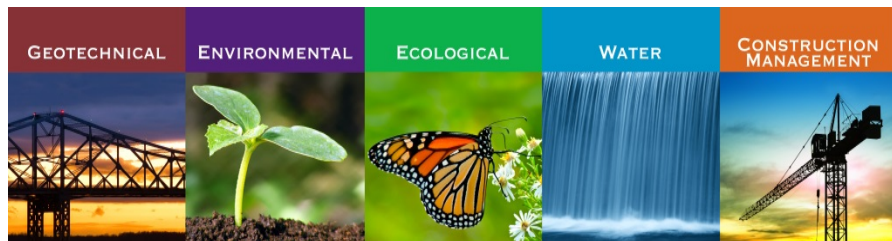




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GROUNDWATER-SURFACE WATER INTERFACE (GSI) RESPONSE ACTIVITY PLAN North Kent Study Area

DRAFT

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ACRONYMS

CD	Consent Decree
CFS	Cubic Feet per Second
CSM	Conceptual Site Model
DoD	United States Department of Defense
EGLE	Michigan Department of Environmental, Great Lakes and Energy
FAV	Final Acute Values
FCV	Final Chronic Values
GIS	Geographic Information Systems
GSI	Groundwater-Surface Water Interface
HNDV	Human Health Non-Drinking Water Values
HSDS	House Street Disposal Site
ID	Identification
MDEQ	Michigan Department of Environmental Quality
MDOT	Michigan Department of Transportation
MGDL	Michigan GIS Data Library
ml/min	Milliliters per Minute
MS/MSD	Matrix Spike/Matrix Spike Duplicate
NE	Northeast
ng/L	Nanogram per Liter
NKSA	North Kent Study Area
ORP	Oxidation-Reduction Potential
PDF	Portable Document Format
PFAS	Per- and Polyfluoroalkyl Substances
PFBS	Perfluorobutane Sulfonic Acid
PFHxA	Perfluorohexanoic Acid
PFHxS	Perfluorohexane Sulfonic Acid
PFNA	Perfluorononanoic Acid
PFOA	Perfluorooctanoic Acid
PFOS	Perfluorooctane Sulfonate
PVC	Polyvinyl Chloride
QAPP	Quality Assurance Project Plan [<i>Former Wolverine Tannery, House Street Disposal Area, and Woven/Jewell Area, Per- and Polyfluoroalkyl Substances Investigation Program</i>]
QA/QC	Quality Assurance/Quality Control
QSM	Quality Systems Manual
R&W/GZA	Rose & Westra, a Division of GZA GeoEnvironmental, Inc.
RAP	Response Activity Plan
SAP	Sampling and Analysis Plan
SOP	Standard Operating Procedures
USGS	United States Geological Survey
VAP	Vertical Aquifer Profiling
Wolverine	Wolverine World Wide, Inc.
WV	Wildlife Values



1.0 INTRODUCTION

On behalf of Wolverine, R&W/GZA, prepared this RAP for the proposed GSI investigation in the NKSA. The objective of this RAP is to investigate potential environmental risks to the GSI in the Rogue River, due to regulated PFAS in groundwater, originating from the former HSDS and the Wolven/Jewell area. Based on the flow and PFAS distribution assessment, the following locations are identified as potential surface water discharge areas for the PFAS-containing groundwater in the HSDS and Wolven-Jewell study areas:

- Southeast downgradient of the HSDS primary plume;
- Downgradient of the HSDS, near the confluence of the Rogue River and the Grand River;
- Downgradient of the HSDS, near the Freska Lake area;
- Wolven Northeast study area;
- Wolven Northwest study area; and
- North Childsdale study area, downgradient of the Wolven study area.

This RAP is prepared pursuant to CD No. 1:18-cv-00039-JTN-SJB, effective February 19, 2020. Specifically, this scope of work is established in Sections 7.4, 7.10, and Appendix S of the CD. This RAP is organized into the following sections:

- Introduction
- CSM
- Proposed Statement of Work
- Investigation Methodologies
- Sampling and Analysis Methods and Procedures
- Data Quality Objectives
- Data Quality Control and Assurance
- Project Schedule for Field Sampling and Analysis
- Project Schedule for Data Evaluation and Report Submittals

2.0 CONCEPTUAL SITE MODEL

The development of the CSM (as defined in Section 4.4 of the CD) was based on interpretation of regional geology and hydrogeology, residential water well sampling data in the NKSA, and groundwater investigations performed associated with the former HSDS and Wolven and Jewell areas. See **Figure 1** for a layout of the NKSA and the PFAS Investigation Areas. For the purpose of this RAP, the CSM is focused on the groundwater flow from the source areas to the Rogue River, PFAS distribution in groundwater, and the fate and transport of PFAS in groundwater. The following sections provide discussions of source areas, hydrology, geology and hydrogeology, PFAS distribution in groundwater, groundwater flow, and PFAS transport.



2.01 HOUSE STREET DISPOSAL SITE

The HSDS, located at 1855 House Street NE, Plainfield Township, Kent County, Michigan encompasses approximately 76 acres (**Figure 1**). The HSDS is currently undeveloped and according to available information, no buildings were previously present. An electric utility right-of-way and associated high-voltage transmission lines cross the northern portion of the HSDS, and an access road from House Street runs south to north across the HSDS.

The properties surrounding the HSDS are primarily undeveloped or residential. Properties to the northwest are undeveloped extending to Clear Bottom Lake and Freska Lake. Properties to the west, southwest, and northeast are primarily residential. House Street NE abuts the HSDS to the south and southeast. Portions of the eastern HSDS boundary are formed by Herrington Avenue NE. Land owned by MDOT is present south and southeast of the HSDS (US-131 right-of-way), and additional residential properties are located westward along House Street.

The HSDS was a State of Michigan licensed and regulated disposal facility from the mid-1960s through 1978. Until 1970, the HSDS received leather tanning byproducts over a portion of time. EGLE Remediation and Redevelopment Division files indicated that HSDS's waste disposal license expired in 1978, but it appears no waste was disposed after 1970. It has been determined that the byproducts contained PFOS and PFOA and their precursors, which are part of a larger group of PFAS. PFAS were in Scotchgard™, a waterproofing material manufactured by 3M Company, that was applied to some leather goods manufactured at the former Wolverine Tannery site in Rockford, Michigan. Based on past investigation data at Wolverine's Tannery Site (R&W/GZA, 2019), the byproducts also contained other substances. However, the data indicates that only PFOS and PFOA appear to be migrating to the GSI areas of interest.

Prior to Wolverine acquiring the HSDS in 1964 and Michigan's first disposal area licensing statute (PA 87 of 1965), Wolverine and other entities disposed of materials on the HSDS (perhaps as early as the 1940s) and also possibly on nearby real estate currently identified as the south adjoining MDOT property and nearby Imperial Pine parcel.

2.02 WOLVEN AND JEWELL AREAS

Certain PFAS were detected in wells in the Wellington Ridge neighborhood, located between 10 Mile and 11 Mile Road, west of Wolven Avenue, and east of US-131. In addition, certain PFAS were also detected in the groundwater monitoring wells near the North Kent Landfill area. No evidence of waste materials was detected during investigations conducted to date in this area. Historical aerial photographs suggest a portion of a gravel pit was previously located in the area of the Lady Lauren cul-de-sac of the Wellington Ridge Development. Aerial photographs suggest disturbances in the gravel pit area ceased by 1965. See **Figure 1** for the locations of the Wolven and Jewell Areas, and the North Kent Landfill Area.

2.03 TOPOGRAPHY

As shown in **Figure 1**, the terrain is generally hilly in the region. The ground surface elevation at HSDS ranges from 740 feet to 800 feet. The HSDS is flanked by higher ground to the northeast and southwest, but ground surface generally dips to the northwest toward the Clear Bottom Lake and Freska Lake, and to the southeast toward the Rogue River. Ground surface elevations for the area east of the HSDS range from 800 to more than 900 feet; ground surface elevations for the west to southwest of the HSDS range from 800 to 820 feet, with lower terrains to the northwest and southeast.

Ground surface elevations in the eastern portion of the Wolven/Jewell study area, where the Wellington Ridge neighborhood is located, range from approximately 780 to more than 930 feet. Most of the neighborhoods in the



eastern portion of the Wolven/Jewell study area sit on relatively high ground, and the lowland areas are generally between the hills, acting as surface water drainage pathways. Ground surface generally dips in various directions, to the west and north west areas of the Wolven/Jewell study area, and northeast toward Wolven Northeast, toward the Rogue River. The portion of the Wolven/Jewell study area located west of US-131 has ground surface elevations ranging from approximately 710 to 850 feet. The Wolven Northeast study area has ground surface elevations ranging from approximately 720 to 910 feet.

2.04 HYDROLOGY

The NKSA is situated within the Rogue River Basin (Basin No. 14F), which is part of the Lower Grand River watershed (HUC 0405006). Based on the Michigan's Major Watersheds – Sub-basins GIS data (Michigan Department of Environmental Quality, 2011) downloaded from MGDL, the HSDS and Wolven/Jewell study areas are situated within the Rogue River Basin (Basin No. 14F), which is part of the Lower Grand River watershed (HUC 0405006). The Rogue River Basin consists of 12 sub-basins, four of which are near the Site area. The HSDS is situated on the water divide of two sub-basins: HUC 405006040080 and HUC 405006040120; the Wolven/Jewell study areas are situated in sub-basins HUC 405006040080 and HUC 405006040110. All of these three sub-basins drain to the Rogue River, which discharges to the Grand River. The HSDA is also near sub-basin HUC 45006050050, which is part of the Grand River basin.

The 2016 National Oceanic and Atmospheric Administration climate data report¹ for Grand Rapids, Michigan, indicates that the mean annual precipitation for the 80-year record period is approximately 36 inches. Based on the state-wide GIS data for the estimated annual groundwater recharge (Michigan State University, 2005), the estimated precipitation at the NKSA ranged from 9 to 15 inches.

From 1989 to 2016, the average annual streamflow rate at USGS Gaging Station No. 04118500 in Rockford, Michigan, is approximately 260 CFS, and the average baseflow rate approximately 210 CFS. The gaging station measures the flow for the sub-basin, HUC 405006040110, and all the upstream sub-basins, representing a drainage area of approximately 234 square miles, according to the USGS record.

2.05 REGIONAL GEOLOGY

Overburden in Kent County is a thick sequence of Pleistocene glacial deposits. The thickness of glacial deposits ranges from 11 to 800 feet in Kent County; however, the majority of glacial deposits range from 200 to 400 feet in thickness (Western Michigan University, 1981; Farrand, 1982). The glacial deposits in the county include till, outwash and lacustrine deposits. Till occurs in end moraines and ground moraines (till plains), interspersed on the surface throughout the County (Stramel, Wisler, & Laird, 1954). For the area near the City of Rockford and Plainfield Township, the Michigan Glacial Land systems (Michigan State University, 2015) indicates that proglacial outwash plain is present along the Rogue River, and end moraines are present either side of the Rogue River extending to the "wide" near the Grand River. At the Site and its vicinity, end moraines of medium-textured till are present. The ground moraine (till plain) and end moraine belong to the unstratified group of deposits, composed of fine- to coarse-grained material, including silt, sand, gravel and boulders.

Based upon bedrock maps for the area (MDEQ, 1987), the bedrock beneath the NKSA includes the Michigan basin series. Based on GIS data from EGLE (MDEQ, 1987), Jurassic "red beds" are present in most of the site area and its vicinity, with small areas of Saginaw formation outcrops. The Jurassic "red beds" are often poorly consolidated or unconsolidated and consist primarily of clay, mudstone, siltstone, sandstone, shale and gypsum. The "red beds" are of low permeability and are considered a confining unit. However, locally in the county, the "red beds" have

¹ <https://www.ncdc.noaa.gov/cdo-web/search>



been documented to supply small quantities of water (Apple & Reeves, 2007). Beneath the “red beds,” bedrock in the region consists of the Mississippian-aged sandstone (Marshall formation), shale (Michigan formation), and the Bayport limestone as well as the Pennsylvanian-aged Saginaw formation. The regional dip is northeasterly toward the center of the Michigan basin.

Based on the Hydrogeologic Atlas of Michigan (Western Michigan University, 1981), the top of bedrock elevation ranges from 500 to 550 feet near the City of Rockford. The top of bedrock elevations at the HSDS area were estimated to range from 540 to 580 feet (R&W/GZA, 2018).

2.06 REGIONAL HYDROGEOLOGY

The direction of regional groundwater flow is influenced by the primary surface water features of the Rogue River and the Grand River. Streamflow data from the USGS Gaging Station indicates that the Rogue River is a gaining stream, acting as a groundwater discharge zone. Based on the static groundwater level in the Wellogig - Statewide Wells GIS Data for Kent County (Michigan State University, 2005a through 2005d), regional groundwater contours were interpolated by R&W/GZA. The regional groundwater contours also indicate regional groundwater flow pattern generally follows the topography, discharging to the Rogue River and the Grand River.

2.07 GROUNDWATER INVESTIGATIONS

R&W/GZA retained drilling contractors to perform subsurface exploration and monitoring well installation to continue delineation of the extent of PFOA and PFOS both vertically and laterally in the NKSA. Since 2017, R&W/GZA oversaw the installation of eighty-four (84) groundwater monitoring wells at 29 locations in the HSDS study area, and thirty-six (36) groundwater monitoring wells at 16 locations in the Wolven/Jewell study areas. At most of the locations, multi-depth cluster wells were installed. The borings were drilled using either hollow stem auguring or rotosonic techniques. Soil samples were collected and logged every 5 feet. VAP groundwater samples were collected every 10 feet in the saturated zone and submitted to an independent laboratory for the PFAS analysis using isotope dilution method in accordance with the most recent version of the DoD QSM procedures.

Monitoring well screen intervals were selected based on PFAS VAP sampling results and geological conditions. Each monitoring well was constructed of factory-slotted, 0.010-inch, 5-foot long PVC screen (in a few cases, 10-foot), and flush-threaded well casing. The annular space surrounding the well screen was filled with sand filter pack to approximately 3 feet above the top of the well screen, followed by a one to one and one half foot-thick hydrated bentonite seal. The remaining annulus was filled with cement and bentonite grout to approximately 1 foot bgs. The wells were finished with a steel protective casing set in a concrete pad. A locking expansion cap was placed in the top of the PVC casing. See **Appendix A** for the soil boring logs and well installation logs. See **Table 1** for well completion information and **Table 2** for static water level measurements. See **Figure 2** for the groundwater monitoring well locations.

Following installation, the newly installed wells were developed to remove sediment from the sand filter pack and well casing. The wells were developed using a 12-volt Mini-Typhoon® submersible pump equipped with dedicated tubing for each well. The pump was decontaminated between wells using a water and Alconox® wash with a water rinse. The wells were developed until the water ran clear. The development water was containerized and staged prior to proper disposal. The tubing and other disposable materials used during the well development were placed in a separate drum and stored for proper disposal.



In addition, surface water level measurement gauges were installed in the following locations in the Rogue River:

- Rockford Dam Seawall;
- East Bridge Street Bridge;
- Rogue River Road Bridge; and
- Jericho Avenue Bridge

The water levels measured from these locations were used in combination with available gaging height data at USGS gaging station, USGS04118500, to evaluate surface water levels in the Rogue River.

2.08 GROUNDWATER SAMPLING

Groundwater sampling was conducted quarterly throughout 2018 and 2019 using low-flow purging and sampling procedures. The wells were purged using either a GeoTech Peristaltic Pump or a GeoTech Bladder Pump and control box. Static water levels in the monitoring wells were measured to maintain stabilized drawdowns during purging. Field indicator parameters, temperature, pH, dissolved oxygen, specific conductance, ORP and turbidity, were monitored using a YSI PRO and field turbidity meters in accordance with the low-flow sampling SOP in the project QAPP. Once the field parameters stabilized, a groundwater sample was collected by disconnecting the tubing from the flow-through cell and collecting the sample directly from the tubing.

Groundwater samples were collected in laboratory-supplied sample containers labeled with the well ID, sample time and date, and analytes. The samples were packed in coolers with ice and shipped to the laboratory under chain-of-custody control via overnight express shipping.

Groundwater PFAS analytical data for the HSDS area and the Wolven/Jewell areas are summarized on **Tables 3** and **4**, respectively. As the subsurface exploration and monitoring well installation progressed, the newly installed wells were added to the sampling list in the quarter following their installation and development.

2.09 SITE GEOLOGY

This section provides a summary of the geology in the NKSA, based on borehole data collected during the subsurface exploration and groundwater monitoring well installation described in **Section 2.07**, and the residential water well construction information and lithology data downloaded from the online Wellogic System.² The Wellogic System made available individual well logs in PDF, GIS shapefiles of county-wide well locations and construction information, and database files of lithology data for some of the wells. R&W/GZA has attempted to verify the well locations by comparing the well addresses to the Kent County Parcel GIS shapefiles and found that some of the well locations in the Wellogic GIS shapefiles are incorrect. To rectify, the Kent County parcel center coordinates are used for the residential well locations if the well addresses are verified with the Kent County Parcel GIS shapefiles. The majority of the well addresses in the Wellogic System GIS shapefiles were verified, and the parcel center locations were used as their coordinates. For some well locations, the addresses of which were not verifiable, the locations in the Wellogic System GIS files were kept and qualified with a note. In addition, lithology data for some of the wells in the Wellogic System GIS shapefiles were not available, and R&W/GZA downloaded the PDF well logs, and compiled the available lithology data into the well lithology database.

² <https://secure1.state.mi.us/wellogic/Login.aspx?ReturnUrl=%2fwellogic%2fdefault.aspx>



The monitoring well locations and the residential water wells with lithology data are shown in **Figure 3**. Geologic cross-sections, A-A', B-B', C-C', D-D', and E-E', are created in the HSDS study area, and geologic cross-sections F-F', G-G', H-H' and I-I' in the Wolven/Jewell study areas to show the lithology in the study areas. See **Figures 4 through 12** for the geological cross-sections.

HSDS Study Area

In the HSDS study area, cross-section A-A' is constructed along the primary plume center line, following the paleo-channel on the Lidar Bare Earth Elevation image on **Figure 3**. Cross-section B-B' is immediately southwest of cross-section A-A'. The lithologies of both A-A' and B-B' are predominantly coarse-grained soil, with the presence of fine-grained soil in a few borings with limited thickness.

Cross-section C-C' is located north-south toward the Grand River. Except for HS-MW-17, where the soil encountered was sand from ground surface to an elevation of approximately 560 feet above mean sea level, fine-grained soil was encountered in all boreholes on this cross-section, with thickness ranging from less than 10 feet to approximately 80 feet. However, water bearing units were encountered in all wells on the cross-section. The presence of fine-grained soil is expected to affect the flow path locally, but not the primary groundwater flow toward the Rogue River or the Grand River.

Cross-section D-D' is located east of the Rogue River, near the confluence to the Grand River, where proglacial outwash is present. The lithologies of the wells on cross-section D-D' are generally coarse-grained soil, sand or gravel, with the presence of clay of limited thickness in a few boreholes. It is consistent with the regional geology.

Cross-section E-E' is constructed from the HSDS toward the Freska Lake area. The lithologies of the boreholes are similar to cross-section A-A' and cross-section B-B'. Coarse-grained soils are generally predominant. Fine-grained soils are present in some boreholes in thickness ranging from less than 10 feet to approximately 70 feet. However, water bearing units were encountered in all of these wells.

In general, coarse-grained soil predominates in most of the soil borings and water well logs in the HSDS study area. The presence and thickness of clay and silt deposits varies horizontally and vertically without stratified correlation between borings. The lithologies shown on the cross-sections in the HSDS study area are characteristics of glacial outwash, and end moraines, to a lesser extent, as documented in regional geology.

Wolven/Jewell Study Areas

Cross-section F-F' is constructed from the Wellington Ridge neighborhood to the Wolven Northeast study area. Fine-grained soil, clay, or silt is predominant in the boreholes on cross-section F-F'. Water bearing units were encountered below the clay stratum or between clay strata. The thickness of fine-grained soil varies from approximately 20 feet to more than 100 feet. In most of the boreholes on cross-section F-F', the top of the clay stratum was shallow, except the well at 3616 11 Mile Road, where more than 100 feet of sand were present above the top of the clay stratum, presenting a potential pathway for surface/shallow contamination to migrate to the deeper zone.

Cross-sections G-G' and H-H' are located from the Wellington Ridge area to the west or northwest toward the portions of the study area located west of US-131. For the boreholes located east of US-131, fine-grained soil is predominant in the boreholes while, for the boreholes located west of US-131, more coarse-grained soil is present. The thickness of fine-grained soil varies from less than 10 feet to more than 100 feet. Similar to cross-section F-F', water bearing units were encountered below the clay stratum or between clay strata.



Cross-section I-I' is constructed from the Wellington Ridge area to the southeast toward the Rogue River. Fine-grained soil, clay, or silt is generally predominant in the boreholes on cross-section I-I. The fine-grained soil strata observed in the borings from 3260 Bent Tree Ridge to 8497 Windstone Road are not as thick when compared to other borings in the NKSA. Overall, the thickness of fine-grained soil varies from approximately 10 feet to approximately 200 feet. Water bearing units were encountered below the clay stratum or between clay strata.

In general, fine-grained soil predominates in most of the soil borings and water well logs in the Wolven/Jewell study area. In the soil borings located west of US-131 or closer to the Rogue River, coarse-grained soils are present in greater thickness and are even dominant in some locations. In addition, individual borings containing only coarse-grained soil exist even in the areas where fine-grained soils are predominant. These locations provide potential migration pathways from the surface/shallow to the deeper zone. The presence and thickness of clay and slit deposits varies horizontally and vertically. They appear to be unstratified and discontinuous in the area. In the soil borings where fine-grained soils are predominant, water bearing units were encountered below the clay stratum or between clay strata. In rare cases, water wells were screened in the bedrock. The lithologies shown on the cross-sections in the Wolven/Jewell study area are characteristic of end moraines as documented in regional geology. The presence of a relatively large volume of fine-grained soil limits the hydraulically conductive saturated zone, and therefore affects groundwater flow and contaminant transport pathway.

2.10 GROUNDWATER FLOW

Static water levels were collected from the monitoring wells and the staff gauges. Groundwater and surface water elevations were calculated from the surveyed elevations of the top of casing for the monitoring wells or reference points for the staff gauges. In addition, surface water elevations recorded at USGS04118500 were also downloaded and converted to the same datum as the monitoring well survey. See **Table 2** for a summary of the static groundwater water level measurements.

In addition to the R&W/GZA installed groundwater monitoring wells, EGLE also collected static water level data from the monitoring wells installed by EGLE during the November 2019 monitoring event, and requested North Kent County Landfill collect and provide static water level data in November 2019. In combination, the November 2019 static water level data provided the most complete set of static water levels and elevations for the NKSA.

For the locations where multiple wells were installed at different intervals, R&W/GZA grouped the wells into shallow aquifer and deep aquifer by borehole lithologies, screen intervals, and static water elevations. See **Table 1** for the well grouping designations.

Based on the November 2019 data set, groundwater elevation contours were interpolated from the static water level data. See **Figure 13** for the groundwater elevation contours in the shallow zone and **Figure 14** for the deep zone.

As shown on **Figure 13**, groundwater in the NKSA flows to the Rogue River. The HSDS is situated at or near a groundwater divide. Groundwater predominantly flows from the HSDS to the southeast to the Rogue River. But a portion of the flow is to the northwest. Because of Freska Lake and Clear Bottom Lake, the hydraulic gradient to the southwest appears to be flat as compared to the southeast. The Wellington Ridge is situated at a groundwater mounding area, and groundwater flows to the northwest, north, northeast and southeast. The hydraulic gradient in the Wolven/Jewell area appears to be steep due to the presence of relatively significant volumes of fine grain soil.



As shown on **Figure 14**, the deep zone groundwater contours are similar to the shallow zone with a few localized variations. Groundwater flow directions are generally similar to the shallow zone as well.

2.11 PFAS DISTRIBUTION IN GROUNDWATER

PFAS analytical data from the groundwater monitoring wells, VAP samples, and residential water well samples collected until December 2019 were combined and used for the interpolation of isoconcentration maps. Where data from multiple sampling depths or sampling events are available at one location, the maximum concentrations were used during interpolation. It is important to note that the isoconcentration maps were geostatistically interpolated from spatially distributed point data, therefore they may overestimate the concentrations or extents in areas where data points were relatively sparse. As implied by the method, the isoconcentration maps are estimations only and are not intended to represent measured or true conditions. **Figures 15, 16, and 17** present the interpolated isoconcentration maps for total PFOS, PFOA and PFAS, respectively. Analytical data for the groundwater monitoring wells are provided on **Table 3** and **Table 4**.

PFAS isoconcentration map indicated the PFAS migrated from the HSDS toward the Rogue River, primarily in the southeast direction, along the plume centerline. A portion of the PFAS plume appeared to migrate from the HSDS to the northwest toward the Freska Lake area and the Rogue River, but the plume transport appeared to be slowed as the plume reached the area of the Freska Lake and Clear Bottom Lake, where the groundwater gradient is relatively flat and groundwater flow pattern is affected by the surface water bodies. The PFAS isoconcentration map also indicated a PFAS plume with relatively low concentration near the confluence of the Rogue River and the Grand River.

In the Wolven/Jewell study areas, the PFAS isoconcentration map indicated that the PFAS-containing groundwater migrated from the Wellington Ridge neighborhood, where PFOS, PFOA, and total PFAS were detected, to the Wolven Northeast area, the Wolven Northwest area, and the North Childsdale area. Based on the groundwater flow evaluation, the PFAS-impacted groundwater is expected to continue migrating to the Rogue River from these areas. It is important to note that the PFAS isoconcentration extent at the northeast corner of US-131 and 10 Mile Road and southwest of the Wellington Ridge neighborhood was a result of interpolation, due to lack of data points in that area.

The PFOA and PFOS isoconcentration maps indicated a similar distribution to the total PFAS isoconcentration map, but their extents and the concentration ranges are less than that of total PFAS because the total PFAS isoconcentration map included other detected compounds, such as PFBS, PFHxA, PFHxS, and PFNA. Furthermore, the distribution of lower chain compound such as PFBS is spatially greater than PFOS and PFOA, due to its relatively low sorption coefficient to soil matrix. In comparison, the extent of PFOS distribution isoconcentration map is slightly less than that of PFOA, likely because PFOS has eight fluorine atoms in the tail, and PFOA has seven fluorine atoms in the tail, and the longer chain PFOS is more strongly sorbed to the soil matrix than PFOA.

2.12 GSI AND APPLICABLE RULE 57 WATER QUALITY STANDARDS

The groundwater flow evaluation and total PFAS and PFOS and PFOA distribution analysis indicate that PFOA and PFOS have migrated toward the Rogue River or will migrate toward the Rogue River. Based on EGLE's Part 201 administrative rules, Part 31 administrative rules Part 4 – Water Quality Standards, the potential environmental exposure pathways for impacted surface water in the Rogue River and applicable Part 4 Rule 57 Water Quality Values are identified as follows:



- Human exposure via non-drinking water exposure route – Rule 57 HNDV;
- Aquatic life exposure to impacted water in the Rogue River – Rule 57 FCV; and
- Wildlife exposure to impacted water in the Rogue River – Rule 57 WV.

The generic Part 201 GSI criteria are the lesser of HNDV, FCV, and WV. It is important to note that the Rogue River is not considered “the Great Lakes and their connecting waters” as defined in Part 4 rules; therefore, human health drinking water value is not applicable. If GSI mixing zone evaluation is to be performed in the future assessment, then Rule 57 FAV, typically greater than FCV, will also be applicable.

Parameter	Units	HNDV	FCV	WV
PFOA	ng/L	12,000	880,000	Not Available
PFOS	ng/L	12	140,000	Not Available

2.13 DATA GAPS

Based on the flow and total PFAS and PFOS and PFOA distribution assessment, the following locations are identified as potential discharge areas for the PFOS- and PFOA-containing groundwater in the HSDS and Wolven-Jewell study areas:

- Southeast downgradient of the HSDS primary plume;
- Downgradient of the HSDS, near the confluence of the Rogue River and the Grand River;
- Downgradient of the HSDS, near the Freska Lake area;
- Wolven Northeast study area;
- Wolven Northwest study area; and
- North Childsdale study area, downgradient of the Wolven study area.

In evaluating the potential risks to the Rogue River, the following data gaps are identified:

- Groundwater elevation and flux at the GSI to evaluate whether groundwater discharges to the Rogue River;
- Groundwater elevation and flux data at the GSI to evaluate the gradient and flux at the GSI, if it is determined groundwater discharges to the Rogue River;
- PFOS, PFOA and PFAS concentrations of the groundwater discharging to the Rogue River; and
- Identification of the proper locations for GSI monitoring wells.

3.0 PROPOSED STATEMENT OF WORK

The following provides a summary of the proposed investigations, based on the identified data gaps. The proposed sampling locations are shown on **Figure 18**. Actual piezometer and pore water sampling locations may vary slightly from the proposed locations of **Figure 18** during installation. While the target locations are shown, limitations for access on private properties, river bank conditions, and utilities may require moving piezometer locations.



3.01 HSDS STUDY AREA

Based on the groundwater flow, analytical data, and our evaluation, the following pore water sampling and GSI piezometer locations are proposed:

- Nine pore water sampling locations (HS-PW-1 through HS-PW-9) and five GSI piezometer locations (HS-GSI-1 through HS-GSI-5) downgradient of the primary House Street plume, along the Rogue River, to monitor potential PFOA and PFOS venting to the surface water.
- Three GSI piezometer locations (HS-GSI-6 through HS-GSI-8) downgradient of the primary House Street plume, along the Grand River, to measure potential PFOA and PFOS venting to the surface water.
- Two pore water sampling locations (HS-PW-10 and HS-PW-11) and one GSI piezometer location (HS-GSI-9) northwest of the House Street Site, downgradient of the Freska Lake area, along the Rogue River, to monitor potential PFOA and PFOS venting to the surface water.

In addition, existing well cluster HS-MW-19S/D and HS-MW-29A are located hydraulically downgradient of the primary House Street plume, also considered to be GSI monitoring points to monitor potential PFOA and PFOS venting to the Rogue River.

3.02 WOLVEN/JEWELL STUDY AREA

Based on the groundwater flow, analytical data, and our evaluation, the following pore water sampling and GSI piezometer locations are proposed:

- Seven pore water sampling locations (Area19-PW-1 through Area19-PW-7) downgradient/northeast of the Area 19 plume within the Rogue River to monitor potential PFOS and PFOA venting to the surface water. These pore water sample locations are located hydraulically downgradient of Wellington Ridge, immediately downgradient of the apparent extent of PFOA+PFOS exceeding 10 ng/L.
- Three GSI piezometer locations (Area19-GSI-1 through Area19-GSI-3) downgradient of the Area 19 plume to the northeast. Staff gauges in the river will be paired with these piezometer locations. These locations along the Rogue River will be used to measure and compare the groundwater elevations to the pore water and surface water elevations. In addition, these locations will be used to monitor potential PFOA and PFOS venting to the surface water at the north and south edges of this portion of the plume along with the center of the plume. Additionally, one existing well installed by EGLE is also considered to be a GSI monitoring point. The purpose of these piezometers is to measure PFOS and PFOA concentrations, if any, near the groundwater-surface interface, prior to venting to the Rogue River.
- Four pore water sampling locations (WVNW-PW-1 through WVNW-PW-4) and two GSI piezometer locations (WVNW-GSI-1 through WVNW-GSI-2) immediately downgradient of the Wolven Northwest plume, along the Rogue River to monitor potential PFOA and PFOS venting to the surface water. Two staff gauges in the river will be paired with these two piezometer locations.
- Six pore water sampling locations (WV/CH-PW-1 through WV/CH-PW-6) and two GSI piezometer locations (WV/CH-GSI-1 through WV/CH-GSI-2) are proposed immediately downgradient/southeast of the Wolven-North Childsdale plume, along the Rogue River to monitor potential PFOS and PFOA venting to the surface water. The existing staff gauges in this segment of the Rogue River will be utilized for water level comparison and groundwater flow evaluation.



4.0 INVESTIGATION METHODOLOGY

Pore water sampling will be performed using the same techniques previously used at the former Wolverine tannery site. Therefore, two-weeks of piezometer and staff gauge measurements will be made to establish groundwater flows to the surface water before any pore water samples will be collected. Piezometer and staff gauge measurements will be made Monday, Wednesday, and Friday of each week. If these measurements do not demonstrate groundwater flow to the River, the two-week monitoring will be repeated until it does.

Relevant tasks completed under this RAP will be completed in accordance with the most recent revision of the QAPP prepared for Wolverine by R&W/GZA.

4.01 PIEZOMETERS

The proposed piezometers will be hand-driven into the groundwater on the river bank. The top of the piezometer will be installed above the estimated flood elevation based on observations of vegetation and deposition. The piezometer will be finished with a 1-foot-thick bentonite seal, followed by a 2-inch concrete pad at the surface. An elevational survey will also be conducted upon completion of the piezometer installations.

The piezometers will be installed following SOP A28 (see **Appendix B**).

4.02 PORE WATER SAMPLING

After demonstrating the groundwater is flowing to the River, pore water samples will be collected using a temporary well point (i.e., stainless-steel probe) driven to discrete depths within the river bottom. A shroud may be used if river bottom conditions allow, to further minimize any short-circuiting during pore water sampling. The pore water will be attempted at 6-inch intervals beginning at 12 inches below the surface of the bottom sediment. Two pore water samples will be attempted following procedures similar to that described below. R&W/GZA's experience indicates that pore water sampling methodology can vary from sampling location to location given physical conditions of the stream bed, etc. As such, the following is proposed only as a guide.

- A 6-foot (or appropriate length) stainless steel probe with a 6-inch screen will be advanced to the desired depth. The top of the screen in the shallowest depth interval will be about 12 inches below the surface of the sediment in the river bottom. Screen intervals are expected to be: 12-18 inches and 18-24 inches.
- A peristaltic pump with dedicated tubing will be used to purge the screen at a flow rate less than 100 ml/min.
- Using a multiparameter meter (as specified in the QAPP) with a flow-through cell, R&W/GZA will measure pH, temperature, conductivity, dissolved oxygen and ORP from the pore water interval and will compare it to measurements collected concurrently from the river. Both readings will be documented on a field data sheet.
- Once the field readings from the pore water have stabilized and the pore water readings are distinguishable from the river readings (i.e., >10% difference for parameters except for temperature), the pore water will be sampled.
- Pore water will be pumped directly into laboratory-provided sampling containers maintaining the flow rate of less than 100 ml/min. R&W/GZA will submit samples to Pace Analytical of Columbia, South Carolina for PFAS analysis using the DoD QSM (which includes isotope dilution.)
- This is further detailed in SOP A27 (**Appendix B**).



5.0 SAMPLING AND ANALYTICAL PROCEDURES

This section provides a generalized SAP for the piezometer and pore water sampling. Specific information regarding sampling procedures and analytical methods is provided in the site-specific QAPP.

5.01 SAMPLING LOCATIONS

As discussed in **Section 3.0**, the following pore water sampling and GSI piezometer locations are proposed:

Area of Investigation	Pore Water	Piezometers	Wells
Southeast downgradient of the HSDS primary plume along Rogue River	HS-PW-1 through HS-PW-9	HS GSI-1 through HS-GSI-5	HS-MW-19S/D and HS-MW-29A
Downgradient of the HSDS near Grand River	--	HS-GSI-6 through HS-GSI-8	--
Northwest of the HSDS, Downgradient of the Freska Lake area	HS-PW-10 and HS-PW-11	--	--
Downgradient of Woven Northeast plume within the Rogue River	Area19-PW-1 through Area19-PW-7	Area19-GSI-1 through Area19-GSI-3, paired staff gauges	One EGLE well
Downgradient of the northwest portion of the Woven/Jewell plume along the Rogue River	WVNW-PW-1 through WVNW-PW-4	WVNW-GSI-1 through WVNW-GSI-2, paired staff gauges	
North Childsdales area, downgradient of the Woven study area	WV/CH-PW-1 through WV/CH-PW-6	WV/CH-GSI-1 through WV/CH-GSI-2, existing staff gauges	

5.02 SAMPLE COLLECTION AND LABELING

Samples will be collected for PFAS analysis following the methods summarized in **Section 4.0** and detailed in the sampling SOPs for Pore Water, Piezometers, and Groundwater Monitoring Wells provided in **Appendix B**. Detailed field and laboratory requirements are provided in the site-specific QAPP.

Sample identification will consist of nomenclatures that include the unique location identification (see reference table above). If applicable, sample identification for each sample will be repeated for each sampling event with consistent spelling.

To prevent misidentification of samples, legible labels will be affixed to each sample container. The labels will be sufficiently durable to remain legible even when wet. At a minimum, the labels will contain the following information:

- Location ID;
- Name or initials of collector; and
- Date and time of collection.



5.03 SAMPLE SHIPPING

Sample bottles will be placed into the cooler and packed with double-bagged wet ice immediately following collection. Packing material will be used as necessary. A temperature blank will be placed in the cooler prior to shipment. The cooler shall be addressed to the appropriate laboratory and dispatched as soon as practical to ensure timely arrival.

5.04 ANALYTICAL METHOD AND PARAMETERS

PFAS will be analyzed using DoD QSM 5.3 guidelines for PFAS by isotope dilution methodology. The analyte list will include the 28 PFAS compounds specified by EGLE, and reporting limits are provided in Table A.7.7 of the project-specific QAPP.

6.0 DATA QUALITY ASSURANCE AND CONTROL

The following field quality control samples will be collected at a rate of one per 20 samples in accordance with the project-specific QAPP: Field blanks, field duplicates, and MS/MSDs.

- Field blanks will be collected by pouring laboratory-supplied certified PFAS-free water into a sample container at the point of sample collection. The purpose of field blanks is to assess potential contamination at the sample point.
- Field duplicates will be collected by filling one additional sample container with water from the sample point. The purpose of field duplicates is to assess variability in sample composition. Field duplicates are not intended to be blind duplicates.
- MS/MSD will be collected by filling two additional sets of sample bottles with water from the sample point. MS/MSD analyses are conducted by the analytical laboratory after samples have been collected and submitted. Analysis of known concentrations of analytes spiked in the MS/MSD samples indicate if matrix interference effects are occurring.
- QA/QC samples will be collected using the methods described in Section 5 and the SOPs in **Appendix B**. Samples will be labeled described in **Section 5.0**. The location of QA/QC samples will be entered into the Monitoring Checklist. QA/QC samples will be analyzed using the same analytical methods used for the primary sample.

7.0 INVESTIGATION DERIVED WASTE

Pore water pumped during the sampling and development water from the piezometers are the only investigation derived wastes anticipated. The pumped water from sampling will be discharged back to the surface water body after the PFAS aliquot is collected. The development water will be discharged to the nearby ground surface in accordance with EGLE interoffice communication regarding purge water disposal from well sampling and development (EGLE, 1999).

8.0 ANTICIPATED SCHEDULE

The schedule for piezometer installation will depend greatly on R&W/GZA's ability to procure access to the desired locations and the potential impact of coronavirus disease 2019 (COVID-19). Piezometers will be installed and developed prior to collecting the two weeks of piezometer and staff gage measurements. After demonstrating groundwater flow toward the River, the pore water sampling will be conducted. Assuming access for all



piezometers and river access is obtained expeditiously and there are no COVID-19-related delays, R&W/GZA currently anticipates collecting pore water samples during fall 2020 low flow conditions (through early October).

R&W/GZA will summarize the findings from this investigation and submit a work plan for installation of permanent monitoring well locations needed for GSI monitoring within 90 days following receipt of all analytical data.

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TABLES

TABLE 1
EXISTING MONITORING WELL CONSTRUCTION INFORMATION
Algoma and Plainfield Townships, Kent County, MI

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Site Location	Well Ownership/ Data Provider	Well Field ID	Top of Casing Elevation (ft)	Ground Surface Elevation (ft)	Top of Screen Depth (ft bgs)	Bottom of Screen Depth (ft bgs)	Casing Diameter (in)	Casing Type	Aquifer Zone	Protective Casing Type
House Street	EGLE	HS-DEQ-MW1D	799.43	799.7	ND	123.82	ND	ND	D	ND
House Street	EGLE	HS-DEQ-MW1I	799.83	800.2	ND	77.58	ND	ND	S	ND
House Street	EGLE	HS-DEQ-MW1S	799.42	799.7	ND	56.56	ND	ND	S	ND
House Street	EGLE	HS-DEQ-MW3D	857.29	857.9	ND	177.41	ND	ND	D	ND
House Street	EGLE	HS-DEQ-MW3S	857.40	857.9	ND	106.45	ND	ND	S	ND
House Street	EGLE	HS-DEQ-MW4-102	733.80	734.4	ND	102.8	ND	ND	D	ND
House Street	EGLE	HS-DEQ-MW4-16	734.23	734.7	ND	16.04	ND	ND	S	ND
House Street	EGLE	HS-DEQ-MW4-53	734.33	734.7	ND	53.85	ND	ND	D	ND
House Street	EGLE	HS-DEQ-MW4-80	734.33	734.7	ND	80.09	ND	ND	D	ND
House Street	EGLE	HS-DEQ-MW4-85	733.61	734.4	ND	85.79	ND	ND	D	ND
House Street	EGLE	HS-DEQ-MW4-90	733.99	734.4	ND	89.68	ND	ND	D	ND
House Street	EGLE	HS-DEQ-MW4-97	733.71	734.4	ND	98.81	ND	ND	D	ND
House Street	EGLE	HS-DEQ-MW5D	812.95	813.5	ND	130.16	ND	ND	S	ND
House Street	EGLE	HS-DEQ-MW5S	813.12	813.5	ND	47.28	ND	ND	S	ND
House Street	EGLE	HS-DEQ-MW6D	795.59	796.4	ND	176.36	ND	ND	D	ND
House Street	EGLE	HS-DEQ-MW6S	796.09	796.4	ND	45.71	ND	ND	S	ND
House Street	EGLE	HS-DEQ-MW7-102	775.04	775.4	ND	102.11	ND	ND	S	ND
House Street	EGLE	HS-DEQ-MW7-33	775.15	775.4	ND	33.33	ND	ND	S	ND
House Street	EGLE	HS-DEQ-MW7-87	775.02	775.4	ND	87.71	ND	ND	S	ND
House Street	EGLE	HS-DEQ-MW7-94	775.16	775.4	ND	94.32	ND	ND	S	ND
House Street	EGLE	HS-DEQ-MW8D	677.86	678.2	ND	33.37	ND	ND	S	ND
House Street	EGLE	HS-DEQ-MW8S	677.87	678.2	ND	28.28	ND	ND	S	ND
House Street	R&W/GZA	HS-MW-10D	780.94	778.1	188.2	193.2	2	PVC	D	Stickup
House Street	R&W/GZA	HS-MW-10M	780.64	777.7	126.4	131.4	2	PVC	S	Stickup
House Street	R&W/GZA	HS-MW-10S	780.06	777.2	48.3	58.3	2	PVC	S	Stickup
House Street	R&W/GZA	HS-MW-11D	744.75	742.1	153.6	158.6	2	PVC	D	Stickup
House Street	R&W/GZA	HS-MW-11M	744.96	742.3	96.4	101.4	2	PVC	D	Stickup
House Street	R&W/GZA	HS-MW-11S	744.78	742.1	21.2	31.2	2	PVC	S	Stickup
House Street	R&W/GZA	HS-MW-12A	716.50	716.8	15.4	20.4	2	PVC	S	Flush
House Street	R&W/GZA	HS-MW-12B	716.36	716.8	51.5	56.5	2	PVC	S	Flush
House Street	R&W/GZA	HS-MW-12C	716.17	716.9	127.7	132.7	2	PVC	D	Flush
House Street	R&W/GZA	HS-MW-12D	716.48	717.0	158.7	163.7	2	PVC	D	Flush
House Street	R&W/GZA	HS-MW-12E	716.29	716.8	187.5	192.5	2	PVC	D	Flush
House Street	R&W/GZA	HS-MW-13A	ND	ND	79.0	84.0	2	PVC	ND	ND
House Street	R&W/GZA	HS-MW-13B	ND	ND	149.0	154.0	2	PVC	ND	ND
House Street	R&W/GZA	HS-MW-13C	ND	ND	199.5	114.5	2	PVC	ND	ND
House Street	R&W/GZA	HS-MW-14D	673.20	670.7	109.0	114.0	2	PVC	D	Stickup
House Street	R&W/GZA	HS-MW-14M	673.53	671.0	68.1	73.1	2	PVC	D	Stickup
House Street	R&W/GZA	HS-MW-14S	673.64	671.2	13.0	23.0	2	PVC	S	Stickup
House Street	R&W/GZA	HS-MW-15D	642.86	639.7	108.6	118.6	2	PVC	D	Stickup
House Street	R&W/GZA	HS-MW-15M	640.98	638.0	44.8	49.8	2	PVC	D	Stickup
House Street	R&W/GZA	HS-MW-15S	640.71	637.5	6.9	16.9	2	PVC	S	Stickup
House Street	R&W/GZA	HS-MW-17D	784.64	782.3	222.1	227.1	2	PVC	D	Stickup
House Street	R&W/GZA	HS-MW-17M	784.17	781.9	167.3	172.3	2	PVC	D	Stickup
House Street	R&W/GZA	HS-MW-17S	784.77	782.0	105.8	110.8	2	PVC	S	Stickup
House Street	R&W/GZA	HS-MW-18D	684.73	682.0	140.6	145.6	2	PVC	D	Stickup
House Street	R&W/GZA	HS-MW-18S	683.93	682.0	12.8	22.8	2	PVC	S	Stickup
House Street	R&W/GZA	HS-MW-19D	680.79	677.7	85.9	95.9	2	PVC	D	Stickup
House Street	R&W/GZA	HS-MW-19S	680.83	677.8	58.4	61.4	2	PVC	S	Stickup
House Street	R&W/GZA	HS-MW-1D	790.73	788.7	172.3	176.9	2	PVC	D	Stickup
House Street	R&W/GZA	HS-MW-1S	791.01	788.8	67.4	72.1	2	PVC	S	Stickup
House Street	R&W/GZA	HS-MW-20D	706.64	703.9	126.1	131.1	2	PVC	D	Stickup
House Street	R&W/GZA	HS-MW-20M	706.90	704.2	101.5	106.5	2	PVC	S	Stickup
House Street	R&W/GZA	HS-MW-20S	706.72	703.9	61.1	66.1	2	PVC	S	Stickup
House Street	R&W/GZA	HS-MW-21D	648.38	645.7	76.2	86.2	2	PVC	D	Stickup
House Street	R&W/GZA	HS-MW-21M	648.85	645.9	59.0	64.0	2	PVC	D	Stickup
House Street	R&W/GZA	HS-MW-21S	648.67	645.8	9.8	19.8	2	PVC	S	Stickup
House Street	R&W/GZA	HS-MW-23A	791.23	791.7	72.1	77.1	2	PVC	S	Flush
House Street	R&W/GZA	HS-MW-23B	791.21	791.5	137.9	142.8	2	PVC	D	Flush
House Street	R&W/GZA	HS-MW-23C	791.09	791.4	210.2	215.0	2	PVC	D	Flush
House Street	R&W/GZA	HS-MW-23D	791.47	792.0	238.9	243.9	2	PVC	D	Flush
House Street	R&W/GZA	HS-MW-24A	776.01	776.3	55.6	60.4	2	PVC	S	Flush
House Street	R&W/GZA	HS-MW-24B	775.72	776.2	225.2	230.0	2	PVC	D	Flush
House Street	R&W/GZA	HS-MW-25D	650.61	651.1	65.7	70.7	2	PVC	D	Flush
House Street	R&W/GZA	HS-MW-25S	650.83	651.2	51.1	56.1	2	PVC	S	Flush
House Street	R&W/GZA	HS-MW-26D	651.75	652.1	79.6	84.6	2	PVC	D	Flush
House Street	R&W/GZA	HS-MW-26M	651.31	651.7	61.7	66.7	2	PVC	D	Flush
House Street	R&W/GZA	HS-MW-26S	651.88	652.0	25.8	30.8	2	PVC	S	Flush
House Street	R&W/GZA	HS-MW-27A	668.44	668.7	21.6	26.2	2	PVC	S	Flush
House Street	R&W/GZA	HS-MW-27B	668.49	668.9	35.4	38.0	2	PVC	S	Flush
House Street	R&W/GZA	HS-MW-27C	668.64	669.0	41.3	45.9	2	PVC	S	Flush
House Street	R&W/GZA	HS-MW-27D	668.54	668.9	52.4	56.4	2	PVC	D	Flush

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Site Location	Well Ownership/ Data Provider	Well Field ID	Top of Casing Elevation (ft)	Ground Surface Elevation (ft)	Top of Screen Depth (ft bgs)	Bottom of Screen Depth (ft bgs)	Casing Diameter (in)	Casing Type	Aquifer Zone	Protective Casing Type
House Street	R&W/GZA	HS-MW-27E	668.56	668.9	58.5	62.5	2	PVC	D	Flush
House Street	R&W/GZA	HS-MW-28A	665.88	666.2	39.1	43.7	2	PVC	S	Flush
House Street	R&W/GZA	HS-MW-28B	666.14	666.4	43.3	47.9	2	PVC	S	Flush
House Street	R&W/GZA	HS-MW-28C	666.16	666.5	49.2	53.8	2	PVC	S	Flush
House Street	R&W/GZA	HS-MW-28D	665.89	666.3	62.2	66.8	2	PVC	D	Flush
House Street	R&W/GZA	HS-MW-28E	665.61	666.0	82.7	87.3	2	PVC	D	Flush
House Street	R&W/GZA	HS-MW-29A	633.13	630.3	3.5	13.5	2	PVC	S	Stickup
House Street	R&W/GZA	HS-MW-29B	633.89	630.5	16.8	21.8	2	PVC	S	Stickup
House Street	R&W/GZA	HS-MW-29C	633.60	630.4	27.2	32.2	2	PVC	D	Stickup
House Street	R&W/GZA	HS-MW-29D	633.19	630.7	37.1	42.1	2	PVC	D	Stickup
House Street	R&W/GZA	HS-MW-2S	799.66	797.6	77.9	82.5	2	PVC	S	Stickup
House Street	R&W/GZA	HS-MW-30A	672.78	673.0	46.9	51.5	2	PVC	S	Flush
House Street	R&W/GZA	HS-MW-30B	673.09	673.4	51.5	56.1	2	PVC	S	Flush
House Street	R&W/GZA	HS-MW-30C	672.90	673.1	77.4	82.0	2	PVC	D	Flush
House Street	R&W/GZA	HS-MW-30D	673.37	673.6	112.7	117.3	2	PVC	D	Flush
House Street	R&W/GZA	HS-MW-30E	672.32	672.9	123.2	127.7	2	PVC	D	Flush
House Street	R&W/GZA	HS-MW-31A	639.30	639.5	17.1	21.6	2	PVC	S	Flush
House Street	R&W/GZA	HS-MW-31B	639.27	639.3	26.0	30.5	2	PVC	S	Flush
House Street	R&W/GZA	HS-MW-31C	639.27	639.4	41.3	45.8	2	PVC	S	Flush
House Street	R&W/GZA	HS-MW-31D	638.96	639.1	48.8	53.4	2	PVC	D	Flush
House Street	R&W/GZA	HS-MW-31E	638.95	639.2	64.1	68.7	2	PVC	D	Flush
House Street	R&W/GZA	HS-MW-32A	727.36	724.8	60.9	65.5	2	PVC	S	Stickup
House Street	R&W/GZA	HS-MW-32B	727.85	725.1	79.1	83.7	2	PVC	D	Stickup
House Street	R&W/GZA	HS-MW-32C	727.72	725.1	108.8	113.4	2	PVC	D	Stickup
House Street	R&W/GZA	HS-MW-32D	727.55	725.0	142.3	146.9	2	PVC	D	Stickup
House Street	R&W/GZA	HS-MW-3P	790.15	787.7	19.3	24.3	2	PVC	P	Stickup
House Street	R&W/GZA	HS-MW-3S	790.69	788.1	70.1	75.0	2	PVC	S	Stickup
House Street	R&W/GZA	HS-MW-4S	784.88	782.3	70.2	74.8	2	PVC	S	Stickup
House Street	R&W/GZA	HS-MW-5D	781.99	779.3	190.5	200.5	2	PVC	D	Stickup
House Street	R&W/GZA	HS-MW-5P	781.55	779.1	17.7	22.4	2	PVC	P	Stickup
House Street	R&W/GZA	HS-MW-5S	781.79	779.2	60.3	65.0	2	PVC	S	Stickup
House Street	R&W/GZA	HS-MW-6D	773.44	771.0	157.5	162.5	2	PVC	D	Stickup
House Street	R&W/GZA	HS-MW-6S	773.34	770.7	58.2	62.9	2	PVC	S	Stickup
House Street	R&W/GZA	HS-MW-7S	791.09	788.9	69.9	74.5	2	PVC	S	Stickup
House Street	R&W/GZA	HS-MW-8	745.09	742.2	30.0	35.0	2	PVC	S	Stickup
House Street	R&W/GZA	HS-MW-9D	820.88	818.2	204.3	209.3	2	PVC	D	Stickup
House Street	R&W/GZA	HS-MW-9M	820.66	817.9	126.8	131.8	2	PVC	S	Stickup
House Street	R&W/GZA	HS-MW-9S	820.20	817.8	26.2	31.2	2	PVC	P	Stickup
North Kent Landfill	NKL	NKLF-MW-35	900.23	ND	ND	ND	ND	ND	ND	ND
North Kent Landfill	NKL	NKLF-MW-48	901.64	ND	ND	ND	ND	ND	ND	ND
North Kent Landfill	NKL	NKLF-MW-53	893.99	ND	ND	ND	ND	ND	ND	ND
North Kent Landfill	NKL	NKLF-MW-54	912.79	ND	ND	ND	ND	ND	ND	ND
North Kent Landfill	NKL	NKLF-MW-55	893.11	ND	ND	ND	ND	ND	ND	ND
North Kent Landfill	NKL	NKLF-MW-56	867.88	866.4	ND	43.97	ND	ND	S	ND
North Kent Landfill	NKL	NKLF-MW-57	894.35	ND	ND	ND	ND	ND	ND	ND
North Kent Landfill	NKL	NKLF-MW-60	844.35	ND	ND	ND	ND	ND	ND	ND
North Kent Landfill	NKL	NKLF-MW-61	841.14	839.8	ND	28.47	ND	ND	S	ND
North Kent Landfill	NKL	NKLF-MW-63	840.81	839.1	ND	102.41	ND	ND	D	ND
North Kent Landfill	NKL	NKLF-MW-65	835.27	834.2	ND	21.87	ND	ND	S	ND
North Kent Landfill	NKL	NKLF-MW-66	874.57	ND	ND	ND	ND	ND	ND	ND
North Kent Landfill	NKL	NKLF-MW-67	902.72	ND	ND	ND	ND	ND	ND	ND
North Kent Landfill	NKL	NKLF-MW-68	900.98	899.2	ND	92.79	ND	ND	S	ND
North Kent Landfill	NKL	NKLF-MW-69	893.04	ND	ND	ND	ND	ND	ND	ND
North Kent Landfill	NKL	NKLF-MW-70	897.8	895.6	ND	63.33	ND	ND	S	ND
North Kent Landfill	NKL	NKLF-MW-71	894.71	ND	ND	ND	ND	ND	ND	ND
North Kent Landfill	NKL	NKLF-MW-72	882.18	879.5	ND	26.98	ND	ND	S	ND
North Kent Landfill	NKL	NKLF-MW-73	900.19	ND	ND	ND	ND	ND	ND	ND
North Kent Landfill	NKL	NKLF-MW-74	880.34	ND	ND	ND	ND	ND	ND	ND
North Kent Landfill	NKL	NKLF-MW-75	881.23	ND	ND	ND	ND	ND	ND	ND
North Kent Landfill	NKL	NKLF-MW-76	849.47	ND	ND	ND	ND	ND	ND	ND
North Kent Landfill	NKL	NKLF-MW-77	837.14	834.2	ND	22.8	ND	ND	S	ND
North Kent Landfill	NKL	NKLF-MW-78	883.89	ND	ND	ND	ND	ND	ND	ND
North Kent Landfill	NKL	NKLF-MW-80	888.05	887.4	ND	42.44	ND	ND	S	ND
North Kent Landfill	NKL	NKLF-MW-81	834.71	ND	ND	ND	ND	ND	ND	ND
North Kent Landfill	NKL	NKLF-MW-82	896.26	ND	ND	ND	ND	ND	ND	ND
North Kent Landfill	NKL	NKLF-TW-02	900.95	ND	ND	ND	ND	ND	ND	ND
North Kent Landfill	NKL	NKLF-TW-04	858.20	ND	ND	ND	ND	ND	ND	ND
North Kent Landfill	NKL	NKLF-TW-05	838.64	ND	ND	ND	ND	ND	ND	ND
North Kent Landfill	NKL	NKLF-TW-06	883.99	ND	ND	ND	ND	ND	ND	ND
Wolven	EGLE	WV-DEQ-MW10-121	764.74	763.865	ND	120.72	ND	ND	D	ND
Wolven	EGLE	WV-DEQ-MW10-177	764.934	763.865	ND	177.63	ND	ND	D	ND
Wolven	EGLE	WV-DEQ-MW10-55	764.909	763.376	ND	55.21	ND	ND	S	ND

TABLE 1
EXISTING MONITORING WELL CONSTRUCTION INFORMATION
Algoma and Plainfield Townships, Kent County, MI

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Page 3 of 3

Site Location	Well Ownership/ Data Provider	Well Field ID	Top of Casing Elevation (ft)	Ground Surface Elevation (ft)	Top of Screen Depth (ft bgs)	Bottom of Screen Depth (ft bgs)	Casing Diameter (in)	Casing Type	Aquifer Zone	Protective Casing Type
Wolven	EGLE	WV-DEQ-MW10-84	764.442	763.376	ND	84.14	ND	ND	D	ND
Wolven	EGLE	WV-DEQ-MW10-95	764.931	763.376	ND	95.25	ND	ND	D	ND
Wolven	EGLE	WV-DEQ-MW11-130	859.121	855.95	ND	130.22	ND	ND	D	ND
Wolven	EGLE	WV-DEQ-MW11-137	859.212	855.763	ND	136.65	ND	ND	D	ND
Wolven	EGLE	WV-DEQ-MW11-145	859.14	855.95	ND	145.71	ND	ND	D	ND
Wolven	EGLE	WV-DEQ-MW11-57	858.794	855.95	ND	56.99	ND	ND	S	ND
Wolven	EGLE	WV-DEQ-MW11-95	859.129	855.763	ND	95.47	ND	ND	S	ND
Wolven	EGLE	WV-DEQ-MW2D	877.53	877.80	ND	168.72	ND	ND	D	ND
Wolven	EGLE	WV-DEQ-MW2S	877.57	877.80	ND	58.04	ND	ND	S	ND
Wolven	EGLE	WV-DEQ-MW9-114	712.079	712.402	ND	114.07	ND	ND	D	ND
Wolven	EGLE	WV-DEQ-MW9-131	712.031	712.402	ND	130.97	ND	ND	D	ND
Wolven	EGLE	WV-DEQ-MW9-57	712.128	712.562	ND	56.85	ND	ND	ND	ND
Wolven	EGLE	WV-DEQ-MW9-73	712.096	712.562	ND	73.34	ND	ND	D	ND
Wolven	EGLE	WV-DEQ-MW9-94	711.979	712.562	ND	94.09	ND	ND	D	ND
Wolven	R&W/GZA	WV-MW-1	859.24	859.2	137.8	142.8	2	PVC	D	Stickup
Wolven	R&W/GZA	WV-MW-10D	751.00	748.6	165	170	2	PVC	D	Stickup
Wolven	R&W/GZA	WV-MW-10M	751.19	748.7	69.9	74.9	2	PVC	S	Stickup
Wolven	R&W/GZA	WV-MW-10S	751.26	748.4	7.0	12.0	2	PVC	S	Stickup
Wolven	R&W/GZA	WV-MW-11D	735.96	733.0	158.9	163.9	2	PVC	D	Stickup
Wolven	R&W/GZA	WV-MW-11S	735.89	732.8	29.4	34.4	2	PVC	S	Stickup
Wolven	R&W/GZA	WV-MW-12D	771.12	771.4	179.2	184.2	2	PVC	D	Flush
Wolven	R&W/GZA	WV-MW-12M	770.75	771.3	146.6	151.6	2	PVC	D	Flush
Wolven	R&W/GZA	WV-MW-12S	771.06	771.3	75.8	80.8	2	PVC	S	Flush
Wolven	R&W/GZA	WV-MW-13D	823.91	821.3	58.8	63.8	2	PVC	D	Stickup
Wolven	R&W/GZA	WV-MW-13M	823.75	821.6	18.1	23.1	2	PVC	S	Stickup
Wolven	R&W/GZA	WV-MW-13S	823.68	821.3	1.7	6.7	2	PVC	S	Stickup
Wolven	R&W/GZA	WV-MW-14D	872.05	872.3	142.3	147.3	2	PVC	D	Flush
Wolven	R&W/GZA	WV-MW-14S	872.18	872.5	8.9	13.9	2	PVC	S	Flush
Wolven	R&W/GZA	WV-MW-15A	721.25	721.5	9.0	14	2	PVC	P	Flush
Wolven	R&W/GZA	WV-MW-15B	721.07	721.4	33.1	38.1	2	PVC	S	Flush
Wolven	R&W/GZA	WV-MW-15C	720.84	721.3	43.7	48.5	2	PVC	S	Flush
Wolven	R&W/GZA	WV-MW-15D	721.09	721.3	135.1	137.8	2	PVC	D	Flush
Wolven	R&W/GZA	WV-MW-16D	823.45	820.9	91.7	96.7	2	PVC	D	Stickup
Wolven	R&W/GZA	WV-MW-16S	823.42	820.9	17.5	22.5	2	PVC	S	Stickup
Wolven	R&W/GZA	WV-MW-2D	791.36	790.5	30.2	35.2	2	PVC	D	Stickup
Wolven	R&W/GZA	WV-MW-2S	793.39	790.6	20.2	25.2	2	PVC	S	Stickup
Wolven	R&W/GZA	WV-MW-3D	823.28	820.7	57.5	62.5	2	PVC	D	Stickup
Wolven	R&W/GZA	WV-MW-3S	823.31	820.6	5.1	10.1	2	PVC	S	Stickup
Wolven	R&W/GZA	WV-MW-4	854.99	852.5	130.2	135.2	2	PVC	D	Stickup
Wolven	R&W/GZA	WV-MW-5D	865.07	862.0	68.7	73.7	2	PVC	D	Stickup
Wolven	R&W/GZA	WV-MW-5S	865.01	862.1	61.5	66.5	2	PVC	S	Stickup
Wolven	R&W/GZA	WV-MW-6D	786.51	784.1	99.1	104.1	2	PVC	D	Stickup
Wolven	R&W/GZA	WV-MW-6S	786.62	784.6	13.3	18.3	2	PVC	S	Stickup
Wolven	R&W/GZA	WV-MW-7D	727.36	727.8	89.5	94.5	2	PVC	S	Flush
Wolven	R&W/GZA	WV-MW-7M	728.19	728.5	49.9	54.9	2	PVC	S	Flush
Wolven	R&W/GZA	WV-MW-7S	727.61	728.0	16.1	21.1	2	PVC	S	Flush
Wolven	R&W/GZA	WV-MW-8D	845.81	846.0	117.2	122.2	2	PVC	D	Flush
Wolven	R&W/GZA	WV-MW-8M	845.74	845.9	60.0	65.0	2	PVC	S	Flush
Wolven	R&W/GZA	WV-MW-8S	845.55	846.0	30.0	35.0	2	PVC	S	Flush
Wolven	R&W/GZA	WV-MW-9	859.86	857.4	92.3	97.3	2	PVC	S	Stickup

Abbreviations

ND = No data provided/ available

ft = feet

bgs = below ground surface

in = inches

NKL = Kent County North Kent Landfill

EGLE = Michigan Department of Environment, Great Lakes, and Energy

R&W/GZA = Rose & Westra, a Division of GZA

P = perched zone

S = shallow zone

D = deep zone

Notes

1) Elevations are provided in North American Vertical Datum of 1988 (NAVD 88).

2) North Kent Landfill elevations converted from NGVD29 to NAVD88 by R&W/GZA by subtracting 0.43 feet from provided elevation.

TABLE 2
STATIC WATER LEVEL MEASUREMENTS
 Algoma and Plainfield Townships, Kent County, MI

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 Page 1 of 1

Site Location	Well Field ID	November 4, 2019 Static Water Level Elevation (ft)
House Street	HS-DEQ-MW1D	739.09
House Street	HS-DEQ-MW1I	748.63
House Street	HS-DEQ-MW1S	749.96
House Street	HS-DEQ-MW3D	748.76
House Street	HS-DEQ-MW3S	839.76
House Street	HS-DEQ-MW4-102	687.91
House Street	HS-DEQ-MW4-16	729.17
House Street	HS-DEQ-MW4-53	688.26
House Street	HS-DEQ-MW4-80	688.11
House Street	HS-DEQ-MW4-85	688.07
House Street	HS-DEQ-MW4-90	688.00
House Street	HS-DEQ-MW4-97	687.77
House Street	HS-DEQ-MW5D	740.83
House Street	HS-DEQ-MW5S	Dry
House Street	HS-DEQ-MW6D	650.30
House Street	HS-DEQ-MW6S	Dry
House Street	HS-DEQ-MW7-102	751.35
House Street	HS-DEQ-MW7-33	751.20
House Street	HS-DEQ-MW7-87	751.33
House Street	HS-DEQ-MW7-94	751.36
House Street	HS-DEQ-MW8D	652.76
House Street	HS-DEQ-MW8S	653.68
House Street	HS-MW-10D	734.19
House Street	HS-MW-10M	726.19
House Street	HS-MW-10S	726.18
House Street	HS-MW-11D	719.37
House Street	HS-MW-11M	719.35
House Street	HS-MW-11S	720.13
House Street	HS-MW-12A	ND
House Street	HS-MW-12B	ND
House Street	HS-MW-12C	ND
House Street	HS-MW-12D	ND
House Street	HS-MW-12E	ND
House Street	HS-MW-13A	ND
House Street	HS-MW-13B	ND
House Street	HS-MW-13C	ND
House Street	HS-MW-14D	660.09
House Street	HS-MW-14M	661.24
House Street	HS-MW-14S	656.70
House Street	HS-MW-15D	635.56
House Street	HS-MW-15M	634.13
House Street	HS-MW-15S	630.84
House Street	HS-MW-17D	689.38
House Street	HS-MW-17M	689.45
House Street	HS-MW-17S	703.64
House Street	HS-MW-18D	663.55
House Street	HS-MW-18S	670.37
House Street	HS-MW-19D	649.16
House Street	HS-MW-19S	651.59
House Street	HS-MW-1D	727.41
House Street	HS-MW-1S	728.00
House Street	HS-MW-20D	648.97
House Street	HS-MW-20M	649.07
House Street	HS-MW-20S	649.12
House Street	HS-MW-21D	638.75
House Street	HS-MW-21M	637.58
House Street	HS-MW-21S	637.79
House Street	HS-MW-23A	723.53
House Street	HS-MW-23B	723.47
House Street	HS-MW-23C	723.48
House Street	HS-MW-23D	723.45
House Street	HS-MW-24A	723.25
House Street	HS-MW-24B	723.21
House Street	HS-MW-25D	627.83
House Street	HS-MW-25S	627.93
House Street	HS-MW-26D	640.12
House Street	HS-MW-26M	639.96
House Street	HS-MW-26S	636.05
House Street	HS-MW-27A	644.51
House Street	HS-MW-27B	644.58
House Street	HS-MW-27C	645.51
House Street	HS-MW-27D	645.74

TABLE 2
STATIC WATER LEVEL MEASUREMENTS
 Algoma and Plainfield Townships, Kent County, MI

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Site Location	Well Field ID	November 4, 2019 Static Water Level Elevation (ft)
House Street	HS-MW-27E	645.61
House Street	HS-MW-28A	629.35
House Street	HS-MW-28B	629.37
House Street	HS-MW-28C	629.30
House Street	HS-MW-28D	630.25
House Street	HS-MW-28E	630.35
House Street	HS-MW-29A	ND
House Street	HS-MW-29B	ND
House Street	HS-MW-29C	ND
House Street	HS-MW-29D	ND
House Street	HS-MW-2S	725.55
House Street	HS-MW-30A	631.99
House Street	HS-MW-30B	632.00
House Street	HS-MW-30C	632.35
House Street	HS-MW-30D	632.53
House Street	HS-MW-30E	632.54
House Street	HS-MW-31A	624.83
House Street	HS-MW-31B	625.05
House Street	HS-MW-31C	624.83
House Street	HS-MW-31D	624.69
House Street	HS-MW-31E	624.77
House Street	HS-MW-32A	720.65
House Street	HS-MW-32B	720.67
House Street	HS-MW-32C	720.90
House Street	HS-MW-32D	720.75
House Street	HS-MW-3P	763.67
House Street	HS-MW-3S	724.86
House Street	HS-MW-4S	724.49
House Street	HS-MW-5D	724.82
House Street	HS-MW-5P	758.61
House Street	HS-MW-5S	724.82
House Street	HS-MW-6D	725.47
House Street	HS-MW-6S	725.44
House Street	HS-MW-7S	726.43
House Street	HS-MW-8	724.19
House Street	HS-MW-9D	744.72
House Street	HS-MW-9M	744.56
House Street	HS-MW-9S	793.72
North Kent Landfill	NKLF-MW-35	867.33
North Kent Landfill	NKLF-MW-48	870.29
North Kent Landfill	NKLF-MW-53	872.08
North Kent Landfill	NKLF-MW-54	877.50
North Kent Landfill	NKLF-MW-55	867.98
North Kent Landfill	NKLF-MW-56	845.56
North Kent Landfill	NKLF-MW-57	862.99
North Kent Landfill	NKLF-MW-60	834.09
North Kent Landfill	NKLF-MW-61	834.67
North Kent Landfill	NKLF-MW-63	752.97
North Kent Landfill	NKLF-MW-65	834.86
North Kent Landfill	NKLF-MW-66	871.83
North Kent Landfill	NKLF-MW-67	863.70
North Kent Landfill	NKLF-MW-68	867.15
North Kent Landfill	NKLF-MW-69	855.72
North Kent Landfill	NKLF-MW-70	848.12
North Kent Landfill	NKLF-MW-71	862.76
North Kent Landfill	NKLF-MW-72	856.81
North Kent Landfill	NKLF-MW-73	895.07
North Kent Landfill	NKLF-MW-74	871.50
North Kent Landfill	NKLF-MW-75	870.84
North Kent Landfill	NKLF-MW-76	848.24
North Kent Landfill	NKLF-MW-77	832.26
North Kent Landfill	NKLF-MW-78	836.08
North Kent Landfill	NKLF-MW-80	867.52
North Kent Landfill	NKLF-MW-81	831.74
North Kent Landfill	NKLF-MW-82	863.27
North Kent Landfill	NKLF-TW-02	863.72
North Kent Landfill	NKLF-TW-04	846.15
North Kent Landfill	NKLF-TW-05	835.50
North Kent Landfill	NKLF-TW-06	854.24
Wolven	WV-DEQ-MW10-121	719.14
Wolven	WV-DEQ-MW10-177	721.88
Wolven	WV-DEQ-MW10-55	723.29

TABLE 2
STATIC WATER LEVEL MEASUREMENTS
 Algoma and Plainfield Townships, Kent County, MI

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 Page 3 of 3

Site Location	Well Field ID	November 4, 2019 Static Water Level Elevation (ft)
Wolver	WV-DEQ-MW10-84	720.09
Wolver	WV-DEQ-MW10-95	715.81
Wolver	WV-DEQ-MW11-130	757.03
Wolver	WV-DEQ-MW11-137	757.20
Wolver	WV-DEQ-MW11-145	756.95
Wolver	WV-DEQ-MW11-57	815.57
Wolver	WV-DEQ-MW11-95	810.62
Wolver	WV-DEQ-MW2D	753.80
Wolver	WV-DEQ-MW2S	826.21
Wolver	WV-DEQ-MW9-114	711.27
Wolver	WV-DEQ-MW9-131	711.27
Wolver	WV-DEQ-MW9-57	703.29
Wolver	WV-DEQ-MW9-73	711.32
Wolver	WV-DEQ-MW9-94	711.39
Wolver	WV-MW-1	751.30
Wolver	WV-MW-10D	749.49
Wolver	WV-MW-10M	747.82
Wolver	WV-MW-10S	742.24
Wolver	WV-MW-11D	<i>Artesian Conditions</i>
Wolver	WV-MW-11S	726.20
Wolver	WV-MW-12D	716.97
Wolver	WV-MW-12M	716.94
Wolver	WV-MW-12S	721.81
Wolver	WV-MW-13D	803.32
Wolver	WV-MW-13M	820.92
Wolver	WV-MW-13S	820.91
Wolver	WV-MW-14D	731.14
Wolver	WV-MW-14S	861.25
Wolver	WV-MW-15A	ND
Wolver	WV-MW-15B	ND
Wolver	WV-MW-15C	ND
Wolver	WV-MW-15D	ND
Wolver	WV-MW-16D	761.52
Wolver	WV-MW-16S	815.71
Wolver	WV-MW-2D	785.38
Wolver	WV-MW-2S	790.29
Wolver	WV-MW-3D	802.01
Wolver	WV-MW-3S	819.14
Wolver	WV-MW-4	753.96
Wolver	WV-MW-5D	802.39
Wolver	WV-MW-5S	802.11
Wolver	WV-MW-6D	765.11
Wolver	WV-MW-6S	781.51
Wolver	WV-MW-7D	715.73
Wolver	WV-MW-7M	715.73
Wolver	WV-MW-7S	715.71
Wolver	WV-MW-8D	754.38
Wolver	WV-MW-8M	823.77
Wolver	WV-MW-8S	823.75
Wolver	WV-MW-9	824.90
Rogue River	Dam Seawall	680.71
Rogue River	E Bridge Street Bridge	680.34
Rogue River	Rogue River Road Bridge	618.90
Rogue River	Jericho Ave Bridge	672.24
Rogue River	USGS04118500	630.419
Rogue River	Rogue River at Rum Creek	692.84

Abbreviations

ND = No data provided/available

ft = feet

Notes

1) Elevations are provided in North American Vertical Datum of 1988 (NAVD 88).

2) Water level static measurements were completed on November 4, 2019 by R&W/GZA, AECOM (for EGLE), and North Ke

TABLE 3
GROUNDWATER ANALYTICAL DATA - PFAS
House Street Disposal Site Study Area
Plainfield Township, Kent County, MI

Sample Location	Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water ²	Part 201 Generic Groundwater Cleanup Criteria – Groundwater Surface Water Interface ²	HS-MW-1D	HS-MW-1D	HS-MW-1D	HS-MW-1D	HS-MW-1D	HS-MW-1D	HS-MW-1D	HS-MW-1S	HS-MW-1S	HS-MW-1S	HS-MW-1S	HS-MW-1S	HS-MW-1S	HS-MW-1S	HS-MW-2S	HS-MW-2S
Sample Name			MW-1D	MW-1D	HS-GW-MW-1D	HS-MW-1D	HS-GW-MW1D	HS-GW-MW1D	HS-GW-MW-1D	MW-1S	MW-1S	HS-GW-MW-1S	HS-MW-1S	HS-GW-MW1S	HS-GW-MW1S	HS-GW-MW-1S	MW-2	MW-2
Well Screen Interval (Feet below ground surface)			172.3-176.9	172.3 - 176.9	172.3 - 176.9	172.3-176.9	172.3-176.9	172.3-176.9	172.3-176.9	67.4-72.1	67.4 - 72.1	67.4 - 72.1	67.4-72.1	67.4-72.1	67.4-72.1	67.4-72.1	77.9-82.5	77.9 - 82.5
Laboratory Sample ID			K1711117-004	TG26033-001	TJ24030-014	UC16019-001	UE30036-007	UI28005-011	UL05055-005	K1711117-003	TG26033-002	TJ24030-013	UC16019-002	UE30036-008	UI28005-010	UL05055-003	K1711117-005	TG26033-003
Sample Date			10/12/2017	07/24/2018	10/24/2018	03/11/2019	05/29/2019	09/27/2019	12/02/2019	10/12/2017	07/23/2018	10/24/2018	03/11/2019	05/29/2019	09/27/2019	12/02/2019	10/12/2017	07/24/2018
Parameter (µg/L)																		
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NCL	<0.0042	<0.0034	<0.0036	<0.0035	<0.0036	<0.0034	<0.0034	<0.0042	<0.0037	<0.0037	<0.0035	<0.0038	<0.0035	<0.0035	<0.0042	<0.0035
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NCL	<0.0042	<0.0034	<0.0036	<0.0035	<0.0036	<0.0034	<0.0034	<0.0042	<0.0037	<0.0037	<0.0035	<0.0038	<0.0035	<0.0035	<0.0042	<0.0035
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NCL	<0.0042	<0.0034	<0.0036	<0.0035	<0.0036	<0.0034	<0.0034	<0.0042	<0.0037	<0.0037	<0.0035	<0.0038	<0.0035	<0.0035	<0.0042	<0.0035
N-Ethyl perfluorooctane sulfonamidoethanol (N-EtFOSE)	NCL	NCL	<0.0042	-	-	-	-	-	-	<0.0042	-	-	-	-	-	-	<0.0042	-
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NCL	<0.0042	<0.0069	<0.0073	<0.0071	<0.0072	<0.0068	<0.0069	<0.0042	<0.0074	<0.0074	<0.007	<0.0076	<0.007	<0.0071	<0.0042	<0.0069
N-Methyl perfluorooctane sulfonamidoethanol (N-MeFOSE)	NCL	NCL	<0.0042	-	-	-	-	-	-	<0.0042	-	-	-	-	-	-	<0.0042	-
Perfluorobutane sulfonic acid (PFBS)	NCL	NCL	<0.0042	0.0046	0.0056	0.0056	0.0057	0.005	0.0054	0.018	0.0057	0.0059	0.0057	0.0059	0.0051	0.0054	<0.0042	0.091
Perfluorodecane sulfonic acid (PFDS)	NCL	NCL	<0.0042	<0.0034	<0.0036	<0.0035	<0.0036	<0.0034	<0.0034	<0.0042	<0.0037	<0.0037	<0.0035	<0.0038	<0.0035	<0.0035	<0.0042	<0.0035
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NCL	<0.0042	<0.0034	<0.0036	<0.0035	<0.0036	<0.0034	<0.0034	<0.0042	<0.0037	<0.0037	<0.0035	<0.0038	<0.0035	<0.0035	<0.0042	<0.0035
Perfluorononane sulfonic acid (PFNS)	NCL	NCL	-	<0.0069	<0.0073	<0.0071	<0.0072	<0.0068	<0.0069	-	<0.0074	<0.0074	<0.007	<0.0076	<0.007	<0.0071	-	<0.0069
Perfluorooctane sulfonamide (FOSA)	NCL	NCL	<0.0042	<0.0034	<0.0036	<0.0035	<0.0036	<0.0034	<0.0034	<0.0042	<0.0037	<0.0037	<0.0035	<0.0038	<0.0035	<0.0035	<0.0042	<0.0035
Perfluoropentane sulfonic acid (PFPeS)	NCL	NCL	-	<0.0034	<0.0036	<0.0035	<0.0036	<0.0034	<0.0034	-	0.0045	0.0045	<0.0035	0.0038	<0.0035	<0.0035	-	0.1
Perfluorohexane sulfonic acid (PFHxS)	NCL	NCL	<0.0042	0.0035	0.0038	<0.0035	<0.0036	<0.0034	0.0035	0.026	0.039	0.043	0.04	0.034	0.026	0.022	<0.0042	0.037
Perfluorobutanoic acid (PFBA)	NCL	NCL	<0.0083	<0.0034	<0.0036	<0.0035	<0.0036	<0.0034	<0.0034	<0.0083	<0.0037	<0.0037	<0.0035	<0.0038	<0.0035	<0.0035	<0.0083	0.011
Perfluorodecanoic acid (PFDA)	NCL	NCL	<0.0042	<0.0034	<0.0036	<0.0035	<0.0036	<0.0034	<0.0034	<0.0042	<0.0037	<0.0037	<0.0035	<0.0038	<0.0035	<0.0035	<0.0042	<0.0035
Perfluorododecanoic acid (PFDoDA)	NCL	NCL	<0.0042	<0.0034	<0.0036	<0.0035	<0.0036	<0.0034	<0.0034	<0.0042	<0.0037	<0.0037	<0.0035	<0.0038	<0.0035	<0.0035	<0.0042	<0.0035
Perfluoroheptanoic acid (PFHpA)	NCL	NCL	<0.0042	<0.0034	<0.0036	<0.0035	<0.0036	<0.0034	<0.0034	0.012	<0.0037	<0.0037	<0.0035	<0.0038	<0.0035	<0.0035	<0.0042	0.011
Perfluorohexanoic acid (PFHxA)	NCL	NCL	<0.0042	<0.0034	<0.0036	<0.0035	<0.0036	<0.0034	<0.0034	0.016	0.0064	0.0061	0.0053	0.0051	<0.0035	<0.0035	<0.0042	0.069
Perfluorononanoic acid (PFNA)	NCL	NCL	<0.0042	<0.0034	<0.0036	<0.0035	<0.0036	<0.0034	<0.0034	<0.0042	<0.0037	<0.0037	<0.0035	<0.0038	<0.0035	<0.0035	<0.0042	<0.0035
Perfluorooctanoic acid (PFOA)	0.07 (JJ)	12	<0.0017	0.0081	0.0089	0.0091	0.0098	0.0087	0.01	0.0042	0.0079 [J]	0.009 [J]	0.0095	0.013	0.0064	0.0072	<0.0017	0.0048 [J]
Perfluorooctane sulfonic acid (PFOS)	0.07 (JJ)	0.012	<0.0042	<0.0034	<0.0036	0.0042	0.0044	0.0034	<0.0038	<0.0042	<0.0037	0.005 [J]	0.0046	0.012	<0.0035	0.006	<0.0042	<0.0035
PFOA + PFOS (Calculated)	0.07	NCL	ND	0.0081	0.0089	0.013	0.014	0.012	0.014	0.0042	0.0079	0.014	0.014	0.025	0.0064	0.013	ND	0.0048
Perfluoropentanoic acid (PFPeA)	NCL	NCL	<0.0042	<0.0034	<0.0036	<0.0035	<0.0036	<0.0034	<0.0034	<0.0042	<0.0037	<0.0037	<0.0035	<0.0038	<0.0035	<0.0035	<0.0042	0.015
Perfluorotetradecanoic acid (PFTeDA)	NCL	NCL	<0.0042	<0.0034	<0.0036	<0.0035	<0.0036	<0.0034	<0.0034	<0.0042	<0.0037	<0.0037	<0.0035	<0.0038	<0.0035	<0.0035	<0.0042	<0.0035
Perfluorotridecanoic acid (PFTrDA)	NCL	NCL	<0.0042	<0.0034	<0.0036	<0.0035	<0.0036	<0.0034	<0.0034	<0.0042	<0.0037	<0.0037	<0.0035	<0.0038	<0.0035	<0.0035	<0.0042	<0.0035
Perfluoroundecanoic acid (PFUnDA)	NCL	NCL	<0.0042	<0.0034	<0.0036	<0.0035	<0.0036	<0.0034	<0.0034	<0.0042	<0.0037	<0.0037	<0.0035	<0.0038	<0.0035	<0.0035	<0.0042	<0.0035
Total PFAS (Calculated)	NCL	NCL	ND	0.016	0.018	0.019	0.02	0.017	0.023	0.076	0.064	0.074	0.065	0.074	0.038	0.041	ND	0.34

TABLE 3
GROUNDWATER ANALYTICAL DATA - PFAS
House Street Disposal Site Study Area
Plainfield Township, Kent County, MI

Sample Location	Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water ²	Part 201 Generic Groundwater Cleanup Criteria – Groundwater Surface Water Interface ²	HS-MW-2S	HS-MW-2S	HS-MW-2S	HS-MW-2S	HS-MW-2S	HS-MW-3S	HS-MW-3S	HS-MW-3S	HS-MW-3S	HS-MW-3S	HS-MW-3S	HS-MW-3S	HS-MW-3S	HS-MW-3S	HS-MW-3S	HS-MW-4S
Sample Name			HS-GW-MW-2S	HS-MW-2	HS-GW-MW2	HS-GW-MW2	HS-GW-MW-2S	MW-3S	MW-3D	MW-3D Dup	HS-GW-MW-3S	HS-GW-MW-3S DUP	HS-MW-3S	HS-MW-3S DUP	HS-GW-MW3S	HS-GW-MW3S	HS-GW-MW-3S	MW-4S
Well Screen Interval (Feet below ground surface)			77.9 - 82.5	77.9-82.5	77.9-82.5	77.9-82.5	77.9-82.5	70.1-75	70.1 - 75	70.1 - 75	70.1 - 75	70.1 - 75	70.1-75	70.1-75	70.1-75	70.1-75	70.1-75	70.2-74.8
Laboratory Sample ID			TJ24030-012	UC16019-003	UE30036-015	UI28005-012	UL05055-009	K1711250-001	TG26033-005	TG26033-006	TJ24030-008	TJ24030-009	UC16019-005	UC16019-006	UE30036-016	UI26001-008	UL05055-011	K1711250-002
Sample Date			10/24/2018	03/11/2019	05/30/2019	09/27/2019	12/03/2019	10/13/2017	07/24/2018	07/24/2018	10/23/2018	10/23/2018	03/13/2019	03/13/2019	05/30/2019	09/24/2019	12/03/2019	10/13/2017
Parameter (µg/L)																		
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NCL	<0.0037	<0.0035	<0.0036	<0.0036	<0.0037	<0.0043	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0036	<0.0043
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NCL	<0.0037	<0.0035	<0.0036	<0.0036	<0.0037	<0.0043	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0036	<0.0043
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NCL	<0.0037	<0.0035	<0.0036	<0.0036	<0.0037	<0.0043	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0036	<0.0043
N-Ethyl perfluorooctane sulfonamidoethanol (N-EtFOSE)	NCL	NCL	-	-	-	-	-	<0.0043	-	-	-	-	-	-	-	-	-	<0.0043
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NCL	<0.0073	<0.0071	<0.0072	<0.0071	<0.0075	<0.0043	<0.0069	<0.007	<0.007	<0.0069	<0.007	<0.007	<0.0071	<0.0069	<0.0071	<0.0043
N-Methyl perfluorooctane sulfonamidoethanol (N-MeFOSE)	NCL	NCL	-	-	-	-	-	<0.0043	-	-	-	-	-	-	-	-	-	<0.0043
Perfluorobutane sulfonic acid (PFBS)	NCL	NCL	0.14	0.079	0.099	0.089	0.04	0.37	0.28	0.29	0.32	0.33	0.38	0.39	0.5	0.4	0.57	0.093
Perfluorodecane sulfonic acid (PFDS)	NCL	NCL	<0.0037	<0.0035	<0.0036	<0.0036	<0.0037	<0.0043	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0036	<0.0043
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NCL	<0.0037	<0.0035	<0.0036	<0.0036	<0.0037	0.032	0.019	0.019	0.03	0.029	0.034	0.04	0.065	0.056	0.05	0.55
Perfluorononane sulfonic acid (PFNS)	NCL	NCL	<0.0073	<0.0071	<0.0072	<0.0071	<0.0075	-	<0.0069	<0.007	<0.007	<0.0069	<0.007	<0.007	<0.0071	<0.0069	<0.0071	-
Perfluorooctane sulfonamide (FOSA)	NCL	NCL	<0.0037	<0.0035	<0.0036	<0.0036	<0.0037	<0.0043	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0036	<0.0043
Perfluoropentane sulfonic acid (PFPeS)	NCL	NCL	0.18	0.097	0.11	0.094	0.028	-	0.47	0.48	0.52	0.52	0.68	0.6	0.92	0.71	0.75	-
Perfluorohexane sulfonic acid (PFHxS)	NCL	NCL	0.054	0.046	0.055	0.03	0.022	0.93	1.1	1.1	1.3	1.3	1.5	1.3	2.1	1.7	1.6	1.6
Perfluorobutanoic acid (PFBA)	NCL	NCL	0.019	0.0095	0.011	0.01	0.0063	0.091	0.061	0.061	0.076	0.074	0.093	0.09	0.13	0.1	0.14	0.16
Perfluorodecanoic acid (PFDA)	NCL	NCL	<0.0037	<0.0035	<0.0036	<0.0036	<0.0037	<0.0043	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0036	<0.0043
Perfluorododecanoic acid (PFDoDA)	NCL	NCL	<0.0037	<0.0035	<0.0036	<0.0036	<0.0037	<0.0043	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0036	<0.0043
Perfluoroheptanoic acid (PFHpA)	NCL	NCL	0.037	0.023	0.022	0.018	0.0065	0.18	0.14	0.13	0.14	0.15	0.14	0.15	0.34	0.2	0.24	0.32
Perfluorohexanoic acid (PFHxA)	NCL	NCL	0.11	0.053	0.072	0.05	0.03	0.39	0.21	0.21	0.31	0.29	0.35	0.33	0.41	0.36	0.51	0.42
Perfluorononanoic acid (PFNA)	NCL	NCL	<0.0037	<0.0035	<0.0036	<0.0036	<0.0037	<0.0043	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0036	<0.0043
Perfluorooctanoic acid (PFOA)	0.07 (JJ)	12	0.0098 [J]	0.0088	0.019	0.006	0.0044	0.38	0.52	0.52	0.59	0.61	0.69	0.63	0.89	0.83	0.73	0.83
Perfluorooctane sulfonic acid (PFOS)	0.07 (JJ)	0.012	<0.0037	<0.0035	<0.0036	<0.0036	<0.0037	0.022	0.017 [J]	0.016 [J]	0.019 [J]	0.018 [J]	0.032	0.032	0.057	0.024	0.023	2
PFOA + PFOS (Calculated)	0.07	NCL	0.0098	0.0088	0.019	0.006	0.0044	0.4	0.54	0.54	0.61	0.63	0.72	0.66	0.95	0.85	0.75	2.8
Perfluoropentanoic acid (PFPeA)	NCL	NCL	0.023	0.012	0.015	0.014	0.0076	0.13	0.084	0.083	0.1	0.1	0.11	0.11	0.14	0.13	0.16	0.17
Perfluorotetradecanoic acid (PFTeDA)	NCL	NCL	<0.0037	<0.0035	<0.0036	<0.0036	<0.0037	<0.0043	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0036	<0.0043
Perfluorotridecanoic acid (PFTrDA)	NCL	NCL	<0.0037	<0.0035	<0.0036	<0.0036	<0.0037	<0.0043	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0036	<0.0043
Perfluoroundecanoic acid (PFUnDA)	NCL	NCL	<0.0037	<0.0035	<0.0036	<0.0036	<0.0037	<0.0043	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0036	<0.0043
Total PFAS (Calculated)	NCL	NCL	0.57	0.33	0.4	0.31	0.14	2.5	2.9	2.9	3.4	3.4	4	3.7	5.6	4.5	4.8	6.1

TABLE 3
GROUNDWATER ANALYTICAL DATA - PFAS
House Street Disposal Site Study Area
Plainfield Township, Kent County, MI

Sample Location	Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water ²	Part 201 Generic Groundwater Cleanup Criteria – Groundwater Surface Water Interface ²	HS-MW-4S	HS-MW-4S	HS-MW-4S	HS-MW-4S	HS-MW-4S	HS-MW-4S	HS-MW-4S	HS-MW-5D	HS-MW-5D	HS-MW-5D	HS-MW-5D	HS-MW-5D	HS-MW-5D	HS-MW-5D	HS-MW-5D	HS-MW-5S
Sample Name			MW-4S	MW-4	HS-GW-MW-4S	HS-MW-4	HS-GW-MW4	HS-GW-MW4S	HS-GW-MW-4S	MW-5D	MW-5D	HS-GW-MW-5D	HS-MW-5D	HS-GW-MW5D	HS-GW-MW5D	HS-GW-MW-5D	HS-GW-MW-5D DUP	MW-5S
Well Screen Interval (Feet below ground surface)			70.2-74.8	70.2 - 74.8	70.2 - 74.8	70.2-74.8	70.2-74.8	70.2-74.8	70.2-74.8	190.5-200.5	190.5 - 200.5	190.5 - 200.5	190.5-200.5	190.5-200.5	190.5-200.5	190.5-200.5	190.5-200.5	60.3-65
Laboratory Sample ID			K1713964-002	TG26033-014	TJ24030-006	UC16019-015	UE30036-014	UI26001-009	UL05055-020	K1800647-004	TG26033-009	TJ24030-003	UC16019-013	UE30036-005	UI26001-007	UL05055-018	UL05055-019	K1711250-003
Sample Date			12/28/2017	07/26/2018	10/23/2018	03/15/2019	05/30/2019	09/24/2019	12/04/2019	01/22/2018	07/25/2018	10/22/2018	03/14/2019	05/28/2019	09/24/2019	12/04/2019	12/04/2019	10/13/2017
Parameter (µg/L)																		
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NCL	<0.0042	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0037	<0.0042	<0.0037	<0.0035	<0.0035	<0.0034	<0.0036	<0.0035	<0.0036
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NCL	<0.0042	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0037	<0.0042	<0.0037	<0.0035	<0.0035	<0.0034	<0.0036	<0.0035	<0.0036
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NCL	<0.0042	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0037	<0.0042	<0.0037	<0.0035	<0.0035	<0.0034	<0.0036	<0.0035	<0.0036
N-Ethyl perfluorooctane sulfonamidoethanol (N-EtFOSE)	NCL	NCL	<0.0042	-	-	-	-	-	-	<0.0042	-	-	-	-	-	-	-	<0.0042
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NCL	<0.0042	<0.007	<0.007	<0.007	<0.0069	<0.007	<0.0074	<0.0042	<0.0075	<0.0071	<0.0071	<0.0069	<0.0073	<0.007	<0.0072	<0.0042
N-Methyl perfluorooctane sulfonamidoethanol (N-MeFOSE)	NCL	NCL	<0.0042	-	-	-	-	-	-	<0.0042	-	-	-	-	-	-	-	<0.0042
Perfluorobutane sulfonic acid (PFBS)	NCL	NCL	0.17	0.16	0.097	0.058	0.055	0.033	0.1	0.0054	0.0063	<0.0035	<0.0035	<0.0034	<0.0036	0.005	0.0068	0.57
Perfluorodecane sulfonic acid (PFDS)	NCL	NCL	<0.0042	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0037	<0.0042	<0.0037	<0.0035	<0.0035	<0.0034	<0.0036	<0.0035	<0.0036	<0.0042
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NCL	0.95	0.84	0.61	0.56	0.46	0.27	0.74	<0.0042	<0.0037	<0.0035	<0.0035	<0.0034	<0.0036	<0.0035	<0.0036	1.1
Perfluorononane sulfonic acid (PFNS)	NCL	NCL	-	<0.007	<0.007	<0.007	<0.0069	<0.007	<0.0074	-	<0.0075	<0.0071	<0.0071	<0.0069	<0.0073	<0.007	<0.0072	-
Perfluorooctane sulfonamide (FOSA)	NCL	NCL	<0.0042	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0037	<0.0042	<0.0037	<0.0035	<0.0035	<0.0034	<0.0036	<0.0035	<0.0036	<0.0042
Perfluoropentane sulfonic acid (PFPeS)	NCL	NCL	-	0.56	0.31	0.18	0.19	0.14	0.38	-	0.0072	<0.0035	<0.0035	<0.0034	<0.0036	0.0053	0.0077	-
Perfluorohexane sulfonic acid (PFHxS)	NCL	NCL	3.2	6	3.5	3	2.9	2.1	4.6	0.013	0.017	0.004	<0.0035	<0.0034	0.0058	0.013	0.02	1.9
Perfluorobutanoic acid (PFBA)	NCL	NCL	0.29	0.29	0.16	0.095	0.071	0.047	0.23	<0.0083	<0.0037	<0.0035	<0.0035	<0.0034	<0.0036	<0.0035	<0.0036	0.14
Perfluorodecanoic acid (PFDA)	NCL	NCL	<0.0042	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0037	<0.0042	<0.0037	<0.0035	<0.0035	<0.0034	<0.0036	<0.0035	<0.0036	<0.0042
Perfluorododecanoic acid (PFDoDA)	NCL	NCL	<0.0042	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0037	<0.0042	<0.0037	<0.0035	<0.0035	<0.0034	<0.0036	<0.0035	<0.0036	<0.0042
Perfluoroheptanoic acid (PFHpA)	NCL	NCL	0.56	0.4	0.3	0.19	0.19	0.15	0.45	<0.0042	<0.0037	<0.0035	<0.0035	<0.0034	<0.0036	<0.0035	<0.0036	0.71
Perfluorohexanoic acid (PFHxA)	NCL	NCL	0.73	0.55	0.42	0.22	0.2	0.12	0.48	0.0077	<0.0037	<0.0035	<0.0035	<0.0034	<0.0036	<0.0035	<0.0036	0.45
Perfluorononanoic acid (PFNA)	NCL	NCL	0.006	0.0051	0.0042	<0.0035	<0.0035	<0.0035	<0.0037	<0.0042	<0.0037	<0.0035	<0.0035	<0.0034	<0.0036	<0.0035	<0.0036	0.018
Perfluorooctanoic acid (PFOA)	0.07 (JJ)	12	1.5	2.7	1.6	1.5	1.4	0.82	2.1	0.0089	0.0091	0.002	<0.0018	0.0028	0.0035	0.008	0.013	2.8
Perfluorooctane sulfonic acid (PFOS)	0.07 (JJ)	0.012	3.6	5.9 [J]	4.8 [J]	4.5	3.2	1.1	2.3	0.026	0.021 [J]	0.0056 [J]	0.0053	0.011	0.0083	0.01	0.015	44
PFOA + PFOS (Calculated)	0.07	NCL	5.1	8.6	6.4	6	4.6	1.9	4.4	0.035	0.03	0.0076	0.0053	0.014	0.012	0.018	0.028	47
Perfluoropentanoic acid (PFPeA)	NCL	NCL	0.33	0.27	0.16	0.094	0.075	0.048	0.21	<0.0042	<0.0037	<0.0035	<0.0035	<0.0034	<0.0036	<0.0035	<0.0036	0.19
Perfluorotetradecanoic acid (PFTeDA)	NCL	NCL	<0.0042	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0037	<0.0042	<0.0037	<0.0035	<0.0035	<0.0034	<0.0036	<0.0035	<0.0036	<0.0042
Perfluorotridecanoic acid (PFTriDA)	NCL	NCL	<0.0042	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0037	<0.0042	<0.0037	<0.0035	<0.0035	<0.0034	<0.0036	<0.0035	<0.0036	<0.0042
Perfluoroundecanoic acid (PFUnDA)	NCL	NCL	<0.0042	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0037	<0.0042	<0.0037	<0.0035	<0.0035	<0.0034	<0.0036	<0.0035	<0.0036	<0.0042
Total PFAS (Calculated)	NCL	NCL	11	18	12	10	8.7	4.8	12	0.061	0.061	0.012	0.0053	0.014	0.018	0.041	0.063	52

TABLE 3
GROUNDWATER ANALYTICAL DATA - PFAS
House Street Disposal Site Study Area
Plainfield Township, Kent County, MI

Sample Location	Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water ²	Part 201 Generic Groundwater Cleanup Criteria – Groundwater Surface Water Interface ²	HS-MW-5S	HS-MW-5S	HS-MW-5S	HS-MW-5S	HS-MW-5S	HS-MW-5S	HS-MW-5S	HS-MW-5S	HS-MW-6D	HS-MW-6D	HS-MW-6D	HS-MW-6D	HS-MW-6D	HS-MW-6D	HS-MW-6S	HS-MW-6S
Sample Name			MW-5S	MW-5M	HS-GW-MW-5M	HS-MW-5S	HS-GW-MW5S	HS-GW-MW5S	HS-GW-MW-5S	MW-6D	MW-6D	HS-GW-MW-6D	HS-MW-6D	HS-GW-MW6D	HS-GW-MW6D	HS-GW-MW-6D	MW-6S	MW-6S
Well Screen Interval (Feet below ground surface)			60.3-65	60.3 - 65	60.3 - 65	60.3-65	60.3-65	60.3-65	60.3-65	157.5-162.5	157.5 - 162.5	157.5 - 162.5	157.5-162.5	157.5-162.5	157.5-162.5	157.5-162.5	58.2-62.9	58.2 - 62.9
Laboratory Sample ID			K1713964-001	TG26033-008	TJ24030-004	UC16019-012	UE30036-004	UI26001-006	UL05055-021	K1713273-007	TG26033-015	TJ24030-002	UC21029-008	UE30036-009	UI28005-004	UL05055-028	K1711250-004	TG26033-016
Sample Date			12/28/2017	07/25/2018	10/23/2018	03/14/2019	05/28/2019	09/24/2019	12/04/2019	12/07/2017	07/26/2018	10/22/2018	03/20/2019	05/29/2019	09/26/2019	12/05/2019	10/16/2017	07/26/2018
Parameter (µg/L)																		
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NCL	<0.03	<0.19	<0.07	<0.078	<0.07	<0.07	<0.071	<0.0043	<0.0035	<0.0035	<0.0035	<0.0036	<0.0036	<0.0036	<0.0042	<0.0035
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NCL	<0.03	<0.19	<0.07	<0.078	<0.07	<0.07	<0.071	<0.0043	<0.0035	<0.0035	<0.0035	<0.0036	<0.0036	<0.0036	<0.0042	<0.0035
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NCL	<0.03	<0.19	<0.07	<0.078	<0.07	<0.07	<0.071	<0.0035	<0.0035	<0.0035	<0.0035	<0.0036	<0.0036	<0.0036	<0.0042	<0.0035
N-Ethyl perfluorooctane sulfonamidoethanol (N-EtFOSE)	NCL	NCL	<0.03	-	-	-	-	-	-	<0.0043	-	-	-	-	-	-	<0.0042	-
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NCL	<0.03	<0.37	<0.14	<0.16	<0.14	<0.14	<0.14	<0.0043	<0.007	<0.0069	<0.007	<0.0071	<0.0072	<0.0071	<0.0042	<0.0069
N-Methyl perfluorooctane sulfonamidoethanol (N-MeFOSE)	NCL	NCL	<0.03	-	-	-	-	-	-	<0.0043	-	-	-	-	-	-	<0.0042	-
Perfluorobutane sulfonic acid (PFBS)	NCL	NCL	1.6	1.2	1.1	1.9	1.6	1.4	1.4	<0.0043	<0.0035	<0.0035	<0.0035	<0.0036	<0.0036	<0.0036	<0.0042	0.0051
Perfluorodecane sulfonic acid (PFDS)	NCL	NCL	<0.03	<0.19	<0.07	<0.078	<0.07	<0.07	<0.071	<0.0043	<0.0035	<0.0035	<0.0035	<0.0036	<0.0036	<0.0036	<0.0042	<0.0035
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NCL	2.2	2.2	1.4	1.7	3.5	2.2	3.4	<0.0043	<0.0035	<0.0035	<0.0035	<0.0036	<0.0036	<0.0036	<0.0042	<0.0035
Perfluorononane sulfonic acid (PFNS)	NCL	NCL	-	<0.37	<0.14	<0.16	<0.14	<0.14	<0.14	-	<0.007	<0.0069	<0.007	<0.0071	<0.0072	<0.0071	-	<0.0069
Perfluorooctane sulfonamide (FOSA)	NCL	NCL	<0.03	<0.19	<0.07	<0.078	<0.07	<0.07	<0.071	<0.0043	<0.0035	<0.0035	<0.0035	<0.0036	<0.0036	<0.0036	<0.0042	<0.0035 [U]
Perfluoropentane sulfonic acid (PFPeS)	NCL	NCL	-	1.8	1.7	3.1	3.1	2.8	3.5	-	<0.0035	<0.0035	<0.0035	<0.0036	<0.0036	<0.0036	-	0.01
Perfluorohexane sulfonic acid (PFHxS)	NCL	NCL	8.2	5.6	4.7	7.5	11	9.9	15	<0.0043	<0.0035	<0.0035	<0.0035	<0.0036	<0.0036	<0.0036	0.014	0.048
Perfluorobutanoic acid (PFBA)	NCL	NCL	0.36	0.29	0.28	0.56	0.52	0.47	0.43	<0.0086	<0.0035	<0.0035	<0.0035	<0.0036	<0.0036	<0.0036	<0.0083	<0.0035
Perfluorodecanoic acid (PFDA)	NCL	NCL	<0.03	<0.19	<0.07	<0.078	<0.07	<0.07	<0.071	<0.0043	<0.0035	<0.0035	<0.0035	<0.0036	<0.0036	<0.0036	<0.0042	<0.0035
Perfluorododecanoic acid (PFDoDA)	NCL	NCL	<0.03	<0.19	<0.07	<0.078	<0.07	<0.07	<0.071	<0.0043	<0.0035	<0.0035	<0.0035	<0.0036	<0.0036	<0.0036	<0.0042	<0.0035
Perfluoroheptanoic acid (PFHpA)	NCL	NCL	1.9	0.99	0.84	1.6	1.8	1.4	2.4	<0.0043	<0.0035	<0.0035	<0.0035	<0.0036	<0.0036	<0.0036	<0.0042	0.0061
Perfluorohexanoic acid (PFHxA)	NCL	NCL	1.3	0.81	0.74	1.5	1.6	1.3	1.3	<0.0043	<0.0035	<0.0035	<0.0035	<0.0036	<0.0036	<0.0036	<0.0042	0.0065
Perfluorononanoic acid (PFNA)	NCL	NCL	0.03	<0.19	<0.07	<0.078	<0.07	<0.07	<0.071	<0.0043	<0.0035	<0.0035	<0.0035	<0.0036	<0.0036	<0.0036	<0.0042	<0.0035
Perfluorooctanoic acid (PFOA)	0.07 [J]	12	7.4	6.2	5.6	8.5	11	8.2	11	<0.0017	<0.0018	<0.0017	<0.0018	<0.0018	<0.0018	<0.0018	0.0098	0.028 [J]
Perfluorooctane sulfonic acid (PFOS)	0.07 [J]	0.012	41	81 [J]	47 [J]	42	100	59	71	<0.0043	<0.0035	<0.0035	<0.0035	<0.0036	<0.0036	<0.0036	<0.0042	<0.0035
PFOA + PFOS (Calculated)	0.07	NCL	48	87	53	51	110	67	82	ND	ND	ND	ND	ND	ND	ND	0.0098	0.028
Perfluoropentanoic acid (PFPeA)	NCL	NCL	0.51	0.36	0.37	0.65	0.61	0.54	0.51	<0.0043	<0.0035	<0.0035	<0.0035	<0.0036	<0.0036	<0.0036	<0.0042	<0.0035 [U]
Perfluorotetradecanoic acid (PFTeDA)	NCL	NCL	<0.03	<0.19	<0.07	<0.078	<0.07	<0.07	<0.071	<0.0043	<0.0035	<0.0035	<0.0035	<0.0036	<0.0036	<0.0036	<0.0042	<0.0035
Perfluorotridecanoic acid (PFTrDA)	NCL	NCL	<0.03	<0.19	<0.07	<0.078	<0.07	<0.07	<0.071	<0.0043	<0.0035	<0.0035	<0.0035	<0.0036	<0.0036	<0.0036	<0.0042	<0.0035
Perfluoroundecanoic acid (PFUnDA)	NCL	NCL	<0.03	<0.19	<0.07	<0.078	<0.07	<0.07	<0.071	<0.0043	<0.0035	<0.0035	<0.0035	<0.0036	<0.0036	<0.0036	<0.0042	<0.0035
Total PFAS (Calculated)	NCL	NCL	65	100	64	69	130	87	110	ND	ND	ND	ND	ND	ND	ND	0.024	0.1

TABLE 3
GROUNDWATER ANALYTICAL DATA - PFAS
House Street Disposal Site Study Area
Plainfield Township, Kent County, MI

Sample Location	Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water ²	Part 201 Generic Groundwater Cleanup Criteria – Groundwater Surface Water Interface ²	HS-MW-6S	HS-MW-6S	HS-MW-6S	HS-MW-6S	HS-MW-6S	HS-MW-7S	HS-MW-7S	HS-MW-7S	HS-MW-7S	HS-MW-7S	HS-MW-7S	HS-MW-7S	HS-MW-7S	HS-MW-8	HS-MW-8	HS-MW-8
Sample Name			HS-GW-MW-6S	HS-MW-6S	HS-GW-MW6S	HS-GW-MW6S	HS-GW-MW-6S	MW-7S	MW-7	HS-GW-MW-7S	HS-MW-7S	HS-MW-7S DUP	HS-GW-MW7S	HS-GW-MW7S	HS-GW-MW-7S	MW-8	MW-8	HS-GW-MW-8
Well Screen Interval (Feet below ground surface)			58.2 - 62.9	58.2-62.9	58.2-62.9	58.2-62.9	58.2-62.9	69.9-74.5	69.9 - 74.5	69.9 - 74.5	69.9-74.5	69.9-74.5	69.9-74.5	69.9-74.5	69.9-74.5	30-35	30 - 35	30 - 35
Laboratory Sample ID			TJ24030-001	UC21029-007	UE30036-010	UI28005-005	UL05055-027	K1711250-005	TG28011-001	TJ24030-007	UC23028-001	UC23028-002	UE30036-017	UI26001-004	UL05055-022	K1713273-008	TG28011-002	TJ24030-015
Sample Date			10/22/2018	03/20/2019	05/29/2019	09/26/2019	12/05/2019	10/16/2017	07/27/2018	10/23/2018	03/21/2019	03/21/2019	05/30/2019	09/23/2019	12/04/2019	12/07/2017	07/27/2018	10/24/2018
Parameter (µg/L)																		
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NCL	<0.0035	<0.0036	<0.0035	<0.0036	<0.0036	<0.0042	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0034	<0.0035	<0.0044	<0.0035	<0.0037
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NCL	<0.0035	<0.0036	<0.0035	<0.0036	<0.0036	<0.0042	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0034	<0.0035	<0.0044	<0.0035	<0.0037
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NCL	<0.0035	<0.0036	<0.0035	<0.0036	<0.0036	<0.0042	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0034	<0.0035	<0.0044	<0.0035	<0.0037
N-Ethyl perfluorooctane sulfonamidoethanol (N-EtFOSE)	NCL	NCL	-	-	-	-	-	<0.0042	-	-	-	-	-	-	-	<0.0044	-	-
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NCL	<0.0069	<0.0073	<0.0069	<0.0072	<0.0072	<0.0042	<0.007	<0.007	<0.0071	<0.007	<0.0069	<0.0067	<0.007	<0.0044	<0.0071	<0.0074
N-Methyl perfluorooctane sulfonamidoethanol (N-MeFOSE)	NCL	NCL	-	-	-	-	-	<0.0042	-	-	-	-	-	-	-	<0.0044	-	-
Perfluorobutane sulfonic acid (PFBS)	NCL	NCL	0.039	0.047	0.0052	0.034	0.0046	<0.0042	0.0046	0.0058	0.0051	0.0053	0.006	0.0046	0.0055	0.11	0.1	0.041
Perfluorodecane sulfonic acid (PFDS)	NCL	NCL	<0.0035	<0.0036	<0.0035	<0.0036	<0.0036	<0.0042	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0034	<0.0035	<0.0044	<0.0035	<0.0037
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NCL	<0.0035	<0.0036	<0.0035	<0.0036	<0.0036	<0.0042	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0034	<0.0035	0.12	0.032	0.16
Perfluorononane sulfonic acid (PFNS)	NCL	NCL	<0.0069	<0.0073	<0.0069	<0.0072	<0.0072	-	<0.007	<0.007	<0.0071	<0.007	<0.0069	<0.0067	<0.007	-	<0.0071	<0.0074
Perfluorooctane sulfonamide (FOSA)	NCL	NCL	<0.0035	<0.0036	<0.0035	<0.0036	<0.0036	<0.0042	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0034	<0.0035	<0.0044	<0.0035	<0.0037
Perfluoropentane sulfonic acid (PFPeS)	NCL	NCL	0.058	0.061	0.011	0.036	<0.0036	-	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0034	<0.0035	-	0.12	0.053
Perfluorohexane sulfonic acid (PFHxS)	NCL	NCL	0.08	0.085	0.039	0.074	0.013	0.0069	0.0064	0.0093	0.011	0.0099	0.0089	0.0089	0.01	0.25	0.28	0.22
Perfluorobutanoic acid (PFBA)	NCL	NCL	<0.0035	0.0046	<0.0035	0.0036	<0.0036	<0.0083	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0034	<0.0035	0.018	0.017	0.011
Perfluorodecanoic acid (PFDA)	NCL	NCL	<0.0035	<0.0036	<0.0035	<0.0036	<0.0036	<0.0042	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0034	<0.0035	<0.0044	<0.0035	<0.0037
Perfluorododecanoic acid (PFDoDA)	NCL	NCL	<0.0035	<0.0036	<0.0035	<0.0036	<0.0036	<0.0042	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0034	<0.0035	<0.0044	<0.0035	<0.0037
Perfluoroheptanoic acid (PFHpA)	NCL	NCL	0.013	0.015	0.0043	0.012	<0.0036	<0.0042	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0034	<0.0035	0.088	0.079	0.046
Perfluorohexanoic acid (PFHxA)	NCL	NCL	0.029	0.031	0.0053	0.021	<0.0036	<0.0042	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0034	<0.0035	0.033	0.049	0.023
Perfluorononanoic acid (PFNA)	NCL	NCL	<0.0035	<0.0036	<0.0035	<0.0036	<0.0036	<0.0042	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0034	<0.0035	<0.0044	<0.0035	<0.0037
Perfluorooctanoic acid (PFOA)	0.07 (JJ)	12	0.045 [J]	0.044	0.028	0.043	0.012	0.0033	0.0023 [J]	0.0024 [J]	0.0029	0.003	0.0035	0.0029	0.003	0.6	0.62	0.59
Perfluorooctane sulfonic acid (PFOS)	0.07 (JJ)	0.012	0.0049 [J]	0.0087	0.0059	0.005	0.0046	0.0047	0.0035 [J]	0.004 [J]	<0.0035	<0.0035	0.0037	0.0047	0.0091	0.15	0.045 [J]	0.18 [J]
PFOA + PFOS (Calculated)	0.07	NCL	0.05	0.053	0.034	0.048	0.017	0.008	0.0058	0.0064	0.0029	0.003	0.0072	0.0076	0.012	0.75	0.67	0.77
Perfluoropentanoic acid (PFPeA)	NCL	NCL	0.0061	0.0078	<0.0035	0.006	<0.0036	<0.0042	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0034	<0.0035	0.017	0.016	0.0091
Perfluorotetradecanoic acid (PFTeDA)	NCL	NCL	<0.0035	<0.0036	<0.0035	<0.0036	<0.0036	<0.0042	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0034	<0.0035	<0.0044	<0.0035	<0.0037
Perfluorotridecanoic acid (PFTrDA)	NCL	NCL	<0.0035	<0.0036	<0.0035	<0.0036	<0.0036	<0.0042	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0034	<0.0035	<0.0044	<0.0035	<0.0037
Perfluoroundecanoic acid (PFUnDA)	NCL	NCL	<0.0035	<0.0036	<0.0035	<0.0036	<0.0036	<0.0042	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0034	<0.0035	<0.0044	<0.0035	<0.0037
Total PFAS (Calculated)	NCL	NCL	0.28	0.3	0.099	0.23	0.034	0.015	0.017	0.022	0.019	0.018	0.022	0.021	0.028	1.4	1.4	1.3

TABLE 3
GROUNDWATER ANALYTICAL DATA - PFAS
House Street Disposal Site Study Area
Plainfield Township, Kent County, MI

Sample Location	Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water ²	Part 201 Generic Groundwater Cleanup Criteria – Groundwater Surface Water Interface ²	HS-MW-8	HS-MW-8	HS-MW-8	HS-MW-8	HS-MW-9D	HS-MW-9D	HS-MW-9D	HS-MW-9D	HS-MW-9D	HS-MW-9D	HS-MW-9D	HS-MW-9D	HS-MW-9M	HS-MW-9M	HS-MW-9M	HS-MW-9M
Sample Name			HS-MW-8	HS-GW-MW8	HS-GW-MW8	HS-GW-MW-8	MW-9C	MW-9D	HS-GW-MW-9D	HS-MW-9D	HS-GW-MW9D	HS-GW-MW9D DUP	HS-GW-MW9D	HS-GW-MW-9D	MW-9B	MW-9M	HS-GW-MW-9M	HS-MW-9M
Well Screen Interval (Feet below ground surface)			30-35	30-35	30-35	30-35	204.3-209.3	204.3 - 209.3	204.3 - 209.3	204.3-209.3	204.3-209.3	204.3-209.3	204.3-209.3	204.3-209.3	126.8-131.8	126.8 - 131.8	126.8 - 131.8	126.8-131.8
Laboratory Sample ID			UC23028-003	UE30036-006	UI26001-010	UL05055-031	K1713273-004	TH01022-002	TJ24030-022	UC21029-006	UE24001-014	UE24001-015	UI26001-014	UL12091-004	K1713273-002	TH01022-005	TJ24030-017	UC21029-005
Sample Date			03/21/2019	05/29/2019	09/24/2019	12/06/2019	12/06/2017	07/31/2018	10/25/2018	03/19/2019	05/22/2019	05/22/2019	09/25/2019	12/09/2019	12/06/2017	07/30/2018	10/25/2018	03/19/2019
Parameter (µg/L)																		
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NCL	<0.0036	<0.0035	<0.0039	<0.0038	<0.0041	<0.0035	<0.0036	<0.0035	<0.0036	<0.0036	<0.0034	<0.0038	<0.0043	<0.0035	<0.0034	<0.0036
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NCL	<0.0036	<0.0035	<0.0039	<0.0038	<0.0041	<0.0035	<0.0036	<0.0035	<0.0036	<0.0036	<0.0034	<0.0038	<0.0043	<0.0035	<0.0034	<0.0036
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NCL	<0.0036	<0.0035	<0.0039	<0.0038	<0.0041	<0.0035	<0.0036	<0.0035	<0.0036	<0.0036	<0.0034	<0.0038	<0.0043	<0.0035	<0.0034	<0.0036
N-Ethyl perfluorooctane sulfonamidoethanol (N-EtFOSE)	NCL	NCL	-	-	-	-	<0.0041	-	-	-	-	-	-	-	<0.0043	-	-	-
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NCL	<0.0072	<0.0071	<0.0078	<0.0075	<0.0041	<0.007	<0.0073	<0.007	<0.0072	<0.0071	<0.0068	<0.0076	<0.0043	<0.0069	<0.0069	<0.0071
N-Methyl perfluorooctane sulfonamidoethanol (N-MeFOSE)	NCL	NCL	-	-	-	-	<0.0041	-	-	-	-	-	-	-	<0.0043	-	-	-
Perfluorobutane sulfonic acid (PFBS)	NCL	NCL	0.026	0.028	0.075	0.086	<0.0041	<0.0035	<0.0036	<0.0035	<0.0036	<0.0036	<0.0034	<0.0038	<0.0043	<0.0035	<0.0034	<0.0036
Perfluorodecane sulfonic acid (PFDS)	NCL	NCL	<0.0036	<0.0035	<0.0039	<0.0038	<0.0041	<0.0035	<0.0036	<0.0035	<0.0036	<0.0036	<0.0034	<0.0038	<0.0043	<0.0035	<0.0034	<0.0036
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NCL	0.078	0.033	0.09	0.12	<0.0041	<0.0035	<0.0036	<0.0035	<0.0036	<0.0036	<0.0034	<0.0038	<0.0043	<0.0035	<0.0034	<0.0036
Perfluorononane sulfonic acid (PFNS)	NCL	NCL	<0.0072	<0.0071	<0.0078	<0.0075	-	<0.007	<0.0073	<0.007	<0.0072	<0.0071	<0.0068	<0.0076	-	<0.0069	<0.0069	<0.0071
Perfluorooctane sulfonamide (FOSA)	NCL	NCL	<0.0036	<0.0035	<0.0039	<0.0038	<0.0041	<0.0035	<0.0036	<0.0035	<0.0036	<0.0036	<0.0034	<0.0038	<0.0043	0.0064	<0.0034	<0.0036
Perfluoropentane sulfonic acid (PFPeS)	NCL	NCL	0.044	0.035	0.13	0.11	-	<0.0035	<0.0036	<0.0035	<0.0036	<0.0036	<0.0034	<0.0038	-	<0.0035	<0.0034	<0.0036
Perfluorohexane sulfonic acid (PFHxS)	NCL	NCL	0.15	0.085	0.39	0.32	<0.0041	<0.0035	<0.0036	<0.0035	<0.0036	<0.0036	<0.0034	<0.0038	<0.0043	<0.0035	<0.0034	<0.0036
Perfluorobutanoic acid (PFBA)	NCL	NCL	0.0066	0.0066	0.012	0.017	<0.0081	<0.0035	<0.0036	<0.0035	<0.0036	<0.0036	<0.0034	<0.0038	<0.0086	<0.0035	<0.0034	<0.0036
Perfluorodecanoic acid (PFDA)	NCL	NCL	<0.0036	<0.0035	<0.0039	<0.0038	<0.0041	<0.0035	<0.0036	<0.0035	<0.0036	<0.0036	<0.0034	<0.0038	<0.0043	<0.0035	<0.0034	<0.0036
Perfluorododecanoic acid (PFDoDA)	NCL	NCL	<0.0036	<0.0035	<0.0039	<0.0038	<0.0041	<0.0035	<0.0036	<0.0035	<0.0036	<0.0036	<0.0034	<0.0038	<0.0043	<0.0035	<0.0034	<0.0036
Perfluoroheptanoic acid (PFHpA)	NCL	NCL	0.037	0.044	0.06	0.074	<0.0041	<0.0035	<0.0036	<0.0035	<0.0036	<0.0036	<0.0034	<0.0038	<0.0043	<0.0035	<0.0034	<0.0036
Perfluorohexanoic acid (PFHxA)	NCL	NCL	0.016	0.024	0.028	0.031	0.0064	<0.0035	<0.0036	<0.0035	<0.0036	<0.0036	<0.0034	<0.0038	<0.0043	<0.0035	<0.0034	<0.0036
Perfluorononanoic acid (PFNA)	NCL	NCL	<0.0036	<0.0035	<0.0039	<0.0038	<0.0041	<0.0035	<0.0036	<0.0035	<0.0036	<0.0036	<0.0034	<0.0038	<0.0043	<0.0035	<0.0034	<0.0036
Perfluorooctanoic acid (PFOA)	0.07 (JJ)	12	0.38	0.35	1.3	0.7	<0.0016	<0.0017	<0.0018	<0.0017	<0.0018	<0.0018	<0.0017	<0.0019	<0.0017	<0.0017	<0.0017	<0.0018
Perfluorooctane sulfonic acid (PFOS)	0.07 (JJ)	0.012	0.14	0.051	0.099	0.12	<0.0041	<0.0035	<0.0036	<0.0035	<0.0036	<0.0036	<0.0034	<0.0038	<0.0043	<0.0035	<0.0034	<0.0036
PFOA + PFOS (Calculated)	0.07	NCL	0.52	0.4	1.4	0.82	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Perfluoropentanoic acid (PFPeA)	NCL	NCL	0.0055	0.0067	0.01	0.011	<0.0041	<0.0035	<0.0036	<0.0035	<0.0036	<0.0036	<0.0034	<0.0038	<0.0043	<0.0035	<0.0034	<0.0036
Perfluorotetradecanoic acid (PFTeDA)	NCL	NCL	<0.0036	<0.0035	<0.0039	<0.0038	<0.0041	<0.0035	<0.0036	<0.0035	<0.0036	<0.0036	<0.0034	<0.0038	<0.0043	<0.0035	<0.0034	<0.0036
Perfluorotridecanoic acid (PFTrDA)	NCL	NCL	<0.0036	<0.0035	<0.0039	<0.0038	<0.0041	<0.0035	<0.0036	<0.0035	<0.0036	<0.0036	<0.0034	<0.0038	<0.0043	<0.0035	<0.0034	<0.0036
Perfluoroundecanoic acid (PFUnDA)	NCL	NCL	<0.0036	<0.0035	<0.0039	<0.0038	<0.0041	<0.0035	<0.0036	<0.0035	<0.0036	<0.0036	<0.0034	<0.0038	<0.0043	<0.0035	<0.0034	<0.0036
Total PFAS (Calculated)	NCL	NCL	0.88	0.66	2.2	1.6	0.0064	ND	ND	ND	ND	ND	ND	ND	ND	0.0064	ND	ND

TABLE 3
GROUNDWATER ANALYTICAL DATA - PFAS
House Street Disposal Site Study Area
Plainfield Township, Kent County, MI

Sample Location	Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water ²	Part 201 Generic Groundwater Cleanup Criteria – Groundwater Surface Water Interface ²	HS-MW-9M	HS-MW-9M	HS-MW-9M	HS-MW-9S	HS-MW-9S	HS-MW-9S	HS-MW-9S	HS-MW-9S	HS-MW-9S	HS-MW-9S	HS-MW-9S	HS-MW-9S	HS-MW-9S	HS-MW-10D	HS-MW-10D	HS-MW-10D	HS-MW-10D
Sample Name			HS-GW-MW9M	HS-GW-MW9M	HS-GW-MW-9M	MW-9A	MW-9S	HS-GW-MW-9S	HS-GW-MW-9S	HS-MW-9S	HS-GW-MW9S	HS-GW-MW9S	HS-GW-MW-9S	HS-GW-MW-9S DUP	MW-10C	MW-10D	HS-GW-MW-10D	HS-MW-10D	
Well Screen Interval (Feet below ground surface)			126.8-131.8	126.8-131.8	126.8-131.8	26.2-31.2	26.2 - 31.2	26.2 - 31.2	26.2 - 31.2	26.2-31.2	26.2-31.2	26.2-31.2	26.2-31.2	26.2-31.2	188.2-193.2	188.2 - 193.2	188.2 - 193.2	188.2-193.2	
Laboratory Sample ID			UE24001-013	UI26001-020	UL12091-003	K1713273-001	TH01022-004	TJ24030-016	TK12032-001	UC21029-004	UE24001-012	UI26001-016	UL12091-013	UL12091-014	K1800647-002	TH01022-007	TJ24030-021	UC21029-003	
Sample Date			05/22/2019	09/25/2019	12/09/2019	12/06/2017	07/30/2018	10/24/2018	11/07/2018	03/19/2019	05/22/2019	09/25/2019	12/11/2019	12/11/2019	01/22/2018	08/01/2018	10/25/2018	03/18/2019	
Parameter (µg/L)																			
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NCL	<0.0035	<0.0036	<0.0036	<0.0042	<0.0035	<0.0034	<0.0037	<0.0036	<0.0035	<0.0037	<0.0038	<0.0037	<0.0044	<0.0034	<0.0035	<0.0038	
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NCL	<0.0035	<0.0036	<0.0036	<0.0064	<0.0035	<0.0034	<0.0037 [UJ]	<0.0036	<0.0035	0.0039	<0.0038	<0.0037	<0.0044	<0.0034	<0.0035	<0.0038	
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NCL	<0.0035	<0.0036	<0.0036	<0.0042	<0.0035	<0.0034	<0.0037	<0.0036	<0.0035	<0.0037	<0.0038	<0.0037	<0.0044	<0.0034	<0.0035	<0.0038	
N-Ethyl perfluorooctane sulfonamidoethanol (N-EtFOSE)	NCL	NCL	-	-	-	<0.0042	-	-	-	-	-	-	-	-	<0.0044	-	-	-	
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NCL	<0.0069	<0.0071	<0.0071	<0.0042	<0.007	<0.0069	<0.0073	<0.0073	<0.007	<0.0074	<0.0077	<0.0074	<0.0044	<0.0069	<0.0069	<0.0075	
N-Methyl perfluorooctane sulfonamidoethanol (N-MeFOSE)	NCL	NCL	-	-	-	<0.0042	-	-	-	-	-	-	-	-	<0.0044	-	-	-	
Perfluorobutane sulfonic acid (PFBS)	NCL	NCL	<0.0035	<0.0036	<0.0036	0.005	<0.0035	<0.0034	<0.0037	<0.0036	<0.0035	<0.0037	<0.0038	<0.0037	<0.0044	<0.0034	<0.0035	<0.0038	
Perfluorodecane sulfonic acid (PFDS)	NCL	NCL	<0.0035	<0.0036	<0.0036	<0.0042	<0.0035	<0.0034	<0.0037	<0.0036	<0.0035	<0.0037	<0.0038	<0.0037	<0.0044	<0.0034	<0.0035	<0.0038	
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NCL	<0.0035	<0.0036	<0.0036	<0.0042	<0.0035	<0.0034	<0.0037	<0.0036	<0.0035	<0.0037	<0.0038	<0.0037	<0.0044	<0.0034	<0.0035	<0.0038	
Perfluorononane sulfonic acid (PFNS)	NCL	NCL	<0.0069	<0.0071	<0.0071	-	<0.007	<0.0069	<0.0073	<0.0073	<0.007	<0.0074	<0.0077	<0.0074	-	<0.0069	<0.0069	<0.0075	
Perfluorooctane sulfonamide (FOSA)	NCL	NCL	<0.0035	<0.0036	<0.0036	<0.0042	<0.0035	<0.0034	<0.0037	<0.0036	<0.0035	<0.0037	<0.0038	<0.0037	<0.0044	<0.0034	<0.0035	<0.0038	
Perfluoropentane sulfonic acid (PFPeS)	NCL	NCL	<0.0035	<0.0036	<0.0036	-	<0.0035	<0.0034	<0.0037	<0.0036	<0.0035	<0.0037	<0.0038	<0.0037	-	<0.0034	<0.0035	<0.0038	
Perfluorohexane sulfonic acid (PFHxS)	NCL	NCL	<0.0035	<0.0036	<0.0036	<0.0042	<0.0035	<0.0034	<0.0037	<0.0036	<0.0035	<0.0037	<0.0038	<0.0037	<0.0044	<0.0034	<0.0035	<0.0038	
Perfluorobutanoic acid (PFBA)	NCL	NCL	<0.0035	<0.0036	<0.0036	<0.0083	<0.0035	<0.0034	<0.0037	<0.0036	<0.0035	<0.0037	0.0049	0.0049	<0.0088	<0.0034	<0.0035	<0.0038	
Perfluorodecanoic acid (PFDA)	NCL	NCL	<0.0035	<0.0036	<0.0036	<0.0042	<0.0035	<0.0034	<0.0037	<0.0036	<0.0035	<0.0037	<0.0038	<0.0037	<0.0044	<0.0034	<0.0035	<0.0038	
Perfluorododecanoic acid (PFDoDA)	NCL	NCL	<0.0035	<0.0036	<0.0036	<0.0042	<0.0035	<0.0034	<0.0037	<0.0036	<0.0035	<0.0037	<0.0038	<0.0037	<0.0044	<0.0034	<0.0035	<0.0038	
Perfluoroheptanoic acid (PFHpA)	NCL	NCL	<0.0035	<0.0036	<0.0036	<0.0042	<0.0035	<0.0034	<0.0037	<0.0036	<0.0035	<0.0037	<0.0038	<0.0037	<0.0044	<0.0034	<0.0035	<0.0038	
Perfluorohexanoic acid (PFHxA)	NCL	NCL	<0.0035	<0.0036	<0.0036	<0.0042	<0.0035	<0.0034	<0.0037	<0.0036	<0.0035	<0.0037	<0.0038	<0.0037	<0.0044	<0.0034	<0.0035	<0.0038	
Perfluorononanoic acid (PFNA)	NCL	NCL	<0.0035	<0.0036	<0.0036	<0.0042	<0.0035	<0.0034	<0.0037	<0.0036	<0.0035	<0.0037	<0.0038	<0.0037	<0.0044	<0.0034	<0.0035	<0.0038	
Perfluorooctanoic acid (PFOA)	0.07 (JJ)	12	<0.0017	<0.0018	<0.0018	0.0024	<0.0017	<0.0017	<0.0018	<0.0018	<0.0017	<0.0018	0.0048	0.0049	<0.0018	<0.0017	<0.0017	<0.0019	
Perfluorooctane sulfonic acid (PFOS)	0.07 (JJ)	0.012	<0.0035	<0.0036	<0.0036	<0.0042	<0.0035	0.0055 [J]	<0.0037	<0.0036	0.0049	<0.0037	0.0076	0.0081	<0.0044	<0.0034	<0.0035	<0.0038	
PFOA + PFOS (Calculated)	0.07	NCL	ND	ND	ND	0.0024	ND	0.0055	ND	ND	0.0049	ND	0.012	0.013	ND	ND	ND	ND	
Perfluoropentanoic acid (PFPeA)	NCL	NCL	<0.0035	<0.0036	<0.0036	<0.0042	<0.0035	<0.0034	<0.0037	<0.0036	<0.0035	<0.0037	<0.0038	<0.0037	<0.0044	<0.0034	<0.0035	<0.0038	
Perfluorotetradecanoic acid (PFTeDA)	NCL	NCL	<0.0035	<0.0036	<0.0036	<0.0042	<0.0035	<0.0034	<0.0037	<0.0036	<0.0035	<0.0037	<0.0038	<0.0037	<0.0044	<0.0034	<0.0035	<0.0038	
Perfluorotridecanoic acid (PFTrDA)	NCL	NCL	<0.0035	<0.0036	<0.0036	<0.0042	<0.0035	<0.0034	<0.0037	<0.0036	<0.0035	<0.0037	<0.0038	<0.0037	<0.0044	<0.0034	<0.0035	<0.0038	
Perfluoroundecanoic acid (PFUnDA)	NCL	NCL	<0.0035	<0.0036	<0.0036	<0.0042	<0.0035	<0.0034	<0.0037	<0.0036	<0.0035	<0.0037	<0.0038	<0.0037	<0.0044	<0.0034	<0.0035	<0.0038	
Total PFAS (Calculated)	NCL	NCL	ND	ND	ND	0.0074	ND	0.0055	ND	ND	0.0049	0.0039	0.017	0.018	ND	ND	ND	ND	

TABLE 3
GROUNDWATER ANALYTICAL DATA - PFAS
House Street Disposal Site Study Area
Plainfield Township, Kent County, MI

Sample Location	Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water ²	Part 201 Generic Groundwater Cleanup Criteria – Groundwater Surface Water Interface ²	HS-MW-10D	HS-MW-10D	HS-MW-10D	HS-MW-10M	HS-MW-10M	HS-MW-10M	HS-MW-10M	HS-MW-10M	HS-MW-10M	HS-MW-10M	HS-MW-10M	HS-MW-10S	HS-MW-10S	HS-MW-10S	HS-MW-10S	HS-MW-10S
Sample Name			HS-GW-MW10D	HS-GW-MW10D	HS-GW-MW-10D	MW-10B	MW-10M	HS-GW-MW-10M	HS-MW-10M	HS-GW-MW10M	HS-GW-MW10M	HS-GW-MW10M	HS-GW-MW-10M	MW-10A	MW-10S	HS-GW-MW-10S	HS-MW-10S	HS-GW-MW10S
Well Screen Interval (Feet below ground surface)			188.2-193.2	188.2-193.2	188.2-193.2	126.4-131.4	126.4 - 131.4	126.4 - 131.4	126.4-131.4	126.4-131.4	126.4-131.4	126.4-131.4	126.4-131.4	48.3-58.3	48.3 - 58.3	48.3 - 58.3	48.3-58.3	48.3-58.3
Laboratory Sample ID			UE24001-003	UI26001-015	UL05055-006	K1800647-001	TH01022-008	TJ24030-018	UC21029-002	UE24001-002	UI26001-017	UI26001-018	UL05055-010	K1800647-003	TH01022-003	TJ27021-002	UC21029-001	UE24001-001
Sample Date	05/20/2019	09/25/2019	12/02/2019	01/22/2018	08/01/2018	10/25/2018	03/18/2019	05/20/2019	09/25/2019	09/25/2019	12/03/2019	01/22/2018	07/31/2018	10/26/2018	03/18/2019	05/20/2019		
Parameter (µg/L)																		
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NCL	<0.0035	<0.0036	<0.0035	<0.0042	<0.0039	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0042	<0.0035	<0.0035	<0.0035	<0.0039
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NCL	<0.0035	<0.0036	<0.0035	<0.0042	<0.0039	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0042	<0.0035	<0.0035	<0.0035	<0.0039
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NCL	<0.0035	<0.0036	<0.0035	<0.0042	<0.0039	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0042	<0.0035	<0.0035	<0.0035	<0.0039
N-Ethyl perfluorooctane sulfonamidoethanol (N-EtFOSE)	NCL	NCL	-	-	-	<0.0042	-	-	-	-	-	-	-	<0.0042	-	-	-	-
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NCL	<0.007	<0.0072	<0.007	<0.0042	<0.0077	<0.007	<0.007	<0.007	<0.0072	<0.0071	<0.0071	<0.0042	<0.007	<0.007	<0.007	<0.0078
N-Methyl perfluorooctane sulfonamidoethanol (N-MeFOSE)	NCL	NCL	-	-	-	<0.0042	-	-	-	-	-	-	-	<0.0042	-	-	-	-
Perfluorobutane sulfonic acid (PFBS)	NCL	NCL	<0.0035	<0.0036	<0.0035	0.0084	0.0062	0.01	0.0085	0.0063	0.0075	0.0079	0.0089	<0.0042	0.004	0.0036	<0.0035	0.004
Perfluorodecane sulfonic acid (PFDS)	NCL	NCL	<0.0035	<0.0036	<0.0035	<0.0042	<0.0039	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0042	<0.0035	<0.0035	<0.0035	<0.0039
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NCL	<0.0035	<0.0036	<0.0035	<0.0042	<0.0039	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	0.0085	0.0055	0.0051	0.0047	0.0049
Perfluorononane sulfonic acid (PFNS)	NCL	NCL	<0.007	<0.0072	<0.007	-	<0.0077	<0.007	<0.007	<0.007	<0.0072	<0.0071	<0.0071	-	<0.007	<0.007	<0.007	<0.0078
Perfluorooctane sulfonamide (FOSA)	NCL	NCL	<0.0035	<0.0036	<0.0035	<0.0042	<0.0039	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0042	<0.0035	<0.0035	<0.0035	<0.0039
Perfluoropentane sulfonic acid (PFPeS)	NCL	NCL	<0.0035	<0.0036	<0.0035	-	<0.0039	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	-	<0.0035	<0.0035	<0.0035	<0.0039
Perfluorohexane sulfonic acid (PFHxS)	NCL	NCL	<0.0035	<0.0036	<0.0035	0.0045	0.0052	0.0054	0.0048	0.0036	0.0039	0.0039	0.0039	0.008	0.01	0.0075	0.006	0.0084
Perfluorobutanoic acid (PFBA)	NCL	NCL	<0.0035	<0.0036	<0.0035	<0.0083	<0.0039	0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0083	<0.0035	<0.0035	<0.0035	<0.0039
Perfluorodecanoic acid (PFDA)	NCL	NCL	<0.0035	<0.0036	<0.0035	<0.0042	<0.0039	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0042	<0.0035	<0.0035	<0.0035	<0.0039
Perfluorododecanoic acid (PFDoDA)	NCL	NCL	<0.0035	<0.0036	<0.0035	<0.0042	<0.0039	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0042	<0.0035	<0.0035	<0.0035	<0.0039
Perfluoroheptanoic acid (PFHpA)	NCL	NCL	<0.0035	<0.0036	<0.0035	<0.0042	<0.0039	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0042	<0.0035	<0.0035	<0.0035	<0.0039
Perfluorohexanoic acid (PFHxA)	NCL	NCL	<0.0035	<0.0036	<0.0035	<0.0042	<0.0039	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0042	<0.0035	<0.0035	<0.0035	<0.0039
Perfluorononanoic acid (PFNA)	NCL	NCL	<0.0035	<0.0036	<0.0035	<0.0042	<0.0039	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0042	<0.0035	<0.0035	<0.0035	<0.0039
Perfluorooctanoic acid (PFOA)	0.07 (JJ)	12	<0.0017	<0.0018	<0.0018	0.0093	0.0073	0.0092	0.0084	0.0072	0.0096	0.0094	0.01	0.015	0.014	0.015	0.012	0.015
Perfluorooctane sulfonic acid (PFOS)	0.07 (JJ)	0.012	<0.0035	<0.0036	<0.0035	0.012	0.012	0.014	0.013	0.012	0.012	0.011	0.013	0.037	0.041 [J]	0.041 [J]	0.04	0.036
PFOA + PFOS (Calculated)	0.07	NCL	ND	ND	ND	0.021	0.019	0.023	0.021	0.019	0.022	0.02	0.023	0.052	0.055	0.056	0.052	0.051
Perfluoropentanoic acid (PFPeA)	NCL	NCL	<0.0035	<0.0036	<0.0035	<0.0042	<0.0039	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0042	<0.0035	<0.0035	<0.0035	<0.0039
Perfluorotetradecanoic acid (PFTeDA)	NCL	NCL	<0.0035	<0.0036	<0.0035	<0.0042	<0.0039	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0042	<0.0035	<0.0035	<0.0035	<0.0039
Perfluorotridecanoic acid (PFTrDA)	NCL	NCL	<0.0035	<0.0036	<0.0035	<0.0042	<0.0039	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0042	<0.0035	<0.0035	<0.0035	<0.0039
Perfluoroundecanoic acid (PFUnDA)	NCL	NCL	<0.0035	<0.0036	<0.0035	<0.0042	<0.0039	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0042	<0.0035	<0.0035	<0.0035	<0.0039
Total PFAS (Calculated)	NCL	NCL	ND	ND	ND	0.034	0.031	0.042	0.035	0.029	0.033	0.032	0.036	0.069	0.075	0.072	0.063	0.068

TABLE 3
GROUNDWATER ANALYTICAL DATA - PFAS
House Street Disposal Site Study Area
Plainfield Township, Kent County, MI

Sample Location	Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water ²	Part 201 Generic Groundwater Cleanup Criteria – Groundwater Surface Water Interface ²	HS-MW-10S	HS-MW-10S	HS-MW-11D	HS-MW-11D	HS-MW-11D	HS-MW-11D	HS-MW-11D	HS-MW-11D	HS-MW-11D	HS-MW-11D	HS-MW-11M	HS-MW-11M	HS-MW-11M	HS-MW-11M	HS-MW-11M	HS-MW-11M	HS-MW-11M
Sample Name			HS-GW-MW10S	HS-GW-MW-10S	MW-11C	MW-11D	HS-GW-MW-11D	HS-MW-11D	HS-GW-MW11D	HS-GW-MW11D	HS-GW-MW11D	HS-GW-MW-11D	MW-11B	MW-11M	HS-GW-MW-11M	HS-MW-11M	HS-GW-MW11M	HS-GW-MW11M	HS-GW-MW-11M
Well Screen Interval (Feet below ground surface)			48.3-58.3	48.3-58.3	153.6-158.6	153.6 - 158.6	153.6 - 158.6	153.6-158.6	153.6-158.6	153.6-158.6	153.6-158.6	153.6-158.6	96.4-101.4	96.4 - 101.4	96.4 - 101.4	96.4-101.4	96.4-101.4	96.4-101.4	96.4-101.4
Laboratory Sample ID			UI26001-019	UL05055-001	K1713273-012	TH01022-016	TJ27021-001	UC16019-011	UE24001-016	UI28005-003	UL05055-013	K1713273-015	TH01022-017	TJ27021-003	UC16019-010	UE24001-018	UI28005-002	UL05055-012	
Sample Date			09/25/2019	12/02/2019	12/08/2017	08/02/2018	10/26/2018	03/14/2019	05/22/2019	09/26/2019	12/03/2019	12/08/2017	08/02/2018	10/26/2018	03/14/2019	05/22/2019	09/26/2019	12/03/2019	
Parameter (µg/L)																			
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NCL	<0.0036	<0.0035	<0.0077	<0.0036	<0.0035	<0.0038	<0.0037	<0.0036	<0.0038	<0.0041	<0.0034	<0.0036	<0.0036	<0.0036	<0.0037	<0.0036	<0.0036
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NCL	<0.0036	<0.0035	<0.0081	<0.0036	<0.0035	<0.0038	<0.0037	<0.0036	<0.0038	<0.0041	<0.0034	<0.0036	<0.0036	<0.0036	<0.0037	<0.0036	<0.0036
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NCL	<0.0036	<0.0035	<0.0041	<0.0036	<0.0035	<0.0038	<0.0037	<0.0036	<0.0038	<0.0041	<0.0034	<0.0036	<0.0036	<0.0036	<0.0037	<0.0036	<0.0036
N-Ethyl perfluorooctane sulfonamidoethanol (N-EtFOSE)	NCL	NCL	-	-	<0.0041	-	-	-	-	-	-	<0.0041	-	-	-	-	-	-	-
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NCL	<0.0072	<0.0071	<0.0041	<0.0071	<0.007	<0.0076	<0.0075	<0.0073	<0.0075	<0.0041	<0.0069	<0.0072	<0.0072	<0.0072	<0.0074	<0.0073	<0.0073
N-Methyl perfluorooctane sulfonamidoethanol (N-MeFOSE)	NCL	NCL	-	-	<0.0041	-	-	-	-	-	-	<0.0041	-	-	-	-	-	-	-
Perfluorobutane sulfonic acid (PFBS)	NCL	NCL	<0.0036	0.0037	<0.0041	<0.0036	<0.0035	<0.0038	<0.0037	<0.0036	<0.0038	<0.0041	<0.0034	0.0061	0.014	0.013	0.046	0.05	
Perfluorodecane sulfonic acid (PFDS)	NCL	NCL	<0.0036	<0.0035	<0.0041	<0.0036	<0.0035	<0.0038	<0.0037	<0.0036	<0.0038	<0.0041	<0.0034	<0.0036	<0.0036	<0.0036	<0.0037	<0.0036	<0.0036
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NCL	<0.0036	0.0037	<0.0041	<0.0036	<0.0035	<0.0038	<0.0037	<0.0036	<0.0038	<0.0041	<0.0034	<0.0036	<0.0036	<0.0036	<0.0037	<0.0036	<0.0036
Perfluorononane sulfonic acid (PFNS)	NCL	NCL	<0.0072	<0.0071	-	<0.0071	<0.007	<0.0076	<0.0075	<0.0073	<0.0075	-	<0.0069	<0.0072	<0.0072	<0.0072	<0.0074	<0.0073	<0.0073
Perfluorooctane sulfonamide (FOSA)	NCL	NCL	<0.0036	<0.0035	<0.0041	0.014	<0.0035	<0.0038	<0.0037	<0.0036	<0.0038	<0.0041	<0.0034	<0.0036	<0.0036	<0.0036	<0.0037	<0.0036	<0.0036
Perfluoropentane sulfonic acid (PFPeS)	NCL	NCL	<0.0036	<0.0035	-	<0.0036	<0.0035	<0.0038	<0.0037	<0.0036	<0.0038	-	<0.0034	<0.0036	<0.0036	<0.0036	<0.0037	0.016	
Perfluorohexane sulfonic acid (PFHxS)	NCL	NCL	0.014	0.013	<0.0041	<0.0036	<0.0035	<0.0038	<0.0037	<0.0036	<0.0038	<0.0041	<0.0034	<0.0036	<0.0036	<0.0036	<0.0037	0.0045	
Perfluorobutanoic acid (PFBA)	NCL	NCL	<0.0036	<0.0035	<0.0081	<0.0036	<0.0035	<0.0038	<0.0037	<0.0036	<0.0038	<0.0081	<0.0034	<0.0036	<0.0036	<0.0036	<0.0037	<0.0036	<0.0036
Perfluorodecanoic acid (PFDA)	NCL	NCL	<0.0036	<0.0035	<0.0041	<0.0036	<0.0035	<0.0038	<0.0037	<0.0036	<0.0038	<0.0041	<0.0034	<0.0036	<0.0036	<0.0036	<0.0037	<0.0036	<0.0036
Perfluorododecanoic acid (PFDoDA)	NCL	NCL	<0.0036	<0.0035	<0.0041	<0.0036	<0.0035	<0.0038	<0.0037	<0.0036	<0.0038	<0.0041	<0.0034	<0.0036	<0.0036	<0.0036	<0.0037	<0.0036	<0.0036
Perfluoroheptanoic acid (PFHpA)	NCL	NCL	<0.0036	<0.0035	<0.0041	<0.0036	<0.0035	<0.0038	<0.0037	<0.0036	<0.0038	<0.0041	<0.0034	<0.0036	<0.0036	<0.0036	<0.0037	<0.0036	<0.0036
Perfluorohexanoic acid (PFHxA)	NCL	NCL	<0.0036	<0.0035	<0.0041	<0.0036	<0.0035	<0.0038	<0.0037	<0.0036	<0.0038	<0.0041	<0.0034	<0.0036	<0.0036	<0.0036	<0.0037	<0.0036	<0.0036
Perfluorononanoic acid (PFNA)	NCL	NCL	<0.0036	<0.0035	<0.0041	<0.0036	<0.0035	<0.0038	<0.0037	<0.0036	<0.0038	<0.0041	<0.0034	<0.0036	<0.0036	<0.0036	<0.0037	<0.0036	<0.0036
Perfluorooctanoic acid (PFOA)	0.07 (JJ)	12	0.018	0.021	<0.0016	<0.0018	<0.0018	<0.0019	<0.0019	<0.0018	<0.0019	<0.0016	<0.0017	<0.0018	<0.0018	<0.0018	<0.0018	<0.0018	<0.0018
Perfluorooctane sulfonic acid (PFOS)	0.07 (JJ)	0.012	0.024	0.024	<0.0041	<0.0036	<0.0035	<0.0038	<0.0037	<0.0036	<0.0038	<0.0041	<0.0034	<0.0036	<0.0036	<0.0036	<0.0037	<0.0036	<0.0036
PFOA + PFOS (Calculated)	0.07	NCL	0.042	0.045	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Perfluoropentanoic acid (PFPeA)	NCL	NCL	<0.0036	<0.0035	<0.0041	<0.0036	<0.0035	<0.0038	<0.0037	<0.0036	<0.0038	<0.0041	<0.0034	<0.0036	<0.0036	<0.0036	<0.0037	<0.0036	<0.0036
Perfluorotetradecanoic acid (PFTeDA)	NCL	NCL	<0.0036	<0.0035	<0.0041	<0.0036	<0.0035	<0.0038	<0.0037	<0.0036	<0.0038	<0.0041	<0.0034	<0.0036	<0.0036	<0.0036	<0.0037	<0.0036	<0.0036
Perfluorotridecanoic acid (PFTrDA)	NCL	NCL	<0.0036	<0.0035	<0.0041	<0.0036	<0.0035	<0.0038	<0.0037	<0.0036	<0.0038	<0.0041	<0.0034	<0.0036	<0.0036	<0.0036	<0.0037	<0.0036	<0.0036
Perfluoroundecanoic acid (PFUnDA)	NCL	NCL	<0.0036	<0.0035	<0.0041	<0.0036	<0.0035	<0.0038	<0.0037	<0.0036	<0.0038	<0.0041	<0.0034	<0.0036	<0.0036	<0.0036	<0.0037	<0.0036	<0.0036
Total PFAS (Calculated)	NCL	NCL	0.056	0.065	ND	0.014	ND	ND	ND	ND	ND	ND	ND	0.0061	0.014	0.013	0.046	0.071	

TABLE 3
GROUNDWATER ANALYTICAL DATA - PFAS
House Street Disposal Site Study Area
Plainfield Township, Kent County, MI

Sample Location	Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water ²	Part 201 Generic Groundwater Cleanup Criteria – Groundwater Surface Water Interface ²	HS-MW-11S	HS-MW-11S	HS-MW-11S	HS-MW-11S	HS-MW-11S	HS-MW-11S	HS-MW-11S	HS-MW-11S	HS-PMW-12	HS-PMW-12	HS-PMW-12	HS-PMW-12	HS-PMW-12	HS-PMW-12	HS-PMW-12	HS-PMW-12	HS-PMW-12
Sample Name			MW-11A	MW-11S	HS-GW-MW-11S	HS-MW-11S	HS-GW-MW11S	HS-GW-MW11S	HS-GW-MW-11S	HS-MW-12 (15-20)	HS-MW-12 (25-30)	HS-MW-12 (35-40)	HS-MW-12 (49-54)	HS-MW-12 (75-80)	HS-MW-12 (85-90)	HS-MW-12 (95-100)	HS-MW-12 (105-110)	HS-MW-12 (115-120)	
Well Screen Interval (Feet below ground surface)			21.2-31.2	21.2 - 31.2	21.2 - 31.2	21.2-31.2	21.2-31.2	21.2-31.2	21.2-31.2	15-20	25-30	35-40	49-54	75-80	85-90	95-100	105-110	115-120	
Laboratory Sample ID			K1713273-011	TH01022-018	TJ27021-005	UC16019-009	UE24001-017	UI28005-001	UL05055-014	UI05015-001	UI05015-002	UI05015-003	UI12066-001	UI12066-002	UI12066-003	UI12066-004	UI12066-005	UI12066-006	
Sample Date			12/08/2017	08/02/2018	10/26/2018	03/14/2019	05/22/2019	09/26/2019	12/03/2019	09/04/2019	09/04/2019	09/04/2019	09/06/2019	09/10/2019	09/10/2019	09/11/2019	09/11/2019	09/11/2019	
Parameter (µg/L)																			
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NCL	<0.0043	<0.0037	<0.0035	<0.0036	<0.0038	<0.0038	<0.0036	<0.0036	<0.0039	<0.0037	<0.0038	<0.0038	<0.0035	<0.0037	<0.0036	<0.0039	
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NCL	<0.0043	<0.0037	<0.0035	<0.0036	<0.0038	<0.0038	<0.0036	<0.0036	<0.0039	<0.0037	<0.0038	<0.0038	<0.0035	<0.0037	<0.0036	<0.0039	
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NCL	<0.0043	<0.0037	<0.0035	<0.0036	<0.0038	<0.0038	<0.0036	<0.0036	<0.0039	<0.0037	<0.0038	<0.0038	<0.0035	<0.0037	<0.0036	<0.0039	
N-Ethyl perfluorooctane sulfonamidoethanol (N-EtFOSE)	NCL	NCL	<0.0043	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NCL	<0.0043	<0.0074	<0.007	<0.0072	<0.0075	<0.0077	<0.0071	<0.0071	<0.0078	<0.0075	<0.0075	<0.0076	<0.007	<0.0074	<0.0072	<0.0078	
N-Methyl perfluorooctane sulfonamidoethanol (N-MeFOSE)	NCL	NCL	<0.0043	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Perfluorobutane sulfonic acid (PFBS)	NCL	NCL	<0.0043	<0.0037	<0.0035	<0.0036	<0.0038	<0.0038	<0.0036	0.034	<0.0039	<0.0037	<0.0038	<0.0038	0.0083	0.054	0.035	0.06	
Perfluorodecane sulfonic acid (PFDS)	NCL	NCL	<0.0043	<0.0037	<0.0035	<0.0036	<0.0038	<0.0038	<0.0036	<0.0036	<0.0039	<0.0037	<0.0038	<0.0038	<0.0035	<0.0037	<0.0036	<0.0039	
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NCL	<0.0043	<0.0037	<0.0035	<0.0036	<0.0038	<0.0038	<0.0036	<0.0036	<0.0039	<0.0037	<0.0038	<0.0038	<0.0035	<0.0037	<0.0036	<0.0039	
Perfluorononane sulfonic acid (PFNS)	NCL	NCL	-	<0.0074	<0.007	<0.0072	<0.0075	<0.0077	<0.0071	<0.0071	<0.0078	<0.0075	<0.0075	<0.0076	<0.007	<0.0074	<0.0072	<0.0078	
Perfluorooctane sulfonamide (FOSA)	NCL	NCL	<0.0043	<0.0037	<0.0035	<0.0036	<0.0038	<0.0038	<0.0036	<0.0036	<0.0039	<0.0037	<0.0038	<0.0038	<0.0035	<0.0037	<0.0036	<0.0039	
Perfluoropentane sulfonic acid (PFPeS)	NCL	NCL	-	<0.0037	<0.0035	<0.0036	<0.0038	<0.0038	<0.0036	0.029	<0.0039	<0.0037	<0.0038	<0.0038	0.0065	0.052	0.022	0.055	
Perfluorohexane sulfonic acid (PFHxS)	NCL	NCL	<0.0043	<0.0037	<0.0035	<0.0036	<0.0038	<0.0038	<0.0036	0.038	0.0067	0.0052	0.0038	<0.0038	0.0062	0.069	0.015	0.064	
Perfluorobutanoic acid (PFBA)	NCL	NCL	<0.0086	<0.0037	<0.0035	<0.0036	<0.0038	<0.0038	<0.0036	0.0071	<0.0039	<0.0037	<0.0038	<0.0038	<0.0035	0.013	0.012	0.018	
Perfluorodecanoic acid (PFDA)	NCL	NCL	<0.0043	<0.0037	<0.0035	<0.0036	<0.0038	<0.0038	<0.0036	<0.0036	<0.0039	<0.0037	<0.0038	<0.0038	<0.0035	<0.0037	<0.0036	<0.0039	
Perfluorododecanoic acid (PFDoDA)	NCL	NCL	<0.0043	<0.0037	<0.0035	<0.0036	<0.0038	<0.0038	<0.0036	<0.0036	<0.0039	<0.0037	<0.0038	<0.0038	<0.0035	<0.0037	<0.0036	<0.0039	
Perfluoroheptanoic acid (PFHpA)	NCL	NCL	<0.0043	<0.0037	<0.0035	<0.0036	<0.0038	<0.0038	<0.0036	0.012	<0.0039	<0.0037	<0.0038	<0.0038	0.0035	0.027	0.018	0.035	
Perfluorohexanoic acid (PFHxA)	NCL	NCL	<0.0043	<0.0037	<0.0035	<0.0036	<0.0038	<0.0038	<0.0036	0.013	<0.0039	<0.0037	<0.0038	<0.0038	0.0044	0.028	0.02	0.034	
Perfluorononanoic acid (PFNA)	NCL	NCL	<0.0043	<0.0037	<0.0035	<0.0036	<0.0038	<0.0038	<0.0036	<0.0036	<0.0039	<0.0037	<0.0038	<0.0038	<0.0035	<0.0037	<0.0036	<0.0039	
Perfluorooctanoic acid (PFOA)	0.07 (JJ)	12	<0.0017	<0.0019	0.0018	0.0024	0.0028	<0.0019	0.0041	0.026	0.0065	<0.0019	<0.0019	<0.0019	0.0093	0.086	0.033	0.1	
Perfluorooctane sulfonic acid (PFOS)	0.07 (JJ)	0.012	<0.0043	<0.0037	<0.0035	<0.0036	<0.0038	<0.0038	<0.0036	<0.0036	<0.0039	<0.0037	<0.0038	<0.0038	<0.0035	0.0046	<0.0036	<0.0039	
PFOA + PFOS (Calculated)	0.07	NCL	ND	ND	0.0018	0.0024	0.0028	ND	0.0041	0.026	0.0065	ND	ND	ND	0.0093	0.091	0.033	0.1	
Perfluoropentanoic acid (PFPeA)	NCL	NCL	<0.0043	<0.0037	<0.0035	<0.0036	<0.0038	<0.0038	<0.0036	0.0064	<0.0039	<0.0037	<0.0038	<0.0038	<0.0035	0.012	0.011	0.017	
Perfluorotetradecanoic acid (PFTeDA)	NCL	NCL	<0.0043	<0.0037	<0.0035	<0.0036	<0.0038	<0.0038	<0.0036	<0.0036	<0.0039	<0.0037	<0.0038	<0.0038	<0.0035	<0.0037	<0.0036	<0.0039	
Perfluorotridecanoic acid (PFTrDA)	NCL	NCL	<0.0043	<0.0037	<0.0035	<0.0036	<0.0038	<0.0038	<0.0036	<0.0036	<0.0039	<0.0037	<0.0038	<0.0038	<0.0035	<0.0037	<0.0036	<0.0039	
Perfluoroundecanoic acid (PFUnDA)	NCL	NCL	<0.0043	<0.0037	<0.0035	<0.0036	<0.0038	<0.0038	<0.0036	<0.0036	<0.0039	<0.0037	<0.0038	<0.0038	<0.0035	<0.0037	<0.0036	<0.0039	
Total PFAS (Calculated)	NCL	NCL	ND	ND	0.0018	0.0024	0.0028	ND	0.0041	0.17	0.013	0.0052	0.0038	ND	0.038	0.35	0.17	0.38	

TABLE 3
GROUNDWATER ANALYTICAL DATA - PFAS
House Street Disposal Site Study Area
Plainfield Township, Kent County, MI

Sample Location	Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water ²	Part 201 Generic Groundwater Cleanup Criteria – Groundwater Surface Water Interface ²	HS-PMW-12	HS-PMW-12	HS-PMW-12	HS-PMW-12	HS-PMW-12	HS-PMW-12	HS-PMW-12	HS-MW-12A	HS-MW-12B	HS-MW-12C	HS-MW-12D	HS-MW-12E	HS-PMW-13	HS-PMW-13	HS-PMW-13	HS-PMW-13
Sample Name			HS-MW-12 (125-130)	HS-MW-12 (135-140)	HS-MW-12 (145-150)	HS-MW-12 (155-160)	HS-MW-12 (165-170)	HS-MW-12 (175-180)	HS-MW-12 (185-190)	HS-GW-MW-12A	HS-GW-MW-12B	HS-GW-MW-12C	HS-GW-MW-12D	HS-GW-MW-12E	HS-13 59-64	HS-13 69-74	HS-13 79-84	HS-13 89-94
Well Screen Interval (Feet below ground surface)			125-130	135-140	145-150	155-160	165-170	175-180	185-190	15.4-20.4	51.5-56.5	127.7-132.7	158.7-163.7	187.5-192.5	59-64	69-74	79-84	89-94
Laboratory Sample ID			UI12066-007	UI18051-001	UI18051-002	UI18051-003	UI18051-004	UI18051-005	UI18051-006	UK29008-021	UK29008-012	UK29008-011	UK29008-010	UK29008-013	UL12092-001	UL12092-002	UL12092-003	UL12092-004
Sample Date			09/11/2019	09/12/2019	09/12/2019	09/12/2019	09/13/2019	09/13/2019	09/16/2019	11/27/2019	11/25/2019	11/25/2019	11/25/2019	11/25/2019	12/09/2019	12/10/2019	12/10/2019	12/10/2019
Parameter (µg/L)																		
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NCL	<0.0034	<0.0039	<0.0036	<0.0037	<0.0037	<0.0037	<0.0035	<0.0036	<0.0037	<0.0038	<0.0034	<0.0035	<0.0034	<0.0034	<0.0034	<0.0034
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NCL	<0.0034	<0.0039	<0.0036	<0.0037	<0.0037	<0.0037	<0.0035	<0.0036	<0.0037	<0.0038	<0.0034	<0.0035	<0.0034	<0.0034	<0.0034	<0.0034
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NCL	<0.0034	<0.0039	<0.0036	<0.0037	<0.0037	<0.0037	<0.0035	<0.0036	<0.0037	<0.0038	<0.0034	<0.0035	<0.0034	<0.0034	<0.0034	<0.0034
N-Ethyl perfluorooctane sulfonamidoethanol (N-EtFOSE)	NCL	NCL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NCL	<0.0068	<0.0079	<0.0072	<0.0074	<0.0074	<0.0074	<0.0069	<0.0072	<0.0073	<0.0076	<0.0068	<0.007	<0.0068	<0.0068	<0.0068	<0.0068
N-Methyl perfluorooctane sulfonamidoethanol (N-MeFOSE)	NCL	NCL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perfluorobutane sulfonic acid (PFBS)	NCL	NCL	0.095	0.079	0.11	0.17	0.13	0.061	<0.0035	<0.0036	<0.0037	0.13	0.14	<0.0035	0.0044	0.0044	0.0054	0.0051
Perfluorodecane sulfonic acid (PFDS)	NCL	NCL	<0.0034	<0.0039	<0.0036	<0.0037	<0.0037	<0.0037	<0.0035	<0.0036	<0.0037	<0.0038	<0.0034	<0.0035	<0.0034	<0.0034	<0.0034	<0.0034
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NCL	<0.0034	<0.0039	<0.0036	<0.0037	<0.0037	<0.0037	<0.0035	<0.0036	<0.0037	<0.0038	<0.0034	<0.0035	<0.0034	<0.0034	<0.0034	<0.0034
Perfluorononane sulfonic acid (PFNS)	NCL	NCL	<0.0068	<0.0079	<0.0072	<0.0074	<0.0074	<0.0074	<0.0069	<0.0072	<0.0073	<0.0076	<0.0068	<0.007	<0.0068	<0.0068	<0.0068	<0.0068
Perfluorooctane sulfonamide (FOSA)	NCL	NCL	<0.0034	<0.0039	<0.0036	<0.0037	<0.0037	<0.0037	<0.0035	<0.0036	<0.0037	<0.0038	<0.0034	<0.0035	<0.0034	<0.0034	<0.0034	<0.0034
Perfluoropentane sulfonic acid (PFPeS)	NCL	NCL	0.09	0.085	0.11	0.13	0.11	0.037	<0.0035	<0.0036	<0.0037	0.13	0.12	<0.0035	<0.0034	<0.0034	<0.0034	<0.0034
Perfluorohexane sulfonic acid (PFHxS)	NCL	NCL	0.09	0.082	0.1	0.06	0.06	0.013	<0.0035	<0.0036	0.0054	0.12	0.091	<0.0035	<0.0034	<0.0034	0.011	0.0079
Perfluorobutanoic acid (PFBA)	NCL	NCL	0.029	0.021	0.026	0.054	0.037	0.023	<0.0035	<0.0036	<0.0037	0.036	0.037	<0.0035	<0.0034	<0.0034	<0.0034	<0.0034
Perfluorodecanoic acid (PFDA)	NCL	NCL	<0.0034	<0.0039	<0.0036	<0.0037	<0.0037	<0.0037	<0.0035	<0.0036	<0.0037	<0.0038	<0.0034	<0.0035	<0.0034	<0.0034	<0.0034	<0.0034
Perfluorododecanoic acid (PFDoDA)	NCL	NCL	<0.0034	<0.0039	<0.0036	<0.0037	<0.0037	<0.0037	<0.0035	<0.0036	<0.0037	<0.0038	<0.0034	<0.0035	<0.0034	<0.0034	<0.0034	<0.0034
Perfluoroheptanoic acid (PFHpA)	NCL	NCL	0.056	0.045	0.057	0.078	0.065	0.025	<0.0035	<0.0036	<0.0037	0.07	0.072	<0.0035	<0.0034	<0.0034	<0.0034	<0.0034
Perfluorohexanoic acid (PFHxA)	NCL	NCL	0.056	0.045	0.061	0.1	0.074	0.037	<0.0035	<0.0036	<0.0037	0.076	0.09	<0.0035	<0.0034	<0.0034	<0.0034	<0.0034
Perfluorononanoic acid (PFNA)	NCL	NCL	<0.0034	<0.0039	<0.0036	<0.0037	<0.0037	<0.0037	<0.0035	<0.0036	<0.0037	<0.0038	<0.0034	<0.0035	<0.0034	<0.0034	<0.0034	<0.0034
Perfluorooctanoic acid (PFOA)	0.07 (JJ)	12	0.15	0.13	0.15	0.14	0.13	0.037	<0.0017	0.0089	0.0023	0.19	0.17	<0.0017	<0.0017	<0.0017	0.0018	0.0035
Perfluorooctane sulfonic acid (PFOS)	0.07 (JJ)	0.012	<0.0034	<0.0039	<0.0036	<0.0037	<0.0037	<0.0037	<0.0035	0.0063	<0.0037	<0.0038	<0.0034	<0.0035	<0.0034	<0.0034	<0.0034	<0.0034
PFOA + PFOS (Calculated)	0.07	NCL	0.15	0.13	0.15	0.14	0.13	0.037	ND	0.015	0.0023	0.19	0.17	ND	ND	ND	0.0018	0.0035
Perfluoropentanoic acid (PFPeA)	NCL	NCL	0.028	0.023	0.029	0.059	0.036	0.023	<0.0035	0.0039	<0.0037	0.039	0.038	<0.0035	<0.0034	<0.0034	<0.0034	<0.0034
Perfluorotetradecanoic acid (PFTeDA)	NCL	NCL	<0.0034	<0.0039	<0.0036	<0.0037	<0.0037	<0.0037	<0.0035	<0.0036	<0.0037	<0.0038	<0.0034	<0.0035	<0.0034	<0.0034	<0.0034	<0.0034
Perfluorotridecanoic acid (PFTrDA)	NCL	NCL	<0.0034	<0.0039	<0.0036	<0.0037	<0.0037	<0.0037	<0.0035	<0.0036	<0.0037	<0.0038	<0.0034	<0.0035	<0.0034	<0.0034	<0.0034	<0.0034
Perfluoroundecanoic acid (PFUnDA)	NCL	NCL	<0.0034	<0.0039	<0.0036	<0.0037	<0.0037	<0.0037	<0.0035	<0.0036	<0.0037	<0.0038	<0.0034	<0.0035	<0.0034	<0.0034	<0.0034	<0.0034
Total PFAS (Calculated)	NCL	NCL	0.59	0.51	0.64	0.79	0.64	0.26	ND	0.019	0.0077	0.79	0.76	ND	0.0044	0.0044	0.018	0.017

TABLE 3
GROUNDWATER ANALYTICAL DATA - PFAS
House Street Disposal Site Study Area
Plainfield Township, Kent County, MI

Sample Location	Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water ²	Part 201 Generic Groundwater Cleanup Criteria – Groundwater Surface Water Interface ²	HS-PMW-13	HS-PMW-13	HS-PMW-13	HS-PMW-13	HS-PMW-13	HS-PMW-13	HS-PMW-13	HS-PMW-13	HS-PMW-13	HS-PMW-13	HS-PMW-13	HS-PMW-14	HS-PMW-14	HS-PMW-14	HS-PMW-14	HS-PMW-14	HS-PMW-14
Sample Name			HS-13 99-104	HS-13 109-114	HS-13 119-124	HS-13 129-134	HS-13-139-144	HS-13-149-154	HS-13-159-164	HS-13-169-174	HS-13-179-184	HS-13 189-194	PMW-14 18-23	PMW-14 38-43	PMW-14 48-53	PMW-14 63-68	PMW-14 73-78	PMW-14 83-88	
Well Screen Interval (Feet below ground surface)			99-104	109-114	119-124	129-134	139-144	149-154	159-164	169-174	179-184	189-194	18-23	38-43	48-53	63-68	73-78	83-88	
Laboratory Sample ID			UL12092-005	UL12092-006	UL12092-007	UL12092-008	UL17018-001	UL17018-002	UL17018-003	UL17018-004	UL17018-005	UL19173-001	K1802201-001	K1802201-002	K1802201-003	K1802247-001	K1802247-002	K1802247-005	
Sample Date			12/10/2019	12/11/2019	12/11/2019	12/11/2019	12/12/2019	12/12/2019	12/12/2019	12/12/2019	12/13/2019	12/13/2019	12/16/2019	03/08/2018	03/08/2018	03/08/2018	03/09/2018	03/09/2018	03/09/2018
Parameter (µg/L)																			
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NCL	<0.0034	<0.0036	<0.0036	<0.0037	<0.0035	<0.0034	<0.0037	<0.0037	<0.0036	<0.0038	<0.0048	<0.005	<0.0048	<0.0048	<0.005	<0.0048	
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NCL	<0.0034	<0.0036	<0.0036	<0.0037	<0.0035	<0.0034	<0.0037	<0.0037	<0.0036	<0.0038	<0.0048	<0.005	<0.0048	<0.0048	<0.005	<0.0048	
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NCL	<0.0034	<0.0036	<0.0036	<0.0037	<0.0035	<0.0034	<0.0037	<0.0037	<0.0036	<0.0038	<0.0048	<0.005	<0.0048	<0.0048	<0.005	<0.0048	
N-Ethyl perfluorooctane sulfonamidoethanol (N-EtFOSE)	NCL	NCL	-	-	-	-	-	-	-	-	-	-	<0.0048	<0.005	<0.0048	<0.0048	<0.005	<0.0048	
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NCL	<0.0068	<0.0072	<0.0072	<0.0074	<0.0071	<0.0069	<0.0074	<0.0074	<0.0073	<0.0076	<0.0048	<0.005	<0.0048	<0.0048	<0.005	<0.0048	
N-Methyl perfluorooctane sulfonamidoethanol (N-MeFOSE)	NCL	NCL	-	-	-	-	-	-	-	-	-	-	<0.0048	<0.005	<0.0048	<0.0048	<0.005	<0.0048	
Perfluorobutane sulfonic acid (PFBS)	NCL	NCL	<0.0034	<0.0036	<0.0036	<0.0037	<0.0035	0.0035	<0.0037	<0.0037	<0.0036	<0.0038	<0.0048	<0.005	<0.0048	<0.0048	<0.005	<0.0048	
Perfluorodecane sulfonic acid (PFDS)	NCL	NCL	<0.0034	<0.0036	<0.0036	<0.0037	<0.0035	<0.0034	<0.0037	<0.0037	<0.0036	<0.0038	<0.0048	<0.005	<0.0048	<0.0048	<0.005	<0.0048	
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NCL	<0.0034	<0.0036	<0.0036	<0.0037	<0.0035	<0.0034	<0.0037	<0.0037	<0.0036	<0.0038	<0.0048	<0.005	<0.0048	<0.0048	<0.005	<0.0048	
Perfluorononane sulfonic acid (PFNS)	NCL	NCL	<0.0068	<0.0072	<0.0072	<0.0074	<0.0071	<0.0069	<0.0074	<0.0074	<0.0073	<0.0076	-	-	-	-	-	-	
Perfluorooctane sulfonamide (FOSA)	NCL	NCL	<0.0034	<0.0036	<0.0036	<0.0037	<0.0035	<0.0034	<0.0037	<0.0037	<0.0036	<0.0038	<0.0048	<0.005	<0.0048	<0.0048	<0.005	<0.0048	
Perfluoropentane sulfonic acid (PFPeS)	NCL	NCL	<0.0034	<0.0036	<0.0036	<0.0037	<0.0035	<0.0034	<0.0037	<0.0037	<0.0036	<0.0038	-	-	-	-	-	-	
Perfluorohexane sulfonic acid (PFHxS)	NCL	NCL	<0.0034	<0.0036	<0.0036	<0.0037	<0.0035	<0.0034	<0.0037	<0.0037	<0.0036	<0.0038	<0.0048	<0.005	<0.0048	<0.0048	<0.005	<0.0048	
Perfluorobutanoic acid (PFBA)	NCL	NCL	<0.0034	<0.0036	<0.0036	<0.0037	<0.0035	<0.0034	<0.0037	<0.0037	<0.0036	<0.0038	<0.0096	<0.01	<0.0096	<0.0096	<0.01	<0.0096	
Perfluorodecanoic acid (PFDA)	NCL	NCL	<0.0034	<0.0036	<0.0036	<0.0037	<0.0035	<0.0034	<0.0037	<0.0037	<0.0036	<0.0038	<0.0048	<0.005	<0.0048	<0.0048	<0.005	<0.0048	
Perfluorododecanoic acid (PFDoDA)	NCL	NCL	<0.0034	<0.0036	<0.0036	<0.0037	<0.0035	<0.0034	<0.0037	<0.0037	<0.0036	<0.0038	<0.0048	<0.005	<0.0048	<0.0048	<0.005	<0.0048	
Perfluoroheptanoic acid (PFHpA)	NCL	NCL	<0.0034	<0.0036	<0.0036	<0.0037	<0.0035	<0.0034	<0.0037	<0.0037	<0.0036	<0.0038	<0.0048	<0.005	<0.0048	<0.0048	<0.005	<0.0048	
Perfluorohexanoic acid (PFHxA)	NCL	NCL	<0.0034	<0.0036	<0.0036	0.0037	<0.0035	<0.0034	<0.0037	<0.0037	<0.0036	<0.0038	<0.0048	<0.005	<0.0048	<0.0048	<0.005	<0.0048	
Perfluorononanoic acid (PFNA)	NCL	NCL	<0.0034	<0.0036	<0.0036	<0.0037	<0.0035	<0.0034	<0.0037	<0.0037	<0.0036	<0.0038	<0.0048	<0.005	<0.0048	<0.0048	<0.005	<0.0048	
Perfluorooctanoic acid (PFOA)	0.07 (JJ)	12	0.0038	0.0029	0.003	0.0033	0.0031	0.0034	0.0035	0.0023	<0.0018	<0.0019	0.002	<0.002	<0.0019	<0.0019	<0.002	<0.0019	
Perfluorooctane sulfonic acid (PFOS)	0.07 (JJ)	0.012	<0.0034	<0.0036	<0.0036	<0.0037	<0.0035	<0.0034	<0.0037	<0.0037	<0.0036	<0.0038	<0.0048	<0.005	<0.0048	<0.0048	<0.005	<0.0048	
PFOA + PFOS (Calculated)	0.07	NCL	0.0038	0.0029	0.003	0.0033	0.0031	0.0034	0.0035	0.0023	ND	ND	0.002	ND	ND	ND	ND	ND	
Perfluoropentanoic acid (PFPeA)	NCL	NCL	<0.0034	<0.0036	<0.0036	<0.0037	<0.0035	<0.0034	<0.0037	<0.0037	<0.0036	<0.0038	<0.0048	<0.005	<0.0048	<0.0048	<0.005	<0.0048	
Perfluorotetradecanoic acid (PFTeDA)	NCL	NCL	<0.0034	<0.0036	<0.0036	<0.0037	<0.0035	<0.0034	<0.0037	<0.0037	<0.0036	<0.0038	<0.0048	<0.005	<0.0048	<0.0048	<0.005	<0.0048	
Perfluorotridecanoic acid (PFTrDA)	NCL	NCL	<0.0034	<0.0036	<0.0036	<0.0037	<0.0035	<0.0034	<0.0037	<0.0037	<0.0036	<0.0038	<0.0048	<0.005	<0.0048	<0.0048	<0.005	<0.0048	
Perfluoroundecanoic acid (PFUnDA)	NCL	NCL	<0.0034	<0.0036	<0.0036	<0.0037	<0.0035	<0.0034	<0.0037	<0.0037	<0.0036	<0.0038	<0.0048	<0.005	<0.0048	<0.0048	<0.005	<0.0048	
Total PFAS (Calculated)	NCL	NCL	0.0038	0.0029	0.003	0.007	0.0031	0.0069	0.0035	0.0023	ND	ND	0.002	ND	ND	ND	ND	ND	

TABLE 3
GROUNDWATER ANALYTICAL DATA - PFAS
House Street Disposal Site Study Area
Plainfield Township, Kent County, MI

Sample Location	Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water ²	Part 201 Generic Groundwater Cleanup Criteria – Groundwater Surface Water Interface ²	HS-PMW-14	HS-PMW-14	HS-MW-14D	HS-MW-14D	HS-MW-14D	HS-MW-14D	HS-MW-14D	HS-MW-14D	HS-MW-14M	HS-MW-14M	HS-MW-14M	HS-MW-14M	HS-MW-14M	HS-MW-14M	HS-MW-14S	HS-MW-14S	HS-MW-14S
Sample Name			PMW-14 93-98	PMW-14 103-108	PMW-14D	HS-MW-14D	HS-MW-14D DUP	HS-GW-MW14D	HS-GW-MW14D	HS-GW-MW-14D	PMW-14M	HS-MW-14M	HS-GW-MW14M	HS-GW-MW14M	HS-GW-MW-14M	PMW-14S	HS-MW-14S	HS-GW-MW14S	
Well Screen Interval (Feet below ground surface)			93-98	103-108	109-114	109-114	109-114	109-114	109-114	109-114	68.1-73.1	68.1-73.1	68.1-73.1	68.1-73.1	68.1-73.1	13-23	13-23	13-23	
Laboratory Sample ID			K1802247-006	K1802302-001	TD12015-001	UB27031-003	UB27031-004	UE18016-008	UI12010-007	UK29008-016	TD12015-003	UB27031-001	UE18016-009	UI12010-009	UK29008-015	TD12015-005	UB27031-002	UE18016-010	
Sample Date			03/09/2018	03/12/2018	04/10/2018	02/26/2019	02/26/2019	05/17/2019	09/10/2019	11/25/2019	04/10/2018	02/26/2019	05/17/2019	09/10/2019	11/25/2019	04/10/2018	02/26/2019	05/17/2019	
Parameter (µg/L)																			
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NCL	<0.0052	<0.0046	<0.0072	<0.0037	<0.0036	<0.0037	<0.0037	<0.0035	<0.0073	<0.0036	<0.0036	<0.0038	<0.0034	<0.0073	<0.0036	<0.0036	
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NCL	<0.0052	<0.0046	<0.0072	<0.0037	<0.0036	<0.0037	<0.0037	<0.0035	<0.0073	<0.0036	<0.0036	<0.0038	<0.0034	<0.0073	<0.0036	<0.0036	
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NCL	<0.0052	<0.0046	<0.0072	<0.0037	<0.0036	<0.0037	<0.0037	<0.0035	<0.0073	<0.0036	<0.0036	<0.0038	<0.0034	<0.0073	<0.0036	<0.0036	
N-Ethyl perfluorooctane sulfonamidoethanol (N-EtFOSE)	NCL	NCL	<0.0052	<0.0046	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NCL	<0.0052	<0.0046	<0.014	<0.0075	<0.0073	<0.0074	<0.0074	<0.007	<0.015	<0.0071	<0.0073	<0.0075	<0.0069	<0.015	<0.0071	<0.0072	
N-Methyl perfluorooctane sulfonamidoethanol (N-MeFOSE)	NCL	NCL	<0.0052	<0.0046	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Perfluorobutane sulfonic acid (PFBS)	NCL	NCL	<0.0052	<0.0046	<0.0036	<0.0037	<0.0036	<0.0037	<0.0037	<0.0035	<0.0036	<0.0036	<0.0036	<0.0038	<0.0034	<0.0037	<0.0036	<0.0036	
Perfluorodecane sulfonic acid (PFDS)	NCL	NCL	<0.0052	<0.0046	<0.0036	<0.0037	<0.0036	<0.0037	<0.0037	<0.0035	<0.0036	<0.0036	<0.0036	<0.0038	<0.0034	<0.0037	<0.0036	<0.0036	
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NCL	<0.0052	<0.0046	<0.0036	<0.0037	<0.0036	<0.0037	<0.0037	<0.0035	<0.0036	<0.0036	<0.0036	<0.0038	<0.0034	<0.0037	<0.0036	<0.0036	
Perfluorononane sulfonic acid (PFNS)	NCL	NCL	-	-	<0.0072	<0.0075	<0.0073	<0.0073	<0.0074	<0.007	<0.0073	<0.0071	<0.0073	<0.0075	<0.0069	<0.0073	<0.0071	<0.0072	
Perfluorooctane sulfonamide (FOSA)	NCL	NCL	<0.0052	<0.0046	<0.0072	<0.0037	<0.0036	<0.0037	<0.0037	<0.0035	<0.0073	<0.0036	<0.0036	<0.0038	<0.0034	<0.0073	<0.0036	<0.0036	
Perfluoropentane sulfonic acid (PFPeS)	NCL	NCL	-	-	<0.0036	<0.0037	<0.0036	<0.0037	<0.0037	<0.0035	<0.0036	<0.0036	<0.0036	<0.0038	<0.0034	<0.0037	<0.0036	<0.0036	
Perfluorohexane sulfonic acid (PFHxS)	NCL	NCL	<0.0052	<0.0046	<0.0036	<0.0037	<0.0036	<0.0037	<0.0037	<0.0035	<0.0036	<0.0036	<0.0036	<0.0038	<0.0034	<0.0037	<0.0036	<0.0036	
Perfluorobutanoic acid (PFBA)	NCL	NCL	<0.01	<0.0093	<0.0036	<0.0037	<0.0036	<0.0037	<0.0037	<0.0035	<0.0036	<0.0036	<0.0036	<0.0038	<0.0034	<0.0037	<0.0036	0.005	
Perfluorodecanoic acid (PFDA)	NCL	NCL	<0.0052	<0.0046	<0.0036	<0.0037	<0.0036	<0.0037	<0.0037	<0.0035	<0.0036	<0.0036	<0.0036	<0.0038	<0.0034	<0.0037	<0.0036	<0.0036	
Perfluorododecanoic acid (PFDoDA)	NCL	NCL	<0.0052	<0.0046	<0.0036	<0.0037	<0.0036	<0.0037	<0.0037	<0.0035	<0.0036	<0.0036	<0.0036	<0.0038	<0.0034	<0.0037	<0.0036	<0.0036	
Perfluoroheptanoic acid (PFHpA)	NCL	NCL	<0.0052	<0.0046	<0.0036	<0.0037	<0.0036	<0.0037	<0.0037	<0.0035	<0.0036	<0.0036	<0.0036	<0.0038	<0.0034	<0.0037	<0.0036	<0.0036	
Perfluorohexanoic acid (PFHxA)	NCL	NCL	<0.0052	<0.0046	<0.0036	<0.0037	<0.0036	<0.0037	<0.0037	<0.0035	<0.0036	<0.0036	<0.0036	<0.0038	<0.0034	<0.0037	<0.0036	0.0065	
Perfluorononanoic acid (PFNA)	NCL	NCL	<0.0052	<0.0046	<0.0036	<0.0037	<0.0036	<0.0037	<0.0037	<0.0035	<0.0036	<0.0036	<0.0036	<0.0038	<0.0034	<0.0037	<0.0036	<0.0036	
Perfluorooctanoic acid (PFOA)	0.07 (JJ)	12	<0.0021	<0.0019	<0.0036	<0.0019	<0.0018	<0.0019	<0.0019	<0.0017	<0.0036	<0.0018	<0.0018	<0.0019	<0.0017	<0.0037	<0.0018	0.0047	
Perfluorooctane sulfonic acid (PFOS)	0.07 (JJ)	0.012	<0.0052	<0.0046	<0.0036	<0.0037	<0.0036	<0.0037	<0.0037	<0.0035	<0.0036	<0.0036	<0.0036	<0.0038	<0.0034	<0.0037	<0.0036	<0.0036	
PFOA + PFOS (Calculated)	0.07	NCL	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0047	
Perfluoropentanoic acid (PFPeA)	NCL	NCL	<0.0052	<0.0046	<0.0036	<0.0037	<0.0036	<0.0037	<0.0037	<0.0035	<0.0036	<0.0036	<0.0036	<0.0038	<0.0034	<0.0037	<0.0036	0.0054	
Perfluorotetradecanoic acid (PFTeDA)	NCL	NCL	<0.0052	<0.0046	<0.0072	<0.0037	<0.0036	<0.0037	<0.0037	<0.0035	<0.0073	<0.0036	<0.0036	<0.0038	<0.0034	<0.0073	<0.0036	<0.0036	
Perfluorotridecanoic acid (PFTrDA)	NCL	NCL	<0.0052	<0.0046	<0.0036	<0.0037	<0.0036	<0.0037	<0.0037	<0.0035	<0.0036	<0.0036	<0.0036	<0.0038	<0.0034	<0.0037	<0.0036	<0.0036	
Perfluoroundecanoic acid (PFUnDA)	NCL	NCL	<0.0052	<0.0046	<0.0036	<0.0037	<0.0036	<0.0037	<0.0037	<0.0035	<0.0036	<0.0036	<0.0036	<0.0038	<0.0034	<0.0037	<0.0036	<0.0036	
Total PFAS (Calculated)	NCL	NCL	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.022	

TABLE 3
GROUNDWATER ANALYTICAL DATA - PFAS
House Street Disposal Site Study Area
Plainfield Township, Kent County, MI

Sample Location	Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water ²	Part 201 Generic Groundwater Cleanup Criteria – Groundwater Surface Water Interface ²	HS-MW-14S	HS-MW-14S	HS-PMW-15	HS-PMW-15	HS-PMW-15	HS-PMW-15	HS-MW-15D	HS-MW-15D	HS-MW-15D	HS-MW-15D	HS-MW-15D	HS-MW-15M	HS-MW-15M	HS-MW-15M	HS-MW-15M	HS-MW-15M
Sample Name			HS-GW-MW14S	HS-GW-MW-14S	PMW152530	PMW154550	PMW15110115	PMW15D110115	PMW-15D	HS-MW-15D	HS-GW-MW15D	HS-GW-MW15D	HS-GW-MW-15D	PMW-15I	HS-MW-15M	HS-GW-MW15M	HS-GW-MW15M	HS-GW-MW-15M
Well Screen Interval (Feet below ground surface)			13-23	13-23	25-30	45-30	110-115	110-115	108.6-118.6	108.6-118.6	108.6-118.6	108.6-118.6	108.6-118.6	44.8-49.8	44.8-49.8	44.8-49.8	44.8-49.8	44.8-49.8
Laboratory Sample ID			UI12010-008	UK29008-014	K1713825-001	K1713825-003	K1713825-005	K1713825-006	K1802511-008	UB28086-006	UE18016-005	UI21016-005	UK19008-012	K1802511-007	UB28086-005	UE18016-006	UI21016-004	UK21036-009
Sample Date			09/10/2019	11/25/2019	12/19/2017	12/20/2017	12/21/2017	12/21/2017	03/15/2018	02/27/2019	05/16/2019	09/19/2019	11/20/2019	03/15/2018	02/27/2019	05/16/2019	09/19/2019	11/19/2019
Parameter (µg/L)																		
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NCL	<0.0036	<0.0034	<0.0042	<0.0042	<0.0042	<0.005	<0.0047	<0.0037	<0.0037	<0.0037	<0.0036	<0.0034	<0.0047	<0.0037	<0.0038	<0.0037
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NCL	<0.0036	<0.0034	<0.0042	<0.0042	<0.0042	<0.005	<0.0047	<0.0037	<0.0037	<0.0037	<0.0036	<0.0034	<0.0047	<0.0037	<0.0038	<0.0037
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NCL	<0.0036	<0.0034	<0.0042	<0.0042	<0.0042	<0.005	<0.0047	<0.0037	<0.0037	<0.0037	<0.0036	<0.0034	<0.0047	<0.0037	<0.0038	<0.0037
N-Ethyl perfluorooctane sulfonamidoethanol (N-EtFOSE)	NCL	NCL	-	-	<0.0042	<0.0042	<0.0042	<0.005	<0.0047	-	-	-	-	-	<0.0047	-	-	-
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NCL	<0.0072	<0.0069	<0.0042	<0.0042	<0.0042	<0.005	<0.0047	<0.0075	<0.0073	<0.0073	<0.0069	<0.0069	<0.0047	<0.0074	<0.0076	<0.0075
N-Methyl perfluorooctane sulfonamidoethanol (N-MeFOSE)	NCL	NCL	-	-	<0.0042	<0.0042	<0.0042	<0.005	<0.0047	-	-	-	-	-	<0.0047	-	-	-
Perfluorobutane sulfonic acid (PFBS)	NCL	NCL	<0.0036	<0.0034	<0.0042	<0.0042	<0.0042	<0.005	<0.0047	<0.0037	<0.0037	<0.0037	<0.0036	<0.0034	<0.0047	<0.0037	<0.0038	<0.0037
Perfluorodecane sulfonic acid (PFDS)	NCL	NCL	<0.0036	<0.0034	<0.0042	<0.0042	<0.0042	<0.005	<0.0047	<0.0037	<0.0037	<0.0037	<0.0036	<0.0034	<0.0047	<0.0037	<0.0038	<0.0037
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NCL	<0.0036	<0.0034	<0.0042	<0.0042	<0.0042	<0.005	<0.0047	<0.0037	<0.0037	<0.0037	<0.0036	<0.0034	<0.0047	<0.0037	<0.0038	<0.0037
Perfluorononane sulfonic acid (PFNS)	NCL	NCL	<0.0072	<0.0069	-	-	-	-	-	<0.0075	<0.0073	<0.0073	<0.0069	-	-	<0.0074	<0.0076	<0.0075
Perfluorooctane sulfonamide (FOSA)	NCL	NCL	<0.0036	<0.0034	<0.0042	<0.0042	<0.0042	<0.005	<0.0047	<0.0037	<0.0037	<0.0037	<0.0036	<0.0034	<0.0047	<0.0037	<0.0038	<0.0037
Perfluoropentane sulfonic acid (PFPeS)	NCL	NCL	<0.0036	<0.0034	-	-	-	-	-	<0.0037	<0.0037	<0.0037	<0.0036	<0.0034	-	<0.0037	<0.0038	<0.0037
Perfluorohexane sulfonic acid (PFHxS)	NCL	NCL	<0.0036	<0.0034	<0.0042	<0.0042	<0.0042	<0.005	<0.0047	<0.0037	<0.0037	<0.0037	<0.0036	<0.0034	<0.0047	<0.0037	<0.0038	<0.0037
Perfluorobutanoic acid (PFBA)	NCL	NCL	<0.0036	<0.0034	<0.0083	<0.0083	<0.0083	<0.01	<0.0094	<0.0037	<0.0037	<0.0037	<0.0036	<0.0034	<0.0094	<0.0037	<0.0038	<0.0037
Perfluorodecanoic acid (PFDA)	NCL	NCL	<0.0036	<0.0034	<0.0042	<0.0042	<0.0042	<0.005	<0.0047	<0.0037	<0.0037	<0.0037	<0.0036	<0.0034	<0.0047	<0.0037	<0.0038	<0.0037
Perfluorododecanoic acid (PFDoDA)	NCL	NCL	<0.0036	<0.0034	<0.0042	<0.0042	<0.0042	<0.005	<0.0047	<0.0037	<0.0037	<0.0037	<0.0036	<0.0034	<0.0047	<0.0037	<0.0038	<0.0037
Perfluoroheptanoic acid (PFHpA)	NCL	NCL	<0.0036	<0.0034	<0.0042	<0.0042	<0.0042	<0.005	<0.0047	<0.0037	<0.0037	<0.0037	<0.0036	<0.0034	<0.0047	<0.0037	<0.0038	<0.0037
Perfluorohexanoic acid (PFHxA)	NCL	NCL	<0.0036	<0.0034	<0.0042	<0.0042	<0.0042	<0.005	<0.0047	<0.0037	<0.0037	<0.0037	<0.0036	<0.0034	<0.0047	<0.0037	<0.0038	<0.0037
Perfluorononanoic acid (PFNA)	NCL	NCL	<0.0036	<0.0034	<0.0042	<0.0042	<0.0042	<0.005	<0.0047	<0.0037	<0.0037	<0.0037	<0.0036	<0.0034	<0.0047	<0.0037	<0.0038	<0.0037
Perfluorooctanoic acid (PFOA)	0.07 (JJ)	12	0.0023	<0.0017	<0.0017	<0.0017	<0.0017	<0.002	<0.0019	<0.0019	<0.0019	<0.0018	<0.0018	<0.0017	<0.0019	<0.0018	<0.0019	<0.0018
Perfluorooctane sulfonic acid (PFOS)	0.07 (JJ)	0.012	0.0036	<0.0034	<0.0042	0.066	<0.0042	<0.005	<0.0047	<0.0037	<0.0037	<0.0037	<0.0036	<0.0034	<0.0047	<0.0037	<0.0038	<0.0037
PFOA + PFOS (Calculated)	0.07	NCL	0.0059	ND	ND	0.066	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Perfluoropentanoic acid (PFPeA)	NCL	NCL	<0.0036	<0.0034	<0.0042	<0.0042	<0.0042	<0.005	<0.0047	<0.0037	<0.0037	<0.0037	<0.0036	<0.0034	<0.0047	<0.0037	<0.0038	<0.0037
Perfluorotetradecanoic acid (PFTeDA)	NCL	NCL	<0.0036	<0.0034	<0.0042	<0.0042	<0.0042	<0.005	<0.0047	<0.0037	<0.0037	<0.0037	<0.0036	<0.0034	<0.0047	<0.0037	<0.0038	<0.0037
Perfluorotridecanoic acid (PFTrDA)	NCL	NCL	<0.0036	<0.0034	<0.0042	<0.0042	<0.0042	<0.005	<0.0047	<0.0037	<0.0037	<0.0037	<0.0036	<0.0034	<0.0047	<0.0037	<0.0038	<0.0037
Perfluoroundecanoic acid (PFUnDA)	NCL	NCL	<0.0036	<0.0034	<0.0042	<0.0042	<0.0042	<0.005	<0.0047	<0.0037	<0.0037	<0.0037	<0.0036	<0.0034	<0.0047	<0.0037	<0.0038	<0.0037
Total PFAS (Calculated)	NCL	NCL	0.0059	ND	ND	0.066	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

TABLE 3
GROUNDWATER ANALYTICAL DATA - PFAS
House Street Disposal Site Study Area
Plainfield Township, Kent County, MI

Sample Location	Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water ²	Part 201 Generic Groundwater Cleanup Criteria – Groundwater Surface Water Interface ²	HS-MW-15S	HS-MW-15S	HS-MW-15S	HS-MW-15S	HS-MW-15S	HS-PMW-17	HS-PMW-17	HS-PMW-17	HS-PMW-17	HS-PMW-17	HS-PMW-17	HS-PMW-17	HS-PMW-17	HS-PMW-17	HS-PMW-17	HS-PMW-17
Sample Name			PMW-15S	HS-MW-15S	HS-GW-MW15S	HS-GW-MW15S	HS-GW-MW-15S	PMW-17 83-88	PMW-17 93-98	PMW-17 103-108	PMW-17 113-118	PMW-17 153-158	PMW-17 163-168	PMW-17 173-178	PMW-17-183'-188'- 2/19	PMW-17-193'-198'- 2/20	PMW-17-203'-208'- 2/20	PMW-17-213'-218'- 2/22
Well Screen Interval (Feet below ground surface)			6.9-16.9	6.9-16.9	6.9-16.9	6.9-16.9	6.9-16.9	83-88	93-98	103-108	113-118	153-158	163-168	173-178	183-188	193-198	203-208	213-218
Laboratory Sample ID			K1802511-006	UB28086-004	UE18016-007	UI21016-003	UK21036-010	K1801045-003	K1801045-004	K1801045-007	K1801045-008	K1801045-011	K1801593-002	K1801593-004	K1801660-001	K1801660-004	K1801660-007	K1801740-001
Sample Date			03/15/2018	02/27/2019	05/16/2019	09/19/2019	11/19/2019	01/30/2018	01/30/2018	01/31/2018	01/31/2018	02/02/2018	02/16/2018	02/16/2018	02/19/2018	02/20/2018	02/20/2018	02/22/2018
Parameter (µg/L)																		
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NCL	<0.0046	<0.0037	<0.0036	<0.0038	<0.0034	<0.0042	<0.0042	<0.0042	<0.0042	<0.0042	<0.0047	<0.0047	<0.0046	<0.0046	<0.0048	<0.0046
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NCL	<0.0046	<0.0037	<0.0036	<0.0038	<0.0034	<0.0042	<0.0042	<0.0042	<0.0042	<0.0042	<0.0047	<0.0047	<0.0046	<0.0046	<0.0048	<0.0046
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NCL	<0.0046	<0.0037	<0.0036	<0.0038	<0.0034	<0.0042	<0.0042	<0.0042	<0.0042	<0.0042	<0.0047	<0.0047	<0.0046	<0.0046	<0.0048	<0.0046
N-Ethyl perfluorooctane sulfonamidoethanol (N-EtFOSE)	NCL	NCL	<0.0046	-	-	-	-	<0.0042	<0.0042	<0.0042	<0.0042	<0.0042	<0.0047	<0.0047	<0.0046	<0.0046	<0.0048	<0.0046
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NCL	<0.0046	<0.0074	<0.0073	<0.0077	<0.0069	<0.0042	<0.0042	<0.0042	<0.0042	<0.0042	<0.0047	<0.0047	<0.0046	<0.0046	<0.0048	<0.0046
N-Methyl perfluorooctane sulfonamidoethanol (N-MeFOSE)	NCL	NCL	<0.0046	-	-	-	-	<0.0042	<0.0042	<0.0042	<0.0042	<0.0042	<0.0047	<0.0047	<0.0046	<0.0046	<0.0048	<0.0046
Perfluorobutane sulfonic acid (PFBS)	NCL	NCL	0.0086	0.0073	0.0058	0.0068	0.0073	<0.0042	<0.0042	0.0057	0.0069	<0.0042	<0.0047	<0.0047	<0.0046	0.026	0.14	0.4
Perfluorodecane sulfonic acid (PFDS)	NCL	NCL	<0.0046	<0.0037	<0.0036	<0.0038	<0.0034	<0.0042	<0.0042	<0.0042	<0.0042	<0.0042	<0.0047	<0.0047	<0.0046	<0.0046	<0.0048	<0.0046
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NCL	<0.0046	<0.0037	<0.0036	<0.0038	<0.0034	<0.0042	<0.0042	<0.0042	<0.0042	<0.0042	<0.0047	<0.0047	<0.0046	<0.0046	<0.0048	0.067
Perfluorononane sulfonic acid (PFNS)	NCL	NCL	-	<0.0074	<0.0073	<0.0077	<0.0069	-	-	-	-	-	-	-	-	-	-	-
Perfluorooctane sulfonamide (FOSA)	NCL	NCL	<0.0046	<0.0037	<0.0036	<0.0038	<0.0034	<0.0042	<0.0042	<0.0042	<0.0042	<0.0042	<0.0047	<0.0047	<0.0046	<0.0046	<0.0048	<0.0046
Perfluoropentane sulfonic acid (PFPeS)	NCL	NCL	-	<0.0037	<0.0036	<0.0038	<0.0034	-	-	-	-	-	-	-	-	-	-	-
Perfluorohexane sulfonic acid (PFHxS)	NCL	NCL	<0.0046	<0.0037	<0.0036	<0.0038	0.004	<0.0042	<0.0042	<0.0042	<0.0042	<0.0042	<0.0047	<0.0047	<0.0046	0.0068	0.29	0.89
Perfluorobutanoic acid (PFBA)	NCL	NCL	<0.0093	<0.0037	<0.0036	<0.0038	<0.0034	<0.0084	<0.0084	<0.0084	<0.0084	<0.0084	<0.0094	<0.0094	<0.0093	0.015	0.029	0.089
Perfluorodecanoic acid (PFDA)	NCL	NCL	<0.0046	<0.0037	<0.0036	<0.0038	<0.0034	<0.0042	<0.0042	<0.0042	<0.0042	<0.0042	<0.0047	<0.0047	<0.0046	<0.0046	<0.0048	<0.0046
Perfluorododecanoic acid (PFDoDA)	NCL	NCL	<0.0046	<0.0037	<0.0036	<0.0038	<0.0034	<0.0042	<0.0042	<0.0042	<0.0042	<0.0042	<0.0047	<0.0047	<0.0046	<0.0046	<0.0048	<0.0046
Perfluoroheptanoic acid (PFHpA)	NCL	NCL	<0.0046	<0.0037	<0.0036	<0.0038	<0.0034	<0.0042	<0.0042	<0.0042	<0.0042	<0.0042	<0.0047	<0.0047	<0.0046	0.007	0.1	0.32
Perfluorohexanoic acid (PFHxA)	NCL	NCL	<0.0046	<0.0037	<0.0036	<0.0038	<0.0034	<0.0042	<0.0042	<0.0042	0.0055	<0.0042	<0.0047	<0.0047	<0.0046	0.023	0.11	0.27
Perfluorononanoic acid (PFNA)	NCL	NCL	<0.0046	<0.0037	<0.0036	<0.0038	<0.0034	<0.0042	<0.0042	<0.0042	<0.0042	<0.0042	<0.0047	<0.0047	<0.0046	<0.0046	<0.0048	<0.0046
Perfluorooctanoic acid (PFOA)	0.07 (JJ)	12	<0.0019	<0.0018	<0.0018	<0.0019	0.0018	<0.0017	<0.0017	0.0044	0.0077	<0.0017	0.0038	0.0023	<0.0019	0.005	0.2	0.72
Perfluorooctane sulfonic acid (PFOS)	0.07 (JJ)	0.012	<0.0046	<0.0037	<0.0036	<0.0038	<0.0034	<0.0042	<0.0042	0.0063	0.0045	<0.0042	<0.0047	<0.0047	<0.0046	<0.0046	<0.0048	0.039
PFOA + PFOS (Calculated)	0.07	NCL	ND	ND	ND	ND	0.0018	ND	ND	0.011	0.012	ND	0.0038	0.0023	ND	0.005	0.2	0.76
Perfluoropentanoic acid (PFPeA)	NCL	NCL	<0.0046	<0.0037	<0.0036	<0.0038	<0.0034	<0.0042	<0.0042	<0.0042	<0.0042	<0.0042	<0.0047	<0.0047	<0.0046	0.017	0.038	0.13
Perfluorotetradecanoic acid (PFTeDA)	NCL	NCL	<0.0046	<0.0037	<0.0036	<0.0038	<0.0034	<0.0042	<0.0042	<0.0042	<0.0042	<0.0042	<0.0047	<0.0047	<0.0046	<0.0046	<0.0048	<0.0046
Perfluorotridecanoic acid (PFTrDA)	NCL	NCL	<0.0046	<0.0037	<0.0036	<0.0038	<0.0034	<0.0042	<0.0042	<0.0042	<0.0042	<0.0042	<0.0047	<0.0047	<0.0046	<0.0046	<0.0048	<0.0046
Perfluoroundecanoic acid (PFUnDA)	NCL	NCL	<0.0046	<0.0037	<0.0036	<0.0038	<0.0034	<0.0042	<0.0042	<0.0042	<0.0042	<0.0042	<0.0047	<0.0047	<0.0046	<0.0046	<0.0048	<0.0046
Total PFAS (Calculated)	NCL	NCL	0.0086	0.0073	0.0058	0.0068	0.013	ND	ND	0.016	0.025	ND	0.0038	0.0023	ND	0.1	0.91	2.9

TABLE 3
GROUNDWATER ANALYTICAL DATA - PFAS
House Street Disposal Site Study Area
Plainfield Township, Kent County, MI

Sample Location	Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water ²	Part 201 Generic Groundwater Cleanup Criteria – Groundwater Surface Water Interface ²	HS-MW-17D	HS-MW-17D	HS-MW-17D	HS-MW-17D	HS-MW-17D	HS-MW-17M	HS-MW-17M	HS-MW-17M	HS-MW-17M	HS-MW-17M	HS-MW-17S	HS-MW-17S	HS-MW-17S	HS-MW-17S	HS-MW-17S	HS-PMW-18
Sample Name			MW-17D	HS-MW-17D	HS-GW-MW17D	HS-GW-MW17D	HS-GW-MW-17D	MW-17M	HS-MW-17M	HS-GW-MW17M	HS-GW-MW17M	HS-GW-MW-17M	MW-17S	HS-MW-17S	HS-GW-MW17S	HS-GW-MW17S	HS-GW-MW-17S	PMW-18-14-19
Well Screen Interval (Feet below ground surface)			222.1-227.1	222.1-227.1	222.1-227.1	222.1-227.1	222.1-227.1	167.3-172.3	167.3-172.3	167.3-172.3	167.3-172.3	167.3-172.3	105.8-110.8	105.8-110.8	105.8-110.8	105.8-110.8	105.8-110.8	14-19
Laboratory Sample ID			K1803589-002	UC09042-006	UE25011-001	UI19006-002	UL12091-010	K1803589-003	UC09042-005	UE25011-003	UI12010-016	UL12091-012	K1803589-001	UC09042-003	UE25011-002	UI12010-014	UL12091-007	TE17021-002
Sample Date			04/17/2018	03/07/2019	05/23/2019	09/16/2019	12/10/2019	04/17/2018	03/07/2019	05/23/2019	09/11/2019	12/11/2019	04/17/2018	03/06/2019	05/23/2019	09/11/2019	12/10/2019	05/14/2018
Parameter (µg/L)																		
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NCL	<0.0046	<0.0035	<0.0035	<0.004	<0.0037	<0.0045	<0.0037	<0.0036	<0.0033	<0.0034	<0.0049	<0.0035	<0.0035	<0.0033	<0.0038	<0.0035
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NCL	<0.0046	<0.0035	<0.0035	<0.004	<0.0037	<0.0045	<0.0037	<0.0036	<0.0033	<0.0034	<0.0049	<0.0035	<0.0035	<0.0033	<0.0038	<0.0035
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NCL	<0.0046	<0.0035	<0.0035	<0.004	<0.0037	<0.0045	<0.0037	<0.0036	<0.0033	<0.0034	<0.0049	<0.0035	<0.0035	<0.0033	<0.0038	<0.0035
N-Ethyl perfluorooctane sulfonamidoethanol (N-EtFOSE)	NCL	NCL	<0.0046	-	-	-	-	<0.0045	-	-	-	-	<0.0049	-	-	-	-	-
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NCL	<0.0046	<0.007	<0.007	<0.007900001	<0.0074	<0.0045	<0.0074	<0.0071	<0.0066	<0.0068	<0.0049	<0.0071	<0.0069	<0.0067	<0.0075	<0.0069
N-Methyl perfluorooctane sulfonamidoethanol (N-MeFOSE)	NCL	NCL	<0.0046	-	-	-	-	<0.0045	-	-	-	-	<0.0049	-	-	-	-	-
Perfluorobutane sulfonic acid (PFBS)	NCL	NCL	0.44	0.43	0.41	0.47	0.42	<0.0045	0.004	0.0039	0.0036	0.0038	<0.0049	0.014	0.02	0.014	0.018	0.0051
Perfluorodecane sulfonic acid (PFDS)	NCL	NCL	<0.0046	<0.0035	<0.0035	<0.004	<0.0037	<0.0045	<0.0037	<0.0036	<0.0033	<0.0034	<0.0049	<0.0035	<0.0035	<0.0033	<0.0038	<0.0035
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NCL	0.081	0.022	0.024	0.028	0.029	<0.0045	<0.0037	<0.0036	<0.0033	<0.0034	<0.0049	<0.0035	<0.0035	<0.0033	<0.0038	<0.0035
Perfluorononane sulfonic acid (PFNS)	NCL	NCL	-	<0.007	<0.007	<0.007900001	<0.0074	-	<0.0074	<0.0071	<0.0066	<0.0068	-	<0.0071	<0.0069	<0.0067	<0.0075	<0.0069
Perfluorooctane sulfonamide (FOSA)	NCL	NCL	<0.0046	<0.0035	<0.0035	<0.004	<0.0037	<0.0045	<0.0037	<0.0036	<0.0033	<0.0034	<0.0049	<0.0035	<0.0035	<0.0033	<0.0038	<0.0035
Perfluoropentane sulfonic acid (PFPeS)	NCL	NCL	-	0.56	0.5	0.57	0.49	-	<0.0037	<0.0036	<0.0033	<0.0034	-	<0.0035	<0.0035	<0.0033	<0.0038	<0.0035
Perfluorohexane sulfonic acid (PFHxS)	NCL	NCL	1.2	0.96	1	1.1	1	<0.0045	<0.0037	<0.0036	<0.0033	<0.0034	<0.0049	<0.0035	<0.0035	<0.0033	<0.0038	<0.0035
Perfluorobutanoic acid (PFBA)	NCL	NCL	0.14	0.11	0.11	0.12	0.12	<0.0089	<0.0037	<0.0036	<0.0033	<0.0034	<0.0098	0.0041	0.0058	0.0034	0.0042	<0.0035
Perfluorodecanoic acid (PFDA)	NCL	NCL	<0.0046	<0.0035	<0.0035	<0.004	<0.0037	<0.0045	<0.0037	<0.0036	<0.0033	<0.0034	<0.0049	<0.0035	<0.0035	<0.0033	<0.0038	<0.0035
Perfluorododecanoic acid (PFDoDA)	NCL	NCL	<0.0046	<0.0035	<0.0035	<0.004	<0.0037	<0.0045	<0.0037	<0.0036	<0.0033	<0.0034	<0.0049	<0.0035	<0.0035	<0.0033	<0.0038	<0.0035
Perfluoroheptanoic acid (PFHpA)	NCL	NCL	0.51	0.3	0.3	0.33	0.31	<0.0045	<0.0037	<0.0036	<0.0033	<0.0034	<0.0049	<0.0035	<0.0035	<0.0033	<0.0038	<0.0035
Perfluorohexanoic acid (PFHxA)	NCL	NCL	0.42	0.27	0.31	0.27	0.28	<0.0045	<0.0037	<0.0036	<0.0033	<0.0034	<0.0049	<0.0035	<0.0035	<0.0033	0.0054	<0.0035
Perfluorononanoic acid (PFNA)	NCL	NCL	<0.0046	<0.0035	<0.0035	<0.004	<0.0037	<0.0045	<0.0037	<0.0036	<0.0033	<0.0034	<0.0049	<0.0035	<0.0035	<0.0033	<0.0038	<0.0035
Perfluorooctanoic acid (PFOA)	0.07 (JJ)	12	1.3	1	1.2	1.2	1.1	<0.0018	<0.0019	<0.0018	<0.0017	<0.0017	<0.002	<0.0018	<0.0017	<0.0017	<0.0019	<0.0017
Perfluorooctane sulfonic acid (PFOS)	0.07 (JJ)	0.012	0.072	0.06	0.058	0.072	0.076	<0.0045	<0.0037	<0.0036	<0.0033	<0.0034	<0.0049	<0.0035	<0.0035	<0.0033	<0.0038	<0.0035
PFOA + PFOS (Calculated)	0.07	NCL	1.4	1.1	1.3	1.3	1.2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Perfluoropentanoic acid (PFPeA)	NCL	NCL	0.16	0.12	0.13	0.13	0.14	<0.0045	<0.0037	<0.0036	<0.0033	<0.0034	<0.0049	<0.0035	0.0044	0.0048	0.0073	<0.0035
Perfluorotetradecanoic acid (PFTeDA)	NCL	NCL	<0.0046	<0.0035	<0.0035	<0.004	<0.0037	<0.0045	<0.0037	<0.0036	<0.0033	<0.0034	<0.0049	<0.0035	<0.0035	<0.0033	<0.0038	<0.0035
Perfluorotridecanoic acid (PFTrDA)	NCL	NCL	<0.0046	<0.0035	<0.0035	<0.004	<0.0037	<0.0045	<0.0037	<0.0036	<0.0033	<0.0034	<0.0049	<0.0035	<0.0035	<0.0033	<0.0038	<0.0035
Perfluoroundecanoic acid (PFUnDA)	NCL	NCL	<0.0046	<0.0035	<0.0035	<0.004	<0.0037	<0.0045	<0.0037	<0.0036	<0.0033	<0.0034	<0.0049	<0.0035	<0.0035	<0.0033	<0.0038	<0.0035
Total PFAS (Calculated)	NCL	NCL	4.3	3.8	4	4.3	4	ND	0.004	0.0039	0.0036	0.0038	ND	0.018	0.03	0.022	0.035	0.0051

TABLE 3
GROUNDWATER ANALYTICAL DATA - PFAS
House Street Disposal Site Study Area
Plainfield Township, Kent County, MI

Sample Location	Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water ²	Part 201 Generic Groundwater Cleanup Criteria – Groundwater Surface Water Interface ²	HS-PMW-18	HS-PMW-18	HS-PMW-18	HS-PMW-18	HS-PMW-18	HS-PMW-18	HS-PMW-18	HS-PMW-18	HS-PMW-18	HS-PMW-18	HS-PMW-18	HS-PMW-18	HS-MW-18D	HS-MW-18D	HS-MW-18D	HS-MW-18D
Sample Name			PMW-18-24-29	PMW-18-34-39	PMW-18-44-49	PMW-18-54-59	PMW-18-64-69	PMW-18-74-79	PMW-18-84-89	PMW-18-94-99	PMW-18-104-109	PMW-18-114-119	PMW-18-124-129	PMW-18-134-139	MW-18D	HS-MW-18D	HS-GW-MW18D	HS-GW-MW18D
Well Screen Interval (Feet below ground surface)			24-29	34-39	44-49	54-59	64-69	74-79	84-89	94-89	104-109	114-119	124-129	134-139	140.6-145.6	140.6-145.6	140.6-145.6	140.6-145.6
Laboratory Sample ID			TE17021-004	TE17021-005	TE17021-006	TE17021-007	TE17021-008	TE17021-011	TE17021-012	TE17020-001	TE17020-004	TE17020-005	TE17020-006	TE17020-007	TG07027-006	UC02020-006	UE24001-004	UI12010-006
Sample Date			05/15/2018	05/15/2018	05/15/2018	05/15/2018	05/15/2018	05/15/2018	05/15/2018	05/16/2018	05/16/2018	05/16/2018	05/16/2018	05/16/2018	07/06/2018	03/01/2019	05/21/2019	09/10/2019
Parameter (µg/L)																		
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NCL	<0.0035	<0.0035	<0.0036	<0.0035	<0.0036	<0.0035	<0.0035	<0.0037	<0.0035	<0.0036	<0.0036	<0.0036	<0.0035	<0.0037	<0.0037	<0.0034
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NCL	<0.0035	<0.0035	<0.0036	<0.0035	<0.0036	<0.0035	<0.0035	<0.0037	<0.0035	<0.0036	<0.0036	<0.0036	<0.0035	<0.0037	<0.0037	<0.0034
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NCL	<0.0035	<0.0035	<0.0035	<0.0035	<0.0036	<0.0035	<0.0035	<0.0037	<0.0035	<0.0036	<0.0036	<0.0036	<0.0035	<0.0037	<0.0037	<0.0034
N-Ethyl perfluorooctane sulfonamidoethanol (N-EtFOSE)	NCL	NCL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NCL	<0.007	<0.007	<0.0072	<0.007	<0.0072	<0.007	<0.007	<0.0074	<0.0071	<0.0072	<0.0071	<0.0071	<0.007	<0.0073	<0.0074	<0.0068
N-Methyl perfluorooctane sulfonamidoethanol (N-MeFOSE)	NCL	NCL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perfluorobutane sulfonic acid (PFBS)	NCL	NCL	0.0062	<0.0035	<0.0036	<0.0035	0.0056	0.01	0.015	0.033	0.14	0.14	0.18	0.17	0.024	0.029	0.031	0.025
Perfluorodecane sulfonic acid (PFDS)	NCL	NCL	<0.0035	<0.0035	<0.0036	<0.0035	<0.0036	<0.0035	<0.0035	<0.0037	<0.0035	<0.0036	<0.0036	<0.0036	<0.0035	<0.0037	<0.0037	<0.0034
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NCL	<0.0035	<0.0035	<0.0036	<0.0035	<0.0036	<0.0035	<0.0035	0.011	0.034	0.03	<0.0036	<0.0036	<0.0035	<0.0037	<0.0037	<0.0034
Perfluorononane sulfonic acid (PFNS)	NCL	NCL	<0.007	<0.007	<0.0072	<0.007	<0.0072	<0.007	<0.007	<0.0074	<0.0071	<0.0072	<0.0071	<0.0071	<0.007	<0.0073	<0.0074	<0.0068
Perfluorooctane sulfonamide (FOSA)	NCL	NCL	<0.0035	<0.0035	<0.0036	<0.0035	<0.0036	<0.0035	<0.0035	<0.0037	<0.0035	<0.0036	<0.0036	<0.0036	<0.0035	<0.0037	<0.0037	<0.0034
Perfluoropentane sulfonic acid (PFPeS)	NCL	NCL	<0.0035	<0.0035	<0.0036	<0.0035	<0.0036	0.0064	0.013	0.041	0.16	0.17	0.13	0.098	0.011	0.015	0.014	0.012
Perfluorohexane sulfonic acid (PFHxS)	NCL	NCL	0.0043	<0.0035	<0.0036	<0.0035	<0.0036	0.011	0.026	0.09	0.35	0.32	0.13	0.06	0.0058	0.0074	0.0082	0.0062
Perfluorobutanoic acid (PFBA)	NCL	NCL	0.0089	<0.0035	<0.0036	<0.0035	<0.0036	<0.0035	<0.0035	0.0074	0.028	0.03	0.059	0.06	0.016	0.018	0.02	0.018
Perfluorodecanoic acid (PFDA)	NCL	NCL	<0.0035	<0.0035	<0.0036	<0.0035	<0.0036	<0.0035	<0.0035	<0.0037	<0.0035	<0.0036	<0.0036	<0.0036	<0.0035	<0.0037	<0.0037	<0.0034
Perfluorododecanoic acid (PFDoDA)	NCL	NCL	<0.0035	<0.0035	<0.0036	<0.0035	<0.0036	<0.0035	<0.0035	<0.0037	<0.0035	<0.0036	<0.0036	<0.0036	<0.0035	<0.0037	<0.0037	<0.0034
Perfluoroheptanoic acid (PFHpA)	NCL	NCL	<0.0035	<0.0035	<0.0036	<0.0035	<0.0036	0.0035	0.0071	0.019	0.082	0.087	0.084	0.07	0.0095	0.011	0.011	0.01
Perfluorohexanoic acid (PFHxA)	NCL	NCL	<0.0035	<0.0035	<0.0036	<0.0035	<0.0036	0.0052	0.0072	0.017	0.079	0.084	0.12	0.12	0.019	0.022	0.024	0.021
Perfluorononanoic acid (PFNA)	NCL	NCL	<0.0035	<0.0035	<0.0036	<0.0035	<0.0036	<0.0035	<0.0035	<0.0037	<0.0035	<0.0036	<0.0036	<0.0036	<0.0035	<0.0037	<0.0037	<0.0034
Perfluorooctanoic acid (PFOA)	0.07 (JJ)	12	<0.0017	<0.0017	<0.0018	<0.0017	0.0022	0.011	0.026	0.083	0.33	0.33	0.18	0.1	0.0092	0.014	0.015	0.015
Perfluorooctane sulfonic acid (PFOS)	0.07 (JJ)	0.012	<0.0035	<0.0035	<0.0036	<0.0035	<0.0036	<0.0035	0.011	0.043	0.098	0.084	0.0045	<0.0036	<0.0035	<0.0037	<0.0037	<0.0034
PFOA + PFOS (Calculated)	0.07	NCL	ND	ND	ND	ND	0.0022	0.011	0.037	0.13	0.43	0.41	0.18	0.1	0.0092	0.014	0.015	0.015
Perfluoropentanoic acid (PFPeA)	NCL	NCL	<0.0035	<0.0035	<0.0036	<0.0035	<0.0036	<0.0035	<0.0035	0.0073	0.03	0.032	0.057	0.06	0.014	0.015	0.017	0.016
Perfluorotetradecanoic acid (PFTeDA)	NCL	NCL	<0.0035	<0.0035	<0.0035	<0.0035	<0.0036	<0.0035	<0.0035	<0.0037	<0.0035	<0.0036	<0.0036	<0.0036	<0.0035	<0.0037	<0.0037	<0.0034
Perfluorotridecanoic acid (PFTrDA)	NCL	NCL	<0.0035	<0.0035	<0.0036	<0.0035	<0.0036	<0.0035	<0.0035	<0.0037	<0.0035	<0.0036	<0.0036	<0.0036	<0.0035	<0.0037	<0.0037	<0.0034
Perfluoroundecanoic acid (PFUnDA)	NCL	NCL	<0.0035	<0.0035	<0.0036	<0.0035	<0.0036	<0.0035	<0.0035	<0.0037	<0.0035	<0.0036	<0.0036	<0.0036	<0.0035	<0.0037	<0.0037	<0.0034
Total PFAS (Calculated)	NCL	NCL	0.019	ND	ND	ND	0.0078	0.047	0.11	0.35	1.3	1.3	0.94	0.74	0.11	0.13	0.14	0.12

TABLE 3
GROUNDWATER ANALYTICAL DATA - PFAS
House Street Disposal Site Study Area
Plainfield Township, Kent County, MI

Sample Location	Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water ²	Part 201 Generic Groundwater Cleanup Criteria – Groundwater Surface Water Interface ²	HS-MW-18D	HS-MW-18S	HS-MW-18S	HS-MW-18S	HS-MW-18S	HS-MW-18S	HS-MW-18S	HS-PMW-19	HS-PMW-19	HS-PMW-19	HS-PMW-19	HS-MW-19D	HS-MW-19D	HS-MW-19D	HS-MW-19D	HS-MW-19D	HS-MW-19S
Sample Name			HS-GW-MW-18D	MW-18S	HS-MW-18S	HS-GW-MW18S	HS-GW-MW18S	HS-GW-MW-18S	HS-GW-MW-18S	PMW-19 55-60	Dupe-1	PMW-19 80-85	PMW-19 90-95	PMW-19D	HS-MW-19D	HS-GW-MW19D	HS-GW-MW19D	HS-GW-MW-19D	PMW-19S
Well Screen Interval (Feet below ground surface)			140.6-145.6	12.8-22.8	12.8-22.8	12.8-22.8	12.8-22.8	12.8-22.8	12.8-22.8	55-60	55-60	80-85	90-95	85.9-95.9	85.9-95.9	85.9-95.9	85.9-95.9	85.9-95.9	58.4-61.4
Laboratory Sample ID			UK19008-015	TG07027-005	UC02020-007	UE24001-005	UI12010-010	UK21036-020	K1800413-001	K1800413-004	K1800413-006	K1800413-007	K1802511-009	UC02020-005	UE24001-007	UI26001-003	UL12091-019	K1802511-010	
Sample Date			11/20/2019	07/06/2018	03/01/2019	05/21/2019	09/10/2019	11/21/2019	01/09/2018	01/09/2018	01/10/2018	01/10/2018	03/16/2018	02/28/2019	05/21/2019	09/23/2019	12/12/2019	03/16/2018	
Parameter (µg/L)																			
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NCL	<0.0037	<0.0035	<0.0037	<0.0036	<0.0034	<0.0035	<0.0043	<0.0042	<0.0043	<0.0042	<0.0049	<0.0035	<0.0035	<0.0034	<0.0036	<0.0045	
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NCL	<0.0037	<0.0035	<0.0037	<0.0036	<0.0034	<0.0035	<0.0043	<0.0042	<0.0043	<0.0042	<0.0049	<0.0035	<0.0035	<0.0034	<0.0036	<0.0045	
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NCL	<0.0037	<0.0035	<0.0037	<0.0036	<0.0034	<0.0035	<0.0043	<0.0042	<0.0043	<0.0042	<0.0049	<0.0035	<0.0035	<0.0034	<0.0036	<0.0045	
N-Ethyl perfluorooctane sulfonamidoethanol (N-EtFOSE)	NCL	NCL	-	-	-	-	-	-	<0.0043	<0.0042	<0.0043	<0.0042	<0.0049	-	-	-	-	<0.0045	
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NCL	<0.0075	<0.007	<0.0074	<0.0073	<0.0068	<0.007	<0.0043	<0.0042	<0.0043	<0.0042	<0.0049	<0.007	<0.007	<0.0069	<0.0072	<0.0045	
N-Methyl perfluorooctane sulfonamidoethanol (N-MeFOSE)	NCL	NCL	-	-	-	-	-	-	<0.0043	<0.0042	<0.0043	<0.0042	<0.0049	-	-	-	-	<0.0045	
Perfluorobutane sulfonic acid (PFBS)	NCL	NCL	0.029	<0.0035	0.0037	<0.0036	<0.0034	<0.0035	<0.0043	<0.0042	<0.0043	<0.0042	<0.0049	<0.0035	<0.0035	<0.0034	<0.0036	<0.0045	
Perfluorodecane sulfonic acid (PFDS)	NCL	NCL	<0.0037	<0.0035	<0.0037	<0.0036	<0.0034	<0.0035	<0.0043	<0.0042	<0.0043	<0.0042	<0.0049	<0.0035	<0.0035	<0.0034	<0.0036	<0.0045	
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NCL	<0.0037	<0.0035	<0.0037	<0.0036	<0.0034	<0.0035	<0.0043	<0.0042	<0.0043	<0.0042	<0.0049	<0.0035	<0.0035	<0.0034	<0.0036	<0.0045	
Perfluorononane sulfonic acid (PFNS)	NCL	NCL	<0.0075	<0.007	<0.0074	<0.0073	<0.0068	<0.007	-	-	-	-	-	<0.007	<0.007	<0.0069	<0.0072	-	
Perfluorooctane sulfonamide (FOSA)	NCL	NCL	<0.0037	<0.0035	<0.0037	<0.0036	<0.0034	<0.0035	<0.0043	<0.0042	<0.0043	<0.0042	<0.0049	<0.0035	<0.0035	<0.0034	<0.0036	<0.0045	
Perfluoropentane sulfonic acid (PFPeS)	NCL	NCL	0.014	<0.0035	<0.0037	<0.0036	<0.0034	<0.0035	-	-	-	-	-	<0.0035	<0.0035	<0.0034	<0.0036	-	
Perfluorohexane sulfonic acid (PFHxS)	NCL	NCL	0.0072	<0.0035	<0.0037	<0.0036	<0.0034	0.0043	<0.0043	<0.0042	<0.0043	<0.0042	<0.0049	<0.0035	<0.0035	<0.0034	<0.0036	<0.0045	
Perfluorobutanoic acid (PFBA)	NCL	NCL	0.02	<0.0035	<0.0037	<0.0036	<0.0034	<0.0035	<0.0086	<0.0083	<0.0086	<0.0083	<0.0098	<0.0035	<0.0035	<0.0034	<0.0036	<0.0091	
Perfluorodecanoic acid (PFDA)	NCL	NCL	<0.0037	<0.0035	<0.0037	<0.0036	<0.0034	<0.0035	<0.0043	<0.0042	<0.0043	<0.0042	<0.0049	<0.0035	<0.0035	<0.0034	<0.0036	<0.0045	
Perfluorododecanoic acid (PFDoDA)	NCL	NCL	<0.0037	<0.0035	<0.0037	<0.0036	<0.0034	<0.0035	<0.0043	<0.0042	<0.0043	<0.0042	<0.0049	<0.0035	<0.0035	<0.0034	<0.0036	<0.0045	
Perfluoroheptanoic acid (PFHpA)	NCL	NCL	0.011	<0.0035	<0.0037	<0.0036	<0.0034	<0.0035	<0.0043	<0.0042	<0.0043	<0.0042	<0.0049	<0.0035	<0.0035	<0.0034	<0.0036	<0.0045	
Perfluorohexanoic acid (PFHxA)	NCL	NCL	0.022	<0.0035	<0.0037	<0.0036	<0.0034	<0.0035	<0.0043	<0.0042	<0.0043	<0.0042	<0.0049	<0.0035	<0.0035	<0.0034	<0.0036	<0.0045	
Perfluorononanoic acid (PFNA)	NCL	NCL	<0.0037	<0.0035	<0.0037	<0.0036	<0.0034	<0.0035	<0.0043	<0.0042	<0.0043	<0.0042	<0.0049	<0.0035	<0.0035	<0.0034	<0.0036	<0.0045	
Perfluorooctanoic acid (PFOA)	0.07 (JJ)	12	0.015	<0.0018	<0.0019	<0.0018	<0.0017	<0.0017	<0.0017	<0.0017	<0.0017	<0.0017	<0.002	<0.0018	<0.0018	<0.0017	<0.0018	<0.0018	
Perfluorooctane sulfonic acid (PFOS)	0.07 (JJ)	0.012	<0.0037	<0.0035	<0.0037	<0.0036	<0.0034	<0.0035	<0.0043	<0.0042	<0.0043	<0.0042	<0.0049	<0.0035	<0.0035	<0.0034	<0.0036	0.0075	
PFOA + PFOS (Calculated)	0.07	NCL	0.015	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0075	
Perfluoropentanoic acid (PFPeA)	NCL	NCL	0.016	<0.0035	<0.0037	<0.0036	<0.0034	<0.0035	<0.0043	<0.0042	<0.0043	<0.0042	<0.0049	<0.0035	<0.0035	<0.0034	<0.0036	<0.0045	
Perfluorotetradecanoic acid (PFTeDA)	NCL	NCL	<0.0037	<0.0035	<0.0037	<0.0036	<0.0034	<0.0035	<0.0043	<0.0042	<0.0043	<0.0042	<0.0049	<0.0035	<0.0035	<0.0034	<0.0036	<0.0045	
Perfluorotridecanoic acid (PFTrDA)	NCL	NCL	<0.0037	<0.0035	<0.0037	<0.0036	<0.0034	<0.0035	<0.0043	<0.0042	<0.0043	<0.0042	<0.0049	<0.0035	<0.0035	<0.0034	<0.0036	<0.0045	
Perfluoroundecanoic acid (PFUnDA)	NCL	NCL	<0.0037	<0.0035	<0.0037	<0.0036	<0.0034	<0.0035	<0.0043	<0.0042	<0.0043	<0.0042	<0.0049	<0.0035	<0.0035	<0.0034	<0.0036	<0.0045	
Total PFAS (Calculated)	NCL	NCL	0.13	ND	0.0037	ND	ND	0.0043	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0075	

TABLE 3
GROUNDWATER ANALYTICAL DATA - PFAS
House Street Disposal Site Study Area
Plainfield Township, Kent County, MI

Sample Location	Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water ²	Part 201 Generic Groundwater Cleanup Criteria – Groundwater Surface Water Interface ²	HS-MW-19S	HS-MW-19S	HS-MW-19S	HS-MW-19S	HS-PMW-20	HS-PMW-20	HS-PMW-20	HS-PMW-20	HS-PMW-20	HS-PMW-20	HS-PMW-20	HS-MW-20D	HS-MW-20D	HS-MW-20D	HS-MW-20D	HS-MW-20M
Sample Name			HS-MW-19S	HS-GW-MW19S	HS-GW-MW19S	HS-GW-MW-19S	SB-20 60-65	SB-20 70-75	SB-20 80-85	SB-20 90-95	SB-20 100-105	SB-20 110-115	SB-20 120-125	HS-MW-20D	HS-GW-MW20D	HS-GW-MW20D	HS-GW-MW-20D	HS-MW-20M
Well Screen Interval (Feet below ground surface)			58.4-61.4	58.4-61.4	58.4-61.4	58.4-61.4	60-65	70-75	80-85	90-95	100-105	110-115	120-125	126.1-131.1	126.1-131.1	126.1-131.1	126.1-131.1	101.5-106.5
Laboratory Sample ID			UC02020-004	UE24001-006	UI26001-002	UL12091-016	TJ21003-001	TJ21003-002	TJ21003-005	TJ21003-006	TJ21003-007	TJ21003-008	TJ21003-011	UC09042-002	UE30036-003	UI19006-022	UK29008-019	UC09042-001
Sample Date	02/28/2019	05/21/2019	09/23/2019	12/11/2019	10/15/2018	10/15/2018	10/16/2018	10/16/2018	10/16/2018	10/16/2018	10/16/2018	10/16/2018	10/17/2018	03/06/2019	05/28/2019	09/18/2019	11/27/2019	03/06/2019
Parameter (µg/L)																		
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NCL	<0.004	<0.0034	<0.0038	<0.0036	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0036	<0.0035	<0.0036	<0.0035	<0.0035	<0.0037
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NCL	<0.004	<0.0034	<0.0038	<0.0036	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0036	<0.0035	<0.0036	<0.0035	<0.0035	<0.0037
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NCL	<0.004	<0.0034	<0.0038	<0.0036	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0036	<0.0035	<0.0036	<0.0035	<0.0035	<0.0037
N-Ethyl perfluorooctane sulfonamidoethanol (N-EtFOSE)	NCL	NCL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NCL	<0.0081	<0.0069	<0.0077	<0.0072	<0.007	<0.007	<0.007	<0.007	<0.0071	<0.0071	<0.0071	<0.0071	<0.0073	<0.007	<0.0069	<0.0074
N-Methyl perfluorooctane sulfonamidoethanol (N-MeFOSE)	NCL	NCL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perfluorobutane sulfonic acid (PFBS)	NCL	NCL	<0.004	<0.0034	<0.0038	<0.0036	0.014	0.0035	0.018	0.05	0.068	0.11	0.15	0.16	0.17	0.17	0.15	0.071
Perfluorodecane sulfonic acid (PFDS)	NCL	NCL	<0.004	<0.0034	<0.0038	<0.0036	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0036	<0.0035	<0.0036	<0.0035	<0.0035	<0.0037
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NCL	<0.004	<0.0034	<0.0038	<0.0036	<0.0035	<0.0035	<0.0035	0.0067	0.0066	<0.0035	<0.0036	<0.0035	<0.0036	<0.0035	<0.0035	0.0095
Perfluorononane sulfonic acid (PFNS)	NCL	NCL	<0.0081	<0.0069	<0.0077	<0.0072	<0.007	<0.007	<0.007	<0.007	<0.0071	<0.0071	<0.0071	<0.0071	<0.0073	<0.007	<0.0069	<0.0074
Perfluorooctane sulfonamide (FOSA)	NCL	NCL	<0.004	<0.0034	<0.0038	<0.0036	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0036	<0.0035	<0.0036	<0.0035	<0.0035	<0.0037
Perfluoropentane sulfonic acid (PFPeS)	NCL	NCL	<0.004	<0.0034	<0.0038	<0.0036	0.0081	<0.0035	0.022	0.058	0.079	0.11	0.1	0.097	0.098	0.11	0.098	0.083
Perfluorohexane sulfonic acid (PFHxS)	NCL	NCL	<0.004	<0.0034	<0.0038	<0.0036	0.0051	<0.0035	0.044	0.11	0.13	0.11	0.053	0.042	0.042	0.046	0.043	0.16
Perfluorobutanoic acid (PFBA)	NCL	NCL	<0.004	<0.0034	<0.0038	<0.0036	0.0036	<0.0035	0.0045	0.012	0.015	0.027	0.043	0.047	0.052	0.05	0.049	0.015
Perfluorodecanoic acid (PFDA)	NCL	NCL	<0.004	<0.0034	<0.0038	<0.0036	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0036	<0.0035	<0.0036	<0.0035	<0.0035	<0.0037
Perfluorododecanoic acid (PFDoDA)	NCL	NCL	<0.004	<0.0034	<0.0038	<0.0036	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0036	<0.0035	<0.0036	<0.0035	<0.0035	<0.0037
Perfluoroheptanoic acid (PFHpA)	NCL	NCL	<0.004	<0.0034	<0.0038	<0.0036	0.0054	<0.0035	0.011	0.03	0.042	0.06	0.066	0.07	0.078	0.077	0.076	0.043
Perfluorohexanoic acid (PFHxA)	NCL	NCL	<0.004	<0.0034	<0.0038	<0.0036	0.0074	<0.0035	0.012	0.028	0.041	0.069	0.11	0.088	0.1	0.1	0.1	0.038
Perfluorononanoic acid (PFNA)	NCL	NCL	<0.004	<0.0034	<0.0038	<0.0036	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0036	<0.0035	<0.0036	<0.0035	<0.0035	<0.0037
Perfluorooctanoic acid (PFOA)	0.07 (JJ)	12	<0.002	<0.0017	<0.0019	<0.0018	0.0084	0.0053	0.041	0.1	0.13	0.13	0.096	0.09	0.12	0.12	0.11	0.16
Perfluorooctane sulfonic acid (PFOS)	0.07 (JJ)	0.012	<0.004	<0.0034	<0.0038	<0.0036	<0.0035	<0.0035	0.011	0.023	0.019	0.0081	<0.0036	<0.0035	<0.0036	<0.0035	<0.0035	0.04
PFOA + PFOS (Calculated)	0.07	NCL	ND	ND	ND	ND	0.0084	0.0053	0.052	0.12	0.15	0.14	0.096	0.09	0.12	0.12	0.11	0.2
Perfluoropentanoic acid (PFPeA)	NCL	NCL	<0.004	<0.0034	<0.0038	<0.0036	<0.0035	<0.0035	0.0051	0.013	0.016	0.032	0.046	0.045	0.054	0.052	0.049	0.017
Perfluorotetradecanoic acid (PFTeDA)	NCL	NCL	<0.004	<0.0034	<0.0038	<0.0036	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0036	<0.0035	<0.0036	<0.0035	<0.0035	<0.0037
Perfluorotridecanoic acid (PFTrDA)	NCL	NCL	<0.004	<0.0034	<0.0038	<0.0036	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0036	<0.0035	<0.0036	<0.0035	<0.0035	<0.0037
Perfluoroundecanoic acid (PFUnDA)	NCL	NCL	<0.004	<0.0034	<0.0038	<0.0036	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0036	<0.0035	<0.0036	<0.0035	<0.0035	<0.0037
Total PFAS (Calculated)	NCL	NCL	ND	ND	ND	ND	0.052	0.0088	0.17	0.43	0.55	0.66	0.66	0.64	0.71	0.73	0.68	0.64

TABLE 3
GROUNDWATER ANALYTICAL DATA - PFAS
House Street Disposal Site Study Area
Plainfield Township, Kent County, MI

Sample Location	Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water ²	Part 201 Generic Groundwater Cleanup Criteria – Groundwater Surface Water Interface ²	HS-MW-20M	HS-MW-20M	HS-MW-20M	HS-MW-20M	HS-MW-20S	HS-MW-20S	HS-MW-20S	HS-MW-20S	HS-MW-20S	HS-PMW-21	HS-PMW-21	HS-PMW-21	HS-PMW-21	HS-PMW-21	HS-MW-21D	HS-MW-21D	HS-MW-21D
Sample Name			HS-GW-MW20M	HS-GW-MW20M	HS-GW-MW20M DUP	HS-GW-MW-20M	MW-20S	HS-GW-MW20S	HS-GW-MW20S	HS-GW-MW-20S	HS-GW-MW-20S	PMW-21 15-20	PMW-21 25-30	PMW-21 35-40	PMW-21 55-60	PMW-21 80-85	PMW-21D	HS-MW-21D	HS-GW-MW21D
Well Screen Interval (Feet below ground surface)			101.5-106.5	101.5-106.5	101.5-106.5	101.5-106.5	61.1-66.1	61.1-66.1	61.1-66.1	61.1-66.1	61.1-66.1	15-20	25-30	35-40	55-60	80-65	76.2-86.2	76.2-86.2	76.2-86.2
Laboratory Sample ID			UE30036-002	UI19006-020	UI19006-021	UK29008-002	UC06036-001	UE30036-001	UI19006-019	UK29008-001	K1800184-001	K1800184-002	K1800184-003	K1800184-004	K1800184-005	K1802511-005	UB28086-003	UE18016-001	
Sample Date	05/28/2019	09/18/2019	09/18/2019	11/26/2019	03/04/2019	05/28/2019	09/18/2019	11/26/2019	01/02/2018	01/03/2018	01/03/2018	01/03/2018	01/03/2018	01/03/2018	03/15/2018	02/27/2019	05/16/2019		
Parameter (µg/L)																			
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NCL	<0.0035	<0.0035	<0.0035	<0.0035	<0.0036	<0.0037	<0.0035	<0.0035	<0.0035	<0.0043	<0.0043	<0.0042	<0.0042	<0.0043	<0.0047	<0.0036	<0.0036
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NCL	<0.0035	<0.0035	<0.0035	<0.0035	<0.0036	<0.0037	<0.0035	<0.0035	<0.0035	<0.0043	<0.0043	<0.0042	<0.0042	<0.0043	<0.0047	<0.0036	<0.0036
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NCL	<0.0035	<0.0035	<0.0035	<0.0035	<0.0036	<0.0037	<0.0035	<0.0035	<0.0035	<0.0043	<0.0043	<0.0042	<0.0042	<0.0043	<0.0047	<0.0036	<0.0036
N-Ethyl perfluorooctane sulfonamidoethanol (N-EtFOSE)	NCL	NCL	-	-	-	-	-	-	-	-	-	<0.0043	<0.0043	<0.0042	<0.0042	<0.0043	<0.0047	-	-
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NCL	<0.0069	<0.0069	<0.007	<0.0071	<0.0071	<0.0074	<0.0071	<0.007	<0.007	<0.0043	<0.0043	<0.0042	<0.0042	<0.0043	<0.0047	<0.0072	<0.0073
N-Methyl perfluorooctane sulfonamidoethanol (N-MeFOSE)	NCL	NCL	-	-	-	-	-	-	-	-	-	<0.0043	<0.0043	<0.0042	<0.0042	<0.0043	<0.0047	-	-
Perfluorobutane sulfonic acid (PFBS)	NCL	NCL	0.068	0.069	0.07	0.06	0.015	0.016	0.018	0.018	0.018	<0.0043	<0.0043	<0.0042	<0.0042	<0.0043	<0.0047	<0.0036	<0.0036
Perfluorodecane sulfonic acid (PFDS)	NCL	NCL	<0.0035	<0.0035	<0.0035	<0.0035	<0.0036	<0.0037	<0.0035	<0.0035	<0.0035	<0.0043	<0.0043	<0.0042	<0.0042	<0.0043	<0.0047	<0.0036	<0.0036
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NCL	0.0088	0.008	0.0084	0.0077	<0.0036	<0.0037	<0.0035	<0.0035	<0.0035	<0.0043	<0.0043	<0.0042	<0.0042	<0.0043	<0.0047	<0.0036	<0.0036
Perfluorononane sulfonic acid (PFNS)	NCL	NCL	<0.0069	<0.0069	<0.007	<0.0071	<0.0071	<0.0074	<0.0071	<0.007	<0.007	-	-	-	-	-	-	<0.0072	<0.0073
Perfluorooctane sulfonamide (FOSA)	NCL	NCL	<0.0035	<0.0035	<0.0035	<0.0035	<0.0036	<0.0037	<0.0035	<0.0035	<0.0035	<0.0043	<0.0043	<0.0042	<0.0042	<0.0043	<0.0047	<0.0036	<0.0036
Perfluoropentane sulfonic acid (PFPeS)	NCL	NCL	0.079	0.08	0.085	0.062	0.013	0.013	0.016	0.012	0.012	-	-	-	-	-	-	<0.0036	<0.0036
Perfluorohexane sulfonic acid (PFHxS)	NCL	NCL	0.16	0.15	0.14	0.13	0.014	0.017	0.019	0.013	0.013	<0.0043	<0.0043	<0.0042	<0.0042	<0.0043	<0.0047	<0.0036	<0.0036
Perfluorobutanoic acid (PFBA)	NCL	NCL	0.015	0.015	0.014	0.014	0.0042	0.0043	0.0047	0.0067	0.0067	<0.0086	<0.0086	<0.0083	<0.0083	<0.0086	<0.0094	<0.0036	<0.0036
Perfluorodecanoic acid (PFDA)	NCL	NCL	<0.0035	<0.0035	<0.0035	<0.0035	<0.0036	<0.0037	<0.0035	<0.0035	<0.0035	<0.0043	<0.0043	<0.0042	<0.0042	<0.0043	<0.0047	<0.0036	<0.0036
Perfluorododecanoic acid (PFDoDA)	NCL	NCL	<0.0035	<0.0035	<0.0035	<0.0035	<0.0036	<0.0037	<0.0035	<0.0035	<0.0035	<0.0043	<0.0043	<0.0042	<0.0042	<0.0043	<0.0047	<0.0036	<0.0036
Perfluoroheptanoic acid (PFHpA)	NCL	NCL	0.042	0.039	0.045	0.038	0.0056	0.0082	0.0094	0.0092	0.0092	<0.0043	<0.0043	<0.0042	<0.0042	<0.0043	<0.0047	<0.0036	<0.0036
Perfluorohexanoic acid (PFHxA)	NCL	NCL	0.038	0.036	0.034	0.034	0.0068	0.0085	0.0093	0.013	0.013	<0.0043	<0.0043	<0.0042	<0.0042	<0.0043	<0.0047	<0.0036	<0.0036
Perfluorononanoic acid (PFNA)	NCL	NCL	<0.0035	<0.0035	<0.0035	<0.0035	<0.0036	<0.0037	<0.0035	<0.0035	<0.0035	<0.0043	<0.0043	<0.0042	<0.0042	<0.0043	<0.0047	<0.0036	<0.0036
Perfluorooctanoic acid (PFOA)	0.07 (JJ)	12	0.17	0.17	0.17	0.15	0.016	0.022	0.022	0.023	0.0022	<0.0017	<0.0017	<0.0017	<0.0017	<0.0017	<0.0019	<0.0018	<0.0018
Perfluorooctane sulfonic acid (PFOS)	0.07 (JJ)	0.012	0.034	0.033	0.032	0.029	<0.0036	<0.0037	<0.0035	<0.0035	<0.0043	<0.0043	<0.0042	<0.0042	<0.0042	<0.0043	0.0061	<0.0036	<0.0036
PFOA + PFOS (Calculated)	0.07	NCL	0.2	0.2	0.2	0.18	0.016	0.022	0.022	0.023	0.0022	ND	ND	ND	ND	ND	0.0061	ND	ND
Perfluoropentanoic acid (PFPeA)	NCL	NCL	0.017	0.015	0.016	0.014	<0.0036	0.0039	0.0045	0.0064	<0.0043	<0.0043	<0.0042	<0.0042	<0.0043	<0.0047	<0.0036	<0.0036	<0.0036
Perfluorotetradecanoic acid (PFTeDA)	NCL	NCL	<0.0035	<0.0035	<0.0035	<0.0035	<0.0036	<0.0037	<0.0035	<0.0035	<0.0035	<0.0043	<0.0043	<0.0042	<0.0042	<0.0043	<0.0047	<0.0036	<0.0036
Perfluorotridecanoic acid (PFTrDA)	NCL	NCL	<0.0035	<0.0035	<0.0035	<0.0035	<0.0036	<0.0037	<0.0035	<0.0035	<0.0035	<0.0043	<0.0043	<0.0042	<0.0042	<0.0043	<0.0047	<0.0036	<0.0036
Perfluoroundecanoic acid (PFUnDA)	NCL	NCL	<0.0035	<0.0035	<0.0035	<0.0035	<0.0036	<0.0037	<0.0035	<0.0035	<0.0035	<0.0043	<0.0043	<0.0042	<0.0042	<0.0043	<0.0047	<0.0036	<0.0036
Total PFAS (Calculated)	NCL	NCL	0.63	0.62	0.61	0.54	0.075	0.093	0.1	0.1	0.1	0.0022	ND	ND	ND	ND	0.0061	ND	ND

TABLE 3
GROUNDWATER ANALYTICAL DATA - PFAS
House Street Disposal Site Study Area
Plainfield Township, Kent County, MI

Sample Location	Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water ²	Part 201 Generic Groundwater Cleanup Criteria – Groundwater Surface Water Interface ²	HS-MW-21D	HS-MW-21D	HS-MW-21D	HS-MW-21D	HS-MW-21M	HS-MW-21M	HS-MW-21M	HS-MW-21M	HS-MW-21M	HS-MW-21S	HS-MW-21S	HS-MW-21S	HS-MW-21S	HS-MW-21S	HS-MW-21S	HS-PMW-23	HS-PMW-23
Sample Name			HS-GW-MW21D DUP	HS-GW-MW21D	HS-GW-MW-21D	HS-GW-MW-21D DUP	PMW-21I	HS-MW-21M	HS-GW-MW21M	HS-GW-MW21M	HS-GW-MW-21M	PMW-21S	HS-MW-21S	HS-GW-MW21S	HS-GW-MW21S	HS-GW-MW-21S	PMW-23(10-20)	PMW-23(70-80)	
Well Screen Interval (Feet below ground surface)			76.2-86.2	76.2-86.2	76.2-86.2	76.2-86.2	59-64	59-64	59-64	59-64	59-64	9.8-19.8	9.8-19.8	9.8-19.8	9.8-19.8	9.8-19.8	10-20	70-80	
Laboratory Sample ID			UE18016-002	UI19006-003	UL12091-001	UL12091-002	K1802511-002	UB28086-002	UE18016-003	UI19006-004	UK29008-020	K1802511-001	UB28086-001	UE18016-004	UI19006-006	UK29008-022	UF15016-001	UF15016-002	
Sample Date			05/16/2019	09/16/2019	12/09/2019	12/09/2019	03/15/2018	02/27/2019	05/16/2019	09/16/2019	11/27/2019	03/15/2018	02/27/2019	05/16/2019	09/16/2019	11/27/2019	06/10/2019	06/11/2019	
Parameter (µg/L)																			
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NCL	<0.0036	<0.0036	<0.0036	<0.0035	<0.0047	<0.0037	<0.0036	<0.0036	<0.0037	<0.0047	<0.0037	<0.0037	<0.0037	<0.0035	<0.0036	<0.0035	
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NCL	<0.0036	0.0058	<0.0036	<0.0035	<0.0047	<0.0037	<0.0036	<0.0036	<0.0037	<0.0047	<0.0037	<0.0037	<0.0037	<0.0035	<0.0036	<0.0035	
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NCL	<0.0036	<0.0036	<0.0036	<0.0035	<0.0047	<0.0037	<0.0036	<0.0036	<0.0037	<0.0047	<0.0037	<0.0037	<0.0037	<0.0035	<0.0036	<0.0035	
N-Ethyl perfluorooctane sulfonamidoethanol (N-EtFOSE)	NCL	NCL	-	-	-	-	<0.0047	-	-	-	-	<0.0047	-	-	-	-	-	-	
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NCL	<0.0073	<0.0072	<0.0072	<0.0071	<0.0047	<0.0075	<0.0073	<0.0071	<0.0074	<0.0047	<0.0073	<0.0074	<0.0074	<0.007	<0.0072	<0.0069	
N-Methyl perfluorooctane sulfonamidoethanol (N-MeFOSE)	NCL	NCL	-	-	-	-	<0.0047	-	-	-	-	<0.0047	-	-	-	-	-	-	
Perfluorobutane sulfonic acid (PFBS)	NCL	NCL	<0.0036	<0.0036	<0.0036	<0.0035	<0.0047	<0.0037	<0.0036	<0.0036	<0.0037	<0.0047	<0.0037	<0.0037	<0.0037	0.0036	0.037	0.015	
Perfluorodecane sulfonic acid (PFDS)	NCL	NCL	<0.0036	<0.0036	<0.0036	<0.0035	<0.0047	<0.0037	<0.0036	<0.0036	<0.0037	<0.0047	<0.0037	<0.0037	<0.0037	<0.0035	<0.0036	<0.0035	
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NCL	<0.0036	<0.0036	<0.0036	<0.0035	<0.0047	<0.0037	<0.0036	<0.0036	<0.0037	<0.0047	<0.0037	<0.0037	<0.0037	<0.0035	<0.0036	<0.0035	
Perfluorononane sulfonic acid (PFNS)	NCL	NCL	<0.0073	<0.0072	<0.0072	<0.0071	-	<0.0075	<0.0073	<0.0071	<0.0074	-	<0.0073	<0.0074	<0.0074	<0.007	<0.0072	<0.0069	
Perfluorooctane sulfonamide (FOSA)	NCL	NCL	<0.0036	<0.0036	<0.0036	<0.0035	<0.0047	<0.0037	<0.0036	<0.0036	<0.0037	<0.0047	<0.0037	<0.0037	<0.0037	<0.0035	<0.0036	<0.0035	
Perfluoropentane sulfonic acid (PFPeS)	NCL	NCL	<0.0036	<0.0036	<0.0036	<0.0035	-	<0.0037	<0.0036	<0.0036	<0.0037	-	<0.0037	<0.0037	<0.0037	<0.0035	0.034	0.011	
Perfluorohexane sulfonic acid (PFHxS)	NCL	NCL	<0.0036	<0.0036	<0.0036	<0.0035	<0.0047	<0.0037	<0.0036	<0.0036	<0.0037	<0.0047	<0.0037	<0.0037	<0.0037	<0.0035	0.072	0.032	
Perfluorobutanoic acid (PFBA)	NCL	NCL	<0.0036	<0.0036	<0.0036	<0.0035	<0.0094	<0.0037	<0.0036	<0.0036	<0.0037	<0.0094	<0.0037	<0.0037	<0.0037	<0.0035	0.0085	<0.0035	
Perfluorodecanoic acid (PFDA)	NCL	NCL	<0.0036	<0.0036	<0.0036	<0.0035	<0.0047	<0.0037	<0.0036	<0.0036	<0.0037	<0.0047	<0.0037	<0.0037	<0.0037	<0.0035	<0.0036	<0.0035	
Perfluorododecanoic acid (PFDoDA)	NCL	NCL	<0.0036	<0.0036	<0.0036	<0.0035	<0.0047	<0.0037	<0.0036	<0.0036	<0.0037	<0.0047	<0.0037	<0.0037	<0.0037	<0.0035	<0.0036	<0.0035	
Perfluoroheptanoic acid (PFHpA)	NCL	NCL	<0.0036	<0.0036	<0.0036	<0.0035	<0.0047	<0.0037	<0.0036	<0.0036	<0.0037	<0.0047	<0.0037	<0.0037	<0.0037	<0.0035	<0.0036	<0.0035	
Perfluorohexanoic acid (PFHxA)	NCL	NCL	<0.0036	<0.0036	<0.0036	<0.0035	<0.0047	<0.0037	<0.0036	<0.0036	<0.0037	<0.0047	<0.0037	<0.0037	<0.0037	<0.0035	0.0078	<0.0035	
Perfluorononanoic acid (PFNA)	NCL	NCL	<0.0036	<0.0036	<0.0036	<0.0035	<0.0047	<0.0037	<0.0036	<0.0036	<0.0037	<0.0047	<0.0037	<0.0037	<0.0037	<0.0035	<0.0036	<0.0035	
Perfluorooctanoic acid (PFOA)	0.07 (JJ)	12	<0.0018	<0.0018	<0.0018	<0.0018	<0.0019	<0.0019	<0.0018	<0.0018	<0.0019	0.0056	0.0028	0.0026	0.0034	0.0031	0.015	0.013	
Perfluorooctane sulfonic acid (PFOS)	0.07 (JJ)	0.012	<0.0036	<0.0036	<0.0036	<0.0035	0.017	<0.0037	<0.0036	<0.0036	<0.0037	0.0092	<0.0037	<0.0037	<0.0037	<0.0035	<0.0036	0.0057	
PFOA + PFOS (Calculated)	0.07	NCL	ND	ND	ND	ND	0.017	ND	ND	ND	ND	0.015	0.0028	0.0026	0.0034	0.0031	0.015	0.019	
Perfluoropentanoic acid (PFPeA)	NCL	NCL	<0.0036	<0.0036	<0.0036	<0.0035	<0.0047	<0.0037	<0.0036	<0.0036	<0.0037	<0.0047	<0.0037	<0.0037	<0.0037	<0.0035	<0.0036	<0.0035	
Perfluorotetradecanoic acid (PFTeDA)	NCL	NCL	<0.0036	<0.0036	<0.0036	<0.0035	<0.0047	<0.0037	<0.0036	<0.0036	<0.0037	<0.0047	<0.0037	<0.0037	<0.0037	<0.0035	<0.0036	<0.0035	
Perfluorotridecanoic acid (PFTrDA)	NCL	NCL	<0.0036	<0.0036	<0.0036	<0.0035	<0.0047	<0.0037	<0.0036	<0.0036	<0.0037	<0.0047	<0.0037	<0.0037	<0.0037	<0.0035	<0.0036	<0.0035	
Perfluoroundecanoic acid (PFUnDA)	NCL	NCL	<0.0036	<0.0036	<0.0036	<0.0035	<0.0047	<0.0037	<0.0036	<0.0036	<0.0037	<0.0047	<0.0037	<0.0037	<0.0037	<0.0035	<0.0036	<0.0035	
Total PFAS (Calculated)	NCL	NCL	ND	0.0058	ND	ND	0.017	ND	ND	ND	ND	0.015	0.0028	0.0026	0.0034	0.0067	0.17	0.077	

TABLE 3
GROUNDWATER ANALYTICAL DATA - PFAS
House Street Disposal Site Study Area
Plainfield Township, Kent County, MI

Sample Location	Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water ²	Part 201 Generic Groundwater Cleanup Criteria – Groundwater Surface Water Interface ²	HS-PMW-23	HS-PMW-23	HS-PMW-23	HS-PMW-23	HS-PMW-23	HS-PMW-23	HS-PMW-23	HS-PMW-23	HS-PMW-23	HS-PMW-23	HS-PMW-23	HS-PMW-23	HS-PMW-23	HS-PMW-23	HS-PMW-23	HS-PMW-23
Sample Name			PMW-23(80-90)	PMW-23(90-100)	PMW-23(100-110)	PMW-23(110-120)	PMW-23(120-130)	PMW-23(130-140)	PMW-23(140-150)	PMW-23(150-160)	PMW-23(160-170)	PMW-23(170-180)	PMW-23(180-190)	PMW-23(190-200)	PMW-23(200-210)	PMW-23(210-220)	PMW-23(220-230)	PMW-23(230-240)
Well Screen Interval (Feet below ground surface)			80-90	90-100	100-110	110-120	120-130	130-140	140-150	150-160	160-170	170-180	180-190	190-200	200-210	210-220	220-230	230-240
Laboratory Sample ID			UF15016-003	UF15016-004	UF15016-005	UF15016-006	UF15016-007	UF15016-008	UF15016-009	UF15016-010	UF15016-011	UF15016-012	UF15016-013	UF15016-014	UF20036-001	UF20036-002	UF20036-003	UF20036-004
Sample Date			06/11/2019	06/11/2019	06/11/2019	06/12/2019	06/12/2019	06/12/2019	06/12/2019	06/13/2019	06/13/2019	06/13/2019	06/14/2019	06/14/2019	06/17/2019	06/17/2019	06/18/2019	06/18/2019
Parameter (µg/L)																		
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NCL	<0.0035	<0.0035	<0.0035	<0.0036	<0.0035	<0.0035	<0.0035	<0.0035	<0.0036	<0.0036	<0.0036	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NCL	<0.0035	<0.0035	<0.0035	<0.0036	<0.0035	<0.0035	<0.0035	<0.0035	<0.0036	<0.0036	<0.0036	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NCL	<0.0035	<0.0035	<0.0035	<0.0036	<0.0035	<0.0035	<0.0035	<0.0035	<0.0036	<0.0036	<0.0036	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035
N-Ethyl perfluorooctane sulfonamidoethanol (N-EtFOSE)	NCL	NCL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NCL	<0.0069	<0.007	<0.0071	<0.0072	<0.0071	<0.007	<0.0071	<0.007	<0.0071	<0.0071	<0.0073	<0.007	<0.0069	<0.007	<0.007	<0.0069
N-Methyl perfluorooctane sulfonamidoethanol (N-MeFOSE)	NCL	NCL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perfluorobutane sulfonic acid (PFBS)	NCL	NCL	0.0091	<0.0035	<0.0035	<0.0036	0.0042	0.069	0.086	0.057	0.16	0.15	0.23	0.22	0.38	0.28	0.25	0.25
Perfluorodecane sulfonic acid (PFDS)	NCL	NCL	<0.0035	<0.0035	<0.0035	<0.0036	<0.0035	<0.0035	<0.0035	<0.0035	<0.0036	<0.0036	<0.0036	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NCL	<0.0035	<0.0035	<0.0035	<0.0036	<0.0035	<0.0035	<0.0035	<0.0035	<0.0036	<0.0036	<0.0036	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035
Perfluorononane sulfonic acid (PFNS)	NCL	NCL	<0.0069	<0.007	<0.0071	<0.0072	<0.0071	<0.007	<0.0071	<0.007	<0.0071	<0.0071	<0.0073	<0.007	<0.0069	<0.007	<0.007	<0.0069
Perfluorooctane sulfonamide (FOSA)	NCL	NCL	<0.0035	<0.0035	<0.0035	<0.0036	<0.0035	<0.0035	<0.0035	<0.0035	<0.0036	<0.0036	<0.0036	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035
Perfluoropentane sulfonic acid (PFPeS)	NCL	NCL	0.0046	<0.0035	<0.0035	<0.0036	0.0054	0.056	0.069	0.052	0.13	0.092	0.16	0.19	0.3	0.19	0.14	0.15
Perfluorohexane sulfonic acid (PFHxS)	NCL	NCL	0.0076	<0.0035	<0.0035	0.0041	0.012	0.06	0.086	0.062	0.11	0.031	0.052	0.071	0.11	0.064	0.021	0.017
Perfluorobutanoic acid (PFBA)	NCL	NCL	<0.0035	<0.0035	<0.0035	<0.0036	<0.0035	0.012	0.014	0.0097	0.028	0.026	0.049	0.052	0.084	0.067	0.072	0.071
Perfluorodecanoic acid (PFDA)	NCL	NCL	<0.0035	<0.0035	<0.0035	<0.0036	<0.0035	<0.0035	<0.0035	<0.0035	<0.0036	<0.0036	<0.0036	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035
Perfluorododecanoic acid (PFDoDA)	NCL	NCL	<0.0035	<0.0035	<0.0035	<0.0036	<0.0035	<0.0035	<0.0035	<0.0035	<0.0036	<0.0036	<0.0036	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035
Perfluoroheptanoic acid (PFHpA)	NCL	NCL	<0.0035	<0.0035	<0.0035	<0.0036	<0.0035	0.013	0.015	0.012	0.025	0.022	0.042	0.041	0.066	0.044	0.044	0.043
Perfluorohexanoic acid (PFHxA)	NCL	NCL	<0.0035	<0.0035	<0.0035	<0.0036	<0.0035	0.056	0.058	0.042	0.11	0.092	0.18	0.18	0.33	0.26	0.27	0.25
Perfluorononanoic acid (PFNA)	NCL	NCL	<0.0035	<0.0035	<0.0035	<0.0036	<0.0035	<0.0035	<0.0035	<0.0035	<0.0036	<0.0036	<0.0036	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035
Perfluorooctanoic acid (PFOA)	0.07 (JJ)	12	0.0049	<0.0017	<0.0018	0.003	0.0049	0.02	0.028	0.02	0.037	0.02	0.033	0.03	0.047	0.03	0.017	0.015
Perfluorooctane sulfonic acid (PFOS)	0.07 (JJ)	0.012	0.0054	<0.0035	<0.0035	<0.0036	<0.0035	0.0048	0.005	0.0036	<0.0036	<0.0036	<0.0036	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035
PFOA + PFOS (Calculated)	0.07	NCL	0.01	ND	ND	0.003	0.0049	0.025	0.033	0.024	0.037	0.02	0.033	0.03	0.047	0.03	0.017	0.015
Perfluoropentanoic acid (PFPeA)	NCL	NCL	<0.0035	<0.0035	<0.0035	<0.0036	<0.0035	0.02	0.019	0.013	0.036	0.038	0.069	0.081	0.13	0.11	0.13	0.13
Perfluorotetradecanoic acid (PFTeDA)	NCL	NCL	<0.0035	<0.0035	<0.0035	<0.0036	<0.0035	<0.0035	<0.0035	<0.0035	<0.0036	<0.0036	<0.0036	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035
Perfluorotridecanoic acid (PFTrDA)	NCL	NCL	<0.0035	<0.0035	<0.0035	<0.0036	<0.0035	<0.0035	<0.0035	<0.0035	<0.0036	<0.0036	<0.0036	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035
Perfluoroundecanoic acid (PFUnDA)	NCL	NCL	<0.0035	<0.0035	<0.0035	<0.0036	<0.0035	<0.0035	<0.0035	<0.0035	<0.0036	<0.0036	<0.0036	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035
Total PFAS (Calculated)	NCL	NCL	0.032	ND	ND	0.0071	0.027	0.31	0.38	0.27	0.64	0.47	0.82	0.87	1.4	1	0.94	0.93

TABLE 3
GROUNDWATER ANALYTICAL DATA - PFAS
House Street Disposal Site Study Area
Plainfield Township, Kent County, MI

Sample Location	Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water ²	Part 201 Generic Groundwater Cleanup Criteria – Groundwater Surface Water Interface ²	HS-MW-23A	HS-MW-23A	HS-MW-23B	HS-MW-23B	HS-MW-23D	HS-MW-23C	HS-MW-23C	HS-MW-23D	HS-PMW-24	HS-PMW-24	HS-PMW-24	HS-PMW-24	HS-PMW-24	HS-PMW-24	HS-PMW-24	HS-PMW-24
Sample Name			HS-GW-MW23A	HS-GW-MW-23A	HS-GW-MW23B	HS-GW-MW-23B	HS-GW-MW23D	HS-GW-MW-23C	HS-GW-MW23C	HS-GW-MW-23D	MW-24A (55-60)	MW-24A (65-70)	MW-24A (75-80)	MW-24A (85-90)	MW-24A (95-100)	MW-24A (105-110)	MW-24A (115-120)	MW-24A (125-130)
Well Screen Interval (Feet below ground surface)			72.1-77.1	72.1-77.1	137.9-142.8	137.9-142.8	238.9-243.9	210.2-215	210.2-215	238.9-243.9	55-60	65-70	75-80	85-90	95-100	105-110	115-120	125-130
Laboratory Sample ID			UI21016-007	UL05055-032	UI21016-009	UL05055-033	UI21016-008	UL05055-034	UI26001-001	UL12091-008	UI26018-001	UI26018-002	UI26018-003	UI26018-004	UI26018-005	UI26018-006	UI26018-007	UI26018-008
Sample Date			09/20/2019	12/06/2019	09/20/2019	12/06/2019	09/20/2019	12/06/2019	09/23/2019	12/10/2019	09/23/2019	09/23/2019	09/23/2019	09/23/2019	09/24/2019	09/24/2019	09/24/2019	09/24/2019
Parameter (µg/L)																		
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NCL	<0.0036	<0.0035	<0.0034	<0.0035	<0.0035	<0.0035	<0.0035	<0.0036	<0.0034	<0.0034	<0.0035	<0.0036	<0.0035	<0.0035	<0.0034	<0.0035
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NCL	<0.0036	<0.0035	<0.0034	<0.0035	<0.0035	<0.0035	<0.0035	<0.0036	<0.0034	<0.0034	<0.0035	<0.0036	<0.0035	<0.0035	<0.0034	<0.0035
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NCL	<0.0036	<0.0035	<0.0034	<0.0035	<0.0035	<0.0035	<0.0035	<0.0036	<0.0034	<0.0034	<0.0035	<0.0036	<0.0035	<0.0035	<0.0034	<0.0035
N-Ethyl perfluorooctane sulfonamidoethanol (N-EtFOSE)	NCL	NCL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NCL	<0.0072	<0.0071	<0.0068	<0.007	<0.0069	<0.0071	<0.007	<0.0072	<0.0068	<0.0068	<0.007	<0.0072	<0.007	<0.007	<0.0068	<0.007
N-Methyl perfluorooctane sulfonamidoethanol (N-MeFOSE)	NCL	NCL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perfluorobutane sulfonic acid (PFBS)	NCL	NCL	0.02	0.018	0.015	0.014	0.23	0.28	0.26	0.14	<0.0034	<0.0034	<0.0035	<0.0036	<0.0035	<0.0035	<0.0034	<0.0035
Perfluorodecane sulfonic acid (PFDS)	NCL	NCL	<0.0036	<0.0035	<0.0034	<0.0035	<0.0035	<0.0035	<0.0035	<0.0036	<0.0034	<0.0034	<0.0035	<0.0036	<0.0035	<0.0035	<0.0034	<0.0035
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NCL	<0.0036	<0.0035	<0.0034	<0.0035	<0.0035	<0.0035	<0.0035	<0.0036	<0.0034	<0.0034	<0.0035	<0.0036	<0.0035	<0.0035	<0.0034	<0.0035
Perfluorononane sulfonic acid (PFNS)	NCL	NCL	<0.0072	<0.0071	<0.0068	<0.007	<0.0069	<0.0071	<0.007	<0.0072	<0.0068	<0.0068	<0.007	<0.0072	<0.007	<0.007	<0.0068	<0.007
Perfluorooctane sulfonamide (FOSA)	NCL	NCL	<0.0036	<0.0035	<0.0034	<0.0035	<0.0035	<0.0035	<0.0035	<0.0036	<0.0034	<0.0034	<0.0035	<0.0036	<0.0035	<0.0035	<0.0034	<0.0035
Perfluoropentane sulfonic acid (PFPeS)	NCL	NCL	0.011	0.0094	0.0081	0.0071	0.15	0.23	0.22	0.076	<0.0034	<0.0034	<0.0035	<0.0036	<0.0035	<0.0035	<0.0034	<0.0035
Perfluorohexane sulfonic acid (PFHxS)	NCL	NCL	0.02	0.019	0.019	0.015	0.016	0.09	0.091	0.011	<0.0034	<0.0034	<0.0035	<0.0036	<0.0035	<0.0035	<0.0034	<0.0035
Perfluorobutanoic acid (PFBA)	NCL	NCL	<0.0036	<0.0035	<0.0034	<0.0035	0.067	0.067	0.064	0.043	<0.0034	<0.0034	<0.0035	<0.0036	<0.0035	<0.0035	<0.0034	<0.0035
Perfluorodecanoic acid (PFDA)	NCL	NCL	<0.0036	<0.0035	<0.0034	<0.0035	<0.0035	<0.0035	<0.0035	<0.0036	<0.0034	<0.0034	<0.0035	<0.0036	<0.0035	<0.0035	<0.0034	<0.0035
Perfluorododecanoic acid (PFDoDA)	NCL	NCL	<0.0036	<0.0035	<0.0034	<0.0035	<0.0035	<0.0035	<0.0035	<0.0036	<0.0034	<0.0034	<0.0035	<0.0036	<0.0035	<0.0035	<0.0034	<0.0035
Perfluoroheptanoic acid (PFHpA)	NCL	NCL	<0.0036	<0.0035	<0.0034	<0.0035	0.037	0.057	0.05	0.02	<0.0034	<0.0034	<0.0035	<0.0036	<0.0035	<0.0035	<0.0034	<0.0035
Perfluorohexanoic acid (PFHxA)	NCL	NCL	0.0047	<0.0035	0.0061	0.0044	0.24	0.26	0.22	0.16	<0.0034	<0.0034	<0.0035	<0.0036	<0.0035	<0.0035	<0.0034	<0.0035
Perfluorononanoic acid (PFNA)	NCL	NCL	<0.0036	<0.0035	<0.0034	<0.0035	<0.0035	<0.0035	<0.0035	<0.0036	<0.0034	<0.0034	<0.0035	<0.0036	<0.0035	<0.0035	<0.0034	<0.0035
Perfluorooctanoic acid (PFOA)	0.07 (JJ)	12	0.013	0.012	0.0075	0.0082	0.013	0.03	0.03	0.0056	<0.0017	<0.0017	<0.0017	<0.0018	<0.0017	<0.0018	<0.0017	<0.0017
Perfluorooctane sulfonic acid (PFOS)	0.07 (JJ)	0.012	0.0042	0.015	<0.0034	<0.0035	<0.0035	<0.0035	<0.0035	<0.0036	<0.0034	<0.0034	<0.0035	<0.0036	<0.0035	<0.0035	<0.0034	<0.0035
PFOA + PFOS (Calculated)	0.07	NCL	0.017	0.027	0.0075	0.0082	0.013	0.03	0.03	0.0056	ND	ND	ND	ND	ND	ND	ND	ND
Perfluoropentanoic acid (PFPeA)	NCL	NCL	<0.0036	<0.0035	<0.0034	<0.0035	0.13	0.11	0.1	0.08	<0.0034	<0.0034	<0.0035	<0.0036	<0.0035	<0.0035	<0.0034	<0.0035
Perfluorotetradecanoic acid (PFTeDA)	NCL	NCL	<0.0036	<0.0035	<0.0034	<0.0035	<0.0035	<0.0035	<0.0035	<0.0036	<0.0034	<0.0034	<0.0035	<0.0036	<0.0035	<0.0035	<0.0034	<0.0035
Perfluorotridecanoic acid (PFTrDA)	NCL	NCL	<0.0036	<0.0035	<0.0034	<0.0035	<0.0035	<0.0035	<0.0035	<0.0036	<0.0034	<0.0034	<0.0035	<0.0036	<0.0035	<0.0035	<0.0034	<0.0035
Perfluoroundecanoic acid (PFUnDA)	NCL	NCL	<0.0036	<0.0035	<0.0034	<0.0035	<0.0035	<0.0035	<0.0035	<0.0036	<0.0034	<0.0034	<0.0035	<0.0036	<0.0035	<0.0035	<0.0034	<0.0035
Total PFAS (Calculated)	NCL	NCL	0.073	0.073	0.056	0.049	0.88	1.1	1	0.54	ND	ND	ND	ND	ND	ND	ND	ND

TABLE 3
GROUNDWATER ANALYTICAL DATA - PFAS
House Street Disposal Site Study Area
Plainfield Township, Kent County, MI

Sample Location	Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water ²	Part 201 Generic Groundwater Cleanup Criteria – Groundwater Surface Water Interface ²	HS-PMW-24	HS-PMW-24	HS-PMW-24	HS-PMW-24	HS-PMW-24	HS-PMW-24	HS-PMW-24	HS-PMW-24	HS-PMW-24	HS-PMW-24	HS-MW-24A	HS-MW-24B	HS-PMW-25	HS-PMW-25	HS-PMW-25	HS-MW-25D
Sample Name			MW-24A(135-140)	MW-24A(145-150)	MW-24A(155-160)	MW-24A(165-170)	MW-24A(175-180)	MW-24A(185-190)	MW-24A(195-200)	HS-MW24 205-210	HS-MW24 215-220	HS-MW24 225-230	HS-GW-MW-24A	HS-GW-MW-24B	SB-25 41-46	SB-25 55-60	SB-25 65-70	HS-MW-25D
Well Screen Interval (Feet below ground surface)			135-140	145-150	155-160	165-170	175-180	185-190	195-200	205-210	215-220	225-230	55.6-60.4	225.2-230	41-46	55-60	65-70	65.7-70.7
Laboratory Sample ID			UI28012-001	UI28012-002	UI28012-003	UI28012-004	UI28012-005	UI28012-006	UI28012-007	UI02010-001	UI02010-002	UI02010-003	UL12091-009	UL12091-015	TJ05091-003	TJ05091-004	TJ05091-005	UC02020-009
Sample Date			09/25/2019	09/25/2019	09/25/2019	09/26/2019	09/26/2019	09/26/2019	09/26/2019	09/27/2019	09/30/2019	09/30/2019	09/30/2019	12/10/2019	12/11/2019	10/03/2018	10/03/2018	10/03/2018
Parameter (µg/L)																		
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NCL	<0.0036	<0.0035	<0.0035	<0.0036	<0.0034	<0.0035	<0.0035	<0.0038	<0.0036	<0.0036	<0.0035	<0.0037	<0.0037	<0.0037	<0.0037	<0.0036
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NCL	<0.0036	<0.0035	<0.0035	<0.0036	<0.0034	<0.0035	<0.0035	<0.0038	<0.0036	<0.0036	<0.0035	<0.0037	<0.0037	<0.0037	<0.0037	<0.0036
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NCL	<0.0036	<0.0035	<0.0035	<0.0036	<0.0034	<0.0035	<0.0035	<0.0038	<0.0036	<0.0036	<0.0035	<0.0037	<0.0037	<0.0037	<0.0037	<0.0036
N-Ethyl perfluorooctane sulfonamidoethanol (N-EtFOSE)	NCL	NCL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NCL	<0.0073	<0.007	<0.0071	<0.0071	<0.0068	<0.007	<0.0069	<0.0076	<0.0072	<0.0072	<0.007	<0.0074	<0.0074	<0.0074	<0.0073	<0.0072
N-Methyl perfluorooctane sulfonamidoethanol (N-MeFOSE)	NCL	NCL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perfluorobutane sulfonic acid (PFBS)	NCL	NCL	<0.0036	<0.0035	<0.0035	<0.0036	<0.0034	<0.0035	<0.0035	<0.0038	<0.0036	<0.0036	<0.0035	<0.0037	0.0039	0.012	0.0099	0.016
Perfluorodecane sulfonic acid (PFDS)	NCL	NCL	<0.0036	<0.0035	<0.0035	<0.0036	<0.0034	<0.0035	<0.0035	<0.0038	<0.0036	<0.0036	<0.0035	<0.0037	<0.0037	<0.0037	<0.0037	<0.0036
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NCL	<0.0036	<0.0035	<0.0035	<0.0036	<0.0034	<0.0035	<0.0035	<0.0038	<0.0036	<0.0036	<0.0035	<0.0037	<0.0037	<0.0037	<0.0037	<0.0036
Perfluorononane sulfonic acid (PFNS)	NCL	NCL	<0.0073	<0.007	<0.0071	<0.0071	<0.0068	<0.007	<0.0069	<0.0076	<0.0072	<0.0072	<0.007	<0.0074	<0.0074	<0.0074	<0.0073	<0.0072
Perfluorooctane sulfonamide (FOSA)	NCL	NCL	<0.0036	<0.0035	<0.0035	<0.0036	<0.0034	<0.0035	<0.0035	<0.0038	<0.0036	<0.0036	<0.0035	<0.0037	<0.0037	<0.0037	<0.0037	<0.0036
Perfluoropentane sulfonic acid (PFPeS)	NCL	NCL	<0.0036	<0.0035	<0.0035	<0.0036	<0.0034	<0.0035	<0.0035	<0.0038	<0.0036	<0.0036	<0.0035	<0.0037	<0.0037	<0.0037	<0.0037	<0.0036
Perfluorohexane sulfonic acid (PFHxS)	NCL	NCL	<0.0036	<0.0035	<0.0035	<0.0036	<0.0034	<0.0035	<0.0035	<0.0038	<0.0036	<0.0036	<0.0035	<0.0037	<0.0037	0.0065	0.005	0.008
Perfluorobutanoic acid (PFBA)	NCL	NCL	<0.0036	<0.0035	<0.0035	<0.0036	<0.0034	<0.0035	<0.0035	<0.0038	<0.0036	<0.0036	<0.0035	<0.0037	0.01	0.005	0.0038	0.0054
Perfluorodecanoic acid (PFDA)	NCL	NCL	<0.0036	<0.0035	<0.0035	<0.0036	<0.0034	<0.0035	<0.0035	<0.0038	<0.0036	<0.0036	<0.0035	<0.0037	<0.0037	<0.0037	<0.0037	<0.0036
Perfluorododecanoic acid (PFDoDA)	NCL	NCL	<0.0036	<0.0035	<0.0035	<0.0036	<0.0034	<0.0035	<0.0035	<0.0038	<0.0036	<0.0036	<0.0035	<0.0037	<0.0037	<0.0037	<0.0037	<0.0036
Perfluoroheptanoic acid (PFHpA)	NCL	NCL	<0.0036	<0.0035	<0.0035	<0.0036	<0.0034	<0.0035	<0.0035	<0.0038	<0.0036	<0.0036	<0.0035	<0.0037	<0.0037	0.0055	<0.0037	0.0056
Perfluorohexanoic acid (PFHxA)	NCL	NCL	<0.0036	<0.0035	<0.0035	<0.0036	<0.0034	<0.0035	<0.0035	<0.0038	<0.0036	<0.0036	<0.0035	<0.0037	0.0049	0.011	0.0075	0.011
Perfluorononanoic acid (PFNA)	NCL	NCL	<0.0036	<0.0035	<0.0035	<0.0036	<0.0034	<0.0035	<0.0035	<0.0038	<0.0036	<0.0036	<0.0035	<0.0037	<0.0037	<0.0037	<0.0037	<0.0036
Perfluorooctanoic acid (PFOA)	0.07 (JJ)	12	<0.0018	<0.0018	<0.0018	<0.0018	<0.0017	<0.0017	<0.0017	<0.0019	<0.0018	<0.0018	<0.0017	<0.0018	0.0062	0.018	0.012	0.016
Perfluorooctane sulfonic acid (PFOS)	0.07 (JJ)	0.012	<0.0036	<0.0035	<0.0035	<0.0036	<0.0034	<0.0035	<0.0035	<0.0038	<0.0036	<0.0036	<0.0035	<0.0037	0.011	0.08	0.05	0.072
PFOA + PFOS (Calculated)	0.07	NCL	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.017	0.098	0.062	0.088
Perfluoropentanoic acid (PFPeA)	NCL	NCL	<0.0036	<0.0035	<0.0035	<0.0036	<0.0034	<0.0035	<0.0035	<0.0038	<0.0036	<0.0036	<0.0035	<0.0037	<0.0037	0.0089	0.006	0.0091
Perfluorotetradecanoic acid (PFTeDA)	NCL	NCL	<0.0036	<0.0035	<0.0035	<0.0036	<0.0034	<0.0035	<0.0035	<0.0038	<0.0036	<0.0036	<0.0035	<0.0037	<0.0037	<0.0037	<0.0037	<0.0036
Perfluorotridecanoic acid (PFTrDA)	NCL	NCL	<0.0036	<0.0035	<0.0035	<0.0036	<0.0034	<0.0035	<0.0035	<0.0038	<0.0036	<0.0036	<0.0035	<0.0037	<0.0037	<0.0037	<0.0037	<0.0036
Perfluoroundecanoic acid (PFUnDA)	NCL	NCL	<0.0036	<0.0035	<0.0035	<0.0036	<0.0034	<0.0035	<0.0035	<0.0038	<0.0036	<0.0036	<0.0035	<0.0037	<0.0037	<0.0037	<0.0037	<0.0036
Total PFAS (Calculated)	NCL	NCL	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.036	0.15	0.094	0.14

TABLE 3
GROUNDWATER ANALYTICAL DATA - PFAS
House Street Disposal Site Study Area
Plainfield Township, Kent County, MI

Sample Location	Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water ²	Part 201 Generic Groundwater Cleanup Criteria – Groundwater Surface Water Interface ²	HS-MW-25D	HS-MW-25D	HS-MW-25D	HS-MW-25S	HS-MW-25S	HS-MW-25S	HS-MW-25S	HS-MW-25S	HS-PMW-26	HS-PMW-26	HS-PMW-26	HS-PMW-26	HS-PMW-26	HS-MW-26D	HS-MW-26D	HS-MW-26D	HS-MW-26D
Sample Name			HS-GW-MW25D	HS-GW-MW25D	HS-GW-MW-25D	HS-MW-25S	HS-GW-MW25S	HS-GW-MW25S	HS-GW-MW-25S	HS-GW-MW-25S	SB-26 25-30	SB-26 50-55	SB-26 60-65	SB-26 70-75	SB-26 79-84	HS-MW-26D	HS-GW-MW26D	HS-GW-MW26D	HS-GW-MW-26D
Well Screen Interval (Feet below ground surface)			65.7-70.7	65.7-70.7	65.7-70.7	51.1-56.1	51.1-56.1	51.1-56.1	51.1-56.1	51.1-56.1	25-30	50-55	60-65	70-75	79-84	79.6-84.6	79.6-84.6	79.6-84.6	79.6-84.6
Laboratory Sample ID			UE15023-008	UI19006-009	UL05055-004	UC02020-008	UE15023-007	UI19006-012	UL05055-002	TK16018-001	TK16018-003	TK16018-004	TK16018-005	TK16018-006	UC02020-003	UE15023-009	UI12010-013	UK21036-008	UK21036-008
Sample Date			05/14/2019	09/17/2019	12/02/2019	03/01/2019	05/14/2019	09/17/2019	12/02/2019	11/12/2018	11/14/2018	11/14/2018	11/14/2018	11/14/2018	02/28/2019	05/15/2019	09/11/2019	11/19/2019	11/19/2019
Parameter (µg/L)																			
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NCL	<0.0037	<0.0037	<0.0038	<0.0037	<0.0036	<0.0038	<0.0037	<0.0036	<0.0035	<0.0035	<0.0035	<0.0036	<0.0037	<0.0036	<0.0038	<0.0035	<0.0035
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NCL	<0.0037	<0.0037	<0.0038	<0.0037	<0.0036	<0.0038	<0.0037	<0.0036	<0.0035	<0.0035	<0.0035	<0.0036	<0.0037	<0.0036	<0.0038	<0.0035	<0.0035
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NCL	<0.0037	<0.0037	<0.0038	<0.0037	<0.0036	<0.0038	<0.0037	<0.0036	<0.0035	<0.0035	<0.0035	<0.0036	<0.0037	<0.0036	<0.0038	<0.0035	<0.0035
N-Ethyl perfluorooctane sulfonamidoethanol (N-EtFOSE)	NCL	NCL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NCL	<0.0074	<0.0073	<0.0077	<0.0073	<0.0072	<0.0076	<0.0074	<0.0072	<0.0071	<0.007	<0.0071	<0.0072	<0.0074	<0.0071	<0.0077	<0.007	<0.007
N-Methyl perfluorooctane sulfonamidoethanol (N-MeFOSE)	NCL	NCL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perfluorobutane sulfonic acid (PFBS)	NCL	NCL	0.012	0.011	0.018	0.017	0.01	0.0082	0.012	<0.0036	0.0059	0.0072	0.0094	<0.0036	<0.0037	<0.0036	<0.0038	<0.0035	<0.0035
Perfluorodecane sulfonic acid (PFDS)	NCL	NCL	<0.0037	<0.0037	<0.0038	<0.0037	<0.0036	<0.0038	<0.0037	<0.0036	<0.0035	<0.0035	<0.0035	<0.0036	<0.0037	<0.0036	<0.0038	<0.0035	<0.0035
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NCL	<0.0037	<0.0037	<0.0038	<0.0037	<0.0036	<0.0038	<0.0037	<0.0036	<0.0035	<0.0035	<0.0035	<0.0036	<0.0037	<0.0036	<0.0038	<0.0035	<0.0035
Perfluorononane sulfonic acid (PFNS)	NCL	NCL	<0.0074	<0.0073	<0.0077	<0.0073	<0.0072	<0.0076	<0.0074	<0.0072	<0.0071	<0.007	<0.0071	<0.0072	<0.0074	<0.0071	<0.0077	<0.007	<0.007
Perfluorooctane sulfonamide (FOSA)	NCL	NCL	<0.0037	<0.0037	<0.0038	<0.0037	<0.0036	<0.0038	<0.0037	<0.0036	<0.0035	<0.0035	<0.0035	<0.0036	<0.0037	<0.0036	<0.0038	<0.0035	<0.0035
Perfluoropentane sulfonic acid (PFPeS)	NCL	NCL	<0.0037	<0.0037	<0.0038	<0.0037	<0.0036	<0.0038	<0.0037	<0.0036	<0.0035	<0.0035	<0.0035	<0.0036	<0.0037	<0.0036	<0.0038	<0.0035	<0.0035
Perfluorohexane sulfonic acid (PFHxS)	NCL	NCL	0.0069	0.007	0.0082	0.0083	0.0045	0.0045	0.0057	<0.0036	<0.0035	<0.0035	<0.0035	<0.0036	<0.0037	<0.0036	<0.0038	<0.0035	<0.0035
Perfluorobutanoic acid (PFBA)	NCL	NCL	0.0047	0.0045	0.0054	0.0046	<0.0036	<0.0038	0.0039	<0.0036	<0.0035	<0.0035	0.0036	<0.0036	<0.0037	<0.0036	<0.0038	<0.0035	<0.0035
Perfluorodecanoic acid (PFDA)	NCL	NCL	<0.0037	<0.0037	<0.0038	<0.0037	<0.0036	<0.0038	<0.0037	<0.0036	<0.0035	<0.0035	<0.0035	<0.0036	<0.0037	<0.0036	<0.0038	<0.0035	<0.0035
Perfluorododecanoic acid (PFDoDA)	NCL	NCL	<0.0037	<0.0037	<0.0038	<0.0037	<0.0036	<0.0038	<0.0037	<0.0036	<0.0035	<0.0035	<0.0035	<0.0036	<0.0037	<0.0036	<0.0038	<0.0035	<0.0035
Perfluoroheptanoic acid (PFHpA)	NCL	NCL	0.0045	<0.0037	0.005	0.004	<0.0036	<0.0038	0.0049	<0.0036	<0.0035	<0.0035	<0.0035	<0.0036	<0.0037	<0.0036	<0.0038	<0.0035	<0.0035
Perfluorohexanoic acid (PFHxA)	NCL	NCL	0.01	0.0076	0.012	0.0089	0.0056	0.0068	0.0092	<0.0036	<0.0035	<0.0035	<0.0035	<0.0036	<0.0037	<0.0036	<0.0038	<0.0035	<0.0035
Perfluorononanoic acid (PFNA)	NCL	NCL	<0.0037	<0.0037	<0.0038	<0.0037	<0.0036	<0.0038	<0.0037	<0.0036	<0.0035	<0.0035	<0.0035	<0.0036	<0.0037	<0.0036	<0.0038	<0.0035	<0.0035
Perfluorooctanoic acid (PFOA)	0.07 (JJ)	12	0.014	0.01	0.015	0.012	0.0091	0.011	0.014	<0.0018	<0.0018	0.0071	0.0051	<0.0018	0.0022	<0.0018	<0.0019	<0.0017	<0.0017
Perfluorooctane sulfonic acid (PFOS)	0.07 (JJ)	0.012	0.051	0.039	0.042	0.11	0.071	0.057	0.061	<0.0036	<0.0035	0.028	0.014	<0.0036	<0.0037	<0.0036	<0.0038	<0.0035	<0.0035
PFOA + PFOS (Calculated)	0.07	NCL	0.065	0.049	0.057	0.12	0.08	0.068	0.075	ND	ND	0.035	0.019	ND	0.0022	ND	ND	ND	ND
Perfluoropentanoic acid (PFPeA)	NCL	NCL	0.0086	0.0061	0.0087	0.007	0.0043	0.0047	0.0067	<0.0036	<0.0035	<0.0035	<0.0035	<0.0036	<0.0037	<0.0036	<0.0038	<0.0035	<0.0035
Perfluorotetradecanoic acid (PFTeDA)	NCL	NCL	<0.0037	<0.0037	<0.0038	<0.0037	<0.0036	<0.0038	<0.0037	<0.0036	<0.0035	<0.0035	<0.0035	<0.0036	<0.0037	<0.0036	<0.0038	<0.0035	<0.0035
Perfluorotridecanoic acid (PFTrDA)	NCL	NCL	<0.0037	<0.0037	<0.0038	<0.0037	<0.0036	<0.0038	<0.0037	<0.0036	<0.0035	<0.0035	<0.0035	<0.0036	<0.0037	<0.0036	<0.0038	<0.0035	<0.0035
Perfluoroundecanoic acid (PFUnDA)	NCL	NCL	<0.0037	<0.0037	<0.0038	<0.0037	<0.0036	<0.0038	<0.0037	<0.0036	<0.0035	<0.0035	<0.0035	<0.0036	<0.0037	<0.0036	<0.0038	<0.0035	<0.0035
Total PFAS (Calculated)	NCL	NCL	0.11	0.085	0.11	0.17	0.1	0.092	0.12	ND	0.0059	0.042	0.032	ND	0.0022	ND	ND	ND	ND

TABLE 3
GROUNDWATER ANALYTICAL DATA - PFAS
House Street Disposal Site Study Area
Plainfield Township, Kent County, MI

Sample Location	Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water ²	Part 201 Generic Groundwater Cleanup Criteria – Groundwater Surface Water Interface ²	HS-MW-26M	HS-MW-26M	HS-MW-26M	HS-MW-26M	HS-MW-26S	HS-MW-26S	HS-MW-26S	HS-MW-26S	HS-MW-26S	HS-MW-26S	HS-PMW-27	HS-PMW-27	HS-PMW-27	HS-PMW-27	HS-PMW-27	HS-MW-27A	HS-MW-27B
Sample Name			HS-MW-26M	HS-GW-MW26M	HS-GW-MW26M	HS-GW-MW-26M	HS-MW-26S	HS-GW-MW26S	HS-GW-MW26S	HS-GW-MW26S DUP	HS-GW-MW-26S	HS-MW27 21-25	HS-MW27 33-37	HS-MW27 41-45	HS-MW27-52-56	HS-MW27-60-64	HS-GW-MW-27A	HS-GW-MW27B	
Well Screen Interval (Feet below ground surface)			61.7-66.7	61.7-66.7	61.7-66.7	61.7-66.7	25.8-30.8	25.8-30.8	25.8-30.8	25.8-30.8	25.8-30.8	21-25	33-37	41-45	52-56	60-64	21.6-26.2	35.4-38	
Laboratory Sample ID			UC02020-002	UE15023-011	UI12010-017	UK21036-005	UC02020-001	UE15023-010	UI12010-015	UI12010-018	UK21036-001	UF19002-001	UF19002-002	UF19002-003	UF19026-001	UF19026-002	UK19008-001	UI12010-002	
Sample Date			02/28/2019	05/15/2019	09/11/2019	11/19/2019	02/28/2019	05/15/2019	09/11/2019	09/11/2019	09/11/2019	11/19/2019	06/17/2019	06/17/2019	06/17/2019	06/18/2019	06/18/2019	11/18/2019	09/09/2019
Parameter (µg/L)																			
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NCL	<0.0038	<0.0037	<0.0035	<0.0037	<0.0036	<0.0036	<0.0038	<0.0037	<0.0037	<0.0037	<0.0035	<0.0037	<0.0036	<0.0041	<0.0038	<0.0034	
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NCL	<0.0038	<0.0037	<0.0035	<0.0037	<0.0036	<0.0036	<0.0038	<0.0037	<0.0037	<0.0037	<0.0035	<0.0037	<0.0036	<0.0041	<0.0038	<0.0034	
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NCL	<0.0038	<0.0037	<0.0035	<0.0037	<0.0036	<0.0036	<0.0038	<0.0037	<0.0037	<0.0037	<0.0035	<0.0037	<0.0036	<0.0041	<0.0038	<0.0034	
N-Ethyl perfluorooctane sulfonamidoethanol (N-EtFOSE)	NCL	NCL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NCL	<0.0076	<0.0074	<0.0071	<0.0073	<0.0073	<0.0073	<0.0076	<0.0073	<0.0073	<0.0073	<0.0075	<0.0069	<0.0075	<0.0071	<0.0082	<0.0077	<0.0068
N-Methyl perfluorooctane sulfonamidoethanol (N-MeFOSE)	NCL	NCL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Perfluorobutane sulfonic acid (PFBS)	NCL	NCL	0.0044	0.0046	0.0049	0.0053	<0.0036	<0.0036	<0.0038	<0.0037	<0.0037	<0.0037	<0.0035	<0.0037	<0.0036	<0.0041	0.004	<0.0034	
Perfluorodecane sulfonic acid (PFDS)	NCL	NCL	<0.0038	<0.0037	<0.0035	<0.0037	<0.0036	<0.0036	<0.0038	<0.0037	<0.0037	<0.0037	<0.0035	<0.0037	<0.0036	<0.0041	<0.0038	<0.0034	
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NCL	<0.0038	<0.0037	<0.0035	<0.0037	<0.0036	<0.0036	<0.0038	<0.0037	<0.0037	<0.0037	<0.0035	<0.0037	<0.0036	<0.0041	<0.0038	<0.0034	
Perfluorononane sulfonic acid (PFNS)	NCL	NCL	<0.0076	<0.0074	<0.0071	<0.0073	<0.0073	<0.0073	<0.0076	<0.0073	<0.0073	<0.0073	<0.0075	<0.0069	<0.0075	<0.0071	<0.0082	<0.0077	<0.0068
Perfluorooctane sulfonamide (FOSA)	NCL	NCL	<0.0038	<0.0037	<0.0035	<0.0037	<0.0036	<0.0036	<0.0038	<0.0037	<0.0037	<0.0037	<0.0035	<0.0037	<0.0036	<0.0041	<0.0038	<0.0034	
Perfluoropentane sulfonic acid (PFPeS)	NCL	NCL	<0.0038	<0.0037	<0.0035	<0.0037	<0.0036	<0.0036	<0.0038	<0.0037	<0.0037	<0.0037	<0.0035	<0.0037	<0.0036	<0.0041	<0.0038	<0.0034	
Perfluorohexane sulfonic acid (PFHxS)	NCL	NCL	<0.0038	<0.0037	<0.0035	<0.0037	<0.0036	<0.0036	<0.0038	<0.0037	<0.0037	<0.0037	<0.0035	<0.0037	<0.0036	<0.0041	0.0056	<0.0034	
Perfluorobutanoic acid (PFBA)	NCL	NCL	<0.0038	<0.0037	<0.0035	<0.0037	<0.0036	<0.0036	<0.0038	<0.0037	<0.0037	<0.0037	0.0079	<0.0035	<0.0037	<0.0036	0.012	0.0067	<0.0034
Perfluorodecanoic acid (PFDA)	NCL	NCL	<0.0038	<0.0037	<0.0035	<0.0037	<0.0036	<0.0036	<0.0038	<0.0037	<0.0037	<0.0037	<0.0035	<0.0037	<0.0036	<0.0041	<0.0038	<0.0034	
Perfluorododecanoic acid (PFDoDA)	NCL	NCL	<0.0038	<0.0037	<0.0035	<0.0037	<0.0036	<0.0036	<0.0038	<0.0037	<0.0037	<0.0037	<0.0035	<0.0037	<0.0036	<0.0041	<0.0038	<0.0034	
Perfluoroheptanoic acid (PFHpA)	NCL	NCL	<0.0038	<0.0037	<0.0035	<0.0037	<0.0036	<0.0036	<0.0038	<0.0037	<0.0037	<0.0037	<0.0035	<0.0037	<0.0036	<0.0041	<0.0038	<0.0034	
Perfluorohexanoic acid (PFHxA)	NCL	NCL	<0.0038	<0.0037	<0.0035	<0.0037	<0.0036	<0.0036	<0.0038	<0.0037	<0.0037	<0.0037	0.0038	<0.0035	<0.0037	<0.0036	<0.0041	0.0069	<0.0034
Perfluorononanoic acid (PFNA)	NCL	NCL	<0.0038	<0.0037	<0.0035	<0.0037	<0.0036	<0.0036	<0.0038	<0.0037	<0.0037	<0.0037	<0.0035	<0.0037	<0.0036	<0.0041	<0.0038	<0.0034	
Perfluorooctanoic acid (PFOA)	0.07 (JJ)	12	0.006	0.0055	0.0054	0.0052	<0.0018	<0.0018	<0.0019	<0.0018	<0.0018	<0.0018	0.0067	0.0032	<0.0019	<0.0018	0.0025	0.0051	<0.0017
Perfluorooctane sulfonic acid (PFOS)	0.07 (JJ)	0.012	0.014	0.011	0.016	0.017	<0.0036	<0.0036	<0.0038	<0.0037	<0.0037	<0.0037	0.0037	<0.0035	<0.0037	<0.0036	<0.0041	<0.0038	<0.0034
PFOA + PFOS (Calculated)	0.07	NCL	0.02	0.017	0.021	0.022	ND	ND	ND	ND	ND	ND	0.01	0.0032	ND	ND	0.0025	0.0051	ND
Perfluoropentanoic acid (PFPeA)	NCL	NCL	<0.0038	<0.0037	<0.0035	<0.0037	<0.0036	<0.0036	<0.0038	<0.0037	<0.0037	<0.0037	0.0037	<0.0035	<0.0037	<0.0036	0.006	<0.0038	<0.0034
Perfluorotetradecanoic acid (PFTeDA)	NCL	NCL	<0.0038	<0.0037	<0.0035	<0.0037	<0.0036	<0.0036	<0.0038	<0.0037	<0.0037	<0.0037	<0.0035	<0.0037	<0.0036	<0.0041	<0.0038	<0.0034	
Perfluorotridecanoic acid (PFTrDA)	NCL	NCL	<0.0038	<0.0037	<0.0035	<0.0037	<0.0036	<0.0036	<0.0038	<0.0037	<0.0037	<0.0037	<0.0035	<0.0037	<0.0036	<0.0041	<0.0038	<0.0034	
Perfluoroundecanoic acid (PFUnDA)	NCL	NCL	<0.0038	<0.0037	<0.0035	<0.0037	<0.0036	<0.0036	<0.0038	<0.0037	<0.0037	<0.0037	<0.0035	<0.0037	<0.0036	<0.0041	<0.0038	<0.0034	
Total PFAS (Calculated)	NCL	NCL	0.024	0.021	0.026	0.028	ND	ND	ND	ND	ND	ND	0.026	0.0032	ND	ND	0.021	0.028	ND

TABLE 3
GROUNDWATER ANALYTICAL DATA - PFAS
House Street Disposal Site Study Area
Plainfield Township, Kent County, MI

Sample Location	Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water ²	Part 201 Generic Groundwater Cleanup Criteria – Groundwater Surface Water Interface ²	HS-MW-27B	HS-MW-27C	HS-MW-27C	HS-MW-27D	HS-MW-27D	HS-MW-27E	HS-MW-27E	HS-PMW-28	HS-PMW-28	HS-PMW-28	HS-PMW-28	HS-MW-28A	HS-MW-28A	HS-MW-28B	HS-MW-28B	HS-MW-28C
Sample Name			HS-GW-MW-27B	HS-GW-MW27C	HS-GW-MW-27C	HS-GW-MW27D	HS-GW-MW-27D	HS-GW-MW27E	HS-GW-MW-27E	HS-MW28 (42-44)	HS-MW28 (51-53)	HS-MW28 (70.5-72.5)	HS-MW28 81-85	HS-GW-MW28A	HS-GW-MW-28A	HS-GW-MW28B	HS-GW-MW-28B	HS-GW-MW28C
Well Screen Interval (Feet below ground surface)			35.4-38	41.3-45.9	41.3-45.9	52.4-56.4	52.4-56.4	58.5-62.5	58.5-62.5	42-44	51-53	70.5-72.5	81-85	39.1-43.7	39.1-43.7	43.3-47.9	43.3-47.9	49.2-53.8
Laboratory Sample ID			UK19008-003	UI12010-001	UK19008-002	UI12010-003	UK21036-002	UI12010-004	UK19008-004	UF07034-001	UF07034-002	UF07034-003	UF12004-001	UI19006-013	UK21036-018	UI19006-005	UK21036-019	UI19006-001
Sample Date			11/18/2019	09/09/2019	11/18/2019	09/09/2019	11/19/2019	09/09/2019	11/18/2019	06/05/2019	06/05/2019	06/06/2019	06/10/2019	09/17/2019	11/21/2019	09/16/2019	11/21/2019	09/16/2019
Parameter (µg/L)																		
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NCL	<0.0037	<0.0036	<0.0038	<0.0034	<0.0038	<0.0036	<0.0037	<0.0035	<0.0036	<0.0035	<0.004	<0.0036	<0.0036	<0.0037	<0.0038	<0.0038
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NCL	<0.0037	<0.0036	<0.0038	<0.0034	<0.0038	<0.0036	<0.0037	<0.0035	<0.0036	<0.0035	<0.004	<0.0036	<0.0036	<0.0037	<0.0038	0.011
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NCL	<0.0037	<0.0036	<0.0038	<0.0034	<0.0038	<0.0036	<0.0037	<0.0035	<0.0036	<0.0035	<0.004	<0.0036	<0.0036	<0.0037	<0.0038	<0.0038
N-Ethyl perfluorooctane sulfonamidoethanol (N-EtFOSE)	NCL	NCL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NCL	<0.0075	<0.0072	<0.0075	<0.0068	<0.0076	<0.0073	<0.0074	<0.007	<0.0072	<0.0069	<0.007900001	<0.0072	<0.0072	<0.0074	<0.0075	<0.0076
N-Methyl perfluorooctane sulfonamidoethanol (N-MeFOSE)	NCL	NCL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perfluorobutane sulfonic acid (PFBS)	NCL	NCL	<0.0037	<0.0036	<0.0038	<0.0034	<0.0038	<0.0036	<0.0037	0.005	0.0065	<0.0035	<0.004	0.0063	0.0047	0.0083	0.0092	<0.0038
Perfluorodecane sulfonic acid (PFDS)	NCL	NCL	<0.0037	<0.0036	<0.0038	<0.0034	<0.0038	<0.0036	<0.0037	<0.0035	<0.0036	<0.0035	<0.004	<0.0036	<0.0036	<0.0037	<0.0038	<0.0038
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NCL	<0.0037	<0.0036	<0.0038	<0.0034	<0.0038	<0.0036	<0.0037	<0.0035	<0.0036	<0.0035	<0.004	<0.0036	<0.0036	<0.0037	<0.0038	<0.0038
Perfluorononane sulfonic acid (PFNS)	NCL	NCL	<0.0075	<0.0072	<0.0075	<0.0068	<0.0076	<0.0073	<0.0074	<0.007	<0.0072	<0.0069	<0.007900001	<0.0072	<0.0072	<0.0074	<0.0075	<0.0076
Perfluorooctane sulfonamide (FOSA)	NCL	NCL	<0.0037	<0.0036	<0.0038	<0.0034	<0.0038	<0.0036	<0.0037	<0.0035	<0.0036	<0.0035	<0.004	<0.0036	<0.0036	<0.0037	<0.0038	<0.0038
Perfluoropentane sulfonic acid (PFPeS)	NCL	NCL	<0.0037	<0.0036	<0.0038	<0.0034	<0.0038	<0.0036	<0.0037	<0.0035	<0.0036	<0.0035	<0.004	<0.0036	<0.0036	<0.0037	<0.0038	<0.0038
Perfluorohexane sulfonic acid (PFHxS)	NCL	NCL	<0.0037	<0.0036	<0.0038	<0.0034	<0.0038	<0.0036	<0.0037	<0.0035	0.0039	<0.0035	<0.004	<0.0036	<0.0036	<0.0037	<0.0038	<0.0038
Perfluorobutanoic acid (PFBA)	NCL	NCL	<0.0037	<0.0036	<0.0038	<0.0034	<0.0038	0.01	0.0074	<0.0035	0.0049	<0.0035	0.006	<0.0036	<0.0036	<0.0037	<0.0038	<0.0038
Perfluorodecanoic acid (PFDA)	NCL	NCL	<0.0037	<0.0036	<0.0038	<0.0034	<0.0038	<0.0036	<0.0037	<0.0035	<0.0036	<0.0035	<0.004	<0.0036	<0.0036	<0.0037	<0.0038	<0.0038
Perfluorododecanoic acid (PFDoDA)	NCL	NCL	<0.0037	<0.0036	<0.0038	<0.0034	<0.0038	<0.0036	<0.0037	<0.0035	<0.0036	<0.0035	<0.004	<0.0036	<0.0036	<0.0037	<0.0038	<0.0038
Perfluoroheptanoic acid (PFHpA)	NCL	NCL	<0.0037	<0.0036	<0.0038	<0.0034	<0.0038	<0.0036	<0.0037	<0.0035	<0.0036	<0.0035	<0.004	<0.0036	<0.0036	<0.0037	<0.0038	<0.0038
Perfluorohexanoic acid (PFHxA)	NCL	NCL	<0.0037	<0.0036	<0.0038	<0.0034	<0.0038	0.0037	<0.0037	<0.0035	0.0041	<0.0035	<0.004	<0.0036	<0.0036	<0.0037	<0.0038	<0.0038
Perfluorononanoic acid (PFNA)	NCL	NCL	<0.0037	<0.0036	<0.0038	<0.0034	<0.0038	<0.0036	<0.0037	<0.0035	<0.0036	<0.0035	<0.004	<0.0036	<0.0036	<0.0037	<0.0038	<0.0038
Perfluorooctanoic acid (PFOA)	0.07 (JJ)	12	<0.0019	<0.0018	<0.0019	<0.0017	<0.0019	0.0031	0.0025	<0.0017	0.0059	<0.0017	0.002	<0.0018	<0.0018	0.0023	<0.0019	<0.0019
Perfluorooctane sulfonic acid (PFOS)	0.07 (JJ)	0.012	<0.0037	<0.0036	<0.0038	<0.0034	<0.0038	<0.0036	<0.0037	<0.0035	0.0057	<0.0035	<0.004	<0.0036	<0.0036	<0.0037	<0.0038	<0.0038
PFOA + PFOS (Calculated)	0.07	NCL	ND	ND	ND	ND	ND	0.0031	0.0025	ND	0.012	ND	0.002	ND	ND	0.0023	ND	ND
Perfluoropentanoic acid (PFPeA)	NCL	NCL	<0.0037	<0.0036	<0.0038	<0.0034	<0.0038	<0.0036	<0.0037	<0.0035	0.0038	<0.0035	<0.004	<0.0036	<0.0036	<0.0037	<0.0038	<0.0038
Perfluorotetradecanoic acid (PFTeDA)	NCL	NCL	<0.0037	<0.0036	<0.0038	<0.0034	<0.0038	<0.0036	<0.0037	<0.0035	<0.0036	<0.0035	<0.004	<0.0036	<0.0036	<0.0037	<0.0038	<0.0038
Perfluorotridecanoic acid (PFTrDA)	NCL	NCL	<0.0037	<0.0036	<0.0038	<0.0034	<0.0038	<0.0036	<0.0037	<0.0035	<0.0036	<0.0035	<0.004	<0.0036	<0.0036	<0.0037	<0.0038	<0.0038
Perfluoroundecanoic acid (PFUnDA)	NCL	NCL	<0.0037	<0.0036	<0.0038	<0.0034	<0.0038	<0.0036	<0.0037	<0.0035	<0.0036	<0.0035	<0.004	<0.0036	<0.0036	<0.0037	<0.0038	<0.0038
Total PFAS (Calculated)	NCL	NCL	ND	ND	ND	ND	ND	0.017	0.0099	0.005	0.035	ND	0.008	0.0063	0.0047	0.011	0.0092	0.011

TABLE 3
GROUNDWATER ANALYTICAL DATA - PFAS
House Street Disposal Site Study Area
Plainfield Township, Kent County, MI

Sample Location	Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water ²	Part 201 Generic Groundwater Cleanup Criteria – Groundwater Surface Water Interface ²	HS-MW-28C	HS-MW-28D	HS-MW-28D	HS-MW-28D	HS-MW-28E	HS-MW-28E	HS-PMW-29	HS-PMW-29	HS-PMW-29	HS-PMW-29	HS-PMW-29	HS-MW-29A	HS-MW-29B	HS-MW-29C	HS-MW-29D	HS-PMW-30
Sample Name			HS-GW-MW-28C	HS-GW-MW28D	HS-GW-MW-28D	HS-GW-MW-28D DUP	HS-GW-MW28E	HS-GW-MW-28E	HS-GW-MW29 (11-15)	HS-GW-MW29 (21-25)	HS-GW-MW29 (31-35)	HS-GW-MW29 (41-45)	HS-GW-MW29 (46-50)	HS-GW-MW-29A	HS-GW-MW-29B	HS-GW-MW-29C	HS-GW-MW-29D	HS-MW30 (52-54)
Well Screen Interval (Feet below ground surface)			49.2-53.8	62.2-66.8	62.2-66.8	62.2-66.8	82.7-87.3	82.7-87.3	11-15	21-25	31-35	41-45	46-50	3.5-13.5	16.8-21.8	27.2-32.2	37.1-42.1	52-54
Laboratory Sample ID			UK21036-016	UI19006-010	UK21036-014	UK21036-015	UI19006-011	UK21036-017	UJ08016-001	UJ08016-002	UJ08016-003	UJ08016-004	UJ08016-005	UK19008-006	UK21036-003	UK21036-004	UK19008-005	UE17049-001
Sample Date			11/21/2019	09/17/2019	11/21/2019	11/21/2019	09/17/2019	11/21/2019	10/01/2019	10/01/2019	10/01/2019	10/01/2019	10/02/2019	11/18/2019	11/19/2019	11/19/2019	11/18/2019	05/13/2019
Parameter (µg/L)																		
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NCL	<0.0035	<0.0035	<0.0036	<0.0037	<0.0035	<0.0036	<0.0036	<0.0035	<0.0035	<0.0036	<0.0036	<0.0035	<0.0034	<0.0035	<0.0035	<0.0036
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NCL	<0.0035	<0.0035	<0.0036	<0.0037	<0.0035	<0.0036	<0.0036	<0.0035	<0.0035	<0.0036	<0.0036	<0.0035	<0.0034	<0.0035	<0.0035	<0.0036
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NCL	<0.0035	<0.0035	<0.0036	<0.0037	<0.0035	<0.0036	<0.0036	<0.0035	<0.0035	<0.0036	<0.0036	<0.0035	<0.0034	<0.0035	<0.0035	<0.0036
N-Ethyl perfluorooctane sulfonamidoethanol (N-EtFOSE)	NCL	NCL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NCL	<0.0071	<0.007	<0.0072	<0.0074	<0.007	<0.0072	<0.0071	<0.007	<0.007	<0.0071	<0.0073	<0.007	<0.0069	<0.007	<0.007	<0.0072
N-Methyl perfluorooctane sulfonamidoethanol (N-MeFOSE)	NCL	NCL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perfluorobutane sulfonic acid (PFBS)	NCL	NCL	<0.0035	<0.0035	<0.0036	<0.0037	<0.0035	<0.0036	0.015	<0.0035	<0.0035	<0.0036	<0.0036	0.018	0.024	0.011	0.0035	0.0067
Perfluorodecane sulfonic acid (PFDS)	NCL	NCL	<0.0035	<0.0035	<0.0036	<0.0037	<0.0035	<0.0036	<0.0036	<0.0035	<0.0035	<0.0036	<0.0036	<0.0035	<0.0034	<0.0035	<0.0035	<0.0036
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NCL	<0.0035	<0.0035	<0.0036	<0.0037	<0.0035	<0.0036	<0.0036	<0.0035	<0.0035	<0.0036	<0.0036	0.01	<0.0034	<0.0035	<0.0035	<0.0036
Perfluorononane sulfonic acid (PFNS)	NCL	NCL	<0.0071	<0.007	<0.0072	<0.0074	<0.007	<0.0072	<0.0071	<0.007	<0.007	<0.0071	<0.0073	<0.007	<0.0069	<0.007	<0.007	<0.0072
Perfluorooctane sulfonamide (FOSA)	NCL	NCL	<0.0035	<0.0035	<0.0036	<0.0037	<0.0035	<0.0036	<0.0036	<0.0035	<0.0035	<0.0036	<0.0036	<0.0035	<0.0034	<0.0035	<0.0035	<0.0036
Perfluoropentane sulfonic acid (PFPeS)	NCL	NCL	<0.0035	<0.0035	<0.0036	<0.0037	<0.0035	<0.0036	<0.0036	<0.0035	<0.0035	<0.0036	<0.0036	0.0056	<0.0034	<0.0035	<0.0035	<0.0036
Perfluorohexane sulfonic acid (PFHxS)	NCL	NCL	<0.0035	<0.0035	<0.0036	<0.0037	<0.0035	<0.0036	0.017	<0.0035	<0.0035	<0.0036	<0.0036	0.025	<0.0034	<0.0035	<0.0035	0.0044
Perfluorobutanoic acid (PFBA)	NCL	NCL	<0.0035	<0.0035	<0.0036	<0.0037	<0.0035	<0.0036	<0.0036	<0.0035	<0.0035	<0.0036	<0.0036	0.01	<0.0034	<0.0035	<0.0035	<0.0036
Perfluorodecanoic acid (PFDA)	NCL	NCL	<0.0035	<0.0035	<0.0036	<0.0037	<0.0035	<0.0036	<0.0036	<0.0035	<0.0035	<0.0036	<0.0036	<0.0035	<0.0034	<0.0035	<0.0035	<0.0036
Perfluorododecanoic acid (PFDoDA)	NCL	NCL	<0.0035	<0.0035	<0.0036	<0.0037	<0.0035	<0.0036	<0.0036	<0.0035	<0.0035	<0.0036	<0.0036	<0.0035	<0.0034	<0.0035	<0.0035	<0.0036
Perfluoroheptanoic acid (PFHpA)	NCL	NCL	<0.0035	<0.0035	<0.0036	<0.0037	<0.0035	<0.0036	<0.0036	<0.0035	<0.0035	<0.0036	<0.0036	0.0064	<0.0034	<0.0035	<0.0035	<0.0036
Perfluorohexanoic acid (PFHxA)	NCL	NCL	<0.0035	<0.0035	<0.0036	<0.0037	<0.0035	<0.0036	<0.0036	<0.0035	<0.0035	<0.0036	<0.0036	0.017	<0.0034	<0.0035	<0.0035	0.0041
Perfluorononanoic acid (PFNA)	NCL	NCL	<0.0035	<0.0035	<0.0036	<0.0037	<0.0035	<0.0036	<0.0036	<0.0035	<0.0035	<0.0036	<0.0036	<0.0035	<0.0034	<0.0035	<0.0035	<0.0036
Perfluorooctanoic acid (PFOA)	0.07 (JJ)	12	<0.0018	<0.0017	<0.0018	<0.0018	<0.0018	<0.0018	0.0091	<0.0017	<0.0018	<0.0018	<0.0018	0.036	<0.0017	<0.0018	<0.0018	0.0088
Perfluorooctane sulfonic acid (PFOS)	0.07 (JJ)	0.012	<0.0035	<0.0035	<0.0036	<0.0037	<0.0035	<0.0036	0.053	<0.0035	<0.0035	<0.0036	<0.0036	0.32	0.004	<0.0035	<0.0035	<0.0036
PFOA + PFOS (Calculated)	0.07	NCL	ND	ND	ND	ND	ND	ND	0.062	ND	ND	ND	ND	0.36	0.004	ND	ND	0.0088
Perfluoropentanoic acid (PFPeA)	NCL	NCL	<0.0035	<0.0035	<0.0036	<0.0037	<0.0035	<0.0036	<0.0036	<0.0035	<0.0035	<0.0036	<0.0036	0.01	<0.0034	<0.0035	<0.0035	<0.0036
Perfluorotetradecanoic acid (PFTeDA)	NCL	NCL	<0.0035	<0.0035	<0.0036	<0.0037	<0.0035	<0.0036	<0.0036	<0.0035	<0.0035	<0.0036	<0.0036	<0.0035	<0.0034	<0.0035	<0.0035	<0.0036
Perfluorotridecanoic acid (PFTrDA)	NCL	NCL	<0.0035	<0.0035	<0.0036	<0.0037	<0.0035	<0.0036	<0.0036	<0.0035	<0.0035	<0.0036	<0.0036	<0.0035	<0.0034	<0.0035	<0.0035	<0.0036
Perfluoroundecanoic acid (PFUnDA)	NCL	NCL	<0.0035	<0.0035	<0.0036	<0.0037	<0.0035	<0.0036	<0.0036	<0.0035	<0.0035	<0.0036	<0.0036	<0.0035	<0.0034	<0.0035	<0.0035	<0.0036
Total PFAS (Calculated)	NCL	NCL	ND	ND	ND	ND	ND	ND	0.094	ND	ND	ND	ND	0.46	0.028	0.011	0.0035	0.024

TABLE 3
GROUNDWATER ANALYTICAL DATA - PFAS
House Street Disposal Site Study Area
Plainfield Township, Kent County, MI

Sample Location	Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water ²	Part 201 Generic Groundwater Cleanup Criteria – Groundwater Surface Water Interface ²	HS-PMW-30	HS-PMW-30	HS-PMW-30	HS-PMW-30	HS-PMW-30	HS-PMW-30	HS-PMW-30	HS-PMW-30	HS-MW-30A	HS-MW-30A	HS-MW-30A	HS-MW-30A	HS-MW-30B	HS-MW-30B	HS-MW-30B	HS-MW-30B	HS-MW-30C	HS-MW-30C
Sample Name			HS-MW30 (61-63)	HS-MW30 (75-77)	HS-MW30 (100-102)	HS-MW30 (111-113)	HS-MW30 (121-123)	HS-MW30 (128-130)	HS-MW30 (138-140)	HS-MW30 (138-140)	HS-GW-MW30A	HS-GW-MW30A	HS-GW-MW-30A	HS-GW-MW-30A DUP	HS-GW-MW30B	HS-GW-MW30B	HS-GW-MW-30B	HS-GW-MW-30B	HS-GW-MW30C	HS-GW-MW30C
Well Screen Interval (Feet below ground surface)			61-63	75-77	100-102	111-113	121-123	128-130	138-140	138-140	46.9-51.5	46.9-51.5	46.9-51.5	46.9-51.5	51.5-56.1	51.5-56.1	51.5-56.1	51.5-56.1	77.4-82	77.4-82
Laboratory Sample ID			UE17049-003	UE17049-004	UE17049-005	UE17049-006	UE17005-001	UE17005-002	UE17005-003	UE17005-003	UG03026-005	UI19006-014	UK19008-010	UK19008-011	UG03026-007	UI21016-001	UK19008-014	UG06001-001	UI19006-015	
Sample Date			05/14/2019	05/14/2019	05/14/2019	05/14/2019	05/15/2019	05/15/2019	05/15/2019	05/15/2019	07/02/2019	09/17/2019	11/20/2019	11/20/2019	07/02/2019	09/19/2019	11/20/2019	07/03/2019	09/17/2019	
Parameter (µg/L)																				
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NCL	<0.0035	<0.0036	<0.0035	<0.0037	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035	<0.0035	<0.0035	<0.0042	<0.0036	<0.0038	<0.0035	<0.0037	<0.0035	<0.0035
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NCL	<0.0035	<0.0036	<0.0035	<0.0037	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035	<0.0035	<0.0035	<0.0042	<0.0036	<0.0038	<0.0035	<0.0037	<0.0035	<0.0035
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NCL	<0.0035	<0.0036	<0.0035	<0.0037	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035	<0.0035	<0.0035	<0.0042	<0.0036	<0.0038	<0.0035	<0.0037	<0.0035	<0.0035
N-Ethyl perfluorooctane sulfonamidoethanol (N-EtFOSE)	NCL	NCL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NCL	<0.007	<0.0073	<0.0071	<0.0075	<0.0073	<0.0071	<0.0071	<0.0071	<0.0071	<0.0069	<0.0071	<0.0084	<0.0072	<0.0075	<0.007	<0.0074	<0.0069	<0.0069
N-Methyl perfluorooctane sulfonamidoethanol (N-MeFOSE)	NCL	NCL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perfluorobutane sulfonic acid (PFBS)	NCL	NCL	<0.0035	0.0042	<0.0035	0.004	<0.0036	<0.0036	<0.0036	<0.0036	0.0061	0.0068	0.0072	0.0069	0.0071	0.0074	0.0073	0.0057	0.0055	0.0055
Perfluorodecane sulfonic acid (PFDS)	NCL	NCL	<0.0035	<0.0036	<0.0035	<0.0037	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035	<0.0035	<0.0035	<0.0042	<0.0036	<0.0038	<0.0035	<0.0037	<0.0035	<0.0035
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NCL	<0.0035	<0.0036	<0.0035	<0.0037	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035	<0.0035	<0.0035	<0.0042	<0.0036	<0.0038	<0.0035	<0.0037	<0.0035	<0.0035
Perfluorononane sulfonic acid (PFNS)	NCL	NCL	<0.007	<0.0073	<0.0071	<0.0075	<0.0073	<0.0071	<0.0071	<0.0071	<0.0069	<0.0071	<0.0084	<0.0072	<0.0075	<0.007	<0.0074	<0.0069	<0.0069	<0.0069
Perfluorooctane sulfonamide (FOSA)	NCL	NCL	<0.0035	<0.0036	<0.0035	<0.0037	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035	<0.0035	<0.0035	<0.0042	<0.0036	<0.0038	<0.0035	<0.0037	<0.0035	<0.0035
Perfluoropentane sulfonic acid (PFPeS)	NCL	NCL	<0.0035	<0.0036	<0.0035	<0.0037	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035	<0.0035	<0.0035	<0.0042	<0.0036	<0.0038	<0.0035	<0.0037	<0.0035	<0.0035
Perfluorohexane sulfonic acid (PFHxS)	NCL	NCL	<0.0035	<0.0036	<0.0035	<0.0037	<0.0036	<0.0036	<0.0036	<0.0036	0.0038	<0.0035	<0.0035	<0.0042	0.0038	<0.0038	0.0038	<0.0037	<0.0035	<0.0035
Perfluorobutanoic acid (PFBA)	NCL	NCL	<0.0035	<0.0036	<0.0035	0.0043	0.01	<0.0036	<0.0036	<0.0036	<0.0035	<0.0035	<0.0035	<0.0042	<0.0036	<0.0038	<0.0035	<0.0037	<0.0035	<0.0035
Perfluorodecanoic acid (PFDA)	NCL	NCL	<0.0035	<0.0036	<0.0035	<0.0037	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035	<0.0035	<0.0035	<0.0042	<0.0036	<0.0038	<0.0035	<0.0037	<0.0035	<0.0035
Perfluorododecanoic acid (PFDoDA)	NCL	NCL	<0.0035	<0.0036	<0.0035	<0.0037	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035	<0.0035	<0.0035	<0.0042	<0.0036	<0.0038	<0.0035	<0.0037	<0.0035	<0.0035
Perfluoroheptanoic acid (PFHpA)	NCL	NCL	<0.0035	<0.0036	<0.0035	<0.0037	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035	<0.0035	<0.0035	<0.0042	<0.0036	<0.0038	<0.0035	<0.0037	<0.0035	<0.0035
Perfluorohexanoic acid (PFHxA)	NCL	NCL	<0.0035	<0.0036	<0.0035	<0.0037	0.0056	<0.0036	<0.0036	<0.0036	<0.0035	<0.0035	<0.0035	<0.0042	<0.0036	<0.0038	<0.0035	<0.0037	<0.0035	<0.0035
Perfluorononanoic acid (PFNA)	NCL	NCL	<0.0035	<0.0036	<0.0035	<0.0037	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035	<0.0035	<0.0035	<0.0042	<0.0036	<0.0038	<0.0035	<0.0037	<0.0035	<0.0035
Perfluorooctanoic acid (PFOA)	0.07 (JJ)	12	<0.0017	<0.0018	<0.0018	0.0026	0.0041	<0.0018	<0.0018	<0.0018	0.0033	0.0025	0.003	0.0027	0.0064	0.0035	0.0041	<0.0018	<0.0017	<0.0017
Perfluorooctane sulfonic acid (PFOS)	0.07 (JJ)	0.012	<0.0035	<0.0036	<0.0035	<0.0037	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035	<0.0035	<0.0035	<0.0042	<0.0036	<0.0038	<0.0035	<0.0037	<0.0035	<0.0035
PFOA + PFOS (Calculated)	0.07	NCL	ND	ND	ND	0.0026	0.0041	ND	ND	ND	0.0033	0.0025	0.003	0.0027	0.0064	0.0035	0.0041	ND	ND	ND
Perfluoropentanoic acid (PFPeA)	NCL	NCL	<0.0035	<0.0036	<0.0035	0.0041	0.0066	<0.0036	<0.0036	<0.0036	<0.0035	<0.0035	<0.0035	<0.0042	<0.0036	<0.0038	<0.0035	<0.0037	<0.0035	<0.0035
Perfluorotetradecanoic acid (PFTeDA)	NCL	NCL	<0.0035	<0.0036	<0.0035	<0.0037	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035	<0.0035	<0.0035	<0.0042	<0.0036	<0.0038	<0.0035	<0.0037	<0.0035	<0.0035
Perfluorotridecanoic acid (PFTrDA)	NCL	NCL	<0.0035	<0.0036	<0.0035	<0.0037	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035	<0.0035	<0.0035	<0.0042	<0.0036	<0.0038	<0.0035	<0.0037	<0.0035	<0.0035
Perfluoroundecanoic acid (PFUnDA)	NCL	NCL	<0.0035	<0.0036	<0.0035	<0.0037	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035	<0.0035	<0.0035	<0.0042	<0.0036	<0.0038	<0.0035	<0.0037	<0.0035	<0.0035
Total PFAS (Calculated)	NCL	NCL	ND	0.0042	ND	0.015	0.026	ND	ND	ND	0.013	0.0093	0.01	0.0096	0.017	0.011	0.015	0.0057	0.0055	0.0055

TABLE 3
GROUNDWATER ANALYTICAL DATA - PFAS
House Street Disposal Site Study Area
Plainfield Township, Kent County, MI

Sample Location	Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water ²	Part 201 Generic Groundwater Cleanup Criteria – Groundwater Surface Water Interface ²	HS-MW-30C	HS-MW-30D	HS-MW-30D	HS-MW-30D	HS-MW-30E	HS-MW-30E	HS-MW-30E	HS-MW-30E	HS-PMW-31	HS-PMW-31	HS-PMW-31	HS-PMW-31	HS-MW-31A	HS-MW-31A	HS-MW-31A	HS-MW-31B	HS-MW-31B
Sample Name			HS-GW-MW-30C	HS-GW-MW30D	HS-GW-MW30D	HS-GW-MW-30D	HS-GW-MW30E	HS-GW-MW30E	HS-GW-MW-30E	HS-MW31 (21.22.5)	HS-MW31 (31.0-32.5)	HS-MW31 (41.0-42.5)	HS-MW31 (51.0-52.5)	HS-GW-MW31A	HS-GW-MW31A	HS-GW-MW-31A	HS-GW-MW31B	HS-GW-MW31B	
Well Screen Interval (Feet below ground surface)			77.4-82	112.7-117.3	112.7-117.3	112.7-117.3	123.2-127.7	123.2-127.7	123.2-127.7	21-22.5	31-32.5	41-42.5	51-52.5	17.1-21.6	17.1-21.6	17.1-21.6	26-30.5	26-30.5	
Laboratory Sample ID			UK21036-026	UG03026-008	UI21016-002	UK21036-024	UG03026-006	UI19006-016	UK21036-025	UE17005-006	UE17005-007	UE17005-008	UE17005-009	UG03026-003	UI13033-001	UK21036-006	UG03026-001	UI13033-004	
Sample Date			11/22/2019	07/02/2019	09/19/2019	11/22/2019	07/02/2019	09/17/2019	11/22/2019	05/15/2019	05/15/2019	05/17/2019	05/17/2019	07/01/2019	09/12/2019	11/19/2019	07/01/2019	09/12/2019	
Parameter (µg/L)																			
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NCL	<0.0034	<0.0036	<0.0035	<0.0036	<0.0037	<0.0034	<0.0038	<0.0034	<0.0035	<0.0036	<0.0035	<0.0035	<0.0035	<0.0036	<0.0036	<0.0037	
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NCL	<0.0034	<0.0036	<0.0035	<0.0036	<0.0037	0.0047	<0.0038	<0.0034	<0.0035	<0.0036	<0.0035	<0.0035	<0.0035	<0.0036	<0.0036	<0.0037	
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NCL	<0.0034	<0.0036	<0.0035	<0.0036	<0.0037	<0.0034	<0.0038	<0.0034	<0.0035	<0.0036	<0.0035	<0.0035	<0.0035	<0.0036	<0.0036	<0.0037	
N-Ethyl perfluorooctane sulfonamidoethanol (N-EtFOSE)	NCL	NCL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NCL	<0.0069	<0.0071	<0.007	<0.0071	<0.0074	<0.0069	<0.0077	<0.0068	<0.007	<0.0072	<0.0071	<0.007	<0.007	<0.0073	<0.0073	<0.0075	
N-Methyl perfluorooctane sulfonamidoethanol (N-MeFOSE)	NCL	NCL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Perfluorobutane sulfonic acid (PFBS)	NCL	NCL	0.0055	0.0048	0.0053	0.0056	0.0055	0.0063	0.0059	<0.0034	0.0099	0.015	0.011	0.011	0.0055	0.0068	0.014	0.012	
Perfluorodecane sulfonic acid (PFDS)	NCL	NCL	<0.0034	<0.0036	<0.0035	<0.0036	<0.0037	<0.0034	<0.0038	<0.0034	<0.0035	<0.0036	<0.0035	<0.0035	<0.0035	<0.0036	<0.0036	<0.0037	
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NCL	<0.0034	<0.0036	<0.0035	<0.0036	<0.0037	<0.0034	<0.0038	<0.0034	<0.0035	<0.0036	<0.0035	<0.0035	<0.0035	<0.0036	<0.0036	<0.0037	
Perfluorononane sulfonic acid (PFNS)	NCL	NCL	<0.0069	<0.0071	<0.007	<0.0071	<0.0074	<0.0069	<0.0077	<0.0068	<0.007	<0.0072	<0.0071	<0.007	<0.007	<0.0073	<0.0073	<0.0075	
Perfluorooctane sulfonamide (FOSA)	NCL	NCL	<0.0034	<0.0036	<0.0035	<0.0036	<0.0037	<0.0034	<0.0038	<0.0034	<0.0035	<0.0036	<0.0035	<0.0035	<0.0035	<0.0036	<0.0036	<0.0037	
Perfluoropentane sulfonic acid (PFPeS)	NCL	NCL	<0.0034	<0.0036	<0.0035	<0.0036	<0.0037	<0.0034	<0.0038	<0.0034	<0.0035	0.0055	<0.0035	<0.0035	<0.0035	<0.0036	0.0041	0.0049	
Perfluorohexane sulfonic acid (PFHxS)	NCL	NCL	<0.0034	<0.0036	<0.0035	<0.0036	<0.0037	<0.0034	<0.0038	<0.0034	0.0091	0.012	0.008	0.0071	0.0075	0.0053	0.011	0.011	
Perfluorobutanoic acid (PFBA)	NCL	NCL	<0.0034	<0.0036	<0.0035	<0.0036	<0.0037	<0.0034	<0.0038	<0.0034	0.0042	0.005	<0.0035	<0.0035	<0.0035	<0.0036	0.006	0.0042	
Perfluorodecanoic acid (PFDA)	NCL	NCL	<0.0034	<0.0036	<0.0035	<0.0036	<0.0037	<0.0034	<0.0038	<0.0034	<0.0035	<0.0036	<0.0035	<0.0035	<0.0035	<0.0036	<0.0036	<0.0037	
Perfluorododecanoic acid (PFDoDA)	NCL	NCL	<0.0034	<0.0036	<0.0035	<0.0036	<0.0037	<0.0034	<0.0038	<0.0034	<0.0035	<0.0036	<0.0035	<0.0035	<0.0035	<0.0036	<0.0036	<0.0037	
Perfluoroheptanoic acid (PFHpA)	NCL	NCL	<0.0034	<0.0036	<0.0035	<0.0036	<0.0037	<0.0034	<0.0038	0.0034	0.0039	<0.0036	<0.0035	<0.0035	<0.0035	<0.0036	0.0038	<0.0037	
Perfluorohexanoic acid (PFHxA)	NCL	NCL	<0.0034	<0.0036	<0.0035	<0.0036	<0.0037	<0.0034	<0.0038	0.0054	0.0059	0.007	0.0075	<0.0035	<0.0035	0.0043	0.0056	0.0082	
Perfluorononanoic acid (PFNA)	NCL	NCL	<0.0034	<0.0036	<0.0035	<0.0036	<0.0037	<0.0034	<0.0038	<0.0034	<0.0035	<0.0036	<0.0035	<0.0035	<0.0035	<0.0036	<0.0036	<0.0037	
Perfluorooctanoic acid (PFOA)	0.07 (JJ)	12	<0.0017	<0.0018	<0.0018	<0.0018	<0.0018	<0.0017	<0.0019	0.0069	0.011	0.011	0.008	0.0035	0.0038	0.0032	0.022	0.012	
Perfluorooctane sulfonic acid (PFOS)	0.07 (JJ)	0.012	<0.0034	<0.0036	<0.0035	<0.0036	<0.0037	<0.0034	<0.0038	<0.0034	<0.0035	0.0055	0.0055	<0.0035	<0.0035	<0.0036	0.0059	0.005	
PFOA + PFOS (Calculated)	0.07	NCL	ND	ND	ND	ND	ND	ND	ND	0.0069	0.011	0.017	0.014	0.0035	0.0038	0.0032	0.028	0.017	
Perfluoropentanoic acid (PFPeA)	NCL	NCL	<0.0034	<0.0036	<0.0035	<0.0036	<0.0037	<0.0034	<0.0038	0.0067	0.0048	0.005	0.0053	<0.0035	<0.0035	<0.0036	0.0051	0.0059	
Perfluorotetradecanoic acid (PFTeDA)	NCL	NCL	<0.0034	<0.0036	<0.0035	<0.0036	<0.0037	<0.0034	<0.0038	<0.0034	<0.0035	<0.0036	<0.0035	<0.0035	<0.0035	<0.0036	<0.0036	<0.0037	
Perfluorotridecanoic acid (PFTrDA)	NCL	NCL	<0.0034	<0.0036	<0.0035	<0.0036	<0.0037	<0.0034	<0.0038	<0.0034	<0.0035	<0.0036	<0.0035	<0.0035	<0.0035	<0.0036	<0.0036	<0.0037	
Perfluoroundecanoic acid (PFUnDA)	NCL	NCL	<0.0034	<0.0036	<0.0035	<0.0036	<0.0037	<0.0034	<0.0038	<0.0034	<0.0035	<0.0036	<0.0035	<0.0035	<0.0035	<0.0036	<0.0036	<0.0037	
Total PFAS (Calculated)	NCL	NCL	0.0055	0.0048	0.0053	0.0056	0.0055	0.011	0.0059	0.022	0.049	0.066	0.045	0.022	0.017	0.02	0.078	0.063	

TABLE 3
GROUNDWATER ANALYTICAL DATA - PFAS
House Street Disposal Site Study Area
Plainfield Township, Kent County, MI

Sample Location	Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water ²	Part 201 Generic Groundwater Cleanup Criteria – Groundwater Surface Water Interface ²	HS-MW-31B	HS-MW-31C	HS-MW-31C	HS-MW-31C	HS-MW-31D	HS-MW-31D	HS-MW-31D	HS-MW-31E	HS-MW-31E	HS-MW-31E	HS-MW-31E	HS-PMW-32	HS-PMW-32	HS-PMW-32	HS-PMW-32	HS-PMW-32
Sample Name			HS-GW-MW-31B	HS-GW-MW31C	HS-GW-MW31C	HS-GW-MW-31C	HS-GW-MW31D	HS-GW-MW31D	HS-GW-MW-31D	HS-GW-MW31E	HS-GW-MW31E DUP	HS-GW-MW31E	HS-GW-MW-31E	WV-MW-32 (54-64)	WV-MW-32 (64-74)	WV-MW-32 (102-112)	WV-MW-32 (112-122)	WV-MW-32 (130-140)
Well Screen Interval (Feet below ground surface)			26-30.5	41.3-45.8	41.3-45.8	41.3-45.8	48.8-53.4	48.8-53.4	48.8-53.4	64.1-68.7	64.1-68.7	64.1-68.7	64.1-68.7	54-64	64-74	102-112	112-122	130-140
Laboratory Sample ID			UK19008-013	UG03026-004	UI13033-003	UK21036-007	UG03026-002	UI13033-002	UK21036-027	UG06001-002	UG06001-003	UI13033-005	UK19008-009	UD19022-001	UD19022-002	UD19022-003	UD19022-004	UD19022-005
Sample Date			11/20/2019	07/01/2019	09/12/2019	11/19/2019	07/01/2019	09/12/2019	11/22/2019	07/03/2019	07/03/2019	09/12/2019	11/20/2019	04/15/2019	04/16/2019	04/16/2019	04/17/2019	04/17/2019
Parameter (µg/L)																		
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NCL	<0.0037	<0.0037	<0.0035	<0.0036	<0.0036	<0.0034	<0.0037	<0.0037	<0.0036	<0.0034	<0.0035	<0.0051	<0.0042	<0.0044	<0.0039	<0.0039
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NCL	<0.0037	<0.0037	<0.0035	<0.0036	<0.0036	<0.0034	<0.0037	<0.0037	<0.0036	<0.0034	<0.0035	<0.0051	<0.0042	<0.0044	<0.0039	<0.0039
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NCL	<0.0037	<0.0037	<0.0035	<0.0036	<0.0036	<0.0034	<0.0037	<0.0037	<0.0036	<0.0034	<0.0035	<0.0051	<0.0042	<0.0044	<0.0039	<0.0039
N-Ethyl perfluorooctane sulfonamidoethanol (N-EtFOSE)	NCL	NCL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NCL	<0.0073	<0.0075	<0.007	<0.0073	<0.0072	<0.0069	<0.0075	<0.0075	<0.0072	<0.0068	<0.007	<0.01	<0.0084	<0.0088	<0.0078	<0.0078
N-Methyl perfluorooctane sulfonamidoethanol (N-MeFOSE)	NCL	NCL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perfluorobutane sulfonic acid (PFBS)	NCL	NCL	0.012	0.018	0.016	0.015	0.012	0.011	0.0076	<0.0037	<0.0036	<0.0034	<0.0035	<0.0051	<0.0042	<0.0044	<0.0039	<0.0039
Perfluorodecane sulfonic acid (PFDS)	NCL	NCL	<0.0037	<0.0037	<0.0035	<0.0036	<0.0036	<0.0034	<0.0037	<0.0037	<0.0036	<0.0034	<0.0035	<0.0051	<0.0042	<0.0044	<0.0039	<0.0039
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NCL	<0.0037	<0.0037	<0.0035	<0.0036	<0.0036	<0.0034	<0.0037	<0.0037	<0.0036	<0.0034	<0.0035	<0.0051	<0.0042	<0.0044	<0.0039	<0.0039
Perfluorononane sulfonic acid (PFNS)	NCL	NCL	<0.0073	<0.0075	<0.007	<0.0073	<0.0072	<0.0069	<0.0075	<0.0075	<0.0072	<0.0068	<0.007	<0.01	<0.0084	<0.0088	<0.0078	<0.0078
Perfluorooctane sulfonamide (FOSA)	NCL	NCL	<0.0037	<0.0037	<0.0035	<0.0036	<0.0036	<0.0034	<0.0037	<0.0037	<0.0036	<0.0034	<0.0035	<0.0051	<0.0042	<0.0044	<0.0039	<0.0039
Perfluoropentane sulfonic acid (PFPeS)	NCL	NCL	0.0043	0.005	0.0052	0.0048	<0.0036	0.0035	<0.0037	<0.0037	<0.0036	<0.0034	<0.0035	<0.0051	<0.0042	<0.0044	<0.0039	<0.0039
Perfluorohexane sulfonic acid (PFHxS)	NCL	NCL	0.013	0.011	0.0095	0.01	0.0082	0.0069	0.0053	<0.0037	<0.0036	<0.0034	<0.0035	<0.0051	<0.0042	<0.0044	<0.0039	<0.0039
Perfluorobutanoic acid (PFBA)	NCL	NCL	0.0072	0.0051	0.0048	0.0047	0.0042	0.0035	<0.0037	<0.0037	<0.0036	<0.0034	<0.0035	<0.0051	<0.0042	0.0046	<0.0039	<0.0039
Perfluorodecanoic acid (PFDA)	NCL	NCL	<0.0037	<0.0037	<0.0035	<0.0036	<0.0036	<0.0034	<0.0037	<0.0037	<0.0036	<0.0034	<0.0035	<0.0051	<0.0042	<0.0044	<0.0039	<0.0039
Perfluorododecanoic acid (PFDoDA)	NCL	NCL	<0.0037	<0.0037	<0.0035	<0.0036	<0.0036	<0.0034	<0.0037	<0.0037	<0.0036	<0.0034	<0.0035	<0.0051	<0.0042	<0.0044	<0.0039	<0.0039
Perfluoroheptanoic acid (PFHpA)	NCL	NCL	0.018	<0.0037	<0.0035	<0.0036	0.0037	0.0038	<0.0037	<0.0037	<0.0036	<0.0034	<0.0035	<0.0051	<0.0042	<0.0044	<0.0039	<0.0039
Perfluorohexanoic acid (PFHxA)	NCL	NCL	0.017	0.006	0.0063	0.0073	0.0074	0.0064	0.0041	<0.0037	<0.0036	<0.0034	<0.0035	<0.0051	<0.0042	<0.0044	<0.0039	<0.0039
Perfluorononanoic acid (PFNA)	NCL	NCL	<0.0037	<0.0037	<0.0035	<0.0036	<0.0036	<0.0034	<0.0037	<0.0037	<0.0036	<0.0034	<0.0035	<0.0051	<0.0042	<0.0044	<0.0039	<0.0039
Perfluorooctanoic acid (PFOA)	0.07 (JJ)	12	0.052	0.01	0.0086	0.0079	0.0073	0.0075	0.0074	<0.0019	<0.0018	<0.0017	<0.0018	<0.0026	<0.0021	0.0026	<0.002	<0.0019
Perfluorooctane sulfonic acid (PFOS)	0.07 (JJ)	0.012	0.014	0.0077	0.0059	0.0052	0.0044	0.0053	0.007	<0.0037	<0.0036	<0.0034	<0.0035	<0.0051	<0.0042	<0.0044	<0.0039	<0.0039
PFOA + PFOS (Calculated)	0.07	NCL	0.066	0.018	0.015	0.013	0.012	0.013	0.014	ND	ND	ND	ND	ND	ND	0.0026	ND	ND
Perfluoropentanoic acid (PFPeA)	NCL	NCL	0.014	0.004	0.0045	0.0057	0.006	0.0048	<0.0037	<0.0037	<0.0036	<0.0034	<0.0035	<0.0051	<0.0042	<0.0044	<0.0039	<0.0039
Perfluorotetradecanoic acid (PFTeDA)	NCL	NCL	<0.0037	<0.0037	<0.0035	<0.0036	<0.0036	<0.0034	<0.0037	<0.0037	<0.0036	<0.0034	<0.0035	<0.0051	<0.0042	<0.0044	<0.0039	<0.0039
Perfluorotridecanoic acid (PFTrDA)	NCL	NCL	<0.0037	<0.0037	<0.0035	<0.0036	<0.0036	<0.0034	<0.0037	<0.0037	<0.0036	<0.0034	<0.0035	<0.0051	<0.0042	<0.0044	<0.0039	<0.0039
Perfluoroundecanoic acid (PFUnDA)	NCL	NCL	<0.0037	<0.0037	<0.0035	<0.0036	<0.0036	<0.0034	<0.0037	<0.0037	<0.0036	<0.0034	<0.0035	<0.0051	<0.0042	<0.0044	<0.0039	<0.0039
Total PFAS (Calculated)	NCL	NCL	0.15	0.067	0.061	0.061	0.053	0.053	0.031	ND	ND	ND	ND	ND	ND	0.0072	ND	ND

TABLE 3
GROUNDWATER ANALYTICAL DATA - PFAS
House Street Disposal Site Study Area
Plainfield Township, Kent County, MI

Sample Location	Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water ²	Part 201 Generic Groundwater Cleanup Criteria – Groundwater Surface Water Interface ²	HS-MW-32A	HS-MW-32A	HS-MW-32A	HS-MW-32B	HS-MW-32B	HS-MW-32B	HS-MW-32C	HS-MW-32C	HS-MW-32C	HS-MW-32D	HS-MW-32D	HS-MW-32D
Sample Name			HS-GW-MW32A	HS-GW-MW32A	HS-GW-MW-32A	HS-GW-MW32B	HS-GW-MW32B	HS-GW-MW-32B	HS-GW-MW32C	HS-GW-MW32C	HS-GW-MW-32C	HS-GW-MW32D	HS-GW-MW32D	HS-GW-MW-32D
Well Screen Interval (Feet below ground surface)			60.9-65.5	60.9-65.5	60.9-65.5	79.1-83.7	79.1-83.7	79.1-83.7	108.8-113.4	108.8-113.4	108.8-113.4	142.3-146.9	142.3-146.9	142.3-146.9
Laboratory Sample ID			UE25011-005	UI07020-001	UK29008-003	UE25011-006	UI07020-003	UK29008-004	UE25011-007	UI07020-002	UK29008-005	UE25011-008	UI07020-004	UK29008-006
Sample Date			05/24/2019	09/06/2019	11/26/2019	05/24/2019	09/06/2019	11/26/2019	05/24/2019	09/06/2019	11/26/2019	05/24/2019	09/06/2019	11/26/2019
Parameter (µg/L)														
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NCL	<0.0036	<0.0037	<0.0034	<0.0037	<0.0035	<0.0035	<0.0038	<0.0036	<0.0037	<0.0037	<0.0035	<0.0035
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NCL	<0.0036	<0.0037	<0.0034	<0.0037	<0.0035	<0.0035	<0.0038	<0.0036	<0.0037	<0.0037	<0.0035	<0.0035
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NCL	<0.0036	<0.0037	<0.0034	<0.0037	<0.0035	<0.0035	<0.0038	<0.0036	<0.0037	<0.0037	<0.0035	<0.0035
N-Ethyl perfluorooctane sulfonamidoethanol (N-EtFOSE)	NCL	NCL	-	-	-	-	-	-	-	-	-	-	-	-
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NCL	<0.0073	<0.0074	<0.0068	<0.0074	<0.0069	<0.0069	<0.0076	<0.0071	<0.0074	<0.0074	<0.0069	<0.0071
N-Methyl perfluorooctane sulfonamidoethanol (N-MeFOSE)	NCL	NCL	-	-	-	-	-	-	-	-	-	-	-	-
Perfluorobutane sulfonic acid (PFBS)	NCL	NCL	<0.0036	<0.0037	<0.0034	<0.0037	<0.0035	<0.0035	<0.0038	<0.0036	<0.0037	<0.0037	<0.0035	<0.0035
Perfluorodecane sulfonic acid (PFDS)	NCL	NCL	<0.0036	<0.0037	<0.0034	<0.0037	<0.0035	<0.0035	<0.0038	<0.0036	<0.0037	<0.0037	<0.0035	<0.0035
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NCL	<0.0036	<0.0037	<0.0034	<0.0037	<0.0035	<0.0035	<0.0038	<0.0036	<0.0037	<0.0037	<0.0035	<0.0035
Perfluorononane sulfonic acid (PFNS)	NCL	NCL	<0.0073	<0.0074	<0.0068	<0.0074	<0.0069	<0.0069	<0.0076	<0.0071	<0.0074	<0.0074	<0.0069	<0.0071
Perfluorooctane sulfonamide (FOSA)	NCL	NCL	<0.0036	<0.0037	<0.0034	<0.0037	<0.0035	<0.0035	<0.0038	<0.0036	<0.0037	<0.0037	<0.0035	<0.0035
Perfluoropentane sulfonic acid (PFPeS)	NCL	NCL	<0.0036	<0.0037	<0.0034	<0.0037	<0.0035	<0.0035	<0.0038	<0.0036	<0.0037	<0.0037	<0.0035	<0.0035
Perfluorohexane sulfonic acid (PFHxS)	NCL	NCL	<0.0036	<0.0037	<0.0034	<0.0037	<0.0035	<0.0035	<0.0038	<0.0036	<0.0037	<0.0037	<0.0035	<0.0035
Perfluorobutanoic acid (PFBA)	NCL	NCL	<0.0036	<0.0037	<0.0034	<0.0037	<0.0035	<0.0035	<0.0038	<0.0036	<0.0037	<0.0037	0.0044	<0.0035
Perfluorodecanoic acid (PFDA)	NCL	NCL	<0.0036	<0.0037	<0.0034	<0.0037	<0.0035	<0.0035	<0.0038	<0.0036	<0.0037	<0.0037	<0.0035	<0.0035
Perfluorododecanoic acid (PFDoDA)	NCL	NCL	<0.0036	<0.0037	<0.0034	<0.0037	<0.0035	<0.0035	<0.0038	<0.0036	<0.0037	<0.0037	<0.0035	<0.0035
Perfluoroheptanoic acid (PFHpA)	NCL	NCL	<0.0036	<0.0037	<0.0034	<0.0037	<0.0035	<0.0035	<0.0038	<0.0036	<0.0037	<0.0037	<0.0035	<0.0035
Perfluorohexanoic acid (PFHxA)	NCL	NCL	<0.0036	<0.0037	<0.0034	<0.0037	<0.0035	<0.0035	<0.0038	<0.0036	<0.0037	<0.0037	<0.0035	<0.0035
Perfluorononanoic acid (PFNA)	NCL	NCL	<0.0036	<0.0037	<0.0034	<0.0037	<0.0035	<0.0035	<0.0038	<0.0036	<0.0037	<0.0037	<0.0035	<0.0035
Perfluorooctanoic acid (PFOA)	0.07 (IJ)	12	<0.0018	<0.0019	<0.0017	<0.0018	<0.0017	<0.0017	<0.0019	<0.0018	<0.0019	<0.0018	<0.0017	<0.0018
Perfluorooctane sulfonic acid (PFOS)	0.07 (IJ)	0.012	<0.0036	<0.0037	<0.0034	<0.0037	<0.0035	<0.0035	<0.0038	<0.0036	<0.0037	<0.0037	<0.0035	<0.0035
PFOA + PFOS (Calculated)	0.07	NCL	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Perfluoropentanoic acid (PFPeA)	NCL	NCL	<0.0036	<0.0037	<0.0034	<0.0037	<0.0035	<0.0035	<0.0038	<0.0036	<0.0037	<0.0037	<0.0035	<0.0035
Perfluorotetradecanoic acid (PFTeDA)	NCL	NCL	<0.0036	<0.0037	<0.0034	<0.0037	<0.0035	<0.0035	<0.0038	<0.0036	<0.0037	<0.0037	<0.0035	<0.0035
Perfluorotridecanoic acid (PFTrDA)	NCL	NCL	<0.0036	<0.0037	<0.0034	<0.0037	<0.0035	<0.0035	<0.0038	<0.0036	<0.0037	<0.0037	<0.0035	<0.0035
Perfluoroundecanoic acid (PFUnDA)	NCL	NCL	<0.0036	<0.0037	<0.0034	<0.0037	<0.0035	<0.0035	<0.0038	<0.0036	<0.0037	<0.0037	<0.0035	<0.0035
Total PFAS (Calculated)	NCL	NCL	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0044	ND

TABLE 3 NOTES

House Street Disposal Site Study Area

Plainfield Township, Kent County, MI

NOTES:

1. Concentration and criteria units are micrograms per Liter ($\mu\text{g/L}$) or parts per billion (ppb). Calculated criteria and concentrations are rounded to two significant digits. "ND" indicates the parameters used in the calculation were not detected.
2. Michigan Part 201 Groundwater Cleanup Criteria are based on "Table 1, Groundwater: Residential and Nonresidential Part 201 Generic Cleanup Criteria and Screening Levels/Part 213 Tier I Risk Based Screening Levels," Michigan Administrative Code, Cleanup Criteria Requirements for Response Activity, Rules 299.44 and 299.49, effective December 30, 2013; updated June 25, 2018.
Abbreviations Include:
"NCL" indicates no criterion listed in EGLE Table 1.
Footnotes Include:
(JJ) - Compliance with the drinking water criteria shall require comparing the sum of the PFOA and PFOS groundwater concentrations to the drinking water criterion of 0.07 $\mu\text{g/L}$.
3. Bold, italic number with thick line border or italic parameter name indicates that parameter was detected above the Michigan Part 201 Groundwater Cleanup Criteria listed.
4. Abbreviations include:
" < RL " indicates the parameter was analyzed for but not detected above the method detection limit; RL = Reporting Limit.
"DUP" indicates a duplicate sample.
"-" indicates the parameter was not analyzed.
"J" indicates the result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
"UJ" indicates the analyte was analyzed for but was not detected. The reported quantitation limit is approximate.
5. Well screen interval presented is the top of the well screen to the bottom of the well screen in feet below ground surface.

TABLE 4
GROUNDWATER ANALYTICAL DATA - PFAS
Wolver/Jewell Study Areas
Algoma Township, Kent County, MI

Sample Location	Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water ²	Part 201 Generic Groundwater Cleanup Criteria – Groundwater Surface Water Interface ²	WV-MW-1	WV-MW-1	WV-MW-1	WV-MW-1	WV-MW-1	WV-PMW-2	WV-PMW-2	WV-MW-2D	WV-MW-2D	WV-MW-2D	WV-MW-2D	WV-MW-2D	WV-MW-2S	WV-MW-2S	WV-MW-2S	WV-MW-2S
Sample Name			PMW-WV-1	MW-WV-1	WV-GW-MW1	WV-GW-MW1	WV-GW-MW-1	PMW-WV-2 (13-18)	PMV-WV 2 31 - 36	PMW-WV-2D	MW-WV-2D	WV-GW-MW2D	WV-GW-MW2D	WV-GW-MW-2D	PMW-WV-2S	MW-WV-2S	WV-GW-MW2S	WV-GW-MW2S
Well Screen Interval (Feet below ground surface)			137.8-142.8	137.8-142.8	137.8-142.8	137.8-142.8	137.8-142.8	13-18	31-36	30.2-35.2	30.2-35.2	30.2-35.2	30.2-35.2	30.2-35.2	20.2-25.2	20.2-25.2	20.2-25.2	20.2-25.2
Laboratory Sample ID			TC30012-002	UB20051-010	UE09028-012	UI05007-008	UK13023-002	K1801515-002	K1801591-001	TC30012-006	UB20051-002	UE09028-013	UI05007-005	UK07051-005	TC30012-010	UB20051-001	UE09028-014	UI05007-004
Sample Date			03/28/2018	02/20/2019	05/10/2019	09/04/2019	11/12/2019	02/14/2018	02/16/2018	03/29/2018	02/18/2019	05/10/2019	09/03/2019	11/05/2019	03/29/2018	02/18/2019	05/10/2019	09/03/2019
Parameter (µg/L)																		
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NCL	<0.007	<0.0035	<0.0036	<0.0034	<0.0035	<0.0047	<0.0051	<0.0072	<0.0036	<0.0036	<0.0036	<0.0038	<0.0074	<0.0036	<0.0037	<0.0036
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NCL	<0.007	<0.0035	<0.0036	<0.0034	<0.0035	<0.0047	<0.0051	<0.0072	<0.0036	<0.0036	<0.0036	<0.0038	<0.0074	<0.0036	<0.0037	<0.0036
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NCL	<0.007	<0.0035	<0.0036	<0.0034	<0.0035	<0.0047	<0.0051	<0.0072	<0.0036	<0.0036	<0.0036	<0.0038	<0.0074	<0.0036	<0.0037	<0.0036
N-Ethyl perfluorooctane sulfonamidoethanol (N-EtFOSE)	NCL	NCL	-	-	-	-	-	<0.0047	<0.0051	-	-	-	-	-	-	-	-	-
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NCL	<0.014	<0.007	<0.0071	<0.0067	<0.007	<0.0047	<0.0051	<0.014	<0.0071	<0.0072	<0.0072	<0.0077	<0.015	<0.0071	<0.0073	<0.0071
N-Methyl perfluorooctane sulfonamidoethanol (N-MeFOSE)	NCL	NCL	-	-	-	-	-	<0.0047	<0.0051	-	-	-	-	-	-	-	-	-
Perfluorobutane sulfonic acid (PFBS)	NCL	NCL	0.046	0.032	0.0072	0.048	0.041	0.02	0.05	0.056	0.051	0.046	0.045	0.042	0.017	0.014	0.013	0.016
Perfluorodecane sulfonic acid (PFDS)	NCL	NCL	<0.0035	<0.0035	<0.0036	<0.0034	<0.0035	<0.0047	<0.0051	<0.0036	<0.0036	<0.0036	<0.0036	<0.0038	<0.0037	<0.0036	<0.0037	<0.0036
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NCL	0.23	0.17	0.071	0.25	0.22	0.13	0.024	0.015	0.016	0.016	0.022	0.016	0.074	0.062	0.047	0.054
Perfluorononane sulfonic acid (PFNS)	NCL	NCL	<0.007	<0.007	<0.0071	<0.0067	<0.007	-	-	<0.0072	<0.0071	<0.0072	<0.0072	<0.0077	<0.0074	<0.0071	<0.0073	<0.0071
Perfluorooctane sulfonamide (FOSA)	NCL	NCL	<0.007	<0.0035	0.0099	<0.0034	<0.0035	<0.0047	<0.0051	<0.0072	<0.0036	<0.0036	<0.0036	<0.0038	<0.0074	<0.0036	<0.0037	<0.0036
Perfluoropentane sulfonic acid (PFPeS)	NCL	NCL	0.14	0.1	0.022	0.14	0.12	-	-	0.14	0.14	0.12	0.13	0.13	0.018	0.015	0.016	0.02
Perfluorohexane sulfonic acid (PFHxS)	NCL	NCL	1.1	0.81	0.18	1.1	0.77	0.086	0.24	0.35	0.32	0.28	0.26	0.28	0.08	0.065	0.052	0.065
Perfluorobutanoic acid (PFBA)	NCL	NCL	0.031	0.022	0.0059	0.037	0.029	<0.0094	0.02	0.026	0.022	0.02	0.017	0.019	0.011	0.0081	0.0074	0.0096
Perfluorodecanoic acid (PFDA)	NCL	NCL	<0.0035	<0.0035	<0.0036	<0.0034	<0.0035	<0.0047	<0.0051	<0.0036	<0.0036	<0.0036	<0.0036	<0.0038	<0.0037	<0.0036	<0.0037	<0.0036
Perfluorododecanoic acid (PFDoDA)	NCL	NCL	<0.0035	<0.0035	<0.0036	<0.0034	<0.0035	<0.0047	<0.0051	<0.0036	<0.0036	<0.0036	<0.0036	<0.0038	<0.0037	<0.0036	<0.0037	<0.0036
Perfluoroheptanoic acid (PFHpA)	NCL	NCL	0.25	0.17	0.035	0.26	0.22	0.035	0.15	0.15	0.14	0.13	0.12	0.12	0.033	0.024	0.022	0.032
Perfluorohexanoic acid (PFHxA)	NCL	NCL	0.1	0.065	0.014	0.11	0.095	0.023	0.061	0.081	0.068	0.061	0.055	0.057	0.023	0.016	0.015	0.017
Perfluorononanoic acid (PFNA)	NCL	NCL	0.015	0.01	0.0049	0.017	0.013	0.0057	<0.0051	<0.0036	<0.0036	<0.0036	<0.0036	<0.0038	0.0058	0.0059	0.006	0.0071
Perfluorooctanoic acid (PFOA)	0.07 (JJ)	12	3.3	2.8	0.57	4.3	2.9	0.28	0.72	0.97	1.1	1	0.89	0.92	0.32	0.29	0.27	0.32
Perfluorooctane sulfonic acid (PFOS)	0.07 (JJ)	0.012	7.3	6.1	3.7	10	6.7	2.7	0.096	0.064	0.064	0.077	0.15	0.11	3.2	3.8	3.4	3.8
PFOA + PFOS (Calculated)	0.07	NCL	11	8.9	4.3	14	9.6	3	0.82	1	1.2	1.1	1	1	3.5	4.1	3.7	4.1
Perfluoropentanoic acid (PFPeA)	NCL	NCL	0.039	0.025	0.0057	0.037	0.036	0.014	0.025	0.033	0.027	0.026	0.025	0.026	0.014	0.0093	0.0083	0.0089
Perfluorotetradecanoic acid (PFTeDA)	NCL	NCL	<0.007	<0.0035	<0.0036	<0.0034	<0.0035	<0.0047	<0.0051	<0.0072	<0.0036	<0.0036	<0.0036	<0.0038	<0.0074	<0.0036	<0.0037	<0.0036
Perfluorotridecanoic acid (PFTrDA)	NCL	NCL	<0.0035	<0.0035	<0.0036	<0.0034	<0.0035	<0.0047	<0.0051	<0.0036	<0.0036	<0.0036	<0.0036	<0.0038	<0.0037	<0.0036	<0.0037	<0.0036
Perfluoroundecanoic acid (PFUnDA)	NCL	NCL	<0.0035	<0.0035	<0.0036	<0.0034	<0.0035	<0.0047	<0.0051	<0.0036	<0.0036	<0.0036	<0.0036	<0.0038	<0.0037	<0.0036	<0.0037	<0.0036
Total PFAS (Calculated)	NCL	NCL	13	10	4.6	16	11	3.3	1.4	1.9	1.9	1.8	1.7	1.7	3.8	4.3	3.9	4.3

TABLE 4
GROUNDWATER ANALYTICAL DATA - PFAS
Wolver/Jewell Study Areas
Algoma Township, Kent County, MI

Sample Location	Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water ²	Part 201 Generic Groundwater Cleanup Criteria – Groundwater Surface Water Interface ²	WV-MW-2S	WV-PMW-3	WV-PMW-3	WV-PMW-3	WV-PMW-3	WV-PMW-3	WV-MW-3D	WV-MW-3D	WV-MW-3D	WV-MW-3D	WV-MW-3D	WV-MW-3D	WV-MW-3S	WV-MW-3S	WV-MW-3S	WV-MW-3S
Sample Name			WV-GW-MW-2S	PMW-WV-3 5-10	PMW-WV-3 13-18	PMW_WV3-3439	PMW_WV3-4449	PMW_WV3-5459	DUP-1	PMW-WV-3D	MW-WV-3D	WV-GW-MW3D	WV-GW-MW3D	WV-GW-MW-3D	PMW-WV-3S	MW-WV-3S	WV-GW-MW3S	WV-GW-MW3S
Well Screen Interval (Feet below ground surface)			20.2-25.2	5-10	13-18	34-39	44-49	54-59	57.5-62.5	57.5-62.5	57.5-62.5	57.5-62.5	57.5-62.5	57.5-62.5	5.1-10.1	5.1-10.1	5.1-10.1	5.1-10.1
Laboratory Sample ID			UK07051-004	K1801320-001	K1801320-002	K1801365-002	K1801365-004	K1801365-005	TC30012-011	TC30012-008	UB16022-008	UE09028-018	UI05007-010	UK07025-005	TC30012-009	UB16022-007	UE09028-022	UI05007-011
Sample Date			11/05/2019	02/08/2018	02/08/2018	02/12/2018	02/12/2018	02/12/2018	03/29/2018	03/29/2018	02/15/2019	05/09/2019	09/04/2019	11/06/2019	03/29/2018	02/15/2019	05/09/2019	09/04/2019
Parameter (µg/L)																		
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NCL	<0.0036	<0.0042	<0.0042	<0.0044	<0.0044	<0.0044	<0.0075	<0.0075	<0.0038	<0.0037	<0.0037	<0.0039	<0.007	<0.0037	<0.0037	<0.0035
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NCL	<0.0036	<0.0042	<0.0042	<0.0044	<0.0044	<0.0044	<0.0075	<0.0075	<0.0038	<0.0037	<0.0037	0.0049	<0.007	<0.0037	<0.0037	<0.0035
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NCL	<0.0036	<0.0042	<0.0042	<0.0044	<0.0044	<0.0044	<0.0075	<0.0075	<0.0038	<0.0037	<0.0037	<0.0039	<0.007	<0.0037	<0.0037	<0.0035
N-Ethyl perfluorooctane sulfonamidoethanol (N-EtFOSE)	NCL	NCL	-	<0.0042	<0.0042	<0.0044	<0.0044	<0.0044	-	-	-	-	-	-	-	-	-	-
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NCL	<0.0073	<0.0042	<0.0042	<0.0044	<0.0044	<0.0044	<0.015	<0.015	<0.0076	<0.0074	<0.0073	<0.0078	<0.014	<0.0075	<0.0074	<0.0071
N-Methyl perfluorooctane sulfonamidoethanol (N-MeFOSE)	NCL	NCL	-	<0.0042	<0.0042	<0.0044	<0.0044	<0.0044	-	-	-	-	-	-	-	-	-	-
Perfluorobutane sulfonic acid (PFBS)	NCL	NCL	0.013	0.0049	0.012	<0.0044	0.0052	0.0053	0.0066	0.0064	0.006	0.0051	0.006	0.0054	0.0049	0.006	0.0068	0.0082
Perfluorodecane sulfonic acid (PFDS)	NCL	NCL	<0.0036	<0.0042	<0.0042	<0.0044	<0.0044	<0.0044	<0.0038	<0.0037	<0.0038	<0.0037	<0.0037	<0.0039	<0.0035	<0.0037	<0.0037	<0.0035
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NCL	0.049	0.021	<0.0042	<0.0044	<0.0044	<0.0044	<0.0038	<0.0037	<0.0038	<0.0037	<0.0037	<0.0039	0.0092	0.0044	<0.0037	0.0041
Perfluorononane sulfonic acid (PFNS)	NCL	NCL	<0.0073	-	-	-	-	-	<0.0075	<0.0075	<0.0076	<0.0074	<0.0073	<0.0078	<0.007	<0.0075	<0.0074	<0.0071
Perfluorooctane sulfonamide (FOSA)	NCL	NCL	<0.0036	<0.0042	<0.0042	<0.0044	<0.0044	<0.0044	<0.0075	<0.0075	<0.0038	<0.0037	<0.0037	<0.0039	<0.007	<0.0037	<0.0037	<0.0035
Perfluoropentane sulfonic acid (PFPeS)	NCL	NCL	0.017	-	-	-	-	-	<0.0038	<0.0037	<0.0038	<0.0037	<0.0037	<0.0039	0.005	0.0052	0.0053	0.0074
Perfluorohexane sulfonic acid (PFHxS)	NCL	NCL	0.061	0.045	0.11	0.024	<0.0044	0.0061	0.0047	0.0042	0.004	<0.0037	0.004	0.0039	0.023	0.018	0.014	0.024
Perfluorobutanoic acid (PFBA)	NCL	NCL	0.0081	0.009	<0.0085	<0.0089	<0.0089	<0.0087	<0.0038	<0.0037	<0.0038	<0.0037	<0.0037	<0.0039	0.0053	0.008	0.0081	0.0097
Perfluorodecanoic acid (PFDA)	NCL	NCL	<0.0036	<0.0042	<0.0042	<0.0044	<0.0044	<0.0044	<0.0038	<0.0037	<0.0038	<0.0037	<0.0037	<0.0039	<0.0035	<0.0037	<0.0037	<0.0035
Perfluorododecanoic acid (PFDoDA)	NCL	NCL	<0.0036	<0.0042	<0.0042	<0.0044	<0.0044	<0.0044	<0.0038	<0.0037	<0.0038	<0.0037	<0.0037	<0.0039	<0.0035	<0.0037	<0.0037	<0.0035
Perfluoroheptanoic acid (PFHpA)	NCL	NCL	0.023	0.029	0.06	<0.0044	<0.0044	<0.0044	<0.0038	<0.0037	<0.0038	<0.0037	<0.0037	<0.0039	0.011	0.0097	0.009	0.014
Perfluorohexanoic acid (PFHxA)	NCL	NCL	0.013	0.013	0.024	<0.0044	<0.0044	<0.0044	<0.0038	<0.0037	<0.0038	<0.0037	<0.0037	<0.0039	0.0061	0.007	0.008	0.0083
Perfluorononanoic acid (PFNA)	NCL	NCL	0.0059	<0.0042	<0.0042	<0.0044	<0.0044	<0.0044	<0.0038	<0.0037	<0.0038	<0.0037	<0.0037	<0.0039	<0.0035	<0.0037	<0.0037	<0.0035
Perfluorooctanoic acid (PFOA)	0.07 (JJ)	12	0.27	0.19	0.13	0.028	<0.0018	<0.0017	<0.0038	<0.0037	<0.0019	<0.0018	0.0019	<0.0019	0.093	0.082	0.063	0.099
Perfluorooctane sulfonic acid (PFOS)	0.07 (JJ)	0.012	3.1	0.34	<0.0042	0.028	<0.0044	<0.0044	<0.0038	<0.0037	<0.0038	<0.0037	<0.0037	<0.0039	0.23	0.15	0.11	0.15
PFOA + PFOS (Calculated)	0.07	NCL	3.4	0.53	0.13	0.056	ND	ND	ND	ND	ND	ND	0.0019	ND	0.32	0.23	0.17	0.25
Perfluoropentanoic acid (PFPeA)	NCL	NCL	0.0079	0.0059	0.0051	<0.0044	<0.0044	<0.0044	<0.0038	<0.0037	<0.0038	<0.0037	<0.0037	<0.0039	<0.0035	<0.0037	<0.0037	0.0049
Perfluorotetradecanoic acid (PFTeDA)	NCL	NCL	<0.0036	<0.0042	<0.0042	<0.0044	<0.0044	<0.0044	<0.0075	<0.0075	<0.0038	<0.0037	<0.0037	<0.0039	<0.007	<0.0037	<0.0037	<0.0035
Perfluorotridecanoic acid (PFTrDA)	NCL	NCL	<0.0036	<0.0042	<0.0042	<0.0044	<0.0044	<0.0044	<0.0038	<0.0037	<0.0038	<0.0037	<0.0037	<0.0039	<0.0035	<0.0037	<0.0037	<0.0035
Perfluoroundecanoic acid (PFUnDA)	NCL	NCL	<0.0036	<0.0042	<0.0042	<0.0044	<0.0044	<0.0044	<0.0038	<0.0037	<0.0038	<0.0037	<0.0037	<0.0039	<0.0035	<0.0037	<0.0037	<0.0035
Total PFAS (Calculated)	NCL	NCL	3.6	0.66	0.34	0.08	0.0052	0.011	0.011	0.011	0.01	0.0051	0.012	0.014	0.39	0.29	0.22	0.33

TABLE 4
GROUNDWATER ANALYTICAL DATA - PFAS
Wolven/Jewell Study Areas
Algoma Township, Kent County, MI

Sample Location	Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water ²	Part 201 Generic Groundwater Cleanup Criteria – Groundwater Surface Water Interface ²	WV-MW-3S	WV-PMW-4	WV-PMW-4	WV-MW-4	WV-MW-4	WV-MW-4	WV-MW-4	WV-MW-4	WV-MW-4	WV-PMW-5	WV-MW-5D	WV-MW-5D	WV-MW-5D	WV-MW-5D	WV-MW-5D	WV-MW-5D	WV-MW-5S
Sample Name			WV-GW-MW-3S	PMW-WV-4-123	PMW-WV-4-125-130	PMW-WV-4	MW-WV-4	WV-GW-MW4	WV-GW-MW4	WV-GW-MW4	WV-GW-MW4	PMW-WV5	PMW-WV-5D	MW-WV-5D	MW-WV-5D DUP	WV-GW-MW5D	WV-GW-MW5D	WV-GW-MW-5D	PMW-WV-5S
Well Screen Interval (Feet below ground surface)			5.1-10.1	118-123	125-130	130.2-135.2	130.2-135.2	130.2-135.2	130.2-135.2	130.2-135.2	130.2-135.2	-	68.7-73.7	68.7-73.7	68.7-73.7	68.7-73.7	68.7-73.7	68.7-73.7	61.5-66.5
Laboratory Sample ID			UK07025-004	K1802438-001	K1802438-002	TE25018-002	UB20051-013	UE16022-001	UI05007-002	UK19013-002	K1802089-001	TC30012-004	UB16022-003	UB16022-005	UE09028-017	UI05007-001	UK19013-003	TC30012-003	
Sample Date			11/06/2019	03/14/2018	03/14/2018	05/23/2018	02/21/2019	05/13/2019	09/03/2019	11/13/2019	03/06/2018	03/28/2018	02/14/2019	02/14/2019	05/09/2019	09/03/2019	11/13/2019	03/28/2018	
Parameter (µg/L)																			
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NCL	<0.0037	<0.0051	<0.0046	<0.0035	<0.0035	<0.0036	<0.0035	<0.0037	<0.0048	<0.0072	<0.0037	<0.0038	<0.0035	<0.0034	<0.0036	<0.0071	
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NCL	<0.0037	<0.0051	<0.0046	<0.0035	<0.0035	<0.0036	<0.0035	<0.0037	<0.0048	<0.0072	<0.0037	<0.0038	<0.0035	<0.0034	<0.0036	<0.0071	
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NCL	<0.0037	<0.0051	<0.0046	<0.0035	<0.0035	<0.0036	<0.0035	<0.0037	<0.0048	<0.0072	<0.0037	<0.0038	<0.0035	<0.0034	<0.0036	<0.0071	
N-Ethyl perfluorooctane sulfonamidoethanol (N-EtFOSE)	NCL	NCL	-	<0.0051	<0.0046	-	-	-	-	-	<0.0048	-	-	-	-	-	-	-	
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NCL	<0.0075	<0.0051	<0.0046	<0.007	<0.007	<0.0071	<0.0069	<0.0074	<0.0048	<0.014	<0.0073	<0.0076	<0.007	<0.0069	<0.0072	<0.014	
N-Methyl perfluorooctane sulfonamidoethanol (N-MeFOSE)	NCL	NCL	-	<0.0051	<0.0046	-	-	-	-	-	<0.0048	-	-	-	-	-	-	-	
Perfluorobutane sulfonic acid (PFBS)	NCL	NCL	0.0074	<0.0051	<0.0046	<0.0035	<0.0035	<0.0036	<0.0035	<0.0037	0.008	0.0083	0.0077	0.0074	0.0074	0.0086	0.009	0.006	
Perfluorodecane sulfonic acid (PFDS)	NCL	NCL	<0.0037	<0.0051	<0.0046	<0.0035	<0.0035	<0.0036	<0.0035	<0.0037	<0.0048	<0.0036	<0.0037	<0.0038	<0.0035	<0.0034	<0.0036	<0.0036	
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NCL	<0.0037	<0.0051	<0.0046	<0.0035	<0.0035	<0.0036	<0.0035	<0.0037	<0.0048	<0.0036	<0.0037	<0.0038	<0.0035	<0.0034	<0.0036	<0.0036	
Perfluorononane sulfonic acid (PFNS)	NCL	NCL	<0.0075	-	-	<0.007	<0.007	<0.0071	<0.0069	<0.0074	-	<0.0072	<0.0073	<0.0076	<0.007	<0.0069	<0.0072	<0.0071	
Perfluorooctane sulfonamide (FOSA)	NCL	NCL	<0.0037	<0.0051	<0.0046	<0.0035	<0.0035	<0.0036	<0.0035	<0.0037	<0.0048	<0.0072	<0.0037	<0.0038	<0.0035	<0.0034	<0.0036	<0.0071	
Perfluoropentane sulfonic acid (PFPeS)	NCL	NCL	0.0054	-	-	<0.0035	<0.0035	<0.0036	<0.0035	<0.0037	-	<0.0036	<0.0037	<0.0038	<0.0035	<0.0034	<0.0036	<0.0036	
Perfluorohexane sulfonic acid (PFHxS)	NCL	NCL	0.015	<0.0051	<0.0046	<0.0035	<0.0035	<0.0036	<0.0035	<0.0037	0.0069	<0.0036	<0.0037	0.0038	0.0039	0.0037	0.0036	<0.0036	
Perfluorobutanoic acid (PFBA)	NCL	NCL	0.0085	0.016	<0.0093	<0.0035	<0.0035	<0.0036	<0.0035	<0.0037	<0.0096	<0.0036	<0.0037	<0.0038	0.005	0.0041	<0.0036	<0.0036	
Perfluorodecanoic acid (PFDA)	NCL	NCL	<0.0037	<0.0051	<0.0046	<0.0035	<0.0035	<0.0036	<0.0035	<0.0037	<0.0048	<0.0036	<0.0037	<0.0038	<0.0035	<0.0034	<0.0036	<0.0036	
Perfluorododecanoic acid (PFDoDA)	NCL	NCL	<0.0037	<0.0051	<0.0046	<0.0035	<0.0035	<0.0036	<0.0035	<0.0037	<0.0048	<0.0036	<0.0037	<0.0038	<0.0035	<0.0034	<0.0036	<0.0036	
Perfluoroheptanoic acid (PFHpA)	NCL	NCL	0.0089	<0.0051	<0.0046	<0.0035	<0.0035	<0.0036	<0.0035	<0.0037	<0.0048	<0.0036	<0.0037	<0.0038	<0.0035	<0.0034	<0.0036	<0.0036	
Perfluorohexanoic acid (PFHxA)	NCL	NCL	0.0063	<0.0051	<0.0046	<0.0035	<0.0035	<0.0036	<0.0035	<0.0037	<0.0048	<0.0036	<0.0037	<0.0038	<0.0035	0.0051	0.0046	<0.0036	
Perfluorononanoic acid (PFNA)	NCL	NCL	<0.0037	<0.0051	<0.0046	<0.0035	<0.0035	<0.0036	<0.0035	<0.0037	<0.0048	<0.0036	<0.0037	<0.0038	<0.0035	<0.0034	<0.0036	<0.0036	
Perfluorooctanoic acid (PFOA)	0.07 (JJ)	12	0.06	0.0044	<0.0019	<0.0017	<0.0017	<0.0018	<0.0017	<0.0019	0.0043	<0.0036	0.0027	0.0027	0.0055	0.0082	0.0061	<0.0036	
Perfluorooctane sulfonic acid (PFOS)	0.07 (JJ)	0.012	0.095	<0.0051	<0.0046	<0.0035	<0.0035	<0.0036	<0.0035	<0.0037	<0.0048	<0.0036	<0.0037	<0.0038	<0.0035	<0.0034	<0.0036	<0.0036	
PFOA + PFOS (Calculated)	0.07	NCL	0.16	0.0044	ND	ND	ND	ND	ND	ND	0.0043	ND	0.0027	0.0027	0.0055	0.0082	0.0061	ND	
Perfluoropentanoic acid (PFPeA)	NCL	NCL	<0.0037	<0.0051	<0.0046	<0.0035	<0.0035	<0.0036	<0.0035	<0.0037	<0.0048	<0.0036	<0.0037	<0.0038	<0.0035	<0.0034	<0.0036	<0.0036	
Perfluorotetradecanoic acid (PFTeDA)	NCL	NCL	<0.0037	<0.0051	<0.0046	<0.0035	<0.0035	<0.0036	<0.0035	<0.0037	<0.0048	<0.0072	<0.0037	<0.0038	<0.0035	<0.0034	<0.0036	<0.0071	
Perfluorotridecanoic acid (PFTrDA)	NCL	NCL	<0.0037	<0.0051	<0.0046	<0.0035	<0.0035	<0.0036	<0.0035	<0.0037	<0.0048	<0.0036	<0.0037	<0.0038	<0.0035	<0.0034	<0.0036	<0.0036	
Perfluoroundecanoic acid (PFUnDA)	NCL	NCL	<0.0037	<0.0051	<0.0046	<0.0035	<0.0035	<0.0036	<0.0035	<0.0037	<0.0048	<0.0036	<0.0037	<0.0038	<0.0035	<0.0034	<0.0036	<0.0036	
Total PFAS (Calculated)	NCL	NCL	0.21	0.02	ND	ND	ND	ND	ND	ND	0.019	0.0083	0.01	0.014	0.022	0.03	0.023	0.006	

TABLE 4
GROUNDWATER ANALYTICAL DATA - PFAS
Wolver/Jewell Study Areas
Algoma Township, Kent County, MI

Sample Location	Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water ²	Part 201 Generic Groundwater Cleanup Criteria – Groundwater Surface Water Interface ²	WV-MW-5S	WV-MW-5S	WV-MW-5S	WV-MW-5S	WV-PMW-6	WV-PMW-6	WV-MW-6D	WV-MW-6D	WV-MW-6D	WV-MW-6D	WV-MW-6D	WV-MW-6S	WV-MW-6S	WV-MW-6S	WV-MW-6S	WV-MW-6S
Sample Name			MW-WV-5S	WV-GW-MW5S	WV-GW-MW5S	WV-GW-MW-5S	PMW-WV-6 13-18	PMWVWV6-03-21-18 (98-103)	MW-6D	MW-WV-6D	WV-GW-MW6D	WV-GW-MW6D	VW-GW-MW-6D	MW-6S	MW-WV-6S	WV-GW-MW6S	WV-GW-MW6S	VW-GW-MW-6S
Well Screen Interval (Feet below ground surface)			61.5-66.5	61.5-66.5	61.5-66.5	61.5-66.5	13-18	98-103	99.1-104.1	99.1-104.1	99.1-104.1	99.1-104.1	99.1-104.1	13.3-18.3	13.3-18.3	13.3-18.3	13.3-18.3	13.3-18.3
Laboratory Sample ID			UB16022-004	UE09028-016	UI05007-003	UK19013-004	K1802550-001	K1802656-003	TD12014-001	UB20051-005	UE02030-010	UH29005-021	UK09009-004	TD12014-003	UB20051-004	UE02030-011	UH29005-020	UK09009-003
Sample Date			02/14/2019	05/09/2019	09/03/2019	11/13/2019	03/19/2018	03/21/2018	04/11/2018	02/19/2019	05/02/2019	08/28/2019	11/08/2019	04/11/2018	02/19/2019	05/02/2019	08/28/2019	11/08/2019
Parameter (µg/L)																		
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NCL	<0.0037	<0.0036	<0.0035	<0.0038	<0.0049	<0.0048	<0.0075	<0.0036	<0.0036	<0.0033	<0.0036	<0.0073	<0.0036	<0.0036	<0.0034	<0.0036
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NCL	<0.0037	<0.0036	<0.0035	<0.0038	<0.0049	<0.0048	<0.0075	<0.0036	<0.0036	<0.0033	<0.0036	<0.0073	<0.0036	<0.0036	<0.0034	<0.0036
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NCL	<0.0037	<0.0036	<0.0035	<0.0038	<0.0049	<0.0048	<0.0075	<0.0036	<0.0036	<0.0033	<0.0036	<0.0073	<0.0036	<0.0036	<0.0034	<0.0036
N-Ethyl perfluorooctane sulfonamidoethanol (N-EtFOSE)	NCL	NCL	-	-	-	-	<0.0049	<0.0048	-	-	-	-	-	-	-	-	-	-
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NCL	<0.0073	<0.0072	<0.007	<0.0077	<0.0049	<0.0048	<0.015	<0.0072	<0.0072	<0.0067	<0.0072	<0.015	<0.0071	<0.0071	<0.0069	<0.0072
N-Methyl perfluorooctane sulfonamidoethanol (N-MeFOSE)	NCL	NCL	-	-	-	-	<0.0049	<0.0048	-	-	-	-	-	-	-	-	-	-
Perfluorobutane sulfonic acid (PFBS)	NCL	NCL	0.0088	0.0075	0.0087	0.0074	0.0083	0.017	0.018	0.016	0.016	0.017	0.017	0.0078	0.0076	0.0082	0.0086	0.0093
Perfluorodecane sulfonic acid (PFDS)	NCL	NCL	<0.0037	<0.0036	<0.0035	<0.0038	<0.0049	<0.0048	<0.0038	<0.0036	<0.0036	<0.0033	<0.0036	<0.0036	<0.0036	<0.0036	<0.0034	<0.0036
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NCL	<0.0037	<0.0036	<0.0035	<0.0038	<0.0049	<0.0048	<0.0038	<0.0036	<0.0036	<0.0033	<0.0036	<0.0036	<0.0036	<0.0036	<0.0034	<0.0036
Perfluorononane sulfonic acid (PFNS)	NCL	NCL	<0.0073	<0.0072	<0.007	<0.0077	-	-	<0.0075	<0.0072	<0.0072	<0.0067	<0.0072	<0.0073	<0.0071	<0.0071	<0.0069	<0.0072
Perfluorooctane sulfonamide (FOSA)	NCL	NCL	<0.0037	<0.0036	<0.0035	<0.0038	<0.0049	<0.0048	<0.0075	<0.0036	<0.0036	<0.0033	<0.0036	<0.0073	<0.0036	<0.0036	<0.0034	<0.0036
Perfluoropentane sulfonic acid (PFPeS)	NCL	NCL	<0.0037	<0.0036	<0.0035	<0.0038	-	-	<0.0038	<0.0036	<0.0036	<0.0033	<0.0036	<0.0036	<0.0036	<0.0036	<0.0034	<0.0036
Perfluorohexane sulfonic acid (PFHxS)	NCL	NCL	<0.0037	<0.0036	0.004	<0.0038	<0.0049	<0.0048	<0.0038	<0.0036	<0.0036	<0.0033	<0.0036	<0.0036	<0.0036	<0.0036	<0.0034	0.0039
Perfluorobutanoic acid (PFBA)	NCL	NCL	<0.0037	<0.0036	<0.0035	<0.0038	<0.0098	<0.0096	0.005	0.0047	0.0049	0.0055	0.0053	<0.0036	0.0072	0.0056	0.0036	0.0098
Perfluorodecanoic acid (PFDA)	NCL	NCL	<0.0037	<0.0036	<0.0035	<0.0038	<0.0049	<0.0048	<0.0038	<0.0036	<0.0036	<0.0033	<0.0036	<0.0036	<0.0036	<0.0036	<0.0034	<0.0036
Perfluorododecanoic acid (PFDoDA)	NCL	NCL	<0.0037	<0.0036	<0.0035	<0.0038	<0.0049	<0.0048	<0.0038	<0.0036	<0.0036	<0.0033	<0.0036	<0.0036	<0.0036	<0.0036	<0.0034	<0.0036
Perfluoroheptanoic acid (PFHpA)	NCL	NCL	<0.0037	<0.0036	<0.0035	<0.0038	<0.0049	<0.0048	<0.0038	<0.0036	<0.0036	<0.0033	<0.0036	<0.0036	0.0039	<0.0036	<0.0034	0.0036
Perfluorohexanoic acid (PFHxA)	NCL	NCL	0.004	<0.0036	<0.0035	<0.0038	<0.0049	<0.0048	<0.0038	<0.0036	<0.0036	<0.0033	<0.0036	<0.0036	0.0063	<0.0036	<0.0034	0.0066
Perfluorononanoic acid (PFNA)	NCL	NCL	<0.0037	<0.0036	<0.0035	<0.0038	<0.0049	<0.0048	<0.0038	<0.0036	<0.0036	<0.0033	<0.0036	<0.0036	<0.0036	<0.0036	<0.0034	<0.0036
Perfluorooctanoic acid (PFOA)	0.07 (JJ)	12	0.005	0.0047	0.0061	0.0026	0.009	0.0029	<0.0038	0.0027	0.0027	0.0034	0.0035	0.0069	0.019	0.013	0.0066	0.024
Perfluorooctane sulfonic acid (PFOS)	0.07 (JJ)	0.012	<0.0037	<0.0036	<0.0035	<0.0038	0.0058	<0.0048	<0.0038	<0.0036	<0.0036	<0.0033	<0.0036	0.0048	0.0044	0.0046	0.0066	0.0089
PFOA + PFOS (Calculated)	0.07	NCL	0.005	0.0047	0.0061	0.0026	0.015	0.0029	ND	0.0027	0.0027	0.0034	0.0035	0.012	0.023	0.018	0.013	0.033
Perfluoropentanoic acid (PFPeA)	NCL	NCL	<0.0037	<0.0036	<0.0035	<0.0038	<0.0049	<0.0048	<0.0038	<0.0036	<0.0036	<0.0033	<0.0036	<0.0036	<0.0036	<0.0036	<0.0034	<0.0036
Perfluorotetradecanoic acid (PFTeDA)	NCL	NCL	<0.0037	<0.0036	<0.0035	<0.0038	<0.0049	<0.0048	<0.0075	<0.0036	<0.0036	<0.0033	<0.0036	<0.0073	<0.0036	<0.0036	<0.0034	<0.0036
Perfluorotridecanoic acid (PFTrDA)	NCL	NCL	<0.0037	<0.0036	<0.0035	<0.0038	<0.0049	<0.0048	<0.0038	<0.0036	<0.0036	<0.0033	<0.0036	<0.0036	<0.0036	<0.0036	<0.0034	<0.0036
Perfluoroundecanoic acid (PFUnDA)	NCL	NCL	<0.0037	<0.0036	<0.0035	<0.0038	<0.0049	<0.0048	<0.0038	<0.0036	<0.0036	<0.0033	<0.0036	<0.0036	<0.0036	<0.0036	<0.0034	<0.0036
Total PFAS (Calculated)	NCL	NCL	0.018	0.012	0.019	0.01	0.023	0.02	0.023	0.023	0.023	0.024	0.026	0.02	0.048	0.031	0.025	0.066

TABLE 4
GROUNDWATER ANALYTICAL DATA - PFAS
Wolver/Jewell Study Areas
Algoma Township, Kent County, MI

Sample Location	Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water ²	Part 201 Generic Groundwater Cleanup Criteria – Groundwater Surface Water Interface ²	WV-PMW-7	WV-PMW-7	WV-PMW-7	WV-PMW-7	WV-PMW-7	WV-PMW-7	WV-PMW-7	WV-PMW-7	WV-PMW-7	WV-MW-7D	WV-MW-7D	WV-MW-7D	WV-MW-7D	WV-MW-7M	WV-MW-7M	WV-MW-7M	WV-MW-7S
Sample Name			PMW-WV-7 20-25	PMW-WV-7 29.5-34.5	PMW-WV-7 40-45	PMW-WV-7 50-55	PMW-WV-7 60-65	PMW-WV-7 70-75	PMW-WV-7 80-85	PMW-WV-7 88.5-93.5	MW-WV-7D	WV-GW-MW7D	WV-GW-MW 7D	WV-GW-MW-7D	WV-GW-MW7M	WV-GW-MW 7M	WV-GW-MW-7M	MW-WV-7S	
Well Screen Interval (Feet below ground surface)			20-25	29.5-34.5	40-45	50-55	60-65	70-75	80-85	88.5-93.5	89.5-94.5	89.5-94.5	89.5-94.5	89.5-94.5	49.9-54.9	49.9-54.9	49.9-54.9	16.1-21.1	
Laboratory Sample ID			TJ26001-001	TJ26001-002	TJ26001-003	TJ26001-004	TJ26001-007	TJ26001-008	TJ26001-009	TJ26001-010	UB14084-007	UE02030-009	UH29005-001	UK07051-003	UE02030-008	UH29005-003	UK07051-002	UB14084-005	
Sample Date			10/23/2018	10/23/2018	10/23/2018	10/23/2018	10/24/2018	10/24/2018	10/24/2018	10/24/2018	02/13/2019	05/03/2019	08/26/2019	11/05/2019	05/03/2019	08/26/2019	11/05/2019	02/13/2019	
Parameter (µg/L)																			
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NCL	<0.0036	<0.0036	<0.0035	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035	<0.0038	<0.0036	<0.0036	<0.0039	<0.0036	<0.0035	<0.0038	<0.0039	
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NCL	<0.0036	<0.0036	<0.0035	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035	<0.0038	<0.0036	<0.0036	<0.0039	<0.0036	<0.0035	<0.0038	<0.0039	
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NCL	<0.0036	<0.0036	<0.0035	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035	<0.0038	<0.0036	<0.0036	<0.0039	<0.0036	<0.0035	<0.0038	<0.0039	
N-Ethyl perfluorooctane sulfonamidoethanol (N-EtFOSE)	NCL	NCL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NCL	<0.0072	<0.0072	<0.0071	<0.0071	<0.0071	<0.0073	<0.0071	<0.0071	<0.0077	<0.0072	<0.0071	<0.0078	<0.0072	<0.007	<0.0076	<0.0078	
N-Methyl perfluorooctane sulfonamidoethanol (N-MeFOSE)	NCL	NCL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Perfluorobutane sulfonic acid (PFBS)	NCL	NCL	0.0051	0.0064	0.0073	0.011	0.0066	0.0073	0.0095	0.0076	0.012	0.01	0.011	0.0097	0.0083	0.01	0.0091	0.0039	
Perfluorodecane sulfonic acid (PFDS)	NCL	NCL	<0.0036	<0.0036	<0.0035	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035	<0.0038	<0.0036	<0.0036	<0.0039	<0.0036	<0.0035	<0.0038	<0.0039	
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NCL	<0.0036	0.011	0.0092	0.012	0.009	0.0081	0.013	0.0053	0.013	0.013	0.013	0.012	0.01	0.011	0.0097	<0.0039	
Perfluorononane sulfonic acid (PFNS)	NCL	NCL	<0.0072	<0.0072	<0.0071	<0.0071	<0.0071	<0.0073	<0.0071	<0.0071	<0.0077	<0.0072	<0.0071	<0.0078	<0.0072	<0.007	<0.0076	<0.0078	
Perfluorooctane sulfonamide (FOSA)	NCL	NCL	<0.0036	<0.0036	<0.0035	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035	<0.0038	<0.0036	<0.0036	<0.0039	<0.0036	<0.0035	<0.0038	<0.0039	
Perfluoropentane sulfonic acid (PFPeS)	NCL	NCL	<0.0036	0.0042	0.0042	0.006	0.0037	0.0039	0.0054	0.0068	0.0092	0.0078	0.0069	0.0077	0.0046	0.0053	0.0053	<0.0039	
Perfluorohexane sulfonic acid (PFHxS)	NCL	NCL	0.0058	0.025	0.02	0.028	0.018	0.018	0.028	0.023	0.041	0.035	0.034	0.033	0.024	0.022	0.024	0.0044	
Perfluorobutanoic acid (PFBA)	NCL	NCL	<0.0036	0.0036	<0.0035	0.0044	0.0039	0.0039	0.0047	0.0042	0.0056	0.0054	0.0055	0.0052	0.004	0.0043	0.0042	0.0047	
Perfluorodecanoic acid (PFDA)	NCL	NCL	<0.0036	<0.0036	<0.0035	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035	<0.0038	<0.0036	<0.0036	<0.0039	<0.0036	<0.0035	<0.0038	<0.0039	
Perfluorododecanoic acid (PFDoDA)	NCL	NCL	<0.0036	<0.0036	<0.0035	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035	<0.0038	<0.0036	<0.0036	<0.0039	<0.0036	<0.0035	<0.0038	<0.0039	
Perfluoroheptanoic acid (PFHpA)	NCL	NCL	<0.0036	0.0075	0.006	0.009	0.0064	0.0065	0.0092	0.0087	0.012	0.012	0.011	0.01	0.0073	0.0078	0.0074	<0.0039	
Perfluorohexanoic acid (PFHxA)	NCL	NCL	<0.0036	0.0073	0.0064	0.0088	0.0062	0.0075	0.0099	0.0074	0.011	0.0097	0.0095	0.0081	0.0066	0.0061	0.0059	0.011	
Perfluorononanoic acid (PFNA)	NCL	NCL	<0.0036	<0.0036	<0.0035	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035	<0.0038	<0.0036	<0.0036	<0.0039	<0.0036	<0.0035	<0.0038	<0.0039	
Perfluorooctanoic acid (PFOA)	0.07 (JJ)	12	0.015	0.063	0.052	0.075	0.051	0.055	0.077	0.063	0.11	0.1	0.12	0.095	0.067	0.077	0.076	0.011	
Perfluorooctane sulfonic acid (PFOS)	0.07 (JJ)	0.012	0.018	0.23	0.23	0.32	0.27	0.26	0.31	0.06	0.14	0.16	0.2	0.17	0.27	0.16	0.28	0.3	
PFOA + PFOS (Calculated)	0.07	NCL	0.033	0.29	0.28	0.4	0.32	0.32	0.39	0.12	0.25	0.26	0.32	0.27	0.34	0.36	0.38	0.011	
Perfluoropentanoic acid (PFPeA)	NCL	NCL	<0.0036	<0.0036	<0.0035	0.0039	0.0043	0.0045	0.0056	0.0035	0.0049	0.0052	0.005	0.0046	0.0038	0.0039	<0.0038	0.0091	
Perfluorotetradecanoic acid (PFTeDA)	NCL	NCL	<0.0036	<0.0036	<0.0035	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035	<0.0038	<0.0036	<0.0036	<0.0039	<0.0036	<0.0035	<0.0038	<0.0039	
Perfluorotridecanoic acid (PFTrDA)	NCL	NCL	<0.0036	<0.0036	<0.0035	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035	<0.0038	<0.0036	<0.0036	<0.0039	<0.0036	<0.0035	<0.0038	<0.0039	
Perfluoroundecanoic acid (PFUnDA)	NCL	NCL	<0.0036	<0.0036	<0.0035	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035	<0.0038	<0.0036	<0.0036	<0.0039	<0.0036	<0.0035	<0.0038	<0.0039	
Total PFAS (Calculated)	NCL	NCL	0.044	0.36	0.34	0.48	0.38	0.37	0.47	0.19	0.36	0.36	0.42	0.36	0.41	0.43	0.44	0.044	

TABLE 4
GROUNDWATER ANALYTICAL DATA - PFAS
Wolver/Jewell Study Areas
Algoma Township, Kent County, MI

Sample Location	Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water ²	Part 201 Generic Groundwater Cleanup Criteria – Groundwater Surface Water Interface ²	WV-MW-7S	WV-MW-7S	WV-MW-7S	WV-PMW-8	WV-PMW-8	WV-PMW-8	WV-PMW-8	WV-PMW-8	WV-PMW-8	WV-MW-8D	WV-MW-8D	WV-MW-8D	WV-MW-8D	WV-MW-8M	WV-MW-8M	WV-MW-8M
Sample Name			WV-GW-MW7S	WV-GW-MW 7S	WV-GW-MW-7S	WV-8 30-35	WV-8 40-45	WV-8 50-55	WV-8 60-65	PMW-WV-8-109-114	PMW-WV-8-119-124	MW-WW-8D	MW-WV-8D	WV-GW-MW 8D	VW-GW-MW-8D	MW-WW-8M	MW-WV-8M	WV-GW-MW8M
Well Screen Interval (Feet below ground surface)			16.1-21.1	16.1-21.1	16.1-21.1	30-35	40-45	50-55	60-65	109-114	119-124	117.2-122.2	117.2-122.2	117.2-122.2	117.2-122.2	60-65	60-65	60-65
Laboratory Sample ID			UE02030-007	UH29005-002	UK07051-001	TE03004-001	TE03004-002	TE03004-003	TE03004-004	TE09005-001	TE09005-002	TG07028-003	UB16022-009	UH29005-004	UK09009-001	TG07028-002	UB14084-002	UE02030-003
Sample Date			05/03/2019	08/26/2019	11/05/2019	05/01/2018	05/01/2018	05/01/2018	05/01/2018	05/08/2018	05/08/2018	07/05/2018	02/15/2019	08/26/2019	11/08/2019	07/05/2018	02/12/2019	05/01/2019
Parameter (µg/L)																		
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NCL	<0.0035	<0.0034	<0.0039	<0.0035	<0.0035	<0.0035	<0.0036	<0.0035	<0.0035	<0.0035	<0.0035	<0.0034	<0.0037	<0.0035	<0.0038	<0.0036
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NCL	<0.0035	<0.0034	<0.0039	<0.0035	<0.0035	<0.0035	<0.0036	<0.0035	<0.0035	<0.0035	<0.0035	<0.0034	<0.0037	<0.0035	<0.0038	<0.0036
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NCL	<0.0035	<0.0034	<0.0039	<0.0035	<0.0035	<0.0035	<0.0036	<0.0035	<0.0035	<0.0035	<0.0035	<0.0034	<0.0037	<0.0035	<0.0038	<0.0036
N-Ethyl perfluorooctane sulfonamidoethanol (N-EtFOSE)	NCL	NCL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NCL	<0.0071	<0.0068	<0.0078	<0.0071	<0.0069	<0.0069	<0.0072	<0.007	<0.007	<0.0069	<0.007	<0.0069	<0.0075	<0.007	<0.0075	<0.0072
N-Methyl perfluorooctane sulfonamidoethanol (N-MeFOSE)	NCL	NCL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perfluorobutane sulfonic acid (PFBS)	NCL	NCL	<0.0035	<0.0034	<0.0039	0.016	0.023	0.054	0.025	<0.0035	0.0038	<0.0035	<0.0035	0.0034	<0.0037	0.073	0.083	0.081
Perfluorodecane sulfonic acid (PFDS)	NCL	NCL	<0.0035	<0.0034	<0.0039	<0.0035	<0.0035	<0.0035	<0.0036	<0.0035	<0.0035	<0.0035	<0.0035	<0.0034	<0.0037	<0.0035	<0.0038	<0.0036
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NCL	<0.0035	<0.0034	<0.0039	0.0039	<0.0035	<0.0035	<0.0036	<0.0035	<0.0035	<0.0035	<0.0035	<0.0034	<0.0037	<0.0035	<0.0038	<0.0036
Perfluorononane sulfonic acid (PFNS)	NCL	NCL	<0.0071	<0.0068	<0.0078	<0.0071	<0.0069	<0.0069	<0.0072	<0.007	<0.007	<0.0069	<0.007	<0.0069	<0.0075	<0.007	<0.0075	<0.0072
Perfluorooctane sulfonamide (FOSA)	NCL	NCL	<0.0035	<0.0034	<0.0039	<0.0035	<0.0035	<0.0035	<0.0036	<0.0035	<0.0035	<0.0035	<0.0035	<0.0034	<0.0037	<0.0035	<0.0038	<0.0036
Perfluoropentane sulfonic acid (PFPeS)	NCL	NCL	<0.0035	<0.0034	<0.0039	0.0043	0.0051	<0.0035	<0.0036	<0.0035	<0.0035	<0.0035	<0.0035	<0.0034	<0.0037	<0.0035	<0.0038	<0.0036
Perfluorohexane sulfonic acid (PFHxS)	NCL	NCL	<0.0035	0.0065	<0.0039	0.021	0.02	0.011	0.012	0.0047	0.0041	<0.0035	<0.0035	<0.0034	<0.0037	0.01	0.012	0.01
Perfluorobutanoic acid (PFBA)	NCL	NCL	<0.0035	0.028	0.0053	0.0065	0.0058	0.0077	0.0056	<0.0035	<0.0035	<0.0035	<0.0035	<0.0034	<0.0037	0.0085	0.0097	0.01
Perfluorodecanoic acid (PFDA)	NCL	NCL	<0.0035	<0.0034	<0.0039	<0.0035	<0.0035	<0.0035	<0.0036	<0.0035	<0.0035	<0.0035	<0.0035	<0.0034	<0.0037	<0.0035	<0.0038	<0.0036
Perfluorododecanoic acid (PFDoDA)	NCL	NCL	<0.0035	<0.0034	<0.0039	<0.0035	<0.0035	<0.0035	<0.0036	<0.0035	<0.0035	<0.0035	<0.0035	<0.0034	<0.0037	<0.0035	<0.0038	<0.0036
Perfluoroheptanoic acid (PFHpA)	NCL	NCL	<0.0035	0.016	0.0054	0.0092	0.0069	0.0049	0.0043	<0.0035	<0.0035	<0.0035	<0.0035	<0.0034	<0.0037	0.0042	0.0052	0.0046
Perfluorohexanoic acid (PFHxA)	NCL	NCL	<0.0035	0.028	0.0079	0.012	0.011	0.0096	0.0067	<0.0035	<0.0035	<0.0035	<0.0035	<0.0034	<0.0037	0.0087	0.011	0.011
Perfluorononanoic acid (PFNA)	NCL	NCL	<0.0035	<0.0034	<0.0039	<0.0035	<0.0035	<0.0035	<0.0036	<0.0035	<0.0035	<0.0035	<0.0035	<0.0034	<0.0037	<0.0035	<0.0038	<0.0036
Perfluorooctanoic acid (PFOA)	0.07 (JJ)	12	0.011	0.026	0.011	0.085	0.06	0.031	0.037	0.011	0.0059	0.0048	0.0048	0.0052	0.0057	0.028	0.03	0.03
Perfluorooctane sulfonic acid (PFOS)	0.07 (JJ)	0.012	0.0036	<0.0034	<0.0039	0.039	0.0065	0.0061	0.0039	<0.0035	<0.0035	<0.0035	<0.0035	<0.0034	<0.0037	0.0045	0.0065	0.005
PFOA + PFOS (Calculated)	0.07	NCL	0.015	0.026	0.011	0.12	0.067	0.037	0.041	0.011	0.0059	0.0048	0.0048	0.0052	0.0057	0.033	0.037	0.035
Perfluoropentanoic acid (PFPeA)	NCL	NCL	<0.0035	0.031	0.0069	0.0068	0.0074	0.0074	0.0047	<0.0035	<0.0035	<0.0035	<0.0035	<0.0034	<0.0037	0.0081	0.0093	0.0086
Perfluorotetradecanoic acid (PFTeDA)	NCL	NCL	<0.0035	<0.0034	<0.0039	<0.0035	<0.0035	<0.0035	<0.0036	<0.0035	<0.0035	<0.0035	<0.0035	<0.0034	<0.0037	<0.0035	<0.0038	<0.0036
Perfluorotridecanoic acid (PFTrDA)	NCL	NCL	<0.0035	<0.0034	<0.0039	<0.0035	<0.0035	<0.0035	<0.0036	<0.0035	<0.0035	<0.0035	<0.0035	<0.0034	<0.0037	<0.0035	<0.0038	<0.0036
Perfluoroundecanoic acid (PFUnDA)	NCL	NCL	<0.0035	<0.0034	<0.0039	<0.0035	<0.0035	<0.0035	<0.0036	<0.0035	<0.0035	<0.0035	<0.0035	<0.0034	<0.0037	<0.0035	<0.0038	<0.0036
Total PFAS (Calculated)	NCL	NCL	0.015	0.14	0.037	0.2	0.15	0.13	0.099	0.016	0.014	0.0048	0.0048	0.0086	0.0057	0.15	0.17	0.16

TABLE 4
GROUNDWATER ANALYTICAL DATA - PFAS
Wolver/Jewell Study Areas
Algoma Township, Kent County, MI

Sample Location	Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water ²	Part 201 Generic Groundwater Cleanup Criteria – Groundwater Surface Water Interface ²	WV-MW-8M	WV-MW-8M	WV-MW-8S	WV-MW-8S	WV-MW-8S	WV-MW-8S	WV-MW-8S	WV-MW-8S	WV-MW-8S	WV-PMW-9	WV-PMW-9	WV-MW-9	WV-MW-9	WV-MW-9	WV-MW-9	WV-MW-9	WV-MW-9	WV-PMW-10
Sample Name			WV-GW-MW 8M	WV-GW-MW-8M	MW-WW-8S	MW-WV-8S	WV-GW-MW8S	WV-GW-MW8SDUP	WV-GW-MW 8S	WV-GW-MW-8S	PMW-WV-9 79-84	PMW-WV-9 89-94	MW-WW-9	MW-WV-9	WV-GW-MW9	WV-GW-MW9	WV-GW-MW9	WV-MW-10 (8-18)		
Well Screen Interval (Feet below ground surface)			60-65	60-65	30-35	30-35	30-35	30-35	30-35	30-35	79-84	89-94	92.3-97.3	92.3-97.3	92.3-97.3	92.3-97.3	92.3-97.3	8-18		
Laboratory Sample ID			UH29005-005	UK07025-007	TG07028-001	UB14084-001	UE02030-004	UE02030-005	UH29005-006	UK07025-006	TE12011-001	TE12011-002	TG07028-004	UB20051-012	UE09028-015	UI05007-009	UK13023-011	UB28083-001		
Sample Date			08/26/2019	11/06/2019	07/05/2018	02/12/2019	05/01/2019	05/01/2019	08/26/2019	11/06/2019	05/10/2018	05/10/2018	07/05/2018	02/21/2019	05/10/2019	09/04/2019	11/11/2019	02/25/2019		
Parameter (µg/L)																				
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NCL	<0.0036	<0.0039	<0.0035	<0.0037	<0.0036	<0.0036	<0.0034	<0.0037	<0.0038	<0.0036	<0.0035	<0.0034	<0.0035	<0.0037	<0.0038	<0.0036		
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NCL	<0.0036	<0.0039	<0.0035	<0.0037	<0.0036	<0.0036	<0.0034	<0.0037	<0.0038	<0.0036	<0.0035	<0.0034	<0.0035	<0.0037	<0.0038	<0.0036		
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NCL	<0.0036	<0.0039	<0.0035	<0.0037	<0.0036	<0.0036	<0.0034	<0.0037	<0.0038	<0.0036	<0.0035	<0.0034	<0.0035	<0.0037	<0.0038	<0.0036		
N-Ethyl perfluorooctane sulfonamidoethanol (N-EtFOSE)	NCL	NCL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NCL	<0.0071	<0.0078	<0.0069	<0.0074	<0.0073	<0.0072	<0.0068	<0.0074	<0.0076	<0.0073	<0.007	<0.0069	<0.0071	<0.0075	<0.0077	<0.0072		
N-Methyl perfluorooctane sulfonamidoethanol (N-MeFOSE)	NCL	NCL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Perfluorobutane sulfonic acid (PFBS)	NCL	NCL	0.092	0.08	0.018	0.021	0.012	0.014	0.015	0.013	<0.0038	0.011	0.011	0.014	0.012	0.014	0.015	0.0077		
Perfluorodecane sulfonic acid (PFDS)	NCL	NCL	<0.0036	<0.0039	<0.0035	<0.0037	<0.0036	<0.0036	<0.0034	<0.0037	<0.0038	<0.0036	<0.0035	<0.0034	<0.0035	<0.0037	<0.0038	<0.0036		
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NCL	<0.0036	<0.0039	<0.0035	<0.0037	<0.0036	<0.0036	<0.0034	<0.0037	0.022	0.025	0.026	0.023	0.026	0.047	0.038	0.0046		
Perfluorononane sulfonic acid (PFNS)	NCL	NCL	<0.0071	<0.0078	<0.0069	<0.0074	<0.0073	<0.0072	<0.0068	<0.0074	<0.0076	<0.0073	<0.007	<0.0069	<0.0071	<0.0075	<0.0077	<0.0072		
Perfluorooctane sulfonamide (FOSA)	NCL	NCL	<0.0036	<0.0039	<0.0035	<0.0037	<0.0036	<0.0036	<0.0034	<0.0037	0.2	0.026	0.031	0.032	0.027	0.025	0.021	<0.0036		
Perfluoropentane sulfonic acid (PFPeS)	NCL	NCL	<0.0036	<0.0039	0.004	0.0042	0.0042	0.0043	0.0037	0.0037	0.0074	0.031	0.033	0.036	0.035	0.039	0.043	<0.0036		
Perfluorohexane sulfonic acid (PFHxS)	NCL	NCL	0.011	0.01	0.016	0.019	0.016	0.016	0.017	0.02	0.042	0.13	0.11	0.13	0.13	0.18	0.21	0.0098		
Perfluorobutanoic acid (PFBA)	NCL	NCL	0.011	0.0099	0.006	0.0069	0.0062	0.0063	0.0061	0.0056	0.0069	0.0073	0.0063	0.0075	0.0081	0.0099	0.011	<0.0036		
Perfluorodecanoic acid (PFDA)	NCL	NCL	<0.0036	<0.0039	<0.0035	<0.0037	<0.0036	<0.0036	<0.0034	<0.0037	<0.0038	<0.0036	<0.0035	<0.0034	<0.0035	<0.0037	<0.0038	<0.0036		
Perfluorododecanoic acid (PFDoDA)	NCL	NCL	<0.0036	<0.0039	<0.0035	<0.0037	<0.0036	<0.0036	<0.0034	<0.0037	<0.0038	<0.0036	<0.0035	<0.0034	<0.0035	<0.0037	<0.0038	<0.0036		
Perfluoroheptanoic acid (PFHpA)	NCL	NCL	0.0055	0.0049	0.0051	0.0048	0.0047	0.005	0.0054	0.007	0.017	0.045	0.04	0.047	0.049	0.062	0.067	<0.0036		
Perfluorohexanoic acid (PFHxA)	NCL	NCL	0.012	0.011	0.0045	0.0038	0.0042	<0.0036	0.004	0.0057	0.0083	0.021	0.019	0.022	0.025	0.03	0.029	0.0042		
Perfluorononanoic acid (PFNA)	NCL	NCL	<0.0036	<0.0039	<0.0035	<0.0037	<0.0036	<0.0036	<0.0034	<0.0037	<0.0038	<0.0036	<0.0035	<0.0034	<0.0035	<0.0037	<0.0038	<0.0036		
Perfluorooctanoic acid (PFOA)	0.07 (JJ)	12	0.033	0.031	0.05	0.055	0.052	0.051	0.066	0.092	0.21	0.47	0.47	0.53	0.54	0.73	0.77	0.023		
Perfluorooctane sulfonic acid (PFOS)	0.07 (JJ)	0.012	0.0052	0.0055	0.042	0.058	0.046	0.048	0.042	0.034	1.6	0.36	0.59	0.54	0.47	0.47	0.48	0.31		
PFOA + PFOS (Calculated)	0.07	NCL	0.038	0.037	0.092	0.11	0.098	0.099	0.11	0.13	1.8	0.83	1.1	1.1	1	1.2	1.3	0.33		
Perfluoropentanoic acid (PFPeA)	NCL	NCL	0.0096	0.009	<0.0035	<0.0037	<0.0036	<0.0036	<0.0034	<0.0037	<0.0038	0.0076	0.0071	0.0083	0.0086	0.01	0.011	<0.0036		
Perfluorotetradecanoic acid (PFTeDA)	NCL	NCL	<0.0036	<0.0039	<0.0035	<0.0037	<0.0036	<0.0036	<0.0034	<0.0037	<0.0038	<0.0036	<0.0035	<0.0034	<0.0035	<0.0037	<0.0038	<0.0036		
Perfluorotridecanoic acid (PFTrDA)	NCL	NCL	<0.0036	<0.0039	<0.0035	<0.0037	<0.0036	<0.0036	<0.0034	<0.0037	<0.0038	<0.0036	<0.0035	<0.0034	<0.0035	<0.0037	<0.0038	<0.0036		
Perfluoroundecanoic acid (PFUnDA)	NCL	NCL	<0.0036	<0.0039	<0.0035	<0.0037	<0.0036	<0.0036	<0.0034	<0.0037	<0.0038	<0.0036	<0.0035	<0.0034	<0.0035	<0.0037	<0.0038	<0.0036		
Total PFAS (Calculated)	NCL	NCL	0.18	0.16	0.15	0.17	0.15	0.14	0.16	0.18	2.1	1.1	1.3	1.4	1.3	1.6	1.7	0.36		

TABLE 4
GROUNDWATER ANALYTICAL DATA - PFAS
Wolver/Jewell Study Areas
Algoma Township, Kent County, MI

Sample Location	Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water ²	Part 201 Generic Groundwater Cleanup Criteria – Groundwater Surface Water Interface ²	WV-PMW-10	WV-PMW-10	WV-PMW-10	WV-PMW-10	WV-MW-10D	WV-MW-10D	WV-MW-10D	WV-MW-10M	WV-MW-10M	WV-MW-10M	WV-MW-10S	WV-MW-10S	WV-MW-10S	WV-PMW-11	WV-PMW-11	WV-PMW-11
Sample Name			WV-MW-10 (18-28)	WV-MW-10 (26-36)	WV-MW-10 (66-76)	WV-MW-10 (163-168)	WV-GW-MW10D	WV-GW-MW10D	WV-GW-MW-10D	WV-GW-MW10M	WV-GW-MW10M	WV-GW-MW-10M	WV-GW-MW10S	WV-GW-MW10S	WV-GW-MW-10S	SB-11 20-25	SB-11 29-34	SB-11-107.5-112.5
Well Screen Interval (Feet below ground surface)			18-28	26-36	66-76	163-168	165-170	165-170	165-170	69.9-74.9	69.9-74.9	69.9-74.9	7-12	7-12	7-12	20-25	29-34	107.5-112.5
Laboratory Sample ID			UB28083-002	UB28083-003	UB28083-004	UC21100-001	UE09028-004	UH29005-011	UK07025-003	UE02030-002	UH29005-009	UK07025-002	UE02030-001	UH29005-010	UK07025-001	UA05034-001	UA05034-002	UA11012-001
Sample Date			02/25/2019	02/26/2019	02/27/2019	03/13/2019	05/08/2019	08/27/2019	11/06/2019	04/30/2019	08/27/2019	11/06/2019	04/30/2019	08/27/2019	11/06/2019	01/03/2019	01/03/2019	01/08/2019
Parameter (µg/L)																		
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NCL	<0.0041	<0.0038	<0.0036	<0.0036	<0.0036	<0.0036	<0.0039	<0.0036	<0.0036	<0.0037	<0.0037	<0.0035	<0.0035	<0.0036	<0.0036	<0.0036
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NCL	<0.0041	<0.0038	<0.0036	<0.0036	<0.0036	<0.0036	<0.0039	<0.0036	<0.0036	<0.0037	<0.0037	<0.0035	<0.0035	<0.0036	<0.0036	<0.0036
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NCL	<0.0041	<0.0038	<0.0036	<0.0036	<0.0036	<0.0036	<0.0039	<0.0036	<0.0036	<0.0037	<0.0037	<0.0035	<0.0035	<0.0036	<0.0036	<0.0036
N-Ethyl perfluorooctane sulfonamidoethanol (N-EtFOSE)	NCL	NCL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NCL	<0.0083	<0.0075	<0.0073	<0.0073	<0.0072	<0.0071	<0.0078	<0.0071	<0.0072	<0.0072	<0.0074	<0.0073	<0.0071	<0.007	<0.0072	<0.0071
N-Methyl perfluorooctane sulfonamidoethanol (N-MeFOSE)	NCL	NCL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perfluorobutane sulfonic acid (PFBS)	NCL	NCL	<0.0041	<0.0038	<0.0036	0.0059	0.0039	0.0042	0.0039	<0.0036	<0.0036	<0.0037	0.011	0.013	0.009	0.0051	<0.0036	<0.0036
Perfluorodecane sulfonic acid (PFDS)	NCL	NCL	<0.0041	<0.0038	<0.0036	<0.0036	<0.0036	<0.0036	<0.0039	<0.0036	<0.0036	<0.0037	<0.0037	<0.0035	<0.0035	<0.0036	<0.0036	<0.0036
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NCL	<0.0041	<0.0038	<0.0036	<0.0036	<0.0036	<0.0036	<0.0039	<0.0036	<0.0036	<0.0037	<0.0037	0.014	0.016	<0.0036	<0.0036	<0.0036
Perfluorononane sulfonic acid (PFNS)	NCL	NCL	<0.0083	<0.0075	<0.0073	<0.0073	<0.0072	<0.0071	<0.0078	<0.0071	<0.0072	<0.0074	<0.0073	<0.0071	<0.007	<0.0072	<0.0071	<0.0071
Perfluorooctane sulfonamide (FOSA)	NCL	NCL	<0.0041	<0.0038	<0.0036	<0.0036	<0.0036	<0.0036	<0.0039	<0.0036	<0.0036	<0.0037	<0.0037	<0.0035	<0.0035	<0.0036	<0.0036	<0.0036
Perfluoropentane sulfonic acid (PFPeS)	NCL	NCL	<0.0041	<0.0038	<0.0036	0.006	<0.0036	<0.0036	<0.0039	<0.0036	<0.0036	<0.0037	0.0057	0.006	0.0044	<0.0036	<0.0036	<0.0036
Perfluorohexane sulfonic acid (PFHxS)	NCL	NCL	<0.0041	<0.0038	<0.0036	<0.0036	<0.0036	<0.0036	<0.0039	<0.0036	<0.0036	<0.0037	0.023	0.029	0.021	<0.0036	<0.0036	<0.0036
Perfluorobutanoic acid (PFBA)	NCL	NCL	<0.0041	<0.0038	<0.0036	<0.0036	<0.0036	<0.0036	<0.0039	<0.0036	<0.0036	<0.0037	0.0037	0.01	0.0051	<0.0036	<0.0036	<0.0036
Perfluorodecanoic acid (PFDA)	NCL	NCL	<0.0041	<0.0038	<0.0036	<0.0036	<0.0036	<0.0036	<0.0039	<0.0036	<0.0036	<0.0037	<0.0037	<0.0035	<0.0035	<0.0036	<0.0036	<0.0036
Perfluorododecanoic acid (PFDoDA)	NCL	NCL	<0.0041	<0.0038	<0.0036	<0.0036	<0.0036	<0.0036	<0.0039	<0.0036	<0.0036	<0.0037	<0.0037	<0.0035	<0.0035	<0.0036	<0.0036	<0.0036
Perfluoroheptanoic acid (PFHpA)	NCL	NCL	<0.0041	<0.0038	<0.0036	<0.0036	<0.0036	<0.0036	<0.0039	<0.0036	<0.0036	<0.0037	0.0053	0.012	0.0081	<0.0036	<0.0036	<0.0036
Perfluorohexanoic acid (PFHxA)	NCL	NCL	<0.0041	<0.0038	<0.0036	<0.0036	<0.0036	<0.0036	<0.0039	<0.0036	<0.0036	<0.0037	<0.0037	0.013	0.0048	<0.0036	<0.0036	<0.0036
Perfluorononanoic acid (PFNA)	NCL	NCL	<0.0041	<0.0038	<0.0036	<0.0036	<0.0036	<0.0036	<0.0039	<0.0036	<0.0036	<0.0037	<0.0037	<0.0035	<0.0035	<0.0036	<0.0036	<0.0036
Perfluorooctanoic acid (PFOA)	0.07 (JJ)	12	<0.0021	<0.0019	<0.0018	0.0045	0.0027	0.0029	0.0026	<0.0018	<0.0018	<0.0018	0.061	0.11	0.092	0.0029	<0.0018	<0.0018
Perfluorooctane sulfonic acid (PFOS)	0.07 (JJ)	0.012	0.0082	<0.0038	<0.0036	<0.0036	<0.0036	<0.0036	<0.0039	<0.0036	<0.0036	<0.0037	0.49	1	0.69	<0.0036	<0.0036	<0.0036
PFOA + PFOS (Calculated)	0.07	NCL	0.0082	ND	ND	0.0045	0.0027	0.0029	0.0026	ND	ND	ND	0.55	1.1	0.78	0.0029	ND	ND
Perfluoropentanoic acid (PFPeA)	NCL	NCL	<0.0041	<0.0038	<0.0036	<0.0036	<0.0036	<0.0036	<0.0039	<0.0036	<0.0036	<0.0037	<0.0037	0.0092	<0.0035	<0.0036	<0.0036	<0.0036
Perfluorotetradecanoic acid (PFTeDA)	NCL	NCL	<0.0041	<0.0038	<0.0036	<0.0036	<0.0036	<0.0036	<0.0039	<0.0036	<0.0036	<0.0037	<0.0037	<0.0035	<0.0035	<0.0036	<0.0036	<0.0036
Perfluorotridecanoic acid (PFTrDA)	NCL	NCL	<0.0041	<0.0038	<0.0036	<0.0036	<0.0036	<0.0036	<0.0039	<0.0036	<0.0036	<0.0037	<0.0037	<0.0035	<0.0035	<0.0036	<0.0036	<0.0036
Perfluoroundecanoic acid (PFUnDA)	NCL	NCL	<0.0041	<0.0038	<0.0036	<0.0036	<0.0036	<0.0036	<0.0039	<0.0036	<0.0036	<0.0037	<0.0037	<0.0035	<0.0035	<0.0036	<0.0036	<0.0036
Total PFAS (Calculated)	NCL	NCL	0.0082	ND	ND	0.016	0.0066	0.0071	0.0065	ND	ND	ND	0.61	1.2	0.85	0.008	ND	ND

TABLE 4
GROUNDWATER ANALYTICAL DATA - PFAS
Wolvern/Jewell Study Areas
Algoma Township, Kent County, MI

Sample Location	Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water ²	Part 201 Generic Groundwater Cleanup Criteria – Groundwater Surface Water Interface ²	WV-PMW-11	WV-PMW-11	WV-PMW-11	WV-PMW-11	WV-PMW-11	WV-MW-11D	WV-MW-11D	WV-MW-11D	WV-MW-11D	WV-MW-11D	WV-MW-11S	WV-MW-11S	WV-MW-11S	WV-MW-11S	WV-PMW-12	WV-PMW-12
Sample Name			SB-11-118-123	SB-11-128-133	SB-11-138-143	SB-11-148-153	SB-11-158.5-163.5	MW-WV-11D	WV-GW-MW11D	WV-GW-MW11D	WV-GW-MW-11D	WV-GW-MW-11D DUP	MW-WV-11S	WV-GW-MW11S	WV-GW-MW11S	WV-GW-MW-11S	SB-12 75-80	SB-12 85-90
Well Screen Interval (Feet below ground surface)			118-123	128-133	138-143	148-153	158.5-163.5	158.9-163.9	158.9-163.9	158.9-163.9	158.9-163.9	158.9-163.9	29.4-34.4	29.4-34.4	29.4-34.4	29.4-34.4	75-80	85-90
Laboratory Sample ID			UA11012-002	UA11012-003	UA11012-004	UA11012-005	UA11012-006	UB16022-001	UE02030-012	UH29005-012	UK07051-006	UK07051-007	UB16022-002	UE02030-013	UH29005-013	UK07051-008	TJ31080-001	TJ31080-002
Sample Date			01/08/2019	01/08/2019	01/09/2019	01/09/2019	01/09/2019	02/14/2019	05/02/2019	08/27/2019	11/05/2019	11/05/2019	02/14/2019	05/02/2019	08/27/2019	11/05/2019	10/29/2018	10/29/2018
Parameter (µg/L)																		
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NCL	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035	<0.0037	<0.0036	<0.004	<0.0037	<0.0037	<0.0036	<0.0036	<0.0036	<0.0036	<0.0036	<0.0043
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NCL	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035	<0.0037	<0.0036	<0.004	<0.0037	<0.0037	<0.0036	<0.0036	<0.0036	<0.0036	<0.0036	<0.0043
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NCL	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035	<0.0037	<0.0036	<0.004	<0.0037	<0.0037	<0.0036	<0.0036	<0.0036	<0.0036	<0.0036	<0.0043
N-Ethyl perfluorooctane sulfonamidoethanol (N-EtFOSE)	NCL	NCL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NCL	<0.0072	<0.0071	<0.0072	<0.0072	<0.0071	<0.0073	<0.0072	<0.0081	<0.0074	<0.0074	<0.0072	<0.0072	<0.0071	<0.0072	<0.0072	<0.0086
N-Methyl perfluorooctane sulfonamidoethanol (N-MeFOSE)	NCL	NCL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perfluorobutane sulfonic acid (PFBS)	NCL	NCL	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035	<0.0037	<0.0036	<0.004	<0.0037	<0.0037	<0.0036	<0.0036	<0.0036	<0.0036	<0.0036	<0.0043
Perfluorodecane sulfonic acid (PFDS)	NCL	NCL	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035	<0.0037	<0.0036	<0.004	<0.0037	<0.0037	<0.0036	<0.0036	<0.0036	<0.0036	<0.0036	<0.0043
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NCL	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035	<0.0037	<0.0036	<0.004	<0.0037	<0.0037	<0.0036	<0.0036	<0.0036	<0.0036	<0.0036	<0.0043
Perfluorononane sulfonic acid (PFNS)	NCL	NCL	<0.0072	<0.0071	<0.0072	<0.0072	<0.0071	<0.0073	<0.0072	<0.0081	<0.0074	<0.0074	<0.0072	<0.0072	<0.0071	<0.0072	<0.0072	<0.0086
Perfluorooctane sulfonamide (FOSA)	NCL	NCL	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035	<0.0037	<0.0036	<0.004	<0.0037	<0.0037	<0.0036	<0.0036	<0.0036	<0.0036	<0.0036	<0.0043
Perfluoropentane sulfonic acid (PFPeS)	NCL	NCL	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035	<0.0037	<0.0036	<0.004	<0.0037	<0.0037	<0.0036	<0.0036	<0.0036	<0.0036	<0.0036	<0.0043
Perfluorohexane sulfonic acid (PFHxS)	NCL	NCL	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035	<0.0037	<0.0036	<0.004	<0.0037	<0.0037	<0.0036	<0.0036	<0.0036	<0.0036	<0.0036	<0.0043
Perfluorobutanoic acid (PFBA)	NCL	NCL	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035	<0.0037	<0.0036	<0.004	<0.0037	<0.0037	<0.0036	<0.0036	<0.0036	<0.0036	<0.0036	<0.0043
Perfluorodecanoic acid (PFDA)	NCL	NCL	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035	<0.0037	<0.0036	<0.004	<0.0037	<0.0037	<0.0036	<0.0036	<0.0036	<0.0036	<0.0036	<0.0043
Perfluorododecanoic acid (PFDoDA)	NCL	NCL	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035	<0.0037	<0.0036	<0.004	<0.0037	<0.0037	<0.0036	<0.0036	<0.0036	<0.0036	<0.0036	<0.0043
Perfluoroheptanoic acid (PFHpA)	NCL	NCL	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035	<0.0037	<0.0036	<0.004	<0.0037	<0.0037	<0.0036	<0.0036	<0.0036	<0.0036	<0.0036	<0.0043
Perfluorohexanoic acid (PFHxA)	NCL	NCL	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035	<0.0037	<0.0036	<0.004	<0.0037	<0.0037	<0.0036	<0.0036	<0.0036	<0.0036	<0.0036	<0.0043
Perfluorononanoic acid (PFNA)	NCL	NCL	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035	<0.0037	<0.0036	<0.004	<0.0037	<0.0037	<0.0036	<0.0036	<0.0036	<0.0036	<0.0036	<0.0043
Perfluorooctanoic acid (PFOA)	0.07 (JJ)	12	<0.0018	<0.0018	<0.0018	<0.0018	<0.0018	<0.0018	<0.0018	<0.002	<0.0019	<0.0018	<0.0018	<0.0018	<0.0018	<0.0018	<0.0018	<0.0021
Perfluorooctane sulfonic acid (PFOS)	0.07 (JJ)	0.012	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035	<0.0037	<0.0036	<0.004	<0.0037	<0.0037	<0.0036	<0.0036	<0.0036	<0.0036	<0.0036	<0.0043
PFOA + PFOS (Calculated)	0.07	NCL	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Perfluoropentanoic acid (PFPeA)	NCL	NCL	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035	<0.0037	<0.0036	<0.004	<0.0037	<0.0037	<0.0036	<0.0036	<0.0036	<0.0036	<0.0036	<0.0043
Perfluorotetradecanoic acid (PFTeDA)	NCL	NCL	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035	<0.0037	<0.0036	<0.004	<0.0037	<0.0037	<0.0036	<0.0036	<0.0036	<0.0036	<0.0036	<0.0043
Perfluorotridecanoic acid (PFTrDA)	NCL	NCL	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035	<0.0037	<0.0036	<0.004	<0.0037	<0.0037	<0.0036	<0.0036	<0.0036	<0.0036	<0.0036	<0.0043
Perfluoroundecanoic acid (PFUnDA)	NCL	NCL	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035	<0.0037	<0.0036	<0.004	<0.0037	<0.0037	<0.0036	<0.0036	<0.0036	<0.0036	<0.0036	<0.0043
Total PFAS (Calculated)	NCL	NCL	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

TABLE 4
GROUNDWATER ANALYTICAL DATA - PFAS
Wolver/Jewell Study Areas
Algoma Township, Kent County, MI

Sample Location	Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water ²	Part 201 Generic Groundwater Cleanup Criteria – Groundwater Surface Water Interface ²	WV-PMW-12	WV-PMW-12	WV-PMW-12	WV-PMW-12	WV-MW-12D	WV-MW-12D	WV-MW-12D	WV-MW-12D	WV-MW-12M	WV-MW-12M	WV-MW-12M	WV-MW-12M	WV-MW-12S	WV-PMW-13	WV-MW-12S	WV-MW-12S
Sample Name			SB-12 145-150	SB-12 155-160	SB-12 165-170	SB-12 175-180	MW-WV-12D	WV-GW-MW12D	WV-GW-MW12D	WV-GW-MW-12D	MW-WV-12M	WV-GW-MW12M	WV-GW-MW12M	WV-GW-MW-12M	MW-WV-12S	WV-MW-13(0-10)	WV-GW-MW12S	WV-GW-MW12S
Well Screen Interval (Feet below ground surface)			145-150	155-160	165-170	175-180	179.2-184.2	179.2-184.2	179.2-184.2	179.2-184.2	146.6-151.6	146.6-151.6	146.6-151.6	146.6-151.6	75.8-80.8	0-10	75.8-80.8	75.8-80.8
Laboratory Sample ID			TL01010-001	TL01010-002	TL01010-003	TL01010-004	UB14084-006	UE09028-006	UH31001-004	UK09008-003	UB14084-004	UE09028-007	UH31001-007	UK09008-002	UB14084-003	UB16023-001	UE09028-008	UH31001-003
Sample Date			11/26/2018	11/27/2018	11/27/2018	11/29/2018	02/13/2019	05/07/2019	08/29/2019	11/07/2019	02/13/2019	05/07/2019	08/30/2019	11/07/2019	02/12/2019	02/14/2019	05/07/2019	08/29/2019
Parameter (µg/L)																		
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NCL	<0.013	<0.011	<0.0056	<0.0039	<0.0037	<0.0035	<0.0035	<0.0035	<0.0037	<0.0037	<0.0034	<0.0034	<0.0036	<0.0038	<0.0035	<0.0036
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NCL	<0.013	<0.011	<0.0056	<0.0039	<0.0037	<0.0035	<0.0035	<0.0035	<0.0037	<0.0037	<0.0034	<0.0034	<0.0036	<0.0038	<0.0035	<0.0036
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NCL	<0.013	<0.011	<0.0056	<0.0039	<0.0037	<0.0035	<0.0035	<0.0035	<0.0037	<0.0037	<0.0034	<0.0034	<0.0036	<0.0038	<0.0035	<0.0036
N-Ethyl perfluorooctane sulfonamidoethanol (N-EtFOSE)	NCL	NCL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NCL	<0.026	<0.023	<0.011	<0.0078	<0.0074	<0.0071	<0.007	<0.0071	<0.0074	<0.0074	<0.0068	<0.0068	<0.0072	<0.0077	<0.0071	<0.0072
N-Methyl perfluorooctane sulfonamidoethanol (N-MeFOSE)	NCL	NCL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perfluorobutane sulfonic acid (PFBS)	NCL	NCL	<0.013	<0.011	<0.0056	<0.0039	<0.0037	<0.0035	<0.0035	<0.0035	<0.0037	<0.0037	<0.0034	<0.0034	<0.0036	0.0045	<0.0035	<0.0036
Perfluorodecane sulfonic acid (PFDS)	NCL	NCL	<0.013	<0.011	<0.0056	<0.0039	<0.0037	<0.0035	<0.0035	<0.0035	<0.0037	<0.0037	<0.0034	<0.0034	<0.0036	<0.0038	<0.0035	<0.0036
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NCL	<0.013	<0.011	<0.0056	<0.0039	<0.0037	<0.0035	<0.0035	<0.0035	<0.0037	<0.0037	<0.0034	<0.0034	<0.0036	<0.0038	<0.0035	<0.0036
Perfluorononane sulfonic acid (PFNS)	NCL	NCL	<0.026	<0.023	<0.011	<0.0078	<0.0074	<0.0071	<0.007	<0.0071	<0.0074	<0.0074	<0.0068	<0.0068	<0.0072	<0.0077	<0.0071	<0.0072
Perfluorooctane sulfonamide (FOSA)	NCL	NCL	<0.013	<0.011	<0.0056	<0.0039	<0.0037	<0.0035	<0.0035	<0.0035	<0.0037	<0.0037	<0.0034	<0.0034	<0.0036	<0.0038	<0.0035	<0.0036
Perfluoropentane sulfonic acid (PFPeS)	NCL	NCL	<0.013	<0.011	<0.0056	<0.0039	<0.0037	<0.0035	<0.0035	<0.0035	<0.0037	<0.0037	<0.0034	<0.0034	<0.0036	<0.0038	<0.0035	<0.0036
Perfluorohexane sulfonic acid (PFHxS)	NCL	NCL	<0.013	<0.011	<0.0056	<0.0039	<0.0037	<0.0035	<0.0035	<0.0035	<0.0037	<0.0037	<0.0034	<0.0034	<0.0036	0.0059	<0.0035	<0.0036
Perfluorobutanoic acid (PFBA)	NCL	NCL	<0.013	<0.011	<0.0056	<0.0039	<0.0037	<0.0035	<0.0035	<0.0035	<0.0037	<0.0037	<0.0034	<0.0034	<0.0036	0.0066	<0.0035	<0.0036
Perfluorodecanoic acid (PFDA)	NCL	NCL	<0.013	<0.011	<0.0056	<0.0039	<0.0037	<0.0035	<0.0035	<0.0035	<0.0037	<0.0037	<0.0034	<0.0034	<0.0036	<0.0038	<0.0035	<0.0036
Perfluorododecanoic acid (PFDoDA)	NCL	NCL	<0.013	<0.011	<0.0056	<0.0039	<0.0037	<0.0035	<0.0035	<0.0035	<0.0037	<0.0037	<0.0034	<0.0034	<0.0036	<0.0038	<0.0035	<0.0036
Perfluoroheptanoic acid (PFHpA)	NCL	NCL	<0.013	<0.011	<0.0056	<0.0039	<0.0037	<0.0035	<0.0035	<0.0035	<0.0037	<0.0037	<0.0034	<0.0034	<0.0036	<0.0038	<0.0035	<0.0036
Perfluorohexanoic acid (PFHxA)	NCL	NCL	<0.013	<0.011	<0.0056	<0.0039	<0.0037	<0.0035	<0.0035	<0.0035	<0.0037	<0.0037	<0.0034	<0.0034	<0.0036	<0.0038	<0.0035	<0.0036
Perfluorononanoic acid (PFNA)	NCL	NCL	<0.013	<0.011	<0.0056	<0.0039	<0.0037	<0.0035	<0.0035	<0.0035	<0.0037	<0.0037	<0.0034	<0.0034	<0.0036	<0.0038	<0.0035	<0.0036
Perfluorooctanoic acid (PFOA)	0.07 (JJ)	12	0.008	<0.0057	0.0034	<0.002	<0.0018	<0.0018	<0.0017	<0.0018	<0.0018	<0.0017	<0.0018	<0.0017	<0.0018	0.029	<0.0018	<0.0018
Perfluorooctane sulfonic acid (PFOS)	0.07 (JJ)	0.012	<0.013	<0.011	<0.0056	<0.0039	<0.0037	<0.0035	<0.0035	<0.0035	<0.0037	<0.0037	<0.0034	<0.0034	<0.0036	0.13	<0.0035	<0.0036
PFOA + PFOS (Calculated)	0.07	NCL	0.008	ND	0.0034	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.16	ND	ND
Perfluoropentanoic acid (PFPeA)	NCL	NCL	<0.013	<0.011	<0.0056	<0.0039	<0.0037	<0.0035	<0.0035	<0.0035	<0.0037	<0.0037	<0.0034	<0.0034	<0.0036	<0.0038	<0.0035	<0.0036
Perfluorotetradecanoic acid (PFTeDA)	NCL	NCL	<0.013	<0.011	<0.0056	<0.0039	<0.0037	<0.0035	<0.0035	<0.0035	<0.0037	<0.0037	<0.0034	<0.0034	<0.0036	<0.0038	<0.0035	<0.0036
Perfluorotridecanoic acid (PFTrDA)	NCL	NCL	<0.013	<0.011	<0.0056	<0.0039	<0.0037	<0.0035	<0.0035	<0.0035	<0.0037	<0.0037	<0.0034	<0.0034	<0.0036	<0.0038	<0.0035	<0.0036
Perfluoroundecanoic acid (PFUnDA)	NCL	NCL	<0.013	<0.011	<0.0056	<0.0039	<0.0037	<0.0035	<0.0035	<0.0035	<0.0037	<0.0037	<0.0034	<0.0034	<0.0036	<0.0038	<0.0035	<0.0036
Total PFAS (Calculated)	NCL	NCL	0.008	ND	0.0034	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.18	ND	ND

TABLE 4
GROUNDWATER ANALYTICAL DATA - PFAS
Wolver/Jewell Study Areas
Algoma Township, Kent County, MI

Sample Location	Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water ²	Part 201 Generic Groundwater Cleanup Criteria – Groundwater Surface Water Interface ²	WV-MW-12S	WV-PMW-13	WV-PMW-13	WV-PMW-13	WV-PMW-13	WV-MW-13D	WV-MW-13D	WV-MW-13D	WV-MW-13M	WV-MW-13M	WV-MW-13M	WV-MW-13S	WV-MW-13S	WV-MW-13S	WV-PMW-14	WV-PMW-14
Sample Name			WV-GW-MW-12S	WV-MW-13(10-20)	WV-MW-13 (35-45)	WV-MW-13 (45-55)	WV-MW-13 (53-63)	WV-GW-MW13D	WV-GW-MW13D	WV-GW-MW-13D	WV-GW-MW13M	WV-GW-MW13M	WV-GW-MW-13M	WV-GW-MW13S	WV-GW-MW13S	WV-GW-MW-13S	WV-MW-14 (139-144)	WV-MW-14 (9-14)
Well Screen Interval (Feet below ground surface)			75.8-80.8	10-20	35-45	45-55	53-63	58.8-63.8	58.8-63.8	58.8-63.8	18.1-23.1	18.1-23.1	18.1-23.1	1.7-6.7	1.7-6.7	1.7-6.7	139-144	9-14
Laboratory Sample ID			UK09008-001	UB16023-002	UB20051-007	UB20051-008	UB20051-009	UE09028-002	UH29005-017	UK09008-006	UE09028-001	UH29005-019	UK09008-005	UE09028-003	UH29005-016	UK09008-004	UD30028-001	UD20015-001
Sample Date			11/07/2019	02/14/2019	02/18/2019	02/18/2019	02/18/2019	05/08/2019	08/28/2019	11/07/2019	05/08/2019	08/28/2019	11/07/2019	05/08/2019	08/28/2019	11/07/2019	04/24/2019	04/15/2019
Parameter (µg/L)																		
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NCL	<0.004	<0.0042	<0.0035	<0.0037	<0.0035	<0.0036	<0.0036	<0.0038	<0.0035	<0.0036	<0.0036	<0.0036	<0.0036	<0.0038	<0.0036	<0.0037
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NCL	<0.004	<0.0042	<0.0035	<0.0037	<0.0035	<0.0036	<0.0036	<0.0038	<0.0035	<0.0036	<0.0036	<0.0036	<0.0036	<0.0038	<0.0036	<0.0037
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NCL	<0.004	<0.0042	<0.0035	<0.0037	<0.0035	<0.0036	<0.0036	<0.0038	<0.0035	<0.0036	<0.0036	<0.0036	<0.0036	<0.0038	<0.0036	<0.0037
N-Ethyl perfluorooctane sulfonamidoethanol (N-EtFOSE)	NCL	NCL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NCL	<0.0079	<0.0084	<0.007	<0.0073	<0.007	<0.0072	<0.0073	<0.0076	<0.007	<0.0072	<0.0072	<0.0072	<0.0072	<0.0076	<0.0072	<0.0073
N-Methyl perfluorooctane sulfonamidoethanol (N-MeFOSE)	NCL	NCL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perfluorobutane sulfonic acid (PFBS)	NCL	NCL	<0.004	<0.0042	0.0053	0.011	0.01	0.01	0.01	0.0098	0.0052	0.0047	0.005	<0.0036	<0.0036	<0.0038	<0.0036	0.015
Perfluorodecane sulfonic acid (PFDS)	NCL	NCL	<0.004	<0.0042	<0.0035	<0.0037	<0.0035	<0.0036	<0.0036	<0.0038	<0.0035	<0.0036	<0.0036	<0.0036	<0.0036	<0.0038	<0.0036	<0.0037
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NCL	<0.004	<0.0042	<0.0035	<0.0037	<0.0035	<0.0036	<0.0036	<0.0038	<0.0035	<0.0036	<0.0036	<0.0036	<0.0036	<0.0038	<0.0036	<0.0037
Perfluorononane sulfonic acid (PFNS)	NCL	NCL	<0.0079	<0.0084	<0.007	<0.0073	<0.007	<0.0072	<0.0073	<0.0076	<0.007	<0.0072	<0.0072	<0.0072	<0.0072	<0.0076	<0.0072	<0.0073
Perfluorooctane sulfonamide (FOSA)	NCL	NCL	<0.004	<0.0042	<0.0035	<0.0037	<0.0035	<0.0036	<0.0036	<0.0038	<0.0035	<0.0036	<0.0036	<0.0036	<0.0036	<0.0038	<0.0036	<0.0037
Perfluoropentane sulfonic acid (PFPeS)	NCL	NCL	<0.004	<0.0042	<0.0035	<0.0037	<0.0035	<0.0036	<0.0036	<0.0038	<0.0035	<0.0036	<0.0036	<0.0036	<0.0036	<0.0038	<0.0036	<0.0037
Perfluorohexane sulfonic acid (PFHxS)	NCL	NCL	<0.004	<0.0042	<0.0035	<0.0037	<0.0035	<0.0036	<0.0036	0.0038	0.005	0.0048	0.0056	<0.0036	<0.0036	0.004	<0.0036	0.0062
Perfluorobutanoic acid (PFBA)	NCL	NCL	<0.004	<0.0042	<0.0035	<0.0037	<0.0035	<0.0036	<0.0036	<0.0038	0.0052	0.0066	0.0062	0.0045	0.0076	0.0078	<0.0036	<0.0037
Perfluorodecanoic acid (PFDA)	NCL	NCL	<0.004	<0.0042	<0.0035	<0.0037	<0.0035	<0.0036	<0.0036	<0.0038	<0.0035	<0.0036	<0.0036	<0.0036	<0.0036	<0.0038	<0.0036	<0.0037
Perfluorododecanoic acid (PFDoDA)	NCL	NCL	<0.004	<0.0042	<0.0035	<0.0037	<0.0035	<0.0036	<0.0036	<0.0038	<0.0035	<0.0036	<0.0036	<0.0036	<0.0036	<0.0038	<0.0036	<0.0037
Perfluoroheptanoic acid (PFHpA)	NCL	NCL	<0.004	<0.0042	<0.0035	<0.0037	<0.0035	<0.0036	<0.0036	<0.0038	<0.0035	<0.0036	<0.0036	<0.0036	<0.0036	<0.0038	<0.0036	<0.0037
Perfluorohexanoic acid (PFHxA)	NCL	NCL	<0.004	<0.0042	<0.0035	<0.0037	<0.0035	<0.0036	<0.0036	<0.0038	<0.0035	<0.0036	<0.0036	<0.0036	<0.0036	<0.0038	<0.0036	<0.0037
Perfluorononanoic acid (PFNA)	NCL	NCL	<0.004	<0.0042	<0.0035	<0.0037	<0.0035	<0.0036	<0.0036	<0.0038	<0.0035	<0.0036	<0.0036	<0.0036	<0.0036	<0.0038	<0.0036	<0.0037
Perfluorooctanoic acid (PFOA)	0.07 (JJ)	12	<0.002	0.0091	0.0032	0.0023	0.0025	0.0027	0.0031	0.003	0.012	0.016	0.015	0.011	0.014	0.018	<0.0018	0.011
Perfluorooctane sulfonic acid (PFOS)	0.07 (JJ)	0.012	<0.004	0.014	0.0062	<0.0037	<0.0035	<0.0036	<0.0036	<0.0038	0.016	0.017	0.017	0.022	0.041	0.085	<0.0036	0.0059
PFOA + PFOS (Calculated)	0.07	NCL	ND	0.023	0.0094	0.0023	0.0025	0.0027	0.0031	0.003	0.028	0.033	0.032	0.033	0.055	0.1	ND	0.017
Perfluoropentanoic acid (PFPeA)	NCL	NCL	<0.004	<0.0042	<0.0035	<0.0037	<0.0035	<0.0036	<0.0036	<0.0038	<0.0035	<0.0036	<0.0036	<0.0036	<0.0036	<0.0038	<0.0036	<0.0037
Perfluorotetradecanoic acid (PFTeDA)	NCL	NCL	<0.004	<0.0042	<0.0035	<0.0037	<0.0035	<0.0036	<0.0036	<0.0038	<0.0035	<0.0036	<0.0036	<0.0036	<0.0036	<0.0038	<0.0036	<0.0037
Perfluorotridecanoic acid (PFTrDA)	NCL	NCL	<0.004	<0.0042	<0.0035	<0.0037	<0.0035	<0.0036	<0.0036	<0.0038	<0.0035	<0.0036	<0.0036	<0.0036	<0.0036	<0.0038	<0.0036	<0.0037
Perfluoroundecanoic acid (PFUnDA)	NCL	NCL	<0.004	<0.0042	<0.0035	<0.0037	<0.0035	<0.0036	<0.0036	<0.0038	<0.0035	<0.0036	<0.0036	<0.0036	<0.0036	<0.0038	<0.0036	<0.0037
Total PFAS (Calculated)	NCL	NCL	ND	0.023	0.015	0.013	0.013	0.013	0.013	0.017	0.043	0.049	0.049	0.038	0.063	0.11	ND	0.038

TABLE 4
GROUNDWATER ANALYTICAL DATA - PFAS
Wolver/Jewell Study Areas
Algoma Township, Kent County, MI

Sample Location	Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water ²	Part 201 Generic Groundwater Cleanup Criteria – Groundwater Surface Water Interface ²	WV-MW-14D	WV-MW-14D	WV-MW-14S	WV-MW-14S	WV-PMW-15	WV-PMW-15	WV-PMW-15	WV-MW-15A	WV-MW-15B	WV-MW-15C	WV-PMW-16	WV-MW-15D	WV-MW-15D	WV-PMW-16	WV-PMW-16	WV-MW-16D
Sample Name			WV-GW-MW14D	VW-GW-MW-14D	WV-GW-MW14S	WV-GW-MW-14S	WV-MW-15 (9-14)	WV-MW-15 33-38	WV-MW-15 43-48	WV-GW-MW-15A	WV-GW-MW-15B	WV-GW-MW-15C	WV-MW-16 (4-14)	WV-GW-MW-15D	WV-GW-MW-15D DUP	WV-MW-16 (12-22)	WV-MW-16 (86-96)	WV-GW-MW16D
Well Screen Interval (Feet below ground surface)			142.3-147.3	142.3-147.3	8.9-13.9	8.9-13.9	9-14	33-38	43-48	9-14	33.1-38.1	43.7-48.5	4-14	135.1-137.8	135.1-137.8	12-22	86-96	91.7-96.7
Laboratory Sample ID			UH29005-018	UK09009-002	UH29005-015	UK09008-007	UH22047-001	UH23038-001	UH23038-002	UK13023-008	UK13023-009	UK13023-010	UC23027-001	UK13023-013	UK13023-014	UC23027-002	UC23027-003	UE09028-005
Sample Date			08/28/2019	11/08/2019	08/28/2019	11/07/2019	08/19/2019	08/21/2019	08/21/2019	11/11/2019	11/11/2019	11/11/2019	03/19/2019	11/11/2019	11/11/2019	03/20/2019	03/22/2019	05/08/2019
Parameter (µg/L)																		
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NCL	<0.0034	<0.0035	<0.0034	<0.0038	<0.0034	<0.0038	<0.0036	<0.0038	<0.0038	<0.0037	<0.0036	<0.0037	<0.0038	<0.0037	<0.0042	<0.0037
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NCL	<0.0034	<0.0035	<0.0034	<0.0038	<0.0034	<0.0038	<0.0036	<0.0038	<0.0038	<0.0037	<0.0036	<0.0037	<0.0038	<0.0037	0.006	<0.0037
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NCL	<0.0034	<0.0035	<0.0034	<0.0038	<0.0034	<0.0038	<0.0036	<0.0038	<0.0038	<0.0037	<0.0036	<0.0037	<0.0038	<0.0037	<0.0042	<0.0037
N-Ethyl perfluorooctane sulfonamidoethanol (N-EtFOSE)	NCL	NCL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NCL	<0.0068	<0.007	<0.0068	<0.0076	<0.0069	<0.0076	<0.0072	<0.0077	<0.0076	<0.0074	<0.0071	<0.0074	<0.0075	<0.0073	<0.0083	<0.0074
N-Methyl perfluorooctane sulfonamidoethanol (N-MeFOSE)	NCL	NCL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perfluorobutane sulfonic acid (PFBS)	NCL	NCL	0.029	0.03	0.015	0.008	<0.0034	<0.0038	<0.0036	<0.0038	<0.0038	<0.0037	0.0083	<0.0037	<0.0038	0.025	<0.0042	<0.0037
Perfluorodecane sulfonic acid (PFDS)	NCL	NCL	<0.0034	<0.0035	<0.0034	<0.0038	<0.0034	<0.0038	<0.0036	<0.0038	<0.0038	<0.0037	<0.0036	<0.0037	<0.0038	<0.0037	<0.0042	<0.0037
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NCL	0.0035	0.0036	<0.0034	<0.0038	<0.0034	<0.0038	<0.0036	<0.0038	<0.0038	<0.0037	<0.0036	<0.0037	<0.0038	<0.0037	<0.0042	<0.0037
Perfluorononane sulfonic acid (PFNS)	NCL	NCL	<0.0068	<0.007	<0.0068	<0.0076	<0.0069	<0.0076	<0.0072	<0.0077	<0.0076	<0.0074	<0.0071	<0.0074	<0.0075	<0.0073	<0.0083	<0.0074
Perfluorooctane sulfonamide (FOSA)	NCL	NCL	<0.0034	<0.0035	<0.0034	<0.0038	<0.0034	<0.0038	<0.0036	<0.0038	<0.0038	<0.0037	<0.0036	<0.0037	<0.0038	<0.0037	<0.0042	<0.0037
Perfluoropentane sulfonic acid (PFPeS)	NCL	NCL	0.064	0.07	<0.0034	<0.0038	<0.0034	<0.0038	<0.0036	<0.0038	<0.0038	<0.0037	<0.0036	<0.0037	<0.0038	0.006	<0.0042	<0.0037
Perfluorohexane sulfonic acid (PFHxS)	NCL	NCL	0.17	0.16	0.0085	0.01	<0.0034	<0.0038	<0.0036	<0.0038	<0.0038	<0.0037	<0.0036	<0.0037	<0.0038	0.011	<0.0042	<0.0037
Perfluorobutanoic acid (PFBA)	NCL	NCL	0.011	0.0099	<0.0034	<0.0038	<0.0034	<0.0038	<0.0036	<0.0038	<0.0038	<0.0037	0.01	<0.0037	<0.0038	0.059	<0.0042	<0.0037
Perfluorodecanoic acid (PFDA)	NCL	NCL	<0.0034	<0.0035	<0.0034	<0.0038	<0.0034	<0.0038	<0.0036	<0.0038	<0.0038	<0.0037	<0.0036	<0.0037	<0.0038	<0.0037	<0.0042	<0.0037
Perfluorododecanoic acid (PFDoDA)	NCL	NCL	<0.0034	<0.0035	<0.0034	<0.0038	<0.0034	<0.0038	<0.0036	<0.0038	<0.0038	<0.0037	<0.0036	<0.0037	<0.0038	<0.0037	<0.0042	<0.0037
Perfluoroheptanoic acid (PFHpA)	NCL	NCL	0.083	0.076	<0.0034	<0.0038	<0.0034	<0.0038	<0.0036	<0.0038	<0.0038	<0.0037	<0.0036	<0.0037	<0.0038	0.019	<0.0042	<0.0037
Perfluorohexanoic acid (PFHxA)	NCL	NCL	0.033	0.033	<0.0034	<0.0038	<0.0034	<0.0038	<0.0036	<0.0038	<0.0038	<0.0037	0.0083	<0.0037	<0.0038	0.055	<0.0042	<0.0037
Perfluorononanoic acid (PFNA)	NCL	NCL	<0.0034	<0.0035	<0.0034	<0.0038	<0.0034	<0.0038	<0.0036	<0.0038	<0.0038	<0.0037	<0.0036	<0.0037	<0.0038	<0.0037	<0.0042	<0.0037
Perfluorooctanoic acid (PFOA)	0.07 (JJ)	12	0.54	0.52	0.0065	0.013	<0.0017	<0.0019	<0.0018	<0.0019	<0.0019	<0.0019	0.01	<0.0018	<0.0019	0.054	0.0024	<0.0019
Perfluorooctane sulfonic acid (PFOS)	0.07 (JJ)	0.012	0.007	0.0074	<0.0034	0.009	<0.0034	<0.0038	<0.0036	<0.0038	<0.0038	<0.0037	0.021	<0.0037	<0.0038	0.066	<0.0042	<0.0037
PFOA + PFOS (Calculated)	0.07	NCL	0.55	0.53	0.0065	0.022	ND	ND	ND	ND	ND	ND	0.031	ND	ND	0.12	0.0024	ND
Perfluoropentanoic acid (PFPeA)	NCL	NCL	0.012	0.012	<0.0034	<0.0038	<0.0034	<0.0038	<0.0036	<0.0038	<0.0038	<0.0037	0.0043	<0.0037	<0.0038	0.026	<0.0042	<0.0037
Perfluorotetradecanoic acid (PFTeDA)	NCL	NCL	<0.0034	<0.0035	<0.0034	<0.0038	<0.0034	<0.0038	<0.0036	<0.0038	<0.0038	<0.0037	<0.0036	<0.0037	<0.0038	<0.0037	<0.0042	<0.0037
Perfluorotridecanoic acid (PFTrDA)	NCL	NCL	<0.0034	<0.0035	<0.0034	<0.0038	<0.0034	<0.0038	<0.0036	<0.0038	<0.0038	<0.0037	<0.0036	<0.0037	<0.0038	<0.0037	<0.0042	<0.0037
Perfluoroundecanoic acid (PFUnDA)	NCL	NCL	<0.0034	<0.0035	<0.0034	<0.0038	<0.0034	<0.0038	<0.0036	<0.0038	<0.0038	<0.0037	<0.0036	<0.0037	<0.0038	<0.0037	<0.0042	<0.0037
Total PFAS (Calculated)	NCL	NCL	0.95	0.92	0.03	0.04	ND	ND	ND	ND	ND	ND	0.062	ND	ND	0.32	0.0084	ND

TABLE 4
GROUNDWATER ANALYTICAL DATA - PFAS
Wolver/Jewell Study Areas
Algoma Township, Kent County, MI

Sample Location	Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water ²	Part 201 Generic Groundwater Cleanup Criteria – Groundwater Surface Water Interface ²	WV-MW-16D	WV-MW-16D	WV-MW-16S	WV-MW-16S	WV-MW-16S	WV-MW-16S
Sample Name			WV-GW-MW16D	WV-GW-MW-16D	WV-GW-MW16S	WV-GW-MW16S	WV-GW-MW16S DUP	WV-GW-MW-16S
Well Screen Interval (Feet below ground surface)			91.7-96.7	91.7-96.7	17.5-22.5	17.5-22.5	17.5-22.5	17.5-22.5
Laboratory Sample ID			UH31001-005	UK13023-001	UE02030-006	UH31001-001	UH31001-002	UK19013-001
Sample Date			08/29/2019	11/12/2019	05/03/2019	08/29/2019	08/29/2019	11/13/2019
Parameter (µg/L)								
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NCL	<0.0036	<0.0035	<0.0036	<0.0035	<0.0037	<0.0037
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NCL	<0.0036	<0.0035	<0.0036	<0.0035	<0.0037	<0.0037
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NCL	<0.0036	<0.0035	<0.0036	<0.0035	<0.0037	<0.0037
N-Ethyl perfluorooctane sulfonamidoethanol (N-EtFOSE)	NCL	NCL	-	-	-	-	-	-
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NCL	<0.0072	<0.007	<0.0071	<0.007	<0.0074	<0.0074
N-Methyl perfluorooctane sulfonamidoethanol (N-MeFOSE)	NCL	NCL	-	-	-	-	-	-
Perfluorobutane sulfonic acid (PFBS)	NCL	NCL	<0.0036	<0.0035	0.0073	0.016	0.018	0.016
Perfluorodecane sulfonic acid (PFDS)	NCL	NCL	<0.0036	<0.0035	<0.0036	<0.0035	<0.0037	<0.0037
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NCL	<0.0036	<0.0035	<0.0036	<0.0035	<0.0037	<0.0037
Perfluorononane sulfonic acid (PFNS)	NCL	NCL	<0.0072	<0.007	<0.0071	<0.007	<0.0074	<0.0074
Perfluorooctane sulfonamide (FOSA)	NCL	NCL	<0.0036	<0.0035	<0.0036	<0.0035	<0.0037	<0.0037
Perfluoropentane sulfonic acid (PFPeS)	NCL	NCL	<0.0036	<0.0035	<0.0036	<0.0035	0.004	<0.0037
Perfluorohexane sulfonic acid (PFHxS)	NCL	NCL	<0.0036	<0.0035	<0.0036	0.0068	0.007	0.0072
Perfluorobutanoic acid (PFBA)	NCL	NCL	<0.0036	<0.0035	0.0074	0.028	0.029	0.02
Perfluorodecanoic acid (PFDA)	NCL	NCL	<0.0036	<0.0035	<0.0036	<0.0035	<0.0037	<0.0037
Perfluorododecanoic acid (PFDoDA)	NCL	NCL	<0.0036	<0.0035	<0.0036	<0.0035	<0.0037	<0.0037
Perfluoroheptanoic acid (PFHpA)	NCL	NCL	<0.0036	<0.0035	<0.0036	0.0076	0.0085	0.0054
Perfluorohexanoic acid (PFHxA)	NCL	NCL	<0.0036	<0.0035	0.0061	0.023	0.023	0.013
Perfluorononanoic acid (PFNA)	NCL	NCL	<0.0036	<0.0035	<0.0036	<0.0035	<0.0037	<0.0037
Perfluorooctanoic acid (PFOA)	0.07 (JJ)	12	<0.0018	<0.0018	0.0094	0.026	0.029	0.021
Perfluorooctane sulfonic acid (PFOS)	0.07 (JJ)	0.012	<0.0036	<0.0035	0.026	0.023	0.025	0.027
PFOA + PFOS (Calculated)	0.07	NCL	ND	ND	0.035	0.049	0.054	0.048
Perfluoropentanoic acid (PFPeA)	NCL	NCL	<0.0036	<0.0035	<0.0036	0.0097	0.011	0.007
Perfluorotetradecanoic acid (PFTeDA)	NCL	NCL	<0.0036	<0.0035	<0.0036	<0.0035	<0.0037	<0.0037
Perfluorotridecanoic acid (PFTrDA)	NCL	NCL	<0.0036	<0.0035	<0.0036	<0.0035	<0.0037	<0.0037
Perfluoroundecanoic acid (PFUnDA)	NCL	NCL	<0.0036	<0.0035	<0.0036	<0.0035	<0.0037	<0.0037
Total PFAS (Calculated)	NCL	NCL	ND	ND	0.056	0.14	0.15	0.12

TABLE 4 NOTES
Wolver/Jewell Study Areas
Algoma Township, Kent County, MI

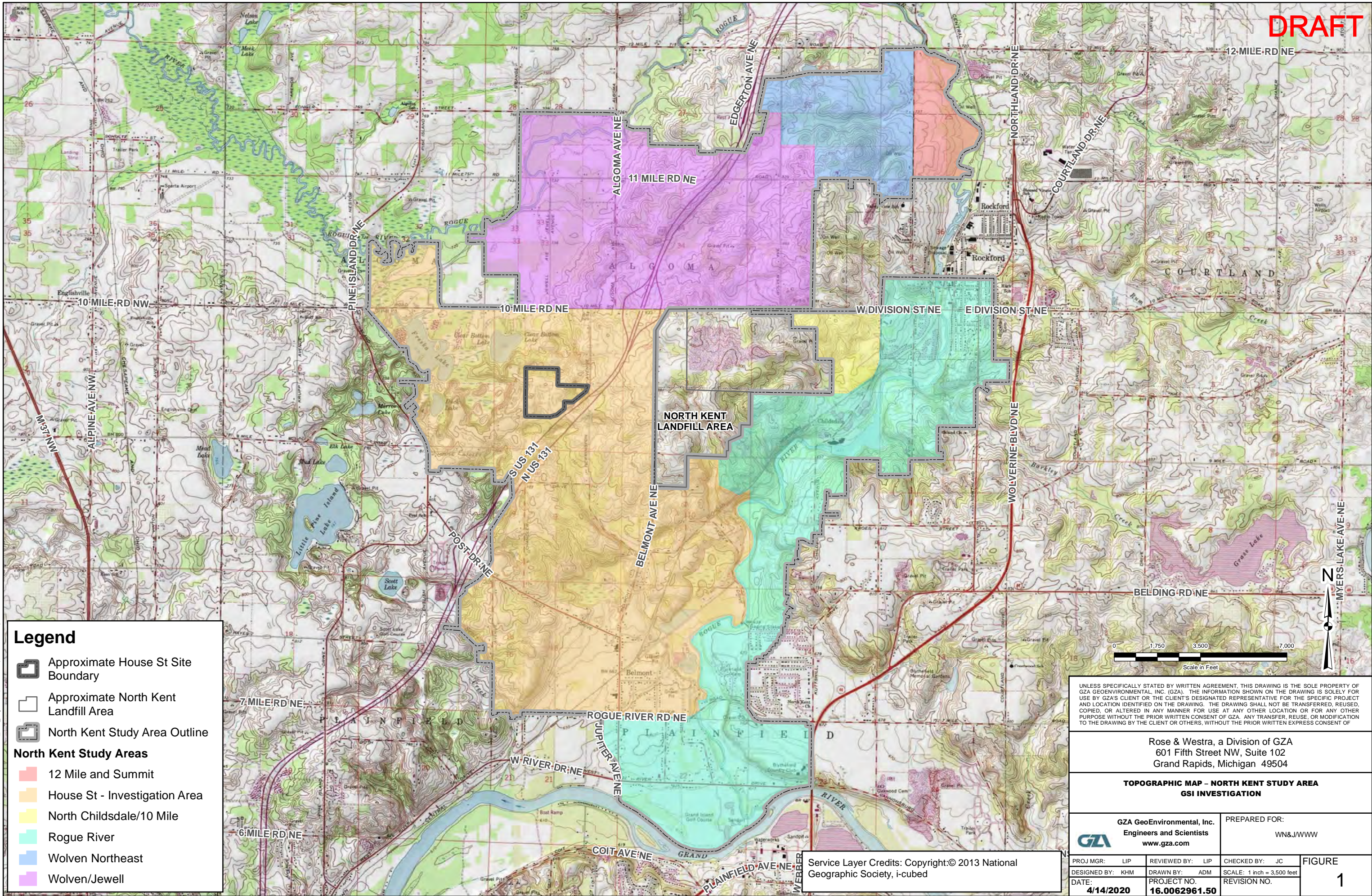
NOTES:

1. Concentration and criteria units are micrograms per Liter ($\mu\text{g/L}$) or parts per billion (ppb). Calculated criteria and concentrations are rounded to two significant digits. "ND" indicates the parameters used in the calculation were not detected.
2. Michigan Part 201 Groundwater Cleanup Criteria are based on "Table 1, Groundwater: Residential and Nonresidential Part 201 Generic Cleanup Criteria and Screening Levels/Part 213 Tier I Risk Based Screening Levels," Michigan Administrative Code, Cleanup Criteria Requirements for Response Activity, Rules 299.44 and 299.49, effective December 30, 2013; updated June 25, 2018.
Abbreviations Include:
"NCL" indicates no criterion listed in EGLE Table 1.
Footnotes Include:
(JJ) - Compliance with the drinking water criteria shall require comparing the sum of the PFOA and PFOS groundwater concentrations to the drinking water criterion of $0.07 \mu\text{g/L}$.
3. Bold, italic number with thick line border or italic parameter name indicates that parameter was detected above the Michigan Part 201 Groundwater Cleanup Criteria listed.
4. Abbreviations include:
" < RL " indicates the parameter was analyzed for but not detected above the method detection limit; RL = Reporting Limit.
"DUP" indicates a duplicate sample.
"-" indicates the parameter was not analyzed.
5. Well screen interval presented is the top of the well screen to the bottom of the well screen in feet below ground surface.



FIGURES

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Legend

- Approximate House St Site Boundary
- Approximate North Kent Landfill Area
- North Kent Study Area Outline

North Kent Study Areas

- 12 Mile and Summit
- House St - Investigation Area
- North Childsdale/10 Mile
- Rogue River
- Wolven Northeast
- Wolven/Jewell

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TOPOGRAPHIC MAP - NORTH KENT STUDY AREA
GSI INVESTIGATION

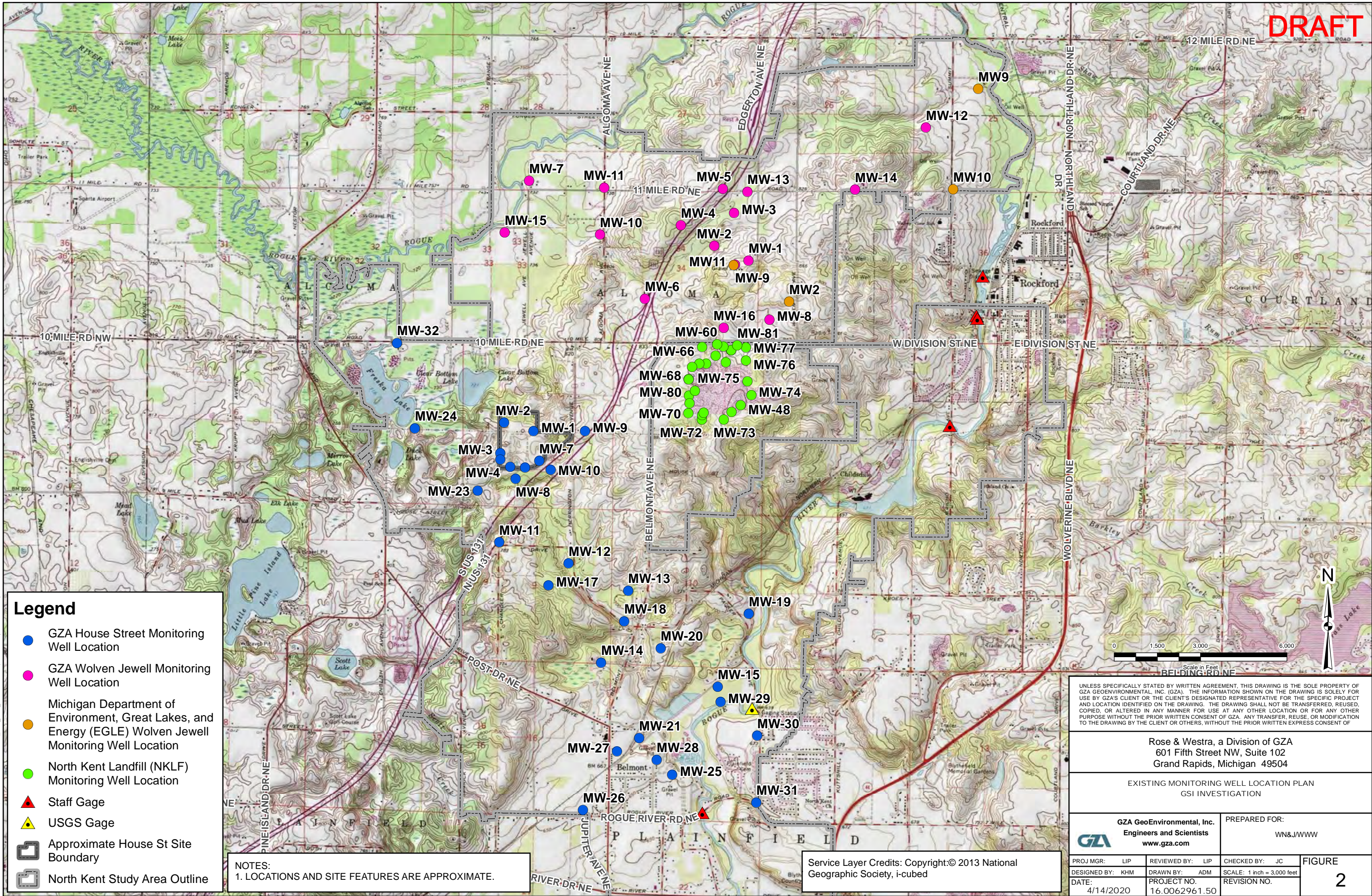
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PROJ MGR: LIP	REVIEWED BY: LIP	CHECKED BY: JC	FIGURE
DESIGNED BY: KHM	DRAWN BY: ADM	SCALE: 1 inch = 3,500 feet	1
DATE: 4/14/2020	PROJECT NO. 16.0062961.50	REVISION NO.	

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Legend

- GZA House Street Monitoring Well Location
- GZA Wolven Jewell Monitoring Well Location
- Michigan Department of Environment, Great Lakes, and Energy (EGLE) Wolven Jewell Monitoring Well Location
- North Kent Landfill (NKLF) Monitoring Well Location
- ▲ Staff Gage
- ▲ USGS Gage
- Approximate House St Site Boundary
- North Kent Study Area Outline

NOTES:
1. LOCATIONS AND SITE FEATURES ARE APPROXIMATE.

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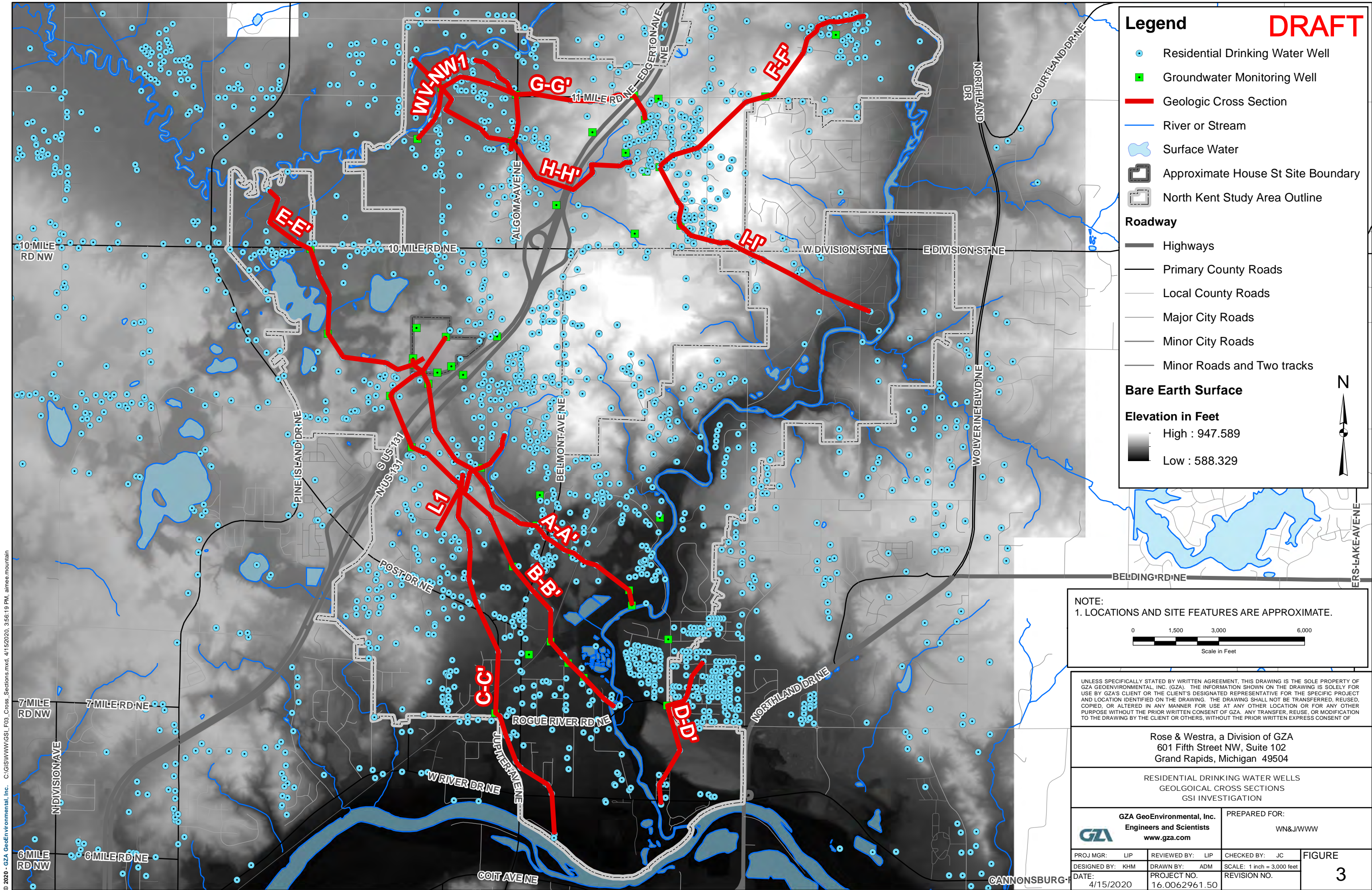
EXISTING MONITORING WELL LOCATION PLAN
GSI INVESTIGATION

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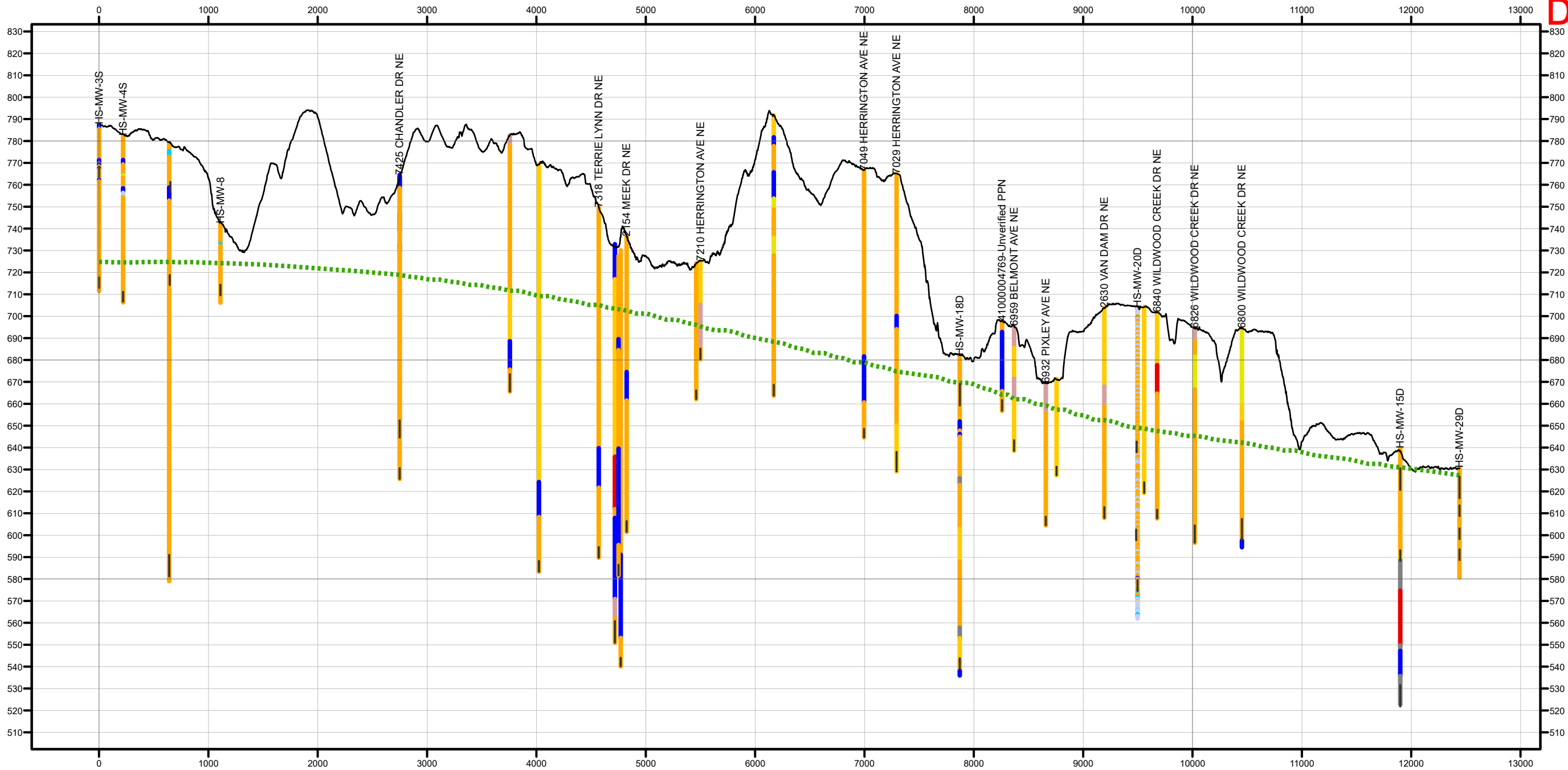
PROJ MGR: LIP	REVIEWED BY: LIP	CHECKED BY: JC	FIGURE
DESIGNED BY: KHM	DRAWN BY: ADM	SCALE: 1 inch = 3,000 feet	2
DATE: 4/14/2020	PROJECT NO. 16.0062961.50	REVISION NO.	

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Legend

- WELL SCREEN

GROUNDWATER TABLE (11/2019)

GROUND SURFACE
- BOREHOLE LITHOLOGY**

Gravel

Sand and Gravel

Sand

Sand/Gravel with Clay/Silt

Clay/Silt with Sand/Gravel

Silt

Clay and Silt

Clay

Top Soil

Organic Soil

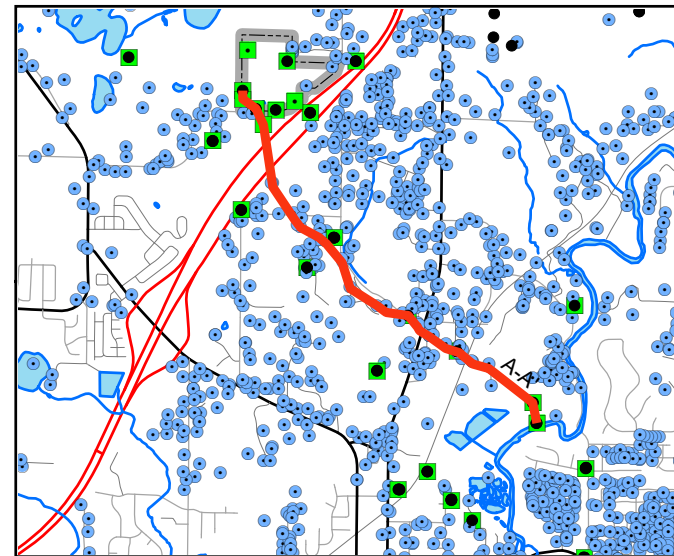
Mud

Marl

Coal

Bedrock

Not Available



02,5005,00010,000

SCALE IN FEET

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NORTH KENT STUDY AREA GSI INVESTIGATION WORK PLAN
GEOLOGICAL CROSS SECTION A-A'

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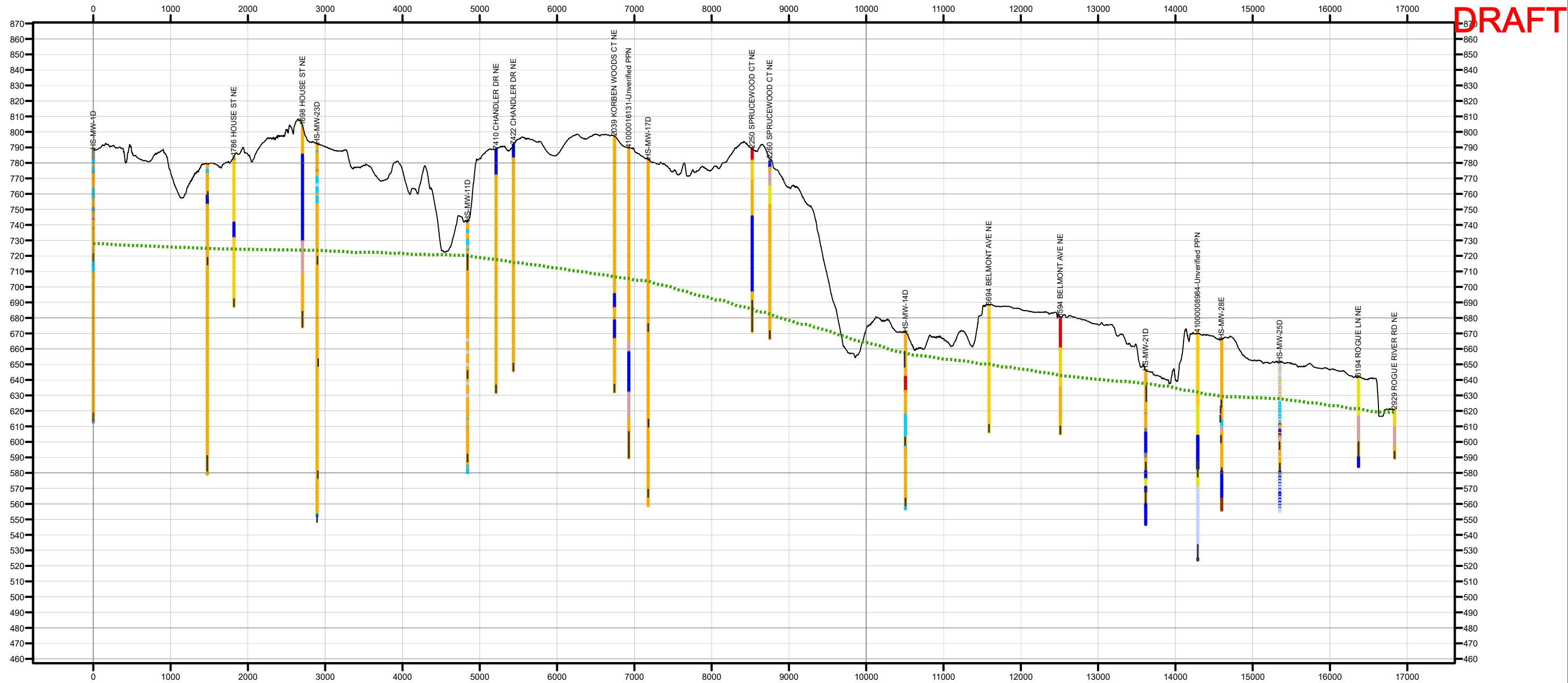
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DESIGNED BY: JC
DATE: 04/14/2020

REVIEWED BY: MW
DRAWN BY: JC
PROJECT NO: 16.0062961.00

CHECKED BY: LMN
SCALE: 1:60,000
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FIG/DWG
4
SHEET NO: XX OF XX

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Legend

WELL SCREEN

GROUNDWATER TABLE (11/2019)

GROUND SURFACE

BOREHOLE LITHOLOGY

Gravel

Sand and Gravel

Sand

Sand/Gravel with Clay/Silt

Clay/Silt with Sand/Gravel

Silt

Clay and Silt

Clay

Top Soil

Organic Soil

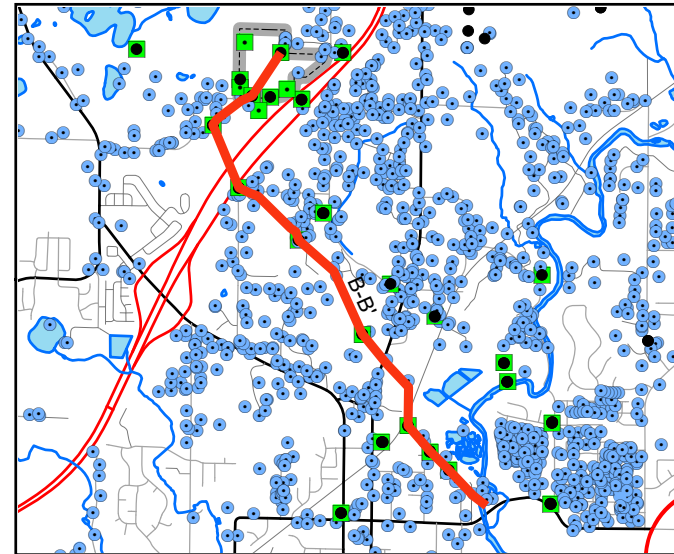
Mud

Marl

Coal

Bedrock

Not Available



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SCALE IN FEET

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NORTH KENT STUDY AREA GSI INVESTIGATION WORK PLAN GEOLOGICAL CROSS SECTION B-B'

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PROJ MGR: LJP

REVIEWED BY: MW

CHECKED BY: LMN

FIG/DWG

DESIGNED BY: JC

DRAWN BY: JC

SCALE: 1:66,000

5

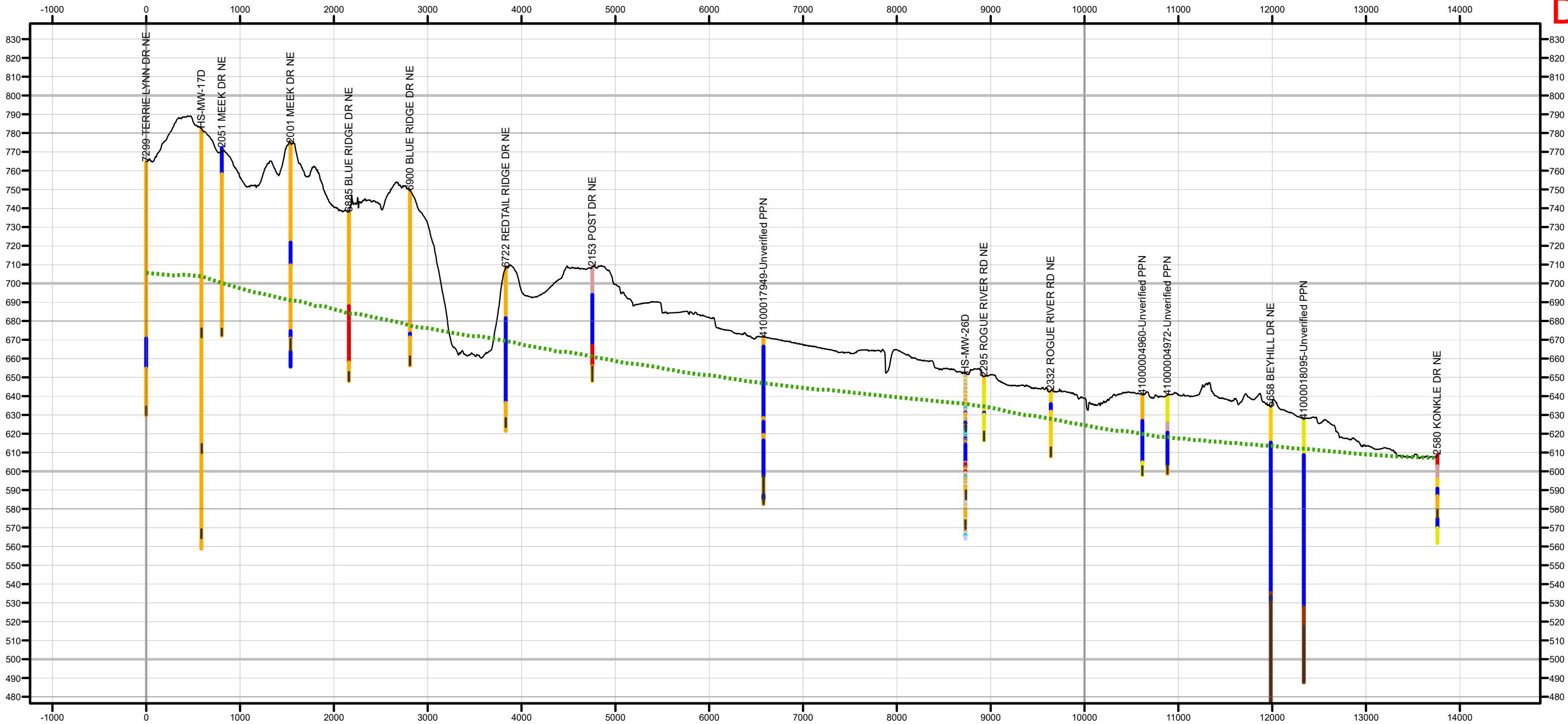
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PROJECT NO: 16.0062961.00

REVISION NO: REVISION NO

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Legend

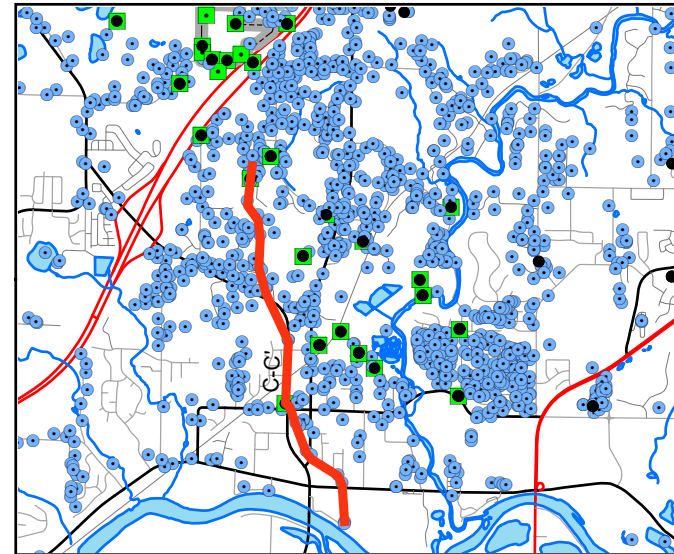
WELL SCREEN

GROUNDWATER TABLE (11/2019)

GROUND SURFACE

BOREHOLE LITHOLOGY

Clay	Gravel	Top Soil
Sand and Gravel	Organic Soil	Mud
Sand	Marl	Coal
Sand/Gravel with Clay/Silt	Clay/Silt with Sand/Gravel	Bedrock
Silt	Not Available	
Clay and Silt		



0 3,250 6,500 13,000
SCALE IN FEET

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GRAND RAPIDS, MICHIGAN 49504

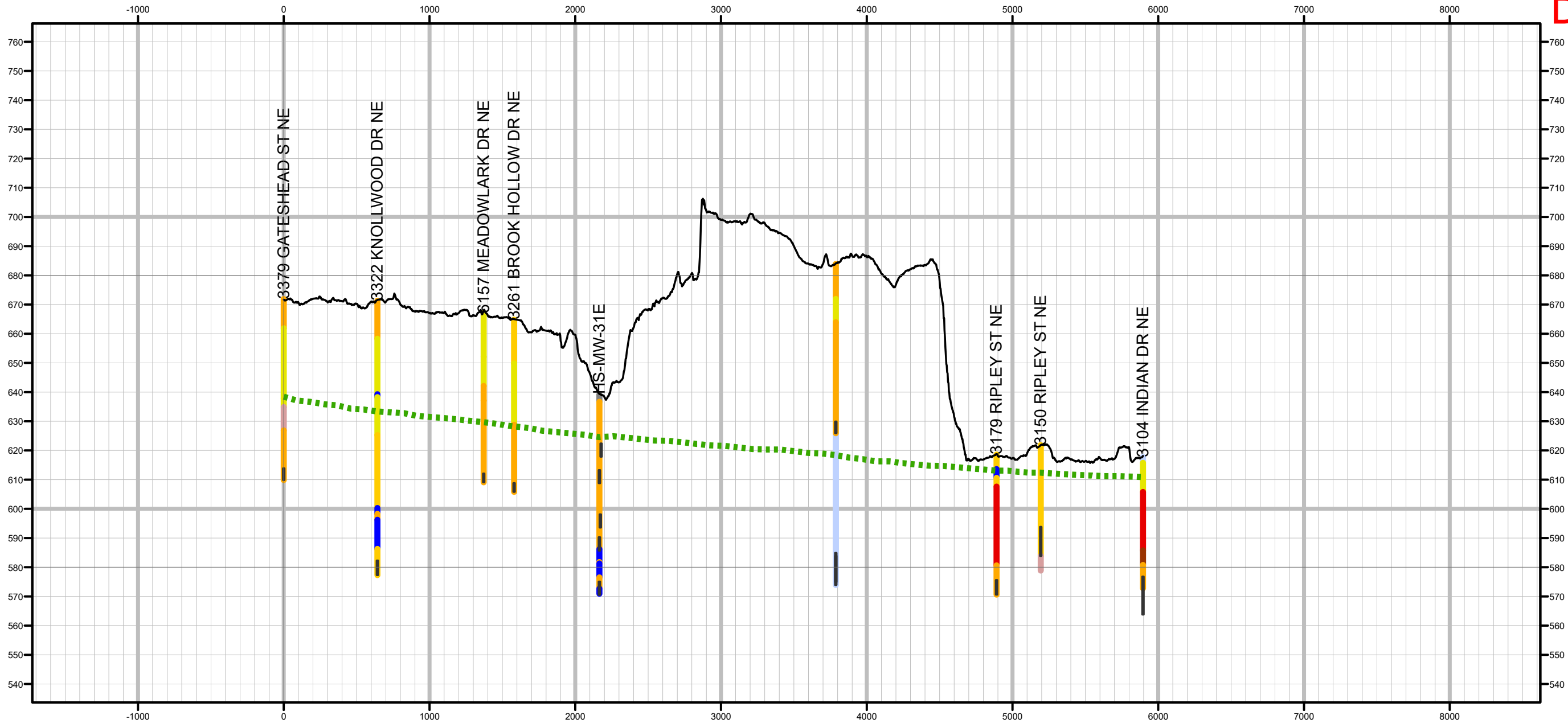
NORTH KENT STUDY AREA GSI INVESTIGATION WORK PLAN GEOLOGICAL CROSS SECTION C-C'

PREPARED BY:
GZA GeoEnvironmental, Inc.
Engineers and Scientists
www.gza.com

PREPARED FOR:
WNJ/WWW

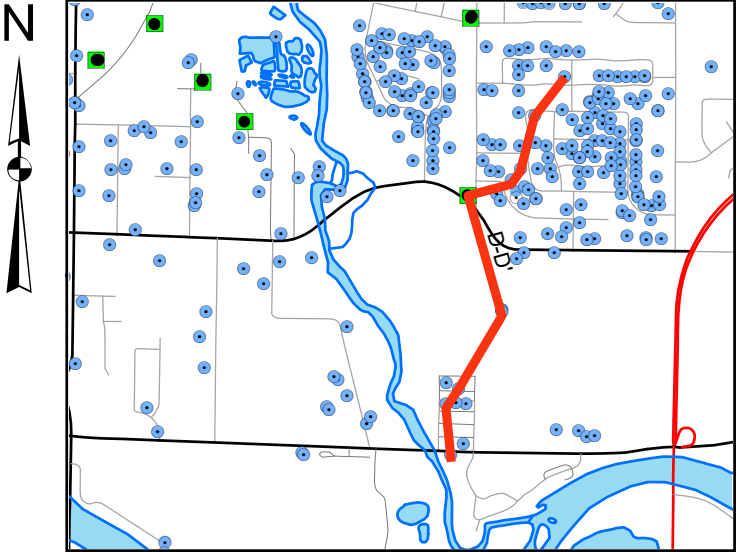
PROJ MGR: LJP	REVIEWED BY: MW	CHECKED BY: LMN	FIG/DWG
DESIGNED BY: JC	DRAWN BY: JC	SCALE: 1:80,000	6
DATE: 04/14/2020	PROJECT NO: 16.0062961.00	REVISION NO	

DRAFT



Legend

- WELL SCREEN
- GROUNDWATER TABLE (11/2019)
- GROUND SURFACE
- BOREHOLE LITHOLOGY**
- Gravel
 - Sand and Gravel
 - Sand
 - Sand/Gravel with Clay/Silt
 - Clay/Silt with Sand/Gravel
 - Silt
 - Clay and Silt
 - Clay
 - Top Soil
 - Organic Soil
 - Mud
 - Marl
 - Coal
 - Bedrock
 - Not Available



0 1,250 2,500 5,000
SCALE IN FEET

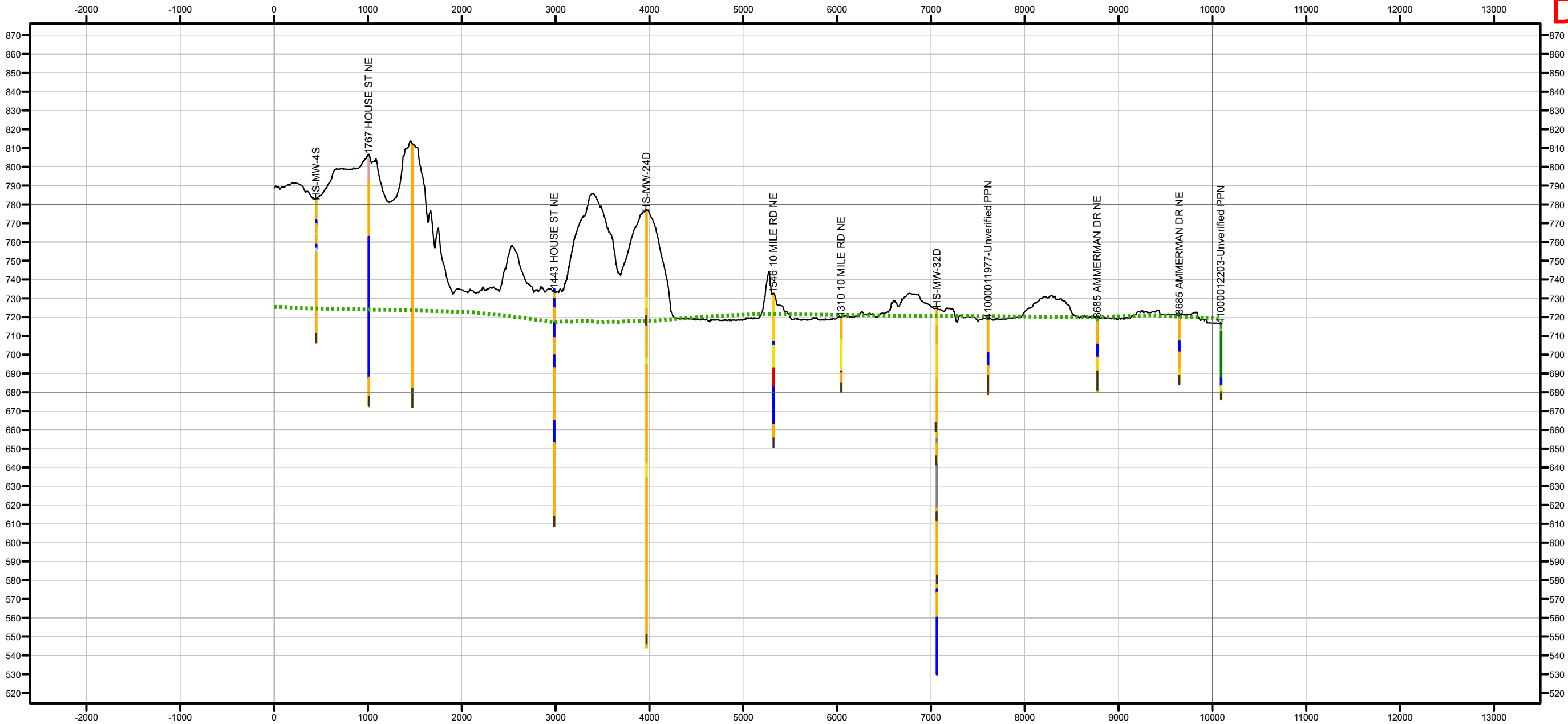
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601 FIFTH STREET NW, SUITE 102
GRAND RAPIDS, MICHIGAN 49504

**NORTH KENT STUDY AREA GSI INVESTIGATION WORK PLAN
GEOLOGICAL CROSS SECTION D-D'**

PREPARED BY: GZA GeoEnvironmental, Inc. Engineers and Scientists www.gza.com	PREPARED FOR: WNJ/WWW		
PROJ MGR: LJP	REVIEWED BY: MW	CHECKED BY: LMN	FIG/DWG
DESIGNED BY: JC	DRAWN BY: JC	SCALE: 1:30,000	7 SHEET NO: XX OF XX
DATE: 04/14/2020	PROJECT NO: 16.0062961.00	REVISION NO	

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DRAFT

Legend



WELL SCREEN



GROUNDWATER TABLE (11/2019)



GROUND SURFACE

BOREHOLE LITHOLOGY

<all other values>

Gravel

Sand and Gravel

Sand

Sand/Gravel with Clay/Silt

Clay/Silt with Sand/Gravel

Silt

Clay and Silt

Clay

Top Soil

Organic Soil

Mud

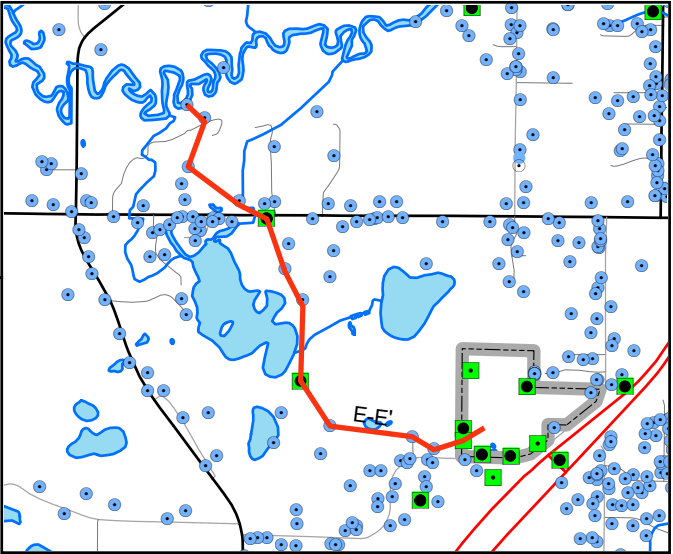
Marl

Coal

Bedrock

Not Available

N



0 1,750 3,500 7,000

SCALE IN FEET

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601 FIFTH STREET NW, SUITE 102
GRAND RAPIDS, MICHIGAN 49504

NORTH KENT STUDY AREA GSI INVESTIGATION WORK PLAN GEOLOGICAL CROSS SECTION E-E'

PREPARED BY:

GZA GeoEnvironmental, Inc.
Engineers and Scientists
www.gza.com

PREPARED FOR:

WNJ/WWW

PROJ MGR:

LJP

REVIEWED BY:

MW

CHECKED BY:

LMN

FIG/DWG

DESIGNED BY:

JC

DRAWN BY:

JC

SCALE:

1:42,000

DATE:

04/14/2020

PROJECT NO:

16.0062961.00

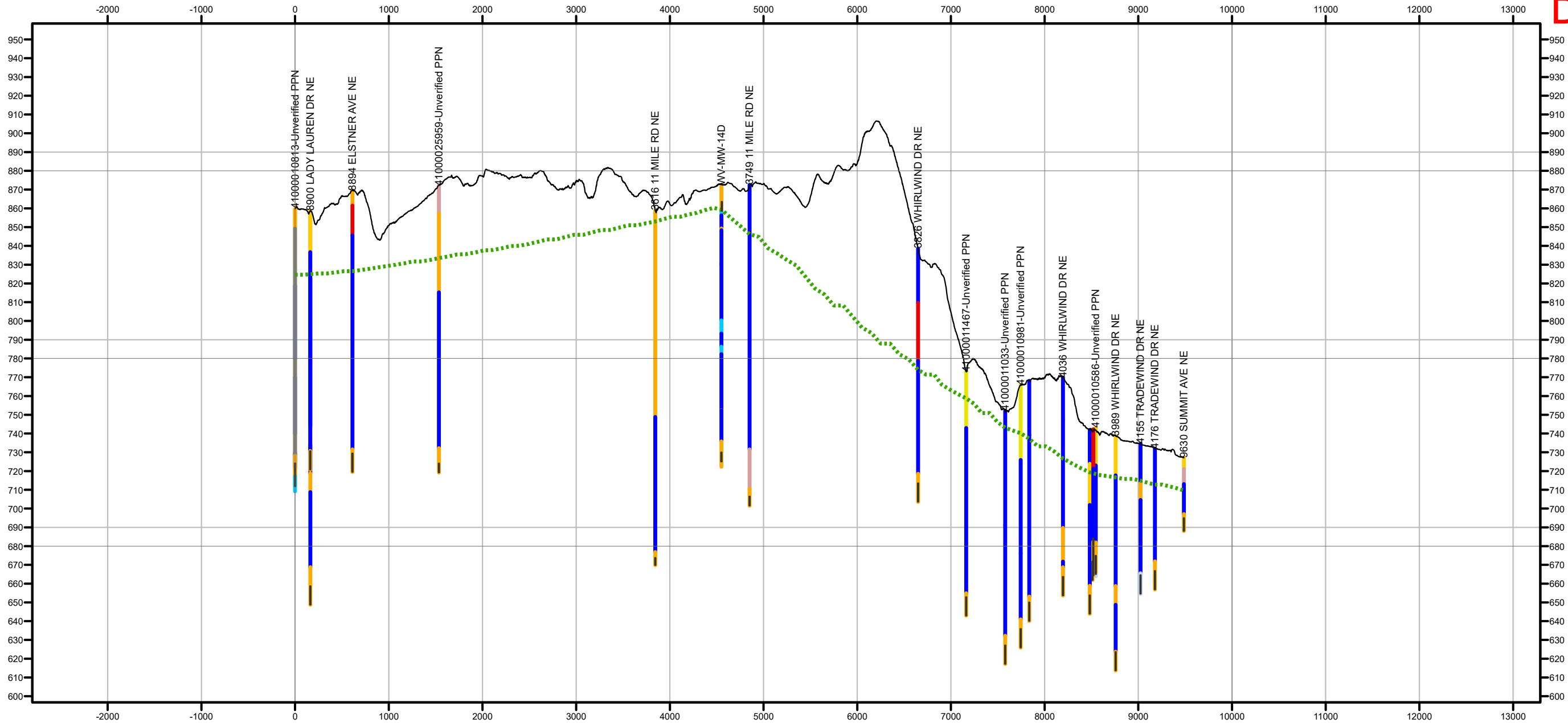
REVISION NO:

REVISION NO

8

SHEET NO: XX OF XX

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DRAFT

Legend

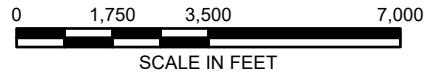
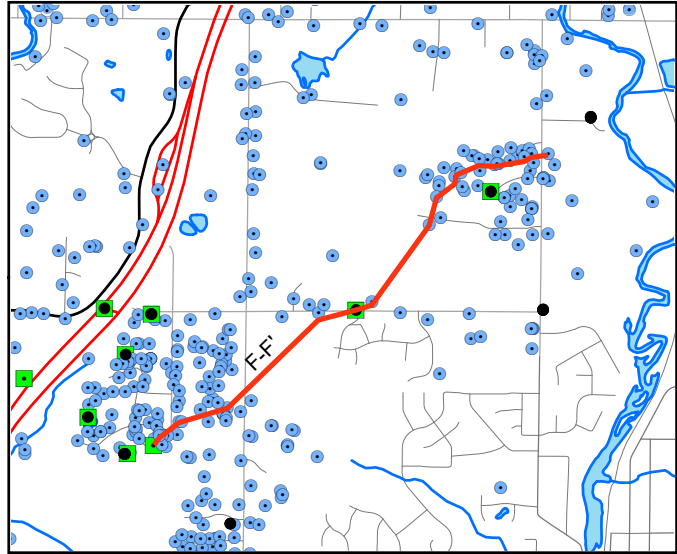
WELL SCREEN

GROUNDWATER TABLE (11/2019)

GROUND SURFACE

BOREHOLE LITHOLOGY


- Gravel
- Sand and Gravel
- Sand
- Sand/Gravel with Clay/Silt
- Clay/Silt with Sand/Gravel
- Silt
- Clay and Silt
- Clay
- Top Soil
- Organic Soil
- Mud
- Marl
- Coal
- Bedrock
- Not Available



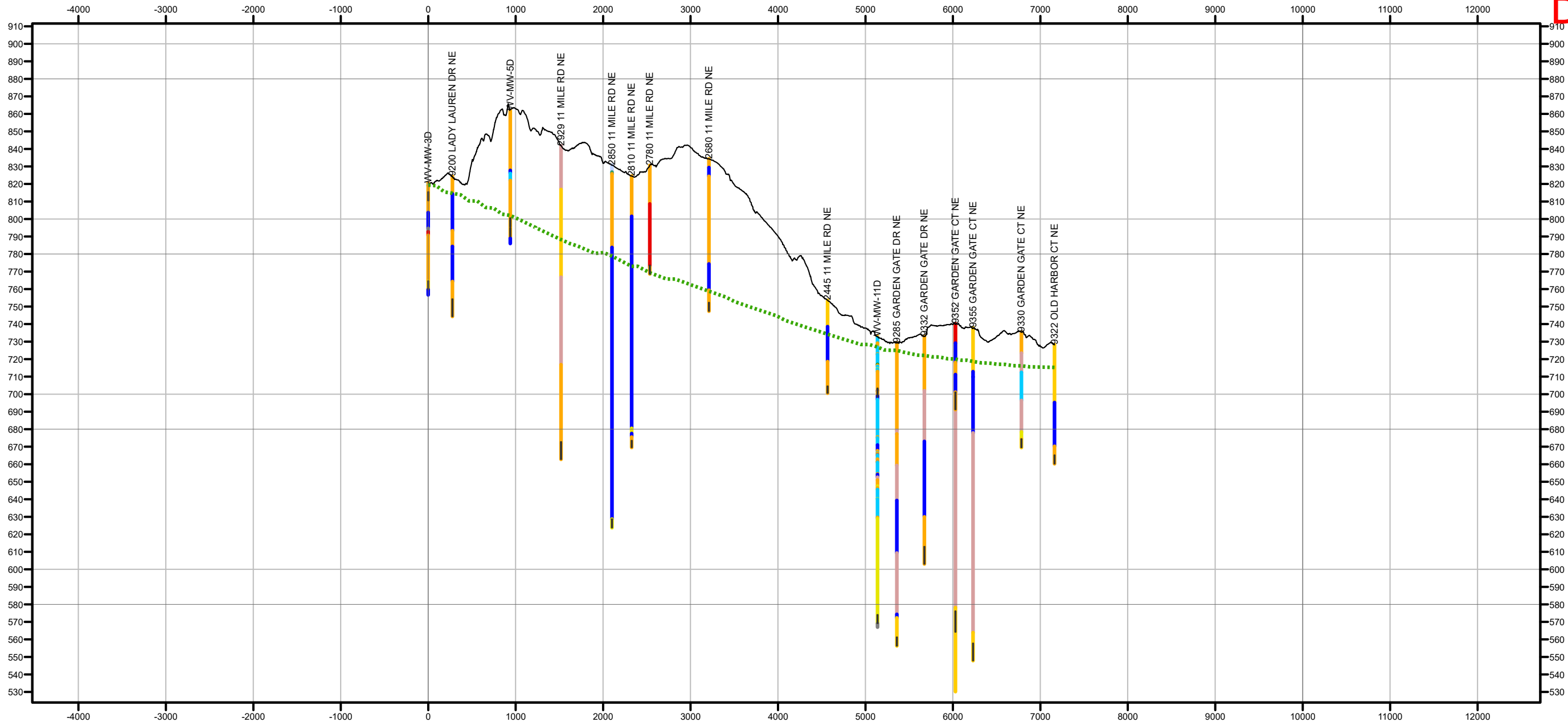
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GRAND RAPIDS, MICHIGAN 49504

NORTH KENT STUDY AREA GSI INVESTIGATION WORK PLAN GEOLOGICAL CROSS SECTION F-F'

PREPARED BY:  GZA GeoEnvironmental, Inc. Engineers and Scientists www.gza.com		PREPARED FOR: WNJ/WWW	
PROJ MGR: LJP	REVIEWED BY: MW	CHECKED BY: LMN	FIG/DWG 9 SHEET NO: XX OF XX
DESIGNED BY: JC	DRAWN BY: JC	SCALE: 1:42,000	
DATE: 04/14/2020	PROJECT NO: 16.0062961.00	REVISION NO	

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DRAFT
















Legend

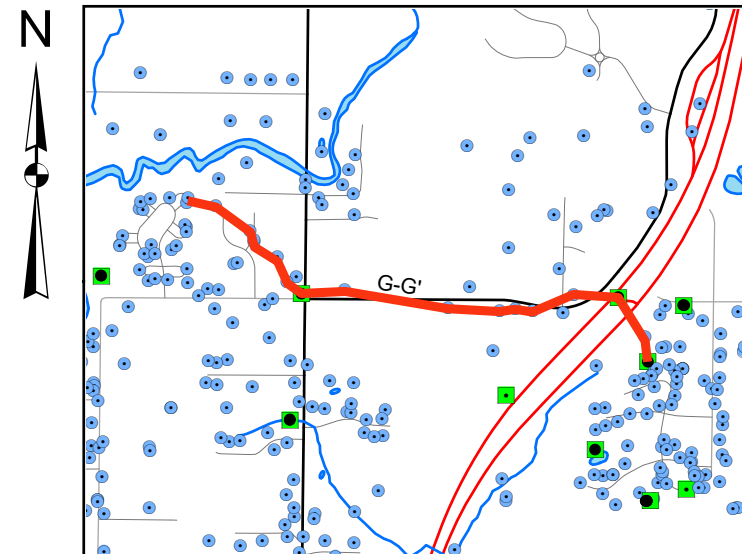
 WELL SCREEN

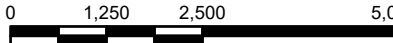

 GROUNDWATER TABLE (11/2019)

 GROUND SURFACE

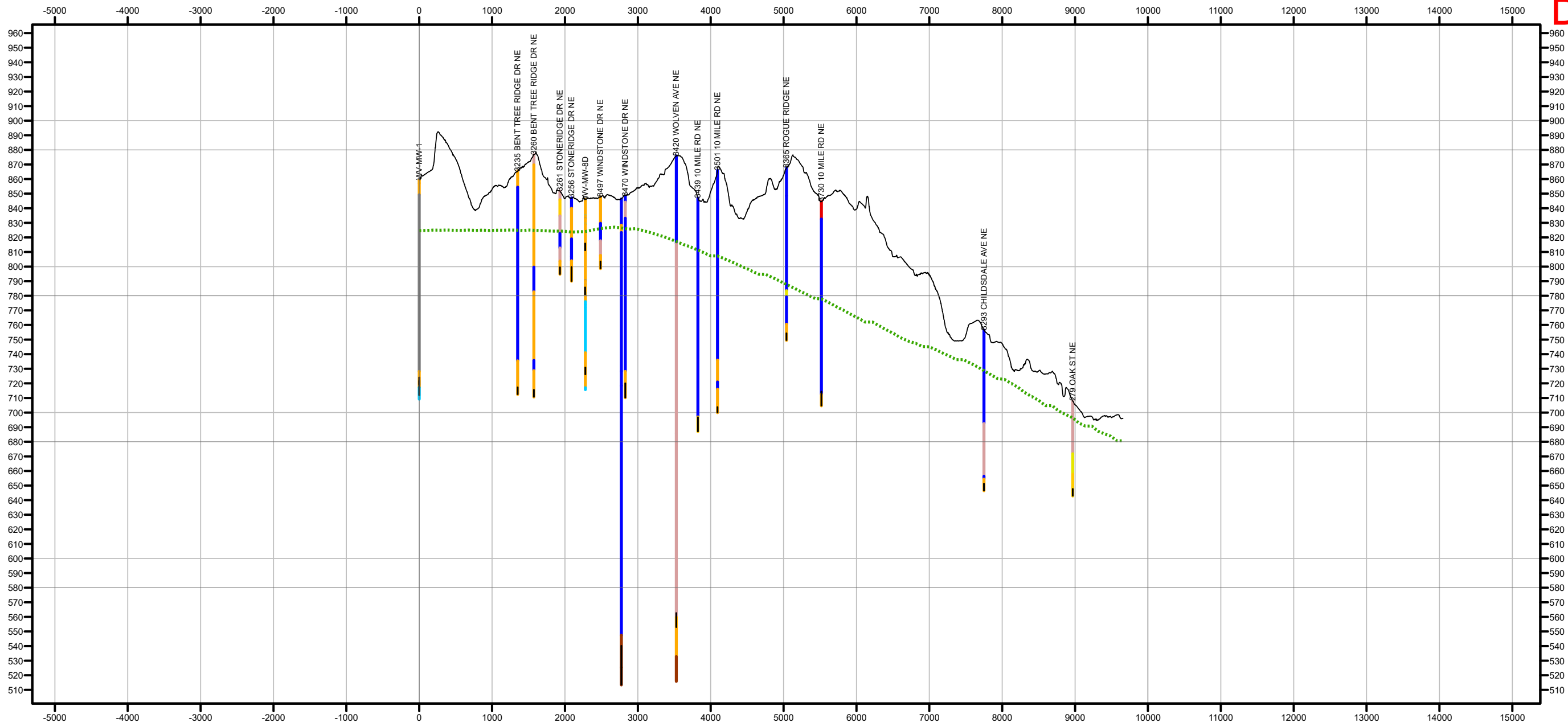
BOREHOLE LITHOLOGY

 Clay	 Top Soil
 Gravel	 Organic Soil
 Sand and Gravel	 Mud
 Sand	 Marl
 Sand/Gravel with Clay/Silt	 Coal
 Clay/Silt with Sand/Gravel	 Bedrock
 Silt	 Not Available
 Clay and Silt	



 SCALE IN FEET			
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NORTH KENT STUDY AREA GSI INVESTIGATION WORK PLAN GEOLOGICAL CROSS SECTION G-G'			
PREPARED BY:  GZA GeoEnvironmental, Inc. Engineers and Scientists www.gza.com		PREPARED FOR: WNJ/WWW	
PROJ MGR: LJP	REVIEWED BY: MW	CHECKED BY: LMN	FIG/DWG
DESIGNED BY: JC	DRAWN BY: JC	SCALE: 1:30,000	10
DATE: 04/14/2020	PROJECT NO: 16.0062961.00	REVISION NO	
			SHEET NO: XX OF XX

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DRAFT

Legend

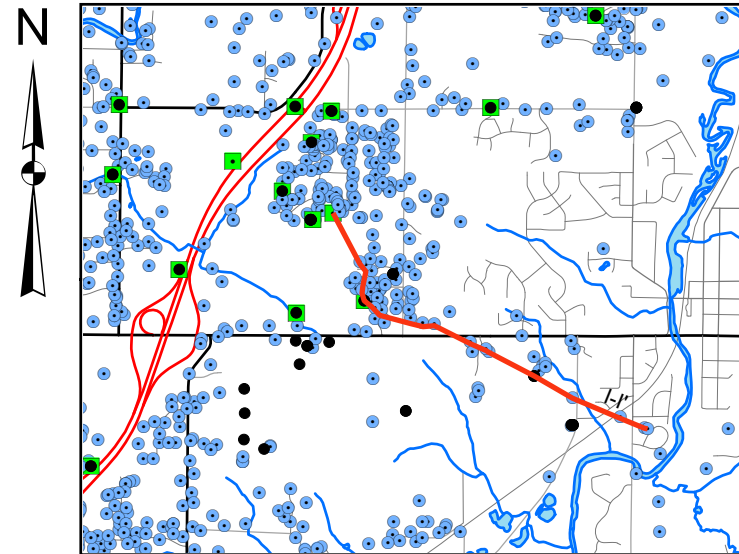
WELL SCREEN

GROUNDWATER TABLE (11/2019)

GROUND SURFACE

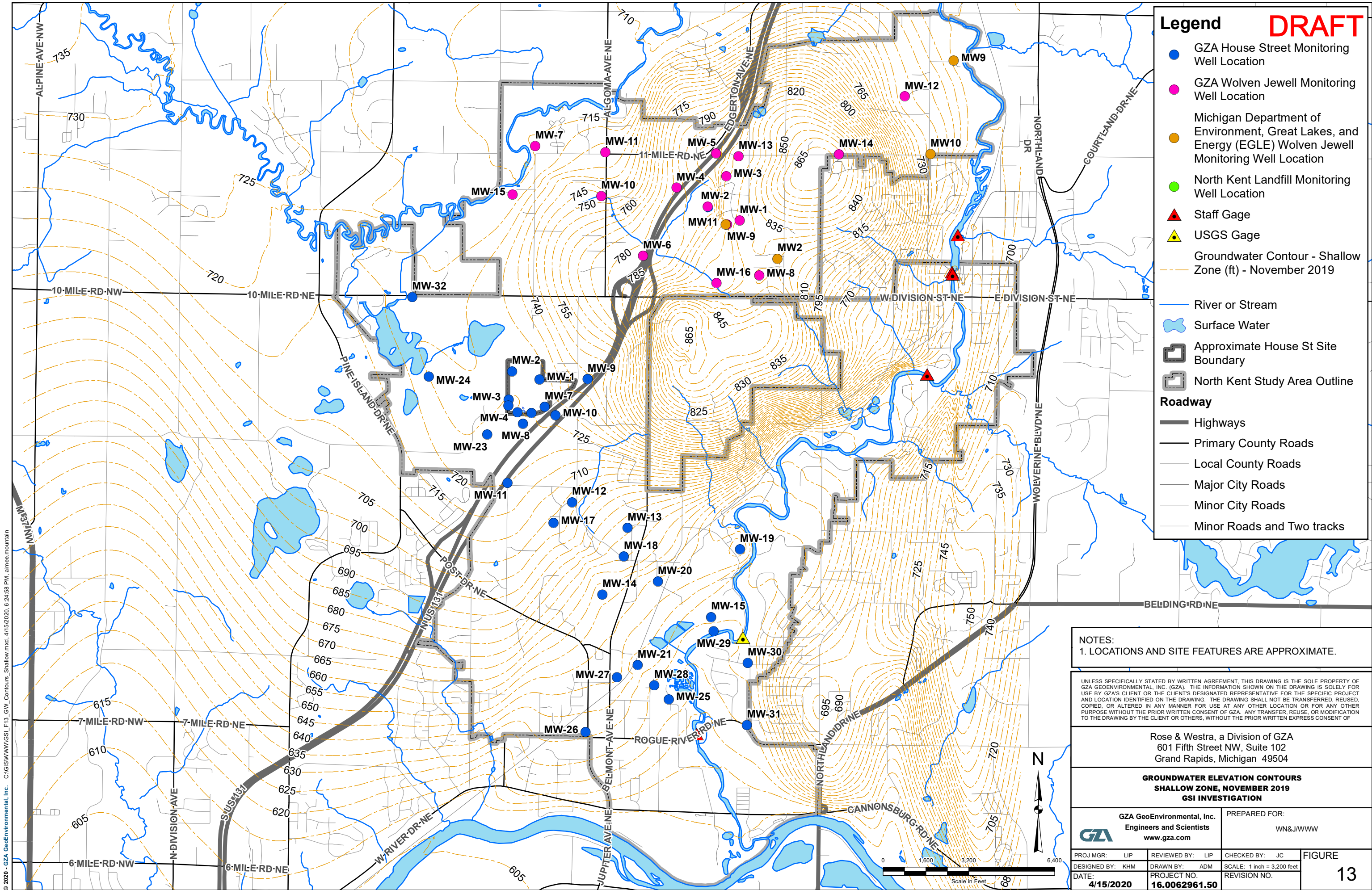
BOREHOLE LITHOLOGY

- Clay
- Gravel
- Sand and Gravel
- Sand
- Sand/Gravel with Clay/Silt
- Clay/Silt with Sand/Gravel
- Silt
- Clay and Silt
- Top Soil
- Organic Soil
- Mud
- Marl
- Coal
- Bedrock
- Not Available

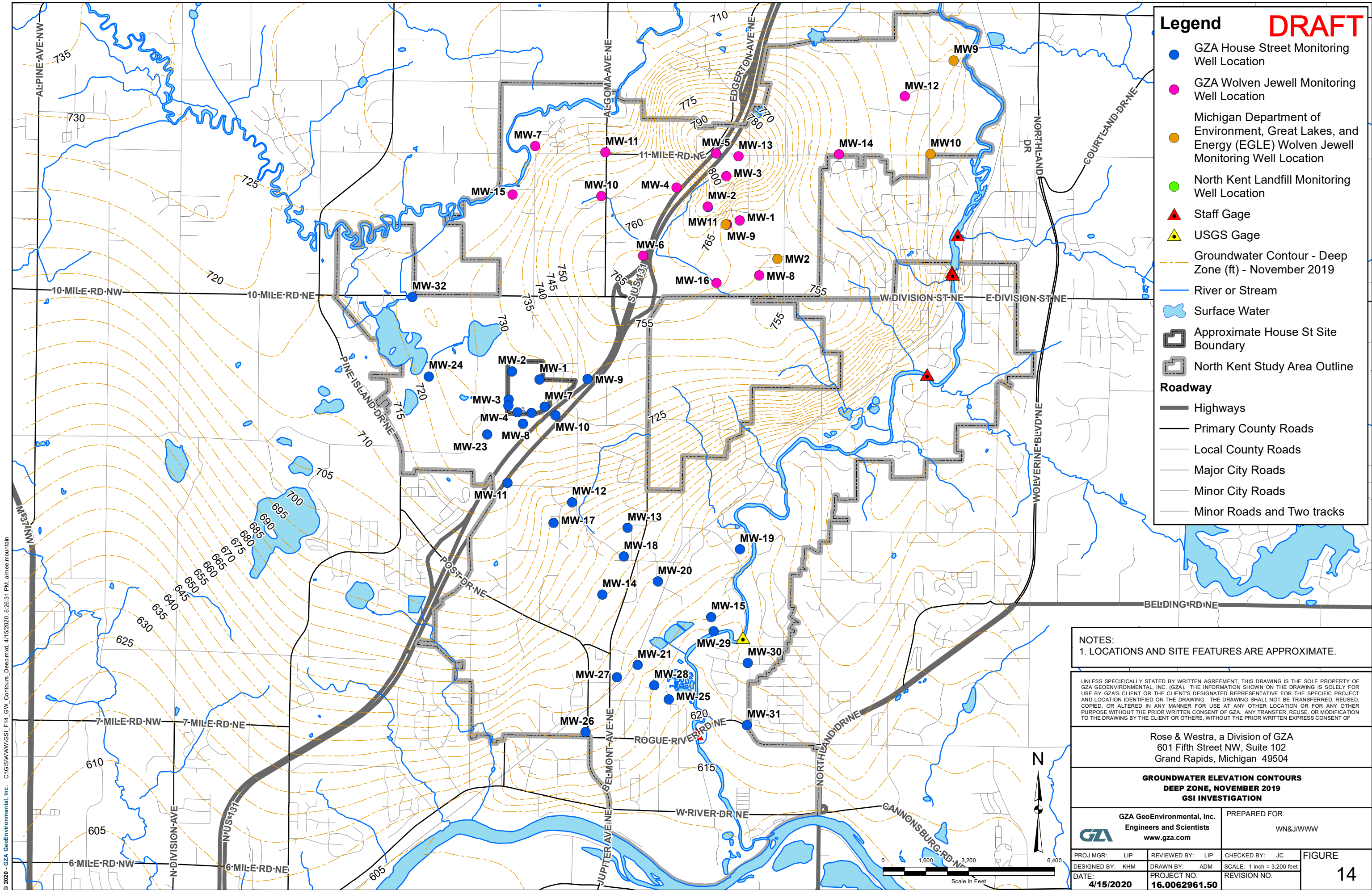


0 2,250 4,500 9,000 SCALE IN FEET			
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NORTH KENT STUDY AREA GSI INVESTIGATION WORK PLAN GEOLOGICAL CROSS SECTION I-I'			
PREPARED BY: GZA GeoEnvironmental, Inc. Engineers and Scientists www.gza.com		PREPARED FOR: WNJ/WWW	
PROJ MGR: LJP	REVIEWED BY: MW	CHECKED BY: LMN	FIG/DWG
DESIGNED BY: JC	DRAWN BY: JC	SCALE: 1:54,000	12
DATE: 04/14/2020	PROJECT NO: 16.0062961.00	REVISION NO	
			SHEET NO: XX OF XX

© 2020 - GZA GeoEnvironmental, Inc. C:\GIS\WW\GSI_F13_GW_Contours_Shallow.mxd, 4/15/2020, 6:24:58 PM, almea.mountain



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Legend

- GZA House Street Monitoring Well Location
- GZA Wolven Jewell Monitoring Well Location
- Michigan Department of Environment, Great Lakes, and Energy (EGLE) Wolven Jewell Monitoring Well Location
- North Kent Landfill (NKLf) Monitoring Well Location
- Staff Gage
- USGS Gage
- River or Stream
- Surface Water
- Approximate House St Site Boundary
- North Kent Study Area Outline

Roadway

- Highways
- Primary County Roads
- Local County Roads
- Major City Roads
- Minor City Roads
- Minor Roads and Two tracks

Approximate PFOS Extent

- $\leq 0.012 \mu\text{g/L}$ (GSI)
- $0.0121 - 0.07 \mu\text{g/L}$ (DWC)
- $0.071 - 5.0 \mu\text{g/L}$
- $5.1 - 20.0 \mu\text{g/L}$
- $20.1 - 100 \mu\text{g/L}$ (MAX)

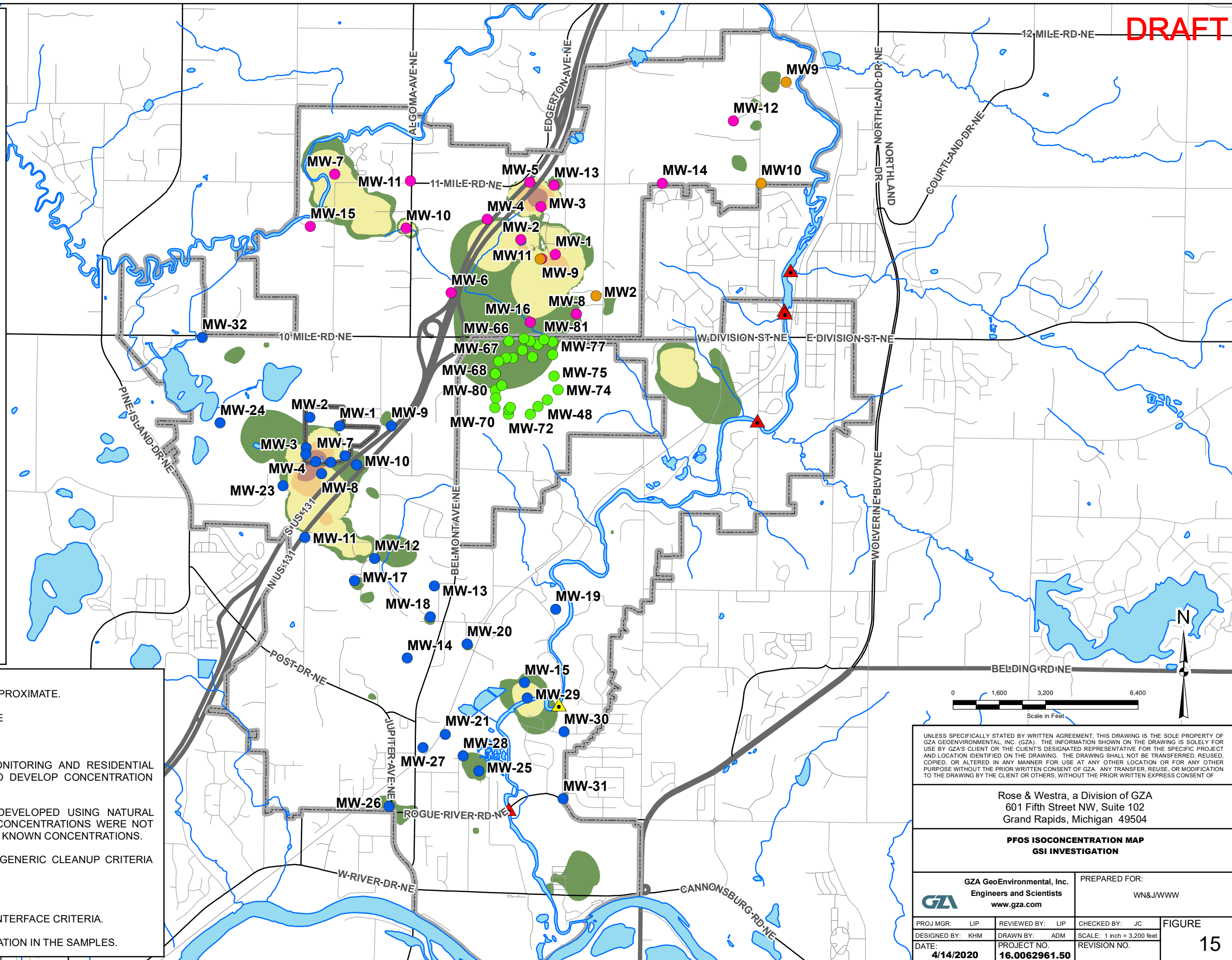
NOTES:

- LOCATIONS AND SITE FEATURES ARE APPROXIMATE.
- PFOS = PERFLUOROOCTANE SULFONATE
- $\mu\text{g/L}$ = MICROGRAM PER LITER
- MAXIMUM CONCENTRATION FROM MONITORING AND RESIDENTIAL WELL SAMPLE RESULTS WERE USED TO DEVELOP CONCENTRATION ISOPLETHS.
- CONCENTRATION ISOPLETHS WERE DEVELOPED USING NATURAL NEIGHBOR INTERPOLATION IN ARCGIS. CONCENTRATIONS WERE NOT EXTRAPOLATED OUTSIDE OF THE AREA OF KNOWN CONCENTRATIONS.
- ABBREVIATIONS FOR MDEQ PART 201 GENERIC CLEANUP CRITERIA FOR RESIDENTIAL USES:

DWC= DRINKING WATER CRITERIA.

GSI = GROUNDWATER - SURFACE WATER INTERFACE CRITERIA.
- MAX = MAXIMUM DETECTED CONCENTRATION IN THE SAMPLES.

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Legend

- GZA House Street Monitoring Well Location
- GZA Wolven Jewell Monitoring Well Location
- Michigan Department of Environment, Great Lakes, and Energy (EGLE) Wolven Jewell Monitoring Well Location
- North Kent Landfill (NKLf) Monitoring Well Location
- Staff Gage
- USGS Gage
- River or Stream
- Surface Water
- Approximate House St Site Boundary
- North Kent Study Area Outline

Roadway

- Highways
- Primary County Roads
- Local County Roads
- Major City Roads
- Minor City Roads
- Minor Roads and Two tracks

Approximate PFOA Extent

- $\leq 0.07 \mu\text{g/L}$ (DWC)
- $0.071 - 1.0 \mu\text{g/L}$
- $1.1 - 5.0 \mu\text{g/L}$
- $5.1 - 12.0 \mu\text{g/L}$ (GSI)
- $12.1 - 16 \mu\text{g/L}$ (MAX)

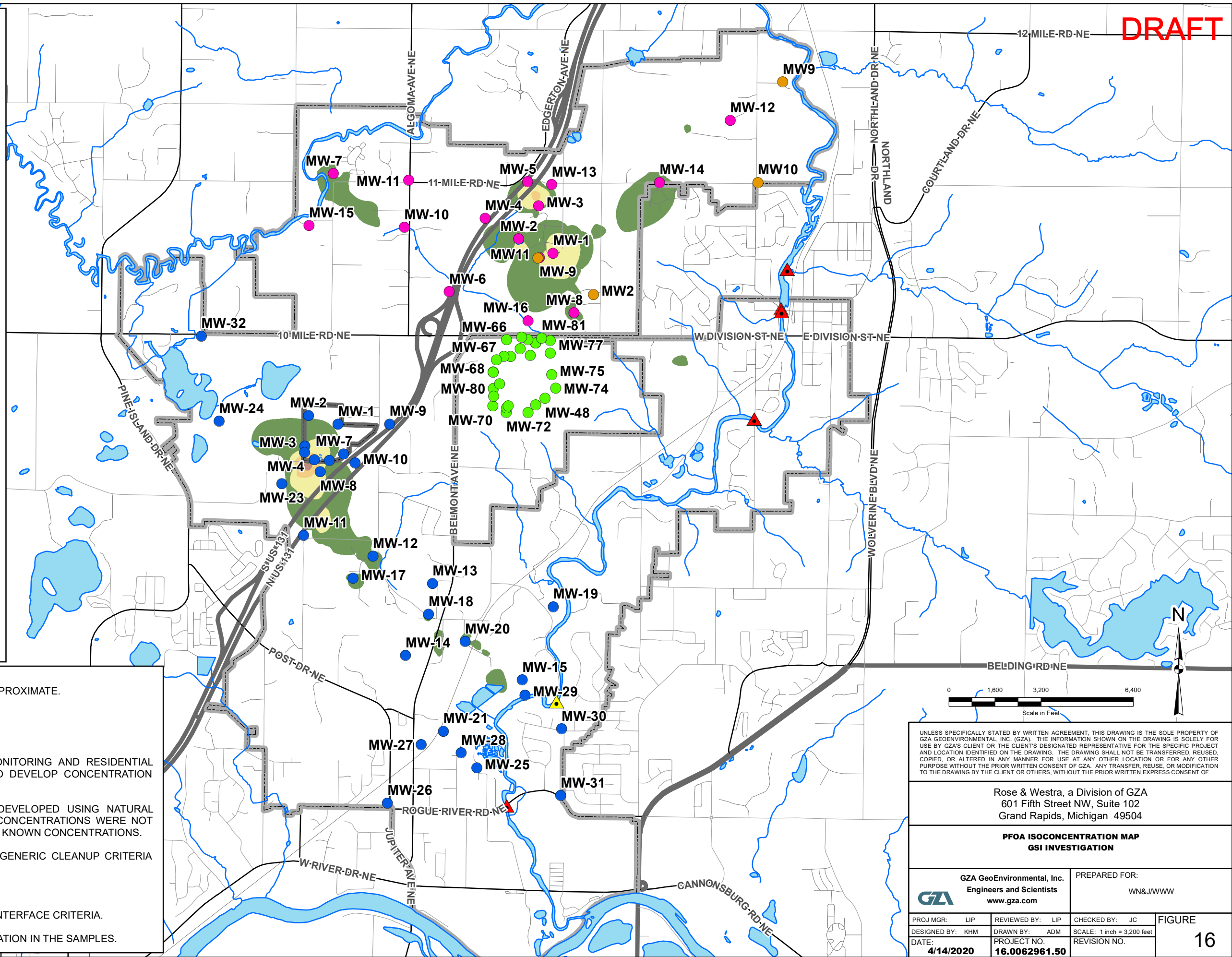
NOTES:

- LOCATIONS AND SITE FEATURES ARE APPROXIMATE.
- PFOA = PERFLUORO-N-OCTANOIC ACID
- $\mu\text{g/L}$ = MICROGRAM PER LITER
- MAXIMUM CONCENTRATION FROM MONITORING AND RESIDENTIAL WELL SAMPLE RESULTS WERE USED TO DEVELOP CONCENTRATION ISOPLETHS.
- CONCENTRATION ISOPLETHS WERE DEVELOPED USING NATURAL NEIGHBOR INTERPOLATION IN ARCGIS. CONCENTRATIONS WERE NOT EXTRAPOLATED OUTSIDE OF THE AREA OF KNOWN CONCENTRATIONS.
- ABBREVIATIONS FOR MDEQ PART 201 GENERIC CLEANUP CRITERIA FOR RESIDENTIAL USES:

DWC= DRINKING WATER CRITERIA.

GSI = GROUNDWATER - SURFACE WATER INTERFACE CRITERIA.
- MAX = MAXIMUM DETECTED CONCENTRATION IN THE SAMPLES.

DRAFT



Legend

- GZA House Street Monitoring Well Location
- GZA Wolven Jewell Monitoring Well Location
- Michigan Department of Environment, Great Lakes, and Energy (EGLE) Wolven Jewell Monitoring Well Location
- North Kent Landfill (NKLf) Monitoring Well Location
- Staff Gage
- USGS Gage
- River or Stream
- Surface Water
- Approximate House St Site Boundary
- North Kent Study Area Outline

Roadway

- Highways
- Primary County Roads
- Local County Roads
- Major City Roads
- Minor City Roads
- Minor Roads and Two tracks

Approximate Total PFAS Extent

- $\leq 0.012 \mu\text{g/L}$
- $0.0121 - 0.07 \mu\text{g/L}$
- $0.071 - 5.0 \mu\text{g/L}$
- $5.1 - 20.0 \mu\text{g/L}$
- $20.1 - 134.73 \mu\text{g/L (MAX)}$

NOTES:

- LOCATIONS AND SITE FEATURES ARE APPROXIMATE.
- PFAS = PERFLUOROALKYL SUBSTANCES (NO TOTAL PFAS CRITERIA/SCREENING LEVELS)
- $\mu\text{g/L}$ = MICROGRAM PER LITER
- MAXIMUM CONCENTRATION FROM MONITORING AND RESIDENTIAL WELL SAMPLE RESULTS WERE USED TO DEVELOP CONCENTRATION ISOPLETHS.
- CONCENTRATION ISOPLETHS WERE DEVELOPED USING NATURAL NEIGHBOR INTERPOLATION IN ARCGIS. CONCENTRATIONS WERE NOT EXTRAPOLATED OUTSIDE OF THE AREA OF KNOWN CONCENTRATIONS.
- MAX = MAXIMUM DETECTED CONCENTRATION IN THE SAMPLES.

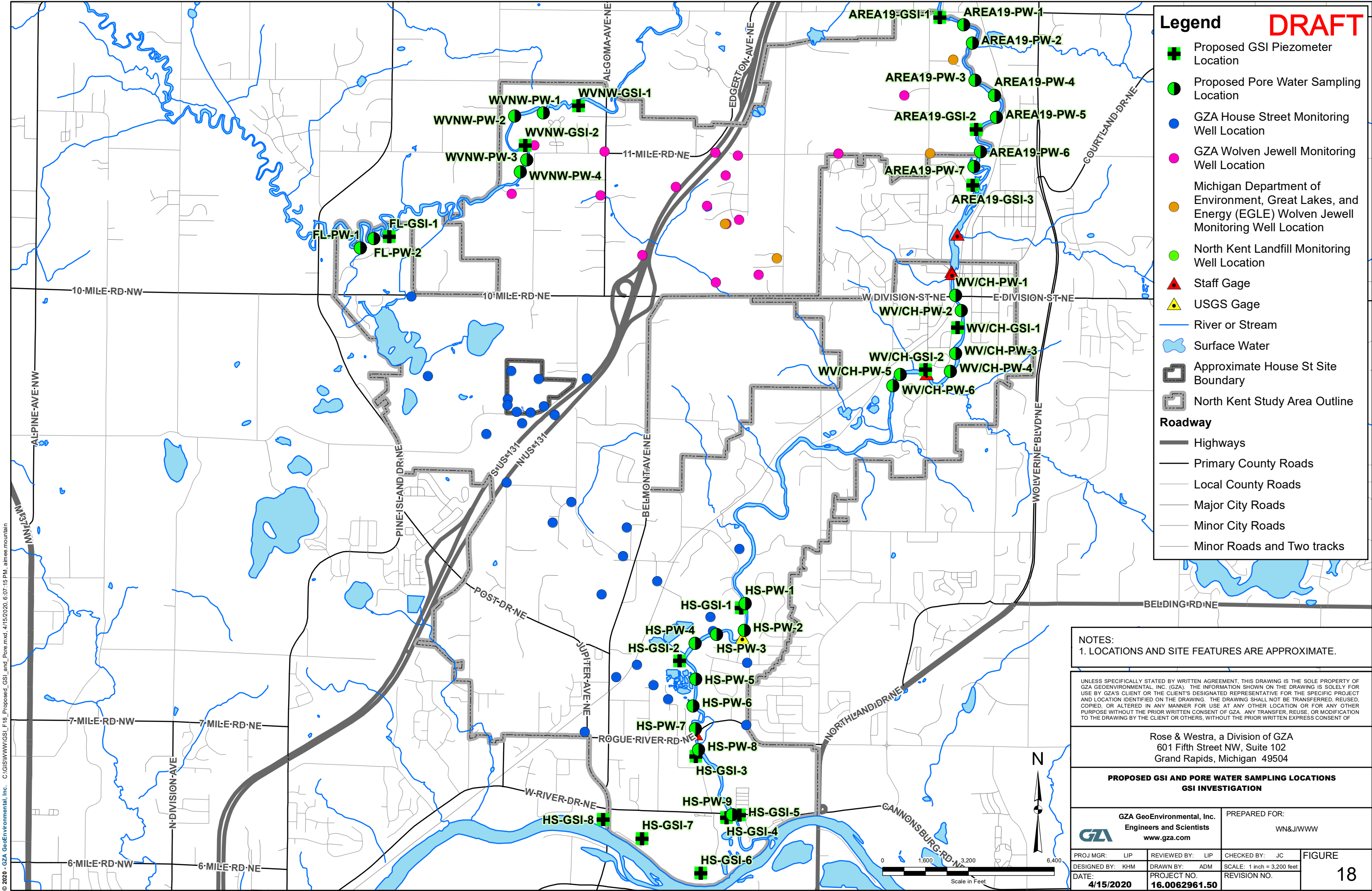
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Rose & Westra, a Division of GZA
601 Fifth Street NW, Suite 102
Grand Rapids, Michigan 49504

TOTAL PFAS ISOCONCENTRATION MAP GSI INVESTIGATION

GZA GeoEnvironmental, Inc. Engineers and Scientists www.gza.com		PREPARED FOR: WN&J/WWW	
PROJ MGR: LIP	REVIEWED BY: LIP	CHECKED BY: JC	FIGURE
DESIGNED BY: KHM	DRAWN BY: ADM	SCALE: 1 inch = 3,200 feet	17
DATE: 4/14/2020	PROJECT NO. 16.0062961.50	REVISION NO.	





APPENDIX A – BORING LOGS



GZA
GeoEnvironmental, Inc.
Engineers and Scientists

Wolverine World Wide, Inc.

1855 House Street NE

Belmont, Michigan

Boring No.: SB-1/MW-1D

Page: 1 of 13

File No.: 16.0062335.52

Check: J Cai

Contractor: Stearns Drilling Company

Foreman: Jerry Huntoon

Logged by: John Morehouse

Date Start/Finish: 9-5-17 / 9-5-17

Boring Location:

GS Elev.: 788.80' Datum:

Auger/
Casing

Sampler

Type: Hollow Stem Auger Split Spoon

O.D. / I.D.: 8.0" / 4.25" 2.0" / 1 3/8"

Hammer Wt.: 140lbs NA

Hammer Fall: 30.0" NA

TOC Elev.: NA NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: NA Survey Date:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
1	1	24/20	0-2	3-4 4-7		Yellowish-brown to brown, SILT, some fine grained Sand, trace Gravel, poorly sorted, dry (ML).	SILT (ML)			
2	2	24/22	2-4	4-5 8-9		Yellowish-brown to brown, SILT, some fine grained Sand, trace Gravel, poorly sorted, dry (ML). Changing at 2.6 feet to: Yellowish-brown, fine to medium SAND, little Silt, moderately sorted, dry (SM). Changing at 2.7 feet to: Mottled dark yellowish-brown to light grayish-brown, SILT, little Clay, little Sand, trace Gravel, poorly sorted, dry (ML).	2.6' 2.7' SAND (SM) SILT (ML)			
3	3	24/24	4-6	8-6 7-7		Yellowish-red to dark brown, medium to fine grained SAND, some Silt, trace Gravel, moderate sorting, dry (SM). Changing at 4.5 feet to: Mottled dark yellowish-brown to light gray, SILT, little Clay, little fine to medium grained Sand, slightly plastic, cohesive, poorly sorted, dry (ML).	4' SAND (SM) 4.5' SILT (ML)			
4	4	24/24	6-8	3-4 5-5		Mottled dark yellowish-brown to light gray, SILT, little Clay, little fine to medium grained Sand, slightly plastic, cohesive, poorly sorted, dry (ML). Changing at 7.1 feet to: Mottled grayish-brown to dark yellowish-brown, CLAY & SILT, plastic, cohesive, moist (CL).	7.1' CLAY & SILT (CL)			
5	5	24	8-10	4-4 3-5		Mottled grayish-brown to dark yellowish-brown, CLAY & SILT, plastic, cohesive, moist (CL).				
6	6	24/20	10-12	2-4 2-2		Mottled grayish-brown to dark yellowish-brown, CLAY & SILT, plastic, cohesive, moist (CL). Changing at 10.4 feet to: Dark gray to dark grayish-brown, fine to medium grained SAND, trace Silt, moderately sorted, moist (SP). Changing at 11.4 feet to: Dark gray to dark grayish-brown, fine to coarse SAND, trace	10.4' SAND (SP) 11.4' SAND (SW) 12'			

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: SB-1/MW-1D

BORING WELL 6233550 WWW.HOUSE STREET NE.GPJ GZA_CORP.GDT 1/25/18



GZA
GeoEnvironmental, Inc.
Engineers and Scientists

Wolverine World Wide, Inc.

1855 House Street NE

Belmont, Michigan

Boring No.: SB-1/MW-1D

Page: 2 of 13

File No.: 16.0062335.52

Check: J Cai

Sample Information						Benton, Michigan		Check: J Cai		
Depth	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
13	7	24/24	12-14	5-6 14-16		Gravel, trace Silt, trace Clay, slightly cohesive, poorly sorted, moist to wet (SW). Dark grayish-brown to very dark grayish-brown, CLAY & SILT, trace Gravel, plastic, cohesive, poorly sorted, moist (CL). Changing at 13.6 feet to: Grayish-brown, coarse to medium SAND, trace Gravel, trace Silt, poorly sorted, moist (SP). Changing at 13.7 feet to: Mottled yellowish-brown to light yellowish-brown to dark gray to black, CLAY & SILT, little Sand, trace Gravel, plastic, cohesive, poorly sorted, moist (CL). Mottled yellowish-brown to light yellowish-brown to dark gray to black, CLAY & SILT, little Sand, trace Gravel, plastic, cohesive, poorly sorted, moist (CL). Changing at 15.0 feet to: Black, fine to coarse grained SAND, trace Gravel, trace Silt, poorly sorted, moist (SW). Changing at 15.1 feet to: Brownish-yellow, SILT, very well sorted, moist to wet (ML). Light yellowish-brown to pale brown, fine grained SAND, trace Silt, very well sorted, moist (SP). Changing at 17.3 feet to: Dark yellowish-brown, fine grained SAND, little Clay, little Silt, slightly to moderately plastic, cohesive, moderately sorted, moist (SC). Light yellowish-brown to pale brown, fine grained SAND, trace Silt, very well sorted, moist (SP). Changing at 19.0 feet to: Yellowish-brown, fine grained SAND, little Clay, little Silt, moderately plastic, cohesive, moderately sorted, moist (SC). Changing at 19.3 feet to: Light yellowish-brown to pale brown, fine grained SAND, trace Silt, very well sorted, moist (SP). Light yellowish-brown to pale brown, fine grained SAND, trace Silt, very well sorted, moist (SP).	CLAY & SILT (CL)			
14	8	24/24	14-16	4-12 7-7			13.6' 13.7' SAND (SP) CLAY & SILT (CL)			
15							15' 15.1' SAND (SW) SILT (ML)			
16	9	24/18	16-18	3-3 5-6			16' SAND (SP)			
17							17.3' SAND (SM)			
18	10	24/20	18-20	2-4 7-9			18' SAND (SP)			
19							19' 19.3' SAND (SM) SAND (SP)			
20	11	24/17	20-22	3-6 7-10						
21										
22	12	24/18	22-24	3-5 6-9		Light yellowish-brown to pale brown, fine grained SAND, trace Silt, very well sorted, moist (SP).				
23										
24	13	24/23	24-26	5-9 10-14		Light yellowish-brown to pale brown, fine grained SAND, trace Silt, very well sorted, moist (SP). Changing at 25.5 feet to: Yellowish-brown, SILT & CLAY, little Silt, slightly plastic, cohesive, well sorted, moist (CL).	25.5' CLAY & SILT (CL)			
25							26'			
REMARKS										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: SB-1/MW-1D	

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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
27	14	24/24	26-28	6-8 13-13		Light yellowish-brown to pale brown, fine grained SAND, trace Silt, very well sorted, moist (SP). Changing at 26.3 feet to: Yellowish-brown, SILT & CLAY, little Silt, slightly plastic, cohesive, well sorted, moist (CL). Changing at 27.7 feet to: Light yellowish-brown to pale brown, fine grained SAND, trace Silt, very well sorted, moist (SP).	26.3' SAND (SP) CLAY & SILT (CL)			
28	15	24/23	28-30	4-10 8-13		Yellowish-brown, CLAY & SILT, little Sand, slightly plastic, cohesive, well sorted, moist (CL). Changing at 28.9 feet to: Light yellowish-brown to pale brown, fine grained SAND, trace Silt, very well sorted, moist (SP). Changing at 29.1 feet to: Yellowish-brown, CLAY & SILT, little Sand, slightly plastic, cohesive, well sorted, moist (CL). Changing at 29.3 feet to: Yellowish-brown, SILT, cohesive, well sorted, moist (ML). Changing at 29.9 feet to: Yellowish-brown, CLAY & SILT, little Sand, slightly plastic, cohesive, well sorted, moist (CL).	27.7' SAND (SP) CLAY & SILT (CL)			
30	16	24/22	30-32	9-12 16-15		Yellowish-brown, CLAY & SILT, little Sand, slightly plastic, cohesive, well sorted, moist (CL). Changing at 29.3 feet to: Yellowish-brown, SILT, cohesive, well sorted, moist (ML). Changing at 29.9 feet to: Yellowish-brown, CLAY & SILT, little Sand, slightly plastic, cohesive, well sorted, moist (CL).	28.9' SAND (SP) CLAY & SILT (CL)			
32	17	24/22	32-34	4-10 8-13		Yellowish-brown, CLAY & SILT, little Sand, slightly plastic, cohesive, well sorted, moist (CL). Changing at 30.6 feet to: Light yellowish-brown to pale brown, fine grained SAND, trace Silt, very well sorted, moist (SP). Changing at 31.0 feet to: Yellowish-brown, CLAY & SILT, little Silt, slightly plastic, cohesive, well sorted, moist (CL).	29.1' SAND (SP) CLAY & SILT (CL)			
34	18	24/23	34-36	7-13 20-25		Yellowish-brown, CLAY & SILT, little Silt, slightly plastic, cohesive, well sorted, moist (CL). Changing at 32.5 feet to: Light gray to light brownish-gray, fine grained SAND, trace Silt, very well sorted, moist (SP).	29.3' CLAY & SILT (CL) SILT (ML)			
36	19	24/20	36-38	4-11 18-26		Light gray to light brownish-gray, fine grained SAND, trace Silt, very well sorted, moist (SP). Changing 37.1 feet to: Light gray, fine to medium SAND, trace Silt, well sorted, moist (SP).	29.9' CLAY & SILT (CL)			
38	20	24/23	38-40	4-7 12-15		Very pale brown to light yellowish-brown, SILT, little Clay, slightly plastic, cohesive, well sorted, moist (ML). Changing at 38.2 feet to: Yellowish-brown, CLAY & SILT, plastic, cohesive, moderately well sorted, moist (CL). Changing at 38.4 feet to: Very pale, brown to light yellowish-brown, SILT, little Clay, slightly plastic, cohesive,	30.6' SAND (SP) CLAY & SILT (CL)			
39							31' CLAY & SILT (CL)			
							32.5' SAND (SP)			
							38' SILT (ML)			
							38.2' CLAY & SILT (CL)			
							38.4' CLAY & SILT (CL)			
							38.7' SILT (ML)			
							38.9' CLAY & SILT (CL)			
							SILT (ML)			
							40'			
REMARKS										
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Sample Information						Bentonite, Michigan		Check: J Cai		
Depth	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
41	21	24/20	40-42	5-10 14-14		moderately well sorted, moist (ML). Changing at 38.7 feet to: Yellowish-brown, CLAY & SILT, plastic, cohesive, moderately well sorted, moist (CL). Changing at 38.9 feet to: Very pale brown to light yellowish-brown, SILT, little Clay, slightly plastic, cohesive, well sorted, moist (ML). Light yellowish-brown, CLAY & SILT, slight plastic, cohesive, very well sorted, moist (CL). Changing at 40.2 feet to: Very pale brown to yellowish-brown, SILT, little Clay, slightly plastic, cohesive, well sorted, moist (ML). Changing at 40.5 feet to: Light yellowish-brown, CLAY & SILT, slight plastic, cohesive, very well sorted, moist (CL). Changing at 41.0 feet to: Very pale brown, fine grained SAND, trace Silt, very well sorted, moist (SP).	40.2' CLAY & SILT (CL) 40.5' SILT (ML) 41' CLAY & SILT (CL) SAND (SP)			
42	22	24/18	42-44	5-5 11-13		Very pale brown, fine grained SAND, trace Silt, very well sorted, moist (SP). Changing at 42.2 feet to: Light yellowish-brown, SILT, trace Clay, slightly plastic, cohesive, well sorted, moist (ML). Changing at 42.4 feet to: Very pale, brown, fine grained SAND, trace Silt, very well sorted, moist (SP).	42.2' SAND (SP) 42.4' SILT (ML)			
43										
44	23	24/20	44-46	10-10 15-22		Very pale, brown, fine grained SAND, trace Silt, very well sorted, moist (SP). Changing at 45.3 feet to: Brown to yellowish-brown, CLAY & SILT, plastic, cohesive, very well sorted, moist (CL). Changing at 45.6 feet to: Very pale brown, fine grained SAND, trace Silt, very well sorted, moist (SP).	45.3' CLAY (CL) 45.6' SAND (SP)			
45										
46	24	24/20	46-48	4-13 16-21		Very pale, brown, fine grained SAND, trace Silt, very well sorted, moist (SP). Changing at 51.2 feet to: Yellowish-brown, SILT, trace Clay, cohesive, non to slightly plastic, very well sorted (bedded), moist (ML). Changing at 51.7 feet to: Very pale brown, fine grained SAND, trace Silt, very well sorted, moist, with occasional very thin Silt seams (SP).				
47										
48	25	24/17	48-50	5-12 23-28		Very pale brown, fine grained SAND, trace Silt, very well sorted, moist (SP). Very pale brown, fine grained SAND, trace Silt, very well sorted, moist (SP).				
49										
50	26	24/20	50-52	4-6 15-17		Very pale brown, fine grained SAND, trace Silt, very well sorted, moist (SP). Changing at 51.2 feet to: Yellowish-brown, SILT, trace Clay, cohesive, non to slightly plastic, very well sorted (bedded), moist (ML). Changing at 51.7 feet to: Very pale brown, fine grained SAND, trace Silt, very well sorted, moist, with occasional very thin Silt seams (SP).	51.2' SILT (ML) 51.7' SAND (SP)			
51										
52	27	24/16	52-54	7-12 16-21		Very pale brown, fine grained SAND, trace Silt, very well sorted, moist, with occasional very thin Silt seams (SP).				
53										
REMARKS										
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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
55	28	24/20	54-56	5-11 17-26		Very pale brown, fine grained SAND, trace Silt, very well sorted, moist, with occasional very thin Silt seams (SP). Changing at 54.2 feet to: Very pale brown, fine grained SAND, little Silt, very well sorted, moist (SP).	54.2' SAND (SM)			
56	29	24/23	56-58	4-9 16-20		Light yellowish-brown, fine to medium grained SAND, trace Silt, well sorted, moist (SP). Changing at 56.3 feet to: Very pale brown, fine grained SAND, little Silt, very well sorted, moist (SM).	56' SAND (SP) 56.3' SAND (SM)			
58	30	24/24	58-60	9-13 18-24		Very pale brown, fine grained SAND, little Silt, very well sorted, moist (SM). Changing at 59.0 feet to: Brown, fine grained SAND, some Silt, very well sorted, moist to wet (SM).				
60	31	24/22	60-62	11-13 22-28		Brown, fine grained SAND, little Silt, non plastic, moderately cohesive, very well sorted, moist (SP).				
62	32	24/22	62-64	6-6 11-14		Brown, fine grained SAND, little Silt, non plastic, moderately cohesive, very well sorted, moist (SM). Changing at 62.7 feet to: Brown, fine to medium grained SAND, trace Silt, grading fine with depth, well sorted, damp (SP). Changing at 63.0 feet to: Brown, fine grained SAND, trace Silt, very well sorted, damp (SP).	62.7' SAND (SP) 63' SAND (SM)			
64	33	24/20	64-66	11-3 6-11		Brown, fine to medium grained SAND, trace Silt, grading fine with depth, well sorted, damp (SP). Changing at 65.0 feet to: Brown, fine grained SAND, some Silt, very well sorted, damp (SM). Changing at 65.1 feet to: Brown, fine to medium grained SAND, trace Silt, grading fine with depth, well sorted, wet (SP). Changing at 65.6 feet to: Brown, CLAY & SILT, plastic, cohesive, well sorted, moist (CL).	64' SAND (SP) 65' SAND (SM) 65.1' SAND (SP) 65.6' CLAY & SILT (CL)			
66	34	24/24	66-68	5-11 12-14		Brown, CLAY & SILT, plastic, cohesive, well sorted, moist (CL). Brown, fine to medium grained SAND, trace Silt, well sorted, wet (SP). Changing at 67.0 feet to: Yellowish-brown, fine to medium grained SAND, little Silt, very well sorted wet (SP).	66' SAND (SP) 67' SAND (SM)			
REMARKS										
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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
69	35	24/13	68-70	2-4 7-13		Yellowish-brown, fine to medium grained SAND, little Silt, very well sorted wet (SP).	SAND (SM)			
70	36	24/18	70-72	2-6 12-16		Yellowish-brown, fine to medium grained SAND, little Silt, very well sorted wet (SP).				
72	37	24/23	72-74	3-3 5-9		Brown, fine to medium grained SAND, trace Silt, well sorted, wet (SP). Changing at 73.1 feet to: Brown, CLAY & SILT, slightly plastic, moderately cohesive, well sorted, moist to wet (CL).	72' SAND (SP)			
73							73.1' CLAY & SILT (CL)			
74	38	24/20	74-76	2-1 2-2		Brown, CLAY & SILT, slightly plastic, moderately cohesive, well sorted, moist to wet (CL).				
76	39	24/19	76-78	2-5 8-11		Brown, CLAY & SILT, slightly plastic, moderately cohesive, well sorted, moist to wet (CL).				
78	40	24/23	78-80	2-4 5-10		Brown, CLAY & SILT, slightly plastic, moderately cohesive, well sorted, moist to wet (CL). Changing at 79.3 feet to: Yellowish-brown, CLAY & SILT, plastic, cohesive, well sorted, moist (CL). Changing at 79.4 feet to: Yellowish-brown, medium to coarse grained SAND, trace Silt, moderately well sorted, wet (SW).	79.4' SAND (SW)			
80	41	24/22	80-82	2-4 6-7		Yellowish-brown, fine to medium grained SAND, trace Silt, well sorted, wet (SP).	80' SAND (SP)			
81							82'			
REMARKS										
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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
82	42	24/24	82-84	2-5 11-12		Yellowish-brown, medium to coarse grained SAND, trace Silt, well sorted, wet (SW). Changing at 82.4 feet to: Yellowish-brown, medium to coarse grained SAND, trace Silt, poorly sorted, wet (SW). Changing at 83.2 feet to: Yellowish-brown to gray, GRAVEL, some coarse grained Sand, trace Silt, poorly sorted, wet (GW). Changing at 83.4 feet to: Yellowish-brown, CLAY & SILT, plastic, cohesivse, well sorted, moist (CL). Changing at 83.5 feet to: Yellowish-brown to gray, GRAVEL, some coarse grained Sand, trace Silt, poorly sorted, wet (GW). Changing at 83.7 feet to: Yellowish-brown, fine to medium SAND, trace Silt, trace Gravel, well sorted, wet (SP).	SAND (SW) 82.4' SAND (SW) 83.4' 83.5' CLAY & SILT (CL) 83.7' GRAVEL (GW) SAND (SP) 84.7' GRAVEL (GW) 85.2' SAND (SP)		Grout	
83										
84	43	24/23	84-86	3-6 11-14		Yellowish-brown, fine to medium SAND, trace Silt, trace Gravel, well sorted, wet (SP). Changing at 84.7 feet to: Yellowish-brown to gray, GRAVEL, some coarse to medium grained Sand, trace Silt, poorly sorted, wet (GW). Changing at 85.2 feet to: Yellowish-brown, fine grained SAND, trace Silt, very well sorted, wet (SP).				
85										
86	44	24/24	86-88	3-4 9-15		Yellowish-brown, fine grained SAND, trace Silt, very well sorted, wet (SP). Changing at 87.2 feet to: Yellowish-brown, coarse grained SAND, some Gravel, trace Silt, very well sorted, wet (SW).				
87										
88	45	24/16	88-90	3-5 8-12		Yellowish-brown, medium to coarse grained SAND, some Gravel, trace Silt, poorly sorted wet (SW).				
89										
90	46	24/22	90-92	3-4 7-11		Yellowish-brown, fine to medium SAND, trace Silt, moderately sorted, wet (SP). Changing at 91.6 feet to: Dark grayish-brown, CLAY & SILT, plastic, cohesive, well sorted, moist (CL). Changing at 91.7 feet to: Yellowish-brown, medium to coarse grained SAND, trace Silt, trace Gravel, grading finer with depth, well sorted, wet (SW).				
91										
92	47	24/1	92-94	5-7 12-13		Yellowish-brown, medium to coarse grained SAND, trace Silt, trace Gravel, grading finer with depth, well sorted, wet (SW).	91.6' 91.7' CLAY & SILT (CL) SAND (SW)	1		
93										
94	48	24/4	94-96	5-7 9-10		Yellowish-brown, medium to coarse grained SAND, trace Silt, trace Gravel, grading finer with depth, well sorted, wet (SW).				
95										
REMARKS 1. Groundwater was encountered at approximately 91.7 feet below ground surface.										
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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
97	49	24/8	96-98	2-3 6-12		Yellowish-brown, medium to coarse grained SAND, trace Silt, trace Gravel, grading finer with depth, well sorted, wet (SW).	SAND (SW)			
98	50	24/11	98-100	2-3 10-12		Yellowish-brown, medium to coarse grained SAND, trace Silt, trace Gravel, grading finer with depth, well sorted, wet (SW).				
100	51	24/23	100-102	3-4 9-13		Yellowish-brown, medium to coarse grained SAND, trace Silt, trace Gravel, grading finer with depth, well sorted, wet (SW). Changing at 101.8 feet to: Dark yellowish-brown to yellowish-brown, CLAY & SILT, moderately plastic, cohesive, well sorted, moist (CL).				
102	52	24/11	102-104	1-1 3-9		Yellowish-brown, fine to medium grained SAND, trace Silt, well sorted, wet (SP).	101.8' 102'CLAY & SILT (CL) SAND (SP)			
104	53	24/11	104-106	4-4 15-26		Yellowish-brown, fine to medium grained SAND, trace Silt, well sorted, wet (SP).				
106	54	24/11	106-108	1-5 15-30		Yellowish-brown, fine to medium grained SAND, trace Silt, well sorted, wet (SP).				
108	55	24/10	108-110	4-9 25-32		Yellowish-brown, fine to medium grained SAND, trace Silt, well sorted, wet (SP).				
109										
REMARKS										
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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
111	56	24/10	110-112	4-9 20-31		Yellowish-brown, fine to medium grained SAND, trace Silt, well sorted, wet (SP).	SAND (SP)			
112	57	24/8	112-114	2-5 14-27		Yellowish-brown, fine to medium grained SAND, trace Silt, well sorted, wet (SP).				
114	58	24/11	114-116	2-4 10-28		Yellowish-brown, fine to medium grained SAND, trace Silt, well sorted, wet (SP).				
116	59	24/14	116-118	4-10 25-40		Yellowish-brown, fine to medium grained SAND, trace Silt, well sorted, wet (SP).				
118	60	24/10	118-120	3-7 21-25		Yellowish-brown, fine to medium grained SAND, trace Silt, well sorted, wet (SP).				
120	61	24/16	120-122	4-7 14-31		Yellowish-brown, fine to medium grained SAND, trace Silt, well sorted, wet (SP).				
122	62	24/14	122-124	3-6 22-32		Yellowish-brown, fine to medium grained SAND, trace Silt, well sorted, wet (SP).				
123										
REMARKS Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.										
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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
125	63	24/19	124-126	5-13 29-45		Yellowish-brown, fine to medium grained SAND, trace Silt, well sorted, wet (SP).	SAND (SP)			
126	64	24/1	126-128	1-5 18-34		Yellowish-brown, fine to medium grained SAND, trace Silt, well sorted, wet (SP).				
128	65	24/24	128-130	6-18 34-48		Yellowish-brown, fine to medium grained SAND, trace Silt, well sorted, wet (SP).				
130	66	24/23	130-132	5-10 28-46		Yellowish-brown, fine to medium grained SAND, trace Silt, well sorted, wet (SP). Changing at 131.5 feet to: Yellowish-brown, medium to coarse grained SAND, trace Silt, moderately sorted, wet (SW). Changing at 131.7 feet to: Yellowish-brown, fine to medium grained SAND, little Silt, trace Gravel, well sorted, wet (SP).				
132	67	24/23	132-134	5-15 30-45		Yellowish-brown, fine to medium grained SAND, little Silt, trace Gravel, well sorted, wet (SP).				
134	68	24/24	134-136	3-5 21-31		Yellowish-brown, fine to medium grained SAND, little Silt, trace Gravel, well sorted, wet (SP).				
136	69	24/11	136-138	6-16 29-43		Yellowish-brown, fine to medium grained SAND, little Silt, trace Gravel, well sorted, wet (SP).				
REMARKS										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: SB-1/MW-1D	

BORING WELL 6233550 WWW.HOUSE STREET NE.GPJ GZA CORP.GDT 1/25/18



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Boring No.: SB-1/MW-1D

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File No.: 16.0062335.52

Check: J Cai

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
139	70	24/6	138-140	2-3 13-33		Yellowish-brown, fine to medium grained SAND, little Silt, trace Gravel, well sorted, wet (SP).	SAND (SP)			
140	71	24/11	140-142	2-4 9-27		Yellowish-brown, fine to medium grained SAND, little Silt, trace Gravel, well sorted, wet (SP).				
142	72	24/14	142-144	3-10 25-42		Yellowish-brown, fine to medium grained SAND, little Silt, trace Gravel, well sorted, wet (SP).				
144	73	24/20	144-146	9-25-50/5"		Yellowish-brown, fine to medium grained SAND, little Silt, trace Gravel, well sorted, wet (SP).				
146	74	24/18	146-148	6-27 52-53		Yellowish-brown, fine to medium grained SAND, little Silt, trace Gravel, well sorted, wet (SP).				
148	75	24/12	148-150	9-34 48-50/3"		Yellowish-brown, fine to medium grained SAND, little Silt, trace Gravel, well sorted, wet (SP).				
150	76	24/0	150-152	6-11 26-29		Yellowish-brown, fine to medium grained SAND, little Silt, trace Gravel, well sorted, wet (SP).				
151										
REMARKS										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: SB-1/MW-1D	

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Check: J Cai

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
153	77	24/24	152-154	2-8 26-31		Yellowish-brown, fine to medium grained SAND, little Silt, trace Gravel, well sorted, wet (SP).	SAND (SP)			
154	78	24/20	154-156	5-12 28-43		Yellowish-brown, fine to medium grained SAND, little Silt, trace Gravel, well sorted, wet (SP).				
156	79	24/1	156-158	3-6 18-21		Yellowish-brown, fine to medium grained SAND, little Silt, trace Gravel, well sorted, wet (SP).				
158	80	24/24	158-160	7-8 19-25		Yellowish-brown, fine to medium grained SAND, little Silt, trace Gravel, well sorted, wet (SP).				
160	81	24/7	160-162	3-10 21-29		Yellowish-brown, fine to medium grained SAND, little Silt, trace Gravel, well sorted, wet (SP).				
162	82	24/0	162-164	4-11 25-32		Yellowish-brown, fine to medium grained SAND, little Silt, trace Gravel, well sorted, wet (SP).				
164	83	24/6	164-166	1-14 34-45		Yellowish-brown, fine to medium grained SAND, little Silt, trace Gravel, well sorted, wet (SP).				
REMARKS										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: SB-1/MW-1D	

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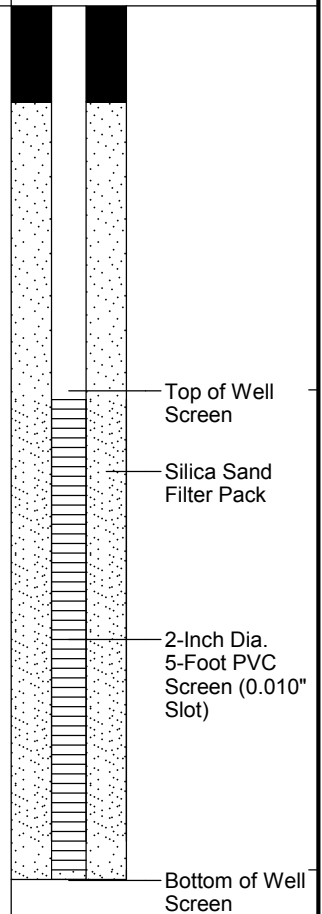
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Check: J Cai

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
167	84	24/24	166-168	9-29 51-50/3"		Yellowish-brown, fine to medium grained SAND, little Silt, trace Gravel, well sorted, wet (SP).	SAND (SP)		
168	85	24/13	168-170	3-6 18-34		Yellowish-brown, fine to medium grained SAND, little Silt, trace Gravel, well sorted, wet (SP).			
170	86	24/1	170-172	5-6 19-44		Yellowish-brown, fine to medium grained SAND, little Silt, trace Gravel, well sorted, wet (SP).			
172	87	24/16	172-174	2-4 7-14		Yellowish-brown, fine to medium grained SAND, little Silt, trace Gravel, well sorted, wet (SP).	172' SAND (SM)		
174	88	24/24	174-176	8-13 21-23		Yellowish-brown, fine to medium grained SAND, little Silt, very well sorted, wet (SP). Changing at 174.7 feet to: Yellowish-brown, SILT, trace Clay, non plastic, cohesive, very well sorted (bedded), moist (ML). Changing at 175.5 feet to: Yellowish-brown, SILT, trace Clay, moderately plastic, cohesive, very well sorted (bedded), wet (ML).	174.7' SILT (ML)		
176						Bottom of Borehole at 176.0 Feet	176'	2	
177									
178									
179									
<div style="display: flex;"> <div style="writing-mode: vertical-rl; transform: rotate(180deg); font-weight: bold; margin-right: 10px;">REMARKS</div> <div> <p>2. Monitoring well was installed in borehole upon completion. Well screen set from 170.1 to 174.7 feet below ground surface.</p> </div> </div>									
<p>Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.</p>								Boring No.: SB-1/MW-1D	

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Boring No.: MW-1S

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File No.: 16.0062335.52

Check: J Cai

Contractor: Stearns Drilling Company

Foreman: Jerry Huntoon

Logged by: John Morehouse

Date Start/Finish: 9-5-17 / 9-5-17

Boring Location:

GS Elev.: 788.70' Datum:

Auger/
Casing

Sampler

GROUNDWATER READINGS

Type: Hollow Stem Auger

Split Spoon

O.D. / I.D.: 8.0" / 4.25"

2.0" / 1 3/8"

Hammer Wt.: 140lbs

NA

Hammer Fall: 30.0"

NA

TOC Elev.: NA

NA

Date	Time	Depth	Casing	Stab

Surveyed By: NA Survey Date:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
1						See SB-1/MW-1D boring log for detailed soil descriptions.				PROTECTIVE CASING
2										Backfill/Cement Pad
3										
4										
5										
6										
7										
8										
9										
10										
11										

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: MW-1S

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Check: J Cai

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										
REMARKS										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: MW-1S	

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Check: J Cai

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
27										
28										
29										
30										
31										
32										Bentonite/Grout
33										
34										
35										
36										
37										
38										
39										
REMARKS										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: MW-1S	

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Boring No.: MW-1S

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File No.: 16.0062335.52

Check: J Cai

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
41										
42										
43										
44										
45										
46										
47										
48										
49										
50										
51										
52										
53										
REMARKS										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: MW-1S	

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Boring No.: MW-1S

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Check: J Cai

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
55										
56										
57										
58										
59										
60										
61										
62										
63										
64										
65										
66										
67										
REMARKS										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: MW-1S	

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Bentonite Seal



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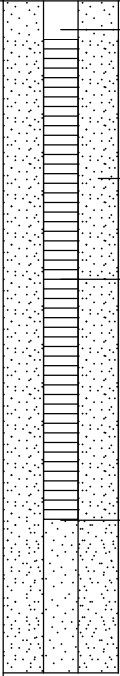
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Boring No.: MW-1S

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File No.: 16.0062335.52

Check: J Cai

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
69									 <p>Top of Well Screen</p> <p>Silica Sand Filter Pack</p> <p>2-Inch Dia. 5-Foot PVC Screen (0.010" Slot)</p> <p>Bottom of Well Screen</p>	
70										
71										
72										
73										
74										
75						Bottom of Borehole at 75.0 Feet		1		
76										
77										
78										
79										
80										
81										
REMARKS										
1. Monitoring well was installed in borehole upon completion. Well screen set from 68.4 to 73.1 feet below ground surface.										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: MW-1S	

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File No.: 16.0062335.52

Check: J Cai

Contractor: Stearns Drilling Company

Foreman: Jerry Huntoon

Logged by: John Morehouse

Date Start/Finish: 9-11-17 / 9-11-17

Boring Location:

GS Elev.: 797.60' Datum:

Auger/
Casing

Sampler

Type: Hollow Stem Auger

Split Spoon

O.D. / I.D.: 8.0" / 4.25"

2.0" / 1 3/8"

Hammer Wt.: 140lbs

NA

Hammer Fall: 30.0"

NA

TOC Elev.: NA

NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: NA Survey Date:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
1	1	24/18	0-2	7-8 8-10		Dark brown to yellowish-brown, SILT & CLAY, some Sand, plastic, cohesive, poorly sorted, moist (CL).	CLAY & SILT (CL)			
2	2	24/23	2-4	8-8 9-9		Dark brown to yellowish-brown, SILT & CLAY, some Sand, plastic, cohesive, poorly sorted, moist (CL).				
3										
4	3	24/22	4-6	5-6 7-7		Dark brown to yellowish-brown, CLAY & SILT, some Sand, plastic, cohesive, poorly sorted, moist (CL). Changing at 4.6 feet to: Brown to grayish-brown, SILT, some fine grained Sand, trace Clay, non to slightly plastic, slightly cohesive, moderately sorted moist (ML). Changing at 5.1 feet to: Yellowish-brown to brown, CLAY & SILT, some Sand, moderately plastic, cohesive, moderately sorted, moist (CL).	4.6' SILT (ML)			
5							5.1' CLAY & SILT (CL)			
6	4	24/22	6-8	4-5 5-6		Yellowish-brown to brown, CLAY & SILT, some Sand, moderately plastic, cohesive, moderately sorted, moist (CL).				
7										
8	5	24/17	8-10	2-4 6-6		Yellowish-brown to brown, CLAY & SILT, some Sand, moderately plastic, cohesive, moderately sorted, moist (CL). Changing at 9.0 feet to: Dark yellowish-brown, fine to medium SAND, trace Silt, moderately sorted moist (SP).	9' SAND (SP)			
9										
10	6	24/17	10-12	3-4 4-4		Mottled dark yellowish-red to dark reddish-brown to dark brown to dark grayish-brown, SILT, some fine grained SAND, moderately sorted, moist (ML). Changing at 10.5 feet to: Yellowish-brown to pale brown, fine to medium SAND, trace Silt, well sorted, moist (SP).	10' SILT (ML) 10.5' SAND (SP)			
11										

REMARKS

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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
13	7	24/17	12-14	2-2 3-4		Yellowish-brown to pale brown, fine to medium SAND, trace Silt, well sorted, moist (SP).	SAND (SP)			
14	8	24/22	14-16	2-2 3-5		Yellowish-brown to pale brown, fine to medium SAND, trace Silt, well sorted, moist (SP). Changing at 15.2 feet to: Soft, Dark brown, CLAY & SILT, plastic, cohesive, moderately sorted, moist (CL). Changing at 15.3 feet to: Yellowish-brown to pale brown, fine to medium grained SAND, trace Silt, well sorted, moist (SP).	15.2' 15.3' CLAY & SILT (CL) SAND (SP)			
16	9	24/24	16-18	4-5 6-6		Yellowish-brown to pale brown, fine to medium grained SAND, trace Silt, well sorted, moist (SP). Changing at 16.6 feet to: Yellowish-brown, CLAY & SILT, plastic, cohesive, moderately sorted, moist (CL).	16.6' CLAY & SILT (CL)			
18	10	24/14	18-20	4-5 8-10		Yellowish-brown, CLAY & SILT, plastic, cohesive, moderately sorted, moist (CL). Changing at 18.6 feet to: Yellowish-brown, fine to coarse grained SAND, some Gravel, trace Silt, poorly sorted, moist SW). Changing at 19.0 feet to: Yellowish-brown, CLAY & SILT, plastic, cohesive, moderately sorted, moist (CL). Changing at 19.3 feet to: Yellowish-brown, fine grained SAND, some Silt, non plastic, moderately cohesive, well sorted, moist (SM).	18.6' SAND (SW) 19' CLAY & SILT (CL) 19.3' SAND (SM)			
20	11	24/24	20-22	4-5 8-10		Dark yellowish-brown to yellowish-brown, SILT & CLAY, moderately plastic, cohesive, well sorted, moist (CL). Changing at 21.7 feet to: Light gray to light brownish-gray, fine grained SAND, trace Silt, very well sorted, moist (SP).	20' CLAY & SILT (CL) 21.7' SAND (SP)			
22	12	24/16	22-24	2-3 5-6		Dark yellowish-brown to yellowish-brown, SILT & CLAY, moderately plastic, cohesive, well sorted, moist (CL). Changing at 22.4 feet to: Light yellowish-brown to pale brown, fine to medium grained SAND, trace Silt, very well sorted, moist (SP).	22' CLAY & SILT (CL) 22.4' SAND (SP)			
24	13	24/16	24-26	4-6 6-6		Light yellowish-brown to pale brown, fine to medium grained SAND, trace Silt, very well sorted, moist (SP).				
25										
REMARKS										
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Check: J Cai

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
27	14	24/20	26-28	4-5 6-6		Light yellowish-brown to pale brown, fine to medium grained SAND, trace Silt, very well sorted, moist (SP).	SAND (SP)			
28	15	24/18	28-30	6-7 12-12		Light yellowish-brown to pale brown, fine to medium grained SAND, trace Silt, very well sorted, moist (SP).				
30	16	24/22	30-32	7-9 11-13		Light yellowish-brown to pale brown, fine to medium grained SAND, trace Silt, very well sorted, moist (SP). Changing at 31.7 feet to: Light yellowish-brown, fine to medium grained SAND, trace Gravel, trace Silt, moderately well sorted, moist (SP).				
32	17	24/18	32-34	7-7 7-8		Light yellowish-brown to yellowish-brown, fine grained SAND, trace Silt, very well sorted, moist (SP). Changing at 32.2 feet to: Pale brown to very pale brown, fine to coarse grained SAND, some Gravel, trace Silt, poorly sorted, moist (SW).	32.2' SAND (SW)			
34	18	24/20	34-36	13-38 31-18		Pale brown, fine to coarse grained SAND, some Gravel, trace Silt, poorly sorted, moist (SW).				
36	19	24/20	36-38	2-4 7-8		Very pale brown, fine grained SAND, trace Silt, very well sorted, moist with occasional trace Gravel, moist (SP).	36' SAND (SP)			
38	20	24/19	38-40	2-3 6-7		Very pale brown, fine grained SAND, trace Silt, very well sorted, moist with occasional trace Gravel, moist (SP).				Grout
39										
REMARKS										

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Boring No.: SB-2/MW-2S

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Check: J Cai

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
41	21	24/20	40-42	5-7 9-13		Very pale brown, fine grained SAND, trace Silt, very well sorted, moist with occasional trace Gravel, moist (SP).	SAND (SP)			
42	22	24/19	42-44	4-6 9-11		Very pale brown, fine grained SAND, trace Silt, very well sorted, moist with occasional trace Gravel, moist (SP).				
44	23	24/22	44-46	5-8 10-13		Very pale brown, fine grained SAND, trace Silt, very well sorted, moist with occasional trace Gravel, moist (SP).				
46	24	24/22	46-48	3-5 8-13		Very pale brown, fine grained SAND, trace Silt, very well sorted, moist with occasional trace Gravel, moist (SP).				
48	25	24/23	48-50	5-7 9-10		Very pale brown, fine grained SAND, trace Silt, very well sorted, moist with occasional trace Gravel, moist (SP).				
50	26	24/22	50-52	6-7 12-13		Very pale brown, fine grained SAND, trace Silt, very well sorted, moist with occasional trace Gravel, moist (SP).				
52	27	24/20	52-54	5-9 11-13		Very pale brown, fine grained SAND, trace Silt, very well sorted, moist with occasional trace Gravel, moist (SP). Changing at 52.8 feet to: Yellowish-brown, CLAY & SILT, well sorted, moist (CL). Changing at 52.9 feet to: Very pale brown, fine grained SAND, trace Silt, very well sorted, moist (SP).	52.8' CLAY & SILT (CL) SAND (SP)			
53							54'			
REMARKS										

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Check: J Cai

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
55	28	24/22	54-56	5-9 13-13		Yellowish-brown, fine to coarse grained SAND, trace Gravel, trace Silt, poorly sorted, moist (SW). Changing at 55.0 feet to: Very pale brown grading to yellowish-brown, fine grained SAND, little Silt, grading to fine to medium grained Sand, trace Silt, very well sorted, moist with occasional trace Gravel, moist (SP).	SAND (SW)			
56	29	24/22	56-58	3-5 11-14		Very pale brown grading to yellowish-brown, fine grained SAND, little Silt, trace Silt, very well sorted, moist with occasional trace Gravel, moist (SP).	55' SAND (SM)			
58	30	24/20	58-60	8-12 15-20		Very pale brown grading to yellowish-brown, fine grained SAND, little Silt, trace Silt, very well sorted, moist with occasional trace Gravel, moist (SP).				
60	31	24/20	60-62	5-9 10-11		Very pale brown grading to yellowish-brown, fine grained SAND, little Silt, trace Silt, very well sorted, moist with occasional trace Gravel, moist (SP).				
62	32	24/22	62-64	8-11 14-15		Very pale brown grading to yellowish-brown, fine grained SAND, little Silt, trace Silt, very well sorted, moist with occasional trace Gravel, moist (SP).				
64	33	24/18	64-66	2-4 8-14		Very pale brown grading to yellowish-brown, fine grained SAND, little Silt, trace Silt, very well sorted, moist with occasional trace Gravel, moist (SP).				
66	34	24/18	66-68	6-14 17-18		Very pale brown grading to yellowish-brown, fine grained SAND, little Silt, trace Silt, very well sorted, moist with occasional trace Gravel, moist (SP).				
67										
REMARKS										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: SB-2/MW-2S	

BORING WELL 6233550 WWW.HOUSE STREET NE.GPJ GZA CORP.GDT 1/25/18



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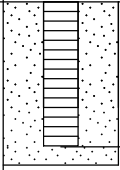
Belmont, Michigan

Boring No.: SB-2/MW-2S

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File No.: 16.0062335.52

Check: J Cai

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
83						Bottom of Borehole at 82.0 Feet		1 2	
84									
85									
86									
87									
88									
89									
90									
91									
92									
93									
94									
95									

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: SB-2/MW-2S



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Boring No.: SB-3P/MW-3P

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File No.: 16.0062335.52

Check: J Cai

Contractor: Stearns Drilling Company

Foreman: Jerry Huntoon

Logged by: John Morehouse

Date Start/Finish: 9-12-17 / 9-12-17

Boring Location:

GS Elev.: 787.50' Datum:

Auger/
Casing

Sampler

Type: Hollow Stem Auger

Split Spoon

O.D. / I.D.: 8.0" / 4.25"

2.0" / 1 3/8"

Hammer Wt.: 140lbs

NA

Hammer Fall: 30.0"

NA

TOC Elev.: NA

NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: NA Survey Date:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
1						See SB-3/MW-3S boring log for detailed soil descriptions.				PROTECTIVE CASING
2										Backfill/Cement Pad
3										
4										
5										
6										
7										
8										Bentonite/Grout
9										
10										
11										

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: SB-3P/MW-3P

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Check: J Cai

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23	1	24/24	23-25	3-4 7-9		Medium dense, brown, well sorted, fine SAND, trace Silt, wet (SP). Changing at 24.3 feet to: Hard, gray and brown mottled, CLAY, trace Silt, damp (CL).	SAND (SP)			
24					>4.0 tsf		24.3' CLAY (CL)	1		
25						Bottom of Borehole at 25.0 Feet	25'	2		
REMARKS 1. Pocket penetrometer readings were measured in tons per square foot (tsf) and are used to evaluate consistency of cohesive soil. 2. Monitoring well was installed in borehole upon completion. Well screen set from 19.0 to 24.0 feet below ground surface.										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: SB-3P/MW-3P	

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Bentonite Seal

Top of Well Screen

Silica Sand Filter Pack

2-Inch Dia. 5-Foot PVC Screen (0.010" Slot)

Bottom of Well Screen



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Boring No.: SB-3/MW-3S

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File No.: 16.0062335.52

Check: J Cai

Contractor: Stearns Drilling Company

Foreman: Jerry Huntoon

Logged by: John Morehouse

Date Start/Finish: 9-12-17 / 9-12-17

Boring Location:

GS Elev.: 788.10' Datum:

Auger/
Casing

Sampler

Type: Hollow Stem Auger

Split Spoon

O.D. / I.D.: 8.0" / 4.25"

2.0" / 1 3/8"

Hammer Wt.: 140lbs

NA

Hammer Fall: 30.0"

NA

TOC Elev.: NA

NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: NA Survey Date:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
1	1	24/21	0-2	5-6 6-7	0.0 ppm >4.0 tsf	Hard, brown, CLAY, trace Silt, trace fine Sand, dry (CL).	CLAY (CL)	1 2	PROTECTIVE CASING	Backfill/Cement Pad
2	2	24/21	2-4	7-5 5-4	0.0 ppm	Loose, dark brown, yellowish brown, fine SAND, trace Silt, damp (SP).	2' SAND (SP)			
3	3	24/14	4-6	3-2 2-3	0.0 ppm	Loose, dark yellowish brown, fine SAND, trace Silt, damp (SP) Changing at 5.2 feet to: Loose, dark yellowish-brown, fine SAND, little Gravel, trace Silt, damp (SP).				
4	4	24/21	6-8	2-5 5-5		Loose, yellowish-brown, well sorted, fine SAND, damp (SP). Changing at 7.8 feet to: Loose, pale brown, fine SAND, damp (SP).				
5	5	24/21	8-10	1-4 5-7		Loose, pale brown, well sorted, fine SAND, trace Silt, damp (SP).				
6	6	24/20	10-12	4-5 6-7		Loose, pale brown, well sorted, fine SAND, trace Silt, damp (SP).				

REMARKS

- Field screening of samples for organic vapors was performed with a MiniRae 2000 photoionization detector equipped with a 10.6 eV lamp. Readings above background levels are shown in parts per million (ppm) of isobutylene. Background was measured at 0.0 ppm.
- Pocket penetrometer readings were measured in tons per square foot (tsf) and are used to evaluate consistency of cohesive soil.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: SB-3/MW-3S

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Check: J Cai

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
13	7	24/20	12-14	3-5 5-5		Loose, pale brown, well sorted, fine SAND, trace Silt, damp (SP).	SAND (SP)			
14	8	24/20	14-16	4-5 5-5		Loose, pale brown, well sorted, fine SAND, trace Silt, damp (SP).				
16	9	24/24	16-18	2-5 9-10	>4.0 tsf	Loose, pale brown, well sorted, fine SAND, trace Silt, damp (SP). Changing at 16.2 feet to: Hard, brown, CLAY, trace Silt, damp (CL). Changing at 17.8 feet to: Medium dense, pale brown, well sorted, fine SAND, trace Silt, moist (SP).	16.2' CLAY (CL)			
18	10	24/24	18-20	2-6 7-9		Medium dense, pale brown, well sorted, fine SAND, trace Silt, moist (SP). Changing at 18.2 feet to: Brown, CLAY, trace Silt, damp (CL). Changing at 19.0 feet to: Medium dense, brown, well sorted, fine to medium SAND, trace Silt, moist (SP).	17.8' SAND (SP) 18.2' CLAY (CL)			
20	11	24/24	20-22	5-6 7-10	>4.0 tsf	Hard, brown, CLAY, trace Silt, damp (CL). Changing at 20.5 feet to: Medium dense, brown, well sorted, fine to medium SAND, trace Silt, moist (SP). Changing at 21.5 feet to: Medium dense, pale brown, well sorted, fine SAND, trace Silt, moist (SP).	19' SAND (SP) 20' CLAY (CL) 20.5' SAND (SP)			
22	12	24/22	22-24	4-4 5-6		Medium dense, pale brown, well sorted, fine SAND, trace Silt, moist (SP). Changing at 23.5 feet to: Medium dense, pale brown, well sorted, fine SAND, some Silt, wet (SM).	23.5' SAND (SM)			
24	13	24/22	24-26	4-4 5-6		Medium dense, pale brown, well sorted, fine SAND, some Silt, wet (SM). Changing at 25.3 feet to: Hard, light gray and brown mottled, CLAY, trace Silt, moist (CL). Changing at 25.9 feet to: Loose, pale brown, well sorted, fine SAND, trace Silt, moist (SP).	25.3' CLAY (CL) 25.9'			
<div>REMARKS</div> <div>3. Double cased from 0.0 to 25.0 feet during drilling.</div>										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: SB-3/MW-3S	

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Check: J Cai

Sample Information						Check: J Cai				
Depth	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
27	14	24/20	26-28	2-2 6-8	>4.0 tsf	Loose, pale brown, well sorted, fine SAND, trace Silt, moist (SP).	SAND (SP)	3		
28	15	24/20	28-30	6-10 10-11		Medium dense, pale brown, well sorted, fine SAND, trace Silt, moist (SP).				
29										
30	16	24/20	30-32	2-4 9-10		Medium dense, pale brown, well sorted, fine SAND, trace Silt, moist (SP).				
31										
32	17	24/21	32-34	5-12 13-20		Medium dense, pale brown, well sorted, fine SAND, trace Silt, moist (SP).				
33										
34	18	24/19	34-36	8-16 28-40		Dense, pale brown, well sorted, fine SAND, trace Silt, moist (SP).				Grout
35										
36	19	24/21	36-38	18-18 19-31		Medium dense, pale brown, well sorted, fine SAND, trace Silt, moist (SP).				
37										
38	20	24	38-40			Very pale brown, fine to medium SAND, trace Silt, very well sorted, moist (SP).				
39										
REMARKS										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: SB-3/MW-3S	

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Check: J Cai

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
41	21	24	40-42			Very pale brown, fine to medium SAND, trace Silt, very well sorted, moist (SP).	SAND (SP)			
42	22	24	42-44			Very pale brown, fine to medium SAND, trace Silt, very well sorted, moist (SP).				
44	24	24	44-46			Very pale brown, fine to medium SAND, trace Silt, very well sorted, moist (SP).				
46	26	24	46-48			Very pale brown, fine to medium SAND, trace Silt, very well sorted, moist (SP).				
48	27	24	48-50			Very pale brown, fine to medium SAND, trace Silt, very well sorted, moist (SP).				
50	28	24	50-52			Very pale brown, fine to medium SAND, trace Silt, very well sorted, moist (SP).				
52	30	24	52-54			Very pale brown, fine to medium SAND, trace Silt, very well sorted, moist (SP).				
53										
REMARKS										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: SB-3/MW-3S	

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Check: J Cai

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
31	24	54-56				Very pale brown, fine to medium SAND, trace Silt, very well sorted, moist (SP).	SAND (SP)			
55										
56	32	24	56-58			Very pale brown, fine to medium SAND, trace Silt, very well sorted, moist (SP).				
57										
58	33	24	58-60			Very pale brown, fine to medium SAND, trace Silt, very well sorted, moist (SP).				
59										
60	34	24	60-62			Very pale brown, fine to medium SAND, trace Silt, very well sorted, moist (SP).				
61										
62	35	24	62-64			Very pale brown, fine to medium SAND, trace Silt, very well sorted, moist (SP). Changing at 63.0 feet to: Light yellowish-brown to yellowish-brown, fine to medium SAND, trace Silt, very well sorted, moist (SP).				
63										
64	36	24	64-66			Yellowish-brown, fine to medium SAND, trace Silt, very well sorted, wet (SP).		4		
65										
66	37	24	66-68			Yellowish-brown, fine to medium SAND, trace Silt, very well sorted, wet (SP). Changing at 67.0 feet to: Yellowish-brown, fine to medium SAND, some Silt, very well sorted, wet (SM). Changing at 67.2 feet to: Yellowish-brown, fine to medium SAND, trace Silt, very well sorted, wet (SP).	67' 67.2'SAND (SM) SAND (SP)			
67										
<div>REMARKS</div> <div>4. Groundwater was encountered at approximately 64.0 feet below ground surface.</div>										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: SB-3/MW-3S	

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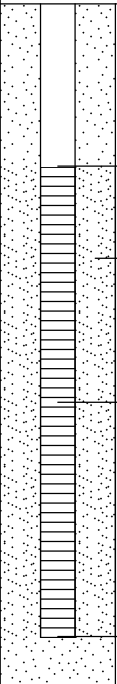
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File No.: 16.0062335.52

Check: J Cai

Sample Information								Check: J Cai		
Depth	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
69	38	24	68-70			Yellowish-brown, fine to medium SAND, trace Silt, very well sorted, wet (SP).	SAND (SP)			
70	39	24	70-72			Yellowish-brown, fine to medium SAND, trace Silt, very well sorted, wet (SP).				
71										
72	40	24	72-74			Yellowish-brown, fine to medium SAND, trace Silt, very well sorted, wet (SP). Changing at 73.8 feet to: Yellowish-brown, fine to medium SAND, some Silt, well sorted, wet (SM).				
73							73.8'			
74	41	24	74-76			Yellowish-brown, fine to medium SAND, some Silt, well sorted, wet (SM).	SAND (SM)			
75										
76						Bottom of Borehole at 76.0 Feet	76'	5		
77										
78										
79										
80										
81										
REMARKS	5. Monitoring well was installed in borehole upon completion. Well screen set from 69.7 to 74.6 feet below ground surface.									
	Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									
Boring No.: SB-3/MW-3S										

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Boring No.: SB-4/MW-4S

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File No.: 16.0062335.52

Check: J Cai

Contractor: Stearns Drilling Company

Foreman: Jerry Huntoon

Logged by: John Morehouse

Date Start/Finish: 9-12-17 / 9-12-17

Boring Location:

GS Elev.: 782.30' Datum:

Auger/
Casing

Sampler

Type: Hollow Stem Auger

Split Spoon

O.D. / I.D.: 8.0" / 4.25"

2.0" / 1 3/8"

Hammer Wt.: 140lbs

NA

Hammer Fall: 30.0"

NA

TOC Elev.: NA

NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: NA Survey Date:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
1	1	24/14	0-2	1-1 1-1	0.0 ppm	Very loose, yellowish- brown, well sorted, fine SAND, some Organic Matter (roots), trace Silt, dry (SP).	SAND	1	PROTECTIVE CASING	Backfill/Cement Pad
2	2	24/14	2-4	1-2 2-2	0.0 ppm	Loose, pale brown, well sorted, fine SAND, damp (SP).				
3										
4	3	24/13	4-6	2-2 4-5	0.1 ppm	Loose, pale brown, well sorted, fine SAND, damp (SP).				
5										
6	4	24/14	6-8	2-3 5-7	0.0 ppm	Loose, pale brown, well sorted, fine SAND, damp (SP).				
7										
8	5	24/14	8-10	3-3 5-7	0.0 ppm	Loose, pale brown, well sorted, fine SAND, damp (SP).				
9										
10	6	24/21	10-12	5-5 7-8	0.0 ppm	Loose, pale brown, well sorted, fine SAND, damp (SP). Changing at 11.0 feet to: Hard, gray and brown mottled, CLAY, trace Silt, damp (CL).				
11					>4.0 tsf		11' CLAY (CL)	2		

REMARKS

- Field screening of samples for organic vapors was performed with a MiniRae 2000 photoionization detector equipped with a 10.6 eV lamp. Readings above background levels are shown in parts per million (ppm) of isobutylene. Background was measured at 0.0 ppm.
- Pocket penetrometer readings were measured in tons per square foot (tsf) and are used to evaluate consistency of cohesive soil.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: SB-4/MW-4S

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Check: J Cai

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
13	7	24	12-14	5-6 7-7	0.0 ppm >4.0 tsf	Hard, gray and brown mottled, CLAY, trace Silt, damp (CL). Changing at 13.0 feet to: Medium dense, pale brown and brown mottled, well sorted, fine SAND, trace Silt, damp (SP).	CLAY (CL) 13' SAND (SP)			
14	8	24/24	14-16	2-2 3-2	0.0 ppm	Loose, yellowish-brown, well sorted, fine SAND, trace Silt, damp (SP).				
16	9	24/18	16-18	1-1 1-3	0.0 ppm	Loose, yellowish-brown, well sorted, fine SAND, trace Silt, damp (SP). Changing at 17.8 feet to: Loose, yellowish-brown, well sorted, fine GRAVEL, trace Silt, damp (GW).				
18	10	24/16	18-20	2-3 6-7	0.0 ppm	Loose, yellowish-brown, well sorted, fine GRAVEL, trace Silt, damp (GW). Changing at 19.0 feet to: Medium dense, yellowish-brown, well sorted, fine SAND, trace Silt, damp (SP).	18' GRAVEL (GW) 19' SAND (SP)			
20	11	24/15	20-22	6-7 9-9	0.0 ppm	Medium dense, yellowish-brown, well sorted, fine SAND, trace Silt, damp (SP).				
22	12	24/24	22-24	4-8 8-10	0.0 ppm	Medium dense, yellowish-brown, well sorted, fine SAND, trace Silt, moist (SP). Changing at 23.9 feet to: Hard, brown, CLAY, damp (CL).				
24	13	24/24	24-26	6-7 9-10	0.0 ppm >4.0 tsf	Hard, brown, CLAY, damp (CL).	23.9' CLAY (CL)			
25							26'			
REMARKS										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: SB-4/MW-4S	

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Check: J Cai

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
27	14	24/0	26-28			NO RECOVERY.	NO RECOVERY			
28	15	24/16	28-30	5-9 11-15	0.0 ppm	Medium dense, pale brown, well sorted, fine SAND, trace Silt, damp (SP).	28' SAND (SP)			
29										
30	16	24/15	30-32	6-12 13-21	0.0 ppm	Medium dense, pale brown, well sorted, fine SAND, trace Silt, damp (SP).				
31										
32	17	24/17	32-34	4-18 31-39	0.0 ppm	Dense, pale brown, well sorted, fine SAND, trace Silt, damp (SP).				
33										
34	18	24/17	34-36	7-10 15-19	0.0 ppm	Medium dense, pale brown, well sorted, fine SAND, trace Silt, damp (SP).				
35										
36	19	24/17	36-38	4-10 15-22	0.0 ppm	Medium dense, pale brown, well sorted, fine SAND, trace Silt, trace Gravel, damp (SP).				
37										
38	20	24/20	38-40	10-12 21-24	0.0 ppm	Dense, pale brown, well sorted, fine SAND, trace Silt, moist (SP).				
39										
REMARKS										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: SB-4/MW-4S	

BORING WELL 6233550 WWW.HOUSE STREET NE.GPJ GZA_CORP.GDT 1/25/18

Bentonite/Grout



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Belmont, Michigan

Boring No.: SB-4/MW-4S

Page: 4 of 6

File No.: 16.0062335.52

Check: J Cai

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
41	21	24/17	40-42	10-11 16-19	0.0 ppm	Dense, pale brown, well sorted, fine SAND, trace Silt, moist (SP). Encountered Rock at 40.2 feet.	SAND (SP)			
42	22	24/19	42-44	7-11 17-25	0.0 ppm	Medium dense, pale brown, well sorted, fine SAND, trace Silt, moist (SP).				
43										
44	23	24/19	44-46	7-12 23-26	0.0 ppm	Dense, pale brown, well sorted, fine SAND, trace Silt, moist (SP).				
45										
46	24	24/19	46-48	10-14 15-15	0.0 ppm	Medium dense, pale brown, well sorted, fine SAND, trace Silt, moist (SP).				
47										
48	25	24/20	48-50	8-14 36-49	0.0 ppm	Dense, pale brown, well sorted, fine SAND, trace Silt, moist (SP).				
49										
50	26	24/24	50-52	18-37 47-47	0.0 ppm	Very dense, pale brown, well sorted, fine SAND, trace Silt, moist (SP).				
51										
52	27	24/21	52-54	33-29 52-50/3"	0.0 ppm	Very dense, pale brown, well sorted, fine SAND, trace Silt, moist (SP).				
53										
REMARKS										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: SB-4/MW-4S	

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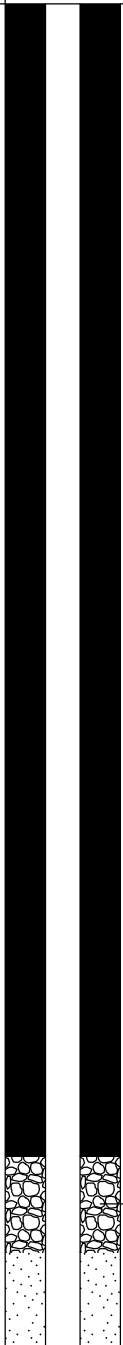
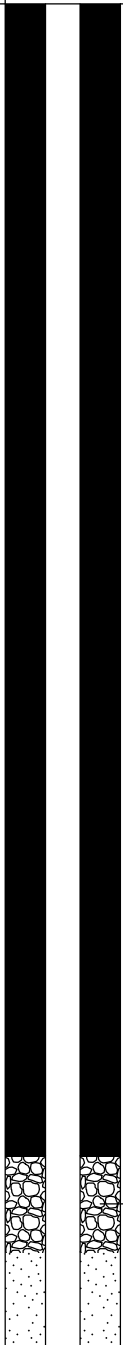
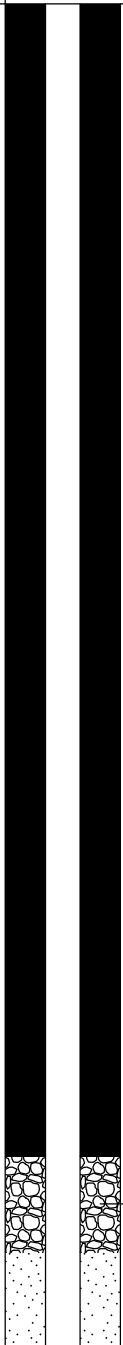
Belmont, Michigan

Boring No.: SB-4/MW-4S

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File No.: 16.0062335.52

Check: J Cai

Sample Information						Check: J Cai				
Depth	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
55	28	24/16	54-56	19-58-50/4"	0.0 ppm	Very dense, pale brown, well sorted, fine SAND, trace Silt, moist (SP).	SAND (SP)	3		
56	29	24	56-58			Light yellowish-brown to pale brown, very well sorted, fine to medium SAND, trace Silt, moist (SP).				
57										
58	30	24	58-60			Light yellowish-brown to pale brown, very well sorted, fine to medium SAND, trace Silt, moist (SP). Changing at 59.6 feet to: Brown, very well sorted, fine to medium SAND, trace Silt, wet (SP).				
59										
60	31	24	60-62			Brown, very well sorted, fine to medium SAND, trace Silt, wet (SP).				
61								3		
62	32	24	62-64			Brown, very well sorted, fine to medium SAND, trace Silt, wet (SP).				
63										
64	33	24	64-66			Brown, very well sorted, fine to medium SAND, trace Silt, wet (SP).				
65										
66	34	24	66-68			Brown, very well sorted, fine to medium SAND, trace Silt, wet (SP).				
67										
REMARKS										
3. Groundwater was encountered at approximately 59.6 feet below ground surface.										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: SB-4/MW-4S	

BORING WELL 6233550 WWW.HOUSE STREET NE.GPJ GZA CORP.GDT 1/25/18



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Boring No.: SB-4/MW-4S

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File No.: 16.0062335.52

Check: J Cai

Sample Information						Check: J Cai				
Depth	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
69	35	24	68-70			Brown, very well sorted, fine to medium SAND, trace Silt, wet (SP).	SAND (SP)		4	
70	36	24	70-72			Brown, very well sorted, fine to medium SAND, trace Silt, wet (SP).				
71										
72	37	24	72-74			Brown, very well sorted, fine to medium SAND, trace Silt, wet (SP).				
73										
74	38	24	74-76			Brown, very well sorted, fine to medium SAND, trace Silt, wet (SP).				
75										
76						Bottom of Borehole at 76.0 Feet	76'			
77										
78										
79										
80										
81										
REMARKS										
4. Monitoring well was installed in borehole upon completion. Well screen set from 71.1 to 75.7 feet below ground surface.										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: SB-4/MW-4S	

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Boring No.: SB-5/MW-5D

Page: 1 of 6

File No.: 16.0062335.52

Check: J Cai

Contractor: Stearns Drilling Company

Foreman: Jerry Huntoon

Logged by: Joe Workman/Adam Kittler

Date Start/Finish: 12-1-17 / 12-5-17

Boring Location:

GS Elev.: 779.10' Datum:

Auger/
Casing

Sampler

GROUNDWATER READINGS

Type: Hollow Stem Auger

Split Spoon

O.D. / I.D.: 17.5" / 12.0"

2.0" / 1 3/8"

Hammer Wt.: 140lbs

NA

Hammer Fall: 30.0"

NA

TOC Elev.: NA

NA

Surveyed By: NA Survey Date:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					PROTECTIVE CASING
1						Blind drill from 0.0 to 20.0 feet. Cuttings observed to consist of brown, fine to medium SAND, trace Silt, damp (SP). See SB-5/MW-5S boring log detailed soil descriptions from 0.0 to 66.0 feet.	SAND (SP) (BLIND DRILL)			
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20	1	24/24	20-22	16/24"	2.5 tsf	Very stiff, gray, Silty CLAY, trace fine Sand, damp (CL).	20' Silty CLAY (CL)	1		
21						Blind drill from 22.0 to 69.0 feet.	22'	2		
22								3		
23										
24										
25										
26										
27										
28										
29										

REMARKS

1. Pocket penetrometer readings were measured in tons per square foot (tsf) and are used to evaluate the consistency of cohesive soil.
2. Spoon driven to confirm depth of confining layer.
3. Double cased from 0.0 to 22.0 feet during drilling.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: SB-5/MW-5D

BORING WELL 6233550 WWW.HOUSE STREET NE.GPJ GZA CORP.GDT 1/25/18



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Boring No.: SB-5/MW-5D

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File No.: 16.0062335.52

Check: J Cai

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
31										
32										
33										
34										
35										
36										
37										
38										
39										
40										
41										
42										
43										
44										
45										
46										
47										
48										
49										
50										
51										
52										
53										
54										
55										
56										
57										
58										
59										
60										
61										
62										
63										
64										
REMARKS										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: SB-5/MW-5D	

BORING WELL 6233550 WWW.HOUSE STREET NE.GPJ GZA CORP.GDT 1/25/18



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Boring No.: SB-5/MW-5D

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File No.: 16.0062335.52

Check: J Cai

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
66										
67										
68										
69	34	24/20	69-71	5-7 9-10	0.0 ppm	Loose, brown, well sorted, fine SAND, trace wet (SP).	SAND (SP)	4		
70										
71										
72										
73										
74	35	24/13	74-76	7-9 12-17	0.0 ppm	Medium dense, brown, well sorted, fine SAND, trace Silt, moist (SP).				
75										
76										
77										
78										
79	36	24/18	79-81	1-3 4-9	0.0 ppm	Loose, pale brown, well sorted, fine SAND, trace Silt, moist (SP).				
80										
81										
82										
83										
84	37	24/6	84-86	2-5 11-11	0.0 ppm	Medium dense, pale brown, well sorted, fine SAND, trace Gravel, trace Silt, moist (SP).				
85										
86										
87										
88										
89	38	24/12	89-91	2-5 10-14	0.0 ppm	Medium dense, pale brown, well sorted, fine SAND, trace Gravel, trace Silt, moist (SP).				
90										
91										
92										
93										
94	39	24/18	94-96	3-10 11-24	0.0 ppm	Medium dense, pale brown, well sorted, fine SAND, trace Silt, moist (SP).				
95										
96										
97										
98										
99	40	24/24	99-101	3-4 10-14	0.0 ppm	Medim dense, pale brown, well sorted, fine				
<div style="display: flex;"> <div style="writing-mode: vertical-rl; transform: rotate(180deg); font-weight: bold; margin-right: 10px;">REMARKS</div> <div> <p>4. Field screening of samples for organic vapors was performed with a MiniRae 2000 photoionization detector equipped with a 10.6 eV lamp. Readings above background levels are shown in parts per million (ppm) of isobutylene. Background was measured at 0.0 ppm.</p> </div> </div>										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: SB-5/MW-5D	

BORING WELL 6233550 WWW.HOUSE STREET NE.GPJ GZA CORP.GDT 1/25/18

Bentonite/Grout



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Boring No.: SB-5/MW-5D

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File No.: 16.0062335.52

Check: J Cai

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
101						SAND, trace Silt, trace Gravel, moist (SP).	SAND (SP)			
102										
103										
104	41	24/9	104-106	2-6 10-19	0.0 ppm	Medium dense, pale brown, well sorted, fine SAND, trace Silt, moist (SP).				
105										
106										
107										
108										
109	42	24/14	109-111	4-8 18-26	0.0 ppm	Medium dense, pale brown, well sorted, fine SAND, trace Silt, trace Gravel, moist (SP).				
110										
111										
112										
113										
114	43	24/8	114-116	5-9 16-22	0.0 ppm	Medium dense, pale brown, well sorted, fine SAND, trace Silt, trace Gravel, moist (SP).				
115										
116										
117										
118										
119	44	24/8	119-121	2-4 10-11	0.0 ppm	Medium dense, pale brown, well sorted, fine SAND, trace Silt, moist (SP).				
120										
121										
122										
123										
124	45	24/8	124-126	3-11 22-27	0.0 ppm	Dense, pale brown, well sorted, fine SAND, trace Silt, trace Gravel, moist (SP).				
125										
126										
127										
128										
129	46	24/24	129-131	3-8 17-31	0.0 ppm	Medium dense, pale brown, well sorted, fine SAND, trace Silt, trace Gravel, moist (SP).				
130										
131										
132										
133										
134	47	24/13	134-136	10-22-50/6"	0.0 ppm	Very dense, pale brown, well sorted, fine				
REMARKS										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: SB-5/MW-5D	

BORING WELL 6233550 WWW.HOUSE STREET NE GPJ GZA CORP.GDT 1/25/18



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Boring No.: SB-5/MW-5D

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File No.: 16.0062335.52

Check: J Cai

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
136						SAND, little Gravel, trace Silt, moist (SP).	SAND (SP)			
137										
138										
139	48	24/14	139-141	10-23 34-35	0.0 ppm	Very dense, pale brown, well sorted, fine SAND, little Gravel, trace Silt, moist (SP).				
140										
141										
142										
143										
144	49	24/6	144-146	4-7 14-21	0.0 ppm	Medium dense, pale brown, well sorted, fine SAND, trace Silt, moist (SP).				
145										
146										
147										
148										
149	50	24/5	149-151	1-3 8-17	0.0 ppm	Medium dense, pale brown, well sorted, fine SAND, trace Silt, moist (SP).				
150										
151										
152										
153										
154	51	24/3	154-156	4-22-50/6"	0.0 ppm	Very dense, pale brown, well sorted, fine SAND, trace Silt, moist (SP).				
155										
156										
157										
158										
159	52	24/18	159-161	10-21 29-34	0.0 ppm	Dense, pale brown, well sorted, fine SAND, trace Silt, moist (SP).				
160										
161										
162										
163										
164	53	24/12	164-166	8-11 11-11	0.0 ppm	Medium dense, pale brown, well sorted, fine SAND, trace Gravel, trace Silt, moist (SP).				
165										
166										
167										
168										
169	54	24/12	169-171	3-3 3-5	0.0 ppm	Loose, pale brown, well sorted, fine SAND,				
REMARKS										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: SB-5/MW-5D	

BORING WELL 6233550 WWW.HOUSE STREET NE GPJ GZA CORP.GDT 1/25/18



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Boring No.: SB-5/MW-5D

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File No.: 16.0062335.52

Check: J Cai

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
171						trace Silt, trace Gravel, moist (SP).	SAND (SP)		
172									
173									
174	55	24/10	174-176	1-1 1-2	0.0 ppm	Very loose, pale brown, well sorted, fine SAND, trace Silt, moist (SP).			
175									
176									
177									
178									
179	56	24/12	179-181	1-3 1-3	0.0 ppm	Very loose, pale brown, well sorted, fine SAND, trace Silt, trace Gravel, moist (SP).			
180									
181									
182									
183									
184	57	24/18	184-186	1-1 1-1	0.0 ppm	Very loose, pale brown, well sorted, fine SAND, little Gravel, trace Silt, moist (SP).			
185									
186									
187									
188									
189	58	24/12	189-191	1-3 10-21	0.0 ppm	Medium dense, pale brown, well sorted, fine SAND, little Gravel, trace Silt, moist (SP).			
190									
191									
192									
193									
194	59	24/8	194-196	32-38-50/4"	0.0 ppm	Very dense, pale brown, well sorted, fine SAND, little Gravel, trace Silt, trace Cobbles, moist (SP).			
195									
196									
197									
198	60	24/0	198-200	50/0"		NO RECOVERY.	198' NO RECOVERY		
199									
200						Bottom of Borehole at 200.0	200'	5	
201									
202									
203									
204									

Top of Well Screen

Silica Sand Filter Pack

2-Inch Dia. 5-Foot PVC Screen (0.010" Slot)

Bottom of Well Screen

5. Monitoring well was installed in borehole upon completion. Well screen set from 188.0 to 198.0 feet below ground surface.

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: SB-5/MW-5D

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Boring No.: MW-5P

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File No.: 16.0062335.52

Check: J Cai

Contractor: Stearns Drilling Company

Foreman: Jerry Huntoon

Logged by: John Morehouse

Date Start/Finish: 9-19-17 / 9-19-17

Boring Location:

GS Elev.: 778.90' Datum:

Auger/
Casing

Sampler

GROUNDWATER READINGS

Type: Hollow Stem Auger

Split Spoon

O.D. / I.D.: 8.0" / 4.25"

2.0" / 1 3/8"

Hammer Wt.: 140lbs

NA

Hammer Fall: 30.0"

NA

TOC Elev.: NA

NA

Date	Time	Depth	Casing	Stab

Surveyed By: NA Survey Date:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
1						See SB-5/MW-5S boring log for detailed soil descriptions.				PROTECTIVE CASING
2										Backfill/Cement Pad
3										
4										
5										
6										
7										Bentonite/Grout
8										
9										
10										
11										

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: MW-5P

BORING WELL 6233550 WWW.HOUSE STREET NE.GPJ GZA_CORP.GDT 1/25/18



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Boring No.: MW-5P

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File No.: 16.0062335.52

Check: J Cai

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23						Bottom of borehole at 22.3 Feet		1		
24										
25										
1. Monitoring well was installed in borehole upon completion. Well screen set from 17.1 to 21.8 feet below ground surface.										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.										

REMARKS

Boring No.: MW-5P

BORING WELL 6233550 WWW.HOUSE STREET NE.GPJ GZA CORP.GDT 1/25/18



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Boring No.: SB-5/MW-5S

Page: 1 of 15

File No.: 16.0062335.52

Check: J Cai

Contractor: Stearns Drilling Company

Foreman: Jerry Huntoon

Logged by: John Morehouse

Date Start/Finish: 9-19-17 / 9-19-17

Boring Location:

GS Elev.: 778.80' Datum:

Auger/
Casing

Sampler

Type: Hollow Stem Auger

Split Spoon

O.D. / I.D.: 8.0" / 4.25"

2.0" / 1 3/8"

Hammer Wt.: 140lbs

NA

Hammer Fall: 30.0"

NA

TOC Elev.: NA

NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: NA Survey Date:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				PROTECTIVE CASING	Backfill/Cement Pad
1	1	24/19	0-2	6-5 8-9		Dark yellowish-brown, fine to coarse grained SAND, little Gravel, trace Silt, poorly sorted, dry to moist (FILL). Changing at 0.4 feet to: Light yellowish-brown, fine to coarse grained SAND, trace Silt, trace Gravel, moderately sorted, moist (FILL). Changing at 0.7 feet to: Very dark grayish-brown to dark yellowish-brown, fine grained SAND, some Silt, slightly cohesive, moderately sorted, moist (FILL). Changing at 1.2 feet to: Brownish-yellow grading to pale brown to very pale brown, fine grained SAND, trace Silt, well sorted, moist (SP). Brownish-yellow grading to pale brown to very pale brown, fine grained SAND, trace Silt, well sorted, moist (SP). Changing at 3.2 feet to: Dark yellowish-brown to brown, fine to medium grained SAND, little Clay, little Silt, trace Gravel, slightly plastic, moderately cohesive, poorly sorted, moist (SC). Changing at 3.5 feet to: Dark yellowish-brown, CLAY & SILT, plastic, cohesive, moderately well sorted, moist (CL).	SAND (FILL) 1.2' SAND (SP)			
2	2	24/20	2-4	4-5 5-5						
3							3.5' CLAY & SILT (CL)			
4	3	24/18	4-6	2-3 3-4						
5										
6	4	24/19	6-8	2-2 2-3		Dark yellowish-brown, CLAY & SILT, plastic, cohesive, moderately well sorted, moist (CL). Light yellowish-brown, fine to medium SAND, trace Silt, very well sorted, moist (SP).	6' SAND (SP)			
7										
8	5	24/17	8-10	2-2 3-4		Light yellowish-brown, fine to medium SAND, trace Silt, very well sorted, moist (SP).				
9										
10	6	24/18	10-12	3-4 4-6		Light yellowish-brown, fine to medium SAND, trace Silt, very well sorted, moist (SP).				
11						Light yellowish-brown, fine to medium SAND, trace Silt, very well sorted, moist (SP).				

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
13	7	24/23	12-14	2-3 5-9		Light yellowish-brown, fine to medium SAND, trace Silt, very well sorted, moist (SP). Light yellowish-brown, fine to medium SAND, trace Silt, very well sorted, moist (SP).	SAND (SP)			
14	8	24/20	14-16	3-9 10-10		Light yellowish-brown, fine to medium SAND, trace Silt, very well sorted, moist (SP).				
16	9	24/20	16-18	2-4 4-4		Light yellowish-brown, fine to medium SAND, trace Silt, very well sorted, moist (SP). Light yellowish-brown, fine to medium SAND, trace Silt, very well sorted, moist (SP).				
18	10	24/19	18-20	3-5 5-4		Light yellowish-brown, fine to medium SAND, trace Silt, very well sorted, moist (SP). Changing at 19.5 feet to: Yellowish-brown, fine to medium grained SAND, trace Silt, well sorted, moist (SP). Changing at 19.3 feet to: Dark brown to dark yellowish-brown grading to black, fine to medium grained SAND, trace Silt, well sorted, moist to wet (SP).				
20	11	24/18	20-22	3-3 4-3		Dark yellowish-brown, fine to medium grained SAND, trace Silt, wet sorted, moist to wet (SP). Changing at 20.2 feet to: Dark gray, fine to medium grained SAND, trace Silt, well sorted, wet (SP). Changing at 20.3 feet to: Reddish-gray, fine to medium grained SAND, trace Silt, well sorted, wet (SP). Changing at 20.7 feet to: Yellowish-brown, fine to medium grained SAND, trace Silt, well sorted, wet (SP).				
22	12	24/23	22-24	2-5 8-8		Brown, Silty CLAY, plastic, cohesive, very well sorted, moist (CL).	22' Silty CLAY (CL)			
24	13	24/20	24-26	4-6 6-7		Brown, Silty CLAY, plastic, cohesive, very well sorted, moist (CL).	26'			
REMARKS										
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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
27	14	24/17	26-28	3-5 8-9		Pale brown to very pale brown, fine to medium grained SAND, trace Silt, very well sorted, moist (SP).	SAND (SP)			
28	15	24/18	28-30	4-6 8-9		Pale brown to very pale brown, fine to medium grained SAND, trace Silt, very well sorted, moist (SP).				Bentonite/Grout
30	16	24/24	30-32	5-6 9-10		Pale brown to very pale brown, fine to medium grained SAND, trace Silt, very well sorted, moist (SP).				
32	17	24/18	32-34	3-5 9-13		Pale brown to very pale brown, fine to medium grained SAND, trace Silt, very well sorted, moist (SP).				
34	18	24/18	34-36	3-7 13-16		Pale brown to very pale brown, fine to medium grained SAND, trace Silt, very well sorted, moist (SP).				
36	19	24/19	36-38	3-7 10-10		Pale brown to very pale brown, fine to medium grained SAND, trace Silt, very well sorted, moist (SP).				
38	20	24/24	38-40	3-5 8-12		Pale brown to very pale brown, fine to medium grained SAND, trace Silt, very well sorted, moist (SP).				
39										
REMARKS										

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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
41	21	24/22	40-42	3-5 11-16		Pale brown to very pale brown, fine to medium grained SAND, trace Silt, very well sorted, moist (SP).	SAND (SP)			
42	22	24/24	42-44	3-11 18-21		Pale brown to very pale brown, fine to medium grained SAND, trace Silt, very well sorted, moist (SP).				
44	23	24/20	44-46	5-10 14-17		Pale brown to very pale brown, fine to medium grained SAND, trace Silt, very well sorted, moist (SP).				
46	24	24/24	46-48	4-7 9-9		Pale brown to very pale brown, fine to medium grained SAND, trace Silt, very well sorted, moist (SP).				
48	25	24/20	48-50	3-8 11-15		Pale brown to very pale brown, fine to medium grained SAND, trace Silt, very well sorted, moist (SP).				
50	26	24/24	50-52	3-10 17-18		Pale brown to very pale brown, fine to medium grained SAND, trace Silt, very well sorted, moist (SP).				
52	27	24/22	52-54	9-13 21-25		Pale brown to very pale brown, fine to medium grained SAND, trace Silt, very well sorted, moist (SP).				
53										
REMARKS Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.										
									Boring No.: SB-5/MW-5S	

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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
55	28	24/24	54-56	4-5 8-10		Pale brown to very pale brown, fine to medium grained SAND, trace Silt, very well sorted, moist (SP). Changing at 54.5 feet to: Brown to yellowish-brown, fine to medium grained SAND, trace Silt, well sorted, wet (SP).	SAND (SP)	1		
56	29	24/24	56-58	3-4 5-6		Brown to yellowish-brown, fine to medium grained SAND, trace Silt, well sorted, wet (SP).				
58	30	24/16	58-60	2-3 5-5		Brown to yellowish-brown, fine to medium grained SAND, trace Silt, well sorted, wet (SP).				
60	31	24/16	60-62	1-1 2-2		Brown to yellowish-brown, fine to medium grained SAND, trace Silt, well sorted, wet (SP). Brown to yellowish-brown, fine to medium grained SAND, trace Silt, well sorted, wet (SP).				
62	32	24/5	62-64	1-4 7-11		Brown to yellowish-brown, fine to medium grained SAND, trace Silt, well sorted, wet (SP).				
64	33	24/11	64-66	2-6 10-10		Brown to yellowish-brown, fine to medium grained SAND, trace Silt, well sorted, wet (SP).				
66							66'			
67										
REMARKS 1. Groundwater was encountered at approximately 54.5 feet below ground surface.										
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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
69	34	24/20	69-71	5-7 9-10	0.0 ppm	Loose, brwn, well sorted, fine SAND, trace Silt, moist (SP).			
70									
71									
72									
73	35	24/13	74-76	7-9 12-17	0.0 ppm	Medium dense, brown, well sorted, fine SAND, trace Silt, moist (SP).			
74									
75									
76									
77	36	24/18	79-81	1-3 4-9	0.0 ppm	Loose, pale brown, well sorted, fine SAND, trace Silt, moist (SP).			
78									
79									
80									
81									
<div>REMARKS</div>									
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: SB-5/MW-5S

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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
83									
84	37	24/6	84-86	2-5 11-11	0.0 ppm	Medium dense, pale brown, well sorted, fine SAND, trace Gravel, trace Silt, moist (SP).			
85									
86									
87									
88									
89	38	24/12	89-91	2-5 10-14	0.0 ppm	Medium dense, pale brown, well sorted, fine SAND, trace Gravel, trace Silt, moist (SP).			
90									
91									
92									
93									
94	39	24/18	94-96	3-10 11-24	0.0 ppm	Medium dense, pale brown, well sorted, fine SAND, trace Silt, moist (SP).			
95									
REMARKS									
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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
97									
98									
99	40	24/24	99-101	3-4 10-14	0.0 ppm	Medim dense, pale brown, well sorted, fine SAND, trace Silt, trace Gravel, moist (SP).			
100									
101									
102									
103									
104	41	24/9	104-106	2-6 10-19	0.0 ppm	Medium dense, pale brown, well sorted, fine SAND, trace Silt, moist (SP).			
105									
106									
107									
108									
109	42	24/14	109-111	4-8 18-26	0.0 ppm	Medium dense, pale brown, well sorted, fine SAND, trace Silt, grace Gravel, moist (SP).			
<div>REMARKS</div>									
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: SB-5/MW-5S

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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
111									
112									
113									
114	43	24/8	114-116	5-9 16-22	0.0 ppm	Medium dense, pale brown, well sorted, fine SAND, trace Silt, trace Gravel, moist (SP).			
115									
116									
117									
118									
119	44	24/8	119-121	2-4 10-11	0.0 ppm	Medium dense, pale brown, well sorted, fine SAND, trace Silt, moist (SP).			
120									
121									
122									
123									
REMARKS									
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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
125	45	24/8	124-126	3-11 22-27	0.0 ppm	Medium dense, pale brown, well sorted, fine SAND, trace Silt, trace Gravel, moist (SP).			
126									
127									
128									
129	46	24/24	129-131	3-8 17-31	0.0 ppm	Dense, pale brown, well sorted, fine SAND, trace Silt, trace Gravel, moist (SP).			
130									
131									
132									
133									
134	47	24/13	134-136	10-22-50/6"	0.0 ppm	Very dense, pale brown, well sorted, fine SAND, little Gravel, trace Silt, moist (SW).			
135									
136									
137									
REMARKS									
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: SB-5/MW-5S

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Bentonite, Michigan										Check:	J Cai							
Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed									
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data													
139	48	24/14	139-141	10-23 34-35	0.0 ppm	Dense, pale brown, well sorted, fine SAND, little Gravel, trace Silt, moist (SW).												
140																		
141																		
142																		
143																		
144	49	24/6	144-146	4-7 14-21	0.0 ppm	Medium dense, pale brown, well sorted, fine SAND, trace Silt, moist (SP).												
145																		
146																		
147																		
148																		
149	50	24/5	149-151	1-3 8-17	0.0 ppm	Medium dense, pale brown, well sorted, fine SAND, trace Silt, moist (SP).												
150																		
151																		
REMARKS																		
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: SB-5/MW-5S									

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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
153									
154	51	24/3	154-156	4-22-50/6"	0.0 ppm	Very dense, pale brown, well sorted, fine SAND, trace Silt, moist (SP).			
155									
156									
157									
158									
159	52	24/18	159-161	10-21 29-34	0.0 ppm	Dense, pale brown, well sorted, fine SAND, trace Silt, moist (SP).			
160									
161									
162									
163									
164	53	24/12	164-166	8-11 11-11	0.0 ppm	Medium dense, pale brown, well sorted, fine SAND, trace Gravel, trace Silt, moist (SP).			
165									
REMARKS									
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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
167									
168									
169	54	24/12	169-171	3-3 3-5	0.0 ppm	Loose, pale brown, well sorted, fine SAND, trace Silt, trace Gravel, moist (SP).			
170									
171									
172									
173									
174	55	24/10	174-176	1-1 1-2	0.0 ppm	Very loose, pale brown, well sorted, fine SAND, trace Silt, moist (SP).			
175									
176									
177									
178									
179	56	24/12	179-181	3-3 3-3	0.0 ppm	Very loose, pale brown, well sorted, fine SAND, trace Silt, trace Gravel, moist (SP).			
<div>REMARKS</div>									
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: SB-5/MW-5S

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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
181									
182									
183									
184	57	24/18	184-186	1-1 1-1	0.0 ppm	Very loose, pale brown, well sorted, fine SAND, little Gravel, trace Silt, moist (SW).			
185									
186									
187									
188									
189	58	24/12	189-191	1-3 10-21	0.0 ppm	Medium dense, pale brown, well sorted, fine SAND, little Gravel, trace Silt, moist (SW).			
190									
191									
192									
193									
REMARKS									
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: SB-5/MW-5S

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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
195	59	24/8	194-196	32-38-50/4"	0.0 ppm	Very dense, pale brown, well sorted, fine SAND, little Gravel, trace Silt, trace Cobbles, moist (SP).			
196									
197									
198	60	24/0	198-200	50/0"		NO RECOVERY.			
199									
200						Bottom of Borehole at 200.0		2	
201									
202									
203									
204									
205									
206									
207									
<div>REMARKS</div> <div>2. Monitoring well was installed in borehole upon completion. Well screen set from 61.9 to 66.6 feet below ground surface.</div>									
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: SB-5/MW-5S

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Contractor: Stearns Drilling Company

Foreman: Jerry Huntoon

Logged by: Julie Groenleer

Date Start/Finish: 10-31-17 / 11-2-17

Boring Location:

GS Elev.: 770.60' Datum:

Auger/
Casing

Sampler

GROUNDWATER READINGS

Type: Hollow Stem Auger

Split Spoon

O.D. / I.D.: 8.0" / 4.25"

2.0" / 1 3/8"

Hammer Wt.: 140lbs

NA

Hammer Fall: 30.0"

NA

TOC Elev.: NA

NA

Date	Time	Depth	Casing	Stab

Surveyed By: NA Survey Date:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					PROTECTIVE CASING
1						See SB-6/MW-6S for soil description from 0.0 to 70.0 feet.				
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: SB-6D/MW-6D

BORING WELL 6233550 WWW.HOUSE STREET NE.GPJ GZA_CORP.GDT 1/25/18



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Boring No.: SB-6D/MW-6D

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Check: J Cai

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
31										
32										
33										
34										
35										
36										
37										
38										
39										
40										
41										
42										
43										
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53										
54										
55										
56										
57										
58										
59										
60										
61										
62										
63										
64										
REMARKS										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.										

Boring No.: SB-6D/MW-6D

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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
66										
67										
68										
69										
70	1	24/18	70-72	1-2 4-12		Loose, brown, fine to medium SAND, trace Silt, wet (SP).	SAND (SP)			
71										
72	2	24/13	72-74	2-3 11-17		Medium dense, brown, fine to medium SAND, trace Silt, wet (SP).				
73										
74	3	24/1	74-76	7-11 19-18		Medium dense, light brown, fine Silty SAND, wet (SM).	74' Silty SAND (SM)			
75										
76	4	24/4	76-78	2-3 3-8		Loose, brown, fine to medium SAND, trace Silt, wet (SP).	76' SAND (SP)			
77										Bentonite/Grout
78	5	24/12	78-80	4-7 15-18		Medium dense, brown, fine to medium SAND, trace Silt, wet (SP).				
79										
80	6	24/20	80-82	2-6 17-25		Medium dense, brown, fine to medium SAND, trace Silt, wet (SP).				
81										
82	7	24/16	82-84	2-2 4-8		Loose, brown, fine to medium SAND, trace Silt, wet (SP).				
83										
84	8	24/12	84-86	2-2 2-7		Very loose, brown, fine to medium SAND, trace Silt, wet (SP).				
85										
86	9	24/20	86-88	5-16 37-35		Very dense, brown, fine to medium SAND, trace Silt, wet (SP).				
87										
88	10	24/13	88-90	5-6 56-50		Very dense, brown, fine to medium SAND, trace Silt, wet (SP).				
89										
90	11	24/24	90-92	6-17 60-30		Very dense, brown, fine to medium SAND, trace Silt, wet (SP).				
91										
92	12	24/0	92-94	4-7 10-11		NO RECOVERY.	92' NO RECOVERY			
93										
94	13	24/0	94-96	2-3 4-11		NO RECOVERY.				
95										
96	14	24/24	96-98	2-7 9-24		Medium dense, brown, fine SAND, trace medium Sand, trace Silt, wet (SP).	96' SAND (SP)			
97										
98	15	24/24	98-100	3-6 13-22		Medium dense, brown, fine SAND, trace medium Sand, trace Silt, wet (SP).				
99						Changing at 99.6 feet to: Medium dense,	99.6' 100'			
REMARKS										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: SB-6D/MW-6D	

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Check: J Cai

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
101	16	24/11	100-102	3-8 20-31		brown, fine Silty SAND, wet (SM). Medium dense, brown, fine to medium SAND, trace Silt, wet (SP).	Silty SAND (SM)/ SAND (SP)			
102	17	24/18	102-104	2-3 10-15		Medium dense, brown, fine to medium SAND, trace Silt, wet (SP).				
103										
104	18	24/6	104-106	5-10 23-22		Dense, brown, fine Silty SAND, wet (SM).	104' Silty SAND (SM)			
105										
106	19	24/17	106-108	9-19 29-29		Dense, brown, fine Silty SAND, wet (SM).				
107										
108	20	24/12	108-110	5-12 18-18		Medium dense, brown, fine to medium SAND, trace Silt, wet (SP).	108' SAND (SP)			
109										
110	21	24/13	110-112	2-3 5-17		Loose, brown, fine to medium SAND, trace Silt, wet (SP).				
111										
112	22	24/0	112-114	3-4 7-12		NO RECOVERY.	112' NO RECOVERY			
113										
114	23	24/0	114-116	3-5 15-17		NO RECOVERY.				
115										
116	24	24/0	116-118	4-13 30-45		NO RECOVERY (bailed for sample description: Brown, fine to medium SAND, trace Silt, moist (SP)).	116' NO RECOVERY (bailed for sample description: SAND (SP))			
117										
118	25	24/10	118-120	9-29 46-54		Very dense, brown, fine to medium SAND, trace Silt, wet (SP).	118' SAND (SP) with Silty SAND in spoon at 120.0 feet			
119										
120	26	24/8	120-122	6-7 9-19		Medium dense, brown, fine to medium SAND, trace Silt, wet (SP).				
121										
122	27	24/24	122-124	10-22 37-39		Very dense, brown, fine to medium SAND, trace Silt, wet (SP).				
123										
124	28	24/24	124-126	6-21 28-28		Dense, brown, fine to medium SAND, trace Silt, wet (SP).				
125										
126	29	24/24	126-128	11-19 33-24		Very dense, brown, fine to medium SAND, trace Silt, wet (SP).				
127										
128	30	24/12	128-130	3-3 3-10		Loose, brown, fine to medium SAND, trace Silt, wet (SP).				
129										
130	31	24/24	130-132	8-25 35-17		Very dense, brown, fine to medium SAND, trace Silt, wet (SP).				
131										
132	32	24/14	132-134	12-29 44-50		Very dense, brown, fine to medium SAND, trace Silt, wet (SP).				
133										
134	33	24/20	134-136	2-7 30-50		Dense, brown, fine to medium SAND, trace				
REMARKS										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: SB-6D/MW-6D	

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Check: J Cai

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
136	34	24/19	136-138	2-4 12-21		Silt, wet (SP).	SAND (SP) with Silty SAND in spoon at 120.0 feet		
137						Medium dense, brown, fine to medium SAND, trace Silt, wet (SP).			
138	35	24/14	138-140	8-11 11-14		Medium dense, brown, fine to medium SAND, trace Silt, wet (SP).			
139						Medium dense, brown, fine to medium SAND, trace Silt, wet (SP).			
140	36	24/12	140-142	5-11 23-24		Dense, brown, fine to medium SAND, trace Silt, trace fine Gravel, wet (SP).			
141						Dense, brown, fine to medium SAND, trace Silt, trace fine Gravel, wet (SP).			
142	37	24/12	142-144	4-8 12-18		Medium dense, brown, fine to medium SAND, trace Silt, wet (SP).			
143						Medium dense, brown, fine to medium SAND, trace Silt, wet (SP).			
144	38	24/10	144-146	1-3 12-17		Medium dense, brown, fine to medium SAND, trace Silt, wet (SP).			
145						Medium dense, brown, fine to medium SAND, trace Silt, wet (SP).			
146	39	24/8	146-148	1-2 4-8		Loose, brown, fine to medium SAND, trace Silt, wet (SP).			
147						Loose, brown, fine to medium SAND, trace Silt, wet (SP).			
148	40	24/9	148-150	1-3 7-14		Loose, brown, fine to medium SAND, trace Silt, wet (SP).			
149						Loose, brown, fine to medium SAND, trace Silt, wet (SP).			
150	41	24/7	150-152	1-2 5-7		Loose, brown, fine to medium SAND, trace Silt, wet (SP).			
151						Loose, brown, fine to medium SAND, trace Silt, wet (SP).			
152	42	24/0	152-154	3-7 20-32		NO RECOVERY.	152' NO RECOVERY		
153						NO RECOVERY.	154' SAND (SP)		
154	43	24/24	154-156	3-8 18-32		Medium dense, brown, fine to medium SAND, trace Silt, wet (SP).			
155						Medium dense, brown, fine to medium SAND, trace Silt, wet (SP).			
156	44	24/14	156-158	5-12 47-24		Very dense, brown, fine to medium SAND, trace Silt, wet (SP).			
157						Very dense, brown, fine to medium SAND, trace Silt, wet (SP).			
158	45	24/24	158-160	3-12 29-36		Dense, brown, fine to medium SAND, trace Silt, wet (SP). Changing at 160.0 feet (in shoe) to: Very stiff, gray, CLAY & SILT, some fine Sand, moist (CL).			
159						Dense, brown, fine to medium SAND, trace Silt, wet (SP). Changing at 160.0 feet (in shoe) to: Very stiff, gray, CLAY & SILT, some fine Sand, moist (CL).			
160	46	24/24	160-162	1-9 23-36	3.75 tsf >4.0 tsf	Hard, gray, CLAY & SILT, some fine to coarse Sand, moist (CL).	160' CLAY & SILT (CL)		
161						Hard, gray, CLAY & SILT, some fine to coarse Sand, moist (CL).	162'		
162						Bottom of Borehole at 162.0 Feet			
163									
164									
165									
166									
167									
168									
169									
REMARKS Pocket penetrometer readings were measured in tons per square foot (tsf) and are used to evaluate consistency of cohesive soil. Monitoring well was installed in borehole upon completion. Well screen set from 155.0 to 160.0 feet below ground surface.									
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.								Boring No.: SB-6D/MW-6D	

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Top of Well Screen
Silica Sand Filter Pack
2-Inch Dia.
5-Foot PVC Screen (0.010" Slot)
Bottom of Well Screen



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Boring No.: SB-6/MW-6S

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Check: J Cai

Contractor: Stearns Drilling Company

Foreman: Jerry Huntoon

Logged by: John Morehouse

Date Start/Finish: 9-13-17 / 9-14-17

Boring Location:

GS Elev.: 770.30' Datum:

Auger/
Casing

Sampler

Type: Hollow Stem Auger

Split Spoon

O.D. / I.D.: 8.0" / 4.25"

2.0" / 1 3/8"

Hammer Wt.: 140lbs

NA

Hammer Fall: 30.0"

NA

TOC Elev.: NA

NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: NA Survey Date:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				PROTECTIVE CASING	Backfill/Cement Pad
1	1	24/18	0-2	4-3 3-5		Very dark grayish-brown to dark brown, fine to medium grained SAND, some Silt, poorly sorted, dry (SM). Changing at 0.2 feet to: Dark brown, fine to medium grained SAND, some Silt, moderately sorted, dry (SM). Changing at 0.4 feet to: Dark yellowish-brown, fine to medium grained SAND, some Silt, trace Gravel, moderately sorted, dry (SM).	SAND (SM)			
2	2	24/16	2-4	8-8 11-12		Dark yellowish-brown, fine to medium grained SAND, some Silt, trace Gravel, moderately sorted, dry (SM). Changing at 2.8 feet to: Dark yellowish-brown, fine to medium SAND, little Clay, little Silt, non to slightly plastic, moderately cohesive, poorly sorted, dry (SC). Changing at 3.0 feet to: Mottled dark yellowish-brown to pale brown, CLAY & SILT, some Sand, trace Gravel, plastic, cohesive, poorly sorted, dry to moist (CL).	2.8' 3' SAND (SC) CLAY & SILT (CL)			
3	3	24/19	4-6	8-9 13-15		Mottled dark yellowish-brown to pale brown, CLAY & SILT, some Sand, trace Gravel, plastic, cohesive, poorly sorted, dry to moist (CL). Changing at 5.2 feet to: Very pale brown, fine to medium SAND, trace Silt, very well sorted, moist (SP).	5.2' SAND (SP)			
4	4	24/14	6-8	2-2 2-2		Very pale brown, fine to medium SAND, trace Silt, very well sorted, moist (SP).				
5	5	24/20	8-10	1-3 3-4		Very pale brown, fine to medium SAND, trace Silt, very well sorted, moist (SP).				
6	6	24/24	10-12	2-3 3-5		Very pale brown, fine to medium SAND, trace Silt, very well sorted, moist (SP).				

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: SB-6/MW-6S

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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
13	7	24/22	12-14	3-4 5-5		Very pale brown, fine to medium SAND, trace Silt, very well sorted, moist (SP).	SAND (SP)			
14	8	24/20	14-16	2-5 6-11		Very pale brown, fine to medium SAND, trace Silt, very well sorted, moist with some alternating beds of dark yellowish-brown, fine to medium grained SAND, trace Gravel at 14.6 feet.				
16	9	24/22	16-18	4-8 9-10		Very pale brown, fine to medium SAND, trace Silt, very well sorted, moist (SP).				
18	10	24/22	18-20	4-5 7-8		Very pale brown, fine to medium SAND, trace Silt, very well sorted, moist (SP).				
20	11	24/19	20-22	6-9 14-15		Very pale brown, fine to medium SAND, trace Silt, very well sorted, moist (SP).				
22	12	24/24	22-24	6-10 11-13		Very pale brown, fine to medium SAND, trace Silt, very well sorted, moist (SP).				
24	13	24/20	24-26	5-8 13-18		Very pale brown, fine to medium SAND, trace Silt, very well sorted, moist (SP).				
25										
REMARKS										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: SB-6/MW-6S	

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Check: J Cai

Sample Information						Check: J Cai				
Depth	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
27	14	24/22	26-28	7-10 15-18		Very pale brown, fine to medium SAND, trace Silt, very well sorted, moist (SP).	SAND (SP)			Bentonite/Grout
28	15	24/22	28-30	7-11 12-14		Very pale brown, fine to medium SAND, trace Silt, very well sorted, moist (SP).				
30	16	24/20	30-32	7-14 15-17		Very pale brown, fine to medium SAND, trace Silt, very well sorted, moist (SP).				
32	17	24/16	32-34	7-10 15-21		Very pale brown, fine to medium SAND, trace Silt, very well sorted, moist (SP).				
34	18	24/22	34-36	6-10 18-20		Very pale brown, fine to medium SAND, trace Silt, very well sorted, moist (SP).				
36	19	24/19	36-38	10-16 23-34		Very pale brown, fine to medium SAND, trace Silt, very well sorted, moist (SP). Changing at 36.8 feet to: Light yellowish-brown, fine grained SAND, little Silt, very well sorted, moist (SM). Changing at 37.8 feet to: Light yellowish-brown to pale brown, fine to medium grained SAND, trace Silt, well sorted, moist (SP).	36.8' SAND (SM)			
38	20	24/19	38-40	9-22 22-20		Light yellowish-brown to pale brown, fine to medium grained SAND, trace Silt, well sorted, moist (SP). Changing at 38.5 feet to: Light yellowish-brown, fine grained SAND, little Silt, very well sorted, moist (SM).	37.8' SAND (SP)			
39							38.5' SAND (SM)			
REMARKS										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: SB-6/MW-6S	

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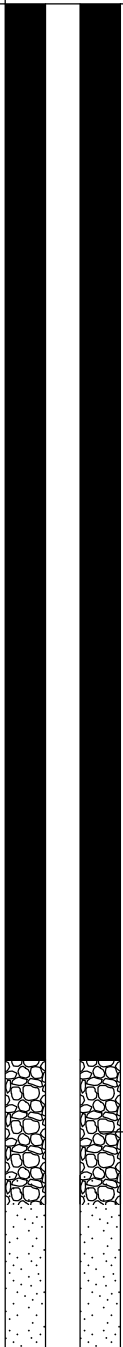
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Check: J Cai

Sample Information						Check: J Cai				
Depth	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
41	21	24/24	40-42	4-6 7-3		Light yellowish-brown, fine grained SAND, little Silt, very well sorted, moist (SM). Changing at 40.9 feet to: Yellowish-brown, fine grained SAND, little Silt, well sorted, moist (SM).	SAND (SM)	1		Bentonite Seal
42	22	24/19	42-44	11-22 37-38		Yellowish-brown, fine grained SAND, little Silt, well sorted, moist (SM). Changing at 43.1 feet to: Very pale brown, fine to medium SAND, trace Silt, very well sorted, moist (SP).	43.1' SAND (SP)			
43										
44	23	24/22	44-46	16-22 28-30		Very pale brown, fine to medium SAND, trace Silt, very well sorted, moist (SP). Changing at 44.8 feet to: Brown, fine to medium grained SAND, trace Silt, well sorted, moist (SP).				
45										
46	24	24/22	46-48	6-8 10-11		Brown, fine to medium grained SAND, trace Silt, trace Gravel, well sorted, wet (SP).				
47										
48	25	24/18	48-50	4-11 18-21		Brown, fine to medium grained SAND, trace Silt, trace Gravel, well sorted, wet (SP).				
49										
50	26	24/18	50-52	5-11 14-17		Brown, fine to medium grained SAND, trace Silt, trace Gravel, well sorted, wet (SP).				
51										
52	27	24/11	52-54	3-9 18-21		Brown, fine to medium grained SAND, trace Silt, trace Gravel, well sorted, wet (SP).				
53										
REMARKS	1. Groundwater was encountered at approximately 46.0 feet below ground surface.									
	Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									
Boring No.: SB-6/MW-6S										

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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
55	28	24/20	54-56	3-8 14-15		Brown, fine to medium grained SAND, trace Silt, trace Gravel, well sorted, wet (SP).	SAND (SP)			
56	29	24/8	56-58	2-4 12-12		Brown, fine to medium grained SAND, trace Silt, trace Gravel, well sorted, wet (SP).				
58	30	24/12	58-60	3-7 12-11		Brown, fine to medium grained SAND, trace Silt, trace Gravel, well sorted, wet (SP).				
60	31	24/7	60-62	1-1 3-7		Brown, fine to medium grained SAND, trace Silt, trace Gravel, well sorted, wet (SP).				
62						Bottom of Borehole at 62.0 Feet	62'	2		
63										
64										
65										
66										
67										
REMARKS 2. Monitoring well was installed in borehole upon completion. Well screen set from 57.1 to 61.8 feet below ground surface.										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: SB-6/MW-6S	

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Boring No.: SB-7/MW-7S

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File No.: 16.0062335.52

Check: J Cai

Contractor: Stearns Drilling Company

Foreman: Jerry Huntoon

Logged by: John Morehouse

Date Start/Finish: 9-19-17 / 9-20-17

Boring Location:

GS Elev.: 788.90' Datum:

Auger/
Casing

Sampler

Type: Hollow Stem Auger

Split Spoon

O.D. / I.D.: 8.0" / 4.25"

2.0" / 1 3/8"

Hammer Wt.: 140lbs

NA

Hammer Fall: 30.0"

NA

TOC Elev.: NA

NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: NA Survey Date:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				PROTECTIVE CASING	Backfill/Cement Pad
1	1	24/18	0-2	2-1 2-1		Very loose, dark brown to yellowish-brown, fine grained SAND, some Silt, moderately sorted, dry (TOPSOIL). Changing at 0.5 feet to: Brownish-yellow, fine grained SAND, little Silt, well sorted, dry (SM).	0.5' SAND (SM)			
2	2	24/12	2-4	2-3 3-4		Loose, yellowish-brown, fine to medium grained SAND, trace Silt, very well sorted, moist (SP).	2' SAND (SP)			
3										
4	3	24/18	4-6	2-2 3-2		Loose, yellowish-brown, fine to medium grained SAND, trace Silt, very well sorted, moist (SP).				
5										
6	4	24/5	6-8	2-2 2-2		Loose, yellowish-brown, fine to medium grained SAND, trace Silt, very well sorted, moist (SP) with fractured rock at 6.1 feet. Changing at 6.3 feet to: Dark brown, CLAY & SILT, some Sand, trace Gravel, plastic, cohesive, mmoist (CL).	6.3' CLAY & SILT (CL)			
7										
8	5	24/12	8-10	2-2 3-4		Loose dark grayish-brown to dark brown, coarse grained SAND, little Gravel, trace Silt, poorly sorted, moist (SP).	8' SAND (SP)			
9										
10	6	24/11	10-12	4-6 4-4		Loose dark grayish-brown to dark brown, coarse grained SAND, little Gravel, trace Silt, poorly sorted, moist (SP).				
11										

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: SB-7/MW-7S

BORING WELL 6233550 WWW.HOUSE STREET NE.GPJ GZA CORP.GDT 1/25/18



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Wolverine World Wide, Inc.

1855 House Street NE

Belmont, Michigan

Boring No.: SB-7/MW-7S

Page: 2 of 6

File No.: 16.0062335.52

Check: J Cai

Sample Information						Bentonite, Michigan		Check: J Cai		
Depth	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
13	7	24/19	12-14	4-7 5-5		Loose dark grayish-brown to dark brown, coarse grained SAND, little Gravel, trace Silt, poorly sorted, moist (SP). Changing at 12.6 feet to: Stiff, brown, CLAY & SILT, some Sand, trace Gravel, plastic, cohesive, poorly sorted, moist (CL). Changing at 13.2 feet to: Stiff, dark brown, CLAY & SILT, some Sand, trace Gravel, plastic, cohesive, poorly sorted, moist (CL). NO RECOVERY.	SAND (SP)			
							12.6'			
							CLAY & SILT (CL)			
							13'			
14	8	24/0	14-16	8-8 9-10		Loose, brown, fine grained SAND, trace Silt, very well sorted, moist (SP). Changing at 16.4 feet to: Medium brown, CLAY & SILT, some Sand, trace Gravel, moderately plastic, cohesive, poorly sorted, moist (CL). Changing at 16.7 feet to: Loose, dark yellowish-brown, fine grained SAND, trace Silt, well sorted, moist (SP). Changing at 17.0 feet to: Medium mottled yellowish-brown, CLAY & SILT, plastic, cohesive, well sorted, moist (CL). Medium mottled yellowish-brown, CLAY & SILT, plastic, cohesive, well sorted, moist (CL). Changing at 18.6 feet to: Stiff mottled yellowish-brown, CLAY & SILT, plastic, cohesive, well sorted, moist (CL). Changing at 18.9 feet to: Loose, light yellowish-brown to brownish-yellow, fine grained SAND, very well sorted, moist (SP). Changing at 19.0 feet to: Stiff, mottled yellowish-brown, CLAY & SILT, plastic, cohesive, well sorted, moist (CL). Stiff, mottled yellowish-brown, CLAY & SILT, plastic, cohesive, well sorted, moist (CL). Loose to medium dense, very pale brown, fine grained SAND, trace Silt, very well sorted (bedded), moist (SP).	13.2SAND (SM)			
							CLAY & SILT (CL)			
							16'			
							SAND (SP)			
16	9	24/17	16-18	3-4 3-5		Loose, brown, fine grained SAND, trace Silt, very well sorted, moist (SP). Changing at 16.4 feet to: Medium brown, CLAY & SILT, some Sand, trace Gravel, moderately plastic, cohesive, poorly sorted, moist (CL). Changing at 16.7 feet to: Loose, dark yellowish-brown, fine grained SAND, trace Silt, well sorted, moist (SP). Changing at 17.0 feet to: Medium mottled yellowish-brown, CLAY & SILT, plastic, cohesive, well sorted, moist (CL). Medium mottled yellowish-brown, CLAY & SILT, plastic, cohesive, well sorted, moist (CL). Changing at 18.6 feet to: Stiff mottled yellowish-brown, CLAY & SILT, plastic, cohesive, well sorted, moist (CL). Changing at 18.9 feet to: Loose, light yellowish-brown to brownish-yellow, fine grained SAND, very well sorted, moist (SP). Changing at 19.0 feet to: Stiff, mottled yellowish-brown, CLAY & SILT, plastic, cohesive, well sorted, moist (CL). Stiff, mottled yellowish-brown, CLAY & SILT, plastic, cohesive, well sorted, moist (CL). Loose to medium dense, very pale brown, fine grained SAND, trace Silt, very well sorted (bedded), moist (SP).	16.4'			
							CLAY & SILT (CL)			
							16.7'			
							SAND (SP)			
17						Loose, brown, fine grained SAND, trace Silt, very well sorted, moist (SP). Changing at 16.4 feet to: Medium brown, CLAY & SILT, some Sand, trace Gravel, moderately plastic, cohesive, poorly sorted, moist (CL). Changing at 16.7 feet to: Loose, dark yellowish-brown, fine grained SAND, trace Silt, well sorted, moist (SP). Changing at 17.0 feet to: Medium mottled yellowish-brown, CLAY & SILT, plastic, cohesive, well sorted, moist (CL). Medium mottled yellowish-brown, CLAY & SILT, plastic, cohesive, well sorted, moist (CL). Changing at 18.6 feet to: Stiff mottled yellowish-brown, CLAY & SILT, plastic, cohesive, well sorted, moist (CL). Changing at 18.9 feet to: Loose, light yellowish-brown to brownish-yellow, fine grained SAND, very well sorted, moist (SP). Changing at 19.0 feet to: Stiff, mottled yellowish-brown, CLAY & SILT, plastic, cohesive, well sorted, moist (CL). Stiff, mottled yellowish-brown, CLAY & SILT, plastic, cohesive, well sorted, moist (CL). Loose to medium dense, very pale brown, fine grained SAND, trace Silt, very well sorted (bedded), moist (SP).	CLAY & SILT (CL)			
							18.9'			
							SAND (SP)			
							CLAY & SILT (CL)			
18	10	24/22	18-20	4-4 5-6		Loose, brown, fine grained SAND, trace Silt, very well sorted, moist (SP). Changing at 16.4 feet to: Medium brown, CLAY & SILT, some Sand, trace Gravel, moderately plastic, cohesive, poorly sorted, moist (CL). Changing at 16.7 feet to: Loose, dark yellowish-brown, fine grained SAND, trace Silt, well sorted, moist (SP). Changing at 17.0 feet to: Medium mottled yellowish-brown, CLAY & SILT, plastic, cohesive, well sorted, moist (CL). Medium mottled yellowish-brown, CLAY & SILT, plastic, cohesive, well sorted, moist (CL). Changing at 18.6 feet to: Stiff mottled yellowish-brown, CLAY & SILT, plastic, cohesive, well sorted, moist (CL). Changing at 18.9 feet to: Loose, light yellowish-brown to brownish-yellow, fine grained SAND, very well sorted, moist (SP). Changing at 19.0 feet to: Stiff, mottled yellowish-brown, CLAY & SILT, plastic, cohesive, well sorted, moist (CL). Stiff, mottled yellowish-brown, CLAY & SILT, plastic, cohesive, well sorted, moist (CL). Loose to medium dense, very pale brown, fine grained SAND, trace Silt, very well sorted (bedded), moist (SP).	17'			
							CLAY & SILT (CL)			
							20.6'			
							SAND (SP)			
19						Loose, brown, fine grained SAND, trace Silt, very well sorted, moist (SP). Changing at 16.4 feet to: Medium brown, CLAY & SILT, some Sand, trace Gravel, moderately plastic, cohesive, poorly sorted, moist (CL). Changing at 16.7 feet to: Loose, dark yellowish-brown, fine grained SAND, trace Silt, well sorted, moist (SP). Changing at 17.0 feet to: Medium mottled yellowish-brown, CLAY & SILT, plastic, cohesive, well sorted, moist (CL). Medium mottled yellowish-brown, CLAY & SILT, plastic, cohesive, well sorted, moist (CL). Changing at 18.6 feet to: Stiff mottled yellowish-brown, CLAY & SILT, plastic, cohesive, well sorted, moist (CL). Changing at 18.9 feet to: Loose, light yellowish-brown to brownish-yellow, fine grained SAND, very well sorted, moist (SP). Changing at 19.0 feet to: Stiff, mottled yellowish-brown, CLAY & SILT, plastic, cohesive, well sorted, moist (CL). Stiff, mottled yellowish-brown, CLAY & SILT, plastic, cohesive, well sorted, moist (CL). Loose to medium dense, very pale brown, fine grained SAND, trace Silt, very well sorted (bedded), moist (SP).				
20	11	24/14	20-22	3-3 4-5		Loose, brown, fine grained SAND, trace Silt, very well sorted, moist (SP). Changing at 16.4 feet to: Medium brown, CLAY & SILT, some Sand, trace Gravel, moderately plastic, cohesive, poorly sorted, moist (CL). Changing at 16.7 feet to: Loose, dark yellowish-brown, fine grained SAND, trace Silt, well sorted, moist (SP). Changing at 17.0 feet to: Medium mottled yellowish-brown, CLAY & SILT, plastic, cohesive, well sorted, moist (CL). Medium mottled yellowish-brown, CLAY & SILT, plastic, cohesive, well sorted, moist (CL). Changing at 18.6 feet to: Stiff mottled yellowish-brown, CLAY & SILT, plastic, cohesive, well sorted, moist (CL). Changing at 18.9 feet to: Loose, light yellowish-brown to brownish-yellow, fine grained SAND, very well sorted, moist (SP). Changing at 19.0 feet to: Stiff, mottled yellowish-brown, CLAY & SILT, plastic, cohesive, well sorted, moist (CL). Stiff, mottled yellowish-brown, CLAY & SILT, plastic, cohesive, well sorted, moist (CL). Loose to medium dense, very pale brown, fine grained SAND, trace Silt, very well sorted (bedded), moist (SP).				
21						Loose, brown, fine grained SAND, trace Silt, very well sorted, moist (SP). Changing at 16.4 feet to: Medium brown, CLAY & SILT, some Sand, trace Gravel, moderately plastic, cohesive, poorly sorted, moist (CL). Changing at 16.7 feet to: Loose, dark yellowish-brown, fine grained SAND, trace Silt, well sorted, moist (SP). Changing at 17.0 feet to: Medium mottled yellowish-brown, CLAY & SILT, plastic, cohesive, well sorted, moist (CL). Medium mottled yellowish-brown, CLAY & SILT, plastic, cohesive, well sorted, moist (CL). Changing at 18.6 feet to: Stiff mottled yellowish-brown, CLAY & SILT, plastic, cohesive, well sorted, moist (CL). Changing at 18.9 feet to: Loose, light yellowish-brown to brownish-yellow, fine grained SAND, very well sorted, moist (SP). Changing at 19.0 feet to: Stiff, mottled yellowish-brown, CLAY & SILT, plastic, cohesive, well sorted, moist (CL). Stiff, mottled yellowish-brown, CLAY & SILT, plastic, cohesive, well sorted, moist (CL). Loose to medium dense, very pale brown, fine grained SAND, trace Silt, very well sorted (bedded), moist (SP).				
22	12	24/16	22-24	1-1 2-3		Loose, brown, fine grained SAND, trace Silt, very well sorted, moist (SP). Changing at 16.4 feet to: Medium brown, CLAY & SILT, some Sand, trace Gravel, moderately plastic, cohesive, poorly sorted, moist (CL). Changing at 16.7 feet to: Loose, dark yellowish-brown, fine grained SAND, trace Silt, well sorted, moist (SP). Changing at 17.0 feet to: Medium mottled yellowish-brown, CLAY & SILT, plastic, cohesive, well sorted, moist (CL). Medium mottled yellowish-brown, CLAY & SILT, plastic, cohesive, well sorted, moist (CL). Changing at 18.6 feet to: Stiff mottled yellowish-brown, CLAY & SILT, plastic, cohesive, well sorted, moist (CL). Changing at 18.9 feet to: Loose, light yellowish-brown to brownish-yellow, fine grained SAND, very well sorted, moist (SP). Changing at 19.0 feet to: Stiff, mottled yellowish-brown, CLAY & SILT, plastic, cohesive, well sorted, moist (CL). Stiff, mottled yellowish-brown, CLAY & SILT, plastic, cohesive, well sorted, moist (CL). Loose to medium dense, very pale brown, fine grained SAND, trace Silt, very well sorted (bedded), moist (SP).				
23						Loose, brown, fine grained SAND, trace Silt, very well sorted, moist (SP). Changing at 16.4 feet to: Medium brown, CLAY & SILT, some Sand, trace Gravel, moderately plastic, cohesive, poorly sorted, moist (CL). Changing at 16.7 feet to: Loose, dark yellowish-brown, fine grained SAND, trace Silt, well sorted, moist (SP). Changing at 17.0 feet to: Medium mottled yellowish-brown, CLAY & SILT, plastic, cohesive, well sorted, moist (CL). Medium mottled yellowish-brown, CLAY & SILT, plastic, cohesive, well sorted, moist (CL). Changing at 18.6 feet to: Stiff mottled yellowish-brown, CLAY & SILT, plastic, cohesive, well sorted, moist (CL). Changing at 18.9 feet to: Loose, light yellowish-brown to brownish-yellow, fine grained SAND, very well sorted, moist (SP). Changing at 19.0 feet to: Stiff, mottled yellowish-brown, CLAY & SILT, plastic, cohesive, well sorted, moist (CL). Stiff, mottled yellowish-brown, CLAY & SILT, plastic, cohesive, well sorted, moist (CL). Loose to medium dense, very pale brown, fine grained SAND, trace Silt, very well sorted (bedded), moist (SP).				
24	13	24/22	24-26	2-3 3-2		Loose to medium dense, very pale brown, fine grained SAND, trace Silt, very well sorted (bedded), moist (SP).				
25						Loose to medium dense, very pale brown, fine grained SAND, trace Silt, very well sorted (bedded), moist (SP).				
REMARKS										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: SB-7/MW-7S	

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Belmont, Michigan

Boring No.: SB-7/MW-7S

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File No.: 16.0062335.52

Check: J Cai

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
27	14	24/22	26-28	2-3 3-3		Loose to medium dense, very pale brown, fine grained SAND, trace Silt, very well sorted (bedded), moist (SP).	SAND (SP)			
28	15	24/22	28-30	2-3 4-3		Loose to medium dense, very pale brown, fine grained SAND, trace Silt, very well sorted (bedded), moist (SP).				
30	16	24/20	30-32	1-3 6-8		Loose to medium dense, very pale brown, fine grained SAND, trace Silt, very well sorted (bedded), moist (SP). Changing at 30.3 feet to: Stiff, yellowish-brown, SILT, little Clay, plastic, cohesive, well sorted, moist to wet (ML). Changing at 30.7 feet to: Medium dense, very pale brown, fine to medium grained SAND, trace Silt, very well sorted (bedded), moist (SP).	30.3' SILT (ML) 30.7' SAND (SP)			
32	17	24/23	32-34	5-5 7-8		Medium dense, very pale brown, fine to medium grained SAND, trace Silt, very well sorted (bedded), moist (SP). Changing at 32.7 feet to: Soft, dark yellowish-brown, CLAY & SILT, plastic, cohesive, moist (CL). Changing at 32.8 feet to: Medium dense, very pale brown, fine to coarse grained SAND, some Gravel, trace Silt, poorly sorted, moist (SP).	32.7' 32.8' CLAY & SILT (CL) SAND (SP)			Bentonite/Grout
34	18	24/20	34-36	4-8 9-8		Medium dense, very pale brown, fine to coarse grained SAND, some Gravel, trace Silt, moderately sorted, moist (SP).				
36	19	24/18	36-38	5-6 7-8		Medium dense, very pale brown, fine to coarse grained SAND, some Gravel, trace Silt, moderately sorted, moist (SP). Changing at 36.1 feet to: Brown to yellowish-brown, CLAY & SILT, plastic, cohesive, well sorted (bedded), moist (CL). Changing at 36.2 feet to: Medium dense, very pale brown, fine to coarse grained SAND, some Gravel, trace Silt, moderately sorted, moist (SP).	36.1' 36.2' CLAY & SILT (CL) SAND (SP)			
38	20	24/18	38-40	3-5 5-7		Medium dense, very pale brown, fine to coarse grained SAND, some Gravel, trace Silt, moderately sorted, moist (SP). Changing at 38.5 feet to: Medium dense, light yellowish-brown to very pale brown, fine to medium grained SAND, trace Silt,				
39										
REMARKS										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: SB-7/MW-7S	

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Boring No.: SB-7/MW-7S

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File No.: 16.0062335.52

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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
41	21	24/20	40-42	2-4 7-8		very well sorted, moist (SP). Medium dense, light yellowish-brown to very pale brown, fine to medium grained SAND, trace Silt, very well sorted, moist (SP).	SAND (SP)			
42	22	24/16	42-44	4-4 6-10		Medium dense, light yellowish-brown to very pale brown, fine to medium grained SAND, trace Silt, very well sorted, moist (SP). Changing at 42.9 feet to: Medium dense, light yellowish-brown, fine to coarse grained SAND, some Gravel, trace Silt, poorly sorted, moist (SP).				
44	23	24/20	44-46	3-5 6-9		Medium dense, light yellowish-brown, fine to coarse grained SAND, trace Silt, poorly sorted, moist (SP). Changing at 45.3 feet to: Stiff to very stiff yellowish-brown grading to dark gray, CLAY & SILT, little Sand, trace Gravel, plastic, cohesive, poorly sorted, moist (CL).	45.3' CLAY & SILT (CL)			
46	24	24/12	46-48	3-6 7-10		Stiff to very stiff yellowish-brown grading to dark gray, CLAY & SILT, little Sand, trace Gravel, plastic, cohesive, poorly sorted, moist (CL).				
48	25	24/18	48-50	10-11 29-17		Stiff to very stiff yellowish-brown grading to dark gray, CLAY & SILT, little Sand, trace Gravel, plastic, cohesive, poorly sorted, moist (CL). Changing 48.6 feet to: Dense to very dense, very pale brown, fine to medium grained SAND, trace Silt, very well sorted, moist (SP).	48.6' SAND (SP)			
50	26	24/6	50-52	21-39 48-25		Dense to very dense, very pale brown, fine to medium grained SAND, trace Silt, very well sorted, moist (SP).				
52	27	24/23	52-54	6-12 16-20		Dense to very dense, very pale brown, fine to medium grained SAND, trace Silt, very well sorted, moist (SP).				
53										
REMARKS										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: SB-7/MW-7S	

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Check: J Cai

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
55	28	24/20	54-56	6-16 17-23		Dense to very dense, very pale brown, fine to medium grained SAND, trace Silt, very well sorted, moist (SP).	SAND (SP)			
56	29	24/23	56-58	6-13 17-21		Dense to very dense, very pale brown, fine to medium grained SAND, trace Silt, very well sorted, moist (SP).				
58	30	24/20	58-60	8-16 20-31		Dense to very dense, very pale brown, fine to medium grained SAND, trace Silt, very well sorted, moist (SP).				
60	31	24/24	60-62	9-17 18-24		Dense to very dense, very pale brown, fine to medium grained SAND, trace Silt, very well sorted, moist (SP).				
62	32	24/18	62-64	4-8 10-11		Medium dense, yellowish-brown, fine to medium grained SAND, trace Silt, well sorted, wet (SP).		1		
64	33	24/23	64-66	2-3 7-10		Medium dense, yellowish-brown, fine to medium grained SAND, trace Silt, well sorted, wet (SP).				
66	34	24/1	66-68	1-3 5-9		Medium dense, yellowish-brown, fine to medium grained SAND, trace Silt, well sorted, wet (SP).				Bentonite Seal
<div>REMARKS</div> <div>1. Groundwater was encountered at approximately 62.0 feet below ground surface.</div>										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: SB-7/MW-7S	

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Boring No.: SB-7/MW-7S

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File No.: 16.0062335.52

Check: J Cai

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
69	35	24/23	68-70	1-4 7-7		Medium dense, yellowish-brown, fine to medim grained SAND, trace Silt, well sorted, wet (SP).	SAND (SP)			
70	36	24/8	70-72	2-7 11-11		Medium dense, yellowish-brown, fine to medim grained SAND, trace Silt, well sorted, wet (SP).				
71										
72	37	24/5	72-74	1-2 5-9		Medium dense, yellowish-brown, fine to medim grained SAND, trace Silt, well sorted, wet (SP).				
73										
74						Bottom of Borehole at 74.0 Feet	74'	2		
75										
76										
77										
78										
79										
80										
81										

REMARKS

2. Monitoring well was installed in borehole upon completion. Well screen set from 70.1 to 74.7 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

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Belmont, Michigan

Boring No.: SB-8/MW-8

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File No.: 16.0062335.52

Check: Jim Cai

Contractor: Stearns Drilling Company

Foreman: Jerry Huntoon

Logged by: John Morehosue

Date Start/Finish: 10-30-17 / 10-30-17

Boring Location:

GS Elev.: 742.20' Datum:

Auger/
Casing

Sampler

Type: Hollow Stem Auger

Split Spoon

O.D. / I.D.: 8.0" / 4.25"

2.0" / 1 3/8"

Hammer Wt.: 140lbs

NA

Hammer Fall: 30"

NA

TOC Elev.: NA

NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: NA Survey Date:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					PROTECTIVE CASING
1	1	24/20	0-2	1-1 1-3		Very loose, very dark grayish-brown, well sorted, fine grained SAND, little silt, slightly cohesive, moist (SM). Changing at 0.9 feet to: Very loose, yellowish-brown, well sorted, fine to medium grained SAND, trace Silt, moist (SP).	SAND (SM) 0.9' SAND (SP)			
2	2	24/6	2-4	2-2 2-1		Very loose, yellowish-brown, well sorted, fine to medium grained SAND, trace Silt, moist (SP).				
3										
4	3	24/15	4-6	2-2 2-1		Very loose, yellowish-brown, well sorted, fine to medium grained SAND, trace Silt, moist (SP).				
5										
6	4	24/17	6-8	2-3 4-6		Loose, yellowish-brown, well sorted, fine to medium grained SAND, trace Silt, moist (SP).				
7										
8	5	24/19	8-10	3-5 5-7		Loose, yellowish-brown, well sorted, fine to medium grained SAND, trace Silt, moist (SP). Changing at 8.5 feet to: Loose, dark yellowish-brown, well sorted, fine grained SAND, little Silt, slightly cohesive, moist (SM). Changing at 8.8 feet to: Loose, light yellowish-brown to brownish-yellow, well sorted, fine to medium grained SAND, trace Silt, moist (SP). Changing at 8.9 feet to: Dark yellowish-brown, moderately well sorted, CLAY & SILT, little Sand, moderately plastic, cohesive, moist (CL). Changing at 9.1 feet to: Loose, light yellowish-brown to brownish-yellow, well sorted, fine to medium grained SAND, trace Silt, moist (SP). Changing at 9.3 feet to: Dark yellowish-brown, moderately well sorted, CLAY & SILT, little Sand, moderately plastic, cohesive, moist (CL). Medium dense, brown, well sorted, fine to medium grained SAND, little Silt, slightly cohesive, moist (SM). Changing at 10.8 feet to: Medium dense, dark yellowish-brown,	8.5' 8.8' SAND (SM) 8.9' SAND (SP) 9.1' CLAY & SILT (CL) 9.3' SAND (SP) 10' CLAY & SILT (CL) SAND (SM) 10.8' SAND (SP)			
9										
10	6	24/18	10-12	6-6 5-5						
11										
12	7	24/17	12-14	3-3 4-4						
13										
14	8	24/17	14-16	3-3 4-5						

Grout

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: SB-8/MW-8

BORING WELL 6233552 WWW.1758 HOUSE STREET NE GPJ GZA CORP GDT 1/25/18



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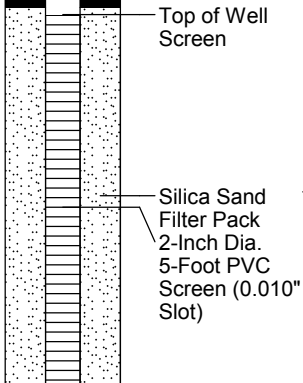
Belmont, Michigan

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File No.: 16.0062335.52

Check: Jim Cai

Sample Information						DEARBORN, MICHIGAN		Check: Jim Cai			
Depth	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed		
16	9	24/18	16-18	3-4 5-5		very well sorted, fine to medium grained SAND, trace Silt, moist (SP). Loose, dark yellowish-brown, very well sorted, fine to medium grained SAND, trace Silt, moist (SP). Loose, yellowish-brown, very well sorted, fine to medium grained SAND, trace Silt, moist (SP). Loose, dark yellowish-brown, very well sorted, fine to medium grained SAND, trace Silt, moist (SP).	SAND (SP)	1			
17											
18	10	24/19	18-20	4-4 4-4		Dark yellowish-brown, very well sorted, fine to medium grained SAND, trace Silt, moist (SP). Dark yellowish-brown, very well sorted, fine to medium grained SAND, trace Silt, moist (SP).					
19											
20	11	24/16	20-22	2-2 2-3		Very loose, brown to yellowish-brown, well sorted, fine to medium grained SAND, trace Silt, wet (SP).					
21											
22	12	24/18	22-24	1-3 2-2		Very loose, brown to yellowish-brown, well sorted, fine to medium grained SAND, trace Silt, wet (SP).					
23											
24	13	24/19	24-26	1-0 0-0		Very loose, brown to yellowish-brown, well sorted, fine to medium grained SAND, trace Silt, wet (SP).					
25											
26	14	24/18	26-28	0-0 0-1		Very loose, brown to yellowish-brown, well sorted, fine to medium grained SAND, trace Silt, wet (SP).		1			
27											
28	15	24/6	28-30	0-0 0-3		Very loose, brown to yellowish-brown, well sorted, fine to medium grained SAND, trace Silt, wet (SP).					
29											
30	16	24/18	30-32	0-1 0-1		Very loose, brown to yellowish-brown, well sorted, fine to medium grained SAND, trace Silt, wet (SP).					
31											
32	18	24/15	32-34	1-1 2-3		Very loose, brown to yellowish-brown, well					
REMARKS	1. Groundwater was encountered at approximately 20.0 feet below ground surface.										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: SB-8/MW-8		

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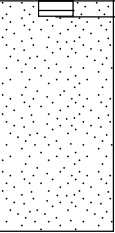
Belmont, Michigan

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Check: Jim Cai

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
33	19	24/17	34-36	0-1 2-3		sorted, fine to medium grained SAND, trace Silt, wet (SP).	SAND (SP)	2		Bottom of Well Screen
34						Very loose, brown to yellowish-brown, well sorted, fine to medium grained SAND, trace Silt, wet (SP).				
35										
36						Bottom of Borehole at 36.0 Feet	36'			
37										
38										
39										
40										
41										
42										
43										
44										
45										
46										
47										
48										
49										
<div>REMARKS</div> <div>2. Monitoring well was installed in borehole upon completion. Well screen set from 27.7 to 32.7 feet below ground surface.</div>										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: SB-8/MW-8	

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File No.: 16.0062335.52

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Contractor: Stearns Drilling Company

Foreman: Jerry Huntoon

Logged by: Joe Workman/John Morehouse

Date Start/Finish: 11-10-17 / 11-17-17

Boring Location:

GS Elev.: 818.20' Datum:

Auger/
Casing

Sampler

GROUNDWATER READINGS

Type: Hollow Stem Auger

Split Spoon

O.D. / I.D.: 8.0" / 4.25"

2.0" / 1 3/8"

Hammer Wt.: 140lbs

NA

Hammer Fall: 30"

NA

TOC Elev.: NA

NA

Date	Time	Depth	Casing	Stab

Surveyed By: NA Survey Date:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					PROTECTIVE CASING
1	1	24/13	0-2	2-2 1-2	1.0 tsf	Stiff, brown, CLAY & SILT, trace fine to medium Sand, trace Organic Matter, damp (CL).	CLAY & SILT (CL)	1		
2	2	24/6	2-4	1-2 3-5	1.5 tsf	Stiff, brown, CLAY & SILT, trace fine to coarse Sand, trace fine Gravel, damp (CL).				
3	3	24/24	4-6	2-4 7-8	3.5 tsf	Very stiff, brown, CLAY & SILT, trace fine Sand, damp (CL).				
4	4	24/24	6-8	4-5 9-11	3.0 tsf	Very stiff, brown, CLAY & SILT, trace fine Sand, damp (CL).				
5	5	24/24	8-10	2-4 7-9	2.5 tsf	Very stiff, brown, CLAY & SILT, trace fine Sand, damp (CL). Changing at 9.0 feet to: Very stiff, brown, CLAY & SILT, little fine to coarse Sand, trace fine Gravel, damp (CL).				
6	6	24/24	10-12	4-5 13-12	1.0 tsf	Stiff, brown, CLAY & SILT, little fine to coarse Sand, trace fine Gravel, damp (CL). Changing at 11.0 feet to: Very stiff, brown and gray, CLAY & SILT with intermittent 1/8 inch seams of fine to medium Sand, damp (CL).				
7					3.5 tsf					
8										
9										
10										
11										

REMARKS

1. Pocket penetrometer readings were measured in tons per square foot (tsf) and are used to evaluate consistency of cohesiv soil.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

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Check: Jim Cai

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
13	7	24/24	12-14	4-8 12-10	3.5 tsf	Very stiff, brown and gray, CLAY & SILT with intermittent 1/8 inch seams of fine to medium Sand, damp (CL). Changing at 13.2 feet to: Very stiff, gray, CLAY & SILT, little fine to coarse Sand, trace fine Gravel, damp (CL).	CLAY & SILT (CL)			
14	8	24/24	14-16	3-4 7-11	3.0 tsf					
16	9	24/24	16-18	3-5 9-12	3.0 tsf	Very stiff, brown and gray CLAY & SILT, trace fine to medium Sand, damp (CL). Changing at 17.7 feet to: Medium dense, brown, fine to medium SAND, trace Silt, damp (SP).	17.7' SAND (SP)			
18	10	24/13	18-20	2-6 7-8						
20	11	24/8	20-22	6-13 12-11	3.0 tsf	Very stiff, brown, CLAY & SILT, little fine to coarse Sand, damp (CL). Changing at 21.0 feet to: Medium dense, brown, fine to coarse SAND, little fine to coarse Gravel, trace Silt, damp (SW).	20' CLAY & SILT (CL) 21' SAND (SP)			
22	12	24/20	22-24	5-5 7-8						
24	13	24/20	24-26	2-2 2-3		Medium dense, brown, fine to medium SAND, trace coarse Sand, trace fine to coarse Gravel, trace Silt, wet (SP).		2		
REMARKS 2. Groundwater was encountered at approximately 24.0 feet below ground surface.										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: SB-9/MW-9D	

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Check: Jim Cai

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
27	14	24/13	26-28	1-1 3-2		Loose, brown, fine to medium SAND, trace coarse Sand, trace Silt, wet (SP).	SAND (SP)			
28	15	24/14	28-30	1-1 2-3		Loose, brown, fine to medium SAND, trace coarse Sand, trace Silt, wet (SP).				
30	16	24/24	30-32	3-1 3-4		Loose, brown, fine to medium SAND, trace coarse Sand, trace Silt, wet (SP). Changing at 31.0 feet to: Stiff, brown, CLAY & SILT, little fine to coarse Sand, moist (CL).				
31					1.0 tsf		31' CLAY & SILT (CL)			
32	17	24/8	32-34	2-5 4-4	0.25 tsf	Very soft, brown, CLAY & SILT, some fine to coarse Sand, little fine Gravel, moist (CL).				
34	18	24/14	34-36	6-3 6-7	1.5 tsf	Stiff, brown, CLAY & SILT, some fine to coarse Sand, little fine Gravel, damp (CL).				
36	19	24/15	36-38	6-8 12-14	2.5 tsf	Very stiff, brown, CLAY & SILT, little fine to coarse Sand, trace fine Gravel, damp (CL).				
38	20	24/14	38-40	8-16 12-12	3.5 tsf	Very stiff, gray, CLAY & SILT, some fine to coarse Sand, trace Cobbles (based on fragments), damp (CL).				
39										
REMARKS										
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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
41	21	24/16	40-42	2-9 31-17	>4.0 tsf	Hard, gray, CLAY & SILT, some fine to coarse Sand, trace fine to coarse Gravel, damp (CL).	CLAY & SILT (CL)			
42	22	24/22	42-44	3-4 10-14	2.5 tsf	Very stiff, gray, CLAY & SILT, little fine to coarse Sand, trace fine Gravel, damp (CL).				
44	23	24/19	44-46	4-6 15-18	3.0 tsf	Very stiff, gray, CLAY & SILT, little fine to coarse Sand, trace fine to coarse Gravel, damp (CL).				
46	24	24/20	46-48	3-15 32-28	>4.0 tsf	Hard, gray, CLAY & SILT, little fine to coarse Sand, trace fine to coarse Gravel, damp (CL).				
48	25	24/20	48-50	4-18 22-30	>4.0 tsf	Hard, gray, CLAY & SILT, little fine to coarse Sand, damp (CL).				
50	26	24/0	50-52	25-29 35-45		NO RECOVERY.	50' NO RECOVERY			
52	27	24/20	52-54	26-24 30-31	>4.0 tsf	Hard, gray, CLAY & SILT, some fine to coarse Sand, little fine to coarse Gravel, trace Cobbles (based on fragments), damp (CL).	52' CLAY & SILT (CL)			
REMARKS										
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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
55	28	24/24	54-56	10-17 20-30	4.0 tsf	Hard, gray, CLAY & SILT, little fine to coarse Sand, trace fine Gravel, damp (CL).	CLAY & SILT (CL)			
56	29	24/0	56-58	24-40 49-54		NO RECOVERY.	56' NO RECOVERY			
58	30	24/24	58-60	8-18 20-31	>4.0 tsf	Hard, gray, CLAY & SILT, little fine to coarse Sand, trace fine Gravel, damp (CL).	58' CLAY & SILT (CL)			
60	31	24/24	60-62	5-4 18-24	4.0 tsf	Hard, gray, CLAY & SILT, little fine to coarse Sand, trace fine Gravel, damp (CL).				
62	32	24/24	62-64	6-14 14-15		Brown, poorly sorted, SILT & CLAY, little Sand, trace gravel, plastic, cohesive, moist (ML).	62' SILT & CLAY (ML)			
64	33	24/24	64-66	6-12 15-17		Brown, poorly sorted, SILT & CLAY, little Sand, trace gravel, plastic, cohesive, moist (ML).				
66	34	24/24	66-68	5-9 14-25		Brown, poorly sorted, SILT & CLAY, little Sand, trace gravel, plastic, cohesive, moist (ML).				
67										
REMARKS										
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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
69	35	24/24	68-70	9-14 19-26		Brown, poorly sorted, SILT & CLAY, little Sand, trace gravel, plastic, cohesive, moist (ML).	SILT & CLAY (ML)			
70	36	24/23	70-72	5-15 20-26		Brown grading to dark grayish-brown, poorly sorted, CLAY & SILT, little Sand, trace Gravel, plastic, cohesive, moist (CL).	70' CLAY & SILT (CL)			
72	37	24/24	72-74	7-14 23-28		Brown grading to dark grayish-brown, poorly sorted, CLAY & SILT, little Sand, trace Gravel, plastic, cohesive, moist (CL).				
74	38	24/24	74-76	9-11 15-20		Brown grading to dark grayish-brown, poorly sorted, CLAY & SILT, little Sand, trace Gravel, plastic, cohesive, moist (CL).				
76	39	24/14	76-78	10-13 33-39		Brown grading to dark grayish-brown, poorly sorted, CLAY & SILT, little Sand, trace Gravel, plastic, cohesive, moist (CL).				
78	40	24/24	78-80	5-25 19-23		Brown grading to dark grayish-brown, poorly sorted, CLAY & SILT, little Sand, trace Gravel, plastic, cohesive, moist (CL).				
80	41	24/24	80-82	6-11 15-21		Brown grading to dark grayish-brown, poorly sorted, CLAY & SILT, little Sand, trace Gravel, plastic, cohesive, moist (CL).				
81										
REMARKS										
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Check: Jim Cai

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
82	42	24/24	82-84	10-15 23-25		Brown grading to dark grayish-brown, poorly sorted, CLAY & SILT, little Sand, trace Gravel, plastic, cohesive, moist (CL).	CLAY & SILT (CL)			
83										
84	43	24/12	84-86	7-14 21-20		Brown grading to dark grayish-brown, poorly sorted, CLAY & SILT, little Sand, trace Gravel, plastic, cohesive, moist (CL).				
85										
86	44	24/24	86-88	8-18 23-25		Brown grading to dark grayish-brown, poorly sorted, CLAY & SILT, little Sand, trace Gravel, plastic, cohesive, moist (CL).				
87										
88	45	24/15	88-90	5-38 33-33		Brown grading to dark grayish-brown, poorly sorted, CLAY & SILT, little Sand, trace Gravel, plastic, cohesive, moist (CL).				
89										
90	46	24/24	90-92	8-14 15-28		Brown grading to dark grayish-brown, poorly sorted, CLAY & SILT, little Sand, trace Gravel, plastic, cohesive, moist (CL).				
91										
92	47	24/24	92-94	15-16 25-33		Brown grading to dark grayish-brown, poorly sorted, CLAY & SILT, little Sand, trace Gravel, plastic, cohesive, moist (CL). Changing at 92.1 feet to: Dark grayish-brown, well sorted, Silty CLAY, plastic, cohesive, moist (CL).	92.1' Silty CLAY (CL)			
93										
94	48	24/24	94-96	13-22 37-43		Dark grayish-brown, well sorted, Silty CLAY, plastic, cohesive, moist (CL). Changing at 94.4 feet to: Dark grayish-brown, poorly sorted, CLAY & SILT, little Sand, trace Gravel, plastic, cohesive, moist (CL).	94.4' CLAY & SILT (CL)			
95										
REMARKS										
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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
97	49	24/24	96-98	8-18 30-23		Dark grayish-brown, poorly sorted, CLAY & SILT, little Sand, trace Gravel, plastic, cohesive, moist (CL).	CLAY & SILT (CL)		Grout	
98	50	24/24	98-100	14-24 33-45		Dark grayish-brown, poorly sorted, CLAY & SILT, little Sand, trace Gravel, plastic, cohesive, moist (CL).				
99										
100	51	24/21	100-102	19-29 47-50/3.5"		Dark grayish-brown, poorly sorted, CLAY & SILT, little Sand, trace Gravel, plastic, cohesive, moist (CL). Changing at 101.5 feet to: Dark grayish-brown, very well sorted, SILT, trace Clay, cohesive, non to slightly plastic, moist with occasional very thin lenses of Clayey Silt, moist (ML).	101.5' SILT (ML)			
101										
102	52	24/24	102-104	13-26 38-44		Dark grayish-brown, very well sorted, SILT, trace Clay, cohesive, non to slightly plastic, moist with occasional very thin lenses of Clayey Silt, moist (ML).				
103										
104	53	24/24	104-106	20-30 41-39		Dark grayish-brown, very well sorted, SILT, trace Clay, cohesive, non to slightly plastic, moist with occasional very thin lenses of Clayey Silt, moist (ML).				
105										
106	54	24/24	106-108	22-33 37-50		Dark grayish-brown, very well sorted, SILT, trace Clay, cohesive, non to slightly plastic, moist with occasional very thin lenses of Clayey Silt, moist (ML).				
107										
108	55	24/14	108-110	7-9 27-28		Dark grayish-brown, very well sorted, SILT, trace Clay, cohesive, non to slightly plastic, moist with occasional very thin lenses of Clayey Silt, moist (ML). Changing at 108.8 feet to: Dark grayish-brown, well sorted, CLAY, plastic, cohesive, moist (CL).	108.8' CLAY (CL)			
109										
REMARKS										
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Check: Jim Cai

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
111	56	24/14	110-112	20-41-50		Dark grayish-brown, well sorted, CLAY, plastic, cohesive, moist (CL). Changing at 110.3 feet to: Dark grayish-brown, very well sorted, SILT, trace Clay, cohesive, non to slightly plastic, moist with occasional very thin lenses of Clayey Silt, moist (ML).	110.3' CLAY (CL) SILT (ML)			
112	57	24/15	112-114	9-30-50/5"		Dark grayish-brown, well sorted, CLAY, plastic, cohesive, moist (CL). Changing at 112.8 feet to: Dark grayish-brown, very well sorted, SILT, trace Clay, cohesive, non to slightly plastic, moist with occasional very thin lenses of Clayey Silt (ML).	112' CLAY (CL) 112.8' SILT (ML)			
114	58	24/24	114-116	15-20 36-50		Dark grayish-brown, well sorted, CLAY, plastic, cohesive, moist (CL). Changing at 114.4 feet to: Dark grayish-brown, very well sorted, SILT, trace Clay, cohesive, non to slightly plastic, moist with occasional very thin lenses of Clayey Silt, moist (ML). Changing at 114.6 feet to: Dark grayish-brown, well sorted, CLAY, plastic, cohesive, moist (CL). Changing at 115.2 feet to: Dark grayish-brown, well sorted, CLAY, plastic, cohesive, moist (CL). Dark grayish-brown, very well sorted, SILT, trace Clay, cohesive, non to slightly plastic, moist with occasional very thin lenses of Clayey Silt (ML). Changing at 116.3 feet to: Grayish-brown, very well sorted, SILT, trace Clay, cohesive, non to slightly plastic, moist with occasional very thin lenses of Clayey Silt (ML). Grayish-brown, very well sorted, SILT, trace Clay, cohesive, non to slightly plastic, moist with occasional very thin lenses of Clayey Silt (ML).	114' CLAY (CL) 114.4' SILT (ML) 114.6' CLAY (CL) 115.1' SILT (ML) 115.2' CLAY (CL)			
116	59	24/15	116-118	1-1 2-5		Dark grayish-brown, well sorted, CLAY, plastic, cohesive, moist (CL). Changing at 115.2 feet to: Dark grayish-brown, well sorted, CLAY, plastic, cohesive, moist (CL). Dark grayish-brown, very well sorted, SILT, trace Clay, cohesive, non to slightly plastic, moist with occasional very thin lenses of Clayey Silt (ML). Changing at 116.3 feet to: Grayish-brown, very well sorted, SILT, trace Clay, cohesive, non to slightly plastic, moist with occasional very thin lenses of Clayey Silt (ML). Grayish-brown, very well sorted, SILT, trace Clay, cohesive, non to slightly plastic, moist with occasional very thin lenses of Clayey Silt (ML).	116' SILT (ML)			
118	60	24/13	118-120	4-11 23-42		Grayish-brown, very well sorted, SILT, trace Clay, cohesive, non to slightly plastic, moist with occasional very thin lenses of Clayey Silt (ML).				
120	61	24/0	120-122	17-55		NO RECOVERY.	120' NO RECOVERY			
122	62	24/12	122-124	26-44-50/3"		Very dense, grayish-brown to brown, very well sorted, fine to medium grained SAND, trace Silt, wet (SP). Changing at 122.8 feet to: Very dense, grayish-brown to brown, very well sorted, fine grained SAND, some Silt, wet (SM).	122' SAND (SP) 122.8' SAND (SM)	3		
123							124'			
REMARKS 3. Groundwater was encountered at approximately 122.0 feet below ground surface.										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: SB-9/MW-9D	

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Check: Jim Cai

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
125	63	24/12	124-126	27-50/4"		Very dense, grayish-brown to brown, very well sorted, fine to medium SAND, trace Silt, wet (SP). Changing at 124.4 feet to: Dark gray, poorly sorted, SILT & CLAY, little Sand, trace Gravel, plastic, cohesive, moist (ML). Changing at 124.6 feet to: Very dense, grayish-brown to brown, very well sorted, fine to medium grained SAND, trace Silt, wet (SP).	SAND (SP) 124.4' SILT & CLAY (CL) 124.6' SAND (SP)			
126	64	24/18	126-128	5-14-50/5"		Very dense, grayish-brown to brown, very well sorted, fine to medium grained SAND, trace Silt, wet (SP). Changing at 126.3 feet to: Dark grayish-brown, very well sorted, Silty CLAY, plastic, cohesive, bedded, moist (CL). Changing at 127.0 feet to: Very dense, brown to grayish-brown, very well sorted, fine to medium grained SAND, trace Silt, wet (SP).	126.3' Silty CLAY (CL) 127' SAND (SP)			
128	65	24/14	128-130	8-46-50/2"		Very dense, brown to grayish-brown, well sorted, fine to medium grained SAND, little Silt, wet (SM).	128' SAND (SM)			
130	66	24/6	130-132	36-50/4"		Very dense, brown to grayish-brown, well sorted, fine to medium grained SAND, little Silt, wet (SM).				
132	67	24/9	132-134	26-50/4.5"		Very dense, brown to grayish-brown, well sorted, fine to medium grained SAND, little Silt, wet (SM). Changing at 132.3 feet to: Very dense, brown to dark brown, moderately sorted, coarse to fine grained SAND, trace Silt, wet (SW). Changing at 132.5 feet to: Very dense, brown to grayish-brown, well sorted, fine to medium SAND, little Silt, wet (SM).	132.3' SAND (SW) 132.5' SAND (SP)			
134	68	24/3	134-136	5-10 39-50/4"		Dense, brown to grayish-brown, well sorted, fine to medium SAND, little Silt, wet (SM).				
136	69	24/6	136-138	9-32-50/5"		Very dense, brown to grayish-brown, well sorted, fine to medium SAND, little Silt, wet (SM).				
137										
REMARKS										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: SB-9/MW-9D	

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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
139	70	24/4	138-140	50/5"		Very dense, grayish-brown, moderately sorted, fine to medium grained SAND, little Silt, trace Clay, trace Gravel, slightly cohesive, wet (SM).	SAND (SP)			
140	71	24/6	140-142	50/5.5"		Very dense, grayish-brown, well sorted, fine grained SAND, trace Silt, non to slightly cohesive, wet with occasional very thin seams of Silty Clay (SP-SC).				
142	72	24/4	142-144	50/4.5"		Very dense, brown to dark brown, moderately sorted, fine to coarse grained SAND, trace Silt, trace Clay, trace Gravel, wet (SW).	142' SAND (SW)			
144	73	24/8	144-146	12-37-50/2"		Very dense, dark grayish-brown, poorly sorted, fine to coarse grained SAND, trace Gravel, trace Silt, trace Clay, wet (SW). Changing at 144.4 feet to: Very dense, pale brown grading to brown, moderately sorted, fine to coarse grained SAND, trace Silt, trace Gravel, non to slightly cohesive, wet (SW).				
146	74	24/10	146-148	32-50/3.5"		Very dense, pale brown grading to brown, moderately sorted, fine to coarse grained SAND, trace Silt, trace Gravel, non to slightly cohesive, wet (SW).				
148	75	24/9	148-150	35-50/3"		Very dense, pale brown grading to brown, moderately sorted, fine to coarse grained SAND, trace Silt, trace Gravel, non to slightly cohesive, wet (SP). Changing at 148.6 feet to: Very dense, pale brown, very well sorted, fine to medium SAND, trace Silt, wet (SP).	148.6' SAND (SP)			
150	76	24/4	150-152	50/5"		Very dense, pale brown, moderately sorted, fine to coarse grained SAND, trace Silt, trace Gravel, wet (SW).	150' SAND (SW)			
151							152'			
REMARKS										
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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
153	77	24/0	152-154	50/4"		NO RECOVERY.	NO RECOVERY			
154	78	24/4	154-156	50/5.5"		Very dense, pale brown, moderately sorted, fine to coarse SAND, trace Silt, trace Gravel, wet (SW).	154' SAND (SW)			
156	79	24/7	156-158	34-50/4"		Very dense, pale brown, moderately sorted, fine to coarse grained SAND, trace Silt, trace Gravel, wet (SW). Changing at 156.5 feet to: Pale brown, very well sorted, SILT, trace Clay, moderately cohesive, slightly plastic, wet (ML).	156.5' SILT (ML)			
158	80	24/4	158-160	40-50/2.5"		Very dense, grayish-brown, very well sorted, fine grained SAND, little Silt, wet (SM).	158' SAND (SM)			
160	81	24/3	160-162	50/5"		Very dense, grayish-brown, very well sorted, fine grained SAND, little Silt, wet (SM).				
162	82	24/4	162-164	41-50/5"		Very dense, brown to dark brown, moderately well sorted, fine grained SAND, little Silt, wet (SM).				
164	83	24/4	164-166	50/6"		Very dense, brown to dark brown, moderately well sorted, fine grained SAND, little Silt, wet (SM).				
165										
REMARKS										
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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
167	84	24/3	166-168	43-50/3"		Very dense, brown to dark brown, moderately well sorted, fine grained SAND, little Silt, wet (SM).	SAND (SM)			
168	85	24/2	168-170	47-50/3"		Very dense, brown, well sorted, fine to medium SAND, little Silt, trace Clay, slightly cohesive, non to slightly plastic, wet (SM).				
170	86	24/7	170-172	36-50/4"		Very dense, brown, well sorted, fine to medium SAND, little Silt, trace Clay, slightly cohesive, non to slightly plastic, wet (SM).				
172	88	24/0	172-174	43-50/3"		Very dense, brown, well sorted, fine to medium SAND, little Silt, trace Clay, slightly cohesive, non to slightly plastic, wet (SM).				
174	89	24/10	174-176	35-50		Very dense, brown, well sorted, fine to medium SAND, little Silt, trace Clay, slightly cohesive, non to slightly plastic, wet (SM). Changing at 174.2 feet to: Grayish-brown, very well sorted, SILT, little fine grained Sand, trace Clay, slightly cohesive, slightly plastic, moist to wet (ML).	174.2' SILT (ML)			
176	90	24/0	176-178	28-50		NO RECOVERY.	176' NO RECOVERY			
178	91	24/4	178-180	45-50/3.5"		Grayish-brown, very well sorted, SILT, little fine grained Sand, trace Clay, slightly cohesive, slightly plastic, moist to wet (ML).	178' SILT (ML)			
179							180'			
REMARKS										

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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
181	92	24/1	180-182	45-50/3.5"		Very dense, brown, well sorted, fine to medium SAND, little Silt, trace Clay, slightly cohesive, non to slightly plastic, wet (SM).	SAND (ML)			
182	93	24/6	182-184	50		Very dense, brown to dark brown, moderately well sorted, fine grained SAND, little Silt, wet (SM). Changing at 182.1 feet to: Brown to dark brown, very well sorted, SILT, moderately cohesive, wet (ML). Changing at 182.2 feet to: Brown to dark brown, moderately well sorted, fine grained SAND, little Silt, wet (SM). Changing at 182.4 feet to: Brown to dark brown, very well sorted, SILT, moderately cohesive, wet (ML). NO RECOVERY.	182.1' 182.2'SILT (ML) 182.4'SAND (SM) SILT (ML)			
184	94	24/0	184-186	50/5.5"		Very dense, grayish-brown, very well sorted, fine to medium SAND, trace Silt, trace Clay, slightly cohesive, wet (SP).	184' NO RECOVERY			
186	95	24/6	186-188	58/6"		Very dense, grayish-brown, very well sorted, fine to medium SAND, trace Silt, trace Clay, slightly cohesive, wet (SP).	186' SAND (SP)			
188	96	24/5	188-190	75/6"		Very dense, grayish-brown, very well sorted, fine to medium SAND, trace Silt, trace Clay, slightly cohesive, wet (SP).				
190	97	24/4	190-192	50/6"		Very dense, grayish-brown, very well sorted, fine to medium SAND, trace Silt, trace Clay, slightly cohesive, wet (SP).				
192	98	24/2	192-194	50/5"		Very dense, grayish-brown, very well sorted, fine to medium SAND, trace Silt, trace Clay, slightly cohesive, wet (SP).				
193										
REMARKS										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: SB-9/MW-9D	

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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
195	99	24/9	194-196	42-50/3"		Grayish-brown, very well sorted, fine to medium SAND, trace Silt, trace Clay, slightly cohesive, wet (SP). Changing at 194.3 feet to: Grayish-brown, very well sorted, SILT, cohesive, moist to wet (ML).	194.3' SAND (SP) SILT (ML)			
196	100	24/9	196-198	15-38-50/3"		Grayish-brown, very well sorted, SILT, cohesive, moist to wet (ML).				
198	101	24/9	198-200	24-50/5"		Grayish-brown, poorly sorted, CLAY & SILT, some Sand, trace Gravel, slightly plastic, moderately cohesive, moist (CL). Changing at 198.2 feet to: Grayish-brown, very well sorted, SILT, cohesive, moist to wet (ML).	198.2' CLAY & SILT (CL) SILT (ML)			
200	102	24/4	200-202	28-50/3"		Grayish-brown, poorly sorted, CLAY & SILT, some Sand, trace Gravel, slightly plastic, moderately cohesive, moist (CL).	200' CLAY & SILT (CL)			
202	103	24/3	202-204	50/6"		Grayish-brown, poorly sorted, CLAY & SILT, some Sand, trace Gravel, slightly plastic, moderately cohesive, moist (CL).				Silica Sand Filter Pack
203										Top of Well Screen
204	104	24/7	204-206	50/6"		Grayish-brown, poorly sorted, CLAY & SILT, some Sand, trace Gravel, slightly plastic, moderately cohesive, moist (CL). Changing at 204.3 feet to: Grayish-brown, well sorted, fine to medium grained SAND, little Silt, moderately cohesive, wet (SM). Changing at 204.4 feet to: Grayish-brown, moderately well sorted, fine to medium SAND, little Silt, trace Gravel, non-plastic, non-cohesive, moist to wet (SM).	204.3' SAND (SM)			
206	105	24/12	206-208	30-50/4"		Grayish-brown, moderately well sorted, fine to medium SAND, little Silt, trace Gravel, non-plastic, non-cohesive, moist to wet (SM). Changing at 206.4 feet to: Grayish-brown, well sorted, SILT, trace Clay, slightly cohesive, moderately	206.4' SILT (ML) SAND (SM)			2-Inch Dia. 5-Foot PVC Screen (0.010" Slot)
207										
REMARKS										

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Check: Jim Cai

Sample Information						Dumont, Michigan		Check:	Jim Cai
Depth	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
209	106	24/9	208-210	19-24 23-25		cohesive, moist to wet (ML). Changing at 206.5 feet to: Dense, grayish-brown, moderately well sorted, fine to medium SAND, little Silt, trace Gravel, non-plastic, non-cohesive, moist to wet (SM). Dense, grayish-brown, moderately well sorted, fine to medium SAND, little Silt, trace Gravel, non-plastic, non-cohesive, moist to wet (SP). Changing at 208.4 feet to: Grayish-brown, well sorted, SILT, trace Clay, slightly cohesive, moderately cohesive, moist to wet (ML). Changing at 208.8 feet to: Grayish-brown, very well sorted, Silty CLAY, plastic, cohesive, moist (CL). Grayish-brown, very well sorted, Silty CLAY, plastic, cohesive, moist (CL). Changing at 211.3 feet to: Grayish-brown, moderately well sorted, fine to medium SAND, little Silt, trace Gravel, non-plastic, non-cohesive, moist to wet (SM).	SAND (SM) 208.4'	4	Bottom of Well Screen
					208.8'		SILT (ML)		
							Silty CLAY (CL)		
210	107	24/8	210-212	14-18-75/6"			211.3'		
211							SAND (SM)		
							212'		
212	108	24/15	212-214	19-45-50/3"			Silty CLAY (CL)		
213							212.9'		
							SAND (SM)		
214	109	24/12	214-216	34-50/3"			214.9'		
215							SILT (ML)		
							216'		
216	110	24/18	216-218	18-27-50/5"			Silty CLAY (CL)		
217							217.4'		
							CLAY & SILT (CL)		
218	111	24/18	218-220	15-32-50/4"			218'		
219							Silty CLAY (CL)		
							220'		
220						Bottom of Borehole at 220.0 Feet			
221									
REMARKS	4. Monitoring well was installed in borehole upon completion. Well screen set from 203.0 to 208.0 feet below ground surface.								
	Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.								
Boring No.: SB-9/MW-9D									

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Check: Jim Cai

Contractor: Stearns Drilling Company

Foreman: Jerry Huntoon

Logged by: John Morehouse

Date Start/Finish: 11-17-17 / 11-17-17

Boring Location:

GS Elev.: 817.90' Datum:

Auger/
Casing

Sampler

GROUNDWATER READINGS

Type: Hollow Stem Auger

Split Spoon

O.D. / I.D.: 8.0" / 4.25"

2.0" / 1 3/8"

Hammer Wt.: 140lbs

NA

Hammer Fall: 30"

NA

TOC Elev.: NA

NA

Date	Time	Depth	Casing	Stab

Surveyed By: NA Survey Date:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					PROTECTIVE CASING
1						See SB-9/MW-9D boring log for sample description and classification.				
2										
3										
4										
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28										
29										

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: MW-9M

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Check: Jim Cai

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
31										
32										
33										
34										
35										
36										
37										
38										
39										
40										
41										
42										
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52										
53										
54										
55										
56										
57										
58										
59										
60										
61										
62										Grout
63										
64										
REMARKS										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: MW-9M	

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Check: Jim Cai

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
66										
67										
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71										
72										
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75										
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99										
REMARKS										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: MW-9M	

BORING WELL 6233552 WWW.US 131 SB-9 THROUGH SB-11.GPJ GZA_CORP.GDT 1/25/18



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US 131

Belmont, Michigan

Boring No.: MW-9M

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File No.: 16.0062335.52

Check: Jim Cai

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
101									
102									
103									
104									
105									
106									
107									
108									
109									
110									
111									
112									
113									
114									
115									
116									
117									
118									
119									
120									
121									
122									
123									
124									
125									
126									
127									
128									
129									
130									
131						Bottom of Borehole at 131.0 Feet		1	
132									
133									
134									

REMARKS

1. Monitoring well was installed in borehole upon completion. Well screen set from 126.0 to 131.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: MW-9M



BORING WELL 6233552 WWW.US131.SB-9 THROUGH SB-11.GPJ GZA_CORP.GDT 1/25/18



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Boring No.: MW-9S

Page: 1 of 1

File No.: 16.0062335.52

Check: Jim Cai

Contractor: Stearns Drilling Company

Foreman: Jerry Huntoon

Logged by: John Morehouse

Date Start/Finish: 11-17-17 / 11-17-17

Boring Location:

GS Elev.: 817.80' Datum:

Auger/
Casing

Sampler

Type: Hollow Stem Auger

Split Spoon

O.D. / I.D.: 8.0" / 4.25"

2.0" / 1 3/8"

Hammer Wt.: 140lbs

NA

Hammer Fall: 30"

NA

TOC Elev.: NA

NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: NA Survey Date:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					PROTECTIVE CASING
1						See SB-9/MW-9D boring log for sample description and classification.				
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										
31										
						Bottom of Borehole at 31.0 Feet		1		

Grout

Bentonite Seal

Top of Well Screen

Silica Sand

Filter Pack

2-Inch Dia.

5-Foot PVC

Screen (0.010"

Slot)

Bottom of Well Screen

REMARKS

1. Monitoring well was installed in borehole upon completion. Well screen set from 26.0 to 31.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: MW-9S

BORING WELL 6233552 WWW.US131.SB-9 THROUGH SB-11.GPJ GZA_CORP.GDT 1/25/18



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Boring No.: SB-10/MW-10D

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File No.: 16.0062335.52

Check: JTM/JMG

Contractor: Stearns Drilling Company

Foreman: Jerry Huntoon

Logged by: Julie Groenleer/Joe Workman

Date Start/Finish: 11-20-17 / 11-28-17

Boring Location: 587,298.7726 N; 12,789,357.1821 E

GS Elev.: 780.9' Datum:

Auger/
Casing

Sampler

Type: Hollow Stem Auger Split Spoon

O.D. / I.D.: 8.0" / 4.25" 2.0" / 1 3/8"

Hammer Wt.: 140lbs NA

Hammer Fall: 30" NA

Other: NA NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD					PROTECTIVE CASING
1	1	24/17	0-2	2-2 3-2		TOPSOIL. Changing at 0.6 feet to: Loose, brown, fine to medium SAND, trace Silt, damp (SP).	0.6' TOPSOIL SAND (SP)			
2	2	24/16	2-4	2-3 8-7		Medium dense, brown, fine to medium SAND, trace Silt, damp (SP).				
3										
4	3	24/0	4-6	4-5 6-8		NO RECOVERY.	4' NO RECOVERY			
5										
6	4	24/18	6-8	3-3 4-4		Loose, brown, fine to medium SAND, trace Silt, damp (SP).	6' SAND (SW)			
7										
8	5	24/14	8-10	2-4 4-4		Loose, brown, fine to medium SAND, trace Silt, damp (SP).				
9										
10	6	24/20	10-12	2-5 7-5		Medium dense, brown, fine to medium SAND, trace Silt, damp (SP).				
11										
12	7	24/12	12-14	3-2 3-3		Loose, brown, fine to medium SAND, trace Silt, damp (SP).				
13										
14	8	24/21	14-16	3-3 3-4		Loose, brown, fine to medium SAND, trace Silt, damp (SP).				
15										
16	9	24/20	16-18	2-4 4-6		Loose, brown, fine to medium SAND, trace Silt, damp (SP).				
17										

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: SB-10/MW-10D

BORING WI 62355.52 HOUSE STREET COMPLETE.GPJ WI DNR.GDT 4/18/20



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Boring No.: SB-10/MW-10D

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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD					
19	10	24/18	18-20	3-6 6-6		Medium dense, brown, fine to medium SAND, trace Silt, damp (SP).	SAND (SW)			
20	11	24/17	20-22	3-4 6-7		Loose, brown, fine to medium SAND, trace Silt, damp (SP).				
22	12	24/19	22-24	3-5 6-7		Medium dense, brown, fine to medium SAND, trace Silt, damp (SP).				
24	13	24/22	24-26	4-6 8-8		Medium dense, brown, fine to medium SAND, trace Silt, damp (SP).				
26	14	24/18	26-28	6-13 13-18		Medium dense, brown, fine to medium SAND, trace Silt, damp (SP).				
28	15	24/20	28-30	10-13 21-20		Dense, brown, fine to medium SAND, trace Silt, damp (SP).				
30	16	24/20	30-32	10-16 21-24		Dense, brown, fine to medium SAND, trace Silt, damp (SP).				
32	17	24/22	32-34	11-16 24-27		Dense, brown, fine to medium SAND, trace Silt, damp (SP).				
34	18	24/18	34-36	10-16 26-32		Dense, brown, fine to medium SAND, trace Silt, damp (SP).				
36	19	24/19	36-38	12-21 25-29		Dense, brown, fine to medium SAND, trace Silt, damp (SP).				
38	20	24/16	38-40	8-18 21-27		Dense, brown, fine to medium SAND, trace Silt, damp (SP).				
REMARKS										

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD					
40	21	24/23	40-42	14-20 22-25		Dense, brown, fine to medium SAND, trace Silt, damp (SP).	SAND (SW)			
41										
42	22	24/20	42-44	8-12 17-21		Medium dense, brown, fine to medium SAND, trace Silt, damp (SP).				
43										
44	23	24/24	44-46	7-10 10-9		Medium dense, brown, fine to medium SAND, trace Silt, damp (SP).				
45										
46	24	24/18	46-48	7-13 14-14		Medium dense, brown, fine to medium SAND, trace Silt, trace Gravel, damp (SP).				
47										
48	25	24/24	48-50	9-11 11-12		Medium dense, brown, fine to medium SAND, trace Silt, trace Gravel, damp (SP).				
49										
50	26	24/16	50-52	9-11 13-10		Medium dense, brown, fine to medium SAND, trace Silt, moist (SP).				
51										
52	27	24/24	52-54	9-11 11-7		Medium dense, brown, fine to medium SAND, trace Silt, moist (SP). Changing at 53.0 feet to: Medium dense, brown, fine to medium SAND, trace Silt, wet (SP).		1		
53										
54	28	24/17	54-56	3-3 6-8		Loose, brown, fine to medium SAND, trace Silt, wet (SP).				
55										
56	29	24/18	56-58	2-3 7-7		Loose, brown, fine to coarse SAND, trace Silt, trace fine Gravel, wet (SW).				
57										
58	30	24/13	58-60	4-8 8-10		Medium dense, brown, fine to coarse SAND, trace Silt, trace fine Gravel, wet (SW).				
59										
REMARKS										
1. Groundwater was encountered at approximately 53.0 feet below ground surface.										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.										

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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD					
61	31	24/6	60-62	2-4 6-9		Loose, brown, fine to coarse SAND, trace Silt, trace fine Gravel, wet (SW).	SAND (SW)			
62	32	24/3	62-64	6-8 13-20		Medium dense, brown, fine to medium SAND, trace Silt, wet (SP).	62' SAND (SP)			
63										
64	33	24/12	64-66	4-9 10-15		Medium dense, brown, fine to medium SAND, trace Silt, wet (SP).				
65										
66	34	24/12	66-68	2-5 8-11		Medium dense, brown, fine to medium SAND, little Silt, wet (SM).	66' SAND (SM)			
67										
68	35	24/8	68-70	5-7 13-15		Medium dense, brown, fine to medium SAND, trace Silt, wet (SP).	68' SAND (SP)			
69										
70	36	24/11	70-72	3-3 7-8		Loose, brown, fine to medium SAND, trace Silt, wet (SP).				
71										
72	37	24/13	72-74	2-4 10-10		Medium dense, brown, fine to medium SAND, trace Silt, wet (SP).				
73										
74	38	24/20	74-76	2-3 5-12		Loose, brown, fine to medium SAND, trace Silt, wet (SP).				
75										
76	39	24/17	76-78	3-8 10-13		Medium dense, brown, fine to medium SAND, trace Silt, wet (SP).				
77										
78	40	24/12	78-80	4-5 8-15		Medium dense, brown, fine to medium SAND, trace Silt, wet (SP).				
79										
80	41	24/21	80-82	4-12 19-22		Dense, brown, fine to medium SAND, trace Silt, wet (SP).				
REMARKS										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: SB-10/MW-10D	

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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD					
82	42	24/13	82-84	4-12 21-25		Dense, brown, fine to medium SAND, trace Silt, wet (SP).	SAND (SP)			
83										
84	43	24/22	84-86	6-10 15-15		Medium dense, brown, fine to medium SAND, trace Silt, wet (SP).				
85										
86	44	24/18	86-88	3-7 7-15		Medium dense, brown, fine to medium SAND, trace Silt, trace coarse Sand, wet (SP).				
87										
88	45	24/19	88-90	5-11 15-16		Medium dense, brown, fine to medium SAND, trace Silt, trace coarse Sand, wet (SP).				
89										
90	46	24/16	90-92	4-8 20-22		Medium dense, brown, fine to medium SAND, trace Silt, trace coarse Sand, wet (SP).				
91										
92	47	24/20	92-94	4-7 15-19		Medium dense, brown, fine to medium SAND, trace Silt, wet (SP).				
93										
94	48	20/20	94-95.7	4-12 38-50/4"		Dense, brown, fine to medium SAND, trace Silt, wet (SP).				
95										
96	49	24/22	96-98	7-14 22-30		Dense, brown, fine to medium SAND, trace Silt, wet (SP).				
97										
98	50	24/4	98-100	5-8 15-22		Medium dense, brown, fine to medium SAND, trace Silt, wet (SP).				
99										
100	51	24/18	100-102	3-8 13-21		Medium dense, brown, fine to medium SAND, trace Silt, wet (SP).				
101										
REMARKS										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: SB-10/MW-10D	

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Grout



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File No.: 16.0062335.52

Check: JTM/JMG

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD					
103	52	24/20	102-104	4-5 15-19		Medium dense, brown, fine to medium SAND, trace Silt, wet (SP).	SAND (SP)			
104	53	24/18	104-106	6-7 13-21		Medium dense, brown, fine to medium SAND, trace Silt, wet (SP).				
106	54	24/13	106-108	5-13 29-45		Dense, brown, fine to medium SAND, trace Silt, wet (SP).				
108	55	24/17	108-110	5-11 21-35		Dense, brown, fine to medium SAND, little Silt, wet (SM).	108' SAND (SM)			
110	56	24/20	110-112	4-13 32-56		Dense, brown, fine to medium SAND, trace Silt, wet (SP).	110' SAND (SP)			
112	57	24/7	112-114	5-11 18-31		Medium dense, brown, fine to medium SAND, trace Silt, wet (SP).				
114	58	24/18	114-116	3-7 18-35		Medium dense, brown, fine to medium SAND, trace Silt, wet (SP).				
116	59	24/8	116-118	2-2 3-5		Loose, brown, fine to medium SAND, trace Silt, wet (SP).				
118	60	24/17	118-120	2-8 36-50		Dense, brown, fine to medium SAND, trace Silt, wet (SP).				
120	61	17/8	120-121.4	4-37-50/5"		Very dense, brown, fine to medium SAND, trace Silt, wet (SP).				
122	62	22/20	122-123.8	11-26 34-50/4"		Very dense, brown, fine to medium SAND, trace Silt, wet (SP).				
REMARKS										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: SB-10/MW-10D	

BORING WI 62355.52 HOUSE STREET COMPLETE.GPJ WI DNR.GDT 4/18/20



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File No.: 16.0062335.52

Check: JTM/JMG

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD					
124	63	24/11	124-126	1-1 15-25		Medium dense, brown, fine to medium SAND, trace Silt, wet (SP).	SAND (SP)			
125										
126	64	24/0	126-128	2-3 8-21		NO RECOVERY.	126' NO RECOVERY			
127										
128	65	24/21	128-130	6-6 16-23		Medium dense, brown, fine to medium SAND, trace Silt, wet (SP).	128' SAND (SP)			
129										
130	66	24/13	130-132	1-10 12-15		Medium dense, brown, fine to medium SAND, trace Silt, wet (SP).				
131										
132	67	24/4	132-134	8-9 23-50		Dense, brown, fine to medium SAND, trace Silt, wet (SP).				
133										
134	68	20/12	134-135.7	5-12 26-50/4"		Dense, brown, fine to medium SAND, trace Silt, wet (SP).				
135										
136	69	20/13	136-137.7	3-7 31-50/2"		Dense, brown, fine to medium SAND, trace Silt, wet (SP).				
137										
138	70	16/11	138-139.3	2-21-50/4"		Very dense, brown, fine to medium SAND, trace Silt, wet (SP).				
139										
140	71	15/15	140-141.3	4-25-50/3"		Very dense, brown, fine to medium SAND, trace Silt, wet (SP).				
141										
142	72	12/12	142-143	19-50/6"		Very dense, brown, fine to medium SAND, trace Silt, wet (SP).				
143										
REMARKS										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: SB-10/MW-10D	

BORING WI 62355.52 HOUSE STREET COMPLETE.GPJ WI DNR.GDT 4/18/20



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Check: JTM/JMG

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD					
145	73	24/21	144-146	9-13 28-27		Medium dense, brown, fine to medium SAND, trace Silt, wet (SP).	SAND (SP)			
146	74	18/16	146-147.5	1-29-50/6"		Very dense, brown, fine to medium SAND, trace Silt, wet (SP).				
148	75	24/20	148-150	6-13 32-50		Dense, brown, fine to medium SAND, trace Silt, wet (SP). Changing at 149.7 feet to: Dense, brown, fine SAND, little Silt, wet (SM).	149.7' SAND (SM)			
150	76	15/13	150-151.36	21-50/3"		Dense, brown, fine SAND, little Silt, wet (SM). Changing at 150.6 feet to: Very dense, brown, fine to medium SAND, trace Silt, wet (SP).	150.6' SAND (SP)			
152	77	11/11	152-152.9	11-50/5"		Very dense, brown, fine to medium SAND, trace Silt, wet (SP).				
154	78	14/13	154-155.28	41-50/2"		Very dense, brown, fine to medium SAND, trace Silt, wet (SP).				
156	79	24/17	156-158	8-15 27-50		Dense, brown, fine to medium SAND, trace Silt, wet (SP).				
158	80	12/12	158-159	6-14		Dense, brown, fine to medium SAND, trace Silt, wet (SP).				
160	81	24/11	160-162	3-5 10-16		Medium dense, brown, fine to medium SAND, trace Silt, wet (SP).				
162	82	16/11	162-163.37	43-50/4"		Very dense, brown, fine to medium SAND, trace Silt, wet (SP).				
164	83	16/16	164-165.32	50-50/4"		Very dense, brown, fine to medium SAND, trace Silt, wet (SP).				
REMARKS										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: SB-10/MW-10D	

BORING WI 62355.52 HOUSE STREET COMPLETE.GPJ WI DNR.GDT 4/18/20



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Check: JTM/JMG

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD					
166	84	23/15	166-167.9	10-28 34-50/5"		Very dense, brown, fine to medium SAND, trace Silt, wet (SP).	SAND (SP)			
167										
168	85	24/24	168-170	7-17 23-20		Dense, brown, fine to medium SAND, trace Silt, wet (SP).				
169										
170	86	23/23	170-171.9	6-12 19-50/5"		Medium dense, brown, fine to medium SAND, trace Silt, wet (SP). Changing at 171.0 feet to: Very dense, gray, fine to medium SAND, little Clay & Silt, trace coarse Sand, trace fine Gravel, wet (SC).	171' SAND (SC)			
171										
172	87	24/24	172-174	16-28 48-36		Very dense, gray, fine to medium SAND, trace Silt, wet (SP). Changing at 173.0 feet to: Very dense, gray, fine to coarse SAND, little Clay & Silt, little fine Gravel, wet (SC). Changing at 173.5 feet to: Very dense, gray, fine to medium SAND, trace Silt, wet (SP). Changing at 173.9 feet to: Very dense, gray, fine to coarse SAND, little Clay & Silt, little fine Gravel, moist (SC).	172' SAND (SP)			
173							173' SAND (SC)			
174	88	7/7	174-174.6	50-50/1"		Very dense, gray, fine to medium SAND, trace coarse Sand, trace Clay & Silt, wet (SP).	173.5' SAND (SP)			
175							173.9' SAND (SC)			
176	89	24/24	176-178	12-29 31-35		Very dense, gray, fine to medium SAND, trace coarse Sand, trace Clay & Silt, wet (SP).	174' SAND (SP)			
177						Very dense, gray, fine to coarse SAND, some fine to coarse Gravel, trace Clay & Silt, wet (SW).	176' SAND (SW)			
178	90	24/24	178-180	16-20 17-42		Very dense, gray, fine to coarse SAND, little fine Gravel, trace Clay & Silt, wet (SW).				
179										
180	91	17/17	180-181.4	13-16-50/5"		Medium dense, gray, fine to coarse SAND, little fine Gravel, trace Silt, wet (SW). Changing at 181.5 feet to: Very dense, gray, fine to medium SAND, little Silt, wet (SM).	181.5' SAND (SM)			
181										
182	92	10/10	182-182.8	11-50/4"		Very dense, fine to coarse SAND, little fine to coarse Gravel, trace Silt, wet (SW).	182' SAND (SW)			Bentonite Seal
183										
184	93	4/4	184-184.3	75/4"		Very dense, gray, fine to medium SAND, little Clay & Silt, trace coarse Sand, trace fine fine Gravel, moist (SC).	184' SAND (SC)			
185										Top of Well Screen
							186'			
REMARKS										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: SB-10/MW-10D	

BORING WI 62355.52 HOUSE STREET COMPLETE.GPJ WI DNR.GDT 4/18/20



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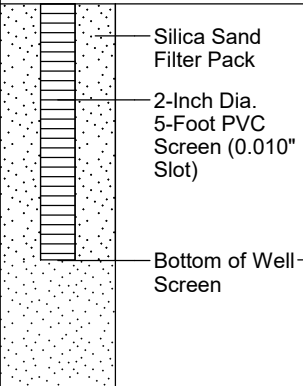
Belmont, Michigan

Boring No.: SB-10/MW-10D

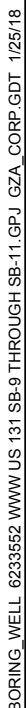
Page: 10 of 10

File No.: 16.0062335.52

Check: JTM/JMG

Bentonite, Michigan										Check: JTM/JMG	
Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed		
	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD						
187	94	3/3	186-186.3	50/3"		Very dense, gray, fine to coarse SAND, some fine to coarse Gravel, trace Cobble, trace Silt, wet (SW).	SAND (SW)				
188	95	2/2	188-188.2	50/2"		Very dense, gray, fine to coarse SAND, some fine to coarse Gravel, trace Cobble, trace Silt, wet (SW).					
189											
190	96	3/1	190-190.3	50/3"		NO RECOVERY.	190' NO RECOVERY (Rock Fragment in Tip)				
191											
192						Bottom of Borehole at 192.0 Feet	192'	2			
193											
194											
195											
196											
197											
198											
199											
200											
201											
202											
203											
204											
205											
206											
REMARKS	2. Monitoring well installed upon completion.										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: SB-10/MW-10D		

BORING WI 62355.52 HOUSE STREET COMPLETE.GPJ WI DNR.GDT 4/18/20





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US 131

Belmont, Michigan

Boring No.: MW-10M

Page: 2 of 2

File No.: 16.0062335.52

Check: Jim Cai

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
0000 0001 0002 0003 0004 0005 0006 0007 0008 0009 0010 0011 0012 0013 0014 0015 0016 0017 0018 0019 0020 0021 0022 0023 0024 0025 0026 0027 0028 0029 0030 0031 0032 0033 0034 0035 0036 0037 0038 0039 0040 0041 0042 0043 0044 0045 0046 0047 0048 0049 0050 0051 0052 0053 0054 0055 0056 0057 0058 0059 0060 0061 0062 0063 0064 0065 0066 0067 0068 0069 0070 0071 0072 0073 0074 0075 0076 0077 0078 0079 0080 0081 0082 0083 0084 0085 0086 0087 0088 0089 0090 0091 0092 0093 0094 0095 0096 0097 0098 0099 0100 0101 0102 0103 0104 0105 0106 0107 0108 0109 0110 0111 0112 0113 0114 0115 0116 0117 0118 0119 0120 0121 0122 0123 0124 0125 0126 0127 0128 0129 0130 0131 0132 0133 0134 0135 0136 0137 0138 0139 0140 0141 0142 0143 0144 0145 0146 0147 0148 0149 0150 0151 0152 0153 0154 0155 0156 0157 0158 0159 0160 0161 0162 0163 0164 0165 0166 0167 0168 0169 0170 0171 0172 0173 0174 0175 0176 0177 0178 0179 0180 0181 0182 0183 0184 0185 0186 0187 0188 0189 0190 0191 0192 0193 0194 0195 0196 0197 0198 0199 0200 0201 0202 0203 0204 0205 0206 0207 0208 0209 0210 0211 0212 0213 0214 0215 0216 0217 0218 0219 0220 0221 0222 0223 0224 0225 0226 0227 0228 0229 0230 0231 0232 0233 0234 0235 0236 0237 0238 0239 0240 0241 0242 0243 0244 0245 0246 0247 0248 0249 0250 0251 0252 0253 0254 0255 0256 0257 0258 0259 0260 0261 0262 0263 0264 0265 0266 0267 0268 0269 0270 0271 0272 0273 0274 0275 0276 0277 0278 0279 0280 0281 0282 0283 0284 0285 0286 0287 0288 0289 0290 0291 0292 0293 0294 0295 0296 0297 0298 0299 0300 0301 0302 0303 0304 0305 0306 0307 0308 0309 0310 0311 0312 0313 0314 0315 0316 0317 0318 0319 0320 0321 0322 0323 0324 0325 0326 0327 0328 0329 0330 0331 0332 0333 0334 0335 0336 0337 0338 0339 0340 0341 0342 0343 0344 0345 0346 0347 0348 0349 0350 0351 0352 0353 0354 0355 0356 0357 0358 0359 0360 0361 0362 0363 0364 0365 0366 0367 0368 0369 0370 0371 0372 0373 0374 0375 0376 0377 0378 0379 0380 0381 0382 0383 0384 0385 0386 0387 0388 0389 0390 0391 0392 0393 0394 0395 0396 0397 0398 0399 0400 0401 0402 0403 0404 0405 0406 0407 0408 0409 0410 0411 0412 0413 0414 0415 0416 0417 0418 0419 0420 0421 0422 0423 0424 0425 0426 0427 0428 0429 0430 0431 0432 0433 0434 0435 0436 0437 0438 0439 0440 0441 0442 0443 0444 0445 0446 0447 0448 0449 0450 0451 0452 0453 0454 0455 0456 0457 0458 0459 0460 0461 0462 0463 0464 0465 0466 0467 0468 0469 0470 0471 0472 0473 0474 0475 0476 0477 0478 0479 0480 0481 0482 0483 0484 0485 0486 0487 0488 0489 0490 0491 0492 0493 0494 0495 0496 0497 0498 0499 0500 0501 0502 0503 0504 0505 0506 0507 0508 0509 0510 0511 0512 0513 0514 0515 0516 0517 0518 0519 0520 0521 0522 0523 0524 0525 0526 0527 0528 0529 0530 0531 0532 0533 0534 0535 0536 0537 0538 0539 0540 0541 0542 0543 0544 0545 0546 0547 0548 0549 0550 0551 0552 0553 0554 0555 0556 0557 0558 0559 0560 0561 0562 0563 0564 0565 0566 0567 0568 0569 0570 0571 0572 0573 0574 0575 0576 0577 0578 0579 0580 0581 0582 0583 0584 0585 0586 0587 0588 0589 0590 0591 0592 0593 0594 0595 0596 0597 0598 0599 0600 0601 0602 0603 0604 0605 0606 0607 0608 0609 0610 0611 0612 0613 0614 0615 0616 0617 0618 0619 0620 0621 0622 0623 0624 0625 0626 0627 0628 0629 0630 0631 0632 0633 0634 0635 0636 0637 0638 0639 0640 0641 0642 0643 0644 0645 0646 0647 0648 0649 0650 0651 0652 0653 0654 0655 0656 0657 0658 0659 0660 0661 0662 0663 0664 0665 0666 0667 0668 0669 0670 0671 0672 0673 0674 0675 0676 0677 0678 0679 0680 0681 0682 0683 0684 0685 0686 0687 0688 0689 0690 0691 0692 0693 0694 0695 0696 0697 0698 0699 0700 0701 0702 0703 0704 0705 0706 0707 0708 0709 0710 0711 0712 0713 0714 0715 0716 0717 0718 0719 0720 0721 0722 0723 0724 0725 0726 0727 0728 0729 0730 0731 0732 0733 0734 0735 0736 0737 0738 0739 0740 0741 0742 0743 0744 0745 0746 0747 0748 0749 0750 0751 0752 0753 0754 0755 0756 0757 0758 0759 0760 0761 0762 0763 0764 0765 0766 0767 0768 0769 0770 0771 0772 0773 0774 0775 0776 0777 0778 0779 0780 0781 0782 0783 0784 0785 0786 0787 0788 0789 0790 0791 0792 0793 0794 0795 0796 0797 0798 0799 0800 0801 0802 0803 0804 0805 0806 0807 0808 0809 0810 0811 0812 0813 0814 0815 0816 0817 0818 0819 0820 0821 0822 0823 0824 0825 0826 0827 0828 0829 0830 0831 0832 0833 0834 0835 0836 0837 0838 0839 0840 0841 0842 0843 0844 0845 0846 0847 0848 0849 0850 0851 0852 0853 0854 0855 0856 0857 0858 0859 0860 0861 0862 0863 0864 0865 0866 0867 0868 0869 0870 0871 0872 0873 0874 0875 0876 0877 0878 0879 0880 0881 0882 0883 0884 0885 0886 0887 0888 0889 0890 0891 0892 0893 0894 0895 0896 0897 0898 0899 0900 0901 0902 0903 0904 0905 0906 0907 0908 0909 0910 0911 0912 0913 0914 0915 0916 0917 0918 0919 0920 0921 0922 0923 0924 0925 0926 0927 0928 0929 0930 0931 0932 0933 0934 0935 0936 0937 0938 0939 0940 0941 0942 0943 0944 0945 0946 0947 0948 0949 0950 0951 0952 0953 0954 0955 0956 0957 0958 0959 0960 0961 0962 0963 0964 0965 0966 0967 0968 0969 0970 0971 0972 0973 0974 0975 0976 0977 0978 0979 0980 0981 0982 0983 0984 0985 0986 0987 0988 0989 0990 0991 0992 0993 0994 0995 0996 0997 0998 0999 1000 1001 1002 1003 1004 1005 1006 1007 1008 1009 1010 1011 1012 1013 1014 1015 1016 1017 1018 1019 1020 1021 1022 1023 1024 1025 1026 1027 1028 1029 1030 1031 1032 1033 1034 1035 1036 1037 1038 1039 1040 1041 1042 1043 1044 1045 1046 1047 1048 1049 1050 1051 1052 1053 1054 1055 1056 1057 1058 1059 1060 1061 1062 1063 1064 1065 1066 1067 1068 1069 1070 1071 1072 1073 1074 1075 1076 1077 1078 1079 1080 1081 1082 1083 1084 1085 1086 1087 1088 1089 1090 1091 1092 1093 1094 1095 1096 1097 1098 1099 1100 1101 1102 1103 1104 1105 1106 1107 1108 1109 1110 1111 1112 1113 1114 1115 1116 1117 1118 1119 1120 1121 1122 1123 1124 1125 1126 1127 1128 1129 1130 1131 1132 1133 1134 1135 1136 1137 1138 1139 1140 1141 1142 1143 1144 1145 1146 1147 1148 1149 1150 1151 1152 1153 1154 1155 1156 1157 1158 1159 1160 1161 1162 1163 1164 1165 1166 1167 1168 1169 1170 1171 1172 1173 1174 1175 1176 1177 1178 1179 1180 1181 1182 1183 1184 1185 1186 1187 1188 1189 1190 1191 1192 1193 1194 1195 1196 1197 1198 1199 1200 1201 1202 1203 1204 1205 1206 1207 1208 1209 1210 1211 1212 1213 1214 1215 1216 1217 1218 1219 1220 1221 1222 1223 1224 1225 1226 1227 1228 1229 1230 1231 1232 1233 1234 1235 1236 1237 1238 1239 1240 1241 1242 1243 1244 1245 1246 1247 1248 1249 1250 1251 1252 1253 1254 1255 1256 1257 1258 1259 1260 1261 1262 1263 1264 1265 1266 1267 1268 1269 1270 1271 1272 1273 1274 1275 1276 1277 1278 1279 1280 1281 1282 1283 1284 1285 1286 1287 1288 1289 1290 1291 1292 1293 1294 1295 1296 1297 1298 1299 1300 1301 1302 1303 1304 1305 1306 1307 1308 1309 1310 1311 1312 1313 1314 1315 1316 1317 1318 1319 1320 1321 1322 1323 1324 1325 1326 1327 1328 1329 1330 1331 1332 1333 1334 1335 1336 1337 1338 1339 1340 1341 1342 1343 1344 1345 1346 1347 1348 1349 1350 1351 1352 1353 1354 1355 1356 1357 1358 1359 1360 1361 1362 1363 1364 1365 1366 1367 1368 1369 1370 1371 1372 1373 1374 1375 1376 1377 1378 1379 1380 1381 1382 1383 1384 1385 1386 1387 1388 1389 1390 1391 1392 1393 1394 1395 1396 1397 1398 1399 1400 1401 1402 1403 1404 1405 1406 1407 1408 1409 1410 1411 1412 1413 1414 1415 1416 1417 1418 1419 1420 1421 1422 1423 1424 1425 1426 1427 1428 1429 1430 1431 1432 1433 1434 1435 1436 1437 1438 1439 1440 1441 1442 1443 1444 1445 1446 1447 1448 1449 1450 1451 1452 1453 1454 1455 1456 1457 1458 1459 1460 1461 1462 1463 1464 1465 1466 1467 1468 1469 1470 1471 1472 1473 1474 1475 1476 1477 1478 1479 1480 1481 1482 1483 1484 1485 1486 1487 1488 1489 1490 1491 1492 1493 1494 1495 1496 1497 1498 1499 1500 1501 1502 1503 1504 1505 1506 1507 1508 1509 1510 1511 1512 1513 1514 1515 1516 1517 1518 1519 1520 1521 1522 1523 1524 1525 1526 1527 1528 1529 1530 1531 1532 1533 1534 1535 1536 1537 1538 1539 1540 1541 1542 1543 1544 1545 1546 1547 1548 1549 1550 1551 1552 1553 1554 1555 1556 1557 1558 1559 1560 1561 1562 1563 1564 1565 1566 1567 1568 1569 1570 1571 1572 1573 1574 1575 1576 1577 1578 1579 1580 1581 1582 1583 1584 1585 1586 1587 1588 1589 1590 1591 1592 1593 1594 1595 1596 1597 1598 1599 1600 1601 1602 1603 1604 1605 1606 1607 1608 1609 1610 1611 1612 1613 1614 1615 1616 1617 1618 1619 1620 1621 1622 1623 1624 1625 1626 1627 1628 1629 1630 1631 1632 1633 1634 1635 1636 1637 1638 1639 1640 1641 1642 1643 1644 1645 1646 1647 1648 1649 1650 1651 1652 1653 1654 1655 1656 1657 1658 1659 1660 1661 1662 1663 1664 1665 1666 1667 1668 1669 1670 1671 1672 1673 1674 1675 1676 1677 1678 1679 1680 1681 1682 1683 1684 1685 1686 1687 1688 1689 1690 1691 1692 1693 1694 1695 1696 1697 1698 1699 1700 1701 1702 1703 1704 1705 1706 1707 1708 1709 1710 1711 1712 1713 1714 1715 1716 1717 1718 1719 1720 1721 1722 1723 1724 1725 1726 1727 1728 1729 1730 1731 1732 1733 1734 1735 1736 1737 1738 1739 1740 1741 1742 1743 1744 1745 1746 1747 1748 1749 1750 1751 1752 1753 1754 1755 1756 1757 1758 1759 1760 1761 1762 1763 1764 1765 1766 1767 1768 1769 1770 1771 1772 1773 1774 1775 1776 1777 1778 1779 1780 1781 1782 1783 1784 1785 1786 1787 1788 1789 1790 1791 1792 1793 1794 1795 1796 1797 1798 1799 1800 1801 1802 1803 1804 1805 1806 1807 1808 1809 1810 1811 1812 1813 1814 1815 1816 1817 1818 1819 1820 1821 1822 1823 1824 1825 1826 1827 1828 1829 1830 1831 1832 1833 1834 1835 1836 1837 1838 1839 1840 1841 1842 1843 1844 1845 1846 1847 1848 1849 1850 1851 1852 1853 1854 1855 1856 1857 1858 1859 1860 1861 1862 1863 1864 1865 1866 1867 1868 1869 1870 1871 1872 1873 1874 1875 1876 1877 1878 1879 1880 1881 1882 1883 1884 1885 1886 1887 1888 1889 1890 1891 1892 1893 1894 1895 1896 1897 1898 1899 1900 1901 1902 1903 1904 1905 1906 1907 1908 1909 1910 1911 1912 1913 1914 1915 1916 1917 1918 1919 1920 1921 1922 1923 1924 1925 1926 1927 1928 1929 1930 1931 1932 1933 1934 1935 1936 1937 1938 1939 1940 1941 1942 1943 1944 1945 1946 1947 1948 1949 1950 1951 1952 1953 1954 1955 1956 1957 1958 1959 1960 1961 1962 1963 1964 1965 1966 1967 1968 1969 1970 1971 1972 1973 1974 1975 1976 1977 1978 197									



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US 131

Belmont, Michigan

Boring No.: MW-10S

Page: 1 of 2

File No.: 16.0062335.52

Check: Jim Cai

Contractor: Stearns Drilling Company

Foreman: Jerry Huntoon

Logged by: Joe Workman

Date Start/Finish:

Boring Location:

GS Elev.: Datum:

**Auger/
Casing**

Sampler

GROUNDWATER READINGS

Type: Hollow Stem Auger

Split Spoon

O.D. / I.D.: 8.0" / 4.25"

2.0" / 1 3/8"

Hammer Wt.: 140lbs

NA

Hammer Fall: 30"

NA

TOC Elev.: NA

NA

Date	Time	Depth	Casing	Stab

Surveyed By: NA Survey Date:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					PROTECTIVE CASING
1						See SB-10/MW-10D boring log for sample description and classification.				
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										

Grout

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: MW-10S

BORING WELL 6233552 WWW.US131.SB-9 THROUGH SB-11.GPJ GZA_CORP.GDT 1/25/18



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US 131

Belmont, Michigan

Boring No.: MW-10S

Page: 2 of 2

File No.: 16.0062335.52

Check: Jim Cai

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
31										
32										
33										
34										
35										
36										
37										
38										
39										
40										
41										
42										
43										
44										
45										
46										
47										
48										
49										
50										
51										
52										
53										
54										
55										
56										
57										
58										
59										
60						Bottom of Borehole at 60.0 Feet		1		
61										
62										
63										
64										
1. Monitoring well was installed in borehole upon completion. Well screen set from 49.0 to 59.0 feet below ground surface.										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.										

BORING WELL 6233552 WWW.US131.SB-9 THROUGH SB-11.GPJ GZA_CORP.GDT 1/25/18

REMARKS

Boring No.: MW-10S



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US 131

Belmont, Michigan

Boring No.: SB-11/MW-11D

Page: 1 of 5

File No.: 16.0062335.52

Check: Jim Cai

Contractor: Stearns Drilling Company

Foreman: Jerry Huntoon

Logged by: Julie Groenleer

Date Start/Finish: 11-6-17 / 11-8-17

Boring Location:

GS Elev.: 742.10' Datum:

Auger/
Casing

Sampler

Type: Hollow Stem Auger

Split Spoon

O.D. / I.D.: 8.0" / 4.25"

2.0" / 1 3/8"

Hammer Wt.: 140lbs

NA

Hammer Fall: 30"

NA

TOC Elev.: NA

NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: NA Survey Date:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					PROTECTIVE CASING
1	1	24/22	0-2	0-1 1-1	1.5 tsf	TOPSOIL. Changing at 0.2 feet to: Very loose, brown, fine to medium SAND, little Silt, damp (SM). Changing at 0.8 feet to: Stiff, brown, CLAY & SILT, trace fine Sand, moist (CL). Changing at 1.4 feet to: Very loose, dark brown, fine to medium SAND, little Clay, little Silt, damp (SC). Medium dense, brown, fine to medium SAND, little Silt, moist (SM). Loose, brown, fine to medium SAND, little Silt, moist (SM). Changing at 5.5 feet to: Stiff, brown, CLAY & SILT, little fine to coarse Sand, moist (CL). Stiff, brown, CLAY & SILT, little fine Sand, moist (CL). Loose, brown, fine to medium SAND, little Silt, moist (SM). Very loose, brown, fine to medium SAND, little Silt, moist (SM). Changing at 11.9 feet to: Stiff, brown, CLAY & SILT, little fine to medium Sand, moist (CL). Hard, brown with gray mottling, CLAY & SILT, trace fine to coarse Sand, damp (CL).	0.2' TOPSOIL 0.8' SAND (SM) 1.4' CLAY & SILT (CL) 2' SAND (SC) SAND (SM)	1		
2	2	24/24	2-4	5-6 7-5						
3										
4	3	24/18	4-6	4-5 5-5						
5										
6	4	24/24	6-8	1-1 2-2	1.0 tsf 1.0 tsf		5.5' CLAY & SILT (CL)			
7										
8	5	24/22	8-10	2-3 2-2			8' SAND (SM)			
9										
10	6	24/22	10-12	2-2 2-2						
11										
12	7	24/22	12-14	2-5 9-11	2.0 tsf >4.0 tsf		11.9' CLAY & SILT (CL)			
13										
14	8	24/24	14-16	7-14 15-12	>4.0 tsf					
15										
16	9	24/14	16-18	1-3 3-3			16' SAND (SM)			
17										
18	10	24/16	18-20	1-4 3-2	2.25 tsf		18' CLAY & SILT (CL)			
19										
20	11	24/4	20-22	4-6 3-3			19.5' SAND (SM)			
21										
22	12	24/24	22-24	1-7 7-7	2.25 tsf		22.9' CLAY & SILT (CL)			
23										
24	13	24/12	24-26	1-1 1-1			23.8' SAND (SM)		2	
25										
26	14	24/24	26-28	1-5 7-10			26' SAND (SP)			
27										
28	15	24/18	28-30	8-9 10-11						
29										

REMARKS

1. Pocket penetrometer readings were measured in tons per square foot (tsf) and are used to evaluate consistency of cohesive soil.
2. Groundwater was encountered at approximately 24.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: SB-11/MW-11D

BORING WELL 6233552 WWW.US131.SB-9 THROUGH SB-11.GPJ GZA_CORP.GDT 1/25/18



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US 131

Belmont, Michigan

Boring No.: SB-11/MW-11D

Page: 2 of 5

File No.: 16.0062335.52

Check: Jim Cai

Sample Information						Demont, Michigan		Check: Jim Cai			
Depth	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed		
31	16	24/10	30-32	2-5 8-14		Medium dense, brown, fine to medium SAND, trace Silt, wet (SP).	SAND (SP)	3			
32	17	24/15	32-34	2-7 8-9		Medium dense, brown, fine to medium SAND, trace Silt, wet (SP).					
34	18	24/10	34-36	3-8 13-11		Medium dense, brown, fine to medium SAND, trace coarse Sand, trace Silt, wet (SP).					
36	19	24/18	36-38	7-8 10-10		Medium dense, brown, fine to medium SAND, trace coarse Sand, trace Silt, wet (SP). Changing at 37.4 feet to: Medium dense, brown, fine SAND, little Silt, wet (SM).	37.4'				
38	20	24/18	38-40	2-2 5-6		Loose, brown, fine SAND, trace Silt, wet (SP).	38' SAND (SM)				
39						Loose, brown, fine SAND, trace Silt, wet (SP).	SAND (SP)				
40	21	24/12	40-42	2-2 5-12		Loose, brown, fine SAND, trace Silt, wet (SP).					
42	22	24/16	42-44	2-4 5-7		Loose, brown, fine SAND, trace Silt, wet (SP).					
44	23	24/18	44-46	3-8 9-10		Medium dense, brown, fine SAND, trace Silt, wet (SP).					
46	24	24/24	46-48	2-7 7-9		Medium dense, brown, fine to coarse SAND, trace fine Gravel, trace Silt, wet (SW).	46' SAND (SW)				
48	25	24/24	48-50	2-7 10-12		Medium dense, brown, fine to medium SAND, trace Silt, wet (SP). Changing at 49.2 feet to: Medium dense, brown, fine to coarse SAND, trace fine Gravel, trace Silt, wet (SW).	48' SAND (SP)				
49							49.2' SAND (SW)				
50	26	24/10	50-52	2-11 14-22		Medium dense, brown, fine SAND, trace Silt, wet (SP).	50' SAND (SP)				
51						Medium dense, brown, fine SAND, trace Silt, wet (SP).					
52	27	24/6	52-54	4-8 15-22		Medium dense, brown, fine SAND, trace Silt, wet (SP).					
53						Medium dense, brown, fine SAND, trace Silt, wet (SP).					
54	28	24/14	54-56	2-4 7-11		Medium dense, brown, fine SAND, trace Silt, wet (SP).					
56	29	24/24	56-58	2-4 6-6		Loose, brown, fine SAND, little Silt, wet (SM).	56' SAND (SM)				
58	30	24/24	58-60	2-4 7-11		Medium dense, brown, fine SAND, trace Silt, wet (SP).	58' SAND (SP)				
60	31	24/18	60-62	5-8 13-22		Medium dense, brown, fine SAND, some Silt, wet (SM).	60' SAND (SM)				
62	32	24/20	62-64	3-6 8-10		Medium dense, brown, fine SAND, some Silt, wet (SM).					
64	33	24/18	64-66	3-5 6-6		Medium dense, brown, fine SAND, some					
REMARKS	3. Rock in tip.										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: SB-11/MW-11D		

BORING WELL 6233552 WWW.US131.SB-9 THROUGH SB-11.GPJ GZA_CORP.GDT 1/25/18



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Belmont, Michigan

Boring No.: SB-11/MW-11D

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File No.: 16.0062335.52

Check: Jim Cai

Sample Information								Check:		Jim Cai	
Depth	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed		
66	34	24/22	66-68	3-7 13-11		Silt, wet (SM).	SAND (SM)				
67						Medium dense, brown, fine SAND, some Silt, wet (SM). Changing at 67.1 feet to:	67.1'				
68	35	24/22	68-70	3-5 8-6		Medium dense, brown, fine to medium SAND, trace Silt, wet (SP).	SAND (SP)				
69						Medium dense, brown, fine to medium SAND, trace Silt, wet (SP). Changing at 68.8 feet to:	68.8'				
70	36	24/23	70-72	2-3 4-5		Medium dense, brown, fine SAND, little Silt, wet (SM).	SAND (SM)				
71						Loose, brown, fine SAND, trace Silt, wet (SP).	70'				
72	37	24/20	72-74	3-4 6-8		Loose, brown, fine SAND, trace Silt, wet (SP).					
73											
74	38	24/24	74-76	3-3 5-9		Loose, brown, fine SAND, trace Silt, wet (SP).					
75											
76	39	24/0	76-78	6-10 15-13		NO RECOVERY.	76'				
77							NO RECOVERY				
78	40	24/17	78-80	2-2 5-11		Loose, brown, fine SAND, trace Silt, wet (SP).	78'				
79							SAND (SP)				
80	41	24/12	80-82	2-4 9-10		Medium dense, brown, fine SAND, trace Silt, wet (SP).					
81											
82	42	24/24	82-84	3-3 5-6		Loose, brown, fine SAND, trace Silt, wet (SP).					
83											
84	43	24/0	84-86	2-4 5-9		NO RECOVERY.	84'				
85							NO RECOVERY				
86	44	24/18	86-88	1-2 5-12		Loose, brown, fine SAND, trace Silt, wet (SP).	86'				
87							SAND (SP)				
88	45	24/8	88-90	6-5 8-11		Medium dense, brown, fine SAND, trace Silt, wet (SP).					
89											
90	46	24/18	90-92	2-4 7-11		Medium dense, brown, fine to medium SAND, trace Silt, wet (SP).					
91											
92	47	24/0	92-94	2-3 6-10		NO RECOVERY.	92'				
93							NO RECOVERY				
94	48	24/16	94-96	2-4 4-8		Loose, brown, fine to medium SAND, trace Silt, wet (SP). Changing at 95.8 feet to:	94'				
95						Loose, brown fine SAND, little Silt, wet (SM).	SAND (SP)				
96	49	24/12	96-98	2-3 4-5		Loose, brown fine SAND, little Silt, wet (SM).	95.8'				
97							SAND (SM)				
98	50	24/16	98-100	2-3 6-8		Loose, brown, fine SAND, trace Silt, wet (SP).	98'				
99							SAND (SP)				
REMARKS											
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: SB-11/MW-11D		

BORING WELL 6233552 WWW.US131.SB-9 THROUGH SB-11.GPJ GZA_CORP.GDT 1/25/18



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File No.: 16.0062335.52

Check: Jim Cai

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
101	51	24/4	100-102	2-5 10-14		Medium dense, brown, fine SAND, trace Silt, wet (SP).	SAND (SP)			
102	52	24/12	102-104	2-7 13-15		Medium dense, brown, fine SAND, trace Silt, wet (SP).				
104	53	24/0	104-106	7-14 15-20		NO RECOVERY.	104' NO RECOVERY			
106	54	24/19	106-108	1-3 8-13		Medium dense, brown, fine to medium SAND, trace Silt, wet (SP).	106' SAND (SP)			
108	55	24/18	108-110	2-4 6-8		Loose, brown, fine to medium SAND, trace Silt, wet (SP).				
110	56	24/10	110-112	7-14 18-17		Dense, brown, fine to medium SAND, trace Silt, wet (SP).				
112	57	24/0	112-114	4-8 10-13		NO RECOVERY.	112' NO RECOVERY			
114	58	24/10	114-116	8-10 11-15		Medium dense, brown, fine to medium SAND, trace Silt, wet (SP).	114' SAND (SP)			
116	59	24/10	116-118	1-2 2-2		Very loose, brown, fine to medium SAND, trace Silt, wet (SP).				
118	60	24/19	118-120	2-2 5-7		Loose, brown, fine to medium SAND, trace Silt, wet (SP).				
120	61	24/21	120-122	2-2 5-7		Loose, brown, fine to medium SAND, trace Silt, wet (SP).				
122	62	24/23	122-124	2-2 7-8		Loose, brown, fine to medium SAND, trace Silt, wet (SP).				
124	63	24/20	124-126	6-7 10-13		Medium dense, brown, fine to medium SAND, trace Silt, wet (SP).				
126	64	24/20	126-128	3-3 4-4		Loose, brown, fine to medium SAND, trace Silt, wet (SP). Changing at 127.5 feet to:	127.5' CLAY & SILT			
128	65	24/12	128-130	3-4 12-14	<0.25 tsf <0.25 tsf	Soft, gray, CLAY & SILT, little fine to medium Sand, moist (CL). Changing at 128.2 feet to: Medium dense, brown, fine to medium SAND, trace Silt, wet (SP).	128.2' CLAY & SILT (CL) SAND (SP)			
130	66	24/9	130-132	2-5 13-15		Medium dense, brown, fine to medium SAND, trace Silt, wet (SP).				
132	67	24/15	132-134	4-10 18-21		Medium dense, brown, fine to medium SAND, trace Silt, wet (SP). Changing at 133.2 feet to: Soft, gray, CLAY & SILT, some fine to medium Sand, moist (CL).	133.2' CLAY & SILT (CL)			
134	68	24/16	134-136	6-13 18-23	0.25 tsf	Changing at 133.9 feet to: Medium dense,	133.9' SAND (SP)			
REMARKS										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: SB-11/MW-11D	

BORING WELL 6233552 WWW.US 131 SB-9 THROUGH SB-11.GPJ GZA_CORP.GDT 1/25/18



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Boring No.: SB-11/MW-11D

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File No.: 16.0062335.52

Check: Jim Cai

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
136	69	24/14	136-138	2-4 12-15		brown, fine to medium SAND, trace Silt, wet (SP).	SAND (SP)		
137						Dense, brown, fine to medium SAND, trace Silt, wet (SP).			
138	70	24/8	138-140	3-10 20-21		Medium dense, brown, fine to medium SAND, trace Silt, wet (SP).			
139						Medium dense, brown, fine to medium SAND, trace Silt, wet (SP).			
140	71	24/18	140-142	3-4 15-18		Medium dense, brown, fine to medium SAND, trace Silt, wet (SP).			
141						Medium dense, brown, fine to medium SAND, trace Silt, wet (SP).			
142	72	24/16	142-144	4-11 19-24		Medium dense, brown, fine to medium SAND, trace Silt, trace fine Gravel, wet (SP).			
143						Medium dense, brown, fine to medium SAND, trace Silt, trace fine Gravel, wet (SP).			
144	73	24/18	144-146	11-13 23-33		Dense, brown, fine to coarse SAND, trace Silt, trace Gravel, wet (SW).	144' SAND (SW)		
145						Dense, brown, fine to coarse SAND, trace Silt, trace Gravel, wet (SW).			
146	74	24/10	146-148	9-13 30-30		Dense, brown, fine to medium SAND, trace Silt, trace coarse Sand, wet (SP).	146' SAND (SP)		
147						Dense, brown, fine to medium SAND, trace Silt, trace coarse Sand, wet (SP).			
148	75	24/10	148-150	9-18 26-34		Dense, brown, fine to medium SAND, trace Silt, trace coarse Sand, wet (SP).			
149						Dense, brown, fine to medium SAND, trace Silt, trace coarse Sand, wet (SP).			
150	76	24/21	150-152	9-23 29-40		Very dense, brown, fine to medium SAND, trace Silt, wet (SP).			
151						Very dense, brown, fine to medium SAND, trace Silt, wet (SP).			
152	77	18/18	152-153.5	25-42-50		Very dense, brown, fine to medium SAND, trace Silt, wet (SP).		4	
153						Very dense, brown, fine to medium SAND, trace Silt, wet (SP).			
154	78	24/24	154-156	11-13 15-18		Medium dense, brown, fine to medium SAND, some Silt, wet (SM).	154' SAND (SM)		
155						Medium dense, brown, fine to medium SAND, some Silt, wet (SM).			
156	79	24/24	156-158	7-17 37-30		Very dense, brown, fine SAND, some Silt, wet (SM). Changing at 157.7 feet to: Hard, gray, CLAY & SILT, little fine Sand, moist (CL).	157.7' CLAY & SILT (CL)		
157						Very dense, brown, fine SAND, some Silt, wet (SM). Changing at 157.7 feet to: Hard, gray, CLAY & SILT, little fine Sand, moist (CL).			
158	80	24/24	158-160	8-18 27-26	>4.0 tsf >4.0 tsf	Hard, gray, CLAY & SILT, little fine Sand, moist (CL). Changing at 159.1 feet to: Dense, gray, fine SAND, some Silt, wet (SM). Changing at 159.9 feet to: Hard, gray, CLAY & SILT, little fine Sand, moist (CL).	159.1' SAND (SM)		
159						Hard, gray, CLAY & SILT, little fine Sand, moist (CL). Changing at 159.1 feet to: Dense, gray, fine SAND, some Silt, wet (SM). Changing at 159.9 feet to: Hard, gray, CLAY & SILT, little fine Sand, moist (CL).	159.9' CLAY & SILT (CL)		
160	81	24/24	160-162	6-10 18-20	>4.0 tsf >4.0 tsf	Hard, gray, CLAY & SILT, some fine Sand, moist (CL).	162' CLAY & SILT (CL)		
161						Hard, gray, CLAY & SILT, some fine Sand, moist (CL).			
162						Bottom of Borehole at 162.0 Feet		5	
163									
164									
165									
166									
167									
168									
169									

- REMARKS**
- Only drove spoon 18 inches due to high blow counts.
 - Monitoring well was installed in borehole upon completion. Well screen set from 150.0 to 155.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: SB-11/MW-11D

BORING WELL 6233552 WWW.US131.SB-9 THROUGH SB-11.GPJ GZA_CORP.GDT 1/25/18



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Boring No.: MW-11M

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File No.: 16.0062335.52

Check: Jim Cai

Contractor: Stearns Drilling Company

Foreman: Jerry Huntoon

Logged by: Julie Groenleer/Joe Workman

Date Start/Finish: 11-8-17 / 11-9-17

Boring Location:

GS Elev.: 742.30' Datum:

Auger/
Casing

Sampler

GROUNDWATER READINGS

Type: Hollow Stem Auger

Split Spoon

O.D. / I.D.: 8.0" / 4.25"

2.0" / 1 3/8"

Hammer Wt.: 140lbs

NA

Hammer Fall: 30"

NA

TOC Elev.: NA

NA

Date	Time	Depth	Casing	Stab

Surveyed By: NA Survey Date:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					PROTECTIVE CASING
1						See SB-11/MW-11D boring log for sample description and classification.				
2										
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48										
49										
50										
51										

Grout

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: MW-11M

BORING WELL 6233552 WWW.US131.SB-9 THROUGH SB-11.GPJ GZA_CORP.GDT 1/25/18



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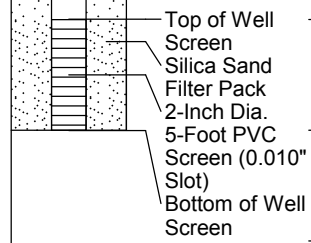
Boring No.: MW-11M

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File No.: 16.0062335.52

Check: Jim Cai

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
53										
54										
55										
56										
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58										
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97										
98										
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100										
101						Bottom of Borehole at 100.0 Feet				
102										
103										
104										
105										
106										
107										
108										
109										
110										
111										
112										
1. Monitoring well was installed in borehole upon completion. Well screen set from 95.0 to 10.0 feet below ground surface.										
REMARKS										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.										Boring No.: MW-11M



BORING WELL 6233552 WWW.US131.SB-9 THROUGH SB-11.GPJ GZA_CORP.GDT 1/25/18



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Boring No.: MW-11S

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File No.: 16.0062335.52

Check: Jim Cai

Contractor: Stearns Drilling Company

Foreman: Jerry Huntoon

Logged by: Joe Workman

Date Start/Finish: 11-9-17 / 11-9-17

Boring Location:

GS Elev.: 742.10' Datum:

Auger/
Casing

Sampler

Type: Hollow Stem Auger

Split Spoon

O.D. / I.D.: 8.0" / 4.25"

2.0" / 1 3/8"

Hammer Wt.: 140lbs

NA

Hammer Fall: 30"

NA

TOC Elev.: NA

NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: NA Survey Date:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					PROTECTIVE CASING
1						See SB-11/MW-11D boring log for sample description and classification.				
2										
3										
4										
5										
6										
7										
8										
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26										
27										
28										
29										
30										
31										
32						Bottom of Borehole at 31.5 Feet		1		

REMARKS

1. Monitoring well was installed in borehole upon completion. Well screen set from 21.0 to 31.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: MW-11S

BORING WELL 6233552 WWW.US131.SB-9 THROUGH SB-11.GPJ GZA_CORP.GDT 1/25/18



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Boring No.: HS-MW-12A

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File No.: 16.0062335.52

Check: JTM/JMG

Contractor: Stearns Drilling Company

Foreman: Jerry Huntoon

Logged by: J. Markosky

Date Start/Finish:

Boring Location:

GS Elev.: Datum:

Auger/
Casing

Sampler

Type: Hollow Stem Auger

Split Spoon

O.D. / I.D.: 8.0" / 4.25"

2.0" / 1 3/8"

Hammer Wt.: 140lbs

NA

Hammer Fall: 30"

NA

TOC Elev.: NA

NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: NA Survey Date:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					PROTECTIVE CASING
1						See HS-MW-12D for detailed soil descriptions.				
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20						Bottom of Borehole at 20.0 Feet				
21										
22										
23										
24										

Bentonite/Grout

Silica Sand Filter Pack
Top of Well Screen

2-Inch Dia.
5-Foot PVC Screen (0.010" Slot)

Bottom of Well Screen

REMARKS

1. Monitoring well HS-MW-12A was installed in borehole upon completion. Well screen set from approximately 15.0 to 20.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-MW-12A

BORING WELL 62355.52 HOUSE STREET COMPLETE.GPJ GZA CORP.GDT 4/15/20



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Boring No.: HS-MW-12B

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File No.: 16.0062335.52

Check: JTM/JMG

Contractor: Stearns Drilling Company

Foreman: Jerry Huntoon

Logged by: J. Markosky

Date Start/Finish:

Boring Location:

GS Elev.: Datum:

Auger/
Casing

Sampler

GROUNDWATER READINGS

Type: Hollow Stem Auger

Split Spoon

O.D. / I.D.: 8.0" / 4.25"

2.0" / 1 3/8"

Hammer Wt.: 140lbs

NA

Hammer Fall: 30"

NA

TOC Elev.: NA

NA

Date	Time	Depth	Casing	Stab

Surveyed By: NA Survey Date:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					PROTECTIVE CASING
1						See HS-MW-12D for detailed soil descriptions.				
2										
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24										
25										
26										
27										
28										
29										

10 Inch Casing

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-MW-12B

BORING WELL 62355.52 HOUSE STREET COMPLETE.GPJ GZA CORP.GDT 4/15/20



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Boring No.: HS-MW-12B

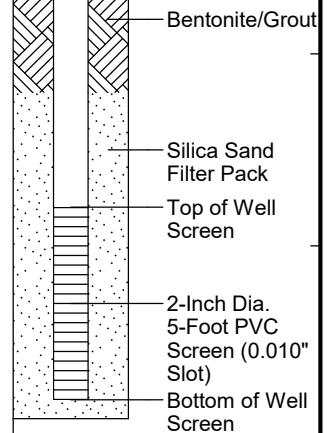
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File No.: 16.0062335.52

Check: JTM/JMG

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
31										
32										
33										
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53										
54										
55						Bottom of Borehole at 54.5 Feet		1		
56										
57										
58										
59										
60										
61										
62										
63										
64										
REMARKS										
1. Monitoring well HS-MW-12B was installed in borehole upon completion. Well screen set from approximately 49.0 to 54.0 feet below ground surface.										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.										Boring No.: HS-MW-12B

BORING WELL 62355.52 HOUSE STREET COMPLETE.GPJ GZA CORP.GDT 4/15/20





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Boring No.: HS-MW-12C

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File No.: 16.0062335.52

Check: JTM/JMG

Contractor: Stearns Drilling Company

Foreman: Jerry Huntoon

Logged by: J. Markosky

Date Start/Finish: 9-3-19 / 9-20-19

Boring Location:

GS Elev.: Datum:

Auger/
Casing

Sampler

Type: Hollow Stem Auger Split Spoon

O.D. / I.D.: 8.0" / 4.25" 2.0" / 1 3/8"

Hammer Wt.: 140lbs NA

Hammer Fall: 30" NA

Other: NA NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD					PROTECTIVE CASING
1						See HS-MW-12D for detailed soil descriptions.				
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

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Check: JTM/JMG

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD					
31										
32										
33										
34										
35										
36										
37										
38										
39										
40										
41										
42										
43										
44										
45										
46										
47										
48										
49										
50										
51										
52										
53										
54										
55										
56										
57										
58										
59										
60										
61										Grout
62										
63										
64										
REMARKS										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.										

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File No.: 16.0062335.52

Check: JTM/JMG

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD					
66										
67										
68										
69										
70										
71										
72										
73										
74										
75										
76										
77										
78										
79										
80										
81										
82										
83										
84										
85										
86										
87										
88										
89										
90										
91										
92										
93										
94										
95										
96										
97										
98										
99										
REMARKS										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.										

Boring No.: HS-MW-12C

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Check: JTM/JMG

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD				
101									
102									
103									
104									
105									
106									
107									
108									
109									
110									
111									
112									
113									
114									
115									
116									
117									
118									
119									
120									
121									
122									
123									
124									
125									
126									
127									
128									
129									
130									
131						Bottom of Borehole at 130.4 Feet		1	
132									
133									
134									

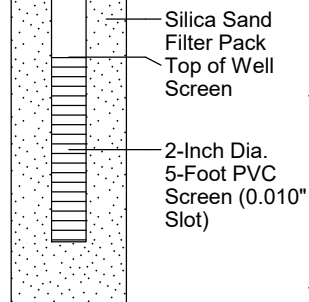
REMARKS

1. Monitoring well HS-MW-12C was installed in borehole upon completion. Well screen set from approximately 124.0 to 128.8 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-MW-12C

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Boring No.: HS-MW-12D

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File No.: 16.0062335.52

Check: JTM/JMG

Contractor: Stearns Drilling Company

Foreman: Jerry Huntoon

Logged by: J. Markosky

Date Start/Finish: 9-3-19 / 9-20-19

Boring Location:

GS Elev.: Datum:

Auger/
Casing

Sampler

Type: Hollow Stem Auger Split Spoon

O.D. / I.D.: 8.0" / 4.25" 2.0" / 1 3/8"

Hammer Wt.: 140lbs NA

Hammer Fall: 30" NA

Other: NA NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD					PROTECTIVE CASING
1	1	24/12	0-2	1-1 3-3	0.0 ppm	Black, TOPSOIL. Changing at 0.5 feet to: Loose, light brown, fine SAND, some Silt, dry.	0.5' TOPSOIL SAND	1		
2	2	24/8	2-4	2-3 2-3	0.0 ppm	Loose, light brown, fine to medium SAND, little Silt, dry.				
3										
4	3	24/14	4-6	3-4 4-5	0.0 ppm	Loose, light brown, fine to medium SAND, little Silt, dry.				
5										
6	4	24/16	6-8	2-3 3-3	0.0 ppm	Loose, light brown, fine to medium SAND, little Silt, moist.				
7										
8	5	24/18	8-10	1-2 2-2	0.0 ppm	Loose, brown, fine to medium SAND, little Silt, damp.				
9										
10	6	24/22	10-12	1-3 4-5	0.0 ppm	Loose, brown, fine to medium SAND, little Silt, wet.				
11										
12	7	24/14	12-14	2-2 1-2	0.0 ppm	Loose, brown, fine to medium SAND, some Silt, wet.				
13										
14	8	24/11	14-16	WOH-1 5-8	0.0 ppm	Loose, brown, fine to medium SAND, little Silt, wet.		2		
15								3		
16	9	24/16	16-18	4-5 8-9	0.0 ppm	Loose, brown, fine to medium SAND, little Silt, wet.				
17										
18	10	24/24	18-20	1-4 9-10	0.0 ppm	Loose, brown, fine to medium SAND, little Silt, wet.				
19										
20	11	24/23	20-22	3-4 7-11	0.0 ppm	Loose, brown, fine to medium SAND, little Silt, wet.				
21										
22	12	24/20	22-24	3-6 9-12	0.0 ppm	Medium dense, brown, fine to medium SAND, little Silt, trace Gravel, wet.				
23										
24	13	24/20	24-26	4-6 10-9	0.0 ppm	Medium dense, brown, fine to medium SAND, little Silt, trace Gravel, wet.		4		
25										
26	14	24/23	26-28	1-2 2-3	0.0 ppm	Loose, brown, fine to medium SAND, little Silt, trace Gravel, wet.				
27										
28	15	24/24	28-30	1-3 3-5	0.0 ppm	Loose, brown, fine to medium SAND, some Silt, wet.				
29										

REMARKS

- Field screening of samples for organic vapors was performed with a MiniRae 2000 photoionization detector equipped with a 10.6 eV lamp. Readings are shown in parts per million (ppm) of isobutylene. Background was measured at 0.0 ppm.
- Groundwater was encountered at approximately 14.0 feet below ground surface.
- Temporary well set at 15.0 to 20.0 feet below ground surface. Purged 55.0 gallons. Groundwater sample submitted for laboratory analysis.
- Temporary well set at 25.0 to 30.0 feet below ground surface. Purged 50.0 gallons. Groundwater sample submitted for laboratory analysis.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-MW-12D

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File No.: 16.0062335.52

Check: JTM/JMG

Sample Information								Check: JTM/JMG		
Depth	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
31	16	24/24	30-32	1-3 3-5	0.0 ppm	Loose, brown, fine to medium SAND, some Silt, wet.	SAND	5		
32	17	24/20	32-34	2-5 5-6	0.0 ppm	Loose, brown, fine to medium SAND, some Silt, wet.				
33										
34	18	24/18	34-36	1-2 3-5	0.0 ppm	Loose, brown, fine to medium SAND, some Silt, wet.				
35										
36	19	24/9	36-38	3-8 12-14	0.0 ppm	Medium dense, brown, fine to medium SAND, some Silt, wet.		6		
37							41.8' Silty CLAY			
38	20	24/20	38-40	2-4 5-10	0.0 ppm	Loose, brown and gray, fine to medium SAND, some Silt, wet.				
39										
40	21	24/24	40-42	1-3 5-6	0.0 ppm	Loose, brown and gray, fine to medium SAND, some Silt, wet. Changing at 41.6 feet to: Gray, Silty CLAY, some fine Sand, wet.	44' SILT & CLAY			
41										
42	22	24/24	42-44	4-8 10-13	0.0 ppm	Gray, Silty CLAY, some fine to medium Sand, dry.	46' SAND	7		
43										
44	23	24/24	44-46	3-11 11-13	0.0 ppm	Very stiff, gray, SILT & CLAY, little fine Sand, wet.				
45										
46	24	24/2	46-48	1-1 1-2	0.0 ppm	Very loose, brown and gray, fine to medium SAND, little Silt, wet.				
47										
48	25	24/20	48-50	2-5 8-12	0.0 ppm	Medium dense, brown, fine to medium SAND, trace Silt, wet. Changing at 49.0 feet to: Medium dense, brown, fine to medim SAND, trace Silt with layers of interbedded Silty Clay, wet.				
49										
50	26	24/14	50-52	1-7 11-14	0.0 ppm	Medium dense, brown, fine to medium SAND, little Silt with interbedded Silty Clay, wet.				
51										
52	27	24/0	52-54	9-30 43-29	0.0 ppm	Medium dense, brown, fine to medium SAND, little Silt with interbedded Silty Clay, wet. NO RECOVERY.				
53										
54	28	24/24	54-56	4-9 11-12	0.0 ppm	Medium dense, brown, fine to medium SAND, little Silt, wet. Changing at 54.5 feet to: Gray, Silty CLAY, trace fine Sand, dry.	54.5' Silty CLAY			
55										
56	29	24/24	56-58	8-13 13-15	0.0 ppm	Very stiff, gray, Silty CLAY, little fine Sand, dry.				
57										
58	30	24/24	58-60	4-8 10-10	0.0 ppm	Very stiff, gray, Silty CLAY, little fine Sand, dry.				
59										
60	31	24/24	60-62	6-8 9-11	0.0 ppm	Very stiff, gray, Silty CLAY, little fine Sand, dry.				
61										
62	32	24/24	62-64	4-10 10-11	0.0 ppm	Very stiff, gray, Silty CLAY, little fine Sand, dry.				
63										
64	33	24/24	64-66	6-11	0.0 ppm	Very stiff, gray, Silty CLAY, little fine Sand,				
REMARKS	5. Temporary well set at 35.0 to 40.0 feet below ground surface. Purged 70.0 gallons. Groundwater sample submitted for laboratory analysis.									
	6. 10.0 inch casing set to 42.6 feet below ground surface.									
7. Temporary well set at 49.0 to 54.0 feet below ground surface. Purged 75.0 gallons. Groundwater sample submitted for laboratory analysis.										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: HS-MW-12D	

BORING WI 62355.52 HOUSE STREET COMPLETE.GPJ WI DNR.GDT 4/19/20



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Check: JTM/JMG

Sample Information						Denton, Michigan		Check: JTM/JMG		
Depth	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
66	34	24/24	66-68	15-16	0.0 ppm	dry.	Silty CLAY			
67				3-9		Very stiff, gray, Silty CLAY, trace fine Sand, dry.				
68				10-10						
69	35	24/24	68-70	6-6	0.0 ppm	Very stiff, gray, Silty CLAY, trace fine Sand, dry.				
70				9-11						
71	36	24/24	70-72	2-2	0.0 ppm	Very stiff, gray, Silty CLAY, trace fine Sand, dry. Changing at 71.0 feet to: Gray, fine SAND, some Silt, wet.	71'			
72				2-5						
73	37	24/16	72-74	1-1	0.0 ppm	Very loose, gray and brown, fine to medium SAND, some Silt, wet.	SAND			
74				2-2						
75	38	24/20	74-76	3-3	0.0 ppm	Loose, gray and brown, fine SAND, some Silt, wet.		8		
76				7-11						
77	39	24/24	76-78	2-3	0.0 ppm	Loose, gray and brown, fine SAND, some Silt, wet.				Grout
78				5-7						
79	40	24/13	78-80	1-1	0.0 ppm	Loose, gray and brown, fine SAND, some Silt, wet.				
80				4-5						
81	41	24/24	80-82	1-1	0.0 ppm	Loose, gray and brown, fine SAND, some Silt, wet.				
82				3-5						
83	42	24/18	82-84	1-3	0.0 ppm	Medium dense, gray and brown, fine to medium SAND, some Silt, wet. Changing at 83.3 feet to: Gray and brown, fine to medium SAND, some Silt, little Gravel, wet.				
84				8-11						
85	43	24/20	84-86	2-5	0.0 ppm	Medium dense, brown, fine to coarse SAND, some Gravel, trace Silt, wet.		9		
86				6-7						
87	44	24/24	86-88	2-4	0.0 ppm	Medium dense, brown, fine to coarse SAND, some Gravel, trace Silt, wet.				
88				12-20						
89	45	24/17	88-90	3-5	0.0 ppm	Medium dense, brown, fine to coarse SAND, little Gravel, little Silt, wet.				
90				9-13						
91	46	24/92	90-92	1-4	0.0 ppm	Medium dense, brown, fine to coarse SAND, little Gravel, little Silt, wet.				
92				7-14						
93	47	24/7	92-94	1-1	0.0 ppm	Very loose, brown, fine to coarse SAND, little Gravel, little Silt, wet.				
94				2-8						
95	48	24/11	94-96	3-10	0.0 ppm	Medium dense, brown, fine to coarse SAND, little Gravel, little Silt, wet.		10		
96				14-22						
97	49	24/12	96-98	1-3	0.0 ppm	Loose, brown and gray, fine to coarse SAND, little Silt, trace Gravel, wet.				
98				6-7						
99	50	24/15	98-100	3-3	0.0 ppm	Medium dense, brown and gray, fine to coarse SAND, little Silt, trace Gravel, wet.				
				12-17						
REMARKS	8. Temporary well set at 75.0 to 80.0 feet below ground surface. Purged 80.0 gallons. Groundwater sample submitted for laboratory analysis.									
	9. Temporary well set at 85.0 to 90.0 feet below ground surface. Purged 55.0 gallons. Groundwater sample submitted for laboratory analysis.									
	10. Temporary well set at 95.0 to 100.0 feet below ground surface. Purged 85.0 gallons. Groundwater sample submitted for laboratory analysis.									
	Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									
Boring No.: HS-MW-12D										

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Check: JTM/JMG

Sample Information						Dennison, Michigan		Check: JTM/JMG		
Depth	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
101	51	24/5	100-102	1-4 4-8	0.0 ppm	Loose, brown and gray, fine to coarse SAND, little Silt, little Gravel, wet.	SAND	11		
102	52	24/12	102-104	3-10 15-15	0.0 ppm	Medium dense, brown, fine to coarse SAND, little Silt, little Gravel, wet.				
103										
104	53	24/14	104-106	2-5 10-19	0.0 ppm	Medium dense, brown, fine to coarse SAND, little Silt, little Gravel, wet.				
105										
106	54	24/8	106-108	1-3 3-11	0.0 ppm	Loose, brown, fine to coarse SAND, little Silt, wet.		12		
107										
108	55	24/16	108-110	1-2 5-12	0.0 ppm	Loose, brown, fine to coarse SAND, little Silt, wet. Changing at 108.4 feet to: Brown, fine to medium SAND, little Silt, wet.				
109										
110	56	24/15	110-112	1-3 3-9	0.0 ppm	Loose, brown, fine to medium SAND, little Silt, wet.				
111								13		
112	57	24/16	112-114	1-12 20-24	0.0 ppm	Dense, brown, fine to medium SAND, little Silt, wet.				
113										
114	58	24/13	114-116	1-5 11-16	0.0 ppm	Medium dense, brown, fine to medium SAND, little Silt, trace Gravel, wet.				
115										
116	60	24/23	116-118	3-14 25-38	0.0 ppm	Dense, brown, fine to medium SAND, little Silt, trace Gravel, wet. Changing at 117.8 feet to: Brown, fine to coarse SAND, some Gravel, little Silt, wet.				
117										
118	61	24/9	118-120	12-19 17-17	0.0 ppm	Dense, brown, fine to coarse SAND, some Silt, little Gravel, wet.				
119										
120	62	24/8	120-122	3-5 13-15	0.0 ppm	Medium dense, brown, fine to coarse SAND, little Silt, little Gravel, wet.				
121										
122	63	24/12	122-124	5-9 14-22	0.0 ppm	Medium dense, brown, fine to coarse SAND, little Silt, little Gravel, wet.				
123										
124	64	24/14	124-126	6-15 23-26	0.0 ppm	Dense, brown, fine to coarse SAND, some Gravel, little Siilt, wet.				
125										
126	65	24/7	126-128	7-17 24-16	0.0 ppm	Dense, brown, fine to coarse SAND, some Gravel, little Siilt, wet.				
127										
128	66	24/9	128-130	7-18 45-41	0.0 ppm	Very dense, brown, fine to coarse SAND, some Gravel, little Siilt, wet.				
129										
130	67	12/12	130-131	17-50/6"	0.0 ppm	Very dense, brown, fine to coarse SAND, some Gravel, little Siilt, wet.				
131										
132	68	24/9	132-134	30-33 14-10	0.0 ppm	Dense, brown, fine to coarse SAND, some Gravel, little Silt, wet.				
133										
134	70	24/20	134-136	15-30	0.0 ppm	Very dense, brown, fine to coarse SAND,				
REMARKS	11. Temporary well set at 105.0 to 110.0 feet below ground surface. Purged 65.0 gallons. Groundwater sample submitted for laboratory analysis.									
	12. Temporary well set at 115.0 to 120.0 feet below ground surface. Purged 100.0 gallons. Groundwater sample submitted for laboratory analysis.									
	13. Temporary well set at 125.0 to 130.0 feet below ground surface. Purged 65.0 gallons. Groundwater sample submitted for laboratory analysis.									
	14. Temporary well set at 135.0 to 140.0 feet below ground surface. Purged - gallons. Groundwater sample submitted for laboratory analysis.									
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: HS-MW-12D	

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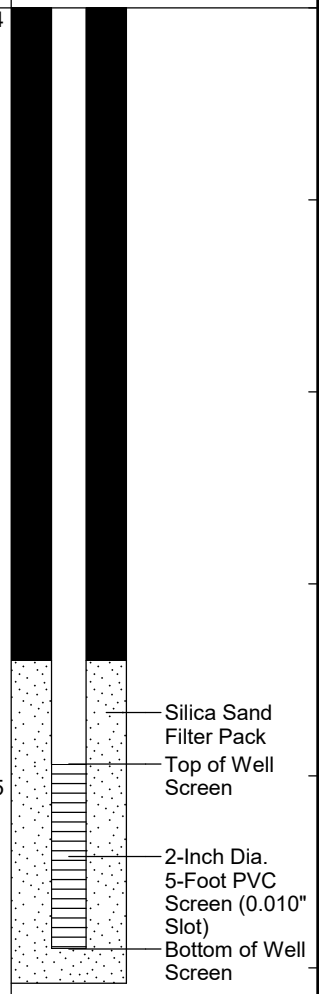
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Check: JTM/JMG

Sample Information								Check: JTM/JMG	
Depth	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
136	71	24/9	136-138	30-21	0.0 ppm	some Gravel, little Silt, wet.	SAND	14	
137				18-23 21-20		Dense, brown, fine to coarse SAND, some Gravel, little Silt, wet.			
138	72	24/13	138-140	10-15	0.0 ppm	Dense, brown, fine to coarse SAND, some Gravel, little Silt, wet.			
139				16-17					
140	73	17/9	140-141.4	1-39-50/50	0.0 ppm	Very dense, brown, fine to coarse SAND, some Gravel, little Silt, wet.			
141									
142	74	17/12	142-143.4	1-34-50/50	0.0 ppm	Very dense, brown, fine to coarse SAND, some Gravel, little Silt, wet. Changing at 142.6 feet to: Brown, fine SAND, some Silt, wet.			
143									
144	75	12/12	144-145	10-50/6"	0.0 ppm	Very dense, brown, fine SAND, some Silt, trace Gravel, wet.			
145									
146	76	18/7	146-147.54	15-50/6"	0.0 ppm	Very dense, brown, fine SAND, some Silt, trace Gravel, wet.			
147									
148	77	10/2	148-148.8	20-50/4"	0.0 ppm	Very dense, brown, fine to medium SAND, little Silt, wet.			
149									
150	78	6/6	150-150.5	50/6"	0.0 ppm	Very dense, brown, fine to medium SAND, little Silt, wet.			
151									
152	79	12/10	152-153	6-50/6"	0.0 ppm	Very dense, brown, fine to medium SAND, little Silt, wet.			
153									
154	80	11/11	154-154.9	29-50/5"	0.0 ppm	Very dense, brown, fine SAND, little Silt, wet.		15	
155									
156	81	11/11	156-156.9	19-50/5"	0.0 ppm	Very dense, brown, fine to medium SAND, little Silt, trace Gravel, wet.			
157									
158	82	12/11	158-159	27-50/6"	0.0 ppm	Very dense, brown, fine to medium SAND, little Silt, trace Gravel, wet.			
159									
160	83	18/18	160-161.55	19-50/6"	0.0 ppm	Very dense, brown, fine to medium SAND, little Silt, trace Gravel, wet.			
161									
162	84	24/20	162-164	2-8 14-14	0.0 ppm	Medium dense, brown, fine to medium SAND, little Silt, wet.			
163									
164	85	12/12	164-165	15-50/6"	0.0 ppm	Very dense, brown, fine to medium SAND, little Silt, wet.			
165									
166	86	23/14	166-167.9	3-10 30-50/5"	0.0 ppm	Dense, brown, fine to medium SAND, little Silt, wet.			
167									
168	87	23/2	168-169.9	3-13 37-50/5"	0.0 ppm	Very dense, brown, fine to medium SAND, little Silt, wet.			
169									
REMARKS	15. Temporary well set at 155.0 to 160.0 feet below ground surface. Purged 55.0 gallons. Groundwater sample submitted for laboratory analysis.								
	16. Temporary well set at 165.0 to 170.0 feet below ground surface. Purged 75.0 gallons. Groundwater sample submitted for laboratory analysis.								
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: HS-MW-12D

BORING WI 62355.52 HOUSE STREET COMPLETE.GPJ WI DNR.GDT 4/19/20





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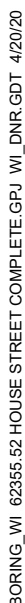
Page: 6 of 6

File No.: 16.0062335.52

Check: JTM/JMG

Sample Information						Dennett, Michigan				Check: JTM/JMG	
Depth	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed		
171	88	18/14	170-171.5	11-16-50/6"	0.0 ppm	Very dense, brown, fine to medium SAND, little Silt, wet.	SAND	17			
172	90	12/12	172-173	11-22	0.0 ppm	Very dense, brown, fine to medium SAND, little Silt, wet.					
173											
174	91	14/14	174-175.2	26-49-50/20"	0.0 ppm	Very dense, brown, fine to medium SAND, little Silt, with small, interbedded Silty Clay layers, wet.					
175											
176	92	12/12	176-177	16-50/6"	0.0 ppm	Very dense, brown, fine SAND, some Silt, wet.					
177											
178	93	18/18	178-179.5	20-27-50/60"	0.0 ppm	Very dense, brown, fine to medium SAND, little Silt, wet. Changing at 178.9 feet to: Brown, fine SAND, some Silt, wet.					
179											
180	94	16/14	180-181.3	36-24-50/4"	0.0 ppm	Very dense, brown, fine to medium SAND, little Silt, wet.					
181											
182	95	21/21	182-183.8	12-23 44-50/3"	0.0 ppm	Very dense, brown, fine to medium SAND, little Silt, wet.		18			
183											
184	96	10/10	184-184.8	29-50/4"	0.0 ppm	Hard, gray, Silty CLAY, some fine to medium Sand, wet. Changing at 184.2 feet to: Brown and gray, fine to medium SAND, little Silt, wet.	184' 184.2' Silty CLAY SAND				
185											
186	97	17/17	186-187.4	8-29-50/50"	0.0 ppm	Very dense, brown and gray, fine to medium SAND, some Silt, wet.					
187											
188	98	24/24	188-190	9-34 44-40	0.0 ppm	Very dense, brown and gray, fine to medium SAND, some Silt, wet. Changing at 189.0 feet to: Gray, Silty CLAY, little fine Sand, wet.	189' Silty CLAY				
189											
190	99	24/24	190-192.1	50-21-29-42"	0.0 ppm	Hard, gray, Silty CLAY, some fine to medium Sand, wet. Changing at 190.5 feet to: Brown and gray, fine to medium SAND, some Silt, wet.	190.5' SAND				
191											
192	100	17/17	192-193.4	8-30-50/50"	0.0 ppm	Hard, gray, Silty CLAY, little fine Sand, dry (weathered Bedrock).	192' Silty CLAY				
193								19			
194						Bottom of Borehole at 194.0 Feet	194'				
195											
196											
197											
198											
199											
200											
201											
202											
203											
204											
REMARKS	17. Temporary well set at 175.0 to 180.0 feet below ground surface. Purged 70.0 gallons. Groundwater sample submitted for laboratory analysis.										
	18. Temporary well set at 185.0 to 190.0 feet below ground surface. Purged 60.0 gallons. Groundwater sample submitted for laboratory analysis.										
	19. Monitoring well was installed in borehole upon completion. Well screen set from 154.7 to 159.5 feet below ground surface.										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: HS-MW-12D		

BORING WI 62355.52 HOUSE STREET COMPLETE.GPJ WI DNR.GDT 4/19/20





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Check: JTM/JMG

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD					
31										
32										
33										
34										
35										
36										
37										
38										
39										
40										
41										
42										
43										
44										
45										
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48										
49										
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51										
52										
53										
54										
55										
56										
57										
58										
59										
60										
61										
62										
63										
64										
REMARKS										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.										

Boring No.: HS-MW-12E

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File No.: 16.0062335.52

Check: JTM/JMG

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD					
66										
67										
68										
69										
70										
71										
72										
73										
74										
75										
76										
77										
78										
79										
80										
81										
82										
83										
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85										
86										
87										
88										
89										
90										
91										
92										
93										
94										
95										
96										
97										
98										
99										
REMARKS										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.										

Boring No.: HS-MW-12E

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Boring No.: HS-MW-12E

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File No.: 16.0062335.52

Check: JTM/JMG

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD					
101										
102										
103										
104										
105										
106										
107										
108										
109										
110										
111										
112										
113										
114										
115										
116										
117										
118										
119										
120										
121										
122										
123										
124										
125										
126										
127										
128										
129										
130										
131										
132										
133										
134										
<div>REMARKS</div> <div>Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.</div>										

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File No.: 16.0062335.52

Check: JTM/JMG

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD					
136										
137										
138										
139										
140										
141										
142										
143										
144										
145										
146										
147										
148										
149										
150										
151										
152										
153										
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156										
157										
158										
159										
160										
161										
162										
163										
164										
165										
166										
167										
168										
169										
REMARKS										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.										

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File No.: 16.0062335.52

Check: JTM/JMG

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD				
171									<p>Silica Sand Filter Pack</p> <p>Top of Well Screen</p> <p>2-Inch Dia. 5-Foot PVC Screen (0.010" Slot)</p> <p>Bottom of Well Screen</p>
172									
173									
174									
175									
176									
177									
178									
179									
180									
181									
182									
183									
184									
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193									
194									
195									
196									
197									
198									
199									
200									
201									
202									
203									
204									

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-MW-12E

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Boring No.: HS-MW-13A

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File No.: 16.0062335.52

Check: JTM/JMG

Contractor: Stearns Drilling Company

Foreman: Jerry Huntoon

Logged by: John Morehouse

Date Start/Finish: 1-14-20 / 1-14-20

Boring Location:

GS Elev.: Datum:

Auger/
Casing

Sampler

GROUNDWATER READINGS

Type: Hollow Stem Auger

Split Spoon

O.D. / I.D.: 8.0" / 4.25"

2.0" / 1 3/8"

Hammer Wt.: 140lbs

NA

Hammer Fall: 30"

NA

TOC Elev.: NA

NA

Surveyed By: NA Survey Date:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					PROTECTIVE CASING
1						See HS-MW-13C for detailed soil descriptions.				
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
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14										
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32										
33										
34										
35										
36										
37										
38										
39										

Bentonite/Grout

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-MW-13A

BORING WELL 62355.52 HOUSE STREET COMPLETE.GPJ GZA CORP.GDT 4/15/20



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Boring No.: HS-MW-13A

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File No.: 16.0062335.52

Check: JTM/JMG

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
41									
42									
43									
44									
45									
46									
47									
48									
49									
50									
51									
52									
53									
54									
55									
56									
57									
58									
59									
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67									
68									
69									
70									
71									
72									
73									
74									
75									
76									
77									
78									
79									
80									
81									
82									
83									
84									
85						Bottom of Borehole at 84.5 Feet		1	
86									

REMARKS

1. Monitoring well HS-MW-13A was installed in borehole upon completion. Well screen set from approximately 79.2 to 84.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-MW-13A

BORING WELL 62355.52 HOUSE STREET COMPLETE.GPJ GZA CORP.GDT 4/15/20



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Boring No.: HS-MW-13B

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File No.: 16.0062335.52

Check: JTM/JMG

Contractor: Stearns Drilling Company

Foreman: Jerry Huntoon

Logged by: John Morehouse

Date Start/Finish: 1-13-20 / 1-14-20

Boring Location:

GS Elev.: Datum:

Auger/
Casing

Sampler

GROUNDWATER READINGS

Type: Hollow Stem Auger

Split Spoon

O.D. / I.D.: 8.0" / 4.25"

2.0" / 1 3/8"

Hammer Wt.: 140lbs

NA

Hammer Fall: 30"

NA

TOC Elev.: NA

NA

Date	Time	Depth	Casing	Stab

Surveyed By: NA Survey Date:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					PROTECTIVE CASING
1						See HS-MW-13C for detailed soil descriptions.				
2										
3										
4										
5										
6										
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31										
32										
33										
34										
35										
36										
37										
38										
39										

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-MW-13B

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File No.: 16.0062335.52

Check: JTM/JMG

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
41										
42										
43										
44										
45										
46										
47										
48										
49										
50										
51										
52										
53										
54										
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80										
81										
82										
83										
84										
85										
86										
REMARKS										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: HS-MW-13B	

BORING WELL 62355.52 HOUSE STREET COMPLETE.GPJ GZA CORP.GDT 4/15/20

Bentonite/Grout



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Boring No.: HS-MW-13B

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File No.: 16.0062335.52

Check: JTM/JMG

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
87										
88										
89										
90										
91										
92										
93										
94										
95										
96										
97										
98										
99										
100										
101										
102										
103										
104										
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125										
126										
127										
128										
129										
130										
131										
132										
133										
REMARKS										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: HS-MW-13B	

BORING WELL 62355.52 HOUSE STREET COMPLETE.GPJ GZA CORP.GDT 4/15/20



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Boring No.: HS-MW-13B

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File No.: 16.0062335.52

Check: JTM/JMG

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
134									
135									
136									
137									
138									
139									
140									
141									
142									
143									
144									
145									
146									
147									
148									
149									
150									
151									
152									
153									
154									
155									
156						Bottom of Borehole at 155.5 Feet		1	
157									
158									
159									
160									
161									
162									
163									
164									
165									
166									
167									
168									
169									
170									
171									
172									
173									
174									
175									
176									
177									
178									
179									
REMARKS									
1. Monitoring well HS-MW-13B was installed in borehole upon completion. Well screen set from approximately 148.8 to 153.6 feet below ground surface.									
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									

Boring No.: HS-MW-13B

BORING WELL 62355.52 HOUSE STREET COMPLETE.GPJ GZA CORP.GDT 4/15/20



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Boring No.: HS-MW-13C

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File No.: 16.0062335.52

Check: JTM/JMG

Contractor: Stearns Drilling Company

Foreman: Jerry Huntoon

Logged by: John Morehouse

Date Start/Finish: 12-16-19 / 12-17-19

Boring Location:

GS Elev.: Datum:

**Auger/
Casing**

Sampler

Type: Hollow Stem Auger

Split Spoon

O.D. / I.D.: 8.0" / 4.25"

2.0" / 1 3/8"

Hammer Wt.: 140lbs

NA

Hammer Fall: 30"

NA

TOC Elev.: NA

NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: NA Survey Date:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					PROTECTIVE CASING
1	1	24/11	0-2	1-2 2-1		Dark brown to dark yellowish brown, fine SAND, some Silt, moist. Changing at 0.2 feet to: Yellowish brown, fine SAND, some Silt, moist. Changing at 0.9 feet to: NO RECOVERY.	SAND 0.9' NO RECOVERY			
2	2	24/1	2-4	4-2 3-6		Yellowish brown, fine SAND, little Silt, moist. Changing at 2.1 feet to: NO RECOVERY.	2' 2.1' SAND NO RECOVERY			
3										
4	3	24/11	4-6	2-4 5-7		Light yellowish brown, fine SAND, trace Silt, moist. Changing at 4.9 feet to: NO RECOVERY.	4' SAND 4.9' NO RECOVERY			
5										
6	4	24/13	6-8	5-6 7-8		Dark yellowish brown, fine to medium SAND, trace Silt, moist. Changing at 6.7 feet to: Dark yellowish brown, SILT, thin seams of Silty Clay, moist. Changing at 6.9 feet to: Dark yellowish brown, fine to medium SAND, trace Silt, moist. Changing at 7.1 feet to: NO RECOVERY.	6' SAND 6.7' 6.9' SILT 7.1' SAND NO RECOVERY			
7										
8	5	24/16	8-10	6-4 5-6		Dark yellowish brown, fine to medium SAND, trace Silt, moist. Changing at 9.3 feet to: NO RECOVERY.	8' SAND 9.3' NO RECOVERY			
9										
10	6	24/12	10-12	4-8 8-10		Dark yellowish brown, fine SAND, some Silt, moist. Changing at 10.5 feet to: Yellowish brown, SILT, moist. Changing at 11.6 feet to: Pale brown, fine SAND, trace Silt, moist. Changing at 11.8 feet to: NO RECOVERY.	10' SAND 10.5' SILT 11.6' SAND 11.8' NO RECOVERY			
11										
12	7	24/17	12-14	6-8 9-11		Pale brown, fine SAND, trace Silt, moist. Changing at 13.4 feet to: NO RECOVERY.	12' NO RECOVERY SAND 13.4' NO RECOVERY			
13										
14	8	24/14	14-16	5-8 10-12		Pale brown, fine SAND, trace Silt, moist. Changing at 15.2 feet to: NO RECOVERY.	14' SAND			

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-MW-13C

BORING WELL 62355.52 HOUSE STREET COMPLETE.GPJ GZA CORP.GDT 4/15/20



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Check: JTM/JMG

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
16	9	24/12	16-18	3-7 7-6		Pale brown, fine SAND, trace Silt, moist. Changing at 17.0 feet to: NO RECOVERY.	15.2' NO RECOVERY 16' SAND		
17							17' NO RECOVERY		
18	10	24/17	18-20	5-6 9-10		Pale brown, fine SAND, trace Silt, moist. Changing at 18.5 feet to: Pale brown, fine SAND, trace Silt, very thin lenses of Silt, moist. Changing at 19.4 feet to: NO RECOVERY.	18' SAND		
19							19.4' NO RECOVERY		
20	11	24/17	20-22	7-9 11-11		Pale brown, fine SAND, trace Silt, moist. Changing at 21.2 feet to: Yellowish brown, fine to medium SAND, trace Silt, moist. Changing at 21.4 feet to: NO RECOVERY.	20' SAND		
21							21.4' NO RECOVERY		
22	12	24/18	22-24	5-8 11-14		Yellowish brown, fine SAND, trace Silt, moist. Changing at 23.5 feet to: NO RECOVERY.	22' SAND		
23							23.5' NO RECOVERY		
24	13	24/18	24-26	13-14 12-18		Yellowish brown, fine SAND, trace Silt, grading to fine to medium SAND, trace Silt, moist. Changing at 25.5 feet to: NO RECOVERY.	24' SAND		
25							25.5' NO RECOVERY		
26	14	24/19	26-28	6-15 17-18		Yellowish brown, fine to medium SAND, trace Silt, moist. Changing at 27.6 feet to: NO RECOVERY.	26' SAND		
27							27.6' NO RECOVERY		
28	15	24/16	28-30	10-22 27-34		Yellowish brown, fine to medium SAND, trace Silt, moist. Changing at 28.6 feet to: Yellowish brown, SILT, some fine Sand, moist. Changing at 29.3 feet to: NO RECOVERY.	28' SAND 28.6' SILT		
29							29.3' NO RECOVERY		
30	16	24/20	30-32	15-20 19-20		Brownish yellow, fine to medium SAND, trace Silt, moist. Changing at 30.3 feet to: Light yellowish brown, fine SAND, trace Silt, moist. Changing at 31.3 feet to: Brownish yellow, fine to medium SAND, trace Silt, moist. Changing at 31.7 feet to: NO RECOVERY.	30' SAND		
31							31.7' NO RECOVERY		
32	17	24/20	32-34	11-14 17-20		Brownish yellow, fine to medium SAND,	32' SAND		
REMARKS									
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: HS-MW-13C

BORING WELL 62355.52 HOUSE STREET COMPLETE.GPJ GZA CORP.GDT 4/15/20



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Sample Information						Demont, Michigan		Check:		JTM/JMG	
Depth	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed		
33	18	24/23	34-36	13-17 20-24		trace Silt, moist. Changing at 33.2 feet to: Yellowish brown, fine to medium SAND, trace Silt, moist. Changing at 33.5 feet to: Brownish yellow, fine to medium SAND, trace Silt, moist. Changing at 33.7 feet to: NO RECOVERY.	SAND				
34						33.7'	NO RECOVERY				
35						34'	SAND				
36	19	24/20	36-38	9-18 22-27		Brownish yellow, fine SAND, trace Silt, moist. Changing at 36.7 to: Yellowish brown, fine to medium SAND, trace Silt, moist. Changing at 36.8 feet to: Yellowish brown, SILT, moist. Changing at 37.7 feet to: NO RECOVERY.	35.9'				
37						36'	NO RECOVERY				
38						36.8'	SAND				
39	20	24/22	38-40	10-10 14-15		Brownish yellow, fine SAND, trace Silt, moist. Changing at 38.5 feet to: Yellowish brown, fine SAND, some Silt, moist. Changing at 38.8 feet to: Yellowish brown, SILT, moist. Changing at 39.7 feet to: Yellowish brown, fine SAND, trace Silt, moist. Changing at 39.8 feet to: NO RECOVERY.	SILT				
40						37.7'	NO RECOVERY				
41						38'	SAND				
42	21	24/22	40-42	12-8 18-23		Dark yellowish brown, medium to coarse SAND, trace Silt, moist. Changing at 41.8 feet to: NO RECOVERY.	38.8'				
43						39.7'	SAND				
44						39.8'	NO RECOVERY				
45	22	24/16	42-44	11-22 23-21		Dark yellowish brown, medium to coarse SAND, trace Silt, moist. Changing at 42.7 feet to: Yellowish brown, fine SAND, trace Silt, moist. Changing at 43.0 feet to: Yellowish brown, fine SAND, trace Silt, thin lenses of coarse SAND, moist. Changing at 43.3 feet to: NO RECOVERY.	SAND				
46						41.8'	NO RECOVERY				
47						42'	SAND				
48	23	24/17	44-46	9-20 22-23		Yellowish brown, fine SAND, some Silt, moist. Changing at 45.4 feet to: NO RECOVERY.	43.3'				
49						44'	NO RECOVERY				
							SAND				
49	24	24/16	46-48	11-19 20-25		Yellowish brown, fine to coarse SAND, trace Silt, moist. Changing at 46.9 feet to: Brownish yellow, fine SAND, trace Silt, moist. Changing at 47.3 feet to: NO RECOVERY.	45.4'				
						46'	NO RECOVERY				
							SAND				
	25	18/18	48-49.5	11-18 20-18		Yellowish brown, fine to medium SAND, trace Gravel, trace Silt, moist. Changing at 48.9 feet to: Dark yellowish brown, coarse SAND, trace Silt, moist. Changing at 49.0 feet to: Yellowish brown, fine to medium SAND, trace Gravel, trace Silt, moist.	47.3'				
						48'	NO RECOVERY				
							SAND				
							49.6'				
							50'	NO			
REMARKS											
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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (6")	Test Data					
51	26	24/16	50-52	11-12 12-11		Changing at 49.2 feet to: Dark yellowish brown, coarse SAND, trace Silt, moist. Changing at 49.3 feet to: Yellowish brown, fine to medium SAND, trace Gravel, trace Silt, moist. Changing at 49.6 feet to: NO RECOVERY.	RECOVERY SAND 51.1' 51.3' SILT NO RECOVERY			
52	27	24/16	52-54	6-5 6-6		Yellowish brown, fine to medium SAND, trace Gravel, trace Silt, moist. Changing at 50.6 feet to: Yellowish brown, fine to medium SAND, trace Silt, moist. Changing at 51.1 feet to: Yellowish brown, SILT, moist. Changing at 51.3 feet to: NO RECOVERY.	52' SAND 53.3' NO RECOVERY			
53										
54	28	24/7	54-56	3-4 8-15		Yellowish brown, fine SAND, trace Silt, wet. Changing at 52.6 feet to: Dark yellowish brown, fine to medium SAND, trace Gravel, trace Silt, wet. Changing at 53.3 feet to: NO RECOVERY.	54' SAND 54.6' NO RECOVERY			
55										
56	29	24/17	56-58	6-10 10-14		Dark yellowish brown, fine to medium SAND, trace Gravel, trace Silt, wet. Changing at 54.6 feet to: NO RECOVERY. Dark yellowish brown, fine to coarse SAND, trace Gravel, trace Silt, wet. Changing at 57.4 feet to: NO RECOVERY.	56' SAND 57.4' NO RECOVERY			
57										
58	30	24/12	58-60	2-5 9-9		Dark yellowish brown, fine to coarse SAND, trace Gravel, trace Silt, wet. Changing at 59.0 feet to: No RECOVERY.	58' SAND 59' NO RECOVERY	1		
59										
60	31	24/1	60-62	1-3 8-10		Yellowish brown, fine SAND, trace Silt, moist. Changing at 60.1 feet to: NO RECOVERY.	60' SAND 60.1' NO RECOVERY			
61										
62	32	24/16	62-64	3-5 17-16		Dark yellowish brown, Silty CLAY, moist. Changing at 62.1 feet to: Dark yellowish brown, fine to coarse SAND, trace Gravel, trace Silt, wet. Changing at 62.3 feet to: Dark yellowish brown, Silty CLAY, moist. Changing at 63.2 feet to: Dark yellowish brown to dark brown, coarse SAND, trace Silt, wet. Changing at 63.3 feet to: NO RECOVERY.	62' Silty CLAY 63.2' 63.3' SAND NO RECOVERY	2		
63										
64	33	24/14	64-66	2-6 10-13		Dark yellowish brown, fine to medium SAND, trace Silt, wet. Changing at 64.4 feet to: Dark yellowish brown, fine to coarse SAND, trace Gravel, trace Silt, wet. Changing at 65.2 feet to: NO RECOVERY. Yellowish brown, fine to coarse SAND, some Gravel, trace Silt, wet. Changing at 66.9 feet to: NO RECOVERY.	64' SAND 65.2' NO RECOVERY 66' SAND 66.9' NO RECOVERY			
65										
66	34	24/11	66-68	4-10 10-12						
67										
REMARKS 1. Temporary well set at 59.0 to 64.0 feet below ground surface. Groundwater sample submitted for laboratory analysis. 2. Groundwater was encountered at approximately 62.1 feet below ground surface.										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: HS-MW-13C	

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Sample Information						Demont, Michigan	Check:	JTM/JMG		
Depth	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
68	35	24/19	68-70	14-16 13-14		Yellowish brown, fine to medium SAND, trace Gravel, trace Silt, wet. Changing at 68.2 feet to: Dark yellowish brown, coarse SAND, trace Silt, wet. Changing at 68.3 feet to: Yellowish brown, fine to medium SAND, trace Gravel, trace Silt, wet. Changing at 69.2 feet to: Dark yellowish brown, Silty CLAY, trace Gravel, moist. Changing at 69.3 feet to: Yellowish brown, fine to medium SAND, trace Gravel, trace Silt, wet. Changing at 69.6 feet to: NO RECOVERY. Dark yellowish brown, GRAVEL, some fine to coarse Sand, trace Silt, wet. Changing at 70.8 feet to: NO RECOVERY. Yellowish brown, fine to medium SAND, trace Gravel, trace Silt, wet. Changing at 72.7 feet to: NO RECOVERY.	68'	3		
							SAND			
69	36	24/10	70-72	3-7 12-12			69.2'			
							69.3' Silty CLAY			
70	37	24/8	72-74	5-8 16-17			69.6' SAND			
							70' NO RECOVERY			
71	38	24/16	74-76	3-12 19-21			GRAVEL			
							70.8'			
72	39	24/19	76-78	14-16 22-26			NO RECOVERY			
							72'			
73	40	24/6	78-80	7-9 15-19			SAND			
							72.7'			
74	41	24/12	80-82	0-0 9-20			NO RECOVERY			
							74'			
75	42	24/18	82-84	2-8 16-22			SAND			
							74.6'			
76	43	24/6	84-86	7-13 15-18			SILT			
							75.3'			
77							NO RECOVERY			
							76'			
78							SAND			
							76.7'			
79							SILT			
							77.4'			
80							77.6' SAND			
							78' NO RECOVERY			
81							78.5' SAND			
							NO RECOVERY			
82							80'			
							SAND			
83							81'			
							NO RECOVERY			
84							82'			
							SAND			
							83.5'			
							NO RECOVERY			
							84' SAND			
							84.5'			
							NO RECOVERY			

REMARKS	3. Temporary well set at 69.0 to 74.0 feet below ground surface. Groundwater sample submitted for laboratory analysis.
	4. Temporary well set at 79.0 to 84.0 feet below ground surface. Groundwater sample submitted for laboratory analysis.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.	Boring No.: HS-MW-13C
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Check: JTM/JMG

Sample Information								Check:	JTM/JMG	
Depth	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
86	44	24/7	86-88	5-10 19-28		Dark yellowish brown, fine to coarse SAND, some Gravel, trace Silt, wet. Changing at 86.6 feet to: NO RECOVERY.	NO RECOVERY 86' SAND 86.6'	5		
87							NO RECOVERY			
88	45	24/19	88-90	11-20 30-45		Dark yellowish brown to yellowish brown, fine to medium SAND, trace Silt, wet. Changing at 89.6 feet to: NO RECOVERY.	88' SAND 89.6'			
89							NO RECOVERY			
90	46	24/17	90-92	2-11 23-43		Dark yellowish brown to yellowish brown, fine to medium SAND, trace Silt, wet. Changing at 91.4 feet to: NO RECOVERY.	90' NO RECOVERY SAND 91.4'			
91							NO RECOVERY			
92	47	24/18	92-94	0-1 6-11		Dark yellowish brown to yellowish brown, fine to medium SAND, trace Silt, wet. Changing at 93.5 feet to: NO RECOVERY.	92' SAND 93.5'			
93							NO RECOVERY			
94	48	24/5	94-96	4-8 16-24		Dark yellowish brown to yellowish brown, fine to medium SAND, trace Silt, wet. Changing at 94.4 feet to: NO RECOVERY.	94' NO RECOVERY SAND 94.4'			
95							NO RECOVERY			
96	49	24/7	96-98	4-13 19-31		Yellowish brown, fine to medium SAND, trace Silt, wet. Changing at 96.6 feet to: NO RECOVERY.	96' SAND 96.6'			
97							NO RECOVERY			
98	50	24/8	98-100	2-7 15-22		Yellowish brown, fine to medium SAND, trace Silt, wet. Changing at 98.7 feet to: NO RECOVERY.	98' SAND 98.7'			
99							NO RECOVERY			
100	51	24/12	100-102	9-15 25-38		Yellowish brown, fine to medium SAND, trace Silt, wet. Changing at 101.0 feet to: NO RECOVERY.	100' SAND 101'			
101							NO RECOVERY			
102	52	24/0	102-104	7-24 39-50/4"		NO RECOVERY.				
REMARKS	5. Temporary well set at 89.0 to 94.0 feet below ground surface. Groundwater sample submitted for laboratory analysis. 6. Temporary well set at 99.0 to 104.0 feet below ground surface. Groundwater sample submitted for laboratory analysis.									
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Bentonite/Grout



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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
103							NO RECOVERY			
104	53	24/12	104-106	11-23 32-45		Yellowish brown, fine to medium SAND, trace Silt, wet. Changing at 105.0 feet to: NO RECOVERY.	104' SAND			
105							105' NO RECOVERY			
106	54	24/16	106-108	5-18 37-50/5"		Yellowish brown, fine to medium SAND, trace Silt, wet. Changing at 107.3 feet to: NO RECOVERY.	106' SAND			
107							107.3' NO RECOVERY			
108	55	24/12	108-110	4-18 48-50/3"		Yellowish brown, fine to medium SAND, trace Silt, wet. Changing at 109.0 feet to: NO RECOVERY.	108' SAND			
109							109' NO RECOVERY	7		
110	56	24/2	110-112	10-22 36-50/5"		Yellowish brown, fine to medium SAND, trace Silt, wet. Changing at 110.2 feet to: NO RECOVERY.	110' 110.2' SAND NO RECOVERY			
111										
112	57	24/14	112-114	13-27 41-50		Yellowish brown, fine to medium SAND, trace Silt, wet. Changing at 113.2 feet to: NO RECOVERY.	112' SAND			
113							113.2' NO RECOVERY			
114	58	24/20	114-116	12-27 35-50		Yellowish brown, fine to medium SAND, trace Silt, wet. Changing at 115.7 feet to: NO RECOVERY.	114' SAND			
115										
116	60	24/16	116-118	3-8 22-48		Yellowish brown, fine to medium SAND, trace Silt, wet. Changing at 117.3 feet to: NO RECOVERY.	115.7' 116' NO RECOVERY SAND			
117							117.3' NO RECOVERY			
118	61	24/0	118-120	5-9 16-27		NO RECOVERY.				
119								8		
REMARKS 7. Temporary well set at 109.0 to 114.0 feet below ground surface. Groundwater sample submitted for laboratory analysis. 8. Temporary well set at 119.0 to 124.0 feet below ground surface. Groundwater sample submitted for laboratory analysis.										
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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (6")	Test Data					
121	62	24/0	120-122	5-10 25-32		NO RECOVERY.	NO RECOVERY			
122	63	24/2	122-124	5-11 18-25		Yellowish brown, fine to medium SAND, trace Silt, wet. Changing at 122.2 feet to: NO RECOVERY.	122' 122.2' SAND NO RECOVERY			
124	64	24/0	124-126	5-12 21-25		NO RECOVERY.				
126	65	24/5	126-128	4-9 19-27		Yellowish brown, fine to medium SAND, trace Silt, wet. Changing at 126.4 feet to: NO RECOVERY.	126' 126.4' SAND NO RECOVERY			
128	66	24/12	128-130	15-23 40-47		Yellowish brown, fine to medium SAND, trace Silt, wet. Changing at 129.0 feet to: NO RECOVERY.	128' SAND 129' NO RECOVERY	9		
130	67	24/5	130-132	7-9 19-33		Yellowish brown, fine to medium SAND, trace Silt, wet. Changing at 130.4 feet to: NO RECOVERY.	130' SAND 130.4' NO RECOVERY			
132	68	24/6	132-134	3-9 22-43		Yellowish brown, fine to medium SAND, trace Silt, wet. Changing at 133.1 feet to: NO RECOVERY.	132' SAND 133.1' NO RECOVERY			
134	70	24/0	134-136	2-4 14-25		NO RECOVERY.				
136	71	24/13	136-138	8-25 36-45		Yellowish brown, fine to medium SAND, trace Silt, wet. Changing at 137.1 feet to: NO RECOVERY.	136' SAND 137.1'			
<div>REMARKS</div> <div>9. Temporary well set at 129.0 to 134.0 feet below ground surface. Groundwater sample submitted for laboratory analysis.</div>										
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Check: JTM/JMG

Sample Information						Check: JTM/JMG				
Depth	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
138	72	24/13	138-140	6-5 7-11		Yellowish brown, fine to medium SAND, trace Silt, wet. Changing at 139.1 feet to: NO RECOVERY.	NO 138'RECOVERY SAND	10		
139							139.1' NO RECOVERY			
140	73	24/13	140-142	1-4 9-17		Yellowish brown, fine to medium SAND, trace Silt, wet. Changing at 141.1 feet to: NO RECOVERY.	140' SAND			
141							141.1' NO RECOVERY			
142	74	24/0	142-144	2-8 18-26		NO RECOVERY.		11		
143										
144	75	24/13	144-146	1-6 13-28		Yellowish brown, fine to medium SAND, trace Silt, wet. Changing at 145.1 feet to: NO RECOVERY.	144' SAND			
145							145.1' NO RECOVERY			
146	76	24/17	146-148	7-13 32-50		Yellowish brown, fine to medium SAND, trace Silt, wet. Changing at 174.4 feet to: NO RECOVERY.	146' SAND	11		
147							147.4' NO RECOVERY			
148	77	24/14	148-150	6-15 28-50		Yellowish brown, fine to medium SAND, trace Silt, wet. Changing at 149.2 feet to: NO RECOVERY.	148' SAND			
149							149.2' NO RECOVERY			
150	78	24/7	150-152	6-15 25-44		Yellowish brown, fine to medium SAND, trace Silt, wet. Changing at 150.6 feet to: NO RECOVERY.	150' SAND	11		
151							150.6' NO RECOVERY			
152	79	24/11	152-154	14-28 63-50/4"		Yellowish brown, fine to medium SAND, trace Silt, wet. Changing at 152.9 feet to: NO RECOVERY.	152' SAND			
153							152.9' NO RECOVERY			
154	80	24/6	154-156	8-19 32-50		Yellowish brown, fine to medium SAND, trace Silt, wet. Changing at 154.5 feet to: NO RECOVERY.	154' SAND	11		
							154.5' NO RECOVERY			
REMARKS	10. Temporary well set at 139.0 to 144.0 feet below ground surface. Groundwater sample submitted for laboratory analysis. 11. Temporary well set at 149.0 to 154.0 feet below ground surface. Groundwater sample submitted for laboratory analysis.									
	Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									
Boring No.: HS-MW-13C										

BORING WELL 62355.52 HOUSE STREET COMPLETE.GPJ GZA CORP.GDT 4/15/20



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File No.: 16.0062335.52

Check: JTM/JMG

Sample Information						Check:		JTM/JMG		
Depth	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
156	81	24/8	156-158	9-18 30-50/2"		Yellowish brown, fine to medium SAND, trace Silt, wet. Changing at 156.7 feet to: NO RECOVERY.	NO RECOVERY 156' SAND 156.7'	12		
157							NO RECOVERY			
158	82	24/2	158-160	3-12 25-37		Yellowish brown, fine to medium SAND, trace Silt, wet. Changing at 158.2 feet to: NO RECOVERY.	158' 158.2' SAND NO RECOVERY			
159										
160	83	18/5	160-161.5	15-13-27		Yellowish brown, fine to medium SAND, trace Silt, wet. Changing at 160.4 feet to: NO RECOVERY.	160' SAND 160.4'			
161							NO RECOVERY			
162	84	24/8	162-164	6-19 32-32		Yellowish brown, fine to medium SAND, trace Silt, wet. Changing at 162.7 feet to: NO RECOVERY.	162' SAND 162.7'			
163							NO RECOVERY			
164	85	24/16	164-166	3-12 28-46		Yellowish brown, fine to medium SAND, trace Silt, wet. Changing at 165.3 feet to: NO RECOVERY.	164' SAND			
165							165.3'			
166	86	18/8	166-167.5	8-22-40		Yellowish brown, fine to medium SAND, trace Silt, wet. Changing at 166.7 feet to: NO RECOVERY.	NO RECOVERY 166' SAND 166.7'			
167							NO RECOVERY			
168	87	24/10	168-170	5-19 25-42		Yellowish brown, fine to medium SAND, trace Silt, wet. Changing at 168.8 feet to: NO RECOVERY.	168' SAND 168.8'	13		
169							NO RECOVERY			
170	88	24/20	170-172	33-30 32-34		Yellowish brown, fine to medium SAND, trace Silt, wet. Changing at 171.3 feet to: Very dark brown, Silty CLAY, moist. Changing at 171.7 feet to: NO RECOVERY.	170' SAND			
171							171.3'			
							171.6' Silty CLAY			
							171.7' SAND			
172	89	24/8	172-174	33-43 45-47		Brown, fine to coarse SAND, some Gravel,	172' NO RECOVERY			
REMARKS	12. Temporary well set at 159.0 to 164.0 feet below ground surface. Groundwater sample submitted for laboratory analysis. 13. Temporary well set at 169.0 to 174.0 feet below ground surface. Groundwater sample submitted for laboratory analysis.									
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.										
Boring No.: HS-MW-13C										

BORING WELL 62355.52 HOUSE STREET COMPLETE.GPJ GZA CORP.GDT 4/15/20



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File No.: 16.0062335.52

Check: JTM/JMG

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
173						trace Silt, wet. Changing at 172.7 feet to: NO RECOVERY.	172.7' SAND NO RECOVERY			
174	90	24/5	174-176	2-6 27-50/3"		Brown, fine to coarse SAND, some Gravel, trace Silt, wet. Changing at 174.3 feet to: NO RECOVERY.	174' 174.3' SAND NO RECOVERY			
175										
176	91	24/0	176-178	14-50/5"		NO RECOVERY.				
177										
178	92	18/4	178-179.5	6-31-50		Brown, fine to coarse SAND, some Gravel, trace Silt, wet. Changing at 178.3 feet to: NO RECOVERY.	178' 178.3' SAND NO RECOVERY	14		
179										
180	93	12/2	180-181	18-50		Brown, fine to coarse SAND, some Gravel, trace Silt, wet. Changing at 180.2 feet to: NO RECOVERY.	180' 180.2' SAND NO RECOVERY			
181										
182	94	24/7	182-184	13-50/2"		Dark grayish brown, CLAY, some Sand, little Silt, trace Gravel, moist. Changing at 182.6 feet to: NO RECOVERY.	182' CLAY 182.6' NO RECOVERY			
183										
184	95	24/19	184-186	19-43 42-50/5"		Dark yellowish brown, fine to medium SAND, trace Silt, wet. Changing at 184.7 feet to: Dark yellowish brown, fine to coarse SAND, little Gravel, trace Silt, wet. Changing at 184.9 feet to: Grayish brown, GRAVEL, some Sand, trace Silt, wet. Changing at 185.6 feet to: NO RECOVERY. Grayish-brown, GRAVEL, some Sand, trace Silt, wet. Changing at 186.5 feet to: NO RECOVERY.	184' SAND 184.9' GRAVEL 185.6' NO RECOVERY 186' GRAVEL 186.5' NO RECOVERY			
185										
186	96	12/6	186-187	23-50						
187										
188	97	12/11	188-189	40-50/4"		Dark yellowish brown, fine to medium SAND, trace Gravel, trace Silt, wet. Changing at 188.3 feet to: Brown to dark brown, medium to coarse SAND, trace Gravel, trace Silt, wet. Changing at 188.9 feet to: NO RECOVERY.	188' SAND 188.9' NO RECOVERY	15		
189							190'			
REMARKS 14. Temporary well set at 179.0 to 184.0 feet below ground surface. Groundwater sample submitted for laboratory analysis. 15. Temporary well set at 189.0 to 194.0 feet below ground surface. Groundwater sample submitted for laboratory analysis.										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: HS-MW-13C	

BORING WELL 62355.52 HOUSE STREET COMPLETE.GPJ GZA CORP.GDT 4/15/20



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Check: JTM/JMG

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
191	98	12/10	190-191	26-50/3"		Dark yellowish-brown, fine to medium SAND, trace Gravel, trace Silt, wet. Changing at 190.6 feet to: Brown, fine to medium SAND, trace Silt, wet. Changing at 190.8 feet to: NO RECOVERY.	SAND 190.8' NO RECOVERY		
192	99	12/12	192-193	25-50/3"		Brown, fine to medium SAND, trace Silt, wet. Changing at 192.6 feet to: NO RECOVERY.			
194	100	12/7	194-195	29-50/2"		Brown, fine to medium SAND, trace Gravel, trace Silt, wet. Changing at 194.6 feet to: Grayish-brown, SILT, little Clay, moist. Changing at 194.7 feet to: NO RECOVERY.	194' SAND 194.6' 194.7' SILT NO RECOVERY		
196	101	6/6	196-196.5	50/3"		Brown, fine to medium SAND, trace Silt, wet. Changing at 196.6 feet to: NO RECOVERY.	196' SAND 196.6' NO RECOVERY		
198	102	12/7	198-199	30-50/3"		Yellowish-brown, fine to medium SAND, trace Gravel, trace Silt, wet. Changing at 198.6 feet to: NO RECOVERY.	198' SAND 198.6' NO RECOVERY		Silica Sand Filter Pack
200	103	18/17	200-201.5	37-33-50/2"		Yellowish-brown, fine to medium SAND, trace Gravel, trace Silt, wet. Changing at 201.2 feet to: NO RECOVERY.	200' SAND 201.2' NO RECOVERY		Top of Well Screen
202	104	12/11	202-203	37-50/2"		Yellowish-brown, fine to medium SAND, trace Gravel, trace Silt, wet. Changing at 202.1 feet to: Grayish-brown, GRAVEL, some coarse Sand, trace Silt, wet. Changing at 202.2 feet to: Brown, SILT, some fine Sand, wet. Changing at 202.3 feet to: Grayish-brown, GRAVEL, some coarse Sand, trace Silt, wet. Changing at 202.5 feet to: Brown, fine SAND, some Silt, moist. Changing at 202.7 feet to: Brown, Silty CLAY, trace Gravel, moist. Dark grayish-brown, Silty CLAY, trace Gravel, moist. Changing at 204.9 feet to: NO RECOVERY. Bottom of Borehole at 205.0 Feet	202' 202.1' SAND 202.2' GRAVEL 202.3' SILT 202.5' GRAVEL 202.7' SAND Silty CLAY		2-Inch Dia. 5-Foot PVC Screen (0.010" Slot)
204	105	12/11	204-205	37-50/2"			204.9' NO RECOVERY		Bottom of Well Screen
205								16	
REMARKS 16. Monitoring well was installed in borehole upon completion. Well screen set from 199.4 to 204.2 feet below ground surface.									
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									

BORING WELL 62355.52 HOUSE STREET COMPLETE.GPJ GZA CORP.GDT 4/15/20

Boring No.: HS-MW-13C



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Boring No.: MW-14D

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File No.: 16.0062335.52

Check: John Morehouse

Contractor: Stearns Drilling Company

Foreman: Bert Graham

Logged by: Christopher Melby

Date Start/Finish: 3-15-18 / 3-15-18

Boring Location:

GS Elev.: Datum:

**Auger/
Casing**

Sampler

Type: Hollow Stem Auger

Split Spoon

O.D. / I.D.: 8.0" / 4.25"

2.0" / 1 3/8"

Hammer Wt.: NA

140lbs

Hammer Fall: NA

30.0"

TOC Elev.: NA

NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: NA Survey Date:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				PROTECTIVE CASING	Backfill/Cement Pad
1	1	24/24	0-2	11-5 9-10		Black, TOPSOIL. Changing at 0.3 feet to: Medium brown, fine SAND, trace, Silt.	SAND			
2										
3										
4										
5										
6										
7										
8	2	24/24	8-10	2-2 2-1		Loose, brown, fine to medium SAND, trace Silt.				
9										
10										
11										
12										
13										
14										
15										
16										
17										
18	3	24/12	18-20	2-3 5-3		Loose, brown and gray, coarse SAND, trace Gravel, wet.				
19										
20										
21										
22										
23	4	24/12	23-25	3-1 1-2		Very loose, brown and gray, fine to coarse SAND, wet.				
24										
25										
26										
27										
28	5	24/16	28-30	2-4 4-5		Loose, brown, fine to medium SAND, trace Silt. Changing at 29.0 feet to: Brown, Clayey SILT, little fine Sand, wet.	29' Clayey SAND			
29										

REMARKS

1. Groundwater encountered at approximately 14.5 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: MW-14D

BORING WELL 62355.52 HOUSE STREET COMPLETE.GPJ GZA CORP.GDT 3/1/19



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File No.: 16.0062335.52

Check: John Morehouse

Bentonite, Michigan										Check: John Morehouse			
Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed				
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data								
31	6	24/20	33-35	2-2 5-5		Medium stiff, Clayey SILT, little to trace fine to medium Sand, wet.	Clayey SAND						
32													
33													
34													
35													
36													
37													
38	7	24/10	38-40	1-1 1-1		Loose, gray, fine SAND, little Clayey Silt, wet.	38'						
39							SAND						
40													
41													
42													
43	8	24/16	43-45	4-4 5-7		Loose, gray, fine to medium SAND, little Silt, wet.							
44													
45													
46													
47													
48	9	24/14	48-50	3-7 8-7		Medium dense, gray, fine to medium SAND, little Silt, wet.							
49													
50													
51													
52													
53	10	24/24	53-55	2-3 3-5		Gray, fine to medium SAND, little Silt, wet. Changing at 53.5 feet to: Gray, Clayey SILT, some fine Sand, wet.	53.5'						
54							Clayey SILT						
55													
56													
57													
58	11	24/14	58-60	1-1 1-1		Soft, gray, Clayey SILT, little fine Sand, wet.							
59													
60													
61													
62													
63	12	24/24	63-65	3-12 23-24		Hard, gray and brown, Clayey SILT, some fine to coarse Sand, wet.							
64													
REMARKS													
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.											Boring No.: MW-14D		

BORING WELL 62355.52 HOUSE STREET COMPLETE.GPJ GZA CORP.GDT 3/1/19



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File No.: 16.0062335.52
Check: John Morehouse

Sample Information						Check: John Morehouse				
Depth	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
66	13	24/24	68-70	5-13 17-18		Fine to medium SAND, trace Silt, wet. Changing at 69.2 feet to: Fine to coarse SAND, trace Gravel, trace Silt, wet.	Clayey SILT			
67										
68							68'			
69							SAND			
70										
71	14	24/20	73-75	31-19 24-30		Hard, gray and brown, Clayey SILT, some fine to medium Sand, wet. Changing at 74.5 feet to: Gray and brown, fine to medium SAND, little Silt, wet.	73'			
72							Clayey SILT			
73							74.5'			
74							SAND			
75										
76	15	24/24	78-80	4-8 20-53		Medium dense, brown and gray, fine to medium SAND, trace Silt, wet.				
77										
78										
79										
80										
81	16	24/18	83-85	2-4 8-26		Medium dense, brown and gray, fine to medium SAND, trace Silt, wet.				
82										
83										
84										
85										
86	17	24/24	88-90	3-7 13-34		Medium dense, brown and gray, fine to coarse SAND, trace Silt, wet.				
87										
88										
89										
90										
91	18	24/24	93-95	4-10 18-25		Medium dense, fine to medium SAND, trace Silt, wet.				
92										
93										
94										
95										
96	19	24/24	98-100	4-6 10-12		Medium dense, brown, fine to medium SAND, trace Silt, wet.				
97										
98										
99										
REMARKS										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: MW-14D	

BORING WELL 62355.52 HOUSE STREET COMPLETE.GPJ GZA CORP.GDT 3/1/19

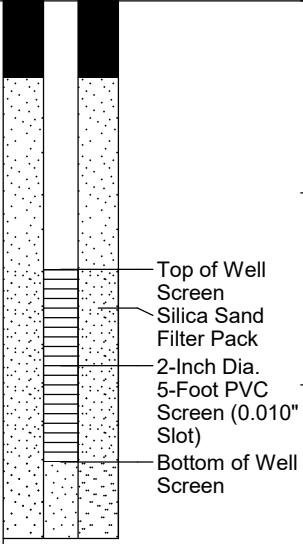


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Check: John Morehouse

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
101	20	24/24	103-105	19-12 19-25		Dense, fine to coarse SAND, little to trace Silt, wet.	SAND		
102									
103									
104									
105									
106	21	24/20	108-110	5-7 25-30		Dense, brown and gray, medium to coarse SAND, trace Silt, wet.			
107									
108									
109									
110									
111	22	4/6	113-113.3	12-75/3"		Hard, brown and gray, CLAY & SILT, some medium to coarse Sand embedded in Clay, wet. Bottom of Borehole at 114.0 Feet	113' CLAY & SILT 114'	2	
112									
113									
114									
115									
116									
117									
118									
119									
120									
121									
122									
123									
124									
125									
126									
127									
128									
129									
130									
131									
132									
133									
134									
REMARKS 2. Monitoring well was installed in borehole upon completion. Well screen set from approximately 107.0 to 112.0 feet below ground surface.									
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.								Boring No.: MW-14D	

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File No.: 16.0062335.52

Check: John Morehouse

Contractor: Stearns Drilling Company

Foreman: Bert Graham

Logged by: Christopher Melby

Date Start/Finish: 3-15-18 / 3-15-18

Boring Location:

GS Elev.: Datum:

Auger/
Casing

Sampler

GROUNDWATER READINGS

Type: Hollow Stem Auger

Split Spoon

O.D. / I.D.: 8.0" / 4.25"

2.0" / 1 3/8"

Hammer Wt.: NA

140lbs

Hammer Fall: NA

30.0"

TOC Elev.: NA

NA

Date	Time	Depth	Casing	Stab

Surveyed By: NA Survey Date:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					PROTECTIVE CASING
1						See PMW-14D boring log for detailed soil descriptions for the first 48.0 feet..				
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
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18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: MW-14M

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Check: John Morehouse

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
31										
32										
33										
34										
35										
36										
37										
38										
39										
40										
41										
42										
43										
44										
45										
46										
47										
48	1	24/12	48-50	2-2 3-2		Loose, brown and gray, fine to medium SAND, trace Silt, wet.	SAND			
49										
50	2	24/24	50-52	1-2 1-2		Very loose, brown and gray, fine to medium SAND, trace Silt, wet.				
51										
52	3	24/24	52-54	2-2 3-5		Medium stiff, gray and brown, Clayey SILT, some fine to medium Sand, wet.	52.5' Clayey SILT			
53										
54										
55										
56										
57										
58										
59										
60										
61										
62										
63										
64										
REMARKS										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: MW-14M	

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Check: John Morehouse

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
66							Clayey SILT		
67									
68	4	24/20	68-70	7-8 10-12		Medium dense, gray and brown, fine to coarse SAND, some Silt, wet.	68' Silty SAND		
69									
70	5	24/24	70-72	2-2 6-15		Loose, gray and brown, fine to medium SAND, little Silt, wet.			
71									
72	6	24/18	72-74	9-12 25-35		Brown and gray, fine to medium SAND, some Silt, wet. Changing at 73.0 feet to: Brown and gray, Clayey SILT, some medium to coarse Sand, embedded in Clayey Silt, wet.	73' Clayey SILT		
73									
74						Bottom of Borehole at 74.0 Feet	74'	1	Top of Well Screen Silica Sand Filter Pack 2-Inch Dia. 10-Foot PVC Screen (0.010" Slot) Bottom of Well Screen
75									
76									
77									
78									
79									
80									
81									
82									
83									
84									
85									
86									
87									
88									
89									
90									
91									
92									
93									
94									
95									
96									
97									
98									
99									
REMARKS 1. Monitoring well was installed in borehole upon completion. Well screen set from approximately 68.0 to 73.0 feet below ground surface.									
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.								Boring No.: MW-14M	

BORING WELL 62355.52 HOUSE STREET COMPLETE.GPJ GZA CORP.GDT 3/1/19



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Boring No.: MW-14S

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File No.: 16.0062335.52

Check: John Morehouse

Contractor: Stearns Drilling Company

Foreman: Bert Graham

Logged by: Christopher Melby

Date Start/Finish: 3-15-18 / 3-15-18

Boring Location:

GS Elev.: Datum:

Auger/
Casing

Sampler

Type: Hollow Stem Auger

Split Spoon

O.D. / I.D.: 8.0" / 4.25"

2.0" / 1 3/8"

Hammer Wt.: NA

140lbs

Hammer Fall: NA

30.0"

TOC Elev.: NA

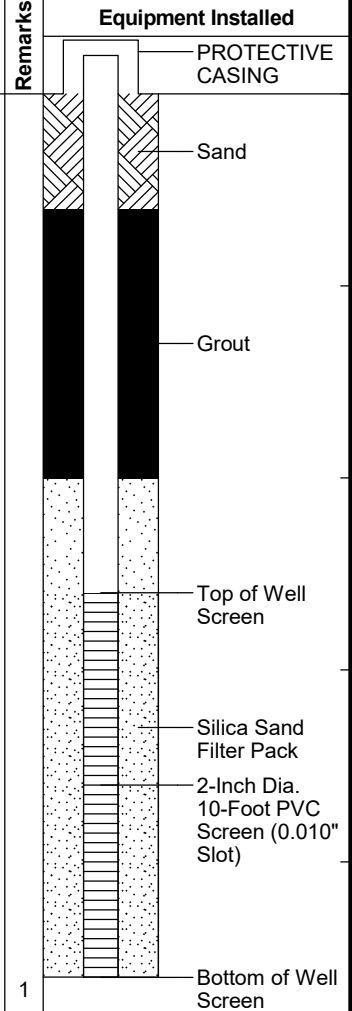
NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: NA Survey Date:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
1						See PMW-14D boring log for detailed soil descriptions.				
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24						Bottom of Borehole at 23.0 Feet				
25										
26										
27										
28										
29										



REMARKS

1. Monitoring well was installed in borehole upon completion. Well screen set from approximately 13.0 to 23.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: MW-14S

BORING WELL 62355.52 HOUSE STREET COMPLETE.GPJ GZA CORP.GDT 3/1/19



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Plainfield, Michigan

Boring No.: MW-15D

Page: 1 of 4

File No.: 16.0062335.52

Check: _____

Contractor: Cascade Drilling

Foreman: Jason

Logged by: Ken Oanes

Date Start/Finish: 12-19-18 / 12-21-17

Boring Location: _____

GS Elev.: _____ Datum: _____

Auger/
Casing

Sampler

GROUNDWATER READINGS

Type: Sonic NA
O.D. / I.D.: NA NA
Hammer Wt.: NA NA
Hammer Fall: NA NA
TOC Elev.: NA NA

Date	Time	Depth	Casing	Stab

Surveyed By: NA Survey Date: _____

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					PROTECTIVE CASING
1	1	60/60	0-5		0.4 ppm	Loose, dark brown, Silty SAND with Organics (plant roots), moist (SM). Changing at 1.4 feet to: Loose, light brown, poorly graded, fine to medium SAND and GRAVEL, with Lithics, moist (SP).	SAND (SM) 1.4' SAND (SW)	1		
2					0.3 ppm					
3										
4										
5	2	60/42	5-10		0.2 ppm	Loose, light brown, well graded, fine to medium SAND with GRAVEL, sub-angular to sub-rounded, moist (SW). Changing at 7.5 feet to: Loose, light brown, well graded, SAND with coarse GRAVEL, sub-rounded, moist (SW).				
6					0.3 ppm					
7										
8										
9										
10	3	60/60	10-15		0.4 ppm	Loose, light brown, Silty SAND with Gravel, wet (SM). Changing at 11.7 feet to: Loose, light brown, well graded, medium to coarse SAND and GRAVEL, sub-angular to sub-rounded, moist (SW).	10' SAND (SM) 11.7' SAND (SW)	2		
11					0.4 ppm					
12										
13										
14										
15	4	60/60	15-20		0.4 ppm	Loose, light brown, poorly graded, medium SAND, some Lithics, trace Gravel, moist (SP).	15' SAND (SP)			
16					0.5 ppm					
17										
18										
19										
20	5	60/60	20-25		0.5 ppm	Loose, light brown, poorly graded, medium SAND, some Lithics, trace Gravel, moist (SP).				
21					0.3 ppm					
22										
23										
24										
25	6	60/60	25-30		0.3 ppm	Loose, tan, poorly graded, medium to coarse SAND, with lithics, sub-angular, moist (SP).		3		
26					0.1 ppm					
27										
28										
29										

REMARKS

- Field screening of samples for organic vapors was performed with a MiniRae 2000 photoionization detector equipped with a 10.6 eV lamp. Readings are shown in parts per million (ppm) of isobutylene. Background was measured at 0.0 ppm.
- Groundwater was encountered at approximately 10.0 feet below ground surface.
- Temporary well set at 25.0 to 30.0 feet below ground surface. Groundwater sample submitted for laboratory analysis.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: MW-15D

BORING WELL 6233552 WWW.PACKER DR. PLAINFIELD MI.GPJ GZA CORP.GDT 1/25/18



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Boring No.: MW-15D

Page: 2 of 4

File No.: 16.0062335.52

Check:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
31	7	60/60	30-35		0.4 ppm	Loose, tan, poorly graded, medium to coarse SAND, with lithics, sub-angular, moist (SP).	SAND (SP)			
32										
33										
34										
35	8	60/60	35-40		0.3 ppm	Loose, brown, Silty fine SAND, sub-rounded, wet (SM). Changing at 35.5 feet to: Loose, brown, well graded, medium to coarse SAND and GRAVEL, sub-rounded to sub-angular, wet (SW). Changing at 37.5 feet: Loose, brown, well graded, coarse SAND, some fine to coarse Gravel, with Clay layers, wet (SW).	35' 35.5' SAND (SM) SAND (SW)			
36										
37										
38										
39	9	60/60	40-45		0.5 ppm	Loose, brown, well graded, fine to coarse SAND with fine GRAVEL, sub-angular, wet (SW). Changing at 43.3 feet to: Loose, light brown, poorly graded, medium SAND, some lithics, sub-angular, wet (SP).	43.3' SAND (SP)			
40										
41										
42										
43	10	60/60	45-50		0.3 ppm	Loose, brown, well graded, medium SAND with Gravel, with layers of Silt and Cobbles, wet (SW).	45' SAND (SW)	4		
44										
45										
46										
47	11	60/60	50-55		2.1 ppm	Loose, coarse GRAVEL and COBBLES up to 6.0 inch diameter, wet (GP). Changing at 51.0 feet to: Stiff, dark brown, SILT, little fine to coarse Gravel, rounded, moist (ML).	50' GRAVEL/COBBLES 51' (GP) SILT (ML)			
48										
49										
50										
51	12	60/60	55-60		3.7 ppm	Stiff, dark brown, SILT, little fine to coarse Gravel, rounded, moist (ML).				
52										
53										
54										
55	13	60/60	60-65		1.6 ppm	Stiff, dark brown, SILT, little fine to coarse Gravel, rounded, moist (ML).				
56										
57										
58										
59					2.7 ppm					
60										
61										
62										
63					2.7 ppm					
64										
							65'			
REMARKS 4. Temporary well set at 45.0 to 50.0 feet below ground surface. Heaving sands pushed casing to 47.5 feet only exposing lower 2.0 feet of well screen. Left overnight to purge after pumping dry. 5. Insufficient groundwater yield. No temporary well or sample.										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: MW-15D	

BORING WELL 6233552 WWW.PACKER DR. PLAINFIELD MI.GPJ GZA CORP.GDT 1/25/18

Grout



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Boring No.: MW-15D

Page: 3 of 4

File No.: 16.0062335.52

Check:

Sample Information						Check:				
Depth	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
66	14	60/60	65-70		1.4 ppm	Stiff, dark gray, Silty fine SAND, trace fine Gravel, moist (SM).	Silty SAND (SM)			
67										
68					0.7 ppm					
69										
70	15	60/60	70-75		1.5 ppm	Stiff, dark gray, Silty fine SAND, moist (SM).				
71										
72					1.2 ppm					
73										
74	16	60/60	75-80		1.2 ppm	Stiff, dark gray, Silty fine SAND, moist (SM).				
75										
76					1.4 ppm					
77										
78	17	60/60	80-85		0.7 ppm	Stiff, dark gray, Silty fine SAND, moist (SM).				
79										
80					0.5 ppm					
81										
82	18	60/60	85-90		0.1 ppm	Very stiff, dark gray, Silty fine SAND, trace medium to coarse Sand, trace coarse Gravel, moist (SM).				
83										
84					0.1 ppm					
85										
86	19	60/60	90-95		0.7 ppm	Stiff, dark gray, SILT, trace Sand, moist (ML). Changing at 92.5 feet to: Stiff, dark gray, SILT transitioning to lean CLAY, moist (CL).	90'			
87							SILT (ML)			
88					0.9 ppm		92.5'			
89							Lean CLAY (CL)			
90	20	60/60	95-100		1.3 ppm	Stiff, dark gray, lean CLAY, trace fine Gravel, sub-rounded, moist (CL).				
91										
92					1.1 ppm					
93										
94										
95										
96										
97										
98										
99										
REMARKS										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: MW-15D	

BORING WELL 6233552 WWW.PACKERDR.PLAINFOIELD MI.GPJ GZA CORP.GDT 1/25/18

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: MW-15D



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Boring No.: MW-15D

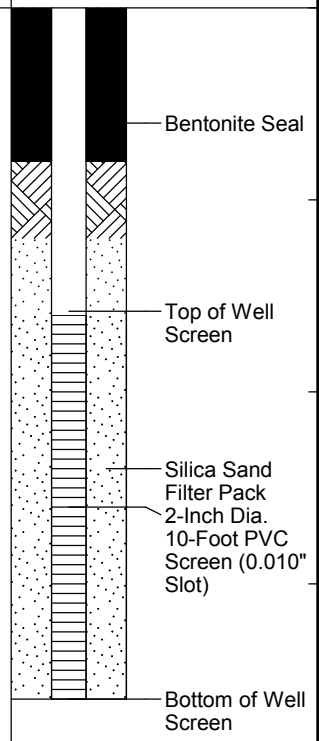
Page: 4 of 4

File No.: 16.0062335.52

Check:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
101	21	60/60	100-105		0.2 ppm	Stiff, dark gray, lean CLAY, trace fine Gravel, sub-rounded, moist (CL). Changing at 104.0 feet to: Stiff, dark gray, SILT, wet (ML).	Lean CLAY (CL)		
102					0.3 ppm				
103									
104							104'		
105	22	60/60	105-110		1.0 ppm	Stiff, SILT with Gravel, small lenses (3-8mm) of white chystaline mineral, dry (ML). Changing at 107 feet to: Loose, dark brown, SILT with coarse Gravel, sub-rounded, wet (ML).	SILT (ML)		
106					0.8 ppm				
107									
108									
109									
110	23	60/60	110-115		112.5 ppm	Loose, SILT with coarse Gravel and Cobbles, sub-rounded, small lenses of white crystalline mineral, wet (ML).		6	
111									
112									
113									
114									
115	24	24/24	115-117		0.5 ppm	Loose, SILT with GRAVEL and COBBLES, sub-rounded, small lenses of white crystalline mineral, wet (ML).			
116									
117						Bottom of Borehole at 117.0 Feet	117'	7	
118									
119									
120									
121									
122									
123									
124									
125									
126									
127									
128									
129									
130									
131									
132									
133									
134									
REMARKS 6. Temporary well set at 110.0 to 115.0 feet below ground surface. Groundwater sample submitted for laboratory analysis. 7. Monitoring well was installed in borehole upon completion. Well screen set from 108.0 to 118.0 feet below ground surface.									
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.								Boring No.: MW-15D	

BORING WELL 6233552 WWW.PACKERDR.PLAINFOIELD MI.GPJ GZA CORP.GDT 1/25/18





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Boring No.: MW-15M

Page: 1 of 2

File No.: 16.0062335.52

Check: _____

Contractor: Cascade Drilling

Foreman: Jason

Logged by: John Morehouse

Date Start/Finish: 1-17-18 / 1-17-18

Boring Location: _____

GS Elev.: _____ Datum: _____

Auger/
Casing

Sampler

Type: Sonic

NA

O.D. / I.D.: NA

NA

Hammer Wt.: NA

NA

Hammer Fall: NA

NA

TOC Elev.: NA

NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: NA Survey Date: _____

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					PROTECTIVE CASING
1						See MW-15D boring log for sample description and classification.				
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										

Grout

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: MW-15M

BORING WELL 6233552 WWW.PACKER DR. PLAINFIELD MI.GPJ GZA_CORP.GDT 1/25/18



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Boring No.: MW-15M

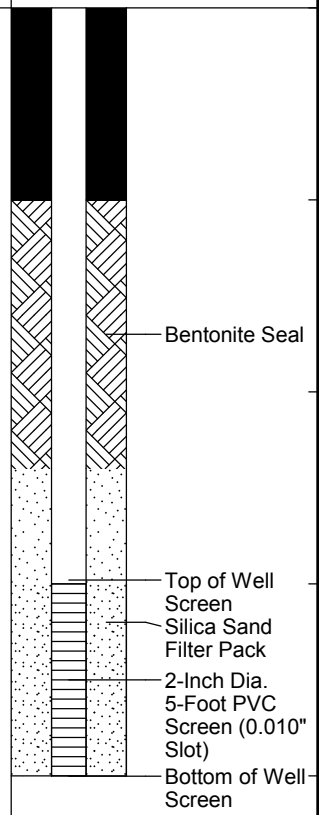
Page: 2 of 2

File No.: 16.0062335.52

Check:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
31										
32										
33										
34										
35										
36										
37										
38										
39										
40										
41										
42										
43										
44										
45										
46										
47										
48										
49										
50						Bottom of Borehole at 50.0 Feet		1		
51										
52										
53										
54										
55										
56										
57										
58										
59										
60										
61										
62										
63										
64										
1. Monitoring well was installed in borehole upon completion. Well screen set from 45.0 to 50.0 feet below ground surface.										
REMARKS										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: MW-15M	

BORING WELL 6233552 WWW.PACKER DR. PLAINFIELD MI.GPJ GZA CORP.GDT 1/25/18





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Plainfield, Michigan

Boring No.: MW-15S

Page: 1 of 1

File No.: 16.0062335.52

Check: _____

Contractor: Cascade Drilling

Foreman: Jason

Logged by: John Morehouse

Date Start/Finish: 1-17-18 / 1-17-18

Boring Location: _____

GS Elev.: _____ Datum: _____

Auger/
Casing

Sampler

Type: Sonic

NA

O.D. / I.D.: NA

NA

Hammer Wt.: NA

NA

Hammer Fall: NA

NA

TOC Elev.: NA

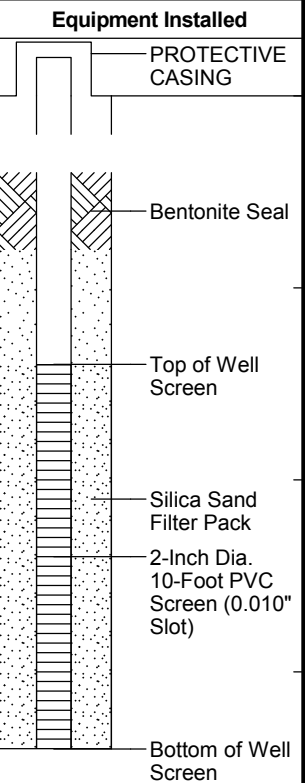
NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: NA Survey Date: _____

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
1						See MW-15D boring log for sample description and classification.				
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17						Bottom of Borehole at 17.0 Feet				
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										



REMARKS

1. Monitoring well was installed in borehole upon completion. Well screen set from 7.0 to 17.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: MW-15S

BORING WELL 6233552 WWW.PACKER DR. PLAINFIELD MI.GPJ GZA CORP.GDT 1/25/18



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House Street

Belmont, Michigan

Boring No.: HS-MW-17D

Page: 1 of 10

File No.: 16.0062335.52

Check: JTM/JMG

Contractor: Stearns Drilling Company

Foreman: Jerry Huntoon

Logged by: Christopher Melby / John Morehouse

Date Start/Finish: 1-29-18 / 2-26-18

Boring Location: 583,275.2942 N; 12,789,270.2772 E

GS Elev.: 784.6' Datum:

Auger/
Casing

Sampler

GROUNDWATER READINGS

Type: Hollow Stem Auger Split Spoon

O.D. / I.D.: 8.0" / 4.25" 2.0"

Hammer Wt.: 140lbs 1 3/8"

Hammer Fall: 30.0" NA

Other: NA NA

Date	Time	Depth	Casing	Stab

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD					
1	1	24/24	0-2	2-3 2-3		Dark brown, decaying LEAVES (FILL). Changing at 0.3 feet to: Very dark brown, well sorted, fine grained SAND, some Silt, some decaying Vegetation, moist (SM). Changing at 0.5 feet to: Dark yellowish brown, well sorted, fine to medium grained SAND, trace Silt, trace Gravel, grading coarser, moist (SP). Dark yellowish brown, well sorted, fine to medium grained SAND, trace Silt, trace Gravel, grading coarser, moist (SP). Dark yellowish brown, well sorted, fine to medium grained SAND, trace Silt, trace Gravel, grading coarser, moist (SP). Changing at 4.5 feet to: Pale brown, very well sorted, fine grained SAND, trace Silt, moist (SP). Changing at 4.6 feet to: Yellowish brown, very well sorted, SILT, little fine grained Sand, slightly cohesive, non-plastic, moist (ML). Changing at 4.7 feet to: Pale brown, very well sorted, fine grained SAND, trace Silt, moist (SP). Changing at 4.8 feet to: Yellowish brown, very well sorted, SILT, little fine grained Sand, slightly cohesive, non-plastic, moist (ML). Changing at 4.9 feet to: Pale brown, very well sorted, fine grained, SAND, trace Silt, moist (SP). Changing at 5.0 feet to: Yellowish brown, very well sorted, SILT, little fine grained Sand, slightly cohesive, non-plastic, moist. Changing at 5.1 feet to: Pale brown, very well sorted, fine grained SAND, trace Silt, moist (SP). Changing at 5.2 feet to: Yellowish brown, very well sorted, SILT, little fine grained Sand, slightly cohesive, non-plastic, moist (ML). Light yellowish brown to pale brown, poorly sorted, fine to coarse grained SAND, little Gravel, trace Silt, moist (SW). Light yellowish brown, well sorted, fine to medium grained SAND, trace Silt, moist (SP). Changing at 9.1 feet to: Dark yellowish brown, well sorted, fine to medium grained SAND, trace Silt, moist (SP). Light yellowish brown, well sorted, fine to medium grained SAND, trace Silt, moist (SP). Light yellowish brown, well sorted, fine to medium grained SAND, trace Silt, moist (SP). Changing at 12.3 feet to: Pale brown,				
2	2	24/24	2-4	2-2 2-3						
3										
4	3	24/24	4-6	2-2 3-3						
5										
6	4	24/24	6-8	3-5 8-9						
7										
8	5	24/24	8-10	5-5 5-5						
9										
10	6	24/24	10-12	3-4 4-4						
11										
12	7	24/24	12-14	5-10 9-6						
13										
14	8	24/24	14-16	3-4 4-4						
15										
16	9	24/24	16-18	3-3 4-4						
17										
18	10	24/24	18-20	3-3 3-4						
19										

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-MW-17D

BORING WI 62355.52 HOUSE STREET COMPLETE.GPJ WI DNR.GDT 4/15/20



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House Street

Belmont, Michigan

Boring No.: HS-MW-17D

Page: 2 of 10

File No.: 16.0062335.52

Check: JTM/JMG

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD					
21	11	24/24	20-22	3-3 4-5		poorly sorted, medium to coarse grained SAND, little Gravel, trace Silt, moist (SW). Light yellowish brown, very well sorted, fine to medium grained SAND, trace Silt, trace Gravel, moist (SP).				
22	12	24/24	22-24	3-6 8-8		Light yellowish brown, very well sorted, fine to medium grained SAND, trace Silt, trace Gravel, moist (SP).				
23						Light yellowish brown, very well sorted, fine to medium grained SAND, trace Silt, trace Gravel, moist (SP).				
24	13	24/24	24-26	6-10 11-11		Light yellowish brown, very well sorted, fine to medium grained SAND, trace Silt, trace Gravel, moist (SP).				
25						Light yellowish brown, very well sorted, fine to medium grained SAND, trace Silt, trace Gravel, moist (SP).				
26	14	24/24	26-28	5-10 12-16		Light yellowish brown, very well sorted, fine to medium grained SAND, trace Silt, trace Gravel, moist (SP). Changing at 22.8 feet to: Brown, poorly sorted, GRAVEL, trace coarse grained Sand, moist (GP). Changing at 22.9 feet to: Light yellowish brown, very well sorted, fine to medium grained SAND, trace Silt, moist (SP). Changing at 23.4 feet to: Brown, very poorly sorted, GRAVEL, trace coarse grained Sand, moist (GP).				
27						Light yellowish brown, well sorted, fine to medium grained SAND, trace Silt, trace Gravel, moist (SP).				
28	15	24/24	28-30	5-12 14-20		Light yellowish brown, well sorted, fine to medium grained SAND, trace Silt, trace Gravel, moist (SP).				
29						Light yellowish brown, well sorted, fine to medium grained SAND, trace Silt, trace Gravel, moist (SP).				
30	16	24/24	30-32	15-12 14-20		Light yellowish brown, well sorted, fine to medium grained SAND, trace Silt, trace Gravel, moist (SP).				
31						Light yellowish brown, well sorted, fine to medium grained SAND, trace Silt, trace Gravel, moist (SP).				
32	17	24/24	32-34	5-7 8-8		Light yellowish brown, well sorted, fine to medium grained SAND, trace Silt, trace Gravel, moist (SP).				
33						Light yellowish brown, well sorted, fine to medium grained SAND, trace Silt, trace Gravel, moist (SP).				
34	18	24/24	34-36	7-8 10-11		Light yellowish brown, well sorted, fine to medium grained SAND, trace Silt, trace Gravel, moist (SP).				
35						Light yellowish brown to pale brown, very well sorted, fine to medium grained SAND, trace Silt, moist (SP).				
36	19	24/24	36-38	7-10 9-14		Light yellowish brown to pale brown, very well sorted, fine to medium grained SAND, trace Silt, moist (SP).				
37						Light yellowish brown to pale brown, very well sorted, fine to medium grained SAND, trace Silt, moist (SP).				
38	20	24/24	38-40	10-10 12-12		Pale to very pale brown, very well sorted, fine grained SAND, trace Silt, moist (SP).				
39						Changing at 39.5 feet to: Brown to yellowish brown, very well sorted, SILT, some fine grained Sand, slightly cohesive, moist (ML).				
40	21	24/24	40-42	11-11 11-10		Pale to very pale brown, very well sorted, fine grained SAND, trace Silt, bedded, moist (SP).				
41										
42	22	24/24	42-44	6-6 7-9		Pale to very pale brown, very well sorted, fine grained SAND, trace Silt, bedded, moist (SP).				
43										
REMARKS										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: HS-MW-17D	

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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD					
44	23	24/24	44-46	6-6 8-9		Pale to very pale brown, very well sorted, fine grained SAND, trace Silt, bedded, moist (SP).				
45										
46	24	24/24	46-48	7-9 10-10		Pale to very pale brown, very well sorted, fine grained SAND, trace Silt, bedded, moist (SP).				
47										
48	25	24/24	48-50	7-4 9-9		Pale to very pale brown, very well sorted, fine grained SAND, trace Silt, bedded, moist (SP).				
49										
50	26	24/24	50-52	5-6 8-10		Pale to very pale brown, very well sorted, fine grained SAND, trace Silt, bedded, moist (SP).				
51										
52	27	24/24	52-54	6-8 13-18		Pale to very pale brown, very well sorted, fine grained SAND, trace Silt, bedded, moist (SP).				
53										
54	28	24/24	54-56	9-12 13-17		Pale to very pale brown, very well sorted, fine grained SAND, trace Silt, bedded, moist (SP).				
55										
56	29	24/24	56-58	10-14 25-22		Pale to very pale brown, very well sorted, fine grained SAND, trace Silt, bedded, moist (SP). Changing at 57.6 feet to: Brown to yellowish brown, very well sorted, SILT, some fine grained Sand, slightly cohesive, non-plastic, moist to wet (ML).				
57										
58	30	24/24	58-60	17-21 31-32		Pale to very pale brown, very well sorted, fine grained SAND, trace Silt, bedded, moist (SP). Changing at 59.0 feet to: Very dark grayish brown, well sorted, fine grained SAND, trace Silt, moist (SP). Changing at 59.1 feet to: Pale brown, very well sorted, fine to medium grained SAND, some Silt, bedded, moist (SM).				
59										
60	31	24/24	60-62	13-22 27-27		Pale brown, very well sorted, fine to medium grained SAND, some Silt, bedded, moist (SM).				
61										
62	32	24/24	62-64	12-21 25-33		Pale brown, very well sorted, fine to medium grained SAND, some Silt, bedded, moist (SM).				
63										
64	33	24/24	64-66	2-6 9-13		Pale brown, very well sorted, fine to medium grained SAND, some Silt, bedded, moist (SM).				
65										
66	34	24/24	66-68	3-10		Pale brown, very well sorted, fine to medium				
REMARKS										
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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD					
67				11-18		grained SAND, some Silt, bedded, moist (SM).				
68	35	24/24	68-70	7-17 21-23		Pale brown, very well sorted, fine to medium grained SAND, some Silt, bedded, moist (SM). Changing at 68.3 feet to: Dark yellowish brown, well sorted, fine to medium grained SAND, trace Silt, moist (SP).				
69						Changing at 68.4 feet to: Pale brown, very well sorted, fine to medium grained SAND, some Silt, bedded, moist (SM).				
70	36	24/24	70-72	5-14 22-28		Pale brown, very well sorted, fine to medium grained SAND, some Silt, bedded, moist (SM).				
71						Pale brown, very well sorted, fine to medium grained SAND, some Silt, bedded, moist (SM).				
72	37	24/24	72-74	8-20 22-35		Pale brown, very well sorted, fine to medium grained SAND, some Silt, bedded, moist (SM).				
73						Pale brown, very well sorted, fine to medium grained SAND, some Silt, bedded, moist (SM).				
74	38	24/24	74-76	5-16 28-41		Pale brown, very well sorted, fine to medium grained SAND, some Silt, bedded, moist (SM).				
75										
76	39	24/24	76-78	9-21 29-44		Pale brown, very well sorted, fine to medium grained SAND, some Silt, bedded, moist (SM). Changing at 76.8 feet to: Light yellowish brown, well sorted, fine to medium grained SAND, trace Silt, wet (SP).				
77						Light yellowish brown, well sorted, fine to medium grained SAND, trace Silt, wet (SP).				
78	40	24/24	78-80	2-10 22-24		Light yellowish brown, well sorted, fine to medium grained SAND, trace Silt, wet (SP).				
79										
80	41	24/24	80-82	2-8 14-24		Light yellowish brown, well sorted, fine to medium grained SAND, trace Silt, wet (SP).				
81										
82	42	24/24	82-84	1-3 6-12		Light yellowish brown, well sorted, fine to medium grained SAND, trace Silt, wet (SP).				
83										
84	43	24/24	84-86	1-1 3-8		Light yellowish brown, well sorted, fine to medium grained SAND, trace Silt, wet (SP).				
85										
86	44	24/24	86-88	1-2 5-12		Light yellowish brown, well sorted, fine to medium grained SAND, trace Silt, wet (SP). Changing at 87.6 feet to: Brown, moderately sorted, coarse grained SAND, some Gravel, wet (SW).				
87						Yellowish brown to brown, well sorted, fine to medium grained SAND, trace Silt, trace Gravel, wet (SP).				
88	45	24/24	88-90	1-2 9-14						
89										
REMARKS										
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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD					
91	46	24/24	90-92	1-2 3-5		Yellowish brown to brown, well sorted, fine to medium grained SAND, trace Silt, trace Gravel, wet (SP).				
92	47	24/24	92-94	1-2 4-11		Yellowish brown to brown, well sorted, fine to medium grained SAND, trace Silt, trace Gravel, wet (SP).				
94	48	24/24	94-96	1-3 5-9		Yellowish brown to brown, well sorted, fine to medium grained SAND, trace Silt, trace Gravel, wet (SP).				
96	49	24/24	96-98	1-4 6-12		Yellowish brown to brown, well sorted, fine to medium grained SAND, trace Silt, trace Gravel, wet (SP).				
98	50	24/24	98-100	3-4 8-15		Yellowish brown to brown, well sorted, fine to medium grained SAND, trace Silt, trace Gravel, wet (SP).				
100	51	24/24	100-102	2-2 3-10		Yellowish brown to brown, well sorted, fine to medium grained SAND, trace Silt, trace Gravel, wet (SP).				
102	52	24/24	102-104	2-7 14-21		Yellowish brown to brown, well sorted, fine to medium grained SAND, trace Silt, trace Gravel, wet (SP). Changing at 103.2 feet to: Brown to yellowish brown, very well sorted, SILT, some fine grained Sand, slightly cohesive, wet (ML). Changing at 103.5 feet to: Brown to yellowish brown, well sorted SILT, some fine grained Sand, trace Clay, moderately cohesive, non to slightly plastic, bedded, moist to wet (ML). Changing at 103.6 feet to: Brown to yellowish brown, very well sorted, SILT, some fine grained Sand, slightly cohesive, wet (ML).				
104	53	24/24	104-106	2-2 3-6		Yellowish brown to brown, very well sorted, fine grained SAND, trace Silt, wet (SP).				
106	54	24/24	106-108	1-1 3-5		Yellowish brown to brown, very well sorted, fine grained SAND, trace Silt, wet (SP). Changing at 108.9 feet to: Yellowish brown to brown, well sorted, SILT, some fine grained Sand, wet (ML). Changing at 109.0 feet to: Yellowish brown to brown, very well sorted, fine to medium grained SAND, trace Silt, wet (SP). Changing at 109.5 feet to: Dark yellowish brown, well sorted, fine to medium SAND, trace Silt, wet (SP). Changing at 109.7 feet to: Yellowish brown				
108	55	24/24	108-110	3-4 8-12						
110	56	24/24	110-112	1-1 3-7						
112	57	24/24	112-114	1-3 5-8						
113										
REMARKS										
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Bentonite/Grout



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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD					
114	58	24/24	114-116	1-4 12-18		to brown, very well sorted, fine to medium grained SAND, trace Silt, wet (SP). Yellowish brown to brown, very well sorted, fine to medium grained SAND, trace Silt, wet (SP). Yellowish brown to brown, very well sorted, fine to medium grained SAND, trace Silt, wet (SP). Yellowish brown to brown, very well sorted, fine to medium grained SAND, trace Silt, wet (SP).				
115										
116	59	24/24	116-118	1-5 12-22		Yellowish brown to brown, very well sorted, fine to medium grained SAND, trace Silt, wet (SP). Yellowish brown to brown, very well sorted, fine to medium grained SAND, trace Silt, wet (SP).				
117										
118	60	24/24	118-120	1-1 1-4		Yellowish brown to brown, very well sorted, fine to medium grained SAND, trace Silt, wet (SP). Changing at 116.2 feet to: Dark yellowish brown, well sorted, Silty CLAY, plastic, cohesive, moist (CL). Changing at 116.3 feet: Yellowish brown to brown, very well sorted, fine to medium grained SAND, trace Silt, wet (SP). Changing at 116.8 feet to: Dark yellowish brown, well sorted, Silty CLAY, plastic, cohesive, moist (CL).				
119										
120	61	24/24	120-122	7-10 14-20		Changing at 116.9 feet to: Yellowish brown to brown, very well sorted, fine to medium grained SAND, trace Silt, wet (SP). Yellowish brown to brown, very well sorted, fine to medium grained SAND, trace Silt, wet (SP). Changing at 119.0 feet to: Dark yellowish brown, well sorted SILT, some fine grained Sand, slightly cohesive, wet (ML).				
121										
122	62	24/24	122-124	4-7 13-15		Changing at 119.1 feet to: Yellowish brown to brown, very well sorted, fine to medium grained SAND, trace Silt, wet (SP). Yellowish brown, well sorted, fine to medium grained SAND, trace Silt, wet (SP).				
123										
124	63	24/24	124-126	5-10 12-20		Changing at 121.3 feet to: Grayish brown to light grayish brown, well sorted, SILT, some fine grained Sand, non-plastic, moderately cohesive, wet (ML). Grayish brown to light grayish brown, well sorted, SILT, some fine grained Sand, non-plastic, moderately cohesive, wet (ML).				
125										
126	64	24/24	126-128	4-10 11-10		Changing at 122.9 feet to: Brown, well sorted, fine grained SAND, some Silt, trace Clay, cohesive, slightly to moderately plastic, moist (SM). Brown, well sorted, fine grained SAND, some Silt, trace Clay, cohesive, slightly to moderately plastic, moist (SM).				
127										
128	65	24/24	128-130	7-12 9-15		Gray to grayish brown, well sorted, fine grained SAND, some Silt, trace Clay, cohesive, slightly to moderately plastic, moist (SM). Changing at 126.6 feet to: Gray to grayish brown, well sorted, CLAY & SILT, little fine grained Sand, plastic, cohesive, moist (CL).				
129										
130	66	24/24	130-132	2-4 7-9		Gray to grayish brown, well sorted, fine grained SAND, some Silt, trace Clay, cohesive, slightly to moderately plastic, moist (CL).				
131										
132	67	24/24	132-134	1-4 5-6		Gray to grayish brown, well sorted, fine grained SAND, some Silt, trace Clay, cohesive, slightly to moderately plastic, moist (CL).				
133										
134	68	24/24	134-136	1-3 5-6		Gray to grayish brown, well sorted, fine grained SAND, some Silt, trace Clay, cohesive, slightly to moderately plastic, moist (CL).				
135										
136	69	24/24	136-138	1-1		Gray to grayish brown, well sorted, fine grained SAND, some Silt, trace Clay, cohesive, slightly to moderately plastic, moist (CL).				
1. Groundwater was encountered at approximately 132.4 feet below ground surface.										
REMARKS										
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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD					
137	70	24/24	138-140	2-6		moist (SM). Gray to grayish brown, well sorted, fine grained SAND, some Silt, trace Clay, cohesive, slightly to moderately plastic, moist (SM).				
138				0-1 1-5		Gray to grayish brown, well sorted, fine grained SAND, some Silt, trace Clay, cohesive, slightly to moderately plastic, moist (SM). Changing at 132.4 feet to: Grayish brown to brown, very well sorted, SILT, trace Clay, moderately cohesive, non to slightly plastic, wet				
139						Varved, grayish brown, very well sorted, SILT, some Clay, some fine grained Sand, cohesive and slightly to moderately plastic, moist to wet (ML).				
140	71	24/24	140-142	0-4 8-14		Brown, well sorted, SILT, little Clay, moderately plastic, cohesive, moist to wet (ML). Changing at 136.3 feet to: Grayish brown, very well sorted, SILT, trace Clay, cohesive, slightly plastic, moist to wet (ML). Changing at 136.4 feet to: Grayish brown, very well sorted, fine grained SAND, little Silt, slightly cohesive, wet (SM).				
141						Grayish brown, very well sorted, fine grained SAND, little Silt, slightly cohesive, wet (SM). Changing 138.9 feet to: Grayish brown, very well sorted, fine grained SAND, trace Silt, wet (SP). Changing at 139.0 feet to: Grayish brown, very well sorted, fine grained SAND, little Silt, slightly cohesive, wet (SM).				
142				6-10 12-16		Yellowish brown, very well sorted, fine grained SAND, little Silt, wet (SM). Changing at 143.5 feet to: Grayish brown, very well sorted, SILT, trace fine grained Sand, moderately cohesive, wet (ML).				
143	72	24/24	142-144			Grayish brown, very well sorted, fine grained SAND, trace Silt, wet (SP). Grayish brown to brown, very well sorted, fine grained SAND, little Silt, wet (SM). Changing at 146.6 feet to: Yellowish brown, well sorted, fine grained SAND, trace Silt, wet (SP). Changing at 146.7 feet to: Grayish brown to brown, very well sorted, SILT, little fine grained SAND, wet (ML).				
144						Grayish brown to brown, very well sorted, SILT, little fine grained SAND, wet (ML). Grayish brown to brown, very well sorted, fine grained SAND, little Silt, slightly cohesive, wet (SM). Changing at 150.5 feet to: Grayish brown to brown, very well sorted, SILT, moderately cohesive, wet (ML).				
145						Changing at 151.9 feet to: Grayish brown to brown, very well sorted, SILT, moderately cohesive, wet (ML). Brown to yellowish brown, very well sorted,				
146	73	24/24	144-146							
147										
148										
149	74	24/24	146-148	3-6 14-20						
150										
151										
152	75	24/24	148-150	1-2 5-15						
153										
154										
155	76	24/24	150-152	6-12 25-33						
156										
157										
158	77	24/24	152-154	1-1 3-7						
159										
	78	24/24	154-156	1-4 14-18						
	79	24/24	156-158	1-8 24-35						
	80	24/24	158-160	4-8 9-22						

REMARKS

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Sample Information						Demont, Michigan		Check: JTM/JMG		
Depth	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
161	81	17/17	160-161.4	7-31-87/5"		fine grained SAND, little Silt, wet (SM). Brown to yellowish brown, very well sorted, fine grained SAND, little Silt, wet (SM). Brown to yellowish brown, very well sorted, fine grained SAND, little Silt, wet (SM). Changing at 156.6 feet to: Dark grayish brown to dark brown, very well sorted, fine grained SAND, little Silt, wet (SM). Dark grayish brown to dark brown, very well sorted, fine grained SAND, little Silt, wet (SM). Very dense, light brown, fine SAND, little to trace Silt, wet (SM). NO RECOVERY. Bailer soil is fine Sand, little to trace Silt.				
162	82	24/0	162-164	4-8 15-10		Very dense, brown, fine SAND, little to trace Silt, wet (SM). Very dense, brown, fine SAND, little to trace Silt wet (SM).				
163										
164	83	12/6	164-165	13-50\6"		Very dense, brown, fine SAND, little to trace Silt, wet (SM). Very dense, brown, fine SAND, little to trace Silt wet (SM).				
165										
166	84	24/8	166-168	6-20 35-50		Very dense, brown, fine SAND, little to trace Silt, wet (SM). Very dense, brown, fine SAND, little to trace Silt wet (SM).				
167										
168	85	17/10	168-169.45	23-50/5"		Very dense, brown, fine SAND, little to trace Silt, wet (SM).				
169										
170	86	16/0	170-171.36	23-50/4"		NO RECOVERY. Bailer soil is fine Sand, little to trace Silt.				
171										
172	87	23/12	172-173.9	3-10 35-50/5"		Very dense, brown, fine SAND, little to trace Silt, wet (SM).				
173										
174	88	17/0	174-175.46	31-50/5"		NO RECOVERY. Bailer soil is fine Sand, little to trace Silt.				
175										
176	89	17/0	176-177.44	40-50/5"		NO RECOVERY. Bailer soil is fine Sand, little to trace Silt.				
177										
178	90	12/0	178-179	15-67		NO RECOVERY. Bailer soils is fine Sand, little to trace Silt.				
179										
180	91	18/0	180-181.5	7-3-90/6"		NO RECOVERY. Bailer soil is fine Sand, little to trace Silt.				
181										
182	92	24/24	182-184	11-16 27-33		Dense, light brown, fine SAND, little to trace Silt, wet (SM).				
183										
REMARKS										
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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD					
184	93	24/8	184-186	9-18 30-52		Dense, light brown, fine SAND, little to trace Silt, wet (SM).				
185										
186	94	24/6	186-188	16-23 48-55		Very dense, light brown, fine SAND, little to trace Silt, wet (SM).				
187										
188	95	24/6	188-190	8-12 35-58		Dense, light brown, fine SAND, little to trace Silt, wet (SM).				
189										
190	96	24/8	190-192	5-13 19-25		Dense, light brown, gray, fine SAND, little to trace Silt, wet (SM).				
191										
192	97	24/10	192-194	13-26 35-41		Very dense, brown, fine to medium SAND, little to trace Silt, wet (SM).				
193										
194	98	24/10	194-196	9-20 42-50		Very dense, light brown, fine to medium SAND, little to trace Silt, wet (SM).				
195										
196	99	24/0	196-198	7-22-62/6"		NO RECOVERY. Bailer soil is light brown gray, fine to medium Sand, little to trace Silt, wet.				
197										
198	100	24/1	198-200	10-12 32-44		Dense, gray to light brown, fine SAND, little to trace Silt, wet (SM).				
199										
200	101	24/10	200-202	10-18 32-48		Very dense, gray to light brown, fine to medium SAND, little to trace Silt, wet (SM).				
201										
202	102	24/6	202-204	5-9 20-28		Medium dense, gray to light brown, fine to medium SAND, little to trace Silt, wet (ML).				
203										
204	103	24/16	204-206	7-14 20-33		Dense, gray to light brown, medium SAND, little to trace Silt, wet (SM).				
205										
206	104	24/14	206-208	6-17		Very dense, gray, medium to coarse SAND,				
REMARKS										
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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD					
207				27-40		trace Silt, wet (SW).				
208	105	24/16	208-210	9-23 32-59		Very dense, gray, medium to coarse SAND, trace Silt, wet (SW). Changing at 208.8 feet to: Very dense, gray, fine SAND, little Silt, wet (SM).				
209										
210	106	24/6	210-212	9-11 14-17		Medium dense, gray and brown, fine SAND, little to trace Silt, wet (SM).				
211										
212	107	24/0	212-214	4-7 26-33		NO RECOVERY. Bailer soil is fine to coarse Sand, little to trace Silt, wet.				
213										
214	108	24/12	214-216	4-7 26-33		Dense, gray, fine to coarse SAND, little Silt, wet (SM).				
215										
216	109	24/10	216-218	4-8 8-30		Medium dense, gray and brown, fine to medium SAND, little to trace Silt, wet (SM).				
217										
218	110	24/12	218-220	5-14 34-30		Dense, gray and brown, fine to medium SAND, little to trace Silt, wet (SM).				
219										
220	111	24/0	220-222	5-7 22-33		NO RECOVERY.				
221										
222	112	24/12	222-224	4-6 33-33		Dense, brown, fine SAND, little Silt, wet (SM). Changing at 223.7 feet to: GRAVEL (potential Bedrock).				
223										
224	113	24/14	224-226	41-35 45-48		Gray, potential weathered BEDROCK. Changing at 13.2 feet to: Brown, Clayey SILT, trace fine to coarse Sand, wet (ML).				
225										
226						Bottom of Borehole at 226.0 Feet				
227										
228										
229										
REMARKS										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: HS-MW-17D	

BORING WI 62355.52 HOUSE STREET COMPLETE.GPJ WI DNR.GDT 4/15/20

Top of Well Screen
Silica Sand Filter Pack
2-Inch Dia. 5-Foot PVC Screen (0.010" Slot)
Bottom of Well Screen



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Boring No.: HS-MW-17M

Page: 1 of 8

File No.: 16.0062335.52

Check: JTM/JMG

Contractor: Stearns Drilling Company

Foreman: Jerry Huntoon

Logged by: Christopher Melby

Date Start/Finish: 3-2-18 / 3-5-18

Boring Location: 583,270.5304 N; 12,789,269.7897 E

GS Elev.: 784.2' Datum:

Auger/
Casing

Sampler

Type: Hollow Stem Auger Split Spoon

O.D. / I.D.: 8.0" / 4.25" 2.0"

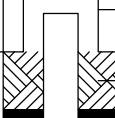
Hammer Wt.: 140lbs 1 3/8"

Hammer Fall: 30.0" NA

Other: NA NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD				PROTECTIVE CASING	Backfill/Cement Pad
1						See PMW-17D/MW-1D boring log for detailed soil descriptions.	SAND			
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-MW-17M

BORING WI 62355.52 HOUSE STREET COMPLETE.GPJ WI DNR.GDT 4/15/20



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Boring No.: HS-MW-17M

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Check: JTM/JMG

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD					
21							SAND			
22										
23										
24										
25										
26										
27										
28										
29										
30										
31										
32										
33										
34										
35										
36										
37										
38										
39										
40										
41										
42										
43										
REMARKS										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.										

Boring No.: HS-MW-17M

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File No.: 16.0062335.52

Check: JTM/JMG

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD					
44							SAND			
45										
46										
47										
48										
49										
50										
51										
52										
53										
54										
55										
56										
57										
58										
59										
60										
61										
62										
63										
64										
65										
66										
REMARKS										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.										

Boring No.: HS-MW-17M

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Boring No.: HS-MW-17M

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File No.: 16.0062335.52

Check: JTM/JMG

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD					
67							SAND			
68										
69										
70										
71										
72										
73										
74										
75										
76										
77										
78										
79										
80										Grout
81										
82										
83										
84										
85										
86										
87										
88										
89										
REMARKS										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.										

Boring No.: HS-MW-17M

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File No.: 16.0062335.52

Check: JTM/JMG

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD					
91							SAND			
92										
93										
94										
95										
96										
97										
98										
99										
100										
101										
102										
103										
104										
105										
106										
107										
108										
109										
110										
111										
112										
113										
REMARKS										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.										

Boring No.: HS-MW-17M

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Boring No.: HS-MW-17M

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File No.: 16.0062335.52

Check: JTM/JMG

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD					
114							SAND			
115										
116										
117										
118										
119										
120										
121										
122										
123										
124										
125										
126										
127										
128										
129										
130										
131										
132										
133										
134										
135										
136										
<div>REMARKS</div> <div>Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.</div>										

Boring No.: HS-MW-17M

BORING: WI 62355.52 HOUSE STREET COMPLETE.GPJ WI DNR.GDT 4/15/20



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File No.: 16.0062335.52

Check: JTM/JMG

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD					
137							SAND			
138										
139										
140										
141										
142										
143										
144										
145										
146										
147										
148										
149										
150										
151										
152										
153										
154										
155										
156										
157										
158										
159										
REMARKS										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.										

Boring No.: HS-MW-17M

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File No.: 16.0062335.52

Check: JTM/JMG

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD				
161							SAND		
162									
163									
164									
165									
166	1	24	166-168			Brown, fine SAND, little to trace Silt.		1	
167									
168						Bottom of Borehole at 168.0 Feet	168'	2	
169									
170									
171									
172									
173									
174									
175									
176									
177									
178									
179									
180									
181									
182									
183									

REMARKS

1. Soil descriptions based on auger cuttings.
2. Monitoring well was installed in borehole upon completion. Well screen set from approximately 163.0 to 168.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-MW-17M

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Boring No.: HS-MW-17S

Page: 1 of 5

File No.: 16.0062335.52

Check: JTM/JMG

Contractor: Stearns Drilling Company

Foreman: Jerry Huntoon

Logged by: Christopher Melby

Date Start/Finish: 2-27-18 / 2-28-18

Boring Location: 583,273.6951 N; 12,789,266.1009 E

GS Elev.: 784.8' Datum:

Auger/
Casing

Sampler

Type: Hollow Stem Auger Split Spoon

O.D. / I.D.: 8.0" / 4.25" 2.0"

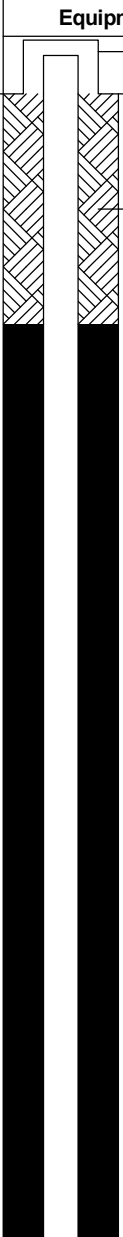
Hammer Wt.: 140lbs 1 3/8"

Hammer Fall: 30.0" NA

Other: NA NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD				PROTECTIVE CASING	Backfill
1						See PMW-17D/MW-1D boring log for detailed soil descriptions.	See PMW-17D/MW-1D for Stratum Descriptions			
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

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Check: JTM/JMG

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD					
21							See PMW-17D/MW-1D for Stratum Descriptions			
22										
23										
24										
25										
26										
27										
28										
29										
30										
31										
32										
33										
34										
35										
36										
37										
38										
39										
40										
41										
42										
43										
REMARKS										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.										

Boring No.: HS-MW-17S

BORING WI 62355.52 HOUSE STREET COMPLETE.GPJ WI DNR.GDT 4/15/20



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Boring No.: HS-MW-17S

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File No.: 16.0062335.52

Check: JTM/JMG

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD				
44							See PMW-17D/MW-1D for Stratum Descriptions		
45									
46									
47									
48									
49									
50									
51									Bentonite/Grout
52									
53									
54									
55									
56									
57									
58									
59									
60									
61									
62									
63									
64									
65									
66									
REMARKS									
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									

Boring No.: HS-MW-17S

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File No.: 16.0062335.52

Check: JTM/JMG

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD					
67							See PMW-17D/MW-1D for Stratum Descriptions			
68										
69										
70										
71										
72										
73										
74										
75										
76										
77										
78										
79										
80										
81										
82										
83										
84										
85										
86										
87										
88										
89										
REMARKS										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.										

Boring No.: HS-MW-17S

BORING WI 62355.52 HOUSE STREET COMPLETE.GPJ WI DNR.GDT 4/15/20



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Boring No.: HS-MW-17S

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File No.: 16.0062335.52

Check: JTM/JMG

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD				
91							See PMW-17D/MW-1D for Stratum Descriptions		
92									
93									
94									
95									
96									
97									
98									
99									
100									
101									
102									
103									
104	1	24/16	104-106	11-5	10-10	Medium dense, brown, fine to medium SAND, trace Silt, wet (SP).	104' SAND (SP)		
105									
106						Bottom of Borehole at 106.0 Feet		1	
107									
108							108'		
109									
110									
111									
112									
113									
1. Monitoring well was installed in borehole upon completion. Well screen set from approximately 103.0 to 108.0 feet below ground surface.									
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									

REMARKS

Boring No.: HS-MW-17S

BORING WI 62355.52 HOUSE STREET COMPLETE.GPJ WI DNR.GDT 4/15/20



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Boring No.: HS-MW-18S

Page: 1 of 1

File No.: 16.0062335.52

Check: JTM/JMG

Contractor: Stearns Drilling Company

Foreman: Burt

Logged by: Kevin Hedinger

Date Start/Finish: 5-14-18 / 5-16-18

Boring Location: 582,018.9901 N; 12,791,903.6374 E

GS Elev.: 683.9' Datum:

Auger/
Casing

Sampler

Type: Hollow Stem Auger Split Spoon

O.D. / I.D.: 8.0" / 4.25" 2.0" / 1 3/8"

Hammer Wt.: 140lbs NA

Hammer Fall: 30" NA

Other: NA NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD					PROTECTIVE CASING
1						See SB-18/MW-18D boring log for sample description and classification.				
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13						Bottom of Borehole at 23.5 Feet				
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										

Grout

Top of Well Screen

Silica Sand Filter Pack

2-Inch Dia. 10-Foot PVC Screen (0.010" Slot)

Bottom of Well Screen

1

1. Monitoring well was installed in borehole upon completion. Well screen set from 13.0 to 23.0 feet below ground surface.

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-MW-18S

BORING WI 62355.52 HOUSE STREET COMPLETE.GPJ WI DNR.GDT 4/15/20



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Packer Drive

Plainfield, Michigan

Boring No.: MW-19D

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File No.: 16.0062335.52

Check: _____

Contractor: Cascade Drilling

Foreman: Jason

Logged by: Ken Oanes

Date Start/Finish: 1-8-18 / 1-8-18

Boring Location: _____

GS Elev.: _____ Datum: _____

Auger/
Casing

Type: Sonic NA

O.D. / I.D.: NA NA

Hammer Wt.: NA NA

Hammer Fall: NA NA

TOC Elev.: NA NA

Sampler

GROUNDWATER READINGS

Date Time Depth Casing Stab

Surveyed By: NA Survey Date: _____

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					PROTECTIVE CASING
1	1	60/60	0-5		0.7 ppm <0.25 tsf	Very soft, black, SILT, contains Organics (topsoil), trace Gravel, moist (ML). Changing at 2.0 feet to: Loose, light brown, Silty fine to coarse GRAVEL, sub-angular, some Sand, moist (GM).	SILT (ML)	1		
2								2'		
3					1.6 ppm		GRAVEL (GM)			
4										
5	2	60/60	5-10		1.6 ppm	Loose, brown, well graded, fine to coarse SAND and GRAVEL, sub-angular to sub-rounded, some lithics, trace Silt, moist (SW).	SAND (SW)	5'		
6					1.5 ppm					
7										
8										
9										
10	3	60/60	10-15		2.8 ppm	Loose, brown, well graded, fine to coarse SAND and GRAVEL, sub-angular to sub-rounded, some lithics, trace Silt, moist (SW).				
11										
12										
13					2.7 ppm					
14										
15	4	60/60	15-20		3.9 ppm	Stiff, light brown, Silty fine SAND, trace fine Gravel, moist (SM).	SAND (SM)	15'		
16					4.3 ppm					
17										
18										
19										
20	5	60/60	20-25		5.8 ppm	Stiff, light brown, Silty fine SAND, trace fine Gravel, moist (SM).				
21										
22					4.2 ppm					
23										
24										
25	6	60/60	25-30		3.5 ppm >4.5 tsf	Stiff, dark gray, Silty CLAY, trace fine Sand, trace fine Gravel, moist (CL).	CLAY (CL)	25'		
26										
27										
28					2.5 ppm					
29										

REMARKS

- Field screening of samples for organic vapors was performed with a MiniRae 2000 photoionization detector equipped with a 10.6 eV lamp. Readings are shown in parts per million (ppm) of isobutylene. Background was measured at 0.0 ppm.
- Pocket penetrometer readings were measured in tons per square foot (tsf) and are used to evaluate consistency of cohesive soil.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: MW-19D

BORING WELL 6233552 WWW.PACKER DR. PLAINFIELD MI.GPJ GZA CORP.GDT 1/25/18



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Packer Drive

Plainfield, Michigan

Boring No.: MW-19D

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File No.: 16.0062335.52

Check:

Flamfield, Michigan										Check:	
Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed		
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data						
31	7	60/60	30-35		5.4 ppm >4.0 tsf	Stiff, dark gray, Silty CLAY, trace fine Sand, trace fine Gravel, moist (CL).	CLAY (CL)				
32											
33					3.3 ppm						
34											
35	8	60	35-40		5.8 ppm >4.0 tsf	Stiff, dark gray, Silty CLAY, trace fine Sand, trace fine Gravel, moist (CL).					
36											
37											
38					5.6 ppm						
39											
40	9	60/60	40-45		11.8 ppm >4.0 tsf	Stiff, dark gray, Silty CLAY, trace fine Sand, trace fine Gravel, moist (CL).					
41											
42											
43					10.7 ppm						
44											
45	10	60/60	45-50		7.2 ppm >4.0 tsf	Stiff, dark gray, Silty CLAY, trace fine Sand, trace fine Gravel, moist (CL).					
46											
47											
48					11.9 ppm						
49											
50	11	60/60	50-55		2.6 ppm >4.5 tsf	Stiff, dark gray, Silty CLAY, trace fine Sand, trace fine Gravel, moist (CL).					
51											
52											
53					10.1 ppm						
54											
55	12	60/60	55-60		0.7 ppm >4.0 tsf	Hard, light gray, Silty CLAY, trace coarse Sand, trace fine Gravel, moist (CL).		3			
56							57'	4			
57							SAND (SM)				
58											
59					1.5 tsf	Changing at 57.0 feet to: Loose, gray, poorly graded, fine SAND, some lithics, sub-rounded, little Silt, wet (SM). Changing at 59.0 feet to: Stiff, gray, SILT, trace fine Sand, trace fine Gravel, wet (ML).	59'				
60	13	60/60	60-65		3.0 ppm >4.0 tsf	Hard, gray, Silty CLAY, trace coarse Sand, trace fine Gravel, sub-angular, moist (CL).	60'				
61							CLAY (CL)				
62											
63					4.8 ppm						
64											
REMARKS	3. Groundwater was encountered 55.0 feet below ground surface.										
	4. Temporary well set at 55.0 to 60.0 feet below ground surface. Groundwater sample submitted for laboratory analysis.										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.								Boring No.: MW-19D			

BORING WELL 6233552 WWW.PACKER DR. PLAINFIELD MI.GPJ GZA CORP.GDT 1/25/18



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Packer Drive

Plainfield, Michigan

Boring No.: MW-19D

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File No.: 16.0062335.52

Check:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
66	14	60/60	65-70		4.2 ppm >4.0 tsf	Hard, gray, Silty CLAY, trace coarse Sand, trace fine Gravel, sub-angular, moist (CL).	CLAY (CL)		
67									
68					2.9 ppm				
69									
70	15	60/60	70-75		7.0 ppm >4.0 tsf	Hard, gray, Silty CLAY, trace coarse Sand, trace fine Gravel with confinement increasing with depth, sub-angular, moist (CL).			
71									
72					6.5 ppm				
73									
74	16	60/60	75-80		10.8 ppm >4.0 tsf	Hard, gray, Silty CLAY, trace coarse Sand, trace fine Gravel with confinement increasing with depth, sub-angular, moist (CL).			
75									
76					4.0 ppm				
77									
78	17	60/60	80-85		2.0 ppm	Loose, brown, Silty fine SAND, some medium to coarse Sand, trace Gravel, sub-angular, wet (SM). Changing at 81.0 feet to: Loose, brown, well graded, fine to coarse SAND and fine to coarse GRAVEL, sub-angular to agular gravel content increasing with depth, wet (SW).	80' SAND (SM) 81' SAND (SW)	5 6	
80									
81					0.3 ppm				
82									
83	18	60/60	85-90		8.2 ppm	Loose, brown, well graded, fine to coarse SAND and fine to coarse GRAVEL, sub-angular to agular gravel content increasing with depth, wet (SW).			
84									
85					0.2 ppm				
86									
87	19	60	90-95		0.4 ppm	Loose, dark gray, fine to coarse SAND and fine to coare GRAVEL, sub-angular, trace Silt, wet with 3 inch Cobble at 91.3 feet (SW).		7	
88									
89					0.3 ppm				
90									
91	20	60/60	95-100		0.1 ppm >4.5 tsf	Hard, dark gray, CLAY, trace fine Sand, trace Gravel, easily rolls 1/8" ribbon, moist (CL).	95' CLAY (CL)		
92									
93					0.1 ppm				
94									
95									
96									
97									
98									
99									

REMARKS

- Groundwater was encountered at approximately 80.0 feet below ground surface.
- Temporary well set at 80.0 to 85.0 feet below ground surface. Groundwater sample submitted for laboratory analysis.
- Temporary well set at 90.0 to 95.0 feet below ground surface. Groundwater sample submitted for laboratory analysis.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: MW-19D

BORING WELL 6233552 WWW.PACKER DR. PLAINFIELD MI.GPJ GZA CORP.GDT 1/25/18



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Boring No.: MW-19D

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File No.: 16.0062335.52

Check:

Sample Information						Check:			
Depth	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
101	21	60/60	100-105		0.3 ppm >4.5 tsf	Hard, dark gray, lean CLAY, low plasticity, moist (CL). Changing at 104.0 feet to: Stiff, dark gray, SILT with Clay, low plasticity, wet (ML).	CLAY (CL)		
102									
103					0.4 ppm 1.5 tsf				
104							104' SILT (ML)		
105	22	60/60	105-110		0.8 ppm 1.0 tsf	Stiff, dark gray, SILT with Clay, low plasticity, trace fine Sand increasing with depth, wet (ML).		8	
106									
107					0.7 ppm				
108									
109									
110	23	60/60	110-115		0.4 ppm 0.5 tsf	Soft, gray, poorly graded, fine SAND, trace Silt, wet (SP). Changing at 111.3 feet to: Hard, dark gray, CLAY with some Silt, moist (CL).	110' SAND (SP)		
111							111.3'		
112							CLAY (CL)		
113					0.7 ppm >4.5 tsf				
114									
115	24	60/60	115-120		0.7 ppm 1.0 tsf	Medium stiff, dark gray, Silty CLAY, moist (CL).			
116									
117									
118					0.5 ppm				
119									
120	25	60/60	120-125		0.8 ppm 4.0 tsf	Hard, gray, CLAY, some Silt, trace Gravel, moist (CL). Changing at 121.3 feet to: Hard, red, CLAY, some Silt, Gypsum inclusions, dry (CL).			
121									
122									
123					1.0 ppm >4.5 tsf				
124							125'		
125						Bottom of Borehole at 125.0 Feet		9	
126									
127									
128									
129									
130									
131									
132									
133									
134									
REMARKS	8. Insufficient groundwater yeild for temporary well.								
	9. Monitoring well was installed in borehole upon completion. Well screen set from 85.0 to 95.0 feet below ground surface.								
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: MW-19D

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Boring No.: MW-19S

Page: 1 of 2

File No.: 16.0062335.52

Check: _____

Contractor: Cascade Drilling

Foreman: Jason

Logged by: John Morehouse

Date Start/Finish: 1-16-18 / 1-16-18

Boring Location: _____

GS Elev.: _____ Datum: _____

Auger/
Casing

Sampler

Type: Sonic

NA

O.D. / I.D.: NA

NA

Hammer Wt.: NA

NA

Hammer Fall: NA

NA

TOC Elev.: NA

NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: NA Survey Date: _____

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					PROTECTIVE CASING
1						See MW-19D boring log for sample description and classification.				
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										

Grout

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: MW-19S

BORING WELL 6233552 WWW.PACKER DR. PLAINFIELD MI.GPJ GZA CORP.GDT 1/25/18



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Boring No.: MW-19S

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File No.: 16.0062335.52

Check:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
31									
32									
33									
34									
35									
36									
37									
38									
39									
40									
41									
42									
43									
44									
45									
46									
47									
48									
49									
50									
51									
52									
53									
54									
55									
56									
57									
58									
59									
60									
61						Bottom of Borehole at 61.0 Feet		1	
62									
63									
64									

Bentonite Seal

Top of Well Screen

Silica Sand Filter Pack

2-Inch Dia. 5-Foot PVC Screen (0.010" Slot)

Bottom of Well Screen

R

E

M

A

R

K

S

1. Monitoring well was installed in borehole upon completion. Well screen set from 58.0 to 61.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: MW-19S

BORING WELL 6233552 WWW.PACKERDR.PLAINFOIELD MI.GPJ GZA CORP.GDT 1/25/18



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Belmont, Michigan

Boring No.: SB-20/MW-20D

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File No.: 16.0062335.52

Check: Julie Groenleer

Contractor: Stearns Drilling Company

Foreman: Jerry Huntoon

Logged by: John Morehouse

Date Start/Finish: 11-15-18 / 11-17-18

Boring Location:

GS Elev.: Datum:

Auger/
Casing

Sampler

GROUNDWATER READINGS

Type: Hollow Stem Auger Split Spoon

O.D. / I.D.: 8.0" / 4.25"

Hammer Wt.: 140 lbs

Hammer Fall: 30"

TOC Elev.: NA

Date	Time	Depth	Casing	Stab

Surveyed By: NA Survey Date:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					PROTECTIVE CASING
1	1	24/10.8	0-2	0-0 1-1	0.0 ppm	Very dark brown, well sorted SILT and fine grained Sand, moist. Changing at 0.4 feet to: Yellowish-brown, moderately sorted, fine to medium grained SAND, trace Silt, trace Gravel, moist. Changing at 0.9 feet to: NO RECOVERY.	SILT 0.4' SAND 0.9' NO RECOVERY	1		
2	2	24/1.2	2-4	2-3 3-3	0.0 ppm	Yellowish-brown, moderately sorted, fine to medium grained SAND, trace Silt, trace Gravel, moist. Changing at 2.1 feet to: NO RECOVERY.	2' 2.1' SAND NO RECOVERY			
4	3	24/15.6	4-6	3-4 5-5	0.0 ppm	Yellowish-brown, moderately sorted, fine to medium grained SAND, trace Silt, trace Gravel, moist. Changing at 4.5 feet to: Dark yellowish-brown, poorly sorted, SILT, some fine grained Sand, trace Gravel, trace Clay, non to slightly plastic, moderately cohesive, moist. Changing at 4.8 feet to: Yellowish-brown, moderately sorted, fine to medium grained SAND, trace Silt, trace Gravel, moist. Changing at 5.3 feet to: NO RECOVERY.	4' SAND 4.5' SILT 4.8' SAND 5.3' NO RECOVERY			
6	4	24/16.8	6-8	2-3 3-3	0.0 ppm	Dark yellowish-brown, poorly sorted, fine to coarse grained SAND, trace Gravel, trace Silt, moist. Changing at 6.6 feet to: Light yellowish-brown, well sorted, fine to medium grained SAND, trace Silt, moist. Changing at 7.4 feet to: NO RECOVERY.	6' SAND 7.4' NO RECOVERY 8'			

REMARKS

- Field screening of samples for organic vapors was performed with a MiniRae 2000 photoionization detector equipped with a 10.6 eV lamp. Readings above background levels are shown in parts per million (ppm) of isobutylene. Groundwater was measured at 0.0 ppm.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: SB-20/MW-20D

BORING WELL 6233552 HOUSE STREET OFF SITE BORINGS WILD WOOD CREEK GPJ GZA CORP GDT 2/27/19



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Boring No.: SB-20/MW-20D

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File No.: 16.0062335.52

Check: Julie Groenleer

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
8	5	24/8.4	8-10	3-4 4-5	0.0 ppm	Light yellowish-brown, well sorted, fine to medium grained SAND, trace Silt, moist. Changing at 8.6 feet to: Light yellowish-brown to pale brown, poorly sorted, fine to coarse grained SAND, some Gravel, trace Silt, moist. Changing at 8.7 feet to: NO RECOVERY.	SAND 8.7' NO RECOVERY			
10	6	24/13.2	10-12	4-5 5-6	0.0 ppm	Light yellowish-brown to pale brown, moderately sorted fine to medium grained SAND, little coarse grained Sand, trace Silt, moist. Changing at 10.2 feet to: Light yellowish-brown to pale brown, poorly sorted, fine to coarse grained SAND, some Gravel, trace Silt, moist. Changing at 11.1 feet to: NO RECOVERY.	10' SAND 11.1' NO RECOVERY			
12	7	24/12	12-14	6-10 8-8	0.0 ppm	Yellowish-brown, poorly sorted, fine to coarse grained SAND, little Gravel, trace Silt, moist. Changing at 12.5 feet to: Yellowish-brown, poorly sorted, medium to coarse grained SAND, trace Gravel, trace Silt, moist. Changing at 13.0 feet to: NO RECOVERY.	12' SAND 13' NO RECOVERY			
14	8	24/14.4	14-16	4-5 9-14	0.0 ppm	Yellowish-brown, poorly sorted, medium to coarse grained SAND, trace Gravel, trace Silt, moist. Changing at 15.0 feet to: GRAVEL, fractured Cobble. Changing at 15.2 feet to: NO RECOVERY.	14' SAND 15' GRAVEL 15.2' NO RECOVERY			
16	9	24/14.4	16-18	8-14 14-14	0.0 ppm	Yellowish-brown, poorly sorted, medium to coarse SAND, little Gravel, trace Silt, moist. Changing at 17.2 feet to: NO RECOVERY.	16' SAND 17.2'			
17										
REMARKS										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: SB-20/MW-20D	

BORING WELL 6233552 HOUSE STREET OFF SITE BORINGS WILD WOOD CREEK.GPJ GZA CORP.GDT 2/27/19



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Boring No.: SB-20/MW-20D

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Check: Julie Groenleer

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
18	10	24/14.4	18-20	9-11 11-14	0.0 ppm	Yellowish-brown, poorly sorted, medium to coarse grained SAND, little Gravel, trace Silt, moist. Changing at 19.2 feet to: NO RECOVERY.	NO RECOVERY			
							18' SAND			
19	11	24/14.4	20-22	11-22 23-19	0.0 ppm	Yellowish-brown, poorly sorted, medium to coarse grained SAND, little Gravel, trace Silt, moist. Changing at 21.2 feet to: NO RECOVERY.	19.2' NO RECOVERY			
20							20' SAND			
21							21.2' NO RECOVERY			
22	12	24/15.6	22-24	5-13 15-14	0.0 ppm	Yellowish-brown, poorly sorted, coarse grained SAND, some Gravel, trace Silt, moist. Changing at 23.3 feet to: NO RECOVERY.	22' SAND			
23							23.3' NO RECOVERY			
24							24' SAND			
25	13	24/14.4	24-26	5-9 10-11	0.0 ppm	Yellowish-brown, poorly sorted, medium to coarse grained SAND, little Gravel, trace Silt, moist. Changing at 25.2 feet to: NO RECOVERY.	25.2' NO RECOVERY			
26							26' SAND			
26	14	24/12	26-28	4-7 47-17	0.0 ppm	Yellowish-brown, poorly sorted, medium to coarse grained SAND, little Gravel, trace Silt, moist. Changing at 26.9 feet to: Very pale brown to pale brown, well sorted, fine				
REMARKS										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: SB-20/MW-20D	

BORING WELL 6233552 HOUSE STREET OFF SITE BORINGS WILD WOOD CREEK GPJ GZA CORP.GDT 2/27/19



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Check: Julie Groenleer

Benton, Michigan										Check: Julie Groenleer	
Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed		
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data						
27	15	24/19.2	28-30	3-6 8-15	0.0 ppm	to medium grained SAND, trace Silt, moist. Changing at 27.0 feet to: NO RECOVERY.	SAND				
						27'	NO RECOVERY				
28						28'	SAND				
29	16	24/16.8	30-32	4-7 9-11	0.0 ppm	Very pale brown to pale brown, very well sorted, fine to medium grained SAND, trace Silt, moist. Changing at 28.1 feet to: Very pale brown to pale brown, very well sorted, fine to medium grained SAND, trace Silt, moist. Changing at 29.6 feet to: NO RECOVERY.	29.6'				NO RECOVERY
30							30'				SAND
31							31.4'				NO RECOVERY
32	17	24/15.6	32-34	3-6 9-10	0.0 ppm	Very pale brown to pale brown, very well sorted, fine to medium grained SAND, trace Silt, moist. Changing at 31.4 feet to: NO RECOVERY.	32'				SAND
33							33.3'				NO RECOVERY
34							34'				SAND
35	18	24/18	34-36	3-6 7-9	0.0 ppm	Very pale brown to pale brown, very well sorted, fine to medium grained SAND, trace Silt, moist. Changing at 33.3 feet to: NO RECOVERY.	35.5'				NO RECOVERY
							36'				
REMARKS											
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: SB-20/MW-20D		

BORING WELL 6233552 HOUSE STREET OFF SITE BORINGS WILD WOOD CREEK.GPJ GZA_CORP.GDT 2/27/19



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Check: Julie Groenleer

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
37	19	24/18	36-38	3-6 8-8	0.0 ppm	Very pale brown to pale brown, very well sorted, fine to medium grained SAND, trace Silt, moist. Changing at 37.5 feet to: NO RECOVERY.	SAND			
							37.5'	NO RECOVERY		
38	20	24/16.8	38-40	3-6 8-10	0.0 ppm	Light yellowish-brown, very well sorted, fine to medium grained SAND, trace Silt, moist. Changing at 39.4 feet to: NO RECOVERY.	SAND			
39							39.4'	NO RECOVERY		
40	21	24/19.2	40-42	3-4 6-7	0.0 ppm	Light yellowish-brown, very well sorted, fine to medium grained SAND, trace Silt, moist. Changing at 41.6 feet to: NO RECOVERY.	SAND			
41							41.6'	NO RECOVERY		
42	22	24/15.6	42-44	4-5 7-8	0.0 ppm	Light yellowish-brown, very well sorted, fine to medium grained SAND, trace Silt, moist. Changing at 43.3 feet to: NO RECOVERY.	SAND			
43							43.3'	NO RECOVERY		
44	23	24/19.2	44-46	3-7 8-11	0.0 ppm	Light yellowish-brown, very well sorted, fine to medium grained SAND, trace Silt, moist. Changing at 45.6 feet to: NO RECOVERY.	SAND			
45										
REMARKS										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: SB-20/MW-20D	

BORING WELL 6233552 HOUSE STREET OFF SITE BORINGS WILD WOOD CREEK.GPJ GZA CORP.GDT 2/27/19



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Check: Julie Groenleer

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
46	24	24/16.8	46-48	4-5 8-10	0.0 ppm	Light yellowish-brown, very well sorted fine to medium grained SAND, trace Silt, moist. Changing at 47.4 feet to: NO RECOVERY.	45.6' SAND 46' NO RECOVERY 46' SAND		
47							47.4' NO RECOVERY		
48	25	24/21.6	48-50	4-6 7-11	0.0 ppm	Light yellowish-brown, very well sorted, fine to medium grained SAND, trace Silt, moist. Changing at 49.8 feet to: NO RECOVERY.	48' SAND		
49									
50	26	24/21.6	50-52	4-6 8-12	0.0 ppm	Light yellowish-brown, very well sorted, fine to medium grained SAND, trace Silt, moist. Changing at 51.8 feet to: NO RECOVERY.	49.8' NO RECOVERY 50' SAND		
51									
52	27	24/20.4	52-54	6-9 10-11	0.0 ppm	Light yellowish-brown, very well sorted, fine to medium grained SAND, trace Silt, moist. Changing at 53.7 feet to: NO RECOVERY.	51.8' NO RECOVERY 52' SAND		
53									
54	28	24/19.2	54-56	2-4 6-8	0.0 ppm	Light yellowish-brown, very well sorted, fine to medium grained SAND, trace Silt, moist. Changing at 54.3 feet to: Brown, very well sorted, fine to medium grained SAND, trace	53.7' NO RECOVERY 54' SAND	2	

REMARKS

2. Groundwater was encountered at approximately 54.3 feet below ground surface.

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Boring No.: SB-20/MW-20D

BORING WELL 6233552 HOUSE STREET OFF SITE BORINGS WILD WOOD CREEK GPJ GZA CORP.GDT 2/27/19



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Belmont, Michigan

Boring No.: SB-20/MW-20D

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File No.: 16.0062335.52

Check: Julie Groenleer

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
55	29	24/21.6	56-58	2-4 6-8	0.0 ppm	Silt, wet. Changing at 55.6 feet: NO RECOVERY.	SAND			
							55.6' NO RECOVERY			
56						Brown, very well sorted, fine to medium grained SAND, trace Silt, wet. Changing at 57.8 feet to: NO RECOVERY.	SAND			
57	30	24/22.8	58-60	1-1 2-4	0.0 ppm					
							57.8' NO RECOVERY			
58						Brown, very well sorted, fine to medium grained SAND, trace Silt, wet. Changing at 59.9 feet to: NO RECOVERY.	SAND			
59	31	24/21.6	60-62	0-1 1-3	0.0 ppm					
							59.9' NO RECOVERY			
60						Brown, very well sorted, fine to medium grained SAND, trace Silt, wet. Changing at 61.8 feet to: NO RECOVERY.	SAND			
61	32	24/16.8	62-64	1-2 2-6	0.0 ppm					
							61.8' NO RECOVERY			
62						Brown, very well sorted, fine to medium grained SAND, trace Silt, wet. Changing at 63.4 feet to: NO RECOVERY.	SAND			
63							63.4' NO RECOVERY			
							64'			
REMARKS										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: SB-20/MW-20D	

BORING WELL 6233552 HOUSE STREET OFF SITE BORINGS WILD WOOD CREEK GPJ GZA CORP.GDT 2/27/19

Bentonite / Grout



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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
65	33	24/22.8	64-66	2-4 4-7	0.0 ppm	Brown, very well sorted, fine to medium grained SAND, trace Silt, wet. Changing at 65.9 feet to: NO RECOVERY.	SAND			
66	34	24/18	66-68	2-2 4-6	0.0 ppm	Brown, very well sorted, fine to medium grained SAND, trace Silt, wet. Changing at 67.5 feet to: NO RECOVERY.	65.9' 66' NO RECOVERY SAND			
67							67.5' NO RECOVERY			
68	35	24/19.2	68-70	8-9 7-10	0.0 ppm	Brown, very well sorted, fine to medium grained SAND, trace Silt, wet. Changing at 69.6 feet to: NO RECOVERY.	68' SAND			
69							69.6' NO RECOVERY			
70	36	24/4.8	70-72	2-3 5-8	0.0 ppm	Brown, very well sorted, fine to medium grained SAND, trace Silt, wet. Changing at 70.4 feet to: NO RECOVERY.	70' SAND			
71							70.4' NO RECOVERY			
72	37	24/24	72-74	2-2 3-6	0.0 ppm	Brown, very well sorted, fine to medium grained SAND, trace Silt, wet.	72' SAND			
73										
REMARKS										
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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
74	38	24/13.2	74-76	1-0 0-0	0.0 ppm	Brown, very well sorted, fine to medium grained SAND, trace Silt, wet. Changing at 75.1 feet to: NO RECOVERY.	SAND			
75							75.1' NO RECOVERY			
76	39	24/21.6	76-78	1-2 5-7	0.0 ppm	Brown, very well sorted, fine to medium grained SAND, trace Silt, wet. Changing at 77.8 feet to: NO RECOVERY.	76' SAND			
77										
78	40	24/9.6	78-80	3-5 6-9	0.0 ppm	Brown, very well sorted, fine to medium grained SAND, trace Silt, wet. Changing at 78.8 feet to: NO RECOVERY.	77.8' 78' NO RECOVERY SAND			
79							78.8' NO RECOVERY			
80	41	24/19.2	80-82	1-3 7-12	0.0 ppm	Brown, very well sorted, fine to medium grained SAND, trace Silt, wet. Changing at 81.6 feet to: NO RECOVERY.	80' SAND			
81										
82	42	24/10.8	82-84	1-2 5-7	0.0 ppm	Brown, very well sorted, fine to medium grained SAND, trace Silt, wet. Changing at 82.9 feet to: NO RECOVERY.	81.6' NO RECOVERY 82' SAND			
REMARKS										
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Benton, Michigan										Check: Julie Groenleer	
Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed		
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data						
83	43	24/22.8	84-86	3-4 9-15	0.0 ppm	Brown, very well sorted, fine to medium grained SAND, trace Silt, wet. Changing at 85.9 feet to: NO RECOVERY.	82.9' SAND				
							NO RECOVERY				
84	44	24/10.8	86-88	1-1 3-6	0.0 ppm	Brown, very well sorted, fine to medium grained SAND, trace Silt, wet. Changing at 86.9 feet to: NO RECOVERY.	84' SAND				
							85.9' NO RECOVERY				
85	45	24/13.2	88-90	2-3 5-10	0.0 ppm	Brown, very well sorted, fine to medium grained SAND, trace Silt, wet. Changing at 89.1 feet to: NO RECOVERY.	86' SAND				
							86.9' NO RECOVERY				
86	46	24/22.8	90-92	1-2 4-10	0.0 ppm	Brown, very well sorted, fine to medium grained SAND, trace Silt, wet. Changing at 91.9 feet to: NO RECOVERY.	88' SAND				
							89.1' NO RECOVERY				
87							90' SAND				
							91.9' NO RECOVERY				
88							91.9' SAND				
							92'				
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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
92	47	24/6	92-94	1-2 5-7	0.0 ppm	Brown, very well sorted, fine to medium grained SAND, trace coarse grained Sand, trace Silt, wet. Changing at 92.5 feet to: NO RECOVERY.	92.5' NO RECOVERY SAND		
93							94' NO RECOVERY		
94	48	24/18	94-96	2-1 4-8	0.0 ppm	Brown, very well sorted, fine to medium grained SAND, trace coarse grained Sand, trace Silt, wet. Changing at 95.5 feet to: NO RECOVERY.	95.5' SAND		
95							96' NO RECOVERY		
96	49	24/15.6	96-98	0-1 2-4	0.0 ppm	Brown, very well sorted, fine to medium grained SAND, trace coarse grained Sand, trace Silt, wet. Changing at 97.3 feet to: NO RECOVERY.	97.3' SAND		
97							98' NO RECOVERY		
98	50	24/18	98-100	1-0 2-4	0.0 ppm	Brown, very well sorted, fine to medium grained SAND, trace coarse grained Sand, trace Silt, wet. Changing at 99.5 feet to: NO RECOVERY.	99.5' SAND		
99							100' NO RECOVERY		
100	51	24/21.6	100-102	2-3 6-10	0.0 ppm	Brown, very well sorted, fine to medium grained SAND, trace coarse grained Sand, trace Silt, wet. Changing at 101.8 feet to: NO RECOVERY.	101.8' SAND		
101									
REMARKS									
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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
102	52	24/20.4	102-104	0-1 3-4	0.0 ppm	Brown, very well sorted, fine to medium grained SAND, trace coarse grained Sand, trace Silt, wet. Changing at 103.7 feet to: NO RECOVERY.	SAND 101.8' 102' NO RECOVERY SAND			
103										
104	53	24/24	104-106	2-3 8-15	0.0 ppm	Brown, very well sorted, fine to medium grained SAND, trace coarse grained Sand, trace Silt, wet.	103.7' 104' NO RECOVERY SAND			
105										
106	54	24/22.8	106-108	3-3 7-10	0.0 ppm	Brown, very well sorted, fine to medium grained SAND, trace coarse grained Sand, trace Silt, wet. Changing at 107.9 feet to: NO RECOVERY.				
107										
108	55	24/22.8	108-110	1-1 2-4	0.0 ppm	Brown, very well sorted, fine to medium grained SAND, trace coarse grained Sand, trace Silt, wet. Changing at 109.9 feet to: NO RECOVERY.	107.9' 108' NO RECOVERY SAND			
109										
110	56	24/13.2	110-112	1-3 4-9	0.0 ppm	Brown, very well sorted, fine to medium grained SAND, trace coarse grained Sand, trace Silt, wet. Changing at 111.1 feet to: NO RECOVERY.	109.9' 110' NO RECOVERY SAND			
REMARKS										
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Bentonite, Michigan											Check: Julie Groenleer	
Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed			
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data							
111	57	24/19.2	112-114	2-3 7-11	0.0 ppm	Brown, very well sorted, fine to medium grained SAND, trace coarse grained Sand, trace Silt, wet. Changing at 113.6 feet to: NO RECOVERY.	SAND					
							111.1'				NO RECOVERY	
112							112'				SAND	
113	58	24/24	114-116	1-3 5-11	0.0 ppm	Brown, very well sorted, fine to medium grained SAND, trace coarse grained Sand, trace Silt, wet.	113.6'					
							NO RECOVERY					
114							114'				SAND	
115	59	24/9.6	116-118	1-1 3-8	0.0 ppm	Brown, very well sorted, fine to medium grained SAND, trace coarse grained Sand, trace Silt, wet. Changing at 116.8 feet to: NO RECOVERY.	116.8'					
							NO RECOVERY					
117							118'				SAND	
118	60	24/20.4	118-120	1-2 5-9	0.0 ppm	Brown, very well sorted, fine to medium grained SAND, trace coarse grained Sand, trace Silt, wet. Changing at 119.7 feet to: NO RECOVERY.	119.7'					
							NO RECOVERY					
119							120'					
REMARKS												
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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
120	61	24/10.8	120-122	2-3 6-10	0.0 ppm	Brown, very well sorted, fine to medium grained SAND, trace coarse grained Sand, trace Silt, wet. Changing at 120.9 feet to: NO RECOVERY.	SAND			
121							120.9' NO RECOVERY			
122	62	24/22.8	122-124	3-4 9-15	0.0 ppm	Brown, very well sorted, fine to medium grained SAND, trace coarse grained Sand, trace Silt, wet. Changing at 123.5 feet to: Dark grayish-brown to dark brown, well sorted, Silty CLAY, plastic, cohesive, moist. Changing at 123.9 feet to: NO RECOVERY.	122' SAND			
123							123.5' Silty CLAY			
124	63	24/18	124-126	2-4 6-11	0.0 ppm	Brown, very well sorted, fine to medium grained SAND, trace coarse grained Sand, trace Silt, wet. Changing at 125.4 feet to: Dark grayish-brown to dark brown, well sorted, Silty CLAY, plastic, cohesive, moist. Changing at 125.5 feet to: NO RECOVERY.	123.9' 124' NO RECOVERY SAND			
125							125.4' 125.5' Silty CLAY NO RECOVERY			Top of Well Screen
126	64	24/16.8	126-128	1-1 3-6	0.0 ppm	Brown, very well sorted, fine to medium grained SAND, trace coarse grained Sand, trace Silt, wet. Changing at 127.4 feet to: NO RECOVERY.	126' SAND			Silica Sand Filter Pack
127							127.4' NO RECOVERY			2-Inch Dia. 5-Foot PVC Screen (0.010" Slot)
128	65	24/22.8	128-130	7-23 36-50/4.5"	0.0 ppm	Brown, very well sorted, fine to medium grained SAND, trace coarse grained Sand, trace Silt, wet. Changing at 129.5 feet to: Dark gray to dark grayish-brown, poorly sorted, CLAY & SILT, trace Sand, trace Gravel, plastic, cohesive, moist. Changing at 129.9 feet to: NO RECOVERY.	128' SAND			
129										
REMARKS										
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Sample Information						Bentonite, Michigan		Check: Julie Groenleer	
Depth	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
130	66	24/24	130-132	4-3 23-46	0.0 ppm	Brown, very well sorted, fine to medium grained SAND, trace coarse grained Sand, trace Silt, wet. Changing at 130.9 feet to: Dark gray to dark grayish-brown, poorly sorted, CLAY & SILT, trace Sand, trace Gravel, plastic, cohesive, moist. Changing at 131.1 feet to: Dark gray, poorly sorted, GRAVEL, some Sand, trace Silt, wet. Changing at 131.3 feet to: Dark gray to dark grayish-brown, poorly sorted, CLAY & SILT, trace Sand, trace Gravel, plastic, cohesive, moist. Changing at 131.5 feet to: Brown, well sorted, fine to coarse SAND, trace Silt, wet. Changing at 131.8 feet to: Dark grayish-brown, poorly sorted, coarse SAND, some Gravel, trace Silt, wet. Brown, very well sorted, fine to medium grained, SAND, trace Silt, wet. Changing at 132.3 feet to: Dark gray to dark grayish-brown, poorly sorted, CLAY & SILT, trace Sand, trace Gravel, plastic, cohesive, moist. Changing at 132.9 feet to: NO RECOVERY.	129.5' SAND CLAY & SILT	 Bottom of Well Screen	
							129.9'		
							130' NO RECOVERY SAND		
131							130.9'		
							131.1' CLAY & SILT		
							131.3' GRAVEL		
						131.5' CLAY & SILT			
132	67	24/10.8	132-134	17-50/5.5"	0.0 ppm	Brown, very well sorted, fine to medium grained SAND, trace Silt, wet. Changing at 132.3 feet to: Dark gray to dark grayish-brown, poorly sorted, CLAY & SILT, trace Sand, trace Gravel, plastic, cohesive, moist. Changing at 132.9 feet to: NO RECOVERY.	SAND		
							132.3'		
							CLAY & SILT		
133							132.9'		
							NO RECOVERY		
134	68	24/6	134-136	50/6"	0.0 ppm	Brown, very well sorted, fine to medium grained SAND, trace Silt, wet. Changing at 134.2 feet to: Dark brown, poorly sorted, GRAVEL, fractured Cobble. Changing at 134.5 feet to: NO RECOVERY.	134'		
							134.2' SAND		
							GRAVEL		
							134.5'		
							NO RECOVERY		
136	69	24/1.2	136-138	50/5.5"	0.0 ppm	Dark grayish-brown, poorly sorted, GRAVEL, some Clay & Silt, moist. Changing at 136.1 feet to: NO RECOVERY.	136'		
							136.1' GRAVEL		
							NO RECOVERY		
138	70	24/1.2	138-140	48-50/2"	0.0 ppm	Dark grayish-brown, poorly sorted, CLAY & SILT, little Gravel, trace Sand, plastic, cohesive, moist. Changing at 138.1 feet to: NO RECOVERY.	138'		
							138.1' CLAY & SILT		
							NO RECOVERY		
REMARKS									
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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
139	71	24/9.6	140-142	37-50/4"	0.0 ppm	Dark grayish-brown, poorly sorted, CLAY & SILT, little Gravel, trace Sand, plastic, cohesive, moist. Changing at 140.8 feet to: NO RECOVERY.	NO RECOVERY		
140							140' CLAY & SILT		
141							140.8' NO RECOVERY		
142							142'		
143						Bottom of Borehole at 142.0 Feet		3	
144									
145									
146									
147									
3. Monitoring well MW-20D was installed in borehole upon completion. Well screen set from 124.5 to 129.5 feet below ground surface.									
REMARKS									
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Contractor: Stearns Drilling Company

Foreman: Jerry Huntoon

Logged by: John Morehouse

Date Start/Finish: 11-5-18 / 11-6-18

Boring Location:

GS Elev.: Datum:

**Auger/
Casing**

Sampler

GROUNDWATER READINGS

Type: Hollow Stem Auger

Split Spoon

O.D. / I.D.: 8.0" / 4.25"

NA

Hammer Wt.: 140 lbs

NA

Hammer Fall: 30"

NA

TOC Elev.: NA

NA

Date	Time	Depth	Casing	Stab

Surveyed By: NA Survey Date:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					PROTECTIVE CASING
1	1		0			See SB-20/MW-20D boring log for detailed soil descriptions.				
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Bentonite /
Grout

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Boring No.: MW-20M

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6868 Wild Wood Creek Road, NE

Belmont, Michigan

Boring No.: MW-20M

Page: 2 of 2

File No.: 16.0062335.52

Check: Julie Groenleer

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
54										
55										
56										
57										
58										
59										
60										
61										
62										
63										
64										
65										
66										
67										
68										
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70										
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81										
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88										
89										
90										
91										
92										
93										
94										
95										
96										
97										
98										
99										
100										
101										
102										
103										
104										
105										
106						Bottom of Borehole at 105.0 Feet		1		
107										
108										
109										
110										
111										
112										
113										
114										
REMARKS										
1. Monitoring well was intalled in borehole upon completion. Well screen set from approximately 100.0 to 105.0 feet below ground surface.										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: MW-20M	

BORING WELL 6233552 HOUSE STREET OFF SITE BORINGS WILD WOOD CREEK GPJ GZA CORP GDT 2/27/19

Top of Well Screen
Silica Sand Filter Pack
2-Inch Dia.
5-Foot PVC Screen (0.010" Slot)
Bottom of Well Screen



GZA
GeoEnvironmental, Inc.
Engineers and Scientists

1855 House Street: Off-Site Borings

6868 Wild Wood Creek Road, NE

Belmont, Michigan

Boring No.: MW-20S

Page: 1 of 2

File No.: 16.0062335.52

Check: Julie Groenleer

Contractor: Stearns Drilling Company

Foreman: Jerry Huntoon

Logged by: John Morehouse

Date Start/Finish: 11-5-18 / 11-6-18

Boring Location:

GS Elev.: Datum:

Auger/
Casing

Sampler

Type: Hollow Stem Auger

Split Spoon

O.D. / I.D.: 8.0" / 4.25"

NA

Hammer Wt.: 140 lbs

NA

Hammer Fall: 30"

NA

TOC Elev.: NA

NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: NA Survey Date:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					PROTECTIVE CASING
1	1		0			See SB-20/MW-20D boring log for detailed soil descriptions.				
2										
3										
4										
5										
6										
7										
8										
9										
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19										
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28										
29										
30										
31										
32										
33										
34										
35										
36										
37										
38										
39										

Bentonite /
Grout

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: MW-20S

BORING WELL 6233552 HOUSE STREET OFF SITE BORINGS WILD WOOD CREEK GPJ GZA CORP GDT 2/27/19



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1855 House Street: Off-Site Borings

6868 Wild Wood Creek Road, NE

Belmont, Michigan

Boring No.: MW-20S

Page: 2 of 2

File No.: 16.0062335.52

Check: Julie Groenleer

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
41										
42										
43										
44										
45										
46										
47										
48										
49										
50										
51										
52										
53										
54										
55										
56										
57										
58										
59										
60										
61										
62										
63										
64										
65						Bottom of Borehole at 65.0 Feet		1		
66										
67										
68										
69										
70										
71										
72										
73										
74										
75										
76										
77										
78										
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80										
81										
82										
83										
84										
85										
86										

Top of Well Screen
Silica Sand Filter Pack
2-Inch Dia. 5-Foot PVC Screen (0.010" Slot)
Bottom of Well Screen

REMARKS

1. Monitoring well was installed in borehole upon completion. Well screen set from approximately 60.0 to 65.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: MW-20S

BORING WELL 6233552 HOUSE STREET OFF SITE BORINGS WILD WOOD CREEK GPJ GZA CORP GDT 2/27/19



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Wolverine World Wide, Inc.

Packer Drive

Plainfield, Michigan

Boring No.: MW-21D

Page: 1 of 3

File No.: 16.0062335.52

Check: _____

Contractor: Cascade Drilling

Foreman: Jason

Logged by: Ken Oanes

Date Start/Finish: 1-2-18 / 1-2-18

Boring Location: _____

GS Elev.: _____ Datum: _____

Auger/
Casing

Type: Sonic NA

O.D. / I.D.: NA NA

Hammer Wt.: NA NA

Hammer Fall: NA NA

TOC Elev.: NA NA

Sampler

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: NA Survey Date: _____

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					PROTECTIVE CASING
1	1	60/60	0-5		1.7 ppm	Loose, black, Silty SAND with Organic Matter (roots), moist (SM). Changing at 1.3 feet to: Loose, light brown, well graded, SAND, trace Gravel, sub-angular to sub-rounded, coarser at 4.5 feet (SM).	SAND (SM) 1.3'	1		
2					0.8 ppm		SAND (SW)			
3										
4										
5	2	60/60	5-10		1.0 ppm	Loose, light brown, poorly graded, SAND, some Silty Clumps, sub-angular to sub-rounded, moist (SM). Changing at 8.5 feet to: Loose, brown, well graded, SAND and Gravel, sub-angular to sub-rounded, wet (SW).	5' SAND (SP)			
6					0.9 ppm					
7										
8										
9							8.5' SAND and GRAVEL (GW)			
10	3	60/60	10-15		1.0 ppm	Loose, brown, well graded, SAND with Gravel, sub-rounded, wet (SW).	10' SAND (SW)			
11										
12					0.5 ppm					
13										
14										
15	4	60/60	15-20		0.7 ppm	Loose, brown, well graded, SAND with Gravel, sub-rounded, wet (SW).				
16										
17					0.7 ppm					
18										
19										
20	5	60/60	20-25		0.6 ppm	Loose, brown, well graded, SAND, sub-angular, wet (SW).				
21										
22					0.7 ppm					
23										
24										
25	6	60/60	25-30		0.5 ppm	Loose, brown, well graded, SAND, sub-angular, wet (SW). Changing at 27.0 feet to: Loose, brown, well graded, SAND, with Gravel and Cobble, sub-angular, wet (SW). Changing at 27.6 feet to: Soft, brown, SILT with Sand, wet (ML). Changing at 28.3 feet to: Loose, brown, poorly graded, SAND, little lithics, sub-rounded, wet (SP).	27.6' SILT (ML)			
26										
27					1.0 ppm		28.3' SAND (SP)			
28										
29										

REMARKS

- Field screening of samples for organic vapors was performed with a MiniRae 2000 photoionization detector equipped with a 10.6 eV lamp. Readings are shown in parts per million (ppm) of isobutylene. Background was measured at 0.0 ppm.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: MW-21D

BORING WELL 6233552 WWW.PACKERDR.PLAINFOIELD.MI.GPJ GZA CORP.GDT 1/25/18



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Packer Drive

Plainfield, Michigan

Boring No.: MW-21D

Page: 2 of 3

File No.: 16.0062335.52

Check:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
31	7	60/60	30-35		0.8 ppm	Loose, brown, poorly graded, SAND, trace Gravel, little lithics, sub-angular, wet (SP).	SAND (SP)	2	Grout	
32					0.6 ppm					
33										
34										
35	8	60/60	35-40		0.4 ppm	Loose, brown, well graded, SAND with Gravel, sub-angular, some lithics, wet (SW). Changing at 37.5 feet to: Stiff, brown, SILT with Sand, trace Gravel, moist (ML).	35' SAND (SW)			
36										
37					0.4 ppm		37.5' SILT (ML)			
38					2.0 tsf					
39	9	60/60	40-45		1.3 ppm	Hard, brown, Silty CLAY with Gravel, sub-rounded, becoming more Clay than Silt towards bottom, moist (OL).	40' CLAY (OL)			
40										
41					1.7 ppm					
42										
43	10	60/60	45-50		1.1 ppm	Very stiff, brown, Silty CLAY with Gravel, sub-rounded, trace Sand, moist (CL).				
44					3.5 tsf					
45										
46					3.9 ppm					
47	11	60/60	50-55		1.1 ppm	Soft, brown, Silty CLAY with Gravel, little Sand, sub-rounded, moist (OL). Changing at 51.0 feet to: Very stiff, brown, lean CLAY, trace Gravel, moist (CL). Changing at 53.5 feet to: Stiff, brown, SILT, trace Gravel, moist (ML).	51' CLAY (CL)			
48					0.5 tsf					
49					1.3 ppm		53.5' SILT (ML)			
50					3.0 tsf					
51	12	60/60	55-60		0.9 ppm	Hard, brown, SILT, little Sand, trace Gravel, moist (ML). Changing at 56.8 feet to: Loose, brown, poorly graded SAND, sub-rounded, some lithetics, 2.0 " Cobbles at 58.9 feet, Wet (SP).	56.8' SAND (SP)			
52					>4.0 tsf					
53					1.8 ppm					
54										
55	13	60/60	60-65		1.1 ppm	Loose, brown, poorly graded, SAND, trace Gravel, sub-rounded, some lithics, wet (SP). Changing at 64.0 feet to: Hard, dark gray, SILT, trace Gravel, grading to Clay, wet (ML).	64' SILT (SM)			
56										
57					>4.0 tsf					
58					1.0 ppm		65'			
59										
60										
61										
62										
63										
64										
REMARKS 2. Pocket penetrometer readings were measured in tons per square foot (tsf) and are used to evaluate consistency of cohesive soil.										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: MW-21D	

BORING WELL 6233552 WWW.PACKERDR.PLAINFOIELD.MI.GPJ GZA CORP.GDT 1/25/18



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Packer Drive

Plainfield, Michigan

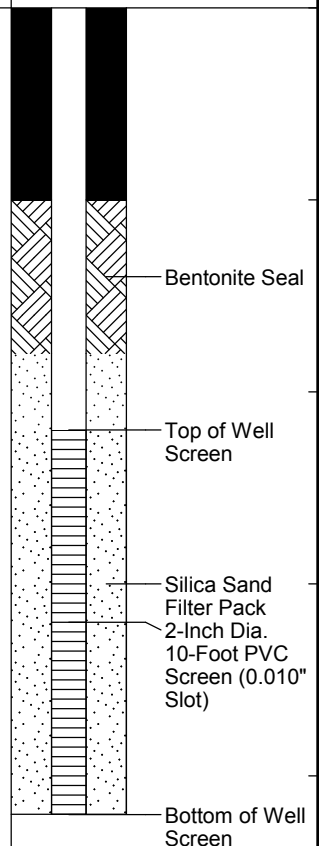
Boring No.: MW-21D

Page: 3 of 3

File No.: 16.0062335.52

Check:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
66	14	60/60	65-70		3.0 ppm 3.5 tsf	Very stiff, dark gray, CLAY, trace Gravel, trace Sand, moist (CL).	CLAY (CL)		
67					1.7 ppm				
68									
69									
70	15	60/60	70-75		0.3 ppm >4.0 tsf	Hard, dark brown, Clayey Gravel, dark brown, sub-round, moist (GL).	70' GRAVEL (GL)		
71					0.7 ppm				
72									
73									
74									
75	16	60/60	75-80		1.2 ppm >4.0 tsf	Hard, dark brown, lean CLAY, little Gravel, moist (CL). Changing at 79.0 feet to: Very stiff, dark brown, Clayey GRAVEL, some Sand, trace Cobbles, moist (GC).	75' CLAY (CL)		
76					1.7 ppm				
77									
78									
79							79' GRAVEL (GL)		
80	17	60/60	80-85		1.6 ppm	Medium dense, dark brown, Clayey SAND with Gravel, Cobbles at 81.0 feet, moist (SC).	80' SAND (SC)		
81					2.3 ppm				
82									
83									
84									
85	18	60/60	85-90		1.1 ppm	Loose, dark brown, SAND, trace Gravel, wet (SW). Changing at 85.8 feet to: Hard, dark gray, lean CLAY, low plasticity, moist (CL).	85' SAND (SW)		
86							CLAY (CL)		
87					1.0 ppm	Changing at 86.6 feet to: Hard, dark red with gray mottles, lean CLAY, small inclusions of white precipitate in gray mottles, possible gypsum Wet (CL).	86.6' CLAY (CL)		
88									
89									
90	19	60/60	90-95		1.9 ppm	Hard, dark reddish brown with gray mottles, lean CLAY, small inclusions of white precipitate material inclusions, dry to moist (CL).			
91					1.3 ppm				
92									
93									
94									
95	20	48/48	95-99		1.1 ppm >4.0 tsf	Hard, dark reddish brown with gray mottles, lean CLAY, small inclusions of white precipitate material inclusions, dry to moist (CL).			
96					1.2 ppm				
97									
98									
99						Bottom of Borehole at 99.0 Feet	99'	3 4	



REMARKS

- Groundwater was not encountered during drilling or upon completion.
- Monitoring well was installed in borehole upon completion. Well screen set from 76.0 to 86.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: MW-21D

BORING WELL 6233552 WWW.PACKERDR.PLAINFOIELD MI.GPJ GZA CORP.GDT 1/25/18



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Packer Drive

Plainfield, Michigan

Boring No.: MW-21M

Page: 1 of 2

File No.: 16.0062335.52

Check: _____

Contractor: Cascade Drilling

Foreman: Jason

Logged by: John Morehouse

Date Start/Finish: 1-18-18 / 1-18-18

Boring Location: _____

GS Elev.: _____ Datum: _____

Auger/
Casing

Sampler

GROUNDWATER READINGS

Type: Sonic

NA

O.D. / I.D.: NA

NA

Hammer Wt.: NA

NA

Hammer Fall: NA

NA

TOC Elev.: NA

NA

Date	Time	Depth	Casing	Stab

Surveyed By: NA Survey Date: _____

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					PROTECTIVE CASING
1						See MW-21D boring log for sample description and classification.				
2										
3										
4										
5										
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7										
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9										
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22										
23										
24										
25										
26										
27										
28										
29										

Grout

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: MW-21M

BORING WELL 6233552 WWW.PACKER DR. PLAINFIELD MI.GPJ GZA_CORP.GDT 1/25/18



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Packer Drive

Plainfield, Michigan

Boring No.: MW-21M

Page: 2 of 2

File No.: 16.0062335.52

Check:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
31										
32										
33										
34										
35										
36										
37										
38										
39										
40										
41										
42										
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49										
50										
51										
52										
53										
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56										
57										
58										
59										
60										
61										
62										
63										
64						Bottom of Borehole at 64.0 Feet		1		

Bentonite Seal

Top of Well Screen

Silica Sand Filter Pack

2-Inch Dia.

5-Foot PVC Screen (0.010" Slot)

Bottom of Well Screen

REMARKS

1. Monitoring well was installed in borehole upon completion. Well screen set from 59.0 to 64.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: MW-21M

BORING WELL 6233552 WWW.PACKERDR.PLAINFOIELD MI.GPJ GZA CORP.GDT 1/25/18



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Packer Drive

Plainfield, Michigan

Boring No.: MW-21S

Page: 1 of 1

File No.: 16.0062335.52

Check: _____

Contractor: Cascade Drilling

Foreman: Jason

Logged by: John Morehouse

Date Start/Finish: 1-18-18 / 1-18-18

Boring Location: _____

GS Elev.: _____ Datum: _____

Auger/
Casing

Sampler

Type: Sonic

NA

O.D. / I.D.: NA

NA

Hammer Wt.: NA

NA

Hammer Fall: NA

NA

TOC Elev.: NA

NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: NA Survey Date: _____

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					PROTECTIVE CASING
1						See MW-21D boring log for sample description and classification.				
2										
3										
4										
5										
6										
7										
8										
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14										
15										
16										
17										
18										
19										
20						Bottom of Borehole at 20.0 Feet				
21										
22										
23										
24										
25										
26										
27										
28										
29										

Bentonite Seal

Top of Well Screen

Silica Sand Filter Pack

2-Inch Dia.
10-Foot PVC
Screen (0.010"
Slot)

Bottom of Well Screen

REMARKS

1. Monitoring well was installed in borehole upon completion. Well screen set from 10.0 to 20.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: MW-21S

BORING WELL 6233552 WWW.PACKER DR. PLAINFIELD MI.GPJ GZA CORP.GDT 1/25/18



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House Street

Belmont, Michigan

Boring No.: HS-MW-23A

Page: 1 of 2

File No.: 16.0062335.52

Check: JTM/JMG

Contractor: Stearns Drilling Company

Foreman: Jerry Huntoon

Logged by: S. Stephenson

Date Start/Finish: 6-20-19 / 6-20-19

Boring Location:

GS Elev.: Datum:

**Auger/
Casing**

Sampler

Type: Hollow Stem Auger

Split Spoon

O.D. / I.D.: 8.0" / 4.25"

2.0" / 1 3/8"

Hammer Wt.: 140lbs

NA

Hammer Fall: 30"

NA

TOC Elev.: NA

NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab
NA				

Surveyed By: NA Survey Date:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					PROTECTIVE CASING
1						See HS-MW-23D boring log for sample description and classification.				
2										
3										
4										
5										
6										
7										
8										
9										
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35										
36										
37										
38										
39										

Bentonite/Grout

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-MW-23A

BORING WELL 62355.52 HOUSE STREET COMPLETE.GPJ GZA CORP.GDT 4/15/20



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House Street

Belmont, Michigan

Boring No.: HS-MW-23A

Page: 2 of 2

File No.: 16.0062335.52

Check: JTM/JMG

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
41									
42									
43									
44									
45									
46									
47									
48									
49									
50									
51									
52									
53									
54									
55									
56									
57									
58									
59									
60									
61									
62									
63									
64									
65									
66									
67									
68									
69									
70									
71									
72									
73									
74									
75									
76						Bottom of Borehole at 75.0 Feet		1	
77									
78									
79									
80									
81									
82									
83									
84									
85									
86									

1. Monitoring well was installed in borehole upon completion. Well screen set from 70.0 to 75.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-MW-23A

BORING WELL 62355.52 HOUSE STREET COMPLETE.GPJ GZA CORP.GDT 4/15/20

REMARKS



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House Street

Belmont, Michigan

Boring No.: HS-MW-23B

Page: 1 of 3

File No.: 16.0062335.52

Check: JTM/JMG

Contractor: Stearns Drilling Company

Foreman: Jerry Huntoon

Logged by: John Morehouse

Date Start/Finish: 7-31-19 / 8-1-19

Boring Location:

GS Elev.: Datum:

Auger/
Casing

Sampler

GROUNDWATER READINGS

Type: Hollow Stem Auger

Split Spoon

O.D. / I.D.: 8.0" / 4.25"

2.0" / 1 3/8"

Hammer Wt.: 140lbs

NA

Hammer Fall: 30"

NA

TOC Elev.: NA

NA

Date	Time	Depth	Casing	Stab

Surveyed By: NA Survey Date:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					PROTECTIVE CASING
1						See HS-MW-23D boring log for sample description and classification.				
2										
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47										
48										
49										

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-MW-23B

BORING WELL 62355.52 HOUSE STREET COMPLETE.GPJ GZA CORP.GDT 4/15/20



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Boring No.: HS-MW-23B

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Check: JTM/JMG

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
51										
52										
53										
54										
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56										
57										
58										
59										
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108										
REMARKS										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: HS-MW-23B	

BORING WELL 62355.52 HOUSE STREET COMPLETE.GPJ GZA CORP.GDT 4/15/20

Bentonite / Grout



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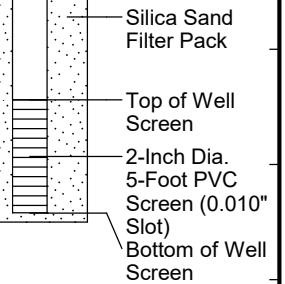
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File No.: 16.0062335.52

Check: JTM/JMG

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
109										
110										
111										
112										
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114										
115										
116										
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132										
133										
134										
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136										
137										
138										
139										
140										
141										
142										
143						Bottom of Borehole at 142.5 Feet		1		
144										
145										
146										
147										
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153										
154										
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158										
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160										
161										
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166										
REMARKS										
1. Monitoring well was installed in borehole upon completion. Well screen set from 137.2 to 142.1 feet below ground surface.										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: HS-MW-23B	

BORING WELL 62355.52 HOUSE STREET COMPLETE.GPJ GZA CORP.GDT 4/15/20





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Boring No.: HS-MW-23C

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File No.: 16.0062335.52

Check: JTM/JMG

Contractor: Stearns Drilling Company

Foreman: Jerry Huntoon

Logged by: John Morehouse

Date Start/Finish: 7-30-19 / 7-31-19

Boring Location:

GS Elev.: Datum:

**Auger/
Casing**

Sampler

GROUNDWATER READINGS

Type: Hollow Stem Auger

Split Spoon

O.D. / I.D.: 8.0" / 4.25"

2.0" / 1 3/8"

Hammer Wt.: 140lbs

NA

Hammer Fall: 30"

NA

TOC Elev.: NA

NA

Surveyed By: NA Survey Date:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					PROTECTIVE CASING
1						See HS-MW-23D boring log for sample description and classification.				
2										
3										
4										
5										
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48										
49										

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-MW-23C

BORING WELL 62355.52 HOUSE STREET COMPLETE.GPJ GZA CORP.GDT 4/15/20



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Check: JTM/JMG

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
51										
52										
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56										
57										
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107										
108										
REMARKS										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: HS-MW-23C	

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File No.: 16.0062335.52

Check: JTM/JMG

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
109										
110										
111										
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114										
115										
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117										
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166										
REMARKS										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: HS-MW-23C	

BORING WELL 62355.52 HOUSE STREET COMPLETE.GPJ GZA CORP.GDT 4/15/20



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Boring No.: HS-MW-23C

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File No.: 16.0062335.52

Check: JTM/JMG

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
168										
169										
170										
171										
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173										
174										
175										
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214										
215										
216						Bottom of Borehole at 215 Feet		1		
217										
218										
219										
220										
221										
222										
223										
224										
REMARKS										
1. Monitoring well was installed in borehole upon completion. Well screen set from 209.6 to 214.4 feet below ground surface.										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.										

Boring No.: HS-MW-23C

BORING WELL 62355.52 HOUSE STREET COMPLETE.GPJ GZA CORP.GDT 4/15/20

Silica Sand Filter Pack

Top of Well Screen

2-Inch Dia. 5-Foot PVC Screen (0.010" Slot)

Bottom of Well Screen



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File No.: 16.0062335.52

Check: JTM/JMG

Contractor: Stearns Drilling Company

Foreman: Jerry Huntoon

Logged by: S. Stephenson

Date Start/Finish: 6-10-19 / 6-18-19

Boring Location:

GS Elev.: Datum:

**Auger/
Casing**

Sampler

GROUNDWATER READINGS

Type: Hollow Stem Auger

Split Spoon

O.D. / I.D.: 8.0" / 4.25"

2.0" / 1 3/8"

Hammer Wt.: 140lbs

NA

Hammer Fall: 30"

NA

TOC Elev.: NA

NA

Date	Time	Depth	Casing	Stab
NA				

Surveyed By: NA Survey Date:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					PROTECTIVE CASING
1	1	24/24	0-2	3-4 5-7		TOPSOIL, dry. Changing at 0.4 feet to: Loose, tan, fine SAND, little Silt, moist.	0.4' TOPSOIL SAND			
2	2	24/24	2-4	3-5 8-11		Loose, tan, fine SAND, little Silt, moist. Changing at 3.0 feet to: Medium dense, tan, fine to medium SAND, trace Silt, moist.				
3										
4	3	24/24	4-6	1-4 5-7		Medium dense, tan, fine to medium SAND, trace Silt, moist. Changing at 5.3 feet to: Stiff, brown, CLAY & SILT, trace fine Sand, dry.	4.8' CLAY & SILT			
5										
6	4	24/20	6-8	2-6 7-6		Medium dense, tan, fine to medium SAND, trace Silt, moist.	6' SAND			
7										
8	5	24/12	8-10	5-6 5-5		Medium dense, tan, fine to medium SAND, trace Silt, moist.				
9										
10	6	24/12	10-12	3-4 4-6		Medium dense, tan, fine to medium SAND, trace Silt, moist.		1		
11										
12	7	24/12	12-14	7-4 4-2		Medium dense, tan, fine to medium SAND, trace Silt, moist.				
13										
14	8	24/12	14-16	2-4 3-3		Loose, brown, fine to medium SAND, little Silt, wet.		2		
15										
16	9	24/15	16-18	5-1 1-2		Loose, brown, fine to medium SAND, little Silt, wet. Changing at 16.4 feet to: Loose, brown, SILT, wet. Changing at 16.6 feet to: Loose, brown, fine to medium SAND, wet. Changing at 17.6 feet to: Brown, Silty CLAY,	16.4' SILT 16.6' SAND 17.6' SILTY CLAY			
17										

REMARKS

1. Temporary well set at 10.0 to 20.0 feet below ground surface. Purged 15.0 gallons. Groundwater sample submitted for laboratory analysis.
2. Groundwater was encountered at approximately 14.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-MW-23D

BORING WELL 62355.52 HOUSE STREET COMPLETE.GPJ GZA CORP.GDT 4/15/20



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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
19	10	24/20	18-20	3-2 1-1		wet. Changing at 17.8 feet to: Brown, fine to coarse SAND, some Silt, wet. Brown, fine to coarse SAND, some Silt, trace fine Gravel, wet.	SAND			
20	11	24/19	20-22	1-1 1-3		Brown, fine to coarse SAND, some Silt, trace fine Gravel, wet. Changing at 21.5 feet to: Brown, CLAY & SILT, little fine to coarse Sand, trace fine Gravel, dry.	21.4' CLAY & SILT			
22	12	24/20	22-24	8-4 5-6		Brown, CLAY & SILT, little fine to coarse Sand, trace fine Gravel, dry (wet on outside).				
24	13	24/19	24-26	3-4 5-6		Brown, CLAY & SILT, little fine to coarse Sand, trace fine Gravel, dry (wet on outer layer).				
26	14	24/0	26-28	7-8 12-13		NO RECOVERY.	26' NO RECOVERY			
28	15	24/20	28-30	4-7 7-7		Stiff, brown, CLAY & SILT, little fine to medium Sand, dry (wet on outer layer).	28' CLAY & SILT			
30	16	24/12	30-32	6-6 10-10		Stiff, brown, CLAY & SILT, little fine to medium Sand, dry (wet on outer layer).				
32	17	24/17	32-34	4-5 7-8		Stiff, brown, CLAY & SILT, little fine to medium Sand, dry (wet on outer layer). Changing at 33.0 feet to: Brown, fine to medium SAND, little Silt, trace fine Gravel, wet.	32.4' SAND			
34	18	24/6	34-36	10-16 18-24		Brown, CLAY & SILT, some fine to medium Sand, wet.	34' CLAY & SILT			
36	19	24/24	36-38	3-5 9-12		Stiff, brown, CLAY & SILT, some fine to medium Sand, trace fine Gravel (wet on outer layer).				
38	20	24/12	38-40	7-10 17-14		Stiff, brown, CLAY & SILT, some fine to medium Sand, trace fine Gravel (wet on	38.7' SAND			
REMARKS										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: HS-MW-23D	

BORING WELL 62355.52 HOUSE STREET COMPLETE.GPJ GZA CORP.GDT 4/15/20



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Check: JTM/JMG

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (6")	Test Data					
40	21	24/12	40-42	10-22 22-29		outer layer). Changing at 38.7 feet to: Light brown, fine to medium SAND, little Silt, trace fine Gravel, moist to dry. Light brown, fine to medium SAND, little Silt, trace fine Gravel, dry.	SAND			
41										
42	22	24/12	42-44	19-21 22-20		Very dense, light brown, fine to medium SAND, trace Silt, dry.				
43										
44	23	24/12	44-46	9-15 21-21		Very dense, brown, fine SAND, little Silt, moist.				
45										
46	24	24/12	46-48	12-14 21-18		Very dense, brown, fine SAND, little Silt, moist.				
47										
48	25	24/17	48-50	22-43-50/5"		Very dense, brown, fine SAND, little Silt, moist (sluff).				
49										
50	26	24/12	50-52	13-24 24-42		Very dense, light brown, fine to coarse SAND, some fine to coarse Gravel, little Silt & Clay, dry with large clumps of Clay.				
51										
52	27	24/12	52-54	11-18 27-29		Very dense, light brown, fine to coarse SAND, some fine to coarse Gravel, little Silt & Clay, dry, with Clay lenses from 6.0 to 6.9" feet and wet.				
53										
54	28	24/12	54-56	12-20 23-30		Very dense, light brown, fine to coarse SAND, some fine to coarse Gravel, little Silt & Clay, dry. Changing at 54.2 feet to: Light brown, CLAY, dry. Changing at 54.7 feet to: Light brown, fine to coarse SAND, some Clay, dry. Changing at 54.8 feet to: Tan, fine to coarse SAND, trace Silt, dry. Tan, fine to coarse SAND, trace Silt, dry.				
55										
56	29	24/8	56-58	29-21 17-19						
57										
58	30	24/12	58-60	7-11 16-17		Tan, fine to coarse SAND, trace Silt, dry.				
59										
REMARKS										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: HS-MW-23D	

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Boring No.: HS-MW-23D

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File No.: 16.0062335.52

Check: JTM/JMG

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
61	31	24/12	60-62	18-17 16-19		Tan, fine to coarse SAND, trace Silt, dry.	SAND			
62	32	24/19	62-64	6-12 13-17		Tan, fine to coarse SAND, trace Silt, dry.				
63										
64	33	24/18	64-66	8-14 19-22		Dense, tan, fine to coarse SAND, trace Silt, moist.				
65										
66	34	24/17	66-68	5-11 12-13		Dense, tan, fine to coarse SAND, trace Silt, moist.				
67										
68	35	24/2	68-70	8-15 18-17		Dense, tan, fine to medium SAND, trace Silt, moist.				
69										
70	36	24/20	70-72	8-8 9-10		Medium dense, tan, fine to medium SAND, little Silt, wet.		3		
71										
72	37	24/20	72-74	5-7 12-10		Medium dense, gray and light brown, fine to coarse SAND, trace Silt, wet.				
73										
74	38	24/22	74-76	8-10 13-15		Medium dense, gray and light brown, fine to coarse SAND, trace Silt, wet.				
75										
76	39	24/12	76-78	6-13 18-24		Medium dense, gray and light brown, fine to coarse SAND, trace Silt, wet.				
77										
78	40	24/24	78-80	9-17 24-30		Medium dense, gray and light brown, fine to coarse SAND, trace Silt, wet.				
79										
80	41	24/20	80-82	3-13 24-31		Medium dense, gray and light brown, fine to coarse SAND, trace Silt, wet.		4 5		
REMARKS 3. Temporary well set at 70.0 to 80.0 feet below ground surface. Purged 35.0 gallons. Groundwater sample submitted for laboratory analysis. 4. 2.0 inch sampler used from 80.0 to 82.0 feet. 5. Temporary well set at 80.0 to 90.0 feet below ground surface. Purged 35.0 gallons. Groundwater sample submitted for laboratory analysis.										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: HS-MW-23D	

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Check: JTM/JMG

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
82	42	24/18	82-84	5-6 10-10		Medium dense, gray and light brown, fine to coarse SAND, trace Silt, wet.	SAND			
83										
84	43	24/12	84-86	2-5 10-14		Medium dense, gray and light brown, fine SAND, trace Silt, wet.				
85										
86	44	24/20	86-88	3-6 14-15		Medium dense, gray and light brown, fine SAND, trace Silt, wet.				
87										
88	45	24/20	88-90	2-4 7-8		Medium dense, gray and light brown, fine SAND, trace Silt, wet.				
89										
90	46	24/12	90-92	1-2 5-6		Medium dense, gray and light brown, fine SAND, trace Silt, wet.		6		
91										
92	47	24/5	92-94	3-3 6-6		Medium dense, gray and light brown, fine SAND, trace Silt, wet.				
93										
94	48	24/20	94-96	6-2 4-8		Medium dense, gray and light brown, fine SAND, trace Silt, wet.				
95										
96	49	24/20	96-98	3-2 7-13		Medium dense, gray and light brown, fine SAND, trace Silt, wet.				
97										
98	50	24/20	98-100	2-2 5-10		Loose, brown, fine SAND, trace Silt, wet.				
99										
100	51	24/20	100-102	1-2 3-5		Loose, brown, fine SAND, trace Silt, wet.		7		
101										
<div>REMARKS</div> <div>6. Temporary well set at 90.0 to 100.0 feet below ground surface. Purged 40.0 gallons. Groundwater sample submitted for laboratory analysis. 7. Temporary well set at 100.0 to 110.0 feet below ground surface. Purged 40.0 gallons. Groundwater sample submitted for laboratory analysis.</div>										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.								Boring No.: HS-MW-23D		

BORING WELL 62355.52 HOUSE STREET COMPLETE.GPJ GZA CORP.GDT 4/15/20



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Boring No.: HS-MW-23D

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File No.: 16.0062335.52

Check: JTM/JMG

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
103	52	24/8	102-104	1-2 3-5		Loose, brown, fine SAND, trace Silt, wet.	SAND			
104	53	24/12	104-106	1-1 4-7		Loose, tan, fine to medium SAND, trace Silt, wet.				
106	54	24/12	106-108	1-1 7-11		Loose, tan, fine to medium SAND, trace Silt, wet.				
108	55	24/20	108-110	1-2 4-5		Loose, tan, fine to medium SAND, trace Silt, wet.				
110	56	24/7	110-112	1-1 3-6		Loose, tan, fine to medium SAND, trace Silt, wet.		8		
112	57	24/12	112-114	3-10 17-11		Loose, tan, fine to medium SAND, trace Silt, wet.				
114	58	24/12	114-116	1-2 5-9		Loose, tan, fine to medium SAND, trace Silt, wet.				
116	60	24/15	116-118	3-7 12-10		Loose, tan, fine to medium SAND, trace Silt, wet.				Bentonite/Grout
118	61	24/8	118-120	2-3 7-8		Loose, tan, fine to medium SAND, trace Silt, wet.				
120	62	24/5	120-122	2-4 5-6		Loose, tan, fine to medium SAND, trace Silt, wet.		9		
122	63	24/8	122-124	1-1 2-1		Loose, tan, fine to medium SAND, trace Silt, wet.				
REMARKS	8. Temporary well set at 110.0 to 120.0 feet below ground surface. Purged 40.0 gallons. Groundwater sample submitted for laboratory analysis.									
	9. Temporary well set at 120.0 to 130.0 feet below ground surface. Purged 40.0 gallons. Groundwater sample submitted for laboratory analysis.									
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.								Boring No.: HS-MW-23D		

BORING WELL 62355.52 HOUSE STREET COMPLETE.GPJ GZA CORP.GDT 4/15/20



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File No.: 16.0062335.52

Check: JTM/JMG

Sample Information						Check: JTM/JMG				
Depth	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
124	64	24/14	124-126	1-1 3-4		Loose, tan, fine to medium SAND, trace Silt, wet.	SAND	10		
125										
126	65	24/8	126-128	1-2 3-6		Loose, tan, fine to medium SAND, trace Silt, wet.				
127										
128	66	24/8	128-130	1-4 3-5		Loose, tan, fine to medium SAND, trace Silt, wet.				
129										
130	67	24/1	130-132	1-1 5-5		Loose, tan, fine to medium SAND, trace Silt, wet.				
131										
132	68	24/0	132-134	1-2 2-3		NO RECOVERY.	132' NO RECOVERY			
133										
134	70	24/6	134-136	1-3 4-5		Loose, brown, fine to medium SAND, trace Silt, wet.	134' SAND	11		
135										
136	71	24/12	136-138	1-1 3-4		Loose, brown, fine to medium SAND, trace Silt, wet.				
137										
138	72	24/12	138-140	1-4 4-7		Loose, brown, fine to medium SAND, trace Silt, wet.				
139										
140	73	24/20	140-142	4-4 6-7		Loose, brown, fine to medium SAND, trace Silt, wet.				
141										
142	74	24/20	142-144	3-7 13-8		Loose, brown, fine to medium SAND, trace Silt, wet.				
143										
REMARKS	10. Temporary well set at 130.0 to 140.0 feet below ground surface. Purged 45.0 gallons. Groundwater sample submitted for laboratory analysis. 11. Temporary well set at 140.0 to 150.0 feet below ground surface. Purged 45.0 gallons. Groundwater sample submitted for laboratory analysis.									
	Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									
Boring No.: HS-MW-23D										

BORING WELL 62355.52 HOUSE STREET COMPLETE.GPJ GZA CORP.GDT 4/15/20



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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
145	75	24/20	144-146	2-2 2-4		Loose, brown, fine to medium SAND, trace Silt, wet.	SAND	12		
146	76	24/18	146-148	0-2 3-5		Loose, brown, fine to medium SAND, trace Silt, wet.				
148	77	24/20	148-150	1-2 4-5		Loose, brown, fine to medium SAND, trace Silt, wet.				
150	78	24/20	150-152	1-3 7-11		Loose, brown, fine to medium SAND, trace Silt, wet.				
152	79	24/10	152-154	3-3 7-7		Loose, brown, fine to medium SAND, trace Silt, wet.				
154	80	24/6	154-156	2-3 5-6		Loose, brown, fine to medium SAND, trace Silt, wet.		13		
156	81	24/10	156-158	4-9 12-10		Loose, brown, fine to medium SAND, trace Silt, wet.				
158	82	24/3	158-160	3-6 6-9		Loose, brown, fine to medium SAND, trace Silt, wet.				
160	83	24/5	160-162	1-1 5-5		Loose, brown, fine to medium SAND, trace Silt, wet.				
162	84	24/2	162-164	6-11 12-13		Loose, brown, fine to medium SAND, trace Silt, wet.				
164	85	24/5	164-166	1-2 5-7		Loose, brown, fine to medium SAND, trace Silt, wet.				
REMARKS 12. Temporary well set at 150.0 to 160.0 feet below ground surface. Purged 40.0 gallons. Groundwater sample submitted for laboratory analysis. 13. Temporary well set at 160.0 to 170.0 feet below ground surface. Purged 70.0 gallons. Groundwater sample submitted for laboratory analysis.										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.								Boring No.: HS-MW-23D		

BORING WELL 62355.52 HOUSE STREET COMPLETE.GPJ GZA CORP.GDT 4/15/20



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Check: JTM/JMG

Benton, Michigan										Check:		JTM/JMG	
Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed				
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data								
166	86	24/6	166-168	2-7 9-8		Loose, brown, fine to medium SAND, trace Silt, wet.	SAND	14					
167													
168	87	24/12	168-170	2-3 7-8		Loose, brown, fine to medium SAND, trace Silt, wet.							
169													
170	88	24/1	170-172	1-2 3-3		Loose, brown, fine to medium SAND, trace Silt, wet.							
171								15					
172	90	24/12	172-174	1-1 4-4		Loose, brown, fine to medium SAND, trace Silt, wet.							
173													
174	91	24	174-176	3-7 10-12		Loose, brown, fine to medium SAND, trace Silt, wet.							
175													
176	92	24/12	176-178	5-9 12-13		Loose, brown, fine to medium SAND, trace Silt, wet.							
177													
178	93	24/12	178-180	1-1 3-8		Loose, brown, fine to medium SAND, trace Silt, wet.							
179													
180	94	24/12	180-182	2-4 6-7		Loose, brown, fine to medium SAND, trace Silt, wet. Changing at 181.9 feet to: Brown, fine to coarse SAND, trace Silt,wet.							
181													
182	95	24/21	182-184	5-10 10-11		Medium dense, brown, fine to coarse SAND, trace Silt, wet. Changing at 183.8 feet to: Medium dense, brown, fine to coarse SAND, some fine Gravel, trace Silt, wet.							
183													
184	96	24/12	184-186	4-7 8-11		Medium dense, brown, fine to coarse SAND, trace Gravel, trace Silt, wet.							
185													
REMARKS	14. Temporary well set at 170.0 to 180.0 feet below ground surface. Purged 80.0 gallons. Groundwater sample submitted for laboratory analysis. 15. Temporary well set at 180.0 to 190.0 feet below ground surface. Purged 100.0 gallons. Groundwater sample submitted for laboratory analysis.												
	Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.												
Boring No.: HS-MW-23D													

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Check: JTM/JMG

Sample Information						Check: JTM/JMG				
Depth	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
187	97	24/12	186-188	3-6 8-11		Medium dense, brown, fine to coarse SAND, trace Gravel, trace Silt, wet.	SAND	16		
188	98	24/4	188-190	3-5 6-8		Medium dense, brown, fine to coarse SAND, trace Gravel, trace Silt, wet.				
189										
190	99	24/1	190-192	1-2 3-7		Medium dense, brown, fine to coarse SAND, trace Gravel, trace Silt, wet.				
191										
192	100	24/8	192-194	2-3 5-8		Medium dense, brown, fine to coarse SAND, trace Gravel, trace Silt, wet.		17		
193										
194	101	24/10	194-196	2-13 27-31		Medium dense, brown, fine to coarse SAND, trace Gravel, trace Silt, wet.				
195										
196	102	24/18	196-198	0-12 28-21		Dense, brown, fine to coarse SAND, trace Gravel, trace Silt, wet.				
197										
198	104	24/0	198-200	3-20-50/5"		NO RECOVERY.	198' NO RECOVERY			
199										
200	105	24/10	200-202	8-20-50/5"		Dense, brown, fine to coarse SAND, trace Gravel, trace Silt, wet.	200' SAND			
201										
202	106	24/6	202-204	18-50/5"		Dense, brown, fine to coarse SAND, trace Gravel, trace Silt, wet.		17		
203										
204	107	24/7	204-206	3-30-50/4"		Dense, brown, fine to coarse SAND, trace Gravel, trace Silt, wet.				
205										
206	108	24/0	206-208	3-6 11-18		NO RECOVERY.	206' NO RECOVERY			
<div>REMARKS</div> <div>16. Temporary well set at 190.0 to 200.0 feet below ground surface. Purged 100.0 gallons. Groundwater sample submitted for laboratory analysis. 17. Temporary well set at 200.0 to 210.0 feet below ground surface. Purged 100.0 gallons. Groundwater sample submitted for laboratory analysis.</div>										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: HS-MW-23D	

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Check: JTM/JMG

Sample Information						Check: JTM/JMG				
Depth	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
208	109	24/12	208-210	0-6 27-50/4"		Dense, brown, fine to coarse SAND, trace Gravel, trace Silt, wet.	NO RECOVERY 208' SAND	18		
209										
210	110	24/4	210-212	3-13 26-22		Dense, brown, fine to coarse SAND, trace Gravel, trace Silt, wet.				
211										
212	111	24/0	212-214	6-11 18-26/3"		NO RECOVERY.	212' NO RECOVERY			
213										
214	112	24/10	214-216	6-23-50/4"		Dense, brown, fine to coarse SAND, trace Gravel, trace Silt, wet.	214' SAND			
215										
216	113	24/0	216-218	4-16 31-29/2"		NO RECOVERY.	216' NO RECOVERY			
217										
218	114	24/0	218-220	19-50/3"		NO RECOVERY with some fine to medium SAND in bailer.				
219										
220	115	24/18	220-222	9-22 24-25		Dense, brown, fine to coarse SAND, trace Gravel, trace Silt, wet.	220' SAND			
221										
222	116	24/8	222-224	4-10 20-28		Dense, brown, fine to coarse SAND, trace Gravel, trace Silt, wet.				
223										
224	117	24/20	224-226	10-25 37-50/5"		Dense, brown, fine to coarse SAND, trace Gravel, trace Silt, wet.				
225										
226	118	24/6	226-228	12-44/5"		Dense, brown, fine to coarse SAND, trace Gravel, trace Silt, wet.				
227										
REMARKS	18. Temporary well set at 210.0 to 220.0 feet below ground surface. Groundwater sample submitted for laboratory analysis.									
	Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									
Boring No.: HS-MW-23D										

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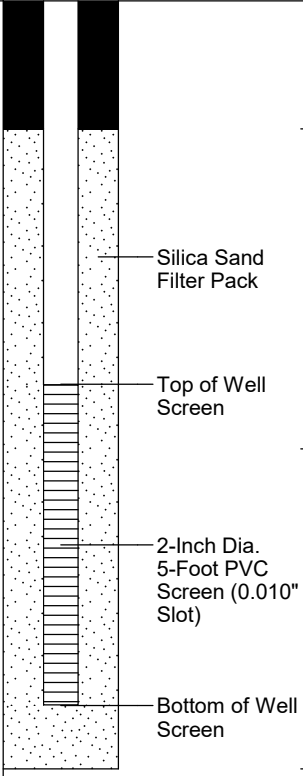
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Check: JTM/JMG

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
229	119	24/6	228-230	44-6"		Dense, brown, fine to coarse SAND, trace Gravel, trace Silt, wet.	SAND			
230	120	24/6	230-232	19-39/4"		Very dense, brown, fine to coarse SAND, trace Silt, trace Gravel, wet.				
231										
232										
233										
234										
235										
236	121	24/11	236-238	20-36/5"		Very dense, brown, fine to coarse SAND, trace Silt, trace Gravel, wet.				
237										
238	122	24/24	238-240	0-11 19-26		Very dense, brown, fine to coarse SAND, trace Silt, trace Gravel, wet. Changing at 238.8 feet to: Very stiff, Clayey SILT, little fine Sand, dry.	238.8' Clayey SILT			
239										
240						Bottom of Borehole at 240.0 Feet	240'	20		
241										
242										
243										
244										
245										
246										
247										
248										
REMARKS										
19. Temporary well set at 230.0 to 240.0 feet below ground surface. Purged 100.0 gallons. Groundwater sample submitted for laboratory analysis.										
20. Monitoring well was installed in borehole upon completion. Well screen set from 234.0 to 239.0 feet below ground surface.										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.										Boring No.: HS-MW-23D

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Boring No.: HS-MW-24A

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File No.: 16.0062335.52

Check: JTM/JMG

Contractor: Stearns Drilling Company

Foreman: Jerry Huntoon

Logged by: Christine Cano

Date Start/Finish: 10-1-19 / 10-2-19

Boring Location:

GS Elev.: Datum:

Auger/
Casing

Sampler

GROUNDWATER READINGS

Type: Hollow Stem Auger

Split Spoon

O.D. / I.D.: 8.0" / 4.25"

2.0" / 1 3/8"

Hammer Wt.: 140lbs

NA

Hammer Fall: 30"

NA

TOC Elev.: NA

NA

Date	Time	Depth	Casing	Stab

Surveyed By: NA Survey Date:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					PROTECTIVE CASING
1						See HS-MW-24D for detailed soil descriptions.				
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										

Bentonite
Slurry / Grout

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-MW-24A

BORING WELL 62355.52 HOUSE STREET COMPLETE.GPJ GZA CORP.GDT 4/15/20



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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
31									
32									
33									
34									
35									
36									
37									
38									
39									
40									
41									
42									
43									
44									
45									
46									
47									
48									
49									
50									
51									
52									
53									
54									
55									
56									
57									
58									
59									
60						Bottom of Borehole at 60.0 Feet		1	
61									
62									
63									
64									

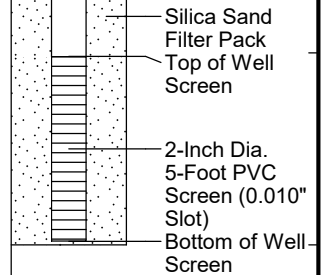
REMARKS

1. Monitoring well HS-MW-24A was installed in borehole upon completion. Well screen set from approximately 55.1 to 59.9 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-MW-24A

BORING WELL 62355.52 HOUSE STREET COMPLETE.GPJ GZA CORP.GDT 4/15/20





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Boring No.: HS-MW-24B

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File No.: 16.0062335.52

Check: JTM/JMG

Contractor: Stearns Drilling Company

Foreman: Jerry Huntoon

Logged by: Christine Cano/John Morehouse

Date Start/Finish: 9-23-19 / 10-1-19

Boring Location:

GS Elev.: Datum:

Auger/
Casing

Sampler

GROUNDWATER READINGS

Type: Hollow Stem Auger Split Spoon

O.D. / I.D.: 8.0" / 4.25" 2.0" / 1 3/8"

Hammer Wt.: 140lbs NA

Hammer Fall: 30" NA

TOC Elev.: NA NA

Date	Time	Depth	Casing	Stab

Surveyed By: NA Survey Date:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (6")	Test Data					PROTECTIVE CASING
1	1	24/16	0-2	1-1 1-2	0.0 ppm	Very loose, brown, fine SAND, some Silt, moist. Changing at 0.3 feet to: Very loose, light brown to tan, fine SAND, trace Silt, moist.	SAND	1		
2	2	24/16	2-4	2-2 3-8	0.0 ppm	Loose, light tan, very fine SAND, trace Silt, moist.				
3										
4	3	24/20	4-6	9-10 12-9	0.0 ppm	Medium dense, light tan, very fine SAND and SILT, moist.				
5										
6	4	24/24	6-8	5-7 10-10	0.0 ppm	Medium dense, light brown, fine SAND, trace Clay, moist.				
7										
8	5	24/24	8-10	7-12 13-12	0.0 ppm	Medium dense, light brown, fine SAND, trace Clay, moist.				
9										
10	6	24/24	10-12	6-3 4-4	0.0 ppm	Loose, light brown, fine SAND, trace Clay, moist. Changing at 11.0 feet to: Loose, tan, fine to medium SAND, trace Silt, moist.				
11										
12	7	24/12	12-14	1-3 2-2	0.0 ppm	Loose, tan, fine to coarse SAND, trace Silt, moist.				
13										
14	8	24/20	14-16	2-3 4-5	0.0 ppm	Loose, brown, fine SAND, trace Clay, moist. Changing at 15.0 feet to: Loose, tan, fine to medium SAND, trace Silt, moist.				
15										
16	9	24/10	16-18	3-6 5-4	0.0 ppm	Medium dense, tan, fine to medium SAND, trace Silt, moist.				
17										
18	10	24/12	18-20	2-3 3-2	0.0 ppm	Loose, tan, fine to medium SAND, trace Silt, moist.				
19										
20	11	24/14	20-22	1-2 2-3	0.0 ppm	Very loose, tan, fine to medium SAND, trace Silt, moist.				
21										
22	12	24/14	22-24	1-2 2-3	0.0 ppm	Very loose, tan, fine to medium SAND, trace Silt, moist.				
23										
24	13	24/14	24-26	3-4 4-4	0.0 ppm	Loose, light tan, fine to medium SAND, trace Silt, moist.				
25										
26	14	24/14	26-28	1-3 3-3	0.0 ppm	Loose, light tan, fine to medium SAND, trace Silt, moist.				
27										
28	15	24/20	28-30	1-4 3-3	0.0 ppm	Loose, light tan, fine to medium SAND, trace Silt, moist.				
29										

REMARKS

- Field screening of samples for organic vapors was performed with a MiniRae 3000 photoionization detector equipped with a 10.6 eV lamp. Readings are shown in parts per million (ppm) of isobutylene. Background was measured at 0.0 ppm.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-MW-24B

BORING WELL 62355.52 HOUSE STREET COMPLETE.GPJ GZA CORP.GDT 4/15/20



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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (6")	Test Data					
31	16	24/19	30-32	3-2 3-4	0.0 ppm	Loose, light tan, fine to medium SAND, trace Silt, moist.	SAND			
32	17	24/14	32-34	4-5 7-4	0.0 ppm	Medium dense, light tan, fine to medium SAND, trace Silt, moist.				
34	18	24/22	34-36	4-5 7-8	0.0 ppm	Medium dense, light tan, fine to medium SAND, trace Silt, trace Gravel, moist.				
36	19	24/17	36-38	4-5 5-6	0.0 ppm	Loose, tan, fine to medium SAND, trace Silt, moist. Changing at 37.5 feet to: Loose, tan, fine to coarse SAND, trace Silt, moist.				
38	20	24/16	38-40	5-7 7-9	0.0 ppm	Medium dense, tan, fine to coarse SAND, trace Silt, moist.				
40	21	24/14	40-42	4-7 7-9	0.0 ppm	Medium dense, tan, Silty fine to medium SAND, trace Gravel, moist.				
42	22	24/13	42-44	5-9 9-10	0.0 ppm	Medium dense, tan, Silty fine to coarse SAND, some Gravel, moist.				
44	23	24/5	44-46	6-10 20-20	0.0 ppm	Medium dense, tan, Silty fine to coarse SAND, trace Gravel, moist.				
46	24	24/12	46-48	5-16 33-16	0.0 ppm	Dense, tan, Sandy GRAVEL, trace Silt, moist.	46' GRAVEL			
48	25	24/4	48-50	11-23 21-13	0.0 ppm	Dense, tan, Sandy GRAVEL, trace Silt, moist.				
50	26	24/0	50-52	17-11 10-9		NO RECOVERY.	50' NO RECOVERY			
52	27	24/1	52-54	18-15 12-9	0.0 ppm	Medium dense, tan, coarse SAND, wet.	52' SAND	2		
54	28	24/4	54-56	15-9 7-7	0.0 ppm	Medium dense, tan, fine to coarse SAND, trace Gravel, wet.		3		
56	29	24/18	56-58	2-2 2-4	0.0 ppm	Loose, tan, fine to coarse SAND, trace Silt, wet.				
58	30	24/17	58-60	1-1 2-3	0.0 ppm	Very loose, tan, fine to coarse SAND, trace Silt, wet.				
60	31	24/0	60-62	1-2 4-6		NO RECOVERY.	60' NO RECOVERY			
62	32	24/5	62-64	2-2 4-4	0.0 ppm	Loose, tan, fine to coarse SAND, trace Silt, wet.	62' SAND			
64	33	24/8	64-66	3-3 4-5	0.0 ppm	Loose, tan, fine to coarse SAND, trace Silt,				
REMARKS 2. Groundwater was encountered at approximately 52.0 feet below ground surface. 3. Temporary well set at 55.0 to 60.0 feet below ground surface. Purged 70.0 gallons. Groundwater sample submitted for laboratory analysis. 4. Temporary well set at 65.0 to 70.0 feet below ground surface. Purged 35.0 gallons. Groundwater sample submitted for laboratory analysis.										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: HS-MW-24B	

BORING WELL 62355.52 HOUSE STREET COMPLETE.GPJ GZA CORP.GDT 4/15/20



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Sample Information						Check: JTM/JMG				
Depth	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
66	34	24/14	66-68	1-2	0.0 ppm	wet.	SAND	4		
67				2-3		Loose, tan, fine to coarse SAND, trace Silt, wet.				
68	35	24/14	68-70	1-2	0.0 ppm	Loose, tan, fine to coarse SAND, trace Silt, wet.				
69				3-10						
70	36	24/24	70-72	7-9	0.0 ppm	Medium dense, tan, fine to coarse SAND, trace Silt, wet.				
71				10-12						
72	37	24/15	72-74	4-3	0.0 ppm	Loose, tan, fine to coarse SAND, trace Silt, wet. Changing at 73.5 feet to: Loose, brown, Sandy GRAVEL, wet.	73.5'			
73				2-2			74' GRAVEL			
74	38	24/14	74-76	6-8	0.0 ppm	Medium dense, brown, fine to coarse SAND and Gravel, trace Silt, wet.	SAND	5		
75				8-8						
76	39	24/2	76-78	2-3	0.0 ppm	Loose, brown, fine to coarse SAND and Gravel, trace Silt, wet.				
77				3-4						
78	40	24/14	78-80	4-5	0.0 ppm	Medium dense, brown to gray, GRAVEL, some fine to coarse Sand, wet.	78'			
79				5-5			GRAVEL			
80	41	24/3	80-82	5-5	0.0 ppm	Medium dense, brown to gray, GRAVEL, some fine to coarse Sand, wet.				
81				5-7						
82	42	24/16	82-84	2-3	0.0 ppm	Loose, brown and gray, coarse SAND, some Gravel, wet.	82'			
83				4-4			SAND			
84	43	24/24	84-86	2-2	0.0 ppm	Loose, brown and gray, coarse SAND, some Gravel, wet.		6		
85				2-4						
86	44	24/16	86-88	2-1	0.0 ppm	Very loose, brown and gray, coarse SAND, some Gravel, wet.				
87				2-2						
88	45	24/12	88-90	3-3	0.0 ppm	Loose, brown and gray, coarse SAND, some Gravel, wet.				
89				3-5						
90	46	24/8	90-92	2-3	0.0 ppm	Loose, brown and gray, coarse SAND, some Gravel, wet.				
91				6-7						
92	47	24/16	92-94	1-1	0.0 ppm	Very loose, brown and gray, coarse SAND, some Gravel, wet.				
93				2-3						
94	48	24/7	94-96	1-2	0.0 ppm	Loose, brown and gray, coarse SAND, some Gravel, wet.		7		
95				3-4						
96	49	24/20	96-98	2-2	0.0 ppm	Loose, brown and gray, coarse SAND, some Gravel, wet.				
97				5-6						
98	50	24/16	98-100	4-2	0.0 ppm	Loose, brown and gray, coarse SAND, some Gravel, wet.				
99				4-5						
REMARKS	5. Temporary well set at 75.0 to 80.0 feet below ground surface. Purged 45.0 gallons. Groundwater sample submitted for laboratory analysis. 6. Temporary well set at 85.0 to 90.0 feet below ground surface. Purged 75.0 gallons. Groundwater sample submitted for laboratory analysis. 7. Temporary well set at 95.0 to 100.0 feet below ground surface. Purged 90.0 gallons. Groundwater sample submitted for laboratory analysis.									
	Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									
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Sample Information						Demont, Michigan		Check:		JTM/JMG							
Depth	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed								
101	51	24/10	100-102	3-7 11-13	0.0 ppm	Medium dense, brown and gray, coarse SAND, some Gravel, wet.	SAND	8		Bentonite Slurry / Grout							
102	52	24/12	102-104	2-2 3-7	0.0 ppm	Loose, brown and gray, coarse SAND, some Gravel, wet.											
103																	
104	53	24/10	104-106	3-4 5-7	0.0 ppm	Loose, brown and gray, coarse SAND, some Gravel, wet.											
105																	
106	54	24/14	106-108	3-9 10-10	0.0 ppm	Medium dense, brown and gray, coarse SAND, some Gravel, wet.											
107																	
108	55	24/16	108-110	2-4 8-9	0.0 ppm	Medium dense, brown and gray, coarse SAND, some Gravel, wet.											
109																	
110	56	24/3	110-112	3-7 9-11	0.0 ppm	Medium dense, brown and gray, coarse SAND, some Gravel, wet.											
111																	
112	57	24/4	112-114	1-4 5-5	0.0 ppm	Loose, brown and gray, coarse SAND, some Gravel, wet.		9				Bentonite Slurry / Grout					
113																	
114	58	24/14	114-116	6-12 19-23	0.0 ppm	Dense, brown and gray, coarse SAND, some Gravel, wet.											
115																	
116	60	24/18	116-118	2-4 12-15	0.0 ppm	Medium dense, brown and gray, coarse SAND, some Gravel, wet.											
117																	
118	61	24/10	118-120	11-17 13-10	0.0 ppm	Medium dense, brown and gray, coarse SAND, some Gravel, wet.											
119																	
120	62	24/12	120-122	4-7 11-13	0.0 ppm	Medium dense, brown and gray, coarse SAND, some Gravel, wet.											
121																	
122	63	24/10	122-124	2-12 20-13	0.0 ppm	Medium dense, brown and gray, coarse SAND, some Gravel, wet.							10		Bentonite Slurry / Grout		
123																	
124	64	24/8	124-126	9-15 15-13	0.0 ppm	Medium dense, brown and gray, coarse SAND, some Gravel, wet.											
125																	
126	65	24/13	126-128	3-11 16-17	0.0 ppm	Medium dense, brown and gray, coarse SAND, some Gravel, wet.											
127																	
128	66	24/10	128-130	11-20 20-21	0.0 ppm	Dense, brown and gray, coarse SAND, some Gravel, trace Silt, wet.											
129																	
130	67	24/12	130-132	5-18 28-30	0.0 ppm	Dense, brown and gray, coarse SAND, some Gravel, trace Silt, wet.											
131																	
132	68	24/5	132-134	9-16 21-24	0.0 ppm	Dense, brown and gray, coarse SAND, some reddish brown, fine Sand, some Gravel, trace Silt, wet.		134' GRAVEL									Bentonite Slurry / Grout
133																	
134	70	24/4	134-136	5-13 20-31	0.0 ppm	Dense, brown and gray, GRAVEL, some											
REMARKS	8. Temporary well set at 105.0 to 110.0 feet below ground surface. Purged 60.0 gallons. Groundwater sample submitted for laboratory analysis. 9. Temporary well set at 115.0 to 120.0 feet below ground surface. Purged 55.0 gallons. Groundwater sample submitted for laboratory analysis. 10. Temporary well set at 125.0 to 130.0 feet below ground surface. Purged 55.0 gallons. Groundwater sample submitted for laboratory analysis. 11. Temporary well set at 135.0 to 140.0 feet below ground surface. Purged 65.0 gallons. Groundwater sample submitted for laboratory analysis.																
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Sample Information						Check:		JTM/JMG		
Depth	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
136	71	24/7	136-138	4-12 16-23	0.0 ppm	medium to coarse Sand, wet.	GRAVEL	11		
137						Medium dense, brown and gray, GRAVEL, some medium to coarse Sand, wet.				
138	72	24/8	138-140	4-7 18-32	0.0 ppm	Medium dense, brown and gray, GRAVEL, some medium to coarse Sand, wet.				
139										
140	73	24/7	140-142	5-11 21-22	0.0 ppm	Dense, brown and gray, GRAVEL, some medium to coarse Sand, wet.	142'			
141										
142	74	24/12	142-144	7-13 21-23	0.0 ppm	Medium dense, brown and gray, fine to coarse SAND, some Gravel, wet.	SAND			
143										
144	75	24/10	144-146	6-17 21-22	0.0 ppm	Dense, brown and gray, fine to coarse SAND, some Gravel, wet.		12		
145										
146	76	24/10	146-148	8-15 16-21	0.0 ppm	Dense, brown and gray, fine to coarse SAND, some Gravel, wet.				
147										
148	77	24/8	148-150	5-16 21-24	0.0 ppm	Dense, brown and gray, fine to coarse SAND, some Gravel, wet.				
149										
150	78	24/14	150-152	4-9 16-14	0.0 ppm	Medium dense, brown and gray, fine to coarse SAND, some Gravel, wet.				
151										
152	79	24/4	152-154	6-10 8-8	0.0 ppm	Medium dense, brown and gray, fine to coarse SAND, some Gravel, wet.				
153										
154	80	24/18	154-156	4-12 21-20	0.0 ppm	Dense, brown and gray, fine to coarse SAND, some Gravel, wet.		13		
155										
156	81	24/6	156-158	5-8 13-10	0.0 ppm	Medium dense, brown and gray, fine to coarse SAND, some Gravel, wet.				
157										
158	82	24/6	158-160	7-11 11-12	0.0 ppm	Medium dense, brown and gray, fine to coarse SAND, some Gravel, wet.				
159										
160	83	24/7	160-162	5-8 9-9	0.0 ppm	Medium dense, brown and gray, fine to coarse SAND, some Gravel, wet.				
161										
162	84	24/5	162-164	5-10 19-26	0.0 ppm	Medium dense, brown and gray, fine to coarse SAND, some Gravel, wet.				
163										
164	85	24/0	164-166	5-13 22-36		NO RECOVERY.	164' NO RECOVERY	14		
165										
166	86	24/0	166-168	7-19 25-39		NO RECOVERY; Switched to bailer for recovery. Bailer: brown and gray, fine to medium SAND, wet.				
167										
168	87	24/0	168-170	2-8 16-22		NO RECOVERY; Bailer: brown and gray, fine to medium SAND, wet.				
169										
REMARKS	12. Temporary well set at 145.0 to 150.0 feet below ground surface. Groundwater sample submitted for laboratory analysis.									
	13. Temporary well set at 155.0 to 160.0 feet below ground surface. Purged 120.0 gallons. Groundwater sample submitted for laboratory analysis.									
14. Temporary well set at 165.0 to 170.0 feet below ground surface. Purged 80.0 gallons. Groundwater sample submitted for laboratory analysis.										
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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (6")	Test Data					
171	88	24/0	170-172	7-11 19-22		NO RECOVERY: Bailer: brown and gray, fine to medium SAND, wet.	NO RECOVERY	15		
172	89	24/5	172-174	2-4 7-10	0.0 ppm	Medium dense, brown and gray, fine to medium SAND, wet.	172' SAND			
173										
174	90	24/0	174-176	5-7 11-16		NO RECOVERY; Bailer: brown and gray, fine to medium SAND, wet.	174' NO RECOVERY	16		
175										
176	91	24/10	176-178	4-7 17-21	0.0 ppm	Medium dense, brown and gray, fine to medium SAND, wet.	176' SAND			
177								17		
178	92	24/20	178-180	4-10 28-35	0.0 ppm	Dense, brown and gray, fine to medium SAND, wet.				
179										
180	93	24/16	180-182	3-10 17-23	0.0 ppm	Medium dense, brown and gray, fine to medium SAND, wet.		18		
181										
182	94	24/7	182-184	3-8 12-17	0.0 ppm	Medium dense, brown and gray, fine to medium SAND, wet.				
183								19		
184	95	24/6	184-186	8-10 13-31	0.0 ppm	Medium dense, brown and gray, fine to medium SAND, wet.				
185										
186	96	24/0	186-188	5-8 19-20		NO RECOVERY; Bailer: brown and gray, fine to medium SAND, wet.	186' NO RECOVERY	20		
187										
188	97	24/3	188-190	5-5 12-14	0.0 ppm	Medium dense, brown and gray, fine to medium SAND, wet.	188' SAND			
189								21		
190	98	24/10	190-192	3-12 20-28	0.0 ppm	Dense, brown and gray, fine to medium SAND, wet.				
191										
192	99	24/4	192-194	2-5 9-13	0.0 ppm	Medium dense, brown and gray, fine to medium SAND, wet.		22		
193										
194	100	24/2	194-196	2-6 9-11	0.0 ppm	Medium dense, brown and gray, fine to medium SAND, wet.				
195								23		
196	101	24/6	196-198	5-11 17-21	0.0 ppm	Medium dense, brown and gray, fine to medium SAND, wet.				
197										
198	102	24/4	198-200	3-3 8-9	0.0 ppm	Medium dense, brown and gray, fine to medium SAND, wet.		24		
199										
200	103	24/6	200-202	4-12 15-22	0.0 ppm	Medium dense, brown and gray, fine to medium SAND, wet.				
201								25		
202	104	24/16	202-204	4-4 7-12	0.0 ppm	Medium dense, brown and gray, fine to medium SAND, wet.				
203										
204	105	24/16	204-206	4-9 17-24	0.0 ppm	Medium dense, brown and gray, fine to		26		
REMARKS 15. Temporary well set at 175.0 to 180.0 feet below ground surface. Purged 125.0 gallons. Groundwater sample submitted for laboratory analysis. 16. Temporary well set at 185.0 to 190.0 feet below ground surface. Purged 135.0 gallons. Groundwater sample submitted for laboratory analysis. 17. Temporary well set at 195.0 to 200.0 feet below ground surface. Purged 135.0 gallons. Groundwater sample submitted for laboratory analysis. 18. Temporary well set at 205.0 to 210.0 feet below ground surface. Groundwater sample submitted for laboratory analysis.										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: HS-MW-24B	

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Sample Information						Check: JTM/JMG				
Depth	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
206	106	24/10	206-208	5-11 25-27	0.0 ppm	medium SAND, wet.	SAND	18		
207						Dense, brown and gray, fine to medium SAND, wet.				
208	107	24/14	208-210	6-15 34-37	0.0 ppm	Dense, brown and gray, fine to medium SAND, wet.				
209						Dense, brown and gray, fine to medium SAND, wet.				
210	108	24/18	210-212	7-24 35-50	0.0 ppm	Very dense, brown and gray, fine to medium SAND, wet.				
211						Very dense, brown and gray, fine to medium SAND, wet.				
212	109	24/22	212-214	2-9 17-30	0.0 ppm	Medium dense, brown, fine to medium SAND, trace Gravel, trace Silt, wet.				
213						Medium dense, brown, fine to medium SAND, trace Gravel, trace Silt, wet.				
214	110	24/6	214-216	5-22-42/5"		Very dense, brown, fine to coarse SAND, trace Gravel, trace Silt, wet.				19
215						Very dense, brown, fine to coarse SAND, trace Gravel, trace Silt, wet.				
216	111	24/16	216-218	9-34-50/4"		Very dense, brown, fine to coarse SAND, trace Gravel, trace Silt, wet.				
217						Very dense, brown, fine to coarse SAND, trace Gravel, trace Silt, wet.				
218	112	18/6	218-219.5	3-17-41		Very dense, brown, fine to coarse SAND, trace Gravel, trace Silt, wet.				
219						Very dense, brown, fine to coarse SAND, trace Gravel, trace Silt, wet.				
220	113	24/12	220-222	10-41-50/5"		Very dense, brown, fine to coarse SAND, trace Gravel, trace Silt, wet.				
221						Very dense, brown, fine to coarse SAND, trace Gravel, trace Silt, wet.				
222	114	18/6	222-223.5	9-20-33		Very dense, brown, fine to coarse SAND, trace Gravel, trace Silt, wet.				
223						Very dense, brown, fine to coarse SAND, trace Gravel, trace Silt, wet.				
224	115	24/10	224-226	6-24-50/5"		Very dense, brown, fine to coarse SAND, trace Gravel, trace Silt, wet.				20
225						Very dense, brown, fine to coarse SAND, trace Gravel, trace Silt, wet.				
226	116	18/5	226-227.5	4-17-35		Very dense, brown, fine to coarse SAND, trace Gravel, trace Silt, wet.				
227						Very dense, brown, fine to coarse SAND, trace Gravel, trace Silt, wet.				
228	117	18/12	228-229.5	8-18-43		Very dense, brown, fine to coarse SAND, trace Gravel, trace Silt, wet.				
229						Very dense, brown, fine to coarse SAND, trace Gravel, trace Silt, wet.				
230	118	24/12	230-232	16-35-50/5"		Very dense, brown, fine to coarse SAND, trace Gravel, trace Silt, wet.				
231						Very dense, brown, fine to coarse SAND, trace Gravel, trace Silt, wet.				
232						Bottom of Borehole at 232.0 Feet	232'	21		
233										
234										
235										
236										
237										
238										
239										
REMARKS	19. Temporary well set at 215.0 to 220.0 feet below ground surface. Groundwater sample submitted for laboratory analysis. 20. Temporary well set at 225.0 to 230.0 feet below ground surface. Groundwater sample submitted for laboratory analysis. 21. Monitoring well was installed in borehole upon completion. Well screen set from 224.6 to 229.4 feet below ground surface.									
	Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									
Boring No.: HS-MW-24B										

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Check: JTM/JMG

Contractor: Stearns Drilling Company

Foreman: Jerry Huntoon

Logged by: Christine Cano/John Morehouse

Date Start/Finish: 9-23-19 / 10-1-19

Boring Location:

GS Elev.: Datum:

**Auger/
Casing**

Sampler

Type: Hollow Stem Auger

Split Spoon

O.D. / I.D.: 8.0" / 4.25"

2.0" / 1 3/8"

Hammer Wt.: 140lbs

NA

Hammer Fall: 30"

NA

TOC Elev.: NA

NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: NA Survey Date:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (6")	Test Data					PROTECTIVE CASING
1	1	24/16	0-2	1-1 1-2	0.0 ppm	Very loose, brown, fine SAND, some Silt, moist. Changing at 0.3 feet to: Very loose, light brown to tan, fine SAND, trace Silt, moist.	SAND	1		
2	2	24/16	2-4	2-2 3-8	0.0 ppm	Loose, light tan, very fine SAND, trace Silt, moist.				
3										
4	3	24/20	4-6	9-10 12-9	0.0 ppm	Medium dense, light tan, very fine SAND and SILT, moist.				
5										
6	4	24/24	6-8	5-7 10-10	0.0 ppm	Medium dense, light brown, fine SAND, trace Clay, moist.				
7										
8	5	24/24	8-10	7-12 13-12	0.0 ppm	Medium dense, light brown, fine SAND, trace Clay, moist.				
9										
10	6	24/24	10-12	6-3 4-4	0.0 ppm	Loose, light brown, fine SAND, trace Clay, moist. Changing at 11.0 feet to: Loose, tan, fine to medium SAND, trace Silt, moist.				
11										
12	7	24/12	12-14	1-3 2-2	0.0 ppm	Loose, tan, fine to coarse SAND, trace Silt, moist.				
13										
14	8	24/20	14-16	2-3 4-5	0.0 ppm	Loose, brown, fine SAND, trace Clay, moist. Changing at 15.0 feet to: Loose, tan, fine to medium SAND, trace Silt, moist.				
15										
16	9	24/10	16-18	3-6 5-4	0.0 ppm	Medium dense, tan, fine to medium SAND, trace Silt, moist.				
17										
18	10	24/12	18-20	2-3 3-2	0.0 ppm	Loose, tan, fine to medium SAND, trace Silt, moist.				
19										
20	11	24/14	20-22	1-2 2-3	0.0 ppm	Very loose, tan, fine to medium SAND, trace Silt, moist.				
21										
22	12	24/14	22-24	1-2 2-3	0.0 ppm	Very loose, tan, fine to medium SAND, trace Silt, moist.				
23										
24	13	24/14	24-26	3-4 4-4	0.0 ppm	Loose, light tan, fine to medium SAND, trace Silt, moist.				
25										
26	14	24/14	26-28	1-3 3-3	0.0 ppm	Loose, light tan, fine to medium SAND, trace Silt, moist.				
27										
28	15	24/20	28-30	1-4 3-3	0.0 ppm	Loose, light tan, fine to medium SAND, trace Silt, moist.				
29										

REMARKS

- Field screening of samples for organic vapors was performed with a MiniRae 3000 photoionization detector equipped with a 10.6 eV lamp. Readings are shown in parts per million (ppm) of isobutylene. Background was measured at 0.0 ppm.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

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BORING WELL 62355.52 HOUSE STREET COMPLETE.GPJ GZA CORP.GDT 4/3/20



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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (6")	Test Data					
31	16	24/19	30-32	3-2 3-4	0.0 ppm	Loose, light tan, fine to medium SAND, trace Silt, moist.	SAND			
32	17	24/14	32-34	4-5 7-4	0.0 ppm	Medium dense, light tan, fine to medium SAND, trace Silt, moist.				
34	18	24/22	34-36	4-5 7-8	0.0 ppm	Medium dense, light tan, fine to medium SAND, trace Silt, trace Gravel, moist.				
36	19	24/17	36-38	4-5 5-6	0.0 ppm	Loose, tan, fine to medium SAND, trace Silt, moist. Changing at 37.5 feet to: Loose, tan, fine to coarse SAND, trace Silt, moist.				
38	20	24/16	38-40	5-7 7-9	0.0 ppm	Medium dense, tan, fine to coarse SAND, trace Silt, moist.				
40	21	24/14	40-42	4-7 7-9	0.0 ppm	Medium dense, tan, Silty fine to medium SAND, trace Gravel, moist.				
42	22	24/13	42-44	5-9 9-10	0.0 ppm	Medium dense, tan, Silty fine to coarse SAND, some Gravel, moist.				
44	23	24/5	44-46	6-10 20-20	0.0 ppm	Medium dense, tan, Silty fine to coarse SAND, trace Gravel, moist.				
46	24	24/12	46-48	5-16 33-16	0.0 ppm	Dense, tan, Sandy GRAVEL, trace Silt, moist.	46' GRAVEL			
48	25	24/4	48-50	11-23 21-13	0.0 ppm	Dense, tan, Sandy GRAVEL, trace Silt, moist.				
50	26	24/0	50-52	17-11 10-9		NO RECOVERY.	50' NO RECOVERY			
52	27	24/1	52-54	18-15 12-9	0.0 ppm	Medium dense, tan, coarse SAND, wet.	52' SAND	2		
54	28	24/4	54-56	15-9 7-7	0.0 ppm	Medium dense, tan, fine to coarse SAND, trace Gravel, wet.		3		
56	29	24/18	56-58	2-2 2-4	0.0 ppm	Loose, tan, fine to coarse SAND, trace Silt, wet.				
58	30	24/17	58-60	1-1 2-3	0.0 ppm	Very loose, tan, fine to coarse SAND, trace Silt, wet.				
60	31	24/0	60-62	1-2 4-6		NO RECOVERY.	60' NO RECOVERY			
62	32	24/5	62-64	2-2 4-4	0.0 ppm	Loose, tan, fine to coarse SAND, trace Silt, wet.	62' SAND			
64	33	24/8	64-66	3-3 4-5	0.0 ppm	Loose, tan, fine to coarse SAND, trace Silt,				
REMARKS 2. Groundwater was encountered at approximately 52.0 feet below ground surface. 3. Temporary well set at 55.0 to 60.0 feet below ground surface. Purged 70.0 gallons. Groundwater sample submitted for laboratory analysis. 4. Temporary well set at 65.0 to 70.0 feet below ground surface. Purged 35.0 gallons. Groundwater sample submitted for laboratory analysis.										
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Sample Information						Check: JTM/JMG				
Depth	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
66	34	24/14	66-68	1-2	0.0 ppm	wet.	SAND	4		
67				2-3		Loose, tan, fine to coarse SAND, trace Silt, wet.				
68	35	24/14	68-70	1-2	0.0 ppm	Loose, tan, fine to coarse SAND, trace Silt, wet.				
69				3-10						
70	36	24/24	70-72	7-9	0.0 ppm	Medium dense, tan, fine to coarse SAND, trace Silt, wet.				
71				10-12						
72	37	24/15	72-74	4-3	0.0 ppm	Loose, tan, fine to coarse SAND, trace Silt, wet. Changing at 73.5 feet to: Loose, brown, Sandy GRAVEL, wet.	73.5'			
73				2-2			74' GRAVEL			
74	38	24/14	74-76	6-8	0.0 ppm	Medium dense, brown, fine to coarse SAND and Gravel, trace Silt, wet.	SAND	5		
75				8-8						
76	39	24/2	76-78	2-3	0.0 ppm	Loose, brown, fine to coarse SAND and Gravel, trace Silt, wet.				
77				3-4						
78	40	24/14	78-80	4-5	0.0 ppm	Medium dense, brown to gray, GRAVEL, some fine to coarse Sand, wet.	78'			
79				5-5			GRAVEL			
80	41	24/3	80-82	5-5	0.0 ppm	Medium dense, brown to gray, GRAVEL, some fine to coarse Sand, wet.				
81				5-7						
82	42	24/16	82-84	2-3	0.0 ppm	Loose, brown and gray, coarse SAND, some Gravel, wet.	82'			
83				4-4			SAND			
84	43	24/24	84-86	2-2	0.0 ppm	Loose, brown and gray, coarse SAND, some Gravel, wet.		6		
85				2-4						
86	44	24/16	86-88	2-1	0.0 ppm	Very loose, brown and gray, coarse SAND, some Gravel, wet.				
87				2-2						
88	45	24/12	88-90	3-3	0.0 ppm	Loose, brown and gray, coarse SAND, some Gravel, wet.				
89				3-5						
90	46	24/8	90-92	2-3	0.0 ppm	Loose, brown and gray, coarse SAND, some Gravel, wet.				
91				6-7						
92	47	24/16	92-94	1-1	0.0 ppm	Very loose, brown and gray, coarse SAND, some Gravel, wet.				
93				2-3						
94	48	24/7	94-96	1-2	0.0 ppm	Loose, brown and gray, coarse SAND, some Gravel, wet.		7		
95				3-4						
96	49	24/20	96-98	2-2	0.0 ppm	Loose, brown and gray, coarse SAND, some Gravel, wet.				
97				5-6						
98	50	24/16	98-100	4-2	0.0 ppm	Loose, brown and gray, coarse SAND, some Gravel, wet.				
99				4-5						
REMARKS	5. Temporary well set at 75.0 to 80.0 feet below ground surface. Purged 45.0 gallons. Groundwater sample submitted for laboratory analysis. 6. Temporary well set at 85.0 to 90.0 feet below ground surface. Purged 75.0 gallons. Groundwater sample submitted for laboratory analysis. 7. Temporary well set at 95.0 to 100.0 feet below ground surface. Purged 90.0 gallons. Groundwater sample submitted for laboratory analysis.									
	Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: HS-MW-24D

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Sample Information						Check:		JTM/JMG					
Depth	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed				
101	51	24/10	100-102	3-7 11-13	0.0 ppm	Medium dense, brown and gray, coarse SAND, some Gravel, wet.	SAND	8	<div></div>	<div></div>	Bentonite Slurry / Grout		
102	52	24/12	102-104	2-2 3-7	0.0 ppm	Loose, brown and gray, coarse SAND, some Gravel, wet.							
103													
104	53	24/10	104-106	3-4 5-7	0.0 ppm	Loose, brown and gray, coarse SAND, some Gravel, wet.							
105													
106	54	24/14	106-108	3-9 10-10	0.0 ppm	Medium dense, brown and gray, coarse SAND, some Gravel, wet.							
107													
108	55	24/16	108-110	2-4 8-9	0.0 ppm	Medium dense, brown and gray, coarse SAND, some Gravel, wet.							
109													
110	56	24/3	110-112	3-7 9-11	0.0 ppm	Medium dense, brown and gray, coarse SAND, some Gravel, wet.							
111													
112	57	24/4	112-114	1-4 5-5	0.0 ppm	Loose, brown and gray, coarse SAND, some Gravel, wet.		9					
113													
114	58	24/14	114-116	6-12 19-23	0.0 ppm	Dense, brown and gray, coarse SAND, some Gravel, wet.							
115													
116	60	24/18	116-118	2-4 12-15	0.0 ppm	Medium dense, brown and gray, coarse SAND, some Gravel, wet.							
117													
118	61	24/10	118-120	11-17 13-10	0.0 ppm	Medium dense, brown and gray, coarse SAND, some Gravel, wet.							
119													
120	62	24/12	120-122	4-7 11-13	0.0 ppm	Medium dense, brown and gray, coarse SAND, some Gravel, wet.							
121													
122	63	24/10	122-124	2-12 20-13	0.0 ppm	Medium dense, brown and gray, coarse SAND, some Gravel, wet.						10	
123													
124	64	24/8	124-126	9-15 15-13	0.0 ppm	Medium dense, brown and gray, coarse SAND, some Gravel, wet.							
125													
126	65	24/13	126-128	3-11 16-17	0.0 ppm	Medium dense, brown and gray, coarse SAND, some Gravel, wet.							
127													
128	66	24/10	128-130	11-20 20-21	0.0 ppm	Dense, brown and gray, coarse SAND, some Gravel, trace Silt, wet.							
129													
130	67	24/12	130-132	5-18 28-30	0.0 ppm	Dense, brown and gray, coarse SAND, some Gravel, trace Silt, wet.							
131													
132	68	24/5	132-134	9-16 21-24	0.0 ppm	Dense, brown and gray, coarse SAND, some reddish brown, fine Sand, some Gravel, trace Silt, wet.							
133													
134	70	24/4	134-136	5-13 20-31	0.0 ppm	Dense, brown and gray, GRAVEL, some	134' GRAVEL						
REMARKS	8. Temporary well set at 105.0 to 110.0 feet below ground surface. Purged 60.0 gallons. Groundwater sample submitted for laboratory analysis.												
	9. Temporary well set at 115.0 to 120.0 feet below ground surface. Purged 55.0 gallons. Groundwater sample submitted for laboratory analysis.												
	10. Temporary well set at 125.0 to 130.0 feet below ground surface. Purged 55.0 gallons. Groundwater sample submitted for laboratory analysis.												
	11. Temporary well set at 135.0 to 140.0 feet below ground surface. Purged 65.0 gallons. Groundwater sample submitted for laboratory analysis.												
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.								Boring No.: HS-MW-24D					

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Sample Information						Check:		JTM/JMG		
Depth	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
136	71	24/7	136-138	4-12 16-23	0.0 ppm	medium to coarse Sand, wet.	GRAVEL	11		
137						Medium dense, brown and gray, GRAVEL, some medium to coarse Sand, wet.				
138	72	24/8	138-140	4-7 18-32	0.0 ppm	Medium dense, brown and gray, GRAVEL, some medium to coarse Sand, wet.				
139						Medium dense, brown and gray, GRAVEL, some medium to coarse Sand, wet.				
140	73	24/7	140-142	5-11 21-22	0.0 ppm	Dense, brown and gray, GRAVEL, some medium to coarse Sand, wet.	142'			
141						Medium dense, brown and gray, GRAVEL, some medium to coarse Sand, wet.				
142	74	24/12	142-144	7-13 21-23	0.0 ppm	Medium dense, brown and gray, fine to coarse SAND, some Gravel, wet.	SAND			
143						Medium dense, brown and gray, fine to coarse SAND, some Gravel, wet.				
144	75	24/10	144-146	6-17 21-22	0.0 ppm	Dense, brown and gray, fine to coarse SAND, some Gravel, wet.		12		
145						Dense, brown and gray, fine to coarse SAND, some Gravel, wet.				
146	76	24/10	146-148	8-15 16-21	0.0 ppm	Dense, brown and gray, fine to coarse SAND, some Gravel, wet.				
147						Dense, brown and gray, fine to coarse SAND, some Gravel, wet.				
148	77	24/8	148-150	5-16 21-24	0.0 ppm	Dense, brown and gray, fine to coarse SAND, some Gravel, wet.				
149						Dense, brown and gray, fine to coarse SAND, some Gravel, wet.				
150	78	24/14	150-152	4-9 16-14	0.0 ppm	Medium dense, brown and gray, fine to coarse SAND, some Gravel, wet.				
151						Medium dense, brown and gray, fine to coarse SAND, some Gravel, wet.				
152	79	24/4	152-154	6-10 8-8	0.0 ppm	Medium dense, brown and gray, fine to coarse SAND, some Gravel, wet.				
153						Medium dense, brown and gray, fine to coarse SAND, some Gravel, wet.				
154	80	24/18	154-156	4-12 21-20	0.0 ppm	Dense, brown and gray, fine to coarse SAND, some Gravel, wet.		13		
155						Dense, brown and gray, fine to coarse SAND, some Gravel, wet.				
156	81	24/6	156-158	5-8 13-10	0.0 ppm	Medium dense, brown and gray, fine to coarse SAND, some Gravel, wet.				
157						Medium dense, brown and gray, fine to coarse SAND, some Gravel, wet.				
158	82	24/6	158-160	7-11 11-12	0.0 ppm	Medium dense, brown and gray, fine to coarse SAND, some Gravel, wet.				
159						Medium dense, brown and gray, fine to coarse SAND, some Gravel, wet.				
160	83	24/7	160-162	5-8 9-9	0.0 ppm	Medium dense, brown and gray, fine to coarse SAND, some Gravel, wet.				
161						Medium dense, brown and gray, fine to coarse SAND, some Gravel, wet.				
162	84	24/5	162-164	5-10 19-26	0.0 ppm	Medium dense, brown and gray, fine to coarse SAND, some Gravel, wet.				
163						Medium dense, brown and gray, fine to coarse SAND, some Gravel, wet.				
164	85	24/0	164-166	5-13 22-36		NO RECOVERY.	164'		14	
165						NO RECOVERY.				
166	86	24/0	166-168	7-19 25-39		NO RECOVERY; Switched to bailer for recovery. Bailer: brown and gray, fine to medium SAND, wet.				
167						NO RECOVERY; Switched to bailer for recovery. Bailer: brown and gray, fine to medium SAND, wet.				
168	87	24/0	168-170	2-8 16-22		NO RECOVERY; Bailer: brown and gray, fine to medium SAND, wet.				
169						NO RECOVERY; Bailer: brown and gray, fine to medium SAND, wet.				
REMARKS	12. Temporary well set at 145.0 to 150.0 feet below ground surface. Groundwater sample submitted for laboratory analysis.									
	13. Temporary well set at 155.0 to 160.0 feet below ground surface. Purged 120.0 gallons. Groundwater sample submitted for laboratory analysis.									
14. Temporary well set at 165.0 to 170.0 feet below ground surface. Purged 80.0 gallons. Groundwater sample submitted for laboratory analysis.										
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Sample Information						Equipment Installed				
Depth	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks		
171	88	24/0	170-172	7-11 19-22		NO RECOVERY: Bailer: brown and gray, fine to medium SAND, wet.	NO RECOVERY	15		
172	89	24/5	172-174	2-4 7-10	0.0 ppm	Medium dense, brown and gray, fine to medium SAND, wet.	172' SAND			
173										
174	90	24/0	174-176	5-7 11-16		NO RECOVERY; Bailer: brown and gray, fine to medium SAND, wet.	174' NO RECOVERY			
175										
176	91	24/10	176-178	4-7 17-21	0.0 ppm	Medium dense, brown and gray, fine to medium SAND, wet.	176' SAND			
177	92	24/20	178-180	4-10 28-35	0.0 ppm	Dense, brown and gray, fine to medium SAND, wet.		16		
178										
179										
180	93	24/16	180-182	3-10 17-23	0.0 ppm	Medium dense, brown and gray, fine to medium SAND, wet.		17		
181										
182										
183	94	24/7	182-184	3-8 12-17	0.0 ppm	Medium dense, brown and gray, fine to medium SAND, wet.		16		
184										
185										
186	95	24/6	184-186	8-10 13-31	0.0 ppm	Medium dense, brown and gray, fine to medium SAND, wet.		17		
187										
188										
189	96	24/0	186-188	5-8 19-20	0.0 ppm	NO RECOVERY; Bailer: brown and gray, fine to medium SAND, wet.	186' NO RECOVERY	16		
190							188'			
191										
192	97	24/3	188-190	5-5 12-14	0.0 ppm	Medium dense, brown and gray, fine to medium SAND, wet.	SAND	17		
193										
194										
195	98	24/10	190-192	3-12 20-28	0.0 ppm	Dense, brown and gray, fine to medium SAND, wet.		16		
196										
197										
198	99	24/4	192-194	2-5 9-13	0.0 ppm	Medium dense, brown and gray, fine to medium SAND, wet.		17		
199										
200										
201	100	24/2	194-196	2-6 9-11	0.0 ppm	Medium dense, brown and gray, fine to medium SAND, wet.		16		
202										
203										
204	101	24/6	196-198	5-11 17-21	0.0 ppm	Medium dense, brown and gray, fine to medium SAND, wet.		17		
205										
206										
207	102	24/4	198-200	3-3 8-9	0.0 ppm	Medium dense, brown and gray, fine to medium SAND, wet.		16		
208										
209										
210	103	24/6	200-202	4-12 15-22	0.0 ppm	Medium dense, brown and gray, fine to medium SAND, wet.		17		
211										
212										
213	104	24/16	202-204	4-4 7-12	0.0 ppm	Medium dense, brown and gray, fine to medium SAND, wet.		16		
214										
215										
216	105	24/16	204-206	4-9 17-24	0.0 ppm	Medium dense, brown and gray, fine to medium SAND, wet.		17		
217										
218										
REMARKS	15. Temporary well set at 175.0 to 180.0 feet below ground surface. Purged 125.0 gallons. Groundwater sample submitted for laboratory analysis. 16. Temporary well set at 185.0 to 190.0 feet below ground surface. Purged 135.0 gallons. Groundwater sample submitted for laboratory analysis. 17. Temporary well set at 195.0 to 200.0 feet below ground surface. Purged 135.0 gallons. Groundwater sample submitted for laboratory analysis. 18. Temporary well set at 205.0 to 210.0 feet below ground surface. Groundwater sample submitted for laboratory analysis.									
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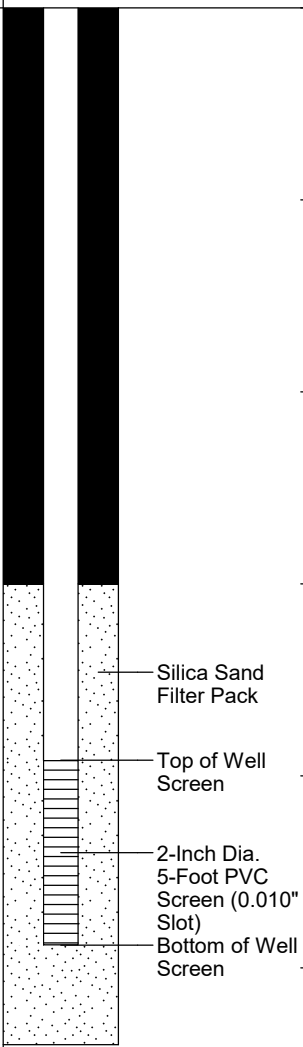
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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
206	106	24/10	206-208	5-11 25-27	0.0 ppm	medium SAND, wet.	SAND	18	
207						Dense, brown and gray, fine to medium SAND, wet.			
208	107	24/14	208-210	6-15 34-37	0.0 ppm	Dense, brown and gray, fine to medium SAND, wet.			
209						Dense, brown and gray, fine to medium SAND, wet.			
210	108	24/18	210-212	7-24 35-50	0.0 ppm	Very dense, brown and gray, fine to medium SAND, wet.			
211						Very dense, brown and gray, fine to medium SAND, wet.			
212	109	24/22	212-214	2-9 17-30	0.0 ppm	Medium dense, brown, fine to medium SAND, trace Gravel, trace Silt, wet.			
213						Medium dense, brown, fine to medium SAND, trace Gravel, trace Silt, wet.			
214	110	24/6	214-216	5-22-42/5"		Very dense, brown, fine to coarse SAND, trace Gravel, trace Silt, wet.			
215						Very dense, brown, fine to coarse SAND, trace Gravel, trace Silt, wet.			
216	111	24/16	216-218	9-34-50/4"		Very dense, brown, fine to coarse SAND, trace Gravel, trace Silt, wet.			
217						Very dense, brown, fine to coarse SAND, trace Gravel, trace Silt, wet.			
218	112	18/6	218-219.5	3-17-41		Very dense, brown, fine to coarse SAND, trace Gravel, trace Silt, wet.			
219						Very dense, brown, fine to coarse SAND, trace Gravel, trace Silt, wet.			
220	113	24/12	220-222	10-41-50/5"		Very dense, brown, fine to coarse SAND, trace Gravel, trace Silt, wet.			
221						Very dense, brown, fine to coarse SAND, trace Gravel, trace Silt, wet.			
222	114	18/6	222-223.5	9-20-33		Very dense, brown, fine to coarse SAND, trace Gravel, trace Silt, wet.			
223						Very dense, brown, fine to coarse SAND, trace Gravel, trace Silt, wet.			
224	115	24/10	224-226	6-24-50/5"		Very dense, brown, fine to coarse SAND, trace Gravel, trace Silt, wet.			
225						Very dense, brown, fine to coarse SAND, trace Gravel, trace Silt, wet.			
226	116	18/5	226-227.5	4-17-35		Very dense, brown, fine to coarse SAND, trace Gravel, trace Silt, wet.			
227						Very dense, brown, fine to coarse SAND, trace Gravel, trace Silt, wet.			
228	117	18/12	228-229.5	8-18-43		Very dense, brown, fine to coarse SAND, trace Gravel, trace Silt, wet.			
229						Very dense, brown, fine to coarse SAND, trace Gravel, trace Silt, wet.			
230	118	24/12	230-232	16-35-50/5"		Very dense, brown, fine to coarse SAND, trace Gravel, trace Silt, wet.			
231						Very dense, brown, fine to coarse SAND, trace Gravel, trace Silt, wet.			
232						Bottom of Borehole at 232.0 Feet	232'	21	
233									
234									
235									
236									
237									
238									
239									
REMARKS 19. Temporary well set at 215.0 to 220.0 feet below ground surface. Groundwater sample submitted for laboratory analysis. 20. Temporary well set at 225.0 to 230.0 feet below ground surface. Groundwater sample submitted for laboratory analysis. 21. Monitoring well was installed in borehole upon completion. Well screen set from 224.6 to 229.4 feet below ground surface.									
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.								Boring No.: HS-MW-24D	

BORING WELL 62355.52 HOUSE STREET COMPLETE.GPJ GZA CORP.GDT 4/3/20



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Check: Julie Groenleer

Contractor: Stearns Drilling Company

Foreman: Jerry Huntoon

Logged by: John Morehouse

Date Start/Finish: 11-1-18 / 11-9-18

Boring Location:

GS Elev.: Datum:

Auger/
Casing

Sampler

GROUNDWATER READINGS

Type: Hollow Stem Auger Split Spoon

O.D. / I.D.: 8.0" / 4.25" NA

Hammer Wt.: 140 lbs NA

Hammer Fall: 30" NA

TOC Elev.: NA NA

Date	Time	Depth	Casing	Stab

Surveyed By: NA Survey Date:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					PROTECTIVE CASING
1	1	24/14.4	0-2	1-2 1-1	0.0 ppm	Very dark grayish-brown, moderately sorted, fine to medium grained SAND, some Silt, trace Gravel, moist; grading at 1.0 feet to: Dark yellowish-brown, well sorted, fine to medium grained SAND, trace Silt, grading coarser, moist. Changing at 1.2 feet to: NO RECOVERY.	SAND 1.2' NO RECOVERY	1		
2	2	24/6	2-4	2-2 1-2	0.0 ppm	Dark yellowish-brown, well sorted, fine to medium grained SAND, trace Silt, trace Gravel, moist. Changing at 2.4 feet to: Yellowish-brown, poorly sorted, fine to coarse grained SAND, little Gravel, trace Silt, moist. Changing at 2.5 feet to: NO RECOVERY.	2' SAND 2.5' NO RECOVERY			
3										
4	3	24/6	4-6	3-1 2-2	0.0 ppm	Yellowish-brown, poorly sorted, fine to coarse grained SAND, little Gravel, trace Silt, moist. Changing at 4.4 feet to: Dark yellowish-brown, poorly sorted, SILT, trace Clay, trace Gravel, slightly plastic, moderately cohesive, moist. Changing at 4.5 feet to: NO RECOVERY.	4' SAND 4.4' SILT 4.5' NO RECOVERY			
5										
6	4	24/7.2	6-8	11-16 29-23	0.0 ppm	Pale brown to light yellowish-brown to grayish-brown to brown to dark yellowish-brown, poorly sorted, medium to coarse grained SAND, some Gravel, trace Silt, moist. Changing at 6.6 feet to: NO RECOVERY.	6' SAND 6.6' NO RECOVERY			
7										
8	5	24/0	8-10	50/6"	0.0 ppm	NO RECOVERY.				
9										
							10'			

REMARKS

- Field screening of samples for organic vapors was performed with a MiniRae 2000 photoionization detector equipped with a 10.6 eV lamp. Readings above background levels are shown in parts per million (ppm) of isobutylene. groundwater was measured at 0.0 ppm.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: SB-25/MW-25M

BORING WELL 6233552 HOUSE STREET OFF SITE BORINGS ROGUE RIVER RD.GPJ GZA CORP.GDT 2/27/19



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Check: Julie Groenleer

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
11	6	24/10.8	10-12	10-19 20-13	0.0 ppm	Grayish-brown to brown, poorly sorted, coarse to medium grained SAND, some Gravel, trace Silt, moist. Changing at 10.8 feet to: Pale brown to light yellowish-brown, moderately sorted, coarse to medium grained SAND, trace Silt, moist. Changing at 10.9 feet to: NO RECOVERY.	SAND 10.9' NO RECOVERY			
12	7	24/9.6	12-14	11-10 12-11	0.0 ppm	Pale brown to light yellowish-brown, poorly sorted, coarse to medium grained SAND, some Gravel, trace Silt, moist. Changing at 12.8 feet to: NO RECOVERY.	12' SAND 12.8' NO RECOVERY			
14	8	24/6	14-16	11-12 8-8	0.0 ppm	Pale brown to light yellowish-brown, poorly sorted, coarse to medium grained SAND, some Gravel, trace Silt, moist. Changing at 14.5 feet to: NO RECOVERY.	14' SAND 14.5' NO RECOVERY			
16	9	24/10.8	16-18	13-15 13-13	0.0 ppm	Pale brown to light yellowish-brown, poorly sorted, coarse to medium grained SAND, some Gravel, trace Silt, moist. Changing at 16.9 feet to: NO RECOVERY.	16' SAND 16.9' NO RECOVERY			
18	10	24/8.4	18-20	9-29 24-23	0.0 ppm	Pale brown to light yellowish-brown, poorly sorted, coarse to medium grained SAND, some Gravel, trace Silt, moist. Changing at 18.7 feet to: NO RECOVERY.	18' SAND 18.7' NO RECOVERY			
20	11	24/8.4	20-22	21-19 14-16	0.0 ppm	Pale brown to light yellowish-brown, poorly sorted, coarse to medium grained SAND, some Gravel, trace Silt, moist. Changing at 20.7 feet to: NO RECOVERY.	20' SAND 20.7' NO RECOVERY			
21										
REMARKS										
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BORING WELL 6233552 HOUSE STREET OFF SITE BORINGS ROGUE RIVER RD.GPJ GZA_CORP.GDT 2/27/19



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Boring No.: SB-25/MW-25M

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Check: Julie Groenleer

Bentonite / Grout													
Check: Julie Groenleer													
Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed				
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data								
22	12	24/9.6	22-24	6-15 12-12	0.0 ppm	Pale brown to light yellowish-brown, poorly sorted, coarse to medium grained SAND, some Gravel, trace Silt, moist. Changing at 22.3 feet to: Very pale brown, very well sorted, fine grained SAND, trace Silt, moist. Changing at 22.4 feet to: Pale brown to light yellowish-brown, poorly sorted, coarse to medium grained SAND, some Gravel, trace Silt, moist. Changing at 22.8 feet to: NO RECOVERY.	22'	[REDACTED]	[REDACTED]	[REDACTED]			
							SAND						
23							22.8'				NO RECOVERY		
24							13				24/4.8	24-26	14-5 5-8
	SAND												
25	24.4'	NO RECOVERY											
26	14	24/18	26-28	4-6 6-5	0.0 ppm	Dark reddish-brown, poorly sorted, CLAY & SILT, little Sand, trace Gravel, plastic, cohesive, moist. Changing at 26.3 feet to: Dark brown, poorly sorted, CLAY & SILT, little Sand, trace Gravel, plastic, cohesive, moist. Changing at 27.5 feet to: NO RECOVERY.							
							CLAY & SILT						
27							27.5'				NO RECOVERY		
28							15				24/19.2	28-30	4-3 3-5
	CLAY & SILT												
29	29.6'	NO RECOVERY											
30	16	24/21.6	30-32	14-21 16-25	0.0 ppm	Strong brown, poorly sorted, SILT & CLAY, little Sand, trace Gravel, moderately plastic, moderately cohesive, moist. Changing at 31.7 feet to: Dark yellowish-brown, poorly sorted, fine grained SAND, some Silt, trace Gravel, non-plastic, moderately cohesive, moist to wet. Changing at 31.8 feet to: NO RECOVERY.							
							SILT & CLAY						
31							31.7'				31.8'		
32							17				24/15.6	32-34	7-10 15-22
	NO RECOVERY												
33	SILT & CLAY												
	33.2'												
	33.3'												
REMARKS													
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.											Boring No.: SB-25/MW-25M		

BORING WELL 6233552 HOUSE STREET OFF SITE BORINGS ROGUE RIVER RD.GPJ GZA CORP.GDT 2/27/19

— Bentonite / Grout



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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
34	18	24/19.2	34-36	15-32-50/5"	0.0 ppm	RECOVERY. Strong brown, poorly sorted, SILT & CLAY, little Sand, trace Gravel, moderately plastic, moderately cohesive, moist. Changing at 34.2 feet to: Dark yellowish-brown, poorly sorted SILT & CLAY, some Sand, trace Gravel, slightly plastic, cohesive, moist. Changing at 35.6 feet to: NO RECOVERY.	SAND NO RECOVERY 34'			
35							SILT & CLAY 35.6'			
36	19	24/10.8	36-38	1-9 21-19	0.0 ppm	Dark yellowish-brown, poorly sorted, SILT & CLAY, some Sand, trace Gravel, slightly plastic, cohesive, moist. Changing at 36.9 feet to: NO RECOVERY.	NO RECOVERY 36'			
37							SILT & CLAY 36.9'			
38	20	24/15.6	38-40	22-37 38-37	0.0 ppm	Brown to yellowish-brown, very well sorted, fine to medium grained SAND, trace Silt, moist to wet. Changing at 38.3 feet to: Dark yellowish-brown, poorly sorted, SILT & CLAY, some Sand, trace Gravel, occasional very thin Sand partings, slightly plastic, cohesive, moist. Changing at 39.3 feet to: NO RECOVERY.	NO RECOVERY 38'			
39							SAND 38.3'			
40	21	24/21.6	40-42	13-29 39-50	0.0 ppm	Dark yellowish-brown to brown, well sorted, Silty CLAY, plastic, cohesive, bedding, moist. Changing at 40.6 feet to: Yellowish-brown to brown, well sorted, fine to medium grained, SAND, trace Silt, wet. Changing at 40.7 feet to: Dark yellowish-brown, well sorted, Silty CLAY, plastic, cohesive, bedded, moist. Changing at 40.8 feet to: Yellowish-brown to brown, well sorted, fine to medium grained SAND, trace Silt, wet. Changing at 41.8 feet to: NO RECOVERY.	SILT & CLAY 39.3'			
41							NO RECOVERY 40'			
42	22	24/20.4	42-44	1-2 12-21	0.0 ppm	Yellowish-brown to brown, well sorted, fine to medium grained SAND, trace Silt, wet. Changing at 43.4 feet to: Dark yellowish-brown, well sorted, Silty CLAY, plastic, cohesive, bedded, moist. Changing at 43.7 feet to: NO RECOVERY.	Silty CLAY 40.6'			
43							40.7' SAND 40.8' Silty CLAY SAND			
44	23	24/24	44-46	5-19 41-50/3"	0.0 ppm	Dark yellowish-brown, well sorted, Silty CLAY, plastic, cohesive, bedded, moist. Changing at 45.6 feet to: Dark yellowish-brown, very well sorted, fine grained SAND, some Silt, slightly cohesive,	41.8'			
							42' NO RECOVERY SAND			
							43.4'			
							Silty CLAY 43.7'			
							NO RECOVERY Silty CLAY			
REMARKS										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: SB-25/MW-25M	

BORING WELL 6233552 HOUSE STREET OFF SITE BORINGS ROGUE RIVER RD.GPJ GZA CORP.GDT 2/27/19



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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
46	24	24/21.6	46-48	14-37-50/5"	0.0 ppm	wet. Dark yellowish-brown, very well sorted, fine grained SAND, some Silt, slightly cohesive, wet. Changing at 46.6 feet to: Dark brown to yellowish-brown, well sorted, Silty CLAY, plastic, cohesive, varved with Silt & Clay, wet. Changing at 47.6 feet to: Dark yellowish-brown, very well sorted, fine grained SAND, some Silt, slightly cohesive, wet. Changing at 47.8 feet to: NO RECOVERY.	Silty CLAY 45.6' SAND 46.6' Silty CLAY 47.6' 47.8' SAND 48' NO RECOVERY 48.4' SAND SILT 49' SAND 49.4' NO RECOVERY 50' SAND 51.3' NO RECOVERY 52' SAND 53.5' NO RECOVERY 54' SAND 55.6' NO RECOVERY 56' SAND	2		
47										
48	25	24/16.8	48-50	8-22 27-35	0.0 ppm	Dark yellowish-brown, very well sorted, fine grained SAND, some Silt, slightly cohesive, wet. Changing at 48.4 feet to: Dark yellowish-brown, well sorted, SILT, some Sand, moist to wet. Changing at 49.0 feet to: Dark yellowish-brown, very well sorted, fine grained SAND, some Silt, slightly cohesive, wet. Changing at 49.4 feet to: NO RECOVERY.				
49										
50	26	24/15.6	50-52	8-23 32-37	0.0 ppm	Dark yellowish-brown, very well sorted, fine grained SAND, some Silt, lightly cohesive, wet. Changing at 51.3 feet to: NO RECOVERY.				
51										
52	27	24/18	52-54	6-14 21-35	0.0 ppm	Dark yellowish-brown, very well sorted, fine grained SAND, some Silt, slightly cohesive, wet. Changing at 53.5 feet to: NO RECOVERY.				
53										
54	28	24/19.2	54-56	4-14 21-33	0.0 ppm	Dark yellowish-brown, very well sorted, fine grained SAND, some Silt, slightly cohesive, wet. Changing at 55.6 feet to: NO RECOVERY.				
55										
56	29	24/19.2	56-58	4-12 17-21	0.0 ppm	Dark yellowish-brown, very well sorted, fine grained SAND, some Silt, slightly cohesive, wet. Changing at 56.5 feet to: Dark				
REMARKS 2. Groundwater was encountered at approximately 45.6 feet below ground surface.										
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BORING WELL 6233552 HOUSE STREET OFF SITE BORINGS ROGUE RIVER RD.GPJ GZA CORP.GDT 2/27/19



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Sample Information								Check: Julie Groenleer		
Depth	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
57	30	24/22.8	58-60	5-10 13-18	0.0 ppm	yellowish-brown, moderately sorted, fine to coarse grained SAND, little Silt, trace Gravel, wet, with occasional lenses discontinuous Silty Clay, plastic, cohesive, moist. Changing at 56.8 feet to: Dark yellowish-brown, moderately sorted, fine to medium grained SAND, little Silt, wet, with occasional lenses of Silty Clay. Changing at 57.6 feet to: NO RECOVERY.	SAND			
58						57.6' NO RECOVERY				
59						58' SAND				
60	59.9' NO RECOVERY									
61	60' SAND									
62	61.2' NO RECOVERY									
63	62' SAND									
64	31	24/14.4	60-62	4-9 18-2	0.0 ppm	Dark yellowish-brown, well sorted, fine to medium grained SAND, little Silt, wet. Changing at 61.2 feet to: NO RECOVERY.				
65										
66										
67	32	24/24	62-64	2-6 15-27	0.0 ppm	Dark yellowish-brown, well sorted, fine to medium grained SAND, little Silt, wet.				
68										
69										
70	33	24/24	64-66	3-7 23-31	0.0 ppm	Dark yellowish-brown, well sorted, fine to medium grained SAND, little Silt, wet.				
71										
72										
73	34	24/12	66-68	3-13 29-35	0.0 ppm	Dark yellowish-brown, well sorted, fine to medium grained SAND, little Silt, wet. Changing at 66.9 feet to: Dark brown to dark yellowish-brown, very well sorted, fine grained SAND, trace Silt, wet with Silty Clay varves, plastic, cohesive, moist. Changing at 67.0 feet to: NO RECOVERY.				
74										
75										
76	35	24/22.8	68-70	5-20-50/6"	0.0 ppm	Dark yellowish-brown, well sorted, fine to				
77										
78										
REMARKS										
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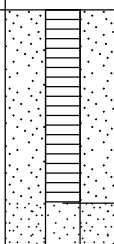
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Check: Julie Groenleer

Sample Information								Check: Julie Groenleer			
Depth	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed		
69	36	24/20.4	70-72	13-19 31-50/3"	0.0 ppm	medium grained SAND, little Silt, wet. Changing at 68.5 feet to: Dark brown to dark yellowish-brown, very well sorted, fine grained SAND, trace Silt, wet with Silty Clay varves, plastic, cohesive, moist. Changing at 68.6 feet to: Dark yellowish-brown, well sorted, fine to medium grained SAND, little Silt, wet. Changing at 69.9 feet to: NO RECOVERY.	SAND		Bottom of Well Screen		
70						Dark yellowish-brown, well sorted, fine to medium grained SAND, little Silt, wet. Changing at 70.4 feet to: Very dark grayish-brown to dark grayish-brown, well sorted, varved Silty CLAY, plastic, cohesive, moist. Changing at 71.7 feet to: NO RECOVERY.	69.9' NO RECOVERY 70' SAND 70.4' Silty CLAY				
71							71.7' NO RECOVERY				
72	37	24/16.8	72-74	42-20 19-24	0.0 ppm	Brown to grayish-brown, very well sorted, SILT, trace Clay, slightly plastic, cohesive, moist. Changing at 72.6 feet to: Dark yellowish-brown, poorly sorted, CLAY & SILT, little Sand, trace Gravel, plastic, cohesive, moist. Changing at 73.0 feet to: Brown to yellowish-brown, poorly sorted, fine to coarse grained SAND, some Gravel, moist to wet. Changing at 73.2 feet to: Mottled yellowish-red to light gray to light grayish-brown, well sorted, Silty CLAY, plastic, cohesive, moist. Changing at 73.4 feet to: NO RECOVERY.	72' SILT				
73						Mottled yellowish-red to light gray to light grayish-brown, well sorted, Silty CLAY, plastic, cohesive, moist. Changing at 74.8 feet to: NO RECOVERY.	72.6' CLAY & SILT 73' SAND 73.2' Silty CLAY 73.4' NO RECOVERY				
74							74' Silty CLAY				
75	38	24/13.2	74-76	16-22 45-50/4"	0.0 ppm	Mottled yellowish-red to light gray to light grayish-brown, well sorted, Silty CLAY, plastic, cohesive, moist. Changing at 74.8 feet to: NO RECOVERY.	74.8' NO RECOVERY				
76						Yellowish-red, well sorted, Silty CLAY, plastic, cohesive, moist. Changing at 76.6 feet to: NO RECOVERY.	76' Silty CLAY				
77							76.6' NO RECOVERY				
78	40	24/7.2	78-80	43-50/4"	0.0 ppm	Yellowish-red, well sorted, Silty CLAY, plastic, cohesive, moist. Changing at 78.6 feet to: NO RECOVERY.	78' Silty CLAY				
79							78.6' NO RECOVERY				
							80'				
REMARKS											
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BORING WELL 6233552 HOUSE STREET OFF SITE BORINGS ROGUE RIVER RD.GPJ GZA CORP.GDT 2/27/19



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Check: Julie Groenleer

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
81	41	24/3.6	80-82	50/5"	0.0 ppm	Yellowish-red, well sorted, Silty CLAY, plastic, cohesive, moist. Changing at 80.3 feet to: NO RECOVERY.	80.3' Silty CLAY NO RECOVERY		
82	42	24/7.2	82-84	20-50	0.0 ppm	Yellowish-red, well sorted, Silty CLAY, plastic, cohesive, moist. Changing at 82.6 feet to: NO RECOVERY.	82' Silty CLAY 82.6' NO RECOVERY		
84	43	24/21.6	84-86	12-33-50/4"	0.0 ppm	Yellowish-red, well sorted, Silty CLAY, plastic, cohesive, moist. Changing at 85.6 feet to: NO RECOVERY.	84' Silty CLAY 85.6' NO RECOVERY		
86	44	24/10.8	86-88	20-50/5"	0.0 ppm	Yellowish-red, well sorted, Silty CLAY, plastic, cohesive, moist. Changing 86.9 feet to: NO RECOVERY.	86' Silty CLAY 86.9' NO RECOVERY		
88	45	24/4.8	88-90	50/5"	0.0 ppm	Mottled yellowish-red to light gray to light grayish-brown, well sorted, Silty CLAY, plastic, cohesive, moist. Changing at 88.9 feet to: NO RECOVERY.	88' Silty CLAY 88.9' NO RECOVERY		
90	46	24/10.8	90-92	23-50/5"	0.0 ppm	Mottled yellowish-red to light gray to light grayish-brown, well sorted, Silty CLAY, plastic, cohesive, moist. Changing at 90.9 feet to: NO RECOVERY.	90' Silty CLAY 90.9' NO RECOVERY		
REMARKS									
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: SB-25/MW-25M

BORING WELL 6233552 HOUSE STREET OFF SITE BORINGS ROGUE RIVER RD.GPJ GZA CORP.GDT 2/27/19



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Belmont, Michigan

Boring No.: SB-25/MW-25M

Page: 9 of 9

File No.: 16.0062335.52

Check: Julie Groenleer

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
92	47	24/8.4	92-94	25-50	0.0 ppm	Mottled yellowish-red to light gray to light grayish-brown, well sorted, Silty CLAY, plastic, cohesive, moist. Changing at 92.7 feet to: NO RECOVERY.	92' Silty CLAY		
							92.7' NO RECOVERY		
93	48	24/3.6	94-96	36-50/2"	0.0 ppm	Mottled yellowish-red to light gray to light grayish-brown, well sorted, Silty CLAY, plastic, cohesive, moist. Changing at 94.3 feet to: NO RECOVERY.	94'		
94							94.3' Silty CLAY		
95							NO RECOVERY		
96						Bottom of Borehole at 96.0 Feet	96'	3	
97									
98									
99									
100									
101									
102									
103									
3. Monitoring well MW-25M was installed in borehole upon completion. Well screen set from 65.0 to 70.0 feet below ground surface.									
REMARKS									
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: SB-25/MW-25M

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Boring No.: MW-25S

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File No.: 16.0062335.52

Check: Julie Groenleer

Contractor: Stearns Drilling Company

Foreman: Jerry Huntoon

Logged by: John Morehouse

Date Start/Finish: 11-1-18 / 11-9-18

Boring Location:

GS Elev.: Datum:

**Auger/
Casing**

Sampler

GROUNDWATER READINGS

Type: Hollow Stem Auger

Split Spoon

O.D. / I.D.: 8.0" / 4.25"

NA

Hammer Wt.: 140 lbs

NA

Hammer Fall: 30"

NA

TOC Elev.: NA

NA

Date	Time	Depth	Casing	Stab

Surveyed By: NA Survey Date:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					PROTECTIVE CASING
1						See SB-25/MW-25M for detailed soil descriptions.				
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										

Bentonite /
Grout

**R
E
M
A
R
K
S**

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: MW-25S

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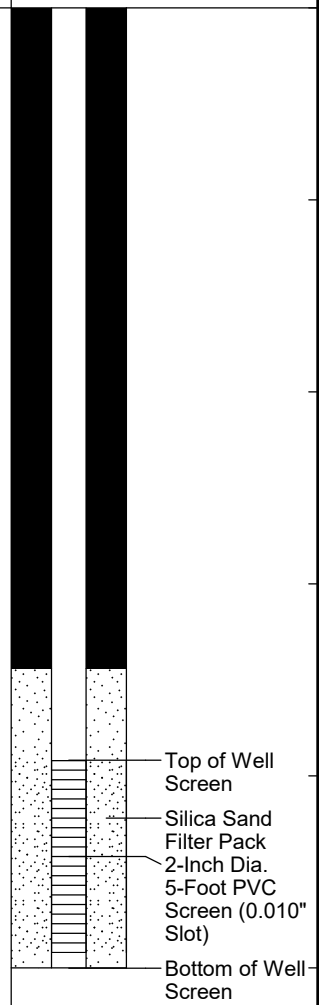
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File No.: 16.0062335.52

Check: Julie Groenleer

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
31										
32										
33										
34										
35										
36										
37										
38										
39										
40										
41										
42										
43										
44										
45										
46										
47										
48										
49										
50										
51										
52										
53										
54										
55						Bottom of Borehole at 55.0 Feet		1		
56										
57										
58										
59										
60										
61										
62										
63										
64										
REMARKS										
1. Monitoring well MW-25S was installed in borehole upon completion. Well screen set from 49.6 to 54.6 feet below ground surface.										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: MW-25S	

BORING WELL 6233552 HOUSE STREET OFF SITE BORINGS ROGUE RIVER RD.GPJ GZA CORP.GDT 2/27/19





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Boring No.: SB-26/MW-26D

Page: 1 of 8

File No.: 16.0062335.52

Check: John Morehouse

Contractor: Stearns Drilling Company

Foreman: Jerry Huntoon

Logged by: John Morehouse

Date Start/Finish: 11-8-18 / 11-15-18

Boring Location: NW Corner of Rogue River & Jupiter Intersection

GS Elev.: Datum:

Auger/
Casing

Sampler

Type: Hollow Stem Auger

Split Spoon

O.D. / I.D.: 8.0" / 4.25"

2.0" / 1 3/8"

Hammer Wt.: 140lbs

NA

Hammer Fall: 30"

NA

TOC Elev.: NA

NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: NA Survey Date:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					PROTECTIVE CASING
1	1	24/16	0-2	2-1 2-1	0.0 ppm	Very dark brown, moderately sorted, fine-grained SAND, some Silt, non to slightly cohesive, moist. Changing at 0.7 feet to: Dark yellowish-brown, moderately sorted, fine to medium-grained SAND, some Silt, moist. Changing at 1.3 feet to: NO RECOVERY.	SAND 1.3' NO RECOVERY			
2	2	24/12	2-4	2-2 3-5	0.0 ppm	Dark yellowish-brown, moderately sorted, fine to medium-grained SAND, some Silt, moist. Changing at 2.7 feet to: Brown to pale brown, poorly sorted, GRAVEL, little to some coarse to medium-grained Sand, trace Silt, moist. Changing at 3.0 feet to: NO RECOVERY.	2' SAND 2.7' GRAVEL 3' NO RECOVERY			
3	3	24/11	4-6	4-3 2-2	0.0 ppm	Brown to pale brown, poorly sorted, GRAVEL, little to some coarse to medium-grained Sand, trace Silt, moist. Changing at 4.4 feet to: Brownish-yellow, poorly sorted, fine to medium-grained SAND, trace Silt, moist. Changing at 4.6 feet to: Dark yellowish-brown, poorly sorted, fine to medium-grained SAND, trace Silt, moist. Changing at 4.9 feet to: NO RECOVERY.	4' GRAVEL 4.4' SAND 4.9' NO RECOVERY			
4	4	24/12	6-8	2-4 10-13	0.0 ppm	Dark yellowish-brown, poorly sorted, fine to medium-grained SAND, trace Silt, moist. Changing at 7.0 feet to: NO RECOVERY.	6' SAND 7' NO RECOVERY			
5	5	24/16	8-10	9-11 9-8	0.0 ppm	Dark yellowish-brown, poorly sorted, medium to coarse-grained SAND, little Gravel, trace Silt, moist. Changing at 9.3 feet to: NO RECOVERY.	8' SAND 9.3' NO RECOVERY 10'			

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: SB-26/MW-26D

BORING WELL 62355.52 HOUSE STREET COMPLETE.GPJ GZA CORP.GDT 2/27/19



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Boring No.: SB-26/MW-26D
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 File No.: 16.0062335.52
 Check: John Morehouse

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
11	6	24/14	10-12	5-7 5-6	0.0 ppm	Dark yellowish-brown, poorly sorted, medium to coarse-grained SAND, little Gravel, trace Silt, moist. Changing at 10.9 feet to: Brown to pale brown, moderately sorted, coarse-grained SAND, some Gravel, trace Silt, moist. Changing at 11.2 feet to: NO RECOVERY.	SAND 11.2' NO RECOVERY			
12	7	24/14	12-14	5-13 23-24	0.0 ppm	Dark yellowish-brown, poorly sorted, coarse to medium-grained SAND, little to some Gravel, trace Silt, moist. Changing at 13.2 feet to: NO RECOVERY.	12' SAND 13.2' NO RECOVERY			
14	8	24/18	14-16	12-19 10-8	0.0 ppm	Dark yellowish-brown, poorly sorted, coarse to medium-grained SAND, little to some Gravel, trace Silt, moist. Changing at 15.5 feet to: NO RECOVERY.	14' SAND 15.5' NO RECOVERY			
16	9	24/16	16-18	12-19 21-50/5.5"	0.0 ppm	Dark yellowish-brown, poorly sorted, coarse to medium-grained SAND, little to some Gravel, trace Silt, moist. Changing at 17.2 feet to: Dark yellowish-brown, poorly sorted, coarse to medium-grained SAND, little to some Gravel, trace Silt, wet. Changing at 17.3 feet to: NO RECOVERY.	16' SAND 17.3' NO RECOVERY			
18	10	24/17	18-20	12-18 17-15	0.0 ppm	Dark yellowish-brown, poorly sorted, coarse to medium-grained SAND, little to some Gravel, trace Silt, wet. Changing at 18.4 feet to: Strong, brown, poorly sorted, SILT & CLAY, some Sand, non to slightly plastic, cohesive, grading to reddish-brown, moderately well sorted, CLAY & SILT, little Sand, plastic, cohesive, moist. Changing at 19.4 feet to: NO RECOVERY.	18' SAND 18.4' SILT & CLAY grading to CLAY & SILT 19.4' NO RECOVERY			
20	11	24/18	20-22	12-20 20-26	0.0 ppm	Dark yellowish-brown, poorly sorted, coarse to medium-grained SAND, little to some Gravel, trace Silt, wet. Changing at 20.6 feet to: Reddish-brown, well sorted, fine to medium-grained SAND, trace Silt, wet. Changing at 20.9 feet to: Dark gray, well sorted, Silty CLAY, laminated, plastic, cohesive, moist. Changing at 21.5 feet to:	20' SAND 20.9' Silty CLAY 21.5'			
REMARKS										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: SB-26/MW-26D	

BORING WELL 62355.52 HOUSE STREET COMPLETE.GPJ GZA CORP.GDT 2/27/19



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Check: John Morehouse

Sample Information						Equipment Installed								
Depth	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks						
22	12	24/20	22-24	11-13 17-20	0.0 ppm	NO RECOVERY. Dark grayish-brown, poorly sorted, Clayey SAND, little Silt, trace Gravel, slightly plastic, cohesive, moist. Changing at 23.2 feet to: Brown, well sorted, fine to medium-grained SAND, trace Silt, moist to wet. Changing at 23.3 feet to: Dark grayish-brown, poorly sorted, Clayey SAND, little Silt, trace Gravel, slightly plastic, coheisve, moist. Changing at 23.6 feet to: NO RECOVERY.	NO 22' RECOVERY SAND	1						
23							23.6'							
24	13	24/17	24-26	4-13 20-25	0.0 ppm	Grayish-brown to dark grayish-brown, well sorted, fine to medium-grained SAND, trace Silt, wet. Changing at 25.2 feet to: Dark grayish-brown to grayish-brown, very well sorted, SILT, some fine-grained Sand, slightly cohesive, wet. Changing at 25.4 feet to: NO RECOVERY.	NO 24' RECOVERY SAND							
25							25.2' 25.4' SILT							
26	14	24/18	26-28	14-22 23-19	0.0 ppm	Dark grayish-brown to grayish-brown, very well sorted, SILT, some fine-grained Sand, slightly cohesive, wet with occuring thin, layers of Silty CLAY, plastic, cohesive, moist. Changing at 27.5 feet to: NO RECOVERY.	NO RECOVERY 26' Silty CLAY							
27							27.5'							
28	15	24/24	28-30	10-16 23-20	0.0 ppm	Grayish-brown to dark grayish-brown, well sorted, fine to medium-grained SAND, trace Silt, wet. Changing at 28.3 feet to: Dark gray, well sorted, Silty CLAY, plastic, cohesive, moist. Changing at 28.9 feet to: Grayish-brown to dark grayish-brown, well sorted, fine to medium-grained SAND, trace Silt, wet. Changing at 29.2 feet to: Dark gray, well sorted, Silty CLAY, plastic, cohesive, moist. Changing at 29.3 feet to: Grayish-brown to dark grayish-brown, well sorted, fine to medium-grained SAND, trace Silt, wet. Changing at 29.6 feet to: Dark gray, well sorted, Silty CLAY, plastic, cohesive, moist. Changing at 29.8 feet to: Grayish-brown to dark grayish-brown, well sorted, fine to medium-grained SAND, trace Silt, wet. Changing at 29.9 feet to: Dark gray, well sorted, Silty CLAY, plastic, cohesive, moist.	NO RECOVERY 28' SAND 28.3' Silty CLAY							
29							28.9' 29.2' SAND 29.3' Silty CLAY							
30	16	24/22	30-32	8-20 20-27	0.0 ppm	Grayish-brown to dark grayish-brown, well sorted, fine to medium-grained SAND, trace Silt, wet. Changing at 29.6 feet to: Dark gray, well sorted, Silty CLAY, plastic, cohesive, moist. Changing at 29.8 feet to: Grayish-brown to dark grayish-brown, well sorted, fine to medium-grained SAND, trace Silt, wet. Changing at 29.9 feet to: Dark gray, well sorted, Silty CLAY, plastic, cohesive, moist.	29.6' SAND 29.8' Silty CLAY 29.9' SAND 30' Silty CLAY CLAY & SILT							
31							31.8'							
32	17	24/23	32-34	9-16 24-34	0.0 ppm	Dark grayish-brown, poorly sorted, CLAY & SILT, little Sand, plastic, cohesive, moist. Changing at 31.8 feet to: NO RECOVERY. Dark gray, poorly sorted, SILT & CLAY, some Sand, plastic, cohesive, moist. changing at 32.4 feet to: Grayish-brown to	32' NO RECOVERY SILT & CLAY 32.4' SAND 32.5' SILT & CLAY 32.9' SAND 33.2'							
33														
1. Groundwater was encountered at approximately 24.0 feet below ground surface.														
REMARKS														
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.											Boring No.: SB-26/MW-26D			

BORING WELL 62355.52 HOUSE STREET COMPLETE.GPJ GZA CORP.GDT 2/27/19



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Boring No.: SB-26/MW-26D

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Check: John Morehouse

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
34	18	24/18	34-36	12-14 27-42	0.0 ppm	dark grayish-brown, well sorted, fine to medium-grained SAND, trace Silt, wet. Changing at 32.5 feet to: Dark gray, poorly sorted, SILT & CLAY, some Sand, plastic, cohesive, moist. Changing at 32.9 feet to: Grayish-brown to dark grayish-brown, well sorted, fine to medium-grained SAND, trace Silt, wet. Changing at 33.2 feet to: Dark gray, poorly sorted, SILT & CLAY, some Sand, plastic, cohesive, moist. Changing at 33.9 feet to: NO RECOVERY.	SILT & CLAY 33.9' 34' NO RECOVERY SILT 34.8' Silty CLAY 35.5' SAND 35.9' 36' NO RECOVERY 36.4' Silty CLAY 36.6' Alternating Silty CLAY and SAND SAND 37.5' Silty CLAY 37.8' 38' NO RECOVERY Silty CLAY			
35										
36	19	24/22	36-38	2-13 23-19	0.0 ppm	Dark grayish-brown to brown, well sorted, SILT, little fine-grained Sand, non-plastic, cohesive, wet. Changing at 34.8 feet to: Dark brown, well sorted, Silty CLAY, plastic, cohesive, moist. Changing at 35.5 feet to: Dark grayish-brown to grayish-brown, well sorted, fine-grained SAND, some Silt, non-plastic, cohesive, wet. Changing at 35.9 feet to: NO RECOVERY.				
37										
38	20	24/24	38-40	8-14 19-23	0.0 ppm	Dark brown, well sorted, Silty CLAY, plastic, cohesive, moist. Changing at 36.4 feet to: Alternating seams of dark brown, well sorted, fine-grained SAND, moist. Changing at 36.6 feet to: Dark grayish-brown to grayish-brown, well sorted, fine to medium-grained SAND, trace Silt, wet. Changing at 37.5 feet to: Dark grayish-brown, well sorted, Silty CLAY, plastic, cohesive, moist. Changing at 37.8 feet to: NO RECOVERY.				
39										
40	21	24/24	40-42	5-13 21-36	0.0 ppm	Dark grayish-brown, well sorted, Silty CLAY, plastic, cohesive, moist. Dark grayish-brown, well sorted, Silty CLAY, plastic, cohesive, moist.				
41										
42	22	24/24	42-44	9-19 27-45	0.0 ppm	Dark grayish-brown, well sorted, Silty CLAY, plastic, cohesive, moist.				
43										
44	23	24/24	44-46	11-17 30-50/5.5"	0.0 ppm	Dark grayish-brown, well sorted, Silty CLAY, plastic, cohesive, moist.				
REMARKS										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: SB-26/MW-26D	

BORING WELL 62355.52 HOUSE STREET COMPLETE.GPJ GZA CORP.GDT 2/27/19



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Boring No.: SB-26/MW-26D
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 File No.: 16.0062335.52
 Check: John Morehouse

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
46	24	24/18	46-48	3-16 29-27	0.0 ppm	Dark grayish-brown, well sorted, Silty CLAY, plastic, cohesive, moist. Changing at 47.3 feet to: Dark yellowish-brown, poorly sorted, SILT & CLAY, some Sand, moderately plastic, cohesive, moist. Changing at 47.4 feet to: Dark grayish-brown, well sorted, Silty CLAY, plastic, cohesive, moist. Changing at 47.5 feet to: NO RECOVERY.	Silty CLAY			
47							47.3' NO RECOVERY			
48	25	24/24	48-50	10-15 28-29	0.0 ppm	Alternating seams of dark yellowish-brown, well sorted, fine to medium-grained Sand, trace Silt, wet, and dark yellowish-brown, poorly sorted, SILT & CLAY, some Sand, moderately plastic, cohesive, moist. Changing at 49.8 feet to: Dark grayish-brown, well sorted, Silty CLAY, plastic, cohesive, moist.	47.5' SILT & CLAY 47.5' Silty CLAY NO RECOVERY Alternating SAND and Silty CLAY			
49							49.8' Silty CLAY			
50	26	24/23	50-52	11-25 37-48	0.0 ppm	Dark yellowish-brown, well sorted, fine to medium-grained SAND, trace Silt, wet. Changing at 50.4 feet to: Dark yellowish-brown, moderately well sorted, fine to medium-grained SAND, some Silt, wet. Changing at 50.5 feet to: Dark grayish-brown, well sorted, Silty CLAY, plastic, cohesive, moist. Changing at 50.7 feet to: Dark yellowish-brown, moderately well sorted, fine to medium-grained SAND, some Silt, wet. Changing at 51.3 feet to: Grayish-brown to light grayish-brown, well sorted, fine-grained SAND, some Silt, wet. Changing at 51.9 feet to: NO RECOVERY. Grayish-brown to light grayish-brown, well sorted, fine-grained SAND, some Silt, wet; very thin lenses of Silty Clay at 52.5 feet and 52.9 feet. Changing at 53.0 feet to: NO RECOVERY.	50' SAND 50.5' Silty CLAY 50.7' SAND			
51							51.9' NO RECOVERY			
52	27	24/12	52-54	7-8 9-18	0.0 ppm	Grayish-brown to light grayish-brown, well sorted, fine-grained SAND, some Silt, wet. Changing at 51.9 feet to: NO RECOVERY. Grayish-brown to light grayish-brown, well sorted, fine-grained SAND, some Silt, wet; very thin lenses of Silty Clay at 52.5 feet and 52.9 feet. Changing at 53.0 feet to: NO RECOVERY.	52' SAND/lenses of Silty Clay			
53							53' NO RECOVERY			
54	28	24/20	54-56	45-36-50/6"	0.0 ppm	Grayish-brown to light grayish-brown, well sorted, fine-grained SAND, some Silt, wet. Changing at 54.8 feet to: Dark grayish-brown to light grayish-brown, poorly sorted, SILT & CLAY, little Sand, trace Gravel, plastic, cohesive, moist. Changing at 55.7 feet to: NO RECOVERY.	54' SAND 54.8' SILT & CLAY			
55							55.7' NO RECOVERY			
56	29	24/20	56-58	3-11 20-21	0.0 ppm	Dark yellowish-brown to grayish-brown, poorly sorted, SILT & CLAY, little Sand, trace Gravel, plastic, cohesive, moist.	56' SILT & CLAY 56.2' SAND			
REMARKS										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: SB-26/MW-26D	

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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
57	30	24/13	58-60	5-1 7-34	0.0 ppm	Changing at 56.2 feet to: Yellowish-brown, poorly sorted, fine to coarse-grained SAND, some Gravel, trace Silt, wet. Changing at 57.6 feet to: NO RECOVERY.	SAND			
							57.6' NO RECOVERY			
58	31	24/22	60-62	31-44 44-42	0.0 ppm	Yellowish-brown, poorly sorted, fine to coarse-grained SAND, some Gravel, trace Silt, wet. Changing at 58.8 feet to: Brown, poorly sorted, fine to coarse-grained SAND, little Gravel, trace Silt, wet. Changing at 59.1 feet to: NO RECOVERY.	SAND			
59							59.1' NO RECOVERY			
60	32	24/20	62-64	3-16 36-50	0.0 ppm	Brown to dark yellowish-brown to yellowish-brown, poorly sorted, fine to coarse-grained SAND, little Gravel, trace Silt, wet. Changing at 61.8 feet to: NO RECOVERY.	SAND			
61							61.8' NO RECOVERY			
62	33	24/16	64-66	11-30 39-50/5.5"	0.0 ppm	Brown to dark yellowish-brown to yellowish-brown, poorly sorted, fine to coarse-grained SAND, little Gravel, trace Silt, wet. Changing at 62.2 feet to: Dark yellowish-brown, well sorted, fine-grained SAND, some Silt, slightly cohesive, moist to wet. Changing at 62.8 feet to: Brown to dark yellowish-brown to yellowish-brown, poorly sorted, fine to coarse-grained SAND, little Gravel, trace Silt, wet. Changing at 63.7 feet to: NO RECOVERY.	SAND			
63							62' NO RECOVERY			
64	34	24/7	66-68	3-18-50/5"	0.0 ppm	Dark yellowish-brown, moderately well sorted, fine to medium-grained SAND, trace Silt, trace Gravel, wet. Changing at 65.3 feet to: NO RECOVERY.	SAND			
65							63.7' NO RECOVERY			
66	35	24/12	68-70	26-50/5.5"	0.0 ppm	Dark yellowish-brown, moderately well sorted, fine to medium-grained SAND, trace Silt, trace Gravel, wet. Changing at 66.6 feet to: NO RECOVERY.	SAND			
67							65.3' NO RECOVERY			
68						Yellowish-brown, moderately well sorted,	SAND			
							66.6' NO RECOVERY			
							68'			
REMARKS										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: SB-26/MW-26D	

BORING WELL 62355.52 HOUSE STREET COMPLETE.GPJ GZA CORP.GDT 2/27/19



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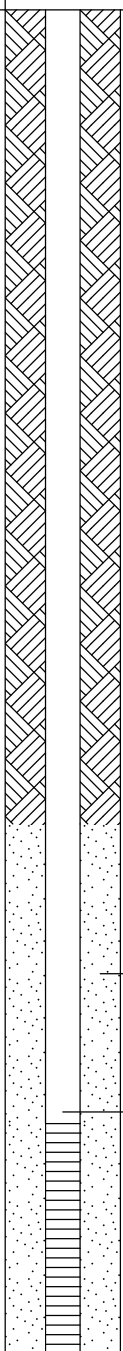
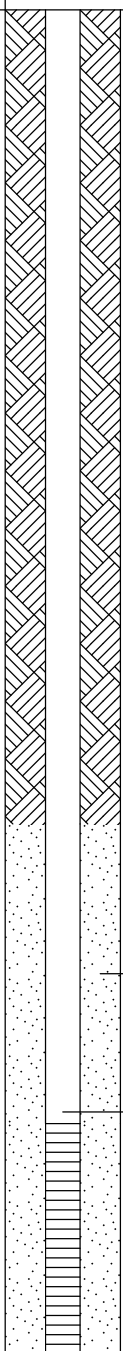
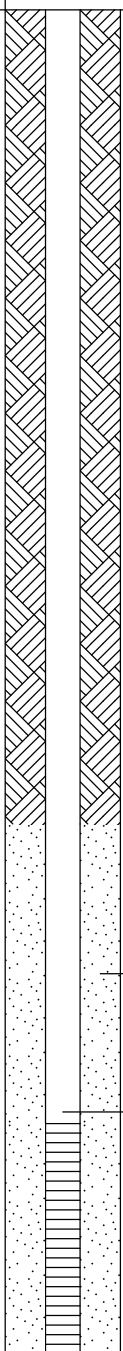
House Street
Belmont, Michigan

Boring No.: SB-26/MW-26D

Page: 7 of 8

File No.: 16.0062335.52

Check: John Morehouse

Sample Information						Check: John Morehouse											
Depth	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed								
69	36	24/10	70-72	18-38 45-50/5"	0.0 ppm	fine to medium-grained SAND, trace Silt, trace Gravel, wet. Changing at 68.4 feet to: Yellowish-brown, moderately well sorted, coarse-grained SAND, trace Silt, wet. Changing at 68.5 feet to: Dark yellowish-brown, moderately well sorted, fine to medium-grained SAND, trace Silt, trace Gravel, wet. Changing at 68.6 feet to: NO RECOVERY.	68.6' SAND										
70						Dark yellowish-brown, poorly sorted, fine to coarse-grained SAND, trace Gravel, trace Silt, wet. Changing at 70.8 feet to: NO RECOVERY.	NO RECOVERY										
71							70' SAND										
72							70.8' NO RECOVERY										
73	37	24/22	72-74	17-34 36-40	0.0 ppm	Dark yellowish-brown, poorly sorted, fine to coarse-grained SAND, trace Gravel, trace Silt, wet. Changing at 72.7 feet to: Yellowish-brown, poorly sorted, fine to coarse-grained SAND, some Silt, trace Gravel, moist. Changing at 72.8 feet to: Dark yellowish-brown, poorly sorted, fine to coarse-grained SAND, trace Gravel, trace Silt, grading coarser, wet. Changing 73.8 feet to: NO RECOVERY.	72' SAND										
74							73.8' NO RECOVERY										
75							74' SAND										
76							75.9' NO RECOVERY										
77	38	24/23	74-76	13-20 28-33	0.0 ppm	Dark grayish-brown, poorly sorted, coarse to medium-grained SAND, trace Gravel, trace Silt, wet. Changing at 75.7 feet to: Dark grayish-brown to dark brown, poorly sorted, fine-grained SAND, some Silt, trace Clay, non to slightly plastic, cohesive, moist. Changing at 75.8 feet to: Dark grayish-brown, poorly sorted, coarse to medium-grained SAND, trace Gravel, trace Silt, wet. Changing at 75.9 feet to: NO RECOVERY.	76' NO RECOVERY										
78							77.4' NO RECOVERY										
79							78' SAND										
							79.8' NO										
REMARKS																	
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.										Boring No.: SB-26/MW-26D							

BORING WELL 62355.52 HOUSE STREET COMPLETE.GPJ GZA CORP.GDT 2/27/19

Boring No.: SB-26/MW-26D



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House Street
 Belmont, Michigan

Boring No.: SB-26/MW-26D

Page: 8 of 8

File No.: 16.0062335.52

Check: John Morehouse

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
81	41	24/17	80-82	10-32-50	0.0 ppm	RECOVERY. Dark grayish-brown, moderately well sorted, fine to medium-grained SAND, trace Silt, moist to wet. Changing at 81.4 feet to: NO RECOVERY.	RECOVERY SAND 81.4'		2-Inch Dia. 5-Foot PVC Screen (0.010" Slot)
82	42	24/14	82-84	12-27 45-50/3"	0.0 ppm	Light yellowish-brown, poorly sorted, fine to medium-grained SAND, some Silt, little Gravel, little Clay, cohesive, moist. Changing at 83.2 feet to: NO RECOVERY.	NO RECOVERY 82' SAND		
83							83.2' NO RECOVERY		
84	43	24/10	84-86	26-50/3"	0.0 ppm	Dark yellowish-brown, poorly sorted, fine to medium-grained SAND, some Silt, little Gravel, little Clay, cohesive, moist. Changing at 84.8 feet to: NO RECOVERY.	84' SAND		
85							84.8' NO RECOVERY		
86	44	24/12	86-88	30-50/3"	0.0 ppm	Dark grayish-brown, poorly sorted, SILT & CLAY, some Sand, trace Gravel, moderately plastic, cohesive, moist. Changing at 87.0 feet to: NO RECOVERY.	86' SILT & CLAY		
87							87' NO RECOVERY		
88						Bottom of Borehole at 88.0 Feet	88'		
89									
90									
91									
<div>REMARKS</div> <div>2. Monitoring well was installed in borehole upon completion. Well screen set from approximately 78.0 to 83.0 feet below ground surface.</div>									
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: SB-26/MW-26D

BORING WELL 62355.52 HOUSE STREET COMPLETE.GPJ GZA CORP.GDT 2/27/19



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Boring No.: MW-26M

Page: 1 of 2

File No.: 16.0062335.52

Check: John Morehouse

Contractor: Stearns Drilling Company

Foreman: Darrell Krause

Logged by: John Morehouse

Date Start/Finish: 12-10-18 / 12-11-18

Boring Location:

GS Elev.: Datum:

**Auger/
Casing**

Sampler

Type: Hollow Stem Auger

Split Spoon

O.D. / I.D.: 8.0" / 4.25"

2.0" / 1 3/8"

Hammer Wt.: 140lbs

NA

Hammer Fall: 30"

NA

TOC Elev.: NA

NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: NA Survey Date:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
1						See SB-26/MW-26D boring log for sample description and classification.				
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REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: MW-26M

BORING WELL 62355.52 HOUSE STREET COMPLETE.GPJ GZA CORP.GDT 3/1/19



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Belmont, Michigan

Boring No.: MW-26M

Page: 2 of 2

File No.: 16.0062335.52

Check: John Morehouse

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
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65						Bottom of Borehole at 65.0 Feet		1	
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75									

REMARKS

1. Monitoring well was installed in borehole upon completion. Well screen set from 60.0 to 65.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: MW-26M

BORING WELL 62355.52 HOUSE STREET COMPLETE.GPJ GZA CORP.GDT 3/1/19

Silica Sand Filter Pack
Top of Well Screen
2-Inch Dia. 5-Foot PVC Screen (0.010" Slot)
Bottom of Well Screen



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Belmont, Michigan

Boring No.: MW-26S

Page: 1 of 1

File No.: 16.0062335.52

Check: John Morehouse

Contractor: Stearns Drilling Company

Foreman: Jerry Huntoon

Logged by: John Morehouse

Date Start/Finish: 11-12-18 / 11-12-18

Boring Location: NW Corner of Intersection

GS Elev.: Datum:

Auger/
Casing

Sampler

Type: Hollow Stem Auger

Split Spoon

O.D. / I.D.: 8.0" / 4.25"

2.0" / 1 3/8"

Hammer Wt.: 140lbs

NA

Hammer Fall: 30"

NA

TOC Elev.: NA

NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: NA Survey Date:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
1						See SB-26/MW-26D boring log for sample description and classification.				
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31						Bottom of Borehole at 30.0 Feet		1		

REMARKS

1. Monitoring well was installed in borehole upon completion. Well screen set from 25.0 to 30.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: MW-26S

BORING WELL 62355.52 HOUSE STREET COMPLETE.GPJ GZA CORP.GDT 2/27/19



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Boring No.: HS-MW27A

Page: 1 of 1

File No.: 16.0062335.52

Check: Lori Powers

Contractor: Stock

Foreman: Ryan

Logged by: JTM

Date Start/Finish: 6-20-19 / 6-20-19

Boring Location: 6390 Belmont Ave. NE, Belmont, MI

GS Elev.: Datum:

Auger/Casing: Sonic

Sampler: NA

Type: NA

O.D. / I.D.: NA

Hammer Wt.: NA

Hammer Fall: NA

TOC Elev.:

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: Survey Date:

Depth Elevation (ft.)		Sample Information				TOC Elev.: _____		Surveyed By: _____		Survey Date: _____																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
		No.	Pen./ Rec. (in.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Gamma (API-GR)		Well Diagram																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
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REMARKS

- Monitoring well was installed in borehole upon completion. Well screen set from 21.1 to 25.7 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-MW27A



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Rockford, Michigan

Boring No.: HS-MW27B

Page: 1 of 1

File No.: 16.0062335.52

Check: Lori Powers

Contractor: Stock

Foreman: Ryan

Logged by: JTM

Date Start/Finish: 6-20-19 / 6-20-19

Boring Location: 6390 Belmont Ave. NE, Belmont, MI

GS Elev.: Datum:

Auger/Casing: Sonic

Sampler: NA

Type: NA

O.D. / I.D.: NA

Hammer Wt.: NA

Hammer Fall: NA

TOC Elev.:

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: Survey Date:

		Sample Information						TOC Elev.: _____		Surveyed By: _____		Survey Date: _____			
Depth	Elevation (ft.)	No.	Pen./ Rec. (in.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Gamma (API-GR)				Well Diagram		
									0 20 40 60 80				PROTECTIVE CASING		
1						See HS-MW27E boring log for sample description and classification.									
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38						Bottom of Borehole at 37.5 Feet		1							

REMARKS

1. Monitoring well was installed in borehole upon completion. Well screen set from 34.8 to 37.4 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-MW27B

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Boring No.: HS-MW27C

Page: 1 of 1

File No.: 16.0062335.52

Check: Lori Powers

Contractor: Stock

Foreman: Ryan

Logged by: JTM

Date Start/Finish: 6-20-19 / 6-20-19

Boring Location: 6390 Belmont Ave. NE, Belmont, MI

GS Elev.: Datum:

Auger/
Casing

Type: Sonic NA

O.D. / I.D.: NA NA

Hammer Wt.: NA NA

Hammer Fall: NA NA

TOC Elev.:

Sampler

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: Survey Date:

Depth	Elevation (ft.)	Sample Information				Sample Description & Classification	Stratum Desc.	Remarks	Gamma (API-GR)					Well Diagram
		No.	Pen./ Rec. (in.)	Blows (/6")	Test Data									
1						See HS-MW27E boring log for sample description and classification.								
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						Bottom of Borehole at 45.5 Feet		1						

REMARKS

1. Monitoring well was installed in borehole upon completion. Well screen set from 40.8 to 45.4 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-MW27C

COPY OF GAMMA LOG 62335.52 MDEQ WWW.GPJ GZA CORP.GDT 4/17/20



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Rockford, Michigan

Boring No.: HS-MW27D

Page: 1 of 2

File No.: 16.0062335.52

Check: Lori Powers

Contractor: Stock

Foreman: Ryan

Logged by: JTM

Date Start/Finish: 6-19-19 / 6-19-19

Boring Location: 6390 Belmont Ave. NE, Belmont, MI

GS Elev.: Datum:

Auger/
Casing

Type: Sonic NA

O.D. / I.D.: NA NA

Hammer Wt.: NA NA

Hammer Fall: NA NA

TOC Elev.:

Sampler

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: Survey Date:

Depth	Elevation (ft.)	Sample Information				Sample Description & Classification	Stratum Desc.	Remarks	Gamma (API-GR)					Well Diagram
		No.	Pen./ Rec. (in.)	Blows (/6")	Test Data									
1						See HS-MW27E boring log for sample description and classification.								<div>PROTECTIVE CASING</div>
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REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-MW27D

COPY OF GAMMA LOG 62335.52 MDEQ WWW.GPJ GZA CORP.GDT 4/17/20



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Rockford, Michigan

Boring No.: HS-MW27D

Page: 2 of 2

File No.: 16.0062335.52

Check: Lori Powers

Depth	Elevation (ft.)	Sample Information				Sample Description & Classification	Stratum Desc.	Remarks	Gamma (API-GR)						Well Diagram
		No.	Pen./ Rec. (in.)	Blows (/6")	Test Data				0	20	40	60	80	100	
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64						Bottom of Borehole at 63 Feet		1							

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1. Monitoring well was installed in borehole upon completion. Well screen set from 59.0 to 63.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-MW27D

COPY OF GAMMA LOG 62335.52 MDEQ WWW.GPJ GZA CORP.GDT 4/17/20



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Rockford, Michigan

Boring No.: HS-MW27E

Page: 1 of 4

File No.: 16.0062335.52

Check: Lori Powers

Contractor: Stock

Foreman: Ryan

Logged by: JTM

Date Start/Finish: 6-17-19 / 6-19-19

Boring Location: 6390 Belmont Ave. NE, Belmont, MI

GS Elev.: Datum:

Auger/
Casing
Type: Sonic
O.D. / I.D.: NA
NA
NA
NA

Hammer Wt.: NA

Hammer Fall: NA

TOC Elev.:

Sampler

NA

NA

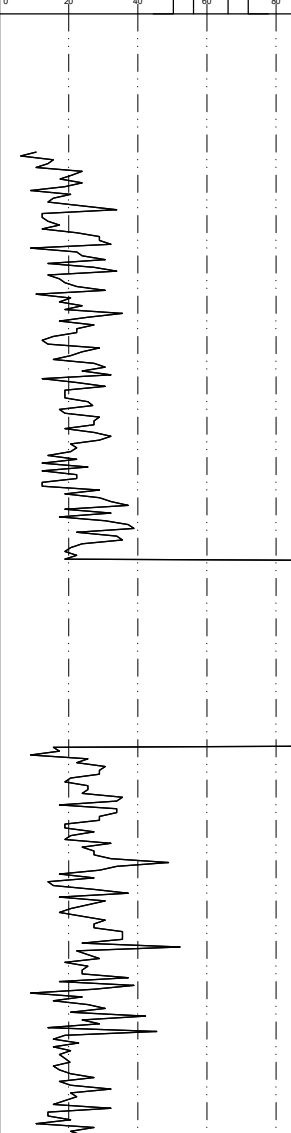

NA

NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: Survey Date:

		Sample Information						TOC Elev.:		Surveyed By:		Survey Date:		
Depth	Elevation (ft.)	No.	Pen./ Rec. (in.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Gamma (API-GR)				Well Diagram	
									PROTECTIVE CASING					
1		1	120/89			Very dark, grayish-brown, poorly sorted, SILT, some fine Sand, trace Gravel, moist. Changing at 1.0 feet to: Dark yellowish-brown, poorly sorted, SILT, some fine Sand, trace Clay, slightly plastic, slightly coheisve, moist. Changing at 1.5 feet to: Dark brown to dark yellowish-brown, moderately sorted, fine to medium SAND, little Silt, trace Gravel, moist. Changing at 6.0 feet to: Dark yellowish-brown, moderately sorted, fine to medium SAND, trace Silt, trace Gravel, moist. Changing at 7.0 feet to: Yellowish-brown, well sorted, fine to medium SAND, trace Silt, moist. Changing at 7.4 feet to: NO RECOVERY.	SILT 1.5' SAND	1						
2														
3														
4														
5														
6														
7														
8														
9														
10		2	120/70			Dark yellowish-brown, poorly sorted, fine to coarse SAND, some Gravel, trace Silt, moist. Changing at 15.0 feet to: Yellowish-brown, moderately well sorted, fine to medium SAND, trace Silt, trace Gravel (silty clay on large gravel), moist. Changing at 15.8 feet to: NO RECOVERY.	7.4' NO RECOVERY 10' SAND							
11														
12														
13														
14														
15														
16							15.8' NO RECOVERY							
17														
18														
19														
20		3	120/115			Yellowish-brown, moderately well sorted, fine to medium SAND, trace Silt, trace Gravel (silty clay on large gravel), moist. Changing at 25.4 feet to: Yellowish-brown, poorly sorted, fine to coarse SAND, some Gravel, trace Silt, wet. Changing at 27.1 feet to: Hard, dark yellowish-brown, poorly sorted, Silty CLAY, trace Gravel, plastic, cohesive, moist. Changing at 28.6 feet to: Hard, dark grayish-brown, poorly sorted, Silty CLAY, trace Gravel, plastic, cohesive, moist. Changing at 29.6 feet to: NO RECOVERY.	20' SAND 27.1' Silty CLAY							
21														
22														
23														
24														
25														
26														
27														
28														
29							29.6' 30'							

REMARKS

1. Groundwater sample was collected from approximately 21.0 to 25.0 feet below ground surface and submitted for analytical laboratory testing.

COPY OF GAMMA LOG 62335.52 MDEQ WWW.GPJ GZA CORP.GDT 4/20/20

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-MW27E



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MDEQ Drilling

Rockford, Michigan

Boring No.: HS-MW27E

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File No.: 16.0062335.52

Check: Lori Powers

Depth	Elevation (ft.)	Sample Information				Sample Description & Classification	Stratum Desc.	Remarks	Gamma (API-GR)	Well Diagram
		No.	Pen./ Rec. (in.)	Blows (/6")	Test Data					
31		4	120/120			Hard, dark grayish-brown, poorly sorted, Silty CLAY, trace Gravel, plastic, cohesive, moist. Changing at 33.7 feet to: Grayish-brown to brown, poorly sorted, fine to coarse SAND, little Silt, trace Gravel, moist to wet. Changing at 36.4 feet to: Hard, dark grayish-brown, poorly sorted, Silty CLAY, trace Gravel, plastic, cohesive, moist. Changing at 36.9 feet to: Grayish-brown to brown, poorly sorted, fine to medium SAND, little Silt, trace Gravel, moist to wet. Changing at 37.0 feet to: Dark grayish-brown, poorly sorted, Silty CLAY, trace Gravel, plastic, cohesive, moist. Changing at 39.8 feet to: NO RECOVERY.	NO RECOVERY Silty CLAY 33.7' SAND 36.4' 36.9' Silty CLAY 37' SAND Silty CLAY 39.8' 40' NO RECOVERY SAND	2		
32										
33										
34										
35										
36										
37										
38										
39										
40		5	120/120			Brown, well sorted, fine to medium SAND, little Silt, lightly cohesive, wet. Changing at 45.6 feet to: Hard, dark grayish-brown, poorly sorted, Silty CLAY, trace Gravel, plastic, cohesive, moist. Changing at 48.8 feet to: Dark grayish-brown, well sorted, Silty CLAY, plastic, cohesive, moist, occasional very thin fine Sand, moist.	45.6' Silty CLAY	3		
41										
42										
43										
44										
45										
46										
47										
48										
49										
50		6	120/120			Brown, well sorted, fine to medium SAND, little Silt, lightly cohesive, wet. Changing at 51.1 feet to: Dark grayish-brown, well sorted, Silty CLAY, plastic, cohesive, moist. Changing at 51.5 feet to: Brown, well sorted, fine to medium SAND, little Silt, lightly cohesive, wet. Changing at 52.9 feet to: Dark grayish-brown, well sorted, Silty CLAY, plastic, cohesive, moist. Changing at 53.5 feet to: Brown, well sorted, fine to medium SAND, little Silt, lightly cohesive, wet. Changing at 54.8 feet to: Dark grayish-brown, well sorted, Silty CLAY, plastic, cohesive, moist.	50' SAND 51.1' 51.55' Silty CLAY 52.9' SAND 53.5' Silty CLAY 54.8' Silty CLAY	4		
51										
52										
53										
54										
55										
56										
57										
58										
59										
60		7	120/112			Dark grayish-brown, well sorted, Silty CLAY, plastic, cohesive, moist. Changing at 60.6 feet to: Brown, well sorted, fine to medium SAND, little Silt, lightly cohesive, wet. Changing at 63.8 feet to: Dark grayish-brown, well sorted, Silty CLAY, plastic, cohesive, moist. Changing at 67.8 feet to: Alternating layers of dark	60.6' SAND 63.8' Silty CLAY	5		
61										
62										
63										
64										

REMARKS

- Groundwater sample was collected from approximately 34.0 to 38.0 feet below ground surface and submitted for analytical laboratory testing.
- Groundwater sample was collected from approximately 41.0 to 45.0 feet below ground surface and submitted for analytical laboratory testing.
- Groundwater sample was collected from approximately 52.0 to 56.0 feet below ground surface and submitted for analytical laboratory testing.
- Groundwater sample was collected from approximately 60.0 to 64.0 feet below ground surface and submitted for analytical laboratory testing.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-MW27E



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Boring No.: HS-MW27E

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File No.: 16.0062335.52

Check: Lori Powers

Sample Information						Check:		Lori Powers						
Depth	Elevation (ft.,)	No.	Pen./ Rec. (in.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Gamma (API-GR)					Well Diagram
									0	20	40	60	80	
66		8	120/112			grayish-brown, well sorted, Silty CLAY, plastic, cohesive, and brown moderate sorted fine to medium SAND, little Silt, moist. Changing at 68.1 feet to: Dark grayish-brown, well sorted, Silty CLAY, well sorted, Silty CLAY, plastic, cohesive moist. Changing at 69.3 feet to: NO RECOVERY.	Silty CLAY							
67														
68														
69														
70														
71														
72														
73														
74														
75														
76														
77														
78														
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93														
94														
95														
96														
97														
98														
99														
REMARKS														

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Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-MW27E



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File No.: 16.0062335.52

Check: Lori Powers

Depth	Elevation (ft.)	Sample Information				Sample Description & Classification	Stratum Desc.	Remarks	Gamma (API-GR)	Well Diagram
		No.	Pen./ Rec. (in.)	Blows (/6")	Test Data					
101		11	60/60			Reddish-brown, moderately sorted, Silty CLAY (possible Red Beds), plastic, cohesive, moist. Changing at 103.8 feet to: White GYPSUM, fractured.	Silty CLAY			
102										
103										
104							103.8' GYPSUM			
105						Bottom of Borehole at 105.0 Feet	105'	6		
106										
107										
108										
109										
110										
111										
112										
113										
114										
115										
116										
117										
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128										
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130										
131										
132										
133										
134										
6. Monitoring well was installed in borehole upon completion. Well screen set from 59.0 to 63.0 feet below surface.										
R E M A R K S										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: HS-MW27E	

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Rockford, Michigan

Boring No.: HS-MW28A

Page: 1 of 1

File No.: 16.0062335.52

Check: Lori Powers

Contractor: Stock

Foreman: Ryan

Logged by: JTM

Date Start/Finish: 6-11-19 / 6-12-19

Boring Location: 6272 Belshire Ave. NE, Belmont, MI

GS Elev.: Datum:

Auger/
Casing

Type: Sonic

O.D. / I.D.: NA

Hammer Wt.: NA

Hammer Fall: NA

TOC Elev.:

Sampler

NA

NA

NA

NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: Survey Date:

		Sample Information						TOC Elev.: _____		Surveyed By: _____		Survey Date: _____		
Depth	Elevation (ft.)	No.	Pen./ Rec. (in.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Gamma (API-GR)				Well Diagram	
													PROTECTIVE CASING	
1						See HS-MW28E boring log for sample description and classification.			0	20	40	60	80	
2														
3														
4														
5														
6														
7														
8														
9														
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11														
12														
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37														
38														
39														
40														
41														
42														
43						Bottom of Borehole at 42.5 Feet		1						

REMARKS

1. Monitoring well was installed in borehole upon completion. Well screen set from 37.5 to 42.1 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-MW28A

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Rockford, Michigan

Boring No.: HS-MW28B

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File No.: 16.0062335.52

Check: Lori Powers

Contractor: Stock

Foreman: Ryan

Logged by: JTM

Date Start/Finish: 6-25-19 / 6-25-19

Boring Location: 6272 Belshire Ave. NE, Belmont, MI

GS Elev.: Datum:

Auger/Casing: Sonic

Sampler: NA

Type: NA

O.D. / I.D.: NA

Hammer Wt.: NA

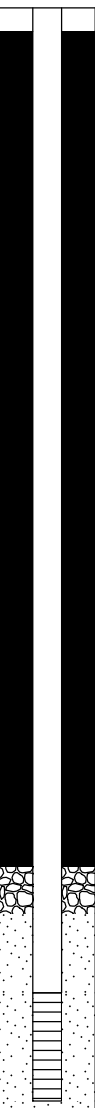
Hammer Fall: NA

TOC Elev.:

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: Survey Date:

		Sample Information				TOC Elev.: _____		Surveyed By: _____		Survey Date: _____				
Depth	Elevation (ft.)	No.	Pen./ Rec. (in.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Gamma (API-GR)			Well Diagram		
													PROTECTIVE CASING	
1						See HS-MW28E boring log for sample description and classification.			0	20	40	60	80	
2														
3														
4														
5														
6														
7														
8														
9														
10														
11														
12														
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43														
44														
45														
46														
47							Bottom of Borehole at 47.0 Feet		1					
48														

REMARKS

1. Monitoring well was installed in borehole upon completion. Well screen set from 41.9 to 46.5 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-MW28B



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Rockford, Michigan

Boring No.: HS-MW28C

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File No.: 16.0062335.52

Check: Lori Powers

Contractor: Stock

Foreman: Ryan

Logged by: JTM

Date Start/Finish: 6-25-19 / 6-25-19

Boring Location: 6272 Belshire Ave. NE, Belmont, MI

GS Elev.: Datum:

Auger/Casing

Sampler

Type: Sonic NA

O.D. / I.D.: NA NA

Hammer Wt.: NA NA

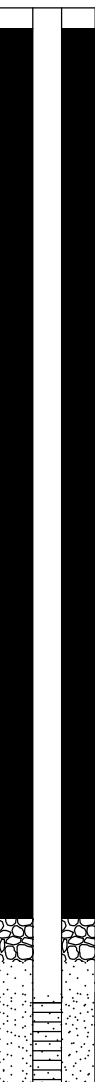
Hammer Fall: NA NA

TOC Elev.:

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: Survey Date:

		Sample Information				TOC Elev.: _____		Surveyed By: _____		Survey Date: _____				
Depth	Elevation (ft.)					Sample Description & Classification	Stratum Desc.	Remarks	Gamma (API-GR)				Well Diagram	
		No.	Pen./ Rec. (in.)	Blows (/6")	Test Data				0 20 40 60 80				PROTECTIVE CASING	
1						See HS-MW28E boring log for sample description and classification.			0	20	40	60	80	
2														
3														
4														
5														
6														
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49														
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51														
52														
53	Bottom of Borehole at 52.5 Feet							1						
54														

REMARKS

1. Monitoring well was installed in borehole upon completion. Well screen set from 47.5 to 52.1 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-MW28C



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Boring No.: HS-MW28D

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File No.: 16.0062335.52

Check: Lori Powers

Contractor: Stock

Foreman: Ryan

Logged by: JTM

Date Start/Finish: 6-11-19 / 6-11-19

Boring Location: 6272 Belshire Ave. NE, Belmont, MI

GS Elev.: Datum:

Auger/
Casing

Type: Sonic NA

O.D. / I.D.: NA NA

Hammer Wt.: NA NA

Hammer Fall: NA NA

TOC Elev.:

Sampler

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: Survey Date:

Depth	Elevation (ft.)	Sample Information				Sample Description & Classification	Stratum Desc.	Remarks	Gamma (API-GR)					Well Diagram
		No.	Pen./ Rec. (in.)	Blows (/6")	Test Data									
1						See HS-MW-28E boring log for sample description and classification.								
2														
3														
4														
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44														

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-MW28D



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Rockford, Michigan

Boring No.: HS-MW28D

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File No.: 16.0062335.52

Check: Lori Powers

Depth	Elevation (ft.)	Sample Information				Sample Description & Classification	Stratum Desc.	Remarks	Gamma (API-GR)						Well Diagram
		No.	Pen./ Rec. (in.)	Blows (/6")	Test Data				0	20	40	60	80	100	
46															
47															
48															
49															
50															
51															
52															
53															
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97															
REMARKS															
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.															

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Boring No.: HS-MW28D



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Rockford, Michigan

Boring No.: HS-MW28D

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File No.: 16.0062335.52

Check: Lori Powers

Depth	Elevation (ft.)	Sample Information				Sample Description & Classification	Stratum Desc.	Remarks	Gamma (API-GR)					Well Diagram
		No.	Pen./ Rec. (in.)	Blows (/6")	Test Data				0	20	40	60	80	
98														
99														
100														
101														
102														
103														
104														
105														
106														
107														
108														
109														
110														
111						Bottom of Borehole at 110.0 Feet		1						
112														
113														
114														
115														
116														
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120														
121														
122														
123														
124														
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148														
149														
REMARKS 1. Monitoring well was installed in borehole upon completion. Well screen set from 80.6 to 85.2 feet below ground surface.														
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.														

Boring No.: HS-MW28D

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Rockford, Michigan

Boring No.: HS-MW28E

Page: 1 of 6

File No.: 16.0062335.52

Check: Lori Powers

Contractor: Stock

Foreman: Ryan

Logged by: JTM

Date Start/Finish: 6-5-19 / 6-11-19

Boring Location: 6272 Belshire Ave. NE, Belmont, MI

GS Elev.: Datum:

Auger/Casing: Sonic

Sampler: NA

Type: NA

O.D. / I.D.: NA

Hammer Wt.: NA

Hammer Fall: NA

TOC Elev.:

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: Survey Date:

Depth Elevation (ft.)		Sample Information				Sample Description & Classification	Stratum Desc.	Remarks	Surveyed By: _____					Survey Date: _____	
		No.	Pen./ Rec. (in.)	Blows (/6")	Test Data				Gamma (API-GR)					Well Diagram	
									0 20 40 60 80					PROTECTIVE CASING	
1		1	120/30			Dark yellowish-brown, poorly sorted, fine to coarse SAND, some Gravel, trace Silt, moist. Changing at 1.2 feet to: Dark yellowish-brown, well sorted, fine to medium SAND, trace Silt, moist. Changing at 1.4 feet to: Yellowish-brown, poorly sorted, fine to coarse SAND, some Gravel, trace Silt, moist. Changing at 2.5 feet to: NO RECOVERY.	SAND								
2							2.5'								
3							NO RECOVERY								
4															
5															
6															
7															
8															
9															
10		2	120/118			Yellowish-brown grading to dark yellowish-brown, moderately sorted, fine to medium SAND, trace Gravel, trace Silt, grading coarser, moist. Changing at 12.6 feet to: Dark yellowish-brown, poorly sorted, fine to coarse SAND, little Gravel, trace Silt, moist. Changing at 14.6 feet to: Dark grayish-brown, poorly sorted, SILT, little Sand, trace Clay, trace Gravel, non-plastic, slightly cohesive, moist around cobble. Changing at 15.0 feet to: Yellowish-brown, well sorted, brown, well sorted, fine to medium SAND, trace Silt, moist. Changing at 19.8 feet to: NO RECOVERY.	10' SAND								
11															
12															
13															
14															
15							14.6' 15' SILT SAND								
16															

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-MW28E



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MDEQ Drilling

Rockford, Michigan

Boring No.: HS-MW28E

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File No.: 16.0062335.52

Check: Lori Powers

Depth	Elevation (ft.)	Sample Information				Sample Description & Classification	Stratum Desc.	Remarks	Gamma (API-GR)						Well Diagram
		No.	Pen./ Rec. (in.)	Blows (/6")	Test Data										
18							SAND								
19															
20		3	120/101			Yellowish-brown, well sorted, fine to medium SAND, trace Silt, trace Gravel, moist. Changing at 28.4 feet to: NO RECOVERY.	19.8' 20' NO RECOVERY SAND								
21															
22															
23															
24															
25															
26															
27															
28							28.4' NO RECOVERY								
29															
30		4	120/118			Pale brown to light yellowish-brown, well sorted, fine to medium SAND, trace Silt, moist. Changing at 39.8 feet to: NO RECOVERY.	30' SAND								
31															
32															
33															
34															
35															
36															
REMARKS															
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.														Boring No.: HS-MW28E	

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Boring No.: HS-MW28E

Page: 3 of 6

File No.: 16.0062335.52

Check: Lori Powers

Depth	Elevation (ft.)	Sample Information				Sample Description & Classification	Stratum Desc.	Remarks	Gamma (API-GR)						Well Diagram
		No.	Pen./ Rec. (in.)	Blows (/6")	Test Data										
37							SAND								
38															
39															
40		5	120/41			Pale brown to light yellowish-brown, well sorted, fine to medium SAND, trace Silt, trace Gravel, moist. Changing at 40.5 feet to: Yellowish-brown, poorly sorted, fine to coarse SAND, some Gravel, trace Silt, moist to wet. Changing at 41.5 feet to: Yellowish-brown, well sorted, fine to medium SAND, trace Silt, wet. Changing at 42.0 feet to: Dark yellowish-brown, poorly sorted, GRAVEL, little coarse Sand, trace Silt, wet. Changing at 43.4 feet to: NO RECOVERY.	39.8' 40' NO RECOVERY SAND								
41															
42							42' GRAVEL	1							
43							42.9' SAND 43.4' NO RECOVERY								
44															
45															
46															
47															
48															
49															
50		6	120/115			Yellowish-brown, well sorted, fine to medium SAND, trace Silt, wet. Changing at 52.5 feet to: Grayish-brown, poorly sorted, Sandy CLAY, little Silt, moderately plastic, cohesive, moist to wet. Changing at 59.6 feet to: NO RECOVERY.	50' SAND	2							
51															
52							52.5' CLAY & SILT								
53															
54															
55															
56							56.4'								

REMARKS

- Groundwater sample was collected from approximately 42.0 to 44.0 feet below ground surface and submitted for analytical laboratory testing.
- Groundwater sample was collected from approximately 51.0 to 53.0 feet below ground surface and submitted for analytical laboratory testing.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-MW28E

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Boring No.: HS-MW28E

Page: 4 of 6

File No.: 16.0062335.52

Check: Lori Powers

Depth	Elevation (ft.)	Sample Information				Sample Description & Classification	Stratum Desc.	Remarks	Gamma (API-GR)						Well Diagram
		No.	Pen./ Rec. (in.)	Blows (/6")	Test Data										
57							Sandy CLAY								
58															
59															
60		7	120/74			Brown, well sorted, fine to medium SAND, trace Silt, wet. Changing at 60.7 feet to:	59.6' 60' NO RECOVERY SAND								
61						Brown, moderately well sorted, SILT, some fine Sand, non-plastic, moderately cohesive, wet. Changing at 60.9 feet to: Brown, well	60.7' 60.9' SILT SAND								
62						sorted, fine to medium SAND, trace Silt, wet. Changing at 61.7 feet to: Brown,	61.7' 62' SILT SAND								
63						moderately well sorted, SILT, some fine Sand, non-plastic, moderately cohesive, wet. Changing at 62.0 feet to: Brown, well									
64						sorted, fine to medium SAND, trace Silt, wet. Changing at 62.5 feet to: Dark	63.8' 63.9' GRAVEL SAND								
65						yellowish-brown, poorly sorted, fine to coarse SAND, little Gravel, trace Silt, wet. Changing at 63.3 feet to: Brown, well sorted,	64.6' GRAVEL SAND								
66						fine to medium SAND, trace Silt, wet. Changing at 63.8 feet to: Dark	65.1' SAND								
67						yellowish-brown, poorly sorted, GRAVEL, little fine to coarse Sand, trace Silt, wet. Changing at 63.9 feet to: Brown, well sorted,	66.2' NO RECOVERY								
68						fine to medium SAND, trace Silt, wet. Changing at 64.6 feet to: Dark									
69						yellowish-brown, poorly sorted, GRAVEL, little fine to coarse Sand, trace Silt, wet. Changing at 65.1 feet to: Brown, well sorted,									
70		8	120/83			fine to medium SAND, trace Gravel, trace Silt, wet. Changing at 66.2 feet to: NO RECOVERY.									
71						Brown, well sorted, fine to medium SAND, trace Gravel, trace Silt, wet. Changing at 76.9 feet to: NO RECOVERY.	70' SAND	3							
72															
73															
74															
75															
76															
REMARKS 3. Groundwater sample was collected from approximately 70.5 to 72.5 feet below ground surface and submitted for analytical laboratory testing.															
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.															

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Boring No.: HS-MW28E



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Boring No.: HS-MW28E

Page: 5 of 6

File No.: 16.0062335.52

Check: Lori Powers

Depth	Elevation (ft.)	Sample Information				Stratum Desc.	Remarks	Gamma (API-GR)	Well Diagram
		No.	Pen./ Rec. (in.)	Blows (/6")	Test Data				
77						76.9' SAND NO RECOVERY			
78									
79									
80		9	120/120			80' SAND			
81							4		
82									
83									
84									
85						85' Silty CLAY			
86									
87									
88									
89									
90		10	120/120						
91									
92									
93									
94									
95									
96									
4. Groundwater sample was collected from approximately 81.0 to 85.0 feet below ground surface and submitted for analytical laboratory testing.									
REMARKS									
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.								Boring No.: HS-MW28E	

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Boring No.: HS-MW28E

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File No.: 16.0062335.52

Check: Lori Powers

Depth	Elevation (ft.)	Sample Information				Sample Description & Classification	Stratum Desc.	Remarks	Gamma (API-GR)	Well Diagram
		No.	Pen./ Rec. (in.)	Blows (/6")	Test Data					
97							Silty CLAY			
98										
99										
100		11	120/120			Dark grayish-brown, poorly sorted, Silty CLAY, trace Sand, trace Gravel, plastic, cohesive, moist. Changing at 102.7 feet to: Brownish-red, poorly consolidated, weathered SHALE, some gypsum, trace Gravel, moist.				
101										
102										
103							102.7' SHALE			
104										
105										
106										
107										
108										
109										
110						Bottom of Borehole at 110.0 Feet	110'	5		
111										
112										
113										
114									-999.25	
115										
116										

REMARKS

5. Monitoring well was installed in borehole upon completion. Well screen set from 80.6 to 85.2 feet below surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-MW28E

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Belmont, Michigan

Boring No.: HS-MW-29A

Page: 1 of 1

File No.: 16.0062335.52

Check: JTM/JMG

Contractor: Stearns Drilling Company

Foreman: Gary Geerligns

Logged by: Christopher Melby

Date Start/Finish: 10-4-19 / 10-4-19

Boring Location:

GS Elev.: Datum:

Auger/
Casing

Sampler

GROUNDWATER READINGS

Type: Hollow Stem Auger

Split Spoon

O.D. / I.D.: 8.0" / 4.25"

2.0" / 1 3/8"

Hammer Wt.: 140lbs

NA

Hammer Fall: 30"

NA

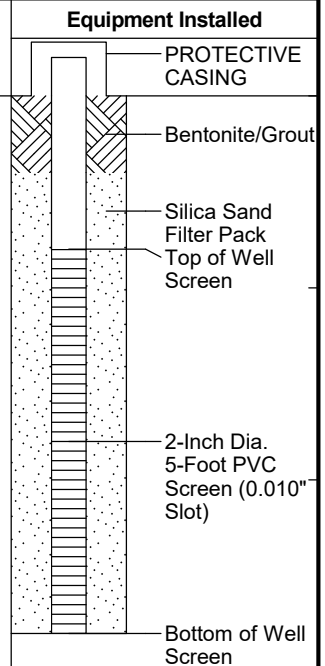
TOC Elev.: NA

NA

Date	Time	Depth	Casing	Stab

Surveyed By: NA Survey Date:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
1						See HS-MW-29D for detailed soil descriptions.				
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15						Bottom of Borehole at 14.0 Feet				
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										



REMARKS

1. Monitoring well HS-MW-29A was installed in borehole upon completion. Well screen set from approximately 4.0 to 14.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-MW-29A

BORING WELL 62355.52 HOUSE STREET COMPLETE.GPJ GZA CORP.GDT 4/15/20



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Boring No.: HS-MW-29B

Page: 1 of 1

File No.: 16.0062335.52

Check: JTM/JMG

Contractor: Stearns Drilling Company

Foreman: Gary Geerligns

Logged by: Christopher Melby

Date Start/Finish: 10-4-19 / 10-4-19

Boring Location:

GS Elev.: Datum:

Auger/
Casing

Sampler

Type: Hollow Stem Auger

Split Spoon

O.D. / I.D.: 8.0" / 4.25"

2.0" / 1 3/8"

Hammer Wt.: 140lbs

NA

Hammer Fall: 30"

NA

TOC Elev.: NA

NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: NA Survey Date:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					PROTECTIVE CASING
1						See HS-MW-29D for detailed soil descriptions.				
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23						Bottom of Borehole at 22.0 Feet		1		
24										
25										
26										
27										
28										
29										

Bentonite/Grout

Silica Sand Filter Pack
Top of Well Screen

2-Inch Dia.
5-Foot PVC Screen (0.010" Slot)
Bottom of Well Screen

REMARKS

1. Monitoring well HS-MW-29A was installed in borehole upon completion. Well screen set from approximately 17.0 to 22.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-MW-29B

BORING WELL 62355.52 HOUSE STREET COMPLETE.GPJ GZA CORP.GDT 4/15/20



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Boring No.: HS-MW-29C

Page: 1 of 1

File No.: 16.0062335.52

Check: JTM/JMG

Contractor: Stearns Drilling Company

Foreman: Gary Geerlign

Logged by: Christopher Melby

Date Start/Finish: 10-2-19 / 10-3-19

Boring Location:

GS Elev.: Datum:

Auger/
Casing

Sampler

Type: Hollow Stem Auger

Split Spoon

O.D. / I.D.: 8.0" / 4.25"

2.0" / 1 3/8"

Hammer Wt.: 140lbs

NA

Hammer Fall: 30"

NA

TOC Elev.: NA

NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: NA Survey Date:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					PROTECTIVE CASING
1						See HS-MW-29D for detailed soil descriptions.				
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										
31										
32										
33						Bottom of Borehole at 32.0 Feet		1		

REMARKS

1. Monitoring well HS-MW-29A was installed in borehole upon completion. Well screen set from approximately 27.0 to 32.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-MW-29C

BORING WELL 62355.52 HOUSE STREET COMPLETE.GPJ GZA CORP.GDT 4/15/20



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Boring No.: HS-MW-29D

Page: 1 of 2

File No.: 16.0062335.52

Check: JTM/JMG

Contractor: Stearns Drilling Company

Foreman: Gary Geerligns

Logged by: Christopher Melby

Date Start/Finish: 10-1-19 / 10-2-19

Boring Location:

GS Elev.: Datum:

Auger/
Casing

Sampler

Type: Hollow Stem Auger

Split Spoon

O.D. / I.D.: 8.0" / 4.25"

2.0" / 1 3/8"

Hammer Wt.: 140lbs

NA

Hammer Fall: 30"

NA

TOC Elev.: NA

NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: NA Survey Date:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					PROTECTIVE CASING
1	1	60/33	0-5		0.0 ppm	Dark brown, fine to medium SAND, little Organic Matter (TOPSOIL). Changing at 1.2 feet to: Brown and gray, CLAY & SILT, little fine Sand, wet with Gravel in tip of sleeve at 2.7 feet.	SAND (TOPSOIL) 1.2' SAND	1		
2										
3										
4										
5	2	60/48	5-10		0.0 ppm	Brown and gray, fine to medium SAND, little Silt, wet.				
6										
7										
8										
9										
10	3	60/60	10-15		0.0 ppm	Brown, fine to medium SAND, little Silt, wet.		2		
11										
12										
13										
14										
15	4	60/57	15-20		0.0 ppm	Brown, fine to medium SAND, little to trace Silt, wet (SM).				
16										
17										
18										
19										
20	5	60/60	20-25		0.0 ppm	Brown, fine to medium SAND, trace Silt, wet.		3		
21										
22										
23										
24										
25	6	60/60	25-30		0.0 ppm	Brown, fine to medium SAND, trace Silt, wet.				
26										
27										
28										
29										

Bentonite/Grout

REMARKS

- Field screening of samples for organic vapors was performed with a MiniRae 2000 photoionization detector equipped with a 10.6 eV lamp. Readings are shown in parts per million (ppm) of isobutylene. Background was measured at 0.0 ppm.
- Soil sample was collected from approximately 11.0 to 15.0 feet below ground surface and submitted for analytical laboratory testing.
- Groundwater sample was collected from approximately 21.0 to 25.0 feet below ground surface and submitted for analytical laboratory analysis.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-MW-29D

BORING WELL 62355.52 HOUSE STREET COMPLETE.GPJ GZA CORP.GDT 4/15/20



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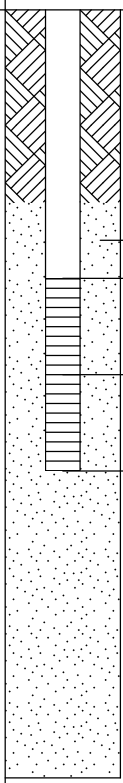
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Boring No.: HS-MW-29D

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File No.: 16.0062335.52

Check: JTM/JMG

Sample Information								Check:	JTM/JMG
Depth	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
31	7	60/60	30-35		0.0 ppm	Brown, fine to medium SAND, trace Silt, wet with small Gravel layer from 33.0 to 33.4 feet.	SAND	4	 <p>Silica Sand Filter Pack Top of Well Screen 2-Inch Dia. 5-Foot PVC Screen (0.010" Slot) Bottom of Well Screen</p>
32									
33									
34									
35	8	60/60	35-40		0.0 ppm	Brown, fine to medium SAND, trace Silt, wet.			
36									
37									
38									
39									
40	9	60/60	40-45		0.0 ppm	Brown, fine to medium SAND, trace Silt, wet.		5	
41									
42									
43									
44									
45	10	60/60	45-50		0.0ppm	Brown, fine to medium SAND, trace Silt, wet.		6	
46									
47									
48									
49									
50						Bottom of Borehole at 50.0 Feet	50'	7	
51									
52									
53									
54									
55									
56									
57									
58									
59									
60									
61									
62									
63									
64									

REMARKS	4. Groundwater sample was collected from approximately 31.0 to 35.0 feet below ground surface and submitted for analytical laboratory analysis.
	5. Groundwater sample was collected from approximately 41.0 to 45.0 feet below ground surface and submitted for analytical laboratory analysis.
	6. Soil sample was collected from approximately 46.0 to 50.0 feet below ground surface and submitted for analytical laboratory testing.
	7. Monitoring well was installed in borehole upon completion. Well screen set from 76.0 to 86.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.	Boring No.: HS-MW-29D
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BORING WELL 62355.52 HOUSE STREET COMPLETE.GPJ GZA CORP.GDT 4/15/20



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Rockford, Michigan

Boring No.: HS-MW30A

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File No.: 16.0062335.52

Check: Lori Powers

Contractor: Stock

Foreman: Ryan

Logged by: JTM

Date Start/Finish: 5-22-19 / 5-22-19

Boring Location: 6205 Packer Drive, NE, Belmont, MI

GS Elev.: Datum:

Auger/
Casing

Sampler

Type: Sonic

NA

O.D. / I.D.: NA

NA

Hammer Wt.: NA

NA

Hammer Fall: NA

NA

TOC Elev.:

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: Survey Date:

Depth Elevation (ft.)		Sample Information				TOC Elev.: _____		Surveyed By: _____		Survey Date: _____	
		No.	Pen./ Rec. (in.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Gamma (API-GR)		Well Diagram
						See HS-MW-30E boring log for sample description and classification.			0 20 40 60 80		PROTECTIVE CASING
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											
15											
16											
17											
18											
19											
20											
21											
22											
23											
24											
25											
26											
27											

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-MW30A



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Boring No.: HS-MW30A

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File No.: 16.0062335.52

Check: Lori Powers

ROCKFORD, MICHIGAN										Check: Lori Powers						
Depth	Elevation (ft.)	Sample Information				Sample Description & Classification	Stratum Desc.	Remarks	Gamma (API-GR)					Well Diagram		
		No.	Pen./ Rec. (in.)	Blows (/6")	Test Data				0	20	40	60	80			100
29																
30																
31																
32																
33																
34																
35																
36																
37																
38																
39																
40																
41																
42																
43																
44																
45																
46																
47																
48																
49																
50						Bottom of Borehole at 50.0 Feet		1								
51																
52																
53																
54																
55																
56																
57																
58																
59																
60																

REMARKS

1. Monitoring well was installed in borehole upon completion. Well screen set from 45.1 to 49.7 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-MW30A

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Boring No.: HS-MW30B

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File No.: 16.0062335.52

Check: Lori Powers

Contractor: Stock

Foreman: Ryan

Logged by: JTM

Date Start/Finish: 5-30-19 / 5-30-19

Boring Location: 6205 Packer Drive, NE, Belmont, MI

GS Elev.: Datum:

Auger/
Casing

Sampler

Type: Sonic NA

O.D. / I.D.: NA NA

Hammer Wt.: NA NA

Hammer Fall: NA NA

TOC Elev.:

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: Survey Date:

Depth	Elevation (ft.)	Sample Information				Sample Description & Classification	Stratum Desc.	Remarks	Gamma (API-GR)					Well Diagram
		No.	Pen./ Rec. (in.)	Blows (/6")	Test Data									
1						See HS-MW-30E boring log for sample description and classification.								
2														
3														
4														
5														
6														
7														
8														
9														
10														
11														
12														
13														
14														
15														
16														
17														
18														
19														
20														
21														
22														
23														
24														
25														
26														
27														
28														
29														

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-MW30B



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Boring No.: HS-MW30B

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File No.: 16.0062335.52

Check: Lori Powers

Depth	Elevation (ft.)	Sample Information				Sample Description & Classification	Stratum Desc.	Remarks	Gamma (API-GR)						Well Diagram
		No.	Pen./ Rec. (in.)	Blows (/6")	Test Data				0	20	40	60	80	100	
31															
32															
33															
34															
35															
36															
37															
38															
39															
40															
41															
42															
43															
44															
45															
46															
47															
48															
49															
50															
51															
52															
53															
54															
55						Bottom of Borehole at 55.0 Feet		1							
56															
57															
58															
59															
60															
61															
62															
63															
64															

REMARKS

1. Monitoring well was installed in borehole upon completion. Well screen set from 49.3 to 53.9 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-MW30B

COPY OF GAMMA LOG 62335.52 MDEQ WWW.GPJ GZA CORP.GDT 4/17/20



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Rockford, Michigan

Boring No.: HS-MW30C

Page: 1 of 2

File No.: 16.0062335.52

Check: Lori Powers

Contractor: Stock

Foreman: Ryan

Logged by: JTM

Date Start/Finish: 5-29-19 / 5-29-19

Boring Location: 6205 Packer Drive, NE, Belmont, MI

GS Elev.: Datum:

Auger/
Casing

Sampler

Type: Sonic NA

O.D. / I.D.: NA NA

Hammer Wt.: NA NA

Hammer Fall: NA NA

TOC Elev.:

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: Survey Date:

Depth	Elevation (ft.)	Sample Information				TOC Elev.: _____		Surveyed By: _____		Survey Date: _____																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
		No.	Pen./ Rec. (in.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Gamma (API-GR)		Well Diagram																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-MW30C



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Rockford, Michigan

Boring No.: HS-MW30C

Page: 2 of 2

File No.: 16.0062335.52

Check: Lori Powers

Depth	Elevation (ft.)	Sample Information				Sample Description & Classification	Stratum Desc.	Remarks	Gamma (API-GR)						Well Diagram
		No.	Pen./ Rec. (in.)	Blows (/6")	Test Data				0	20	40	60	80	100	
42															
43															
44															
45															
46															
47															
48															
49															
50															
51															
52															
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67															
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69															
70															
71															
72															
73															
74															
75															
76															
77															
78															
79															
80						Bottom of Borehole at 80.0 Feet		1							
81															
82															
83															
84															
85															
86															
87															
88															

REMARKS

1. Monitoring well was installed in borehole upon completion. Well screen set from 74.3 to 78.9 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-MW30C

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Rockford, Michigan

Boring No.: HS-MW30D

Page: 1 of 2

File No.: 16.0062335.52

Check: Lori Powers

Contractor: Stock

Foreman: Ryan

Logged by: JTM

Date Start/Finish: 5-31-19 / 6-3-19

Boring Location: 6205 Packer Drive, NE, Belmont, MI

GS Elev.: Datum:

Auger/
Casing

Type: Sonic

O.D. / I.D.: NA

Hammer Wt.: NA

Hammer Fall: NA

TOC Elev.:

Sampler

NA

NA

NA

NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: Survey Date:

Depth	Elevation (ft.)	Sample Information				TOC Elev.: _____		Surveyed By: _____		Survey Date: _____	
		No.	Pen./ Rec. (in.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Gamma (API-GR)		Well Diagram
1						See HS-MW-30E boring log for sample description and classification.			0 20 40 60 80		<div>PROTECTIVE CASING</div>
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											
15											
16											
17											
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19											
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47											
48											
49											
50											
51											
52											
53											
54											
55											
56											

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-MW30D



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Rockford, Michigan

Boring No.: HS-MW30D

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File No.: 16.0062335.52

Check: Lori Powers

Depth	Elevation (ft.)	Sample Information				Sample Description & Classification	Stratum Desc.	Remarks	Gamma (API-GR)						Well Diagram
		No.	Pen./ Rec. (in.)	Blows (/6")	Test Data				0	20	40	60	80	100	
58															
59															
60															
61															
62															
63															
64															
65															
66															
67															
68															
69															
70															
71															
72															
73															
74															
75															
76															
77															
78															
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80															
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90															
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97															
98															
99															
100															
101															
102															
103															
104															
105															
106															
107															
108															
109															
110															
111															
112															
113															
114															
115															
116						Bottom of Borehole at 115.0 Feet		1							
117															
118															
119															
120															
121															
122															
123															

REMARKS

1. Monitoring well was installed in borehole upon completion. Well screen set from 109.5 to 114.1 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-MW30D



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Rockford, Michigan

Boring No.: HS-MW30E

Page: 1 of 6

File No.: 16.0062335.52

Check: Lori Powers

Contractor: Stock

Foreman: Ryan

Logged by: JTM

Date Start/Finish: 5-13-19 / 5-28-19

Boring Location: 6205 Packer Drive, NE, Belmont, MI

GS Elev.: Datum:

Auger/
Casing

Type: Sonic NA

O.D. / I.D.: NA NA

Hammer Wt.: NA NA

Hammer Fall: NA NA

TOC Elev.:

Sampler

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: Survey Date:

Depth Elevation (ft.)		Sample Information				Sample Description & Classification	Stratum Desc.	Remarks	Gamma (API-GR)				Well Diagram	
		No.	Pen./ Rec. (in.)	Blows (/6")	Test Data				PROTECTIVE CASING					
1		1	120/56		0.0 ppm	Very dark brown to dark brown, moderately well sorted, fine to medium SAND, some Silt, moist. Changing at 1.0 feet to: Dark yellowish-brown, moderately sorted, fine to medium SAND, little Silt, moist. Changing at 3.0 feet to: Yellowish-brown, poorly sorted, fine to coarse SAND, trace Gravel, trace Silt, moist. Changing at 4.7 feet to: NO RECOVERY.	SAND	1						
2					4.7' NO RECOVERY									
3														
4														
5														
6														
7														
8														
9														
10		2	120/48		0.0 ppm	Brown to yellowish-brown, poorly sorted, coarse to medium SAND, some Gravel, trace Silt, moist. Changing at 10.8 feet to: Brown to yellowish-brown, poorly sorted, coarse to medium SAND, some Gravel, some Silt, non-plastic, cohesive, moist. Changing at 11.0 feet to: Brown to yellowish-brown, poorly sorted, coarse to medium SAND, some Gravel, trace Silt, moist. Changing at 11.4 feet to: Light yellowish-brown, moderately well sorted, fine to medium SAND, trace Silt, moist. Changing at 12.4 feet to: Yellowish-brown, poorly sorted, fine to coarse SAND, little Gravel, trace Silt, moist. Changing at 14.0 feet to: NO RECOVERY.	10' SAND							
11														
12														
13														
14														
15														
16														
17														
18														
19														
20		3	120/65		0.0 ppm	Yellowish-brown to dark yellowish-brown, poorly sorted, fine to coarse SAND, little Gravel, moist. Changing at 21.7 feet to: Yellowish-brown to brown, poorly sorted, fine to medium SAND, trace Gravel, trace Silt, moist. Changing at 22.8 feet to: Dark yellowish-brown to dark brown, poorly sorted, fine to coarse SAND, some gravel,	20' SAND							
21														
22														
23														

REMARKS

- Field screening of samples for organic vapors was performed with a MiniRae 3000 photoionization detector equipped with a 10.6 eV lamp. Readings above levels are shown in parts per million (ppm) isobutylene. Background was measured at 0.0 ppm.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-MW30E

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Rockford, Michigan

Boring No.: HS-MW30E

Page: 2 of 6

File No.: 16.0062335.52

Check: Lori Powers

Depth	Elevation (ft.)	Sample Information				Sample Description & Classification	Stratum Desc.	Remarks	Gamma (API-GR)	Well Diagram
		No.	Pen./ Rec. (in.)	Blows (/6")	Test Data					
25						trace Silt, moist. Changing at 25.4 feet to: NO RECOVERY.	SAND			
26							25.4' NO RECOVERY			
27										
28										
29										
30		4	120/58		0.0 ppm	Yellowish-brown to dark yellowish-brown, poorly sorted, fine to coarse SAND, little Gravel, trace Silt, moist. Changing at 31.3 feet to: Light yellowish-brown, moderately well sorted, fine to medium SAND, trace Silt, moist. Changing at 34.8 feet to: NO RECOVERY.	30' SAND			
31										
32										
33										
34										
35							34.8' NO RECOVERY			
36										
37										
38										
39										
40		5	120/0			NO RECOVERY.				
41										
42										
43										
44										
45										
46										
47										
48										
49										
50		6	120/19		0.0 ppm	Yellowish-brown, poorly sorted, medium to coarse SAND, some Gravel, trace Silt, wet. Changing at 50.9 feet to: Dark yellowish-brown, poorly sorted, medium to	50' SAND			
51							51.6'			

REMARKS

2. Groundwater sample collected from 52.0 to 54.0 feet and submitted for analytical laboratory testing.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-MW30E

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Rockford, Michigan

Boring No.: HS-MW30E

Page: 3 of 6

File No.: 16.0062335.52

Check: Lori Powers

Depth	Elevation (ft.)	Sample Information				Sample Description & Classification	Stratum Desc.	Remarks	Gamma (API-GR)	Well Diagram
		No.	Pen./ Rec. (in.)	Blows (/6")	Test Data					
53						coarse SAND, some Gravel, trace Silt, wet. Changing at 51.6 feet to: NO RECOVERY.	NO RECOVERY	2		
54										
55										
56										
57										
58										
59										
60		7	120/97		0.0 ppm	Yellowish-brown, poorly sorted, GRAVEL, some fine to coarse grained Sand, trace Silt, wet. Changing at 60.5 feet to:	60' GRAVEL	3		
61						Yellowish-brown, moderately well sorted, fine to medium SAND, trace Silt, wet.	60.5' SAND			
62						Changing at 62.5 feet to: Grayish-brown to dark brown, poorly sorted, Silty CLAY, little Sand, plastic, cohesive, moist. Changing at 63.5 feet to: Grayish-brown to dark grayish-brown, poorly sorted, Silty CLAY, trace Gravel, trace Sand, plastic, cohesive, moist. Changing at 68.1 feet to: NO RECOVERY.	62.5' CLAY			
63										
64										
65										
66										
67										
68							68.1' NO RECOVERY			
69										
70		8	120/119		0.0 ppm	Grayish-brown to dark grayish-brown, poorly sorted, Silty CLAY, trace Gravel, trace Sand, plastic, cohesive, moist. Changing at 72.6 feet to: Dark yellowish-brown to dark red, poorly sorted, coarse SAND, little Gravel, trace Silt, wet. Changing at 77.9 feet to: Brown to yellowish-brown, well sorted, fine SAND, little Silt, wet. Changing at 79.9 feet to: NO RECOVERY.	70' Silty CLAY	4		
71										
72							72.6' SAND			
73										
74										
75										
76										
77										
78										
79							79.9'			

REMARKS

- Groundwater sample collected from 61.0 to 63.0 feet and submitted for analytical laboratory testing.
- Groundwater sample collected from 75.0 to 77.0 feet and submitted for analytical laboratory testing.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-MW30E



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Rockford, Michigan

Boring No.: HS-MW30E

Page: 4 of 6

File No.: 16.0062335.52

Check: Lori Powers

Depth	Elevation (ft.)	Sample Information				Sample Description & Classification	Stratum Desc.	Remarks	Gamma (API-GR)	Well Diagram
		No.	Pen./ Rec. (in.)	Blows (/6")	Test Data					
81		9	120/114		0.0 ppm	Brown to yellowish-brown, well sorted, fine SAND, little Silt, wet. Changing at 83.7 feet to: Dark red, very well sorted, fine SAND, trace Silt, wet. Changing at 83.8 feet to: Dark grayish-brown to dark brown, poorly sorted, Silty CLAY, trace Gravel, trace Sand, plastic, cohesive, moist. Changing at 84.2 feet to: Dark grayish-brown to dark brown, very well sorted, SILT, wet. Changing at 85.2 feet to: Dark grayish-brown to dark brown, poorly sorted, Silty CLAY, trace Gravel, trace Sand, plastic, cohesive, moist. Changing at 86.9 feet to: Yellowish-brown, moderately sorted, SILT, wet, with thin dark brown, Silty Clay stringers, moist. Changing at 87.2 feet to: Brown, very well sorted, SILT, some fine grained Sand, wet. Changing at 89.5 feet to: NO RECOVERY.	80' NO RECOVERY SAND			
82							83.8'			
83							84.2' Silty CLAY			
84							85.2' SILT			
85							Silty CLAY			
86							86.9'			
87							SILT			
88										
89							89.5'			
90		10	120/108		0.0 ppm	Yellowish-brown, very well sorted, fine SAND, little Silt, wet. Changing at 99.0 feet to: NO RECOVERY.	90' NO RECOVERY SAND			
91										
92										
93										
94										
95										
96										
97										
98										
99							99'			
100		11	120/96		0.0 ppm	Yellowish-brown, very well sorted, fine SAND, little Silt, wet. Changing at 108.0 feet to: NO RECOVERY.	100' NO RECOVERY SAND	5		
101										
102										
103										
104										
105										
106										
107							108'			

REMARKS

5. Groundwater sample collected from 100.0 to 102.0 feet and submitted for analytical laboratory testing.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-MW30E

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Rockford, Michigan

Boring No.: HS-MW30E

Page: 5 of 6

File No.: 16.0062335.52

Check: Lori Powers

Depth	Elevation (ft.)	Sample Information				Sample Description & Classification	Stratum Desc.	Remarks	Gamma (API-GR)						Well Diagram
		No.	Pen./ Rec. (in.)	Blows (/6")	Test Data										
109							NO RECOVERY								
110		12	120/95		0.0 ppm	Yellowish-brown, very well sorted, fine SAND, little Silt, wet. Changing at 111.3 feet to: Yellowish-brown, very well sorted SILT, little fine grained Sand, slightly cohesive, wet. Changing at 111.8 feet to: Yellowish-brown, very well sorted, fine SAND, little Silt, wet. Changing at 117.9 feet to: NO RECOVERY.	110' SAND	6							
111							111.3' SILT								
112							111.8' SAND								
113															
114															
115															
116															
117															
118															
119															
120		13	120/76		0.0 ppm	Yellowish-brown, very well sorted, fine SAND, little Silt, grading slightly coarser (fine to medium grained SAND, trace Gravel, little Silt), wet. Changing at 126.3 feet to: NO RECOVERY.		7							
121															
122															
123															
124															
125															
126							126.3' NO RECOVERY	8							
127															
128															
129															
130		14	120/77		0.0 ppm	Yellowish-brown, moderately sorted, fine to medium SAND, little Silt, trace Gravel, wet. Changing at 131.0 feet to: Dark yellowish-brown, moderately sorted, fine to medium SAND, little Silt, trace Gravel, wet. Changing at 131.6 feet to: Yellowish-brown, moderately sorted, fine to medium SAND, little Silt, wet. Changing at 136.4 feet to: NO RECOVERY.	130' SAND								
131															
132															
133															
134															
135															

REMARKS

6. Groundwater sample collected from 111.0 to 113.0 feet and submitted for analytical laboratory testing.
7. Groundwater sample collected from 121.0 to 123.0 feet and submitted for analytical laboratory testing.
8. Groundwater sample collected from 128.0 to 130.0 feet and submitted for analytical laboratory testing.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-MW30E

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Boring No.: HS-MW30E

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File No.: 16.0062335.52

Check: Lori Powers

Depth	Elevation (ft.)	Sample Information				Sample Description & Classification	Stratum Desc.	Remarks	Gamma (API-GR)	Well Diagram
		No.	Pen./ Rec. (in.)	Blows (/6")	Test Data					
137		15	60/34		0.0 ppm	Dark gray, with some dark red iron staining, SHALE. Changing at 142.8 feet to: NO RECOVERY	136.4' NO RECOVERY	9		
138										
139										
140							140' SHALE			
141										
142										
143							142.8' NO RECOVERY.			
144										
145							145'			
146						Bottom of Borehole at 145.0 Feet		10		
147										
148										
149										
150										
151										
152										
153										
154										
155										
156										
157										
158										
159										
160										
161										
162										
163										

REMARKS

9. Groundwater sample collected from 138.0 to 140.0 feet and submitted for analytical laboratory testing.
10. Monitoring well HS-MW30E was installed in borehole upon completion. Well screen set from 120.7 to 125.2 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-MW30E

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MDEQ Drilling

Rockford, Michigan

Boring No.: HS-MW31A

Page: 1 of 1

File No.: 16.0062335.52

Check: Lori Powers

Contractor: Stock

Foreman: Ryan

Logged by: JTM

Date Start/Finish: 6-4-19 / 6-4-19

Boring Location: 6205 Packer Drive, NE, Belmont, MI

GS Elev.: Datum:

Auger/Casing: Sonic

Sampler: NA

Type: NA

O.D. / I.D.: NA

Hammer Wt.: NA

Hammer Fall: NA

TOC Elev.:

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: Survey Date:

Depth	Elevation (ft.)	Sample Information				Sample Description & Classification	Stratum Desc.	Remarks	TOC Elev.: _____ Surveyed By: _____ Survey Date: _____					Well Diagram		
		No.	Pen./ Rec. (in.)	Blows (/6")	Test Data				Gamma (API-GR)	PROTECTIVE CASING						
1						See HS-MW-31E boring log for sample description and classification.										
2																
3																
4																
5																
6																
7																
8																
9																
10																
11																
12																
13																
14																
15																
16																
17																
18																
19																
20																
21							Bottom of Borehole at 21.0 Feet		1							
22																
23																

REMARKS

1. Monitoring well was installed in borehole upon completion. Well screen set from 16.1 to 20.6 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-MW31A

COPY OF GAMMA LOG 62335.52 MDEQ WWW.GPJ GZA CORP.GDT 4/15/20



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MDEQ Drilling

Rockford, Michigan

Boring No.: HS-MW-31B

Page: 1 of 1

File No.: 16.0062335.52

Check: Lori Powers

Contractor: Stock

Foreman: Ryan

Logged by: JTM

Date Start/Finish: 5-20-19 / 5-20-19

Boring Location: 6205 Packer Drive, NE, Belmont, MI

GS Elev.: Datum:

Auger/Casing

Sampler

Type: 254125 NA

O.D. / I.D.: NA NA

Hammer Wt.: NA NA

Hammer Fall: NA NA

TOC Elev.:

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: Survey Date:

Depth	Elevation (ft.)	Sample Information				Sample Description & Classification	Stratum Desc.	Remarks	Gamma (API-GR)					Well Diagram
		No.	Pen./ Rec. (in.)	Blows (/6")	Test Data				0	20	40	60	80	
1						See HS-MW31E boring log for sample description and classification.								
2														
3														
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22														
23														
24														
25														
26														
27														
28														
29														
30														
31														
32														
						Bottom of Borehole at 30.0 Feet		1						

REMARKS

1. Monitoring well was installed in borehole upon completion. Well screen set from 24.2 to 28.7 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-MW-31B

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Boring No.: HS-MW-31C

Page: 1 of 2

File No.: 16.0062335.52

Check: Lori Powers

Contractor: Stock

Foreman: Ryan

Logged by: JTM

Date Start/Finish: 6-4-19 / 6-4-19

Boring Location: 6205 Packer Drive, NE, Belmont, MI

GS Elev.: Datum:

Auger/
Casing

Type: Sonic

O.D. / I.D.: NA

Hammer Wt.: NA

Hammer Fall: NA

TOC Elev.:

Sampler

NA

NA

NA

NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: Survey Date:

Depth	Elevation (ft.)	Sample Information				Sample Description & Classification	Stratum Desc.	Remarks	Gamma (API-GR)					Well Diagram
		No.	Pen./ Rec. (in.)	Blows (/6")	Test Data									
1						See HS-MW31E boring log for sample description and classification.								
2														
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29														

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-MW-31C



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Rockford, Michigan

Boring No.: HS-MW-31C

Page: 2 of 2

File No.: 16.0062335.52

Check: Lori Powers

Depth	Elevation (ft.)	Sample Information				Sample Description & Classification	Stratum Desc.	Remarks	Gamma (API-GR)	Well Diagram
		No.	Pen./ Rec. (in.)	Blows (/6")	Test Data					
31										
32										
33										
34										
35										
36										
37										
38										
39										
40										
41										
42										
43										
44										
45					Bottom of Borehole at 45.0 Feet		1			
46										
47										
48										
49										
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64										
REMARKS 1. Monitoring well was installed in borehole upon completion. Well screen set from 39.4 to 43.9 feet below ground surface.										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.										

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Boring No.: HS-MW-31C



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Rockford, Michigan

Boring No.: HS-MW-31D

Page: 1 of 2

File No.: 16.0062335.52

Check: Lori Powers

Contractor: Stock

Foreman: Ryan

Logged by: JTM

Date Start/Finish: 6-3-19 / 6-4-19

Boring Location: 6205 Packer Drive, NE, Belmont, MI

GS Elev.: Datum:

Auger/
Casing

Sampler

Type: Sonic NA

O.D. / I.D.: NA NA

Hammer Wt.: NA NA

Hammer Fall: NA NA

TOC Elev.:

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: Survey Date:

Depth	Elevation (ft.)	Sample Information				Sample Description & Classification	Stratum Desc.	Remarks	Gamma (API-GR)					Well Diagram
		No.	Pen./ Rec. (in.)	Blows (/6")	Test Data									
1						See HS-MW31E boring log for sample description and classification.								
2														
3														
4														
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38														
39														

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-MW-31D



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Rockford, Michigan

Boring No.: HS-MW-31D

Page: 2 of 2

File No.: 16.0062335.52

Check: Lori Powers

ROCKFORD, MICHIGAN										Check: Lori Powers					
Depth	Elevation (ft.)	Sample Information				Sample Description & Classification	Stratum Desc.	Remarks	Gamma (API-GR)					Well Diagram	
		No.	Pen./ Rec. (in.)	Blows (/6")	Test Data				0	20	40	60	80		100
41															
42															
43															
44															
45															
46															
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59															
60															
61															
62															
63															
64															
65															
66															
67															
68						Bottom of Borehole at 68.0 Feet		1							
69															
70															
71															
72															
73															
74															
75															
76															
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84															
85															
86															

REMARKS

1. Monitoring well was installed in borehole upon completion. Well screen set from 61.8 to 66.4 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-MW-31D



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Boring No.: HS-MW-31E

Page: 1 of 3

File No.: 16.0062335.52

Check: Lori Powers

Contractor: Stock

Foreman: Ryan

Logged by: JTM

Date Start/Finish: 5-16-19 / 5-21-19

Boring Location: 6205 Packer Drive, NE, Belmont, MI

GS Elev.: Datum:

Auger/Casing: Sonic

Sampler: NA

Type: NA

O.D. / I.D.: NA

Hammer Wt.: NA

Hammer Fall: NA

TOC Elev.:

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: Survey Date:

Depth	Elevation (ft.)	Sample Information				Stratum Desc.	Remarks	Gamma (API-GR)	PROTECTIVE CASING	Well Diagram
		No.	Pen./ Rec. (in.)	Blows (/6")	Test Data					
1		1	120/71		0.0 ppm	SILT				
2						2.5' SAND				
3										
4										
5						5.9' NO RECOVERY				
6										
7										
8										
9										
10		2	120/78		0.0 pm	10' SAND				
11										
12										
13										
14										
15										
16						16.5' NO RECOVERY				
17										
18										
19										
20		3	120/67		0.0 ppm	20' SAND				
21										
22										
23										
24										
25						25.6' NO RECOVERY				
26										
27										
28										
29						30'				

REMARKS

1. Groundwater sample collected from 21.0 to 22.5 feet and submitted for analytical laboratory testing.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-MW-31E



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Rockford, Michigan

Boring No.: HS-MW-31E

Page: 2 of 3

File No.: 16.0062335.52

Check: Lori Powers

ROCKFORD, MICHIGAN						Check: Lori Powers					
Depth	Elevation (ft.)	Sample Information				Sample Description & Classification	Stratum Desc.	Remarks	Gamma (API-GR)	Well Diagram	
		No.	Pen./ Rec. (in.)	Blows (/6")	Test Data						
31		4	120/76		0.0 ppm	Dark yellowish-brown, well sorted, fine to medium SAND, trace Silt, moist to wet. Changing at 36.3 feet to: NO RECOVERY.	SAND	2			
32							36.3'				
33							NO RECOVERY				
34								3			
35											
36							40'				
37		5	120/85		0.0 ppm	Dark yellowish-brown, well sorted, fine to medium SAND, trace Silt, moist to wet. Changing at 47.1 feet to: NO RECOVERY.	SAND				
38								4			
39											
40							47.1'				
41											
42											
43											
44											
45											
46											
47											
48											
49											
50		6	120/108		0.0 ppm	Dark yellowish-brown, well sorted, fine to medium SAND, trace Silt, moist to wet. Changing at 53.3 feet to: Very dark grayish-brown, poorly sorted, Silty CLAY, trace Gravel, trace Sand, plastic, cohesive, moist. Changing at 57.4 feet to: Dark grayish-brown to dark brown, well sorted, fine to medium SAND, trace Silt, wet. Changing at 57.9 feet to: Very dark grayish-brown, poorly sorted, Silty CLAY, trace Gravel, trace Sand, plastic, cohesive, moist. Changing at 59.0 feet to: NO RECOVERY.	SAND				
51											
52											
53											
54											
55											
56											
57											
58											
59											
60											
61											
62											
63											
64											
<div>REMARKS</div> <div>2. Groundwater sample collected from 31.0 to 32.5 feet and submitted for analytical laboratory testing.</div> <div>3. Groundwater sample collected from 41.0 to 42.5 feet and submitted for analytical laboratory testing.</div> <div>4. Groundwater sample collected from 51.0 to 52.5 feet and submitted for analytical laboratory testing.</div>											
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.										Boring No.: HS-MW-31E	

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MDEQ Drilling

Rockford, Michigan

Boring No.: HS-MW-31E

Page: 3 of 3

File No.: 16.0062335.52

Check: Lori Powers

Depth	Elevation (ft.)	Sample Information				Sample Description & Classification	Stratum Desc.	Remarks	Gamma (API-GR)	Well Diagram
		No.	Pen./ Rec. (in.)	Blows (/6")	Test Data					
66						some Gravel, little Silt, trace Clay, non-plastic, moderately cohesive, moist to wet. Changing at 66.5 feet to: Hard, dark brown, poorly sorted, Silty CLAY, trace Gravel, plastic, cohesive, moist. Changing at 68.3 feet to: Very hard, brown, poorly sorted, Silty CLAY, trace Gravel, possible red Bedrock, dry to moist.	SAND 66.5'			
67							Silty CLAY			
68							68.3'			
69										
70						Bottom of Borehole at 70.0 Feet		5		
71										
72										
73										
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99										
		<div>REMARKS</div> <div>5. Monitoring well HS-MW31B was installed in borehole upon completion. Well screen set from 24.2 to 28.8 feet below ground surface.</div>								
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: HS-MW-31E	

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Rockford, Michigan

Boring No.: HS-MW-32A

Page: 1 of 2

File No.: 16.0062335.52

Check: Lori Powers

Contractor: Stock

Foreman: Ryan

Logged by: JTM

Date Start/Finish: 5-9-19 / 5-9-19

Boring Location: 1332 10 Mile Road NE, Comstock Park, MI

GS Elev.: Datum:

Auger/
Casing

Sampler

Type: Sonic NA

O.D. / I.D.: NA NA

Hammer Wt.: NA NA

Hammer Fall: NA NA

TOC Elev.:

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: Survey Date:

Depth	Elevation (ft.)	Sample Information				Sample Description & Classification	Stratum Desc.	Remarks	Gamma (API-GR)					Well Diagram
		No.	Pen./ Rec. (in.)	Blows (/6")	Test Data									
1						See HS-MW-32D boring log for sample description and classification.								
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REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-MW-32A



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MDEQ Drilling

Rockford, Michigan

Boring No.: HS-MW-32A

Page: 2 of 2

File No.: 16.0062335.52

Check: Lori Powers

Depth	Elevation (ft.)	Sample Information				Sample Description & Classification	Stratum Desc.	Remarks	Gamma (API-GR)	Well Diagram
		No.	Pen./ Rec. (in.)	Blows (/6")	Test Data					
46										
47										
48										
49										
50										
51										
52										
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64										
65										
66					Bottom of Borehole at 65.0 Feet		1			
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97										
REMARKS 1. Monitoring well was installed in borehole upon completion. Well screen set from 57.8 to 62.4 feet below ground surface.										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.										

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Boring No.: HS-MW-32A



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MDEQ Drilling

Rockford, Michigan

Boring No.: HS-MW-32B

Page: 1 of 2

File No.: 16.0062335.52

Check: Lori Powers

Contractor: Stock

Foreman: Ryan

Logged by: JTM

Date Start/Finish: 5-8-19 / 5-8-19

Boring Location: 1332 10 Mile Road NE, Comstock Park, MI

GS Elev.: Datum:

Auger/
Casing

Sampler

Type: Sonic NA

O.D. / I.D.: NA NA

Hammer Wt.: NA NA

Hammer Fall: NA NA

TOC Elev.:

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: Survey Date:

Depth	Elevation (ft.)	Sample Information				Sample Description & Classification	Stratum Desc.	Remarks	Gamma (API-GR)					Well Diagram
		No.	Pen./ Rec. (in.)	Blows (/6")	Test Data									
1						See HS-MW-32D boring log for sample description and classification.								
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REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-MW-32B



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Rockford, Michigan

Boring No.: HS-MW-32B

Page: 2 of 2

File No.: 16.0062335.52

Check: Lori Powers

ROCKFORD, MICHIGAN										Check: Lori Powers					
Depth	Elevation (ft.)	Sample Information				Sample Description & Classification	Stratum Desc.	Remarks	Gamma (API-GR)					Well Diagram	
		No.	Pen./ Rec. (in.)	Blows (/6")	Test Data				0	20	40	60	80		100
51															
52															
53															
54															
55															
56															
57															
58															
59															
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84						Bottom of Borehole at 83.0 Feet		1							
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REMARKS

1. Monitoring well was installed in borehole upon completion. Well screen set from 78.2 to 82.8 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-MW-32B

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Rockford, Michigan

Boring No.: HS-MW-32C

Page: 1 of 2

File No.: 16.0062335.52

Check: Lori Powers

Contractor: Stock

Foreman: Ryan

Logged by: JTM

Date Start/Finish: 5-8-19 / 5-8-19

Boring Location: 1332 10 Mile Road NE, Comstock Park, MI

GS Elev.: Datum:

Auger/
Casing

Sampler

Type: Sonic

O.D. / I.D.: NA

Hammer Wt.: NA

Hammer Fall: NA

TOC Elev.:

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: Survey Date:

Depth	Elevation (ft.)	Sample Information				Sample Description & Classification	Stratum Desc.	Remarks	Gamma (API-GR)					Well Diagram
		No.	Pen./ Rec. (in.)	Blows (/6")	Test Data									
1						See HS-MW-32D boring log for sample description and classification.								
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REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-MW-32C



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Boring No.: HS-MW-32C

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File No.: 16.0062335.52

Check: Lori Powers

Depth	Elevation (ft.)	Sample Information				Sample Description & Classification	Stratum Desc.	Remarks	Check: Lori Powers					Well Diagram	
		No.	Pen./ Rec. (in.)	Blows (/6")	Test Data				0	20	40	60	80		100
56															
57															
58															
59															
60															
61															
62															
63															
64															
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66															
67															
68															
69															
70															
71															
72															
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99															
100															
101															
102															
103															
104															
105															
106															
107															
108															
109															
110															
111															
112						Bottom of Borehole at 112.0 Feet		1							
113															
114															
115															
116															
117															
118															

REMARKS

1. Monitoring well was installed in borehole upon completion. Well screen set from 107.2 to 111.8 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-MW-32C

COPY OF GAMMA LOG 62335.52 MDEQ WWW.GPJ GZA CORP.GDT 4/15/20



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MDEQ Drilling

Rockford, Michigan

Boring No.: HS-MW-32D

Page: 1 of 6

File No.: 16.0062335.52

Check: Lori Powers

Contractor: Stock

Foreman: Ryan

Logged by: MJS/KWO

Date Start/Finish: 5-6-19 / 5-6-19

Boring Location: 1332 10 Mile Road NE, Comstock Park, MI

GS Elev.: Datum:

Auger/Casing: Sonic

Sampler: NA

Type: NA

O.D. / I.D.: NA

Hammer Wt.: NA

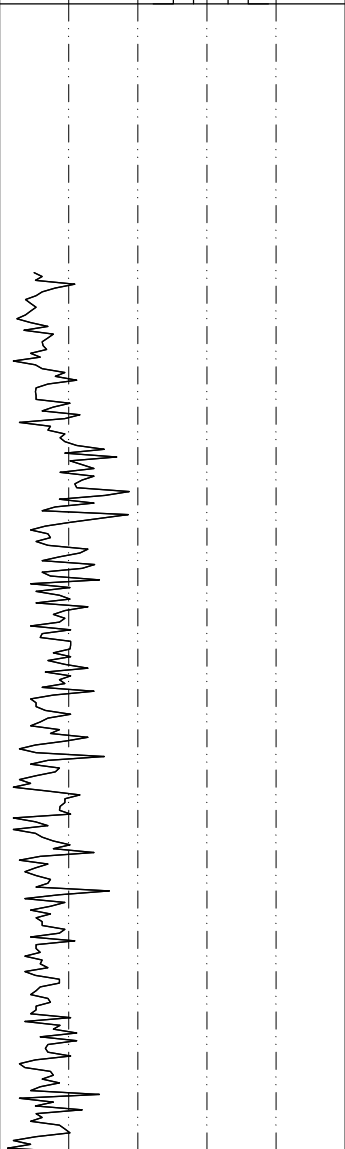

Hammer Fall: NA

TOC Elev.:

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab
3-2-99	17:00	7.2	5	5 min.
3-3-99	08:00	6.5	5	15 hours
3-3-99	12:00	6.8	---	20 min.

Surveyed By: Survey Date:

Depth Elevation (ft.)		Sample Information				TOC Elev.: _____		Surveyed By: _____		Survey Date: _____		
		No.	Pen./ Rec. (in.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Gamma (API-GR)		Well Diagram	
1		1	24/24			Black, TOPSOIL with Roots and Grass. Changing at 0.5 feet to: Loose, brown, fine to medium SAND, trace fine Gravel, moist.	0.5' TOPSOIL SAND	1				
2		96/48		0.0 ppm	Loose, brown, fine to medium SAND, trace Silt, moist. Changing at 3.5 feet to: Loose, brown, fine to medium SAND and GRAVEL, moist.	3.5' SAND and GRAVEL						
3		120/72		1.0 ppm	Loose, brown, fine to coarse SAND, trace Gravel, trace Silt, moist.	10' SAND						
4		120/90		1.7 ppm	Loose, brown, fine to coarse SAND and GRAVEL, trace Clay & Silt, moist.	20' SAND and GRAVEL						
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												
24												
25												
26												
27												
28												
29												

REMARKS

- Field screening of samples for organic vapors was performed with a MiniRae 3000 photoionization detector equipped with a 10.6 eV lamp. Readings above levels are shown in parts per million (ppm) isobutylene. Background was measured at 0.0 ppm.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-MW-32D



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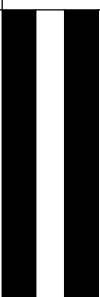
Rockford, Michigan

Boring No.: HS-MW-32D

Page: 2 of 6

File No.: 16.0062335.52

Check: Lori Powers

Depth		Elevation (ft.)	Sample Information				ROCKFORD, Michigan					Check: Lori Powers	
			No.	Pen./ Rec. (in.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Gamma (API-GR)			Well Diagram
31			5	120/120		0.4 ppm	Loose, gray, fine to coarse SAND and GRAVEL, moist. Changing at 38.0 feet to: Soft, gray, Silty SAND, moist. Changing at 35.0 feet to: Loose, gray, fine to medium SAND, moist to wet.	SAND and GRAVEL	2				
32													
33													
34													
35						0.5 ppm							
36													
37													
38								38' SAND					
39													
40			6	120/120		1.5 ppm 1.8 ppm	Loose, gray, Silty SAND, moist.						
41													
42													
43													
44													
45													
46													
47													
48													
49													
50			7	120/120		0.4 ppm	Loose, gray, Silty SAND, moist.						
51													
52													
53													
54													
55						0.3 ppm							
56													
57													
58													
59													
60			8	120/120		1.4 ppm	Loose, brown, fine to coarse SAND and Gravel, wet. Changing at 65.0 feet to: Loose, gray, fine to medium SAND, wet.						
61													
62													
63													
64													

REMARKS

2. Temporary well pushed to 64.0 feet below ground surface. Groundwater collected for laboratory analytical testing.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-MW-32D

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Rockford, Michigan

Boring No.: HS-MW-32D

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File No.: 16.0062335.52

Check: Lori Powers

Depth	Elevation (ft.)	Sample Information				Stratum Desc.	Remarks	Gamma (API-GR)	Well Diagram
		No.	Pen./ Rec. (in.)	Blows (/6")	Test Data				
66					2.2 ppm	SAND			
67									
68									
69									
70		9	120/120		1.5 ppm	70' SILT			
71									
72						72.5' SAND			
73									
74							3		
75					2.0 ppm				
76									
77									
78									
79									
80		10	120/120		1.0 ppm				
81									
82									
83						83.3' SILT			
84									
85					4.5 ppm				
86									
87									
88									
89									
90		11	120/120		2.5 ppm				
91									
92									
93									
94									
95					3.0 ppm				
96									
97									
98									
99									

REMARKS

3. Temporary well pushed to 74.0 feet below ground surface. Groundwater collected for laboratory analytical testing.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-MW-32D

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Boring No.: HS-MW-32D

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File No.: 16.0062335.52

Check: Lori Powers

Depth	Elevation (ft.)	Sample Information				Stratum Desc.	Remarks	Gamma (API-GR)	Well Diagram
		No.	Pen./ Rec. (in.)	Blows (/6")	Test Data				
101		12	120/120		0.6 ppm	SILT			
102									
103									
104									
105					1.2 ppm				
106									
107						107' SAND			
108									
109									
110		13	60/60		5.1 ppm				
111									
112							4		
113									
114									
115		14	60/60		7.1 ppm				
116									
117									
118									
119									
120		15	120/120		0.5 ppm				
121									
122							5		
123									
124									
125					0.4 ppm				
126									
127									
128									
129									
130		16	120/120		1.0 ppm				
131									
132									
133									
134									
REMARKS		4. Temporary well pushed to 112.0 feet below ground surface. Groundwater collected for laboratory analytical testing. 5. Temporary well pushed to 122.0 feet below ground surface. Groundwater collected for laboratory analytical testing.							
		Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.							

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Rockford, Michigan

Boring No.: HS-MW-32D

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File No.: 16.0062335.52

Check: Lori Powers

Depth	Elevation (ft.)	Sample Information				Sample Description & Classification	Stratum Desc.	Remarks	Gamma (API-GR)	Well Diagram
		No.	Pen./ Rec. (in.)	Blows (/6")	Test Data					
136					0. ppm		SAND			
137										
138										
139										
140		17	120/120		0.9 ppm	Loose, gray, fine to coarse SAND, black and gray, some Silt, moist. Changing at 145.0 feet to: Dense, gray and black, SAND and SILT, trace coarse Gravel, , moist.		6		
141										
142										
143										
144										
145					0.5 ppm					
146										
147										
148										
149										
150		18	120/120		1.7 ppm	Dense, gray, CLAY, some fine to coarse SAND, moist. Changing at 151.7 feet to: Loose, gray, fine to coarse SAND, some Silt, wet.	150' CLAY			
151							151.7' SAND			
152										
153										
154					1.5 ppm					
155										
156										
157										
158										
159										
160		19	120/120		1.4 ppm	Loose, gray, Silty SAND, moist. Changing at 165.0 feet to: Dense, gray, CLAY, some fine Sand, moist.				
161										
162										
163										
164										
165					3.9 ppm		165' CLAY			
166										
167										
168										
169										
REMARKS 6. Temporary well pushed to 140.0 feet below ground surface. Groundwater collected for laboratory analytical testing.										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: HS-MW-32D	

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Rockford, Michigan

Boring No.: HS-MW-32D

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File No.: 16.0062335.52

Check: Lori Powers

Depth	Elevation (ft.)	Sample Information				Stratum Desc.	Remarks	Gamma (API-GR)	Well Diagram
		No.	Pen./ Rec. (in.)	Blows (/6")	Test Data				
171		20	120/120		2.9 ppm	Dense, gray, CLAY, trace fine Sand, moist.	CLAY		
172									
173									
174									
175					1.7 ppm				
176									
177									
178									
179									
180		21	120/120		1.9 ppm	Dense, gray CLAY, moist.			
181									
182									
183									
184									
185					2.3 ppm				
186									
187									
188									
189									
190		22	60/60		2.1 ppm	Dense, gray, CLAY, moist.	7		
191									
192									
193					2.8 ppm				
194									
195						Bottom of Borehole at 195.0 Feet	195'		
196									
197									
198									
199									
200									
201									
202									
203									
204									
REMARKS 7. Driller mentioned possible bedrock at 195.0 feet. Monitoring well was installed in borehole upon completion. Well screen set from 137.6 to 142.2 feet below ground surface.									
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.								Boring No.: HS-MW-32D	

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Wolven Avenue Area

Algoma Twp, Kent County, Michigan

Boring No.: MW-WV1

Page: 1 of 5

File No.: 16.0062677.81

Check:

Contractor: Stearns Drilling Company

Foreman: Jerry Huntoon

Logged by: SAC / JTM

Date Start/Finish: 1-29-18 / 2-5-18

Boring Location:

GS Elev.: Datum:

Auger/
Casing

Sampler

Type: Hollow Stem Auger

Split Spoon

O.D. / I.D.: 12.25" / 4.25"

2.0" / 1 3/8"

Hammer Wt.: NA

140lbs

Hammer Fall: NA

30.0"

TOC Elev.: NA

NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: NA Survey Date:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					PROTECTIVE CASING
1	1	24/24	0-2	8-7 3-3	ND	SAND, TOPSOIL and ORGANIC MATTER (roots)(FILL). Changing at 0.2 feet to: Loose, orange, fine SAND, moist (FILL).	0.2' SAND / TOPSOIL / ORGANIC MATTER (FILL)	1		Concrete
2	2	24/18	2-4	4-3 3-4	ND	Loose, brown, SILT and SAND, moist.	2' SAND (FILL)			
3										
4	3	24/24	4-6	2-2 2-2	ND	Very loose, brown, fine SAND, some Silt, moist.				
5										
6	4	24/24	6-8	6-9 11-15	ND	Medium dense, brown, fine SAND, some Silt, trace small Gravel, dry.				
7										
8	5	24/24	8-10	4-7 10-3	ND	Medium dense, brown, fine SAND, some Silt, trace small Gravel, dry. (1.0 inch Gravel at 9.0 feet)				
9										
10	6	24/24	10-12	2-4 10-12	ND	Medium dense, brown, SILT, some fine Sand, trace Gravel, dry.	10' SILT			
11										
12	7	24/24	12-14	2-4 14-17	ND	Medium dense, brown, SILT, some fine Sand, trace Gravel, Iron staining in fractures, dry.				
13										
14	8	24/24	14-16	6-12 20-21	ND	Dense, brown, SILT, some fine Sand, trace Gravel, Iron staining in fractures, dry.				
15										
16	9	24/24	16-18	6-10 15-19	ND	Medium dense, brown, SILT, some fine Sand, trace Gravel, Iron staining in fractures, dry.				
17										
18	10	24/24	18-20	3-8 15-17	ND	Medium dense, brown, SILT, some fine Sand, trace Gravel, dry. (1.0 inch Gravel at 19.0 feet)				
19										
20	11	24/24	20-22	4-13 16-18	ND	Medium dense, brown, SILT, some fine Sand, trace Gravel, Iron staining in fractures, dry.				
21										
22	12	24/24	22-24	28-10 19-20	ND	Medium dense, brown grading to grayish brown at 23.5 feet, SILT, some very fine Sand, trace Gravel, dry.				
23										
24	13	24/24	24-26	5-8 11-12	ND	Medium dense, grayish brown, SILT, some fine Sand (Gray, Clay from 24.5 to 24.75 feet, dry).				
25										
26	14	24/24	26-28	5-7 11-13	ND	Medium dense, gray, SILT, some Clay, trace fine Sand, trace Gravel, dry.				
27										
28	15	24/24	28-30	3-4 6-7	ND	Medium dense, gray, SILT, some Clay, moist to wet.				
29										

REMARKS

- Field screening of samples for organic vapors was performed with a MiniRae 3000 photoionization detector equipped with a 10.6 eV lamp. Readings above background levels are shown in parts per million by volume (ppmv) of isobutylene. ND indicates nothing detected (<0.1 ppmv).

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: MW-WV1

BORING WELL 6267781 WWW.WOLVENAVENUE.GPJ GZA CORP.GDT 8/1/18



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Wolverine World Wide
Wolven Avenue Area
Algoma Twp, Kent County, Michigan

Boring No.: MW-WV1
Page: 2 of 5
File No.: 16.0062677.81
Check:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
31	16	24/24	30-32	2-3 6-0	ND	Loose, gray, SILT, some Clay, moist.	SILT	2		
32	18	24/0	32-34	27-37 41-27	-	Rock stuck in tip of split spoon.				
33										
34	19	24/24	34-36	2-5 12-12	ND	Medium dense, gray, SILT, some Clay, trace Gravel, moist.				
35										
36	20	24/24	36-38	4-7 11-12	ND	Medium dense, gray, SILT, some Clay, moist. (1.0 inch Gravel at 36.5 feet)				
37										
38	21	24/24	38-40	3-9 12-13	ND	Medium dense, gray, SILT, some Clay, some Gravel, moist.				
39										
40	22	24/24	40-42	5-9 11-16	ND	Medium dense, gray, SILT, some Clay, trace Gravel, moist.				
41										
42	23	24/24	42-44	4-8 10-13	ND	Medium dense, gray, SILT, some Clay, trace Gravel, moist. (Sand from 43.0 to 43.25 feet)				
43										
44	24	24/24	44-46	5-11 15-18	ND	Medium dense, gray, SILT, some Clay, trace Gravel. (1.0-inch Sand seam at 45.0 feet)				
45										
46	25	24/24	46-48	4-7 14-15	ND	Medium dense, gray, SILT, some Clay, trace Gravel, moist.				
47										
48	26	24/24	48-50	6-4 14-15	ND	Medium dense, gray, SILT, some Clay, moist. (very moist to wet ground Rock at 49.0 feet)				
49										
50	27	24/24	50-52	2-2 5-9	ND	Loose, gray, SILT, some Clay, trace Gravel, moist. (very moist Sand seams from 51.0 to 51.2 feet)				
51										
52	28	24/24	52-54	2-8 11-14	ND	Medium dense, gray, SILT, some Clay, moist. (trace Gravel at 53.5 feet)				
53										
54	30	24/24	54-56	6-10 14-15	ND	Medium dense, gray, SILT, some Clay, trace Gravel, moist.				
55										
56	31	24/24	56-58	5-8 14-16	ND	Medium dense, gray, SILT, some Clay, trace Gravel, moist.				
57										
58	32	24/24	58-60	5-11 16-17	ND	Medium dense, gray, SILT, some Clay, trace Gravel, moist.				
59										
60	33	24/24	60-62	3-8 13-13	ND	Loose, gray, SILT, some Clay, trace Gravel, moist.				
61										
62	34	24/24	62-64	5-7 14-15	ND	Medium dense, gray, SILT, some Clay, trace Gravel, moist.				
63										
64	35	24/24	64-66	6-11 15-18	ND	Medium dense, gray, SILT, some Clay,				
										Bentonite Grout
<div style="display: flex;"> <div style="writing-mode: vertical-rl; transform: rotate(180deg); font-weight: bold; margin-right: 10px;">REMARKS</div> <div> <p>2. Groundwater was encountered at approximately 31.0 feet below ground surface.</p> </div> </div>										
<p>Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.</p>										Boring No.: MW-WV1

BORING WELL 6267781 WWW.WOLVENAVENUE.GPJ GZA CORP.GDT 8/1/18



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Wolven Avenue Area
Algoma Twp, Kent County, Michigan

Boring No.: MW-WV1
Page: 3 of 5
File No.: 16.0062677.81
Check:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
66	36	24/24	66-68	4-10 14-15	ND	trace Gravel, moist. Changing at 64.5 feet to: Gray, SILT, some Clay, trace Gravel, moist.	SILT			
67						Medium dense, gray, SILT, some Clay, trace Gravel, moist.				
68	37	24/24	68-70	4-5 11-14	ND	Medium dense, gray, SILT, some Clay, trace Gravel, moist.				
69						Medium dense, gray, SILT, some Clay, trace Gravel, moist.				
70	38	24/24	70-72	6-12 10-21	ND	Medium dense, gray, SILT, some Clay, trace Gravel, moist.				
71										
72	39	24/24	72-74	5-8 22-17	ND	Medium dense, gray, SILT, some Clay, trace Gravel, moist. (loose, wet seam at 73.0 feet)				
73										
74	40	24/24	74-76	12-20 21-24	ND	Dense, gray, SILT, some Clay, trace Gravel, moist.				
75										
76	41	24/24	76-78	6-11 16-22	ND	Medium dense, gray, SILT, some Clay, trace Gravel, moist.				
77										
78	42	24/24	78-80	5-13 17-20	ND	Medium dense, gray, SILT, some Clay, trace Gravel, moist.				
79										
80	43	24/24	80-82	8-12 15-21	ND	Medium dense, gray, SILT, some Clay, trace Gravel, moist.				
81										
82	44	24/24	82-84	4-9 13-18	ND	Medium dense, gray, SILT, some Clay, trace Gravel, moist.				
83										
84	45	24/24	84-86	6-13 17-26	ND	Medium dense, gray, SILT, some Clay, trace Gravel, moist.				
85										
86	46	24/24	86-88	7-14 22-28	ND	Dense, gray, SILT, some Clay, trace Gravel, moist. (1.0-inch Gravel at 87.5 feet)				
87										
88	47	24/24	88-90	7-15 28-27	ND	Dense, gray, SILT, some Clay, trace Gravel, moist.				
89										
90	48	24/24	90-92	10-18 26-29	ND	Dense, gray, SILT, some Clay, trace Gravel, moist.				
91										
92	49	24/12	92-94	8-16 24-31	ND	Dense, gray, SILT, some Clay, trace Gravel, moist.				
93										
94	50	24/24	94-96	11-27 33-37	ND	Dense, gray, SILT, some Clay, trace Gravel, moist.				
95										
96	51	24/24	96-98	10-24 36-39	ND	Dense, gray, SILT, some Clay, trace Gravel, moist.				
97										
98	52	24/24	98-100	7-17 26-27	ND	Dense, gray, SILT, some Clay, trace Gravel, moist.				
99										
<div style="display: flex;"> <div style="writing-mode: vertical-rl; transform: rotate(180deg); font-weight: bold; margin-right: 10px;">REMARKS</div> <div style="flex-grow: 1;"></div> </div>										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: MW-WV1	

BORING WELL 6267781 WWW.WOLVENAVENUE.GPJ GZA CORP.GDT 8/1/18



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Wolverine World Wide
Wolven Avenue Area
Algoma Twp, Kent County, Michigan

Boring No.: MW-WV1
Page: 4 of 5
File No.: 16.0062677.81
Check:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
101	53	24/24	100-102	8-20 25-28	ND	Dense, gray, SILT, some Clay, trace Gravel, moist.	SILT			
102	54	24/24	102-104	10-21 27-39	ND	Dense, gray, SILT, some Clay, trace Gravel, moist.				
103										
104	55	24/21	104-106	8-17 23-27	ND	Dense, gray, SILT, some Clay, trace Gravel, moist. (0.5-inch sand seam at 105.3 feet)				
105										
106	56	24/24	106-108	9-18 27-35	ND	Dense, gray, SILT, some Clay, trace Gravel, moist.				
107										
108	58	24/12	108-110	10-28 36-45	ND	Dense, gray, SILT, some Clay, trace Gravel, moist.				
109										
110	59	24/24	110-112	15-23 31-47	ND	Very dense, gray, SILT, some Clay, trace Gravel, moist.				
111										
112	60	24/24	112-114	10-22 29-44	ND	Very dense, gray, SILT, some Clay, trace Gravel, moist.				
113										
114	61	24/24	114-116	7-24 27-35	ND	Very dense, gray, SILT, some Clay, trace Gravel, moist. (1.0 inch gravel piece at 115.0 feet)				
115										
116	62	24/24	116-118	18-28 34-40	ND	Very dense, gray, SILT, some Clay, trace Gravel, moist.				
117										
118	63	24/18	118-120	10-12 15-27	ND	Medium dense, gray, SILT, some Clay, trace Gravel, moist.				
119										
120	64	24/24	120-122	14-23 27-35	ND	Dense, gray, SILT, some Clay, trace Gravel, moist.				
121										
122	65	24/24	122-124	13-19 25-32	ND	Dense, gray, SILT, some Clay, trace Gravel, moist.				
123										
124	65	24/24	124-126	9-14 21-27	ND	Dense, gray, SILT, some Clay, trace Gravel, moist.				
125										
126	66	24/24	126-128	11-15 22-30	ND	Dense, gray, SILT, some Clay, trace Gravel, moist.				
127										
128	67	24/24	128-130	6-10 16-24	ND	Medium dense, grayish brown, SILT, some Clay, little fine Sand, trace Gravel, moist. Changing at 129.0 feet to: Grayish brown, SILT, some Clay, little fine Sand, trace Gravel, moist to wet.				
129										
130	68	24/24	130-132	6-8 9-9	ND	Medium dense, grayish brown, SILT, some Clay, little fine Sand, trace Gravel, moist to wet. Changing at 131.0 feet to: Tan, fine SAND, wet.	131' SAND			
131										
132	70	24/0	132-134	6-7 8-11	-	NO RECOVERY.				
133										
134	71	24/12	134-136	18-25 42-50	ND	Very dense, tan, fine SAND, wet.				
<div style="display: flex; justify-content: space-between;"> <div style="writing-mode: vertical-rl; transform: rotate(180deg);"> BORING WELL 6267781 WWW.WOLVENAVENUE.GPJ GZA CORP.GDT 8/1/18 </div> <div> REMARKS </div> </div>										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: MW-WV1	


2-Inch PVC Riser



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Engineers and Scientists

Wolverine World Wide
Wolven Avenue Area
Algoma Twp, Kent County, Michigan

Boring No.: MW-WV1
Page: 5 of 5
File No.: 16.0062677.81
Check:

Sample Information						Check:				
Depth	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
136	72	24/24	136-138	4-50/3"	ND	Very dense, tan, fine SAND, wet.	SAND			Filter Sand 2-Inch PVC Well Screen
137										
138										
139										
140	73	24/12	140-142	42-50/5"	3.2 ppmv	Very dense, Grayish brown, well sorted, fine to medium SAND, trace Silt, trace Clay, moist to wet.	142'			
141							SILT & CLAY			
142	74	24/18	142-144	23-37 20/6"--	3.4 ppmv	Hard, dark gray, SILT & CLAY, trace Sand, trace Gravel, moist.				
143										
144										
145	75	24/18	144-146	22-41-50->50	4.1 ppmv	Hard, dark gray, SILT & CLAY, trace Sand, trace Gravel, moist.				
146										
147										
148										
149	76	24/18	148-150	23-31-50->50	4.3 ppmv	Hard, dark gray, poorly sorted, SILT & CLAY, trace Sand, trace Gravel, plastic, cohesive, moist.	150'			
150										
151						Bottom of Borehole at 150.0 Feet		3		
152										
153										
154										
155										
156										
157										
158										
159										
160										
161										
162										
163										
164										
165										
166										
167										
168										
169										
REMARKS										
3. Monitoring well was installed in borehole upon completion. Well screen set from 135.0 to 140.0 feet below ground surface.										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: MW-WV1	

BORING WELL 6267781 WWW.WOLVENAVENUE.GPJ GZA CORP.GDT 8/1/18



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Wolverine World Wide

Wolven Avenue Area

Algoma Twp, Kent County, Michigan

Boring No.: MW-WV2

Page: 1 of 2

File No.: 16.0062677.81

Check: _____

Contractor: Stearns Drilling Company

Foreman: Jerry Huntoon

Logged by: John Morehouse

Date Start/Finish: 2-14-18 / 2-14-18

Boring Location: _____

GS Elev.: _____ Datum: _____

Auger/
Casing

Sampler

GROUNDWATER READINGS

Type: Hollow Stem Auger

Split Spoon

O.D. / I.D.: 12.25" / 4.25"

2.0" / 1 3/8"

Hammer Wt.: NA

140lbs

Hammer Fall: NA

30.0"

TOC Elev.: NA

NA

Date	Time	Depth	Casing	Stab

Surveyed By: NA Survey Date: _____

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
1	1	24/24	0-2	1-1 1-1	ND	Very loose, black, fine to medium SAND and SILT, trace Clay.	SAND and SILT	1		PROTECTIVE CASING
2	2	24/18	2-4	1-1 1-1	ND	Very loose, black, fine to medium SAND and SILT, some Wood Fragments.				Concrete
3										
4	3	24/4	4-6	0-1 1-1	ND	Very loose, black, SILT and fibrous PEAT.	4' SILT and PEAT			
5										
6	4	24/12	6-8	0-0 1-1	ND	Very loose, black, SILT and fibrous PEAT, wet.				
7										
8	5	24/18	8-10	1-0 1-1	ND	Very loose, brown, fine SAND, some Silt, wet.	8' SAND and SILT			
9										
10	6	24/18	10-12	2-2 1-1	ND	Very loose, brown, fine SAND and SILT, wet.				
11										
12	7	24/24	12-14	1-4 4-4	ND	Loose, brown, fine to medium SAND and SILT, some Gravel, Some Clay lenses, wet.				
13										
14	8	24/17	14-16	1-2 3-2	ND	Loose, brown, fine to medium SAND and SILT, some Gravel, wet.				
15										
16	9	24/12	16-18	1-1 3-3	ND	Loose, brown, fine SAND and SILT, wet.				
17										
18	10	24/18	18-20	1-2 2-3	ND	Loose, brown, fine SAND and SILT, trace Clay, wet.				
19										
20	11	24/12	20-22	1-2 2-2	ND	Loose, brown, fine SAND and SILT, trace Clay, wet.				

REMARKS

- Field screening of samples for organic vapors was performed with a MiniRae 2000 photoionization detector equipped with a 10.6 eV lamp. Readings above background levels are shown in parts per million by volume (ppmv) of isobutylene. ND indicates nothing detected (<0.1 ppmv).
- A groundwater sample was collected from a temporary monitoring with a well screen set at approximately 13.0 to 18.0 feet below ground surface and submitted for analytical laboratory testing.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: MW-WV2

BORING WELL 6267781 WWW.WOLVENAVENUE.GPJ GZA CORP.GDT 8/1/18



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Wolverine World Wide
Wolver Avenue Area
Algoma Twp, Kent County, Michigan

Boring No.: MW-WV2
Page: 2 of 2
File No.: 16.0062677.81
Check:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
22	12	24/12	22-24	1-1 1-1	ND	Very loose, brown, fine SAND and SILT, wet.	SAND and SILT			
23										
24	13	24/24	24-26	2-3 2-3	ND	Loose, brown, fine to medium SAND and SILT, wet. Changing at 25.5 feet to: Tan, CLAY, wet.				
25							25.5'			
26	14	24/18	26-28	2-2 2-2	ND	Soft, tan, CLAY, wet (CL).	CLAY			2-Inch PVC Riser
27										
28	15	24/12	28-30	2-3 11-10	ND	Stiff, tan, CLAY, wet. Changing at 28.5 feet to: Fine to coarse SAND and GRAVEL, wet.		3		Bentonite
29							28.5'			
30	16	24/0	30-32	8-17 18-21	ND	NO RECOVERY.	SAND and GRAVEL			
31								4		
32	17	24/13	32-34	6-8 9-12	ND	Medium dense, brown, fine to coarse SAND and Gravel, trace Silt, wet.				Filter Sand
33										2-Inch PVC Well Screen
34	18	24/6	34-36	7-9 10-21	ND	Medium dense, gray, SILT, trace fine to medium Sand, wet.				
35							34'			
36	19	24/15	36-38	10-16 22-45	ND	Hard, gray, CLAY, some Silt, some fine to medium Sand, wet.	SILT			
37							36'			
38	20	18/18	38-39.5	12-32-75/6"	ND	Very dense, gray, fine to medium SAND and SILT, some Gravel, wet (GLACIAL TILL).	CLAY			
39							38'			Bentonite and Sand
40						Bottom of Borehole at 39.5 Feet	SAND (GLACIAL TILL)			
41							39.5'			
42										
43										
44										
45										
REMARKS 3. Gravel stuck in tip of split spoon. 4. Groundwater sample was collected from temporary monitoring well with screen set at approximately 31.0 to 36.0 feet below ground surface and submitted for analytical laboratory testing.										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: MW-WV2	

BORING WELL 6267781 WWW.WOLVER AVENUE.GPJ GZA CORP.GDT 8/1/18



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Wolverine World Wide

Wolven Avenue Area

Algoma Twp, Kent County, Michigan

Boring No.: MW-WV2S

Page: 1 of 1

File No.: 16.0062677.81

Check:

Contractor: Stearns Drilling Company

Foreman: Jerry Huntoon

Logged by: John Morehouse

Date Start/Finish: 2-14-18 / 2-14-18

Boring Location:

GS Elev.: Datum:

Auger/
Casing

Sampler

Type: Hollow Stem Auger

Split Spoon

O.D. / I.D.: 12.25" / 4.25"

2.0" / 1 3/8"

Hammer Wt.: NA

140lbs

Hammer Fall: NA

30.0"

TOC Elev.: NA

NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: NA Survey Date:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
1						See MW-WV2 boring log for soil descriptions.				PROTECTIVE CASING
2										Concrete
3										
4										
5										
6										
7										
8										Bentonite Grout
9										
10										
11										
12										
13										
14										
15										
16										2-Inch PVC Riser
17										Bentonite
18										
19										
20										Top of Well Screen
21										Filter Sand
22										2-Inch PVC Well Screen
23										
24										
25										
26										
27										
						Bottom of Borehole at 25.0 Feet				

REMARKS

1. Monitoring well was installed in borehole upon completion. Well screen set from 20.0 to 25.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: MW-WV2S

BORING WELL 6267781 WWW.WOLVENAVENUE.GPJ GZA CORP.GDT 8/1/18



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Wolverine World Wide

Wolven Avenue Area

Algoma Twp, Kent County, Michigan

Boring No.: MW-WV3

Page: 1 of 3

File No.: 16.0062677.81

Check: _____

Contractor: Stearns Drilling Company

Foreman: Jerry Huntoon

Logged by: John Morehouse/Anthony Leonido

Date Start/Finish: _____

Boring Location: _____

GS Elev.: _____ Datum: _____

Auger/
Casing

Sampler

GROUNDWATER READINGS

Type: Hollow Stem Auger Split Spoon

O.D. / I.D.: 12.25" / 4.25" 2.0" / 1 3/8"

Hammer Wt.: NA 140lbs

Hammer Fall: NA 30.0"

TOC Elev.: NA NA

Date	Time	Depth	Casing	Stab

Surveyed By: NA Survey Date: _____

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				PROTECTIVE CASING	Concrete
1	1	24/24	0-2	1-1 3-3	ND	Very loose, dark brown, fine to medium SAND, little Clay, little Silt, little Organic Matter (wood, leaves), moist. Changing at 0.3 feet to: Brown, fine to medium SAND, little Silt, moist. Changing at 1.5 feet to: Brown and gray, CLAY & SILT, little fine to medium Sand, trace Organic Matter (roots), moist. Changing at 1.8 feet to: Brown, fine to medium SAND, trace Silt, wet.	SAND	1		
2	2	24/19	2-4	3-4 5-6	ND	Very loose, brown, fine to medium SAND, trace Silt, trace Organic Matter (wood fragments, leaves), trace Hair, wet.	1.5' 1.8' CLAY & SILT SAND	2		
3	3	24/15	4-6	1-1 2-2	ND	Very loose, gray, fine to medium SAND, trace Silt, trace fine Gravel, wet.		3		
4	4	24/16	6-8	0-1 1-2	ND	Very loose, brown, fine to medium SAND, trace Silt, trace Organic Matter (wood fragments, leaves), trace Hair, wet.				
5	5	24/19	8-10	0-0 1-1	ND	Very loose, brown, fine to medium SAND, trace Silt, trace Organic Matter (leaves), trace Hair, wet.				
6	6	24/21	10-12	2-3 3-3	ND	Loose, gray, fine to medium SAND, trace Silt, wet.				
7	7	24/16	12-14	0-1 1-2	ND	Very loose, brown, fine to medium SAND, trace Silt, trace fine Gravel, wet.				
8	8	24/16	14-16	2-3 3-4	ND	Loose, brown, fine to medium SAND, trace Silt, wet.		4		
9	9	24/24	16-18	4-6 9-10	ND	Medium dense, fine to medium SAND, trace Silt, wet. Changing at 17.0 feet to: Gray, Silty CLAY, trace fine to coarse Sand, moist.	17' Silty CLAY			
10	10	24/18	18-20	4-8 8-9	ND	Very stiff, gray, Silty CLAY, trace fine to coarse Sand, moist.				
11	11	24/18	20-22	4-8 9-9	ND	Very stiff, gray, SILT, trace Gravel, trace Clay, wet.				

REMARKS

- Field screening of samples for organic vapors was performed with a MiniRae 2000 photoionization detector equipped with a 10.6 eV lamp. Readings above background levels are shown in parts per million by volume (ppmv) of isobutylene. ND indicates nothing detected (<0.1 ppmv).
- Groundwater was encountered at approximately 1.8 feet below ground surface.
- A groundwater sample was collected from a temporary well with a well screen set at approximately 5.0 to 10.0 feet below ground surface and submitted for laboratory analytical testing.
- A groundwater sample was collected from a temporary well with a well screen set at approximately 15.0 to 20.0 feet below ground surface and submitted for laboratory analytical testing.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: MW-WV3

BORING WELL 6267781 WWW.WOLVEN AVENUE.GPJ GZA CORP.GDT 8/1/18



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Wolverine World Wide
Wolven Avenue Area
Algoma Twp, Kent County, Michigan

Boring No.: MW-WV3
Page: 2 of 3
File No.: 16.0062677.81
Check:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
23	12	24/18	22-24	3-5 6-9	ND	Stiff, gray, Silty CLAY, trace fine Sand, wet.	Silty CLAY			
24	13	24/18	24-26	3-8 9-10	ND	Very stiff, brown to gray bands, Silty CLAY, trace fine Sand, wet.				
25										
26	14	24/17	26-28	5-6 9-7	ND	Stiff, gray, SILT, trace medium Sand, wet.	26' SILT			
27										
28	15	24/15	28-30	2-3 4-4	ND	Loose, gray, fine SAND and SILT, trace Clay, wet.	28' SAND and SILT			
29										
30	16	24/8	30-32	1-2 2-3	ND	Very loose, brown, fine SAND, trace Silt, wet.	30' SAND			
31										
32	17	24/8	32-34	1-2 2-4	ND	Very loose, brown, fine SAND, trace Silt, wet.				
33										
34	18	24/12	34-36	1-3 3-5	ND	Loose, brown, fine SAND, trace Silt, wet.		5		
35										
36	19	24/9	36-38	1-2 4-5	ND	Loose, brown, fine SAND, trace Silt, wet.				
37										
38	20	24/10	38-40	1-1 2-6	ND	Very loose, brown, fine to medium SAND, trace Silt, wet.				
39										
40	21	24/11	40-42	3-8 10-11	ND	Medium dense, brown, fine SAND, trace Gravel, trace Silt, wet.				
41										
42	22	24/12	42-44	15-19 21-20	ND	Dense, brown, fine to medium SAND, trace Silt, wet.				
43										
44	23	24/15	44-46	6-14 21-25	ND	Dense, brown, fine to medium SAND, trace Silt, wet.		6		
45										
46	24	24/20	46-48	4-16 23-24	ND	Dense, brown, fine to medium SAND, trace Silt, wet.				
47										
REMARKS 5. A groundwater sample was collected from a temporary well with a well screen from approximately 34.0 to 39.0 feet below ground surface and submitted for laboratory analytical testing. 6. A groundwater sample was collected from a temporary well with a well screen from approximately 44.0 to 49.0 feet below ground surface and submitted for laboratory analytical testing.										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: MW-WV3	

BORING WELL 6267781 WWW.WOLVEN AVENUE.GPJ GZA CORP.GDT 8/1/18

Bentonite Grout



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Engineers and Scientists

Wolverine World Wide
Wolver Avenue Area
Algoma Twp, Kent County, Michigan

Boring No.: MW-WV3
Page: 3 of 3
File No.: 16.0062677.81
Check:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
48	25	24/15	48-50	4-8 11-15	ND	Medium dense, brown, fine SAND, wet.	SAND			
49										
50	26	24/15	50-52	8-18 22-35	ND	Dense, fine to medium SAND, trace Silt, wet.				
51										
52	27	24/20	52-54	4-9 21-29	ND	Dense, brown, fine SAND, trace Silt, wet.				
53										
54	28	24/20	54-56	2-6 17-21	ND	Medium dense, brown, fine to medium SAND, trace Silt, wet.		7		
55										
56	29	24/3	56-58	3-8 12-15	ND	Medium dense, gray and brown, fine to coarse SAND and GRAVEL, wet.	56' SAND and GRAVEL	8		
57										
58	30	24/12	58-60	3-4 13-16	ND	Medium dense, brown, fine to coarse SAND and GRAVEL, wet.				
59										
60	31	24/18	60-62	4-6 8-9	ND	Medium dense, brown, fine to coarse SAND and Gravel, trace Silt, wet. Changing at 61.0 feet to: Tan, CLAY, wet.	61' CLAY			
61										
62	32	24/20	62-64	8-11 11-12	ND	Very stiff, tan, CLAY, wet.				
63										
64						Bottom of Borehole at 64.0 Feet	64'	8		
65										
66										
67										
68										
69										
70										
71										
72										
73										

2-Inch PVC Riser

Bentonite

Filter Sand

2-Inch PVC Well Screen

Bentonite and Sand

REMARKS

7. A groundwater sample was collected from a temporary well with a well screen from approximately 54.0 to 59.0 feet below ground surface and submitted for laboratory analytical testing.

8. Gravel stuck in tip of split spoon.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: MW-WV3

BORING WELL 6267781 WWW.WOLVER AVENUE.GPJ GZA CORP.GDT 8/1/18



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Wolverine World Wide

Wolver Avenue Area

Algoma Twp, Kent County, Michigan

Boring No.: MW-WV3S

Page: 1 of 1

File No.: 16.0062677.81

Check: _____

Contractor: Stearns Drilling Company

Foreman: Jerry Huntoon

Logged by: Anthony Leonido

Date Start/Finish: _____

Boring Location: _____

GS Elev.: _____ Datum: _____

**Auger/
Casing**

Sampler

Type: Hollow Stem Auger

Split Spoon

O.D. / I.D.: 12.25" / 4.25"

2.0" / 1 3/8"

Hammer Wt.: NA

140lbs

Hammer Fall: NA

30.0"

TOC Elev.: NA

NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: NA Survey Date: _____

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
1						See MW-WV3 boring log for soil descriptions.				PROTECTIVE CASING
2										Concrete
3										Bentonite Grout
4										2-Inch PVC Riser
5										
6										
7										Filter Sand
8										2-Inch PVC Well Screen
9										
10										
11						Bottom of Borehole at 10.1 Feet				
12										
13										
14										
15										
16										
17										
18										
19										

REMARKS

1. Monitoring well was installed in borehole upon completion. Well screen set from 5.0 to 10.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: MW-WV3S

BORING WELL 6267781 WWW.WOLVER AVENUE.GPJ GZA CORP.GDT 8/1/18



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Wolverine World Wide

Wolver Avenue Area

Algoma Twp, Kent County, Michigan

Boring No.: MW-WV4

Page: 1 of 6

File No.: 16.0062677.81

Check: _____

Contractor: Stearns Drilling Company

Foreman: Jerry Huntoon

Logged by: Anthony Leonido

Date Start/Finish: 3-12-18 / 3-12-18

Boring Location: _____

GS Elev.: _____ Datum: _____

Auger/
Casing

Sampler

GROUNDWATER READINGS

Type: Hollow Stem Auger Split Spoon
O.D. / I.D.: 12.25" / 4.25" 2.0" / 1 3/8"
Hammer Wt.: NA 140lbs
Hammer Fall: NA 30.0"
TOC Elev.: NA NA

Date	Time	Depth	Casing	Stab
3/16/18	1600	84.0'	Open	

Surveyed By: NA Survey Date: _____

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					PROTECTIVE CASING
1	1	24/24	0-2	1-1 1-1	ND	TOPSOIL. Changing at 0.5 feet to: Very loose, brown and black, fine to medium SAND and SILT, dry.	0.5' TOPSOIL (LOAM) SAND and SILT			Concrete
2										
3										
4	2	24/18	4-6	1-1 2-3	0.1	Very loose, brown, fine SAND, little Silt, dry.		1		
5										
6										
7										
8										
9	3	24/20	9-11	3-4 6-6	ND	Loose, brown, fine SAND, trace Silt, dry.	9' SAND			
10										
11										
12										
13							13' SAND and SILT			
14	4	24/18	14-16	4-5 5-7	ND	Loose, brown, fine SAND, dry. Changing at 15.0 feet to: Tan, fine SAND and SILT, dry (SM).				
15										
16										
17										
18										
19	5	24/20	19-21	5-10 19-21	ND	Medium dense, brown, SILT, trace fine Sand, dry.	19' SILT			
20										
21										

REMARKS

- Field screening of samples for organic vapors was performed with a MiniRae 3000 photoionization detector equipped with a 10.6 eV lamp. Readings above background levels are shown in parts per million per volume (ppmv) of isobutylene. ND indicates nothing detected (<0.1 ppmv).

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: MW-WV4

BORING WELL 6267781 WWW.WOLVER AVENUE.GPJ GZA CORP.GDT 8/1/18



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Wolverine World Wide
Wolver Avenue Area
Algoma Twp, Kent County, Michigan

Boring No.: MW-WV4
Page: 2 of 6
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Check:

Sample Information						Check:				
Depth	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
23	6	24/20	24-26	8-13 13-17	0.1	Medium dense, brown, fine SAND, trace Silt, dry.	SILT			
24							24'			
25							SAND			
26										
27	7	24/22	29-31	2-5 8-12	ND	Medium dense, brown, fine SAND, trace Silt, dry.				
28										
29										
30										
31	8	24/20	34-36	3-10 14-15	ND	Medium dense, brown, fine SAND, trace Silt, dry.				
32										
33										
34										
35	9	24/24	39-41	5-12 17-21	ND	Medium dense, brown, fine SAND, trace Silt, dry.				
36										
37										
38										
39	10	24/22	44-46	8-21 22-30	ND	Dense, brown, fine SAND and fine GRAVEL, trace Silt.				
40										
41										
42										
43										
44										
45										
46										
47										
REMARKS										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: MW-WV4	

BORING WELL 6267781 WWW.WOLVER AVENUE.GPJ GZA CORP.GDT 8/1/18



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Wolverine World Wide
Wolven Avenue Area
Algoma Twp, Kent County, Michigan

Boring No.: MW-WV4
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Check:

Algoma Twp, Kent County, Michigan										Check:			
Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed				
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data								
48	11	24/21	49-51	3-11 22-28	ND	Dense, brown, fine to medium SAND and SILT, dry.	SAND	2					
49							49'				SAND and SILT		
50													
51													
52													
53	12	11/11	54-54.9	16-50/5"	ND	Very dense, brown, fine SAND and SILT, some medium Gravel, dry.							
54													
55													
56													
57													
58	13	24/24	59-61	21-30 39-50	ND	Very dense, brown, fine to coarse SAND and SILT, trace medium Gravel, dry (GLACIAL TILL).	59'						
59							SAND and SILT (GLACIAL TILL)						
60													
61													
62													
63	14	24/24	64-66	11-21 24-27	ND	Hard, gray, Silty CLAY, dry.	64'						
64							Silty CLAY						
65													
66													
67													
68	15	24/19	69-71	19-43 38-46	ND	Very dense, gray, fine SAND and SILT with Clay lenses, trace medium Sand, dry (GLACIAL TILL).	69'						
69							SAND and SILT (GLACIAL TILL)						
70													
71													
72													
73													
REMARKS	2. Split spoon refusal at approximately 55.0 feet.												
	Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.												
									Boring No.: MW-WV4				

BORING WELL 6267781 WWW.WOLVEN AVENUE.GPJ GZA CORP.GDT 8/1/18



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 Algoma Twp, Kent County, Michigan

Boring No.: MW-WV4
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 File No.: 16.0062677.81
 Check:

Algoma Twp, Kent County, Michigan										Check:	
Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed		
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data						
74	16	24/24	74-76	8-14 24-31	ND	Dense, gray, fine to medium SAND and SILT, some Clay, damp (GLACIAL TILL).	SAND and SILT (GLACIAL TILL)				
75											
76											
77											
78											
79	17	18/18	79-80.5	13-27 37-0	ND	Dense, gray, fine to medium SAND and SILT, some Clay, damp (GLACIAL TILL).		4			
80											
81											
82											
83											
84	18	10/0	84-84.8	28-50/4"	ND	NO RECOVERY.		3			
85											
86											
87											
88											
89	19	24/24	89-91	8-13 19-25	ND	Dense, gray, fine SAND and SILT, some medium Gravel, moist (GLACIAL TILL).					
90											
91											
92											
93											
94	20	24/24	94-96	14-24 28-41	ND	Very dense, gray, fine SAND and SILT, some medium Gravel, moist (GLACIAL TILL).					
95											
96											
97											
98											
REMARKS	4. Split spoon refusal at approximately 80.5 feet. 3. Gravel stuck in tip of split spoon.										
	Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.								Boring No.: MW-WV4		

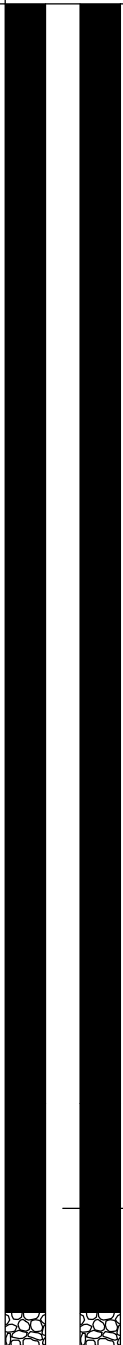
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Wolver Avenue Area
Algoma Twp, Kent County, Michigan

Boring No.: MW-WV4
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File No.: 16.0062677.81
Check:

Sample Information						Check:				
Depth	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
100	21	24/24	99-101	19-18 20-31	ND	Dense, gray, fine SAND and SILT, some medium Gravel, dry (GLACIAL TILL).	SAND and SILT (GLACIAL TILL)			
101										
102										
103										
104	22	24/24	104-106	13-20 30-50	ND	Very dense, gray, fine SAND and SILT, some medium Gravel, dry (GLACIAL TILL).				
105										
106										
107										
108										
109	23	24/24	109-111	9-12 24-42	ND	Dense, gray, fine SAND and SILT, some medium Gravel, damp (GLACIAL TILL).				
110										
111										
112										
113										
114	24	24/24	114-116	9-17 28-41	ND	Dense, gray, fine SAND and SILT, some medium Gravel, damp (GLACIAL TILL).				
115										
116										
117										
118										
119	25	24/24	119-121	8-15 31-50	ND	Dense, gray, fine SAND and SILT, some medium Gravel, damp (GLACIAL TILL).				
120										
121										
122										
123										
124	26	18/18	124-125.5	9-27-50/6"	10.7	Very dense, gray, fine SAND and SILT,		5		
REMARKS	5. Groundwater was encountered at approximately 123.5 feet below ground surface.									
	Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									
Boring No.: MW-WV4										

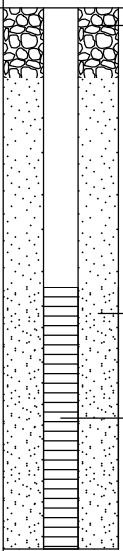
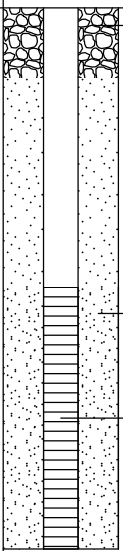
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Wolver Avenue Area
Algoma Twp, Kent County, Michigan

Boring No.: MW-WV4
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File No.: 16.0062677.81
Check:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
125	27	15/12	128-129.3	15-35-50/3"	5.0	some medium Gravel, damp, with green, fine Sand and Silt lenses and blue, fine Sand and Silt lenses, damp (GLACIAL TILL).	SAND and SILT (GLACIAL TILL)	6		Bentonite
126										
127										
128						Very dense, brown, fine to medium SAND, trace Silt, wet, with layer of green, fine SAND.	128' SAND			
129										
130	28	12/12	134-135	17-50+	ND			7		Filter Sand
131										
132										
133							133' Silty SAND and CLAY			
134						Very dense, red and green, fine Silty SAND, some Silty Clay, wet.	135'			
135						Bottom of Borehole at 135.0 Feet				
136										
137										
138										
139										
140										
141										
142										
143										
144										
145										
146										
147										
148										
149										
150										
<div>REMARKS</div> <div> <p>6. A temporary well screen was set from 125.0 to 130.0 below ground surface. Groundwater sample was collected and submitted for laboratory analytical testing.</p> <p>7. Monitoring well was installed in the borehole upon completion. Well screen set from 130.0 to 135.0 feet below ground surface.</p> </div>										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: MW-WV4	

BORING WELL 6267781 WWW.WOLVERAVENUE.GPJ GZA CORP.GDT 8/1/18



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Wolven Avenue Area

Algoma Twp, Kent County, Michigan

Boring No.: MW-WV5D

Page: 1 of 3

File No.: 16.0062677.81

Check:

Contractor: Stearns Drilling Company

Foreman: Jerry Huntoon

Logged by: Joe Workman

Date Start/Finish: 3-14-18 / 3-14-18

Boring Location:

GS Elev.: Datum:

Auger/
Casing

Sampler

Type: Hollow Stem Auger

Split Spoon

O.D. / I.D.: 12.25" / 4.25"

2.0" / 1 3/8"

Hammer Wt.: NA

140lbs

Hammer Fall: NA

30.0"

TOC Elev.: NA

NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab
3/14/18	1005	64.4'	Top of PVC	

Surveyed By: NA Survey Date:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					PROTECTIVE CASING
1	1	24/13	0-2	2-3 5-6	9.0	Loose, dark brown, fine to medium SAND, trace Organic Matter (roots), trace Clay, trace Silt, damp. Changing at 1.0 foot to: Brown, fine to medium SAND, trace Silt, damp.	SAND	1		Concrete
2	2	24/11	2-4	3-4 4-5	3.0	Loose, brown, fine to medium SAND, trace Silt, damp (rock fragment in tip of spoon).				
3										
4	3	24/21	4-6	2-2 3-3	10.0	Loose, tan, fine to medium SAND, trace Silt, damp.				
5										
6	4	24/15	6-8	2-2 3-3	ND	Loose, brown, fine to medium SAND, trace fine to coarse Gravel, moist.				
7										
8	5	24/18	8-10	2-2 3-4	ND	Loose, brown, fine to medium SAND, trace Silt, moist.				
9										
10	6	24/22	10-12	3-2 2-2	3.0	Loose, brown, fine to medium SAND, trace Silt, moist.				
11										
12	7	24/23	12-14	2-1 2-3	ND	Loose, brown, fine to medium SAND, trace Silt, moist.				
13										
14	8	24/24	14-16	2-3 3-3	ND	Loose, tan, fine to medium SAND, trace Silt, moist. Changing at approximately 15.8 feet to: Loose, brown, fine to coarse SAND, trace Silt, moist.				
15										
16	9	24/24	16-18	4-5 8-10	ND	Medium dense, brown, fine to medium SAND, trace Silt, damp.				
17										
18	10	24/22	18-20	5-10 11-11	ND	Medium dense, brown, fine to coarse SAND, trace Silt, damp. Changing at approximately 19.7 feet to: Brown, fine to coarse SAND, trace Silt, damp.				
19										
20	11	24/20	20-22	10-9 13-12	ND	Medium dense, brown, fine to medium SAND, trace Silt, damp. Changing at approximately 21.5 feet to: Medium dense, brown, fine to coarse SAND, trace fine to coarse Gravel, trace Silt, damp with 1.0 inch layer of CLAY and SILT at approximately 21.7 feet.				
21										
22	12	24/20	22-24	4-5 10-9	ND	Medium dense, tan, fine to medium SAND,				
23										

REMARKS

- Field screening of samples for organic vapors was performed with a MiniRae 3000 photoionization detector equipped with a 10.6 eV lamp. Readings above background levels are shown in parts per million by volume (ppmv) of isobutylene. ND indicates nothing detected (<0.1 ppmv).

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: MW-WV5D

BORING WELL 6267781 WWW.WOLVEN AVENUE.GPJ GZA CORP.GDT 8/1/18



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Wolven Avenue Area
Algoma Twp, Kent County, Michigan

Boring No.: MW-WV5D
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Check:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
25	13	24/21	24-26	5-5 9-13	ND	trace Silt, damp. Medium dense, tan, fine to medium SAND, trace Silt, damp.	SAND			
26	14	24/18	26-28	3-7 7-7	ND	Loose, brown, fine to coarse SAND, trace Silt, trace fine Gravel, damp. Changing at approximately 27.0 feet to: Medium dense, brown, fine to medium SAND, trace Silt, damp.				
28	15	24/19	28-30	2-3 4-4	ND	Loose, brown, fine to coarse SAND, trace fine Gravel, trace Silt, damp.				
30	16	24/17	30-32	2-3 4-4	ND	Loose, brown, fine to coarse SAND, trace fine Gravel, trace Silt, damp.				
32	17	24/19	32-34	2-2 2-2	ND	Loose, brown, fine to coarse SAND, trace fine Gravel, trace Silt, damp.		3		
34	18	24/24	34-36	2-3 4-7	ND	Loose, brown, fine to coarse SAND, trace fine Gravel, trace Silt, moist. Changing at approximately 34.2 feet to: Brown, Silty CLAY, little fine to coarse Sand, trace fine Gravel, damp.	34.2' Silty CLAY			
36	19	24/24	36-38	1-4 3-3	ND	Medium, brown, CLAY & SILT, some fine Sand, moist. Changing at approximately 36.4 feet to: Brown, fine to medium SAND, trace Silt, wet. Changing at approximately 36.6 feet to: Brown, CLAY & SILT, some fine to medium Sand, moist.	36' CLAY & SILT	4		
40	21	24/24	40-42	4-9 9-11	ND	Medium, brown, CLAY & SILT, some fine to medium Sand, moist. Changing at approximately 39.2 feet to: Medium SAND, trace Silt, damp.	40' SAND			
42	22	24/22	42-44	10-13 18-19	ND	Medium dense, brown, fine SAND, trace Silt, wet. Medium dense, brown, fine SAND, trace Silt, wet.				
44	23	24/24	44-46	6-10 10-13	ND	Medium dense, brown, fine SAND, trace Silt, wet.				
46	24	24/20	46-48	5-12 17-22	ND	Medium dense, brown, fine SAND, trace Silt, wet.				
48	25	24/22	48-50	7-16 21-22	ND	Medium dense, brown, fine SAND, trace Silt, wet.				
50	26	24/24	50-52	10-11 16-21	ND	Medium dense, brown, fine SAND, trace Silt, wet.				
51										
REMARKS 3. Driller noted some clay present in tip of spoon. 4. Groundwater was encountered at approximately 36.4 feet below ground surface.										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: MW-WV5D	

BORING WELL 6267781 WWW.WOLVENAVENUE.GPJ GZA CORP.GDT 8/1/18

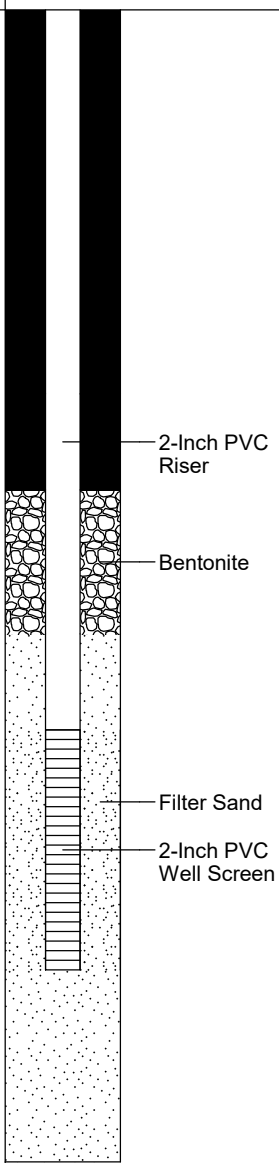
Bentonite
Grout



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Algoma Twp, Kent County, Michigan

Boring No.: MW-WV5D
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Check:

Sample Information						Check:				
Depth	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
53	27	24/24	52-54	4-11 14-14	ND	Medium dense, brown, fine SAND, trace Silt, wet.	SAND		5	
54	28	24/24	54-56	5-8 13-19	ND	Medium dense, brown, fine SAND, trace Silt, wet.				
55										
56	29	24/24	56-58	3-5 13-27	ND	Medium dense, brown, fine SAND, trace Silt, wet.				
57										
58	30	24/21	58-60	9-18 10-16	ND	Medium dense, brown, fine SAND, trace Silt, wet. Changing at approximately 58.5 feet to: Brown, fine to coarse SAND, some fine Gravel, wet.				
59										
60	31	24/24	60-62	12-18 19-12	ND	Dense, brown, medium to coarse SAND, some fine Gravel, trace Silt, wet.				
61										
62	32	24/15	62-64	2-3 6-9	ND	Loose, brown, medium to coarse SAND, some fine Gravel, trace Silt, wet.				
63										
64	33	24/18	64-66	1-2 5-9	ND	Loose, brown and gray, fine SAND, trace Silt, wet.				
65										
66	34	24/12	66-68	2-4 7-12	ND	Medium dense, brown and gray, fine SAND, trace Silt, wet.				
67										
68	35	24/10	68-70	1-4 7-10	ND	Medium dense, brown and gray, fine SAND, trace Silt, wet.				
69										
70	36	24/15	70-72	2-4 7-14	ND	Medium dense, brown and gray, fine SAND, trace Silt, wet.				
71										
72	37	24/24	72-74	2-5 10-13	ND	Medium dense, brownish gray, fine SAND, trace Silt, wet. Changing at approximately 73.0 feet to: Brown, CLAY.	73'			
73							CLAY			
74	38	24/24	74-76	11-14 26-27	ND	Hard, brown, CLAY. Changing at approximately 75.5 feet to: Gray, CLAY.	76'			
75										
76						Bottom of Borehole at 76.0 Feet				
77										
78										
79										
REMARKS	5. Monitoring well was installed in borehole upon completion. Well screen set from 67.0 to 72.0 feet below ground surface.									
	Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									
Boring No.: MW-WV5D										

BORING WELL 6267781 WWW.WOLVERAVENUE.GPJ GZA CORP.GDT 8/1/18



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Wolven Avenue Area

Algoma Twp, Kent County, Michigan

Boring No.: MW-WV5S

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File No.: 16.0062677.81

Check:

Contractor: Stearns Drilling Company

Foreman: Jerry Huntoon

Logged by: Joe Workman/Anthony Leonido

Date Start/Finish: 3-14-18 / 3-14-18

Boring Location:

GS Elev.: Datum:

Auger/
Casing

Sampler

GROUNDWATER READINGS

Type: Hollow Stem Auger

Split Spoon

O.D. / I.D.: 12.25" / 4.25"

2.0" / 1 3/8"

Hammer Wt.: NA

140lbs

Hammer Fall: NA

30.0"

TOC Elev.: NA

NA

Date	Time	Depth	Casing	Stab

Surveyed By: NA Survey Date:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
1						See MW-WV5D boring log for soil descriptions.				
2										
3										
4										
5										
6										
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32										
33										
34										

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: MW-WV5S

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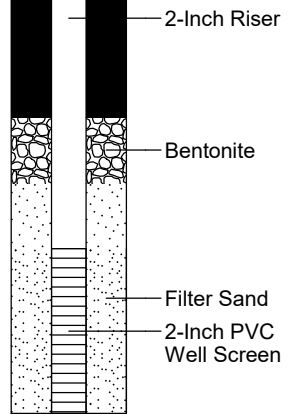
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File No.: 16.0062677.81
Check:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
36										
37										
38										
39										
40										
41										
42										
43										
44										
45										
46										
47										
48										
49										
50										
51										
52										
53										
54										
55										
56										
57										
58										
59										
60										
61										
62										
63										
64										
65										
66						Bottom of Borehole at 65.0 Feet		1		
67										
68										
69										
70										
71										
72										
73										
74										
75										
1. Monitoring well was installed in borehole upon completion. Well screen set from 60.0 to 65.0 feet below ground surface.										
REMARKS										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: MW-WV5S	

BORING WELL 6267781 WWW.WOLVENAVENUE.GPJ GZA CORP.GDT 8/1/18





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Wolverine World Wide

Wolver Avenue Area

Algoma Twp, Kent County, Michigan

Boring No.: MW-WV6D

Page: 1 of 3

File No.: 16.0062677.81

Check: _____

Contractor: Stearns Drilling Company

Foreman: Jerry Huntoon

Logged by: Anthony Leonido

Date Start/Finish: 3-19-18 / 3-20-18

Boring Location: _____

GS Elev.: _____ Datum: _____

Auger/
Casing

Sampler

Type: Hollow Stem Auger

Split Spoon

O.D. / I.D.: 12.25" / 4.25"

2.0" / 1 3/8"

Hammer Wt.: NA

140lbs

Hammer Fall: NA

30.0"

TOC Elev.: NA

NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: NA Survey Date: _____

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				PROTECTIVE CASING	Concrete
1	1	24/8	0-2	1-1 2-2	ND	Top 2.0 inches LOAM. Changing to: Loose, brown, fine to medium SAND and SILT, dry.	SAND and SILT	1		
2										
3										
4	2	24/12	4-6	2-2 1-1	ND	Loose, brown, fine SAND, trace Silt, dry.	4' SAND and GRAVEL			
5										
6										
7										
8										
9	3	24/12	9-11	2-5 7-7	ND	Medium dense, brown, fine SAND and fine GRAVEL, trace Silt, wet.				
10										
11										
12										
13										
14	4	24/15	14-16	2-5 7-7	ND	Medium dense, brown, fine to coarse SAND and fine GRAVEL, some Silt, wet.		2		
15										
16										
17										
18										
19	5	24/18	19-21	2-3 5-16	ND	Medium, brown, SILT, wet.	19' SILT			
20										
21										
22										
23										
24	6	24/18	24-26	4-10 20-11	ND	Very stiff, brown, SILT, trace fine Sand, wet.				
25										
26										
27										
28										
29	7	24/19	29-31	11-25 25-32	ND	Very dense, brown, SAND and SILT, some Clay, wet (GLACIAL TILL).	29' GLACIAL TILL			
30										
31										
32										
33										
34	8	24/19	34-36	4-14 25-34	ND	Very dense, brown, fine Silty SAND and				

REMARKS

- Field screening of samples for organic vapors was performed with a MiniRae 3000 photoionization detector equipped with a 10.6 eV lamp. Readings above background levels are shown in parts per million by volume (ppmv) of isobutylene. ND indicates nothing detected (<0.1 ppmv).
- A groundwater sample was collected from a temporary monitoring with well screen set at approximately 13.0 to 18.0 feet below ground surface and submitted for analytical laboratory testing.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: MW-WV6D

BORING WELL 6267781 WWW.WOLVERAVENUE.GPJ GZA CORP.GDT 8/1/18



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Wolverine World Wide
Wolven Avenue Area
Algoma Twp, Kent County, Michigan

Boring No.: MW-WV6D
Page: 2 of 3
File No.: 16.0062677.81
Check:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
36						SILT, some Clay, wet (GLACIAL TILL).	GLACIAL TILL			
37										
38										
39	9	12/12	39-40	21-97	ND	Very dense, brown, SAND and SILT, some Clay, wet (GLACIAL TILL).				
40										
41										
42										
43										
44										
45										
46										
47										
48										
49	10	24/18	49-51	21-38 44-53	ND	Very dense, brown, SAND and SILT, some Clay, wet (GLACIAL TILL).				
50										
51										
52										
53										
54	11	24/16	54-56	20-27 44-50	ND	Very dense, brown, SAND and SILT, some Clay, wet (GLACIAL TILL).				
55										
56										
57										
58										
59	12	24/17	59-61	20-24 30-46	ND	Very dense, brown, SAND and SILT, some Clay, wet (GLACIAL TILL).				
60										
61										
62										
63										
64	13	16/16	64-65.3	45-32-50/4"	ND	Very dense, brown, SAND and SILT, some Clay, wet (GLACIAL TILL).				
65										
66										
67										
68										
69	14	16/14	69-70.3	28-46-50/4"	ND	Very dense, brown, SAND and SILT, some Clay, wet (GLACIAL TILL).				
70										
71										
72										
73										
74	15	12/10	74-75	35-68	ND	Very dense, brown, SAND and SILT, some Clay, wet (GLACIAL TILL).				
75										
REMARKS										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: MW-WV6D	

BORING WELL 6267781 WWW.WOLVENAVENUE.GPJ GZA CORP.GDT 8/1/18

Bentonite Grout



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Wolverine World Wide
Wolver Avenue Area
Algoma Twp, Kent County, Michigan

Boring No.: MW-WV6D
Page: 3 of 3
File No.: 16.0062677.81
Check:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
77	16	17/15	79-80.4	14-25-50/5"	ND	Very dense, brown, SAND and SILT, some Clay, wet (GLACIAL TILL).	GLACIAL TILL		
78									
79									
80									
81									
82	17	6/6	84-84.5	50-100/0"	ND	Very dense, brown, SAND and SILT, some Clay, wet (GLACIAL TILL).			
83									
84									
85									
86									
87	18	14/10	89-90.2	20-40-50/4"	ND	Very dense, brown, SAND and SILT, some Clay, wet (GLACIAL TILL).			
88									
89									
90									
91									
92	19	19/17	94-95.6	40-48 50-40/1"	ND	Very dense, brown, fine SAND, trace Silt, wet.	94' SAND		2-Inch PVC Riser Bentonite
93									
94									
95									
96									
97	20	24/20	99-101	2-11 26-33	ND	Very dense, brown, fine SAND, trace Silt, wet.			Filter Sand 2-Inch PVC Well Screen
98									
99									
100									
101									
102	21	24/18	104-106	16-16 21-21	ND	Dense, brown, fine SAND, trace Silt, wet. Changing at approximately 105.0 feet to: Gray, CLAY, wet.	105' CLAY 106'	3	
103									
104									
105									
106									
107						Bottom of Borehole at 106.0 Feet		4	
108									
109									
110									
111									
112									
113									
114									
115									
116									
REMARKS 3. Groundwater was encountered at approximately 104.0 feet below ground surface. 4. Monitoring well was installed in borehole upon completion. Well screen set from 98.0 to 103.0 feet below ground surface.									
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.								Boring No.: MW-WV6D	

BORING WELL 6267781 WWW.WOLVERAVENUE.GPJ GZA CORP.GDT 8/1/18



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Algoma Twp, Kent County, Michigan

Boring No.: MW-WV6S

Page: 1 of 1

File No.: 16.0062677.81

Check: _____

Contractor: Stearns Drilling Company

Foreman: Burt Graham

Logged by: Christopher Melby

Date Start/Finish: _____

Boring Location: _____

GS Elev.: _____ Datum: _____

Auger/
Casing

Sampler

GROUNDWATER READINGS

Type: Hollow Stem Auger

Split Spoon

O.D. / I.D.: 12.25" / 4.25"

2.0" / 1 3/8"

Hammer Wt.: NA

140lbs

Hammer Fall: NA

30.0"

TOC Elev.: NA

NA

Date	Time	Depth	Casing	Stab

Surveyed By: NA Survey Date: _____

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					PROTECTIVE CASING
1						See MW-WV6D boring log for soil descriptions.				
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18						Bottom of Borehole at 18.0 Feet		1		
19										

REMARKS

1. Monitoring well was installed in borehole upon completion. Well screen set from 13.0 to 18.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: MW-WV6S

BORING WELL 6267781 WWW.WOLVENAVENUE.GPJ GZA CORP.GDT 8/1/18



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Wolven Avenue Area

Algoma Twp, Kent County, Michigan

Boring No.: PMW-WV-7/MW-WV-7D

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File No.: 16.0062677.81

Check: Leslie Nelson

Contractor: Stearns Drilling Company

Foreman: Jerry Zach/Travis

Logged by: John Morehouse

Date Start/Finish: 10-23-18 / 10-25-18

Boring Location:

GS Elev.: Datum: NAD 83

Auger/
Casing

Sampler

Type: Hollow Stem Auger

Split Spoon

O.D. / I.D.: 12.25" / 4.25"

2.0" / 1 3/8"

Hammer Wt.: NA

140lbs

Hammer Fall: NA

30.0"

TOC Elev.: NA

NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab
NM	NM	NM	NM	NM

Surveyed By: NA Survey Date:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					PROTECTIVE CASING
1	1	24/20.4	0-2	2-2 2-2	ND	Very dark brown, fine grained SAND, some Silt, trace Gravel, moist. Changing at 0.4 feet to: Dark yellowish-brown to yellowish-brown, very fine grained SAND and SILT, moist. Changing at 1.7 feet to: NO RECOVERY.	0.4' SAND SAND and SILT	1		
2	2	24/15.6	2-4	1-2 1-1	ND	Yellowish-brown, very fine grained SAND and SILT, moist. Changing at 3.3 feet to: NO RECOVERY.	1.7' NO RECOVERY 2' SAND and SILT			
3							3.3' NO RECOVERY			
4	3	24/19.2	4-6	1-4 3-2	ND	Yellowish-brown to brown, CLAY & SILT, moist. Changing at 4.6 feet to: Yellowish-brown, fine to medium grained SAND, trace Silt, moist. Changing at 5.6 feet to: NO RECOVERY.	4' CLAY & SILT 4.6' SAND			
5							5.6' NO RECOVERY			
6	4	24/12	6-8	1-1 1-1	ND	Yellowish-brown, fine to coarse grained SAND, little Gravel, trace Silt, moist. Changing at 7.0 feet to: NO RECOVERY.	6' NO RECOVERY SAND			
7							7' NO RECOVERY			
8	5	24/6	8-10	1-1 1-1	ND	Yellowish-brown, fine to coarse grained SAND, little Gravel, trace Silt, moist. Changing at 8.5 feet to: NO RECOVERY.	8' SAND 8.5' NO RECOVERY			
9										
10	6	24/12	10-12	1-1 2-2	ND	Yellowish-brown, fine to coarse grained SAND, little Gravel, trace Silt, moist. Changing at 10.6 feet to: Pale brown to light yellowish-brown, fine SAND, trace Silt, moist. Changing at 11.0 feet to: NO RECOVERY.	10' SAND 11' NO RECOVERY			
11										
12	7	24/16.8	12-14	2-3 3-3	ND	Pale brown to light yellowish-brown, fine SAND, trace Silt, moist. Changing at 12.7 feet to: Brown, fine to medium SAND, trace Silt, wet. Changing at 13.4 feet to: NO RECOVERY.	12' SAND 13.4' NO RECOVERY	2		
13										
14	8	24/15.6	14-16	3-2 3-4	ND	Brown, fine to medium SAND, trace Silt, wet. Changing at 15.3 feet to: NO RECOVERY.	14' SAND			

REMARKS

- Field screening of samples for organic vapors was performed with a MiniRae 3000 photoionization detector equipped with a 10.6 eV lamp. Readings above background levels are shown in parts per million by volume (ppmv) of isobutylene. ND indicates nothing detected (<0.1 ppmv).
- Groundwater was encountered at approximately 12.7 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: PMW-WV-7/MW-WV-7D

BORING WELL 6267781 WWW.WOLVENAVENUE.GPJ GZA CORP.GDT 3/25/19



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Wolven Avenue Area
Algoma Twp, Kent County, Michigan

Boring No.: PMW-WV-7/MW-WV-7D
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File No.: 16.0062677.81
Check: Leslie Nelson

Sample Information						Check: Leslie Nelson							
Depth	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed				
16	9	24/16.8	16-18	2-2 3-4	ND	Brown, fine to medium SAND, trace Silt, wet. Changing at 17.4 feet to: NO RECOVERY.	15.3' SAND NO RECOVERY 16'						
17							SAND						
18	10	24/19.2	18-20	0-2 3-6	ND		17.4' NO RECOVERY 18' SAND						
19						19.6' NO RECOVERY 20' SAND							
20	11	24/16.8	20-22	5-6 5-11	ND	21.4' NO RECOVERY 22' SAND							
21						23.6' NO RECOVERY 24' SAND							
22	12	24/19.2	22-24	8-12 13-11	ND	25.3' NO RECOVERY 26' SAND							
23						27.2' NO RECOVERY 28' SAND							
24	13	24/15.6	24-26	1-1 1-1	ND	29.8' NO RECOVERY 30' SAND							
25						31.4' NO RECOVERY 32' SAND							
26	14	24/14.4	26-28	1-1 2-0	ND	Brown, fine to medium SAND, trace Silt, trace Gravel, wet. Changing at 29.8 feet to: NO RECOVERY.							
27													
28	15	24/21.6	28-30	1-1 1-2	ND								
29													
30	16	24/16.8	30-32	0-0 1-1	ND	Brown, fine to medium SAND, trace Silt,							
31													
32	17	24/20.4	32-34	0-1 3-4	ND								
REMARKS													
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.											Boring No.: PMW-WV-7/MW-WV-7D		

BORING WELL 6267781 WWW.WOLVENAVENUE.GPJ GZA CORP.GDT 3/25/19



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Algoma Twp, Kent County, Michigan

Boring No.: PMW-WV-7/MW-WV-7D
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Check: Leslie Nelson

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
33						trace Gravel, wet. Changing at 33.7 feet to: NO RECOVERY.	SAND			
34	18	24/22.8	34-36	1-2 4-5	ND	Brown, fine to medium SAND, trace Silt, trace Gravel, wet. Changing at 35.9 feet to: NO RECOVERY.	33.7' 34' NO RECOVERY SAND			
35										
36	19	24/10.8	36-38	1-2 1-4	ND	Brown, fine to medium SAND, trace Silt, trace Gravel, wet. Changing at 36.9 feet to: NO RECOVERY.	35.9' 36' NO RECOVERY SAND			
37							36.9' NO RECOVERY			
38	20	24/12	38-40	1-0 4-4	ND	Brown, fine to medium SAND, trace Silt, trace Gravel, wet. Changing at 38.9 feet to: Brown, GRAVEL, some fine to coarse grained Sand, trace Silt, wet. Changing at 38.9 feet to: NO RECOVERY.	38' SAND			
39							38.9' 39' GRAVEL NO RECOVERY			
40	21	24/15.6	40-42	1-1 1-2	ND	Brown, fine to medium SAND, trace Silt, trace Gravel, wet. Changing at 41.3 feet to: NO RECOVERY.	40' SAND			
41							41.3' NO RECOVERY			
42	22	24/15.6	42-44	1-1 1-1	ND	Brown, fine to medium SAND, trace Silt, trace Gravel, wet. Changing at 43.3 feet to: NO RECOVERY.	42' SAND			
43							43.3' NO RECOVERY			
44	23	24/6	44-46	1-1 1-1	ND	Brown, fine to medium SAND, trace Silt, wet. Changing at 44.3 feet to: Brown, fine to medium SAND, little coarse grained Sand, little Gravel, trace Silt, wet. Changing at 44.5 feet to: NO RECOVERY.	44' SAND			
45							44.5' NO RECOVERY			
46	24	24/9.6	46-48	1-1 3-5	ND	Brown, fine to medium SAND, little coarse grained Sand, little Gravel, trace Silt, wet. Changing at 46.6 feet to: Brown, GRAVEL and fine to coarse grained Sand, trace Silt, wet. Changing at 46.8 feet to: NO RECOVERY.	46' SAND			
47							46.6' 46.8' GRAVEL NO RECOVERY			
48	25	24/10.8	48-50	2-3 4-7	ND	Brown, fine to medium SAND, trace coarse grained Sand, trace Gravel, trace Silt, wet. Changing at 48.9 feet to: NO RECOVERY.	48' SAND			
49							48.9' NO RECOVERY			
							50'			
REMARKS										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.										Boring No.: PMW-WV-7/MW-WV-7D

BORING WELL 6267781 WWW.WOLVENAVENUE.GPJ GZA CORP.GDT 3/25/19

Bentonite Grout



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Wolven Avenue Area
Algoma Twp, Kent County, Michigan

Boring No.: PMW-WV-7/MW-WV-7D
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Check: Leslie Nelson

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
51	26	24/15.6	50-52	1-1 2-2	ND	Brown, fine to medium grained SAND, trace coarse grained Sand, trace Gravel, trace Silt, wet; with thin lenses of yellowish-brown, Silty Clay, moist. Changing at 51.3 feet to: NO RECOVERY.	SAND 51.3' NO RECOVERY			
52	27	24/15.6	52-54	0-0 2-9	ND	Brown, fine to medium grained SAND, trace coarse grained Sand, trace Gravel, trace Silt, wet. Changing at 53.2 feet to: Brown, GRAVEL and fine to coarse grained Sand, trace Silt, wet. Changing at 53.3 feet to: NO RECOVERY.	SAND 53.2' 53.3' GRAVEL NO RECOVERY			
54	28	24/10.8	54-56	1-1 2-3	ND	Brown, fine to medium grained SAND, trace coarse grained Sand, trace Silt, wet. Changing at 54.9 feet to: NO RECOVERY.	SAND 54.9' NO RECOVERY			
56	29	24/4.8	56-58	1-0 2-4	ND	Brown, fine to medium grained SAND, trace coarse grained Sand, trace Gravel, trace Silt, wet. Changing at 56.3 feet to: Brown, GRAVEL, trace Silt, wet. Changing at 56.4 feet to: NO RECOVERY.	56' 56.3' SAND 56.4' GRAVEL NO RECOVERY			
58	30	24/13.2	58-60	1-2 2-3	ND	Brown, fine to medium grained SAND, trace coarse grained Sand, trace Gravel, trace Silt, wet. Changing at 59.1 feet to: NO RECOVERY.	58' SAND 59.1' NO RECOVERY			
60	31	24/9.6	60-62	1-2 6-11	ND	Brown, fine to medium grained SAND, trace coarse grained Sand, trace Gravel, trace Silt, wet. Changing at 60.8 feet to: NO RECOVERY.	60' SAND 60.8' NO RECOVERY			
62	32	24/18	62-64	1-4 7-11	ND	Brown, fine to medium grained SAND, trace coarse grained Sand, trace Gravel, trace Silt, wet. Changing at 63.5 feet to: NO RECOVERY.	62' SAND 63.5' NO RECOVERY			
64	33	24/13.2	64-66	1-2 3-6	ND	Brown, fine to medium grained SAND, trace coarse grained Sand, trace Gravel, trace Silt, wet. Changing at 65.1 feet to: NO RECOVERY.	64' SAND 65.1' NO RECOVERY			
66	34	24/16.8	66-68	2-3 5-8	ND	Brown, fine to medium grained SAND, trace coarse grained Sand, trace Gravel, trace Silt, wet. Changing at 67.4 feet to: NO RECOVERY.	66' SAND 67.4'			
REMARKS Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.										

BORING WELL 6267781 WWW.WOLVENAVENUE.GPJ GZA CORP.GDT 3/25/19

Boring No.: PMW-WV-7/MW-WV-7D



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Wolven Avenue Area
Algoma Twp, Kent County, Michigan

Boring No.: PMW-WV-7/MW-WV-7D
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File No.: 16.0062677.81
Check: Leslie Nelson

Sample Information								Check: Leslie Nelson		
Depth	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
68	35	24/21.6	68-70	1-1 2-3	ND	Brown, fine to medium grained SAND, trace coarse grained Sand, trace Gravel, trace Silt, wet. Changing at 69.8 feet to: NO RECOVERY.	NO 68' RECOVERY SAND			
69										
70	36	24/21.6	70-72	1-2 2-4	ND	Brown, fine to medium grained SAND, trace coarse grained Sand, trace Gravel, trace Silt, wet. Changing at 71.8 feet to: NO RECOVERY.	69.8' 70' NO RECOVERY SAND			
71										
72	37	24/12	72-74	1-0 0-1	ND	Brown, fine to medium grained SAND, trace coarse grained Sand, trace Gravel, trace Silt, wet. Changing at 73.0 feet to: NO RECOVERY.	71.8' 72' NO RECOVERY SAND			
73							73' NO RECOVERY			
74	38	24/15.6	74-76	2-3 4-9	ND	Brown, fine to medium grained SAND, trace coarse grained Sand, trace Gravel, trace Silt, wet. Changing at 75.3 feet to: NO RECOVERY.	74' SAND			
75							75.3' NO RECOVERY			
76	39	24/19.2	76-78	1-2 5-6	ND	Brown, fine to medium grained SAND, trace coarse grained Sand, trace Gravel, trace Silt, wet. Changing at 77.2 feet to: Brown, fine to coarse grained SAND, some Gravel, trace Silt, wet. Changing at 77.6 feet to: NO RECOVERY.	76' SAND			
77							77.6' NO RECOVERY SAND			
78	40	24/12	78-80	2-1 4-5	ND	Brown, fine to coarse grained SAND, some Gravel, trace Silt, wet. Changing at 79.0 feet to: NO RECOVERY.	78' NO RECOVERY SAND			
79							79' NO RECOVERY			
80	41	24/24	80-82	2-3 5-18	ND	Brown, fine to medium grained SAND, some Gravel, trace Silt, wet.	80' SAND			
81										
82	42	24/10.8	82-84	7-11 15-27	ND	Brown, GRAVEL, some fine to coarse grained SAND, wet. Changing at 82.9 feet to: NO RECOVERY.	82' GRAVEL			
83							82.9' NO RECOVERY			
84	43	24/19.2	84-86	23-27 35-25	ND	Yellowish-brown, GRAVEL, some Silty Sand, wet. Changing at 85.5 feet to: Yellowish-brown, GRAVEL, trace Silt, wet.	84' GRAVEL			
REMARKS										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: PMW-WV-7/MW-WV-7D	

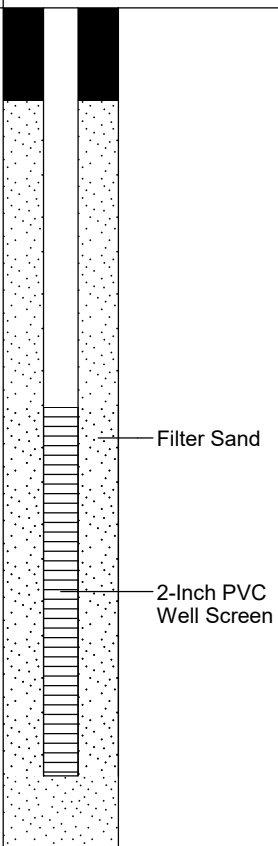
BORING WELL 6267781 WWW.WOLVENAVENUE.GPJ GZA CORP.GDT 3/25/19



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Wolverine World Wide
Wolven Avenue Area
Algoma Twp, Kent County, Michigan

Boring No.: PMW-WV-7/MW-WV-7D
Page: 6 of 6
File No.: 16.0062677.81
Check: Leslie Nelson

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
86	44	24/8.4	86-88	6-8 19-29	ND	Changing at 85.6 feet to: NO RECOVERY. Brown, fine to coarse grained SAND, some Gravel, trace Silt, wet. Changing at 86.7 feet to: NO RECOVERY.	85.6' GRAVEL 86' NO RECOVERY 86.7' SAND NO RECOVERY		
87									
88	45	24/24	88-90	3-4 10-17	ND	Brown, fine to coarse grained SAND, some Gravel, trace Silt, wet. Changing at 88.8 feet to: Yellowish-brown, GRAVEL, trace Silt, wet.	88' SAND 88.8' GRAVEL		
89									
90	46	24/7.2	90-92	14-35 40-50/5"	ND	Yellowish-brown, GRAVEL and fine to coarse grained SAND, little Silt, moist to wet. Changing at 90.6 feet to: NO RECOVERY.	90.6' NO RECOVERY		
91									
92	47	24/14.4	92-94	4-8 12-10	ND	Yellowish-brown, GRAVEL and fine to coarse grained SAND, little Silt, moist to wet. Changing at 93.0 feet to: Very dark grayish-brown, Silty CLAY, moist. Changing at 93.2 feet to: NO RECOVERY.	92' GRAVEL 93' 93.2' CLAY NO RECOVERY		
93									
94	48	24/24	94-96	17-24 26-50	ND	Very dark grayish-brown, Silty CLAY, moist.	94' Silty CLAY		
95									
96						Bottom of Borehole at 96.0 Feet	96'	3	
97									
98									
99									
100									
101									
102									
REMARKS 3. Monitoring well was installed in borehole upon completion. Well screen set from 90.2 to 95.0 feet below ground surface.									
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									

BORING WELL 6267781 WWW.WOLVENAVENUE.GPJ GZA CORP.GDT 3/25/19

Boring No.: PMW-WV-7/MW-WV-7D



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Wolven Avenue Area

Algoma Twp, Kent County, Michigan

Boring No.: MW-WV-7M

Page: 1 of 2

File No.: 16.0062677.81

Check: Kate McDonald

Contractor: Stearns Drilling Company

Foreman: Jerry H.

Logged by: John Morehouse

Date Start/Finish: 3-18-19 / 3-18-19

Boring Location:

GS Elev.: Datum

Auger/
Casing

Sampler

GROUNDWATER READINGS

Type: Direct Push

MacroCore

O.D. / I.D.: NA

2.25"

Hammer Wt.: NA

NA

Hammer Fall: NA

NA

Other: NA

NA

Date	Time	Depth	Casing	Stab

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD					PROTECTIVE CASING
1						See MW-WV7D boring log for soil descriptions.				
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										
31										
32										
33										
34										
35										
36										
37										
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41										
42										
43										
44										
45										
46										
47										
48										
49										
50										
51										

Bentonite
Grout

Filter Sand
2-Inch PVC
Well Screen

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: MW-WV-7M



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Wolven Avenue Area
Algoma Twp, Kent County, Michigan

Boring No.: MW-WV-7M
Page: 2 of 2
File No.: 16.0062677.81
Check: Kate McDonald

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD				
53									
54									
55						Bottom of Borehole at 55.0 Feet		1	
56									
57									
58									
59									
60									
61									
62									
63									
64									
65									
66									
67									
68									
69									
70									
71									
72									
73									
74									
75									
76									
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97									
98									
99									
100									
101									
102									
103									
104									
105									
106									
107									
108									
109									
110									
111									
112									
REMARKS									
1. Monitoring well was installed in borehole upon completion. Well screen set from 50.0 to 55.0 feet below ground surface.									
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									

Boring No.: MW-WV-7M

BORING WI 6267781 WWW.WOLVEN AVENUE.GPJ WI DNR.GDT 4/15/20



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Wolverine World Wide

Wolver Avenue Area

Algoma Twp, Kent County, Michigan

Boring No.: MW-WV7S

Page: 1 of 1

File No.: 16.0062677.81

Check: Leslie Nelson

Contractor: Stearns Drilling Company

Foreman: Jerry Zach/Travis

Logged by: John Morehouse

Date Start/Finish: 10-25-18 / 10-25-18

Boring Location:

GS Elev.: Datum: NAD 83

Auger/
Casing

Sampler

Type: Hollow Stem Auger

Split Spoon

O.D. / I.D.: 12.25" / 4.25"

2.0" / 1 3/8"

Hammer Wt.: NA

140lbs

Hammer Fall: NA

30.0"

TOC Elev.: NA

NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab
NM	NM	NM	NM	NM

Surveyed By: NA Survey Date:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					PROTECTIVE CASING
1						See boring log PMW-WV-7/MW-WV-7D for soil descriptions.				
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22						Bottom of Borehole at 21.5 Feet		1		

REMARKS

1. Monitoring well was installed in borehole upon completion. Well screen set from 15.7 to 20.5 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: MW-WV7S

BORING WELL 6267781 WWW.WOLVERAVENUE.GPJ GZA CORP.GDT 3/25/19



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Wolven Avenue Area

Algoma Twp, Kent County, Michigan

Boring No.: MW-WV8D

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File No.: 16.0062677.81

Check: _____

Contractor: Stearns Drilling Company

Foreman: Burt Graham

Logged by: Christopher Melby

Date Start/Finish: / 5-9-18

Boring Location: _____

GS Elev.: _____ Datum: _____

Auger/
Casing

Sampler

GROUNDWATER READINGS

Type: Hollow Stem Auger

Split Spoon

O.D. / I.D.: 12.25" / 4.25"

2.0" / 1 3/8"

Hammer Wt.: NA

140lbs

Hammer Fall: NA

30.0"

TOC Elev.: NA

NA

Date	Time	Depth	Casing	Stab

Surveyed By: NA Survey Date: _____

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				PROTECTIVE CASING	Concrete
1	1	24/21	0-2	3-4 4-3		Dark, yellowish brown, moderately well sorted fine to medium grained SAND, little Silt, slightly cohesive, moist (FILL). Changing at 1.2 feet to: Yellowish brown with occasional dark grayish brown, moderately well sorted fine to medium grained SAND, little Silt, moist.	SAND (FILL) 1.2' SAND			
2	2	24/14	2-4	1-1 1-3		Yellowish brown, well sorted fine to medium grained SAND, trace Silt, moist.				
3										
4	3	24/17	4-6	1-2 2-2		Yellowish brown, well sorted fine to medium grained SAND, trace Silt, moist.				
5										
6	4	24/17	6-8	2-3 2-3		Yellowish brown, well sorted fine to medium grained SAND, trace Silt, moist.				
7										
8	5	24/24	8-10	3-2 3-4		Yellowish brown, well sorted fine to medium grained SAND, trace Silt, moist.				
9										
10	6	24/19	10-12	4-4 4-4		Yellowish brown, well sorted fine to medium grained SAND, trace Silt, moist. Changing at 11.2 feet to: Brown tho yellowish brown, moderately sorted CLAY & SILT, little Sand, plastic, cohesive, moist.	11.2' 11.4' CLAY & SILT SAND			
11										
12	7	24/19	12-14	1-5 5-5		Brown to yellowish brown, moderately sorted CLAY & SILT, little Sand, plastic, cohesive, moist. Changing at 13.0 feet to: Brown to yellowish brown, very well sorted SILT, cohesive, non plastic, moist.	13' 13.2' SILT SAND			
13										
14	8	24/21	14-16	3-4 5-7		Brown to yellowish brown, very well sorted SILT, cohesive, non plastic, moist. Changing at 15.3 feet to: Pale brown to				

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: MW-WV8D

BORING WELL 6267781 WWW.WOLVENAVENUE.GPJ GZA CORP.GDT 8/1/18



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Wolven Avenue Area
Algoma Twp, Kent County, Michigan

Boring No.: MW-WV8D
Page: 2 of 8
File No.: 16.0062677.81
Check:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
16	9	24/17	16-18	2-3 7-7		brown, moderately sorted, fine to coarse grained SAND, trace Silt, moist. Pale brown to light yellowish brown, very well sorted, fine to medium grained SAND, trace Silt, moist. Changing at 17 feet o:	SAND			
17						Yellowish brown, well sorted, CLAY & SILT, trace Sand, plastic, cohesive, moist. Changing at 17.1 feet o: Pale brown to light yellowish brown, very well sorted, fine to medium grained SAND, trace Silt, moist.	17' CLAY & SILT SAND			
18	10	24/20	18-20	5-5 6-7		Pale brown to light yellowish brown, very well sorted, fine to medium grained SAND, trace Silt, moist. Pale brown to light yellowish brown, very well sorted, fine to medium grained SAND, trace Silt, moist.				
19										
20	11	24/20	20-22	7-7 8-10		Pale brown to light yellowish brown, very well sorted, fine to medium grained SAND, trace Silt, moist. Changing at 21.1 feet to:				
21						Pale brown to brown, moderately well sorted, fine to coarse grained SAND, trace Silt, moist.				
22	12	24/19	22-24	4-7 9-12		Pale brown to brown, moderately well sorted, fine to coarse grained SAND, trace Silt, moist. Changing at 23.3 feet to:				
23						Yellowish brown to brown, moderately sorted, fine to coarse grained SAND, some Gravel, trace Silt, moist to wet.		1		
24	13	24/14	24-26	11-12 8-9		Yellowish brown to brown, moderately sorted, fine to coarse grained SAND, some Gravel, trace Silt, moist to wet.				
25										
26	14	24/20	26-28	3-4 6-7		Brown to dark brown, poorly sorted, medium to coarse grained SAND, some Gravel, trace Silt, wet; grains finer.				
27										
28	15	24/19	28-30	4-4 7-8		Brown to dark brown, moderately well sorted, fine to medium SAND, trace Silt, wet.				
29										
30	16	24/19	30-32	3-5 5-8		Brown to dark brown, moderately well sorted, fine to medium SAND, trace Silt, wet. Changing at 30.5 feet to: Brown, poorly sorted, coarse grained SAND, some Gravel, trace Silt, wet. Changing at 30.6 feet to:				
31						Brown to dark brown, moderately well sorted, fine to medium SAND, trace Silt, wet.				
32	17	24/14	32-34	6-5 7-6						
<div style="display: flex;"> <div style="writing-mode: vertical-rl; transform: rotate(180deg); font-weight: bold; margin-right: 10px;">REMARKS</div> <div> <p>1. Groundwater was encountered at approximately 23.3 feet below ground surface.</p> </div> </div>										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: MW-WV8D	

BORING WELL 6267781 WWW.WOLVENAVENUE.GPJ GZA CORP.GDT 8/1/18



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Wolverine World Wide
Wolven Avenue Area
 Algoma Twp, Kent County, Michigan

Boring No.: MW-WV8D
Page: 3 of 8
File No.: 16.0062677.81
Check:

Sample Information						Algonia Twp, Kent County, Michigan		Check:		
Depth	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
33	18	24/18	34-36	1-2 2-5		Brown to dark brown, moderately well sorted, fine to medium SAND, trace Silt, wet. Changing at 33.2 feet to: Brown, well sorted, fine to medium grained SAND, trace Silt, wet.	SAND			
34						Brown, well sorted, fine to medium grained SAND, trace Silt, wet. Changing at 34.3 feet to: Brown, poorly sorted, fine to coarse grained SAND, little Gravel, trace Silt, wet.				
35						Changing at 34.4 feet to: Brown, well sorted, fine to medium grained SAND, trace Silt, wet. Changing at 34.8 feet to: Brown, poorly sorted, fine to coarse grained SAND, little Gravel trace Silt, wet. Changing at 35.5 feet to: Brown, well sorted, fine to medium grained SAND, trace Silt, wet.				
36	19	24/18	36-38	5-7 9-10		Brown, well sorted, fine to medium grained SAND, trace Silt, wet. Changing at 36.2 feet to: Dark brown, poorly sorted, medium to coarse grained SAND, some Gravel, trace Silt, wet.				
37						Dark brown, poorly sorted, medium to coarse grained SAND, some Gravel, trace Silt, wet.				
38						20				
39										
40	21	24/12	40-42	6-6 6-6						
41										
42						22				
43										
44	23	24/14	44-46	3-5 6-9			Brown, well sorted, fine to medium grained SAND, trace Silt, wet. Changing at 44.5 feet to: Dark brown, poorly sorted, medium to coarse grained SAND, some Gravel, trace Silt, wet. Changing at 44.6 feet to: Brown, well sorted, fine to medium grained SAND, trace Silt, wet.			
45						Dark yellowish brown, moderately well sorted, fine to coarse grained SAND, little Gravel, trace Silt, wet; grading coarser.				
46						24	24/15	46-48	2-4 6-6	
47										
48	25	24/12	48-50	4-7 6-7						
49										
REMARKS										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: MW-WV8D	



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Wolverine World Wide
Wolven Avenue Area
Algoma Twp, Kent County, Michigan

Boring No.: MW-WV8D
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File No.: 16.0062677.81
Check:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
51	26	24/24	50-52	3-10 15-18		Brown, moderately well sorted, fine to coarse grained SAND, little Silt, trace Gravel, trace Silt, wet. Changing at 51.9 feet to: Brown, poorly sorted, fine to coarse SAND, little Silt, trace Gravel, moist to wet.	SAND			
52	27	24/7	52-54	3-7-50/4"		Dark brown, poorly sorted, medium to coarse grained SAND, some Gravel, trace Silt, wet. Changing at 52.6 feet to: Brown, moderately well sorted, fine to coarse SAND, trace Gravel, trace Silt, wet.				
53										
54	28	24/24	54-56	4-7 23-50		Brown, moderately well sorted, fine to coarse SAND, trace Gravel, trace Silt, wet. Changing at 55.2 feet to: Yellowish brown to dark yellowish brown, very well sorted, fine grained SAND, some Silt, bedded, wet. Changing at 55.7 feet to: Brown, very well sorted, SILT, little fine grained Sand, moderately cohesive, wet; grades coarser.	55.7' 56' SILT SAND			
55						Yellowish brown, very well sorted, fine grained SAND and Silt, moderately cohesive, wet; grades coarser.				
56	29	24/14	56-58	4-17-50/6"		Yellowish brown, very well sorted, fine grained SAND and Silt, moderately cohesive, wet.				
57										Bentonite Grout
58	30	24/23	58-60	16-27 33-45		Yellowish brown, very well sorted, fine grained SAND and Silt, moderately cohesive, wet. Changing at 58.5 feet to: Yellowish brown, very well sorted, SILT, moderately cohesive, non plastic, wet. Changing at 58.6 feet to: Yellowish brown, very well sorted, fine grained SAND and Silt, moderately cohesive, wet.	58.5' 58.6' SILT SAND			
59										
60	31	24/9	60-62	5-8 38-50/3"		Yellowish brown, very well sorted, fine grained SAND and Silt, moderately cohesive, wet.				
61										
62	32	24/13	62-64	3-14 42-41		Yellowish brown, very well sorted, fine grained SAND and Silt, moderately cohesive, wet.				
63										
64	33	24/11	64-66	38-50/4.5"		Yellowish brown, very well sorted, fine grained SAND and Silt, moderately cohesive, wet. Changing at 64.5 feet to: Light yellowish brown, very well sorted, SILT, moderately cohesive, non plastic, wet. Changing at 64.7 feet to: Light yellowish brown, well sorted, SILT & CLAY, slightly plastic, moderately cohesive, moist. Changing at 64.9 feet to: Yellowish brown, very well sorted, fine grained SAND and Silt, moderately cohesive, wet.	64.5' 64.7' SILT 64.9' SILT & CLAY SAND			
65										
66	34	24/9	66-68	4-15 34-40			66' 66.5' SILT SAND			
67										
REMARKS Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.										
									Boring No.: MW-WV8D	

BORING WELL 6267781 WWW.WOLVENAVENUE.GPJ GZA CORP.GDT 8/1/18



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Wolven Avenue Area
Algoma Twp, Kent County, Michigan

Boring No.: MW-WV8D
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Check:

Sample Information						Check:							
Depth	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed				
68	35	24/11	68-70	8-14 44-50/4"		Grayish brown very well sorted, SILT, trace fine grained Sand, cohesive, non plastic, bedded, moist. Changing at 66.5 feet to: Grayish brown, very well sorted, fine grained SAND, trace Silt, moist.	SAND						
69													
70	36	24/9	70-72	49-50/4"		Grayish brown, very well sorted, fine grained SAND, trace Silt, moist. Changing at 68.3 feet to: Grayish brown, moderately sorted, fine to medium SAND, some Silt, trace Gravel, slightly cohesive, moist to wet.	70' SILT & CLAY						
71													
72	37	24/24	72-74	8-10 20-29		Dark grayish brown, poorly sorted, CLAY & SILT, little Sand, trace Gravel, plastic, cohesive, moist.	72' CLAY & SILT						
73													
74	38	24/24	74-76	13-24 35-45		Hard, brown, Clayey SILT, some medium Sand, trace Gravel (embedded in Clayey SILT), wet.	74' Clayey SILT						
75													
76													
77													
78													
79	39	24/24	79-81	6-13 27-41		Hard, brown, Clayey SILT, some medium Sand (embedded in Clayey Silt), wet.							
80													
81													
82													
83													
84	40	24/18	84-86	2-2 5-6		Medium stiff, brown, Clayey SILT, some medium Sand, wet.							
REMARKS													
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.											Boring No.: MW-WV8D		

BORING WELL 6267781 WWW.WOLVENAVENUE.GPJ GZA CORP.GDT 8/1/18



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Wolverine World Wide
Wolver Avenue Area
Algoma Twp, Kent County, Michigan

Boring No.: MW-WV8D
Page: 6 of 8
File No.: 16.0062677.81
Check:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
86							Clayey SILT			
87										
88										
89	41	24/24	89-91	9-16 44-45		Hard, brown, Clayey SILT, some medium Sand, wet.				
90										
91										
92										
93										
94	42	24/24	94-96	8-16 30-55		Hard, brown, Clayey SILT, some medium Sand, wet.				
95										
96										
97										
98										
99	43	24/24	99-101	8-19 34-42		Hard, brown, Clayey SILT, some medium Sand, wet.				
100										
101										
102										
REMARKS										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: MW-WV8D	

BORING WELL 6267781 WWW.WOLVER AVENUE.GPJ GZA CORP.GDT 8/1/18



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Wolverine World Wide
 Woven Avenue Area
 Algoma Twp, Kent County, Michigan

Boring No.: MW-WV8D
 Page: 7 of 8
 File No.: 16.0062677.81
 Check:

Sample Information						Check:					
Depth	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed		
103	44	24/24	104-106	6-14 20-20		Hard, brown, Clayey SILT, some medium to coarse Sand, wet. Changing at 105.0 feet to: Brown, fine to medium SAND, little Silt, wet.	Clayey SILT				
104											
105							105'				
106							SAND				
107	45	24/20	109-111	7-10 15-37		Medium dense, brown, fine to coarse SAND, little Silt, wet.					
108											
109											
110											
111	46	22/22	114-115.8	3-5 24-50/4"		Medium dense, brown, fine to medium SAND, trace Silt, wet.					
112											
113											
114											
115	47	11/11	119-119.9	6-63/5"		Very dense, brown, fine to medium SAND, trace Silt, wet. Changing at 119.6 feet to: Very dense, gray, fine to medium SAND and					
116											
117											
118											
119											
REMARKS											
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: MW-WV8D		

BORING WELL 6267781 WWW.WOVLEN AVENUE.GPJ GZA CORP.GDT 8/1/18

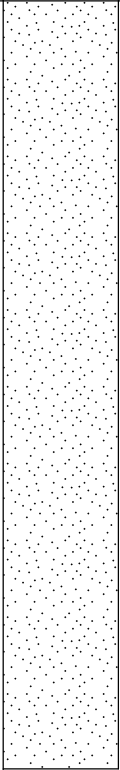
Filter Sand
 2-Inch PVC Well Screen



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Wolverine World Wide
Wolver Avenue Area
Algoma Twp, Kent County, Michigan

Boring No.: MW-WV8D
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Check:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
121	48	6/6	121-121.5	74		Silt, wet.	SAND	2		
122						Very dense, gray, fine to medium SAND and Silt, wet.				
123										
124	49	9/9	124-124.8	35-50/3"		Very dense, gray, fine to medium SAND and Silt.				
125										
126										
127										
128										
129	50	16/16	129-130.3	17-42-50/4"		Hard, gray, SILT & CLAY, some fine to medium Sand, wet.	129' SILT & CLAY			
130						Bottom of Borehole at 130.3 Feet	130.3'	3		
131										
132										
133										
134										
135										
136										
137										
REMARKS 2. Auger advancement slows at 120.0 fee below ground surface. Harder material. Collected in spoon. 3. Monitoring well was installed in borehole upon completion. Well screen set from 115.0 to 120.0 feet below ground surface.										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: MW-WV8D	

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Wolven Avenue Area

Algoma Twp, Kent County, Michigan

Boring No.: MW-WV8M

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File No.: 16.0062677.81

Check: _____

Contractor: Stearns Drilling Company

Foreman: Burt Graham

Logged by: Christopher Melby

Date Start/Finish: 5-9-18 / 5-10-18

Boring Location: _____

GS Elev.: _____ Datum: _____

Auger/
Casing

Sampler

GROUNDWATER READINGS

Type: Hollow Stem Auger

Split Spoon

O.D. / I.D.: 12.25" / 4.25"

2.0" / 1 3/8"

Hammer Wt.: NA

140lbs

Hammer Fall: NA

30.0"

TOC Elev.: NA

NA

Date	Time	Depth	Casing	Stab

Surveyed By: NA Survey Date: _____

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
1						See MW-WV8D boring log for soil descriptions from 0.0 to 63.0 feet.				
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										
31										
32										
33										
34										
35										

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: MW-WV8M

BORING WELL 6267781 WWW.WOLVENAVENUE.GPJ GZA CORP.GDT 8/1/18



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Wolven Avenue Area
Algoma Twp, Kent County, Michigan

Boring No.: MW-WV8M
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File No.: 16.0062677.81
Check:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
37										
38										
39										
40										
41										
42										
43										
44										
45										
46										
47										
48										
49										
50										
51										
52										
53										
54										
55										
56										
57										
58										
59										
60										
61										
62										
63	S-1	24/24	63-65	15-23		Very dense, brown, fine to medium SAND, trace Silt, wet.	SAND			
64				36-51						
65						Bottom of Borehole at 65.0 Feet	65'	1		
66										
67										
68										
69										
70										
71										
72										
73										
74										
75										
76										
77										
REMARKS										
1. Monitoring well was installed in borehole upon completion. Well screen set from 60.0 to 65.0 feet below ground surface.										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.										

Boring No.: MW-WV8M

BORING WELL 6267781 WWW.WOLVENAVENUE.GPJ GZA CORP.GDT 8/1/18

Filter Sand
2-Inch PVC Well Screen



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Wolver Avenue Area

Algoma Twp, Kent County, Michigan

Boring No.: MW-WV8S

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File No.: 16.0062677.81

Check: _____

Contractor: Stearns Drilling Company

Foreman: Burt Graham

Logged by: Christopher Melby

Date Start/Finish: 5-9-18 / 5-9-18

Boring Location: _____

GS Elev.: _____ Datum: _____

Auger/
Casing

Sampler

GROUNDWATER READINGS

Type: Hollow Stem Auger Split Spoon
O.D. / I.D.: 12.25" / 4.25" 2.0" / 1 3/8"
Hammer Wt.: NA 140lbs
Hammer Fall: NA 30.0"
TOC Elev.: NA NA

Date	Time	Depth	Casing	Stab

Surveyed By: NA Survey Date: _____

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
1						See MW-WV8D boring log for soil descriptions from 0.0 to 33.0 feet.				PROTECTIVE CASING
2										Concrete
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										Bentonite Grout
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										Bentonite
27										
28										
29										
30										
31										Filter Sand
32										
33	S-1	24/12	33-35	2-3		Loose, brown and gray, fine to coarse SAND, trace Silt.	SAND			2-Inch PVC Well Screen
34				4-6						
35						Bottom of Borehole at 35.0 Feet	35'	1		

REMARKS

1. Monitoring well was installed in borehole upon completion. Well screen set from 30.0 to 35.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: MW-WV8S

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Algoma Twp, Kent County, Michigan

Boring No.: MW-WV9D

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Check: _____

Contractor: Stearns Drilling Company

Foreman: Jerry Zach/Travis

Logged by: John Morehouse

Date Start/Finish: _____

Boring Location: _____

GS Elev.: _____ Datum: _____

Auger/
Casing

Sampler

Type: Hollow Stem Auger

Split Spoon

O.D. / I.D.: 12.25" / 4.25"

2.0" / 1 3/8"

Hammer Wt.: NA

140lbs

Hammer Fall: NA

30.0"

TOC Elev.: NA

NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: NA Survey Date: _____

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					PROTECTIVE CASING
1	1	24/21	0-2	2-2 2-3		Very dark grayish brown, moderately well sorted, SILT, some fine to medium grained Sand, trace Gravel, moist.	SILT			
2	2	24/19	2-4	2-1 1-1		Dark yellowish brown, poorly sorted, fine grained SAND, some Silt, trace Clay, slightly plastic, moderately cohesive, moist.	2' SAND			Sand
3										
4	3	24/20	4-6	3-2 2-3		Yellowish brown, well sorted, fine to medium grained SAND, trace Silt, moist.				Hole Plug
5										
6	4	24/17	6-8	2-2 2-3		Yellowish brown, well sorted, fine to medium grained SAND, trace Silt, moist.				
7										
8	5	24/18	8-10	2-3 2-2		Yellowish brown, well sorted, fine to medium grained SAND, trace Silt, moist.				
9										
10	6	24/23	10-12	2-2 3-3		Yellowish brown, well sorted, fine to medium grained SAND, trace Silt, moist.				
11										

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: MW-WV9D

BORING WELL 6267781 WWW.WOLVEN AVENUE.GPJ GZA CORP.GDT 8/1/18



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Wolven Avenue Area
Algoma Twp, Kent County, Michigan

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Check:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
13	7	24/17	12-14	3-4 5-4		Pale brown, well sorted, fine to medium grained SAND, bedded, moist.	SAND			
14	8	24/19	14-16	3-4 5-5		Pale brown, well sorted, fine to medium grained SAND, bedded, moist.				
16	9	24/23	16-18	3-7 7-7		Pale brown, well sorted, fine to medium grained SAND, bedded, moist.				
18	10	24/17	18-20	3-4 6-7		Pale brown, well sorted, fine to medium grained SAND, bedded, moist.				
20	11	24/23	20-22	3-5 5-7		Pale brown, well sorted, fine to medium grained SAND, bedded, moist. Changing at 21.2 feet to: Yellowish brown, very well sorted, SILT & CLAY, moderately plastic, moderately cohesive, moist. Changing at 21.3 feet to: Pale brown grading to very pale brown, well sorted, fine to medium grained SAND, bedded, moist.	21.2' 21.3' SILT & CLAY SAND			
22	12	24/17	22-24	8-13 17-22		Pale brown grading to very pale brown, well sorted, fine to medium grained SAND, bedded, moist.				
24	13	24/23	24-26	15-20 18-21		Pale brown grading to very pale brown, well sorted, fine to medium grained SAND, bedded, moist. Changing at 25.1 feet to: Yellowish brown, moderately sorted, fine to coarse grained SAND, some Silt, trace Clay, trace Gravel, slightly to moderately plastic, cohesive, moist.				
REMARKS										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: MW-WV9D	

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 Check:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
27	14	24/23	26-28	6-11 14-17		Yellowish brown, moderately sorted, fine to coarse grained SAND, some Silt, trace Clay, trace Gravel, slightly to moderately plastic, cohesive, moist.	SAND			
28	15	24/22	28-30	10-18 17-18		Yellowish brown, moderately sorted, fine to coarse grained SAND, some Silt, trace Clay, trace Gravel, slightly to moderately plastic, cohesive, moist.				
30	16	24/18	30-32	11-16 19-22		Yellowish brown, moderately sorted, fine to coarse grained SAND, some Silt, trace Clay, trace Gravel, slightly to moderately plastic, cohesive, moist.				
32	17	24/23	32-34	11-14 15-16		Yellowish brown, moderately sorted, fine to coarse grained SAND, some Silt, trace Clay, trace Gravel, slightly to moderately plastic, cohesive, moist. Changing at 32.6 feet to: Yellowish brown to brown, very well sorted, fine grained SAND, trace Silt, moist to wet. Changing at 33.2 feet to: Yellowish brown, moderately sorted, fine to coarse grained SAND, some Silt, trace Clay, trace Gravel, slightly to moderately plastic, cohesive, moist.				
34	18	24/24	34-36	13-17 21-25		Yellowish brown, moderately sorted, fine to coarse grained SAND, some Silt, trace Clay, trace Gravel, slightly to moderately plastic, cohesive, moist.				
36	19	24/24	36-38	8-12 22-24		Yellowish brown, moderately sorted, fine to coarse grained SAND, some Silt, trace Clay, trace Gravel, slightly to moderately plastic, cohesive, moist.				
38	20	24/23	38-40	17-18 23-25		Yellowish brown, moderately sorted, fine to coarse grained SAND, some Silt, trace Clay, trace Gravel, slightly to moderately plastic, cohesive, moist.	38' CLAY & SILT			
REMARKS										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: MW-WV9D	

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Algoma Twp, Kent County, Michigan

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Check:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
41	21	24/19	40-42	6-13 21-28		Yellowish brown, moderately sorted, fine to coarse grained SAND, some Silt, trace Clay, trace Gravel, slightly to moderately plastic, cohesive, moist.	CLAY & SILT			
42	22	24/19	42-44	5-11 17-20		Yellowish brown, moderately sorted, fine to coarse grained SAND, some Silt, trace Clay, trace Gravel, slightly to moderately plastic, cohesive, moist.				
44	23	24/22	44-46	7-15 20-23		Yellowish brown, moderately sorted, fine to coarse grained SAND, some Silt, trace Clay, trace Gravel, slightly to moderately plastic, cohesive, moist.				
46	24	24/20	46-48	5-6 9-13		Yellowish brown, moderately sorted, fine to coarse grained SAND, some Silt, trace Clay, trace Gravel, slightly to moderately plastic, cohesive, moist. Changing at 46.3 feet to: Brown, well sorted, fine to medium grained SAND, trace Silt, moist to wet. Changing at 46.9 feet to: Dark grayish brown, moderately sorted, CLAY & SILT, some Sand, trace Gravel, slightly to moderately plastic, cohesive, moist.	46.3' SAND			
48	25	24/24	48-50	8-16 24-30		Dark grayish brown, moderately sorted, CLAY & SILT, some Sand, trace Gravel, slightly to moderately plastic, cohesive, moist.	46.9' CLAY & SILT			Bentonite Grout
50	26	24/11	50-52	5-11 19-25		Dark grayish brown, moderately sorted, CLAY & SILT, some Sand, trace Gravel, slightly to moderately plastic, cohesive, moist.				
52	27	24/24	52-54	7-17 23-32		Dark grayish brown, moderately sorted, CLAY & SILT, some Sand, trace Gravel, slightly to moderately plastic, cohesive, moist.				
53										
REMARKS Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.										

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Check:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
55	28	24/24	54-56	7-16 25-26		Dark grayish brown, moderately sorted, CLAY & SILT, some Sand, trace Gravel, slightly to moderately plastic, cohesive, moist. Changing at 55.5 feet to: Brown, poorly sorted, fine to coarse grained SAND, little Gravel, little Silt, moist to wet.	CLAY & SILT			
56	29	24/24	56-58	5-13 19-25		Changing at 55.6 feet to: Dark grayish brown, moderately sorted, CLAY & SILT, some Sand, trace Gravel, slightly to moderately plastic, cohesive, moist. Dark grayish brown, moderately sorted, CLAY & SILT, some Sand, trace Gravel, slightly to moderately plastic, cohesive, moist.	55.5' 55.6' SAND CLAY & SILT			
58	30	24/24	58-60	9-15 31-43		Dark grayish brown, moderately sorted, CLAY & SILT, some Sand, trace Gravel, slightly to moderately plastic, cohesive, moist. Changing at 59.5 feet to: Dark yellowish brown, poorly sorted, CLAY & SILT, trace Sand, trace Gravel, plastic, cohesive, moist. Changing at 59.7 feet to: Yellowish brown, well sorted, SILT, trace Sand, non plastic, moderately cohesive, moist.	59.7' SILT			
60	31	24/24	60-62	11-15-50/5"		Dark grayish brown, poorly sorted, CLAY & SILT, trace Sand, trace Gravel, plastic, cohesive, moist. Changing at 60.6 feet to: Brown, poorly sorted, fine to medium grained SAND, little Silt, trace Clay, soft, moist to wet. Changing at 60.7 feet to: Dark yellowish brown grading to dark grayish brown, poorly sorted, CLAY & SILT, trace Sand, trace Gravel, plastic, cohesive, moist.	60' CLAY & SILT 60.6' SAND 60.7' CLAY & SILT			
62	32	24/24	62-64	5-13 23-22		Dark yellowish brown grading to dark grayish brown, poorly sorted, CLAY & SILT, trace Sand, trace Gravel, plastic, cohesive, moist. Changing at 62.4 feet to: Dark yellowish brown, poorly sorted, CLAY & SILT, trace Sand, trace Gravel, plastic, cohesive, moist. Changing at 62.7 feet to: Brown, poorly sorted, fine to medium grained, SAND, little Silt, trace Clay, slightly plastic, moist to wet. Changing at 62.8 feet to: Dark yellowish brown, poorly sorted, CLAY & SILT, trace Sand, trace Gravel, plastic, cohesive, moist. Changing at 63.5 feet to: Dark grayish brown, poorly sorted, CLAY & SILT, trace Sand, trace Gravel, plastic, cohesive, grades softer, moist.	62.7' SAND 62.8' CLAY & SILT			
64	33	24/24	64-66	8-16 30-45		Dark grayish brown, poorly sorted, CLAY & SILT, trace Sand, trace Gravel, plastic, cohesive, grades softer, moist.				
66	34	24/24	66-68	13-23 32-35		Dark grayish brown, poorly sorted, CLAY & SILT, trace Sand, trace Gravel, plastic, cohesive, grades softer, moist.				
67										
REMARKS										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: MW-WV9D	

BORING WELL 6267781 WWW.WOLVENAVENUE.GPJ GZA CORP.GDT 8/1/18



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Algoma Twp, Kent County, Michigan

Boring No.: MW-WV9D
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Check:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
69	35	24/24	68-70	11-18 24-32		Dark grayish brown, poorly sorted, CLAY & SILT, trace Sand, trace Gravel, plastic, cohesive, grades softer, moist.	CLAY & SILT			
70	36	24/24	70-72	12-10 11-18		Dark grayish brown, poorly sorted, CLAY & SILT, trace Sand, trace Gravel, plastic, cohesive, grades softer, moist.				
71										
72	37	24/24	72-74	12-14 17-20		Dark grayish brown, poorly sorted, CLAY & SILT, trace Sand, trace Gravel, plastic, cohesive, grades softer, moist.				
73										
74	38	24/11	74-76	0-2 3-5		Yellowish brown, moderately sorted, fine to coarse grained SAND, little Silt trace Gravel, moist to wet.	74' SAND			
75										
76	39	24/15	76-78	8-15 23-26		Yellowish brown, moderately sorted, fine to coarse grained SAND, little Silt trace Gravel, moist to wet. Changing at 76.9 feet to:				
77						Yellowish brown, moderately well sorted, fine to medium grained SAND, little Silt, moderately cohesisve, moist to wet.		1		
78	40	24/15	78-80	8-20 29-37		Yellowish brown, moderately well sorted, fine to medium grained SAND, little Silt, moderately cohesisve, moist to wet.				
79										
80	41	24/9	80-82	14-33-50/3"		Yellowish brown, moderately well sorted, fine to medium grained SAND, little Silt, moderately cohesisve, moist to wet.				
81										
<div>REMARKS</div> <div>1. Groundwater was encountered at approximately 76.9 feet below ground surface.</div>										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: MW-WV9D	

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Check:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
82	42	24/3	82-84	21-44-50/3"		Yellowish brown, moderately well sorted, fine to medium grained SAND, little Silt, moderately cohesivse, moist to wet.	SAND		
83									
84	43	24/8	84-86	50/5"		Yellowish brown, poorly sorted, fine to medium grained SAND, little Silt, trace Gravel, trace Clay, non to slighty plastic, slightly cohesive, moist to wet.			
85									
86	44	24/7	86-88	12-35-50/6"		Yellowish brown, poorly sorted, fine to medium grained SAND, little Silt, trace Gravel, trace Clay, non to slighty plastic, slightly cohesive, moist to wet.			
87									
88	47	24/7	88-90	21-50/3"		Light yellowish brown to pale brown, very well sorted, fine to medium grained SAND, trace Silt, wet.			
89									
90	48	24/2	90-92	13-34-50/3"		Yellowish brown, poorly sorted, fine to medium grained SAND, little Silt, trace Gravel, trace Clay, non to slighty plastic, slightly cohesive, moist to wet.			
91									
92	49	24/17	92-94	5-14 30-50/3"		Yellowish brown, poorly sorted, fine to medium grained SAND, little Silt, trace Gravel, trace Clay, non to slighty plastic, slightly cohesive, moist to wet.			
93									
94	50	24/13	94-96	35-34 32-30		Light yellowish brown to pale brown, very well sorted, fine to medium grained SAND, trace Silt, occasional very thin Silt seams, wet.			
95									
<div>REMARKS</div> <div> <p>Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.</p> </div>									

Boring No.: MW-WV9D

BORING WELL 6267781 WWW.WOLVENAVENUE.GPJ GZA CORP.GDT 8/1/18

Filter Sand
 2-Inch PVC Well Screen



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Wolverine World Wide
Wolven Avenue Area
Algoma Twp, Kent County, Michigan

Boring No.: MW-WV9D
Page: 8 of 8
File No.: 16.0062677.81
Check:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
96	51	24/24	96-98	7-12 9-11		Light yellowish brown to pale brown, very well sorted, fine to medium grained SAND, trace Silt, occasional very thin Silt seams, wet. Changing at 96.6 feet to: Dark grayish brown, poorly sorted, SILT & CLAY, little Sand, trace Gravel, slightly plastic, moderately cohesive, moist. Changing at 96.8 feet to: Light yellowish brown to pale brown, very well sorted, fine to medium grained SAND, trace Silt, wet. Changing at 97.3 feet to: Dark grayish brown, poorly sorted, medium to coarse grained SAND, trace Gravel, trace Silt, wet. Changing at 97.8 feet to: Dark grayish brown, poorly sorted, medium to coarse grained SAND, trace Gravel, moderately plastic, cohesive, hard, moist.	SAND 96.6' 96.8' SILT & CLAY SAND 97.8' SILT & CLAY	2	
97									
98	52	24/15	98-100	8-16 21-28		Dark grayish brown, poorly sorted, medium to coarse grained SAND, trace Gravel, moderately plastic, cohesive, hard, moist. Bottom of Borehole at 100.0 Feet	100'		
99									
100									
101									
102									
103									
104									
105									
106									
107									
108									
109									
<div>REMARKS</div> <div>2. Monitoring well was installed in borehole upon completion. Well screen set from 92.3 to 97.3 feet below ground surface.</div>									
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: MW-WV9D

BORING WELL 6267781 WWW.WOLVENAVENUE.GPJ GZA CORP.GDT 8/1/18



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Wolverine World Wide

Wolven Avenue Area

Algoma Twp, Kent County, Michigan

Boring No.: MW-WV-10D

Page: 1 of 4

File No.: 16.0062677.81

Check: Kate McDonald

Contractor: Stearns Drilling Company

Foreman: Jerry H.

Logged by: John Morehouse

Date Start/Finish: 3-5-19 / 3-13-19

Boring Location:

GS Elev.: Datum

Auger/
Casing

Sampler

GROUNDWATER READINGS

Type: Hollow Stem Auger Split Spoon

O.D. / I.D.: 12.25" / 4.25" 2.0" / 1 3/8"

Hammer Wt.: NA 140lbs

Hammer Fall: NA 30.0"

Other: NA NA

Date	Time	Depth	Casing	Stab

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD					PROTECTIVE CASING
1						See MW-WV-10S for soil descriptions from 0.0 to 78.8 feet.	BLIND DRILL	1		
2										
3										
4										
5										
6										
7										
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36										
37										
38										
39										

REMARKS

1. Blind drilled from 0.0 to 78.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: MW-WV-10D



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Wolven Avenue Area
Algoma Twp, Kent County, Michigan

Boring No.: MW-WV-10D
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Check: Kate McDonald

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD					
41							BLIND DRILL			
42										
43										
44										
45										
46										
47										
48										
49										
50										
51										
52										
53										
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76										
77										
78	1	24/22	78-80	11-24	2.3 ppmv	Gray, CLAY, moist. Changing at 78.2 feet to: Very dense, brown, fine to coarse SAND, moist.	78' 78.2' CLAY SAND			
79				36-50						
80	2	24/24	80-82	12-48-50	1.7 ppmv	Very dense, fine to coarse SAND, moist. Changing at 80.2 feet to: Hard, gray, CLAY, wet.	80.2' CLAY			
81										
82	3	24/24	82-84	42-50	0.1 ppmv	Hard, gray, Clayey SILT, wet. Changing at 83.8 feet to: Very dense, gray, fine to coarse SAND, wet.	82' Clayey SILT			
83										
84	4	24/12	84-86	19-50	1.7 ppmv	Hard, gray, Clayey SILT, trace fine to	83.8' 84' SAND Clayey SILT			
85										
86							86' CLAY			
Field screening of samples for organic vapors was performed with a MiniRae 3000 photoionization detector equipped with a 10.6 eV lamp. Readings above background levels are shown in parts per million by volume (ppmv) of isobutylene. ND indicates nothing detected (<0.1 ppmv).										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.										

REMARKS

Boring No.: MW-WV-10D

BORING: WI 6267781 WWW.WOLVEN AVENUE.GPJ WI_DNR.GDT 4/17/20



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Wolverine World Wide
Wolven Avenue Area
Algoma Twp, Kent County, Michigan

Boring No.: MW-WV-10D
Page: 3 of 4
File No.: 16.0062677.81
Check: Kate McDonald

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD					
87	5	24/24	86-88	3-10	2.3 ppmv	coarse Sand, wet.	CLAY			
88	6	24/24	88-90	28-45	1.5 ppmv	Hard, gray, CLAY, trace Silt, trace Rock fragments, moist. Changing at 86.2 feet to:	88' Clayey SILT			
89				19-29		Gray, SAND, moist. Changing at 87.2 feet to:	90' Silty CLAY			
90	7	24/24	90-92	38-50	2.3 ppmv	Stiff, gray, Silty CLAY, wet.				
91				10-18		Hard, gray, Clayey SILT, trace fine to coarse Sand, moist.				
92	8	24/24	92-94	32-41	2.5 ppmv	Hard, gray, Silty CLAY, little fine to coarse Sand, moist.				
93				3-8		Hard, gray, Silty CLAY, trace Rock fragments, wet.				
94	9	24/24	94-96	21-27	1.9 ppmv	Hard, gray, Silty CLAY, trace Rock fragments, wet.				
95				3-8		Hard, gray, Silty CLAY, trace Rock fragments, wet.				
96	10	24/24	96-98	20-21	0.9 ppmv	Hard, gray, Silty CLAY, trace fine to coarse Sand, wet.				
97				26-38		Hard, gray, Silty CLAY, trace fine to coarse Sand, wet.				
98	11	24/24	98-100	27-32	7.1 ppmv	Hard, gray, Silty CLAY, wet.				
99				40-80		Hard, gray, Silty CLAY, wet.				
100	12	24/24	100-102	1-2	1.6 ppmv	Hard, gray, Silty CLAY, trace fine to coarse Sand, wet.				
101				11-22		Hard, gray, Silty CLAY, wet.				
102	13	24/12	102-104	5-40	0.9 ppmv	Hard, gray, Silty CLAY, wet.				
103				48-50		Hard, gray, Silty CLAY, trace Gravel, wet.				
104	14	24/24	104-106	5-19	1.7 ppmv	Hard, gray, Silty CLAY, trace fine to coarse Sand, wet.				
105				18-26		Hard, gray, Silty CLAY, trace fine to coarse Sand, wet.				
106	15	24/24	106-108	2-2	1.6 ppmv	Hard, gray, Silty CLAY, moist.				
107				18-24		Hard, gray, Silty CLAY, wet.				
108	16	24/24	108-110	6-13	1.8 ppmv	Hard, gray, Silty CLAY, wet.				
109				25-46		Hard, gray, Silty CLAY, wet.				
110	17	24/20	110-112	7-28-50	0.6 ppmv	Hard, gray, Silty CLAY, wet.				
111						Hard, gray, Silty CLAY, moist. Changing at 113.7 feet to: Very loose, fine to coarse SAND, trace Gravel, moist.	114' SAND			
112	18	24/24	112-114	3-19	1.4 ppmv	Medium dense, gray, fine to coarse SAND, trace Silt, wet.	116.5' Clayey SAND			
113				50-21		Medium dense, gray, fine to coarse SAND, trace Silt, wet.	118' SAND			
114	19	24/24	114-116	2-4	2.2 ppmv	Medium dense, gray, fine to coarse SAND, trace Silt, wet.	119.8' CLAY			
115				10-16		Dense, gray, SAND, wet. Changing at 119.8 feet to: Hard, gray, CLAY, little fine to coarse Sand, trace Gravel, moist.	120' Silty CLAY			
116	20	24/10	116-118	6-27-50/40	0.7 ppmv	Hard, gray, Silty CLAY, trace Rock fragments, wet.				
117				5-26		Hard, gray, Silty CLAY, trace Gravel, wet.	124' SAND			
118	21	24/23	118-120	29-32	0.5 ppmv	Medium dense, gray and brown, SAND, wet. Changing at 123.8 feet to: Hard, gray, Silty CLAY, trace Gravel, wet.				
119				24-50		Dense, gray and brown, SAND, trace Gravel, wet. Changing at 127.5 feet to: Hard, gray, Silty CLAY, trace fine to coarse Sand, wet.				
120	22	24/10	120-122	6-27-50	0.4 ppmv	Hard, gray, Silty CLAY, trace fine to coarse Sand, wet.				
121				6-27-50		Gray and brown, fine to coarse SAND, wet.	130' Silty CLAY			
122	23	24/24	122-124	13-31-52/60	0.4 ppmv	Hard, gray, Silty CLAY, trace fine to coarse Sand, wet.				
123				11-26		Hard, gray, Silty CLAY, trace fine to coarse Sand, wet.				
124	24	24/24	124-126	23-50/6"	0.6 ppmv	Hard, gray, Silty CLAY, trace fine to coarse Sand, wet.				
125						Hard, gray, Silty CLAY, trace fine to coarse Sand, wet.				
126	25	24/24	126-128	9-30-50/60	0.4 ppmv	Hard, gray, Silty CLAY, trace fine to coarse Sand, wet.				
127						Hard, gray, Silty CLAY, trace fine to coarse Sand, wet.				
128	26	24/4	128-130	4-40-50/60	0.4 ppmv	Hard, gray, Silty CLAY, trace fine to coarse Sand, wet.				
129						Hard, gray, Silty CLAY, trace fine to coarse Sand, wet.				
130	27	24/24	130-132	13-31-52/60	0.4 ppmv	Hard, gray, Silty CLAY, trace fine to coarse Sand, wet.				
131						Hard, gray, Silty CLAY, trace fine to coarse Sand, wet.				
132	28	24/24	132-134	11-26	0.4 ppmv	Hard, gray, Silty CLAY, trace fine to coarse Sand, wet.				
133						Hard, gray, Silty CLAY, trace fine to coarse Sand, wet.				
REMARKS										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: MW-WV-10D	

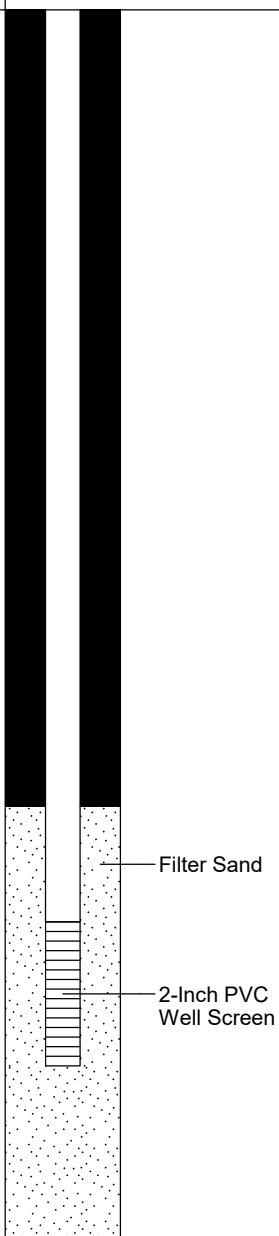
BORING WI 6267781 WWW.WOLVEN AVENUE.GPJ WI DNR.GDT 4/17/20



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Wolverine World Wide
Wolven Avenue Area
Algoma Twp, Kent County, Michigan

Boring No.: MW-WV-10D
Page: 4 of 4
File No.: 16.0062677.81
Check: Kate McDonald

Sample Information						Check: Kate McDonald			
Depth	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
134	29	24/24	134-136	29-50/6"	6.3 ppmv	SAND, wet.	Silty CLAY	2	
135				6-34-50/6"		Hard, gray, Silty CLAY, trace fine to coarse SAND, wet.	136'		
136	30	24/14	136-138	5-17	1.5 ppmv	Very stiff, Clayey SILT, little fine to coarse Sand, wet. Changing at 137.8 feet to: Hard, gray, Silty CLAY, wet.	Clayey SILT		
137				28-33			138'		
138	31	24/22	138-140	14-50/6"	1.1 ppmv	Hard, gray, Silty CLAY, wet with Rock fragments at top of spoon.	Silty CLAY		
139									
140	32	24/24	140-142	8-20	1.2 ppmv	Hard, gray, Silty CLAY, wet.			
141				25-34					
142	33	24/24	142-144	22-27	2.0 ppmv	Hard, gray, Silty CLAY, wet with fine Sand at bottom of spoon.			
143				40-45					
144	34	24/24	144-146	9-22	0.8 ppmv	Hard, gray, Silty CLAY, little Gravel, wet with 2-inch of Gravel at top of spoon.			
145				44-50/3"					
146	35	24/24	146-148	9-38-50/3"	1.6 ppmv	Hard, gray, Silty CLAY, wet.			
147									
148	36	24/24	148-150	2-22	1.2 ppmv	Hard, gray, Silty CLAY, wet.			
149				29-32					
150	37	24/24	150-152	2-7	2.3 ppmv	Very stiff, gray, Silty CLAY, wet.			
151				19-31					
152	38	24/24	152-154	18-30	1.9 ppmv	Hard, gray, Silty CLAY, trace Gravel, wet.			
153				44-50/6"			154'		
154	39	24/24	154-156	8-14	1.5 ppmv	Very dense, gray, Clayey fine to coarse SAND, some Gravel, wet.	SAND		
155				45-50/6"					
156	40	24/18	156-158	22-50/4"	1.5 ppmv	Very dense, gray, Clayey fine to coarse SAND, some Gravel, wet.			
157							158'		
158	41	24/15	158-160	24-50/3"	1.0 ppmv	Very dense, gray, Clayey fine to coarse SAND and GRAVEL, wet.	SAND and GRAVEL		
159									
160	42	24/24	160-162	50/4"	0.4 ppmv	Very dense, gray, Clayey fine to coarse SAND and GRAVEL, wet.			
161									
162	43	24/24	162-164	14-50/4"	0.2 ppmv	Very dense, gray, Clayey fine to coarse SAND and GRAVEL, wet.			
163							164'		
164	44	24/10	164-166	50/3"	0.4 ppmv	Hard, Silty CLAY, some Gravel, some fine to coarse Sand, wet.	CLAY		
165							166'		
166	45	24/12	166-168	50/6"	0.9 ppmv	Very dense, red, Clayey fine to coarse SAND, some Gravel, wet.	SAND		
167									
168	46	24/12	168-170	50	0.7 ppmv	Very dense, red, Clayey fine to coarse SAND, some Gravel, trace Shells, wet.			
169							170'		
170	47	24/0	170-172	50/3"	NA	NO RECOVERY.	NO RECOVERY	3	
171									
172	48	24/0	172-174	50/3"	NA	NO RECOVERY.			
173									
174	49	24/0	174-176	50/3"	NA	NO RECOVERY.			
175									
176						Bottom of Borehole at 176.0 Feet	176'	4	
177									
178									
179									

REMARKS

- Temporary well installed from 158.0 to 168.0 feet below ground surface. Well screen interval from 163.0 to 168.0 feet below ground surface. Purged 80.0 gallons of water.
- Likely encountered sandstone bedrock at 170.0 feet below ground surface with a well screen set from 165.0 to 170.0 feet below ground surface.
- Monitoring well was installed in borehole upon completion. Well screen set from approximately 165.0 to 170.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: MW-WV-10D

BORING WI 6267781 WWW.WOLVEN AVENUE.GPJ WI DNR.GDT 4/17/20



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Wolverine World Wide

Wolver Avenue Area

Algoma Twp, Kent County, Michigan

Boring No.: MW-WV-10M

Page: 1 of 2

File No.: 16.0062677.81

Check: Kate McDonald

Contractor: Stearns Drilling Company

Foreman: Jerry H.

Logged by: John Morehouse

Date Start/Finish: 3-5-19 / 3-13-19

Boring Location: _____

GS Elev.: _____ Datum: _____

Auger/
Casing

Sampler

GROUNDWATER READINGS

Type: Hollow Stem Auger Split Spoon

O.D. / I.D.: 12.25" / 4.25" 2.0" / 1 3/8"

Hammer Wt.: NA 140lbs

Hammer Fall: NA 30.0"

TOC Elev.: NA NA

Date	Time	Depth	Casing	Stab

Surveyed By: NA Survey Date: _____

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				PROTECTIVE CASING	Filter Sand Bentonite/Grout
1	1	24/12	0-2	3-1 1-4	ND	Very loose, dark brown, TOPSOIL. Changing at 0.5 feet to: Brown, fine SAND, some Silt, trace Gravel, dry.	0.5' TOPSOIL SAND	1		
2	2	24/0	2-4	3-2 2-4	NA	NO RECOVERY.	2' NO RECOVERY	2		
3							4' SAND			
4	3	24/24	4-6	1-2 2-4	ND	Loose, light brown, fine to medium SAND, little Silt, moist.	6' NO RECOVERY			
5	4	24/0	6-8	3-2 4-4	NA	NO RECOVERY.	8' SAND	3		
6								4		
7	5	24/18	8-10	2-3 3-3	ND	Loose, light brown, fine SAND, some Silt, wet.				
8	6	24/24	10-12	1-1 1-1	ND	Very loose, light brown, fine SAND, some Silt, wet. Changing at 11.5 feet to: Brown, fine to coarse SAND, some Silt, wet.				
9	7	24/24	12-14	3-7 4-6	ND	Medium dense, brown, fine to coarse SAND, some Silt, trace Rock fragments, wet.				
10	8	24/24	14-16	1-3 5-8	ND	Loose, brown, fine to coarse SAND, little Silt, trace Rock fragments, wet.				
11	9	24/24	16-18	7-11 13-36	ND	Medium dense, fine to coarse SAND, little Silt, wet.				
12	10	24/24	18-20	4-10 9-11	ND	Medium dense, brown, fine to coarse SAND, little fine Gravel, little Silt, wet.		5		
13	11	24/24	20-22	6-19 21-18	ND	Dense, brown, fine to coarse SAND, little Gravel, little Silt, wet.				
14	12	24/24	22-24	6-16 15-15	ND	Dense, brown, fine to coarse SAND, little Gravel, little Silt, wet.				
15	13	24/24	24-26	10-17 18-16	ND	Dense, brown, fine to coarse SAND, little Gravel, little Silt, wet.				
16	14	24/24	26-28	2-6 10-9	ND	Dense, brown, fine to coarse SAND, little Gravel, little Silt, wet. Changing at 26.5 feet to: Brown, fine SAND and Silt with 17 to 18-inch brown, Silty CLAY lenses.	28.8' Silty CLAY	6		
17	15	24/24	28-30	4-6 6-15	ND	Medium dense, brown, fine to coarse SAND, little Silt, wet. Changing at 28.8 feet to: Brown, Silty CLAY, little fine Sand, wet.	30.5' CLAY & SILT			
18	16	24/24	30-32	5-8 8-10	ND	Medium dense, brown, fine to coarse SAND, little Silt, wet. Changing at 30.5 feet to: Brown, CLAY & SILT, little fine Sand, wet.	32' Clayey SILT			
19	17	24/12	32-34	2-4 10-13	ND	Stiff, brown, Clayey SILT, little fine Sand, wet.	34' SAND	7		
20	18	24/24	34-36	8-9 22-40	ND	Dense, brown, fine SAND and SILT, wet.	36' Silty CLAY			
21	19	24/24	36-38	7-16 26-21	ND	Hard, gray, Silty CLAY, wet.				
22	20	24/24	38-40	4-9 15-17	ND	Very stiff, brown and gray, Silty CLAY, wet.				

REMARKS

- Field screening of samples for organic vapors was performed with a MiniRae 3000 photoionization detector equipped with a 10.6 eV lamp. Readings above background levels are shown in parts per million by volume (ppmv) of isobutylene. ND indicates nothing detected (<0.1 ppmv).
- During drilling to 4.0 feet below ground surface, sediment appeared to be Sand.
- Groundwater was encountered at approximately 8.0 feet below ground surface.
- Temporary well installed from 8.0 to 18.0 feet below ground surface. Well screen interval from 13.0 to 18.0 feet below ground surface. Purged 30.0 gallons of water.
- Temporary well installed from 18.0 to 28.0 feet below ground surface. Well screen interval from 23.0 to 28.0 feet below ground surface. Purged 20.0-25.0 gallons of water.
- Temporary well installed from 26.0 to 36.0 feet below ground surface. Well screen interval from 31.0 to 36.0 feet below ground surface. Purged 20.0-25.0 gallons of water.

Stratification was noted from 18.0 feet below ground surface. Types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: MW-WV-10M


BORING WELL 6267781 WWW.WOLVER AVENUE.GPJ GZA CORP.GDT 4/20/20



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Wolverine World Wide
Wolven Avenue Area
Algoma Twp, Kent County, Michigan

Boring No.: MW-WV-10M
Page: 2 of 2
File No.: 16.0062677.81
Check: Kate McDonald

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
41	21	24/24	40-42	5-10 14-15	ND	Very stiff, brown and gray, Silty CLAY, wet.	Silty CLAY		
42	22	24/24	42-44	3-6 8-13	ND	Stiff, brown and gray, Silty CLAY, wet.			
43									
44	23	24/24	44-46	3-3 6-11	ND	Stiff, brown and gray, Silty CLAY, wet.			
45									
46	24	24/24	46-48	2-5 10-15	ND	Stiff, brown and gray, Silty CLAY, wet.			
47									
48	25	24/24	48-50	6-7 11-16	ND	Changing at 47.5 feet to: Stiff, brown and gray, Silty CLAY, trace fine Sand, wet.			
49						Very stiff, brown and gray, Silty CLAY, trace Fine Sand, wet.			
50	26	24/24	50-52	12-17 <1-21	ND	Hard, brown and gray, Silty CLAY, trace fine Sand, wet.			
51									
52	27	24/24	52-54	4-15 21-19	ND	Hard, brown and gray, Silty CLAY, trace fine Sand, wet. Changing at 53.5 feet to: Brown and gray, fine SAND and Silt, little Clay, wet.	53.5' 54' SAND Silty CLAY		
53									
54	28	24/24	54-56	5-11 17-20	ND	Very stiff, brown and gray, Silty CLAY with Sandy lenses 12-18 inches and black smear at 18 inches.	57.2' 58' CLAY & SILT Silty CLAY		
55									
56	29	24/24	56-58	8-16 20-27	ND	Hard, brown and gray, Silty CLAY, wet. Changing at 57.2 feet to: Brown and gray, CLAY & SILT, trace fine to coarse Sand, wet.	59.5' 60' CLAY & SILT Clayey SILT		
57									
58	30	24/24	58-60	4-8 17-22	ND	Very stiff, brown and gray, Silty CLAY, trace fine Sand, wet. Changing at 59.5 feet to: Brown and gray, CLAY & SILT, trace fine to coarse Sand, wet.	62' 63.6' 64.3' SAND 65' Silty CLAY 65.5' SAND Clayey SILT		
59									
60	31	24/24	60-62	8-14 15-22	ND	Very stiff, Clayey SILT, little fine to coarse Sand, wet.			
61									
62	32	24/24	62-64	3-7 22-27	ND	Very stiff, Silty CLAY, trace fine Sand, wet. Changing at 63.6 feet to: Brown, fine to coarse SAND and Silt, little fine Gravel, wet.	68' SAND		
63									
64	33	24/24	64-66	6-44-50/6"	ND	Very dense, brown, fine to medium SAND, some Silt, wet. Changing at 64.3 feet to: Brown and gray, Silty CLAY, trace fine to coarse Sand, wet. Changing at 65.0 feet to: Brown, fine to coarse SAND, little Gravel, some Silt, wet. Changing at 65.5 feet to: Brown, Clayey SILT, little fine to coarse Sand, wet.			
65									
66	34	24/6	66-68	22-50/4"	ND	Hard, brown, Clayey SILT, little fine to coarse Sand, wet.			
67									
68	35	24/18	68-70	17-35-50/6"	ND	Very dense, gray and brown, fine to coarse SAND, little Silt, trace Gravel, wet. Dense, gray and brown, fine to medium SAND, little Silt, wet.			
69									
70	36	24/21	70-72	3-8 22-50/3"	ND	Dense, gray and brown, fine to medium SAND, little Silt, wet with Silty Clay 15 to 16 inches.			
71									
72	37	24/18	72-74	2-14-50/6"	ND	Very dense, gray and brown, fine to medium SAND, little Silt, wet.			
73									
74	38	24/18	74-76	8-29-50/6"	ND	Bottom of Borehole at 75 Feet	75'		
75									
76	39	24/15	76-78	17-30-50/3"	ND				
77									
78									
79									
80									
81									
82									
83									
84									
85									
86									

- REMARKS**
- Switched to 3.0-inch split spoon at 64.0 feet below ground surface.
 - Temporary well installed from 66.0 to 76.0 feet below ground surface. Well screen interval from 71.0 to 66.0 feet below ground surface. Purged 34.0 gallons of water.
 - Switched to 2.0-inch split spoon at 68.0 feet below ground surface.
 - Monitoring well was installed in borehole upon completion. Well screen set from approximately 71.0 to 75.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: MW-WV-10M

BORING WELL 6267781 WWW.WOLVENAVENUE.GPJ GZA CORP.GDT 4/20/20



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Wolverine World Wide

Wolver Avenue Area

Algoma Twp, Kent County, Michigan

Boring No.: MW-WV-10S

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File No.: 16.0062677.81

Check: Kate McDonald

Contractor: Stearns Drilling Company

Foreman: Jerry Zach/Travis

Logged by: C. Melby

Date Start/Finish: 3-5-19 / 3-9-19

Boring Location: _____

GS Elev.: _____

Auger/
Casing

Sampler

GROUNDWATER READINGS

Type: Hollow Stem Auger Split Spoon

O.D. / I.D.: 12.25" / 4.25" 2.0" / 1 3/8"

Hammer Wt.: NA 140lbs

Hammer Fall: NA 30.0"

Other: NA NA

Date	Time	Depth	Casing	Stab

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD					PROTECTIVE CASING
1	1	24/12	0-2	3-1 1-4	ND	Very loose, dark brown, TOPSOIL. Changing at 0.5 feet to: Brown, fine SAND, some Silt, trace Gravel, dry.	TOPSOIL 0.5' SAND	1		
2	2	24/0	2-4	3-2 2-4	NA	NO RECOVERY.	2' NO RECOVERY	2		
3										
4	3	24/24	4-6	1-2 2-4	ND	Loose, light brown, fine to medium SAND, little Silt, moist.	4' SAND			
5										
6	4	24/0	6-8	3-2 4-4	NA	NO RECOVERY.	6' NO RECOVERY			
7										
8	5	24/18	8-10	2-3 3-3	ND	Loose, light brown, fine SAND, some Silt, wet.	8' SAND	3		
9								4		
10	6	24/24	10-12	1-1 1-1	ND	Very loose, light brown, fine SAND, some Silt, wet. Changing at 11.5 feet to: Brown, fine to coarse SAND, some Silt, wet.				
11										
12	7	24/24	12-14	3-7 4-6	ND	Medium dense, brown, fine to coarse SAND, some Silt, trace Rock fragments, wet.				
13										
14	8	24/24	14-16	1-3 5-8	ND	Loose, brown, fine to coarse SAND, little Silt, trace Rock fragments, wet.				

REMARKS

- Field screening of samples for organic vapors was performed with a MiniRae 3000 photoionization detector equipped with a 10.6 eV lamp. Readings above background levels are shown in parts per million by volume (ppmv) of isobutylene. ND indicates nothing detected (<0.1 ppmv).
- During drilling to 4.0 feet below ground surface, sediment appeared to be Sand.
- Groundwater was encountered at approximately 8.0 feet below ground surface.
- Temporary well installed from 8.0 to 18.0 feet below ground surface. Well screen interval from 13.0 to 18.0 feet below ground surface. Purged 30.0 gallons of water.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: MW-WV-10S



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Wolven Avenue Area
Algoma Twp, Kent County, Michigan

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Check: Kate McDonald

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD					
16	9	24/24	16-18	7-11 13-36	ND	Medium dense, fine to coarse SAND, little Silt, wet.	SAND	5		
17										
18	10	24/24	18-20	4-10 9-11	ND	Medium dense, brown, fine to coarse SAND, little fine Gravel, little Silt, wet.				
19										
20	11	24/24	20-22	6-19 21-18	ND	Dense, brown, fine to coarse SAND, little Gravel, little Silt, wet.				
21										
22	12	24/24	22-24	6-16 15-15	ND	Dense, brown, fine to coarse SAND, little Gravel, little Silt, wet.		6		
23										
24	13	24/24	24-26	10-17 18-16	ND	Dense, brown, fine to coarse SAND, little Gravel, little Silt, wet.				
25										
26	14	24/24	26-28	2-6 10-9	ND	Dense, brown, fine to coarse SAND, little Gravel, little Silt, wet. Changing at 26.5 feet to: Brown, fine SAND and Silt with 17 to 18-inch brown, Silty CLAY lenses.				
27										
28	15	24/24	28-30	4-6 6-15	ND	Medium dense, brown, fine to coarse SAND, little Silt, wet. Changing at 28.8 feet to: Brown, Silty CLAY, little fine Sand, wet.	28.8' Silty CLAY			
29										
30	16	24/24	30-32	5-8 8-10	ND	Medium dense, brown, fine to coarse SAND, little Silt, wet. Changing at 30.5 feet to: Brown, CLAY & SILT, little fine Sand, wet.	30.5' CLAY & SILT			
31										
32	17	24/12	32-34	2-4	ND	Stiff, brown, Clayey SILT, little fine Sand,	32' Clayey SILT			
REMARKS 5. Temporary well installed from 18.0 to 28.0 feet below ground surface. Well screen interval from 23.0 to 28.0 feet below ground surface. Purged 20.0-25.0 gallons of water. 6. Temporary well installed from 26.0 to 36.0 feet below ground surface. Well screen interval from 31.0 to 36.0 feet below ground surface. Purged 20.0-25.0 gallons of water.										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: MW-WV-10S	

BORING: WI 6267781 WWW.WOLVEN AVENUE.GPJ WI DNR.GDT 4/17/20



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Wolver Avenue Area
Algoma Twp, Kent County, Michigan

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Check: Kate McDonald

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD					
33				10-13		wet.	Clayey SILT			
34	18	24/24	34-36	8-9 22-40	ND	Dense, brown, fine SAND and SILT, wet.	34' SAND	7	Bentonite/Grout	
35										
36	19	24/24	36-38	7-16 26-21	ND	Hard, gray, Silty CLAY, wet.	36' Silty CLAY			
37										
38	20	24/24	38-40	4-9 15-17	ND	Very stiff, brown and gray, Silty CLAY, wet.				
39										
40	21	24/24	40-42	5-10 14-15	ND	Very stiff, brown and gray, Silty CLAY, wet.				
41										
42	22	24/24	42-44	3-6 8-13	ND	Stiff, brown and gray, Silty CLAY, wet.				
43										
44	23	24/24	44-46	3-3 6-11	ND	Stiff, brown and gray, Silty CLAY, wet.				
45										
46	24	24/24	46-48	2-5 10-15	ND	Stiff, brown and gray, Silty CLAY, wet. Changing at 47.5 feet to: Stiff, brown and gray, Silty CLAY, trace fine Sand, wet.				
47										
48	25	24/24	48-50	6-7 11-16	ND	Very stiff, brown and gray, Silty CLAY, trace Fine Sand, wet.				
49										
REMARKS 7. Casing was set at 36.0 feet below ground surface.										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: MW-WV-10S	

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Check: Kate McDonald

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD					
51	26	24/24	50-52	12-17 <1-21	ND	Hard, brown and gray, Silty CLAY, trace fine Sand, wet.	Silty CLAY			
52	27	24/24	52-54	4-15 21-19	ND	Hard, brown and gray, Silty CLAY, trace fine Sand, wet. Changing at 53.5 feet to: Brown and gray, fine SAND and Silt, little Clay, wet.	53.5' SAND			
54	28	24/24	54-56	5-11 17-20	ND	Very stiff, brown and gray, Silty CLAY with Sandy lenses 12-18 inches and black smear at 18 inches.	54' Silty CLAY			
56	29	24/24	56-58	8-16 20-27	ND	Hard, brown and gray, Silty CLAY, wet. Changing at 57.2 feet to: Brown and gray, CLAY & SILT, trace fine to coarse Sand, wet.	57.2' CLAY & SILT			
58	30	24/24	58-60	4-8 17-22	ND	Very stiff, brown and gray, Silty CLAY, trace fine Sand, wet. Changing at 59.5 feet to: Brown and gray, CLAY & SILT, trace fine to coarse Sand, wet.	58' Silty CLAY			
60	31	24/24	60-62	8-14 15-22	ND	Very stiff, Clayey SILT, little fine to coarse Sand, wet.	59.5' CLAY & SILT			
62	32	24/24	62-64	3-7 22-27	ND	Very stiff, Silty CLAY, trace fine Sand, wet. Changing at 63.6 feet to: Brown, fine to coarse SAND and Silt, little fine Gravel, wet.	60' Clayey SILT			
64	33	24/24	64-66	6-44-50/6"	ND	Very dense, brown, fine to medium SAND, some Silt, wet. Changing at 64.3 feet to: Brown and gray, Silty CLAY, trace fine to coarse Sand, wet. Changing at 65.0 feet to: Brown, fine to coarse SAND, little Gravel, some Silt, wet. Changing at 65.5 feet to: Brown, Clayey SILT, little fine to coarse Sand, wet.	62' Silty CLAY	8		
66	34	24/6	66-68	22-50/4"	ND	Hard, brown, Clayey SILT, little fine to coarse Sand, wet.	63.6' SAND	9		
67							64.3' Silty CLAY			
							65' SAND			
							65.5' Clayey SILT			
REMARKS 8. Switched to 3.0-inch split spoon at 64.0 feet below ground surface. 9. Temporary well installed from 66.0 to 76.0 feet below ground surface. Well screen interval from 71.0 to 66.0 feet below ground surface. Purged 34.0 gallons of water.										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: MW-WV-10S	

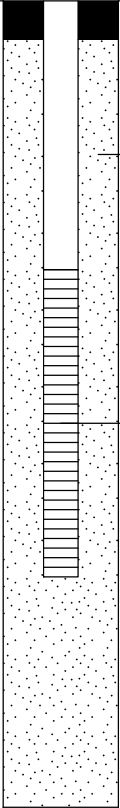
BORING WI 6267781 WWW.WOLVEN AVENUE.GPJ WI DNR.GDT 4/17/20



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Wolven Avenue Area
Algoma Twp, Kent County, Michigan

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Check: Kate McDonald

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD				
68	35	24/18	68-70	17-35-50/6"	ND	Very dense, gray and brown, fine to coarse SAND, little Silt, trace Gravel, wet.	68' Clayey SILT SAND	10	
69									
70	36	24/21	70-72	3-8 22-50/3"	ND	Dense, gray and brown, fine to medium SAND, little Silt, wet.			
71									
72	37	24/18	72-74	2-14-50/6"	ND	Dense, gray and brown, fine to medium SAND, little Silt, wet with Silty Clay 15 to 16 inches.			
73									
74	38	24/18	74-76	8-29-50/6"	ND	Very dense, gray and brown, fine to medium SAND, little Silt, wet.			
75									
76	39	24/15	76-78	17-30-50/3"	ND	Hard, gray, Silty CLAY, wet.			
77									
78						Bottom of Borehole at 78.8 Feet	78'	11	
79									
80									
81									
82									
83									
84									

REMARKS
10. Switched to 2.0-inch split spoon at 68.0 feet below ground surface.
11. Monitoring well was installed in borehole upon completion. Well screen set from approximately 71.0 to 75.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: MW-WV-10S

BORING WI 6267781 WWW.WOLVEN AVENUE.GPJ WI DNR.GDT 4/17/20



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Wolverine World Wide

Wolven Avenue Area

Algoma Twp, Kent County, Michigan

Boring No.: MW-WV-11/MW-WV-11D

Page: 1 of 15

File No.: 16.0062677.81

Check: Leslie Nelson

Contractor: Stearns Drilling Company

Foreman: Jerry H., Travis & Zach/Gary

Logged by: John Morehouse

Date Start/Finish: 1-3-19 / 1-9-19

Boring Location: 11 Mile Rd & Algoma Ave NE, Rockford, MI

GS Elev.: No Surveyed Datum: NAD 83

Auger/
Casing

Sampler

GROUNDWATER READINGS

Type: Hollow Stem Auger

Split Spoon

O.D. / I.D.: 12.25" / 4.25"

2.0" / 1 3/8"

Hammer Wt.: NA

140lbs

Hammer Fall: NA

30.0"

TOC Elev.: NA

NA

Date	Time	Depth	Casing	Stab
NM	NM	NM	NM	NM

Surveyed By: NA Survey Date:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					PROTECTIVE CASING
1	1	24/20.4	0-2	1-0 1-2	ND	Black, fine to medium-grained SAND, little Silt, slightly cohesive, moist. Changing at 0.7 feet to: Dark yellowish-brown, CLAY & SILT, plastic, cohesive, moist. Changing at 1.7 feet to: NO RECOVERY.	SAND 0.7' CLAY & SILT 1.7' NO RECOVERY 2' CLAY & SILT	1		
2	2	24/24	2-4	2-3 3-5	ND	Dark yellowish-brown, CLAY & SILT, plastic, cohesive, moist. Changing at 2.7 feet to: Mottled, yellowish-brown, CLAY & SILT, little Sand, plastic, cohesive, moist. Changing at 3.5 feet to: Light brownish-gray, SILT, little Clay, moderately plastic, cohesive, moist. Changing at 3.8 feet to: Yellowish-brown, fine to medium grained SAND, little Silt. wet.	3.5' SILT 3.8' SAND	2		
3	3	24/15.6	4-6	1-2 3-3	ND	Yellowish-brown, fine to medium grained SAND, little Silt. wet. Changing at 5.3 feet to: NO RECOVERY.	5.3' NO RECOVERY 6' CLAY & SILT 6.2' SAND 6.4' CLAY & SILT			
4	4	24/24	6-8	3-2 4-5	ND	Brown, CLAY & SILT, plastic, cohesive, moist. Changing at 6.2 feet to: Yellowish-brown, fine to medium grained SAND, little Silt, wet. Changing at 6.4 feet to: Brown, CLAY & SILT, plastic, cohesive, moist. Changing at 7.5 feet to: Yellowish-brown, CLAY & SILT, plastic, cohesive, moist. Changing at 7.6 feet to: Brown, CLAY & SILT, plastic, cohesive, moist. Changing at 7.8 feet to: Yellowish-brown, fine to medium grained SAND, little Silt, wet. Changing at 7.9 feet to: Brown, CLAY & SILT, plastic, cohesive, moist.	7.5' SAND 7.6' CLAY & SILT 7.8' SAND 7.9' CLAY & SILT 8.5' SAND 8.6' CLAY & SILT			
5	5	24/16.8	8-10	2-3 3-5	ND	Yellowish-brown, fine to medium grained SAND, little Silt, wet. Changing at 7.9 feet to: Brown, CLAY & SILT, plastic, cohesive, moist. Changing at 8.5 feet to: Yellowish-brown, fine to medium grained SAND, trace Silt, wet. Changing at 8.6 feet to: Brown, CLAY & SILT, plastic, cohesive, moist. Changing at 9.4 feet to: NO	9.4' NO RECOVERY 10'			

REMARKS

- Field screening of samples for organic vapors was performed with a MiniRae 3000 photoionization detector equipped with a 10.6 eV lamp. Readings above background levels are shown in parts per million by volume (ppmv) of isobutylene. ND indicates nothing detected (<0.1 ppmv).
- Groundwater was encountered at approximately 3.8 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: PMW-WV-11/MW-WV-11D

BORING WELL 6267781 WWW.WOLVENAVENUE.GPJ GZA CORP.GDT 3/25/19



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Wolven Avenue Area
Algoma Twp, Kent County, Michigan

Boring No.: MW-WV-11/MW-WV-11D
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File No.: 16.0062677.81
Check: Leslie Nelson

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
11	6	24/24	10-12		ND	RECOVERY. Yellowish-brown, fine to medium grained SAND, trace Silt, wet. Changing at 10.4 feet to: Grayish-brown, CLAY & SILT, plastic, cohesive, moist. Changing at 11.5 feet to: Light brownish-gray, fine grained SAND, some Silt, little Clay, moderately plastic, cohesive, wet. Changing at 11.6 feet to: Grayish-brown, CLAY & SILT, plastic, cohesive, moist.	SAND 10.4' CLAY & SILT 11.5' 11.6' SAND CLAY & SILT			
12	7	24/18	12-14	3-1 2-3	ND	Grayish-brown, CLAY & SILT, plastic, cohesive, moist. Changing at 12.2 feet to: Brown, fine to medium grained SAND, trace Silt, wet. Changing at 12.4 feet to: Grayish-brown, CLAY & SILT, plastic, cohesive, moist. Changing at 13.5 feet to: NO RECOVERY.	12.2' 12.4' SAND CLAY & SILT 13.5' NO RECOVERY 14' CLAY & SILT			
14	8	24/14.4	14-16	1-2 3-5	ND	Grayish-brown, CLAY & SILT, plastic, cohesive, moist. Changing at 15.2 feet to: NO RECOVERY.	15.2' NO RECOVERY 16' PEAT 16.4' SAND 17.1' 17.2' CLAY & SILT NO RECOVERY			
16	9	24/14.4	16-18	2-4-2	ND	Very dark brown, PEAT, some Silt, little Clay, plastic, cohesive, moist. Changing at 16.4 feet to: Dark yellowish-brown to yellowish-brown, fine to medium grained SAND, trace Silt, moist. Changing at 17.1 feet to: Yellowish-brown to brown, CLAY & SILT, plastic, cohesive, moist. Changing at 17.2 feet to: NO RECOVERY.	18' CLAY & SILT 18.5' GRAVEL 18.8' CLAY & SILT 19.1' NO RECOVERY			
18	10	24/13.2	18-20	1-2 3-6	ND	Yellowish-brown to brown, CLAY & SILT, plastic, cohesive, moist. Changing at 18.5 feet to: Dark brown, GRAVEL, some coarse to medium grained Sand, trace Silt, wet. Changing at 18.8 feet to: Yellowish-brown, CLAY & SILT, plastic, cohesive, moist. Changing at 19.1 feet to: NO RECOVERY.	20' SAND 21.5'			
20	11	24/18	20-22	2-2 3-5	ND	Yellowish-brown, fine grained SAND, trace Silt, wet. Changing at 20.5 feet to: Dark brown to yellowish-brown, medium to coarse grained SAND, some Gravel, trace Silt, wet; occasional very thin seams of Silty Clay, trace Gravel. Changing at 21.5 feet to: NO RECOVERY.				
REMARKS										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: PMW-WV-11/MW-WV-11D	

BORING WELL 6267781 WWW.WOLVENAVENUE.GPJ GZA CORP.GDT 3/25/19



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Wolver Avenue Area
Algoma Twp, Kent County, Michigan

Boring No. MW-WV-11/MW-WV-11D
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File No.: 16.0062677.81
Check: Leslie Nelson

Sample Information								Check: Leslie Nelson			
Depth	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed		
22	12	24/12	22-24	3-5 4-3	ND	Dark brown to yellowish-brown, medium to coarse grained SAND, some Gravel, trace Silt, moist. Changing at 23.0 feet to: NO RECOVERY.	NO 22' RECOVERY SAND				
23							23' NO RECOVERY				
24	13	24/13.2	24-26	1-0 2-3	ND	Yellowish-brown, medium grained SAND, trace Silt, wet. Changing at 24.9 feet to: Dark brown to yellowish-brown, medium to coarse grained SAND, some Gravel, trace Silt, wet. Changing at 25.1 feet to: NO RECOVERY.	24' SAND				
25							25.1' NO RECOVERY				
26	14	24/8.4	26-28	2-4 4-4	ND	Brown, fine to coarse grained SAND, little Gravel, trace Silt, wet. Changing at 26.7 feet to: NO RECOVERY.	26' SAND				
27							26.7' NO RECOVERY				
28	15	24/15.6	28-30	3-4 3-4	ND	Brown, fine to coarse grained SAND, little Gravel, trace Silt, wet. Changing at 29.3 feet to: No RECOVERY.	28' SAND				
29							29.3' NO RECOVERY				
30	16	24/15.6	30-32	2-2 6-5	ND	Brown, fine to coarse grained SAND, little Gravel, trace Silt, wet. Changing at 31.1 feet to: Brown, Silty CLAY, plastic, cohesive, moist. Changing at 31.3 feet to: NO RECOVERY.	30' SAND				
31							31.1' 31.3' CLAY NO RECOVERY				
32	17	24/16.8	32-34	28-18 13-16	ND	Brown, medium to coarse grained SAND, trace Silt, wet. Changing at 32.9 feet to: NO RECOVERY.	32' SAND				
33							32.9' NO RECOVERY				
REMARKS											
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BORING WELL 6267781 WWW.WOLVER AVENUE.GPJ GZA CORP.GDT 3/25/19



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Wolverine World Wide
Wolven Avenue Area
Algoma Twp, Kent County, Michigan

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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
34	18	24/18	34-36	3-4 7-8	ND	Dark gray, Silty CLAY, little Sand, trace Gravel, plastic, cohesive, moist. Changing at 35.5 feet to: NO RECOVERY.	NO RECOVERY 34' Silty CLAY			
35										
36	19	24/22.8	36-38	2-4 6-8	ND	Dark grayish-brown, CLAY & SILT, little Sand, trace Gravel, plastic, cohesive, moist. Changing at 37.9 feet to: NO RECOVERY.	35.5' NO RECOVERY 36' CLAY & SILT			
37										
38	20	24/24	38-40	2-7 6-5	ND	Dark grayish-brown, CLAY & SILT, little Sand, trace Gravel, plastic, cohesive, moist.	37.9' 38' NO RECOVERY CLAY & SILT			
39										
40	21	24/21.6	40-42	4-5 7-10	ND	Dark grayish-brown, CLAY & SILT, little Sand, trace Gravel, plastic, cohesive, moist. Changing at 41.8 feet to: NO RECOVERY.				
41										
42	22	24/22.8	42-44	3-6 8-10	ND	Dark grayish-brown, CLAY & SILT, little Sand, trace Gravel, plastic, cohesive, moist. Changing at 43.9 feet to: NO RECOVERY.	41.8' 42' NO RECOVERY CLAY & SILT			
43										
44	23	24/24	44-46	3-5 7-10	ND	Dark grayish-brown, CLAY & SILT, little Sand, trace Gravel, plastic, cohesive, moist.	43.9' 44' NO RECOVERY CLAY & SILT			
REMARKS										
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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
46	24	24/21.6	46-48	2-4 5-9	ND	Dark grayish-brown, CLAY & SILT, little Sand, trace Gravel, plastic, cohesive, moist. Changing at 47.8 feet to: NO RECOVERY.	CLAY & SILT			
47										
48	25	24/21.6	48-50	8-14 11-15	ND	Dark grayish-brown, CLAY & SILT, little Sand, trace Gravel, plastic, cohesive, moist. Changing at 49.4 feet to: Brown, SILT & CLAY, some Sand, little Gravel, plastic, cohesive, moist. Changing at 49.6 feet to: Dark grayish-brown, CLAY & SILT, little Sand, trace Gravel, plastic, cohesive, moist. Changing at 49.8 feet to: NO RECOVERY.	47.8' 48' NO RECOVERY CLAY & SILT			
49							49.4' 49.6' SILT & CLAY 49.8' CLAY & SILT			
50	26	24/14.4	50-52	2-2 6-9	ND	Dark grayish-brown, CLAY & SILT, little Sand, trace Gravel, plastic, cohesive, moist. Changing at 51.2 feet to: NO RECOVERY.	50' NO RECOVERY CLAY & SILT			
51							51.2' NO RECOVERY			
52	27	24/21.6	52-54	2-7 11-14	ND	Dark grayish-brown, CLAY & SILT, little Sand, trace Gravel, plastic, cohesive, moist. Changing at 53.8 feet to: NO RECOVERY.	52' CLAY & SILT			
53										
54	28	24/18	54-56	4-21-22	ND	Dark grayish-brown, CLAY & SILT, little Sand, trace Gravel, plastic, cohesive, moist. Changing at 55.4 feet to: Brown, fine to medium grained SAND, little Silt, moist to wet. Changing at 55.5 feet to: NO RECOVERY.	53.8' 54' NO RECOVERY CLAY & SILT			
55							55.4' 55.5' SAND			
56	29	24/21.6	56-58	3-9 13-20	ND	Dark grayish-brown, CLAY & SILT, little Sand, trace Gravel, plastic, cohesive, moist. Changing at 57.4 feet to: Dark	56' NO RECOVERY CLAY & SILT			
REMARKS										
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Argonia Twp, Kent County, Michigan										Check: Leslie Nelson	
Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed		
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data						
57	30	24/20.4	58-60	4-10 13-16	ND	grayish-brown, fine to medium grained SAND, little Silt, little Clay, slightly plastic, cohesive, moist. Changing at 57.8 feet to: NO RECOVERY.	CLAY & SILT				
						57.4'	SAND				
						57.8'	NO RECOVERY				
58						58'	CLAY & SILT				
	31	24/14.4	60-62	3-10 24-15	ND	Dark grayish-brown, CLAY & SILT, little Sand, trace Gravel, plastic, cohesive, moist. Changing at 59.7 feet to: NO RECOVERY.	59.7'				
						60'	NO RECOVERY				
						61.2'	NO RECOVERY				
60						62'	SILT & CLAY				
	32	24/21.6	62-64	25-8-10	ND	Dark grayish-brown, CLAY & SILT, some Sand, trace Gravel, moderately plastic, cohesive, moist. Changing at 63.8 feet to: NO RECOVERY.	63.8'				
						64'	NO RECOVERY				
						65.3'	SAND				
62						66.1'	NO RECOVERY				
	33	24/22.8	64-66	6-10 15-26	ND	Dark grayish-brown, Silty CLAY, plastic, cohesive, moist. Changing at 65.3 feet to: Dark grayish-brown, medium grained SAND, trace Silt, wet. Changing at 65.9 feet to: NO RECOVERY.	66.4'				
						66.4'	SAND				
						66.7'	SILT				
64						67.4'	SILT & CLAY				
	34	24/20.4	66-68	27-28 21-30	ND	Dark grayish-brown, fine to medium grained SAND, trace Silt, wet. Changing at 66.1 feet to: Dark grayish-brown, SILT, little fine grained Sand, non-plastic, cohesive, wet. Changing at 66.4 feet to: Dark grayish-brown, SILT & CLAY, some Sand, trace Gravel, moderately plastic, cohesive, moist. Changing at 66.7 feet to: Dark grayish-brown, fine to medium grained SAND, trace Silt, wet. Changing at 67.4 feet to: Dark grayish-brown, SILT, little Clay,	67.4'				
						67.7'	SILT				
						68'	NO RECOVERY				
66						68.2'	SAND				
REMARKS											
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	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
69	36	24/22.8	70-72	33-48-50/3"	ND	plastic, cohesive, moist to wet. Changing at 67.7 feet to: NO RECOVERY.	SILT & CLAY			
						Dark grayish-brown, fine to medium grained SAND, trace Silt. wet. Changing at 68.2 feet to: Dark grayish-brown, SILT & CLAY, some Sand, trace Gravel, moderately plastic, cohesive, moist. Changing at 69.4 feet to: Dark grayish-brown, CLAY & SILT, little Sand, trace Gravel, moderately plastic, cohesive, moist. Changing at 69.6 feet to: Varved, dark grayish-brown, SILT, with alternating layers of Silty Clay, plastic, cohesive, moist. Changing at 69.8 feet to: NO RECOVERY.	69.4' CLAY & SILT			
70							69.8' NO RECOVERY SAND			
71							70' NO RECOVERY SAND			
72	37	24/2.4	72-74	55/3"	ND	Brown, fine to medium grained SAND, trace Silt, wet. Changing at 71.4 feet to: Grayish-brown, SILT, trace Clay, trace fine grained Sand, moderately plastic, cohesive, moist to wet. Changing at 71.7 feet to: Brown, fine to medium grained SAND, trace Silt, wet. Changing at 71.9 feet to: NO RECOVERY.	71.4' SILT			
						Dark grayish-brown, Silty CLAY, plastic, cohesive, moist. Changing at 72.2 feet to: NO RECOVERY.	71.7' SAND			
73							71.9' NO RECOVERY Silty CLAY NO RECOVERY			
74							72' NO RECOVERY			
75	38	24/2.4	74-76	57/2"	ND	Dark grayish-brown, SILT & CLAY, some Sand, plastic, cohesive, moist. Changing at 74.2 feet to: NO RECOVERY.	74' SILT & CLAY			
							74.2' NO RECOVERY			
76							76' CLAY & SILT			
77						Grayish-brown to dark grayish-brown, CLAY & SILT, little Gravel, little Sand, plastic, cohesive, moist. Changing at 77.1 feet to: Varved grayish-brown to dark grayish-brown, SILT, some fine grained Sand, trace Clay, with fine grained SAND, slightly plastic, cohesive, moist. Changing at 77.4 feet to: Dark gray, Silty CLAY, plastic, cohesive, moist. Changing at 77.9 feet to: NO RECOVERY.	77.1' SILT			
78	40	24/18	78-80	7-11 14-30	ND	Dark gray, Silty CLAY, plastic, cohesive, bedded, moist. Changing at 78.4 feet to: Brown, fine to medium grained SAND, little Silt, moist. Changing 78.8 feet to: Dark gray, Silty CLAY, plastic, cohesive, bedded, moist. Changing at 79.5 feet to: NO RECOVERY.	77.4' Silty CLAY			
							77.9' NO RECOVERY			
79							78' NO RECOVERY Silty CLAY SAND			
							78.4' Silty CLAY SAND			
							78.8' Silty CLAY			
							79.5' NO RECOVERY			
							80'			
REMARKS										
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	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
81	41	24/21.6	80-82	12-25 33-40	ND	Dark gray, Silty CLAY, plastic, cohesive, bedded, moist. Changing at 80.4 feet to: Brown, fine to medium grained SAND, little Silt, wet. Changing at 80.5 feet to: Dark gray, Silty CLAY, plastic, cohesive, bedded, moist. Changing at 80.8 feet to: Brown, fine to medium grained SAND, little Silt, wet. Changing at 81.0 feet to: Dark gray, Silty CLAY, plastic, cohesive, bedded, moist. Changing at 81.4 feet to: Brown, fine to medium grained SAND, little Silt, wet. Changing at 81.6 feet to: Dark gray, Silty CLAY, plastic, cohesive, bedded, moist. Changing at 81.8 feet to: NO RECOVERY. Brown, fine to medium grained SAND, trace Silt, wet. Changing at 83.2 feet to: NO RECOVERY.	Silty CLAY 80.4' 80.5' SAND 80.8' Silty CLAY 81' SAND Silty CLAY 81.4' 81.6' SAND 81.8' Silty CLAY 82' NO RECOVERY SAND 83.2' NO RECOVERY 84' SAND 85.4' GRAVEL 85.8' 86' NO RECOVERY Fractured 86.5' COBBLE SAND 87.4' 87.6' Silty CLAY NO RECOVERY 88' SILT & CLAY 88.7' NO RECOVERY 90' 90.1' SILT & CLAY NO RECOVERY			
82	42	24/14.4	82-84	0-0 2-6	ND	Brown, fine to medium SAND, trace Silt, wet. Changing at 85.4 feet to: Brown, GRAVEL, some coarse Sand, trace Silt, wet. Changing at 85.8 feet to: NO RECOVERY.				
86	44	24/21.6	86-88	49-28 39-50	ND	Brown, fractured COBBLE. Changing at 86.5 feet to: Brown, fine to medium SAND, some Silt, slightly cohesive, moist to wet. Changing at 87.4 feet to: Brown, Silty CLAY, little Sand, trace Gravel, plastic, cohesive, moist. Changing at 87.6 feet to: NO RECOVERY.				
88	45	24/8.4	88-90	19-39-50/3"	ND	Dark grayish-brown, SILT & CLAY, some Sand, trace Gravel, plastic, cohesive, moist. Changing at 88.7 feet to: NO RECOVERY.				
90	46	24/1.2	90-92	56/4"	ND	Dark grayish-brown, SILT & CLAY, some Sand, trace Gravel, plastic, cohesive, moist. Changing at 90.1 feet to: NO RECOVERY.				
REMARKS										
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Sample Information						Check: Leslie Nelson				
Depth	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
92	47	24/18	92-94	20-50-24	ND	Dark grayish-brown, SILT & CLAY, some Sand, trace Gravel, plastic, cohesive, moist. Changing at 92.7 feet to: Dark brown, GRAVEL, some fine to coarse grained Sand, wet. Changing at 92.9 feet to: Dark grayish-brown, SILT & CLAY, some Sand, trace Gravel, plastic, cohesive, moist. Changing at 93.5 feet to: NO RECOVERY.	92'	<div></div>	<div></div>	<div></div>
							SILT & CLAY			
93							92.7'			
							92.9' GRAVEL			
	SILT & CLAY									
94	48	24/20.4	94-96	14-24 39-44	ND	Dark grayish-brown, SILT & CLAY, some Sand, trace Gravel, plastic, cohesive, moist. Changing at 95.7 feet to: NO RECOVERY.	93.5'			
							NO RECOVERY			
94'										
SILT & CLAY										
95	49	24/24	96-98	9-27 31-33	ND	Dark grayish-brown to dark gray, SILT & CLAY, some Sand, trace Gravel, moderately plastic, cohesive, moist; very thin Sand, seam at 98.9 feet.	95.7'			
NO RECOVERY										
96'										
SILT & CLAY										
97	50	24/20.4	98-100	8-28-47	ND	Dark grayish-brown to dark gray, SILT & CLAY, some Sand, trace Gravel, moderately plastic, cohesive, moist; very thin Sand, seam at 98.9 feet. Changing at 99.7 feet to: NO RECOVERY.				
98	51	24/24	100-102	8-22 29-36	ND	Dark grayish-brown to dark gray, SILT & CLAY, some Sand, trace Gravel, moderately plastic, cohesive, moist.	99.7'			
NO RECOVERY										
100'										
SILT & CLAY										
101	52	24/20.4	102-104	13-31 46-50/5"	ND	Dark grayish-brown to dark gray, SILT & CLAY, some Sand, trace Gravel, moderately plastic, cohesive, moist. Changing at 103.3 feet to: Brown, fine to medium grained SAND, trace Silt, wet. Changing at 103.7 feet to: NO RECOVERY.				
102							103.3'			
103										
REMARKS										
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	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
104	53	24/6	104-106	50/5.5"	ND	Dark gray, GRAVEL, some fine to coarse grained SAND, trace Silt, wet. Changing at 104.5 feet to: NO RECOVERY.	SAND 103.7' NO 104' RECOVERY GRAVEL 104.5' NO RECOVERY			
105										
106	54	24/13.2	106-108	1-2 6-15	ND	Dark grayish-brown, GRAVEL, some fine to coarse grained Sand, trace Silt, wet. Changing at 107.1 feet to: NO RECOVERY.	106' GRAVEL			
107							107.1' NO RECOVERY			
108	55	24/6	108-110	2-2 6-9	ND	Dark grayish-brown, GRAVEL, some fine to coarse grained Sand, trace Silt, wet. Changing at 108.5 feet to: NO RECOVERY.	108' GRAVEL 108.5' NO RECOVERY			
109										
110	56	24/15.6	110-112	14-15	ND	Dark grayish-brown, GRAVEL, some fine to coarse grained Sand, trace Silt, wet. Changing at 111.3 feet to: NO RECOVERY.	110' GRAVEL			
111							111.3' NO RECOVERY			
112	57	24	112-114			No sampling attempts.	112' NO SAMPLING ATTEMPTS			
113										
114	58	24	114-116			No sampling attempts.				
REMARKS										
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	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
116	59	24	116-118			No sampling attempts.	NO SAMPLING ATTEMPTS			
117										
118	60	24	118-120			No sampling attempts.				
119										
120	61	24	120-122			No sampling attempts.				
121										
122	62	24	122-124			No sampling attempts.				
123										
124	63	24	124-126			No sampling attempts.				
125										
126	64	24	126-128			No sampling attempts.				
REMARKS										
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	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
127							NO SAMPLING ATTEMPTS			
128	65	24	128-130			No sampling attempts.				
129										
130	66	24	130-132			No sampling attempts.				
131										
132	67	24	132-134			No sampling attempts.				
133										
134	68	24	134-136			No sampling attempts.				
135										
136	69	24	136-138			No sampling attempts.				
137										
138	70	24	138-140			No sampling attempts.				
REMARKS										
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	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
139							NO SAMPLING ATTEMPTS			
140	71	24	140-142			No sampling attempts.				
141										
142	72	24	142-144			No sampling attempts.				
143										
144	73	24	144-146			No sampling attempts.				
145										
146	74	24	146-148			No sampling attempts.				
147										
148	75	24	148-150			No sampling attempts.				
149										
REMARKS										
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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
151	76	24	150-152			No sampling attempts.	NO SAMPLING ATTEMPTS			
152	77	24	152-154			No sampling attempts.				
154	78	24	154-156			No sampling attempts.				
156	79	24	156-158			No sampling attempts.				
158	80	24	158-160			No sampling attempts.				
160	81	24	160-162			No sampling attempts.				
REMARKS										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.										Boring No.: PMW-WV-11/MW-WV-11D

BORING WELL 6267781 WWW.WOLVER AVENUE.GPJ GZA CORP.GDT 3/25/19

Filter Sand

2-Inch PVC Well Screen



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Wolverine World Wide
 Woven Avenue Area
 Algoma Twp, Kent County, Michigan

Boring No. MW-WV-11/MW-WV-11D
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 Check: Leslie Nelson

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
162	82	24	162-164			No sampling attempts.	NO SAMPLING ATTEMPTS		
163									
164	83	24/9.6	164-166	25-50/3	ND	Dark grayish-brown, SILT, trace fine grained SAND, non-plastic, cohesive, moist.	164' SILT		
165									
166						Bottom of Borehole at 166.0 Feet	166'	3	
167									
168									
169									
170									
171									
172									
173									

R E M A R K S	3. Monitoring well was installed in borehole upon completion. Well screen set from 158.9 to 163.7 feet below ground surface.
--	--

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: PMW-WV-11/MW-WV-11D

BORING WELL 6267781 WWW.WOVLEN.AVENUE.GPJ GZA CORP.GDT 3/25/19



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Wolven Avenue Area

Algoma Twp, Kent County, Michigan

Boring No.: MW-WV11S

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File No.: 16.0062677.81

Check: Leslie Nelson

Contractor: Stearns Drilling Company

Foreman: Jerry H., Travis & Zach/Gary

Logged by: John Morehouse

Date Start/Finish: 1-3-19 / 1-3-19

Boring Location:

GS Elev.: Datum: NAD 83

Auger/
Casing

Sampler

GROUNDWATER READINGS

Type: Hollow Stem Auger Split Spoon
O.D. / I.D.: 12.25" / 4.25" 2.0" / 1 3/8"
Hammer Wt.: NA 140lbs
Hammer Fall: NA 30.0"
TOC Elev.: NA NA

Date	Time	Depth	Casing	Stab

Surveyed By: NA Survey Date:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					PROTECTIVE CASING
1						See boring log PMW-WV-11/MW-WV-11D for soil descriptions.		1	Bentonite Grout	Filter Sand
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										
31										
32										
33										
34										
35						Bottom of Borehole at 34.0 Feet				

REMARKS

1. Monitoring well was installed in borehole upon completion. Well screen set from 28.8 to 33.6 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: MW-WV11S

BORING WELL 6267781 WWW.WOLVENAVENUE.GPJ GZA CORP.GDT 3/25/19



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Wolver Avenue Area

Algoma Twp, Kent County, Michigan

Boring No.: MW-WV12D

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File No.: 16.0062677.81

Check: Kate McDonald

Contractor: Stearns Drilling Company

Foreman: Jerry H.

Logged by: John Morehouse

Date Start/Finish: 10-26-18 / 11-29-18

Boring Location: _____

GS Elev.: _____ Datum: _____

Auger/
Casing

Sampler

GROUNDWATER READINGS

Type: Hollow Stem Auger Split Spoon

O.D. / I.D.: 12.25" / 4.25" 2.0" / 1 3/8"

Hammer Wt.: NA 140lbs

Hammer Fall: NA 30.0"

Other: NA NA

Date	Time	Depth	Casing	Stab

Sample Information						Other:	NA	NA					
Depth	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed				
												PROTECTIVE CASING	
1	1	24	0-2	3-3 3-3	0.0 ppm	Dark brown, poorly sorted, fine to medium-grained SAND, some Silt, trace Clay, trace Gravel, non to slightly plastic, slightly cohesive, moist. Changing at 1.6 feet to: NO RECOVERY.	SAND	1					
2	2	24	2-4	2-2 1-1	0.0 ppm	Dark brown, poorly sorted, fine to medium-grained SAND, some Silt, trace Clay, trace Gravel, non to slightly plastic, slightly cohesive, moist. Changing at 2.3 feet to: Dark yellowish-brown, poorly sorted, SILT, little Clay, trace Gravel, moderately plastic, cohesive, moist. Changing at 2.6 feet to: Dark yellowish-brown, poorly sorted, CLAY & SILT, little Sand, trace Gravel, plstic, cohesive, moist. Changing at 2.8 feet to: NO RECOVERY.	1.6' NO 2' RECOVERY SAND 2.3' SILT 2.6' 2.8' CLAY & SILT						
3							NO RECOVERY						
4	3	24	4-6	0-0 1-2	0.0 ppm	Dark yellowish-brown, poorly sorted, Silty CLAY, trce Gravel, plastic, cohesive, moist. Changing at 5.6 feet to: NO RECOVERY.	4' Silty CLAY						
5							5.6' NO RECOVERY Silty CLAY						
6	4	24	6-8	0-1 5-6	0.0 ppm	Dark yellowish-brown, poorly sorted, Silty CLAY, trace Gravel, plastic, cohesive, moist. Changing at 7.6 feet to: Yellowish-brown, poorly sorted, fine to medium-grained SAND, little Silt, little Clay, trace Gravel, slightly plastic, slightly cohesive, moist. Changing 7.8 feet to: NO RECOVERY.	7.6' 7.8' SAND 8' NO RECOVERY SAND						
7							9.5' NO RECOVERY SAND						
8	5	24	8-10	4-7 9-8	0.0 ppm	Yellowish-brown, poorly sorted, fine to medium-grained SAND, little Silt, little Clay, trace Gravel, slightly plastic, slightly cohesive, moist. Changing at 8.6 feet to: Yellowish-brown, poorly sorted, fine to medium-grained SAND, little Silt, little Clay, trace Gravel, slightly plastic, slightly cohesive, moist. Changing at 9.5 feet to: NO RECOVERY.	11.5' NO RECOVERY						
9							12'						
10	6	24	10-12	5-8 8-10	0.0 ppm	Yellowish-brown, poorly sorted, fine to medium-grained SAND, little Silt, little Clay, trace Gravel, slightly plastic, slightly cohesive, moist. Changing at 11.5 feet to: NO RECOVERY.							
11													

REMARKS

- Field screening of samples for organic vapors was performed with a MiniRae 3000 photoionization detector equipped with a 10.6 eV lamp. Readings above background levels are shown in parts per million by volume (ppmv) of isobutylene. ND indicates nothing detected (<0.1 ppmv).

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: MW-WV12D

BORING WI 6267781 WWW.WOLVEN AVENUE.GPJ WI DNR.GDT 4/17/20



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Wolven Avenue Area
Algoma Twp, Kent County, Michigan

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Check: Kate McDonald

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD					
12	7	24	12-14	2-7 13-24	0.0 ppm	Yellowish-brown, poorly sorted, fine to medium-grained SAND, little Silt, little Clay, trace Gravel, slightly plastic, slightly cohesive, moist. Changing at 13.0 feet to: Yellowish-brown, poorly sorted, fine to coarse-grained SAND, some Gravel, little Silt, slightly cohesive, moist. Changing at 13.9 feet to: NO RECOVERY.	SAND			
13					0.0 ppm					
14	8	24	14-16	14-11 10-14	0.0 ppm	Yellowish-brown, poorly sorted, fine to coarse-grained SAND, some Gravel, little Silt, slightly cohesive, moist. Changing at 14.5 feet to: Yellowish-brown, poorly sorted, fine to medium-grained SAND, little Silt, little Clay, trace Gravel, slightly plastic, slightly cohesive, moist. Changing at 15.7 feet to: NO RECOVERY.	13.9' 14' NO RECOVERY SAND			
15										
16	9	24	16-18	6-8 9-13	0.0 ppm	Dark gray, poorly sorted, Silty CLAY, plastic, cohesive, moist. Changing at 17.8 feet to: NO RECOVERY.	15.7' 16' NO RECOVERY Silty CLAY			
17										
18	10	24	18-20	6-10 11-16	0.0 ppm	Brown, moderately well sorted, fine to medium-grained SAND, little Silt, moist to wet. Changing at 18.3 feet to: Yellowish-brown, poorly sorted, fine to medium-grained SAND, little Silt, little Clay, trace Gravel, slightly plastic, slightly cohesive, moist with occasional fine Sand partings. Changing at 18.8 feet to: Brown, moderately well sorted, fine to medium-grained SAND, little Silt, moist to wet. Changing at 18.9 feet to: Yellowish-brown, poorly sorted, fine to medium-grained SAND, little Silt, little Clay, trace Gravel, slightly plastic, slightly cohesive, moist with occasional fine Sand partings. Changing at 19.8 feet to: NO RECOVERY.	17.8' 18' NO RECOVERY SAND	2		
19										
20	11	24	20-22	2-6 10-16	0.0 ppm	Brown, moderately well sorted, fine to medium-grained SAND, little Silt, moist to wet. Changing at 18.9 feet to: Yellowish-brown, poorly sorted, fine to medium-grained SAND, little Silt, little Clay, trace Gravel, slightly plastic, slightly cohesive, moist with occasional fine Sand partings. Changing at 19.8 feet to: NO RECOVERY.	19.8' 20' NO RECOVERY SAND			
21										
22	12	24	22-24	6-8 12-10	0.0 ppm	Brown, moderately well sorted, fine to medium-grained SAND, little Silt, moist to wet. Changing at 20.4 feet to: Yellowish-brown, poorly sorted, fine to medium-grained SAND, little Silt, little Clay, trace Gravel, slightly plastic, slightly cohesive, moist with occasional fine Sand partings. Changing at 20.8 feet to: Brown, moderately well sorted, fine to medium-grained SAND, little Silt, moist to wet. Changing at 20.9 feet to: Yellowish-brown, poorly sorted, fine to medium-grained SAND, little Silt, little Clay, trace Gravel, slightly plastic, slightly cohesive, moist with occasional fine Sand partings. Changing at 21.4 feet to: Brown,	21.8' 22' NO RECOVERY Silty CLAY			
23										
24	13	24	24-26	4-8 12-15	0.0 ppm	Yellowish-brown, poorly sorted, fine to medium-grained SAND, little Silt, little Clay, trace Gravel, slightly plastic, slightly cohesive, moist with occasional fine Sand partings. Changing at 21.4 feet to: Brown,	23.7' 24' NO RECOVERY Silty CLAY			
25										
2. Groundwater was encountered at approximately 18.0 feet below ground surface.										
REMARKS										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: MW-WV12D	

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Wolven Avenue Area
Algoma Twp, Kent County, Michigan

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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD					
14	24	26-28	6-13 15-16	0.0 ppm		moderately well sorted, fine to medium-grained SAND, little Silt, moist to wet. Changing at 21.5 feet to: Yellowish-brown, poorly sorted, fine to medium-grained SAND, little Silt, little Clay, trace Gravel, slightly plastic, slightly cohesive, moist with occasional fine Sand partings. Changing at 21.8 feet to: NO RECOVERY.	Silty CLAY			
27							27' 27.2' SAND Silty CLAY			
28	15	24	28-30	5-7 10-14	0.0 ppm	Dark grayish-brown, well sorted, Silty CLAY, plastic, cohesive, moist. Changing at 23.7 feet to: NO RECOVERY.	27.8' 28' NO RECOVERY Silty CLAY			
29						Dark grayish-brown, well sorted, Silty CLAY, trace Gravel, plastic, cohesive, moist with fine Sand partings at 24.7 feet. Changing at 25.4 feet to: Dark grayish-brown, poorly sorted, Silty CLAY, trace Gravel, plastic, cohesive, moist with fine Sand partings at 25.4 feet and 25.7 feet.				
30	16	24	30-32	5-7 11-16	0.0 ppm	Dark grayish-brown, poorly sorted, Silty CLAY, trace Gravel, plastic, cohesive, moist with fine Sand partings at 26.7 feet. Changing at 27.0 feet to: Brown, very well sorted, fine-grained SAND, trace Silt, moist. Changing at 27.2 feet to: Dark grayish-brown, poorly sorted, Silty CLAY, trace Gravel, plastic, cohesive, moist with fine Sand partings at 27.4 feet. Changing at 27.8 feet to: NO RECOVERY.	31.9' 32' NO RECOVERY Silty CLAY			
31						Dark gray, well sorted, Silty CLAY, plastic, cohesive, moist.				
32	17	24	32-34	4-9 11-17	0.0 ppm	Dark gray, well sorted, Silty CLAY, plastic, cohesive, moist. Changing at 31.9 feet to: NO RECOVERY.				
33						Dark gray, well sorted, Silty CLAY, plastic, cohesive, moist.				
34	18	24	34-36	5-11 13-13	0.0 ppm	Dark gray, well sorted, Silty CLAY, plastic, cohesive, moist.				
35						Dark gray, well sorted, Silty CLAY, plastic, cohesive, moist.				
36	19	24	36-38	3-7 12-12	0.0 ppm	Dark gray, well sorted, Silty CLAY, plastic, cohesive, moist.				
37										
38	20	24	38-40	3-8 11-13	0.0 ppm	Dark gray, well sorted, Silty CLAY, plastic, cohesive, moist.	38' CLAY & SILT			
39										
REMARKS										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: MW-WV12D	

BORING: WI 6267781 WWW.WOLVEN AVENUE.GPJ WI DNR.GDT 4/17/20



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Wolven Avenue Area
Algoma Twp, Kent County, Michigan

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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD					
41	21	24	40-42	3-7 89-10	0.0 ppm	Dark gray, well sorted, Silty CLAY, plastic, cohesive, moist. Changing at 41.2 feet to: Dark gray, poorly sorted, SILT & CLAY, some Sand, trace Gravel, moderately plastic, cohesive, moist. Changing at 41.4 feet to: Dark gray, well sorted, Silty CLAY, plastic, cohesive, moist with occasional fine Sand partings.	CLAY & SILT 41.2' 41.4' SILT & CLAY Silty CLAY 42'			
42	22	24	42-44	3-8 10-13	0.0 ppm	Dark grayish-brown, poorly sorted, CLAY & SILT, trace Gravel, plastic, cohesive, moist. Changing at 43.6 feet to: Dark gray, well sorted, Silty CLAY, plastic, cohesive, moist. Changing at 43.9 feet to: Dark grayish-brown, poorly sorted, CLAY & SILT, trace Gravel, plastic, cohesive, moist.	CLAY & SILT 43.6' 43.9' Silty CLAY			
44	23	24	44-46	2-8 12-12	0.0 ppm	Dark grayish-brown, poorly sorted, CLAY & SILT, trace Gravel, plastic, cohesive, moist. Changing at 44.9 feet to: Dark grayish-brown, poorly sorted, SILT & CLAY, little Sand, trace Gravel, slightly plastic, cohesive, moist. Changing at 45.8 feet to: NO RECOVERY.	CLAY & SILT 44.9' SILT & CLAY 45.8' 46' NO RECOVERY SILT & CLAY Silty CLAY			
46	24	24	46-48	4-6 11-16	0.0 ppm	Dark grayish-brown, poorly sorted, SILT & CLAY, little Sand, trace Gravel, slightly plastic, cohesive, moist. Changing at 46.2 feet to: Dark gray, well sorted, Silty CLAY, plastic, cohesive, moist. Changing at 47.8 feet to: NO RECOVERY.	46.2' SILT & CLAY Silty CLAY 47.8' 48' NO RECOVERY Silty CLAY			
48	25	24	48-50	3-7 14-23	0.0 ppm	Dark gray, well sorted, Silty CLAY, plastic, cohesive, moist with fine Sand parting at 48.6 feet. Changing at 49.8 feet to: Brown, well sorted, fine to medium -grained SAND, trace Silt, moist to wet. Changing at 49.9 feet to: NO RECOVERY.	48' NO RECOVERY Silty CLAY 49.8' 49.9' SAND NO RECOVERY SAND			
50	26	24	50-52	2-9 14-22	0.0 ppm	Grayish-brown to brown, poorly sorted, fine to coarse-grained SAND, trace Gravel, trace Silt, wet. Changing at 50.7 feet to: Dark gray, very well sorted, fine-grained SAND, some Silt, wet. Changing at 51.0 feet to: Dark yellowish-brown, moderately sorted, fine-grained SAND, some Silt, trace Clay, slightly plastic, cohesive, wet. Changing at 51.3 feet to: Yellowish-brown, well sorted, fine to medium-grained SAND, trace Silt, wet. Changing at 51.5 feet to: NO RECOVERY.	50.7' NO RECOVERY SAND 51.0' NO RECOVERY SAND 51.3' SAND 51.5' NO RECOVERY SAND 52' SAND 52.8' SILT			
52	27	24	52-54	10-15 17-27	0.0 ppm	Yellowish-brown, well sorted, fine to medium-grained SAND, trace Silt, wet. Changing at 52.8 feet to: Dark grayish-brown, very well sorted, SILT, trace	52.8' SILT 53.7' NO 54'			
53										
REMARKS										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: MW-WV12D	

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Wolven Avenue Area
Algoma Twp, Kent County, Michigan

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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD				
55	28	24	54-56	13-17 17-32	0.0 ppm	Clay, slightly plastic, cohesive, moist. Changing at 53.7 feet to: NO RECOVERY. Dark grayish-brown, poorly sorted, SILT & CLAY, little Sand, trace Gravel, moderately plastic, cohesive, moist. Changing at 55.2 feet to: Dark grayish-brown to grayish-brown, well sorted, fine to medium-grained SAND, trace Silt, wet.	RECOVERY SILT & CLAY 55.2' 55.4' SAND CLAY & SILT		
56	29	24	56-58	3-13 16-20	0.0 ppm	Changing at 55.4 feet to: Varved dark grayish-brown, very well sorted, Silty CLAY & SILT, plastic, cohesive, moist. Changing at 55.9 feet to: Dark gray, poorly sorted, CLAY & SILT, trace Gravel, plastic, cohesive, moist.	56' SILT		
58	30	24	58-60	3-13 21-47	0.0 ppm	Dark grayish-brown to brown, well sorted, SILT with very thin Clay varves, plastic (Clay), cohesive, moist to wet. Changing at 57.7 feet to: NO RECOVERY.	57.7' NO RECOVERY CLAY & SILT		
59						Dark grayish-brown, moderately sorted, CLAY & SILT, trace fine-grained Sand, plastic, cohesive, moist. Changing at 59.0 feet to: Dark gray to dark grayish-brown, moderately well sorted, fine to medium SAND, little Silt, moist to wet. Changing at 59.3 feet to: Dark grayish-brown, moderately sorted, CLAY & SILT, trace fine-grained Sand, plastic, cohesive, moist. Changing at 59.6 feet to: NO RECOVERY.	59' 59.3' SAND 59.6' CLAY & SILT		
60	31	24	60-62	3-10 15-37	0.0 ppm	Varved dark grayish-brown, moderately sorted, CLAY & SILT, trace fine-grained Sand, plastic, cohesive, moist. Changing at 59.6 feet to: NO RECOVERY.	60' RECOVERY Silty CLAY and SAND		
61						Varved dark grayish-brown, well sorted, Silty CLAY and fine SAND, plastic, cohesive, moist to wet. Changing at 61.1 feet to: Dark grayish-brown, moderately well sorted, Silty CLAY, trace Gravel, plastic, cohesive, moist with occasional fine Sand partings.	61.1' Silty CLAY		
62	32	24	62-64	5-10 12-44	0.0 ppm	Changing at 61.7 feet to: NO RECOVERY. Varved dark grayish-brown, well sorted, Silty CLAY and fine-grained SAND, plastic, cohesive, moist to wet with fine Sand partings from 62.0 to 63.0 feet. Changing at 63.0 feet to: Dark grayish-brown, poorly sorted, CLAY & SILT, trace Gravel, trace Sand, plastic, cohesive, moist. Changing at 63.6 feet to: NO RECOVERY.	61.7' NO RECOVERY Silty CLAY and SAND		
63						Dark grayish-brown, poorly sorted, CLAY & SILT, trace Gravel, trace Sand, plastic, cohesive, moist. Changing at 64.6 feet to: Dark grayish-brown, well sorted, fine to medium SAND, trace Silt, wet. Changing at 64.7 feet to: Dark grayish-brown, well sorted, Silty CLAY, plastic, cohesive, moist.	62' RECOVERY Silty CLAY and SAND 63' CLAY & SILT 63.6' NO RECOVERY CLAY & SILT		
64	33	24	64-66	6-12 16-34	0.0 ppm	Dark grayish-brown, poorly sorted, CLAY & SILT, trace Gravel, trace Sand, plastic, cohesive, moist. Changing at 64.6 feet to: Dark grayish-brown, well sorted, fine to medium SAND, trace Silt, wet. Changing at 64.7 feet to: Dark grayish-brown, well sorted, Silty CLAY, plastic, cohesive, moist.	64.6' 64.7' SAND 65.1' Silty CLAY 65.3' SAND 65.6' CLAY & SILT		
65						Changing at 64.7 feet to: Dark grayish-brown, well sorted, Silty CLAY, plastic, cohesive, moist. Changing at 65.1 feet to: Dark grayish-brown, moderately well sorted, fine to medium-grained SAND, little Clay, little Silt, slightly plastic, moist to wet. Changing at 65.3 feet to: Dark grayish-brown, moderately sorted, CLAY & SILT, trace Gravel, trace Sand, plastic, cohesive, moist. Changing at 65.6 feet to: NO RECOVERY.	65.1' NO RECOVERY Silty CLAY and SAND		
66	34	24	66-68	7-17 22-45	0.0 ppm		66' RECOVERY Silty CLAY and SAND		
67							67.9'		
REMARKS									
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: MW-WV12D

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Wolven Avenue Area
Algoma Twp, Kent County, Michigan

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Check: Kate McDonald

Sample Information						Argonia Twp., Kent County, Michigan		Check: Kate McDonald		
Depth	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
69	35	24	68-70	3-4 12-25	0.0 ppm	Varved dark grayish-brown, well sorted, Silty CLAY and fine-grained SAND, plastic, cohesive, moist. Changing at 67.9 feet to: Brown, moderately well sorted, fine to coarse-grained SAND, little Silt, grace Gravel, moist to wet.	68' SAND 68.5' Silty CLAY SAND 69' NO RECOVERY			
70	36	24	70-72	6-13-50/6	0.0 ppm	Dark grayish-brown, well sorted, Silty CLAY, plastic, cohesive, moist. Changing at 68.5 feet to: Brown, well sorted, fine to medium-grained SAND, trace Silt, moist to wet. Changing at 69.0 feet to: Varved dark grayish-brown, well sorted, Silty CLAY and fine-grained SAND, plastic, cohesive, moist. Changing at 69.1 feet to: Varved dark grayish-brown, well sorted, Silty CLAY and SILT, plastic, cohesive, moist. Changing at 69.2 feet to: NO RECOVERY.	70' CLAY & SILT 71' Silty CLAY 71.4' SAND 71.6' Silty CLAY 71.8' SAND			
72	37	24	72-74	2-7 17-40	0.0 ppm	Dark grayish-brown, poorly sorted, CLAY & SILT, trace Gravel, plastic, cohesive, moist. Grading to 71.0 feet: Dark grayish-brown, well sorted, Silty CLAY, plastic, cohesive, moist. Changing at 71.4 feet to: Brown, very well sorted, fine to medium-grained SAND, trace Silt, moist to wet. Changing at 71.6 feet to: Dark grayish-brown, well sorted, Silty CLAY, plastic, cohesive, moist. Changing at 71.8 feet to: Brown, very well sorted, fine to medium SAND, trace Silt, moist to wet.	73.5' NO RECOVERY 74' SAND 74.5' NO RECOVERY			
74	38	24	74-76	1-10 33-50	0.0 ppm	Brown, very well sorted, fine to medium SAND, trace Silt, moist to wet. Changing at 73.5 feet to: NO RECOVERY.	76' SAND 76.3' NO RECOVERY			
76	39	24	76-78	1-4 16-26	0.0 ppm	Brown, very well sorted, fine to medium-grained SAND, trace Silt, moist to wet. Changing at 74.5 feet to: NO RECOVERY.	78' SAND			
78	40	24	78-80	5-22 31-38	0.0 ppm	Brown, very well sorted, fine to medium-grained SAND, trace Silt, wet. Changing at Changing at 79.6 feet to: NO RECOVERY.	79.6' NO RECOVERY 80' SAND			
80	41	24	80-82	1-11 14-43	0.0 ppm	Brown, very well sorted, fine to medium-grained SAND, trace Silt, wet. Changing at 81.6 feet to: NO RECOVERY.	81.6' NO RECOVERY 82' SAND			
REMARKS										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: MW-WV12D	

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Wolven Avenue Area
Algoma Twp, Kent County, Michigan

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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD					
82	42	24	82-84	10-26 40-50	0.0 ppm	Brown, very well sorted, fine to medium-grained SAND, trace Silt, wet. Changing at 83.3 feet to: NO RECOVERY.	SAND			
83							83.3' NO RECOVERY			
84	43	24	84-86	4-10 17-20	0.0 ppm	Brown, very well sorted, fine to medium-grained SAND, trace Silt, wet. Changing at 85.2 feet to: Dark grayish-brown poorly sorted, SAND, little Clay, little Silt, slightly plastic, moderately cohesive, moist. Changing at 85.2 feet to: NO RECOVERY.	84' SAND			
85							85.3' NO RECOVERY			
86	44	24	86-88	15-28 33-50/4.5"	0.0 ppm	Dark grayish-brown, poorly sorted SAND, some Silt, trace Clay, slightly plastic, moderately cohesive, moist. Changing at 87.4 feet to: NO RECOVERY.	86' SAND			
87							87.4' NO RECOVERY			
88	45	24	88-90	11-21 20-25	0.0 ppm	Dark grayish-brown, poorly sorted SAND, some Silt, trace Clay, trace Gravel, slightly plastic, moderately cohesive, moist. Changing at 88.9 feet to: Dark grayish-brown, poorly sorted, CLAY & SILT, some Sand, slightly plastic, cohesive, moist. Changing at 89.2 feet to: NO RECOVERY.	88' SAND			
89							88.9' CLAY & SILT			
90	46	24	90-92	14-23 19-22	0.0 ppm	Dark grayish-brown, poorly sorted, CLAY & SILT, some Sand, slightly plastic, cohesive, moist. Changing at 90.6 feet to: Dark grayish-brown, well sorted, SILT, non plastic, moderately cohesive, moist to wet. Changing at 91.5 feet to: Dark grayish-brown to dark gray, poorly sorted, SILT & CLAY, trace Gravel, plastic, cohesive, moist. Changing at 91.9 feet to: NO RECOVERY.	89.2' NO RECOVERY			
91							90' CLAY & SILT			
92	47	24	92-94	9-31-50/6"	0.0 ppm	Dark grayish-brown to dark gray, poorly sorted, SILT & CLAY, trace Gravel, plastic, cohesive, moist. Changing at 91.9 feet to: NO RECOVERY.	90.6' SILT			
93							91.5' SILT & CLAY			
94	48	24	94-96	31-50/4.5"	0.0 ppm	Varved dark grayish-brown, well sorted, Silty CLAY and Silt, plastic, cohesive, moist. Changing at 93.2 feet to: NO RECOVERY.	91.9' NO RECOVERY			
95							92' SILT & CLAY			
							93.1' CLAY & SILT			
							93.2' NO RECOVERY			
							94' CLAY & SILT			
							95.3' NO RECOVERY			
							96'			
REMARKS										
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Bentonite Grout



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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD					
49	24		96-98	25-48-50/4	0.0 ppm 0.0 ppm	Dark grayish-brown, poorly sorted, CLAY & SILT, some Sand, trace Gravel, plastic, cohesive, moist. Changing at 97.2 feet to: NO RECOVERY.	CLAY & SILT			
97							97.2'			
							NO RECOVERY			
98	50	24	98-100	27-50/5.5"	0.0 ppm	Dark grayish-brown, poorly sorted, CLAY & SILT, some Sand, trace Gravel, plastic, cohesive, moist. Changing at 98.3 feet to: Dark grayish-brown, well sorted, Silty CLAY, plastic, cohesive, moist. Changing at 98.9 feet to: NO RECOVERY.	CLAY & SILT			
							98.3'			
							Silty CLAY			
99							98.9'			
							NO RECOVERY			
100	51	24	100-102	8-23 37-32	0.0 ppm	Brown, well sorted, fine to medium-grained SAND, trace Silt, wet. Changing at 100.5 feet to: Brown, very well sorted, SILT, trace Clay, slightly plastic, cohesive, varved with very thin layers of Silty CLAY, moist. Changing at 101.2 feet to: NO RECOVERY.	SAND			
							100.5'			
101							SILT			
							101.2'			
							NO RECOVERY			
102	52	24	102-104	27-28 44-45	0.0 ppm	Light grayish-brown to pale brown, very well sorted, SILT, cohesive, moist. Changing at 102.2 feet to: Dark grayish-brown, poorly sorted, CLAY & SILT, little Sand, trace Gravel, plastic, cohesive, moist. Changing at 103.2 feet to: NO RECOVERY.	SILT			
							102.2'			
							CLAY & SILT			
103							103.2'			
							NO RECOVERY			
104	53	24	104-106	11-27-50/5"	0.0 ppm	Dark grayish-brown, poorly sorted, CLAY & SILT, little Sand, trace Gravel, plastic, cohesive, moist. Changing at 105.4 feet to: NO RECOVERY.	CLAY & SILT			
							105.4'			
							NO RECOVERY			
106	54	24	106-108	31-50/5.5"	0.0 ppm	Dark grayish-brown, poorly sorted, CLAY & SILT, little Sand, trace Gravel, plastic, cohesive, moist. Changing at 107.4 feet to: NO RECOVERY.	CLAY & SILT			
							107.4'			
							NO RECOVERY			
108	55	24	108-110	26-50/4"	0.0 ppm	Dark grayish-brown, poorly sorted, CLAY & SILT, little Sand, trace Gravel, plastic, cohesive, moist. Changing at 108.8 feet to: NO RECOVERY.	CLAY & SILT			
							108.8'			
							NO RECOVERY			
109							110'			
REMARKS										
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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD					
111	56	24	110-112	11-22 37-50/5"	0.0 ppm	Dark grayish-brown, poorly sorted, CLAY & SILT, little Sand, trace Gravel, plastic, cohesive, moist. Changing at 111.9 feet to: NO RECOVERY.	CLAY & SILT			
112	57	24	112-114	31-50/3.5"	0.0 ppm	Dark grayish-brown, poorly sorted, CLAY & SILT, little Sand, trace Gravel, plastic, cohesive, moist. Changing at 112.7 feet to: NO RECOVERY.	111.9' 112' NO RECOVERY CLAY & SILT 112.6' 112.7' SAND NO RECOVERY			
114	58	24	114-116	18-38-50	0.0 ppm	Dark grayish-brown, very well sorted, SILT, trace Clay, slightly plastic, cohesive, varved with very thin layers of Silty CLAY, moist. Changing at 114.7 feet to: Dark grayish-brown, well sorted, fine to medium-grained SAND, trace Silt, wet. Changing at 114.8 feet to: Dark grayish-brown, poorly sorted, CLAY & SILT, little Sand, trace Gravel, plastic, cohesive, moist. Changing at 115.5 feet to: NO RECOVERY.	114' SILT 114.7' 114.8' SAND CLAY & SILT 115.5' NO RECOVERY			
116	59	24	116-118	4-13 25-50	0.0 ppm	Dark grayish-brown, poorly sorted, CLAY & SILT, little Sand, trace Gravel, plastic, cohesive, moist. Changing at 116.4 feet to: Dark grayish-brown, poorly sorted, CLAY & SILT, little Sand, trace Gravel, plastic, cohesive, moist. Changing at 117.8 feet to: NO RECOVERY.	116' CLAY & SILT 117.8' 118' NO RECOVERY CLAY & SILT			
118	60	24	118-120	5-27 34-39	0.0 ppm	Dark grayish-brown, poorly sorted, CLAY & SILT, little Sand, trace Gravel, plastic, cohesive, moist. Changing at 121.9 feet to: NO RECOVERY.	121.9' 122' NO RECOVERY CLAY & SILT			
122	62	24	122-124	17-23 46-50/3.5"	0.0 ppm	Dark grayish-brown, poorly sorted, CLAY & SILT, little Sand, trace Gravel, plastic, cohesive, moist. Changing at 123.5 feet to: Dark grayish-brown, very well sorted, SILT, trace Clay, slightly plastic, cohesive, varved with very thin layers of Silty CLAY, moist. Changing at 123.8 feet to: NO RECOVERY.	123.5' 123.8' SILT 124' NO			
REMARKS										
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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD					
125	63	24	124-126	8-24 44-50/4"	0.0 ppm	Dark grayish-brown, poorly sorted, CLAY & SILT, little Sand, trace Gravel, plastic, cohesive, moist. Changing at 125.8 feet to: NO RECOVERY.	RECOVERY CLAY & SILT			
126	64	24	126-128	10-25 47-50/4"	0.0 ppm	Dark grayish-brown, poorly sorted, CLAY & SILT, little Sand, trace Gravel, plastic, cohesive, moist. Changing at 127.8 feet to: NO RECOVERY.	125.8' 126' NO RECOVERY CLAY & SILT			
128	65	24	128-130	27-34-50/50"	0.0 ppm	Dark grayish-brown, poorly sorted, CLAY & SILT, little Sand, trace Gravel, plastic, cohesive, moist. Changing at 129.4 feet to: NO RECOVERY.	127.8' 128' NO RECOVERY CLAY & SILT			
130	66	24	130-132	9-21 35-50/5"	0.0 ppm	Dark grayish-brown, poorly sorted, CLAY & SILT, little Sand trace Gravel, plastic, cohesive, moist. Changing at 131.9 feet to: NO RECOVERY.	129.4' NO RECOVERY 130' CLAY & SILT			
132	67	24	132-134	7-9 10-17	0.0 ppm	Dark grayish-brown poorly sorted, CLAY & SILT, little Sand, trace Gravel, plastic, cohesive, moist. Changing at 132.8 feet to: Dark grayish-brown, very well sorted, SILT, non plastic, cohesive, moist. Changing at 133.1 feet to: Dark grayish-brown, well sorted, Silty CLAY, plastic, cohesive, moist. Changing at 133.4 feet to: Dark grayish-brown, well sorted, SILT, some fine-grained SAND, non plastic, cohesive, moist to wet. Changing at 133.8 feet to: NO RECOVERY.	131.9' 132' NO RECOVERY CLAY & SILT			
134	68	24	134-136	19-33-50/40"	0.0 ppm	Dark grayish-brown, poorly sorted, CLAY & SILT, little Sand, trace Gravel, plastic, cohesive, moist. Changing at 134.3 feet to: Dark grayish-brown, very well sorted, SILT, non plastic, cohesive, moist. Changing at 134.6 feet to: Dark grayish-brown, moderately sorted, SILT, little Clay, slightly plastic, cohesive, moist. Changing at 134.8 feet to: Dark grayish-brown, very well sorted, fine to medium-grained SAND, trace Silt, wet. Changing at 135.4 feet to: NO RECOVERY.	132.8' 133.1' SILT 133.4' Silty CLAY 133.8' SILT 134' NO RECOVERY 134.3' CLAY & SILT 134.6' SILT 134.8' SILT & CLAY (CL)			
136	69	24	136-138	50/4.5"	0.0 ppm	Dark grayish-brown, well sorted,				
REMARKS										
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	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD					
139	70	24	138-140	30-50/2"	0.0 ppm	fine-grained SAND with layers of well sorted, Silty CLAY, moist. Chaging at 136.4 feet to: NO RECOVERY. Dark grayish-brown, well sorted, fine-grained SAND with layers of well sorted Silty CLAY, moist. Changing at 138.4 feet to: Dark grayish-brown, poorly sorted, SILT & CLAY, little Sand, trace Gravel, slightly plastic, cohesive, moist. Changing at 138.6 feet to: NO RECOVERY.	SILT & CLAY (CL) 138.6'			
140	71	24	140-142	2-1 4-8	0.0 ppm	Dark grayish-brown, well sorted, Varved dark grayish-brown, well sorted, SILT and Silty CLAY, plastic, cohesive, moist. Changing at 140.8 feet to: NO RECOVERY.	NO RECOVERY 140' SILT & CLAY 140.8'			
142	72	24	142-144	7-19 35-50/3.5"	0.0 ppm	Dark grayish-brown to dark brown, poorly sorted, coarse-grained SAND, some Gravel, trace Silt, moist to wet. Changing at 142.3 feet to: Dark grayish-brown to dark brown, poorly sorted, fine to coarse-grained SAND, little Gravel, trace Silt, moist to wet. Changing at 143.0 feet to: NO RECOVERY.	NO RECOVERY 142' SAND			
144	73	24	144-146	41-50	0.0 ppm	Brown to dark gray, poorly sorted, GRAVEL with coarse-grained SAND, little Silt, wet. Changing at 144.7 feet to: NO RECOVERY.	143' NO RECOVERY 144' GRAVEL 144.7'			
146	74	24	146-148	18-50/5"	0.0 ppm	Brown to dark gray, poorly sorted, GRAVEL with coarse-grained SAND, little Silt, wet. Changing at 146.9 feet to: NO RECOVERY.	NO RECOVERY 146' GRAVEL 146.9'			
148	75	24	148-150	38-50/5"	0.0 ppm	Brown to dark gray, poorly sorted, GRAVEL with coarse-grained SAND, little Silt, wet. Changing at 148.9 feet to: NO RECOVERY.	NO RECOVERY 148' GRAVEL 148.9'			
150	76	24	150-152	50/5"	0.0 ppm	Brown to dark gray, poorly sorted, GRAVEL with coarse-grained SAND, little Silt, wet. Changing at 150.4 feet to: NO RECOVERY.	NO RECOVERY 150' GRAVEL 150.4'			
151							NO RECOVERY 152'			
REMARKS										
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	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD					
153	77	24	152-154	30-50/3"	0.0 ppm	Brown to dark gray, poorly sorted, GRAVEL with coarse-grained SAND, little Silt, moderately cohesive, moist to wet. Changing at 152.4 feet to: Very dark gray, poorly sorted, GRAVEL, some Silt, little Sand, trace Clay, non to slightly plastic, cohesive, moist. Changing at 152.5 feet to: Dark yellowish-brown, moderately sorted, coarse to medium-grained SAND, some Gravel, little Silt, moist. Changing at 152.7 feet to: NO RECOVERY.	GRAVEL 152.5' 152.7' SAND NO RECOVERY			
154	78	24	154-156	50/4"	0.0 ppm	Dark yellowish-brown, moderately sorted, coarse to medium-grained SAND, some Gravel, little Silt, wet. Changing at 154.2 feet to: Dark yellowish-brown, poorly sorted, fine to coarse-grained, SAND, trace Silt, trace Gravel, wet. Changing at 154.5 feet to: NO RECOVERY.	154' SAND 154.5' NO RECOVERY			
156	79	24	156-158	50-50/3"	0.0 ppm	Dark brown to dark yellowish-brown, poorly sorted, fine to coarse-grained SAND, trace Silt, wet. Changing at 156.5 feet to: Dark brown, poorly sorted, GRAVEL, some medium to coarse-grained Sand, little Silt, slightly cohesive, moist to wet. Changing at 156.8 feet to: NO RECOVERY.	156' SAND 156.5' GRAVEL 156.8' NO RECOVERY			
158	80	24	158-160	20-50/6"	0.0 ppm	Dark brown, poorly sorted, GRAVEL, some medium to coarse-grained SAND, little Silt, slightly cohesive, moist to wet. Changing at 159.0 feet to: NO RECOVERY.	158' GRAVEL 159' NO RECOVERY			
160	81	24	160-162	32-50/3"	0.0 ppm	Dark brown, poorly sorted, GRAVEL, some medium to coarse-grained SAND, little Silt, slightly cohesive, moist to wet. Changing at 160.8 feet to: NO RECOVERY.	160' GRAVEL 160.8' NO RECOVERY			
162	82	24	162-164	50-64	0.0 ppm	Dark yellowish-brown, poorly sorted, fine to coarse-grained SAND, some Silt, little Gravel, moist to wet. Changing at 162.8 feet to: NO RECOVERY.	162' SAND 162.8' NO RECOVERY			
164	83	24	164-166	40-50	0.0 ppm	Dark yellowish-brown to dark brown, moderately sorted, GRAVEL, some coarse-grained Sand, trace Silt, wet. Changing at 164.4 feet to: Dark yellowish-brown, poorly sorted, fine to coarse-grained SAND, some Silt, little Gravel, moist to wet. Changing at 165.0 to NO RECOVERY.	164' GRAVEL 164.4' SAND 165' NO RECOVERY 166'			
REMARKS										
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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD					
167	84	24	166-168	47-50/4"	0.0 ppm	Dark yellowish-brown to dark brown, moderately sorted, GRAVEL, some coarse-grained Sand, trace Silt, wet. Changing at 166.1 feet to: Dark yellowish-brown, poorly sorted, fine to coarse-grained SAND, some silt, little Gravel, moist to wet. Changing at 166.7 feet to: Yellowish-brown, well sorted, fine to medium-grained SAND, trace Silt, wet. Changing at 166.8 feet to: NO RECOVERY. Dark yellowish-brown, poorly sorted, fine to coarse-grained SAND, some Silt, little Gravel, moist to wet. Changing at 168.8 feet to: NO RECOVERY.	166.1' GRAVEL SAND 166.8' NO RECOVERY			
168	85	24	168-170	30-50/4"	0.0 ppm	Dark yellowish-brown, poorly sorted, fine to coarse-grained SAND, some Silt, little Gravel, moist to wet. Changing at 170.8 feet to: NO RECOVERY.	168' SAND 168.8' NO RECOVERY			
170	86	24	170-172	21-50/4"	0.0 ppm	Dark yellowish-brown, poorly sorted, fine to coarse-grained SAND, some Silt, little Gravel, moist to wet. Changing at 170.8 feet to: NO RECOVERY.	170' SAND 170.8' NO RECOVERY			
172	87	24	172-174	20-50/4"	0.0 ppm	Dark yellowish-brown to dark brown, poorly sorted, GRAVEL, some Silt, little fine to coarse-grained Sand, wet. Changing at 172.9 feet to: NO RECOVERY.	172' GRAVEL 172.9' NO RECOVERY			
174	88	24	174-176	45-50/4.5"	0.0 ppm	Dark yellowish-brown to dark brown, poorly sorted, GRAVEL, some Silt, little fine to coarse-grained Sand, wet. Changing at 174.9 feet to: NO RECOVERY.	174' GRAVEL 174.9' NO RECOVERY			
176	89	24	176-178	40-50/2"	0.0 ppm	Dark yellowish-brown to dark brown, poorly sorted, GRAVEL, some Silt, little fine to coarse-grained Sand, wet. Changing at 176.6 feet to: NO RECOVERY.	176' GRAVEL 176.6' NO RECOVERY			
178	90	24	178-180	11-12 9-12	0.0 ppm	Dark yellowish-brown to dark brown, poorly sorted, GRAVEL, some Silt, little fine to coarse-grained Sand, wet. Changing at 178.9 feet to: NO RECOVERY.	178' GRAVEL 178.9' NO RECOVERY			
180'										

Filter Sand

2-Inch PVC Well Screen

REMARKS

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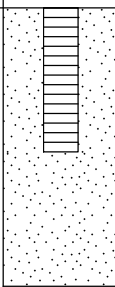
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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD				
181	91	24	180-182	33-50/5"	0.0 ppm	Dark yellowish-brown to dark brown, poorly sorted, GRAVEL, some Silt, little fine to coarse-grained Sand, wet. Changing at 180.8 feet to: NO RECOVERY.	GRAVEL 180.8' No RECOVERY		
182	92	24	182-184	33-18 10-27	0.0 ppm	Dark yellowish-brown to dark brown, poorly sorted, GRAVEL, some Silt, little fine to coarse-grained Sand, wet. Changing at 182.9 feet to: Dark grayish-brown, poorly sorted, CLAY & SILT, trace Sand, trace Gravel, plastic, cohesive, moist. Changing at 183.3 feet to: NO RECOVERY.	182' GRAVEL 182.9' CLAY & SILT 183.3' NO RECOVERY		
183	93	24	184-186	21-33-50/30	0.0 ppm	Dark grayish-brown, poorly sorted, CLAY & SILT, trace Sand, trace Gravel, plastic, cohesive, moist. Changing at 185.0 feet to: NO RECOVERY.	184' CLAY & SILT		
184							185' NO RECOVERY		
185							186'		
186									
187						Bottom of Borehole at 186.0 Feet		3	
188									
189									
190									
191									
192									
193									
3. Monitoring well was installed in borehole upon completion. Well screen set from 176.6 to 181.5 feet below ground surface.									
REMARKS									
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: MW-WV12D

BORING: WI 6267781 WWW.WOLVEN AVENUE.GPJ WI DNR.GDT 4/17/20



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Wolverine World Wide

Wolven Avenue Area

Algoma Twp, Kent County, Michigan

Boring No.: MW-WV-12M

Page: 1 of 3

File No.: 16.0062677.81

Check: Kate McDonald

Contractor: Stearns Drilling Company

Foreman: Jerry H.

Logged by: John Morehouse

Date Start/Finish: 12-5-18 / 12-5-18

Boring Location:

GS Elev.: Datum

Auger/
Casing

Sampler

GROUNDWATER READINGS

Type: Direct Push

MacroCore

O.D. / I.D.: NA

2.25"

Hammer Wt.: NA

NA

Hammer Fall: NA

NA

Other: NA

NA

Date	Time	Depth	Casing	Stab

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD					PROTECTIVE CASING
1						See boring log PMW-WV-12/MW-WV-12D for soil descriptions.				
2										
3										
4										
5										
6										
7										
8										
9										
10										
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48										
49										

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: MW-WV-12M



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Wolven Avenue Area
Algoma Twp, Kent County, Michigan

Boring No.: MW-WV-12M
Page: 2 of 3
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Check: Kate McDonald

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD					
51										
52										
53										
54										
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57										
58										
59										
60										
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62										
63										
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108										
REMARKS										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.										

Bentonite
Grout

Boring No.: MW-WV-12M


BORING: WI 6267781 WWW.WOLVEN AVENUE.GPJ WI DNR.GDT 4/17/20



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Wolverine World Wide
Wolven Avenue Area
Algoma Twp, Kent County, Michigan

Boring No.: MW-WV-12M
Page: 3 of 3
File No.: 16.0062677.81
Check: Kate McDonald

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD					
109									 <p>Filter Sand</p> <p>2-Inch PVC Well Screen</p>	
110										
111										
112										
113										
114										
115										
116										
117										
118										
119										
120										
121										
122										
123										
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140										
141										
142										
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144										
145										
146										
147										
148										
149										
150						Bottom of Borehole at 150.0 Feet		1		
151										
152										
153										
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156										
157										
158										
159										
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161										
162										
163										
164										
165										
166										

REMARKS

1. Monitoring well was installed in borehole upon completion. Well screen set from 144.5 to 149.4 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: MW-WV-12M



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Wolven Avenue Area

Algoma Twp, Kent County, Michigan

Boring No.: MW-WV-12S

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File No.: 16.0062677.81

Check: Kate McDonald

Contractor: Stearns Drilling Company

Foreman: Jerry H.

Logged by: John Morehouse

Date Start/Finish: 12-6-18 / 12-5-18

Boring Location:

GS Elev.: Datum

Auger/
Casing

Sampler

GROUNDWATER READINGS

Type: Direct Push

MacroCore

O.D. / I.D.: NA

2.25"

Hammer Wt.: NA

NA

Hammer Fall: NA

NA

Other: NA

NA

Date	Time	Depth	Casing	Stab

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD					PROTECTIVE CASING
1						See boring log PMW-WV-12/MW-WV-12D for soil descriptions.				
2										
3										
4										
5										
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43										
44										
45										
46										
47										
48										
49										

Bentonite
Grout

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: MW-WV-12S



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Wolven Avenue Area
Algoma Twp, Kent County, Michigan

Boring No.: MW-WV-12S
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File No.: 16.0062677.81
Check: Kate McDonald

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD					
51										
52										
53										
54										
55										
56										
57										
58										
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69										
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72										
73										
74										
75										
76										
77										
78										
79										
80						Bottom of Borehole at 80.0 Feet		1		
81										
82										
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86										
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89										
90										
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103										
104										
105										
106										
107										
108										
REMARKS										
1. Monitoring well was installed in borehole upon completion. Well screen set from 74.6 to 79.5 feet below ground surface.										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.										

Boring No.: MW-WV-12S

BORING: WI 6267781 WWW.WOLVEN AVENUE.GPJ WI DNR.GDT 4/17/20



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Wolver Avenue Area

Algoma Twp, Kent County, Michigan

Boring No.: MW-WV-13D

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File No.: 16.0062677.81

Check: Kate McDonald

Contractor: Stearns Drilling Company

Foreman: Jerry Zach/Travis

Logged by: C. Melby

Date Start/Finish: 2-14-19 / 2-18-19

Boring Location: _____

GS Elev.: _____

Auger/
Casing

Sampler

GROUNDWATER READINGS

Type: Hollow Stem Auger Split Spoon

O.D. / I.D.: 12.25" / 4.25" 2.0" / 1 3/8"

Hammer Wt.: NA 140lbs

Hammer Fall: NA 30.0"

Other: NA NA

Date	Time	Depth	Casing	Stab

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD					PROTECTIVE CASING
1	1	24/8	0-2	WOH 12"-1-1		Very soft, light brown, Clayey SILT, little Organic Matter, Moist.	Clayey SILT	1		
2	2	24/24	2-4	2-3	4-4	Very soft, light brown, Clayey SILT, little Organic Matter, Moist. Changing at 2.5 feet to: Brown, fine to medium SAND and Silt, wet.	2.5' SAND	3		
3										
4	3	24/12	4-6	1-3	3-1	Loose, light brown, fine to medium SAND and Silt wet.				
5										
6	4	24/12	6-8	1-1	3-3	Loose, brown, fine to medium SAND and Silt, wet.				
7										
8	5	24/10	8-10	1-3	4-4	Loose, brown, fine to medium SAND and Silt, with tip of spoon at 9.9 feet gray, Silty CLAY, some fine to medium Sand, wet.				
9										
10	6	24/10	10-12	1-4	5-5	Loose, brown, fine to medium SAND, trace Silt, wet.	9.9' Silty CLAY SAND	4		
11										
12	7	24/16	12-14	4-5	4-4	Loose, brown, fine to coarse SAND, little Gravel, trace Silt, wet.				
13										
14	8	24/18	14-16	1-4	5-5	Loose, brown, fine to medium SAND, trace Silt, wet.				

REMARKS

- Field screening of samples for organic vapors was performed with a MiniRae 3000 photoionization detector equipped with a 10.6 eV lamp. Readings above background levels are shown in parts per million by volume (ppmv) of isobutylene. ND indicates nothing detected (<0.1 ppmv).
- Installed temporary well from 0.0 to 10.0 feet below ground surface with a 5-foot well screen, and purged 20.0 gallons of water.
- Groundwater was encountered at approximately 2.0 feet below ground surface.
- Installed temporary well from 10.0 to 20.0 feet below ground surface with a 5-foot well screen, and purged 35.0 gallons of water.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: MW-WV-13D

BORING WI 6267781 WWW.WOLVEN AVENUE.GPJ WI DNR.GDT 4/17/20



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Wolven Avenue Area
Algoma Twp, Kent County, Michigan

Boring No.: MW-WV-13D
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Check: Kate McDonald

Sample Information						Check: Kate McDonald								
Depth	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed					
16	9	24/16	16-18	3-5 5-10		Medium dense, brown, fine to medium SAND, trace Silt, wet. Changing at 16.5 feet to: Brown, Clayey SILT, some fine to medium Sand, wet.	SAND	5	<div></div>	<div></div>				
17							16.5' Clayey SILT							
18	10	24/16	18-20	5-8 9-7	Brown, Clayey SILT, some fine to medium Sand, wet.									
19														
20	11	24/12	20-22	5-8 6-9	Medium dense, brown, fine to medium SAND, little Silt, wet.	20' SAND								
21														
22	12	24/16	22-24	1-6 3-4	Loose, brown, fine to medium SAND, little Silt, wet. Changing at 23.0 feet to: Brown, Silty CLAY, some fine Sand, wet.									
23						23' Silty CLAY								
24	13	24/21	24-26	2-6 8-10	Stiff, gray, Silty CLAY, trace fine Sand, wet.									
25														
26	14	24/12	26-28	0-0 2-3	Soft, brown, Silty CLAY, little fine Sand, wet.									
27														
28	15	24/24	28-30	3-5 6-7	Stiff, brown, Silty CLAY, some fine Sand, wet. Changing at 28.8 feet to: Medium dense, brown, fine to medium SAND, some Silt, wet. Changing at 29.5 feet to: Soft, Silty CLAY, trace fine Sand, wet.									
29						28.8' SAND								
30	16	24/24	30-32	3-5 8-9	Stiff, gray, brown and red, Silty CLAY, trace fine to coarse Sand, wet.	29.5' Silty CLAY								
31														
32	17	24/24	32-34	2-4	Stiff, brown, Clayey SILT, little fine to	32' Clayey SILT								
REMARKS						5. Installed 10-inch casing to 25.0 feet below ground surface. 12.25 inch auger advanced to 25.0 feet for 10-inch casing install.								
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.											Boring No.: MW-WV-13D			

BORING: WI 6267781 WWW.WOLVEN AVENUE.GPJ WI DNR.GDT 4/17/20



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Wolven Avenue Area
Algoma Twp, Kent County, Michigan

Boring No.: MW-WV-13D
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File No.: 16.0062677.81
Check: Kate McDonald

Sample Information						Algonia Twp, Kent County, Michigan		Check: Kate McDonald		
Depth	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
33	18	24/16	34-36	6-10		medium Sand, wet. Changing at 33.8 feet to: Gray and brown, fine SAND, some Silt, wet.	Clayey SILT	6		
34				Stiff, brown, Clayey SILT, little fine Sand, wet. Changing at 35.4 feet to: Brown, fine SAND, some Silt, wet.		33.8' SAND				
35						34' Clayey SILT				
36	19	24/14	36-38	5-9	Medium dense, brown, fine SAND and Silt, wet.	35.4' SAND				
37				18-16						
38				20		24/24	38-40			
39	5-10									
40	21	24/16	40-42	2-10	40' SAND					
41	22	24/24	42-44	22-22	Dense, gray and brown, SAND and Silt, wet.					
42				6-16						
43				20-28						
44	23	24/18	44-46	3-6	Medium dense, gray and brown, SAND and Silt, wet.		7			
45				15-15						
46				24						24/18
47	6-10	Loose, tan and brown, fine to coarse SAND, little Silt, trace Gravel, wet.								
48	25		24/18	48-50	3-6					
49	9-25		Medium dense, fine to coarse SAND, little Silt, wet.							
REMARKS										
6. Installed temporary well from 35.0 to 45.0 feet below ground surface with a 5-foot well screen, and purged 30.0 gallons of water. 7. Installed temporary well from 45.0 to 55.0 feet below ground surface with a 5-foot well screen, and purged 30.0 gallons of water.										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: MW-WV-13D	

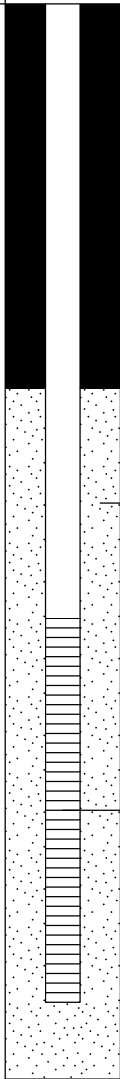
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Check: Kate McDonald

Algoma Twp, Kent County, Michigan										Check: Kate McDonald	
Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed		
	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD						
51	26	24/14	50-52	5-3 16-19		Medium dense, tan and brown, fine to medium SAND, little Silt, wet.	SAND	8			
52	27	24/24	52-54	3-5 8-11		Medium dense, tan and brown, fine to medium SAND, little Silt, wet.					
53											
54	28	24/18	54-56	2-2 3-4		Loose, tan and brown, fine to medium SAND, little Silt, trace Gravel, wet.					
55											
56	29	24/24	56-58	0-2 3-4		Loose, tan and brown, fine to medium SAND, trace Silt, trace Gravel, wet.					
57											
58	30	24/12	58-60	2-2 5-5		Loose, tan and brown, fine to medium SAND, trace Silt, wet.					
59											
60	31	24/0	60-62	1-1 2-3		NO RECOVERY.	60' NO RECOVERY				
61											
62	32	24/18	62-64	3-8 18-19		Medium dense, brown, fine to medium SAND, wet. Changing at 63.0 feet to: Brown, Clayey SILT, trace fine to coarse Sand, wet.	62' SAND				
63							63' Clayey SILT				
64	33	24/12	64-66	10-16 24-33		Hard, gray, Silty CLAY, trace fine Sand, wet.	64' Silty CLAY				
65											
66	34	24/15	66-68	7-16 30-50/3"		Hard, gray, Silty CLAY, trace fine Sand, wet. Changing at 67.7 feet to: Gray, Silty CLAY, some fine to coarse Sand, trace Rock fragments, wet.					
67											
REMARKS	8. Installed temporary well from 53.0 to 63.0 feet below ground surface with a 5-foot well screen, and purged 65.0 gallons of water.										
	Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.										
Boring No.: MW-WV-13D											

BORING WI 6267781 WWW.WOLVEN AVENUE.GPJ WI DNR.GDT 4/17/20

Boring No.: MW-WV-13D



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Wolven Avenue Area
Algoma Twp, Kent County, Michigan

Boring No.: MW-WV-13D
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Check: Kate McDonald

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD				
68	35	24/12	68-70	9-52-50/3"		Very dense, gray, fine to coarse SAND and Silt, trace Gravel, wet. Changing at 69.8 feet to: Gray, Silty CLAY, some fine to coarse Sand, wet.	68' Silty CLAY SAND		
69									
70	36	24/18	70-72	13-26 39-45		Hard, Clayey SILT, some fine to coarse Sand, little Rock fragments, trace Gravel, wet.	69.8' 70' Silty CLAY Clayey SILT		
71									
72	37	24/24	72-74	11-18 21-21		Hard, Clayey SILT, some fine to coarse Sand, little Rock fragments, trace Gravel, wet.			
73									
74	38	24/24	74-76	15-22 24-37		Hard, CLAY & SILT, some fine to coarse Sand, little Rock fragments, wet.	74' CLAY & SILT		
75									
76	39	24/0	76-78	15-50/6"		NO RECOVERY.	76' NO RECOVERY	9	
77									
78	40	24/24	78-80	6-26 24-20		Hard, gray, CLAY & SILT, little fine to coarse Sand, wet.	78' CLAY & SILT		
79									
80	42	24/18	80-82	33-27 27-36		Hard, gray, Clayey SILT, little fine to coarse Sand, trace Rock fragments, wet.	80' Clayey SILT		
81									
82	43	24/8	82-84	13-50/2"		Hard, gray, SILT & CLAY, some Rock fragments, little fine to coarse Sand with large Boulder at 82.8 feet.	82' SILT & CLAY		
83									
84	44	24/24	84-86	19-29 35-45		Crushed BOULDER. Changing at 84.5 feet to: Gray, Clayey SILT, little fine to coarse Sand, wet.	84' Crushed 84.5' BOULDER Clayey SILT		
<div>REMARKS</div> <div>9. Large rock shards.</div>									
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: MW-WV-13D

BORING WI 6267781 WWW.WOLVEN AVENUE.GPJ WI DNR.GDT 4/17/20



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Algoma Twp, Kent County, Michigan

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Check: Kate McDonald

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD				
86	45	24/0	86-88	10-50/1"		NO RECOVERY.	Clayey SILT 86' NO RECOVERY	10	
87									
88	46	24/6	88-90	21-50/3"		Hard, gray, Clayey SILT, little fine to coarse Sand with 2-inch Rock fragment at bottom.	88' Clayey SILT		
89									
90	47	24/6	90-92	50/6"		Hard, gray, Clayey SILT, little fine to coarse Sand, some Rock fragments, wet.			
91									
92	48	24/18	92-94	26-48-50/6"		Hard, gray, Clayey SILT, little fine to coarse Sand, some Rock fragments, wet.			
93									
94	49	24/20	94-96	5-22 45-50/5"		Hard, gray, Clayey SILT and fine to coarse Sand, little Gravel, trace Rock fragments, wet.			
95									
96	50	24/11	96-98	20-50/5"		Hard, gray, Clayey SILT, some fine to coarse Sand, wet.			
97									
98	51	24/9	98-100	34-50/3"		Hard, gray, Clayey SILT, some fine to coarse Sand, wet with 2-inch Rock fragments from 98.5 to 98.8 feet.			
99									
100	52	24/6	100-102	15-50/0"		Hard, gray, Clayey SILT, little fine to coarse Sand, trace Rock fragments, wet.			
101						Bottom of Borehole at 101.0 Feet	101'	11	
102									
REMARKS 10. 1-inch rock fragments. 11. Monitoring well was installed in borehole upon completion. Well screen set from approximately 58.0 to 63.0 feet below ground surface.									
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: MW-WV-13D

BORING WI 6267781 WWW.WOLVEN AVENUE.GPJ WI DNR.GDT 4/17/20



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Wolverine World Wide

Wolver Avenue Area

Algoma Twp, Kent County, Michigan

Boring No.: MW-WV-13M

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File No.: 16.0062677.81

Check: Kate McDonald

Contractor: Stearns Drilling Company

Foreman: J. Muntoon

Logged by: S. Stephenson

Date Start/Finish: 2-22-19 / 2-22-19

Boring Location:

GS Elev.: Datum

Auger/
Casing

Sampler

Type: Hollow Stem Auger Split Spoon

O.D. / I.D.: 12.25" / 4.25" 2.0" / 1 3/8"

Hammer Wt.: NA 140lbs

Hammer Fall: NA 30.0"

Other: NA NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD					
1						See boring log WV-MW-13/WV-MW-13D for soil descriptions.				
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15						Bottom of Borehole at 23.8 Feet				
16										
17										
18										
19										
20										
21										
22										
23										
24										

Grout

Bentonite Plug

Silica Sand Filter Pack

2-Inch PVC Well Screen

1

REMARKS

1. Monitoring well was installed in borehole upon completion. Well screen set from 18.0 to 23.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: MW-WV-13M

BORING: WI 6267781 WWW.WOLVER AVENUE.GPJ WI DNR.GDT 4/17/20



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Wolverine Avenue Area

Algoma Twp, Kent County, Michigan

Boring No.: MW-WV-13S

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File No.: 16.0062677.81

Check: Kate McDonald

Contractor: Stearns Drilling Company

Foreman: Jerry Huntoon

Logged by: C. Melby/ J. Markosky

Date Start/Finish: 3-26-19 / 3-26-19

Boring Location: _____

GS Elev.: _____

Auger/
Casing

Sampler

GROUNDWATER READINGS

Type: Direct Push

MacroCore

O.D. / I.D.: NA

2.25"

Hammer Wt.: NA

NA

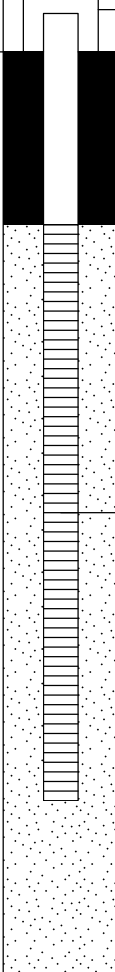
Hammer Fall: NA

NA

Other: NA

NA

Date	Time	Depth	Casing	Stab

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD				PROTECTIVE CASING	
1						See boring log WV-MW-13/WV-MW-13D for soil descriptions.				
2										
3										
4										
5										
6										
7										
8						Bottom of Borehole at 8.0 Feet		1		
9										

REMARKS

1. Monitoring well was installed in borehole upon completion. Well screen set from 1.5 to 6.5 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: MW-WV-13S



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Algoma Twp, Kent County, Michigan

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File No.: 16.0062677.81

Check: Kate McDonald

Contractor: Stearns Drilling Company

Foreman: Jerry Huntoon

Logged by: J. Markosky

Date Start/Finish: 4-15-19 / 4-24-19

Boring Location: See Survey

GS Elev.: See Survey Datum: State Plane S Zone NAD 83

Auger/
Casing

Sampler

Type: Hollow Stem Auger Split Spoon

O.D. / I.D.: 12.25" / 4.25" 2.0" / 1 3/8"

Hammer Wt.: NA 140lbs

Hammer Fall: NA 30.0"

Other: NA NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab
TBD				

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD					
1	1	24/24	0-2	1-2 1-2	0.0 ppm	Very loose, dark brown, fine to medium SAND, some Organic Matter, dry (TOPSOIL). Changing at 1.0 foot to: Brown, fine to medium SAND, little Silt, dry (TOPSOIL).	SAND	1	None	
2	2	24/12	2-4	1-2 4-3	0.0 ppm	Loose, brown, fine to coarse SAND, little Silt, dry.				
3										
4	3	24/12	4-6	2-2 2-2	0.0 ppm	Loose, brown, fine to coarse SAND, little Silt, dry.		2		
5										
6	4	24/12	6-8	0-0 1-1	0.0 ppm	Very loose, brown, fine to coarse SAND, little Silt, moist.				
7										
8	5	24/24	8-10	1-1 1-1	0.0 ppm	Very loose, brown, fine to coarse SAND, little Silt, moist.				
9										
10	6	24/24	10-12	1-3 2-3	0.0 ppm	Loose, brown, fine to coarse SAND, little Silt, moist.				
11										
12	7	24/12	12-14	4-6 8-8	0.0 ppm	Loose, brown, fine to coarse SAND, little Silt, wet.				
13										
14	8	24/24	14-16	7-9 11-14	0.0 ppm	Medium dense, brown, fine to coarse SAND, little Silt, wet. Changing at 14.2 feet to: Brown, CLAY & SILT, trace fine Sand,	14.2' CLAY & SILT			

REMARKS

- Field screening of samples for organic vapors was performed with a MiniRae 2000 photoionization detector equipped with a 10.6 eV lamp. Readings above background levels are shown in parts per million (ppm) of isobutylene. Background was measured at 0.0 ppm.
- Groundwater sample collected from temporary well with well screen set from approximately 4.0 to 14.0 feet below ground surface and submitted for analytical laboratory testing.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: WV-MW-14D



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Wolver Avenue Area
Algoma Twp, Kent County, Michigan

Boring No.: WV-MW-14D
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File No.: 16.0062677.81
Check: Kate McDonald

Sample Information						Algonia Twp, Kent County, Michigan				Check: Kate McDonald	
Depth	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed		
16	9	24/24	16-18	5-8 13-14	0.0 ppm	dry. Very stiff, gray, Silty CLAY, trace fine Sand, dry.	CLAY & SILT 16' Silty CLAY	3			
17											
18	10	24/24	18-20	8-9 14-15	0.0 ppm	Very stiff, gray, Silty CLAY, trace fine Sand, dry.					
19											
20	11	24/24	20-22	10-13 13-17	0.0 ppm	Very stiff, gray, Silty CLAY, trace fine Sand, dry.					
21											
22	12	24/20	22-24	0-0 4-12	0.0 ppm	Very stiff, gray, Silty CLAY, trace fine Sand, dry. Changing at 23.0 feet to: Brown, fine to coarse SAND, little Silt, moist.	23' SAND				
23											
24	13	24/24	24-26	7-7 12-14	0.0 ppm	Very stiff, gray, CLAY, little Silt, dry.	24' CLAY				
25											
26	14	24/24	26-28	5-9 13-17	0.0 ppm	Very stiff, gray, CLAY, little Silt, dry.					
27											
28	15	24/24	28-30	2-8 12-13	0.0 ppm	Very stiff, gray, CLAY, little Silt, dry.					
29											
30	16	24/24	30-32	5-7 12-17	0.0 ppm	Very stiff, gray, CLAY, little Silt, dry.					
31											
32	17	24/24	32-34	5-8	0.0 ppm	Very stiff, gray, CLAY, little Silt, dry with 1.0					
REMARKS	3. Sand bailer used at 26.0 feet below ground surface. Not enough water for installation of a temporary well.										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: WV-MW-14D		

BORING: WI 6267781 WWW.WOLVER AVENUE.GPJ WI DNR.GDT 4/17/20



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Wolver Avenue Area
Algoma Twp, Kent County, Michigan

Boring No.: WV-MW-14D
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Check: Kate McDonald

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD				
33				10-12		inch Sand seam at 33.2 feet.	CLAY		
34	18	24/24	34-36	5-9 12-13	0.0 ppm	Very stiff, gray, CLAY, little Silt, dry.			
35									
36	19	24/24	36-38	4-8 13-15	0.0 ppm	Very stiff, gray, CLAY, little Silt, dry.			
37									
38	20	24/24	38-40	5-10 13-17	0.0 ppm	Very stiff, gray, CLAY, little Silt, dry.			
39									
40	21	24/18	40-42	2-8 13-14	0.0 ppm	Very stiff, gray, CLAY, little Silt, dry.			
41									
42	22	24/24	42-44	4-10 13-18	0.0 ppm	Very stiff, gray, Silty CLAY, dry.	42' Silty CLAY		
43									
44	23	24/24	44-46	5-9 7-9	0.0 ppm	Very stiff, gray, Silty CLAY, dry with 1.0 inch Sand seam at 45.8 feet.			
45									
46	24	24/24	46-48	7-11 11-19	0.0 ppm	Very stiff, gray, Silty CLAY, dry.			
47									
48	25	24/24	48-50	2-11 31-23	0.0 ppm	Hard, gray, Silty CLAY, little fine to coarse Sand, dry.			
49									
REMARKS									
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: WV-MW-14D

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Algoma Twp, Kent County, Michigan

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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD				
51	26	24/24	50-52	4-7 8-10	0.0 ppm	Very stiff, gray, Silty CLAY, little fine Sand, dry.	Silty CLAY		
52	27	24/24	52-54	6-10 9-14	0.0 ppm	Very stiff, gray, Silty CLAY, little fine Sand, dry.			
54	28	24/24	54-56	9-17 27-41	0.0 ppm	Hard, gray, Silty CLAY, little fine to coarse Sand, dry.		4	
56	29	24/24	56-58	5-8 11-11	0.0 ppm	Very stiff, gray, Silty CLAY, little fine to coarse Sand, dry.			
58	30	24/24	58-60	4-7 9-11	0.0 ppm	Very stiff, gray, Silty CLAY, trace fine to coarse Sand, dry.			
60	31	24/12	60-62	12-12 14-15	0.0 ppm	Very stiff, gray, Silty CLAY, little fine to medium Sand, dry.			
62	32	24/24	62-64	2-4 7-7	0.0 ppm	Stiff, gray, Silty CLAY, little fine to medium Sand, dry.			
64	33	24/20	64-66	5-6 10-12	0.0 ppm	Very stiff, gray, Silty CLAY little fine Sand, dry.			
66	34	24/24	66-68	10-13 18-23	0.0 ppm	Hard, gray, Silty CLAY little fine Sand, dry.			
4. 3.0" split spoon used from 54.0 to 56.0 feet below ground surface.									
REMARKS									
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: WV-MW-14D

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Wolver Avenue Area
Algoma Twp, Kent County, Michigan

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Check: Kate McDonald

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD				
68	35	24/24	68-70	5-11 16-18	0.0 ppm	Very stiff, gray, Silty CLAY little fine Sand, dry.	Silty CLAY		
69									
70	36	24/24	70-72	8-16 23-26	0.0 ppm	Hard, gray, Silty CLAY, little fine to coarse Sand, dry.			
71									
72	37	24/24	72-74	9-15 17-22	0.0 ppm	Hard, gray, CLAY & SILT, little fine to medium Sand, dry.	72' CLAY & SILT		
73									
74	38	24/24	74-76	4-8 18-23	0.0 ppm	Very stiff, gray, SILT & CLAY, little fine to medium Sand, dry.	74' SILT & CLAY		
75									
76	39	24/24	76-78	8-21 26-29	0.0 ppm	Hard, gray, CLAY & SILT, little fine to medium Sand, dry.	76' CLAY & SILT		
77									
78	40	24/24	78-80	8-13 23-32	0.0 ppm	Hard, gray, CLAY & SILT, little fine to medium Sand, dry. Changing at 79.0 feet to: Hard, dark gray, Silty CLAY, little fine Sand, dry.	79' Silty CLAY	5	
79									
80	41	24/24	80-82	7-12 20-28	0.0 ppm	Hard, dark gray, Silty CLAY, little fine Sand, dry. Changing at 81.0 feet to: Hard, gray and green, Silty CLAY, little fine Sand, dry.			
81									
82	42	24/24	82-84	10-16 25-28	0.0 ppm	Hard, brown, Silty CLAY, some fine to medium Sand, dry. Changing at 82.7 feet to: Brown to olive, Silty CLAY, little fine Sand, dry.			
83									
84	43	24/24	84-86	4-13 18-23	0.0 ppm	Hard, light gray to gray, Silty CLAY, little fine to medium Sand, dry.			
<div>REMARKS</div> <div>5. Small hydraulic leak on CME 1050. Switched to CME 95.</div>									
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Algoma Twp, Kent County, Michigan

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Check: Kate McDonald

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD				
86	44	24/24	86-88	5-4 12-14	0.0 ppm	Very stiff, gray to olive, CLAY & SILT, little fine Sand, dry.	Silty CLAY 86' CLAY & SILT		
87									
88	45	24/12	88-90	9-50/6"	0.0 ppm	Very stiff, gray to olive, CLAY & SILT, little fine Sand, dry. Changing at 89.9 feet to: Gray, fine to medium SAND, dry.			
89									
90	46	24/24	90-92	12-13 21-36	0.0 ppm	Hard, gray, Silty CLAY, little fine to medium Sand, dry.	89.9' 90' SAND Silty CLAY		
91									
92	47	24/24	92-94	5-14 20-21	0.0 ppm	Hard, gray, Silty CLAY, little fine to medium Sand, dry.			
93									
94	48	24/24	94-96	6-12 15-22	0.0 ppm	Very stiff, gray, Silty CLAY, little fine to medium Sand, dry.			
95									
96	49	24/20	96-98	5-11 15-20	0.0 ppm	Very stiff, gray, Silty CLAY, little fine to medium Sand, dry.			
97									
98	50	24/24	98-100	5-10 19-20	0.0 ppm	Very stiff, gray, Silty CLAY, little fine to medium Sand, dry.			
99									
100	51	24/24	100-102	3-7 12-18	0.0 ppm	Very stiff, gray, Silty CLAY, little fine to medium Sand, dry.			
101									
102	52	24/24	102-104	6-12	0.0 ppm	Very stiff, gray, Silty CLAY, little fine to			
REMARKS									

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: WV-MW-14D

BORING WI 6267781 WWW.WOLVEN AVENUE.GPJ WI DNR.GDT 4/17/20



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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD				
103				18-16		medium Sand, dry.	Silty CLAY		
104	53	24/24	104-106	5-11 19-18	0.0 ppm	Very stiff, gray, Silty CLAY, little fine to medium Sand, dry.			
105									
106	54	24/24	106-108	6-13 20-19	0.0 ppm	Hard, gray, Silty CLAY, little fine to coarse Sand, dry.			
107									
108	55	24/24	108-110	7-12 19-20	0.0 ppm	Hard, gray, Silty CLAY, little fine to coarse Sand, dry.		6	
109									
110	56	24/11	110-112	42-50/5"	0.0 ppm	Hard, gray, Silty CLAY, little fine to coarse Sand, dry. Changing at 110.8 feet to: Gray, Silty CLAY, some fine Sand, dry.			
111									
112	57	24/12	112-114	12-50/6"	0.0 ppm	Hard, gray, Silty CLAY, little fine to coarse Sand, dry.			
113									
114	58	24/17	114-116	12-24-50/50	0.0 ppm	Hard, gray, Silty CLAY, little fine to coarse Sand, dry.			
115									
116	59	24/24	116-118	10-15 31-31	0.0 ppm	Hard, gray, Silty CLAY, little fine to coarse Sand, dry.			
117									
118	60	24/24	118-120	11-9 14-25	0.0 ppm	Hard, gray, Silty CLAY, little fine to coarse Sand, dry. Changing at 119.9 feet to: Gray, fine to medium SAND, moist to dry.			
119							119.9'		
6. 3.0" split spoon used from 108.0 to 110.0 feet below ground surface.									
REMARKS									
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: WV-MW-14D

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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD				
121	61	24/24	120-122	11-16 24-30	0.0 ppm	Hard, gray, Silty CLAY, little fine to coarse Sand, dry.	120' SAND Silty CLAY		
122	62	24/16	122-124	25-28-50/40	0.0 ppm	Hard, gray, Silty CLAY, little fine to coarse Sand, dry.			
124	63	24/23	124-126	10-26 49-50/5"	0.0 ppm	Hard, gray, Silty CLAY, little fine to coarse Sand, dry.			
126	64	24/17	126-128	22-52-50/50	0.0 ppm	Hard, gray, Silty CLAY, little fine to coarse Sand, dry.			
128	65	24/12	128-130	6-29-50/5"	0.0 ppm	Hard, gray, Silty CLAY, little fine to coarse Sand, dry.			
130	66	24/24	130-132	5-12 24-31	0.0 ppm	Hard, gray, Silty CLAY, little fine to coarse Sand, dry.			
132	67	24/23	132-134	15-24 40-50/5'	0.0 ppm	Hard, gray, Silty CLAY, little fine to coarse Sand, dry.			
134	68	24/12	134-136	20-38	0.0 ppm	Hard, gray, Silty CLAY, little fine to coarse Sand, dry.			
136	69	24/12	136-138	22-50/5"	0.0 ppm	Hard, gray, Silty CLAY, little fine to coarse Sand, dry. Changing at 136.5 feet to: Brown to gray, fine SAND, little Silt, moist.	136.5' SAND		
137									
REMARKS									

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: WV-MW-14D

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Algoma Twp, Kent County, Michigan

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Check: Kate McDonald

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD				
138	70	24/11	138-140	20-50/5"	0.0 ppm	Very dense, gray, fine to coarse SAND, little Silt, wet.	SAND	7	
139									
140	71	24/18	140-142	45-44-50/6"	0.0 ppm	Very dense, gray, fine to coarse SAND, little Silt, wet.			
141									
142	72	24/18	142-144	11-23 40-50/4"	0.0 ppm	Very dense, gray, fine to coarse SAND, little Silt, wet.			
143									
144	73	24/16	144-146	12-35-50/4"	0.0 ppm	Very dense, gray, fine to coarse SAND, little Silt, wet. Changing at 144.5 feet to: Very dense, gray, medium to coarse SAND, little Silt, wet.			
145									
146	74	24/24	146-148		0.0 ppm	Brown, fine to coarse SAND, some Gravel, little Silt, wet.			
147									
148	75	24/1	148-150	50/1"	0.0 ppm	Very dense, gray, fine to coarse SAND, little Silt, wet.			
149									
150						Bottom of Borehole at 150.0 Feet	150'	8	
151									
152									
153									
154									
<div>REMARKS</div> <div>7. Groundwater was encountered at approximately 138.0 feet below ground surface. 8. See WV-MW-14M for well installation details.</div>									
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: WV-MW-14D

BORING: WI 6267781 WWW.WOLVER AVENUE.GPJ WI DNR.GDT 4/17/20



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Wolverine World Wide

Wolven Avenue Area

Algoma Twp, Kent County, Michigan

Boring No.: WV-MW-14M

Page: 1 of 3

File No.: 16.0062677.81

Check: Kate McDonald

Contractor: Stearns Drilling Company

Foreman: Jerry Huntoon

Logged by: J. Markosky

Date Start/Finish: 4-29-19 / 5-1-19

Boring Location: See Survey

GS Elev.: See Survey Datum

Auger/

Sampler

GROUNDWATER READINGS

Type: Hollow Stem Auger Split Spoon

O.D. / I.D.: 12.25" / 4.25" 2.0" / 1 3/8"

Hammer Wt.: NA 140lbs

Hammer Fall: NA 30.0"

Other: NA NA

Date	Time	Depth	Casing	Stab

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD					PROTECTIVE CASING
1						See MW-WV-14D boring log for soil descriptions.				
2										
3										
4										
5										
6										
7										
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50										
51										
52										
53										
54										

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: WV-MW-14M



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Wolven Avenue Area
Algoma Twp, Kent County, Michigan

Boring No.: WV-MW-14M
Page: 2 of 3
File No.: 16.0062677.81
Check: Kate McDonald

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD					
56										
57										
58										
59										
60										
61										
62										
63										
64										
65										
66										
67										
68										
69										
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113										
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117										
118										
REMARKS										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.										

Boring No.: WV-MW-14M

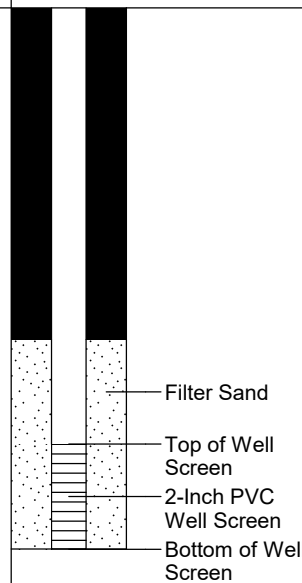


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Wolven Avenue Area
Algoma Twp, Kent County, Michigan

Boring No.: WV-MW-14M
Page: 3 of 3
File No.: 16.0062677.81
Check: Kate McDonald

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD					
120										
121										
122										
123										
124										
125										
126										
127										
128										
129										
130										
131										
132										
133										
134										
135										
136										
137										
138										
139										
140										
141										
142										
143										
144										
145						Bottom of Borehole at 145.0 Feet		1		
146										
147										
148										
149										
150										
151										
152										
153										
154										
155										
156										
157										
158										
159										
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161										
162										
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170										
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172										
173										
174										
175										
176										
177										
178										
179										
180										
181										
182										
REMARKS										
1. Monitoring well was installed in borehole upon completion. Well screen set from 140.0 to 145.0 feet below ground surface.										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.										Boring No.: WV-MW-14M



BORING WI 6267781 WWW.WOLVEN AVENUE.GPJ WI DNR.GDT 4/17/20



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Wolver Avenue Area

Algoma Twp, Kent County, Michigan

Boring No.: WV-MW-14S

Page: 1 of 1

File No.: 16.0062677.81

Check: Kate McDonald

Contractor: Stearns Drilling Company

Foreman: Jerry Huntoon

Logged by: J. Markosky

Date Start/Finish: 4-28-19 / 4-29-19

Boring Location: See Survey

GS Elev.: See Survey

Auger/
Casing

Sampler

GROUNDWATER READINGS

Type: Hollow Stem Auger Split Spoon

O.D. / I.D.: 12.25" / 4.25" 2.0" / 1 3/8"

Hammer Wt.: NA 140lbs

Hammer Fall: NA 30.0"

Other: NA NA

Date	Time	Depth	Casing	Stab

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD					PROTECTIVE CASING
1						See MW-WV-14D boring log for soil descriptions.				
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14						Bottom of Borehole at 14.0 Feet		1		
15										

REMARKS

1. Monitoring well was installed in borehole upon completion. Well screen set from 9.0 to 14.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: WV-MW-14S

BORING: WI 6267781 WWW.WOLVER AVENUE.GPJ WI DNR.GDT 4/17/20



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Wolver Avenue Area

Algoma Twp, Kent County, Michigan

Boring No.: WV-MW-15A

Page: 1 of 1

File No.: 16.0062677.81

Check: Kate McDonald

Contractor: Stearns Drilling Company

Foreman: Jerry Huntoon

Logged by: John Morehouse

Date Start/Finish: 8-28-19 / 8-30-19

Boring Location: North Side of Property

GS Elev.: NM Datum: M State Plane S Zone NAD 83

Auger/
Casing

Sampler

Type: Hollow Stem Auger

Split Spoon

O.D. / I.D.: 12.25" / 4.25"

2.0" / 1 3/8"

Hammer Wt.: NA

140lbs

Hammer Fall: NA

30.0"

TOC Elev.: NA

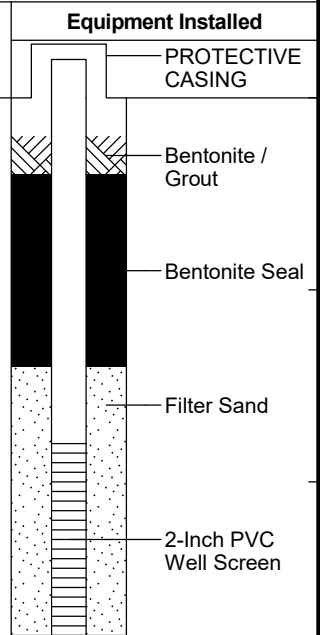
NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab
NM	NM	NM	NM	NM

Surveyed By: NA Survey Date:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
1						See MW-WV-15D boring log for soil descriptions.				
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15						Bottom of Borehole at 14.0 Feet				
16										
17										
18										
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25										
26										
27										
28										
29										



REMARKS

1. Monitoring well was installed in borehole upon completion. Well screen set from 9.0 to 14.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: WV-MW-15A

BORING WELL 6267781 WWW.WOLVER AVENUE.GPJ GZA CORP.GDT 9/27/19



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Wolven Avenue Area

Algoma Twp, Kent County, Michigan

Boring No.: WV-MW-15B

Page: 1 of 1

File No.: 16.0062677.81

Check: Kate McDonald

Contractor: Stearns Drilling Company

Foreman: Jerry Huntoon

Logged by: John Morehouse

Date Start/Finish: 8-28-19 / 8-30-19

Boring Location: North Side of Property

GS Elev.: NM Datum: M State Plane S Zone NAD 83

Auger/
Casing

Sampler

Type: Hollow Stem Auger

Split Spoon

O.D. / I.D.: 12.25" / 4.25"

2.0" / 1 3/8"

Hammer Wt.: NA

140lbs

Hammer Fall: NA

30.0"

TOC Elev.: NA

NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab
NM	NM	NM	NM	NM

Surveyed By: NA Survey Date:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					PROTECTIVE CASING
1						See MW-WV-15D boring log for soil descriptions.				
2										
3										
4										
5										
6										
7										
8										
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32										
33										
34										
35										
36										
37										
38										
39										
						Bottom of Borehole at 38.0 Feet		1		

REMARKS

1. Monitoring well was installed in borehole upon completion. Well screen set from 33.0 to 38.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: WV-MW-15B

BORING WELL 6267781 WWW.WOLVENAVENUE.GPJ GZA CORP.GDT 9/27/19



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Algoma Twp, Kent County, Michigan

Boring No.: WV-MW-15C

Page: 1 of 2

File No.: 16.0062677.81

Check: Kate McDonald

Contractor: Stearns Drilling Company

Foreman: Jerry Huntoon

Logged by: John Morehouse

Date Start/Finish: 8-21-19 / 8-21-19

Boring Location: North Side of Property

GS Elev.: NM Datum: M State Plane S Zone NAD 83

Auger/
Casing

Sampler

Type: Hollow Stem Auger

Split Spoon

O.D. / I.D.: 12.25" / 4.25"

2.0" / 1 3/8"

Hammer Wt.: NA

140lbs

Hammer Fall: NA

30.0"

TOC Elev.: NA

NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab
NM	NM	NM	NM	NM

Surveyed By: NA Survey Date:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					PROTECTIVE CASING
1						See MW-WV-15D boring log for soil descriptions.				
2										
3										
4										
5										
6										
7										
8										
9										
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27										
28										
29										

Bentonite / Grout

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: WV-MW-15C

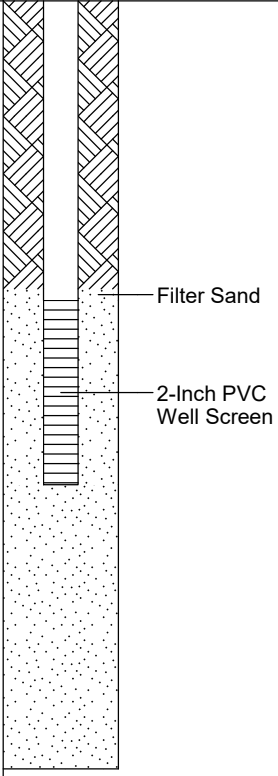
BORING WELL 6267781 WWW.WOLVENAVENUE.GPJ GZA CORP.GDT 9/27/19



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Wolven Avenue Area
Algoma Twp, Kent County, Michigan

Boring No.: WV-MW-15C
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File No.: 16.0062677.81
Check: Kate McDonald

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
31									 <p>Filter Sand</p> <p>2-Inch PVC Well Screen</p>
32									
33									
34									
35									
36									
37									
38									
39									
40									
41									
42									
43									
44									
45									
46									
47									
48									
49									
50						Bottom of Borehole at 50.0 Feet		1	
51									
52									
53									
54									
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56									
57									
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60									
61									
62									
63									
64									

REMARKS

1. Monitoring well was installed in borehole upon completion. Well screen set from 37.8 to 42.6 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: WV-MW-15C

BORING WELL 6267781 WWW.WOLVENAVENUE.GPJ GZA CORP.GDT 9/27/19



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Wolven Avenue Area

Algoma Twp, Kent County, Michigan

Boring No.: WV-MW-15D

Page: 1 of 8

File No.: 16.0062677.81

Check: Kate McDonald

Contractor: Stearns Drilling Company

Foreman: Jerry Huntoon

Logged by: John Morehouse

Date Start/Finish: 8-9-19 / 8-19-19

Boring Location: North Side of Property

GS Elev.: NM Datum: M State Plane S Zone NAD 83

Auger/
Casing

Sampler

Type: Hollow Stem Auger

Split Spoon

O.D. / I.D.: 12.25" / 4.25"

2.0" / 1 3/8"

Hammer Wt.: NA

140lbs

Hammer Fall: NA

30.0"

TOC Elev.: NA

NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab
NM	NM	NM	NM	NM

Surveyed By: NA Survey Date:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (6")	Test Data					PROTECTIVE CASING
1	1	24/14	0-2	3-6 6-9		Very dark grayish-brown, SILT, some fine Sand, trace Gravel, moist. Changing at 0.6 feet to: Yellowish-brown, SILT, some Sand, trace Gravel, moist. Changing at 1.2 feet to: NO RECOVERY.	SILT 1.2' NO RECOVERY			
2	2	24/14	2-4	7-6 3-5		Yellowish-brown, SILT, some Sand, trace Gravel, moist. Changing at 2.4 feet to: Brownish-yellow, fine to medium SAND, trace Silt, moist. Changing at 2.8 feet to: Dark yellowish-brown, fine to medium SAND, trace Silt, moist. Changing at 3.2 feet to: NO RECOVERY.	2' SILT 2.4' SAND 3.2' NO RECOVERY			
3										
4	3	24/11	4-6	4-9 8-13		Brown, fine to coarse SAND, trace Gravel, trace Silt, wet. Changing at 4.9 feet to: NO RECOVERY.	4' SAND 4.9' NO RECOVERY			
5										
6	4	24/11	6-8	3-6 7-6		Brown, fine to coarse SAND, trace Gravel, trace Silt, grading to medium to coarse SAND, trace Gravel, trace Silt, wet. Changing at 6.9 feet to: NO RECOVERY.	6' SAND 6.9' NO RECOVERY			
7										
8	5	24/4	8-10	2-10 9-4		Brown, medium to coarse SAND, trace Gravel, trace Silt, wet. Changing at 8.3 feet to: NO RECOVERY.	8' SAND 8.3' NO RECOVERY			
9										
10	6	24/12	10-12	2-4 3-4		Brown, medium to coarse SAND, trace Gravel, trace Silt, wet. Changing at 11.0 feet to: NO RECOVERY.	10' SAND 11' NO RECOVERY			
11										
12	7	24/17	12-14	3-9 8-10		Brown, medium to coarse SAND, trace Gravel, trace Silt, wet. Changing at 12.7 feet to: Dark grayish-brown, SILT & CLAY, moderately plastic, cohesive, moist. Changing at 12.8 feet to: Dark grayish-brown, Silty CLAY, plastic, cohesive, moist. Changing at 13.4 feet to: NO RECOVERY.	12' SAND 12.7' SILT & CLAY 12.8' Silty CLAY 13.4' NO RECOVERY Silty CLAY			
13										
14	8	24/13	14-16	9-12 11-10		Dark grayish-brown, Silty CLAY, plastic, cohesive, moist. Changing at 15.1 feet to: NO RECOVERY.	14' RECOVERY Silty CLAY 15.1' NO RECOVERY			
15										

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: WV-MW-15D

BORING WELL 6267781 WWW.WOLVEN AVENUE.GPJ GZA CORP.GDT 9/27/19



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Wolverine World Wide
Wolven Avenue Area
Algoma Twp, Kent County, Michigan

Boring No.: WV-MW-15D
Page: 2 of 8
File No.: 16.0062677.81
Check: Kate McDonald

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (6")	Test Data					
17	9	24/17	16-18	3-6 6-6		Dark grayish-brown, Silty CLAY, plastic, cohesive, moist, occasional very thin lenses of fine grained Sand, moist. Changing at 17.4 feet to: NO RECOVERY.	Silty CLAY			
18	10	24/18	18-20	2-5 6-9		Dark grayish-brown, Silty CLAY, plastic, cohesive, occasional very thin lenses of fine Sand, moist. Changing at 18.6 feet to: Brown, fine SAND, trace Silt, wet. Changing at 18.9 feet to: Dark grayish-brown, Silty CLAY, plastic, cohesive, moist. Changing at 19.5 feet to: NO RECOVERY.	17.4' NO RECOVERY 18' Silty CLAY 18.6' SAND 18.9' Silty CLAY 19.5' NO RECOVERY 20' Silty CLAY			
19						Dark grayish-brown, Silty CLAY, plastic, cohesive, bedded, occasional very thin lenses of fine Sand, moist. Changing at 21.9 feet to: NO RECOVERY.				
20	11	24/23	20-22	4-10 12-15		Dark grayish-brown, Silty CLAY, plastic, cohesive, bedded, occasional very thin lenses of fine Sand, moist. Changing at 21.9 feet to: NO RECOVERY.	21.9' NO RECOVERY 22' Silty CLAY			
21						Dark grayish-brown, Silty CLAY, plastic, cohesive, bedded, occasional very thin lenses of fine Sand, moist. Changing at 23.6 feet to: NO RECOVERY.				
22	12	24/19	22-24	4-9 10-13		Dark grayish-brown, Silty CLAY, plastic, cohesive, bedded, occasional very thin lenses of fine Sand, moist. Changing at 23.6 feet to: NO RECOVERY.	23.6' NO RECOVERY 24' Silty CLAY			
23						Dark grayish-brown, Silty CLAY, plastic, cohesive, bedded, occasional very thin lenses of fine Sand, moist. Changing at 24.5 feet to: Brown, fine SAND, trace Silt, wet. Changing at 24.9 feet to: Dark grayish-brown, Silty CLAY, plastic, cohesive, bedded, moist. Changing at 25.3 feet to: Brown, fine SAND, trace Silt, wet. Changing at 25.6 feet to: Dark grayish-brown, Silty CLAY, plastic, cohesive, bedded, moist.	24.5' SAND 24.9' Silty CLAY 25.3' SAND 25.6' Silty CLAY			
24	13	24/24	24-26	2-13 13-13		Dark grayish-brown, Silty CLAY, plastic, cohesive, bedded, occasional very thin lenses of fine Sand, moist. Changing at 24.5 feet to: Brown, fine SAND, trace Silt, wet. Changing at 24.9 feet to: Dark grayish-brown, Silty CLAY, plastic, cohesive, bedded, moist. Changing at 25.3 feet to: Brown, fine SAND, trace Silt, wet. Changing at 25.6 feet to: Dark grayish-brown, Silty CLAY, plastic, cohesive, bedded, moist.	26.2' SILT			
25						Dark grayish-brown, Silty CLAY, plastic, cohesive, bedded, moist. Changing at 26.2 feet to: Brown, SILT, little Sand, cohesive, non-plastic, moist. Changing at 27.4 feet to: Dark grayish-brown, Silty CLAY, plastic, cohesive, bedded, moist.	27.4' Silty CLAY			
26	14	24/24	26-28	1-8 11-11		Dark grayish-brown, Silty CLAY, plastic, cohesive, bedded, moist. Changing at 26.2 feet to: Brown, SILT, little Sand, cohesive, non-plastic, moist. Changing at 27.4 feet to: Dark grayish-brown, Silty CLAY, plastic, cohesive, bedded, moist.	28' SAND / SILT / Silty CLAY			
27						Brown, fine SAND, Silt and Silty Clay, moist to wet. Changing at 29.7 feet to: NO RECOVERY.	29.7' NO RECOVERY 30' SAND			
28	15	24/20	28-30	WOH		Grayish-brown to brown, fine SAND, some Silt, wet. Changing at 30.8 feet to: Grayish-brown to brown, SAND, Silt and Silty Clay, moist to wet. Changing at 30.9 feet to: Grayish-brown to brown, fine SAND, some Silt, wet.	30.8' SAND / SILT / Silty CLAY 30.9' SAND			
29						Brown to grayish-brown, fine SAND, little Silt, wet. Changing at 32.4 feet to: Dark grayish-brown, Silty CLAY, plastic, cohesive, moist. Changing at 32.8 feet to: Brown to grayish-brown, fine SAND, little Silt, wet.	32.4' Silty CLAY 32.8' SAND			
30	16	24/24	30-32	1-2 3-3		Brown to grayish-brown, fine SAND, little Silt, wet. Changing at 32.4 feet to: Dark grayish-brown, Silty CLAY, plastic, cohesive, moist. Changing at 32.8 feet to: Brown to grayish-brown, fine SAND, little Silt, wet.	34.2' Silty CLAY 34.3' SAND			
31						Brown to grayish-brown, fine SAND, little Silt, wet.				
32	17	24/18	32-34	2-6 5-5		Brown to grayish-brown, fine SAND, little Silt, wet.				
33										
34	18	24/14	34-36	1-2 4-4						
<div>REMARKS</div> <div>1. Groundwater was encountered at approximately 28.0 feet below ground surface.</div>										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: WV-MW-15D	

BORING WELL 6267781 WWW.WOLVEN AVENUE.GPJ GZA CORP.GDT 9/27/19



GZA
GeoEnvironmental, Inc.
Engineers and Scientists

Wolverine World Wide
Wolven Avenue Area
Algoma Twp, Kent County, Michigan

Boring No.: WV-MW-15D
Page: 3 of 8
File No.: 16.0062677.81
Check: Kate McDonald

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
35						Silt, wet. Changing at 34.2 feet to: Dark grayish-brown, Silty CLAY, plastic, cohesive, moist. Changing at 34.3 feet to: Brown to grayish-brown, fine SAND, little Silt, wet.	SAND SAND			
36	19	24/22	36-38	4-10 13-11		Brown to grayish-brown, fine SAND, little Silt, wet. Changing at 36.1 feet to: Dark grayish-brown, fine SAND, little Silt, wet. Changing at 36.3 feet to: Brown to grayish-brown, fine SAND, little Silt, wet. Changing at 36.8 feet to: Brown, SILT, cohesive, non-plastic, moist. Changing at 37.0 feet to: Brown to grayish-brown, fine SAND, little Silt, wet. Changing at 37.5 feet to: Brown, SILT, cohesive, non-plastic, moist. Changing at 37.6 feet to: Brown to grayish-brown, fine SAND, little Silt, wet. Brown, fine to coarse SAND, trace Gravel, trace Silt, wet. Changing at 38.7 feet to: NO RECOVERY.	36.1' 36.3' Silty CLAY 36.8' SAND 37' SILT 37.5' SAND 37.6' SILT SAND			
37										
38	20	24/8	38-40	2-5 10-12			38.7' NO RECOVERY			
39										
40	21	24/22	40-42	1-2 6-9			40' SAND			
41										
42	22	24/19	42-44	1-5 7-9			41.8' NO RECOVERY 42' NO RECOVERY 42.5' SAND 42.6' Silty CLAY 42.9' GRAVEL 43' Silty CLAY 43.6' SAND			
43										
44	23	24/22	44-46	4-6 9-12			44' NO RECOVERY 44.6' SAND 44.7' Silty CLAY SAND			
45							45.4' SILT 45.8' NO RECOVERY GRAVEL			
46	24	24/24	46-48	6-14 24-31						
47							47.3' Silty CLAY 47.5' Sandy CLAY Silty CLAY			
48	25	24/24	48-50	14-30 30-30						
49										
50		60					50' NO SAMPLE COLLECTED			
51										
52										
53										
REMARKS										
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: WV-MW-15D	

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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
54							NO SAMPLE COLLECTED			
55	26	12/12	55-56	7-9		Dark grayish-brown, Silty CLAY, plastic, cohesive, bedded, moist.	55' Silty CLAY			
56	27	24/24	56-58	7-18 20-29		Dark grayish-brown, Silty CLAY, plastic, cohesive, bedded, moist. Changing at 57.6 feet to: Dark grayish-brown, Silty CLAY, trace Gravel, plastic, cohesive, some bedding, moist.				
57										
58	28	24/24	58-60	40-39 22-22		Dark grayish-brown, Silty CLAY, trace Gravel, plastic, cohesive, some bedding, moist.				
59										
60	29	24/24	60-62	19-21 30-44		Dark grayish-brown, Silty CLAY, trace Gravel, plastic, cohesive, moist.				
61										
62	30	24/24	62-64	3-11 17-23		Dark grayish-brown, Silty CLAY, trace Gravel, plastic, cohesive, moist.				
63										
64	31	24/24	64-66	12-29 32-50		Dark grayish-brown, Silty CLAY, trace Gravel, plastic, cohesive, moist.				
65										
66	32	24/24	66-68	12-20 26-40		Dark grayish-brown, Silty CLAY, trace Gravel, plastic, cohesive, moist.				
67										
68	33	24/5	68-70	17-50		Dark grayish-brown, Silty CLAY, trace Gravel, plastic, cohesive, moist.	68.4' NO RECOVERY			
69										
70	34	24/24	70-72	9-19 31-42		Dark grayish-brown, Silty CLAY, trace Gravel, plastic, cohesive, moist.	70' Silty CLAY			
71										
REMARKS										
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Bentonite / Grout



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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
73	35	10/8	72-72.8	30-50/4"		Dark grayish-brown, Silty CLAY, trace Gravel, plastic, cohesive, moist. Changing at 72.7 feet to: NO RECOVERY.	Silty CLAY 72.7' NO RECOVERY			
74	36	17/12	74-75.4	15-39-50/5"		Dark grayish-brown, Silty CLAY, trace Gravel, plastic, cohesive, moist. Changing at 74.3 feet to: Dark grayish-brown to brown, fine to medium SAND, little to some Silt, slightly cohesive, non-plastic, moist to wet. Changing at 74.6 feet to: Dark grayish-brown, fine SAND, some Silt, little Clay, trace Gravel, non to slightly plastic, cohesive, moist. Changing at 75.0 feet to: NO RECOVERY.	74' Silty CLAY 74.3' SAND 75' NO RECOVERY			
76	37	8/5	76-76.7	30-50/2"		Dark grayish-brown, fine SAND, some Silt, little Clay, trace Gravel, non to slightly plastic, cohesive, moist. Changing at 75.0 feet to: NO RECOVERY.	76' SAND 76.4' NO RECOVERY			
78	38	10/10	78-78.8	20-50/4"		Dark grayish-brown, fine SAND, some Silt, little Clay, trace Gravel, non to slightly plastic, cohesive, moist. Changing at 76.4 feet to: NO RECOVERY.	78' SAND 78.8' NO RECOVERY			
80	39	10/8	80-80.8	34-50/4"		Dark grayish-brown, fine SAND, some Silt, little Clay, trace Gravel, non to slightly plastic, cohesive, moist. Changing at 80.7 feet to: NO RECOVERY.	80' SAND 80.7' NO RECOVERY			
82	40	10/8	82-82.8	15-50/4"		Dark grayish-brown, fine SAND, some Silt, little Clay, trace Gravel, non to slightly plastic, cohesive, moist. Changing at 82.7 feet to: NO RECOVERY.	82' SAND 82.7' NO RECOVERY			
84	41	11/12	84-84.9	32-50/5"		Dark grayish-brown, fine SAND, some Silt, little Clay, trace Gravel, non to slightly plastic, cohesive, moist. Changing at 85.0 feet to: NO RECOVERY.	84' SAND 85' NO RECOVERY			
86	42	11/11	86-86.9	31-50/5"		Dark grayish-brown, fine SAND, some Silt, little Clay, trace Gravel, non to slightly plastic, cohesive, moist. Changing at 86.9 feet to: NO RECOVERY.	86' SAND 86.9' NO RECOVERY			
88	43	12/12	88-89	33-50		Dark grayish-brown, fine SAND, some Silt, little Clay, trace Gravel, non to slightly plastic, cohesive, moist. Changing at 88.5 feet to: Dark grayish-brown to dark yellowish-brown, fine to medium SAND, little to some Silt, moist to wet. Changing at 89.0 feet to: NO RECOVERY.	88' SAND 89' NO RECOVERY			
90	44	11/12	90-90.9	38-50/4.5"		Dark grayish-brown, fine SAND, some Silt,	90' SAND			
<div>REMARKS</div>										
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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
91						little Clay, trace Gravel, non to slightly plastic, cohesive, moist. Changing at 91.0 feet to: NO RECOVERY.	91' SAND NO RECOVERY			
92	45	12/12	92-93	27-50		Dark grayish-brown, fine SAND, some Silt, little Clay, trace Gravel, non to slightly plastic, cohesive, moist. Changing at 93.0 feet to: NO RECOVERY.	92' SAND			
93							93' NO RECOVERY			
94	46	12/12	94-95	27-50		Dark grayish-brown, fine SAND, some Silt, little Clay, trace Gravel, non to slightly plastic, cohesive, moist. Changing at 95.0 feet to: NO RECOVERY.	94' SAND			
95							95' NO RECOVERY			
96	47	17/18	96-97.4	29-47-50/5"		Dark grayish-brown, Silty CLAY, plastic, cohesive, moist. Changing at 97.5 feet to: NO RECOVERY.	96' Silty CLAY			
97							97.5' NO RECOVERY			
98	48	18/18	98-99.5	23-43-50		Brown, fine to medium SAND, little Silt, trace Gravel, moist to wet. Changing at 98.4 feet to: Dark grayish-brown, Silty CLAY, plastic, cohesive, moist.	98' SAND 98.4' Silty CLAY			
99										
100	49	8/7	100-100.7	48-50/2"		Dark grayish-brown, fine to medium SAND, little Silt, trace Gravel, slightly cohesive, moist to wet. Changing at 100.4 feet to: Dark grayish-brown, fine SAND, some Silt, little Clay, trace Gravel, non to slightly plastic, cohesive, moist. Changing at 100.9 feet to: NO RECOVERY.	100' SAND			
101							100.9' NO RECOVERY			
102	50	10/7	102-102.8	37-50/3.5"		Grayish-brown to brown, fine to medium SAND, little Silt, trace Gravel, slightly cohesive, moist to wet. Changing at 102.6 feet to: NO RECOVERY.	102' SAND 102.6' NO RECOVERY			
103										
104	51	10/8	104-104.8	37-50/4"		Dark grayish-brown, fine SAND, some Silt, little Clay, trace Gravel, non to slightly plastic, cohesive, moist. Changing at 104.7 feet to: NO RECOVERY.	104' SAND 104.7' NO RECOVERY			
105										
106	52	9/8	106-106.8	41-50/3"		Dark grayish-brown, fine SAND, some Silt, little Clay, trace Gravel, non to slightly plastic, cohesive, moist. Changing at 106.9 feet to: NO RECOVERY.	106' SAND 106.9' NO RECOVERY			
107										
108	53	11/8	108-108.9	44-50/4.5"		Dark grayish-brown, fine SAND, some Silt, little Clay, trace Gravel, non to slightly plastic, cohesive, moist. Changing at 108.9 feet to: NO RECOVERY.	108' SAND 108.9'			
109										
REMARKS										
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	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
110	54	11/14	110-110.9	38-50/5"		Dark grayish-brown, fine SAND, some Silt, little Clay, trace Gravel, non to slightly plastic, cohesive, moist. Changing at 111.3 to 112.0 feet to: NO RECOVERY.	110' NO RECOVERY SAND			
111							111.3' NO RECOVERY			
112	55	11/12	112-112.9	31-50/5"		Dark grayish-brown, fine SAND, some Silt, little Clay, trace Gravel, non to slightly plastic, cohesive, moist. Changing at 113.0 feet to: NO RECOVERY.	112' NO RECOVERY SAND			
113							113' NO RECOVERY			
114	56	17/17	114-115.4	11-36-50/5"		Dark grayish-brown, fine SAND, some Silt, little Clay, trace Gravel, non to slightly plastic, cohesive, moist. Changing at 115.4 feet to: NO RECOVERY.	114' NO RECOVERY SAND			
115							115.4' NO RECOVERY			
116	57	12/8	116-117	48-50/5.5"		Dark grayish-brown, fine SAND, some Silt, little Clay, trace Gravel, non to slightly plastic, cohesive, moist. Changing at 116.9 feet to: NO RECOVERY.	116' NO RECOVERY SAND			
117							116.9' NO RECOVERY			
118	58	18/18	118-119.5	26-49-50		Dark grayish-brown, fine SAND, some Silt, little Clay, trace Gravel, non to slightly plastic, cohesive, moist. Changing at 119.5 feet to: NO RECOVERY.	118' NO RECOVERY SAND			
119							119.5' NO RECOVERY			
120	59	21/22	120-121.8	23-37 40-50/3"		Dark grayish-brown, fine SAND, some Silt, little Clay, trace Gravel, non to slightly plastic, cohesive, moist.	120' NO RECOVERY SAND			
121										
122	60	5/0	122-122.4	50/5"		NO RECOVERY.	122' NO RECOVERY			
123										
124	61	11/10	124-124.9	33-50/5"		Dark grayish-brown, fine SAND, some Silt, little Clay, trace Gravel, non to slightly plastic, cohesive, moist. Changing at 124.8 feet to: NO RECOVERY.	124' NO RECOVERY SAND			
125							124.8' NO RECOVERY			
126	62	10/9	126-126.8	48-50/4"		Dark grayish-brown, fine SAND, some Silt, little Clay, trace Gravel, non to slightly plastic, cohesive, moist. Changing at 126.9 feet to: NO RECOVERY.	126' NO RECOVERY SAND			
127							126.9' NO RECOVERY			
							128'			
REMARKS										
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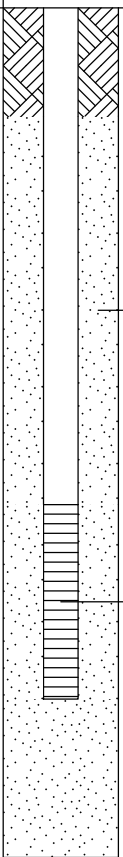
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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
129	63	10/9	128-128.8	40-50/4"		Dark grayish-brown, fine SAND, some Silt, little Clay, trace Gravel, non to slightly plastic, cohesive, moist. Changing at 128.9 feet to: NO RECOVERY.	SAND 128.9' NO RECOVERY		
130	64	11/11	130-130.9	33-50/5"		Dark grayish-brown, fine SAND, some Silt, little Clay, trace Gravel, non to slightly plastic, cohesive, moist. Changing at 131.2 feet to: NO RECOVERY.	130' SAND 131.2' NO RECOVERY		
131							132' SAND 133.4' NO RECOVERY		
132	65	9/9	132-132.8	46-50/3"		Brown, fine to medium SAND, little Silt, moist to wet. Changing at 132.6 feet to: Dusky red to dark yellowish-brown to gray, fine to medium SAND, little Silt moist to wet (weathered Sandstone). Changing at 135.4 feet to: NO RECOVERY.	132' SAND 133.4' NO RECOVERY		
133							134.2' SAND NO RECOVERY		
134	66	2/2	134-134.2	50/2"		Brown, fine to coarse SAND, little Gravel, trace Silt, wet (weathered Sandstone). Changing at 134.2 feet to: NO RECOVERY.	134.2' SAND NO RECOVERY		
135							136' SHALE		
136	67	3/4	136-136.3	50/3"		Dark gray, weathered SHALE, moist.	136' SHALE		
137							138'		
138						Bottom of Borehole at 138.0 Feet		2	
139									
140									
141									
142									
143									
144									
145									
146									
<div>REMARKS</div> <div>2. Monitoring well was installed in borehole upon completion. Well screen set from 134.9 to 137.6 feet below ground surface.</div>									
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Wolverine World Wide

Wolven Avenue Area

Algoma Twp, Kent County, Michigan

Boring No.: MW-WV-16D

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Check: Kate McDonald

Contractor: Stearns Drilling Company

Foreman: Jerry Huntoon

Logged by: S. Stephenson

Date Start/Finish: 3-21-19 / 3-22-19

Boring Location: See Survey

GS Elev.: See Survey Datum: State Plane S Zone NAD 83

Auger/
Casing

Sampler

Type: Hollow Stem Auger Split Spoon

O.D. / I.D.: 12.25" / 4.25" 2.0" / 1 3/8"

Hammer Wt.: NA 140lbs

Hammer Fall: NA 30.0"

Other: NA NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab
NM				

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD					
	1	300	0-25		ND	Blind drill. See MW-WV-16S for soil descriptions from 0.0 to 25.0 feet.	BLIND DRILL	1		PROTECTIVE CASING
1										Concrete
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										

REMARKS

1. Field screening of samples for organic vapors was performed with a MiniRae 3000 photoionization detector equipped with a 10.6 eV lamp. Readings above background levels are shown in parts per million by volume (ppmv) of isobutylene. ND indicates nothing detected (<0.1 ppmv).

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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD					
16							BLIND DRILL			
17										
18										
19										
20										
21										
22										
23										
24										
25										
26	2	24/24	26-28	3-9 14-23	ND	Very stiff, brown, CLAY & SILT, little Sand, trace Rock fragments.	26' CLAY & SILT	2		
27										
28	3	24/24	28-30	6-7 8-16	ND	Very stiff, brown, CLAY & SILT, little Sand, trace Rock fragments. Silt lenses from approximately 28.4 to 28.7 feet below ground surface.				
29										
30	4	24/24	30-32	5-8 14-19	ND	Very stiff, brown, CLAY & SILT, trace Sand, wet.				
31										
32	5	24/24	32-34	5-9	ND	Very stiff, brown, CLAY & SILT, trace Sand,				
2. Second borehole drilling at MW-WV-16D.										
REMARKS										
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	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD					
33				29-33		wet.	CLAY & SILT			
34	6	24/24	34-36	9-8 14-17	ND	Very stiff, brown, CLAY & SILT, trace Sand, wet.				
35										
36	7	24/24	36-38	11-7 12-17	ND	Very stiff, brown, CLAY & SILT, trace Sand, wet.				
37										
38	8	24/24	38-40	5-10 19-24	ND	Very stiff, brown, CLAY & SILT, trace Sand, wet.				
39										
40	9	24/24	40-42	4-12 15-26	ND	Very stiff, brown, CLAY & SILT, trace Sand, wet.				
41										
42	10	24/24	42-44	5-9 12-14	ND	Very stiff, brown, CLAY & SILT, trace Sand, wet.				
43										
44	11	24/24	44-46	6-10 15-21	ND	Very stiff, brown, CLAY & SILT, trace Sand, wet.				
45										
46	12	24/24	46-48	4-9 19-24	ND	Very stiff, brown, CLAY & SILT, trace Sand, wet. Changing at 47.5 feet to: Brown and gray, fine SAND, some Silt, wet.				
47							47.5' SAND			
48	13	24/24	48-50	3-7 6-8	ND	Stiff, brown, CLAY & SILT, trace Sand, wet. Changing at 48.5 feet to: Brown, fine SAND, some Silt, wet. Changing at 49.0 feet to: Brown, Clayey SILT, trace Sand, wet.	48' CLAY & SILT			
49							48.5' SAND			
							49' Clayey SILT			
REMARKS										

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Algoma Twp, Kent County, Michigan

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Algoma Twp, Kent County, Michigan										Check: Kate McDonald	
Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed		
	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD						
51	14	24/24	50-52	3-9 9-16	ND	Brown, Clayey SILT, some Sand, wet. Changing at 51.7 feet to: Brown, CLAY & SILT, trace Sand, wet.	Clayey SILT				
52	15	24/24	52-54	3-8 14-23	ND	Very stiff, brown, CLAY & SILT, trace Sand, wet.	51.5'				
53							CLAY & SILT				
54	16	24/24	54-56	5-10 16-19	ND	Very stiff, brown, CLAY & SILT, trace Sand, wet.					
55											
56	17	24/24	56-58	2-7 13-19	ND	Very stiff, brown, CLAY & SILT, trace Sand, wet.					
57											
58	18	24/24	58-60	3-10 15-21	ND	Very stiff, brown, CLAY & SILT, trace Sand, wet.					
59											
60	19	24/24	60-62	3-8 17-25	ND	Very stiff, brown, CLAY & SILT, trace Sand, wet.					
61											
62	20	24/24	62-64	2-11 15-22	ND	Very stiff, brown, CLAY & SILT, trace Sand, wet.					
63											
64	21	24/24	64-66	4-10 14-19	ND	Very stiff, brown, CLAY & SILT, trace Sand, wet.					
65											
66	22	24	66-68	4-11 16-21	ND	Very stiff, brown, CLAY & SILT, trace Sand, wet.					
67											
REMARKS											
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: MW-WV-16D		

BORING: WI 6267781 WWW.WOLVEN AVENUE.GPJ WI DNR.GDT 4/17/20



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Wolverine World Wide
Wolver Avenue Area
Algoma Twp, Kent County, Michigan

Boring No.: MW-WV-16D
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Sample Information						Argonia Twp, Kent County, Michigan		Check: Kate McDonald					
Depth	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed				
68	23	24/24	68-70	4-11 19-23	ND	Very stiff, brown, CLAY & SILT, trace Sand, wet. Changing at 69.0 feet to: Brown, Silty CLAY, trace Sand, wet.	CLAY & SILT						
69							69' Silty CLAY						
70	24	24/24	70-72	3-14 23-27	ND	Brown, Silty CLAY, trace Sand, wet. Changing at 71.0 feet to: Brown, CLAY & SILT, wet.	71' CLAY & SILT						
71							72' Silty CLAY						
72	25	24/24	72-74	4-10 17-26	ND	Very stiff, brown, Silty CLAY, trace Sand, wet. Changing at 73.0 feet to: Dark brown and dark gray, Silty CLAY, trace Sand, wet.	75.8' 76' CLAY & SILT Silty CLAY						
73													
74	26	24/18	74-76	10-19 33-39	ND	Hard, black and gray with slight blue and green tinge, Silty CLAY, trace Sand, wet. Changing at 75.8 feet to: Green, CLAY & SILT, some Sand, wet.	77.5' CLAY & SILT						
75													
76	27	24/12	76-78	1-6 15-25	ND	Very stiff, black and gray, Silty CLAY, wet. changing at 77.5 feet to: Pale green and gray, CLAY & SILT, little to trace Sand, wet.							
77													
78	28	24/18	78-80	10-20 26-38	ND	Pale green and gray, CLAY & SILT, little to trace Sand, wet.							
79													
80	29	24/24	80-82	11-24 35-39	ND	Pale green and gray, CLAY & SILT, little to trace Sand, wet.							
81													
82	30	24/24	82-84	7-16 24-38	ND	Pale green and gray, CLAY & SILT, little to trace Sand, wet.							
83													
84	31	24/12	84-86	12-50/6"	ND	Pale green and gray, CLAY & SILT, little to trace Sand, wet. Pulverized rock at 85.9 feet below ground surface.							
REMARKS													
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.											Boring No.: MW-WV-16D		

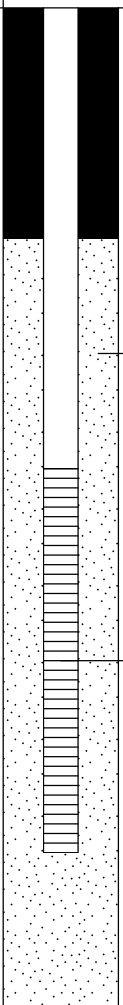
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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD				
86	32	24/18	86-88	2-5 6-9	ND	Gray, CLAY & SILT, little Sand, wet. Changing at 86.2 feet to: Brown and gray, fine SAND and SILT, wet.	CLAY & SILT 86.2' SAND and SILT	3	
87									
88	33	24/18	88-90	6-24-50/6"	ND	Very dense, brown and gray, fine SAND, some Silt, wet.	88' SAND		
89									
90	34	24/8	90-92	37-50/2"	ND	Very dense, brown and gray, fine SAND, some Silt, wet.			
91									
92	35	24/10	92-94	24-50/4"	ND	Very dense, brown and gray, fine SAND, some Silt, wet.			
93									2-Inch PVC Well Screen
94	36	24/6	94-96	50/6"	ND	Very dense, brown and gray, fine SAND, some Silt, wet.			
95									
96	37	24/18	96-98	18-31-50/6"	ND	Brown and gray, Clayey SILT, little fine to coarse Sand, dry.	96' Clayey SILT		
97									
98						Bottom of Borehole at 98.0 Feet	98'	4	
99									
100									
101									
102									

REMARKS

3. Groundwater sample was collected from temporary well with a well screen from approximately 91.0 to 96.0 feet.
4. Monitoring well was installed in borehole upon completion. Well screen set from 91.0 to 96.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

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Wolven Avenue Area

Algoma Twp, Kent County, Michigan

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Contractor: Stearns Drilling Company

Foreman: J. Muntoon

Logged by: Sheryl Stephenson

Date Start/Finish: 3-19-19 / 3-20-19

Boring Location: See Survey

GS Elev.: See Survey

Auger/
Casing

Sampler

Type: Hollow Stem Auger Split Spoon

O.D. / I.D.: 12.25" / 4.25" 2.0" / 1 3/8"

Hammer Wt.: NA 140lbs

Hammer Fall: NA 30.0"

Other: NA NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD				PROTECTIVE CASING	
1	1	24/6	0-2	1-1 1-1	ND	Very loose, brown, TOPSOIL.	TOPSOIL			
2	2	24/18	2-4	2-3 4-4	ND	Loose, light brown, fine SAND, little Silt, moist.	SAND			
3										
4	3	24/18	4-6	3-5 5-4	ND	Medium dense, light brown and gray, fine SAND, little Silt, trace fine Gravel, moist.				
5										
6	4	24/18	6-8	4-7 5-5	ND	Medium dense, light brown, fine to coarse SAND, little Gravel, little Silt, wet. Changing at 7.5 feet to: Orange and brown, fine SAND, little Silt, wet.		1		
7										
8	5	24/12	8-10	2-4 6-5	ND	Medium dense, brown, fine SAND, some Silt, trace fine Gravel, wet.		2		Bentonite Grout
9										
10	6	24/24	10-12	1-6 6-5	ND	Medium dense, brown, fine SAND, some Silt, wet. Changing at 11.0 feet to: Brown, fine to coarse SAND, some Silt, little fine Gravel, wet.				
11										
12	7	24/18	12-14	9-11 12-17	ND	Very stiff, gray, Clayey SILT, some fine to coarse Sand, wet.	Clayey SILT			
13										
14	8	24/18	14-16	6-12 12-13	ND	Medium dense, gray, fine to medium SAND, some Silt, trace fine Gravel, wet. Changing at 15.0 feet to: Gray, Clayey SILT, little fine to coarse Sand, dry.	SAND			
15										
16	9	24/18	16-18	5-11 9-13	ND	Medium dense, gray, SAND and SILT, trace fine Gravel, moist.	Clayey SILT	3		
17										
18	10	24/8	18-20	7-16 14-13	ND	Dense, brown, fine to medium SAND, some Silt, wet.	SAND and SILT			
19										
20	11	24/12	20-22	1-7 8-12	ND	Medium dense, fine to medium SAND, some Silt, wet. Changing at 21.0 feet to: Brown, Clayey SILT, some Sand, trace fine Gravel, moist.	SAND			Filter Sand
21										2-Inch PVC Well Screen
22	12	24/0	22-24	9-13 15-15		NO RECOVERY.	Clayey SILT	4		
							NO RECOVERY			

REMARKS

- Groundwater was encountered at approximately 6.0 feet below ground surface.
- Temporary well installed from 4.0 to 14.0 feet below ground surface. Well screen interval from 9.0 to 14.0 feet below ground surface. Purged 25.0 gallons of water.
- Casing set at 15.0 feet below ground surface.
- 2.0-inch of Sand and Silt with large Gabbro fragment and cohesive nature.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	% REC	% RQD				
24	13	24/18	24-26	5-5 9-10	ND	Medium dense, brown, Clayey SILT, some Sand, trace fine Gravel, wet. Changing at 23.0 feet to: Brown, CLAY & SILT, trace Gravel, moist.	24' NO RECOVERY	5	
							Clayey SILT		
25							25' CLAY & SILT		
26							26' Bottom of Borehole at 26.0 Feet		
27									
28									
29									
30									
31									
32									
33									
34									
35									
36									
37									
38									
39									
40									
41									
42									
43									
44									
45									
46									
47									
48									
49									
5. Monitoring well was installed in borehole upon completion. Well screen set from 17.0 to 22.0 feet below ground surface.									
REMARKS									
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.									Boring No.: MW-WV-16S

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APPENDIX B – STANDARD OPERATING PROCEDURES

Pore Water Sampling Procedure

PURPOSE

The purpose of the Standard Operating Procedure (SOP) is to obtain pore water samples for analysis for PFAS that are representative of environmental conditions at the location sampled.

PREPARATION

If a sample cannot be obtained safely, the sample should not be collected at all and the circumstances shall be documented in the sampler's field notes. This procedure requires a minimum of two sample personnel for safety concerns.

Sampling locations shall be permanently located using a global positioning system (GPS) unit for future reference. The expected accuracy of the GPS unit shall be determined in advance and specified in the Sampling and Analysis Plan (SAP).

When collecting surface water, pore water, and sediment samples in the same location, sampling should occur in that order: surface water samples first, then pore water samples, and finally sediment samples.

EQUIPMENT AND MATERIALS

The following equipment is typically used in collecting pore water samples:

- Appropriate health and safety gear as indicated in an approved site-specific Health & Safety Plan.
- Site-Specific SAP which includes a map and other project-specific information including field data from last sampling event, if available.
- Waders.
- Boat.
- Sample containers, preserved as necessary, cooler, and double-bagged ice.
- Field worksheets, sample labels, and chain of custody forms.
- Pencil/pen and calculator.
- Camera to take digital pictures.
- The manufacturer's instruction manuals for all equipment.
- Ruler or staff gauge for measuring water depth.
- GPS unit or similar device.
- Decontamination supplies/equipment; including laboratory-grade PFAS-free water.
- Paper towels.
- Henry sampler (Push Point).
- Flange for Henry sampler to reduce likelihood of surface water intrusion.
- Shop-fabricated sampler for use in locations that are too deep or where sediment depths prevent the use of the Henry sampler. See attachment for a drawing and picture describing the shop-fabricated sampler.
- A multiparameter meter (e.g., YSI PRO or other approved meter as specified in the site-specific QAPP) and flow through cell for measuring pH, specific conductivity in $\mu\text{S}/\text{cm}$, and temperature ($^{\circ}\text{C}$).
- A probe guard for the multiparameter meter to take in-situ parameter surface water readings.
- A Turbidity Meter (e.g., Hach 2100P or 2100Q or other approved meter as specified in the site-specific QAPP).
- Appropriate calibration solutions for the multi-parameter and turbidity meters, if water quality parameters are collected.

Pore Water Sampling Procedure

- Peristaltic pump and tubing
- Toolbox to include general items such as large and small wrenches, pipe wrenches, pliers, screw drivers, 25-foot measuring tape, sharp knife (locking blade), and duct tape, at a minimum.

PROCEDURE

In general, all instrumentation necessary for field monitoring and health and safety purposes shall be maintained, tested, and inspected according to the manufacturer's instructions. The manufacturer's instruction manuals for field equipment shall be kept on-site with the equipment.

All instruments will be successfully calibrated once by the sampling team prior to the sampling event according to SOP A15: *Calibration of Field Instruments*.

Instruments will be calibrated at the beginning of each sampling day at the site and will be checked (in the run mode) in the morning and again at the end of the day. Instrument calibration will be performed additional times during the sampling day if instrument readings appear to be significantly different than previously observed.

Digital photographs are usually taken at each sampling location, upstream and downstream from the same position so that consistency can be maintained between sampling rounds.

If not previously done, use a GPS unit to permanently mark the sample location for future reference (See SOP A11: *Global Positioning System*).

If the stream/creek/water body must be waded to collect pore water samples, the water should not exceed three feet in depth. If the water exceeds three feet, samples will be collected by boat.

Using a stream staff/gage or similar measuring device, measure the depth of water from the bottom of the streambed/lakebed to the surface of the water, in feet, directly downstream of each sampling location and record on the *Pore Water Worksheet*. Some sites may have a permanently installed staff gage at one location to monitor water levels instead of, or in addition to, collecting measurements at each separate location.

Pore water samples to be collected from the same water body should be collected sequentially from downstream to upstream sample locations. Sample locations will be approached from the downstream side to minimize bottom sediment disturbance, and the sampler should stand down stream of the sampling device. Water samples collected from a boat shall be collected from the bow or upstream side of the boat, away from the motor, with extreme care taken to avoid contamination of the sample.

At each sample location either a Henry sampler or the shop-fabricated sampler will be driven through a flange in the stream bottom. The purpose of the flange is to reduce surface water intrusion during sampling. The flange is carefully placed on top of the sediment. The sampler is inserted through the flange to the desired depth. The flange should fit snugly around the body of the sampler to prevent surface water from contaminating the pore water sample. Samplers will estimate the thickness of organic sediment on the bottom of the river based on resistance. The sampler inlet will be positioned 6-12 inches below the base of the loose sediment.

Samplers will use a peristaltic pump to remove fines from the sampler to facilitate flow. During purging, samplers will monitor and record indicator field parameters (turbidity, temperature, pH, specific conductance) at 3 minute or greater intervals. All measurements, except turbidity will be taken using a flow through cell. The pore water will be sampled using low-flow sampling methods as described below once the field readings from the pore water have stabilized and the pore water readings are distinguishable from the river readings. The following criteria shall be used to determine if pore water is ready for sampling (in order of preference):

1. There is a >10% difference between the river and pore water field parameter readings; OR
2. There is a >10% difference between the river and pore water readings for two out of the 3 readings; OR

Pore Water Sampling Procedure

3. The sample has cleared (no visible fines, turbidity at least 10% lower than river reading) and the sampler has been purged for at least 15 minutes.

When field parameters are stabilized in accordance with the criteria above, samples may be collected directly into the sample containers. Collect duplicates and other quality control samples as required in the SAP.

Once sampling containers are filled with the appropriate amount, they are capped and cleaned to remove any potential residue. Place samples in re-sealable plastic bags and store the samples in accordance with appropriate protocols. If samples require cooling, the samples shall be placed in a cooler of **double-bagged** ice.

QUALITY ASSURANCE SAMPLES

Collect appropriate quality assurance samples as specified in the site-specific SAP. At a minimum, at least one duplicate, one MS/MSD, and one field blank (for PFAS) should be collected per 20 samples. Duplicate samples are collected by filling a separate container for each analysis immediately following the actual field sample collection and should be in the same priority order as indicated in the SAP. Duplicate samples are typically not intended to be blind duplicate samples.

Equipment blanks should be collected on non-disposable equipment to ensure that the equipment is clean and the decontamination procedure is adequate (e.g., syringes, glass or stainless steel containers, etc.).

If using an in-line filter for dissolved metals, collect an equipment blank prior to sampling by running deionized water through the filter and collecting a sample for dissolved metals to ensure the integrity of the filter.

DECONTAMINATION

Decontaminate equipment according to GZA SOP A10: *Decontamination Procedure*. Disposable sampling equipment shall be discarded after completing the sampling task and not reused.

RECORDS AND DOCUMENTATION

In general, all data and sampling information will be documented as recorded as specified in the SAP. Specific reporting of these sampling events may include, but is not limited to, the following information:

1. Samples collected.
2. Date and time of sample collection.
3. Water depths at the sampling locations.
4. Any water quality parameter readings taken.
5. General physical description of the samples and sampling locations.
6. Digital photographs of sampling locations including one or more of the larger surrounding area, along with any notes on the photographs.

SPECIAL NOTES

None.

APPLICABLE STANDARDS AND REFERENCES

U.S. Environmental Protection Agency, region 4, Science and Ecosystem support Division, *Standard Operating Procedure SESDPROC-513-R3*, December 14, 2016.

Pore Water Sampling Procedure

ATTACHMENT

Pore Water Worksheet

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Location ID:

**Sediment Thickness
(ft) (est):**

Sample Time

[illegible]

Piezometer Installation and Measurement

PURPOSE

The purpose of the Standard Operating Procedure (SOP) is to install piezometers in a manner in which they can be used for measurement of groundwater to surface water flow.

EQUIPMENT AND MATERIALS

- Hand auger
- Stainless steel well screen
- Galvanized threaded piping
- Dielectric Pipe Couplings
- Pipe wrenches
- Well/fence post driver
- Vented well cap
- Bentonite seal and concrete pad for piezometers installed on the riverbank.
- GPS unit or similar device
- Camera to take digital pictures
- Appropriate health and safety PPE and an approved site-specific Health and Safety Plan

INSTALLATION PROCEDURES

1. Using a pipe wrench, assemble the well screen and galvanized piping
2. Hand Auger as needed, then hand drive piezometer casing so that the top of screen is approximately 3 feet below the river bottom. The top of the piezometer should be above the estimated flood level based on observations of vegetation and deposition
3. Make a note of the general material (gravel vs sediment) on a GZA boring log. Calculate the depth of the screen beneath the floor of the river.
4. Piezometer completion shall include a 1-foot bentonite seal and concrete pad for those installed on the riverbank. If in-stream piezometers are installed, the bentonite seal and concrete pad shall not be installed.
5. Use a GPS to permanently mark the piezometer location

MEASUREMENT PROCEDURES

Water level measurements shall be collected following the procedures outlined in SOP A14, Water Level Measurement and recorded on the form included in SOP A14.

RECORDS AND DOCUMENTATION

The details of the installation shall be recorded on the GZA boring log. If needed, additional information can be attached as a separate sheet.



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