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ENVIRONMENT

Date:  
January 31, 2018

Subject:

RACER Pontiac North Campus (PNC) – Injection Test Summary  
Montcalm Seep Interim Measure Work Plan Implementation

Contact:  
Brad Saunders

Phone:  
517-974-4441

Dear Mr. Nemani:

Arcadis of Michigan, LLC (Arcadis) has drafted this summary memo of injection test activities completed at the RACER PNC site (**Figure 1**) in December 2017. The activities were completed in accordance with the Montcalm Seep Interim Measure (IM) Work Plan prepared in response to ongoing discussions with RACER and the United States Environmental Protection Agency (USEPA) regarding mitigation of the potential for seeps along the E. Montcalm St. Right-Of-Way. The seep IM Work Plan was submitted to the USEPA and Michigan Department of Environmental Quality (MDEQ) on November 10, 2017.

Email:  
[Brad.Saunders@arcadis.com](mailto:Brad.Saunders@arcadis.com)

Our ref:  
B0064607.2018

In response to prior observations and findings related to the source of the seep, Arcadis proposed a methodology for implementing a hydraulic control groundwater extraction system with upgradient re-injection to mitigate the groundwater seep. The proposed system would relocate water from a toe drain collection line adjacent to Montcalm St. to an upgradient area of the Site where it would be re-injected into the subsurface.

Prior to developing a final design, Arcadis proposed that a pilot injection test be completed to assist in preparing the final design to achieve seep control. The objective of the pilot test was to obtain operational and design parameters for the proposed system.

The activities summarized below were completed in accordance with the work plan:

- 1) A four-inch diameter Injection Well (INJ-01-17) and two, two-inch diameter monitoring wells (MW-03-17 and MW-04-17) were installed at the North end of the USPS distribution facility property (**Figure 2**) and subsequently developed. Monitoring wells MW-03-17 and MW-04-17 were each located approximately 10 feet from INJ-01-17 and each other. The well construction and boring logs for each of the wells are included as **Attachment 1**. The observations from the boring logs were used for determining well screen locations, which were positioned to intersect soils that appeared to be more transmissive. Soil analytical sampling was also conducted to document baseline conditions at the proposed injection area. Soil samples were collected from two depths within the screened injection and monitoring interval at INJ-01-17 (16-17 feet below ground level {bgl} and 20-21 feet bgl) and MW-03-17 (18-19 bgl and 20-21 bgl). The analysis of soil at the injection point (INJ-01-17) was performed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), polychlorinated biphenyls (PCBs), and total metals. Soil analytical results are summarized in **Table 1**, with soil laboratory analytical reports provided in **Attachment 2**. In addition, the soil samples collected from the depths within the screened intervals at both INJ-01-17 and MW-03-17 were analyzed for particle size, with distributions provided in analytical reports also include in **Attachment 2**. Results were used to validate injection well screen and filter pack sizing.
- 2) Groundwater samples were collected via low-flow sampling methodology from INJ-01-17, MW-03-17, and MW-04-17 to document baseline conditions at the proposed injection area. The analysis of groundwater was performed for VOCs, SVOCs, and total metals. Total dissolved solids and total suspended solids analyses were also included to support analysis for potential formation plugging. Groundwater analytical results are summarized in **Table 2**, with laboratory analytical reports provided in **Attachment 3**.
- 3) Slug tests were conducted on INJ-01, MW-03 and MW-04 to determine the hydraulic conductivity of the soil, which helps in evaluating the ease with which the injected water would disperse through the formation. The baildown slug tests were analyzed using AQTESOLV® to estimate conductivity values. Results from the slug test are included as **Attachment 4**.
- 4) An injection test was conducted on INJ-01 to determine operational design parameters needed to finalize the approach for implementing full-scale operation. To conduct the injection test, a frac tank was mobilized to the Site and filled with potable water. This frac tank was plumbed to an injection manifold, and water was pumped into the subsurface at regulated flow rates. Step tests were initiated to start at a flowrate of 0.5 gallons per minute (GPM), followed by steps of increasing flowrate. Additional steps included testing at 1.0, 2.5, 4.0, and 4.5 GPM. During each step, localized mounding was measured and groundwater chemistry parameters were recorded

including temperature, dissolved oxygen, pH, conductivity, and oxygen reducing potential at monitoring wells MW-03-17 and MW-04-17. One final test was conducted at a flowrate of approximately 6.1 GPM with a sealed wellhead connection which resulted in localized mounding to ground surface from the soils within the borehole space at the injection well location. Over the course of step testing, approximately 2,100 gallons of water was injected into the ground. A figure displaying the mounding response throughout the injection test is included as **Attachment 5**.

## CONCLUSIONS AND RECOMMENDATIONS

The wells INJ-01-17, MW-03-17 and MW-04-17 were installed and developed as described in the previously submitted Montcalm Seep IM Work Plan. Prior to performing activities in the relevant area, soil and groundwater samples were collected and show no detections of VOCs, SVOCs, or PCBs. Soil at INJ-01-17 from 16-17 feet below grade had groundwater surface water protection criteria exceedances for cobalt and selenium, and also non-residential drinking water exceedances of cobalt and manganese. In addition, soil at INJ\_01-17 from 20-21 feet below grade had non-residential drinking water exceedances of cobalt and manganese. However, soil concentrations of cobalt, selenium and manganese were within the typical range of statewide data reported in the Michigan Background Soil Survey. Furthermore, the groundwater-surface water exposure pathway in the vicinity of the injection is incomplete, and institutional controls have been implemented to restrict the use of groundwater at the site. Groundwater from MW-04-17 had non-residential drinking water criteria exceedances for lead and manganese, while both MW-03-17 and INJ-01-17 had non-residential drinking water exceedances for manganese only. Evaluation of the most recent groundwater metals data obtained from 2014-2017 at the seven temporary monitoring wells (TW-MD-01 through TW-MD-07) located along the seep location does not indicate that injection of the seep water will result in additional groundwater criteria exceedances in the vicinity of the proposed injection point beyond existing exceedances for which the exposure pathway have been determined to be incomplete or where institutional controls exist.

Grain size sampling results confirm boring lithological observations noted on boring logs. Grain size distribution from the coarser samples indicates poorly sorted sand lenses. Based on the results and observations, Arcadis recommends 10 slot well screen with Global number 5 filter pack across sand lenses and Global number 6 filter pack used across silt lenses, consistent with the construction of INJ-01-17. The poorly sorted nature of the sand lenses emphasizes the importance of aggressive well development for the planned additional injection well.

Slug test analysis established a hydraulic conductivity of 1.3E-03 centimeters per second (cm/sec) in INJ-01-17. Hydraulic conductivity was similar in monitoring wells MW-03-17 and MW-04-17 at 3.0E-03 and 2.8E-03 cm/sec, respectively. These values are consistent with hydraulic conductivities previously reported at the Site which were considered for sustained operation of the proposed seep water re-injection system.

Injection testing determined that a sustained flowrate of 4.0 GPM is feasible, while still maintaining two feet or more of freeboard above localized groundwater mounding to the ground surface. Arcadis

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recommends one additional six-inch diameter injection well be installed, which should more than double the feasible injection flowrate of the full-scale design to an estimated capability between 8.0 – 9.0 GPM. The proposed additional injection well will be offset from INJ-01-17 by approximately 50 feet to the southeast. This proposed operational injection rate is slightly lower than the 10-25 GPM proposed in the previously submitted Montcalm Seep IM Work Plan, but is still more than enough flow to compensate for the 1.0 – 6.0 GPM projected groundwater flux required to be pumped to dewater seepage. The pump anticipated to be used for seep dewatering will not have to change, but will be set to operate at the projected injection rate over a longer cycle period than previously presented.

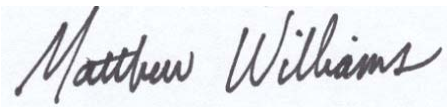
Detailed analysis and information on the recommended system design is available in the Montcalm Seep IM Work Plan that was submitted to RACER, MDEQ, and the USEPA in November 2017. Upon approval of the work plan, Arcadis will finalize design drawings and proceed with contractor procurement for full-scale installation.

Per discussions with MDEQ to date, Arcadis and RACER assume that the Montcalm Seep IM Work Plan requires approval from the MDEQ Hazardous Waste Section under Part 31 R323 Rule 2210(u) for re-injection of groundwater to move forward with implementation.

Please contact us if you have any questions regarding the enclosed memo or its attachments.

Sincerely,

Arcadis of Michigan, LLC



Matt Williams  
Senior Engineer



Brad Saunders, P.E.  
Principal Engineer/ Certified Project Manager

### Figures

- 1 Site Location
- 2 Injection Test Layout

### Tables

- 1 Soil Laboratory Analytical Results
- 2 Groundwater Laboratory Analytical Results

### Attachments

- 1 Boring and Well Construction Logs
- 2 Soil Laboratory Analytical Report

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- 3 Groundwater Laboratory Analytical Report
- 4 Slug Test Results
- 5 Injection Test Mounding Results

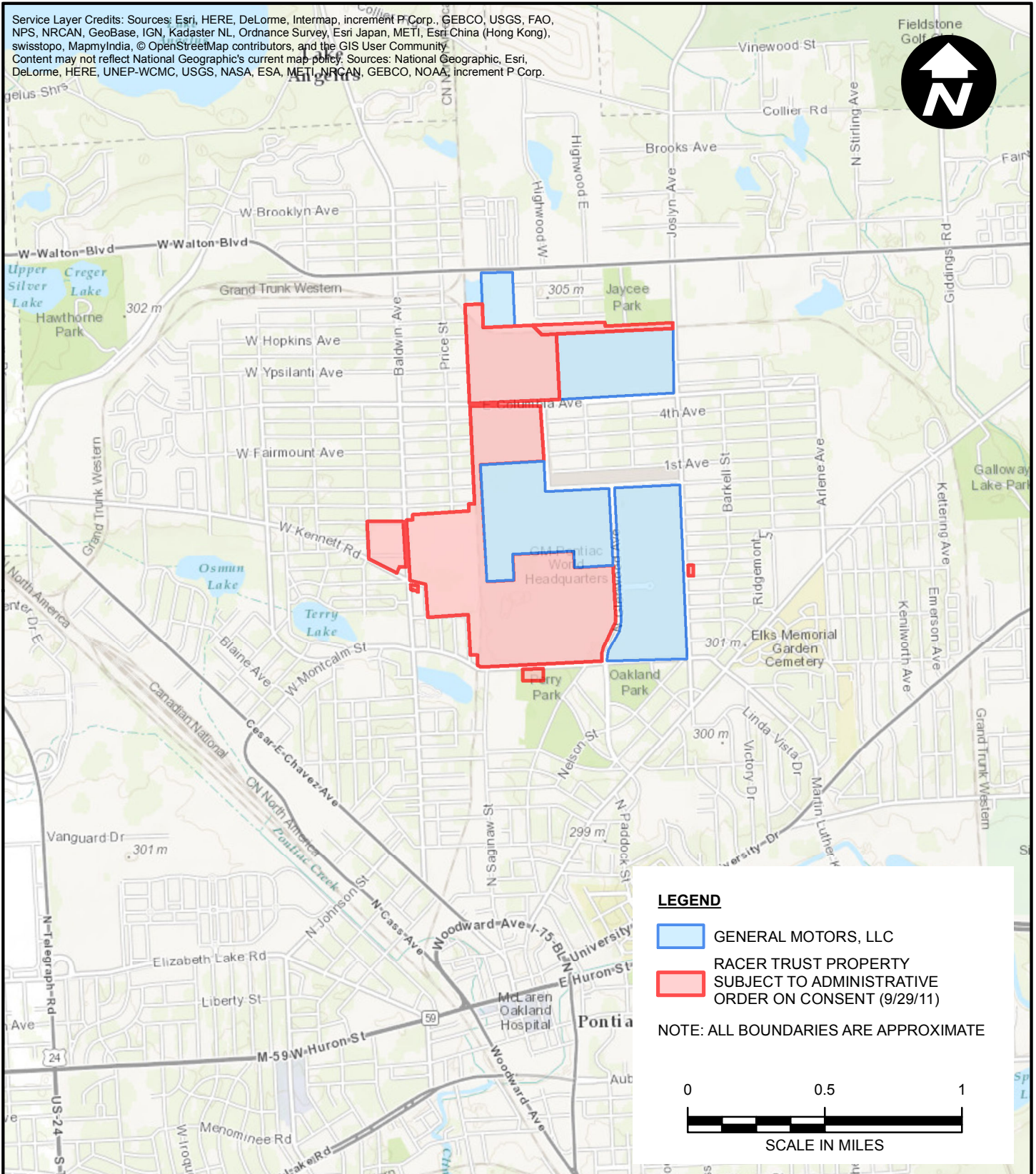
# FIGURES



# FIGURE 1

Site Location

Service Layer Credits: Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community  
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**LEGEND**

- GENERAL MOTORS, LLC
- RACER TRUST PROPERTY
- SUBJECT TO ADMINISTRATIVE ORDER ON CONSENT (9/29/11)

NOTE: ALL BOUNDARIES ARE APPROXIMATE



SCALE IN MILES



**SITE LOCATION**

RACER TRUST  
 PONTIAC NORTH CAMPUS  
 PONTIAC, MICHIGAN

**SITE LOCATION**

# FIGURE 2

Injection Test Layout

CITY: DIV/GROUP: DB: LD: PIC: PM: TM: LYRON="OFF=REF" D:\GIS\Project Files\MotorsLiqu道ationCompany\PontiacNorthCampus\CAD\_Data\StormDesign\PNC\_02\_REV\20180118.dwg LAYOUT: 2\_SAVED: 1/30/2018 12:10 PM ACADVER: 20.1S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: ARCADIS NOV1.CTB PLOTTED: 1/30/2018 12:10 PM BY: YARBROUGH, TOBI



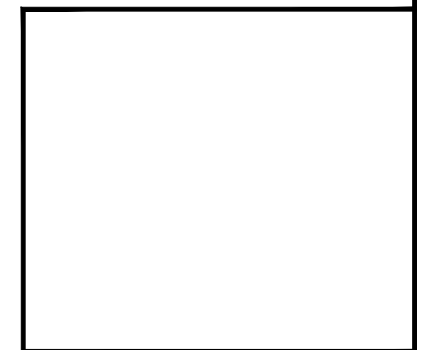
**LEGEND**

- MONITORING WELL LOCATION
- ▲ INJECTION TEST MONITORING WELL
- INJECTION WELL

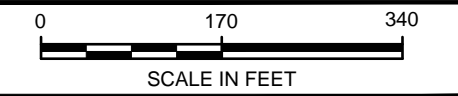
**NOTES**

1. REFER TO FIGURE C-1 IN THE MONTCALM SEEP INJECTION WORK PLAN (NOVEMBER 2017) FOR THE GENERAL LOCATION OF THE INJECTION TEST LAYOUT AT THE RACER PONTIAC NORTH CAMPUS.
2. LOCATIONS OF INJECTION TEST WELLS ARE APPROXIMATE AND HAVE NOT BEEN SURVEYED TO DATE.
3. GROUND SURFACE CONTOURS ARE APPROXIMATE. ELEVATIONS SHOULD BE FIELD VERIFIED.

DRAFT



Professional Engineer's (PE'S FULL NAME)		
P.E.'s Number (NUM)	State MI	Date Signed
ARCADIS Project No. B0064607.2017.00007 Date SEPTEMBER 2017 ARCADIS ARCADIS OF MICHIGAN, LLC. 300 S. WASHINGTON SQUARE, STE 315 LANSING, MICHIGAN 48933		
		2



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Project Mgr. (MGR)		 <b>ARCADIS</b> ARCADIS OF MICHIGAN, LLC.
Designed by (DSN)		
Drawn by	TRY	
Checked by (CHK)		

<b>RACER TRUST</b> PONTIAC NORTH CAMPUS	<b>INJECTION TEST LAYOUT</b>
GENERAL	

# TABLES



# TABLE 1

Soil Laboratory Analytical Results

**Table 1**  
**Soil Laboratory Analytical Results**  
**RACER Trust**  
**Pontiac North Campus**

Location ID:	MDEQ Draft 2017	MDEQ Draft 2016	MDEQ Draft 2017	MDEQ Draft 2017	MDEQ Draft 2017	INJ-01-17	INJ-01-17
Sample Depth: Date Collected: Units Sample Name:	Direct Contact µg/kg	GSIP µg/kg	Non-residential Drinking Water µg/kg	Tier 1 VI SLs µg/kg	Non-Residential VI RIASLs µg/kg	16-17' 10/17/17 µg/kg INJ-01-17_(16-17)	20-21' 10/17/17 µg/kg INJ-01-17_(20-21)
<b>Volatile Organics</b>							
Acetone	1.00E+08	3.40E+04	3.40E+05	2.60E+05	7.80E+05	1,100 U	1,100 U
Benzene	4.30E+05	4.00E+03	1.00E+02	1.70E+00	12 (M)	70 U	70 U
Bromodichloromethane	5.30E+05	--	1.60E+03	6.10E-01	--	70 U	70 U
Bromoform	4.20E+06	--	1.60E+03	4.50E+01	--	70 U	70 U
Bromomethane	1.70E+07	2.00E+02	7.60E+03	9.00E-01	--	400 U	400 U
2-Butanone (MEK)	1.00E+08	4.40E+04	2.20E+05	3.10E+04	--	1,100 U	1,100 U
Carbon disulfide	5.50E+07	--	3.60E+04	5.20E+01	--	400 U	400 U
Carbon tetrachloride	5.10E+05	7.60E+02	1.00E+02	3.10E-01	--	70 U	70 U
Chlorobenzene	1.70E+07	5.00E+02	2.00E+03	8.20E+01	360	70 U	70 U
Chloroethane	1.70E+07	2.20E+04	1.50E+04	3.30E+02	1500	400 U	400 U
Chloroform	8.50E+06	7.00E+03	1.60E+03	2.60E-01	1.9 (M)	70 U	70 U
Chloromethane	1.00E+07	--	2.20E+04	6.90E+00	--	400 U	400 U
Cyclohexane	--	--	--	3.20E+02	--	70 U	70 U
1,2-Dibromo-3-chloropropane	--	--	--	--	--	70 U	70 U
Dibromochloromethane	3.90E+05	--	1.60E+03	4.00E-01	--	70 U	70 U
1,2-Dibromoethane	--	--	--	--	--	70 U	70 U
1,2-Dichlorobenzene	1.00E+08	2.60E+02	1.20E+04	1.50E+03	--	70 U	70 U
1,3-Dichlorobenzene	1.70E+06	5.60E+02	760	1.00E+01	--	70 U	70 U
1,4-Dichlorobenzene	2.60E+06	3.40E+02	1.50E+03	2.30E+01	--	70 U	70 U
Dichlorodifluoromethane	4.30E+06	--	2.20E+03	1.20E+01	--	70 U	70 U
1,1-Dichloroethane	5.80E+06	1.50E+04	1.30E+04	2.60E+00	19 (M)	70 U	70 U
1,2-Dichloroethane	3.60E+05	1.50E+04	1.00E+02	8.20E-01	--	70 U	70 U
1,1-Dichloroethene	4.30E+07	1.50E+04	1.40E+02	1.20E+01	54	70 U	70 U
trans-1,2-Dichloroethene	1.70E+07	3.00E+04	2.00E+03	3.90E+01	340	70 U	70 U
cis-1,2-Dichloroethene	1.70E+06	1.20E+04	1.40E+03	2.10E+00	9.2 (M)	70 U	70 U
1,2-Dichloropropane	9.20E+05	4.60E+03	1.00E+02	2.10E+00	--	70 U	70 U
cis-1,3-Dichloropropene	--	--	--	--	--	70 U	70 U
trans-1,3-Dichloropropene	--	--	--	--	--	70 U	70 U
Ethylbenzene	3.00E+06	3.60E+02	1.50E+03	1.20E+01	86	70 U	70 U
2-Hexanone (methyl butyl ketone)	4.30E+06	--	1.90E+03	2.10E+02	--	4,000 U	4,000 U
Isopropylbenzene	8.50E+07	6.60E+02	--	--	--	70 U	70 U
Methyl Acetate	--	--	--	--	--	4,000 U	4,000 U
4-Methyl-2-pentanone (MIBK)	4.30E+07	--	1.90E+04	1.20E+04	--	4,000 U	4,000 U
tert-Methyl butyl ether (MTBE)	9.80E+06	1.40E+05	8.00E+02	7.40E+01	520	400 U	400 U
Methyl cyclohexane	--	--	--	--	--	70 U	70 U
Methylene chloride	5.10E+06	3.00E+04	1.00E+02	1.30E+02	570	400 U	400 U
Styrene	2.60E+06	1.60E+03	1.00E+02	1.50E+02	--	70 U	70 U
1,1,2,2-Tetrachloroethane	1.70E+05	1.60E+03	3.60E+02	2.70E+00	--	70 U	70 U
Tetrachloroethene	5.10E+06	1.20E+03	1.00E+02	6.20E+00	19 (M)	70 U	70 U
Toluene	6.70E+07	5.40E+03	1.60E+04	3.70E+03	16,000	70 U	70 U
1,1,2-Trichloro-1,2,2-trifluoroethane	1.00E+08	8.60E+02	4.60E+06	8.60E+02	--	100 U	100 U
1,2,4-Trichlorobenzene	1.10E+06	4.40E+03	3.10E+03	5.30E+01	230 (M)	100 U	100 U
1,1,1-Trichloroethane	1.00E+08	1.80E+03	4.00E+03	4.50E+02	1900	70 U	70 U
1,1,2-Trichloroethane	3.40E+05	6.60E+03	1.00E+02	3.70E-04	--	70 U	70 U
Trichloroethene	2.50E+05	4.00E+03	1.00E+02	3.30E-01	1.0 (M)	70 U	70 U
Trichlorofluoromethane	1.00E+08	--	1.10E+05	1.90E+01	--	100 U	100 U
Vinyl chloride	4.60E+04	2.60E+02	4.00E+01	8.20E-02	2.0 (M)	100 U	100 U
p,m-Xylene	1.00E+08	8.20E+2	5600	280	1,200	100 U	100 U
o-Xylene	--	--	--	--	--	70 U	70 U
<b>Semivolatile Organics</b>							
Acenaphthene	5.10E+07	6.10E+03	1.80E+05	2.00E+05	--	330 U	330 U
Acenaphthylene	5.10E+07	--	1.80E+05	--	--	330 U	330 U
Anthracene	1.00E+08	--	2.30E+04	1.30E+07	--	330 U	330 U
Benzo(a)anthracene	(Q)	--	5.30E+04	1.60E+05	--	330 U	330 U
Benzo(b)fluoranthene	(Q)	--	2.90E+04	--	--	330 U	330 U
Benzo(k)fluoranthene	(Q)	--	1.50E+04	--	--	330 U	330 U
Benzo(ghi)perylene	2.10E+06	--	1.60E+04	--	--	330 U	330 U
Benzo(a)pyrene	4.10E+04	--	3.80E+03	--	--	330 U	330 U
4-Bromophenyl phenyl ether	--	--	--	--	--	330 U	330 U
Butyl benzyl phthalate	9.90E+06	1.50E+04	7.60E+04	--	--	330 U	330 U
4-Chloro-3-methylphenol	5.00E+07	2.80E+02	3.40E+04	--	--	280 U	280 U
2-Chloronaphthalene	--	--	--	--	--	330 U	330 U
4-Chloroaniline	--	--	--	--	--	330 U	330 U
bis(2-Chloroethoxy)methane	--	--	--	--	--	330 U	330 U
bis(2-Chloroethyl)ether	3.00E+04	1.00E+02	6.60E+01	3.40E+00	--	330 U	330 U
bis(2-Chloroisopropyl)ether	--	--	--	--	--	330 U	330 U
2-Chlorophenol	4.00E+06	3.60E+02	2.60E+03	1.20E+04	--	330 U	330 U
4-Chlorophenyl phenyl ether	--	--	--	--	--	330 U	330 U
Chrysene	--	--	--	--	--	330 U	330 U
p,m-Cresol (Methyphenols)	--	--	--	--	--	330 U	330 U
o-Cresol (2-Methyphenol)	--	--	--	--	--	330 U	330 U
Di-n-Butylphthalate	3.30E+06	3.60E+02	4.10E+03	--	--	330 U	330 U
Di-n-Octylphthalate	1.50E+07	--	9.90E+04	--	--	330 U	330 U
Dibenzo(a,h)anthracene	(Q)	--	1.50E+05	--	--	330 U	330 U

See Notes on last page.

**Table 1**  
**Soil Laboratory Analytical Results**  
**RACER Trust**  
**Pontiac North Campus**

Location ID:	MDEQ Draft 2017	MDEQ Draft 2016	MDEQ Draft 2017	MDEQ Draft 2017	MDEQ Draft 2017	INJ-01-17	INJ-01-17
Sample Depth: Date Collected: Units	Direct Contact	GSIP	Non-residential Drinking Water	Tier 1 VI SLs	Non-Residential VI RIASLs	16-17' 10/17/17 µg/kg	20-21' 10/17/17 µg/kg
Sample Name:	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	INJ-01-17_(16-17)	INJ-01-17_(20-21)
Dibenzofuran	8.50E+05	1.20E+03	5.60E+03	7.10E+06	--	330 U	330 U
1,2-Dichlorobenzene	1.00E+08	2.60E+02	1.20E+04	1.50E+03	--	330 U	330 U
1,3-Dichlorobenzene	1.70E+06	5.60E+02	7.60E+02	1.00E+01	45 (M)	330 U	330 U
1,4-Dichlorobenzene	2.60E+06	3.40E+02	1.50E+03	2.30E+01	160	330 U	330 U
3,3'-Dichlorobenzidine	7.40E+04	2.00E+03	8.40E+02	--	--	2,000 U	2,000 U
2,4-Dichlorophenol	1.70E+07	3.30E+02	7.60E+03	--	--	330 U	330 U
Diethylphthalate	1.00E+08	2.20E+03	3.00E+05	--	--	330 U	330 U
2,4-Dimethylphenol	1.70E+07	7.60E+03	7.60E+03	--	--	330 U	330 U
Dimethylphthalate	8.50E+07	--	3.80E+04	--	--	330 U	330 U
4,6-Dinitro-2-methylphenol	--	--	--	--	--	830 U	830 U
2,4-Dinitrophenol	1.70E+06	3.80E+02	7.60E+02	--	--	830 U	830 U
2,4-Dinitrotoluene	4.90E+04	--	1.10E+02	--	--	330 U	330 U
2,6-Dinitrotoluene	--	--	--	--	--	330 U	330 U
1,2-Diphenylhydrazine	--	--	--	--	--	330 U	330 U
bis(2-Ethylhexyl)phthalate	3.40E+06	5.40E+04	2.30E+04	--	--	330 U	330 U
Fluoranthene	4.90E+07	2.80E+03	4.60E+05	--	--	330 U	330 U
Fluorene	3.40E+07	3.50E+03	2.20E+05	4.70E+05	--	330 U	330 U
Hexachlorobenzene	1.20E+04	3.30E+02	2.00E+02	6.7	--	330 U	330 U
Hexachlorobutadiene	4.30E+05	5.00E+01	5.40E+02	2.5	--	330 U	330 U
Hexachlorocyclopentadiene	4.30E+05	--	2.40E+03	0.32	--	330 U	330 U
Hexachloroethane	6.00E+05	3.00E+02	2.60E+02	3.2	--	330 U	330 U
Indeno(1,2,3-cd)pyrene	(Q)	--	1.20E+04	--	--	330 U	330 U
Isophorone	3.50E+07	2.60E+04	7.60E+04	--	--	330 U	330 U
2-Methylnaphthalene	3.40E+06	1.50E+03	6.10E+03	1700	--	330 U	330 U
Naphthalene	8.50E+07	5.50E+02	9.50E+04	67	--	330 U	330 U
2-Nitroaniline	--	--	--	--	--	330 U	330 U
3-Nitroaniline	--	--	--	--	--	830 U	830 U
4-Nitroaniline	--	--	--	--	--	830 U	830 U
Nitrobenzene	1.70E+06	3.60E+03	7.60E+02	1.70E+02	--	330 U	330 U
2-Nitrophenol	1.70E+06	--	7.60E+02	--	--	330 U	330 U
4-Nitrophenol	--	--	--	--	--	830 U	830 U
N-Nitrosodi-n-propylamine	4.70E+03	--	1.10E+01	--	--	330 U	330 U
N-Nitrosodiphenylamine	6.80E+06	--	6.40E+04	--	--	330 U	330 U
Pentachlorophenol	6.50E+04	(G,X)	1.60E+02	--	--	330 U	330 U
Phenanthrene	2.60E+07	1.10E+03	3.00E+05	--	--	330 U	330 U
Phenol	1.00E+08	9.00E+03	1.10E+05	--	--	330 U	330 U
Pyrene	3.70E+07	--	2.40E+05	2.50E+07	--	330 U	330 U
1,2,4-Trichlorobenzene	1.10E+06	4.40E+03	3.10E+03	5.30E+01	--	330 U	330 U
2,4,5-Trichlorophenol	2.60E+07	--	3.30E+04	--	--	330 U	330 U
2,4,6-Trichlorophenol	3.00E+06	3.30E+02	9.80E+03	--	--	330 U	330 U
<b>Metals</b>							
Antimony	6.00E+05	9.40E+04	4.30E+03	--	--	500 U	500 U
Arsenic	5.20E+04	4.70E+03	4.70E+03	--	--	4,030	2,520
Barium	1.00E+08	(G)	1.30E+06	--	--	34,700	15,100
Beryllium	2.90E+05	(G)	5.10E+04	--	--	260	200 U
Cadmium	2.20E+05	(G,X)	6.00E+03	--	--	220	200 U
Chromium (III)	1.00E+08	(G,X)	1.00E+08	--	--	8,440	3,230
Chromium (VI)	3.60E+04	(G,X)	3.10E+04	--	--	--	--
Cobalt	7.40E+05	2.00E+03	1.10E+02	--	--	7,820	1,790
Copper	2.50E+06	(G)	5.80E+06	--	--	14,900	5,280
Lead	7.60E+05	(G,X)	1.80E+05	3,300	--	7,840	3,300
Manganese	3.20E+07	(G,X)	1.00E+03	--	--	361,000	563,000
Mercury	1.50E+05	2.60E-02	4.00E+01	0.027	0.12	50 U	50 U
Nickel	4.00E+06	(G)	1.10E+05	--	--	17,000	6,990
Selenium	1.20E+07	4.20E+02	4.20E+03	--	--	910	400 U
Silver	6.70E+05	1.00E+02	1.40E+04	--	--	200 U	200 U
Thallium	2.50E+04	4.20E+03	2.30E+03	--	--	200 U	200 U
Vanadium	3.30E+04	4.30E+05	2.10E+04	--	--	12,300	4,080
Zinc	1.00E+08	(G)	5.00E+06	--	--	34,900	9,920
<b>Organics -PCBs/Pesticides</b>							
PCB-1016	--	--	--	--	--	330 U	330 U
PCB-1242	--	--	--	--	--	330 U	330 U
PCB-1221	--	--	--	--	--	330 U	330 U
PCB-1232	--	--	--	--	--	330 U	330 U
PCB-1248	--	--	--	--	--	330 U	330 U
PCB-1254	--	--	--	--	--	330 U	330 U
PCB-1260	--	--	--	--	--	330 U	330 U

See Notes on last page.

**Notes:**

1 Criteria listed are from the Draft Proposed Michigan Department of Environmental Quality (MDEQ) Clean Up Criteria Requirements Table 1: Groundwater: Residential and Nonresidential, Part 201 Generic Cleanup Criteria and Screening Levels and Table 4. VI Tier 1 Groundwater, Soil, and Vapor Screening Levels Part 201 Generic Screening Levels/Part 213 Risk-Based Screening Levels, August 29, 2017 as well as the minimum values from the Rule 57 Water Quality Values, Surface Water Assessment Section, Michigan DQ dated 10/21/2016.

2. "-" = The compound was not listed in the MDEQ criteria

**Footnotes for Criteria:**

1. M = Site-Specific criterion may be below target detection limits (TDL)
2. G=Groundwater surface water interface (GSI) criterion depends on the pH or water hardness, or both, of the receiving surface water
3. Q=Criteria for carcinogenic polycyclic aromatic hydrocarbons were developed using relative potential potencies to benzo(a)pyrene
4. X=The GSI criterion shown in the generic cleanup criteria tables is not protective for

**Abbreviations:**

<b>µg/kg</b>	Microgram per kilogram
<b>µg/L</b>	Microgram per liter
<b>B</b>	Analyte was also detected in the associated method blank.
<b>DW</b>	Drinking Water
<b>GSIP</b>	Groundwater Surfacewater Interface Protection
<b>GW</b>	Groundwater
<b>J</b>	Indicates an estimated value.
<b>MDEQ</b>	Michigan Department of Environmental Quality
<b>NA</b>	A criterion or value is not available
<b>RIASL</b>	Recommended Interim Action Screening Level
<b>SL</b>	Screening Level
<b>U</b>	Compound analyzed for but not detected above the detection limit.
<b>VI</b>	Vapor intrusion
<b>VIA</b>	Volatilization to Indoor Air
<b>Y</b>	Elevated reporting limit due to high target concentration.

# TABLE 2

Groundwater Laboratory Analytical Results

Table 2  
Groundwater Laboratory Analytical Results  
RACER Trust  
Pontiac North Campus

Location ID:	MDEQ 2017 DRAFT Res DW	MDEQ 2017 DRAFT Non- Res DW	MDEQ 2017 DRAFT Tier 1 VI GW SLs	MDEQ 2017 DRAFT Non- Res GW VIA RIASLs	MW-04-17	MW-03-17	INJ-01-17
Sample Depth:	-	-	-	-	-	-	-
Date Collected:	-	-	-	-	12/01/17	12/01/17	12/01/17
Units	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Sample Name:	-	-	-	-	MW0417_120117	MW0317_120117	INJ0117_120117
<b>Volatile Organics</b>							
Acetone	5,300	17,000	50,000	4.7E+07	50 U	50 U	50 U
Benzene	5	5	1	120	1 U	1 U	1 U
Bromodichloromethane	80	80	1.2	--	1 U	1 U	1 U
Bromoform	80	80	89	--	1 U	1 U	1 U
Bromomethane	120	380	2.1	--	5 U	5 U	5 U
2-Butanone (MEK)	2,400	11,000	2,600	--	25 U	25 U	25 U
Carbon Disulfide	440	1,800	92	--	5 U	5 U	5 U
Carbon Tetrachloride	5	5	0.41	--	1 U	1 U	1 U
Chlorobenzene	100	100	33	2,700	1 U	1 U	1 U
Chloroethane	240	760	620	35,000	5 U	5 U	5 U
Chloroform	80	80	0.49	61	1 U	1 U	1 U
Chloromethane	220	1,100	15	810	5 U	5 U	5 U
Cyclohexane	--	--	290	--	1 U	1 U	1 U
1,2-Dibromo-3-chloropropane	0.2	0.2	0.00045	--	5 U	5 U	5 U
Dibromochloromethane	80	80	0.78	--	5 U	5 U	5 U
1,2-Dibromoethane	0.05	0.05	0.13	--	1 U	1 U	1 U
1,2-Dichlorobenzene	600	600	370	--	1 U	1 U	1 U
1,3-Dichlorobenzene	12	38	2.6	250	1 U	1 U	1 U
1,4-Dichlorobenzene	75	75	5.9	930	1 U	1 U	1 U
Dichlorodifluoromethane	30	94	13	--	5 U	5 U	5 U
1,1-Dichloroethane	130	650	4.7	540	1 U	1 U	1 U
1,2-Dichloroethane	5	5	1.4	--	1 U	1 U	1 U
1,1-Dichloroethene	7	7	18	860	1 U	1 U	1 U
trans-1,2-Dichloroethene	100	100	27	6,500	1 U	1 U	1 U
cis-1,2-Dichloroethene	70	70	3.4	240	1 U	1 U	1 U
1,2-Dichloropropane	5	5	2.6	--	1 U	1 U	1 U
cis-1,3-Dichloropropene	--	--	--	--	1 U	1 U	1 U
trans-1,3-Dichloropropene	--	--	--	--	1 U	1 U	1 U
Ethylbenzene	74	74	2.8	360	1 U	1 U	1 U
2-Hexanone (methyl butyl ketone)	30	94	660	--	50 U	50 U	50 U
Isopropylbenzene	590	1,900	0.6	--	1 U	1 U	1 U
Methyl acetate	--	--	--	--	10 U	10 U	10 U
4-Methyl-2-pentanone (MIBK)	300	940	720	--	50 U	50 U	50 U
Methyl tert-butyl ether (MTBE)	40	40	250	32,000	5 U	5 U	5 U
Methylcyclohexane	--	--	--	--	1 U	1 U	1 U
Methylene chloride	5	5	79	20,000	5 U	5 U	5 U
Styrene	100	100	33	--	1 U	1 U	1 U
1,1,1,2-Tetrachloroethane	3.6	18	2.4	--	1 U	1 U	1 U
Tetrachloroethene	5	5	1.5	320	1 U	1 U	1 U
Toluene	790	790	300	1.1E+05	1 U	1 U	1 U
1,1,2-trichloro-1,2,2-trifluoroethane	160,000	170,000	840	--	1 U	1 U	1 U
1,2,4-Trichlorobenzene	70	70	3.8	460	5 U	5 U	5 U
1,1,1-Trichloroethane	200	200	180	41,000	1 U	1 U	1 U
1,1,2-Trichloroethane	5	5	0.00047	--	1 U	1 U	1 U
Trichloroethene	5	5	0.073	21	1 U	1 U	1 U
Trichlorofluoromethane	1,800	5,700	22	--	1 U	1 U	1 U
Vinyl Chloride	2	2	0.12	28	1 U	1 U	1 U
m&p-Xylene	280	280	75	6,000	2 U	2 U	2 U
o-Xylene					1 U	1 U	1 U
<b>Semivolatile Organics</b>							
Acenaphthene	360	1,100	3,900	--	5 U	5 U	5 U
Acenaphthylene	360	1,100	65	--	5 U	5 U	5 U
Anthracene	43	43	43	--	5 U	5 U	5 U
Benzo(a)anthracene	2.3	9.4	9.4	--	1 U	1 U	1 U
Benzo(b)fluoranthene	1.5	1.5	--	--	1 U	1 U	1 U
Benzo(k)fluoranthene	0.8	0.8	--	--	1 U	1 U	1 U
Benzo(g,h,i)perylene	0.26	0.26	--	--	1 U	1 U	1 U
Benzo(a)pyrene	0.2	0.2	--	--	1 U	1 U	1 U
4-Bromophenyl-phenylether	--	--	--	--	5 U	5 U	5 U
Butylbenzylphthalate	80	330	--	--	5 U	5 U	5 U
4-Chloro-3-Methylphenol	400	1,700	--	--	5 U	5 U	5 U
2-Chloronaphthalene	470	1,500	--	--	5 U	5 U	5 U
4-Chloroaniline	3	9.4	--	--	10 U	10 U	10 U
bis(2-Chloroethoxy)methane	--	--	--	--	5 U	5 U	5 U
bis(2-Chloroethyl)ether	0.66	3.3	6.8	--	5 U	5 U	5 U
bis(2-Chloroisopropyl)ether	--	--	--	--	5 U	5 U	5 U
2-Chlorophenol	32	130	45	--	10 U	10 U	10 U
4-Chlorophenyl-phenylether	--	--	--	--	5 U	5 U	5 U
Chrysene	2	2	--	--	1 U	1 U	1 U
p,m-Cresol (Methyphenols)	30	94	--	--	20 U	20 U	20 U
o-Cresol (2-Methyphenol)	800	3,800	--	--	10 U	10 U	10 U

See Notes on last page.

Table 2  
Groundwater Laboratory Analytical Results  
RACER Trust  
Pontiac North Campus

Location ID: Sample Depth: Date Collected: Units Sample Name:	MDEQ 2017 DRAFT Res DW	MDEQ 2017 DRAFT Non- Res DW	MDEQ 2017 DRAFT Tier 1 VI GW SLs	MDEQ 2017 DRAFT Non- Res GW VIA RIASLs	MW-04-17  12/01/17 µg/L MW0417_120117	MW-03-17  12/01/17 µg/L MW0317_120117	INJ-01-17  12/01/17 µg/L INJ0117_120117
Di-n-Butylphthalate	27	110	--	--	5 U	5 U	5 U
Di-n-Octylphthalate	22	22	22	--	5 U	5 U	5 U
Dibenzo(a,h)anthracene	0.23	2.5	--	--	2 U	2 U	2 U
Dibenzofuran	5.9	19	3,100	--	4 U	4 U	4 U
1,2-Dichlorobenzene	600	600	370	--	1 U	1 U	1 U
1,3-Dichlorobenzene	12	38	2.6	--	1 U	1 U	1 U
1,4-Dichlorobenzene	75	75	5.9	--	1 U	1 U	1 U
3,3'-Dichlorobenzidine	1.6	8.2	--	--	5 U	5 U	5 U
2,4-Dichlorophenol	80	380	--	--	10 U	10 U	10 U
Diethylphthalate	4,700	15,000	--	--	5 U	5 U	5 U
2,4-Dimethylphenol	120	380	--	--	5 U	5 U	5 U
Dimethylphthalate	590	1,900	--	--	5 U	5 U	5 U
4,6-Dinitro-2-methylphenol	2.4	7.6	--	--	20 U	20 U	20 U
2,4-Dinitrophenol	12	38	--	--	25 U	25 U	25 U
2,4-Dinitrotoluene	1.1	5.5	--	--	5 U	5 U	5 U
2,6-Dinitrotoluene	--	--	--	--	5 U	5 U	5 U
1,2-Diphenylhydrazine	--	--	--	--	5 U	5 U	5 U
bis(2-Ethylhexyl)phthalate	6	6	--	--	5 U	5 U	5 U
Fluoranthene	240	260	--	--	1 U	1 U	1 U
Fluorene	240	760	1,700	--	5 U	5 U	5 U
Hexachlorobenzene	1	1	0.11	--	5 U	5 U	5 U
Hexachlorobutadiene	5.9	19	0.32	--	10 U	10 U	10 U
Hexachlorocyclopentadiene	50	50	0.03	--	5 U	5 U	5 U
Hexachloroethane	4.2	13	1.5	--	5 U	5 U	5 U
Indeno(1,2,3-cd)pyrene	0.19	0.19	--	--	2 U	2 U	2 U
Isophorone	760	3,800	--	--	5 U	5 U	5 U
2-Methylnaphthalene	24	76	66	--	5 U	5 U	5 U
Naphthalene	590	1,900	4.2	--	5 U	5 U	5 U
2-Nitroaniline	--	--	--	--	25 U	25 U	25 U
3-Nitroaniline	--	--	--	--	25 U	25 U	25 U
4-Nitroaniline	--	--	--	--	25 U	25 U	25 U
Nitrobenzene	12	38	68	--	5 U	5 U	5 U
2-Nitrophenol	12	38	0.12	--	5 U	5 U	5 U
4-Nitrophenol	--	--	--	--	25 U	25 U	25 U
N-Nitrosodi-n-propylamine	0.1	0.53	--	--	5 U	5 U	5 U
N-Nitrosodiphenylamine	150	750	--	--	5 U	5 U	5 U
Pentachlorophenol	1	1	--	--	5 U	5 U	5 U
Phenanthrene	180	570	0.077	--	2 U	2 U	2 U
Phenol	1,200	5,700	--	--	5 U	5 U	5 U
Pyrene	140	140	140	--	5 U	5 U	5 U
1,2,4-Trichlorobenzene	70	70	3.8	460	5 U	5 U	5 U
2,4,5-Trichlorophenol	180	570	--	--	5 U	5 U	5 U
2,4,6-Trichlorophenol	40	170	--	--	4 U	4 U	4 U
<b>Metals</b>							
Antimony	6	6	NA	--	5 U	5 U	5 U
Arsenic	10	10	NA	--	2 U	2 U	2 U
Barium	2000	2000	NA	--	58	50	48
Beryllium	4	4	NA	--	1 U	1 U	1 U
Cadmium	5	5	NA	--	0.5 U	0.5 U	0.5 U
Chromium	100	100	NA	--	14	5 U	5 U
Cobalt	1.8	5.7	NA	--	5 U	5 U	5 U
Copper	1000	1000	NA	--	5 U	5 U	10
Lead	1.0	1	NA	--	27	3 U	3 U
Manganese	50	50	NA	--	530	480	475
Mercury	2	2	NA	7.2	0.2 U	0.2 U	0.2 U
Nickel	36	110	NA	--	5 U	5 U	5 U
Selenium	50	50	NA	--	5 U	5 U	5 U
Silver	100	100	NA	--	0.5 U	0.5 U	0.5 U
Thallium	2	2	NA	--	2 U	2 U	2 U
Vanadium	0.4	1.3	NA	--	5 U	5 U	5 U
Zinc	5000	5000	NA	--	22	5 U	5 U
<b>Inorganics</b>							
Total Dissolved Solids	--	--	--	--	562,000	558,000	586,000
Total Suspended Solids	--	--	--	--	3,000	3,000 U	11,000

See Notes on last page.

**Notes:**

1 Criteria listed are from the Draft Proposed Michigan Department of Environmental Quality (MDEQ) Clean Up Criteria Requirements Table 1: Groundwater: Residential and Nonresidential, Part 201 Generic Cleanup Criteria and Screening Levels and Table 4. VI Tier 1 Groundwater, Soil, and Vapor Screening Levels Part 201 Generic Screening Levels/Part 213 Risk-Based Screening Levels, August 29, 2017 as well as the minimum values from the Rule 57 Water Quality Values, Surface Water Assessment Section, Michigan DQ dated 10/21/2016.

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3. Q=Criteria for carcinogenic polycyclic aromatic hydrocarbons were developed using relative potential potencies to benzo(a)pyrene
4. X=The GSI criterion shown in the generic cleanup criteria tables is not protective for

**Abbreviations:**

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<b>GW</b>	Groundwater
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<b>MDEQ</b>	Michigan Department of Environmental Quality
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<b>RIASL</b>	Recommended Interim Action Screening Level
<b>SL</b>	Screening Level
<b>U</b>	Compound analyzed for but not detected above the detection limit.
<b>VI</b>	Vapor intrusion
<b>VIA</b>	Volatilization to Indoor Air
<b>Y</b>	Elevated reporting limit due to high target concentration.

# ATTACHMENTS



# **Attachment 1**

**Boring and Well Construction Logs**

**Date Start:** 10/17/17  
**Date Finish:** 10/18/17  
**Drilling Company:** Stearns  
**Driller's Name:** B. Marshal, B. Graham, Z. Galvanek  
**Drilling Method:** Hand Auger, Sonic  
**Sampling Method:** 5.0'/10.0' Core barrel, Continuous  
**Rig Type:** Geoprobe  
**Water Level Start (ft. bgs.):** 15.0  
**Water Level Finish (ft. btoc.):**

**Northing:**  
**Easting:**  
**Casing Elevation:**  
**Borehole Depth (ft. bgs.):** 35.0  
**Surface Elevation:**  
**Descriptions By:** Kaitlyn Voet

**Well/Boring ID:** INJ-01-17  
**Client:** RACER  
**Location:** RACER PNC  
**Weather Conditions:** Sunny and windy, 60 F

DEPTH (feet bgs.)	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Water Level (ft. bgs.)	Well/Boring Construction
0	0							(0.0 - 0.3') TOPSOIL, grass.		
3.3		1	0.0-5.0	HA				(0.3 - 5.0') SAND, fine to medium, subrounded; and SILT, medium plasticity, no dilatancy; some large pebbles to small cobbles, subrounded to subangular; poorly sorted; dry; dark brown (10YR 3/3). Note: Fill.  Note: Slight to moderate odors and gray discoloration from 2.0-5.0' bgs. Note: Concrete and brick pieces from 2.5-5.0' bgs.		Backfill sand (0.6-4.5' bgs)
2.6										
8.3										
8.8										
6.9										
5	-5	2	5.0-10.0	2.75				(5.0 - 10.0') SAND, fine to medium, subrounded; and SILT, medium plasticity, slow to no dilatancy; trace granules, subangular; poorly sorted; dry; medium stiff; dark grayish brown (10YR 4/2).		4" sch 40 pvc (0.0-15.0' bgs) Neat Cement Seal (4.5-12.0' bgs)
0.0										
0.0										
0.1										
0.4										
10	-10							(10.0 - 15.0') CLAY, little silt, medium to low plasticity, rapid dilatancy; and SAND, very fine to fine, subangular; poorly sorted; moist; soft; very dark gray (10YR 3/1).  Note: Medium stiff and black (10YR 2/1) from 12.0-13.0' bgs.		#6 Filter Pack sand (12.0-14.0' bgs)
1.1										
0.6										
0.6										
0.6										
15	-15	3	10.0-20.0	10.0				(15.0 - 15.5') SAND, medium, subrounded; little silt; well sorted; wet; dark gray (10YR 4/1).  (15.5 - 19.0') CLAY, medium plasticity, slow dilatancy; some very fine sand, subrounded; moist to wet; soft; dark yellowish brown (10YR 4/4).	15.0	#5 Filter Pack sand (14.0-15.5' bgs) #6 Filter Pack sand (15.5-19.0' bgs)
0.8										
0.4										
0.4										
0.3										
0.3										

**Remarks:** bgs = below ground surface  
 NA = not applicable  
 btoc = below top of casing  
 Hand auger to 5.0' bgs.  
 Groundwater encountered at 15.0' bgs.





<b>Date Start:</b> 10/18/17 <b>Date Finish:</b> 10/19/17 <b>Drilling Company:</b> Stearns <b>Driller's Name:</b> B. Marshal, B. Graham, Z. Galvanek <b>Drilling Method:</b> Hand Auger, Sonic <b>Sampling Method:</b> 5.0'/10.0' Core barrel, Continuous <b>Rig Type:</b> Sonic <b>Water Level Start (ft. bgs.):</b> 13.0 <b>Water Level Finish (ft. btoc.):</b>	<b>Northing:</b> <b>Easting:</b> <b>Casing Elevation:</b> <b>Borehole Depth (ft. bgs.):</b> 30.0 <b>Surface Elevation:</b> <b>Descriptions By:</b> Kaitlyn Voet	<b>Well/Boring ID:</b> MW-03-17 <b>Client:</b> RACER <b>Location:</b> RACER PNC <b>Weather Conditions:</b> Sunny, 65 F
--	--	---

DEPTH (feet bgs.)	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Water Level (ft. bgs.)	Well/Boring Construction
0	0							(0.0 - 0.3') TOPSOIL, grass.		
					6.2			(0.3 - 1.0') SILT; and SAND, very fine, subrounded; poorly sorted; moist; dark brown (10YR 3/3).		Backfill sand (0.5-1.5' bgs)
					8.8			(1.0 - 2.0') SAND, very fine to fine, subrounded; some silt; poorly sorted; moist; dark yellowish brown (10YR 3/4).		
		1	0.0-6.5	HA	40.2			(2.0 - 3.0') SAND, very fine, subrounded; well sorted; moist; dark gray (10YR 4/1). Note: Moderate odors from 2.0-6.0' bgs.		
					27.0			(3.0 - 13.0') SILT, low plasticity to nonplastic, slow to no dilatancy; and SAND, very fine, subrounded; moist; soft; very dark grayish brown (10YR 3/2).		
					19.8					
					27.0					
								Note: Slight odors from 6.0-9.0' bgs.		
		2	6.5-10.0	3.5	0.9					Bentonite slurry (1.5-14.0' bgs)
					1.2					2" sch 40 pvc (0.4-18.0' bgs)
					3.0					
					1.0			Note: Transition to black (10YR 2/1) from 9.8-10.0' and 11.0-12.0' bgs.		
					1.0					
					1.5					
					0.7					
					0.7			(13.0 - 15.0') SAND, fine to medium, subrounded; little to trace silt; trace small pebbles, subrounded; poorly sorted; wet; very dark gray (10YR 3/1).		
		3	10.0-20.0	8.3	1.6					Bentonite chips (14.0-16.0' bgs)
					1.0			(15.0 - 18.0') CLAY, medium plasticity, slow dilatancy; some very fine sand; moist to wet; soft; very dark grayish brown (10YR 3/2). Note: Transition to dark yellowish brown (10YR 4/4), and very soft, from 17.0-18.0' bgs.		
					0.9					#6 Filter Pack sand (16.0-17.0' bgs)
					0.7					
					0.5			(18.0 - 20.0') SAND, very fine to fine, subangular to subrounded; well sorted; wet; dark yellowish brown (10YR 4/6).		

**Remarks:** bgs = below ground surface  
NA = not applicable  
btoc = below top of casing  
Hand auger to 6.5' bgs.  
Groundwater encountered at 13.0' bgs.



<b>Date Start:</b> 10/18/17 <b>Date Finish:</b> 10/19/17 <b>Drilling Company:</b> Stearns <b>Driller's Name:</b> B. Marshal, B. Graham, Z. Galvanek <b>Drilling Method:</b> Hand Auger, Sonic <b>Sampling Method:</b> 5.0'/10.0' Core barrel, Continuous <b>Rig Type:</b> Sonic <b>Water Level Start (ft. bgs.):</b> 13.0 <b>Water Level Finish (ft. btoc.):</b>	<b>Northing:</b> <b>Easting:</b> <b>Casing Elevation:</b> <b>Borehole Depth (ft. bgs.):</b> 30.0 <b>Surface Elevation:</b> <b>Descriptions By:</b> Kaitlyn Voet	<b>Well/Boring ID:</b> MW-03-17 <b>Client:</b> RACER <b>Location:</b> RACER PNC <b>Weather Conditions:</b> Sunny, 65 F
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DEPTH (feet bgs.)	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Water Level (ft. bgs.)	Well/Boring Construction
20	-20				0.5			Note: Medium to large pebbles, subrounded from 19.5-20.0' bgs.		<p>#5 Filter Pack sand (17.0-23.0' bgs)  2" 10 slot PVC screen (18.0-22.0' bgs)  Bentonite chips (23.0-30.0' bgs)</p>
					0.2	X		(20.0 - 22.5') SAND, medium to coarse, subrounded; and PEBBLES, small to very large, subrounded; some granules, subrounded; poorly sorted; wet; dark yellowish brown (10YR 4/6).		
					0.3			(22.5 - 23.1') SAND, very fine, subrounded; and SILT, nonplastic, slow to rapid dilatancy; poorly sorted; moist to wet; very dark grayish brown (10YR 3/2).		
					0.3			(23.1 - 25.0') SAND, fine to medium, subrounded; well sorted; wet; dark yellowish brown (10YR 4/6). Note: Little silt from 23.1-24.5' bgs.		
25	-25	4	20.0-30.0	10.0	0.3			(25.0 - 30.0') SILT, some clay, medium plasticity, no dilatancy; little very fine sand, subrounded; poorly sorted; dry to moist; very dark gray (10YR 3/1). Note: and SAND, very fine to fine, subrounded; from 26.2-26.3', 27.3-27.4', and 29.0-29.3' bgs.		
					0.3					
30	-30				0.3			End of boring at 30.0' bgs.		
35	-35									

	<b>Remarks:</b> bgs = below ground surface NA = not applicable btoc = below top of casing Hand auger to 6.5' bgs. Groundwater encountered at 13.0' bgs.
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**Date Start:** 10/18/17  
**Date Finish:** 10/19/17  
**Drilling Company:** Stearns  
**Driller's Name:** B. Marshal, B. Graham, Z. Galvanek  
**Drilling Method:** Hand Auger, Sonic  
**Sampling Method:** 5.0'/10.0' Core barrel, Continuous  
**Rig Type:** Sonic  
**Water Level Start (ft. bgs.):** 12.0  
**Water Level Finish (ft. btoc.):**

**Northing:**  
**Easting:**  
**Casing Elevation:**  
**Borehole Depth (ft. bgs.):** 30.0  
**Surface Elevation:**  
**Descriptions By:** Kaitlyn Voet


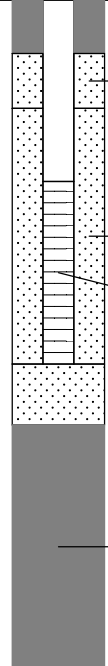






**Well/Boring ID:** MW-04-17  
**Client:** RACER  
**Location:** RACER PNC  
**Weather Conditions:** Sunny, 65 F


DEPTH (feet bgs.)	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Water Level (ft. bgs.)	Well/Boring Construction
0	0							(0.0 - 0.3') TOPSOIL, grass.		
1.7								(0.3 - 2.0') SILT; some sand, very fine to fine, subrounded; little small to large pebbles, subrounded; poorly sorted; moist; dark brown (10YR 3/3).		Backfill sand (0.5-1.5' bgs)
6.5								(2.0 - 3.0') SAND, fine, subrounded; some silt; poorly sorted; moist; dark brown (10YR 3/3).		
16.3								Note: Slight odors from 2.0-6.0' bgs.		
15.1		1	0.0-6.5	HA				(3.0 - 3.5') SAND, very fine to fine, subrounded; and SILT; poorly sorted; moist; dark brown (10YR 3/3).		
18.0								(3.5 - 6.5') SILT, medium plasticity, slow to no dilatancy; some very fine to fine sand, subrounded; poorly sorted; moist; soft; very dark grayish brown (10YR 3/2).		
10.4	-5									
3.8								(6.5 - 12.0') SILT, medium plasticity, slow to no dilatancy; and SAND, fine, subrounded; trace granules, subrounded; poorly sorted; moist; medium stiff; very dark gray (10YR 3/1).		
1.7		2	6.5-10.0	2.3						
1.5										
7.1	-10									
0.4										
0.3										
2.6								(12.0 - 13.5') SAND, fine to medium, subrounded; trace silt; little granules to small pebbles, subrounded; poorly sorted; wet; dark grayish brown (10YR 4/2).		
1.6										
0.9	-15							(13.5 - 15.0') CLAY, medium plasticity, slow dilatancy; little very fine sand, subrounded; moist; medium stiff to stiff; olive (5Y 4/3).		Bentonite slurry (1.5-18.0' bgs)
0.8		3	10.0-20.0	7.9				(15.0 - 17.0') CLAY, low plasticity, slow dilatancy; and SILT; trace very fine sand; trace small to large pebbles, subrounded; moist to wet; soft to medium stiff; very dark gray (10YR 3/1).		2" sch 40 pvc (0.4-22.0' bgs)
0.7										
0.7								(17.0 - 19.0') CLAY, low plasticity to nonplastic, slow dilatancy; and SAND, very fine; moist to wet; soft; brown (10YR 5/3).		
0.6										Bentonite chips

**Remarks:** bgs = below ground surface  
 NA = not applicable  
 btoc = below top of casing  
 Hand auger to 6.5' bgs.  
 Groundwater encountered at 12.0' bgs.



<b>Date Start:</b> 10/18/17 <b>Date Finish:</b> 10/19/17 <b>Drilling Company:</b> Stearns <b>Driller's Name:</b> B. Marshal, B. Graham, Z. Galvanek <b>Drilling Method:</b> Hand Auger, Sonic <b>Sampling Method:</b> 5.0'/10.0' Core barrel, Continuous <b>Rig Type:</b> Sonic <b>Water Level Start (ft. bgs.):</b> 12.0 <b>Water Level Finish (ft. btoc.):</b>	<b>Northing:</b> <b>Easting:</b> <b>Casing Elevation:</b> <b>Borehole Depth (ft. bgs.):</b> 30.0 <b>Surface Elevation:</b> <b>Descriptions By:</b> Kaitlyn Voet	<b>Well/Boring ID:</b> MW-04-17 <b>Client:</b> RACER <b>Location:</b> RACER PNC <b>Weather Conditions:</b> Sunny, 65 F
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DEPTH (feet bgs.)	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Water Level (ft. bgs.)	Well/Boring Construction
20	-20				0.5			(19.0 - 20.5') SAND, fine to medium, trace coarse, subrounded; and PEBBLES, small to medium, subrounded; poorly sorted; moist to wet; dark yellowish brown (10YR 4/6).		 <p>(18.0-19.9' bgs)</p> <p>#6 Filter Pack sand (19.9-20.8' bgs)</p> <p>#5 Filter Pack sand (20.8-26.0' bgs)</p> <p>2" 10 slot PVC screen (22.0-25.0' bgs)</p> <p>Bentonite chips (26.0-30.0' bgs)</p>
					0.3			(20.5 - 22.0') SILT; trace very fine sand; trace small pebbles, subrounded; dry; very stiff; dark yellowish brown (10YR 4/4). Note: Transition to dark grayish brown(10YR 4/2) from 21.0-22.0' bgs.		
					0.3			(22.0 - 23.5') SAND, fine, subrounded; well sorted; wet; dark yellowish brown (10YR 4/4).		
					0.3			(23.5 - 25.0') SAND, fine to medium, little coarse, subrounded; and PEBBLES, small to large, subrounded; poorly sorted; wet; dark yellowish brown (10YR 4/6).		
25	-25	4	20.0-30.0	10.0	0.3			(25.0 - 29.0') SILT, some clay, medium plasticity, no dilatancy; little very fine sand; trace small to large pebbles, subrounded; poorly sorted; dry to moist; medium stiff to stiff; very dark gray (10YR 3/1).		
					0.3			(29.0 - 29.5') SAND, very fine, subrounded; little to trace silt; well sorted; wet; very dark gray (10YR 3/1).		
					0.3			(29.5 - 30.0') SILT, some clay, medium plasticity, no dilatancy; little very fine sand; trace small to large pebbles, subrounded; poorly sorted; dry to moist; medium stiff; very dark gray (10YR 3/1).		
30	-30							End of boring at 30.0' bgs.		
35	-35									

	<b>Remarks:</b> bgs = below ground surface NA = not applicable btoc = below top of casing Hand auger to 6.5' bgs. Groundwater encountered at 12.0' bgs.
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# **Attachment 2**

**Soil Laboratory Analytical Report**



# Analytical Laboratory Report

Supplemental Report

Report ID: S84575.01(02)  
Generated on 11/09/2017  
Replaces report S84575.01(01) generated on 10/30/2017

Report to

Attention: Theresa Olechwiw  
Arcadis  
28550 Cabot Drive  
Suite 500  
Novi, MI 48377

Phone: NA FAX: 248-994-2241  
Email: [theresa.olechwiw@arcadis-us.com](mailto:theresa.olechwiw@arcadis-us.com)

Additional Contacts: Christi Kiker, Matthew Williams, Trevor Swarthout

Report produced by

Merit Laboratories, Inc.  
2680 East Lansing Drive  
East Lansing, MI 48823

Phone: (517) 332-0167 FAX: (517) 332-6333

Contacts for report questions:  
John Lavery ([johnlavery@meritlabs.com](mailto:johnlavery@meritlabs.com))  
Barbara Ball ([bball@meritlabs.com](mailto:bball@meritlabs.com))

Report Summary

Lab Sample ID(s): S84575.01-S84575.05  
Project: B0064607.2017.00007  
Collected Date: 10/17/2017 - 10/19/2017  
Submitted Date/Time: 10/20/2017 14:00  
Sampled by: Kaitlyn Voet  
P.O. #: B0064607.2017.00007

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- Report Narrative (Page 2)
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- Glossary of Abbreviations (Page 3)
- Method Summary (Page 4)
- Sample Summary (Page 5)

Maya Murshak  
Technical Director



# Analytical Laboratory Report

Supplemental Report

## General Report Notes

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Analytical results relate only to the samples tested, in the condition received by the laboratory.

Methods may be modified for improved performance.

Results reported on a dry weight basis where applicable.

'Not detected' indicates that parameter was not found at a level equal to or greater than the reporting limit (RL).

40 CFR Part 136 Table II Required Containers, Preservation Techniques and Holding Times for the Clean Water Act specify that samples for acrolein and acrylonitrile need to be preserved at a pH in the range of 4 to 5 or if not preserved, analyzed within 3 days of sampling.

QA/QC corresponding to this analytical report is a separate document with the same Merit ID reference and is available upon request.

Full accreditation certificates are available upon request. Starred (\*) analytes are not NELAP accredited.

Samples are held by the lab for 30 days from the final report date unless a written request to hold longer is provided by the client.

Report shall not be reproduced except in full, without the written approval of Merit Laboratories, Inc.

Limits for drinking water samples, are listed as the MCL Limits (Maximum Contaminant Level Concentrations)

## Report Narrative

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All analyses complete



## Laboratory Certifications

Authority	Certification ID
Michigan DEQ	#9956
DOD ELAP/ISO 17025	#69699
WBENC	#2005110032
Ohio VAP	#CL0002
Indiana DOH	#C-MI-07
New York NELAC	#11814
North Carolina DENR	#680
North Carolina DOH	#26702
Alaska CSLAP	#17-001

## Qualifier Descriptions

Qualifier	Description
!	Result is outside of stated limit criteria
B	Compound also found in associated method blank
E	Concentration exceeds calibration range
F	Analysis run outside of holding time
G	Estimated result due to extraction run outside of holding time
H	Sample submitted and run outside of holding time
I	Matrix interference with internal standard
J	Estimated value less than reporting limit, but greater than MDL
L	Elevated reporting limit due to low sample amount
M	Result reported to MDL not RDL
O	Analysis performed by outside laboratory. See attached report.
R	Preliminary result
S	Surrogate recovery outside of control limits
T	No correction for total solids
X	Elevated reporting limit due to matrix interference
Y	Elevated reporting limit due to high target concentration
b	Value detected less than reporting limit, but greater than MDL
e	Reported value estimated due to interference
j	Analyte also found in associated method blank
p	Benzo(b)Fluoranthene and Benzo(k)Fluoranthene integrated as one peak.
x	Preserved from bulk sample

## Glossary of Abbreviations

Abbreviation	Description
RL/RDL	Reporting Limit
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
SW	EPA SW 846 (Soil and Wastewater) Methods
E	EPA Methods
SM	Standard Methods



# Analytical Laboratory Report

Supplemental Report

## Method Summary

Method	Version
SM2540B	Standard Method 2540 B 20th Edition
SW3050B	SW 846 Method 3050B Revision 2 December 1996
SW3550C	SW 846 Method 3550C Revision 3 February 2007
SW5035A/8260C	SW 846 Method 8260C Revision 3 August 2006 / 5035A Revision 1 July 2002
SW6020A	SW 846 Method 6020A Revision 1 February 2007
SW7471B	SW 846 Method 7471B Revision 2 February 2007
SW8082A	SW 846 Method 8082A Revision 1 February 2007
SW8270D	SW 846 Method 8270D Revision 4 February 2007



# Analytical Laboratory Report

Supplemental Report

## Sample Summary (5 samples)

Sample ID	Sample Tag	Matrix	Collected Date/Time
S84575.01	INJ-01-17_(16-17)	Soil	10/17/17 17:45
S84575.02	INJ-01-17_(20-21)	Soil	10/17/17 17:55
S84575.03	MW-03-17_(18-19)	Soil	10/19/17 10:10
S84575.04	MW-03-17_(20-21)	Soil	10/19/17 10:15
S84575.05	Trip Blank	Methanol	10/19/17 00:01



# Analytical Laboratory Report

Supplemental Report

**Lab Sample ID: S84575.01**

Sample Tag: INJ-01-17\_(16-17)

Collected Date/Time: 10/17/2017 17:45

Matrix: Soil

COC Reference: PNC

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
4	4oz Glass	None	Yes	5.0	IR
1	32oz Glass	None	Yes	5.0	IR
1	40ml Glass	MeOH	Yes	5.0	IR

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags
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**Extraction / Prep.**

BNA Extraction	Completed			SW3550C	10/26/17 15:00	PLB		
Extraction, PCB	Completed			SW3550C	10/23/17 15:15	WAR		
Mercury Digestion	Completed			SW7471B	10/24/17 09:00	JRH		
Metal Digestion	Completed			SW3050B	10/26/17 11:00	JRH		

**Inorganics**

Total Solids*	82	%	1	SM2540B	10/23/17 14:40	JBL		
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**Metals**

Antimony	Not detected	mg/kg	0.50	SW6020A	10/26/17 13:06	JRH	7440-36-0	
Arsenic	4.03	mg/kg	0.20	SW6020A	10/26/17 13:06	JRH	7440-38-2	
Barium	34.7	mg/kg	1.0	SW6020A	10/26/17 13:06	JRH	7440-39-3	
Beryllium	0.26	mg/kg	0.20	SW6020A	10/26/17 13:06	JRH	7440-41-7	
Cadmium	0.22	mg/kg	0.20	SW6020A	10/26/17 13:06	JRH	7440-43-9	
Chromium	8.44	mg/kg	0.50	SW6020A	10/26/17 13:06	JRH	7440-47-3	
Cobalt	7.82	mg/kg	0.50	SW6020A	10/26/17 13:06	JRH	7440-48-4	
Copper	14.9	mg/kg	0.50	SW6020A	10/26/17 13:06	JRH	7440-50-8	
Lead	7.84	mg/kg	0.30	SW6020A	10/26/17 13:06	JRH	7439-92-1	
Manganese	361	mg/kg	0.50	SW6020A	10/26/17 13:06	JRH	7439-96-5	
Mercury	Not detected	mg/kg	0.050	SW7471B	10/24/17 14:12	JRH	7439-97-6	
Nickel	17.0	mg/kg	0.50	SW6020A	10/26/17 13:06	JRH	7440-02-0	
Selenium	0.91	mg/kg	0.40	SW6020A	10/26/17 13:06	JRH	7782-49-2	
Silver	Not detected	mg/kg	0.20	SW6020A	10/26/17 13:06	JRH	7440-22-4	
Thallium	Not detected	mg/kg	0.20	SW6020A	10/26/17 13:06	JRH	7440-28-0	
Vanadium	12.3	mg/kg	0.50	SW6020A	10/26/17 13:06	JRH	7440-62-2	
Zinc	34.9	mg/kg	0.50	SW6020A	10/26/17 13:06	JRH	7440-66-6	

**Organics - PCBs/Pesticides**

**PCB List**

PCB-1016	Not detected	ug/kg	330	SW8082A	10/23/17 17:16	JAN	12674-11-2	
PCB-1242	Not detected	ug/kg	330	SW8082A	10/23/17 17:16	JAN	53469-21-9	
PCB-1221	Not detected	ug/kg	330	SW8082A	10/23/17 17:16	JAN	11104-28-2	
PCB-1232	Not detected	ug/kg	330	SW8082A	10/23/17 17:16	JAN	11141-16-5	
PCB-1248	Not detected	ug/kg	330	SW8082A	10/23/17 17:16	JAN	12672-29-6	
PCB-1254	Not detected	ug/kg	330	SW8082A	10/23/17 17:16	JAN	11097-69-1	
PCB-1260	Not detected	ug/kg	330	SW8082A	10/23/17 17:16	JAN	11096-82-5	

**Organics - Semi-Volatiles**

**Semi-Volatile Organics - MDEQ**

Acenaphthene	Not detected	ug/kg	330	SW8270D	10/26/17 23:35	PL	83-32-9	
Acenaphthylene	Not detected	ug/kg	330	SW8270D	10/26/17 23:35	PL	208-96-8	



# Analytical Laboratory Report

Supplemental Report

Lab Sample ID: S84575.01 (continued)

Sample Tag: INJ-01-17\_(16-17)

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags
<b>Organics - Semi-Volatiles (continued)</b>								
<b>Semi-Volatile Organics - MDEQ (continued)</b>								
Anthracene	Not detected	ug/kg	330	SW8270D	10/26/17 23:35	PL	120-12-7	
Benzo(a)anthracene	Not detected	ug/kg	330	SW8270D	10/26/17 23:35	PL	56-55-3	
Benzo(b)fluoranthene	Not detected	ug/kg	330	SW8270D	10/26/17 23:35	PL	205-99-2	
Benzo(k)fluoranthene	Not detected	ug/kg	330	SW8270D	10/26/17 23:35	PL	207-08-9	
Benzo(ghi)perylene	Not detected	ug/kg	330	SW8270D	10/26/17 23:35	PL	191-24-2	
Benzo(a)pyrene	Not detected	ug/kg	330	SW8270D	10/26/17 23:35	PL	50-32-8	
bis(2-Chloroethoxy)methane	Not detected	ug/kg	330	SW8270D	10/26/17 23:35	PL	111-91-1	
bis(2-Chloroethyl)ether*	Not detected	ug/kg	330	SW8270D	10/26/17 23:35	PL	111-44-4	
bis(2-Chloroisopropyl)ether*	Not detected	ug/kg	330	SW8270D	10/26/17 23:35	PL	108-60-1	
bis(2-Ethylhexyl)phthalate*	Not detected	ug/kg	330	SW8270D	10/26/17 23:35	PL	117-81-7	
4-Bromophenyl phenyl ether	Not detected	ug/kg	330	SW8270D	10/26/17 23:35	PL	101-55-3	
Butyl benzyl phthalate	Not detected	ug/kg	330	SW8270D	10/26/17 23:35	PL	85-68-7	
4-Chloroaniline	Not detected	ug/kg	330	SW8270D	10/26/17 23:35	PL	106-47-8	
2-Chloronaphthalene	Not detected	ug/kg	330	SW8270D	10/26/17 23:35	PL	91-58-7	
4-Chloro-3-methylphenol	Not detected	ug/kg	280	SW8270D	10/26/17 23:35	PL	59-50-7	
2-Chlorophenol	Not detected	ug/kg	330	SW8270D	10/26/17 23:35	PL	95-57-8	
4-Chlorophenyl phenyl ether	Not detected	ug/kg	330	SW8270D	10/26/17 23:35	PL	7005-72-3	
Chrysene	Not detected	ug/kg	330	SW8270D	10/26/17 23:35	PL	218-01-9	
p,m-Cresol	Not detected	ug/kg	330	SW8270D	10/26/17 23:35	PL	3/4-CRESOL	
o-Cresol*	Not detected	ug/kg	330	SW8270D	10/26/17 23:35	PL	95-48-7	
Dibenzo(ah)anthracene	Not detected	ug/kg	330	SW8270D	10/26/17 23:35	PL	53-70-3	
Dibenzofuran*	Not detected	ug/kg	330	SW8270D	10/26/17 23:35	PL	132-64-9	
di-n-Butyl phthalate	Not detected	ug/kg	330	SW8270D	10/26/17 23:35	PL	84-74-2	
1,2-Dichlorobenzene*	Not detected	ug/kg	330	SW8270D	10/26/17 23:35	PL	95-50-1	
1,3-Dichlorobenzene*	Not detected	ug/kg	330	SW8270D	10/26/17 23:35	PL	541-73-1	
1,4-Dichlorobenzene*	Not detected	ug/kg	330	SW8270D	10/26/17 23:35	PL	106-46-7	
3,3'-Dichlorobenzidine	Not detected	ug/kg	2,000	SW8270D	10/26/17 23:35	PL	91-94-1	
2,4-Dichlorophenol	Not detected	ug/kg	330	SW8270D	10/26/17 23:35	PL	120-83-2	
Diethyl phthalate	Not detected	ug/kg	330	SW8270D	10/26/17 23:35	PL	84-66-2	
2,4-Dimethylphenol	Not detected	ug/kg	330	SW8270D	10/26/17 23:35	PL	105-67-9	
Dimethyl phthalate	Not detected	ug/kg	330	SW8270D	10/26/17 23:35	PL	131-11-3	
4,6-Dinitro-2-methylphenol	Not detected	ug/kg	830	SW8270D	10/26/17 23:35	PL	534-52-1	
2,4-Dinitrophenol	Not detected	ug/kg	830	SW8270D	10/26/17 23:35	PL	51-28-5	
2,4-Dinitrotoluene	Not detected	ug/kg	330	SW8270D	10/26/17 23:35	PL	121-14-2	
2,6-Dinitrotoluene	Not detected	ug/kg	330	SW8270D	10/26/17 23:35	PL	606-20-2	
1,2-Diphenylhydrazine	Not detected	ug/kg	330	SW8270D	10/26/17 23:35	PL	122-66-7	
di-n-Octyl phthalate	Not detected	ug/kg	330	SW8270D	10/26/17 23:35	PL	117-84-0	
Fluoranthene	Not detected	ug/kg	330	SW8270D	10/26/17 23:35	PL	206-44-0	
Fluorene	Not detected	ug/kg	330	SW8270D	10/26/17 23:35	PL	86-73-7	
Hexachlorobenzene*	Not detected	ug/kg	330	SW8270D	10/26/17 23:35	PL	118-74-1	
Hexachlorobutadiene	Not detected	ug/kg	330	SW8270D	10/26/17 23:35	PL	87-68-3	
Hexachlorocyclopentadiene	Not detected	ug/kg	330	SW8270D	10/26/17 23:35	PL	77-47-4	
Hexachloroethane	Not detected	ug/kg	330	SW8270D	10/26/17 23:35	PL	67-72-1	
Indeno(1,2,3-cd)pyrene	Not detected	ug/kg	330	SW8270D	10/26/17 23:35	PL	193-39-5	
Isophorone	Not detected	ug/kg	330	SW8270D	10/26/17 23:35	PL	78-59-1	
2-Methylnaphthalene	Not detected	ug/kg	330	SW8270D	10/26/17 23:35	PL	91-57-6	
Naphthalene	Not detected	ug/kg	330	SW8270D	10/26/17 23:35	PL	91-20-3	
2-Nitroaniline	Not detected	ug/kg	830	SW8270D	10/26/17 23:35	PL	88-74-4	
3-Nitroaniline	Not detected	ug/kg	830	SW8270D	10/26/17 23:35	PL	99-09-2	



# Analytical Laboratory Report

Supplemental Report

Lab Sample ID: S84575.01 (continued)

Sample Tag: INJ-01-17\_(16-17)

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags
<b>Organics - Semi-Volatiles (continued)</b>								
<b>Semi-Volatile Organics - MDEQ (continued)</b>								
4-Nitroaniline	Not detected	ug/kg	830	SW8270D	10/26/17 23:35	PL	100-01-6	
Nitrobenzene	Not detected	ug/kg	330	SW8270D	10/26/17 23:35	PL	98-95-3	
2-Nitrophenol	Not detected	ug/kg	330	SW8270D	10/26/17 23:35	PL	88-75-5	
4-Nitrophenol	Not detected	ug/kg	830	SW8270D	10/26/17 23:35	PL	100-02-7	
N-Nitrosodiphenylamine	Not detected	ug/kg	330	SW8270D	10/26/17 23:35	PL	86-30-6	
N-Nitrosodi-n-propylamine*	Not detected	ug/kg	330	SW8270D	10/26/17 23:35	PL	621-64-7	
Pentachlorophenol	Not detected	ug/kg	330	SW8270D	10/26/17 23:35	PL	87-86-5	
Phenanthrene	Not detected	ug/kg	330	SW8270D	10/26/17 23:35	PL	85-01-8	
Phenol	Not detected	ug/kg	330	SW8270D	10/26/17 23:35	PL	108-95-2	
Pyrene	Not detected	ug/kg	330	SW8270D	10/26/17 23:35	PL	129-00-0	
1,2,4-Trichlorobenzene	Not detected	ug/kg	330	SW8270D	10/26/17 23:35	PL	120-82-1	
2,4,5-Trichlorophenol	Not detected	ug/kg	330	SW8270D	10/26/17 23:35	PL	95-95-4	
2,4,6-Trichlorophenol	Not detected	ug/kg	330	SW8270D	10/26/17 23:35	PL	88-06-2	
<b>Organics - Volatiles</b>								
<b>TCL Volatile Organics HighLevel 5035/8260</b>								
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	ug/kg	100	SW5035A/8260C	10/23/17 19:24	JML	76-13-1	
Acetone	Not detected	ug/kg	1,100	SW5035A/8260C	10/23/17 19:24	JML	67-64-1	
Carbon disulfide	Not detected	ug/kg	400	SW5035A/8260C	10/23/17 19:24	JML	75-15-0	
Methyl Acetate	Not detected	ug/kg	4,000	SW5035A/8260C	10/23/17 19:24	JML	79-20-9	
tert-Methyl butyl ether (MTBE)*	Not detected	ug/kg	400	SW5035A/8260C	10/23/17 19:24	JML	1634-04-4	
2-Butanone (MEK)*	Not detected	ug/kg	1,100	SW5035A/8260C	10/23/17 19:24	JML	78-93-3	
Dichlorodifluoromethane	Not detected	ug/kg	70	SW5035A/8260C	10/23/17 19:24	JML	75-71-8	
Chloromethane	Not detected	ug/kg	400	SW5035A/8260C	10/23/17 19:24	JML	74-87-3	
Vinyl chloride	Not detected	ug/kg	100	SW5035A/8260C	10/23/17 19:24	JML	75-01-4	
Bromomethane	Not detected	ug/kg	400	SW5035A/8260C	10/23/17 19:24	JML	74-83-9	
Chloroethane	Not detected	ug/kg	400	SW5035A/8260C	10/23/17 19:24	JML	75-00-3	
Trichlorofluoromethane	Not detected	ug/kg	100	SW5035A/8260C	10/23/17 19:24	JML	75-69-4	
1,1-Dichloroethene	Not detected	ug/kg	70	SW5035A/8260C	10/23/17 19:24	JML	75-35-4	
Methylene chloride	Not detected	ug/kg	400	SW5035A/8260C	10/23/17 19:24	JML	75-09-2	
trans-1,2-Dichloroethene*	Not detected	ug/kg	70	SW5035A/8260C	10/23/17 19:24	JML	156-60-5	
1,1-Dichloroethane	Not detected	ug/kg	70	SW5035A/8260C	10/23/17 19:24	JML	75-34-3	
cis-1,2-Dichloroethene*	Not detected	ug/kg	70	SW5035A/8260C	10/23/17 19:24	JML	156-59-2	
Chloroform	Not detected	ug/kg	70	SW5035A/8260C	10/23/17 19:24	JML	67-66-3	
1,1,1-Trichloroethane	Not detected	ug/kg	70	SW5035A/8260C	10/23/17 19:24	JML	71-55-6	
Cyclohexane	Not detected	ug/kg	70	SW5035A/8260C	10/23/17 19:24	JML	110-82-7	
4-Methyl-2-pentanone (MIBK)*	Not detected	ug/kg	4,000	SW5035A/8260C	10/23/17 19:24	JML	108-10-1	
2-Hexanone*	Not detected	ug/kg	4,000	SW5035A/8260C	10/23/17 19:24	JML	591-78-6	
Carbon tetrachloride	Not detected	ug/kg	70	SW5035A/8260C	10/23/17 19:24	JML	56-23-5	
Benzene	Not detected	ug/kg	70	SW5035A/8260C	10/23/17 19:24	JML	71-43-2	
1,2-Dichloroethane	Not detected	ug/kg	70	SW5035A/8260C	10/23/17 19:24	JML	107-06-2	
Trichloroethene	Not detected	ug/kg	70	SW5035A/8260C	10/23/17 19:24	JML	79-01-6	
1,2-Dichloropropane	Not detected	ug/kg	70	SW5035A/8260C	10/23/17 19:24	JML	78-87-5	
Bromodichloromethane	Not detected	ug/kg	70	SW5035A/8260C	10/23/17 19:24	JML	75-27-4	
Methyl cyclohexane	Not detected	ug/kg	70	SW5035A/8260C	10/23/17 19:24	JML	108-87-2	
cis-1,3-Dichloropropene	Not detected	ug/kg	70	SW5035A/8260C	10/23/17 19:24	JML	10061-01-5	
Toluene	Not detected	ug/kg	70	SW5035A/8260C	10/23/17 19:24	JML	108-88-3	
trans-1,3-Dichloropropene	Not detected	ug/kg	70	SW5035A/8260C	10/23/17 19:24	JML	10061-02-6	
1,1,2-Trichloroethane	Not detected	ug/kg	70	SW5035A/8260C	10/23/17 19:24	JML	79-00-5	



# Analytical Laboratory Report

Supplemental Report

Lab Sample ID: S84575.01 (continued)

Sample Tag: INJ-01-17\_(16-17)

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags
<b>Organics - Volatiles (continued)</b>								
<b>TCL Volatile Organics HighLevel 5035/8260 (continued)</b>								
Tetrachloroethene	Not detected	ug/kg	70	SW5035A/8260C	10/23/17 19:24	JML	127-18-4	
Dibromochloromethane	Not detected	ug/kg	70	SW5035A/8260C	10/23/17 19:24	JML	124-48-1	
1,2-Dibromoethane*	Not detected	ug/kg	70	SW5035A/8260C	10/23/17 19:24	JML	106-93-4	
Chlorobenzene	Not detected	ug/kg	70	SW5035A/8260C	10/23/17 19:24	JML	108-90-7	
1,1,2,2-Tetrachloroethane	Not detected	ug/kg	70	SW5035A/8260C	10/23/17 19:24	JML	79-34-5	
Ethylbenzene	Not detected	ug/kg	70	SW5035A/8260C	10/23/17 19:24	JML	100-41-4	
p,m-Xylene	Not detected	ug/kg	100	SW5035A/8260C	10/23/17 19:24	JML		
o-Xylene	Not detected	ug/kg	70	SW5035A/8260C	10/23/17 19:24	JML	95-47-6	
Styrene*	Not detected	ug/kg	70	SW5035A/8260C	10/23/17 19:24	JML	100-42-5	
Isopropylbenzene	Not detected	ug/kg	70	SW5035A/8260C	10/23/17 19:24	JML	98-82-8	
Bromoform*	Not detected	ug/kg	70	SW5035A/8260C	10/23/17 19:24	JML	75-25-2	
1,3-Dichlorobenzene	Not detected	ug/kg	70	SW5035A/8260C	10/23/17 19:24	JML	541-73-1	
1,4-Dichlorobenzene	Not detected	ug/kg	70	SW5035A/8260C	10/23/17 19:24	JML	106-46-7	
1,2-Dichlorobenzene	Not detected	ug/kg	70	SW5035A/8260C	10/23/17 19:24	JML	95-50-1	
1,2-Dibromo-3-chloropropane*	Not detected	ug/kg	70	SW5035A/8260C	10/23/17 19:24	JML	96-12-8	
1,2,4-Trichlorobenzene	Not detected	ug/kg	100	SW5035A/8260C	10/23/17 19:24	JML	120-82-1	
<b>Other / Misc.</b>								
Misc. Special Project*	Completed				11/09/17 12:00	Geo		O

O-Analysis performed by outside laboratory. See attached report.



# Analytical Laboratory Report

Supplemental Report

Lab Sample ID: S84575.02

Sample Tag: INJ-01-17\_(20-21)

Collected Date/Time: 10/17/2017 17:55

Matrix: Soil

COC Reference: PNC

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
4	4oz Glass	None	Yes	5.0	IR
1	32oz Glass	None	Yes	5.0	IR
1	40ml Glass	MeOH	Yes	5.0	IR

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags
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**Extraction / Prep.**

BNA Extraction	Completed			SW3550C	10/26/17 15:00	PLB		
Extraction, PCB	Completed			SW3550C	10/23/17 15:15	WAR		
Mercury Digestion	Completed			SW7471B	10/24/17 09:00	JRH		
Metal Digestion	Completed			SW3050B	10/26/17 11:00	JRH		

**Inorganics**

Total Solids*	93	%	1	SM2540B	10/23/17 14:40	JBL		
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**Metals**

Antimony	Not detected	mg/kg	0.50	SW6020A	10/26/17 13:08	JRH	7440-36-0	
Arsenic	2.52	mg/kg	0.20	SW6020A	10/26/17 13:08	JRH	7440-38-2	
Barium	15.1	mg/kg	1.0	SW6020A	10/26/17 13:08	JRH	7440-39-3	
Beryllium	Not detected	mg/kg	0.20	SW6020A	10/26/17 13:08	JRH	7440-41-7	
Cadmium	Not detected	mg/kg	0.20	SW6020A	10/26/17 13:08	JRH	7440-43-9	
Chromium	3.23	mg/kg	0.50	SW6020A	10/26/17 13:08	JRH	7440-47-3	
Cobalt	1.79	mg/kg	0.50	SW6020A	10/26/17 13:08	JRH	7440-48-4	
Copper	5.28	mg/kg	0.50	SW6020A	10/26/17 13:08	JRH	7440-50-8	
Lead	3.30	mg/kg	0.30	SW6020A	10/26/17 13:08	JRH	7439-92-1	
Manganese	563	mg/kg	0.50	SW6020A	10/26/17 13:08	JRH	7439-96-5	
Mercury	Not detected	mg/kg	0.050	SW7471B	10/24/17 14:14	JRH	7439-97-6	
Nickel	6.99	mg/kg	0.50	SW6020A	10/26/17 13:08	JRH	7440-02-0	
Selenium	Not detected	mg/kg	0.40	SW6020A	10/26/17 13:08	JRH	7782-49-2	
Silver	Not detected	mg/kg	0.20	SW6020A	10/26/17 13:08	JRH	7440-22-4	
Thallium	Not detected	mg/kg	0.20	SW6020A	10/26/17 13:08	JRH	7440-28-0	
Vanadium	4.08	mg/kg	0.50	SW6020A	10/26/17 13:08	JRH	7440-62-2	
Zinc	9.92	mg/kg	0.50	SW6020A	10/26/17 13:08	JRH	7440-66-6	

**Organics - PCBs/Pesticides**

**PCB List**

PCB-1016	Not detected	ug/kg	330	SW8082A	10/23/17 17:01	JAN	12674-11-2	
PCB-1242	Not detected	ug/kg	330	SW8082A	10/23/17 17:01	JAN	53469-21-9	
PCB-1221	Not detected	ug/kg	330	SW8082A	10/23/17 17:01	JAN	11104-28-2	
PCB-1232	Not detected	ug/kg	330	SW8082A	10/23/17 17:01	JAN	11141-16-5	
PCB-1248	Not detected	ug/kg	330	SW8082A	10/23/17 17:01	JAN	12672-29-6	
PCB-1254	Not detected	ug/kg	330	SW8082A	10/23/17 17:01	JAN	11097-69-1	
PCB-1260	Not detected	ug/kg	330	SW8082A	10/23/17 17:01	JAN	11096-82-5	

**Organics - Semi-Volatiles**

**Semi-Volatile Organics - MDEQ**

Acenaphthene	Not detected	ug/kg	330	SW8270D	10/27/17 00:04	PL	83-32-9	
Acenaphthylene	Not detected	ug/kg	330	SW8270D	10/27/17 00:04	PL	208-96-8	



# Analytical Laboratory Report

Supplemental Report

Lab Sample ID: S84575.02 (continued)

Sample Tag: INJ-01-17\_(20-21)

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags
<b>Organics - Semi-Volatiles (continued)</b>								
<b>Semi-Volatile Organics - MDEQ (continued)</b>								
Anthracene	Not detected	ug/kg	330	SW8270D	10/27/17 00:04	PL	120-12-7	
Benzo(a)anthracene	Not detected	ug/kg	330	SW8270D	10/27/17 00:04	PL	56-55-3	
Benzo(b)fluoranthene	Not detected	ug/kg	330	SW8270D	10/27/17 00:04	PL	205-99-2	
Benzo(k)fluoranthene	Not detected	ug/kg	330	SW8270D	10/27/17 00:04	PL	207-08-9	
Benzo(ghi)perylene	Not detected	ug/kg	330	SW8270D	10/27/17 00:04	PL	191-24-2	
Benzo(a)pyrene	Not detected	ug/kg	330	SW8270D	10/27/17 00:04	PL	50-32-8	
bis(2-Chloroethoxy)methane	Not detected	ug/kg	330	SW8270D	10/27/17 00:04	PL	111-91-1	
bis(2-Chloroethyl)ether*	Not detected	ug/kg	330	SW8270D	10/27/17 00:04	PL	111-44-4	
bis(2-Chloroisopropyl)ether*	Not detected	ug/kg	330	SW8270D	10/27/17 00:04	PL	108-60-1	
bis(2-Ethylhexyl)phthalate*	Not detected	ug/kg	330	SW8270D	10/27/17 00:04	PL	117-81-7	
4-Bromophenyl phenyl ether	Not detected	ug/kg	330	SW8270D	10/27/17 00:04	PL	101-55-3	
Butyl benzyl phthalate	Not detected	ug/kg	330	SW8270D	10/27/17 00:04	PL	85-68-7	
4-Chloroaniline	Not detected	ug/kg	330	SW8270D	10/27/17 00:04	PL	106-47-8	
2-Chloronaphthalene	Not detected	ug/kg	330	SW8270D	10/27/17 00:04	PL	91-58-7	
4-Chloro-3-methylphenol	Not detected	ug/kg	280	SW8270D	10/27/17 00:04	PL	59-50-7	
2-Chlorophenol	Not detected	ug/kg	330	SW8270D	10/27/17 00:04	PL	95-57-8	
4-Chlorophenyl phenyl ether	Not detected	ug/kg	330	SW8270D	10/27/17 00:04	PL	7005-72-3	
Chrysene	Not detected	ug/kg	330	SW8270D	10/27/17 00:04	PL	218-01-9	
p,m-Cresol	Not detected	ug/kg	330	SW8270D	10/27/17 00:04	PL	3/4-CRESOL	
o-Cresol*	Not detected	ug/kg	330	SW8270D	10/27/17 00:04	PL	95-48-7	
Dibenzo(ah)anthracene	Not detected	ug/kg	330	SW8270D	10/27/17 00:04	PL	53-70-3	
Dibenzofuran*	Not detected	ug/kg	330	SW8270D	10/27/17 00:04	PL	132-64-9	
di-n-Butyl phthalate	Not detected	ug/kg	330	SW8270D	10/27/17 00:04	PL	84-74-2	
1,2-Dichlorobenzene*	Not detected	ug/kg	330	SW8270D	10/27/17 00:04	PL	95-50-1	
1,3-Dichlorobenzene*	Not detected	ug/kg	330	SW8270D	10/27/17 00:04	PL	541-73-1	
1,4-Dichlorobenzene*	Not detected	ug/kg	330	SW8270D	10/27/17 00:04	PL	106-46-7	
3,3'-Dichlorobenzidine	Not detected	ug/kg	2,000	SW8270D	10/27/17 00:04	PL	91-94-1	
2,4-Dichlorophenol	Not detected	ug/kg	330	SW8270D	10/27/17 00:04	PL	120-83-2	
Diethyl phthalate	Not detected	ug/kg	330	SW8270D	10/27/17 00:04	PL	84-66-2	
2,4-Dimethylphenol	Not detected	ug/kg	330	SW8270D	10/27/17 00:04	PL	105-67-9	
Dimethyl phthalate	Not detected	ug/kg	330	SW8270D	10/27/17 00:04	PL	131-11-3	
4,6-Dinitro-2-methylphenol	Not detected	ug/kg	830	SW8270D	10/27/17 00:04	PL	534-52-1	
2,4-Dinitrophenol	Not detected	ug/kg	830	SW8270D	10/27/17 00:04	PL	51-28-5	
2,4-Dinitrotoluene	Not detected	ug/kg	330	SW8270D	10/27/17 00:04	PL	121-14-2	
2,6-Dinitrotoluene	Not detected	ug/kg	330	SW8270D	10/27/17 00:04	PL	606-20-2	
1,2-Diphenylhydrazine	Not detected	ug/kg	330	SW8270D	10/27/17 00:04	PL	122-66-7	
di-n-Octyl phthalate	Not detected	ug/kg	330	SW8270D	10/27/17 00:04	PL	117-84-0	
Fluoranthene	Not detected	ug/kg	330	SW8270D	10/27/17 00:04	PL	206-44-0	
Fluorene	Not detected	ug/kg	330	SW8270D	10/27/17 00:04	PL	86-73-7	
Hexachlorobenzene*	Not detected	ug/kg	330	SW8270D	10/27/17 00:04	PL	118-74-1	
Hexachlorobutadiene	Not detected	ug/kg	330	SW8270D	10/27/17 00:04	PL	87-68-3	
Hexachlorocyclopentadiene	Not detected	ug/kg	330	SW8270D	10/27/17 00:04	PL	77-47-4	
Hexachloroethane	Not detected	ug/kg	330	SW8270D	10/27/17 00:04	PL	67-72-1	
Indeno(1,2,3-cd)pyrene	Not detected	ug/kg	330	SW8270D	10/27/17 00:04	PL	193-39-5	
Isophorone	Not detected	ug/kg	330	SW8270D	10/27/17 00:04	PL	78-59-1	
2-Methylnaphthalene	Not detected	ug/kg	330	SW8270D	10/27/17 00:04	PL	91-57-6	
Naphthalene	Not detected	ug/kg	330	SW8270D	10/27/17 00:04	PL	91-20-3	
2-Nitroaniline	Not detected	ug/kg	830	SW8270D	10/27/17 00:04	PL	88-74-4	
3-Nitroaniline	Not detected	ug/kg	830	SW8270D	10/27/17 00:04	PL	99-09-2	



# Analytical Laboratory Report

Supplemental Report

Lab Sample ID: S84575.02 (continued)

Sample Tag: INJ-01-17\_(20-21)

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags
<b>Organics - Semi-Volatiles (continued)</b>								
<b>Semi-Volatile Organics - MDEQ (continued)</b>								
4-Nitroaniline	Not detected	ug/kg	830	SW8270D	10/27/17 00:04	PL	100-01-6	
Nitrobenzene	Not detected	ug/kg	330	SW8270D	10/27/17 00:04	PL	98-95-3	
2-Nitrophenol	Not detected	ug/kg	330	SW8270D	10/27/17 00:04	PL	88-75-5	
4-Nitrophenol	Not detected	ug/kg	830	SW8270D	10/27/17 00:04	PL	100-02-7	
N-Nitrosodiphenylamine	Not detected	ug/kg	330	SW8270D	10/27/17 00:04	PL	86-30-6	
N-Nitrosodi-n-propylamine*	Not detected	ug/kg	330	SW8270D	10/27/17 00:04	PL	621-64-7	
Pentachlorophenol	Not detected	ug/kg	330	SW8270D	10/27/17 00:04	PL	87-86-5	
Phenanthrene	Not detected	ug/kg	330	SW8270D	10/27/17 00:04	PL	85-01-8	
Phenol	Not detected	ug/kg	330	SW8270D	10/27/17 00:04	PL	108-95-2	
Pyrene	Not detected	ug/kg	330	SW8270D	10/27/17 00:04	PL	129-00-0	
1,2,4-Trichlorobenzene	Not detected	ug/kg	330	SW8270D	10/27/17 00:04	PL	120-82-1	
2,4,5-Trichlorophenol	Not detected	ug/kg	330	SW8270D	10/27/17 00:04	PL	95-95-4	
2,4,6-Trichlorophenol	Not detected	ug/kg	330	SW8270D	10/27/17 00:04	PL	88-06-2	
<b>Organics - Volatiles</b>								
<b>TCL Volatile Organics HighLevel 5035/8260</b>								
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	ug/kg	100	SW5035A/8260C	10/23/17 19:44	JML	76-13-1	
Acetone	Not detected	ug/kg	840	SW5035A/8260C	10/23/17 19:44	JML	67-64-1	
Carbon disulfide	Not detected	ug/kg	300	SW5035A/8260C	10/23/17 19:44	JML	75-15-0	
Methyl Acetate	Not detected	ug/kg	3,000	SW5035A/8260C	10/23/17 19:44	JML	79-20-9	
tert-Methyl butyl ether (MTBE)*	Not detected	ug/kg	300	SW5035A/8260C	10/23/17 19:44	JML	1634-04-4	
2-Butanone (MEK)*	Not detected	ug/kg	840	SW5035A/8260C	10/23/17 19:44	JML	78-93-3	
Dichlorodifluoromethane	Not detected	ug/kg	60	SW5035A/8260C	10/23/17 19:44	JML	75-71-8	
Chloromethane	Not detected	ug/kg	300	SW5035A/8260C	10/23/17 19:44	JML	74-87-3	
Vinyl chloride	Not detected	ug/kg	100	SW5035A/8260C	10/23/17 19:44	JML	75-01-4	
Bromomethane	Not detected	ug/kg	300	SW5035A/8260C	10/23/17 19:44	JML	74-83-9	
Chloroethane	Not detected	ug/kg	300	SW5035A/8260C	10/23/17 19:44	JML	75-00-3	
Trichlorofluoromethane	Not detected	ug/kg	100	SW5035A/8260C	10/23/17 19:44	JML	75-69-4	
1,1-Dichloroethene	Not detected	ug/kg	60	SW5035A/8260C	10/23/17 19:44	JML	75-35-4	
Methylene chloride	Not detected	ug/kg	300	SW5035A/8260C	10/23/17 19:44	JML	75-09-2	
trans-1,2-Dichloroethene*	Not detected	ug/kg	60	SW5035A/8260C	10/23/17 19:44	JML	156-60-5	
1,1-Dichloroethane	Not detected	ug/kg	60	SW5035A/8260C	10/23/17 19:44	JML	75-34-3	
cis-1,2-Dichloroethene*	Not detected	ug/kg	60	SW5035A/8260C	10/23/17 19:44	JML	156-59-2	
Chloroform	Not detected	ug/kg	60	SW5035A/8260C	10/23/17 19:44	JML	67-66-3	
1,1,1-Trichloroethane	Not detected	ug/kg	60	SW5035A/8260C	10/23/17 19:44	JML	71-55-6	
Cyclohexane	Not detected	ug/kg	60	SW5035A/8260C	10/23/17 19:44	JML	110-82-7	
4-Methyl-2-pentanone (MIBK)*	Not detected	ug/kg	3,000	SW5035A/8260C	10/23/17 19:44	JML	108-10-1	
2-Hexanone*	Not detected	ug/kg	3,000	SW5035A/8260C	10/23/17 19:44	JML	591-78-6	
Carbon tetrachloride	Not detected	ug/kg	60	SW5035A/8260C	10/23/17 19:44	JML	56-23-5	
Benzene	Not detected	ug/kg	60	SW5035A/8260C	10/23/17 19:44	JML	71-43-2	
1,2-Dichloroethane	Not detected	ug/kg	60	SW5035A/8260C	10/23/17 19:44	JML	107-06-2	
Trichloroethene	Not detected	ug/kg	60	SW5035A/8260C	10/23/17 19:44	JML	79-01-6	
1,2-Dichloropropane	Not detected	ug/kg	60	SW5035A/8260C	10/23/17 19:44	JML	78-87-5	
Bromodichloromethane	Not detected	ug/kg	60	SW5035A/8260C	10/23/17 19:44	JML	75-27-4	
Methyl cyclohexane	Not detected	ug/kg	60	SW5035A/8260C	10/23/17 19:44	JML	108-87-2	
cis-1,3-Dichloropropene	Not detected	ug/kg	60	SW5035A/8260C	10/23/17 19:44	JML	10061-01-5	
Toluene	Not detected	ug/kg	60	SW5035A/8260C	10/23/17 19:44	JML	108-88-3	
trans-1,3-Dichloropropene	Not detected	ug/kg	60	SW5035A/8260C	10/23/17 19:44	JML	10061-02-6	
1,1,2-Trichloroethane	Not detected	ug/kg	60	SW5035A/8260C	10/23/17 19:44	JML	79-00-5	



# Analytical Laboratory Report

Supplemental Report

Lab Sample ID: S84575.02 (continued)

Sample Tag: INJ-01-17\_(20-21)

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags
<b>Organics - Volatiles (continued)</b>								
<b>TCL Volatile Organics HighLevel 5035/8260 (continued)</b>								
Tetrachloroethene	Not detected	ug/kg	60	SW5035A/8260C	10/23/17 19:44	JML	127-18-4	
Dibromochloromethane	Not detected	ug/kg	60	SW5035A/8260C	10/23/17 19:44	JML	124-48-1	
1,2-Dibromoethane*	Not detected	ug/kg	60	SW5035A/8260C	10/23/17 19:44	JML	106-93-4	
Chlorobenzene	Not detected	ug/kg	60	SW5035A/8260C	10/23/17 19:44	JML	108-90-7	
1,1,2,2-Tetrachloroethane	Not detected	ug/kg	60	SW5035A/8260C	10/23/17 19:44	JML	79-34-5	
Ethylbenzene	Not detected	ug/kg	60	SW5035A/8260C	10/23/17 19:44	JML	100-41-4	
p,m-Xylene	Not detected	ug/kg	100	SW5035A/8260C	10/23/17 19:44	JML		
o-Xylene	Not detected	ug/kg	60	SW5035A/8260C	10/23/17 19:44	JML	95-47-6	
Styrene*	Not detected	ug/kg	60	SW5035A/8260C	10/23/17 19:44	JML	100-42-5	
Isopropylbenzene	Not detected	ug/kg	60	SW5035A/8260C	10/23/17 19:44	JML	98-82-8	
Bromoform*	Not detected	ug/kg	60	SW5035A/8260C	10/23/17 19:44	JML	75-25-2	
1,3-Dichlorobenzene	Not detected	ug/kg	60	SW5035A/8260C	10/23/17 19:44	JML	541-73-1	
1,4-Dichlorobenzene	Not detected	ug/kg	60	SW5035A/8260C	10/23/17 19:44	JML	106-46-7	
1,2-Dichlorobenzene	Not detected	ug/kg	60	SW5035A/8260C	10/23/17 19:44	JML	95-50-1	
1,2-Dibromo-3-chloropropane*	Not detected	ug/kg	60	SW5035A/8260C	10/23/17 19:44	JML	96-12-8	
1,2,4-Trichlorobenzene	Not detected	ug/kg	100	SW5035A/8260C	10/23/17 19:44	JML	120-82-1	
<b>Other / Misc.</b>								
Misc. Special Project*	Completed				11/09/17 12:00	Geo		O

O-Analysis performed by outside laboratory. See attached report.



# Analytical Laboratory Report

Supplemental Report

**Lab Sample ID: S84575.03**

Sample Tag: MW-03-17\_(18-19)

Collected Date/Time: 10/19/2017 10:10

Matrix: Soil

COC Reference: PNC

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	4oz Glass	None	Yes	5.0	IR

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags
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**Other / Misc.**

Misc. Special Project*	Completed				11/09/17 12:00	Geo		O
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O-Analysis performed by outside laboratory. See attached report.



# Analytical Laboratory Report

Supplemental Report

**Lab Sample ID: S84575.04**

Sample Tag: MW-03-17\_(20-21)

Collected Date/Time: 10/19/2017 10:15

Matrix: Soil

COC Reference: PNC

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	4oz Glass	None	Yes	5.0	IR

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags
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**Other / Misc.**

Misc. Special Project*	Completed				11/09/17 12:00	Geo		O
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O-Analysis performed by outside laboratory. See attached report.



# Analytical Laboratory Report

Supplemental Report

Lab Sample ID: S84575.05

Sample Tag: Trip Blank

Collected Date/Time: 10/19/2017 00:01

Matrix: Methanol

COC Reference: PNC

## Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	40ml Glass	MeOH	Yes	5.0	IR

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags
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### Organics - Volatiles

#### TCL Volatile Organics HighLevel 5035/8260

1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	ug/kg	100	SW5035A/8260C	10/23/17 15:57	JML	76-13-1	
Acetone	Not detected	ug/kg	750	SW5035A/8260C	10/23/17 15:57	JML	67-64-1	
Carbon disulfide	Not detected	ug/kg	300	SW5035A/8260C	10/23/17 15:57	JML	75-15-0	
Methyl Acetate	Not detected	ug/kg	3,000	SW5035A/8260C	10/23/17 15:57	JML	79-20-9	
tert-Methyl butyl ether (MTBE)*	Not detected	ug/kg	300	SW5035A/8260C	10/23/17 15:57	JML	1634-04-4	
2-Butanone (MEK)*	Not detected	ug/kg	750	SW5035A/8260C	10/23/17 15:57	JML	78-93-3	
Dichlorodifluoromethane	Not detected	ug/kg	50	SW5035A/8260C	10/23/17 15:57	JML	75-71-8	
Chloromethane	Not detected	ug/kg	300	SW5035A/8260C	10/23/17 15:57	JML	74-87-3	
Vinyl chloride	Not detected	ug/kg	100	SW5035A/8260C	10/23/17 15:57	JML	75-01-4	
Bromomethane	Not detected	ug/kg	300	SW5035A/8260C	10/23/17 15:57	JML	74-83-9	
Chloroethane	Not detected	ug/kg	300	SW5035A/8260C	10/23/17 15:57	JML	75-00-3	
Trichlorofluoromethane	Not detected	ug/kg	100	SW5035A/8260C	10/23/17 15:57	JML	75-69-4	
1,1-Dichloroethene	Not detected	ug/kg	50	SW5035A/8260C	10/23/17 15:57	JML	75-35-4	
Methylene chloride	Not detected	ug/kg	300	SW5035A/8260C	10/23/17 15:57	JML	75-09-2	
trans-1,2-Dichloroethene*	Not detected	ug/kg	50	SW5035A/8260C	10/23/17 15:57	JML	156-60-5	
1,1-Dichloroethane	Not detected	ug/kg	50	SW5035A/8260C	10/23/17 15:57	JML	75-34-3	
cis-1,2-Dichloroethene*	Not detected	ug/kg	50	SW5035A/8260C	10/23/17 15:57	JML	156-59-2	
Chloroform	Not detected	ug/kg	50	SW5035A/8260C	10/23/17 15:57	JML	67-66-3	
1,1,1-Trichloroethane	Not detected	ug/kg	50	SW5035A/8260C	10/23/17 15:57	JML	71-55-6	
Cyclohexane	Not detected	ug/kg	50	SW5035A/8260C	10/23/17 15:57	JML	110-82-7	
4-Methyl-2-pentanone (MIBK)*	Not detected	ug/kg	3,000	SW5035A/8260C	10/23/17 15:57	JML	108-10-1	
2-Hexanone*	Not detected	ug/kg	3,000	SW5035A/8260C	10/23/17 15:57	JML	591-78-6	
Carbon tetrachloride	Not detected	ug/kg	50	SW5035A/8260C	10/23/17 15:57	JML	56-23-5	
Benzene	Not detected	ug/kg	50	SW5035A/8260C	10/23/17 15:57	JML	71-43-2	
1,2-Dichloroethane	Not detected	ug/kg	50	SW5035A/8260C	10/23/17 15:57	JML	107-06-2	
Trichloroethene	Not detected	ug/kg	50	SW5035A/8260C	10/23/17 15:57	JML	79-01-6	
1,2-Dichloropropane	Not detected	ug/kg	50	SW5035A/8260C	10/23/17 15:57	JML	78-87-5	
Bromodichloromethane	Not detected	ug/kg	50	SW5035A/8260C	10/23/17 15:57	JML	75-27-4	
Methyl cyclohexane	Not detected	ug/kg	50	SW5035A/8260C	10/23/17 15:57	JML	108-87-2	
cis-1,3-Dichloropropene	Not detected	ug/kg	50	SW5035A/8260C	10/23/17 15:57	JML	10061-01-5	
Toluene	Not detected	ug/kg	50	SW5035A/8260C	10/23/17 15:57	JML	108-88-3	
trans-1,3-Dichloropropene	Not detected	ug/kg	50	SW5035A/8260C	10/23/17 15:57	JML	10061-02-6	
1,1,2-Trichloroethane	Not detected	ug/kg	50	SW5035A/8260C	10/23/17 15:57	JML	79-00-5	
Tetrachloroethene	Not detected	ug/kg	50	SW5035A/8260C	10/23/17 15:57	JML	127-18-4	
Dibromochloromethane	Not detected	ug/kg	50	SW5035A/8260C	10/23/17 15:57	JML	124-48-1	
1,2-Dibromoethane*	Not detected	ug/kg	50	SW5035A/8260C	10/23/17 15:57	JML	106-93-4	
Chlorobenzene	Not detected	ug/kg	50	SW5035A/8260C	10/23/17 15:57	JML	108-90-7	
1,1,2,2-Tetrachloroethane	Not detected	ug/kg	50	SW5035A/8260C	10/23/17 15:57	JML	79-34-5	
Ethylbenzene	Not detected	ug/kg	50	SW5035A/8260C	10/23/17 15:57	JML	100-41-4	
p,m-Xylene	Not detected	ug/kg	100	SW5035A/8260C	10/23/17 15:57	JML		
o-Xylene	Not detected	ug/kg	50	SW5035A/8260C	10/23/17 15:57	JML	95-47-6	
Styrene*	Not detected	ug/kg	50	SW5035A/8260C	10/23/17 15:57	JML	100-42-5	



# Analytical Laboratory Report

Supplemental Report

Lab Sample ID: S84575.05 (continued)

Sample Tag: Trip Blank

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags
<b>Organics - Volatiles (continued)</b>								
<b>TCL Volatile Organics HighLevel 5035/8260 (continued)</b>								
Isopropylbenzene	Not detected	ug/kg	50	SW5035A/8260C	10/23/17 15:57	JML	98-82-8	
Bromoform*	Not detected	ug/kg	50	SW5035A/8260C	10/23/17 15:57	JML	75-25-2	
1,3-Dichlorobenzene	Not detected	ug/kg	50	SW5035A/8260C	10/23/17 15:57	JML	541-73-1	
1,4-Dichlorobenzene	Not detected	ug/kg	50	SW5035A/8260C	10/23/17 15:57	JML	106-46-7	
1,2-Dichlorobenzene	Not detected	ug/kg	50	SW5035A/8260C	10/23/17 15:57	JML	95-50-1	
1,2-Dibromo-3-chloropropane*	Not detected	ug/kg	50	SW5035A/8260C	10/23/17 15:57	JML	96-12-8	
1,2,4-Trichlorobenzene	Not detected	ug/kg	100	SW5035A/8260C	10/23/17 15:57	JML	120-82-1	



2680 East Lansing Dr., East Lansing, MI 48823  
 Phone (517) 332-0167 Fax (517) 332-4034  
 www.meritlabs.com

C.O.C. Page # 1 of 1

C.O.C. I.D.# PNC

REPORT TO	CHAIN OF CUSTODY RECORD	INVOICE TO
CONTACT NAME <b>Christi Kiker, Theresa Olechiv, Matt Williams, Trevor Swarhout</b>	CONTACT NAME <b>Christi Kiker</b>	<input checked="" type="checkbox"/> SAME
COMPANY <b>ARCADIS U.S., Inc.</b>	COMPANY	
ADDRESS <b>28550 Cabot Drive Suite 500</b>	ADDRESS	
CITY <b>Novi</b>	CITY	STATE <b>MI</b>
STATE <b>MI</b>	STATE	ZIP CODE <b>48377</b>
ZIP CODE <b>48377</b>	ZIP CODE	
PHONE NO. <b>248-994-2240</b>	PHONE NO.	EMAIL ADDRESS <b>christi.kiker@arcadis.com</b>
FAX NO. <b>248.994.2241</b>	P.O. NO.	
EMAIL ADDRESS <b>Christi.kiker@arcadis.com; Theresa.Olechiv@arcadis.com; Trevor.swarhout@arcadis.com; Matthew.williams@arcadis.com</b>	QUOTE NO. <b>WA-01</b>	

PROJECT NO./NAME: **B0064607.2017.00007** SAMPLER(S) - PLEASE PRINT/SIGN NAME: **Kaitlyn Voet / Kaitlyn Voet**

TURNAROUND TIME REQUIRED:  1 DAY  2 DAYS  3 DAYS  STANDARD  OTHER

DELIVERABLES REQUIRED:  LEVEL I  LEVEL II  LEVEL III  LEVEL IV  EDD  OTHER

Matrix Code: GW=Groundwater WW=Waste Water S=Soil L=Liquid SD=Solid  
 SL=Sludge DW=Drinking Water O=Oil A=Air W=Waste

# OF CONTAINERS & PRESERVATIVES								VOCs (8260C)	SVOCs (8270D)	PCBs (8082A)	Metals (6020A/7471B)	Total Solids (6350B)	Grain Size (ASTM D613)
NONE	HCL	HNO3	H2SO4	NAOH	MEOH	OTHER							
5					1		1	1	1	1	1	1	
5					1		1	1	1	1	1	1	
1												1	
1												1	
					1		1						

Certifications  
 Ohio VAP  Drinking Water  
 DoD  NPDES

Project Locations  
 Detroit  New York  
 Other

Special Instructions  
 See attached VOC list

MERIT LAB NO. FOR LAB USE ONLY	YEAR		SAMPLE TAG IDENTIFICATION - DESCRIPTION	MATRIX	# OF BOTTLES
	DATE	TIME			
84575.01	10/17/17	1745	INJ-01-17-(16-17)	S	6
.02	10/17/17	1755	INJ-01-17-(20-21)	S	6
.03	10/19/17	1010	MW-03-17-(18-19)	S	1
.04	10/19/17	1015	MW-03-17-(20-21)	S	1
.05	10/19/17	-	Trip Blank	-	1

Relinquished By: **Kaitlyn Voet / Arcadis**  Sampler Date: **10/19/17** Time: **1850**

Received By: **[Signature]** Date: **10/20/17** Time: **1120**

Relinquished By: **[Signature]** Date: **10/20/17** Time: **1460**

Received By: **[Signature]** Date: **10/20/17** Time: **1460**

Relinquished By: **Novi Cold Storage** Date: **10/19/17** Time: **1850**

Received By: **Novi Cold Storage** Date: **10/20/17** Time: **1120**

Seal No. Seal Intact  Yes  No Initials

Seal No. Seal Intact  Yes  No Initials

Notes: Temp. on arrival **5.0**

Table 4

Summary of Groundwater Analytical Results  
 RACER Trust Pontiac North Campus  
 Pontiac, Michigan



Design & Consultancy  
 for natural and  
 built assets

PNC VOC Analyte List - 8260C		
Volatile Organic Compounds		
VOC	Acetone	1
VOC	Benzene	1
VOC	Bromodichloromethane	1
VOC	Bromoform	1
VOC	Bromomethane	1
VOC	2-Butanone	1
VOC	Carbon Disulfide	1
VOC	Carbon Tetrachloride	1
VOC	Chlorobenzene	1
VOC	Chloroethane	1
VOC	Chloroform	1
VOC	Chloromethane	1
VOC	Cumene	1
VOC	Cyclohexane	1
VOC	1,2-Dibromo-3-chloropropane	1
VOC	Dibromochloromethane	1
VOC	1,2-Dibromoethane	1
VOC	1,2-Dichlorobenzene	1
VOC	1,3-Dichlorobenzene	1
VOC	1,4-Dichlorobenzene	1
VOC	Dichlorodifluoromethane	1
VOC	1,1-Dichloroethane	1
VOC	1,2-Dichloroethane	1
VOC	1,1-Dichloroethene	1
VOC	cis-1,2-Dichloroethene	1
VOC	trans-1,2-Dichloroethene	1
VOC	1,2-Dichloropropane	1
VOC	1,3-Dichloropropene (summed)	1
VOC	Ethyl Benzene	1
VOC	2-Hexanone	1
VOC	Methyl Acetate	1
VOC	Methyl tert-butyl ether	1
VOC	4-Methyl-2-pentanone	1
VOC	Methylcyclohexane	1
VOC	Methylene Chloride	1
VOC	Styrene	1
VOC	1,1,1,2-Tetrachloroethane	1
VOC	Tetrachloroethene	1
VOC	Toluene	1
VOC	1,2,4-Trichlorobenzene	1
VOC	1,1,1-Trichloroethane	1
VOC	1,1,2-Trichloroethane	1
VOC	Trichloroethene	1
VOC	Trichlorofluoromethane	1
VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	1
VOC	Vinyl Chloride	1
VOC	Xylenes (total)	1

## CHAIN OF CUSTODY

GeoTesting Express, Inc.  
 125 Nagog Park  
 Acton, MA 01720  
 800-434-1062 Toll Free  
 978-635-0424 Phone  
 978-635-0266 Fax

Sales Order No.:  
 GTX No.:

Company Name: **MERIT LABORATORIES**  
 Address: **2680 East Lansing Dr, East Lansing MI 48823**  
 Contact: **JOHN LAVERTY**  
 e-mail: **JOHN.LAVERTY@MERITLABS.COM**  
 Phone Number: **517-927-2730**  
 Fax Number: **517-332-4034**  
 Project Name: **584575**  
 Project Number: **N/A**  
 Project Location: **Unknown**

- |                 |                |
|-----------------|----------------|
| Sample Type     | Container Type |
| 1. Soil         | 1. Bucket      |
| 2. Geosynthetic | 2. Bag         |
| 3. Rock         | 3. Jar         |
| 4. Concrete     | 4. Tube        |
| 5. Other        | 5. Roll        |



**Merit**  
 Laboratories, Inc.

2680 East Lansing Dr.  
 East Lansing, MI 48823  
 meritlabs.com

**John Laverty**  
 Project Director

Direct 517.827.2730 Cell 517.763.6976  
 Ph 517.332.0167 X 161  
 johnlaverty@meritlabs.com

Grain Size (Method D6913)

Sample Identification	Container Size	Sampling Date	Sampling Time	Sample Type	Analysis				Comments
584575.01	32oz 3	10/17/17	17:45	Soil	X				*Spoke w/ Ethan on 10/6/17
584575.02	32oz 3	10/17/17	17:55	Soil	X				
584575.03	32oz 3	10/19/17	10:10	Soil	X				
584575.04	32oz 3	10/19/17	10:15	Soil	X				

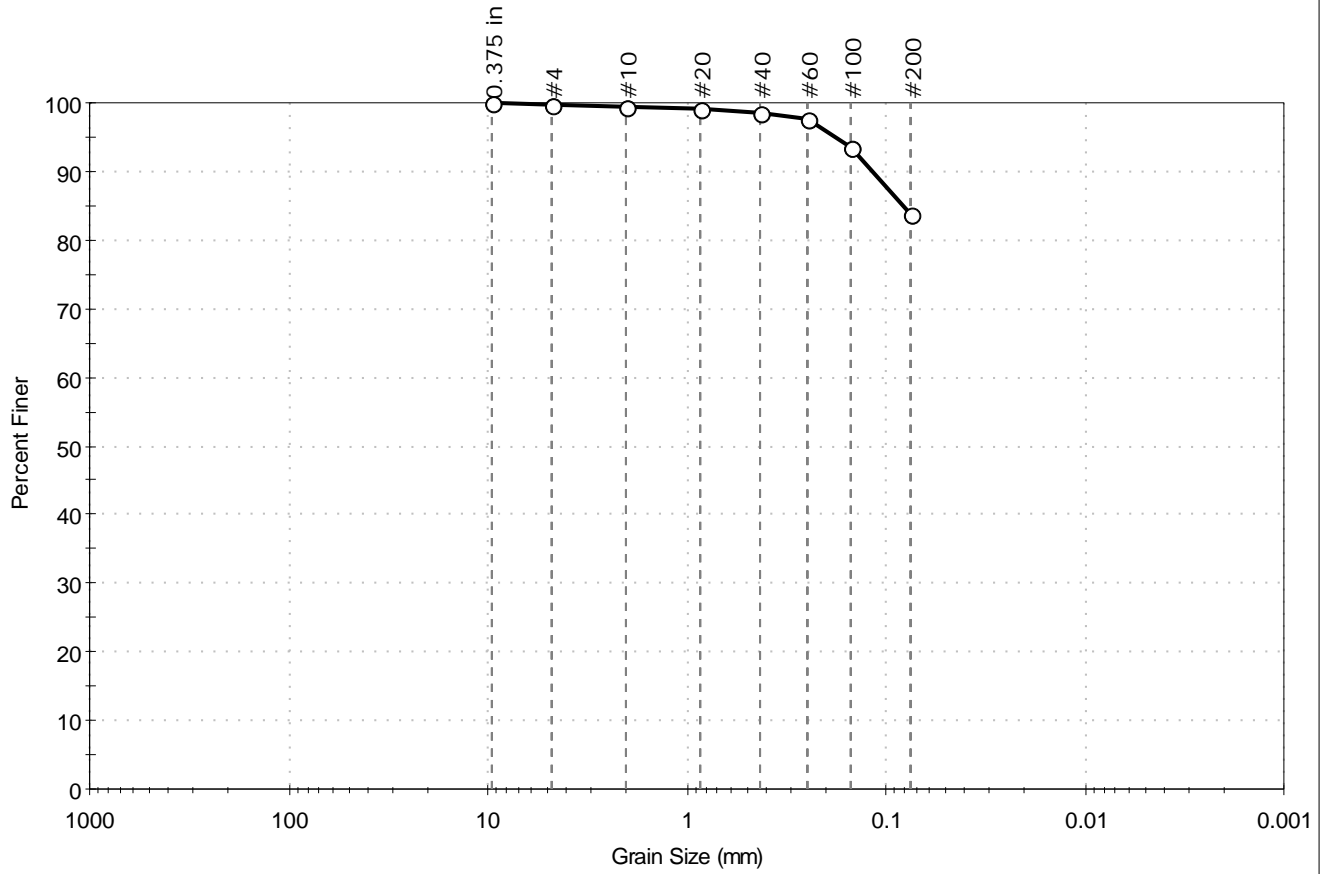
Relinquished By: <i>[Signature]</i>	Date: 10/24/17	Received By: UPS	Date: 10/24/17	Turn-Around Time Requested:
	Time: 10:30 AM		Time: 10:30 AM	
Relinquished By: UPS	Date:	Received By:	Date:	No. of Business Days: STD
	Time:		Time:	
Relinquished By:	Date:	Received By:	Date:	Special Instructions:
	Time:		Time:	Samples may be hazardous
SHIPPED VIA: UPS				Testing for VOC's, SVOC's, Metals

S PCB's TH 10/24/17



Client: Merit Laboratories, Inc.	Project: 584575	Location: ---	Project No: GTX-307236
Boring ID: ---	Sample Type: jar	Tested By: jbr	Checked By: emm
Sample ID: 584575.01	Test Date: 11/09/17	Test Id: 431557	
Depth: ---	Test Comment: ---	Visual Description: Moist, brown clay with sand	Sample Comment: ---

## Particle Size Analysis - ASTM D6913



% Cobble	% Gravel	% Sand	% Silt & Clay Size
---	0.3	15.8	83.9

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.375 in	9.50	100		
#4	4.75	100		
#10	2.00	99		
#20	0.85	99		
#40	0.42	99		
#60	0.25	98		
#100	0.15	94		
#200	0.075	84		

<u>Coefficients</u>	
D <sub>85</sub> = 0.0811 mm	D <sub>30</sub> = N/A
D <sub>60</sub> = N/A	D <sub>15</sub> = N/A
D <sub>50</sub> = N/A	D <sub>10</sub> = N/A
C <sub>u</sub> = N/A	C <sub>c</sub> = N/A

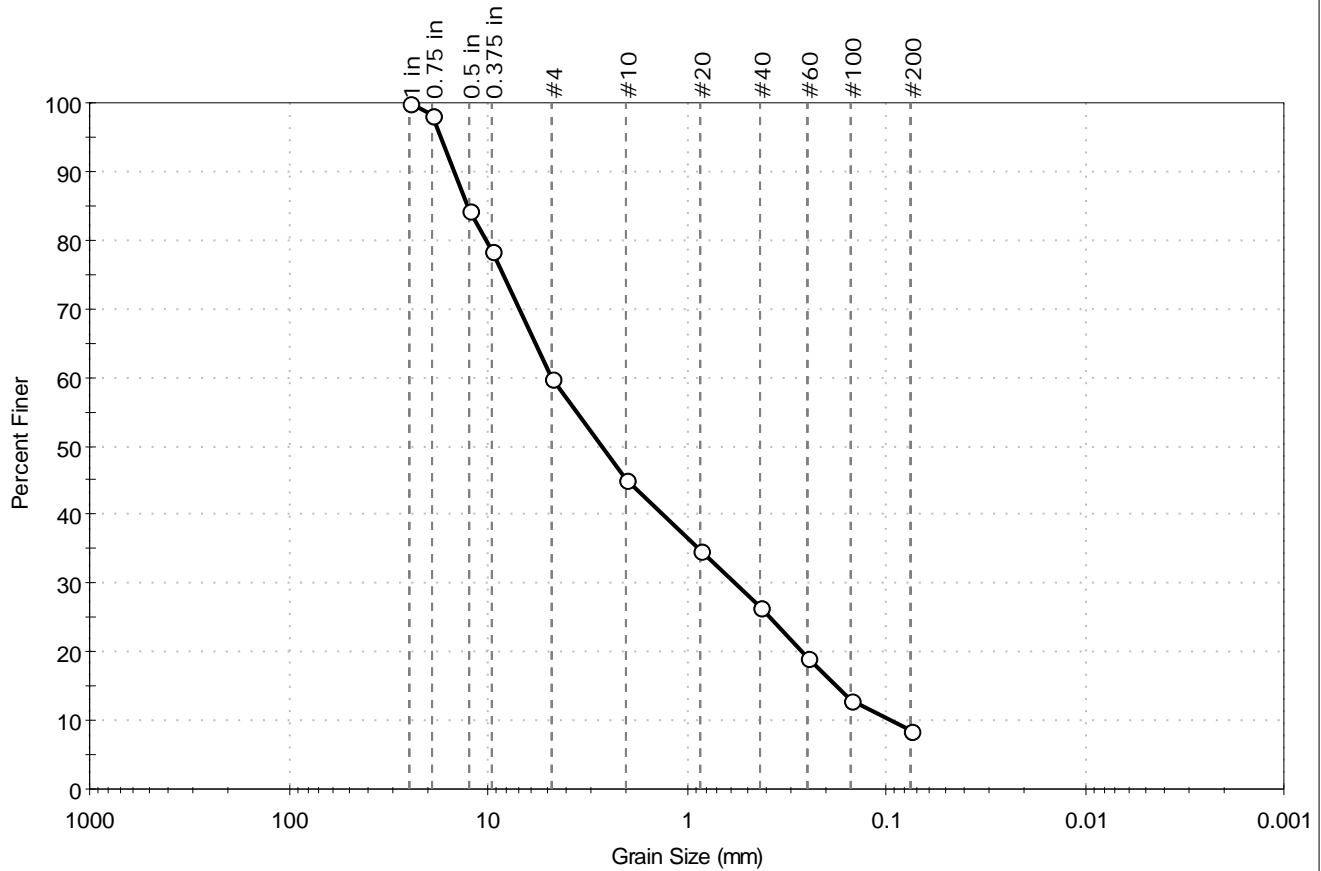
<u>Classification</u>	
ASTM	N/A
AASHTO	Silty Soils (A-4 (0))

<u>Sample/Test Description</u>
Sand/Gravel Particle Shape : ---
Sand/Gravel Hardness : ---



Client: Merit Laboratories, Inc.	Project No: GTX-307236
Project: 584575	
Location: ---	
Boring ID: ---	Sample Type: jar
Sample ID: 584575.02	Tested By: jbr
Depth: ---	Test Date: 11/09/17
Test Comment: ---	Checked By: emm
Visual Description: Moist, brown sand with silt and gravel	Test Id: 431558
Sample Comment: ---	

## Particle Size Analysis - ASTM D6913



% Cobble	% Gravel	% Sand	% Silt & Clay Size
--	40.0	51.5	8.5

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
1 in	25.00	100		
0.75 in	19.00	98		
0.5 in	12.50	84		
0.375 in	9.50	78		
#4	4.75	60		
#10	2.00	45		
#20	0.85	35		
#40	0.42	27		
#60	0.25	19		
#100	0.15	13		
#200	0.075	8.5		

<u>Coefficients</u>	
D <sub>85</sub> = 12.7926 mm	D <sub>30</sub> = 0.5686 mm
D <sub>60</sub> = 4.7525 mm	D <sub>15</sub> = 0.1786 mm
D <sub>50</sub> = 2.6618 mm	D <sub>10</sub> = 0.0953 mm
C <sub>u</sub> = 49.869	C <sub>c</sub> = 0.714

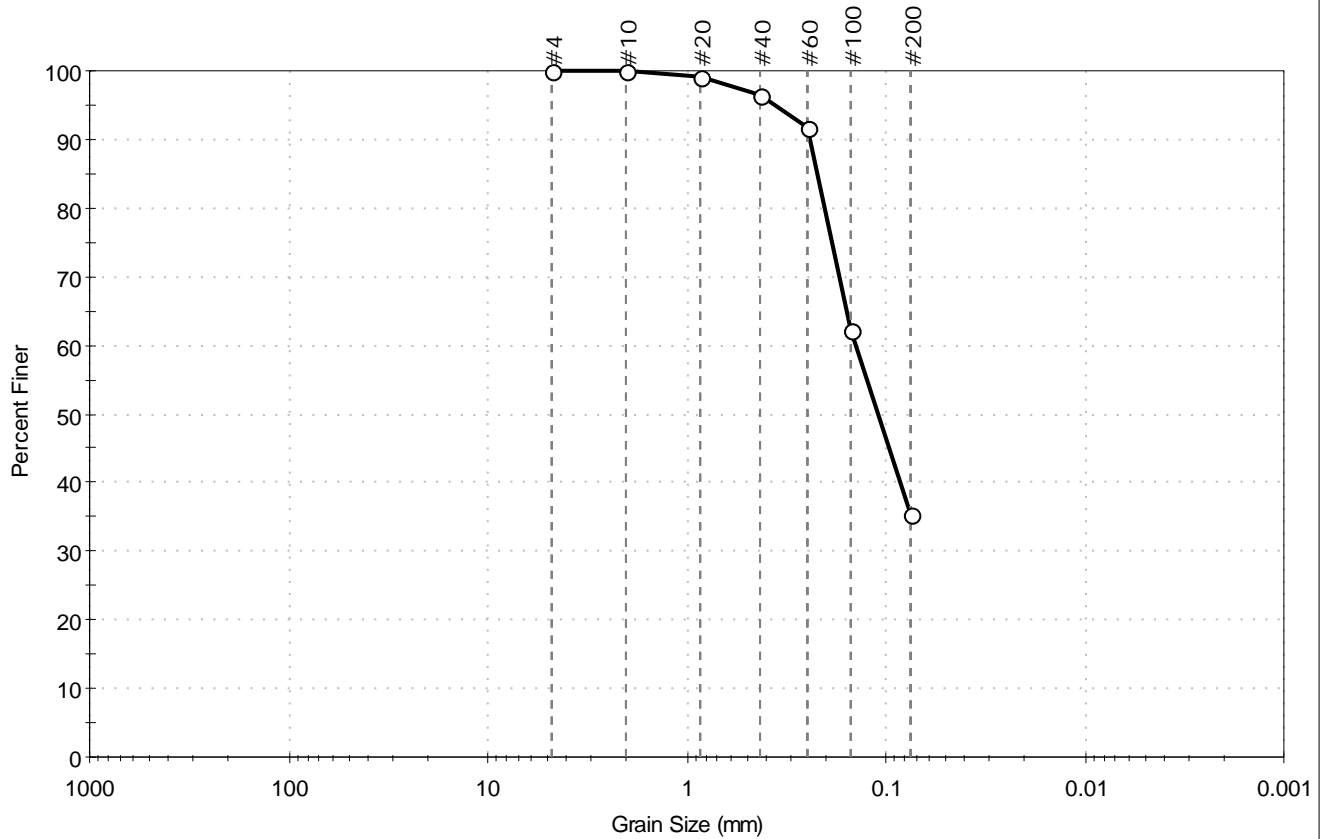
<u>Classification</u>	
ASTM	N/A
AASHTO	Stone Fragments, Gravel and Sand (A-1-a (1))

<u>Sample/Test Description</u>
Sand/Gravel Particle Shape : ANGULAR
Sand/Gravel Hardness : HARD



Client: Merit Laboratories, Inc.	Project: 584575	Location: ---	Project No: GTX-307236
Boring ID: ---	Sample Type: jar	Tested By: jbr	Checked By: emm
Sample ID: 584575.03	Test Date: 11/09/17	Test Id: 431559	
Depth: ---	Test Comment: ---	Visual Description: Moist, brown silty sand	Sample Comment: ---

## Particle Size Analysis - ASTM D6913



% Cobble	% Gravel	% Sand	% Silt & Clay Size
---	0.0	64.5	35.5

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
#4	4.75	100		
#10	2.00	100		
#20	0.85	99		
#40	0.42	96		
#60	0.25	92		
#100	0.15	62		
#200	0.075	35		

<u>Coefficients</u>	
D <sub>85</sub> = 0.2226 mm	D <sub>30</sub> = N/A
D <sub>60</sub> = 0.1412 mm	D <sub>15</sub> = N/A
D <sub>50</sub> = 0.1091 mm	D <sub>10</sub> = N/A
C <sub>u</sub> = N/A	C <sub>c</sub> = N/A

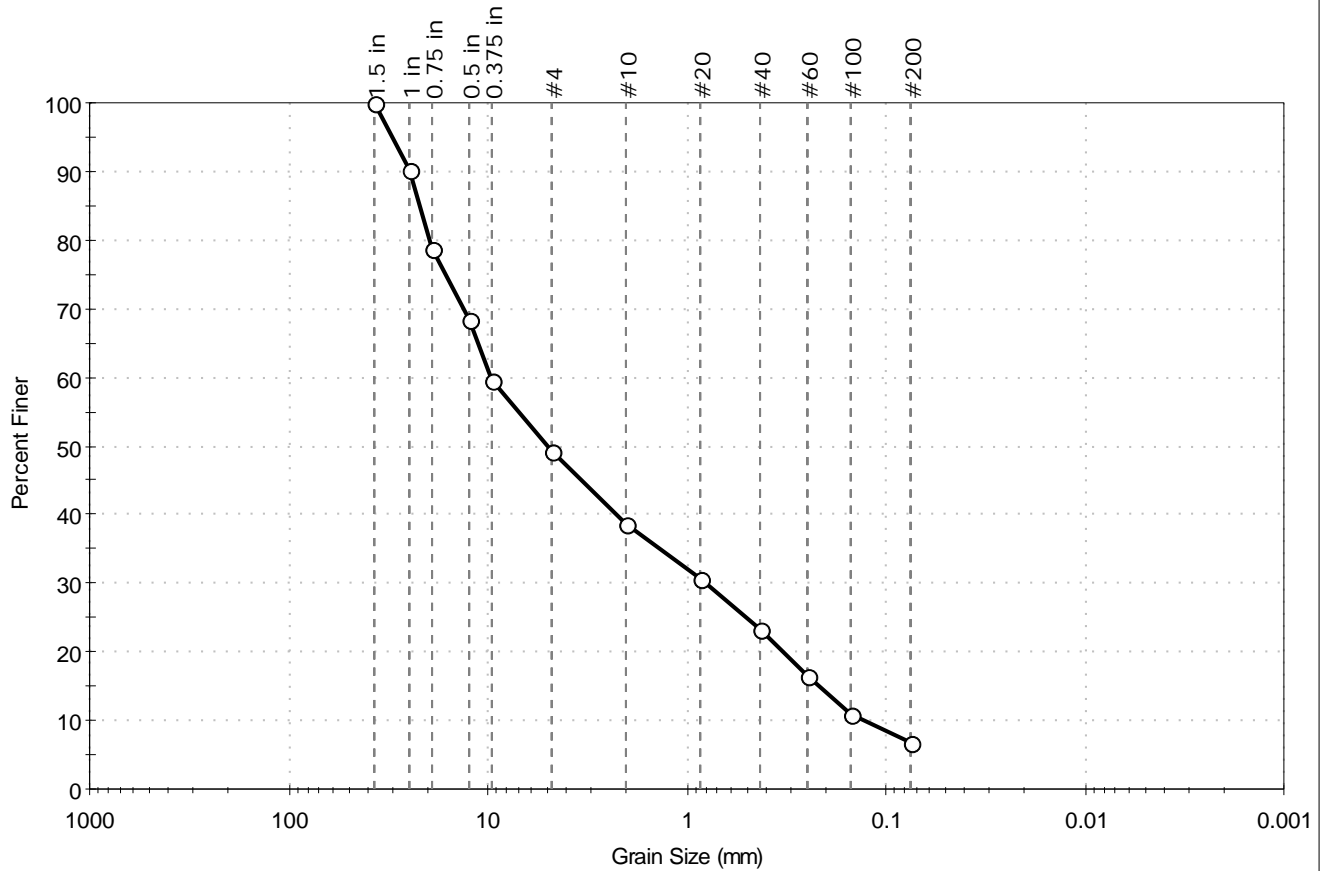
<u>Classification</u>	
ASTM	N/A
AASHTO	Silty Soils (A-4 (0))

<u>Sample/Test Description</u>
Sand/Gravel Particle Shape : ---
Sand/Gravel Hardness : ---



Client: Merit Laboratories, Inc.	Project No: GTX-307236
Project: 584575	
Location: ---	
Boring ID: ---	Sample Type: jar
Sample ID: 584575.04	Tested By: jbr
Depth: ---	Test Date: 11/09/17
	Checked By: emm
	Test Id: 431560
Test Comment: ---	
Visual Description: Moist, brown gravel with silt and sand	
Sample Comment: ---	

## Particle Size Analysis - ASTM D6913



% Cobble	% Gravel	% Sand	% Silt & Clay Size
--	50.6	42.6	6.8

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
1.5 in	37.50	100		
1 in	25.00	90		
0.75 in	19.00	79		
0.5 in	12.50	68		
0.375 in	9.50	60		
#4	4.75	49		
#10	2.00	39		
#20	0.85	31		
#40	0.42	23		
#60	0.25	17		
#100	0.15	11		
#200	0.075	6.8		

<u>Coefficients</u>	
D <sub>85</sub> = 22.0049 mm	D <sub>30</sub> = 0.7984 mm
D <sub>60</sub> = 9.6159 mm	D <sub>15</sub> = 0.2169 mm
D <sub>50</sub> = 4.9520 mm	D <sub>10</sub> = 0.1294 mm
C <sub>u</sub> = 74.311	C <sub>c</sub> = 0.512

<u>Classification</u>	
ASTM	N/A
AASHTO	Stone Fragments, Gravel and Sand (A-1-a (1))

<u>Sample/Test Description</u>
Sand/Gravel Particle Shape : ANGULAR
Sand/Gravel Hardness : HARD

# **Attachment 3**

**Groundwater Laboratory Analytical Report**



# Analytical Laboratory Report

Report ID: S85938.01(01)  
Generated on 12/18/2017

Report to

Attention: Matthew Williams  
Arcadis  
28550 Cabot Drive  
Suite 500  
Novi, MI 48377

Phone: N/A FAX: 248-994-2241  
Email: matthew.williams@arcadis.com

Report produced by

Merit Laboratories, Inc.  
2680 East Lansing Drive  
East Lansing, MI 48823

Phone: (517) 332-0167 FAX: (517) 332-6333

Contacts for report questions:  
John Lavery (johnlavery@meritlabs.com)  
Barbara Ball (bball@meritlabs.com)

Report Summary

Lab Sample ID(s): S85938.01-S85938.04  
Project: B0064607.2017.00007 / RACER PNC  
Collected Date: 12/01/2017  
Submitted Date/Time: 12/06/2017 08:00  
Sampled by: Kamath / Wisman  
P.O. #: B0064607.2017.00007

Table of Contents

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Method Summary (Page 4)  
Sample Summary (Page 5)

Maya Murshak  
Technical Director



# Analytical Laboratory Report

## General Report Notes

---

Analytical results relate only to the samples tested, in the condition received by the laboratory.

Methods may be modified for improved performance.

Results reported on a dry weight basis where applicable.

'Not detected' indicates that parameter was not found at a level equal to or greater than the reporting limit (RL).

40 CFR Part 136 Table II Required Containers, Preservation Techniques and Holding Times for the Clean Water Act specify that samples for acrolein and acrylonitrile need to be preserved at a pH in the range of 4 to 5 or if not preserved, analyzed within 3 days of sampling.

QA/QC corresponding to this analytical report is a separate document with the same Merit ID reference and is available upon request.

Full accreditation certificates are available upon request. Starred (\*) analytes are not NELAP accredited.

Samples are held by the lab for 30 days from the final report date unless a written request to hold longer is provided by the client.

Report shall not be reproduced except in full, without the written approval of Merit Laboratories, Inc.

Limits for drinking water samples, are listed as the MCL Limits (Maximum Contaminant Level Concentrations)

## Report Narrative

---

There is no additional narrative for this analytical report



# Analytical Laboratory Report

## Laboratory Certifications

Authority	Certification ID
Michigan DEQ	#9956
DOD ELAP/ISO 17025	#69699
WBENC	#2005110032
Ohio VAP	#CL0002
Indiana DOH	#C-MI-07
New York NELAC	#11814
North Carolina DENR	#680
North Carolina DOH	#26702
Alaska CSLAP	#17-001

## Qualifier Descriptions

Qualifier	Description
!	Result is outside of stated limit criteria
B	Compound also found in associated method blank
E	Concentration exceeds calibration range
F	Analysis run outside of holding time
G	Estimated result due to extraction run outside of holding time
H	Sample submitted and run outside of holding time
I	Matrix interference with internal standard
J	Estimated value less than reporting limit, but greater than MDL
L	Elevated reporting limit due to low sample amount
M	Result reported to MDL not RDL
O	Analysis performed by outside laboratory. See attached report.
R	Preliminary result
S	Surrogate recovery outside of control limits
T	No correction for total solids
X	Elevated reporting limit due to matrix interference
Y	Elevated reporting limit due to high target concentration
b	Value detected less than reporting limit, but greater than MDL
e	Reported value estimated due to interference
j	Analyte also found in associated method blank
p	Benzo(b)Fluoranthene and Benzo(k)Fluoranthene integrated as one peak.
x	Preserved from bulk sample

## Glossary of Abbreviations

Abbreviation	Description
RL/RDL	Reporting Limit
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
SW	EPA SW 846 (Soil and Wastewater) Methods
E	EPA Methods
SM	Standard Methods



# Analytical Laboratory Report

## Method Summary

Method	Version
E200.8	EPA Method 200.8 Revision 5.4
E245.1	EPA Method 245.1 Revision 3.0
N/A	Not Applicable
SM2540C	Standard Method 2540 C 20th Edition
SM2540D	Standard Method 2540 D 20th Edition
SW3015A	SW 846 Method 3015A Revision 1 February 2007
SW3510C	SW 846 Method 3510C Revision 3 December 1996
SW5030C/8260C	SW 846 Method 8260C Revision 3 August 2006 / 5030C Revision 3 May 2003
SW8270D	SW 846 Method 8270D Revision 4 February 2007



# Analytical Laboratory Report

## Sample Summary (4 samples)

Sample ID	Sample Tag	Matrix	Collected Date/Time
S85938.01	MW0417_120117	Water	12/01/17 11:45
S85938.02	MW0317_120117	Water	12/01/17 11:45
S85938.03	INJ0117_120117	Water	12/01/17 11:45
S85938.04	Trip Blank	Water	12/01/17 00:01



# Analytical Laboratory Report

Lab Sample ID: S85938.01

Sample Tag: MW0417\_120117

Collected Date/Time: 12/01/2017 11:45

Matrix: Water

COC Reference: 105354

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	125ml Plastic	HNO3	Yes	4.4	IR
3	40ml Glass	HCL	Yes	4.4	IR
1	1L Plastic	None	Yes	4.4	IR
2	1L Amber	None	Yes	4.4	IR

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags
----------	---------	-------	----	--------	---------------	------	-------	-------

**Extraction / Prep.**

BNA Extraction	Completed			SW3510C	12/08/17 11:30	PLB		
Mercury Digestion	Completed			E245.1	12/18/17 10:00	JRH		
Metal Digestion	Completed			SW3015A	12/11/17 09:00	CCM		
pH check for VOCs*	<2	STD Units		N/A	12/12/17 11:00	JML		

**Inorganics**

Total Dissolved Solids	562	mg/L	20	SM2540C	12/08/17 20:45	ASB		
Total Suspended Solids	3	mg/L	3	SM2540D	12/08/17 12:20	ASB		

**Metals**

Antimony	Not detected	mg/L	0.005	E200.8	12/11/17 10:23	CCM	7440-36-0	
Arsenic	Not detected	mg/L	0.002	E200.8	12/11/17 10:23	CCM	7440-38-2	
Barium	0.058	mg/L	0.005	E200.8	12/11/17 10:23	CCM	7440-39-3	
Beryllium	Not detected	mg/L	0.001	E200.8	12/11/17 10:23	CCM	7440-41-7	
Cadmium	Not detected	mg/L	0.0005	E200.8	12/11/17 10:23	CCM	7440-43-9	
Chromium	0.014	mg/L	0.005	E200.8	12/11/17 10:23	CCM	7440-47-3	
Cobalt	Not detected	mg/L	0.005	E200.8	12/11/17 10:23	CCM	7440-48-4	
Copper	Not detected	mg/L	0.005	E200.8	12/11/17 10:23	CCM	7440-50-8	
Lead	0.027	mg/L	0.003	E200.8	12/11/17 10:23	CCM	7439-92-1	
Manganese	0.530	mg/L	0.005	E200.8	12/11/17 10:23	CCM	7439-96-5	
Mercury	Not detected	mg/L	0.0002	E245.1	12/18/17 13:48	JRH	7439-97-6	
Nickel	Not detected	mg/L	0.005	E200.8	12/11/17 10:23	CCM	7440-02-0	
Selenium	Not detected	mg/L	0.005	E200.8	12/11/17 10:23	CCM	7782-49-2	
Silver	Not detected	mg/L	0.0005	E200.8	12/11/17 10:23	CCM	7440-22-4	
Thallium	Not detected	mg/L	0.002	E200.8	12/11/17 10:23	CCM	7440-28-0	
Vanadium	Not detected	mg/L	0.005	E200.8	12/11/17 10:23	CCM	7440-62-2	
Zinc	0.022	mg/L	0.005	E200.8	12/11/17 10:23	CCM	7440-66-6	

**Organics - Semi-Volatiles**

**Semi-Volatile Organics - MDEQ**

Acenaphthene	Not detected	ug/L	5	SW8270D	12/12/17 01:12	PL	83-32-9	
Acenaphthylene	Not detected	ug/L	5	SW8270D	12/12/17 01:12	PL	208-96-8	
Anthracene	Not detected	ug/L	5	SW8270D	12/12/17 01:12	PL	120-12-7	
Benzo(a)anthracene	Not detected	ug/L	1	SW8270D	12/12/17 01:12	PL	56-55-3	
Benzo(b)fluoranthene	Not detected	ug/L	1	SW8270D	12/12/17 01:12	PL	205-99-2	
Benzo(k)fluoranthene	Not detected	ug/L	1	SW8270D	12/12/17 01:12	PL	207-08-9	
Benzo(ghi)perylene	Not detected	ug/L	1	SW8270D	12/12/17 01:12	PL	191-24-2	
Benzo(a)pyrene	Not detected	ug/L	1	SW8270D	12/12/17 01:12	PL	50-32-8	
bis(2-Chloroethoxy)methane	Not detected	ug/L	5	SW8270D	12/12/17 01:12	PL	111-91-1	
bis(2-Chloroethyl)ether	Not detected	ug/L	5	SW8270D	12/12/17 01:12	PL	111-44-4	



# Analytical Laboratory Report

Lab Sample ID: S85938.01 (continued)

Sample Tag: MW0417\_120117

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags
<b>Organics - Semi-Volatiles (continued)</b>								
<b>Semi-Volatile Organics - MDEQ (continued)</b>								
bis(2-Chloroisopropyl)ether*	Not detected	ug/L	5	SW8270D	12/12/17 01:12	PL	108-60-1	
bis(2-Ethylhexyl)phthalate	Not detected	ug/L	5	SW8270D	12/12/17 01:12	PL	117-81-7	
4-Bromophenyl phenyl ether	Not detected	ug/L	5	SW8270D	12/12/17 01:12	PL	101-55-3	
Butyl benzyl phthalate	Not detected	ug/L	5	SW8270D	12/12/17 01:12	PL	85-68-7	
4-Chloroaniline	Not detected	ug/L	10	SW8270D	12/12/17 01:12	PL	106-47-8	
2-Chloronaphthalene	Not detected	ug/L	5	SW8270D	12/12/17 01:12	PL	91-58-7	
4-Chloro-3-methylphenol	Not detected	ug/L	5	SW8270D	12/12/17 01:12	PL	59-50-7	
2-Chlorophenol	Not detected	ug/L	10	SW8270D	12/12/17 01:12	PL	95-57-8	
4-Chlorophenyl phenyl ether	Not detected	ug/L	5	SW8270D	12/12/17 01:12	PL	7005-72-3	
Chrysene	Not detected	ug/L	1	SW8270D	12/12/17 01:12	PL	218-01-9	
p,m-Cresol	Not detected	ug/L	20	SW8270D	12/12/17 01:12	PL	3/4-CRESOL	
o-Cresol*	Not detected	ug/L	10	SW8270D	12/12/17 01:12	PL	95-48-7	
Dibenzo(ah)anthracene	Not detected	ug/L	2	SW8270D	12/12/17 01:12	PL	53-70-3	
Dibenzofuran*	Not detected	ug/L	4	SW8270D	12/12/17 01:12	PL	132-64-9	
di-n-Butyl phthalate	Not detected	ug/L	5	SW8270D	12/12/17 01:12	PL	84-74-2	
1,2-Dichlorobenzene	Not detected	ug/L	1	SW8270D	12/12/17 01:12	PL	95-50-1	
1,3-Dichlorobenzene	Not detected	ug/L	1	SW8270D	12/12/17 01:12	PL	541-73-1	
1,4-Dichlorobenzene	Not detected	ug/L	1	SW8270D	12/12/17 01:12	PL	106-46-7	
3,3'-Dichlorobenzidine	Not detected	ug/L	5	SW8270D	12/12/17 01:12	PL	91-94-1	
2,4-Dichlorophenol	Not detected	ug/L	10	SW8270D	12/12/17 01:12	PL	120-83-2	
Diethyl phthalate	Not detected	ug/L	5	SW8270D	12/12/17 01:12	PL	84-66-2	
2,4-Dimethylphenol	Not detected	ug/L	5	SW8270D	12/12/17 01:12	PL	105-67-9	
Dimethyl phthalate	Not detected	ug/L	5	SW8270D	12/12/17 01:12	PL	131-11-3	
4,6-Dinitro-2-methylphenol	Not detected	ug/L	20	SW8270D	12/12/17 01:12	PL	534-52-1	
2,4-Dinitrophenol	Not detected	ug/L	25	SW8270D	12/12/17 01:12	PL	51-28-5	
2,4-Dinitrotoluene	Not detected	ug/L	5	SW8270D	12/12/17 01:12	PL	121-14-2	
2,6-Dinitrotoluene	Not detected	ug/L	5	SW8270D	12/12/17 01:12	PL	606-20-2	
1,2-Diphenylhydrazine*	Not detected	ug/L	5	SW8270D	12/12/17 01:12	PL	122-66-7	
di-n-Octyl phthalate	Not detected	ug/L	5	SW8270D	12/12/17 01:12	PL	117-84-0	
Fluoranthene	Not detected	ug/L	1	SW8270D	12/12/17 01:12	PL	206-44-0	
Fluorene	Not detected	ug/L	5	SW8270D	12/12/17 01:12	PL	86-73-7	
Hexachlorobenzene	Not detected	ug/L	5	SW8270D	12/12/17 01:12	PL	118-74-1	
Hexachlorobutadiene	Not detected	ug/L	10	SW8270D	12/12/17 01:12	PL	87-68-3	
Hexachlorocyclopentadiene	Not detected	ug/L	5	SW8270D	12/12/17 01:12	PL	77-47-4	
Hexachloroethane	Not detected	ug/L	5	SW8270D	12/12/17 01:12	PL	67-72-1	
Indeno(1,2,3-cd)pyrene	Not detected	ug/L	2	SW8270D	12/12/17 01:12	PL	193-39-5	
Isophorone	Not detected	ug/L	5	SW8270D	12/12/17 01:12	PL	78-59-1	
2-Methylnaphthalene	Not detected	ug/L	5	SW8270D	12/12/17 01:12	PL	91-57-6	
Naphthalene	Not detected	ug/L	5	SW8270D	12/12/17 01:12	PL	91-20-3	
2-Nitroaniline	Not detected	ug/L	25	SW8270D	12/12/17 01:12	PL	88-74-4	
3-Nitroaniline	Not detected	ug/L	25	SW8270D	12/12/17 01:12	PL	99-09-2	
4-Nitroaniline	Not detected	ug/L	25	SW8270D	12/12/17 01:12	PL	100-01-6	
Nitrobenzene	Not detected	ug/L	5	SW8270D	12/12/17 01:12	PL	98-95-3	
2-Nitrophenol	Not detected	ug/L	5	SW8270D	12/12/17 01:12	PL	88-75-5	
4-Nitrophenol	Not detected	ug/L	25	SW8270D	12/12/17 01:12	PL	100-02-7	
N-Nitrosodiphenylamine	Not detected	ug/L	5	SW8270D	12/12/17 01:12	PL	86-30-6	
N-Nitrosodi-n-propylamine	Not detected	ug/L	5	SW8270D	12/12/17 01:12	PL	621-64-7	
Pentachlorophenol	Not detected	ug/L	5	SW8270D	12/12/17 01:12	PL	87-86-5	
Phenanthrene	Not detected	ug/L	2	SW8270D	12/12/17 01:12	PL	85-01-8	



# Analytical Laboratory Report

Lab Sample ID: S85938.01 (continued)

Sample Tag: MW0417\_120117

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags
<b>Organics - Semi-Volatiles (continued)</b>								
<b>Semi-Volatile Organics - MDEQ (continued)</b>								
Phenol	Not detected	ug/L	5	SW8270D	12/12/17 01:12	PL	108-95-2	
Pyrene	Not detected	ug/L	5	SW8270D	12/12/17 01:12	PL	129-00-0	
1,2,4-Trichlorobenzene	Not detected	ug/L	5	SW8270D	12/12/17 01:12	PL	120-82-1	
2,4,5-Trichlorophenol	Not detected	ug/L	5	SW8270D	12/12/17 01:12	PL	95-95-4	
2,4,6-Trichlorophenol	Not detected	ug/L	4	SW8270D	12/12/17 01:12	PL	88-06-2	
<b>Organics - Volatiles</b>								
<b>Volatile Organics - Arcadis</b>								
Acetone	Not detected	ug/L	50	SW5030C/8260C	12/12/17 16:32	JML	67-64-1	
2-Butanone (MEK)	Not detected	ug/L	25	SW5030C/8260C	12/12/17 16:32	JML	78-93-3	
Benzene	Not detected	ug/L	1	SW5030C/8260C	12/12/17 16:32	JML	71-43-2	
Bromodichloromethane	Not detected	ug/L	1	SW5030C/8260C	12/12/17 16:32	JML	75-27-4	
Bromoform	Not detected	ug/L	1	SW5030C/8260C	12/12/17 16:32	JML	75-25-2	
Bromomethane	Not detected	ug/L	5	SW5030C/8260C	12/12/17 16:32	JML	74-83-9	
Carbon disulfide	Not detected	ug/L	5	SW5030C/8260C	12/12/17 16:32	JML	75-15-0	
Carbon tetrachloride	Not detected	ug/L	1	SW5030C/8260C	12/12/17 16:32	JML	56-23-5	
Chlorobenzene	Not detected	ug/L	1	SW5030C/8260C	12/12/17 16:32	JML	108-90-7	
Chloroethane	Not detected	ug/L	5	SW5030C/8260C	12/12/17 16:32	JML	75-00-3	
Chloroform	Not detected	ug/L	1	SW5030C/8260C	12/12/17 16:32	JML	67-66-3	
Chloromethane	Not detected	ug/L	5	SW5030C/8260C	12/12/17 16:32	JML	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	ug/L	5	SW5030C/8260C	12/12/17 16:32	JML	96-12-8	
1,2-Dichlorobenzene	Not detected	ug/L	1	SW5030C/8260C	12/12/17 16:32	JML	95-50-1	
1,2-Dichloroethane	Not detected	ug/L	1	SW5030C/8260C	12/12/17 16:32	JML	107-06-2	
1,2-Dichloropropane	Not detected	ug/L	1	SW5030C/8260C	12/12/17 16:32	JML	78-87-5	
1,3-Dichlorobenzene	Not detected	ug/L	1	SW5030C/8260C	12/12/17 16:32	JML	541-73-1	
1,4-Dichlorobenzene	Not detected	ug/L	1	SW5030C/8260C	12/12/17 16:32	JML	106-46-7	
cis-1,2-Dichloroethene	Not detected	ug/L	1	SW5030C/8260C	12/12/17 16:32	JML	156-59-2	
Dibromochloromethane	Not detected	ug/L	5	SW5030C/8260C	12/12/17 16:32	JML	124-48-1	
Dichlorodifluoromethane	Not detected	ug/L	5	SW5030C/8260C	12/12/17 16:32	JML	75-71-8	
trans-1,2-Dichloroethene	Not detected	ug/L	1	SW5030C/8260C	12/12/17 16:32	JML	156-60-5	
Ethylbenzene	Not detected	ug/L	1	SW5030C/8260C	12/12/17 16:32	JML	100-41-4	
2-Hexanone	Not detected	ug/L	50	SW5030C/8260C	12/12/17 16:32	JML	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	ug/L	50	SW5030C/8260C	12/12/17 16:32	JML	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	ug/L	5	SW5030C/8260C	12/12/17 16:32	JML	1634-04-4	
Methylene chloride	Not detected	ug/L	5	SW5030C/8260C	12/12/17 16:32	JML	75-09-2	
Styrene	Not detected	ug/L	1	SW5030C/8260C	12/12/17 16:32	JML	100-42-5	
1,1,1-Trichloroethane	Not detected	ug/L	1	SW5030C/8260C	12/12/17 16:32	JML	71-55-6	
1,1,2-Trichloroethane	Not detected	ug/L	1	SW5030C/8260C	12/12/17 16:32	JML	79-00-5	
1,2,4-Trichlorobenzene	Not detected	ug/L	5	SW5030C/8260C	12/12/17 16:32	JML	120-82-1	
Tetrachloroethene	Not detected	ug/L	1	SW5030C/8260C	12/12/17 16:32	JML	127-18-4	
Toluene	Not detected	ug/L	1	SW5030C/8260C	12/12/17 16:32	JML	108-88-3	
Trichloroethene	Not detected	ug/L	1	SW5030C/8260C	12/12/17 16:32	JML	79-01-6	
Trichlorofluoromethane	Not detected	ug/L	1	SW5030C/8260C	12/12/17 16:32	JML	75-69-4	
Vinyl chloride	Not detected	ug/L	1	SW5030C/8260C	12/12/17 16:32	JML	75-01-4	
o-Xylene	Not detected	ug/L	1	SW5030C/8260C	12/12/17 16:32	JML	95-47-6	
p,m-Xylene*	Not detected	ug/L	2	SW5030C/8260C	12/12/17 16:32	JML		
Isopropylbenzene	Not detected	ug/L	1	SW5030C/8260C	12/12/17 16:32	JML	98-82-8	
Cyclohexane	Not detected	ug/L	1	SW5030C/8260C	12/12/17 16:32	JML	110-82-7	
1,1-Dichloroethane	Not detected	ug/L	1	SW5030C/8260C	12/12/17 16:32	JML	75-34-3	



# Analytical Laboratory Report

Lab Sample ID: S85938.01 (continued)

Sample Tag: MW0417\_120117

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags
<b>Organics - Volatiles (continued)</b>								
<b>Volatile Organics - Arcadis (continued)</b>								
1,1-Dichloroethene	Not detected	ug/L	1	SW5030C/8260C	12/12/17 16:32	JML	75-35-4	
Methyl Acetate	Not detected	ug/L	10	SW5030C/8260C	12/12/17 16:32	JML	79-20-9	
Methyl cyclohexane	Not detected	ug/L	1	SW5030C/8260C	12/12/17 16:32	JML	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	ug/L	1	SW5030C/8260C	12/12/17 16:32	JML	76-13-1	
1,2-Dibromoethane	Not detected	ug/L	1	SW5030C/8260C	12/12/17 16:32	JML	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	ug/L	1	SW5030C/8260C	12/12/17 16:32	JML	79-34-5	
cis-1,3-Dichloropropene	Not detected	ug/L	1	SW5030C/8260C	12/12/17 16:32	JML	10061-01-5	
trans-1,3-Dichloropropene	Not detected	ug/L	1	SW5030C/8260C	12/12/17 16:32	JML	10061-02-6	



# Analytical Laboratory Report

Lab Sample ID: S85938.02

Sample Tag: MW0317\_120117

Collected Date/Time: 12/01/2017 11:45

Matrix: Water

COC Reference: 105354

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	125ml Plastic	HNO3	Yes	4.4	IR
3	40ml Glass	HCL	Yes	4.4	IR
1	1L Plastic	None	Yes	4.4	IR
2	1L Amber	None	Yes	4.4	IR

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags
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**Extraction / Prep.**

BNA Extraction	Completed			SW3510C	12/08/17 11:30	PLB		
Mercury Digestion	Completed			E245.1	12/18/17 10:00	JRH		
Metal Digestion	Completed			SW3015A	12/11/17 09:00	CCM		
pH check for VOCs*	<2	STD Units		N/A	12/12/17 11:00	JML		

**Inorganics**

Total Dissolved Solids	558	mg/L	20	SM2540C	12/08/17 20:45	ASB		
Total Suspended Solids	Not detected	mg/L	3	SM2540D	12/08/17 12:20	ASB		

**Metals**

Antimony	Not detected	mg/L	0.005	E200.8	12/11/17 10:25	CCM	7440-36-0	
Arsenic	Not detected	mg/L	0.002	E200.8	12/11/17 10:25	CCM	7440-38-2	
Barium	0.050	mg/L	0.005	E200.8	12/11/17 10:25	CCM	7440-39-3	
Beryllium	Not detected	mg/L	0.001	E200.8	12/11/17 10:25	CCM	7440-41-7	
Cadmium	Not detected	mg/L	0.0005	E200.8	12/11/17 10:25	CCM	7440-43-9	
Chromium	Not detected	mg/L	0.005	E200.8	12/11/17 10:25	CCM	7440-47-3	
Cobalt	Not detected	mg/L	0.005	E200.8	12/11/17 10:25	CCM	7440-48-4	
Copper	Not detected	mg/L	0.005	E200.8	12/11/17 10:25	CCM	7440-50-8	
Lead	Not detected	mg/L	0.003	E200.8	12/11/17 10:25	CCM	7439-92-1	
Manganese	0.480	mg/L	0.005	E200.8	12/11/17 10:25	CCM	7439-96-5	
Mercury	Not detected	mg/L	0.0002	E245.1	12/18/17 13:50	JRH	7439-97-6	
Nickel	Not detected	mg/L	0.005	E200.8	12/11/17 10:25	CCM	7440-02-0	
Selenium	Not detected	mg/L	0.005	E200.8	12/11/17 10:25	CCM	7782-49-2	
Silver	Not detected	mg/L	0.0005	E200.8	12/11/17 10:25	CCM	7440-22-4	
Thallium	Not detected	mg/L	0.002	E200.8	12/11/17 10:25	CCM	7440-28-0	
Vanadium	Not detected	mg/L	0.005	E200.8	12/11/17 10:25	CCM	7440-62-2	
Zinc	Not detected	mg/L	0.005	E200.8	12/11/17 10:25	CCM	7440-66-6	

**Organics - Semi-Volatiles**

**Semi-Volatile Organics - MDEQ**

Acenaphthene	Not detected	ug/L	5	SW8270D	12/12/17 01:41	PL	83-32-9	
Acenaphthylene	Not detected	ug/L	5	SW8270D	12/12/17 01:41	PL	208-96-8	
Anthracene	Not detected	ug/L	5	SW8270D	12/12/17 01:41	PL	120-12-7	
Benzo(a)anthracene	Not detected	ug/L	1	SW8270D	12/12/17 01:41	PL	56-55-3	
Benzo(b)fluoranthene	Not detected	ug/L	1	SW8270D	12/12/17 01:41	PL	205-99-2	
Benzo(k)fluoranthene	Not detected	ug/L	1	SW8270D	12/12/17 01:41	PL	207-08-9	
Benzo(ghi)perylene	Not detected	ug/L	1	SW8270D	12/12/17 01:41	PL	191-24-2	
Benzo(a)pyrene	Not detected	ug/L	1	SW8270D	12/12/17 01:41	PL	50-32-8	
bis(2-Chloroethoxy)methane	Not detected	ug/L	5	SW8270D	12/12/17 01:41	PL	111-91-1	
bis(2-Chloroethyl)ether	Not detected	ug/L	5	SW8270D	12/12/17 01:41	PL	111-44-4	



# Analytical Laboratory Report

Lab Sample ID: S85938.02 (continued)

Sample Tag: MW0317\_120117

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags
<b>Organics - Semi-Volatiles (continued)</b>								
<b>Semi-Volatile Organics - MDEQ (continued)</b>								
bis(2-Chloroisopropyl)ether*	Not detected	ug/L	5	SW8270D	12/12/17 01:41	PL	108-60-1	
bis(2-Ethylhexyl)phthalate	Not detected	ug/L	5	SW8270D	12/12/17 01:41	PL	117-81-7	
4-Bromophenyl phenyl ether	Not detected	ug/L	5	SW8270D	12/12/17 01:41	PL	101-55-3	
Butyl benzyl phthalate	Not detected	ug/L	5	SW8270D	12/12/17 01:41	PL	85-68-7	
4-Chloroaniline	Not detected	ug/L	10	SW8270D	12/12/17 01:41	PL	106-47-8	
2-Chloronaphthalene	Not detected	ug/L	5	SW8270D	12/12/17 01:41	PL	91-58-7	
4-Chloro-3-methylphenol	Not detected	ug/L	5	SW8270D	12/12/17 01:41	PL	59-50-7	
2-Chlorophenol	Not detected	ug/L	10	SW8270D	12/12/17 01:41	PL	95-57-8	
4-Chlorophenyl phenyl ether	Not detected	ug/L	5	SW8270D	12/12/17 01:41	PL	7005-72-3	
Chrysene	Not detected	ug/L	1	SW8270D	12/12/17 01:41	PL	218-01-9	
p,m-Cresol	Not detected	ug/L	20	SW8270D	12/12/17 01:41	PL	3/4-CRESOL	
o-Cresol*	Not detected	ug/L	10	SW8270D	12/12/17 01:41	PL	95-48-7	
Dibenzo(ah)anthracene	Not detected	ug/L	2	SW8270D	12/12/17 01:41	PL	53-70-3	
Dibenzofuran*	Not detected	ug/L	4	SW8270D	12/12/17 01:41	PL	132-64-9	
di-n-Butyl phthalate	Not detected	ug/L	5	SW8270D	12/12/17 01:41	PL	84-74-2	
1,2-Dichlorobenzene	Not detected	ug/L	1	SW8270D	12/12/17 01:41	PL	95-50-1	
1,3-Dichlorobenzene	Not detected	ug/L	1	SW8270D	12/12/17 01:41	PL	541-73-1	
1,4-Dichlorobenzene	Not detected	ug/L	1	SW8270D	12/12/17 01:41	PL	106-46-7	
3,3'-Dichlorobenzidine	Not detected	ug/L	5	SW8270D	12/12/17 01:41	PL	91-94-1	
2,4-Dichlorophenol	Not detected	ug/L	10	SW8270D	12/12/17 01:41	PL	120-83-2	
Diethyl phthalate	Not detected	ug/L	5	SW8270D	12/12/17 01:41	PL	84-66-2	
2,4-Dimethylphenol	Not detected	ug/L	5	SW8270D	12/12/17 01:41	PL	105-67-9	
Dimethyl phthalate	Not detected	ug/L	5	SW8270D	12/12/17 01:41	PL	131-11-3	
4,6-Dinitro-2-methylphenol	Not detected	ug/L	20	SW8270D	12/12/17 01:41	PL	534-52-1	
2,4-Dinitrophenol	Not detected	ug/L	25	SW8270D	12/12/17 01:41	PL	51-28-5	
2,4-Dinitrotoluene	Not detected	ug/L	5	SW8270D	12/12/17 01:41	PL	121-14-2	
2,6-Dinitrotoluene	Not detected	ug/L	5	SW8270D	12/12/17 01:41	PL	606-20-2	
1,2-Diphenylhydrazine*	Not detected	ug/L	5	SW8270D	12/12/17 01:41	PL	122-66-7	
di-n-Octyl phthalate	Not detected	ug/L	5	SW8270D	12/12/17 01:41	PL	117-84-0	
Fluoranthene	Not detected	ug/L	1	SW8270D	12/12/17 01:41	PL	206-44-0	
Fluorene	Not detected	ug/L	5	SW8270D	12/12/17 01:41	PL	86-73-7	
Hexachlorobenzene	Not detected	ug/L	5	SW8270D	12/12/17 01:41	PL	118-74-1	
Hexachlorobutadiene	Not detected	ug/L	10	SW8270D	12/12/17 01:41	PL	87-68-3	
Hexachlorocyclopentadiene	Not detected	ug/L	5	SW8270D	12/12/17 01:41	PL	77-47-4	
Hexachloroethane	Not detected	ug/L	5	SW8270D	12/12/17 01:41	PL	67-72-1	
Indeno(1,2,3-cd)pyrene	Not detected	ug/L	2	SW8270D	12/12/17 01:41	PL	193-39-5	
Isophorone	Not detected	ug/L	5	SW8270D	12/12/17 01:41	PL	78-59-1	
2-Methylnaphthalene	Not detected	ug/L	5	SW8270D	12/12/17 01:41	PL	91-57-6	
Naphthalene	Not detected	ug/L	5	SW8270D	12/12/17 01:41	PL	91-20-3	
2-Nitroaniline	Not detected	ug/L	25	SW8270D	12/12/17 01:41	PL	88-74-4	
3-Nitroaniline	Not detected	ug/L	25	SW8270D	12/12/17 01:41	PL	99-09-2	
4-Nitroaniline	Not detected	ug/L	25	SW8270D	12/12/17 01:41	PL	100-01-6	
Nitrobenzene	Not detected	ug/L	5	SW8270D	12/12/17 01:41	PL	98-95-3	
2-Nitrophenol	Not detected	ug/L	5	SW8270D	12/12/17 01:41	PL	88-75-5	
4-Nitrophenol	Not detected	ug/L	25	SW8270D	12/12/17 01:41	PL	100-02-7	
N-Nitrosodiphenylamine	Not detected	ug/L	5	SW8270D	12/12/17 01:41	PL	86-30-6	
N-Nitrosodi-n-propylamine	Not detected	ug/L	5	SW8270D	12/12/17 01:41	PL	621-64-7	
Pentachlorophenol	Not detected	ug/L	5	SW8270D	12/12/17 01:41	PL	87-86-5	
Phenanthrene	Not detected	ug/L	2	SW8270D	12/12/17 01:41	PL	85-01-8	



# Analytical Laboratory Report

Lab Sample ID: S85938.02 (continued)

Sample Tag: MW0317\_120117

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags
<b>Organics - Semi-Volatiles (continued)</b>								
<b>Semi-Volatile Organics - MDEQ (continued)</b>								
Phenol	Not detected	ug/L	5	SW8270D	12/12/17 01:41	PL	108-95-2	
Pyrene	Not detected	ug/L	5	SW8270D	12/12/17 01:41	PL	129-00-0	
1,2,4-Trichlorobenzene	Not detected	ug/L	5	SW8270D	12/12/17 01:41	PL	120-82-1	
2,4,5-Trichlorophenol	Not detected	ug/L	5	SW8270D	12/12/17 01:41	PL	95-95-4	
2,4,6-Trichlorophenol	Not detected	ug/L	4	SW8270D	12/12/17 01:41	PL	88-06-2	
<b>Organics - Volatiles</b>								
<b>Volatile Organics - Arcadis</b>								
Acetone	Not detected	ug/L	50	SW5030C/8260C	12/11/17 15:26	JML	67-64-1	
2-Butanone (MEK)	Not detected	ug/L	25	SW5030C/8260C	12/11/17 15:26	JML	78-93-3	
Benzene	Not detected	ug/L	1	SW5030C/8260C	12/11/17 15:26	JML	71-43-2	
Bromodichloromethane	Not detected	ug/L	1	SW5030C/8260C	12/11/17 15:26	JML	75-27-4	
Bromoform	Not detected	ug/L	1	SW5030C/8260C	12/11/17 15:26	JML	75-25-2	
Bromomethane	Not detected	ug/L	5	SW5030C/8260C	12/11/17 15:26	JML	74-83-9	
Carbon disulfide	Not detected	ug/L	5	SW5030C/8260C	12/11/17 15:26	JML	75-15-0	
Carbon tetrachloride	Not detected	ug/L	1	SW5030C/8260C	12/11/17 15:26	JML	56-23-5	
Chlorobenzene	Not detected	ug/L	1	SW5030C/8260C	12/11/17 15:26	JML	108-90-7	
Chloroethane	Not detected	ug/L	5	SW5030C/8260C	12/11/17 15:26	JML	75-00-3	
Chloroform	Not detected	ug/L	1	SW5030C/8260C	12/11/17 15:26	JML	67-66-3	
Chloromethane	Not detected	ug/L	5	SW5030C/8260C	12/11/17 15:26	JML	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	ug/L	5	SW5030C/8260C	12/11/17 15:26	JML	96-12-8	
1,2-Dichlorobenzene	Not detected	ug/L	1	SW5030C/8260C	12/11/17 15:26	JML	95-50-1	
1,2-Dichloroethane	Not detected	ug/L	1	SW5030C/8260C	12/11/17 15:26	JML	107-06-2	
1,2-Dichloropropane	Not detected	ug/L	1	SW5030C/8260C	12/11/17 15:26	JML	78-87-5	
1,3-Dichlorobenzene	Not detected	ug/L	1	SW5030C/8260C	12/11/17 15:26	JML	541-73-1	
1,4-Dichlorobenzene	Not detected	ug/L	1	SW5030C/8260C	12/11/17 15:26	JML	106-46-7	
cis-1,2-Dichloroethene	Not detected	ug/L	1	SW5030C/8260C	12/11/17 15:26	JML	156-59-2	
Dibromochloromethane	Not detected	ug/L	5	SW5030C/8260C	12/11/17 15:26	JML	124-48-1	
Dichlorodifluoromethane	Not detected	ug/L	5	SW5030C/8260C	12/11/17 15:26	JML	75-71-8	
trans-1,2-Dichloroethene	Not detected	ug/L	1	SW5030C/8260C	12/11/17 15:26	JML	156-60-5	
Ethylbenzene	Not detected	ug/L	1	SW5030C/8260C	12/11/17 15:26	JML	100-41-4	
2-Hexanone	Not detected	ug/L	50	SW5030C/8260C	12/11/17 15:26	JML	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	ug/L	50	SW5030C/8260C	12/11/17 15:26	JML	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	ug/L	5	SW5030C/8260C	12/11/17 15:26	JML	1634-04-4	
Methylene chloride	Not detected	ug/L	5	SW5030C/8260C	12/11/17 15:26	JML	75-09-2	
Styrene	Not detected	ug/L	1	SW5030C/8260C	12/11/17 15:26	JML	100-42-5	
1,1,1-Trichloroethane	Not detected	ug/L	1	SW5030C/8260C	12/11/17 15:26	JML	71-55-6	
1,1,2-Trichloroethane	Not detected	ug/L	1	SW5030C/8260C	12/11/17 15:26	JML	79-00-5	
1,2,4-Trichlorobenzene	Not detected	ug/L	5	SW5030C/8260C	12/11/17 15:26	JML	120-82-1	
Tetrachloroethene	Not detected	ug/L	1	SW5030C/8260C	12/11/17 15:26	JML	127-18-4	
Toluene	Not detected	ug/L	1	SW5030C/8260C	12/11/17 15:26	JML	108-88-3	
Trichloroethene	Not detected	ug/L	1	SW5030C/8260C	12/11/17 15:26	JML	79-01-6	
Trichlorofluoromethane	Not detected	ug/L	1	SW5030C/8260C	12/11/17 15:26	JML	75-69-4	
Vinyl chloride	Not detected	ug/L	1	SW5030C/8260C	12/11/17 15:26	JML	75-01-4	
o-Xylene	Not detected	ug/L	1	SW5030C/8260C	12/11/17 15:26	JML	95-47-6	
p,m-Xylene*	Not detected	ug/L	2	SW5030C/8260C	12/11/17 15:26	JML		
Isopropylbenzene	Not detected	ug/L	1	SW5030C/8260C	12/11/17 15:26	JML	98-82-8	
Cyclohexane	Not detected	ug/L	1	SW5030C/8260C	12/11/17 15:26	JML	110-82-7	
1,1-Dichloroethane	Not detected	ug/L	1	SW5030C/8260C	12/11/17 15:26	JML	75-34-3	



# Analytical Laboratory Report

Lab Sample ID: S85938.02 (continued)

Sample Tag: MW0317\_120117

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags
<b>Organics - Volatiles (continued)</b>								
<b>Volatile Organics - Arcadis (continued)</b>								
1,1-Dichloroethene	Not detected	ug/L	1	SW5030C/8260C	12/11/17 15:26	JML	75-35-4	
Methyl Acetate	Not detected	ug/L	10	SW5030C/8260C	12/11/17 15:26	JML	79-20-9	
Methyl cyclohexane	Not detected	ug/L	1	SW5030C/8260C	12/11/17 15:26	JML	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	ug/L	1	SW5030C/8260C	12/11/17 15:26	JML	76-13-1	
1,2-Dibromoethane	Not detected	ug/L	1	SW5030C/8260C	12/11/17 15:26	JML	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	ug/L	1	SW5030C/8260C	12/11/17 15:26	JML	79-34-5	
cis-1,3-Dichloropropene	Not detected	ug/L	1	SW5030C/8260C	12/11/17 15:26	JML	10061-01-5	
trans-1,3-Dichloropropene	Not detected	ug/L	1	SW5030C/8260C	12/11/17 15:26	JML	10061-02-6	



# Analytical Laboratory Report

**Lab Sample ID: S85938.03**  
 Sample Tag: INJ0117\_120117  
 Collected Date/Time: 12/01/2017 11:45  
 Matrix: Water  
 COC Reference: 105354

**Sample Containers**

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	125ml Plastic	HNO3	Yes	4.4	IR
3	40ml Glass	HCL	Yes	4.4	IR
1	1L Plastic	None	Yes	4.4	IR
2	1L Amber	None	Yes	4.4	IR

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags
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**Extraction / Prep.**

BNA Extraction	Completed			SW3510C	12/08/17 11:30	PLB		
Mercury Digestion	Completed			E245.1	12/18/17 10:00	JRH		
Metal Digestion	Completed			SW3015A	12/11/17 09:00	CCM		
pH check for VOCs*	<2	STD Units		N/A	12/12/17 11:00	JML		

**Inorganics**

Total Dissolved Solids	586	mg/L	20	SM2540C	12/08/17 20:45	ASB		
Total Suspended Solids	11	mg/L	3	SM2540D	12/08/17 12:20	ASB		

**Metals**

Antimony	Not detected	mg/L	0.005	E200.8	12/11/17 10:26	CCM	7440-36-0	
Arsenic	Not detected	mg/L	0.002	E200.8	12/11/17 10:26	CCM	7440-38-2	
Barium	0.048	mg/L	0.005	E200.8	12/11/17 10:26	CCM	7440-39-3	
Beryllium	Not detected	mg/L	0.001	E200.8	12/11/17 10:26	CCM	7440-41-7	
Cadmium	Not detected	mg/L	0.0005	E200.8	12/11/17 10:26	CCM	7440-43-9	
Chromium	Not detected	mg/L	0.005	E200.8	12/11/17 10:26	CCM	7440-47-3	
Cobalt	Not detected	mg/L	0.005	E200.8	12/11/17 10:26	CCM	7440-48-4	
Copper	0.010	mg/L	0.005	E200.8	12/11/17 10:26	CCM	7440-50-8	
Lead	Not detected	mg/L	0.003	E200.8	12/11/17 10:26	CCM	7439-92-1	
Manganese	0.475	mg/L	0.005	E200.8	12/11/17 10:26	CCM	7439-96-5	
Mercury	Not detected	mg/L	0.0002	E245.1	12/18/17 13:52	JRH	7439-97-6	
Nickel	Not detected	mg/L	0.005	E200.8	12/11/17 10:26	CCM	7440-02-0	
Selenium	Not detected	mg/L	0.005	E200.8	12/11/17 10:26	CCM	7782-49-2	
Silver	Not detected	mg/L	0.0005	E200.8	12/11/17 10:26	CCM	7440-22-4	
Thallium	Not detected	mg/L	0.002	E200.8	12/11/17 10:26	CCM	7440-28-0	
Vanadium	Not detected	mg/L	0.005	E200.8	12/11/17 10:26	CCM	7440-62-2	
Zinc	Not detected	mg/L	0.005	E200.8	12/11/17 10:26	CCM	7440-66-6	

**Organics - Semi-Volatiles**

**Semi-Volatile Organics - MDEQ**

Acenaphthene	Not detected	ug/L	5	SW8270D	12/12/17 02:10	PL	83-32-9	
Acenaphthylene	Not detected	ug/L	5	SW8270D	12/12/17 02:10	PL	208-96-8	
Anthracene	Not detected	ug/L	5	SW8270D	12/12/17 02:10	PL	120-12-7	
Benzo(a)anthracene	Not detected	ug/L	1	SW8270D	12/12/17 02:10	PL	56-55-3	
Benzo(b)fluoranthene	Not detected	ug/L	1	SW8270D	12/12/17 02:10	PL	205-99-2	
Benzo(k)fluoranthene	Not detected	ug/L	1	SW8270D	12/12/17 02:10	PL	207-08-9	
Benzo(ghi)perylene	Not detected	ug/L	1	SW8270D	12/12/17 02:10	PL	191-24-2	
Benzo(a)pyrene	Not detected	ug/L	1	SW8270D	12/12/17 02:10	PL	50-32-8	
bis(2-Chloroethoxy)methane	Not detected	ug/L	5	SW8270D	12/12/17 02:10	PL	111-91-1	
bis(2-Chloroethyl)ether	Not detected	ug/L	5	SW8270D	12/12/17 02:10	PL	111-44-4	



# Analytical Laboratory Report

Lab Sample ID: S85938.03 (continued)

Sample Tag: INJ0117\_120117

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags
<b>Organics - Semi-Volatiles (continued)</b>								
<b>Semi-Volatile Organics - MDEQ (continued)</b>								
bis(2-Chloroisopropyl)ether*	Not detected	ug/L	5	SW8270D	12/12/17 02:10	PL	108-60-1	
bis(2-Ethylhexyl)phthalate	Not detected	ug/L	5	SW8270D	12/12/17 02:10	PL	117-81-7	
4-Bromophenyl phenyl ether	Not detected	ug/L	5	SW8270D	12/12/17 02:10	PL	101-55-3	
Butyl benzyl phthalate	Not detected	ug/L	5	SW8270D	12/12/17 02:10	PL	85-68-7	
4-Chloroaniline	Not detected	ug/L	10	SW8270D	12/12/17 02:10	PL	106-47-8	
2-Chloronaphthalene	Not detected	ug/L	5	SW8270D	12/12/17 02:10	PL	91-58-7	
4-Chloro-3-methylphenol	Not detected	ug/L	5	SW8270D	12/12/17 02:10	PL	59-50-7	
2-Chlorophenol	Not detected	ug/L	10	SW8270D	12/12/17 02:10	PL	95-57-8	
4-Chlorophenyl phenyl ether	Not detected	ug/L	5	SW8270D	12/12/17 02:10	PL	7005-72-3	
Chrysene	Not detected	ug/L	1	SW8270D	12/12/17 02:10	PL	218-01-9	
p,m-Cresol	Not detected	ug/L	20	SW8270D	12/12/17 02:10	PL	3/4-CRESOL	
o-Cresol*	Not detected	ug/L	10	SW8270D	12/12/17 02:10	PL	95-48-7	
Dibenzo(ah)anthracene	Not detected	ug/L	2	SW8270D	12/12/17 02:10	PL	53-70-3	
Dibenzofuran*	Not detected	ug/L	4	SW8270D	12/12/17 02:10	PL	132-64-9	
di-n-Butyl phthalate	Not detected	ug/L	5	SW8270D	12/12/17 02:10	PL	84-74-2	
1,2-Dichlorobenzene	Not detected	ug/L	1	SW8270D	12/12/17 02:10	PL	95-50-1	
1,3-Dichlorobenzene	Not detected	ug/L	1	SW8270D	12/12/17 02:10	PL	541-73-1	
1,4-Dichlorobenzene	Not detected	ug/L	1	SW8270D	12/12/17 02:10	PL	106-46-7	
3,3'-Dichlorobenzidine	Not detected	ug/L	5	SW8270D	12/12/17 02:10	PL	91-94-1	
2,4-Dichlorophenol	Not detected	ug/L	10	SW8270D	12/12/17 02:10	PL	120-83-2	
Diethyl phthalate	Not detected	ug/L	5	SW8270D	12/12/17 02:10	PL	84-66-2	
2,4-Dimethylphenol	Not detected	ug/L	5	SW8270D	12/12/17 02:10	PL	105-67-9	
Dimethyl phthalate	Not detected	ug/L	5	SW8270D	12/12/17 02:10	PL	131-11-3	
4,6-Dinitro-2-methylphenol	Not detected	ug/L	20	SW8270D	12/12/17 02:10	PL	534-52-1	
2,4-Dinitrophenol	Not detected	ug/L	25	SW8270D	12/12/17 02:10	PL	51-28-5	
2,4-Dinitrotoluene	Not detected	ug/L	5	SW8270D	12/12/17 02:10	PL	121-14-2	
2,6-Dinitrotoluene	Not detected	ug/L	5	SW8270D	12/12/17 02:10	PL	606-20-2	
1,2-Diphenylhydrazine*	Not detected	ug/L	5	SW8270D	12/12/17 02:10	PL	122-66-7	
di-n-Octyl phthalate	Not detected	ug/L	5	SW8270D	12/12/17 02:10	PL	117-84-0	
Fluoranthene	Not detected	ug/L	1	SW8270D	12/12/17 02:10	PL	206-44-0	
Fluorene	Not detected	ug/L	5	SW8270D	12/12/17 02:10	PL	86-73-7	
Hexachlorobenzene	Not detected	ug/L	5	SW8270D	12/12/17 02:10	PL	118-74-1	
Hexachlorobutadiene	Not detected	ug/L	10	SW8270D	12/12/17 02:10	PL	87-68-3	
Hexachlorocyclopentadiene	Not detected	ug/L	5	SW8270D	12/12/17 02:10	PL	77-47-4	
Hexachloroethane	Not detected	ug/L	5	SW8270D	12/12/17 02:10	PL	67-72-1	
Indeno(1,2,3-cd)pyrene	Not detected	ug/L	2	SW8270D	12/12/17 02:10	PL	193-39-5	
Isophorone	Not detected	ug/L	5	SW8270D	12/12/17 02:10	PL	78-59-1	
2-Methylnaphthalene	Not detected	ug/L	5	SW8270D	12/12/17 02:10	PL	91-57-6	
Naphthalene	Not detected	ug/L	5	SW8270D	12/12/17 02:10	PL	91-20-3	
2-Nitroaniline	Not detected	ug/L	25	SW8270D	12/12/17 02:10	PL	88-74-4	
3-Nitroaniline	Not detected	ug/L	25	SW8270D	12/12/17 02:10	PL	99-09-2	
4-Nitroaniline	Not detected	ug/L	25	SW8270D	12/12/17 02:10	PL	100-01-6	
Nitrobenzene	Not detected	ug/L	5	SW8270D	12/12/17 02:10	PL	98-95-3	
2-Nitrophenol	Not detected	ug/L	5	SW8270D	12/12/17 02:10	PL	88-75-5	
4-Nitrophenol	Not detected	ug/L	25	SW8270D	12/12/17 02:10	PL	100-02-7	
N-Nitrosodiphenylamine	Not detected	ug/L	5	SW8270D	12/12/17 02:10	PL	86-30-6	
N-Nitrosodi-n-propylamine	Not detected	ug/L	5	SW8270D	12/12/17 02:10	PL	621-64-7	
Pentachlorophenol	Not detected	ug/L	5	SW8270D	12/12/17 02:10	PL	87-86-5	
Phenanthrene	Not detected	ug/L	2	SW8270D	12/12/17 02:10	PL	85-01-8	



# Analytical Laboratory Report

Lab Sample ID: S85938.03 (continued)

Sample Tag: INJ0117\_120117

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags
<b>Organics - Semi-Volatiles (continued)</b>								
<b>Semi-Volatile Organics - MDEQ (continued)</b>								
Phenol	Not detected	ug/L	5	SW8270D	12/12/17 02:10	PL	108-95-2	
Pyrene	Not detected	ug/L	5	SW8270D	12/12/17 02:10	PL	129-00-0	
1,2,4-Trichlorobenzene	Not detected	ug/L	5	SW8270D	12/12/17 02:10	PL	120-82-1	
2,4,5-Trichlorophenol	Not detected	ug/L	5	SW8270D	12/12/17 02:10	PL	95-95-4	
2,4,6-Trichlorophenol	Not detected	ug/L	4	SW8270D	12/12/17 02:10	PL	88-06-2	
<b>Organics - Volatiles</b>								
<b>Volatile Organics - Arcadis</b>								
Acetone	Not detected	ug/L	50	SW5030C/8260C	12/11/17 15:49	JML	67-64-1	
2-Butanone (MEK)	Not detected	ug/L	25	SW5030C/8260C	12/11/17 15:49	JML	78-93-3	
Benzene	Not detected	ug/L	1	SW5030C/8260C	12/11/17 15:49	JML	71-43-2	
Bromodichloromethane	Not detected	ug/L	1	SW5030C/8260C	12/11/17 15:49	JML	75-27-4	
Bromoform	Not detected	ug/L	1	SW5030C/8260C	12/11/17 15:49	JML	75-25-2	
Bromomethane	Not detected	ug/L	5	SW5030C/8260C	12/11/17 15:49	JML	74-83-9	
Carbon disulfide	Not detected	ug/L	5	SW5030C/8260C	12/11/17 15:49	JML	75-15-0	
Carbon tetrachloride	Not detected	ug/L	1	SW5030C/8260C	12/11/17 15:49	JML	56-23-5	
Chlorobenzene	Not detected	ug/L	1	SW5030C/8260C	12/11/17 15:49	JML	108-90-7	
Chloroethane	Not detected	ug/L	5	SW5030C/8260C	12/11/17 15:49	JML	75-00-3	
Chloroform	Not detected	ug/L	1	SW5030C/8260C	12/11/17 15:49	JML	67-66-3	
Chloromethane	Not detected	ug/L	5	SW5030C/8260C	12/11/17 15:49	JML	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	ug/L	5	SW5030C/8260C	12/11/17 15:49	JML	96-12-8	
1,2-Dichlorobenzene	Not detected	ug/L	1	SW5030C/8260C	12/11/17 15:49	JML	95-50-1	
1,2-Dichloroethane	Not detected	ug/L	1	SW5030C/8260C	12/11/17 15:49	JML	107-06-2	
1,2-Dichloropropane	Not detected	ug/L	1	SW5030C/8260C	12/11/17 15:49	JML	78-87-5	
1,3-Dichlorobenzene	Not detected	ug/L	1	SW5030C/8260C	12/11/17 15:49	JML	541-73-1	
1,4-Dichlorobenzene	Not detected	ug/L	1	SW5030C/8260C	12/11/17 15:49	JML	106-46-7	
cis-1,2-Dichloroethene	Not detected	ug/L	1	SW5030C/8260C	12/11/17 15:49	JML	156-59-2	
Dibromochloromethane	Not detected	ug/L	5	SW5030C/8260C	12/11/17 15:49	JML	124-48-1	
Dichlorodifluoromethane	Not detected	ug/L	5	SW5030C/8260C	12/11/17 15:49	JML	75-71-8	
trans-1,2-Dichloroethene	Not detected	ug/L	1	SW5030C/8260C	12/11/17 15:49	JML	156-60-5	
Ethylbenzene	Not detected	ug/L	1	SW5030C/8260C	12/11/17 15:49	JML	100-41-4	
2-Hexanone	Not detected	ug/L	50	SW5030C/8260C	12/11/17 15:49	JML	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	ug/L	50	SW5030C/8260C	12/11/17 15:49	JML	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	ug/L	5	SW5030C/8260C	12/11/17 15:49	JML	1634-04-4	
Methylene chloride	Not detected	ug/L	5	SW5030C/8260C	12/11/17 15:49	JML	75-09-2	
Styrene	Not detected	ug/L	1	SW5030C/8260C	12/11/17 15:49	JML	100-42-5	
1,1,1-Trichloroethane	Not detected	ug/L	1	SW5030C/8260C	12/11/17 15:49	JML	71-55-6	
1,1,2-Trichloroethane	Not detected	ug/L	1	SW5030C/8260C	12/11/17 15:49	JML	79-00-5	
1,2,4-Trichlorobenzene	Not detected	ug/L	5	SW5030C/8260C	12/11/17 15:49	JML	120-82-1	
Tetrachloroethene	Not detected	ug/L	1	SW5030C/8260C	12/11/17 15:49	JML	127-18-4	
Toluene	Not detected	ug/L	1	SW5030C/8260C	12/11/17 15:49	JML	108-88-3	
Trichloroethene	Not detected	ug/L	1	SW5030C/8260C	12/11/17 15:49	JML	79-01-6	
Trichlorofluoromethane	Not detected	ug/L	1	SW5030C/8260C	12/11/17 15:49	JML	75-69-4	
Vinyl chloride	Not detected	ug/L	1	SW5030C/8260C	12/11/17 15:49	JML	75-01-4	
o-Xylene	Not detected	ug/L	1	SW5030C/8260C	12/11/17 15:49	JML	95-47-6	
p,m-Xylene*	Not detected	ug/L	2	SW5030C/8260C	12/11/17 15:49	JML		
Isopropylbenzene	Not detected	ug/L	1	SW5030C/8260C	12/11/17 15:49	JML	98-82-8	
Cyclohexane	Not detected	ug/L	1	SW5030C/8260C	12/11/17 15:49	JML	110-82-7	
1,1-Dichloroethane	Not detected	ug/L	1	SW5030C/8260C	12/11/17 15:49	JML	75-34-3	



# Analytical Laboratory Report

Lab Sample ID: S85938.03 (continued)

Sample Tag: INJ0117\_120117

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags
<b>Organics - Volatiles (continued)</b>								
<b>Volatile Organics - Arcadis (continued)</b>								
1,1-Dichloroethene	Not detected	ug/L	1	SW5030C/8260C	12/11/17 15:49	JML	75-35-4	
Methyl Acetate	Not detected	ug/L	10	SW5030C/8260C	12/11/17 15:49	JML	79-20-9	
Methyl cyclohexane	Not detected	ug/L	1	SW5030C/8260C	12/11/17 15:49	JML	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	ug/L	1	SW5030C/8260C	12/11/17 15:49	JML	76-13-1	
1,2-Dibromoethane	Not detected	ug/L	1	SW5030C/8260C	12/11/17 15:49	JML	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	ug/L	1	SW5030C/8260C	12/11/17 15:49	JML	79-34-5	
cis-1,3-Dichloropropene	Not detected	ug/L	1	SW5030C/8260C	12/11/17 15:49	JML	10061-01-5	
trans-1,3-Dichloropropene	Not detected	ug/L	1	SW5030C/8260C	12/11/17 15:49	JML	10061-02-6	



# Analytical Laboratory Report

Lab Sample ID: S85938.04

Sample Tag: Trip Blank

Collected Date/Time: 12/01/2017 00:01

Matrix: Water

COC Reference: 105354

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	40ml Glass	HCL	Yes	4.4	IR

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags
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**Extraction / Prep.**

pH check for VOCs*	<2	STD Units		N/A	12/12/17 11:00	JML		
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**Organics - Volatiles**

**Volatile Organics - Arcadis**

Acetone	Not detected	ug/L	50	SW5030C/8260C	12/11/17 13:36	JML	67-64-1	
2-Butanone (MEK)	Not detected	ug/L	25	SW5030C/8260C	12/11/17 13:36	JML	78-93-3	
Benzene	Not detected	ug/L	1	SW5030C/8260C	12/11/17 13:36	JML	71-43-2	
Bromodichloromethane	Not detected	ug/L	1	SW5030C/8260C	12/11/17 13:36	JML	75-27-4	
Bromoform	Not detected	ug/L	1	SW5030C/8260C	12/11/17 13:36	JML	75-25-2	
Bromomethane	Not detected	ug/L	5	SW5030C/8260C	12/11/17 13:36	JML	74-83-9	
Carbon disulfide	Not detected	ug/L	5	SW5030C/8260C	12/11/17 13:36	JML	75-15-0	
Carbon tetrachloride	Not detected	ug/L	1	SW5030C/8260C	12/11/17 13:36	JML	56-23-5	
Chlorobenzene	Not detected	ug/L	1	SW5030C/8260C	12/11/17 13:36	JML	108-90-7	
Chloroethane	Not detected	ug/L	5	SW5030C/8260C	12/11/17 13:36	JML	75-00-3	
Chloroform	Not detected	ug/L	1	SW5030C/8260C	12/11/17 13:36	JML	67-66-3	
Chloromethane	Not detected	ug/L	5	SW5030C/8260C	12/11/17 13:36	JML	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	ug/L	5	SW5030C/8260C	12/11/17 13:36	JML	96-12-8	
1,2-Dichlorobenzene	Not detected	ug/L	1	SW5030C/8260C	12/11/17 13:36	JML	95-50-1	
1,2-Dichloroethane	Not detected	ug/L	1	SW5030C/8260C	12/11/17 13:36	JML	107-06-2	
1,2-Dichloropropane	Not detected	ug/L	1	SW5030C/8260C	12/11/17 13:36	JML	78-87-5	
1,3-Dichlorobenzene	Not detected	ug/L	1	SW5030C/8260C	12/11/17 13:36	JML	541-73-1	
1,4-Dichlorobenzene	Not detected	ug/L	1	SW5030C/8260C	12/11/17 13:36	JML	106-46-7	
cis-1,2-Dichloroethene	Not detected	ug/L	1	SW5030C/8260C	12/11/17 13:36	JML	156-59-2	
Dibromochloromethane	Not detected	ug/L	5	SW5030C/8260C	12/11/17 13:36	JML	124-48-1	
Dichlorodifluoromethane	Not detected	ug/L	5	SW5030C/8260C	12/11/17 13:36	JML	75-71-8	
trans-1,2-Dichloroethene	Not detected	ug/L	1	SW5030C/8260C	12/11/17 13:36	JML	156-60-5	
Ethylbenzene	Not detected	ug/L	1	SW5030C/8260C	12/11/17 13:36	JML	100-41-4	
2-Hexanone	Not detected	ug/L	50	SW5030C/8260C	12/11/17 13:36	JML	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	ug/L	50	SW5030C/8260C	12/11/17 13:36	JML	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	ug/L	5	SW5030C/8260C	12/11/17 13:36	JML	1634-04-4	
Methylene chloride	Not detected	ug/L	5	SW5030C/8260C	12/11/17 13:36	JML	75-09-2	
Styrene	Not detected	ug/L	1	SW5030C/8260C	12/11/17 13:36	JML	100-42-5	
1,1,1-Trichloroethane	Not detected	ug/L	1	SW5030C/8260C	12/11/17 13:36	JML	71-55-6	
1,1,2-Trichloroethane	Not detected	ug/L	1	SW5030C/8260C	12/11/17 13:36	JML	79-00-5	
1,2,4-Trichlorobenzene	Not detected	ug/L	5	SW5030C/8260C	12/11/17 13:36	JML	120-82-1	
Tetrachloroethene	Not detected	ug/L	1	SW5030C/8260C	12/11/17 13:36	JML	127-18-4	
Toluene	Not detected	ug/L	1	SW5030C/8260C	12/11/17 13:36	JML	108-88-3	
Trichloroethene	Not detected	ug/L	1	SW5030C/8260C	12/11/17 13:36	JML	79-01-6	
Trichlorofluoromethane	Not detected	ug/L	1	SW5030C/8260C	12/11/17 13:36	JML	75-69-4	
Vinyl chloride	Not detected	ug/L	1	SW5030C/8260C	12/11/17 13:36	JML	75-01-4	
o-Xylene	Not detected	ug/L	1	SW5030C/8260C	12/11/17 13:36	JML	95-47-6	
p,m-Xylene*	Not detected	ug/L	2	SW5030C/8260C	12/11/17 13:36	JML		
Isopropylbenzene	Not detected	ug/L	1	SW5030C/8260C	12/11/17 13:36	JML	98-82-8	



# Analytical Laboratory Report

Lab Sample ID: S85938.04 (continued)

Sample Tag: Trip Blank

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags
<b>Organics - Volatiles (continued)</b>								
<b>Volatile Organics - Arcadis (continued)</b>								
Cyclohexane	Not detected	ug/L	1	SW5030C/8260C	12/11/17 13:36	JML	110-82-7	
1,1-Dichloroethane	Not detected	ug/L	1	SW5030C/8260C	12/11/17 13:36	JML	75-34-3	
1,1-Dichloroethene	Not detected	ug/L	1	SW5030C/8260C	12/11/17 13:36	JML	75-35-4	
Methyl Acetate	Not detected	ug/L	10	SW5030C/8260C	12/11/17 13:36	JML	79-20-9	
Methyl cyclohexane	Not detected	ug/L	1	SW5030C/8260C	12/11/17 13:36	JML	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	ug/L	1	SW5030C/8260C	12/11/17 13:36	JML	76-13-1	
1,2-Dibromoethane	Not detected	ug/L	1	SW5030C/8260C	12/11/17 13:36	JML	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	ug/L	1	SW5030C/8260C	12/11/17 13:36	JML	79-34-5	
cis-1,3-Dichloropropene	Not detected	ug/L	1	SW5030C/8260C	12/11/17 13:36	JML	10061-01-5	
trans-1,3-Dichloropropene	Not detected	ug/L	1	SW5030C/8260C	12/11/17 13:36	JML	10061-02-6	



Merit  
Laboratories, Inc.

2680 East Lansing Dr., East Lansing, MI 48823  
Phone (517) 332-0167 Fax (517) 332-4034  
www.meritlabs.com

C.O.C. PAGE # \_\_\_\_\_ OF \_\_\_\_\_

105354

REPORT TO

CHAIN OF CUSTODY RECORD

INVOICE TO

CONTACT NAME **MATTHEW R WILLIAMS**

COMPANY **ARCADIS**

ADDRESS **28550 CABOT DR #500**

CITY **NOVI** STATE **MI** ZIP CODE **48377**

PHONE NO. **248-994-2297** FAX NO. **-** P.O. NO. **-**

E-MAIL ADDRESS **MATTHEW.WILLIAMS@ARCADIS.COM** QUOTE NO. **-**

CONTACT NAME **CHRISTI KIKER**  SAME

COMPANY **ARCADIS**

ADDRESS **28550 CABOT DR #500**

CITY **NOVI** STATE **MI** ZIP CODE **48377**

PHONE NO. **248-994-2297** E-MAIL ADDRESS **CHRISTI.KIKER@ARCADIS.COM**

ANALYSIS (ATTACH LIST IF MORE SPACE IS REQUIRED)

PROJECT NO./NAME **B0064607.2017.00007/RACER-PNC** SAMPLER(S) - PLEASE PRINT/SIGN NAME **DKAMATH Rachel/RWISMAN Rachel**

TURNAROUND TIME REQUIRED  1 DAY  2 DAYS  3 DAYS  STANDARD  OTHER \_\_\_\_\_

DELIVERABLES REQUIRED  STD  LEVEL II  LEVEL III  LEVEL IV  EDD  OTHER \_\_\_\_\_

- Certifications
- OHIO VAP  Drinking Water
- DoD  NPDES
- Project Locations
- Detroit  New York
- Other \_\_\_\_\_
- Special Instructions

MATRIX CODE: GW=GROUNDWATER WW=WASTEWATER S=SOIL L=LIQUID SD=SOLID  
SL=SLUDGE DW=DRINKING WATER O=OIL WP=WIPE A=AIR W=WASTE

# Containers & Preservatives

MERIT LAB NO. FOR LAB USE ONLY	YEAR		SAMPLE TAG IDENTIFICATION-DESCRIPTION	MATRIX	# OF BOTTLES	# Containers & Preservatives							VOCs-	SVOCs-	METALS-	TSS/TDS-	
	DATE	TIME				NONE	HCl	HNO <sub>3</sub>	H <sub>2</sub> SO <sub>4</sub>	NaOH	MeOH	OTHER					
85938.01	12/1/17	11:45	MW0417_120117	W	7	3	3	1						3	2	1	1
.02	↓		MW0317_120117	W	7	3	3	1						3	2	1	1
.03	↓		INJ0117_120117	W	7	3	3	1						3	2	1	1
.04	12/1/17	-	TRIP BLANK	W	1	1								1			

RELINQUISHED BY: **RACHEL WISMAN** *Rachel Wisman*  Sampler DATE **12/1/17** TIME **19:00**

SIGNATURE/ORGANIZATION \_\_\_\_\_

RECEIVED BY: **NOVI FRIDGE** DATE **12/1/17** TIME **19:02**

SIGNATURE/ORGANIZATION \_\_\_\_\_

RELINQUISHED BY: **Christi Kiker** DATE **12/5/17** TIME **15:25**

SIGNATURE/ORGANIZATION \_\_\_\_\_

RECEIVED BY: **Christi Kiker** DATE **12/5/17** TIME **15:55**

SIGNATURE/ORGANIZATION \_\_\_\_\_

RELINQUISHED BY: **Christi Kiker** DATE **12/5/17** TIME **19:10**

SIGNATURE/ORGANIZATION \_\_\_\_\_

RECEIVED BY: **NOVI FRIDGE** DATE **12/5/17** TIME **19:10**

SIGNATURE/ORGANIZATION \_\_\_\_\_

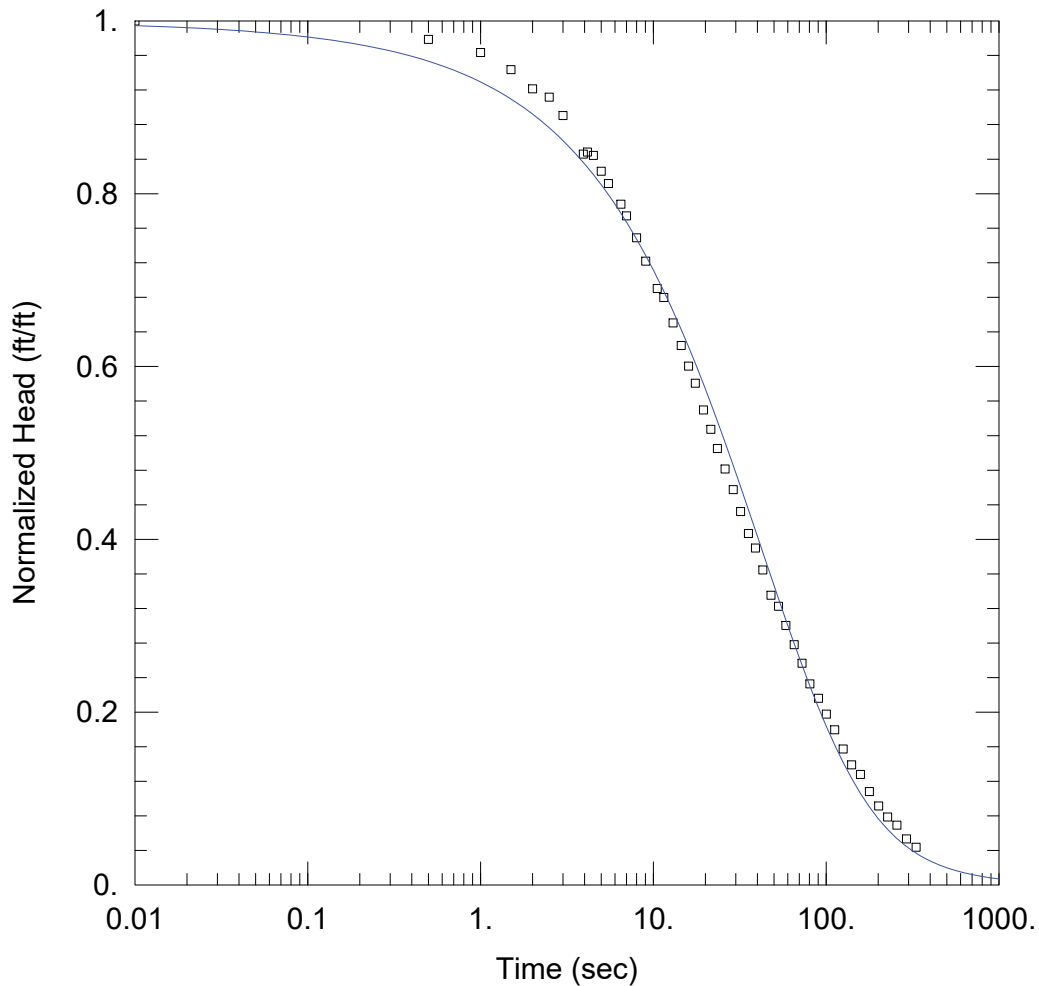
SEAL NO. \_\_\_\_\_ SEAL INTACT YES  NO  INITIALS **Christi Kiker** NOTES: \_\_\_\_\_ TEMP. ON ARRIVAL **4.7**

SEAL NO. \_\_\_\_\_ SEAL INTACT YES  NO  INITIALS **Christi Kiker** DATE **12/6/17** TIME **8:00**

PLEASE NOTE: SIGNING ACKNOWLEDGES ADHERENCE TO MERIT'S SAMPLE ACCEPTANCE POLICY ON REVERSE SIDE

# Attachment 4

## Slug Test Results



INJ-01-17

AQUIFER DATA

Saturated Thickness: 20. ft

WELL DATA (INJ-01-17)

Initial Displacement: 1.259 ft

Static Water Column Height: 24.49 ft

Total Well Penetration Depth: 21.99 ft

Screen Length: 17.5 ft

Casing Radius: 0.167 ft

Well Radius: 0.25 ft

SOLUTION

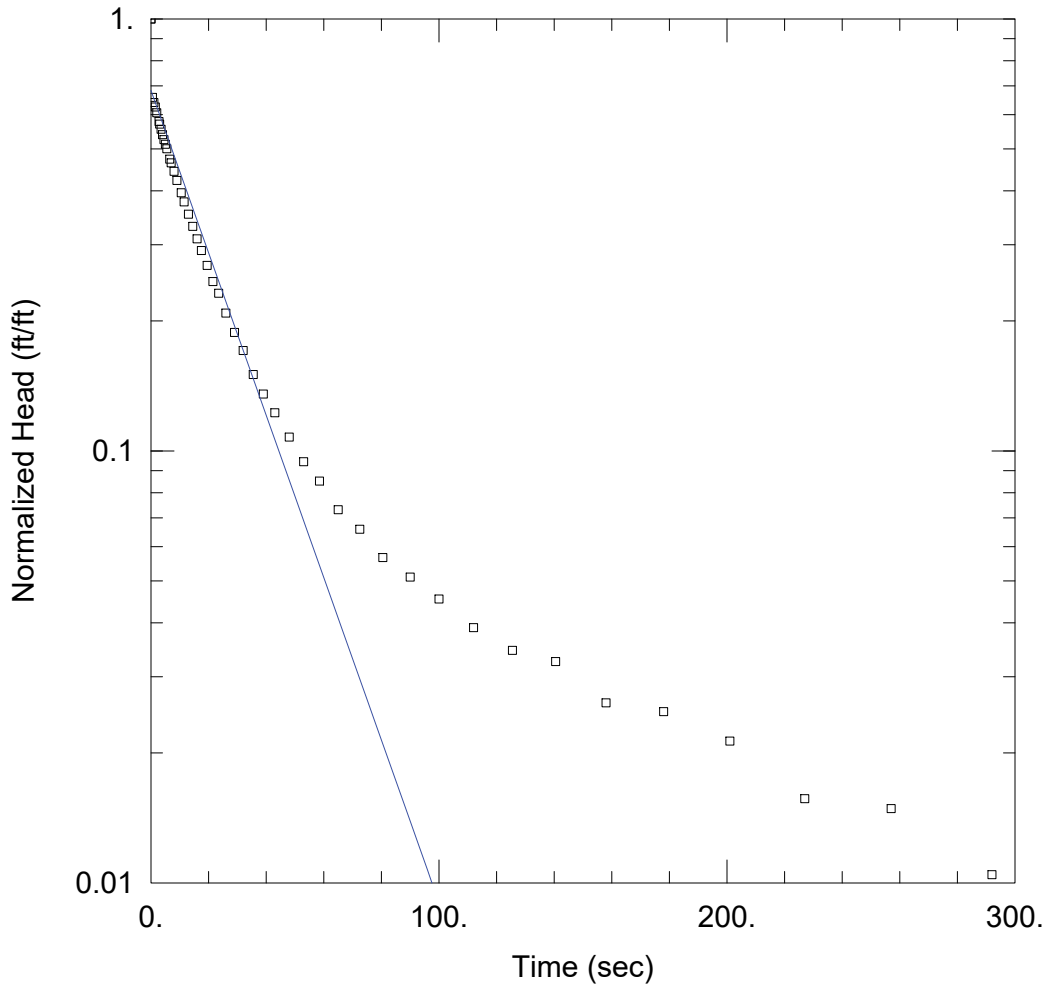
Aquifer Model: Unconfined

Solution Method: KGS Model

Kr = 0.0015 cm/sec

Ss = 0.0006573 ft<sup>-1</sup>

Kz/Kr = 1.



MW-03-17

AQUIFER DATA

Saturated Thickness: 4. ft

Anisotropy Ratio ( $K_z/K_r$ ): 1.

WELL DATA (MW-03-17)

Initial Displacement: 2.489 ft

Static Water Column Height: 12.23 ft

Total Well Penetration Depth: 12.23 ft

Screen Length: 4. ft

Casing Radius: 0.083 ft

Well Radius: 0.25 ft

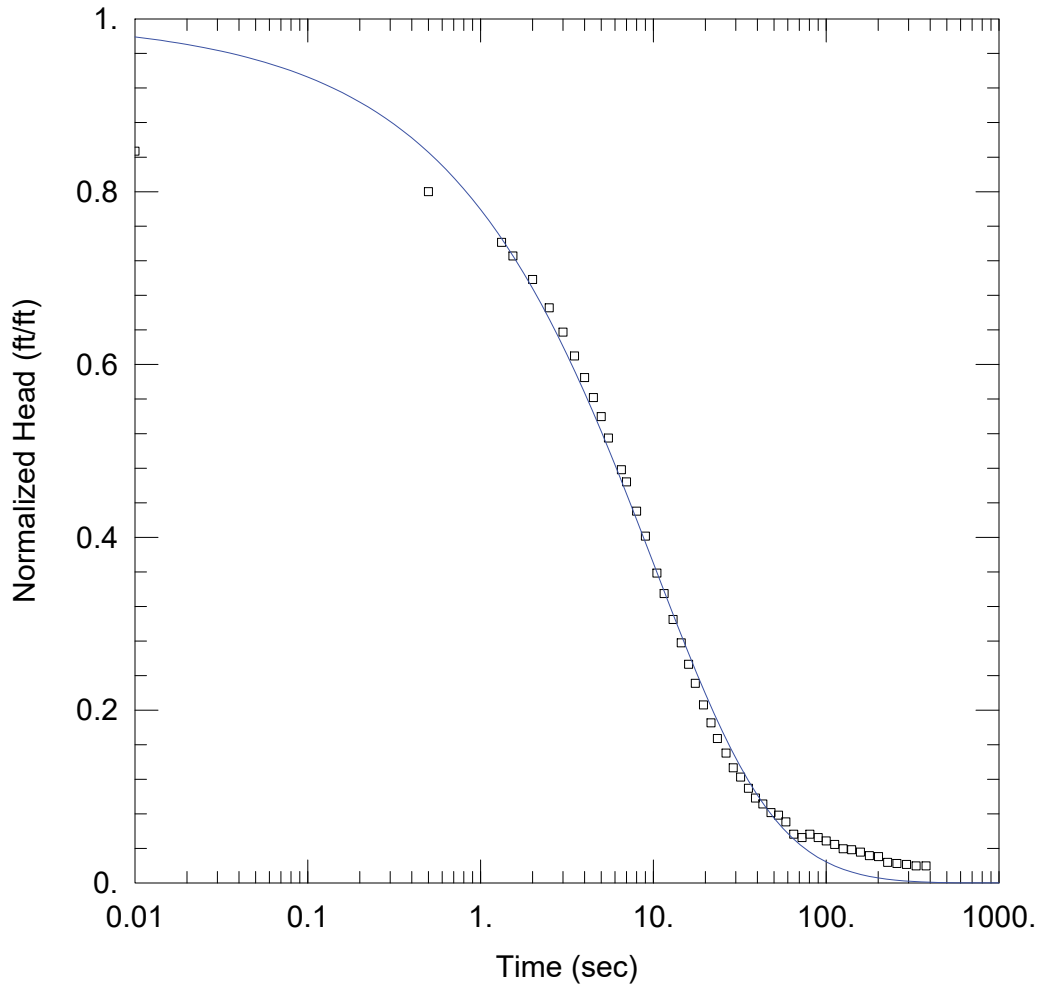
SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

$K = 0.003$  cm/sec

$y_0 = 1.7$  ft



MW-04-17

AQUIFER DATA

Saturated Thickness: 3. ft

WELL DATA (MW-04-17)

Initial Displacement: 1.771 ft

Static Water Column Height: 14.58 ft

Total Well Penetration Depth: 14.58 ft

Screen Length: 3. ft

Casing Radius: 0.083 ft

Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined

Solution Method: KGS Model

Kr = 0.0028 cm/sec

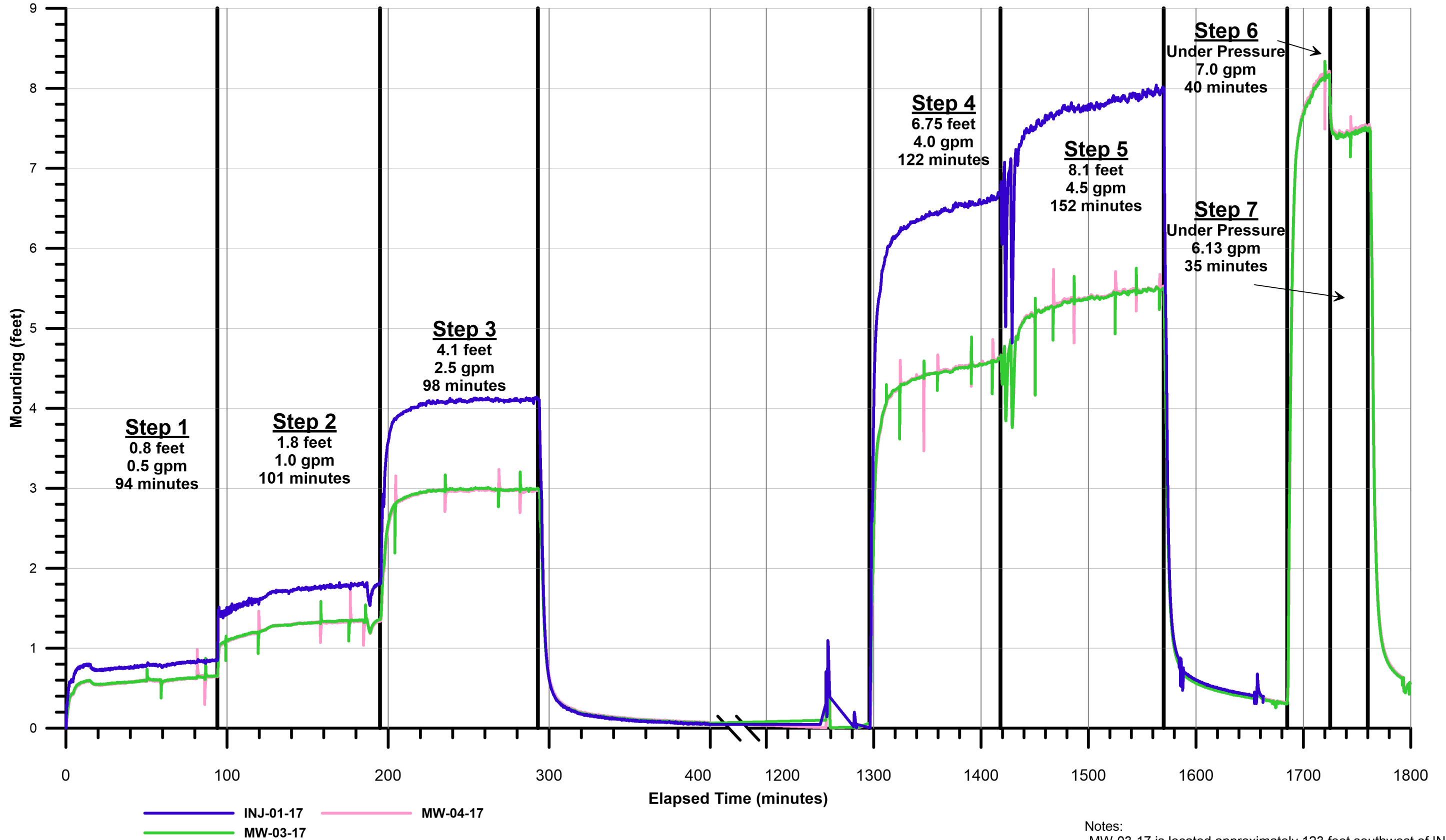
Ss = 0.0039 ft<sup>-1</sup>

Kz/Kr = 1.

# Attachment 5

## Injection Test Moulding Results

## INJ-01-17 Injection Test 12/5/17 - 12/6/17



Notes:  
 -MW-03-17 is located approximately 123 feet southwest of INJ-01-17.  
 -MW-04-17 is located approximately 95 feet south of INJ-01-17.