ATTACHMENT I

CMMS DATA

All assets for the Wastewater Treatment Facility, Sewage Pumping Stations, CSO Basins and ancillary systems have been entered into the CMMS, arranged in a parent-child hierarchy (see Fig. 1). The types of information available for an asset are shown in Fig. 2. Information includes a Bill of Materials, PM types and frequencies, and Work Statuses.

KPI templates (Fig. 3) have been developed within the CMMS and will be populated with data beginning in 2014.

Each asset has 3 pages of data (Fig. 4, Fig. 5, Fig. 6), including its Criticality value (see Fig. 4).

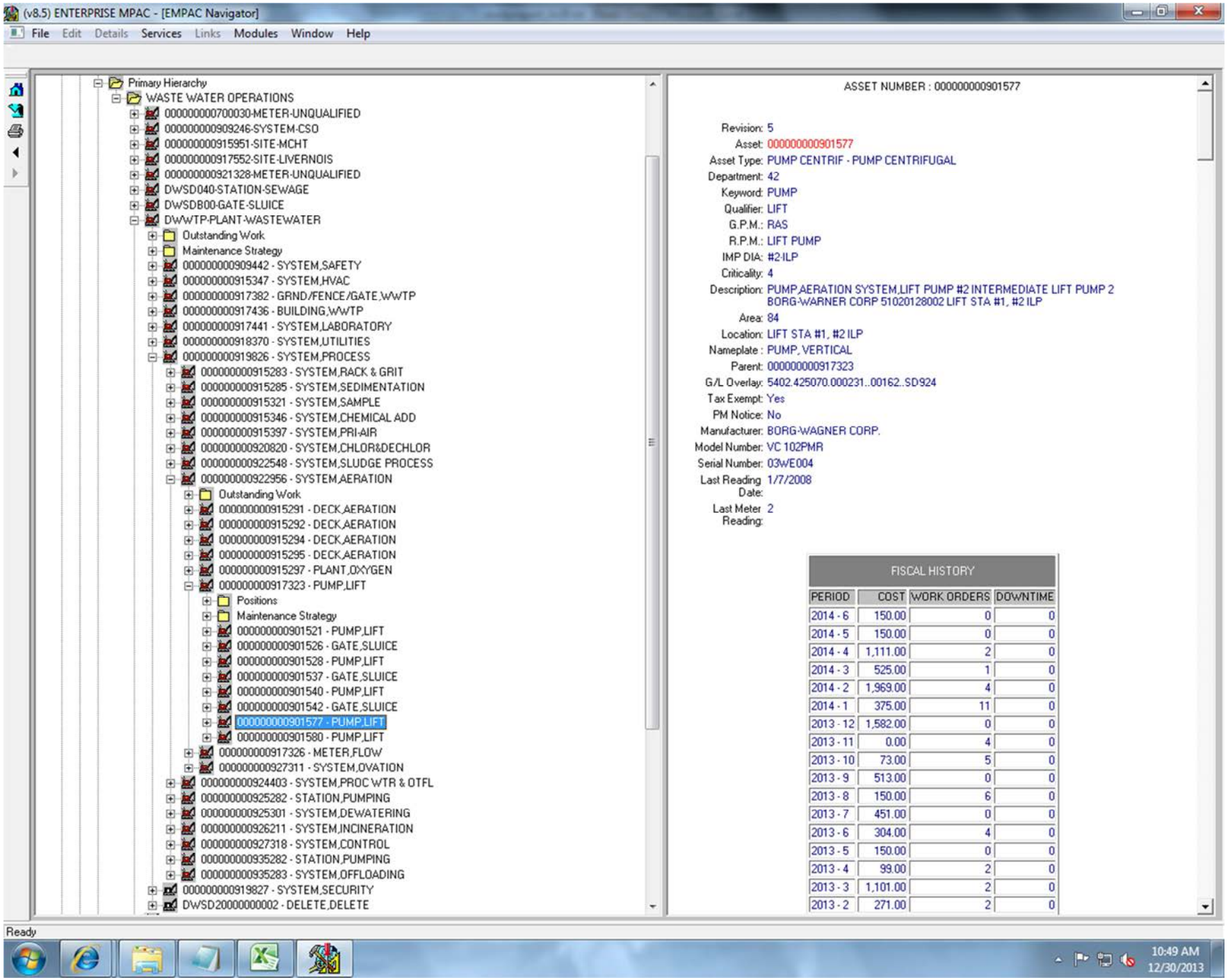


Fig. 1: Asset Hierarchy-Overview

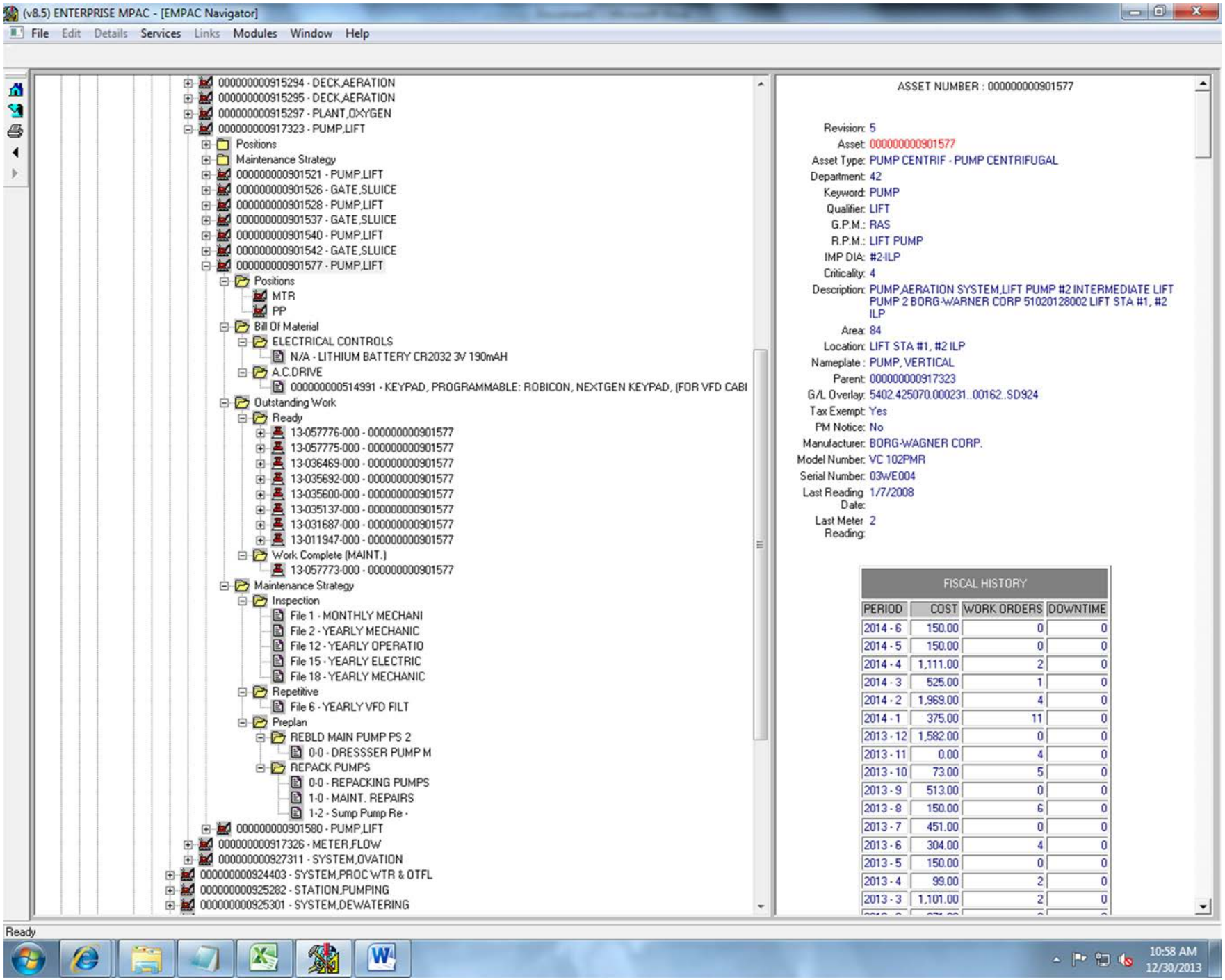
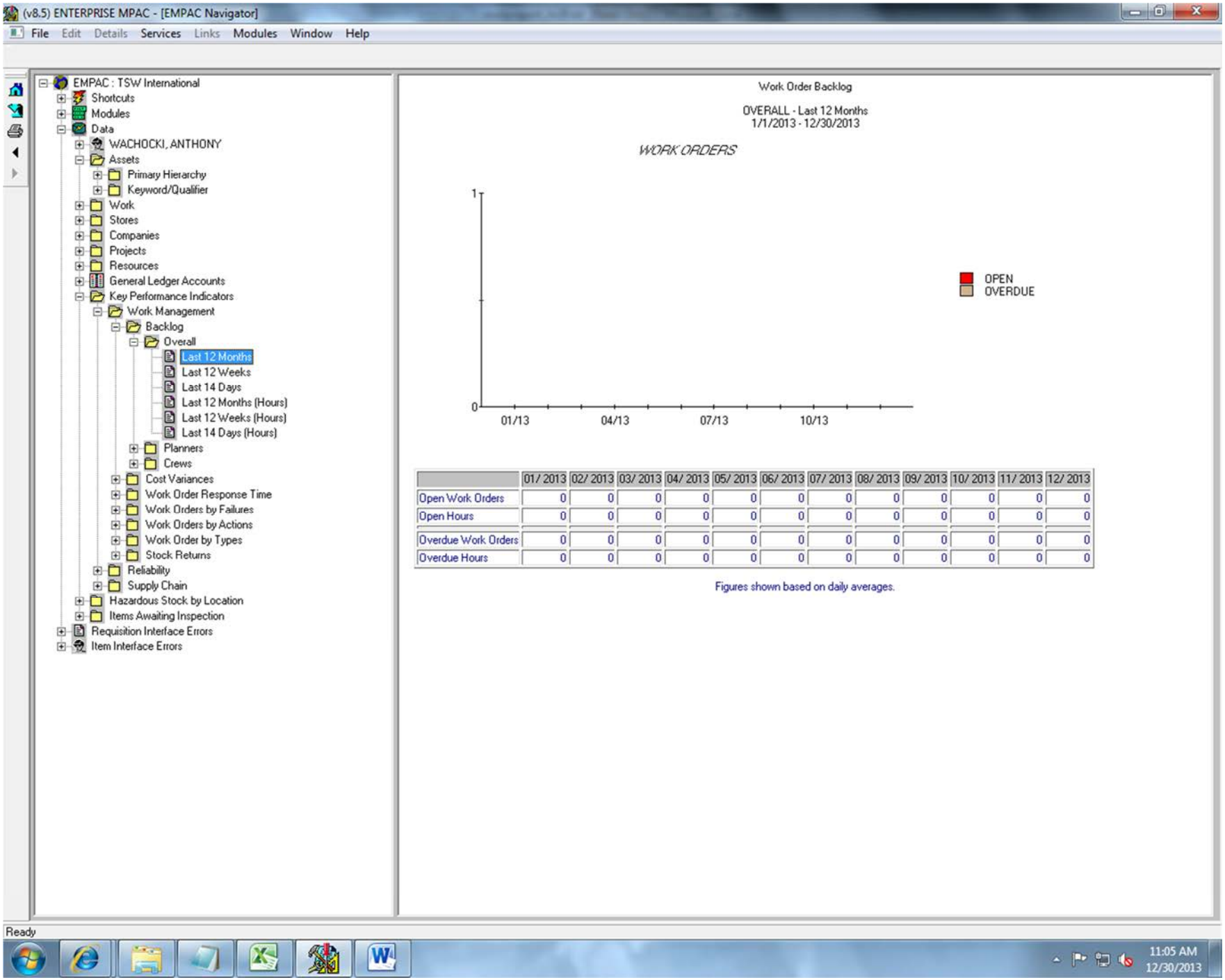


Fig. 2: Asset Hierarchy-Asset Information



	01/ 2013	02/ 2013	03/ 2013	04/ 2013	05/ 2013	06/ 2013	07/ 2013	08/ 2013	09/ 2013	10/ 2013	11/ 2013	12/ 2013
Open Work Orders	0	0	0	0	0	0	0	0	0	0	0	0
Open Hours	0	0	0	0	0	0	0	0	0	0	0	0
Overdue Work Orders	0	0	0	0	0	0	0	0	0	0	0	0
Overdue Hours	0	0	0	0	0	0	0	0	0	0	0	0

Fig. 3: CMMS KPI Templates

Asset Maintenance - 000000000901577

901577

Asset Number 000000000901577 Revision 5

Asset 000000000901577

Status: Active / Inactive / Deleted

Asset Type PUMP CENTRIF PUMP CENTRIFUGAL

Department 42 WASTE WATER OPERATIONS

Keyword PUMP Alias

Qualifier LIFT

G.P.M. RAS FT HD

R.P.M. LIFT PUMP SERVICE

IMP DIA #2-ILP H.P.

Description PUMP,AERATION SYSTEM,LIFT PUMP #2 INTERMEDIATE LIFT PUMP 2 BORG-WARNER CORP 51020128002 LIFT STA #1, #2 ILP

G/L Overlay 5402.425070.000231..00162..SD924

Location LIFT STA #1, #2 ILP

Area 84 WWTP-AERATION SYSTEM

Criticality 4 SHUTDOWN 2 OR MORE AREAS

Nameplate

Inspection Type

Parent

1	NON-CRITICAL EQUIPMENT
2	SHUTDOWN OF A SYSTEM
3	SHUTDOWN 1 AREA
4	SHUTDOWN 2 OR MORE AREAS
5	SHUTDOWN ENTIRE PLT/SITE

mpt Flag ☑

tice Flag ☐

Fig. 4: Asset Information-Page 1 (includes Criticality value)

Asset Maintenance - 000000000901577

901577

Asset 000000000901577 PUMP, LIFT

Manufacturer BORG-WAGNER CORP.

Model Number VC 102PMR

Serial Number 03WE004 Latitude

Catalog Number Longitude

Drawing Number Elevation

Last Drawing Update

Last Drawing Notes

Purchase Order Number

Purchase Date Capital ID Number

Same As

RCM Asset Type PUIL Days Since Last Failure

RCM Base Date 11/27/2012 Mean Time To Repair 0.0 hours

Operating Environment Mean Time Between Failures 0 days

RCM Reference Number

Runtime Readings Threshold 4 Last Reading Date 1/7/2008

Last Meter Reading 2

Last Overhaul Work Order 09-035974-000 Life To Date Reading 2

Last Overhaul 5/7/2009 Average Daily Runtime

Fig. 5: Asset Information-Page 2

Asset Maintenance - 000000000901577

901577

Asset 000000000901577 PUMP, LIFT

Category	Description
000000	Default Category
100	PUMPS
200	MOTORS
201	WIRING & CIRCUITS
203	INSTRUMENTATION
204	ELECTRICAL CONTROLS
207	CONTROL PANELS
251	MOTOR CONTROLLER
252	TEMPERATURE ELEMENT
253	TEMP TRANSMITTER
254	PRESSURE TRANSMITTER
258	FLOW ELEMENT
259	FLOW TRANSMITTER
264	INDICATOR
268	DCS
275	TACHOMETER
276	FLOW SWITCH
277	SOLENOID VALVE
279	FLOW REGULATOR
281	VIBRATION MONITOR
283	POSITION TRANSMITTER
285	POSITION ELEMENT
288	DATA COMMNCTION LINK
290	INPUT/OUTPUT
291	BUBBLER SYSTEM
292	A.C.DRIVE
296	ALARM PANEL
401	FANS/BLOWERS
404	HEAT EXCHANGERS
406	FILTERS
601	DOORS/WINDOWS/WALLS
603	PLUMBING-UTILITIES
610	LOCKER ROOMS
611	DRAIN LINES
652	LUBRICATING SYSTEMS
700	TANKS
720	VALVES
721	HOSES

Fig. 6: Asset Information-Page 3

ATTACHMENT II

PREVENTIVE MAINTENANCE PLAN

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
WASTEWATER TREATMENT PLANT

9300 WEST JEFFERSON AVENUE, SUITE 103
DETROIT, MICHIGAN 48209
PHONE 313•297•4300 TTY:311
FAX 313•297•0110
WWW.DETROITMI.GOV

July 31, 2012

Mr. Charles Hill
Michigan Department of Environmental Quality
Southeastern Michigan District Headquarters
27700 Donald Court
Warren, Michigan 48092-2793

Regarding: The Preventive Maintenance Plan
ACO-000131 and AACO-000020

Dear Mr. Hill:

The Detroit Water and Sewerage Department hereby submits the Wastewater Operations Group (WWOG) Preventive Maintenance Plan (PMP), pursuant to Article III.D.3.4 of the Amended Administrative Consent Order AACO-000020 that was issued on May 18, 2012 by Michigan Department of Environmental Quality (MDEQ).

PMP implementation will commence soon after receiving MDEQ's approval. WWOG is available to discuss and address any issues MDEQ may have regarding the PMP.

If you have any questions regarding this letter, please contact me at (313) 297-4300.

Samuel A. Smalley, P.E.

Assistant Director – WWOG

SS/ta

Cc: D. Latimer
J. Peace
J. Urbanik
S. Patel
C. Willey

The Preventive Maintenance Plan

July 31, 2012

Detroit Water & Sewerage Department – Wastewater Operations Group

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II. Definitions
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VII. Implementation Schedule
VIII. Monitoring and Reporting

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Attachment B - Derivation of PM Staff Requirements
Attachment C - January 24, 2012 MDEQ letter to DWSD
Attachment D - Scheduled Replacement Program
Attachment E - PMP Implementation Schedule

I. Summary

A. This Preventive Maintenance Plan (PMP) is about equipment and systems managed, operated and maintained by DWSD's Wastewater Operations Group (WWOG), generally located at the Wastewater Treatment Plant (WWTP) and the Combined Sewer Overflow (CSO) facilities.

B. The Preventive Maintenance Plan is being developed and submitted in response to the requirements of § III.D.3.4 of the Administrative Consent Order (ACO)[1] of the Michigan Department of Environmental Quality (MDEQ), that states[2]:

> *3.4 On or before July 31, 2012, the DWSD shall submit to the DEQ for review and approval a Preventive Maintenance Plan (PMP) for the Detroit WWTP that includes maintenance metrics and targets to evaluate the effectiveness of and adherence to the PMP, along with a schedule for Implementing the PMP. The PMP shall be designed to ensure that the DWSD has enough equipment operable and available to adequately treat all incoming wastewater to meet all effluent limitations, conditions, and requirements and to ensure that the solids Inventory Is managed in accordance with paragraph 3.1.b.ii. The DWSD shall implement the PMP In accordance with the following schedule:*
>
> *a. Upon DEQ approval, the maintenance metrics, targets and implementation schedule shall be incorporated by reference into this Consent Order and may be incorporated into the NPDES permit.*
>
> *b. The reporting frequency for these maintenance metrics is specified in paragraph 3.9. through 3.10. in this section.*
>
> *c. On or before January 1, 2013, the DWSD shall submit to the DEQ for review and approval a complete and updated online Operation and Maintenance (O&M) Manual for existing equipment and facilities. Upon DEQ approval, the O&M Manual shall be maintained and updated in accordance with the requirements of the NPDES permit.*

C. The implementation of this Preventive Maintenance Plan DWSD will assist in having sufficient operable and available equipment to adequately treat all incoming wastewater to meet effluent limitations, conditions, and requirements and to ensure that the solids inventory[3] is managed in accordance with the ACO requirements[4].

D. Maintenance metrics for evaluating the effectiveness of and adherence to the PMP are included in this report, as well as a PMP implementation schedule.

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[1] The ACO was originally issued on July 8, 2011, and amended on May 18, 2012.
[2] The ACO excerpt is italicized to differentiate it from the PMP text.
[3] Throughout this report the solids measurement unit is dry tons per day (dtpd), unless otherwise noted.
[4] Per § III.A.3.1.b.ii that states: *Maintain a monthly average solids inventory of less than 750 dtpd when there are less than 5 days of discharge from outfall 049A during the month, and maintain a calendar quarterly average solids inventory not to exceed 1000 dtpd. Solids Inventory for purposes of this order is defined as the total solids in gravity thickener complexes A and B, determined daily in dtpd*.

E. Anticipating that the upcoming NPDES permit renewal negotiations will include "Asset Management" requirements, this Preventive Maintenance Plan is formulated to be congruent with standard asset management practices should MDEQ elect to incorporate elements or all of this PMP into the renewed NPDES permit.

II. Definitions

A. References to "reactive" maintenance indicate repairs of unscheduled, emergency or catastrophic equipment or system breakdowns or failures.

B. References to "proactive" maintenance indicate scheduled "preventive" and "predictive" maintenance activities conducted at pre-determined intervals to minimize failures.

C. "Preventive" maintenance (PM) generally comprises activities such as greasing, lubrication, oil changes, filter changes, scheduling, resource allocation, proactive repairs, visual and non-intrusive inspections, and reliability and maintainability improvements.

D. "Predictive" maintenance (PdM) generally comprises activities performed prior to the equipment's failure such as vibration analysis, infrared analysis, ultrasonic analysis, laser alignment; and other similar activities aimed at predicting the equipment's or system's failure point.

III. Objectives

The overall objective of this Preventive Maintenance Plan is to protect and enhance the water quality of the Detroit and Rouge Rivers and air quality by meeting or exceeding the requirements of the Clean Water and Clean Air Acts. Specific objectives of the Preventive Maintenance Plan are:

A. Ensure availability of operable WWTP equipment to adequately treat all incoming wastewater and meet all effluent limitations, conditions, and regulatory requirements.

B. Manage solids inventory to ensure continued compliance with the stipulations under ACO § III.A.3.1.b.ii[5].

C. Establish and fully implement a practical plan for identifying, scheduling and timely completing WWTP's preventive maintenance activities.

D. Minimize recurrence of equipment breakdowns and emergency repairs.

E. Ensure availability of updated and comprehensive operation and maintenance (O&M) manuals for WWTP equipment.

F. Ensure availability of adequate staffing to carry out the preventive maintenance.

G. Ensure up-to-date training of WWTP operations and maintenance staff on the operation and maintenance of equipment.

[5] See footnote no. 3 for the full text of ACO § III.A.3.1.b.ii.

H. Attain and continuously develop a cadre of trained maintenance staff and licensed equipment operators.

I. Improve efficiency and quality of maintenance and repairs activities.

J. Achieve and maintain a maintenance activity balance of ~20% reactive (unplanned) maintenance and ~80% proactive (planned) maintenance.

K. Prepare and timely issue the ACO-required maintenance reports.

L. Establish the foundation for the Asset Management Plan.

IV. Background

A. Prior to 2010, WWTP's preventive maintenance activities were in some respect sporadic, inefficient, ineffective, not compliance-focused, and not reliability-centered, largely due to factors such as: Shortage of qualified personnel; Ineffective maintenance planning and execution; Lack of parts availability; Increasingly bureaucratic and rather dysfunctional procurement and contract approval process; Deferred capital investment; Lack of a capital planning that is attuned to WWTP's operations and equipment life-cycle; Economic and political pressures on minimizing water rate increases, and other factors. Consequently, the WWTP has been—and continues to a lesser extent today—experiencing a persistent volume of corrective and emergency repairs.

B. To continue the transition from a largely reactive maintenance mode to a condition-based maintenance mode, DWSD embarked in 2010 on implementing steps focused on improving the maintenance processes and increasing the effectiveness and productivity of WWTP assets and staff. Nowadays, to keep the WWTP processes operational, the maintenance staff prioritize their activities to address the corrective and emergency maintenance repairs, while at the same time perform the preventive maintenance activities.

C. DWSD's target PM completion rate is 75%. Since 2011 PM completions have generally been trending higher. In June 2012 about 91% of WWTP's scheduled preventive maintenance (PM) work orders were carried out, and the July 2011 PM completions rate is trending higher. WWTP's PM completion rates in the 1st and 2nd quarters of 2012 were ~66.3% and ~87.33, respectively. Reductions in the volume of corrective and emergency maintenance repairs are gradually being realized as a result of the preventive maintenance efforts.

V. Preventive Maintenance Plan Elements

The preventive maintenance plan constitutes the primary elements identified in this section. Implementation of some of these elements has already begun, and the remaining elements will be implemented while minimizing adverse effects on WWTP's operations. The actual implementation order of these elements may vary from their listing order herein, and some of these elements may be concurrently implemented. The preventive maintenance plan will be

revisited and modified as necessary to adapt to technological advances, new treatment quality standards, and changes in the demand for wastewater treatment services.

A. *Streamlined Reliability-Centered Maintenance (RCM):*

1. DWSD will prioritize the existing equipment by selecting those most critical to DWSD's operations, safety, and NPDES permit compliance—e.g., capacity at primary, secondary, dewatering and disposal—as well as equipment and systems that would yield the largest gains in the overall equipment up-time and reliability[6] at the WWTP. Critical equipment would likely comprise equipment currently appearing on WWOG's weekly "Red/Green" report[7].

2. Through application of "streamlined" RCM methodologies[8,9], common failures will be identified, especially failures having the greatest impact on operations, and the detectability and likelihood of their recurrence will be established. Based on the streamlined RCM findings, the appropriate mix of predictive (PdM) and preventive (PM) maintenance activities that would most effectively reduce or prevent the recurrence of identified failures will be established and implemented at the frequency determined by the mean time between failures[10] analysis. Where it can be efficiently and cost-effectively accomplished, re-engineering or outright replacement of equipment or systems will be implemented. Included under **Attachment A** is the RCM Decision Diagram.

3. Also based on the streamlined RCM findings, a PM/PdM performance standard for each equipment and system will be developed and integrated into DWSD's Computerized Maintenance Management System (CMMS)[11].

4. As gains in WWTP's overall equipment up-time and reliability are realized, application of the streamlined RCM methodology will be expanded to the remainder of equipment and systems.

---

[6] Systems selected for prioritization may also meet any of the following criteria: a) High cost/number of predictive maintenance actions; b) High cost/number of corrective maintenance actions; c) High contribution to down-time; d) Safety and environmental impact; and e) Pareto Rule (80% of total costs are associated with 20% of the failures).

[7] The "Red/Green" report is a status-reporting compilation of 328 of WWTP's critical equipment items whose operational/ out-of-service status is monitored daily by the WWOG management, operations and maintenance staff, and the report is updated weekly.

[8] The "standard" RCM methodology is described in SAE Standard JA1011 Section 5 (published by SAE International), and is summarized by the following sequence of steps: a) Define a function; b) Define how the function can fail (function failure); c) Document the causes of function failure (failure mode); d) Describe what happens when the function fails (failure effects); e) Analyze the consequences of failure; and f) Determine the necessary action(s) to predict or prevent the failure.

[9] The "streamlined" RCM methodology is summarized by the following sequence of steps: a) Select system and collect data; b) Define system boundaries; c) Define function(s) and perform functional failure analysis; d) Perform failure modes and effects analysis; e) Perform logic tree analysis; and f) Select appropriate, effective and efficient interventions, and effect high value-added maintenance policy(ies) to predict, minimize or—if possible—eliminate the failure's recurrence.

[10] For a repairable product, reliability is quantified as MTBF (Mean Time Between Failures). MTBF is calculated as $\Theta = T/R$, where Θ = MTBF, T = total time, and R = number of failures of the same failure mode.

[11] DWSD current CMMS is the Enterprise Maintenance Planning and Control (EMPAC) software application that was developed by Indus International, currently supported by a 3rd-party vendor (Ventyx), and is expected to transition in 2013 to Oracle's Work and Asset Maintenance (WAM) software application.

B. *Work Orders:*

1. DWSD will continue its current practice of identifying and entering in the CMMS the PM work orders for each WWOG equipment item and system; scheduling the work orders (including recurring work orders); completing the work orders and entering into the CMMS each work order's critical information (such as actual expended hours, crew size, material and equipment used and/or replaced, etc.); closing the work orders in the CMMS; and periodically reviewing and analyze the CMMS maintenance data.

2. PM work order generation is a routine process that can be subject to modifications based on supervisory experience. Factors for modifying the PM work orders include the Standard Operating Procedures (SOPs), vendor maintenance manuals, operator rounds, condition monitoring rounds, and the CMMS.

3. WWOG is currently developing cleanup PMs for all process areas, has completed setting up cleanup PMs for one process area, and plans on doing the same for the remaining process areas (conveyors, mixers, etc.).

C. *Staffing Level:*

1. In keeping with prior commitments made in and subsequent to the January 11, 2011 Staffing Plan and the ACO, DWSD will continue hiring and retaining qualified maintenance and operations staff at all levels. Since 2010, WWOG dedicated 15 staff members to conduct and manage the PMs. The number of maintenance staff needed for the WWOG was determined based on the analysis presented under **Attachment B** (Derivation of PM Staff Requirements) that was developed and incorporated in the MDEQ-approved Staffing Plan.

2. Current staffing levels are—and will continue to be maintained—in accordance with the requirements of ACO § III.F.3.6, and the supplemental provisions stipulated in the January 24, 2012 MDEQ letter to DWSD that approved the Staffing Plan (See **Attachment C**). In January 2011 the WWOG had 483 operations and maintenance personnel on hand (excluding engineering and administrative staff). As of January 2012 WWOG's staff totaled 645 comprising 86 engineering and administrative personnel, 82 lab personnel and 477 operations and maintenance staff.

3. The unusual increase in WWOG staff retirements experienced in 2011 has subsided, and the staffing levels have stabilized. Past performance not withstanding, continued improvement in WWOG's maintenance performance is expected, largely due to the renewed support of DWSD management and the Board of Water Commissioners, and as prompted by the November 4, 2011 Federal Court Order.

4. Prior to the November 4, 2011 Federal Court Order, staffing for DWSD positions was handled by the City of Detroit's Human Resources Department, but this

responsibility has been transitioned to DWSD's newly established in-house Human Resources division that operates independently from the City's Human Resources Department. Some benefits the WWOG expects to realize from this transition include shorter times for completing most new hirings or promotions, and the end of the "bumping" practice that often resulted in losing good but shorter-tenured WWOG maintenance staff or transferred maintenance staff from other City departments to the WWOG that had limited or no experience in maintaining wastewater equipment.

D. *Training:*

1. WWOG will continue training its staff in accordance with the requirements of ACO § III.F.3.6, and the supplemental training-related provisions stipulated in the January 24, 2012 MDEQ letter to DWSD that approved the Staffing Plan. Specifically, DWSD has submitted the following training-related requirements on or ahead of the respective due dates:

   a. March 1, 2012: The Wastewater Operator Certification Training Program.

   b. March 30, 2012: The Cross Training and Employee Rotation Schedule.

   c. April 27, 2012: The Course Materials for the WWOG Manager/ Supervisor Mentoring Training Program.

   d. May 10, 2012: Held the 1st round of the Wastewater Operator Certification Training classes.

   e. June 29, 2012: Submitted policies and procedures for the recruitment program and new hiring process.

2. DWSD will update the WWOG training program periodically, and ensure appropriate and continued training of existing and new maintenance staff.

3. DWSD will continue to cultivate a culture that encourages, incentivizes and rewards the maintenance and operations staff for attaining work-related and industry-recognized certifications and licenses, thereby providing an unceasing pipeline of home-grown, qualified and best-in-class maintenance staff and licensed operators with hands-on experience on DWSD's equipment.

E. *Procurement:*

1. DWSD will continue to streamline the parts, equipment, service and capital contract procurement process to reduce the procurement durations. To ensure prompt availability of parts for critical assets, WWOG has and continues to establish parts supply and service Period Agreement Requests (PARs) with the vendors and/or manufacturers of WWOG's critical assets. For small dollar purchases of maintenance parts and supplies, WWOG has the option of using the DWSD-issued credit cards known as Purchase Cards (or P-Cards). DWSD also has the option of tapping the active skilled trades and as-needed maintenance contracts to obtain urgently needed parts or perform emergency or scheduled

repairs. Because of these efforts, availability of parts for critical equipment now rarely affects the maintenance activities.

2. DWSD has adopted the practice of kitting[12] the parts and materials needed for a specific repair or maintenance work order prior to commencing the associated maintenance work, thereby reducing the repair time and minimizing the equipment's down time.

3. As required by the November 4, 2011 Order of the Federal Court, DWSD and its Board of Water Commissioners:

   a. Began separating DWSD's purchasing process from the City's central purchasing department.

   b. Introduced a tiered and streamlined approval process of contracts and purchase orders.

   c. Implemented a procedure for expedited engagement of consultants and contractors as necessary for addressing urgent DWSD needs.

F. *Capital Improvement Plan (CIP):*

1. WWOG will create, implement and monitor an effective capital improvement plan and, to the extent practicable, avoid deferring planned capital investment(s). This plan will be attuned to WWTP's operations, maintenance requirements and equipment life-cycle, and will be incorporated in DWSD's fiscal Capital Improvement Plan.

2. WWOG conducts a comprehensive WWTP-wide needs assessment study every 3 years to identify improvements necessary for continued operation of the WWTP in compliance with current and upcoming regulatory requirements. The identified needs are grouped into projects that are implemented by in-house resources or competitively procured and implemented through construction or professional services contracts. The last needs assessment study was completed in 2010, and the next needs assessment study is underway, expected to be completed in August 2013.

3. In addition to regulatory-mandated and safety-required capital improvements, WWOG's scheduled replacement program (SRP) constitutes a significant part of the capital improvement plan. The SRP, shown under **Attachment D**, is a 2-year comprehensive list of WWOG equipment and systems with a projected replacement time for each item, i.e., FY 2012-2013 or FY 2013-2014. The SRP is updated and incorporated in WWOG's fiscal budget annually.

G. *Operation & Maintenance Manual:*

1. DWSD will develop a comprehensive and up-to-date online operation and maintenance (O&M) manual that complies with the MDEQ's standards for O&M

[12] Kitting is the process of gathering all the parts (type and quantity) needed for a particular repair or maintenance work order, prior to commencing the work on that work order.

manual, and comprises the systems and equipment operated and maintained by the Wastewater Operations Group. This process commenced in early 2012 and is scheduled for completion by the end of 2012, as required by ACO § III.D.3.4.c.

2. The online O&M manuals will be periodically updated to reflect the latest equipment, processes, systems and modification implemented by the maintenance and operations staff.

H. *Monitoring:*

1. DWSD will monitor the condition of equipment and systems based on the PM and PdM standards established under the Preventive Maintenance Plan. Essential elements of the PM/PdM standard may include but are not limited to i) equipment identifier; ii) equipment name; iii) procedure name; iv) procedure frequency; v) available reference materials; vi) safety concerns and required personal protection equipment; vii) required tools; viii) required spare parts and consumables; ix) required crafts/skills; x) estimated time to complete; xi) specific tasks to be performed; and xii) a section to record findings.

2. Sufficient inspections will be conducted to ensure that inspection procedures are sufficiently detailed to assist the inspector in identifying the failure mode, and recording the inspection results. Also will address components, equipment or systems that do not meet the performance requirements.

I. *Standardization:*

1. PM Work orders have been and will continue to be standardized to include essential information that must be correctly entered by the work order originator, planner and executor, emphasizing the need for collecting and entering full and accurate maintenance data to ensure the quality and integrity of the preventive maintenance program data.

2. Newly issued work order data will likely include, but is not limited to i) the requestor's name and phone number; ii) date; iii) asset number; iv) location; v) description of the problem including symptoms—if known; vi) name of the work order recipient authorized to approve work orders; vii) department, section and division; viii) priority; and ix) the desired completion date. Completed/closed work order data will likely include, but is not limited to i) description of failure; ii) major replacement parts installed; iii) total hours expended in performing the work; iv) field comments essential to process improvement; and v) completion/closing date.

J. *Forecasting:*

1. As part of the annual budget preparation process, DWSD will continue to forecast the near- and long-term maintenance needs of the Wastewater Operations Group, including but not limited to equipment and systems maintenance work orders, availability of experienced and specialized staff, standard and special order parts availability, process chemicals and consumables

availability, capital for acquisition of new or replacement equipment and processes, renting of special equipment to effect maintenance, etc.

K. *Federal Court Requirements:*

1. As prompted by the Federal Court's November 4, 2011 Order, many DWSD business processes, especially those related to finance, human resources, law and procurement, are undergoing comprehensive reviews internally by DWSD and its Board of Water Commissioners, and externally by DWSD-hired consultants. These reviews may recommend business process changes that vary widely in scope and nature, with the overarching mission of achieving sustainable compliance with regulatory requirements and implementing streamlined, effective and efficient business processes. Details of the business process re-engineering are currently being drawn and are expected to be implemented during the latter part of 2012.

2. DWSD will promptly inform MDEQ should revisions to the Preventive Maintenance Plan become necessary as a result of business process re-engineering.

L. *Existing Maintenance Program:*

1. DWSD will continue updating its existing maintenance program so that it represents DWSD's current equipment, operational and technical standards, operating procedures, regulatory compliance requirements, and safety requirements.

2. WWOG will continue using its current PM process, that generally begins with the equipment's procurement, installation and placement into operation. Each new or replacement equipment must be tested and demonstrated by the vendor and accepted by DWSD a condition precedent for commencing the PM activities. The accepted equipment is entered into EMPAC as a new asset (and sub-assets, if applicable) where it is assigned a unique asset identification number, its PM procedures are entered and scheduled, the associated skilled trades crews are identified, and the duration and frequency of PMs are entered in EMPAC (e.g., periodic inspections, lubrications, etc.). WWOG weekly generates the EMPAC system's PM reports, and the associated PM work orders are delivered and assigned to the operations and maintenance staff responsible for that asset (and sub-assets). The work orders are then scheduled, completed and closed in EMPAC.

3. There are approximately 4,500 WWTP assets, and approximately 1,200 assets at CSO facilities. The recent addition of the Oakwood P.S. is expected to increase the number of assets at CSO facilities by approximately 300.

VI. Performance Measures

A. The effectiveness of the preventive maintenance program will be tracked with respect to the established benchmarks of 80% planned and 20% unplanned PMs[13], and the 75% PM completion rate. WWOG may introduce other benchmarks. When a benchmark is significantly trailed, appropriate resources and adjustments will be promptly applied, with initial efforts concentrated on the costliest and worst performing processes, i.e., attack the big losses first.

B. The proposed performance measures are generally categorized as "Equipment Reliability" and "Maintenance Organization".

1. *Equipment Reliability Performance Measures[14]:* The following "Equipment Reliability" performance measures will be developed:

   a. "Mean Time Between Failure (MTBF)", a reliability-related measure calculated as the total number of equipment failures divided by the total number of operating hours. Equipment with low MTBF may require further assessment and/or redesign.

   b. "Mean Time To Repair (MTTR)", a measure of how fast repairs can be completed on a particular piece of equipment, calculated as the sum of all repair times divided by the total number of repair activities. If this metric is excessively high, the equipment may be considered overly complex, or additional training may be required.

   c. "Mean Time Between Repair (MTBR)", a measure of actual time available for equipment operation, calculated as the average time interval between previous repair and the next failure incident.

   d. As RCM-based analysis is developed and data are accumulated, WWOG can evaluate the applicability and effectiveness of its equipment by measuring the "Overall Equipment Effectiveness (OEE)", a direct measure of overall equipment health and reliability. Equipment with OEE less than 80% will trigger the streamlined RCM analysis, and may necessitate corrective actions such as re-design, or revision of the PM and PdM procedures, or other corrective actions.

2. *Maintenance Organization Performance Measures:* The "Maintenance Organization" performance measures have been—and will continue to be—tracked and updated as part of DWSD's monthly Key Performance Indicators (KPI) report, e.g., "Employee Availability", "CM and PM Work Orders

[13] WWOG's actual ratio of planned to unplanned PMs is currently near the 80/20 benchmark. WWOG is continuing its efforts to improve on this benchmark.

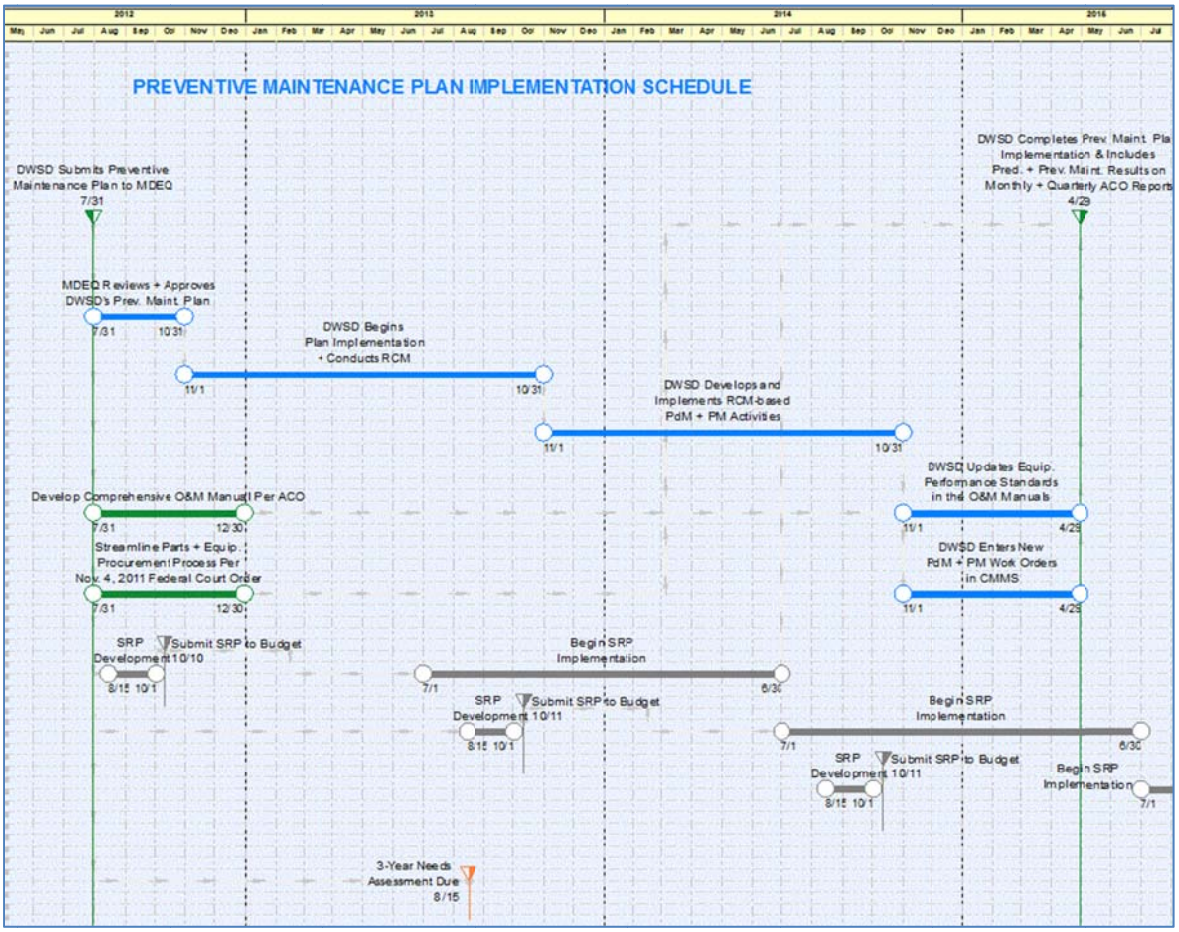
[14] Current CMMS (EMPAC) data necessary for measuring "equipment reliability" may be unavailable, incomplete or inaccurate for old closed work orders, but since 2011 the WWOG maintenance and planning staff have been committed to entering complete and accurate data of newly scheduled and closed work orders. Therefore, the initial equipment reliability reports may be incomplete or appear erroneous.

Completed", and "PM Work Orders Completed As Planned". These KPIs were presented under the Operations Performance Plan of September 30, 2011.

C. A narrative of overall performance and compliance will also be prepared and reported to MDEQ as part of the Quarterly ACO Report.

VII. Implementation Schedule

A. The proposed implementation schedule is presented below, but a larger-sized version is included under **Attachment E**. The schedule activities and sequence generally mirror those described under Section V of this report (Preventive Maintenance Plan Elements).



B. Implementation of the proposed preventive maintenance plan will commence soon after receiving MDEQ's approval. In the meantime, DWSD will carry on with the current preventive maintenance activities and improving them when and where warranted.

C. The following items comprise a narrative of the proposed implementation schedule for the preventive maintenance plan:

1. Following DWSD's submittal of the Preventive Maintenance Plan, a 3-month window is allotted for MDEQ's review and approval of the plan.

2. Next is a 12-month DWSD activity to apply the streamlined RCM methodology to its critical equipment and systems, and based on the findings from this activity, development and implementation of RCM-based predictive and preventive maintenance activities/ work orders will be performed over the next 12-month period.

3. Two concurrent activities will be performed next; the first has a 6-month duration for incorporating the RCM-based performance standards into WWOG's comprehensive operations and maintenance (O&M) manual, and the second also has a 6-month duration for incorporating the RCM-based predictive and preventive maintenance work orders in the CMMS.

4. Following completion of the above activities, DWSD's monthly and quarterly ACO reports will include the status of preventive maintenance metrics and targets.

5. Separately from but concurrently with the preventive maintenance plan DWSD is developing the complete and updated online O&M manual for existing equipment and facilities, to be submitted to MDEQ no later than the ACO deadline of January 1, 2013. As depicted in the proposed schedule, DWSD will incorporate the RCM-based performance standards into the updated online O&M manual after the manual is submitted for MDEQ's approval.

6. Also separately from but concurrently with the preventive maintenance plan, and as mandated by the Federal Court's November 4, 2011 order, DWSD is streamlining its procurement process for equipment and materials vendors and suppliers, as well as the procurement of its professional and construction services contract. Completion of this effort is expected by or before the end of 2012.

7. An activity for SRP development is scheduled to commence in August 2012 and conclude by the end of September 2012, whereby the existing SRP is updated. In early October 2012 the updated SRP is submitted in-house for inclusion in the fiscal budget of the WWOG. This process is repeated annually.

8. The latest WWTP needs assessment study was completed and submitted to MDEQ in 2010. Underway is the development of the 3-year WWTP needs assessment study that is scheduled to be completed in August 2013. A finish milestone for the 2013 needs assessment study is included on the schedule.

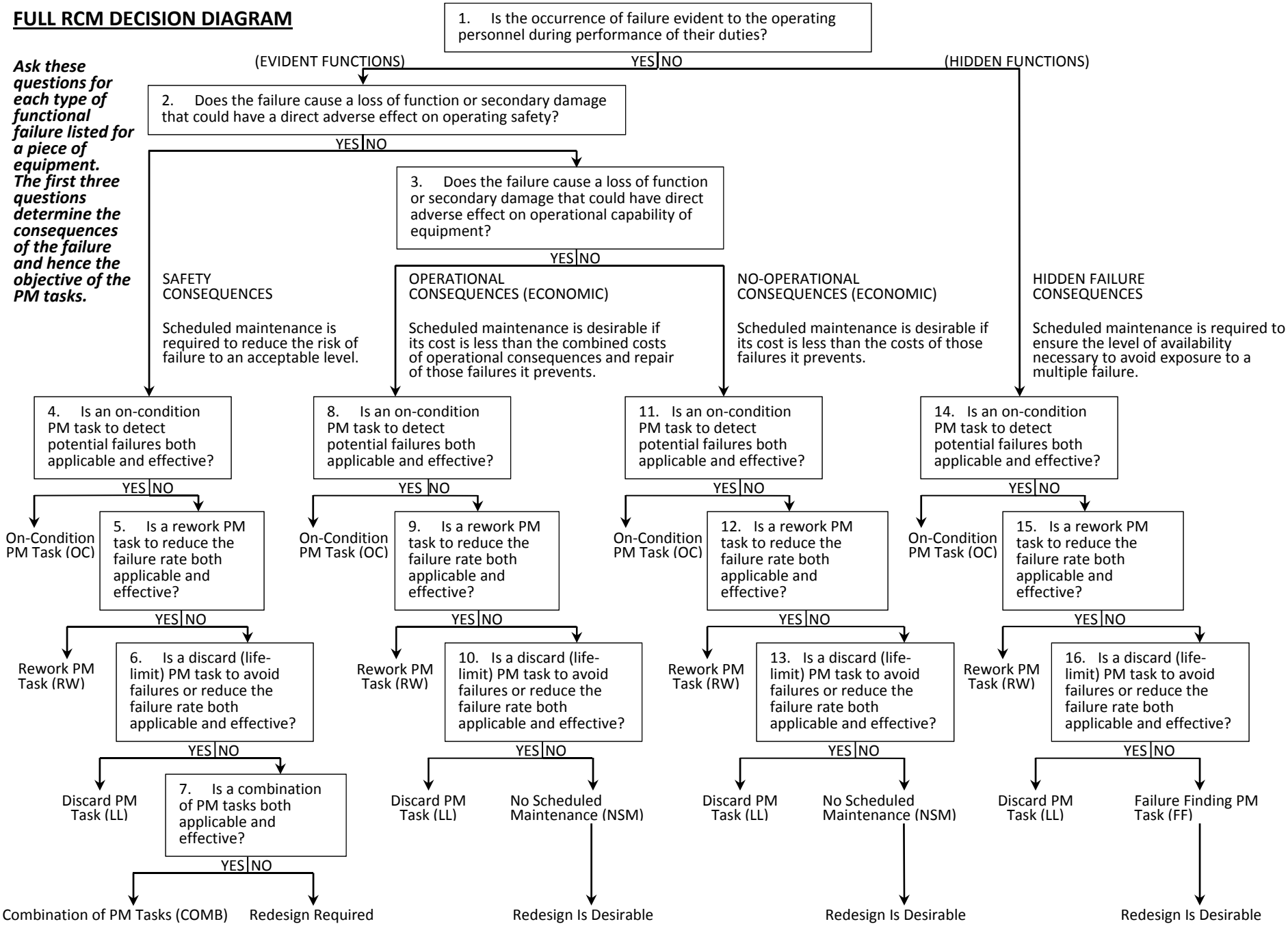
VIII. Monitoring and Reporting

A. Reporting on the maintenance metrics and targets identified in the PMP will be included in the ACO Quarterly Report that WWOG currently prepares and submits to MDEQ in accordance with ACO § III.I.3.9 and § III.I.3.10.

B. The reports may be revised by mutual agreement between DWSD and MDEQ to better represent the then present circumstances.

FULL RCM DECISION DIAGRAM

Ask these questions for each type of functional failure listed for a piece of equipment. The first three questions determine the consequences of the failure and hence the objective of the PM tasks.



Derivation of PM Staff Requirements

Manufacturer's recommendations for preventive maintenance activities, instructions, frequencies, resources, and level of effort have been entered into the WWTP computerized maintenance management system (CMMS) Enterprise Maintenance Planning and Control (EMPAC) for all equipment servicing the WWTP and the CSO Basins.

An EMPAC database query was written by the Maintenance Planning Manager to capture and tally all recommended preventive maintenance time (in hours) by craft for each crew area of the WWTP (i.e. liquids, solids and facilities) and for the CSO Basins. Refer to the accompanying report printout identified as: PM Labor Hours.

The resulting report identified the total preventive maintenance labor hours by craft as follows:

	ELEC	ITTE	MECH	PLMB	WELD	BKLR	PEOM
TOTAL HRS	25373	19776	67113	2952	0	25	1337

It is noted that the WWTP staff believe the manufacturers recommendations for preventive maintenance activity frequency and level of effort to be conservative, thereby over stating the total number of hours estimated to be required for PM. Conversely, the estimate does not take into account the additional time required to travel from one job location to the next, to secure the necessary tools, parts and supplies, work breaks and other inefficiencies that would tend to increase the total time to perform PM.

For purposes of establishing an initial estimate of the number of full time equivalents (FTEs) required to perform the PM services based on the EMPAC-derived projection of maintenance hours, the standard 2080 work hours per year was used.

	ELEC	ITTE	MECH	PLMB	WELD	BKLR	PEOM
TOTAL FTEs	12.2	9.5	32.3	1.4	0	0	0.7

To account for loss of available standard work hours resulting from paid time off including: vacation, holidays, sick, funeral, and FMLA leave; as well as time for staff training, an adjustment to the standard work hours per year (an average reduction of approximately 420 hours) has been calculated. This reduction in available work hours results in an adjustment of 1.25 times the number of FTEs calculated to complete the actual workload. Applying this factor to the FTE calculations presented in the previous table, and rounding to the nearest whole number, results in the following calculation of FTEs by craft to perform preventive maintenance:

	ELEC	ITTE	MECH	PLMB	WELD	BKLR	PEOM
TOTAL FTEs	15	12	40	2	0	0	1

The revised FTEs by craft (to perform preventive maintenance) were then reviewed and discussed with Operations and Maintenance and the following minor adjustments were made:

	ELEC	ITTE	MECH	PLMB	WELD	BKLR	PEOM
TOTAL FTEs	15	10	38	3	0	0	2

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
LANSING

RICK SNYDER
GOVERNOR

DAN WYANT
DIRECTOR

January 24, 2012

Sue McCormick, Director
Detroit Water & Sewerage Department
735 Randolph Street
Detroit, MI 48226-2830

Dear Ms. McCormick:

SUBJECT: Administrative Consent Order – ACO-000131 (ACO)
Detroit Wastewater Treatment Plant

We have completed our review of the Staffing Plan for the Wastewater Operations Group (WWOG) that was submitted in accordance with the requirements under Section III, paragraph 3.6a of the ACO entered between the Department of Environmental Quality (Department) and the Detroit Water & Sewerage Department (DWSD) on July 8, 2011. The evaluation of the Staffing Plan included reviewing the revised Succession Planning and Training Program submitted on December 2, 2011, and the organizational chart for the CSO Operations staff submitted by Mr. Samuel Smalley in accordance with the Department's September 19, 2011, conditional approval of the WWOG Staffing Plan.

Based on our review the Department finds that the WWOG Staffing plan is now complete and the DWSD is in compliance with the requirements of Section III, paragraph 3.6 a. of the ACO.

The Staffing Plan, including the CSO Organizational Chart and the Supplemental Succession Planning and Training Program is hereby approved.

In accordance with Section III, Paragraph 3.6.a of the ACO, the following targets and metrics of the Succession Planning and Training Program are hereby incorporated by reference as enforceable provisions of the ACO:

1. WWOG Minimum Staffing Level is established at 645 Full Time Equivalents.
2. **On or before March 1, 2012,** DWSD will complete development of a Wastewater Operator Certification Training Program.
3. **On or before April 1, 2012,** DWSD will develop a Cross Training and Employee Rotation Schedule for the WWOG.
4. **On or before May 1, 2012,** DWSD will complete development of the course materials for the WWOG Manager/Supervisor Mentoring Training Program.
5. **On or before May 15, 2012,** DWSD will hold the first round of Wastewater Operator Certification Training classes.
6. **On or before July 1, 2012,** DWSD will develop policies and procedures for the recruitment program and new hire process.
7. **On or before August 1, 2012,** DWSD will complete the first round of training for WWOG supervisory and management staff.
8. **On or before December 31, 2012,** DWSD will complete procurement, installation, data conversion and implementation of the Learning Management System.

CONSTITUTION HALL • 525 WEST ALLEGAN STREET • P.O. BOX 30473 • LANSING, MICHIGAN 48909-7973
www.michigan.gov/deq • (800) 662-9278

Sue McCormick
Page 2
January 24, 2012

9. **On or before January 1, 2013**, DWSD will complete revisions to the supervisory job descriptions, duties and performance evaluation criteria (inclusive of mentoring requirements) for the WWOG.
10. **On or before January 1, 2013**, DWSD will develop and implement an employee assessment program and comprehensive training program that will support wastewater certification.

Should you require further information, please contact Ms. Jodi Lynn Peace, Senior Environmental Quality Analyst, Water Resources Division, Southeast Michigan District Office, at 586-753-3783; peacej@michigan.gov; or Department of Environmental Quality, 27700 Donald Court, Warren, Michigan 48092-2793.

Sincerely,

Laura Verona

Laura Verona, District Supervisor
Public Wastewater Unit
Southeast Michigan District Office
Water Resources Division
586-753-3793

cc: Mr. Chris Brown, City of Detroit
Mr. Samuel Smalley, DWSD
Mr. Mark Jacobs, Dykema Gossett
Ms. Pamela J. Stevenson, DAG
Mr. William Creal, DEQ
Mr. Pete Ostlund, DEQ
Mr. Barry Selden, DEQ
Ms. Jodi L. Peace, DEQ
Compliance File

DETROIT WATER & SEWERAGE DEPARTMENT

OTHER EQUIPMENT BUDGET REQUEST - FY 2012-13 (FORM H) AND FY 2013-14

CAPITAL IMPROVEMENT PROGRAM (EQUIPMENT PURCHASES)

USE ONE OBJECT CODE PER PAGE

Requesting Cost Center: _____

Capital or Replace?

Cost Center	Object	Description	Quantity	C or R	Unit Price	Total Cost	Explanation	2012-13 Budget Quantity	2012-13 Budget Total Cost	2013-14 Budget Quantity	2013-14 Budget Total Cost
		Solids									
427030	344111	Grinders/6" Monoflow	24	R	$ 14,000	$ 336,000	Average life 1 to 1.5 years	12	$ 168,000	12	$ 168,000
427030	344111	Grinders/4" Monoflow	10	R	$ 14,000	$ 140,000	Average life 1 to 1.5 years	5	$ 70,000	5	$ 70,000
427030	344111	Pumps-Filter feed, with motor and drive	6	R	$ 60,000	$ 360,000	Due 2009	6	$ 360,000	0	$ -
427030	344111	Pumps-Polymer	5	R	$ 35,000	$ 175,000	Due 2009	3	$ 105,000	2	$ 70,000
427030	344111	Belt conveyors	14	R	$ 120,000	$ 1,680,000	Rebuild due 2010	8	$ 960,000	6	$ 720,000
427030	344111	Pumps for SFE 1 and 2, CII Dewatering	2	R	$ 30,000	$ 60,000	Due 1993	2	$ 60,000	0	$ -
427030	344111	Pumps for SFE booster, CII Dewatering	2	R	$ 30,000	$ 60,000	Due 1993	2	$ 60,000	0	$ -
427030	344111	Weigh Conveyor 15- 1 THRU 15-6- Complex I- incineration	6	R	$ 23,500	$ 141,000	Due 1999	6	$ 141,000	0	$ -
427030	344111	Shaft Cooling Air Fan #1 - Complex I Incineration	6	R	$ 23,259	$ 139,554	Due 2004	6	$ 139,554	0	$ -
427030	344111	Burner Air Fans- Complex II Incineration	8	R	$ 23,000	$ 184,000	Due 1998	8	$ 184,000	0	$ -
427030	344111	Dry Ash Crusher #1-6 Gearbox- Complex I Incineration	6	R	$ 6,325	$ 37,950	Due 1983	6	$ 37,950	0	$ -
427030	344111	Center Shaft Drive #1- thru -6 Complex I	6	R	$ 8,500	$ 51,000	Due 1993	6	$ 51,000	0	$ -
427030	344111	Induced Draft Fan and motor #8- thru 15 Complex II Incineration	8	R	$ 96,270	$ 770,160	Due 2012	8	$ 770,160	0	$ -
427030	344111	Central Shaft Cooling Fan #7 thru 14 Complex II Incineration	8	R	$ 10,300	$ 82,400	Due 1998	8	$ 82,400	0	$ -
427030	344111	Auxiliary Combustion Air Fan and motor #7 thru 14 Complex II Incineration	8	R	$ 11,000	$ 88,000	Due 1998	8	$ 88,000	0	$ -
427030	344111	Dry Ash Crusher motor and gearbox # 7 thru 14 Gearbox Complex II Incineration	8	R	$ 7,500	$ 60,000	Due 1999	8	$ 60,000	0	$ -
427030	344111	Shaft Cooling Air Fan #1 THRU 6 Motor Complex I Incineration	6	R	$ 1,050	$ 6,300	Due 1998	6	$ 6,300	0	$ -
427030	344111	Burner Air Fan #1 thru 6 Motor -Complex I Incinreation	6	R	$ 3,760	$ 22,560	Due 1998	6	$ 22,560	0	$ -
427030	344111	8" Knife gates for ash vaccum pumps CII	3	R	$ 3,000	$ 9,000	Due 1998	3	$ 9,000	0	$ -
427030	344111	10" Knife gates for lime mixer	2	R	$ 1,205	$ 2,410	Need for improvement	2	$ 2,410	0	$ -
		SFE System									
427030	344111	Backwash SFE valves	8	R	$ 2,500	$ 20,000	Due 2013	0	$ -	8	$ 20,000
427030	344111	SFE strainer, motor and strainer shaft	8	R	$ 79,000	$ 632,000	Due 2013	0	$ -	8	$ 632,000
		Liquids									
427030	344111	Mixers for CSO plants	15	R	$ 20,000	$ 300,000	Due 2010	15	$ 300,000	0	$ -
427030	344111	Mixers for Aeration cecks	3	R	$ 150,000	$ 450,000	Installed in 2005, need as spare	0	$ -	3	$ 450,000
	344111	Circular Storage Tank Mixer #1-#4	4	R	$ 32,000	$ 128,000	Due 1999	4	$ 128,000	0	$ -
427030	344111	Chlorine solution pump	4	R	$ 29,500	$ 118,000	Due 2013	0	$ -	4	$ 118,000
427030	344111	SO2 solution pump	4	R	$ 29,500	$ 118,000	Due 2013	0	$ -	4	$ 118,000
427030	344111	SFE pumps at Rack and Grit, PS1	3	R	$ 3,000	$ 9,000	Due 2011	3	$ 9,000	0	$ -
427030	344111	Aeration blower and motor at Rack and Grit, PS 2	3	R	$ 38,000	$ 114,000	Due 2006	3	$ 114,000	0	$ -
427030	344111	Underhung Monorail at Rack and Grit, PS2	2	R	$ 45,000	$ 90,000	Due 2011	2	$ 90,000	0	$ -

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DETROIT WATER & SEWERAGE DEPARTMENT

OTHER EQUIPMENT BUDGET REQUEST - FY 2012-13 (FORM H) AND FY 2013-14

CAPITAL IMPROVEMENT PROGRAM (EQUIPMENT PURCHASES)

USE ONE OBJECT CODE PER PAGE

Requesting Cost Center: _____

Cost Center	Object	Description	Quantity	C or R (Capital or Replace?)	Unit Price	Total Cost	Explanation	2012-13 Budget Quantity	2012-13 Budget Total Cost	2013-14 Budget Quantity	2013-14 Budget Total Cost
427030	644111	BSTP Pump #3 , 4 Complex A	2	R	$ 24,000	$ 48,000	Due 1999	2	$ 48,000	0	$ -
		Network Devices									
427030	680348	Data concentrators, Pump St#1 Control Room	1	R	$ 50,000	$ 50,000	Due 2014	0	$ -	1	$ 50,000
427030	680348	Printers, Pump St#1 Control Room	1	R	$ 1,000	$ 1,000	Due 2014	0	$ -	1	$ 1,000
427030	680348	Operator Consoles, Pump St#1 Control Room	1	R	$ 150,000	$ 150,000	Due 2014	0	$ -	1	$ 150,000
427030	680348	Operator Console, Primary Head Sewage Plant Operator Building (Sludge Processing Complex A)	1	R	$ 150,000	$ 150,000	Due 2014	0	$ -	1	$ 150,000
427030	680348	Pump Station 2 Control Room (Motor Floor)Remote I/O cabinet #1,	1	R	$ 50,000	$ 50,000	Due 2014	0	$ -	1	$ 50,000
427030	680348	Remote I/O cabinet #2, Pump Station 2 Control Room (Electrical Room First Floor)	1	R	$ 50,000	$ 50,000	Due 2014	0	$ -	1	$ 50,000
427030	680348	Remote I/O cabinet #3, Pump Station 2 Control Room (Chemical Addition Building Electrical Room)	1	R	$ 50,000	$ 50,000	Due 2014	0	$ -	1	$ 50,000
427030	680348	Remote I/O cabinet #4, Pump Station 2 Control Room (1st Floor Electrical Room)	1	R	$ 50,000	$ 50,000	Due 2009	1	$ 50,000	0	$ -
427030	680348	Remote I/O cabinet #5, Pump Station 2 Control Room (Chemical Addition Building Electrical Room)	1	R	$ 50,000	$ 50,000	Due 2009	1	$ 50,000	0	$ -
427030	680348	Operator Consoles, Roof of EB-10	1	R	$ 150,000	$ 150,000	Due 2009	1	$ 150,000	0	$ -
427030	680348	Printers, Roof of EB-10	1	R	$ 1,000	$ 1,000	Due 2014	0	$ -	1	$ 1,000
427030	680348	Operator Workstation, Secondary Head Sewage Plant Operator Building	1	R	$ 5,000	$ 5,000	Due 2014	0	$ -	1	$ 5,000
427030	680348	Operator consoles, Incineration Complex II (fifth floor)	1	R	$ 5,000	$ 5,000	Due 2014	0	$ -	1	$ 5,000
427030	680348	AB PLC-5/05 Processor, Chlorination and Dechlorination Control Rooms	1	R	$ 50,000	$ 50,000	Due 2013	0	$ -	1	$ 50,000
427030	680348	Processor Control cabinets, Chlorination and Dechlorination Control Rooms	1	R	$ 50,000	$ 50,000	Due 2013	0	$ -	1	$ 50,000
427030	680348	Operator consoles, Chlorination and Dechlorination Control Rooms	1	R	$ 5,000	$ 5,000	Due 2013	0	$ -	1	$ 5,000
427030	680348	I/O Cabinets, Chlorination and Dechlorination Control Rooms	1	R	$ 5,000	$ 5,000	Due 2012	1	$ 5,000	0	$ -
427030	680343	72" magmeter #A3, ILP Station 2	1	R	$ 125,000	$ 125,000	Due 2012	0	$ -	1	$ 125,000
427030	680343	72" magmeter #A4, ILP Station 2	1	R	$ 125,000	$ 125,000	Due 2012	0	$ -	1	$ 125,000
427030	680343	60" Flowmeter, SFE Line	1	R	$ 100,000	$ 100,000	Due 2012	0	$ -	1	$ 100,000
427030	680343	48" Flowmeter, SFE Line	1	R	$ 80,000	$ 80,000	Due 2007	0	$ -	1	$ 80,000
427030	680343	Accusonic Flowmeter, Detroit River Outfall #1	1	R	$ 200,000	$ 200,000	Due 2007	0	$ -	1	$ 200,000

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DETROIT WATER & SEWERAGE DEPARTMENT

OTHER EQUIPMENT BUDGET REQUEST - FY 2012-13 (FORM H) AND FY 2013-14

CAPITAL IMPROVEMENT PROGRAM (EQUIPMENT PURCHASES)

USE ONE OBJECT CODE PER PAGE

Requesting Cost Center: _____ Capital or Replace?

Cost Center	Object	Description	Quantity	C or R	Unit Price	Total Cost	Explanation	2012-13 Budget Quantity	2012-13 Budget Total Cost	2013-14 Budget Quantity	2013-14 Budget Total Cost
427030	680348	Automation PLC #1, Incineration Complex I (4th Floor Control Room back ICP)	1	R	$ 25,000	$ 25,000	Due 2010	1	$ 25,000	0	$ -
427030	680348	Automation PLC #2, Incineration Complex I (4th Floor Control Room back ICP)	1	R	$ 25,000	$ 25,000	Due 2010	1	$ 25,000	0	$ -
427030	680348	Automation PLC #3, Incineration Complex I (4th Floor Control Room back ICP)	1	R	$ 25,000	$ 25,000	Due 2010	1	$ 25,000	0	$ -
427030	680348	Automation PLC #4, Incineration Complex I (4th Floor Control Room back ICP)	1	R	$ 25,000	$ 25,000	Due 2009	1	$ 25,000	0	$ -
427030	680348	Automation PLC #5, Incineration Complex I (4th Floor Control Room back ICP)	1	R	$ 25,000	$ 25,000	Due 2009	1	$ 25,000	0	$ -
427030	680348	Automation PLC #6, Incineration Complex I (4th Floor Control Room back ICP)	1	R	$ 25,000	$ 25,000	Due 2009	1	$ 25,000	0	$ -
427030	680348	Panel Overview Operator Interface Station #1, Incinera- tion Complex I (4th Floor Control Room front ICP)	1	R	$ 4,200	$ 4,200	Due 2009	1	$ 4,200	0	$ -
427030	680348	Panel Overview Operator Interface Station #2, Incinera- tion Complex I (4th Floor Control Room front ICP)	1	R	$ 4,200	$ 4,200	Due 2009	1	$ 4,200	0	$ -
427030	680348	Panel Overview Operator Interface Station #3, Incinera- tion Complex I (4th Floor Control Room front ICP)	1	R	$ 4,200	$ 4,200	Due 2009	1	$ 4,200	0	$ -
427030	680348	Panel Overview Operator Interface Station #4, Incinera- tion Complex I (4th Floor Control Room front ICP)	1	R	$ 4,200	$ 4,200	Due 1999	1	$ 4,200	0	$ -
427030	680348	Panel Overview Operator Interface Station #5, Incinera- tion Complex I (4th Floor Control Room front ICP)	1	R	$ 4,200	$ 4,200	Due 1999	1	$ 4,200	0	$ -
427030	680348	Panel Overview Operator Interface Station #6, Incinera- tion Complex I (4th Floor Control Room front ICP)	1	R	$ 4,200	$ 4,200	Due 1999	1	$ 4,200	0	$ -
427030	680348	Control Logix Processor, Incineration Complex I (4th Floor Control Room)	1	R	$ 10,000	$ 10,000	Due 1999	1	$ 10,000	0	$ -
427030	680348	Operator Workstation #1, Control Logix Processor, Incineration Complex I	1	R	$ 5,000	$ 5,000	Due 1999	1	$ 5,000	0	$ -
427030	680348	Operator Workstation #2, Incineration Complex II (4th Floor Control Room)	1	R	$ 5,000	$ 5,000	Due 1999	1	$ 5,000	0	$ -
427030	680348	Opacity server, OAB Main Control Room (1st Floor behind MAP board)	1	R	$ 150,000	$ 150,000	Due 2011	1	$ 150,000	0	$ -
427030	680348	Level Sensor, Pump Station #1 FeCl2 Tank	1	R	$ 5,000	$ 5,000	Due 2011	1	$ 5,000	0	$ -
427030	680348	Level Sensor, Pump Station #1 FeCl3 Tank	1	R	$ 5,000	$ 5,000	Due 2011	1	$ 5,000	0	$ -

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DETROIT WATER & SEWERAGE DEPARTMENT

OTHER EQUIPMENT BUDGET REQUEST - FY 2012-13 (FORM H) AND FY 2013-14

CAPITAL IMPROVEMENT PROGRAM (EQUIPMENT PURCHASES)

USE ONE OBJECT CODE PER PAGE

Requesting Cost Center: _____

Cost Center	Object	Description	Quanity	Capital or Replace? C or R	Unit Price	Total Cost	Explanation	2012-13 Budget Quantity	2012-13 Budget Total Cost	2013-14 Budget Quantity	2013-14 Budget Total Cost
427030	680348	Level Sensor, Pump Station #1 Wet well	1	R	$ 10,000	$ 10,000	Due 2010	1	$ 10,000	0	$ -
427030	680348	Level Sensor, Pump Station #2 Wet well	1	R	$ 10,000	$ 10,000	Due 2005	1	$ 10,000	0	$ -
427030	680348	Operator console, Sludge Pumping Station #3 Control Room	1	R	$ 150,000	$ 150,000	Due 2014	0	$ -	1	$ 150,000
427030	680348	CEM cabinet # 3-14 for THC control and m	12	R	$ 100,000	$ 1,200,000	Due 2014	0	$ -	12	$ 1,200,000
427030	680348	RAID 5 server at old admin bldg 1st floor	1	R	$ 150,000	$ 150,000	Due 2009	1	$ 150,000	0	$ -
427030		**Electrical**									
427030	644118	480V MCC in EB-24, EB-25, EB-26 Complex II	25	R	$50,000	$ 1,250,000	Due 2010	15	$ 750,000	10	$ 500,000
427030	644118	Unit Substation in EB-24, EB-25, EB-26 Complex II	3	R	$400,000	$ 1,200,000	Due 2010	2	$ 800,000	1	$ 400,000
427030	644118	BSTP Pump Drive and Motor #3, 4 Complex A	2	R	$11,000	$ 22,000	Due 1999	2	$ 22,000	0	$ -
427030	644118	SFE Pump#1 thru 8 Motor, SFE bldg	8	R	$90,000	$ 720,000	Due 2013	0	$ -	8	$ 720,000
	644118	Center Drive and motor for Circular Clarifier #15-16	4	R	$ 5,500	$ 22,000	Due 1992	4	$ 22,000	0	$ -
427030	644118	Tank Drive and motor for 25 Final Tanks	100	R	$ 7,500	$ 750,000	Due 1999	50	$ 375,000	50	$ 375,000
427030	644118	Head Motor Pulley	20	R	$ 14,000	$ 280,000	Due 1992	10	$ 140,000	10	$ 140,000
427030	644111	Ash Vacuum Pump Motor	5	R	$ 15,000	$ 75,000	Due 2004	3	$ 45,000	2	$ 30,000
427030	644111	Ash Silo Vacuum Pump Drives	5	R	$ 2,500	$ 12,500	Due 2004	3	$ 7,500	2	$ 5,000
427030	644111	Bar rack drive at Rack and Grit, PS2	8	R	$ 2,000	$ 16,000	Due 2011	4	$ 8,000	4	$ 8,000
427030		**Total**			**$ 3,848,869**	**$ 14,157,034**			**$ 7,016,034**		**$ 7,141,000**

The DWSD definition of capital *equipment* covers the acquisition of tangible property not intended for resale with a useful life, which is greater than one (1) year, and where costs exceed $1,000.

	Object/	Utility	
Office Equipment	644118	783393	Shop Equipment
Communication Equipment	644115	780398	Computer Hardware & Software
	644111	780389	ACQ Other Equipment

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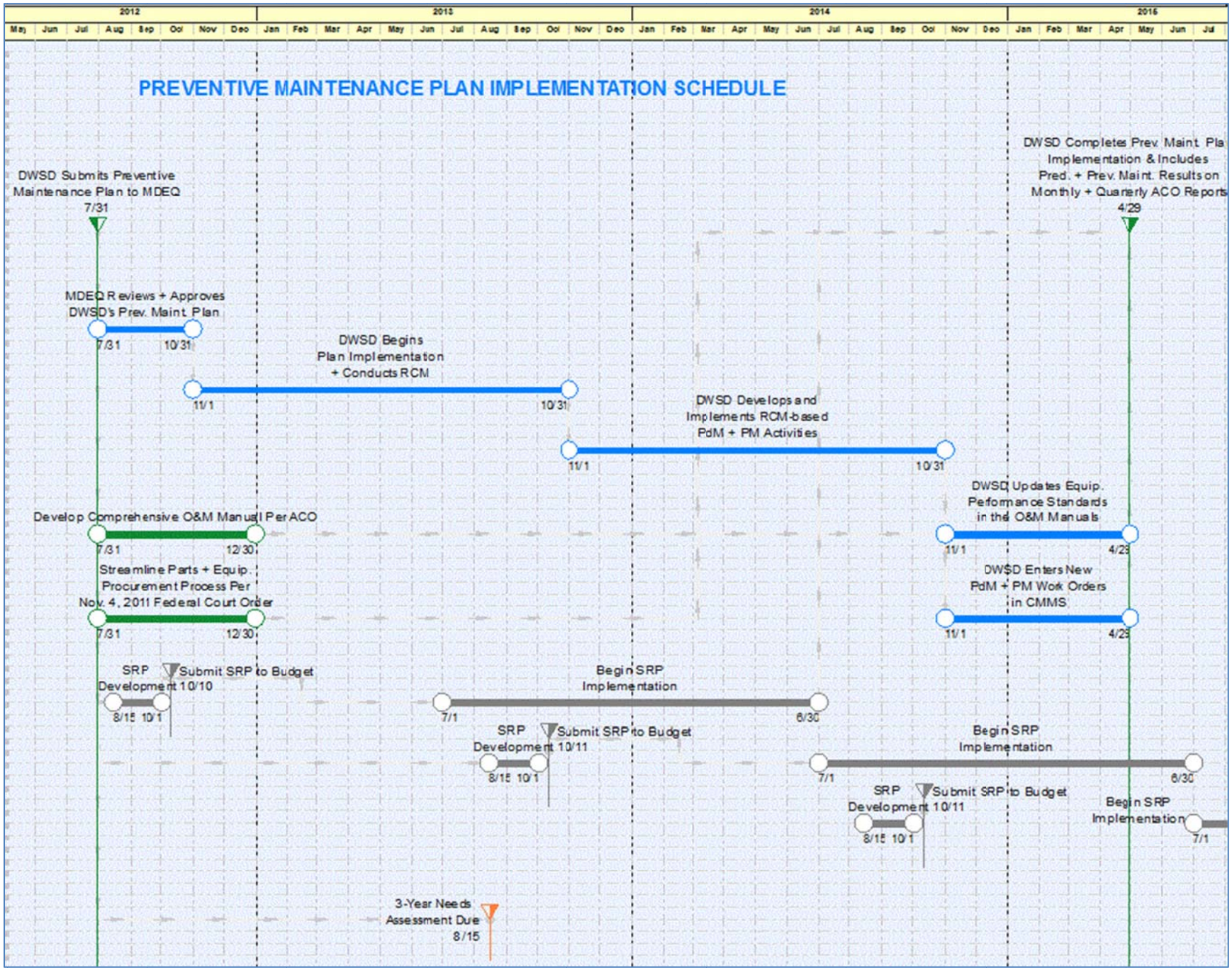
2012
2013
2014
2015
May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul
PREVENTIVE MAINTENANCE PLAN IMPLEMENTATION SCHEDULE
DWSD Submits Preventive Maintenance Plan to MDEQ
7/31
DWSD Completes Prev. Maint. Pla Implementation & Includes Pred. + Prev. Maint. Results on Monthly + Quarterly ACO Reports
4/29
MDEQ Reviews + Approves DWSD's Prev. Maint. Plan
7/31
10/31
DWSD Begins Plan Implementation + Conducts RCM
11/1
10/31
DWSD Develops and Implements RCM-based PdM + PM Activities
11/1
10/31
DWSD Updates Equip. Performance Standards in the O&M Manuals
11/1
4/29
Develop Comprehensive O&M Manual Per ACO
7/31
12/30
Streamline Parts + Equip. Procurement Process Per Nov. 4, 2011 Federal Court Order
7/31
12/30
DWSD Enters New PdM + PM Work Orders in CMMS
11/1
4/29
SRP Development
Submit SRP to Budget
10/10
8/15
10/1
Begin SRP Implementation
7/1
6/30
SRP Development
Submit SRP to Budget
10/11
8/15
10/1
Begin SRP Implementation
7/1
6/30
SRP Development
Submit SRP to Budget
10/11
8/15
10/1
Begin SRP Implementation
7/1
3-Year Needs Assessment Due
8/15

ATTACHMENT III

PREDICTIVE MAINTENANCE PLAN

Site	Area	Equipment	Component	Qty	Test Frequencies		
					Vib. Analy.	IR-contract	IR-inhouse
WWTP	Pump Station 1	Raw Sewage Pump	Motor: 800, 1000, 1250 HP	8	6 months	6 months	-
WWTP	Pump Station 1	Raw Sewage Pump	Steady Bearing	8	6 months	6 months	-
WWTP	Pump Station 1	Raw Sewage Pump	Pump	8	6 months	-	6 months
WWTP	Pump Station 1	Raw Sewage Pump	Local panel	8	-	6 months	-
WWTP	Pump Station 1	Lube Oil Pump	Motor: 0.5 HP	8	-	-	6 months
WWTP	Pump Station 1	Lube Oil Pump	Pump	8	-	-	6 months
WWTP	Pump Station 1	Lube Oil Pump	Local panel	8	-	-	6 months
WWTP	Pump Station 1	Bar Screen	Motor: 1.5, 2 HP	8	-	-	12 months
WWTP	Pump Station 1	Bar Screen	Reducer	8	-	-	12 months
WWTP	Pump Station 1	Bar Screen	Local panel	8	-	-	12 months
WWTP	Pump Station 1	Screenings Conveyor	Motor: 7.5 HP	1	-	-	12 months
WWTP	Pump Station 1	Screenings Conveyor	Reducer	1	-	-	12 months
WWTP	Pump Station 1	Screenings Conveyor	Local panel	1	-	-	12 months
WWTP	Pump Station 1	Grit Collector	Motor: 1.7, 5 HP	16	-	-	12 months
WWTP	Pump Station 1	Grit Collector	Reducer	16	-	-	12 months
WWTP	Pump Station 1	Grit Collector	Local panel	16	-	-	12 months
WWTP	Pump Station 1	Grit Flight Conveyor	Motor: 2.5, 7.5 HP	2	-	-	12 months
WWTP	Pump Station 1	Grit Flight Conveyor	Reducer	2	-	-	12 months
WWTP	Pump Station 1	Grit Flight Conveyor	Local panel	2	-	-	12 months
WWTP	Pump Station 1	Grit Cross Conveyor	Motor: 2 HP	2	-	-	12 months
WWTP	Pump Station 1	Grit Cross Conveyor	Reducer	2	-	-	12 months
WWTP	Pump Station 1	Grit Cross Conveyor	Local panel	2	-	-	12 months
WWTP	Pump Station 1	SFE Booster Pump	Motor: 40 HP	1	12 months	-	12 months
WWTP	Pump Station 1	SFE Booster Pump	Local panel	1	-	-	12 months
WWTP	Pump Station 1	Overhead Crane					
WWTP	PS1 Ferric	Ferric Transfer Pump	Motor: 20 HP	2	-	-	12 months
WWTP	PS1 Ferric	Ferric Transfer Pump	Local panel	2	-	-	12 months
WWTP	PS1 Polymer	Dust Collector	Motor: 3 HP	2	-	-	12 months
WWTP	PS1 Polymer	Dust Collector	Blower	2	-	-	-
WWTP	PS1 Polymer	Dust Collector	Local panel	2	-	-	12 months
WWTP	PS1 Polymer	Dilution Tank Mixer	Motor: 5 HP	2	-	-	12 months
WWTP	PS1 Polymer	Dilution Tank Mixer	Reducer	2	-	-	12 months
WWTP	PS1 Polymer	Dilution Tank Mixer	Local panel	2	-	-	12 months
WWTP	PS1 Polymer	Water Booster Pumps	Motor: 2.5 HP	2	-	-	12 months
WWTP	PS1 Polymer	Water Booster Pumps	Local panel	2	-	-	12 months
WWTP	PS1 Polymer	Polymer Feed Pump	Gear Motor: 15 HP	3	-	-	12 months
WWTP	PS1 Polymer	Polymer Feed Pump	Pump	3	-	-	12 months
WWTP	PS1 Polymer	Polymer Feed Pump	Local panel	3	-	-	12 months
WWTP	PS1 Polymer	Polymer Feed Pump	VFD	3	-	-	12 months
WWTP	Pump Station 2	Raw Sewage Pump	Motor: 900 HP	7	6 months	6 months	-
WWTP	Pump Station 2	Raw Sewage Pump	Steady Bearing	14	6 months	6 months	-
WWTP	Pump Station 2	Raw Sewage Pump	Pump	7	6 months	-	6 months
WWTP	Pump Station 2	Raw Sewage Pump	Local panel	7	-	6 months	-
WWTP	Pump Station 2	Raw Sewage Pump	VFD	5	-	6 months	-
WWTP	Pump Station 2	Lube Oil Pump	Motor: 0.25 HP	7	-	-	6 months
WWTP	Pump Station 2	Lube Oil Pump	Pump	7	-	-	6 months
WWTP	Pump Station 2	Lube Oil Pump	Local panel	7	-	-	6 months
WWTP	Pump Station 2	Wet Well Dewatering Pump	Motor: 30 HP	1	12 months	12 months	-
WWTP	Pump Station 2	Wet Well Dewatering Pump	Pump	1	12 months	-	12 months
WWTP	Pump Station 2	Wet Well Dewatering Pump	Local panel	1	-	-	12 months
WWTP	Pump Station 2	Return Exhaust Fan	Motor: ? HP	1	-	-	-
WWTP	Pump Station 2	Return Exhaust Fan	Fan	1	-	-	-
WWTP	Pump Station 2	Return Exhaust Fan	Local panel	1	-	-	-
WWTP	Pump Station 2	Bleed Air Fan	Motor: ? HP	1	-	-	-
WWTP	Pump Station 2	Bleed Air Fan	Fan	1	-	-	-
WWTP	Pump Station 2	Bleed Air Fan	Local panel	1	-	-	-
WWTP	Pump Station 2	Through Floor Exhaust Fan	Motor: ? HP	2	-	-	-
WWTP	Pump Station 2	Through Floor Exhaust Fan	Fan	2	-	-	-
WWTP	Pump Station 2	Through Floor Exhaust Fan	Local panel	2	-	-	-
WWTP	Pump Station 2	Pump Room Hoist		2	-	-	-
WWTP	Pump Station 2	Pump Room Bridge Crane		1	-	-	-
WWTP	Pump Station 2	Pump Room Jib Crane		1	-	-	-
WWTP	Pump Station 2	Motor Room Bridge Crane		1	-	-	-
WWTP	Pump Station 2	Wet Well Clamshell		1	-	-	-
WWTP	Pump Station 2	Wet Well Hoist		1	-	-	-

Site	Area	Equipment	Component	Qty	Test Frequencies		
					Vib. Analy.	IR-contract	IR-inhouse
WWTP	Pump Station 2	Bar Screen	Motor: 0.75 HP	8	-	12 months	-
WWTP	Pump Station 2	Bar Screen	Reducer	8	-	12 months	-
WWTP	Pump Station 2	Bar Screen	Local panel	8	-	12 months	-
WWTP	Pump Station 2	Screenings Conveyor	Motor: 5 HP	1	-	12 months	-
WWTP	Pump Station 2	Screenings Conveyor	Reducer	1	-	12 months	-
WWTP	Pump Station 2	Screenings Conveyor	Local panel	1	-	12 months	-
WWTP	Pump Station 2	Aerated Grit Blower	Motor: 200 HP	3	12 months	12 months	-
WWTP	Pump Station 2	Aerated Grit Blower	Blower	3	12 months	-	12 months
WWTP	Pump Station 2	Aerated Grit Blower	Local panel	3	-	12 months	-
WWTP	Pump Station 2	Screenings Bridge Crane		1	-	-	-
WWTP	Pump Station 2	Grit Chamber Monorail Crane		2	-	-	-
WWTP	PS2 Polymer	Dust Collector	Motor: 3 HP	2	-	-	12 months
WWTP	PS2 Polymer	Dust Collector	Blower	2	-	-	12 months
WWTP	PS2 Polymer	Dust Collector	Local panel	2	-	-	12 months
WWTP	PS2 Polymer	Bin Discharger	Motor: 3 HP	2	-	-	12 months
WWTP	PS2 Polymer	Bin Discharger	Activator	2	-	-	12 months
WWTP	PS2 Polymer	Bin Discharger	Local panel	2	-	-	12 months
WWTP	PS2 Polymer	Storage/Dilution Tank Mixer	Motor: 1.5 HP	4	-	-	12 months
WWTP	PS2 Polymer	Storage/Dilution Tank Mixer	Reducer	4	-	-	12 months
WWTP	PS2 Polymer	Storage/Dilution Tank Mixer	Local panel	4	-	-	12 months
WWTP	PS2 Polymer	Polymer Transfer Pump	Motor: 0.5 HP	2	-	-	12 months
WWTP	PS2 Polymer	Polymer Transfer Pump	Pump	2	-	-	12 months
WWTP	PS2 Polymer	Polymer Transfer Pump	Local panel	2	-	-	12 months
WWTP	PS2 Polymer	Polymer Feed Pump	Motor: 10 HP	3	-	-	12 months
WWTP	PS2 Polymer	Polymer Feed Pump	Reducer	3	-	-	12 months
WWTP	PS2 Polymer	Polymer Feed Pump	Pump	3	-	-	12 months
WWTP	PS2 Polymer	Polymer Feed Pump	Local panel	3	-	-	12 months
WWTP	PS2 Polymer	Polymer Feed Pump	VFD	3	-	-	12 months
WWTP	Primary Tanks	Rectangular Main Collecter	Motor: 0.5 HP	84	-	-	12 months
WWTP	Primary Tanks	Rectangular Main Collecter	Reducer	84	-	-	12 months
WWTP	Primary Tanks	Rectangular Cross Collecter	Motor: 0.5 HP	12	-	-	12 months
WWTP	Primary Tanks	Rectangular Cross Collecter	Reducer	12	-	-	12 months
WWTP	Primary Tanks	Rectangular Sludge Pump	Motor: 40 HP	12	12 months	12 months	-
WWTP	Primary Tanks	Rectangular Sludge Pump	Pump	12	12 months	-	12 months
WWTP	Primary Tanks	Rectangular Sludge Pump	Local panel	12	-	12 months	-
WWTP	Primary Tanks	Rectangular Scum Collecter	Motor: 5 HP	12	-	-	12 months
WWTP	Primary Tanks	Rectangular Scum Collecter	Reducer	12	-	-	12 months
WWTP	Primary Tanks	Circular Center Drive	Motor: 3, 5 HP	12	-	-	12 months
WWTP	Primary Tanks	Circular Center Drive	Reducer	12	-	-	12 months
WWTP	Primary Tanks	Circular Center Drive	Local panel	6	-	-	12 months
WWTP	Primary Tanks	Station 1 Centrifugal Sludge Pump	Motor: 50 HP	2	12 months	12 months	-
WWTP	Primary Tanks	Station 1 Centrifugal Sludge Pump	Pump	2	12 months	-	12 months
WWTP	Primary Tanks	Station 1 Centrifugal Sludge Pump	Local panel	2	-	12 months	-
WWTP	Primary Tanks	~~Station 1 Plunger Sludge Pump~~	~~Motor~~	~~1~~	-	-	-
WWTP	Primary Tanks	~~Station 1 Plunger Sludge Pump~~	~~Reducer~~	~~1~~	-	-	-
WWTP	Primary Tanks	~~Station 1 Plunger Sludge Pump~~	~~Pump~~	~~1~~	-	-	-
WWTP	Primary Tanks	Station 2 Centrifugal Sludge Pump	Motor: 75 HP	3	12 months	12 months	-
WWTP	Primary Tanks	Station 2 Centrifugal Sludge Pump	VS Belt Drive	3	12 months	-	12 months
WWTP	Primary Tanks	Station 2 Centrifugal Sludge Pump	Pump	3	12 months	-	12 months
WWTP	Primary Tanks	Station 2 Centrifugal Sludge Pump	Local panel	3	-	12 months	-
WWTP	Primary Tanks	Station 3 Centrifugal Sludge Pump	Motor: 125 HP	3	12 months	12 months	-
WWTP	Primary Tanks	Station 3 Centrifugal Sludge Pump	VS Hydraulic Drive	3	12 months	-	12 months
WWTP	Primary Tanks	Station 3 Centrifugal Sludge Pump	Pump	3	12 months	-	12 months
WWTP	Primary Tanks	Station 3 Centrifugal Sludge Pump	Local panel	3	-	12 months	-
WWTP	Primary Tanks	Circular Scum Conveyor	Motor: 2 HP	3	-	-	12 months
WWTP	Primary Tanks	Circular Scum Conveyor	Reducer	3	-	-	12 months
WWTP	Primary Tanks	Circular Scum Conveyor	Local panel	3	-	-	12 months
WWTP	Primary Tanks	Circular Scum Pump	Motor: 10 HP	3	-	-	12 months
WWTP	Primary Tanks	Circular Scum Pump	Reducer	3	-	-	12 months
WWTP	Primary Tanks	Circular Scum Pump	Pump	3	-	-	12 months
WWTP	Primary Tanks	Circular Scum Pump	Local panel	3	-	-	12 months
WWTP	Primary Tanks	Scum Concentrator Drive	Motor: 0.5 HP	3	-	-	12 months
WWTP	Primary Tanks	Scum Concentrator Drive	Reducer	3	-	-	12 months
WWTP	Primary Tanks	Scum Concentrator Drive	Transmission	3	-	-	12 months
WWTP	Primary Tanks	Scum Concentrator Drive	Local panel	3	-	-	12 months

Site	Area	Equipment	Component	Qty	Test Frequencies		
					Vib. Analy.	IR-contract	IR-inhouse
WWTP	Primary Tanks	Scum Concentrator Pump	Motor: 15 HP	3	-	-	12 months
WWTP	Primary Tanks	Scum Concentrator Pump	Reducer	3	-	-	12 months
WWTP	Primary Tanks	Scum Concentrator Pump	Pump	3	-	-	12 months
WWTP	Primary Tanks	Scum Concentrator Pump	Local panel	3	-	-	12 months
WWTP	Primary Tanks	Scum Grinder	Motor: 5 HP	3	-	-	12 months
WWTP	Primary Tanks	Scum Grinder	Reducer	3	-	-	12 months
WWTP	Primary Tanks	Scum Grinder	Grinder	3	-	-	12 months
WWTP	Primary Tanks	Scum Grinder	Local panel	3	-	-	12 months
WWTP	Aeration 1/2	Intermediate Lift Pump	Motor: 2500 HP	2	6 months	6 months	-
WWTP	Aeration 1/2	Intermediate Lift Pump	Pump	2	6 months	-	12 months
WWTP	Aeration 1/2	Intermediate Lift Pump	Local Panel	2	-	-	12 months
WWTP	Aeration 1/2	Intermediate Lift Pump	VFD	2	-	6 months	-
WWTP	Aeration 1/2	Purge Blower	Motor: 100 HP	2	24 months	24 months	-
WWTP	Aeration 1/2	Purge Blower	Blower	2	24 months	-	24 months
WWTP	Aeration 1/2	Purge Blower	Local Panel	2	-	-	24 months
WWTP	Aeration 1/2	Aeration Mixer	Motor: 100, 75, 25 HP	40	12 months	12 months	-
WWTP	Aeration 1/2	Aeration Mixer	Reducer	40	12 months	-	12 months
WWTP	Aeration 1/2	Aeration Mixer	Mixer	40	12 months	-	12 months
WWTP	Aeration 1/2	Aeration Mixer	Local Panel	40	-	-	12 months
WWTP	Aeration 3/4	Intermediate Lift Pump	Motor: 2500 HP	3	6 months	6 months	-
WWTP	Aeration 3/4	Intermediate Lift Pump	Pump	3	6 months	-	12 months
WWTP	Aeration 3/4	Intermediate Lift Pump	Local Panel	3	-	-	12 months
WWTP	Aeration 3/4	Intermediate Lift Pump	VFD	3	-	6 months	-
WWTP	Aeration 3/4	Purge Blower	Motor: 100 HP	2	24 months	24 months	-
WWTP	Aeration 3/4	Purge Blower	Blower	2	24 months	-	24 months
WWTP	Aeration 3/4	Purge Blower	Local Panel	2	-	-	24 months
WWTP	Aeration 3/4	Aeration Mixer	Motor: 100, 75, 50 25 HP	62	12 months	12 months	-
WWTP	Aeration 3/4	Aeration Mixer	Reducer	62	12 months	-	12 months
WWTP	Aeration 3/4	Aeration Mixer	Mixer	62	12 months	-	12 months
WWTP	Aeration 3/4	Aeration Mixer	Local Panel	62	-	-	12 months
WWTP	Secondary Tanks	Center Drive	Motor: 1.5 HP	50	-	-	12 months
WWTP	Secondary Tanks	Center Drive	Reducer	50	-	-	12 months
WWTP	Secondary Tanks	Center Drive	Local Panel	25	-	-	12 months
WWTP	Secondary Tanks	RAS Pump	Motor: 200, 150, 100	25	12 months	12 months	-
WWTP	Secondary Tanks	RAS Pump	Pump	25	12 months	-	12 months
WWTP	Secondary Tanks	RAS Pump	Local panel	25	-	12 months	-
WWTP	Secondary Tanks	RAS Pump	VFD	25	-	12 months	-
WWTP	SFE Building	SFE Pump	Motor: 1000, 600 HP	8	12 months	12 months	-
WWTP	SFE Building	SFE Pump	Pump	8	12 months	-	12 months
WWTP	SFE Building	SFE Pump	Local panel	8	-	12 months	-
WWTP	SFE Building	SFE Strainer	Motor: 4 HP	8	-	-	12 months
WWTP	SFE Building	SFE Strainer	Reducer	8	-	-	12 months
WWTP	SFE Building	SFE Strainer	Strainer	8	-	-	12 months
WWTP	SFE Building	SFE Strainer	Local panel	8	-	-	12 months
WWTP	SFE Building	Seal Water Booster Pump	Motor: 10 HP	2	-	-	12 months
WWTP	SFE Building	Seal Water Booster Pump	Pump	2	-	-	12 months
WWTP	SFE Building	Seal Water Booster Pump	Local panel	2	-	-	12 months
WWTP	Chlorination	Scrubber Fan	Motor: 7.5 HP	1	-	-	12 months
WWTP	Chlorination	Scrubber Fan	Fan	1	-	-	12 months
WWTP	Chlorination	Scrubber Fan	Local panel	1	-	-	12 months
WWTP	Chlorination	Scrubber Pump	Motor: 7.5 HP	1	-	-	12 months
WWTP	Chlorination	Scrubber Pump	Pump	1	-	-	12 months
WWTP	Chlorination	Scrubber Pump	Local panel	1	-	-	12 months
WWTP	Chlorination	Exhaust Fan	Motor: ? HP	6	-	-	-
WWTP	Chlorination	Exhaust Fan	Fan	6	-	-	-
WWTP	Chlorination	Exhaust Fan	Local panel	6	-	-	-
WWTP	De-chlorination	Injection Water Booster Pump	Motor: 79.3 HP	4	-	-	12 months
WWTP	De-chlorination	Injection Water Booster Pump	Pump	4	-	-	12 months
WWTP	De-chlorination	Injection Water Booster Pump	Local panel	4	-	-	12 months
WWTP	De-chlorination	Scrubber Fan	Motor: 7.5 HP	2	-	-	12 months
WWTP	De-chlorination	Scrubber Fan	Fan	2	-	-	12 months
WWTP	De-chlorination	Scrubber Fan	Local panel	2	-	-	12 months
WWTP	De-chlorination	Scrubber Pump	Motor: 7.5 HP	2	-	-	12 months
WWTP	De-chlorination	Scrubber Pump	Pump	2	-	-	12 months
WWTP	De-chlorination	Scrubber Pump	Local panel	2	-	-	12 months

Site	Area	Equipment	Component	Qty	Test Frequencies		
					Vib. Analy.	IR-contract	IR-inhouse
WWTP	Sludge Processing A	Thickener Center Drive	Motor: 3 HP	12	-	-	12 months
WWTP	Sludge Processing A	Thickener Center Drive	Reducer	12	-	-	12 months
WWTP	Sludge Processing A	Thickener Center Drive	Local Panel	6	-	-	12 months
WWTP	Sludge Processing A	Thickener Dewatering Pump	Motor: 60 HP	10	-	-	12 months
WWTP	Sludge Processing A	Thickener Dewatering Pump	Pump	10	-	-	12 months
WWTP	Sludge Processing A	Thickener Dewatering Pump	Local panel	10	-	-	12 months
WWTP	Sludge Processing A	Thickener Dewatering Pump	VFD	10	-	-	12 months
WWTP	Sludge Processing A	Storage Tank 1/2 Mixing Blower	Motor: 30 HP	3	-	-	12 months
WWTP	Sludge Processing A	Storage Tank 1/2 Mixing Blower	Blower	3	-	-	12 months
WWTP	Sludge Processing A	Storage Tank 1/2 Mixing Blower	Local panel	3	-	-	12 months
WWTP	Sludge Processing A	Storage Tank 3/4 Mixing Blower	Motor: 30 HP	3	-	-	12 months
WWTP	Sludge Processing A	Storage Tank 3/4 Mixing Blower	Blower	3	-	-	12 months
WWTP	Sludge Processing A	Storage Tank 3/4 Mixing Blower	Local panel	3	-	-	12 months
WWTP	Sludge Processing A	1-4 Sludge Feed Pump	Motor: 200 HP	4	12 months	12 months	-
WWTP	Sludge Processing A	1-4 Sludge Feed Pump	VS Hydraulic Drive	4	12 months	-	12 months
WWTP	Sludge Processing A	1-4 Sludge Feed Pump	Pump	4	12 months	-	12 months
WWTP	Sludge Processing A	1-4 Sludge Feed Pump	Local panel	4	-	12 months	-
WWTP	Sludge Processing A	Storage Tank 5/6 Mixing Pump	Motor: 25 HP	2	-	-	12 months
WWTP	Sludge Processing A	Storage Tank 5/6 Mixing Pump	Pump	2	-	-	12 months
WWTP	Sludge Processing A	Storage Tank 5/6 Mixing Pump	Local panel	2	-	-	12 months
WWTP	Sludge Processing A	5-6 Sludge Feed Pump	Motor: 250 HP	2	12 months	12 months	-
WWTP	Sludge Processing A	5-6 Sludge Feed Pump	Pump	2	12 months	-	12 months
WWTP	Sludge Processing A	5-6 Sludge Feed Pump	Local panel	2	-	12 months	-
WWTP	Sludge Processing A	5-6 Sludge Feed Pump	VFD	2	-	12 months	-
WWTP	Sludge Processing B	Thickener Center Drive	Motor: 3 HP	12	-	-	12 months
WWTP	Sludge Processing B	Thickener Center Drive	Reducer	12	-	-	12 months
WWTP	Sludge Processing B	Thickener Center Drive	Local Panel	6	-	-	12 months
WWTP	Sludge Processing B	Thickener Dewatering Pump	Motor: 40 HP	9	-	-	12 months
WWTP	Sludge Processing B	Thickener Dewatering Pump	Pump	9	-	-	12 months
WWTP	Sludge Processing B	Thickener Dewatering Pump	Local panel	9	-	-	12 months
WWTP	Sludge Processing B	Thickener Dewatering Pump	VFD	9	-	-	12 months
WWTP	Sludge Processing B	WAS Pump	Motor: 30 HP	3	-	-	12 months
WWTP	Sludge Processing B	WAS Pump	Pump	3	-	-	12 months
WWTP	Sludge Processing B	WAS Pump	Local panel	3	-	-	12 months
WWTP	Sludge Processing B	WAS Pump	VFD	3	-	-	12 months
WWTP	Dewatering 1	Polymer Unloading Pump	Gear Motor: 25 HP	2	-	-	12 months
WWTP	Dewatering 1	Polymer Unloading Pump	Pump	2	-	-	12 months
WWTP	Dewatering 1	Polymer Unloading Pump	Local panel	2	-	-	12 months
WWTP	Dewatering 1	Polymer Unloading Pump	VFD	2	-	-	12 months
WWTP	Dewatering 1	Polymer Transfer Pump	Gear Motor: 5 HP	2	-	-	12 months
WWTP	Dewatering 1	Polymer Transfer Pump	Pump	2	-	-	12 months
WWTP	Dewatering 1	Polymer Transfer Pump	Local panel	2	-	-	12 months
WWTP	Dewatering 1	Polymer Transfer Pump	VFD	2	-	-	12 months
WWTP	Dewatering 1	Polymer Dilution Tank Mixer	Motor: 3 HP	2	-	-	12 months
WWTP	Dewatering 1	Polymer Dilution Tank Mixer	Reducer	2	-	-	12 months
WWTP	Dewatering 1	Polymer Dilution Tank Mixer	Mixer	2	-	-	12 months
WWTP	Dewatering 1	Polymer Dilution Tank Mixer	Local Panel	2	-	-	12 months
WWTP	Dewatering 1	Polymer Feed Pump	Gear Motor: 25 HP	2	-	-	12 months
WWTP	Dewatering 1	Polymer Feed Pump	Pump	2	-	-	12 months
WWTP	Dewatering 1	Polymer Feed Pump	Local panel	2	-	-	12 months
WWTP	Dewatering 1	Polymer Feed Pump	VFD	2	-	-	12 months
WWTP	Dewatering 1	Belt Filter Press Drive	Motor: 3 HP	10	-	-	12 months
WWTP	Dewatering 1	Belt Filter Press Drive	Reducer	10	-	-	12 months
WWTP	Dewatering 1	Belt Filter Press Drive	Local Panel	10	-	-	12 months
WWTP	Dewatering 1	Sludge Conditioning Tank Drive	Motor: 1.5 HP	10	-	-	12 months
WWTP	Dewatering 1	Sludge Conditioning Tank Drive	Reducer	10	-	-	12 months
WWTP	Dewatering 1	Sludge Conditioning Tank Drive	Agitator	10	-	-	12 months
WWTP	Dewatering 1	Sludge Conditioning Tank Drive	Local Panel	10	-	-	12 months
WWTP	Dewatering 1	SFE Booster Pumps	Motor: ? HP	10	-	-	12 months
WWTP	Dewatering 1	SFE Booster Pumps	Pump	10	-	-	12 months
WWTP	Dewatering 1	SFE Booster Pumps	Local panel	10	-	-	12 months
WWTP	Dewatering 1	Sludge Grinder	Motor: 3 HP	10	-	-	12 months
WWTP	Dewatering 1	Sludge Grinder	Reducer	10	-	-	12 months
WWTP	Dewatering 1	Sludge Grinder	Grinder	10	-	-	12 months
WWTP	Dewatering 1	Sludge Grinder	Local Panel	10	-	-	12 months

Site	Area	Equipment	Component	Qty	Test Frequencies		
					Vib. Analy.	IR-contract	IR-inhouse
WWTP	Dewatering 1	Conveyor Belt	Motor: 7.5 HP	1	-	-	12 months
WWTP	Dewatering 1	Conveyor Belt	Reducer	1	-	-	12 months
WWTP	Dewatering 1	Conveyor Belt	Local panel	1	-	-	12 months
WWTP	Dewatering 1	Extraction Screw	Motor: 20 HP	2	-	-	12 months
WWTP	Dewatering 1	Extraction Screw	Drive	2	-	-	12 months
WWTP	Dewatering 1	Extraction Screw	Screw	2	-	-	12 months
WWTP	Dewatering 1	Extraction Screw	Local Panel	2	-	-	12 months
WWTP	Dewatering 1	Extraction Screw	VFD	2	-	-	12 months
WWTP	Dewatering 1	Sludge Cake Pump	Motor: 300 HP	2	12 months	12 months	-
WWTP	Dewatering 1	Sludge Cake Pump	Drive	2	12 months	-	12 months
WWTP	Dewatering 1	Sludge Cake Pump	Pump	2	12 months	-	12 months
WWTP	Dewatering 1	Sludge Cake Pump	Local Panel	2	-	12 months	-
WWTP	Dewatering 1	Screw Feeder	Motor	2	-	-	12 months
WWTP	Dewatering 1	Screw Feeder	Reducer	2	-	-	12 months
WWTP	Dewatering 1	Screw Feeder	Screw: 50 HP	2	-	-	12 months
WWTP	Dewatering 1	Screw Feeder	Local Panel	2	-	-	12 months
WWTP	Dewatering 1	Screw Feeder	VFD	2	-	-	12 months
WWTP	Dewatering 2 Lower	Sludge Grinder	Motor: 3 HP	12	-	-	12 months
WWTP	Dewatering 2 Lower	Sludge Grinder	Grinder	12	-	-	12 months
WWTP	Dewatering 2 Lower	Sludge Grinder	Local panel	12	-	-	12 months
WWTP	Dewatering 2 Lower	Westfalia Centrifuge	Main motor: 300 HP	8	12 months	12 months	-
WWTP	Dewatering 2 Lower	Westfalia Centrifuge	Main gearbox	8	12 months	-	12 months
WWTP	Dewatering 2 Lower	Westfalia Centrifuge	Scroll motor: 50 HP	8	12 months	-	12 months
WWTP	Dewatering 2 Lower	Westfalia Centrifuge	Scroll gearbox	8	12 months	-	12 months
WWTP	Dewatering 2 Lower	Westfalia Centrifuge	Local panel	8	-	12 months	-
WWTP	Dewatering 2 Lower	Sharples Centrifuge	Main motor: 300 HP	4	12 months	12 months	-
WWTP	Dewatering 2 Lower	Sharples Centrifuge	Main gearbox	4	12 months	-	12 months
WWTP	Dewatering 2 Lower	Sharples Centrifuge	Scroll motor: 100 HP	4	12 months	-	12 months
WWTP	Dewatering 2 Lower	Sharples Centrifuge	Scroll gearbox	4	12 months	-	12 months
WWTP	Dewatering 2 Lower	Sharples Centrifuge	Local panel	4	-	12 months	-
WWTP	Dewatering 2 Lower	Screw Conveyor	Motor: 5, 7.5 HP	12	-	-	12 months
WWTP	Dewatering 2 Lower	Screw Conveyor	Reducer	12	-	-	12 months
WWTP	Dewatering 2 Lower	Screw Conveyor	Local panel	12	-	-	12 months
WWTP	Dewatering 2 Lower	Belt Conveyor	Drum motor: 7.5 HP	2	-	-	12 months
WWTP	Dewatering 2 Lower	Belt Conveyor	Local panel	2	-	-	12 months
WWTP	Dewatering 2 Upper	SFE Booster Pump	Motor: 125 HP	2	12 months	12 months	-
WWTP	Dewatering 2 Upper	SFE Booster Pump	Pump	2	12 months	-	12 months
WWTP	Dewatering 2 Upper	SFE Booster Pump	Local panel	2	-	12 months	-
WWTP	Dewatering 2 Upper	SFE Strainer	Motor: 0.75 HP	2	-	-	12 months
WWTP	Dewatering 2 Upper	SFE Strainer	Reducer	2	-	-	12 months
WWTP	Dewatering 2 Upper	SFE Strainer	Pump	2	-	-	12 months
WWTP	Dewatering 2 Upper	SFE Strainer	Local panel	2	-	-	12 months
WWTP	Dewatering 2 Upper	Dilute Polymer Mixer	Motor: 3 HP	2	-	-	12 months
WWTP	Dewatering 2 Upper	Dilute Polymer Mixer	Reducer	2	-	-	12 months
WWTP	Dewatering 2 Upper	Dilute Polymer Mixer	Local panel	2	-	-	12 months
WWTP	Dewatering 2 Upper	Raw Polymer Transfer Pump	Motor: 10 HP	2	-	-	12 months
WWTP	Dewatering 2 Upper	Raw Polymer Transfer Pump	Hydraulic drive	2	-	-	12 months
WWTP	Dewatering 2 Upper	Raw Polymer Transfer Pump	Local panel	2	-	-	12 months
WWTP	Dewatering 2 Upper	Raw Polymer Transfer Pump	VFD	2	-	-	12 months
WWTP	Dewatering 2 Upper	Polymer Feed Pump	Motor: 40 HP	2	-	-	12 months
WWTP	Dewatering 2 Upper	Polymer Feed Pump	Hydraulic drive	2	-	-	12 months
WWTP	Dewatering 2 Upper	Polymer Feed Pump	Local panel	2	-	-	12 months
WWTP	Dewatering 2 Upper	Polymer Feed Pump	VFD	2	-	-	12 months
WWTP	Dewatering 2 Upper	BFP Hydraulic Drive Pump	Motor: 50 HP	12	-	-	12 months
WWTP	Dewatering 2 Upper	BFP Hydraulic Drive Pump	Pump	12	-	-	12 months
WWTP	Dewatering 2 Upper	SFE Booster Pump	Hydraulic motor	12	-	-	12 months
WWTP	Dewatering 2 Upper	SFE Booster Pump	Pump	12	-	-	12 months
WWTP	Dewatering 2 Upper	Upper Belt Drive	Hydraulic motor	12	-	-	12 months
WWTP	Dewatering 2 Upper	Lower Belt Drive	Hydraulic motor	12	-	-	12 months
WWTP	Dewatering 2 Upper	Gravity Belt Drive	Hydraulic motor	12	-	-	12 months
WWTP	Dewatering 2 Upper	Conditioning Tank Drive	Hydraulic motor	12	-	-	12 months
WWTP	Dewatering 2 Upper	Grinder Drive	Hydraulic motor	12	-	-	12 months
WWTP	Dewatering 2 Upper	Grinder Drive	Grinder	12	-	-	12 months
WWTP	Dewatering 2 Upper	Belt Conveyor	Drum motor: 20 HP	3	-	-	12 months
WWTP	Dewatering 2 Upper	Belt Conveyor	Local panel	3	-	-	12 months

Site	Area	Equipment	Component	Qty	Test Frequencies		
					Vib. Analy.	IR-contract	IR-inhouse
WWTP	Incineration 1	Center Shaft	Motor: 7.5 HP	6	-	-	12 months
WWTP	Incineration 1	Center Shaft	Reducer	6	-	-	12 months
WWTP	Incineration 1	Center Shaft	Shaft	6	-	-	12 months
WWTP	Incineration 1	Center Shaft	Local panel	6	-	-	12 months
WWTP	Incineration 1	Burner Air Blower	Motor: 100 HP	6	12 months	12 months	-
WWTP	Incineration 1	Burner Air Blower	Drive	6	12 months	-	12 months
WWTP	Incineration 1	Burner Air Blower	Blower	6	12 months	-	12 months
WWTP	Incineration 1	Burner Air Blower	Local panel	6	-	12 months	-
WWTP	Incineration 1	Induced Draft Fan	Motor: 300 HP	6	12 months	12 months	-
WWTP	Incineration 1	Induced Draft Fan	Fan	6	12 months	-	12 months
WWTP	Incineration 1	Induced Draft Fan	Local panel	6	-	12 months	-
WWTP	Incineration 1	Shaft Cooling Air Fan	Motor: 20 HP	6	-	-	12 months
WWTP	Incineration 1	Shaft Cooling Air Fan	Fan	6	-	-	12 months
WWTP	Incineration 1	Shaft Cooling Air Fan	Local panel	6	-	-	12 months
WWTP	Incineration 1	Screw Feeder	Motor: 5 HP	6	-	-	12 months
WWTP	Incineration 1	Screw Feeder	Drive	6	-	-	12 months
WWTP	Incineration 1	Screw Feeder	Screw	6	-	-	12 months
WWTP	Incineration 1	Screw Feeder	Local panel	6	-	-	12 months
WWTP	Incineration 1	Screw Feeder	VFD	6	-	-	12 months
WWTP	Incineration 1	Live Bottom Hopper	Motor: 9.9 HP	6	-	-	12 months
WWTP	Incineration 1	Live Bottom Hopper	Hydraulic Drive	6	-	-	12 months
WWTP	Incineration 1	Live Bottom Hopper	Screws	24	-	-	12 months
WWTP	Incineration 1	Live Bottom Hopper	Local panel	6	-	-	12 months
WWTP	Incineration 1	Live Bottom Hopper	VFD	6	-	-	12 months
WWTP	Incineration 1	Weigh Belt	Motor: ? HP	6	-	-	12 months
WWTP	Incineration 1	Weigh Belt	Drive	6	-	-	12 months
WWTP	Incineration 1	Weigh Belt	Local panel	6	-	-	12 months
WWTP	Incineration 2	Center Shaft	Motor: 15 HP	8	-	-	12 months
WWTP	Incineration 2	Center Shaft	Reducer	8	-	-	12 months
WWTP	Incineration 2	Center Shaft	Shaft	8	-	-	12 months
WWTP	Incineration 2	Center Shaft	Local panel	8	-	-	12 months
WWTP	Incineration 2	Burner Air Blower	Motor: 75 HP	8	12 months	12 months	-
WWTP	Incineration 2	Burner Air Blower	Drive	8	12 months	-	12 months
WWTP	Incineration 2	Burner Air Blower	Blower	8	12 months	-	12 months
WWTP	Incineration 2	Burner Air Blower	Local panel	8	-	12 months	-
WWTP	Incineration 2	Induced Draft Fan	Motor: 500 HP	8	12 months	12 months	-
WWTP	Incineration 2	Induced Draft Fan	Fan	8	12 months	-	12 months
WWTP	Incineration 2	Induced Draft Fan	Local panel	8	-	12 months	-
WWTP	Incineration 2	Shaft Cooling Air Fan	Motor: 30 HP	8	12 months	-	12 months
WWTP	Incineration 2	Shaft Cooling Air Fan	Fan	8	12 months	-	12 months
WWTP	Incineration 2	Shaft Cooling Air Fan	Local panel	8	-	-	12 months
WWTP	Incineration 2	Screw Feeder	Motor: 5 HP	8	12 months	-	12 months
WWTP	Incineration 2	Screw Feeder	Drive	8	12 months	-	12 months
WWTP	Incineration 2	Screw Feeder	Screw	8	12 months	-	12 months
WWTP	Incineration 2	Screw Feeder	Local panel	8	-	-	12 months
WWTP	Incineration 2	Screw Feeder	VFD	8	-	-	12 months
WWTP	Incineration 2	Weigh Belt	Motor: ? HP	8	-	-	12 months
WWTP	Incineration 2	Weigh Belt	Drive	8	-	-	12 months
WWTP	Incineration 2	Weigh Belt	Local panel	8	-	-	12 months
WWTP	Ash 1	Ash Crusher	Motor: 5 HP	6	12 months	-	12 months
WWTP	Ash 1	Ash Crusher	Drive	6	12 months	-	12 months
WWTP	Ash 1	Ash Crusher	Local panel	6	-	-	12 months
WWTP	Ash 1	Vacuum Pump	Motor: 300 HP	2	12 months	12 months	-
WWTP	Ash 1	Vacuum Pump	Drive	2	12 months	-	12 months
WWTP	Ash 1	Vacuum Pump	Local panel	2	-	12 months	-
WWTP	~~Ash 1~~	~~Wet Ash Sluice Pump~~	~~Motor: 60 HP~~	~~2~~			
WWTP	~~Ash 1~~	~~Wet Ash Sluice Pump~~	~~Drive~~	~~2~~			
WWTP	~~Ash 1~~	~~Wet Ash Sluice Pump~~	~~Local panel~~	~~2~~			
WWTP	~~Ash 1~~	~~Wet Ash Pump~~	~~Motor: 150 HP~~	~~2~~			
WWTP	~~Ash 1~~	~~Wet Ash Pump~~	~~Drive~~	~~2~~			
WWTP	~~Ash 1~~	~~Wet Ash Pump~~	~~Local panel~~	~~2~~			
WWTP	Ash 2	Ash Crusher	Motor: 3 HP	8	-	-	12 months
WWTP	Ash 2	Ash Crusher	Drive	8	-	-	12 months
WWTP	Ash 2	Ash Crusher	Local panel	8	-	-	12 months
WWTP	Ash 2	Vacuum Pump	Motor: 300 HP	3	12 months	12 months	-

Site	Area	Equipment	Component	Qty	Test Frequencies		
					Vib. Analy.	IR-contract	IR-inhouse
WWTP	Ash 2	Vacuum Pump	Drive	3	12 months	-	12 months
WWTP	Ash 2	Vacuum Pump	Local panel	3	-	12 months	-
WWTP	Ash 2	Ash Blower	Motor: 30 HP	3	-	-	12 months
WWTP	Ash 2	Ash Blower	Drive	3	-	-	12 months
WWTP	Ash 2	Ash Blower	Local panel	3	-	-	12 months
WWTP	Ash 2	Ash Booster Pump	Motor: 75 HP	1	-	-	12 months
WWTP	Ash 2	Ash Booster Pump	Drive	1	-	-	12 months
WWTP	Ash 2	Ash Booster Pump	Local panel	1	-	-	12 months
WWTP	Ash 2	SFE Booster Pump	Motor: 250 HP	1	12 months	12 months	-
WWTP	Ash 2	SFE Booster Pump	Drive	1	12 months	-	12 months
WWTP	Ash 2	SFE Booster Pump	Local panel	1	-	12 months	-
WWTP	Central Offload	Transfer Screw Conveyor	Motor: 50 HP	4	-	-	12 months
WWTP	Central Offload	Transfer Screw Conveyor	Drive	4	-	-	12 months
WWTP	Central Offload	Transfer Screw Conveyor	Screw	4	-	-	12 months
WWTP	Central Offload	Transfer Screw Conveyor	Local panel	4	-	-	12 months
WWTP	Central Offload	Lime Transfer Screw Conveyor	Motor: 3 HP	3	-	-	12 months
WWTP	Central Offload	Lime Transfer Screw Conveyor	Drive	3	-	-	12 months
WWTP	Central Offload	Lime Transfer Screw Conveyor	Screw	3	-	-	12 months
WWTP	Central Offload	Lime Transfer Screw Conveyor	Local panel	3	-	-	12 months
WWTP	Central Offload	Reversing Bin Discharger	Motor: 75 HP	3			
WWTP	Central Offload	Reversing Bin Discharger	Drive	3	12 months	12 months	-
WWTP	Central Offload	Reversing Bin Discharger	Screw	3	12 months	-	12 months
WWTP	Central Offload	Reversing Bin Discharger	Local panel	3	-	12 months	-
WWTP	Central Offload	Venturi Scrubber	Motor: 3 HP	3	-	-	12 months
WWTP	Central Offload	Venturi Scrubber	Fan	3	-	-	12 months
WWTP	Central Offload	Venturi Scrubber	Local panel	3	-	-	12 months
WWTP	Central Offload	Lime Mixer	Motor: 100 HP	3	-	-	12 months
WWTP	Central Offload	Lime Mixer	Drive	3	-	-	12 months
WWTP	Central Offload	Lime Mixer	Local panel	3	-	-	12 months

ATTACHMENT IV

ANNUAL SCHEDULED REPLACEMENT PLAN (SRP)

UPDATE

NOVEMBER 27, 2013

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
WASTEWATER TREATMENT PLANT

9300 WEST JEFFERSON AVENUE, SUITE 103
DETROIT, MICHIGAN 48209
PHONE 313•297•4300 TTY:311
FAX 313•297•0110
WWW.DETROITMI.GOV

November 27, 2013

Ms. Jodi L. Peace
Michigan Department of Environmental Quality
Water Resources Division
27700 Donald Court
Warren, Michigan 48092-2793

RE: ANNUAL SCHEDULED REPLACEMENT PLAN (SRP) UPDATE
ADMINISTRATIVE CONSENT ORDER – ACO-000131 and AACO-00020

Dear Ms. Peace:

Transmitted herewith is the Annual Scheduled Replacement Plan (SRP) Update Report, submitted in accordance with the approved Preventive Maintenance Plan, and pursuant to the Administrative Consent Order ACO-000131, Section III, Paragraph 3.4. This report provides a list of equipment and systems within the Wastewater Operations Group to be procured and installed, or other-wise rebuilt during fiscal year 2014/2015. This list addresses equipment and systems not otherwise included in major capital improvements or the small capital projects.

Should you have any questions, please call me at (313) 297-4300.

Respectfully,

David Schechter for SS

Samuel A. Smalley, PE
Assistant Director - WWOG

SAS/dehm

Attachment

Cc: S. McCormick, W. Barrott, D. Latimer, J. Urbanik, W. Wolfson, A. Ibrahim, D. Schechter, E. Hogan

DETROIT WATER & SEWERAGE DEPARTMENT

OTHER EQUIPMENT BUDGET REQUEST - FY 2014-2015 (FORM H)

CAPITAL IMPROVEMENT PROGRAM (EQUIPMENT PURCHASES)

USE ONE OBJECT CODE PER PAGE

Requesting Cost Center: _____

Cost Center	Description	Quantity	Unit Price	Total Cost
	Solids			
427030	Sludge blend mixer #1 and motor, Complex A	1	$ 29,500	$ 29,500
427030	Circular storage tank mixer 1-4, Complex A	4	$ 29,500	$ 118,000
427030	Pumps for SFE 1 and 2, CII Dewatering	2	$ 30,000	$ 60,000
427030	Pumps for SFE booster, CII Dewatering	2	$ 30,000	$ 60,000
427030	Burner Air Fans- Complex II Incineration	8	$ 23,000	$ 184,000
427030	Center Shaft Motor # 7 thru 14 Complex II Incineration	8	$ 10,000	$ 80,000
427030	Central Shaft Cooling Fan #7 thru 14 Complex II Incineration	8	$ 10,300	$ 82,400
427030	Auxiliary Combustion Air Fan and motor #7 thru 14 Complex II Incineration	8	$ 11,000	$ 88,000
427030	Ash Silo Vacuum Pump, motor and drive. C-II	3	$ 95,000	$ 285,000
	SFE System			
427030	SFE Strainer, strainer shaft 1 thru 5, 7, 8	8	$ 80,000	$ 640,000
427030	SFE pump and motor	8	$ 190,000	$ 1,520,000
	Liquids			
	Circular Storage Tank Mixer #1-#4	4	$ 32,000	$ 128,000
427030	Chlorine solution pump	4	$ 29,500	$ 118,000
427030	SO2 solution pump	4	$ 29,500	$ 118,000
427030	SFE pumps at Rack and Grit, PS1	3	$ 3,000	$ 9,000
427030	Secondary Clarifiers Tank and Drive	25	$ 8,000	$ 200,000
427030	BSTP Pump, motor and drive #1, 2, 3 , 4 Complex A	4	$ 35,000	$ 140,000
	Network Devices			
427030	Data concentrators, Pump St#1 Control Room	1	$ 50,000	$ 50,000
427030	Printers, Pump St#1 Control Room	1	$ 1,000	$ 1,000
427030	Operator Consoles, Pump St#1 Control Room	1	$ 150,000	$ 150,000
427030	Operator Console, Primary Head Sewage Plant Operator Building (Sludge Processing Complex A)	1	$ 150,000	$ 150,000
427030	Pump Station 2 Control Room (Motor Floor)Remote I/O cabinet #1,	1	$ 50,000	$ 50,000
427030	Remote I/O cabinet #2, Pump Station 2 Control Room (Electrical Room First Floor)	1	$ 50,000	$ 50,000
427030	Remote I/O cabinet #3, Pump Station 2 Control Room (Chemical Addition Building Electrical Room)	1	$ 50,000	$ 50,000
427030	Remote I/O cabinet #4, Pump Station 2 Control Room (1st Floor Electrical Room)	1	$ 50,000	$ 50,000
427030	Remote I/O cabinet #5, Pump Station 2 Control Room (Chemical Addition Building Electrical Room)	1	$ 50,000	$ 50,000
427030	Operator Consoles, Roof of EB-10	1	$ 150,000	$ 150,000
427030	Printers, Roof of EB-10	1	$ 1,000	$ 1,000
427030	Operator Workstation, Secondary Head Sewage Plant Operator Building	1	$ 5,000	$ 5,000

Cost Center	Description	Quantity	Unit Price	Total Cost
427030	Operator consoles, Incineration Complex II (fifth floor)	1	$ 5,000	$ 5,000
427030	AB PLC-5/05 Processor, Chlorination and Dechlorination Control Rooms	1	$ 50,000	$ 50,000
427030	Processor Control cabinets, Chlorination and Dechlorination Control Rooms	1	$ 50,000	$ 50,000
427030	Operator consoles, Chlorination and Dechlorination Control Rooms	1	$ 5,000	$ 5,000
427030	I/O Cabinets, Chlorination and Dechlorination Control Rooms	1	$ 5,000	$ 5,000
427030	72" magmeter #A3, ILP Station 2	1	$ 125,000	$ 125,000
427030	72" magmeter #A4, ILP Station 2	1	$ 125,000	$ 125,000
427030	60" Flow meter, SFE Line	1	$ 100,000	$ 100,000
427030	48" Flow meter, SFE Line	1	$ 80,000	$ 80,000
427030	Accusonic Flowmeter, Detroit River Outfall #1	1	$ 200,000	$ 200,000
427030	Operator Workstation #2, Incineration Complex II (4th Floor Control Room)	1	$ 5,000	$ 5,000
427030	Opacity server, OAB Main Control Room (1st Floor behind MAP board)	1	$ 150,000	$ 150,000
427030	Level Sensor, Pump Station #1 FeCl2 Tank	1	$ 5,000	$ 5,000
427030	Level Sensor, Pump Station #1 FeCl3 Tank	1	$ 5,000	$ 5,000
427030	Level Sensor, Pump Station #1 Wet well	1	$ 10,000	$ 10,000
427030	Level Sensor, Pump Station #2 Wet well	1	$ 10,000	$ 10,000
427030	Operator console, Sludge Pumping Station #3 Control Room	1	$ 150,000	$ 150,000
427030	CEM cabinet # 7-14 for THC control and monitoring	8	$ 100,000	$ 800,000
427030	RAID 5 server at old admin bldg 1st floor	1	$ 150,000	$ 150,000
427030	**Electrical**			
427030	Unit Substation in EB-24, Complex II	1	$ 400,000	$ 400,000
427030	15kV Primary Switchgear "A,B" (EB-1)	1	$ 200,000	$ 200,000
427030	15kV Primary Switchgear "BB" (EB-1)	1	$ 200,000	$ 200,000
427030	5kV Substation "DE-1" (EB-1)	1	$ 300,000	$ 300,000
427030	5kV MCC "ME" (EB-1)	1	$ 45,000	$ 45,000
427030	5kV MCC "MD" (EB-1)	1	$ 45,000	$ 45,000
427030	Primary Transformers A1, B1, & C (EB-2)	1	$ 80,000	$ 80,000
427030	Unit Substation "OP-2" (EB-18)	1	$ 300,000	$ 300,000
427030	480V MCC-1 (EB-18)	2	$ 45,000	$ 90,000
427030	Unit Substation Switchgear (EB-19)	1	$ 200,000	$ 200,000
427030	Unit Substation "OP-1" (EB-19)	1	$ 300,000	$ 300,000
427030	480V MCC-(EB-19)	2	$ 45,000	$ 90,000
427030	Main Distribution Panel "MDP-1" (EB-28)	1	$ 50,000	$ 50,000
427030	**Total**			**$ 8,946,900**

The DWSD definition of capital *equipment* covers the acquisition of tangible property not intended for resale with a useful life, which is greater than one (1) year, and where costs exceed <u>$1,000</u>.

	Object/	
Office Equipment	644118	Shop Equipment
Communication Equipment	644115	Computer Hardware & Software
	644111	ACQ Other Equipment

ATTACHMENT V

SCHEDULED REPLACEMENT PROGRAM REPORT

FOR

CSO FACILITIES AND WASTEWATER PUMPING STATIONS