510	$11,512	1	1	0.0	0.0	1.0	2.0	1.0	2
5666	Stormwater Sewer	STMH_8112 - STMH_8113	N/A	15.00	PVC	72.40		637180.123	26916121.484	602.103	$20,806	01/01/2010	8	75	66	$18,342	$22,203	1	1	0.0	0.0	1.0	2.0	1.0	2
5667	Stormwater Sewer	STMH_8113 - STMH_8114	N/A	15.00	PVC	139.64		637125.177	26916249.859	600.664	$43,371	01/01/2010	8	75	66	$38,236	$46,282	1	1	0.0	0.0	1.0	2.0	1.0	2
5668	Stormwater Sewer	STMH_8109 - STMH_8110	N/A	12.00	VCP	165.04		637504.506	26915328.224	596.432	$4,208	01/01/1939	79	75	0	$0	$8,697	1	1	0.0	0.0	1.0	3.0	1.0	3
5669	Stormwater Sewer	STMH_8110 - STMH_8103	N/A	12.00	VCP	56.11		637530.295	26915378.054	595.829	$34,735	01/01/1939	79	75	0	$0	$37,066	1	1	0.0	0.0	1.0	3.0	1.0	3
5670	Stormwater Sewer	STMH_8103 - STMH_8012	N/A	12.00	VCP	334.94		637545.297	26915712.653	618.200	$23,570	01/01/1939	79	75	0	$0	$48,712	1	1	0.0	0.0	1.0	3.0	1.0	3
5671	Stormwater Sewer	STMH_8104 - STMH_8105	N/A	12.00	VCP	314.27		637670.182	26914652.037	594.360	$15,218	01/01/1939	79	75	0	$0	$31,451	1	1	0.0	0.0	1.0	2.0	1.0	2
5672	Stormwater Sewer	STMH_8105 - STMH_8106	N/A	12.00	VCP	202.91		637621.268	26914848.960	593.587	$6,562	01/01/1939	79	75	0	$0	$13,562	1	1	0.0	0.0	1.0	2.0	1.0	2
5673	Stormwater Sewer	STMH_8106 - STMH_8107	N/A	12.00	VCP	87.49		637600.494	26914933.952	593.897	$4,535	01/01/1939	79	75	0	$0	$9,371	1	1	0.0	0.0	1.0	2.0	1.0	2
5674	Stormwater Sewer	STMH_8107 - STMH_8108	N/A	12.00	VCP	60.46		637585.976	26914992.644	594.179	$13,521	01/01/1939	79	75	0	$0	$27,944	1	1	0.0	0.0	1.0	2.0	1.0	2
5675	Stormwater Sewer	STMH_8108 - STMH_8109	N/A	12.00	VCP	180.29		637543.415	26915167.834	595.111	$12,378	01/01/1939	79	75	0	$0	$25,582	1	1	0.0	0.0	1.0	2.0	1.0	2
5676	Stormwater Sewer	STMH_7110 - STMH_7111	N/A	12.00	PVC	39.37		637198.718	26912482.647	607.404	$43,692	01/01/2011	7	75	67	$39,101	$46,835	1	1	0.0	0.0	1.0	2.0	1.0	2
5677	Stormwater Sewer	STMH_7111 - STMH_7112	N/A	15.00	PVC	314.33		637157.636	26912794.282	605.887	$2,911	01/01/2010	8	75	66	$2,566	$3,670	1	1	0.0	0.0	1.0	2.0	1.0	2
5678	Stormwater Sewer	STMH_7112 - STMH_8148	N/A	15.00	PVC	263.23		637122.361	26913055.140	605.339	$26,284	01/01/2010	8	75	66	$23,172	$58,633	1	1	0.0	0.0	1.0	2.0	1.0	2
5679	Stormwater Sewer	STMH_8148 - STMH_8149	N/A	18.00	PVC	178.30		637101.937	26913232.263	606.857	$58,363	01/01/2010	8	75	66	$51,453	$62,080	1	1	0.0	0.0	1.0	3.0	1.0	3
5680	Stormwater Sewer	STMH_8149 - STMH_8150	N/A	18.00	PVC	371.74		637056.015	26913601.155	609.803	$53,204	01/01/2010	8	75	66	$46,905	$56,449	1	1	0.0	0.0	1.0	3.0	1.0	3
5681	Stormwater Sewer	STMH_8150 - STMH_8152	N/A	18.00	PVC	324.42		637016.645	26913923.173	612.414	$7,765	01/01/2010	8	75	66	$6,845	$8,238	1	1	0.0	0.0	1.0	3.0	1.0	3
5682	Stormwater Sewer	STMH_8152 - STMH_8143	N/A	18.00	PVC	47.35		637057.854	26913946.486	611.859	$21,071	01/01/2010	8	75	66	$18,576	$30,233	1	1	0.0	0.0	1.0	3.0	1.0	3
5683	Stormwater Sewer	STMH_7802 - STMH_7801	N/A	12.00	PVC	25.07		636633.418	26913000.313	613.093	$43,816	01/01/2011	7	75	67	$39,212	$46,837	1	1	0.0	0.0	1.0	2.0	1.0	2
5684	Stormwater Sewer	STMH_7801 - STMH_8156	N/A	12.00	PVC	253.86		636885.815	26913027.478	615.455	$3,636	01/01/2010	8	75	66	$3,205	$3,886	1	1	0.0	0.0	1.0	3.0	1.0	3
5685	Stormwater Sewer	STMH_8156 - STMH_8148	N/A	12.00	PVC	238.16		637122.361	26913055.140	605.339	$24,523	01/01/2010	8	75	66	$21,619	$51,770	1	1	0.0	0.0	1.0	3.0	1.0	3
5686	Stormwater Sewer	STMH_8157 - STMH_8156	N/A	9.00	VCP	340.59		636885.815	26913027.478	615.455	$9,759	01/01/1939	79	75	0	$0	$10,482	1	1	0.0	0.0	1.0	2.0	1.0	2
5687	Stormwater Sewer	STMH_7803 - STMH_7802	N/A	12.00	PVC	302.18		636623.415	26913023.305	613.126	$6,229	01/01/2011	7	75	67	$5,574	$7,226	1	1	0.0	0.0	1.0	2.0	1.0	2
5688	Stormwater Sewer	STMH_6815 - STMH_7801	N/A	10.00	PVC	206.73		636633.418	26913000.313	613.093	$12,049	01/01/2011	7	75	67	$10,783	$20,794	1	1	0.0	0.0	1.0	2.0	1.0	2
5689	Stormwater Sewer	STMH_7846 - STMH_7845	N/A	12.00	PVC	38.49		635983.139	26913023.466	611.898	$32,137	01/01/2010	8	75	66	$28,332	$34,517	1	1	0.0	0.0	1.0	1.0	1.0	1
5690	Stormwater Sewer	STMH_7845 - STMH_7844	N/A	12.00	PVC	297.84		636280.830	26913014.104	613.371	$5,196	01/01/2010	8	75	66	$4,580	$5,581	1	1	0.0	0.0	1.0	2.0	1.0	2
5691	Stormwater Sewer	STMH_7913 - STMH_7912	N/A	8.00	VCP	219.17		635799.851	26917255.690	605.107	$9,439	01/01/1939	79	75	0	$0	$18,249	1	1	0.0	0.0	1.0	1.0	1.0	1
5692	Stormwater Sewer	STMH_7912 - STMH_7911	N/A	8.00	VCP	335.30		635936.943	26916949.698	606.627	$15,780	01/01/1939	79	75	0	$0	$33,314	1	1	0.0	0.0	1.0	1.0	1.0	1
5693	Stormwater Sewer	STMH_7911 - STMH_7910	N/A	8.00	VCP	110.23		635979.479	26916848.011	606.616	$24,142	01/01/1939	79	75	0	$0	$50,966	1	1	0.0	0.0	1.0	1.0	1.0	1
5694	Stormwater Sewer	STMH_7910 - STMH_7909	N/A	8.00	PVC	28.96		636004.045	26916832.671	606.913	$7,936	01/01/2011	7	75	67	$7,102	$16,754	1	1	0.0	0.0	1.0	1.0	1.0	1
5695	Stormwater Sewer	STMH_6103 - STMH_6107	N/A	12.00	PVC	268.37		632188.319	26904910.425	642.197	$19,255	01/01/2011	7	75	67	$17,232	$43,323	1	1	0.0	0.0	1.0	1.0	1.0	1
5696	Stormwater Sewer	STMH_6107 - STMH_6108	N/A	12.00	PVC	44.35		632148.862	26904890.167	641.883	$1,449	01/01/2011	7	75	67	$1,296	$3,232	1	1	0.0	0.0	1.0	1.0	1.0	1
5697	Stormwater Sewer	STMH_6108 - STMH_6109	N/A	12.00	CP	22.29		632130.366	26904902.611	641.364	$26,075	01/01/1949	69	75	5	$1,765	$50,615	1	1	0.0	0.0	1.0	2.0	1.0	2
5698	Stormwater Sewer	STMH_6106A - STMH_6108	N/A	18.00	CP	315.53		632148.862	26904890.167	641.883	$5,988	01/01/1949	69	75	5	$405	$6,431	1	1	0.0	0.0	1.0	2.0	1.0	2
5699	Stormwater Sewer	STMH_6105 - STMH_6110	N/A	10.00	CP	300.85		632178.217	26905240.633	643.079	$25,290	01/01/1949	69	75	5	$1,712	$54,611	1	1	0.0	0.0	1.0	2.0	1.0	2
5700	Stormwater Sewer	STMH_6110 - STMH_6116	N/A	12.00	CP	338.02		631840.435	26905253.227	639.249	$11,390	01/01/1949	69	75	5	$771	$25,409	1	1	0.0	0.0	1.0	2.0	1.0	2
5701	Stormwater Sewer	STMH_6115 - STMH_6116	N/A	30.00	CP	339.02		631840.435	26905253.227	639.249	$3,793	01/01/1948	70	75	4	$206	$7,858	1	1	0.0	0.0	1.0	2.0	1.0	2
5702	Stormwater Sewer	STMH_7716 - STMH_7700	N/A	12.00	VCP	330.12		632839.326	26916337.210	627.394	$12,904	01/01/1939	79	75	0	$0	$23,530	1	1	0.0	0.0	1.0	1.0	1.0	1
5703	Stormwater Sewer	STMH_7700 - STMH_7699	N/A	15.00	VCP	405.57		633244.693	26916324.461	617.647	$48,346	01/01/1939	79	75	0	$0	$84,325	1	1	0.0	0.0	1.0	2.0	1.0	2
5704	Stormwater Sewer	STMH_7696 - STMH_7695	N/A	12.00	VCP	350.98		632847.399	26916004.986	628.027	$39,205	01/01/1939	79	75	0	$0	$78,740	1	1	0.0	0.0	1.0	2.0	1.0	2
5705	Stormwater Sewer	STMH_7695 - STMH_7694	N/A	12.00	PVC	383.16		633230.432	26915995.034	620.515	$26,323	01/01/2000	18	75	56	$19,693	$54,402	1	1	0.0	0.0	1.0	2.0	1.0	2
5706	Stormwater Sewer	STMH_7688 - STMH_7687	N/A	12.00	VCP	344.41		632831.816	26915668.353	628.284	$4,288	01/01/1939	79	75	0	$0	$8,862	1	1	0.0	0.0	1.0	2.0	1.0	2
5707	Stormwater Sewer	STMH_7866A - STMH_7866	N/A	12.00	RCP	197.93		636100.523	26914403.342	612.806	$11,090	01/01/1996	22	75	52	$7,705	$13,983	1	1	0.0	0.0	1.0	4.0	1.0	4
5708	Stormwater Sewer	STMH_8162 - STMH_7806	N/A	27.00	RCP	226.03		636584.786	26913896.093	612.352	$1,093	01/01/1975	43	75	31	$453	$1,614	1	1	0.0	0.0	1.0	3.0	1.0	3
5709	Stormwater Sewer	STMH_7908 - STMH_7909	N/A	24.00	RCP	48.24		636004.045	26916832.671	606.913	$25,098	01/01/2011	7	75	67	$22,461	$26,610	1	1	0.0	0.0	1.0	1.0	1.0	1
5710	Stormwater Sewer	STMH_7909 - STMH_7905	N/A	24.00	RCP	151.20		636140.809	26916897.135	606.348	$4,113	01/01/2011	7	75	67	$3,680	$4,402	1	1	0.0	0.0	1.0	2.0	1.0	2
5711	Stormwater Sewer	STMH_7905 - STMH_7890	N/A	24.00	RCP	218.25		636337.652	26916991.388	604.757	$7,569	01/01/2011	7	75	67	$6,773	$8,113	1	1	0.0	0.0	1.0	2.0	1.0	2
5712	Stormwater Sewer	STMH_7889 - STMH_7883	N/A	30.00	RCP	34.28		636353.777	26917001.322	604.813	$3,807	01/01/2011	7	75	67	$3,407	$4,091	1	1	0.0	0.0	1.0	3.0	1.0	3
5713	Stormwater Sewer	STMH_7890 - STMH_7883	N/A	30.00	RCP	18.94		636353.777	26917001.322	604.813	$14,389	01/01/2011	7	75	67	$12,877	$15,256	1	1	0.0	0.0	1.0	5.0	1.0	5
5714	Stormwater Sewer	STMH_7888 - STMH_7889	N/A	30.00	RCP	357.41		636353.392	26916967.040	604.915	$6,891	01/01/2011	7	75	67	$6,167	$7,405	1	1	0.0	0.0	1.0	3.0	1.0	3
5715	Stormwater Sewer	STMH_7891 - STMH_7890	N/A	24.00	RCP	86.68		636337.652	26916991.388	604.757	$29,489	01/01/2016	2	75	72	$28,357	$54,064	1	1	0.0	0.0	1.0	2.0	1.0	2
5716	Stormwater Sewer	STMH_7833 - STMH_7882	N/A	36.00	RCP	197.68		636531.313	26917088.268	600.687	$1,757	01/01/2011	7	75	67	$1,572	$3,919	1	1	0.0	0.0	1.0	2.0	1.0	2
5717	Stormwater Sewer	STMH_7885 - STMH_7886	N/A	18.00	RCP	179.81		636631.739	26916356.702	606.235	$7,307	01/01/1939	79	75	0	$0	$13,396	1	1	0.0	0.0	1.0	2.0	1.0	2
5718	Stormwater Sewer	STMH_7901A - STMH_7887	N/A	18.00	RCP	57.62		636595.892	26916423.846	606.565	$25,492	01/01/2010	8	75	66	$22,473	$27,202	1	1	0.0	0.0	1.0	2.0	1.0	2
5719	Stormwater Sewer	STMH_6639A - STMH_6639	N/A	12.00	PE	151.80		630435.816	26912978.056	705.046	$4,579	01/01/1996	22	75	52	$3,181	$7,666	1	1	0.0	0.0	1.0	1.0	1.0	1
5720	Stormwater Sewer	STMH_7971 - STOF_020	N/A	21.00	CP	245.66		635598.840	26913044.508	0.000	$13,855	01/01/1949	69	75	5	$938	$30,907	1	1	0.0	0.0	1.0	3.0	1.0	3
5721	Stormwater Sewer	STMH_7977 - STMH_7978	N/A	12.00	PVC	255.08		635298.337	26913615.515	614.786	$9,716	01/01/2001	17	75	57	$7,399	$11,003	1	1	0.0	0.0	1.0	1.0	1.0	1
5722	Stormwater Sewer	STMH_7920 - STMH_7921	N/A	15.00	RCP	49.06		635975.615	26916112.803	609.380	$2,860	01/01/1949	69	75	5	$193	$5,375	1	1	0.0	0.0	1.0	1.0	1.0	1
5723	Stormwater Sewer	STMH_7919 - STMH_7920	N/A	15.00	RCP	217.21		636008.491	26916076.393	609.506	$3,385	01/01/1949	69	75	5	$229	$7,309	1	1	0.0	0.0	1.0	1.0	1.0	1
5724	Stormwater Sewer	STMH_7918 - STMH_7918	N/A	12.00	RCP	169.29		636104.814	26915881.704	611.490	$14,988	01/01/1949	69	75	5	$1,015	$32,365	1	1	0.0	0.0	1.0	1.0	1.0	1
5725	Stormwater Sewer	STMH_7917 - STMH_7918	N/A	8.00	PVC	23.78		636180.148	26915730.105	611.490	$11,004	01/01/2011	7	75	67	$9,847	$24,546	1	1	0.0	0.0	1.0	1.0	1.0	1
5726	Stormwater Sewer	STMH_7916 - STMH_7918	N/A	12.00	RCP	166.57		636180.148	26915730.105	611.490	$3,187	01/01/1949	69	75	5	$215	$3,425	1	1	0.0	0.0	1.0	1.0	1.0	1
5727	Stormwater Sewer	STMH_7915 - STMH_7916	N/A	12.00	RCP	125.86		636254.888	26915581.240	611.065	$10,827	01/01/1959	59	75	15	$2,177	$24,153	1	1	0.0	0.0	1.0	1.0	1.0	1
5728	Stormwater Sewer	STMH_6631 - STMH_6632	N/A	10.00	PVC	395.66		630758.010	26912217.980	718.165	$33,777	01/01/2008	10	75	64	$28,876	$39,225	1	1	0.0	0.0	1.0	1.0	1.0	1
5729	Stormwater Sewer	STMH_6630 - STMH_6631	N/A	10.00	PVC	131.49		630741.337	26911822.674	722.446	$49,062	01/01/2008	10	75	64	$41,943	$56,975	1	1	0.0	0.0	1.0	1.0	1.0	1
5730	Stormwater Sewer	STMH_6629 - STMH_6630	N/A	10.00	PVC	193.57		630736.227	26911691.281	721.793	$16,305	01/01/2008	10	75	64	$13,939	$18,935	1	1	0.0	0.0	1.0	1.0	1.0	1
5731	Stormwater Sewer	STMH_6628 - STMH_6629	N/A	10.00	PVC	235.11		630729.710	26911497.818	722.088	$24,003	01/01/2008	10	75	64	$20,520	$27,874	1	1	0.0	0.0	1.0	1.0	1.0	1
5732	Stormwater Sewer	STMH_6632 - STMH_6633	N/A	10.00	PVC	272.40		630763.115	26912490.331	712.782	$39,342	01/01/2008	10	75	64	$33,633	$45,687	1	1	0.0	0.0	1.0	1.0	1.0	1
5733	Stormwater Sewer	STMH_7972 - STMH_7971	N/A	12.00	CP	213.15		635353.184	26913042.775	617.540	$8,075	01/01/1949	69	75	5	$546	$18,014	1	1	0.0	0.0	1.0	2.0	1.0	2
5734	Stormwater Sewer	STMH_7973 - STMH_7972	N/A	12.00	CP	124.24		635140.232	26913051.956	619.448	$32,346	01/01/1949	69	75	5	$2,190	$37,522	1	1	0.0	0.0	1.0	2.0	1.0	2
5735	Stormwater Sewer	STMH_6847 - STMH_6826	N/A	12.00	RCP	314.41		635105.960	26909011.190	621.568	$9,485	01/01/2009	9	75	65	$8,235	$11,959	1	1	0.0	0.0	1.0	1.0	1.0	1
5736	Stormwater Sewer	STMH_6826 - STMH_6825	N/A	15.00	RCP	273.98		635278.658	26909223.882	619.219	$2,553	01/01/2009	9	75	65	$2,216	$2,920	1	1	0.0	0.0	1.0	1.0	1.0	1
5737	Stormwater Sewer	STMH_6825 - STMH_6824	N/A	18.00	RCP	382.51		635461.004	26909560.134	616.263	$35,343	01/01/2009	9	75	65	$30,687	$40,823	1	1	0.0	0.0	1.0	1.0	1.0	1
5738	Stormwater Sewer	STMH_6824 - STMH_6823	N/A	18.00	RCP	299.96		635588.534	26909831.635	618.161	$53,169	01/01/2009	9	75	65	$46,165	$60,819	1	1	0.0	0.0	1.0	1.0	1.0	1
5739	Stormwater Sewer	STMH_7886 - STMH_7887	N/A	24.00	RCP	76.11		636595.892	26916423.846	606.565	$47,749	01/01/1939	79	75	0	$0	$51,312	1	1	0.0	0.0	1.0	2.0	1.0	2
5740	Stormwater Sewer	STMH_7887 - STMH_7888	N/A	30.00	RCP	237.56		636504.006	26916642.913	605.750	$71,840	01/01/2011	7	75	67	$64,292	$77,201	1	1	0.0	0.0	1.0	3.0	1.0	3
5741	Stormwater Sewer	STMH_8130A - STMH_3310A	N/A	12.00	RCP	276.57		637006.814	26915490.710	0.000	$24,885	01/01/2011	7	75	67	$22,270	$30,334	1	1	0.0	0.0	1.0	2.0	1.0	2
5742	Stormwater Sewer	STMH_7884 - STMH_7885	N/A	18.00	RCP	113.85		636703.417	26916191.797	606.659	$15,643	01/01/1939	79	75	0	$0	$30,028	1	1	0.0	0.0	1.0	2.0	1.0	2
5743	Stormwater Sewer	STMH_8032 - STMH_8033	N/A	18.00	RCP	315.44		634137.748	26915958.000	609.904	$2,550	01/01/2001	17	75	57	$1,941	$2,888	1	1	0.0	0.0	1.0	2.0	1.0	2
5744	Stormwater Sewer	STMH_7692 - STMH_8033	N/A	18.00	RCP	38.10		634137.748	26915958.000	609.904	$60,515	01/01/2000	18	75	56	$45,275	$68,749	1	1	0.0	0.0	1.0	2.0	1.0	2
5745	Stormwater Sewer	STMH_7693 - STMH_7692	N/A	18.00	RCP	411.67		634101.356	26915969.293	609.611	$36,311	01/01/2000	18	75	56	$27,166	$73,082	1	1	0.0	0.0	1.0	2.0	1.0	2
5746	Stormwater Sewer	STMH_8033 - STMH_8034	N/A	24.00	RCP	16.89		634149.423	26915970.205	609.786	$10,529	01/01/2001	17	75	57	$8,018	$19,786	1	1	0.0	0.0	1.0	2.0	1.0	2
5747	Stormwater Sewer	STMH_8034 - STMH_8035	N/A	24.00	VCP	115.70		634264.875	26915962.577	609.571	$6,265	01/01/1939	79	75	0	$0	$11,773	1	1	0.0	0.0	1.0	3.0	1.0	3
5748	Stormwater Sewer	STMH_7694 - STMH_7693	N/A	15.00	VCP	459.64		633689.889	26915982.168	615.480	$51,727	01/01/1939	79	75	0	$0	$59,390	1	1	0.0	0.0	1.0	2.0	1.0	2
5749	Stormwater Sewer	STMH_7535 - STMH_7536	N/A	18.00	RCP	282.42		630151.086	26913810.917	697.233	$31,080	01/01/2007	11	75	63	$26,156	$35,552	1	1	0.0	0.0	1.0	1.0	1.0	1
5750	Stormwater Sewer	STMH_7536 - STMH_7537	N/A	18.00	RCP	223.60		630152.905	26914034.510	686.882	$38,596	01/01/2007	11	75	63	$32,481	$43,847	1	1	0.0	0.0	1.0	1.0	1.0	1
5751	Stormwater Sewer	STMH_7537 - STMH_7538	N/A	18.00	RCP	262.55		630150.636	26914297.054	660.220	$24,082	01/01/2007	11	75	63	$20,266	$27,358	1	1	0.0	0.0	1.0	1.0	1.0	1
5752	Stormwater Sewer	STMH_7538 - STMH_7539	N/A	18.00	RCP	163.82		630108.148	26914455.268	652.070	$19,329	01/01/2007	11	75	63	$16,266	$21,958	1	1	0.0	0.0	1.0	1.0	1.0	1
5753	Stormwater Sewer	STMH_7539 - STMH_7540	N/A	18.00	RCP	131.49		630114.271	26914586.613	647.686	$21,688	01/01/2007	11	75	63	$18,251	$24,639	1	1	0.0	0.0	1.0	2.0	1.0	2
5754	Stormwater Sewer	STMH_7540 - STMH_7541	N/A	18.00	RCP	147.54		630114.069	26914734.151	645.236	$35,487	01/01/2007	11	75	63	$29,864	$40,036	1	1	0.0	0.0	1.0	2.0	1.0	2
5755	Stormwater Sewer	STMH_7541 - STMH_7542	N/A	24.00	RCP	227.48		630124.765	26914961.377	642.077	$10,447	01/01/2007	11	75	63	$8,791	$11,786	1	1	0.0	0.0	1.0	2.0	1.0	2
5756	Stormwater Sewer	STMH_7542 - STMH_7543	N/A	24.00	RCP	66.97		630127.209	26915026.266	639.742	$12,415	01/01/2007	11	75	63	$10,448	$14,007	1	1	0.0	0.0	1.0	3.0	1.0	3
5757	Stormwater Sewer	STMH_7543 - STMH_7544	N/A	24.00	RCP	79.58		630126.557	26915105.846	639.383	$36,374	01/01/2007	11	75	63	$30,611	$41,776	1	1	0.0	0.0	1.0	3.0	1.0	3
5758	Stormwater Sewer	STMH_7544 - STMH_7545	N/A	36.00	RCP	180.07		630131.372	26915285.851	638.284	$21,850	01/01/2007	11	75	63	$18,388	$25,095	1	1	0.0	0.0	1.0	3.0	1.0	3
5759	Stormwater Sewer	STMH_7545 - STMH_7546	N/A	36.00	RCP	108.17		630136.263	26915393.910	637.676	$88,239	01/01/2007	11	75	63	$74,259	$101,343	1	1	0.0	0.0	1.0	3.0	1.0	3
5760	Stormwater Sewer	STMH_7546 - STMH_7561	N/A	36.00	RCP	436.82		630151.754	26915830.459	635.452	$161,920	01/01/2007	11	75	63	$136,267	$258,383	1	1	0.0	0.0	1.0	3.0	1.0	3
5761	Stormwater Sewer	STMH_7680 - STMH_7679	N/A	48.00	RCP	34.19		632821.024	26915343.245	628.634	$45,690	01/01/1949	69	75	5	$3,094	$52,773	1	1	0.0	0.0	1.0	4.0	1.0	4
5762	Stormwater Sewer	STMH_7669 - STMH_7680	N/A	48.00	RCP	291.99		632796.086	26915319.861	628.612	$25,520	01/01/1949	69	75	5	$1,728	$51,364	1	1	0.0	0.0	1.0	4.0	5.0	20
5763	Stormwater Sewer	STMH_7670 - STMH_7669	N/A	15.00	VCP	323.04		632788.426	26915027.975	628.638	$25,930	01/01/1939	79	75	0	$0	$52,189	1	1	0.0	0.0	1.0	2.0	1.0	2
5764	Stormwater Sewer	STMH_7659 - STMH_7669	N/A	48.00	RCP	297.32		632788.426	26915027.975	628.638	$5,421	01/01/1949	69	75	5	$367	$6,224	1	1	0.0	0.0	1.0	4.0	5.0	20
5765	Stormwater Sewer	STMH_7660 - STMH_7659	N/A	12.00	PVC	40.15		632781.026	26914730.747	628.414	$40,175	01/01/2000	18	75	56	$30,057	$46,127	1	1	0.0	0.0	1.0	1.0	1.0	1
5766	Stormwater Sewer	STMH_7661 - STMH_7660	N/A	12.00	PVC	297.59		632753.834	26914701.203	628.127	$44,152	01/01/2000	18	75	56	$33,032	$50,693	1	1	0.0	0.0	1.0	1.0	1.0	1
5767	Stormwater Sewer	STMH_7651 - STMH_7659	N/A	48.00	RCP	346.29		632781.026	26914730.747	628.414	$5,665	01/01/1949	69	75	5	$383	$6,436	1	1	0.0	0.0	1.0	4.0	3.0	12
5768	Stormwater Sewer	STMH_7652 - STMH_7651	N/A	18.00	PVC	38.54		632770.542	26914384.617	628.735	$39,708	01/01/2000	18	75	56	$29,708	$45,421	1	1	0.0	0.0	1.0	1.0	1.0	1

CITY OF SAULT STE. MARIE, MICHIGAN

Summary

id	Equipment Description	Asset ID	Construction Drawings Sheet Reference	Capacity or Size	Material	Length	Comment	Northing State Plane Ordinate	Easting State Plane Ordinate	Elevation	Original Cost	Year Installed (01/01/YYYY)	Age	Expected useful life (years)	Remaining Useful Life (years)	Depreciated Value	Replacement Cost	Average number of units in service	Total Number of units	Redundancy (Number)	Redundancy (percent)	Redundancy Score (R) (Reduces (C))	Criticality (C) (see back-up sheets)	Probability of Failure (P) (see back-up sheets)	Business Risk (BRE=PxCxR)
5769	Stormwater Sewer	STMH_7653 - STMH_7652	N/A	18.00	PVC	285.67		632732.549	26914391.069	628.426	$41,114	01/01/2000	18	75	56	$30,760	$47,030	1	1	0.0	0.0	1.0	1.0	1.0	1
5770	Stormwater Sewer	STMH_7644 - STMH_7651	N/A	42.00	RCP	277.60		632770.542	26914384.617	628.735	$22,153	01/01/1949	69	75	5	$1,500	$45,782	1	1	0.0	0.0	1.0	3.0	5.0	15
5771	Stormwater Sewer	STMH_7719 - STMH_7720	N/A	10.00	CP	330.89		632537.015	26916996.125	621.404	$20,429	01/01/1950	68	75	6	$1,655	$45,572	1	1	0.0	0.0	1.0	1.0	1.0	1
5772	Stormwater Sewer	STMH_7703 - STMH_7702	N/A	10.00	VCP	460.28	Blocked Completely No Flow	633718.972	26916641.106	609.905	$24,946	01/01/1939	79	75	0	$0	$56,129	1	1	0.0	0.0	1.0	1.0	1.0	1
5773	Stormwater Sewer	STMH_7702 - STMH_7701	N/A	12.00	VCP	432.41		634151.238	26916629.797	606.145	$29,458	01/01/1939	79	75	0	$0	$66,281	1	1	0.0	0.0	1.0	1.0	1.0	1
5774	Stormwater Sewer	STMH_7706 - STMH_8057	N/A	48.00	RCP	486.48		634203.636	26917576.920	601.621	$6,540	01/01/1949	69	75	5	$442	$12,840	1	1	0.0	0.0	1.0	3.0	1.0	3
5775	Stormwater Sewer	STMH_7634 - STMH_7644	N/A	36.00	RCP	335.94		632762.629	26914107.126	630.240	$16,715	01/01/1949	69	75	5	$1,132	$37,610	1	1	0.0	0.0	1.0	3.0	1.0	3
5776	Stormwater Sewer	STMH_7629 - STMH_7634	N/A	30.00	RCP	319.06		632752.869	26913771.323	633.127	$42,022	01/01/1949	69	75	5	$2,845	$48,800	1	1	0.0	0.0	1.0	3.0	5.0	15
5777	Stormwater Sewer	STMH_7635 - STMH_7634	N/A	30.00	RCP	174.12		632752.869	26913771.323	633.127	$15,310	01/01/1948	70	75	4	$832	$34,447	1	1	0.0	0.0	1.0	2.0	1.0	2
5778	Stormwater Sewer	STMH_7645 - STMH_7644	N/A	12.00	VCP	295.37		632762.629	26914107.126	630.240	$26,688	01/01/1939	79	75	0	$0	$55,156	1	1	0.0	0.0	1.0	1.0	1.0	1
5779	Stormwater Sewer	STMH_7630 - STMH_7629	N/A	10.00	PVC	338.89		632744.120	26913452.388	641.022	$54,061	01/01/2001	17	75	57	$41,169	$62,442	1	1	0.0	0.0	1.0	1.0	1.0	1
5780	Stormwater Sewer	STMH_7626 - STMH_7629	N/A	12.00	PVC	288.12		632744.120	26913452.388	641.022	$34,139	01/01/2001	17	75	57	$25,998	$72,426	1	1	0.0	0.0	1.0	1.0	1.0	1
5781	Stormwater Sewer	STMH_7685 - STMH_7684	N/A	15.00	PVC	405.95		634083.974	26915647.804	611.406	$34,390	01/01/2000	18	75	56	$25,729	$71,072	1	1	0.0	0.0	1.0	2.0	1.0	2
5782	Stormwater Sewer	STMH_7684 - STMH_8032	N/A	18.00	CP	45.93		634129.620	26915642.664	611.662	$56,428	01/01/2000	18	75	56	$42,217	$64,547	1	1	0.0	0.0	1.0	2.0	1.0	2
5783	Stormwater Sewer	STMH_7686 - STMH_7685	N/A	12.00	VCP	458.53		633678.084	26915654.996	616.971	$29,088	01/01/1939	79	75	0	$0	$60,116	1	1	0.0	0.0	1.0	2.0	1.0	2
5784	Stormwater Sewer	STMH_7689 - STMH_7688	N/A	12.00	RCP	57.17		632487.453	26915673.832	629.755	$20,420	01/01/1939	79	75	0	$0	$42,201	1	1	0.0	0.0	1.0	2.0	1.0	2
5785	Stormwater Sewer	STMH_7690 - STMH_7689	N/A	12.00	VCP	272.26		632430.288	26915674.813	629.384	$20,798	01/01/1939	79	75	0	$0	$46,396	1	1	0.0	0.0	1.0	1.0	1.0	1
5786	Stormwater Sewer	STMH_7691 - STMH_7690	N/A	12.00	VCP	319.97		632158.062	26915679.280	629.953	$5,296	01/01/1939	79	75	0	$0	$6,059	1	1	0.0	0.0	1.0	1.0	1.0	1
5787	Stormwater Sewer	STMH_7727 - STMH_7691	N/A	8.00	VCP	344.79		631838.119	26915683.660	630.706	$14,544	01/01/1939	79	75	0	$0	$24,810	1	1	0.0	0.0	1.0	1.0	1.0	1
5788	Stormwater Sewer	STMH_7673 - STMH_8031	N/A	42.00	RCP	24.44		634113.716	26915297.352	614.056	$55,293	01/01/1949	69	75	5	$3,744	$125,506	1	1	0.0	0.0	1.0	5.0	1.0	5
5789	Stormwater Sewer	STMH_7674 - STMH_7673	N/A	42.00	RCP	438.83		634099.517	26915317.246	614.021	$14,418	01/01/1949	69	75	5	$976	$32,727	1	1	0.0	0.0	1.0	5.0	4.0	20
5790	Stormwater Sewer	STMH_7675 - STMH_7674	N/A	42.00	RCP	114.43		633660.737	26915324.012	619.521	$28,172	01/01/1949	69	75	5	$1,907	$63,947	1	1	0.0	0.0	1.0	5.0	1.0	5
5791	Stormwater Sewer	STMH_7676 - STMH_7675	N/A	42.00	RCP	223.59		633546.320	26915325.657	621.155	$12,987	01/01/1949	69	75	5	$879	$29,478	1	1	0.0	0.0	1.0	5.0	5.0	25
5792	Stormwater Sewer	STMH_7677 - STMH_7676	N/A	42.00	RCP	103.07		633322.787	26915330.668	626.118	$5,024	01/01/1949	69	75	5	$340	$8,764	1	1	0.0	0.0	1.0	5.0	1.0	5
5793	Stormwater Sewer	STMH_7681 - STMH_7679	N/A	15.00	PVC	354.18		632821.024	26915343.245	628.634	$41,121	01/01/2000	18	75	56	$30,765	$47,496	1	1	0.0	0.0	1.0	2.0	1.0	2
5794	Stormwater Sewer	STMH_7682 - STMH_7681	N/A	15.00	PVC	318.77		632466.857	26915346.550	629.819	$22,275	01/01/2000	18	75	56	$16,665	$48,102	1	1	0.0	0.0	1.0	2.0	1.0	2
5795	Stormwater Sewer	STMH_7683 - STMH_7682	N/A	15.00	VCP	322.83		632148.143	26915352.254	630.043	$6,385	01/01/1939	79	75	0	$0	$7,304	1	1	0.0	0.0	1.0	1.0	1.0	1
5796	Stormwater Sewer	STMH_7528 - STMH_7527	N/A	12.00	VCP	18.86		631497.329	26915362.859	630.693	$47,665	01/01/1939	79	75	0	$0	$93,370	1	1	0.0	0.0	1.0	4.0	1.0	4
5797	Stormwater Sewer	STMH_7527 - STMH_7683	N/A	10.00	VCP	328.07		631825.372	26915358.465	630.925	$2,232	01/01/1939	79	75	0	$0	$5,022	1	1	0.0	0.0	1.0	1.0	1.0	1
5798	Stormwater Sewer	STMH_7531 - STMH_7583	N/A	12.00	CP	324.14		631168.376	26915365.714	631.175	$14,877	01/01/1950	68	75	6	$1,205	$18,758	1	1	0.0	0.0	1.0	1.0	1.0	1
5799	Stormwater Sewer	STMH_7584 - STMH_7583	N/A	12.00	CP	114.50		631168.376	26915365.714	631.175	$12,695	01/01/1950	68	75	6	$1,029	$19,107	1	1	0.0	0.0	1.0	1.0	1.0	1
5800	Stormwater Sewer	STMH_7583 - STMH_7526	N/A	12.00	CP	87.54		631165.700	26915278.219	630.568	$9,732	01/01/1950	68	75	6	$788	$17,747	1	1	0.0	0.0	1.0	2.0	1.0	2
5801	Stormwater Sewer	STMH_7671 - STMH_7670	N/A	15.00	VCP	328.23		632465.397	26915030.692	629.816	$24,492	01/01/1939	79	75	0	$0	$50,617	1	1	0.0	0.0	1.0	2.0	1.0	2
5802	Stormwater Sewer	STMH_7672 - STMH_7671	N/A	12.00	VCP	326.56		632137.203	26915035.578	630.280	$2,566	01/01/1939	79	75	0	$0	$6,477	1	1	0.0	0.0	1.0	2.0	1.0	2
5803	Stormwater Sewer	STMH_7580 - STMH_7672	N/A	12.00	VCP	326.27		631810.677	26915040.246	630.836	$40,529	01/01/1939	79	75	0	$0	$72,287	1	1	0.0	0.0	1.0	3.0	1.0	3
5804	Stormwater Sewer	STMH_7525 - STMH_7580	N/A	12.00	PVC	325.72		631484.437	26915044.886	630.830	$19,382	01/01/2000	18	75	56	$14,500	$35,344	1	1	0.0	0.0	1.0	2.0	1.0	2
5805	Stormwater Sewer	STMH_7530 - STMH_7525	N/A	12.00	PVC	327.51		631158.761	26915050.303	631.232	$24,311	01/01/2000	18	75	56	$18,188	$47,001	1	1	0.0	0.0	1.0	1.0	1.0	1
5806	Stormwater Sewer	STMH_7526 - STMH_7525	N/A	12.00	CP	228.02		631158.761	26915050.303	631.232	$20,997	01/01/1950	68	75	6	$1,702	$47,243	1	1	0.0	0.0	1.0	2.0	1.0	2
5807	Stormwater Sewer	STMH_7663 - STMH_7662	N/A	12.00	PVC	326.41		632129.254	26914709.455	629.427	$18,240	01/01/2000	18	75	56	$13,646	$21,158	1	1	0.0	0.0	1.0	1.0	1.0	1
5808	Stormwater Sewer	STMH_7662 - STMH_7661	N/A	12.00	PVC	327.05		632456.259	26914704.143	629.531	$40,801	01/01/2000	18	75	56	$30,525	$47,330	1	1	0.0	0.0	1.0	1.0	1.0	1
5809	Stormwater Sewer	STMH_7654 - STMH_7653	N/A	18.00	PVC	295.78		632446.971	26914398.108	628.685	$6,959	01/01/2000	18	75	56	$5,206	$7,961	1	1	0.0	0.0	1.0	1.0	1.0	1
5810	Stormwater Sewer	STMH_7646 - STMH_7645	N/A	12.00	VCP	355.85		632467.291	26914111.255	631.073	$10,513	01/01/1939	79	75	0	$0	$12,026	1	1	0.0	0.0	1.0	1.0	1.0	1
5811	Stormwater Sewer	STMH_7638 - STMH_7637	N/A	30.00	RCP	461.27		632110.826	26913784.693	640.996	$16,974	01/01/1948	70	75	4	$922	$31,119	1	1	0.0	0.0	1.0	2.0	1.0	2
5812	Stormwater Sewer	STMH_7637 - STMH_7636	N/A	30.00	RCP	308.60		632419.333	26913777.129	636.736	$44,282	01/01/1948	70	75	4	$2,406	$99,634	1	1	0.0	0.0	1.0	2.0	1.0	2
5813	Stormwater Sewer	STMH_7636 - STMH_7635	N/A	30.00	RCP	159.48		632578.806	26913775.762	634.425	$29,626	01/01/1948	70	75	4	$1,610	$66,658	1	1	0.0	0.0	1.0	2.0	1.0	2
5814	Stormwater Sewer	STMH_7639 - STMH_7638	N/A	24.00	RCP	176.81		631649.657	26913794.218	644.581	$7,318	01/01/1948	70	75	4	$397	$8,371	1	1	0.0	0.0	1.0	2.0	1.0	2
5815	Stormwater Sewer	STMH_7520 - STMH_7518	N/A	10.00	CP	421.48		631226.560	26913492.591	0.000	$13,622	01/01/1950	68	75	6	$1,104	$25,215	1	1	0.0	0.0	1.0	1.0	1.0	1
5816	Stormwater Sewer	STMH_6633 - STMH_6625	N/A	10.00	PVC	317.27		631080.365	26912486.580	713.399	$17,669	01/01/2004	14	75	60	$14,162	$21,778	1	1	0.0	0.0	1.0	1.0	1.0	1
5817	Stormwater Sewer	STMH_6625 - STMH_6626	N/A	10.00	PVC	236.57		631085.802	26912723.086	708.365	$29,575	01/01/2000	18	75	56	$22,126	$34,345	1	1	0.0	0.0	1.0	2.0	1.0	2
5818	Stormwater Sewer	STMH_6626 - STMH_6627	N/A	10.00	PVC	238.51		631093.767	26912961.460	703.541	$20,280	01/01/2000	18	75	56	$15,172	$23,285	1	1	0.0	0.0	1.0	2.0	1.0	2
5819	Stormwater Sewer	STMH_6642 - STMH_7508	N/A	15.00	RCP	51.45		630441.400	26913170.741	703.077	$8,882	01/01/1965	53	75	21	$2,497	$11,199	1	1	0.0	0.0	1.0	2.0	1.0	2
5820	Stormwater Sewer	STMH_6639 - STMH_6642	N/A	15.00	PE	141.32		630439.558	26913119.323	702.993	$17,457	01/01/1996	22	75	52	$12,129	$22,011	1	1	0.0	0.0	1.0	1.0	1.0	1
5821	Stormwater Sewer	STMH_6637 - STMH_6638	N/A	10.00	PVC	233.91		630428.503	26912739.334	708.741	$29,615	01/01/2000	18	75	56	$22,156	$34,392	1	1	0.0	0.0	1.0	1.0	1.0	1
5822	Stormwater Sewer	STMH_6638 - STMH_6639	N/A	10.00	PVC	238.83		630435.816	26912978.056	705.046	$16,817	01/01/2000	18	75	56	$12,581	$21,056	1	1	0.0	0.0	1.0	1.0	1.0	1
5823	Stormwater Sewer	STMH_6822 - STMH_6821	N/A	24.00	RCP	54.17		635637.934	26910014.546	615.440	$6,885	01/01/1961	57	75	17	$1,568	$10,607	1	1	0.0	0.0	1.0	2.0	1.0	2
5824	Stormwater Sewer	STMH_6821 - STMH_6820	N/A	24.00	RCP	151.09		635778.231	26910070.632	607.927	$9,015	01/01/1961	57	75	17	$2,053	$11,232	1	1	0.0	0.0	1.0	2.0	1.0	2
5825	Stormwater Sewer	STMH_6823 - STCB_12233	N/A	24.00	RCP	62.03		635556.889	26909884.985	0.000	$41,695	01/01/1961	57	75	17	$9,499	$47,694	1	1	0.0	0.0	1.0	1.0	1.0	1
5826	Stormwater Sewer	STCB_12233 - STCB_6822	N/A	24.00	RCP	111.53		635588.734	26909991.875	0.000	$2,138	01/01/1961	57	75	17	$487	$3,493	1	1	0.0	0.0	1.0	2.0	1.0	2
5827	Stormwater Sewer	STMH_8052 - STMH_8505	N/A	9.00	VCP	362.68	Bad Shape Old Sanitary	634896.949	26918473.377	608.272	$2,379	01/01/1939	79	75	0	$0	$4,599	1	1	0.0	0.0	1.0	1.0	1.0	1
5828	Stormwater Sewer	STMH_8521 - STMH_8518	N/A	15.00	VCP	458.07		634931.488	26920142.687	597.520	$28,823	01/01/1939	79	75	0	$0	$59,568	1	1	0.0	0.0	1.0	3.0	1.0	3
5829	Stormwater Sewer	STMH_8048 - STMH_8050	N/A	12.00	VCP	352.05		634792.691	26917877.459	609.573	$32,525	01/01/1939	79	75	0	$0	$40,331	1	1	0.0	0.0	1.0	1.0	1.0	1
5830	Stormwater Sewer	STMH_8051 - STMH_8050	N/A	12.00	VCP	343.51	Old Sanitary Pipe	634792.691	26917877.459	609.573	$26,113	01/01/1939	79	75	0	$0	$55,128	1	1	0.0	0.0	1.0	1.0	1.0	1
5831	Stormwater Sewer	STMH_7707 - STMH_7706	N/A	12.00	RCP	15.16		634172.519	26917091.439	606.298	$14,357	01/01/1995	23	75	51	$9,783	$29,672	1	1	0.0	0.0	1.0	2.0	1.0	2
5832	Stormwater Sewer	STMH_8038 - STMH_8040	N/A	12.00	RCP	215.46		634236.212	26917131.359	604.425	$9,396	01/01/1998	20	75	54	$6,779	$11,651	1	1	0.0	0.0	1.0	1.0	1.0	1
5833	Stormwater Sewer	STMH_8040 - STMH_7706	N/A	12.00	RCP	75.17		634172.519	26917091.439	606.298	$124,782	01/01/1998	20	75	54	$90,029	$217,643	1	1	0.0	0.0	1.0	1.0	1.0	1
5834	Stormwater Sewer	STMH_7111 - STMH_7710	N/A	12.00	VCP	25.31		633280.577	26916972.542	611.284	$36,589	01/01/1998	20	75	54	$26,398	$39,222	1	1	0.0	0.0	1.0	2.0	1.0	2
5835	Stormwater Sewer	STMH_8402 - STMH_8403	N/A	48.00	RCP	29.92		634265.465	26918962.735	608.960	$8,274	01/01/1949	69	75	5	$560	$30,904	1	1	0.0	0.0	1.0	4.0	1.0	4
5836	Stormwater Sewer	STMH_8403 - STMH_8404	N/A	48.00	RCP	70.72		634274.184	26919032.914	607.626	$17,053	01/01/1949	69	75	5	$1,154	$63,695	1	1	0.0	0.0	1.0	4.0	1.0	4
5837	Stormwater Sewer	STMH_8404 - STMH_8405	N/A	48.00	RCP	145.76		634217.389	26919167.218	606.144	$6,507	01/01/1949	69	75	5	$440	$24,304	1	1	0.0	0.0	1.0	4.0	1.0	4
5838	Stormwater Sewer	STMH_8401A - STMH_8402	N/A	48.00	RCP	141.55		634241.145	26918945.315	609.014	$3,500	01/01/1949	69	75	5	$237	$13,073	1	1	0.0	0.0	1.0	4.0	1.0	4
5839	Stormwater Sewer	STMH_8401 - STMH_8401A	N/A	48.00	RCP	35.06		634099.927	26918935.764	605.391	$16,561	01/01/1949	69	75	5	$1,121	$61,857	1	1	0.0	0.0	1.0	4.0	1.0	4
5840	Stormwater Sewer	STMH_8407 - STMH_8509	N/A	48.00	RCP	316.76		634503.701	26919360.680	604.073	$9,951	01/01/1950	68	75	6	$806	$11,382	1	1	0.0	0.0	1.0	5.0	1.0	5
5841	Stormwater Sewer	STMH_8518 - STMH_8517	N/A	15.00	VCP	142.07		634989.397	26920012.952	597.992	$31,607	01/01/1939	79	75	0	$0	$68,252	1	1	0.0	0.0	1.0	3.0	1.0	3
5842	Stormwater Sewer	STMH_8517 - STMH_8514	N/A	15.00	VCP	380.74		635145.272	26919665.588	599.236	$11,224	01/01/1939	79	75	0	$0	$22,590	1	1	0.0	0.0	1.0	3.0	1.0	3
5843	Stormwater Sewer	STMH_8504 - STMH_8511	N/A	15.00	VCP	382.60		635422.968	26919040.703	601.054	$20,415	01/01/1939	79	75	0	$0	$43,099	1	1	0.0	0.0	1.0	3.0	1.0	3
5844	Stormwater Sewer	STMH_8507 - STMH_8504	N/A	15.00	VCP	330.03		635076.535	26918878.326	604.284	$72,475	01/01/1939	79	75	0	$0	$221,687	1	1	0.0	0.0	1.0	2.0	1.0	2
5845	Stormwater Sewer	STMH_8506 - STMH_8507	N/A	15.00	VCP	328.58		634780.718	26918732.001	607.330	$15,069	01/01/1939	79	75	0	$0	$17,499	1	1	0.0	0.0	1.0	1.0	1.0	1
5846	Stormwater Sewer	STMH_8505 - STMH_8507	N/A	9.00	VCP	283.54		634780.718	26918732.001	607.330	$25,958	01/01/1939	79	75	0	$0	$52,244	1	1	0.0	0.0	1.0	1.0	1.0	1
5847	Stormwater Sewer	STMH_8045 - STMH_8046	N/A	9.00	VCP	355.01	Pipe Crushed	634541.753	26917712.742	605.829	$32,756	01/01/1939	79	75	0	$0	$40,617	1	1	0.0	0.0	1.0	1.0	1.0	1
5848	Stormwater Sewer	STMH_8044 - STMH_8045	N/A	8.00	PVC	60.05		634688.724	26917389.579	606.660	$25,561	01/01/1998	20	75	54	$18,442	$53,962	1	1	0.0	0.0	1.0	1.0	1.0	1
5849	Stormwater Sewer	STMH_8043 - STMH_8044	N/A	8.00	PVC	230.89		634679.568	26917330.235	606.106	$6,845	01/01/1998	20	75	54	$4,938	$8,647	1	1	0.0	0.0	1.0	1.0	1.0	1
5850	Stormwater Sewer	STMH_7698 - STMH_7697	N/A	18.00	CP	432.56		634137.609	26916300.623	607.662	$40,078	01/01/1939	79	75	0	$0	$76,932	1	1	0.0	0.0	1.0	2.0	1.0	2
5851	Stormwater Sewer	STMH_7699 - STMH_7698	N/A	18.00	CP	460.67		633705.190	26916311.822	612.988	$32,040	01/01/1939	79	75	0	$0	$64,485	1	1	0.0	0.0	1.0	2.0	1.0	2
5852	Stormwater Sewer	STMH_7725 - STMH_7726	N/A	12.00	CP	249.39		631947.524	26916328.073	630.058	$6,640	01/01/1967	51	75	23	$2,044	$11,327	1	1	0.0	0.0	1.0	1.0	1.0	1
5853	Stormwater Sewer	STMH_7717 - STMH_7718	N/A	12.00	CP	151.81		632517.489	26916509.461	628.372	$12,806	01/01/1950	68	75	6	$1,038	$23,738	1	1	0.0	0.0	1.0	1.0	1.0	1
5854	Stormwater Sewer	STMH_7718 - STMH_7719	N/A	10.00	CP	156.17		632524.117	26916665.489	628.925	$27,133	01/01/1950	68	75	6	$2,199	$50,295	1	1	0.0	0.0	1.0	1.0	1.0	1
5855	Stormwater Sewer	STMH_8041 - STMH_8041A	N/A	48.00	RCP	580.38		634213.359	26918216.586	603.166	$70,086	01/01/1949	69	75	5	$4,746	$122,243	1	1	0.0	0.0	1.0	4.0	1.0	4
5856	Stormwater Sewer	STMH_8042 - STMH_8057	N/A	12.00	RCP	104.32		634203.636	26917576.920	601.621	$26,322	01/01/1994	24	75	50	$17,586	$33,249	1	1	0.0	0.0	1.0	2.0	1.0	2
5857	Stormwater Sewer	STMH_8046 - STMH_8042	N/A	12.00	RCP	262.05		634305.527	26917599.314	599.855	$29,924	01/01/1998	20	75	54	$21,590	$58,087	1	1	0.0	0.0	1.0	2.0	1.0	2
5858	Stormwater Sewer	STMH_7705 - STMH_7706	N/A	48.00	RCP	237.27		634172.519	26917091.439	606.298	$104,593	01/01/1949	69	75	5	$7,083	$182,429	1	1	0.0	0.0	1.0	3.0	1.0	3
5859	Stormwater Sewer	STMH_6842 - STMH_6837	N/A	36.00	RCP	232.21		635922.488	26910366.000	607.852	$18,906	01/01/1970	48	75	26	$6,577	$29,070	1	1	0.0	0.0	1.0	3.0	1.0	3
5860	Stormwater Sewer	STMH_6837 - STMH_6836	N/A	48.00	RCP	251.16		636173.599	26910360.896	609.440	$2,189	01/01/1970	48	75	26	$761	$4,405	1	1	0.0	0.0	1.0	3.0	1.0	3
5861	Stormwater Sewer	STMH_6836 - STMH_6836A	N/A	48.00	RCP	45.39		636208.907	26910332.374	0.000	$5,175	01/01/1970	48	75	26	$1,800	$9,967	1	1	0.0	0.0	1.0	3.0	1.0	3
5862	Stormwater Sewer	STMH_6839 - STMH_6838	N/A	15.00	VCP	176.19		635921.194	26910393.675	608.336	$22,947	01/01/1939	79	75	0	$0	$26,619	1	1	0.0	0.0	1.0	2.0	4.0	8
5863	Stormwater Sewer	STMH_6838 - STMH_6837	N/A	15.00	VCP	27.71		635922.488	26910366.000	607.852	$13,919	01/01/1939	79	75	0	$0	$28,015	1	1	0.0	0.0	1.0	2.0	1.0	2
5864	Stormwater Sewer	STMH_6874 - STMH_6873	N/A	12.00	CP	117.33		634857.073	26912237.635	678.707	$3,521	01/01/1949	69	75	5	$238	$4,084	1	1	0.0	0.0	1.0	1.0	1.0	1
5865	Stormwater Sewer	STMH_6876 - STMH_6875	N/A	12.00	PVC	134.47		634825.588	26912120.598	682.786	$13,553	01/01/2001	17	75	57	$10,321	$26,202	1	1	0.0	0.0	1.0	1.0	1.0	1
5866	Stormwater Sewer	STMH_6867 - STMH_6868	N/A	10.00	PVC	108.28		635331.258	26912208.936	654.994	$23,910	01/01/2001	17	75	57	$18,208	$27,735	1	1	0.0	0.0	1.0	2.0	1.0	2
5867	Stormwater Sewer	STMH_6868 - STMH_6869	N/A	12.00	CP	191.28	Bend in pipe	635334.592	26912400.186	646.464	$35,319	01/01/2001	17	75	57	$26,896	$78,788	1	1	0.0	0.0	1.0	2.0	1.0	2
5868	Stormwater Sewer	STMH_6869 - STOF_016	N/A	12.00	CP	543.37		635876.803	26912364.798	0.000	$29,496	01/01/1949	69	75	5	$1,997	$63,695	1	1	0.0	0.0	1.0	2.0	1.0	2
5869	Stormwater Sewer	STMH_7982 - STMH_7879	N/A	15.00	PVC	270.97		635280.154	26913698.230	614.962	$16,538	01/01/2001	17	75	57	$12,594	$19,206	1	1	0.0	0.0	1.0	3.0	1.0	3
5870	Stormwater Sewer	STMH_7984 - STMH_7982	N/A	12.00	PVC	100.15		635037.221	26913578.187	614.670	$25,881	01/01/2001	17	75	57	$19,709	$30,022	1	1	0.0	0.0	1.0	2.0	1.0	2
5871	Stormwater Sewer	STMH_7985 - STMH_7984	N/A	12.00	PVC	207.05		634942.472	26913545.740	615.899	$12,795	01/01/2001	17	75	57	$9,743	$14,842	1	1	0.0	0.0	1.0	2.0	1.0	2
5872	Stormwater Sewer	STMH_7988 - STMH_7985	N/A	12.00	PVC	121.60		634736.320	26913564.975	617.783	$24,909	01/01/2001	17	75	57	$18,969	$28,894	1	1	0.0	0.0	1.0	2.0	1.0	2
5873	Stormwater Sewer	STMH_7989 - STMH_7988	N/A	12.00	PVC	199.27		634640.247	26913490.433	620.469	$21,236	01/01/2001	17	75	57	$16,171	$24,634	1	1	0.0	0.0	1.0	2.0	1.0	2
5874	Stormwater Sewer	STMH_7986 - STMH_7988	N/A	12.00	PVC	102.36		634640.247	26913490.433	620.469	$15,200	01/01/2001	17	75	57	$11,575	$17,632	1	1	0.0	0.0	1.0	2.0	1.0	2
5875	Stormwater Sewer	STMH_6723 - STCB_12008	N/A	12.00	RCP	29.99		633663.793	26912427.583	0.000	$26,530	01/01/1974	44	75	30	$10,645	$40,493	1	1	0.0	0.0	1.0	1.0	1.0	1
5876	Stormwater Sewer	STMH_6178A - STCB_11967	N/A	15.00	RCP	50.63		632707.117	26910655.955	0.000	$2,675	01/01/2011	7	75	67	$2,393	$3,060	1	1	0.0	0.0	1.0	1.0	1.0	1
5877	Stormwater Sewer	STMH_6735 - STMH_6737	N/A	15.00	CP	139.50		632731.735	26912879.814	0.000	$1,616	01/01/1950	68	75	6	$130	$2,757	1	1	0.0	0.0	1.0	1.0	1.0	1
5878	Stormwater Sewer	STCB_12038 - STCB_12039	N/A	10.00	PVC	38.45		632419.660	26912379.133	0.000	$19,038	01/01/1988	30	75	44	$11,195	$21,989	1	1	0.0	0.0	1.0	1.0	1.0	1
5879	Stormwater Sewer	STMH_6709 - STMH_6708	N/A	36.00	RCP	352.43		633931.981	26910093.371	694.484	$8,176	01/01/1962	56	75	18	$1,971	$11,926	1	1	0.0	0.0	1.0	3.0	1.0	3
5880	Stormwater Sewer	STMH_6870 - STMH_7971	N/A	15.00	CP	427.49		635353.184	26913042.775	617.540	$23,756	01/01/1949	69	75	5	$1,608	$27,556	1	1	0.0	0.0	1.0	2.0	1.0	2
5881	Stormwater Sewer	STMH_6871 - STMH_6870	N/A	12.00	CP	190.04		635137.922	26912673.445	645.448	$7,799	01/01/2001	17	75	57	$5,939	$17,398	1	1	0.0	0.0	1.0	1.0	1.0	1
5882	Stormwater Sewer	STMH_6873 - STMH_6872A	N/A	12.00	CP	135.23		634921.981	26912356.269	673.909	$7,627	01/01/1949	69	75	5	$516	$17,013	1	1	0.0	0.0	1.0	1.0	1.0	1
5883	Stormwater Sewer	STMH_6872 - STMH_6871	N/A	12.00	CP	119.99		635035.685	26912513.244	664.388	$5,019	01/01/1949	69	75	5	$339	$11,196	1	1	0.0	0.0	1.0	1.0	1.0	1
5884	Stormwater Sewer	STMH_7983 - STMH_7982	N/A	8.00	PVC	133.37		635037.221	26913578.187	614.670	$12,519	01/01/2001	17	75	57	$9,533	$14,522	1	1	0.0	0.0	1.0	2.0	1.0	2
5885	Stormwater Sewer	STMH_6875 - STMH_6874	N/A	12.00	PVC	28.17		634853.755	26912120.350	682.334	$16,809	01/01/2001	17	75	57	$12,800	$19,499	1	1	0.0	0.0	1.0	1.0	1.0	1
5886	Stormwater Sewer	STMH_7980 - STMH_7981	N/A	12.00	PVC	130.18		635038.002	26913385.470	615.931	$24,090	01/01/2001	17	75	57	$18,345	$27,944	1	1	0.0	0.0	1.0	1.0	1.0	1
5887	Stormwater Sewer	STMH_7981 - STMH_7982	N/A	12.00	PVC	192.72		635037.221	26913578.187	614.670	$34,956	01/01/2001	17	75	57	$26,620	$40,375	1	1	0.0	0.0	1.0	1.0	1.0	1
5888	Stormwater Sewer	STMH_7991 - STMH_7990	N/A	12.00	PVC	53.39		634685.755	26913317.017	624.377	$67,800	01/01/2001	17	75	57	$51,632	$99,705	1	1	0.0	0.0	1.0	2.0	1.0	2
5889	Stormwater Sewer	STMH_7990 - STMH_7989	N/A	12.00	PVC	169.89		634516.723	26913334.067	624.069	$6,674	01/01/2001	17	75	57	$5,082	$7,742	1	1	0.0	0.0	1.0	2.0	1.0	2
5890	Stormwater Sewer	STMH_8163 - STMH_8162	N/A	12.00	RCP	10.41	2 12"	636810.720	26913902.648	612.447	$5,262	01/01/1975	43	75	31	$2,181	$7,920	1	1	0.0	0.0	1.0	3.0	1.0	3
5891	Stormwater Sewer	STMH_8153 - STMH_8163	N/A	21.00	RCP	183.23		636820.871	26913900.338	612.487	$36,948	01/01/1975	43	75	31	$15,319	$53,012	1	1	0.0	0.0	1.0	2.0	1.0	2
5892	Stormwater Sewer	STMH_8164 - STMH_8163	N/A	15.00	RCP	53.15		636820.871	26913900.338	612.487	$24,817	01/01/1975	43	75	31	$10,289	$37,351	1	1	0.0	0.0	1.0	3.0	1.0	3
5893	Stormwater Sewer	STMH_8144 - STMH_8153	N/A	12.00	RCP	27.10		636999.097	26913942.860	612.237	$23,397	01/01/1975	43	75	31	$9,700	$29,500	1	1	0.0	0.0	1.0	2.0	1.0	2
5894	Stormwater Sewer	STMH_7833 - STMH_3310A	N/A	18.00	VCP	382.70		637006.814	26915490.710	0.000	$42,897	01/01/1939	79	75	0	$0	$45,863	1	1	0.0	0.0	1.0	2.0	1.0	2
5895	Stormwater Sewer	STMH_7832 - STMH_7833	N/A	12.00	PVC	57.34		636653.086	26915344.645	609.628	$33,295	01/01/2010	8	75	66	$29,353	$63,911	1	1	0.0	0.0	1.0	2.0	1.0	2
5896	Stormwater Sewer	STMH_7834 - STMH_7833	N/A	15.00	PVC	28.14		636653.086	26915344.645	609.628	$32,255	01/01/2015	3	75	71	$30,587	$34,576	1	1	0.0	0.0	1.0	2.0	1.0	2
5897	Stormwater Sewer	STMH_7092 - STMH_7091	N/A	12.00	RCP	191.54		637659.715	26912533.274	606.209	$22,935	01/01/1998	20	75	54	$16,547	$26,333	1	1	0.0	0.0	1.0	3.0	1.0	3
5898	Stormwater Sewer	STMH_7109 - STMH_7110	N/A	12.00	PVC	277.87		637183.852	26912446.194	607.724	$5,315	01/01/2011	7	75	67	$4,756	$5,708	1	1	0.0	0.0	1.0	2.0	1.0	2
5899	Stormwater Sewer	STMH_7821 - STMH_7822	N/A	27.00	RCP	132.14		636260.316	26914653.028	612.602	$3,765	01/01/1975	43	75	31	$1,561	$5,768	1	1	0.0	0.0	1.0	2.0	1.0	2
5900	Stormwater Sewer	STMH_6106 - STMH_6106A	N/A	15.00	CP	366.52		632133.733	26904574.997	644.149	$24,927	01/01/1949	69	75	5	$1,688	$50,170	1	1	0.0	0.0	1.0	1.0	1.0	1
5901	Stormwater Sewer	STMH_6109 - STMH_6115	N/A	21.00	CP	306.76		631823.842	26904914.614	638.641	$21,971	01/01/1949	69	75	5	$1,488	$49,012	1	1	0.0	0.0	1.0	2.0	1.0	2
5902	Stormwater Sewer	STMH_8454B - STMH_8454A	N/A	15.00	VCP	484.13		634351.584	26921473.676	596.877	$3,017	01/01/1998	20	75	54	$2,176	$3,719	1	1	0.0	0.0	1.0	2.0	1.0	2
5903	Stormwater Sewer	STMH_8454 - STMH_8455	N/A	18.00	VCP	305.48		634152.295	26921921.352	595.780	$23,807	01/01/1998	20	75	54	$17,176	$29,344	1	1	0.0	0.0	1.0	2.0	1.0	2
5904	Stormwater Sewer	STMH_8455 - STMH_8458	N/A	18.00	VCP	23.39		634133.653	26921935.477	595.605	$42,089	01/01/1998	20	75	54	$30,367	$95,820	1	1	0.0	0.0	1.0	2.0	1.0	2
5905	Stormwater Sewer	STMH_8454A - STMH_8454	N/A	18.00	VCP	184.55		634275.522	26921641.826	596.529	$57,612	01/01/1998	20	75	54	$41,566	$72,136	1	1	0.0	0.0	1.0	2.0	1.0	2
5906	Stormwater Sewer	STMH_8461 - STMH_8460	N/A	12.00	VCP	320.56		633789.337	26921758.252	598.616	$20,379	01/01/1939	79	75	0	$0	$23,078	1	1	0.0	0.0	1.0	1.0	1.0	1
5907	Stormwater Sewer	STMH_8460 - STMH_8458	N/A	27.00	VCP	387.25		634133.653	26921935.477	595.605	$24,042	01/01/1939	79	75	0	$0	$49,687	1	1	0.0	0.0	1.0	2.0	1.0	2
5908	Stormwater Sewer	STMH_8456 - STOF_059	N/A	27.00	VCP	447.76		634587.119	26922161.469	0.000	$1,357	01/01/1939	79	75	0	$0	$3,089	1	1	0.0	0.0	1.0	3.0	1.0	3
5909	Stormwater Sewer	STMH_8458 - STMH_8457	N/A	27.00	VCP	46.08		634169.033	26921964.997	595.141	$39,527	01/01/1939	79	75	0	$0	$79,555	1	1	0.0	0.0	1.0	2.0	1.0	2
5910	Stormwater Sewer	STMH_8459 - STMH_8460	N/A	15.00	VCP	500.35		633789.337	26921758.252	598.616	$37,176	01/01/1939	79	75	0	$0	$83,646	1	1	0.0	0.0	1.0	2.0	1.0	2
5911	Stormwater Sewer	STMH_8522 - STMH_8522A	N/A	9.00	VCP	258.26		634280.477	26920668.154	599.948	$14,057	01/01/1939	79	75	0	$0	$29,677	1	1	0.0	0.0	1.0	2.0	1.0	2
5912	Stormwater Sewer	STMH_8522A - STMH_8522B	N/A	9.00	VCP	195.24		634198.755	26920845.470	600.213	$37,504	01/01/1939	79	75	0	$0	$77,508	1	1	0.0	0.0	1.0	2.0	1.0	2
5913	Stormwater Sewer	STMH_8522B - STMH_8459	N/A	12.00	VCP	500.05		633994.410	26921301.863	598.616	$35,210	01/01/1939	79	75	0	$0	$74,333	1	1	0.0	0.0	1.0	2.0	1.0	2
5914	Stormwater Sewer	STMH_8523 - STMH_8522	N/A	9.00	VCP	489.03		634383.785	26920431.452	600.581	$25,694	01/01/1939	79	75	0	$0	$53,102	1	1	0.0	0.0	1.0	1.0	1.0	1
5915	Stormwater Sewer	STMH_8510 - STMH_8523	N/A	9.00	VCP	521.65		634584.640	26919985.720	601.452	$31,389	01/01/1939	79	75	0	$0	$67,783	1	1	0.0	0.0	1.0	5.0	1.0	5
5916	Stormwater Sewer	STMH_8512 - STMH_8504	N/A	9.00	VCP	228.33		635076.535	26918878.326	604.284	$15,794	01/01/1939	79	75	0	$0	$34,105	1	1	0.0	0.0	1.0	1.0	1.0	1
5917	Stormwater Sewer	STMH_8502A - STMH_8503	N/A	9.00	VCP	211.97		635208.203	26918584.558	604.591	$23,179	01/01/1939	79	75	0	$0	$48,933	1	1	0.0	0.0	1.0	2.0	1.0	2
5918	Stormwater Sewer	STMH_8503 - STMH_8504	N/A	9.00	VCP	321.93		635076.535	26918878.326	604.284	$30,225	01/01/1939	79	75	0	$0	$60,833	1	1	0.0	0.0	1.0	2.0	1.0	2
5919	Stormwater Sewer	STMH_8501 - STMH_8502	N/A	12.00	RCP	348.32		635349.314	26918268.805	604.591	$9,639	01/01/1998	20	75	54	$6,954	$20,350	1	1	0.0	0.0	1.0	1.0	1.0	1

CITY OF SAULT STE. MARIE, MICHIGAN

Summary

id	Equipment Description	Asset ID	Construction Drawings Sheet Reference	Capacity or Size	Material	Length	Comment	Northing State Plane Ordinate	Easting State Plane Ordinate	Elevation	Original Cost	Year Installed (01/01/YYYY)	Age	Expected useful life (years)	Remaining Useful Life (years)	Depreciated Value	Replacement Cost	Average number of units in service	Total Number of units	Redundancy (Number)	Redundancy (percent)	Redundancy Score (R) (Reduces (C))	Criticality (C) (see back-up sheets)	Probability of Failure (P) (see back-up sheets)	Business Risk (BRE=PxCxR)
5920	Stormwater Sewer	STMH_8511 - STMH_8513	N/A	15.00	VCP	454.92		635237.749	26919456.206	599.959	$16,440	01/01/1939	79	75	0	$0	$34,707	1	1	0.0	0.0	1.0	3.0	1.0	3
5921	Stormwater Sewer	STMH_8513 - STMH_8514	N/A	15.00	VCP	228.89		635145.272	26919665.588	599.236	$7,657	01/01/1939	79	75	0	$0	$12,219	1	1	0.0	0.0	1.0	3.0	1.0	3
5922	Stormwater Sewer	STMH_7710 - STMH_7709	N/A	12.00	VCP	430.59		633715.180	26916958.749	607.216	$12,946	01/01/1939	79	75	0	$0	$15,018	1	1	0.0	0.0	1.0	2.0	5.0	10
5923	Stormwater Sewer	STMH_7709 - STMH_7708	N/A	12.00	VCP	159.28		633874.452	26916957.160	605.359	$27,988	01/01/1939	79	75	0	$0	$62,435	1	1	0.0	0.0	1.0	2.0	1.0	2
5924	Stormwater Sewer	STMH_7707A - STMH_7707	N/A	12.00	VCP	191.43		634159.217	26917084.176	606.378	$7,838	01/01/1939	79	75	0	$0	$17,484	1	1	0.0	0.0	1.0	2.0	1.0	2
5925	Stormwater Sewer	STMH_7708 - STMH_7707A	N/A	12.00	VCP	120.58		633986.689	26917001.226	605.270	$10,353	01/01/1939	79	75	0	$0	$23,096	1	1	0.0	0.0	1.0	2.0	5.0	10
5926	Stormwater Sewer	STMH_7113 - STMH_7711	N/A	12.00	VCP	404.37		633255.333	26916974.399	611.486	$14,408	01/01/1939	79	75	0	$0	$24,824	1	1	0.0	0.0	1.0	2.0	5.0	10
5927	Stormwater Sewer	STMH_7720 - STMH_7713	N/A	12.00	VCP	314.29		632851.209	26916988.383	615.364	$22,157	01/01/1939	79	75	0	$0	$49,428	1	1	0.0	0.0	1.0	2.0	1.0	2
5928	Stormwater Sewer	STMH_7721 - STMH_7720	N/A	12.00	VCP	340.88		632537.015	26916996.125	621.404	$20,120	01/01/1939	79	75	0	$0	$44,883	1	1	0.0	0.0	1.0	1.0	5.0	5
5929	Stormwater Sewer	STMH_7704 - STMH_7703	N/A	10.00	VCP	389.79	Blocked Completely No Flow	633258.883	26916654.521	615.043	$51,013	01/01/1939	79	75	0	$0	$88,975	1	1	0.0	0.0	1.0	1.0	1.0	1
5930	Stormwater Sewer	STMH_8522 - STMH_8521	N/A	12.00	VCP	384.31		634745.498	26920561.293	598.828	$18,595	01/01/1939	79	75	0	$0	$39,256	1	1	0.0	0.0	1.0	2.0	1.0	2
5931	Stormwater Sewer	STMH_8524B - STMH_8522	N/A	12.00	VCP	328.11		634383.785	26920431.452	600.581	$1,508	01/01/1939	79	75	0	$0	$2,421	1	1	0.0	0.0	1.0	2.0	1.0	2
5932	Stormwater Sewer	STMH_8414A - STMH_8524B	N/A	12.00	VCP	283.51		634077.953	26920312.612	601.356	$30,136	01/01/1939	79	75	0	$0	$34,808	1	1	0.0	0.0	1.0	2.0	1.0	2
5933	Stormwater Sewer	STMH_8509 - STMH_8524	N/A	10.00	VCP	356.53		634357.976	26919686.070	602.861	$37,559	01/01/1939	79	75	0	$0	$79,291	1	1	0.0	0.0	1.0	5.0	1.0	5
5934	Stormwater Sewer	STMH_8524 - STMH_8524A	N/A	12.00	VCP	342.59		634218.173	26919998.836	601.221	$25,776	01/01/1939	79	75	0	$0	$53,271	1	1	0.0	0.0	1.0	1.0	1.0	1
5935	Stormwater Sewer	STMH_8524A - STMH_8524B	N/A	12.00	VCP	343.68		634077.953	26920312.612	601.356	$24,608	01/01/1939	79	75	0	$0	$50,857	1	1	0.0	0.0	1.0	1.0	1.0	1
5936	Stormwater Sewer	STMH_8412 - STMH_8411	N/A	12.00	RCP	335.57		634027.325	26919601.829	603.240	$16,269	01/01/2006	12	75	62	$13,474	$18,872	1	1	0.0	0.0	1.0	1.0	1.0	1
5937	Stormwater Sewer	STMH_8409 - STMH_8408	N/A	15.00	RCP	315.26		634171.888	26919277.145	604.436	$4,342	01/01/2006	12	75	62	$3,596	$5,037	1	1	0.0	0.0	1.0	1.0	1.0	1
5938	Stormwater Sewer	STMH_8410 - STMH_8411	N/A	12.00	RCP	34.74		634027.325	26919601.829	603.240	$5,179	01/01/2006	12	75	62	$4,289	$5,982	1	1	0.0	0.0	1.0	1.0	1.0	1
5939	Stormwater Sewer	STMH_8408 - STMH_8407	N/A	15.00	RCP	71.59		634218.511	26919222.821	604.903	$43,821	01/01/2006	12	75	62	$36,294	$50,126	1	1	0.0	0.0	1.0	1.0	1.0	1
5940	Stormwater Sewer	STMH_8406 - STMH_8405	N/A	10.00	PVC	18.16		634217.389	26919167.218	606.144	$49,732	01/01/1989	29	75	45	$29,910	$138,426	1	1	0.0	0.0	1.0	4.0	1.0	4
5941	Stormwater Sewer	STMH_8405 - STMH_8407	N/A	48.00	RCP	55.62		634218.511	26919222.821	604.903	$1,889	01/01/1949	69	75	5	$127	$2,615	1	1	0.0	0.0	1.0	4.0	1.0	4
5942	Stormwater Sewer	STMH_7875 - STMH_7874	N/A	15.00	PVC	104.97		635629.105	26914528.405	612.943	$12,067	01/01/2015	3	75	71	$11,443	$17,602	1	1	0.0	0.0	1.0	2.0	1.0	2
5943	Stormwater Sewer	STMH_7874 - STMH_7876	N/A	18.00	RCP	35.88		635596.969	26914512.440	0.000	$14,590	01/01/1974	44	75	30	$5,854	$15,682	1	1	0.0	0.0	1.0	2.0	1.0	2
5944	Stormwater Sewer	STMH_7949 - STMH_7948	N/A	18.00	RCP	50.79		635497.185	26914791.954	611.997	$44,402	01/01/2016	2	75	72	$42,698	$47,596	1	1	0.0	0.0	1.0	1.0	1.0	1
5945	Stormwater Sewer	STMH_7951 - STMH_7950	N/A	15.00	PVC	205.15		635332.403	26915123.492	612.000	$44,240	01/01/2016	2	75	72	$42,543	$64,471	1	1	0.0	0.0	1.0	1.0	1.0	1
5946	Stormwater Sewer	STMH_7950 - STMH_7949	N/A	15.00	PVC	319.44		635474.448	26914837.372	611.460	$28,516	01/01/2016	2	75	72	$27,422	$30,567	1	1	0.0	0.0	1.0	1.0	1.0	1
5947	Stormwater Sewer	STMH_5816 - STMH_5817	N/A	24.00	RCP	84.66		623414.000	26907525.812	700.082	$1,156	01/01/1976	42	75	32	$494	$1,686	1	1	0.0	0.0	1.0	3.0	1.0	3
5948	Stormwater Sewer	STMH_6429 - STCH_11489	N/A	18.00	RCP	120.11		623590.080	26908518.132	0.000	$18,941	01/01/1976	42	75	32	$8,105	$27,629	1	1	0.0	0.0	1.0	2.0	1.0	2
5949	Stormwater Sewer	STMH_6428 - STMH_6427	N/A	12.00	RCP	381.62		623677.276	26908519.999	699.489	$13,092	01/01/1976	42	75	32	$5,602	$19,097	1	1	0.0	0.0	1.0	2.0	1.0	2
5950	Stormwater Sewer	STMH_6427 - STMH_6426	N/A	24.00	RCP	353.98		623918.638	26908778.931	697.578	$36,254	01/01/1976	42	75	32	$15,514	$55,335	1	1	0.0	0.0	1.0	3.0	1.0	3
5951	Stormwater Sewer	STMH_6432 - STMH_6431	N/A	18.00	RCP	95.36		623517.507	26908711.745	702.297	$19,916	01/01/1976	42	75	32	$8,522	$23,163	1	1	0.0	0.0	1.0	2.0	1.0	2
5952	Stormwater Sewer	STMH_6431 - STTD_11496	N/A	18.00	RCP	173.77		623682.058	26908767.587	0.000	$10,394	01/01/1976	42	75	32	$4,448	$15,162	1	1	0.0	0.0	1.0	2.0	1.0	2
5953	Stormwater Sewer	STMH_6426 - STOF_090	N/A	30.00	RCP	62.28		623972.870	26908809.548	0.000	$42,832	01/01/1976	42	75	32	$18,329	$60,531	1	1	0.0	0.0	1.0	3.0	1.0	3
5954	Stormwater Sewer	STMH_7697 - STMH_7701	N/A	36.00	RCP	329.46		634151.238	26916629.797	606.145	$37,633	01/01/1949	69	75	5	$2,548	$72,238	1	1	0.0	0.0	1.0	3.0	1.0	3
5955	Stormwater Sewer	STMH_7701 - STMH_7705	N/A	48.00	RCP	224.87		634162.104	26916854.400	606.319	$32,431	01/01/1949	69	75	5	$2,196	$67,024	1	1	0.0	0.0	1.0	3.0	1.0	3
5956	Stormwater Sewer	STMH_8049 - STMH_8046	N/A	12.00	RCP	260.20		634541.753	26917712.742	605.829	$7,020	01/01/1998	20	75	54	$5,064	$8,704	1	1	0.0	0.0	1.0	2.0	1.0	2
5957	Stormwater Sewer	STCB_11554 - STMH_6749	N/A	8.00	CP	5.97		631670.400	26912758.236	706.907	$7,994	01/01/1965	53	75	21	$2,247	$11,039	1	1	0.0	0.0	1.0	1.0	1.0	1
5958	Stormwater Sewer	STMH_6749 - STMH_6748	N/A	24.00	RCP	38.27		631708.447	26912754.075	707.701	$36,338	01/01/1965	53	75	21	$10,218	$54,690	1	1	0.0	0.0	1.0	2.0	1.0	2
5959	Stormwater Sewer	STMH_6748 - STMH_6747	N/A	24.00	RCP	228.09		631761.841	26912975.831	698.231	$4,440	01/01/1965	53	75	21	$1,248	$6,736	1	1	0.0	0.0	1.0	2.0	1.0	2
5960	Stormwater Sewer	STMH_6752B - STCB_12065	N/A	18.00	CMP	216.32		631656.356	26912639.730	0.000	$3,935	01/01/1965	53	75	21	$1,106	$6,319	1	1	0.0	0.0	1.0	2.0	1.0	2
5961	Stormwater Sewer	STCB_11553 - STMH_6749	N/A	24.00	CMP	119.34		631670.400	26912758.236	706.907	$501	01/01/1965	53	75	21	$140	$859	1	1	0.0	0.0	1.0	2.0	1.0	2
5962	Stormwater Sewer	STMH_6752A - STMH_6752B	N/A	18.00	RCP	38.02		631690.696	26912426.153	712.383	$21,416	01/01/1965	53	75	21	$6,022	$34,395	1	1	0.0	0.0	1.0	1.0	1.0	1
5963	Stormwater Sewer	STCB_12060 - STCB_6752C	N/A	15.00	RCP	147.58		631717.045	26912396.398	0.000	$10,591	01/01/2007	11	75	63	$8,913	$15,450	1	1	0.0	0.0	1.0	1.0	1.0	1
5964	Stormwater Sewer	STMH_6752C - STMH_6752B	N/A	18.00	RCP	39.74		631690.696	26912426.153	712.383	$42,102	01/01/1965	53	75	21	$11,839	$48,481	1	1	0.0	0.0	1.0	2.0	1.0	2
5965	Stormwater Sewer	STMH_6742 - STCB_11987	N/A	15.00	RCP	250.35		632344.865	26911760.596	0.000	$5,569	01/01/1984	34	75	40	$2,977	$7,690	1	1	0.0	0.0	1.0	1.0	1.0	1
5966	Stormwater Sewer	STMH_7869 - STMH_7870	N/A	18.00	RCP	114.88		635676.956	26914196.639	611.794	$12,664	01/01/1996	22	75	52	$8,798	$15,609	1	1	0.0	0.0	1.0	4.0	1.0	4
5967	Stormwater Sewer	STMH_7866 - STMH_7867	N/A	12.00	RCP	108.54		636002.495	26914356.747	612.696	$22,763	01/01/1996	22	75	52	$15,815	$28,701	1	1	0.0	0.0	1.0	4.0	1.0	4
5968	Stormwater Sewer	STMH_7867 - STMH_7868	N/A	12.00	RCP	96.43		635917.180	26914311.794	612.564	$17,426	01/01/1996	22	75	52	$12,107	$21,972	1	1	0.0	0.0	1.0	4.0	1.0	4
5969	Stormwater Sewer	STMH_7868 - STMH_7869	N/A	12.00	RCP	151.53		635780.101	26914247.212	612.312	$14,819	01/01/1996	22	75	52	$10,296	$18,266	1	1	0.0	0.0	1.0	4.0	1.0	4
5970	Stormwater Sewer	STMH_7812 - STMH_7813	N/A	12.00	RCP	121.83		636605.151	26914648.960	613.670	$9,962	01/01/1996	22	75	52	$6,921	$12,560	1	1	0.0	0.0	1.0	3.0	1.0	3
5971	Stormwater Sewer	STMH_7813 - STMH_7814	N/A	12.00	RCP	86.62		636526.738	26914612.149	613.654	$30,803	01/01/1996	22	75	52	$21,401	$37,648	1	1	0.0	0.0	1.0	3.0	1.0	3
5972	Stormwater Sewer	STMH_8146 - STMH_8145	N/A	12.00	RCP	202.45		637035.399	26914818.044	609.114	$11,521	01/01/1996	22	75	52	$8,004	$17,340	1	1	0.0	0.0	1.0	2.0	1.0	2
5973	Stormwater Sewer	STMH_7822 - STMH_7823	N/A	27.00	RCP	26.70		636236.051	26914664.176	612.743	$22,090	01/01/1975	43	75	31	$9,158	$33,840	1	1	0.0	0.0	1.0	2.0	1.0	2
5974	Stormwater Sewer	STMH_7823 - STMH_7824	N/A	27.00	RCP	156.67		636172.131	26914807.210	612.747	$7,833	01/01/1975	43	75	31	$3,247	$12,000	1	1	0.0	0.0	1.0	2.0	1.0	2
5975	Stormwater Sewer	STMH_7824 - STMH_7825	N/A	27.00	RCP	55.55		636149.797	26914858.077	612.635	$15,779	01/01/1975	43	75	31	$6,542	$24,172	1	1	0.0	0.0	1.0	3.0	1.0	3
5976	Stormwater Sewer	STMH_7826 - STMH_7827	N/A	27.00	RCP	119.81		636054.312	26915069.203	612.755	$24,697	01/01/1975	43	75	31	$10,239	$30,105	1	1	0.0	0.0	1.0	3.0	1.0	3
5977	Stormwater Sewer	STMH_7828 - STMH_7827	N/A	18.00	RCP	180.27		636054.312	26915069.203	612.755	$3,216	01/01/1990	28	75	46	$1,977	$4,055	1	1	0.0	0.0	1.0	2.0	1.0	2
5978	Stormwater Sewer	STMH_8126 - STMH_8125	N/A	12.00	RCP	236.80		637673.565	26913441.487	603.318	$3,702	01/01/1998	20	75	54	$2,670	$4,668	1	1	0.0	0.0	1.0	2.0	1.0	2
5979	Stormwater Sewer	STMH_8134 - STMH_8135	N/A	18.00	RCP	33.87		637579.314	26914036.384	602.618	$18,461	01/01/1998	20	75	54	$13,319	$22,504	1	1	0.0	0.0	1.0	4.0	1.0	4
5980	Stormwater Sewer	STMH_7849 - STMH_7850	N/A	33.00	RCP	69.90		636293.155	26913959.369	611.973	$11,367	01/01/1975	43	75	31	$4,712	$16,565	1	1	0.0	0.0	1.0	4.0	1.0	4
5981	Stormwater Sewer	STMH_7850 - STMH_7851	N/A	33.00	RCP	69.31		636230.860	26913928.983	612.080	$37,955	01/01/1975	43	75	31	$15,736	$55,312	1	1	0.0	0.0	1.0	4.0	1.0	4
5982	Stormwater Sewer	STMH_7851 - STMH_7852	N/A	33.00	RCP	231.43		636021.873	26913829.558	612.544	$9,471	01/01/1975	43	75	31	$3,926	$11,486	1	1	0.0	0.0	1.0	4.0	1.0	4
5983	Stormwater Sewer	STMH_7807 - STMH_7849	N/A	33.00	RCP	176.64		636355.981	26913990.004	612.222	$6,616	01/01/1975	43	75	31	$2,743	$14,759	1	1	0.0	0.0	1.0	3.0	1.0	3
5984	Stormwater Sewer	STMH_7805 - STMH_7806	N/A	12.00	VCP	70.83		636584.786	26913896.093	612.352	$18,313	01/01/1939	79	75	0	$0	$28,054	1	1	0.0	0.0	1.0	2.0	1.0	2
5985	Stormwater Sewer	STMH_6409 - STMH_6410	N/A	30.00	RCP	72.76		625689.837	26910287.681	701.963	$35,918	01/01/1976	42	75	32	$15,370	$55,299	1	1	0.0	0.0	1.0	4.0	1.0	4
5986	Stormwater Sewer	STMH_6532 - STMH_6534	N/A	30.00	RCP	235.86		626314.411	26910888.462	706.448	$32,727	01/01/1976	42	75	32	$14,005	$50,386	1	1	0.0	0.0	1.0	4.0	1.0	4
5987	Stormwater Sewer	STMH_6534 - STMH_6535	N/A	30.00	RCP	235.45		626147.536	26910722.363	704.434	$42,261	01/01/1976	42	75	32	$18,085	$64,121	1	1	0.0	0.0	1.0	4.0	1.0	4
5988	Stormwater Sewer	STMH_6530 - STMH_6532	N/A	24.00	RCP	219.18		626486.626	26911049.620	705.357	$32,785	01/01/1976	42	75	32	$14,030	$50,474	1	1	0.0	0.0	1.0	4.0	1.0	4
5989	Stormwater Sewer	STMH_6529 - STMH_6530	N/A	21.00	RCP	278.65		626643.024	26911203.176	704.579	$6,164	01/01/1976	42	75	32	$2,637	$9,443	1	1	0.0	0.0	1.0	4.0	1.0	4
5990	Stormwater Sewer	STMH_6528 - STMH_6529	N/A	21.00	RCP	271.07		626846.922	26911393.095	706.135	$32,044	01/01/1976	42	75	32	$13,713	$45,977	1	1	0.0	0.0	1.0	3.0	1.0	3
5991	Stormwater Sewer	STMH_6527 - STMH_6528	N/A	21.00	RCP	273.65		627042.382	26911580.911	707.473	$31,173	01/01/1976	42	75	32	$13,340	$44,727	1	1	0.0	0.0	1.0	3.0	1.0	3
5992	Stormwater Sewer	STMH_6525 - STMH_6527	N/A	21.00	RCP	276.25		627238.106	26911772.166	708.244	$31,470	01/01/1976	42	75	32	$13,467	$45,153	1	1	0.0	0.0	1.0	3.0	1.0	3
5993	Stormwater Sewer	STMH_6524 - STMH_6525	N/A	18.00	RCP	275.20		627437.607	26911963.253	710.378	$31,769	01/01/1976	42	75	32	$13,595	$45,582	1	1	0.0	0.0	1.0	3.0	1.0	3
5994	Stormwater Sewer	STMH_6523 - STMH_6524	N/A	18.00	RCP	246.40		627637.230	26912152.682	711.789	$29,996	01/01/1976	42	75	32	$12,836	$43,756	1	1	0.0	0.0	1.0	2.0	1.0	2
5995	Stormwater Sewer	STMH_6521 - STMH_6523	N/A	15.00	RCP	300.86		627814.134	26912324.197	712.179	$26,858	01/01/1976	42	75	32	$11,493	$39,178	1	1	0.0	0.0	1.0	2.0	1.0	2
5996	Stormwater Sewer	STMH_6520 - STMH_6521	N/A	12.00	RCP	271.98		628033.418	26912530.185	714.339	$29,785	01/01/1976	42	75	32	$12,746	$44,828	1	1	0.0	0.0	1.0	2.0	1.0	2
5997	Stormwater Sewer	STMH_7829 - STMH_7828	N/A	15.00	RCP	94.62		636217.093	26915146.653	612.289	$30,692	01/01/1990	28	75	46	$18,868	$44,771	1	1	0.0	0.0	1.0	2.0	1.0	2
5998	Stormwater Sewer	STMH_7561 - STMH_7562	N/A	36.00	RCP	503.45		630173.456	26916333.441	634.992	$30,276	01/01/2007	11	75	63	$25,479	$34,772	1	1	0.0	0.0	1.0	3.0	1.0	3
5999	Stormwater Sewer	STMH_7509 - STMH_7508	N/A	36.00	RCP	328.07		630441.400	26913170.747	703.077	$1,749	01/01/1965	53	75	21	$491	$2,854	1	1	0.0	0.0	1.0	4.0	1.0	4
6000	Stormwater Sewer	STMH_7511 - STMH_7509	N/A	30.00	RCP	220.10		630113.415	26913177.987	706.592	$6,551	01/01/1965	53	75	21	$1,842	$10,294	1	1	0.0	0.0	1.0	4.0	1.0	4
6001	Stormwater Sewer	STMH_6609 - STMH_6608	N/A	30.00	RCP	82.74		631326.235	26910494.241	715.429	$44,982	01/01/1996	22	75	52	$31,253	$56,960	1	1	0.0	0.0	1.0	2.0	1.0	2
6002	Stormwater Sewer	STMH_6608 - STOF_082	N/A	36.00	RCP	379.38		631315.328	26910115.022	0.000	$13,982	01/01/1996	22	75	52	$9,714	$17,705	1	1	0.0	0.0	1.0	3.0	1.0	3
6003	Stormwater Sewer	STMH_8132 - STMH_8133	N/A	18.00	RCP	181.64		637626.496	26913796.855	603.169	$28,808	01/01/1998	20	75	54	$20,784	$35,117	1	1	0.0	0.0	1.0	4.0	1.0	4
6004	Stormwater Sewer	STMH_8125 - STMH_8123	N/A	12.00	RCP	23.89		637690.611	26913458.219	603.153	$27,232	01/01/1998	20	75	54	$19,647	$34,337	1	1	0.0	0.0	1.0	2.0	1.0	2
6005	Stormwater Sewer	STMH_8122 - STMH_8123	N/A	15.00	RCP	165.19		637690.611	26913458.219	603.153	$22,335	01/01/1998	20	75	54	$16,114	$27,226	1	1	0.0	0.0	1.0	3.0	1.0	3
6006	Stormwater Sewer	STMH_8133 - STMH_8134	N/A	18.00	RCP	210.28		637586.724	26914003.339	602.664	$4,640	01/01/1998	20	75	54	$3,347	$5,656	1	1	0.0	0.0	1.0	4.0	1.0	4
6007	Stormwater Sewer	STMH_7089 - STMH_7090	N/A	15.00	PVC	165.86		637796.350	26912714.464	605.136	$10,959	01/01/1998	20	75	54	$7,906	$13,722	1	1	0.0	0.0	1.0	3.0	1.0	3
6008	Stormwater Sewer	STMH_7090A - STMH_8118	N/A	15.00	RCP	210.38		637770.247	26913013.261	603.826	$14,840	01/01/1998	20	75	54	$10,707	$18,401	1	1	0.0	0.0	1.0	3.0	1.0	3
6009	Stormwater Sewer	STMH_8118 - STMH_8119	N/A	15.00	RCP	121.19		637748.600	26913132.497	603.743	$8,813	01/01/1998	20	75	54	$6,358	$11,034	1	1	0.0	0.0	1.0	3.0	1.0	3
6010	Stormwater Sewer	STMH_7091 - STMH_7089	N/A	12.00	RCP	118.72		637777.288	26912549.706	605.976	$23,942	01/01/1998	20	75	54	$17,274	$29,688	1	1	0.0	0.0	1.0	3.0	1.0	3
6011	Stormwater Sewer	STMH_7088 - STMH_7087	N/A	15.00	RCP	323.20		637759.228	26912187.477	606.921	$21,396	01/01/1995	23	75	51	$14,580	$26,371	1	1	0.0	0.0	1.0	2.0	1.0	2
6012	Stormwater Sewer	STMH_7094 - STMH_7093	N/A	12.00	RCP	259.92		637467.504	26912331.641	605.112	$21,041	01/01/2009	9	75	65	$18,269	$25,518	1	1	0.0	0.0	1.0	2.0	1.0	2
6013	Stormwater Sewer	STMH_7093 - STMH_7092	N/A	12.00	RCP	169.89		637470.833	26912501.497	606.396	$32,491	01/01/2009	9	75	65	$28,211	$37,689	1	1	0.0	0.0	1.0	2.0	1.0	2
6014	Stormwater Sewer	STMH_5815 - STMH_5815A	N/A	18.00	RCP	272.45		623409.010	26907367.257	0.000	$8,951	01/01/1976	42	75	32	$3,830	$12,650	1	1	0.0	0.0	1.0	3.0	1.0	3
6015	Stormwater Sewer	STMH_5815A - STMH_5816	N/A	24.00	RCP	73.97		623411.387	26907441.193	701.234	$10,244	01/01/1976	42	75	32	$4,383	$14,477	1	1	0.0	0.0	1.0	3.0	1.0	3
6016	Stormwater Sewer	STMH_8011 - STMH_8010	N/A	18.00	RCP	221.39		634480.228	26914319.626	614.794	$6,284	01/01/1960	58	75	16	$1,347	$8,970	1	1	0.0	0.0	1.0	3.0	1.0	3
6017	Stormwater Sewer	STMH_8010 - STMH_8009	N/A	24.00	RCP	283.82		634737.058	26914440.416	613.376	$21,917	01/01/1960	58	75	16	$4,700	$35,201	1	1	0.0	0.0	1.0	3.0	1.0	3
6018	Stormwater Sewer	STMH_8009 - STMH_8008	N/A	24.00	RCP	24.01		634757.398	26914453.172	613.512	$31,504	01/01/1960	58	75	16	$6,756	$48,533	1	1	0.0	0.0	1.0	3.0	1.0	3
6019	Stormwater Sewer	STMH_8008 - STMH_8007	N/A	24.00	RCP	196.79		634934.831	26914538.272	612.403	$2,665	01/01/1960	58	75	16	$571	$4,106	1	1	0.0	0.0	1.0	3.0	1.0	3
6020	Stormwater Sewer	STMH_7952 - STMH_7948	N/A	36.00	RCP	269.75		635497.185	26914791.954	611.997	$7,580	01/01/1975	43	75	31	$3,142	$11,047	1	1	0.0	0.0	1.0	5.0	1.0	5
6021	Stormwater Sewer	STMH_7948 - STMH_7943	N/A	30.00	RCP	258.27		635727.320	26914909.177	611.890	$7,568	01/01/1975	43	75	31	$3,137	$8,076	1	1	0.0	0.0	1.0	5.0	1.0	5
6022	Stormwater Sewer	STMH_7943 - STMH_7827	N/A	30.00	RCP	364.05		636054.312	26915069.203	612.755	$5,316	01/01/1975	43	75	31	$2,204	$5,673	1	1	0.0	0.0	1.0	5.0	1.0	5
6023	Stormwater Sewer	STMH_7096 - STMH_7097	N/A	12.00	RCP	36.76		637277.967	26911871.729	605.794	$7,987	01/01/2009	9	75	65	$6,934	$9,686	1	1	0.0	0.0	1.0	3.0	1.0	3
6024	Stormwater Sewer	STMH_7095 - STMH_7097	N/A	24.00	RCP	149.23		637277.967	26911871.729	605.794	$4,595	01/01/1995	23	75	51	$3,131	$5,330	1	1	0.0	0.0	1.0	3.0	1.0	3
6025	Stormwater Sewer	STMH_7097 - STMH_7098	N/A	24.00	RCP	56.65		637221.484	26911867.448	605.617	$65,773	01/01/1995	23	75	51	$44,821	$83,286	1	1	0.0	0.0	1.0	3.0	1.0	3
6026	Stormwater Sewer	STMH_7098 - STMH_7099	N/A	30.00	RCP	389.19		637215.723	26911478.305	605.744	$6,409	01/01/1995	23	75	51	$4,367	$8,116	1	1	0.0	0.0	1.0	3.0	1.0	3
6027	Stormwater Sewer	STMH_7105 - STMH_7104	N/A	18.00	RCP	258.65		637201.316	26911637.841	605.296	$18,259	01/01/1970	48	75	26	$6,352	$27,481	1	1	0.0	0.0	1.0	2.0	1.0	2
6028	Stormwater Sewer	STMH_7728 - STCB_13556	N/A	12.00	CP	171.10		631698.702	26916341.607	0.000	$20,179	01/01/1967	51	75	23	$6,212	$21,673	1	1	0.0	0.0	1.0	1.0	1.0	1
6029	Stormwater Sewer	STMH_7729 - STMH_7728	N/A	12.00	CP	149.47		631869.439	26916330.431	630.093	$36,809	01/01/2010	8	75	66	$32,451	$39,348	1	1	0.0	0.0	1.0	1.0	1.0	1
6030	Stormwater Sewer	STMH_7723 - STMH_7724	N/A	12.00	CP	198.54		632206.760	26916364.541	629.664	$4,102	01/01/1997	21	75	53	$2,904	$6,261	1	1	0.0	0.0	1.0	1.0	1.0	1
6031	Stormwater Sewer	STMH_7724 - STMH_7725	N/A	12.00	CP	43.18		632196.850	26916322.515	630.144	$21,198	01/01/1974	44	75	30	$8,506	$36,161	1	1	0.0	0.0	1.0	1.0	1.0	1
6032	Stormwater Sewer	STMH_7547 - STMH_7551A	N/A	48.00	RCP	689.02	Pipe does not connect with catch basins in the interior of this block	631517.751	26916377.617	631.421	$19,637	01/01/1950	68	75	6	$1,591	$28,644	1	1	0.0	0.0	1.0	4.0	1.0	4
6033	Stormwater Sewer	STMH_6668 - STMH_6669	N/A	12.00	CP	124.94		628943.899	26912447.564	718.309	$29,512	01/01/1980	38	75	36	$14,204	$40,755	1	1	0.0	0.0	1.0	2.0	1.0	2
6034	Stormwater Sewer	STMH_7940 - STMH_7941	N/A	15.00	PVC	259.87		635168.017	26917073.780	611.350	$5,026	01/01/2015	3	75	71	$4,766	$5,388	1	1	0.0	0.0	1.0	1.0	1.0	1
6035	Stormwater Sewer	STMH_7931 - STMH_7932	N/A	15.00	PVC	194.61		635847.578	26915557.272	611.130	$30,436	01/01/2015	3	75	71	$28,862	$32,478	1	1	0.0	0.0	1.0	1.0	1.0	1
6036	Stormwater Sewer	STMH_7932 - STMH_7933	N/A	18.00	RCP	204.27		635763.717	26915743.530	610.900	$28,983	01/01/2015	3	75	71	$27,484	$30,928	1	1	0.0	0.0	1.0	1.0	1.0	1
6037	Stormwater Sewer	STMH_7933 - STMH_7934	N/A	18.00	RCP	194.51		635684.727	26915921.283	610.350	$3,581	01/01/2015	3	75	71	$3,395	$7,208	1	1	0.0	0.0	1.0	1.0	1.0	1
6038	Stormwater Sewer	STMH_7937 - STMH_7939	N/A	15.00	PVC	300.96		635414.902	26916521.723	607.640	$38,561	01/01/2015	3	75	71	$36,567	$41,149	1	1	0.0	0.0	1.0	1.0	1.0	1
6039	Stormwater Sewer	STMH_7825 - STMH_7826	N/A	27.00	RCP	111.91		636103.915	26914960.148	612.815	$16,893	01/01/1975	43	75	31	$7,004	$25,878	1	1	0.0	0.0	1.0	3.0	1.0	3
6040	Stormwater Sewer	STMH_7873 - STMH_7874	N/A	15.00	PVC	62.31		635629.105	26914528.405	612.943	$3,911	01/01/2015	3	75	71	$3,708	$5,705	1	1	0.0	0.0	1.0	2.0	1.0	2
6041	Stormwater Sewer	STMH_6424 - STMH_6425	N/A	36.00	RCP	202.92		624001.012	26908844.002	697.940	$5,930	01/01/1976	42	75	32	$2,537	$8,762	1	1	0.0	0.0	1.0	5.0	1.0	5
6042	Stormwater Sewer	STMH_6423 - STMH_6424	N/A	36.00	RCP	281.35		624171.280	26908954.391	698.989	$31,859	01/01/1976	42	75	32	$13,633	$47,078	1	1	0.0	0.0	1.0	5.0	1.0	5
6043	Stormwater Sewer	STMH_6422 - STMH_6423	N/A	36.00	RCP	305.90		624402.514	26909114.664	700.223	$44,172	01/01/1976	42	75	32	$18,903	$65,273	1	1	0.0	0.0	1.0	5.0	1.0	5
6044	Stormwater Sewer	STMH_6421 - STMH_6422	N/A	36.00	RCP	158.33		624646.195	26909299.587	701.025	$23,120	01/01/1976	42	75	32	$9,894	$34,164	1	1	0.0	0.0	1.0	5.0	1.0	5
6045	Stormwater Sewer	STMH_6417 - STMH_6421	N/A	36.00	RCP	323.96		624870.264	26909507.352	701.702	$44,565	01/01/1976	42	75	32	$19,071	$55,799	1	1	0.0	0.0	1.0	5.0	1.0	5
6046	Stormwater Sewer	STMH_6415 - STMH_6417	N/A	36.00	RCP	335.27		625107.335	26909728.137	702.780	$6,605	01/01/1976	42	75	32	$2,826	$10,081	1	1	0.0	0.0	1.0	5.0	1.0	5
6047	Stormwater Sewer	STMH_6416 - STMH_6415	N/A	12.00	RCP	69.53		625349.199	26909960.324	702.013	$50,862	01/01/1976	42	75	32	$21,766	$75,158	1	1	0.0	0.0	1.0	1.0	1.0	1
6048	Stormwater Sewer	STMH_6412 - STMH_6415	N/A	36.00	RCP	214.04		625349.199	26909960.324	702.013	$52,638	01/01/1976	42	75	32	$22,526	$77,784	1	1	0.0	0.0	1.0	4.0	1.0	4
6049	Stormwater Sewer	STMH_6410 - STMH_6412	N/A	30.00	RCP	258.40		625503.027	26910109.146	701.636	$17,746	01/01/1976	42	75	32	$7,594	$20,299	1	1	0.0	0.0	1.0	4.0	1.0	4
6050	Stormwater Sewer	STMH_6407 - STMH_6409	N/A	30.00	RCP	348.44		625742.440	26910337.953	701.768	$10,114	01/01/1976	42	75	32	$4,328	$15,571	1	1	0.0	0.0	1.0	4.0	1.0	4
6051	Stormwater Sewer	STMH_6635 - STMH_6407	N/A	30.00	RCP	210.05		625992.979	26910580.116	703.443	$5,534	01/01/1976	42	75	32	$2,368	$8,889	1	1	0.0	0.0	1.0	2.0	1.0	2
6052	Stormwater Sewer	STMH_7978 - STOF_023	N/A	24.00	CP	64.35		635361.411	26913628.243	0.000	$16,273	01/01/2001	17	75	57	$12,392	$18,876	1	1	0.0	0.0	1.0	1.0	1.0	1
6053	Stormwater Sewer	STMH_7084 - STMH_7085	N/A	12.00	RCP	204.56		637694.724	26911656.576	606.356	$20,876	01/01/1995	23	75	51	$14,226	$26,322	1	1	0.0	0.0	1.0	2.0	1.0	2
6054	Stormwater Sewer	STMH_7085 - STMH_7086	N/A	12.00	RCP	181.53		637716.171	26911834.269	607.390	$41,279	01/01/1995	23	75	51	$28,130	$50,061	1	1	0.0	0.0	1.0	2.0	1.0	2
6055	Stormwater Sewer	STMH_7087 - STMH_7086	N/A	18.00	RCP	355.82		637716.171	26911834.269	607.390	$38,461	01/01/1995	23	75	51	$26,209	$48,157	1	1	0.0	0.0	1.0	2.0	1.0	2
6056	Stormwater Sewer	STCB_12540 - STOF_002	N/A	24.00	RCP	28.78		636485.807	26910235.928	0.000	$18,012	01/01/1961	57	75	17	$4,103	$21,844	1	1	0.0	0.0	1.0	3.0	1.0	3
6057	Stormwater Sewer	STMH_7023 - STMH_7022	N/A	24.00	RCP	131.82		636647.107	26910270.139	607.196	$13,153	01/01/1961	57	75	17	$2,996	$21,124	1	1	0.0	0.0	1.0	3.0	1.0	3
6058	Stormwater Sewer	STMH_7077 - STMH_7077A	N/A	15.00	RCP	49.74		637072.047	26910357.381	611.073	$16,744	01/01/1961	57	75	17	$3,814	$26,892	1	1	0.0	0.0	1.0	2.0	1.0	2
6059	Stormwater Sewer	STMH_7025 - STMH_7026	N/A	12.00	RCP	125.50		637155.766	26910423.283	610.510	$6,266	01/01/1970	48	75	26	$2,179	$9,563	1	1	0.0	0.0	1.0	2.0	1.0	2
6060	Stormwater Sewer	STMH_7026 - STMH_7077	N/A	12.00	RCP	65.95		637120.767	26910367.381	611.709	$4,924	01/01/1970	48	75	26	$1,713	$7,908	1	1	0.0	0.0	1.0	1.0	1.0	1
6061	Stormwater Sewer	STMH_7078 - STMH_7078A	N/A	12.00	RCP	151.51		637330.309	26910410.119	607.712	$20,316	01/01/1961	57	75	17	$4,628	$33,148	1	1	0.0	0.0	1.0	2.0	1.0	2
6062	Stormwater Sewer	STMH_8217 - STMH_8218	N/A	36.00	RCP	255.34		624154.801	26921320.877	632.374	$36,345	01/01/2000	18	75	56	$27,192	$41,742	1	1	0.0	0.0	1.0	2.0	1.0	2
6063	Stormwater Sewer	STMH_8218 - STMH_8219	N/A	36.00	RCP	179.92		624334.705	26921318.277	631.693	$41,479	01/01/2000	18	75	56	$31,033	$47,640	1	1	0.0	0.0	1.0	2.0	1.0	2
6064	Stormwater Sewer	STMH_8219 - STMH_8220	N/A	36.00	RCP	205.34		624540.040	26921316.496	631.982	$46,352	01/01/2000	18	75	56	$34,678	$53,236	1	1	0.0	0.0	1.0	2.0	1.0	2
6065	Stormwater Sewer	STMH_8220 - STMH_8221	N/A	36.00	RCP	229.47		624769.488	26921313.779	632.681	$38,666	01/01/2000	18	75	56	$28,928	$44,408	1	1	0.0	0.0	1.0	2.0	1.0	2
6066	Stormwater Sewer	STMH_8222 - STMH_8221	N/A	36.00	RCP	191.41		624960.902	26921313.585	632.681	$42,489	01/01/2000	18	75	56	$31,788	$48,799	1	1	0.0	0.0	1.0	2.0	1.0	2
6067	Stormwater Sewer	STMH_8224 - STMH_8223	N/A	36.00	RCP	161.86		625171.209	26921309.874	631.101	$14,693	01/01/2000	18	75	56	$10,992	$16,639	1	1	0.0	0.0	1.0	2.0	1.0	2
6068	Stormwater Sewer	STMH_8222 - STMH_8223	N/A	36.00	RCP	210.34		625171.209	26921309.874	631.101	$6,312	01/01/2000	18	75	56	$4,722	$7,249	1	1	0.0	0.0	1.0	2.0	1.0	2
6069	Stormwater Sewer	STMH_8226 - STMH_8225	N/A	24.00	RCP	203.37		625430.360	26921310.198	630.235	$40,478	01/01/2000	18	75	56	$30,284	$45,839	1	1	0.0	0.0	1.0	1.0	1.0	1
6070	Stormwater Sewer	STMH_8211 - STMH_8227	N/A	18.00	CP	218.51		626203.162	26921303.328	630.707	$22,467	01/01/2000	18	75	56	$16,809	$25,347	1	1	0.0	0.0	1.0	1.0	1.0	1

CITY OF SAULT STE. MARIE, MICHIGAN

Summary

id	Equipment Description	Asset ID	Construction Drawings Sheet Reference	Capacity or Size	Material	Length	Comment	Northing State Plane Ordinate	Easting State Plane Ordinate	Elevation	Original Cost	Year Installed (01/01/YYYY)	Age	Expected useful life (years)	Remaining Useful Life (years)	Depreciated Value	Replacement Cost	Average number of units in service	Total Number of units	Redundancy (Number)	Redundancy (percent)	Redundancy Score (R) (Reduces (C))	Criticality (C) (see back-up sheets)	Probability of Failure (P) (see back-up sheets)	Business Risk (BRE=PxCxR)
6071	Stormwater Sewer	STMH_8227 - STMH_8213A	N/A	24.00	CP	268.06		626471.223	26921302.575	627.885	$25,917	01/01/2000	18	75	56	$19,390	$27,782	1	1	0.0	0.0	1.0	1.0	1.0	1
6072	Stormwater Sewer	STMH_8213A - STOF_150	N/A	24.00	CP	78.35		626477.894	26921380.640	0.000	$31,774	01/01/1991	27	75	47	$19,956	$40,135	1	1	0.0	0.0	1.0	2.0	1.0	2
6073	Stormwater Sewer	STMH_7970 - STMH_7971	N/A	12.00	CP	51.74		635353.184	26913042.775	617.540	$20,881	01/01/2001	17	75	57	$15,901	$40,534	1	1	0.0	0.0	1.0	2.0	1.0	2
6074	Stormwater Sewer	STMH_8135 - STMH_8137	N/A	18.00	RCP	134.75		637551.692	26914168.275	602.726	$7,108	01/01/1998	20	75	54	$5,128	$8,665	1	1	0.0	0.0	1.0	4.0	1.0	4
6075	Stormwater Sewer	STMH_8124 - STMH_8123	N/A	12.00	RCP	41.58		637690.611	26913458.219	603.153	$2,747	01/01/1998	20	75	54	$1,981	$3,463	1	1	0.0	0.0	1.0	2.0	1.0	2
6076	Stormwater Sewer	STMH_6807 - STMH_6806	N/A	12.00	RCP	58.27		636605.012	26911813.904	610.703	$8,180	01/01/1970	48	75	26	$2,845	$9,392	1	1	0.0	0.0	1.0	2.0	1.0	2
6077	Stormwater Sewer	STMH_6806 - STMH_6805	N/A	12.00	RCP	150.39		636601.936	26911663.547	610.007	$5,535	01/01/1970	48	75	26	$1,925	$8,449	1	1	0.0	0.0	1.0	2.0	1.0	2
6078	Stormwater Sewer	STCB_12283 - STOF_009	N/A	12.00	VCP	59.53		636011.361	26911704.124	0.000	$4,102	01/01/1939	79	75	0	$0	$5,607	1	1	0.0	0.0	1.0	4.0	1.0	4
6079	Stormwater Sewer	STMH_6854 - STOF_008	N/A	12.00	RCP	61.00		636029.909	26911594.803	0.000	$44,765	01/01/2004	14	75	60	$35,880	$90,096	1	1	0.0	0.0	1.0	1.0	1.0	1
6080	Stormwater Sewer	STMH_6856 - STOF_010	N/A	12.00	RCP	36.05		636006.192	26911732.462	0.000	$12,711	01/01/1939	79	75	0	$0	$14,745	1	1	0.0	0.0	1.0	4.0	1.0	4
6081	Stormwater Sewer	STMH_6142 - STMH_6143	N/A	18.00	CP	227.59		631747.200	26905905.896	639.177	$24,748	01/01/1974	44	75	30	$9,930	$36,100	1	1	0.0	0.0	1.0	2.0	1.0	2
6082	Stormwater Sewer	STMH_6143 - STMH_6144	N/A	18.00	CP	227.05		631520.340	26905915.085	638.001	$29,860	01/01/1974	44	75	30	$11,982	$42,842	1	1	0.0	0.0	1.0	2.0	1.0	2
6083	Stormwater Sewer	STMH_6144 - STMH_6145	N/A	21.00	CP	259.65		631260.763	26905921.231	637.335	$26,194	01/01/1974	44	75	30	$10,511	$66,109	1	1	0.0	0.0	1.0	2.0	1.0	2
6084	Stormwater Sewer	STMH_6699 - STMH_6507	N/A	12.00	CP	281.07		628741.027	26912253.034	717.195	$4,367	01/01/1980	38	75	36	$2,101	$4,668	1	1	0.0	0.0	1.0	3.0	1.0	3
6085	Stormwater Sewer	STMH_6507 - STMH_6508	N/A	15.00	CP	169.54		628612.893	26912131.570	716.459	$10,696	01/01/1980	38	75	36	$5,148	$14,622	1	1	0.0	0.0	1.0	3.0	1.0	3
6086	Stormwater Sewer	STMH_6508 - STMH_6509	N/A	15.00	CP	98.13		628542.723	26912062.968	716.119	$32,518	01/01/1980	38	75	36	$15,651	$43,449	1	1	0.0	0.0	1.0	3.0	1.0	3
6087	Stormwater Sewer	STMH_6509 - STMH_6511	N/A	18.00	CP	273.26		628344.304	26911875.080	714.716	$6,452	01/01/1980	38	75	36	$3,105	$8,150	1	1	0.0	0.0	1.0	3.0	1.0	3
6088	Stormwater Sewer	STMH_5824 - STMH_5823	N/A	15.00	PVC	137.00		623345.677	26907892.005	703.409	$7,290	01/01/1995	23	75	51	$4,967	$8,841	1	1	0.0	0.0	1.0	3.0	1.0	3
6089	Stormwater Sewer	STMH_5823 - STCB_10012	N/A	18.00	RCP	16.20		623361.795	26907890.421	0.000	$16,302	01/01/1995	23	75	51	$11,109	$20,412	1	1	0.0	0.0	1.0	3.0	1.0	3
6090	Stormwater Sewer	STMH_6636 - STMH_6634	N/A	12.00	RCP	166.41		630780.754	26912975.179	705.583	$29,005	01/01/1996	22	75	52	$20,152	$33,683	1	1	0.0	0.0	1.0	2.0	1.0	2
6091	Stormwater Sewer	STMH_7106 - STMH_7105	N/A	15.00	RCP	184.44		637206.550	26911896.147	605.697	$47,402	01/01/1970	48	75	26	$16,491	$69,079	1	1	0.0	0.0	1.0	2.0	1.0	2
6092	Stormwater Sewer	STMH_6858 - STMH_6857	N/A	12.00	RCP	219.01		635856.585	26911873.057	618.968	$4,596	01/01/2004	14	75	60	$3,683	$10,253	1	1	0.0	0.0	1.0	2.0	1.0	2
6093	Stormwater Sewer	STMH_6857A - STOF_013	N/A	12.00	RCP	20.79		635975.511	26911902.350	0.000	$27,377	01/01/2004	14	75	60	$21,943	$31,757	1	1	0.0	0.0	1.0	2.0	1.0	2
6094	Stormwater Sewer	STMH_6808 - STMH_6810	N/A	12.00	RCP	60.59		636361.660	26911851.533	615.837	$12,585	01/01/2004	14	75	60	$10,087	$14,450	1	1	0.0	0.0	1.0	3.0	1.0	3
6095	Stormwater Sewer	STMH_6809 - STMH_6810	N/A	12.00	RCP	93.22		636268.509	26911855.223	615.837	$5,434	01/01/2004	14	75	60	$4,355	$6,304	1	1	0.0	0.0	1.0	3.0	1.0	3
6096	Stormwater Sewer	STMH_6138 - STMH_6137	N/A	18.00	RCP	296.90		632913.720	26907163.919	637.291	$38,550	01/01/1998	20	75	54	$27,813	$47,515	1	1	0.0	0.0	1.0	2.0	1.0	2
6097	Stormwater Sewer	STMH_6137 - STMH_6172A	N/A	18.00	RCP	130.65		633044.264	26907158.599	636.894	$38,300	01/01/1998	20	75	54	$27,633	$47,207	1	1	0.0	0.0	1.0	2.0	1.0	2
6098	Stormwater Sewer	STMH_6136 - STMH_6172A	N/A	12.00	RCP	150.81		633044.264	26907158.599	636.894	$16,854	01/01/1998	20	75	54	$12,160	$20,774	1	1	0.0	0.0	1.0	2.0	1.0	2
6099	Stormwater Sewer	STMH_7078A - STMH_7077	N/A	12.00	RCP	213.86		637120.767	26910367.381	611.709	$3,726	01/01/1961	57	75	17	$848	$4,322	1	1	0.0	0.0	1.0	2.0	1.0	2
6100	Stormwater Sewer	STMH_7077A - STMH_7024A	N/A	18.00	RCP	169.13		636906.367	26910323.372	0.000	$12,878	01/01/1961	57	75	17	$2,934	$21,969	1	1	0.0	0.0	1.0	3.0	1.0	3
6101	Stormwater Sewer	STMH_7024 - STMH_7023	N/A	18.00	RCP	132.86		636776.430	26910295.679	607.459	$11,923	01/01/1961	57	75	17	$2,716	$18,198	1	1	0.0	0.0	1.0	3.0	1.0	3
6102	Stormwater Sewer	STMH_7021 - STMH_6801	N/A	15.00	RCP	105.66		636566.537	26910344.245	608.495	$15,109	01/01/1970	48	75	26	$5,256	$23,275	1	1	0.0	0.0	1.0	3.0	1.0	3
6103	Stormwater Sewer	STMH_8201 - STMH_8213A	N/A	24.00	CP	163.02		626471.223	26921302.575	630.279	$52,268	01/01/2000	18	75	56	$39,105	$59,191	1	1	0.0	0.0	1.0	1.0	1.0	1
6104	Stormwater Sewer	STMH_8202 - STMH_8201	N/A	24.00	CP	346.14		626634.191	26921298.621	629.054	$28,139	01/01/2000	18	75	56	$21,052	$32,188	1	1	0.0	0.0	1.0	1.0	1.0	1
6105	Stormwater Sewer	STMH_8203 - STMH_8202	N/A	18.00	CP	202.44		626980.315	26921295.061	630.343	$29,543	01/01/2000	18	75	56	$22,103	$33,794	1	1	0.0	0.0	1.0	1.0	1.0	1
6106	Stormwater Sewer	STMH_8225 - STMH_8224	N/A	24.00	RCP	97.30		625333.062	26921311.299	630.389	$30,708	01/01/2000	18	75	56	$22,974	$34,776	1	1	0.0	0.0	1.0	1.0	1.0	1
6107	Stormwater Sewer	STMH_8223 - STOF_122	N/A	36.00	RCP	31.25		625169.932	26921341.093	0.000	$32,696	01/01/2000	18	75	56	$24,461	$37,552	1	1	0.0	0.0	1.0	2.0	1.0	2
6108	Stormwater Sewer	STCB_10878 - STMH_6142	N/A	15.00	CP	243.72		631974.424	26905918.796	640.225	$19,234	01/01/1974	44	75	30	$7,718	$38,712	1	1	0.0	0.0	1.0	1.0	1.0	1
6109	Stormwater Sewer	STMH_6141 - STMH_6140	N/A	12.00	RCP	206.16		632912.859	26906476.989	638.498	$24,807	01/01/1998	20	75	54	$17,898	$36,187	1	1	0.0	0.0	1.0	2.0	1.0	2
6110	Stormwater Sewer	STMH_6140 - STMH_6139	N/A	18.00	RCP	92.99		632896.139	26906568.463	638.300	$23,708	01/01/1998	20	75	54	$17,105	$29,893	1	1	0.0	0.0	1.0	2.0	1.0	2
6111	Stormwater Sewer	STMH_6139 - STMH_6138	N/A	18.00	RCP	298.84		632902.771	26906867.224	638.604	$11,996	01/01/1998	20	75	54	$8,655	$14,785	1	1	0.0	0.0	1.0	2.0	1.0	2
6112	Stormwater Sewer	STMH_6667 - STMH_7515	N/A	24.00	RCP	88.89		629115.941	26913191.519	714.617	$13,118	01/01/1965	53	75	21	$3,688	$18,116	1	1	0.0	0.0	1.0	2.0	1.0	2
6113	Stormwater Sewer	STMH_6661 - STMH_7514	N/A	18.00	RCP	46.63		629463.187	26913187.481	711.812	$13,349	01/01/1965	53	75	21	$3,753	$18,434	1	1	0.0	0.0	1.0	1.0	1.0	1
6114	Stormwater Sewer	STMH_STUB - STMH_6661	N/A	18.00	RCP	15.23		629463.122	26913140.856	0.000	$5,587	01/01/1967	51	75	23	$1,720	$7,715	1	1	0.0	0.0	1.0	1.0	1.0	1
6115	Stormwater Sewer	STMH_7515 - STMH_7514	N/A	27.00	RCP	347.27		629463.187	26913187.481	711.812	$10,899	01/01/1965	53	75	21	$3,064	$24,522	1	1	0.0	0.0	1.0	3.0	1.0	3
6116	Stormwater Sewer	STMH_7514 - STMH_7513	N/A	30.00	RCP	326.57		629789.707	26913181.648	709.106	$43,756	01/01/1965	53	75	21	$12,304	$75,010	1	1	0.0	0.0	1.0	3.0	1.0	3
6117	Stormwater Sewer	STMH_6659 - STMH_7512	N/A	18.00	RCP	44.88		629821.450	26913180.694	708.898	$4,989	01/01/1965	53	75	21	$1,402	$7,786	1	1	0.0	0.0	1.0	2.0	1.0	2
6118	Stormwater Sewer	STMH_7513 - STMH_7512	N/A	30.00	RCP	31.76		629821.450	26913180.694	708.898	$41,148	01/01/1965	53	75	21	$11,571	$70,540	1	1	0.0	0.0	1.0	3.0	1.0	3
6119	Stormwater Sewer	STMH_7512 - STMH_7511	N/A	30.00	RCP	71.88		629893.313	26913179.111	708.465	$4,001	01/01/1965	53	75	21	$1,125	$6,860	1	1	0.0	0.0	1.0	4.0	1.0	4
6120	Stormwater Sewer	STMH_6653 - STMH_7509	N/A	12.00	RCP	44.44		630113.415	26913177.987	706.592	$16,916	01/01/1965	53	75	21	$4,756	$26,401	1	1	0.0	0.0	1.0	1.0	1.0	1
6121	Stormwater Sewer	STMH_6537 - STMH_6536	N/A	24.00	RCP	177.96		628757.767	26913124.870	716.345	$31,976	01/01/1965	53	75	21	$8,991	$51,356	1	1	0.0	0.0	1.0	2.0	1.0	2
6122	Stormwater Sewer	STMH_6536A - STMH_6536	N/A	18.00	RCP	103.91		628757.767	26913124.870	716.345	$28,083	01/01/1965	53	75	21	$7,897	$36,658	1	1	0.0	0.0	1.0	2.0	1.0	2
6123	Stormwater Sewer	STMH_6536 - STMH_7515	N/A	24.00	RCP	364.32		629115.941	26913191.519	714.617	$10,287	01/01/1965	53	75	21	$2,892	$16,521	1	1	0.0	0.0	1.0	2.0	1.0	2
6124	Stormwater Sewer	STCB_12206 - STOF_078	N/A	18.00	CP	97.17	Ashmun Bay	634286.699	26908115.085	0.000	$12,380	01/01/1974	44	75	30	$4,967	$19,072	1	1	0.0	0.0	1.0	1.0	1.0	1
6125	Stormwater Sewer	STMH_6829 - STMH_6830	N/A	24.00	RCP	136.52		634480.938	26908282.754	0.000	$14,276	01/01/2001	17	75	57	$10,871	$20,176	1	1	0.0	0.0	1.0	2.0	1.0	2
6126	Stormwater Sewer	STMH_6828B - STMH_6828	N/A	18.00	RCP	85.96		634678.717	26908687.015	628.973	$8,644	01/01/2009	9	75	65	$7,505	$9,984	1	1	0.0	0.0	1.0	2.0	1.0	2
6127	Stormwater Sewer	STMH_6826 - STOF_126	N/A	18.00	RCP	18.37		634686.262	26908670.270	0.000	$6,212	01/01/2009	9	75	65	$5,393	$7,106	1	1	0.0	0.0	1.0	1.0	1.0	1
6128	Stormwater Sewer	STMH_6840 - STMH_6842	N/A	12.00	RCP	183.58		635690.579	26910377.826	608.873	$36,457	01/01/2009	9	75	65	$31,654	$53,873	1	1	0.0	0.0	1.0	2.0	1.0	2
6129	Stormwater Sewer	STMH_6820 - STMH_6819	N/A	24.00	RCP	120.29		635892.174	26910109.174	608.074	$16,771	01/01/1961	57	75	17	$3,821	$25,837	1	1	0.0	0.0	1.0	2.0	1.0	2
6130	Stormwater Sewer	STMH_6819 - STMH_6818	N/A	30.00	RCP	78.93		635968.457	26910129.457	607.825	$13,352	01/01/1961	57	75	17	$3,042	$20,569	1	1	0.0	0.0	1.0	2.0	1.0	2
6131	Stormwater Sewer	STMH_6818 - STMH_6817	N/A	30.00	RCP	110.06		636075.940	26910153.152	609.365	$9,788	01/01/1961	57	75	17	$2,230	$16,892	1	1	0.0	0.0	1.0	2.0	1.0	2
6132	Stormwater Sewer	STMH_6817 - STMH_6816	N/A	30.00	RCP	74.84		636149.277	26910168.075	612.490	$13,648	01/01/1961	57	75	17	$3,109	$23,554	1	1	0.0	0.0	1.0	2.0	1.0	2
6133	Stormwater Sewer	STMH_6816 - STCB_12236A	N/A	30.00	RCP	97.17		636244.644	26910186.709	0.000	$9,430	01/01/1961	57	75	17	$2,148	$16,165	1	1	0.0	0.0	1.0	2.0	1.0	2
6134	Stormwater Sewer	STCB_12236A - STOF_004	N/A	36.00	RCP	15.06		636259.283	26910190.223	0.000	$12,846	01/01/1961	57	75	17	$2,926	$21,914	1	1	0.0	0.0	1.0	2.0	1.0	2
6135	Stormwater Sewer	STMH_6635 - STMH_7506	N/A	15.00	RCP	55.90		630785.972	26913167.979	701.575	$19,137	01/01/1965	53	75	21	$5,381	$24,129	1	1	0.0	0.0	1.0	2.0	1.0	2
6136	Stormwater Sewer	STMH_6118 - STMH_6113	N/A	12.00	CP	305.21		631785.745	26904267.563	662.775	$4,060	01/01/1948	70	75	4	$220	$7,850	1	1	0.0	0.0	1.0	1.0	1.0	1
6137	Stormwater Sewer	STMH_6119 - STMH_STOF145	N/A	12.00	PVC	54.14		631178.181	26904533.662	0.000	$31,740	01/01/1956	62	75	12	$5,113	$65,748	1	1	0.0	0.0	1.0	1.0	1.0	1
6138	Stormwater Sewer	STMH_11186 - STMH_6119	N/A	12.00	PVC	41.73		631129.334	26904510.324	0.000	$26,171	01/01/1956	62	75	12	$4,216	$34,968	1	1	0.0	0.0	1.0	1.0	1.0	1
6139	Stormwater Sewer	STMH_6511 - STMH_6512	N/A	24.00	RCP	160.09		628229.884	26911763.107	713.645	$18,946	01/01/2004	14	75	60	$15,185	$21,456	1	1	0.0	0.0	1.0	3.0	1.0	3
6140	Stormwater Sewer	STMH_6512 - STMH_6514	N/A	24.00	RCP	125.47		628138.412	26911677.223	714.684	$2,926	01/01/2004	14	75	60	$2,345	$3,301	1	1	0.0	0.0	1.0	3.0	1.0	3
6141	Stormwater Sewer	STMH_6620 - STMH_6621	N/A	18.00	RCP	371.35		628897.186	26911408.291	718.331	$38,927	01/01/2001	17	75	57	$29,644	$44,224	1	1	0.0	0.0	1.0	2.0	1.0	2
6142	Stormwater Sewer	STMH_6621 - STMH_6505	N/A	18.00	RCP	264.81		628703.485	26911588.859	716.631	$21,806	01/01/2001	17	75	57	$16,606	$27,495	1	1	0.0	0.0	1.0	2.0	1.0	2
6143	Stormwater Sewer	STMH_6505 - STMH_6506	N/A	24.00	RCP	395.18		628308.856	26911609.753	715.432	$26,055	01/01/2001	17	75	57	$19,841	$29,396	1	1	0.0	0.0	1.0	2.0	1.0	2
6144	Stormwater Sewer	STMH_6506 - STMH_6515	N/A	24.00	RCP	167.02		628141.837	26911609.417	714.808	$18,480	01/01/2001	17	75	57	$14,073	$25,261	1	1	0.0	0.0	1.0	2.0	1.0	2
6145	Stormwater Sewer	STMH_6513 - STMH_6514	N/A	24.00	RCP	18.76		628139.744	26911658.515	714.684	$16,463	01/01/2004	14	75	60	$13,195	$18,428	1	1	0.0	0.0	1.0	3.0	1.0	3
6146	Stormwater Sewer	STMH_6514 - STMH_6515	N/A	48.00	RCP	49.14		628141.837	26911609.417	714.808	$73,813	01/01/2004	14	75	60	$59,163	$93,830	1	1	0.0	0.0	1.0	3.0	1.0	3
6147	Stormwater Sewer	STMH_6515 - STMH_6516	N/A	48.00	RCP	250.21		628163.601	26911360.151	0.000	$73,553	01/01/1980	38	75	36	$35,402	$93,499	1	1	0.0	0.0	1.0	4.0	1.0	4
6148	Stormwater Sewer	STMH_6618 - STMH_6617	N/A	15.00	RCP	329.24		629622.456	26910651.298	719.120	$54,588	01/01/2001	17	75	57	$41,570	$62,015	1	1	0.0	0.0	1.0	1.0	1.0	1
6149	Stormwater Sewer	STMH_6617 - STMH_6616	N/A	15.00	RCP	130.13		629723.505	26910569.306	719.491	$42,472	01/01/2001	17	75	57	$32,343	$49,057	1	1	0.0	0.0	1.0	1.0	1.0	1
6150	Stormwater Sewer	STMH_7529 - STMH_7579	N/A	30.00	RCP	318.30		631462.696	26914732.518	630.954	$40,938	01/01/1990	28	75	46	$25,166	$47,488	1	1	0.0	0.0	1.0	2.0	1.0	2
6151	Stormwater Sewer	STMH_7022 - STCB_12540	N/A	24.00	RCP	136.11		636514.019	26910241.601	0.000	$14,632	01/01/1961	57	75	17	$3,333	$22,542	1	1	0.0	0.0	1.0	3.0	1.0	3
6152	Stormwater Sewer	STMH_7080 - STMH_7081	N/A	12.00	RCP	168.49		637614.988	26911020.870	607.827	$16,516	01/01/1995	23	75	51	$11,255	$20,824	1	1	0.0	0.0	1.0	2.0	1.0	2
6153	Stormwater Sewer	STMH_7081 - STMH_7082	N/A	12.00	RCP	143.62		637633.451	26911163.295	608.278	$10,421	01/01/1995	23	75	51	$7,101	$13,140	1	1	0.0	0.0	1.0	2.0	1.0	2
6154	Stormwater Sewer	STMH_7083 - STMH_7084	N/A	12.00	RCP	201.89		637668.746	26911453.668	607.436	$23,525	01/01/1995	23	75	51	$16,031	$29,662	1	1	0.0	0.0	1.0	2.0	1.0	2
6155	Stormwater Sewer	STMH_7575 - STMH_7529	N/A	27.00	RCP	310.25		631144.396	26914733.244	0.000	$69,690	01/01/1990	28	75	46	$42,842	$134,090	1	1	0.0	0.0	1.0	2.0	1.0	2
6156	Stormwater Sewer	STCB_12823 - STCB_7575	N/A	24.00	RCP	168.68		630834.356	26914744.700	0.000	$13,178	01/01/1990	28	75	46	$8,101	$16,615	1	1	0.0	0.0	1.0	1.0	1.0	1
6157	Stormwater Sewer	STMH_5061 - STOF_053	N/A	36.00	RCP	159.15		632210.865	26897321.233	0.000	$4,439	01/01/1998	20	75	54	$3,202	$5,471	1	1	0.0	0.0	1.0	2.0	1.0	2
6158	Stormwater Sewer	STCB_10702 - STMH_5601	N/A	24.00	RCP	86.66		632052.710	26897338.973	611.684	$24,754	01/01/1984	34	75	40	$13,235	$31,346	1	1	0.0	0.0	1.0	1.0	1.0	1
6159	Stormwater Sewer	STCB_10703 - STCB_10702	N/A	30.00	RCP	146.48		632055.523	26897425.585	0.000	$50,380	01/01/1999	19	75	55	$37,020	$67,314	1	1	0.0	0.0	1.0	1.0	1.0	1
6160	Stormwater Sewer	STMH_8428 - STMH_8427	N/A	18.00	RCP	95.21		632498.227	26923032.761	596.654	$24,669	01/01/2004	14	75	60	$19,773	$28,218	1	1	0.0	0.0	1.0	2.0	1.0	2
6161	Stormwater Sewer	STMH_8427 - STMH_8426	N/A	18.00	RCP	341.52		632537.422	26922947.944	599.079	$13,234	01/01/2004	14	75	60	$10,607	$15,138	1	1	0.0	0.0	1.0	2.0	1.0	2
6162	Stormwater Sewer	STMH_8428 - STMH_8429	N/A	18.00	RCP	177.47		632425.580	26923194.683	594.996	$27,776	01/01/2004	14	75	60	$22,263	$31,773	1	1	0.0	0.0	1.0	2.0	1.0	2
6163	Stormwater Sewer	STMH_8429 - STMH_8430	N/A	18.00	RCP	199.83		632344.383	26923377.271	596.422	$10,083	01/01/2004	14	75	60	$8,081	$11,534	1	1	0.0	0.0	1.0	2.0	1.0	2
6164	Stormwater Sewer	STMH_8430 - STMH_8431	N/A	18.00	RCP	72.54		632315.118	26923443.648	596.201	$29,510	01/01/2004	14	75	60	$23,653	$33,419	1	1	0.0	0.0	1.0	2.0	1.0	2
6165	Stormwater Sewer	STMH_8431 - STMH_8462	N/A	24.00	RCP	195.43		632232.117	26923620.580	596.354	$18,523	01/01/2004	14	75	60	$14,846	$21,543	1	1	0.0	0.0	1.0	2.0	1.0	2
6166	Stormwater Sewer	STMH_8462 - STMH_8463	N/A	24.00	RCP	134.96		632357.922	26923669.441	595.191	$4,107	01/01/2004	14	75	60	$3,291	$4,652	1	1	0.0	0.0	1.0	3.0	1.0	3
6167	Stormwater Sewer	STMH_8462 - STOF_117	N/A	24.00	RCP	27.20		632208.719	26923634.454	0.000	$54,170	01/01/2004	14	75	60	$43,419	$63,002	1	1	0.0	0.0	1.0	3.0	1.0	3
6168	Stormwater Sewer	STMH_8436 - STCB-14907	N/A	36.00	RCP	26.98		632998.198	26924408.367	0.000	$26,283	01/01/2004	14	75	60	$21,066	$28,174	1	1	0.0	0.0	1.0	4.0	1.0	4
6169	Stormwater Sewer	STMH_STUB - STMH_8410	N/A	12.00	RCP	23.74		633992.716	26919598.822	0.000	$9,794	01/01/2006	12	75	62	$8,111	$21,848	1	1	0.0	0.0	1.0	1.0	1.0	1
6170	Stormwater Sewer	STMH_8413 - STMH_8412	N/A	12.00	RCP	130.15		633888.728	26919907.442	602.251	$3,743	01/01/2006	12	75	62	$3,100	$8,350	1	1	0.0	0.0	1.0	1.0	1.0	1
6171	Stormwater Sewer	STMH_8414 - STMH_8414A	N/A	12.00	VCP	57.59	Plans have descrepancies	633812.315	26920213.555	602.385	$21,263	01/01/1939	79	75	0	$0	$43,943	1	1	0.0	0.0	1.0	1.0	1.0	1
6172	Stormwater Sewer	STMH_8415 - STMH_8414	N/A	15.00	RCP	233.61		633757.718	26920195.233	602.931	$29,158	01/01/2006	12	75	62	$24,149	$33,823	1	1	0.0	0.0	1.0	1.0	1.0	1
6173	Stormwater Sewer	STMH_8416 - STMH_8415	N/A	12.00	RCP	233.26		633664.344	26920409.368	601.919	$21,112	01/01/2006	12	75	62	$17,485	$24,489	1	1	0.0	0.0	1.0	1.0	1.0	1
6174	Stormwater Sewer	STMH_8411 - STMH_8409	N/A	15.00	RCP	40.15		634044.684	26919565.628	602.966	$41,947	01/01/2006	12	75	62	$34,742	$48,658	1	1	0.0	0.0	1.0	1.0	1.0	1
6175	Stormwater Sewer	STMH_8417 - STMH_8416	N/A	12.00	RCP	168.89		633567.546	26920621.596	602.790	$24,210	01/01/2005	13	75	61	$19,728	$28,084	1	1	0.0	0.0	1.0	1.0	1.0	1
6176	Stormwater Sewer	STMH_5602 - STCB_10709	N/A	30.00	RCP	77.63		631884.554	26897762.571	0.000	$11,736	01/01/1996	22	75	52	$8,154	$14,465	1	1	0.0	0.0	1.0	1.0	1.0	1
6177	Stormwater Sewer	STCB_10709 - STCB_10703	N/A	30.00	RCP	338.82		631909.051	26897424.636	0.000	$18,355	01/01/1996	22	75	52	$12,752	$22,261	1	1	0.0	0.0	1.0	1.0	1.0	1
6178	Stormwater Sewer	STMH_5602A - STCB_10711	N/A	18.00	RCP	90.98		631874.410	26897903.390	0.000	$18,677	01/01/1996	22	75	52	$12,976	$24,954	1	1	0.0	0.0	1.0	1.0	1.0	1
6179	Stormwater Sewer	STCB_10711 - STCB_10710	N/A	24.00	RCP	25.46		631897.411	26897892.472	0.000	$11,230	01/01/1996	22	75	52	$7,802	$13,842	1	1	0.0	0.0	1.0	1.0	1.0	1
6180	Stormwater Sewer	STCB_10710 - STCB_10709	N/A	24.00	RCP	130.18		631884.554	26897762.571	0.000	$3,590	01/01/1996	22	75	52	$2,494	$4,354	1	1	0.0	0.0	1.0	1.0	1.0	1
6181	Stormwater Sewer	STMH_5604A - STCB_10726	N/A	15.00	RCP	158.12		631601.139	26898641.741	0.000	$3,653	01/01/1996	22	75	52	$2,538	$4,573	1	1	0.0	0.0	1.0	1.0	1.0	1
6182	Stormwater Sewer	STMH_5604 - STCB_10726	N/A	15.00	RCP	255.32		632102.697	26898630.090	0.000	$18,817	01/01/1996	22	75	52	$13,073	$23,561	1	1	0.0	0.0	1.0	1.0	1.0	1
6183	Stormwater Sewer	STCB_10713 - STMH_5602A	N/A	18.00	RCP	87.05		631881.642	26897994.079	619.551	$774	01/01/1996	22	75	52	$537	$976	1	1	0.0	0.0	1.0	1.0	1.0	1
6184	Stormwater Sewer	STMH_5608 - STMH_5607	N/A	15.00	CP	301.43		632184.190	26899958.190	620.195	$9,316	01/01/1949	69	75	5	$630	$20,781	1	1	0.0	0.0	1.0	1.0	5.0	5
6185	Stormwater Sewer	STMH_5609 - STMH_5608	N/A	12.00	CP	143.32		631877.622	26899969.532	623.454	$12,026	01/01/1949	69	75	5	$814	$26,828	1	1	0.0	0.0	1.0	1.0	5.0	5
6186	Stormwater Sewer	STMH_5610 - STMH_5609	N/A	12.00	CP	185.02		631734.441	26899975.844	624.641	$20,796	01/01/1949	69	75	5	$1,408	$24,123	1	1	0.0	0.0	1.0	1.0	4.0	4
6187	Stormwater Sewer	STMH_5615 - STMH_5616	N/A	18.00	RCP	128.65		632236.028	26900796.953	622.360	$30,922	01/01/2002	16	75	58	$23,960	$35,372	1	1	0.0	0.0	1.0	1.0	1.0	1
6188	Stormwater Sewer	STMH_8204 - STMH_8205	N/A	18.00	CP	212.54		627695.591	26921301.939	630.212	$24,845	01/01/2000	18	75	56	$18,588	$28,135	1	1	0.0	0.0	1.0	2.0	1.0	2
6189	Stormwater Sewer	STMH_8205 - STMH_8206	N/A	24.00	CP	164.53		627860.099	26921299.077	628.701	$24,608	01/01/2000	18	75	56	$18,410	$27,868	1	1	0.0	0.0	1.0	2.0	1.0	2
6190	Stormwater Sewer	STMH_8206 - STMH_8207	N/A	24.00	CP	162.97		628023.062	26921297.775	629.643	$16,811	01/01/2000	18	75	56	$12,577	$18,021	1	1	0.0	0.0	1.0	3.0	1.0	3
6191	Stormwater Sewer	STMH_8207 - STMH_8208	N/A	24.00	CP	130.85		628153.890	26921295.647	629.767	$23,612	01/01/2000	18	75	56	$17,665	$26,639	1	1	0.0	0.0	1.0	3.0	1.0	3
6192	Stormwater Sewer	STMH_6116 - STMH_6117	N/A	36.00	RCP	33.87		631815.760	26905276.428	0.000	$31,598	01/01/1948	70	75	4	$1,717	$65,454	1	1	0.0	0.0	1.0	2.0	1.0	2
6193	Stormwater Sewer	STMH_6117 - STMH_6120	N/A	36.00	RCP	282.13		631533.663	26905280.594	638.641	$19,839	01/01/1948	70	75	4	$1,078	$44,255	1	1	0.0	0.0	1.0	3.0	1.0	3
6194	Stormwater Sewer	STMH_6645 - STMH_6643	N/A	12.00	RCP	207.87		630011.380	26910626.721	717.256	$29,824	01/01/1996	22	75	52	$20,721	$37,343	1	1	0.0	0.0	1.0	1.0	1.0	1
6195	Stormwater Sewer	STMH_6643 - STMH_6615	N/A	12.00	RCP	77.23		630010.183	26910549.496	717.232	$23,905	01/01/1996	22	75	52	$16,609	$30,141	1	1	0.0	0.0	1.0	1.0	1.0	1
6196	Stormwater Sewer	STMH_6646 - STMH_6647	N/A	15.00	RCP	250.62		630039.675	26911459.594	720.992	$38,565	01/01/1996	22	75	52	$26,794	$47,534	1	1	0.0	0.0	1.0	1.0	1.0	1
6197	Stormwater Sewer	STMH_6647 - STMH_6648	N/A	15.00	RCP	298.96		630051.024	26911758.333	720.741	$18,116	01/01/1996	22	75	52	$12,586	$22,329	1	1	0.0	0.0	1.0	1.0	1.0	1
6198	Stormwater Sewer	STMH_6648 - STMH_6649	N/A	15.00	RCP	140.44		630053.659	26911898.745	719.752	$38,669	01/01/1996	22	75	52	$26,867	$47,661	1	1	0.0	0.0	1.0	1.0	1.0	1
6199	Stormwater Sewer	STMH_6615 - STMH_6614	N/A	15.00	RCP	220.59		630230.686	26910543.467	717.925	$39,932	01/01/1996	22	75	52	$27,744	$45,677	1	1	0.0	0.0	1.0	2.0	1.0	2
6200	Stormwater Sewer	STMH_6614 - STMH_6613	N/A	18.00	RCP	173.55		630404.139	26910537.581	717.861	$26,250	01/01/1996	22	75	52	$18,238	$32,867	1	1	0.0	0.0	1.0	2.0	1.0	2
6201	Stormwater Sewer	STMH_6612 - STMH_6611	N/A	21.00	RCP	167.24		630718.892	26910526.143	717.380	$19,943	01/01/1996	22	75	52	$13,856	$24,374	1	1	0.0	0.0	1.0	2.0	1.0	2
6202	Stormwater Sewer	STMH_6613 - STMH_6612	N/A	21.00	RCP	147.72		630551.765	26910532.246	717.885	$22,388	01/01/1996	22	75	52	$15,555	$27,595	1	1	0.0	0.0	1.0	2.0	1.0	2
6203	Stormwater Sewer	STMH_6611 - STMH_6610	N/A	24.00	RCP	260.50		630979.211	26910516.452	716.728	$22,577	01/01/1996	22	75	52	$15,686	$27,594	1	1	0.0	0.0	1.0	2.0	1.0	2
6204	Stormwater Sewer	STMH_6610 - STMH_6609	N/A	27.00	RCP	266.17		631245.332	26910511.557	715.280	$36,731	01/01/1996	22	75	52	$25,520	$44,546	1	1	0.0	0.0	1.0	2.0	1.0	2
6205	Stormwater Sewer	STMH_6128 - STMH_6127	N/A	8.00	PVC	46.09		633118.219	26906212.059	638.985	$13,480	01/01/1991	27	75	47	$8,466	$19,664	1	1	0.0	0.0	1.0	2.0	1.0	2
6206	Stormwater Sewer	STMH_6126 - STMH_5127	N/A	8.00	CP	23.32		633118.219	26906212.059	0.000	$33,117	01/01/1998	20	75	54	$23,893	$48,309	1	1	0.0	0.0	1.0	2.0	1.0	2
6207	Stormwater Sewer	STMH_6129 - STMH_6130	N/A	18.00	RCP	123.67		633328.564	26906584.090	638.767	$21,007	01/01/1970	48	75	26	$7,308	$29,688	1	1	0.0	0.0	1.0	2.0	1.0	2
6208	Stormwater Sewer	STMH_8208 - STMH_8209	N/A	24.00	CP	151.36		628305.247	26921295.939	630.199	$39,106	01/01/2000	18	75	56	$29,257	$44,119	1	1	0.0	0.0	1.0	3.0	1.0	3
6209	Stormwater Sewer	STMH_8209 - STMH_8212	N/A	24.00	CP	250.68		628555.903	26921292.729	629.504	$30,372	01/01/2000	18	75	56	$22,723	$34,742	1	1	0.0	0.0	1.0	3.0	1.0	3
6210	Stormwater Sewer	STMH_8212 - STMH_8213	N/A	24.00	CP	144.02		628699.898	26921290.128	627.885	$8,041	01/01/2000	18	75	56	$6,015	$9,338	1	1	0.0	0.0	1.0	3.0	1.0	3
6211	Stormwater Sewer	STMH_8213 - STMH_8214	N/A	30.00	CP	43.23		628743.130	26921289.988	627.811	$11,047	01/01/2000	18	75	56	$8,264	$13,398	1	1	0.0	0.0	1.0	3.0	1.0	3
6212	Stormwater Sewer	STMH_8214 - STMH_8215	N/A	30.00	CP	185.81		628928.938	26921288.789	625.974	$31,984	01/01/1990	28	75	46	$19,662	$37,143	1	1	0.0	0.0	1.0	3.0	1.0	3
6213	Stormwater Sewer	STMH_8215 - STMH_8216	N/A	30.00	CP	171.96		629100.613	26921278.902	624.466	$14,956	01/01/2000	18	75	56	$11,189	$17,368	1	1	0.0	0.0	1.0	3.0	1.0	3
6214	Stormwater Sewer	STMH_8313 - STMH_8314	N/A	30.00	CP	193.70		629372.601	26921250.187	621.460	$7,652	01/01/2000	18	75	56	$5,724	$9,690	1	1	0.0	0.0	1.0	4.0	1.0	4
6215	Stormwater Sewer	STMH_8315 - STMH_8316	N/A	30.00	CP	269.60		629685.959	26921219.385	618.270	$54,827	01/01/2000	18	75	56	$41,019	$63,766	1	1	0.0	0.0	1.0	4.0	1.0	4
6216	Stormwater Sewer	STMH_8314 - STMH_8315	N/A	30.00	CP	45.28		629417.750	26921246.752	621.092	$49,607	01/01/1990	28	75	46	$30,496	$57,695	1	1	0.0	0.0	1.0	4.0	1.0	4
6217	Stormwater Sewer	STMH_8216 - STMH_8313	N/A	30.00	CP	80.41		629179.281	26921262.272	623.299	$51,579	01/01/2000	18	75	56	$38,589	$59,239	1	1	0.0	0.0	1.0	3.0	1.0	3
6218	Stormwater Sewer	STMH_8316 - STMH_8317	N/A	30.00	CP	297.97		629983.504	26921203.425	0.000	$25,937	01/01/2000	18	75	56	$19,405	$30,166	1	1	0.0	0.0	1.0	4.0	1.0	4
6219	Stormwater Sewer	STMH_8317 - STMH_8318	N/A	30.00	CP	140.96		630124.210	26921194.913	610.552	$12,728	01/01/2000	18	75	56	$9,522	$14,781	1	1	0.0	0.0	1.0	4.0	1.0	4
6220	Stormwater Sewer	STMH_8318 - STMH_8319	N/A	30.00	CP	68.43		630192.551	26921191.388	609.340	$12,918	01/01/2000	18	75	56	$9,664	$15,001	1	1	0.0	0.0	1.0	4.0	1.0	4
6221	Stormwater Sewer	STMH_8319 - STOF_108	N/A	30.00	CP	69.45		630257.034	26921217.182	0.000	$7,646	01/01/2000	18	75	56	$5,720	$10,681	1	1	0.0	0.0	1.0	4.0	1.0	4

CITY OF SAULT STE. MARIE, MICHIGAN

Summary

id	Equipment Description	Asset ID	Construction Drawings Sheet Reference	Capacity or Size	Material	Length	Comment	Northing State Plane Ordinate	Easting State Plane Ordinate	Elevation	Original Cost	Year Installed (01/01/YYYY)	Age	Expected useful life (years)	Remaining Useful Life (years)	Depreciated Value	Replacement Cost	Average number of units in service	Total Number of units	Redundancy (Number)	Redundancy (percent)	Redundancy Score (R) (Reduces (C))	Criticality (C) (see back-up sheets)	Probability of Failure (P) (see back-up sheets)	Business Risk (BRE=PxCxR)
6222	Stormwater Sewer	STMH_8320 - STOF_107	N/A	24.00	CP	60.69		630347.509	26921230.250	0.000	$7,082	01/01/1977	41	75	33	$3,125	$10,849	1	1	0.0	0.0	1.0	3.0	1.0	3
6223	Stormwater Sewer	STMH_8322 - STMH_8320	N/A	24.00	CP	80.97		630385.594	26921183.003	607.347	$31,279	01/01/2000	18	75	56	$23,401	$36,283	1	1	0.0	0.0	1.0	3.0	1.0	3
6224	Stormwater Sewer	STMH_8321 - STMH_8320	N/A	30.00	RCP	50.23		630385.594	26921183.003	607.347	$12,226	01/01/1977	41	75	33	$5,395	$13,845	1	1	0.0	0.0	1.0	3.0	1.0	3
6225	Stormwater Sewer	STMH_8312 - STMH_8321	N/A	30.00	RCP	308.54		630412.172	26921140.386	607.438	$35,641	01/01/1977	41	75	33	$15,728	$41,451	1	1	0.0	0.0	1.0	3.0	1.0	3
6226	Stormwater Sewer	STMH_8323 - STMH_8324	N/A	12.00	RCP	250.23		631032.175	26921125.417	602.774	$41,027	01/01/2009	9	75	65	$35,622	$47,592	1	1	0.0	0.0	1.0	1.0	1.0	1
6227	Stormwater Sewer	STMH_8325 - STMH_8324	N/A	12.00	RCP	328.22		631359.730	26921104.554	602.774	$6,409	01/01/2009	9	75	65	$5,564	$6,870	1	1	0.0	0.0	1.0	1.0	1.0	1
6228	Stormwater Sewer	STMH_8442 - STMH_8325	N/A	15.00	RCP	329.17		631688.029	26921081.328	600.675	$37,923	01/01/2009	9	75	65	$32,927	$43,803	1	1	0.0	0.0	1.0	1.0	1.0	1
6229	Stormwater Sewer	STMH_8418 - STMH_8419	N/A	12.00	RCP	193.68		633325.999	26921187.539	601.575	$35,058	01/01/2005	13	75	61	$28,568	$40,102	1	1	0.0	0.0	1.0	1.0	1.0	1
6230	Stormwater Sewer	STMH_8419 - STMH_8420	N/A	18.00	RCP	252.22		633222.089	26921417.355	601.287	$15,258	01/01/2005	13	75	61	$12,433	$17,453	1	1	0.0	0.0	1.0	1.0	1.0	1
6231	Stormwater Sewer	STMH_8420 - STMH_8420A	N/A	18.00	RCP	109.77		633177.569	26921517.690	0.000	$26,637	01/01/2005	13	75	61	$21,706	$30,470	1	1	0.0	0.0	1.0	1.0	1.0	1
6232	Stormwater Sewer	STMH_8420B - STMH_8421	N/A	18.00	RCP	199.63		633017.105	26921874.532	598.395	$24,309	01/01/2005	13	75	61	$19,809	$27,806	1	1	0.0	0.0	1.0	1.0	1.0	1
6233	Stormwater Sewer	STMH_8421 - STMH_8422	N/A	18.00	RCP	174.88		632945.922	26922034.271	599.015	$17,312	01/01/2005	13	75	61	$14,107	$19,803	1	1	0.0	0.0	1.0	1.0	1.0	1
6234	Stormwater Sewer	STMH_8422 - STMH_8423	N/A	18.00	RCP	124.55		632894.277	26922147.604	598.704	$17,629	01/01/2005	13	75	61	$14,365	$20,166	1	1	0.0	0.0	1.0	1.0	1.0	1
6235	Stormwater Sewer	STMH_8423 - STMH_8423A	N/A	18.00	RCP	126.83		632841.864	26922263.094	598.187	$17,610	01/01/2005	13	75	61	$14,350	$20,143	1	1	0.0	0.0	1.0	1.0	1.0	1
6236	Stormwater Sewer	STMH_8424 - STMH_8425	N/A	18.00	RCP	135.22		632735.450	26922502.398	598.238	$16,833	01/01/2005	13	75	61	$13,717	$19,256	1	1	0.0	0.0	1.0	2.0	1.0	2
6237	Stormwater Sewer	STMH_8425 - STMH_8425A	N/A	18.00	RCP	121.10		632688.061	26922613.845	598.303	$3,668	01/01/2004	14	75	60	$2,940	$4,195	1	1	0.0	0.0	1.0	2.0	1.0	2
6238	Stormwater Sewer	STMH_8420A - STMH_8420B	N/A	18.00	RCP	191.63		633099.008	26921692.480	599.187	$27,748	01/01/2005	13	75	61	$22,611	$31,741	1	1	0.0	0.0	1.0	1.0	1.0	1
6239	Stormwater Sewer	STMH_8434 - STMH_8435	N/A	30.00	RCP	309.92		633197.420	26923985.919	588.824	$15,239	01/01/2004	14	75	60	$12,214	$16,335	1	1	0.0	0.0	1.0	3.0	1.0	3
6240	Stormwater Sewer	STMH_8433 - STMH_8434	N/A	30.00	RCP	192.63		632907.194	26923877.216	592.063	$57,024	01/01/2004	14	75	60	$45,706	$66,322	1	1	0.0	0.0	1.0	3.0	1.0	3
6241	Stormwater Sewer	STMH_8435 - STMH_8436	N/A	36.00	RCP	450.85		633024.485	26924402.283	0.000	$5,450	01/01/2004	14	75	60	$4,368	$6,260	1	1	0.0	0.0	1.0	3.0	1.0	3
6242	Stormwater Sewer	STMH_8432 - STMH_8433	N/A	30.00	RCP	100.67		632729.067	26923803.884	593.816	$35,444	01/01/2004	14	75	60	$28,409	$41,223	1	1	0.0	0.0	1.0	3.0	1.0	3
6243	Stormwater Sewer	STMH_8463 - STMH_8432	N/A	30.00	RCP	294.40		632632.278	26923776.212	593.844	$25,545	01/01/2004	14	75	60	$20,475	$30,980	1	1	0.0	0.0	1.0	3.0	1.0	3
6244	Stormwater Sewer	STMH_5616 - STMH_5617	N/A	18.00	RCP	222.46		632246.387	26901019.175	622.203	$5,793	01/01/2002	16	75	58	$4,488	$6,626	1	1	0.0	0.0	1.0	1.0	1.0	1
6245	Stormwater Sewer	STMH_5607 - STCB_10242	N/A	18.00	CP	356.27		632539.930	26899938.730	0.000	$14,661	01/01/1949	69	75	5	$992	$29,507	1	1	0.0	0.0	1.0	2.0	4.0	8
6246	Stormwater Sewer	STCB_10238 - STMH_5606	N/A	12.00	CP	280.72		631730.624	26899861.752	624.062	$4,020	01/01/1965	53	75	21	$1,130	$4,664	1	1	0.0	0.0	1.0	1.0	1.0	1
6247	Stormwater Sewer	STMH_5606 - STMH_5609	N/A	12.00	CP	114.16		631734.441	26899975.844	624.641	$28,146	01/01/1965	53	75	21	$7,914	$56,647	1	1	0.0	0.0	1.0	1.0	1.0	1
6248	Stormwater Sewer	STMH_6114 - STMH_6115	N/A	18.00	CP	328.28		631823.842	26904914.614	638.641	$31,868	01/01/1948	70	75	4	$1,732	$72,550	1	1	0.0	0.0	1.0	2.0	1.0	2
6249	Stormwater Sewer	STCB_11129 - STMH_6114	N/A	18.00	CP	243.47		631804.489	26904586.906	643.538	$8,009	01/01/1948	70	75	4	$435	$12,339	1	1	0.0	0.0	1.0	1.0	1.0	1
6250	Stormwater Sewer	STMH_6113 - STCB_11129	N/A	18.00	CP	76.44		631788.564	26904343.954	0.000	$25,934	01/01/1948	70	75	4	$1,409	$52,197	1	1	0.0	0.0	1.0	1.0	1.0	1
6251	Stormwater Sewer	STMH_6123 - STMH_6124	N/A	12.00	RCP	398.55		632910.528	26905869.187	640.281	$29,065	01/01/1970	48	75	26	$10,111	$44,362	1	1	0.0	0.0	1.0	2.0	1.0	2
6252	Stormwater Sewer	STMH_6124 - STMH_6125	N/A	12.00	RCP	305.95		633069.266	26906130.733	639.118	$10,347	01/01/1970	48	75	26	$3,599	$15,093	1	1	0.0	0.0	1.0	2.0	1.0	2
6253	Stormwater Sewer	STMH_6125 - STMH_6127	N/A	18.00	RCP	94.92		633118.219	26906212.059	638.985	$2,659	01/01/1970	48	75	26	$925	$3,358	1	1	0.0	0.0	1.0	2.0	1.0	2
6254	Stormwater Sewer	STMH_6127 - STMH_6129	N/A	18.00	RCP	303.83		633271.767	26906474.231	639.234	$5,255	01/01/1970	48	75	26	$1,828	$6,637	1	1	0.0	0.0	1.0	2.0	1.0	2
6255	Stormwater Sewer	STMH_6130 - STMH_6131	N/A	24.00	RCP	173.62		633406.579	26906739.189	639.365	$35,331	01/01/1970	48	75	26	$12,291	$49,930	1	1	0.0	0.0	1.0	2.0	1.0	2
6256	Stormwater Sewer	STMH_6131 - STMH_6132	N/A	24.00	RCP	291.99		633535.078	26907001.385	638.667	$37,311	01/01/1970	48	75	26	$12,980	$52,729	1	1	0.0	0.0	1.0	2.0	1.0	2
6257	Stormwater Sewer	STMH_6132 - STMH_6133	N/A	24.00	RCP	308.36		633669.738	26907278.784	636.835	$43,747	01/01/1970	48	75	26	$15,219	$61,825	1	1	0.0	0.0	1.0	2.0	1.0	2
6258	Stormwater Sewer	STMH_6834 - STMH_6833	N/A	24.00	RCP	31.61		633934.295	26907986.440	636.136	$12,482	01/01/1968	50	75	24	$4,009	$17,021	1	1	0.0	0.0	1.0	3.0	1.0	3
6259	Stormwater Sewer	STMH_6135 - STMH_6834	N/A	24.00	RCP	178.91		633930.890	26907955.011	636.193	$17,343	01/01/1968	50	75	24	$5,570	$21,868	1	1	0.0	0.0	1.0	3.0	1.0	3
6260	Stormwater Sewer	STMH_6133 - STMH_10863	N/A	24.00	RCP	361.55		633827.545	26907604.075	0.000	$20,754	01/01/1970	48	75	26	$7,220	$31,489	1	1	0.0	0.0	1.0	3.0	1.0	3
6261	Stormwater Sewer	STCB_10865 - STMH_6135	N/A	24.00	RCP	117.11		633899.653	26907778.847	635.266	$24,129	01/01/1968	50	75	24	$7,750	$36,315	1	1	0.0	0.0	1.0	3.0	1.0	3
6262	Stormwater Sewer	STMH_5611 - STOF_10745	N/A	12.00	RCP	166.37		632198.314	26899987.085	0.000	$16,528	01/01/2002	16	75	58	$12,807	$22,594	1	1	0.0	0.0	1.0	1.0	1.0	1
6263	Stormwater Sewer	STCB_10244 - STMH_5607	N/A	12.00	RCP	32.16		632184.190	26899958.190	620.195	$11,673	01/01/2002	16	75	58	$9,045	$14,388	1	1	0.0	0.0	1.0	1.0	1.0	1
6264	Stormwater Sewer	STMH_5617 - STOF_070	N/A	18.00	RCP	41.67		632218.747	26901050.365	0.000	$9,697	01/01/2002	16	75	58	$7,513	$11,092	1	1	0.0	0.0	1.0	1.0	1.0	1
6265	Stormwater Sewer	STMH_5618 - STOF_071	N/A	18.00	RCP	69.76		632218.268	26901089.917	0.000	$21,246	01/01/2002	16	75	58	$16,462	$24,540	1	1	0.0	0.0	1.0	1.0	1.0	1
6266	Stormwater Sewer	STMH_5619 - STCB_10072	N/A	15.00	RCP	164.70		632246.449	26902333.358	0.000	$10,756	01/01/2002	16	75	58	$8,334	$13,561	1	1	0.0	0.0	1.0	1.0	1.0	1
6267	Stormwater Sewer	STMH_6411 - STCB_11422	N/A	18.00	RCP	127.67		625398.466	26908615.260	0.000	$33,604	01/01/2008	10	75	64	$28,728	$49,656	1	1	0.0	0.0	1.0	1.0	1.0	1
6268	Stormwater Sewer	STMH_7552 - STMH_7551	N/A	8.00	PVC	185.07		631527.953	26916387.179	631.274	$47,337	01/01/2003	15	75	59	$37,311	$102,564	1	1	0.0	0.0	1.0	5.0	1.0	5
6269	Stormwater Sewer	STMH_7551A - STMH_7553	N/A	60.00	RCP	467.54		631534.873	26916844.840	631.043	$22,948	01/01/1950	68	75	6	$1,860	$26,650	1	1	0.0	0.0	1.0	4.0	1.0	4
6270	Stormwater Sewer	STMH_7553 - STMH_7554	N/A	60.00	RCP	197.24		631544.943	26917041.821	630.865	$202,450	01/01/1950	68	75	6	$16,410	$389,532	1	1	0.0	0.0	1.0	5.0	1.0	5
6271	Stormwater Sewer	STMH_7726 - STMH_7728	N/A	12.00	CP	78.12		631869.439	26916330.431	630.093	$22,066	01/01/1967	51	75	23	$6,793	$49,649	1	1	0.0	0.0	1.0	1.0	1.0	1
6272	Stormwater Sewer	STMH_6663 - STMH_6663A	N/A	8.00	CP	75.98		629037.213	26912535.218	718.714	$6,552	01/01/1980	38	75	36	$3,153	$9,104	1	1	0.0	0.0	1.0	2.0	1.0	2
6273	Stormwater Sewer	STMH_6652 - STMH_6654	N/A	15.00	CP	287.02		629792.926	26912536.528	714.783	$4,222	01/01/1965	53	75	21	$1,187	$6,889	1	1	0.0	0.0	1.0	2.0	1.0	2
6274	Stormwater Sewer	STMH_6651 - STMH_6652	N/A	15.00	PVC	15.02		630079.945	26912537.357	714.186	$28,415	01/01/1965	53	75	21	$7,990	$45,636	1	1	0.0	0.0	1.0	1.0	1.0	1
6275	Stormwater Sewer	STMH_6654 - STMH_6655	N/A	18.00	CP	158.09		629794.108	26912694.613	712.988	$27,756	01/01/1965	53	75	21	$7,805	$44,578	1	1	0.0	0.0	1.0	2.0	1.0	2
6276	Stormwater Sewer	STMH_6655 - STMH_6656	N/A	18.00	CP	280.36		629808.139	26912974.625	709.365	$11,074	01/01/1965	53	75	21	$3,114	$17,786	1	1	0.0	0.0	1.0	2.0	1.0	2
6277	Stormwater Sewer	STMH_6656 - STMH_11812	N/A	18.00	CP	111.86		629818.910	26913085.964	0.000	$4,802	01/01/1965	53	75	21	$1,350	$7,495	1	1	0.0	0.0	1.0	2.0	1.0	2
6278	Stormwater Sewer	STMH_6649 - STMH_6650	N/A	15.00	PVC	299.76		630063.209	26912198.349	716.872	$38,608	01/01/1995	23	75	51	$26,309	$48,342	1	1	0.0	0.0	1.0	1.0	1.0	1
6279	Stormwater Sewer	STMH_6650 - STMH_6651	N/A	15.00	PVC	324.44		630080.264	26912522.340	713.594	$1,337	01/01/1995	23	75	51	$911	$2,238	1	1	0.0	0.0	1.0	1.0	1.0	1
6280	Stormwater Sewer	STMH_6622 - STMH_6623	N/A	12.00	PVC	189.62		631069.583	26911671.239	722.514	$18,692	01/01/1997	21	75	53	$13,237	$23,569	1	1	0.0	0.0	1.0	1.0	1.0	1
6281	Stormwater Sewer	STMH_6623 - STMH_6624	N/A	12.00	PVC	162.54		631075.526	26911833.672	721.263	$29,335	01/01/1997	21	75	53	$20,774	$34,066	1	1	0.0	0.0	1.0	1.0	1.0	1
6282	Stormwater Sewer	STMH_7810 - STMH_8165	N/A	15.00	RCP	235.40		636741.222	26914191.761	612.714	$14,011	01/01/1975	43	75	31	$5,809	$17,666	1	1	0.0	0.0	1.0	3.0	1.0	3
6283	Stormwater Sewer	STMH_8165 - STMH_8164	N/A	15.00	RCP	250.68		636819.004	26913953.457	612.479	$22,035	01/01/1975	43	75	31	$9,135	$23,620	1	1	0.0	0.0	1.0	3.0	1.0	3
6284	Stormwater Sewer	STMH_7830 - STMH_7830A	N/A	15.00	RCP	281.58		636453.631	26914948.539	612.678	$4,924	01/01/1975	43	75	31	$2,041	$7,411	1	1	0.0	0.0	1.0	2.0	1.0	2
6285	Stormwater Sewer	STMH_7831 - STMH_7830	N/A	15.00	RCP	49.74		636707.507	26915070.325	611.514	$8,314	01/01/1975	43	75	31	$3,447	$8,887	1	1	0.0	0.0	1.0	2.0	1.0	2
6286	Stormwater Sewer	STMH_8147 - STMH_7831	N/A	15.00	RCP	116.38		636752.471	26915091.592	610.388	$27,993	01/01/1975	43	75	31	$11,606	$29,776	1	1	0.0	0.0	1.0	2.0	1.0	2
6287	Stormwater Sewer	STMH_7566 - STMH_7567	N/A	18.00	RCP	251.03		630428.292	26918426.604	631.621	$14,460	01/01/2010	8	75	66	$12,748	$15,431	1	1	0.0	0.0	1.0	1.0	1.0	1
6288	Stormwater Sewer	STMH_7564 - STMH_7555	N/A	12.00	VCP	331.31		631238.951	26917064.709	630.464	$20,813	01/01/1939	79	75	0	$0	$46,430	1	1	0.0	0.0	1.0	1.0	1.0	1
6289	Stormwater Sewer	STMH_6404 - STMH_6403	N/A	18.00	RCP	367.69		625703.874	26908948.380	699.315	$11,059	01/01/2009	9	75	65	$9,602	$12,650	1	1	0.0	0.0	1.0	1.0	1.0	1
6290	Stormwater Sewer	STMH_6403 - STMH_6402	N/A	18.00	RCP	194.76		625695.328	26908753.804	700.532	$51,109	01/01/2009	9	75	65	$44,376	$58,463	1	1	0.0	0.0	1.0	2.0	1.0	2
6291	Stormwater Sewer	STMH_6402 - STMH_6401	N/A	18.00	RCP	249.40		625687.723	26908507.561	698.806	$27,072	01/01/2009	9	75	65	$23,505	$30,967	1	1	0.0	0.0	1.0	2.0	1.0	2
6292	Stormwater Sewer	STMH_7010 - STMH_7011	N/A	30.00	CP	76.50		636787.267	26909203.696	610.548	$38,997	01/01/2005	13	75	61	$31,778	$45,286	1	1	0.0	0.0	1.0	2.0	1.0	2
6293	Stormwater Sewer	STMH_7011 - STMH_7013	N/A	30.00	CP	209.66		636744.996	26909409.050	611.590	$19,678	01/01/2005	13	75	61	$16,035	$22,852	1	1	0.0	0.0	1.0	2.0	1.0	2
6294	Stormwater Sewer	STMH_7013 - STMH_7014	N/A	30.00	CP	105.80		636757.056	26909514.156	610.351	$9,646	01/01/2005	13	75	61	$7,860	$11,218	1	1	0.0	0.0	1.0	2.0	1.0	2
6295	Stormwater Sewer	STMH_7014 - STOF_128	N/A	30.00	CP	52.42		636721.396	26909552.580	0.000	$24,971	01/01/2005	13	75	61	$20,348	$29,043	1	1	0.0	0.0	1.0	2.0	1.0	2
6296	Stormwater Sewer	STMH_7015 - STOF_127	N/A	30.00	RCP	135.71		636723.584	26909735.744	0.000	$15,405	01/01/2005	13	75	61	$12,553	$17,916	1	1	0.0	0.0	1.0	2.0	1.0	2
6297	Stormwater Sewer	STMH_7017 - STMH_7016	N/A	30.00	RCP	153.03		636892.363	26909875.944	610.919	$36,234	01/01/2005	13	75	61	$29,527	$41,033	1	1	0.0	0.0	1.0	2.0	1.0	2
6298	Stormwater Sewer	STMH_7016 - STMH_7015	N/A	30.00	RCP	83.72		636828.892	26909821.350	610.344	$28,158	01/01/2005	13	75	61	$22,946	$32,749	1	1	0.0	0.0	1.0	2.0	1.0	2
6299	Stormwater Sewer	STMH_7020 - STMH_7019	N/A	12.00	CP	134.94		637432.196	26909894.583	607.446	$10,460	01/01/2005	13	75	61	$8,523	$15,743	1	1	0.0	0.0	1.0	2.0	1.0	2
6300	Stormwater Sewer	STMH_7019 - STMH_7018	N/A	30.00	RCP	156.00		637276.209	26909896.861	609.861	$16,868	01/01/2005	13	75	61	$13,745	$19,567	1	1	0.0	0.0	1.0	2.0	1.0	2
6301	Stormwater Sewer	STMH_7018 - STMH_7017	N/A	24.00	RCP	239.96		637037.765	26909923.772	611.813	$28,705	01/01/2005	13	75	61	$23,391	$33,385	1	1	0.0	0.0	1.0	2.0	1.0	2
6302	Stormwater Sewer	STMH_7562 - STOF_102	N/A	36.00	CP	149.88	29"x45" HE	630126.740	26916475.854	0.000	$20,813	01/01/2007	11	75	63	$17,515	$46,430	1	1	0.0	0.0	1.0	3.0	1.0	3
6303	Stormwater Sewer	STMH_7568 - STOF_103	N/A	12.00	CP	55.63		630153.967	26917044.023	0.000	$13,297	01/01/2015	3	75	71	$12,609	$20,296	1	1	0.0	0.0	1.0	1.0	1.0	1
6304	Stormwater Sewer	STMH_7569 - STMH_7570	N/A	12.00	RCP	139.97		630268.926	26917542.315	632.364	$9,881	01/01/1977	41	75	33	$4,360	$15,082	1	1	0.0	0.0	1.0	1.0	1.0	1
6305	Stormwater Sewer	STMH_7570 - STMH_7571	N/A	12.00	RCP	104.02		630274.968	26917646.155	632.839	$11,041	01/01/1977	41	75	33	$4,872	$16,617	1	1	0.0	0.0	1.0	1.0	1.0	1
6306	Stormwater Sewer	STMH_7571 - STMH_7572	N/A	15.00	RCP	111.52		630277.213	26917757.656	632.416	$23,567	01/01/1977	41	75	33	$10,400	$34,378	1	1	0.0	0.0	1.0	1.0	1.0	1
6307	Stormwater Sewer	STMH_7572 - STMH_7573	N/A	18.00	RCP	216.22		630286.808	26917973.658	631.720	$57,693	01/01/1977	41	75	33	$25,460	$81,533	1	1	0.0	0.0	1.0	1.0	1.0	1
6308	Stormwater Sewer	STMH_7573 - STMH_8301	N/A	24.00	RCP	476.80		630304.188	26918450.143	632.352	$7,313	01/01/1977	41	75	33	$3,227	$7,804	1	1	0.0	0.0	1.0	1.0	1.0	1
6309	Stormwater Sewer	STMH_8301 - STMH_8302	N/A	27.00	RCP	176.21		630311.918	26918626.179	632.145	$17,221	01/01/1977	41	75	33	$7,599	$26,513	1	1	0.0	0.0	1.0	1.0	1.0	1
6310	Stormwater Sewer	STMH_8302 - STMH_8303	N/A	27.00	RCP	123.89		630315.308	26918750.025	631.892	$22,837	01/01/1977	41	75	33	$10,078	$35,159	1	1	0.0	0.0	1.0	1.0	1.0	1
6311	Stormwater Sewer	STMH_8303 - STMH_8304	N/A	27.00	RCP	164.30		630321.973	26918914.185	630.999	$24,744	01/01/1977	41	75	33	$10,919	$38,095	1	1	0.0	0.0	1.0	1.0	1.0	1
6312	Stormwater Sewer	STMH_8304 - STMH_8305	N/A	27.00	RCP	178.01		630329.723	26919092.029	631.396	$48,726	01/01/1977	41	75	33	$21,503	$75,017	1	1	0.0	0.0	1.0	1.0	1.0	1
6313	Stormwater Sewer	STMH_8305 - STMH_8306	N/A	27.00	RCP	350.55		630342.596	26919442.336	630.194	$46,430	01/01/1977	41	75	33	$20,490	$71,482	1	1	0.0	0.0	1.0	1.0	1.0	1
6314	Stormwater Sewer	STMH_8306 - STMH_8309	N/A	27.00	RCP	334.03		630356.574	26919776.069	627.305	$51,936	01/01/1977	41	75	33	$22,920	$79,959	1	1	0.0	0.0	1.0	1.0	1.0	1
6315	Stormwater Sewer	STMH_8309 - STMH_8310	N/A	27.00	RCP	373.64		630368.768	26920149.511	620.154	$42,989	01/01/1977	41	75	33	$18,971	$66,184	1	1	0.0	0.0	1.0	3.0	1.0	3
6316	Stormwater Sewer	STMH_8310 - STMH_8311	N/A	27.00	RCP	309.27		630383.866	26920458.412	615.893	$51,990	01/01/1977	41	75	33	$22,943	$80,042	1	1	0.0	0.0	1.0	3.0	1.0	3
6317	Stormwater Sewer	STMH_8311 - STMH_8312	N/A	27.00	RCP	374.03		630398.097	26920832.168	610.575	$43,504	01/01/1977	41	75	33	$19,198	$66,644	1	1	0.0	0.0	1.0	3.0	1.0	3
6318	Stormwater Sewer	STMH_7522B - STCB_12821	N/A	24.00	RCP	48.24		630827.847	26914448.355	0.000	$20,535	01/01/1990	28	75	46	$12,624	$27,106	1	1	0.0	0.0	1.0	1.0	1.0	1
6319	Stormwater Sewer	STCB_12821 - STCB_12823	N/A	24.00	RCP	127.74		630831.247	26914576.051	0.000	$23,784	01/01/1990	28	75	46	$14,621	$28,844	1	1	0.0	0.0	1.0	1.0	1.0	1
6320	Stormwater Sewer	STMH_7994 - STMH_7993	N/A	48.00	RCP	197.78		634919.958	26913856.029	615.101	$55,069	01/01/1965	53	75	21	$15,485	$80,983	1	1	0.0	0.0	1.0	5.0	1.0	5
6321	Stormwater Sewer	STMH_7993 - STMH_7992	N/A	48.00	RCP	265.88		635158.969	26913972.504	613.881	$26,107	01/01/1965	53	75	21	$7,341	$61,707	1	1	0.0	0.0	1.0	5.0	1.0	5
6322	Stormwater Sewer	STMH_8014 - STMH_8015	N/A	12.00	RCP	320.84		634580.588	26914823.373	613.127	$35,833	01/01/2003	15	75	59	$28,243	$41,141	1	1	0.0	0.0	1.0	1.0	1.0	1
6323	Stormwater Sewer	STMH_8015 - STMH_8016	N/A	12.00	RCP	265.43		634460.719	26915060.191	613.998	$35,402	01/01/2003	15	75	59	$27,903	$40,647	1	1	0.0	0.0	1.0	1.0	1.0	1
6324	Stormwater Sewer	STMH_8016 - STMH_8018	N/A	12.00	RCP	262.24		634344.165	26915295.103	612.392	$31,167	01/01/2003	15	75	59	$24,565	$35,784	1	1	0.0	0.0	1.0	1.0	1.0	1
6325	Stormwater Sewer	STMH_7872 - STMH_7874	N/A	18.00	RCP	88.87		635629.105	26914528.405	612.943	$8,661	01/01/1974	44	75	30	$3,475	$9,284	1	1	0.0	0.0	1.0	2.0	1.0	2
6326	Stormwater Sewer	STMH_7876 - STCB_13599	N/A	18.00	RCP	110.71		635497.825	26914463.183	0.000	$10,462	01/01/1974	44	75	30	$4,198	$15,010	1	1	0.0	0.0	1.0	2.0	1.0	2
6327	Stormwater Sewer	STCB_13599 - STMH_7877	N/A	18.00	RCP	52.56		635450.647	26914440.022	611.816	$3,205	01/01/1974	44	75	30	$1,286	$3,717	1	1	0.0	0.0	1.0	2.0	1.0	2
6328	Stormwater Sewer	STMH_7808 - STMH_7807	N/A	12.00	VCP	101.78		636530.940	26914014.284	612.376	$12,151	01/01/1939	79	75	0	$0	$27,106	1	1	0.0	0.0	1.0	2.0	1.0	2
6329	Stormwater Sewer	STMH_7678 - STMH_7677	N/A	48.00	RCP	23.37		633219.735	26915332.484	627.191	$80,826	01/01/1949	69	75	5	$5,474	$140,976	1	1	0.0	0.0	1.0	5.0	1.0	5
6330	Stormwater Sewer	STCB_11165 - STCB_11167	N/A	24.00	RCP	72.16		633858.969	26907669.030	0.000	$4,726	01/01/1968	50	75	24	$1,518	$7,213	1	1	0.0	0.0	1.0	3.0	1.0	3
6331	Stormwater Sewer	STMH_6112 - STMH_6113	N/A	12.00	CP	20.54		631785.745	26904267.563	662.775	$6,039	01/01/1948	70	75	4	$328	$12,154	1	1	0.0	0.0	1.0	1.0	1.0	1
6332	Stormwater Sewer	STMH_7518 - STMH_7521	N/A	21.00	RCP	323.86		631327.987	26913800.156	657.396	$34,561	01/01/1948	70	75	4	$1,878	$64,064	1	1	0.0	0.0	1.0	1.0	1.0	1
6333	Stormwater Sewer	STMH_8457 - STMH_8456	N/A	27.00	VCP	14.44		634180.781	26921973.387	0.000	$2,226	01/01/1939	79	75	0	$0	$3,798	1	1	0.0	0.0	1.0	3.0	1.0	3
6334	Stormwater Sewer	STMH_8041B - STMH_8401	N/A	48.00	RCP	385.55		634097.015	26918900.820	0.000	$11,997	01/01/1949	69	75	5	$812	$15,127	1	1	0.0	0.0	1.0	4.0	1.0	4
6335	Stormwater Sewer	STMH_6031 - STMH_6030	N/A	48.00	RCP	72.26		634112.756	26915225.094	0.000	$1,582	01/01/1949	69	75	5	$107	$1,688	1	1	0.0	0.0	1.0	5.0	1.0	5
6336	Stormwater Sewer	STMH_8027 - STMH_8028	N/A	36.00	VCP	191.66		634120.592	26915198.222	614.549	$1,508	01/01/1939	79	75	0	$0	$1,725	1	1	0.0	0.0	1.0	2.0	1.0	2
6337	Stormwater Sewer	STMH_8030 - STMH_8029	N/A	48.00	RCP	32.29		634136.044	26915202.727	614.425	$43,846	01/01/1949	69	75	5	$2,969	$50,155	1	1	0.0	0.0	1.0	5.0	1.0	5
6338	Stormwater Sewer	STMH_8018 - STMH_8029A	N/A	12.00	RCP	225.05		634142.160	26915195.897	612.392	$41,633	01/01/2003	15	75	59	$32,815	$48,294	1	1	0.0	0.0	1.0	5.0	1.0	5
6339	Stormwater Sewer	STMH_8019 - STMH_8020	N/A	12.00	RCP	333.07		634203.773	26914930.255	614.395	$12,385	01/01/2004	14	75	60	$9,927	$14,367	1	1	0.0	0.0	1.0	1.0	1.0	1
6340	Stormwater Sewer	STMH_8020 - STMH_8022	N/A	12.00	RCP	99.08		634158.885	26915018.587	614.822	$6,165	01/01/2004	14	75	60	$4,941	$7,079	1	1	0.0	0.0	1.0	1.0	1.0	1
6341	Stormwater Sewer	STMH_8022 - STMH_8027	N/A	12.00	RCP	45.67		634114.804	26915006.650	615.692	$8,693	01/01/2004	14	75	60	$6,967	$9,808	1	1	0.0	0.0	1.0	1.0	1.0	1
6342	Stormwater Sewer	STMH_8027A - STMH_8027	N/A	18.00	RCP	10.85		634114.804	26915006.650	615.692	$3,460	01/01/2003	15	75	59	$2,727	$6,036	1	1	0.0	0.0	1.0	2.0	1.0	2
6343	Stormwater Sewer	STMH_7666 - STMH_7665	N/A	12.00	RCP	428.91		634091.616	26915003.542	615.533	$29,555	01/01/2003	15	75	59	$23,295	$34,283	1	1	0.0	0.0	1.0	1.0	1.0	1
6344	Stormwater Sewer	STMH_7665 - STMH_8027A	N/A	18.00	RCP	15.72		634106.773	26914999.358	615.727	$53,614	01/01/2003	15	75	59	$42,258	$62,192	1	1	0.0	0.0	1.0	2.0	1.0	2
6345	Stormwater Sewer	STMH_8025 - STMH_8027	N/A	36.00	VCP	286.85		634114.804	26915006.650	615.692	$2,110	01/01/1939	79	75	0	$0	$2,414	1	1	0.0	0.0	1.0	2.0	1.0	2
6346	Stormwater Sewer	STMH_8017 - STMH_8018	N/A	12.00	RCP	230.86		634344.165	26915295.103	612.392	$30,382	01/01/2003	15	75	59	$23,947	$34,883	1	1	0.0	0.0	1.0	5.0	1.0	5
6347	Stormwater Sewer	STMH_7100 - STMH_7101	N/A	12.00	RCP	291.15		637192.656	26911232.954	605.218	$21,941	01/01/1995	23	75	51	$14,951	$32,006	1	1	0.0	0.0	1.0	2.0	1.0	2
6348	Stormwater Sewer	STMH_7101 - STMH_7102	N/A	18.00	RCP	201.29		637197.227	26911434.197	606.010	$43,526	01/01/1970	48	75	26	$15,143	$67,011	1	1	0.0	0.0	1.0	2.0	1.0	2
6349	Stormwater Sewer	STMH_2017 - STMH_6182	N/A	18.00	RCP	27.01		636592.942	26912339.561	0.000	$29,760	01/01/1977	41	75	33	$13,133	$36,922	1	1	0.0	0.0	1.0	2.0	1.0	2
6350	Stormwater Sewer	STCB_13637 - STCB_13634	N/A	48.00	RCP	22.78		636740.149	26917146.200	0.000	$13,564	01/01/2010	8	75	66	$11,958	$21,784	1	1	0.0	0.0	1.0	5.0	1.0	5
6351	Stormwater Sewer	STCB_13634 - STOF_143	N/A	48.00	RCP	43.41		636778.059	26917167.359	0.000	$6,425	01/01/2010	8	75	66	$5,664	$7,108	1	1	0.0	0.0	1.0	5.0	1.0	5
6352	Stormwater Sewer	STMH_6844 - STMH_6842	N/A	42.00	RCP	101.64		635690.579	26910377.826	608.873	$12,335	01/01/1970	48	75	26	$4,291	$18,990	1	1	0.0	0.0	1.0	3.0	1.0	3
6353	Stormwater Sewer	STMH_7604 - STMH_7997	N/A	48.00	RCP	260.94		634277.449	26913543.077	623.608	$4,179	01/01/1965	53	75	21	$1,175	$5,279	1	1	0.0	0.0	1.0	5.0	1.0	5
6354	Stormwater Sewer	STMH_7618 - STMH_8006	N/A	28.00	RCP	82.10		634106.082	26913789.874	622.185	$12,784	01/01/2003	15	75	59	$10,076	$14,766	1	1	0.0	0.0	1.0	3.0	1.0	3
6355	Stormwater Sewer	STMH_8006 - STMH_8005	N/A	18.00	RCP	352.33		634424.234	26913941.327	618.365	$2,405	01/01/1991	27	75	47	$1,510	$3,398	1	1	0.0	0.0	1.0	4.0	1.0	4
6356	Stormwater Sewer	STMH_7619 - STMH_7618	N/A	15.00	RCP	99.10		634034.743	26913749.236	622.979	$47,891	01/01/2003	15	75	59	$37,747	$55,316	1	1	0.0	0.0	1.0	3.0	1.0	3
6357	Stormwater Sewer	STMH_8446 - STMH_8445	N/A	12.00	CP	120.84		633449.039	26923195.134	592.921	$39,407	01/01/1990	28	75	46	$24,225	$48,572	1	1	0.0	0.0	1.0	2.0	1.0	2
6358	Stormwater Sewer	STMH_8445 - STMH_8444	N/A	12.00	CP	124.96		633478.053	26923316.675	589.873	$13,897	01/01/1990	28	75	46	$8,543	$17,522	1	1	0.0	0.0	1.0	2.0	1.0	2
6359	Stormwater Sewer	STMH_8444 - STMH_8443	N/A	12.00	CP	32.43		633507.208	26923330.872	589.769	$14,370	01/01/1990	28	75	46	$8,834	$18,119	1	1	0.0	0.0	1.0	2.0	1.0	2
6360	Stormwater Sewer	STMH_8443 - STMH_061	N/A	12.00	CP	287.00		633723.791	26923196.810	0.000	$3,729	01/01/1990	28	75	46	$2,292	$4,702	1	1	0.0	0.0	1.0	2.0	1.0	2
6361	Stormwater Sewer	STMH_8442 - STOF_060	N/A	30.00	CP	93.58		633720.073	26923172.647	0.000	$33,005	01/01/1992	26	75	48	$21,170	$41,614	1	1	0.0	0.0	1.0	1.0	1.0	1
6362	Stormwater Sewer	STMH_8467A - STMH_8467B	N/A	30.00	CP	169.99		633635.565	26923132.455	590.769	$47,952	01/01/1992	26	75	48	$30,757	$55,625	1	1	0.0	0.0	1.0	3.0	1.0	3
6363	Stormwater Sewer	STMH_8470C - STMH_8470B	N/A	12.00	RCP	66.88		633472.864	26923569.405	589.101	$40,056	01/01/1983	35	75	39	$20,883	$50,506	1	1	0.0	0.0	1.0	3.0	1.0	3
6364	Stormwater Sewer	STMH_8439 - STMH_8440	N/A	12.00	RCP	81.83		633438.245	26923643.551	596.951	$23,435	01/01/1983	35	75	39	$12,217	$32,034	1	1	0.0	0.0	1.0	1.0	1.0	1
6365	Stormwater Sewer	STMH_8440 - STMH_8437	N/A	15.00	RCP	215.00		633628.583	26923743.524	601.978	$7,088	01/01/1983	35	75	39	$3,695	$8,187	1	1	0.0	0.0	1.0	1.0	1.0	1
6366	Stormwater Sewer	STMH_8470 - STOF_062	N/A	18.00	RCP	324.20		633932.447	26923856.527	0.000	$7,023	01/01/1983	35	75	39	$3,661	$9,698	1	1	0.0	0.0	1.0	3.0	1.0	3
6367	Stormwater Sewer	STMH_8469 - STCB_14916	N/A	12.00	PVC	383.62		632825.801	26924174.035	0.000	$38,579	01/01/2006	12	75	62	$31,952	$51,547	1	1	0.0	0.0	1.0	1.0	1.0	1
6368	Stormwater Sewer	STCB_13614 - STCB_13613	N/A	12.00	PVC	25.64		632842.648	26924193.360	0.000	$12,243	01/01/2006	12	75	62	$10,140	$13,545	1	1	0.0	0.0	1.0	1.0	1.0	1
6369	Stormwater Sewer	STCB_14915 - STOF_115	N/A	12.00	PVC	48.54		632869.906	26924233.521	0.000	$3,130	01/01/2006	12	75	62	$2,592	$6,051	1	1	0.0	0.0	1.0	1.0	1.0	1
6370	Stormwater Sewer	STMH_7560 - STMH_7549	N/A	18.00	CP	304.23		630835.214	26915708.225	631.105	$101,697	01/01/1976	42	75	32	$43,520	$116,801	1	1	0.0	0.0	1.0	1.0	1.0	1
6371	Stormwater Sewer	STMH_7549 - STCB_12896	N/A	18.00	CP	170.51		631005.719	26915709.920	0.000	$1,734	01/01/1976	42	75	32	$742	$2,014	1	1	0.0	0.0	1.0	1.0	1.0	1
6372	Stormwater Sewer	STCB_12896 - STMH_7548	N/A	18.00	CP	198.60		631204.280	26915706.043	630.747	$12,387	01/01/1976	42	75	32	$5,300	$17,681	1	1	0.0	0.0	1.0	1.0	1.0	1

CITY OF SAULT STE. MARIE, MICHIGAN

Summary

id	Equipment Description	Asset ID	Construction Drawings Sheet Reference	Capacity or Size	Material	Length	Comment	Northing State Plane Ordinate	Easting State Plane Ordinate	Elevation	Original Cost	Year Installed (01/01/YYYY)	Age	Expected useful life (years)	Remaining Useful Life (years)	Depreciated Value	Replacement Cost	Average number of units in service	Total Number of units	Redundancy (Number)	Redundancy (percent)	Redundancy Score (R) (Reduces (C))	Criticality (C) (see back-up sheets)	Probability of Failure (P) (see back-up sheets)	Business Risk (BRE=PxCxR)
6373	Stormwater Sewer	STMH_7548 - STCB_12897	N/A	18.00	CP	180.15		631384.428	26915704.986	0.000	$18,586	01/01/1976	42	75	32	$7,953	$27,112	1	1	0.0	0.0	1.0	2.0	1.0	2
6374	Stormwater Sewer	STCB_12897 - STMH_7547	N/A	18.00	CP	105.87		631489.115	26915689.191	630.792	$15,868	01/01/1976	42	75	32	$6,790	$17,043	1	1	0.0	0.0	1.0	2.0	1.0	2
6375	Stormwater Sewer	STMH_7517 - STMH_7518	N/A	8.00	PVC	170.29		631226.560	26913492.591	0.000	$22,704	01/01/1948	70	75	4	$1,234	$24,398	1	1	0.0	0.0	1.0	1.0	1.0	1
6376	Stormwater Sewer	STMH_7521 - STMH_7639	N/A	21.00	RCP	144.91		631472.866	26913796.972	650.784	$18,414	01/01/1948	70	75	4	$1,000	$24,307	1	1	0.0	0.0	1.0	2.0	1.0	2
6377	Stormwater Sewer	STMH_7722 - STMH_7721	N/A	12.00	VCP	309.54	245' S of Manhole Broken or Crushed	632196.277	26917005.994	628.501	$22,832	01/01/1939	79	75	0	$0	$28,788	1	1	0.0	0.0	1.0	1.0	5.0	5
6378	Stormwater Sewer	STMH_7555 - STMH_7554	N/A	12.00	CP	20.05		631544.943	26917041.821	630.865	$14,391	01/01/1948	70	75	4	$782	$21,660	1	1	0.0	0.0	1.0	5.0	1.0	5
6379	Stormwater Sewer	STMH_7554 - STMH_7575	N/A	60.00	RCP	668.15		631590.940	26917708.386	0.000	$1,303	01/01/1950	68	75	6	$105	$2,907	1	1	0.0	0.0	1.0	5.0	1.0	5
6380	Stormwater Sewer	STMH_7930 - STOF_045	N/A	36.00	RCP	64.68		635341.528	26917400.370	0.000	$27,051	01/01/1949	69	75	5	$1,832	$28,997	1	1	0.0	0.0	1.0	3.0	1.0	3
6381	Stormwater Sewer	STMH_7927 - STMH_7928	N/A	30.00	RCP	388.94		635536.587	26917025.182	606.210	$10,692	01/01/1949	69	75	5	$724	$24,341	1	1	0.0	0.0	1.0	3.0	1.0	3
6382	Stormwater Sewer	STMH_7926 - STMH_7927	N/A	24.00	RCP	62.21		635696.734	26916670.747	608.280	$36,560	01/01/1949	69	75	5	$2,476	$83,232	1	1	0.0	0.0	1.0	2.0	1.0	2
6383	Stormwater Sewer	STMH_7921 - STMH_7922	N/A	24.00	RCP	31.43		635960.281	26916140.240	608.840	$10,271	01/01/1949	69	75	5	$695	$19,300	1	1	0.0	0.0	1.0	2.0	1.0	2
6384	Stormwater Sewer	STMH_7922 - STMH_7923	N/A	24.00	RCP	112.86		635901.529	26916236.606	608.460	$17,396	01/01/1949	69	75	5	$1,178	$41,119	1	1	0.0	0.0	1.0	2.0	1.0	2
6385	Stormwater Sewer	STMH_7923 - STMH_7924	N/A	24.00	RCP	56.99		635871.701	26916285.165	608.430	$7,847	01/01/1949	69	75	5	$531	$14,746	1	1	0.0	0.0	1.0	2.0	1.0	2
6386	Stormwater Sewer	STMH_7924 - STMH_7925	N/A	24.00	RCP	86.23		635836.259	26916363.779	608.080	$25,023	01/01/1949	69	75	5	$1,694	$47,021	1	1	0.0	0.0	1.0	2.0	1.0	2
6387	Stormwater Sewer	STMH_7925 - STMH_7926	N/A	24.00	RCP	274.98		635722.392	26916614.072	607.440	$5,661	01/01/1949	69	75	5	$383	$10,638	1	1	0.0	0.0	1.0	2.0	1.0	2
6388	Stormwater Sewer	STMH_7934 - STMH_7936	N/A	18.00	CP	45.33		635666.211	26915962.660	610.600	$23,135	01/01/1949	69	75	5	$1,566	$46,563	1	1	0.0	0.0	1.0	1.0	1.0	1
6389	Stormwater Sewer	STMH_7936 - STMH_7935	N/A	18.00	CP	51.06		635712.163	26915984.927	610.240	$41,834	01/01/1949	69	75	5	$2,833	$44,843	1	1	0.0	0.0	1.0	2.0	1.0	2
6390	Stormwater Sewer	STMH_7935 - STMH_7921	N/A	18.00	CP	292.85		635975.615	26916112.803	609.380	$4,034	01/01/1949	69	75	5	$273	$8,119	1	1	0.0	0.0	1.0	2.0	1.0	2
6391	Stormwater Sewer	STMH_8057 - STMH_7936	N/A	15.00	PVC	46.46		635666.211	26915962.660	610.600	$12,899	01/01/2016	2	75	72	$12,404	$22,498	1	1	0.0	0.0	1.0	3.0	1.0	3
6392	Stormwater Sewer	STMH_6406 - STMH_6405	N/A	12.00	RCP	309.33		625713.789	26909395.514	701.004	$48,434	01/01/2009	9	75	65	$42,053	$74,567	1	1	0.0	0.0	1.0	1.0	1.0	1
6393	Stormwater Sewer	STMH_6405 - STMH_6404	N/A	18.00	RCP	79.56		625712.922	26909315.957	700.641	$38,666	01/01/2009	9	75	65	$33,572	$44,853	1	1	0.0	0.0	1.0	1.0	1.0	1
6394	Stormwater Sewer	STMH_6538 - STMH_6537	N/A	18.00	RCP	183.38		628580.609	26913141.762	715.788	$29,680	01/01/1965	53	75	21	$8,346	$50,630	1	1	0.0	0.0	1.0	2.0	1.0	2
6395	Stormwater Sewer	STMH_8101 - STOF_058	N/A	48.00	CI	181.87		637868.853	26915847.665	0.000	$25,120	01/01/1939	79	75	0	$0	$51,915	1	1	0.0	0.0	1.0	5.0	1.0	5
6396	Stormwater Sewer	STMH_6849 - STMH_6848	N/A	12.00	RCP	46.98		635370.839	26911159.306	633.589	$7,625	01/01/2000	18	75	56	$5,704	$8,845	1	1	0.0	0.0	1.0	1.0	1.0	1
6397	Stormwater Sewer	STMH_6848 - STCB_12295	N/A	12.00	CP	229.91		635598.840	26911129.709	0.000	$6,343	01/01/1990	28	75	46	$3,899	$7,283	1	1	0.0	0.0	1.0	1.0	1.0	1
6398	Stormwater Sewer	STMH_6847 - STMH_6846	N/A	12.00	DIP	82.48		635742.490	26911144.978	610.827	$28,739	01/01/1991	27	75	47	$18,050	$35,637	1	1	0.0	0.0	1.0	1.0	1.0	1
6399	Stormwater Sewer	STMH_6865 - STMH_6863	N/A	12.00	VCP	158.39		634494.774	26911728.808	699.541	$33,003	01/01/1939	79	75	0	$0	$44,097	1	1	0.0	0.0	1.0	2.0	5.0	10
6400	Stormwater Sewer	STMH_6863 - STCB_12317	N/A	12.00	VCP	251.95		634746.621	26911721.728	0.000	$30,968	01/01/1939	79	75	0	$0	$42,333	1	1	0.0	0.0	1.0	2.0	5.0	10
6401	Stormwater Sewer	STMH_6862 - STMH_6861	N/A	12.00	VCP	279.37		635054.664	26911701.406	677.962	$16,377	01/01/1939	79	75	0	$0	$36,532	1	1	0.0	0.0	1.0	3.0	5.0	15
6402	Stormwater Sewer	STMH_6861 - STMH_6860	N/A	12.00	VCP	219.49		635274.115	26911697.134	662.790	$18,159	01/01/1939	79	75	0	$0	$40,508	1	1	0.0	0.0	1.0	3.0	5.0	15
6403	Stormwater Sewer	STMH_6860 - STMH_6860A	N/A	12.00	VCP	70.71		635338.542	26911726.277	658.787	$10,568	01/01/1939	79	75	0	$0	$23,576	1	1	0.0	0.0	1.0	3.0	4.0	12
6404	Stormwater Sewer	STMH_7969 - STOF_019	N/A	15.00	VCP	36.48		635603.338	26913030.797	0.000	$6,467	01/01/1950	68	75	6	$524	$7,502	1	1	0.0	0.0	1.0	3.0	1.0	3
6405	Stormwater Sewer	STMH_8001 - STMH_8005	N/A	18.00	RCP	163.23		634424.234	26913941.327	618.365	$17,507	01/01/1956	62	75	12	$2,820	$22,169	1	1	0.0	0.0	1.0	1.0	1.0	1
6406	Stormwater Sewer	STMH_7997 - STMH_7995	N/A	48.00	RCP	300.94		634547.937	26913674.990	619.395	$14,528	01/01/1965	53	75	21	$4,085	$25,954	1	1	0.0	0.0	1.0	5.0	1.0	5
6407	Stormwater Sewer	STMH_7995 - STMH_7994	N/A	48.00	RCP	215.96		634742.283	26913769.148	615.617	$76,740	01/01/1965	53	75	21	$21,579	$112,852	1	1	0.0	0.0	1.0	5.0	1.0	5
6408	Stormwater Sewer	STMH_7877 - STMH_7877A	N/A	21.00	RCP	90.97		635368.834	26914400.246	610.949	$3,127	01/01/1974	44	75	30	$1,254	$4,620	1	1	0.0	0.0	1.0	2.0	1.0	2
6409	Stormwater Sewer	STMH_7877A - STOF_028	N/A	36.00	CMP	19.92		635351.179	26914391.031	0.000	$10,586	01/01/1974	44	75	30	$4,247	$12,280	1	1	0.0	0.0	1.0	2.0	1.0	2
6410	Stormwater Sewer	STMH_8050 - STMH_8049	N/A	12.00	RCP	56.16		634777.210	26917823.479	609.269	$29,199	01/01/1998	20	75	54	$21,067	$56,680	1	1	0.0	0.0	1.0	1.0	1.0	1
6411	Stormwater Sewer	STMH_8515 - STMH_8516	N/A	36.00	CP	239.13		635398.805	26919763.145	593.441	$59,396	01/01/1939	79	75	0	$0	$123,035	1	1	0.0	0.0	1.0	5.0	1.0	5
6412	Stormwater Sewer	STMH_8516 - STOF_140	N/A	36.00	DIP	530.32		635873.714	26919999.160	0.000	$26,271	01/01/1939	79	75	0	$0	$56,730	1	1	0.0	0.0	1.0	5.0	1.0	5
6413	Stormwater Sewer	STMH_8509 - STMH_8514	N/A	48.00	RCP	710.53		635145.272	26919665.588	599.236	$25,670	01/01/1950	68	75	6	$2,080	$54,193	1	1	0.0	0.0	1.0	5.0	1.0	5
6414	Stormwater Sewer	STMH_8514 - STMH_8515	N/A	48.00	RCP	32.58		635176.299	26919675.543	598.862	$28,457	01/01/1950	68	75	6	$2,306	$57,152	1	1	0.0	0.0	1.0	3.0	1.0	3
6415	Stormwater Sewer	STMH_5612 - STOF_056	N/A	15.00	PVC	151.64		632762.789	26900588.427	0.000	$1,201	01/01/1986	32	75	42	$674	$1,394	1	1	0.0	0.0	1.0	1.0	1.0	1
6416	Stormwater Sewer	STMH_7625 - STMH_7626	N/A	12.00	PVC	121.41		633032.173	26913446.229	637.492	$38,896	01/01/2001	17	75	57	$29,620	$44,659	1	1	0.0	0.0	1.0	2.0	1.0	2
6417	Stormwater Sewer	STMH_7623 - STMH_7622	N/A	12.00	RCP	105.79		633267.663	26913438.330	633.835	$7,742	01/01/2003	15	75	59	$6,102	$17,420	1	1	0.0	0.0	1.0	2.0	1.0	2
6418	Stormwater Sewer	STMH_7622 - STMH_7621	N/A		RCP	124.74		633392.204	26913431.232	632.786	$13,223	01/01/2003	15	75	59	$10,422	$15,339	1	1	0.0	0.0	1.0	2.0	1.0	2
6419	Stormwater Sewer	STMH_7621 - STMH_7620	N/A	12.00	RCP	246.60		633614.020	26913538.972	630.265	$15,468	01/01/2003	15	75	59	$12,191	$17,963	1	1	0.0	0.0	1.0	3.0	1.0	3
6420	Stormwater Sewer	STMH_7620 - STMH_7619	N/A	15.00	RCP	371.25		633946.686	26913703.772	625.066	$30,825	01/01/2003	15	75	59	$24,296	$35,757	1	1	0.0	0.0	1.0	3.0	1.0	3
6421	Stormwater Sewer	STMH_STUB - STMH_7624	N/A	10.00	VCP	95.02		633160.459	26913320.940	0.000	$2,968	01/01/1939	79	75	0	$0	$3,443	1	1	0.0	0.0	1.0	2.0	1.0	2
6422	Stormwater Sewer	STMH_7624 - STMH_7623	N/A	9.00	VCP	120.97		633161.937	26913441.905	638.010	$15,177	01/01/1939	79	75	0	$0	$17,605	1	1	0.0	0.0	1.0	2.0	1.0	2
6423	Stormwater Sewer	STMH_7633 - STMH_7632	N/A	15.00	RCP	246.97		633403.979	26913759.522	629.030	$39,977	01/01/2003	15	75	59	$31,509	$80,291	1	1	0.0	0.0	1.0	1.0	1.0	1
6424	Stormwater Sewer	STMH_5613 - STMH_5614	N/A	8.00	PVC	9.68		632632.408	26901293.662	614.288	$43,189	01/01/2002	16	75	58	$33,465	$50,155	1	1	0.0	0.0	1.0	2.0	1.0	2
6425	Stormwater Sewer	STMH_5614 - STOF_057	N/A	8.00	PVC	61.34		632693.747	26901293.113	0.000	$17,882	01/01/2002	16	75	58	$13,856	$20,455	1	1	0.0	0.0	1.0	2.0	1.0	2
6426	Stormwater Sewer	STMH_7522A - STMH_7522	N/A	12.00	RCP	34.92		631449.077	26914421.228	631.010	$6,802	01/01/1988	30	75	44	$3,999	$8,249	1	1	0.0	0.0	1.0	1.0	1.0	1
6427	Stormwater Sewer	STMH_6708 - STMH_6707A	N/A	36.00	RCP	179.22		633924.399	26909914.313	692.467	$50,045	01/01/1962	56	75	18	$12,069	$81,763	1	1	0.0	0.0	1.0	3.0	1.0	3
6428	Stormwater Sewer	STMH_6711 - STMH_6883	N/A	15.00	RCP	75.01		634050.830	26912873.302	673.596	$21,152	01/01/1975	43	75	31	$8,769	$24,536	1	1	0.0	0.0	1.0	1.0	1.0	1
6429	Stormwater Sewer	STMH_7815 - STMH_7816	N/A	6.00	XXX	110.92		636503.367	26914423.092	612.771	$8,504	01/01/1950	68	75	6	$689	$16,549	1	1	0.0	0.0	1.0	3.0	1.0	3
6430	Stormwater Sewer	STMH_7564 - STMH_7555	N/A	12.00	VCP	320.20		631559.038	26917056.080	630.464	$37,404	01/01/1939	79	75	0	$0	$39,915	1	1	0.0	0.0	1.0	1.0	1.1	1.1
6432	Stormwater Sewer	STMH_7939 - STMH_7938	N/A	15.00	PVC	18.96		635421.760	26916539.398	607.600	$36,122	01/01/2015	3	75	71	$34,254	$38,721	1	1	0.0	0.0	1.0	1.0	1.0	1
6433	Stormwater Sewer	STMH_7906 - STMH_7907	N/A	15.00	PVC	54.45		635953.171	26916795.941	606.540	$2,448	01/01/2015	3	75	71	$2,321	$2,624	1	1	0.0	0.0	1.0	1.0	1.0	1
6434	Stormwater Sewer	STMH_7907 - STMH_7908	N/A	15.00	PVC	17.61		635960.479	26916811.963	606.815	$8,007	01/01/2015	3	75	71	$7,593	$8,490	1	1	0.0	0.0	1.0	1.0	1.0	1
6435	Stormwater Sewer	STMH_8140 - STMH_8139	N/A	12.00	PVC	56.59		637369.704	26914122.330	604.461	$18,009	01/01/2010	8	75	66	$15,876	$19,343	1	1	0.0	0.0	1.0	4.0	1.0	4
6436	Stormwater Sewer	STMH_8142 - STMH_8140	N/A	12.00	PVC	133.40		637321.357	26914092.919	604.684	$23,151	01/01/2010	8	75	66	$20,410	$86,470	1	1	0.0	0.0	1.0	4.0	1.0	4
6437	Stormwater Sewer	STMH_8137 - STMH_8138	N/A	18.00	RCP	51.88		637542.194	26914219.282	602.964	$39,961	01/01/1998	20	75	54	$28,831	$149,256	1	1	0.0	0.0	1.0	4.0	1.0	4
6438	Stormwater Sewer	STMH_7968 - STMH_7967	N/A	15.00	PVC	319.62		635101.077	26916383.905	608.910	$2,882	01/01/2016	2	75	72	$2,771	$5,435	1	1	0.0	0.0	1.0	1.0	1.0	1
6439	Stormwater Sewer	STMH_7835 - STMH_7834	N/A	15.00	PVC	232.05		636652.911	26915372.785	609.410	$43,192	01/01/2015	3	75	71	$40,959	$46,171	1	1	0.0	0.0	1.0	2.0	1.0	2
6440	Stormwater Sewer	STMH_7632 - STMH_7631	N/A	15.00	RCP	211.77		633615.716	26913755.613	628.535	$31,859	01/01/2003	15	75	59	$25,111	$36,799	1	1	0.0	0.0	1.0	1.0	1.0	1
6441	Stormwater Sewer	STMH_7631 - STMH_7618	N/A	15.00	RCP	419.08		634034.743	26913749.236	622.979	$27,319	01/01/2003	15	75	59	$21,532	$31,554	1	1	0.0	0.0	1.0	1.0	1.0	1
6442	Stormwater Sewer	STMH_7642 - STMH_7641	N/A	18.00	RCP	232.16		633631.697	26914103.432	626.051	$31,685	01/01/2003	15	75	59	$24,974	$36,244	1	1	0.0	0.0	1.0	1.0	1.0	1
6443	Stormwater Sewer	STMH_7641 - STMH_7640	N/A	18.00	RCP	408.57		634040.231	26914097.801	620.776	$34,127	01/01/2003	15	75	59	$26,898	$38,770	1	1	0.0	0.0	1.0	1.0	1.0	1
6444	Stormwater Sewer	STMH_7640 - STMH_8013	N/A	18.00	RCP	52.65		634092.073	26914106.963	620.250	$60,060	01/01/2003	15	75	59	$47,339	$68,232	1	1	0.0	0.0	1.0	3.0	1.0	3
6445	Stormwater Sewer	STMH_8013 - STMH_8012	N/A	18.00	RCP	171.50		634246.738	26914181.067	618.200	$40,105	01/01/2003	15	75	59	$31,610	$46,522	1	1	0.0	0.0	1.0	3.0	1.0	3
6446	Stormwater Sewer	STMH_7648 - STMH_7647	N/A	18.00	RCP	410.36		634050.367	26914433.642	618.518	$29,209	01/01/2003	15	75	59	$23,022	$33,738	1	1	0.0	0.0	1.0	1.0	1.0	1
6447	Stormwater Sewer	STMH_7647 - STMH_8023	N/A	18.00	RCP	75.63		634095.936	26914494.008	618.283	$57,040	01/01/2003	15	75	59	$44,958	$65,248	1	1	0.0	0.0	1.0	2.0	1.0	2
6448	Stormwater Sewer	STMH_8023 - STMH_8024	N/A	24.00	RCP	55.73		634104.864	26914549.015	618.014	$20,336	01/01/2003	15	75	59	$16,028	$40,843	1	1	0.0	0.0	1.0	2.0	1.0	2
6449	Stormwater Sewer	STMH_8024 - STMH_8025	N/A	36.00	VCP	170.89		634108.854	26914719.858	616.800	$34,136	01/01/1939	79	75	0	$0	$68,558	1	1	0.0	0.0	1.0	2.0	1.0	2
6450	Stormwater Sewer	STMH_7649 - STMH_7648	N/A	15.00	RCP	226.43		633640.022	26914437.238	624.566	$29,852	01/01/2003	15	75	59	$23,529	$34,480	1	1	0.0	0.0	1.0	1.0	1.0	1
6451	Stormwater Sewer	STMH_7643 - STMH_7642	N/A	15.00	RCP	227.95		633399.542	26914104.271	627.756	$34,978	01/01/2003	15	75	59	$27,569	$79,395	1	1	0.0	0.0	1.0	1.0	1.0	1
6452	Stormwater Sewer	STMH_7650 - STMH_7649	N/A	15.00	RCP	231.41		633413.667	26914442.997	626.058	$74,452	01/01/2003	15	75	59	$58,683	$129,859	1	1	0.0	0.0	1.0	1.0	1.0	1
6453	Stormwater Sewer	STMH_7668 - STMH_7667	N/A	12.00	RCP	224.59		633426.447	26915017.890	625.263	$21,023	01/01/2003	15	75	59	$16,570	$91,100	1	1	0.0	0.0	1.0	1.0	1.0	1
6454	Stormwater Sewer	STMH_7667 - STMH_7666	N/A	12.00	RCP	236.44		633662.870	26915015.327	621.665	$28,074	01/01/2003	15	75	59	$22,127	$32,566	1	1	0.0	0.0	1.0	1.0	1.0	1
6455	Stormwater Sewer	STMH_7658 - STMH_7657	N/A	15.00	RCP	221.42		633423.672	26914724.023	625.560	$63,924	01/01/2003	15	75	59	$50,384	$111,495	1	1	0.0	0.0	1.0	1.0	1.0	1
6456	Stormwater Sewer	STMH_7657 - STMH_7656	N/A	15.00	RCP	230.14		633653.800	26914722.017	623.358	$28,563	01/01/2003	15	75	59	$22,513	$32,991	1	1	0.0	0.0	1.0	1.0	1.0	1
6457	Stormwater Sewer	STMH_7656 - STMH_7655	N/A	18.00	RCP	401.67		634055.330	26914711.554	616.599	$29,688	01/01/2003	15	75	59	$23,400	$34,290	1	1	0.0	0.0	1.0	1.0	1.0	1
6458	Stormwater Sewer	STMH_7655 - STMH_8026	N/A	18.00	RCP	50.07		634100.723	26914732.676	617.282	$59,045	01/01/2003	15	75	59	$46,539	$67,078	1	1	0.0	0.0	1.0	2.0	1.0	2
6459	Stormwater Sewer	STMH_8026 - STMH_8025	N/A	18.00	RCP	15.18		634108.854	26914719.858	616.800	$22,808	01/01/2003	15	75	59	$17,977	$45,807	1	1	0.0	0.0	1.0	2.0	1.0	2
6460	Stormwater Sewer	STMH_STUB - STMH_7522A	N/A	12.00	RCP	53.21		631445.805	26914386.467	0.000	$6,082	01/01/1988	30	75	44	$3,576	$13,684	1	1	0.0	0.0	1.0	1.0	1.0	1
6461	Stormwater Sewer	STMH_7522 - STMH_7523	N/A	21.00	RCP	147.31		631454.579	26914568.438	631.809	$3,666	01/01/1988	30	75	44	$2,155	$5,063	1	1	0.0	0.0	1.0	1.0	1.0	1
6462	Stormwater Sewer	STMH_7523 - STMH_7579	N/A	21.00	RCP	164.28		631462.696	26914732.518	630.954	$43,972	01/01/1988	30	75	44	$25,857	$50,487	1	1	0.0	0.0	1.0	1.0	1.0	1
6463	Stormwater Sewer	STMH_7579 - STMH_7581	N/A	36.00	RCP	328.13		631468.951	26915060.593	630.606	$24,471	01/01/1988	30	75	44	$14,390	$50,572	1	1	0.0	0.0	1.0	3.0	1.0	3
6464	Stormwater Sewer	STMH_7581 - STMH_7528	N/A	36.00	RCP	302.45		631478.474	26915362.896	630.698	$7,441	01/01/1950	68	75	6	$603	$13,568	1	1	0.0	0.0	1.0	3.0	1.0	3
6465	Stormwater Sewer	STMH_7528 - STMH_7547	N/A	42.00	RCP	326.47		631489.115	26915689.191	630.792	$53,793	01/01/1950	68	75	6	$4,360	$68,117	1	1	0.0	0.0	1.0	4.0	1.0	4
6466	Stormwater Sewer	STMH_7852 - STMH_7853	N/A	36.00	RCP	123.90		635910.373	26913775.539	611.797	$20,538	01/01/1975	43	75	31	$8,515	$29,931	1	1	0.0	0.0	1.0	4.0	1.0	4
6467	Stormwater Sewer	STMH_8127 - STMH_8126	N/A	12.00	RCP	32.19		637449.721	26913364.221	610.148	$47,058	01/01/1998	20	75	54	$33,952	$49,981	1	1	0.0	0.0	1.0	2.0	1.0	2
6468	Stormwater Sewer	STMH_8155 - STMH_8154	N/A	18.00	RCP	283.44		636985.088	26914268.396	611.322	$34,533	01/01/1975	43	75	31	$14,317	$36,914	1	1	0.0	0.0	1.0	2.0	1.0	2
6469	Stormwater Sewer	STMH_8154 - STMH_8144	N/A	21.00	RCP	321.29		637025.331	26913949.640	612.389	$30,895	01/01/1975	43	75	31	$12,809	$45,067	1	1	0.0	0.0	1.0	2.0	1.0	2
6470	Stormwater Sewer	STMH_8037 - STOF_042	N/A	24.00	RCP	85.10		634579.144	26916102.382	0.000	$24,777	01/01/1977	41	75	33	$10,934	$31,241	1	1	0.0	0.0	1.0	3.0	1.0	3
6471	Stormwater Sewer	STMH_8035A - STMH_8037	N/A	24.00	VCP	190.54		634498.440	26916075.374	609.935	$10,723	01/01/1939	79	75	0	$0	$14,978	1	1	0.0	0.0	1.0	3.0	1.0	3
6472	Stormwater Sewer	STMH_7922 - STOF_026	N/A	48.00	RCP	131.79		635269.285	26914044.608	0.000	$5,186	01/01/1965	53	75	21	$1,458	$9,745	1	1	0.0	0.0	1.0	2.0	1.0	2
6473	Stormwater Sewer	STMH_8004 - STMH_8003	N/A	24.00	RCP	299.47		634880.777	26914165.848	614.457	$29,512	01/01/1991	27	75	47	$18,536	$35,792	1	1	0.0	0.0	1.0	4.0	1.0	4
6474	Stormwater Sewer	STMH_8003 - STMH_8002	N/A	24.00	RCP	189.86		635050.866	26914250.212	613.320	$42,225	01/01/1991	27	75	47	$26,521	$51,209	1	1	0.0	0.0	1.0	4.0	1.0	4
6475	Stormwater Sewer	STMH_8002 - STOF_033	N/A	30.00	RCP	103.59		635140.504	26914302.137	0.000	$26,771	01/01/1991	27	75	47	$16,814	$32,466	1	1	0.0	0.0	1.0	4.0	1.0	4
6476	Stormwater Sewer	STMH_8005 - STMH_8004	N/A	24.00	RCP	209.31		634611.295	26914035.232	616.207	$45,450	01/01/1991	27	75	47	$28,546	$56,020	1	1	0.0	0.0	1.0	4.0	1.0	4
6477	Stormwater Sewer	STMH_6516 - STMH_6517	N/A	48.00	RCP	249.33		627914.470	26911350.186	713.867	$44,909	01/01/1980	38	75	36	$21,615	$57,088	1	1	0.0	0.0	1.0	4.0	1.0	4
6478	Stormwater Sewer	STMH_7929 - STMH_7930	N/A	30.00	RCP	249.99		635390.723	26917358.385	607.350	$7,244	01/01/1949	69	75	5	$490	$15,005	1	1	0.0	0.0	1.0	3.0	1.0	3
6479	Stormwater Sewer	STMH_7928 - STMH_7929	N/A	30.00	RCP	113.74		635490.752	26917129.279	606.310	$23,499	01/01/1949	69	75	5	$1,591	$53,498	1	1	0.0	0.0	1.0	3.0	1.0	3
6480	Stormwater Sewer	STMH_8056 - STMH_8057	N/A	15.00	PVC	115.00		635625.971	26915939.429	601.621	$6,459	01/01/2016	2	75	72	$6,211	$6,923	1	1	0.0	0.0	1.0	1.0	1.0	1
6481	Stormwater Sewer	STMH_7960 - STMH_7962	N/A	15.00	PVC	263.93		635060.413	26915658.579	610.290	$1,937	01/01/2016	2	75	72	$1,862	$2,080	1	1	0.0	0.0	1.0	1.0	1.0	1
6482	Stormwater Sewer	STMH_7961 - STMH_7962	N/A	12.00	PVC	14.35		635060.413	26915658.579	610.290	$36,899	01/01/2016	2	75	72	$35,483	$39,554	1	1	0.0	0.0	1.0	1.0	1.0	1
6483	Stormwater Sewer	STMH_7959 - STMH_7960	N/A	15.00	PVC	68.10		635296.386	26915776.804	610.820	$36,687	01/01/2016	2	75	72	$35,279	$39,326	1	1	0.0	0.0	1.0	1.0	1.0	1
6484	Stormwater Sewer	STMH_7953 - STOF_036	N/A	24.00	RCP	31.21		635187.683	26914691.035	0.000	$9,465	01/01/1975	43	75	31	$3,924	$10,146	1	1	0.0	0.0	1.0	5.0	1.0	5
6485	Stormwater Sewer	STMH_7952 - STMH_7953	N/A	36.00	RCP	46.22		635217.287	26914700.919	611.602	$3,933	01/01/1975	43	75	31	$1,630	$5,493	1	1	0.0	0.0	1.0	5.0	1.0	5
6486	Stormwater Sewer	STMH_7942 - STOF_043	N/A	18.00	RCP	36.63		635114.654	26917093.710	0.000	$51,331	01/01/1981	37	75	37	$25,392	$78,635	1	1	0.0	0.0	1.0	1.0	1.0	1
6487	Stormwater Sewer	STMH_7941 - STMH_7942	N/A	15.00	PVC	36.16		635133.691	26917062.415	611.690	$4,359	01/01/2015	3	75	71	$4,133	$5,824	1	1	0.0	0.0	1.0	1.0	1.0	1
6488	Stormwater Sewer	STMH_7965 - STOF_041	N/A	12.00	RCP	55.05		634804.405	26916216.183	0.000	$7,661	01/01/1978	40	75	34	$3,483	$8,212	1	1	0.0	0.0	1.0	2.0	1.0	2
6489	Stormwater Sewer	STMH_7963 - STMH_7964	N/A	15.00	PVC	246.27		634849.872	26916124.947	608.250	$12,225	01/01/2016	2	75	72	$11,756	$13,104	1	1	0.0	0.0	1.0	2.0	1.0	2
6490	Stormwater Sewer	STMH_7964 - STMH_7965	N/A	15.00	PVC	87.95		634859.322	26916212.385	609.220	$5,230	01/01/2016	2	75	72	$5,029	$7,982	1	1	0.0	0.0	1.0	2.0	1.0	2
6491	Stormwater Sewer	STMH_7966 - STMH_7965	N/A	15.00	PVC	55.12		634859.322	26916212.385	609.220	$36,552	01/01/2016	2	75	72	$35,150	$39,181	1	1	0.0	0.0	1.0	1.0	1.0	1
6492	Stormwater Sewer	STMH_7962 - STMH_7963	N/A	15.00	PVC	265.46		634948.241	26915899.176	609.260	$34,232	01/01/2016	2	75	72	$32,918	$36,694	1	1	0.0	0.0	1.0	2.0	1.0	2
6493	Stormwater Sewer	STMH_7945 - STMH_7944	N/A	18.00	PVC	281.28		635708.642	26914939.574	611.620	$22,764	01/01/2016	2	75	72	$21,890	$24,402	1	1	0.0	0.0	1.0	1.0	1.0	1
6494	Stormwater Sewer	STMH_7947 - STMH_7946	N/A	15.00	PVC	290.00		635512.395	26915339.018	611.810	$36,416	01/01/2016	2	75	72	$35,019	$55,786	1	1	0.0	0.0	1.0	1.0	1.0	1
6495	Stormwater Sewer	STMH_7944 - STMH_7943	N/A	18.00	RCP	35.68		635727.320	26914909.177	611.890	$41,910	01/01/2016	2	75	72	$40,302	$44,723	1	1	0.0	0.0	1.0	5.0	1.0	5
6496	Stormwater Sewer	STMH6859B - STCB_12283	N/A	12.00	VCP	150.62		635952.180	26911697.693	0.000	$39,688	01/01/1939	79	75	0	$0	$55,438	1	1	0.0	0.0	1.0	4.0	5.0	20
6497	Stormwater Sewer	STMH7999 - STMH_7998	N/A	8.00	PVC	68.62		634271.504	26913554.538	623.878	$32,071	01/01/2008	10	75	64	$27,417	$42,851	1	1	0.0	0.0	1.0	5.0	1.0	5
6498	Stormwater Sewer	STMH7996 - STMH_7998	N/A	8.00	PVC	45.20		634271.504	26913554.538	623.878	$1,601	01/01/2008	10	75	64	$1,368	$1,859	1	1	0.0	0.0	1.0	5.0	1.0	5
6499	Stormwater Sewer	STMH7998 - STMH_7997	N/A	8.00	PVC	12.91		634277.449	26913543.077	623.608	$8,509	01/01/2008	10	75	64	$7,274	$9,881	1	1	0.0	0.0	1.0	5.0	1.0	5
6500	Stormwater Sewer	STMH7842 - STMH_7841	N/A	10.00	PVC	116.53		636266.343	26913395.283	610.507	$7,452	01/01/1986	32	75	42	$4,183	$11,216	1	1	0.0	0.0	1.0	2.0	1.0	2
6501	Stormwater Sewer	STMH7841 - STMH_7840	N/A	10.00	PVC	152.52		636336.137	26913259.667	611.183	$12,120	01/01/1986	32	75	42	$6,804	$16,781	1	1	0.0	0.0	1.0	2.0	1.0	2
6502	Stormwater Sewer	STMH7840 - STMH_7839	N/A	12.00	PVC	159.96		636333.550	26913099.732	612.138	$15,862	01/01/1986	32	75	42	$8,904	$21,963	1	1	0.0	0.0	1.0	2.0	1.0	2
6503	Stormwater Sewer	STMH7839 - STMH_7838	N/A	12.00	PVC	56.35		636371.146	26913057.754	613.803	$18,395	01/01/1986	32	75	42	$10,326	$24,793	1	1	0.0	0.0	1.0	2.0	1.0	2
6504	Stormwater Sewer	STMH7838 - STMH_7837	N/A	12.00	PVC	10.96		636379.195	26913050.312	613.718	$6,481	01/01/1956	62	75	12	$1,044	$8,735	1	1	0.0	0.0	1.0	2.0	1.0	2
6505	Stormwater Sewer	STMH7858 - STMH_7859	N/A	15.00	RCP	75.27		636136.885	26914172.830	612.863	$11,792	01/01/1975	43	75	31	$4,889	$17,747	1	1	0.0	0.0	1.0	3.0	1.0	3
6506	Stormwater Sewer	STMH7859 - STMH_7860	N/A	15.00	RCP	119.11		636029.328	26914121.664	612.436	$18,054	01/01/1975	43	75	31	$7,485	$27,173	1	1	0.0	0.0	1.0	3.0	1.0	3
6507	Stormwater Sewer	STMH7860 - STMH_7861	N/A	15.00	RCP	182.37		635864.672	26914043.267	611.379	$4,841	01/01/1975	43	75	31	$2,007	$7,286	1	1	0.0	0.0	1.0	3.0	1.0	3
6508	Stormwater Sewer	STMH7861 - STMH_7862	N/A	15.00	RCP	48.90		635821.351	26914020.579	611.638	$16,391	01/01/1975	43	75	31	$6,795	$23,910	1	1	0.0	0.0	1.0	3.0	1.0	3
6509	Stormwater Sewer	STMH7862 - STMH_7863	N/A	18.00	RCP	150.38		635685.680	26913955.721	611.310	$5,605	01/01/1975	43	75	31	$2,323	$6,509	1	1	0.0	0.0	1.0	3.0	1.0	3
6510	Stormwater Sewer	STMH7830A - STMH_7824	N/A	24.00	RCP	314.99		636172.131	26914807.210	612.747	$932	01/01/1975	43	75	31	$386	$1,699	1	1	0.0	0.0	1.0	2.0	1.0	2
6511	Stormwater Sewer	STMH_7946 - STMH_7945	N/A	15.00	PVC	163.77		635584.792	26915192.116	612.730	$40,310	01/01/2016	2	75	72	$38,763	$43,210	1	1	0.0	0.0	1.0	1.0	1.0	1
6512	Stormwater Sewer	STMH_7967 - STMH_7966	N/A	15.00	PVC	262.96		634865.452	26916267.159	609.950	$44,427	01/01/2016	2	75	72	$42,722	$47,623	1	1	0.0	0.0	1.0	1.0	1.0	1
6513	Stormwater Sewer	STMH_7938 - STMH_7938A	N/A	18.00	RCP	258.80		635655.357	26916650.791	607.350	$6,845	01/01/2016	2	75	72	$6,582	$7,304	1	1	0.0	0.0	1.0	1.0	1.0	1
6514	Stormwater Sewer	STMH_7938A - STMH_7927	N/A	18.00	RCP	45.94		635696.734	26916670.747	608.280	$2,635	01/01/2016	2	75	72	$2,533	$2,825	1	1	0.0	0.0	1.0	1.0	1.0	1
6515	Stormwater Sewer	STMH_6845A - STMH_6845B	N/A	30.00	RCP	49.46		635433.208	26910399.310	626.663	$8,114	01/01/1970	48	75	26	$2,822	$12,430	1	1	0.0	0.0	1.0	3.0	1.0	3
6516	Stormwater Sewer	STMH_6845B - STMH_6845C	N/A	30.00	RCP	57.55		635490.569	26910394.699	620.274	$15,555	01/01/1970	48	75	26	$5,411	$22,986	1	1	0.0	0.0	1.0	3.0	1.0	3
6517	Stormwater Sewer	STMH_6845C - STMH_6844	N/A	36.00	RCP	99.08		635589.273	26910386.114	609.726	$39,059	01/01/1970	48	75	26	$13,588	$84,345	1	1	0.0	0.0	1.0	3.0	1.0	3
6518	Stormwater Sewer	STMH_6857 - STMH_6857A	N/A	12.00	RCP	101.69		635955.237	26911897.734	618.720	$2,599	01/01/2004	14	75	60	$2,083	$3,015	1	1	0.0	0.0	1.0	2.0	1.0	2
6519	Stormwater Sewer	STMH_6662 -STMH_6663	N/A	12.00	CP	127.13		629113.174	26912533.414	719.194	$7,902	01/01/1980	38	75	36	$3,803	$10,941	1	1	0.0	0.0	1.0	2.0	1.0	2
6520	Stormwater Sewer	STMH_6663 -STCB_11832	N/A	30.00	CMP	42.54		629113.717	26912575.954	0.000	$13,443	01/01/1980	38	75	36	$6,470	$18,564	1	1	0.0	0.0	1.0	2.0	1.0	2
6521	Stormwater Sewer	STMH_6663A -STMH_6669	N/A	12.00	CP	128.03		628943.899	26912447.564	718.309	$2,598	01/01/1980	38	75	36	$1,250	$3,017	1	1	0.0	0.0	1.0	2.0	1.0	2
6522	Stormwater Sewer	STMH_8054 - STOF_047	N/A	12.00	CP	31.72		635284.636	26917658.264	0.000	$1,823	01/01/1950	68	75	6	$147	$3,525	1	1	0.0	0.0	1.0	1.0	1.0	1
6523	Stormwater Sewer	STMH_8138B - SAMH_3341A	N/A	47.00	SB	252.58		637252.298	26914893.392	0.000	$8,205	01/01/1939	79	75	0	$0	$8,771	1	1	0.0	0.0	1.0	5.0	1.0	5
6524	Stormwater Sewer	STMH_8138A - STMH_8138B	N/A	47.00	SB	139.73		637354.493	26914662.438	605.194	$29,552	01/01/1939	79	75	0	$0	$110,378	1	1	0.0	0.0	1.0	5.0	1.0	5

CITY OF SAULT STE. MARIE, MICHIGAN

Summary

id	Equipment Description	Asset ID	Construction Drawings Sheet Reference	Capacity or Size	Material	Length	Comment	Northing State Plane Ordinate	Easting State Plane Ordinate	Elevation	Original Cost	Year Installed (01/01/YYYY)	Age	Expected useful life (years)	Remaining Useful Life (years)	Depreciated Value	Replacement Cost	Average number of units in service	Total Number of units	Redundancy (Number)	Redundancy (percent)	Redundancy Score (R) (Reduces (C))	Criticality (C) (see back-up sheets)	Probability of Failure (P) (see back-up sheets)	Business Risk (BRE=PxCxR)
6525	Stormwater Sewer	STMH_8138 - STMH_8138A	N/A	47.00	SB	341.55		637409.738	26914534.098	604.511	$16,348	01/01/1939	79	75	0	$0	$61,060	1	1	0.0	0.0	1.0	5.0	1.0	5
6526	Stormwater Sewer	STMH_7900 - STMH_7899	N/A	15.00	PVC	144.80		636414.613	26915918.779	609.360	$23,478	01/01/2015	3	75	71	$22,264	$25,054	1	1	0.0	0.0	1.0	1.0	1.0	1
6527	Stormwater Sewer	STMH_7899 - STMH_7897	N/A	15.00	PVC	135.02		636472.853	26915796.970	609.900	$20,128	01/01/2015	3	75	71	$19,087	$21,576	1	1	0.0	0.0	1.0	1.0	1.0	1
6528	Stormwater Sewer	STMH_7897 - STMH_7896	N/A	15.00	PVC	240.13		636693.494	26915891.734	607.360	$18,767	01/01/2015	3	75	71	$17,796	$20,117	1	1	0.0	0.0	1.0	1.0	1.0	1
6529	Stormwater Sewer	STMH_7896 - STMH_8167	N/A	15.00	PVC	81.35		636768.238	26915923.836	606.838	$33,378	01/01/2015	3	75	71	$31,652	$35,780	1	1	0.0	0.0	1.0	1.0	1.0	1
6530	Stormwater Sewer	STMH_7103 -STMH_7102	N/A	18.00	RCP	10.63		637197.227	26911434.197	606.010	$21,044	01/01/1970	48	75	26	$7,321	$30,697	1	1	0.0	0.0	1.0	3.0	1.0	3
6531	Stormwater Sewer	STMH_7086 -STMH_7095	N/A	24.00	RCP	292.76		637426.975	26911879.785	605.862	$45,901	01/01/1995	23	75	51	$31,279	$56,576	1	1	0.0	0.0	1.0	3.0	1.0	3
6532	Stormwater Sewer	STMH_7079 -STCB_12552	N/A	12.00	RCP	29.81		637560.920	26910858.808	0.000	$19,377	01/01/2004	14	75	60	$15,531	$24,432	1	1	0.0	0.0	1.0	2.0	1.0	2
6533	Stormwater Sewer	STMH_7879 -STMH_7978	N/A	12.00	PVC	84.69		635298.337	26913615.515	614.786	$1,079	01/01/2001	17	75	57	$821	$1,148	1	1	0.0	0.0	1.0	3.0	1.0	3
6534	Stormwater Sewer	STMH_8143 - STMH_8138	N/A	47.00	CP	358.01		637369.704	26914122.330	602.964	$23,151	01/01/1939	79	75	0	$0	$86,470	1	1	0.0	0.0	1.0	4.0	1.0	4
6535	Stormwater Sewer	STMH_6706 - STMH_6704	N/A	36.00	RCP	198.00		633869.363	26909246.765	665.642	$67,241	01/01/1962	56	75	18	$16,216	$109,858	1	1	0.0	0.0	1.0	3.0	1.0	3
6536	Stormwater Sewer	STMH_6701 - STCB_12803	N/A	12.00	RCP	30.12		633849.544	26908529.009	0.000	$13,675	01/01/2011	7	75	67	$12,238	$22,342	1	1	0.0	0.0	1.0	2.0	1.0	2
6537	Stormwater Sewer	STMH_6704 - STCB_11914	N/A	15.00	PE	16.03		633883.940	26909240.088	0.000	$61,522	01/01/1990	28	75	46	$37,821	$100,514	1	1	0.0	0.0	1.0	3.0	1.0	3
6538	Stormwater Sewer	STMH_6703B - STMH_6703A	N/A	15.00	PE	74.94		633749.348	26909077.072	665.516	$1,908	01/01/1990	28	75	46	$1,172	$2,389	1	1	0.0	0.0	1.0	2.0	1.0	2
6539	Stormwater Sewer	STMH_6703A - STCB_11914	N/A	15.00	PE	211.40		633883.940	26909240.088	0.000	$8,918	01/01/1990	28	75	46	$5,482	$11,166	1	1	0.0	0.0	1.0	2.0	1.0	2
6540	Stormwater Sewer	STMH_6604 - STMH_6603	N/A	27.00	RCP	316.09		629645.125	26909420.239	704.889	$20,297	01/01/1961	57	75	17	$4,624	$31,268	1	1	0.0	0.0	1.0	2.0	1.0	2
6541	Stormwater Sewer	STMH_6503 - STMH_6502	N/A	18.00	RCP	420.04		628222.341	26910893.644	712.458	$61,648	01/01/1961	57	75	17	$14,045	$69,552	1	1	0.0	0.0	1.0	2.0	1.0	2
6542	Stormwater Sewer	STMH_6502 - STMH_6501	N/A	21.00	RCP	348.22		628464.376	26910643.294	712.947	$41,584	01/01/1961	57	75	17	$9,474	$66,786	1	1	0.0	0.0	1.0	2.0	1.0	2
6543	Stormwater Sewer	STMH_6501 - STMH_6607	N/A	21.00	RCP	501.56		628812.285	26910282.018	711.446	$36,563	01/01/1961	57	75	17	$8,330	$57,456	1	1	0.0	0.0	1.0	2.0	1.0	2
6544	Stormwater Sewer	STMH_6607 - STMH_6606	N/A	24.00	RCP	348.82		629055.343	26910031.824	710.029	$70,943	01/01/1961	57	75	17	$16,163	$88,015	1	1	0.0	0.0	1.0	2.0	1.0	2
6545	Stormwater Sewer	STMH_6606 - STMH_6605	N/A	24.00	RCP	350.69		629298.766	26909779.373	707.261	$40,463	01/01/1961	57	75	17	$9,218	$61,392	1	1	0.0	0.0	1.0	2.0	1.0	2
6546	Stormwater Sewer	STMH_6605 - STMH_6604	N/A	24.00	RCP	182.86		629425.115	26909647.192	706.055	$38,927	01/01/1961	57	75	17	$8,868	$59,969	1	1	0.0	0.0	1.0	2.0	1.0	2
6547	Stormwater Sewer	STMH_6803A - STOF_083	N/A	27.00	RCP	238.35		630052.782	26909331.831	0.000	$51,843	01/01/1961	57	75	17	$11,811	$75,552	1	1	0.0	0.0	1.0	3.0	1.0	3
6548	Stormwater Sewer	STMH_6603 - STMH_6603A	N/A	27.00	RCP	399.42		629922.122	26909132.481	702.450	$39,195	01/01/1961	57	75	17	$8,930	$67,643	1	1	0.0	0.0	1.0	2.0	1.0	2
6549	Stormwater Sewer	STMH_6602 - STMH_6601	N/A	12.00	RCP	349.17		630550.262	26908486.000	700.080	$49,528	01/01/1961	57	75	17	$11,284	$85,475	1	1	0.0	0.0	1.0	2.0	1.0	2
6550	Stormwater Sewer	STMH_8041A - STMH_8042B	N/A	48.00	RCP	325.98		634083.331	26918515.511	0.000	$82,894	01/01/1949	69	75	5	$5,614	$144,582	1	1	0.0	0.0	1.0	4.0	1.0	4
6551	Stormwater Sewer	STMH_6707A - STMH_6707	N/A	36.00	CMP	473.53		633907.318	26909441.096	669.317	$25,449	01/01/1962	56	75	18	$6,137	$41,579	1	1	0.0	0.0	1.0	3.0	1.0	3
6552	Stormwater Sewer	STMH_7664 - STMH_7670	N/A	12.00	PVC	145.92		632465.397	26915030.692	629.816	$2,186	01/01/2003	15	75	59	$1,723	$2,500	1	1	0.0	0.0	1.0	1.0	1.0	1
6553	Stormwater Sewer	STMH_8029 - STOF_040	N/A	48.00	RCP	552.42		634630.105	26915449.858	0.000	$1,238	01/01/1939	79	75	0	$0	$1,421	1	1	0.0	0.0	1.0	5.0	1.0	5
6554	Stormwater Sewer	STMH_8029A - STMH_8029	N/A	12.00	RCP	9.17		634136.044	26915202.727	614.425	$6,942	01/01/2003	15	75	59	$5,471	$12,109	1	1	0.0	0.0	1.0	5.0	1.0	5
6555	Stormwater Sewer	STMH_8028 - STMH_8029	N/A	48.00	RCP	16.10		634136.044	26915202.727	614.425	$118,771	01/01/1939	79	75	0	$0	$207,159	1	1	0.0	0.0	1.0	2.0	1.0	2
6556	Stormwater Sewer	STMH_8012 - STMH_8011	N/A	18.00	RCP	53.71		634281.536	26914221.982	618.148	$23,839	01/01/1977	41	75	33	$10,520	$27,269	1	1	0.0	0.0	1.0	3.0	1.0	3
6557	Stormwater Sewer	STCB_13825 - STOF_037	N/A	42.00	RCP	82.21		635004.089	26914611.141	0.000	$2,809	01/01/1977	41	75	33	$1,239	$3,017	1	1	0.0	0.0	1.0	3.0	1.0	3
6558	Stormwater Sewer	STMH_8007 - STCB_13825	N/A	24.00	RCP	19.87		634942.625	26914556.553	0.000	$21,843	01/01/1977	41	75	33	$9,639	$33,650	1	1	0.0	0.0	1.0	3.0	1.0	3
6559	Stormwater Sewer	STMH_8439 - STMH_8440	N/A	15.00	RCP	201.92		632135.972	26921053.532	596.951	$26,047	01/01/2009	9	75	65	$22,615	$30,086	1	1	0.0	0.0	1.0	1.0	1.1	1.1
6560	Stormwater Sewer	STMH_8440 - STOF_106	N/A	15.00	RCP	54.95		632092.312	26921086.898	0.000	$11,395	01/01/2009	9	75	65	$9,893	$13,162	1	1	0.0	0.0	1.0	1.0	1.0	1
6561	Stormwater Sewer	STMH_8441 - STOF_105	N/A	15.00	RCP	88.34		632066.670	26921087.812	0.000	$42,463	01/01/2009	9	75	65	$36,869	$49,047	1	1	0.0	0.0	1.0	1.0	1.0	1
6562	Stormwater Sewer	STMH_8438 - STMH_8439	N/A	15.00	RCP	301.22		632337.501	26921041.022	597.203	$26,047	01/01/2009	9	75	65	$22,615	$30,086	1	1	0.0	0.0	1.0	1.0	1.0	1
6563	Stormwater Sewer	STMH_8442 - STMH_8441	N/A	15.00	RCP	293.98		631981.515	26921064.320	597.137	$15,815	01/01/2009	9	75	65	$13,731	$20,026	1	1	0.0	0.0	1.0	1.0	1.0	1
6564	Stormwater Sewer	STMH_8437 - STMH_8438	N/A	15.00	RCP	301.61		632638.170	26921022.895	598.634	$22,540	01/01/2009	9	75	65	$19,570	$24,161	1	1	0.0	0.0	1.0	1.0	1.0	1
6565	Stormwater Sewer	STMH_7532 - STCB_12843	N/A	12.00	PVC	129.36		630675.790	26914750.390	0.000	$27,564	01/01/1998	20	75	54	$19,887	$42,072	1	1	0.0	0.0	1.0	1.0	1.0	1
6566	Stormwater Sewer	STCB_12843 - STCB_7576	N/A	12.00	PVC	114.59		630790.371	26914749.094	0.000	$21,647	01/01/1998	20	75	54	$15,618	$31,577	1	1	0.0	0.0	1.0	1.0	1.0	1
6567	Stormwater Sewer	STMH_6702 - STMH_6703	N/A	15.00	PE	79.34		633830.030	26909155.521	665.516	$13,392	01/01/1990	28	75	46	$8,232	$16,768	1	1	0.0	0.0	1.0	2.0	1.0	2
6568	Stormwater Sewer	STMH_7533 - STCB_12884	N/A	12.00	RCP	290.15		630505.941	26915358.414	0.000	$39,257	01/01/1976	42	75	32	$16,799	$44,905	1	1	0.0	0.0	1.0	1.0	1.0	1
6569	Stormwater Sewer	STMH_6701C - STCB_11905	N/A	36.00	RCP	96.30		633855.742	26908717.399	0.000	$9,442	01/01/1960	58	75	16	$2,024	$11,822	1	1	0.0	0.0	1.0	2.0	1.0	2
6570	Stormwater Sewer	STMH_6704 - STMH_6701C	N/A	36.00	RCP	433.25		633859.304	26908813.633	0.000	$29,502	01/01/1960	58	75	16	$6,327	$47,323	1	1	0.0	0.0	1.0	3.0	1.0	3
6571	Stormwater Sewer	STMH_6860A - STMH_6859	N/A	12.00	VCP	162.59		635500.987	26911719.371	635.037	$14,267	01/01/1939	79	75	0	$0	$31,827	1	1	0.0	0.0	1.0	3.0	5.0	15
6572	Stormwater Sewer	STMH_7976 - STMH_7975	N/A	12.00	PVC	29.30		634757.479	26913065.814	629.079	$31,885	01/01/2001	17	75	57	$24,281	$36,987	1	1	0.0	0.0	1.0	2.0	1.0	2
6573	Stormwater Sewer	STMH_7975 - STMH_7973	N/A	12.00	PVC	258.77		635016.102	26913057.118	621.020	$3,663	01/01/2001	17	75	57	$2,789	$4,249	1	1	0.0	0.0	1.0	2.0	1.0	2
6574	Stormwater Sewer	STMH_6878 - STMH_6877	N/A	12.00	CP	208.87		634975.728	26912750.535	645.870	$25,581	01/01/1954	64	75	10	$3,438	$37,762	1	1	0.0	0.0	1.0	1.0	1.0	1
6575	Stormwater Sewer	STMH_6877 - STMH_6870	N/A	12.00	CP	180.70		635137.922	26912673.445	645.448	$15,665	01/01/1954	64	75	10	$2,105	$30,286	1	1	0.0	0.0	1.0	1.0	1.0	1
6576	Stormwater Sewer	STMH_6864 - STCB_12315	N/A	15.00	RCP	284.11		634745.041	26911684.128	0.000	$10,296	01/01/1984	34	75	40	$5,505	$22,967	1	1	0.0	0.0	1.0	2.0	1.0	2
6577	Stormwater Sewer	STCB_12315 - STCB_12317	N/A	15.00	RCP	37.63		634746.621	26911721.728	0.000	$2,035	01/01/1984	34	75	40	$1,088	$4,540	1	1	0.0	0.0	1.0	3.0	1.0	3
6578	Stormwater Sewer	STCB_12317 - STCB_6862	N/A	12.00	VCP	31.31		634775.412	26911709.421	0.000	$3,194	01/01/1939	79	75	0	$0	$4,921	1	1	0.0	0.0	1.0	3.0	4.0	12
6579	Stormwater Sewer	STMH_11971 - STMH_6866	N/A	15.00	RCP	219.92		634183.831	26911700.475	712.462	$2,944	01/01/1984	34	75	40	$1,574	$4,294	1	1	0.0	0.0	1.0	1.0	4.0	4
6580	Stormwater Sewer	STMH_6866 - STMH_6864	N/A	15.00	RCP	277.34		634461.084	26911693.561	700.308	$13,427	01/01/1984	34	75	40	$7,179	$15,593	1	1	0.0	0.0	1.0	2.0	1.0	2
6581	Stormwater Sewer	STMH_6810A - STOF_011	N/A	12.00	RCP	67.60		636200.027	26911815.189	0.000	$18,705	01/01/2004	14	75	60	$14,992	$27,285	1	1	0.0	0.0	1.0	3.0	1.0	3
6582	Stormwater Sewer	STMH_6810 - STMH_6810A	N/A	12.00	RCP	43.48		636267.543	26911811.759	613.833	$8,451	01/01/2004	14	75	60	$6,773	$9,803	1	1	0.0	0.0	1.0	3.0	1.0	3
6583	Stormwater Sewer	STCB_12267 - STOF_017	N/A	12.00	CMP	151.13		636015.220	26912574.145	0.000	$18,337	01/01/1966	52	75	22	$5,400	$31,281	1	1	0.0	0.0	1.0	1.0	1.0	1
6584	Stormwater Sewer	STCB_12271 - STOF_018	N/A	12.00	CMP	131.49		635930.538	26912780.355	0.000	$3,869	01/01/1966	52	75	22	$1,139	$8,632	1	1	0.0	0.0	1.0	2.0	1.0	2
6585	Stormwater Sewer	STCB_12269 - STCB_12271	N/A	12.00	CMP	215.73		636061.747	26912771.796	0.000	$11,176	01/01/1966	52	75	22	$3,291	$19,066	1	1	0.0	0.0	1.0	1.0	1.0	1
6586	Stormwater Sewer	STMH_7837 - STMH_7836	N/A	12.00	PVC	59.34		636335.699	26913009.944	613.585	$25,819	01/01/1956	62	75	12	$4,159	$38,858	1	1	0.0	0.0	1.0	2.0	1.0	2
6587	Stormwater Sewer	STMH_6821A- STMH_6821	N/A	8.00	CP	73.89		636592.942	26912339.561	615.440	$6,284	01/01/1994	24	75	50	$4,198	$9,534	1	1	0.0	0.0	1.0	2.0	1.0	2
6588	Stormwater Sewer	STMH_6872A - STMH_6872	N/A	12.00	CP	77.22		634951.721	26912427.528	672.631	$9,801	01/01/1949	69	75	5	$663	$11,382	1	1	0.0	0.0	1.0	1.0	1.0	1
6589	Stormwater Sewer	STMH6859 - STMH_6859A	N/A	12.00	VCP	150.68		635651.484	26911711.974	624.511	$9,784	01/01/1939	79	75	0	$0	$21,826	1	1	0.0	0.0	1.0	4.0	5.0	20
6590	Stormwater Sewer	STMH6859A - STMH_6859B	N/A	12.00	VCP	150.53		635801.795	26911706.032	613.181	$9,790	01/01/1939	79	75	0	$0	$21,839	1	1	0.0	0.0	1.0	4.0	4.0	16
6591	Stormwater Sewer	STMH_7714 - STMH_7715	N/A	12.00	RCP	103.57		632475.476	26916319.324	629.586	$24,759	01/01/2009	9	75	65	$21,497	$51,168	1	1	0.0	0.0	1.0	1.0	1.0	1
6592	Stormwater Sewer	STMH_7551 - STMH_7551A	N/A	8.00	PVC	13.98		631517.751	26916377.617	631.421	$112,209	01/01/2003	15	75	59	$88,443	$243,120	1	1	0.0	0.0	1.0	1.0	1.0	1
6593	Stormwater Sewer	STMH_7575 - STOF_104	N/A	60.00	RCP	230.00		631598.054	26917938.276	0.000	$971	01/01/1950	68	75	6	$78	$1,735	1	1	0.0	0.0	1.0	2.0	1.0	2
6594	Stormwater Sewer	STMH_6805 - STMH_6804	N/A	15.00	RCP	238.41		636595.125	26911425.237	610.616	$14,287	01/01/1970	48	75	26	$4,970	$21,806	1	1	0.0	0.0	1.0	2.0	1.0	2
6595	Stormwater Sewer	STMH_6425 - STOF_089]	N/A	36.00	RCP	37.77		623981.721	26908811.532	0.000	$8,657	01/01/1976	42	75	32	$3,704	$13,327	1	1	0.0	0.0	1.0	5.0	1.0	5
6596	Stormwater Sewer	STMH_5817 - STMH_5818	N/A	24.00	RCP	46.70		623433.125	26907568.415	700.320	$55,447	01/01/1976	42	75	32	$23,728	$106,786	1	1	0.0	0.0	1.0	3.0	1.0	3
6597	Stormwater Sewer	STMH_5816A - STMH_5817	N/A	18.00	RCP	10.61		623414.000	26907525.812	700.082	$5,651	01/01/1976	42	75	32	$2,418	$7,986	1	1	0.0	0.0	1.0	3.0	1.0	3
6598	Stormwater Sewer	STMH_5819 - STMH_5818	N/A	24.00	RCP	129.31		623433.125	26907568.415	700.320	$19,794	01/01/1976	42	75	32	$8,470	$28,873	1	1	0.0	0.0	1.0	3.0	1.0	3
6599	Stormwater Sewer	STMH_5820 - STMH_5819	N/A	18.00	RCP	181.59		623418.320	26907696.874	699.375	$757	01/01/1976	42	75	32	$323	$1,105	1	1	0.0	0.0	1.0	3.0	1.0	3
6600	Stormwater Sewer	STMH_5818 - STMH_5813	N/A	45.00	RCP	342.26	45 x 29	623772.630	26907525.051	698.238	$15,647	01/01/1976	42	75	32	$6,696	$22,112	1	1	0.0	0.0	1.0	3.0	1.0	3
6601	Stormwater Sewer	STMH_6664A - STMH_6664B	N/A	21.00	RCP	205.45		629010.050	26912783.401	718.020	$18,007	01/01/2007	11	75	63	$15,154	$20,491	1	1	0.0	0.0	1.0	2.0	1.0	2
6602	Stormwater Sewer	STMH_6664B - STMH_6665	N/A	21.00	RCP	124.19		629126.103	26912827.608	716.164	$21,178	01/01/2007	11	75	63	$17,822	$32,626	1	1	0.0	0.0	1.0	2.0	1.0	2
6603	Stormwater Sewer	STMH_6664 - STTD_11832	N/A	8.00	PVC	20.95		629113.717	26912575.954	0.000	$29,790	01/01/2007	11	75	63	$25,070	$33,899	1	1	0.0	0.0	1.0	2.0	1.0	2
6604	Stormwater Sewer	STTD_10812 - STOF_088	N/A	48.00	RCP	93.67		623816.071	26906547.918	0.000	$8,950	01/01/1993	25	75	49	$5,860	$10,136	1	1	0.0	0.0	1.0	3.0	1.0	3
6605	Stormwater Sewer	STMH_5809 - STTD_10812	N/A	48.00	RCP	215.93		623749.103	26906613.411	0.000	$33,842	01/01/1993	25	75	49	$22,159	$47,561	1	1	0.0	0.0	1.0	4.0	1.0	4
6606	Stormwater Sewer	STMH_5810 - STMH_5809	N/A	48.00	RCP	152.44		623752.023	26906829.316	694.599	$26,718	01/01/1993	25	75	49	$17,494	$37,550	1	1	0.0	0.0	1.0	4.0	1.0	4
6607	Stormwater Sewer	STMH_5811 - STMH_5810	N/A	48.00	RCP	120.35		623756.222	26906981.698	694.838	$72,172	01/01/1993	25	75	49	$47,257	$101,430	1	1	0.0	0.0	1.0	4.0	1.0	4
6608	Stormwater Sewer	STMH_5812 - STMH_5811	N/A	48.00	RCP	325.10		623759.814	26907101.997	695.043	$25,326	01/01/1993	25	75	49	$16,583	$44,959	1	1	0.0	0.0	1.0	4.0	1.0	4
6609	Stormwater Sewer	STMH_5813 - STMH_5812	N/A	60.00	RCP	98.16		623768.254	26907426.984	697.059	$29,697	01/01/1976	42	75	32	$12,708	$43,320	1	1	0.0	0.0	1.0	4.0	1.0	4
6610	Stormwater Sewer	STMH_8228 - STMH_8229	N/A	15.00	RCP	186.46		628653.811	26921718.081	622.568	$36,212	01/01/2014	4	75	70	$33,857	$38,642	1	1	0.0	0.0	1.0	1.0	1.0	1
6611	Stormwater Sewer	STMH_8229 - STCB_14321	N/A	18.00	RCP	243.03		628855.198	26921854.128	0.000	$14,441	01/01/2014	4	75	70	$13,502	$15,410	1	1	0.0	0.0	1.0	1.0	1.0	1
6612	Stormwater Sewer	STMH_8231 - STMH_8230	N/A	15.00	CP	138.04		628412.929	26921848.691	624.428	$25,191	01/01/2014	4	75	70	$23,553	$27,003	1	1	0.0	0.0	1.0	1.0	1.0	1
6613	Stormwater Sewer	STMH_8230 - STCB_14324	N/A	18.00	CP	96.92		628423.146	26921945.072	0.000	$19,188	01/01/2014	4	75	70	$17,940	$20,569	1	1	0.0	0.0	1.0	1.0	1.0	1
6614	Stormwater Sewer	STCB_14324 - STOF_111	N/A	18.00	CP	104.64		628433.564	26922049.196	0.000	$17,023	01/01/2014	4	75	70	$15,916	$18,166	1	1	0.0	0.0	1.0	1.0	1.0	1
6615	Stormwater Sewer	STMH_8234 - STMH_8233	N/A	15.00	CP	140.24		627943.722	26921765.529	626.224	$25,513	01/01/2014	4	75	70	$23,854	$27,348	1	1	0.0	0.0	1.0	1.0	1.0	1
6616	Stormwater Sewer	STMH_8233 - STMH_8232	N/A	15.00	CP	160.95		628095.732	26921818.428	625.193	$19,494	01/01/2014	4	75	70	$18,226	$20,896	1	1	0.0	0.0	1.0	1.0	1.0	1
6617	Stormwater Sewer	STMH_8232 - STMH_8231	N/A	15.00	CP	181.23		628274.921	26921845.547	625.158	$22,372	01/01/2014	4	75	70	$20,917	$23,982	1	1	0.0	0.0	1.0	1.0	1.0	1
6618	Stormwater Sewer	STCB_13010 - STCB_13012	N/A	12.00	RCP	147.91		626466.323	26921897.072	0.000	$25,310	01/01/2012	6	75	68	$22,988	$27,185	1	1	0.0	0.0	1.0	1.0	1.0	1
6619	Stormwater Sewer	STMH_7107 - STMH_6804	N/A	36.00	RCP	289.03		636595.125	26911425.237	610.616	$37,512	01/01/1970	48	75	26	$13,050	$40,291	1	1	0.0	0.0	1.0	4.0	1.0	4
6620	Stormwater Sewer	STMH_7102 - STMH_7107	N/A	30.00	RCP	313.14		636884.138	26911428.709	608.153	$1,159	01/01/1970	48	75	26	$403	$1,691	1	1	0.0	0.0	1.0	2.0	1.0	2
6621	Stormwater Sewer	STMH_7557 -STMH_7551A	N/A	18.00	CP	280.74		631517.751	26916377.617	631.421	$8,411	01/01/1964	54	75	20	$2,252	$10,624	1	1	0.0	0.0	1.0	1.0	1.0	1
6622	Stormwater Sewer	STMH_7557A -STCB_12975	N/A	8.00	PVC	73.78		631228.703	26916527.606	0.000	$33,162	01/01/1998	20	75	54	$23,926	$48,373	1	1	0.0	0.0	1.0	1.0	1.0	1
6623	Stormwater Sewer	STMH_7082 -STMH_7083	N/A	12.00	RCP	90.62		637644.795	26911253.201	608.018	$23,218	01/01/1995	23	75	51	$15,822	$29,274	1	1	0.0	0.0	1.0	2.0	1.0	2
6624	Stormwater Sewer	STMH_7099 -STMH_7103	N/A	30.00	RCP	37.92		637197.946	26911444.806	605.989	$33,482	01/01/1995	23	75	51	$22,816	$42,216	1	1	0.0	0.0	1.0	3.0	1.0	3
6625	Stormwater Sewer	STMH_7104 -STMH_7103	N/A	18.00	RCP	193.06		637197.946	26911444.806	605.989	$28,192	01/01/1970	48	75	26	$9,808	$41,125	1	1	0.0	0.0	1.0	3.0	1.0	3
6626	Stormwater Sewer	STMH_7574 - STMH_8301	N/A	18.00	RCP	49.08		630304.188	26918450.143	632.352	$52,433	01/01/2010	8	75	66	$46,225	$66,394	1	1	0.0	0.0	1.0	1.0	1.0	1
6627	Stormwater Sewer	STMH_8035 - STMH_8035A	N/A	24.00	VCP	68.85		634327.382	26915991.444	608.810	$18,292	01/01/1939	79	75	0	$0	$33,535	1	1	0.0	0.0	1.0	3.0	1.0	3
6628	Stormwater Sewer	CSO7 - STMH_8101	N/A	47.00	SB	340.13		637698.549	26915783.859	588.116	$73,127	01/01/1939	79	75	0	$0	$127,547	1	1	0.0	0.0	1.0	5.0	1.0	5
6629	Stormwater Sewer	STMH_8437 - STOF_113	N/A	15.00	RCP	162.16		627064.797	26921728.153	0.000	$38,857	01/01/2014	4	75	70	$36,330	$44,881	1	1	0.0	0.0	1.0	1.0	1.0	1
6630	Stormwater Sewer	STMH_6529A - STCB_11637	N/A	4.00	PVC	65.57		626799.803	26911446.411	0.000	$26,521	01/01/1976	42	75	32	$11,349	$37,480	1	1	0.0	0.0	1.0	1.0	1.0	1
6631	Stormwater Sewer	STMH_6421 - STMH_6422	N/A	36.00	RCP	147.26		624761.286	26909408.313	701.025	$48,027	01/01/1976	42	75	32	$20,552	$70,970	1	1	0.0	0.0	1.0	5.0	1.1	5.5
6632	Stormwater Sewer	STMH_6510 - STMH_6511	N/A	6.00	PVC	56.60		628344.304	26911875.080	714.716	$24,174	01/01/1999	19	75	55	$17,763	$27,376	1	1	0.0	0.0	1.0	3.0	1.0	3
6633	Stormwater Sewer	STMH_8506A - STMH_8506	N/A	8.00	PVC	121.52		634486.143	26918586.434	611.799	$26,072	01/01/2000	18	75	56	$19,506	$52,474	1	1	0.0	0.0	1.0	1.0	1.0	1
6634	Stormwater Sewer	STMH_8055 - STOF_048	N/A	12.00	CP	24.31		635505.487	26917866.229	0.000	$15,985	01/01/1950	68	75	6	$1,295	$17,135	1	1	0.0	0.0	1.0	2.0	1.0	2
6635	Stormwater Sewer	STMH_5821 - STMH_5820	N/A	18.00	RCP	6.95		623428.981	26907878.154	699.864	$13,907	01/01/1976	42	75	32	$5,951	$16,866	1	1	0.0	0.0	1.0	3.0	1.0	3
6636	Stormwater Sewer	STMH_5825 - STMH_5822	N/A	24.00	CMP	51.70		623325.135	26907734.444	702.743	$15,537	01/01/1995	23	75	51	$10,587	$27,099	1	1	0.0	0.0	1.0	3.0	1.0	3
6637	Stormwater Sewer	STMH_6703 - STMH_6703A	N/A	15.00	PE	112.53		633749.348	26909077.072	665.516	$25,157	01/01/1990	28	75	46	$15,465	$31,499	1	1	0.0	0.0	1.0	2.0	1.0	2
6638	Stormwater Sewer	STMH_6830 - STOF_079	N/A	24.00	RCP	117.99		634582.329	26908222.418	0.000	$2,851	01/01/1974	44	75	30	$1,144	$4,325	1	1	0.0	0.0	1.0	2.0	1.0	2
6639	Stormwater Sewer	STCB_10301 - STMH_5404	N/A	18.00	RCP	90.49		632122.758	26897233.345	611.328	$46,402	01/01/1996	22	75	52	$32,239	$49,740	1	1	0.0	0.0	1.0	2.0	1.0	2
6640	Stormwater Sewer	STMH_5409 - STMH_5412	N/A	12.00	RCP	169.82		631517.004	26897231.997	620.717	$29,736	01/01/1991	27	75	47	$18,676	$36,652	1	1	0.0	0.0	1.0	1.0	1.0	1
6641	Stormwater Sewer	SAMH_7505A - SAMH_7517A	N/A	8.00	PVC	64.26		630979.536	26913337.141	0.000	$50,266	01/01/2015	3	75	71	$47,667	$53,389	1	1	0.0	0.0	1.0	1.0	1.0	1
6642	Stormwater Sewer	STMH_8058 - STOF_146	N/A	12.00	PVC	33.45		634925.297	26916728.775	0.000	$13,094	01/01/2016	2	75	72	$12,591	$56,742	1	1	0.0	0.0	1.0	2.0	1.0	2
6643	Stormwater Sewer	STMH_8143 - STMH_8138	N/A	47.00	CP	197.87		637542.194	26914219.282	602.964	$2,574	01/01/1939	79	75	0	$0	$3,929	1	1	0.0	0.0	1.0	4.0	1.1	4.4
6644	Stormwater Sewer	STMH_8425 - STMH_8426	N/A	18.00	RCP	26.38		632685.271	26922640.082	599.079	$47,472	01/01/2004	14	75	60	$38,050	$54,302	1	1	0.0	0.0	1.0	2.0	1.0	2
6645	Stormwater Sewer	STMH_5822 - STMH_STOF094	N/A	24.00	CMP	98.63		623324.202	26907635.815	0.000	$2,089	01/01/1995	23	75	51	$1,423	$2,575	1	1	0.0	0.0	1.0	3.0	1.0	3
6646	Stormwater Sewer	STMH_8238 - STMH_8237	N/A	15.00	RCP	183.55		627112.647	26921573.219	627.179	$24,493	01/01/2014	4	75	70	$22,900	$37,708	1	1	0.0	0.0	1.0	1.0	1.0	1
6647	Stormwater Sewer	STMH_8436 - STMH_8437	N/A	15.00	RCP	189.09		627112.647	26921573.219	601.978	$38,908	01/01/2014	4	75	70	$36,378	$44,940	1	1	0.0	0.0	1.0	4.0	1.0	4
6648	Stormwater Sewer	STMH_8435 - STMH_8435A	N/A	15.00	RCP	109.63		627346.620	26921596.945	0.000	$91,072	01/01/2014	4	75	70	$85,150	$104,597	1	1	0.0	0.0	1.0	3.0	1.0	3
6649	Stormwater Sewer	STMH_8345A - STMH_8436	N/A	15.00	RCP	46.10		627300.641	26921593.538	0.000	$4,103	01/01/2014	4	75	70	$3,836	$15,323	1	1	0.0	0.0	1.0	2.0	1.0	2
6650	Stormwater Sewer	STMH_8206A - STMH_8206	N/A	15.00	CP	120.94		627860.099	26921299.077	628.701	$19,758	01/01/2014	4	75	70	$18,473	$22,375	1	1	0.0	0.0	1.0	2.0	1.0	2
6651	Stormwater Sewer	STCB_14321 - STOF_110	N/A	18.00	RCP	96.17		628926.030	26921919.173	0.000	$15,592	01/01/2014	4	75	70	$14,578	$16,639	1	1	0.0	0.0	1.0	1.0	1.0	1
6652	Stormwater Sewer	STCB_13005 - STCB_8227	N/A	12.00	CP	117.54		626203.162	26921303.328	0.000	$4,435	01/01/2012	6	75	68	$4,028	$4,764	1	1	0.0	0.0	1.0	1.0	1.0	1
6653	Stormwater Sewer	STMH_6438 - STOF_140	N/A	18.00	RCP	71.70		625071.214	26913305.425	0.000	$3,911	01/01/1986	32	75	42	$2,195	$5,225	1	1	0.0	0.0	1.0	1.0	1.0	1
6654	Stormwater Sewer	STCB_13007 - STCB_13005	N/A	12.00	CP	32.85		626225.824	26921418.660	0.000	$19,968	01/01/2012	6	75	68	$18,136	$21,447	1	1	0.0	0.0	1.0	1.0	1.0	1
6655	Stormwater Sewer	STMH_6537A - STMH_6536A	N/A	18.00	CMP	322.99		628793.004	26913027.120	715.108	$2,018	01/01/1960	58	75	16	$432	$3,442	1	1	0.0	0.0	1.0	2.0	1.0	2
6656	Stormwater Sewer	STMH_6537B - STMH_6537A	N/A	12.00	RCP	23.74		628496.034	26912900.099	715.013	$18,155	01/01/1965	53	75	21	$5,105	$29,157	1	1	0.0	0.0	1.0	2.0	1.0	2
6657	Stormwater Sewer	STMH_8121 - STMH_8122	N/A	12.00	RCP	34.26		637719.561	26913295.590	603.016	$19,657	01/01/1998	20	75	54	$14,182	$24,613	1	1	0.0	0.0	1.0	3.0	1.0	3
6658	Stormwater Sewer	STMH_7881 - STMH_7880	N/A	21.00	RCP	40.62		636698.692	26917126.010	594.085	$10,033	01/01/2010	8	75	66	$8,845	$10,705	1	1	0.0	0.0	1.0	5.0	1.0	5
6659	Stormwater Sewer	STMH_6846 - STMH_6839	N/A	15.00	VCP	566.08		635923.096	26910569.859	607.340	$39,301	01/01/1939	79	75	0	$0	$45,589	1	1	0.0	0.0	1.0	1.0	4.0	4
6660	Stormwater Sewer	STMH_6855 - STMH_6846	N/A	15.00	VCP	566.64		635933.953	26911135.830	610.827	$2,343	01/01/1939	79	75	0	$0	$5,227	1	1	0.0	0.0	1.0	4.0	1.0	4
6661	Stormwater Sewer	STMH_6120 - STMH_6121	N/A	36.00	RCP	283.40		631250.526	26905292.691	639.728	$1,811	01/01/1948	70	75	4	$98	$3,750	1	1	0.0	0.0	1.0	3.0	1.0	3
6662	Stormwater Sewer	STMH_6121 - STMH_6122	N/A	36.00	RCP	16.17		631238.514	26905303.508	640.257	$77,884	01/01/1948	70	75	4	$4,233	$176,784	1	1	0.0	0.0	1.0	3.0	1.0	3
6663	Stormwater Sewer	STCB_10325 - STCB_13030	N/A	15.00	RCP	333.83		625419.814	26921838.706	0.000	$9,794	01/01/2012	6	75	68	$8,895	$14,287	1	1	0.0	0.0	1.0	1.0	1.0	1
6664	Stormwater Sewer	STCB_13030 - STCB_13031	N/A	15.00	CP	254.67		625475.177	26922087.287	0.000	$15,459	01/01/2012	6	75	68	$14,041	$16,572	1	1	0.0	0.0	1.0	1.0	1.0	1
6665	Stormwater Sewer	STMH_6122 - STMH_6145	N/A	42.00	RCP	618.12		631260.615	26905921.236	637.335	$37,863	01/01/1948	70	75	4	$2,058	$57,790	1	1	0.0	0.0	1.0	3.0	1.0	3
6666	Stormwater Sewer	STMH_6145 - STOF_074	N/A	42.00	RCP	249.47	Approx 240 Ft of 42"	631269.535	26906170.543	0.000	$73,271	01/01/1948	70	75	4	$3,982	$88,860	1	1	0.0	0.0	1.0	3.0	1.0	3
6667	Stormwater Sewer	STMH_6101 - STMH_6102	N/A	18.00	RCP	10.62		632437.589	26904561.560	644.659	$24,028	01/01/2010	8	75	66	$21,183	$48,360	1	1	0.0	0.0	1.0	1.0	1.0	1
6668	Stormwater Sewer	STMH_6102 - STMH_6106A	N/A	18.00	RCP	304.15		632133.733	26904574.997	644.149	$36,230	01/01/1948	70	75	4	$1,969	$38,914	1	1	0.0	0.0	1.0	1.0	1.0	1
6669	Stormwater Sewer	STMH_6111 - STMH_6114	N/A	12.00	CP	175.24		631804.489	26904586.906	643.538	$1,335	01/01/1949	69	75	5	$90	$2,978	1	1	0.0	0.0	1.0	1.0	1.0	1
6670	Stormwater Sewer	STMH_6171A - STOF_076	N/A	24.00	RCP	519.65		633069.740	26907677.623	0.000	$7,037	01/01/1998	20	75	54	$5,077	$7,544	1	1	0.0	0.0	1.0	3.0	1.0	3
6671	Stormwater Sewer	STMH_6845 - STMH_6845A	N/A	30.00	RCP	88.74		635383.798	26910401.447	632.054	$6,973	01/01/1970	48	75	26	$2,425	$10,683	1	1	0.0	0.0	1.0	3.0	1.0	3
6672	Stormwater Sewer	STMH_5613A - STMH_5613	N/A	8.00	PVC	348.30		632629.321	26901284.485	614.962	$8,589	01/01/2002	16	75	58	$6,655	$19,326	1	1	0.0	0.0	1.0	2.0	1.0	2
6673	Stormwater Sewer	STTD_10705 - STMH_5603	N/A	18.00	CP	269.50		632090.180	26898004.843	617.393	$20,795	01/01/1984	34	75	40	$11,118	$29,225	1	1	0.0	0.0	1.0	1.0	1.0	1
6674	Stormwater Sewer	STMH_5603 - STTD_10704	N/A	18.00	CP	156.95		632079.346	26897848.272	0.000	$30,383	01/01/1984	34	75	40	$16,245	$38,042	1	1	0.0	0.0	1.0	1.0	1.0	1
6675	Stormwater Sewer	STMH_5417 - STMH_5412	N/A	12.00	CP	104.77		631517.004	26897231.997	620.717	$13,119	01/01/1991	27	75	47	$8,239	$16,612	1	1	0.0	0.0	1.0	1.0	1.0	1

CITY OF SAULT STE. MARIE, MICHIGAN

Summary

id	Equipment Description	Asset ID	Construction Drawings Sheet Reference	Capacity or Size	Material	Length	Comment	Northing State Plane Ordinate	Easting State Plane Ordinate	Elevation	Original Cost	Year Installed (01/01/YYYY)	Age	Expected useful life (years)	Remaining Useful Life (years)	Depreciated Value	Replacement Cost	Average number of units in service	Total Number of units	Redundancy (Number)	Redundancy (percent)	Redundancy Score (R) (Reduces (C))	Criticality (C) (see back-up sheets)	Probability of Failure (P) (see back-up sheets)	Business Risk (BRE=PxCxR)
6676	Stormwater Sewer	STMH_5607A - STOF_054	N/A	18.00	CP	185.58		632725.296	26899929.877	0.000	$20,799	01/01/1949	69	75	5	$1,408	$44,913	1	1	0.0	0.0	1.0	2.0	1.0	2
6677	Stormwater Sewer	STMH_6833 - STOF_129	N/A	24.00	RCP	24.57		633948.851	26908006.239	0.000	$3,667	01/01/1968	50	75	24	$1,177	$5,564	1	1	0.0	0.0	1.0	3.0	1.0	3
6678	Stormwater Sewer	STMH_6828A - STMH_6828B	N/A	18.00	RCP	44.69		634599.940	26908721.426	631.843	$11,949	01/01/2009	9	75	65	$10,375	$13,668	1	1	0.0	0.0	1.0	2.0	1.0	2
6679	Stormwater Sewer	STMH_6752 - STMH_6753	N/A	18.00	RCP	223.60		631652.912	26912430.396	706.054	$3,764	01/01/1965	53	75	21	$1,058	$6,045	1	1	0.0	0.0	1.0	1.0	1.0	1
6680	Stormwater Sewer	STMH_6665 - STMH_6666	N/A	24.00	CMP	190.80		629133.543	26913018.260	714.253	$9,545	01/01/1966	52	75	22	$2,811	$14,705	1	1	0.0	0.0	1.0	2.0	1.0	2
6681	Stormwater Sewer	STMH_6666 - STTD_11841	N/A	24.00	CMP	85.99		629149.452	26913102.767	0.000	$10,312	01/01/1966	52	75	22	$3,037	$15,645	1	1	0.0	0.0	1.0	2.0	1.0	2
6682	Stormwater Sewer	STMH_5613B - STMH_5613A	N/A	12.00	VCP	195.87		632281.218	26901296.086	622.798	$3,062	01/01/1939	79	75	0	$0	$5,223	1	1	0.0	0.0	1.0	1.0	1.0	1
6684	Stormwater Sewer	STCB_10737 - STMH_5620	N/A	12.00	RCP	6.73		631293.493	26898642.169	0.000	$13,585	01/01/1996	22	75	52	$9,438	$20,612	1	1	0.0	0.0	1.0	1.0	1.0	1
6685	Stormwater Sewer	STMH_5620 - STCB_10736	N/A	12.00	RCP	93.53		631383.373	26898616.309	0.000	$47,936	01/01/1996	22	75	52	$33,305	$67,369	1	1	0.0	0.0	1.0	1.0	1.0	1
6686	Stormwater Sewer	STCB_10704 - STCB_10702	N/A	18.00	RCP	423.36		632055.523	26897425.585	0.000	$4,574	01/01/1984	34	75	40	$2,445	$6,111	1	1	0.0	0.0	1.0	1.0	1.0	1
6687	Stormwater Sewer	STMH_6616 - STMH_6615	N/A	18.00	RCP	287.28		630010.098	26910549.500	717.232	$16,787	01/01/2001	17	75	57	$12,783	$19,389	1	1	0.0	0.0	1.0	1.0	1.0	1
6688	Stormwater Sewer	STMH_7576A - STMH_7576	N/A	12.00	PVC	35.07		630790.371	26914749.094	634.606	$56,439	01/01/1990	28	75	46	$34,696	$76,127	1	1	0.0	0.0	1.0	1.0	1.0	1
6689	Stormwater Sewer	STMH_7556 - STMH_7548	N/A	15.00	RCP	145.37		631204.280	26915706.043	630.747	$30,040	01/01/1978	40	75	34	$13,657	$46,884	1	1	0.0	0.0	1.0	1.0	1.0	1
6690	Stormwater Sewer	STMH_7567 - STMH_7574	N/A	18.00	RCP	97.05		630332.647	26918410.157	631.908	$7,510	01/01/2010	8	75	66	$6,620	$8,066	1	1	0.0	0.0	1.0	1.0	1.0	1
6691	Stormwater Sewer	STCB_13012 - STCB_13014	N/A	12.00	RCP	187.48		626371.858	26922059.018	0.000	$31,122	01/01/2012	6	75	68	$28,267	$33,361	1	1	0.0	0.0	1.0	1.0	1.0	1
6692	Stormwater Sewer	STCB_14219 - STOF_124	N/A	12.00	RCP	20.81		626380.475	26922077.958	0.000	$14,329	01/01/2011	7	75	67	$12,823	$15,291	1	1	0.0	0.0	1.0	1.0	1.0	1
6693	Stormwater Sewer	STCB_13024 - STCB_13025	N/A	15.00	RCP	67.33		625416.844	26921504.893	0.000	$35,399	01/01/2012	6	75	68	$32,151	$37,946	1	1	0.0	0.0	1.0	1.0	1.0	1
6694	Stormwater Sewer	STCB_14325 - STOF_114	N/A	18.00	RCP	114.25		625543.786	26922372.090	0.000	$6,067	01/01/2012	6	75	68	$5,510	$7,038	1	1	0.0	0.0	1.0	1.0	1.0	1
6695	Stormwater Sewer	STCB_13031 - STCB_13033	N/A	15.00	RCP	111.22		625544.918	26922173.923	0.000	$12,373	01/01/2012	6	75	68	$11,238	$13,263	1	1	0.0	0.0	1.0	1.0	1.0	1
6696	Stormwater Sewer	STCB_13033 - STCB_13035	N/A	15.00	RCP	89.01		625521.998	26922259.935	0.000	$5,729	01/01/2012	6	75	68	$5,203	$8,356	1	1	0.0	0.0	1.0	1.0	1.0	1
6697	Stormwater Sewer	STCB_13017 - STCB_13014	N/A	15.00	CP	223.90		626371.858	26922059.018	0.000	$9,359	01/01/2012	6	75	68	$8,500	$10,032	1	1	0.0	0.0	1.0	1.0	1.0	1
6698	Stormwater Sewer	STMH_6517 - STMH_6518	N/A	48.00	RCP	152.23		627804.561	26911244.852	715.355	$7,103	01/01/1980	38	75	36	$3,418	$11,542	1	1	0.0	0.0	1.0	4.0	1.0	4
6699	Stormwater Sewer	STMH_6518 - STOF_142	N/A	48.00	RCP	414.54		627491.747	26910972.842	0.000	$25,838	01/01/1980	38	75	36	$12,436	$39,437	1	1	0.0	0.0	1.0	4.0	1.0	4
6700	Stormwater Sewer	STMH_6437 - STCB_11647	N/A	8.00	PVC	125.72		626101.957	26910796.985	0.000	$8,532	01/01/2004	14	75	60	$6,838	$11,400	1	1	0.0	0.0	1.0	2.0	1.0	2
6701	Stormwater Sewer	STTD_11103 - STOF131	N/A	24.00	RCP	59.27		631730.719	26902851.649	0.000	$1,138	01/01/2005	13	75	61	$927	$2,561	1	1	0.0	0.0	1.0	1.0	1.0	1
6702	Stormwater Sewer	STMH_8458 - STMH_3802	N/A	12.00	RCP	26.19		634149.191	26921956.562	0.000	$4,930	01/01/1961	57	75	17	$1,123	$10,460	1	1	0.0	0.0	1.0	2.0	1.0	2
6703	Stormwater Sewer	STMH_8057 - STMH_8041	N/A	48.00	RCP	59.99		634196.249	26917636.458	601.600	$4,516	01/01/1949	69	75	5	$305	$4,851	1	1	0.0	0.0	1.0	3.0	1.0	3
6704	Stormwater Sewer	STMH_8502 - STMH_8503	N/A	9.00	VCP	133.88		635295.002	26918391.174	604.591	$15,262	01/01/1939	79	75	0	$0	$32,220	1	1	0.0	0.0	1.0	2.0	1.0	2
6705	Stormwater Sewer	STMH_8464 - STMH_8465	N/A	24.00	PE	181.17		633644.584	26922677.722	0.000	$16,145	01/01/1992	26	75	48	$10,355	$19,580	1	1	0.0	0.0	1.0	2.0	1.0	2
6706	Stormwater Sewer	STMH_8465 - STMH_8466	N/A	24.00	PE	114.50		633746.977	26922728.968	594.087	$8,296	01/01/1992	26	75	48	$5,321	$10,061	1	1	0.0	0.0	1.0	2.0	1.0	2
6707	Stormwater Sewer	STMH_8466 - STMH_8467	N/A	24.00	CP	58.84		633800.036	26922754.395	0.000	$40,949	01/01/1992	26	75	48	$26,265	$51,852	1	1	0.0	0.0	1.0	2.0	1.0	2
6708	Stormwater Sewer	STMH_8467 - STMH_8467A	N/A	30.00	CP	242.30		633702.678	26922976.275	591.228	$28,728	01/01/1992	26	75	48	$18,426	$36,378	1	1	0.0	0.0	1.0	3.0	1.0	3
6709	Stormwater Sewer	STCB_10706 - STCB_10705	N/A	18.00	CP	38.43		632102.458	26898274.063	0.000	$57,261	01/01/1984	34	75	40	$30,616	$72,508	1	1	0.0	0.0	1.0	1.0	1.0	1
6710	Stormwater Sewer	STMH_7090 - STMH_7090A	N/A	15.00	RCP	92.09		637806.401	26912806.009	604.932	$25,035	01/01/1998	20	75	54	$18,062	$31,347	1	1	0.0	0.0	1.0	3.0	1.0	3
6711	Stormwater Sewer	STMH_7510 - STMH_7509	N/A	12.00	RCP	18.41		630113.415	26913177.987	706.592	$27,733	01/01/1965	53	75	21	$7,798	$47,543	1	1	0.0	0.0	1.0	4.0	1.0	4
6712	Stormwater Sewer	STMH_6836A - STOF_005	N/A	48.00	RCP	31.95		636240.823	26910331.010	0.000	$69,070	01/01/1970	48	75	26	$24,030	$94,186	1	1	0.0	0.0	1.0	3.0	1.0	3
6713	Stormwater Sewer	STMH_8119 - STMH_8120	N/A	15.00	RCP	74.06		637735.372	26913205.361	603.251	$10,901	01/01/1998	20	75	54	$7,865	$13,649	1	1	0.0	0.0	1.0	3.0	1.0	3
6714	Stormwater Sewer	STMH_8120 - STMH_8122	N/A	15.00	RCP	91.60		637719.404	26913295.563	603.016	$3,940	01/01/1998	20	75	54	$2,842	$4,968	1	1	0.0	0.0	1.0	3.0	1.0	3
6715	Stormwater Sewer	STMH_8123 - STMH_8132	N/A	18.00	RCP	163.03		637658.496	26913618.056	603.172	$4,782	01/01/1998	20	75	54	$3,450	$6,029	1	1	0.0	0.0	1.0	4.0	1.0	4
6716	Stormwater Sewer	STMH_5401 - STMH_5402	N/A	18.00	RCP	34.41		632249.903	26897224.981	609.345	$11,200	01/01/1991	27	75	47	$7,034	$13,804	1	1	0.0	0.0	1.0	1.0	1.0	1
6717	Stormwater Sewer	STMH_5404 - STMH_5402	N/A	18.00	RCP	127.42		632249.903	26897224.981	609.345	$9,853	01/01/1991	27	75	47	$6,188	$12,337	1	1	0.0	0.0	1.0	2.0	1.0	2
6718	Stormwater Sewer	STMH_5405 - STMH_5403	N/A	15.00	RCP	82.80		632176.497	26897289.286	609.952	$24,184	01/01/1996	22	75	52	$16,802	$29,808	1	1	0.0	0.0	1.0	1.0	1.0	1
6719	Stormwater Sewer	STMH_5407 - STCB_10301	N/A	18.00	RCP	187.47		632036.548	26897205.842	0.000	$5,807	01/01/1996	22	75	52	$4,034	$7,322	1	1	0.0	0.0	1.0	2.0	1.0	2
6720	Stormwater Sewer	STMH_5412 - STMH_5407	N/A	18.00	RCP	333.37		631850.348	26897227.618	0.000	$2,041	01/01/1991	27	75	47	$1,281	$2,574	1	1	0.0	0.0	1.0	2.0	1.0	2
6721	Stormwater Sewer	STMH_5416 - STMH_5417	N/A	12.00	CP	17.75		631412.240	26897230.813	622.685	$13,096	01/01/1991	27	75	47	$8,225	$16,240	1	1	0.0	0.0	1.0	1.0	1.0	1
6722	Stormwater Sewer	STMH_6108 - STMH_6109	N/A	12.00	CP	22.29		632130.366	26904902.611	641.364	$1,449	01/01/1949	69	75	5	$98	$3,232	1	1	0.0	0.0	1.0	2.0	1.1	2.2
6723	Stormwater Sewer	STMH_6518 - STMH_6519	N/A	48.00	RCP	36.99		627767.870	26911240.140	0.000	$122,289	01/01/1980	38	75	36	$58,859	$155,452	1	1	0.0	0.0	1.0	4.0	1.0	4
6724	Stormwater Sewer	STMH_6211A - STOF_125	N/A	18.00	RCP	19.25		625375.006	26907844.208	0.000	$34,666	01/01/2008	10	75	64	$29,636	$39,654	1	1	0.0	0.0	1.0	1.0	1.0	1
6725	Stormwater Sewer	STMH_6420 - STMH_6419	N/A		RCP	26.76		625047.356	26908680.070	699.992	$23,120	01/01/1997	21	75	53	$16,372	$34,164	1	1	0.0	0.0	1.0	2.0	1.0	2
6726	Stormwater Sewer	STMH_6419 - STMH_6418	N/A	15.00	RCP	145.35		625041.419	26908534.844	699.615	$3,051	01/01/1997	21	75	53	$2,160	$3,853	1	1	0.0	0.0	1.0	2.0	1.0	2
6727	Stormwater Sewer	STMH_8423A - STMH_8424	N/A	18.00	RCP	126.69		632789.508	26922378.457	597.672	$18,795	01/01/2005	13	75	61	$15,316	$21,500	1	1	0.0	0.0	1.0	1.0	1.0	1
6728	Stormwater Sewer	STMH_8168 - STMH_8139	N/A	12.00	PVC	413.12		637369.704	26914122.330	604.461	$13,778	01/01/1990	28	75	46	$8,470	$30,736	1	1	0.0	0.0	1.0	3.0	1.0	3
6729	Stormwater Sewer	STMH_8171 - STMH_8170	N/A	8.00	PVC	71.60		637041.558	26914665.898	610.029	$24,615	01/01/1990	28	75	46	$15,132	$27,876	1	1	0.0	0.0	1.0	3.0	1.0	3
6730	Stormwater Sewer	STMH_8170 - STMH_8169	N/A	6.00	ZZZ	99.26		637134.279	26914701.342	609.468	$8,162	01/01/1939	79	75	0	$0	$10,310	1	1	0.0	0.0	1.0	3.0	1.0	3
6731	Stormwater Sewer	STMH_8169 - STMH_8168	N/A	12.00	ZZZ	211.97		637210.907	26914503.707	606.997	$6,353	01/01/1939	79	75	0	$0	$14,294	1	1	0.0	0.0	1.0	3.0	1.0	3
6732	Stormwater Sewer	STMH_6756 - STOF_080	N/A	12.00	CP	74.33		633994.656	26909600.871	0.000	$11,700	01/01/1984	34	75	40	$6,255	$16,786	1	1	0.0	0.0	1.0	1.0	1.0	1
6733	Sanitary Sewer	SAMH_2048EOP - SAMH_2048	N/A	12.00	VCP	100.30	137	635475.982	26911722.198	0.000	$6,519	01/01/1944	74	75	0	$0	$14,543	1	1	0.0	0.0	1.0	1.0	1.0	1
6734	Sanitary Sewer	SAMH_3732EOP - SAMH_3732	N/A	15.00	RCP	12.28	12	630370.305	26919822.550	0.000	$36,542	01/01/1976	42	75	32	$15,637	$53,304	1	1	0.0	0.0	1.0	2.0	1.0	2
6735	Sanitary Sewer	SAMH_3029EOP - SAMH_3029	N/A	12.00	VCP	177.03	Not Active	636333.176	26913028.603	0.000	$11,507	01/01/1939	79	75	0	$0	$25,669	1	1	0.0	0.0	1.0	1.0	1.0	1
6736	Sanitary Sewer	SAMH_1876EOP - SAMH_1876	N/A	8.00	PVC	11.60	11	632091.380	26912762.700	0.000	$1,438	01/01/2001	17	75	57	$1,095	$1,670	1	1	0.0	0.0	1.0	1.0	1.0	1
6737	Sanitary Sewer	SAMH_2662EOP - SAMH_2662	N/A	8.00	PVC	35.62	35	631249.696	26916414.940	0.000	$4,061	01/01/1998	20	75	54	$2,930	$5,129	1	1	0.0	0.0	1.0	1.0	1.0	1
6738	Sanitary Sewer	SAMH_1810EOP - SAMH_1810	N/A	6.00	VCP	35.51	35	633840.734	26910281.581	0.000	$2,628	01/01/1950	68	75	6	$213	$5,113	1	1	0.0	0.0	1.0	2.0	1.0	2
6739	Sanitary Sewer	SAMH_0513EOP - SAMH_0513	N/A	8.00	PVC	11.64	11	630644.869	26901347.940	0.000	$1,094	01/01/1978	40	75	34	$497	$1,676	1	1	0.0	0.0	1.0	2.0	1.0	2
6740	Sanitary Sewer	SAMH_3831EOP - SAMH_3831	N/A	8.00	PVC	75.92	75	633115.434	26922259.866	0.000	$17,319	01/01/2001	17	75	57	$13,189	$33,483	1	1	0.0	0.0	1.0	1.0	1.0	1
6741	Sanitary Sewer	SAMH_3830EOP - SAMH_3830	N/A	8.00	PVC	63.93	63	633348.047	26922380.578	0.000	$31,973	01/01/2001	17	75	57	$24,348	$39,835	1	1	0.0	0.0	1.0	1.0	1.0	1
6742	Sanitary Sewer	SAMH_3503EOP - SAMH_3503	N/A	8.00	PVC	63.27	63	625055.471	26921302.305	0.000	$7,846	01/01/2000	18	75	56	$5,870	$9,111	1	1	0.0	0.0	1.0	1.0	1.0	1
6743	Sanitary Sewer	SAMH_3501EOP - SAMH_3501	N/A	8.00	PVC	40.79	40	625849.245	26921296.554	0.000	$5,058	01/01/2000	18	75	56	$3,784	$5,873	1	1	0.0	0.0	1.0	2.0	1.0	2
6744	Sanitary Sewer	SAMH_1120EOP - SAMH_1120	N/A	8.00	PVC	86.01	215	631056.927	26902742.897	0.000	$10,665	01/01/2001	17	75	57	$8,121	$12,385	1	1	0.0	0.0	1.0	1.0	1.0	1
6745	Sanitary Sewer	SAMH_3641 - SAMH_3641	N/A	8.00	PVC	37.34	332	627197.685	26922464.994	626.474	$8,614	01/01/2001	17	75	57	$6,559	$10,003	1	1	0.0	0.0	1.0	1.0	1.0	1
6746	Sanitary Sewer	SAMH_3167 - SAMH_3166	N/A	12.00	VCP	242.99	250	634497.835	26914316.001	614.900	$18,224	01/01/1939	79	75	0	$0	$37,663	1	1	0.0	0.0	1.0	1.0	5.0	5
6747	Sanitary Sewer	SAMH_2872EOP - SAMH_2872	N/A	9.00	VCP	20.28		632736.145	26913109.219	0.000	$1,298	01/01/1939	79	75	0	$0	$2,920	1	1	0.0	0.0	1.0	1.0	1.0	1
6748	Sanitary Sewer	SAMH_1865AEOP - SAMH_1865A	N/A	9.00	VCP	25.69	Inactive	632697.179	26911758.055	0.000	$1,644	01/01/1939	79	75	0	$0	$3,700	1	1	0.0	0.0	1.0	1.0	1.0	1
6749	Sanitary Sewer	SAMH_1865AEOP2 - SAMH_1865A	N/A	9.00	VCP	26.57	Inactive	632697.179	26911758.055	0.000	$1,700	01/01/1939	79	75	0	$0	$3,826	1	1	0.0	0.0	1.0	1.0	1.0	1
6750	Sanitary Sewer	SAMH_0603EOP - SAMH_0603	N/A	8.00	PVC	6.85	10' Capped Off	631558.156	26897356.299	0.000	$850	01/01/2001	17	75	57	$647	$987	1	1	0.0	0.0	1.0	1.0	1.0	1
6751	Sanitary Sewer	SAMH_2222EOP - SAMH_2222	N/A	8.00	PVC	70.00		637459.144	26912508.561	0.000	$8,680	01/01/2001	17	75	57	$6,610	$10,080	1	1	0.0	0.0	1.0	1.0	1.0	1
6752	Sanitary Sewer	SAMH_2821EOP - SAMH_2821	N/A	8.00	PVC	9.06	9	633542.306	26913516.403	0.000	$1,124	01/01/2001	17	75	57	$855	$1,305	1	1	0.0	0.0	1.0	1.0	1.0	1
6753	Sanitary Sewer	SAMH_2209EOP - SAMH_2209	N/A	8.00	PVC	64.26	64	636873.437	26910363.763	0.000	$7,968	01/01/2001	17	75	57	$6,067	$9,253	1	1	0.0	0.0	1.0	2.0	1.0	2
6754	Sanitary Sewer	SAMH_1001EOP - SAMH_1001	N/A	8.00	VCP	6.71	Stub	630188.197	26904001.910	0.000	$631	01/01/1976	42	75	32	$270	$966	1	1	0.0	0.0	1.0	1.0	1.0	1
6755	Sanitary Sewer	SAMH_2897EOP - SAMH_2897	N/A	8.00	VCP	92.15	92	631464.132	26914136.021	0.000	$6,819	01/01/1950	68	75	6	$552	$13,269	1	1	0.0	0.0	1.0	1.0	1.0	1
6756	Sanitary Sewer	SAMH_2832EOP - SAMH_2832	N/A	12.00	VCP	28.88		634101.534	26914121.235	0.000	$1,877	01/01/1939	79	75	0	$0	$4,187	1	1	0.0	0.0	1.0	4.0	1.0	4
6757	Sanitary Sewer	SAMH_3701 - SAMH_3701EOP	N/A	8.00	PVC	69.46		631724.875	26921056.870	0.000	$43,598	01/01/2001	17	75	57	$33,201	$50,204	1	1	0.0	0.0	1.0	1.0	1.0	1
6758	Sanitary Sewer	SAMH_3077EOP - SAMH_3077	N/A	8.00	PVC	108.67		636635.770	26915861.152	0.000	$14,562	01/01/2015	3	75	71	$13,809	$15,649	1	1	0.0	0.0	1.0	2.0	1.0	2
6759	Sanitary Sewer	SAMH_1823EOP - SAMH_1823	N/A		VCP	20.02		632965.499	26909380.881	0.000	$1,481	01/01/1950	68	75	6	$120	$2,882	1	1	0.0	0.0	1.0	3.0	1.0	3
6760	Sanitary Sewer	SAMH_1131EOP - SAMH_1131	N/A	10.00	PVC	83.93		631135.288	26904293.965	0.000	$8,729	01/01/1980	38	75	36	$4,201	$12,086	1	1	0.0	0.0	1.0	1.0	1.0	1
6761	Sanitary Sewer	SAMH_1161EOP - SAMH_1161	N/A		VCP	104.15		633214.766	26906769.187	0.000	$6,665	01/01/1939	79	75	0	$0	$14,997	1	1	0.0	0.0	1.0	3.0	4.0	12
6762	Sanitary Sewer	SAMH_1514AEOP -SAMH_1514A	N/A	8.00	PVC	67.22	178	625823.789	26910702.811	0.000	$8,335	01/01/2001	17	75	57	$6,347	$9,680	1	1	0.0	0.0	1.0	4.0	1.0	4
6763	Sanitary Sewer	SAMH_2670EOP - SAMH_2670	N/A	8.00	VCP	199.74		630605.627	26917744.476	0.000	$16,778	01/01/1961	57	75	17	$3,822	$28,763	1	1	0.0	0.0	1.0	1.0	1.0	1
6764	Sanitary Sewer	SAMH_0724EOP - SAMH_0724	N/A	8.00	PVC	10.59		622972.755	26908428.823	0.000	$1,207	01/01/1999	19	75	55	$886	$1,525	1	1	0.0	0.0	1.0	1.0	1.0	1
6765	Stormwater Sewer	STMH_6742EOP - STMH_6742	N/A	12.00	RCP	53.04		632094.580	26911766.052	0.000	$35,451	01/01/1984	34	75	40	$18,955	$54,110	1	1	0.0	0.0	1.0	1.0	1.0	1
6766	Stormwater Sewer	STMH_6718BEOP - STMH_6718B	N/A	18.00	CP	148.03	To college parking lot C	632792.150	26910318.340	0.000	$8,996	01/01/1991	27	75	47	$5,650	$10,391	1	1	0.0	0.0	1.0	2.0	1.0	2
6767	Stormwater Sewer	STMH_7871EOP - STMH_7871	N/A	21.00	RCP	25.84		635588.523	26914154.013	0.000	$9,687	01/01/1994	24	75	50	$6,472	$14,131	1	1	0.0	0.0	1.0	1.0	1.0	1
6768	Stormwater Sewer	STMH_7851EOP - STMH_7851	N/A	24.00	RCP	67.17		636230.860	26913928.983	0.000	$20,319	01/01/1998	20	75	54	$14,660	$29,611	1	1	0.0	0.0	1.0	1.0	1.0	1
6769	Stormwater Sewer	STMH_7828EOP - STMH_7828	N/A	12.00	RCP	27.96		636217.093	26915146.653	0.000	$12,207	01/01/1990	28	75	46	$7,504	$15,045	1	1	0.0	0.0	1.0	1.0	1.0	1
6770	Stormwater Sewer	STMH_7511EOP - STMH_7511	N/A	21.00	RCP	62.39		629893.313	26913179.111	0.000	$9,057	01/01/1967	51	75	23	$2,788	$15,526	1	1	0.0	0.0	1.0	1.0	1.0	1
6771	Stormwater Sewer	STMH_7506EOP - STMH_7506	N/A	6.00	PVC	15.67		630785.972	26913167.979	0.000	$3,042	01/01/1965	53	75	21	$855	$4,880	1	1	0.0	0.0	1.0	1.0	1.0	1
6772	Stormwater Sewer	STMH_5604A - STMH_5604B	N/A	15.00	RCP	30.69		632113.272	26898601.276	0.000	$9,703	01/01/1996	22	75	52	$6,741	$16,553	1	1	0.0	0.0	1.0	1.0	1.0	1
6773	Stormwater Sewer	STMH_6536AEOP - STMH_6536A	N/A	24.00	RCP	214.37		628793.004	26913027.120	0.000	$19,754	01/01/1980	38	75	36	$9,507	$30,432	1	1	0.0	0.0	1.0	2.0	1.0	2
6774	Stormwater Sewer	STMH_7527EOP - STMH_7527	N/A	10.00	VCP	34.87		631497.329	26915362.859	630.693	$1,226	01/01/1939	79	75	0	$0	$2,734	1	1	0.0	0.0	1.0	1.0	1.0	1
6775	Stormwater Sewer	STMH_7833EOP - STMH_7833	N/A	12.00	VCP	27.03	Needs Bulkhead to East	636653.086	26915344.645	0.000	$3,912	01/01/1939	79	75	0	$0	$4,193	1	1	0.0	0.0	1.0	1.0	1.0	1
6776	Stormwater MH	STUB4	N/A	12.00	CP	15.03	12" Conc Collapsed and filled with dirt	635270.699	26917686.754	0.000	$4,261	01/01/1950	68	75	6	$345	$4,825	1	1	0.0	0.0	1.0	1.0	1.0	1
6777	Stormwater MH	STUB1	N/A	8.00	CP	7.94		636140.620	26912559.284	0.000	$7,159	01/01/1962	56	75	18	$1,726	$12,273	1	1	0.0	0.0	1.0	1.0	1.0	1
6778	Stormwater MH	STUB2	N/A	6.00	PVC	85.23		636027.694	26912774.018	0.000	$1,643	01/01/1966	52	75	22	$483	$2,816	1	1	0.0	0.0	1.0	1.0	1.0	1
6779	Stormwater MH	STUB3	N/A	8.00	CP	19.56		636209.631	26912766.181	0.000	$1,127	01/01/1962	56	75	18	$271	$2,179	1	1	0.0	0.0	1.0	1.0	1.0	1
6780	Stormwater Sewer	STMH_6812AEOP - STMH_6812A	N/A	8.00	CP	55.27		636656.606	26912377.070	0.000	$31,895	01/01/1994	24	75	50	$21,309	$46,525	1	1	0.0	0.0	1.0	2.0	1.0	2
6781	Stormwater Sewer	STMH_6872AEOP - STMH_6872A	N/A	6.00	PVC	79.04		634921.981	26912356.269	0.000	$8,790	01/01/2001	17	75	57	$6,693	$19,608	1	1	0.0	0.0	1.0	1.0	1.0	1
6782	Stormwater Sewer	STMH_7706EOP - STMH_7706	N/A	30.00	CMP	60.00	Bulkheaded with 8" PVC Going into it	634172.519	26917091.439	0.000	$1,894	01/01/1950	68	75	6	$153	$2,349	1	1	0.0	0.0	1.0	1.0	1.0	1
6783	Stormwater MH	STUB6	N/A	24.00	RCP	279.50		632144.452	26896915.362	0.000	$0	01/01/1980	38	75	36	$0	$0	1	1	0.0	0.0	1.0	1.0	1.0	1
6784	Stormwater Sewer	STMH_7517A - STMH_7517	N/A	8.00	PVC	169.43		631148.925	26913341.025	0.000	$30,443	01/01/2015	3	75	71	$28,869	$56,351	1	1	0.0	0.0	1.0	1.0	1.0	1
6785	Stormwater Sewer	STMH_5411EOP - STMH_5411	N/A	18.00	RCP	53.53		631581.156	26897210.730	0.000	$45,672	01/01/1991	27	75	47	$28,686	$55,673	1	1	0.0	0.0	1.0	1.0	1.0	1
6786	Stormwater Sewer	STMH_5408 - STMH_5409	N/A	12.00	RCP	50.50		631515.205	26897062.189	0.000	$19,529	01/01/1991	27	75	47	$12,265	$24,624	1	1	0.0	0.0	1.0	1.0	1.0	1
6787	Stormwater Sewer	STMH_5411EOP - STMH_5411	N/A	18.00	RCP	230.51		631527.641	26897211.886	0.000	$6,905	01/01/1991	27	75	47	$4,336	$8,511	1	1	0.0	0.0	1.0	1.0	1.1	1.1
6788	Stormwater Sewer	SAMH_0603A - STMH_5416	N/A	12.00	RCP	114.30		631414.382	26897213.194	0.000	$13,145	01/01/1991	27	75	47	$8,256	$16,574	1	1	0.0	0.0	1.0	1.0	1.0	1
6789	Stormwater Sewer	STMH_6435EOP - STMH_6435	N/A	30.00	RCP	108.24		623414.650	26910238.746	0.000	$15,590	01/01/2004	14	75	60	$12,495	$18,104	1	1	0.0	0.0	1.0	1.0	1.0	1
6790	Stormwater Sewer	STMH_6438EOP - STMH_6438	N/A	18.00	RCP	32.86		625066.855	26913233.858	0.000	$57,178	01/01/1986	32	75	42	$32,099	$87,271	1	1	0.0	0.0	1.0	1.0	1.0	1
6791	Stormwater Sewer	STMH_6828BEOP - STMH_6828B	N/A	15.00	RCP	67.01		634599.940	26908721.426	0.000	$21,297	01/01/2009	9	75	65	$18,491	$24,027	1	1	0.0	0.0	1.0	2.0	1.0	2
6792	Stormwater Sewer	STMH_5613BEOP - STMH_5613B	N/A	12.00	VCP	36.02		632085.452	26901302.568	0.000	$2,516	01/01/1960	58	75	16	$539	$4,313	1	1	0.0	0.0	1.0	1.0	1.0	1
6793	Stormwater Sewer	STMH_5613BEOP2 - STMH_5613B	N/A	6.00	VCP	29.95		632085.452	26901302.568	0.000	$7,606	01/01/1960	58	75	16	$1,631	$8,833	1	1	0.0	0.0	1.0	1.0	1.0	1
6794	Stormwater Sewer	STMH_5613AEOP - STMH_5613A	N/A	8.00	VCP	134.21		632281.211	26901296.102	622.798	$12,732	01/01/1939	79	75	0	$0	$28,402	1	1	0.0	0.0	1.0	1.0	1.0	1
6795	Stormwater Sewer	STMH_7575EOP - STMH_7575	N/A	18.00	CP	10.91	Bulkheaded	630834.356	26914744.700	0.000	$4,034	01/01/1950	68	75	6	$326	$5,086	1	1	0.0	0.0	1.0	1.0	1.0	1
6796	Stormwater MH	STUB5	N/A	24.00	RCP	28.22		631889.179	26902968.279	0.000	$36,614	01/01/2005	13	75	61	$29,836	$47,794	1	1	0.0	0.0	1.0	1.0	1.0	1
6797	Stormwater Sewer	STMH_5402EOP - STMH_5402	N/A	18.00	RCP	86.82		632273.273	26897308.595	0.000	$16,437	01/01/1991	27	75	47	$10,323	$20,260	1	1	0.0	0.0	1.0	2.0	1.0	2
6798	Stormwater Sewer	STMH_6418EOP - STMH_6418	N/A	15.00	RCP	374.49		625028.859	26908160.563	0.000	$18,750	01/01/1997	21	75	53	$13,278	$23,110	1	1	0.0	0.0	1.0	2.0	1.0	2
9	Lift Station	PS004	N/A	N/A	N/A	N/A		625675.231	26908036.353	0.000	$100,000	1/1/1966	52	30	0	$0	$300,000	1	1	0.0	0.0	1.0	4.0	2.0	8
10	Lift Station	PS008	N/A	N/A	N/A	N/A		636661.123	26917071.090	N/A	$1,000,000	1/1/2011	7	30	23	$766,667	$1,200,000	1	1	0.0	0.0	1.0	4.0	2.0	8
11	Lift Station	PS006	N/A	N/A	N/A	N/A		632002.507	26897302.150	N/A	$200,000	1/1/1998	20	30	10	$66,667	$400,000	1	1	0.0	0.0	1.0	5.0	2.0	10
12	Lift Station	PS001	N/A	N/A	N/A	N/A		632578.060	26901263.771	N/A	$100,000	1/1/1961	57	30	0	$0	$600,000	1	1	0.0	0.0	1.0	3.0	2.0	6
13	Lift Station	PS005	N/A	N/A	N/A	N/A		627167.175	26926442.694	N/A	$250,000	1/1/1976	42	30	0	$0	$800,000	1	1	0.0	0.0	1.0	3.0	2.0	6
15	Lift Station	PS002	N/A	N/A	N/A	N/A		610438.765	26913797.447	N/A	$0	N/A	N/A	30	N/A	N/A	$0	1	1	0.0	0.0	1.0	3.0	2.0	6
18	Lift Station	PS003	N/A	N/A	N/A	N/A		623682.146	26904564.598	N/A	$350,000	1/1/2015	3	30	27	$315,000	$350,000	1	1	0.0	0.0	1.0	0.0	2.0	0
19	Lift Station	PS007	N/A	N/A	N/A	N/A		637056.910	26917546.827	N/A	$0	N/A	N/A	30	N/A	N/A	$0	1	1	0.0	0.0	1.0	2.0	1.0	2
20	Lift Station	PS010	N/A	N/A	N/A	N/A		618413.809	26919752.491	N/A	$0	N/A	N/A	30	N/A	N/A	$0	1	1	0.0	0.0	1.0	0.0	1.0	0
21	Lift Station	PS009	N/A	N/A	N/A	N/A		617136.719	26921472.045	N/A	$0	N/A	N/A	30	N/A	N/A	$0	1	1	0.0	0.0	1.0	0.0	1.0	0
6799	WWTP	AS-BD-001	N/A	N/A	N/A	N/A	Administration and Pretreatment Building and Substructure (1960/1985)	N/A	N/A	N/A	$0	6/1/1960	58	75	17	$0	$1,741,731	1	1	0.0	0.0	1.0	0.0	1.0	6.25
6800	WWTP	AS-BD-002	N/A	N/A	N/A	N/A	Primary Treatment And Service Building (1960)	N/A	N/A	N/A	$0	6/1/1960	58	75	17	$0	$1,597,155	1	1	0.0	0.0	1.0	3.0	4.0	12
6801	WWTP	AS-BD-003	N/A	N/A	N/A	N/A	Administration/Pretreatment Shingle Roofs	N/A	N/A	N/A	$25,605	6/1/2010	8	20	12	$15,363	$30,000	1	1	0.0	0.0	1.0	3.0	2.0	6
6802	WWTP	AS-BD-004	N/A	N/A	N/A	N/A	Primary Treatment/Service Building Membrane Roofs	N/A	N/A	N/A	$17,544	6/1/1984	34	35	1	$501	$34,398	1	1	0.0	0.0	1.0	3.0	3.0	9
6803	WWTP	AS-BD-005	N/A	N/A	N/A	N/A	Administration/Pretreatment Building, Windows and Doors	N/A	N/A	N/A	$30,394	6/1/1985	33	50	17	$10,334	$58,425	1	1	0.3	0.3	0.5	2.5	2.0	2.5
6804	WWTP	AS-BD-006	N/A	N/A	N/A	N/A	Primary Settling/Service Building, Windows and Doors	N/A	N/A	N/A	$0	6/1/1960	58	60	2	$0	$80,642	1	1	0.3	0.3	0.5	2.5	3.5	4.375
6805	WWTP	AS-BD-007	N/A	N/A	N/A	N/A	Laboratory Casework and Accessory Cabinetry	N/A	N/A	N/A	$45,187	6/1/1985	33	40	7	$7,908	$86,860	1	1	0.0	0.0	1.0	3.0	2.5	7.5
6806	WWTP	AS-BD-008	N/A	N/A	N/A	N/A	Service Building Elevator	N/A	N/A	N/A	$0	6/1/1960	58	60	2	$0	$130,000	1	1	0.0	0.0	1.0	4.0	5.0	20
6807	WWTP	AS-P-001	N/A	N/A	N/A	N/A	Automatic Samplers, RS, PE, and FE	N/A	N/A	N/A	$11,774	6/1/1985	33	40	7	$2,060	$22,632	3	3	0.0	0.0	1.0	4.0	3.0	12
6808	WWTP	AS-P-002	N/A	N/A	N/A	N/A	Sample Pumps	N/A	N/A	N/A	$8,638	6/1/1985	33	35	2	$494	$16,605	4	4	0.0	0.0	1.0	4.0	2.5	10
6809	WWTP	AS-P-003	N/A	N/A	N/A	N/A	Oxidative Liquor Pumps	N/A	N/A	N/A	$21,116	6/1/1985	33	50	17	$7,179	$40,590	2	2	0.0	0.0	1.0	2.0	2.5	5
6810	WWTP	AS-M-001	N/A	N/A	N/A	N/A	Administration/Pretreatment and Digester Heating Supply Units	N/A	N/A	N/A	$12,286	6/1/1985	33	40	7	$2,150	$23,616	1	1	0.0	0.0	1.0	4.0	3.0	12
6811	WWTP	AS-M-002	N/A	N/A	N/A	N/A	Administration/Pretreatment Heating, Ventilation, and Cooling Units	N/A	N/A	N/A	$6,655	6/1/1985	33	40	7	$1,165	$12,792	1	1	0.0	0.0	1.0	3.0	3.0	9
6812	WWTP	AS-M-003	N/A	N/A	N/A	N/A	Administration/Pretreatment Roof Ventilators, Fans, Intake Dampers	N/A	N/A	N/A	$9,913	6/1/1985	33	40	7	$1,735	$19,055	1	1	0.0	0.0	1.0	3.0	2.5	7.5
6813	WWTP	AS-M-004	N/A	N/A	N/A	N/A	Office and Laboratory Air Condition System	N/A	N/A	N/A	$10,558	6/1/1985	33	35	2	$603	$20,295	1	1	0.0	0.0	1.0	3.0	4.0	12
6814	WWTP	AS-M-005	N/A	N/A	N/A	N/A	Screen Area HV Unit	N/A	N/A	N/A	$2,943	6/1/1985	33	35	2	$168	$5,658	1	1	0.0	0.0	1.0	3.5	2.5	8.75
6815	WWTP	AS-M-006	N/A	N/A	N/A	N/A	Headworks Duplex Sump Pump Equipment	N/A	N/A	N/A	$21,836	6/1/1985	33	40	7	$3,821	$41,974	1	1	0.0	0.0	1.0	4.0	4.5	18
6816	WWTP	AS-M-007	N/A	N/A	N/A	N/A	High Pressure Air Supply Equipment	N/A	N/A	N/A	$3,373	6/1/1985	33	50	17	$1,147	$6,483	1	1	0.0	0.0	1.0	3.5	4.0	14
6817	WWTP	AS-M-008	N/A	N/A	N/A	N/A	Primary Settling and Service Building, Heating Supply Units	N/A	N/A	N/A	$7,727	6/1/1985	33	35	2	$442	$14,852	1	1	0.0	0.0	1.0	3.0	2.5	7.5

CITY OF SAULT STE. MARIE, MICHIGAN

Summary

id	Equipment Description	Asset ID	Construction Drawings Sheet Reference	Capacity or Size	Material	Length	Comment	Northing State Plane Ordinate	Easting State Plane Ordinate	Elevation	Original Cost	Year Installed (01/01/YYYY)	Age	Expected useful life (years)	Remaining Useful Life (years)	Depreciated Value	Replacement Cost	Average number of units in service	Total Number of units	Redundancy (Number)	Redundancy (percent)	Redundancy Score (R) (Reduces (C))	Criticality (C) (see back-up sheets)	Probability of Failure (P) (see back-up sheets)	Business Risk (BRE=PxCxR)
6818	WWTP	AS-M-009	N/A	N/A	N/A	N/A	Primary Settling and Service Building, Ventilation Equipment	N/A	N/A	N/A	$3,711	6/1/1985	33	40	7	$649	$7,134	1	1	0.0	0.0	1.0	3.0	3.0	9
6819	WWTP	AS-M-010	N/A	N/A	N/A	N/A	Prim. Settling and Service Bldg., Roof Ventilators, Fans, Intake Dampers	N/A	N/A	N/A	$2,240	6/1/1985	33	40	7	$392	$4,305	1	1	0.0	0.0	1.0	3.0	3.0	9
6820	WWTP	AS-M-011	N/A	N/A	N/A	N/A	Service Water Pumping System	N/A	N/A	N/A	$15,607	6/1/1985	33	50	17	$5,306	$30,000	1	1	0.0	0.0	1.0	4.5	5.0	22.5
6821	WWTP	AS-M-012	N/A	N/A	N/A	N/A	Potable Water System and Accessories	N/A	N/A	N/A	$46,599	6/1/1985	33	50	17	$15,844	$89,575	1	1	0.0	0.0	1.0	3.0	2.5	7.5
6822	WWTP	AS-E-001	N/A	N/A	N/A	N/A	Administration/Pretreatment 480 Volt Power Supply, MCC-B/MCC-F	N/A	N/A	N/A	$50,657	6/1/1985	33	50	17	$17,223	$97,375	1	1	0.0	0.0	1.0	5.0	2.5	12.5
6823	WWTP	AS-E-002	N/A	N/A	N/A	N/A	Administration/Pretreatment Low Voltage Electrical Distribution	N/A	N/A	N/A	$51,777	6/1/1985	33	50	17	$17,604	$99,528	1	1	0.0	0.0	1.0	3.0	2.0	6
6824	WWTP	AS-E-003	N/A	N/A	N/A	N/A	Administration/Pretreatment Lighting	N/A	N/A	N/A	$20,711	6/1/1985	33	40	7	$3,624	$39,811	1	1	0.0	0.0	1.0	3.0	2.5	7.5
6825	WWTP	AS-E-004	N/A	N/A	N/A	N/A	Service Bldg., 480 Volt Distribution, LV Substation 1 and MCC-A/MCC-E	N/A	N/A	N/A	$66,654	6/1/1985	33	50	17	$22,662	$128,125	1	1	0.0	0.0	1.0	5.0	2.5	12.5
6826	WWTP	AS-E-005	N/A	N/A	N/A	N/A	Standby Power Generator, Diesel Fired	N/A	N/A	N/A	$89,157	6/1/1985	33	50	17	$30,313	$171,380	1	1	0.0	0.0	1.0	4.0	2.5	10
6827	WWTP	AS-E-006	N/A	N/A	N/A	N/A	Diesel Storage, 250 Gallon, Basement	N/A	N/A	N/A	$1,249	6/1/1985	33	50	17	$425	$2,400	2	2	0.0	0.0	1.0	3.0	2.5	7.5
6828	WWTP	AS-E-007	N/A	N/A	N/A	N/A	Prim. Settling and Service Bldg., Low Voltage Electrical Distribution	N/A	N/A	N/A	$47,479	6/1/1985	33	40	7	$8,309	$91,266	1	1	0.0	0.0	1.0	3.0	2.5	7.5
6829	WWTP	AS-E-008	N/A	N/A	N/A	N/A	Primary Settling and Service Building Lighting	N/A	N/A	N/A	$0	6/1/1960	58	60	2	$0	$36,506	1	1	0.0	0.0	1.0	3.0	3.0	9
6830	WWTP	AS-I-001	N/A	N/A	N/A	N/A	Main Control Panel, Administration Area	N/A	N/A	N/A	$57,046	6/1/1985	33	40	7	$9,983	$109,656	1	1	0.0	0.0	1.0	4.5	3.5	15.75
6831	WWTP	AS-I-002	N/A	N/A	N/A	N/A	Control Panel 1, Service Building	N/A	N/A	N/A	$13,331	6/1/1985	33	35	2	$762	$25,625	1	1	0.0	0.0	1.0	4.5	3.0	13.5
6832	WWTP	AS-I-003	N/A	N/A	N/A	N/A	Flow Meters, Lot	N/A	N/A	N/A	$14,931	6/1/1985	33	35	2	$853	$28,700	1	1	0.0	0.0	1.0	4.0	3.0	12
6833	WWTP	AS-I-004	N/A	N/A	N/A	N/A	Level Sensors, Position Sensors	N/A	N/A	N/A	$4,399	6/1/1985	33	35	2	$251	$8,456	1	1	0.0	0.0	1.0	4.0	2.5	10
6834	WWTP	AS-OM-001	N/A	N/A	N/A	N/A	Office Equipment	N/A	N/A	N/A	$4,177	6/1/1989	29	40	11	$1,149	$7,417	1	1	0.0	0.0	1.0	2.0	3.0	6
6835	WWTP	AS-OM-002	N/A	N/A	N/A	N/A	Maintenance Equipment	N/A	N/A	N/A	$15,179	6/1/1997	21	30	9	$4,554	$23,006	1	1	0.0	0.0	1.0	3.0	2.5	7.5
6836	WWTP	AS-OM-003	N/A	N/A	N/A	N/A	Laboratory Equipment	N/A	N/A	N/A	$28,086	6/1/1989	29	35	6	$4,815	$49,877	1	1	0.0	0.0	1.0	3.0	3.0	9
6837	WWTP	HW-P-001-1	N/A	N/A	N/A	N/A	Raw Sewage Screw Pump No. 1	N/A	N/A	N/A	$65,463	6/1/1985	33	50	17	$22,257	$125,835	1	1	0.0	0.0	1.0	5.0	4.5	22.5
6838	WWTP	HW-P-001-2	N/A	N/A	N/A	N/A	Raw Sewage Screw Pump No. 2	N/A	N/A	N/A	$65,463	6/1/1985	33	50	17	$22,257	$125,835	1	1	0.0	0.0	1.0	5.0	4.5	22.5
6839	WWTP	HW-P-001-3	N/A	N/A	N/A	N/A	Raw Sewage Screw Pump No. 3	N/A	N/A	N/A	$65,463	6/1/1985	33	50	17	$22,257	$125,835	1	1	0.0	0.0	1.0	5.0	4.5	22.5
6840	WWTP	HW-P-001-4	N/A	N/A	N/A	N/A	Raw Sewage Screw Pump No. 4	N/A	N/A	N/A	$65,463	6/1/1985	33	50	17	$22,257	$125,835	1	1	0.0	0.0	1.0	5.0	4.5	22.5
6841	WWTP	HW-P-001-5	N/A	N/A	N/A	N/A	Raw Sewage Screw Pump No. 5	N/A	N/A	N/A	$120,948	6/1/2016	2	50	48	$116,110	$125,835	1	1	0.0	0.0	1.0	4.0	1.0	4
6842	WWTP	HW-P-002	N/A	N/A	N/A	N/A	Mechanical Coarse Screen	N/A	N/A	N/A	$83,757	6/1/1985	33	50	17	$28,477	$161,000	1	1	0.0	0.0	0.5	4.0	4.0	8
6843	WWTP	HW-P-003	N/A	N/A	N/A	N/A	Eductor Grit, Equipment	N/A	N/A	N/A	$47,991	6/1/1985	33	40	7	$8,398	$92,250	1	1	0.3	0.3	1.0	4.0	5.0	20
6844	WWTP	HW-P-004-1	N/A	N/A	N/A	N/A	Eductor Grit Blowers, Electric Motor, No. 1	N/A	N/A	N/A	$15,213	12/4/2004	13	30	17	$8,621	$19,680	1	1	0.0	0.0	1.0	4.0	2.5	10
6845	WWTP	HW-P-004-2	N/A	N/A	N/A	N/A	Eductor Grit Blowers, Digester Gas Motor, No. 2	N/A	N/A	N/A	$10,238	12/4/1985	33	40	7	$1,792	$19,680	1	1	0.0	0.0	1.0	3.0	5.0	15
6846	WWTP	HW-P-005	N/A	N/A	N/A	N/A	Grit Screw Classifier	N/A	N/A	N/A	$29,965	6/1/1985	33	40	7	$5,244	$57,600	1	1	0.0	0.0	0.5	4.0	4.5	9
6847	WWTP	HW-P-006	N/A	N/A	N/A	N/A	Hydraulic Gates, Pretreatment	N/A	N/A	N/A	$29,222	6/1/1996	22	40	18	$13,150	$45,177	1	1	0.3	0.3	0.5	3.0	4.5	6.75
6848	WWTP	HW-P-007	N/A	N/A	N/A	N/A	Process Valves, Pretreatment	N/A	N/A	N/A	$5,247	6/1/1985	33	50	17	$1,784	$10,086	1	1	0.3	0.3	0.5	3.0	2.5	3.75
6849	WWTP	HW-P-008	N/A	N/A	N/A	N/A	Process Piping, Pretreatment	N/A	N/A	N/A	$9,221	6/1/1985	33	75	42	$5,164	$17,724	1	1	0.3	0.3	1.0	3.0	2.0	6
6850	WWTP	PT-TK-001	N/A	N/A	N/A	N/A	Primary Settling Tanks and Channels	N/A	N/A	N/A	$0	6/1/1960	58	75	17	$0	$274,560	1	1	0.0	0.0	1.0	3.0	2.0	6
6851	WWTP	PT-P-001	N/A	N/A	N/A	N/A	Primary Settling Chain and Rake Equipment and Drives	N/A	N/A	N/A	$105,835	6/1/2013	5	30	25	$88,196	$116,850	4	4	0.0	0.0	1.0	4.0	2.0	8
6852	WWTP	PT-P-002	N/A	N/A	N/A	N/A	Primary Tank Scum Collectors	N/A	N/A	N/A	$7,359	6/1/1985	33	50	17	$2,502	$14,145	4	4	0.0	0.0	1.0	4.0	3.0	12
6853	WWTP	PT-P-003	N/A	N/A	N/A	N/A	Primary Effluent Weirs	N/A	N/A	N/A	$5,827	6/1/1985	33	50	17	$1,981	$11,200	4	4	0.0	0.0	1.0	4.0	2.0	8
6854	WWTP	PT-P-004	N/A	N/A	N/A	N/A	Primary Tank Drain Pumps, Original Headworks Pumps	N/A	N/A	N/A	$0	6/1/1960	58	60	2	$0	$60,000	1	1	0.0	0.0	1.0	3.5	4.0	14
6855	WWTP	PT-P-005	N/A	N/A	N/A	N/A	Primary Scum Pump	N/A	N/A	N/A	$11,237	6/1/1985	33	40	7	$1,966	$21,600	1	1	0.0	0.0	1.0	3.5	3.5	12.25
6856	WWTP	PT-P-006	N/A	N/A	N/A	N/A	Primary Sludge Pumps	N/A	N/A	N/A	$28,155	6/1/1985	33	50	17	$9,573	$54,120	1	1	0.0	0.0	1.0	4.0	3.0	12
6857	WWTP	PT-P-007	N/A	N/A	N/A	N/A	Primary Sludge Valves	N/A	N/A	N/A	$3,006	6/1/1985	33	50	17	$1,022	$5,778	1	1	0.0	0.0	0.5	3.0	3.0	4.5
6858	WWTP	PT-P-008	N/A	N/A	N/A	N/A	Primary Sludge Piping	N/A	N/A	N/A	$0	6/1/1960	58	75	17	$0	$11,347	1	1	0.3	0.3	1.0	3.0	2.0	6
6859	WWTP	ST-BD-001	N/A	N/A	N/A	N/A	RBC Gallery Building	N/A	N/A	N/A	$149,306	6/1/1985	33	50	17	$50,764	$287,000	2	2	0.0	0.0	1.0	3.0	2.5	7.5
6860	WWTP	ST-BD-002	N/A	N/A	N/A	N/A	RBC Building Roofs	N/A	N/A	N/A	$3,805	6/1/1995	23	35	12	$1,305	$6,000	1	1	0.0	0.0	1.0	3.0	2.5	7.5
6861	WWTP	ST-BD-003	N/A	N/A	N/A	N/A	RBC Building Doors and Windows	N/A	N/A	N/A	$3,999	6/1/1985	33	50	17	$1,360	$7,688	1	1	0.0	0.0	1.0	3.0	2.5	7.5
6862	WWTP	ST-BD-004	N/A	N/A	N/A	N/A	RBC FRP Covers, 16 Shafts	N/A	N/A	N/A	$416,183	6/1/1985	33	50	17	$141,502	$800,000	16	16	0.0	0.0	1.0	4.0	2.0	8
6863	WWTP	ST-BD-005	N/A	N/A	N/A	N/A	Final Settling Building	N/A	N/A	N/A	$67,188	6/1/1985	33	75	42	$37,625	$129,150	1	1	0.0	0.0	1.0	3.0	2.5	7.5
6864	WWTP	ST-BD-006	N/A	N/A	N/A	N/A	Final Tank Roofs	N/A	N/A	N/A	$1,712	6/1/1995	23	35	12	$587	$2,700	1	1	0.0	0.0	1.0	3.0	2.5	7.5
6865	WWTP	ST-BD-007	N/A	N/A	N/A	N/A	Final Settling Tank Aluminum Domes	N/A	N/A	N/A	$400,576	6/1/1985	33	50	17	$136,196	$770,000	2	2	0.0	0.0	1.0	3.0	2.0	6
6866	WWTP	ST-TK-001	N/A	N/A	N/A	N/A	RBC Concrete Tanks and Channels	N/A	N/A	N/A	$655,488	6/1/1985	33	75	42	$367,073	$1,260,000	1	1	0.0	0.0	1.0	4.0	2.0	8
6867	WWTP	ST-TK-002	N/A	N/A	N/A	N/A	Final Settling Tanks, 2 Circular	N/A	N/A	N/A	$462,483	6/1/1985	33	75	42	$258,991	$889,000	2	2	0.0	0.0	1.0	4.0	2.0	8
6868	WWTP	ST-P-001	N/A	N/A	N/A	N/A	RBC Shafts, Media, Mechanical Drive, (Train 1, Shaft 1)	N/A	N/A	N/A	$68,670	6/1/1985	33	40	7	$12,017	$132,000	1	1	0.0	0.0	1.0	4.0	3.0	12
6869	WWTP	ST-P-002	N/A	N/A	N/A	N/A	RBC Shafts, Media, Mechanical Drive, (Train 1, Shaft 2)	N/A	N/A	N/A	$68,670	6/1/1985	33	40	7	$12,017	$132,000	1	1	0.0	0.0	1.0	4.0	3.0	12
6870	WWTP	ST-P-003	N/A	N/A	N/A	N/A	RBC Shafts, Media, Mechanical Drive, (Train 1, Shaft 3)	N/A	N/A	N/A	$68,670	6/1/1985	33	40	7	$12,017	$132,000	1	1	0.0	0.0	1.0	4.0	3.0	12
6871	WWTP	ST-P-004	N/A	N/A	N/A	N/A	RBC Shafts, Media, Mechanical Drive, (Train 1, Shaft 4)	N/A	N/A	N/A	$68,670	6/1/1985	33	40	7	$12,017	$132,000	1	1	0.0	0.0	1.0	4.0	3.0	12
6872	WWTP	ST-P-005	N/A	N/A	N/A	N/A	RBC Shafts, Media, Mechanical Drive, (Train 2, Shaft 1)	N/A	N/A	N/A	$68,670	6/1/1985	33	40	7	$12,017	$132,000	1	1	0.0	0.0	1.0	4.0	3.0	12
6873	WWTP	ST-P-006	N/A	N/A	N/A	N/A	RBC Shafts, Media, Mechanical Drive, (Train 2, Shaft 2)	N/A	N/A	N/A	$68,670	6/1/1985	33	40	7	$12,017	$132,000	1	1	0.0	0.0	1.0	4.0	3.0	12
6874	WWTP	ST-P-007	N/A	N/A	N/A	N/A	RBC Shafts, Media, Mechanical Drive, (Train 2, Shaft 3)	N/A	N/A	N/A	$68,670	6/1/1985	33	40	7	$12,017	$132,000	1	1	0.0	0.0	1.0	4.0	3.0	12
6875	WWTP	ST-P-008	N/A	N/A	N/A	N/A	RBC Shafts, Media, Mechanical Drive, (Train 2, Shaft 4)	N/A	N/A	N/A	$68,670	6/1/1985	33	40	7	$12,017	$132,000	1	1	0.0	0.0	1.0	4.0	3.0	12
6876	WWTP	ST-P-009	N/A	N/A	N/A	N/A	RBC Shafts, Media, Mechanical Drive, (Train 3, Shaft 1)	N/A	N/A	N/A	$68,670	6/1/1985	33	40	7	$12,017	$132,000	1	1	0.0	0.0	1.0	4.0	3.0	12
6877	WWTP	ST-P-010	N/A	N/A	N/A	N/A	RBC Shafts, Media, Mechanical Drive, (Train 3, Shaft 2)	N/A	N/A	N/A	$68,670	6/1/1985	33	40	7	$12,017	$132,000	1	1	0.0	0.0	1.0	4.0	3.0	12
6878	WWTP	ST-P-011	N/A	N/A	N/A	N/A	RBC Shafts, Media, Mechanical Drive, (Train 3, Shaft 3)	N/A	N/A	N/A	$68,670	6/1/1985	33	40	7	$12,017	$132,000	1	1	0.0	0.0	1.0	4.0	3.0	12
6879	WWTP	ST-P-012	N/A	N/A	N/A	N/A	RBC Shafts, Media, Mechanical Drive, (Train 3, Shaft 4)	N/A	N/A	N/A	$68,670	6/1/1985	33	40	7	$12,017	$132,000	1	1	0.0	0.0	1.0	4.0	3.0	12
6880	WWTP	ST-P-013	N/A	N/A	N/A	N/A	RBC Shafts, Media, Mechanical Drive, (Train 4, Shaft 1)	N/A	N/A	N/A	$68,670	6/1/1985	33	40	7	$12,017	$132,000	1	1	0.0	0.0	1.0	4.0	4.0	16
6881	WWTP	ST-P-014	N/A	N/A	N/A	N/A	RBC Shafts, Media, Mechanical Drive, (Train 4, Shaft 2)	N/A	N/A	N/A	$68,670	6/1/1985	33	40	7	$12,017	$132,000	1	1	0.0	0.0	1.0	4.0	3.0	12
6882	WWTP	ST-P-015	N/A	N/A	N/A	N/A	RBC Shafts, Media, Mechanical Drive, (Train 4, Shaft 3)	N/A	N/A	N/A	$68,670	6/1/1985	33	40	7	$12,017	$132,000	1	1	0.0	0.0	1.0	4.0	3.0	12
6883	WWTP	ST-P-016	N/A	N/A	N/A	N/A	RBC Shafts, Media, Mechanical Drive, (Train 4, Shaft 4)	N/A	N/A	N/A	$68,670	6/1/1985	33	40	7	$12,017	$132,000	1	1	0.0	0.0	0.5	4.0	3.0	6
6884	WWTP	ST-P-017	N/A	N/A	N/A	N/A	RBC Low Pressure Blowers	N/A	N/A	N/A	$19,196	6/1/1985	33	40	7	$3,359	$36,900	2	2	0.5	0.3	1.0	4.0	2.5	10
6885	WWTP	ST-P-018	N/A	N/A	N/A	N/A	Sludge Collector Mechanisms	N/A	N/A	N/A	$124,855	6/1/1985	33	50	17	$42,451	$240,000	2	2	0.0	0.0	1.0	4.0	2.5	10
6886	WWTP	ST-P-019	N/A	N/A	N/A	N/A	Secondary Effluent Weirs	N/A	N/A	N/A	$19,769	6/1/1985	33	50	17	$6,721	$38,000	2	2	0.0	0.0	1.0	4.0	2.0	8
6887	WWTP	ST-P-020	N/A	N/A	N/A	N/A	Final Tank Sludge Pumps	N/A	N/A	N/A	$28,155	6/1/1985	33	40	7	$4,927	$54,120	1	1	0.0	0.0	1.0	4.0	3.0	12
6888	WWTP	ST-P-021	N/A	N/A	N/A	N/A	Final Tank Scum Pump	N/A	N/A	N/A	$12,485	6/1/1985	33	40	7	$2,185	$24,000	1	1	0.0	0.0	0.5	3.5	2.5	4.375
6889	WWTP	ST-P-022	N/A	N/A	N/A	N/A	Final Tank Valves	N/A	N/A	N/A	$4,782	6/1/1985	33	50	17	$1,626	$9,193	1	1	0.3	0.3	0.5	3.0	2.5	3.75
6890	WWTP	ST-P-023	N/A	N/A	N/A	N/A	Final Tank Piping	N/A	N/A	N/A	$42,873	6/1/1985	33	75	42	$24,009	$82,411	1	1	0.3	0.3	1.0	3.0	2.5	7.5
6891	WWTP	ST-M-001	N/A	N/A	N/A	N/A	RBC Building HVAC Equipment	N/A	N/A	N/A	$2,943	6/1/1985	33	35	2	$168	$5,658	1	1	0.0	0.0	1.0	3.0	3.0	9
6892	WWTP	ST-M-002	N/A	N/A	N/A	N/A	Final Tank HVAC Equipment	N/A	N/A	N/A	$4,348	6/1/1985	33	35	2	$248	$8,358	1	1	0.0	0.0	1.0	3.0	2.5	7.5
6893	WWTP	ST-E-001	N/A	N/A	N/A	N/A	RBC and Final Tank Area, 480 Volt Power Supply and Control	N/A	N/A	N/A	$37,113	6/1/1985	33	50	17	$12,618	$71,340	1	1	0.0	0.0	1.0	5.0	2.5	12.5
6894	WWTP	ST-E-002	N/A	N/A	N/A	N/A	RBC and Final Tank Area Low Voltage Distribution and Lighting	N/A	N/A	N/A	$8,660	6/1/1985	33	40	7	$1,515	$16,646	1	1	0.0	0.0	1.0	3.0	2.5	7.5
6895	WWTP	DF-TK-001	N/A	N/A	N/A	N/A	Chlorine Contact Tank and Disinfection Chamber	N/A	N/A	N/A	$0	6/1/1960	58	75	17	$0	$168,000	2	2	0.0	0.0	1.0	5.0	3.0	15
6896	WWTP	DF-TK-002	N/A	N/A	N/A	N/A	Outfall, Junction Chamber A, and Junction Chamber B	N/A	N/A	N/A	$29,029	6/1/1985	33	75	42	$16,256	$55,800	2	2	0.0	0.0	1.0	3.0	2.0	6
6897	WWTP	DF-P-001	N/A	N/A	N/A	N/A	Hydraulic Gates, Disinfection	N/A	N/A	N/A	$38,751	6/1/1985	33	50	17	$13,176	$74,489	1	1	0.0	0.0	1.0	3.0	2.5	7.5
6898	WWTP	DF-P-002	N/A	N/A	N/A	N/A	Chlorine Storage, Handling, and Feed Equipment	N/A	N/A	N/A	$47,991	6/1/1985	33	35	2	$2,742	$92,250	1	1	0.0	0.0	1.0	5.0	3.0	15
6899	WWTP	DF-M-001	N/A	N/A	N/A	N/A	Chlorine Area HVAC Equipment	N/A	N/A	N/A	$2,024	6/1/1985	33	35	2	$116	$3,890	1	1	0.0	0.0	1.0	4.0	2.5	10
6900	WWTP	DF-E-001	N/A	N/A	N/A	N/A	Chlorine Area Electrical Distribution Systems	N/A	N/A	N/A	$3,199	6/1/1985	33	40	7	$560	$6,150	1	1	0.0	0.0	1.0	4.0	2.5	10
6901	WWTP	DF-I-001	N/A	N/A	N/A	N/A	Chlorine Areas Instrumentation	N/A	N/A	N/A	$1,600	6/1/1985	33	35	2	$91	$3,075	1	1	0.0	0.0	1.0	5.0	2.5	12.5
6902	WWTP	CT-P-001	N/A	N/A	N/A	N/A	Ferric Chloride Metering Pumps	N/A	N/A	N/A	$7,349	6/1/2010	8	35	27	$5,669	$8,610	3	3	0.0	0.0	1.0	4.0	3.0	12
6903	WWTP	CT-P-002	N/A	N/A	N/A	N/A	Ferric Chloride Bulk Storage Tanks	N/A	N/A	N/A	$24,635	6/1/1985	33	50	17	$8,376	$47,355	2	2	0.0	0.0	1.0	3.0	3.0	9
6904	WWTP	CT-P-003	N/A	N/A	N/A	N/A	Ferric Chloride Piping and Accessories	N/A	N/A	N/A	$10,022	6/1/1985	33	40	7	$1,754	$19,265	1	1	0.0	0.0	1.0	3.0	3.0	9
6905	WWTP	CT-P-004	N/A	N/A	N/A	N/A	Anionic Polymer Storage, Handling, Feed, and Accessory Equipment	N/A	N/A	N/A	$5,080	6/1/1985	33	35	2	$290	$9,765	1	1	0.0	0.0	1.0	3.0	2.5	7.5
6906	WWTP	SH-BD-001	N/A	N/A	N/A	N/A	Digester Building	N/A	N/A	N/A	$69,987	6/1/1985	33	75	42	$39,193	$134,531	1	1	0.0	0.0	1.0	3.0	3.0	9
6907	WWTP	SH-BD-002	N/A	N/A	N/A	N/A	Digester Building Roof	N/A	N/A	N/A	$0	6/1/1960	58	60	2	$0	$2,438	1	1	0.0	0.0	1.0	3.0	3.0	9
6908	WWTP	SH-TK-001	N/A	N/A	N/A	N/A	Digester Tanks, Primary No. 1	N/A	N/A	N/A	$0	6/1/1960	58	75	17	$0	$451,000	1	1	0.0	0.0	1.0	4.0	3.0	12
6909	WWTP	SH-TK-002	N/A	N/A	N/A	N/A	Digester Tanks, Secondary No. 2	N/A	N/A	N/A	$0	6/1/1960	58	75	17	$0	$451,000	1	1	0.0	0.0	1.0	4.0	5.0	20
6910	WWTP	SH-TK-003	N/A	N/A	N/A	N/A	Digester Tanks, Primary No. 3	N/A	N/A	N/A	$277,282	6/1/1985	33	75	42	$155,278	$533,000	1	1	0.0	0.0	1.0	5.0	5.0	25
6911	WWTP	SH-TK-004	N/A	N/A	N/A	N/A	Digester Tank, Secondary No. 4	N/A	N/A	N/A	$437,252	6/1/1985	33	75	42	$244,861	$840,500	1	1	0.0	0.0	1.0	5.0	5.0	25
6912	WWTP	SH-P-001	N/A	N/A	N/A	N/A	Floating cover, Secondary Digester No. 2	N/A	N/A	N/A	$0	6/1/1960	58	60	2	$0	$204,000	1	1	0.0	0.0	1.0	3.0	5.0	15
6913	WWTP	SH-P-002	N/A	N/A	N/A	N/A	Floating cover, Secondary Digester No. 4	N/A	N/A	N/A	$118,612	6/1/1985	33	50	17	$40,328	$228,000	1	1	0.0	0.0	1.0	3.0	5.0	15
6914	WWTP	SH-P-003	N/A	N/A	N/A	N/A	Digested Sludge Pumps	N/A	N/A	N/A	$28,155	6/1/1985	33	50	17	$9,573	$54,120	2	2	0.0	0.0	1.0	3.5	2.5	8.75
6915	WWTP	SH-P-004	N/A	N/A	N/A	N/A	Transfer Sludge Pumps	N/A	N/A	N/A	$22,474	6/1/1985	33	40	7	$3,933	$43,200	1	1	0.0	0.0	1.0	3.5	3.0	10.5
6916	WWTP	SH-P-005	N/A	N/A	N/A	N/A	Eductor Type, Primary Digester Mixing Systems	N/A	N/A	N/A	$399,536	6/1/1985	33	40	7	$69,919	$768,000	2	2	0.0	0.0	1.0	3.0	3.0	9
6917	WWTP	SH-P-006	N/A	N/A	N/A	N/A	Digester Gas Compressors	N/A	N/A	N/A	$15,357	6/1/1985	33	35	2	$878	$29,520	2	2	0.0	0.0	1.0	3.0	2.5	7.5
6918	WWTP	SH-P-007	N/A	N/A	N/A	N/A	Spiral Heat Exchanger	N/A	N/A	N/A	$50,998	6/1/2015	3	40	37	$47,174	$54,120	1	1	0.0	0.0	1.0	4.0	1.0	4
6919	WWTP	SH-P-008	N/A	N/A	N/A	N/A	Belt Filter Presses	N/A	N/A	N/A	$324,623	6/1/1985	33	50	17	$110,372	$624,000	2	2	0.0	0.0	1.0	4.0	3.0	12
6920	WWTP	SH-P-009	N/A	N/A	N/A	N/A	Digester Gas Handling Equipment	N/A	N/A	N/A	$56,523	6/1/1985	33	50	17	$19,218	$108,650	1	1	0.0	0.0	1.0	3.0	3.0	9
6921	WWTP	SH-P-010	N/A	N/A	N/A	N/A	Digester Gas Piping and Valves	N/A	N/A	N/A	$16,096	6/1/1985	33	50	17	$5,473	$30,941	1	1	0.0	0.0	1.0	3.5	3.0	10.5
6922	WWTP	SH-P-011	N/A	N/A	N/A	N/A	Waste Gas Burner	N/A	N/A	N/A	$26,235	6/1/1985	33	40	7	$4,591	$50,430	1	1	0.0	0.0	1.0	3.5	5.0	17.5
6923	WWTP	SH-P-012	N/A	N/A	N/A	N/A	Digester Area Sludge Valves	N/A	N/A	N/A	$11,613	6/1/1975	43	50	7	$1,626	$27,211	1	1	0.0	0.0	1.0	3.0	3.5	10.5
6924	WWTP	SH-P-013	N/A	N/A	N/A	N/A	Digester Area Sludge Piping (Exposed and Submerged)	N/A	N/A	N/A	$32,724	6/1/1972	46	75	29	$12,653	$81,371	1	1	0.0	0.0	1.0	3.0	2.5	7.5
6925	WWTP	SH-P-014	N/A	N/A	N/A	N/A	Cationic Polymer Feed Pumps, Piping , and Accessories	N/A	N/A	N/A	$3,519	6/1/1985	33	35	2	$201	$6,765	1	1	0.0	0.0	1.0	3.0	1.5	4.5
6926	WWTP	SH-M-001	N/A	N/A	N/A	N/A	Digester Area Unit Heaters, Convection Units, and Supply Units	N/A	N/A	N/A	$5,999	6/1/1985	33	35	2	$343	$11,531	1	1	0.0	0.0	1.0	3.0	3.0	9
6927	WWTP	SH-M-002	N/A	N/A	N/A	N/A	Digester Area Ventilation System	N/A	N/A	N/A	$2,200	6/1/1985	33	35	2	$126	$4,228	1	1	0.0	0.0	1.0	3.0	3.0	9
6928	WWTP	SH-E-001	N/A	N/A	N/A	N/A	Digester Area 480V Distribution, MCC-D/MCC-H	N/A	N/A	N/A	$53,323	6/1/1985	33	50	17	$18,130	$102,500	1	1	0.0	0.0	1.0	5.0	2.5	12.5
6929	WWTP	SH-E-002	N/A	N/A	N/A	N/A	Digester Area LV Electrical Distribution	N/A	N/A	N/A	$3,999	6/1/1985	33	40	7	$700	$7,688	1	1	0.0	0.0	1.0	3.0	2.5	7.5
6930	WWTP	SH-E-003	N/A	N/A	N/A	N/A	Digester Area Lighting	N/A	N/A	N/A	$1,600	6/1/1985	33	40	7	$280	$3,075	1	1	0.0	0.0	1.0	3.0	3.0	9
6931	WWTP	SH-I-001	N/A	N/A	N/A	N/A	Instrumentation, CP-4	N/A	N/A	N/A	$12,798	6/1/1985	33	35	2	$731	$24,600	1	1	0.0	0.0	1.0	4.0	3.0	12
6932	WWTP	SD-TK-001	N/A	N/A	N/A	N/A	Sludge Dry Beds-Structure, 1960	N/A	N/A	N/A	$0	6/1/1960	58	75	17	$0	$198,000	1	1	0.0	0.0	1.0	2.0	3.0	6
6933	WWTP	SD-TK-002	N/A	N/A	N/A	N/A	Sludge Dry Beds-Structure, 1985	N/A	N/A	N/A	$0	6/1/1960	58	75	17	$0	$379,500	1	1	0.0	0.0	1.0	2.0	2.5	5
6934	WWTP	SD-P-001	N/A	N/A	N/A	N/A	Drying Bed Piping and Valves	N/A	N/A	N/A	$14,841	6/1/1975	43	75	32	$6,332	$34,776	1	1	0.0	0.0	1.0	3.5	4.5	15.75
6935	WWTP	F-C-001	N/A	N/A	N/A	N/A	Access Road Bituminous Pavement	N/A	N/A	N/A	$53,344	6/1/1994	24	50	26	$27,739	$85,800	1	1	0.0	0.0	1.0	2.5	3.0	7.5
6936	WWTP	F-C-002	N/A	N/A	N/A	N/A	Isolation and Safety Fencing and Gates	N/A	N/A	N/A	$2,101	6/1/1972	46	50	4	$168	$5,225	1	1	0.0	0.0	1.0	3.0	3.0	9
6937	WWTP	F-C-003	N/A	N/A	N/A	N/A	Gravity Storm and Sanitary Sewer	N/A	N/A	N/A	$52,689	6/1/1982	36	70	34	$25,592	$107,479	1	1	0.0	0.0	1.0	3.0	2.5	7.5
6938	WWTP	F-P-001	N/A	N/A	N/A	N/A	Process Yard Piping	N/A	N/A	N/A	$52,003	6/1/1989	29	70	41	$30,459	$92,350	1	1	0.0	0.0	1.0	4.0	2.5	10
6939	WWTP	F-E-001	N/A	N/A	N/A	N/A	Site Electrical and Lighting	N/A	N/A	N/A	$9,688	6/1/2000	18	30	12	$3,875	$13,838	1	1	0.0	0.0	1.0	2.5	2.5	6.25
6940	WWTP	F-OM-001	N/A	N/A	N/A	N/A	Sewer Vactor, 2015 Peterbilt	N/A	N/A	N/A	$396,011	6/1/2015	3	30	27	$356,410	$420,250	1	1	0.0	0.0	1.0	4.0	2.0	8
6941	WWTP	F-OM-002	N/A	N/A	N/A	N/A	Pickup, 2009, Ford F-250, 4WD, Plow	N/A	N/A	N/A	$34,307	6/1/2009	9	20	11	$18,869	$41,000	1	1	0.0	0.0	1.0	4.0	4.5	18
6942	WWTP	F-OM-003	N/A	N/A	N/A	N/A	Load Lugger, 2008, International, Custom Fabricated	N/A	N/A	N/A	$180,477	6/1/2008	10	30	20	$120,318	$220,000	1	1	0.0	0.0	1.0	3.0	3.5	10.5
6943	WWTP	F-OM-004	N/A	N/A	N/A	N/A	Fork Lift, 1985, Clark, Propane Fueled, 1.5 Ton	N/A	N/A	N/A	$39,425	6/1/2006	12	40	28	$27,597	$50,000	1	1	0.0	0.0	0.1	4.5	4.5	2.025
6944	WWTP	F-OM-005	N/A	N/A	N/A	N/A	Portable Generators, Perkins Diesel, 2	N/A	N/A	N/A	$32,500	6/1/1995	23	25	2	$2,600	$51,250	1	2	1.0	1.0	1.0	4.0	3.0	12
6945	WWTP	F-OM-006	N/A	N/A	N/A	N/A	Lawn Tractor, Groundsmaster, Short Turn	N/A	N/A	N/A	$6,854	6/1/2003	15	25	10	$2,742	$9,225	1	1	0.0	0.0	1.0	3.0	3.5	10.5
6946	WWTP	F-OM-007	N/A	N/A	N/A	N/A	Pump, 2015, 6" Trash, Trailer Mounted	N/A	N/A	N/A	$4,523	6/1/2015	3	40	37	$4,184	$4,800	1	1	0.0	0.0	1.0	3.0	2.0	6
6947	WWTP	F-OM-008	N/A	N/A	N/A	N/A	Pumps, Portable	N/A	N/A	N/A	$1,333	6/1/1985	33	35	2	$76	$2,563	1	1	0.0	0.0	0.3	3.5	3.5	3.0625
6948	WWTP	F-OM-009	N/A	N/A	N/A	N/A	Dumpsters and Wheel Carts, (Grit, Sludge, Scum, Garbage)	N/A	N/A	N/A	$17,832	6/1/2003	15	20	5	$4,458	$24,000	5	8	3.0	0.6	1.0	3.0	3.0	6

CITY OF SAULT STE. MARIE, MICHIGAN

Summary

id	Equipment Description	Asset ID	Construction Drawings Sheet Reference	Capacity or Size	Material	Length	Comment	Northing State Plane Ordinate	Easting State Plane Ordinate	Elevation	Original Cost	Year Installed (01/01/YYYY)	Age	Expected useful life (years)	Remaining Useful Life (years)	Depreciated Value	Replacement Cost	Average number of units in service	Total Number of units	Redundancy (Number)	Redundancy (percent)	Redundancy Score (R) (Reduces (C))	Criticality (C) (see back-up sheets)	Probability of Failure (P) (see back-up sheets)	Business Risk (BRE=PxCxR)

WASTEWATER ASSET MANAGEMENT PLAN

VILLAGE OF SEBEWAING

HURON COUNTY, MICHIGAN

OCTOBER 2018

BASED ON:

ASSET MANAGEMENT GUIDANCE FOR WASTEWATER

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY, JULY 2013

STORMWATER, ASSET MANAGEMENT, AND WASTEWATER (SAW) GRANT

PROJECT NUMBER: 1065-01

PREPARED BY:

230 S. Washington Avenue
Saginaw, MI 48607

PROJECT ID NUMBER: **122910.15**

EXECUTIVE SUMMARY

Prepared by: **SPICER GROUP, INC.**
230 S. Washington Avenue
Saginaw, MI 48607
Phone: (989)-754-4717

Owner: **VILLAGE OF SEBEWAING**
222 N. Center Street
Sebewaing, MI 48759
Phone: (989)-883-2660
Matt Bumhoffer

The Village of Sebewaing entered into an agreement with the Michigan Finance Authority for grant funds issued under Public Act No. 511 of 2012 for the *Stormwater, Asset Management, and Wastewater (SAW)* program. The Village received the following grants:

Wastewater Asset Management Plan (WWAMP)-100% Grant	$355,997
Storm Water Asset Management Plan (SWAMP)-90% Grant	$244,625
LESS Local Match	($24,462.50)
Total Grant Amount	$576,159.50

The Asset Management Plans (AMPs) needed to be completed within three years of the date of agreement; November 2018.

Each AMP has the following key components:

- Asset Inventory and Condition Assessment
- Critical Assets (Risk)
- Level of Service Determination
- Revenue Structure
- Capital Improvement Plan

List of Major Assets

- 75,545 feet of sanitary sewer pipes ranging in size from 8”-15”
- 301 sanitary sewer manholes
- 2 pumping stations
- 5 lagoon cells, aeration system, interconnecting structures, piping and valves and a treatment building which houses ferric chloride equipment along with the Phosphorus Treatment Cell

Wastewater Asset Inventory and Condition Assessment

The Village's wastewater system consists of three main components: The collection system (pipes and manholes), pump stations and the wastewater treatment lagoons.

For the collection system, Spicer Group, Inc. completed a mobile mapping LiDAR survey of the entire Village, and used the survey information to develop a comprehensive Geographic Information System (GIS). This GIS is located on a new computer in the Village DPW building, and is a detailed "smart" mapping system with databases, using the ArcGIS/Arc Online by ESRI platform. This system can be accessed and updated in the field by DPW staff from two new iPad supplied as part of the SAW grant project. From the GIS, as-built plans, pipe/manhole condition ratings, materials, year installed, inspection records, CCTV video inspections etc. can be accessed. This information can also be modified to provide specific lists and maps, and can be updated easily when future improvements are made.

The Village currently has 75,545 feet of sanitary sewer pipes in the entire sanitary sewer collection system ranging in size from 8"-15", 301 sanitary sewer manholes and two pumping stations serving approximately 1,105 customers. Dependable Sewer Cleaning, from Bay City completed a comprehensive cleaning and televising program of the sanitary sewer pipes using the NASSCO Pipeline Assessment Certification Program (PACP) to identify features and defects within the collection system. Spicer Group, Inc. completed a comprehensive inspection of the manholes using the NASSCO Manhole Assessment Certification Program (MACP) standards to identify features and defects within the manholes. The MACP/PACP system is used to standardize the scoring and to quantify the condition of the wastewater assets.

The next main components of the Village's wastewater system are the two pump stations located on First Street and on Hickory Court. The First Street Pump Station is the main pump station that sends all of the wastewater for the Village via a forcemain to the wastewater lagoons. Spicer Group Inc. completed an inspection and condition assessment of each station, and provided recommendations for future improvements. It was recommended that the Village start budgeting for these future upgrades.

The last main component of the Village's wastewater system is the wastewater treatment lagoons. This treatment system consists of 5 lagoon cells, aeration system, interconnecting structures, piping and valves and a treatment building which houses ferric chloride equipment along with the Phosphorus Treatment Cell which can be used in the event that additional phosphorus removal is needed to meet discharge limits. Spicer Group Inc. completed an inspection and condition assessment of each wastewater treatment component and provided recommendations for future improvements. It was recommended that the Village start budgeting for these future upgrades.

Criticality (Risk)

For each asset in the Village's wastewater system, a criticality/risk analysis was performed to determine and prioritize the Village's key components. Based on the condition assessments and the field inspections, the Likelihood of Failure (LoF) was calculated for every asset; including all pipes, manholes, pump station and lagoon treatment system components. Next, the Consequence of Failure (CoF) was calculated and scored for each asset based on the economic, social, and environmental consequences if that asset failed. Finally, the Criticality (Risk) score was calculated using:

LoF x CoF = RISK

Sebewaing's collection system has 8 pipe segments that received a LoF score of 5 or above and has 19 pipe segments that received a LoF score between 4 and 5. The collection system also has 38 manholes that received a LoF score of 5 or above as well as 15 manholes that received a LoF score between 4 and 5. The Village's collection system has zero pipes with Consequence of Failure score of 4.0 or above and 6 pipe segments with a Consequence of Failure score between 3 and 4. The Village also has 4 manholes with a score between 3 and 4. Of all 301 manholes that were accounted for, there were zero that fell into the 'High Risk' range , and 4 manholes fell into the 'Medium Risk' range, the remaining 297 sanitary manholes fell into the low to no risk range.

Level of Service (LOS)

The next phase of the AMP is a Level of Service determination. What level of service does the Village want to provide to its wastewater customers? How are projects going to be prioritized and included in the Capital Improvement Plan (CIP)? What cost is the Village willing to endure to provide that level of service? These are all questions that were discussed as a part of the overall asset management plan. The Villages' Level of Service Goals are as follows:

Mission Statement

The Village of Sebewaing strives to develop a financially stable, high performing wastewater collection, pumping and treatment service that addresses the customer's wants and needs and upholds the local, State, and Federal regulatory requirements at a minimum cost to our customers.

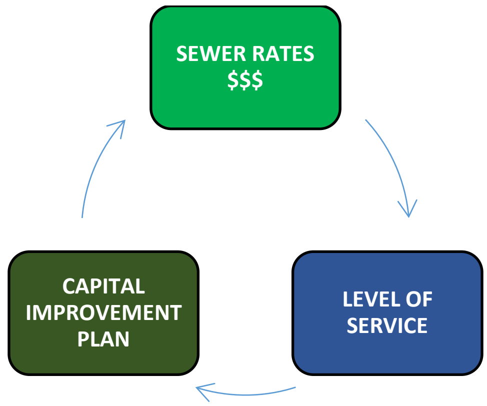
One of the basic goals is to review the capital improvement projects to determine the best value options for the Village's' customers based on life cycle costs and overall benefits to the community:

- "**MINIMUM**" Level of Service – Priority projects to meet the minimum local, State, and/or Federal regulations. Typically to be completed within the next 5 years.
- "**MEDIUM**" Level of Service – Projects that will need to be done eventually; typically when other infrastructure projects are happening.
- "**HIGH**" Level of Service – Projects that are on the long range radar that could spur future development and growth for the Village.

Generally, the "high" level of service projects will have a higher construction/initial cost, but would provide a better long-term or life cycle cost for the Village. The "minimum" level of service projects would have a lower initial cost, but would also have a shorter life span and higher overall life cycle costs.

As the AMP progressed, different scenarios were evaluated to show the relationship between the Village's desired Level of Service and the costs of the capital improvement projects associated with that LOS, and the effect of that LOS on sewer rates.

Asset Management Plan Evaluation Process



The resulting capital improvement plan and revenue structure was one that met the Village's goals, addressed the improvements that need to be made, and is a sustainable rate structure for the Village's customers.

The Village chose to adopt a minimum Level of Service.

Revenue Structure

Spicer Group performed the revenue structure analysis for the AMP. Sewer account balances, expenditures, revenues, etc. were reviewed and inputted to perform a gap analysis to determine if there were any deficiencies in the rates. The Village's current rate structure was found to have no deficiencies meaning the Village could fund current and future operations and maintenance of the system. However, the gap analysis did not consider any capital improvement project required to maintain the selected LOS.

The Capital Improvement Plan (CIP) projects were evaluated and allocated to various years of completion, and the existing sewer rate structure supports the Village's current and future needs while incorporating the Capital Improvement Plan and met the Village level of service goals. Therefore, no sewer rate adjustments are necessary. This should be reviewed annually as part of the Villages normal budgeting process.

Capital Improvement Plan

The Capital Improvement Plan (CIP) is the culmination of all the parts of the Asset Management Plan (AMP). Reviewing the results of the wastewater system Inventory & Condition Assessment, Level of Service (LOS) determination, Criticality (Risk), Revenue Structure, and preliminary CIP project lists, a process was worked through to categorize and prioritize the final CIP. Various degrees of Level of Service and the associated CIP projects were evaluated and plugged into the Revenue Structure model, and the resulting sewer rates for that set of scenarios were reviewed. If the projected rates were too high, a lower LOS was chosen and those CIP projects were plugged into the Revenue Structure model and the resulting rates were then reviewed. The process then continued with different CIP projects at varying LOS's until an acceptable rate structure, level of service, and capital improvement plan was developed. A 5-year CIP was developed that includes various sanitary system improvements. The table below summarizes the minimum service level projects that were included in the 5-year capital improvement plan.

Village of Sebewaing 5 year Capital Improvement Plan				
Level of Service	Location	Project Description	Replacement Cost	Replacement Year
Minimum	First Street Pump Station	Replace Pump Impeller Assembly	$3,000	2019
Minimum	First Street Pump Station	Replace Pump Impeller Assembly	$3,000	2020
Minimum	First Street Pump Station	Replace Pump Impeller Assembly	$3,000	2021
Minimum	First Street Pump Station	Replace Pump Impeller Assembly	$3,000	2022
Minimum	Wastewater Lagoons	Electrical Upgrades	$15,000	2019
Minimum		Updating Vactor Truck	$50,000	2018
Minimum	Hickory Court Pump Station	Electrical Upgrades	$40,000	2018
Minimum	North Miller St Sewer Lining	870 lin. Ft. CIPP Sanitary Sewer Lining	$42,080	2018
Minimum	North Center, W Bay, Sharpstee	1550 lft CIPP San. Sewer Lining & lateral rep	$92,170	2019
Minimum	Prairie St and Sebewaing Rd	1660 lin. Ft. CIPP Sanitary Sewer Lining	$81,090	2020
Minimum	Albert, W Sharpsteen, Beck Rd	1750 lin. Ft. CIPP Sanitary Sewer Lining	$92,700	2021
Minimum	W Sharpsteen, 9th, E Main, N Be	2010 lin. Ft. CIPP Sanitary Sewer Lining	$97,740	2022
Total Capital Improvements			**$522,780**	

Conclusion

The Village of Sebewaing's wastewater system is a typical, aging municipal infrastructure system. The DPW staff have taken a proactive approach to routine operation and maintenance of the system. Structurally, the system is very sound and only has some issues when it comes to maintenance particularly with infiltration. There are many stretches of pipe that are structurally in good condition, but should be lined to prevent this excess amount of groundwater from entering the system. The existing sewer rate structure supports these capital improvements without the need for a rate increase.

In accordance with the SAW Grant requirements, the Village's Wastewater Asset Management Plan (WWAMP) needs to be kept available for citizen review for 15 years. The WWAMP should be reviewed annually, and the components updated and included in the Village's annual budget process.

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date November 2018
(no later than 3 years from executed grant date)

The Village of Sebewaing certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1065-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: ~~Yes or~~ **No**

   If No - Date of the rate methodology approval letter: 6-28-18.

2) Significant Progress Made: Yes or No

   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)

3) Date of rate methodology review letter identifying the gap: ________________.

4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ________________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Alexander Khoury	at	(989) 883-2150	alexander.khoury@yahoo.com
Name		Phone Number	Email

[signature] 10-25-18
Signature of Authorized Representative (Original Signature Required) Date

Alexander Khoury Village President
Print Name and Title of Authorized Representative

STORMWATER ASSET MANAGEMENT PLAN
EXECUTIVE SUMMARY

VILLAGE OF SEBEWAING

HURON COUNTY, MICHIGAN

OCTOBER 2018

BASED ON:

***ASSET MANAGEMENT GUIDANCE FOR WASTEWATER AND STORMWATER SYSTEMS*, MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY, JULY 2013**

STORMWATER, ASSET MANAGEMENT, AND WASTEWATER (SAW) GRANT

PROJECT NUMBER: 1065-01

PREPARED BY:

230 S. Washington Avenue
Saginaw, MI 48607

PROJECT ID NUMBER: 122910SG2015

VILLAGE OF SEBEWAING
SAW Grant Project No. 1065-01

EXECUTIVE SUMMARY

Prepared by: **SPICER GROUP, INC.**
230 S. Washington
Saginaw, MI 48607

Owner: **VILLAGE OF SEBEWAING**
222 N. Center St.
Sebewaing, MI 48759
(989) 883-2660
Matt Bumhoffer

The Village of Sebewaing entered into an agreement with the Michigan Department of Environmental Quality and the Michigan Finance Authority for grant funds issued under Public Act No. 511 of 2012 for the *Stormwater, Asset Management, and Wastewater (SAW)* program. The Village received the follow grants:

Wastewater Asset Management Plan (WWAMP)-100% Grant	$355,997
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The Asset Management Plans (AMPs) needed to be completed within three years of the date of agreement; November 2018.

Each AMP has the following key components:

- Asset Inventory and Condition Assessment
- Level of Service Determination
- Critical Assets (Risk)
- Revenue Structure
- Capital Improvement Plan

Storm Water Asset Inventory and Condition Assessment

The Village of Sebewaing's storm water collection system consists of a series of 4", 6", 8", 10", 12", 15", 18", 24" and 36" pipes. These pipes or "storm sewers" collect storm water from "catch basins", footing drains/sump systems (sump leads), open inlets, roadside drainage, roof drains, groundwater infiltration etc.

For the collection system, Spicer Group, Inc. completed a mobile mapping LiDAR survey of the entire Village, and used the survey information to develop a comprehensive Geographic Information System (GIS). This GIS is located on a new computer in the Village DPW office, and is detailed "smart" mapping system with databases, using the ArcGIS/Arc Online by ESRI platform. This system can be accessed and updated in the field by DPW staff from two new iPads supplied as part of the SAW grant project. From the GIS as-built plans, pipe/manhole condition ratings, materials, year installed, inspection records, CCTV video inspection etc. can be accessed. This information can also be queried to provide specific lists and maps, and updated easily when future improvements are made.

The Village currently has around 65,017 feet of storm sewer pipes ranging in size from 4”-36”. Below is a table showing the diameter and materials of the storm water piping:

Table ES-1: Village-Owned Storm Water Pipes by Diameter and Material

Village Owned Storm Sewer							
Pipe Diameter	CMP	PE	PVC	RCP	VCP	Unknown	**Total**
4"			120.7	37.3	158.2		316.2
6"		300.2	673.8		786.8		1760.8
8"		145.2	2836.1	1689.5	10211.1	576.5	15458.4
10"				305.5	4071.2		4376.7
12"	109.6	1076.7	2310	3661.7	17533.5	842	25533.5
15"			385.7	532.9	4002.8		4921.4
18"				651.9	1708.1	246	2606
24"		1450.2		2468.9	152.2		4071.3
36"		19.9					19.9
Unknown					106.6	5846.2	5952.8
Total	109.6	2992.2	6326.3	9347.7	38730.5	7510.7	**65017**
Percent by Material	0.2%	4.6%	9.7%	14.4%	59.6%	11.6%	100.0%

Dependable Sewer from Bay City completed a cleaning and televising program for the storm sewer pipes. Spicer Group, Inc. completed a comprehensive inspection of the storm water structures owned by the Village. The NASSCO Manhole/Pipeline Assessment Certification Program (MACP/PACP) standards were used to identify and code the defects and was used to standardize the scoring and quantify the condition of the storm water assets.

Portions of the overall collection system network are owned and operated by other entities including the Huron County Road Commission, MDOT and private owners. A breakdown of the stormwater assets located inside the Village limits by owner can be seen below.

Table ES-2: Storm Water Pipes by Owner

Ownership	Length (Feet)	% of System
Village of Sebewaing	65,017.00	71.60%
County	9,540.00	10.50%
MDOT	15,159.70	16.70%
Privately Owned	1,026.70	1.10%
Total	**90,743.40**	**100.00%**

All of the storm water in the Village eventually drains to the Sebewaing River, which is an intercounty drain. The Sebewaing River runs through the center of the Village and flows into the Saginaw Bay of Lake Huron.

Criticality (Risk)

For each asset in the Village's storm water system, a criticality/risk analysis was performed to determine and prioritize the Village's key components. Based on the condition assessments and the field inspections, the Likelihood of Failure (LoF) was calculated for every asset; including all pipes, manholes, drainage structures, etc. Next, the Consequence of Failure (CoF) was calculated and scored for each asset based on the economic, social, and environmental consequences, if that asset failed. Finally, the Criticality (Risk) score was calculated using:

RISK = LoF x CoF

For the Village's storm water collection system, there were 51 pipe locations and 12 structure locations identified with high LoF scores. A total of 23 pipes locations and 9 structure locations had "moderate to major disruption" CoF scores. When analyzing the overall risk, 74 pipe locations and 10 drainage structures having medium risk.

Level of Service

Mission Statement

The Village of Sebewaing strives to maintain a basic storm water collection system service that addresses the residents' wants and needs and upholds the local, State, and Federal regulatory requirements at a minimum cost to our residents.

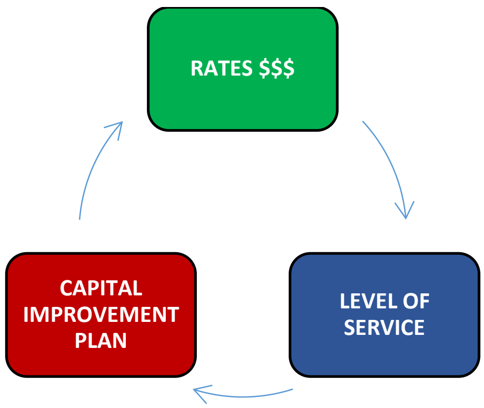
Basic goals:

- Operate and maintain the storm water system to minimize flooding and property damage.
- Provide rapid and effective emergency response service.
- Review the condition of storm water assets as a part of other infrastructure construction projects.
- Seek a funding source for operation & maintenance and repair/replacement of storm water assets.
- Review the maintenance and capital improvement plans/projects annually to determine the lowest cost options for our residents:
  - **"MINIMUM"** Level of Service – Address resident complaints as they come in.
  - **"MEDIUM"** Level of Service – Point repairs to the existing system that have been identified. Mainly projects that the cleaning and televising crew had to abandon the inspection due to obstructions, collapses, holes etc.
  - **"HIGH"** Level of Service – Lining or replacement projects to be completed with other infrastructure improvement projects.

Performance Measurements:

- Review annual performance goals for storm sewer system operation & maintenance, rehabilitation, and capital improvements.
- Annually review the number and severity of resident complaints.
- Continue to perform annual cleaning of the storm sewer system.
- Annually review the amount of storm sewer assets that have been repaired or replaced.
- Review and update the Storm Water Asset Management Plan, GIS, and Capital Improvement Plan annually.

ES-3: Asset Management Plan Evaluation Process



Since Michigan has not created a climate which would allow municipalities to create either an enterprise fund or a utility fee for storm water asset improvements, funding comes from the Village's Local and Major Street funds. The Village has fixed sources of revenues from a combination of State, County, Township and Village taxes. These limited funds are in some ways restricted on their use in that they are primarily designated for road improvements.

Since there is no real funding mechanism for storm water assets, the Village has been maintaining a minimum Level of Service. The storm sewer system is cleaned annually and repairs to pipes or catch basins are made as needed. When residents notify the Village of flooding or drainage issues, the DPW will address the issue on a case-by-case basis. When the Village has street resurfacing or replacement projects, the storm water system is inspected, evaluated, and appropriate repairs and/or replacement is done based on the funding available.

Revenue Structure

The financial impact analysis found that the Village's Street funds do have sufficient revenue to continue to perform annual storm sewer system cleaning, and make minor or emergency repairs as needed. However, there is not adequate funds available to make proactive structure replacements or line or replace pipelines. The majority of the revenue sources to the Street Funds are outside of the Village's control and without an increased millage, or grant/loan programs, the Village does not have a way to increase their revenues. The Village will strive to maintain a minimum level of service and continue to incorporate storm sewer system improvements in their road improvement projects.

Capital Improvement Plan

The Capital Improvement Plan (CIP) is the culmination of all the parts of the Asset Management Plan (AMP). Reviewing the results of the stormwater system Inventory & Condition Assessment, Level of Service (LOS) determination, Criticality (Risk), Revenue Structure, and preliminary CIP project lists, a process was worked through to categorize and prioritize the final CIP.

Until a funding mechanism for storm water improvements is found, the Village is forced to continue its annual cleaning program and make minor or emergency repairs as needed. The Village will be replacing the broken covers and performing the other maintenance repairs as funds and staffing ability allows. Structure 190 is being replaced in 2019 as part of a road improvement project. The other structure replacements will be incorporated into other road projects or as emergency repairs. Of the 20 pipe segments that had Risk scores of 15 and higher, approximately half of them may only require re-cleaning/heavy cleaning to remove the deposits, roots or other obstructions. There are several pipe segments that are damaged and should be either lined or replaced. However, without a funding source, these improvemetns may not be feasbile for the Village to complete outside of incorporating them into road projects or addressing them as emergency repairs.

Conclusion

The Village of Sebewaing’s storm water system is a typical, aging municipal infrastructure system. Since there is no real funding mechanism for storm water assets, the Village has been maintaining a minimum Level of Service for its residents. This has resulted in a reactionary operation and maintenance practice. When residents notify the Village of flooding or drainage issues, the DPW will address the issue on a case-by-case basis. When the Village is planning for street resurfacing or replacement projects, the storm water system is inspected, evaluated, and appropriate repairs and/or replacement is done based on the funding available.

Until a funding mechanism for storm water improvements is found, the Village is forced to continue this reactionary policy. The Village should continue to urge its State legislators to develop a plan to fund municipal storm water improvements, such as supporting HB 5991.

In accordance with the SAW Grant requirements, the Village’s Storm Water Asset Management Plan (SWAMP) needs to be kept available for citizen review for 15 years. The SWAMP should be reviewed annually, and the components updated and included in the Village’s annual budget process.

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Due Date **November 2018**
(no later than 3 years from executed grant date)

The Village of Sebewaing certifies that all storm water asset management plan (SWAMP) activities specified in SAW Grant No. 1065-01 have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SWAMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

Alexander Khoury at (989) 883-2150 alexander.khoury@yahoo.com
Name Phone Number Email

10-25-18
Signature of Authorized Representative (Original Signature Required) Date

Alexander Khoury Village President
Print Name and Title of Authorized Representative

Protecting our Infrastructure Investment

ASSET MANAGEMENT PLAN

Wastewater Executive Summary Report

Prepared for:

Village of Shelby

SAW Project No. 1627-01

November 2018

FLEIS&VANDENBRINK
DESIGN. BUILD. OPERATE.

EXECUTIVE SUMMARY

OVERVIEW

Public Act 562 of 2012 authorized money for Stormwater, Asset Management, and Wastewater (SAW) Grant Program. In September of 2015, The Village of Shelby received a Stormwater, Asset Management, and Wastewater (SAW) Grant from the Michigan Department of Environmental Quality (MDEQ), project no. 1627-01, to provide financial assistance for the development of a wastewater asset management plan (AMP) for the Village's publicly owned wastewater utility.

This AMP is intended to be a living document that is updated as assets continue to wear and age, and as additional inspection/condition results are found and incorporated into the plan.

The contact person for the Village of Shelby AMP is:

Robert Widigan, Village Administrator
Address: 218 N. Michigan Avenue Shelby, MI 49455
Phone number: (231) 861-4400
Email: administrator@shelbyvillage.com

ASSET INVENTORY AND CONDITION ASSESSMENT

The wastewater collection system and WWTP assets consist of the following:

- 78,343 feet of sanitary sewer (gravity pipe and force main) ranging from 4-inch to 15-inch diameter
- 302 wastewater manholes
- 1 WWTP
  - 2 aerated lagoons (one diffused aeration, one surface aeration)
  - 2 facultative (storage) lagoons
- 3 sanitary lift stations (can-style flooded suction lift and submersible grinder)

The Village of Shelby WWTP is currently an aerated and facultative lagoon system with groundwater discharge via rapid infiltration basins (RIBs) in accordance with Groundwater Discharge Permit No. GW1810137. The facility is permitted to discharge 84 million gallons per day (mgd) at a maximum rate of 1.242 mgd.

ASSET IDENTIFICATION AND LOCATION

A comprehensive wastewater system asset inventory was developed from operation and maintenance manuals including a review of existing record drawings, field notes, staff knowledge, and site visits, supplemented with field survey work. Asset material, size and age were identified through the review of available historical record documents. Spatial orientation (pipe location), pipe depth and invert elevations were determined through GPS field survey and a comprehensive evaluation of the gravity system. This information was organized into a new (GIS) database and piping network for archiving, mapping and further evaluation purposes. The inventory includes 115 WWTP assets, 54 Lift Station Assets, and 593 Collection System Assets.

CONDITION ASSESSMENT AND EXPECTED USEFUL LIFE

For the Village of Shelby, a comprehensive evaluation of the collection system was performed. NASSCO-MACP manhole field-based assessments were completed on all 302 manhole structures. Pipeline cleaning and NASSCO-PACP CCTV field-based inspections were conducted on 33% of the gravity pipe. Recommendations identified the need for maintenance with 35% of the system tagged for inspection and/or cleaning. Rehabilitation for short-term (1-5 year) and long term (6-20 year) accounted for 10% of the system identifying the need for repairs, lining and replacement. The remaining 55% of assets were placed in the 20+ year category.

Overall, the condition of the assets at the WWTP are good. Ongoing repairs have helped to maintain the condition of many assets while some assets may require repair or replacement in the near-future due to age or deterioration caused by harsh conditions associated with wastewater treatment. The WWTP was completely reconstructed in 2010.

The condition of the assets at the lift stations range from good to poor. Ongoing maintenance has maintained adequate operating condition of many assets while other assets have deteriorated due to age and the harsh conditions associated with typical wastewater collection systems.

LEVEL OF SERVICE

DEFINING THE EXPECTED LEVEL OF SERVICE (LOS)

The overall objective of the Village of Shelby Wastewater Department is to provide reliable wastewater collection and treatment services at a minimum cost, consistent with applicable environmental and health regulations. To achieve this the following Level of Service (LOS) goals are proposed:

WASTEWATER UTILITY - LEVEL OF SERVICE STATEMENT

The overall objective of the Village of Shelby Wastewater System is to provide reliable wastewater collection and treatment services at a minimum cost, consistent with applicable environmental and health regulations. To achieve this, the following Level of Service (LOS) goals are proposed:

- Provide adequate collection system and treatment capacity for all service areas.
- Comply with all local, state and federal regulations at all times for treated effluent from the WWTP.
- Actively maintain collection and treatment system assets in reliable working condition.
- Reduce inflow/infiltration (I/I) flow volumes to mitigate potential for sanitary overflows, water in basements, and overloading of the treatment plant.
- Provide rapid and effective emergency response services to customers.
- Ensure operations staff are properly certified.
- Regularly review health and safety procedures for operations staff to provide proper worker safety.
- Regularly review projected O&M and capital expenditures. Adjust user rates, as necessary, to ensure sound financial management of the wastewater system.

The LOS goals may need to be adjusted from time to time as the utility ages, the needs of community change or new rules or regulations require a change in operation. For this reason, the LOS goals should be reviewed by the Village from time to time to make sure they accurately reflect the desired operation of the utility.

MEASURING PERFORMANCE

Performance measurements are specific metrics designed to assess whether Level of Service objectives are being met. Evaluations of goals should be completed at least annually to determine if, the provided resources are being used appropriately. Level of Service requirements can be updated to account for changes due to growth, regulatory requirements, and technology.

CRITICAL ASSETS

DETERMINING CRITICALITY

Business Risk is the determination of criticality of each asset in the wastewater system. Criticality is based on two factors; Likelihood (Probability) of Failure and Consequence of Failure using the following formula:

Business Risk = Consequence of Failure Score x Likelihood of Failure Score

Defining an asset's Business Risk allows for management of risk and aids in decision making for where to allocate operation, maintenance and capital improvement funds.

Likelihood of Failure (LoF) is a measure of how likely an asset is to fail. The following categories have been developed to quantify how likely an asset is to fail:

- Condition of the asset
- Remaining useful life (Age)

- Service History
- Operational status

Consequence of Failure (CoF) is a measure of the social, economic, financial or environmental impact of failure of an asset and the utilities ability to respond, convey and treat wastewater. CoF categories of the collection system include:

- Proximity to critical environmental features
- Location (Zoning District) of asset
- Facilities served by asset
- Size and location of asset within the utility network
- Type of asset

The WWTP and lift station categories for CoF are:

- Process
- Financial Impact
- Safety
- Environmental Impact
- Disruption to the Community
- Ability to Respond

ASSESSING CRITICALITY

Using the strategy outlined above, a Business Risk Evaluation (BRE) was performed for each asset of the Village of Shelby using Innovyze-InfoMaster software. InfoMaster is an ArcGIS-based sewer asset management and capital planning software that will compile, analyze and assess Business Risk for each asset and develops a Capital Improvement Plan.

CRITICALITY RESULTS

Using the strategy outlined above, a Business Risk Evaluation (BRE) was performed for each asset using a graphical ArcGIS-based sewer asset management and capital planning software that compiles, analyzes and assesses Business Risk for each asset and develops a Capital Improvement Plan. The results of the BRE are provided in easily understood tabular and graphical output.

Figure 1 provides the risk rating for gravity and force main pipe by number of pipe segments. Twelve pipe segments in the collection system had an extreme risk rating and are recommended to be replaced, lined or point repaired. Much of the collection system's gravity pipes, 86 percent as shown in Figure 1, have a low to negligible risk rating and are indicative of pipes in relatively good condition.

Figure 2 provides the risk rating for the collection system manholes. One manhole is identified as extreme risk, and is recommended to be cleaned, lined and repaired. Many manholes are at low to negligible risk and are indicative of manholes in relatively good condition (85 percent).

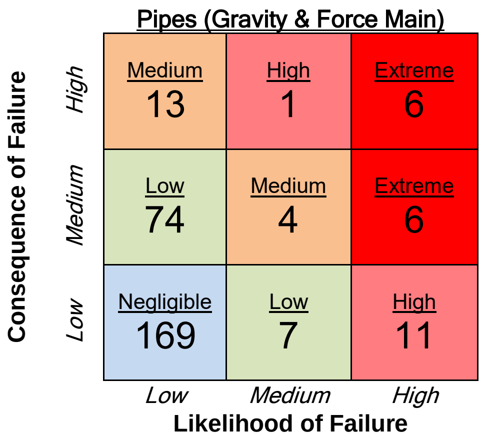


Figure 1. Business Risk Matric (Risk Rating) by Number of Gravity and Force Main Pipes

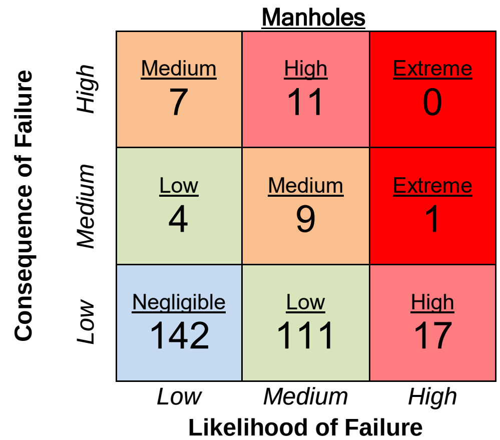


Figure 2. Business Risk Matrix (Risk Rating) by Number of Manholes

A summary of the risk ratings for WWTP assets is provided in the AMP detailed report for the WWTP and Lift Stations. A complete list of assets categorized from low to extreme risk ratings is available in Appendix F of the WWTP and LS AMP Report. No assets scored in the “Extreme Risk” category which would require a plan for very short-term asset renewal or risk mitigation. The assets shown in the “High Risk” category may require a plan for asset renewal or risk mitigation. Some of the assets are addressed in the Capital Improvement Plan section below.

A summary of the Lift Station assets is shown graphically in the AMP detailed report for the WWTP and Lift Stations. A complete list of assets sorted from highest to lowest Business Risk was provided to staff and is available in Appendix G of the WWTP and LS AMP Report. The Lift Station assets in the “High Risk” category may require a plan for asset renewal or risk mitigation. Some of the assets are addressed in the Capital Improvement Plan section below.

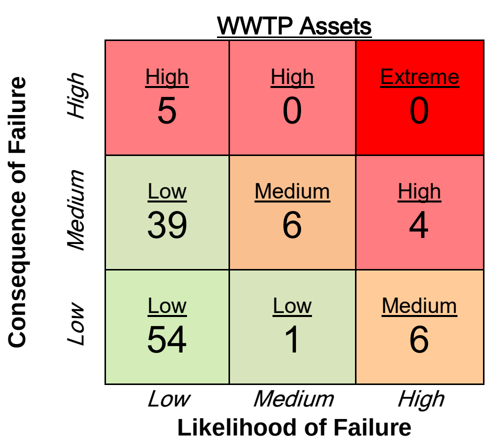


Figure 3. WWTP Assets by Risk Rating

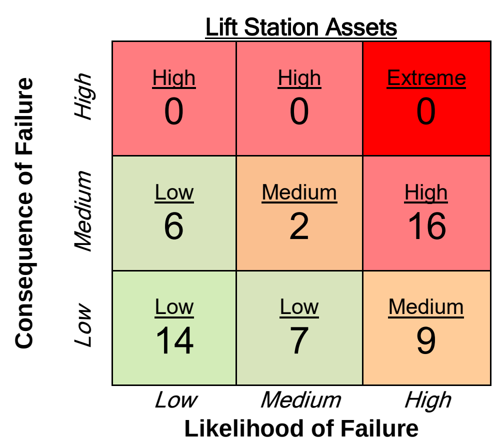


Figure 4. Lift Station Assets by Risk Rating

A spreadsheet providing asset criticality for each utility asset has been included in the AMP detailed report for the collection and treatment systems.

Capital Improvement Project Plan (Long-term Funding Plan)

A Capital Improvement Plan with recommendations was prepared for the Village's assets based on the Business Risk evaluation. Data-driven information from the business risk assessment and condition assessment was used to identify and prioritize the capital improvement projects. The information was also used to schedule inspections to evaluate the condition of high business risk assets. A Short-Term 1-5 year and Long-Term 6-20 year Capital Improvement Plan (CIP) was prepared to address the projected needs for each asset in the system.

CIP Development

Collection System assets were grouped by strategy and assigned costs from a unit database. This database includes unit construction values in 2018 construction dollars based on a survey of recent projects in Michigan and includes engineering and administrative rates where applicable. Opinions of probable project costs for the WWTF and Lift Station assets were prepared and are based on conceptual layouts of new facilities, or price quotes from material and equipment representatives. Assets were categorized and prioritized by year based on risk rating and criticality score to develop the CIP.

The CIP was developed by assigning each project to a CIP year (1-5) based on several factors. In addition to Risk Rating, other factors used to assign CIP year include:

- Asset rehabilitation grouping (i.e. the type of repair/construction recommended)
- Coordination with other planned projects to achieve economies of scale or limiting disruption (an example is a street reconstruction project where identified utility recommendations can be included)

The 5-Year CIP must also consider project cost when assigned to a CIP year to balance capital requirements with generated utility revenues. The recommended 5-Year Capital Improvement Plan for the wastewater collection system is included in Table 3a. Recommendations for the long term 6-20 year CIP are included in Table 3b.

Table 3a. 5-Year Capital Improvement Plan: Rehabilitation

Rehabilitation Action	Total Cost (Current Year Dollars)	2019	2020	2021	2022	2023
Pipe Replacement	$178,600	$ -	$ 140,200	$ -	$ -	$ 47,800
Pipe Lining	$58,100	$ -	$ 59,800	$ -	$ -	$ -
Pipe Point Repair	$104,500	$ 76,800	$ -	$ 29,500	$ -	$ -
Manhole Clean, Line, Repair and Adjust	$32,300	$ -	$ 8,300	$ 25,700	$ -	$ -
Manhole Clean, Line and Repair	$43,100	$ -	$ -	$ -	$ 47,100	$ -
Manhole Repair, Line and Adjust	$7,300	$ -	$ -	$ -	$ 8,000	$ -
Total	**$423,900**	**$ 76,800**	**$ 208,300**	**$ 55,200**	**$ 55,100**	**$ 47,800**

Assumes 3% Inflation per Year

Table 3b: Capital Improvement Plan 6-20 Year

Description	6-20 Year
Collection System	
Known Collection System Rehabilitation	$ 220,000
Projected Collection System Rehabilitation	$ 770,000
Total Rehabilitation Cost	***$ 990,000***

**Costs based on 2018 construction dollars*

Table 4a and 4b show the short-term and long-term recommendations, respectively, for the WWTF and lift station system assets.

Table 4a: Recommended Capital Improvements for WWTP and Lift Stations 1-5 Year						
Rehab Action	**Total Cost (Current Year Dollars)**	**2019**	**2020**	**2021**	**2022**	**2023**
Mixer Replacement	$44,000	$ 45,300	$ -	$ -	$ -	$ -
Lagoon Berm Improvements	$8,100	$ 8,300	$ -	$ -	$ -	$ -
Industrial Park Lift Station Rehabilitation	$292,400	$ -	$ 310,200	$ -	$ -	$ -
Harvey Street Lift Station Rehabilitation	$265,400	$ -	$ -	$ 290,000	$ -	$ -
Aeration Diffuser Replacement	$186,800	$ -	$ -	$ 204,100	$ -	$ -
MCC Inspection	$16,800	$ -	$ -	$ -	$ 18,900	$ -
WWTP Equipment Replacement	$94,800	$ -	$ -	$ -	$ -	$ 109,900
TOTAL	**$908,300**	**$53,600**	**$ 310,200**	**$ 494,100**	**$18,900**	**$ 109,900**

Table 4b: Recommended Capital Improvements for WWTP and Lift Stations 6-20 Year	
Description	**6-20 Year**
Lagoon Cleaning	$ 1,059,000
Total Rehabilitation Cost	***$ 1,059,000***

**Costs based on 2018 construction dollars*

OPERATIONS, MAINTENANCE & REPLACEMENT

Regular operation, maintenance and replacement (OM&R) is essential in the management of a wastewater collection system. The collection system is subject to a variety of operational problems and can suffer from clogging, scour, corrosion, and collapse. Inspection, cleaning, and rehabilitation are important for optimizing the proper functioning of the collection system. By optimizing the performance infiltration/inflow are reduced and sanitary sewer overflows (SSO) are minimized or eliminated preserving the substantial investment the community has in its collection system.

Table 5a identifies the recommended maintenance actions items for the wastewater collection system in a five-year summary. The total cost, as shown in the 'Total' column below, is taken and divided by five and then disbursed between 2019 to 2023, where each increasing year is multiplied by a 3% inflation factor starting at year 2 (2020).

Table 5a. Collection System Maintenance Summary Table: Year by Year						
Maintenance Action	**Total Cost (Current Year Dollars)**	**2019**	**2020**	**2021**	**2022**	**2023**
Manhole Assessment	$ 3,750	$ -	$ -	$ -	$ 4,100	$ -
Manhole Cleaning	$ 810	$ -	$ -	$ -	$ -	$ 1,000
CCTV	$ 172,300	$ 37,300	$ 37,400	$ 37,700	$ 33,600	$ 36,700
Total Project Cost	***$ 177,000***	***$ 37,300***	***$ 37,400***	***$ 37,700***	***$ 37,700***	***$ 37,700***

Assumes 3% Inflation per Year

In addition to the capital improvements, an annual equipment replacement fund should be developed to replace disposable equipment. These are items that can be financially accounted for through operation, maintenance and replacement (OM&R) funds and can be replaced by WWTP staff without bringing in an outside contractor. Existing disposable materials include wear parts in pumps and motors, laboratory instruments, etc. A list of WWTP and lift station assets requiring replacement in the next 20 years was generated based on the expected useful life of assets included in the asset inventory. Table 5b provides the results of the analysis.

Table 5b: WWTP and Lift Stations Equipment Replacement Budget			
Asset Description	**Rehab/Replacement Cost**	**Expected Useful Life (Years)**	**Annual Budget**
Lift Stations			
Industrial Park Lift Station Pumps	$23,600	25	$944
Industrial Park Lift Station Motors	$13,000	10	$1,300
Northland Crossing Lift Station Pumps	$16,000	15	$1,067
Harvey Street Lift Station Pumps	$23,600	25	$944
Harvey Street Lift Station Motors	$13,000	10	$1,300
Wastewater Treatment Plant			
Blowers (2)	$14,000	25	$560
Blower Motors (2)	$14,000	10	$1,400
Floating Aerators (2)	$14,000	20	$700
Lagoon Circulator	$48,200	20	$2,410
Influent Flow Meter	$600	10	$60
Mixers (2)	$18,000	10	$1,800
Effluent Pump	$17,800	10	$1,780
Effluent Flow Meters (2)	$2,800	10	$280
Ferric Level Sensor	$2,600	10	$260
Ferric Metering Pumps (2)	$3,400	10	$340
		Total:	**$15,145**

Revenue Structure (Minimum Life Cycle Costs)

The revenue and rate methodology is an instrument to determine rates and charges that will provide sufficient revenues to cover operation, maintenance, capital replacement, and debt costs.

A study was completed on a cash basis that demonstrated sufficient revenues to meet the Michigan Department of Environmental Quality SAW Grant requirements. The study results were approved by MDEQ on July 20, 2018.

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date November 30, 2018
(no later than 3 years from executed grant date)

The Village of Shelby *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1627-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or **No**

   If No - Date of the rate methodology approval letter: April 30, 2018.

2) Significant Progress Made: Yes or **No**

   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)

3) Date of rate methodology review letter identifying the gap: N/A.

4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on N/A.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Robert Widigan at	(231) 861-4400	administrator@shelbyvillage.com
Name	Phone Number	Email

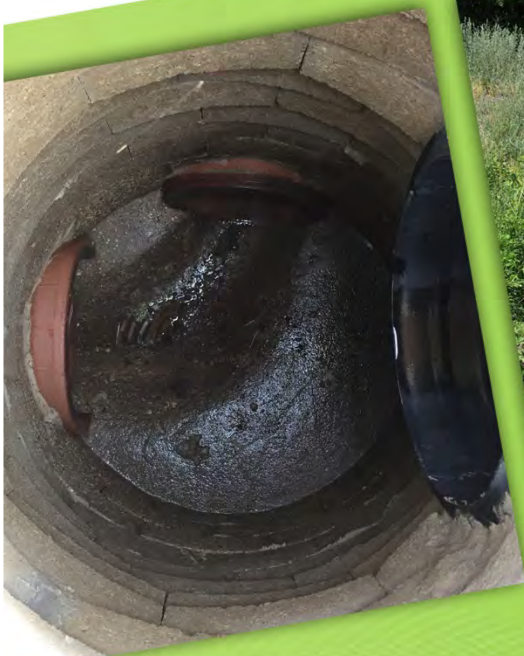
Robert Widigan 11/28/2018
Signature of Authorized Representative (Original Signature Required) Date

Robert Widigan, Village Administrator
Print Name and Title of Authorized Representative

Protecting our Infrastructure Investment

ASSET MANAGEMENT PLAN

Stormwater Executive Summary Report



Prepared for:

Village of Shelby

SAW Project No. 1627-01

November 2018

FLEIS&VANDENBRINK

DESIGN. BUILD. OPERATE.

Executive Summary

Overview

Public Act 562 of 2012 authorized money for Stormwater, Asset Management, and Wastewater (SAW) Grant Program. In October of 2015, The Village received a Stormwater, Asset Management, and Wastewater (SAW) Grant from the Michigan Department of Environmental Quality (MDEQ), project no. 1627-01, to provide financial assistance for the development of a stormwater asset management plan (AMP) for the Village's publicly owned stormwater utility. This AMP is intended to be a living document that is updated as assets continue to wear and age, and as additional inspection/condition results are found and incorporated into the plan.

The contact person for the Village of Shelby AMP is:

Robert Widigan, Village Administrator
Address: 218 N. Michigan Avenue, Shelby, MI 49455
Phone number: (231) 861-4400
Email: administrator@shelbyvillage.com

Asset Inventory and Condition Assessment

The stormwater collection system assets consist of the following:

- 36,073 feet of storm sewers ranging from 4-inch to 60-inch diameter
- 398 stormwater structures
    - 279 catch basins
    - 91 manholes
    - 28 culverts

Asset Identification and Location

A comprehensive stormwater system asset inventory was developed from available record drawings, field notes, staff knowledge, and site visits; supplemented with field survey work. Asset material, size and age were identified through the review of available historical record documents. Spatial orientation (pipe location), pipe depth and invert elevations were determined through GPS field survey and a comprehensive evaluation of the gravity system. This information was organized into a new (GIS) database and piping network for archiving, mapping, and further evaluation purposes.

The purchase of GIS equipment provided with the SAW grant program will greatly enhance the Village's ability to physically track underground improvements and locate defects in storm water system assets

Condition Assessment and Expected Useful Life

For the Village of Shelby, a comprehensive evaluation of the collection system was performed. NASSCO-MACP structure field-based assessments were completed on all 398 structures. Pipeline cleaning and NASSCO-PACP CCTV field-based inspections were conducted on 10% of the Village stormwater collection system.

Recommendations for short-term (1-5 year) and long term (6-20 year) identified the need for maintenance; 73% of the storm structures and 90% of the sewer system was tagged for CCTV, inspection, and/or cleaning. Rehabilitation is recommended for approximately 25% of the storm structures and 10% of the storm sewer collection system, for point repairs, lining, and replacement. The remaining assets (2% and 0%, respectively) were placed in the beyond 20-year planning category.

Level of Service

Defining the Expected Level of Service (LOS)

Level of Service (LOS) defines the way in which the Village stakeholders want the storm water system to perform over the long term and is an MDEQ required component of an AMP. The LOS can include any technical, managerial, or financial components the Village wishes, if all regulatory requirements are met.

Throughout the development of this AMP, F&V worked with the Village of Shelby staff to develop the following LOS statement and goals.

STORMWATER – LEVEL OF SERVICE STATEMENT

"To provide appropriate stormwater collection, diversion, and conveyance at a minimum cost, consistent with applicable environmental regulations. To achieve this the following Level of Service (LOS) goals are for the Village of Shelby:

- *Provide adequate stormwater collection system and conveyance capacity for all service areas*
- *Actively maintain stormwater collection and conveyance system assets in reliable working condition.*
- *Provide rapid and effective emergency response services to customers.*
- *Maintenance and operations staff are to be properly trained.*
- *Provide properly trained maintenance and operations staff*

The LOS goals may need to be adjusted from time to time as the utility ages, the needs of community change or new rules or regulations require a change in operation. For this reason, the LOS goals should be reviewed by the Village of Shelby from time to time to make sure they accurately reflect the desired operation of the storm water system.

MEASURING PERFORMANCE

Performance measurements are specific metrics designed to assess whether Level of Service objectives are being met. Evaluations of goals should be completed at least annually to determine if the provided resources are being used appropriately. Level of Service requirements can be updated to account for changes due to growth, regulatory requirements, and technology.

CRITICAL ASSETS

Determining Criticality

Business Risk is the determination of criticality of each asset in the wastewater system. Criticality is based on two factors; Likelihood (Probability) of Failure and Consequence of Failure using the following formula:

Business Risk = Consequence of Failure Score x Likelihood of Failure Score

Defining an asset's Business Risk allows for management of risk and aids in decision making for where to allocate operation, maintenance and capital improvement funds.

Likelihood of Failure (LoF) is a measure of how likely an asset is to fail. The following categories have been developed to quantify how likely an asset is to fail:

- Condition of the asset
- Remaining useful life (Age)
- Service History
- Operational status

Consequence of Failure (CoF) is a measure of the social, economic, financial and environmental impact of failure of an asset and the utilities ability to respond, convey and treat wastewater. CoF categories of the collection system include:

- Proximity to critical environmental features
- Location (Zoning District) of asset
- Facilities served by asset
- Size and location of asset within the utility network
- Type of asset.

ASSESSING CRITICALITY

Using the strategy outlined above, a Business Risk Evaluation (BRE) was performed for each asset of the Village of Shelby using Innovyze-InfoMaster software. InfoMaster is an ArcGIS-based sewer asset management and capital planning software that will compile, analyze and assess Business Risk for each asset and develops a Capital Improvement Plan.

The Business Risk score, also known as Criticality, is calculated for each asset using the following equation:

Business Risk = Consequence of Failure Score x Likelihood of Failure Score

Figure 1 provides the risk rating for storm sewer pipes by number of pipe segments. Eight (8) pipe segments in the stormwater collection system have an extreme risk rating and six (6) have a high-risk rating and are recommended for near-term rehabilitation or replacement. Much of the storm system's pipes, 86.5%, have a low to negligible risk rating and are indicative of pipes in relatively good condition.

Figure 2 below provides the risk rating for the stormwater structures. 29 structures (7 percent) are identified as extreme risk and 68 structures (17 percent) have a high-risk rating and are recommended for near-term replacement or rehabilitation. Many structures (56 percent) are at low or negligible risk, indicative of structures in relatively good condition.

Pipes

Consequence of Failure	Low	Medium	High
High	Medium 37	High 6	Extreme 2
Medium	Low 160	Medium 3	Extreme 6
Low	Negligible 181	Low 1	High 0

Likelihood of Failure

Figure 1: Business Risk Matrix (Risk Rating) by Number of Gravity Pipes

Manholes

Consequence of Failure	Low	Medium	High
High	Medium 17	High 12	Extreme 4
Medium	Low 59	Medium 60	Extreme 25
Low	Negligible 81	Low 84	High 56

Likelihood of Failure

Figure 2: Business Risk Matrix (Risk Rating) by Number of Structures

A spreadsheet providing asset criticality for each utility asset is included in the AMP detailed report for the stormwater collection system.

CAPITAL IMPROVEMENT PROJECT PLAN

A Capital Improvement Plan with recommendations was prepared for the Village's assets based on the Business Risk evaluation. Data-driven information from the business risk assessment and condition assessment was used to identify and prioritize the capital improvement projects. The information was also used to schedule inspections to evaluate the condition of high business risk assets. Short-Term 1-5 year and Long-Term 6-20-year Capital Improvement Plan (CIP) was prepared to address the projected needs for each asset in the system.

CIP DEVELOPMENT

The Village of Shelby identifies assets of $5,000 or more to be capital expenditures. Collection System assets were grouped by strategy and assigned costs from a unit database. This database includes unit construction values in 2018 construction dollars based on a survey of recent projects in Michigan and includes engineering and administrative rates where applicable. Assets were categorized and prioritized by year based on risk rating and criticality score to develop the CIP.

The CIP was developed by assigning each project to a CIP year (1-5) based on several factors. In addition to Risk Rating, other factors used to assign CIP year include:

- Asset rehabilitation grouping (i.e. the type of repair/construction recommended)
- Coordination with other planned projects to achieve economies of scale or limiting disruption (an example is a street reconstruction project where identified utility recommendations can be included)

The 5-Year CIP must also consider project cost when assigned to a CIP year to balance capital

Table 3a. 5-Year Capital Improvement Plan: Rehabilitation						
Rehabilitation Action	**Total Cost (Current Year Dollars)**	**2019**	**2020**	**2021**	**2022**	**2023**
Pipe Replacement	$ 150,400	$ 133,000	$ -	$ -	$ -	$ 19,600
Pipe Lining	$ 39,600	$ -	$ 36,400	$ -	$ 4,700	$ -
Pipe Point Repair	$ 126,000	$ 67,400	$ -	$ 62,200	$ -	$ -
Manhole Clean, Line and Repair	$ 451,800	$ -	$ 160,700	$ 74,200	$ 129,300	$ 121,100
Total	**$ 808,600**	**$ 200,400**	**$ 197,100**	**$ 136,400**	**$ 134,000**	**$ 140,700**

requirements with generated utility revenues. The recommended 5-Year Capital Improvement Plan for the wastewater collection system is included in Table 3a. Recommendations for the long term 6-20 year CIP are included in Table 3b.

Assumes 3% Inflation per Year

Table 3b: Capital Improvement Plan 6-20 Year	
Description	**6-20 Year**
Collection System	
Known Collection System Rehabilitation	$ 137,700
Projected Collection System Rehabilitation	$ 401,700
Total Rehabilitation Cost	***$ 539,400***

**Costs based on 2018 construction dollars*

OPERATIONS AND MAINTENANCE

A preventative maintenance program to systematically clean and inspect pipelines to NASSCO-certified standards is critical for a sound stormwater system. The process of cleaning and CCTV inspection of pipelines either with equipment owned by the community or contracted is a relatively inexpensive maintenance effort when compared to rehabilitation efforts. It is recommended that at a minimum, all pipelines be cleaned and televised every five years, or that 20% of the system be cleaned and televised annually. Available budget will dictate the frequency or size of yearly projects.

Table 5 identifies the recommended maintenance actions items for the wastewater collection system in a five-year summary. The total cost, as shown in the 'Total Cost' column below, is taken and divided by five and then disbursed between 2019 to 2023, where each increasing year is multiplied by a 3% inflation factor starting at year 2 (2020).

Table 5. 5-Year Capital Improvement Plan: Maintenance						
Maintenance Action	**Total Cost (Current Year Dollars)**	**2019**	**2020**	**2021**	**2022**	**2023**
Manhole Inspection	$ 18,800	$ 3,300	$ -	$ -	$ 17,600	$ -
Manhole Cleaning	$ 176,000	$ 60,300	$ 45,600	$ -	$ 33,400	$ 77,800
CCTV	$ 91,900	$ -	$ 22,300	$ 75,600	$ 25,400	$ -
Total	**$ 361,300**	**$ 63,600**	**$ 67,900**	**$ 75,600**	**$ 76,400**	**$ 77,800**

Assumes 3% Inflation per Year

Revenue Structure (Minimum Life Cycle Costs)

Road maintenance and storm drain maintenance is traditionally funded through proceeds from Public Act 51. The Village of Shelby has relied on this funding source to maintain drainage. This practice is expected to continue for the foreseeable future.

DEQ

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Due Date November 30, 2018
(no later than 3 years from executed grant date)

The Village of Shelby *(legal name of grantee)* certifies that all stormwater asset management plan (SWAMP) activities specified in SAW Grant No. . 1627-01 have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SWAMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

Rob Widigan at (231) 861-4400 administrator@shelbyvillage.com
Name Phone Number Email

11/28/2018
Signature of Authorized Representative (Original Signature Required) Date

Robert Widigan Village Administrator
Print Name and Title of Authorized Representative

Protecting our Infrastructure Investment

ASSET MANAGEMENT PLAN

Wastewater Executive Summary Report

Prepared for:

Village of Sheridan

SAW Project No. 1606-01

FLEIS&VANDENBRINK
DESIGN. BUILD. OPERATE.

November 2018

EXECUTIVE SUMMARY

OVERVIEW

Public Act 562 of 2012 authorized money for Stormwater, Asset Management, and Wastewater (SAW) Grant Program. December of 2015, the Village received a Stormwater, Asset Management, and Wastewater (SAW) Grant from the Michigan Department of Environmental Quality (MDEQ), project no. 1606-01, to provide financial assistance for the development of a wastewater asset management plan (AMP) for the Village's publicly owned wastewater utility. This AMP is intended to be a living document that is updated as assets continue to wear and age, and as additional inspection/condition results are found and incorporated into the plan.

The contact person for the Village of Sheridan AMP is:

Doug Lane, Village DPW Superintendent
Address: 115 E. Evergreen Street P.O. Box 179. Sheridan, MI 48884
Phone number: (989) 291-3485
Email: SheridanDPW@casair.net

ASSET INVENTORY & CONDITION ASSESSMENT

A list of the major assets in the Village's wastewater system, described further below, include:

- Collection system piping system and manholes
  - 37,551 feet of sanitary sewer ranging from 2-inch to 10-inch diameter
  - 99 wastewater manholes
- Wastewater Stabilization Lagoon (WWSL)
  - Tertiary Lagoon – 1
  - Secondary Lagoon – 1
  - Aeration Cells – 2
- Sanitary sewer lift stations in the collection system
  - 5 sanitary sewer lift stations

The wastewater collection system assets include approximately 37,551 feet of sanitary sewers (gravity pipe and force mains) and 99 wastewater manholes connecting the gravity pipe. Approximately 25,953 feet of 8" to 10" diameter pipe makes up the gravity sewer. Approximately 11, 598 feet of 2" to 8" diameter pipe makes up the force main. These assets are located in existing street rights-of-way or in easements dedicated for the assets use and maintenance.

The WWSL currently includes the following treatment processes and major equipment:

- Tertiary Lagoon
- Secondary Lagoon
- Two Aeration Cells

Treated effluent is seasonally discharged to a tributary of Prairie Creek in accordance with the Village's NPDES permit No. MIG580000 and Certificate of Coverage. The design capacity of the WWSL is 119,000 gallons per day (gpd). The current annual average flow received by the facility is approximately 50,000 gallons per day.

There are 5 sanitary sewer lift stations located throughout the wastewater collection system. The stations are either submersible style or grinder type stations.

Since their construction, the lift stations have generally been maintained and upgraded as necessary. In 2015, a new natural gas generator was installed at the Main Lift Station to provide a backup power source.

<u>Asset Identification & Location</u>

A comprehensive wastewater system asset inventory was developed from operation and maintenance (O&M) manuals included a review of existing record drawings, field notes, staff knowledge, and site visits, supplemented with field survey work. Asset material, size and age were identified through the review of available historical record documents and Closed-Circuit Televising (CCTV) data. Spatial orientation (pipe location), pipe depth and invert elevations were determined through GPS field survey and a comprehensive evaluation of the gravity system. This information was organized into a new or updated (GIS) database and piping network for archiving, mapping and further evaluation purposes. The inventory includes over 65 WWSL assets, 5 lift stations, 37,551 ft of sanitary sewer and 99 sanitary sewer structures.

Condition Assessment and Expected Useful Life

A comprehensive evaluation of the collection system was performed. NASSCO-MACP manhole field-based assessments were completed on all 99 manhole structures. Pipeline cleaning and NASSCO-PACP CCTV field-based inspections were conducted on the gravity pipe. Capacity Analysis was modeled for average day and peak hour conditions to identify capacity concerns. Recommendations for short-term (1-5 year) and long term (6-20 year) identified the need for maintenance with 62% of the system tagged for inspection and/or cleaning. Rehabilitation accounted for 1.5% of the system identifying the need for point repairs and lining. The remaining 36.5% of assets were placed in the 20+ year category.

The condition of the assets at the lift stations range from good to poor. Ongoing maintenance has also upheld the condition of many assets while other assets have deteriorated due to age and the harsh conditions associated with typical wastewater collection systems. The recommendations for short- and long-term improvements are relatively extensive.

LEVEL OF SERVICE

Defining the Expected Level of Service (LOS)

The overall objective of the Village Wastewater Department is to provide reliable wastewater collection and treatment services at a minimum cost, consistent with applicable environmental and health regulations. To achieve this, the Level of Service (LOS) goals are:

WASTEWATER UTILITY - LEVEL OF SERVICE STATEMENT

The overall objective of the Village of Sheridan Wastewater Department is to provide reliable wastewater collection and treatment services at a minimum cost, consistent with applicable environmental and health regulations. To achieve this the following Level of Service (LOS) goals are:

- Provide adequate collection system and treatment capacity for all service areas.
- Comply with all local, state and federal regulations at all times for treated effluent from the WWSL.
- Actively maintain collection and treatment system assets in reliable working condition.
- Reduce inflow/infiltration (I/I) flow volumes to mitigate potential for sanitary overflows, water in basements, and overloading of treatment facility.
- Provide rapid and effective emergency response services to customers.
- Ensure operations staff are properly certified.
- Regularly review health and safety procedures for operations staff to provide proper worker safety.
- Regularly review projected O&M and capital expenditures. Adjust user rates, as necessary, to ensure sound financial management of wastewater system.

The LOS goals may need to be adjusted from time to time as the utility ages, the needs of community change or new rules or regulations require a change in operation. For this reason, the LOS goals should be reviewed by the Village from time to time to make sure they accurately reflect the desired operation of the utility.

Measuring Performance:

Performance measurements are metrics designed to be used for assessing whether Level of Service objectives are being met. Level of Service goals should be evaluated on an annual basis to determine if the provided resources are being used appropriately. Level of Services requirements should be updated to account for changes due to growth, regulatory requirements, and technology.

Critical Assets

Determining Criticality

Business Risk is the determination of criticality of each asset in the wastewater system. Criticality is based on two factors; Likelihood (Probability) of Failure and Consequence of Failure using the following formula:

Business Risk = Consequence of Failure Score x Likelihood of Failure Score

Defining an asset's Business Risk allows for management of risk and aids in decision making for where to allocate operation and maintenance and capital improvement funds.

Likelihood of Failure (LoF) is a measure of how likely an asset is to fail. The following categories have been developed to quantify how likely an asset is to fail:

- Condition of the asset
- Remaining useful life (Age)
- Service History
- Operational status

Consequence of Failure (CoF) is a measure of the social, economic, financial or environmental impact of failure of an asset and the utilities ability to respond, convey and treat wastewater. CoF categories of the collection system include:

- Proximity to critical environmental features
- Location (Zoning District) of asset
- Facilities served by asset
- Size and location of asset within the utility network
- Type of asset.

The WWSL and lift station categories for CoF are:

- Process
- Financial Impact
- Safety
- Environmental Impact
- Disruption to the Community
- Ability to Respond

Criticality Results

Using the strategy outlined above, a Business Risk Evaluation (BRE) was performed for each asset using a graphical ArcGIS-based sewer asset management and capital planning software that compiles, analyzes and assesses Business Risk for each asset and develops a Capital Improvement Plan. The results of the BRE are provided in easily understood tabular and graphical output.

Figure 1 provides the risk rating for gravity and force main pipe by number of pipe segments. No assets were scored in the "Extreme Risk" category. Four pipe segments in the collection system were found to a high risk rating and are recommended to be inspected immediately Much of the collection system's gravity pipes, 87 percent as shown in Figure 1, have a low to negligible risk rating and are indicative of pipes or manholes in relatively good condition.

Consequence of Failure \ Likelihood of Failure	Low	M. Low	Medium	M. High	High
High	0	0	0	1	0
M. High	0	0	0	3	0
Medium	0	0	4	28	3
M. Low	0	3	3	41	6
Low	0	2	1	3	0

Figure 1. Business Risk Matric (Risk Rating) by Number of Gravity and Force Main Pipes

Figure 2 provides the risk rating for the collection system manholes. Two manholes are identified as extreme risk and seven are identified as high risk. These structures are recommended for replacement or to be cleaned, lined, and repaired. Many manholes are at low to medium risk and recommended to be included in a long-term 6-20 year rehabilitation strategy (91 percent).

Manholes

Consequence of Failure \ Likelihood of Failure	Low	Medium	High
High	Medium 6	High 1	Extreme 0
Medium	Low 25	Medium 3	Extreme 2
Low	Negligible 36	Low 10	High 6

Figure 2. Business Risk Matrix (Risk Rating) by Number of Manholes

Figure 3 provides the risk ratings for the WWSL and lift station assets. One asset was found to fall into the category of extreme risks. The eleven assets with high risk ratings should be inspected at regular intervals.

Consequence of Failure				
	High	0 *(High)*	4 *(High)*	1 *(Extreme)*
	Medium	1 *(Low)*	21 *(Medium)*	7 *(High)*
	Low	0 *(Low)*	2 *(Low)*	14 *(Medium)*
		Low	Medium	High
			Probability of Failure	

Figure 3. Business Risk Matrix (Risk Rating) for WWSL and Lift Station Assets

A spreadsheet providing asset criticality for each utility asset has been included in the AMP detailed report for the collection and treatment systems.

Capital Improvement Plan

A Capital Improvement Plan (CIP) with rehabilitation recommendations was prepared for the Village's wastewater utility assets based on the Business Risk Evaluation. The CIP recommendations are provided for the collection system, WWSL and lift stations/force mains. From the BRE, a short-term (1-5 year CIP) and long-term (6-20 year CIP) was developed for the utility. Table 1 shows detailed recommendations of the collection system assets needing rehabilitation in the short-term CIP.

Table 1. 5-Year Capital Improvement Plan: Rehabilitation

Rehabilitation Actions	Cost (Current Year Dollars)	2019	2020	2021	2022	2023
MH Replace	$ 5,356	$ -	$ -	$ -	$ -	$ 6,028
Manhole Repair, Line, and Adjust	$ 14,504	$ -	$ -	$ -	$ 15,849	$ -
Manhole Repair and Line	$ 4,574	$ -	$ -	$ -	$ 4,998	$ -
Total	**$ 24,434**	**$ -**	**$ -**	**$ -**	**$ 20,847**	**$ 6,028**

Assumes 3% Inflation per Year

Table 2 displays collection system assets needing rehabilitation in the long-term CIP.

Table 2: Capital Improvement Plan 6-20 Year

Description	6-20 Year
Known Collection System Rehabilitation	$ 12,659.86
Projected Collection System Rehabilitation	$ 474,576.32
Total Rehabilitation Cost	***$ 487,227.18***

**Costs based on 2018 construction dollars*

Table 3 shows detailed recommendations for the WWSL and lift station system assets needing rehabilitation in the short-term CIP (1-5 years) and in the long-term (6-20 years).

Table 3. Recommended Capital Improvements for WWSL and Lift Stations			
Asset Description	**Anticipated Year of Replacement**	**Project Cost (2018 Dollars)**	**Replacement Cost (Inflated 3%/yr)**
1-5-YEAR CIP PROJECTS			
WWSL Influent Pipe and Structure Replacement	2020	$ 934,000	$ 991,000
Main Lift Station Improvements	2020	$ 227,000	$ 241,000
Pine Street Lift Station Improvements	2020	$ 239,000	$ 254,000
Grant Street Lift Station Improvements	2020	$ 239,000	$ 254,000
Mill Street Lift Station Improvements	2020	$ 119,000	$ 127,000
Pearl Lake lift Station Improvements	2020	$ 119,000	$ 127,000
Ancillary Equipment Upgrades	2020	$ 27,000	$ 29,000
6-20-YEAR CIP PROJECTS			
Secondary Lagoon Biosolids Removal	2038	$ 87,000	$ 158,000
Tertiary Lagoon Biosolids Removal	2038	$ 80,000	$ 145,000
WWSL Effluent Pipe Replacement	2038	$ 462,000	$ 835,000
Note: This table represents budgetary estimates for planning purposes. Further definition of the scope of the projects through preliminary and final design will provide details necessary to improve the accuracy of the costs.			

OPERATIONS, MAINTENANCE & REPLACEMENT

Regular operation, maintenance and replacement (OM&R) is essential in the management of a wastewater collection system. The collection system is subject to a variety of operational problems and can suffer from clogging, scour, corrosion, and collapse. Inspection, cleaning, and rehabilitation are important for optimizing the proper functioning of the collection system. By optimizing the performance infiltration/inflow are reduced and sanitary sewer overflows (SSO) are minimized or eliminated preserving the substantial investment the community has in its collection system.

Table 4a summarizes the recommended preventative maintenance inspections to be considered in the short term (1-5 years) with recommended cost over the 5-year period.

Table 4a. Collection System Maintenance Summary Table: Year by Year						
Maintenance Action	**Total Cost (Current Year Dollars)**	**2019**	**2020**	**2021**	**2022**	**2023**
Manhole Assessment	$ 3,214	$ -	$ -	$ -	$ 3,512	$ -
Manhole Cleaning	$ 4,017	$ 803	$ -	$ -	$ -	$ 3,617
CCTV	$ 86,263	$ -	$ 1,861	$ 89,600	$ -	$ -

A list of WWSL and lift (pump) station assets requiring replacement in the next 20 years was generated based on the expected useful life of assets included in the asset inventory. Assets addressed in the CIP were not included in the replacement cost table. Table 4b provides the results of the analysis.

Table 4b. Village of Sheridan				
Equipment Replacement Budget				
Item	**Rehab/ Replacement Cost**	**Life Years**	**Annual Budget**
Main Lift Station Pumps/Controls	$ 30,000	15	$ 2,000
Main Lift Station Generator	$ 10,000	15	$ 667
Pine Street Lift Station Pumps/Controls	$ 10,000	15	$ 667
Grant Street Lift Station Pumps/Controls	$ 10,000	15	$ 667
Mill Street Lift Station Pumps/Controls	$ 8,000	15	$ 533
Pearl Lake Lift Station Pumps/Controls	$ 8,000	15	$ 533
Portable Generators	$ 5,000	15	$ 333
Lagoon Repairs	$ 30,000	20	$ 1,500
Total	**$ 111,000**		**$ 6,900**

An annual equipment replacement fund should be developed to replace disposable equipment. These are items that can be financially accounted for through operation, maintenance and replacement (OM&R) funds and can be replaced by WWSL staff without bringing in an outside contractor. Existing disposable materials include chemicals, wear parts in pumps and motors, laboratory instruments, etc. The existing OM&R fund is enough for the current operations.

Revenue Structure

The final component of the AMP is to evaluate projected user rates that will provide sufficient revenues to cover operation, maintenance, capital improvement projects and debt costs. A study was conducted by Michigan Rural Waters Association. The wastewater utility rate study report includes two components:

1. The MDEQ rate methodology requires and analysis of the current budget on a cash basis to determine if there is a revenue gap. The rate methodology calculated under the MDEQ requirements compared to the current approved rates revealed a gap where expenditures exceed revenue. Copies of the MRWA Rate Study and MDEQ review letter can be found in Appendix A. The MDEQ rate study report and a copy of that approval letter and report is contained in Appendix A.
2. Copies of the Capital Improvement Plan can be found in Appendix B.

Based on the recommendations of Michigan Rural Waters Association, the Village made the following rate adjustments on November 13, 2018:

1. Increase the sewer charge per customer by $9.00 per month.
2. Increase the sewer charge for all customers by 5% annually beginning in 2020.

Furthermore, the Village intends to perform a follow-up rate analysis in 18 to 24 months.

DEQ

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date November 30, 2018
(no later than 3 years from executed grant date)

The Village of Sheridan *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1606-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or No
   If No - Date of the rate methodology approval letter: ______________.
2) Significant Progress Made: Yes or No
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: August 8, 2018.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on October 9, 2018.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Doug Lane	at	989 560 8313	SheridanDPW@casair.net
Name		Phone Number	Email

x [signature] 11/29/2018
Signature of Authorized Representative (Original Signature Required) Date

Doug Lane , DPW Superintendent
Print Name and Title of Authorized Representative

April 2017

ORDINANCE NO. 820
AMENDED November 13, 2018
EFFECTIVE January 1, 2019

PLEASE TAKE NOTE: That Ordinance No. 820 was amended by the Sheridan Village Council at its meeting November 13, 2018, and is effective with the January 1, 2019 Utility Billing and shall be revised as follows:

Section 10.2a To increase the Sewer charge from $62.85 to $71.85 for flat rate service per customer, per billing cycle effective January 1, 2019 billing.

Section 10.2d To increase a flat rate of $9.00 to Sewer charges for metered customers, per billing cycle effective January 1, 2019.

A 5% increase will apply to the quarterly Sewer charge beginning year 2020 and every year thereafter.

Dated: November 14, 2018

Village of Sheridan

Kathy Sanders

Kathy Sanders, Village Clerk

ASSET MANAGEMENT PLAN

Stormwater Executive Summary Report

Prepared for:

Village of Sheridan

SAW Project No. 1606-01

November 2018

FLEIS&VANDENBRINK
DESIGN. BUILD. OPERATE.

Executive Summary

Overview

Public Act 562 of 2012 authorized money for Stormwater, Asset Management, and Wastewater (SAW) Grant Program. In December of 2015, The Village received a Stormwater, Asset Management, and Wastewater (SAW) Grant from the Michigan Department of Environmental Quality (MDEQ), project no. 1606-01, to provide financial assistance for the development of a stormwater asset management plan (AMP) for the Village's publicly owned stormwater utility. This AMP is intended to be a living document that is updated as assets continue to wear and age, and as additional inspection/condition results are found and incorporated into the plan.

This AMP is intended to be a living document that is updated as assets continue to wear and age, and as additional inspection/condition results are found and incorporated into the plan.

The contact person for the Village of Sheridan AMP is:

Doug Lane, Village DPW Superintendent
Address: 115 E. Evergreen Street P.O. Box 179. Sheridan, MI 48884
Phone number: (989) 291-3485
Email: SheridanDPW@casair.net

Asset Inventory and Condition Assessment

The stormwater collection system assets consist of approximately 10,932 feet (2.07 miles) of storm sewers ranging in size from 4" thru 24" diameter. The storm sewer in connected by 128 stormwater structures (manholes and catch basins). MDOT owns and maintains approximately 3,337 feet (30.5 percent) of gravity pipe and 36 structural assets of the stormwater collection system along M-66. Of the 128 stormwater structures, twelve (12) are culverts and are owned and maintained by the Village. These assets are located in existing street rights-of-way or in easements dedicated for the assets use and maintenance.

A list of the major assets in the Village's stormwater system, described further below, include:

- 10,932 feet of storm sewer pipe ranging from 4-inch to 24-inch diameter.
- 128 stormwater manholes

Asset Identification and Location

A comprehensive stormwater system asset inventory was developed from available record drawings, field notes, staff knowledge, and site visits; supplemented with field survey work. Asset material, size and age were identified through the review of available historical record documents. Spatial orientation (pipe location), pipe depth and invert elevations were determined through GPS field survey and a comprehensive evaluation of the gravity system. This information was organized into a new or updated (GIS) database and piping network for archiving, mapping, and further evaluation purposes.

The purchase of GIS/GPS equipment provided with the SAW grant program will greatly enhance the Village's ability to physically track underground improvements and locate defects in storm water system assets.

Condition Assessment and Expected Useful Life

For the Village of Sheridan, a comprehensive evaluation of the collection system was performed. NASSCO-MACP structure field-based assessments were completed on all 128 structures. Pipeline cleaning and NASSCO-PACP CCTV field-based inspections were conducted on 87.5% of the Village stormwater collection system.

Recommendations for short-term (1-5 year) and long term (6-20 year) identified the need for maintenance; 30.5% of the storm structures and 46% of the sewer system was tagged for CCTV, inspection, and/or cleaning. Rehabilitation is recommended for approximately 33.5% of the storm structures and 3% of the sewer collection system, for point repairs, lining, and replacement. Pipe upsizing is recommended for 20%

of the sewer collection system A few pipe segments with structural problems were identified for complete replacement. The remaining assets (36% and 31%, respectively) were placed in the beyond 20-year planning category.

Level of Service

Defining the Expected Level of Service (LOS)

Level of Service (LOS) defines the way in which the Village stakeholders want the storm water system to perform over the long term and is an MDEQ required component of an AMP. The LOS can include any technical, managerial, or financial components the Village wishes, if all regulatory requirements are met.

Throughout the development of this AMP, F&V worked with the Village of Sheridan staff to develop the following LOS statement and goals.

STORMWATER – LEVEL OF SERVICE STATEMENT

"To provide appropriate stormwater collection, diversion, and conveyance at a minium cost, consistent with applicable environmental regulations. To achieve this the following Level of Service (LOS) goals are for the Village of Sheridan:

- *Provide adequate stormwater collection system and conveyance capacity for all service areas*
- *Actively maintain stormwater collection and conveyance system assets in reliable working condition.*
- *Provide rapid and effective emergency response services to customers.*
- *Maintenance and operations staff are to be properly trained.*
- *Provide properly trained maintenance and operations staff*

The LOS goals may need to be adjusted from time to time as the utility ages, the needs of community change or new rules or regulations require a change in operation. For this reason, the LOS goals should be reviewed by the Village of Sheridan from time to time to make sure they accurately reflect the desired operation of the storm water system.

Measuring Performance

Performance measurements are specific metrics designed to assess whether Level of Service objectives are being met. Evaluations of goals should be completed at least annually to determine if the provided resources are being used appropriately. Level of Service requirements can be updated to account for changes due to growth, regulatory requirements, and technology.

Critical Assets

Determining Criticality

Business Risk is the determination of criticality of each asset in the wastewater system. Criticality is based on two factors; Likelihood (Probability) of Failure and Consequence of Failure using the following formula:

Business Risk = Consequence of Failure Score x Likelihood of Failure Score

Defining an asset's Business Risk allows for management of risk and aids in decision making for where to allocate operation, maintenance and capital improvement funds.

Likelihood of Failure (LoF) is a measure of how likely an asset is to fail. The following categories have been developed to quantify how likely an asset is to fail:

- Condition of the asset
- Remaining useful life (Age)
- Service History
- Operational status

Consequence of Failure (CoF) is a measure of the social, economic, financial and environmental impact of failure of an asset and the utilities ability to respond, convey and treat wastewater. CoF categories of the collection system include:

- Proximity to critical environmental features
- Location (Zoning District) of asset
- Facilities served by asset
- Size and location of asset within the utility network
- Type of asset.

Assessing Criticality

Using the strategy outlined above, a Business Risk Evaluation (BRE) was performed for each asset of the Village of Sheridan using Innovyze-InfoMaster software. InfoMaster is an ArcGIS-based sewer asset management and capital planning software that will compile, analyze and assess Business Risk for each asset and develops a Capital Improvement Plan.

The Business Risk score, also known as Criticality, is calculated for each asset using the following equation:

Business Risk = Consequence of Failure Score x Likelihood of Failure Score

Figure 1 provides the risk rating for storm sewer pipes by number of pipe segments. No pipe segments in the stormwater collection system have an extreme risk rating and three (3) have a high-risk rating and are recommended for near-term rehabilitation or replacement. Much of the storm system's pipes, 82.5%, have a low to negligible risk rating and are indicative of pipes in relatively good condition.

Figure 2 below provides the risk rating for the stormwater structures. 28 structures (22 percent) are identified as extreme risk and 52 structures (41 percent) have a high-risk rating and are recommended for replacement or rehabilitation. Many structures (29%) are at low or negligible risk, indicative of structures in relatively good condition.

Pipes (Gravity & Force Main)

Consequence of Failure	Low (Likelihood of Failure)	Medium (Likelihood of Failure)	High (Likelihood of Failure)
High	Medium 18	High 0	Extreme 0
Medium	Low 62	Medium 1	Extreme 0
Low	Negligible 46	Low 1	High 3

Figure 1: Business Risk Matrix (Risk Rating) by Number of Gravity Pipes

Manholes

Consequence of Failure	Low (Likelihood of Failure)	Medium (Likelihood of Failure)	High (Likelihood of Failure)
High	Medium 4	High 22	Extreme 15
Medium	Low 14	Medium 7	Extreme 13
Low	Negligible 10	Low 13	High 30

Figure 2: Business Risk Matrix (Risk Rating) by Number of Structures

A spreadsheet providing asset criticality for each utility asset is included in the AMP detailed report for the stormwater collection system.

Capital Improvement Project Plan (Long-term Funding Plan)

A Capital Improvement Plan with recommendations was prepared for the Village's assets based on the Business Risk evaluation. Data-driven information from the business risk assessment and condition assessment was used to identify and prioritize the capital improvement projects. The information was also used to schedule inspections to evaluate the condition of high business risk assets. Short-Term 1-5 year

and Long-Term 6-20-year Capital Improvement Plan (CIP) was prepared to address the projected needs for each asset in the system.

CIP DEVELOPMENT

The Village of Sheridan identifies assets of $5,000 or more to be capital expenditures. Collection System assets were grouped by strategy and assigned costs from a unit database. This database includes unit construction values in 2018 construction dollars based on a survey of recent projects in Michigan and includes engineering and administrative rates where applicable. Assets were categorized and prioritized by year based on risk rating and criticality score to develop the CIP.

The CIP was developed by assigning each project to a CIP year (1-5) based on several factors. In addition to Risk Rating, other factors used to assign CIP year include:

Table 1. 5-Year Capital Improvement Plan: Rehabilitation						
Rehabilitation Action	**Total Cost (Current Year Dollars)**	**2019**	**2020**	**2021**	**2022**	**2023**
Pipe Replacement	$ 33,997	$ -	$ -	$ -	$ -	$ 38,263
Manhole Replacement	$ 69,628	$ -	$ 5,517	$ -	$ -	$ 72,339
Manhole Clean, Line and Repair	$ 59,152	$ -	$ 11,077	$ -	$ 52,884	$ -
Manhole Repair and Line	$ 54,888	$ -	$ 4,711	$ -	$ 54,980	$ -
Total	**$ 217,665**	**$ -**	**$ 21,305**	**$ -**	**$ 107,864**	**$ 110,602**

- Asset rehabilitation grouping (i.e. the type of repair/construction recommended)
- Coordination with other planned projects to achieve economies of scale or limiting disruption (an example is a street reconstruction project where identified utility recommendations can be included)

Assumes 3% Inflation per Year

The 5-Year CIP must also consider project cost when assigned to a CIP year to balance capital requirements with generated utility revenues. The recommended 5-Year Capital Improvement Plan for the wastewater collection system is included in Table 1. Recommendations for the long term 6-20 year CIP are included in Table 2.

Table 2: Capital Improvement Plan 6-20 Year	
Description	**6-20 Year**
Collection System	
Known Collection System Rehabilitation	$ 5,665.00
Projected Collection System Rehabilitation	$ 143,491.16
Total Rehabilitation Cost	***$ 149,156.16***

**Costs based on 2018 construction dollars*

OPERATIONS AND MAINTENANCE

A preventative maintenance program to systematically clean and inspect pipelines to NASSCO-certified standards is critical for a sound stormwater system. The process of cleaning and CCTV inspection of pipelines either with equipment owned by the community or contracted is a relatively inexpensive maintenance effort when compared to rehabilitation efforts. It is recommended that at a minimum, all pipelines be cleaned and televised every five years, or that 20% of the system be cleaned and televised annually. Available budget will dictate the frequency or size of yearly projects.

Table 3 identifies the recommended maintenance actions items for the wastewater collection system in a five-year summary. The total cost, as shown in the 'Total' column below, is taken and divided by five and then disbursed between 2019 to 2023, where each increasing year is multiplied by a 3% inflation factor starting at year 2 (2020).

Table 3. 5-Year Capital Improvement Plan: Maintenance

Maintenance Action	Total Cost (Current Year Dollars)	2019	2020	2021	2022	2023
Manhole Inspection	$ 2,142	$ -	$ -	$ -	$ 2,341	$ -
Manhole Cleaning	$ 11,248	$ -	$ -	$ -	$ -	$ 12,659
CCTV	$ 9,939	$ -	$ -	$ 10,544	$ -	$ -
Total	**$ 23,329**	**$ -**	**$ -**	**$ 10,544**	**$ 2,341**	**$ 12,659**

Assumes 3% Inflation per Year

REVENUE STRUCTURE (MINIMUM LIFE CYCLE COSTS)

Road maintenance and storm drain maintenance is traditionally funded through proceeds from Public Act 51. The Village of Sheridan has relied on this funding source to maintain drainage. This practice is expected to continue for the foreseeable future.

Village of Sheridan | Asset Management Plan – SW Executive Summary | November 2018
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DEQ

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Due Date __November 30, 2018__
(no later than 3 years from executed grant date)

The __Village of Sheridan__ *(legal name of grantee)* certifies that all stormwater asset management plan (SWAMP) activities specified in SAW Grant No. __1606-01__ have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SWAMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

__Doug Lane__ at __989.560.8313__ __SheridanDPW@casair.com__
Name Phone Number Email

x __________ 11/29/2018
Signature of Authorized Representative (Original Signature Required) Date

__Doug Lane, Village Superintendent__
Print Name and Title of Authorized Representative

Certification of Project Completeness Summary

Sidney Township
PO Box 141
Sidney, MI 48885
(989) 328-3535

SAW Grant Project No. 1116-01

In November 2015, Sidney Township entered into an agreement with the Department of Environmental Quality and the Michigan Finance Authority for grant funds issued under Public Act No. 511 of 2012 for the *Stormwater, Asset Management, and Wastewater (SAW)* program. The Township received the following:

Wastewater Asset Management Plan (WWAMP) Project Cost	$275,000
LESS Local Match	($ 0)
Total Grant Amount – 100% Grant	$275,000

Wastewater Asset Inventory

The Township's wastewater collection system was constructed in 2011 and has been inventoried, including 243 grinder can stations, 18,000 feet of 1-1/4" low pressure service leads, 36,700 feet of collection system main and pump station forcemains, 4,100 feet of ductile iron pipe, and a 3-cell wastewater lagoon treatment system with groundwater disposal via a 5-unit spray irrigation discharge to farm fields.

Each asset was identified and accounted for using existing as-built information on file. These assets can be located using the ESRI GIS base map that has been created as part of the Asset Management Plan. This base map was populated using survey grade geospatial data which shows structures, pump stations, pipelines, and the lagoon system in the Michigan State Plane coordinate system. In addition to the geospatial data, each asset was populated with asset management information based on field observations of existing conditions and information from construction. The Township will be able to facilitate an asset management program by updating the asset information as repairs and maintenance activities take place.

Using this data, the total asset value in 2018 dollars is estimated at $6.6 million dollars.

Condition Assessment

Topographic survey, field inspections, and condition assessments were performed on the manholes, pipelines, pump stations, and lagoon system. Manholes, cleanouts, valves, and lagoon system structures were inspected using NASSCO's MACP standards for field inspections. A condition assessment of the pipes was based on age, material, maintenance history, and the knowledge that the system was recently built in 2011. The sewer system is low pressure collection system, so televising was not possible. All pipe lines were scored using NASSCO's PACP standards for pipeline inspections. Using the available data, spreadsheets were created to document and perform condition assessment calculations using NASSCO's MACP/PACP Quick Rating System.

For manholes and pipelines, the quick rating system is the sum of all defect grades divided by the number of defects. This quick rating is broken down into two categories: structural and operation and maintenance. The two scores are then combined to generate a Combined quick rating, which was then used to calculate the Likelihood of Failure for the risk assessment.

At this time, the greatest deficiency within the system is the effect that hydrogen sulfide corrosion has on the Lakeside Pump Station concrete wet well, ductile iron piping, and mechanical components.

Overall, most of the Township's grinder cans are in very good to good condition. The results of the condition assessment are summarized in the following tables:

GRINDER STATION OVERALL DEFECTS	
Defect Category	Number of Grinder Stations
Structural	40
O&M	20

GRINDER STATIONS= COMBINED DEFECTS		
Combined Quick Rating	Number of Stations	Percent of System (%)
High - Grade 5	12	5%
Medium - Grade 3-4	22	9%
Low - Grade 1-2	31	13%
No Defects - 0000	178	73%
Total	**243**	**100%**

Overall, most of the Township's manholes are in very good condition. The results of the condition assessment are summarized in the following tables:

SANITARY MANHOLE OVERALL DEFECTS	
Defect Category	Number of Manholes
Structural	2
O&M	1

SANITARY MANHOLE COMBINED DEFECTS		
Combined Quick Rating	Number of Manholes	Percent of System (%)
High - Grade 5	0	0%
Medium - Grade 3-4	2	5%
Low - Grade 1-2	1	3%
No Defects - 0000	37	93%
Total	**40**	**100%**

Overall, all of the Township's pipes are in good to very good condition. The results of the condition assessment are summarized in the following tables:

SANITARY PIPE OVERALL DEFECTS	
Defect Category	Number of Pipe Segments
Structural	0
O&M	0

This inventory and condition assessment of the Township's system is the base of the entire AMP. It was used to determine a current need for repair, the priority of repair projects, and a future O&M plan. The inventory, as-built data, and condition assessments were used to create and populate an ESRI ArcGIS base map.

Level of Service Determination

For the Level of Service, the Township planned their CIP projects and rate structure to continue to maintain the current level of service, which they feel is both affordable and that achieves their Mission Statement:

> *Sidney Township commits to operating a financially sustainable, safe, efficient, and environmentally responsible wastewater collection and treatment system to provide the community with reliable service, and strives to meet the local, state, and federal regulatory requirements at a fair and reasonable cost to its customers through the implementation of asset management. The Township's asset management program strives for effective maintenance planning, capital improvement planning and budgeting.*

Based on a Rate Methodology Decision Meeting held on October 1, 2018, the Township chose to maintain the current level of service, which they felt best fits the Township's needs from both a risk management standpoint and rate standpoint. From there, the financial consultant entered the costs into the financial model, along with operating expense minimums and bonded project considerations. Sidney Township set their target level of service as Low Level of Service and adjusted their operation and maintenance budget. The Township plans to implement the recommended rate increases from the financial model. The pump station improvements project identified will be accomplished in year 5.

Criticality (Risk)

For each asset in the Township's wastewater system, a criticality/risk analysis was developed. The calculation that determined overall risk was defined as:

Likelihood of Failure (LoF) * Consequence of Failure (CoF) = Risk

The LoF for assets is primarily based on the physical condition of the asset as inspected in the field. Using the quick rating developed from NASSCO standards, a LoF value between 1000 and 5999 was found for each sewer and manhole asset. A LoF value between 1 and 5 was determined for each pump station and lagoon asset, by assessing the age of the asset, performing a visual inspection, interviewing operators for maintenance records, and performing flow rate tests on the pumps. The following table shows the grading scale definitions for all assets throughout the Township:

Likelihood of Failure (LoF)		
Description	Grade	Failure of Asset
Immediate	5	Asset has failed or will likely fail within 5 years
Poor	4	Asset will probably fail in 5-10 years
Fair	3	Asset may fail in 10-20 years
Good	2	Asset unlikely to fail for at least 20 years
Excellent	1	Failure unlikely in foreseeable future

The Consequence of Failure (CoF) aggregates the empirical value associated with failure of an asset as it directly and indirectly pertains to social, environmental, and cost implications. A percentage of the carried weight between the social, environment, and cost factors must be assigned by the Owner and Engineer. The factors established are for this system evaluation and are not finite. The underlying components contributing to the social, environmental, and cost factors are described below. One (1) has the least CoF implications, where six (6) has the highest.

Factors:

1. Position of Pipe/Sewer/Manhole Relative to System Network
   a. Position of main trunk / interceptor sewers have greater CoF as opposed to small tributary sewers.
   b. Weighting can be population based or service area based.

2. Pipe Diameter

   a. Generally larger diameter sewers carry larger amounts of flow and typically constitute trunk sewers.
   b. Weighting is relative to the system's range of pipe diameter sizes.
3. Depth of Sewer/Manhole
   a. Sewers constructed at deeper elevations typically require more costs to excavate and repair/replace.
   b. Weighting is relative to the system's range of depths.

4. Locations of Sewer/Manhole
   a. Location will have social, economic, and environmental impacts.
   b. Factors have been established on PACP criteria.
   c. Example, a sewer in a resident's "yard" will carry less CoF for the same sewer in a "Major Highway" such as an MDOT trunk line.

5. Proximity to a Waterway.
   a. This is primarily an environmental consideration.
   b. Failure directly or indirectly to environmentally sensitive areas like rivers, lakes, streams, and or wetlands are associated with this factor.

6. Accessibility Standards
   a. Ease of access is vital to timely repairs.
   b. Impacts include cost, social, and potentially environmental

The following table summarizes the CoF scale definitions:

Consequence of Failure (CoF)		
Description	Grade	Failure of Asset
Catastrophic Disruption	6	Massive system failure - severe health effect, extensive damages, LOS severely compromised
Major Disruption	5	Major effect - major capacity loss, health effects, and costs, LOS compromised
Moderate to Major Disruption	4	Major effect - moderate to major loss of system capacity, costs, and health effects, LOS may be compromised
Moderate Disruption	3	Moderate effect - moderate loss of system capacity, health effects, and costs, LOS still achieved
Minor Disruption	2	Minor effect - minor capacity loss, costs, and health effects
Insignificant Disruption	1	Slight effect - slight loss of system capacity, minor health effects, minor costs

Using the aforementioned formula, the risk for each asset was calculated. The assets were ranked based on the nature of the defects found and the CoF. The results for the Sidney Township were 6 grinder stations were found to be high risk assets in the system. Using LoF and risk information, a capital improvement plan (CIP) was developed to reduce the overall risk of the system. The CIP involves a systematic approach to address all assets in the system over the span of the next 10-20 years.

Capital Improvement Plan

The Capital Improvement Plan is a prioritized list of all the projects that need to be completed to meet the level of service goals of the system. The asset inventory, condition assessment, critical assets and level of service sections were taken into consideration to form the capital improvement plan.

After selecting the desired level of service for each scope of work, the total cost of the pump stations improvements is approximately $295,000. Additionally, the O&M and Short Lived Assets budgets were adjusted to account for other necessary repairs to the system, and these were taken into consideration for the rate structure as well.

Revenue Structure

Wastewater account balances, expenditures, revenues, etc. were reviewed and entered into a financial software model. The model was used initially to determine if there was a gap the operating funds compared to generated revenue. After reviewing the financial data, rate structure, and operating budgets, the Township was found to have no deficiencies in the 2.5-year gap analysis.

Following the 2.5-year gap analysis, the capital improvement plan (CIP) was added to the financial model. By reviewing the Township's reserve funds, current rate structure, and cost estimates for the CIP, various rate structure iterations were developed. The result was a recommendation for various increases to the Township's sanitary sewer rates in a 10-year planning period, for which the first rate resolution was adopted by the Township Board on November 5, 2018.

List of Major Assets

The following is a breakdown of the assets of Sidney Township's wastewater system:

- 58,736 feet of pipe
  - 17,983 feet of 1-14" HDPE
  - 6,943 feet of 2" HDPE
  - 11,147 feet of 3" HDPE
  - 3,418 feet of 4" HDPE
  - 15,169 feet of 6" HDPE
  - 3,087 feet of 6" ductile iron
  - 191 feet of 8" ductile iron
  - 800 feet of 10" ductile iron
- 243 grinder pump stations
- 40 manholes
- 2 pump stations
- 3-cell facultative lagoon treatment system with groundwater discharge via a 5-unit spray irrigation system to farm fields

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date November 30, 2018
(no later than 3 years from executed grant date)

The Sidney Township *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1116-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or No
   If No - Date of the rate methodology approval letter: May 3, 2018.
2) Significant Progress Made: Yes or No
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: ________.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Carrie Wills, Clerk	at (989) 506-0860	clerksidneytwp@gmail.com
Name	Phone Number	Email

[signature] 11-27-2018
Signature of Authorized Representative (Original Signature Required) Date

Terry Peterman, Township Supervisor
Print Name and Title of Authorized Representative

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Stormwater, Asset Management, and Wastewater (SAW)

Wastewater Asset Management Plan

Executive Summary

Overview

The Southeast Macomb County Wastewater Disposal System (SEMCWDS) is located in the City of St. Clair Shores and serves approximately 84,500 people within St. Clair Shores and Roseville. SEMCWDS is owned and operated by the Macomb County Public Works Office (MCPWO) and is comprised of 4.7 miles of enclosed sewer, 84 sanitary structures, the Violet Pump Station, and the Bon Heur Pump Station.

MCPWO was awarded a grant to investigate and evaluate the SEMCWDS wastewater assets. With $99,900 in funding from the State including a 10% local match, the intent of this Wastewater Asset Management Plan is to identify assets, establish a level of service, determine relative criticality, analyze capital investments and ensure long-term funding strategies in order to preserve the longevity of SEMCWDS assets.

Wastewater Asset Inventory

Asset data was compiled from engineering plans, SEMCWDS operational plans, correspondence from MCPWO representatives, closed-circuit television (CCTV) investigations and field inspections. The data was then consolidated into a computerized maintenance management system and asset management plan software, called NEXGEN. SEMCWDS owns 366 major assets including sanitary sewer pipes, structures, and pump stations as outlined below.

- Northeast Relief Sewer
    - 22,896 feet of gravity sewer ranging in size from 12 inch to 54 inch
    - 1,729 feet of 24 inch forcemain
    - 84 sanitary sewer structures

- Violet Pump Station
    - 81 vertical assets including, but not limited to, a wet well, dry pit, chopper and centrifugal pumps, generator, VFD's, knife gate and check valves, electrical components, flow meters, and level sensors.
- Bon Heur Pump Station
    - 116 vertical assets including, but not limited to, a wet well, motor room, screw pumps and motors, generator, supply and exhaust fan, sluice gates, electrical components, and level sensors.

Condition Assessment

A condition assessment was performed on the sewers by means of Closed Circuit Television (CCTV) while investigation of stormwater structures, pump stations, and their assets was performed by means of visual assessment. Each asset was analyzed on an overall 1 to 5 rating scale. Whereby 1 indicates new or excellent condition and 5 indicates imminent failure. The below table summarizes the condition of all assets investigated. For simplistic purposes, the condition assessments listed in the below table were rounded to the nearest whole number. On average, the condition assessment rating for the SEMCWDS was 1.63.

Informal Nonmenclature	Condition Assessment Rating	No. of Assets (Each)	Percentage
Excellent	1	192	52%
Good	2	116	32%
Fair	3	43	12%
Poor	4	2	1%
Failure	5	4	1%
Not Assessed		9	2%
Total		**366**	**100%**

Note, non-assessed items consist of approximately 2,576 feet of 54" sewer line due to the standing Wet Well level of the Violet Pump Station. It is also noted that a condition assessment of the 36 inch and 48 inch sluice gates in the Wet Well of Bon Heur Pump Station was not performed, due to the condition of the mechanical actuators, but are believed to be in poor condition.

Level of Service

MCPWO defined level of service as cost effectively improving the condition and reliability of the collection system. As a result, MCPWO hopes to safeguard present and future public health, welfare, and environment from basement back–ups. AEW believes that this can be achieved with continual monitoring, necessary maintenance and rehabilitation of the SEMCWWDS assets as outlined in accordance with the recommended Capital Improvement Plan and NEXGEN maintenance schedule.

Criticality Analysis

Assets were then analyzed to determine their Probability of Failure (POF) and Consequence of Failure (COF). Both the probability of failure (POF) and consequence of failure (COF) are analyzed on a 1 to 5 rating scale. Whereby for POF, 1 indicates new or excellent condition and 5 indicated failure or imminent failure and whereby for COF, 1 indicates an insignificant disruption and 5 indicates a catastrophic disruption.

An assets likelihood to fail was determined by analyzing two factors: the physical condition of an asset and useful expended life of an asset. An 80% to 20% weighting scale was then applied to convert back to a 1 to 5 scale. The following tables displays the thought process for determining POF for sewer lines, sewer structures and vertical assets.

Probability of Failure Rating	PACP Structural Rating (50% of Total)	PACP O&M Rating (30% of Total)	Useful Life Expended (20% of Total)
1	Excellent (ACI = 1)	Excellent (ACI = 1)	Percent of Useful Life: <60%
2	Good (ACI = 2)	Good (ACI = 2)	Percent of Useful Life: 60-80%
3	Fair (ACI = 3)	Fair (ACI = 3)	Percent of Useful Life: 80-90%
4	Poor (ACI = 4)	Poor (ACI = 4)	Percent of Useful Life: 90-100%
5	Failure (ACI = 5)	Failure (ACI = 5)	Percent of Useful Life: 100%

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$$POF = 0.5 * PACP\ Structural\ Rating + 0.3 * PACP\ O\&M\ Rating + 0.2 * Useful\ Life\ Expended$$

Probability of Failure Rating	MACP Structural Rating (50% of Total)	MACP O&M Rating (30% of Total)	Useful Life Expended (20% of Total)
1	Excellent (ACI = 1)	Excellent (ACI = 1)	Percent of Useful Life: <60%
2	Good (ACI = 2)	Good (ACI = 2)	Percent of Useful Life: 60-80%
3	Fair (ACI = 3)	Fair (ACI = 3)	Percent of Useful Life: 80-90%
4	Poor (ACI = 4)	Poor (ACI = 4)	Percent of Useful Life: 90-100%
5	Failure (ACI = 5)	Failure (ACI = 5)	Percent of Useful Life: 100%

$$POF = 0.5 * MACP\ Structural\ Rating + 0.3 * MACP\ O\&M\ Rating + 0.2 * Useful\ Life\ Expended$$

Probability of Failure Rating	Condition Assessment (80% of Total)	Useful Life Expended (20% of Total)
1	Excellent (ACI = 1)	Percent of Useful Life: <60%
2	Good (ACI = 2)	Percent of Useful Life: 60-80%
3	Fair (ACI = 3)	Percent of Useful Life: 80-90%
4	Poor (ACI = 4)	Percent of Useful Life: 90-100%
5	Failure (ACI = 5)	Percent of Useful Life: 100%

$$POF = 0.8 * Condition\ Assessment + 0.2 * Useful\ Life\ Expended$$

An assets COF was determined by analyzing six factors: 1) the impact on the collection process, 2) financial impact, 3) safety concerns, 4) environmental/regulatory impacts, 5) disruption to the community and 6) required response time. The impact on the sewer collection process was decided to be 1.25 times more critical than the five other factors, therefore a 20%, 16%, 16%, 16%, 16%, 16% weighting scale was applied prior to converting to an overall 1 to 5 scale. The table below displays the thought process for determining consequence of failure.

Consequence of Failure Rating	Process Impact (20% of Total)	Financial Impact (16% of Total)	Safety (16% of Total)	Environmental / Regualtory Impact (16% of Total)	Disruption to the Community (16% of Total)	Required Response Time (16% of Total)
1	No impact on process	Insignificant ($1-$10,000)	No injury	100% compliance with permits	No disruption	>8 hours
2	Potential process upset	Minor Cost ($10,000-$500,000)	Minor injury requiring no medical treatment with no lost time	Localized and minimal impact on the environment and ecosystem	Minor Disruption	4 to 8 hours
3	Loss of redundancy	Moderate Cost ($500,000-$1,000,000)	Minor injury requiring treatment off-site or lost time	Techincal violation, but no enforcement action	Sporadic service disruptions	2 to 4 hours
4	Process shutdown	Significant Cost ($1,000,000-$10,000,000)	Severe Injury to employees or public	Violation with minor enforcement action	Short term impact but substantial disruption	1/2 hour to 2 hours
5	Mission Critical - Unable to accomplish mission	Major Cost (> $10Million)	Loss of Life	Enforcement action with fines or ACO	Long term impact; area-wide disruption	1/2 hour

$$COF = 0.2 * Process\ Impact + 0.16 * Financial\ Impact + 0.16 * Safety + 0.16 * Env.Impact + 0.16 * Disruption\ to\ the\ Community + 0.16 * Required\ Response\ Time$$

The POF of an asset takes into account the condition rating while the COF takes into account the size, location, and surrounding. POF and COF scores were determined for each asset and then multiplied together resulting in the Business Risk Exposure (BRE) score, also known as the criticality score. The BRE score is used to prioritize what assets are most critically in need of repair. Any asset with a BRE score of 16 or greater is considered critical by the MDEQ.

It was found that the SEMCWDS had zero assets that scored over 16 points when analyzing assets critical to sustained performance. The following table summarizes the poorest BRE ratings found for the SEMCWDS.

NEXGEN Asset Name	Asset Description	Business Risk Exposure (1-25 Rating)
BH-PS-P3	Bon Heur Passavant 20,000 GPM Wet Weather Screw Pump, West	14.43
BH-PS-P4	Bon Heur Passavant 20,000 GPM Wet Weather Screw Pump, East	14.43
BH-PS-WW-GA-SG-1	Bon Heur 36" Sluice Gate Actuator for West Dry Weather Screw Pump Bay	14.40
BH-PS-WW-GA-SG-2	Bon Heur 36" Sluice Gate Actuator for East Dry Weather Screw Pump Bay	14.40
BH-PS-WW-GA-SG-3	Bon Heur 48" Sluice Gate Actuator for West Wet Weather Screw Pump Bay	14.40
BH-PS-WW-GA-SG-4	Bon Heur 48" Sluice Gate Actuator for East Wet Weather Screw Pump Bay	14.40
BH-PS-P1	Bon Heur Passavant 10,000 GPM Dry Weather Screw Pump, West	13.69
BH-PS-P2	Bon Heur Passavant 10,000 GPM Dry Weather Screw Pump, East	13.69
BH-PS-WW-PLT	Bon Heur Wet Well Platform	12.66
[NER-MH-055]-[NER-MH-017]	15" RCP at Greater Mack and Violet	11.56
BH-PS-WW-G-SG-1	Bon Heur 36" Sluice Gate for West Dry Weather Screw Pump Bay	11.52
BH-PS-WW-G-SG-2	Bon Heur 36" Sluice Gate for East Dry Weather Screw Pump Bay	11.52
BH-PS-WW-G-SG-3	Bon Heur 48" Sluice Gate for West Wet Weather Screw Pump Bay	11.52
BH-PS-WW-G-SG-4	Bon Heur 48" Sluice Gate for East Wet Weather Screw Pump Bay	11.52
VIO-PS-WW	Violet Wet Well	11.43
BH-PS-WW-STR	Bon Heur Wet Well Stairs	11.20
BH-PS-TRNF-BIG	Bon Heur Main 480V Transformer (Outside)	10.88
BH-PS-PMOT-P3	Bon Heur 200Hp Lincoln Motor for the West Wet Weather Screw Pump	10.68
BH-PS-PMOT-P4	Bon Heur 200Hp Lincoln Motor for the East Wet Weather Screw Pump	10.20

Revenue Structure

The legal formation of the SEMCWDS was governed by Public Act 342 of 1939. The original construction of the infrastructure was paid through federal grants, state grants and issuing bonds. The issued bonds were then apportioned based on the service area of each entity. The most recent audit was on July 31, 1986, and the SEMCWDS Contract apportionments were as follows:

Entity	Apportionment
Eastpointe	34.39%
Roseville	32.90%
St. Clair Shores	32.71%

Since the apportionment was established under contract and serviced entities are in agreeance with the original contract apportionments, there are no gaps in the funding structure. Projects identified in the Capital Improvement Plan will be annually incorporated into the budget for approval by the SEMCWDS Board.

Capital Improvement Plan

Although no asset reached a BRE score of 16 or greater, some rehabilitation and replacement of assets was deemed critical by MCPWO. The estimated rehabilitation, replacement, and associated costs included in the five (5) year Capital Improvement Plan (CIP) are shown below. The plan will be updated annually with the SEMCWDS's budget. A twenty year capital improvement plan has also been completed and is included in the complete Wastewater Asset Management Plan.

Fiscal Year	Projects	Project Cost[1]	Total Project Costs
2019-20	CCTV of Northeast Relief Sewer Lines, including 24,691 LF of sewer ranging from 12 inches to 54 inches	$ 122,460	$ 584,720
	Level 2 MACP Manhole Inspection of Northeast Relief Sewer Structures and Violet Wet Well, 85 Total Structures	$ 31,933	
	Design for Major Overhaul of Bon Heur Pumping Operations[2]	$ 396,379	
	Replace Air Relief Valve on NE Relief Forcemain at Violet PS, VIO-PS-VLT-ARV	$ 19,096	
	Violet Dry Well Crane Modifications[3]	$ 12,731	
	Replace Sensor Bars on Bon Heur Security Gate	$ 2,122	
2020-21	Major Overhaul of Bon Heur Pumping Operations[2]	$ 1,649,471	$ 1,683,619
	Design of Miscellaneous Northeast Relief Sewer Line Repairs as a result of 2019-20 CCTV Investigations[4]	$ 27,318	
	Design of Miscellaneous Northeast Relief Sewer Structure Repairs as a result of 2019-20 Level 2 MACP Manhole Inspections[4]	$ 6,830	
2021-22	Miscellaneous Repairs to Northeast Relief Sewer Lines as a result of 2019-20 CCTV Investigations[4]	$ 112,551	$ 153,182
	Replace Harper Effluent Level Sensor	$ 2,814	
	Miscellaneous Repairs to Northeast Relief Sewer Structures as a result of 2019-20 Level 2 MACP Manhole Inspections[5]	$ 37,817	
2022-23	Cleaning of Electrical Components - Bon Heur & Violet[6]	$ 27,823	$ 42,314
	Replace Battery in Lighting Inverter - Bon Heur	$ 2,898	
	Replace Roof over Motor Room - Bon Heur	$ 11,593	
2023-24	Replace Dual Equipment Hatch - Fan Room of Bon Heur	$ 4,418	$ 4,418
	5 Year Total		**$ 2,468,253**
Note:	[1]Project Costs are based on CY 2018 and include 3% inflation for each subsequent year. [2]Major Overhaul of Bon Heur Pumping Operations includes the coating of all passavant screw pumps, replacement of all upper and lower pump bearings, replacement of all pump motors, replacement of all pump gear reducers, replacement of all greasing pumps, motors and reducers, replacement of 36" and 48" wet well sluice gates, replacement of mechanical sluice gate actuators with electric sluice gate actuators connected to SCADA, replacement of the wet well roof, spot epoxy repairs to the effluent chamber, replacement of the wet well concrete stairs and platform and bypass pumping. Design services are estimated at 25% of the approximate construction cost. [3]Modifications to the Violet Dry Well Crane include welding and clearance adjustment of the existing crane and hoist system as detailed by HRC in 2017 [4]Miscellaneous Repairs to the Northeast Relief Sewer Lines and Structures are included based on anticipated findings of the 2019-20 CCTV Investigation and Level 2 MACP Manhole Inspections. Design services are estimated at 25% of the approximate construction cost. [5]Miscellaneous Repairs to the Northeast Relief Sewer Structures include $28,137 of currently unknown repairs and $9,679 of anticipated repairs for NER-MH-013, NER-MH-014, NER-MH-022 and NER-MH-061. Defects as listed in Appendix F. [6]Cleaning of Electrical Components includes cleaning the inside of panels, cleaning of terminal connections and greasing of electrical connections within the panel.		

Macomb County Public Works Office AEW Project No. 0211-0165
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This summary provides a brief overview of the investigation, and evaluation of the system assets, condition, operation and needs. A more comprehensive discussion can be found in the Wastewater Asset Management Plan.

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Southeast Macomb County Wastewater Disposal System - Major Asset List		
No.	Asset Name	Asset Type
1	NER-MH-001	Manhole
2	NER-MH-002	Manhole
3	NER-MH-003	Manhole
4	NER-MH-004	Manhole
5	NER-MH-005	Manhole
6	NER-MH-006	Manhole
7	NER-MH-007	Manhole
8	NER-MH-008	Manhole
9	NER-MH-009	Manhole
10	NER-MH-010	Manhole
11	NER-MH-011	Manhole
12	NER-MH-012	Manhole
13	NER-MH-013	Manhole
14	NER-MH-014	Manhole
15	NER-MH-015	Manhole
16	NER-MH-016	Manhole
17	NER-MH-017	Manhole
18	NER-MH-018	Manhole
19	NER-MH-019	Manhole
20	NER-MH-020	Manhole
21	NER-MH-021	Manhole
22	NER-MH-022	Manhole
23	NER-MH-023	Manhole
24	NER-MH-024	Manhole
25	NER-MH-025	Manhole
26	NER-MH-026	Manhole
27	NER-MH-027	Manhole
28	NER-MH-028	Manhole
29	NER-MH-029	Manhole
30	NER-MH-030	Manhole
31	NER-MH-031	Manhole
32	NER-MH-032	Manhole
33	NER-MH-033	Manhole
34	NER-MH-034	Manhole
35	NER-MH-035	Manhole
36	NER-MH-036	Manhole
37	NER-MH-037	Manhole
38	NER-MH-038	Manhole
39	NER-MH-039	Manhole
40	NER-MH-040	Manhole
41	NER-MH-041	Manhole
42	NER-MH-042	Manhole
43	NER-MH-043	Manhole
44	NER-MH-044	Manhole
45	NER-MH-045	Manhole
46	NER-MH-046	Manhole
47	NER-MH-047	Manhole
48	NER-MH-048	Manhole
49	NER-MH-049	Manhole
50	NER-MH-050	Manhole
51	NER-MH-051	Manhole
52	NER-MH-052	Manhole
53	NER-MH-053	Manhole

Southeast Macomb County Wastewater Disposal System - Major Asset List		
No.	Asset Name	Asset Type
54	NER-MH-054	Manhole
55	NER-MH-055	Manhole
56	NER-MH-056	Manhole
57	NER-MH-057	Manhole
58	NER-MH-058	Manhole
59	NER-MH-059	Manhole
60	NER-MH-060	Manhole
61	NER-MH-061	Manhole
62	NER-MH-062	Manhole
63	NER-MH-063	Manhole
64	NER-MH-064	Manhole
65	NER-MH-065	Manhole
66	NER-MH-066	Manhole
67	NER-MH-067	Manhole
68	NER-MH-068	Manhole
69	NER-MH-069	Manhole
70	NER-MH-070	Manhole
71	NER-MH-071	Manhole
72	NER-MH-072	Manhole
73	NER-MH-073	Manhole
74	NER-MH-073A	Manhole
75	NER-MH-074	Manhole
76	NER-MH-075	Manhole
77	NER-MH-076	Manhole
78	NER-MH-077	Manhole
79	NER-MH-078	Manhole
80	[NER-MH-002]-[NER-MH-001]	Buried Pipe
81	[NER-MH-003]-[NER-MH-002]	Buried Pipe
82	[NER-MH-004]-[NER-MH-003]	Buried Pipe
83	[NER-MH-005]-[NER-MH-004]	Buried Pipe
84	[NER-MH-006]-[NER-MH-005]	Buried Pipe
85	[NER-MH-007]-[NER-MH-006]	Buried Pipe
86	[NER-MH-008]-[NER-MH-007]	Buried Pipe
87	[NER-MH-009]-[NER-MH-008]	Buried Pipe
88	[NER-MH-010]-[NER-MH-009]	Buried Pipe
89	[NER-MH-011]-[NER-MH-010]	Buried Pipe
90	[NER-MH-012]-[NER-MH-011]	Buried Pipe
91	[NER-MH-013]-[NER-MH-012]	Buried Pipe
92	[NER-MH-014]-[NER-MH-013]	Buried Pipe
93	[NER-MH-015]-[NER-MH-014]	Buried Pipe
94	[NER-MH-016]-[NER-MH-015]	Buried Pipe
95	[NER-MH-018]-[NER-MH-017]	Buried Pipe
96	[NER-MH-019]-[NER-MH-018]	Buried Pipe
97	[NER-MH-020]-[NER-MH-019]	Buried Pipe
98	[NER-MH-021]-[NER-MH-020]	Buried Pipe
99	[NER-MH-022]-[NER-MH-021]	Buried Pipe
100	[NER-MH-023]-[NER-MH-022]	Buried Pipe
101	[NER-MH-024]-[NER-MH-023]	Buried Pipe
102	[NER-MH-025]-[NER-MH-024]	Buried Pipe
103	[NER-MH-026]-[NER-MH-025]	Buried Pipe
104	[NER-MH-027]-[NER-MH-026]	Buried Pipe
105	[NER-MH-028]-[NER-MH-027]	Buried Pipe
106	[NER-MH-029]-[NER-MH-028]	Buried Pipe

Southeast Macomb County Wastewater Disposal System - Major Asset List		
No.	Asset Name	Asset Type
107	[NER-MH-030]-[NER-MH-029]	Buried Pipe
108	[NER-MH-031]-[NER-MH-030]	Buried Pipe
109	[NER-MH-032]-[NER-MH-031]	Buried Pipe
110	[NER-MH-033]-[NER-MH-032]	Buried Pipe
111	[NER-MH-034]-[NER-MH-033]	Buried Pipe
112	[NER-MH-035]-[NER-MH-034]	Buried Pipe
113	[NER-MH-036]-[NER-MH-035]	Buried Pipe
114	[NER-MH-037]-[NER-MH-036]	Buried Pipe
115	[NER-MH-038]-[NER-MH-037]	Buried Pipe
116	[NER-MH-039]-[NER-MH-038]	Buried Pipe
117	[NER-MH-040]-[NER-MH-039]	Buried Pipe
118	[NER-MH-041]-[NER-MH-040]	Buried Pipe
119	[NER-MH-042]-[NER-MH-041]	Buried Pipe
120	[NER-MH-043]-[NER-MH-042]	Buried Pipe
121	[NER-MH-044]-[NER-MH-043]	Buried Pipe
122	[NER-MH-045]-[NER-MH-044]	Buried Pipe
123	[NER-MH-046]-[NER-MH-045]	Buried Pipe
124	[NER-MH-047]-[NER-MH-046]	Buried Pipe
125	[NER-MH-048]-[NER-MH-047]	Buried Pipe
126	[NER-MH-049]-[NER-MH-048]	Buried Pipe
127	[NER-MH-050]-[NER-MH-049]	Buried Pipe
128	[NER-MH-051]-[NER-MH-050]	Buried Pipe
129	[NER-MH-052]-[NER-MH-051]	Buried Pipe
130	[NER-MH-053]-[NER-MH-052]	Buried Pipe
131	[NER-MH-054]-[NER-MH-053]	Buried Pipe
132	[NER-MH-055]-[NER-MH-017]	Buried Pipe
133	[NER-MH-056]-[NER-MH-055]	Buried Pipe
134	[NER-MH-057]-[NER-MH-056]	Buried Pipe
135	[NER-MH-058]-[NER-MH-057]	Buried Pipe
136	[NER-MH-059]-[NER-MH-058]	Buried Pipe
137	[NER-MH-060]-[NER-MH-020]	Buried Pipe
138	[NER-MH-061]-[NER-MH-060]	Buried Pipe
139	[NER-MH-062]-[NER-MH-061]	Buried Pipe
140	[NER-MH-063]-[NER-MH-062]	Buried Pipe
141	[NER-MH-064]-[NER-MH-063]	Buried Pipe
142	[NER-MH-065]-[NER-MH-064]	Buried Pipe
143	[NER-MH-066]-[NER-MH-065]	Buried Pipe
144	[NER-MH-067]-[NER-MH-066]	Buried Pipe
145	[NER-MH-068]-[NER-MH-067]	Buried Pipe
146	[NER-MH-069]-[NER-MH-068]	Buried Pipe
147	[NER-MH-070]-[NER-MH-069]	Buried Pipe
148	[NER-MH-072]-[NER-MH-071]	Buried Pipe
149	[NER-MH-073]-[NER-MH-072]	Buried Pipe
150	[NER-MH-073A]-[NER-MH-073]	Buried Pipe
151	[NER-MH-074]-[NER-MH-073A]	Buried Pipe
152	[NER-MH-075]-[NER-MH-074]	Buried Pipe
153	[NER-MH-076]-[NER-MH-075]	Buried Pipe
154	[NER-MH-077]-[NER-MH-076]	Buried Pipe
155	[NER-MH-078]-[NER-MH-077]	Buried Pipe
156	[NER-VLT-004]-[NER-MH-016]	Forcemain
157	[VIO-PS-VLT]-[NER-VLT-004]	Forcemain
158	BH-PS-AI-HOOD	Fan
159	BH-PS-ATS-1	Automatic Transfer Switch

Southeast Macomb County Wastewater Disposal System - Major Asset List		
No.	Asset Name	Asset Type
160	BH-PS-ATS-2	Automatic Transfer Switch
161	BH-PS-BOLLARD	Bollards
162	BH-PS-CARDREADER	Card Reader/HMI
163	BH-PS-CP-SPRINK	Local Control Panel
164	BH-PS-DR-MTL	Door
165	BH-PS-DSC-CRANE	Disconnect
166	BH-PS-DSC-GEN	Disconnect
167	BH-PS-DSC-SF	Disconnect
168	BH-PS-DSC-WH	Disconnect
169	BH-PS-DUCT	Ductwork
170	BH-PS-EF-1	Fan
171	BH-PS-EMSH	Eyewash/Shower
172	BH-PS-EXTWALL	Exterior Walls
173	BH-PS-FAN-BATH	Fan
174	BH-PS-FE-EF	Flow Meter
175	BH-PS-FEXT-1	Fire Extinguisher
176	BH-PS-FEXT-2	Fire Extinguisher
177	BH-PS-FLR-UP	Platform
178	BH-PS-FOUND	Foundation
179	BH-PS-FR-CRANE	Crane
180	BH-PS-FR-LT-XP	Inside Lighting
181	BH-PS-GEN	Generator
182	BH-PS-GREASE-P1	Pump
183	BH-PS-GREASE-P2	Pump
184	BH-PS-GREASE-P3	Pump
185	BH-PS-GREASE-P4	Pump
186	BH-PS-GR-GREASE-P1	Gear Drive
187	BH-PS-GR-GREASE-P2	Gear Drive
188	BH-PS-GR-GREASE-P3	Gear Drive
189	BH-PS-GR-GREASE-P4	Gear Drive
190	BH-PS-GR-P1	Gear Drive
191	BH-PS-GR-P2	Gear Drive
192	BH-PS-GR-P3	Gear Drive
193	BH-PS-GR-P4	Gear Drive
194	BH-PS-HTC-ROOF	Hatch
195	BH-PS-INTWALL	Finish
196	BH-PS-LAND	Landscape
197	BH-PS-LDR-4	Ladder
198	BH-PS-LDR-HTC-ROOF	Ladder
199	BH-PS-LP-A	Distribution Panel
200	BH-PS-LP-B	Distribution Panel
201	BH-PS-LS-HARP	Level Instrument
202	BH-PS-LS-WW	Ultrasonic Level Instrument
203	BH-PS-LT-EX	Exterior Lighting
204	BH-PS-LT-INV	Lighting Inverter
205	BH-PS-LUV-E	Damper/Louver
206	BH-PS-LUV-W	Damper/Louver
207	BH-PS-LVSG	Low Voltage Switchgear
208	BH-PS-MCC-1	Motor Control Center
209	BH-PS-MCC-2	Motor Control Center
210	BH-PS-MDSC	Low Voltage Switchgear
211	BH-PS-METER	Meter
212	BH-PS-MR-CRANE	Crane

Southeast Macomb County Wastewater Disposal System - Major Asset List		
No.	Asset Name	Asset Type
213	BH-PS-MR-LT	Inside Lighting
214	BH-PS-OIT	Screen-OIT
215	BH-PS-P1	Pump
216	BH-PS-P2	Pump
217	BH-PS-P3	Pump
218	BH-PS-P4	Pump
219	BH-PS-PAVEMENT	Pavement
220	BH-PS-P-BOIL-1	Pump
221	BH-PS-P-BOIL-2	Pump
222	BH-PS-PI-WW	Pressure Instrument
223	BH-PS-PMOT-BOIL-1	Motor
224	BH-PS-PMOT-BOIL-2	Motor
225	BH-PS-PMOT-GREASE-P1	Motor
226	BH-PS-PMOT-GREASE-P2	Motor
227	BH-PS-PMOT-GREASE-P3	Motor
228	BH-PS-PMOT-GREASE-P4	Motor
229	BH-PS-PMOT-P1	Motor
230	BH-PS-PMOT-P2	Motor
231	BH-PS-PMOT-P3	Motor
232	BH-PS-PMOT-P4	Motor
233	BH-PS-ROOF-MR	Roof
234	BH-PS-RPZ	Pressure Regulating Valve
235	BH-PS-SCADA	Local Control Panel
236	BH-PS-SCON-OIL	Secondary Containment
237	BH-PS-SECCAM-1	Security Camera
238	BH-PS-SECCAM-2	Security Camera
239	BH-PS-SECFNCE	Fence
240	BH-PS-SECGATE	Gate/Door Opener
241	BH-PS-SHWR	Eyewash/Shower
242	BH-PS-SIGN	Facility Signage
243	BH-PS-SINK	Sink
244	BH-PS-SLAB	Floor Slab
245	BH-PS-SPRINK	Sprinkler System
246	BH-PS-STR-FLRUP	Stairs
247	BH-PS-TANK-BOIL	Tank
248	BH-PS-TANK-GEN-FUEL	Tank
249	BH-PS-TOILET	Toilet
250	BH-PS-TRNF-BIG	Transformer
251	BH-PS-TRNF-SMALL	Transformer
252	BH-PS-UH-BATH	Heater
253	BH-PS-UH-E	Heater
254	BH-PS-UH-W	Heater
255	BH-PS-URINAL	Urinal
256	BH-PS-WH	Water Heater
257	BH-PS-WND-IN	Window
258	BH-PS-WW-DR-MTL	Door
259	BH-PS-WW-GA-SG-1	
260	BH-PS-WW-GA-SG-2	
261	BH-PS-WW-GA-SG-3	
262	BH-PS-WW-GA-SG-4	
263	BH-PS-WW-G-SG-1	Sluice Gate
264	BH-PS-WW-G-SG-2	Sluice Gate
265	BH-PS-WW-G-SG-3	Sluice Gate

Southeast Macomb County Wastewater Disposal System - Major Asset List		
No.	Asset Name	Asset Type
266	BH-PS-WW-G-SG-4	Sluice Gate
267	BH-PS-WW-HTC-EQP	Hatch
268	BH-PS-WW-INTWALL	Finish
269	BH-PS-WW-LT-XP	Inside Lighting
270	BH-PS-WW-PLT	Platform
271	BH-PS-WW-ROOF	Roof
272	BH-PS-WW-SF-1	Fan
273	BH-PS-WW-STR	Stairs
274	VIO-PS-ANODE	
275	VIO-PS-ATS	Automatic Transfer Switch
276	VIO-PS-BOLLARD	Bollards
277	VIO-PS-CARDREADER	Card Reader/HMI
278	VIO-PS-CRANE	Crane
279	VIO-PS-CV-P-1	Check Valve
280	VIO-PS-CV-P-2	Check Valve
281	VIO-PS-CV-P-3	Check Valve
282	VIO-PS-CV-P-4	Check Valve
283	VIO-PS-DEHUMID	Dehumidifer
284	VIO-PS-DSC-GEN	Disconnect
285	VIO-PS-DSC-MLFT	Disconnect
286	VIO-PS-DSC-P-1	Disconnect
287	VIO-PS-DSC-P-2	Disconnect
288	VIO-PS-DSC-P-3	Disconnect
289	VIO-PS-DSC-P-4	Disconnect
290	VIO-PS-DSC-SECGATE	Disconnect
291	VIO-PS-DW	Vault
292	VIO-PS-DW-HTC-EQP	Hatch
293	VIO-PS-DW-LDR-EQP	Ladder
294	VIO-PS-DW-LT	Inside Lighting
295	VIO-PS-FE-VLT	Flow Meter
296	VIO-PS-FEXT-1	Fire Extinguisher
297	VIO-PS-FEXT-2	Fire Extinguisher
298	VIO-PS-GEN	Generator
299	VIO-PS-GEN-SLAB	Floor Slab
300	VIO-PS-HYD	Yard Hydrant
301	VIO-PS-LDR-6	Ladder
302	VIO-PS-LP-GEN	Distribution Panel
303	VIO-PS-LS-OC-1	Level Instrument
304	VIO-PS-LS-OC-2	Level Instrument
305	VIO-PS-LS-WW-1	Level Instrument
306	VIO-PS-LS-WW-2	Level Instrument
307	VIO-PS-METER	Meter
308	VIO-PS-MSTRT-P-3	Motor Starter
309	VIO-PS-MSTRT-P-4	Motor Starter
310	VIO-PS-OCS-P-OC-1	Pump
311	VIO-PS-OCS-P-OC-2	Pump
312	VIO-PS-OCS-SLAB	Floor Slab
313	VIO-PS-OCS-TANK-H2O2	Tank
314	VIO-PS-OCS-TANK-STX	Tank
315	VIO-PS-P-1	Pump
316	VIO-PS-P-2	Pump
317	VIO-PS-P-3	Pump
318	VIO-PS-P-4	Pump

Southeast Macomb County Wastewater Disposal System - Major Asset List		
No.	Asset Name	Asset Type
319	VIO-PS-PAV	Pavement
320	VIO-PS-PIPE-12	Forcemain
321	VIO-PS-PIPE-16	Forcemain
322	VIO-PS-PIPE-20	Forcemain
323	VIO-PS-PMOT-1	Motor
324	VIO-PS-PMOT-2	Motor
325	VIO-PS-PMOT-3	Motor
326	VIO-PS-PMOT-4	Motor
327	VIO-PS-P-SUMP	Pump
328	VIO-PS-RAINGAUGE	Rain Gauge
329	VIO-PS-RPZ	Pressure Regulating Valve
330	VIO-PS-SECFNCE	Fence
331	VIO-PS-SECGATE	Gate/Door Opener
332	VIO-PS-SF	Fan
333	VIO-PS-SIGN	Facility Signage
334	VIO-PS-TANK-GEN	Tank
335	VIO-PS-TRNF-BIG	Transformer
336	VIO-PS-TRNF-SMALL	Transformer
337	VIO-PS-VFD-P-1	Variable Frequency Drive
338	VIO-PS-VFD-P-2	Variable Frequency Drive
339	VIO-PS-VLT	Vault
340	VIO-PS-VLT-ARV	Air Vacuum/Release Valve
341	VIO-PS-VLT-HTC-EQP	Hatch
342	VIO-PS-VLT-P-SUMP	Pump
343	VIO-PS-VLT-V	Gate Valve
344	VIO-PS-V-P-1-EF	Knife Gate Valve
345	VIO-PS-V-P-1-IN	Knife Gate Valve
346	VIO-PS-V-P-2-EF	Knife Gate Valve
347	VIO-PS-V-P-2-IN	Knife Gate Valve
348	VIO-PS-V-P-3-EF	Knife Gate Valve
349	VIO-PS-V-P-3-IN	Knife Gate Valve
350	VIO-PS-V-P-4-EF	Knife Gate Valve
351	VIO-PS-V-P-4-IN	Knife Gate Valve
352	VIO-PS-WW	Wet Well
353	VIO-PS-WW-GRATE	Platform
354	VIO-PS-WW-HTC	Hatch
355	NER-VLT-001	Vault
356	NER-VLT-001-CLNOUT	
357	NER-VLT-001-HTC	Hatch
358	NER-VLT-002	Vault
359	NER-VLT-002-CLNOUT	
360	NER-VLT-002-HTC	Hatch
361	NER-VLT-003	Vault
362	NER-VLT-003-CLNOUT	
363	NER-VLT-003-HTC	Hatch
364	NER-VLT-004	Vault
365	NER-VLT-004-ARV	Air Vacuum/Release Valve
366	NER-VLT-004-HTC	Hatch

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date November 30, 2018
(no later than 3 years from executed grant date)

Southeast Macomb County Wastewater Disposal System *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1410-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or No

   If No - Date of the rate methodology approval letter: **June 19, 2018**.

2) Significant Progress Made: Yes or No

   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)

3) Date of rate methodology review letter identifying the gap: ____________.

4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ____________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Brian Baker	at	(586) 469-5325	brian.baker@macombgov.org
Name		Phone Number	Email

11/29/2018

Signature of Authorized Representative (Original Signature Required) Date

Brian Baker, Chief Deputy - MCPWO

Print Name and Title of Authorized Representative

Memorandum

Date:	November 20, 2018
To:	Ms. Cindy Clendenon
Company:	Michigan Department of Environmental Quality
From:	Prein&Newhof
Project #:	2130284
Re:	Spring Lake Township SAW Grant: Summary of Wastewater Asset Management Plan

Ms. Clendenon:

This memorandum provides the summary of Spring Lake Township's SAW grant activities required under Section 603 of Public Act 84 of 2015. Headings and italicized quotes are from recent MDEQ guidance.

Grantee Information

Spring Lake Township SAW Grant

101 South Buchanan

Spring Lake, MI 49456

springlaketwp.org

Contact Information for the grantee:

Ms. Carolyn Boersma

Address: 101 South Buchanan, Spring Lake, MI 49456

Phone: 616-842-1340

Email: CBoersma@springlaketwp.org

SAW Grant Project Number: 1449-01

Executive Summary

Spring Lake Township received a SAW Grant in 2015 to prepare a Waste Water Asset Management Plan. The Grant agreement indicated the following amounts:

Plan Cost	Grant Amount	Local Match
$849,672	$764,705	$84,967

The Key components in their Asset Management Plan include:

a. Asset Inventory and Condition Assessment
b. Level of Service
c. Criticality of Assets
d. Operation and Maintenance Strategies/Revenue Structure
e. Long-term Funding/Capital Improvement Plan

Asset Inventory

"Describe the system components included in the AMP. Discuss how they were located and identified, if applicable. Describe the platform used to develop and maintain the inventory of assets."

All assets that are functionally or financially significant to the waste water system have been inventoried.

- Collection system manholes were located using primarily survey quality GPS with some use of handheld GPS, and field witnessing.
- Lift stations were located using survey quality GPS.

Locations for assets that have fixed geographic locations such as pipes, manholes, buildings, and major fixed equipment are recorded in a GIS. Data regarding date of installation, material, and other physical characteristics for each asset is incorporated into the GIS geodatabase.
Location of non-pipe assets such as buildings and other equipment is compiled in a package of inventory spreadsheets. These assets were not mapped in GIS.
GIS and asset spreadsheets will be used to maintain asset data in the future.

Condition Assessment

"Discuss the condition assessment process, including what methods were used. Summarize the results of the assessment for each asset category."

The condition of collection system piping was documented with either a pole mounted zoom camera (looking down each pipe from the manholes) or with in-line closed circuit television (CCTV) from manhole to manhole. The zoom camera method was used on gravity sewer lines newer than 1993 and provided a very economical initial condition assessment of the pipes. Pipes noted to have potentially significant deficiencies were flagged and follow-up inspections were performed with full in-line CCTV.

Using the zoom camera data, pipes were rated based on several factors such as joint conditions, wall corrosion, and infiltration. Composite Risk of Failure ratings of 1-5 (5 being the worst) were assigned to each pipe segment.

Pipes inspected with CCTV were rated using the PACP system (Pipeline Assessment Certification Program). The PACP ratings were then used to derive a composite Risk of Failure rating of 1-5 for each pipe. Force main conditions were estimated using pipe age, material, and break history records.

Percentage of pipes within each rating category

1	2	3	4	5
15%	76%	9%	0%	0%

Gravity sewer conditions were estimated using pipe age, material, break history records, and either zoom camera or CCTV inspection.

Percentage of pipes within each rating category

1	2	3	4	5
87%	10%	1%	1%	1%

Manholes were visually inspected and rated on a scale of 1-5 based factors related to the condition of castings, steps, and structures. Manholes along West Spring Lake Road, Woodland Ridge and various other locations were identified as in need of lining upgrades.

Percentage of manholes within each rating category

1	2	3	4	5
80%	10%	8%	2%	0%

Visual inspection and performance testing of pump stations were completed to evaluate asset condition. Pump station assets, including pumps, valves, piping, structures, electrical, controls, and other assets were rated on a scale of 1-5. There are 30 pump stations in Spring Lake Township. The following stations were identified as needing station upgrades: PS2, PS4, PS12, PS13, PS19 and PS 32 as well as improvements to the Cathodic Protection Systems and Variable Frequency Drive Programming.

Percentage of Pump Stations within each rating category

1	2	3	4	5
47%	23%	50%	23%	0%

All (3) Grinder Stations were identified as close to failure and in need of upgrades.

Percentage of Grinder Stations within each rating category

1	2	3	4	5
0%	0%	0%	0%	100%

All (3) Meter Stations were identified as in need of upgrades.

Percentage of Meter Station within each rating category

1	2	3	4	5
0%	0%	67%	33%	0%

Level of Service Determination

"Discuss the level of service the municipality has determined that it wants to provide its customers based on the municipality's ability to provide the service and customer expectations. Discuss the procedures used to involve stakeholders in the AMP discussion. What are the trade-offs for the service to be provided? This may include any technical, managerial, health standard, safety, or financial restraints, as long as all regulatory requirements are met. Discuss how this was determined."

We recognize that the people served by our system are more than customers, they are the system owners. Our staff acts as stewards of the system. We have presented the results of our condition assessments, reviewed the costs for meeting various Levels of Service, and reviewed the rate impacts of those options. Based on the input received, we have established the following Level of Service Goals:

1. Meet Regulatory Requirements
   a. Maintain a specified number of Certified Operators
   b. Continue our Industrial Pretreatment Program
2. Minimize Service Interruptions
   a. Staff/equip crews sufficiently to perform specific routine maintenance items
   b. Repair/replace assets as required to limit emergency responses to 5 per year
3. Minimize Public Hazards
   a. Staff/equip emergency response services for 24 hour per day service and 30 minute response times
   b. Limit service interruptions to less than 6 hours
4. Manage Storm Water Inflow and Ground Water Infiltration
   a. Monitor I/I and implement CIP projects to meet EPA guidelines
5. Provide Capacity for Community Growth
6. Minimize Life Cycle Costs

Criticality of Assets

"Provide a summary of the method used to assess the criticality of assets considering the likelihood and consequence of failure. Based on the condition of the assets, and the determined risk tolerance, how were the assets ranked? What assets were considered most critical?"

Assets were given a Risk of Failure (RoF) rating of 1-5 (5 being the worst) based on factors related to both physical and functional conditions. The factors considered varied by the asset type and were tailored to identify both physical and functional deficiencies. For example, pipe ratings considered factors such as joint offsets and structural cracking while lift station pumps considered factors such as design pumping rate vs actual pumping rate.

Assets were given a Consequence of Failure (CoF) of 1-5 (5 being the worst) based on potential damage to adjacent utilities, transportation network, and the surrounding property/environment. The magnitude of the potential service disruption was also a factor.

Assets with the higher rankings for Consequence of Failure were those that:

- Provide service to a significant portion of the system
- Serve schools/major industry
- Are under major roads
- Are adjacent to waterways or significant wetlands

Consequence of Failure and Criticality should not be confused. Criticality is the product of as asset's Risk of Failure (RoF) and Consequence of Failure (CoF). Criticality drives an asset's action priority.

Criticality ratings were calculated and ranged from 1-25 (25 being the highest priority). The final Criticality ratings were considered when the comprehensive Capital Improvement Plan was generated.

Revenue Structure

"Discuss how the rates, charges, or other means of revenue were reviewed to determine if there will be sufficient funds to cover system operation, maintenance, replacement, capital improvement projects, and debt costs, identified in the AMP. If the current rate structure was not sufficient, discuss what increases were needed to ensure the desired level of service is sustainable and if any changes were made."

Historical operating expenses were reviewed using current audit and budget information. Based on that information, a "Test Year" was developed that reflected a baseline cost. The baseline costs included currently budgeted expenses, debt service, and leveling for base operating cost.
The customer base was reviewed, including the number of billable customers and volumetric sales. Other operating and non-operating revenues were also evaluated. Prediction of customer and volume counts were made including trending in system utilization, projection of operating costs, and

anticipated inflation by expense category. Refinancing and/or restructuring possibilities were also explored.

The CIP provided refined cost projections for the first 10 years of the financial analysis. The Asset Management System identified the estimated asset investment cost by year for the remaining lifecycle of all assets. The annual investment cost was evaluated and scenarios developed for cash funding and debt financing. Based on that analysis, rate adjustment options were identified. It was determined that the current rate structure was sufficient to cover O&M activities but increases were needed to fully implement the desired CIP. Public meetings were held to convey the results of the asset evaluation (RoF and Criticality) along with the financial evaluation. Rate changes required to provide our desired Level of Service were implemented in 2017.

Capital Improvement Plan

"Describe the long-term Capital Improvement Plan that was developed to address system needs identified in the AMP. Provide a list of the identified improvements/projects."

Once assets RoF ratings were assigned and actions prioritized using the Criticality ratings, action timelines were predicted for maintenance/repair/replacement. Because the wastewater collection system assets share physical space with other asset systems such as storm water, roadway, and drinking water, it was imperative that the CIP process coordinated actions on these systems.

Scope of work and action timelines for the other asset systems were incorporated based on:

- Roadway **-** based on roadway PASER (Pavement Surface Evaluation and Rating) evaluations
- Drinking Water – based on the Water Reliability Study and Water Asset Management Plan

Individual project scopes for the comprehensive CIP were created to maximize coordination of work on various assets and minimize overall costs. The CIP projects include improvements to the waste water system (both collection and treatment. The CIP costs were incorporated into the revenue structure review. A 10-year CIP document was created which will be available to the public once the final rate structure has been adopted.

The projects identified in the CIP are:

- Manhole Lining –W. Spring Lake Road
- Grinder Pump Station Replacement and Mission Installation
- Pump Station Upgrades – PS No. 19 (Pump No. 2)
- Pump Station Upgrades and Mission Installation – PS No. 33
- Cathodic Protection System Improvements: PS No. 4, 12 & 13
- Generators: Pump Station No. 10, 14, 21,29
- Sanitary Sewer Repairs – Structural Point Repairs
- Manhole Lining and Repairs
- Pump Station Upgrades – PS No. 12
- Meter Station Upgrades
- Pump Station Upgrades – PS No. 2
- Pump Station Upgrades – PS No. 32 – VFD programming
- Variable Frequency Drive Programming
- Grand Haven Spring Lake Sewer (GHSLSA) WWTP Headworks
- Division Street – Grand Haven Spring Lake Sewer Authority Pump Station
- GHSLSA Grand River Force Main

List of Major Assets

"Provide a general list of the major assets identified in the AMP"

Spring Lake Township's major assets include:

- 30 lift stations
- 3 grinder stations
- 3 meter stations
- 42,000 feet of sanitary force main
- 258,400 feet of gravity sanitary sewer
- 1,110 Sanitary Manholes

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date November 30, 2018
(no later than 3 years from executed grant date)

The Spring Lake Township *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1449-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: ~~Yes~~ or No

   If No - Date of the rate methodology approval letter: May14, 2018.

2) Significant Progress Made: Yes or No

   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)

3) Date of rate methodology review letter identifying the gap: __________.

4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on __________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Name		Phone Number	Email
Carolyn Boersma	at	616-842-1340	cboersma@springlaketwp.org

C. Carolyn Boersma — 11-30-18

Signature of Authorized Representative (Original Signature Required) — Date

Carolyn Boersma, Spring Lake Township Clerk

Print Name and Title of Authorized Representative

St. Clair County Wastewater Treatment Plant

451 State St, Algonac, MI 48001
Nicholas Cucchiara
810-794-7875
SAW GRANT # 1091-01

11/30/2018

Table of Contents

1 Executive Summary

The St. Clair County Wastewater Treatment Plant's (SCCWWTP) Asset Management Program centers on the following five (5) core elements: current state of the assets; the required sustainable level of service; assets critical to sustained performance; the minimum life-cycle costs; and the best long term funding strategy. The program includes Level of Service (LoS) Goals, an inventory of wastewater assets owned and/or operated by the SCCWWTP, Probability of Failure (PoF) scores, Consequence of Failure (CoF) scores, Risk scores, a list of potential capital improvements, and an evaluation of rates to determine whether sufficient funds will be available to complete improvements. SCCWWTP was awarded a $75,700 grant, including a $7,570 grant match, in order to complete the Asset Management Program.

2 Condition Assessment

The asset inventory was exported from the Check Up Program for Small Systems (CUPSS) into a modified version of the MDEQ Asset Management Workbook. The condition of assets are estimated using remaining useful life. **Figure 1** below illustrates the condition of system assets. **Appendix A** includes the inventory with corresponding condition. The PoF score was estimated using the condition as well as staffs' knowledge of performance issues.

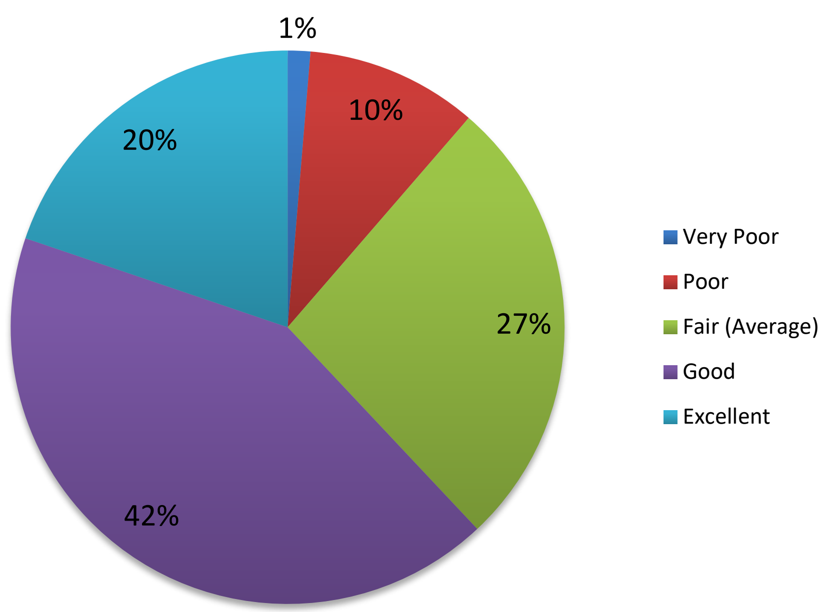

Figure 1 - Condition of System Assets

3 Level of Service

The LoS goals help the SCCWWTP achieve a sustainability and/or efficient organization. The goals are divided into the following four categories:

- Operations & Management
- Inspections & Observations
- Maintenance
- Capital Improvements

Appendix B contains the LoS goals and the corresponding Key Performance Indicators (KPIs).

4 Criticality of Assets

CoF scores are assigned to assets using institutional knowledge of the treatment system. Values are based on staff's understanding of the following topics:

- Maximum Allowable Service Outage
- Impact on Quality
- Impact on Quantity
- Redundancy

Appendix A includes the inventory with corresponding PoF score. **Figure 2** shows the Probability of Failure for system assets. A PoF of 1 is considered Low and a PoF of 5 is High.

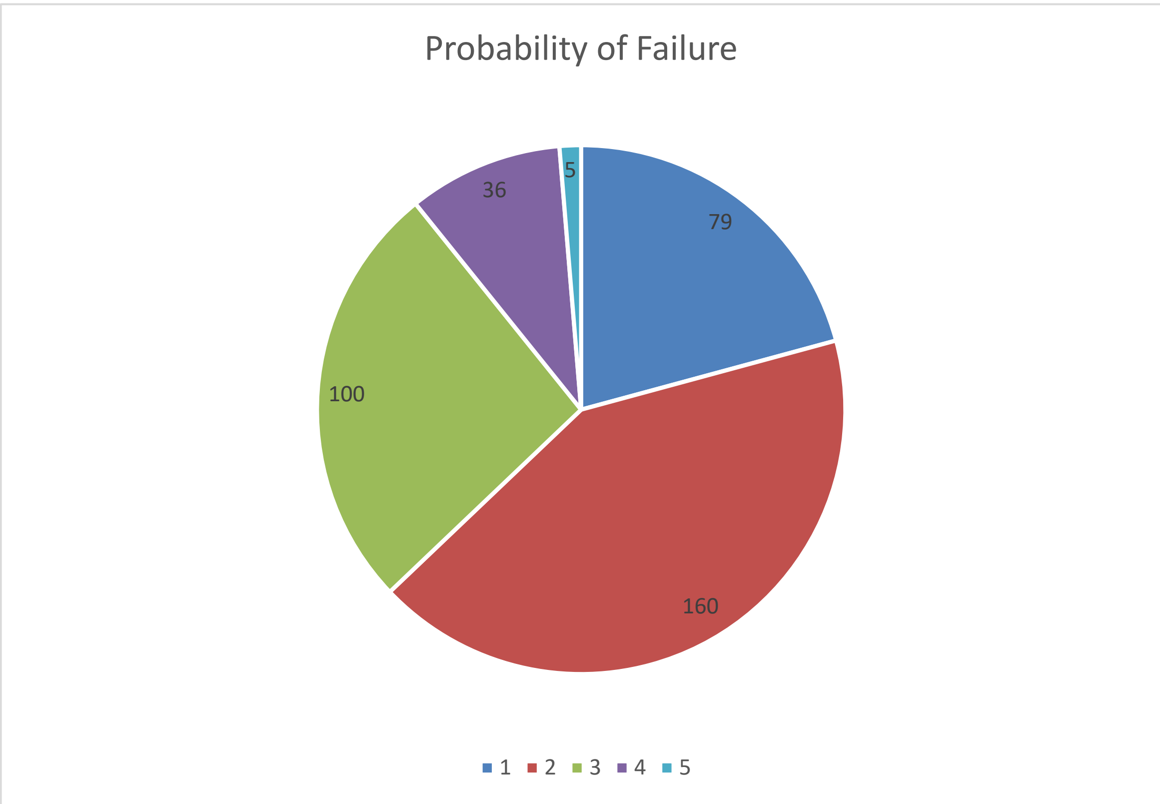

Figure 2 - Consequence of Failure of System Assets

The SSC WWTP defines Risk as the product of CoF and PoF. **Figure 3** gives a breakdown of the risk scores for system assets. Low risk assets have low scores. High risk assets approach 25.

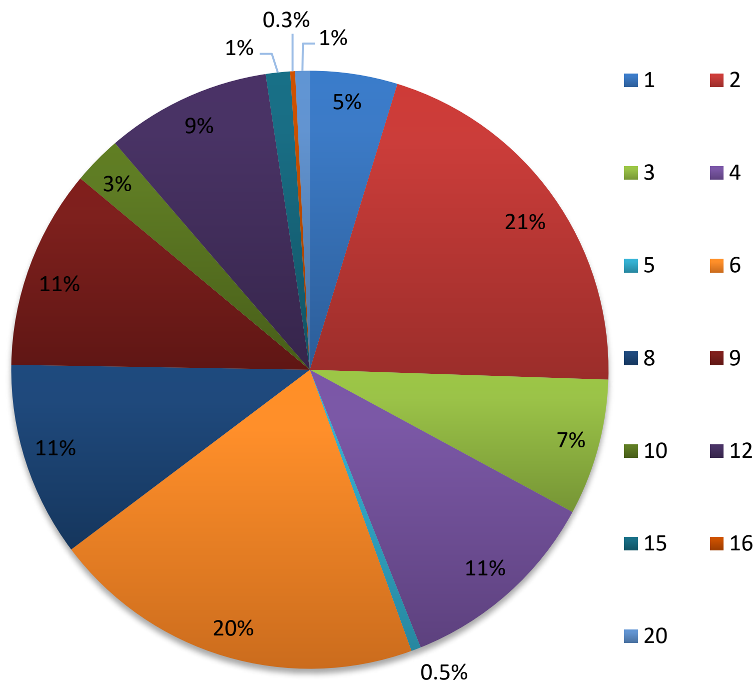

Figure 3 - Risk of System Assets

5 Revenue Structure

Allocation of Operation Costs:	Algonac	Clay	Ira	Total
(Using Annual Flow Percentages)				
January 1, 2017 - March 31, 2017	41.299%	36.710%	21.991%	100.000%
April 1, 2017 - June 30, 2017	43.633%	35.331%	21.036%	100.000%
July 1, 2017 - September 30, 2017	45.455%	39.090%	15.455%	100.000%
October 1, 2017 - December 31, 2017	44.476%	34.706%	20.818%	100.000%
12 month Average	43.716%	36.459%	19.825%	100.000%

As part of the Asset Management Program, the SCCWWTP completed a funding gap analysis. **Appendix C** contains the gap calculations and the sewer rate ordinance.

The gap analysis determined that there was $0.00 gap.

6 Capital Improvement Plan

PROJECT	PLANNED YEAR	PLANNED BUDGET
Station 1 Well Recoat	2019	$130,000
Roof Coatings (Various)	2019	$ 21,000
Storage Tank Valves (4)	2019	$ 9,000
Auto Sampler (1)	2019	$ 7,000
Small Garage Room Heater	2019	$ 4,500
Air Compressor	2019	$ 3,100
Trickling Filter 1, Blower 1	2019	$ 3,600
Trickling Filter 2, Blower 1	2019	$ 3,600
Katolite Generator	2020	$200,000
Analytic Balance	2020	$ 4,600
Mechanical Convection Oven	2020	$ 3,500
PH Probe	2020	$ 1,000
3 HP Primary Sludge Pump	2021	$ 63,000
CL2 Jet Pump #1	2021	$ 21,000
3 HP Digester Recirculating Pump 1	2021	$ 15,000
Sigma 1600 Liquid Sampler 1/Raw	2021	$ 7,200
Sigma 1600 Liquid Sampler 3/FE	2021	$ 7,200
Mettler PM2000	2021	$ 6,000
Precision Scientific Low Temp Incubator	2021	$ 6,000
Influent Flow Meter	2022	$ 25,000
Michigan Station Pump 1, 10 HP	2022	$ 20,000
Main Building Roll-up Door	2022	$ 20,000
3 HP Digester Recirculating Pump 2	2022	$ 15,000
3 HP Digester Recirculating Pump 3	2022	$ 15,000
16” Effluent Flow Meter	2023	$ 25,000
40 HP Pump 1, Secondary Influent Pump	2023	$ 25,000
Secondary Clarifier 1 Sludge Pump	2023	$ 24,000
Secondary Clarifier 2 Sludge Pump	2023	$ 24,000
Clay/Ira Pit 16” Flow Meter 1	2023	$ 23,500
Secondary Clarifier Drive 2	2023	$ 20,000
Ferric Transfer Pump 1	2023	$ 18,500
24 HP Pump 1 Station 1	2024	$ 42,000
24 HP Pump 3 Station 1	2024	$ 42,000
40 HP Pump 2, Secondary Influent Pump	2024	$ 25,000
40 HP Pump3, Secondary Influent Pump	2025	$ 25,000
Effluent Sample Pump	2025	$ 8,000
Secondary Sludge Pump Building Heater	2025	$ 4,000

PROJECT	YEARS UNTIL PROJECT MUST BEGIN	COST	RESERVE REQUIRED EACH YEAR
Station 1 Well Recoat	1	$130,000	$130,000
Roof Coatings (Various)	1	$ 21,000	$ 21,000
Storage Tank Valves (4)	1	$ 9,000	$ 9,000
Auto Sampler (1)	1	$ 7,000	$ 7,000
Small Garage Room Heater	1	$ 4,500	$ 4,500
Air Compressor	1	$ 3,100	$ 3,100
Trickling Filter 1, Blower 1	1	$ 3,600	$ 3,600
Trickling Filter 2, Blower 1	1	$ 3,600	$ 3,600
Katolite Generator	2	$200,000	$100,000
Analytic Balance	2	$ 4,600	$ 2,300
Mechanical Convection Oven	2	$ 3,500	$ 2,300
PH Probe	2	$ 1,000	$ 500
3 HP Primary Sludge Pump	3	$ 63,000	$ 21,000
CL2 Jet Pump #1	3	$ 21,000	$ 7,000
3 HP Digester Recirculating Pump 1	3	$ 15,000	$ 5,000
Sigma 1600 Liquid Sampler 1/Raw	3	$ 7,200	$ 2,400
Sigma 1600 Liquid Sampler 3/FE	3	$ 7,200	$ 2,400
Mettler PM2000	3	$ 6,000	$ 2,000
Precision Scientific Low Temp Incubator	3	$ 6,000	$ 2,000
Influent Flow Meter	4	$ 25,000	$ 6,250
Michigan Station Pump 1, 10 HP	4	$ 20,000	$ 5,000
Main Building Roll-up Door	4	$ 20,000	$ 5,000
3 HP Digester Recirculating Pump 2	4	$ 15,000	$ 3,750
3 HP Digester Recirculating Pump 3	4	$ 15,000	$ 3,750
16” Effluent Flow Meter	5	$ 25,000	$ 5,000
40 HP Pump 1, Secondary Influent Pump	5	$ 25,000	$ 5,000
Secondary Clarifier 1 Sludge Pump	5	$ 24,000	$ 4,800
Secondary Clarifier 2 Sludge Pump	5	$ 24,000	$ 4,800
Clay/Ira Pit 16” Flow Meter 1	5	$ 23,500	$ 4,700
Secondary Clarifier Drive 2	5	$ 20,000	$ 4,000
Ferric Transfer Pump 1	5	$ 18,500	$ 3,700
24 HP Pump 1 Station 1	6	$ 42,000	$ 7,000
24 HP Pump 3 Station 1	6	$ 42,000	$ 7,000
40 HP Pump 2, Secondary Influent Pump	6	$ 25,000	$ 4,167
40 HP Pump3, Secondary Influent Pump	7	$ 25,000	$ 3,571
Effluent Sample Pump	7	$ 8,000	$ 1,143
Secondary Sludge Pump Building Heater	7	$ 4,000	$ 571

7 Recommendations

- Supplement condition assessments with physical inspections.
- Use a redundancy factor (EPA method for example) in risk calculations instead of grouping it with CoF to determine more-accurate replacement points.
- Review LoS KPIs annually to identify best-practice system performance.

8 List of Major Assets

The following is a list of the most critical assets at the SCC WWTP:

- 10 HP Pump 1 MI Station
- 10 HP Pump 2 MI Station
- 15 HP Pump 1 Station 2
- 15 HP Pump 2 Station 2
- 15 HP Pump 3 Station 2
- 15 HP Raw sewage pump 1
- 16" Eff. Flowmeter
- 24 HP Pump 1 Station 1
- 24 HP pump 2 station 1
- 24 HP pump 3 station 1
- 3 HP Digester Recirculation pump 1
- 3 HP Digester Recirculation pump 2
- 3 HP Digester Recirculation pump 3
- 3 HP Primary Sludge Pump
- 35 HP Raw sewage pump 2
- 35 HP Raw sewage pump 3
- 40 HP Pump 1 - Secondary Influent Pump
- 40 HP Pump 2 - Secondary Influent Pump
- 40 HP Pump 3 - Secondary Influent Pump
- 40 HP Pump 4 - Secondary Influent Pump
- 5HP Marlow Sludge Pump
- Aggressive Control Panel 1
- Bar Screen and Washing Compactor
- Big Garage
- Chemical Feed Transformer LP-B
- Chlorine contact chamber
- CL2 Jet pump #1
- CL2 Jet pump #2
- Clay/ Ira pit
- Clay/ Ira pit 16" flow meter 1
- Clay/ Ira pit 8" flow meter 2
- Digester 1
- Digester 1 compressor
- Digester 1 gas mixing motor
- Digester 2
- Digester 2 Boiler
- Digester 2 compressor
- Digester 2 Gas mixing motor
- Distribution Panel 1
- Distribution Panel 1 Feed
- Distribution Panel 1 Transformer
- Distribution Panel 2
- Distribution Panel 2 Feed
- Distribution Panel 2 Transformer
- Ferric and Chlorine building Distribution Panel 3
- Ferric/Chlorine Storage building
- Grit

- Grit Removal system
- Influent flow meter
- Junction Chamber
- Katolite Generator pump station 1
- Katolite Generator pump Station 2
- Katolite Generator WWTP
- Main WWTP Building
- Primary Clarifier 1
- Primary Clarifier 2
- Primary Clarifier 3
- Primary Clarifier 4
- Primary Motor Control Panel
- Secondary Clarifier 1
- Secondary Clarifier 1 10 HP Sludge Pump Motor
- Secondary Clarifier 1 Sludge Pump
- Secondary Clarifier 2
- Secondary Clarifier 2 Sludge Pump
- Secondary Motor control panel
- Secondary Sludge Pump Bldg.
- Sludge Pump House motor control panel MCCFG
- Sludge Storage Tank East
- Sludge Storage Tank North
- Sludge Storage Tank South
- Sludge Storage Tank West
- Switch Gear Automatic Transfer Switch
- Trickling Filter 1
- Trickling Filter 1 Gear-Reducing Drive
- Trickling Filter 2
- Trickling Filter 2 Gear-Reducing Drive

Appendix A includes the inventory with corresponding CoF score.

APPENDIX A – Inventory and Risk Calculations

#	ASSETS	CONDITION	CRITICALITY/ CONSEQUENCE OF FAILURE (COF) (1-5)	BUSINESS RISK
1	0 Turn Mower	Good	3	6
2	0.33 HP Baldor industrial motor	Excellent	1	1
3	1 HP Baldor Industrial motor	Good	1	2
4	1 HP Motor	Excellent	1	1
5	1.5 HP Dayton Energy Efficient motor 1	Excellent	1	1
6	1.5 HP Dayton Energy Efficient motor 2	Excellent	1	1
7	1.5 HP Dayton Energy Efficient motor 3	Excellent	1	1
8	1.5 HP Lincoln motor	Good	1	2
9	1.5 HP Lincoln motor 1	Excellent	1	1
10	1.5 HP Lincoln motor 2	Good	1	2
11	1.5 HP Lincoln motor 3	Good	1	2
12	1.5 HP Lincoln motor 4	Good	1	2
13	1/2 HP Primary Clarifier Drive 1	Fair/Average	3	12
14	1/2 HP Primary Clarifier Drive 2	Fair/Average	3	12
15	1/2 HP Primary Clarifier Drive 3	Fair/Average	3	12
16	1/2 HP Primary Clarifier Drive 4	Excellent	3	3
17	1/3 HP Polymer batching system	Fair/Average	3	9
18	10 HP motor	Good	1	2
19	10 HP Pump 1 MI Station	Fair/Average	5	13
20	10 HP Pump 2 MI Station	Excellent	5	3
21	15 HP Pump 1 Station 2	Fair/Average	5	7
22	15 HP Pump 2 Station 2	Good	4	3
23	15 HP Pump 3 Station 2	Good	4	3
24	15 HP Raw sewage pump 1	Excellent	3	1
25	16" Eff. Flowmeter	Fair/Average	3	12
26	1900 PSI pressure washer	Good	1	2
27	2 HP Dayton Industrial motor	Excellent	1	1
28	24 HP Pump 1 Station 1	Fair/Average	4	10
29	24 HP pump 2 station 1	Excellent	4	2
30	24 HP pump 3 station 1	Fair/Average	4	10
31	3 HP Digester Recirculation motor 1	Fair/Average	3	3
32	3 HP Digester Recirculation motor 2	Fair/Average	3	3
33	3 HP Digester Recirculation motor 3	Good	3	2
34	3 HP Digester Recirculation pump 1	Poor	4	10
35	3 HP Digester Recirculation pump 2	Poor	4	10
36	3 HP Digester Recirculation pump 3	Fair/Average	4	10
38	3 HP Primary Sludge Pump	Fair/Average	4	**16**

#	ASSETS	CONDITION	CRITICALITY/ CONSEQUENCE OF FAILURE (COF) (1-5)	BUSINESS RISK
37	3 HP Reliance motor	Fair/Average	1	3
39	3 HP Sludge Pump discharge plug valve	Fair/Average	3	9
40	3 HP Sludge Pump Suction plug valve	Fair/Average	3	9
41	3/4 HP mixing motor 1	Good	1	2
42	3/4 HP mixing motor 2	Good	1	2
43	35 HP Raw sewage pump 2	Good	3	2
44	35 HP Raw sewage pump 3	Good	3	2
45	35 HP Raw sewage pump 4	Good	2	1
46	4 inch plug valve 1	Excellent	2	2
47	4 inch plug valve 2	Excellent	2	2
48	4 inch plug valve 3	Excellent	2	2
49	4 inch plug valve 4	Excellent	2	2
50	4 inch plug valve 5	Excellent	2	2
51	40 HP Gate valve	Good	3	2
52	40 HP Pump 1 - Secondary Influent Pump	Fair/Average	5	10
53	40 HP Pump 1 check valve - Secondary Influent	Good	3	3
54	40 HP Pump 1 Gate valve - Secondary Influent	Good	3	3
55	40 HP Pump 2 - Secondary Influent Pump	Fair/Average	5	10
56	40 HP Pump 2 check valve - Secondary Influent	Good	3	3
57	40 HP Pump 2 Gate valve - Secondary Influent	Good	3	3
58	40 HP Pump 3 - Secondary Influent Pump	Fair/Average	5	10
59	40 HP Pump 3 check valve - Secondary Influent	Good	3	3
60	40 HP Pump 3 Gate valve - Secondary Influent	Good	3	3
61	40 HP Pump 4 - Secondary Influent Pump	Fair/Average	5	10
62	40 HP Pump 4 check valve - Secondary Influent	Good	2	2
63	40 HP Pump 4 Gate valve - Secondary Influent	Good	3	3
64	5HP Marlow Sludge Pump	Fair/Average	4	8
65	6 inch heated sludge pipe plug valve 1	Good	2	4
66	6 inch heated sludge pipe plug valve 2	Good	2	4
67	6 inch plug valve	Fair/Average	2	6
68	6 inch plug valve	Excellent	2	2
69	6 inch plug valve	Excellent	2	2
70	6 inch plug valve 1	Excellent	2	2
71	6 inch plug valve 2	Excellent	2	2
72	6 inch plug valve 3	Excellent	2	2
73	6 inch plug valve 4	Excellent	2	2
74	6 inch plug valve 5	Excellent	2	2
75	6 inch plug valve 6	Excellent	2	2
76	7.5 HP motor	Excellent	1	1
77	Aggressive Control Panel 1	Good	4	4
78	Aggressive Control Panel 2	Good	4	4
78.1	Air Compressor (add new)	Excellent	2	2
79	Air Compressor (MB Boiler Room)	Fair/Average	4	12
80	Analytic balance	Good	5	10

#	ASSETS	CONDITION	CRITICALITY/ CONSEQUENCE OF FAILURE (COF) (1-5)	BUSINESS RISK
81	Arc Welder	Good	1	1
82	Baldor 1.5 HP Energy eff. motor	Fair/Average	1	3
83	Bar Screen and Washing Compactor	Excellent	4	4
84	Bench Grinder	Good	1	2
85	Big Garage	Good	3	6
86	Big Garage Heater 1	Good	2	2
87	Big Garage Heater 2	Good	2	2
88	Capacitor 1	Good	1	1
89	Capacitor 2	Good	1	1
90	Chemical Feed Transformer LP-B	Fair/Average	3	6
91	Chlorine Ball (pvc) valve 10	Good	1	2
92	Chlorine Ball (pvc) valve 11	Good	1	2
93	Chlorine ball (pvc) valve 12	Good	1	2
94	Chlorine Ball (pvc) valve 3	Good	1	2
95	Chlorine ball (pvc) valve 7	Good	1	2
96	Chlorine Ball (pvc) valve 8	Good	1	2
97	Chlorine Ball (pvc)valve 4	Good	1	2
98	Chlorine ball(pvc) valve 9	Good	1	2
99	Chlorine contact chamber	Fair/Average	5	8
100	Chlorine contact gate valve 1	Good	2	2
101	Chlorine Contact gate valve 2	Good	2	2
102	Chlorine Plug valve 1	Fair/Average	1	3
103	Chlorine plug valve 13	Good	1	2
104	Chlorine plug valve 14	Good	1	2
105	Chlorine Plug valve 2	Good	1	2
106	Chlorine Plug valve 5	Good	1	2
107	Chlorine Plug valve 6	Good	1	2
108	Chlorine room 2 Ton hoist	Good	1	2
110	Chlorine Room heater 2	Fair/Average	2	2
111	Chlorine room heater 3	Poor	2	8
112	Chlorine room heater 4	Poor	2	2
115	CL2 Jet pump #1	Fair/Average	3	15
116	CL2 Jet pump #2	Good	4	4
113	CL2 Module	Good	3	6
114	CL2 Probe	Good	3	6
117	Clay/ Ira pit	Good	3	6
118	Clay/ Ira pit 16" flow meter 1	Fair/Average	3	12
119	Clay/ Ira pit 8" flow meter 2	Good	3	6
120	Clay/ Ira pit Heater 1	Good	2	4
121	Clay/ Ira pit room gate valve 1	Good	2	2
122	Clay/ Ira pit room gate valve 2	Good	2	2
125	Digester 1	Fair/Average	4	6
126	Digester 1 Boiler	Poor	2	3
127	Digester 1 check valve	Good	2	4

#	ASSETS	CONDITION	CRITICALITY/ CONSEQUENCE OF FAILURE (COF) (1-5)	BUSINESS RISK
128	Digester 1 compressor	Excellent	3	2
129	Digester 1 Flame Arrester	Good	4	8
130	Digester 1 gas mixing motor	Fair/Average	3	5
131	Digester 1 motorized valve 1	Excellent	2	0
132	Digester 1 motorized valve 2	Excellent	3	0
133	Digester 1 motorized valve 3	Excellent	2	0
134	Digester 1 motorized valve 4	Excellent	2	0
135	Digester 1 motorized valve 5	Excellent	3	0
136	Digester 1 motorized valve 6	Excellent	3	0
137	Digester 1 Regulator	Excellent	3	2
138	Digester 2	Fair/Average	4	6
139	Digester 2 Boiler	Fair/Average	3	1
140	Digester 2 check valve	Fair/Average	2	2
141	Digester 2 compressor	Fair/Average	3	5
142	Digester 2 Flame Arrester	Good	4	8
143	Digester 2 Gas mixing motor	Excellent	3	2
144	Digester 2 motorized valve 1	Excellent	3	0
145	Digester 2 motorized valve 2	Fair/Average	3	1
146	Digester 2 motorized valve 3	Fair/Average	3	1
147	Digester 2 motorized valve 4	Fair/Average	3	1
148	Digester 2 motorized valve 5	Fair/Average	3	1
149	Digester 2 motorized valve 6	Fair/Average	3	1
150	Digester 2 Regulator	Fair/Average	3	5
151	Digester Boiler 1 pressure Valve	Excellent	2	2
152	Digester boiler room heater 1	Fair/Average	4	6
153	Digester boiler room heater 2	Good	1	1
154	Digital level transmitter 1	Good	2	4
155	Digital level transmitter 2	Good	2	4
156	Distribution Panel 1	Good	5	5
157	Distribution Panel 1 Feed	Good	5	5
158	Distribution Panel 1 Transformer	Good	5	5
159	Distribution Panel 2	Good	5	5
160	Distribution Panel 2 Feed	Good	5	5
161	Distribution Panel 2 Transformer	Good	5	5
162	DO Module	Excellent	3	3
163	DO probe	Excellent	3	3
164	Drill Press	Good	1	2
165	E. Sludge storage plug Decanting Valve 1	Poor	2	2
166	E. Sludge storage plug Decanting Valve 2	Poor	2	2
167	E. Sludge storage plug Decanting Valve 3	Poor	2	2
168	E. Sludge storage plug Decanting Valve 4	Poor	2	2
169	E. Sludge storage plug Inlet Valve 5	Poor	2	2
170	Eff. Sample pump	Poor	3	15
171	Effluent valve RSP 1	Fair/Average	3	9

#	ASSETS	CONDITION	CRITICALITY/ CONSEQUENCE OF FAILURE (COF) (1-5)	BUSINESS RISK
172	Effluent valve RSP 2	Fair/Average	3	9
173	Effluent valve RSP 4	Fair/Average	3	9
175	FB1400 Lab Furnace	Good	4	8
176	Ferric and Chlorine building Distribution Panel 3	Good	5	5
177	Ferric and Chlorine building Heating Unit 1	Poor	2	3
178	Ferric and Chlorine building Heating Unit 2	Poor	2	3
179	Ferric and Chlorine building Heating Unit 3	Poor	2	3
180	Ferric and Chlorine building Heating Unit 4	Poor	2	3
181	Ferric and Chlorine building sump pump	Poor	2	8
181.1	Ferric Room heater 1	Excellent	2	2
182	Ferric Storage Tank 1	Good	3	3
183	Ferric Storage Tank 2	Good	3	3
184	Ferric Transfer Pump 1	Fair/Average	3	12
185	Ferric Transfer Pump 2	Good	2	8
186	Ferric/Chlorine Storage building	Good	3	6
187	Fi-streem glass still	Good	2	2
188	Ford Car	Poor	1	1
189	Ford Super Duty	Excellent	2	1
190	Front Entrance Gate	Fair/Average	1	3
191	Fume Hood 1	Good	5	5
192	Fume Hood 2	Good	3	3
193	GLS sampler (portable)	Excellent	1	1
194	GMC PU #573	Excellent	1	0
196	Grit	Excellent	4	4
197	Grit eff. gate valve	Good	3	2
198	Grit eff. gate valve 2	Fair/Average	3	2
199	Grit eff. gate valve 3	Fair/Average	3	2
200	Grit eff. gate valve	Excellent	3	1
201	Grit Removal system	Excellent	5	5
202	Grit Room 1 Ton Hoist	Good	1	1
203	Hach Low Temperature Incubator	Good	2	4
204	Hach Spectrophotometer	Good	2	2
205	Homelite mobile pump	Good	1	2
206	Hydraulic Jack	Excellent	1	1
207	Hydraulic Jack	Excellent	1	1
208	Influent flow meter	Fair/Average	3	12
209	Influent sample pump 1	Fair/Average	3	9
210	Influent sample pump motor	Fair/Average	3	9
211	John Deere front end loader and backhoe	Very Poor	1	5
212	John Deere riding snow blower	Fair/Average	1	3
213	Junction Chamber	Fair/Average	3	9
214	Junction chamber gate valve	Fair/Average	3	9
215	Katolite Generator pump station 1	Good	4	8
216	Katolite Generator pump Station 2	Good	4	8

#	ASSETS	CONDITION	CRITICALITY/ CONSEQUENCE OF FAILURE (COF) (1-5)	BUSINESS RISK
217	Katolite Generator WWTP	Very Poor	4	20
218	Leeson energy saving motor	Fair/Average	1	3
220	Main Building Boiler	Excellent	2	1
221	Main building roll-up door	Very Poor	3	12
222	Main Building Unit Heater 1	Excellent	2	0
223	Main building Unit Heater 2	Excellent	2	0
224	Main building Unit Heater 3	Fair/Average	2	1
225	Main building Unit Heater 4	Fair/Average	2	1
226	Main building Unit Heater 5	Good	2	1
227	Main building Unit Heater 6	Fair/Average	2	1
228	Main WWTP Building	Good	3	6
229	Manual bar screen	Excellent	2	1
230	MB Air Conditioner	Excellent	2	2
231	MB motor control 1 ton hoist	Excellent	1	1
232	Mechanical convection oven	Good	5	10
233	Mettler PM2000	Excellent	5	10
233.1	MI Station	Good	4	8
234	MI Station pump 1 check valve	Good	2	2
235	MI Station pump 1 gate discharge valve	Good	2	2
236	MI Station pump 1 gate suction valve	Good	2	2
237	MI Station pump 2 Check valve	Good	2	2
238	MI Station pump 2 gate discharge valve	Good	2	2
239	MI Station pump 2 gate suction valve	Good	2	2
240	Military Crane Truck	Excellent	2	2
241	Miller Generator/ welder	Good	1	2
242	Mobile Generator	Good	4	8
243	N. Sludge storage air scrubber 1	Good	2	2
244	N. Sludge storage plug decanting valve 1	Poor	3	3
245	N. Sludge storage plug decanting valve 2	Poor	3	3
246	N. Sludge Storage plug decanting valve 3	Poor	3	3
247	N. Sludge storage plug decanting valve 4	Poor	3	3
248	N. Sludge storage plug Inlet valve 5	Poor	3	3
249	Napco Autoclave	Good	2	4
250	NH 3 Module	Excellent	2	2
251	NH3 probe	Fair/Average	3	9
253	PH Module	Fair/Average	2	6
254	PH probe	Good	4	12
255	Polymer	Excellent	1	1
256	Polymer day tank	Fair/Average	3	9
258	Polymer Day Tank 1	Good	1	1
259	Polymer Day Tank 2	Good	1	1
123	Polymer Feed (metering) Pump 1	Excellent	1	1
124	Polymer Feed (metering) Pump 2	Excellent	1	1
257	Polymer Feed system control panel	Fair/Average	4	12

#	ASSETS	CONDITION	CRITICALITY/ CONSEQUENCE OF FAILURE (COF) (1-5)	BUSINESS RISK
260	Polymer pump room Air Compressor	Fair/Average	1	2
260.1	Polymer Transfer Pump 1	Poor	4	8
261	Poulan Pro 5 HP 24in snow blower	Good	1	2
262	Powder Dispenser	Excellent	1	1
219	Precision Scientific Low Temperature Incubator	Good	5	10
263	Primary Clarification inf. valve	Good	3	2
264	Primary Clarifier 1	Fair/Average	4	3
265	Primary Clarifier 1 Inf. gate valve 2	Good	3	1
266	Primary Clarifier 1 Inf. gate valve 1	Good	3	1
267	Primary Clarifier 1 Scum valve	Good	1	1
268	Primary Clarifier 2	Fair/Average	4	3
269	Primary Clarifier 2 Inf. gate valve 2	Good	3	1
270	Primary Clarifier 2 Inf. gate valve 1	Good	3	1
271	Primary Clarifier 2 Scum valve	Fair/Average	1	1
272	Primary Clarifier 3	Fair/Average	4	3
273	Primary Clarifier 3 Inf. gate valve 1	Good	3	1
274	Primary Clarifier 3 Inf. gate valve 2	Good	3	1
275	Primary Clarifier 3 Scum valve	Fair/Average	1	1
276	Primary Clarifier 4	Fair/Average	4	3
277	Primary Clarifier 4 Inf. gate valve 1	Excellent	3	0
278	Primary Clarifier 4 Inf. gate valve 2	Good	3	1
279	Primary Clarifier 4 Scum valve	Fair/Average	1	1
280	Primary Motor Control Panel	Fair/Average	4	3
280.1	Pump Station 1	Fair/Average	4	8
280.2	Pump Station 2	Excellent	4	4
281	Recirculation pump 1 Discharge plug valve	Excellent	2	1
282	Recirculation pump 1 Suction plug valve	Excellent	2	1
283	Recirculation pump 2 Discharge plug valve	Excellent	2	1
284	Recirculation pump 2 Suction plug valve	Excellent	2	1
285	Recirculation pump 3 Discharge plug valve	Excellent	2	1
286	Recirculation pump 3 Suction plug valve	Excellent	2	1
287	S. sludge storage air Scrubber	Poor	2	4
288	S. sludge storage Decanting plug valve 1	Poor	3	3
289	S. sludge storage Decanting plug valve 2	Poor	3	3
290	S. Sludge storage Decanting plug valve 3	Poor	3	3
291	S. Sludge storage Decanting plug valve 4	Poor	3	3
292	S. Sludge storage Inlet plug valve 5	Poor	3	3
293	Sand Blaster	Good	2	4
294	Screen room/Wet well	Fair/Average	1	3
295	Secondary Clarifier 1	Fair/Average	3	5
296	Secondary Clarifier 1 10 HP Sludge Pump Motor	Fair/Average	3	5
297	Secondary Clarifier 1 Influent Sluice Gate	Good	2	2
298	Secondary Clarifier 1 plug valve 1	Fair/Average	2	2
299	Secondary Clarifier 1 plug valve 2	Fair/Average	2	2

#	ASSETS	CONDITION	CRITICALITY/ CONSEQUENCE OF FAILURE (COF) (1-5)	BUSINESS RISK
300	Secondary Clarifier 1 plug valve 3	Fair/Average	2	2
301	Secondary Clarifier 1 plug valve 4	Fair/Average	2	2
302	Secondary Clarifier 1 Sludge Pump	Poor	5	13
303	Secondary Clarifier 2	Poor	3	5
304	Secondary Clarifier 2 10 HP Sludge Pump Motor	Fair/Average	3	5
305	Secondary Clarifier 2 Influent Sluice Gate	Good	2	2
306	Secondary Clarifier 2 plug valve 1	Fair/Average	2	2
307	Secondary Clarifier 2 plug valve 2	Fair/Average	2	2
308	Secondary Clarifier 2 plug valve 3	Fair/Average	2	2
309	Secondary Clarifier 2 plug valve 4	Fair/Average	2	2
310	Secondary Clarifier 2 Sludge Pump	Poor	5	13
311	Secondary Clarifier drive 1	Excellent	4	4
312	Secondary Clarifier drive 2	Fair/Average	4	12
313	Secondary Clarifier knife gate valve	Fair/Average	2	3
315	Secondary Influent VFD1	Fair/Average	3	2
316	Secondary Influent VFD2	Fair/Average	3	2
317	Secondary Influent VFD3	Excellent	3	1
318	Secondary Influent VFD4	Fair/Average	3	2
319	Secondary Motor control panel	Poor	4	8
320	Secondary Sludge Pump Bldg.	Good	3	6
314	Secondary Sludge Pump Bldg. heater	Fair/Average	4	12
321	Security Lighting system	Good	1	2
322	Service water pump 1	Good	3	2
323	Service water pump 2	Good	3	2
324	Service water pump 3	Good	1	1
325	Sigma 1600 Liquid Sampler 1/Raw	Fair/Average	3	12
326	Sigma 1600 Liquid Sampler 2/PE	Fair/Average	2	2
327	Sigma 1600 Liquid Sampler 3/FE	Fair/Average	3	12
328	Sludge Pump House motor control panel MCCFG	Fair/Average	3	9
329	Sludge removal catwalk	Excellent	1	1
330	Sludge removal Plug Valve	Good	1	2
331	Sludge Storage Tank East	Good	3	2
332	Sludge Storage Tank North	Good	3	2
333	Sludge Storage Tank South	Good	3	2
334	Sludge Storage Tank West	Good	3	2
335	Small garage	Good	2	4
336	Small Garage 1/2 ton hoist	Good	1	1
337	Small garage diesel tank	Good	1	2
338	Small garage fume hood	Excellent	1	1
339	Small garage Unit Heater 3	Fair/Average	3	12
340	Solar Spark Vent Flare 2	Excellent	2	2
341	Stir Plate	Good	2	4
342	Suction valve RSP 1	Fair/Average	3	1
343	Suction valve RSP 2	Fair/Average	3	1

#	ASSETS	CONDITION	CRITICALITY/ CONSEQUENCE OF FAILURE (COF) (1-5)	BUSINESS RISK
344	Suction valve RSP 3	Fair/Average	3	1
345	Suction valve RSP 4	Fair/Average	3	1
346	Switch Gear Automatic Transfer Switch	Excellent	3	3
252	Thermostar-Orion switchbox	Excellent	2	2
347	Trickling Filter 1	Good	3	3
348	Trickling Filter 1 Blower 1	Poor	4	10
349	Trickling Filter 1 Blower 2	Excellent	4	1
350	Trickling Filter 1 Gear-Reducing Drive	Fair/Average	5	8
351	Trickling Filter 1 Inlet Gate Valve	Good	3	6
352	Trickling Filter 1 Mechanism VFD	Fair/Average	2	3
353	Trickling Filter 1-2 Inlet Isolation Gate Valve	Good	3	6
354	Trickling Filter 2	Good	3	3
355	Trickling Filter 2 Blower 1	Poor	4	10
356	Trickling Filter 2 Blower 2	Good	4	2
357	Trickling Filter 2 Gear-Reducing Drive	Fair/Average	5	8
358	Trickling Filter 2 Inlet Gate Valve	Good	3	6
359	Trickling Filter 2 Mechanism VFD	Fair/Average	2	3
360	Trickling Filter Eff. Sluice gate 1	Excellent	2	1
361	Trickling Filter Eff. Sluice gate 2	Excellent	2	1
362	Trickling Filter Eff. Sluice gate 3	Good	2	4
363	Vacuum Pump 1	Excellent	1	1
364	Vacuum Pump 2	Excellent	1	1
365	VFD RSP2	Fair/Average	3	3
366	VFD RSP3	Good	2	1
367	VFD RSP4	Excellent	2	1
368	VFD1 Pump station 1	Fair/Average	4	6
369	VFD1 Pump station 2	Excellent	2	1
370	VFD2 Pump station 1	Excellent	3	2
371	VFD2 pump station 2	Excellent	2	1
372	W. Sludge storage Decanting plug valve 1	Poor	3	3
373	W. Sludge storage Decanting plug valve 2	Poor	3	3
374	W. Sludge storage Decanting plug valve 3	Poor	3	3
375	W. Sludge storage Decanting plug valve 4	Poor	3	3
376	W. Sludge storage Inlet plug valve 5	Poor	2	2
377	Water Bath Incubator (280 Series)	Good	3	9
378	Water Heater	Excellent	2	2
379	Weil McLane Boiler	Good	3	2
380	Wet Well 1-Ton Hoist	Fair/Average	1	3
381	YSI Dissolved Oxygen Instrument	Excellent	2	2

APPENDIX B – Level of Service Goals

Typical Industry Metrics and Recommendations for the Saint Clair County Wastewater Treatment Plant

ID	Type	Level of Service (LoS) Categories	LoS Goals	Key Performance Measure (KPM)	Key Performance Indicator (KPI)	Units	Actual Performance	KPI Achieved (Yes/No)
1	Cs	Operating Cost Effectiveness	Meet Service Requirements with Economic Efficiency	$ cost of cleaning lift stations / MG	$10.00	$/MG	6.43	Yes
8	Cs	Preventative Maintenance	Provide Reliable Service and Infrastructure	(# manhole inspections / # of manholes) x 100	100%	%	100%	Yes
12	Ps	Equipment Calibration	Provide Reliable Service and Infrastructure	# Flow meter calibrations / flow meters	1	# calibrations	1.00	Yes
14	Ps	Pump Rehabilitation	Provide Reliable Service and Infrastructure	(# of pumps replaced / total # of pumps) x 100	>=9	(%)	9%	Yes
17	Ps	Pump Station Inspection	Provide Reliable Service and Infrastructure	# of pump station inspections / # of pump stations	>52	# inspections/ # PS	65	Yes
18	Ps	Pump Station Reliability	Provide Reliable	(# of pump station failures / # of pump stations) x 100	0	(%)	0.0%	Yes

ID	Type	Level of Service (LoS) Categories	LoS Goals	Key Performance Measure (KPM)	Key Performance Indicator (KPI)	Units	Actual Performance	KPI Achieved (Yes/No)
			Service and Infrastructure					
20	Ps	Operating Cost Effectiveness	Meet Service Requirements with Economic Efficiency	CCF Digester Gas Produced / MG	>75	CCF/MG	78.47	Yes
21	Ts	Customer Satisfaction	Provide Good Customer Service	# of wastewater related odor complaints / 1000 service connections	<=0.33	# complaints/1,000 connections	0.00	Yes
29	Ts	Operating Cost Effectiveness	Meet Service Requirements with Economic Efficiency	$ cost Polymer / MG	<7	$ /MG	6.61	Yes
31	Ts	Environmental Compliance	Protect the Environment	# of regulated tests out of compliance	0	# tests	0.00	Yes
34	Ts	Employees per Activity	Provide a Safe and Productive Workplace	# WWTP non-supervisory employee hours / MGY 2017 treated	>8.5	# employee hours /MGY	8.77	Yes
35	Ts	Treatment Capacity	Provide Adequate Capacity	(# MGD average daily flow / # MGD design capacity) X 100	<60%	%	50.40	Yes

APPENDIX C – Revenue Gap Analysis and Sewer Rate Ordinance

St. Clair County Department of Public Works

2018 WWTP Operational Budget

Operational Expenses:	2018 Amended Budget
Salaries	$ 215,000
Benefits	$ 215,000
Laboratory Supplies	$ 3,000
Operational Chemicals	$ 70,000
Tools and Supplies	$ 2,000
Custodial Supplies	$ 1,000
Office Supplies	$ 1,000
Professional services - Audit	$ 9,000
Professional services - Other	$ 40,000
Telephone	$ 4,000
Fuel- Gas and Diesel	$ 2,000
Travel and Education	$ 1,000
Memberships and dues	$ 1,000
Licenses and Permits	$ 10,000
Insurance	$ 30,000
Electricity	$ 82,000
Natural Gas	$ 11,000
Water	$ 19,000
Building and Grounds Maintenance	$ 10,000
Plant Equipment Maintenance	$ 30,000

Vehicle Maintenance	$ 7,000
Miscellaneous	$ 1,000
Administration	$ 7,000
Total WWTP Operational Expenses Supported by Rates	$ 771,000
Operational Rate Revenue (a):	
City of Algonac	$ 337,048
Clay Township	$ 281,101
Ira Township	$ 152,851
Total WWTP Operational Rate Revenue Supported by Rates	$ 771,000
GAP	$ - 0 -

(a) *Based on estimated annual flow percentages:*

Allocation of Operation Costs:	Algonac	Clay	Ira	Total
(Using Annual Flow Percentages)				
January 1, 2017 - March 31, 2017	41.299%	36.710%	21.991%	100.000%
April 1, 2017 - June 30, 2017	43.633%	35.331%	21.036%	100.000%
July 1, 2017 - September 30, 2017	45.455%	39.090%	15.455%	100.000%
October 1, 2017 - December 31, 2017	44.476%	34.706%	20.818%	100.000%
12 month Average	43.716%	36.459%	19.825%	100.000%

2014 Contract Extension that determines Equipment Replacement percentage rates to participating communities.

2014 SDI WWTP
Contract extension.|

COUNTY OF ST. CLAIR

ROAD COMMISSION • PUBLIC WORKS

21 Airport Drive • St. Clair, Michigan 48079-1404

Phone: (810) 364-5720 • Fax: (810) 364-9050

E-Mail: roads@stclaircounty.org • Website: www.sccrc-roads.org

COMMISSIONERS: William L. Blumerich, Kenneth C. Foerster, Timothy J. LaLonde

December 3, 2018

Revolving Loan Section
Office of Drinking Water & Municipal Assistance
Michigan Dept. of Environmental Quality
PO Box 30817
Lansing, MI 48909-8311

To whom it may concern:

Please find attached a Request for Disbursement of Funds from the Wastewater (SAW) Grant Program for the St. Clair County Department of Public Works Waste Water Treatment Plant (Project #1091-01).

Respectfully,
ST. CLAIR COUNTY
BOARD OF PUBLIC WORKS

Greg Owens
Director of Internal Services

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY – DRINKING WATER AND MUNICIPAL ASSISTANCE DIVISION
REVOLVING LOAN SECTION

STORMWATER / ASSET MANAGEMENT / WASTEWATER (SAW) GRANT PROGRAM
REQUEST FOR DISBURSEMENT OF FUNDS

THIS INFORMATION IS REQUIRED UNDER AUTHORITY OF PARTS 52 AND 53, 1994 PA 451, AS AMENDED.

DOCUMENTATION TO SUPPORT THE INCURRED COSTS MUST BE INCLUDED WITH EACH REQUEST
PLEASE SEE OTHER SIDE FOR INSTRUCTIONS TO COMPLETE REQUEST

A. Project #	B. Request #	C. Period Covered by Request	D. Request Type	E. Grantee's EIN	F. Grant Amount
1091-01	2	01/01/17 (M/D/Y) to 11/30/18 (M/D/Y)	☐ partial XX final	38-3060468	$68,130

G. Grantee Name: Kirk D. Weston, Director		Phone # 810-364-5720
Address: 21 Airport Drive, St. Clair, MI 48079	Email: kweston@stclaircounty.org	
H. Grantee's Bank Name: Chemical Bank		Phone # 810-985-0443
Address: 525 Water Street, Port Huron, MI 48060		
Account Name: DPW General Revolving Fund	ABA # 072410013	Account # 508715323
Special Instructions:		

I. Budget Items (Include Eligible Costs Only Using Dollars and Cents)	Requested Incurred Costs This Period	Cumulative Costs Incurred To Date
1. PROJECT PLANNING COSTS (for SRF plans, USDA-RD Preliminary Engineering Reports, or Project Proposal)	$	$
2. DESIGN ENGINEERING COSTS	$	$
3. RATE METHODOLOGY DEVELOPMENT COSTS (awarded under planning or design grant)	$	$
4. WASTEWATER ASSET MANAGEMENT PLAN COSTS	$ 42,813.43	$ 75,700.00
5. STORMWATER ASSET MANAGEMENT PLAN COSTS	$	$
6. STORMWATER MANAGEMENT PLAN COSTS (Nonpoint Source Watershed Management Plans)	$	$
7. INNOVATIVE WASTEWATER OR STORMWATER TECHNOLOGY COSTS	$	$
8. DISADVANTAGED COMMUNITY CONSTRUCTION COSTS	$	$
9. TOTAL CUMULATIVE AMOUNT FOR PERIOD COVERED BY THIS REQUEST (add totals in 1st column)	$ 42,813.43	
10. TOTAL CUMULATIVE ELIGIBLE COSTS INCURRED TO DATE (add totals in 2nd column)		$ 75,700.00
11. LESS LOCAL MATCH (if applicable)		($ 7,570.00)
12. LESS AMOUNT PREVIOUSLY DISBURSED		($ 29,597.91)
13. AMOUNT REQUESTED FOR DISBURSEMENT		$ 38,532.09

J. For each request, describe the scope of work completed to date. Attach separate sheet if more space is needed. Discuss the progress made on the services not yet complete and a schedule for their completion by the grant period end date. The grant agreement cannot exceed three (3) years from your grant agreement date.

PLEASE SEE ATTACHED

I certify that I am an authorized representative of the grantee and am authorized to make the following certifications on behalf of the grantee: (i) there is no pending litigation or event which will materially and adversely affect the project or the prospects for its completion; (ii) the representations, warranties and covenants contained in the grant agreement for the obligations pursuant to which this request for disbursement is submitted continue to be true and accurate in all material respects as of the date hereof; (iii) to the best of my knowledge and belief, the costs above were incurred in accordance with the terms of the grant agreement and the application for assistance for this project; and (iv) the amount requested for disbursement has not previously been requested.

Authorized Representative Name (Print or Type): Kirk D. Weston **Title:** Managing Director

Authorized Representative Signature (Original): [signature] **Date:** 12/3/18

EMAIL THIS COMPLETED REQUEST TO YOUR DEQ PROJECT MANAGER OR MAIL TO THE ADDRESS SHOWN ON THE REVERSE SIDE

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY – OFFICE OF DRINKING WATER AND MUNICIPAL ASSISTANCE
REVOLVING LOAN SECTION

STORMWATER / ASSET MANAGEMENT / WASTEWATER (SAW) GRANT PROGRAM
REQUEST FOR DISBURSEMENT OF FUNDS

THIS INFORMATION IS REQUIRED UNDER AUTHORITY OF PARTS 52 AND 53, 1994 PA 451, AS AMENDED.

DOCUMENTATION TO SUPPORT THE INCURRED COSTS MUST BE INCLUDED WITH EACH REQUEST
PLEASE SEE OTHER SIDE FOR INSTRUCTIONS TO COMPLETE REQUEST

A. Project #	B. Request #	C. Period Covered by Request	D. Request Type	E. Grantee's EIN	F. Grant Amount
1091-01	1	06/01/15 to 12/31/16 (M/D/Y) (M/D/Y)	XX partial ☐ final	38-3060468	$68,130.00

G. Grantee Name: Kirk Weston, Director		Phone # 810-364-5720
Address: 21 Airport Drive, St. Clair, MI 48079	Email: kweston@stclaircounty.org	
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Address: 525 Water Street, Port Huron, MI 48060		
Account Name: DPW General Revolving Fund	ABA #072410013	Account #508715323
Special Instructions:		

I. Budget Items (Include Eligible Costs Only Using Dollars and Cents)	Requested Incurred Costs This Period	Cumulative Costs Incurred To Date
1. PROJECT PLANNING COSTS (for SRF plans, USDA-RD Preliminary Engineering Reports, or Project Proposal)	$	$
2. DESIGN ENGINEERING COSTS	$	$
3. RATE METHODOLOGY DEVELOPMENT COSTS (awarded under planning or design grant)	$	$
4. WASTEWATER ASSET MANAGEMENT PLAN COSTS	$ 32,886.57	$ 32,886.57
5. STORMWATER ASSET MANAGEMENT PLAN COSTS	$	$
6. STORMWATER MANAGEMENT PLAN COSTS (Nonpoint Source Watershed Management Plans)	$	$
7. INNOVATIVE WASTEWATER OR STORMWATER TECHNOLOGY COSTS	$	$
8. DISADVANTAGED COMMUNITY CONSTRUCTION COSTS	$	$
9. TOTAL CUMULATIVE AMOUNT FOR PERIOD COVERED BY THIS REQUEST (add totals in 1st column)	$ 32,886.57	
10. TOTAL CUMULATIVE ELIGIBLE COSTS INCURRED TO DATE (add totals in 2nd column)		$ 32,886.57
11. LESS LOCAL MATCH (if applicable)		($ 3,288.66)
12. LESS AMOUNT PREVIOUSLY DISBURSED		($ 0.00)
13. AMOUNT REQUESTED FOR DISBURSEMENT		$29,597.91

J. For each request, describe the scope of work completed to date. Attach separate sheet if more space is needed. Discuss the progress made on the services not yet complete and a schedule for their completion by the grant period end date. The grant agreement cannot exceed three (3) years from your grant agreement date.

PLEASE SEE ATTACHED

I certify that I am an authorized representative of the grantee and am authorized to make the following certifications on behalf of the grantee: (i) there is no pending litigation or event which will materially and adversely affect the project or the prospects for its completion; (ii) the representations, warranties and covenants contained in the grant agreement for the obligations pursuant to which this request for disbursement is submitted continue to be true and accurate in all material respects as of the date hereof; (iii) to the best of my knowledge and belief, the costs above were incurred in accordance with the terms of the grant agreement and the application for assistance for this project; and (iv) the amount requested for disbursement has not previously been requested.

Authorized Representative Name (Print or Type): Kirk Weston **Title:** Director

Authorized Representative Signature (Original): [signature] **Date:** 04/24/18

EMAIL THIS COMPLETED REQUEST TO YOUR DEQ PROJECT MANAGER OR MAIL TO THE ADDRESS SHOWN ON THE REVERSE SIDE

2018 WWTP SAW Grant
Asset Management Plan Summary
2015-2018 Expenses

Vendor	Invoice #	Invoice Date	Invoice Amount	Description of activity
CTI	42784	06/07/2016	$ 8,472.90	GAP Analysis
CTI	43000	09/01/2016	$ 6,324.30	Asset Management Plan (AMP) - Fixed Asset Data
PCE	16091-01	07/14/2016	$ 2,615.00	AMP-Survey Outfall, pump stations, buildings; GIS Data Processing
PCE	16091-021	08/31/2016	$ 750.00	AMP-Survey Outfall, pump stations, buildings; GIS Data Processing; Outfall manhole Inspection; WWTP Building GPD Elevation
PCE	16135-03	10/18/2016	$ 1,000.00	AMP-Survey Outfall, pump stations, buildings; GIS Data Processing; Outfall manhole Inspection; WWTP Building GPD Elevation
PCE	16091-04	11/30/2016	$ 650.00	AMP-Survey Outfall, pump stations, buildings; GIS Data Processing; Outfall manhole Inspection; WWTP Building GPD Elevation
CTI	43362	01/30/2017	$ 28,090.00	AMP - Fixed Asset Data, OM&R & Rate Sufficiency
CTI	43969	09/22/2017	$ 7,057.26	AMP Reporting, OM&R & Rate Sufficiency
CTI	44184	12/03/2017	$ 5,041.46	AMP Reporting
PCE	16091-05	03/20/2017	$ 2,485.00	AMP-Survey Outfall, pump stations, buildings; GIS Data Processing; Outfall manhole Inspection; WWTP Building GPD Elevation
			$ 62,485.92	2015-2018 Outside Consultants
			$ 17,864.24	2015-2018 Staff labor assisting in AMP
			$ 80,350.16	**Total 2015-2018 AMP Outside Consultants & staff labor costs incurred**
			$ (32,886.57)	Less Request #1 (2015-2016) submitted 04/24/18
			$ 47,463.59	Remaining 2017-2018 Outside Consultant and staff labor costs
			$ (4,650.16)	Less excess costs over $75,700 total grant
			$ 42,813.43	Request #2 - FINAL (2017-2018) submitted 12/03/18

DEQ SAW Grant Rate Methodology Development Costs

(Line 3 on Application)

Date	Employee	Hours	Hourly Wage Rate	Hourly Fringe Rate	Total
06/10/2015	Laidlaw, Alex	2.5	$ 10.000	$ 10.000	$ 50.00
06/11/2015	Laidlaw, Alex	10.0	$ 10.000	$ 10.000	$ 200.00
06/12/2015	Laidlaw, Alex	10.0	$ 10.000	$ 10.000	$ 200.00
06/16/2015	Laidlaw, Alex	10.0	$ 10.000	$ 10.000	$ 200.00
06/17/2015	Laidlaw, Alex	10.0	$ 10.000	$ 10.000	$ 200.00
06/18/2015	Laidlaw, Alex	10.0	$ 10.000	$ 10.000	$ 200.00
06/19/2015	Laidlaw, Alex	10.0	$ 10.000	$ 10.000	$ 200.00
06/23/2015	Laidlaw, Alex	10.0	$ 10.000	$ 10.000	$ 200.00
06/24/2015	Laidlaw, Alex	10.0	$ 10.000	$ 10.000	$ 200.00
06/25/2015	Laidlaw, Alex	10.0	$ 10.000	$ 10.000	$ 200.00
06/26/2015	Laidlaw, Alex	10.0	$ 10.000	$ 10.000	$ 200.00
06/30/2015	Laidlaw, Alex	10.0	$ 10.000	$ 10.000	$ 200.00
07/01/2015	Laidlaw, Alex	10.0	$ 10.000	$ 10.000	$ 200.00
07/02/2015	Laidlaw, Alex	10.0	$ 10.000	$ 10.000	$ 200.00
07/06/2015	Laidlaw, Alex	10.0	$ 10.000	$ 10.000	$ 200.00
07/07/2015	Laidlaw, Alex	10.0	$ 10.000	$ 10.000	$ 200.00
07/08/2015	Laidlaw, Alex	10.0	$ 10.000	$ 10.000	$ 200.00
07/09/2015	Laidlaw, Alex	10.0	$ 10.000	$ 10.000	$ 200.00
07/14/2015	Laidlaw, Alex	10.0	$ 10.000	$ 10.000	$ 200.00
07/15/2015	Laidlaw, Alex	10.0	$ 10.000	$ 10.000	$ 200.00
07/16/2015	Laidlaw, Alex	10.0	$ 10.000	$ 10.000	$ 200.00
07/17/2015	Laidlaw, Alex	10.0	$ 10.000	$ 10.000	$ 200.00
07/21/2015	Laidlaw, Alex	10.0	$ 10.000	$ 10.000	$ 200.00
07/22/2015	Laidlaw, Alex	10.0	$ 10.000	$ 10.000	$ 200.00
07/23/2015	Laidlaw, Alex	10.0	$ 10.000	$ 10.000	$ 200.00
07/24/2015	Laidlaw, Alex	10.0	$ 10.000	$ 10.000	$ 200.00
07/28/2015	Laidlaw, Alex	10.0	$ 10.000	$ 10.000	$ 200.00
07/29/2015	Laidlaw, Alex	10.0	$ 10.000	$ 10.000	$ 200.00
07/30/2015	Laidlaw, Alex	10.0	$ 10.000	$ 10.000	$ 200.00
07/31/2015	Laidlaw, Alex	10.0	$ 10.000	$ 10.000	$ 200.00
08/04/2015	Laidlaw, Alex	10.0	$ 10.000	$ 10.000	$ 200.00
08/05/2015	Laidlaw, Alex	10.0	$ 10.000	$ 10.000	$ 200.00
08/06/2015	Laidlaw, Alex	10.0	$ 10.000	$ 10.000	$ 200.00
08/07/2015	Laidlaw, Alex	10.0	$ 10.000	$ 10.000	$ 200.00
08/11/2015	Laidlaw, Alex	10.0	$ 10.000	$ 10.000	$ 200.00
08/12/2015	Laidlaw, Alex	10.0	$ 10.000	$ 10.000	$ 200.00
08/13/2015	Laidlaw, Alex	10.0	$ 10.000	$ 10.000	$ 200.00
08/14/2015	Laidlaw, Alex	10.0	$ 10.000	$ 10.000	$ 200.00
08/18/2015	Laidlaw, Alex	10.0	$ 10.000	$ 10.000	$ 200.00
08/19/2015	Laidlaw, Alex	10.0	$ 10.000	$ 10.000	$ 200.00
08/20/2015	Laidlaw, Alex	10.0	$ 10.000	$ 10.000	$ 200.00
08/21/2015	Laidlaw, Alex	10.0	$ 10.000	$ 10.000	$ 200.00
		412.5			$ 8,250.00 2015 Labor

DEQ SAW Grant Rate Methodology Development Costs

(Line 3 on Application)

Date	Employee	Hours	Hourly Wage Rate	Hourly Fringe Rate	Total	
07/20/2016	Roy, Brian	7.0	$ 27.268	$ 27.268	$ 381.75	
07/20/2016	Cucchiara, Nick	5.0	$ 36.360	$ 36.360	$ 363.60	
07/20/2016	Barnowski, Eric	7.0	$ 23.577	$ 23.577	$ 330.08	
08/03/2016	Cucchiara, Nick	8.0	$ 36.360	$ 36.360	$ 581.76	
08/03/2016	Bekes, David	3.0	$ 23.158	$ 23.158	$ 138.95	
08/04/2016	Roy, Brian	4.0	$ 27.268	$ 27.268	$ 218.14	
08/04/2016	Barnowski, Eric	4.0	$ 23.577	$ 23.577	$ 188.62	
08/09/2016	Bekes, David	4.0	$ 23.158	$ 23.158	$ 185.26	
08/09/2016	Roy, Brian	4.0	$ 27.268	$ 27.268	$ 218.14	
08/10/2016	Roy, Brian	3.0	$ 27.268	$ 27.268	$ 163.61	
08/10/2016	Bekes, David	3.0	$ 23.158	$ 23.158	$ 138.95	
08/10/2016	Cucchiara, Nick	2.0	$ 36.360	$ 36.360	$ 145.44	
08/11/2016	Roy, Brian	1.0	$ 27.268	$ 27.268	$ 54.54	
08/11/2016	Bekes, David	3.0	$ 23.158	$ 23.158	$ 138.95	
08/11/2016	Barnowski, Eric	2.0	$ 23.577	$ 23.577	$ 94.31	
08/11/2016	Cucchiara, Nick	2.0	$ 36.360	$ 36.360	$ 145.44	
08/12/2016	Barnowski, Eric	2.0	$ 23.577	$ 23.577	$ 94.31	
08/13/2016	Barnowski, Eric	3.0	$ 23.577	$ 23.577	$ 141.46	
08/15/2016	Cucchiara, Nick	1.0	$ 36.360	$ 36.360	$ 72.72	
08/16/2016	Cucchiara, Nick	4.0	$ 36.360	$ 36.360	$ 290.88	
08/17/2016	Barnowski, Eric	4.0	$ 23.577	$ 23.577	$ 188.62	
08/17/2016	Roy, Brian	4.0	$ 27.268	$ 27.268	$ 218.14	
08/17/2016	Bekes, David	4.0	$ 23.158	$ 23.158	$ 185.26	
08/17/2016	Cucchiara, Nick	2.0	$ 36.360	$ 36.360	$ 145.44	
					$ 4,824.37	2016 Labor
08/09/2017	Cucchiara, Nick	4.0	$ 37.270	$ 37.270	$ 298.16	
08/09/2017	Roy, Brian	1.0	$ 27.950	$ 27.950	$ 55.90	
08/09/2017	Barnowski, Eric	1.0	$ 24.166	$ 24.166	$ 48.33	
08/09/2017	Bekes, David	3.0	$ 23.737	$ 23.737	$ 142.42	
01/10/2018	Roy, Brian	10.0	$ 27.950	$ 27.950	$ 559.00	
01/10/2018	Barnowski, Eric	10.0	$ 24.166	$ 24.166	$ 483.32	
01/10/2018	Cucchiara, Nick	5.0	$ 37.270	$ 37.270	$ 372.70	
01/11/2018	Roy, Brian	10.0	$ 27.950	$ 27.950	$ 559.00	
01/11/2018	Barnowski, Eric	10.0	$ 24.166	$ 24.166	$ 483.32	
01/11/2018	Cucchiara, Nick	5.0	$ 37.270	$ 37.270	$ 372.70	
01/18/2018	Roy, Brian	10.0	$ 27.950	$ 27.950	$ 559.00	
01/18/2018	Barnowski, Eric	10.0	$ 24.166	$ 24.166	$ 483.32	
01/18/2018	Cucchiara, Nick	5.0	$ 37.270	$ 37.270	$ 372.70	
		170.0			$ 4,789.87	2017-2018 Labor
					$17,864.24	Total Labor

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date November 13, 2018
(no later than 3 years from executed grant date)

The St. Clair County Department of Public Works (*legal name of grantee*) certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1091-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or No No

   If No - Date of the rate methodology approval letter: December 10, 2018.

2) Significant Progress Made: Yes or No

   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)

3) Date of rate methodology review letter identifying the gap:_________________________.

4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on____________________________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Nicholas Cucchiara	at	810-794-7875	ncucchiara@stclaircounty.org
Name		Phone Number	Email

[signature] 12/11/18

Signature of Authorized Representative (Original Signature Required) Date

Kirk D. Weston, Managing Director

Print Name and Title of Authorized Representative

City of St. Clair
547 N. Carney Drive
St. Clair, MI 48079
(810) 329-7121
Michael Booth, mbooth@cityofstclair.com
http://www.cityofstclair.com/departments/superintendent/

Overview

The City of St. Clair is home to over 5,000 residents in an area comprising 3.6 square miles. The City has a separated wastewater and stormwater system for which the condition is not readily known. This led City Council to apply for a grant through the Michigan Department of Environmental Quality (MDEQ) Stormwater, Asset Management, and Wastewater (SAW) Program.

The City of St. Clair was awarded a grant for $468,628, with a local match of $52,070 to investigate and evaluate the City's stormwater assets. With the grant the City engaged Anderson, Eckstein and Westrick (AEW) to investigate and develop a Stormwater Asset Management Plan (AMP). Through development and implementation of this plan, the insight and understanding of the stormwater system can be significantly improved. A comprehensive investigation included inventory and inspection of stormwater assets, condition assessment of assets, capital improvement needs, and enhancement of the existing Geographic Information System (GIS) which includes mapping, database, and system information.

Asset Inventory/Condition Assessment

St. Clair's stormwater assets include over 23.1 miles of enclosed sewer and 1,810 stormwater structures. A condition assessment was performed on the City's stormwater sewers and structures. The condition assessment for the storm sewer was performed by means of Closed Circuit Television (CCTV) while investigation of stormwater structures was performed by means of visual assessment.

Criticality Analysis

Assets were then analyzed to determine their Probability of Failure (POF) and Consequence of Failure (COF). The POF of an asset takes into account the condition rating while the COF takes into account financial, safety and environmental impacts. POF and COF scores were determined for each asset and then multiplied together resulting in the Business Risk Exposure (BRE) score, also known as the criticality score. The BRE score is used to prioritize what assets are most critically in need of repair. Any asset with a BRE score of 16 or greater is considered critical by the MDEQ.

Based on the current assessments, the following assets are considered critical:

- 38 stormwater sewer segments (over 2,000 feet)
- 8 stormwater structures

Level of Service

To reasonably serve the City of St. Clair a desired LOS must be established. In terms of the City's stormwater system, the LOS would be the satisfaction of the residents, business owners and property owners. There are many factors that can affect the perceived LOS of the system including sewer backups, which can result in both street, yard and basement flooding.

St. Clair's stormwater system is currently operating at a satisfactory LOS and will continue to do so through continued maintenance, rehabilitation and replacement of its assets as presented in the Asset Management Plan and Capital Improvement Plan.

Capital Improvement Plan

Based on the condition assessment and criticality analysis, a cost estimate was created for all sewer pipes and structures. The City ultimately decided that the assets in need of the most immediate repair were pipe with a PACP rating of 4 or 5 and structures that received a BRE score of 13 or greater. The estimated cost to repair all of the critical stormwater assets in the City is $732,000. The City has decided to allot approximately $120,000 per year for 6 years to repair the critical assets. Contingency costs, as well as costs to keep the AMP updated, have been included in the annual cost.

This summary provides a brief overview of the investigation, and evaluation of the system assets, condition, operation and needs. A more comprehensive discussion can be found in the Stormwater Asset Management Plan.

City of St. Clair
547 N. Carney Drive
St. Clair, MI 48079
(810) 329-7121
Michael Booth, mbooth@cityofstclair.com
http://www.cityofstclair.com/departments/superintendent/

St. Clair Critical Assets

No.	Asset I.D.	Asset Type
1	SW2399	Burried Pipe
2	SW2410	Burried Pipe
3	SW2409	Burried Pipe
4	SW2549	Burried Pipe
5	SW2806	Burried Pipe
6	SW1459	Burried Pipe
7	SW1464	Burried Pipe
8	SW1463	Burried Pipe
9	SW1530	Burried Pipe
10	SW1532	Burried Pipe
11	SW1535	Burried Pipe
12	SW1516	Burried Pipe
13	SW1604	Burried Pipe
14	SW1568	Burried Pipe
15	SW2447	Burried Pipe
16	SW2372	Burried Pipe
17	SW2234	Burried Pipe
18	SW1815	Burried Pipe
19	SW2303	Burried Pipe
20	SW1414	Burried Pipe
21	SW1407	Burried Pipe
22	SW1393	Burried Pipe
23	SW1586	Burried Pipe
24	SW1591	Burried Pipe
25	SW2613	Burried Pipe
26	SW2091	Burried Pipe
27	SW1557	Burried Pipe
28	SW1718	Burried Pipe
29	SW2528	Burried Pipe
30	SW1352	Burried Pipe
31	SW2326	Burried Pipe
32	SW2601	Burried Pipe
33	SW2602	Burried Pipe
34	SW2603	Burried Pipe
35	SW2719	Burried Pipe
36	SW1567	Burried Pipe
37	SW2522	Burried Pipe
38	SW1733	Burried Pipe
39	PR-7-4W	Catch Basin
40	PR-7-2W	Catch Basin
41	JC-10-7	Catch Basin
42	JC-10-4W	Catch Basin
43	PR-18-8	Catch Basin
44	PR-17-1-3	Catch Basin
45	PR-17-1-4	Catch Basin
46	JC-9-11SE	Catch Basin

DEQ

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

RECEIVED
NOV 26 2018

Completion Due Date November 30, 2018
(no later than 3 years from executed grant date)

The City of St. Clair *(legal name of grantee)* certifies that all stormwater asset management plan (SWAMP) activities specified in SAW Grant No. 1592-01 have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SWAMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

Michael Booth	at	(810) 329-7172	mbooth@cityofstclair.com
Name		Phone Number	Email

11-30-18

Signature of Authorized Representative (Original Signature Required) Date

Michael Booth, City Superintendent
Print Name and Title of Authorized Representative

STERLING RELIEF DRAINAGE DISTRICT
STERLING RELIEF DRAIN
ASSET MANAGEMENT PLAN

200-16347-14001

SAW No. 1208-01

November 2018

Sterling Relief Drainage District

Sterling Relief Drain Asset Management Plan

November 2018

Macomb County, MI
Department of Public Works
21777 Dunham Road
Clinton Township, MI 48036
586-469-5325

EXECUTIVE SUMMARY

In 2015, the Sterling Relief Drainage District was awarded a Stormwater-Asset Management-Wastewater (SAW) grant by the Michigan Department of Environmental Quality (MDEQ) to conduct management and design services for the Sterling Relief Drain (Drain) stormwater system. An asset management plan is a document that assists a municipal utility in understanding the condition of its assets and plan for sustaining the same assets. The plan demonstrates how the County's goal of establishing & delivering certain levels of service may be achieved through effective and sustainable management of the stormwater system. By developing a proactive, long-term plan for stormwater asset management, the County will have a sustainable system that can be partnered with other County plans to ensure the well-being of the community, environment and future generations.

This AMP includes all assets within the Drain system. Best practices suggest an AMP should include four core elements:

1. Asset Inventory
2. Level of Service
3. Criticality
4. Capital Improvement Plan

Asset Inventory

The existing MCPWO GIS information was used as a basis for the inventory, and was augmented with survey data, detailed equipment and collection system asset inventories, and cost opinions. The value of the MCPWO's entire Drain infrastructure exceeds $36 million. Approximately 87% of the system cost is associated with underdrains and culverts. Table I-1 summarizes the quantity and baseline system replacement value (in 2018 dollars).

Table I-1 - Drain System Asset Summary and Cost

Asset Description	Quantity (unit)	Baseline System Value (2018 Dollars)
Underdrain	28,290 (feet)	$12,472,000
Catch Basin Leads & Tap Lines	4,390 (feet)	$408,000
Culverts	5,375 (feet)	$14,900,000
Manholes and Structures	126 (each)	$1,049,000
Inlets/Outlets	33 (each)	$390,000
Outfalls	2 (each)	$501,000
Open Channel	121.7 (acres)	$5,338,000
ROW Fence	54,320 (feet)	$1,320,000
ROW Access	15 (each)	$158,000
	Total Drain Value	**$36,536,000**

Level of Service

Level of Service is a measure of the amount and/or quality of the public facility which must be provided to meet that community's basic needs & expectations. The level of service element encompasses those Drain system goals that the MCPWO will attempt to maintain throughout the implementation of the AMP. These goals include providing a system that meets their permitted regulatory standards, communicating these goals with residents, and maintaining their Drain system in a manner to avoid flooding and functionality of the Drain.

Criticality

Criticality of assets is used to prioritize future improvements. Criticality is measured by use of a numerical score called Business Risk Exposure (BRE), which accounts for the following factors: Consequence of Failure (COF) and Probability of Failure (POF). The COF and POF were determined for each asset through the collection of condition assessment information. Using COF and POF, a Business Risk Evaluation (BRE) was determined. The BRE assists in determining the highest risk assets within the Drain and thus the assets to receive the highest priority for capital improvements.

In many cases, assets were inspected in order to prepare condition assessments. However, in some cases, survey limitations (plugged/blocked pipe, poor conditions in upstream or downstream structures, structures that could not be located, structures filled with water, etc.) prevented the collection of asset information. When an asset was not inspected, its condition, when available, was inferred based upon the previously compiled Sterling Relief Channel Inventory report from 2005.

Capital Improvement Plan

A 20-year capital improvement plan was developed for the Drain using the results of the business risk evaluation conducted in this AMP. The capital improvement plan identifies areas in the system where funding should be spent on system infrastructure over the next 20 years. This capital improvement plan should be routinely updated to ensure that it includes short- and long-term needs and will provide the MCPWO with defensible documentation for setting aside and safeguarding funds for projects. Table I-2 illustrates the projects included in the 20-year CIP.

Table ES-2 - Sterling Drain System Capital Improvement Projects (2018-2038)

MCPWO 20-year Capital Improvement Plan (2018-2038)			
Project Number	Description	Project Year	Project Cost
SD-County-01	2019 County-Performed CIP Work	2019	$68,250
SD-Contracted-01	2019 Contractor-Performed CIP Work	2019	$130,000
SD-County-02	2020 County-Performed CIP Work	2020	$15,000
SD-Contracted-02	2020 Contractor-Performed CIP Work	2020	$76,400
SD-Contracted-03	2023 Contractor-Performed CIP Work	2023	$129,350
SD-LongTerm-01	Ten-Year Long-Term CIP Work	2028	$151,000
SD-LongTerm-02	Twenty-Year Long-Term CIP Work	2038	$151,000
		Subtotal	**$721,000**

Future Steps

The MCPWO will be required through their permit to submit reports, including specific information regarding what capital improvement projects were completed, how much was spent on sewer cleaning, preventative maintenance, and other measures.

This AMP, inclusive of the GIS model of the Drain system, are intended to be worked as a unit to assist MCPWO staff in operating, maintaining and upgrading the MCPWO's Drain infrastructure efficiently and cost effectively. It will be a living set of documents that will require an on-going process of recording information to help the decision makers best manage the needs of the MCPWO's Drain.

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Due Date November 30th, 2018
(no later than 3 years from executed grant date)

The Sterling Relief Drainage District *(legal name of grantee)* certifies that all stormwater asset management plan (SWAMP) activities specified in SAW Grant No. 1208-01 have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SWAMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

Brian Baker, Chief Deputy at 586-307-8210 Brian.baker@macombgov.org

Name | Phone Number | Email

11-15-18

Signature of Authorized Representative (Original Signature Required) | Date

BRIAN BAKER CHIEF DEPUTY, MACOMB COUNTY PUBLIC WORKS

Print Name and Title of Authorized Representative

Protecting our Infrastructure Investment

ASSET MANAGEMENT PLAN

Stormwater Executive Summary Report

Prepared for:

Village of Suttons Bay

SAW Project No. 1576-01

October 2018

FLEIS&VANDENBRINK

DESIGN. BUILD. OPERATE.

1.0 EXECUTIVE SUMMARY

OVERVIEW

Public Act 562 of 2012 authorized money for Stormwater, Asset Management, and Wastewater (SAW) Grant Program. In November 2015, the Village of Suttons Bay received a Stormwater, Asset Management, and Wastewater (SAW) Grant from the Michigan Department of Environmental Quality (MDEQ) Project No. 1576-01. The grant provided 90% funding (10% local match) based on the SAW grant application submitted in December 2013.

This report provides the Asset Management Plan (AMP) for the Village's stormwater collection system. Working with Village staff, Fleis and VandenBrink (F&V) provided technical assistance for asset identification, condition assessment, and capital improvement planning of the stormwater collection system.

This AMP is intended to be a living document that is updated as assets continue to wear and age, and as additional inspection/condition results are found and incorporated into the plan.

The contact person for the Village of Suttons Bay AMP is:

Rob Larrea, AICP, Village Manager
420 N Front Street
P.O. Box 395
Suttons Bay, MI 49682
Phone number: 231.271.3051
Email: manager@suttonsbayvillage.org

ASSET INVENTORY AND CONDITION ASSESSMENT

The stormwater collection system assets consist of approximately 8,590 feet (1.63 miles) of storm sewers and 127 stormwater structures (manholes/catch basins) connecting the gravity pipe and 25 outfall structures. Forty-six percent of the system was initially installed in the 1950's, seventy-eight percent of the stormwater collection system is 12 inch and High-Density Polyethylene Pipe (HDPE) comprises approximately thirty-four percent of the existing system. These assets are located in existing street rights-of-way or in easements dedicated for the assets use and maintenance.

ASSET IDENTIFICATION AND LOCATION

A comprehensive stormwater system asset inventory was developed from available record drawings, field notes, staff knowledge, and site visits; supplemented with field survey work. Asset material, size and age were identified through the review of available historical record documents. Spatial orientation (pipe location), pipe depth and invert elevations were determined through GPS field survey and a comprehensive evaluation of the gravity system. This information was organized into a new, or updated (GIS) database and piping network for archiving, mapping and further evaluation purposes.

CONDITION ASSESSMENT AND EXPECTED USEFUL LIFE

For the Village of Suttons Bay, a comprehensive evaluation of the collection system manholes was performed. NASSCO-MACP structure field-based assessments were performed on 190 identified structures. The grant did not include Underground Infrastructure Condition Assessment using Closed Circuit Televising (CCTV). Because CCTV was not done, the project relied upon existing local knowledge and historical information. Based on discussions with the stormwater system operations staff, there have not been any known capacity, flooding, or ponding issues with the Village-owned stormwater system.

Recommendations for short-term (1-5 year) and long term (6-20 year) identifies the need for maintenance – seventy-nine percent of the system was tagged for inspection and/or cleaning. Rehabilitation accounted for one percent of the of the system identifying the need for point repairs and lining. The twenty percent remaining assets were placed in the beyond 20-year planning category.

CRITICAL ASSETS

DETERMINING CRITICALITY

Business Risk is the determination of criticality of each asset in the wastewater system. Criticality is based on two factors; Likelihood (Probability) of Failure and Consequence of Failure using the following formula:

Business Risk = Consequence of Failure Score x Likelihood of Failure Score

Defining an asset's Business Risk allows for management of risk and aids in decision making for where to allocate operation and maintenance and capital improvement funds.

Likelihood of Failure (LoF) is a measure of how likely an asset is to fail. The following categories have been developed to quantify how likely an asset is to fail:

- Condition of the asset
- Remaining useful life (Age)
- Service History
- Operational status

Consequence of Failure (CoF) is a measure of the social, economic or environmental impact of failure of an asset and on the utility's ability to convey stormwater. CoF categories of the stormwater collection system include:

- Location of asset
- Facilities served by asset
- Size

CRITICALITY RESULTS

Using the strategy outlined above, a Business Risk Evaluation (BRE) was performed for each asset using a graphical ArcGIS-based sewer asset management and capital planning software that compiles, analyzes and assesses Business Risk for each asset and develops a Capital Improvement Plan. The results of the BRE are provided in easily understood tabular and graphical output.

Figure 1 provides the risk rating for storm sewer pipes by number of pipe segments. 1 pipe segment in the stormwater collection system have an extreme risk rating. The likelihood of failure accounts for service history since CCTV was not included in this grant all pipe segments have been identified for CCTV, due to the potential impact of failure moved these assets into the extreme risk rating.

Figure 2 provides the risk rating for the storm sewer structures. 2 structures are identified as extreme risk and are recommended for replacement or rehabilitation. These manholes are included in the 1-2 year CIP recommending cleaning, lining and repair.

Consequence of Failure	Likelihood of Failure: *Low*	*Medium*	*High*
High	Medium **3**	High **0**	Extreme **0**
Medium	Low **11**	Medium **0**	Extreme **1**
Low	Negligible **104**	Low **0**	High **1**

Figure 1: Business Risk Matrix (Risk Rating) by Number of Gravity Pipes

Consequence of Failure	Likelihood of Failure: *Low*	*Medium*	*High*
High	Medium **3**	High **0**	Extreme **0**
Medium	Low **60**	Medium **3**	Extreme **2**
Low	Negligible **78**	Low **6**	High **4**

Figure 2: Business Risk Matrix (Risk Rating) by Number of Structures

A spreadsheet providing asset criticality for each utility asset has been included in the AMP detailed report for the stormwater collection system.

CAPITAL IMPROVEMENT PLAN

A Capital Improvement Plan with recommendations was prepared for the Village's assets based on the Business Risk evaluation. Data-driven information from the business risk assessment and condition assessment was used to identify and prioritize the capital improvement projects. The information was also used to schedule inspections to evaluate the condition of high business risk assets. Short-Term 1-5 year and Long-Term 6-20 year Capital Improvement Plan (CIP) was prepared to address the projected needs for each asset in the system. The 5-year CIP rehabilitation total is $45,592.

OPERATIONS AND MAINTENANCE

A preventative maintenance program to systematically clean and CCTV inspect pipelines to NASSCO-certified standards is critical for a sound stormwater system. The process of cleaning and CCTV inspection of pipelines either with equipment owned by the community or contracted is a relatively inexpensive maintenance effort when compared to rehabilitation efforts. For this reason, it is recommended that at a minimum, all pipelines be cleaned and televised every five years, or that 20% of the system be cleaned and televised annually. Available budget will dictate the frequency or size of yearly projects. The 5-year CIP maintenance total is $51,230.

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Due Date 11/28/2018
(no later than 3 years from executed grant date)

The Village of Suttons Bay certifies that all stormwater asset management plan (SWAMP) activities specified in SAW Grant No. 1576-01 have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SWAMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

Rob Larrea, AICP	at (231) 271-3051 Ext. 222	manager@villageofsuttonsbay.org
Name	Phone Number	Email

11-29-18

Signature of Authorized Representative (Original Signature Required) Date

Rob Larrea, AICP – Village Manager
Print Name and Title of Authorized Representative

Mr. Greg Mayhew, City Engineer
City of Taylor
25605 Northline Road
Taylor, Michigan 48180
Phone – 734-287-6550
SAW Grant Project Number 1610-01

Executive Summary

1. Overview of SAW Grant Program

The City of Taylor, Wayne County, Michigan was successful in obtaining a Storm Water, Asset Management and Wastewater (SAW) grant from the Michigan Department of Environmental Quality (MDEQ) in the amount of $2,000,000.00 to begin a thorough, detailed, conditional analysis of the existing sanitary sewer collection system throughout the entire City, develop a capital improvement plan and to develop a comprehensive asset management plan. The SAW grant study was managed for the City of Taylor by engineering consultant, Hennessey Engineers, Inc. (HEI) of Southgate, Michigan. The following items of work were completed as a part of the SAW grant study:

- Cleaning and televising of approximately 60 percent of the sanitary sewers installed prior to 1994 located throughout the City to identify any structural defects within the sewer system and identify locations of infiltration through pipe joints.
- Update, expand and improve the existing Geographic Information System (GIS) database of the sanitary sewer system.

Results of the SAW grant program were as follows:

- During the cleaning and television investigation, several pipe segments were identified with longitudinal, circumferential and/or multiple cracking, offset joints, holes within the pipe, deformed pipe or broken pipe.
- Several locations during the cleaning and television investigation were identified as having moderate to heavy infiltration through pipe joints.
- The existing GIS geodatabase of the sanitary sewer system was updated as needed and information compiled from the cleaning and televising program entered into the database.
- The City implemented a sewer repair program addressing all severe defects encountered through the SAW grant program.

This report provides a summary of the Asset Management Plan (AMP) for the City's sanitary collection system. HEI with assistance from City staff prepared the asset management plan for the sanitary sewer collection system. The goal of asset management is to meet a required level of service for the City's current and future users in the most cost effective and economical way through proper operation and maintenance techniques and the rehabilitation and/or replacement of assets within the sanitary sewer system to comply with State and Federal regulations.

2. Asset Inventory and Condition Assessment

The City of Taylor has municipal water and sewer service throughout the City. The water distribution and wastewater collection systems within the City are owned and maintained by the City's Department of Public Works. Water is purchased through the Great Lakes Water Authority (GLWA), formerly the Detroit Water and Sewerage Department (DWSD) and sewage is discharged into the Downriver Utility Wastewater Authority (DUWA) interceptor system and treated at their wastewater treatment facility located in the City of Wyandotte. The wastewater collection system assets consist of 1,306,559 lineal feet (247.45 miles) of gravity sewers ranging in size from six (6) inches to fifty-four (54) inches in diameter and 5,574 sanitary manholes. These assets are mostly located in dedicated utility easements or dedicated rear yard easements to allow the City to access the facilities for continued maintenance and operation purposes. However, certain sewers are located within an existing road right-of-way owned and maintained by the City of Taylor, Wayne County or the Michigan Department of Transportation (MDOT). A summary of the pipe inventory evaluated as part of the SAW grant program is as follows:

Pipe Size (in.)	**Pipe Length (ft.)**					
	Concrete	**Clay**	**Truss**	**PVC**	**Total**	**System Total**
6	284	1,754	0	856	2,894	7,628
8	139	10,786	222	1,423	12,570	30.669
10	332,774	20,233	15,075	3,208	371,290	648,700
12	142,653	79,989	2,092	620	225,354	325,145
15	32,581	6,603	1,163	408	40,755	93,440
18	3,412	5,788	0	122	9,322	26,696
21	9,383	2,005	0	0	11,388	26,589
24	4,470	2,084	0	0	6,554	17,949
27	542	327	0	0	869	926
30	9,269	0	0	0	9,269	27,441
36	3,798	0	0	0	3,798	6,425
42	70	0	0	0	70	19.566
48	730	0	0	0	730	27,219
54	0	0	0	0	0	48,166
Total	540,105	129,572	18,552	6,637	694,866	1,306,559
				Total Pipe Length (Miles)	***131.60***	***247.45***

Asset Identification and Location

A comprehensive sanitary sewer system asset inventory was developed from operation and maintenance manuals, including a review of existing record drawings, field notes, staff knowledge and site visits, in addition to field reconnaissance and cleaning and television investigation of sewers. Information such as age, size and material were identified as best as possible from as-built drawings and archived records and from the cleaning and television investigation program. The physical location of assets with the sanitary collection system had previously been collected with the use of Global Positioning System (GPS) technology several years ago and compiled into a Geographic Information System (GIS) geodatabase in the early 2000's. As part of the SAW grant study, updates and revisions as needed were entered into the GIS geodatabase. The GIS geodatabase allows for better organization and record keeping, allows City personnel to better track required maintenance and allows the City to better prepare capital improvement programs and identify projects for the future. The GIS geodatabase includes information on the entire sanitary sewer system. The GIS geodatabase had been sporadically but not consistently updated in recent years and as part of the SAW grant program was expanded and updated upon to include information compiled from the cleaning and television investigation programs.

Condition Assessment

As part of the SAW grant study, a comprehensive, detailed evaluation of the sanitary collection system was begun consisting of cleaning and televising of sewers. A comprehensive, detailed evaluation of the sanitary collection system had not been completed in the past within the City of Taylor. Based upon the available funding through the SAW grant, approximately 60 percent of the sanitary collection system built prior to 1994 was able to be evaluated to start this comprehensive, detailed evaluation. The SAW grant evaluation put priority on older neighborhoods throughout the City and those neighborhoods where known and frequent problems occur within the sanitary sewer system Evaluations were based on the National Association of Sewer Service Companies (NASSCO) Pipeline Assessment Certification Program (PACP) rating assets one (1) through five (5), with five (5) being a severe rating. Overall, the structural condition of the collection system was found to be in fair condition with structural defects such as cracked and broken pipe found sporadically throughout the system, more so within the older neighborhoods of the City located along the northern edge of the City, north of I-94 and within the northeast quadrant of the City being east of Telegraph Road and north of Goddard Road. In addition, there were several locations where infiltration and inflow was entering the system through deteriorated pipe joints.

Based upon the results of the SAW grant study, the City through their water and sewer fund balance has been addressing those structural defects rated a 4 or a 5 or where heavy infiltration through pipe joints were identified through a cured-in-place pipe lining program. The City, to date, has completed approximately 50 percent of the cured-in-place pipe lining program and expects to complete all repairs by June 30, 2019. The total cost of repairs is estimated at approximately five (5) million dollars.

3. Level of Service

The City of Taylor has developed overall level of service goals that the sanitary sewer collection system should provide. The primary objective is to provide a reliable and well maintained sanitary sewer collection system in the most cost effective means and in compliance with State and Federal regulations. To meet these requirements, the level of service goals are proposed as the following:

- Provide adequate capacity within the sewer system and meet contractual capacity with the DUWA system
- Provide continued maintenance of the collection system to provide for a reliable working condition at all times
- Comply with all County, State and Federal health and environmental regulations
- Continually reduce or eliminate infiltration and inflow sources into the collection system to prevent sewer surcharging and potential basement backups
- Provide adequate customer service and have an effective emergency response plan in place
- Ensure that all Department of Public Works staff are regularly trained and certified to operate sanitary sewer facilities
- Regularly review safety procedures and provide necessary training to City staff
- Address sewers with severe structural defects and heavy infiltration through pipe joints through a cured-in-place pipe installation program to maintain reliability of the sanitary sewer system
- Routinely review and evaluate the sanitary sewer system and update the asset management plan and capital improvement plan on an annual basis to allow the proper adjustment of water and sewer rates to fund future capital expenditures required to continually maintain a reliably working system

Level of service requirements can be updated regularly to account for changes to the sanitary sewer system, changes in regulatory requirements, technology upgrades, significant population growth or significant decrease in population, staffing levels and financial capabilities.

4. Criticality of Assets

Determining Criticality of Assets

Business risk is the determination of criticality of each asset in the sanitary sewer system. Business Risk, also referred to as criticality, is determined based on two factors; the probability of failure and the consequence of failure. Defining an asset's business risk provides assistance to City staff in making important, cost effective decisions on how to allocate funds for the operation and maintenance of the sanitary sewer system and for future capital improvements.

The Probability of Failure is a measure of how likely an asset is to fail. Probability of Failure is based on weighted factors such as the physical or operational condition of the asset, age, service history and operational status.

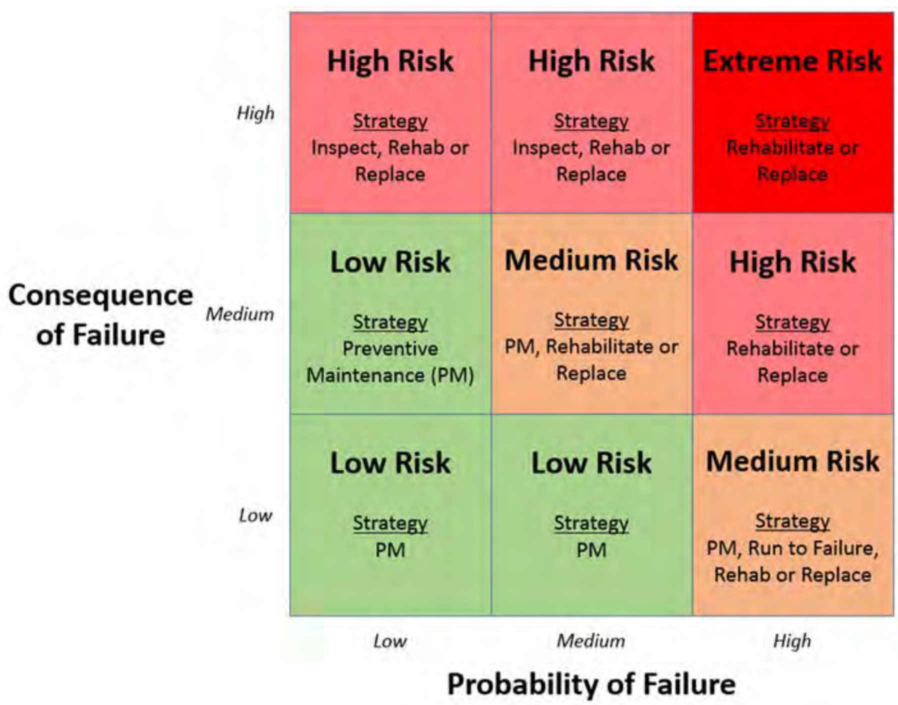
The Consequence of Failure is a measure of the impact of failure for an asset on the sanitary system's ability to convey and treat wastewater. Consequence of Failure is based on weighted factors such as location of asset, facilities or population served by the asset, size of the asset and ability to respond to emergencies for the collection system.

Assessing Criticality of Assets

The criticality of assets is assessed by calculating the "Business Risk Score", also known as Criticality, for each asset and is calculated by the following:

Business Risk = Probability of Failure Score x Consequence of Failure Score

Risk ratings are assigned to each asset based upon the above calculations and placed into the matrix to identify the risk of each asset. Risk ratings were calculated and compiled into a spreadsheet to be able to analyze and assess business risk for each asset and assists with developing a capital improvement plan.



For the collection system completed as part of the SAW grant program, the pipe network currently have business risks ranging from low risk to high risk. The risk rating of an asset can be used to develop a risk-based strategy for asset rehabilitation or replacement. A summary of the business risk analysis for the 3,323 pipe assets evaluated under the SAW grant program within the collection system is shown on the next page:

Consequence of Failure	Probability of Failure: Low	Med	High
High	*High* 53	*High* 35	*Extreme* 5
Med	*Low* 59	*Medium* 24	*High* 4
Low	*Low* 2,023	*Low* 910	*Medium* 210

The cured-in-place pipe lining program currently taking place will address those locations with a high probability of failure and those with a medium probability of failure and high consequence of failure. Following the cured-in-place pipe lining program expected to be completed in June 2019, the business risk analysis summary is expected to be the following and will need to be revisited upon the completion of the rehabilitation program.

Consequence of Failure	Probability of Failure: Low	Med	High
High	*High* 93	*High* 0	*Extreme* 0
Med	*Low* 63	*Medium* 24	*High* 0
Low	*Low* 2,233	*Low* 910	*Medium* 0

5. Capital Improvement Project Planning

Based upon the business risk evaluation, the City has developed short term (5 year) and long term (20 year) capital improvement plans providing recommendations for improvements to the sanitary sewer collection and treatment system. The business risk evaluation assisted the City to prioritize all future capital improvement projects and develop a rate structure to fund these projects. For the collection system evaluated as part of the SAW grant program, immediate needs are to address those structural defects that were rated in poor to severe condition and to eliminate heavy infiltration through pipe joints. This work is currently being completed utilizing available water and sewer fund balance. For future projects, it is anticipated the City will inspect the remaining collection system that was not evaluated as part of the SAW grant program over the next two (2) years and complete the rehabilitation of these sewers where structural defects exist immediately following the completion of the cleaning and television investigation; Following the completion of investigating the entire City's sanitary sewer system, it is recommended that both sewers and manholes be evaluated on a routine cycle every six (6) years (4 square miles of the City per year averaging 217,760 lineal feet) to identify any new or potential problems and identify ways to address these problems. Therefore, estimated costs for the current rehabilitation program and future investigative and rehabilitation projects are as follows:

• Current Cured-in-Place Pipe Program	\$5,005,000
• Cleaning and Television Investigation of Remaining Sewers	\$1,268,300 (over 2 years)
• Anticipated Cured-in-Place Pipe Program Based on Cleaning and Televising of Remaining Sewers	\$1,000,000
• Annual Cleaning and Televising of Sewers (Beginning in Year 3)	\$ 500,000 annually
• Future Rehabilitation Work Based Upon Annual Maintenance	To Be Determined

As mentioned previously, the current cured-in-place pipe program and the cleaning and televising of remaining sewers would be funded through available water and sewer fund balance. Future rehabilitation and maintenance programs may also be funded through available fund balance depending on the availability; otherwise, sewer rates will need to be raised to cover the costs of these programs and the rates should be reviewed on an annual basis to identify needs required to continually maintain and rehabilitate the sewer system to maintain a reliable system.

6. Revenue Structure

A rate methodology report was submitted to the MDEQ on May 14, 2018 and approved by MDEQ staff on May 16, 2018. Costs for future improvement projects; in addition to future investigative work and frequency such as cleaning and television investigation and manhole inspections are figured into future rate adjustments.

City staff along with the Engineering consultant, determine if the rate structures are sufficient to meet the current needs of the City's sanitary sewer system. Over the course of time, adjustments may need to be made to the rate structure in order to fund future projects.

The asset management plan developed allows the City to calculate estimated costs for future projects and assist with future rate adjustments. Based upon the SAW grant study, there is an immediate need to rehabilitate sewers with poor to severe structural defects and eliminate heavy infiltration through pipe joints to maintain a reliable sanitary sewer system. Since the submittal of the rate methodology report, the City has proceeded with this rehabilitative work with available water and sewer fund balance and expects to be completed with this program in June 2019. In addition to the current needs, there will be additional needs in the future for the system within the next 20 years.

Following the completion of the rehabilitation program and the completion of cleaning and televising the remaining sewers within the sanitary sewer system utilizing fund balance, the City's current sewer rate structure will need to be revisited and modified as necessary to support additional routine maintenance and rehabilitation programs of the sanitary sewer system. The estimated costs for the proposed projects were estimated based upon current projects taking place within the City of Taylor and other nearby communities.

Therefore, if fund balance is not available to start a routine maintenance program in Year 3 and to perform additional rehabilitation within the sewer system beginning in Year 3, the total increase in rates to support the future projects within the sanitary sewer system is currently estimated to be $5.77 per REU per month. If fund balance is available to fund the rehabilitative program in Year 3, the total increase in rates to support the asset management plan and 20 year capital improvement plan for future improvement projects and investigative work for the sanitary sewer system is estimated to be $2.89 per REU per month.

This asset management plan along with the rate methodology should be revisited on an annual basis and the asset management plan and rate methodology updated as needed on an annual basis to account for maintenance and rehabilitative work completed within the given year and to update cost estimates for future projects.

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date **November 30, 2018**
(no later than 3 years from executed grant date)

The **City of Taylor** certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. **1610-01** have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: **No**

   If No - Date of the rate methodology approval letter: **May 16, 2018**.

2) Significant Progress Made: Yes or No

   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)

3) Date of rate methodology review letter identifying the gap: ______________________.

4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ______________________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

R. Ryan Kern, P.E.	734-759-1600	rrkern@hengineers.com
Name	**Phone Number**	**Email**

Gregory T. Mayhew — 11/27/18

Signature of Authorized Representative **(Original Signature Required)** — **Date**

Greg Mayhew, City Engineer
Print Name and Title of Authorized Representative

Protecting our Infrastructure Investment

ASSET MANAGEMENT PLAN

Wastewater Executive Summary Report

Prepared for:

Tittabawassee Township

SAW Project No. 1025-01

FINAL
November 2018

FLEIS&VANDENBRINK
DESIGN. BUILD. OPERATE.

EXECUTIVE SUMMARY

OVERVIEW

Public Act 562 of 2012 authorized money for the Storm water, Asset Management, and Wastewater (SAW) Grant Program. In November of 2015, Tittabawassee Township received a SAW Grant from the Michigan Department of Environmental Quality (MDEQ), project no. 1025-01, to provide financial assistance for the development of a wastewater asset management plan (AMP) for the Township's publicly owned wastewater utility. The assets that comprise the utility include collection system piping and manholes, lift station/pump stations and force mains.

The SAW Grant amount awarded to Tittabawassee Township was $699,215
The Local Match provided by Tittabawassee Township was $77,691

This AMP is intended to be a living document that is updated as assets continue to wear and age, and as additional inspection/condition results are found and incorporated into the plan.

Questions regarding the Asset Management Plan should be directed to:
Mr Ken Dey
Director of Department of Public Works
Tittabawassee Township
145 S. Second Street
P.O. Box 158
Freeland, MI 48623-0158
(989) 695-9512
Email: kdey@tittabawassee.org

ASSET INVENTORY AND CONDITION ASSESSMENT

The wastewater collection system major assets consist of approximately:

- Gravity Sewer (6 inch thru 16 Inch): 195,470 feet (37.0 miles)
- Force Main (6 inch thru 16 inch): 43,236 feet (8.2 miles)
- Service Laterals: 2,465
- Manhole Structures: 725 each
- Sewer Lift Stations: 8 each

These assets are located in existing street rights-of-way or in easements dedicated for the assets use and maintenance.

The treatment of wastewater for Tittabawassee Township is provided by the Tittabawassee Township DPW. The wastewater collection system is operated and maintained by Township staff.

The wastewater treatment plant major assets consist of the following:

- Two facultative lagoons
- Six treatment lagoon cells
- Two sludge storage lagoons
- Aeration equipment
- Influent and effluent flow monitoring equipment
- Mechanical bar screen at the headworks
- Mechanical clarifiers for phosphorous removal
- Chemical precipitation equipment
- Two Clarifiers
- Headworks Building
- Process piping
- Office building
- Equipment building
- Storage building

- Emergency Generator
- Sewer Vac Truck
- Loader Backhoe
- Boom Truck
- Mini Excavator
- Bypass Pumps
- Design capacity 0.9 MGD

Asset Identification and Location
A comprehensive wastewater system asset inventory was developed from GIS assessment information provided by the Township.

Asset material, size and age were identified through the review of available historical record documents and Closed Circuit Televising (CCTV) data.

Spatial orientation (pipe and structure locations) were determined through GPS and GIS information provided by the Township.

This information was organized into a new database and piping network for archiving and future evaluation purposes.

Condition Assessment and Expected Useful Life
A comprehensive evaluation of the collection system was performed.

NASSCO-MACP Level 1 manhole field-based assessments were completed on manhole structures within the collection system.

Pipeline cleaning and NASSCO-PACP CCTV field-based inspections were conducted on the collection system’s gravity pipe.

The condition of the collection system assets reviewed ranged from Good to Excellent, with only a few minor deficiencies.

System flow rates were analyzed for average day and peak hour conditions throughout the system.

Recommendations for short-term (1-5 year) and long term (6-20 year) system maintenance and improvements were identified. It is recommended to clean and televise the collection system on a 7 to 10-year rotating basis.

The condition of the assets at the lift stations range from Good to Excellent. Ongoing maintenance has upheld the condition of many assets while other assets have deteriorated due to age and the harsh conditions associated with typical wastewater collection systems. The recommendations for short term and long-term improvements are somewhat extensive due to age of the equipment.

The condition of the assets at the Waste Water Treatment Plant (WWTP) range from Good to Excellent. Ongoing maintenance has upheld the condition of many assets while other assets have deteriorated due to age and the harsh conditions associated with typical wastewater collection systems. The Aeration system and mechanical screen at the headworks are relatively new and in good working condition. Most of the items that are included in the 1-5 year CIP are valve replacements due to reaching their useful life.

Level of Service

Defining the Expected Level of Service (LOS)

The overall objective of Tittabawassee Township as it relates to their wastewater collection system is to adopt the following Level of Service (LOS) goals:

LEVEL OF SERVICE STATEMENT

The overall objective of Tittabawassee Township is to provide reliable wastewater collection services at a minimum cost, consistent with applicable environmental and health regulations. To achieve this the following Level of Service (LOS) goals are proposed:

- Provide adequate collection system and treatment capacity for all service areas.
- Comply with local, state and federal regulations.
- Actively maintain collection system assets in reliable working condition.
- Reduce inflow/infiltration (I/I) flow volumes to mitigate potential for sanitary overflows, water in basements, and overloading of treatment plant.
- Provide rapid and effective emergency response services to customers.
- Ensure operations staff are properly certified.
- Regularly review health and safety procedures for operations staff to provide proper worker safety.
- Regularly review projected O&M and capital expenditures. Adjust user rates, as necessary, to ensure sound financial management of wastewater system.

The LOS goals may need to be adjusted from time to time as the utility ages, the needs of the community change or new rules or regulations require a change in operation. For this reason, the LOS goals should be reviewed by the Township annually to make sure they accurately reflect the desired operation of the utility.

Measuring Performance

To assure that LOS goals are met, performance measurements may need to be implemented. During the LOS review with the community the need for performance measurements was discussed.

Critical Assets

Determining Criticality

Business Risk is the determination of criticality of each asset in the wastewater system. Criticality is based on two factors; Likelihood (Probability) of Failure and Consequence of Failure using the following formula:

Business Risk = Consequence of Failure Score X Likelihood of Failure Score

Defining an asset's Business Risk allows for management of risk and aids in decision making for where to allocate operation and maintenance and capital improvement funds.

Likelihood of Failure (LoF) is a measure of how likely an asset is to fail. The following categories have been developed to quantify how likely an asset is to fail:

- Condition of the asset
- Remaining useful life (Age)
- Service History
- Operational status

Consequence of Failure (CoF) is a measure of the social, economic, financial or environmental impact of failure of an asset and the utilities ability to respond, convey and treat wastewater. CoF categories of the collection system include:

- Proximity to critical environmental features
- Location (Zoning District) of asset
- Facilities served by asset
- Size and location of asset within the utility network
- Type of asset

Criticality Results

Using the strategy outlined above, a Business Risk Evaluation (BRE) was performed for each asset using a capital planning template that compiles, analyzes and assesses Business Risk for each asset and develops a Capital Improvement Plan. The results of the BRE are provided in easily understood tabular and graphical output.

A spreadsheet providing asset criticality for each utility asset has been included in the AMP detailed report for the collection system.

Figure 1 provides the risk rating for gravity pipe by number of pipe segments that were assessed. Four pipe segments in the collection system have been identified with an extreme risk rating. All of these deficiencies are cracks in the pipe or a broken pipe. These sections of pipe are placed in the 1-5 year CIP. A majority of the collection system's gravity pipes, 94 percent as shown in Figure 1, have a low to negligible risk rating and are indicative of pipes in relatively good condition.

Figure 2 provides the risk rating for the collection system manholes that were assessed. There is a total of 4 manholes that have been identified with an extreme risk rating which include a broken frame, frame height adjustment and leaking seal and/or chimneys. Much of the collection system's manholes, 75 percent as shown in Figure 2, have a low to negligible risk rating and are indicative of manholes in relatively good condition.

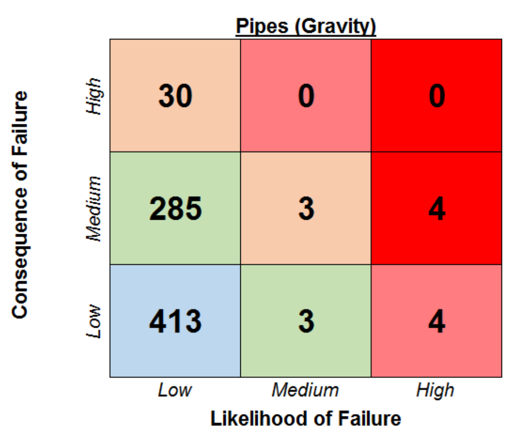


Figure 1. Business Risk Matrix (Risk Rating) by Number of Gravity Pipes

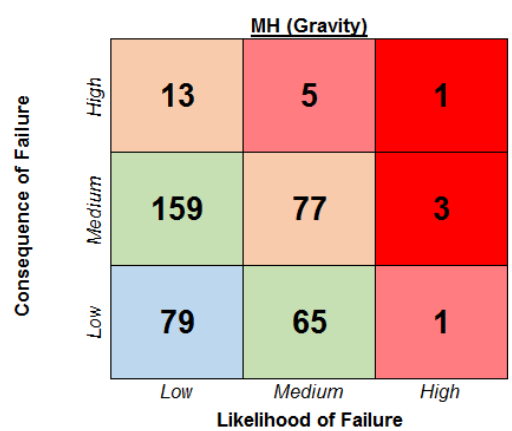


Figure 2. Business Risk Matrix (Risk Rating) by Number of Manholes

Figure 3 provides the risk ratings for the lift station assets. No assets are identified as an extreme risk. There are 23 assets identified as high risk. Most of the assets that are of high risk are items that need attention due to age of the components. These are addressed more specifically in the WWTP and LS AMP Report.

Consequence of Failure		Low	Medium	High
	High	8 *(High)*	2 *(High)*	0 *(Extreme)*
	Medium	36 *(Low)*	26 *(Medium)*	13 *(High)*
	Low	25 *(Low)*	7 *(Low)*	15 *(Medium)*

Probability of Failure

Figure 3. Business Risk Matrix (Risk Rating) by Number of Lift Station Assets

Figure 4 provides the risk ratings for the WWTP assets. No assets are identified as an extreme risk. There are 16 assets identified as high risk. Most of the assets that are of high risk are items that need attention due to age of the components. These are addressed more specifically in the WWTP and LS AMP Report.

Consequence of Failure		Low	Medium	High
	High	2 *(High)*	2 *(High)*	0 *(Extreme)*
	Medium	42 *(Low)*	27 *(Medium)*	12 *(High)*
	Low	18 *(Low)*	9 *(Low)*	59 *(Medium)*

Probability of Failure

Figure 4. Business Risk Matrix (Risk Rating) by Number of WWTP Assets

Capital Improvement Plan

A Capital Improvement Plan (CIP) with rehabilitation recommendations was prepared for the Township's wastewater utility assets based on the Business Risk evaluation. The CIP recommendations are provided for the collection system, pumping stations and force mains. From the BRE, a short-term (1-5 year) and long-term (6-20 year) CIP's were developed for the utility.

This AMP included a detailed condition assessment of the collection system including televising of pipe, and field condition assessments of all accessible sanitary manholes and lift stations.

Based on the AMP condition assessment of the sanitary sewer system, the Township has identified assets of the collection system and lift stations for improvement. These improvements can be completed with funding from the Township's Capitol Improvement Fund.

(1-5 Year) Capital Improvements include:

- Make repairs to structures that are the highest likelihood of failure.
- Make repairs to pipes that are the highest likelihood of failure.
- Replace Lift Station Assets and WWTP Assets with a high risk rating

(6-20 Year) Capital Improvements include:

- Continue to repair structures and pipe deficiencies that correlate to scheduled road work.
- Repair lift stations and WWTP Assets per AMP as components reach their useful life.

Operations, Maintenance and Replacement

Regular operation, maintenance and replacement (OM&R) is essential in the management of a wastewater collection system. The collection system is subject to a variety of operational problems and can suffer from clogging, scour, corrosion, and collapse. Inspection, cleaning, and rehabilitation are important for optimizing the function of the collection system. By optimizing the performance infiltration/inflow are reduced and sanitary sewer overflows (SSO) are minimized or eliminated preserving the substantial investment the community has in its collection system.

An annual lift station equipment replacement fund should be developed to replace disposable equipment. These are items that can be financially accounted for through operation, maintenance and replacement (OM&R) funds and can be replaced by outside contractors. Existing disposable materials include, wear parts in pumps and motors, etc. The existing OM&R fund is sufficient for the current equipment and operations.

Revenue Structure

The revenue and rate methodology is an instrument to determine user rates and charges that will provide sufficient revenues to pay for utility operating costs.

The existing rates were determined to create sufficient funds to fulfill the day-to-day maintenance and operations of the entire sanitary collection system.

The MDEQ approved the Township's rate methodology on 6/21/18.

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date: November 30, 2018
(no later than 3 years from executed grant date)

Tittabawassee Township *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. **1025-01** have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e (3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: No

   If No - Date of the rate methodology approval letter:

2) Significant Progress Made: Yes or No

   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)

3) Date of rate methodology review letter identifying the gap: ______________________.

4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ___________________________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

MARC A MCGILL (989) 695-9512 mmcgill@tittabawassee.org

Name Phone Number Email

[signature] 11/28/2018

Signature of Authorized Representative (Original Signature Required) Date

MARC A MCGILL, TOWNSHIP MANAGER

Print Name and Title of Authorized Representative

Stormwater, Asset Management, and Wastewater (SAW)

Asset Management Plan Executive Summary

SAW Grant No. 1544-01

Torch Lake Area Sewage Authority
20 Gregory Street
Lake Linden, MI 49945
Dennis Racine, Chairman
(906)296-0214

Executive Summary

Torch Lake Area Sewage Authority was awarded the SAW Grant in 2015. Torch Lake Area Sewage Authority (TLASA) sewer systems consists of collection mains, lift stations, grinder stations, lagoons, and maintenance equipment. Maintenance of the system is performed by TLASA personnel. The Torch Lake Area includes the communities of Lake Linden, Hubbell, and Tamarack.

The existing sewer collections system consists of approximately 86,000 lineal feet (LF) of vitrified clay pipe (VCP) installed in the late 1970's, and approximately 2500 LF of VCP installed in the early 1900's. There are approximately 450 manholes in the system. An improvement project in 2008 upgraded 28,000 lf of gravity sewer with cured in place pipe lining (CIPP), to decrease the volume of inflow and infiltration (I&I) into the system.

There are 8 duplex lift stations and 6 simplex grinder pumps in the system. There are two main lift stations (one in Tamarack and one in Lake Linden) which have backup generators. The other lift stations have manual transfer switches, and the system has a portable backup generator. The improvement project in 2008 upgraded all lift stations with new pumps and controls, and new backup generators at the two main lift stations.

The sewer treatment system consists of two (2) lagoon systems, one in Lake Linden and one in Tamarack. These lagoon treatment systems are stabilization lagoon systems with ground water discharge. The ground water discharge is via seepage lagoons located near the shoreline of Torch Lake. Each lagoon treatment system consists of a single stabilization lagoon and a single seepage lagoon.

This SAW Grant includes compiling an inventory of all sewer system assets and developing an Asset Management Plan (AMP) and developing a Geographical Information System (GIS). The AMP provides proposed 20-year capital improvements, maintenance recording platform, system replacement budgeting, and financial budget planning.

Sewer mains and manholes greater than 20 years old were televised. All found manholes were surveyed and this survey data was used to create the master mapping. All of this information was gathered and put into ESRI mapping/GIS system.

The final project total cost was $332,893.68 of the $338,513 grant (100% grant, no local match).

Wastewater and/or Stormwater Asset Inventory

The system components included in the asset management include the 86,000 LF of sanitary sewer and 450 man holes. It also includes the sewer maintenance equipment operated by the TLASA personnel. All system components were identified and located in the field using surveying methods. That information was inputted into AutoCAD and exported into the GIS mapping system for use by the TLASA. Pipe televising and manhole inspection information was then linked to the various components in GIS to provide a robust, interactive system inventory.

The GIS mapping system is then linked to the Asset Management database, a program developed by UPEA to meet the specific needs of the TLASA. TLASA personnel can easily update and modify the program when improvements or repairs are made to the system. The database also includes budget information, replacement plans, capital improvement plans, and maintenance plans.

Condition Assessment

The condition assessment for the collection assets was completed by applying the condition rating provided by Tunnel Vision Pipeline Services using the PACP/ MACP standard pipeline reviewing protocol for coding defects and construction features. This information was sufficient to assess the condition of the system components. An analysis was then performed on the location and criticality of the components in order to assign a failure criticality rating for each component. Overall the system is in good condition with the following percentages of components condition: good (65%), fair (30%) and poor (5%).

The condition assessment for the treatment assets was completed by exchanging information with TLASA operators on current conditions of components, and also applying proper service life span for all components. The service life was then adjusted for frequency of required and routine maintenance, and service demand placed upon the component. This method was used to properly identify the current condition state of each asset.

Level of Service Determination

The TLASA desires to meet all DEQ requirements in regards to level of service expected from a Municipal Sewer Collection and Treatment System. The goal is to provide a system that effectively transmits all of the sewage within the system. This is achieved by preventing direct discharges of untreated sewage into the environment. By completing past sewer separation projects, recent improvements to the current system, and planning future sewer improvement projects, they have taken the appropriate steps toward ensuring this goal is obtained.

Criticality of Assets

The criticality level of the assets was determined by reviewing the entire collection system and determining the severity of defects to each pipe segment. The televising by the PACP/ MACP standard provided an initial rating for structural condition and maintenance condition. This rating was further refined based on reviewing the televising video and adjusting for severity of defect, taking into account the sewer operators first-hand accounts of known issues.

This review/ rating process required a strong understanding of the existing sewer system, which was had developed during the review of the system information throughout the course of the SAW grant project.

Assets were then ranked based on their importance to the operation of the system. The more severe the consequence of having a particular asset out of service, the higher ranking it received. The TLASA systems most critical pieces of infrastructure are the lift stations and lagoons. Without the lift stations operating as intended, an overall back-up of the system would occur causing major, negative consequences. Also, without the lagoons operating normally, sewage would not be properly treated. If failure were to occur to the lagoons system, unintended discharge or overflow could occur and cause environmental issues.

Revenue Structure

Rates, charges, expenditures, capital improvements, replacement costs, maintenance cost and debt payments are all taken into consideration in the asset management database that was developed by UPEA. This information was then shared with a financial consultant who reviewed and updated the current and projected necessary revenues.

Capital Improvement Plan

The TLASA intends to undertake a series of improvement projects over the next 20 years to address deficiencies in the sewer system. These projects will be funded by USDA RD loan/ grant funding and local funding when applicable.

Phase 1:

Proposed Construction - 2019-2023
Lagoon Expansions: Lake Linden and Hubbell-Tamarack Lagoons. Upgrades to maintenance equipment.

Construction:	$ 6,500,000
Contingency:	$ 650,000
Engineering/ Administration:	$ 1,050,000
Bonding/ Legal:	$ 50,000
Total:	$ 8,250,000

Phase 2:

Proposed Construction - 2024-2028:
Miscellaneous upgrades to system valves, lift station and grinder station components. Consider replacement of VAC-Truck.

Construction:	$	750,000
Contingency:	$	75,000
Engineering/ Administration:	$	190,000
Bonding/ Legal:	$	15,000
Total:	$	1,030,000

Phase 3:

Proposed Construction - 2029-2033:
Due to the better than expected condition of the collection system, no outstanding projects are projected in this time frame barring any unexpected developments.

Phase 4:

Proposed Construction - 2034-2038:
Miscellaneous sewer segment repairs throughout the system. Acquisition of new back-up generator.

Construction:	$	442,500
Contingency:	$	44,500
Engineering/ Administration:	$	122,000
Bonding/ Legal:	$	10,000
Total:	$	619,000

Recommendations:

We recommend the continued use of the GIS mapping and Asset Management Database. These items should be useful tools for everyone involved with the sewer system. The systems should be updated as aspects of the sewer system changes. Fully utilizing the program will produce a well-organized, detailed, up-to-date account on the current state of the sewer system.

List of Major Assets

Below is a general list of the major assets identified in the AMP.

- 86,000 *feet of 6 - 12 inch pipe*
- 450 *manholes*
- 1,600 *sewer service lines*
- 4 Lagoons – *2 Seepage, 2 Stabilization for Lake Linden, and Tamarack-Hubbell Systems*

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date __11/16/18______________
(no later than 3 years from executed grant date)

The __Torch Lake Area Sewage Authority *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1544-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or No

   If No - Date of the rate methodology approval letter: __May 3, 2018________.

2) Significant Progress Made: Yes or No N/A

   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)

3) Date of rate methodology review letter identifying the gap: __N/A___________________.

4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on _____N/A_____________________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Torch Lake Area Sewage Authority at (906)296-8721 dennis@schoolcrafttownship.net

Name | Phone Number | Email

Dennis Racine 11/16/2018

Signature of Authorized Representative (Original Signature Required) Date

Dennis Racine, Chairman

Print Name and Title of Authorized Representative

STORMWATER ASSET MANAGEMENT PLAN

VILLAGE OF UBLY

HURON COUNTY, MICHIGAN

NOVEMBER 2018

BASED ON:

***ASSET MANAGEMENT GUIDANCE FOR WASTEWATER AND STORMWATER SYSTEMS*, MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY, JULY 2013**

STORMWATER, ASSET MANAGEMENT, AND WASTEWATER (SAW) GRANT

PROJECT NUMBER: 1117-01

PREPARED BY:

230 S. Washington Avenue
Saginaw, MI 48607

PROJECT ID NUMBER: **122923SG2015**

VILLAGE OF UBLY
SAW Grant Project No. 1117-01

EXECUTIVE SUMMARY

Prepared by: **SPICER GROUP, INC.**
230 S. Washington
Saginaw, MI 48607

Owner: **VILLAGE OF UBLY**
2241 Pierce Street
Ubly, MI 48475
(989) -553-0240
Jason Nicol, President

On November 24, 2015, the Village of Ubly entered into an agreement with the Michigan Department of Environmental Quality and the Michigan Finance Authority for grant funds issued under Public Act No. 511 of 2012 for the *Stormwater, Asset Management, and Wastewater (SAW)* program. The Village received the following grant:

Stormwater Asset Management Plan (SWAMP) – 90% Grant	***$275,000***
Eligible Cost Subtotal	$27,500
LESS Local Match	($27,500)
Total Grant Amount	$247,500

The Asset Management Plans (AMPs) needed to be completed within three years of the date of agreement; November 2018.

Each AMP has the following key components:

- Asset Inventory and Condition Assessment
- Level of Service Determination
- Critical Assets (Risk)
- Revenue Structure
- Capital Improvement Plan

Storm Water Asset Inventory and Condition Assessment

The Village of Ubly's storm water collection system consists of a series of 4"-27" pipes. These pipes or "storm sewers" collect storm water from "catch basins", footing drains/sump systems (sump leads), open inlets, roadside drainage, roof drains, groundwater infiltration etc. A base map of the system is included in Appendix 2.

For the collection system, Spicer Group, Inc. completed a mobile mapping LiDAR survey of the entire Village and used the survey information to develop a comprehensive Geographic Information System (GIS). This GIS is located on a new computer in the Village office, and is detailed "smart" mapping system with databases, using the ArcGIS/Arc Online by ESRI platform. This system can be accessed and updated in the field by DPW staff from a new iPad supplied as part of the SAW grant project. From the

GIS as-built plans, pipe/manhole condition ratings, materials, year installed, inspection records, CCTV video inspection etc. can be accessed. This information can also be queried to provide specific lists and maps and updated easily when future improvements are made.

The table below shows that in the Village of Ubly there is about 35,000 feet of storm sewer pipes. In total, about 80% of this storm sewer is owned and maintained by the Village. The remaining storm sewer is owned by the MDOT and private entities.

Table ES-1: STORM SEWER OWNERSHIP

Ownership	Length (Feet)	% of System
Village Ubly	**28,056.70**	**80.2%**
MDOT	**6,186.20**	**17.7%**
Privately Owned	**738.2**	**2.1%**
Total	**34,981.10**	**100.0%**

The Village currently has around 28,000 feet of storm sewer pipes ranging in size from 8" to 27". Below is a table showing the diameter and materials of the storm water piping:

Table ES-2: Village-Owned Storm Water Pipes by Diameter and Material

Village Owned Storm Sewer							
Pipe Diameter	Polyethylene	PVC	Concrete Pipe	Clay Tile	Corrugated Metal Pipe	Unknown	**Total Length**
8"	692.30	53.50	2,463.30	77.70	318.00		3,604.80
10"			2,428.70		102.10		2,530.80
12"	2,642.70		4,584.20	3,100.10			10,327.00
15"	191.80		3,482.70	1,822.50			5,497.00
18"	42.80		1,657.10				1,699.90
21"			2,435.10				2,435.10
24"	277.30		469.60				746.90
27"			803.40				803.40
Unknown						411.80	411.80
Total Length	3,846.90	53.5	18,324.10	5,000.30	420.1	411.8	**28,056.70**
Percent by Material	13.7%	0.2%	65.3%	17.8%	1.5%	1.5%	100.0%

Corby Energy completed a cleaning and televising program for the storm sewer pipes. Spicer Group, Inc. completed a comprehensive inspection of all the storm water structures owned by the Village. The NASSCO Manhole/Pipeline Assessment Certification Program (MACP/PACP) standards were used to identify and code the defects and was used to standardize the scoring and quantify the condition of the storm water assets.

The North Branch of the Cass River flows through the heart of Ubly. The river provides an outlet for the Village storm sewer. The Huron County Drain Commissioner maintains the banks of the river. Therefore, it falls under the jurisdiction of both the county and MDEQ. All the storm water in the Village eventually drains into the North Branch of the Cass River where it flows southwest towards Cass City where it joins into the Cass River. The Cass River ultimately flows into the Saginaw River west of Bridgeport and south of the City of Saginaw in the Shiawassee National Wildlife Refuge.

Criticality (Risk)

For each asset in the Village's storm water system, a criticality/risk analysis was performed to determine and prioritize the Village's key components. Based on the condition assessments and the field inspections, the Likelihood of Failure (LoF) was calculated for every asset; including all pipes, manholes, drainage structures, etc. Next, the Consequence of Failure (CoF) was calculated and scored for each asset based on the economic, social, and environmental consequences, if that asset failed. Finally, the Criticality (Risk) score was calculated using:

$$\textbf{RISK = LoF x CoF}$$

The collection system had 10 pipes with LoF scores of 5 or above. The highest scoring pipe (NE.29-NE.26) There were a total of 8 pipes that fell into the poor LoF category with scores ranging from 4.6-4.1. The remaining pipes all fell into the fair-excellent ranges. There was a total of 16 manholes that had LoF values ranging from 5.2 to 5.1. Another 28 manholes were assigned LoF values of 4.2-4.1. The remaining manholes fell into the fair-excellent LoF categories.

The highest CoF value assigned to the collection system pipes was a value of 4.9 for pipe segment SW.02- SW.01. In total no pipes fell into the catastrophic-major disruption CoF categories. The majority of the pipes fell into the moderate-minor disruption categories due to the number of customers that would be affected by a sudden interruption to storm water collection service. A total of 19 storm water structures fell into the moderate-major CoF category. The remaining structures all fell into the moderate-insignificant disruption categories.

Overall, no pipes fell into the high-risk category. The highest risk score assigned to a pipe was 18.6 for pipe segment SE.57-SE.56. There was a total of 25 pipes that fell into the medium risk category with risk values varying from 18.6-12. The rest of the pipes fell into the low risk category. There were no manholes that fell into the high-risk category. A total of 7 manholes fell into the medium risk category with the remaining manholes all falling into the low risk category.

Level of Service

Mission Statement

The Village of Ubly strives to maintain a basic storm water collection system service that *addresses* the residents' wants and needs and upholds the local, State, and Federal regulatory requirements at a minimum cost to our residents.

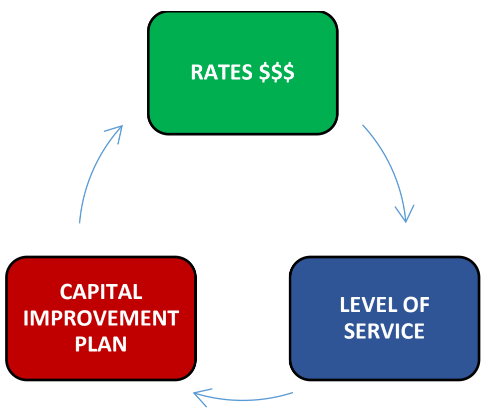
Basic goals:

- Operate and maintain the storm water system to minimize flooding and property damage.
- Provide rapid and effective emergency response service.
- Review the condition of storm water assets as a part of other infrastructure construction projects.
- Seek a funding source for operation & maintenance and repair/replacement of storm water assets.
- Review the maintenance and capital improvement plans/projects annually to determine the lowest cost options for our residents:
  - **"MINIMUM"** Level of Service – Address resident complaints as they come in.
  - **"MEDIUM"** Level of Service – Point repairs to the existing system that have been identified. Mainly projects that the cleaning and televising crew had to abandon the inspection due to obstructions, collapses, holes etc.
  - **"HIGH"** Level of Service – Lining or replacement projects to be completed with other infrastructure improvement projects.

Performance Measurements:

- Review annual performance goals for storm sewer system operation & maintenance, rehabilitation, and capital improvements.
- Annually review the number and severity of resident complaints.
- Annually review the amount of storm sewer assets that have been repaired or replaced.
- Review and update the Storm Water Asset Management Plan, GIS, and Capital Improvement Plan annually.

ES-3: Asset Management Plan Evaluation Process



Since Michigan has not created a climate which would allow municipalities to create either an enterprise fund or a utility fee for storm water asset improvements, funding comes from the Village's general fund. Act 51 monies received from the State for street/road improvements could also be used for storm water improvements that affect the street projects directly. However, Act 51 funding is very limited.

Since Michigan has not created a climate which would allow municipalities to create either an enterprise fund or utility fee for storm water asset improvements, funding comes from the Village's Local and Major Street funds. The Village has fixed sources of revenues from a combination of State, County, Township and Village taxes. These limited funds are in some ways restricted on their use in that they are primarily designated for road improvements.

Revenue Structure

Spicer Group teamed with Municipal Analytics for the revenue structure analysis for the AMP. Since Michigan has not created a climate which would allow municipalities to create either an enterprise fund or a utility fee for storm water asset improvements, funding comes from the Village's general fund. Act 51 funds received from the State for street/road improvements could also be used for storm water improvements that affect the street projects directly. However, Act 51 funding is very limited. Another mechanism for funding large storm water improvements is through the Huron County Drain Commissioner's office, using the Drain Code, PA 40 of 1956.

The financial impact analysis found that the Village's general fund does have sufficient revenue to complete small storm water capital improvement projects but does not have a mechanism to collect rates/fees to provide storm water collection services. The Village will strive to maintain a minimum level of service and seek outside grants and funding for storm water infrastructure capital improvements. The Village should continue to update this analysis on an annual basis to determine if funds become available to address the proposed medium to large capital improvement projects.

Capital Improvement Plan

The Capital Improvement Plan (CIP) is the culmination of all the parts of the Asset Management Plan (AMP). Reviewing the results of the stormwater system Inventory & Condition Assessment, Level of Service (LOS) determination, Criticality (Risk), Revenue Structure, and preliminary CIP project lists, a process was worked through to categorize and prioritize the final CIP.

Until a funding mechanism for storm water improvements is found, the Village is forced to continue its *reactionary* policy. In order to have some sort of financial mechanism for the Village to proactively improve the storm water system, we recommended a minimal discretionary budgetary line item of $5,000 per year for the Village to continue cleaning & televising, lining, root treatment, and misc. repairs. With this discretionary budget line item, many smaller "Minimum" Level of Service projects can be slowly completed.

Village of Ubly Storm Sewer Capital Improvement Plan

Annual Maintenance

Annual Operation and Maintenance/Reactive Repairs	$5,000.00

Project Number

Project Number	Level of Service	Year	Project Name	Project Description	Estimated Cost
1	Min.		West Main Street Point Repair	Point Repair is 40' East of NW.11	$5,000.00
2	Min.		West Main & Murphy Street Point Repair	Point Repair is in the Northeast Quadrant of Murphy/Main Intersection 35' East NW.06	$5,000.00
3	Min.		West Main & N. Washington Street Point Repair	Point Repair is in the Northwest Quadrant of N. Washington & W. Main Intersection 15' South NW.02	$5,000.00
4	Min.		Murphy Street Storm Sewer Replacement	Agnes Street To 500' South of Agnes Street	$155,000.00
5	Min.		Pike Street Storm Sewer Replacement	Bliss Street to Union Street	$130,000.00
6	High		Main Street Storm Sewer Replacement	North Branch of Cass River to 200' East of Railroad Tracks	$1,315,000.00

Annual Maintenance	$5,000.00
Grand Total Minimum Level of Service	$300,000.00
Grand Total High Level of Service	$1,615,000.00

Conclusion

The Village of Ubly's storm water system is a typical, aging municipal infrastructure system. Since there is no real funding mechanism for storm water assets, the Village has been maintaining a very minimum Level of Service for its residents. This has resulted in a reactionary operation and maintenance practice. When residents notify the Village of flooding or drainage issues, the DPW will address the issue on a case-by-case basis. When the Village is planning for street resurfacing or replacement projects, the storm water system is inspected, evaluated, and appropriate repairs and/or replacement is done based on the funding available.

In order to have some sort of financial mechanism for the Village to proactively improve the storm water system, we recommended a minimal discretionary budgetary line item of $5,000 per year for the Village to continue cleaning & televising, lining, root treatment, and misc. repairs.

Until a funding mechanism for storm water improvements is found, the Village is forced to continue this reactionary policy. The Village should continue to urge its State legislators to develop a plan to fund municipal storm water improvements, such as supporting HB 5991.

In accordance with the SAW Grant requirements, the Village's Storm Water Asset Management Plan (SWAMP) needs to be kept available for citizen review for 15 years. The SWAMP should be reviewed annually, and the components updated and included in the Village's annual budget process.

DEQ

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Due Date November 30, 2018
(no later than 3 years from executed grant date)

The Village of Ubly certifies that all storm water asset management plan (SWAMP) activities specified in SAW Grant No. 1117-01 have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SWAMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

David Franzel	at (989) 658-2369	davefranzel@gmail.com
Name	Phone Number	Email

David Franzel 11-29-18

Signature of Authorized Representative (Original Signature Required) Date

David Franzel, DPW Supervisor

Print Name and Title of Authorized Representative

City of Vassar

MDEQ AMP Summary

October 2018

16C0009 1285-01

Prepared By:

ROWE PROFESSIONAL SERVICES COMPANY

REPRESENTATIVE: Brian Chapman

ADDRESS: 287 E. Huron Avenue, Vassar, MI 48768

PHONE #: (989) 823-8517

EMAIL: citymanager@cityofvassar.org

PROJECT #: 1285-01

TABLE OF CONTENTS

LIST OF TABLES

ACRONYMS

AMP	Asset Management Plan
CIP	Capital Improvement Plan
DPS	Department of Public Services
MDEQ	Michigan Department of Environmental Quality
USDA-RD	United States Department of Agriculture's Rural Development

EXECUTIVE SUMMARY

In accordance with the Michigan Department of Environmental Quality (MDEQ), the City of Vassar has prepared an Asset Management Plan (AMP) for both their storm and wastewater systems. The purpose of the AMP is to define a method of cataloging, evaluating, and maintaining the storm and wastewater systems.

The sanitary sewer reports from the video survey shows the system overall is in good working order. However, as can be seen from the inventory, several locations surveyed need maintenance. Issues can be seen ranging from minor deposits or encrustations on pipe joints and walls to sags in pipes. Through proper maintenance and planned improvements, the system should continue to provide proper service for the city.

The storm sewer reports from the video survey shows the system is in working order. However, as can be seen from the inventory, several locations surveyed need maintenance. Issues can be seen ranging from debris in the form of sand, gravel, leaves, sticks, and trash, as well as separated pipe joints. With proper maintenance and planned improvements, the system should continue to provide proper service for the city.

The City of Vassar is committed to improving and maintaining protection of the public health and performance of their wastewater collection utility assets, while minimizing the long-term cost of operating those assets. The city will strive to make the most cost-effective renewal and replacement investments and provide the highest quality customer service possible.

I. ASSET INVENTORY

The City of Vassar's sanitary sewer system is comprised of a collection of gravity sewer lines, a single lift station, force main, and a wastewater treatment plant. There is a combination of gravity pipes and force mains making up the collection of pipes that range in size from 6 inches to 18 inches in diameter. Once at the wastewater treatment plant, the water is treated based on the state standards and is then discharged into the Cass River.

The city's storm sewer system is a collection of pipes and ditches used to collect and transport water runoff. All the water collected is then discharged in the Cass River along with other local streams and drains. To maintain efficient flow, the system and catch basins are all cleaned on a four-year rotation.

A. Collection Systems

The city's sanitary sewer collection system totals 82,160 feet and is composed of the following list of assets:

- 72,232 feet of 8-inch sewer pipe
- 4,887 feet of 10-inch sewer pipe
- 830 feet of 12-inch sewer pipe
- 2,859 feet of 15-inch sewer pipe
- 52 feet of 18-inch sewer pipe
- 379 manholes
- 1 lift station
- 1,300 feet of 4-inch force main

The city's storm sewer collection system totals 67,654 feet and is composed of the following list of assets:

- 499 feet of 6-inch sewer pipe
- 2,014 feet of 8-inch sewer pipe
- 3,262 feet of 10-inch sewer pipe
- 13,514 feet of 12-inch sewer pipe
- 6,466 feet of 15-inch sewer pipe
- 288 feet of 16-inch sewer pipe
- 1,188 feet of 18-inch sewer pipe
- 112 feet of 20-inch sewer pipe
- 6,170 feet of 24-inch sewer pipe
- 1,629 feet of 30-inch sewer pipe
- 175 feet of 36-inch sewer pipe
- 759 drainage structures (catch basins/manholes)

1. Sewer
   The independent survey videoed 80,860 feet (98%) of sanitary collection system piping. The remaining balance of pipe not televised was inaccessible and/or consists of force main. A detailed examination was performed on each gravity pipe televised with each defect being rated and the condition of the pipe being assigned an overall rating.

   Reviewing the sanitary sewer reports from the video survey shows the system overall is in good working order. However, as can be seen from the inventory, several locations surveyed need maintenance. Issues can be seen ranging from minor deposits or encrustations on pipe joints and walls to sags in pipes.

   An independent survey video was also conducted of 35,110 feet (52%) of storm collection system piping. The remaining portion of the storm system not televised contained obstructions impeding the camera from advancing. When the Contractor attempted to clean and remove some of these obstructions, the pipes were damage causing the city to have to make costly repairs. Heavy cleaning procedures to clear these pipes will not be pursued at this time because storm water flow is only slightly affected and these obstructions only impede a camera. A detailed examination was performed on each gravity pipe televised with each defect being rated and the condition of the pipe being assigned an overall rating.

   Reviewing the storm sewer reports from the video survey shows the system is in working order. However, as can be seen from the inventory, several locations surveyed need maintenance. Issues can be seen ranging from debris in the form of sand, gravel, leaves, sticks, and trash, as well as separated pipe joints. With proper maintenance and planned improvements, the system should continue to provide proper service for the city.

2. Manholes
   Most of the sanitary manholes throughout the village were found to be in relatively sound condition. The storm manholes were in similar condition with most of them being in an overall sound condition. The primary maintenance needed for both sets of manholes includes the repairs of deteriorating chimneys. Other minor issues discovered were minor root intrusion, weeping, infiltration around joints, and cleanup of some debris that has entered the structures.

B. Lift Station

Although most of the city's wastewater needs are serviced through gravity sewer, there is one lift station maintained by the City of Vassar. Located along Enterprise Drive, the lift station collects flows from nearby developments and transports them through a 4-inch force main (1,200 feet) to a structure (No. 1103) at the southeast corner of E. Huron Avenue and Norman Street. The station was originally installed in 1987, however the pumps and controls were replaced in 2009. With continued scheduled maintenance and repairs, the lift station should continue to function as the design intended for another 25 years or more.

II. REVENUE STRUCTURE

It is important to Vassar to maintain and improve their assets. The city's sewer system is no exception. To do this, the costs associated to own and operate the sewer system, both collection and treatment, must be fully understood. To cover these costs, rates must be structured to meet current and future expenditures. Although the future cannot be predicted, goals can be set and plans put into place to prepare for the city's future needs.

Establishing a rate structure to meet short- and long-term needs as well as customer expectations is a priority of the city. With that in mind, the financial management goals are as follows:

- Identify funding level necessary to meet level of service needs.
- Forecast schedule of when financial resources will be required.
- Establish user fees that will generate adequate revenue for financing future improvements.

Attached you will find the city's rate structure which was submitted and approved by MDEQ in June of 2018.

III. CAPITAL IMPROVEMENT PROJECT PLAN

Maintaining a municipal system means always planning for future needs. The wastewater system is no exception with growing and/or changing needs of the population it serves and the constant wear and tear of the system it undergoes providing its service.

A. Five-Year Plan

Evaluated assets with a consequence of failure rating of 17 or greater typically make up the bulk of projects proposed for the five-year Capital Improvement Plan (CIP). Fortunately for the city, the sanitary system does not have any pipe with a consequence of failure ratings above 16. However, based on conversations with Department of Public Services (DPS) personnel, various sections of the system experience minor back-ups and require cleaning several times a year. Review of the televising reports for the sections identified by the DPS indicate defects in the form of sags and mineral deposits, which are known to cause sediment and/or debris to build up in the lines and thus require frequent cleaning. To be able to keep these assets working properly requires them to be improved to a higher condition and functionality.

Therefore, it is our recommendation the proposed five-year CIP focus on the specific areas that the city has identified. The sections of pipe identified for replacement are located along Plumb Street, North Water Street, Arch Street, Spruce Street, Briarwood Street, Welsh Street, Grant Street, Hazel Street, and Huron Street totaling nearly 5,800 feet of pipe.

1. Collection System Cost Breakdown by Street

Arch Street	$308,000
Briarwood Street	$105,600
Grant Street	$94,600
Hazel Street	$77,000
Huron Street	$121,000
Plumb Street	$110,000
Spruce Street	$127,600
N. Water Street	$231,000
Walsh Street	$39,600
Collection System Subtotal	**$1,214,400**

Because the consequence of failure ratings for the proposed improvements are below 17, there is no urgency to construct the improvements within the first couple of years. However, it is our understanding the city intends to secure a United States Department of Agriculture's (USDA) Rural Development (RD) Loan/Grant to fund the proposed five-year CIP project. This process typically takes two years from application preparation and submittal to closing on the construction loan/grant funding. Therefore, it is our recommendation the design process should begin no later than year three from the date of this report.

Along with focusing on these areas of the collection system, they should also perform a study to analyze the feasibility of upgrading the existing treatment plant, constructing a new treatment plant, or forming a Sanitary Authority with nearby communities of Vassar Township and the Village of Millington for the construction of a new community treatment plant. The city should however continue to make scheduled repairs to the existing treatment plant to prolong the life of it until a study can be completed. The following is a list of treatment plant improvements and the anticipated cost associated with each item. These improvements are planned with funding already saved and specifically allocated over the next five years.

2. Treatment Plant Improvements Cost Breakdown

Replace B-3 EB Blower	$7,000
Replace P-3 Raw Sewage Pump	$50,000
Install a Filter System Prior to UV	$300,000
Resurface Secondary Digester	$15,000
Replace E-14 RBC Drive Unit	$20,000
Replace UV E-6	$40,000
Community Treatment Study	$5,000
Treatment Plant Subtotal	**$437,000**

3. **Five-Year CIP Sanitary System Improvement Total $1,651,400**

B. Twenty-Year Plan

A consequence of failure between 9 and 16 qualifies an asset for the 20-year CIP. These assets are important to both systems' operations that have fallen out of their prime condition. These can vary from more deteriorated assets playing less critical roles in the system to minor deteriorated assets in critical roles. As assets fall into this category, the city will have time to budget for the improvements.

Any important issues that may come to surface when looking deeper into their storm and sanitary systems in the first five years should be added to this plan. This would include things such as the upgrades or replacement of the wastewater treatment plant or storm improvements determined in the drainage study. In addition, upgrades to the existing storm system should be considered an integral part of any road improvement project. Ultimately, the 20-year CIP needs to plan and budget for the outcome of the treatment plant feasibility study for another potential cost of 8 to 15 million dollars for refurbishment of the existing plant or a new plant for the city alone or being built as part a newly formed sewer authority.

Table III-1: Capital Improvement Plan

Project	Cost	Years Until Project Begins
Collection System Improvement Project	$1,720,000	3
Lift Station Rehabilitation	$100,000	8
Manhole Rehabilitation	$200,000	10
Collection Rehabilitation	$500,000	15

It is recommended the city revisit their rate structure in advance of future capital improvements to establish revenue needs for financing the anticipated 20-year CIP work.

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City of Vassar Operating Budget
Sanitary Sewer System

Community Name: City of Vassar **County:** Tuscola

Address: 287 E Huron Ave
Vassar, MI 48768

A. Applicant Fiscal Year: **From:** 6/30/2016 **To:** 6/30/2017

B. Operating Income:	**From Sewer Rates & Charges:**	$739,087
	Other (e.g. hydrant rentals, etc)	$19,051
	Total Operating Income:	$758,138
C. Operating Expenses:		
	Salaries/Benefits	$266,096
	Operating Supplies	$20,980
	Contracted Services	$7,840
	Administrative Expenses	$28,000
	Other Services and charges	$155,462
	Total Operating Expenses:	$478,378
D.	**Net Operating Income:**	$279,760
E. Non Operating Income:		
	Interest:	$442
	State Grants:	$309,650
	Total Non Operating Income:	$310,092
F.	**Net Income**	$589,852
G. Expenditures/Transfers		
	Interest and amortization Expense	$21,242
	SAW grant Expenses	$344,055
	Total Expenditures/Transfers:	$365,297
	Excess/Deficit over net income:	$224,555

Rate Methodology   Table 4

Calculate Operating Reserve (optional if creating budget for only OM&R)	
$ 478,378	Total OM&R from Expenditures in table below
$ 239,189	Targeted Operating Reserve Amount (this is 50% of OM&R)
$ 1,023,161	<<< Enter amount of cash or equivalents
$ (783,972)	Additional Operating Reserves Needed (If negative number, stop here)
0	<<< Enter # of years to accumulate reserves (rule of thumb is 5 years)
$ -	Annual Contribution To Achieve Targeted Operating Reserve Amount

Expenditures	**Budget**	**Option 1**	**Option 2**	**Option 3**		**Option 4**		**Option 5**		
		Variable	Fixed	Variable	Fixed	Variable	Fixed		Variable	Fixed
		100%	100%	80%	20%	20%	80%	%	0%	0%
Operation, Maintenance and Repair (OM&R)										
Salaries and Frin	$ 266,096	$ 266,096	$ 266,096	$ 212,877	$ 53,219	$ 53,219	$ 212,877	0%	$ -	$ -
Administrative Expense	$ 28,000	$ 28,000	$ 28,000	$ 22,400	$ 5,600	$ 5,600	$ 22,400	0%	$ -	$ -
Operating Supplies	$ 20,980	$ 20,980	$ 20,980	$ 16,784	$ 4,196	$ 4,196	$ 16,784	0%	$ -	$ -
Contract Services	$ 7,840	$ 7,840	$ 7,840	$ 6,272	$ 1,568	$ 1,568	$ 6,272	0%	$ -	$ -
Other Services and Charges	$ 155,462	$ 155,462	$ -	$ 124,370	$ 31,092	$ 31,092	$ 124,370	0%	$ -	$ -
Depreciation	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0%	$ -	$ -
Total OM&R	**$ 478,378**	**$ 478,378**	**$ 322,916**	**$ 382,702**	**$ 95,676**	**$ 95,676**	**$ 382,702**		$ -	$ -
Capital Improvement (See CIP Calculation Document)	$ 77,347	$ 77,347	$ 77,347	$ 61,878	$ 15,469	$ 15,469	$ 61,878	0%	$ -	$ 77,347
Operating Reserves	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0%	$ -	$ -
Debt Expenses	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0%	$ -	$ -
Miscellaneous	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0%	$ -	$ -
Total Water System Expenses	**$ 555,725**	**$ 555,725**	**$ 400,263**	**$ 444,580**	**$ 111,145**	**$ 111,145**	**$ 444,580**		**$ -**	**$ 77,347**

RICK SNYDER
GOVERNOR

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
LANSING

C. HEIDI GRETHER
DIRECTOR

June 19, 2018

Mr. Brian Chapman
City of Vassar
287 East Huron Avenue
Vassar, Michigan 48768

Dear Mr. Chapman:

SUBJECT: Stormwater, Asset Management, Wastewater (SAW)
City of Vassar
SAW Grant Project Number 1285-01

We have reviewed the information contained in the rate methodology dated March 30, 2018. It has been demonstrated that significant progress has been made, as determined by the department, toward achieving the funding structure necessary to implement the program.

Accordingly, the applicant has fulfilled the significant progress requirement and complies with Section 5204e(3)(a), Part 52, Clean Water Assistance, of the Natural Resource and Environmental Protection Act, 1994 PA 451, as amended.

If there are any questions regarding approval of the rate methodology, please contact Mr. Robert Schneider in the Revolving Loan Section, Drinking Water and Municipal Assistance Division, by phone at 517-388-6466, or by mail at DEQ, P.O. Box 30817, Lansing, Michigan 48909-8311.

Sincerely,

Sonya T. Butler

Sonya T. Butler, Section Manager
Revolving Loan Section
Drinking Water and Municipal Assistance Division
517-284-5433

cc: Ms. Mary G. Martin, Executive Director, Michigan Finance Authority
Mr. Eric Pocan, DEQ

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date October 30, 2018
(no later than 3 years from executed grant date)

The City of Vassar *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1285-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or No

   If No - Date of the rate methodology approval letter: June 19, 2018.

2) Significant Progress Made: Yes or No

   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)

3) Date of rate methodology review letter identifying the gap: ____________.

4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ____________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Name		Phone Number	Email
Dean A. Oparka, PE	at	810-341-7500	doparka@rowepsc.com

10-30-18

Signature of Authorized Representative (Original Signature Required) Date

Brian Chapman, City Manager

Print Name and Title of Authorized Representative

DEQ

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Due Date October 30, 2018
(no later than 3 years from executed grant date)

The City of Vassar *(legal name of grantee)* certifies that all stormwater asset management plan (SWAMP) activities specified in SAW Grant No. 1285-01 have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SWAMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

Dean A. Oparka, PE	at 810-341-7500	doparka@rowepsc.com
Name	Phone Number	Email

Signature of Authorized Representative (Original Signature Required) — Date: 11-5-18

Brian Chapman, City Manager
Print Name and Title of Authorized Representative

CITY OF WAKEFIELD
SAW Grant Asset Management Project
Asset Management Plan Summary

City of Wakefield
SAW Grant Asset Management Plan
Grant No. 1360-01
Richard Brackney, City Manager
509 Sunday Lake Street
Wakefield, MI 49968
906.229.5131 Extension 1003

Executive Summary

This sanitary sewer Asset Management Plan (AMP) is intended to provide an assessment of the sanitary sewer system assets and to provide an opinion of asset conditions and future needs. Operating, maintenance, and replacement costs are reviewed for system assets and the desired level of service of the major assets is defined for the utility.

The goal of an AMP is to use system-wide information to determine the life cycle cost for maintenance, repair, and replacements to maintain the desired level of service. By performing pre-emptive maintenance on the system, and timing repairs before they become emergencies, the City can make the most of their funds over the long term.

A summary of the sanitary sewer system assets is listed in Table 1 below:

Table 1: System Asset Summary		
Total Gravity Sewer	130,629	LFT
Total Force-Main Sewer	23,985	LFT
Total Manholes	510	EACH
Lift Stations	9	EACH

The breakdown of pipe sizing for the system is shown in Table 2 and shown in Figure 1 at the end of this summary:

Table 2: Sanitary Sewer Sizing Breakdown		
Pipe Diameter	Length	
2" Forcemain	5,395	LFT
4" Forcemain	5,099	LFT
6" Forcemain	952	LFT
8" Forcemain	5,965	LFT
12" Forcemain	1,255	LFT
6" Sewer Main	5,634	LFT
8" Sewer Main	89,532	LFT
10" Sewer Main	7,441	LFT
12" Sewer Main	20,970	LFT
15" Sewer Main	7,371	LFT
18" Sewer Main	2,677	LFT
21" Sewer Main	2,323	LFT

The makeup of the sanitary sewer sizing is reflected in Figure 1 below:

Figure 1 - Pipe Size Breakdown

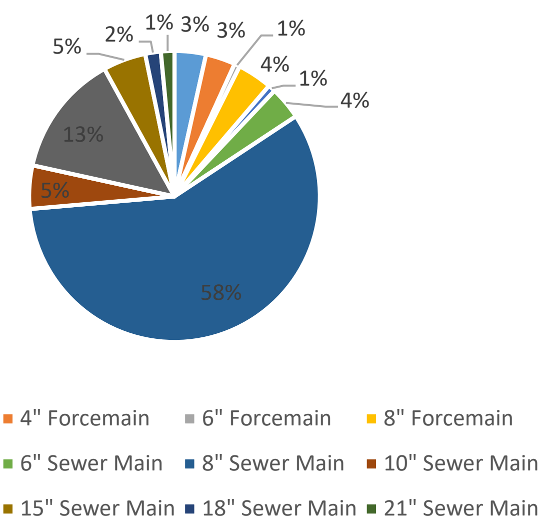


Table 3 indicates the quantity of each material making up the City's sanitary sewer system. Figure 2 located at the end of this summary shows the locations of the sewer main by material type.

Table 3: Sanitary Sewer Material Breakdown		
Pipe Material	Length	
Cast Iron Pipe (CIP)	5,394	LFT
Cured in Place Pipe (CIPP)	4,163	LFT
Ductile Iron Pipe (DIP)	6,612	LFT
High Density Polyethylene Pipe (HDPE)	10,983	LFT
Polyvinyl Chloride (PVC)	97,490	LFT
Reinforced Concrete Pipe (RCP)	8,037	LFT
Truss Pipe	2,437	LFT
Vitrified Clay Pipe (VCP)	19,498	LFT

A majority of the City's system has been upgraded to a plastic product over the past 22 years. The newer plastic piping has a lower possibility of catastrophic failure from collapse or breakage, and newer pipes generally have a longer service life. Approximately 17% of the City's system consists of vitrified clay and concrete pipe. This type of pipe is significantly older than the plastic piping and more prone to failure due to age. It is also subject to higher infiltration rates at joints. Figure 2 provides a visual breakdown of the materials within the system.

Figure 2 - Pipe Material Breakdown

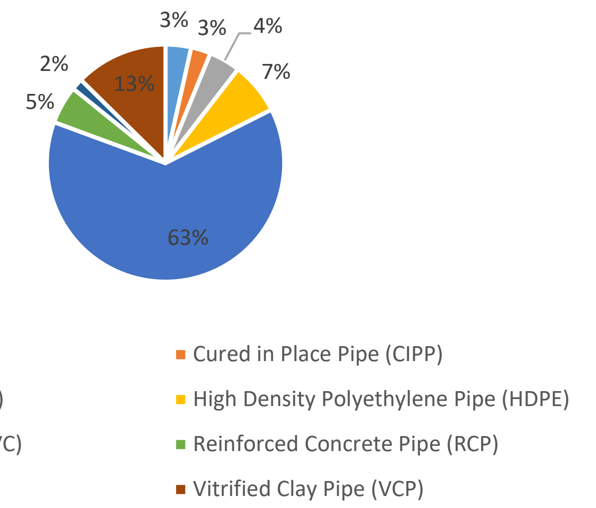


Figure 3 at the end of this summary shows the locations of the sewer main by pipe age.

Wastewater Collection System Asset Inventory

A complete inventory and condition assessment of all components of the City's Sanitary Sewer System was conducted to gather information on the assets. These assets are broken down into three categories: manholes, pipes, and lift stations. The inventory and condition assessments were performed through multiple methods. Records research was performed on existing drawings to get a general idea of system layout and asset locations, and where feasible, manual surveys were performed.

A Level 1 Manhole Assessment and Certification Program (MACP) inspection was performed on all manholes in the City's system, with some additional Level 2 data logged. A Level 1 inspection provides basic condition assessment information to evaluate the general condition of a manhole, while Level 2 inspections gather and record detailed information to fully document all defects, determine condition of the asset, and provide the specific information needed to recommend corrective action. Data was logged using a custom tool for tablets, allowing for generation of a final inspection report for each manhole. GPS equipment was used to collect the location of each manhole for mapping. Measurements were made within each manhole to establish invert elevations of connecting pipes.

Sewer main evaluations were performed using the Pipe Assessment and Certification Program (PACP) methods for televising pipes. Reports and videos for each of the televised sections of pipe were prepared by PACP certified televising contractors and reviewed by GEI. Information gathered from televising, along with information from record drawings and other historical records was used to determine the condition of each section of pipe.

Lift stations were inspected and evaluated through various visual and analytical means. Records research was performed to collect and determine existing information for each of the lift stations and a visual inspection of each lift station was made. A review of the past operation performance and a review of the history of repairs was also completed. Vibration and infrared monitoring was performed initially to create baseline readings and to identify imminent potential failures. Subsequent readings were recorded yearly and changes and trends were noted and evaluated. These readings allowed DPW staff to find and diagnose potential problems and to avoid future failures.

Table 4 provides a summary of the condition ratings that were used for all assets. After the asset was evaluated a condition rating was assigned to each asset. Asset Inventory tables for Sanitary Sewer Manholes, Sanitary Sewer Pipes, and Sanitary Sewer Lift Stations are enclosed with this summary in Tables C-1, C-2, and C-3. These tables show the condition ratings that were assigned to each asset.

Table 4: Condition Assessment Ratings	
Condition Rating	Description
5	Asset Unserviceable - Over 50% of asset requires replacement
4	Significant deterioration - significant renewal/upgrade required (20 -40%)
3	Moderate deterioration - Significant maintenance required (10 -20%)
2	Minor Deterioration - Minor maintenance required (5%)
1	New or Excellent Condition - Only normal maintenance required

As part of the system study, a risk assessment was performed for each of the system assets. This risk assessment was completed using a combination of the asset's condition rating, as well as the asset's criticality, or consequence of failure rating. The Condition Rating number assigned varied between 1 and 5 with 1 being a minor defect grade and 5 being the most significant defect grade. The resulting condition rating allows the City to prioritize those items where both condition and consequence of failure are used to determine areas of concern and prioritize maintenance schedules. Table 5 shown below, summarizes the condition rating assigned to the asset types listed:

Table 5: Condition Ratings - System Assets					
Asset Type	Rated Condition				
	1	2	3	4	5
Sanitary Sewer (LFT)	119,018	15,499	16,165	3,807	125
Manholes	326	85	73	21	5
Lift Stations	-	9	-	-	-

In addition to the above Condition Assessment Rating, a Business Risk Factor Rating is produced for each asset. This rating is the product of the condition and criticality ratings described above to give a Business Risk Factor Rating, which scales from 1 (least risk) to 25 (highest risk). A Business Risk Factor of one is an asset that has a low probability of failure and has a low criticality that poses an insignificant disruption to the System, while a Business Risk Factor of 25 is an asset that has a significant chance of failure and would cause a significant disruption in the system if it did fail. The City has identified any items with a Business Risk Factor Rating of greater than 16 to be of sufficient risk to require a plan for repair or replacement. The Business Risk Factor for each asset is also listed in Tables C-1, C-2, and C-3 at the end of this summary.

Criticality of Assets

The City's Sewer System was evaluated, and a criticality rating was given to all sections of the system. The Criticality Ratings are based on a scale of 1 to 5, with 5 being the most critical. High criticality indicates that the system component is essential to the operation of the system and/or serves a critical customer or part of the system. Low criticality ratings indicate that the system component would cause minor disruptions if something were to happen and service was interrupted.

Table 6: Criticality of Asset

Performance Rating	Description
5	Catastrophic disruption
4	Major disruption
3	Moderate disruption
2	Minor disruption
1	Insignificant disruption

The most critical areas of the City's system are located on the downstream sections of the system near the main lift station and on the line transporting wastewater along Highway M-28 and northward to the lagoons. As you progress from the outstretches of the system, downstream, to the City's main lift station, there is typically more wastewater flow due to large portions of the system draining to these areas. Therefore, a disruption to sewer mains in these areas are likely to cause more significant disruptions and affect more customers. The City's sewer lift stations were also given higher criticality ratings as disruptions to these components typically are more expensive and difficult to repair. Areas of this system that were rated with lower criticality ratings are typically located on the outer edges, serve fewer customers, and have lower flows. Disruptions to these areas would affect less people and are generally easier to correct.

Level of Service Determination

The minimum level of service for the City's Sewer System has been set at being able to provide functional wastewater collection for flows from the City's residents without disruption, overflow, discharge events, or violations of standard wastewater collection practices. Potential violations include sewer backups that cause wastewater to either come to surface or to back up into individual service lines and basements. In order to prevent sewer backups, the City must maintain their lines in a satisfactory condition by repairing collapsed pipes, jetting and cleaning lines that pose additional risk due to solids build-up, slope, or condition concerns. In addition, lift stations must be kept operational and be capable of pumping the necessary flows to avoid backups. Proper provisions for backup power or bypass pumping must be maintained to avoid backups during extensive power outages.

Revenue Structure

The City's current sanitary sewer rate is made up of a number of different charges that make up a total fixed rate of $30.13 per month per customer plus an additional usage charge of $6.02 per 1,000 gallons. A summary of the various components of the sewer rate is shown below.

Table 7: City of Wakefield Sanitary Sewer Rates

	Fixed Monthly Charge	Usage Charge, per 1,000 Gal	Effective Date
Readiness to Serve	$ 2.60		03/27/2017
		$ 3.50	12/23/2013
Rural Development Bond	$ 26.93		03/01/2010
		$ 2.52	02/12/2001
MDEQ Capital Improvements	$ 0.60		03/01/2016
Totals →	**$ 30.13**	**$ 6.02**	

The City submitted to the MDEQ their Sewer System Rate Methodology on January 31, 2018. The submittal was reviewed by the DEQ and approved in a letter to the City on May 17, 2018.

Projected annual revenues for the City's Sewer System are based on a projection of income from the City's sewer rates and charges as described in previous sections. Table 8 is a summary of the revenues collected by the City from the system's Residential and Other or Commercial users. A total of 792 Residential Customers and 84 Other/Commercial Customers were used in the revenue projections.

Table 8: Annual Revenue Calculations

Existing Customer Info - Users

Customer Type	*Users*
Residential Users	792
Other Users	84
	876

Existing 2017-18 Rate Structure	*Monthly Fixed Rate*	*Rate per 1,000 Gal*	*Users*	*Monthly Gallons*	*Monthly Revenue*	*Annual Revenue*
Residential	$ 30.13	$ 6.02	792	2,261,200	$ 37,475	$449,705
Other Users	$ 30.13	$ 6.02	84	239,800	$ 3,975	$ 47,694
		Totals→	**876**	**2,501,000**	**$ 41,450**	**$497,399**

Capital Improvement Plan

Table 9 is a summary of the capital improvements that the City intends to complete over the next twenty years. Note that the larger capital improvements are expected to be done through the assistance of one of the available grant/loan programs. This would reduce the annual cost for each by using grant funds and/or spreading out the expected costs over a longer period of time.

Table 7.4.3: Capital Improvements Summary	
10-Year Capital Improvements Summary	
Location	Estimated Construction Cost
Misc. Sewer Main Repair/Replacement (0-10 Years)	$164,000.00
Manhole Rehabilitation	$44,000.00
Lagoon Structure Repair	$22,000.00
0-10 Year Total →	**$230,000.00**
20-Year Capital Improvements Summary	
Location	
WICO Sewer Main Replacement	$748,000.00
Chicagon Mine Sewer Main Replacement	$983,000.00
Industrial Park Sewer Main Replacement	$281,000.00
Misc. Sewer Main Repair/Replacement (11-20 Years)	$528,000.00
Lift Station Upgrades	$991,000.00
Lagoon Dredging	$2,284,000.00
11-20 Year Total →	**$5,815,000.00**
Total →	**$6,045,000.00**

Recommendations

In general, the majority of the assets that make up the City's Sanitary Sewer System are in good condition. A large portion of the system has been repaired or replaced in the last 20 plus years and the remaining older assets in the system are not viewed to be in immediate danger of failing. The biggest problems in the City's system stem from high amounts of inflow which can overwhelm lift stations and collection system piping during heavy rain events. It is thought that a large portion of the clear water inflow into the system comes from roof drains located on the flat roofed buildings located throughout the City. During heavy rain events large amounts of water are introduced to the collection system immediately and combined with other sources of inflow and infiltration can cause surcharging of the system. Additionally, it is suspected that basement floor drains and sump pumps in residential areas is also a large contributor to the inflow problem.

Over the course of this study, all components of the sewer system have been evaluated. Upon conclusion of these evaluations, various summary reports were generated and presented to the City. The reports called out the deficiencies identified and included recommendations for correction. Some of these deficiencies have been corrected by the City over the past several years, while some are still unresolved. This summary is a comprehensive list of the deficiencies identified during all the previous studies and evaluations, and it is recommended that the City use this document as a guide to prioritize repairs and work towards reducing the amount of I&I that enters the system during wet weather events.

The City's current rate structure provides sufficient funds to cover the current operation and maintenance costs of the system. However, if expenses continue to rise, it can be expected that the operation and maintenance costs will exceed revenues in the coming years if there is not some type of rate increase. It is advised that the City review the current rate system and evaluate the need for a rate increase. It is recommended the City review past and future expenses including capital improvements projects outlined above when examining future rate increases to determine if they are sufficient to meet the expected future expenditures.

This Asset Management Plan should be considered a working plan and updated annually to reflect changes in the City's Sewer System, rate structures, budgets, or other facets of the plan.

List of Major Assets

See the following enclosed figure and tables for a list of the City's major assets:

- Figure 1: Sanitary Sewer System Map by Pipe Diameter
- Figure 2: Sanitary Sewer System Map by Pipe Material
- Figure 3: Sanitary Sewer System Map by Pipe Age
- Table C-1: Sanitary Sewer Manhole Inventory
- Table C-2: Sanitary Sewer Pipe Inventory
- Table C-3: Sanitary Sewer Lift Station Inventory

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date November 30, 2018
(no later than 3 years from executed grant date)

The City of Wakefield *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1360-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or **No**

   If No - Date of the rate methodology approval letter: **May 17, 2018**.

2) Significant Progress Made: **Yes** or No

   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)

3) Date of rate methodology review letter identifying the gap: **N/A**.

4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on **N/A.**

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

John Granato at 906-364-3422

Name | Phone Number | Email

John C Granato 11/8/18

Signature of Authorized Representative (Original Signature Required) | Date

John C Granato

Print Name and Title of Authorized Representative

Stormwater, Asset Management, and Wastewater (SAW)
Asset Management Plan Executive Summary Guidance
City of Watervliet, Michigan

Wastewater Sewer System

Date: November 11, 2018
To: Mr. Clarence Jones
Re: Organization: Michigan Department of Environmental Quality
From: Wightman & Associates, Inc.
Re: City of Watervliet SAW Grant: Summary of Wastewater Asset Management Plan

Grantee Information:
City of Watervliet
PO Box 86
Watervliet, MI 49098
citymanager@watervliet.org
Mr. Tyler Dotson; Manager
Ph: (269) 463-6769
SAW Project #: 1319-01

Executive Summary: *Summary of the project scope, and grant and match amount, if applicable. List the key components that make up an Asset Management Plan (AMP).*

An asset management program is a tool for community leaders and utility managers to proactively decide when to repair, replace or rehabilitate assets and how those improvements will be funded to maintain a perpetual level of service. The Key Components of the Asset Management Program (AMP) are:

1) Asset Inventory and Condition Assessment.
2) Level of Service.
3) Criticality of Assets.
4) Capital Improvement Plan.
5) Asset Management Financial Plan and Revenue Structure.

The program is organized into three components that answer the following questions:

Asset Management Program (AMP):

- What level of service will be provided?
- What improvements need to be made and when?
- What changes to operations need to be made?
- How will these improvements and changes be funded?
- How is the plan implemented?

Geographic Information System (GIS):

- What do we own, where is it, what is the condition and what is the remaining life?
- What are the most critical assets?
- Where was maintenance performed and what was done?
- Where are improvements needed?

System User Manual:

- How will the asset management program tools be used?
- How will the asset management program be maintained and updated?
- How will the asset management program provide a guide for planning decisions?

		Sanitary	Storm	Total
1)	Total Grant:	$510,000	$250,000	$ 760,000
2)	Less: Match	$ 51,000	$ 25,000	$ 76,000
3)	Net Grant:	$459,000	$225,000	$ 684,000

Wastewater Asset Inventory: *Describe the system components included in the AMP. Discuss how they were located and identified, if applicable. Describe the platform used to develop and maintain the inventory of assets.*

The City of Watervliet operates a wastewater collection system consisting of 11.3 miles of collection system gravity pipe and 667 feet of pressurized force main, a grinder station, and one lift station that convey the wastewater from the City to the Paw Paw Lake Sewage Treatment System where the wastewater goes for treatment.

With a thorough knowledge of the basic layout of the collection system, a comprehensive inventory of all wastewater system assets was performed using as-built utility drawings and on-site Global Positioning System (GPS) field locations. Using the data collected, detailed maps of the wastewater collection system were prepared using Geographical Information System (GIS) software. The mapping was prepared using the state plane coordinate system, allowing the operator to obtain coordinates for and accurately locate system assets in the field utilizing handheld GPS equipment.

Condition Assessment: *Discuss the condition assessment process, including what methods were used. Summarize the results of the assessment for each asset category. The percentage of good, fair, and poor for each category can be used, if preferred.*

After completing the comprehensive inventory of the utility system assets, conditional assessments of all asset components were performed. The condition assessment provides the critical information needed to assess the physical condition and functionality of the assets in the collection system and estimate their remaining service life. All gravity lines were inspected using cameras inserted into the sewer pipes. Videos are available to both City and Wightman personnel via links in the system GIS map. The City has one lift station at River Oaks with a 200-foot, 4-inch diameter force main and a grinder station at the ballfields off Baldwin Avenue with a 467-foot, 2-inch force main.

During the field inspections, any manhole, pipe, and/or equipment defects were noted and classified using a standard coding system based on the National Association of Sewer Service Companies (NASSCO) numerical grading system, which defines the severity of observed defects. Grades for both structural and operation and maintenance defects were assigned based on the severity of the immediate defect and the likelihood of further defect deterioration or asset failure. The numerical grading system uses numbers ranging from 1 (new asset, no or minor defects) to 5 (defect requiring immediate action).

Once field inspections were completed for each asset and individual defects were graded, an overall condition rating was applied to each asset, again using a numerical system ranging from 1 (very good condition) to 5 (very poor condition). Overall condition ratings for pipes were based on NASSCO Pipeline Assessment Certification Program methodology. Overall condition ratings for manholes were based on NASSCO Manhole Assessment Certification Program Level 1 inspection methodology. Overall condition ratings for lift stations were based on physical inspection of the major components and drawdown testing to determine the performance of the pumping equipment.

Condition Rating	Description
1	New or Excellent (Very Good)
2	Minor Deterioration (Good)
3	Moderate Deterioration (Fair)
4	Significant Deterioration (Poor)
5	Unserviceable (Very Poor)

Level of Service Determination: *Discuss the level of service the municipality has determined that it wants to provide its customers based on the municipality's ability to provide the service and customer expectations. Discuss the procedures used to involve stakeholders in the AMP discussion. What are the trade-offs for the service to be provided? This may include any technical, managerial, health standard, safety, or financial restraints, as long as all regulatory requirements are met. Discuss how this was determined.*

The Level of Service (LOS) defines the way in which the Owner desires the facility or utility to perform over the long term. The LOS should ensure that all regulatory requirements are met and should include any technical, managerial, or financial components the Owner deems necessary to meet customer expectations. The LOS is a fundamental part in defining how the City of Watervliet wastewater system will be operated and maintained in the future. As with all components of the AMP, defining the desired LOS will be an ongoing process.

The Asset Management Team developed the statements in the following Table to define the desired level of service for the wastewater system:

Major Area	Goals and Objectives	Level of Service Statements
Clean Effluent Water	All federal and state water quality regulations will be complied with.	NA-Treatment is at Paw Paw Lake
Health and Safety	Provide a safe and injury free work place. Protect the public health. Protect the environment.	Regular safety meetings – monthly at a minimum.
Security	Secure all wastewater facilities from unauthorized access and intrusions.	All control panels and vaults will be padlocked at all times.
Operator Certification	Provisions for appropriately credentialed and experienced operators.	Jeff has S3, Mark has S2, D3 The City is in the process of implementing a succession planning process. It is desired to have two certified operators for water and sewer systems.
Administrative	Provide excellent customer service.	Produce accurate, timely billing. Have someone available between 8:30am and 5:00pm to answer calls.
Customer Complaints	Provide excellent customer service.	Respond to customer complaints within one day and communicate through close of issue.
Response Time	Provide excellent customer service.	Respond to emergency calls within two hours at all times and non-emergency calls within one day during normal business hours.
Reporting	Follow all MDEQ requirements	Meet all MDEQ requirements
Regulatory Changes	Be aware of regulatory changes and be in position to comply with changes as they occur.	Attend continuing education programs to retain certification at a minimum. Route applicable correspondence from the MDEQ to all affected staff.

Major Area	Goals and Objectives	Level of Service Statements
Rules and Regulations	Monitor and enforce all wastewater ordinances.	Review wastewater ordinances periodically – annually at a minimum. Enforce provisions of wastewater ordinances.
Emergency Power Source	Provide adequate emergency power in necessary locations.	A portable generator is available to run the lift station, replacement of the transfer switch is planned. Generators shall be maintained under an annual maintenance contract.
Collection System	Maintain the following in good operating condition and prevent overflows and system back-ups: Gravity sewers. General System Maintenance.	All gravity sanitary sewers will be cleaned and those susceptible to root intrusion will be treated on a rotational basis such that 20% of entire the system is cleaned and 20% of the lines with root intrusion treated annually resulting in the entire system being cleaned every 5 years. Utilize flow monitoring results to direct ordinance enforcement for direct inflows.
Lift Station	Maintain pumps and related equipment – focus on preventative maintenance to prevent unscheduled breakdown. Lift station valve maintenance.	Maintain all mechanical and electrical equipment as needed. Visually inspect all components of each lift station monthly. Clean the equipment and verify it functions. Clean lift station wet wells semi-annually to remove grease and sediment. Exercise check valves and gate valves semi-annually (at a minimum).
Financial	Maintain a financial plan to generate sufficient revenue to operate and maintain the wastewater system.	Confirm wastewater revenues are sufficient to meet wastewater budget annually. Review sewer rates every year.
Operating Reserves	Maintain sufficient reserves to cover anticipated major expense and potential unexpected breakdowns.	Maintain a minimum of six months' operating expenses in reserve accounts.

<u>**Criticality of Assets:**</u> *Provide a summary of the method used to assess the criticality of assets considering the likelihood and consequence of failure. Based on the condition of the assets, and the determined risk tolerance, how were the assets ranked? What assets were considered most critical?*

Criticality is determined by multiplying the likelihood of failure by the consequence of failure and is a significant factor in prioritizing capital improvements. In general, the higher the criticality of an asset, the more resources that should be allocated to maintain the asset. However, criticality is only one tool that can be utilized to analyze and prioritize capital improvements and its use is subject to careful evaluation of the asset(s) in question and sound engineering judgement.

A. Likelihood of Failure

The likelihood of failure is determined by the condition rating. Below is the ranking system for likelihood of failure that was used to analyze the system. Accordance with Table 6 below.

Likelihood of Failure Rating	Asset Condition/ Description	Remaining Useful Life
1	Very Good	More than 90%
2	Good	60 to 89.9%
3	Fair	30 to 59.9%
4	Poor	10 to 29.9%
5	Very Poor	Less than 10%

Table 1 – Likelihood of failure assessment methodology

B. Consequence of Failure

To determine the consequence of failure, it is important to consider the significant costs of failure. These costs include not only the monetary cost of the repair, but could also include:

- Social cost associated with the loss of the asset.
- Repair/replacement costs related to collateral damage caused by the failure.
- Legal costs related to additional damage caused by the failure.
- Environmental costs (and possible environmental cleanup costs) created by the failure.
- Loss of business revenue to the community caused by the failure.
- Other miscellaneous costs associated with the asset failure.

The consequence of failure can be high if any one of these costs is significant or if the accumulation of several costs occurs due to a failure. In the event of the failure of a wastewater asset, the environmental, social, and legal costs can outweigh the costs of collateral damage and even the cost of repairing the failure itself. The consequence of failure for Cassopolis wastewater assets was assessed using the criteria presented in the table below:

Consequence of Failure Rating	Social, Human, and Environmental Effects[1]	Collateral Damage Effects
1 (Insignificant)	< 10% loss of service, limited potential for human contact with sewage, minimal property damage	Structure/pipe outside of road right-of-way (ROW), no impact to traffic or other structures
2 (Minor)	10% to 24% loss of service, potential for human contact with sewage, minimal property damage	Structure/pipe located under the pavement or curb of a residential or minor local road
3 (Moderate)	25% to 49% loss of service, potential for human contact with sewage, limited property damage, disruption to essential services/major industry	Structure/pipe located under the pavement or curb of a major collector roadway

[1] Loss of service for the wastewater system refers to the number of service connections impacted due to a single failure.

4 (Major)	50% to 89% loss of service, likely human contact with sewage, moderate property damage, disruption to multiple industries/essential services	Structure/pipe located along state roadways, interstate highways, railroad ROW, or close enough to a building to cause collateral damage
5 (Catastrophic)	90+% loss of service, high potential of human contact with sewage, extensive property damage	Structure/pipe located under the pavement or curb of state roadways or interstate highways, under railroad tracks, or underneath a building

C. Criticality

As previously discussed, the criticality of each asset was calculated by multiplying the condition rating corresponding to the likelihood of failure of the asset by the consequence of failure rating of the asset. As such, the range of criticality numbers that can be assigned to an asset is 1 to 25 with the criticality of the asset increasing the higher the number assigned to it, as shown in the table below. The resulting criticality of each asset is included as an attribute for that asset in the GIS mapping database.

Criticality Rating	Criticality Description
1 to 5	Very Low
6 to 10	Low
11 to 15	Moderate
16 to 20	High
21 to 25	Very High

Revenue Structure: *Discuss how the rates, charges, or other means of revenue were reviewed to determine if there will be sufficient funds to cover system operation, maintenance, replacement, capital improvement projects, and debt costs, identified in the AMP. If the current rate structure was not sufficient, discuss what increases were needed to ensure the desired level of service is sustainable and if any changes were made.*

A. Methodology – Asset Management Financial Plan:

A significant effort has been made by the Village to inventory assets, evaluate the infrastructure, and determine asset criticality. The result is the identification of asset investment cost by project and by year. The AMFP covers an extended forecast period to take this asset evaluation into account. The AMFP is a four-step process:

1) Historical comparison with audits and budgets.
2) Test year, or normalized budget year, along with inflation assumptions for purposes of forecasting.
3) Proof of rate to revenue for reliance on customer data.
4) Cash flow forecast including revenue, operating expense, capital spending, debt, and fund balance (i.e., actual cash and investment balance).

The analysis is "cash basis" approach as described in the AWWA Manual of Rate Making Practices. From year to year, this AMFP may be used to implement policy regarding rate management and budgeting.

B. Management Summary

1. Rates: Rate increase of 6% per year through 2029 with 1.5% per year thereafter.
2. Cash Balance: Maintain average cash balances above 6/9 months of operating expenses.
3. Debt Financing: Secure a 40 year, $3M USDA Loan at 3.25% in 2020.

AMFP – Management Tool: The AMFP is a living document. It is most effective as a tool used annually for budget and user rate decisions.

Capital Improvement Plan: *Describe the long-term Capital Improvement Plan that was developed to address system needs identified in the AMP. Provide a list of the identified improvements/projects.*

Capital improvement projects are projects that a utility has an extended period of time to plan for and are typically projects that cover high-cost, non-recurring expenditures. To ensure that the desired LOS can be maintained, a long-term plan for required capital improvements, known as a Capital Improvement Plan (CIP), is required as part of an AMP. The CIP helps to ensure that the long-term reliability needs of the utility are met. The CIP is based upon planning for those capital improvements determined to be required or likely to be required due to the likelihood of failure of the assets and their criticality. The planning period for a CIP is 20 years to allow for the development of a rate structure adequate to finance those projects that can reasonably be predicted to be needed during that period.
The table below lists the recommended capital improvement projects as well as cyclical improvement projects (i.e. equipment replacement) over the next twenty years for the wastewater collection system.

Priority	CIP Year	Project Name	Estimated Cost
1	2020	Abandon Sewer North of Arclight Brewery	$12,000
2	2020	Church Ct - MH just south of Butternut to South	$29,000
3	2020	Line from First Street to Metering Chamber 2	$63,000
4	2020	Line to Interceptor from Paw Paw Avenue on Mill Site	$54,000
5	2020	North Court East of Main	$30,000
6	2020	Replace sewer in Church St alley	$42,000
7	2020	Replace Sewer on Walnut west of Lewis	$13,000
8	2020	Riverside east of Richard Ave	$14,000
9	2025	East St Joseph at Allen Court	$11,000
11	2025	Lewis Street Sewer Lining	$34,000
12	2025	Line sewer across St Joseph	$19,000
13	2025	Richard South of Van Atter Ct	$9,000
14	2025	Riverside between Lewiston and Richard - replace 100'	$22,000
15	2025	Van Atter - East of Richard	$68,000
16	2030	Allen Court at Saint Joseph	$21,000
17	2030	Crossing of Red Arrow West of Lewis Street	$11,000
18	2030	Lewis Street from St Joseph North 270'	$26,000
19	2030	Sutherland North of Brown Street	$15,000
20	2035	East Saint Joseph east of Sutherland Avenue	$13,000
21	2035	High View Street	$18,000

Total Estimated Project Cost for 20 Year CIP (current dollars) = $524,000
Total Estimated Project Cost for 20 Year CIP (inflation adjusted[2] costs) = $593,000

[2] Twenty-year inflation adjusted calculations assumed a compounded annual inflation rate of 2% per year.

List of Major Assets: *Provide a general list of the major assets identified in the AMP.*

The table on the following page contains a summary of the City's Assets:

Item	Quantity	Units
Forcemain	667	LF
MH	257	EA
4" San	33	LF
6" San	614	LF
8" San	29414	LF
10" San	7502	LF
12" San	13921	LF
15" San	5023	LF
18" San	2784	LF
24" San	52	LF
Total Sewer Pipe	***59,640***	LF

Table 2 - Wastewater System Assets

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date **November 30, 2018**
(no later than 3 years from executed grant date)

The City of Watervliet, Michigan *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1319-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or **No**

   If No - Date of the rate methodology approval letter: 5/14/18

2) Significant Progress Made: Yes or No

   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)

3) Date of rate methodology review letter identifying the gap: ______________________.

4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ____________________________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Mr. Tyler Dotson at **(269) 463-6769** **citymanager@watervliet.org**
Name Phone Number Email

David McBrinker 13 Nov 18
Signature of Authorized Representative (Original Signature Required) Date

Mr. David Brinker, Mayor
Print Name and Title of Authorized Representative

it's all about people

Stormwater, Asset Management, and Wastewater (SAW)
Asset Management Plan Executive Summary Guidance
City of Watervliet, Michigan

Stormwater Sewer System

Date: November 11, 2018
To: Mr. Clarence Jones
C/O: Michigan Department of Environmental Quality
From: Wightman & Associates, Inc.
Re: City of Watervliet SAW Grant: Summary of Stormwater Asset Management Plan

Grantee Information:
City of Watervliet
PO Box 86
Watervliet, MI 49098
citymanager@watervliet.org
Mr. Tyler Dotson; Manager
Ph: (269) 463-6769
SAW Project #: 1319-01

Executive Summary: *Summary of the project scope, and grant and match amount, if applicable. List the key components that make up an Asset Management Plan (AMP).*

An asset management program is a tool for community leaders and utility managers to proactively decide when to repair, replace or rehabilitate assets and how those improvements will be funded to maintain a perpetual level of service. The Key Components of the Asset Management Program (AMP)

1) Asset Inventory and Condition Assessment
2) Level of Service
3) Criticality of Assets
4) Capital Improvement Plan
5) Asset Management Financial Plan and Revenue Structure

The program is organized into three components that answer the following questions:

Asset Management Program (AMP):

- What level of service will be provided?
- What improvements need to be made and when?
- What changes to operations need to be made?
- How will these improvements and changes be funded?
- How is the plan implemented?

Geographic Information System (GIS)

- What do we own, where is it, what is the condition and what is the remaining life?
- What are the most critical assets?
- Where was maintenance performed and what was done?
- Where are improvements needed?

System User Manual

- How will the asset management program tools be used?
- How will the asset management program be maintained and updated?
- How will the asset management program provide a guide for planning decisions?

	Sanitary	Storm	Total
1) Total Grant:	$510,000	$250,000	$ 760,000
2) Less: Match	$ 51,000	$ 25,000	$ 76,000
3) Net Grant:	$459,000	$225,000	$ 684,000

Stormwater Asset Inventory: *Describe the system components included in the AMP. Discuss how they were located and identified, if applicable. Describe the platform used to develop and maintain the inventory of assets.*

The first step in developing an AMP is to identify the equipment, infrastructure, personnel, tools, and anything else that comprises or services the utility in question. A GIS location and mapping software system was used to pinpoint the location and inventory of the system assets. The inventory of system assets will be continuously updated in this GIS locating and mapping software.

Description:

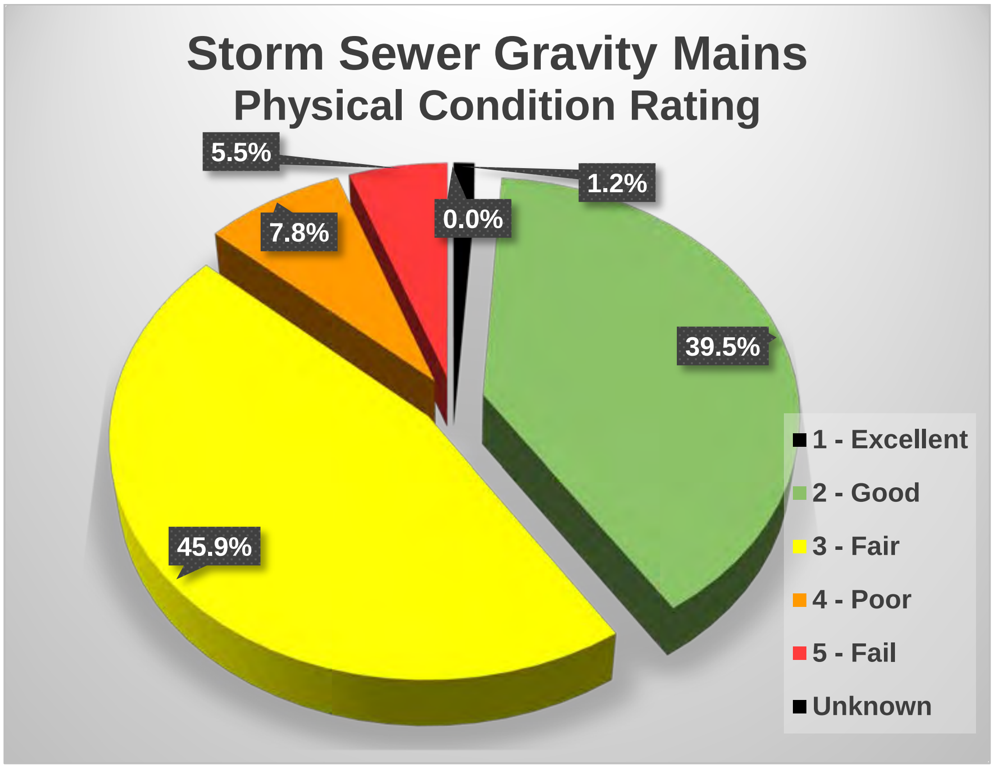
Through this inventory of the storm sewer system and review of historical data, it was determined that the stormwater collection system includes more than 33,000 feet of gravity sewer, over 330 storm structures, over 3,600 feet of storm culverts, and about 14,850 feet of open drains. The stormwater collection system serves the majority of the City and conveys flow with primary outfalls being into the Paw Paw River and its tributaries.

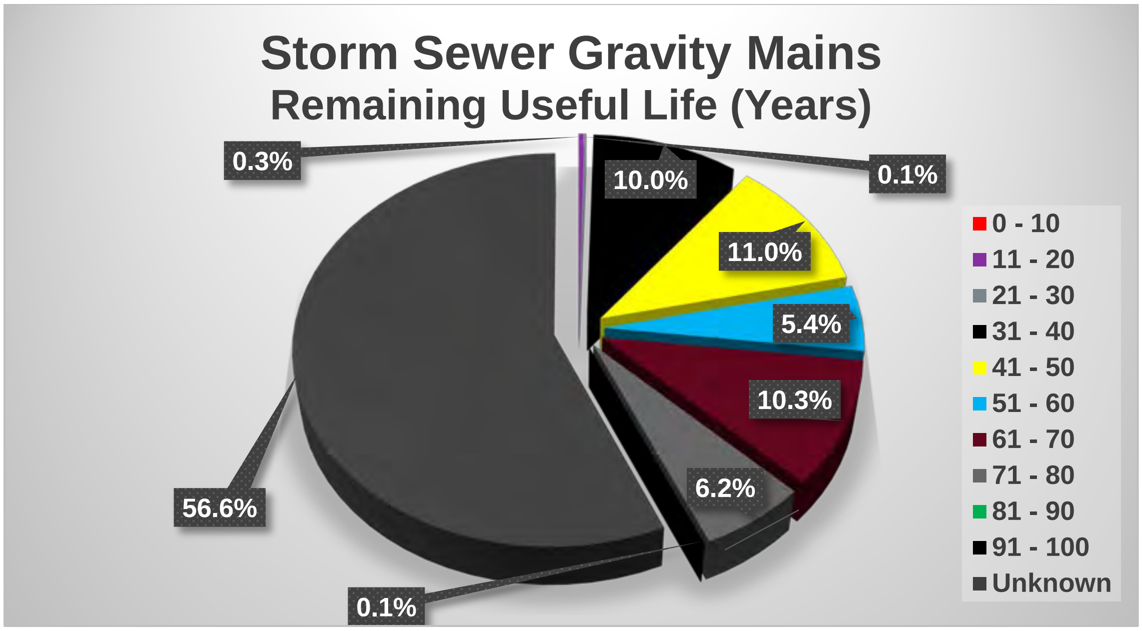
Condition Assessment: *Discuss the condition assessment process, including what methods were used. Summarize the results of the assessment for each asset category. The percentage of good, fair, and poor for each category can be used, if preferred.*

The overall stormwater system is in fair condition with some areas in poor condition that are impacting capacity of the system. The soils within and surrounding Watervliet are also not conducive to infiltration and drainage issues are exacerbated as the water percolates into the ground very slowly.

A significant portion of the pipes in the storm collection system in the northwest quadrant are undersized for the amount of flow discharging to them. The natural drainage pathways include a substantial amount of land which is not in the City and it's possible this additional area wasn't considered during design or construction. It is also possible the original design was intended as a detention system as the ditches are very flat and blocked in several locations. There are several areas behind homes where surface water will not flow to an inlet. However, if all the surface water directly drained to an inlet, nearly all pipes in the district would be undersized. We have proposed an in-depth study of the area to endeavor to maximize detention while providing positive drainage and thereby minimize pipe replacement costs.

A good portion of the system is quite aged and deteriorated as expected for storm pipe. Several locations of collapsed or fractured pipe were identified in the CCTV that are in need of repair to restore capacity and reliability to the system.





Level of Service Determination: *Discuss the level of service the municipality has determined that it wants to provide its customers based on the municipality's ability to provide the service and customer expectations. Discuss the procedures used to involve stakeholders in the AMP discussion. What are the trade-offs for the service to be provided? This may include any technical, managerial, health standard, safety, or financial restraints, as long as all regulatory requirements are met. Discuss how this was determined.*

Level of Service: The Level of Service (LOS) defines the way in which the Owner desires the facility or utility to perform over the long term. The LOS should ensure that all regulatory requirements are met and should include any technical, managerial, or financial components the Owner deems necessary to meet customer expectations. The LOS is a fundamental part in defining how the City of Watervliet storm water system will be operated and maintained in the future. As with all components of the AMP, defining the desired LOS will be an ongoing process.

The Asset Management Team selected the following statements to define the desired LOS for the City of New Buffalo stormwater system:

1. We will strive to maintain compliance with all regulatory requirements at all times.

2. Should a blockage or break occur, we will correct the problem as soon as possible to minimize any future flooding.

3. We will develop and implement a preventive maintenance program to reduce the likelihood of the occurrence of a blockage or breakage.

4. We will respond to customer complaints during normal business hours. Communication with the complainant or customers affected will occur.

5. We will maintain an asset management program for the system and provide reports on an as needed basis.

6. We will develop a work order system to identify, assign and track preventative and reactive work on the system and report on the status of work orders to the City on an as needed basis.

7. We will inform the customers of our desired level of service and report on the compliance with the level of service to the City on an as needed basis.

8. We will enforce our current ordinances and require permits to work within the right of way thereby reducing the number of ditches being filled in which block flow pathways.

9. We will develop and/or maintain a system of inlets for clean water inflows into the storm water collection system such as footing drains and roofs.

Criticality of Assets: *Provide a summary of the method used to assess the criticality of assets considering the likelihood and consequence of failure. Based on the condition of the assets, and the determined risk tolerance, how were the assets ranked? What assets were considered most critical?*

Criticality is determined by multiplying the likelihood of failure by the consequence of failure and is a significant factor in prioritizing capital improvements. In general, the higher the criticality of an asset, the more resources that should be allocated to maintain the asset. However, criticality is only one tool that can be utilized to analyze and prioritize capital improvements and its use is subject to careful evaluation of the asset(s) in question and sound engineering judgement.

A. Likelihood of Failure

The likelihood of failure is determined by the condition rating. Below is the ranking system for likelihood of failure that was used to analyze the system.

NASSCO Condition Assessment System	
Condition Rating	Description
1	New or Excellent (Very Good)
2	Minor Deterioration (Good)
3	Moderate Deterioration (Fair)
4	Significant Deterioration (Poor)
5	Unserviceable (Very Poor)

B. Consequence of Failure

To determine the consequence of failure, it is important to consider the significant costs of failure. These costs include not only the monetary cost of the repair, but could also include:

- Social costs associated with the failure of the asset.
- Repair/replacement costs related to collateral damage caused by the failure.
- Legal costs related to damage caused by the failure.
- Loss of business revenue to the community caused by the failure.
- Other miscellaneous costs associated with the asset failure.

The consequence of failure can be high if any one of these costs is significant or if the accumulation of several costs occurs due to a failure. In the case of the failure of a stormwater asset, social costs and/or the costs of collateral damage caused by the failure can even outweigh the cost of repairing the failure itself.

Loss of service for the stormwater system refers to number of service connections impacted due to a single isolated failure.

The consequence of failure for City of Watervliet stormwater assets was assessed using the following criteria:

Consequence of Failure Rating	Social Effects	Collateral Damage Effects
1 (Insignificant)	Minimal property damage	Structure/pipe outside of road right-of-way (ROW), no impact to traffic or other structures
2 (Minor)	Minimal property damage	Structure/pipe located under the pavement or curb of a residential or minor local road
3 (Moderate)	Limited property damage, disruption to essential services/major industry	Structure/pipe located under the pavement or curb of a major collector roadway
4 (Major)	Moderate property damage, disruption to multiple industries/essential services	Structure/pipe located along state roadways, interstate highways, railroad ROW, or close enough to a building to cause collateral damage
5 (Catastrophic)	Extensive property damage	Structure/pipe located under the pavement or curb of state roadways or interstate highways, under railroad tracks, or underneath a building

Table 1 - Consequence of failure rating scheme for stormwater assets

Utilizing the above ranking system, a thorough knowledge of the service area, and sound engineering judgement, a consequence of failure was assigned to each asset in the stormwater system. These consequence of failure values for each asset are included as an attribute for that asset in the GIS mapping data base. The consequence of failure for the various asset classes in the stormwater collection system is shown below in Figure 8-11.

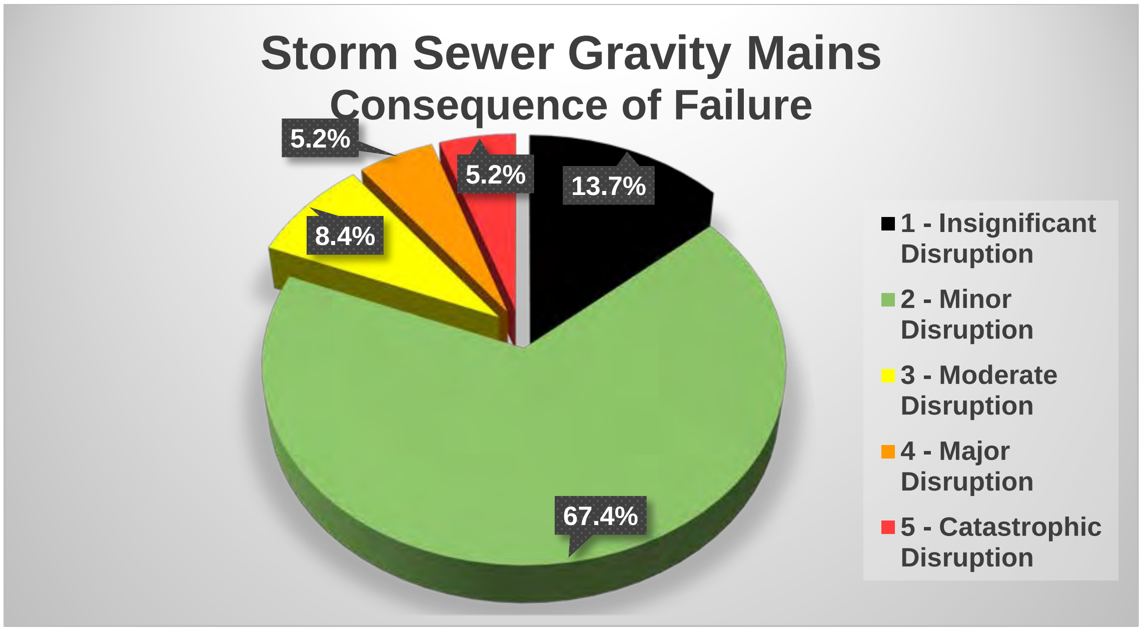


Figure 1 - Storm sewer gravity main consequence of failure rating

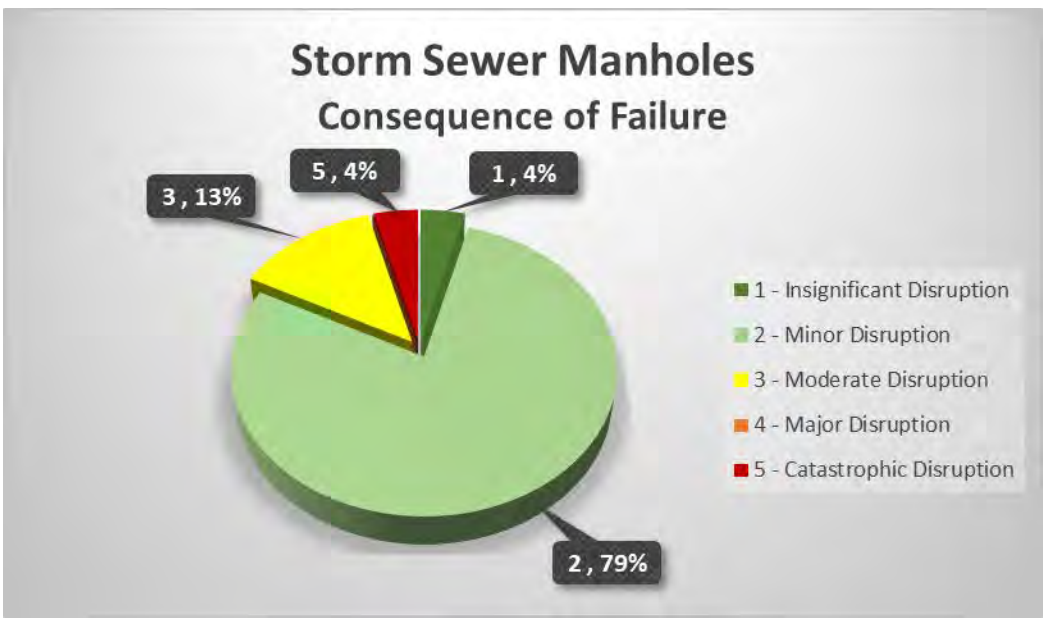


Figure 2 - Storm sewer manhole consequence of failure rating

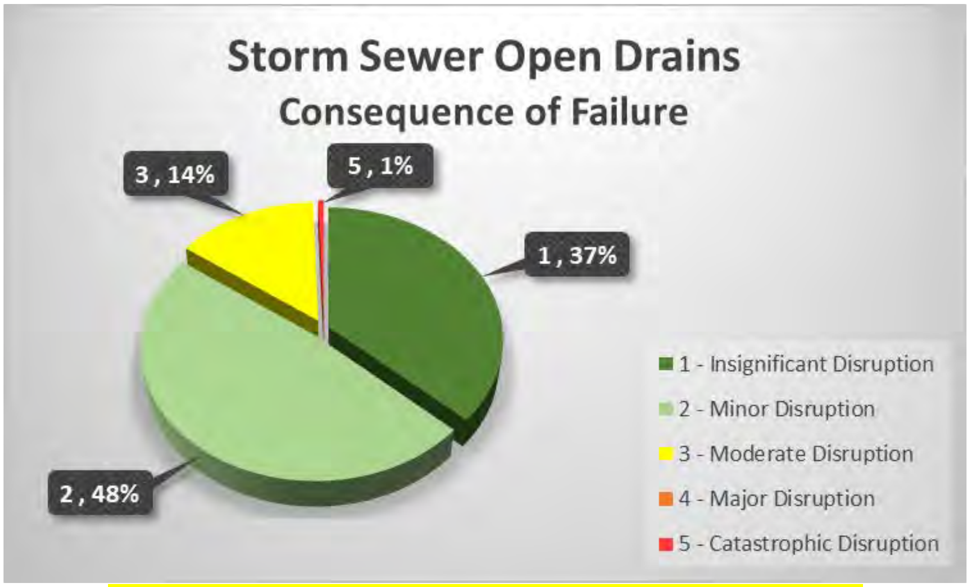


Figure 3 - Storm sewer open drain consequence of failure rating

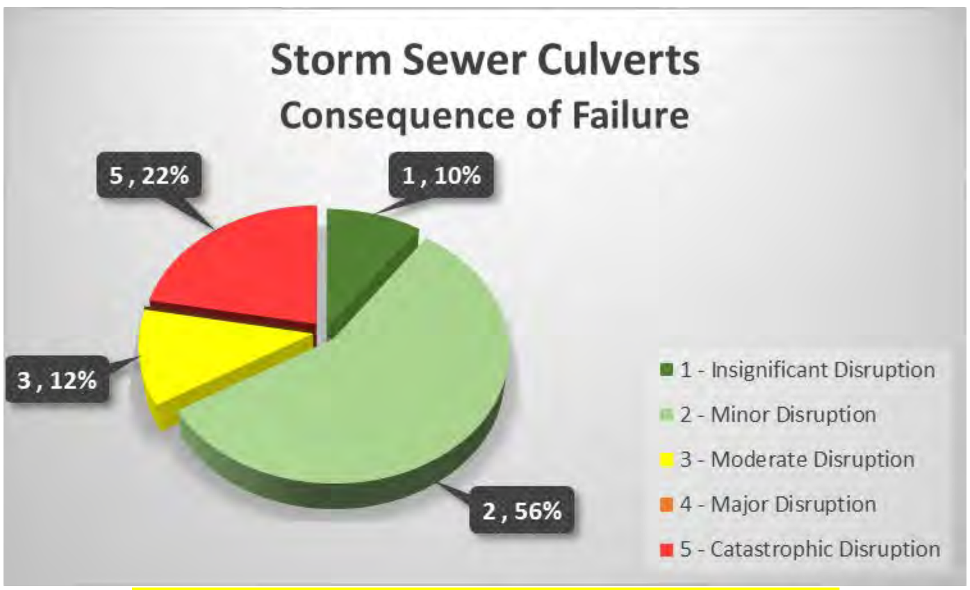


Figure 4 - Storm sewer culvert consequence of failure rating

Revenue Structure: *Discuss how the rates, charges, or other means of revenue were reviewed to determine if there will be sufficient funds to cover system operation, maintenance, replacement, capital improvement projects, and debt costs, identified in the AMP. If the current rate structure was not sufficient, discuss what increases were needed to ensure the desired level of service is sustainable and if any changes were made.*

As previously mentioned, one of the primary goals of an AMP is to develop a long-term plan for revenues capable of supporting the required capital improvements in addition to routine O&M costs. However, unlike a sanitary sewer AMP, where a source of revenue exists from sanitary sewer user fees, stormwater systems have no separate stream of revenue. Improvements to the stormwater system are usually funded as a part of a street improvement project and routine O&M costs are covered in the day-to-day operations of the City. As such, an in-depth asset management financial review (AMFR) cannot be conducted and a revenue structure cannot be developed for the stormwater system.

Capital Improvement Plan: *Describe the long-term Capital Improvement Plan that was developed to address system needs identified in the AMP. Provide a list of the identified improvements/projects.*

A. Description

Capital improvement projects are projects that a utility has an extended period of time to plan for and are typically projects that cover high-cost, non-recurring expenditures. To ensure that the desired LOS can be maintained, a long-term plan for required capital improvements, known as a Capital Improvement Plan (CIP), is required as part of an AMP. The CIP helps to ensure that the long-term reliability needs of the utility are met. The CIP is based upon planning for those capital improvements determined to be required or likely to be required due to the likelihood of failure of the assets and their criticality. The planning period for a CIP is 20 years to allow for the development of a rate structure adequate to finance those projects that can reasonably be predicted to be needed during that period.

B. Recommended Stormwater System Projects:

Table 6 lists the recommended capital improvement projects for the next twenty years for the stormwater system. Where appropriate, the estimated project costs shown below. Include engineering, construction observation, and contingency costs, thus representing the total estimated cost for the project. Detailed descriptions and cost estimates for each project listed can be found in Appendix E in the Asset Management Plan.

Priority	CIP Year	Project Name	Estimated Cost[1]
1	2019	Creation of a Storm Water Utility	$32,000
2	2019	High View Street - East	$25,000
3	2019	High View Street - Morlock Drain	$27,000
4	2019	Paw Paw west of Forest Park	$45,000
5	2020	Butternut Bridge Drain - Repair separated storm pipe	$17,000
6	2020	Myrtle Street	$79,000
7	2020	Pearl Street and Bluff View Outfall Pipe Lining	$8,000
8	2020	Repair damaged sections of pipe on Western Avenue between Twin Hills and Parsons	$3,000
9	2025	Northwest Drainage Project	$307,000
		Total Estimated Project Cost for Twenty Year Stormwater CIP (current $=	$543,000
		Total Estimated Project Cost for 20 Year CIP (inflation adjusted[2] costs) =	$597,000

Table 2 - Recommended stormwater system capital improvement projects

[1] Estimated CIP project costs shown include both engineering fees and a contingency budget, where appropriate.

A. <u>List of Major Assets:</u> *Provide a general list of the major assets identified in the AMP.*

The following is a summary of the following table contains a summary of the stormwater system assets owned by City of Watervliet that were identified and included in the stormwater AMP.

Asset Description	Quantity	Units
36” Storm Sewer	109	LF
30” Storm Sewer	329	LF
24” Storm Sewer	3,840	LF
18” Storm Sewer	903	LF
15” Storm Sewer	7,525	LF
12” Storm Sewer	16,129	LF
10” Storm Sewer	791	LF
8” Storm Sewer	2,236	LF
6” Storm Sewer	1,473	LF
Storm Culverts	3,600	LF
Storm Manhole	84	EA
Inlet Structure	251	EA
Storm Water Open Drains	14,850	LF
Storm Water Discharge Point	27	EA

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Due Date **11/30/18**
(no later than 3 years from executed grant date)

The City of Watervliet, Michigan *(legal name of grantee)* certifies that all stormwater asset management plan (SWAMP) activities specified in SAW Grant No. **1319-01** have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SWAMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

Name		Phone Number	Email
Mr. Tyler Dotson	**at**	**(269) 463-6769**	**citymanager@watervliet.org**

David M. Brinker — 13 MAY 18

Signature of Authorized Representative (Original Signature Required) Date

Mr. David Brinker, Mayor

Print Name and Title of Authorized Representative

SAW GRANT NO. 1370-01

ASSET MANAGEMENT PLAN

WHITEFORD TOWNSHIP
MICHIGAN

SEWER DISTRICT 2

September 2018

Whiteford Township, Michigan
8000 Yankee Road, Suite 100
Ottawa Lake, Michigan 49267

DAVID ARTHUR CONSULTANTS, INC.
110 Main Street
Dundee, Michigan 48131
734-823-5080
www.daceng.com

Table of Contents

UTILITY INFORMATION

OWNER

Whiteford Township
8000 Yankee Road, Suite 100
Ottawa Lake, MI 49267
(734) 856-2416

UTILITY

Sewer District #: 2
Number of Connections: 94
Number of Meter Equivalents: 104

CONTACTS

Walter Ruhl
Township Supervisor
Asset Manager
supervisor@whitefordtownship.org
(734) 854-2416

Tim Hill
Township Treasurer
Asset Manager
whitefordtreasurer@gmail.com

GENERAL INFORMATION

ABBREVIATIONS

AMP - Asset management plan
CIP - Capital improvements plan
EOL - End of life
EPA - Environmental Protection Agency
LoS - Level of service
MDEQ - Michigan Department of Environmental Quality
MMI - Maintenance maintained item
OM&R - Operation, maintenance and repair
SAW - Stormwater, Asset management and Wastewater (grant)
S2 - Sewer district 2

SYSTEM DESCRIPTION

Sewer District #2 (S2) serves Ottawa Lake and the Memorial Highway corridor of Whiteford Township. S2 extends from 1300 ft north of Brown St. along Memorial Hwy south to the Michigan/Ohio state line. The user base consists of 59 homes; 29 of those on Memorial Hwy; and 31 businesses. Within the existing sewer district, there are an additional 26 parcels that could eventually be developed for sewer use.

In the Ottawa Lake area, 4600 ft of 8-in SDR35 PVC sewer main gravity flows to a wet well directly under the pump's lift station, which is located at the volunteer fire station on Brown St. It is from there pumped through 17,600 ft of 6-in PVC force main to a manhole that is 600 ft from the state line. Billed flow is totalized by Flo-Dar sensor as it enters the manhole, from which it then exits by gravity on its way to the Lucas County wastewater treatment plant through the City of Sylvania, Ohio.

Pumps located at the lift station on Brown St. have relatively short cycle times with quick transitions up to and down from full flow. The system therefore includes 7 automatic air vent valves which limit backpressure on pump startups and vacuum on shutdowns. These vent valves have integral activated carbon canisters for odor control and are located in the (6-ft dia) manholes.

The 29 homes and one business that tie directly into the force main have 450-gallon collection basins, grinder pumps and alarm panels at each location. One business operates dual alternating grinder pumps.

There are 15 ball valves in the force main, each located in a 4-ft dia manhole.

PURPOSE AND SCOPE

This document is a planning tool for managing Sewer District 2 (S2) assets in relation to the Township's budget, and for informing future asset purchase and rate-setting decisions. It was created with funding from a Stormwater, Asset Management and Wastewater (SAW) grant awarded through the Michigan Department of Environmental Quality (MDEQ).

The key concept promulgated by the SAW Grant program is that assets are not one-time, buy-and-forget items, but recurring obligations that require a funding structure for not only operation and maintenance, but also for replacement. Included are future assets in the form of capital improvements projects (CIPs). Accordingly, this document provides the wherewithal for such stewardship.

PLATFORM AND FEATURES

Inputs for inflation and interest are included. At this writing, the national debt stands at over two-and-a-half times the money supply, and is more than the Gross Domestic Product. Failure to include both interest and inflation in future projections would induce higher error in (and perhaps largely invalidate) long term planning figures. A current year input is provided.

Other inputs are: actual reserves, both annual and accumulated, meter equivalent total, existing debt payment, other obligation (for the unexpected), quarterly customer bill amount, and CIPs.

ASSETS OVERVIEW

Individual assets typically first come into account bundled as a CIP. At the conclusion of the CIP, its components become assets, which require a cash flow. Sewer District 2 made this transition in 2014. All pertinent S2 assets are entered into an asset inventory with financial, operational, life, location, condition and replacement information for each.

Each asset creates both a present and a future funding demand. Present demands, accounted for even if relatively small, are for ongoing operation, maintenance and repair (OM&R) costs. The future demand is for asset replacement at the end of its useful (actual) life, which is almost always different from its planned life. (Planned life is used to determine annual reserve installments to cover replacement.) When within its planned life, an asset's replacement cost is inflation-adjusted to the end of that life and reduced to an equivalent annual payment (at the current interest rate). Summed for all assets, this produces the current year's required annual reserve deposit.

The amount that should have accumulated by the current year for each asset is also summed and yields the required reserve fund balance. In each year, each asset generates (at current inflation and interest rates) required amounts for both an annual payment and a reserve fund balance. The required reserve fund balance increases as assets age, the rate of increase tapering off after full replacement cost is reached at the end of the asset's planned life.

When an asset's actual life exceeds its expected life, the annual reserve fund payment is reduced to just the inflation amount, and the accumulated balance is just the inflation-adjusted replacement cost. Apart from financial figures, subjective asset evaluation information, such as that on asset condition, is reviewed and updated annually. The highest criticality is displayed along with the first asset (in the case of multiple occurrences) to which it pertains.

OPERATION

Required annual and accumulated monies for deposit into reserve are tallied for all assets, as with the CIPs.

The following items are used:

1. The Year for which asset financials are to be evaluated.
2. The average Interest rate earned on reserve funds for the planning period.
3. Inflation is calculated using a weighted average from recent historical data.
4. Reserve Fund balance can be entered from the most recent financial statement, or can be a theoretical amount for planning.
5. Annual Reserve is the amount actually deposited into the reserve fund in the current year (or can also be a theoretical figure, as with Reserve Fund).
6. Meter-equivalent Total is the number of equivalent meters on active connections currently in the system.
7. Existing Debt Payment is the sum of existing annual debt on the system paid by all customers.

Summary figures are under Reserve Funding Requirements, including reserves needed for the 5- and 20-year planning periods. Surplus/deficit amounts are shown for annual and accumulated reserves, and carried over to the Rate Adjustments Table. The amount currently paid by customers is shown, along with the Current and Required average reserve deposits per meter equivalent (ME). The surplus/deficit amount (Surpl./Need) in quarterly bills per ME is shown. At least annually, typically after the close of the fiscal year, current values are reviewed, evaluations made, and township officials are informed so that management decisions can be made.

CONVENTIONS AND GUIDELINES

1. Assets with indeterminate lives, or those that exceed 50 years, are not recorded, including real estate, pipe, manholes, wet wells, below-grade lids.
2. This asset management plan (AMP) is for Sewer District 2 only.

FORMATTING

- Rounded whole dollar amounts are displayed.

FORMULAS AND CALCULATIONS

- All compounding is assumed to occur annually unless otherwise noted.
- Any interest earned on external reserve funds is not considered here.

LEVEL OF SERVICE

Area	Target	Goals	Level of Service	Status	Comments
Workplace and Facilities	Health and safety	Safe workplace, no MIOSHA safety violations	Worker training program. Periodic safety meetings.	✓	Fully implemented
	Security	All facilities secured against unauthorized intrusion	Employ multiple security barriers as prudent.	✓	Fully implemented
Equipment and Infrastructure	Reliability	System 100% reliable under all conditions	Monitor backup system testing. Inspect and do preventive maintenance on schedule, Ex. valve cycling. Make corrections as indicated. Any and all maintenance documented. Emergency and after-hours procedures in place. Annual review and status update of major components.	✓	Fully Implemented
	Integrity	Any leakage amounts within acceptable limits	Check metered water totals against wastewater volumes for 'unaccounted sewage'. Log and track this figure.	✓	Fully Implemented
Customer Interface	Messaging	Communicate established level of service to customers	Place permanent and periodic notice(s) on website and in direct mailers. Provide maximum advance notice for planned service interruption, 4-week if possible, with followup 48-hour and 24-hour prior notices.		
	Fairness in billing	Each user of the system pay for only, and exactly, what is used	Monitor water usage patterns and investigate any sustained diminished flows.	✓	The burden of illegal use is shared by all users.
	Emergency response	Worker(s) on-site within two hours of reported problem	Designated on-call respondent system in-place.	✓	
	General complaints	Excellent customer service	Periodic checks for correct billing. Investigate and respond within 48 business hours, escalate to higher township authorities as needed to resolve. Follow up with customer to assure satisfaction. Review complaints log annually for potential management action.	✓	On-going
Regulations	Compliance	Township management remains aware of new or changed regulations, to plan ahead	Ongoing education, webinars, conferences, training sessions, etc.	✓	Fully Implemented
Financial	Operating reserves	Sufficient reserves to cover all anticipated major expenses and potential unexpected breakdowns	Keep fund balance at a minimum of 80% of required reserve. Follow asset management plan. Check and adjust rates periodically.	✓	Fully implemented

FUNDING SUMMARY

ANNUAL UPDATES

Year	2017
Interest	2.00%
Inflation	1.36%
Reserve Fund	$23,145
Annual Reserve	$8,873
Meter-eq. Total	104
Exist. Debt Pmt.	$24,172
Other Annual	$0

Annual RRI

$85.32

DETAIL OF RESERVE FUNDING REQUIREMENTS

Requirements	**Current Reserves, Target**		**Future Reserves**	
	Annual	**Accumulated**	**5-yr (2022)**	**20-yr (2037)**
Asset Replacement	20,827	60,064	49,644	128,833
CIP	0			
OM&R	100			
Totals	20,927			
Actual Reserves	23,145			
Net Surplus/(Shortfall)	2,218			

ANNUAL ASSET REVIEW

Maximum Criticality of All Existing Assets:	2 - (lift pump, 10 HP, 200 gpm)
Asset class with highest percentage failure:	no failures or replacements
Total OM&R hours budget:	100
Total asset values, purchase:	$144,125
Total asset values, installation:	$126,950
Total of asset values, replaced:	$271,075

CAPITAL IMPROVEMENTS PROJECTS

Capital improvements projects, on adoption, are listed in the projects table below, with the targeted start and completion years and projected future cost at time funds are spent.

FUTURE PROJECT

Sewer #3 (Not approved by Township Board at this time)
Start Target 2020
Year Finish 2021

PAST PROJECTS

Sewer District 2 - $1.72 M
Year Started 2011
Year Finished 2014
Planned Cost $2.34 M
Final Cost $3.02 M partially covered by grant, balance financed

INFLATION

Current inflation number being applied is 1.36%.

Year	**CPI**	**PPI**		**Historical**
		Average	**Data**	
2010	1.6		175.4	
2011	3.2	13.7	189.1	
2012	2.1	4.0	193.1	
2013	1.5	0.8	193.9	
2014	1.6	1.6	195.5	
2015	0.1	(10.0)	185.5	
2016	1.3	(3.6)	181.9	1.36%
6-yr avg:	1.6	1.1		

ASSET INVENTORY AND CONDITION ASSESSMENT

The following is a list of major components of the district. Components were installed in 2014 and are considered in prime condition as noted:

Description	Evaluation			
	Probability	Consequences	Condition	Criticality
Lift pump, 10 HP, 200 gpm	1	1	1	1
Air vent valve w/canister	1	1	1	1
Cover, 6’ manhole, 26”ø	1	1	1	1
Force main shutoff valve	1	1	1	1
Grinder pumps, on-site	1	1	1	1
Alarm panel, on-site	1	1	1	1
Cover, 4’ manhole, 24”ø	1	1	1	1

ASSET RATING, CONDITION, AND CRITICALITY

The following rating system is used to determine how critical is the need for replacement of an asset, the “criticality,” which is the product of Probability of Failure and Consequences of Failure. Condition is a separate rating.

For each rating, the following impacts are considered: safety, social, economic, financial and environmental.

Index	Condition, percent extra maintenance required
1	New/Excellent, only normal maintenance needed
2	Good, up to 5%
3	Fair, up to 20%
4	Poor, up to 40%
5	Unserviceable, over 40%, asset needs replacement

Index	Probability of Failure
1	Improbable, Failure very unlikely
2	Remote, unlikely within the next ten years
3	Possible, likely within the next ten years
4	Probable, unlikely within the next two years
5	Imminent, likely within the next two years

Index	Consequences of Failure
1	Insignificant disruption
2	Minor disruption
3	Moderate disruption
4	Major disruption
5	Catastrophic disruption

Criticality

Criticality comprehends risk. Sewer District 2 was designed with redundant fallback layers to protect the functional integrity under multiple catastrophic hits:

- Pump station: Backup generator, capacity in wet well and collection system, bypass ports at pump station to connect external pump

- Individual feeds along Memorial Hwy.: Homeowners' backup generators to power grinder pumps, ~450 gallons capacity of basins

- Under extreme conditions, sewage can be removed from pump station or individual storage basins by pump-and-haul truck

CONCLUSION

The information used in the preparation of the full AMP was ascertained using original construction drawings, post construction as-built drawings and GPS field investigation shots to verify physical evidence. Data was catalogued, values used at time of installation, current values based on industry standards, and future values based on inflation, and amortization schedules were used in preparing tables. Tables were created and are linked through a formula system for input of deteriorated and/or replaced assets to determine part replacements.

The result of this extensive data collection and compilation of material quantities provides the Township with a comprehensive list of assets, catalogued for future review and replacement. The sewer system installed is efficient in its application and use and the AMP has provided the Township with reliable timely information for future maintenance, upgrades, and replacement of assets.

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date September 30, 2018
(no later than 3 years from executed grant date)

The Whiteford Township Board *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1370-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or No
   If No - Date of the rate methodology approval letter: 07/18/2018.
2) Significant Progress Made: Yes or No
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: ______________.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ______________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Angela Christensen, Clerk	at 734-854-2416	whitefordtwpclerk@bex.net
Name	Phone Number	Email

[signature] 7-2-2018
Signature of Authorized Representative (Original Signature Required) Date

Walter H. Ruhl, Whiteford Township Supervisor
Print Name and Title of Authorized Representative

HUBBELL, ROTH & CLARK, INC
CONSULTING ENGINEERS SINCE 1915

MAILING: PO Box 824
Bloomfield Hills, MI 48303-0824
SHIPPING: 555 Hulet Drive
Bloomfield Hills, MI 48302-0360
PHONE: 248-454-6300
WEBSITE: hrcengr.com

November 30, 2018

Michigan Department of Environmental Quality
Revolving Loan Section
Office of Drinking Water and Municipal Assistance
P.O. Box 30241
Lansing, Michigan 48909-7741

Attn: Eric Pocan, Project Manager

Re: City of Wixom — HRC Job No. 20150735
Wastewater Asset Management Plan
SAW Grant Project #1098-01

Dear Mr. Pocan:

On behalf of the City of Wixom, Hubbell, Roth, & Clark, Inc. is pleased to submit the deliverables required for the City of Wixom's wastewater Asset Management Plan (AMP). A brief discussion of each of the five major components is included along with a list of the plan's major identified assets. The signed Certification of Project Completeness form is included for the Wastewater AMP.

The City's Wastewater AMP will be available to the Department of Environmental Quality (DEQ) upon request, and a copy of the plan will be available to the public for at least 15 years. Wixom will have a copy available at the Wixom City Hall located at 49045 Pontiac Trail, Wixom, MI 48393.

If you have any questions or require any additional information, please contact the undersigned.

Very truly yours,

HUBBELL, ROTH & CLARK, INC.

Karyn Stickel, P.E.
Associate

Nancy M.D. Faught, P.E.
Partner

CR
Attachment
cc: City of Wixom: T. Sikma
Suez: M. Delaney
DEQ-WRD; Lansing District Office; C. Bennett
HRC; T. Wagonmaker, H. Davis, C. Ross

City of Wixom, Michigan
Asset Management Plan – SAW Grant No. 1098-01
Wastewater Collection System

Grantee: City of Wixom, Michigan

City Hall
49045 Pontiac Trail
Wixom MI

Hours
Monday - Thursday
7:15 am - 5:30 pm

Karyn Stickel, Consulting Engineer
Hubbell, Roth & Clark, Inc.
Phone: 248-454-6566
E-mail: kstickel@hrc-engr.com

Steven Brown, City Manager
Phone: (248) 624-0894
E-mail: CITYOFWIXOM@wixomgov.org

Tim Sikma - Public Works Director
Phone: (248) 960-0870
E-mail: DPWAdmin@wixomgov.org

Matthew Delaney, Project Manager
Suez
Phone: 248-960-0870
Email: Matthew.Delaney@Suez-na.com

The total award amount of $2,500,000 was provided to the City of Wixom to complete a Wastewater Asset Management Plan, with the City responsible for $500,000 in match funding. The final amount spent will not be available until the last disbursement request, after the November 30, 2018 deadline.

A. Asset Inventory:

The City's Geographic Information Systems (GIS) was updated to inventory all the City-owned sanitary sewer collection system asset. In addition, the pump stations and POTW assets were entered in ERPortal, a CMMS software. The City also purchased the necessary hardware and software, and received training to locate and track assets with fixed locations.

The GIS, asset spreadsheets, and CMMS will all be used to maintain asset data in the future. Below is a general list of major assets identified:

- 1,812 Sanitary Manholes
- 54 Miles of Sanitary Gravity Mains
- 2 Sanitary Sewer Pump Stations
- 1 Wastewater Treatment Plant

B. Condition Assessment:

The GIS includes fields to record the required criticality factors and hyperlinks to scanned utility plans. Representatives from HRC were physically able to assess 90 percent of the City's sanitary manhole structure inventory using the Manhole Assessment Certification Program (MACP) rating system. The City hired Metro Environmental Services to clean and televise most of the Township's eligible sanitary sewer lines that were installed before 1998 using the Pipeline Assessment Certification Program (PACP) rating system. This information was used to determine a Probability of Failure (POF) score, discussed below.

A meter study of the sanitary sewer collection system was complete to investigate inflow and infiltration in the system. The results were compared with evidence of infiltration observed during the CCTV and manhole inspections.

The POTW and two (2) sanitary sewer pump station were inspected and their condition, equipment, infrastructure, and structures were properly recorded. This included a detailed structural evaluation of the aeration channels, equalization basin, and clarifiers.

C. Level of Service:

The City developed a mission statement as part of the AMP as follows:

The City of Wixom is committed to maintaining the integrity and performance of its sanitary collection and treatment systems. The City strives to operate and maintain these systems in the most cost-effective way to efficiently meet applicable local, state and federal regulations and to protect public health and the environment. Pursuant to that goal, our asset management program will allow us to systematically identify assets most in need of repair, rehabilitation, or replacement, and budget accordingly.

The City choose to implement this statement as the defined Level of Service. The City's statement considers the impacts to public health and the system's ability to comply with regulations. The current procedures and ongoing operations of the City have successfully fulfilled this mission and will continue to be implemented. Because the level of service provided to date has been adequate, public works leaders choose to continue their ongoing processes rather than defining specific goals to track at this time. The City will review the statement and ongoing system activities annually to determine if the mission is not being successfully fulfilled and further measurement of the stated goals is necessary

D. Criticality of Assets:

Factors were developed to determine how some assets are more critical than others. A Probability of Failure (POF) was estimated for assets with inspection data based on condition using the PACP/MACP methodology, age, soil, and pipe material. A Consequence of Failure (COF) was determined based on sewer diameter, road and surface type, depth, and proximity to the railroad or water bodies. Probably of Failure (POF) and Consequence of Failure (COF) were assigned on a scale of 1-5, with 5 being the worst condition/highest consequent. A Business Risk Evaluation Score (BRE) was calculated by multiplying POF and COF.

84 percent of the City's sanitary sewer lines and 88 percent of sanitary manholes had a BRE score of 5 or less on a scale of 1 to 25, with 1 being lowest risk. Below is a summary of the BRE scores:

- Sanitary Pipes:
  - 84% BRE 1-5
  - 15% BRE 6-10
  - Less than 1% BRE 11-15
  - 0% BRE 16-20
  - 0% BRE 21-25
- Sanitary Manholes:
  - 88% BRE 1-5
  - 12% BRE 6-10
  - Less than 1% BRE 11-15
  - 0% BRE 16-20
  - 0% BRE 21-25

A criticality analysis was also done on the vertical assets based on Condition and Criticality Scores. These factors were developed through field inspections by a team of process, structural, mechanical, electrical, and instrumentation and control discipline specialists from Suez.

E. Operation and Maintenance Strategies/Revenue Structure:

Utility Financial Solutions, LLC (UFS) was contracted to complete a Rate Study for the City. The Rate Study shows a gap for 2018. A rate track is provided to fully recover the revenue gap within two years. The revenue gap will be 57% recovered with the 2019 rate increase of 9.9 percent, which were approved by Wixom's Board on May 22, 2018.

F. Long-term Funding/Capital improvement Plan

The City maintains a capital improvement plan (CIP) that has been updated and included in the full AMP. The sanitary sewer collection system, pump station, and POTW WWTP improvement projects have been recommended over the next 10 years with a total estimated cost of approximately $10,000,000.

The estimated cost for each project at the WWTP has been included in the proposed budget for the estimated year of completion. Annual sewer collection system rehabilitation costs have been budgeted based on the results of manhole inspection and CCTV.

The City is on a rate track and investigating funding opportunities. UFS will continue to work with the City to determine the appropriate next steps.

A signed Certification of Project Completeness form is enclosed.

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date November 30, 2018
(no later than 3 years from executed grant date)

The City of Wixom *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1098-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: **Yes** or No

   If No - Date of the rate methodology approval letter: ______________________.

2) Significant Progress Made: **Yes** or No

   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)

3) Date of rate methodology review letter identifying the gap: June 19, 2018.

4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on May 22, 2018.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Steve Brown	(248) 624-0894	CITYOFWIXOM@wixomgov.org
Name	Phone Number	Email

Steven Brown   11/26/18

Signature of Authorized Representative (Original Signature Required)   Date

Steve Brown, City Manager

Print Name and Title of Authorized Representative

April 2017

City of Wyoming
2350 Ivanrest Ave SW │ Wyoming, MI 49418

City of Wyoming, MI
Wastewater Asset Management Plan

November 2018

Submitted by:
Jon Burke
Operations Manager
BurkeJ@wyomingmi.gov
(616) 261-3550

CHAPTER 1 EXECUTIVE SUMMARY

1.1 PROJECT SCOPE

The City of Wyoming (City) owns and operates a regional wastewater treatment plant, lift stations and associated sanitary and storm water collection systems. The City's clean water treatment plant (CWP), treats an average of 13 MGD and serves a population of 140,000 people including residents of several surrounding communities. This system includes linear and fixed assets that must be properly managed and maintained to meet level of service objectives.

The City of Wyoming Asset Management Plan was developed in accordance with NPDES Permit Number MI00024392. The planning structure follows the Michigan Department of Environmental Quality (MDEQ) guidance including the Asset Management Plan Program Checklist (2017). The Asset Management Plan was funded through the MDEQ Stormwater, Asset Management and Wastewater (SAW) grant program. The key components of the City's SAW grant are summarized in Table 1-1. The table includes the total SAW grant and local matching funds.

Table 1-1 SAW Grant Components

Description	Sum
Project Planning Costs	$0
Design Engineering Costs	$0
User Charge System Development Costs	$0
Wastewater Asset Management Plan Costs	$1,188,252
Stormwater Asset Management Plan Costs	$0
Innovative Wastewater and Stormwater Technology Costs	$0
Disadvantaged Community Construction Costs	$0
Eligible Cost Subtotal	$1,188,252
City Matching Funds	$130,396
SAW Grant Total	$1,057,856

Note. The actual component sums may be updated based on the final project invoicing.

1.2 ASSET MANAGEMENT FRAMEWORK

The Asset Management framework is designed to achieve the following objectives:

- Utilize assets to provide defined levels of service
- Maintain a level of risk acceptable to the organization
- Achieve service level and risk objectives at the lowest life cycle cost.

The City's asset management framework incorporates policy, strategy, plans and governance for the effective management of the assets. The framework also provides a methodology for identifying and analyzing future needs and the facilities, programs, operational improvements, and policies recommended to meet those needs.

Key components of the asset management framework include:

- An agreed **policy** that establishes the principles and requirements for asset management and incorporates an accountability structure that identifies roles and responsibilities.
- A **strategy** that sets out the actions needed to implement the policy and links the asset performance to level of service objectives
- Asset management **plans** that link to the policy, strategy, long-term financial plans and intended levels of service.
- Systems that support the **operational** needs of the City to execute maintenance, manage efficiency, implement capital and report performance.

The concept is to integrate CMMS and GIS (as well as other systems) into the City's asset management plan and workflow and business processes. Data and information from the City's systems is used to balance costs, risks, opportunities and performance to achieve the City's level of service objectives.

The goal is to position the City's staff over time to address the following five questions: (taken from EPA Simple):

- What is the current state of my assets?
- What is my required level of service?
- Which assets are critical to sustained performance?
- What are the minimum life cycle costs capital improvement program (CIP) and operation and maintenance (O&M) strategies?
- What are my best O&M and CIP investment strategies?

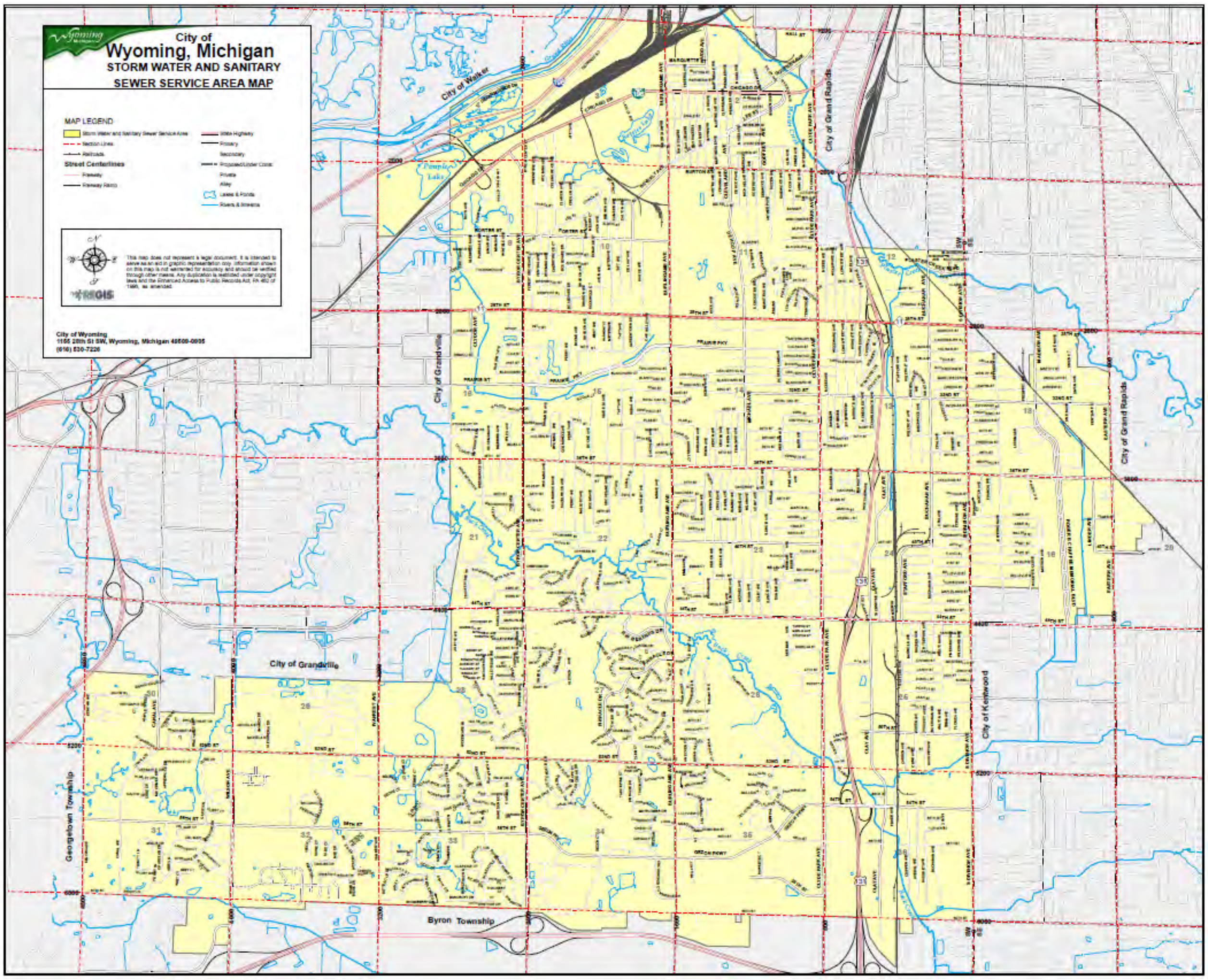
1.3 WASTEWATER TREATMENT AND COLLECTIONS ASSET INVENTORY

The City currently defines an asset as something acquired or purchased and has monetary value (its cost, book value, market value or residual value). For the purposes of updates to the asset registry and evaluation of the wastewater treatment and lift station assets, the following general asset definition was applied:

- Has a greater value than $1,000
- Has a useful life greater than 1 year
- Is the lowest level where a work order is generated, or
- Is critical to the process, regulatory compliance or personnel safety.

Linear assets in the wastewater and stormwater collection system are currently managed using Esri ArcGIS (GIS) through a regional GIS platform (REGIS). New World Software is used to manage the City's finances, including purchasing and inventory. BS&A software manages water metering and other functions within the City. The City of Wyoming service area is illustrated in Figure 1-1.

Figure 1-1 City of Wyoming Service Area

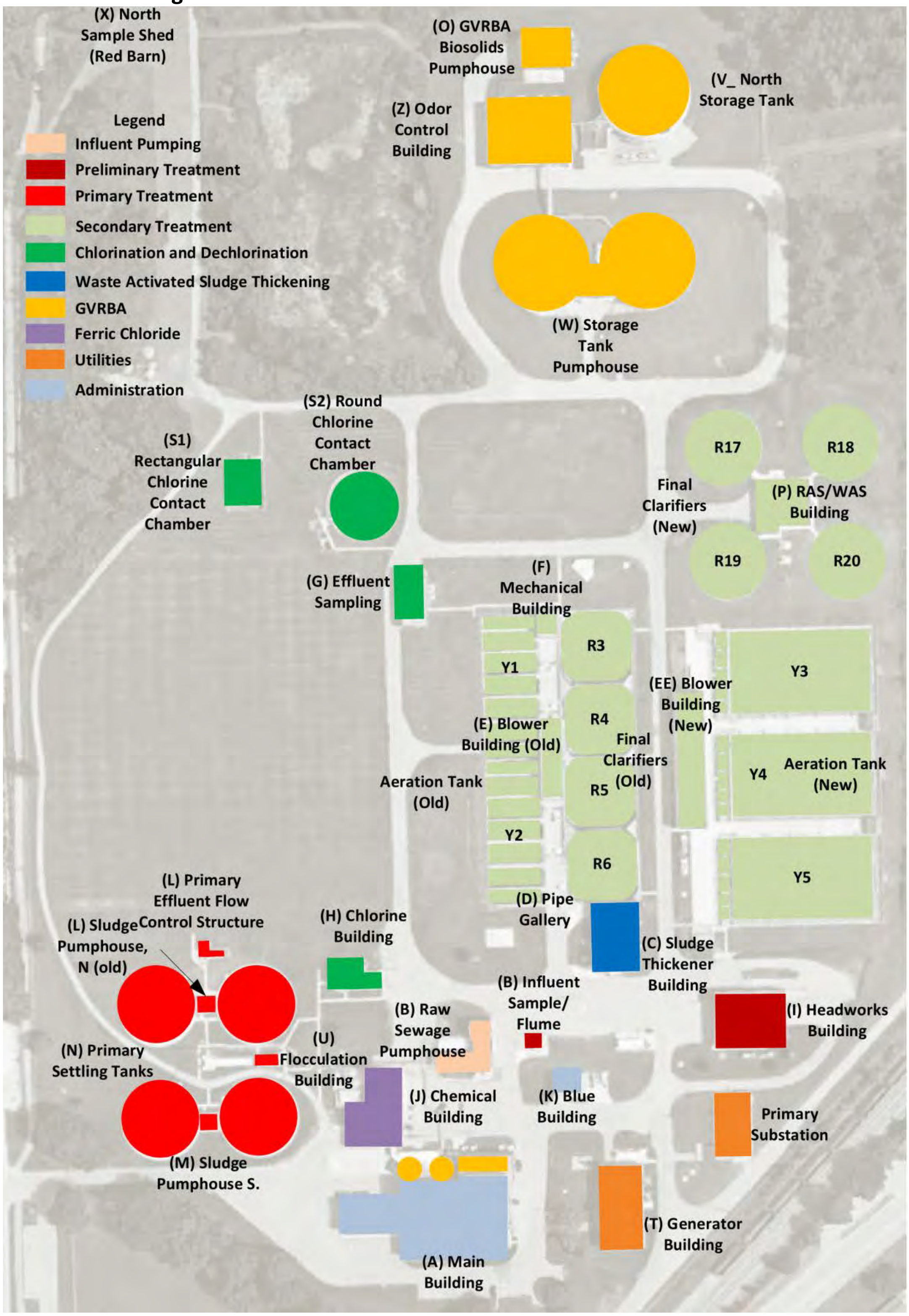


1.3.1 CLEAN WATER PLANT AND LIFT STATIONS

The CWP consists of structures and equipment that treat wastewater prior to surface water discharge. The majority of the assets are owned by the City of Wyoming. The Grand Valley Regional Biosolids Authority owns storage and pumping assets that are used to transfer biosolids from the CWP to the City of Grand Rapids. The City manages sixteen wastewater, stormwater and flow monitoring structures in the collection system.

Figure 1-2 illustrates the main structures and unit processes at the CWP. The assets are organized based on the associated structure. The assets are further organized based on a sub-location within the specific structure.

Figure 1-2 Clean Water Plant Structures and Unit Processes



1.3.2 SANITARY SEWER COLLECTION SYSTEM

The City owns and operates a network of sanitary sewer piping that collects wastewater generated within the service area. Assets within this system include piping (gravity and force mains), manholes, air-relief valves, access structures and flow regulators. The sanitary sewer collection system is comprised of 273 miles of sewer lines ranging in size from 4" to 66".

1.3.3 STORM WATER COLLECTION SYSTEM

The storm sewer system includes storm sewers, curb and gutter, culverts, retention and detention facilities, pump stations, treatment units, and all other appurtenances used to manage and convey storm water. The system includes 75 miles of stormwater pipe.

1.4 ASSET INVENTORY AND LEVELS OF SERVICE

The City's fixed asset inventory for the CWP and lift stations are developed to support the needs of the project. The fixed asset inventory is managed in the computerized maintenance management system (CMMS).

The collections and stormwater asset inventory is managed in GIS and integrated with CMMS. The inventory includes multiple attributes used to locate, identify and manage the individual assets as part of the systems.

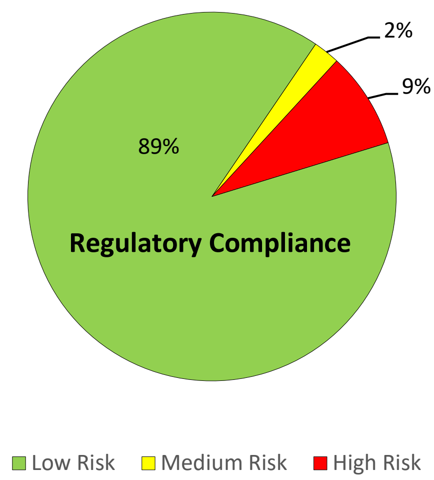
1.4.1 LEVELS OF SERVICE

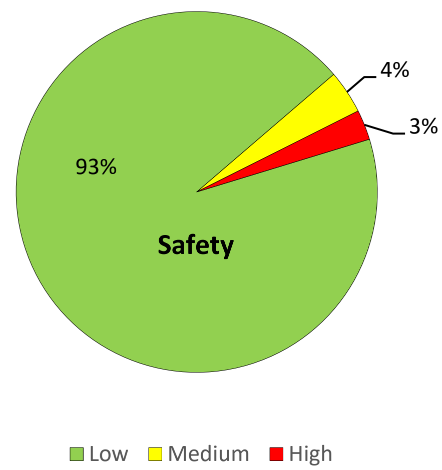
The City's level of service objectives are primarily focused on regulatory compliance with the National Pollution Discharge Elimination System (NPDES) permit and maintaining a safe work environment. The level of service objectives are managed as part of a business risk evaluation process that considers the condition, criticality and probability of failure.

1.5 ASSET ASSESSMENT

The asset management plan incorporates a fixed asset assessment based on a business risk evaluation. By assessing an asset's criticality and probability of failure, a business risk factor is calculated to identify asset risks. A summary of the fixed asset risks are illustrated in Figure 1-3.

Figure 1-3 Fixed Asset Risk





1.6 BUDGET SUFFICIENCY

The City's rate methodology provides sufficient revenue to fund the operations, maintenance and capital needs for the wastewater systems. The City's rate methodology includes the following elements:

- Maintain a minimum bond coverage ratio greater than 1.25
- Maintain a minimum working capital balance equal to 120 days of O&M and debt service costs
- Execute modest annual rate adjustments.

1.7 CAPITAL PLANNING

The City developed a Capital Improvements Plan for fiscal years 2019 - 2027. The plan projects the average annual expenditures required to meet level of service objectives and maintain aging assets for each infrastructure system. The City formed the budget by prioritizing projects they would like to complete during that term. The maintenance and capital improvement planning budget details for the upcoming year along with the planning for overall rate impacts through fiscal year 2027 are included in Table 1-2. The City also developed capital improvement planning for a 20 year horizon.

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Table 1-2 Capital Improvement Plan (Fiscal Years 2019 – 2027)

Project Number/Title	Fiscal Year (FY) ($1,000)									
	FY2019	FY2020	FY2021	FY2022	FY2023	FY2024	FY2025	FY2026	FY2027	Total
Collection System (Asset Management)	$800	$800	$800	$800	$800	$800	$1,000	$1,250	$1,250	$8,300
CWP (Asset Management)	$460	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,250	$1,250	$8,960
Meter Replacement (AMI)		$350	$350	$350	$350	$350				$1,750
Replace CWP Main Bld. RTU	$450									$450
56th and Division Sewer main		$300								$300
Replace CWP Aeration Blowers (2)	`		$2,500							$2,500
Replace UV Disinfection System			$2,500							$2,500
Totals	$1,710	$2,450	$7,150	$2,150	$2,150	$2,150	$2,000	$2,500	$2,500	$24,760
Sewer Working Capital	$1,710	$2,450	$7,150	$2,150	$2,150	$2,150	$2,000	$2,500	$2,500	$24,760
CIP Fund Cash	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date November 30, 2018
(no later than 3 years from executed grant date)

The City of Wyoming, MI *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1535-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or No

   If No - Date of the rate methodology approval letter: June 19, 2018.

2) Significant Progress Made: Yes or No

   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)

3) Date of rate methodology review letter identifying the gap ______________.

4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ______________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Jon Burke at 616-261-3576 burkej@wyomingmi.gov

Name | Phone Number | Email

[signature] 11-27-18

Signature of Authorized Representative (Original Signature Required) Date

Mr. Curtis Holt, City Manager

Print Name and Title of Authorized Representative

CITY OF YALE, ST. CLAIR COUNTY, MICHIGAN
STORMWATER, ASSET MANAGEMENT, AND WASTEWATER (SAW) GRANT 1537-01
EXECUTIVE SUMMARY
REVISED 12/11/2018

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EXECUTIVE SUMMARY

The City of Yale (Yale), with the aid of Huron Consultants (Huron), has completed the requirements of the Stormwater, Asset Management, and Wastewater (SAW) Grant for Wastewater, awarded by the State of Michigan Department of Environmental Quality (MDEQ). The Grant was awarded in November of 2015, in the amount of $354,847.00, with a local match of 10%, equating to $35,485.00, a total reimbursement of costs totaling $319,362.00, and with a timeline of 3 years to complete the requirements by November 30, 2018.

Beginning in 2015 with the SAW Grant award, Yale and Huron began to work on the plan set forth in the SAW Grant application. This Executive Summary will highlight methodology for the development of the following five (5) major components of the Wastewater Asset Management Plan (AMP):

1. Asset Inventory and Condition Assessment
2. Level of Service
3. Criticality of Assets
4. Operation and Maintenance Strategies/Revenue Structure
5. Long-term Funding/Capital Improvement Plan

The major components were comprised of multiple Tasks to methodically build the AMP, which is submitted with this package. Each of these components is expanded upon later in this report.

ASSET INVENTORY AND CONDITION ASSESSMENT

Yale operates and maintains a waste water collection system initially constructed in the early 1960's. The inventory of the system began in 2015 upon award of the Grant, with the aid of record documents and a comprehensive history of the initial system and all subsequent improvements.

Huron surveyed the entire system, and created maps using AutoCAD Civil 3D software. The information derived from that survey was compared with the records, and a comprehensive inventory of the system was created.

Asset Inventory:
272 Each Sanitary Manhole Structures
3 Each Treatment Lagoons
1 Each Pump Stations and Appurtenances
3,660’, 12” Forcemain and Appurtenances
1,031’, 6” Poly Vinyl Chloride (PVC) Sewer
3,011’, 6” Vitrified Clay Pipe (VCP) Sewer
7’, 8” Ductile Iron Pipe (DIP) Sewer
873’, 8” Reinforced Plastic Pipe (RMP) Sewer
25’ 8” Steel Pipe (SP) Sewer
11,945’, 8” VCP Sewer
219’, 10” DIP Sewer
1,759’, 10” PVC Sewer
2,549’, 10” RMP Sewer
3,281’, 10” VCP Sewer
129’, 12” DIP Sewer
464’, 12” PVC Sewer
1,501’, 12” VCP Sewer
1,041’, 12” Reinforced Concrete Pipe (RCP) Sewer
2,113’, 15” RCP Sewer
1,915’, 18” RCP Sewer

From that inventory, Huron had prepared plans and specifications to publicly bid the cleaning and televising of the system. The bid package was released in late 2016. Unfortunately, due to the high demand for these services by all other SAW Grant recipients, the bids came in over budget. Yale negotiated with, and awarded the Contract to Michigan Pipe Inspection, Inc. The cleaning and televising of the manholes and gravity sewer pipe was completed in the Fall of 2017. Michigan Pipe Inspection provided revised pipe materials and diameters. Huron then used the data to assess the overall rating of the system and focus on areas requiring improvements.

The NASSCO standards used in the development of the deliverables by Michigan Pipe Inspection made for a simple transition and assessment of data, for the pipe and manhole reports, pictures and videos. Huron used the data to categorize the Criticality of Assets, and Capital Improvement Plan (CIP), each covered later in this report. The reports for the manholes and pipe sections used the NASSCO standards for rating the condition of the assets.

About half of the gravity collection system was found to be structurally sound and with a low rating for structural, operation and maintenance concerns. The 135 priority pipes identified, in comparison to the total of over 270 pipes in the system, were found to have evidence of infiltration as observed during dry weather conditions, and some structural deficiencies.

Much of the gravity collection system is Reinforced Concrete Pipe (RCP) and Vitrified Clay Pipe (VCP). Being constructed over 40 years, there are expectedly issues regarding joints, and some structural issues. The most prevalent factors in the higher ratings of pipes included cracks, defective taps, roots, encrustation and scale, and infiltration.

Yale has contracted with Dude Solutions to prepare the Geographic Information System (GIS) data, and coordinate with the St. Clair County Geographic Information Systems (SCCGIS) Department, so that there will be layers on the County GIS website which will illustrate the wastewater system. The general public would not be able to access the background wastewater system information, only authorized County and Yale personnel.

This AMP itself was developed from the Asset Management Plan Workbook form in Microsoft Excel format provided from the MDEQ website. Huron has used the AMP Workbook for water systems for years, and it was simply altered to be specific to the Yale wastewater system. The AMP Workbook Table 1 - Asset Inventory complimented the Condition Assessment by providing the methodology to rate the criticality of each major system component at a glance, being pump stations and forcemains and appurtenances, gravity sewer collection system, manholes, the treatment lagoons, and discharge sewer and manholes.

Yale knows well which portions of the system should require critical attention. The Pump Station and most of the system is over 50 years old, however Yale has provided regular maintenance and improvements, including significant improvements in the 1990's. The forcemains were not televised, due the prohibitive cost of by-pass pumping in order to clean and televise, so the costs of cleaning and televising have been taken into consideration for cost estimating.

The AMP and CIP illustrate the scope of the proposed improvements, with a 10-year plan and beyond, to rate and address all aspects of the system that may require maintenance.

LEVEL OF SERVICE

As defined in the SAW Grant Application, Level of Service (LOS) indicates the way in which the utility stakeholders want the utility to perform over the long term. The LOS can include any technical, managerial, or financial components the utility wishes, as long as all regulatory requirements are met. The LOS will become a fundamental part of how the utility is operated.

This Level of Service Statement was developed:

> The City shall be responsible for the supervision and control of the maintenance of the existing sewer line and all new connections. The City shall be responsible for the supervision and control of all other matters related to the operation, maintenance, alteration, repair, and management of the wastewater treatment works. The City may employ such person or persons in such capacity or capacities as advisable to carry out the efficient management and operations of the system and may make such necessary or recommended rules, orders and regulations to assure the efficient management and operation of the system, including the setting of rates, surcharges, fees, penalties, or other charges, for the use of said system.

A public hearing was held at the Yale City Hall on June 26, 2017, at which time the City Council, pertinent Yale staff, and the public in attendance discussed what was involved with the SAW Grant, development of the AMP, CIP, Budget and Rate Structure. The first Sewer User Rate increase was adopted by the City Council on June 26, 2017 and went into effect for the FYE2018. A second Sewer User Rate increase was adopted on June 11, 2018, which went into effect for the FYE2019. This finalized AMP was adopted by the City Council on November 12, 2018. Minutes from pertinent meetings requiring adoptions by the City Council are provided with the enclosed Certification of Project Completeness.

CRITICALITY OF ASSETS

As said above, the Criticality of Assets developed in the AMP Workbook complimented our Asset Inventory and Condition Assessment. The AMP Workbook provided a solid base to populate the data into tables for an overall view of the system at a glance. Huron had developed an expanded Asset Inventory in Microsoft Excel, in which the ratings from the Michigan Pipe Inspection reports were entered in order to categorize which larger sections of the system might require improvements for the CIP.

The AMP Workbook was a tool used to assign the values of Condition, Probability of Failure, and Criticality of Asset, to arrive at the Business Risk of the failure of each component. Pump Stations and Appurtenances shall be considered most critical, as any pump station that becomes inoperable would cause a threat to Public Safety and Welfare, and may cause a hardship to Yale to provide emergency maintenance, by-pass pumping, or both, at a significant cost. The Force Mains associated with Pump Stations would be the next critical elements, for the same reasons stated above—costly emergency maintenance and/or by-pass pumping would be required.

Each manhole and section of gravity sewer pipe would be less critical, though a total collapse or blockage of any of those elements may lead to emergency maintenance and/or by-pass pumping. This may seem redundant, but it is the reality and must be taken into consideration when cost estimating.

The criticality of each component in the system has determined where in the CIP 10-year plan to place the most emphasis on preventive maintenance, and will be covered under the CIP.

OPERATION AND MAINTENANCE STRATEGIES/REVENUE STRUCTURE

Operation and Maintenance (O&M) Strategies have been discussed at length, culminating in the projects identified in the CIP. The oldest failing sewer pipes, being the highest priorities identified in the system, require immediate improvements. Elimination of known or potential Inflow and Infiltration (I&I) into the system will be the priority. The CIP addresses the two (2) major options in the courses of action to take: slip-lining of the sections of sewer at priority locations only, versus slip-lining of large blocks of sewer in the system each year. This may mean the difference between internally funding annual improvement projects, versus seeking supplemental external funding, specifically the State Revolving Fund.

Significant reduction in the potential for I&I will improve the future economy and efficiency of the system. Every infiltrating pipe that is slip lined or otherwise repaired contributes to the elimination of the excess volume of water that passes through the Pump Station.

Much deliberation has been put into how to fund the proposed CIP and future O&M of the system. Evaluation of the Sewer Fund Budget and Rates began in 2015, though Asset Inventory and Condition Assessment were the focus for 2016 and 2017. The annual budget had historically indicated the Sewer Fund operated in a deficit.

This is contrary to the requirements of the Enterprise Fund, so Rate Structure became the focus. One requirement of the SAW Grant was to identify and take measures to begin to rectify budget deficit prior to finalizing the AMP.

In FY2016-17, Total Revenues were $341,969.18, and Total Expenses were $411,467.95, for a deficit of $69,498.77. That deficit was covered by the 590 Sewer Fund cash balance which currently amounts to $161,697.

Yale took the initiative early in the Grant and planned for Sewer Usage Rate increases. In July 2017, Yale proposed a Sewer Usage Rate increase of 15%. On April 18, 2018, as part of the requirements of the Grant, Huron sent a letter to Robert Schneider of the MDEQ outlining the basis of Rate Structure, including increasing the Sewer Usage Rate by 15% in 2018 and 2019.

Yale then determined toward the close of the fiscal year in June 2018 that the Sewer Usage Rate increase of July 2017 had culminated in an annual surplus. FY2017-18, Total Revenues were $473,173.66, and Total Expenses were $336,535.00, for a net surplus of $136,638.66.

The rate increases beginning in 2017 have contributed to closing at least a portion of the gap, if not already guaranteed a budget surplus annually. The Sewer Usage Rate increase proposed in July 2018 was reduced to 10%, taking effect in October 2018. Yale will annually determine if the Sewer Usage Rate should be increased, continuing in June 2019.

LONG-TERM FUNDING/CAPITAL IMPROVEMENT PLAN

Yale does not anticipate removing and replacing much of the sewer system, but rather slip-lining the pipes to preserve the resources in the ground, and to minimize costly disturbance and restoration. Huron created the basis for the CIP cost estimates anticipating annual large-scale projects, slip-lining blocks of sewer per year. Once Yale has a better idea of the Sewer Fund Budget Surplus, this can be re-evaluated for internal funding, or the pursuit of external funding.

The CIP breaks down the analysis of the sewer system by Michigan Pipe Inspection for the priority pipes with the highest ratings. The AMP and CIP will be reviewed and evolve annually. Roughly $800,000 in improvements over 20 years equates to an average of about $40,000.00 per year. Yale anticipates internal funding for the CIP projects for improvements to the sewers. Long-term funding of the CIP projects may be feasible internally, if the Sewer Fund exhibits the projected Budget Surplus by the raising of the Usage Rates and Fixed Fees.

However, Yale may opt to levy against their assets to continue to pursue external funding through the State Revolving Fund, and/or United States Department of Agriculture (USDA) Rural Utilities Service (RUS) funding.

CONCLUSION

Yale is pleased to have this AMP in place to aid in the annual appropriations toward Capital Improvement Projects necessary to continue the O&M of the Wastewater System, with the mechanisms set in place to assure a balanced budget, if not a budget surplus. This AMP is a living document, to be evaluated every Fiscal Year when setting the budget.

Yale looks forward to continuing collaboration with the MDEQ on providing better public service, and also considers seeking future funding through the State Revolving Fund.

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date 11/12/2018
(no later than 3 years from executed grant date)

The City of Yale *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1537-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: **Yes** or No
   If No - Date of the rate methodology approval letter: ______________________.
2) Significant Progress Made: Yes or No
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: 04/18/2018.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on 07/01/2017.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

John G. Osborn	at (810) 387-3311	jgosborn@yalemi.us
Name	Phone Number	Email

John G Osborn — 11-21-18

Signature of Authorized Representative (Original Signature Required) — Date

City Manager

Print Name and Title of Authorized Representative

City of Zilwaukee
Asset Management Plan
Summary
November 2018

City Hall

November 17, 2018

To: Clarence Jones, Project Manager
MDEQ - Revolving Loan Section
P.O. Box 30817
Lansing, Michigan 48909-8311

From: Daniel Potter, Potter Consulting

Executive Summary
City of Zilwaukee Wastewater Asset Management Plan
SAW Grant NO. 1084-01

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General

The City of Zilwaukee provides sanitary sewer service to approximately 1,600 residents. The City of Zilwaukee encompasses 2.34 square miles or 1,497 acres and is located along the Saginaw River in Northern Saginaw County. The City is bordered on the East by the Saginaw River, Carrollton Township to the South, Kochville Township to the West, and Zilwaukee Township to the North. The City of Zilwaukee is regionally located on the Northern fringe of the Saginaw Metropolitan Area. The City is located within 10 miles of the City of Bay City and Saginaw Bay, which is a part of Lake Huron. The City is part of the Northwest Utilities Authority which also provides service to Carrolton Township, Kochville Township, Saginaw Charter Township, and Saginaw Department of Public Works. The sewage is transported to the City of Saginaw Wastewater Treatment Plant.

Public Act 562 of 2012 authorized money for Stormwater, Asset Management, and Wastewater (SAW) Grant Program. In May 2014, The City of Zilwaukee received a Stormwater, Asset Management, and Wastewater (SAW) Grant from the Michigan Department of Environmental Quality (MDEQ), Project NO. 1084-01, to provide financial assistance for the development of a wastewater asset management plan (AMP) for the City's publicly owned collection system. This AMP is intended to be a living document that is updated as assets continue to wear and age, and as additional inspection/condition results are found and incorporated into the plan.

1. **Inventory and Condition Assessment**

   As part of the grant process an inventory of all wastewater assets was developed on an ESRI Geographical Information System (GIS) platform. The inventory includes all gravity pipes, forcemains, manholes and pump stations. The manholes and pump stations were located using Global Positioning Satellite (GPS) equipment. The gravity lines and forcemains were then digitized from City of Zilwaukee record drawings. The record drawings were then scanned and attached to the appropriate element in GIS.

   Condition assessment for the gravity pipes was performed by using CCTV to inspect the sanitary sewers. The CCTV inspections were conducted using third party NASSCO PACP certified contractors. This information and the videos of the pipes were incorporated into the GIS platform. Manhole condition assessment was performed by certified NASSCO MACP inspectors and this information was incorporated into the GIS. Pump Station condition assessment was performed by experienced consultants and engineers and is also incorporated into the GIS.

   Major Components of the City of Zilwaukee Sanitary Sewer System

   Lift Stations: Two (2) Smith and Loveless Can Type

   Gravity Main: 63,037 feet, ranging from 8” to 18” with materials including PVC, VCP, and RCP

   Force Main: 400 feet of 6” ductile iron pipe
1,064 feet of cast iron pipe

   Manholes: 2,227

1. **Level of Service Statement**

Mission Statement

The City of Zilwaukee strives to operate the utility system in the most cost effective and efficient manner while meeting and exceeding all Federal, State, and Local regulations.

Safety and Security

Maintain a safe and secure utility system that meets all regulations.

Regulatory

Comply with all local, state and federal regulations at all times

Staffing

Maintain appropriate levels of staffing, and experience throughout the City. Ensure operations staff are provided appropriate training.

System Operation and Maintenance

Actively maintain the sanitary sewer system on a regular basis. Maintain twice weekly checks of the lift stations and an ongoing televising program that will televise the system on a 5-year rotating basis. Actively use SCADA to prevent flooding and overflows. Reduce inflow/infiltration (I/I) flow volumes to mitigate potential for sanitary overflows, water in basements, and overloading of treatment plant. Provide adequate collection system and treatment capacity for all service areas.

Customer Service

Provide rapid and effective responses to public concerns and system emergencies.

Funding

Regularly review projected O&M and capital expenditures. Adjust user rates, as necessary, to ensure sound financial management of wastewater system.

2. **Criticality of Assets**

Business Risk is the determination of criticality of each asset in the wastewater system. Criticality is based on two factors: 1) Likelihood of Failure and 2) Consequence of Failure. Defining an asset's Business Risk allows for management of risk and aids in decision making for where to allocate operation and maintenance and capital improvement funds.

Likelihood of Failure (LoF) is a measure of how likely an asset is to fail. Each asset was given a score from 1-5 with 1 being new or in good working condition and 5 being poor condition or eminent failure. The following categories have been developed to quantify how likely an asset is to fail:

- Condition of the asset
- Remaining useful life (Age)
- Anticipated life
- Maintenance history
- CCTV Inspections where applicable

Consequence of Failure (CoF) is a measure of the social, economic or environmental impact of failure of an asset and on the utility's ability to convey wastewater. Each asset was given a score from 1-5 with 1 being minimal impact and 5 being catastrophic impact. CoF categories of the wastewater collection system include:

- Location of asset
- Critical facilities served by asset
- Size
- Depth

Using the strategy outlined above, a Business Risk Evaluation (BRE) was performed for each asset of the City of Zilwaukee. The Business Risk score, also known as Criticality, is calculated for each asset using the following equation:

Business Risk = Consequence of Failure Score x Likelihood of Failure Score

3. Capital Improvement Program (CIP)

A Capital Improvement Program was developed and is updated it on a regular basis. The AMP is one of the tools used to identify potential capital projects. The 2018 CIP includes refurbishing the Schust and Sherman Lift Station. The 5-Year CIP is attached.

Pipes and Force Mains

Pipes and forcemains were assigned LoF, CoF, and BRE values based on the above. A CIP was then developed in order to prioritize the projects and provide funding estimates for budget and rate purposes. The analysis indicated that 17 of the 219 pipe segments or 7.7 % were in need of repairs in the near future. These 17 segments have been prioritized for trenchless repair. An additional 31 segments or 14.1% are in fair shape and will require point repairs or grouting at some point. The remaining 171 segments or 78% were found to be in good to excellent condition The City has allocated $30,000 per year for the next 20 years to make the necessary repairs.

Manholes

Manholes were inspected by certified MACP inspectors and then LoF, CoF, and BRE were developed as outlined in Section 2 above. Fourteen (14) manholes or 6% were in need of near-term attention. Ninety-five (95) manholes or 42% were found to need some minor maintenance. The remaining 117 manholes or 52 % were found to be in good shape. The manholes in need of service have been added to the CIP. These manhole repairs are included in the $30,000 per year for the next 20 years.

Lift Stations

There are two lift stations that are maintained by the City of Zilwaukee: Schust & Sherman, and Wellington. Both City of Zilwaukee stations were inspected by Rowe PSC and Potter Consulting. The Wellington station was found to be in fair condition with and is expected to provide another 10-15 years of service. The Schust and Sherman station was found to be in poor condition and is schedule to be completely refurbished in December 2018 at a cost of approximately $100,000. There are two additional pump stations inside the City that are operated and maintained by NWUA.

4. **OPERATIONS, MAINTENANCE AND REPLACEMENT**
   Regular operation, maintenance and replacement (OM&R) is essential in the management of a wastewater collection system. The collection system is subject to a variety of operational problems and can suffer from clogging, scour, corrosion, and collapse. Inspection, cleaning, and rehabilitation are important for optimizing the proper functioning of the collection system. By optimizing the performance infiltration/inflow are reduced and sanitary sewer overflows (SSO) are minimized or eliminated preserving the substantial investment the community has in its collection system. An annual equipment replacement fund should be developed to replace disposable equipment. These are items that can be financially accounted for through operation, maintenance and replacement (OM&R) funds and can be replaced by DPW staff without bringing in an outside contractor. Existing disposable materials include, wear parts in pumps and motors, compressors, sump pumps, etc.

5. **Funding and Rate Structure**
   The revenue and rate methodology is an instrument to determine user rates and charges that will provide sufficient revenues to pay for utility operating costs. A study was conducted by Potter Consulting in 2015 and is updated on an annual basis. The rate methodology required by the MDEQ for SAW Grant Management Plans requires an analysis of the current budget on a cash basis to determine if there is a revenue gap. The analysis performed in 2018 by Potter Consulting showed that a revenue gap did exist for current utility operations. The City Council passed a rate increase on May 7, 2018 increasing the rates by approximately 20% in order to meet the 10% minimum increase required by the SAW Grant. The City is committed to a 20% increase in each of the next four years to eliminate the gap.

City of Zilwaukee

Sanitary Sewer System Capital Improvement Program (CIP)

Five Year CIP 2018 - 2023

Project Number	Capital Improvement Program	Project Status	2018 Construction Costs	Contingencies	Total CIP Project Cost
	Projects Currently Shovel Ready				
Project 1	Refurbish Schust and Sherman PS	2018 Construction	$100,000.00	$10,000.00	$110,000.00
	Subtotal		**$100,000.00**	**$10,000.00**	**$110,000.00**
	Proposed Projects				
Project 2	2019 Gravity Main and Manhole Repairs	Pending	$30,000.00	$3,000.00	$33,000.00
Project 3	2020 Gravity Main and Manhole Repairs	Pending	$30,000.00	$3,000.00	$33,000.00
Project 4	2021 Gravity Main and Manhole Repairs	Pending	$30,000.00	$3,000.00	$33,000.00
Project 5	2022 Gravity Main and Manhole Repairs	Pending	$30,000.00	$3,000.00	$33,000.00
Project 6	2023 Gravity Main and Manhole Repairs	Pending	$30,000.00	$3,000.00	$33,000.00
	Subtotal		**$150,000.00**	**$15,000.00**	**$165,000.00**
	Total CIP Costs		**$250,000**	**$25,000**	**$275,000**

Updated November 2018

Prepared by:

Potter Consulting

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date November 30, 2018
(no later than 3 years from executed grant date)

The City of Zilwaukee *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1084-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes
   If No - Date of the rate methodology approval letter: ________________________.
2) Significant Progress Made: Yes
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: May 25, 2018.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on May 7, 2018.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Mary Bourbina at:	989-755-0931	mbourbina@zilwaukeemichigan.gov
Name	Phone Number	Email

Eugene C Jolin 11/17/18

Signature of Authorized Representative (Original Signature Required) Date

Eugene Jolin, Mayor
Print Name and Title of Authorized Representative