

GEOTECHNICAL

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WATER

CONSTRUCTION MANAGEMENT

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MEMORANDUM

To: Abby Hendershott, MDEQ

From: Leslie Nelson, Rose & Westra, a Division of GZA GeoEnvironmental, Inc.

Date: August 10, 2018

File No.: 16.0062677.81 Task 001

Re: Wolverine World Wide, Inc. (Wolverine) – Wolven/Jewell RI – Progress Report

This Progress Report (PR) is being provided at the request of the MDEQ to provide an update regarding the implementation of the December 13, 2017 Source Area Investigation Work Plan (WP) related to per- and polyfluorinated alkyl substances (PFAS) detected in residential wells in the Wolven/Jewell study area.

According to the MDEQ, historical aerial photographs from as early as 1953 through at least 1965 show a gravel pit and interviews with a former area resident suggested the gravel pit may have been used as a disposal location for Wolverine waste. This former gravel pit, located south of Royal Hannah Drive in Algoma Township, is approximately 0.5 mile west of Wolven Avenue.

The purpose of this investigation is to assess groundwater quality in the vicinity of the gravel pit and delineate the vertical and lateral extents of PFAS in groundwater.

ACTIONS PERFORMED

During the initial phase of the WP implementation, which encompasses the period from January 4, 2018 through July 31, 2018, GZA has done the following tasks:

- Prepared general cross sections based on available residential well logs;
- 2. Negotiated access with property owners in eight locations to allow monitoring well installation;
- Drilled using a hollow stem auger drill rig and characterized soil, along with collecting vertical aquifer profiling samples for analysis of PFAS every 10 feet in most locations.
- 4. Installed, developed, surveyed, and sampled 14 monitoring wells.
- 5. Prepared boring logs and monitoring well installation logs for each monitoring well.
- 6. Prepared additional cross sections using monitoring well drilling data along with available residential well drilling data.

Table 1 summarizes the monitoring well information for the wells installed during this reporting period. The monitoring well locations are shown on attached Figure 1.





Static water level measurements were taken from the monitoring wells on August 3, 2018 and are summarized on Table 2. Figure 2 presents a groundwater flow map based on site-specific information collected on August 3, 2018. As shown on Figure 2, shallow groundwater flow is primarily to the northwest. Deeper groundwater flow is primarily to the southwest.

Three cross sections were developed utilizing both the drilling information and area residential well logs. Figure 1 shows the cross-section cuts in plan view. Figures 3, 4, and 5 are sections A-A', B-B' and C-C', respectively.

ANALYTICAL DATA RECIEVED

Tables 3 (PFAS), 4 (organic compounds) and 5 (inorganic compounds) summarize the analytical data received through August 4, 2018. This data includes both vertical profile data and data from the permanent monitoring wells.

PFAS

During the vertical aquifer profiling, PFAS compounds were detected in all of the well locations that were vertically profiled at one or more depths. However, only samples from PMW-WV2, PMW-WV-3, PMW-WV-8 and PMW-WV-9 had at least one concentration of PFOA/PFOS greater than the combined criteria of 70 ppt. In the permanent monitoring wells, concentrations of PFOA/PFOS greater than the combined criteria of 70 ppt were detected in MW-WV-1, MW-WV-2D, MW-WV-3S, MW-WV-8S, and MW-WV-9. Data from both the vertical profiling and the permanent well sampling are included in Table 1.

Organics

The groundwater samples were analyzed for volatile organic compounds (VOCs). There were no VOCs detected at concentrations greater than Michigan's Part 201 generic residential criteria in any of the monitoring wells.

Inorganics

The groundwater samples were analyzed for Michigan 18 metals and general chemistry (nitrate/nitrite, ammonia, sodium, potassium, calcium, magnesium, chloride, sulfate, and alkalinity). The only inorganics measured above Michigan's Part 201 generic residential drinking water criteria were iron and chloride. Iron was identified in most of the wells at concentrations between 110 and 3,600 μ g/L (aesthetic criterion is 300 μ g/L, health-based criterion is 2,000 μ g/L). Chloride was identified in two wells, MW-WV-6s and MW-WV-6D, at concentrations greater than the criterion of 250,000 μ g/L.

Based on this data, an additional monitoring well may be warranted at MW-WV-9 to monitor the zone from 79 to 84 feet bgs. As illustrated on the cross sections, the PFAS concentrations are higher in shallower portions of each water-bearing unit. In the deeper wells within each unit, concentrations are reduced or the compounds are not detected.

ANTICIPATED ACTIONS AND SCHEDULE FOR NEXT REPORTING PERIOD

During the next reporting period, August 4 to September 30, 2018, R&W/GZA anticipates commencing the Lamoreaux Farms soil investigation. This effort is estimated to take three weeks, but the length of the effort will be better estimated once it is underway. The scope of work for this effort is summarized in our August 3, 2018 letter to DEQ.





GZA also anticipates conducting an additional round of monitoring well sampling at Lamoreaux Farms, which is estimated to take approximately 7 working days. This work will not be conducted until the Lamoreaux Farms soil investigation is complete and therefore will not be completed prior to the next report.

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Table 1
Monitoring Well Information
Wolven/Jewell Investigation
Rockford, Michigan

Well ID	Grade Elevation	Initial Top of Casing Elevation	Screened Interval (ft)	Elevation Midpoint of Well Screen	Screen Length
Monitoring wells					
MW-WV-1	859.20	859.24	135-140	721.70	5.0
MW-WV-2D	790.50	791.36	30-35	758.00	5.0
MW-WV-3S	820.60	823.31	5-10	813.10	5.0
MW-WV-3D	820.70	823.28	56-61	762.20	5.0
MW-WV-4	852.36	854.89	130-135	719.86	5.0
MW-WV-5S	862.10	864.93	60-65	799.60	5.0
MW-WV-5D	862.00	865.07	67-72	792.50	5.0
MW-WV-6S	784.42	786.62	13-18	768.92	5.0
MW-WV-6D	784.02	786.51	98-103	683.52	5.0
MW-WV-8S	846.00	845.55	30-35	813.50	5.0
MW-WV-8M	845.90	845.90	60-65	783.40	5.0
MW-WV-8D	846.00	845.80	115-120	728.50	5.0
MW-WV-9	857.37	859.86	92.3-97.3	762.57	5.0
Residential Wells					
2975 Royal Hannah	790.70	Unknown	80-90	705.70	10.0
9190 Lady Lauren	832.86	Unknown	50-60	777.86	10.0
9187 Lady Lauren	838.37	Unknown	55-65	778.37	10.0
9193 Lady Lauren	840.62	Unknown	55-65	780.62	10.0
9169 Lady Lauren	837.43	Unknown	53-63	779.43	10.0
3069 Royal Hannah	798.19	Unknown	200-210	593.19	10.0
3081 Royal Hannah	801.22	Unknown	70-80	726.22	10.0
3099 Royal Hannah	801.07	Unknown	80-90	716.07	10.0
3070 Royal Hannah	821.87	Unknown	112-122	704.87	10.0
8922 Lady Lauren	897.90	Unknown	128-138	764.90	10.0
8903 Lady Lauren	864.80	Unknown	138-148	721.80	10.0
Notes					

- 1. Monitoring wells were surveyed by Excel Engineering.
- 2. Residential well grade elevations were surveyed by Excel Engineering.
- 3. Residential well data other than grade elevation were collected from well logs available on Wellogic.

Table 2
Static Water Levels
Wolven/Jewell Investigation
Rockford, MI

Well Number	Wellscreen	Top of Casing	Measured on 8/3/2018				
	Interval	Elevation	Depth to	Static Water			
			Water	Elevation			
MW-WV-1	135-140	859.24	117.21	742.03			
MW-WV-2S	20-25	793.39	3.48	789.91			
MW-WV-2D	30-35	791.36	9.77	781.59			
MW-WV-3S	5-10	823.31	6.01	817.30			
MW-WV-3D	56-61	823.28	23.63	799.65			
MW-WV-4	130-135	854.89	109.93	744.96			
MW-WV-5S	60-65	864.93	64.60	800.33			
MW-WV-5D	67-72	865.07	64.82	800.25			
MW-WV-6S	13-18	786.62	8.13	778.49			
MW-WV-6D	98-103	786.51	28.20	758.31			
MW-WV-8S	30-35	849.99	24.37	825.62			
MW-WV-8M	60-65	849.74	24.54	825.20			
MW-WV-8D	115-120	849.80	100.01	749.79			
MW-WV-9	92.3-97.3	859.86	38.29	821.57			

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SUMMARY OF GROUNDWATER ANALYTICAL DATA - PFAS WOLVEN AND JEWELL STUDY AREAS

		PLAINFIFLD TOWN	ISHIP MICHIGAN						
LOCATION			MW-WV-1	MW-WV-2D	MW-WV-2S	MW-WV-3D	MW-WV-3D	MW-WV-3S	MW-WV-4
SAMPLE NAME	PART 201 GENERIC RESIDENTIAL	GROUNDWATER CLEANUP		MW-WV-2D	MW-WV-2S	MW-WV-3D	MW-WV-3D (DUP)	MW-WV-3S	MW-WV-4
LB ID	CRITERIA - DRINKING WATER	CRITERIA - GROUNDWATER SURFACE WATER INTERFACE	TC30012-002	TC30012-006	TC30012-010	TC30012-008	TC30012-011	TC30012-009	TE25018-002
SAMPLE DATE		SOM NOE WAYER MATERIAL NOE	03/28/2018	03/29/2018	03/29/2018	03/29/2018	03/29/2018	03/29/2018	05/23/2018
Parameter (ng/l)	•								
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NA	NA	<7	<7.2	<7.4	<7.5	<7.5	<7	<3.5
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NA	NA	<7	<7.2	<7.4	<7.5	<7.5	<7	<3.5
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NA	NA	<7	<7.2	<7.4	<7.5	<7.5	<7	<3.5
N-Ethyl perfluorooctane sulfonamidoethanol	NA	NA							
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NA	NA	<14	<14	<15	<15	<15	<14	<7
N-Methyl perfluorooctane sulfonamidoethanol	NA	NA							
Perfluorobutane sulfonic acid (PFBS)	NA	NA	46	56	17	6.4	6.6	4.9	<3.5
Perfluorobutanoic acid (PFBA)	NA	NA	31	26	11	<3.7	<3.8	5.3 Q	<3.5
Perfluorodecane sulfonic acid (PFDS)	NA	NA	<3.5	<3.6	<3.7	<3.7	<3.8	<3.5	<3.5
Perfluorodecanoic acid (PFDA)	NA	NA	<3.5	<3.6	<3.7	<3.7	<3.8	<3.5	<3.5
Perfluorododecanoic acid (PFDoDA)	NA	NA	<3.5	<3.6	<3.7	<3.7	<3.8	<3.5	<3.5
Perfluoroheptane sulfonic acid (PFHpS)	NA	NA	230	15	74	<3.7	<3.8	9.2	<3.5
Perfluoroheptanoic acid (PFHpA)	NA	NA	250	150	33	<3.7	<3.8	11	<3.5
Perfluorohexane sulfonic acid (PFHxS)	NA	NA	1,100	350	80	4.2	4.7	23	<3.5
Perfluorohexanoic acid (PFHxA)	NA	NA	100	81	23	<3.7	<3.8	6.1	<3.5
Perfluorononanoic acid (PFNA)	NA	NA	15	<3.6	5.8	<3.7	<3.8	<3.5	<3.5
Perfluorooctane sulfonamide (FOSA)	NA	NA	<7	<7.2	<7.4	<7.5	<7.5	<7	<3.5
Perfluorooctane sulfonic acid (PFOS)	70	12	7,300	64	3,200	<3.7	<3.8	230	<3.5
Perfluorooctanoic acid (PFOA)	70	12,000.00	3,300	970	320	<3.7	<3.8	93	<1.7
Perfluoropentanoic acid (PFPeA)	NA	NA	39	33	14	<3.7	<3.8	<3.5	<3.5
Perfluorotetradecanoic acid (PFTeDA)	NA	NA	<7	<7.2	<7.4	<7.5	<7.5	<7	<3.5
Perfluorotridecanoic acid (PFTrDA)	NA	NA	<3.5	<3.6	<3.7	<3.7	<3.8	<3.5	<3.5
Perfluoroundecanoic acid (PFUnDA)	NA	NA	<3.5	<3.6	<3.7	<3.7	<3.8	<3.5	<3.5
Perfluorononane sulfonic acid (PFNS)	NA	NA	<7	<7.2	<7.4	<7.5	<7.5	<7	<7
Perfluoropentane sulfonic acid (PFPeS)	NA	NA	140	140	18	<3.7	<3.8	5	<3.5

- 1. Concentration and criteria units are nano-grams per liter (ng/L) or parts per trillion (ppt); "< RL" indicates the compound was analyzed for but not detected above the method detection limit; RL = Reporting Limit
- 2. Bold indicates that compound was detected above the RL. Italic number with thick line border or italic chemical indicates that compound was detected above the USEPA Health Advisory for Drinking Water Uses.
- 3. Michigan Part 201 groundwater cleanup criteria protective of drinking water uses were based on MDEQ 's Table 1, Groundwater: Residential and Nonresidential, Part 201 Generic Cleanup cCiteria and Screening Levels, June 2018.
- 4. The cleanup criteria of 70 ppt was established for the combined concentrations of PFOA and PFOS.

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SUMMARY OF GROUNDWATER ANALYTICAL DATA - PFAS WOLVEN AND JEWELL STUDY AREAS

		PI AINFIFI D TOWN							
LOCATION			MW-WV-5D	MW-WV-5S	MW-WV-6D	MW-WV-6S	MW-WV-8D	MW-WV-8M	MW-WV-8S
SAMPLE NAME	PART 201 GENERIC RESIDENTIAL	PART 201 GENERIC GROUNDWATER CLEANUP	MW-WV-5D	MW-WV-5S	MW-WV-6D	MW-WV-6S	MW-WV-8D	MW-WV-8M	MW-WV-8S
LB ID	GROUNDWATER CLEANUP CRITERIA - DRINKING WATER	CRITERIA - GROUNDWATER SURFACE WATER INTERFACE	TC30012-004	TC30012-003	TD12014-001	TD12014-003	TG07028-003	TG07028-002	TG07028-001
SAMPLE DATE			03/28/2018	03/28/2018	04/11/2018	04/11/2018	07/05/2018	07/05/2018	07/05/2018
Parameter (ng/l)	•								
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NA	NA	<7.2	<7.1	<7.5	<7.3	<3.5	<3.5	<3.5
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NA	NA	<7.2	<7.1	<7.5	<7.3	<3.5	<3.5	<3.5
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NA	NA	<7.2	<7.1	<7.5	<7.3	<3.5	<3.5	<3.5
N-Ethyl perfluorooctane sulfonamidoethanol	NA	NA							
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NA	NA	<14	<14	<15	<15	<6.9	<7	<6.9
N-Methyl perfluorooctane sulfonamidoethanol	NA	NA							
Perfluorobutane sulfonic acid (PFBS)	NA	NA	8.3	6	18	7.8	<3.5	73	18
Perfluorobutanoic acid (PFBA)	NA	NA	<3.6	<3.6	5	<3.6	<3.5	8.5	6
Perfluorodecane sulfonic acid (PFDS)	NA	NA	<3.6	<3.6	<3.8	<3.6	<3.5	<3.5	<3.5
Perfluorodecanoic acid (PFDA)	NA	NA	<3.6	<3.6	<3.8	<3.6	<3.5	<3.5	<3.5
Perfluorododecanoic acid (PFDoDA)	NA	NA	<3.6	<3.6	<3.8	<3.6	<3.5	<3.5	<3.5
Perfluoroheptane sulfonic acid (PFHpS)	NA	NA	<3.6	<3.6	<3.8	<3.6	<3.5	<3.5	<3.5
Perfluoroheptanoic acid (PFHpA)	NA	NA	<3.6	<3.6	<3.8	<3.6	<3.5	4.2	5.1
Perfluorohexane sulfonic acid (PFHxS)	NA	NA	<3.6	<3.6	<3.8	<3.6	<3.5	10	16
Perfluorohexanoic acid (PFHxA)	NA	NA	<3.6	<3.6	<3.8	<3.6	<3.5	8.7	4.5
Perfluorononanoic acid (PFNA)	NA	NA	<3.6	<3.6	<3.8	<3.6	<3.5	<3.5	<3.5
Perfluorooctane sulfonamide (FOSA)	NA	NA	<7.2	<7.1	<7.5	<7.3	<3.5	<3.5	<3.5
Perfluorooctane sulfonic acid (PFOS)	70	12	<3.6	<3.6	<3.8	4.8	<3.5	4.5	42
Perfluorooctanoic acid (PFOA)	70	12,000.00	<3.6	<3.6	<3.8	6.9	4.8	28	50
Perfluoropentanoic acid (PFPeA)	NA	NA	<3.6	<3.6	<3.8	<3.6	<3.5	8.1	<3.5
Perfluorotetradecanoic acid (PFTeDA)	NA	NA	<7.2	<7.1	<7.5	<7.3	<3.5	<3.5	<3.5
Perfluorotridecanoic acid (PFTrDA)	NA	NA	<3.6	<3.6	<3.8	<3.6	<3.5	<3.5	<3.5
Perfluoroundecanoic acid (PFUnDA)	NA	NA	<3.6	<3.6	<3.8	<3.6	<3.5	<3.5	<3.5
Perfluorononane sulfonic acid (PFNS)	NA	NA	<7.2	<7.1	<7.5	<7.3	<6.9	<7	<6.9
Perfluoropentane sulfonic acid (PFPeS)	NA	NA	<3.6	<3.6	<3.8	<3.6	<3.5	<3.5	4

- 1. Concentration and criteria units are nano-grams per liter (ng/L) or parts per trillion (ppt); "< RL" indicates the compound was analyzed for but not detected above the method detection limit; RL = Reporting Limit
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- 3. Michigan Part 201 groundwater cleanup criteria protective of drinking water uses were based on MDEQ 's Table 1, Groundwater: Residential and Nonresidential, Part 201 Generic Cleanup cCiteria and Screening Levels, June 2018.
- 4. The cleanup criteria of 70 ppt was established for the combined concentrations of PFOA and PFOS.

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SUMMARY OF GROUNDWATER ANALYTICAL DATA - PFAS WOLVEN AND JEWELL STUDY AREAS

PLAINFIELD TOWNSHIP MICHIGAN

		PLAINFIFLD TOWN	SHIP, WILL HIGAN	1	1			1	
LOCATION			MW-WV-9	PMV-WV-2	PMW-WV-2	PMW-WV-3	PMW-WV3	PMW-WV3	PMW-WV-3
SAMPLE NAME	PART 201 GENERIC RESIDENTIAL GROUNDWATER CLEANUP	PART 201 GENERIC GROUNDWATER CLEANUP	MW-WV-9	PMV-WV-2 (31- 36)	PMW-WV-2 (13- 18)	PMW-WV-3 (13- 18)	PMW-WV3 (34- 39)	PMW-WV3 (44- 49)	PMW-WV-3 (5- 10)
LB ID	CRITERIA - DRINKING WATER	CRITERIA - GROUNDWATER SURFACE WATER INTERFACE	TG07028-004	K1801591-001	K1801515-002	K1801320-002	K1801365-002	K1801365-004	K1801320-001
SAMPLE DATE			07/05/2018	02/16/2018	02/14/2018	02/08/2018	02/12/2018	02/12/2018	02/08/2018
Parameter (ng/l)									
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NA	NA	<3.5	<5.1	<4.7	<4.2	<4.4	<4.4	<4.2
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NA	NA	<3.5	<5.1	<4.7	<4.2	<4.4	<4.4	<4.2
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NA	NA	<3.5	<5.1	<4.7	<4.2	<4.4	<4.4	<4.2
N-Ethyl perfluorooctane sulfonamidoethanol	NA	NA		<5.1	<4.7	<4.2	<4.4	<4.4	<4.2
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NA	NA	<7	<5.1	<4.7	<4.2	<4.4	<4.4	<4.2
N-Methyl perfluorooctane sulfonamidoethanol	NA	NA		<5.1	<4.7	<4.2	<4.4	<4.4	<4.2
Perfluorobutane sulfonic acid (PFBS)	NA	NA	11	50	20	12	<4.4	5.2	4.9
Perfluorobutanoic acid (PFBA)	NA	NA	6.3	20	<9.4	<8.5	<8.9	<8.9	9
Perfluorodecane sulfonic acid (PFDS)	NA	NA	<3.5	<5.1	<4.7	<4.2	<4.4	<4.4	<4.2
Perfluorodecanoic acid (PFDA)	NA	NA	<3.5	<5.1	<4.7	<4.2	<4.4	<4.4	<4.2
Perfluorododecanoic acid (PFDoDA)	NA	NA	<3.5	<5.1	<4.7	<4.2	<4.4	<4.4	<4.2
Perfluoroheptane sulfonic acid (PFHpS)	NA	NA	26	24	130	<4.2	<4.4	<4.4	21
Perfluoroheptanoic acid (PFHpA)	NA	NA	40	150	35	60	<4.4	<4.4	29
Perfluorohexane sulfonic acid (PFHxS)	NA	NA	110	240	86	110	24	<4.4	45
Perfluorohexanoic acid (PFHxA)	NA	NA	19	61	23	24	<4.4	<4.4	13
Perfluorononanoic acid (PFNA)	NA	NA	<3.5	<5.1	5.7	<4.2	<4.4	<4.4	<4.2
Perfluorooctane sulfonamide (FOSA)	NA	NA	31	<5.1	<4.7	<4.2	<4.4	<4.4	<4.2
Perfluorooctane sulfonic acid (PFOS)	70	12	590	96	2,700	<4.2	28	<4.4	340
Perfluorooctanoic acid (PFOA)	70	12,000.00	470	720	280	130	28	<1.8	190
Perfluoropentanoic acid (PFPeA)	NA	NA NA		25	14	5.1	<4.4	<4.4	5.9
Perfluorotetradecanoic acid (PFTeDA)	NA	NA NA		<5.1	<4.7	<4.2	<4.4	<4.4	<4.2
Perfluorotridecanoic acid (PFTrDA)	NA	NA NA		<5.1	<4.7	<4.2	<4.4	<4.4	<4.2
Perfluoroundecanoic acid (PFUnDA)	NA	NA	<3.5	<5.1	<4.7	<4.2	<4.4	<4.4	<4.2
Perfluorononane sulfonic acid (PFNS)	NA	NA	<7						
Perfluoropentane sulfonic acid (PFPeS)	NA	NA	33						

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SUMMARY OF GROUNDWATER ANALYTICAL DATA - PFAS WOLVEN AND JEWELL STUDY AREAS

		PLAINFIFI D TOWN	SHIP MICHIGAN						
LOCATION			PMW-WV3	PMW-WV-4	PMW-WV-4	PMW-WV-5	PMW-WV-6	PMW-WV-6	PMW-WV-8
SAMPLE NAME	PART 201 GENERIC RESIDENTIAL GROUNDWATER CLEANUP	PART 201 GENERIC GROUNDWATER CLEANUP	PMW-WV3 (54- 59)	PMW-WV-4 (118- 123)	PMW-WV-4 (125- 130)	PMW-WV-5	PMW-WV-6 (13- 18)	PMW-WV-6 (98- 103)	PMW-WV-8 (109- 114)
LB ID	CRITERIA - DRINKING WATER	CRITERIA - GROUNDWATER SURFACE WATER INTERFACE	K1801365-005	K1802438-001	K1802438-002	K1802089-001	K1802550-001	K1802656-003	TE09005-001
SAMPLE DATE			02/12/2018	03/14/2018	03/14/2018	03/06/2018	03/19/2018	03/21/2018	05/08/2018
Parameter (ng/l)									
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NA	NA	<4.4	<5.1	<4.6	<4.8	<4.9	<4.8	<3.5
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NA	NA	<4.4	<5.1	<4.6	<4.8	<4.9	<4.8	<3.5
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NA	NA	<4.4	<5.1	<4.6	<4.8	<4.9	<4.8	<3.5
N-Ethyl perfluorooctane sulfonamidoethanol	NA	NA	<4.4	<5.1	<4.6	<4.8	<4.9	<4.8	
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NA	NA	<4.4	<5.1	<4.6	<4.8	<4.9	<4.8	<7
N-Methyl perfluorooctane sulfonamidoethanol	NA	NA	<4.4	<5.1	<4.6	<4.8	<4.9	<4.8	
Perfluorobutane sulfonic acid (PFBS)	NA	NA	5.3	<5.1	<4.6	8	8.3	17	<3.5
Perfluorobutanoic acid (PFBA)	NA	NA	<8.7	16	<9.3	<9.6	<9.8	<9.6	<3.5
Perfluorodecane sulfonic acid (PFDS)	NA	NA	<4.4	<5.1	<4.6	<4.8	<4.9	<4.8	<3.5
Perfluorodecanoic acid (PFDA)	NA	NA	<4.4	<5.1	<4.6	<4.8	<4.9	<4.8	<3.5
Perfluorododecanoic acid (PFDoDA)	NA	NA	<4.4	<5.1	<4.6	<4.8	<4.9	<4.8	<3.5
Perfluoroheptane sulfonic acid (PFHpS)	NA	NA	<4.4	<5.1	<4.6	<4.8	<4.9	<4.8	<3.5
Perfluoroheptanoic acid (PFHpA)	NA	NA	<4.4	<5.1	<4.6	<4.8	<4.9	<4.8	<3.5
Perfluorohexane sulfonic acid (PFHxS)	NA	NA	6.1	<5.1	<4.6	6.9	<4.9	<4.8	4.7
Perfluorohexanoic acid (PFHxA)	NA	NA	<4.4	<5.1	<4.6	<4.8	<4.9	<4.8	<3.5
Perfluorononanoic acid (PFNA)	NA	NA	<4.4	<5.1	<4.6	<4.8	<4.9	<4.8	<3.5
Perfluorooctane sulfonamide (FOSA)	NA	NA	<4.4	<5.1	<4.6	<4.8	<4.9	<4.8	<3.5
Perfluorooctane sulfonic acid (PFOS)	70	12	<4.4	<5.1	<4.6	<4.8	5.8	<4.8	<3.5
Perfluorooctanoic acid (PFOA)	70	12,000.00	<1.7	4.4	<1.9	4.3	9	2.9	11
Perfluoropentanoic acid (PFPeA)	NA	NA	<4.4	<5.1	<4.6	<4.8	<4.9	<4.8	<3.5
Perfluorotetradecanoic acid (PFTeDA)	NA	NA	<4.4	<5.1	<4.6	<4.8	<4.9	<4.8	<3.5
Perfluorotridecanoic acid (PFTrDA)	NA	NA	<4.4	<5.1	<4.6	<4.8	<4.9	<4.8	<3.5
Perfluoroundecanoic acid (PFUnDA)	NA	NA	<4.4	<5.1	<4.6	<4.8	<4.9	<4.8	<3.5
Perfluorononane sulfonic acid (PFNS)	NA	NA							<7
Perfluoropentane sulfonic acid (PFPeS)	NA	NA							<3.5

- 1. Concentration and criteria units are nano-grams per liter (ng/L) or parts per trillion (ppt); "< RL" indicates the compound was analyzed for but not detected above the method detection limit; RL = Reporting Limit
- 2. Bold indicates that compound was detected above the RL. Italic number with thick line border or italic chemical indicates that compound was detected above the USEPA Health Advisory for Drinking Water Uses.
- 3. Michigan Part 201 groundwater cleanup criteria protective of drinking water uses were based on MDEQ 's Table 1, Groundwater: Residential and Nonresidential, Part 201 Generic Cleanup cCiteria and Screening Levels, June 2018.
- 4. The cleanup criteria of 70 ppt was established for the combined concentrations of PFOA and PFOS.

SUMMARY OF GROUNDWATER ANALYTICAL DATA - PFAS WOLVEN AND JEWELL STUDY AREAS

		PLAINFIFLD TOWN							
LOCATION			PMW-WV-8	PMW-WV-8	PMW-WV-8	PMW-WV-8	PMW-WV-8	PMW-WV-9	PMW-WV-9
SAMPLE NAME	PART 201 GENERIC RESIDENTIAL GROUNDWATER CLEANUP	PART 201 GENERIC GROUNDWATER CLEANUP	PMW-WV-8 (119- 124)	PMW-WV-8 (30- 35)	PMW-WV-8 (40- 45)	PMW-WV-8 (50- 55)	PMW-WV-8 (60- 65)	PMW-WV-9 (79- 84)	PMW-WV-9 (89- 94)
LB ID	CRITERIA - DRINKING WATER	CRITERIA - GROUNDWATER SURFACE WATER INTERFACE	TE09005-002	TE03004-001	TE03004-002	TE03004-003	TE03004-004	TE12011-001	TE12011-002
SAMPLE DATE		JOHN NOE WATER HATELIANCE	05/08/2018	05/01/2018	05/01/2018	05/01/2018	05/01/2018	05/10/2018	05/10/2018
Parameter (ng/l)									
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NA	NA	<3.5	<3.5	<3.5	<3.5	<3.6	<3.8	<3.6
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NA	NA	<3.5	<3.5	<3.5	<3.5	<3.6	<3.8	<3.6
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NA	NA	<3.5	<3.5	<3.5	<3.5	<3.6	<3.8	<3.6
N-Ethyl perfluorooctane sulfonamidoethanol	NA	NA							
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NA	NA	<7	<7.1	<6.9	<6.9	<7.2	<7.6	<7.3
N-Methyl perfluorooctane sulfonamidoethanol	NA	NA							
Perfluorobutane sulfonic acid (PFBS)	NA	NA	3.8	16	23	54	25	<3.8	11
Perfluorobutanoic acid (PFBA)	NA	NA	<3.5	6.5	5.8	7.7	5.6	6.9	7.3
Perfluorodecane sulfonic acid (PFDS)	NA	NA	<3.5	<3.5	<3.5	<3.5	<3.6	<3.8	<3.6
Perfluorodecanoic acid (PFDA)	NA	NA	<3.5	<3.5	<3.5	<3.5	<3.6	<3.8	<3.6
Perfluorododecanoic acid (PFDoDA)	NA	NA	<3.5	<3.5	<3.5	<3.5	<3.6	<3.8	<3.6
Perfluoroheptane sulfonic acid (PFHpS)	NA	NA	<3.5	3.9	<3.5	<3.5	<3.6	22	25
Perfluoroheptanoic acid (PFHpA)	NA	NA	<3.5	9.2	6.9	4.9	4.3	17	45
Perfluorohexane sulfonic acid (PFHxS)	NA	NA	4.1	21	20	11	12	42	130
Perfluorohexanoic acid (PFHxA)	NA	NA	<3.5	12	11	9.6	6.7	8.3	21
Perfluorononanoic acid (PFNA)	NA	NA	<3.5	<3.5	<3.5	<3.5	<3.6	<3.8	<3.6
Perfluorooctane sulfonamide (FOSA)	NA	NA	<3.5	<3.5	<3.5	<3.5	<3.6	200	26
Perfluorooctane sulfonic acid (PFOS)	70	12	<3.5	39	6.5	6.1	3.9	1,600	360
Perfluorooctanoic acid (PFOA)	70	12,000.00	5.9	85	60	31	37	210	470
Perfluoropentanoic acid (PFPeA)	NA	NA	<3.5	6.8	7.4	7.4	4.7	<3.8	7.6
Perfluorotetradecanoic acid (PFTeDA)	NA	NA NA		<3.5	<3.5	<3.5	<3.6	<3.8	<3.6
Perfluorotridecanoic acid (PFTrDA)	NA	NA	<3.5	<3.5	<3.5	<3.5	<3.6	<3.8	<3.6
Perfluoroundecanoic acid (PFUnDA)	NA	NA	<3.5	<3.5	<3.5	<3.5	<3.6	<3.8	<3.6
Perfluorononane sulfonic acid (PFNS)	NA	NA	<7	<7.1	<6.9	<6.9	<7.2	<7.6	<7.3
Perfluoropentane sulfonic acid (PFPeS)	NA	NA	<3.5	4.3	5.1	<3.5	<3.6	7.4	31

- 1. Concentration and criteria units are nano-grams per liter (ng/L) or parts per trillion (ppt); "< RL" indicates the compound was analyzed for but not detected above the method detection limit; RL = Reporting Limit
- 2. Bold indicates that compound was detected above the RL. Italic number with thick line border or italic chemical indicates that compound was detected above the USEPA Health Advisory for Drinking Water Uses.
- 3. Michigan Part 201 groundwater cleanup criteria protective of drinking water uses were based on MDEQ 's Table 1, Groundwater: Residential and Nonresidential, Part 201 Generic Cleanup cCiteria and Screening Levels, June 2018.
- 4. The cleanup criteria of 70 ppt was established for the combined concentrations of PFOA and PFOS.

TABLE 4
SUMMARY OF GROUNDWATER SAMPLE ANALYSIS - VOC
WOLVEN/JEWELL STUDY AREA
PLAINFIELD TOWNSHIP, MICHIGAN

March Marc	LOCATION		PART 201 GENERIC		MW-WV-1	MW-WV-2D	MW-WV-2S	MW-WV-3D	MW-WV-3S	MW-WV-4	MW-WV-5D	MW-WV-5S	MW-WV-6D	MW-WV-6S	MW-WV-8D	MW-WV-8M	MW-WV-8S	MW-WV-9	WV-DUP-1
Control Cont							_												
March Marc																			
Control Cont	SAMPLE DATE				43187	43188	43188	43188	43188	43243	43187	43187	43215	43215	43286	43286	43286	43286	43188
March Marc	LAB ID	DRINKING WATER		INDOOR INHDALATION	TC30010-002	TC30010-009	TC30010-005	TC30010-008	TC30010-007	TE25018-002	TC30010-001	TC30010-003	TD28005-001	TD28005-002	TG07028-003	TG07028-002	TG07028-001	TG07028-004	TC30010-006
Second S	Parameter (ug/L)																		
Processor Proc	Acetone	730	1,700.00	1,000,000,000.00	<20	32	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
Secondary Seco	Benzene	5	200	5,600.00	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Processor Proc	Bromodichloromethane	80	NA	4,800.00	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Proceedings 198	Bromoform	80	NA	470,000.00	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
The particular Fig. Fig.	Bromomethane (Methyl bromide)	10	4	4,000.00	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Second 18	Carbon disulfide	800	NA	250,000.00	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	7.6	<1	<1	<1	<1
Processor 100 1,000 1,	Carbon tetrachloride	5	38	370	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Proceedings	Chlorobenzene	100	25	210,000.00	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
New Processor 10	Chloroethane	430	1,100.00	5,700,000.00	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Mathematical No. Mathematica	Chloroform	80	350	28,000.00	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	1.5	<1
2.25 1.45 1.25 1.45 1.25 1.45	Chloromethane (Methyl chloride)	260	NA	8,600.00	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
2000 1000	Cyclohexane	NA	NA	NA	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
2. Decomposition (1) 2. Decomposition (1)	1,2-Dibromo-3-chloropropane (DBCP)	0.2	NA	220	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
3.00 1.00	Dibromochloromethane	80	NA	14,000.00	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
5.4 1.00006 1.5 1.00006 1.5 1.5 1.00006 1.5	1,2-Dibromoethane (Ethylene dibromide)	0.05	5.7	2,400.00	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
A CHISTOPHERESE 77	1,2-Dichlorobenzene	600	13	160,000.00	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
No.	1,3-Dichlorobenzene	6.6	28	18,000.00	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
3.3 celementaries	1,4-Dichlorobenzene	75	17	16,000.00	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,2000000000000000000000000000000000000	Dichlorodifluoromethane	1,700.00	NA	220,000.00	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
3.1 Octorowynee 7	1,1-Dichloroethane	880	740	1,000,000.00	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
28-12-0-16-0-16-0-16-0-16-0-16-0-16-0-16-0	1,2-Dichloroethane	5	360	9,600.00	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Part	1,1-Dichloroethylene	7	130	200	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
22-04-10-10-10-10-10-10-10-10-10-10-10-10-10-	cis-1,2-Dichloroethylene	70	620	93,000.00	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
in 3.2 Definition regimene	trans-1,2-Dichloroethylene	100	1,500.00	85,000.00	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Transplate propries	1,2-Dichloropropane	5	230	16,000.00	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Highestone 18 18 110,000.0	cis-1,3-Dichloropropene	NA	NA	NA	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Personne 1,000 NA 4,20,000,00 40 40 40 40 40 40	trans-1,3-Dichloropropene	NA	NA	NA	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Segregory beneme Segregory b	Ethylbenzene	74	18	110,000.00	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Methyl sketate NA	2-Hexanone	1,000.00	NA	4,200,000.00	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Methyl ethyl ketone (2-Butanone) 13,000.00 2,200.00 240,000,000.00 cl cl cl cl cl cl cl	Isopropyl benzene	800	28	56,000.00	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Methyl isobury ketone	Methyl acetate	NA	NA	NA	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Methyler (MTBL) 40 7,100,00 47,000,000 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	Methyl ethyl ketone (2-Butanone)	13,000.00	2,200.00	240,000,000.00	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Methylene Chloride 5 1,500.00 220,000.00 d d d d d d d d d d d d d d d d d	Methyl isobutyl ketone	1,800.00	NA	20,000,000.00	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Syree 100 80 170,000.00 41 41 41 41 41 41 41 41 41 41 41 41 41	Methyl tertiary butyl ether (MTBE)	40	7,100.00	47,000,000.00	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,1,2,2-Tetrahloroethane 8.5 78 12,000.00	Methylene Chloride	5	1,500.00	220,000.00	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	3	<1
Fetablioroethylene S	Styrene			170,000.00	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Toluene 790 270 530,000.00 41 41 41 41 41 41 41 41 41 41 41 41 41	1,1,2,2-Tetrachloroethane	8.5																	
1,1,2-Trichloro-1,2,2-trifluoreethane 170,000.00 32 170,000.00 c1	Tetrachloroethylene	·		,															
1,2,4-Trichlorobenzene 70 99 300,000.00 41 41 41 41 41 41 41 41 41 41 41 41 41	Toluene		270	530,000.00	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,1,1-Trichlorethane 200 89 660,000.00 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	1,1,2-Trichloro-1,2,2-trifluoroethane																		
1,1,2-Trichloroethane 5 330 17,000.00 1 1,000.00 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1,2,4-Trichlorobenzene																		
Frichloroethylene 5 200 2,200.00	1,1,1-Trichloroethane	200	89	660,000.00	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Trichlorofluoromethane 2,600.00 NA 1,100,000.00 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1	1,1,2-Trichloroethane	5		,	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Vinjl Chloride 2 13 1,100.00 <1	Trichloroethylene	·																	
m,p-Xylene 280 41 190,000.00 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1	Trichlorofluoromethane	2,600.00					<1												
O-Xylene NA NA NA	Vinyl Chloride	_	13	<u>'</u>	<1	<1	<1	<1	<1	<1	<1		<1	<1	<1	<1	<1	<1	<1
Methylcyclohexane NA NA NA <5	m,p-Xylene	280	41	190,000.00	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	o-Xylene						<1	<1		<1					<1		<1		
	Methylcyclohexane		NA		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Xylenes 280 41 190,000.00 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1	Xylenes	280	41	190,000.00	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1

NOTES:

1. Concentration and criteria units are micro-grams per liter (ng/L) or parts per billion (ppt); "< RL" indicates the compound was analyzed for but not detected above the method detection limit; RL = Reporting Limit

2. Bold indicates that compound was detected above the RL. Italic number with thick line border or italic chemical indicates that compound was detected above the USEPA Health Advisory for Drinking Water Uses.

3. Michigan Part 201 groundwater cleanup criteria protective of drinking water uses were based on MDEQ 's Table 1, Groundwater: Residential and Nonresidential, Part 201 Generic Cleanup Citeria and Screening Levels, June 2018.

TABLE 5

SUMMARY OF GROUNDWATER SAMPLE ANALYSIS - INORGANIC WOLVEN/JEWELL STUDY AREA PLAINFIELD TOWNSHIP, MICHIGAN

16.0061278.81 Page 1 of 2 See Page 2 For Notes 8/10/2018

LOCATION	PART 201 GENERIC	PART 201 GENERIC	PART 201 GENERIC	MW-WV-1	MW-WV-2D	MW-WV-2S	MW-WV-3D	MW-WV-3S	MW-WV-4
SAMPLE NAME	RESIDENTIAL GROUNDWATER	GROUNDWATER CLEANUP CRITERIA -	RESIDENTIAL GROUNDWATER	MW-WV-1	MW-WV-2D	MW-WV-2S	MW-WV-3D	MW-WV-3S	MW-WV-4
SAMPLE DATE	CLEANUP CRITERIA -	GROUNDWATER SURFACE WATER	CLEANUP CRITERIA - INDOOR	3/28/2018	3/29/2018	3/29/2018	3/29/2018	3/29/2018	5/23/2018
LAB ID	DRINKING WATER	INTERFACE	INHDALATION	TC30010-002	TC30010-009	TC30010-005	TC30010-008	TC30010-007	TE25018-002
Parameter (ug/L)									
Antimony	6	130	NA	<2	<2	<2	<2	<2	<2
Arsenic	10	10	NA	<2	<2	<2	<2	<2	<2
Barium	2,000.00	NA	NA	190	97	42	25	50	86
Beryllium	4	NA	NA	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Cadmium	5	NA	NA	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Calcium	NA	NA	NA	87,000	120,000	86,000	74,000	16,000	49,000
Chloride	250,000.00	NA	NA	32,000	78,000	55,000	64,000	34,000	3,500
Chromium	NA	NA	NA	<5	<5	<5	<5	<5	<5
Cobalt	40	100	NA	<5	<5	<5	<5	<5	<5
Copper	1,000.00	NA	NA	<5	<5	<5	<5	<5	<5
Iron	300	NA	NA	1,600	480	230	230	3,600	690
Lead	4	NA	NA	<1	<1	<1	<1	<1	<1
Magnesium	400,000.00	NA	NA	33,000	30,000	27,000	24,000	6,300	16,000
Mercury	2	0.0013	56	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Molybdenum	73	3,200.00	NA	<10	<10	<10	<10	<10	<10
Nickel	100	NA	NA	<5	8.9	<5	<5	<5	<5
Potassium	NA	NA	NA	2,300	3,800	2,400	1,100	1,700	1,500
Selenium	50	5	NA	<5	<5	<5	<5	<5	<5
Silver	34	0.2	NA	<1	<1	<1	<1	<1	<1
Sodium	NA	NA	NA	17,000	12,000	31,000	25,000	9,500	10,000
Sulfate	250,000.00	NA	NA	43,000	44,000	15,000	11,000	<1,000	11,000
Thallium	2	3.7	NA	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Vanadium	4.5	27	NA	<5	<5	<5	<5	<5	<5
Zinc	2,400.00	NA	NA	<10	<10	<10	<10	<10	<10
Alkalinity	NA	NA	NA	300,000	38,000	290,000	230,000	41,000	210,000
Nitrate-Nitrite (as N)	NA	NA	NA	<20	<20	4,200	2,200	30	39
Nitrogen, Ammonia (As N)	NA	NA	NA	<100	<100	<100	280	650	410

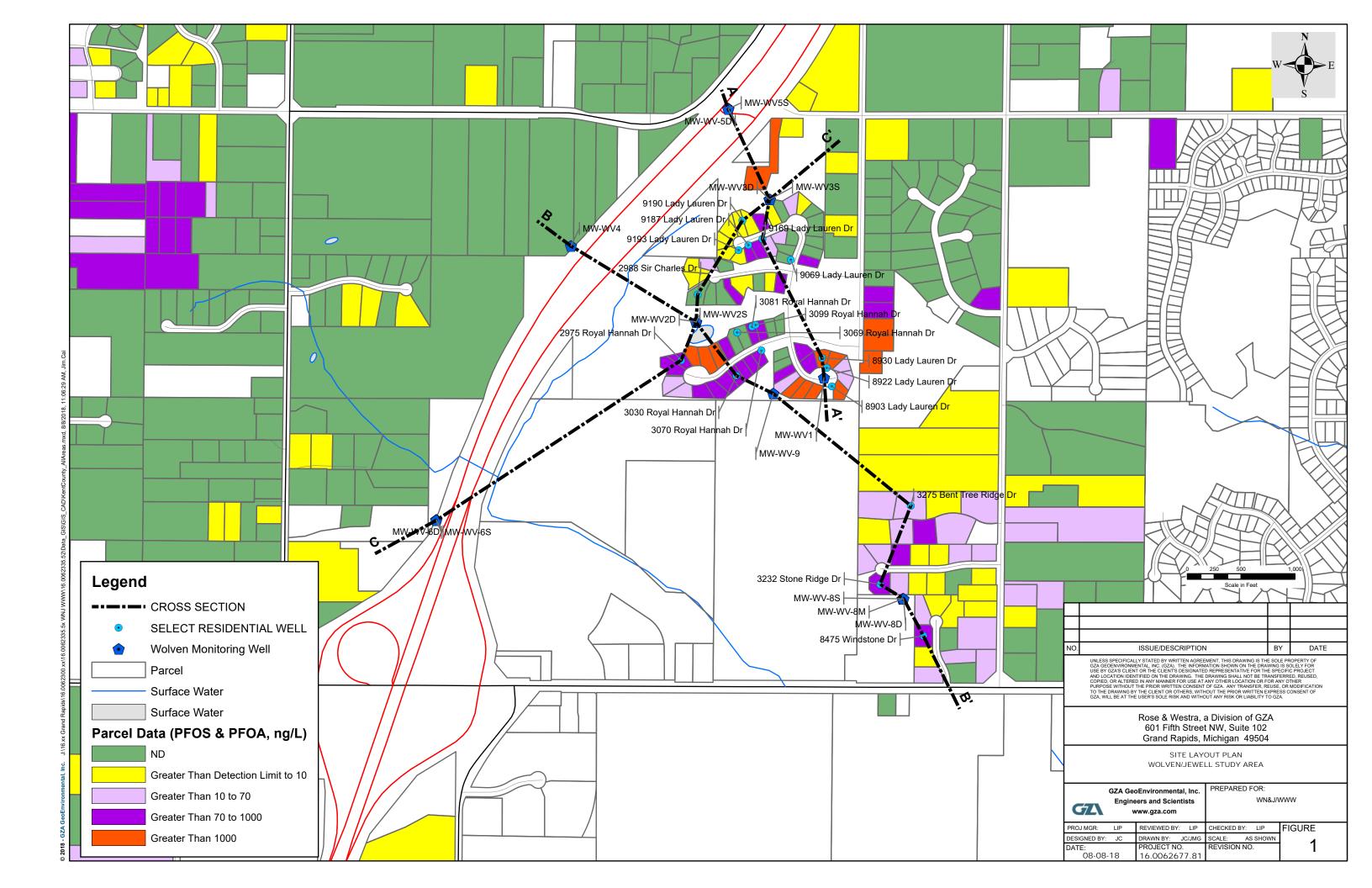
- 1. Concentration and criteria units are micro-grams per liter (ng/L) or parts per billion (ppt);
- "< RL" indicates the compound was analyzed for but not detected above the method detection limit; RL = Reporting Limit
- 2. Bold indicates that compound was detected above the RL. Italic number with thick line border or italic chemical indicates that compound was detected above the USEPA Health Advisory for Drinking Water Uses.
- 3. Michigan Part 201 groundwater cleanup criteria protective of drinking water uses were based on MDEQ 's Table 1, Groundwater: Residential and Nonresidential, Part 201 Generic Cleanup cCiteria and Screening Levels, June 2018.

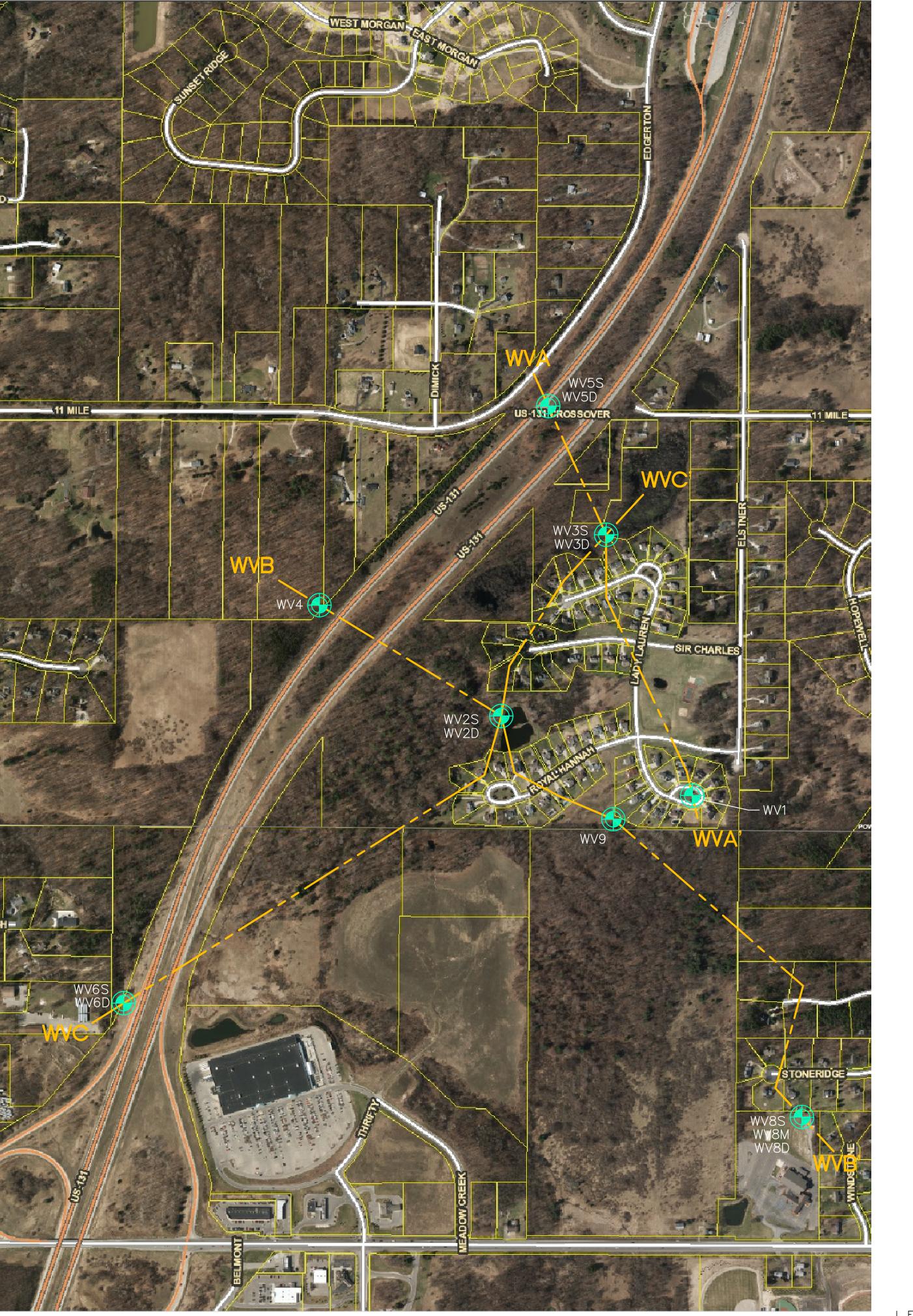
TABLE 5 SUMMARY OF GROUNDWATER SAMPLE ANALYSIS - INORGANIC WOLVEN/JEWELL STUDY AREA PLAINFIELD TOWNSHIP, MICHIGAN

16.0061278.81 Page 2 of 2 See Page 2 For Notes 8/10/2018

					1	1	1					
LOCATION	PART 201 GENERIC	PART 201 GENERIC	PART 201 GENERIC	MW-WV-5D	MW-WV-5S	MW-WV-6D	MW-WV-6S	MW-WV-8D	MW-WV-8M	MW-WV-8S	MW-WV-9	WV-DUP-1
SAMPLE NAME	RESIDENTIAL	GROUNDWATER CLEANUP CRITERIA -	RESIDENTIAL GROUNDWATER	MW-WV-5D	MW-WV-5S	MW-WV-6D	MW-WV-6S	MW-WV-8D	MW-WV-8M	MW-WV-8S	MW-WV-9	WV-DUP-1
SAMPLE DATE	GROUNDWATER CLEANUP CRITERIA -	GROUNDWATER SURFACE WATER	CLEANUP CRITERIA - INDOOR	3/28/2018	3/28/2018	4/25/2018	4/25/2018	7/5/2018	7/5/2018	7/5/2018	7/5/2018	3/29/2018
LAB ID	DRINKING WATER	INTERFACE	INHDALATION	TC30010-001	TC30010-003	TD28005-001	TD28005-002	TG07028-003	TG07028-002	TG07028-001	TG07028-004	TC30010-006
Parameter (ug/L)												
Antimony	6	130	NA	<2	<2	<2	<2	<2	<2	<2	<2	<2
Arsenic	10	10	NA	<2	<2	<2	<2	2.9	<2	<2	<2	<2
Barium	2,000.00	NA	NA	24	22	93	23	62	88	17	73	25
Beryllium	4	NA	NA	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Cadmium	5	NA	NA	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Calcium	NA	NA	NA	96,000 S	99,000	61,000 S	61,000	46,000	150,000 S	99,000	66,000	69,000
Chloride	250,000.00	NA	NA	42,000	36,000	310,000	430,000	38,000	<1,000	150,000	14,000	64,000
Chromium	NA	NA	NA	<5	<5	<5	<5	<5	<5	<5	<5	<5
Cobalt	40	100	NA	<5	<5	<5	<5	<5	<5	<5	<5	<5
Copper	1,000.00	NA	NA	<5	<5	<5	<5	<5	<5	<5	<5	<5
Iron	300	NA	NA	250	200	360	110	260	500	360	1,500	400
Lead	4	NA	NA	<1	<1	<1	<1	<1	<1	<1	<1	<1
Magnesium	400,000.00	NA	NA	30,000	30,000	32,000	17,000	16,000	49,000 S	30,000	27,000	22,000
Mercury	2	0.0013	56	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Molybdenum	73	3,200.00	NA	<10	<10	<10	<10	12	<10	<10	13	<10
Nickel	100	NA	NA	<5	<5	<5	<5	<5	<5	<5	<5	<5
Potassium	NA	NA	NA	1,400	1,300	4,200	2,000	5,900	2,000	1,500	4,700	1,100
Selenium	50	5	NA	<5	<5	<5	<5	<5	<5	<5	<5	<5
Silver	34	0.2	NA	<1	<1	<1	<1	<1	<1	<1	<1	<1
Sodium	NA	NA	NA	33,000	24,000	210,000 S	290,000	15,000	230,000 S	67,000	8,900	23,000
Sulfate	250,000.00	NA	NA	16,000	15,000	20,000	17,000	32,000	110,000	24,000	34,000	11,000
Thallium	2	3.7	NA	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Vanadium	4.5	27	NA	<5	<5	<5	<5	<5	<5	<5	<5	<5
Zinc	2,400.00	NA	NA	<10	<10	<10	<10	<10	<10	<10	<10	<10
Alkalinity	NA	NA	NA	350,000	340,000	350,000	350,000	170,000	310,000	300,000	310,000	230,000
Nitrate-Nitrite (as N)	NA	NA	NA	1,200	4,500	34	1,600	210	5,600 B	4,500 B	<20	2,100
Nitrogen, Ammonia (As N)	NA	NA	NA	<100	<100	<100	<100	460	<100	<100	<100	<100

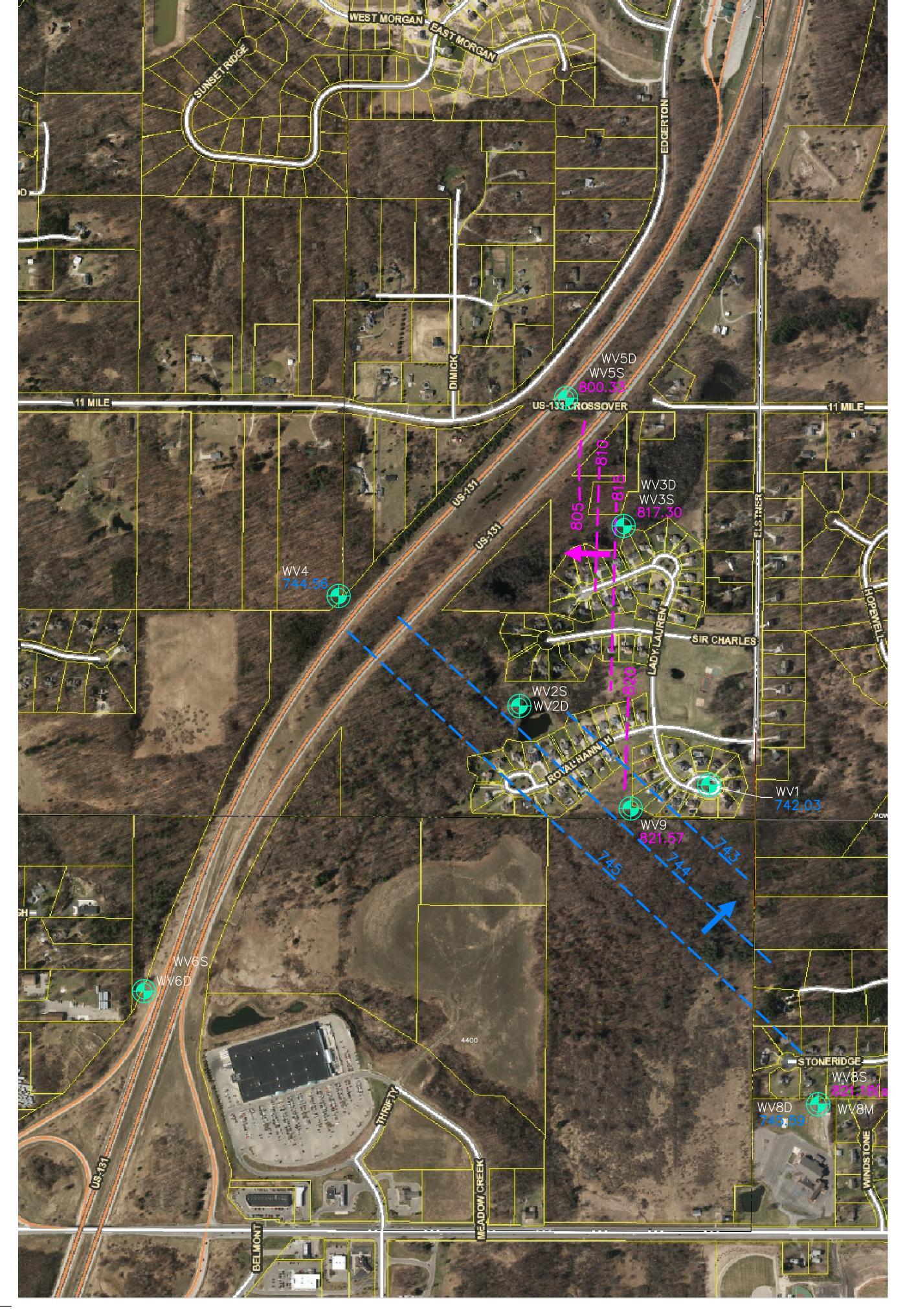
- 1. Concentration and criteria units are micro-grams per liter (ng/L) or parts per billion (ppt);
- "< RL" indicates the compound was analyzed for but not detected above the method detection limit; RL = Reporting Limit
- 2. Bold indicates that compound was detected above the RL. Italic number with thick line border or italic chemical indicates that compound was detected above the USEPA Health Advisory for Drinking Water Uses.
- 3. Michigan Part 201 groundwater cleanup criteria protective of drinking water uses were based on MDEQ 's Table 1, Groundwater: Residential and Nonresidential, Part 201 Generic Cleanup cCiteria and Screening Levels, June 2018.





WELLINGTON RIDGE AREA WELLS W/ SECTION CUTS

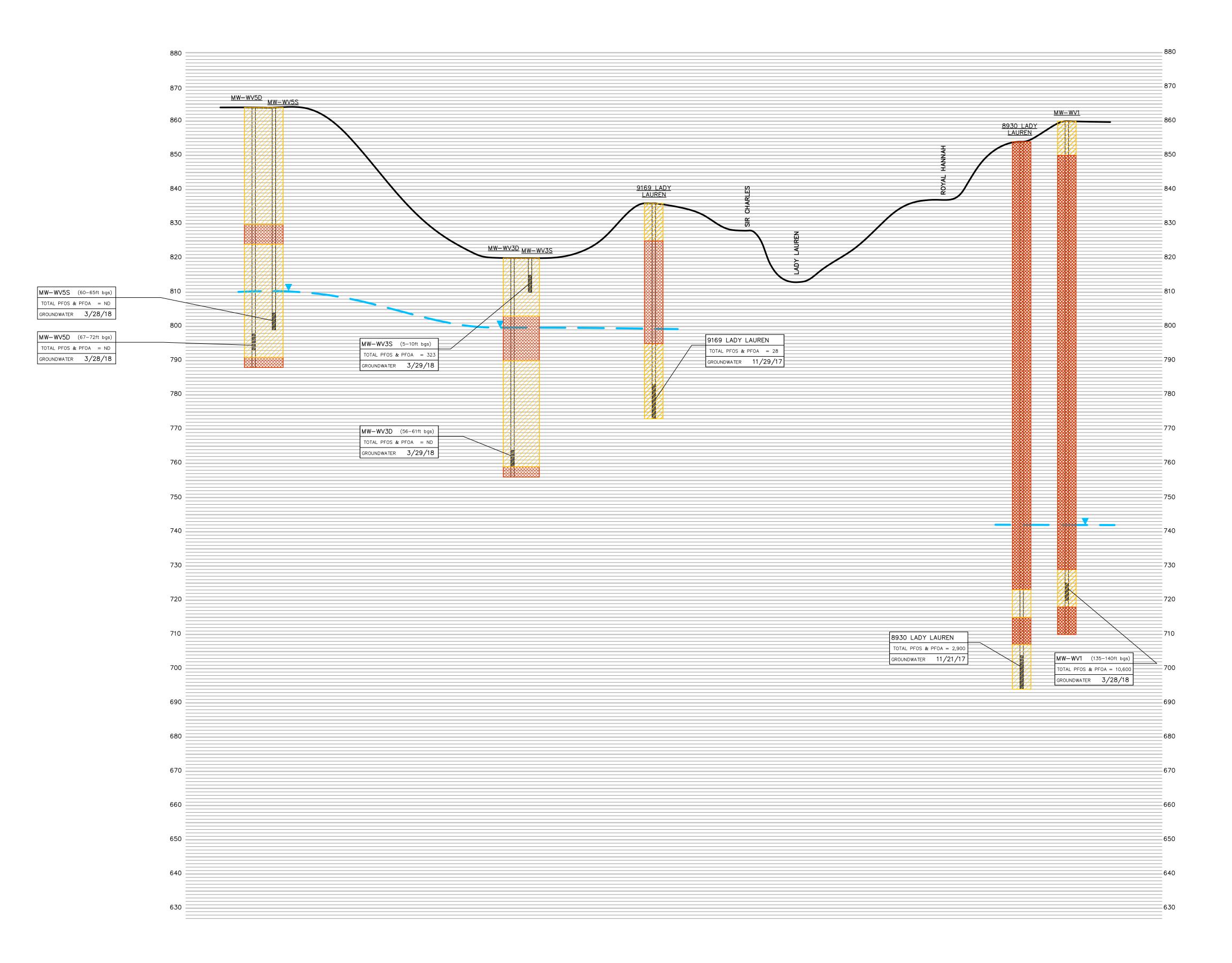
SCALE: 1" = 400'



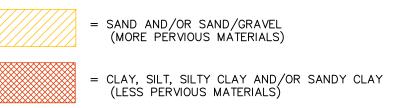
<u>LEGEND</u> = APPROX. DIRECTION OF GROUNDWATER FLOW (SHALLOW AQUIFER) = APPROX. DIRECTION OF GROUNDWATER FLOW (DEEP AQUIFER)

GROUNDWATER CONTOURS BASED ON AUG. 2018 MEASUREMENTS SCALE: 1" = 400'

PROJECT NO. 16.0062677.81



GEOLOGY LEGEND (SIMPLIFIED)



NORTHWEST—SOUTHEAST GEOLOGIC CROSS—SECTION WVA—WVA'

W/ PFOS and PFOA DATA

HORIZONTAL SCALE: 1" = 175'
VERTICAL SCALE: 1" = 15'

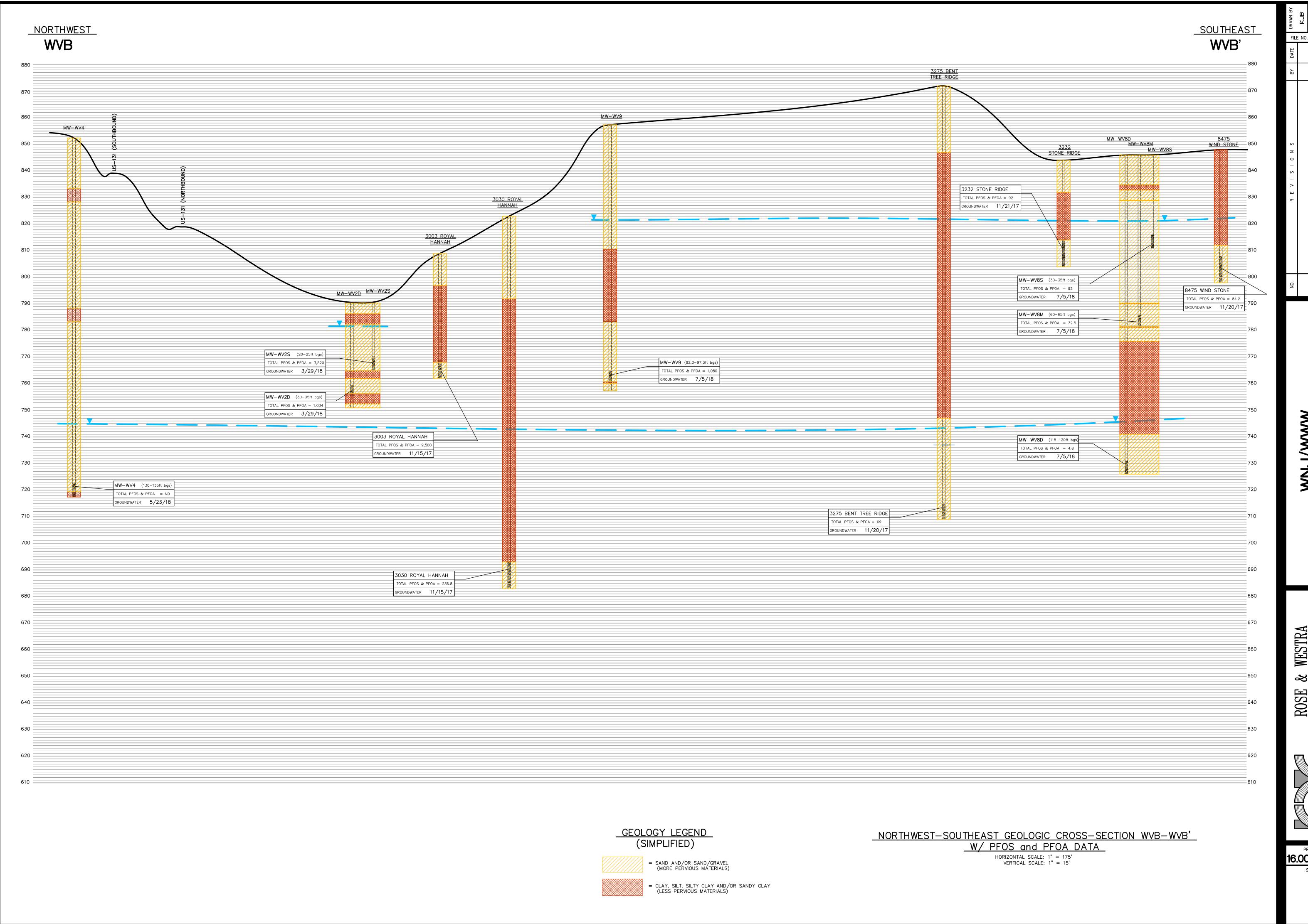
PROJECT NO.

16.0062677.8

SHEET NO.

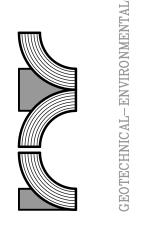
ROSE & W DIVISION

3

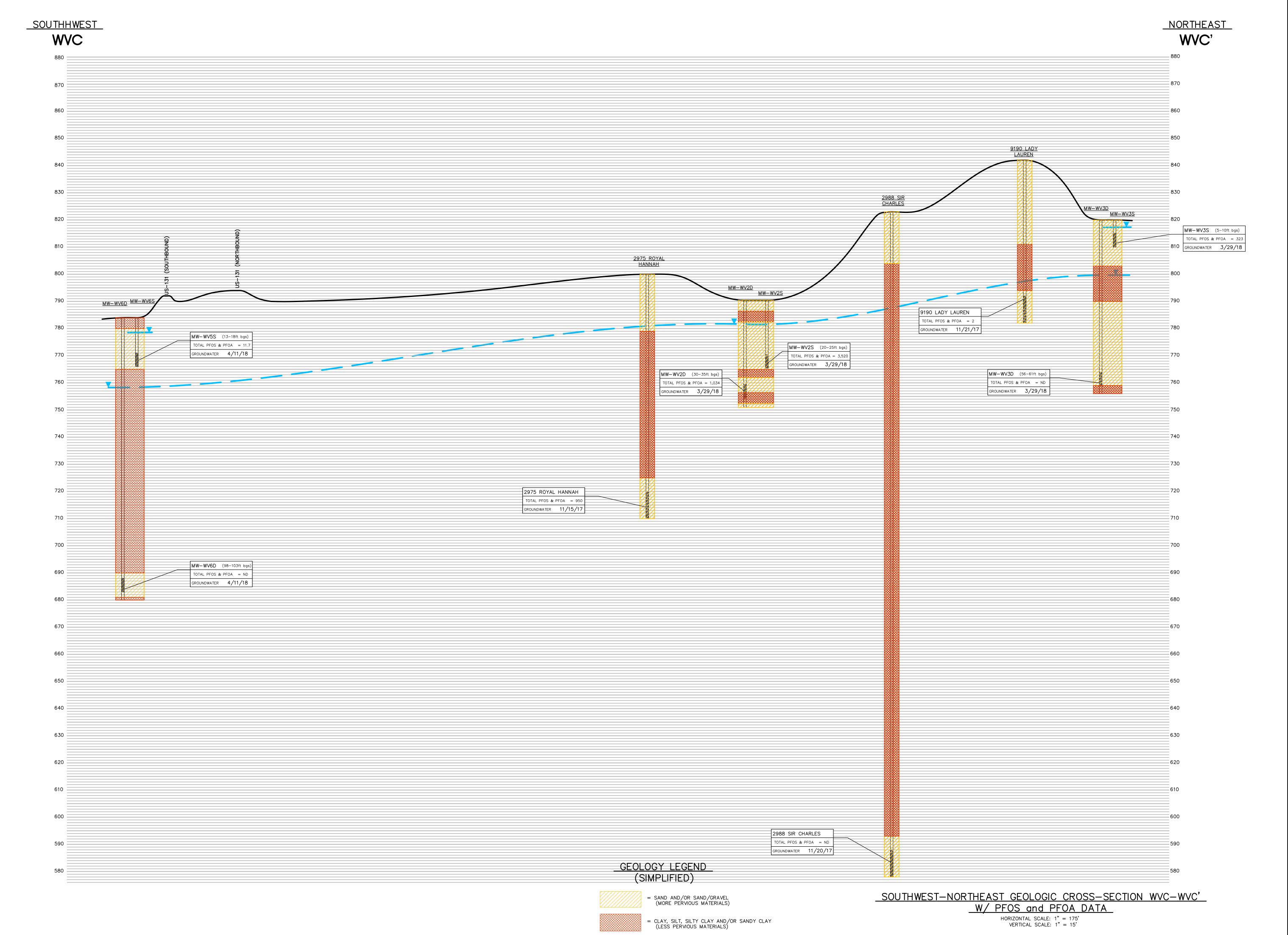


10th **≤ ≤**

ROSE & W DIVISION



PROJECT NO. 16.0062677.81



W
ELL
SS REPORT

REVISED IN ACCORDANCE WITH CONSTRUCTION RECORDS

DRAWN BY
LMN
SS REPORT

REVISED IN ACCORDANCE WITH CONSTRUCTION RECORDS

DRAWN BY
LMN
SS PATABOTT

DRAWN BY
LMN
STABLE

DATE

WNJ/WWW WOLVEN/JEWELL AUG. 10th PROGRESS REPC

ROSE & WESTRA
A DIVISION OF GZA
Grand Rapids, Michigan

GEOTECHNICAL—ENVIRONMENTAL—E

PROJECT NO.

16.0062677.8

SHEET NO.

5



Contractor: _

Foreman: _

Logged by: _

GS Elev.: _

Date Start/Finish: _

Boring Location: __

GZA GeoEnvironmental, Inc. Engineers and Scientists

Stearns Drilling Company

SAC / JTM

1-29-18 / 2-5-18

Jerry Huntoon

_ Datum: __

Wolverine World Wide Wolven Avenue Area

Boring No.: MW-WV1

Page: ____1 ___ of ____5 File No.: 16.0062677.81

Survey Date:

Stab

Algoma Twp, Kent County, Michigan

Auger/ Casing

NA

Check: Sampler **GROUNDWATER READINGS** Date Depth Casing

Surveyed By: _

Type: Hollow Stem Auger Split Spoon O.D. / I.D.: 12.25" / 4.25" 2.0" / 1 3/8" Hammer Wt.: NA 140lbs NA 30.0" Hammer Fall: ____

NA

TOC Elev.: __

NA

		San	nple Inforr	nation		TOC Elev.: NA NA	_ Surveyed By:	NA	Survey Date:
Depth	Na	Pen./	Depth	Blows	Test	Sample	Stratum	arks	Equipment Installed
	No.	Rec. (in.)	(Ft.)	(/6")	Data	Description & Classification	Desc.	Remarks	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 2'MATTER (FILL)	1	Concrete
2- 3-	2	24/18	2-4	4-3 3-4	ND	Loose, brown, SILT and SAND, moist.	SAND (FILL) SAND		
4- 5-	3	24/24	4-6	2-2 2-2	ND	Very loose, brown, fine SAND, some Silt, moist.			-
6- 7-	4	24/24	6-8	6-9 11-15	ND	Medium dense, brown, fine SAND, some Silt, trace small Gravel, dry.			
8- 9-	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)			
10 — 11 —	6	24/24	10-12	2-4 10-12	ND	Medium dense, brown, SILT, some fine Sand, trace Gravel, dry.	SILT		-
12- 13-	7	24/24	12-14	2-4 14-17	ND	Medium dense, brown, SILT, some fine Sand, trace Gravel, Iron staining in fractures, dry.			
14 — 15 —	8	24/24	14-16	6-12 20-21	ND	Dense, brown, SILT, some fine Sand, trace Gravel, Iron staining in fractures, dry.			-
16- 17-	9	24/24	16-18	6-10 15-19	ND	Medium dense, brown, SILT, some fine Sand, trace Gravel, Iron staining in fractures, dry.			
18- 19-	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)			
20 – 21 –	11	24/24	20-22	4-13 16-18	ND	Medium dense, brown, SILT, some fine Sand, trace Gravel, Iron staining in fractures, dry.			
22 – 23 –	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.			
24 – 25 –	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).			-
26 – 27 –	14	24/24	26-28	5-7 11-13	ND	Medium dense, gray, SILT, some Clay, trace fine Sand, trace Gravel, dry.			
28- 29-	15	24/24	28-30	3-4 6-7	ND	Medium dense, gray, SILT, some Clay, moist to wet.			

1. Field screeing 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).

6267781 WWW WOLVEN AVENUE.GPJ GZA_CORP.GDT 8/1/18 REMARKS



GZA GeoEnvironmental, Inc. Engineers and Scientists

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:

	Sample Information							Check:			
Depth	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed		
	16	24/24	30-32	2-3 6-0	ND	Loose, gray, SILT, some Clay, moist.	SILT				
31 – 32 –	18	24/0	32-34	27-37	_	Rock stuck in tip of split spoon.		2			
33-			02 0 .	41-27		The state of the s					
34 – 35 –	19	24/24	34-36	2-5 12-12	ND	Medium dense, gray, SILT, some Clay, trace Gravel, moist.					
36 – 37 –	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)					
38- 39-	21	24/24	38-40	3-9 12-13	ND	Medium dense, gray, SILT, some Clay, some Gravel, moist.					
40 – 41 –	22	24/24	40-42	5-9 11-16	ND	Medium dense, gray, SILT, some Clay, trace Gravel, moist.					
42- 43-	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)					
44 – 45 –	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)					
46 – 47 –	25	24/24	46-48	4-7 14-15	ND	Medium dense, gray, SILT, some Clay, trace Gravel, moist.					
48- 49-	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)					
50 — 51 —	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)					
52 – 53 –	28	24/24	52-54	2-8 11-14	ND	Medium dense, gray, SILT, some Clay, moist. (trace Gravel at 53.5 feet)					
54 — 55 —	30	24/24	54-56	6-10 14-15	ND	Medium dense, gray, SILT, some Clay, trace Gravel, moist.					
56 – 57 –	31	24/24	56-58	5-8 14-16	ND	Medium dense, gray, SILT, some Clay, trace Gravel, moist.					
58 – 59 –	32	24/24	58-60	5-11 16-17	ND	Medium dense, gray, SILT, some Clay, trace Gravel, moist.					
60 — 61 —	33	24/24	60-62	3-8 13-13	ND	Loose, gray, SILT, some Clay, trace Gravel, moist.					
62 – 63 –	34	24/24	62-64	5-7 14-15	ND	Medium dense, gray, SILT, some Clay, trace Gravel, moist.					
64 —	35	24/24	64-66	6-11 15-18	ND	Medium dense, gray, SILT, some Clay,			— Bentonite Grout		

 $2. \ \ Groundwater\ was\ encountered\ at\ approximately\ 31.0\ feet\ below\ ground\ surface.$

REMARKS



GZA GeoEnvironmental, Inc. Engineers and Scientists

Wolverine World Wide Wolven Avenue Area

Algoma Twp, Kent County, Michigan

Boring No.: ___MW-WV1 Page: ___3 __ of __5

File No.: ________ 61 _______ 5

ے		San	ple Inforn	nation		1	Check:				
Depth	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed		
66 – 67 –	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. Medium dense, gray, SILT, some Clay,	SILT				
68 – 69 –	37	24/24	68-70	4-5 11-14	ND	trace Gravel, moist. Medium dense, gray, SILT, some Clay, trace Gravel, moist.					
'0 '1	38	24/24	70-72	6-12 10-21	ND	Medium dense, gray, SILT, some Clay, trace Gravel, moist.					
72 – 73 –	39	24/24	72-74	5-8 22-17	ND	Medium dense, gray, SILT, some Clay, trace Gravel, moist. (loose, wet seam at					
74 — 75 —	40	24/24	74-76	12-20 21-24	ND	73.0 feet) Dense, gray, SILT, some Clay, trace Gravel, moist.					
76 – 77 –	41	24/24	76-78	6-11 16-22	ND	Medium dense, gray, SILT, some Clay, trace Gravel, moist.					
78 — 79 —	42	24/24	78-80	5-13 17-20	ND	Medium dense, gray, SILT, some Clay, trace Gravel, moist.					
30 — 31 —	43	24/24	80-82	8-12 15-21	ND	Medium dense, gray, SILT, some Clay, trace Gravel, moist.					
32 – 33 –	44	24/24	82-84	4-9 13-18	ND	Medium dense, gray, SILT, some Clay, trace Gravel, moist.					
34 — 35 —	45	24/24	84-86	6-13 17-26	ND	Medium dense, gray, SILT, some Clay, trace Gravel, moist.					
86 – 87 –	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)					
88 – 89 –	47	24/24	88-90	7-15 28-27	ND	Dense, gray, SILT, some Clay, trace Gravel, moist.					
90 — 91 —	48	24/24	90-92	10-18 26-29	ND	Dense, gray, SILT, some Clay, trace Gravel, moist.					
92 – 93 –	49	24/12	92-94	8-16 24-31	ND	Dense, gray, SILT, some Clay, trace Gravel, moist.					
94 — 95 —	50	24/24	94-96	11-27 33-37	ND	Dense, gray, SILT, some Clay, trace Gravel, moist.					
96 – 97 –	51	24/24	96-98	10-24 36-39	ND	Dense, gray, SILT, some Clay, trace Gravel, moist.					
98 – 99 –	52	24/24	98-100	7-17 26-27	ND	Dense, gray, SILT, some Clay, trace Gravel, moist.					

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



GZA GeoEnvironmental, Inc. Engineers and Scientists

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:

Sample Information					Check:			
Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Equipment Installed		
3 24/24	100-102	8-20 25-28	ND	Dense, gray, SILT, some Clay, trace Gravel, moist.	SILT			
24/24	102-104	10-21 27-39	ND	Dense, gray, SILT, some Clay, trace Gravel, moist.				
5 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)				
3 24/24	106-108	9-18 27-35	ND	Dense, gray, SILT, some Clay, trace Gravel, moist.				
3 24/12	108-110	10-28 36-45	ND	Dense, gray, SILT, some Clay, trace Gravel, moist.				
24/24	110-112	15-23 31-47	ND	Very dense, gray, SILT, some Clay, trace Gravel, moist.				
) 24/24	112-114	10-22 29-44	ND	Very dense, gray, SILT, some Clay, trace Gravel, moist.				
24/24	114-116	7-24 27-35	ND	Very dense, gray, SILT, some Clay, trace Gravel, moist. (1.0 inch gravel piece at				
24/24	116-118	18-28 34-40	ND	115.0 feet) Very dense, gray, SILT, some Clay, trace Gravel, moist.				
3 24/18	118-120	10-12 15-27	ND	Medium dense, gray, SILT, some Clay, trace Gravel, moist.				
24/24	120-122	14-23 27-35	ND	Dense, gray, SILT, some Clay, trace Gravel, moist.				
5 24/24	122-124	13-19 25-32	ND	Dense, gray, SILT, some Clay, trace Gravel, moist.				
5 24/24	124-126	9-14 21-27	ND	Dense, gray, SILT, some Clay, trace Gravel, moist.				
3 24/24	126-128	11-15 22-30	ND	Dense, gray, SILT, some Clay, trace Gravel, moist.				
7 24/24	128-130	6-10 16-24	ND	Medium dense, grayish brown, SILT, some Clay, little fine Sand, trace Gravel, moist.		— 2Inch PVC		
3 24/24	130-132	6-8 9-9	ND	Changing at 129.0 feet to: Grayish brown, SILT, some Clay, little fine Sand, trace Gravel, moist to wet. Medium dense, grayish brown, SILT, some	131' SAND	Riser		
) 24/0	132-134	6-7 8-11	-	Clay, little fine Sand, trace Gravel, moist to wet. Changing at 131.0 feet to: Tan, fine SAND, wet.				
24/12	134-136	18-25 42-50	ND	NO RECOVERY. Very dense, tan, fine SAND, wet.				
ı line	es represe	es represent approxima	es represent approximate boundary	es represent approximate boundary between s	es represent approximate boundary between soil types, transitions may be gradual. Water level readings	es represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made a tions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were		



Boring No.: MW-WV1 Page: ____5 of ____5

File No.: __16.0062677.81

igiri ea s'ario scientists	Algoma Twp, Kent County, Michigan
	Aigoria Twp, Kerit County, Michigan

_ L		San	ple Inforn	nation		Check:				
Depth	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
36 – 37 – 38 –	72	24/24	136-138	4-50/3"	ND	Very dense, tan, fine SAND, wet.	SAND		Filter Sand 2-Inch PVC Well Screen	
39 — 40 — 41 —	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.	440			
12— 13—	74	24/18	142-144	23-37 20/6"	3.4 ppmv	Hard, dark gray, SILT & CLAY, trace Sand, trace Gravel, moist.	SILT & CLAY			
14 — 15 —	75	24/18	144-146	22-41-50->50	4.1 ppmv	Hard, dark gray, SILT & CLAY, trace Sand, trace Gravel, moist.				
46 — 47 — 48 — 49 —	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'			
50 51 						Bottom of Borehole at 150.0 Feet	100	3		
52-										
53 –										
55-										
56-										
57 - 58 -										
59										
30										
31-										
32										
63 – 64 –										
55										
66-										
88										
39										
67 – 68 – 69 – 3 = 3 = 4	3. Monit	oring wel	l was instal	lled in boreh	nole upor	n completion. Well screen set from 135.0 to 140.0 fee	et below ground si	urfac	e.	
tratific	ation line	es represe	nt approxima	ate boundary	between s	oil types, transitions may be gradual. Water level readings	have been made at	times	Boring No.: MW-WV1	

GZA GeoEnvironmental, Inc. Engineers and Scientists
Engineers and Scientists

Boring No.: MW-WV2

Algoma Twp, Kent County, Michigan

Page: ___1__ of ___2 File No.: 16.0062677.81 Check:

Auger/ Casing

Sampler Type: Hollow Stem Auger Split Spoon

GROUNDWATER READINGS Date Depth Casing Stab

Date Start/Finish: _ Boring Location: _ GS Elev.: _

Contractor: __

Foreman: _

Logged by: _

_ Datum: _

Stearns Drilling Company

John Morehouse

2-14-18 / 2-14-18

Jerry Huntoon

Sample Information

O.D. / I.D.: <u>12.25" / 4.25"</u> _ 2.0" / 1 3/8" NA Hammer Wt.: ____ 140lbs NA 30.0" Hammer Fall: ____ NA NA TOC Elev.: __

NA Surveyed By: _ Survey Date:

ğ		Pen./	Depth	Blows	Test	Comple	Stratum	rks	Equipment Installed		
Depth	No.	Rec. (in.)	(Ft.)	(/6")	Data	Sample Description & Classification	Desc.	Remarks		PROTECTIV CASING	
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		Concrete	
2- 3-	2	24/18	2-4	1-1 1-1	ND	Very loose, black, fine to medium SAND and SILT, some Wood Fragments.					
4- 5-	3	24/4	4-6	0-1 1-1	ND	Very loose, black, SILT and fibrous PEAT.	4' SILT and PEAT				
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	ND	Very loose, brown, fine SAND, some Silt,	8' SAND and SILT				
9-	J	27/10	0-10	1-1	140	wet.	O, TE GIRG OIL				
10- 11-	6	24/18	10-12	2-2 1-1	ND	Very loose, brown, fine SAND and SILT, wet.					
12— 13—	7	24/24	12-14	1-4 4-4	ND	Loose, brown, fine to medium SAND and SILT, some Gravel, Some Clay lenses, wet.		2		—Bentonite Grout	
14 — 15 —	8	24/17	14-16	1-2 3-2	ND	Loose, brown, fine to medium SAND and SILT, some Gravel, wet.					
16 — 17 —	9	24/12	16-18	1-1 3-3	ND	Loose, brown, fine SAND and SILT, wet.					
18- 19-	10	24/18	18-20	1-2 2-3	ND	Loose, brown, fine SAND and SILT, trace Clay, wet.					
20 —	11	24/12	20-22	1-2 2-2	ND	Loose, brown, fine SAND and SILT, trace Clay, wet.					

REMARKS



Algoma Twp, Kent County, Michigan

Boring No.: MW-WV2 Page: ____2 of ___2 File No.: 16.0062677.81

		San	nple Inforn	nation			<i>g</i>		Check:			
Depth	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipm	ent Installed		
22- 23-	12	24/12	22-24	1-1 1-1	ND	Very loose, brown, fine SAND and SILT, wet.	SAND and SILT					
24 – 25 –	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.	25.5'					
26 – 27 –	14	24/18	26-28	2-2 2-2	ND	Soft, tan, CLAY, wet (CL).	CLAY			—2-Inch PVC Riser		
28 – 29 –	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.	28.5' SAND and GRAVEL	3		—Bentonite		
30 — 31 —	16	24/0	30-32	8-17 18-21	ND	NO RECOVERY.		4				
32- 33-	17	24/13	32-34	6-8 9-12	ND	Medium dense, brown, fine to coarse SAND and Gravel, trace Silt, wet.		4		—Filter Sand —2-Inch PVC Well Screer		
34 — 35 —	18	24/6	34-36	7-9 10-21	ND	Medium dense, gray, SILT, trace fine to medium Sand, wet.	34' SILT					
36 — 37 —	19	24/15	36-38	10-16 22-45	ND	Hard, gray, CLAY, some Silt, some fine to medium Sand, wet.	36' CLAY			Pantanita a		
38 — 39 —	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).	SAND (GLACIAL TILL)	_		— Bentonite a Sand		
40-						Bottom of Borehole at 39.5 Feet	39.5'					
41-												
42-												
43-												
44 –												
45 –												
R E M A R K S	Groui	ndwater s	n tip of split sample was analytical la	spoon. collected fi boratory tes	rom temp sting.	porary monitoring well with screen set at approximate	ely 31.0 to 36.0 fee	t bel	ow ground surfa	ace and		
 Stratifi	cation line	es represe	nt approxima	ate boundarv	between s	soil types, transitions may be gradual. Water level readings	have been made at	times	De de de	A A) A / \ A / \ / C		
nd un	der condi	tions state	d. Fluctuation	ons of ground	water may	y occur due to other factors than those present at the time n	neasurements were n	nade.	Boring No.:	IVIVV-VVV2		

Gravel stuck in tip of split spoon.
 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.

,		∣ GZ	ΪΑ				Wolverine	World Wide	е		Boring No.: MW-WV2S				
	57\)		oEnvironr ·				Wolven A		Page:1 of1						
	Engineers and Scientists					Alao	ma Twp, Ke				File No.: <u>16.0062677.81</u>				
Con	tractor:	S	tearns Dri	lling Comp	oany		Auger/		norngan		Check:				
Fore	reman: Jerry Huntoon						Casing	Sampler		GROUN	DWATER READINGS				
Log	ged by:		John M	<u>lorehouse</u>			ollow Stem Auger		Date	Time	Depth Casing Stab				
			2-14				12.25" / 4.25"	2.0" / 1 3/8"							
GS	Elev.: _		Date	um:		Hammer Fall: _		30.0"			NA 5 5 1				
		Sam	ple Inforn	nation		TOC Elev.:	NA	NA	Surveyed	I Ву:	NA Survey Date:				
ŧ			•							ks	Equipment Installed				
Depth	No.	Pen./ Rec.	Depth	Blows	Test	Sample Description & Classification		Stratum	Remarks	PROTECTIVE					
-		(in.)	(Ft.)	(/6")	Data	Descript	ion & Classifica	ation	Desc.	Sen	CASING				
						See MW-WV2 bo	oring log for soil	l			Concrete				
1-						descriptions.					Control				
2-															
3-															
4-															
5-															
6-															
7-											Bentonite				
8-											Grout				
9-															
10-															
11-	<u> </u> 														
12-															
13-															
14-															
15-											— 2-Inch PVC				
16-										D	Riser				
17-											Bentonite				
1											bo loo				
18-															
19-											[설계 기술]				
20-										[:	Top of Well				
21-											Screen				
											Filter Sand				
22-											2-Inch PVC				
23-											Well Screen				
24-															
35															
25-						Bottom of Boreho	ole at 25.0 Feet			1					
26-															
27-															
<u> </u>															
21— 22— 23— 24— 25— 26— 27— REMMARKS Stratification	1. Monit	oring wel	l was instal	lled in bore	hole upo	n completion. Well so	creen set from 20	.0 to 25.0 feet be	elow ground	surface.					
E															
M															
R															
K															
Stratif	ication line	es represe	nt approxima	ate boundary	between	soil types, transitions ma	av be gradual Wat	er level readings h	ave been mad	e at times	T				
and ur						y occur due to other fact					Boring No.: MW-WV2S				

	GZ/
C7\	Geo
GLI	Eng

Contractor: ___

Environmental, Inc. ineers and Scientists

Stearns Drilling Company

Wolverine World Wide Wolven Avenue Area

GROUNDWATER READINGS

Boring No.: MW-WV3 Page: ___1 __ of ___3

Algoma Twp, Kent County, Michigan Auger/

Sampler

140lbs

30.0"

File No.: 16.0062677.81 Check:

Foreman: ___ Jerry Huntoon Logged by: John Morehouse/Anthony Leonido Date Start/Finish: _

Sample Information

Type: Hollow Stem Auger Split Spoon O.D. / I.D.: 12.25" / 4.25" 2.0" / 1 3/8" Hammer Wt.: NA

Casing

Date Depth Casing Stab

Boring Location: _ GS Elev.: _ _ Datum: __

TOC Elev.: ____

NA Hammer Fall: ____ NA NA

NA Surveyed By: _ Survey Date: _

ا ہا									
Depth	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed PROTECTIVE
								₩	CASING
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,	SAND	1	Concrete
2- 3-	2	24/19	2-4	3-4 5-6	ND	little Silt, moist. Changing at 1.5 feet to: Brown and gray, CLAY & SILT, little fine to medium Sand, trace Organic Matter (roots),	1.8'CLAY & SILT SAND	2	
4- 5-	3	24/15	4-6	1-1 2-2	ND	moist. Changing at 1.8 feet to: Brown, fine to medium SAND, trace Silt, wet. Loose, brown, fine to medium SAND, trace Silt, wet.			
6-	4	24/16	6-8	0-1	ND	Very loose, gray, fine to medium SAND, trace Silt, trace fine Gravel, wet. Very loose, brown, fine to medium SAND,		3	
7-	-	27/10	0-0	1-2		trace Silt, trace Organic Matter (wood fragments, leaves), trace Hair, wet.			
8-	5	24/19	8-10	0-0 1-1	ND	Very loose, brown, fine to medium SAND, trace Silt, trace Organic Matter (leaves),			
9-						trace Hair, wet.			
10-	6	24/21	10-12	2-3 3-3	ND	Loose, gray, fine to medium SAND, trace Silt, wet.			-
12-	7	24/16	12-14	0-1 1-2	ND	Very loose, brown, fine to medium SAND, trace Silt, trace fine Gravel, wet.			
13-						ados cini, ados into ciavol, von			
14-	8	24/16	14-16	2-3 3-4	ND	Loose, brown, fine to medium SAND, trace Silt, wet.			
15-								4	
16- 17-	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,	17' Silty CLAY		
18-	10	24/18	18-20	4-8 8-9	ND	moist. Very stiff, gray, Silty CLAY, trace fine to coarse Sand, moist.			
19-									
20-	11	24/18	20-22	4-8 9-9	ND	Very stiff, gray, SILT, trace Gravel, trace Clay, wet.			
- '									

R E M

A R K

S WELL

6267781 WWW WOLVEN AVENUE.GPJ GZA CORP.GDT 8/1/18

- 1. 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).
- 2. Groundwater was encountered at approximately 1.8 feet below ground surface.

 3. 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.
- 4. 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.



MW-WV3 Boring No.: __

Page: ____2 of ____3 File No.: 16.0062677.81

Check:

Engineers and Scientists Algoma Twp, Kent County, Michigan

_		Sam	ple Inforn	nation				Check:			
Depth	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed		
23-	12	24/18	22-24	3-5 6-9	ND	Stiff, gray, Silty CLAY, trace fine Sand, wet.	Silty CLAY				
24 – 25 –	13	24/18	24-26	3-8 9-10	ND	Very stiff, brown to gray bands, Silty CLAY, trace fine Sand, wet.			— Bentonite		
26 – 27 –	14	24/17	26-28	5-6 9-7	ND	Stiff, gray, SILT, trace medium Sand, wet.	26' SILT	_	Grout		
28-	15	24/15	28-30	2-3 4-4	ND	Loose, gray, fine SAND and SILT, trace Clay, wet.	28' SAND and SILT	_			
30 -	16	24/8	30-32	1-2 2-3	ND	Very loose, brown, fine SAND, trace Silt, wet.	30' SAND	_			
32- 33-	17	24/8	32-34	1-2 2-4	ND	Very loose, brown, fine SAND, trace Silt, wet.					
34 – 35 –	18	24/12	34-36	1-3 3-5	ND	Loose, brown, fine SAND, trace Silt, wet.		5			
36 -	19	24/9	36-38	1-2 4-5	ND	Loose, brown, fine SAND, trace Silt, wet.					
38 — 39 —	20	24/10	38-40	1-1 2-6	ND	Very loose, brown, fine to medium SAND, trace Silt, wet.					
40 - 41 -	21	24/11	40-42	3-8 10-11	ND	Medium dense, brown, fine SAND, trace Gravel, trace Silt, wet.					
42 — 43 —	22	24/12	42-44	15-19 21-20	ND	Dense, brown, fine to medium SAND, trace Silt, wet.					
44 — 45 —	23	24/15	44-46	6-14 21-25	ND	Dense, brown, fine to medium SAND, trace Silt, wet.		6			
46 - 47 -	24	24/20	46-48	4-16 23-24	ND	Dense, brown, fine to medium SAND, trace Silt, wet.					
R	for lat 6. A gro	ooratory a undwater	ınalytical te	sting. as collected		emporary well with a well screen from approximately emporary well with a well screen from approximately					
Stratific						soil types, transitions may be gradual. Water level readings y occur due to other factors than those present at the time n			Boring No.: MW-WV3		

^{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.

A groundwater sample was collected from a temporary well with a well screen from approximately 34.0 to 49.0 feet below ground surface and submitted for laboratory analytical testing.



Algoma Twp, Kent County, Michigan

Boring No.: MW-WV3 Page: ___3__ of ___3

File No.: 16.0062677.81

_		Sam	ple Inforn	nation	T	Algoma Twp, Kent County,		Check:			
Depth	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipn	nent Installed	
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.				—2-Inch PVC	
51-										Riser	
52-	27	24/20	52-54	4-9 21-29	ND	Dense, brown, fine SAND, trace Silt, wet.				Bentonite	
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 -							56'				
57-	29	24/3	56-58	3-8 12-15	ND	Medium dense, gray and brown, fine to coarse SAND and GRAVEL, wet.	SAND and GRAVEL	8		— Filter Sand	
58-	20	04/40	F0 C0	3-4	ND	Madium dance husum fine to seeme CAND				r mor cana	
59-	30	24/12	58-60	13-16	IND	Medium dense, brown, fine to coarse SAND and GRAVEL, wet.				—2-Inch PVC Well Screer	
30 —	31	24/18	60-62	4-6 8-9	ND	Medium dense, brown, fine to coarse SAND					
61 —	01	2 1,7 10	00 02	8-9		and Gravel, trace Silt, wet. Changing at 61.0 feet to: Tan, CLAY, wet.	61'				
62-	32	24/20	62-64	8-11	ND	Very stiff, tan, CLAY, wet.				Dantan'ita	
63-				11-12						—Bentonite an Sand	
64						Bottom of Borehole at 64.0 Feet	64'	8			
65											
66-											
67-											
68											
59 -											
70 - 71 -											
72-											
73-											
R	for lal	oratory a	sample wa analytical te i tip of split	esting.	I from a t	emporary well with a well screen from approximately	54.0 to 59.0 feet	belov	v ground surfac	e and submitted	
Stratific						soil types, transitions may be gradual. Water level readings y occur due to other factors than those present at the time m				MW-WV3	

^{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.

į,		∣ GZ	:A			\	Volverine	World Wide	е		Boring N	lo.: <u>MW-</u>	WV3S
	5 Z\			mental, In			Page:1 of1 File No.:16.0062677.81						
			_	d Scientists		Algoma	Twp, Ker	nt County, N	/lichigan				
Con	tractor:			Iling Com	pany		Auger/	Sampler					
Fore	eman: _		Jerry F	iy Leonido			Stem Auger	Split Spoon	Date	GROUN Time	NDWATER I Depth	READINGS Casing	Stab
				iy Econido					Date	111110	Вери	Ousnig	Otab
						Hammer Wt.:							
GS	Elev.: _		Dat	um:		Hammer Fall:		30.0"					
		San	nple Inforr	nation		TOC Elev.:	NA	NA	Surveyed	Ву:	NA Su	rvey Date:	
Depth		Pen./								Š	Equi	pment Insta	alled
Del	No.	Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Description 6	imple & Classifica	tion	Stratum Desc.	Remarks			FECTIVE
						See MW-WV3 boring	g log for soil				T '		
1-						descriptions.					-	Concr	rete
2-												Bento	nito
3-												Grout	
												2-Inch	n PVC
4 —												Riser	
5-													
6-													
7-												Filter	Sand
,												2-Inch	
8-												Well S	Screen
9-													
9												:] }	
10 —						Bottom of Borehole a	at 10 1 Eget			1	110A 110	<u> </u>	
11-						Bottom of Borenole a	at 10.11 eet			'			
''-													
12-													
13-													
14-													
15-													
16-													
17-													
18 <i>-</i>													
19-													
15— 16— 17— 18— 19— REMARKS	1. Monit	oring wel	I was insta	lled in bore	hole upo	n completion. Well screer	n set from 5.0	to 10.0 feet bel	ow ground si	urface.			
						soil types, transitions may be					Boring N	o : M/M/ \A/\/	36
and ur						y occur due to other factors to					Boring N	o.: MW-WV	

	GZA	Wolverir	e World Wide	Э					
GZ	GeoEnvironmental, Inc.	Wolven	Avenue Area						
	Engineers and Scientists	Algoma Twp, Kent County, Michigar							
Contractor: _	Stearns Drilling Company	Auger/	-						
Foreman:	Jerry Huntoon	Casing	Sampler		G				
Logged by: _	Anthony Leonido	Type: Hollow Stem Auge	r Split Spoon	Date					
Date Start/Fin	ish: <u>3-12-18 / 3-12-18</u>	O.D. / I.D.:12.25" / 4.25"	2.0" / 1 3/8"	3/16/18					
Boring Location	on:	Hammer Wt.:NA	140lbs						
GS Elev.:	Datum:	Hammer Fall:NA	30.0"						

Boring No.: MW-WV4 Page: ___1__ of ___6 File No.: 16.0062677.81

Check: _ ROUNDWATER READINGS

	Date	Time	Depth	Casing	Stab
	3/16/18	1600	84.0'	Open	
1					
	Surveyed	By:N	A Sur	vey Date:	

			ple Inforr						φ.			
Depth	No.	Pen./ Rec.	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equi	pment Installed PROTECTIVE		
	1	(in.) 24/24	0-2	1-1 1-1	ND	TOPSOIL. Changing at 0.5 feet to: Very loose, brown and black, fine to medium	0.5' TOPSOIL (LOAM)	- Re	_	CASING Concrete		
1-						SAND and SILT, dry.	SAND and SILT					
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'					
9-	3	24/20	9-11	3-4 6-6	ND	Loose, brown, fine SAND, trace Silt, dry.	SAND					
10-												
11-												
13-							13'					
14-				4.5			SAND and SILT					
15-	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).						
16-						(Oil).						
17-												
18-												
19-	5	24/20	19-21	5-10	ND	Medium dense, brown, SILT, trace fine	19' SILT	-				
20-				19-21		Sand, dry.						
21-												



Boring No.: MW-WV4
Page: 2 of 6
File No.: 16.0062677.81

Check:

Algoma Twp, Kent County, Michigan

		San	ple Inforr	nation					Check		
Depth	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Eq	uipment Instal	led
23-							SILT				
24-		0.4/00	04.00	0.40	0.4	M "	24' SAND				
25-	6	24/20	24-26	8-13 13-17	0.1	Medium dense, brown, fine SAND, trace Silt, dry.	SAND				-
26-											
27-											
28-											
29-	7	24/22	29-31	2-5 8-12	ND	Medium dense, brown, fine SAND, trace					
30 —						Silt, dry.					-
31-											
32-											
33- 34-											
35-	8	24/20	34-36	3-10 14-15	ND	Medium dense, brown, fine SAND, trace Silt, dry.					-
36-											
37-											
38-											
39-	9	24/24	39-41	5-12 17-21	ND	Medium dense, brown, fine SAND, trace					
40-						Silt, dry.					-
41-											
42-											
43-											
45-	10	24/22	44-46	8-21 22-30	ND	Dense, brown, fine SAND and fine GRAVEL, trace Silt.					-
46-											
47 —											
R E M A R K											
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-WV4

30RING_WELL 6267781 WWW WOLVEN AVENUE.GPJ GZA_CORP.GDT 8/1/18



Algoma Two Kent County Michigan

Boring No.: MW-WV4 Page: ___3__ of ___6

File No.: 16.0062677.81

ا ے	Sample Information							Check:		
Depth	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
18 –							SAND			
19-	11	24/21	49-51	3-11	ND	Dense, brown, fine to medium SAND and	49' SAND and SILT			
50-	11	24/21	49-51	22-28	ND	SILT, dry.	SAND and SILT			
51-										
52-										
53-										
54-	12	11/11	54-54.9	16-50/5"	ND	Very dense, brown, fine SAND and SILT,		2		
55-						some medium Gravel, dry.				
6-										
57-										
8-										
i9-	40	04/04	50.04	04.00	NID		59'			
io –	13	24/24	59-61	21-30 39-50	ND	Very dense, brown, fine to coarse SAND and SILT, trace medium Gravel, dry	SAND and SILT (GLACIAL TILL)			
						(GLACIAL TILL).			— Bentonite Grout	
51 –									Grout	
2-										
3-										
64 —	14	24/24	64-66	11-21 24-27	ND	Hard, gray, Silty CLAY, dry.	64' Silty CLAY	1		
55										
6-										
67 —										
8-										
i9-	15	24/19	69-71	19-43	ND	Very dense, gray, fine SAND and SILT with	69' SAND and SILT	- 1		
0-	13	24/13	03-71	38-46		Clay lenses, trace medium Sand, dry (GLACIAL TILL).	(GLACIAL TILL)			
, 1						(GENOINE TIEE).				
'2-										
73) Culit	nnoon ret	usal at app	rovimatal	55.0 fost					
≀ ´	z. Spiit :	spoon rei	usai at app	ioximately	55.0 leet					
1										
2										
3										
ratific	cation line	es represe	nt approxima	te boundary	hetween s	soil types, transitions may be gradual. Water level readings	s have been made at	times	Boring No.: MW-WV4	



Algoma Twp, Kent County, Michigan

Boring No.: MW-WV4 Page: ___4 __ of ___6 File No.: 16.0062677.81

_ L		San	ple Inforn	nation				Check:		
Depth	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
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).				
30 - 31 -						,		4		
32										
33-										
34 –	18	10/0	84-84.8	28-50/4"	ND	NO RECOVERY.		3		
35-										
36 - 37 -										
38 –										
39 –	19	24/24	89-91	8-13 19-25	ND	Dense, gray, fine SAND and SILT, some				
90-				19-25		medium Gravel, moist (GLACIAL TILL).				
91-										
92-										
94 –	20	24/24	94-96	14-24	ND	Very dense, gray, fine SAND and SILT.				
95-				28-41		Very dense, gray, fine SAND and SILT, some medium Gravel, moist (GLACIAL TILL).				
96 –										
97 – 98 –										
\perp	1 Split	spoon ref	usal at app	roximately	80 5 feet					
R = 3	a. Grave	ъроон ret	usai at app	spoon.	ov.ə reet					
Stratific	cation line	es represe	nt approxima	ite boundary	between s	soil types, transitions may be gradual. Water level reading y occur due to other factors than those present at the time	s have been made at	times	Boring No.: MW-WV4	



Boring No.: MW-WV4 Page: ____5 __ of ___6 File No.: 16.0062677.81

Algoma Twp, Kent County, Michigan

		San	nple Inforn	nation		Algoria Twp, Kent County, Michigan			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-						come mediam craves, any (content media					
106											
107 108											
109											
110	23	24/24	109-111	9-12 24-42	ND	Dense, gray, fine SAND and SILT, some medium Gravel, damp (GLACIAL TILL).					
111-											
112-											
113-											
114-	24	24/24	114-116	9-17	ND	Dense, gray, fine SAND and SILT, some					
115-				28-41		medium Gravel, damp (GLACIAL TILL).					
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 —						modum Gravor, damp (GE/10)//E TIEE).					
122										Inch PVC	
123 — 124 —	26	18/18	124-125.5	9-27-50/6"	10.7	Very dense, gray, fine SAND and SILT,		5			
R E M A R K S						ely 123.5 feet below ground surface.	1				
Stratificand und	cation line	es represe tions state	nt approxima d. Fluctuatio	te boundary	between s	soil types, transitions may be gradual. Water level readings y occur due to other factors than those present at the time m	have been made at neasurements were r	times	Boring No.: MW	-WV4	



Wolverine World Wide Wolven Avenue Area

Algoma Twp, Kent County, Michigan

MW-WV4 Boring No.: __ Page: ___6__ of ___6

File No.: 16.0062677.81

		Sar	mple Inforn	nation		Algoma Twp, Kent County,	Check:		
Depth	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
25-						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
27- 28- 29-	27	15/12	128-129.3	15-35-50/3"	5.0	Very dense, brown, fine to medium SAND, trace Silt, wet, with layer of green, fine SAND.	128' SAND		46 46 23 23 46 46 46 46
30 - 31 -									Filter Sand
32- 33-							133'		2-Inch PVC Well Screer
34 -	28	12/12	134-135	17-50+	ND	Very dense, red and green, fine Silty SAND, some Silty Clay, wet.	Silty SAND and CLAY		
36-						Bottom of Borehole at 135.0 Feet		7	
37-									
38-									
39-									
40-									
41-									
42-									
43-									
44-									
45-									
46-									
45— 46— 47—									
48-									
49-									
R	testin	g.				o 130.0 below ground surface. Groundwater sample upon completion. Well screen set from 130.0 to 135.			
trotific	cation line	es represe	ent approxima	te boundary	between s	soil types, transitions may be gradual. Water level readings y occur due to other factors than those present at the time n	have been made at t	imes	Boring No.: MW-WV4



Wolverine World Wide Wolven Avenue Area

Boring No.: <u>MW-WV5D</u>
Page: <u>1</u> of <u>3</u>

Algoma Twp, Kent County, Michigan

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

Auger/
Casing
Type: Hollow Stem Auger
Split Spoon

 Date
 Time
 Depth
 Casing
 Stab

 3/14/18
 1005
 64.4'
 Top of PVC

Boring Location: _____ Datum: _____ Datum: _____

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

Surveyed By: NA Survey Date:

_		Jan	ipie illioli	ilation					
Depth	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed 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:	SAND	1	Concrete
2- 3-	2	24/11	2-4	3-4 4-5	3.0	Brown, fine to medium SAND, trace Silt, damp. Loose, brown, fine to medium SAND, trace Silt, damp (rock fragment in tip of spoon).			
4- 5-	3	24/21	4-6	2-2 3-3	10.0	Loose, tan, fine to medium SAND, trace Silt, damp.			
6- 7-	4	24/15	6-8	2-2 3-3	ND	Loose, brown, fine to medium SAND, trace fine to coarse Gravel, moist.			
8- 9-	5	24/18	8-10	2-2 3-4	ND	Loose, brown, fine to medium SAND, trace Silt, moist.			
10- 11-	6	24/22	10-12	3-2 2-2	3.0	Loose, brown, fine to medium SAND, trace Silt, moist.			
12-	7	24/23	12-14	2-1 2-3	ND	Loose, brown, fine to medium SAND, trace Silt, moist.			
14- 15-	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			
16- 17-	9	24/24	16-18	4-5 8-10	ND	to: Loose, brown, fine to coarse SAND, trace Silt, moist. Medium dense, brown, fine to medium SAND, trace Silt, damp.			
18- 19-	10	24/22	18-20	5-10 11-11	ND	Medium dense, brown, fine to coarse SAND, trace Silt, damp. Changing at			
20 – 21 –	11	24/20	20-22	10-9 13-12	ND	approximately 19.7 feet to: Brown, fine to coarse SAND, trace Silt, damp. Medium dense, brown, fine to medium SAND, trace Silt, damp. Changing at			
22-	12	24/20	22-24	4-5 10-9	ND	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			
23-						\21.7 feet. Medium dense, tan, fine to medium SAND,			

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).

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



Wolverine World Wide

Wolven Avenue Area

Algoma Twp, Kent County, Michigan

Boring No.: MW-WV5D Page: ____2 of ____3

File No.: 16.0062677.81

Pen./ Rec. (in.) 24/21 24/18 24/19 24/19 24/19 24/24 24/24 24/24	Depth (Ft.) 24-26 26-28 28-30 30-32 32-34 34-36 36-38 38-40	Blows (/6") 5-5 9-13 3-7 7-7 2-3 4-4 2-2 2-2 2-2 2-3 4-7 1-4 3-3	ND	Sample Description & Classification trace Silt, damp. Medium dense, tan, fine to medium SAND, trace Silt, damp. 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. Loose, brown, fine to coarse SAND, trace fine Gravel, trace Silt, damp. Loose, brown, fine to coarse SAND, trace fine Gravel, trace Silt, damp. Loose, brown, fine to coarse SAND, trace fine Gravel, trace Silt, damp. Loose, brown, fine to coarse SAND, trace fine Gravel, trace Silt, damp. 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. 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	Stratum Desc. SAND 34.2' Silty CLAY 36' CLAY & SILT	Remarks 2	Bentonite Grout
24/18 24/19 24/17 24/19 24/24 24/24	26-28 28-30 30-32 32-34 34-36 36-38	9-13 3-7 7-7 2-3 4-4 2-3 4-4 2-2 2-2 2-3 4-7	ND ND ND ND ND	Medium dense, tan, fine to medium SAND, trace Silt, damp. 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. Loose, brown, fine to coarse SAND, trace fine Gravel, trace Silt, damp. Loose, brown, fine to coarse SAND, trace fine Gravel, trace Silt, damp. Loose, brown, fine to coarse SAND, trace fine Gravel, trace Silt, damp. Loose, brown, fine to coarse SAND, trace fine Gravel, trace Silt, damp. 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. 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	34.2' Silty CLAY	3	
24/19 24/17 24/19 24/24 24/24 24/20	28-30 30-32 32-34 34-36 36-38 38-40	2-3 4-4 2-3 4-4 2-2 2-2 2-2 1-4 3-3	ND ND ND ND	Silt, trace fine Gravel, damp. Changing at approximately 27.0 feet to: Medium dense, brown, fine to medium SAND, trace Silt, damp. Loose, brown, fine to coarse SAND, trace fine Gravel, trace Silt, damp. Loose, brown, fine to coarse SAND, trace fine Gravel, trace Silt, damp. Loose, brown, fine to coarse SAND, trace fine Gravel, trace Silt, damp. Loose, brown, fine to coarse SAND, trace fine Gravel, trace Silt, damp. 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. 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	Silty CLAY		
24/17 24/19 24/24 24/24 24/24	30-32 32-34 34-36 36-38 38-40	2-3 4-4 2-2 2-2 2-3 4-7	ND ND ND ND	damp. Loose, brown, fine to coarse SAND, trace fine Gravel, trace Silt, damp. Loose, brown, fine to coarse SAND, trace fine Gravel, trace Silt, damp. Loose, brown, fine to coarse SAND, trace fine Gravel, trace Silt, damp. Loose, brown, fine to coarse SAND, trace fine Gravel, trace Silt, damp. 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. 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	Silty CLAY		
24/19 24/24 24/24 24/20	32-34 34-36 36-38 38-40	2-2 2-2 2-3 4-7	ND ND ND	fine Gravel, trace Silt, damp. Loose, brown, fine to coarse SAND, trace fine Gravel, trace Silt, damp. 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. 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	Silty CLAY		
24/24 24/24 24/20	34-36 36-38 38-40	2-2 2-3 4-7 1-4 3-3	ND ND	fine Gravel, trace Silt, damp. 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. 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	Silty CLAY		Glout
24/24	36-38 38-40	4-7 1-4 3-3	ND ND	fine Gravel, trace Silt, moist. Changing at approximately 34.2 feet to: Brown, Silty CLAY, little fine to coarse Sand, trace fine Gravel, damp. 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	Silty CLAY	4	
24/20	38-40	3-3		Gravel, damp. 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		4	
		1-2 5-5	ND	trace Silt, wet. Changing at approximately			
24/24	40.40		1	∖fine to medium Sand, moist.			
,	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. Medium dense, brown, fine SAND, trace	40' SAND		
24/22	42-44	10-13 18-19	ND	Silt, wet. Medium dense, brown, fine SAND, trace Silt, wet.			
24/24	44-46	6-10 10-13	ND	Medium dense, brown, fine SAND, trace Silt, wet.			
24/20	46-48	5-12 17-22	ND	Medium dense, brown, fine SAND, trace Silt, wet.			
24/22	48-50	7-16 21-22	ND	Medium dense, brown, fine SAND, trace Silt, wet.			
24/24	50-52	10-11 16-21	ND	Medium dense, brown, fine SAND, trace Silt, wet.			
l r noted s ndwater v	l ome clay pr was encour	l resent in tip itered at ap	o of spoo pproximat	l n. tely 36.4 feet below ground surface.			
r	noted s	noted some clay produced water was encour	noted some clay present in tip dwater was encountered at ap	noted some clay present in tip of spoodwater was encountered at approxima	noted some clay present in tip of spoon. dwater was encountered at approximately 36.4 feet below ground surface. s represent approximate boundary between soil types, transitions may be gradual. Water level reading	noted some clay present in tip of spoon. dwater was encountered at approximately 36.4 feet below ground surface. s represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made a	noted some clay present in tip of spoon.

^{3.} Driller noted some clay present in tip of spoon.4. Groundwater was encountered at approximately 36.4 feet below ground surface.



Wolverine World Wide Wolven Avenue Area

Algoma Twp, Kent County, Michigan

Boring No.: MW-WV5D Page: ___3__ of ___3

File No.: 16.0062677.81

_		Sam	ple Inforn	nation		Algoma Twp, Kent County,	, , , , , , , , , , , , , , , , , , ,	Check:
Depth	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	S Equipment Installed
53-	27	24/24	52-54	4-11 14-14	ND	Medium dense, brown, fine SAND, trace Silt, wet.	SAND	
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	ND	Medium dense, brown, fine SAND, trace		
59 — 60 —				10-16		Silt, wet. Changing at approximately 58.5 feet to: Brown, fine to coarse SAND, some fine Gravel, wet.		
61-	31	24/24	60-62	12-18 19-12	ND	Dense, brown, medium to coarse SAND, some fine Gravel, trace Silt, wet.		— 2-Inch PV0 Riser
62 – 63 –	32	24/15	62-64	2-3 6-9	ND	Loose, brown, medium to coarse SAND, some fine Gravel, trace Silt, wet.		
64 – 65 –	33	24/18	64-66	1-2 5-9	ND	Loose, brown and gray, fine SAND, trace Silt, wet.		Bentonite
66 – 67 –	34	24/12	66-68	2-4 7-12	ND	Medium dense, brown and gray, fine SAND, trace Silt, wet.		
88 – 89 –	35	24/10	68-70	1-4 7-10	ND	Medium dense, brown and gray, fine SAND, trace Silt, wet.		Filter Sand
70 – 71 –	36	24/15	70-72	2-4 7-14	ND	Medium dense, brown and gray, fine SAND, trace Silt, wet.		2-Inch PV0 Well Scree
72- 73-	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' CLAY	
74 – 75 –	38	24/24	74-76	11-14 26-27	ND	Hard, brown, CLAY. Changing at approximately 75.5 feet to: Gray, CLAY.		
76						Bottom of Borehole at 76.0 Feet	76'	5
77-								
78 – 79 –								
R =	5. Monit	oring well	l was instal	Led in bore	hole upor	completion. Well screen set from 67.0 to 72.0 feet l	Lelow ground surf	face.
						soil types, transitions may be gradual. Water level readings y occur due to other factors than those present at the time m		

,		GZ	:A				Wolverine	World Wide	е		В	oring No	o.:MW-\	WV5S_
		Ge	oEnvironr	mental, Ind			Wolven A	venue Area			Pa	age:	of _	2
	-/	_	-	d Scientists		Algoi	ma Twp, Kei	nt County, N	/lichigan				16.00626	577.81
	tractor:			lling Comp	oany		Auger/	Sampler						
		loe '		Huntoon /Anthony L	eonido		Casing ollow Stem Auger	-	Date	GROU Time		ATER R Depth	EADINGS Casing	Stab
Log	gea by:		3-14	1-18 / 3-14	<u>-18</u>		12.25" / 4.25"		Date	111116		рерии	Casing	Stab
						Hammer Fall: _	NA	30.0"						
		Com	ple Inforr	notion		TOC Elev.: _	NA	NA	Surveyed	Ву: _	NA	Su	rvey Date:	
₌		Jan	ipie illion	liation						Ŋ	Т	F		
Depth	No.	Pen./ Rec.	Depth	Blows	Test		Sample		Stratum	ar k	-	Equip	ment Insta	
-		(in.)	(Ft.)	(/6")	Data	Descripti	on & Classifica	ition	Desc.	Remarks			CASI	ECTIVE NG
						See MW-WV5D I	poring log for so	oil			\top			
1-						descriptions.						-	Concr	ete
2-													i	
3-														
4- 5-														
6-														
7-														
8-														
9-														
10-														
11-														
12-														
13-														
14-														
15-														
16-														
17-														
18-														
19-														
20 –														
22-														
23-														
24-														
25-														
£ 26−													Bento	nite
[∞] 27−													Grout	
[28 —														
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<u>≼</u> 30−														
31-														
^წ 32 —														
33-														
餐 34− ≅														
26 27 28 27														
≶ R ≶ E														
∑ M														
8/1/8 R														
²⁹ K ∃ S														
MEI														
Stratifi						soil types, transitions ma						loring No	o.: MW-WV	 5S
and ur						y occur due to other fact						orning INC	IVIVV-VV V	,



Wolverine World Wide Wolven Avenue Area

Boring No.: MW-WV5S Page: ____2 of ___2

File No.: 16.0062677.81

Algoma Twp, Kent County, Michigan

퉏		Sam	ple Inforn	nation					Check:
Depth	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
36-									
37-									
38 -									
39 –									
10 –									
11-									
12-									
13-									
44 –									
45 –									
46-									
47-									
48-									
19 —									
50-									
51-									
52-									0.1.1.51
53 —									— 2-Inch Rise
54 –									
55 –									
56-									500
57 –									Bentonite
58-									
59-									
30 -									
31-									
32-									Filter Sand
63									2-Inch PVC
64									Well Screen
35									
						Bottom of Borehole at 65.0 Feet		1	
36									
37-									
88									
59 —									
70 –									
71-									
72-									
72. I									
٦٦							1		
73 - 74 -									

		ı GZ	'A				Wolverine	World Wid	е		Boring No	.: MW-\	NV6D
(3 Z\)		oEnvironr	,			Wolven A	venue Area	3		Page:		3
		En	gineers and	d Scientists	3	Λlao	ma Twp, Ker				File No.:	16.00626	377.81
Con	tractor:	S	tearns Dri	lling Comp	oany	Aigu	Auger/		/iici iigai i		Check: _		
Fore	eman: _			luntoon		_	Casing	Sampler		GROUNE	WATER R	EADINGS	
Log	ged by:		Anthon	y Leonido		Type:H	lollow Stem Auger	Split Spoon	Date	Time	Depth	Casing	Stal
Date	Start/F	inish: _	3-19	-18 / 3-20	-18	O.D. / I.D.:	12.25" / 4.25"	2.0" / 1 3/8"					
Bori	ng Loca	ation: _				Hammer Wt.:	NA	140lbs					
GS	Elev.: _		Date	um:		Hammer Fall: .							
		Sam	nple Inforn	nation		TOC Elev.:	NA .	NA NA	Surveyed	By:^	NA Sur	vey Date:	
Depth	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Descript	Sample ion & Classifica	tion	Stratum Desc.	Remarks	Equip	ment Insta	ECTIV
1- 2- 3-	1	24/8	0-2	1-1 2-2	ND	Top 2.0 inches L brown, fine to me		d SILT, dry.	SAND and SIL			Concr	ete
4- 5- 6-	2	24/12	4-6	2-2 1-1	ND	Loose, brown, fir	ne SAND, trace		SAND and GRAVEL				

3- 4- 5- 6-	2	24	12	4-6	2-2 1-1	ND	Loose, brown, fine SAND, trace Silt, dry.	SAND and GRAVEL	-
7 - 8 - 9 - 10 -	3	24	12	9-11	2-5 7-7	ND	Medium dense, brown, fine SAND and fine GRAVEL, trace Silt, wet.		-
12 - 13 - 14 - 15 - 16 -	4	24	15	14-16	2-5 7-7	ND	Medium dense, brown, fine to coarse SAND and fine GRAVEL, some Silt, wet.	2	-
17- 18- 19- 20- 21- 22-	5	24	18	19-21	2-3 5-16	ND	Medium, brown, SILT, wet.	19' SILT	-
23 - 24 - 25 -	6	24	18	24-26	4-10 20-11	ND	Very stiff, brown, SILT, trace fine Sand, wet.		-
E.GPJ GZA CORP.GDT 8/1/18 20 - 30 - 31 - 32 - 32 - 32 - 32 - 32 - 32 - 32	7	24	19	29-31	11-25 25-32	ND	Very dense, brown, SAND and SILT, some Clay, wet (GLACIAL TILL).	29' GLACIAL TILL	-
33 - 34 - 34 -		24	19	34-36	4-14 25-34	ND	Very dense, brown, fine Silty SAND and		
BORING WELL 6267781 WWW WOLVEN AVENUE GP 3 33 34 ST and ST	al 2. A	oove bad groundv	kgrou ⁄ater s	ind levels sample wa	are shown	in parts p from a to	s was performed with a MiniRae 3000 photoionizatior per million by volume (ppmv) of isobutylene. ND indic emporary monitoring with well screen set at approxin	ates nothing detected (<0.1 ppmv).
Strat							oil types, transitions may be gradual. Water level readings y occur due to other factors than those present at the time m		Boring No.: MW-WV6D

Stab

PROTECTIVE CASING

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.



Sample Information

Wolverine World Wide Wolven Avenue Area

___ Pag

Boring No.: <u>MW-WV6D</u>
Page: <u>2</u> of <u>3</u>

File No.: 16.0062677.81

Algoma Twp, Kent County, Michigan

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Depth	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
36- 37-						SILT, some Clay, wet (GLACIAL TILL).	GLACIAL TILL			
38- 39-										
40 – 41 –	9	12/12	39-40	21-97	ND	Very dense, brown, SAND and SILT, some Clay, wet (GLACIAL TILL).				-
42- 43-										
44 — 45 —										
46 – 47 –									Bentonite	
48- 49-	10	24/18	49-51	21-38 44-53	ND	Very dense, brown, SAND and SILT, some			Grout	
50 – 51 –				44-55		Clay, wet (GLACIAL TILL).				-
52 — 53 — 54 —										
55 – 56 –	11	24/16	54-56	20-27 44-50	ND	Very dense, brown, SAND and SILT, some Clay, wet (GLACIAL TILL).				-
57 – 58 –										
59 – 60 –	12	24/17	59-61	20-24 30-46	ND	Very dense, brown, SAND and SILT, some Clay, wet (GLACIAL TILL).				-
61- 62-										
63 — 64 —	13	16/16	64-65.3	45-32-50/4"	ND	Very dense, brown, SAND and SILT, some				
65 — 66 — 67 —						Clay, wet (GLACIAL TILL).				_
68-	44	16/14	60.70.0	28-46-50/4"	ND	New dense brown SAND and SUT come				
67 — 68 — 69 — 71 — 72 — 74 — 75 — 74 — 75 —	14	16/14	69-70.3	20-40-30/4	ND	Very dense, brown, SAND and SILT, some Clay, wet (GLACIAL TILL).				-
72- 73-										
74- 75-	15	12/10	74-75	35-68	ND	Very dense, brown, SAND and SILT, some Clay, wet (GLACIAL TILL).				-

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times 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

3ORING_WELL 6267781 WWW WOLVEN AVENUE.GPJ GZA_CORP.GDT 8/1/18

REMARKS



Wolverine World Wide Wolven Avenue Area

Algoma Twp, Kent County, Michigan

Boring No.: MW-WV6D Page: ___3__ of ___3

File No.: 16.0062677.81

No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
16	17/15	79-80 4					œ	
		70-00.4	14-25-50/5"	ND	Very dense, brown, SAND and SILT, some Clay, wet (GLACIAL TILL).	GLACIAL TILL		
17	6/6	84-84.5	50-100/0"	ND	Very dense, brown, SAND and SILT, some Clay, wet (GLACIAL TILL).			
18	14/10	89-90.2	20-40-50/4"	ND	Very dense, brown, SAND and SILT, some Clay, wet (GLACIAL TILL).			
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
20	24/20	99-101	2-11 26-33	ND	Very dense, brown, fine SAND, trace Silt, wet.			Filter Sand 2-Inch PVC Well Scree
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' 106' CLAY	3	
					DOMONI OF DOTONOIS AL 100.0 T GEL			
						below ground surfa	ace.	
	20 21 Grount Monite	19 19/17 20 24/20 21 24/18 Groundwater v Monitoring wel	19 19/17 94-95.6 20 24/20 99-101 21 24/18 104-106 Groundwater was encour Monitoring well was instal	19 19/17 94-95.6 40-48 50-40/1" 20 24/20 99-101 2-11 26-33 21 24/18 104-106 16-16 21-21 Groundwater was encountered at app Monitoring well was installed in borely signal to the second seco	19 19/17 94-95.6 40-48 ND 20 24/20 99-101 2-11 ND 21 24/18 104-106 16-16 ND 21-21 ND Groundwater was encountered at approximate Monitoring well was installed in borehole upor	Clay, wet (GLACIAL TILL). 19 19/17 94-95.6 40-48 50-40/1* ND Very dense, brown, fine SAND, trace Silt, wet. 20 24/20 99-101 2-11 26-33 ND Very dense, brown, fine SAND, trace Silt, wet. 21 24/18 104-106 16-16 21-21 Dense, brown, fine SAND, trace Silt, wet. Changing at approximately 105.0 feet to: Gray, CLAY, wet. Bottom of Borehole at 106.0 Feet Groundwater was encountered at approximately 104.0 feet below ground surface. Monitoring well was installed in borehole upon completion. Well screen set from 98.0 to 103.0 feet	Clay, wet (GLACIAL TILL). 19 19/17 94-95.6 40-48 50-40/1* ND Very dense, brown, fine SAND, trace Silt, wet. 20 24/20 99-101 2-11 28-33 ND Very dense, brown, fine SAND, trace Silt, wet. 21 24/18 104-106 16-16 21-21 Dense, brown, fine SAND, trace Silt, wet. Changing at approximately 105.0 feet to: Gray, CLAY, wet. Bottom of Borehole at 106.0 Feet Groundwater was encountered at approximately 104.0 feet below ground surface. Monitoring well was installed in borehole upon completion. Well screen set from 98.0 to 103.0 feet below ground surface.	Claý, wet (ĠLACIAL TILL). 19 19/17 94-95.6 40-48 50-40/1* ND Very dense, brown, fine SAND, trace Silt, wet. 20 24/20 99-101 2-11 26-33 ND Very dense, brown, fine SAND, trace Silt, wet. 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. Bottom of Borehole at 106.0 Feet 4

		∣ GZ	:A				Wolverine	World Wid	е		_ [3oring N	lo.: MW-	WV6S
	5 Z\)			mental, In			Wolven A	venue Area	1		F	Page:	_1 of	1
			_	d Scientist		Algor	na Twp, Kei	nt County, N	/lichigan				16.0062	
	tractor:			illing Com	pany		Auger/	Sampler						
				Graham pher Melby	v		Casing ollow Stem Auger	-	Date	GRO Tin		NATER F Depth	READINGS Casing	Stab
				prior iviolo			12.25" / 4.25"		Date			Борин	Justing	Jus
Bor	ing Loc	ation:				Hammer Wt.: _	NA	140lbs						
GS	Elev.: _		Dat	um:		Hammer Fall: _								
		Sam	nple Inforr	mation		TOC Elev.: _	NA	NA	Surveyed	By:	N/	· Su	rvey Date:	
th c		Pen./								Π.	Š	Equir	pment Inst	alled
Depth	No.	Rec. (in.)	Depth (Ft.)	(/6")	Test Data	Descripti	Sample on & Classifica	ition	Stratum Desc.		Remarks			TECTIVE
						See MW-WV6D to descriptions.	ooring log for so	oil						
1-						descriptions.								
2-														
3-														
4 –													— Bento Grout	
5-													Groun	
Ū														
6-														
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9													2-Incl	h PVC
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44														
11-													:	
12-														
40														
13 –													# 4	
14 —														
													Filter	Sand
15 –													2 Incl	h PVC
16-														Screen
17 –														
18-						Dotters of David	lo et 40 0 = 1				<u>, E</u>			
						Bottom of Boreho	ne at 1ŏ.∪ Feet				1			
19 –														
_	1. Monit	toring wel	l was insta	lled in bore	hole upo	n completion. Well sc	reen set from 13	.0 to 18.0 feet be	elow ground :	surfac	e.			
R E														
M A														
R														
K S														
						soil types, transitions ma						Borina N	o.: MW-WV	 '6S
and ur	nder cond	itions state	a. Fluctuatio	ons of groun	awater ma	ay occur due to other factor	ors than those pres	ent at the time me	asurements we	ere ma	ae.		** V	

,		∣ GZ	'A				Wolverine	World Wid	de			Borin	g No.:	MW-\	WV8D
	57 \			mental, In			Wolven A	Avenue Are				Page:	1	of _	8
		En	gineers an	d Scientists	3	Algo	ma Twp, Ke	nt County.	Michigan					6.00626	
Con	tractor:	S		Iling Comp	oany		Auger/	<u>-</u>	gan		-	Checl	k:		
				- Braham		<u> </u>	Casing	Sampler						DINGS	
Log	ged by:		Christo	oher Melby	/		ollow Stem Auger		_ Date	Tir	ne	Dep	oth C	Casing	Stab
				/ 5-9-18			12.25" / 4.25"		-						
						Hammer Wt.: _			-						
GS	Elev.: _		Dat	um:		Hammer Fall: _ TOC Elev.:		30.0" NA		L D	N	Δ	C	Data:	
		San	nple Inforr	nation		TOC Elev.: _	NA NA	NA	Surveyed	і ву:	IN		Surve	y Date:	
ŧ		I	·								Š	F	auinme	ent Insta	lled
Depth	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Descripti	Sample on & Classification	ation	Stratum Desc.	۱	Remarks				ECTIVE
	1	24/21	0-2	3-4 4-3		Dark, yellowish b sorted fine to me	dium grained S	ÁND, little	SAND (FILL			,			
1 1-						Silt, slightly cohe Changing at 1.21			1.2'					-Concr	ete
						with occasional d	lark grayish bro	wn,	SAND						
						moderately well s		edium							
2-	2	24/14	2-4	1-1		grained SÁND, lit Yellowish brown,		to medium							
				1-3		grained SAND, t									
3-															
4-	3	24/17	4-6	1-2 2-2		Yellowish brown,									
				2-2		grained SAND, t	race Silt, moist	-							
5-															
6-	4	24/17	6-8	2-3 2-3		Yellowish brown,									
				2-3		grained SAND, t	race Silt, moist	-							
7-	1														
8-															
0	5	24/24	8-10	3-2 3-4		Yellowish brown,									
						grained SAND, t	race Siit, moist	-							
9-															
10-		0.4440	40.40												
	6	24/19	10-12	4-4 4-4		Yellowish brown, grained SAND, t									
						at 11.2 feet to: B									
11-						moderately sorte		, little Sand,	11.2'	_					
						plastic, cohesive	, moist.		11.4CLAY & SIL SAND						
12-	7	24/40	10.44	1 5		Droum to sellesse	h brown	rataly							
	7	24/19	12-14	1-5 5-5		Brown to yellowis sorted CLAY & S									
40						cohesive, moist.	Changing at 13	.0 feet to:	13'						
13-						Brown to yellowis SILT, cohesive, r			13.2' SILT						
						SILT, COHESIVE, I	ion piastic, moi	ວເ.	SAND						
14 —	8	24/21	14-16	3-4		Brown to yellowis	sh brown yery	vall sortad							
	"	27/21	14-10	3-4 5-7		SILT, cohesive, r									
						Changing at 15.3				_					
11— 12— 13— 14— REMARKS		•	•		•				•						
R E															
M															
A															
R K															
ŝ															
Stratifi	ication lin	es represe	nt approxima	ate boundary	between	soil types, transitions ma	av be gradual Wat	er level readings	have been mad	e at tin	nes				
and ur						y occur due to other fact						Borin	ig No.:	MW-WV8	BD



Wolverine World Wide

Wolven Avenue Area

Algoma Twp, Kent County, Michigan

Boring No.: MW-WV8D Page: ____2 of ____8

File No.: 16.0062677.81

		Sam	ple Inforn	nation					Check:
Depth	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
						brown, moderately sorted, fine to coarse grained SAND, trace Silt, moist.	SAND	_	
16-	9	24/17	16-18	2-3 7-7		Pale brown to light yellowish brown, very well sorted, fine to medium grained SAND, trace Silt, moist. Changing at 17 feet o: Yellowish brown, well sorted, CLAY & SILT, trace Sand, plastic, cohesive, moist. Changing at 17.1 feet o: Pale brown to light	17' 17.1°CLAY & SILT SAND		
18- 19-	10	24/20	18-20	5-5 6-7		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.			
20 — 21 —	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: Pale brown to brown, moderately well sorted, fine to coarse grained SAND, trace			
22 — 23 —	12	24/19	22-24	4-7 9-12		Silt, moist. Pale brown to brown, moderately well sorted, fine to coarse grained SAND, trace Silt, moist. Changing at 23.3 feet to: Yellowish brown to brown, moderately sorted, fine to coarse grained SAND, some Gravel, trace Silt, moist to wet.		1	
24 — 25 —	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.			
26 – 27 –	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.			
28 — 29 —	15	24/19	28-30	4-4 7-8		Brown to dark brown, moderately well sorted, fine to medium SAND, trace Silt, wet.			
30 — 31 —	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,			
32-	17	24/14	32-34	6-5 7-6		trace Silt, wet. Changing at 30.6 feet to: Brown to dark brown, moderately well sorted, fine to medium SAND, trace Silt, wet.			
R E M A R K S	1. Grou	ndwater v	vas encoun	itered at ap	proximat	ely 23.3 feet below ground surface.			
						soil types, transitions may be gradual. Water level readings y occur due to other factors than those present at the time n			Boring No.: MW-WV8D



Sample Information

Wolverine World Wide

Wolven Avenue Area

Algoma Twp, Kent County, Michigan

Boring No.: MW-WV8D

Page: ___3__ of ___8_ File No.: 16.0062677.81

Equipment	Installed
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33 — 34 — 1					Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
34 1						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	SAND		
	18	24/18	34-36	1-2 2-5		Silt, wet. Brown, well sorted, fine to medium grained SAND, trace Silt, wet. Changing at 34.3 feet to: Brown, poorly sorted, fine to coarse			
	19	24/18	36-38	5-7 9-10		grained SAND, little Gravel, trace Silt, wet. 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			
37— 38— 39—	20	24/21	38-40	7-7 8-9		grained SAND, trace Silt, wet. 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. Dark brown, poorly sorted, medium to coarse grained SAND, some Gravel, trace			
40 – 2 41 –	21	24/12	40-42	6-6 6-6		Silt, wet. Brown, well sorted, fine to medium grained SAND, trace Silt, wet. Changing at 41.0 feet to: Brown, well sorted, fine to medium grained SAND, trace Silt, wet.			
42- 43-	22	24/2	42-44	1-1 1-1		Brown, well sorted, fine to medium grained SAND, trace Silt, wet.			
44 — 2 45 —	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			
46 – ₂	24	24/15	46-48	2-4 6-6		Silt, wet. Changing at 44.6 feet to: Brown, well sorted, fine to medium grained SAND, trace Silt, wet. Dark yellowish brown, moderately well sorted, fine to coarse grained SAND, little Gravel, trace Silt, wet; grading coarser.			
48- 49-	25	24/12	48-50	4-7 6-7		Dark yellowish brown, moderately well sorted, fine to coarse grained SAND, little Gravel, trace Silt, wet; grading coarser.			



Wolverine World Wide

Wolven Avenue Area

Algoma Twp, Kent County, Michigan

Boring No.: MW-WV8D

Page: 4 of 8 File No.: 16.0062677.81

Check:

		San	ple Inforr	mation					Check:	
Depth	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipmen	t Installed
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- 53-	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.				
54 — 55 —	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, year, well costed fine.				
56 – 57 –	29	24/14	56-58	4-17-50/6"		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. Yellowish brown, very well sorted, fine grained SAND and Silt, moderately cohesive, wet.	55.7' 56' SILT SAND			Bentonite Grout
58 — 59 —	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,	58.5' 	=		
60 — 61 —	31	24/9	60-62	5-8 38-50/3"		moderately cohesive, non plastic, wet. Changing at 58.6 feet to: Yellowish brown, very well sorted, fine grained SAND and Silt, moderately cohesive, wet. Yellowish brown, very well sorted, fine grained SAND and Silt, moderately cohesive, wet.				
62- 63-	32	24/13	62-64	3-14 42-41		Yellowish brown, very well sorted, fine grained SAND and Silt, moderately cohesive, wet.				
64 — 65 —	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,	64.5' 64.7' SILT R4.9SILT & CLAY SAND			
66 — 67 —	34	24/9	66-68	4-15 34-40		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.	66' SILT 66.5' SAND			

BORING WELL 6267781 WWW WO

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



Wolverine World Wide

Wolven Avenue Area Algoma Twp, Kent County, Michigan Boring No.: MW-WV8D Page: ___5 of ___8

File No.: 16.0062677.81

_		San	ple Inforr	mation		Algoma Twp, Kent County, I	,		Check:
Depth	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
68 – 69 –	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. Grayish brown, very well sorted, fine grained	SAND		
70 — 71 —	36	24/9	70-72	49-50/4"		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. Grayish brown, poorly sorted, SILT & CLAY, little Sand, trace Gravel, slightly plastic, cohesive, moist.	70' SILT & CLAY		
72- 73-	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		
74 — 75 —	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		
76 77 78 79 80 81 82 83	39	24/24	79-81	6-13 27-41		Hard, brown, Clayey SILT, some medium Sand (embedded in Clayey Silt), wet.			
84 —	40	24/18	84-86	2-2 5-6		Medium stiff, brown, Clayey SILT, some medium Sand, wet.			

3ORING_WELL 6267781 WWW WOI 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.

Wolverine World Wide Wolven Avenue Area

Algoma Twp, Kent County, Michigan

Boring No.: MW-WV8D Page: ___6 __ of ___8

File No.: 16.0062677.81

_		Sam	ple Inforn	nation				1.0	Check:	
Depth	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equip	oment Installed
86-							Oldydy OlE i			
87 –										
88-										
89-	41	24/24	89-91	9-16 44-45		Hard, brown, Clayey SILT, some medium				
90-						Sand, wet.				
91 —										
92-										
93-										
94 –	42	24/24	94-96	8-16 30-55		Hard, brown, Clayey SILT, some medium Sand, wet.				
95						Cana, wet.				
96-										
97 —										
98-										
99-	43	24/24	99-101	8-19 34-42		Hard, brown, Clayey SILT, some medium Sand, wet.				
00-										
01-										
02-										
\dashv										
R E VI										
01- 02- REMARK										
8										
tratific	cation line	s represe	nt approxima	ite boundary	between s	soil types, transitions may be gradual. Water level readings y occur due to other factors than those present at the time m	have been made at	times	Boring N	o.: MW-WV8D

3ORING_WELL 6267781 WWW

Wolverine World Wide Wolven Avenue Area

Algoma Twp, Kent County, Michigan

Boring No.: MW-WV8D Page: ____7__ of ____8_

File No.: 16.0062677.81

ے ا		Sali	nple Inform	lation	1			10		
Depth	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipme	ent Installed
03-							Clayey SILT			
04-	44	24/24	104-106	6-14 20-20		Hard, brown, Clayey SILT, some medium to				
05-				20-20		coarse Sand, wet. Changing at 105.0 feet to: Brown, fine to medium SAND, little Silt, wet.	105' SAND			
06-							37412			
7-										
8-										
9-	45	24/20	109-111	7-10 15-37		Medium dense, brown, fine to coarse SAND, little Silt, wet.				
0-										
1-										
2-										
3-										
4-	46	22/22	114-115.8	3-5 24-50/4"		Medium dense, brown, fine to medium				
5-						SAND, trace Silt, wet.				
6-										Filter Sand
7-										
8-										-2-Inch PVC Well Screer
9-										
	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				
								•		



Wolverine World Wide Wolven Avenue Area

Boring No.: MW-WV8D Page: ___8 __ of ___8 File No.: 16.0062677.81

Algoma Twp, Kent County, Michigan

_ L		San	nple Inform	nation					Check:
Depth	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
21-	48	6/6	121-121.5	74		Silt, wet. Very dense, gray, fine to medium SAND and Silt, wet.	SAND	2	
23-	49	9/9	124-124.8	35-50/3"		Very dense, gray, fine to medium SAND and			
25-	40	0,0	124 124.0			Silt.			
27 –									
29 —	50	16/16	129-130.3	17-42-50/4"		Hard, gray, SILT & CLAY, some fine to medium Sand, wet.	129' SILT & CLAY		
31 —						Bottom of Borehole at 130.3 Feet	130.3'	3	
32-									
33-									
35-									
36 - 37 -									
36 – 37 – 37 – 38 E M A R K S Stratificand und	2. Auger 3. Monite	advance	ement slows Il was install	s at 120.0 fo ed in boreh	ee below nole upor	ground surface. Harder material. Collected in spoor n completion. Well screen set from 115.0 to 120.0 fe	l. et below ground s	surfac	ee.
Stratific	ation line	s represe	nt approximate	te boundary	between s	soil types, transitions may be gradual. Water level readings y occur due to other factors than those present at the time m	have been made a	t times	Boring No.: MW-WV8D

^{3.} Monitoring well was installed in borehole upon completion. Well screen set from 115.0 to 120.0 feet below ground surface.

	/		ı GZ	A				Wolverine	World Wide	Э		Boring	No.:MW-\	WV8M_
	(3 Z\	Ge	oEnvir on r				Wolven A	Avenue Area			Page: _	1 of _	2
			En	gineers and	d Scientists	6	Algor		nt County, M				:16.00626	677.81
- 1 (Con	tractor:	S	tearns Dri	lling Comp	oany		Auger/	-	lioriigari		Check:	-	
F	ore	man: _			Graham			Casing	Sampler		GROUNE	WATER	READINGS	
L	_og	ged by:		Christop	her Melby	/		llow Stem Auger	Split Spoon	Date	Time	Depth	Casing	Stab
				5-9				12.25" / 4.25"	2.0" / 1 3/8"					
							Hammer Wt.: _							
19	GS E	Elev.: _		Date	um:		Hammer Fall: _					10		
			San	ple Inforn	nation		TOC Elev.: _	NA	NA	Surveyed	ву:	<u> </u>	urvey Date:	
=	Deptn										ks	Fau	ipment Insta	alled
8	ř	No.	Pen./ Rec.	Depth	Blows	Test	Dogovinti	Sample	-4:	Stratum	ar			ECTIVE
			(in.)	(Ft.)	(/6'')	Data	Description	on & Classifica	ation	Desc.	Remarks		CASI	
	.						See MW-WV8D b	ooring log for so	oil			-		
	1-						descriptions from	0.0 to 63.0 fee	et.				——Concr	ete
	2-													
	3-													
	4													
	5-													-
	6-													
	7-													
	8-													
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BORING_WELL 6267781 WWW WOLVEN AVENUE.GPJ GZA_CORP.GDT 8/1/18														
NG C4	rotifi	cation lie	ae renrea	nt approvince	ate houndar	hetweer	soil types, transitions ma	v he gradual M/-4	tor lovel roadings L	ave hoon mad	a at times			
ar ar							y occur due to other factor					Boring	No.: MW-WV	BM



Wolverine World Wide Wolven Avenue Area

Boring No.: MW-WV8M Page: ____2 of ___2

File No.: 16.0062677.81

		Çar	ple Inforn	nation		Algoma Twp, Kent County,	iviicnigan	_	Check:
Depth	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
37 — 38 — 40 — 41 — 42 — 44 — 45 — 46 — 47 — 55 — 55 — 56 — 66 — 66 — 66 — 72 — 73 — 75 — 77 — 75 — 77 — 77 — 77 — 77	S-1	24/24	63-65	15-23 36-51		Very dense, brown, fine to medium SAND, trace Silt, wet. Bottom of Borehole at 65.0 Feet	SAND 65°		Filter Sand — 2-Inch PVC Well Screer
1. R E W A R	Monit	oring wel	l was instal	lled in borel	nole upor	n completion. Well screen set from 60.0 to 65.0 feet	t below ground surf	face.	

		GZ					vvoiverine	World Wid	e				o.: <u>MW-\</u>	
	7 []		oEnvironr gineers and				Wolven A	venue Area	3				1 of _	
			-			Algon	na Twp, Kei	nt County, N	/lichigan				16.00626	
Cont	tractor:	S	tearns Dri		oany	_	Auger/	Sampler			Ch	ieck: _		
				Graham		_	Casing	_				ATER R	EADINGS	
Logo	ged by:		Christop	her Melby	/	Type:Hol	low Stem Auger		Date	Time		Depth	Casing	Stab
			5-9				12.25" / 4.25"							
						Hammer Wt.:								
GS E	Elev.: _		Datu	um:		Hammer Fall:					NI A			
		Sam	nple Inforn	nation		TOC Elev.: _	NA NA	NA	Surveyed	Ву:	NA	Sur	vey Date:	
₽										S		Fauin	ment Insta	llad
Depth	No.	Pen./ Rec.	Depth	Blows	Test		Sample		Stratum	ark	-	Equip		
-	110.	(in.)	(Ft.)	(/6")	Data	Description	n & Classifica	ition	Desc.	Remarks	[— PROT CASIN	ECTIVE
\dashv						See MW-WV8D b	oring log for so	nil		<u> </u>	\vdash		0/1011	-
1-						descriptions from	0.0 to 33.0 fee	t.				-	Concr	ete
2-														
3-														
4														
5-														
6-														
7														
8														
9-														
0-														
1-														
2-														
3-													Bento	nite
1													Grout	
5														
6														
7 –														
3-														
9-														
0-														
1 –														
2-														
3-														
4														
5-											2540			
6-													Bento	nite
7-														
8-														
29											:			
80												::::	1	
31													Filter S	Sand
32														
33													2-Inch	PVC
84-	S-1	24/12	33-35	2-3 4-6		Loose, brown and	gray, fine to co	oarse	SAND				Well S	Screen
35						SAND, trace Silt.			35'					
٦٢						Bottom of Borehol	e at 35.0 Feet			1			-	
R E M A R	1. Monit	coring wel	l was instal	led in bore	hole upoi	n completion. Well scr	een set from 30	.0 to 35.0 feet b	elow ground s	surface.	•			
3														
'														
						soil types, transitions may y occur due to other facto						oring No	.: MW-WV8	3S

		GZ				vvoivei	rine vvoria vvid	ie		Boring No	o.: <u>MVV-V</u>	WV9D_
	3 2\)			mental, Ind d Scientists		Wolve	en Avenue Are	а		Page:	of	8
		1 = 11	giri ca rs and	u screniisis	5	Algoma Twp.	Kent County, I	Michigan			16.00626	
	tractor:			Iling Com		Auger/	Sampler					
Fore	man: _		Jerry Za	ch/Travis		Casing	_	_		DWATER F		
				<u>lorehouse</u>		Type: Hollow Stem Au			Time	Depth	Casing	Stab
								-				
						Hammer Wt.:NA Hammer Fall:NA		-				
GSE	iev.: _		Dati	um:		TOC Elev.: NA	<u></u>	Surveyed	Bv:	NA Su	rvev Date:	
_		San	ple Inforn	nation		100 2101.1		_ Our voyou	- J		ivey bate.	
Depth		Pen./	Daniella	DI	Test	Cample		Stratum	 	Equip	ment Insta	lled
۵	No.	Rec. (in.)	Depth (Ft.)	Blows (/6")	Data	Sample Description & Class	ification	Desc.	Remarks		—PROT	ECTIVE
	1	24/21	0-2	2-2		Very dark grayish brown, mo	oderately well	SILT	~~~		(ASII	NG
		- "-"	0 2	2-3		sorted, SILT, some fine to m						
						Sand, trace Gravel, moist.						
1-												
											\$	
								21			Sand	
2-	2	24/19	2-4	2-1		Dark yellowish brown, poorly	sorted, fine	SAND			Sanu	
4				1-1		grained SAND, some Silt, tra slightly plastic, moderately c					\$	
						slightly plastic, moderately c	onesive, moist.					
3-											1	
4												
											*	
4-	3	24/20	4-6	3-2 2-3		Yellowish brown, well sorted				\gg		
4				2-3		grained SAND, trace Silt, mo	oist.				Hole F	Plug
_										\gg		
5-												
4												
6-												
١	4	24/17	6-8	2-2 2-3		Yellowish brown, well sorted grained SAND, trace Silt, mo						
-						grained SAND, trace Sitt, Inc	Jist.					
7-												
.												
-												
8-	_	24/40	0.40	2-3		Vallandah haranga mali aasta d	l fine to me alima					
	5	24/18	8-10	2-2		Yellowish brown, well sorted grained SAND, trace Silt, mo	i, illie to medium oist.					
٦												
9-												
10	6	24/23	10-12	2-2		Yellowish brown, well sorted	l, fine to medium					-
_				3-3		grained SAND, trace Silt, mo	oist.					
11-												
4												
				•	•			•	,			
R												
E M												
Α												
R K												
s												
										_		
Stratific	cation line	es represe	nt approxima	ate boundary	between s	soil types, transitions may be gradual.	Water level readings	have been made	e at times	Boring No	o.: MW-WV9)D
and ull	aci wildi	world state	u. i iuotuatit	ons of ground	AMOREI IIIG	, 55541 445 15 011151 1451013 111411 111056	, prosont at the tille III	Sasarennenta We	, c made.	1 -		

BORING_WELL 6267781 WWW WOLVEN AVENUE.GPJ GZA_CORP.GDT 8/1/18



Sample Information

Wolverine World Wide

Wolven Avenue Area Algoma Twp, Kent County, Michigan

Boring No.: MW-WV9D Page: ____2 of ____8

File No.: 16.0062677.81

- 1		Sarr							
Depth	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installe
13-	7	24/17	12-14	3-4 5-4		Pale brown, well sorted, fine to medium grained SAND, bedded, moist.	SAND	E	
14 — - 15 —	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 — - 19 —	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	21.2' -21.3'ILT & CLAY SAND	:	
22-	12	24/17	22-24	8-13 17-22		SAND, bedded, moist. Pale brown grading to very pale brown, well sorted, fine to medium grained SAND, bedded, moist.			
	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.			



Wolverine World Wide

Wolven Avenue Area

Algoma Twp, Kent County, Michigan

Boring No.: MW-WV9D

Page: ___3__ of ___8_ File No.: 16.0062677.81

_	Sample Information				1		Check:			
Depth	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
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	ш.		
28 — - 29 —	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				
34 — - 35 —	18	24/24	34-36	13-17 21-25		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. Yellowish brown, moderately sorted, fine to coarse grained SAND, some Silt, trace Clay, trace Gravel, slightly to moderately plastic, cohesive, moist.				
36 — - 37 —	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			

3ORING_WELL 6267781 WWW WOL 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.



Wolverine World Wide

Wolven Avenue Area Algoma Twp, Kent County, Michigan Boring No.: MW-WV9D

Page: ___4 __ of ___8 File No.: 16.0062677.81

No 21	(in.)	Depth (Ft.) 40-42	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
-	24/19	40-42						
					Yellowish brown, moderately sorted, fine to coarse grained SAND, some Silt, trace Clay, trace Gravel, slightly to moderately plastic, cohesive, moist.	CLAY & SILT		
22	2 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.			
23	3 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.			
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	46.3' SAND 46.9' CLAY & SILT	_	
.8 — 25 - - -9 —	5 24/24	48-50	8-16 24-30			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. Dark grayish brown, moderately sorted, CLAY & SILT, some Sand, trace Gravel, slightly to moderately plastic, cohesive, moist.		
50 – 26 51 –	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 - 23	7 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.			



Sample Information

Wolverine World Wide

Wolven Avenue Area

Algoma Twp, Kent County, Michigan

Boring No.: MW-WV9D

Page: 5 of 8 File No.: 16.0062677.81

Check:

_		Jan	ipie intori	illation						
Depth	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Equipment Installed		
55— 56— 57—	28	24/24	54-56 56-58	7-16 25-26 5-13 19-25		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. 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.	CLAY & SILT 55.5' 55.6' SAND CLAY & SILT			
58 — - 59 —	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,				
60 —	31	24/24	60-62	11-15-50/5"		cohesive, moist. Changing at 59.7 feet to: Yellowish brown, well sorted, SILT, trace Sand, non plastic, moderately cohesive, moist. 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	59.7' 60' SILT CLAY & SILT 60.6' 60.7' SAND CLAY & SILT			
62-63-	32	24/24	62-64	5-13 23-22		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. Dark yellowish brown grading to dark grayish brown, poorly sorted, CLAY & SILT, trace Sand, trace Gravel, plastic, cohesive,	62.7' -62.8' SAND CLAY & SILT			
64 — - 65 —	33	24/24	64-66	8-16 30-45		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				
66 —	34	24/24	66-68	13-23 32-35		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. Dark grayish brown, poorly sorted, CLAY & SILT, trace Sand, trace Gravel, plastic, cohesive, grades softer, moist. Dark grayish brown, poorly sorted, CLAY & SILT, trace Sand, trace Gravel, plastic, cohesive, grades softer, moist.				

BORING WELL 6267781 WWW WOL

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



Wolverine World Wide Wolven Avenue Area

Algoma Twp, Kent County, Michigan

Boring No.: MW-WV9D Page: ___6 __ of ___8

File No.: 16.0062677.81

		Sam	ıple Infori	mation				File No.: 16.0062677.81 Check:		
Depth	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
-	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			
69 — - 70 —										
'1-	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.				
- '2- - '3-	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.				
- '4- - '5-	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			
- '6- - '7-	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: Yellowish brown, moderately well sorted, fine to medium grained SAND, little Silt, moderately cohesisve, moist to wet.		1		
8- - 9-	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.				
- 30 — - 31 —	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.				
	1. Grou	ndwater v	vas encour	ntered at app	oroximat	ely 76.9 feet below ground surface.				



Wolverine World Wide

Wolven Avenue Area Algoma Twp, Kent County, Michigan Boring No.: MW-WV9D

Page: ____7__ of ____8 File No.: 16.0062677.81

Check:

Sample Information Depth Remarks **Equipment Installed** Pen./ Depth **Blows** Test Sample Stratum No. Rec. Description & Classification (Ft.) (/6")Data Desc. (in.) 21-44-50/3 SAND 42 24/3 82-84 Yellowish brown, moderately well sorted, fine to medium grained SAND, little Silt, moderately cohesisve, moist to wet. 83 84 24/8 50/5" 43 84-86 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 24/7 86-88 12-35-50/6" Yellowish brown, poorly sorted, fine to medium grained SAND, little Silt, trace 44 Gravel, trace Clay, non to slighty plastic, slightly cohesive, moist to wet. 87 88 21-50/3" 47 24/7 88-90 Light yellowish brown to pale brown, very well sorted, fine to medium grained SAND, trace Silt, wet. 89 90 Yellowish brown, poorly sorted, fine to medium grained SAND, little Silt, trace 24/2 90-92 13-34-50/3" 48 Gravel, trace Clay, non to slighty plastic, slightly cohesive, moist to wet. 91 92 24/17 92-94 5-14 49 Yellowish brown, poorly sorted, fine to 30-50/3" medium grained SAND, little Silt, trace Gravel, trace Clay, non to slighty plastic, 8/1/18 slightly cohesive, moist to wet. 93 GZA CORP.GDT Filter Sand 94 50 24/13 94-96 35-34 Light yellowish brown to pale brown, very well sorted, fine to medium grained SAND, trace Silt, occasional very thin Silt seams, 2-Inch PVC wet. 95 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-WV9D

6267781 WWW WOLVEN AVENUE.GPJ WELL



Wolverine World Wide

Wolven Avenue Area Algoma Twp, Kent County, Michigan Boring No.: MW-WV9D Page: ___8 of __8

File No.: 16.0062677.81

- Cample information							Check:		
Depth	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
97 — - 98 — - 99 —	51	24/24	96-98 98-100	7-12 9-11 8-16 21-28		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,	\$AND 96.6' 96.85ILT & CLAY \$AND 97.8' \$ILT & CLAY	Ř	
00-						trace Gravel, moderately plastic, cohesive, hard, moist. 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'	2	
03-									
05-									
06-									
07 -									
09-									
R E M A R K S	2. Monit	oring wel	l was instal	led in borel	 hole upor	n completion. Well screen set from 92.3 to 97.3 feet	below ground surfa	ice.	
Stratific	cation line	es represe	nt approxima	ate boundary	between s	soil types, transitions may be gradual. Water level readings	have been made at t	imes	Boring No.: MW-WV9D