ARCADIS Design & Consultancy for natural and built assets

2017 ANNUAL GROUNDWATER MONITORING REPORT

Pontiac North Campus

February 2018

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Pontiac North Campus

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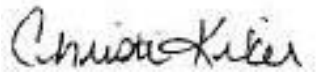

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CONTENTS

TABLES

FIGURES

APPENDICES

ACRONYMS AND ABBREVIATIONS

CMS	Site Corrective Measures Study
DCE	dichloroethene
DO	dissolved oxygen
EI	Environmental Indicator
FSP	Field Sampling Plan
GMC	General Motors Corporation
GM LLC	General Motors LLC
GMP	Groundwater Monitoring Program
GSI	Groundwater Surface Water Interface
LNAPL	light non-aqueous phase liquid
mg/L	milligrams per liter
MLC	Motors Liquidation Company
NRDWC	non-residential drinking water criteria
NRHBDW	non-residential health-based drinking water
NTU	nephelometric turbidity unit
ORP	oxidation reduction potential
PCB	polychlorinated biphenyl
PCE	tetrachloroethene
PNC	Pontiac North Campus
QAPP	Quality Assurance Project Plan
RACER	Revitalizing Auto Communities Environmental Response
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Field Investigation
RDWC	residential drinking water criteria
SSPL	site-specific parameter list
TCL	target compound list
USEPA	U.S. Environmental Protection Agency
µg/L	micrograms per liter
VOC	volatile organic compound

1 INTRODUCTION

On June 1, 2009, General Motors Corporation (GMC) filed for Chapter 11 protection under the U.S. bankruptcy code. On July 10, 2009 GMC was renamed Motors Liquidation Company (MLC) and on the same day some of the operating assets of GMC, including a portion of the Pontiac North Campus (PNC), were sold to a newly formed company named "General Motors Company". General Motors Company changed its name to General Motors LLC (GM LLC) on October 16, 2009. Assets not sold to GM LLC remained the property of MLC, in its capacity as debtor-in-possession in the bankruptcy case. Effective March 31, 2011, the Revitalizing Auto Communities Environmental Response Trust (RACER) was created through a Bankruptcy Settlement Agreement among MLC, the federal government, 14 states, and the St. Regis Mohawk Tribe. Ownership of MLC properties were transferred to RACER and RACER became responsible for completing remediation of those properties, including a portion of PNC (hereafter referred to as the Site) (Figure 1).

The Site Groundwater Monitoring Program (GMP; Appendix A) was presented as part of the Environmental Indicators (EI) CA 750 determination (ENVIRON 2002). Groundwater samples have been collected from select monitoring wells on either a semi-annual or annual basis since 2002 as part of the GMP to demonstrate that constituent concentrations in groundwater are stable and that migration of contaminated groundwater is not occurring. On October 30, 2009, MLC and GM LLC jointly submitted a request to the U.S. Environmental Protection Agency (USEPA) to modify the Site GMP. The USEPA responded on November 23, 2009 via email granting the request for modification to the plan (Appendix B).

A groundwater restriction ordinance prohibiting the use of groundwater wells was adopted by the City of Pontiac on August 16, 2013 for the RACER PNC Site and the area downgradient of the Site. Existing and planned deed restrictions do restrict, and will further restrict, use of onsite groundwater for any purpose. PNC property parcels sold by RACER include restrictions on groundwater use and prohibit the installation of groundwater wells.

Beginning with the annual event in 2009, the original sub-set of eight monitoring wells sampled are located on and immediately downgradient from RACER-owned property and are listed below and shown on Figures 2 and 3.

Shallow Saturated Zone	
MW-40-99	MWM16-21 (MWM16-30 added as replacement - 2017)
MWF1R	MWM16-43 (MWM16-37 added as replacement - 2016)
MWF7-01	MWW1-04
MWF12-01	MWW10-03

During the 2013 annual groundwater sampling event, it was discovered that monitoring well MWM16-43 was damaged and no longer suitable for sampling. Monitoring well MWM16-43 is located south of Columbia Ave near the former Plant 15. The well was assumed to have been damaged by activities performed by a demolition contractor and is now filled with gravel. Due to continuing construction activities by the current property owner, the monitoring well was not replaced. However, monitoring well MWM16-37

located just north and east of MWM16-43, was proposed as an alternative sampling location. The screens for both wells are set at the same depth and monitor the same groundwater unit.

During the 2017 well inventory event, monitoring well MWM16-21 could not be located. Monitoring well MWM16-21 is located north of Columbia Ave near the former Plant 25. The well appears to have been paved/concreted over during parking lot resurfacing completed by the current property owner. Monitoring well MWM16-45 located just north and east of MWM16-21, was proposed as an alternative sampling location, but it was discovered to be filled with dirt and no longer suitable for sampling in October 2017. The closest well to MWM16-21 with similar screen depths was MWM16-30 located southeast of MWM16-21. This well, in addition to eight other wells listed in the table below, have similar screened intervals and were added to the sampling list to better characterize groundwater quality in the Fiero area and to delineate previous vinyl chloride exceedances upgradient and adjacent to MWM16-37. The well construction logs for these additional wells are included in this report as Appendix C.

Additional Shallow Saturated Zone Wells	
MWF8-01	MWF12-02
MWM31-02	MWM32-01
MWM16-29	MWM16-02
MWM16-31	MWM16-36

To supplement sampling and analysis of groundwater from monitoring wells MWF8-01 and MWF12-02, additional sampling has also been completed in the southwestern portion of the Fiero Powerhouse property. This sampling has primarily been focused on the delineation of various VOCs, including 1,4-dioxane, adjacent to the Powerhouse facility and along the downgradient property boundary. Results of this additional sampling, including recent sampling conducted in October 2017 and January 2018, have, and will continue to be reported separately.

The following sections of this report summarize the procedures used to complete the groundwater sampling and the analytical results for the groundwater samples collected during this event.

2 GROUNDWATER SAMPLING PROCEDURES

2.1 Water Level Measurements

Groundwater and LNAPL level measurements were recorded from selected monitoring wells on October 26 through 27, 2016 in accordance with procedures outlined in the Field Sampling Plan (FSP) of the RCRA Facility Investigation (RFI) Work Plan (EEC 2001a) and Quality Assurance Project Plan (QAPP; EEC 2001b). Groundwater and LNAPL levels were measured to the nearest 0.01 foot with an oil/water interface probe. Groundwater elevations were calculated using surveyed top-of-well casing elevations. Equivalent groundwater elevations were calculated for wells where LNAPL was present. A summary of water levels and groundwater elevations is presented in Table 1.

2.2 Groundwater Sample Collection

Groundwater samples were collected using low-flow sampling procedures, as presented in the FSP and QAPP. The procedures presented in the FSP are taken from the Low-Stress (or Low-Flow) Purging and Sampling Procedure (USEPA 1996), which is the USEPA Region V standard method for collecting low-stress/low-flow groundwater samples from monitoring wells.

During sampling, purge water was monitored for dissolved oxygen (DO), temperature, specific conductivity, turbidity, oxygen reduction potential (ORP), and ph. These water quality measurements were used to determine groundwater sample stability prior to collection of the groundwater samples.

Groundwater samples were collected and submitted for laboratory analysis for target compound list (TCL) volatile organic compounds (VOCs) using USEPA Method 8260B, polychlorinated biphenyls (PCBs) using USEPA Method 8082A, and select site-specific parameter list (SSPL) metals using USEPA Method 6020B and 7470A. A total metals analysis was used for the wells to be analyzed for metals. Merit Laboratories, Inc. in Lansing, Michigan analyzed groundwater samples in accordance with methods described in the RFI Work Plan.

3 GROUNDWATER SAMPLING RESULTS

3.1 Groundwater Elevation

Groundwater elevations from unconfined water table zone monitoring wells (screened across the water table) were used to create a shallow groundwater potentiometric surface map (Figure 2). Apparent shallow groundwater flow across the Site and the adjacent GM LLC property is generally to the south and southwest; however, subsurface features (e.g., sewer lines, other man-made features, and re-worked native and fill material) may create localized effects (groundwater mounds or depressions), as shown on Figure 2. In general, since the Storm Sewer Bulkheading Event in 2012, the groundwater levels have increased up to 5 feet in the area downgradient of the former Plant 14 bulkhead locations. Groundwater elevation data will continue to be evaluated as part of the groundwater monitoring program to monitor potential changes in groundwater flow direction.

3.2 Analytical Results

The groundwater data were compared to select criteria from Michigan Department of Environmental Quality Operational Memorandum #1, Attachment #1, dated December 30, 2013 (MDEQ 2013). The select criteria used to evaluate groundwater quality at the Site include residential and non-residential drinking water criteria (RDWC and NRDWC), groundwater surface water interface criteria (GSI), and non-residential health-based drinking water values (NRHBDW). A summary of the October 2017 annual sampling groundwater analytical data is included in Table 2 and presented on Figure 3. A summary of groundwater analytical data from historical sampling events dating from 2001 through 2016 is included in Appendix D.

It should be noted that the criteria used for comparison include those designed to be protective of potential exposures via drinking water use and groundwater interfacing with surface water and are conservative for evaluating the groundwater data from the shallow and intermediate saturated zones at the Site. The criteria are being used to provide a point of reference for detected constituents. The Site and the immediate vicinity obtain potable water from the Great Lakes Water Authority (GLWA) and do not rely on local groundwater as a drinking water supply. In addition, a groundwater restriction ordinance prohibiting the use of groundwater wells was adopted by the City of Pontiac on August 16, 2013 for the Site and the area downgradient of the Site. Therefore, groundwater with constituent concentrations higher than these generic screening criteria does not indicate that the groundwater poses unacceptable risks given the existing or planned groundwater use restrictions.

The RFI Supplemental Report No. 1 (EEC 2003) concluded that residential drinking water use was not a current or reasonably expected future use of the shallow and intermediate groundwater at the Site or in the area given the current groundwater ordinance. However, groundwater at the Site does have the potential to migrate off site based on the interpreted southwesterly groundwater flow direction. Due to the potential for off-site migration, RDWC, NRDWC, and GSI are used for screening data near the downgradient property boundary.

The October 2017 groundwater data, presented in Table 2 and on Figure 3, have been compared to RDWC, NRDWC, and GSI as a frame of reference for the evaluation of groundwater quality near the

downgradient property boundary. The following is a summary of the October 2017 groundwater sample results:

VOCs

- The concentrations of vinyl chloride detected in monitoring wells MWM16-37 and MWM16-31 (4 and 3 micrograms per liter (µg/l), respectively) exceed the RDWC or NRDWC of 2 µg/L.
- The concentration of trichloroethene detected in monitoring well MWM16-30 (15 µg/l) exceeds the RDWC and NRDWC of 5 µg/l.

PCBs

- No PCB exceedances were detected in groundwater samples collected during the October 2017 sampling event. The turbidity of the PCB samples collected from monitoring wells MWW10-03, MWW1-04 and MW40-99 ranged from 0.87, 1.54 and 10.7 nephelometric turbidity units (NTUs), respectively.

Inorganics

- The concentrations of total manganese detected at monitoring wells MWF12-01 (17.8 milligrams per liter (mg/L)), MWF12-02 (0.808 mg/L), and MWW10-03 (0.067 mg/L) exceed the aesthetic RDWC and NRDWC of 0.05 mg/L. Manganese in MWF12-01 also exceeds the NRHBDW value of 2.5 mg/L. The turbidity of the samples from monitoring wells MWF12-01, MWF12-02, and MWW10-03 were 7.00, 1.37, and 0.87 NTUs, respectively.
- Monitoring well MWF12-01 was resampled and analyzed for manganese in January 2018 to confirm the October 2017 result. The concentration of total manganese detected in January at MWF12-01 (3.32 mg/L) was still above the aesthetic RDWC and NRDWC, as well the NRHBDW. The turbidity of the sample was 3.77 NTUs.
- The concentration of vanadium detected at monitoring well MWW1-04 was 0.045 mg/L, which is higher than the RDWC of 0.0045 mg/L but lower than the NRDWC of 0.062 mg/L.

pH

- Monitoring well MWW1-04 exhibited an elevated pH reading of 11.15. The pH readings from the remaining wells sampled in October 2017 were within the RDWC and NRDWC pH range of 6.5 to 8.5.

4 CONCLUSIONS

Overall, groundwater analytical results are similar to previous sampling results at the majority of locations. Select key constituents detected in numerous events were graphed to allow for evaluation of trends in concentration over time. These graphs are presented in Appendix E. The conclusions are as follows:

- The concentrations of 1,1-dichloroethene in monitoring wells MWF7-01 and MWF12-01 are lower than the NRDWC of 0.007 mg/L. The concentrations of 1,1-dichloroethene appear to be decreasing in both MWF7-01 and MWF12-01 (downgradient of MWF7-01). This indicates that 1,1-dichloroethene is naturally attenuating at the Site.
- Concentrations of both cis-1,2-dichloroethene (cis-1,2-DCE) and tetrachloroethene (PCE) have decreased since 2009 at monitoring well MWF7-01. Concentrations of both constituents are lower than the NRDWC of 0.07 mg/L for cis-1,2-DCE and 0.005 mg/L for PCE. This indicates that these compounds are natural attenuating at the Site.
- The concentration of manganese in monitoring well MWW10-03 appears to be stable. The concentration of manganese in MWF12-01 appeared to exhibit an increasing trend. While the concentration was below the health-based NRDWC of 2.5 mg/L in the 2016 sampling event, the concentration was above the criteria in 2017 and was the highest concentration since at least 2002. Manganese was re-sampled in MWF12-01 in January 2018 to further assess concentrations. The concentration of total manganese detected in January at MWF12-01 (3.32 mg/L) was still above the aesthetic RDWC and NRDWC, as well the NRHBDW. However, the concentration was comparable to results from 2012 to 2016. A re-evaluation of the trend graph with the January 2018 data included shows the concentration appears to have a slightly increasing trend.
- The concentrations of total PCBs in monitoring well MWW1-04 have fluctuated over time but show an overall downward trend. Concentrations have been below the NRDWC and RDWC of 0.5 mg/L since 2015.
- pH results in MWW1-04 have exceeded the RDWC and NRDWC pH range of 6.5 to 8.5 since 2007. However, the overall pH trend at this well is decreasing and becoming more neutral.
- The concentration of vanadium in monitoring well MWW1-04 has fluctuated over time but shows an overall decreasing trend. The concentrations of vanadium in MWW1-04 have remained lower than the NRDWC of 0.062 mg/L since 2011.
- The concentration of vinyl chloride in well MWM16-21 and MWM16-37 exceeded RDWC and NRDWC criteria of 0.002 mg/L for the first time in 2016. The concentration of vinyl chloride in MWM16-37 exceeded criteria again in 2017 but has decreased since last year (9 mg/L vs. 4 mg/L). As MWM16-21 is not accessible, MWM16-30 was used as a replacement and had no detection of vinyl chloride in 2017. Seven wells were sampled to delineate vinyl chloride in this area and the only other well to contain an exceedance of criteria was MWM16-31 (3 µg/L) which is just upgradient of MWM16-37. MWM16-37 and MWM16-31 will continue to be monitored to determine if an increasing trend is occurring in that area of the Site.

- Trichloroethene (TCE) was also detected at a concentration exceeding RDWC and NRDWC in monitoring well MWM16-30. This was the first detection of TCE in this well. This well will continue to be monitored to evaluate VOC concentration trends.

Generally, VOC concentration exceedances (vinyl chloride and TCE) have been identified at four well locations within the former Plant 15 and 25 property boundaries (MWM16-21, MWM16-30, MWM16-31 and MWM16-37). Vinyl chloride in this area appears to slowly migrate downgradient from the former Plant 25 property across Columbia Avenue and onto the former Plant 15 property to the south. However, there remain no detections of VOCs at three other well locations further downgradient on the former Plant 15 property (MWM16-43, MWM31-02 and MWM32-01.

Inorganic concentration exceedances, including manganese and vanadium, have been found in two well locations (MWF12-01 and MWF12-02) along the Fiero downgradient property boundary just south of the former coal storage area and in one well location (MWW1-04) along the southern property boundary just west of Saginaw Street and adjacent to Montcalm Street. However, concentrations are generally just above criteria. In addition, PCB concentrations at MWW1-04 exceeded criteria in 2013 and prior years but have been consistently below criteria in each annual sampling event since that time.

As stated previously, the Site and the immediate vicinity obtain potable water from the Great Lakes Water Authority (GLWA) and do not rely on local groundwater as a drinking water supply. In addition, a groundwater restriction ordinance prohibiting the use of groundwater wells was adopted by the City of Pontiac on August 16, 2013 for the Site and the area downgradient of the Site. Therefore, groundwater with constituent concentrations higher than the generic screening criteria does not indicate that the groundwater poses unacceptable risks given the existing or planned groundwater use restrictions.

These results continue to support USEPA's 2004 CA750 determination that migration of contaminated groundwater is under control for the Pontiac North Facility and the 2017 CA750 determination that migration of contaminated groundwater is under control for the former Pontiac Fiero Assembly Facility. Currently, there are no recommendations for further action related to these results other than to continue with the planned groundwater deed restriction and complete monitoring next year, except if modified by approval from USEPA.

Upon approval of the Corrective Measures Study, the groundwater monitoring program will be finalized, and any needed additional deed restrictions will be reviewed with USEPA and recorded. The revised groundwater monitoring program will include monitoring points, parameters, duration, and monitoring objectives to maintain groundwater compliance supporting achievement of site closure.

5 REFERENCES

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Michigan Department of Environmental Quality. 2013. Operational Memorandum #1, Attachment #1, Cleanup Criteria Requirements for Response Activity. December 30.

U.S. Environmental Protection Agency (USEPA; Region I). 1996. Low-Stress (or Low-Flow) Purging and Sampling Procedure for the Collection of Ground Water Samples from Monitoring Wells – Revision 2. July 30, 1996.

TABLES

Table 1
Groundwater Elevation Summary, October 2017
2017 Annual Groundwater Monitoring Report
RACER Trust Pontiac North Campus

ARCADIS Design & Consultancy for natural and built assets

Well ID	Well Elevation [1]	Depth to Water (ft)	Depth to LNAPL (ft)	Groundwater Elevation	LNAPL Thickness (ft)	Equivalent Groundwater Elevation [2]
SITEWIDE						
MWF1R	971.74	25.82	--	945.92	--	--
OFFSITE						
MWOS-01	943.79	7.65	--	936.14	--	--
MWOS-02	943.46	7.27	--	936.19	--	--
MWOS-03	944.35	7.71	--	936.64	--	--
MWOS-04	942.52	4.24	--	938.28	--	--
MWOS-06	944.01	1.72	--	942.29	--	--
FIERO						
F-7						
MWF7-01	970.30	20.62	--	949.68	--	--
F-8						
MWF8-01	972.94	19.35	--	953.59	--	--
F-12						
MWF12-01	965.39	18.05	--	947.34	--	--
MWF12-02	966.81	18.94	--	947.87	--	--
F-16						
MWF16-10	973.57	20.55	--	953.02	--	--
MWF16-11	973.36	20.75	--	952.61	--	--
MWF16-05	973.95	21.27	--	952.68	--	--
MWF16-17	973.32	20.82		952.50	--	--
MWF16-16	973.22	23.31	--	949.91	--	--
MWF16-23	973.39	24.77	--	948.62	--	--
PONTIAC SCHOOL BOARD PROPERTY						
MWPS-02	942.30	4.60	--	937.70	--	--
DEMOLITION AREA						
W-1						
MWW01-SEN03	981.67	39.11	--	942.56	--	--
MWW01-SEN04	971.12	27.80	--	943.32	--	--
MWW1-04	944.20	8.70	--	NA [4]	--	--
MWW1-06	943.63	5.40	--	938.23	--	--
MW-40-99	952.32	9.73	--	942.59	--	--
TW-01-01	972.95	29.52	26.41	943.43	3.11	946.17
TW-01-02	973.38	21.28	--	952.10	--	--
TW-01-03	969.06	16.06	--	953.00	--	--
W-5						
MWW5-01	970.57	16.43	--	954.14	--	--
W-8						
TW-03-01	970.48	21.84	21.81	948.64	0.03	948.67
MWW8-34	966.55	15.44	15.39	951.11	0.05	951.15
MWW8-45	968.40	18.15	--	950.25	--	--
MWW8-48	971.08	25.04	19.85	946.04	5.19	950.61
MWW8-65	969.62	34.57	25.11	935.05	9.46	943.38
RWW8-119	969.36	18.91	--	950.45	--	--
RWW8-124	967.77	17.37	--	950.40	--	--
RWW8-125	967.64	17.31	--	950.33	--	--
RWW8-129	966.71	17.26	16.31	949.45	0.95	950.29
RWW8-130	966.44	16.19	--	950.25	--	--
RWW8-131	966.01	15.73	--	950.28	--	--
RWW8-132	965.47	15.32	--	950.15	--	--
RWW8-133	966.34	17.12	16.10	949.22	1.02	950.12
TW-11-01	969.28	10.18	4.98	959.10	5.20	963.68
TW-11-02	970.38	8.55	6.05	961.83	2.50	964.03
TW-09-01	970.01	17.54	17.52	952.47	0.02	952.49
TW-10-01	971.91	20.88	--	951.03	--	--
TW-10-02	971.83	18.53	--	953.30	--	--
TWW8-01	969.37	31.09	24.15	938.28	6.94	944.39

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ARCADIS Design & Consultancy for natural and built assets

Well ID	Well Elevation [1]	Depth to Water (ft)	Depth to LNAPL (ft)	Groundwater Elevation	LNAPL Thickness (ft)	Equivalent Groundwater Elevation [2]
W-10						
MWW10-03	958.20	10.60	--	947.60	--	--
MWW10-SEN01	967.31	19.34	--	947.97	--	--
MWW10-SEN02	967.68	26.24	--	941.44	--	--
MFD						
M-2						
MWM2-22	967.56	17.94	--	NA[4]	--	--
MWM2-28	967.70	17.60	--	NA[4]	--	--
TWM2-04	967.64	48.56	--	NA[4]	--	--
M-4						
MWM4-05	985.70	8.36	--	977.34	--	--
MWM4-06R	961.10	7.85	--	953.25	--	--
M-5						
MWM5-02	977.07	19.92	--	957.15	--	--
MWM5-03	978.78	21.71	--	957.07	--	--
M-16						
MWM16-02	979.83	23.10	--	956.73	--	--
MWM16-15	985.14	Well under concrete pile (10/23/17)				
MWM16-29	985.32	27.11	--	958.21	--	--
MWM16-30	985.37	27.91	--	957.46	--	--
MWM16-31	981.08	23.81	--	957.27	--	--
MWM16-36	981.33	24.35	--	956.98	--	--
MWM16-37	980.37	23.49	--	956.88	--	--
MWM16-45	984.62	Well filled with dirt (10/23/17)				
M-31/M-32						
MWM31-02	983.64	27.45	--	956.19	--	--
MWM32-01	983.64	27.87	--	955.77	--	--

CNL = could not locate
ft = feet
LNAPL = light non-aqueous phase liquid
NA = not applicable
NM = not measured

Footnotes:

1 - Top of Casing Elevation is in feet National Vertical Geodetic Datum (1988)

2 - The equivalent groundwater (GW) elevation is calculated where LNAPL is present using the LNAPL surface elevation, the thickness of LNAPL and the approximate specific density of the LNAPL (0.8). The calculation is a follows:

Equivalent GW elevation = LNAPL surface elevation - ((1-specific density of the LNAPL) x LNAPL thickness)

3 - Well is on GM or other Non-Racer Property and was not gauged.

4 - Well converted to stick-up in July 2017. Well requires re-surveying.

5 - Water levels collected on October 23 - 27, 2017.

Table 2
Summary of Groundwater Analytical Results
2017 Annual Groundwater Monitoring Report
RACER trust Pontiac North Campus

Location ID: Date Collected: Sample Name:	Units	Groundwater Surface Water Interface Shaded	Res Drinking Water Yellow HL	Non-Res Drinking Water Orange HL	Non-Res Health Based Drinking Water Value Bold	MW-40-99 10/26/17 MW-40-99_GW-102617	MWF1R 10/23/17 MWF1R_GW-102317	MWF7-01 10/24/17 MWF7-01_GW-102417	MWF8-01 10/26/17 MWF8-01_GW-102617
Field Parameters									
pH	pH units	- -	- -	- -	- -	7.15	7.08	7.17	7.08
Turbidity	NTU	- -	- -	- -	- -	10.7	3.67	0.63	1.41
PCBs									
Aroclor-1016	ug/L	0.2	0.5	0.5	- -	0.1 U	NA	NA	NA
Aroclor-1221	ug/L	0.2	0.5	0.5	- -	0.1 U	NA	NA	NA
Aroclor-1232	ug/L	0.2	0.5	0.5	- -	0.1 U	NA	NA	NA
Aroclor-1242	ug/L	0.2	0.5	0.5	- -	0.1 U	NA	NA	NA
Aroclor-1248	ug/L	0.2	0.5	0.5	- -	0.1 U	NA	NA	NA
Aroclor-1254	ug/L	0.2	0.5	0.5	- -	0.1 U	NA	NA	NA
Aroclor-1260	ug/L	0.2	0.5	0.5	- -	0.1 U	NA	NA	NA
Total PCBs	ug/L	0.2	0.5	0.5	- -	0.1 U	NA	NA	NA
Volatile Organics									
1,1,1-Trichloroethane	ug/L	89	200	200	- -	1 U	1 U	18	1 U
1,1,2,2-Tetrachloroethane	ug/L	78	8.5	35	- -	1 U	1 U	1 U	1 U
1,1,2-trichloro-1,2,2-trifluoroethane	ug/L	32	170,000	170,000	- -	1 U	1 U	1 U	1 U
1,1,2-Trichloroethane	ug/L	330	5	5	- -	1 U	1 U	1 U	1 U
1,1-Dichloroethane	ug/L	740	880	2,500	- -	1 U	1 U	3	1 U
1,1-Dichloroethene	ug/L	130	7	7	- -	1 U	1 U	1	1 U
1,2,4-Trichlorobenzene	ug/L	99	70	70	- -	5 U	5 U	5 U	5 U
1,2-Dibromo-3-chloropropane	ug/L	- -	0.2	0.2	- -	5 U	5 U	5 U	5 U
1,2-Dibromoethane	ug/L	5.7	0.05	0.05	- -	1 U	1 U	1 U	1 U
1,2-Dichlorobenzene	ug/L	13	600	600	- -	1 U	1 U	1 U	1 U
1,2-Dichloroethane	ug/L	360	5	5	- -	1 U	1 U	1 U	1 U
1,2-Dichloropropane	ug/L	230	5	5	- -	1 U	1 U	1 U	1 U
1,3-Dichlorobenzene	ug/L	28	6.6	19	- -	1 U	1 U	1 U	1 U
1,4-Dichlorobenzene	ug/L	17	75	75	- -	1 U	1 U	1 U	1 U
2-Butanone	ug/L	2,200	13,000	38,000	- -	25 U	25 U	25 U	25 U
4-Methyl-2-pentanone	ug/L	- -	1,800	5,200	- -	50 U	50 U	50 U	50 U
Acetone	ug/L	1,700	730	2,100	- -	50 U	50 U	50 U	50 U
Benzene	ug/L	200	5	5	- -	1 U	1 U	1 U	1 U
Bromodichloromethane	ug/L	- -	80	80	- -	1 U	1 U	1 U	1 U
Bromoform	ug/L	- -	80	80	- -	1 U	1 U	1 U	1 U
Bromomethane	ug/L	35	10	29	- -	5 U	5 U	5 U	5 U
Carbon Disulfide	ug/L	- -	800	2,300	- -	5 U	5 U	5 U	5 U
Carbon Tetrachloride	ug/L	45	5	5	- -	1 U	1 U	1 U	1 U
CFC-11	ug/L	- -	2,600	7,300	- -	1 U	1 U	1 U	1 U

Table 2
Summary of Groundwater Analytical Results
2017 Annual Groundwater Monitoring Report
RACER trust Pontiac North Campus

Location ID: Date Collected: Sample Name:	Units	Groundwater Surface Water Interface Shaded	Res Drinking Water Yellow HL	Non-Res Drinking Water Orange HL	Non-Res Health Based Drinking Water Value Bold	MW-40-99 10/26/17 MW-40-99_GW-102617	MWF1R 10/23/17 MWF1R_GW-102317	MWF7-01 10/24/17 MWF7-01_GW-102417	MWF8-01 10/26/17 MWF8-01_GW-102617
CFC-12	ug/L	- -	1,700	4,800	- -	5 U	5 U	5 U	5 U
Chlorobenzene	ug/L	25	100	100	- -	1 U	1 U	1 U	1 U
Chlorodibromomethane	ug/L	- -	80	80	- -	5 U	5 U	5 U	5 U
Chloroethane	ug/L	1,100	430	1,700	- -	5 U	5 U	5 U	5 U
Chloroform	ug/L	350	80	80	- -	1 U	1 U	1 U	1
Chloromethane	ug/L	- -	260	1,100	- -	5 U	5 U	5 U	5 U
cis-1,2-Dichloroethene	ug/L	620	70	70	- -	1 U	1 U	1 U	1 U
cis-1,3-Dichloropropene	ug/L	- -	- -	- -	- -	1 U	1 U	1 U	1 U
Cyclohexane	ug/L	- -	- -	- -	- -	1 U	1 U	1 U	1 U
Ethylbenzene	ug/L	18	74	74	**700**	1 U	1 U	1 U	1 U
Isopropylbenzene	ug/L	28	800	2,300	- -	1 U	1 U	1 U	1 U
m&p-Xylene	ug/L	- -	- -	- -	- -	2 U	2 U	2 U	2 U
Methyl acetate	ug/L	- -	- -	- -	- -	10 U	10 U	10 U	10 U
Methylene chloride	ug/L	1,500	5	5	- -	5 U	5 U	5 U	5 U
Methyl N-Butyl Ketone	ug/L	- -	1,000	2,900	- -	50 U	50 U	50 U	50 U
Methyl tert-butyl ether	ug/L	7,100	40	40	**690**	5 U	5 U	5 U	5 U
Methylcyclohexane	ug/L	- -	- -	- -	- -	1 U	1 U	1 U	1 U
o-Xylene	ug/L	- -	- -	- -	- -	1 U	1 U	1 U	1 U
Styrene	ug/L	80	100	100	- -	1 U	1 U	1 U	1 U
Tetrachloroethene	ug/L	60	5	5	- -	1 U	1 U	1	1 U
Toluene	ug/L	270	790	790	**1,000**	1 U	1 U	1 U	1 U
trans-1,2-Dichloroethene	ug/L	1,500	100	100	- -	1 U	1 U	1 U	1 U
trans-1,3-Dichloropropene	ug/L	- -	- -	- -	- -	1 U	1 U	1 U	1 U
Trichloroethene	ug/L	200	5	5	- -	1 U	1 U	1 U	1 U
Vinyl Chloride	ug/L	13	2	2	- -	1 U	1 U	1 U	1 U
Inorganics									
Antimony	mg/L	0.13	0.006	0.006	- -	NA	NA	NA	NA
Lead	mg/L	0.014	0.004	0.004	- -	NA	NA	NA	NA
Manganese	mg/L	1.3	0.05	0.05	**2.5**	NA	NA	NA	NA
Vanadium	mg/L	0.027	0.0045	0.062	- -	NA	NA	NA	NA

Table 2
Summary of Groundwater Analytical Results
2017 Annual Groundwater Monitoring Report
RACER trust Pontiac North Campus

Location ID: Date Collected: Sample Name:	Units	Groundwater Surface Water Interface Shaded	Res Drinking Water Yellow HL	Non-Res Drinking Water Orange HL	Non-Res Health Based Drinking Water Value Bold	MWF12-01 10/24/17 MWF12-01_GW-102417	MWF12-01 01/17/18 MWF12-01_GW-011718	MWF12-02 10/24/17 MWF12-02_GW-102417	MWM16-02 10/23/17 MWM16-02_GW-102317
Field Parameters									
pH	pH units	- -	- -	- -	- -	7.04	6.79	7.19	7.07
Turbidity	NTU	- -	- -	- -	- -	7.0	3.77	1.37	15.2
PCBs									
Aroclor-1016	ug/L	0.2	0.5	0.5	- -	NA	NA	NA	NA
Aroclor-1221	ug/L	0.2	0.5	0.5	- -	NA	NA	NA	NA
Aroclor-1232	ug/L	0.2	0.5	0.5	- -	NA	NA	NA	NA
Aroclor-1242	ug/L	0.2	0.5	0.5	- -	NA	NA	NA	NA
Aroclor-1248	ug/L	0.2	0.5	0.5	- -	NA	NA	NA	NA
Aroclor-1254	ug/L	0.2	0.5	0.5	- -	NA	NA	NA	NA
Aroclor-1260	ug/L	0.2	0.5	0.5	- -	NA	NA	NA	NA
Total PCBs	ug/L	0.2	0.5	0.5	- -	NA	NA	NA	NA
Volatile Organics									
1,1,1-Trichloroethane	ug/L	89	200	200	- -	8 [10]	NA	1	1 U
1,1,2,2-Tetrachloroethane	ug/L	78	8.5	35	- -	1 U [1 U]	NA	1 U	1 U
1,1,2-trichloro-1,2,2-trifluoroethane	ug/L	32	170,000	170,000	- -	1 U [1 U]	NA	1 U	1 U
1,1,2-Trichloroethane	ug/L	330	5	5	- -	1 U [1 U]	NA	1 U	1 U
1,1-Dichloroethane	ug/L	740	880	2,500	- -	2 [2]	NA	2	1 U
1,1-Dichloroethene	ug/L	130	7	7	- -	1 U [1 U]	NA	1 U	1 U
1,2,4-Trichlorobenzene	ug/L	99	70	70	- -	5 U [5 U]	NA	5 U	5 U
1,2-Dibromo-3-chloropropane	ug/L	- -	0.2	0.2	- -	5 U [5 U]	NA	5 U	5 U
1,2-Dibromoethane	ug/L	5.7	0.05	0.05	- -	1 U [1 U]	NA	1 U	1 U
1,2-Dichlorobenzene	ug/L	13	600	600	- -	1 U [1 U]	NA	1 U	1 U
1,2-Dichloroethane	ug/L	360	5	5	- -	1 U [1 U]	NA	1 U	1 U
1,2-Dichloropropane	ug/L	230	5	5	- -	1 U [1 U]	NA	1 U	1 U
1,3-Dichlorobenzene	ug/L	28	6.6	19	- -	1 U [1 U]	NA	1 U	1 U
1,4-Dichlorobenzene	ug/L	17	75	75	- -	1 U [1 U]	NA	1 U	1 U
2-Butanone	ug/L	2,200	13,000	38,000	- -	25 U [25 U]	NA	25 U	25 U
4-Methyl-2-pentanone	ug/L	- -	1,800	5,200	- -	50 U [50 U]	NA	50 U	50 U
Acetone	ug/L	1,700	730	2,100	- -	50 U [50 U]	NA	50 U	50 U
Benzene	ug/L	200	5	5	- -	1 U [1 U]	NA	1 U	1 U
Bromodichloromethane	ug/L	- -	80	80	- -	1 U [1 U]	NA	1 U	1 U
Bromoform	ug/L	- -	80	80	- -	1 U [1 U]	NA	1 U	1 U
Bromomethane	ug/L	35	10	29	- -	5 U [5 U]	NA	5 U	5 U
Carbon Disulfide	ug/L	- -	800	2,300	- -	5 U [5 U]	NA	5 U	5 U
Carbon Tetrachloride	ug/L	45	5	5	- -	1 U [1 U]	NA	1 U	1 U
CFC-11	ug/L	- -	2,600	7,300	- -	1 U [1 U]	NA	1 U	1 U

Table 2
Summary of Groundwater Analytical Results
2017 Annual Groundwater Monitoring Report
RACER trust Pontiac North Campus

Location ID: Date Collected: Sample Name:	Units	Groundwater Surface Water Interface Shaded	Res Drinking Water Yellow HL	Non-Res Drinking Water Orange HL	Non-Res Health Based Drinking Water Value Bold	MWF12-01 10/24/17 MWF12-01_GW-102417	MWF12-01 01/17/18 MWF12-01_GW-011718	MWF12-02 10/24/17 MWF12-02_GW-102417	MWM16-02 10/23/17 MWM16-02_GW-102317
CFC-12	ug/L	- -	1,700	4,800	- -	5 U [5 U]	NA	5 U	5 U
Chlorobenzene	ug/L	25	100	100	- -	1 U [1 U]	NA	1 U	1 U
Chlorodibromomethane	ug/L	- -	80	80	- -	5 U [5 U]	NA	5 U	5 U
Chloroethane	ug/L	1,100	430	1,700	- -	5 U [5 U]	NA	5 U	5 U
Chloroform	ug/L	350	80	80	- -	1 U [1 U]	NA	1 U	1 U
Chloromethane	ug/L	- -	260	1,100	- -	5 U [5 U]	NA	5 U	5 U
cis-1,2-Dichloroethene	ug/L	620	70	70	- -	1 U [1 U]	NA	1 U	1 U
cis-1,3-Dichloropropene	ug/L	- -	- -	- -	- -	1 U [1 U]	NA	1 U	1 U
Cyclohexane	ug/L	- -	- -	- -	- -	1 U [1 U]	NA	1 U	1 U
Ethylbenzene	ug/L	18	74	74	**700**	1 U [1 U]	NA	1 U	1 U
Isopropylbenzene	ug/L	28	800	2,300	- -	1 U [1 U]	NA	1 U	1 U
m&p-Xylene	ug/L	- -	- -	- -	- -	2 U [2 U]	NA	2 U	2 U
Methyl acetate	ug/L	- -	- -	- -	- -	10 U [10 U]	NA	10 U	10 U
Methylene chloride	ug/L	1,500	5	5	- -	5 U [5 U]	NA	5 U	5 U
Methyl N-Butyl Ketone	ug/L	- -	1,000	2,900	- -	50 U [50 U]	NA	50 U	50 U
Methyl tert-butyl ether	ug/L	7,100	40	40	**690**	5 U [5 U]	NA	5 U	5 U
Methylcyclohexane	ug/L	- -	- -	- -	- -	1 U [1 U]	NA	1 U	1 U
o-Xylene	ug/L	- -	- -	- -	- -	1 U [1 U]	NA	1 U	1 U
Styrene	ug/L	80	100	100	- -	1 U [1 U]	NA	1 U	1 U
Tetrachloroethene	ug/L	60	5	5	- -	1 U [1 U]	NA	1 U	1 U
Toluene	ug/L	270	790	790	**1,000**	1 U [1 U]	NA	1 U	1 U
trans-1,2-Dichloroethene	ug/L	1,500	100	100	- -	1 U [1 U]	NA	1 U	1 U
trans-1,3-Dichloropropene	ug/L	- -	- -	- -	- -	1 U [1 U]	NA	1 U	1 U
Trichloroethene	ug/L	200	5	5	- -	1 U [1 U]	NA	1 U	1 U
Vinyl Chloride	ug/L	13	2	2	- -	1 U [1 U]	NA	1 U	1 U
Inorganics									
Antimony	mg/L	0.13	0.006	0.006	- -	NA	NA	NA	NA
Lead	mg/L	0.014	0.004	0.004	- -	NA	NA	NA	NA
Manganese	mg/L	1.3	0.05	0.05	**2.5**	**17.8**	**3.32 [3.12]**	0.808	NA
Vanadium	mg/L	0.027	0.0045	0.062	- -	NA	NA	NA	NA

Table 2
Summary of Groundwater Analytical Results
2017 Annual Groundwater Monitoring Report
RACER trust Pontiac North Campus

Location ID: Date Collected: Sample Name:	Units	Groundwater Surface Water Interface Shaded	Res Drinking Water Yellow HL	Non-Res Drinking Water Orange HL	Non-Res Health Based Drinking Water Value Bold	MWM16-29 10/25/17 MWM16-29_GW-102517	MWM16-30 10/23/17 MWM16-30_GW-102317	MWM16-31 10/23/17 MWM16-31_GW-102317	MWM16-36 10/23/17 MWM16-36_GW-102317
Field Parameters									
pH	pH units	- -	- -	- -	- -	7.46	6.44	7.01	8.31
Turbidity	NTU	- -	- -	- -	- -	1.28	1.49	1.99	5.68
PCBs									
Aroclor-1016	ug/L	0.2	0.5	0.5	- -	NA	NA	NA	NA
Aroclor-1221	ug/L	0.2	0.5	0.5	- -	NA	NA	NA	NA
Aroclor-1232	ug/L	0.2	0.5	0.5	- -	NA	NA	NA	NA
Aroclor-1242	ug/L	0.2	0.5	0.5	- -	NA	NA	NA	NA
Aroclor-1248	ug/L	0.2	0.5	0.5	- -	NA	NA	NA	NA
Aroclor-1254	ug/L	0.2	0.5	0.5	- -	NA	NA	NA	NA
Aroclor-1260	ug/L	0.2	0.5	0.5	- -	NA	NA	NA	NA
Total PCBs	ug/L	0.2	0.5	0.5	- -	NA	NA	NA	NA
Volatile Organics									
1,1,1-Trichloroethane	ug/L	89	200	200	- -	1 U	10	1 U	1 U
1,1,2,2-Tetrachloroethane	ug/L	78	8.5	35	- -	1 U	1 U	1 U	1 U
1,1,2-trichloro-1,2,2-trifluoroethane	ug/L	32	170,000	170,000	- -	1 U	1 U	1 U	1 U
1,1,2-Trichloroethane	ug/L	330	5	5	- -	1 U	1 U	1 U	1 U
1,1-Dichloroethane	ug/L	740	880	2,500	- -	1 U	1 U	1 U	1 U
1,1-Dichloroethene	ug/L	130	7	7	- -	1 U	1 U	1 U	1 U
1,2,4-Trichlorobenzene	ug/L	99	70	70	- -	5 U	5 U	5 U	5 U
1,2-Dibromo-3-chloropropane	ug/L	- -	0.2	0.2	- -	5 U	5 U	5 U	5 U
1,2-Dibromoethane	ug/L	5.7	0.05	0.05	- -	1 U	1 U	1 U	1 U
1,2-Dichlorobenzene	ug/L	13	600	600	- -	1 U	1 U	1 U	1 U
1,2-Dichloroethane	ug/L	360	5	5	- -	1 U	1 U	1 U	1 U
1,2-Dichloropropane	ug/L	230	5	5	- -	1 U	1 U	1 U	1 U
1,3-Dichlorobenzene	ug/L	28	6.6	19	- -	1 U	1 U	1 U	1 U
1,4-Dichlorobenzene	ug/L	17	75	75	- -	1 U	1 U	1 U	1 U
2-Butanone	ug/L	2,200	13,000	38,000	- -	25 U	25 U	25 U	25 U
4-Methyl-2-pentanone	ug/L	- -	1,800	5,200	- -	50 U	50 U	50 U	50 U
Acetone	ug/L	1,700	730	2,100	- -	50 U	50 U	50 U	50 U
Benzene	ug/L	200	5	5	- -	1 U	1 U	1 U	1 U
Bromodichloromethane	ug/L	- -	80	80	- -	1 U	1 U	1 U	1 U
Bromoform	ug/L	- -	80	80	- -	1 U	1 U	1 U	1 U
Bromomethane	ug/L	35	10	29	- -	5 U	5 U	5 U	5 U
Carbon Disulfide	ug/L	- -	800	2,300	- -	5 U	5 U	5 U	5 U
Carbon Tetrachloride	ug/L	45	5	5	- -	1 U	1 U	1 U	1 U
CFC-11	ug/L	- -	2,600	7,300	- -	1 U	1 U	1 U	1 U

Table 2
Summary of Groundwater Analytical Results
2017 Annual Groundwater Monitoring Report
RACER trust Pontiac North Campus

Location ID: Date Collected: Sample Name:	Units	Groundwater Surface Water Interface Shaded	Res Drinking Water Yellow HL	Non-Res Drinking Water Orange HL	Non-Res Health Based Drinking Water Value Bold	MWM16-29 10/25/17 MWM16-29_GW-102517	MWM16-30 10/23/17 MWM16-30_GW-102317	MWM16-31 10/23/17 MWM16-31_GW-102317	MWM16-36 10/23/17 MWM16-36_GW-102317
CFC-12	ug/L	- -	1,700	4,800	- -	5 U	5 U	5 U	5 U
Chlorobenzene	ug/L	25	100	100	- -	1 U	1 U	1 U	1 U
Chlorodibromomethane	ug/L	- -	80	80	- -	5 U	5 U	5 U	5 U
Chloroethane	ug/L	1,100	430	1,700	- -	5 U	5 U	5 U	5 U
Chloroform	ug/L	350	80	80	- -	1 U	1 U	1 U	1 U
Chloromethane	ug/L	- -	260	1,100	- -	5 U	5 U	5 U	5 U
cis-1,2-Dichloroethene	ug/L	620	70	70	- -	1 U	1 U	1 U	1 U
cis-1,3-Dichloropropene	ug/L	- -	- -	- -	- -	1 U	1 U	1 U	1 U
Cyclohexane	ug/L	- -	- -	- -	- -	1 U	1 U	1 U	1 U
Ethylbenzene	ug/L	18	74	74	**700**	1 U	1 U	1 U	1 U
Isopropylbenzene	ug/L	28	800	2,300	- -	1 U	1 U	1 U	1 U
m&p-Xylene	ug/L	- -	- -	- -	- -	2 U	2 U	2 U	2 U
Methyl acetate	ug/L	- -	- -	- -	- -	10 U	10 U	10 U	10 U
Methylene chloride	ug/L	1,500	5	5	- -	5 U	5 U	5 U	5 U
Methyl N-Butyl Ketone	ug/L	- -	1,000	2,900	- -	50 U	50 U	50 U	50 U
Methyl tert-butyl ether	ug/L	7,100	40	40	**690**	5 U	5 U	5 U	5 U
Methylcyclohexane	ug/L	- -	- -	- -	- -	1 U	1 U	1 U	1 U
o-Xylene	ug/L	- -	- -	- -	- -	1 U	1 U	1 U	1 U
Styrene	ug/L	80	100	100	- -	1 U	1 U	1 U	1 U
Tetrachloroethene	ug/L	60	5	5	- -	1 U	1 U	1 U	1 U
Toluene	ug/L	270	790	790	**1,000**	1 U	1 U	1 U	1 U
trans-1,2-Dichloroethene	ug/L	1,500	100	100	- -	1 U	1 U	1 U	1 U
trans-1,3-Dichloropropene	ug/L	- -	- -	- -	- -	1 U	1 U	1 U	1 U
Trichloroethene	ug/L	200	5	5	- -	1 U	15	1 U	1 U
Vinyl Chloride	ug/L	13	2	2	- -	1 U	1 U	3	1 U
Inorganics									
Antimony	mg/L	0.13	0.006	0.006	- -	NA	NA	NA	NA
Lead	mg/L	0.014	0.004	0.004	- -	NA	NA	NA	NA
Manganese	mg/L	1.3	0.05	0.05	**2.5**	NA	NA	NA	NA
Vanadium	mg/L	0.027	0.0045	0.062	- -	NA	NA	NA	NA

Table 2
Summary of Groundwater Analytical Results
2017 Annual Groundwater Monitoring Report
RACER trust Pontiac North Campus

Location ID: Date Collected: Sample Name:	Units	Groundwater Surface Water Interface Shaded	Res Drinking Water Yellow HL	Non-Res Drinking Water Orange HL	Non-Res Health Based Drinking Water Value Bold	MWM16-37 10/23/17 MWM16-37_GW-102317	MWM31-02 10/24/17 MWM31-02_GW-102417	MWM32-01 10/23/17 MWM32-01_GW-102317	MWW1-04 10/25/17 MWW1-04_GW-102517	MWW10-03 10/26/17 MWW10-03_GW-102617
Field Parameters										
pH	pH units	- -	- -	- -	- -	7.06	7.03	6.90	11.15	7.12
Turbidity	NTU	- -	- -	- -	- -	2.91	1.33	7.49	1.54	0.87
PCBs										
Aroclor-1016	ug/L	0.2	0.5	0.5	- -	NA	NA	NA	0.1 U	0.1 U
Aroclor-1221	ug/L	0.2	0.5	0.5	- -	NA	NA	NA	0.1 U	0.1 U
Aroclor-1232	ug/L	0.2	0.5	0.5	- -	NA	NA	NA	0.1 U	0.1 U
Aroclor-1242	ug/L	0.2	0.5	0.5	- -	NA	NA	NA	0.1	0.1 U
Aroclor-1248	ug/L	0.2	0.5	0.5	- -	NA	NA	NA	0.1 U	0.1 U
Aroclor-1254	ug/L	0.2	0.5	0.5	- -	NA	NA	NA	0.1 U	0.1 U
Aroclor-1260	ug/L	0.2	0.5	0.5	- -	NA	NA	NA	0.1 U	0.1 U
Total PCBs	ug/L	0.2	0.5	0.5	- -	NA	NA	NA	0.1	0.1 U
Volatile Organics										
1,1,1-Trichloroethane	ug/L	89	200	200	- -	1 U	1 U	1 U	1 U [1 U]	1 U
1,1,2,2-Tetrachloroethane	ug/L	78	8.5	35	- -	1 U	1 U	1 U	1 U [1 U]	1 U
1,1,2-trichloro-1,2,2-trifluoroethane	ug/L	32	170,000	170,000	- -	1 U	1 U	1 U	1 U [1 U]	1 U
1,1,2-Trichloroethane	ug/L	330	5	5	- -	1 U	1 U	1 U	1 U [1 U]	1 U
1,1-Dichloroethane	ug/L	740	880	2,500	- -	1 U	1 U	1 U	1 U [1 U]	1 U
1,1-Dichloroethene	ug/L	130	7	7	- -	1 U	1 U	1 U	1 U [1 U]	1 U
1,2,4-Trichlorobenzene	ug/L	99	70	70	- -	5 U	5 U	5 U	5 U [5 U]	5 U
1,2-Dibromo-3-chloropropane	ug/L	- -	0.2	0.2	- -	5 U	5 U	5 U	5 U [5 U]	5 U
1,2-Dibromoethane	ug/L	5.7	0.05	0.05	- -	1 U	1 U	1 U	1 U [1 U]	1 U
1,2-Dichlorobenzene	ug/L	13	600	600	- -	1 U	1 U	1 U	1 U [1 U]	1 U
1,2-Dichloroethane	ug/L	360	5	5	- -	1 U	1 U	1 U	1 U [1 U]	1 U
1,2-Dichloropropane	ug/L	230	5	5	- -	1 U	1 U	1 U	1 U [1 U]	1 U
1,3-Dichlorobenzene	ug/L	28	6.6	19	- -	1 U	1 U	1 U	1 U [1 U]	1 U
1,4-Dichlorobenzene	ug/L	17	75	75	- -	1 U	1 U	1 U	1 U [1 U]	1 U
2-Butanone	ug/L	2,200	13,000	38,000	- -	25 U	25 U	25 U	25 U [25 U]	25 U
4-Methyl-2-pentanone	ug/L	- -	1,800	5,200	- -	50 U	50 U	50 U	50 U [50 U]	50 U
Acetone	ug/L	1,700	730	2,100	- -	50 U	50 U	50 U	50 U [50 U]	50 U
Benzene	ug/L	200	5	5	- -	1 U	1 U	1 U	1 U [1 U]	1 U
Bromodichloromethane	ug/L	- -	80	80	- -	1 U	1 U	1 U	1 U [1 U]	1 U
Bromoform	ug/L	- -	80	80	- -	1 U	1 U	1 U	1 U [1 U]	1 U
Bromomethane	ug/L	35	10	29	- -	5 U	5 U	5 U	5 U [5 U]	5 U
Carbon Disulfide	ug/L	- -	800	2,300	- -	5 U	5 U	5 U	5 U [5 U]	5 U
Carbon Tetrachloride	ug/L	45	5	5	- -	1 U	1 U	1 U	1 U [1 U]	1 U
CFC-11	ug/L	- -	2,600	7,300	- -	1 U	1 U	1 U	1 U [1 U]	1 U

Table 2
Summary of Groundwater Analytical Results
2017 Annual Groundwater Monitoring Report
RACER trust Pontiac North Campus

Location ID: Date Collected: Sample Name:	Units	Groundwater Surface Water Interface Shaded	Res Drinking Water Yellow HL	Non-Res Drinking Water Orange HL	Non-Res Health Based Drinking Water Value Bold	MWM16-37 10/23/17 MWM16-37_GW-102317	MWM31-02 10/24/17 MWM31-02_GW-102417	MWM32-01 10/23/17 MWM32-01_GW-102317	MWW1-04 10/25/17 MWW1-04_GW-102517	MWW10-03 10/26/17 MWW10-03_GW-102617
CFC-12	ug/L	- -	1,700	4,800	- -	5 U	5 U	5 U	5 U [5 U]	5 U
Chlorobenzene	ug/L	25	100	100	- -	1 U	1 U	1 U	1 U [1 U]	1 U
Chlorodibromomethane	ug/L	- -	80	80	- -	5 U	5 U	5 U	5 U [5 U]	5 U
Chloroethane	ug/L	1,100	430	1,700	- -	5 U	5 U	5 U	5 U [5 U]	5 U
Chloroform	ug/L	350	80	80	- -	1 U	1 U	1 U	1 U [1 U]	1 U
Chloromethane	ug/L	- -	260	1,100	- -	5 U	5 U	5 U	5 U [5 U]	5 U
cis-1,2-Dichloroethene	ug/L	620	70	70	- -	1 U	1 U	1 U	1 U [1 U]	1 U
cis-1,3-Dichloropropene	ug/L	- -	- -	- -	- -	1 U	1 U	1 U	1 U [1 U]	1 U
Cyclohexane	ug/L	- -	- -	- -	- -	1 U	1 U	1 U	1 U [1 U]	1 U
Ethylbenzene	ug/L	18	74	74	**700**	1 U	1 U	1 U	1 U [1 U]	1 U
Isopropylbenzene	ug/L	28	800	2,300	- -	1 U	1 U	1 U	1 U [1 U]	1 U
m&p-Xylene	ug/L	- -	- -	- -	- -	2 U	2 U	2 U	2 U [2 U]	2 U
Methyl acetate	ug/L	- -	- -	- -	- -	10 U	10 U	10 U	10 U [10 U]	10 U
Methylene chloride	ug/L	1,500	5	5	- -	5 U	5 U	5 U	5 U [5 U]	5 U
Methyl N-Butyl Ketone	ug/L	- -	1,000	2,900	- -	50 U	50 U	50 U	50 U [50 U]	50 U
Methyl tert-butyl ether	ug/L	7,100	40	40	**690**	5 U	5 U	5 U	5 U [5 U]	5 U
Methylcyclohexane	ug/L	- -	- -	- -	- -	1 U	1 U	1 U	1 U [1 U]	1 U
o-Xylene	ug/L	- -	- -	- -	- -	1 U	1 U	1 U	1 U [1 U]	1 U
Styrene	ug/L	80	100	100	- -	1 U	1 U	1 U	1 U [1 U]	1 U
Tetrachloroethene	ug/L	60	5	5	- -	1 U	1 U	1 U	1 U [1 U]	1 U
Toluene	ug/L	270	790	790	**1,000**	1 U	1 U	1 U	1 U [1 U]	1 U
trans-1,2-Dichloroethene	ug/L	1,500	100	100	- -	1 U	1 U	1 U	1 U [1 U]	1 U
trans-1,3-Dichloropropene	ug/L	- -	- -	- -	- -	1 U	1 U	1 U	1 U [1 U]	1 U
Trichloroethene	ug/L	200	5	5	- -	1 U	1 U	1 U	1 U [1 U]	1 U
Vinyl Chloride	ug/L	13	2	2	- -	4	1 U	1 U	1 U [1 U]	1 U
Inorganics										
Antimony	mg/L	0.13	0.006	0.006	- -	NA	NA	NA	0.005	NA
Lead	mg/L	0.014	0.004	0.004	- -	NA	NA	NA	NA	0.003 U
Manganese	mg/L	1.3	0.05	0.05	**2.5**	NA	NA	NA	NA	0.067
Vanadium	mg/L	0.027	0.0045	0.062	- -	NA	NA	NA	0.045	NA

Notes:
mg/L = milligrams per liter.
µg/L = micrograms per liter.
"U" indicates the compound was analyzed for but not detected. The associated value is the compound quantitation limit.
Duplicate analyses are presented in brackets.
"NA" indicates that the compound was not analyzed.

1. Criteria listed are from Michigan Department of Environmental Quality Operational Memorandum #1, Attachment #1, dated December 30, 2013, the Draft Proposed MDEQ Clean Up Criteria Requirements Table 4. VI Tier 1 Groundwater, Soil, and Vapor Screening Levels Part 201 Generic Screening Levels/Part 213 Risk-Based Screening Levels, and the Draft 2017 Media-Specific Volatilization to Indoor Air Interim Action Screening Levels August 29, 2017.

2. Groundwater Surface Water Interface Criteria listed for lead and manganese is calculated based on a hardness of 150 mg/L-CaCO3 for southern Lower Peninsula Waters protected as a drinking water source.
Shaded values exceed Michigan Groundwater Surface Water Interface.
Yellow highlighted values exceed Michigan Residential Drinking Water
Orange highlighted values exceed Non-Residential Drinking Water.
Bold values exceed Non-Residential Health Based Drinking Water Value.
Values in italics exceed Residential Groundwater Volatilization to Indoor Air Inhalation
Values in red type exceed Non-Residential Groundwater Volatilization to Indoor Air Inhalation

FIGURES

Service Layer Credits:

SPO PARKING

FORMER PLANT 25

SPO

FORMER PLANT 15

FORMER PLANT 12

PLANT 14

FORMER FIERO PARKING LOT

FORMER FIERO PLANT 17

POWER HOUSE

GM WWTP

FORMER PLANT 14S (PLANTS 5 AND 23)

USPS REGIONAL DISTRIBUTION CENTER (LEASED PROPERTY)

GM POWERTRAIN

HARRIS LAKE

STORMWATER DETENTION FACILITY

PERRY PARK

OAKLAND PARK

W Colgate Ave
E Colgate Ave
W Sheffield Ave
E Sheffield Ave
Laurel Ave
Princeton Ave
W Princeton Ave
E Princeton Ave
W Hopkins Ave
E Hopkins Ave
W Yale Ave
E Yale Ave
W Ypsilanti Ave
E Ypsilanti Ave
Price St
E Ann Arbor Ave
Peacock Ave
Clara Ave
W Columbia Ave
E Columbia Ave
W Longfellow Ave
E Longfellow Ave
Ivy St
W Strathmore Ave
E Strathmore Ave
W Fairmont Ave
E Fairmont Ave
W Rutgers Ave
E Rutgers Ave
W Cornell Ave
E Cornell Ave
Hollywood Ave
Tennyson Ave
W Tennyson Ave
Mansfield Ave
E Madison Ave
Lebaron Ave
Wesbrook St
Lenox Ave
Markle Ave
Raskob St
Lowell St
Parkdale Ave
N Merrimac St
Merrimac St
S Merrimac St
Young St
Wing St
Portland St
W Montcalm St
E Montcalm St
Burt Ave
Legrande Ave
Garner St
Hudson Ave
Riker St
Hood St
W Rundell St
E Rundell St
Putnam Ave
Hamilton St
Whitfield St
Jefferson St
Cadillac St
Virginia St
Kimball St
Grandie St
Home St
Kemp St
Wolfe St
N Glenwood Ave
Edison St
Marquette St
Nelson St
Hammond St
S Glenwood Ave
Linda Vista Dr

LEGEND

- USPS DISTRIBUTION CENTER PROPERTY BOUNDARY
- PNC PROPERTY (GMC)
- PROPERTY SOLD BY RACER
- GENERAL MOTORS, LLC
- RACER TRUST PROPERTY SUBJECT TO AOC (9/29/11)

AOC – ADMINISTRATIVE ORDER ON CONSENT
GM – GENERAL MOTORS CORPORATION
PNC – PONTIAC NORTH CAMPUS
RACER – REVITALIZING AUTO COMMUNITIES ENVIRONMENTAL RESPONSE TRUST
SPO – SERVICE PARTS OPERATION
USPS – UNITED STATES POSTAL SERVICE
WWTP – WASTEWATER TREATMENT PLANT
NOTE: ALL BOUNDARIES ARE APPROXIMATE

0 310 620
SCALE IN FEET

RACER TRUST
PONTIAC NORTH CAMPUS
PONTIAC, MICHIGAN

SITE LAYOUT MAP

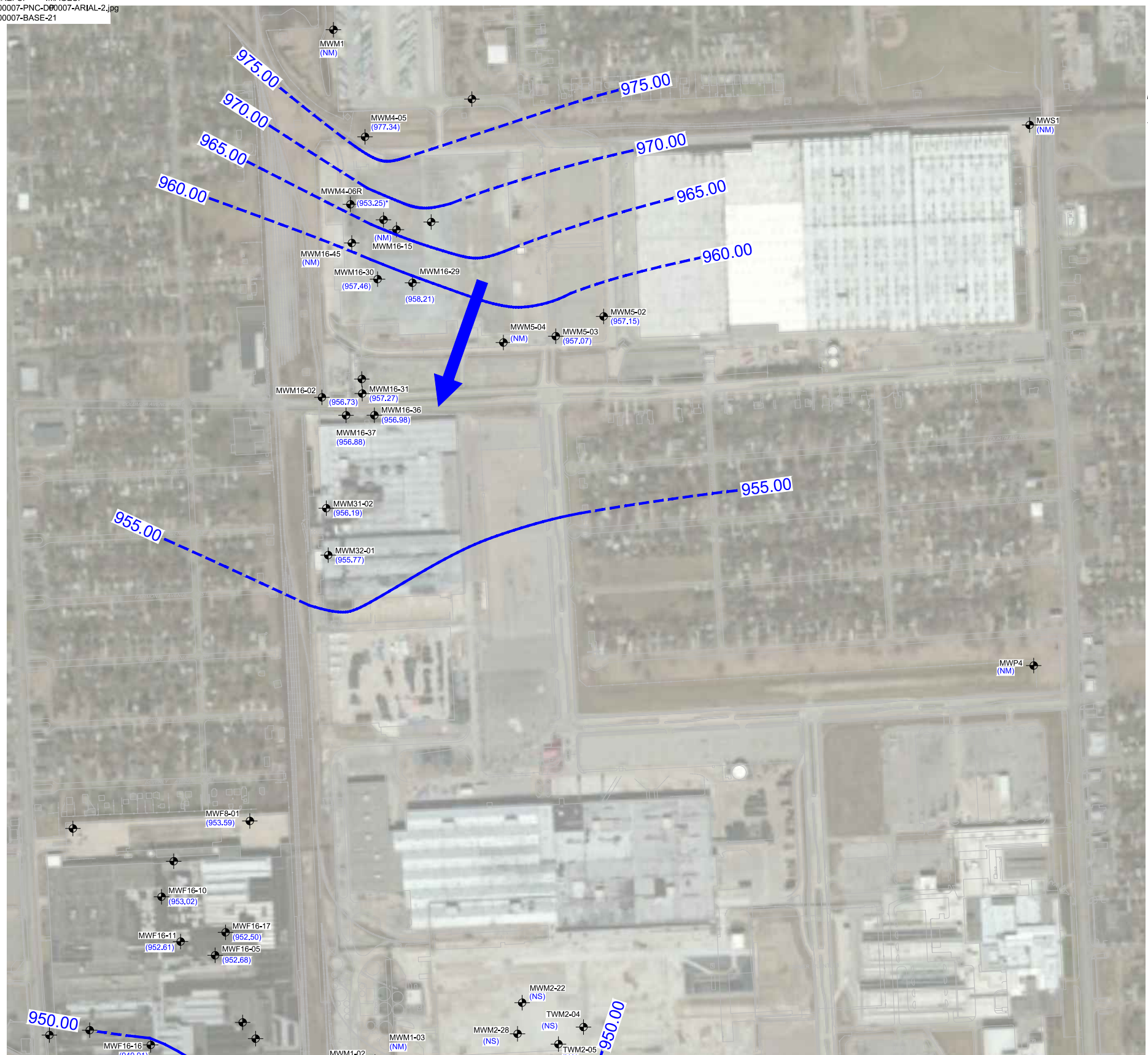
ARCADIS Design & Consultancy for natural and built assets

FIGURE 1

CITY: Novi DIV: ENV DB: TRY PIC: PM: TM: TR: PROJECT NUMBER: B0064607.2012.0002 COORDINATE SYSTEM: NAD 1983 StatePlane Michigan South FIPS 2113 Feet
D:\GIS\Project Files\MotorsLiquidationCompany\PontiacNorthCampus\Documents\PNC_Property Layout_2017_12.mxd PLOTTED: 12/20/2017 12:52:19 PM BY: TYarbrough

CITY:SYRACUSE DIV/GROUP:IMDV-21 DB:G.STOWELL PM:(Reqd) LYRON=*;OFF=*REF*
C:\Users\gstowell\OneDrive - ARCADIS\BIM 360 Docs\RACER TRUST\RACER Pontiac North Campus\2018\B0064607.2017\01-DWG\00007-GW-CONT-2.DWG LAYOUT: 2 SAVED: 1/12/2018 3:42 PM ACADVER: 21.0S (LMS TECH) PAGESETUP: C-PD2B-PDF-GMS PLOTSTYLETABLE: PLTFULL.CTB
PLOTTED: 1/12/2018 3:44 PM BY: STOWELL, GARY

XREFS: IMAGES:
00007-PNC-DE 00007-ARIAL-2.jpg
00007-BASE-21



LEGEND:

- GROUNDWATER MONITORING WELL LOCATION
- (937.70) GROUNDWATER ELEVATION
- * WELL NOT USED FOR GROUNDWATER CONTOURING
- 955.00 GROUNDWATER CONTOUR (CONTOUR INTERVAL 5.0 FEET) (DASHED WHERE INFERRED)
- APPROXIMATE GROUNDWATER FLOW DIRECTION
- NA NOT AVAILABLE
- ROW RIGHT-OF-WAY
- NM NOT MEASURED
- NS NOT SURVEYED

NOTES:

1. ALL SAMPLE LOCATIONS ARE APPROXIMATE.
2. GROUNDWATER ELEVATIONS CALCULATED FROM WATER LEVELS COLLECTED ON OCTOBER 23 – 27, 2017.
3. ALL ELEVATIONS ARE REFERENCED TO A MEAN SEE LEVEL DATUM AND ARE IN UNITS OF FEET ABOVE MEAN SEE LEVEL.
4. WELLS WITH NO GROUNDWATER ELEVATION AND LABEL WERE NOT INCLUDED IN THE ANNUAL SAMPLING AND GAUGING.
5. THE EQUIVALENT GROUNDWATER ELEVATION IS CALCULATED WHERE LNAPL IS PRESENT USING THE LNAPL SURFACE ELEVATION, THE THICKNESS OF LNAPL AND THE APPROXIMATE SPECIFIC DENSITY OF THE LNAPL (0.8).
6. WELLS WITHOUT GROUNDWATER ELEVATION AND/OR LABEL WERE NOT INCLUDED IN THE ANNUAL SAMPLING AND GAUGING.
7. WELLS WITH NS WERE CONVERTED TO STICK-UPS IN JULY 2017 AND REQUIRE RE-SURVEYING.

0 300' 600'
GRAPHIC SCALE

RACER TRUST
PONTIAC, MICHIGAN
PONTIAC NORTH CAMPUS

GROUNDWATER CONTOUR MAP OCTOBER - 2017

ARCADIS Design & Consultancy for natural and built assets

FIGURE
2

MWM16-37		
Date	9/20/2016	10/23/2017
Field Parameters		
pH Field	7.06	7.06
VOCS		
1,1,1-Trichloroethane	ND (0.001)	ND (0.001)
1,1,2-Trichloroethane	ND (0.001)	ND (0.001)
1,1-Dichloroethane	ND (0.001)	ND (0.001)
1,1-Dichloroethene	ND (0.001)	ND (0.001)
1,2-Dichloroethane	ND (0.001)	ND (0.001)
Acetone	ND (0.050)	ND (0.05)
Benzene	ND (0.001)	ND (0.001)
cis-1,2-Dichloroethene	ND (0.001)	ND (0.001)
Ethylbenzene	ND (0.001)	ND (0.001)
Methylene chloride	ND (0.005)	ND (0.005)
Tetrachloroethene	ND (0.001)	ND (0.001)
Toluene	ND (0.001)	ND (0.001)
Trichloroethene	ND (0.001)	ND (0.001)
Vinyl Chloride	0.009 (RDW, NRDW)	0.004 (RDW, NRDW)

MWM16-02	
Date	10/23/2017
Field Parameters	
pH	7.07
VOCs	
1,1,1-Trichloroethane	ND (0.001)
1,1,2-Trichloroethane	ND (0.001)
1,1-Dichloroethane	ND (0.001)
1,1-Dichloroethene	ND (0.001)
1,2-Dichloroethane	ND (0.001)
Acetone	ND (0.05)
Benzene	ND (0.001)
cis-1,2-Dichloroethene	ND (0.001)
Ethylbenzene	ND (0.001)
Methylene chloride	ND (0.005)
Tetrachloroethene	ND (0.001)
Toluene	ND (0.001)
Trichloroethene	ND (0.001)
Vinyl Chloride	ND (0.001)

MWM16-21					
Date	10/2/2012	12/5/2013	9/19/2014	9/22/2015	9/20/2016
Field Parameters					
pH Field	6.99	7.77	7.1	7.58	7.21
VOCs					
1,1,1-Trichloroethane	ND(0.001)	ND(0.001)	ND (0.001)	ND (0.001)	ND (0.001)
1,1,2-Trichloroethane	ND(0.001)	ND(0.001)	ND (0.001)	ND (0.001)	ND (0.001)
1,1-Dichloroethane	ND(0.001)	ND(0.001)	ND (0.001)	ND (0.001)	ND (0.001)
1,1-Dichloroethene	ND(0.001)	ND(0.001)	ND (0.001)	ND (0.001)	ND (0.001)
1,2-Dichloroethane	ND(0.001)	ND(0.001)	ND (0.001)	ND (0.001)	ND (0.001)
Acetone	ND(0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.050)
Benzene	ND(0.001)	ND(0.001)	ND (0.001)	ND (0.001)	ND (0.001)
cis-1,2-Dichloroethene	ND(0.001)	ND(0.001)	ND (0.001)	ND (0.001)	ND (0.001)
Ethylbenzene	ND(0.001)	ND(0.001)	ND (0.001)	ND (0.001)	ND (0.001)
Methylene chloride	ND(0.005)	ND(0.005)	ND (0.005)	ND (0.005)	ND (0.005)
Tetrachloroethene	ND(0.001)	ND(0.001)	ND (0.001)	ND (0.001)	ND (0.001)
Toluene	ND(0.001)	ND(0.001)	ND (0.001)	ND (0.001)	ND (0.001)
Trichloroethene	ND(0.001)	ND(0.001)	ND (0.001)	ND (0.001)	ND (0.001)
Vinyl Chloride	ND(0.001)	ND(0.001)	.00034 J	0.0011	0.003 (RDW, NRDW)

MWM16-30	
Date	10/23/2017
Field Parameters	
pH	6.44
VOCs	
1,1,1-Trichloroethane	0.01
1,1,2-Trichloroethane	ND (0.001)
1,1-Dichloroethane	ND (0.001)
1,1-Dichloroethene	ND (0.001)
1,2-Dichloroethane	ND (0.001)
Acetone	ND (0.05)
Benzene	ND (0.001)
cis-1,2-Dichloroethene	ND (0.001)
Ethylbenzene	ND (0.001)
Methylene chloride	ND (0.005)
Tetrachloroethene	ND (0.001)
Toluene	ND (0.001)
Trichloroethene	0.015 (RDW, NRDW)
Vinyl Chloride	ND (0.001)

MWM16-29	
Date	10/25/2017
Field Parameters	
pH	7.46
VOCs	
1,1,1-Trichloroethane	ND (0.001)
1,1,2-Trichloroethane	ND (0.001)
1,1-Dichloroethane	ND (0.001)
1,1-Dichloroethene	ND (0.001)
1,2-Dichloroethane	ND (0.001)
Acetone	ND (0.05)
Benzene	ND (0.001)
cis-1,2-Dichloroethene	ND (0.001)
Ethylbenzene	ND (0.001)
Methylene chloride	ND (0.005)
Tetrachloroethene	ND (0.001)
Toluene	ND (0.001)
Trichloroethene	ND (0.001)
Vinyl Chloride	ND (0.001)

MWM16-31	
Date	10/23/2017
Field Parameters	
pH	7.01
VOCs	
1,1,1-Trichloroethane	ND (0.001)
1,1,2-Trichloroethane	ND (0.001)
1,1-Dichloroethane	ND (0.001)
1,1-Dichloroethene	ND (0.001)
1,2-Dichloroethane	ND (0.001)
Acetone	ND (0.05)
Benzene	ND (0.001)
cis-1,2-Dichloroethene	ND (0.001)
Ethylbenzene	ND (0.001)
Methylene chloride	ND (0.005)
Tetrachloroethene	ND (0.001)
Toluene	ND (0.001)
Trichloroethene	ND (0.001)
Vinyl Chloride	0.003 (RDW, NRDW)

MWM16-36	
Date	10/23/2017
Field Parameters	
pH	8.31
VOCs	
1,1,1-Trichloroethane	ND (0.001)
1,1,2-Trichloroethane	ND (0.001)
1,1-Dichloroethane	ND (0.001)
1,1-Dichloroethene	ND (0.001)
1,2-Dichloroethane	ND (0.001)
Acetone	ND (0.05)
Benzene	ND (0.001)
cis-1,2-Dichloroethene	ND (0.001)
Ethylbenzene	ND (0.001)
Methylene chloride	ND (0.005)
Tetrachloroethene	ND (0.001)
Toluene	ND (0.001)
Trichloroethene	ND (0.001)
Vinyl Chloride	ND (0.001)

MWM16-43	
Date	10/2/2012
Field Parameters	
pH Field	6.83
VOCs	
1,1,1-Trichloroethane	ND(0.001)
1,1,2-Trichloroethane	ND(0.001)
1,1-Dichloroethane	ND(0.001)
1,1-Dichloroethene	ND(0.001)
1,2-Dichloroethane	ND(0.001)
Acetone	ND(0.025)
Benzene	ND(0.001)
cis-1,2-Dichloroethene	ND(0.001)
Ethylbenzene	ND(0.001)
Methylene chloride	ND(0.005)
Tetrachloroethene	ND(0.001)
Toluene	ND(0.001)
Trichloroethene	ND(0.001)
Vinyl Chloride	ND(0.001)

MWM31-02	
Date	10/24/2017
Field Parameters	
pH	7.03
VOCs	
1,1,1-Trichloroethane	ND (0.001)
1,1,2-Trichloroethane	ND (0.001)
1,1-Dichloroethane	ND (0.001)
1,1-Dichloroethene	ND (0.001)
1,2-Dichloroethane	ND (0.001)
Acetone	ND (0.05)
Benzene	ND (0.001)
cis-1,2-Dichloroethene	ND (0.001)
Ethylbenzene	ND (0.001)
Methylene chloride	ND (0.005)
Tetrachloroethene	ND (0.001)
Toluene	ND (0.001)
Trichloroethene	ND (0.001)
Vinyl Chloride	ND (0.001)

MWM32-01	
Date	10/23/2017
Field Parameters	
pH	6.9
VOCs	
1,1,1-Trichloroethane	ND (0.001)
1,1,2-Trichloroethane	ND (0.001)
1,1-Dichloroethane	ND (0.001)
1,1-Dichloroethene	ND (0.001)
1,2-Dichloroethane	ND (0.001)
Acetone	ND (0.05)
Benzene	ND (0.001)
cis-1,2-Dichloroethene	ND (0.001)
Ethylbenzene	ND (0.001)
Methylene chloride	ND (0.005)
Tetrachloroethene	ND (0.001)
Toluene	ND (0.001)
Trichloroethene	ND (0.001)
Vinyl Chloride	ND (0.001)

MWF8-01		
Date	9/21/2016	10/26/2017
Field Parameters		
pH Field	6.99	7.08
VOCS		
1,1,1-Trichloroethane	ND (0.001)	ND (0.001)
1,1,2-Trichloroethane	ND (0.001)	ND (0.001)
1,1-Dichloroethane	ND (0.001)	ND (0.001)
1,1-Dichloroethene	ND (0.001)	ND (0.001)
1,2-Dichloroethane	ND (0.001)	ND (0.001)
Acetone	ND (0.050)	ND (0.05)
Benzene	ND (0.001)	ND (0.001)
cis-1,2-Dichloroethene	ND (0.001)	ND (0.001)
Ethylbenzene	ND (0.001)	ND (0.001)
Methylene chloride	ND (0.005)	ND (0.005)
Tetrachloroethene	ND (0.001)	ND (0.001)
Toluene	ND (0.001)	ND (0.001)
Trichloroethene	ND (0.001)	ND (0.001)
Vinyl Chloride	ND (0.001)	ND (0.001)

MWF7-01						
Date	10/3/2012	12/4/2013	9/19/2014	9/22/2015	9/22/2016	10/24/2017
Field Parameters						
pH Field	6.99	7.64	7.08	7.13	7.16	7.17
VOCs						
1,1,1-Trichloroethane	0.0075	0.0073	0.014 [0.014]	0.035	0.009	0.018
1,1,2-Trichloroethane	ND(0.001)	ND(0.001)	ND (0.001) [ND (0.001)]	ND (0.0014)	ND (0.001)	ND (0.001)
1,1-Dichloroethane	0.0032	0.0019	0.0049 J [0.0072 J]	0.012	0.002	0.003
1,1-Dichloroethene	0.00073	0.00041 J	0.0013 [0.0017]	0.0038	ND (0.001)	0.001
1,2-Dichloroethane	ND(0.001)	ND(0.001)	ND (0.001) [ND (0.001)]	ND (0.0014)	ND (0.001)	ND (0.001)
Acetone	ND(0.025)	ND (0.025)	ND (0.025) [ND (0.025)]	ND (0.036)	ND (0.050)	ND (0.05)
Benzene	ND(0.001)	ND(0.001)	ND (0.001) [ND (0.001)]	ND (0.0014)	ND (0.001)	ND (0.001)
cis-1,2-Dichloroethene	0.0004	ND(0.001)	0.00045 J [0.00081 J]	0.0019	ND (0.001)	ND (0.001)
Ethylbenzene	ND(0.001)	ND(0.001)	ND (0.001) [ND (0.001)]	ND (0.0014)	ND (0.001)	ND (0.001)
Methylene chloride	ND(0.005)	ND(0.005)J	ND (0.005) [ND (0.005)]	ND (0.0072) B	ND (0.005)	ND (0.005)
Tetrachloroethene	0.00057	0.00074 J	0.00091 J [0.00099 J]	0.0024	ND (0.001)	0.001
Toluene	ND(0.001)	ND(0.001)	ND (0.001) [ND (0.001)]	ND (0.0014)	ND (0.001)	ND (0.001)
Trichloroethene	ND(0.001)	ND(0.001)	0.00016 J [0.0002 J]	0.00066 J	ND (0.001)	ND (0.001)
Vinyl Chloride	ND(0.001)	ND(0.001)	ND (0.001) [ND (0.001)]	ND (0.0014)	ND (0.001)	ND (0.001)

MWF1R						
Date	10/2/2012	12/4/2013	9/19/2014	9/22/2015	9/20/2016	10/23/2017
Field Parameters						
pH Field	7.19	7.66	7.22	7.07	7.03	7.08
VOCs						
1,1,1-Trichloroethane	ND(0.001)	ND(0.001)	ND (0.001)	0.00067 J	ND (0.001)	ND (0.001)
1,1,2-Trichloroethane	ND(0.001)	ND(0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)
1,1-Dichloroethane	ND(0.001)	ND(0.001)	0.00028 J	0.00061 J	ND (0.001)	ND (0.001)
1,1-Dichloroethene	ND(0.001)	ND(0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)
1,2-Dichloroethane	ND(0.001)	ND(0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)
Acetone	ND(0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.050)	ND (0.05)
Benzene	ND(0.001)	ND(0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)
cis-1,2-Dichloroethene	ND(0.001)	ND(0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)
Ethylbenzene	ND(0.001)	ND(0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)
Methylene chloride	ND(0.005)	ND(0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)
Tetrachloroethene	ND(0.001)	ND(0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)
Toluene	ND(0.001)	ND(0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)
Trichloroethene	ND(0.001)	ND(0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)
Vinyl Chloride	ND(0.001)	ND(0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)

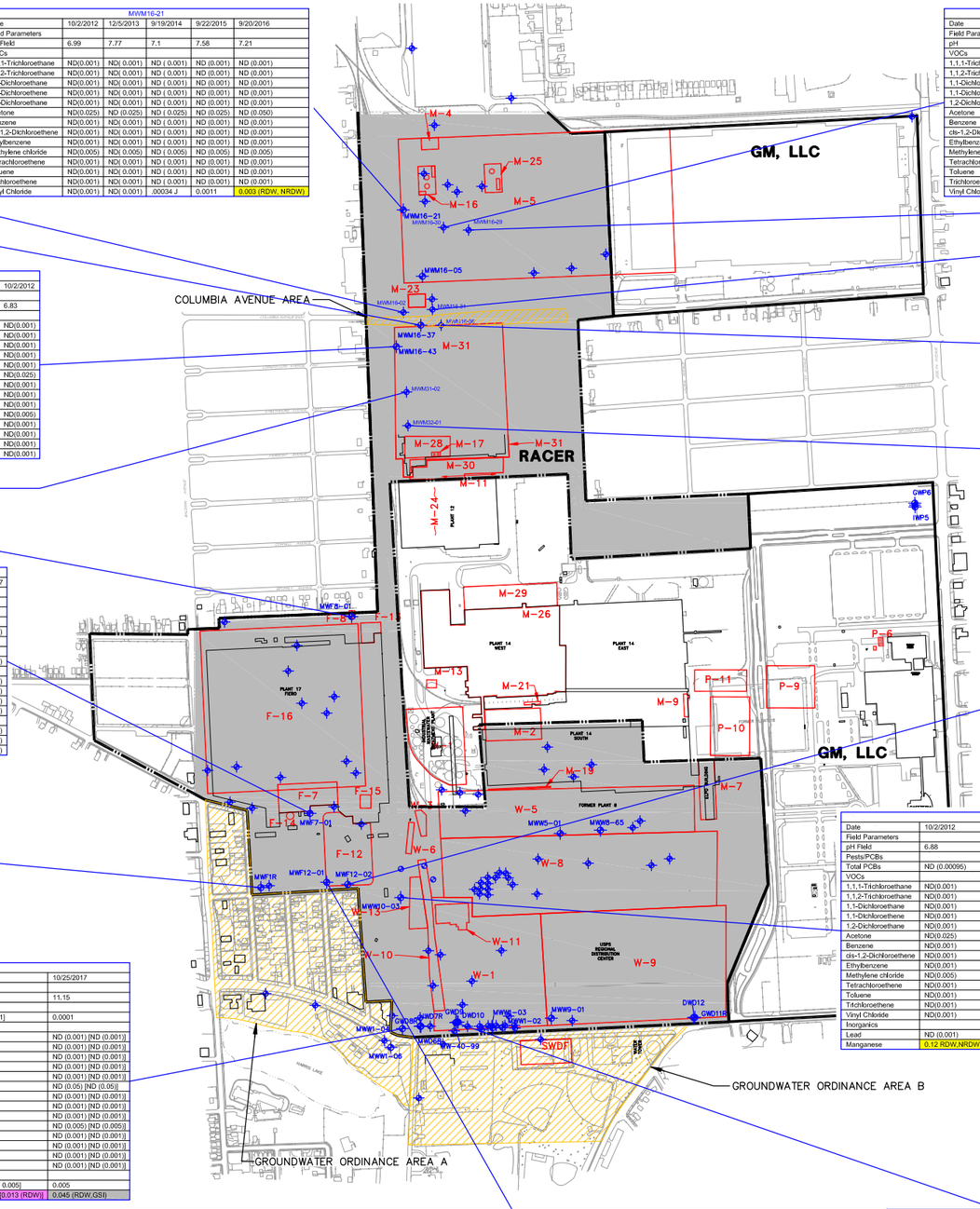
MWW1-04						
Date	10/3/2012	12/4/2013	9/23/2014	9/23/2015	9/21/2016	10/25/2017
Field Parameters						
pH Field	11.27	9.78	11.84	9.77	11.69	11.15
PCBs						
Total PCBs	0.00043	0.00052(RDW,NRDW)	0.000348 [ND (.00010)]	0.00025	0.0001 [0.0001]	0.0001
VOCs						
1,1,1-Trichloroethane	NA	NA	NA	NA	NA	ND (0.001) [ND (0.001)]
1,1,2-Trichloroethane	NA	NA	NA	NA	NA	ND (0.001) [ND (0.001)]
1,1-Dichloroethane	NA	NA	NA	NA	NA	ND (0.001) [ND (0.001)]
1,1-Dichloroethene	NA	NA	NA	NA	NA	ND (0.001) [ND (0.001)]
1,2-Dichloroethane	NA	NA	NA	NA	NA	ND (0.001) [ND (0.001)]
Acetone	NA	NA	NA	NA	NA	ND (0.05) [ND (0.05)]
Benzene	NA	NA	NA	NA	NA	ND (0.001) [ND (0.001)]
cis-1,2-Dichloroethene	NA	NA	NA	NA	NA	ND (0.001) [ND (0.001)]
Ethylbenzene	NA	NA	NA	NA	NA	ND (0.001) [ND (0.001)]
Methylene chloride	NA	NA	NA	NA	NA	ND (0.005) [ND (0.005)]
Tetrachloroethene	NA	NA	NA	NA	NA	ND (0.001) [ND (0.001)]
Toluene	NA	NA	NA	NA	NA	ND (0.001) [ND (0.001)]
Trichloroethene	NA	NA	NA	NA	NA	ND (0.001) [ND (0.001)]
Vinyl Chloride	NA	NA	NA	NA	NA	ND (0.001) [ND (0.001)]
Inorganics						
Antimony	0.0042	< 0.0031 B	0.003 [0.0031]	0.0032	ND 0.005 [ND 0.005]	0.005
Vanadium	0.014	0.02 (RDW)	0.013 (RDW) [0.014 (RDW)]	0.02 (RDW)	0.013 (RDW) [0.013 (RDW)]	0.045 (RDW,GSI)

MWF12-01							
Date	10/3/2012	12/4/2013	9/19/2014	9/22/2015	9/21/2016	10/24/2017	1/17/2018
Field Parameters							
pH Field	7.21	7.51	7.1	7.47 [7.47]	7.19	7.04	6.79
VOCs							
1,1,1-Trichloroethane	0.009	0.026	0.025	0.022 [0.018]	0.016 [0.017]	0.008 [0.01]	NA
1,1,2-Trichloroethane	ND(0.001)	ND(0.001)	ND (0.001)	ND (0.001) [ND(0.001)]	ND (0.001) [ND (0.001)]	ND (0.001) [ND (0.001)]	NA
1,1-Dichloroethane	0.0011	0.0041	0.0046	0.0039 [0.0041]	0.003 [0.004]	0.002 [0.002]	NA
1,1-Dichloroethene	0.00045	0.0014	0.0022	0.0012 [0.0012]	ND (0.001) [0.001]	ND (0.001) [ND (0.001)]	NA
1,2-Dichloroethane	ND(0.001)	ND(0.001)	ND (0.001)	ND (0.001) [ND(0.001)]	ND (0.001) [ND (0.001)]	ND (0.001) [ND (0.001)]	NA
Acetone	ND(0.025)	0.0024 J	ND (0.025)	ND (0.025) [ND(0.025)]	ND (0.050) [ND (0.050)]	ND (0.05) [ND (0.05)]	NA
Benzene	ND(0.001)	ND(0.001)	ND (0.001)	ND (0.001) [ND(0.001)]	ND (0.001) [ND (0.001)]	ND (0.001) [ND (0.001)]	NA
cis-1,2-Dichloroethene	ND(0.001)	ND(0.001)	0.0002 J	ND (0.001) [ND(0.001)]	ND (0.001) [ND (0.001)]	ND (0.001) [ND (0.001)]	NA
Ethylbenzene	ND(0.001)	ND(0.001)	ND (0.001)	ND (0.001) [ND(0.001)]	ND (0.001) [ND (0.001)]	ND (0.001) [ND (0.001)]	NA
Methylene chloride	ND(0.005)	ND(0.005) J	ND (0.005)	ND (0.005) [ND(0.005)]	ND (0.005) [ND (0.005)]	ND (0.005) [ND (0.005)]	NA
Tetrachloroethene	ND(0.001)	ND(0.001)	ND (0.001)	ND (0.001) [ND(0.001)]	ND (0.001) [ND (0.001)]	ND (0.001) [ND (0.001)]	NA
Toluene	ND(0.001)	ND(0.001)	ND (0.001)	ND (0.001) [ND(0.001)]	ND (0.001) [ND (0.001)]	ND (0.001) [ND (0.001)]	NA
Trichloroethene	ND(0.001)	ND(0.001)	ND (0.001)	ND (0.001) [ND(0.001)]	ND (0.001) [ND (0.001)]	ND (0.001) [ND (0.001)]	NA
Vinyl Chloride	ND(0.001)	ND(0.001)	ND (0.001)	ND (0.001) [ND(0.001)]	ND (0.001) [ND (0.001)]	ND (0.001) [ND (0.001)]	NA
Inorganics							
Manganese	**3.2 (RDW,NRDW,NRHBDW,GSI)**	**5.2 (RDW,NRDW,NRHBDW,GSI)**	2.4 (RDW,NRDW,GSI)	**2.8 [2.6] (RDW,NRDW,NRHBDW,GSI)**	2.25 (RDW,NRDW,GSI)**[5.29 (RDW, NRDW, NRHBDW,GSI)]**	**17.8 (RDW, NRDW, NRHBDW,GSI)**	**3.32[3.12] (RDW, NRDW, NRHBDW,GSI)**

MW-40-99						
Date	10/3/2012	12/3/2013	9/18/2014	9/22/2015	9/20/2016	10/26/2017
Field Parameters						
pH Field	7.23	7.15	7.25	7.5	7	7.15
PCBs						
Total PCBs	NA	NA	NA	NA	NA	ND (0.0001)
VOCs						
1,1,1-Trichloroethane	ND(0.001)	ND(0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)
1,1,2-Trichloroethane	ND(0.001)	ND(0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)
1,1-Dichloroethane	ND(0.001)	ND(0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)
1,1-Dichloroethene	ND(0.001)	ND(0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)
1,2-Dichloroethane	ND(0.001)	ND(0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)
Acetone	0.0016 J	ND (0.025) B	0.031	ND (0.025)	ND (0.050)	ND (0.05)
Benzene	ND(0.001)	ND(0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)
cis-1,2-Dichloroethene	ND(0.001)	ND(0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)
Ethylbenzene	ND(0.001)	ND(0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)
Methylene chloride	ND(0.005)	ND(0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)
Tetrachloroethene	ND(0.001)	ND(0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)
Toluene	0.00016 J	ND(0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)
Trichloroethene	ND(0.001)	ND(0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)
Vinyl Chloride	ND(0.001)	ND(0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)

MWF12-02		
Date	9/21/2016	10/24/2017
Field Parameters		
pH Field	7.52	7.19
VOCS		
1,1,1-Trichloroethane	0.004	0.001
1,1,2-Trichloroethane	ND (0.001)	ND (0.001)
1,1-Dichloroethane	0.002	0.002
1,1-Dichloroethene	ND (0.001)	ND (0.001)
1,2-Dichloroethane	ND (0.001)	ND (0.001)
Acetone	ND (0.050)	ND (0.05)
Benzene	ND (0.001)	ND (0.001)
cis-1,2-Dichloroethene	ND (0.001)	ND (0.001)
Ethylbenzene	ND (0.001)	ND (0.001)
Methylene chloride	ND (0.005)	ND (0.005)
Tetrachloroethene	ND (0.001)	ND (0.001)
Toluene	ND (0.001)	ND (0.001)
Trichloroethene	ND (0.001)	ND (0.001)
Vinyl Chloride	ND (0.001)	ND (0.001)
Inorganics		
Manganese	**3.91 (RDW, NRDW, NRHBDW, GSI)**	0.808 (RDW, NRDW)

MWW10-03						
Date	10/2/2012	12/5/2013	9/18/2014	9/23/2015	9/21/2016	10/26/2017
Field Parameters						
pH Field	6.88	6.83	7.11	7.3	7.15	7.12
Pests/PCBs						
Total PCBs	ND (0.00095)	< 0.000098 [<0.00011]	ND(0.000095)	ND (0.000095)	ND (0.001)	ND (0.0001)
VOCs						
1,1,1-Trichloroethane	ND(0.001)	ND(0.001) [ND(0.001)]	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)
1,1,2-Trichloroethane	ND(0.001)	ND(0.001) [ND(0.001)]	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)
1,1-Dichloroethane	ND(0.001)	ND(0.001) [ND(0.001)]	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)
1,1-Dichloroethene	ND(0.001)	ND(0.001) [ND(0.001)]	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)
1,2-Dichloroethane	ND(0.001)	ND(0.001) [ND(0.001)]	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)
Acetone	ND(0.025)	ND (0.025) [ND (0.0250]	ND (0.025)	ND (0.025)	ND (0.050)	ND (0.05)
Benzene	ND(0.001)	ND(0.001) [ND(0.001)]	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)
cis-1,2-Dichloroethene	ND(0.001)	ND(0.001) [ND(0.001)]	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)
Ethylbenzene	ND(0.001)	ND(0.001) [ND(0.001)]	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)
Methylene chloride	ND(0.005)	ND(0.005) [ND(0.005)]	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)
Tetrachloroethene	ND(0.001)	ND(0.001) [ND(0.001)]	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)
Toluene	ND(0.001)	ND(0.001) [ND(0.001)]	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)
Trichloroethene	ND(0.001)	ND(0.001) [ND(0.001)]	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)
Vinyl Chloride	ND(0.001)	ND(0.001) [ND(0.001)]	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)
Inorganics						
Lead	ND (0.001)	ND(0.001) [ND(0.001)]	ND (0.001)	0.001 U	ND (0.003)	ND (0.003)
Manganese	0.12 RDW,NRDW	0.047 [0.062 RDW,NRDW]	0.03	0.12 RDW,NRDW	0.060 (RDW, NRDW)	0.067 (RDW, NRDW)



LEGEND:

▬	APPROXIMATE GENERAL MOTORS (GM) COMPANY, LLC PROPERTY BOUNDARY
▬ ·· ▬	APPROXIMATE RACER TRUST (RACER) PROPERTY BOUNDARY
MWM1-⊕	GROUNDWATER MONITORING WELL LOCATION
-·-·-·-	FENCED AREA
M-5 □	APPROXIMATE AOI (AREA OF INTEREST) AREA AND IDENTIFICATION NUMBER
▨	OFF-SITE GROUNDWATER ORDINANCE AREA

MICHIGAN PART 201 GENERIC CRITERIA FOR GROUNDWATER

RDW – RESIDENTIAL DRINKING WATER CRITERIA
NRDW – NON-RESIDENTIAL DRINKING WATER CRITERIA
NRHBDW – NON-RESIDENTIAL HEALTH BASED DRINKING WATER VALUE
GSI – GROUNDWATER SURFACE WATER INTERFACE CRITERIA

🟨	CONSTITUENT CONCENTRATION EXCEEDS NON-RESIDENTIAL AND RESIDENTIAL SCREENING CRITERIA
🟪	CONSTITUENT CONCENTRATION EXCEEDS RESIDENTIAL SCREENING CRITERIA
⬜	CONSTITUENT CONCENTRATION EXCEEDS GROUNDWATER SURFACE WATER INTERFACE CRITERIA AND ONE OR MORE ADDITIONAL CRITERIA

BOLD VALUE = CONSTITUENT CONCENTRATION EXCEEDS NON-RESIDENTIAL HEALTH BASED DRINKING WATER VALUE

NOTES:

1. ALL SAMPLE LOCATIONS ARE APPROXIMATE.
2. ALL CONCENTRATIONS ARE PRESENTED IN MILLIGRAMS PER LITER (MG/L).
3. DUPLICATE ANALYSES ARE PRESENTED IN BRACKETS.
4. ND (0.25) – CONSTITUENT NOT DETECTED, ASSOCIATED DETECTION LIMIT PRESENTED IN BRACKETS.
5. B – RESULT EXCEEDS THE METHOD OF DETECTION LIMIT AND/OR REPORTING LIMIT IN THE METHOD BLANK
6. J – ESTIMATED CONCENTRATION.
7. NA – NOT ANALYZED
8. VOC – VOLATILE ORGANIC COMPOUND
9. ANALYTICAL DATA DATING BACK TO SEPTEMBER 2012 PRESENTED ON THIS FIGURE. ALL HISTORICAL DATA PRESENTED IN ATTACHMENT 3.
10. MONITORING WELL MWM16-43 WAS NOT SAMPLED IN 2013, 2014 AND 2015 BECAUSE THE WELL WAS DAMAGED. MWM16-37 WAS SAMPLED IN 2016 AS A REPLACEMENT WELL FOR MWM16-43.
11. MWM16-21 COULD NOT BE LOCATED/SAMPLED IN 2017.

	Units	Non-Residential Drinking Water Criteria	Residential Drinking Water Criteria	Groundwater Surface Water Interface Crlterla
Pests/PCBs				
Total PCB's	mg/L	0.0005	0.0005	0.0002
VOCs				
1,1,1-Trichloroethane	mg/L	0.2	0.2	0.089
1,1,2-Trichloroethane	mg/L	0.005	0.005	0.33
1,1-Dichloroethane	mg/L	2.5	0.88	0.74
1,1-Dichloroethene	mg/L	0.007	0.007	0.13
1,2-Dichloroethane	mg/L	0.005	0.005	0.36
Acetone	mg/L	2.1	0.73	1.7
Benzene	mg/L	0.005	0.005	0.2
cis-1,2-Dichloroethene	mg/L	0.07	0.07	0.62
Ethylbenzene	mg/L	0.074	0.074	0.018
Dichloromethane (Methylene Chloride)	mg/L	0.005	0.005	1.5
Tetrachloroethene	mg/L	0.005	0.005	0.06
Toluene	mg/L	0.79	0.79	0.27
Trichloroethene	mg/L	0.005	0.005	0.2
Vinyl Chloride	mg/L	0.002	0.002	0.013
Inorganics				
Antimony	mg/L	0.006	0.006	0.13
Lead	mg/L	0.004	0.004	0.014
Manganese	mg/L	0.05	0.05	1.3
Vanadium	mg/L	0.062	0.0045	0.027

0 500' 1000'
GRAPHIC SCALE

RACER TRUST
PONTIAC, MICHIGAN
PONTIAC NORTH CAMPUS

GROUNDWATER ANALYTICAL SUMMARY OCTOBER 2017

ARCADIS Design & Consultancy for natural and built assets

FIGURE
3

CITY: SYRACUSE DIV/GROUP: IMDV DB: A.FOX G.STOWELL PM:(Reqd) LYR:(Opt)ON=*;OFF=*REF*
C:\Users\gstowell\OneDrive - ARCADIS\BIM 360 Docs\RACER TRUST\RACER Pontiac North Campus\2018\B0064607.2017\01-DWG\00007-DATABOX-3.DWG LAYOUT: 3 SAVED: 2/16/2018 3:05 PM ACADVER: 21.0S (LMS TECH) PAGESETUP: C-LD2B-PDF-GMS PLOTSTYLETABLE: PLTFULL.CTB
PLOTTED: 2/16/2018 3:05 PM BY: STOWELL, GARY
XREFS: 00007-BASE-21 00007-PNC-DL IMAGES:

APPENDIX A

Letter to USEPA

Transmitted Via Email

October 30, 2009

Mr. Nate Nemani
United States Environmental Protection Agency
Region V, LU-9J
77 West Jackson Street
Chicago, IL 60604-3590
LU-9J

Re: GM Pontiac North Campus – Semi-Annual Groundwater Monitoring Program Proposed Modifications

Dear Mr. Nemani:

The purpose of this letter is to request approval from the United States Environmental Protection Agency (U.S. EPA) to modify the Groundwater Monitoring Program (GMP) for the General Motors Pontiac North Campus Facility (Facility) located in Pontiac, Michigan.

GM Corporation filed for Chapter 11 protection on June 1, 2009 under the Bankruptcy Code. On July 10, 2009, GM Company (since renamed GM LLC) was created through the sale of certain GM Corporation assets pursuant to Section 363 of the Bankruptcy Code. General Motors Corporation (renamed MLC) remains in Chapter 11 bankruptcy protection and is managing the assets that were not sold to GM Company (now GM LLC). A portion of the Pontiac North Campus is part of GM LLC and a portion remains with MLC. GM LLC and MLC are jointly submitting this request until the facility separation discussions (e.g., utility splits) are completed and we have an agreement with U.S. EPA on managing the Corrective Action in the future.

Attachment A details the proposed changes to the GMP and provides supporting information. These include the elimination of select monitoring wells and parameters, a change in monitoring frequency and terminating the program after 2 additional years of sampling.

We are requesting U.S. EPA approval of the proposed modifications to the GMP provided in Attachment A, including termination of the program after an additional 2 years (ending in November 2011) if concentrations remain stable or decline. MLC and GM LLC feel that a 2 year timeframe is appropriate given the quantity of groundwater data that has been generated since 2001. Based on the extensive database of analytical data, and the observed stability of groundwater conditions at the Facility, the proposed modifications present a modest reduction in monitoring that will continue to demonstrate that the conditions at the Facility are adequately assessed.

The next semi-annual groundwater sampling event is scheduled for early December 2009. We would appreciate your expeditious review of these modifications so we can eliminate unnecessary sampling during the December monitoring event. To facilitate your review, GM LLC and MLC propose a conference call on Thursday November 5th or Friday November 6th, 2009 to discuss these proposed modifications to the Groundwater Monitoring Program. In the meantime, if you have any questions please feel free to contact the undersigned.

Sincerely,

Robert Hare
MLC Project Manager
248-225-3277

Jean Caufield
GM LLC Project Manager
313-506-9468

cc: John McKenna, ARCADIS
Gavin O'Neill, CRA
Francis Ramacciotti, ENVIRON

Attachment A
Proposed Modifications
Semi-Annual Groundwater Monitoring Program

On October 10, 2000, GM Corporation (now MLC) and the U.S. EPA entered into a Performance Based Corrective Action Agreement for the Pontiac North Campus Site. The Site encompasses approximately 595 acres in the northwest quadrant of the City of Pontiac. Groundwater samples have been collected from select monitoring wells on a semi-annual basis since 2002 as part of the GMP to demonstrate that constituent concentrations in groundwater are stable and that migration of contaminated groundwater is not occurring. The Groundwater Monitoring Program (GMP) was presented as part of the Environmental Indicators (EI) CA750 determination (ENVIRON, 2002). Since 2002, GM Corporation added several additional monitoring wells to the GMP at the request of the U.S. EPA. Following each monitoring event a report summarizing the results was prepared and submitted to U.S. EPA. Following the semi-annual sampling events of 2008, the groundwater monitoring program was evaluated to determine if modifications to the plan are warranted.

Two initial rounds of sampling were completed at each monitoring well that was installed as part of the RFI Work Plan (ENCORE, 2001). Monitoring wells included in the GMP have been sampled on a semi-annual basis since 2002. Additional wells were added to the GMP as additional RFI activities were completed or additional groundwater monitoring was required as a provision for completed Interim Measures (IM). When the analytical data from the semi-annual sampling appeared to be anomalous an additional groundwater sample was immediately collected from that individual well to verify the results for individual constituent(s). These confirmation samples are identified as a Partial Sample Event.

A comprehensive database of these analytical results has been developed over the past eight years. Even though groundwater at the Facility is not used as a drinking water source, analytical results were compared against both Michigan Department of Environmental Quality (MDEQ) Part 201 Residential Drinking Water criteria (RDW) and Industrial Drinking Water (IDW) criteria. Stable or reducing conditions have been observed in at least four sampling events in the analytical results at several locations included in the GMP.

This submittal proposes the following:

1) Elimination of select monitoring wells and parameters from the GMP,
2) Change the frequency of monitoring from semi-annual to annual; and
3) Implement the GMP for 2 more years and terminate it after that provided the data continue to show stable or decreasing trends.

The attached Table 1 provides an evaluation of each monitoring well in the semi-annual sampling program, and indicates modifications being proposed to the sample collection frequency and associated groundwater analysis.

SEMI-VOLATILE ORGANIC COMPOUNDS

Semi-volatile organic compounds (SVOCs) were analyzed for at the majority of the monitoring wells in the GMP. Two SVOCs were only detected above drinking water criteria in three monitoring wells, IWD7, MWW1-02 and MWW1-04. Bis (2-Ethylhexyl)phthalate was detected above the screening criteria once (January 2002) out of 16 sampling events at monitoring well IWD7 and once (October 2004) out of 14 sampling events at well MWW1-02 Bis (2-Ethylhexyl)phthalate is a common laboratory contaminant. Pentachlorophenol was detected above the screening criteria in monitoring well MWW1-04 four (November 2005, February 2006, May 2006, and November 2007) out of 15 samples collected. Based on this evaluation, it is proposed that SVOCs be removed from the analytical parameter list for the GMP.

SHALLOW MONITORING WELLS

For shallow monitoring wells (designated MW) at the Facility, 8 monitoring wells are proposed for elimination from the sampling program. Sample frequency for the remaining monitoring wells is proposed to be reduced from semi-annual to annual for two more years, ending in November 2011 (see Table 1A). The eight monitoring wells (MWD6, MWW1-02, MWW1-03, MWW1-06, MWF12-02, MWM16-05, MWM16-22, and MWM16-54) are proposed to be removed from the GMP because the analytical results have either not exceeded drinking water criteria, were non-detect, or if constituents were detected above criteria the concentrations have stabilized.

Monitoring wells located downgradient of light non-aqueous phase liquid (LNAPL) Area Nos. 1, 2, 3, and 9/10 will continue to be sampled to monitor the upgradient LNAPL areas. Monitoring wells MW40-99 and MWW9-01 are all located downgradient of LNAPL areas. These monitoring locations have not exhibited elevated concentrations of volatile organic compounds (VOCs), PCBs, or site specific parameter list (SSPL) metals and detected concentrations have stabilized. However, they will continue to be sampled to monitor the upgradient LNAPL areas. We propose that these wells be sampled annually instead of the current semi-annual monitoring.

For shallow monitoring wells that have a limited number of sample events (MWW5-01, MWM16-21, MWM16-43, and MWW8-65) the sample frequency will be reduced to annually. Some of these wells have only been sampled three to five times, thus precluding observation of contaminant concentration trends.

Five shallow monitoring wells have been sampled for total dioxins (MWW1-02, MWW1-03, MWW1-04, MWW1-06, and MW40-99). Exceedances of the screening criteria were observed at MWW1-03, MWW1-04 and MW40-99. Dioxins have been reported exceeding criteria three times (15 total samples collected) in monitoring well MWW1-03 and have not been detected above criteria since May 2008. Following the detection of dioxins exceeding criteria in May 2008 a confirmatory sample was collected and the results were non-detect. Dioxins have been reported exceeding criteria once (15 total samples) in monitoring well MWW1-04 and have not been reported exceeding criteria since May 2006. Dioxins have been reported exceeding criteria twice (14 total samples) in monitoring well MW40-99 and have not been reported exceeding criteria since May 2007. We are proposing that dioxins be removed from the sampling program due to the low levels observed and stability of the analytical results.

INTERMEDIATE MONITORING WELLS

We are proposing that intermediate monitoring wells (designated IW) at the Facility be removed from the groundwater sampling program, as shown on Table 1B. Groundwater samples have been collected from monitoring well IWP5 a total of 15 times. Thallium (dissolved) was detected in this well above screening criteria in January 2001 and has not exceeded the screening criteria since (15 sample events). Acetone has also been detected above the screening criteria; however it was reported in the RFI Report (ENCORE 2002) that it has been documented that bentonite pellets, which were used in the well construction, have been known to contain acetone. Acetone is also a common laboratory contaminant Acetone has not been detected above criteria since November 2002 (12 sample events). Groundwater samples have also been collected 15 times from monitoring well IWD7. Bis (2-Ethylhexyl)phthalate, lead, and vanadium were detected above the screening criteria once in January 2002. Since that time these three constituents have not been detected above screening criteria (13 sample events). Arsenic was detected twice above screening criteria (May and November 2007 sampling events) in this well. In both subsequent sampling events (October 2007 and November 2008) arsenic did not exceed the screening criteria.

Groundwater samples have never been collected from monitoring well IWP2, due to insufficient water in the well to collect a sample. For this reason, this well should be removed from the GMP and abandoned.

DEEP MONITORING WELLS

We are proposing that deep monitoring wells (designated GW and DW) be removed from the groundwater sampling program (Table 1C). As part of the original RFI activities, groundwater monitoring wells were installed into two deeper groundwater bearing units (outwash deposits) at the Facility. Deep monitoring wells designated as GW (e.g. GWD8) were installed between 878 and 893 feet above mean sea level (AMSL) in a sand zone (upper outwash deposits). The depth of the GW wells range from 55 to 107 feet below ground surface. Monitoring wells were also installed in a deeper groundwater bearing zone (lower outwash deposits) to determine if a downward vertical hydraulic gradient existed at the Facility and if constituents detected in the shallower water bearing units had migrated to the lower water bearing units. These monitoring wells installed in the lower outwash deposits were designated as DW (e.g. DWD10) and were installed between 808 and 858 AMSL in a sand and gravel zone. The depth of the DW wells range from 115 to 150 feet below ground surface.

Chromium has been detected twice and vanadium once exceeding criteria in monitoring well GWP6. Neither has been detected above criteria since November 2007. Lead and vanadium have been detected once each exceeding criteria in monitoring well GWP3; neither has been detected above criteria since May 2005. The only other two constituents detected above criteria were methylene chloride in monitoring well DWD12 in (May 2003) and acetone in monitoring wells GWD8 (September 2001), GWD9 (May and December 2003), GWP3 (September 2001, and GWP6 (September 2001 and January 2002). Both of these constituents are common laboratory contaminants and acetone has also been documented to be contained in bentonite pellets.

Arsenic is the only other constituent observed above screening criteria in the lower outwash deposits at the Facility. The concentrations of arsenic in the monitoring wells installed in both the upper (GW) and

lower (DW) outwash deposits have been consistent over time. Elevated arsenic concentrations in groundwater in southeastern Michigan are well documented and it is believed that the concentrations detected in these deep monitoring wells are associated with regional background levels. In addition, for monitoring wells were arsenic has been detected above criteria the concentrations have stabilized.

Due to the lack of reported exceedances of VOCs, SVOCs, and PCBs in the deep saturated groundwater zone, it is proposed that the deep monitoring wells be removed from the groundwater monitoring program.

Tables 1A through 1C provide a detailed summary of the proposed changes to the groundwater monitoring program. Appendix A provides the complete set of the semi-annual groundwater sampling analytical tables.

APPENDIX B

Email Approval from USEPA

Subject: FW: GM Pontiac North Campus - Semi-Annual Groundwater Monitoring Program Proposed Modifications
Attachments: PNC GMP Moficication Proposal 10-30-09.pdf

-----Original Message-----
From: Nemani.Nate@epamail.epa.gov [mailto:Nemani.Nate@epamail.epa.gov]
Sent: Monday, November 23, 2009 2:59 PM
To: Hare, Robert
Cc: Landale, Beth; jean.e.caufield@gm.com; McKenna, John; O'Neill, Gavin
Subject: Re: GM Pontiac North Campus - Semi-Annual Groundwater Monitoring Program Proposed Modifications

Bob:

The proposal modifications to the semi-annual Groundwater Monitoring Program (GMP) outlined in the October 30, 2009 e-mail w/ attachments for the subject facility have been reviewed.

The submittal requested approval for the following provisions.

a) Elimination of select monitoring wells and parameters from the GMP .

b) Change of frequency of monitoring from semi-annual to annual for certain wells.

c) Implement the GMP for two (2) more years and terminate it after that provided the data continue to show stable or decreasing trends.

Based on the review and the justifications offered for the changes, the above provisions a) and b) are hereby approved.

Regarding the provision c), to terminate the GW monitoring after 2 years, a separate request , will need to be submitted at the of the 2-year period with pertinent documentation.

If you have any questions, please contact me.

Nate

NATE NEMANI, P.E.
RCRA CORRECTIVE ACTION PROJECT MANAGER
LAND AND CHEMICALS DIVISION
REMEDIATION AND REUSE BRANCH,
U. S.EPA, REGION 5 ,
77 W JACKSON Blvd, CHICAGO,ILLINOIS,60604, Mail Code: LU-9J
(312) 886-3224 (PHONE)
(312) 692-2176 (FAX)
nemani.nate@epa.gov (e-mail address)

From: "O'Neill, Gavin" <goneill@craworld.com>

To: Nate Nemani/R5/USEPA/US@EPA

Cc: "Hare, Robert" <rhare@alixpartners.com>, <jean.e.caufield@gm.com>, "Landale, Beth"
<blandale@craworld.com>, "McKenna, John" <John.McKenna@arcadis-us.com>

Date: 10/30/2009 01:02 PM

Subject: GM Pontiac North Campus - Semi-Annual Groundwater Monitoring Program Proposed Modifications

Mr. Nemani

Please find attached a joint request from GM LLC and MLC to modify the Semi-Annual Groundwater Monitoring Program for the GM Pontiac North Campus. As presented in the attached letter, we are proposing a conference call next week on either November 5 or 6, 2009 to discuss the proposed modifications. Please let us know at your earliest convenience your availability for those dates.

Should you have any questions or require additional information, please contact our office.

_____--------_____
Gavin O'Neill
Conestoga-Rovers & Associates (CRA)

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[attachment "PNC Proposed Modifications to GMP.pdf" deleted by Nate Nemani/R5/USEPA/US]

APPENDIX C

Well Construction Logs

Date Start/Finish: 9/17/01-9/18/01 **Drilling Company:** Pennsylvania Drilling Co **Driller's Name:** Earl Stye **Drilling Method:** 8" spun casing **Sampler Size:** **Auger Size:** **Rig Type:**	**Northing:** 426115.73 **Easting:** 13411291.42 **Casing Elevation:** 972.94 **Borehole Depth:** 28 **Surface Elevation:** 973.41 **Descriptions By:** Bart Williams	**Well/Boring ID:** MWF8-01 **Client:** GM **Location:** GM Pontiac North Campus

DEPTH / ELEVATION	Sample Run Number	Sample/Int/Type	Blows / 6 Inches	N - Value	Recovery (feet)	PID Headspace (ppm)	USCS Code	Geologic Column	Stratigraphic Description	Hydrostratigraphy	Boring Construction
975											Aboveground Locked Protective Casing
0	0-2		2 2 0 0	2	0.7	BG	Concrete		Concrete		Concrete (0 - 2' bgs)
									brown, medium SAND, very loose to medium dense, moist (fill)		
	2-4		4 7 6 8	12	1.5	1.0					
970											
	4-6		3 6 9 18	15	1.4	0.9					
5											
	6-8		8 9 9 12	18	1.7	1.1					Cement/Bentonite Grout (2 - 14' bgs)
	8-10		10 3 8 7	11	1.5	2.0					2-inch ID, flush threaded, Schedule 40 PVC riser pipe (0 - 18' bgs)
965									at 9.0 increase in moisture		
10	10-12		6 8 10 11	18	1.6	2.0	SP		at 11.0 some Silty Sands		
	12-14		10 12 14 19	26	1.5	2.1					
960									at 14.0 grading to coarser sand		
	14-16		7 10 9 12	19	1.5	BG					Hydrated Bentonite Seal (14 - 16' bgs)
15											

ENCORE

Remarks: 8" Borehole

BG - Background
bgs - below ground surface

Client:
GM

Site Location:
GM Pontiac North Campus

Well/Boring ID: MWF8-01

Borehole Depth: 28

DEPTH / ELEVATION	Sample Run Number	Sample/Int/Type	Blows / 6 Inches	N - Value	Recovery (feet)	PID Headspace (ppm)	USCS Code	Geologic Column	Stratigraphic Description	Hydrostratigraphy	Boring Construction
	16-18		12 10 13 16	23	1.4	0.6	SP		brown medium SAND, very loose to medium dense, moist (fill)		2-inch ID, flush threaded, Schedule 40 PVC riser pipe (0 - 18' bgs)
955	18-20		10 12 11 14	23	1.4	1.3			at 20.0 trace fine Gravel content		
20	20-22		12 11 12 15	23	1.6	1.0			gray-brown well graded fine to coarse SAND and fine to medium GRAVEL, dense, wet		# 5 Sand Pack (16 - 28' bgs)
	22-24		11 13 13 14	26	1.8	BG			at 22.0 trace Silt and Clay		2-inch ID, PVC wire-wrapped, 10-slot well screen (18 - 28' bgs)
950	24-26		12 14 15 16	29	1.7	BG	SW-GW				
25	26-28		10 13 15 27	28	1.8	BG					

ENCORE

Remarks: 8" Borehole

BG - Background
bgs - below ground surface

Date Start/Finish: 8/14/01
Drilling Company: Pennsylvania Drilling Co
Driller's Name: Norm Hormel
Drilling Method: Hollow Stem
Sampler Size: 2", 2' Long
Auger Size:
Rig Type:

Northing: 424218.48
Easting: 13411263.41
Casing Elevation: 966.81

Borehole Depth: 26
Surface Elevation: 963.98

Descriptions By: G. Liedel

Well/Boring ID: MWF12-02

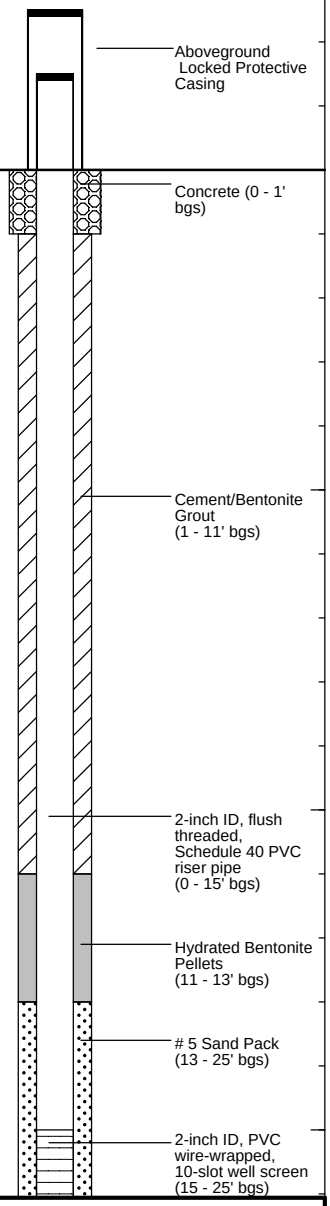
Client: GM

Location: GM Pontiac North Campus

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Blows / 6 Inches	N - Value	Recovery (feet)	PID Headspace (ppm)	USCS Code	Stratigraphic Description
	965								
0								Coal	Coal
		0-2 1	SS	2 5 8 9	13	0.4	BG	CL	light brown Silty CLAY, trace fine to medium Sand, trace fine Gravel, medium dense, moist (fill)
		2-4 2	SS	70/4		0.0	BG	GP	brown medium GRAVEL, very dense, moist
	960	4-6 3	SS	8 10 15 19	25	0.0	BG		
5		6-8 4	SS	6 5 5 4	10	1.8	BG	SP	light brown very fine SAND, trace Silt, loose, moist
	955	8-10 5	SS	4 4 5 5	9	1.5	BG		
10		10-12 6	SS	5 5 7 10	12	1.8	BG	ML-SM	light brown very fine SAND and SILT, moist to wet
		12-14 7	SS	11 12 13 14	25	2.0	BG	SP	light brown, fine SAND, medium dense to dense, moist
	950	14-16 8	SS	3 4 7 9	11	1.8	BG		at 14.5' becomes orangish brown at 15.2' becomes gray
15									

Hydrostratigraphy

Boring Construction



Remarks: Water table at 17.0'
SS - Splitspoon
BG - Background
ppm - parts per million bgs - below ground surface

Client:
GM

Site Location:
GM Pontiac North Campus

Well/Boring ID: MWF12-02

Borehole Depth: 26

DEPTH / ELEVATION	Sample Run Number	Sample/Int/Type	Blows / 6 Inches	N - Value	Recovery (feet)	PID Headspace (ppm)	USCS Code	Geologic Column	Stratigraphic Description	Hydrostratigraphy	Boring Construction
	16-18 9	SS	8 9 11 12	20	2.0	BG	SP		light brown, fine SAND, medium dense, moist at 18.0' becomes medium with orange staining		
945	18-20 10	SS	2 3 4 5	7	2.0	BG					
20	20-22 11	SS	3 4 6 7	10	2.0	BG					# 5 Sand Pack (13 - 25' bgs)
	22-24 12	SS	8 9 10 12	19	2.0	BG					2-inch ID, PVC wire-wrapped, 10-slot well screen (15 - 25' bgs)
940	24-26 13	SS	11 13 14 12	27	2.0	BG					Natural Collapse (25 - 26' bgs)
25											

ENCORE

Remarks: Water table at 17.0'
SS - Splitspoon
BG - Background
ppm - parts per million bgs - below ground surface

Date Start/Finish: 01/25/02 **Drilling Company:** Pennsylvania Drilling Co **Driller's Name:** Earl Dye **Drilling Method:** 8" spun casing **Sampler Size:** 2", 2' Long **Auger Size:** 3 1/4" **Rig Type:** CME	**Northing:** 428271.45 **Easting:** 13411658.47 **Casing Elevation:** 979.83 **Borehole Depth:** 29 **Surface Elevation:** 980.15 **Descriptions By:** Bart Williams	**Well/Boring ID:** MWM16-02 **Client:** GM **Location:** GM Pontiac North Campus

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Blows / 6 Inches	N - Value	Recovery (feet)	PID Headspace (ppm)	USCS Code	Geologic Column	Stratigraphic Description	Hydrostratigraphy	Boring Construction
0	980	0-2	SS	5 5 10 4	15	1.0	BG	GW		brown fine to coarse GRAVEL, parking lot material, medium dense, dry (fill)		Flushmount Locked Protective Casing Concrete (0 - 1' bgs)
		2-4	SS	5 8 10 4	18	1.3	BG	SC		brown to gray Sandy CLAY, fine to medium Sand, trace Silt, medium to high plasticity, dry to moist		
5	975	4-6	SS	4 5 5 4	10	1.3	BG					Hydrated Bentonite Seal (1 - 17' bgs)
		6-8	SS	3 4 4 4	8	1.2	BG					
		8-10	SS	5 5 6 7	11	0.3	BG	SW		brown fine to coarse SAND, trace fine Gravel, medium dense, wet		
10	970	10-12	SS	5 8 9 18	17	1.6	BG					2-inch ID, flush threaded, Schedule 40 PVC riser pipe (0 - 19' bgs)
		12-14	SS	22 14 15 72	29	1.0	BG	CL		gray Silty CLAY, trace fine Gravel, low plasticity, very stiff to hard, dry		
15	965	14-16	SS	16 18 17 18	35	0.9	BG BG					

ENCORE

Remarks:

SS - Splitspoon

BG - Background

ppm - parts per million bgs - below ground surface

Client:
GM

Site Location:
GM Pontiac North Campus

Well/Boring ID: MWM16-02

Borehole Depth: 29

DEPTH / ELEVATION	Sample Run Number	Sample/Int/Type	Blows / 6 Inches	N - Value	Recovery (feet)	PID Headspace (ppm)	USCS Code	Geologic Column	Stratigraphic Description	Hydrostratigraphy	Boring Construction
	16-18	SS	17 15 15 17	30	0.8	BG	CL		gray Silty CLAY, trace fine Gravel, low plasticity, very stiff to hard, dry		Hydrated Bentonite Seal (1 - 17' bgs)
	18-20	SS	6 7 7 7	14	0.8	BG			light brown medium SAND, medium dense, dry to moist		2-inch ID, flush threaded, Schedule 40 PVC riser pipe (0 - 19' bgs)
20 960	20-22	SS	8 9 11 12	20	0.7	BG			At 21.0' wetness, increase in density		
	22-24	SS	12 13 13 11	26	0.7	BG					
	24-26	SS	13 15 15 17	30	0.9	BG	SP				2-inch ID, PVC wire-wrapped, 10-slot well screen (19 - 29' bgs)
25 955	26-28	SS	12 11 13 14	24	0.9	BG					# 5 Sand Pack (17 - 29' bgs)
	28-30	SS	10 13 13 14	26	0.9	BG			28.0 - 30.0 some coarse sands		Formation Collapse (29 - 30' bgs)
30											

Remarks:
SS - Splitspoon
BG - Background
ppm - parts per million bgs - below ground surface

Date Start/Finish: 4/3/04 **Drilling Company:** Prosonic Corporation **Driller's Name:** Joe Tidwell/Don Bond **Drilling Method:** Geoprobe 6610 DT **Sampler Size:** 5.0' acetate liners **Rig Type:** NA	**Northing:** 428881 **Easting:** 12412119 **Casing Elevation:** 985.32 **Borehole Depth:** 35' **Surface Elevation:** 985.6 **Descriptions By:** Wayne Patterson	**Well ID:** MWM16-29 **Client:** General Motors Corporation **Location:** Pontiac North Campus Pontiac, Michigan

DEPTH / ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	USCS Code	Geologic Column	Stratigraphic Description	Well Construction
0 985							Concrete.	Flushmount Protective Cover
	1	0-5'	3.0'	BG	SP		FILL - Light brown fine POORLY GRADED SAND, loose to medium dense, no odor, dry.	
5 980	2	5-10'	5.0'	BG			7.5' bgs - 3" Clay lense. 9' bgs - 2" Clay lense.	Hydrated Bentonite Chips (0.5'-21' bgs)
10 975	3	10-15'	5.0'	BG			14.2' bgs - 3" Clay lense.	2" ID Schedule 40 PVC Riser (0.5'-23' bgs)
15							Dark gray fine to medium WELL GRADED SAND, loose, no odor, moist. 15' bgs - Wet, increased grain size to fine to coarse with depth.	

EEC
Encore Environmental Consortium, LLC

Remarks: bgs= below ground surface
NA= not available/not applicable
BG = below grade

Client:
General Motors Corporation

Site Location:
GM Pontiac North Campus

Boring ID: MWM16-29

Borehole Depth: 35'

DEPTH / ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	USCS Code	Geologic Column	Stratigraphic Description	Well Construction
970								
	4	15-20'	2.5'	BG	SW		Dark gray fine to medium WELL GRADED SAND, loose, no odor, moist.	
					CL		Dark gray LEAN CLAY with SILT, little fine to coarse Sand, few fine Gravel, moderately plastic, soft to medium stiff, no odor, native till, wet.	
20								
965	5	20-25'	4.0'	BG	SM		Gray brown very fine POORLY GRADED SILTY SAND, medium dense, no odor, dry to moist.	
25								
960	6	25-30'	4.0'	BG	ML		Dark gray SILT, no odor, wet at 25' bgs.	2" ID 0.010" Schedule 40 PVC Wire Wrapped Screen (23'-33' bgs)
30								
955	7	30-35'	2.5'	BG	SP		Dark gray fine to medium POORLY GRADED SAND, loose, no odor, wet.	#5 Sand Pack (21'-33' bgs)
35								Natural Collapse

Remarks: bgs= below ground surface
NA= not available/not applicable
BG = below grade

Date Start/Finish: 8/5/04
Drilling Company: Prosonic Corporation
Driller's Name: Dan O'Mara
Drilling Method: Rotosonic
Sampler Size:

Northing: 428291
Easting: 13411864
Casing Elevation: 981.08

Borehole Depth: 37'
Surface Elevation: 981.62

Descriptions By: Corrie Bondy

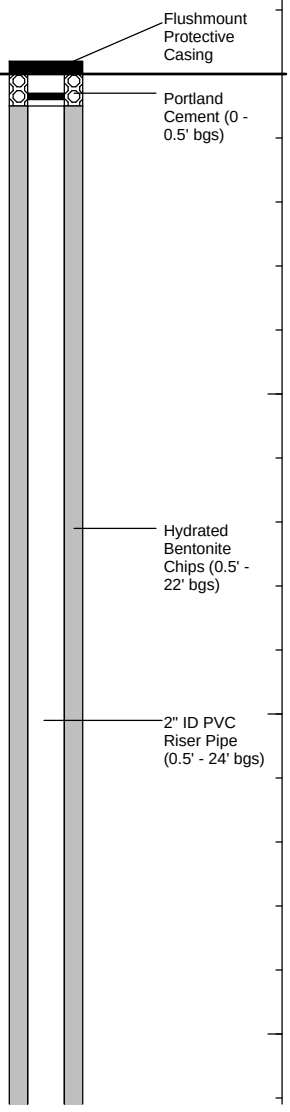
Well ID: MWM16-31

Client: General Motors Corporation

Location: Pontiac North Campus
Pontiac, Michigan

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (%)	PID Headspace (ppm)	USCS Code	Geologic Column	Stratigraphic Description
0	0							
					1.7	SP		FILL - Light brown POORLY GRADED SAND, fine to medium grained, loose, moist.
								Dark Brown at 1.5'
		1	0-7'	6.3	2.9	CL		FILL - Brown CLAY, with fine to medium Sand, trae SIlt and fine subrounded to subangular Gravel, firm, low plasticity, moist.
5	-5				2.5	GW		FILL - Brown to Black WELL GRADED GRAVEL with Asphalt, fine to coarse grained, angular, trace Cobbles, moist.
						SC		Brown CLAYEY SAND, fine to medium grained, loose, low to moderate plasticity, moist.
					1.4	CH		Brown CLAY with fine to medium SAND and SILT, firm to stiff, high plasticity, moist.
10	-10				0.7			Brown CLAYEY SAND, fine to medium grained, loose, low to moderate plasticity, moist.
								Decrease in Clay at 12'.
		2	7'-17'	10	3.9	SC		
15	-15							

Well Construction



EEC
Encore Environmental Consortium, LLC

Remarks:

Client:
General Motors Corporation

Site Location:
GM Pontiac North Campus

Boring ID: MWM16-31

Borehole Depth: 37'

DEPTH ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (%)	PID Headspace (ppm)	USCS Code	Geologic Column	Stratigraphic Description	Well Construction
				1.5				
				5.5	ML		Brown SANDY SILT, fine grained, firm, moist to very moist.	
20-20				3.3				
	3	17'-27'	10	5.6	SC		Brown CLAYEY SAND, fine to medium grained, loose, low to moderate plasticity, moist.	
25-25				1.9			No clay/silt at 25'.	
				BG			Very moist at 27'	
30-30				BG			Saturated at 30'.	Sand Pack (22' - 37' bgs)
							Gray fine to coarse Sand, with fine Gravel, trace coarse,subrounded Gravel, saturated at 32.5'.	2" ID 0.010" Wire Wrapped PVC Screen (24' - 34' bgs)
	4	27'-37'	10	7.3	ML		Gray SANDY SILT, fine grained, firm, moist to very moist.	
35-35								

Remarks:

Client:
General Motors Corporation

Site Location:
GM Pontiac North Campus

Boring ID: MWM16-31

Borehole Depth: 37'

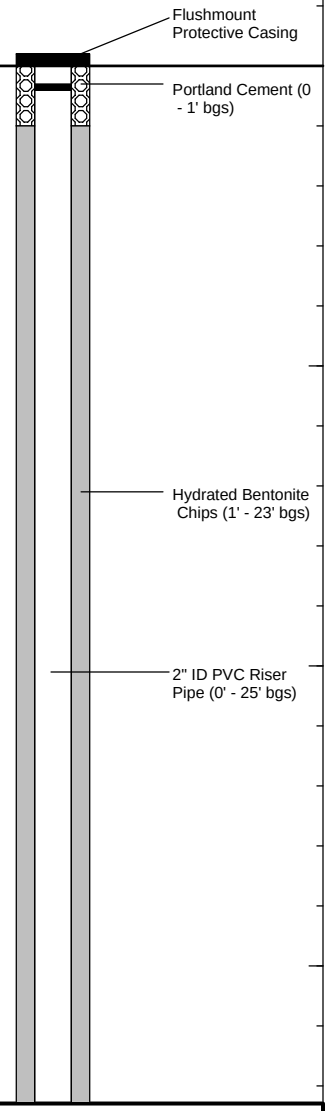
DEPTH ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (%)	PID Headspace (ppm)	USCS Code	Geologic Column	Stratigraphic Description	Well Construction
				1.5				

Remarks:

Date Start/Finish: 11/1/04 **Drilling Company:** Prosonic Corporation **Driller's Name:** Dan O'Mara **Drilling Method:** RotoSonic **Sampler Size:** NA **Rig Type:** NA	**Northing:** 428180.58 **Easting:** 13411925.54 **Casing Elevation:** 981.75 **Borehole Depth:** 38' **Surface Elevation:** 981.82 **Descriptions By:** Wayne Patterson	**Well ID:** MWM16-36 **Client:** General Motors Corporation **Location:** Pontiac North Campus Pontiac, Michigan

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	USCS Code	Stratigraphic Description
0	0						CONCRETE.
						CL	Dark grayish brown LEAN CLAY with SILT, little fine to coarse Sand, few fine to coarse Gravel, moist, medium stiff.
		1	0-7'	100%	BG		
5	-5					ML	Dark grayish brown SILT, moist to wet, dense.
						CL	Brown mottled LEAN CLAY with SILT, little fine to coarse Sand, few fine to coarse Gravel, moist, medium stiff.
						ML	Brown mottled SILT, dry to moist, loose.
10	-10					ML	Brown SILT, wet, dense.
							Brown SILT, dry, loose.
		2	7'-18'	100%	BG		
15	-15						

Well Construction



Remarks: bgs = below ground surface
ppm = parts per million
NA = not applicable/not available
BG = background

Client:
General Motors Corporation

Site Location:
GM Pontiac North Campus

Boring ID: MWM16-36

Borehole Depth: 38'

DEPTH ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	USCS Code	Geologic Column	Stratigraphic Description	Well Construction
20-20					ML			
	3	18'-28'	100%	BG				
25-25							Pale brown poorly graded fine to medium SAND, dry, loose.	Sand Pack (23' - 35' bgs)
							Color change to brown, moist to wet.	
					SP		Color change to dark gray, few fine Gravel, wet.	
30-30								
							Dark gray SILT, few Clay, wet, dense.	
	4	28'-38'	100%	BG	ML			2" ID 0.010" Wire Wrapped PVC Screen (25' - 35' bgs)
35-35							Dark grayish brown LEAN CLAY with SILT, some fine to coarse Sand, little fine to coarse Gravel, stiff, moist.	
					CL			

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Remarks: bgs = below ground surface
ppm = parts per million
NA = not applicable/not available
BG = background

Date Start/Finish: 4/5/2005
Drilling Company: Prosonic
Driller's Name: Joe Tidwell
Drilling Method: 2 1/4" Direct Push
Sampler Size: 5' x 2"
Rig Type: Geoprobe

Northing: 427707.32
Easting: 13411680.61
Casing Elevation: 983.51

Borehole Depth: 38' bgs
Surface Elevation: 983.9

Descriptions By: Marie Mathe, Taushauna Moore

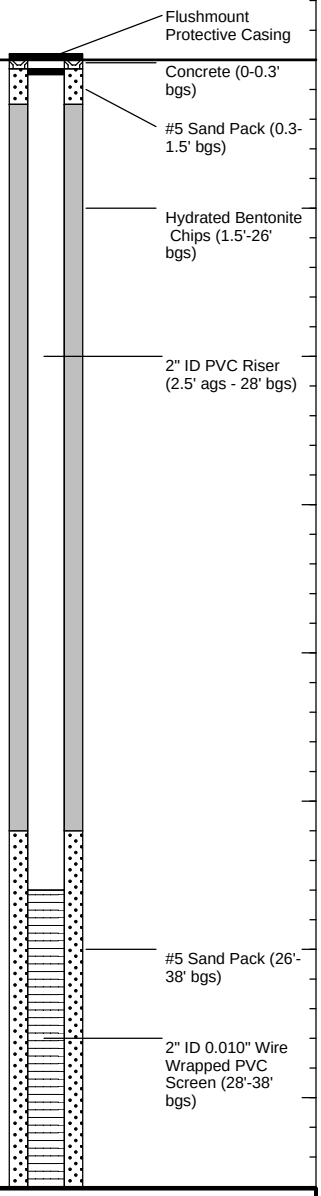
Well ID: MWM31-02

Client: General Motors

Location: GM Pontiac North Campus
Pontiac, Michigan

DEPTH / ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	USCS Code	Stratigraphic Description
0 / 0						
				11.3		CONCRETE
					SP	FILL - Black fine, foundry SAND, poorly graded, loose, moist.
	1	0-5'	60%	12.8	GP	FILL - Brown fine GRAVEL with SAND, poorly graded, loose, moist.
5 / -5				13.7		Brown CLAY, trace fine subrounded Gravel, firm, medium plasticity, moist. 5' bgs - Color becomes olive gray.
	2	5'-10'	50%	16.6		
				11.8		
10 / -10					CL	
				14.7		
	3	10'-15'	90%	13.6		14' bgs - Collor changes to brown.
15 / -15				13.2		
				13.8		Light brown fine SILTY SAND, poorly graded, compact, moist.
	4	15'-20'	75%	13.6		
20 / -20					SM	
				6.4		
	5	20'-25'	75%	12.5		22' bgs - Becomes wet, dense.
25 / -25				11.8		Brown fine to medium SAND, trace Silt, poorly graded, compact, moist.
				12.5		
	6	25'-30'	75%	12.3		
30 / -30					SP	
				12.6		30' bgs - Becomes wet.
	7	30'-35'	75%	12.1		
35 / -35						
	8	35'-38'	NA	NA		No lithologic description

Well Construction



Remarks: bgs - below ground surface, NA- not available
Well construction approximated.

EEC Encore Environmental Consortium, LLC

Project: 64411.120
Data File:MWM31-02.dat

Template:I:\rockware\logplot\logfiles\Template\PontiacEEC.ldf
Date: 4/18/2005

Date Start/Finish: 10/5/06 **Drilling Company:** Prosonic Corporation **Driller's Name:** Joe Tidwell **Drilling Method:** Sonic **Sampler Size:** 5-10' corebarrel **Rig Type:** Sonic	**Northing:** 427468.53 **Easting:** 13411690.58 **Casing Elevation:** 983.64 **Borehole Depth:** 38.0' **Surface Elevation:** 983.99 **Descriptions By:** Wayne Patterson	**Well ID:** MWM32-01 **Client:** General Motors **Location:** Pontiac North Campus Pontiac, Michigan

DEPTH / ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	USCS Code	Geologic Column	Stratigraphic Description	Well Construction
985								Flushmount Protective Casing
0							Wood block.	Portland Cement (0'-0.6' bgs)
							Concrete.	
							FILL - Light brown fine to medium SANDY SILT, trace fine subrounded Gravel, loose, no odor, dry.	
	1	Hand Auger	100%	BG				
980							FILL - Brown LEAN CLAY, trace fine subrounded Gravel, medium plasticity, no odor, moist.	
5								
	2	6-9'	100%	BG			Concrete.	
975							Dark brown LEAN CLAY, trace fine to coarse subrounded Sand, trace fine subrounded Gravel, no odor, moist.	Hydrated Bentonite Chips (0.6'-26' bgs)
10					CL			
	3	9-18'	100%	BG				2" ID PVC Riser (0.3'-28' bgs)
970								
15							Light brown fine POORLY GRADED SAND, loose, no odor, dry.	
					SP			

Remarks: bgs = below ground surface
NA = Not Applicable/Not Available
BG = background

Client:
General Motors

Site Location:
GM Pontiac North Campus

Boring ID: MWM32-01

Borehole Depth: 38.0'

DEPTH / ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	USCS Code	Geologic Column	Stratigraphic Description	Well Construction
965 / 20					SP		Light brown fine POORLY GRADED SAND, loose, no odor, dry.	
	4	18-28'	100%	BG				
960 / 25					ML		Light brown SILT, no odor, moist to wet.	
					SP		Light brown fine POORLY GRADED SAND, loose, no odor, dry.	
							Becomes wet.	#5 Sand Pack (26'-38' bgs)
955 / 30								2" ID 0.010" Wire Wrapped PVC Screen (28'-38' bgs)
	5	28-38'	100%	BG				
950 / 35								
945							End of boring at 38' bgs.	

Remarks: bgs = below ground surface
NA = Not Applicable/Not Available
BG = background

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APPENDIX D

Historical Semi-Annual Sampling Event Groundwater Analytical Data Summary (CD)

APPENDIX E

Chemical Concentration Graphs

APPENDIX E
RACER TRUST PONTIAC NORTH CAMPUS
2017 ANNUAL GROUNDWATER MONITORING REPORT
CHEMICAL CONCENTRATION GRAPHS