Memorandum

September 30, 2019

To:	Greg Rudloff, USEPA	Ref. No.:	012607-T35Y19
From:	Chris Meincke/ds/268	Tel:	248-893-3400
cc:	Tessy Jose, GLWA Rich Conforti, EGLE Jacob Runge, EGLE David Favero, RACER Tom Kinney, GHD		

Subject: **Area 1 Groundwater Elevation Monitoring Summary**
Performance Based Administrative Order on Consent
Docket Number RCRA 05 2011 0025
Eckles Road Site, Livonia, Michigan
USEPA ID No. MID 005 356 621
GLWA Special Discharge Permit No. SD6-94508

1. Introduction

GHD Services Inc. (GHD) has prepared this memorandum to summarize the groundwater elevation monitoring and associated groundwater extraction operations conducted from December 2018 through September 2019 for the Revitalizing Auto Communities Environmental Response Trust (RACER) site located at 12950 Eckles Road in Livonia, Michigan (Site). This submittal has been prepared to fulfill Section E.2 of Great Lakes Water Authority (GLWA) Special Discharge Permit SD6-94508 dated June 3, 2019, to continue to investigate the hydraulic profile of site to evaluate minimum pumping requirements to prevent flooding conditions requiring increased dewatering activities. The cessation of groundwater pumping activities and groundwater elevation monitoring activities were conducted to evaluate the response of groundwater elevations within the Area 1 Barrier Wall/containment area and whether pumping is required on a continuous or periodic basis. These activities were conducted to support additional characterization, modeling, and treatability activities being conducted regarding Per- and Polyfluoroalkyl Substances (PFAS) in and related to Area 1 at the Site.

The following sections present a summary of groundwater extraction operations and monitoring activities conducted at the Site and a summary of the results.

2. Background

Historically, groundwater flowed from the north portion of Area 1 to a French Drain, where the groundwater was extracted and transported to a Groundwater Treatment Plant (GWTP). Groundwater elevations were depressed in the area of the French Drain due to the dewatering activities conduced since 1981.

Groundwater elevations, contours, and flow directions changed significantly in 2004 when a soil-bentonite barrier wall was installed around Area 1, significantly decreasing pumping required to reduce off-site migration of chromium and nickel-impacted groundwater. In-situ chemical reduction (ISCR) injections were conducted 2015 through 2017 to reduce the concentrations of nickel and chromium in groundwater. The Area 1 GWTP process was modified in December 2018 based on reduced influent concentrations of chromium and nickel. PFAS have been detected in the GWTP influent, and effluent discharged to the GLWA sewer system. GLWA requested the development of best management practice (BMP) plan for PFAS and modified special discharge permits for discharges containing PFAS above specific levels, including plans to reduce the concentration of PFAS in the discharge. A PFAS Laboratory Treatability Study has been completed, and the contingencies/supplements for the proposed zero valent iron (ZVI) permeable reactive gate (PRG) to prevent PFAS migration outside of the containment area are being evaluated. RACER proposed to temporarily shut down groundwater pumping activities in December 2018 and periodically monitor groundwater elevations at select monitoring wells to evaluate the response of groundwater elevations within the containment area and whether pumping is required on a continuous or periodic basis. Details of the proposed activities are provided in a Request to Temporarily Cease Operations letter to the United States Environmental Protection Agency (USEPA) dated December 2018.

3. Site Activities Summary

GHD installed transducers in fifteen monitoring wells and the French Drain sump on December 20, 2018. Manual water level measurements were also collected on December 20, 2018. Depth to water measurements are presented in Table 1. Monitoring well locations are presented on Figure 1. Following installation of transducers and depth to water measurements, the French Drain was shut down on December 20, 2019. Groundwater levels were measured periodically to evaluate the response to the cessation of pumping activities. Groundwater levels were measured on December 20, 2018, January 4, 2019, January 17, 2019, February 18, 2019, March 15, 2019, April 15, 2019, May 6, 2019, May 23, 2019, June 6, 2019, June 13, 2019, July 12, 2019, August 8, 2019, and September 12, 2019. Groundwater elevations are presented in Table 2 and on Figure 2. Based on groundwater elevations measured in April 2019, and significant spring precipitation events in southeast Michigan, the French Drain pumping operations were restarted on April 22, 2019. The GWTP operated from April 22, 2019 until June 14, 2019. Approximately 2,260,000 gallons of groundwater were pumped from the French Drain and discharged to the GLWA sanitary sewer between April and June 2019. Groundwater level measurements and logging with transducers has continued through September 2019.

4. Results

4.1 Groundwater Elevation Monitoring

Based on the manual groundwater elevation measurements, groundwater levels were observed to have a slow steady increase during the months immediately following shutdown of the GWTP. Spring rains and associated surface water infiltration appeared to cause an increase in groundwater levels in March and April 2018 in monitoring wells located within the Area 1 Barrier Wall, specifically near the center and south

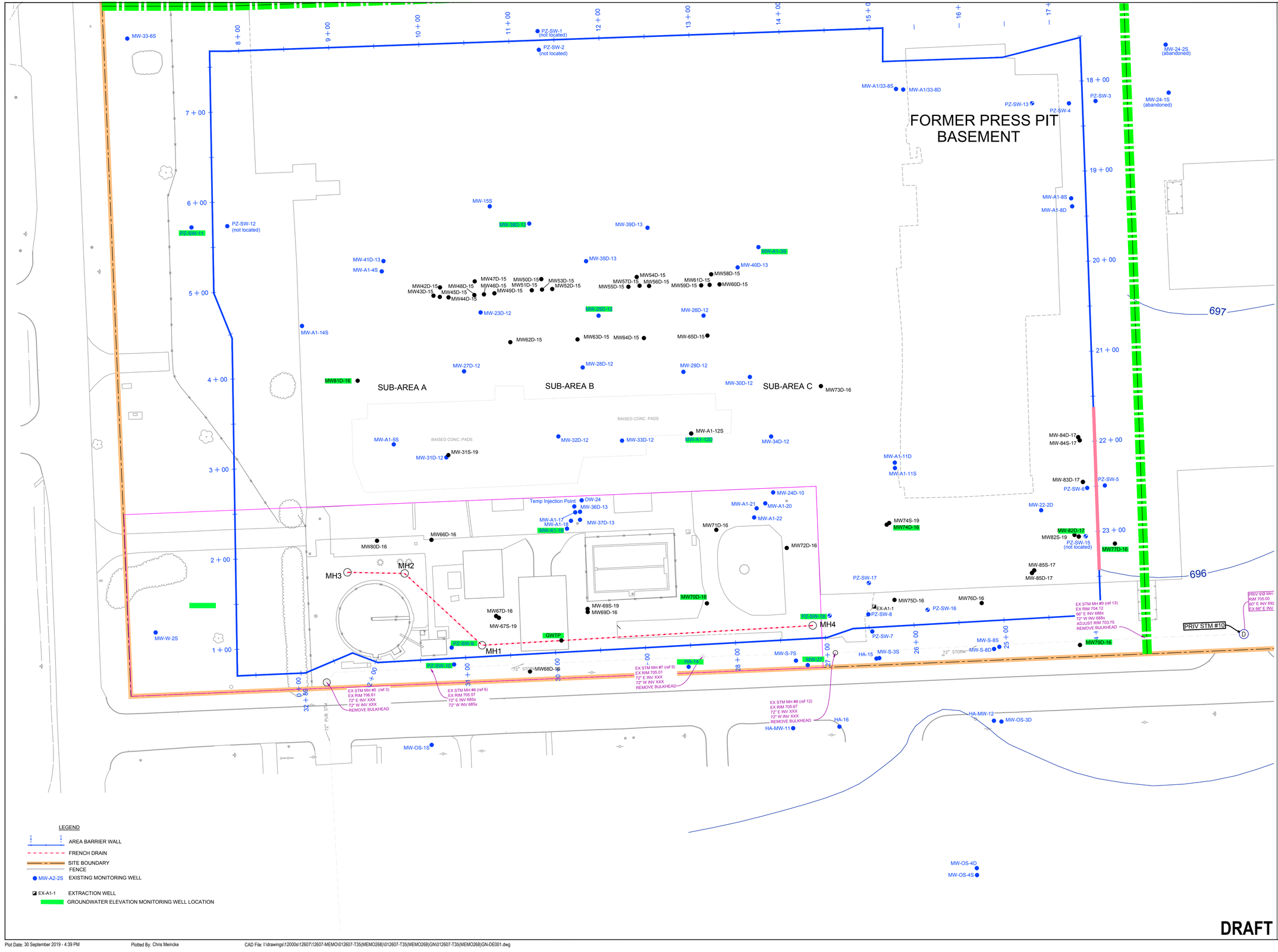
portions of the contained area. Groundwater elevations in monitoring wells located south and southeast of the Area 1 Barrier Wall did not appear to have increases as large as monitoring wells located within the Area 1 Barrier Wall. Groundwater elevations continued to increase in monitoring wells within the Area 1 Barrier Wall after the French Drain operations were restarted in April 2019, with the exception of monitoring wells located in close proximity to the French Drain. All groundwater elevations showed decreases beginning in May 2019, following approximately 1 month of GWTP operations and continued to decrease through June 2019, when French Drain operations were ceased. Groundwater elevations have generally remained stable since GWTP operations were suspended in June 2019, with the exception of monitoring wells located in close proximity to the French Drain, which continued to recover through August 2019, as groundwater elevations equalized throughout the contained area.

4.2 Groundwater Model

The transducer data has been utilized in the existing Site Groundwater Model to evaluate potential pumping/dewatering scenarios to manage groundwater at the Site. The Groundwater Model is also being utilized to evaluate potential capping scenarios to reduce infiltration of surface water/precipitation and reduce or eliminate the amount of water that may need to be managed on an ongoing basis. The evaluations with the Groundwater Model are ongoing and the results will be submitted under separate cover as part of the overall proposed activities at the Site. Contaminant transport of PFAS within the Area 1 Barrier Wall utilizing potential reduced infiltration scenarios is also being evaluated to identify alternative dewatering locations that will allow for the discharge of water below GWLA Special Discharge Permit Limits without requiring treatment.

5. Conclusions

Based on the results of the groundwater measurement activities, without the French Drain operating, groundwater elevations appear to equalize at depths of approximately 2 to 4 feet below ground surface (bgs) within the containment area. Spring precipitation events appear to cause an increase in groundwater elevations to less than 1 foot bgs in some locations. Under current conditions, periodic dewatering activities are required to prevent groundwater levels from rising to within 1 to 2 feet bgs, primarily in the spring and fall seasons with increased precipitation. Storm systems with significant precipitation events could cause short-term groundwater elevations increases that may require limited French Drain operations to manage groundwater levels until equalization can occur within the containment area. Preliminary results from use of the Site Groundwater Model indicate that the volume of water to be extracted at the Site can be significantly reduced if the primary source of infiltration (precipitation) can be eliminated through construction of a cap or installation of impervious surfaces (building, parking lots, etc.) through redevelopment activities. This option along with supplementing the ZVI PRG are being evaluated as part of the process to submit a plan in fulfillment of Special Discharge Permit Section E.3. to address PFAS in any groundwater discharge from the Site to the sanitary sewer.



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0 25 50 ft

Client
RACER TRUST

Project
ECKLES ROAD SITE
LIVONIA, MICHIGAN

No.	Issue	Drawn	Approved	Date
-	-	-	-	-

Drawn DRAWN
Designer
Drafting Check
Design Check
Project Manager CM
Date Sep 30, 2019
This document shall not be used for construction unless signed and sealed for construction.
Scale AS SHOWN
Original Size ANSI D
Bar is one inch on original size drawing
0 1"

Project No. 012607-T35

Title
AREA 1 MONITORING WELL LOCATIONS
GROUNDWATER ELEVATION MONITORING

Sheet No.
FIGURE 1
Sheet 1 of 1

Plot Date: 30 September 2019 - 4:39 PM Plotted By: Chris Meincke CAD File: I:\drawings\12000s\12607\12607-MEMO\012607-T35(MEMO268)\012607-T35(MEMO268)GN\012607-T35(MEMO268)GN-DE001.dwg

Figure 2

Area 1 Groundwater Elevations
RACER Eckles Road Site
LIvonia, Michigan

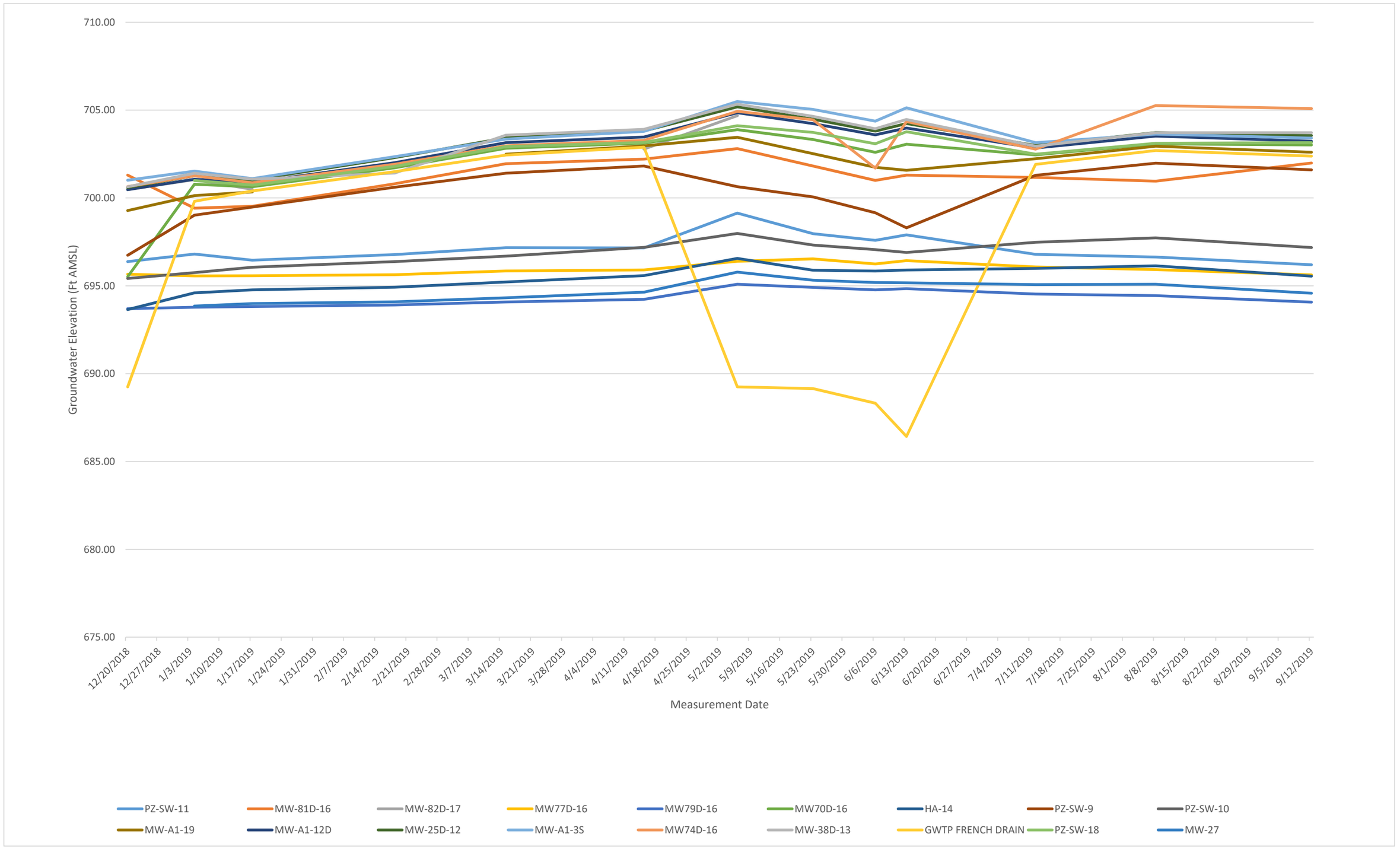

Table 1

Depth to Water Measurements
RACER Eckles Road Site
Livonia, Michigan

Well ID	Depth To Water (feet below top of riser)												
	12/20/2018	1/4/2019	1/17/2019	2/18/2019	3/15/2019	4/15/2019	5/6/2019	5/23/2019	6/6/2019	6/13/2019	7/12/2019	8/8/2019	9/12/2019
PZ-SW-11	8.58	8.15	8.5	8.18	7.79	7.8	5.82	6.99	7.37	7.06	8.17	8.32	8.76
MW-81D-16	5.33	7.21	7.1	5.82	4.68	4.42	3.82	4.81	5.63	5.33	5.46	5.67	4.64
MW-82D-17	5.7	5.14	5.69	**	--	3.4	1.5	--	--	--	3.73	3.29	3.21
MW77D-16	12.5	12.6	12.59	12.53	12.32	12.26	11.77	11.63	11.92	11.73	12.09	12.24	12.54
MW79D-16	12.78	12.7	12.66	12.57	12.4	12.25	11.39	11.57	11.71	11.64	11.95	12.04	12.41
MW70D-16	11.9	6.64	6.78	5.7	4.59	4.3	3.53	4.09	4.82	4.36	4.97	4.34	4.4
HA-14	12.3	11.35	11.18	11.03	10.73	10.37	9.39	10.06	10.11	10.05	9.96	9.81	10.4
PZ-SW-9	8.82	6.54	6.08	4.95	4.15	3.74	4.92	5.5	6.4	7.26	4.27	3.58	3.96
PZ-SW-10	10.03	9.7	9.39	9.07	8.76	8.26	7.47	8.13	8.39	8.55	7.97	7.72	8.27
MW-A1-19	6.41	5.56	5.35	**	3.2	2.73	2.24	3.17	3.95	4.12	3.46	2.75	3.09
MW-A1-12D	5.38	4.78	4.97	3.84	2.7	2.38	1	1.62	2.26	1.87	3.01	2.33	2.62
MW-25D-12	5.69	5.02	5.26	3.99	2.86	2.47	1.1	1.8	2.48	2.05	3.3	2.56	2.73
MW-A1-3S	5.5	4.98	5.41	4.16	3.16	2.72	1.02	1.47	2.14	1.38	3.36	2.88	3.1
MW74D-16	8.04	7.43	7.82	6.77	5.72	5.41	3.76	4.24	6.99	4.34	5.91	3.43	3.6
MW-38D-13	5.65	4.88	5.22	4.87	2.71	2.38	0.95	1.64	2.35	1.82	3.34	2.57	2.57
GWTP FRENCH DRAIN	16.1	5.54	4.95	3.85	2.91	2.46	16.1	16.2	17.03	18.92	3.44	2.65	2.97
PZ-SW-18	-	4.29	4.55	3.48	2.36	2.12	1.17	1.55	2.2	1.51	2.79	2.17	2.13
MW-27	-	11.9	11.76	11.66	11.43	11.11	9.97	10.43	10.56	10.58	10.68	10.66	11.17

MW located within Area 1 Barrier Wall
** : J-plug or Cap Frozen not measured
-- : Under standing water/not accessible

Table 2

September 30, 2019

Monitoring Well Information and Groundwater Elevations
RACER Eckles Road Site
Livonia, Michigan

Northing	Easting	Top of Riser Elevation	Ground Surface Elevation	Well ID	Groundwater Elevation (feet above mean sea level) 12/20/2018	1/4/2019	1/17/2019	2/18/2019	3/15/2019	4/15/2019	5/6/2019	5/23/2019	6/6/2019	6/13/2019	7/12/2019	8/8/2019	9/12/2019
320555.49	13376293.63	704.96	705.40	PZ-SW-11	696.38	696.81	696.46	696.78	697.17	697.16	699.14	697.97	697.59	697.90	696.79	696.64	696.20
13376478.04	320385.429		706.63	MW-81D-16	701.30	699.42	699.53	700.81	701.95	702.21	702.81	701.82	701.00	701.30	701.17	700.96	701.99
320212.529	13377278.2	706.18	706.47	MW-82D-17	700.48	701.04	700.49			702.78	704.68						
320204.725	13377318.34	708.16	706.63	MW77D-16	695.66	695.56	695.57	695.63	695.84	695.90	696.39	696.53	696.24	696.43	696.07	695.92	695.62
320092.218	13377279.6	706.48	704.69	MW79D-16	693.70	693.78	693.82	693.91	694.08	694.23	695.09	694.91	694.77	694.84	694.53	694.44	694.07
320138.418	13376865.6	707.42	705.80	MW70D-16	695.52	700.78	700.64	701.72	702.83	703.12	703.89	703.33	702.60	703.06	702.45	703.08	703.02
320067.972	13376845.36	705.95	706.30	HA-14	693.65	694.60	694.77	694.92	695.22	695.58	696.56	695.89	695.84	695.90	695.99	696.14	695.55
320089.3	13376582.37	705.56	706.23	PZ-SW-9	696.74	699.02	699.48	700.61	701.41	701.82	700.64	700.06	699.16	698.30	701.29	701.98	701.60
320070.56	13376585.06	705.45	706.09	PZ-SW-10	695.42	695.75	696.06	696.38	696.69	697.19	697.98	697.32	697.06	696.90	697.48	697.73	697.18
320221.29	13376710.30	705.69	706.05	MW-A1-19	699.28	700.13	700.34		702.49	702.96	703.45	702.52	701.74	701.57	702.23	702.94	702.60
320326.17	13376848.36	705.85	706.40	MW-A1-12D	700.47	701.07	700.88	702.01	703.15	703.47	704.85	704.23	703.59	703.98	702.84	703.52	703.23
320457.64	13376745.33	706.29	706.68	MW-25D-12	700.60	701.27	701.03	702.30	703.43	703.82	705.19	704.49	703.81	704.24	702.99	703.73	703.56
320533.69	13376922.78	706.51	706.89	MW-A1-3S	701.01	701.53	701.10	702.35	703.35	703.79	705.49	705.04	704.37	705.13	703.15	703.63	703.41
320225.728	13377065.09	708.69	706.58	MW74D-16	700.65	701.26	700.87	701.92	702.97	703.28	704.93	704.45	701.70	704.35	702.78	705.26	705.09
320559.73	13376668.45	706.29	706.66	MW-38D-13	700.64	701.41	701.07	701.42	703.58	703.91	705.34	704.65	703.94	704.47	702.95	703.72	703.72
320096.65	13376703.41	705.35	705.35	GWTP FRENCH DRAIN	689.25	699.81	700.40	701.50	702.44	702.89	689.25	689.15	688.32	686.43	701.91	702.70	702.38
320124.92	13377001.41	705.28	705.63	PZ-SW-18		700.9925	700.7325	701.8025	702.9225	703.1625	704.1125	703.7325	703.0825	703.7725	702.4925	703.1125	703.1525
320069.856	13376977.48	705.75	706.1	MW-27		693.85	693.99	694.09	694.32	694.64	695.78	695.32	695.19	695.17	695.07	695.09	694.58

Riser Damaged, Top of Riser Elevation is at approximate ground surface elevation