Revitalizing Auto Communities
Environmental Response Trust

February 28, 2019

U.S. EPA Region 5
Remediation and Reuse Branch
Land and Chemicals Division, LU-9J
77 West Jackson Blvd.
Chicago, IL 60604-3590
Attn: Mirtha Cápiro

RE: 2018 Groundwater Monitoring Report
RACER Trust Moraine Facilities
Moraine, Ohio

Dear Ms. Cápiro:

The Revitalizing Auto Communities Environmental Response Trust (RACER Trust) is providing this 2018 Groundwater Monitoring Report for the RACER Trust Moraine Facilities in Moraine, Ohio. This report presents the groundwater monitoring activities conducted to assess the performance of the current corrective measures completed in 2018 at the following facilities located in Moraine, Ohio: former Delphi Harrison Thermal Systems Moraine Plant; former General Motors Powertrain Group, Moraine Engine Plant; and former General Motors Truck Group, Moraine Assembly Plant. Additionally, the results of the poly- and perfluorinated alkyl substances (PFAS) groundwater evaluation are included in the report.

If you have any questions, please contact me at (937) 751-8635.

Sincerely,

Pamela L. Barnett

Pamela L. Barnett, PG
Cleanup Manager (DE, LA, MA, OH, PA, VA)
RACER Trust

cc:
B. Sundar, U.S. EPA
C. Neal, U.S. EPA

K. Baker, Montgomery County
B. Moore, Montgomery County
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C. Brown, Copart Inc.
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C. Whittlesey, Ohio Realty Advisors
K. Hodnett, Ohio Department of Transportation
T. Scherack, West Carrollton Service Department
D. Beal, DMAX LLC

Revitalizing Auto Communities Environmental Response Trust (RACER Trust)

2018 GROUNDWATER MONITORING REPORT

Former Delphi Harrison Thermal Systems, Moraine Plant
Former General Motors Powertrain Group, Moraine Engine Plant
Former General Motors Truck Group, Moraine Assembly Plant
Moraine, Ohio

February 28, 2019

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1 INTRODUCTION

This 2018 Groundwater Monitoring Report summarizes the groundwater monitoring activities completed in 2018 at the Revitalizing Auto Communities Environmental Response Trust (RACER Trust) Moraine Facilities (formerly General Motors Corporation [former GM Corporation]) located in Moraine, Ohio (Site; **Figure 1**). The facilities included:

- former Delphi Harrison Thermal Systems Moraine Plant (former Delphi Thermal Moraine)
- former General Motors Powertrain Group, Moraine Engine Plant (former Moraine Engine)
- former General Motors Truck Group, Moraine Assembly Plant (former Moraine Assembly)

Current property owners and parcel boundaries associated with the Site are shown on **Figure 2**.

This report summarizes the 2018 groundwater monitoring program (**Table 1**) and the performance of the ongoing interim measures. These interim measures were included in the Interim Measures/Corrective Measures (IM/CM) Report (Arcadis G&M, Inc. 2001) and incorporate the Former Oil House Area interim measures (in-situ remediation of groundwater, **Figure 3**); the capture zone interim measure (pumping for the lower aquifer, **Figure 3**); institutional actions (the Site will remain industrial and groundwater use will be restricted); and a groundwater monitoring program. The groundwater monitoring for the facilities was conducted in accordance with the Addendum to the Site-Wide Groundwater Monitoring Report for 2016 (Addendum; Arcadis, Inc. 2017a) and the 2017 Groundwater Monitoring Report (Arcadis, Inc. 2018a).

Additional groundwater monitoring was completed in 2018 in accordance with the approved PFAS Sampling Plan - Revision No. 1 (Arcadis, Inc. 2018b) and the PFAS Sampling Plan – Second Groundwater Sampling Event (Arcadis, Inc. 2018c). The additional groundwater monitoring activities were completed to evaluate concentrations of poly- and perfluorinated alkyl substances (PFAS) in the upper aquifer throughout the Site.

1.1 Site Description

The Site has been used for industrial purposes since the property was acquired in the mid-1920s by former GM Corporation. The former Moraine Engine and Moraine Assembly facilities occupy approximately 282 acres, while the adjacent former Delphi Thermal Moraine facility occupies approximately 143 acres (Montgomery County Engineer's Office). The facilities are located in the City of Moraine in Montgomery County in southwestern Ohio. A small portion of the Moraine Assembly facility is located in the City of Kettering. **Figure 1** presents the location of each facility, property boundaries, and site features.

Frigidaire (a former division of former GM Corporation) produced appliances from the late 1920s until 1979. Former GM Corporation announced the shutdown of all Frigidaire operations in January 1979. During 1980 and 1981, the majority of the former Frigidaire Plant 2 was converted to the former Moraine Engine facility, and the former Frigidaire Plant 3 and the northeast corner of former Frigidaire Plant 2 were converted to the Moraine Assembly facility. Since 1981, former Moraine Engine operations have included the machining, painting (this operation was discontinued in September 1995), and assembly of diesel truck engines. Operations at the former Moraine Engine facility ceased in the fall of 2000. The plant building has undergone decommissioning and demolition, and the majority of this site has been covered with a parking surface. Former GM Corporation operated a regional haulaway at the location of the former Moraine Engine plant, which was referred to as the Vehicle Distribution Center. Operations at the regional haulaway ceased in December 2008.

Beginning in 1981, former Moraine Assembly operations included the manufacturing, assembly, and painting of small trucks and later sport utility vehicles. Operations at the former Moraine Assembly ceased in December 2008. Currently, an active diesel engine manufacturer, DMAX Ltd. (DMAX), is located north of former Delphi Thermal Moraine. DMAX is a joint venture between General Motors and Isuzu. This area was historically associated with the former Moraine Assembly and Engine Plant operations.

Former Delphi Thermal Moraine’s major operations, which began in 1941, included the machining and assembly of automotive air conditioning compressors, accumulator dehydrators, and miscellaneous air conditioning valves. Operations at the former Delphi Thermal Moraine Building 14 ceased in September 2003, and the building was decommissioned. Demolition of Building 14 was completed in 2005.

On June 1, 2009, former GM Corporation and certain subsidiaries filed voluntary petitions for relief under Chapter 11 of the Bankruptcy Code. An order was entered approving the sale of substantially all of former GM Corporation’s assets to a new and independent company (now known as General Motors Company, LLC) under Section 363 of the Bankruptcy Code on June 5, 2009. The sale closed on July 10, 2009. At that time, former GM Corporation changed its name to Motors Liquidation Company (MLC). RACER Trust was established on March 31, 2011 by a federal bankruptcy court to own, manage, remediate, and revitalize the properties from the 2009 former GM Corporation bankruptcy.

On June 30, 2011, RACER Trust sold former Delphi Thermal Moraine (with the exception of the South Lagoon), former Moraine Engine Plant, and former Moraine Assembly Plant to Industrial Realty Group Moraine, LLC (IRG). As part of the property transfer, RACER Trust retained environmental liability for these properties.

Current Site operations include multi-tenant use for commercial and industrial purposes. The closed South Settling Lagoon was not included in this property transaction. The closed South Settling Lagoon was retained by RACER Properties LLC.

On September 29, 2011, the Administrative Order on Consent (AOC) for the Site was fully executed proceeding under Section 3008(h) of the Resource Conservation and Recovery Act (RCRA), as amended, 42 United States Code (U.S.C.) Section 6928(h), United States Environmental Protection Agency (U.S. EPA) Docket No: RCRA-05-2011-0016. The performance–based AOC covers corrective action for past releases of hazardous contaminants at or from the Site.

IRG currently leases several portions of the Site for industrial purposes and has sold several portions of the property. Select parcels were transferred from IRG to the affiliated Industrial Commercial Properties LLC (ICP). Figure 2 provides details of the established parcels and current owners. The following list represents current ownership of the Site:

- IRG owns Lots #5435, 5458, and 5523:
    - Lot #5435 is currently a vacant area covered by pavement and grass.
    - Lot #5458 is currently a vacant area covered by pavement.

  - Lot #5523 is currently comprised of a vacant industrial building, paved surface, and wooded area.
- ICP owns Lots #5418, 5437, and 5439:
  - Lot #5418 is currently comprised of a vacant industrial building and parking lot.
  - Lot #5437 is currently comprised of a vacant industrial building, paved surface, and wooded area.
  - Lot #5439 is currently occupied by Fuyao Asset Management A, LLC (Fuyao).
- Copart of Connecticut, Inc. (Copart) owns Lot #5433. Copart currently utilizes this lot to store cars for online auctions.
- Fuyao owns Lots #1, #2, #5438. Fuyao currently produces and stores Original Equipment Manufacturer automotive glass at this facility.
- Inland Property Management, Inc. owns Lot #5436. This lot is currently occupied by RJ Trucking, Inc.
- Wright Warehousing, Inc. owns Lot #5459. An office building is currently being constructed and mulch is stored on this lot.
- The State of Ohio owns Lot #5460. A full-service Ohio Department of Transportation facility is currently being constructed on this lot.
- Norfolk Southern owns Lot #5524. This lot is currently occupied by rail spurs and used as an equipment storage area.

1.2 Groundwater Monitoring Program Objectives

The objectives of groundwater monitoring in 2018 at the former Site are as follows:

1. Monitor groundwater quality west of the Miami River near the Miami Shores neighborhood and downgradient of the Site near the City of West Carrollton
2. Evaluate concentrations of PFAS at the Site
3. Monitor the effectiveness of the lower aquifer capture (DN-13) downgradient of the property boundary
4. Monitor the effectiveness of interim measures activities in in-situ reactive zones RZ-1, RZ-3 west, RZ-3 east (inactive), and RZ-4 east (inactive)
5. Monitor groundwater quality upgradient and downgradient of the closed North and South Settling Lagoons

1.3 Baseline Groundwater Monitoring Program Sampling Event

To provide a basis for evaluating the performance of the interim measures, a comprehensive site-wide groundwater sampling event for volatile organic compounds (VOCs) was completed in September 1999 to establish a baseline data set. The next site-wide groundwater sampling event was completed between September and October 2000. During the 2000 sampling event and at the request of the U.S. EPA, groundwater samples were analyzed for Appendix IX chlorinated VOCs and cis-1,2-dichloroethene (cis-1,2-DCE) by Method 8260, semi-volatile organic compounds (SVOCs) by Method 8270, and metals by

Method 6010B to verify that current groundwater conditions were consistent with previous site conditions. The results of this one-time sampling event confirmed that chlorinated VOCs were the constituents of potential concern in groundwater at the Site. SVOCs were not detected and metals were not detected above levels of concern during the 2000 sampling event. The analytical results from the 1999 baseline event and the 2000 site-wide event are presented in the IM/CM Report (Arcadis G&M, Inc. 2001).

1.4 Interim Measures Description

1.4.1 Source Area and Diffuse Groundwater Treatment

1.4.1.1 Primary Groundwater Source Area Interim Measure

In July 2017, the Primary Groundwater Source Area Interim Measures Work Plan Addendum (Arcadis, Inc. 2017b) was submitted to the U.S. EPA and approved on July 21, 2017 (U.S. EPA 2017a). This Work Plan detailed the design basis and methodology for implementation of an enhanced reductive dechlorination (ERD) pilot test in the former Process Sump Area (PSA). The associated field activities were completed in the fourth quarter of 2017 and first quarter of 2018. The results of this pilot test will be submitted in a forthcoming report.

1.4.1.2 Phase 1 Dynamic Groundwater Recirculation™ Interim Measure

In May 2017, the Phase 1 Dynamic Groundwater Recirculation (DGR™) Interim Measure Pilot Test Work Plan (Arcadis, Inc. 2017c) was submitted to the U.S. EPA. This Work Plan was prepared in accordance with the Request for Interim Measures to Remediate Groundwater Contamination as Source of Vapor Intrusion Off-site letter (U.S. EPA 2017b) and approved on June 6, 2017 (U.S. EPA 2017c). The associated field activities were completed in the third quarter of 2017. On May 2018, the Phase 1 DGR™ Interim Measure Design Report and Work Plan (Arcadis, Inc. 2018d) was submitted to the U.S. EPA and approved on July 2018 (U.S. EPA 2018). Construction of the Phase 1 DGR™ system is expected to be completed by mid-2019. A Construction Completion Report will be submitted to the U.S. EPA documenting the final specifications and function of the system.

1.4.2 In-Situ Reactive Zones

The reductive dechlorination of chlorinated VOCs can be enhanced by the introduction of a carbon source that stimulates activity of indigenous microorganisms. The high carbon loading triggers a succession of microbial species. Initially, aerobic electron acceptors such as oxygen and nitrate are consumed. Then, the microbial succession leads to a consortium of species that survive by sulfate reduction, methanogenesis, and other similar metabolic pathways supporting the highly reducing conditions necessary for the dechlorination of tetrachloroethene (PCE), trichloroethene (TCE), cis-1,2-DCE, and vinyl chloride. This ERD process has been developed at the Site through the use of in-situ reactive zones for the introduction of a degradable carbon source necessary to develop the desired reducing conditions.

Enhanced reductive dechlorination was implemented in 1999 as a component of the Former Oil House Area interim measures at three in-situ reactive zones: 1) at the southern boundary of the Former Oil House Area (RZ-1); 2) at an intermediate downgradient location south of the Former Oil House Area in the ME well series area (RZ-2 which was operated from 1999 to 2002); and 3) at a downgradient location south of former Delphi Thermal Moraine (RZ-3 West) and the former Moraine Engine plant (RZ-3 East). Using the data obtained from the Supplemental Groundwater Investigation conducted in 2006, RZ-4 was designed and installed to address chlorinated VOC impacts identified west of RZ-3 West (GM-16). The in-situ reactive zone locations are shown on **Figure 3**. The actual layouts of each in-situ reactive zone are shown on **Figures 4** and **5** and are discussed below:

- At RZ-1, molasses solution is introduced into the upper aquifer, above the upper clay till. The carbon source solution injection wells are screened across the lower 10 feet (ft) of this portion of the upper aquifer, which is 4 ft to 12 ft thick. RZ-1 consists of 21 injection wells, of which 12 wells (RZ-1J through RZ-1U) were added in 2002 to expand RZ-1.
- Former RZ-2 consisted of four monitoring wells (ME-1 [abandoned], ME-2, ME-4, and ME-5 [abandoned]), located along the western edge of the former Moraine Engine Plant 3 building. The RZ-2 wells were screened within the upper 3 ft of the upper aquifer. RZ-2 was operated from 1999 to 2002.
- RZ-3 consists of 46 injection wells, 30 wells in RZ-3 West (RZ-3A through RZ-3DD) and 16 wells in RZ-3 East (RZ-3FF through RZ-3KK and RZ-3MM through RZ-3VV). At RZ-3, the injection wells are screened from the approximate upper aquifer water table to a depth of 46 ft to 68 ft below land surface (bls), to allow carbon source solution introduction to the lower 20 ft to 30 ft of the upper aquifer. Injection wells RZ-3RR through RZ-3VV were installed in April 2005 in order to establish a reactive zone further down-gradient and closer to the property boundary. The additional injection wells are screened from 34 ft to 54 ft bls. Injection wells RZ-3MM through RZ-3QQ have not been operated since the installation of RZ-3RR through RZ-3VV in 2005.

  In 2018, the RZ-3 East network was not active due to data indicating site-specific VOC concentrations were within acceptable targets and did not require treatment. Specifically, concentrations of parent products in monitoring well GM-21 (RZ-3 East) have been below the Maximum Contaminant Levels (MCLs) for approximately three years. Vinyl chloride is the only site-specific VOC concentration remaining above the MCL. Based on these results, it is recommended that injections in RZ-3 East continue to be discontinued.
- RZ-4 consists of 15 injection wells, seven wells in RZ-4 West (RZ-4I through RZ-4O) and eight wells in RZ-4 East (RZ-4A through RZ-4H). These injection wells were installed in July 2006. The RZ-4 West injection wells are located in the southeast corner of the closed South Settling Lagoon and the RZ-4 East injection wells are located north of Landfill L1 and west of the Waste Pile/Staging Area. At RZ-4, the injection wells are screened approximately from the water table of the upper aquifer to a depth of 57 ft to 62 ft bls, to allow carbon source solution introduction to the lower 30 ft of the upper aquifer.

  RZ-4 East is located in the vicinity of the neighborhood where implementation of Phase 1 DGR™ was planned in 2018. Molasses injections in the vicinity of the Phase 1 DGR™ interim measure should stop six months to one year in advance of implementation as the reduced metal species (e.g., ferrous iron) and organic carbon from the molasses introductions can cause fouling in wells used for extraction. Therefore, injections in RZ-4 East were not completed in 2018.

To establish conditions conducive to ERD within in-situ reactive zones RZ-1, RZ-2, and RZ-3, a readily degradable carbon source (a dilute solution of molasses and potable water) was periodically delivered into the injection wells during a 6-month period from December 1999 to May 2000. The molasses solution consisted of either a 10-to-1 or 20-to-1 ratio of potable water to feed-grade molasses that was pumped into each injection well. The initial event, conducted in December 1999, consisted of two consecutive rounds of carbon source solution introductions in each in-situ reactive zone injection well. After the initial introduction event, the carbon source solution introductions were scheduled twice per month through May 2000. Due to the success during the first six months of implementing this technology, carbon source introduction activities continued in October, November, and December 2000 through 2003.

Introductions in RZ-1 were modified in the fall of 2003 after review of the previous site-wide groundwater analytical results. Due to the success of RZ-1, reduced carbon loading was implemented at a frequency of one introduction event every other month. Monitoring well GM-28 was periodically sampled to verify that the necessary reducing conditions were being sustained to promote the reductive dechlorination process. In May 2005, the introduction routine was changed to two injections every quarter to maintain reducing conditions and provide sufficient carbon to allow for complete degradation of the chlorinated VOCs.

Monthly carbon source solution injections were completed in 2013 in in-situ reactive zones RZ-1, RZ-3, and RZ-4 East through August, with the exception of January, due to weather conditions. The frequency of substrate injections at in-situ reactive zones RZ-1, RZ-3, and RZ-4 East was modified starting in September 2013. This amended schedule included quarterly carbon source solution introductions based on the updated Conceptual Site Model (CSM), specifically transport velocities in the upper aquifer. The groundwater mass transport velocity was evaluated and refined as part of the 2012 CMP (Arcadis, Inc. 2012a) using data generated through operation of the injection program and the Pre-Design Investigation. The results of the evaluation indicated that the estimated mass transport velocity is approximately 0.25 feet per day (ft/day), which is slower than the estimates generated prior to initiation of the injections in 1999 (i.e., greater than 1 ft/day). Calculations were subsequently completed to evaluate the current injection frequency relative to the revised (lower) mass transport velocity. Specifically, the estimated time for the molasses solution to “wash out” of the in-situ reactive zone area through groundwater transport was estimated assuming a mass transport velocity of 0.25 ft/day. The results of these calculations indicated that molasses will wash out of the in-situ reactive zone area every 3 to 4 months.

During the initial period of the amended introduction schedule (quarterly), an evaluation was completed to confirm the estimated carbon source wash out rate and to confirm that the interim measure remained effective. This evaluation consisted of baseline sampling and a 3-month discontinuation of carbon source introductions from December 2013 through February 2014 to provide data for the establishment of organic carbon degradation trends. The organic carbon degradation trends were subsequently used to confirm the theoretical quarterly wash out rate.

To support the injection frequency evaluation, groundwater samples were collected from in-situ reactive zone wells RZ-1E, RZ-3D, RZ-3S, RZ-3TT, and RZ-4E for the analysis of total organic carbon (TOC). Baseline groundwater grab samples for TOC were collected on December 11, 2013, immediately following completion of the November 2013 injection in these wells. Grab groundwater samples for TOC then were collected from the same five in-situ reactive zone wells in January and February 2014. In addition, groundwater samples were collected for the analysis of TOC, methane, ethene, ethane, and

VOCs from monitoring wells GM-19S, GM-21, and GM-32 during the site-wide annual groundwater monitoring event in October 2014.

TOC generally decreases on a first-order relationship. As such, first order decay rate constants were calculated and used to estimate/extrapolate when it is expected that concentrations will reach 20 milligrams per liter (mg/L) at each carbon source solution injection location and on a site-wide/average basis. Twenty mg/L is the optimal concentration that typically results in sufficient excess organic carbon to drive ERD within the in-situ reactive zone area. Ultimately, these calculations were used to document the proposed revised injection frequency.

A summary of the TOC analytical results collected during the evaluation period is provided in **Appendix A**. Using these data, a unique degradation half-life (k-value [day^{-1}]) was calculated for each of the sampled injection wells (RZ-3D, RZ-3S, RZ-3TT, RZ-1E, and RZ-4E). The hydraulic conductivity estimates provided in the 2012 CMP (Arcadis, Inc. 2012a) were then used to calculate the time it would take the TOC levels to drop to 20 mg/L starting from the day of the injection event. A summary of the half-life analysis is provided in **Appendix A**. As shown on **Table A-2,** the calculated required injection frequency ranges from approximately 6 to 13 months with an average of approximately 9 months.

The organic carbon degradation trend evaluation confirmed the revised site model and that a reduced injection frequency was warranted at the Site. As a conservative initial step, the injection frequency was reduced to quarterly (e.g., as opposed to every 6 to 13 months). In addition, monitoring data collected from GM-19S, GM-21, and GM-32 during the site-wide annual sampling event in October 2014 confirmed that the ERD process has not been adversely affected as a result of the revised injection frequency. Specifically, methane, ethane, ethene, and chlorinated VOC analytical data were consistent with historic data as discussed in **Appendix A**. A quarterly injection frequency continued through 2018. Carbon source solution injection volumes in 2018 are summarized on **Table 2**.

Additional injection frequency reductions are recommended in **Section 5.3.1**.

1.4.3 Capture Zones

Well DN-13 is a lower aquifer extraction well that is owned and operated by Montgomery County and has been used in a Pump-to-Waste Program since March 1990 in cooperation with former GM Corporation/ MLC until March 31, 2011 and continued with RACER Trust. The capture zone interim measure for the lower aquifer consists of continued pumping of DN-13 in 2018. Samples at the DN-13 invert outfall and well flow rate data are collected on a monthly basis as a requirement of the National Pollutant Discharge Elimination System (NPDES) permit, and is the results are submitted to the Ohio Environmental Protection Agency (Ohio EPA). Well DN-13 was operational throughout 2018 except for the periodic shutdowns related to power failures and for operation and maintenance activities. Details on well DN-13 operation and lower aquifer capture analysis are discussed in **Section 3.2**. The location of well DN-13 is shown on **Figure 3**.

2 GROUNDWATER MONITORING SUMMARY

To meet the objectives of the groundwater monitoring program in 2018, the scope of work presented in Site-Wide Groundwater Monitoring Plan (Arcadis G&M, Inc. 2002), the Addendum (Arcadis, Inc. 2017a), and the 2017 Groundwater Monitoring Report (Arcadis, Inc. 2018a) were completed. In addition, groundwater monitoring was completed in accordance with the approved PFAS Sampling Plan - Revision No. 1 (Arcadis, Inc. 2018b) and the PFAS Sampling Plan – Second Groundwater Sampling Event (Arcadis, Inc. 2018c). The PFAS sampling methods and results are presented in **Appendix B**. Groundwater sampling forms are included as **Appendix C**. The analytical data including quality assurance results included as **Appendix D**.

The 1999 baseline through 2017 groundwater quality data for the site-specific VOC parameter list are summarized in **Appendix E**. For 2018, the site-specific VOC groundwater data is summarized in **Table 3** of this report. This information is used to assess the effectiveness of the on-going interim measures (in-situ reactive zones and capture zone), monitoring the closed settling lagoons, and monitoring water table VOC concentrations near the Miami Shores neighborhood. Monitoring for PFAS was also completed in 2018 (**Table 4**). The following sections summarize collection of the annual groundwater elevation measurements, monthly groundwater recovery system monitoring, and groundwater monitoring.

2.1 Groundwater Elevation Monitoring

Groundwater levels were measured on July 26 and 27, 2018. The measured wells included on-site and off-site monitoring wells at the three facilities as shown on **Figure 6** (upper aquifer wells) and **Figure 7** (lower aquifer wells). Groundwater levels were measured in accordance with procedures defined in the Phase 1 Dynamic Groundwater Recirculation (DGR™) Interim Measure Pilot Test Work Plan, Standard Operating Procedure (SOP) #17 (Arcadis, Inc. 2017c).

2.2 Monthly Groundwater Recovery System Monitoring

The NPDES permit was revised in 2012 to include lower aquifer well DN-13 as a separate final outfall to the Great Miami River and remove the north and south retention basins (TW-2 is an intermediate monitoring station prior to discharge to south storm water retention basin), as they were included with the property sold to IRG in 2011. The Ohio EPA approved renewal of NPDES Permit 1IC00008*KD for the internal outfall related to TW-2 and for the DN-13 outfall on December 1, 2017. The permit requires monthly monitoring and reporting. As proposed in a letter from RACER Trust to the U.S. EPA (Arcadis, Inc. 2012b), the TW-2 groundwater recovery and treatment system was shut down on July 31, 2012, following the shutdown procedures in the 1996 Operations, Maintenance, and Monitoring Manual Groundwater Recovery and Treatment. The impact of the system shutdown was measured by the results of monthly sampling of monitoring wells GM-6 and GM-17 for a total of 6 months (August 2012 through January 2013). As discussed in the April 24, 2013 letter to the U.S. EPA (Arcadis, Inc. 2013), shutdown of the groundwater recovery and treatment system continued through 2014 due to the results of this monthly sampling. Continued shutdown of the system is recommended based on the results of groundwater monitoring since TW-2 system shutdown.

Table 5 summarizes the VOC results for the monthly DN-13 effluent sampling during 2018. The analyses were conducted in accordance with methods specified in the NPDES Permit 1IC00008*KD.

2.3 2018 Groundwater Monitoring Program

In 2018, the following wells were sampled to assess the groundwater monitoring program objectives, as detailed in **Section 1.2**:

- Off-Site Groundwater Monitoring: MW-5, GM-65S, GM-65D, GM-79, GM-80, GM-81, RMW-95, RWM-96, and RMW-97
- Performance Monitoring of DN-13: DN-13, GM-9, GM-15, and GM-20D
- Performance Monitoring of IRZs:
  - RZ-1: GM-28R and GM-29
  - RZ-3 West: GM-6 and GM-8; GM-32 (TOC only)
  - Inactive RZ-3 East: GM-21
  - Inactive RZ-4 East: GM-19S
- Closed North and South Settling Lagoons:
  - Closed North Settling Lagoon: HR-4, W-2-N, W-3-N, and W-4-N
  - Closed South Settling Lagoon: HR-1, HR-17, W-2-S, W-3-S, and W-4-S
- Site-Wide PFAS Investigation: W-1-N, W-4-N, HR-1, HR-11, GM-6, GM-8, GM-16, GM-19S, GM-21, GM-23, GM-24, GM-34, GM-35, GM-48, GM-60, GM-63, GM-65S, GM-66, GM-72, GM-75S, RMW-92, and RMW-94

A summary of the 2018 groundwater monitoring activities, including the number of monitoring wells and analytical parameters, is presented on **Table 1**. Well construction data for the wells used in the program are presented in **Table 6**.

Groundwater samples were collected from the specified wells using the low-flow methodology and following procedures outlined in SOP #14 (Arcadis, Inc., 2017c). Field parameters including pH, specific conductance, temperature, oxidation/reduction potential, and dissolved oxygen were measured during purging of each well using a multi-parameter groundwater quality flow-through cell (**Appendix C**). One groundwater sample from well DN-13 was collected through the sampling valve according SOP #14 (Arcadis, Inc., 2017c).

The groundwater samples were collected and managed under standard chain-of-custody procedures and validated in accordance with the approved Supplemental RFI Work Plan and the RFI Quality Assurance Project Plan (Geraghty & Miller, Inc. 1997) and as presented in the draft Amended Quality Assurance Project Plan (Arcadis, Inc. 2011). Analytical results are presented and discussed in **Section 2.5.3**.

2.4 Laboratory Analytical Methods

Groundwater samples were analyzed for the site-specific VOC parameter list using Method 8260B. This parameter list was developed after evaluating data from the September 1999 baseline groundwater sampling event and the one-time sampling event conducted in September/October 2000 (which included analysis of Appendix IX VOCs, cis-1,2-DCE, SVOCs, and metals) as part of the Former Oil House Area interim measures. The site-specific VOCs include: benzene, 1,1-dichloroethane (1,1-DCA), 1,1-dichloroethene (1,1-DCE), cis-1,2-DCE, trans-1,2-dichloroethene (trans-1,2-DCE), ethylbenzene, PCE, toluene, 1,1,1-trichloroethane (1,1,1-TCA), TCE, vinyl chloride, and xylenes. As indicated previously, additional analyses were completed to support the effectiveness of ERD and to evaluate PFAS at the Site. These results are summarized in **Appendices A** and **B**.

Select groundwater samples from upper aquifer monitoring wells collected during the groundwater monitoring event were also analyzed for the following biogeochemical indicator parameters: manganese (total and dissolved), iron (total and dissolved), sulfate, sulfide, TOC, chloride, dissolved gases (ethane and ethene), and methane. **Table 1** lists specific field, laboratory, and biogeochemical indicator parameters and laboratory analytical methods. The groundwater samples were submitted to TestAmerica Laboratories, Inc. in North Canton, Ohio or Microseeps/Pace Analytical Energy Services, LLC in Pittsburgh, Pennsylvania. Only ethene, ethane, and methane samples were submitted to and analyzed by Microseeps/Pace Analytical.

2.5 Groundwater Monitoring Program Results

2.5.1 Groundwater Elevation Monitoring

As part of the 2018 groundwater monitoring program, groundwater levels were measured to determine groundwater flow directions, horizontal hydraulic gradients, and vertical hydraulic gradients in and between the upper and lower aquifers. One groundwater elevation monitoring event was completed on July 26 and 27, 2018. The groundwater level measurement data are presented on **Table 7**.

2.5.1.1 Upper Aquifer

Depth-to-water data from upper aquifer wells were collected on July 26 and 27, 2018, and a contour map of the potentiometric surface was generated (**Figure 8**). Groundwater flow for the upper aquifer is generally from northeast to southwest. The general groundwater flow conditions for 2018 are consistent with historical groundwater flow conditions documented in the previous annual groundwater monitoring reports.

Table 8 presents the 2018 monthly precipitation totals, recorded by the National Weather Service, and the deviation from reported average amounts. The 2018 annual total precipitation recorded at the Dayton, Ohio monitoring station was 48.99 inches, which was 7.94 inches above average.

Horizontal hydraulic gradient values within the upper aquifer in 2018 ranged from 3.3×10^{-4} feet per foot (ft/ft) to 6.8×10^{-4} ft/ft (**Table 9**). The average horizontal hydraulic gradient, based on the well pairs presented in **Table 9**, was 4.7×10^{-4} ft/ft for the upper aquifer.

2.5.1.2 Lower Aquifer

Depth-to-water data from lower aquifer wells were collected on July 26 and 27, 2018 and a contour map of the potentiometric surface was generated (**Figure 9**). Groundwater flow for the lower aquifer is generally from northeast to southwest towards pumping well DN-13. An estimated cone of depression surrounds pumping well DN-13 as indicated by influence of the surrounding monitoring wells (**Figure 9**). Hydraulic capture of lower aquifer groundwater by DN-13 is discussed further in **Section 3.2**. The general groundwater flow conditions for 2018 are consistent with historical groundwater flow conditions, with DN-13 in operation.

Horizontal hydraulic gradients in the lower aquifer in 2018 ranged in magnitude from 3.4 x 10^{-4} ft/ft to 7.3 x 10^{-4} ft/ft (**Table 9**). Overall, an average hydraulic gradient of 5.4 x 10^{-4} ft/ft was calculated for the lower aquifer; however, further downgradient the hydraulic gradient increased with proximity to pumping well DN-13 (**Section 3.2**).

2.5.2 Vertical Hydraulic Gradients

Vertical hydraulic gradients between the upper aquifer above the upper clay till, upper aquifer, and the lower aquifer were calculated for the groundwater elevation data collected on July 26 and 27, 2018. A total of 11 pairs of upper and lower aquifer wells were used to calculate the vertical hydraulic gradients upgradient, on-site, off-site, and downgradient (**Table 10**). Vertical gradients were calculated using the following equation:

$$I_V = \frac{h_{upper} - h_{lower}}{D_v}$$

Where

I_v = vertical hydraulic gradient (ft/ft)

h_{upper} = groundwater elevation in upper aquifer monitoring well (feet above mean sea level [ft AMSL])

h_{lower} = groundwater elevation in lower aquifer monitoring well (ft AMSL)

D_v = distance between midpoint of lower screen and midpoint of saturated section of upper screen (ft)

Vertical hydraulic gradients were mainly downward ranging between 7.0 x 10^{-4} ft/ft to 2.2 x 10^{-2} ft/ft. Upward vertical gradients were observed upgradient at HR-11/HR-12 monitoring well pair and at GM-75S/GM-75D monitoring well pair on-site.

2.5.3 Groundwater Monitoring Analytical Results

Groundwater was sampled to evaluate the presence of site-specific VOCs based on the groundwater monitoring objectives detailed in **Section 1.2**. **Table 3** and **Appendix D** provide the groundwater results for 2018. The 1999 baseline through 2017 groundwater quality data for the site-specific VOC parameter list are provided in tables in **Appendix E**. The associated isoconcentration figures for TCE, PCE, and total site-specific VOCs are provided as **Appendix F**.

2.5.3.1 Off-Site Groundwater Monitoring

Upper aquifer monitoring wells in the Miami Shores neighborhood (MW-5, GM-79, GM-80, GM-81, RMW-95, RWM-96, and RMW-97) were sampled in 2018. Additionally, monitoring wells GM-65S and GM-65D were sampled at the request of the City of West Carrollton. TCE concentrations exceeded the MCL of 5.0 ug/L in two locations: GM-79 (21 ug/L) and GM-80 (5.3 ug/L). In addition, the PCE concentration at three locations exceeded the MCL of 5.0 ug/L: GM-79 (13 ug/L), GM-80 (18 ug/L), and RWM-96 (7.0 ug/L). The other constituents were detected at relatively low concentrations or below reporting limits.

The groundwater data from the Miami Shores monitoring wells were screened against the most conservative Ohio EPA Vapor Intrusion Screening Levels (VISLs). If no VISL was available, the U.S. EPA site-specific VISLs were used (**Table 11**). The water table wells (RMW-95, RMW-96, RMW-97, and GM-80), which represent conditions closes to the receptor (i.e., residential properties), did not exceed the VISLs.

2.5.3.2 Performance Monitoring of DN-13

The off-site, lower aquifer groundwater quality downgradient of the Site was evaluated with lower aquifer wells DN-13, GM-9, GM-15, and GM-20D. TCE concentrations exceeded the MCL of 5.0 ug/L in DN-13 (6.2 ug/L), GM-9 (9.1 ug/L), and GM-15 (5.8 ug/L). The other constituents were detected at relatively low concentrations or below reporting limits. Groundwater capture by extraction well DN-13 is discussed in **Section 3.2**.

2.5.3.3 IRZ Performance Monitoring

As described in **Section 1.4.2**, the current in-situ reactive zone network consists of RZ-1 and RZ-3 West. In 2018, carbon solution was introduced into the groundwater through injection wells shown on **Figures 4** and **5**. Operation of the in-situ reactive zones was monitored through the collection of field parameter measurements and laboratory analyses of biogeochemical indicator parameters and site-specific VOCs, according to the Site-Wide Groundwater Monitoring Plan (Arcadis G&M, Inc. 2002) and revisions in the Site-Wide Groundwater Monitoring Report for 2009 (Arcadis, Inc. 2010). Concentrations of site-specific VOCs as related to the performance of the in-situ reactive zones are presented in this section. Groundwater concentration trends for the in-situ reactive zone performance monitoring wells are presented in **Figures 10** through **13**.

<u>RZ-1</u>

RZ-1 (**Figure 4**) was installed as an interim measure to remediate the area downgradient of the source area at the Site (Former Oil House Area). Three upper aquifer wells (GM-23, GM-28R [replacement for GM-28], and GM-29) are used to monitor the groundwater quality to evaluate the effectiveness of the reactive zone (**Figure 10**).

- PCE concentrations at monitoring well GM-23 have decreased from 15,000 ug/L in 2001 to 8.4 ug/L in 2018. TCE concentrations have generally decreased from 2,200 ug/L in 2001 to 5.0 ug/L in 2018. Concentrations of cis-1,2-DCE have decreased from 19,000 ug/L in 2005 to 260 ug/L in 2018. Vinyl chloride concentrations increased to a concentration of 4,100 ug/L in 2006 and have generally decreased since to a concentration of 210 ug/L in 2018. Concentrations of trans-1,2-DCE were relatively low prior to initiating introductions in 2000. Concentrations peaked in 2006 at 270 J ug/L and have generally decreased to 16 ug/L in 2018.

- Monitoring well GM-28 was used for evaluating groundwater conditions downgradient of RZ-1. Due to an obstruction in the well, monitoring well GM-28 had not been sampled since 2011. As a result, replacement monitoring well GM-28R was installed on December 21, 2015. Due to constraints associated with property access and underground utilities, monitoring well GM-28R was installed approximately 87 ft southeast of monitoring well GM-28.

  Based on the 2011 data for monitoring well GM-28, concentrations of PCE, TCE, and cis-1,2-DCE remained consistently low since peak concentrations in 1999. Vinyl chloride concentrations in GM-28 fluctuated, with a maximum concentration of 12.4 ug/L in 2000. In 2011, the vinyl chloride concentration in monitoring well GM-28 was 0.57 J ug/L. Site-specific VOCs were detected at relatively low concentrations or below reporting limits in monitoring well GM-28R in 2018.

- Monitoring well GM-29 is within the zone of influence of carbon introductions conducted in the Former Oil House Area after reactive zone RZ-1 was expanded in 2002. Concentrations of PCE and TCE have remained relatively consistent since 2000 with current concentrations of 13 ug/L and 310 ug/L in 2018, respectively. A peak concentration of cis-1,2-DCE (2,871 ug/L) was noted in 2000, and concentrations have decreased to 420 ug/L in 2018. Concentrations of vinyl chloride have fluctuated since introductions began in 2000 but have generally decreased since 2005, with a concentration of 41 ug/L in 2018.

RZ-3 East

Although reactive zone RZ-3 East was inactive in 2018, one upper aquifer well (GM-21) was used to monitor the associated downgradient groundwater quality (**Figure 11**).

- PCE concentrations in this well have consistently been below reporting limits. Concentrations of TCE in well GM-21 peaked in 2002 at 230 ug/L and have generally decreased to 3.9 ug/L in 2018. Concentrations of cis-1,2-DCE have fluctuated since a peak concentration of 100 ug/L in 2003 and have generally decreased to a concentration of 23 ug/L in 2018. The maximum vinyl chloride concentration in monitoring well GM-21 (19 ug/L) was observed in 2008 and was 15 ug/L in 2018. The other site-specific VOCs were detected at relatively low concentrations or below reporting limits in monitoring well GM-21.

Overall, these results indicate that groundwater conditions have not significantly changed following the deactivation of this treatment zone.

RZ-3 West

Reactive zone RZ-3 West (Figure 5) is located south of former Delphi Thermal Moraine. Two upper aquifer wells (GM-6 and GM-8) are used to monitor the groundwater quality to evaluate the effectiveness of the reactive zone (**Figure 12**).

- Monitoring well GM-6 is used for evaluating groundwater conditions downgradient of RZ-3 West. Concentrations of PCE and TCE have decreased in monitoring well GM-6 to below reporting limits in

2018. The other site-specific VOCs were detected at relatively low concentrations or below reporting limits in monitoring well GM-6 in 2018.

- Monitoring well GM-8 serves as a downgradient well for reactive zone RZ-3 West. Concentrations of PCE, TCE, and cis-1,2-DCE have remained consistently low or below their respective reporting limits since 2000. Concentrations of vinyl chloride have remained at or below the reporting limit since 2007 and were below the reporting limit in 2018. The other site-specific VOCs were detected at relatively low concentrations or below reporting limits in monitoring well GM-8 in 2018.

RZ-4 East

Although reactive zone RZ-4 East was inactive in 2018, one upper aquifer well (GM-19S) was used to monitor the associated downgradient groundwater quality (**Figure 13**).

- Concentrations of PCE, TCE, and cis-1,2-DCE in monitoring well GM-19S have been low or below reporting limits since 2007. Concentrations of vinyl chloride reached a peak concentration of 17 ug/L in 2013 and have decreased to 8.8 ug/L in 2018. Concentrations of the other site-specific VOCs were detected at relatively low concentrations or below reporting limits and consistent with the previous sampling events.

Overall, these results indicate that groundwater concentrations have not significantly changed indicating minimal rebound in this treatment zone (**Figure 13**).

2.5.3.4 Monitoring of Closed Settling Lagoons

Groundwater quality is monitored upgradient and downgradient of the closed North and South Settling Lagoons as described in **Section 2.3**. Upgradient monitoring wells used are HR-4 for the closed North Settling Lagoon and HR-1 and HR-17 for the closed South Settling Lagoon (**Figure 3**). Wells downgradient of the closed North (W-2-N, W-3-N, and W-4-N) and South (W-2-S, W-3-S, and W-4-S) Settling Lagoons (closed through in-situ solidification and installation of a cover system in 2001 after the 1999 baseline sampling event) were sampled in 2018. The monitoring of the closed North and South Settling Lagoons showed that the closed lagoons do not appear to be contributing constituents to existing groundwater concentrations in the area.

On August 10, 2018, Ohio EPA provided comments regarding the 2017 Groundwater Monitoring Report (Ohio EPA 2018). In this letter, a request was made regarding the structure and content of the Supplementary Annual Reports. The 2018 Supplemental Annual Report with revised format and content is provided as **Appendix G**.

2.5.3.5 PFAS Evaluation

To evaluate areas where PFAS may have been associated with past industrial processes at the Site, groundwater samples were collected at select locations for PFAS analysis during two sampling events in 2018. The most applicable screening level for the Site is the U.S. EPA Health Advisory Level (HAL) of 70 nanograms per liter (ng/L) for a combined concentration of perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS). The combined concentrations of PFOA and PFOS from the August 2018 sampling event ranged from 1.8 ng/L to 217 ng/L at monitoring wells W-4-N and GM-35, respectively. The result from monitoring well GM-35 was the only combined PFOA and PFOS result that exceeded the HAL during the initial sampling event. The combined concentrations of PFOA and PFOS from the December 2018 sampling event ranged from 5.2 ng/L to 52 ng/L at GM-21 and GM-35, respectively. None of the combined PFOA and PFOS results exceeded the HAL. The methods and results associated with the PFAS evaluation are included in **Appendix B**.

3 CORRECTIVE MEASURE PERFORMANCE

3.1 In-Situ Reactive Zone Performance Results

A detailed assessment of the effectiveness of the reactive zones and the results of this monitoring are presented in **Appendix A** and summarized below.

- Enhanced reductive dechlorination continued to achieve the desired reduction of chlorinated VOC concentrations in groundwater.
- As optimal, aquifer conditions were strongly reducing within and downgradient of the in-situ reactive zones due to the introduction of carbohydrate, as evidenced by the presence of methane at concentrations significantly above background data.
- The target compounds (PCE and TCE) were reduced to daughter products (cis-1,2-DCE and vinyl chloride) and ultimately to end products (ethene and ethane) based on the chlorinated VOC and light hydrocarbon data (ethene and ethane).
- No significant change in anaerobic conditions (e.g., the concentration of methane) or treatment effectiveness (e.g., sustained reductions in chlorinated VOC concentrations with the observation of elevated ethene and/or ethane) were observed.

3.2 Capture Zone Performance Results

Pumping well DN-13 is utilized to capture site-specific VOCs in lower aquifer groundwater. To determine the effectiveness of DN-13 in this regard, several lines of evidence were evaluated following the general procedures outlined in the U.S. EPA guidance, A Systematic Approach for Evaluation of Capture Zones at Pump and Treat Systems (U.S. EPA 2008).

1. Review site data, CSM, and remedial objectives
2. Define site-specific target capture zone(s)
3. Interpret groundwater levels
4. Complete calculations for basis of hydraulic capture
5. Evaluate groundwater concentration trends
6. Interpret site capture

3.2.1 Site Data and Conceptual Site Model

The initial steps for this capture zone analysis included review of Site data and the CSM, which consists of the hydrogeologic structure, hydrogeologic properties (e.g. hydraulic conductivity), site groundwater elevations (**Table 7**), site hydraulic gradients (horizontal [**Tables 9** and **12**] and vertical [**Table 10**]), and DN-13 operational data (e.g. pumping rates).

A depiction of the lower aquifer, including the location of the largely continuous regional clay till unit, and the screened interval of monitoring wells and DN-13 is presented in the 2012 CMP (Arcadis, Inc. 2012a).

The lower aquifer hydraulic conductivity ranges from approximately 260 to 440 ft/day (Arcadis, Inc. 2012a and Geraghty & Miller, Inc. 1990). Site groundwater elevation contours (i.e., potentiometric surface map) for the lower aquifer are presented on **Figure 9** and indicate that groundwater generally flows in a northeast to southwest direction across the Site.

The approximate run-time average flow rate (pump in operation) for DN-13 in 2018 was approximately 804 gallons per minute (gpm) or 1.16 million gallons per day (MGD) while the average period (daily) rate (total flow volume averaged over the entire year – including downtime) for 2018 was approximately 736 gpm (1.06 MGD). Well DN-13 was operational for 92% of 2018 except for the periodic minor shutdowns related to power failures and for operation and maintenance activities detailed in **Appendix H**.

3.2.2 DN-13 Pumping Well Operation and Maintenance

Well DN-13 is a lower aquifer extraction well that is owned by Montgomery County and operated by Montgomery County and RACER Trust. Well DN-13 was part of the former Greater Moraine Water System located in the former North Dryden Road well field and has been used in a Pump-to-Waste Program since March 1990 in cooperation with former GM Corporation until March 31, 2011. The operation has continued since that time in cooperation with RACER Trust.

The interim measure for the lower aquifer at the Site consists of continued pumping of DN-13 to capture impacted groundwater. As required by the NPDES permit regulated by the Ohio EPA, the outfall for DN-13 discharges to the Great Miami River, and monthly sampling is performed to monitor water quality along with the discharge flow rate.

An operation and maintenance plan have been defined in the Extraction Well DN-13 Operation and Maintenance Memorandum (Arcadis, Inc. 2015a) and the Extraction Well DN-13 Operation and Maintenance Statue Memorandum (Arcadis, Inc. 2015b). Data has been collected monthly since April 2015 and is used to evaluate the performance of extraction well DN-13 by collecting specific data to monitor extraction well performance; establishing criteria to determine reduced performance and prompt corrective action; and developing protocols for corrective action. DN-13 performance monitoring and corrective actions are detailed in the quarterly progress reports submitted to the U.S. EPA and the Ohio EPA. Corrective actions, monitoring data, and operation and maintenance activities/actions for DN-13 are provided in **Appendix H**.

3.2.3 Site-Specific Target Capture Zone

The target capture zone for DN-13 is defined as the extent of impacted groundwater in the lower aquifer containing total site-specific VOC concentrations above 5 ug/L (**Figures F-6** and **14**). The pumping program at DN-13 is intended to prevent further migration of the VOC plume and to capture the VOC-impacted groundwater in the lower aquifer downgradient of the upper aquifer source areas at the Site. The maximum width (perpendicular to groundwater flow) of total site-specific VOC concentrations greater than 5 ug/L in the lower aquifer was estimated to be 2,700 ft. To account for some uncertainty in the delineation, an additional 250 ft was added (i.e., 125 ft on each side), which results in an approximate plume width of 2,950 ft.

3.2.4 Interpreted Groundwater Levels

3.2.4.1 Potentiometric Surface

Groundwater elevation data are measured on an annual basis at the Site (**Table 7**), and this data can be used to support several lines of evidence to demonstrate hydraulic capture. In general, groundwater in the lower aquifer flows primarily from the northeast to the southwest (**Figure 9**). Groundwater elevation data from the surrounding monitoring well network indicate that there is a localized cone of depression in the vicinity of DN-13 with groundwater flowing towards the pumping well. An inferred capture zone was delineated by drawing flow lines perpendicular to groundwater elevation contours in the lower aquifer and is shown on **Figure 14**. The inferred delineation results in an estimated capture width of approximately 3,300 ft, just upgradient of DN-13.

3.2.4.2 Horizontal Hydraulic Gradients

In addition to capture interpretation via potentiometric surface maps, observed water-level data were also used to approximate the extent of hydraulic capture by calculating the magnitude and direction of horizontal hydraulic gradients between sets of adjacent monitoring wells located in the vicinity of the extraction well DN-13. This triangular irregular network (TIN) analysis provides a means of evaluating observed water-level data free of bias that is inherent in hand-drawn potentiometric surface maps.

Generally, monitoring well pairs are used as gradient control points for capture evaluation (i.e., used to demonstrate inward gradients or inward flow towards the pumping well). However, the current distribution of monitoring wells in the vicinity of DN-13 prohibits the designation of practical well pairs. To provide an accurate measure of the extent of hydraulic influence that DN-13 has on the lower aquifer system, hydraulic gradients were calculated to evaluate the flow direction (gradient angle and magnitude) using water-level data from sets of three adjacent monitoring wells (Devlin 2003). This method of analysis is consistent with and presented in the U.S. EPA's capture zone guidance (U.S. EPA 2008). Four sets of adjacent monitoring wells (three per set) located in the vicinity of DN-13 were evaluated using 2018 groundwater elevation data and are shown in **Table 12** and on **Figure 15**. Results of the groundwater flow directions (hydraulic gradients) in the lower aquifer indicated effective capture of groundwater by DN-13.

3.2.4.3 Vertical Hydraulic Gradients

Vertical hydraulic gradients were calculated from available upper and lower aquifer well pairs within the vicinity of DN-13 including GM-10/GM-9, GM-18/GM-13, and GM-17/GM-11. The calculated vertical hydraulic gradients shown in **Table 10** indicate that a downward (negative) gradient is present within the vicinity of DN-13. The magnitude of downward vertical hydraulic gradients in the vicinity of DN-13 compared to on-site are greater (GM-18/GM-13 and GM-17/GM-11 compared to GM-2/GM-1 and 4S/GM-5).

3.2.5 Calculations for Basis of Hydraulic Capture

To verify the interpretation of field data (i.e. potentiometric surface maps), flow calculations were also completed to evaluate the extent of capture and provide an additional line of evidence. As outlined in the

U.S. EPA guidance (U.S. EPA 2008), the simplest and most commonly applied horizontal capture zone calculation is the estimated flow rate calculation. Through application of Darcy's law, this calculation provides an estimated groundwater flux moving through the cross-sectional area of the target capture zone such that a pumping rate required to capture this flux can be determined. The estimated groundwater flux/required pumping rate can then be compared to the actual pumping rates measured in the field to assess whether or not the system is pumping at a rate sufficient to contain the target capture zone.

Simplified assumptions for this calculation include the following:

- Homogeneous, isotropic aquifer of infinite extent
- Confined aquifer, uniform aquifer thickness
- Fully penetrating recovery well(s)
- Uniform regional horizontal hydraulic gradient
- Steady-state flow
- Negligible vertical gradient
- Net recharge is accounted for in the regional hydraulic gradient
- No other sources of water to the recovery well (e.g., flux from rivers or from other aquifers), except as represented by the "factor" in the estimated flow rate calculation

The required pumping rate/groundwater flux is calculated using the following equation:

Q = K*i*(b*w)**factor*

where:

Q is the volumetric recovery rate or groundwater flux (cubic feet/day [ft^3/day])

K is the hydraulic conductivity (ft/day)

i is the regional hydraulic gradient (ft/ft)

b is the saturated thickness (ft)

w is the plume width (ft)

The *factor* term is intended to account for other contributions to the pumping well such as flux from a river or induced vertical flow from other stratigraphic units. The assumed value for this term ranges from 1.5 to 2.0 (U.S. EPA 2008).

As noted in the U.S. EPA guidance document, this calculation requires an estimate of the regional hydraulic gradient, without the influence of pumping. Because regional hydraulic gradients often change with time, U.S. EPA (2008) suggests that, in some cases, water-level data obtained cross-gradient or even upgradient and collected during the remedy implementation may be more appropriate than pre-remedy groundwater level data for calculating regional hydraulic gradient. As such, the average horizontal hydraulic gradient, *i*, for the lower aquifer upgradient of DN-13 in 2018 is approximately 5.4×10^{-4} ft/ft (**Table 9**).

As previously noted, the hydraulic conductivity, *K*, for the lower aquifer ranges from approximately 260 to 440 ft/day and the width of the target capture zone, *w*, in the lower aquifer is conservatively estimated to be approximately 2,950 ft. The estimated saturated thickness (and, consequently, the impacted thickness), *b*, of the lower aquifer is approximately 85 ft.

Using the parameter values listed above, the groundwater flux/required pumping rate was calculated for the Site and shown in the table below.

Condition	Hydraulic Conductivity (ft/day)	Hydraulic Gradient (ft/ft)	Saturated Thickness (ft)	Lower Aquifer Plume Width (ft)	Factor	Groundwater Flux/Pumping Rate (MGD/gpm)
2018 Minimum	260	5.4×10^{-4}	85	2,950	2	0.53/366
2018 Maximum (Conservative)	440	5.4×10^{-4}	85	2,950	2	0.89/619

Note that a maximum *factor* of 2 was applied in both cases to provide a realistic range in groundwater flux. For the given range in hydraulic conductivity values, the minimum and maximum groundwater flux through the target capture zone are estimated to be approximately 0.53 and 0.89 MGD (366 and 619 gpm), respectively. Recall that the average period (daily) extraction rate for DN-13 for 2018 was calculated to be 1.06 MGD (736 gpm). Compared to the estimated DN-13 groundwater flux/required pumping rates under both hydraulic conductivity conditions, the actual period extraction rates for 2018 exceed the maximum (conservative) groundwater flux estimate. Therefore, even after incorporating an overly conservative set of parameters and applying a maximum value for the *factor*, the results of this calculation suggest that the current operation rate of DN-13 is sufficient to capture the target capture zone.

It is important to note that this mathematical model does not and cannot account for aquifer heterogeneities (e.g., changes in transmissivity) or system complexities (e.g., boundary effects, recharge, off-site sources, and off-site pumping). Therefore, these results represent a very simplified and idealized depiction of the actual groundwater flux through the aquifer.

3.2.6 Chlorinated VOC Concentration Trends

Because plume migration generally follows groundwater flow towards pumping well DN-13, chlorinated VOC concentration trends were statistically analyzed for three monitoring wells located cross-gradient of DN-13. The goal of this trend analysis was to determine if chlorinated VOC concentrations were increasing, decreasing, or stable to provide an additional line of evidence for DN-13 capture. The capture zone statistics are included as **Appendix I**.

Data were statistically analyzed from three lower aquifer monitoring wells (GM-9, GM-15, and GM-20D). These monitoring wells were chosen based on two criteria: having a sufficient number of data points to allow for statistical testing and for their location relative to DN-13. It was also of interest to examine the period beginning in July 2008, when Arcadis assumed control of the flow rate at the extraction well.

The statistical tests were performed for the total concentration of detected chlorinated VOCs. The chlorinated VOCs that were detected in the three wells at any time from 1999 to 2018 included 1,1,1-TCA, 1,1-DCA, cis-1,2-DCE, PCE, trans-1,2-DCE, TCE, and vinyl chloride. The detected concentrations of the chlorinated VOCs were totaled and are presented in **Table I-1**. Field duplicates were not included. J-flagged concentrations were taken to be quantitative for the purposes of this statistical evaluation. Non-detections were treated as zeroes in the summation.

Trends in groundwater quality were evaluated using both the Mann-Kendall test for trends and the Sen's Slope Estimator. The coefficient of variation was also used as a measure of stability of groundwater chlorinated VOC concentrations. The purpose of these tests was to identify statistically significant trends in the concentrations of chlorinated VOCs. Statistical methods were employed following Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities - Unified Guidance, provided by the U.S. EPA (U.S. EPA, 2009; Unified Guidance).

The Mann-Kendall trend test is a non-parametric test for linear trends based upon the concept that a series of data points without a trend should fluctuate randomly around a constant mean. The test is non-parametric because there is no requirement that the data follow any specific underlying distribution. If an increasing trend were to exist, one would expect an earlier point to have a lower value than a later point. The converse would be true if a decreasing trend were present. A Mann-Kendall statistic *S* is computed by comparing each pair of data points in a data set and assigning a value of +1 or -1 if the earlier data point is less than the later data point or greater than the later one, respectively. If the two data points are equal, the pair is assigned a zero. The values assigned to the pairs are summed. If the total is positive, it implies that the majority of the differences between points are positive, indicating a positive trend. Likewise, a negative sum indicates a decreasing trend. A value at or near zero indicates that the differences are roughly equal, implying that there is no trend. A critical value of *S* is determined based on the number of points in the data set and the level of significance (α) of the test. If the Mann-Kendall statistic *S* exceeds the critical *S*, then an upward trend is statistically significant. Conversely, if the Mann-Kendall *S* is negative and its absolute value is greater than the critical *S*, then there is a statistically significant downward trend. An alpha of 0.05 was used with 0.025 significance on each of two tails, when the data sets analyzed had 10 or more members. For data sets with eight members, an alpha of 0.10 was used with 0.05 significance on each of two tails. Details concerning this test and how to conduct it can be found in Section 17.3.2 of the Unified Guidance. The statistics for the Mann-Kendall test are implemented in Microsoft Excel based on U.S. EPA (2009) guidance.

The magnitude of the trend can be evaluated using Sen's slope estimator. The Sen's slope estimator, sometimes referred to as the Theil-Sen line (Helsel and Hirsch, 2002), is a non-parametric method for estimating the slope of time-series data (U.S. EPA, 2006). The method was first introduced by Sen in 1968 (Sen, 1968). The approach involves computing slopes for each point compared to every successive point, and then using the median of these slopes as an estimate of overall slope (U.S. EPA, 2006). Sen's slope estimator is robust to outliers, data sets with a limited number of non-detects (i.e., values less than sample reporting limits), and datasets with missing values (Gibbons, 1994; U.S. EPA, 2006). In fact, nonparametric methods such as Sen's slope estimator often perform as well or better than parametric methods and have the added benefit of avoiding pitfalls common to parametric regression methods, which can include violating assumptions of normality or failure to address leverage points that can have a substantial effect on the results (Helsel and Hirsch, 2002). For the Sens' trend analysis, values below the reporting limit were treated in the same manner as done for the Mann-Kendall analysis as per U.S. EPA (2009). A 95% confidence level ($\alpha = 0.05$ significance level) was used to test the null hypothesis that the slope is not significantly different from zero (no trend) for the Sen's slope estimation. The U.S. EPA (2009) recommends that at least four and preferably eight samples be collected in order to perform Sen's slope estimator. For the Sens' trend analysis, values below the reporting limit were treated in the same manner as done for the Mann-Kendall analysis as per U.S. EPA (2009).

For each data set, the coefficient of variation index was computed by dividing the standard deviation by the arithmetic mean of the data. If no statistically significant trend could be identified by the Mann-Kendall test and if the coefficient of variation was less than or equal to 1.0, then the data set was considered to be "stable." If no trend was identified and the coefficient of variation exceeded 1.0, then the analysis could only conclude that there was "no trend."

The results of the statistical tests are presented in **Table I-2** of **Appendix I**. Time series plots for each dataset along with the results from the Mann-Kendall and Sen's slope estimator trend tests are presented in **Figures I-1** through **I-6**. When the full data set was analyzed, no statistically significant trend was identified by the Mann-Kendall test for GM-9 or GM-15. Because the coefficient of variation was less than 1.0 for both monitoring wells, the chlorinated VOC concentration data were determined to be stable. For GM-20D, a statistically significant decreasing trend was observed. The three monitoring well data sets were tested using Sen's Slope Estimator as a second line of evidence. In all three cases, Sen's Slope Estimator confirmed the results obtained using the Mann-Kendall test.

For the post-July 2008 dataset (i.e., the time during which Arcadis was in control of the DN-13 extraction well flow rate), a statistically significant decreasing trend was identified with the Mann-Kendall test and confirmed with the Sen's Slope Estimator test for trends in GM-9 and GM-20D.

An increasing trend was identified in GM-15 based on the results from the Mann-Kendall and Sen's slope estimator trend tests using the post-July 2008 dataset. Total chlorinated VOC concentrations at GM-15 ranged from 6.9 ug/L to 10.8 ug/L from 1999 to 2014. In November 2015 and August 2016, the total chlorinated VOC concentrations increased to 17.34 ug/L and 18.04 ug/L, respectively, but decreased slightly in August 2017 to 16.85 ug/L and again in July 2018 to 15.46 ug/L. Upon review of the historical data (**Appendix E**), it should be noted that the increasing total chlorinated VOC concentrations are attributable to increasing daughter product concentrations, specifically cis-1,2-DCE. The concentrations of TCE (parent product) do not appear to be increasing; rather, the TCE data have remained relatively consistent. Consequently, these data suggest effective capture.

3.2.7 Interpreted Capture

The lines of evidence evaluated indicate that the current operation of DN-13 in 2018 is providing sufficient capture within the lower aquifer to control and prevent further migration of site-specific VOCs. The lines of evidence investigated as part of this analysis and their associated conclusions can be summarized as follows:

1. Interpret Groundwater Levels.

a. Potentiometric Surface Map – The lower aquifer groundwater elevation data indicate that groundwater flows from the northeast to the southwest towards pumping well DN-13 and that the inferred capture zone encompasses the target capture zone.

b. Horizontal Hydraulic Gradients – The horizontal hydraulic gradient evaluation indicates that DN-13 is providing effective capture in the downgradient region of the lower aquifer.

c. Vertical Hydraulic Gradients – The vertical hydraulic gradients calculated for monitoring well pairs in the vicinity of DN-13 indicate an overall downward (negative) vertical hydraulic gradient from the upper to the lower aquifer.

2. Groundwater Flux Calculation – The groundwater flux calculations, which are based on conservative parameter values, indicate that the 2018 average operating flow rate at DN-13 was sufficient to capture the groundwater flux of the total site-specific VOC groundwater plume moving through the target capture zone.

3. Evaluate Groundwater Concentration Trends – Results from the total chlorinated VOC trend analysis and data review show that chlorinated VOC concentrations in the lower aquifer in the vicinity of DN-13 are decreasing, stable, or potentially attributable to natural attenuation (e.g., increasing concentrations of daughter products), thereby indicating effective plume capture.

Based on these multiple lines of evidence, an interpreted capture zone was delineated and shows containment of the target capture zone on **Figure 16**. The results of this updated analysis are consistent with previous analyses and the lines of evidence suggest that sufficient hydraulic capture within the lower aquifer at the Site has been achieved.

4 CORRECTIVE ACTION COMPLETION STRATEGY

4.1 Effectiveness of Interim Measure Activities

4.1.1 Background and Objectives

Updated Corrective Measures Objectives (CMOs) based on the RFI, Supplemental RFI, and supplemental investigation results, including the Baseline Risk Assessment (BRA) conclusions; Supplemental BRA conclusions; CMP supplemental risk assessment; requirements of the AOC; and U.S. EPA guidance (U.S. EPA 1994) have been provided in the 2012 CMP (Arcadis, Inc. 2012a). The CMOs proposed in the CMP to address site-specific VOCs in groundwater are presented below.

The CMOs for the protection of human health for the upper aquifer are as follows:

1. Address chlorinated VOC mass from historic releases from the primary source area (former Oil House Area), including the chlorinated VOC mass delineated near the former Process Sump Area
2. Limit future migration of chlorinated VOCs from the primary source area to downgradient portions of the upper aquifer and into the lower aquifer
3. Prevent the migration of chlorinated VOCs at concentrations exceeding the MCLs beyond the existing plume boundary
4. Continue implementing the final corrective measures until the CMOs are achieved on-site and MCLs can be met and maintained at the property line point of compliance without active remedial measures

The CMOs for the protection of human health for the lower aquifer are as follows:

1. To maintain the lower aquifer as usable groundwater for potential off-site, downgradient drinking water uses
2. Prevent the migration of chlorinated VOCs at concentrations exceeding MCLs beyond the existing plume boundary
3. To meet and maintain MCLs at the downgradient property line point of compliance without active remedial measures

Implementation of the final remedy as outlined in the 2012 CMP is pending U.S. EPA approval. A CMP Addendum to summarize data collected since the 2012 CMP, update the CSM, update the risk assessment, and summarize the proposed final remedy is anticipated to be submitted in 2019.

4.1.2 Results

An evaluation of the data collected in 2018 is presented in **Section 2.5.3**. Current site-specific VOC groundwater distribution within the upper aquifer above MCLs is migrating downgradient (southwest) beyond the property boundary. For the lower aquifer, well DN-13, through several lines of evidence, indicates sufficient capture within the lower aquifer exists to mitigate and control the migration of site-specific VOCs off-site (refer to **Section 3.2**).

5 CONCLUSIONS AND RECOMMENDATIONS

This groundwater monitoring report presents the groundwater monitoring activities completed in 2018 at the RACER Trust Moraine Facilities located in Moraine, Ohio. These activities were completed to meet the five objectives presented in **Section 1.2**. Compliance with these objectives is presented for the off-site groundwater monitoring activities, PFAS evaluation, interim measures, closed lagoons, and on-going groundwater monitoring in the following sections.

5.1 Off-Site Groundwater Monitoring

Groundwater samples were collected from the seven monitoring wells (RMW-95, RMW-96, RMW-97, GM-79, GM-80, GM-81, and MW-5) in the Miami Shores neighborhood. The groundwater data were screened against the applicable VISLs (**Table 11**). The water table wells (RMW-95, RMW-96, RMW-97, and GM-80), which represent conditions closest to the receptor (i.e., residential properties), did not exceed the VISLs. Results from this screening assessment indicate that groundwater concentrations of site-specific VOCs do not present an unacceptable vapor intrusion risk in the Miami Shores neighborhood.

As detailed above, monitoring wells GM-65S and GM-65D were sampled at the request of the City of West Carrolton. Site-specific VOCs were detected at relatively low concentrations or below reporting limits (**Table 3**). The data indicate that the upper and lower aquifer site-specific VOC plumes at the Site remain northeast of the City of West Carrollton Wellhead Protection Area (**Appendices F-3 and F-6**).

5.2 PFAS Evaluation

To evaluate areas where PFAS may have been associated with past industrial processes at the Site, groundwater samples were collected at select locations for PFAS analysis during two sampling events in 2018 (**Appendix B**). The data were screened against the HAL for a combined concentration of PFOA and PFOS. The results indicate that PFAS in the upper aquifer is delineated. The only sample that exceeded the HAL was from monitoring well GM-35 (217 ng/L), during only the August sampling event. During the December 2018 sampling event, the combined PFOA and PFOS concentration in monitoring well GM-35 was below the HAL. Therefore, the elevated concentration appears to be localized near GM-35 and only during the August event. It is also noteworthy that there were detections of PFAS upgradient of the Site.

Based on the findings from the two PFAS groundwater sampling events, additional sampling and/or remediation of PFAS at the Site is not necessary.

5.3 Interim Measures Performance

The approach for RACER Trust in achieving its corrective action goals for the former Moraine Facilities is based on a combination of interim measures (in-situ treatment and hydraulic control) designed to reduce existing plume concentrations thereby achieving plume reduction and migration control.

5.3.1 In-Situ Treatment

Groundwater quality monitoring at and downgradient of the reactive zones indicates that this in-situ treatment program has been effective at reducing chlorinated VOC concentrations in groundwater via anaerobic reductive dechlorination. As observed during the 2018 monitoring, the upper aquifer conditions in the areas downgradient of the in-situ reactive zones have been converted to strongly reducing conditions through the introduction of a carbon source, as evidenced by the presence of methane at concentrations significantly above baseline data and further supported qualitatively with field parameter data (e.g., low dissolved oxygen and oxidation-reduction potential). Further, the chlorinated VOC results indicate that the target compounds (PCE and TCE) have been effectively reduced to daughter products (cis-1,2-DCE and vinyl chloride) and ultimately to ethene and ethane.

In general, the process of ERD has been successful in achieving reduction of chlorinated VOC concentrations downgradient of source areas. Previously, TOC data collected from the active IRZs at the site has indicated that an injection frequency of once every 6 to 13 months may be appropriate to sustain appropriate substrate concentrations to support ongoing reductive dechlorination. Considering the anticipated modifications to the overall remedial strategy over the next few years, it is recommended that active injections be suspended on an interim basis to prepare groundwater conditions for the new treatment approach. This suspension is recommended to allow for: a) further assessment of TOC longevity within the site IRZs; b) initiation of redox restoration process that can support burn out of the active IRZs and oxidation of reduced metals (e.g., iron and manganese) that may complicate ex-situ treatment once the new design is installed; and c) an evaluation of residual VOC concentrations in key IRZs following cessation of the injection activities. It should be noted that the interim suspension of the IRZ injections may be modified based on the timing of remedy approval and installation and changes in VOC concentrations (i.e., increases) that may prompt continuation of injection activities.

The 2019 IRZ performance monitoring program will be similar to the 2018 program. The only significant change will be the frequency of monitoring events, which will increase from annual to semi-annual. The data will be reviewed semi-annually to determine if there is a significant rebound in VOC concentrations to the extent that the conceptual design of the diffuse groundwater plume treatment system would significantly change without the interim IRZ program. If concentrations increase to the extent that changes to the remedial design for the diffuse plume become likely, the IRZ program will resume. If the overall changes to the site-specific VOC data indicate an immaterial effect on the diffuse groundwater plume system design, the IRZ program will remain suspended. IRZ performance monitoring activities, conclusions, and recommendations will be summarized in the quarterly progress reports and the annual groundwater monitoring reports.

5.3.2 Hydraulic Capture

Groundwater elevation monitoring, horizontal and vertical hydraulic gradients, groundwater flux calculations, and lower aquifer chlorinated VOC concentration trends indicate that the interim measure DN-13 continues to be effective at maintaining capture of the target capture zone in the lower aquifer. Based on the effective performance of the pumping program during 2018, the current pumping program at DN-13 will continue to be implemented and evaluated in 2019.

Concentrations in upper aquifer monitoring wells immediately downgradient of the Site to the southwest, as well as concentrations in lower aquifer wells remain above MCLs. Therefore, active measures to include a final proposed site-wide remedy are still required to achieve the corrective measures objectives. Both the amended in-situ treatment and hydraulic capture (lower aquifer) will continue until modifications are implemented for the final site-wide remedy.

5.4 Post-Closure Monitoring

As proposed in the Site-Wide Groundwater Monitoring Plan (Arcadis G&M, Inc. 2002), post-closure monitoring data collected at the closed North and South Settling Lagoons were evaluated to determine if these closed units may be contributing site-specific VOCs to groundwater.

This evaluation determined that post-closure monitoring data indicate that these units do not appear to be affecting groundwater quality. Based on the results from the 2018 monitoring, no changes in the monitoring program for the closed lagoons are proposed.

5.5 2019 Groundwater Monitoring Program

Based on the on-going remedial design tasks and expected remedy implementation, it is proposed that the 2019 groundwater monitoring program remain mostly consistent with the sampling program for 2018. This includes monitoring associated with DN-13, the IRZs, and the closed North and South Settling Lagoons. Deviations from the 2018 monitoring program are as follows:

- Water table wells in the Miami Shores neighborhood (GM-80, RMW-95, RMW-96, and RMW-97) will be sampled in the first or second quarter of 2019. The results, conclusions, and recommendations from the Miami Shores monitoring event will be submitted to the U.S. EPA in a letter report with tables and figures.
- Performance monitoring of the IRZs (as detailed in **Section 5.3.1**) will be completed on a semi-annual basis.

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TABLES

ARCADIS Design & Consultancy for natural and built assets

Table 1
Groundwater Monitoring Program for 2018
RACER Trust Moraine Facilities
Moraine, Ohio

2018 Annual Groundwater Sampling

Upper aquifer monitoring wells analyzed for the site-specific list of VOCs(1) and field parameters(2) in 2018. Biogeochemical parameters(3) and PFAS(4) were analyzed at select wells identified below:

W-1-N(4)	HR-17	GM-19S (3)(4)	GM-34(4)	GM-72(4)	RMW-95(5)
W-2-N	W-2-S	GM-21(3)(4)	GM-35(4)	GM-75S(4)	RMW-96(5)
W-3-N	W-3-S	GM-23(3)(4)	GM-48(4)	GM-79(5)	RMW-97(5)
W-4-N(4)	W-4-S	GM-24(4)	GM-60(4)	GM-80(5)	MW-5
HR-1(4)	GM-6(3)(4)	GM-28R(3)	GM-63(4)	GM-81(5)	
HR-4	GM-8(3)(4)	GM-29(3)	GM-65S(4)	RMW-92(4)	
HR-11(4)	GM-16(4)	GM-32(6)	GM-66(4)	RMW-94(4)	

Lower aquifer monitoring wells sampled for the site-specific list of VOCs(1) and field parameters(2) in 2018:

DN-13	GM-20D
GM-9	GM-65D
GM-15	

Analytical Methods

The following table presents the analytical methods used to analyze each parameter sampled during the annual groundwater monitoring event.

Parameter	Analytical Method
Site-specific list of VOCs	SW846 8260B
PFAS	EPA 537M
Manganese, total and dissolved	SW846 6010B
Iron, total and dissolved	SW846 6010B
Sulfate	MCAWW 300.0
Sulfide, total	SM 4500 S2 F-2000
Total organic carbon	SW846 9060
Chlorides	SW846 9251
Ethane, ethene, methane	AM20GAX

NOTES:

1 – Site-specific list of VOCs for 2018 includes: benzene, 1,1-dichloroethane, 1,1-dichloroethene, cis-1,2-dichloroethene, trans-1,2-dichloroethene, ethylbenzene, tetrachloroethene, toluene, 1,1,1-trichloroethane, trichloroethene, vinyl chloride, and xylenes.

2 – Field parameters include: pH, specific conductivity, dissolved oxygen, oxidation reduction potential, and temperature.

3 – Biogeochemical parameters include: nitrate, manganese (total and dissolved), iron (total and dissolved), sulfate, sulfide, total organic carbon, chlorides, ethane, ethene, and methane.

4 – Upper aquifer monitoring wells were used to evaluate concentrations of PFAS in groundwater.

5 – Upper aquifer monitoring wells were used to evaluate groundwater between the Great Miami River and Miami Shores neighborhood.

6 - Upper aquifer monitoring well GM-32 was sampled for total organic carbon only.

Table 2
Carbon Source Solution Introduction Volumes for 2018
RACER Trust Moraine Facilities
Moraine, Ohio

Injection Well	First Quarter		Second Quarter		Third Quarter		Fourth Quarter	
	Injection Event #172(1)		Injection Event #173(2)		Injection Event #174(3)		Injection Event #175(4)	
	Volume (gal)	Flow Rate (gpm)	Volume (gal)	Flow Rate (gpm)	Volume (gal)	Flow Rate (gpm)	Volume (gal)	Flow Rate (gpm)
Reactive Zone 1								
RZ-1C*	0	NA	0	NA	0	NA	0	NA
RZ-1D	800	26.70	800	26.70	800	22.90	800	25.00
RZ-1E	800	22.90	800	21.60	800	22.90	800	22.90
RZ-1F	800	23.50	800	21.60	800	21.60	800	22.20
RZ-1G	800	26.70	800	25.80	800	27.60	800	25.00
RZ-1H	800	9.50	800	14.80	800	16.70	800	8.10
RZ-1I	800	25.80	800	21.60	800	27.60	800	25.80
RZ-1J	800	26.70	800	25.80	800	28.60	800	24.20
RZ-1K	800	27.60	800	27.60	800	28.60	800	27.60
RZ-1L	800	28.60	800	29.60	800	33.30	800	32.00
RZ-1M	400	14.30	300	4.90	300	19.50	300	20.50
RZ-1N	400	23.50	800	14.45	800	13.30	800	10.30
RZ-1O	800	20.00	800	17.40	800	19.50	800	21.60
RZ-1P	800	28.60	800	30.80	800	30.80	800	29.60
RZ-1Q	400	8.20	800	4.80	800	5.80	800	4.80
RZ-1R	400	30.80	800	29.60	800	28.60	800	26.70
RZ-1S	800	23.50	800	21.60	800	26.70	800	22.90
RZ-1T	800	27.60	800	22.90	800	25.00	800	28.60
RZ-1U	800	26.70	800	27.60	800	25.00	800	28.60
Reactive Zone 1 Total Volume	12,800	NA	13,900	NA	13,900	NA	13,900	NA

NOTES:
* Injection event not completed due to molasses solution daylighting.
Carbon source introduced into each well is a 50:1 solution (potable water to molasses).
gal - gallons.
gpm - gallons per minute.
NA - Not Applicable.
(1) Injection Event #172 was completed February 20th - 23rd, February 26th - 28th, March 1st, March 5th - 7th, March 9th, March 12th - 13th, and March 16th of 2018.
(2) Injection Event #173 was completed April 25th - 27th, April 30th, May 7th - 11th, and May 14th - 17th of 2018.
(3) Injection Event #174 was completed July 9th -13th, July 30th, August 6th, August 8th -10th, August 22nd -23rd, and September 11th of 2018.
(4) Injection Event #175 was completed October 8th -11th, 17th -19th, 22nd -25th, and October 29th of 2018.

Table 2
Carbon Source Solution Introduction Volumes for 2018
RACER Trust Moraine Facilities
Moraine, Ohio

ARCADIS Design & Consultancy for natural and built assets

Injection Well	First Quarter		Second Quarter		Third Quarter		Fourth Quarter	
	Injection Event #172(1)		Injection Event #173(2)		Injection Event #174(3)		Injection Event #175(4)	
	Volume (gal)	Flow Rate (gpm)	Volume (gal)	Flow Rate (gpm)	Volume (gal)	Flow Rate (gpm)	Volume (gal)	Flow Rate (gpm)
Reactive Zone 3								
RZ-3A	1,600	26.60	1,600	23.90	1,600	26.20	1,600	17.50
RZ-3B	1,600	25.90	1,600	24.45	1,600	26.25	1,600	25.25
RZ-3C	1,600	22.90	1,600	24.65	1,600	21.90	1,600	23.20
RZ-3D	600	6.30	800	5.40	800	7.10	800	7.10
RZ-3E	300	11.90	800	8.10	800	12.30	800	11.40
RZ-3F	1,500	17.30	1,600	15.40	1,600	10.90	1,600	11.45
RZ-3G	1,600	11.50	1,600	13.15	800	8.30	800	6.00
RZ-3H	1,600	22.90	1,600	23.55	1,600	24.35	1,600	22.65
RZ-3I	1,600	18.60	1,600	12.55	1,600	11.95	800	10.80
RZ-3J	1,600	24.30	1,600	23.55	1,600	15.75	1,600	19.10
RZ-3K	1,600	14.10	1,600	13.45	1,600	17.85	1,600	18.60
RZ-3L	1,600	28.60	1,600	28.60	1,600	28.15	1,600	25.90
RZ-3M	1,600	27.70	1,600	30.80	1,600	29.20	1,600	27.65
RZ-3N	1,600	29.70	1,600	29.10	1,600	28.75	1,600	28.60
RZ-3O	1,600	25.50	1,600	27.20	1,600	25.45	1,600	26.25
RZ-3P	1,600	22.40	1,600	21.50	1,600	20.85	1,600	18.95
RZ-3Q	1,600	27.20	1,600	27.65	1,600	29.20	1,600	25.00
RZ-3R	1,600	29.60	1,600	29.60	1,600	32.05	1,600	27.60
RZ-3S	1,600	23.10	1,600	24.15	1,600	25.90	1,600	20.85
RZ-3T	1,600	24.60	1,600	24.00	1,600	23.30	1,600	20.55
RZ-3U	1,600	27.20	1,600	27.65	1,600	26.20	1,600	24.20

NOTES:
* Injection event not completed due to molasses solution daylighting.
Carbon source introduced into each well is a 50:1 solution (potable water to molasses).
gal - gallons.
gpm - gallons per minute.
NA - Not Applicable.
(1) Injection Event #172 was completed February 20th - 23rd, February 26th - 28th, March 1st, March 5th - 7th, March 9th, March 12th - 13th, and March 16th of 2018.
(2) Injection Event #173 was completed April 25th - 27th, April 30th, May 7th - 11th, and May 14th - 17th of 2018.
(3) Injection Event #174 was completed July 9th -13th, July 30th, August 6th, August 8th -10th, August 22nd -23rd, and September 11th of 2018.
(4) Injection Event #175 was completed October 8th -11th, 17th -19th, 22nd -25th, and October 29th of 2018.

Table 2
Carbon Source Solution Introduction Volumes for 2018
RACER Trust Moraine Facilities
Moraine, Ohio

Injection Well	First Quarter		Second Quarter		Third Quarter		Fourth Quarter	
	Injection Event #172(1)		Injection Event #173(2)		Injection Event #174(3)		Injection Event #175(4)	
	Volume (gal)	Flow Rate (gpm)	Volume (gal)	Flow Rate (gpm)	Volume (gal)	Flow Rate (gpm)	Volume (gal)	Flow Rate (gpm)
Reactive Zone 3								
RZ-3V	1,600	24.60	1,600	25.85	1,600	26.25	1,600	22.65
RZ-3W	1,600	26.30	1,600	25.00	1,600	22.50	1,600	22.90
RZ-3X	1,600	26.80	1,600	26.30	1,600	30.45	1,600	24.30
RZ-3Y	1,600	25.90	1,600	24.90	1,600	28.10	1,600	23.50
RZ-3Z	1,600	26.30	1,600	25.80	1,600	26.30	1,600	22.65
RZ-3AA	1,600	25.90	1,600	25.00	1,600	26.30	1,600	22.00
RZ-3BB	1,600	25.10	1,600	25.85	1,600	25.00	1,600	20.75
RZ-3CC	1,600	26.70	1,600	27.20	1,600	23.70	1,600	19.25
RZ-3DD	1,600	27.50	1,600	24.15	1,600	26.90	1,600	25.85
Reactive Zone 3 Total Volume	45,600	NA	46,400	NA	45,600	NA	44,800	NA

NOTES:
* Injection event not completed due to molasses solution daylighting.
Carbon source introduced into each well is a 50:1 solution (potable water to molasses).
gal - gallons.
gpm - gallons per minute.
NA - Not Applicable.
(1) Injection Event #172 was completed February 20th - 23rd, February 26th - 28th, March 1st, March 5th - 7th, March 9th, March 12th - 13th, and March 16th of 2018.
(2) Injection Event #173 was completed April 25th - 27th, April 30th, May 7th - 11th, and May 14th - 17th of 2018.
(3) Injection Event #174 was completed July 9th -13th, July 30th, August 6th, August 8th -10th, August 22nd -23rd, and September 11th of 2018.
(4) Injection Event #175 was completed October 8th -11th, 17th -19th, 22nd -25th, and October 29th of 2018.

Table 3
Summary of Groundwater VOC Analytical Results from Upper/Lower Aquifer Monitoring Wells in 2018
RACER Trust Moraine Facilities
Moraine, Ohio

	Units	MCL[1]	Downgradient Reactive Zone Performance Wells						
			GM-23 07/26/2018 Upper Aquifer	**GM-6 07/24/2018 Upper Aquifer**	**GM-8 07/24/2018 Upper Aquifer**	**GM-19S 07/24/2018 Upper Aquifer**	**GM-21 07/25/2018 Upper Aquifer**	**GM-28R 07/25/2018 Upper Aquifer**	**GM-29 07/25/2018 Upper Aquifer**
Site-Specific Volatile Organic Compounds									
1,1,1-Trichloroethane	ug/L	200	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	8.1
1,1-Dichloroethane	ug/L		8.0	0.26 J	0.47 J	2.3	9.3	< 1.0 U	10
1,1-Dichloroethene	ug/L	7	0.81 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U
Benzene	ug/L	5	0.47 J	< 1.0 U	1.3	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U
cis-1,2-Dichloroethene	ug/L	70	**260**	0.40 J	0.30 J	31	23	3.5	**420**
Ethylbenzene	ug/L	700	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U
Tetrachloroethene	ug/L	5	**8.4**	< 1.0 U	< 1.0 U	0.37 J	< 1.0 U	3.5	**13**
Toluene	ug/L	1,000	0.16 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U
trans-1,2-Dichloroethene	ug/L	100	16	< 1.0 U	< 1.0 U	0.66 J	1.6	< 1.0 U	13
Trichloroethene	ug/L	5	5.0	< 1.0 U	< 1.0 U	2.4	3.9	0.30 J	**310**
Vinyl chloride	ug/L	2	**210**	0.65 J	0.91 J	**8.8**	**15**	0.70 J	**41**
Xylene (total)	ug/L	10,000	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 4.0 U
Total Site-Specific VOCs	ug/L		509	1.3	3.0	46	53	8.0	815

NOTES:

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[1] - A MCL is not listed for 1,1-dichloroethane.

The QA/QC results for 2018 data are shown in Appendix D.

BOLD - Result above MCL.

ug/L - Micrograms per Liter.

MCL - Maximum Contaminant Level.

J - Value is estimated.

U - Constituent not detected above laboratory reporting limit shown.

Table 3
Summary of Groundwater VOC Analytical Results from Upper/Lower Aquifer Monitoring Wells in 2018
RACER Trust Moraine Facilities
Moraine, Ohio

	Units	MCL[1]	Closed North Settling Lagoon Monitoring Results				Closed South Settling Lagoon Monitoring Results			
			HR-4 07/24/2018 Upper Aquifer	W-2-N 07/24/2018 Upper Aquifer	W-3-N 07/24/2018 Upper Aquifer	W-4-N 07/25/2018 Upper Aquifer	HR-17 07/25/2018 Upper Aquifer	W-2-S 07/25/2018 Upper Aquifer	W-3-S 07/25/2018 Upper Aquifer	W-4-S 07/25/2018 Upper Aquifer
Site-Specific Volatile Organic Compounds										
1,1,1-Trichloroethane	ug/L	200	1.6	0.38 J	< 1.0 U	< 1.0 U	4.8	0.98 J	0.87 J	1.8
1,1-Dichloroethane	ug/L		1.6	0.31 J	< 1.0 U	6.9	2.2	0.83 J	0.61 J	2.1
1,1-Dichloroethene	ug/L	7	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Benzene	ug/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
cis-1,2-Dichloroethene	ug/L	70	0.45 J	2.7	16	8.7	1.1	2.2	1.1	17
Ethylbenzene	ug/L	700	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Tetrachloroethene	ug/L	5	0.16 J	< 1.0 U	< 1.0 U	0.26 J	**180**	2	**19**	**68**
Toluene	ug/L	1,000	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
trans-1,2-Dichloroethene	ug/L	100	< 1.0 U	0.28 J	0.33 J	1.3	< 1.0 U	0.32 J	0.19 J	1.5
Trichloroethene	ug/L	5	0.29 J	1.9	< 1.0 U	**6.1**	0.92 J	4.6	**27**	**42**
Vinyl chloride	ug/L	2	< 1.0 U	< 1.0 U	1.1	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Xylene (total)	ug/L	10,000	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U
Total Site-Specific VOCs	ug/L		4.1	5.6	17	23	189	11	49	132

NOTES:

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BOLD - Result above MCL.

ug/L - Micrograms per Liter.

MCL - Maximum Contaminant Level.

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Table 3
Summary of Groundwater VOC Analytical Results from Upper/Lower Aquifer Monitoring Wells in 2018
RACER Trust Moraine Facilities
Moraine, Ohio

	Units	MCL[1]	Downgradient On-Site	Off-Site Downgradient of the Site						
			HR-1 07/25/2018 Upper Aquifer	GM-65S 9/14/2018 Upper Aquifer	GM-79 07/23/2018 Upper Aquifer	GM-80 07/23/2018 Upper Aquifer	GM-81 07/23/2018 Upper Aquifer	MW-5 7/23/2018 Upper Aquifer	RMW-95 07/23/2018 Upper Aquifer	RMW-96 07/23/2018 Upper Aquifer
Site-Specific Volatile Organic Compounds										
1,1,1-Trichloroethane	ug/L	200	0.77 J	< 1.0 U	0.39 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,1-Dichloroethane	ug/L		0.96 J	< 1.0 U	1.7	0.54 J	1.1	0.64 J	0.57 J	0.28 J
1,1-Dichloroethene	ug/L	7	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Benzene	ug/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.13 J	< 1.0 U
cis-1,2-Dichloroethene	ug/L	70	20	< 1.0 U	4.5	1.5	1.6	0.92 J	0.38 J	0.80 J
Ethylbenzene	ug/L	700	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.13 J	< 1.0 U
Tetrachloroethene	ug/L	5	**99**	2.4	**13**	**18**	< 1.0 U	< 1.0 U	3.4	**7.0**
Toluene	ug/L	1,000	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.33 J	< 1.0 U
trans-1,2-Dichloroethene	ug/L	100	1.3	< 1.0 U	< 1.0 U	< 1.0 U	0.19 J	<1.0 U	< 1.0 U	< 1.0 U
Trichloroethene	ug/L	5	**40**	< 1.0 U	**21**	**5.3**	1.5	1.6	1.6	2.1
Vinyl chloride	ug/L	2	< 1.0 U	< 1.0 U	0.27 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Xylene (total)	ug/L	10,000	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	0.19 J	< 2.0 U
Total Site-Specific VOCs	ug/L		162	2.4	41	25	4.4	1.6	6.7	10

NOTES:

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BOLD - Result above MCL.

ug/L - Micrograms per Liter.

MCL - Maximum Contaminant Level.

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Table 3
Summary of Groundwater VOC Analytical Results from Upper/Lower Aquifer Monitoring Wells in 2018
RACER Trust Moraine Facilities
Moraine, Ohio

				Off-Site Downgradient of the Site				
	Units	MCL[1]	RMW-97 07/23/2018 Upper Aquifer	GM-15 07/24/2018 Lower Aquifer	GM-20D 07/24/2018 Lower Aquifer	GM-9 7/24/2018 Lower Aquifer	GM-65D 9/14/2018 Lower Aquifer	DN-13 07/24/2018 Lower Aquifer
Site-Specific Volatile Organic Compounds								
1,1,1-Trichloroethane	ug/L	200	< 1.0 U	< 1.0 U	< 1.0 U	0.49 J	1.7	0.52 J
1,1-Dichloroethane	ug/L		< 1.0 U	1.9	< 1.0 U	0.18 J	0.33 J	1.1
1,1-Dichloroethene	ug/L	7	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Benzene	ug/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
cis-1,2-Dichloroethene	ug/L	70	0.93 J	6.6	< 1.0 U	< 1.0 U	0.28 J	4.7
Ethylbenzene	ug/L	700	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Tetrachloroethene	ug/L	5	4.7	< 1.0 U	1.0	< 1.0 U	< 1.0 U	1.4
Toluene	ug/L	1,000	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
trans-1,2-Dichloroethene	ug/L	100	< 1.0 U	0.66 J	< 1.0 U	< 1.0 U	< 1.0 U	0.28 J
Trichloroethene	ug/L	5	1.1	**5.8**	0.63 J	**9.1**	3.0	**6.2**
Vinyl chloride	ug/L	2	< 1.0 U	0.50 J	< 1.0 U	< 1.0 U	< 1.0 U	0.53 J
Xylene (total)	ug/L	10,000	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U
Total Site-Specific VOCs	ug/L		6.7	15	1.6	9.8	5.3	15

NOTES:

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[1] - A MCL is not listed for 1,1-dichloroethane.

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BOLD - Result above MCL.

ug/L - Micrograms per Liter.

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Table 4
Summary of PFAS Data in Groundwater in 2018
RACER Trust Moraine Facilities
Moraine, Ohio

ARCADIS Design & Consultancy for natural and built assets

	Unit	U.S. EPA Health Advisory Level	GM-6	GM-8		GM-16		GM-19S		GM-21		GM-23
			8/8/2018	8/8/2018	12/5/2018	8/8/2018	12/5/2018	8/8/2018	12/4/2018	8/7/2018	12/5/2018	8/8/2018
Constituents												
Perfluorooctanesulfonic acid (PFOS)	ng/L	-	7.4	27	21	25	16	4.0	3.5	6	0.85 J	2
Perfluorooctanoic acid (PFOA)	ng/L	-	6.0	19	15	15	4.8	3.7	3.1	10	4.3	9.8
Combined (PFOS and PFOA)	ng/L	70	13	46	36	40	21	7.7	6.6	16	5.2	12
N-methyl perfluorooctane sulfonamidoacetic acid (NMeFOSAA)	ng/L	-	<19 U	<19 U	< 19 U	<16 U	< 19 U	<16 U	< 17 U	<16 U	< 17 U	<18 U
N-ethyl perfluorooctane sulfonamidoacetic acid (NEtFOSAA)	ng/L	-	<19 U	<19 U	< 19 U	<16 U	< 19 U	<16 U	< 17 U	<16 U	< 17 U	<18 U
Perfluorobutanesulfonic acid (PFBS)	ng/L	-	5.6	4.6	4.3	3.5	3.6	6.0	3.8	3.8	3.1	3.8
Perfluorobutanoic acid (PFBA)	ng/L	-	3.9	4.2 CI	3.9 B	6.3 CI	3.6 B	3.7	3.3 B	10	7.0 B	<1.8 U
Perfluorodecanesulfonic acid (PFDS)	ng/L	-	<1.9 U	<1.9 U	< 1.9 U	<1.6 U	< 1.9 U	<1.6 U	< 1.7 U	<1.6 U	< 1.7 U	<1.8 U
Perfluorodecanoic acid (PFDA)	ng/L	-	<1.9 U	<1.9 U	< 1.9 U	0.32 J	< 1.9 U	<1.6 U	< 1.7 U	0.54 J	0.28 J	0.27 J
Perfluorododecanoic acid (PFDoA)*	ng/L	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Perfluorododecanoic acid (PFDoA)	ng/L	-	<1.9 U	<1.9 U	< 1.9 U	<1.6 U	< 1.9 U	<1.6 U	< 1.7 U	<1.6 U	< 1.7 U	<1.8 U
Perfluoroheptanesulfonic Acid (PFHpS)	ng/L	-	0.18 J	<1.9 U	< 1.9 U	0.26 J	0.30 J	0.16 J	0.18 J	0.22 J	< 1.7 U	0.17 J
Perfluoroheptanoic acid (PFHpA)	ng/L	-	1.3 J	1.6 J	1.0 J	1.8	1.5 J	2.5	1.5 J	4.7	2	5.1
Perfluorohexanoic acid (PFHxA)	ng/L	-	2.6	2.4	1.9	3.2	2.4	5.6	3.3	4.7	4.3	8.3
Perfluorohexanesulfonic acid (PFHxS)	ng/L	-	5.3 B	4.9 B	4.6 B	6.6 B	8.0 B	12 B	12 B	1.7 B	3.3 B	3.2 B
Perfluorononanesulfonic acid (PFNS)	ng/L	-	<1.9 U	<1.9 U	< 1.9 U	<1.6 U	< 1.9 U	<1.6 U	< 1.7 U	<1.6 U	< 1.7 U	<1.8 U
Perfluorononanoic acid (PFNA)	ng/L	-	0.42 J	0.32 J	< 1.9 U	2.1	1.5 J	0.42 J	0.31 J	1.2 J	0.37 J	<1.8 U
Perfluorooctane Sulfonamide (FOSA)	ng/L	-	<1.9 U	<1.9 U	< 1.9 U	<1.6 U	< 1.9 U	<1.6 U	< 1.7 U	<1.6 U	< 1.7 U	<1.8 U
Perfluoropentanesulfonic acid (PFPeS)	ng/L	-	1.0 J	0.78 J	0.39 J	1.3 J	1.3 J	3.3	1.9	0.41 J	1.4 J	2.3
Perfluoropentanoic acid (PFPeA)	ng/L	-	2.6	2.4	2.7	1.3 J	2.7	5.2	2.8	5	4.8	10
Perfluorotetradecanoic acid (PFTeA)	ng/L	-	<1.9 U	<1.9 U	< 1.9 U	<1.6 U	< 1.9 U	<1.6 U	< 1.7 U	<1.6 U	< 1.7 U	<1.8 U
Perfluorotetradecanoic acid (PFTeA)*	ng/L	-	NA	<1.9 U H	NA	NA	NA	NA	NA	NA	NA	NA
Perfluorotridecanoic Acid (PFTriA)*	ng/L	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Perfluorotridecanoic Acid (PFTriA)	ng/L	-	<1.9 U	<1.9 U	< 1.9 U	<1.6 U	< 1.9 U	<1.6 U	< 1.7 U	<1.6 U	< 1.7 U	<1.8 U
Perfluoroundecanoic acid (PFUnA)	ng/L	-	<1.9 U	<1.9 U	< 1.9 U	<1.6 U	< 1.9 U	<1.6 U	< 1.7 U	<1.6 U	< 1.7 U	<1.8 U
4:2 FTS	ng/L	-	<19 U	<19 U	< 19 U	<16 U	< 19 UF1	<16 U	< 17 U	<18 U	< 17 U	<16 U
6:2 FTS	ng/L	-	<19 U	<19 U	< 19 U	<16 U	< 19 U	<16 U	< 17 U	<18 U	< 17 U	<16 U
8:2 FTS	ng/L	-	<19 U	<19 U	< 19 U	<16 U	< 19 U	<16 U	< 17 U	<18 U	< 17 U	<16 U

Notes:
- Not available.
* Sample re-prepared due to Isotope Dilution Analyte percent recovery out of range in the initial analysis.
Bold and shaded - Result above combined PFOA and PFOS Health Advisory Level.
B - Compound was found in the blank and sample.
CI - The peak identified by the data system exhibited chromatographic interference that could not be resolved. There is reason to suspect there may be a high bias.
F1 - MS and/or MSD recovery is outside acceptance limits.
H - Sample was prepped or analyzed beyond the specified holding time.
J - Result is less than the reporting limit but greater than or equal to the method detection limit and the concentration is an approximate value.
NA - Not analyzed.
ng/L - Nanograms per liter.
U - Indicates the analyte was analyzed for but not detected.

Table 4
Summary of PFAS Data in Groundwater in 2018
RACER Trust Moraine Facilities
Moraine, Ohio

	Unit	U.S. EPA Health Advisory Level	GM-24		GM-34	GM-35		GM-48	GM-60	GM-63	GM-65S
			8/8/2018	12/5/2018	8/7/2018	8/8/2018	12/5/2018	12/4/2018	12/4/2018	8/9/2018	12/4/2018
Constituents											
Perfluorooctanesulfonic acid (PFOS)	ng/L	-	13	11	11	130 CI	29	6.9	1.2 J	14	11
Perfluorooctanoic acid (PFOA)	ng/L	-	10	10	6.4	87	23	6.3	3.7	5.1	3.1
Combined (PFOS and PFOA)	ng/L	70	23	21	17	**217**	52	13	4.9	19	14
N-methyl perfluorooctane sulfonamidoacetic acid (NMeFOSAA)	ng/L	-	<16 U	< 17 U	<17 U	<19 U	< 18 U	<16 U	< 18 U	<16 U	< 16 U
N-ethyl perfluorooctane sulfonamidoacetic acid (NEtFOSAA)	ng/L	-	<16 U	< 17 U	<17 U	<19 U	< 18 U	<16 U	< 18 U	<16 U	< 16 U
Perfluorobutanesulfonic acid (PFBS)	ng/L	-	100	130	7.4	4.8	2.6	4.1	3.9	5.9	7.4
Perfluorobutanoic acid (PFBA)	ng/L	-	20	23 B	4.1	63 CI	< 9.1 U	4.6 B	6.9 B	2.8	5.0 B
Perfluorodecanesulfonic acid (PFDS)	ng/L	-	<1.6 U	< 1.7 U	<1.7 U	<1.9 U	< 1.8 U	< 1.6 U	< 1.8 U	<1.6 U	< 1.6 U
Perfluorodecanoic acid (PFDA)	ng/L	-	1.6 U	0.36 J	<1.7 U	<1.9 U	< 1.8 U	< 1.6 U	< 1.8 U	<1.6 U	< 1.6 U
Perfluorododecanoic acid (PFDoA)*	ng/L	-	NA	NA	NA	NA	NA	NA	NA	NA	NA
Perfluorododecanoic acid (PFDoA)	ng/L	-	<1.6 U	< 1.7 U	<1.7 U	<1.9 U	< 1.8 U	< 1.6 U	< 1.8 U	<1.6 U	< 1.6 U
Perfluoroheptanesulfonic Acid (PFHpS)	ng/L	-	2.9	2.3	0.40 J	0.84 J	< 1.8 U	0.35 J	< 1.8 U	0.42 J	0.22 J
Perfluoroheptanoic acid (PFHpA)	ng/L	-	15	9.9	3.7	1.2 J	0.97 J	2.7	2.9	1.6	2.5
Perfluorohexanoic acid (PFHxA)	ng/L	-	140	170	8.1	<1.9 U	< 1.8 U	4.2	9.5	2.3	5.2
Perfluorohexanesulfonic acid (PFHxS)	ng/L	-	250 B	270 B	15 B	5.3 B	3.4 B	8.6 B	3.9 B	14 B	< 1.6 U
Perfluorononanesulfonic acid (PFNS)	ng/L	-	<1.6 U	< 1.7 U	<1.7 U	<1.9 U	< 1.8 U	< 1.6 U	< 1.8 U	<1.6 U	< 1.6 U
Perfluorononanoic acid (PFNA)	ng/L	-	0.58 J	0.76 J	0.62 J	<1.9 U	< 1.8 U	1.2 J	< 1.8 U	5.6	0.37 J
Perfluorooctane Sulfonamide (FOSA)	ng/L	-	<1.6 U	< 1.7 U	<1.7 U	<1.9 U	< 1.8 U	< 1.6 U	< 1.8 U	<1.6 U	< 1.6 U
Perfluoropentanesulfonic acid (PFPeS)	ng/L	-	76	83	9.0	8.8	< 1.8 U	1.7	1.0 J	3.5	1.4 J
Perfluoropentanoic acid (PFPeA)	ng/L	-	33	39	8.1	<1.9 U	< 9.1 U	4	12	2.0	6.5
Perfluorotetradecanoic acid (PFTeA)	ng/L	-	<1.6 U	< 1.7 U	<1.7 U	<1.9 U	< 1.8 U	< 1.6 U	< 1.8 U	<1.6 U	< 1.6 U
Perfluorotetradecanoic acid (PFTeA)*	ng/L	-	NA	NA	NA	NA	NA	NA	NA	NA	NA
Perfluorotridecanoic Acid (PFTriA)*	ng/L	-	NA	NA	NA	NA	NA	NA	NA	NA	NA
Perfluorotridecanoic Acid (PFTriA)	ng/L	-	<1.6 U	< 1.7 U	<1.7 U	<1.9 U	< 1.8 U	< 1.6 U	< 1.8 U	<1.6 U	< 1.6 U
Perfluoroundecanoic acid (PFUnA)	ng/L	-	<1.6 U	< 1.7 U	<1.7 U	<1.9 U	< 1.8 U	< 1.6 U	< 1.8 U	<1.6 U	< 1.6 U
4:2 FTS	ng/L	-	<17 U	< 17 U	<19 U	<16 U	< 18 U	<16	< 18 U	<17 U	< 16 U
6:2 FTS	ng/L	-	<17 U	< 17 U	4.2 J	6.2 J	< 91 U	<16	< 18 U	31	< 16 U
8:2 FTS	ng/L	-	<17 U	< 17 U	<19 U	<16 U	< 91 U	<16	< 18 U	<17 U	< 16 U

Notes:
- Not available.
* Sample re-prepared due to Isotope Dilution Analyte percent recovery out of range in the initial analysis.
Bold and shaded - Result above combined PFOA and PFOS Health Advisory Level.
B - Compound was found in the blank and sample.

F1 - MS and/or MSD recovery is outside acceptance limits.
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NA - Not analyzed.
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Table 4
Summary of PFAS Data in Groundwater in 2018
RACER Trust Moraine Facilities
Moraine, Ohio

	Unit	U.S. EPA Health Advisory Level	GM-66		GM-72	GM-75S	HR-1	HR-11	RMW-92	RMW-94	RMW-94	W-1-N	W-4-N
			8/7/2018	12/5/2018	8/7/2018	8/9/2018	8/7/2018	8/7/2018	8/8/2018	8/8/2018	12/5/2018	8/7/2018	8/7/2018
Constituents													
Perfluorooctanesulfonic acid (PFOS)	ng/L	-	4.9	< 1.7 U	4.0	1.3 J	9.3	0.55 J	13	15	14	1.2	< 1.7 U
Perfluorooctanoic acid (PFOA)	ng/L	-	8.6	6.3	3.8	3.9	6.6	4.7	8.4	8.4	6.6	0.76 J	1.8
Combined (PFOS and PFOA)	ng/L	70	14	6.3	7.8	5.2	16	5.3	21	23	21	2.0	1.8
N-methyl perfluorooctane sulfonamidoacetic acid (NMeFOSAA)	ng/L	-	<17 U	< 17 U	<16 U	<18 U	<17 U	< 16 U	<17 U	<17 U	< 18 U	<17 U	<17 U
N-ethyl perfluorooctane sulfonamidoacetic acid (NEtFOSAA)	ng/L	-	<17 U	< 17 U	<16 U	<18 U	<17 U	< 16 U	<17 U	<17 U	< 18 U	<17 U	<17 U
Perfluorobutanesulfonic acid (PFBS)	ng/L	-	8.8	8.8	4.0	2.3	4.6	44	4.7	4.6	4.6	3.7	8.8
Perfluorobutanoic acid (PFBA)	ng/L	-	12	11 B	4.6	8.2	9.2	12	6.7	5.3	4.6 B	3.4	13
Perfluorodecanesulfonic acid (PFDS)	ng/L	-	<1.7 U	< 1.7 U	<1.6 U	<1.8 U	<1.7 U	< 1.6 U	<1.7 U	<1.7 U	< 1.8 U	<1.7 U	<1.7 U
Perfluorodecanoic acid (PFDA)	ng/L	-	0.48 J	< 1.7 U	<1.6 U	1.1 J	<1.7 U	< 1.6 U	<1.7 U	<1.7 U	< 1.8 U	<1.7 U	<1.7 U
Perfluorododecanoic acid (PFDoA)*	ng/L	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Perfluorododecanoic acid (PFDoA)	ng/L	-	<1.7 U	< 1.7 U	<1.6 U	0.56 J	<1.7 U	< 1.6 U	<1.7 U	<1.7 U	< 1.8 U	<1.7 U	<1.7 U
Perfluoroheptanesulfonic Acid (PFHpS)	ng/L	-	<1.7 U	< 1.7 U	<1.6 U	<1.8 U	0.30 J	< 1.6 U	0.41 J	0.66 J	0.57 J	<1.7 U	<1.7 U
Perfluoroheptanoic acid (PFHpA)	ng/L	-	10	7.9	2.5	2.7	5.7	7.7	3.5	4.2	2.3	1.8	2.1
Perfluorohexanoic acid (PFHxA)	ng/L	-	17	14	4.2	7.1	15	70	7.4	5.1	5.2	2.8	11
Perfluorohexanesulfonic acid (PFHxS)	ng/L	-	3.5 B	1.6 JB	9.4 B	2.6 B	3.3 B	74 B	6.0 B	6.5 B	5.6 B	3.0 B	2.5 B
Perfluorononanesulfonic acid (PFNS)	ng/L	-	<1.7 U	< 1.7 U	<1.6 U	<1.8 U	<1.7 U	< 1.6 U	<1.7 U	<1.7 U	< 1.8 U	<1.7 U	<1.7 U
Perfluorononanoic acid (PFNA)	ng/L	-	2.8	0.32 J	0.22 J	0.74 J	3.3	0.23 J	0.83 J	1.0 J	0.84 J	<1.7 U	<1.7 U
Perfluorooctane Sulfonamide (FOSA)	ng/L	-	<1.7 U	< 1.7 U	<1.6 U	<1.8 U	<1.7 U	< 1.6 U	<1.7 U	<1.7 U	< 1.8 U	<1.7 U	<1.7 U
Perfluoropentanesulfonic acid (PFPeS)	ng/L	-	3.2	2.8	1.0 J	0.48 J	1.1 J	43	1.4 J	1.1 J	1.1 J	1.1 J	2.5
Perfluoropentanoic acid (PFPeA)	ng/L	-	22.0	15	3.6	7.3	13	18	6.6	5.3	4.3	3.0	9.2
Perfluorotetradecanoic acid (PFTeA)	ng/L	-	<1.7 U	< 1.7 U	<1.6 U	<1.8 U	<1.7 U	< 1.6 U	<1.7 U	<1.7 U	< 1.8 U	<1.7 U	<1.7 U
Perfluorotetradecanoic acid (PFTeA)*	ng/L	-	NA	NA	NA	<1.8 U H	NA	NA	NA	NA	NA	NA	NA
Perfluorotridecanoic Acid (PFTriA)*	ng/L	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Perfluorotridecanoic Acid (PFTriA)	ng/L	-	<1.7 U	< 1.7 U	<1.6 U	<1.8 U	<1.7 U	< 1.6 U	<1.7 U	<1.7 U	< 1.8 U	<1.7 U	<1.7 U
Perfluoroundecanoic acid (PFUnA)	ng/L	-	<1.7 U	< 1.7 U	<1.6 U	<1.8 U	<1.7 U	< 1.6 U	<1.7 U	<1.7 U	< 1.8 U	<1.7 U	<1.7 U
4:2 FTS	ng/L	-	<16 U	< 17 U	<18 U	<17 U	<16 U	< 16 U	<17 U	<17 U	< 18 U	< 17 U	< 17 UF1
6:2 FTS	ng/L	-	2.2 J	41	<18 U	<17 U	<16 U	< 16 U	<17 U	<17 U	< 18 U	< 17 U	1.7 J
8:2 FTS	ng/L	-	<16 U	< 17 U	<18 U	<17 U	<16 U	< 16 U	<17 U	<17 U	< 18 U	< 17 U	< 17 U

Notes:
- Not available.
* Sample re-prepared due to Isotope Dilution Analyte percent recovery out of range in the initial analysis.
Bold and shaded - Result above combined PFOA and PFOS Health Advisory Level.
B - Compound was found in the blank and sample.

F1 - MS and/or MSD recovery is outside acceptance limits.
H - Sample was prepped or analyzed beyond the specified holding time.
J - Result is less than the reporting limit but greater than or equal to the method detection limit and the concentration is an approximate value.
NA - Not analyzed.
ng/L - Nanograms per liter.
U - Indicates the analyte was analyzed for but not detected.

Table 5
DN-13 Monthly Effluent Monitoring for 2018
RACER Trust Moraine Facilities
Moraine, Ohio

Volatile Organic Compound[1]	Units	1/2/2018	2/1/2018	3/6/2018	4/11/2018	5/1/2018	6/4/2018	7/2/2018	8/15/2018	9/13/2018	10/1/2018	11/14/2018	12/5/2018
1,1,1-Trichloroethane	ug/L	0.40 J	0.50 J	0.47 J	0.57 J	0.41 J	0.42 J	< 1.0 U	0.65 J	0.50 J	0.41 J	0.76 J	0.35 J
1,1-Dichloroethane	ug/L	0.67 J	0.90 J	0.78 J	0.86 J	0.81 J	0.90 J	0.61 J	1.2	1.1	0.86 J	1.3	0.94 J
Benzene	ug/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Chloroethane	ug/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
cis-1,2-Dichloroethene	ug/L	3.1	3.8	4.1	3.6	2.9	2.9 B	2.4	4.4	4.6	3.5	5.1	3.4
Ethylbenzene	ug/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Tetrachloroethene	ug/L	1.1	0.54 J	0.49 J	1.4	1.1	0.74 J	0.71 J	1.4	0.68 J	1.1	1.3	0.75 J
Toluene	ug/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Trichloroethene	ug/L	3.8	4.4	4.9	4.8	4.3	3.5	3.4	6.0	5.5	4.5	6.9	4.0
Vinyl chloride	ug/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.27 J	< 1.0 U	0.52 J	< 1.0 U	0.22 J	< 1.0 U	< 1.0 U
Xylene (total)	ug/L	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U
Total VOCs	**ug/L**	**9.1**	**10**	**11**	**11**	**10**	**8.7**	**7.1**	**14**	**12**	**11**	**15**	**9.4**

NOTES:
[1] - Analytical method for volatile organic compounds (VOC) analysis is U.S. EPA Method 624.
< - Constituent not detected above laboratory reporting limit shown.
ug/L - Micrograms per Liter.
J - Estimated result less than reporting limit.
U - Constituent not detected above laboratory reporting limit shown.
B - Constituent was found in the blank and sample.

Table 6
Groundwater Well Construction Details
RACER Trust Moraine Facilities
Moraine, Ohio

Well	Surface Elevation ft amsl	TOC Elevation ft amsl	Well Diameter inches	Screened Interval ft bls	Screened Interval ft bls	Screened Interval ft amsl	Screened Interval ft amsl	Borehole Depth ft bls	State Plane Coordinates Northing, y	State Plane Coordinates Easting, x	Geologic Modifiers
Upper Aquifer Wells											
W-1-N	737.61	739.02	4	35	70	702.61	667.61	70	625116.2043	1483946.9943	UA:TT
W-2-N	729.68	731.68	4	35	60	694.68	669.68	60	623865.9104	1483351.6742	UA
W-3-N	731.98	733.66	4	32	57	699.98	674.98	57	623695.8796	1483607.3111	UA
W-4-N	729.88	731.63	4	40	65	689.88	664.88	65	623651.9134	1483795.0108	UA:TT
HR-1	730.10	732.71	2	47	57	683.10	673.10	57	621967.7490	1483378.1275	UA:TT
HR-2	732.62	734.75	2	47	57	685.62	675.62	58	623649.3090	1484030.9226	UA:TT
HR-3	734.31	736.75	2	50	60	684.31	674.31	61	623612.1403	1484238.0984	UA:TT
HR-4	740.61	742.60	2	55	65	685.61	675.61	67	624582.0074	1484003.5860	UA:TT
HR-5	730.95	734.27	2	44	54	686.95	676.95	59	623354.8172	1483478.6541	UA:TT
HR-6	730.18	732.66	2	43	53	687.18	677.18	59	622588.6622	1483298.8965	UA:TT
HR-7	731.00	731.73	2	47	57	684.00	674.00	58	623373.8266	1483168.5266	UA:TT
HR-11	740.90	743.33	2	60	70	680.90	670.90	75	625682.4858	1485262.9762	UA
HR-16	724.60	727.01	4	42	62	682.60	662.60	70	621167.6648	1482171.8435	UA:TT
HR-17	725.40	726.43	4	27	47	698.40	678.40	56	621128.4488	1482780.5158	UA:TT
W-1-S	728.23	729.29	4	25	60	703.23	668.23	60	621396.0291	1482990.4046	UA:TT
W-2-S	725.01	726.64	4	30	65	695.01	660.01	65	620618.7813	1482078.7622	UA:TT
W-3-S(1)	727.17	729.17	4	36	76	691.17	651.17	76	620461.1340	1482167.2280	UA
W-4-S	726.66	727.92	4	30	70	696.66	656.66	70	620363.7630	1482551.3610	UA
GM-2(2)	NM	735.81	2	45	55	688.00	678.00	55	619586.2208	1483427.9998	UA
4S(2)	NM	731.36	4	30	65	699.00	664.00	65	619578.3226	1483129.6378	UA
GM-6(2)	727.87	729.46	2	35	45	696.00	686.00	45	619627.6172	1482930.9571	UA:TT
GM-8	732.67	734.40	2	40	50	692.67	682.67	50	619866.4552	1482965.5535	UA:TT
GM-10(2)	NM	723.90	2	40	50	681.00	671.00	50	618762.6410	1482667.7306	UA:TT
GM-16(2)	NM	725.30	2	48	58	678.00	668.00	58	619420.5576	1482149.1466	UA
GM-17(2)	NM	723.84	2	40	50	684.00	674.00	50	619311.8761	1482697.0210	UA
GM-18(2)	NM	723.80	2	45	55	679.00	669.00	55	619229.5883	1482505.4542	UA:TT
GM-19S(2)	NM	730.92	2	47	57	691.00	681.00	57	620339.5683	1483017.2551	UA:TT
GM-21	725.36	725.00	2	45	55	680.36	670.36	55	619920.5937	1483764.5951	UA:TT
GM-22	731.84	731.63	2	44	54	687.84	677.84	54	620840.4209	1484226.5683	UA:TT
GM-23(2)	NM	731.07	2	24	34	674.00	664.00	34	623699.2336	1484619.9213	UA:TUT
GM-24	747.61	747.29	2	58	68	689.61	679.61	70	625945.0802	1486991.6971	UA
GM-25	747.05	746.17	2	48	58	699.05	689.05	58	622786.2705	1486599.6865	UA:TT
GM-26	722.29	722.29	2	50	60	672.29	662.29	60	617729.9788	1482129.0695	UA
GM-27	731.03	730.57	2	40	50	691.03	681.03	58	623696.6136	1484630.7659	UA:TT

Table 6
Groundwater Well Construction Details
RACER Trust Moraine Facilities
Moraine, Ohio

Well	Surface Elevation	TOC Elevation	Well Diameter	Screened Interval				Borehole Depth	State Plane Coordinates		Geologic
	ft amsl	ft amsl	inches	ft bls	ft bls	ft amsl	ft amsl	ft bls	Northing, y	Easting, x	Modifiers
Upper Aquifer Wells											
GM-28(2)(3)	NM	736.46	2	22	32	715.00	705.00	32	623392.3799	1484436.8617	UA:TUT
GM-28R(4)	731.87	731.28	2	20	30	711.87	701.87	30.5	623340.8360	1484507.2690	UA
GM-29	731.31	731.37	2	28	38	703.31	693.31	38	623534.4471	1484535.0727	UA:TUT
GM-30(2)(5)	NM	734.79	2	28	38	707.00	697.00	38	623876.3465	1484609.5933	UA:TUT
GM-31(5)	732.05	732.13	2	51	61	681.05	671.05	62	621336.9337	1483965.1322	UA:TT
GM-32	732.47	732.08	2	51	61	681.47	671.47	51	620114.2493	1483379.9656	UA:TT
GM-33	730.30	729.77	2	48	58	682.30	672.30	58	620731.1770	1483641.4860	UA:TT
GM-34	731.06	730.56	2	26	36	705.06	695.06	36	620730.0760	1483650.2870	UA:WT
GM-35	731.56	731.27	2	57	67	674.56	664.56	70	620275.4320	1483275.5790	UA:TT
GM-36	731.44	731.11	2	25	35	706.44	696.44	35	620383.2312	1483300.8386	UA:WT
GM-37	730.36	730.05	2	46	56	684.36	674.36	56	620407.3595	1483456.0282	UA:TT
GM-38	730.31	729.88	2	24	34	706.31	696.31	34	620403.1387	1483471.6479	UA:WT
GM-43	729.41	729.00	2	40	50	689.41	679.41	54	622192.2046	1483441.3723	UA:TT
GM-44	729.30	728.77	2	51	61	678.30	668.30	62	621686.3425	1483331.5124	UA:TT
GM-45	730.03	729.75	2	50	60	680.03	670.03	60	621409.1769	1483266.9285	UA:TT
GM-46	728.13	727.79	2	19.8	29.8	708.33	698.33	29.8	623393.7601	1484777.0271	UA:TUT
GM-47	727.03	726.75	2	49.4	59.4	677.63	667.63	59.4	620060.6143	1482479.3608	UA:TT
GM-48	728.98	728.67	2	63.2	73.2	665.78	655.78	73.2	619488.4287	1481740.8154	UA:TT
GM-49	728.28	727.88	2	66.9	76.9	661.38	651.38	76.9	618643.7266	1481742.8231	UA:TT
GM-50	727.03	726.56	2	29.7	39.7	697.33	687.33	39.7	620065.0482	1482445.8840	UA:WT
GM-51	728.82	728.30	2	34.3	44.3	694.52	684.52	44.3	619465.2399	1481753.1472	UA:WT
GM-52	728.16	727.62	2	34	44	694.16	684.16	44	618604.5296	1481740.7235	UA:WT
GM-53	730.53	730.35	2	23	33	707.53	697.53	33	621184.8324	1484855.6876	UA:TT
GM-55	719.90	719.86	2	25	35	694.90	684.90	35	618008.2839	1482441.5719	UA:WT
GM-57(6)	719.41	721.40	2	25	35	694.41	684.41	35	617724.0851	1482132.1351	UA:WT
GM-59	732.46	732.25	2	25	35	707.46	697.46	35	622767.1930	1484695.7390	UA:WT
GM-60	732.46	732.24	2	42	52	690.46	680.46	52	622766.9830	1484695.8090	UA:TT
GM-62R(4)	723.15	723.51	2	50	60	NA	NA	60	620288.2230	1482671.1700	UA
GM-63	726.21	725.79	2	30	40	696.21	686.21	40	620289.0440	1482666.1930	UA:WT
GM-64	726.38	725.95	2	50	60	676.38	666.38	60	620284.6106	1482681.2885	UA:TT
GM-65S	723.94	723.58	2	42	52	681.94	671.94	52	617392.2259	1481382.4271	UA
GM-66	733.50	733.22	2	45	55	688.50	678.50	57	622780.3860	1484091.5572	UA:TT
GM-67S	732.54	732.06	2	44	54	688.54	678.54	54	623050.0533	1484547.2174	UA:TT
GM-68S	732.477	732.18	2	39.5	49.5	692.977	682.98	49.5	622326.2125	1484652.8528	UA:TT

Table 6
Groundwater Well Construction Details
RACER Trust Moraine Facilities
Moraine, Ohio

Well	Surface Elevation ft amsl	TOC Elevation ft amsl	Well Diameter inches	Screened Interval				Borehole Depth ft bls	State Plane Coordinates		Geologic Modifiers
				ft bls	ft bls	ft amsl	ft amsl		Northing, y	Easting, x	
Upper Aquifer Wells											
GM-71	737.194	736.82	2	21	31	716.19	706.19	37	622639.9540	1485205.9130	UA:TUT
GM-72	737.05	736.78	2	52	62	685.05	675.05	67	622639.3610	1485217.5130	UA:TT
GM-74S	732.52	732.17	2	40	50	692.52	682.52	50	622444.5430	1484733.8601	UA:TT
GM-75S	738.26	737.69	2	42	52	696.26	686.26	52	622790.6745	1485039.3503	UA:TT
GM-76S	739.49	739.00	2	27	37	712.49	702.49	37	623538.7809	1485313.4176	UA:TT
GM-77S	741.49	741.14	2	33	43	708.49	698.49	43	621576.9342	1485892.0315	UA:TT
GM-78	721.58	721.18	2	40	50	681.58	671.58	70	618257.5787	1483035.5947	UA
GM-79	718.54	717.91	2	45	55	673.54	663.54	60	618970.9862	1481045.8893	UA:TT
GM-80	716.23	715.82	2	15	25	701.23	691.23	25	617951.2997	1480939.3277	UA:WT
GM-81	715.80	715.31	2	50	60	665.80	655.80	90	617934.8895	1480934.7439	UA
GM-83S	726.44	725.84	2	44	54	682.44	672.44	54	622568.7465	1482112.9569	UA:TT
RMW-89[4]	738.84	738.50	2	40.7	50.7	698.14	688.14	65	623394.9330	1484777.0130	UA
RMW-90[4]	727.44	727.05	2	43.5	53.5	683.94	673.94	100	623067.3300	1485313.5590	UA:TT
RMW-91[4]	723.16	725.50	2	48	53	675.16	670.16	57	620642.1340	1482814.1830	UA:WT
RMW-92[4]	723.37	725.92	2	26	36	697.37	687.37	38	620642.2440	1482803.2450	UA
RMW-93[4]	724.66	727.56	2	50	60	674.66	664.66	60	620378.8040	1482440.7050	UA:TT
RMW-94[4]	724.83	727.53	2	30	40	694.83	684.83	40	620379.9670	1482432.7020	UA
RMW-95[4]	716.01	715.33	2	6.3	21.3	709.71	694.71	22	619596.1990	1480976.9770	UA
RMW-96[4]	717.12	716.73	2	7.5	22.5	709.62	694.62	24	618973.8400	1481026.2050	UA
RMW-97[4]	714.84	714.21	2	9	24	705.84	690.84	24	618501.5300	1480934.2350	UA
PW-1S[4]	736.18	735.76	2	36	51	700.18	685.18	54	622968.4670	1484992.4760	UA
PW-1D[4]	736.18	735.81	2	51.5	56.5	684.68	679.68	60	622975.6010	1484993.9630	UA:TT
PW-2S/D[4]	736.05	735.30	2	41	61	695.05	675.05	62.5	622929.6530	1484983.1820	UA:TT
PW-3S[4]	736.13	735.75	2	36	41	700.13	695.13	70	622949.6170	1484987.7260	UA
PW-3D[4]	736.13	735.79	2	47	57	689.13	679.13	70	622949.3510	1484987.8520	UA:TT
PW-4S[4]	736.17	735.73	2	37	47	699.17	689.17	50	622964.5560	1484989.6620	UA
PW-4D[4]	736.18	735.67	2	50	55	686.18	681.18	55	622971.9500	1484991.3960	UA:TT
PW-5S[4]	735.99	735.52	2	39	49	696.99	686.99	63	622919.2550	1484979.0620	UA
PW-5D[4]	735.99	735.62	2	56	61	679.99	674.99	63	622919.0190	1484979.3390	UA:TT
PW-6S[4]	731.35	731.08	2	25	35	706.35	696.35	35	622831.4210	1484839.3060	UA
PW-6D[4]	731.35	731.04	2	40	50	691.35	681.35	63.5	622837.3590	1484840.7790	UA:TT
EW-1[4]	724.95	726.97	8	40	60	684.95	664.95	63	620405.0250	1482238.8630	UA:TT
EW-2[4]	725.26	726.74	8	39.5	59.5	685.76	665.76	63	620369.7470	1482502.1140	UA:TT
EAST	NM	730.98	2	NA	NA	NA	NA	71	620545.6947	1483674.2190	UA:TT

Table 6
Groundwater Well Construction Details
RACER Trust Moraine Facilities
Moraine, Ohio

Well	Surface Elevation ft amsl	TOC Elevation ft amsl	Well Diameter inches	Screened Interval ft bls	ft bls	ft amsl	ft amsl	Borehole Depth ft bls	State Plane Coordinates Northing, y	Easting, x	Geologic Modifiers
Upper Aquifer Wells											
WEST	NM	731.08	2	NA	NA	NA	NA	52	620509.6228	1483299.0985	UA:TT
WSU-17	726.93	726.18	2	11.69	66.9	715.24	659.28	67	619558.2279	1482898.5384	UA:TT
WSU-18	734.18	733.52	2	29.2	69.2	704.98	664.32	69	619554.9290	1483096.6469	UA:TT
WSU-19	727.28	726.62	2	33.4	63.4	693.88	663.22	63	619736.8872	1482880.3995	UA:TT
WSU-22	726.21	726.49	2	NA	NA	NA	NA	52	620311.4363	1482687.2293	UA:TT
WSU-23	724.65	724.90	2	NA	NA	NA	NA	58	620381.0854	1481978.6336	UA:TT
WSU-24	725.10	724.82	2	NA	NA	NA	NA	66	619124.1425	1483169.1107	UA:TT
TW-2(2)	NM	733.38	10	35	45	696.00	686.00	45	619568.4036	1482942.6663	UA:TT
ME-2(5)	731.60	731.28	2	27	37	704.60	694.60	37	621327.2669	1484014.6258	UA:WT
ME-3(5)	732.23	731.73	2	29	39	703.23	693.23	39	621288.3532	1483969.5620	UA:WT
ME-4(5)	732.05	732.24	2	26	36	706.05	696.05	36	621321.4422	1483952.3693	UA:WT
ME-6(5)	733.09	732.68	2	29	39	704.09	694.09	39	621706.9517	1484057.0461	UA:WT
MW-1(7)	713.60	715.53	2	61.2	71.2	652.40	642.40	71.7	621420.6144	1480209.1127	UA:TT
MW-4(7)	707.45	707.19	2	19.6	39.6	687.85	667.85	40	619035.3250	1478050.0733	UA
MW-5(7)	709.59	709.34	2	22.5	42.5	687.09	667.09	43	618787.9839	1478971.6197	UA
MW-9(7)	713.16	712.85	2	63	73	650.16	640.16	73.5	617169.4849	1478747.1452	UA

Table 6
Groundwater Well Construction Details
RACER Trust Moraine Facilities
Moraine, Ohio

Well	Surface Elevation ft amsl	TOC Elevation ft amsl	Well Diameter inches	Screened Interval ft bls	Screened Interval ft bls	Screened Interval ft amsl	Screened Interval ft amsl	Borehole Depth ft bls	State Plane Coordinates Northing, y	State Plane Coordinates Easting, x	Geologic Modifiers
Lower Aquifer Wells											
GM-1	NM	735.74	2	90	100	NA	NA	100	619570.7118	1483421.8130	LA
GM-3	NM	730.44	2	90	100	NA	NA	100	619621.9727	1482926.3542	LA
GM-4	NM	731.46	2	140	150	NA	NA	150	619602.7099	1482922.7333	LA
GM-5	NM	731.29	2	90	100	NA	NA	100	619588.6213	1483126.6107	LA
GM-7R	NM	735.61	2	80	90	NA	NA	91	619863.8298	1482962.1340	LA
GM-9	NM	724.07	2	90	100	NA	NA	100	618771.8670	1482674.1902	LA
GM-11	NM	723.71	2	90	100	NA	NA	100	619318.6270	1482694.0524	LA
GM-13	NM	723.82	2	90	100	NA	NA	100	619239.1943	1482501.6168	LA
GM-14	NM	723.50	2	140	150	NA	NA	150	619244.0886	1482515.5184	LA
GM-15	NM	725.23	2	90	100	NA	NA	100	619427.7004	1482156.5128	LA
GM-19D	727.90	729.40	4	145	150	NA	NA	150	620339.8625	1483063.5273	LA
GM-20D	NM	727.26	4	87	92	NA	NA	92	619177.7271	1483236.8889	LA
GM-39	731.15	730.95	2	106	116	625.15	615.15	116	623705.5364	1484609.0626	LA
GM-40	727.28	727.04	2	140	150	587.28	577.28	150	621693.8055	1483084.8121	LA
GM-41	731.22	733.65	2	104	114	627.22	617.22	114	621635.7801	1484818.4021	LA
GM-42	729.48	729.16	2	140	150	589.48	579.48	150	620810.1968	1483562.5296	LA
GM-54	730.51	730.29	2	70	80	660.51	650.51	80	621182.1891	1484848.6752	LA
GM-56	719.75	719.52	2	75	85	644.75	634.75	85	618006.1752	1482448.5647	LA:NTP
GM-58	735.59	735.46	2	72	82	663.59	653.59	82	621541.9882	1485308.7468	LA:BT
GM-61	732.48	732.23	2	70	80	662.48	652.48	80	622762.6947	1484707.4691	LA:BT
GM-65D	723.83	723.54	2	85	95	638.83	628.83	108	617389.5183	1481380.4746	LA:NTP
GM-67D	731.93	731.45	2	70	80	661.93	651.93	121	623053.5624	1484533.4779	LA:BT
GM-68D	732.46	732.27	2	64	74	668.46	658.46	150	622327.5383	1484645.8862	LA:BT
GM-69	732.42	732.08	2	90	100	642.42	632.42	140	621314.8199	1484401.6371	LA
GM-70	737.47	737.19	2	72	82	665.47	655.47	120	621944.0370	1485505.8829	LA
GM-73	737.34	736.97	2	85	95	652.34	642.34	120	622635.9765	1485216.5022	LA
GM-74D	732.49	732.04	2	69	79	663.49	653.49	120	622450.0123	1484735.6502	LA:BT
GM-75D	738.13	737.68	2	85	95	653.13	643.13	120	622793.2406	1485027.5873	LA
GM-76D	739.48	738.94	2	70	80	669.48	659.48	120	623535.2043	1485312.4245	LA:BT
GM-77D	741.52	740.93	2	75	85	666.52	656.52	100	621574.4283	1485889.3662	LA:BT
GM-82	732.55	732.14	2	85	95	647.55	637.55	119.5	621972.7146	1484304.7894	LA
GM-83D	726.41	725.77	2	110	120	616.41	606.41	120	622568.1953	1482120.4685	LA
GM-84	740.44	739.92	2	96.5	106.5	643.94	633.94	120	620619.4561	1485522.1487	LA:BT
RMW-85(8)	736.28	736.65	2	85	95	651.28	641.28	105	622914.0083	1484978.1674	LA
RMW-86(8)	728.85	729.22	2	70	80	658.85	648.85	105	620409.7071	1483253.2715	LA:BT
RMW-87(8)	727.69	728.01	2	67	77	660.69	650.69	100	621671.6198	1483277.4116	LA:BT
RMW-88(4)	738.42	738.25	2	90	100	648.42	638.42	100	625051.9881	1484580.6683	LA

Table 6
Groundwater Well Construction Details
RACER Trust Moraine Facilities
Moraine, Ohio

Well	Surface Elevation ft amsl	TOC Elevation ft amsl	Well Diameter inches	Screened Interval ft bls	Screened Interval ft bls	Screened Interval ft amsl	Screened Interval ft amsl	Borehole Depth ft bls	State Plane Coordinates Northing, y	State Plane Coordinates Easting, x	Geologic Modifiers
Lower Aquifer Wells											
HR-12	741.00	742.64	4	120	130	621.00	611.00	130	625702.3993	1485250.0490	LA
HR-13	733.20	735.03	4	75	85	658.20	648.20	85	623616.8315	1484215.3411	LA:BT
HR-14	729.90	731.63	4	78	88	651.90	641.90	88	623675.4267	1483782.2839	LA
HR-15	732.10	733.74	4	88	98	644.10	634.10	98	623712.7941	1483595.9072	LA
M73C	NM	716.55	NA	NA	NA	NA	NA	NA	618973.2537	1482114.3309	LA
MT69(9)	719.84	722.71	8	NA	NA	NA	NA	158	617749.1907	1482121.3945	LA
MT576M	750.00	751.46	5	NA	NA	NA	NA	114	622940.2909	1487799.4686	LA
MT596M(10)	759.18	757.73	5	NA	NA	NA	NA	89	624057.1091	1488849.1418	LA
DN-13	724.09	727.54	20	110	170	614.09	554.09	170	619197.5730	1482251.6120	LA
11B	744.50	742.56	NA	NA	NA	NA	NA	158	622501.4801	1485799.6814	LA
A	NM	739.00	20	155	205	NA	NA	205	624325.4108	1484805.7949	LA
31	NM	734.05	20	90	122	NA	NA	122	623727.4107	1485049.2752	LA
34	NM	733.46	20	107	140	NA	NA	140	622178.4664	1485017.7925	LA
39	NM	732.07	20	117	142	NA	NA	145	623442.4628	1484987.5777	LA
44	733.91	734.62	24	128	166	605.91	567.91	NA	624519.7322	1483988.8824	LA
FW-1A	NM	739.89	24	105	166	NA	NA	169	625357.5160	1486090.3366	LA
FW-2	NM	737.48	20	NA	150	NA	NA	160	622516.4369	1485616.6642	LA
FW-3	NM	739.26	20	NA	141	NA	NA	200	622675.0394	1484968.9430	LA
FW-4	NM	731.62	14	NA	136	NA	NA	160	620605.0473	1484338.1137	LA

NOTES:

Survey of well coordinates were originally to a site-specific coordinate system in feet with the vertical datum as the National Geodetic Vertical Datum of 1929 (NGVD 29) using an on-site benchmark. Base map and well coordinates were converted in 2011 to the Ohio South State Plane coordinate system North American Datum of 1983 (NAD 83) and NGVD 29 was retained as the vertical datum.

TOC - Top of Casing.
ft amsl - feet above mean sea level.
ft bls - feet below land surface.
(1) - Ground surface elevation estimated based on a 2-foot height of outer casing stick-up.
(2) - Elevations estimated.
(3) - Well flush mount damaged and obstructed at depth.
(4) - Wells installed after 2011 are surveyed to the Ohio South State Plan coordinate system and the North American Vertical Datum of 1988 (NAVD 88).
(5) - Depth of screened interval and total well depth have been modified from the well log due to site construction.
(6) - Well above grade construction damaged in 2011.
(7) - City of Moraine Monitoring Wells.
(8) - TOC elevation is calculated based on adjacent well elevations and field measurements on November 26, 2012.
(9) - Well unusable - collapsed screen.
(10) - Measuring point is top of cement housing.

BT - Below Till (regional clay till).
LA - Lower Aquifer.
NA - Not Available.
NM - Not Measured.
NTP - No Till Present.
TT - Top of Till (regional clay till).
TUT - Top of Upper Till (upper clay till).
UA - Upper Aquifer.
WT - Water Table (screened across the water table interface).

Table 7
Groundwater Level Measurements Collected During 2018
RACER Trust Moraine Facilities
Moraine, Ohio

Well	Measuring Point Elevation (feet AMSL)	Depth-to-Water (feet)	Total Depth (feet)	Groundwater or Surface Water Elevation (feet AMSL)
Upper Aquifer Wells				
W-1-N	739.02	28.29	70.00	710.73
W-2-N	731.68	21.28	59.70	710.40
W-3-N	733.66	23.21	57.60	710.45
W-4-N	731.63	21.08	66.60	710.55
HR-1	732.71	23.02	59.00	709.69
HR-2	734.75	24.16	58.70	710.59
HR-3	736.75	26.10	62.20	710.65
HR-4	742.60	31.71	66.80	710.89
HR-5	734.27	23.88	57.80	710.39
HR-6	732.66	22.88	55.45	709.78
HR-7	731.73	21.58	57.40	710.15
HR-11	743.33	31.81	69.10	711.52
HR-16	727.01	18.24	65.00	708.77
HR-17	726.43	17.23	59.55	709.20
W-1-S	729.29	19.80	59.55	709.49
W-2-S	726.64	18.34	67.00	708.30
W-3-S	729.17	20.78	76.40	708.39
W-4-S	727.92	19.15	72.50	708.77
GM-2	735.81	26.71	56.30	709.10
4S	731.36	22.70	68.40	708.66
GM-6	730.27	21.70	46.30	708.57
GM-8	735.17	26.62	50.00	708.55
GM-10	723.90	15.72	50.20	708.18
GM-16	725.30	17.35	58.00	707.95
GM-17	723.84	15.54	50.05	708.30
GM-18	723.80	15.66	54.86	708.14
GM-19S	730.92	21.71	57.00	709.21
GM-21	725.00	15.36	53.30	709.64
GM-22	731.63	22.51	57.20	709.12
GM-23	731.07	20.23	32.20	710.84
GM-24[3]	747.29	NM	68.05	NM
GM-25[3]	746.17	NM	58.00	NM
GM-26	722.29	14.51	58.40	707.78
GM-27	730.57	19.66	47.10	710.91
GM-28R[1]	731.28	21.32	32.00	709.96
GM-29	731.37	20.41	32.60	710.96
GM-30	734.79	24.47	36.00	710.32
GM-31[2]	732.13	NM	63.20	NM
GM-32	732.08	22.79	56.50	709.29
GM-33	729.77	20.17	54.30	709.60
GM-34	730.56	20.92	35.25	709.64
GM-35	731.27	22.13	65.40	709.14
GM-36	731.11	21.85	34.45	709.26

Table 7
Groundwater Level Measurements Collected During 2018
RACER Trust Moraine Facilities
Moraine, Ohio

ARCADIS Design & Consultancy for natural and built assets

Well	Measuring Point Elevation (feet AMSL)	Depth-to-Water (feet)	Total Depth (feet)	Groundwater or Surface Water Elevation (feet AMSL)
Upper Aquifer Wells				
GM-37	730.05	20.46	34.25	709.59
GM-38	729.88	20.60	56.10	709.28
GM-43	729.00	19.25	49.70	709.75
GM-44	728.77	19.31	60.90	709.46
GM-45	729.75	19.71	60.00	710.04
GM-46	727.79	16.17	27.70	711.62
GM-47	726.75	18.52	59.40	708.23
GM-48	728.67	NM	73.02	NM
GM-49	727.88	20.61	76.29	707.27
GM-50	726.56	18.35	39.50	708.21
GM-51	728.30	20.83	44.20	707.47
GM-52	727.62	20.32	44.00	707.30
GM-53	730.35	20.05	32.55	710.30
GM-55	719.86	12.02	35.10	707.84
GM-57	721.74	14.73	35.00	707.01
GM-59	732.25	21.54	34.40	710.71
GM-60	732.24	21.55	50.40	710.69
GM-62R[1]	723.51	15.71	60.70	707.80
GM-63	725.79	17.23	39.10	708.56
GM-64	725.95	17.41	58.50	708.54
GM-65S	723.58	16.62	52.10	706.96
GM-66	733.22	NM	54.20	NM
GM-67S	732.06	21.38	53.60	710.68
GM-68S	732.18	21.59	49.90	710.59
GM-71	736.82	25.93	61.40	710.89
GM-72	736.78	25.91	32.10	710.87
GM-74S	732.17	21.43	49.50	710.74
GM-75S	737.69	26.89	51.80	710.80
GM-76S	739.00	27.49	36.80	711.51
GM-77S	741.14	29.94	42.69	711.20
GM-78	721.18	12.73	49.40	708.45
GM-79	717.91	11.01	54.20	706.90
GM-80	715.82	9.24	24.50	706.58
GM-81	715.31	8.62	60.36	706.69
GM-83S	725.84	16.13	53.80	709.71
RMW-89[1,2]	738.56	NM	50.30	NM
RMW-90[1]	727.41	17.87	54.15	709.54
RMW-91[1]	726.66	17.63	NM	709.03
RMW-92[1]	727.08	18.03	NM	709.05
RMW-93[1]	728.72	20.19	NM	708.53
RMW-94[1]	728.69	20.12	NM	708.57
RMW-95[1]	716.23	9.11	NM	707.12
RMW-96[1]	717.64	10.71	NM	706.93

Table 7
Groundwater Level Measurements Collected During 2018
RACER Trust Moraine Facilities
Moraine, Ohio

Well	Measuring Point Elevation (feet AMSL)	Depth-to-Water (feet)	Total Depth (feet)	Groundwater or Surface Water Elevation (feet AMSL)
RMW-97[1]	715.12	8.37	NM	706.75
EAST	730.98	21.35	71.30	709.63
WEST	731.08	21.74	51.40	709.34
WSU-17	726.18	18.60	46.25	707.58
WSU-18	733.52	24.86	61.20	708.66
WSU-19	726.62	19.70	63.10	706.92
WSU-22[4]	Damaged	NM	NM	NM
WSU-23	724.90	16.85	57.40	708.05
WSU-24	724.82	16.02	66.55	708.80
TW-2	733.38	24.97	46.00	708.41
ME-2	732.08	22.21	NM	709.87
ME-3[2]	731.73	NM	NM	NM
ME-4[2]	732.24	NM	NM	NM
ME-6[2]	732.68	NM	NM	NM
Lower Aquifer Wells				
GM-1	735.74	26.96	103.40	708.78
GM-3	730.44	22.21	102.20	708.23
GM-4	731.46	23.30	139.50	708.16
GM-5	731.29	22.90	102.00	708.39
GM-7R	735.61	27.02	93.20	708.59
GM-9	724.07	16.14	99.60	707.93
GM-11	723.71	15.85	99.20	707.86
GM-13	723.82	16.35	100.10	707.47
GM-14	723.50	16.10	150.00	707.40
GM-15	725.23	23.58	98.90	701.65
GM-19D	730.73	21.67	148.00	709.06
GM-20D	727.26	18.30	100.80	708.96
GM-39	730.95	20.07	118.40	710.88
GM-40	727.04	18.09	150.30	708.95
GM-41	733.65	23.45	16.30	710.20
GM-42	729.16	20.29	152.30	708.87
GM-54	730.29	19.94	80.00	710.35
GM-56	719.52	11.76	86.44	707.76
GM-58	735.46	24.80	82.00	710.66
GM-61	732.23	21.65	78.94	710.58
GM-65D	723.54	16.61	96.51	706.93
GM-67D	732.19	21.57	79.20	710.62
GM-68D	732.27	21.81	70.80	710.46
GM-69	732.08	22.23	100.79	709.85
GM-70	737.19	26.36	81.80	710.83
GM-73	736.97	26.14	96.50	710.83
GM-74D	732.04	21.54	80.21	710.50
GM-75D	737.68	26.85	94.30	710.83
GM-76D	738.94	27.85	80.10	711.09
GM-77D	740.93	30.16	86.30	710.77
GM-82	732.14	22.22	96.87	709.92
GM-83D	725.77	17.01	119.70	708.76

Table 7
Groundwater Level Measurements Collected During 2018
RACER Trust Moraine Facilities
Moraine, Ohio

Well	Measuring Point Elevation (feet AMSL)	Depth-to-Water (feet)	Total Depth (feet)	Groundwater or Surface Water Elevation (feet AMSL)
GM-84	739.92	29.56	106.80	710.36
RMW-85[5]	736.65	25.80	94.40	710.85
RMW-86[5]	729.22	20.41	80.10	708.81
RMW-87[5]	728.01	19.04	76.10	708.97
RMW-88[1]	738.25	27.89	102.70	710.36
HR-12	742.64	31.11	134.61	711.53
HR-13	735.03	24.36	87.00	710.67
HR-14	731.63	21.25	91.20	710.38
HR-15	733.74	24.35	102.20	709.39
M73C	716.55	9.14	NM	707.41
MT576M	751.46	39.04	NM	712.42
MT596M	757.73	39.41	NM	718.32
Production and Fire Wells				
DN-13 (County Well) [ON] *	727.78	65.42	170.00	662.36
11B	742.56	31.06	NM	711.50
31	734.05	22.75	122.00	711.30
34	733.46	22.95	NM	710.51
39	732.07	21.47	142.00	710.60
A	739.00	26.40	NM	712.60
EW-1[1]	727.97	19.63	NM	708.34
EW-2[1]	727.74	19.16	NM	708.58
FW-1A	739.89	NM	NM	NM
FW-2[2]	737.48	26.50	NM	710.98
FW-3[2]	739.26	28.50	NM	710.76
FW-4[2]	731.62	22.17	NM	709.45
Stream Gauge**				
SG1	747.64	44.20	NA	703.44
SG2	709.95	2.49	NA	707.46
SG3	718.45	DRY	NA	NM
SG4	714.78	DRY	NA	NM
SG5	711.10	1.51	NA	709.59
SG6	723.21	15.76	NA	707.45
SG7	731.55	14.83	NA	716.72
IRZ Wells				
RZ-1D*	731.20	15.90	NM	715.30
RZ-3F	728.54	19.54	NM	709.00
RZ-3N*	729.99	18.35	NM	711.64
RZ-3MM	726.92	17.64	48.96	709.28
RZ-4A	725.71	16.81	55.10	708.90
RZ-4D	727.07	17.79	53.90	709.28
RZ-4G	728.16	19.31	NM	708.85
RZ-4O	726.46	17.90	NM	708.56
Moraine City				
MW-1	715.53	NM	NM	NM
MW-4	707.19	4.67	NM	702.52
MW-5	709.34	4.78	NM	704.56
MW-9	712.85	9.17	NM	703.68

Table 7
Groundwater Level Measurements Collected During 2018
RACER Trust Moraine Facilities
Moraine, Ohio

Well	Measuring Point Elevation (feet AMSL)	Depth-to-Water (feet)	Total Depth (feet)	Groundwater or Surface Water Elevation (feet AMSL)
ERD Pilot Test Wells[1]				
PW-1S	736.71	26.02	NM	710.69
PW-1D	736.76	26.06	NM	710.70
PW-2S/D	736.25	25.59	NM	710.66
PW-3S	736.70	26.01	NM	710.69
PW-3D	736.74	25.93	NM	710.81
PW-4S	736.68	25.90	NM	710.78
PW-4D	736.62	25.85	NM	710.77
PW-5S	736.47	25.73	NM	710.74
PW-5D	736.57	25.84	NM	710.73
PW-6S	732.06	21.28	NM	710.78
PW-6D	732.02	21.22	NM	710.80

NOTES:

* - Data not used for potentiometric surface contouring. Anomalous water level elevations that are not used for contour may be due factors, such as field transcription errors, top of casing survey inconsistencies, surface subsidence, etc.

** - Surface water measurement. Data not used for potentiometric surface contouring - posted for informational purposes.

[1] - Wells installed after 2011 are surveyed to the Ohio South State Plane coordinate system and the North American Vertical Datum (NAVD 88). Data not used for potentiometric surface contouring - posted for informational purposes.

[2] - Access to well location restricted.

[3] - Well could not be located.

[4] - Well damaged.

[5] - Well location estimated by field measurements collected on November 26, 2012 from known surveyed points. Vertical elevation correlated to nearby wells surveyed to NGVD 29 vertical datum.

Elevations are reported in feet above mean sea level (AMSL).

Groundwater levels were measured on July 26 and 27, 2018 using electronic water level indicators.

Groundwater level measurements are reported in feet below the measuring point.

Measuring point is to top of the well casing or surveyed measuring point.

NA - Not Applicable.

NM - Not Measured.

Survey of well coordinates were originally to a site-specific coordinate system in feet with the vertical datum as the National Geodetic Vertical Datum of 1929 (NGVD 29) using an on-site benchmark. Base map and well coordinates were converted in 2011 to the Ohio South State Plane coordinate system and NGVD 29 was retained as the vertical datum.

Table 8
Summary of Precipitation Measurements Recorded
by the National Weather Service during 2018 – Dayton, Ohio
RACER Trust Moraine Facilities
Moraine, Ohio

Month	Actual Precipitation	Average Precipitation[1]	Departure from Average
January	2.69	2.71	0.02 Below
February	5.62	2.24	3.38 Above
March	3.56	3.34	0.22 Above
April	4.78	4.09	0.69 Above
May	3.06	4.66	1.60 Below
June	3.06	4.17	1.11 Below
July	3.32	4.11	0.79 Below
August	4.33	2.99	1.34 Above
September	6.72	3.30	3.42 Above
October	1.53	2.93	1.40 Below
November	5.69	3.39	2.30 Above
December	4.63	3.12	1.51 Above
2018 Total	**48.99**	**41.05**	**7.94 Above**

NOTES:
Precipitation measurements are reported in inches.
1: Average precipitation information was obtained from the NOAA Website (http://w2.weather.gov/climate/xmacis.php?wfo=iln) using data from 1981 to 2010.

Table 9
Horizontal Gradients for Upper/Lower Aquifer Well Pairs in 2018
RACER Trust Moraine Facilities
Moraine, Ohio

Horizontal Gradients - July 26 and 27, 2018	ft./ft.
W-2-N/W-1-S	3.6E-04
W-3-N/HR-1	4.3E-04
HR-5/HR-1	5.2E-04
HR-4/HR-1	5.0E-04
HR-7/W-1-S	3.3E-04
HR-5/W-1-S	4.5E-04
HR-1/GM-16	6.2E-04
GM-75S/GM-68S	3.6E-04
GM-53/4S	6.8E-04
Average Hydraulic Gradient for Upper Aquifer Wells	**4.7E-04**
GM-58/GM-20D	5.4E-04
GM-54/GM-1	7.3E-04
HR-15/GM-83D	3.4E-04
Average Hydraulic Gradient for Lower Aquifer Wells	**5.4E-04**

NOTE:

ft. - feet.

Table 10
Vertical Gradients for Upper/Lower Aquifer Well Pairs in 2018
RACER Trust Moraine Facilities
Moraine, Ohio

ARCADIS Design & Consultancy for natural and built assets

Vertical Gradients - July 26 and 27, 2018		
Upper/Lower Aquifer Wells	**Direction**	**Gradient (ft./ft.)**
Upgradient		
HR-11/HR-12	U	+1.7E-04
On-Site		
W-3-N/HR-15	D	-2.2E-02
GM-2/GM-1	D	-7.1E-03
4S/GM-5	D	-5.7E-03
GM-75S/GM-75D	U	+7.0E-04
Off-Site/Downgradient		
GM-10/GM-9	D	-5.0E-03
GM-16/GM-15	--	--
GM-18/GM-13	D	-1.5E-02
GM-17/GM-11	D	-8.8E-03
GM-55/GM-56	D	-1.7E-03
GM-65S/GM-65D	D	-7.0E-04

NOTES:

D - Downward gradient (-).

ft. - feet.

U - Upward gradient (+).

Upper/lower aquifer well pairs in the vicinity of DN-13 are GM-10/GM-9, GM-16/GM-15, GM-18/GM-13, and GM-17/GM-11.

Table 11
Focused Off-Site Vapor Intrusion Groundwater Screening Results
RACER Trust Moraine Facilities
Moraine, Ohio

	Units	Vapor Intrusion Screening Levels (ug/L)[1] Water Table Well?	RMW-95 7/23/2018 Yes	RMW-96 7/23/2018 Yes	RMW-97 7/23/2018 Yes	GM-79 7/23/2018 No	GM-80 7/23/2018 Yes	GM-81 7/23/2018 No	MW-5 7/23/2018 No
Site-Specific Volatile Organic Compounds									
1,1,1-Trichloroethane	ug/L	9,900	<1.0	<1.0	<1.0	0.39 J	<1.0	<1.0	<1.0
1,1-Dichloroethane	ug/L	100	0.57 J	0.28 J	<1.0	1.7	0.54 J	1.1	0.64 J
1,1-Dichloroethene	ug/L	250	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Benzene	ug/L	21	0.13 J	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
cis-1,2-Dichloroethene	ug/L	NL	0.38 J	0.80 J	0.93 J	4.5	1.5	1.6	0.92 J
Ethylbenzene	ug/L	50	0.13 J	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Tetrachloroethene	ug/L	130	3.4	7.0	4.7	13	18	<1.0	<1.0
Toluene	ug/L	27,000	0.33 J	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
trans-1,2-Dichloroethene	ug/L	NL	<1.0	<1.0	<1.0	<1.0	<1.0	0.19 J	<1.0
Trichloroethene	ug/L	11	1.6	2.1	1.1	**21**	5.3	1.5	1.6
Vinyl chloride	ug/L	2.2	<1.0	<1.0	<1.0	0.27 J	<1.0	<1.0	<1.0
Xylene (total)	ug/L	560	0.19 J	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Total Site-Specific VOCs	ug/L		6.73	10.18	6.73	40.9	25.3	4.39	3.16

NOTES:

< - Constituent not detected above laboratory reporting limit shown.

BOLD - Result above screening level.

ug/L - Micrograms per Liter.

J - Value is estimated.

1: The data were screened against the most conservative Ohio EPA screening level; if no value was available, the U.S. EPA site-specific vapor intrusion level was used.

USEPA Vapor Intrusion Screening Levels were used to calculate target residential screening levels for groundwater concentration based a groundwater temperature of 18.65 degrees celsius (95% UCL of groundwater temperatures from water table well GM-80 from 2010 to 2016) and the lower of either a target cancer risk of 1E-05 or a target hazard index of 1. Screening levels assumes 26 year exposure duration, 350 days per year, 24 hours per day.

Table 12
Lower Aquifer Triangular Irregular Network Horizontal Hydraulic Gradients in 2018
RACER Trust Moraine Facilities
Moraine, Ohio

TIN Cell	Monitoring Well Groundwater Elevations (ft. AMSL)			Hydraulic Gradient	Flow Direction Azimuth (degrees)
TIN A	GM-1	GM-5	GM-20D	1.6E-03	310
	708.78	**708.39**	**708.96**		
TIN B	GM-5	GM-20D	GM-14	2.2E-03	292
	708.39	**708.96**	**707.40**		
TIN C	GM-14	GM-20D	GM-9	2.2E-03	281
	707.40	**708.96**	**707.93**		
TIN D	GM-9	GM-14	M73C	1.1E-03	327
	707.93	**707.40**	**707.41**		
TIN E	GM-5	GM-14	GM-15	--	--
	708.39	**707.40**	**--**		

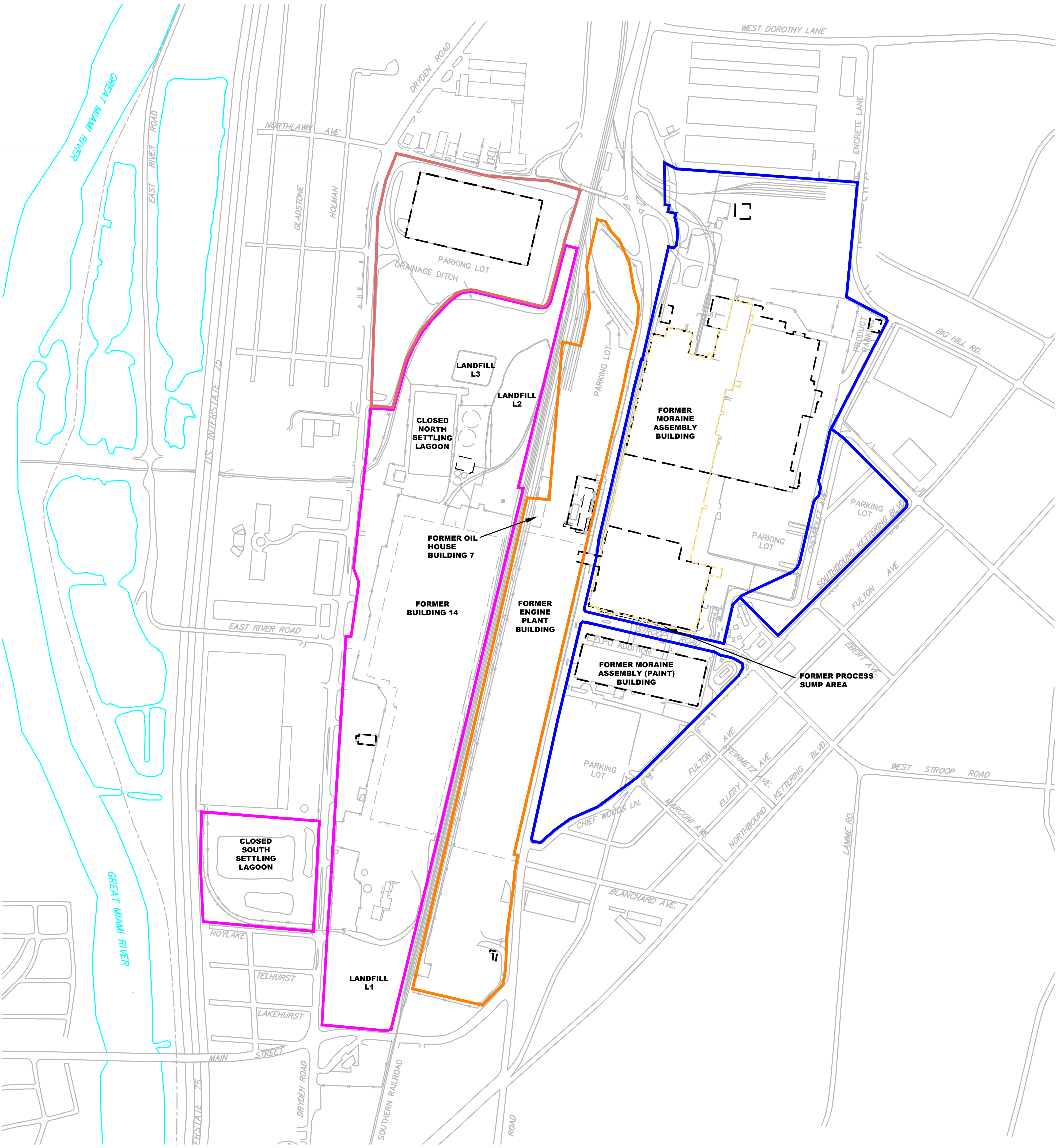
NOTES:

AMSL - Above Mean Sea Level.

ft. - feet.

TIN - Triangular irregular network.

FIGURES



LEGEND

- RIVER LEVEE
- FORMER BUILDING FOOTPRINT
- CURRENT BUILDING FOOTPRINT
- SURFACE WATER FEATURE
- FORMER DELPHI HARRISON THERMAL SYSTEMS, MORAINE PLANT PROPERTY BOUNDARY
- FORMER GENERAL MOTORS POWERTRAIN GROUP, MORAINE ENGINE PLANT PROPERTY BOUNDARY
- FORMER GENERAL MOTORS TRUCK GROUP, MORAINE ASSEMBLY PLANT PROPERTY BOUNDARY
- DMAX, LTD
- FORMER MORAINE ASSEMBLY BUILDINGS

N

0 200 1000ft

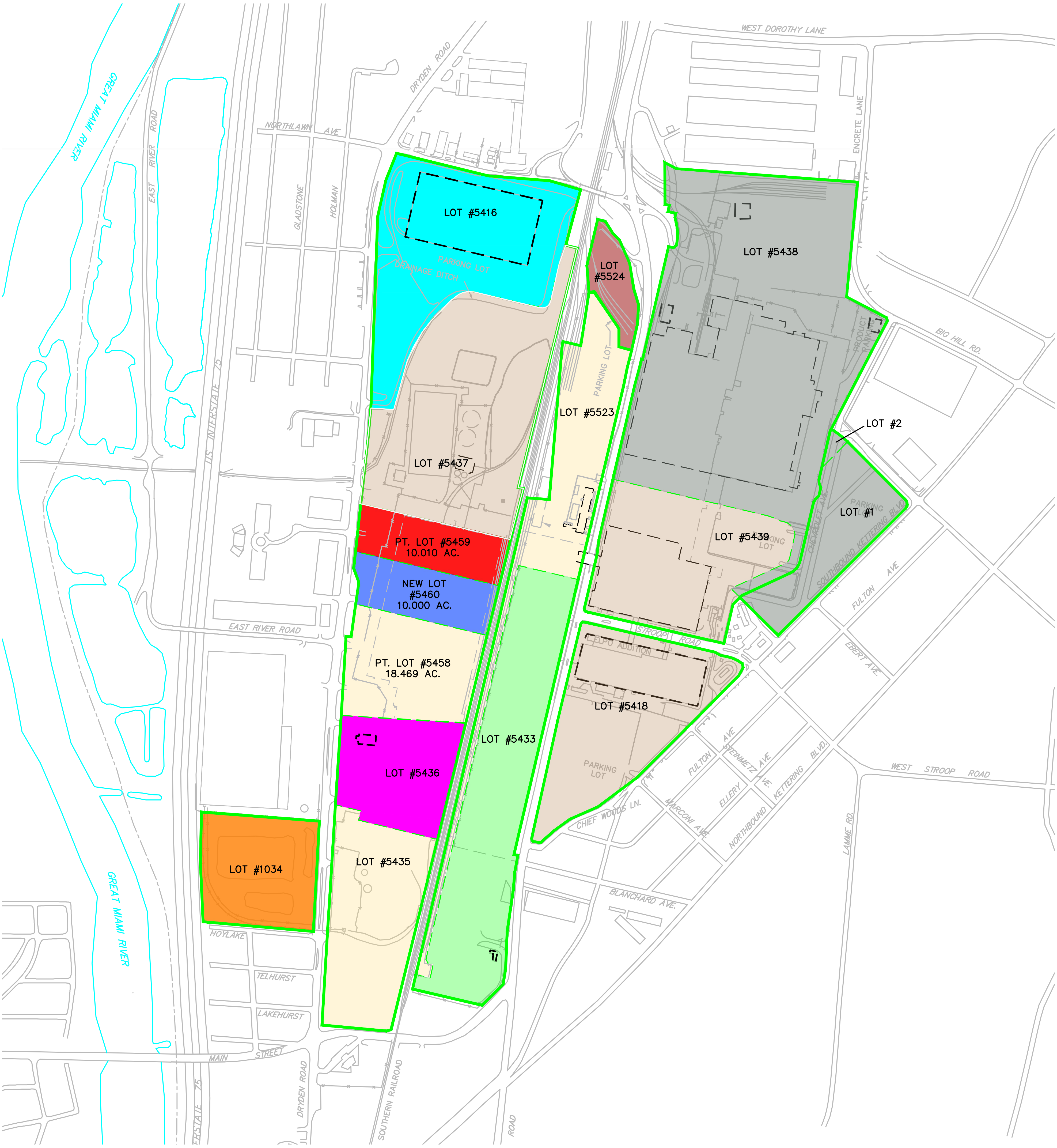
RACER TRUST
MORAINE, OHIO

OH000294.2019

SITE LAYOUT

ARCADIS Design & Consultancy for natural and built assets

FIGURE
1



LEGEND

RIVER LEVEE
FORMER BUILDING FOOTPRINT
CURRENT BUILDING FOOTPRINT
SURFACE WATER FEATURE
PROPERTY BOUNDARY
PARCEL BOUNDARY

LOT INFORMATION		
LOT NUMBER	ACREAGE	LOT OWNER
LOT #1	15.568 Ac.	FUYAO ASSET MANAGEMENT A LLC
LOT #2	0.5585 Ac.	FUYAO ASSET MANAGEMENT A LLC
LOT #5438	94.060 Ac.	FUYAO ASSET MANAGEMENT A LLC
LOT #5524	6.659 Ac.	NORFOLK SOUTHERN RAILWAY FKA CONSOLIDATED RAIL CORPORATION
LOT #5418	31.576 Ac.	ICP MORAINE LLC
LOT #5437	47.065 Ac.	ICP MORAINE LLC
LOT #5439	30.580 Ac.	ICP MORAINE LLC
LOT #5458	18.469 Ac.	IRG MORAINE LLC
LOT #5523	20.254 Ac.	IRG MORAINE LLC
LOT #5435	25.020 Ac.	IRG MORAINE LLC
LOT #1034	18.174 Ac.	RACER PROPERTIES LLC
LOT #5433	41.145 Ac.	COPART OF CONNECTICUT INC.
		(RJ TRUCKING)
LOT #5416	38.612 Ac.	DMAX LTD
LOT #5459	10.010 Ac.	WRIGHT WAREHOUSE INC.
LOT #5460	10.000 Ac.	STATE OF OHIO

N

0 200 1000ft

NOTE:
LOT INFORMATION WAS CHECKED ON 1/28/19 AT HTTP://ENGINEER.GOMVO.ORG/APPS/LANDRECORDS/

RACER TRUST
MORAINE, OHIO

OH000294.2019

SITE PARCEL MAP

ARCADIS Design & Consultancy for natural and built assets

FIGURE
2

CITY:DUBLIN DIV/GROUP:SER2 DB:R. SMITH LD:(Opt) PIC:(Opt) PM:N. GILLOTTI TM:T. FORTNER LYR:(Opt)ON=*;OFF=*REF*
C:\BIM\OneDrive - ARCADIS\BIM 360 Docs\RACER TRUST\RACER\MORAINE OH 2017 ACTIVITI\2019\OH000294.2018\01-DWG\0004B\ANN294-04B-2019-SW-WELL-LOC.dwg LAYOUT: FIG SITEWIDE-C-M-ALL WELLS SAVED: 2/18/2019 11:41 AM ACADVER: 23.0S (LMS TECH) PAGESETUP: ----
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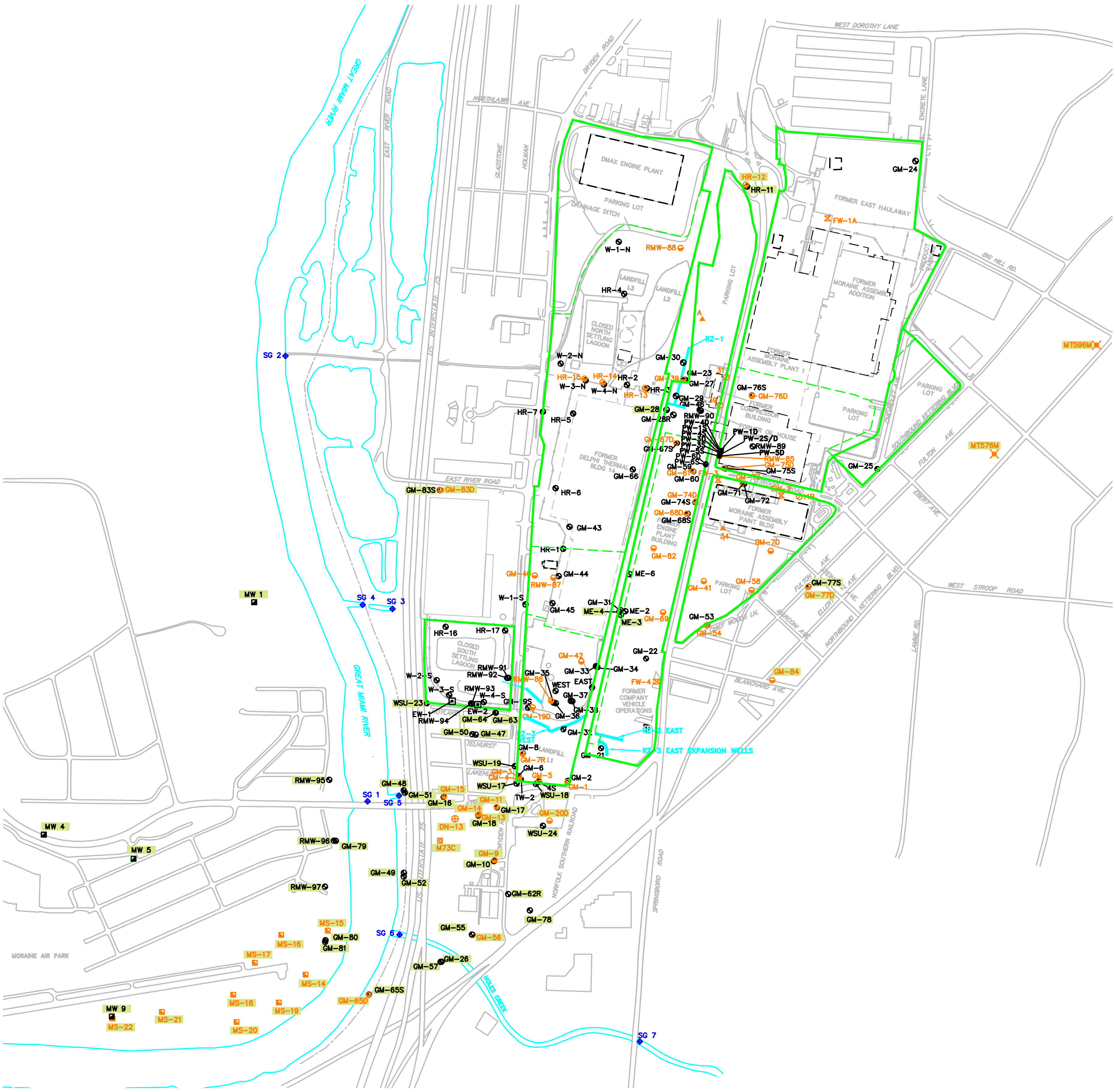


LEGEND

MONITORING WELL (UPPER AQUIFER)
INACTIVE RECOVERY WELL (TW-2)
MONITORING WELL (LOWER AQUIFER)
PIEZOMETER
CARBON SOURCE INTRODUCTION WELLS, REACTIVE ZONES (RZ-1, RZ-3, AND RZ-4)
FIRE WELL
PRODUCTION WELL CONVERTED TO MONITORING WELL (34, A)
INACTIVE PRODUCTION WELL (31, 39, 11B)
MONTGOMERY COUNTY WELL (USED BY RACER TRUST AS A LOWER AQUIFER RECOVERY WELL)
MONTGOMERY COUNTY WELL (INACTIVE MIAMI SHORES WELL FIELD - DAYTON PRIMARY PUBLIC SUPPLY BACKUP)
EXTRACTION WELL
PRIVATE WELL
STREAM GAUGE
RIVER LEVEE
CITY OF MORAINE MONITORING WELL
FORMER BUILDING FOOTPRINT
CURRENT BUILDING FOOTPRINT
SURFACE WATER FEATURE
PROPERTY BOUNDARY
PARCEL BOUNDARY
OFFSITE WELLS

NOTES:
1. ORANGE INDICATES LOWER AQUIFER WELLS.
2. BLACK INDICATES UPPER AQUIFER WELLS.

N

0 200 1000ft

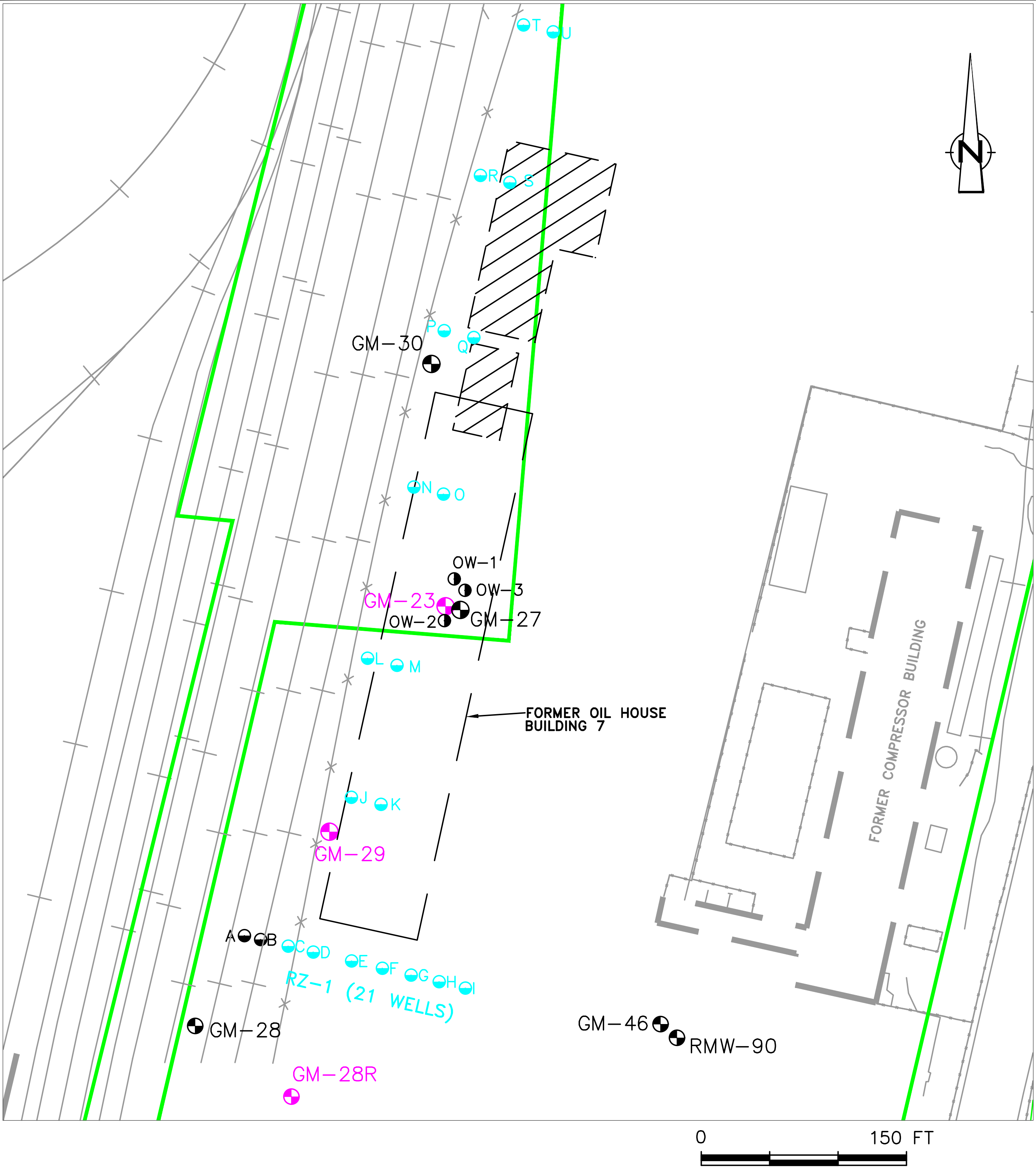
RACER TRUST
MORAINE, OHIO

OH000294.2019

SITE-WIDE CORRECTIVE MEASURES

ARCADIS Design & Consultancy for natural and built assets

FIGURE
3



LEGEND

- CARBON SOURCE INTRODUCTION WELL
- INACTIVE CARBON SOURCE INTRODUCTION WELL
- OXIDATION WELLS (INACTIVE)
- MONITORING WELL (UPPER AQUIFER)
- APPROXIMATE LOCATION OF FORMER MORAINE ENGINE TANK FARM
- MONITORING WELL UTILIZED FOR PERFORMANCE MONITORING
- PROPERTY BOUNDARY

RACER TRUST
MORAINE, OHIO

OH000294.2019

REACTIVE ZONE #1

ARCADIS Design & Consultancy for natural and built assets

FIGURE
4

C:\BIM\OneDrive - ARCADIS\BIM 360 Docs\RACER TRUST\RACER\MORAINE OH 2017 ACTIVITY\2019\OH000294.2018\01-DWG\0004B\ANN294-04B-2019-RZ-1-SAMPLES.dwg LAYOUT: REACTIVE ZONE 1 SAVED: 1/24/2019 9:38 AM ACADVER: 23.0S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: ACAD.CTB PLOTTED: 2/19/2019 7:25 AM BY: SMITH, BOB
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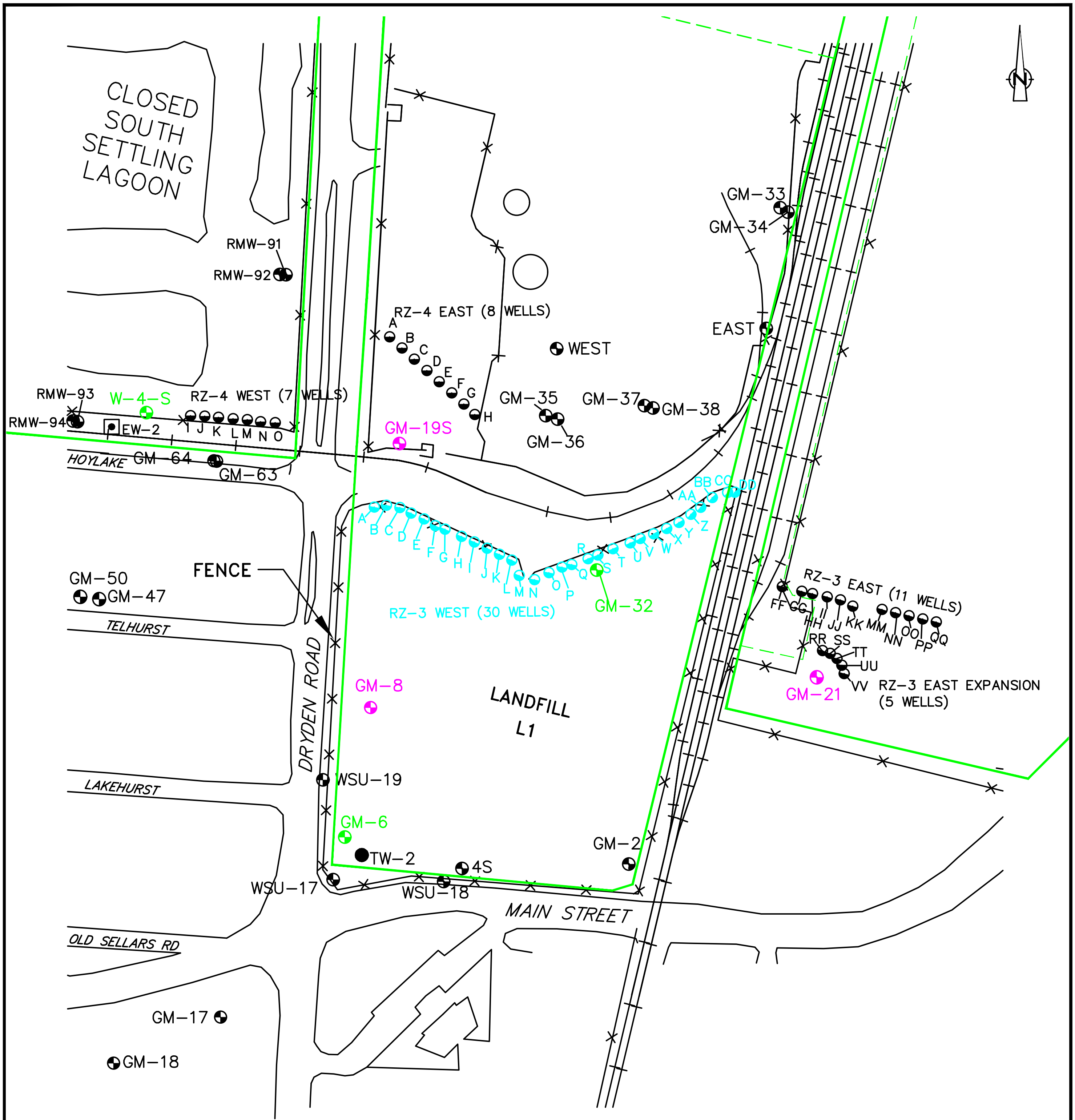

LEGEND

- UPPER AQUIFER MONITORING WELL SAMPLED IN 2018
- CARBON SOURCE INTRODUCTION WELLS
- INACTIVE CARBON SOURCE INTRODUCTION WELLS
- INACTIVE RECOVERY WELL
- MONITORING WELL (UPPER AQUIFER)
- MONITORING WELL UTILIZED FOR PERFORMANCE MONITORING
- EXTRACTION WELL
- PROPERTY BOUNDARY
- PARCEL BOUNDARY

NOTES: 1. INTRODUCTION WELL RZ-3LL WAS NOT INSTALLED DUE TO PRESENCE OF UNDERGROUND UTILITIES.
2. GM-32 MONITORED FOR TOTAL ORGANIC CARBON ONLY.

RACER TRUST
MORAINE, OHIO

OH000294.2019

REACTIVE ZONES #3 AND #4

ARCADIS Design & Consultancy for natural and built assets

FIGURE
5

PLOTTED: 2/19/2019 7:26 AM BY: SMITH, BOB
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XREFS: PROJECTNAME: ----

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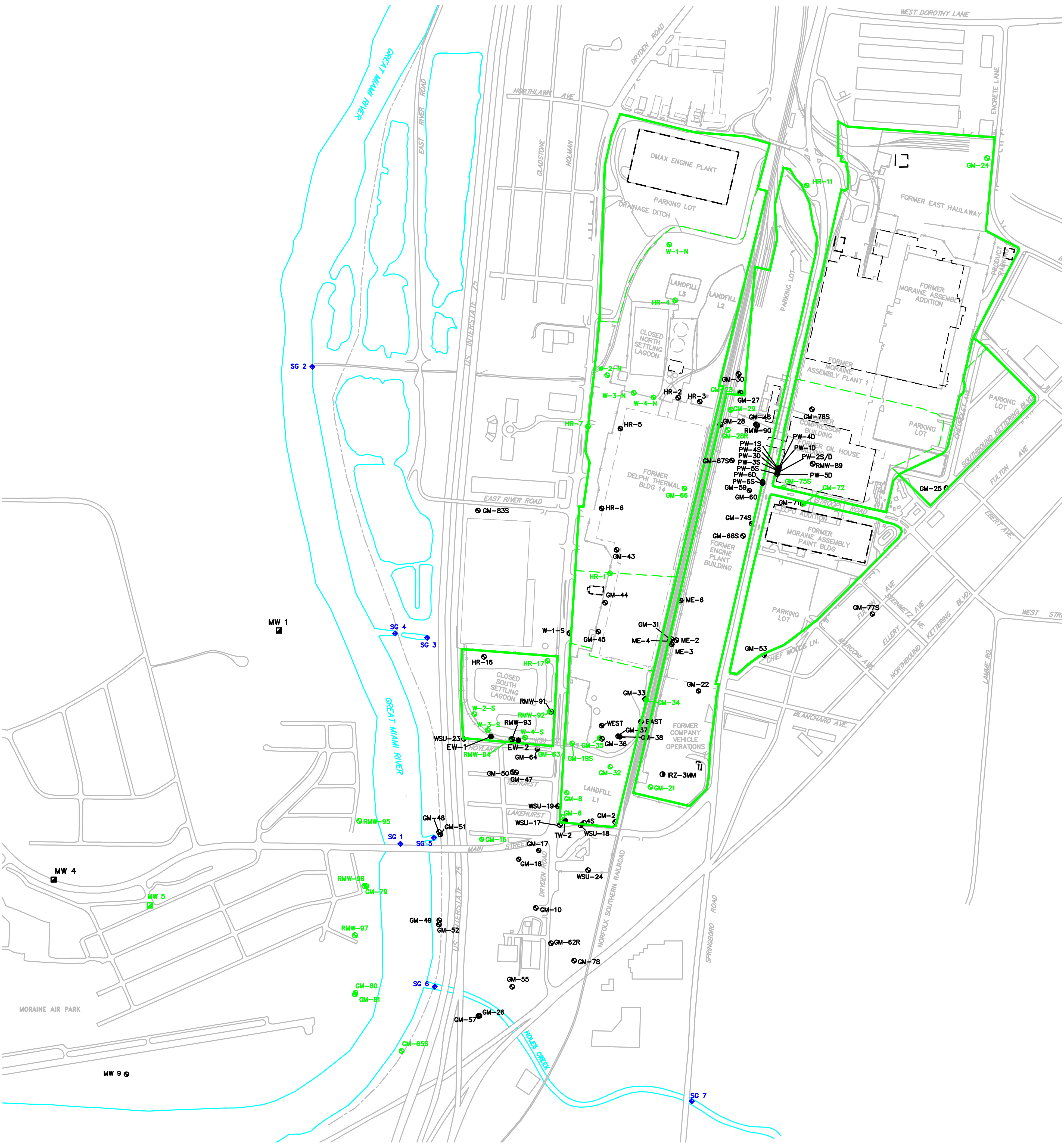


LEGEND

- MONITORING WELL (UPPER AQUIFER)
- INACTIVE EXTRACTION WELL (EW-1, EW-2, AND TW-2)
- CITY OF MORAINE MONITORING WELL
- STREAM GAUGE
- UPPER AQUIFER MONITORING WELL SAMPLED IN 2018
- FORMER BUILDING FOOTPRINT
- CURRENT BUILDING FOOTPRINT
- RIVER LEVEE
- SURFACE WATER FEATURE
- PROPERTY BOUNDARY
- PARCEL BOUNDARY

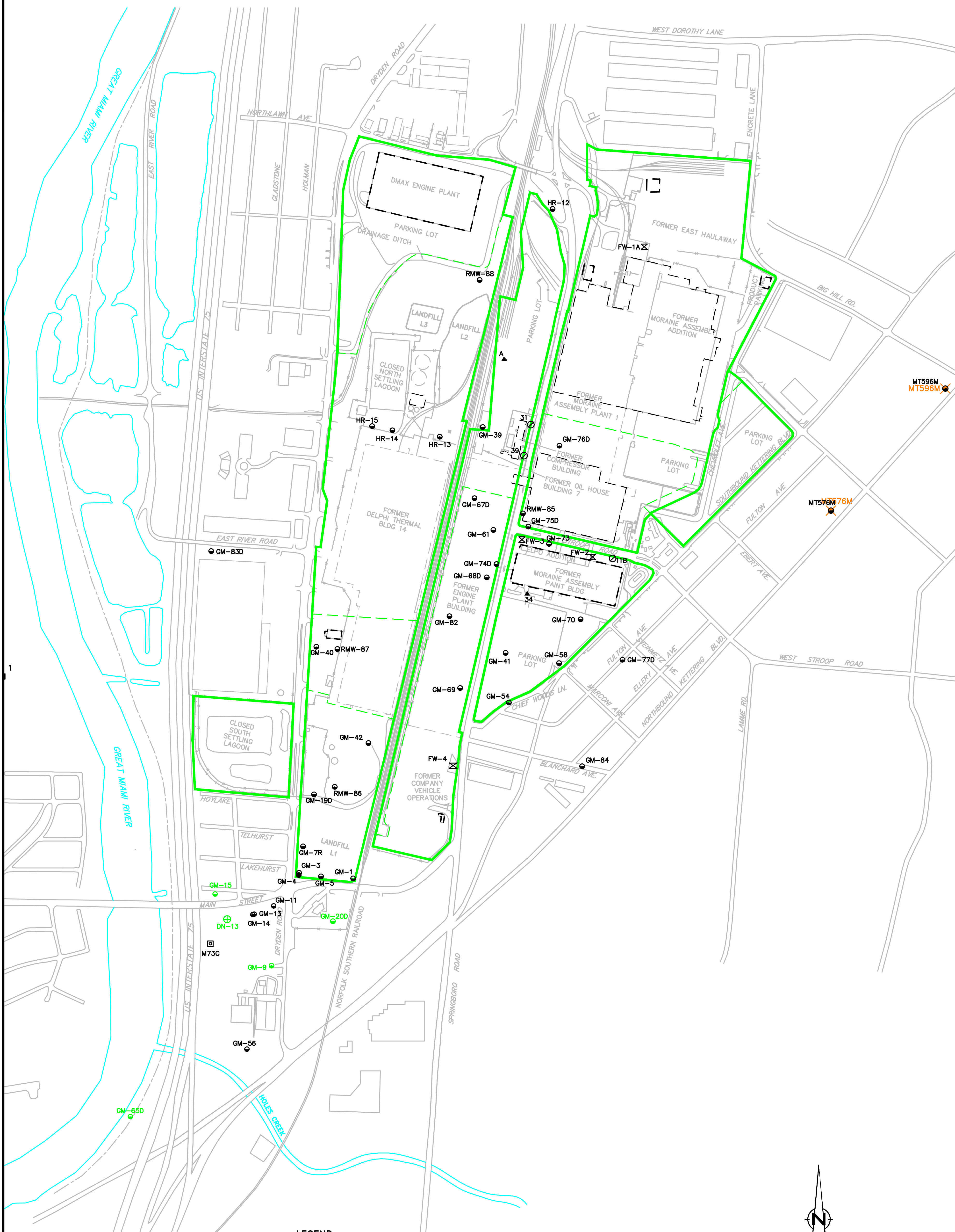
RACER TRUST
MORAINE, OHIO

OH000294.2019

UPPER AQUIFER MONITORING WELLS FOR GROUNDWATER MONITORING

ARCADIS Design & Consultancy for natural and built assets

FIGURE
6



LEGEND

- MONITORING WELL (LOWER AQUIFER)
- PIEZOMETER
- FIRE WELL
- PRODUCTION WELL CONVERTED TO MONITORING WELL (A, 34)
- INACTIVE PRODUCTION WELL (31, 39, 11B, 12A)
- MONTGOMERY COUNTY WELL (USED BY RACER TRUST AS A LOWER AQUIFER RECOVERY WELL)
- LOWER AQUIFER MONITORING WELL SAMPLED IN 2018
- FORMER BUILDING FOOTPRINT
- CURRENT BUILDING FOOTPRINT
- RIVER LEVEE
- SURFACE WATER FEATURE
- PROPERTY BOUNDARY
- PARCEL BOUNDARY

RACER TRUST
MORAINE, OHIO

OH000294.2019

LOWER AQUIFER MONITORING WELLS FOR GROUNDWATER MONITORING

ARCADIS Design & Consultancy for natural and built assets

FIGURE
7

CITY:DUBLIN DIV/GROUP:SER2 DB:R. SMITH LD:(Opt) PIC:(Opt) PM:N. GILLOTTI TM:T. FORTNER LYR:(Opt)ON=*;OFF=*REF*
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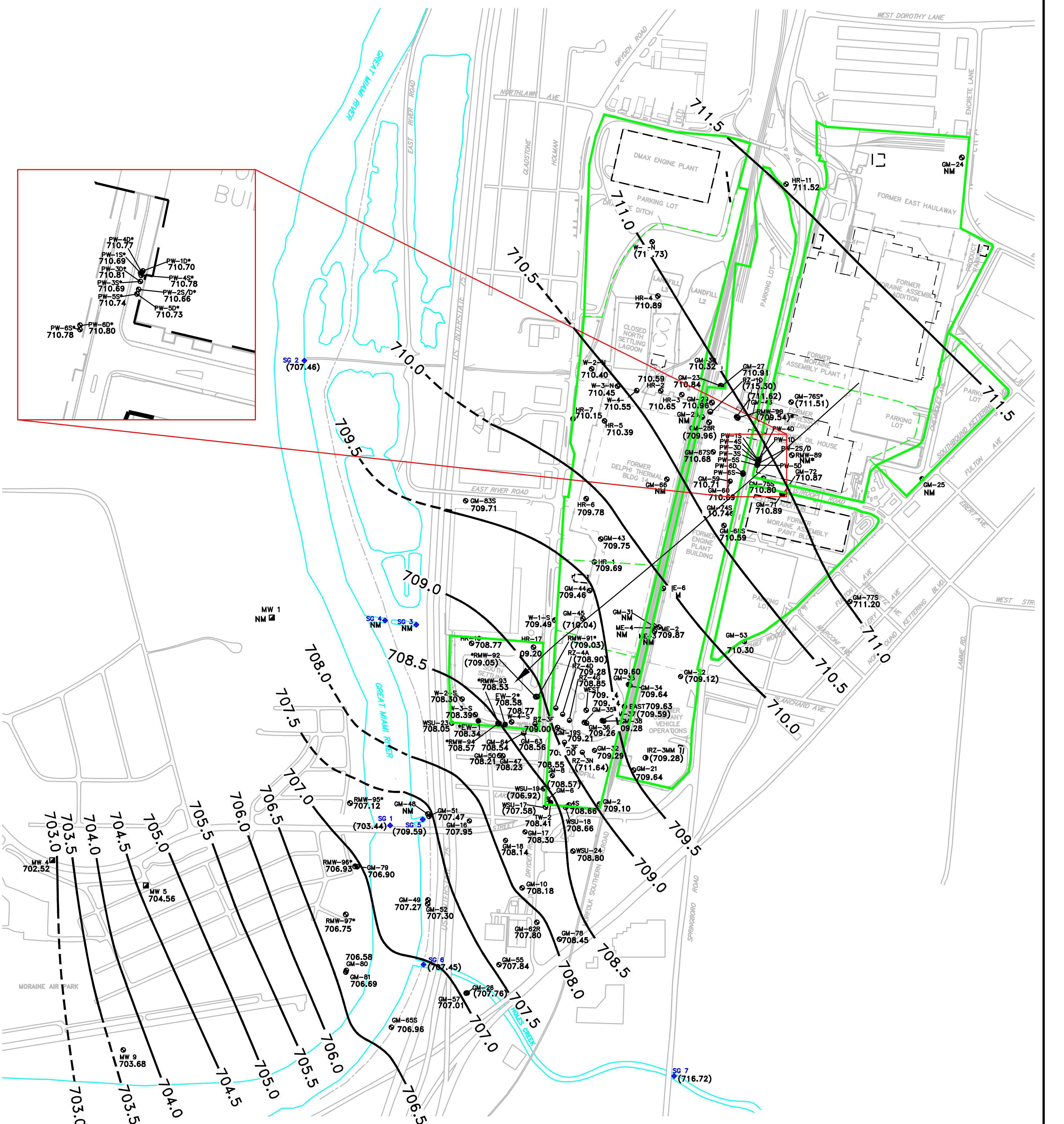


LEGEND

⊗	MONITORING WELL (UPPER AQUIFER)
●	INACTIVE EXTRACTION WELL (EW-1, EW-2, AND TW-2)
◆ 707.56	STREAM GAUGE AND STREAM GAUGE MEASUREMENT; NOT USED FOR CONTOURING
◑	CARBON INTRODUCTION WELL
◪	CITY OF MORAINE MONITORING WELL
— · —	RIVER LEVEE
——	PROPERTY BOUNDRY
— —	PARCEL BOUNDARY
708.14	GROUNDWATER ELEVATION (FEET ABOVE MEAN SEA LEVEL)
704.0 —	GROUNDWATER CONTOUR (FEET ABOVE MEAN SEA LEVEL) CONTOUR INTERVAL = 0.5 FOOT
( )	NOT USED FOR CONTOURING
NM	NOT MEASURED
*	WELLS INSTALLED AFTER 2011 ARE SURVEYED TO THE OHIO SOUTH STATE PLANE COORDINATE SYSTEM AND THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88).
⟶	FLOW DIRECTION
— —	FORMER BUILDING FOOTPRINT
— —	CURRENT BUILDING FOOTPRINT
——	SURFACE WATER FEATURE

NOTES:

1. DEPTH TO WATER MEASUREMENTS COLLECTED FROM TOP OF WELL CASING ON JULY 26-27, 2018.
2. SURVEY OF WELL COORDINATES WERE ORIGINALLY TO A SITE-SPECIFIC COORDINATE SYSTEM IN FEET IN NATIONAL GEODETIC VERTICAL DATUM OF 1929 (NGVD 29) USING AN ON-SITE BENCHMARK. BASE MAP AND WELL COORDINATES WERE CONVERTED IN 2011 TO OHIO SOUTH STATE PLANE COORDINATE SYSTEM AND NGVD 29 WAS RETAINED AS THE VERTICAL DATUM.
3. GROUNDWATER ELEVATION CONTOURS DEPICT LOSING STREAM CONDITIONS BASED ON GREAT MIAMI RIVER STREAM GAUGE LEVELS AND RESULTS FROM THE GROUNDWATER-SURFACE WATER INTERACTION ASSESSMENT AND REFINEMENT TO THE GROUNDWATER FLOW MODEL.

N

0 200 1000ft

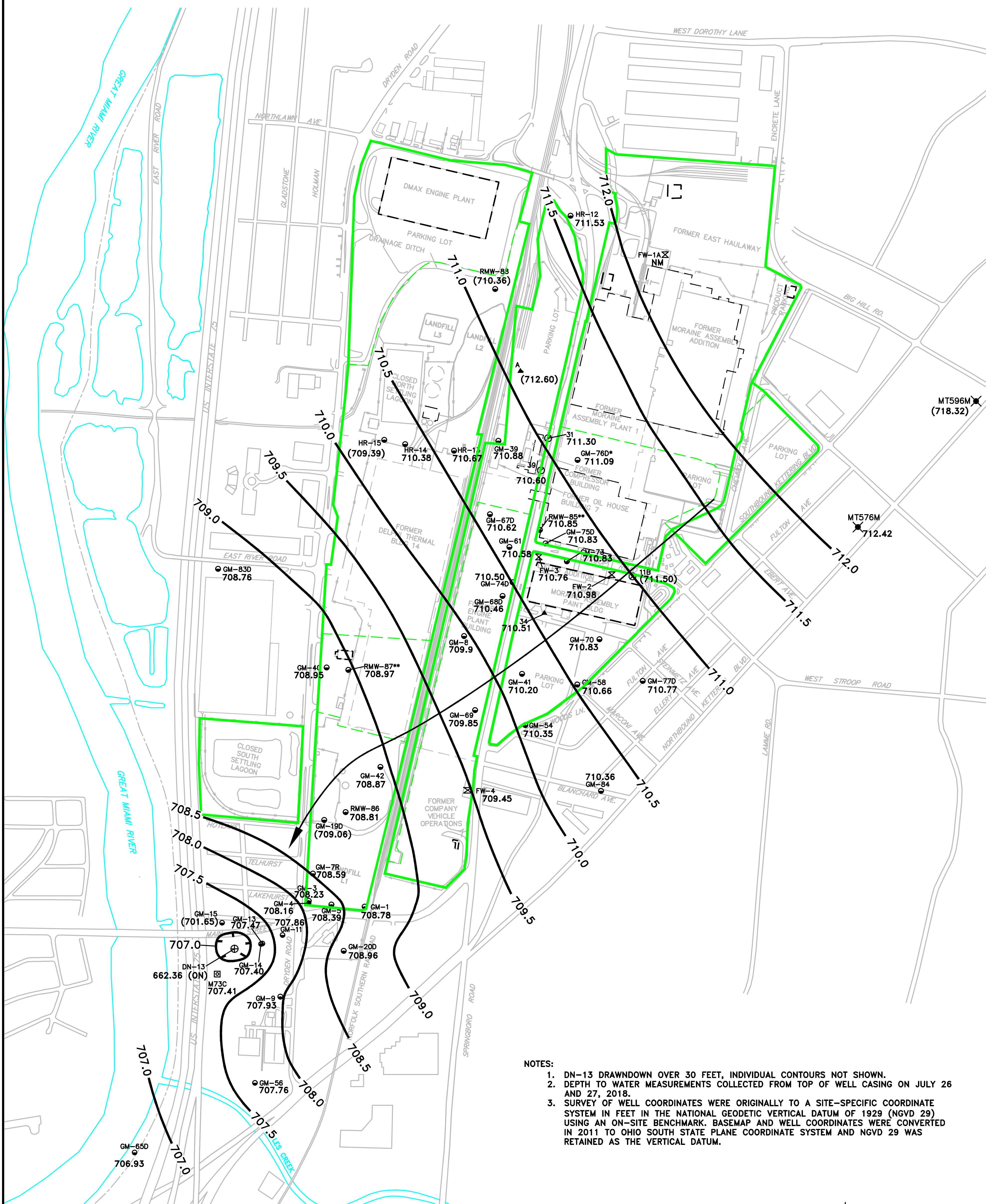
RACER TRUST
MORAINE, OHIO

OH000294.2019

POTENTIOMETRIC SURFACE (UPPER AQUIFER) JULY 2018

ARCADIS Design & Consultancy for natural and built assets

FIGURE
8



NOTES:
1. DN-13 DRAWNDOWN OVER 30 FEET, INDIVIDUAL CONTOURS NOT SHOWN.
2. DEPTH TO WATER MEASUREMENTS COLLECTED FROM TOP OF WELL CASING ON JULY 26 AND 27, 2018.
3. SURVEY OF WELL COORDINATES WERE ORIGINALLY TO A SITE-SPECIFIC COORDINATE SYSTEM IN FEET IN THE NATIONAL GEODETIC VERTICAL DATUM OF 1929 (NGVD 29) USING AN ON-SITE BENCHMARK. BASEMAP AND WELL COORDINATES WERE CONVERTED IN 2011 TO OHIO SOUTH STATE PLANE COORDINATE SYSTEM AND NGVD 29 WAS RETAINED AS THE VERTICAL DATUM.

LEGEND

- MONITORING WELL (LOWER AQUIFER)
- PIEZOMETER
- FIRE WELL
- PRODUCTION WELL CONVERTED TO MONITORING WELL (A, 34)
- INACTIVE PRODUCTION WELL
- MONTGOMERY COUNTY WELL (USED BY RACER TRUST AS A LOWER AQUIFER RECOVERY WELL)
- PRIVATE WELL
- RIVER LEVEE
- PROPERTY BOUNDARY
- PARCEL BOUNDARY
- FORMER BUILDING FOOTPRINT
- CURRENT BUILDING FOOTPRINT
- SURFACE WATER FEATURE

*	WELLS INSTALLED AFTER 2011 ARE SURVEYED TO THE OHIO SOUTH STATE PLANE COORDINATE SYSTEM AND THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88). DATA NOT USED IN CONTOURING AND POSTED FOR INFORMATIONAL PURPOSES
**	WELLS LOCATION ESTIMATED BY FIELD MEASUREMENTS FROM KNOWN SURVEYED POINTS. VERTICAL ELEVATION CORRECTED TO NEARBY WELLS SURVEYED TO NGVD 29 VERTICAL DATUM
709.63	GROUNDWATER ELEVATION (FEET ABOVE MEAN SEA LEVEL)
NM	NOT MEASURED
707.0	GROUNDWATER ELEVATION CONTOUR (FEET ABOVE MEAN SEA LEVEL) CONTOUR INTERVAL = 0.5 FOOT
	CONE OF DEPRESSION (ESTIMATED INDIVIDUAL CONTOURS NOT SHOWN)
( )	NOT USED FOR CONTOURING
	GROUNDWATER FLOW DIRECTION
ON/OFF	INDICATES WHETHER RECOVERY WELL IS IN OPERATION

N

0 200 700ft

RACER TRUST
MORAINE, OHIO

OH000294.2019

POTENTIOMETRIC SURFACE (LOWER AQUIFER) JULY 2018

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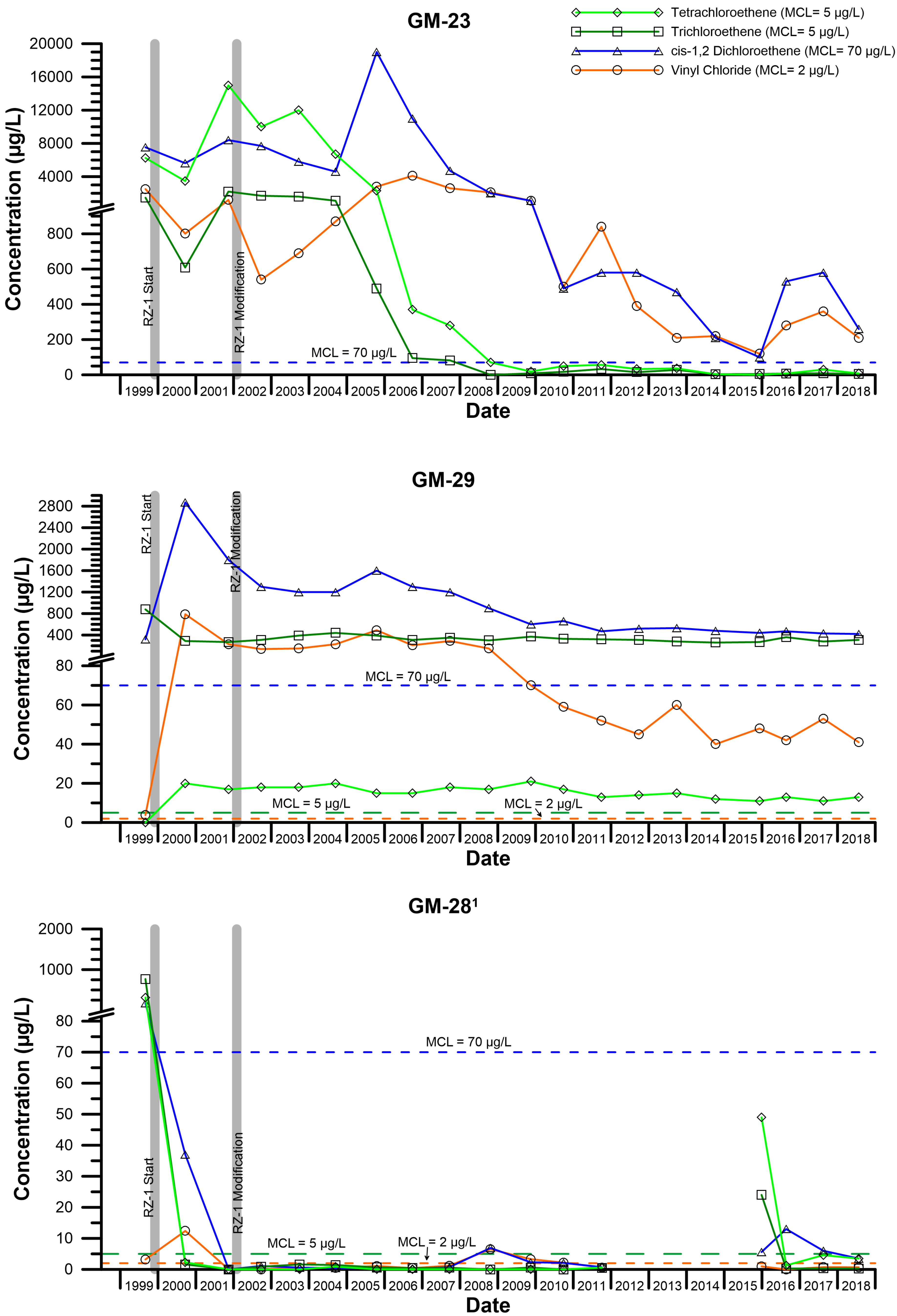
FIGURE
9



Notes:
MCL = Maximum Contaminant Level
µg/L = micrograms per liter
1 - Performance monitoring well GM-28 was not sampled in 2012 through 2015 due to an obstruction in the well. Monitoring well GM-28R was installed in 2015 as a replacement for GM-28.

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RZ-1 AREA GROUNDWATER CONCENTRATION GRAPHS

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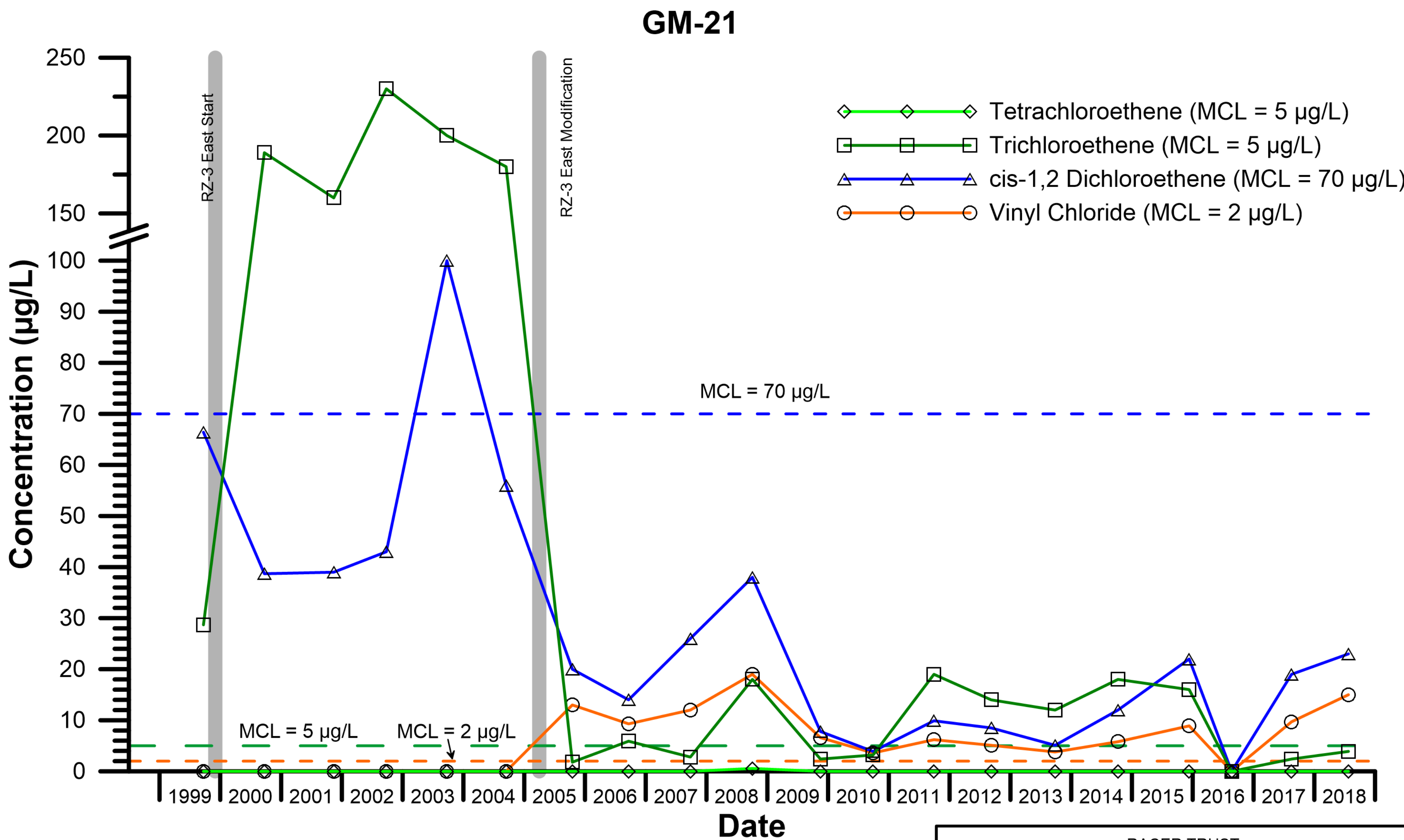
FIGURE
10



Notes:
MCL = Maximum Contaminant Level
µg/L = micrograms per liter
Carbon source introductions were not completed in 2018 in RZ-3 East

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RZ-3 EAST AREA GROUNDWATER CONCENTRATION GRAPH

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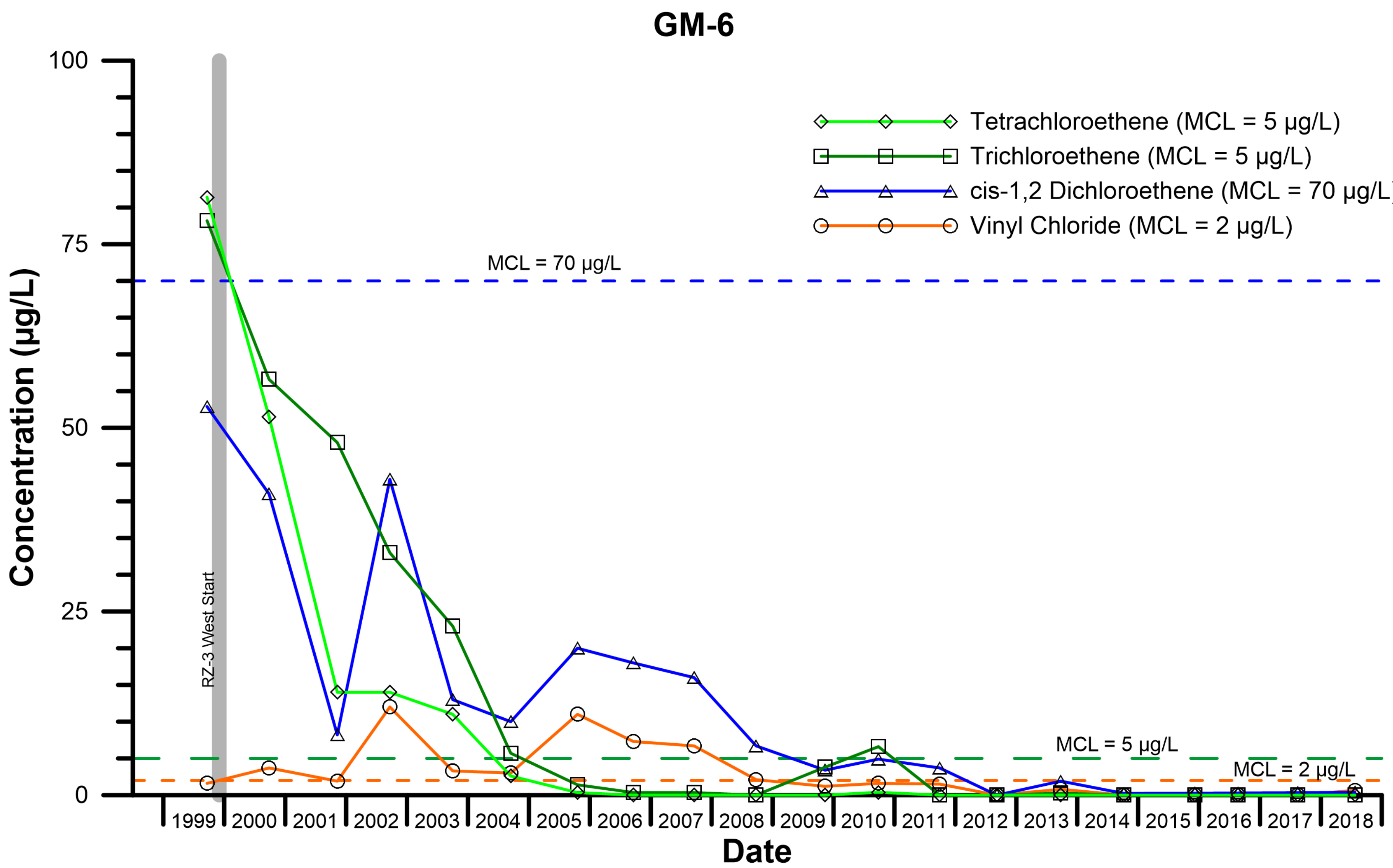
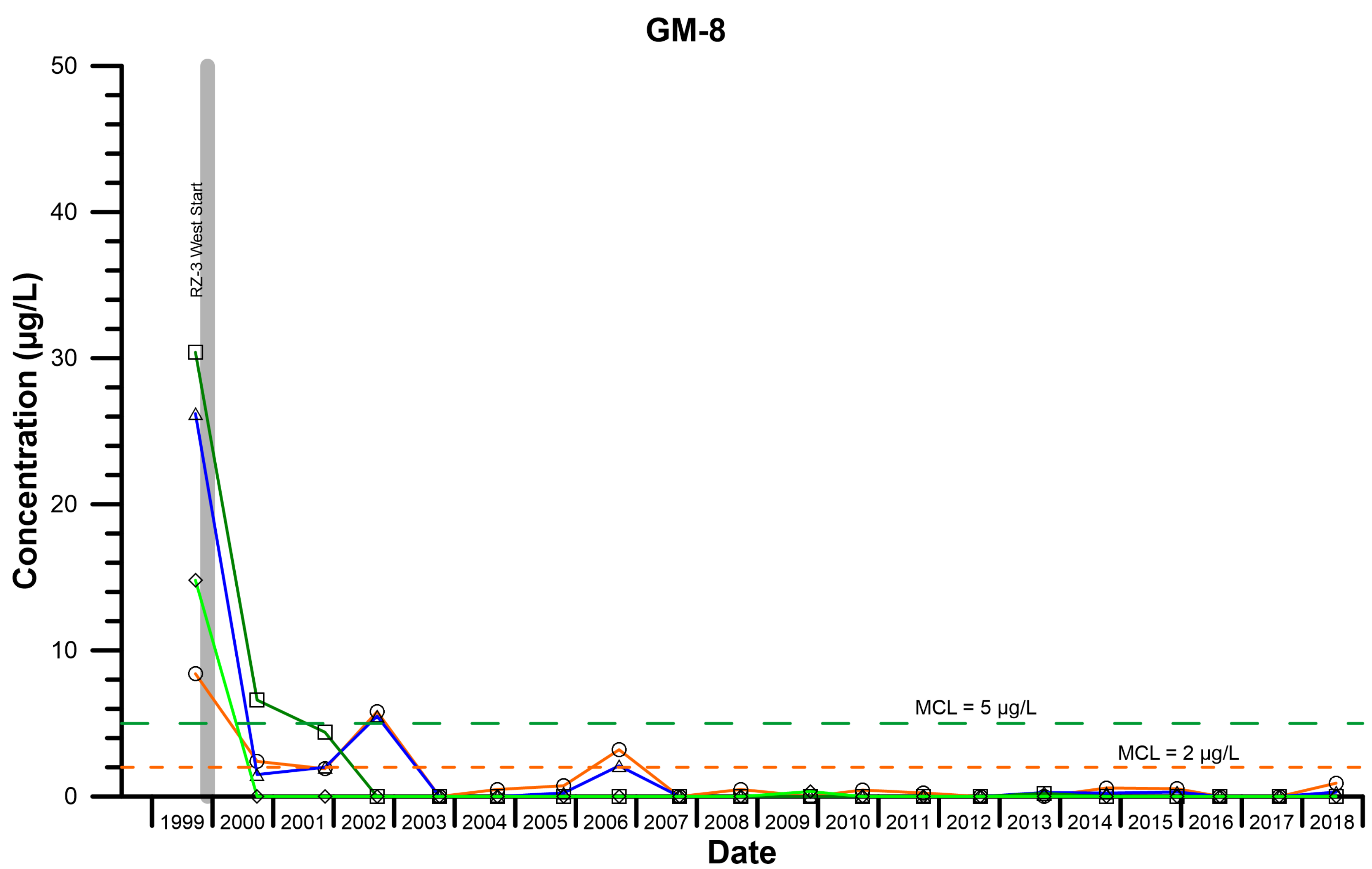
FIGURE
11





MCL = Maximum Contaminant Level
µg/L = micrograms per liter

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RZ-3 WEST AREA GROUNDWATER CONCENTRATION GRAPHS

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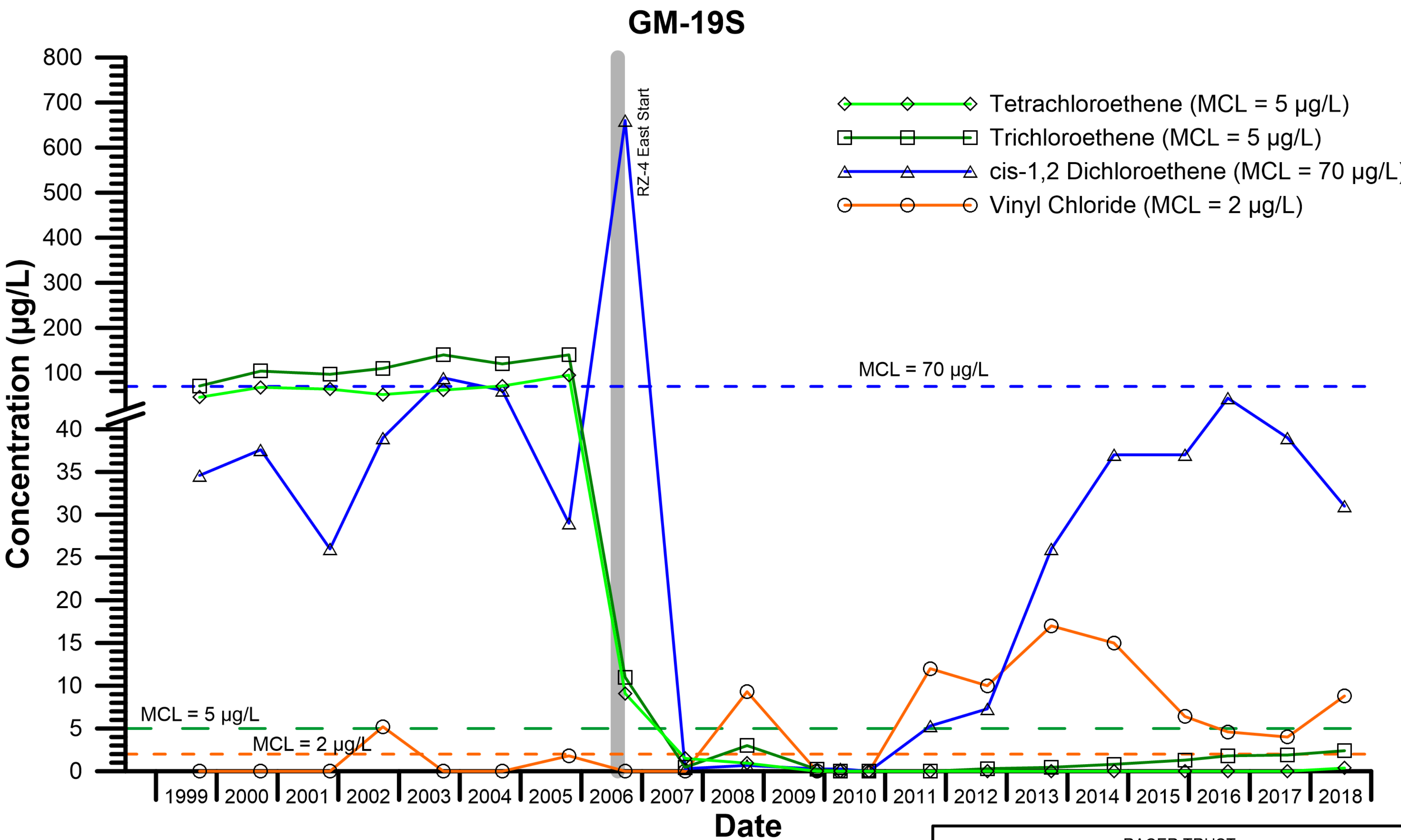
FIGURE
12



Notes:
MCL = Maximum Contaminant Level
µg/L = micrograms per liter
Carbon source introductions were not completed in 2018 in RZ-4 East

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RZ-4 EAST AREA GROUNDWATER CONCENTRATION GRAPH

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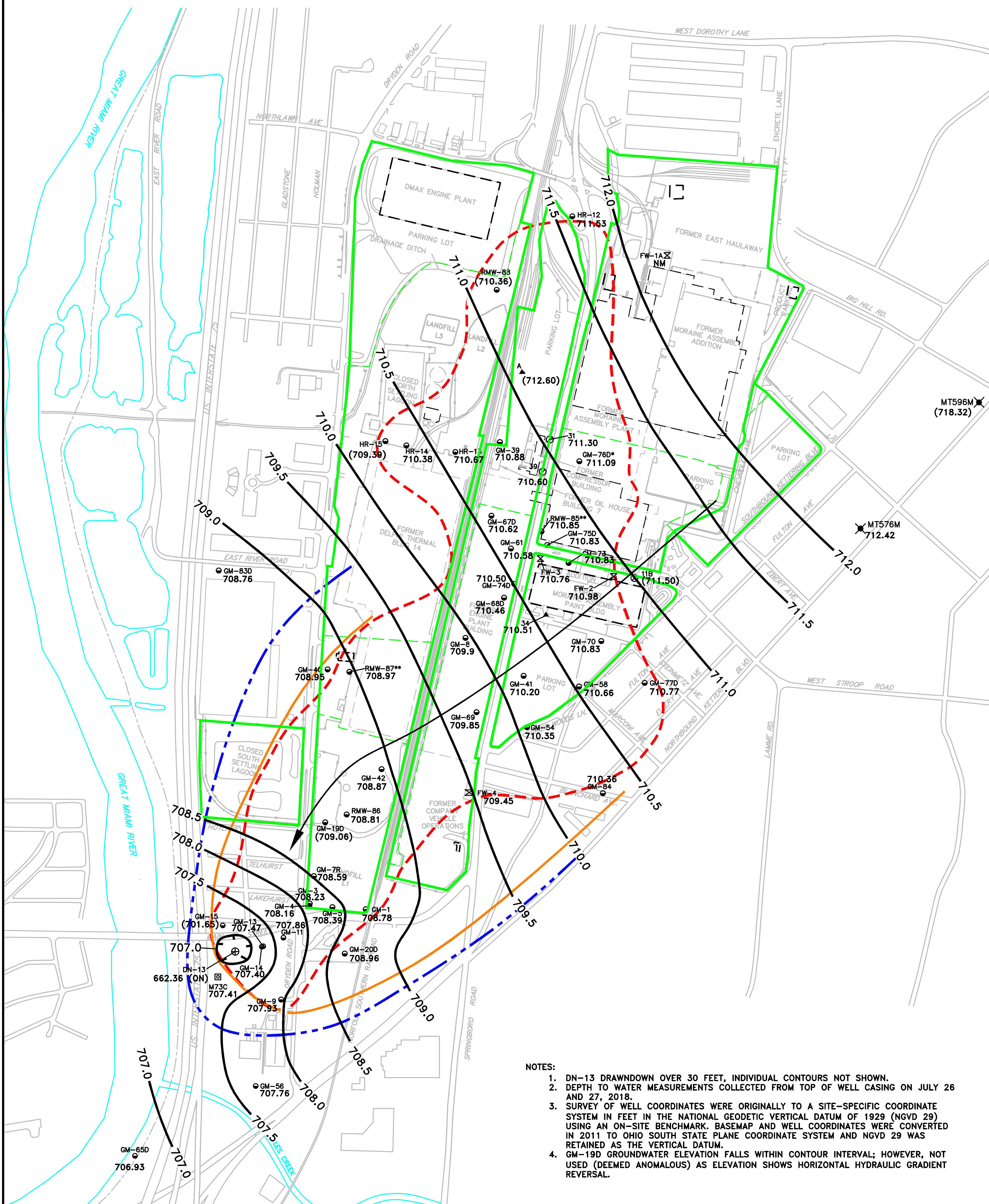
FIGURE
13

CITY:DUBLIN DIV/GROUP:SER2 DB:R. SMITH LD:(Opt) PIC:(Opt) PM:N. GILLOTTI TM:T. FORTNER LYR:(Opt)ON=*;OFF=*REF*
C:\BIM\OneDrive - ARCADIS\BIM 360 Docs\RACER TRUST\RACER\MORAINE OH 2017 ACTIVITI\2019\OH000294.2018\01-DWG\0004B\ANN294-04B-2019-GW-ELEVATIONS.dwg LAYOUT: GE ELEV 070018 - CZ SAVED: 2/19/2019 7:59 AM ACADVER: 23.0S (LMS TECH) PAGESETUP: ----
PLOTSTYLETABLE: ACAD.CTB PLOTTED: 2/19/2019 8:03 AM BY: SMITH, BOB



NOTES:

1. DN-13 DRAWNDOWN OVER 30 FEET, INDIVIDUAL CONTOURS NOT SHOWN.
2. DEPTH TO WATER MEASUREMENTS COLLECTED FROM TOP OF WELL CASING ON JULY 26 AND 27, 2018.
3. SURVEY OF WELL COORDINATES WERE ORIGINALLY TO A SITE-SPECIFIC COORDINATE SYSTEM IN FEET IN THE NATIONAL GEODETIC VERTICAL DATUM OF 1929 (NGVD 29) USING AN ON-SITE BENCHMARK. BASEMAP AND WELL COORDINATES WERE CONVERTED IN 2011 TO OHIO SOUTH STATE PLANE COORDINATE SYSTEM AND NGVD 29 WAS RETAINED AS THE VERTICAL DATUM.
4. GM-19D GROUNDWATER ELEVATION FALLS WITHIN CONTOUR INTERVAL; HOWEVER, NOT USED (DEEMED ANOMALOUS) AS ELEVATION SHOWS HORIZONTAL HYDRAULIC GRADIENT REVERSAL.

LEGEND

- MONITORING WELL (LOWER AQUIFER)
- PIEZOMETER
- FIRE WELL
- PRODUCTION WELL CONVERTED TO MONITORING WELL (A, 34)
- INACTIVE PRODUCTION WELL
- MONTGOMERY COUNTY WELL (USED BY RACER TRUST AS A LOWER AQUIFER RECOVERY WELL)
- PRIVATE WELL
- RIVER LEVEE
- PROPERTY BOUNDARY
- PARCEL BOUNDARY
- FORMER BUILDING FOOTPRINT
- CURRENT BUILDING FOOTPRINT
- SURFACE WATER FEATURE
- LOWER AQUIFER TOTAL SITE SPECIFIC VOC PLUME GREATER THAN 5 ug/L
- INFERRED CAPTURE ZONE
- LOWER AQUIFER TARGET CAPTURE ZONE

*	WELLS INSTALLED AFTER 2011 ARE SURVEYED TO THE OHIO SOUTH STATE PLANE COORDINATE SYSTEM AND THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88). DATA NOT USED IN CONTOURING AND POSTED FOR INFORMATIONAL PURPOSES
**	WELLS LOCATION ESTIMATED BY FIELD MEASUREMENTS FROM KNOWN SURVEYED POINTS. VERTICAL ELEVATION CORRECTED TO NEARBY WELLS SURVEYED TO NGVD 29 VERTICAL DATUM
706.93	GROUNDWATER ELEVATION (FEET ABOVE MEAN SEA LEVEL)
NM	NOT MEASURED
707.0	GROUNDWATER ELEVATION CONTOUR (FEET ABOVE MEAN SEA LEVEL) CONTOUR INTERVAL = 0.5 FOOT
	CONE OF DEPRESSION (ESTIMATED INDIVIDUAL CONTOURS NOT SHOWN)
( )	NOT USED FOR CONTOURING
	GROUNDWATER FLOW DIRECTION
ON/OFF	INDICATES WHETHER RECOVERY WELL IS IN OPERATION

N

0 200 700ft

RACER TRUST
MORAINE, OHIO

OH000294.2019

POTENTIOMETRIC SURFACE (LOWER AQUIFER) JULY 26-27, 2018 WITH INFERRED AND TARGETED CAPTURE ZONES

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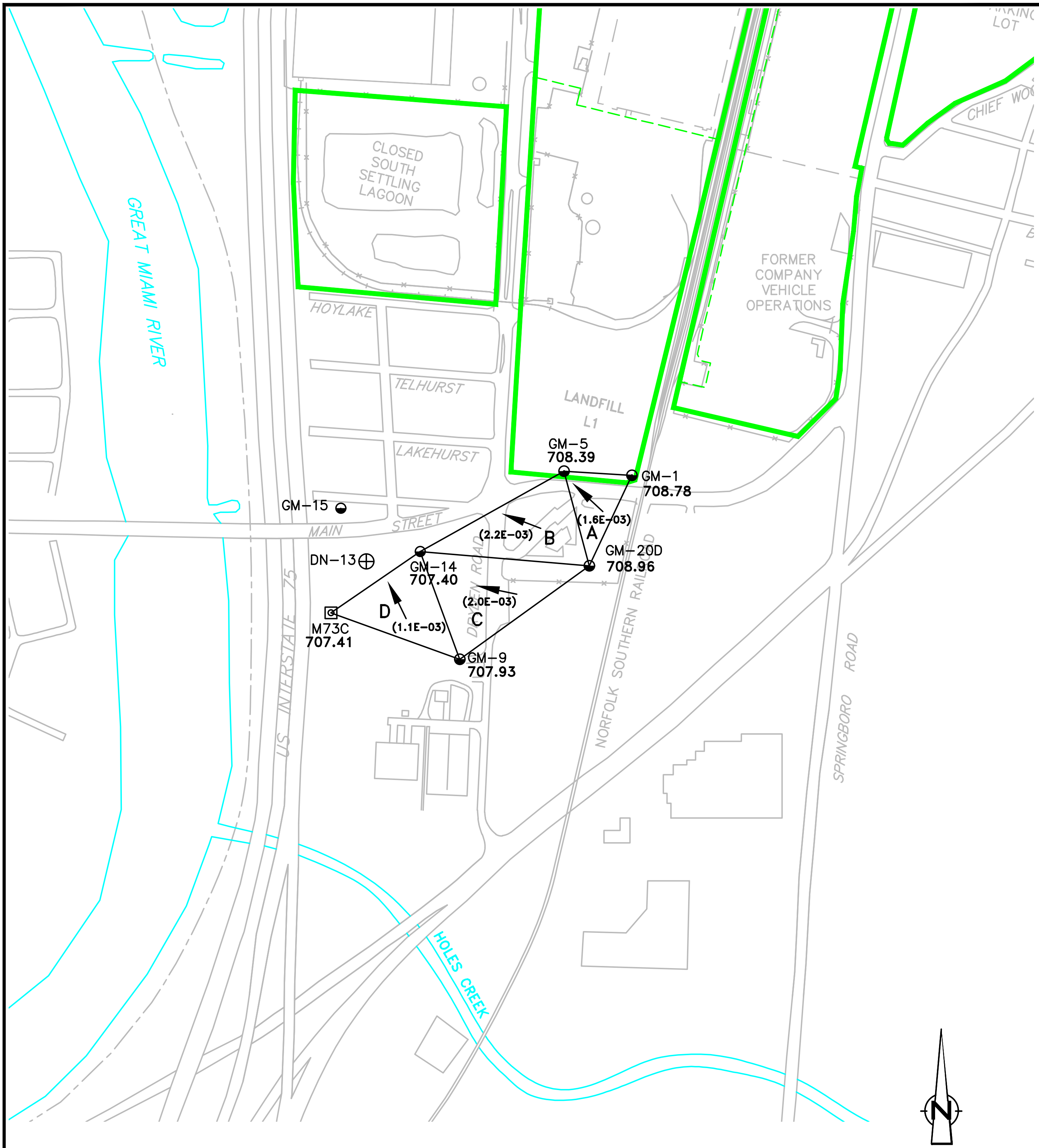
FIGURE
14



LEGEND

GM−9	MONITORING WELL (LOWER AQUIFER)
	PIEZOMETER (LOWER AQUIFER)
	MONTGOMERY COUNTY WELL (USED BY RACER TRUST AS LOWER AQUIFER RECOVERY WELL)
	RIVER LEVEE
	FORMER BUILDING FOOTPRINT
	SURFACE WATER FEATURE
	PROPERTY BOUNDARY
	PARCEL BOUNDARY
A	TRIANGULAR IRREGULAR NETWORK (TIN) CELL ID
(1.0E−0.3)	HORIZONTAL HYDRAULIC GRADIENT DIRECTION AND MAGNITUDE (FOOT/FOOT)

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OH000294.2019

LOWER AQUIFER HORIZONTAL GRADIENTS JULY 2018

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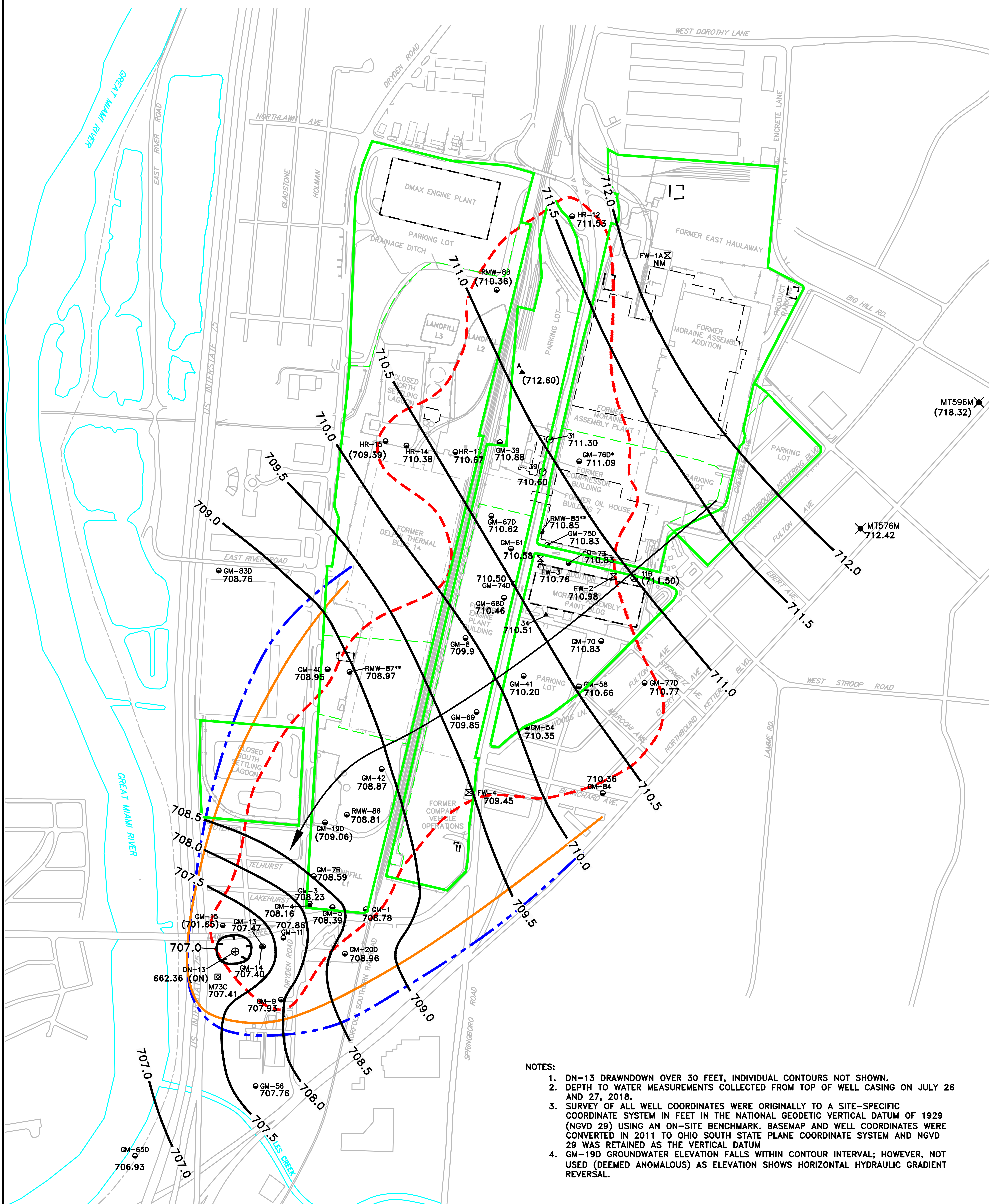
FIGURE
15



NOTES:

1. DN-13 DRAWNDOWN OVER 30 FEET, INDIVIDUAL CONTOURS NOT SHOWN.
2. DEPTH TO WATER MEASUREMENTS COLLECTED FROM TOP OF WELL CASING ON JULY 26 AND 27, 2018.
3. SURVEY OF ALL WELL COORDINATES WERE ORIGINALLY TO A SITE-SPECIFIC COORDINATE SYSTEM IN FEET IN THE NATIONAL GEODETIC VERTICAL DATUM OF 1929 (NGVD 29) USING AN ON-SITE BENCHMARK. BASEMAP AND WELL COORDINATES WERE CONVERTED IN 2011 TO OHIO SOUTH STATE PLANE COORDINATE SYSTEM AND NGVD 29 WAS RETAINED AS THE VERTICAL DATUM
4. GM-19D GROUNDWATER ELEVATION FALLS WITHIN CONTOUR INTERVAL; HOWEVER, NOT USED (DEEMED ANOMALOUS) AS ELEVATION SHOWS HORIZONTAL HYDRAULIC GRADIENT REVERSAL.

LEGEND

- MONITORING WELL (LOWER AQUIFER)
- PIEZOMETER
- FIRE WELL
- PRODUCTION WELL CONVERTED TO MONITORING WELL (A, 34)
- INACTIVE PRODUCTION WELL
- MONTGOMERY COUNTY WELL (USED BY RACER TRUST AS A LOWER AQUIFER RECOVERY WELL)
- PRIVATE WELL
- RIVER LEVEE
- PROPERTY BOUNDARY
- PARCEL BOUNDARY
- FORMER BUILDING FOOTPRINT
- CURRENT BUILDING FOOTPRINT
- SURFACE WATER FEATURE
- LOWER AQUIFER TARGET CAPTURE ZONE
- INFERRED CAPTURE ZONE
- INTERPRETED CAPTURE ZONE

* WELLS INSTALLED AFTER 2011 ARE SURVEYED TO THE OHIO SOUTH STATE PLANE COORDINATE SYSTEM AND THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88). DATA NOT USED IN CONTOURING AND POSTED FOR INFORMATIONAL PURPOSES

** WELLS LOCATION ESTIMATED BY FIELD MEASUREMENTS FROM KNOWN SURVEYED POINTS. VERTICAL ELEVATION CORRECTED TO NEARBY WELLS SURVEYED TO NGVD 29 VERTICAL DATUM

706.93 GROUNDWATER ELEVATION (FEET ABOVE MEAN SEA LEVEL)

NM NOT MEASURED

707.0 — GROUNDWATER ELEVATION CONTOUR (FEET ABOVE MEAN SEA LEVEL) CONTOUR INTERVAL = 0.5 FOOT

CONE OF DEPRESSION (ESTIMATED INDIVIDUAL CONTOURS NOT SHOWN)

( ) NOT USED FOR CONTOURING

GROUNDWATER FLOW DIRECTION

ON/OFF INDICATES WHETHER RECOVERY WELL IS IN OPERATION

N

0 200 700ft

RACER TRUST
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OH000294.2019

INTERPRETED CAPTURE ZONE

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FIGURE
16

APPENDIX A

In-Situ Reactive Zones Performance Results for 2018

In-Situ Reactive Zones Performance Results

As described in Section 1.4.2 of the 2018 Groundwater Monitoring Report (Monitoring Report), the carbon solution delivery network consists of three in-situ reactive zones (IRZs), RZ-1, RZ-3 (East and West), and RZ-4 (East). During 2018, a carbon solution was introduced into the groundwater through introduction wells at RZ-1 and RZ-3 West, as shown on Figures 4 and 5 of the Monitoring Report, respectively. RZ-1 was originally installed in 1999 as a nine well barrier downgradient of the Former Oil House area. Based on the performance of the enhanced reductive dechlorination (ERD) technology, RZ-1 was expanded into portions of the Former Oil House area by the addition of 12 introduction wells in 2002.

RZ-3 was originally installed in 1999 and has been operated as a cut-off barrier (30 wells in RZ-3 East and 11 wells in RZ-3 West) to mitigate further downgradient site-specific volatile organic compound (VOC) migration. In 2005, RZ-3 East was modified by the addition of five introduction wells (RZ-3RR through RZ-3VV) and cessation of introduction in five existing wells (RZ-3MM through RZ-3QQ) to improve performance at the far eastern edge of the plume. In 2018, the introduction wells at RZ-3 East were not used due to data indicating that site-specific VOC concentrations did not require active remediation.

Using data obtained from the Supplemental Groundwater Investigation conducted in 2006, RZ-4 was designed and installed to address VOC concentrations present on the western side of the plume. RZ-4 consists of 15 introduction wells, seven wells in RZ-4 West and eight wells in RZ-4 East. The RZ-4 West wells are in the southeast corner of the closed South Settling Lagoon and the RZ-4 East wells are located north of Landfill L1 and west of the Waste Pile/Staging Area. Introductions to RZ-4 began in August 2006. Operation at RZ-4 West was discontinued September 2007. In 2018, the introduction wells at RZ-4 East were not used because these wells are in the vicinity of the neighborhood where implementation of Phase 1 Dynamic Groundwater Recirculation (DGR™) is planned.

The following sections discuss the monitoring completed to assess the effectiveness of the in-situ reactive zones and the results of this monitoring.

Reactive Zone Monitoring

Operation of the reactive zones was monitored through the collection of field parameter measurements and laboratory analyses of biogeochemical indicator parameters and VOCs, according to the Site-Wide Groundwater Monitoring Plan (Arcadis G&M, Inc. 2002) and as modified in subsequent annual monitoring reports. Field parameter measurements included: pH, specific conductivity, dissolved oxygen (DO), oxidation-reduction potential (ORP), and temperature. Biogeochemical parameters, collected at select monitoring wells, included manganese (total and dissolved), iron (total and dissolved), sulfate, sulfide, total organic carbon

(TOC), chlorides, light hydrocarbons (ethane and ethene), and methane. The monitored VOCs included: benzene, toluene, ethylbenzene, xylenes, tetrachloroethene (PCE), trichloroethene (TCE), cis-1,2-dichloroethene (cis-1,2-DCE), vinyl chloride, 1,1,1-trichloroethane (1,1,1-TCA), 1,1-dichloroethane (1,1-DCA), 1,1-dichloroethene (1,1-DCE), and trans-1,2-dichloroethene (trans-1,2-DCE). Historical TOC data collected to evaluate organic carbon longevity within the IRZs and to review the applicable injection timing are presented in **Tables A-1** and **A-2**. The VOC data collected from the IRZ monitoring wells are presented in **Tables A-3** through **A-6** of this appendix. The bioattenuation parameter data collected from the IRZ monitoring wells are presented in **Tables A-7** through **A-10**. An evaluation of pertinent monitoring data is presented in the following sections.

The operational monitoring data highlighted above can be broadly categorized as: (i) “primary” operational monitoring data, which tracks the actual operation of the remediation system and determines whether the operation is proceeding as planned, and (ii) “secondary” operational monitoring data, which assists in any necessary troubleshooting of the system. The secondary data becomes important in the event that degradation of the VOCs is not proceeding as expected, and the cause cannot be determined from the primary operational monitoring data. The primary operational monitoring data includes pH, TOC, VOCs, ethene, ethane, and methane. Secondary operational monitoring data includes dissolved manganese, dissolved iron, sulfate, and ORP. The primary operational data for select IRZ monitoring wells is discussed below and presented graphically on **Figures A-1** through **A-3**.

Locations of the performance monitoring wells relative to each reactive zone are shown on Figures 4 and 5 of the Monitoring Report. The following wells are used for performance monitoring of the IRZs.

- At RZ-1, monitoring wells GM-23, GM-28R, and GM-29 are currently used for performance monitoring. GM-23 and GM-29 are located within the area of RZ-1 expansion wells. GM-28, located downgradient of the original RZ-1 transect, was formerly used for performance monitoring, however, it is no longer sampled due to an obstruction in the well. Replacement well GM-28R was installed in 2015 and is used in this evaluation. At RZ-1, carbon is introduced into 19 injection wells designated as RZ-1C through RZ-1U.
- At RZ-3 West, monitoring well GM-32, which is within the introduction zone due to its location being constrained by the proximity of Landfill L1, is designated as the downgradient monitoring well. Monitoring well GM-32 is only analyzed for TOC, as this well is located in the early stages of the reactive zone due to its proximity to the introduction wells. Monitoring well GM-8 is located further downgradient and is also utilized to monitor the performance of RZ-3 West. At RZ-3 West, carbon solution is introduced into 30 injection wells designated as RZ-3A through RZ-3DD.
- For RZ-3 East, monitoring well GM-21 is designated as the downgradient monitor well. As stated above, carbon solution was not introduced into the RZ-3 East network in 2018.

- For RZ-4 East, monitoring well GM-19S is designated as the downgradient monitor well. As stated above, carbon solution was not introduced into the RZ-3 East network in 2018.

During 2018, a target volume of 800 gallons and 1,600 gallons of a 2 percent molasses solution was injected per introduction well at RZ-1 and RZ-3 West, respectively. Injections were completed on a quarterly basis in accordance with the revised injection frequency which was determined through implementation of the In-Situ Reactive Zone Interim Measure Injection Frequency Evaluation (Arcadis, Inc. 2014). **Table A-1** is a summary of the TOC analytical results collected during the evaluation period. **Table A-2** is a summary of the half-life analysis.

Table 2 in the Monitoring Report presents the carbon solution introduction volumes for different introduction wells in 2018.

Analysis of Primary Operational Monitoring Data

The primary operational data are comprised of a limited number of variables that are monitored at a frequency necessary to supply the information required for the operation of the remediation system. The entire data set is presented in **Tables A-1** through **A-8**. **Figures A-1** through **A-3** present the primary operational data (pH, TOC, methane, VOCs, ethane, and ethene) graphically for monitoring wells used for monitoring the effectiveness of each of the IRZs (GM-23, GM-29, GM-28R, GM-8, GM-21, and GM-19S). The graphs are organized to allow a simple comparison of the trends in each monitoring well for pH, TOC, methane, VOCs, ethene, ethane, and total parent-daughter compound molarity. A discussion of the primary operational data is provided below.

pH

The preferred pH range for reductive dechlorination is between 6 and 8 standard units (s.u.), and the acceptable pH range extends from 5 to 9 s.u. The pH measurements collected in 2018 from performance monitoring wells were within the acceptable pH range.

Total Organic Carbon and Anaerobic Indicator Parameters

Organic carbon electron donor availability is considered the primary parameter that dictates the overall size and length of the in-situ reactive zones downgradient of each of the injection barriers. The size of the in-situ reactive zone has been historically determined based on evidence of injection influence (i.e., changes in TOC concentrations relative to the background conditions) at individual monitoring wells within each of the reactive zones. The most representative and straightforward method of assessing whether reduction-oxidation reaction conditions are appropriate for reductive dechlorination is to continue reviewing whether detectable methane is present at a given well location and using this performance metric to document that highly anaerobic groundwater conditions exist at a given well location. **Figures A-1** through **A-3** provide methane databoxes with historic concentrations in the performance monitoring wells. The observation of methane indicates that background terminal electron acceptors (e.g., dissolved oxygen, ferric iron, sulfate) have been depleted in the IRZ and that the necessary conditions for efficient reductive dechlorination have been established in the vicinity of the IRZs.

TOC values in the RZ-1 performance monitoring wells ranged from 6.6 to 8.8 mg/L, indicate concentrations were at background or slightly above background levels, and indicate the carbon is being consumed rapidly by an active soil microbial community. Methane concentrations in GM-23, GM-28R, and GM-29 (3.7, 1.8, and 4.0 milligrams per liter [mg/L], respectively) were reported above the 0.2 mg/L benchmark and remain above the background levels observed in these monitoring wells in 1999 (i.e., sampling before the start of carbon introductions). Sulfate concentrations in GM-23, GM-28R, and GM-29 (38, 24, and 49 mg/L, respectively) were above the benchmark value of 20 mg/L. The sulfate results, combined with the observed methane concentration, demonstrates that background electron acceptors are being utilized enough to foster development of highly anaerobic conditions, and indicates conditions conducive for reductive dechlorination (e.g., methanogenic) are being maintained.

TOC concentrations at RZ-3 West performance monitoring wells indicate concentrations near or below the range of the background levels (6.2 and 3.8 mg/L for GM-8 and GM-32, respectively). These data are anticipated and consistent with historical data. Methane remained above background conditions at monitoring well GM-8 (1.6 mg/L), and the sulfate concentration at GM-8 was 38 mg/L. The observed methane concentration at GM-8 in spite of its considerable transport distance from the RZ-3 injection network demonstrates that conditions conducive for reductive dechlorination are being maintained in RZ-3 West.

A performance evaluation of RZ-3 East was completed despite no carbon injections completed in 2018. TOC concentrations at RZ-3 East monitoring well GM-21 of 95 mg/L are significantly above baseline conditions and consistent with historical data. The increased TOC concentration at GM-21 is attributed to its proximity to the RZ-3 East injection network. The increased TOC concentration is consistent with the observed methane concentration of 15 mg/L, which is above the benchmark value of 0.2 mg/L. In addition, the sulfate concentration at GM-21 was 32 mg/L, which in conjunction with the reported methane concentration indicates conditions conducive for reductive dechlorination are being maintained as a result of the carbon injections at RZ-3 East.

A performance evaluation of RZ-4 East was completed despite no carbon injections completed in 2018. The TOC concentration at RZ-4 East monitoring well GM-19S (1.7 mg/L) was similar to background concentrations and indicate the carbon is being consumed rapidly by an active IRZ microbial community. This concentration is consistent with the historical range of TOC values observed over the course of RZ-4 operation (from below detection to 22 mg/L). The concentration of methane at monitoring well GM-19S (0.21 mg/L) remained above the background levels and is slightly above the 0.2 mg/L benchmark. The sulfate concentration for GM-19S (53 mg/L) was above the benchmark value of 20 mg/L. The observation of elevated methane concentrations demonstrates that influence of anaerobic conditions established within RZ-4 are observed in groundwater further downgradient.

VOC Analytical Results

The groundwater analytical data for the site-specific list of VOCs are presented in **Table A-3** for RZ-1, **Table A-4** for RZ-3 West, **Table A-5** for RZ-3 East, and **Table A-**6 for RZ-4 East. Additionally, the degradation of PCE and TCE (parent compounds) to cis-1,2-DCE, vinyl chloride (daughter products), and ethene and ethane (end products) are provided with the pH, TOC, and methane data for performance monitoring wells associated with RZ-1 (GM-23, GM-29, and GM-28R **Figure A-1**), RZ-3 East/West (GM-21 and GM-8 **Figure A-2**), and RZ-4 East (GM-19S **Figure A-3**). These figures also show a comparison of degradation end-products ethane and ethene to VOCs per performance well based on molar weight equivalence.

The following bullets summarize the observations and trends evident among the reactive zones at the Site which indicate that enhanced reduction of the targeted chlorinated VOCs is progressing as a result of the carbon introduction process:

- Degradation of the chlorinated VOCs was sustained throughout 2018 within the RZ-1 treatment area. The total chlorinated VOC concentrations in GM-29 increased slightly in 2018 compared to 2017 (814 micrograms per liter [ug/L] in 2017 and 815 ug/L in 2018). The 2018 concentrations were primarily associated with cis-1,2-DCE (420 ug/L), TCE (310 ug/L), vinyl chloride (41 ug/L), and PCE (13 ug/L), which were all above their respective MCLs. Concentrations of ethene and ethane were 7.4 ug/L and 110 ug/L, respectively. The fluctuation in total chlorinated VOCs is consistent with the range observed over the last 5 years, and the observation of both daughter and end products demonstrates that complete transformation of the parent species to is being achieved.
- Total chlorinated VOC concentrations in GM-28R were 8.0 ug/L in 2018 and were primarily associated with PCE (3.5 ug/L) and cis-1,2-DCE (3.5 ug/L), both below their respective MCLs. The concentration of ethene and ethane were 2.2 ug/L and 1.2 ug/L, respectively. These concentrations demonstrate that transformation of the parent species to daughter products is ongoing and complete transformation is being achieved. VOC concentration totals in 2018 (8.0 ug/L) were consistent with the VOC concentration totals observed in 2017 (11.9 ug/L).
- Total chlorinated VOC concentrations in GM-23 decreased from 1,007 ug/L in 2017 to 509 ug/L in 2018. Total chlorinated VOC concentrations in GM-23 have fluctuated within a similar range for the past five years. The 2018 concentrations were primarily associated with cis-1,2-DCE (260 ug/L), vinyl chloride (210 ug/L), and PCE (8.4 ug/L), which were above their respective MCLs. These concentrations demonstrate that transformation of the parent species to daughter products is ongoing in close proximity to this well location. This is confirmed by the observation of ethene and ethane (26 ug/L and 95 ug/L, respectively), which demonstrates that complete transformation is being achieved (**Figure A-1**).

- Concentrations of total chlorinated VOCs at RZ-3 West monitoring well GM-8 remained stable in 2018 (2.98 ug/L) compared to 2017 (1.6 ug/L). These data continue to document the effectiveness of the carbon injections at RZ-3 West. Concentrations of ethene and ethane were 0.015 J ug/L and 30 ug/L, respectively, and demonstrate complete transformation from parent products to end products is being achieved.
- Concentrations of total chlorinated VOCs at RZ-3 East monitoring well GM-21 increased in 2018 (52.8 ug/L) to levels similar to concentrations observed in 2017 (43.6 ug/L). The 2018 concentrations were primarily associated with cis-1,2-dichloroethene (23 ug/L) which was below the MCL as well as vinyl chloride (15 ug/L), which was above the MCL. Ethene and ethane (5.7 ug/L and 7.5 ug/L, respectively) concentrations demonstrate that complete transformation of residual VOC concentrations is being achieved (**Figure A-2**).
- Degradation of the chlorinated VOCs was sustained throughout 2018 downgradient of the RZ-4 East treatment area. The total VOC concentration reported in monitoring well GM-19S remained stable during 2018 (45.5 ug/L) as compared to the 2017 concentration of 47.7 ug/L. The 2018 concentrations were primarily associated with cis-1,2-DCE (31 ug/L). Concentrations of vinyl chloride (8.8 ug/L) were above the MCL. These concentrations demonstrate that transformation of the parent species to daughter products is ongoing, but the lack of ethane and ethene indicate that complete transformation has not yet occurred.

Conclusions

The following observations and conclusions can be made:

- Aquifer conditions were strongly reducing within and downgradient of the reactive zones due to the introduction of carbohydrate, as evidenced by the presence of methane at concentrations significantly about background data.
- The target compounds (PCE and TCE) were reduced to daughter products (cis-1,2-DCE and vinyl chloride) and ultimately to end products (ethene and ethane) based on the VOC and light hydrocarbon data.
- Enhanced reductive dechlorination continued to achieve the desired reduction of VOC concentrations in groundwater.
- No significant change in anaerobic conditions (e.g., the concentration of methane) or treatment effectiveness (e.g., sustained reductions in chlorinated VOC concentrations with the observation of elevated ethene and/or ethane) were observed as a result of decreasing the injection frequency to quarterly and decreasing the injection well network.
- Considering the anticipated modifications to the overall remedial strategy for the Site, it is recommended that active injections be suspended on an interim basis to prepare groundwater conditions for the new treatment approach. This suspension is recommended to allow for: a) further assessment of TOC longevity within the site IRZs; b) initiation of the redox restoration

process that can support burn out of the active IRZs and oxidation of reduced metals (e.g., iron and manganese) that may complicate ex-situ treatment once the new design is installed; and c) an evaluation of residual VOC concentrations in key IRZs that may be observed following cessation of the injection activities. It should be noted that the interim suspension of the IRZ injections may be modified based on the timing of the proposed remedy approval and installation and changes in VOC concentrations (i.e., increases) that may prompt continuation of injection activities.

The 2019 IRZ performance monitoring program will be similar to the 2018 program. The only significant change will be the frequency of monitoring events, which will increase from annual to semi-annual. The data will be reviewed semi-annually to determine if there is a significant rebound in VOC concentrations to the extent that the conceptual design of the diffuse groundwater plume treatment system would significantly change without the interim IRZ program. If concentrations increase to the extent that changes to the remedial design for the diffuse plume become likely, the IRZ program will resume. If the overall changes to the site-specific VOC data indicate an immaterial effect on the diffuse groundwater plume system design, the IRZ program will remain suspended.

References

Arcadis, Inc. 2014. In-Situ Reactive Zone Interim Measure Injection Frequency Evaluation, RACER Trust, Moraine, Ohio. May 2014.

Arcadis Geraghty & Miller, Inc. 2002. Site-Wide Groundwater Monitoring Plan, General Motors Corporation, Moraine, Ohio. May 2002.

Table A-1
TOC Data in the Reactive Zone
RACER Trust
Moraine, Ohio

Monitoring Location	Date	Days Since Injection	TOC (mg/L)
RZ-3D	12/11/2013	0	3200
	1/9/2014	29	940
	2/11/2014	62	720
RZ-3S	12/11/2013	0	2600
	1/9/2014	29	1800
	2/11/2014	62	980
RZ-3TT	12/11/2013	0	3600
	1/9/2014	29	1900
	2/11/2014	62	370
RZ-1E	12/11/2013	0	2800
	1/9/2014	29	560
	2/11/2014	62	420
RZ-4E	12/11/2013	0	2300
	1/9/2014	29	1300
	2/11/2014	62	840

NOTES:

mg/L - Milligrams per Liter.

TOC - Total Organic Carbon.

Table A-2
Reactive Zone TOC Decay and Required Carbon Introduction Frequency
RACER Trust
Moraine, Ohio

ARCADIS Design & Consultancy for natural and built assets

			Calculated Half-life	Estimated Days to Reach 20 mg/L from Last Sampling Date (t)(2)	Required Injection Frequency(3)
Monitoring Location	Recent Injection Date	Recent Sample Collection Date	k (day-1) (1)	(days)	(months)
RZ-3D	12/9/2013	2/11/2014	0.0237	151.20	7.17
RZ-3S	12/9/2013	2/11/2014	0.0158	308.07	12.40
RZ-3TT	12/6/2013	2/11/2014	0.037	121.62	6.29
RZ-1E	12/9/2013	2/11/2014	0.0301	129.30	6.44
RZ-4E	12/10/2013	2/11/2014	0.0162	320.55	12.79
				Average (months) =	9.02

NOTES:

(1) t = -(1/k)LN(C/C0)

C - target TOC concentration to trigger injection (i.e., 20 mg/L)

C0 - TOC cocentration from the previous sampling event

(2) Slope from k-value plots.

(3) Required injection frequency = t + days between December 2013 injection event and February 2014 TOC sampling event.

mg/L - Milligrams per Liter.

TOC - Total Organic Carbon.

Table A-3
Summary of Annual Groundwater Analytical Results from Reactive Zone 1 Wells
RACER Trust
Moraine, Ohio

ARCADIS Design & Consultancy for natural and built assets

RZ-1			GM-29												
Constituents	**Units**	**MCL[1]**	**9/1/99**	**2/22/00**	**5/26/00**	**9/21/00**	**3/20/01**	**6/26/01**	**11/13/01**	**12/12/01**	**6/13/02**	**9/25/02**	**5/22/03**	**9/24/03**	**9/15/04**
Volatile Organic Compounds															
1,1,1-Trichloroethane	ug/L	200	37.8	36.0	32.5	24.5	27.0	23.8 J	<50 U	19 J	17	16 J	<50 U	18 J	21 J
1,1-Dichloroethane	ug/L	--	4.3	4.1	6.3	16.6	10.8	6.3 J	<50 U	<50 U	<50 U	<40 U	<50 U	<33 U	<50 U
1,1-Dichloroethene	ug/L	7	1.3	1.1	1.6	3.1	3.5	3.0 J	<50 U	<50 U	<50 U	<40 U	<50 U	<33 U	<50 U
Benzene	ug/L	5	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 UJ	<50 U	<50 U	<50 U	<40 U	<50 U	<33 U	<50 U
cis-1,2-Dichloroethene	ug/L	**70**	**320**	**223**	**1,190J**	**2,871**	**2,170**	**2,050 J**	**1,800**	**1,800**	**1,600**	**1,300**	**950**	**1,200**	**1,200**
Ethylbenzene	ug/L	700	<1.0 U	1.4	<1.0	<1.0	<1.0 U	<1.0U J	21 J	<50 U	<50 U	<40 U	<50 U	<33 U	<50 U
Tetrachloroethene	ug/L	**5**	<20	**38.7**	**24.6**	**20.0**	**24.4**	**24.8 J**	**17 J**	**22 J**	**22**	**18 J**	**47J**	**18 J**	**20 J**
Toluene	ug/L	1000	<1.0 U	<1.0 U	<1.0 U	2.2	<1.0 U	<1.0 UJ	<50 U	<50 U	<50 U	<40 U	<50 U	<33 U	<50 U
trans-1,2-Dichloroethene	ug/L	100	11.1	9.1	8.9	14.4	20.4	25.6 J	26	24 J	21	21	<25 U	20	21 J
Trichloroethene	ug/L	**5**	**878**	**758**	**649 J**	**289**	**354**	**437 J**	**270**	**320**	**380**	**310**	**280**	**390**	**440**
Vinyl chloride	ug/L	**2**	**3.8**	1.0	1.7	**788**	**362**	**276 J**	**230**	**280**	**140**	**140**	**99**	**150**	**230**
Xylenes	ug/L	10,000	<1.0 U	6.0	<1.0 U	<1.0 U	<1.0 U	<1.0 UJ	52	<50 U	<50 U	<40 U	<50 U	<33 U	<50 U
Total VOCs	**ug/L**		**1,256**	**1,078**	**1,915**	**4,029**	**2,972**	**2,847**	**2,416**	**2,465**	**2,180**	**1,805**	**1,376**	**1,796**	**1,932**

RZ-1	GM-29													
Constituents	**10/17/05**	**9/28/06**	**9/26/07**	**10/6/08**	**11/17/09**	**9/29/10**	**9/30/11**	**9/26/12**	**9/27/13**	**10/9/14**	**12/8/15**	**8/22/16**	**8/17/17**	**7/25/18**
Volatile Organic Compounds														
1,1,1-Trichloroethane	19 J	17 J	15 J	12 J	18	11 J	11 J	10 J	15	9.1 J	9.9	10	9.6	8.1
1,1-Dichloroethane	18 J	15 J	15 J	11 J	12	11 J	8.5 J	8.2 J	12	9.5 J	10	10	13	10
1,1-Dichloroethene	<50 U	<33 U	<50 U	<33 U	<10 U	<20 U	<13 U	<20 U	1.7	<14 U	1.2 J	<2.0 U	1.0 J	<2.0 U
Benzene	<50 U	<33 U	<50 U	<33 U	<10 U	<20 U	< 13 U	<20 U	0.20 J	<14 U	<1.7 U	<2.0 U	< 2.0 U	<2.0 U
cis-1,2-Dichloroethene	**1,600**	**1,300**	**1,200**	**900**	**600**	**660**	**470**	**520**	**530**	**480**	**440**	**470**	**430**	**420**
Ethylbenzene	<50 U	<33 U	<50 U	<33 U	<10 U	<20 U	<13 U	<20 U	<1.0 U	<14 U	<1.7 U	<2.0 U	< 2.0 U	<2.0 U
Tetrachloroethene	**15 J**	**15 J**	**18 J**	**17 J**	**21 J**	**17 J**	**13**	**14 J**	**15**	**12 J**	**11**	**13**	**11**	**13**
Toluene	<50 U	<33 U	<50 U	<33 U	<10 U	<20 U	<13 U	<20 U	<1.0 U	<14 U	<1.7 U	<2.0 U	< 2.0 U	<2.0 U
trans-1,2-Dichloroethene	27 J	20 J	19 J	16 J	20	19 J	17	15 J	20	15	15	14	16	13
Trichloroethene	**390**	**310**	**350**	**300**	**370**	**330**	**320**	**310**	**280**	**260**	**270**	**360**	**280**	**310**
Vinyl chloride	**490**	**210**	**290**	**150**	**70**	**59**	**52**	**45**	**60**	**40**	**48**	**42**	**53**	**41**
Xylenes	<100 U	<67 U	<100 U	<67 U	<20 U	<40 U	<25 U	<40 U	<2.0 U	<29 U	<3.3 U	<4.0 U	< 4.0 U	<4.0 U
Total VOCs	**2,559**	**1,887**	**1,907**	**1,406**	**1,111**	**1,107**	**892**	**922**	**934**	**826**	**805**	**919**	**814**	**815**

NOTES:
< - Constituent not detected above laboratory reporting limit shown.
(1) MCL not listed for 1,1-dichloroethene.
(2) Well GM-28R was installed on December 28, 2015.
Bold - Result above MCL.
Carbon source introductions began in December 1999.
J - Value is estimated.
MCL - Maximum Contaminant Level.
ug/L - Micrograms per Liter.
Samples collected in September and October 1999 represent baseline conditions.
UJ - Constituent not detected above laboratory reporting limit; reporting limit estimated.
U - Constituent not detected above laboratory reporting limit shown.

Table A-3
Summary of Annual Groundwater Analytical Results from Reactive Zone 1 Wells
RACER Trust
Moraine, Ohio

ARCADIS Design & Consultancy for natural and built assets

RZ-1 Constituents	Units	MCL[1]	GM-23 9/2/99	2/21/00	5/31/00	9/20/00	3/20/01	6/26/01	11/12/01	12/12/01	6/13/02	9/26/02	5/22/03	9/23/03	9/14/04
Volatile Organic Compounds															
1,1,1-Trichloroethane	ug/L	200	7.2	<50 U	< 20	2.0	3.1	1.5	<420 U	<500 U	<330 U	<400 U	< 620 U	<500 U	<500 U
1,1-Dichloroethane	ug/L		32.5	<50 U	12.8 J	16.3	17.9	3.7	<420 U	<500 U	<330 U	<400 U	< 620 U	<500 U	<500 U
1,1-Dichloroethene	ug/L	7	**17.2**	<50 U	6.6 J	5.1	**15.9**	**16.3**	<420 U	<500 U	<330 U	<400 U	< 620 U	<500 U	<500 U
Benzene	ug/L	5	1.9	<50 U	<20 U	<1.0 U	1.4	<1.0 U	<420 U	<500 U	<330 U	<400 U	< 620 U	<500 U	<500 U
cis-1,2-Dichloroethene	ug/L	**70**	**7,530**	**10,400 D**	**4,080 J**	**5,620**	**9,640**	**11,000**	**8,400**	**7,200**	**9,900**	**7,700**	**6,800**	**5,800**	**4,600**
Ethylbenzene	ug/L	700	<1.0 U	<50	<20 U	<1.0 U	<1.0 U	<1.0 U	<420 U	<500 U	<330 U	<400 U	< 620 U	<500 U	<500 U
Tetrachloroethene	ug/L	**5**	**6,250**	**7,280 J**	**6,200 J**	**3,470**	**2,910**	**8,600**	**15,000**	**14,000**	**8,400**	**10,000**	**12,000**	**12,000**	**6,700**
Toluene	ug/L	1000	<1.0 U	<50 U	<20 U	<1.0 U	<1.0 U	2.3	<420 U	<500 U	<330 U	<400 U	< 620 U	<500 U	<500 U
trans-1,2-Dichloroethene	ug/L	100	54.5	118 J	39.8 J	33.2	85.5	60.8	<210 U	<250 U	<170 U	<200 U	< 310 U	< 250 U	< 250 U
Trichloroethene	ug/L	**5**	**1,460**	**1,350 D**	**1,480 J**	**609**	**745**	**1,780 J**	**2,200**	**2,100**	**1,900**	**1,700**	**1,500**	**1,600**	**1,100**
Vinyl chloride	ug/L	**2**	**2,500**	**2,420 J**	**140 J**	**801**	**765**	**68**	**1200**	<500 U	**810**	**540**	**1700**	**690**	**870**
Xylenes	ug/L	10,000	<1.0 U	<50 U	<20 U	<1.0 U	<1.0 U	1.4	<420 U	<500 U	<330 U	<400 U	< 620 U	<500 U	<500 U
Total VOCs	**ug/L**		**17,853**	**21,568**	**11,959**	**10,557**	**14,184**	**21,534**	**26,800**	**23,300**	**21,010**	**19,940**	**22,000**	**20,090**	**13,270**

RZ-1 Constituents	GM-23 10/17/05	9/28/06	9/27/07	10/23/08	11/17/09	9/29/10	9/29/99	2/22/00	5/26/00	9/30/11	9/7/12	9/27/13	10/10/14	12/8/15	8/22/16	8/17/17	7/26/18
Volatile Organic Compounds																	
1,1,1-Trichloroethane	<560 U	<330 U	<200 U	<62 U	<20 U	<22 U	<1.0	<50	<5.0	<20 U	<25 U	<1.0 U	<10 U	<1.0 U	<2.0 U	< 2.0 U	<1.0 U
1,1-Dichloroethane	<560 U	<330 U	<200 U	<62 U	5.0 J	<22 U	<1.0	<50	<5.0	<20 U	<25 U	2.6	8.4 J	15	8.6	5.4	8.0
1,1-Dichloroethene	<560 U	<330 U	<200 U	<62 U	<20 U	<22 U	<1.0	<50	<5.0	<20 U	<25 U	1.7	<10 U	0.47 J	1.1 J	1.4 J	0.81 J
Benzene	<560 U	<330 U	<200 U	<62 U	<20 U	<22 U	<1.0	<50	<5.0	<20 U	<25 U	0.28 J	<10 U	0.69 J	<2.0 U	< 2.0 U	0.47 J
cis-1,2-Dichloroethene	**19,000**	**11,000**	**4,700**	**2,000**	**1,100**	**490**	**14.8**	**306**	**161**	**580**	**580**	**470**	**210**	**100**	**530**	**580**	**260**
Ethylbenzene	<560 U	<330 U	<200 U	<62 U	<20 U	<22 U	<1.0	<50	2.0	<20 U	<25 U	<1.0 U	<10 U	<1.0 U	<2.0 U	< 2.0 U	<1.0 U
Tetrachloroethene	**2,300**	**370**	**280**	**71**	**19 J**	**50**	**91.5**	**50.5**	**17.5**	**57**	**33**	**37**	3.6 J	0.58 J	**8.0**	**30**	**8.4**
Toluene	<560 U	<330 U	<200 U	<62 U	<20 U	<22 U	<1.0	<50	1.1J	<20 U	<25 U	<1.0 U	<10 U	<1.0 U	<2.0 U	< 2.0 U	0.16 J
trans-1,2-Dichloroethene	<560 U	270 J	130 J	58 J	31	16 J	<1.0	<50	<5.0	21	21 J	15	20	13	18	22	16
Trichloroethene	**490 J**	**95 J**	**82 J**	<62 U	**8.3 J**	**17 J**	**44.1**	**<50**	**13.8**	**33**	**15 J**	**28**	4.1 J	5.0	**7.6**	**8.6**	5.0
Vinyl chloride	**2,800**	**4,100**	**2,600**	**2,100**	**1,100**	**500**	**<1.0**	**<50**	**136.0**	**840**	**390**	**210**	**220**	**120**	**280**	**360**	**210**
Xylenes	<1100 U	< 670 U	<400 U	<120 U	<40 U	<44 U	<1.0	<50	<5.0	<40 U	<50 U	<2.0 U	<20 U	<2.0 U	<4.0 U	< 4.0 U	<2.0 U
Total VOCs	**24,590**	**15,835**	**7,792**	**4,229**	**2,263**	**1,073**	**150**	**357**	**331**	**1,531**	**1,039**	**764**	**466**	**255**	**853**	**1,007**	**509**

NOTES:
< - Constituent not detected above laboratory reporting limit shown.
(1) MCL not listed for 1,1-dichloroethene.
(2) Well GM-28R was installed on December 28, 2015.
Bold - Result above MCL.
Carbon source introductions began in December 1999.
J - Value is estimated.
MCL - Maximum Contaminant Level.
ug/L - Micrograms per Liter.
Samples collected in September and October 1999 represent baseline conditions.
UJ - Constituent not detected above laboratory reporting limit; reporting limit estimated.
U - Constituent not detected above laboratory reporting limit shown.

Table A-3
Summary of Annual Groundwater Analytical Results from Reactive Zone 1 Wells
RACER Trust
Moraine, Ohio

RZ-1 Constituents	Units	MCL[1]	GM-28 9/1/99	2/23/00	5/26/00	9/21/00	3/20/01	6/26/01	11/15/01	12/12/01	7/21/02	9/24/02	5/23/03
Volatile Organic Compounds													
1,1,1-Trichloroethane	ug/L	200	17.7	23.2	18.1	5.0	<1.0 U	<1.0 U	<10 U	<5.0 UJ	<4.0 U	<1.0 U	<1.0 U
1,1-Dichloroethane	ug/L		3.3	4.2	11.8	9.9	<1.0 U	<1.0 U	<10 U	<5.0 UJ	<4.0 U	2.7	4.2
1,1-Dichloroethene	ug/L	7	<1.0 U	<1.0 U	3.8	<1.0 U	<1.0 U	<1.0 U	<10 U	<5.0 UJ	<4.0 U	<1.0 U	<1.0 U
Benzene	ug/L	5	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<10 U	<5.0 UJ	<4.0 U	<1.0 U	<1.0 U
cis-1,2-Dichloroethene	ug/L	**70**	**175**	**503**	**2,700**	37.0	7.7	**352**	<5.0 U	<2.2 UJ	<2.0 U	1.1	0.66
Ethylbenzene	ug/L	700	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<10 U	<5.0 UJ	<4.0 U	<1.0 U	<1.0 U
Tetrachloroethene	ug/L	**5**	**316**	**88.4**	**30.2**	2.3	2.8	<1.0 U	<10 U	<5.0 UJ	<4.0 U	<1.0 U	0.95 J
Toluene	ug/L	1000	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<10 U	<1.8UJ	<4.0 U	<1.3	1.0
trans-1,2-Dichloroethene	ug/L	100	9.2	9.7	36.5	22.3	17.6	<1.0 U	11	11 J	8.6	11	9.2
Trichloroethene	ug/L	**5**	**768**	**833**	**14.8**	1.6	1.8	<1.0 U	<10 U	<5.0 UJ	<4.0 U	0.86J	3.1
Vinyl chloride	ug/L	**2**	**3.2**	<1.0 U	1.9	**12.4**	**2.6**	<1.0 U	<10 U	<5.0 UJ	<4.0 U	<1.0 U	<1.0 U
Xylenes	ug/L	10,000	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<10 U	<5.0 UJ	<4.0 U	<1.2 U	0.87 J
Total VOCs	**ug/L**		**1,292**	**1,462**	**2,817**	**90.5**	**32.5**	**352**	**11.0**	**11.0**	**8.60**	**15.7**	**20.0**

RZ-1 Constituents	Units	MCL[1]	GM-28 10/1/03	4/30/04	9/15/04	10/18/05	9/27/06	9/20/07	10/22/08	11/16/09	9/28/10	10/5/11	GM-28R[2] 12/28/15	8/22/16	8/17/17	7/25/18
Volatile Organic Compounds																
1,1,1-Trichloroethane	ug/L	200	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	< 5 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	< 1.0 U	<1.0 U
1,1-Dichloroethane	ug/L		3.3	3.5	3.3	4.0	4.2	4.6	2.2 J	3.6	4.6	2.1	0.55 J	<1.0 U	0.25 J	<1.0 U
1,1-Dichloroethene	ug/L	7	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	< 5 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	< 1.0 U	<1.0 U
Benzene	ug/L	5	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	< 5 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	< 1.0 U	<1.0 U
cis-1,2-Dichloroethene	ug/L	**70**	0.58	0.45 J	0.41 J	0.32 J	0.26 J	0.72 J	6.9	2.3	2.1	0.72 J	5.6	13	6.0	3.5
Ethylbenzene	ug/L	700	0.28 J	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	< 5 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	< 1.0 U	<1.0 U
Tetrachloroethene	ug/L	**5**	<1.0 U	<1.0 U	0.88 J	<1.0 U	<1.0 U	<1.0 U	< 5 U	<1.0 U	<1.0 U	0.63 J	**49**	1.3	4.6	3.5
Toluene	ug/L	1000	1.0	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	< 5 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	< 1.0 U	<1.0 U
trans-1,2-Dichloroethene	ug/L	100	4.0	2.2	1.2	0.63 J	0.66 J	0.58 J	1.3 J	1.7	1.5	0.69 J	0.38 J	0.31 J	< 1.0 U	<1.0 U
Trichloroethene	ug/L	**5**	1.6	1.6	1.4	0.66 J	0.43 J	0.51 J	< 5 U	0.58 J	<1.0 U	0.41 J	**24**	0.29 J	0.33 J	0.30 J
Vinyl chloride	ug/L	**2**	0.53 J	<1.0 U	0.44 J	1.1	0.42 J	1.2	**6.5**	**3.3**	**2.2**	0.57 J	0.99 J	<1.0 U	0.72 J	0.70 J
Xylenes	ug/L	10,000	1.6	<1.0 U	<1.0 U	<2.0 U	<2.0 U	<2.0 U	<10 U	<2.0 U	<2.0 U	<2.0 U	<2.0 U	<2.0 U	< 2.0 U	< 2.0 U
Total VOCs	**ug/L**		**12.9**	**7.75**	**7.63**	**6.71**	**5.97**	**7.61**	**16.9**	**11.5**	**10.4**	**5.12**	**80.5**	**14.9**	**11.9**	**8.0**

NOTES:
< - Constituent not detected above laboratory reporting limit shown.
(1) MCL not listed for 1,1-dichloroethene.
(2) Well GM-28R was installed on December 28, 2015.
Bold - Result above MCL.
Carbon source introductions began in December 1999.
J - Value is estimated.
MCL - Maximum Contaminant Level.
ug/L - Micrograms per Liter.
Samples collected in September and October 1999 represent baseline conditions.
UJ - Constituent not detected above laboratory reporting limit; reporting limit estimated.
U - Constituent not detected above laboratory reporting limit shown.

Table A-4
Summary of Annual Groundwater Analytical Results from Reactive Zone 3 West Wells
RACER Trust
Moraine, Ohio

RZ-3 West			GM-8																				
Constituents	**Units**	**MCL[1]**	**3/6/98**	**9/20/99**	**9/26/00**	**11/9/01**	**9/20/02**	**10/1/03**	**9/14/04**	**10/19/05**	**9/19/06**	**9/18/07**	**9/23/08**	**11/16/09**	**9/27/10**	**9/29/11**	**9/6/12**	**9/26/13**	**10/7/14**	**12/8/15**	**8/22/16**	**8/16/17**	**7/24/18**
Volatile Organic Compounds																							
1,1,1-Trichloroethane	ug/L	200	6.7	1.9	<1.0 U	0.40 J	<2.0 U	<2.0 U	<1.0 U	<1.0 U	<5.0 U	<2.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U
1,1-Dichloroethane	ug/L	--	49.3	30.2	36.5	40	63	48	15	16	18	9.1	1.7	2.9	3.0	1.9	0.66 J	0.88 J	0.59 J	0.43 J	0.37 J	.44 J	0.47 J
1,1-Dichloroethene	ug/L	7	1.0	<1.0 U	<1.0 U	<1.0 U	<2.0 U	<2.0 U	<1.0 U	<1.0 U	<5.0 U	<2.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U
Benzene	ug/L	5	2.3	3.4	1.1	0.78 J	**5.5**	**5.4**	4.2	3.5	2.1 J	2.4	**6.8**	3.9	4.7	3.5	3.5	1.9	1.2	<1.0 U	0.79 J	0.86 J	1.3
cis-1,2-Dichloroethene	ug/L	70	56.1	26.2	1.5	2.0	5.5	<1.0 U	<0.5 U	0.24 J	2.1 J	<2.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	0.27 J	0.23 J	0.31 J	<1.0 U	<1.0 U	0.30 J
Ethylbenzene	ug/L	700	28.9	20.7	12.5	0.40 J	7.5	11	19	29	<5.0 U	1.7 J	8.6	5.5	0.33 J	5.4	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U
Tetrachloroethene	ug/L	5	**20.0**	**14.8**	<1.0 U	<1.0 U	<2.0 U	<2.0 U	<1.0 U	<1.0 U	<5.0 U	<2.0 U	<1.0 U	0.34 J	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U
Toluene	ug/L	1000	<1.0 U	<1.0 U	<1.0 U	<1.0 U	1.8 J	1.2 J	<1.0 U	0.39 J	<5.0 U	<2.0 U	<1.0 U	0.13 J	0.18 J	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U
trans-1,2-Dichloroethene	ug/L	100	10.1	12.0	5.4	3.6	9	4.4	1.1	0.99 J	1 J	0.9 J	0.27 J	0.22 J	0.29 J	0.20 J	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U
Trichloroethene	ug/L	5	**95.2**	**30.4**	**6.6**	4.4	<2.0	<2.0 U	<1.0 U	<1.0 U	<5.0 U	<2.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	0.21 J	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U
Vinyl chloride	ug/L	2	**10.1**	**8.4**	**2.4**	1.9	**5.8**	<2.0 U	0.48 J	0.73 J	3.2 J	<2.0 U	0.48 J	<1.0 U	0.44 J	0.24 J	<1.0 U	< 1.0 U	0.58 J	0.53 J	<1.0 U	<1.0 U	0.91 J
Xylenes	ug/L	10,000	10.3	2.3	1.9	0.39 J	1.5 J	2.0	1.1	<2.0 U	<10 U	0.9 J	3.9	1.3 J	<2.0 U	0.99 J	<2.0 U	<2.0 U	<2.0 U	<2.0 U	<2.0 U	0.31 J	<2.0 U
Total VOCs	**ug/L**		**290**	**150**	**67.9**	**53.9**	**99.6**	**72**	**40.9**	**50.9**	**26.4**	**15**	**21.8**	**14.3**	**8.94**	**12.2**	**4.16**	**3.26**	**2.60**	**1.27**	**1.16**	**1.61**	**2.98**

NOTES:
< - Constituent not detected above laboratory reporting limit shown.
(1) MCL not listed for 1,1-dichloroethene.
Bold - Result above MCL.
Carbon source introductions began in December 1999.
J - Value is estimated.
MCL - Maximum Contaminant Level.
ug/L - Micrograms per Liter.
Samples collected in September and October 1999 represent baseline conditions.
UJ - Constituent not detected above laboratory reporting limit; reporting limit estimated.
U - Constituent not detected above laboratory reporting limit shown.

Table A-5
Summary of Annual Groundwater Analytical Results from Reactive Zone 3 East Wells
RACER Trust
Moraine, Ohio

ARCADIS Design & Consultancy for natural and built assets

RZ-3 East			GM-21																									
Constituents	**Units**	**MCL[1]**	**9/22/99**	**2/23/00**	**5/26/00**	**9/22/00**	**3/19/01**	**6/25/01**	**11/13/01**	**12/11/01**	**6/12/02**	**9/25/02**	**5/22/03**	**9/24/03**	**9/14/04**	**10/17/05**	**9/20/06**	**12/1/06**	**9/26/07**	**10/3/08**	**11/16/09**	**9/28/10**	**9/29/11**	**9/7/12**	**9/26/13**	**10/9/14**	**12/11/15**	**8/22/16**	**8/17/17**	**7/25/18**
Volatile Organic Compounds																														
1,1,1-Trichloroethane	ug/L	200	53.1	15.4	27.9	15.7	7.0	7.7	6.9	1.2	23	31	18	31	26	4.3	12	4.7	8.5	8.7	2.4	0.75 J	1.0	<2.0 U	<1.0 U	<1.0 U	<2.0 U	<1.0 U	< 1.0 U	< 1.0 U
1,1-Dichloroethane	ug/L		9.0	5.8	6.8	5.6	5.1	4.1	3.8J	0.71 J	5.4	5.0 J	4.1 J	6.9 J	4.2 J	3.4	8.6	6.4	18	15	22	20	16	18	9.5	16	12	<1.0 U	11	9.3
1,1-Dichloroethene	ug/L	7	3.9	1.6	2.4	1.6	1.2	<1.0 U	<5.0 U	<1.0 U	3.6	2.6 J	<6.7 U	2.0 J	3.1 J	<1.0 U	0.19 J	0.2 J	< 1.4 U	0.33 J	<1.0 U	<1.0 U	<1.0 U	<2.0 U	<1.0 U	<1.0 U	<2.0 U	<1.0 U	< 1.0 U	< 1.0 U
Benzene	ug/L	5	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<5.0 U	<1.0 U	<6.0 U	<6.7 U	<6.7 U	<8.0 U	<9.1 U	<1.0 U	<1.0 U	<1.0 U	< 1.4 U	< 1.4 U	<1.0 U	<1.0 U	<1.0 U	<2.0 U	<1.0 U	<1.0 U	<2.0 U	<1.0 U	< 1.0 U	< 1.0 U
cis-1,2-Dichloroethene	ug/L	70	66.4	35.9	47.8	38.7	39.5	37.8	39	6.5	48	43	**130**	**100**	56	20	14	8.2	26	38	7.8	3.9	9.9	8.5	5.1	12	22	<1.0 U	19	23
Ethylbenzene	ug/L	700	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<5.0 U	<1.0 U	<6.0 U	<6.7 U	<6.7 U	<8.0 U	<9.1 U	<1.0 U	<1.0 U	<1.0 U	< 1.4 U	< 1.4 U	<1.0 U	<1.0 U	<1.0 U	<2.0 U	<1.0 U	<1.0 U	<2.0 U	<1.0 U	< 1.0 U	< 1.0 U
Tetrachloroethene	ug/L	5	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<5.0 U	<1.0 U	<6.0 U	<6.7 U	<6.7 U	<8.0 U	<9.1 U	<1.0 U	<1.0 U	<1.0 U	< 1.4 U	0.56 J	<1.0 U	<1.0 U	<1.0 U	<2.0 U	<1.0 U	<1.0 U	<2.0 U	<1.0 U	< 1.0 U	< 1.0 U
Toluene	ug/L	1000	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<5.0 U	<1.0 U	<6.0 U	<6.7 U	<6.7 U	<8.0 U	<9.1 U	<1.0 U	<1.0 U	<1.0 U	< 1.4 U	< 1.4 U	<1.0 U	<1.0 U	<1.0 U	<2.0 U	<1.0 U	<1.0 U	<2.0 U	<1.0 U	< 1.0 U	< 1.0 U
trans-1,2-Dichloroethene	ug/L	100	7.8	9.3	7.4	12.9	16.4	15.7	15	2.8	8.3	5.1	2.2J	2.9J	7.9	22	4.3	4.8	2.5	4.7	4.4	3	1.9	1.7 J	1.1	1.6	1.6 J	<1.0 U	1.5	1.6
Trichloroethene	ug/L	5	**28.7**	**283**	**311**	**189**	**169**	**158**	**160**	**28**	**210**	**230**	**79**	**200**	**180**	1.8	**5.9**	0.8 J	2.8	**18**	2.4	3.2	**19**	**14**	**12**	**18**	**16**	<1.0 U	2.4	3.9
Vinyl chloride	ug/L	2	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<5.0 U	<1.0 U	<6.0 U	<6.7 U	<6.7 U	<8.0 U	<9.1 U	**13**	**9.3**	**4.7**	**12**	**19**	**6.6**	**3.6**	**6.2**	**5.1**	**3.8**	**5.8**	**8.9**	<1.0 U	**9.7**	**15**
Xylenes	ug/L	10000	<1.0 U	2.3	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<5.0 U	<1.0 U	<6.0 U	<6.7 U	<6.7 U	<8.0 U	<9.1 U	<2.0 U	<2.0 U	<2.0 U	<'2.9 U	< 2.9 U	<2.0 U	<2.0 U	<2.0 U	<4.0 U	<2.0 U	<2.0 U	<4.0 U	<2.0 U	< 2.0 U	< 2.0 U
Total VOCs	**ug/L**		**169**	**353**	**403**	**264**	**238**	**223**	**225**	**39.2**	**298**	**317**	**233**	**343**	**277**	**64.5**	**54.3**	**29.8**	**69.8**	**104**	**45.6**	**34.5**	**54.0**	**47.3**	**31.5**	**53.4**	**60.5**	**0.0**	**43.6**	**52.8**

NOTES:
< - Constituent not detected above laboratory reporting limit shown.
(1) MCL not listed for 1,1-dichloroethene.
Bold - Result above MCL.
Carbon source introductions began in December 1999.
MCL - Maximum Contaminant Level.
ug/L - Micrograms per Liter.
J - Value is estimated.
Samples collected in September and October 1999 represent baseline conditions.
UJ - Constituent not detected above laboratory reporting limit; reporting limit estimated.
U - Constituent not detected above laboratory reporting limit shown.

Table A-6
Summary of Annual Groundwater Analytical Results from Reactive Zone 4 East Wells
RACER Trust
Moraine, Ohio

RZ-4 East														GM-19S														
Constituents	**Units**	**MCL[1]**	**9/20/99**	**5/24/00**	**9/22/00**	**3/19/01**	**6/25/01**	**11/12/01**	**6/12/02**	**9/26/02**	**5/21/03**	**09/25/03**	**09/13/04**	**10/18/05**	**09/21/06**	**09/17/07**	**09/23/08**	**11/17/09**	**4/7/10**	**9/27/10**	**9/29/11**	**41158**	**9/26/13**	**10/7/14**	**12/8/15**	**8/22/16**	**8/16/17**	**7/24/18**
Volatile Organic Compounds																												
1,1,1-Trichloroethane	ug/L	200	16	17.9	14.5	11.9	9.6	7.6	7.2	6.3	12	13	14	13	9.7 J	0.59 J	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	< 1.4 U	<1.0 U	<1.0 U	< 1.0 U	< 1.0 U
1,1-Dichloroethane	ug/L		7.7	7.0	4.4	4.1	2.9	2.9 J	3.7	6.3	8.4	8.3	8.1	9.0	7 J	10	13	12	9.6	9.5	10.0	8.4	8.3	7.6	3.1	3.4	2.3	2.3
1,1-Dichloroethene	ug/L	7	1.0	1.1	<1.0 U	<1.0 U	<1.0 U	<3.3 U	0.98	<4.0 U	<4.0 U	1.6 J	1.9 J	1.2 J	<22 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	< 1.4 U	<1.0 U	<1.0 U	< 1.0 U	< 1.0 U
Benzene	ug/L	5	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<3.3 U	0.62	<4.0 U	<4.0 U	<5.0 U	<4.0 U	<1.7 U	<22 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	< 1.4 U	<1.0 U	<1.0 U	< 1.0 U	< 1.0 U
cis-1,2-Dichloroethene	ug/L	70	34.6	42.9	37.6	38.2	31.5	26	28	39	**81**	**89**	61	29	**660**	0.3 J	0.68 J	0.27 J	0.27 J	< 1.0 U	5.3	7.3	26	37	37	44	39	31
Ethylbenzene	ug/L	700	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<3.3 U	<3.3 U	<4.0 U	<4.0 U	<5.0 U	<4.0 U	<1.7 U	<22 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	< 1.4 U	<1.0 U	<1.0 U	< 1.0 U	< 1.0 U
Tetrachloroethene	ug/L	5	**46**	**57.1**	**68**	**67.6**	**71.7**	**64**	**60**	**52**	**62**	**62**	**71**	**95**	**9.1 J**	1.5	0.94 J	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	< 1.4 U	<1.0 U	<1.0 U	< 1.0 U	0.37 J
Toluene	ug/L	1000	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<3.3 U	<3.3 U	<4.0 U	<4.0 U	<5.0 U	<4.0 U	<1.7 U	<22 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	< 1.4 U	<1.0 U	<1.0 U	< 1.0 U	< 1.0 U
trans-1,2-Dichloroethene	ug/L	100	2.3	2.7	2.6	3.0	2.4	2.0	2.3	2.7	2.5	2.9	2.4	1.0 J	10 J	0.29 J	0.52 J	0.37 J	0.45 J	0.46 J	1.1	0.84 J	1.1	0.91 J	0.66 J	0.64 J	0.52 J	0.66 J
Trichloroethene	ug/L	5	**71.1**	**104**	**104**	**107**	**121**	**97**	**110**	**110**	**120**	**140**	**120**	**140**	**11 J**	0.46 J	3	0.22 J	<1.0 U	<1.0 U	<1.0 U	0.30 J	0.46 J	0.81 J	1.3	1.8	1.9	2.4
Vinyl chloride	ug/L	2	<1.0 U	1.4	<1.0 U	<1.0 U	<1.0 U	<3.3 U	0.70	**5.2**	<4.0 U	<5.0 U	<4.0 U	1.8	<22 U	<1.0 U	**9.3**	<1.0 U	<1.0 U	<1.0 U	**12**	**10**	**17**	**15**	**6.4**	**4.6**	**4**	**8.8**
Xylenes	ug/L	10000	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<3.3 U	<3.3 U	<4.0 U	<4.0 U	<5.0 U	<4.0 U	<3.3 U	<44 U	<2.0 U	<2.0 U	<2.0 U	<2.0 U	<2.0 U	<2.0 U	<2.0 U	<2.0 U	< 2.9 U	<2.0 U	<2.0 U	< 2.0 U	< 2.0 U
Total VOCs	**ug/L**		**179**	**234**	**231**	**232**	**239**	**200**	**214**	**222**	**286**	**317**	**278**	**290**	**707**	**13.1**	**27.4**	**12.9**	**10.3**	**10.0**	**28.4**	**26.8**	**52.9**	**61.3**	**48.5**	**54.4**	**47.7**	**45.5**

NOTES:

< - Constituent not detected above laboratory reporting limit shown.

(1) MCL not listed for 1,1-dichloroethene.

Bold - Result above MCL.

Carbon source introductions began in December 1999.

J - Value is estimated.

MCL - Maximum Contaminant Level.

ug/L - Micrograms per Liter.

Samples collected in September and October 1999 represent baseline conditions.

UJ - Constituent not detected above laboratory reporting limit; reporting limit estimated.

U - Constituent not detected above laboratory reporting limit shown.

Table A-7
Bioattenuation Parameter Results for Groundwater Samples Collected in Reactive Zone 1
RACER Trust
Moraine, Ohio

ARCADIS Design & Consultancy for natural and built assets

RZ-1		GM-29												
Constituents	Units	9/1/99	2/22/00	5/26/00	9/21/00	3/20/01	6/26/01	11/13/01	12/12/01	6/13/02	9/25/02	5/22/03	9/24/03	9/15/04
Inorganics & TOC														
Nitrate	mg/L	0.0	0.0	0.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrite	mg/L	0.0	0.0	0.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrogen, Ammonia	mg/L	<0.30 U	<0.30 U	<0.30 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese (Total)	mg/L	0.552	0.136	0.35	0.248	0.203	0.136	0.17 B	0.17	1.5 B	0.18 B	0.67 J	0.20 J	0.17
Manganese (Dissolved)	mg/L	0.13	0.101	0.177	0.125	0.116	0.128	0.17 B	0.15	0.13 B	0.16 B	0.15 J	0.21 J	0.15
Iron (Total)	mg/L	18	1.43	10.1	8.48	5.84	2.52	3.4	3.8	47.8 B	3.8	28.6	4.9	3.2
Iron (Dissolved)	mg/L	0.24	0.13	2.78	3.09	<0.10 U	2.03	3.3	2.9	2.2 B	2.8	2.4	3.6	2.7
Iron (Ferrous)	mg/L	0.02	0.0	2.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sulfate	mg/L	90	126	31	29	31	37	65	48	63	76	91 J	52	14 J
Sulfide	mg/L	<4.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	1.3	<1.0 U	<1.0 U	<1.0 U	0.54 B	1.6	<1.0 U
Total Organic Carbon	mg/L	18	11	22	<1.0 U	7.57	7.3	10	10	8.0	8.0	7.0	9.0	9.0
Chloride	mg/L	254	426	508	373	337	262	600 B	460	490	490	490	560 J	540
Permanent Gases														
Carbon Dioxide	mg/L	46.52	49.87	44.05	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Oxygen	mg/L	1.02	0.66	1.41	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrogen	mg/L	20.29	18.7	15.61	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methane	mg/L	0.012	0.0077	0.00017	1.62	1.30	1.5	0.610	1.2	0.56	1.1	0.6	1.5	3.8
Carbon Monoxide	mg/L	<0.40 U	<0.40 U	<0.40 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Light Hydrocarbon Scan														
Ethane	ng/L	5,641	1,861	751	639	460	17,000	20,000	28,000	14,000	16,000	7,400	9,900	13,000
Ethene	ng/L	9,769	1,275	12,098	441,796	160,000	130,000	230,000	180,000	48,000	140,000	150,000	200,000	1,700,000
Field Parameters														
pH	S.U.	6.99	7.02	6.86	7.24	7.31	7.20	7.47	7.57	7.14	7.22	6.32	6.88	6.85
Specific Conductivity	umhos/cm	1,502	3,044	2,388	1,942	1,733	1,291	2,703	2,860	1,977	2,354	2,303	2,278	2,580
Dissolved Oxygen	mg/L	0.35	0.51	0.45	3.44	8.20	0.40	0.22	0.01	3.57	1.40	1.38	0.13	0.04
Redox Potential	mV	-526.6	19.6	-105.4	-35.0	-158.2	-166.4	-129.7	-168	-122.9	-91.3	-157.8	-118.6	-134
Temperature	^oC	17.8	16.9	17.97	17.64	20.04	20.47	16.42	17.13	19.33	17.63	18.23	16.81	16.4

RZ-1		GM-29																
Constituents	Units	9/29/99	2/22/00	5/26/00	10/17/05	9/28/06	9/26/07	10/6/08	11/17/09	9/29/10	9/30/11	9/26/12	9/27/13	10/9/14	12/8/15	8/22/16	8/17/17	7/25/18
Inorganics & TOC																		
Nitrate	mg/L	0.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.1 U	NA	NA
Nitrite	mg/L	0.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrogen, Ammonia	mg/L	<0.30 U	39.0	37.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.100 UH	NA	NA	NA
Manganese (Total)	mg/L	0.422	18.7	9.78	0.18	1.3	0.3 J	< 0.19 U	0.296	0.451	0.18	0.170	0.190	0.190	0.22	0.14	180	0.15
Manganese (Dissolved)	mg/L	0.203	13.2	10.7	0.14	0.12	0.16 J	< 0.16 U	0.118	0.113	0.11	0.110	0.110	0.130	0.12	0.13	140	0.12
Iron (Total)	mg/L	6.78	566	374	4.6	<1.0 U	8.9	< 5.4 U	13.8	19.6	6.3	5.0	6.5	6.4	7.3	4.4	5.8	4.6
Iron (Dissolved)	mg/L	<0.10 U	366	417	3.7	2.9	3.4	< 3.9 U	3.3	2.97	2.4	2.3	2.4	3.6	4.0	4.1	4.1	3.6
Iron (Ferrous)	mg/L	0.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sulfate	mg/L	61	508	140	51	70	65	< 5 UJ	68	72	64	58	55	41	49	42	43	49
Sulfide	mg/L	<1.0 U	<1.0 U	5.18	<1.0 U	<1.0 U	<1.0 U	<1.0 U	0.56 J	<1.0 U	<1.0 U	0.80 J	<1.0 U	<1.0 U	<1.0 U	<1.0 U	< 1.0 U	<1.0 U
Total Organic Carbon	mg/L	6.0	14,100	5550	11	13	15 J	16	9.0	8.0	8.5	9.4	12	16	12	14	5.9	8.8
Chloride	mg/L	397	1,560	1080	370	380	360 J	<1.0 U	210	160	130	130 B	140	150	150 B	140	140	120
Permanent Gases																		
Carbon Dioxide	mg/L	16.96	999.4	918.87	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Oxygen	mg/L	8.23	0.20	0.17	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrogen	mg/L	14.51	7.13	6.19	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methane	mg/L	0.0043	0.026	0.88	13	10	NA	16	8.1	5.7	3.1	3.7	4.5	6.0	5.9	6.7	6.2	4.0
Carbon Monoxide	mg/L	NA	<0.40 U	<0.40 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Light Hydrocarbon Scan																		
Ethane	ng/L	1218	1495	770	170,000	350,000	NA	370,000	360,000	340,000	180,000	160,000	150,000	180,000	170,000	160,000	140,000	110,000
Ethene	ng/L	2458	1980	11737	1,600,000 J	750,000	NA	420,000	140,000	59,000	20,000	18,000	17,000	16,000	16,000	17,000	12,000	7,400
Field Parameters																		
pH	S.U.	7.24	5.76	5.48	6.80	6.94	6.63	7.1	6.91	7.09	6.59	6.69	6.87	6.94	7.19	6.93	6.75	6.90
Specific Conductivity	umhos/cm	2,033	28,360	11,895	2,200	2,170	2,350	1,870	1.264	1,427	1,651	960	1,302	1,341	1,460	1,340	1,300	1,090
Dissolved Oxygen	mg/L	0.82	2.84	4.32	0.00	0.29	0.4	0.11	0.16	2.00	0.15	0.70	0.21	0.11	0.00	0.26	3.35	NA
Redox Potential	mV	175	-118.4	-65.4	-153	-168	-139	-54	-140.1	-163	-14.2	-60	-108	-102.1	-124.0	-155.0	-125.0	-183.0
Temperature	^oC	18.33	20.24	21.74	16.8	16.69	18	16.78	16.50	18.00	21.1	21.0	24.0	17.2	16.7	10.9	19.5	16.7

NOTES:
< - Constituent not detected above laboratory reporting limit.
(1) Monitoring Well GM-28R was installed on December 21, 2015 as a replacement for well GM-28.
B - Blank Contamination.
^oC - Degrees Celsius.
Carbon source introductions began in December 1999.
F2 - MS/MSD RPD (relative perect difference) exceeds control limits.
J - Value is estimated.
mg/L - Milligrams per Liter.
ng/L - Nanograms per Liter.
umhos/cm - Micromohs per Centimeter.
mV - Millivolts.
NA - Not Analyzed.
Samples collected in September 1999 represent baseline conditions.
S.U. - Standard Units.
U - Constituent not detected above laboratory reporting limit shown.

Table A-7
Bioattenuation Parameter Results for Groundwater Samples Collected in Reactive Zone 1
RACER Trust
Moraine, Ohio

RZ-1		GM-23																						
Constituents	**Units**	**9/2/99**	**2/21/00**	**5/31/00**	**3/20/01**	**6/13/02**	**9/26/02**	**5/22/03**	**9/23/03**	**9/14/04**	**10/17/05**	**9/28/06**	**9/27/07**	**10/23/08**	**11/17/09**	**9/29/10**	**9/30/11**	**9/7/12**	**9/27/13**	**10/10/14**	**12/5/15**	**8/22/16**	**8/17/17**	**7/26/18**
Inorganics & TOC																								
Nitrate	mg/L	0.08	0.0	0.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<1.0 U	NA	NA
Nitrite	mg/L	3.83	0.0	0.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrogen, Ammonia	mg/L	<0.30 U	0.94	2.84	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.550 H	NA	NA	NA
Manganese (Total)	mg/L	4.71	0.887	0.121	0.469	1.5 J	1.0 J	1.5 J	1.6 J	1.3 J	0.79	1.5	1.4 J	0.89	0.539	0.508	0.57	0.410 B	0.450	0.250 B	0.14	0.18	0.31	0.24
Manganese (Dissolved)	mg/L	0.346	0.841	0.101	0.311	1.3 J	0.68 J	1.5 J	1.7 J	1.2 J	0.81	1.5	1.3 J	0.90	0.516	0.492	0.5	0.380 B	0.440	0.240 B	0.22	0.17	300	0.22
Iron (Total)	mg/L	13.6	0.53	0.18	0.48	0.16 J	0.63	0.50	0.14	0.11	30.7	13.6	10.8	10.1	5.51	5.72	7.5	4.8	3.6	4.0 B	4.2	4.5	3.6	3.2
Iron (Dissolved)	mg/L	<0.10 U	<0.10 U	<0.10 U	<0.10 U	<0.10 U	<0.10 U	<0.10 U	<0.10 U	<0.10 U	34.2	13.2	10	10	5.21	5.33	6	4.7	3.7	4.1 B	5.8	4.6	3.2	2.8
Iron (Ferrous)	mg/L	4.0	0.0	0.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sulfate	mg/L	72	650	8040	1440	920	810	310 J	650	430 J	120	850	590	490	130	160	200	74	120	34	15	34	61	38
Sulfide	mg/L	<4.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	0.67 B	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	0.73 J	<1.0 U	<1.0 U	<1.0 U	<1.0 U	0.59 J	<1.0 U	<1.0 U	<1.0 U	<1.0 U
Total Organic Carbon	mg/L	19	25	19	10.8	15 J	15	15	13	10 J	360	11	9.0	9.0	7.0	9.0	6.6	7.2	6.4	7.7	6.9 B	6.2	5.9	6.6
Chloride	mg/L	118	143	85	232	180	190	220	140 J	220	260	220	210	220	100	43	65	97 B	39	150 B	180 B	120	71	130
Permanent Gases																								
Carbon Dioxide	mg/L	88.47	264.8	323.79	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Oxygen	mg/L	0.96	1.56	17.78	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrogen	mg/L	20.22	13.75	3.13	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methane	mg/L	0.12	0.72	0.021	0.78	1.6	2.1	2.7	1.8	1.5	1.3	0.91	0.64	1.9	1.7	2.5	2.0	2.6	0.84	5.5	5.4	4.5	2.6	3.7
Carbon Monoxide	mg/L	<0.40 U	<0.40 U	<0.40 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Light Hydrocarbon Scan																								
Ethane	ng/L	6,878	14,644	1,037	11,000	25,000	32,000	44,000	23,000	17,000	16,000	12,000	7,100	21,000	31,000	36,000	25,000	71,000	16,000	100,000	88,000	84,000	71,000	95,000
Ethene	ng/L	580,916	439,458	569	260,000	230,000	230,000	1,200,000	270,000	260,000	500,000	900,000	370,000 J	960,000	2,100,000	1,700,000	230,000	74,000	16,000	74,000	140,000	76,000	28,000	26,000
Field Parameters																								
pH	S.U.	6.80	6.62	6.31	6.64	6.81	6.76	5.59	6.73	7.04	5.66	6.69	6.34	7.74	6.80	6.89	6.52	9.13	6.76	6.98	7.43	6.89	6.37	6.9
Specific Conductivity	umhos/cm	1,160	2,856	6,720	3,448	2,290	2,390	1,683	2,258	2,130	2,570	2,740	2,470	1,465	1.184	1,395	1,812	1,310	1,228	1,321	1,530	1,330	1,110	1,180
Dissolved Oxygen	mg/L	0.65	0.78	10.48	8.38	4.23	0.42	1.76	0.85	0.00	0.00	0.40	0.44	0.11	0.16	0.23	0.54	2.83	0.40	0.23	0.00	0.40	5.20	NA
Redox Potential	mV	122.2	158.7	194.2	160.4	346.5	215.6	247.9	198.8	57	-108	-108	-91	189	-90.1	-104.2	-52	-161	-49	-63.8	-79	-114	-164	NA
Temperature	^{o}C	17.89	17.6	26.45	19.08	16.40	19.06	17.91	17.38	16.30	16.50	16.78	17.50	17.12	17.15	18.89	17.40	22.5	24.7	16.7	16.7	18.5	18.9	16.7

NOTES:
< - Constituent not detected above laboratory reporting limit.
(1) Monitoring Well GM-28R was installed on December 21, 2015 as a replacement for well GM-28.
B - Blank Contamination.
^{o}C - Degrees Celsius.
Carbon source introductions began in December 1999.

J - Value is estimated.
mg/L - Milligrams per Liter.
ng/L - Nanograms per Liter.
umhos/cm - Micromohs per Centimeter.
mV - Millivolts.
NA - Not Analyzed.
Samples collected in September 1999 represent baseline conditions.
S.U. - Standard Units.
U - Constituent not detected above laboratory reporting limit shown.

Table A-7
Bioattenuation Parameter Results for Groundwater Samples Collected in Reactive Zone 1
RACER Trust
Moraine, Ohio

RZ-1		GM-28										
Constituents	**Units**	**9/1/99**	**2/23/00**	**5/26/00**	**9/21/00**	**3/20/01**	**6/26/01**	**11/15/01**	**12/12/01**	**7/21/02**	**9/24/02**	**5/23/03**
Inorganics & TOC												
Nitrate	mg/L	0.08	0.0	0.0	NA	NA	NA	NA	NA	NA	NA	NA
Nitrite	mg/L	0.06	0.0	0.0	NA	NA	NA	NA	NA	NA	NA	NA
Nitrogen, Ammonia	mg/L	<0.30 U	<0.30 U	0.68	NA	NA	NA	NA	NA	NA	NA	NA
Manganese (Total)	mg/L	3.2	1.15	6.26	4.1	0.594	2.24	0.58	0.47	1.1	0.48 B	0.69 J
Manganese (Dissolved)	mg/L	0.068	0.449	6.71	3.94	0.477	1.76	0.61	0.49	1.1	0.41 B	0.29 J
Iron (Total)	mg/L	106	25.3	22.7	58.9	29.6	59	23.6	23.5	36.2	28.7	47.9
Iron (Dissolved)	mg/L	<0.10	0.59	23.3	48.3	2.65	49.8	23.3	23.7	34.7	23.4	16.7
Iron (Ferrous)	mg/L	0.0	0.03	2.6	NA	NA	NA	NA	NA	NA	NA	NA
Sulfate	mg/L	89	43	<5.0 U	<5.0 U	9.0	106	<5.0 U	<5.0 U	<5.0 U	18	65J
Sulfide	mg/L	<4.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	1.5	<1.0 U	2.0	4.3	2.5
Total Organic Carbon	mg/L	15	24	742	571	90.0	360	74	68B	140	23	15
Chloride	mg/L	208	664	805	782	1030	508	730B	560	370	450	350
Permanent Gases												
Carbon Dioxide	mg/L	41.52	63.57	16.51	NA	NA	NA	NA	NA	NA	NA	NA
Oxygen	mg/L	2.32	0.59	0.64	NA	NA	NA	NA	NA	NA	NA	NA
Nitrogen	mg/L	19.42	16.39	19.82	NA	NA	NA	NA	NA	NA	NA	NA
Methane	mg/L	0.002487	0.001832	0.21	1.70	13.0	13.0	13	20	19	14	8.9
Carbon Monoxide	mg/L	<0.40 U	<0.40 U	<0.40 U	NA	NA	NA	NA	NA	NA	NA	NA
Light Hydrocarbon Scan												
Ethane	ng/L	750	493	865	1,198	42,000	39,000	91,000	98,000	420,000	300,000	310,000
Ethene	ng/L	48	98	646	1,794,606	57,000	5,000	1,100	1,400	8,800	12,000	74,000
Field Parameters												
pH	S.U.	7.02	6.92	7.01	7.18	7.1	6.64	6.50	7.45	6.84	7.24	6.86
Specific Conductivity	umhos/cm	1,359	3,124	4,402	4,538	3,724	3,216	3,136	3,700	2,187	2,195	2,132
Dissolved Oxygen	mg/L	0.95	1.45	2.52	6.78	4.36	0.41	0.83	0.20	0.68	0.35	1.41
Redox Potential	mV	90.5	56.0	-93.7	-200.1	-70.6	-177.8	-148.2	-203	-153.3	-135.3	-93.1
Temperature	^{o}C	16.4	18.48	19.24	20.21	18.93	19.04	19.24	18.92	20.44	18.68	16.88

RZ-1		GM-28 (cont.)										GM-28R[1]			
Constituents	**Units**	**10/1/03**	**4/30/04**	**9/15/04**	**10/18/05**	**9/27/06**	**9/20/07**	**10/22/08**	**11/16/09**	**9/28/10**	**10/5/11**	**12/28/15**	**8/22/16**	**8/17/17**	**7/25/18**
Inorganics & TOC															
Nitrate	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.1 U	NA	NA
Nitrite	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrogen, Ammonia	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese (Total)	mg/L	0.42 J	0.34	0.37	0.45	0.46	0.44 J	1.4	0.468	0.468	0.72	0.63	0.40	0.32	0.29
Manganese (Dissolved)	mg/L	0.40 J	0.32	0.36	0.45	0.43	0.43 J	1.5	0.444	0.466	0.49	0.67	0.38	0.30	0.25
Iron (Total)	mg/L	23.4 J	17.6	15.7	16.1	14.5	11.7	23.4	11.3	11.6	22	4.6	5.6	5.7	5.9
Iron (Dissolved)	mg/L	22.4 J	16.4	15.1	15.2	13.1	10.7	23.7	10.2	10.6	5.5	3.5	4.6	3.7	4.5
Iron (Ferrous)	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sulfate	mg/L	31J	89	93 J	91	75	77	33	55	45	41	33	42	29	24
Sulfide	mg/L	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	NA	<1.0 U	<1.0 U	<1.0 U F2
Total Organic Carbon	mg/L	17	15 J	8.0	10	7.0	8.0 J	310	6.0	7.0	9.1	3.9	4.2	4.8	6.7
Chloride	mg/L	270 J	320	340	320	320	300 J	260	220	170	130	70	61	12	18
Permanent Gases															
Carbon Dioxide	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Oxygen	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrogen	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methane	mg/L	11	7.9	6.6	2.8	2.5	2.3	2.9	4.2	2.3	0.76	0.69	0.36	0.86	1.8
Carbon Monoxide	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Light Hydrocarbon Scan															
Ethane	ng/L	230,000	160,000	150,000	81,000	73,000	72,000	52,000	73,000	53,000	14,000	1,200	290	580	1200
Ethene	ng/L	430	160	54	<210 U	<25 U	62	9,300	<200 U	150	86	240	27 J	52 J	2200
Field Parameters															
pH	S.U.	6.80	NA	6.85	5.47	7.08	6.72	6.49	7.04	7.16	NA	6.79	6.95	6.23	7.00
Specific Conductivity	umhos/cm	1,501	NA	2,030	2,230	1,880	2	1,428	1.821	1,615	NA	1080	911	681	593
Dissolved Oxygen	mg/L	0.34	NA	0	0	0.29	0.64	0.13	0.20	2.70	NA	0.22	0.29	2.97	NA
Redox Potential	mV	-146.9	NA	-165	-166	-183	-152	27	-166.2	-153.5	NA	-78	-126	-111	-177
Temperature	^{o}C	17.97	NA	16.2	15.9	16.33	17.1	16.38	16.65	16.56	NA	16.79	18.1	17.48	19.1

NOTES:
< - Constituent not detected above laboratory reporting limit.
(1) Monitoring Well GM-28R was installed on December 21, 2015 as a replacement for well GM-28.
B - Blank Contamination.
^{o}C - Degrees Celsius.
Carbon source introductions began in December 1999.

J - Value is estimated.
mg/L - Milligrams per Liter.
ng/L - Nanograms per Liter.
umhos/cm - Micromohs per Centimeter.
mV - Millivolts.
NA - Not Analyzed.
Samples collected in September 1999 represent baseline conditions.
S.U. - Standard Units.
U - Constituent not detected above laboratory reporting limit shown.

Table A-8
Bioattenuation Parameter Results for Groundwater Samples Collected in Reactive Zone 3 West
RACER Trust
Moraine, Ohio

ARCADIS Design & Consultancy for natural and built assets

RZ-3 West		GM-32																							
Constituents	**Units**	**9/22/99**	**2/28/00**	**5/30/00**	**9/25/00**	**3/19/01**	**11/12/01**	**12/11/01**	**6/12/02**	**9/20/02**	**5/23/03**	**10/1/03**	**9/14/04**	**10/19/05**	**9/19/06**	**9/18/07**	**9/23/08**	**11/16/09**	**9/27/10**	**9/29/11**	**9/6/12**	**9/26/13**	**10/8/14**	**12/8/15**	**8/17/16**	**8/16/17**	**7/24/18**
Inorganics & TOC																									
Nitrate	mg/L	0	0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrite	mg/L	0	0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrogen, Ammonia	mg/L	2.3	2.0	19	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese (Total)	mg/L	0.15	0.52	0.051	0.30	0.17	0.16 B	0.087 B	0.043 B	0.053 B	0.10 J	0.13 J	0.13 J	0.076	0.088	0.077 J	0.051	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese (Dissolved)	mg/L	0.05	0.06	0.048	0.31	<0.050 U	0.020 B	0.024 B	0.042 B	0.028 B	0.077 J	0.11 J	0.13 J	0.067	0.078	0.072 J	0.056	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iron (Total)	mg/L	8.14	42.4	18.4	81.0	13	16.5	10.5	7.5	8.4 B	21.3	31.4 J	33.9	22.0	24.7	20	14	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iron (Dissolved)	mg/L	3.53	0.59	17.1	81.6	3.17	5.2	6.5	8.1	6.8 B	18.7	30.5 J	34.5	19.8	24.5	19.5	13.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iron (Ferrous)	mg/L	1.8	2.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sulfate	mg/L	30	<5.0 U	<10 U	<10 U	<20 U	5.0	4.0 J	1.0 J	<5.0 U	<5.0 U	<5.0 U	<5.0 U	<5.0 U	<5.0 U	<5.0 U	24	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sulfide	mg/L	<1.0 U	<10 U	<1.0 U	<1.0 U	1.6	<1.0 U	<1.0	0.50 J	1.3	0.86 B	7.3	16	4.1	1.0	14	7.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Organic Carbon	mg/L	68	1200	2020	2720	1120	320 B	250	240	160	150	170	240 J	300	260	290 J	95	170	260	71	62	40	22	6.0	4.2	9.2	3.8
Chloride	mg/L	317	638	740	740	798	700 B	630	470	510	390	510 J	530	550	560	560 J	400	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Permanent Gases																									
Carbon Dioxide	mg/L	39.79	8.94	24.32	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Oxygen	mg/L	1.67	0.85	<0.15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrogen	mg/L	14.93	15.23	2.40	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methane	mg/L	2.7	7.1	15	17	29	29	38	24	32	24	19	25	30 J	26	26	25	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Carbon Monoxide	mg/L	<0.40 U	<0.40 U	<0.40 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Light Hydrocarbon Scan																									
Ethane	ng/L	1,649	9,965	1,029	189	7,900	42,000	72,000	84,000	94,000	74,000	46,000	57,000	85,000 J	76,000	73,000	58,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethene	ng/L	86,509	163,855	472,312	510,593	150,000	130,000	90,000	93,000	49,000	9,900	3,400	2,000	1,900 J	2,400	1,200	940	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Field Parameters																									
pH	S.U.	7.54	8.59	7.64	7.73	8.36	8.42	8.13	8.55	8.13	6.41	6.81	6.86	6.30	6.84	7.00	7.13	7.02	7.68	7.20	7.15	8.05	7.26	7.04	6.81	6.68	7.15
Specific Conductivity	umhos/cm	2,750	9,030	9,195	9,225	7,483	6,874	6,200	5,432	4,289	3,908	3,192	4,210	4,810	4,510	4,240	3,220	3,540	5,328	3,280	1,998	1,388	1,520	1,380	1,200	1,320	1,140
Dissolved Oxygen	mg/L	0.09	0.23	10.82	2.55	0.36	0.07	0.03	1.14	0.22	1.93	0.31	0.00	0.00	0.21	0.45	1.79	0.89	2.4	1.97	0.94	0.42	0.72	0.00	7.08	6.36	0.00
Redox Potential	mV	-226.4	-279.1	-213.6	-353.8	-152.5	-222.8	-279	-220.5	-227.1	-204.6	-154.4	-160	-191	-193	-161	-200	-108	-236.9	-244	-73	-17	-99	-165.0	-148.0	-105	-167
Temperature	^oC	19.27	19.72	23.48	19.27	19.3	18.84	18.62	20.83	19.81	19.31	18.47	17.20	17.00	17.70	16.70	18.71	16.30	16.79	18.77	21.5	18.36	18.48	15.57	17.96	15.83	16.21

NOTES:
< - Constituent not detected above laboratory reporting limit.
B - Blank Contamination.
^oC - Degrees Celsius.
Carbon source introductions began in December 1999.
J - Value is estimated.
mg/L - Milligrams per Liter.
ng/L - Nanograms per Liter.
umhos/cm - Micromohs per Centimeter.
mV - Millivolts.
NA - Not Analyzed.
Samples collected in September 1999 represent baseline conditions.
S.U. - Standard Units.
U - Constituent not detected above laboratory reporting limit shown.

Table A-8
Bioattenuation Parameter Results for Groundwater Samples Collected in Reactive Zone 3 West
RACER Trust
Moraine, Ohio

ARCADIS Design & Consultancy for natural and built assets

RZ-3 West		GM-8																		
Constituents	**Units**	**3/6/98**	**9/20/99**	**9/20/02**	**12/9/03**	**9/14/04**	**10/19/05**	**9/19/06**	**9/18/07**	**9/23/08**	**11/16/09**	**9/27/10**	**9/30/11**	**9/6/12**	**9/26/13**	**10/7/14**	**12/5/15**	**8/22/16**	**8/16/17**	**7/24/18**
Inorganics & TOC																				
Nitrate	mg/L	<4.4 U	0.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.1 U	NA	NA
Nitrite	mg/L	<0.033 U	0.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrogen, Ammonia	mg/L	1.69	1.95	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.100 UH	NA	NA	NA
Manganese (Total)	mg/L	0.20	0.13	0.085 B	0.21	0.13	0.17	0.16	0.12 J	0.027	0.0617	0.14	0.035	0.025	0.037	0.061	0.086	0.091	0.082	0.068
Manganese (Dissolved)	mg/L	0.23	0.13	0.084 B	0.21	0.14	0.15	0.15	0.11 J	0.026	0.0643	0.0604	0.031	0.025	0.036	0.061	0.09	0.082	0.08	0.071
Iron (Total)	mg/L	1.0	0.27	0.55 B	1.9	1.8	3.2	3.4	3.3	0.69	2.2	4.27	1.2	0.830	1.700	2.700	4.1	3.8	3.4	2.9
Iron (Dissolved)	mg/L	1.2	0.26	0.52 B	1.9	1.8	2.8	3.1	3.0	0.64	2.13	2.05	0.98	0.780	1.200	2.500	4.2	3.2	3.3	3.0
Iron (Ferrous)	mg/L	<0.2 U	0.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sulfate	mg/L	59	54	59	<5.0 U	13 J	27	24	49	32	23	22	24	27	22	28	32	32	29	38
Sulfide	mg/L	<1.0 U	<1.0 U	<1.0 U	<1.0 U	2	<1.0 U	1.8	0.86 J	0.54 J	1.2 J	1.4	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U
Total Organic Carbon	mg/L	7.0	8.0	16	20	19 J	19	16	16 J	12	15	19	17	8.2	9.8	5.8	4.7	5.4	7.0	6.2
Chloride	mg/L	248	216	180	180 J	190	260	320	360 J	250	230	230	270	190 B	150	150	170 B	130	120	130
Permanent Gases																				
Carbon Dioxide	mg/L	15.8	9.91	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Oxygen	mg/L	1.1	0.92	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrogen	mg/L	19.7	25.42	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methane	mg/L	1.5	2.5	8.5	14	9.0	8.1 J	7.2	9.1	4.4	7.8	6.7	4.7	2.5	1.8	2.3	2.1	1.9	2.4	1.6
Carbon Monoxide	mg/L	<0.40 U	<0.40 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Light Hydrocarbon Scan																				
Ethane	ng/L	370	1,134	13,000	12,000	18,000	17,000 J	7,200	10,000	22,000	11,000	19,000	26,000	10,000	12,000	12,000	23,000	41,000	33,000	30,000
Ethene	ng/L	12,233	39,617	3,700	440	56	< 76 U J	1,200	32	140	< 220 U	33	120	140	930	34	250	15 J	23 J	15 J
Field Parameters																				
pH	S.U.	7.7	7.98	8.18	7.2	7.76	6.45	7.31	7.21	8.1	7.86	7.89	7.81	10.32	7.92	7.44	7.42	7.33	6.92	7.68
Specific Conductivity	umhos/cm	1,539	1,584	1,734	1,870	1,900	2,080	2,120	2,300	2,060	1,920	2,083	2,560	1,690	1,488	1,419	1,420	1,330	1,420	1,340
Dissolved Oxygen	mg/L	0.16	0.28	0.37	0.04	0.00	0.00	0.53	0.70	0.00	0.00	3.00	0.60	7.38	0.63	0.55	0.00	3.97	3.61	0.21
Redox Potential	mV	-145	-49.8	-150.6	-137	-186	-162	-160	-125	-262	-24	-167.7	-115	-209	-42.8	-168.3	-200.0	-174.0	-193.0	-214.0
Temperature	^oC	17.53	19.09	19.2	18.17	16.60	16.30	18.10	17.00	17.60	16.00	16.51	21.10	20.34	15.70	15.60	15.89	18.74	16.29	16.03

NOTES:
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^oC - Degrees Celsius.
Carbon source introductions began in December 1999.
J - Value is estimated.
mg/L - Milligrams per Liter.
ng/L - Nanograms per Liter.
umhos/cm - Micromohs per Centimeter.
mV - Millivolts.
NA - Not Analyzed.
Samples collected in September 1999 represent baseline conditions.
S.U. - Standard Units.
U - Constituent not detected above laboratory reporting limit shown.

Table A-9
Bioattenuation Parameter Results for Groundwater Samples Collected in Reactive Zone 3 East
RACER Trust
Moraine, Ohio

ARCADIS Design & Consultancy for natural and built assets

RZ-3 East		GM-21																	
Constituents	**Units**	**9/22/99**	**2/23/00**	**5/26/00**	**9/22/00**	**3/19/01**	**11/13/01**	**12/11/01**	**10/3/08**	**11/16/09**	**9/28/10**	**9/29/11**	**9/7/12**	**9/26/13**	**10/9/14**	**12/11/15**	**8/22/16**	**8/17/17**	**7/25/18**
Inorganics & TOC																			
Nitrate	mg/L	0.0	0.0	0.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.1 U	NA	NA
Nitrite	mg/L	0.0	0.0	0.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrogen, Ammonia	mg/L	<0.30 U	<0.30 U	<0.30 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.100 UH	NA	NA	NA
Manganese (Total)	mg/L	0.321	0.233	0.215	0.336	0.298	0.30 B	0.30 B	0.78	0.882	0.758	0.93	1.100 B	1.1	1.1 B	0.880 B	0.62	0.48	0.57
Manganese (Dissolved)	mg/L	0.273	0.225	0.212	0.312	0.291	0.32 B	0.29 B	0.77	0.893	0.768	0.91	1.100 B	1.0	1.1 B	0.890 B	0.61	0.51	0.54
Iron (Total)	mg/L	2.58	0.30	0.83	0.63	0.11	<0.10 U	0.16	17.9	19.6	26.1	32	31	32	34 B	29 B	29	21	27
Iron (Dissolved)	mg/L	<0.10 U	<0.10 U	<0.10 U	<0.10 U	<0.10 U	<0.10 U	0.11	16.7	20.2	25.6	31	33	32	34 B	29 B	28	22	27
Iron (Ferrous)	mg/L	0.4	0.0	0.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sulfate	mg/L	103	102	80	102	118	120	100	38	19	13	23	56	21	<50 U	16	41	47	32
Sulfide	mg/L	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	1.9	1.5	4.0 J	<1.0 U	<1.0 U	14	1.0	1.6	0.47 J	<1.0 U	<1.0 U	0.80 J
Total Organic Carbon	mg/L	1.0	3.0	2.0	<1.0 U	<1.0 U	2.0 B	1.0	18	45	91	100	86	120	120	110	94	81	95
Chloride	mg/L	136	145	126	129	165	140	150	240	220	230	300	240 B	290	310 B	300 B	240	230	250
Permanent Gases																			
Carbon Dioxide	mg/L	37.04	37.40	18.70	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Oxygen	mg/L	1.41	0.99	1.89	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrogen	mg/L	23.40	21.67	23.64	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methane	mg/L	0.037	0.018	0.014	0.042	0.048	0.049	0.035	28	28	23	15	12	NA	15	17	16	13	15
Carbon Monoxide	mg/L	<0.40 U	<0.40 U	<0.40 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Light Hydrocarbon Scan																			
Ethane	ng/L	72	67	84	72	82	76	120	77,000	71,000	50,000	21,000	7,500	NA	6,800	6,300	6,100	6,400	7,500
Ethene	ng/L	169	38	70	69	46	46	100	13,000	6,700	3,600	3,100	5,800	NA	5,400	8,100	7,000	4,600	5,700
Field Parameters																			
pH	S.U.	6.99	7.22	7.06	7.21	7.85	7.50	7.45	6.05	6.40	6.46	6.50	6.36	6.38	7.12	6.95	6.40	6.30	6.40
Specific Conductivity	umhos/cm	1,188	1,299	1,048	1,096	1,067	1,190	1,360	1,405	2,088	2,424	2,974	2,511	1,373	2,853	1,280	2,560	2,340	2,350
Dissolved Oxygen	mg/L	0.66	0.60	0.40	0.99	0.57	0.04	0.04	0.12	0.24	3.60	0.30	0.12	0.47	0.28	0	0.64	5.08	NA
Redox Potential	mV	-26.9	113.3	167.1	153.9	218.5	168.8	-25	68	-92.1	-95.1	-13.7	-12	22.6	-29.3	-151	-93	-76	-116
Temperature	^{o}C	20.43	18.43	17.92	19.03	17.59	16.73	15.82	16.5	16.32	16.65	23.00	22.90	23.70	16.40	16.37	17.32	17.42	17.2

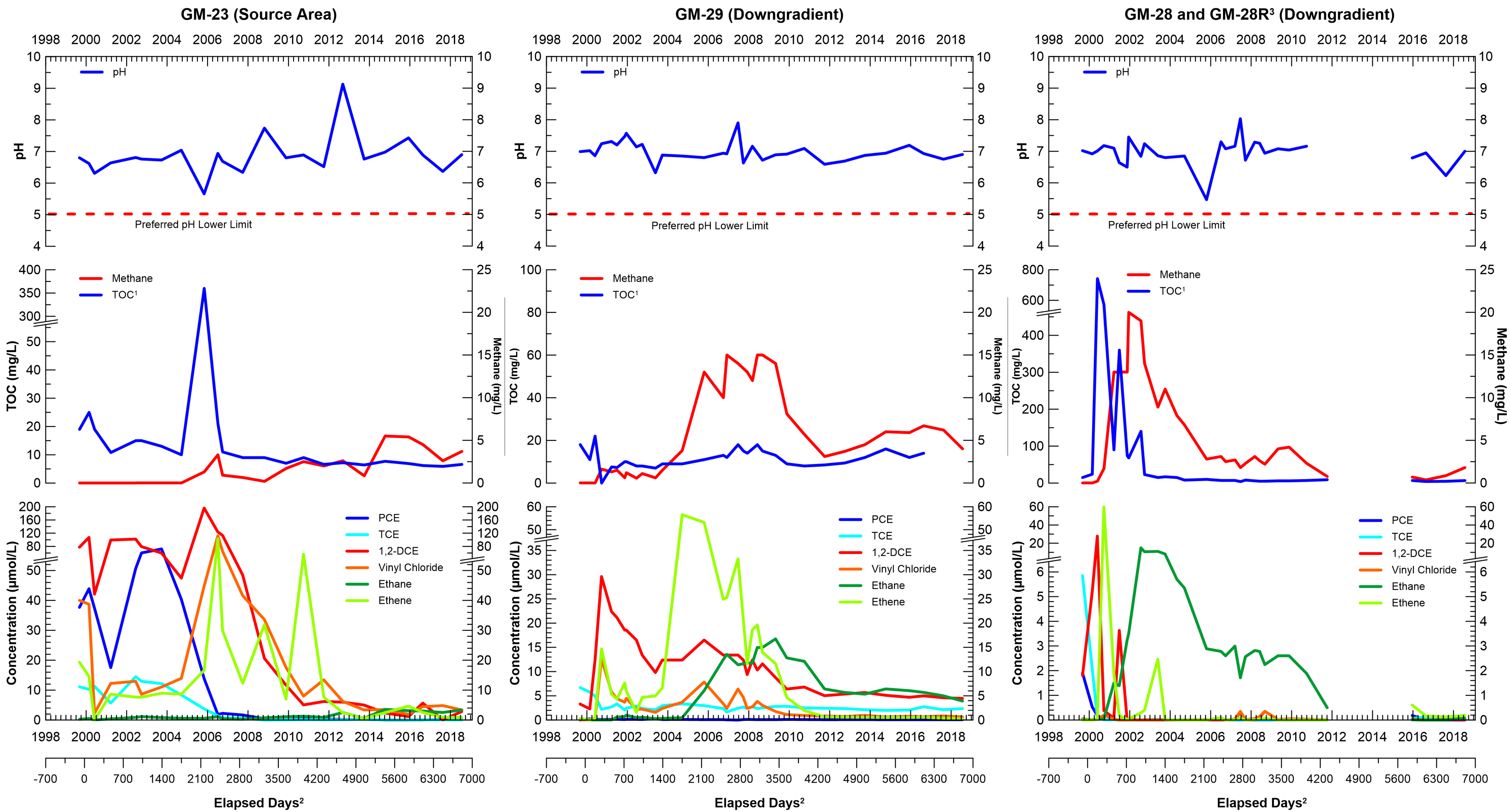
NOTES:
< - Constituent not detected above laboratory reporting limit.
B - Blank Contamination.
^{o}C - Degrees Celsius.
Carbon source introductions began in December 1999.
J - Value is estimated.
mg/L - Milligrams per Liter.
mV - Millivolts.
NA - Not Analyzed.
ng/L - Nanograms per Liter.
S.U. - Standard Units.
umhos/cm - Micromohs per Centimeter.
Samples collected in September 1999 represent baseline conditions.
U - Constituent not detected above laboratory reporting limit shown.

Table A-10
Bioattenuation Parameter Results for Groundwater Samples Collected in Reactive Zone 4 East
RACER Trust
Moraine, Ohio

ARCADIS Design & Consultancy for natural and built assets

RZ-4 East		GM-19S																										
Constituents	**Units**	**9/20/99**	**2/23/00**	**5/24/00**	**9/22/00**	**3/19/01**	**11/20/01**	**12/11/01**	**6/12/02**	**9/26/02**	**5/21/03**	**9/25/03**	**9/13/04**	**10/18/05**	**9/21/06**	**9/17/07**	**9/23/08**	**11/17/09**	**4/7/10**	**9/27/10**	**9/29/11**	**9/6/12**	**9/26/13**	**10/7/14**	**12/5/15**	**8/22/16**	**8/16/17**	**7/24/18**
Inorganics & TOC																												
Nitrate	mg/L	11	0.0	0.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.1 U	NA	NA
Nitrite	mg/L	0.0	0.0	0.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrogen, Ammonia	mg/L	<0.30 U	<0.30 U	<0.30 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.100 UH	NA	NA	NA
Manganese (Total)	mg/L	0.726	1.09	0.247	0.238	0.191	0.20	0.21 B	0.25 B	0.39 B	0.30 J	0.23 J	0.25	0.24	0.99	0.28 J	0.16	0.0911	NA	0.169	0.17	0.130	0.110	0.15	0.14	0.22	0.26	0.29
Manganese (Dissolved)	mg/L	0.185	0.205	0.200	0.187	0.155	0.19	0.18 B	0.18 B	0.19 B	0.20 J	0.21 J	0.16	0.2	0.94	0.15 J	0.16	0.0900	NA	0.170	0.14	0.130	0.110	0.15	0.18	0.21	0.22	0.28
Iron (Total)	mg/L	16.9	39.4	1.19	0.40	0.9	0.091	0.18	0.26	0.44	0.17	0.96	3.0	0.38	1.6	12.7	7.4	15.2	NA	18.9	11	6.7	5.5	7.4	6.7	4.8	5.5	6.0
Iron (Dissolved)	mg/L	<0.10 U	<0.10 U	<0.10 U	<0.10 U	<0.10 U	<0.10 U	<0.10 U	<0.10 U	<0.10 U	<0.10 U	<0.10 U	<0.10 U	<0.10 U	1.4	9.4	7.3	15.1	NA	18.3	9	6.4	5.4	5.7	6.4	4.7	4.2	5.4
Iron (Ferrous)	mg/L	0.0	0.0	0.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sulfate	mg/L	127	131	131	118	113	100	90	110	110	150 J	150	110 J	83	95	63	68	25	NA	21	58	84	76	43	47	39	50	53
Sulfide	mg/L	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	0.96J	<1.0 U	<1.0 U	<1.0 U	1.3	1.6	<1.0 U	<1.0 U	<1.0 U	<1.0 U	1.0 J	NA	0.80 J	<1.0 U	0.75 J	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U
Total Organic Carbon	mg/L	2.0	7.0	5.0	<1.0 U	<1.0 U	2.0 B	1.0	1.0	3.0	2.0	2.0	1.0	3.0	22	6.0 J	3.0	10	NA	14	4.6	2.6	3.2	2.2	2.5	1.3	1.3	1.7
Chloride	mg/L	247	197	168	165	158	130 B	150	140	210	270	300J	310	320	350	400 J	390	460	NA	390	340	290 B	230	170	160 B	150	150 B	140
Permanent Gases																												
Carbon Dioxide	mg/L	41.85	57.12	50.12	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Oxygen	mg/L	4.43	1.01	1.24	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrogen	mg/L	20.87	17.07	17.13	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methane	mg/L	0.0099	0.0027	0.0033	0.0037	0.039	0.0050	0.0088	0.002	0.46	0.0021	0.0022	0.0014	< 0.0065 U	0.025	7.5	0.79	25	NA	19	1.3	0.0090	0.22	0.54	1.2	0.46	0.72	0.21
Carbon Monoxide	mg/L	<0.40 U	<0.40 U	<0.40 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Light Hydrocarbon Scan																												
Ethane	ng/L	71	104	139	184	210	300	350	410	730	170	80	48	<250 U	730	7,800	550	11,000	NA	9,300	870	53	85	91	160	37 J	14 J	57 J
Ethene	ng/L	55	45	43	36	61	34	27	130	770	78	45	51	<220 U	550	22,000	30,000	<120 U	NA	72	1,800	760	590	600	330	180	180	390
Field Parameters																												
pH	S.U.	7.05	7.05	7.00	7.19	7.14	7.28	7.31	7.09	7.02	6.71	6.93	7.13	5.97	6.84	7.03	7.1	6.93	6.78	7.47	6.33	7.11	8.43	6.85	6.95	6.92	6.64	7.11
Specific Conductivity	umhos/cm	1,500	1,784	1,548	1,235	1,097	1,190	1,350	1,052	1,474	1,706	1,726	1,970	1,940	2,150	2,010	2,290	1,951	2,370	1,986	2,150	1,377	1,539	1,280	1,280	1,180	1,180	1,130
Dissolved Oxygen	mg/L	0.92	0.30	1.94	1.36	0.96	1.75	0.06	0.9	0.47	2.01	1.87	0.0	0.0	0.3	0.43	1.87	0.33	0.80	0.67	2.08	0.54	0.54	0.32	0	2.16	3.72	0
Redox Potential	mV	31.3	149.6	200.1	187.7	320.8	195.6	13	446.3	259.6	178.3	135	160	122	-82	-145	-153	-137.9	-157	-112.5	-150	-26	-64.1	-79	-151	-133	-138	-143
Temperature	^{o}C	20.85	18.69	20.80	20.09	20.14	19.24	19.1	20.39	20.36	20.22	19.57	18.6	17.6	17.9	17.5	16.9	16.68	17.73	16.43	17.82	23.90	19.80	15.30	16.37	17.37	17.41	16.87

NOTES:
mg/L - Milligrams per Liter.
ng/L - Nanograms per Liter.
S.U. - Standard Units.
umhos/cm - Micromohs per Centimeter.
mV - Millivolts.
^{o}C - Degrees Celsius.
J - Value is estimated.
B - Blank Contamination.
NA - Not Analyzed.
< - Constituent not detected above laboratory reporting limit.
U - Constituent not detected above laboratory reporting limit shown.
Samples collected in September 1999 represent baseline conditions.
Carbon source introductions began in December 1999.



1 - TOC breakthrough is 20 mg/L.
2 - Days since RZ-1 ERD implementation.
3 - GM-28 has not been sampled since 2011 due to an obstruction in the well. GM-28R was installed in 2015 as a replacement for GM-28.
ERD - Enhanced reductive dechlorination.

pH - Negative logarithm of the hydrogen-ion concentration.
mg/L - Milligram per liter.
µmol/L - Micromoles per liter.
TOC - Total organic carbon.
PCE - Tetrachloroethene.
TCE - Trichloroethene.
1,2-DCE - cis and trans-1,2-Dichloroethene.

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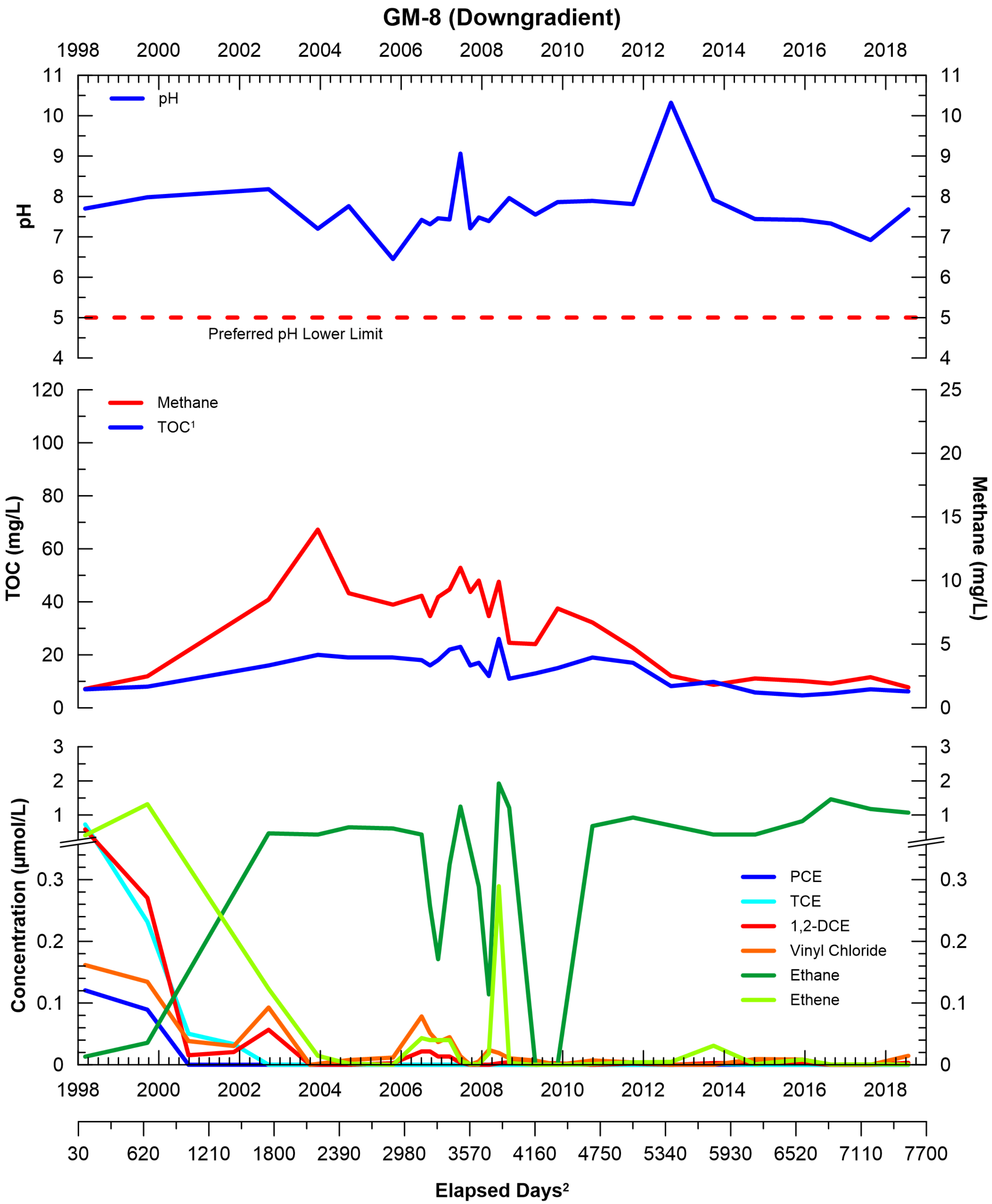
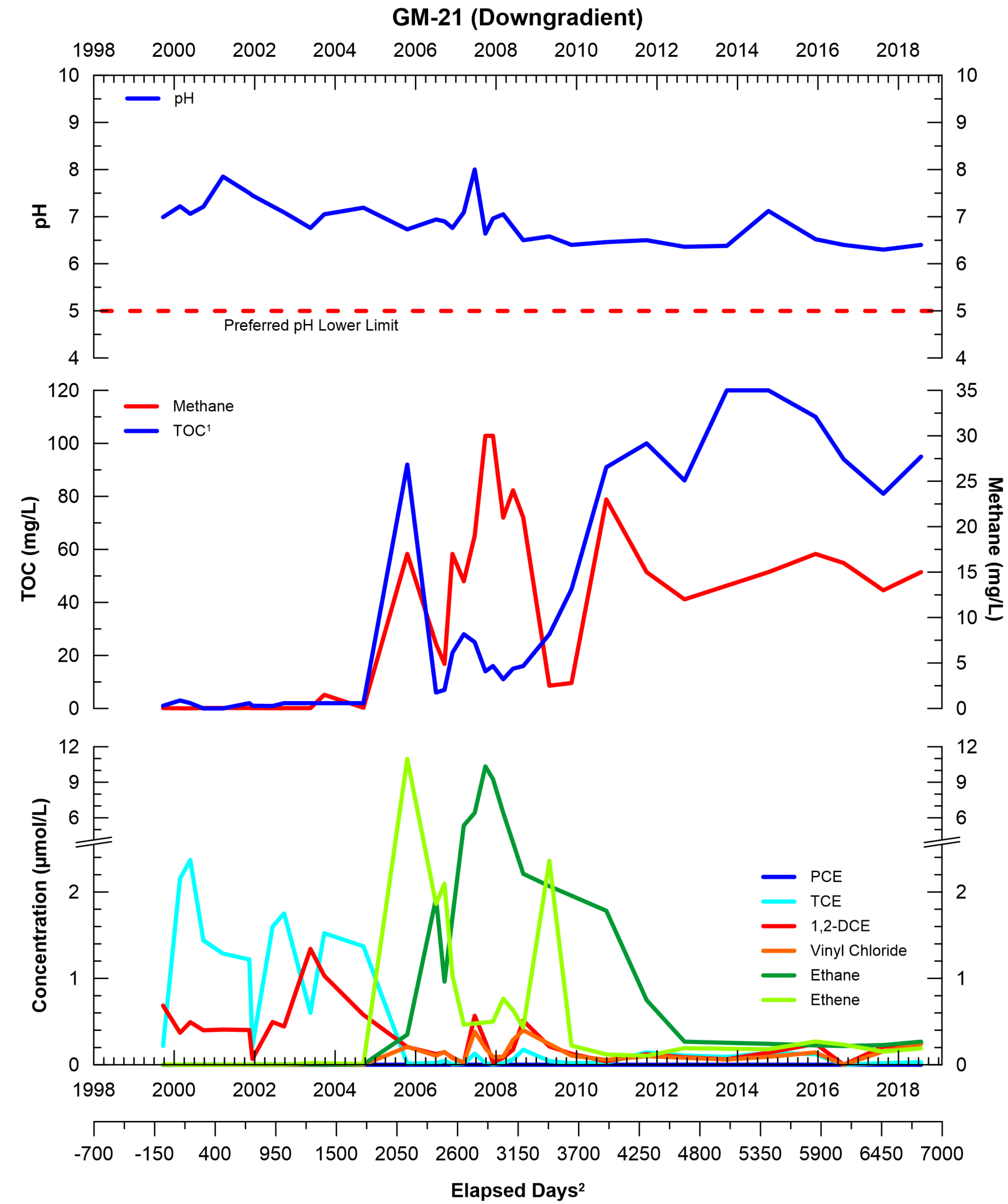
RZ-1 ERD ANALYSIS
(GM-23, GM-29, GM-28, GM-28R)

ARCADIS Design & Consultancy for natural and built assets

FIGURE
A-1





1 - TOC breakthrough is 20 mg/L.
2 - Days since RZ-3 ERD implementation.
ERD - Enhanced reductive dechlorination.
pH - Negative logarithm of the hydrogen-ion concentration.
mg/L - Milligram per liter.

µmol/L - micromoles per liter.
TOC - Total organic carbon.
PCE - Tetrachloroethene.
TCE - Trichloroethene.
1,2-DCE - cis and trans-1,2-Dichloroethene.

Note: Ethene, ethane, and methane parameters were not collected during the 2013 annual groundwater sampling event at GM-21.

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RZ-3 WEST/EAST ERD ANALYSIS
GM-8 (WEST), GM-21(EAST)

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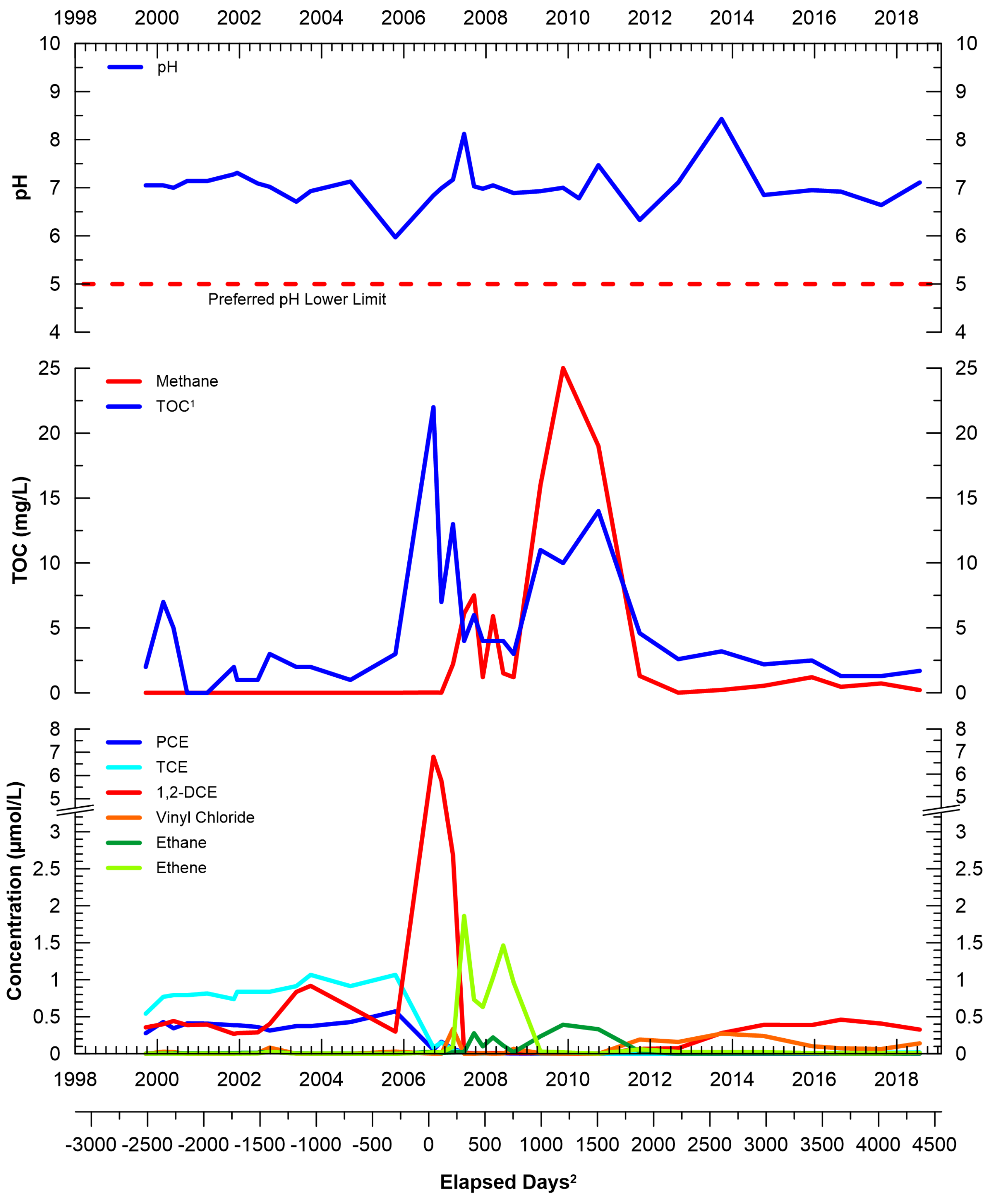
FIGURE
A-2



1 - TOC breakthrough is 20 mg/L.
2 - Days since RZ-4 ERD implementation.
ERD - Enhanced reductive dechlorination.
pH - Negative logarithm of the hydrogen-ion concentration.
mg/L - Milligram per liter.
µmol/L - micromoles per liter.
TOC - Total organic carbon.
PCE - Tetrachloroethene.
TCE - Trichloroethene.
cis-1,2-DCE - cis-1,2-Dichloroethene.

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OH000294.2019

RZ-4 ERD ANALYSIS
(GM-19S - DOWNGRADIENT)

ARCADIS Design & Consultancy for natural and built assets

FIGURE
A-3

APPENDIX B

PFAS Evaluation Memorandum

MEMO

To:

Mirtha Capiro, U.S. EPA

Copies:

Pam Barnett, RACER Trust

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Columbus, Ohio 43235
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From:

Arcadis, Inc.

Date:

February 28, 2019

Arcadis Project No.:

OH000294.2019

Subject:

PFAS Evaluation Memorandum

RACER Trust Moraine Facilities, Moraine, Ohio

To evaluate areas where poly- and perfluorinated alkyl substances (PFAS) may have been associated with past industrial processes at the RACER Trust Moraine Facilities (Site), groundwater samples were collected at select locations for PFAS analysis during two sampling events in 2018 (**Figure B-1**). The objectives of the sampling events were to evaluate potential PFAS concentrations based on historical industrial processes, evaluate potential PFAS concentrations near the source of the site-specific volatile organic compound (VOC) plume, monitor concentrations at the property boundary, and provide supplemental data for the City of West Carrollton. The first sampling event was completed from August 7 through 9, 2018, and the second event occurred on December 4 and 5, 2018. The following is a summary of the wells sampled during each event and the rationale for sampling the indicated wells:

- GM-8, GM-19S, GM-21, GM-35, and RMW-94 (August and December 2018); GM-6 and GM-63 (August 2018) – These locations were selected to evaluate PFAS concentrations in the area of the 2005 industrial fire in which firefighting foam (AFFF) was used and near the downgradient property boundary.
- GM-16 (August and December 2018) and GM-48 (December 2018) – These locations were selected to evaluate PFAS concentrations downgradient of the Site.

- GM-23 and RMW-92 (August 2018); GM-66 (August and December 2018) – These locations were selected to evaluate the PFAS concentrations along the centerline of the site-specific VOC plume.
- GM-24 (August and December 2018), HR-11 (August 2018), and W-1-N (August 2018) – These locations were selected to evaluate the PFAS concentrations upgradient of the Site.
- GM-34 (August 2018) – This location was selected to evaluate the PFAS concentrations on the eastern side of the Site.
- GM-60 (December 2018) – This location was selected based on the relative proximity to the source area and centerline of the site-specific VOC plume.
- GM-65S (December 2018) – This location was selected to evaluate PFAS concentrations in groundwater on the southern boundary of the site-specific VOC plume and upgradient of the City of West Carrollton.
- GM-72 and GM-75S (August 2018) – These locations were selected to evaluate concentrations of PFAS near the site-specific VOC source area.
- HR-1 (August 2018) – This location was selected to evaluate the PFAS concentrations along the centerline of the site-specific VOC plume.
- W-4-N (August 2018) – This location was selected to evaluate concentrations of PFAS on the western side of the Site.

Table 6 of the 2018 Groundwater Monitoring Report (Monitoring Report) summarizes well construction details, including relationship to the regional clay till, for the network. The analytical results of the August and December 2018 PFAS sampling events are summarized on **Table B-1** and **Figure B-1**.

PROCEDURE

Sampling for PFAS presents unique challenges to typical field sampling protocols as PFAS can be found in many materials such as Teflon tape, pump bladders, and water and oil resistant gear. While most of these materials would not present a large source of contamination of PFAS, they should be avoided. Avoiding potential sources of PFAS contamination is particularly important when concentrations and analytical method detection limits are both expected to be low (i.e. part per trillion). To minimize the chance of cross-contamination, sampling was conducted in accordance with the Arcadis PFAS Sampling Technical Guidance Information (TGI). The PFAS Sampling TGI was provided to the field staff and is included as **Attachment B-1**. The following procedures were used when collecting groundwater samples.

Field Personnel Equipment

- The sampling team filled out the field checklist prior to initiating sample collection.
- Oil and water-resistant clothing such as Goretex or other outdoor performance wear were not worn. Sampling attire included natural fabrics that were well laundered. Rubber rain gear was acceptable for wet weather sampling.
- Clean nitrile gloves were used between sampling locations.
- Showering was avoided the day of sampling.
- Use of personal care products was minimized to those that are medically necessary.
- Any food was consumed away from the area of sampling. Hands were washed before resuming sampling.

Groundwater Sample Collection

Groundwater samples were collected using a submersible pump.

- Low-flow sampling procedures were used to collect the samples.
- Equipment was decontaminated between samples in accordance with the PFAS Sampling TGI.
- Samples were collected near the surface of the water column in the well once low-flow purging was complete.
- Samples were collected in laboratory supplied unpreserved, 250-milliliter HDPE plastic containers.
- Samples were not filtered.
- Samples were stored in a cooler with ice at 4° C for transport to the laboratory.

Sampling Equipment

- All plastic sampling equipment was HDPE. This applied to pump bladders, tubing used for purging, and flow through cells. Sampling equipment did not contain any material that was Teflon coated or was noted to be organic resistant or non-stick.
- Reusable sampling equipment (e.g. flow through cells) was rinsed with PFAS-free water between sampling locations.

Laboratory Analysis

- Groundwater samples were analyzed by TestAmerica Laboratories, Inc. in Sacramento, California. Sampling bottles were provided by the laboratory.
- Samples were analyzed by LC-MS/MS with isotope dilution by modified United States Environmental Protection Agency (U.S. EPA) Method 537 M. Analysis and reporting were completed in accordance with Department of Defense Quality System Manual Version 5.1 (QSM 5.1). The standard method includes 24 PFAS compounds, including perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS) analysis.
- Analysis of the entire sample (i.e. whole sample analysis) was completed. The laboratory indicated sample volume and sample container size desired.

Sampling QA/QC

The following QA/QC samples were collected (**Table B-1**):

- Equipment blank were collected with decontaminated sampling equipment each day for both events.
- Duplicate samples were collected at GM-6 (August 2018) and GM-35 (December 2018).
- MS/MSD samples were collected at W-4-N (August 2018) and GM-16 (December 2018).

RESULTS

The most applicable screening level for the Site is the U.S. EPA Health Advisory Level (HAL) for a combined concentration of PFOA and PFOS (70 nanograms per liter [ng/L]). The results from each sampling event were screened against this value (**Table B-1**). The combined concentrations of PFOA and PFOS from the August 2018 sampling event ranged from 1.8 ng/L to 217 ng/L at monitoring wells W-4-N and GM-35, respectively. The result from monitoring well GM-35 was the only combined PFOA and PFOS result that exceeded the HAL. Monitoring well GM-35 is in the area to the south of Former Building 14, where on February 8, 2005 an industrial fire occurred requiring the use of PFAS-containing AFFF (**Figure B-1**).

The combined concentrations of PFOA and PFOS from the December 2018 sampling event ranged from 5.2 ng/L to 52 ng/L at GM-21 and GM-35, respectively. None of the combined PFOA and PFOS results exceeded the HAL.

CONCLUSIONS AND RECOMMENDATIONS

The results indicate that PFAS in the upper aquifer is delineated. The only sample that exceeded the HAL was from monitoring well GM-35 (217 ng/L), during the August sampling event. Monitoring well GM-35 is located downgradient of the 2005 fire location, where AFFF was used. During the December 2018 sampling event, the combined PFOA and PFOS concentration in monitoring well GM-35 was below the HAL. Therefore, the elevated concentration appears to be localized near GM-35 during the August event. It is also noteworthy that there were detections of PFAS upgradient of the Site.

Based on the findings from the two PFAS groundwater sampling events, additional sampling and/or remediation of PFAS at the Site is not recommended.

Table

Table B-1 – Summary of PFAS Data in Groundwater in 2018

Figure

Figure B-1 – Preliminary PFAS Groundwater Analytical Data with Total Chlorinated VOC Isoconcentration Contours

Attachment

Attachment B-1 – PFAS Sampling Technical Guidance Information

TABLE

Table B-1
Summary of PFAS Data in Groundwater in 2018
RACER Trust Moraine Facilities
Moraine, Ohio

	Unit	U.S. EPA Health Advisory Level	GM-6	GM-8		GM-16		GM-19S		GM-21		GM-23
			8/8/2018	8/8/2018	12/5/2018	8/8/2018	12/5/2018	8/8/2018	12/4/2018	8/7/2018	12/5/2018	8/8/2018
Constituents												
Perfluorooctanesulfonic acid (PFOS)	ng/L	-	7.4	27	21	25	16	4.0	3.5	6	0.85 J	2
Perfluorooctanoic acid (PFOA)	ng/L	-	6.0	19	15	15	4.8	3.7	3.1	10	4.3	9.8
Combined (PFOS and PFOA)	ng/L	70	13	46	36	40	21	7.7	6.6	16	5.2	12
N-methyl perfluorooctane sulfonamidoacetic acid (NMeFOSAA)	ng/L	-	<19 U	<19 U	< 19 U	<16 U	< 19 U	<16 U	< 17 U	<16 U	< 17 U	<18 U
N-ethyl perfluorooctane sulfonamidoacetic acid (NEtFOSAA)	ng/L	-	<19 U	<19 U	< 19 U	<16 U	< 19 U	<16 U	< 17 U	<16 U	< 17 U	<18 U
Perfluorobutanesulfonic acid (PFBS)	ng/L	-	5.6	4.6	4.3	3.5	3.6	6.0	3.8	3.8	3.1	3.8
Perfluorobutanoic acid (PFBA)	ng/L	-	3.9	4.2 CI	3.9 B	6.3 CI	3.6 B	3.7	3.3 B	10	7.0 B	<1.8 U
Perfluorodecanesulfonic acid (PFDS)	ng/L	-	<1.9 U	<1.9 U	< 1.9 U	<1.6 U	< 1.9 U	<1.6 U	< 1.7 U	<1.6 U	< 1.7 U	<1.8 U
Perfluorodecanoic acid (PFDA)	ng/L	-	<1.9 U	<1.9 U	< 1.9 U	0.32 J	< 1.9 U	<1.6 U	< 1.7 U	0.54 J	0.28 J	0.27 J
Perfluorododecanoic acid (PFDoA)*	ng/L	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Perfluorododecanoic acid (PFDoA)	ng/L	-	<1.9 U	<1.9 U	< 1.9 U	<1.6 U	< 1.9 U	<1.6 U	< 1.7 U	<1.6 U	< 1.7 U	<1.8 U
Perfluoroheptanesulfonic Acid (PFHpS)	ng/L	-	0.18 J	<1.9 U	< 1.9 U	0.26 J	0.30 J	0.16 J	0.18 J	0.22 J	< 1.7 U	0.17 J
Perfluoroheptanoic acid (PFHpA)	ng/L	-	1.3 J	1.6 J	1.0 J	1.8	1.5 J	2.5	1.5 J	4.7	2	5.1
Perfluorohexanoic acid (PFHxA)	ng/L	-	2.6	2.4	1.9	3.2	2.4	5.6	3.3	4.7	4.3	8.3
Perfluorohexanesulfonic acid (PFHxS)	ng/L	-	5.3 B	4.9 B	4.6 B	6.6 B	8.0 B	12 B	12 B	1.7 B	3.3 B	3.2 B
Perfluorononanesulfonic acid (PFNS)	ng/L	-	<1.9 U	<1.9 U	< 1.9 U	<1.6 U	< 1.9 U	<1.6 U	< 1.7 U	<1.6 U	< 1.7 U	<1.8 U
Perfluorononanoic acid (PFNA)	ng/L	-	0.42 J	0.32 J	< 1.9 U	2.1	1.5 J	0.42 J	0.31 J	1.2 J	0.37 J	<1.8 U
Perfluorooctane Sulfonamide (FOSA)	ng/L	-	<1.9 U	<1.9 U	< 1.9 U	<1.6 U	< 1.9 U	<1.6 U	< 1.7 U	<1.6 U	< 1.7 U	<1.8 U
Perfluoropentanesulfonic acid (PFPeS)	ng/L	-	1.0 J	0.78 J	0.39 J	1.3 J	1.3 J	3.3	1.9	0.41 J	1.4 J	2.3
Perfluoropentanoic acid (PFPeA)	ng/L	-	2.6	2.4	2.7	1.3 J	2.7	5.2	2.8	5	4.8	10
Perfluorotetradecanoic acid (PFTeA)	ng/L	-	<1.9 U	<1.9 U	< 1.9 U	<1.6 U	< 1.9 U	<1.6 U	< 1.7 U	<1.6 U	< 1.7 U	<1.8 U
Perfluorotetradecanoic acid (PFTeA)*	ng/L	-	NA	<1.9 U H	NA	NA	NA	NA	NA	NA	NA	NA
Perfluorotridecanoic Acid (PFTriA)*	ng/L	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Perfluorotridecanoic Acid (PFTriA)	ng/L	-	<1.9 U	<1.9 U	< 1.9 U	<1.6 U	< 1.9 U	<1.6 U	< 1.7 U	<1.6 U	< 1.7 U	<1.8 U
Perfluoroundecanoic acid (PFUnA)	ng/L	-	<1.9 U	<1.9 U	< 1.9 U	<1.6 U	< 1.9 U	<1.6 U	< 1.7 U	<1.6 U	< 1.7 U	<1.8 U
4:2 FTS	ng/L	-	<19 U	<19 U	< 19 U	<16 U	< 19 UF1	<16 U	< 17 U	<18 U	< 17 U	<16 U
6:2 FTS	ng/L	-	<19 U	<19 U	< 19 U	<16 U	< 19 U	<16 U	< 17 U	<18 U	< 17 U	<16 U
8:2 FTS	ng/L	-	<19 U	<19 U	< 19 U	<16 U	< 19 U	<16 U	< 17 U	<18 U	< 17 U	<16 U

Notes:
- Not available.
* Sample re-prepared due to Isotope Dilution Analyte percent recovery out of range in the initial analysis.
Bold and shaded - Result above combined PFOA and PFOS Health Advisory Level.
B - Compound was found in the blank and sample.
CI - The peak identified by the data system exhibited chromatographic interference that could not be resolved. There is reason to suspect there may be a high bias.
F1 - MS and/or MSD recovery is outside acceptance limits.
H - Sample was prepped or analyzed beyond the specified holding time.
J - Result is less than the reporting limit but greater than or equal to the method detection limit and the concentration is an approximate value.
NA - Not analyzed.
ng/L - Nanograms per liter.
U - Indicates the analyte was analyzed for but not detected.

Table B-1
Summary of PFAS Data in Groundwater in 2018
RACER Trust Moraine Facilities
Moraine, Ohio

	Unit	U.S. EPA Health Advisory Level	GM-24		GM-34	GM-35		GM-48	GM-60	GM-63	GM-65S
			8/8/2018	12/5/2018	8/7/2018	8/8/2018	12/5/2018	12/4/2018	12/4/2018	8/9/2018	12/4/2018
Constituents											
Perfluorooctanesulfonic acid (PFOS)	ng/L	-	13	11	11	130 CI	29	6.9	1.2 J	14	11
Perfluorooctanoic acid (PFOA)	ng/L	-	10	10	6.4	87	23	6.3	3.7	5.1	3.1
Combined (PFOS and PFOA)	ng/L	70	23	21	17	**217**	52	13	4.9	19	14
N-methyl perfluorooctane sulfonamidoacetic acid (NMeFOSAA)	ng/L	-	<16 U	< 17 U	<17 U	<19 U	< 18 U	<16 U	< 18 U	<16 U	< 16 U
N-ethyl perfluorooctane sulfonamidoacetic acid (NEtFOSAA)	ng/L	-	<16 U	< 17 U	<17 U	<19 U	< 18 U	<16 U	< 18 U	<16 U	< 16 U
Perfluorobutanesulfonic acid (PFBS)	ng/L	-	100	130	7.4	4.8	2.6	4.1	3.9	5.9	7.4
Perfluorobutanoic acid (PFBA)	ng/L	-	20	23 B	4.1	63 CI	< 9.1 U	4.6 B	6.9 B	2.8	5.0 B
Perfluorodecanesulfonic acid (PFDS)	ng/L	-	<1.6 U	< 1.7 U	<1.7 U	<1.9 U	< 1.8 U	< 1.6 U	< 1.8 U	<1.6 U	< 1.6 U
Perfluorodecanoic acid (PFDA)	ng/L	-	1.6 U	0.36 J	<1.7 U	<1.9 U	< 1.8 U	< 1.6 U	< 1.8 U	<1.6 U	< 1.6 U
Perfluorododecanoic acid (PFDoA)*	ng/L	-	NA	NA	NA	NA	NA	NA	NA	NA	NA
Perfluorododecanoic acid (PFDoA)	ng/L	-	<1.6 U	< 1.7 U	<1.7 U	<1.9 U	< 1.8 U	< 1.6 U	< 1.8 U	<1.6 U	< 1.6 U
Perfluoroheptanesulfonic Acid (PFHpS)	ng/L	-	2.9	2.3	0.40 J	0.84 J	< 1.8 U	0.35 J	< 1.8 U	0.42 J	0.22 J
Perfluoroheptanoic acid (PFHpA)	ng/L	-	15	9.9	3.7	1.2 J	0.97 J	2.7	2.9	1.6	2.5
Perfluorohexanoic acid (PFHxA)	ng/L	-	140	170	8.1	<1.9 U	< 1.8 U	4.2	9.5	2.3	5.2
Perfluorohexanesulfonic acid (PFHxS)	ng/L	-	250 B	270 B	15 B	5.3 B	3.4 B	8.6 B	3.9 B	14 B	< 1.6 U
Perfluorononanesulfonic acid (PFNS)	ng/L	-	<1.6 U	< 1.7 U	<1.7 U	<1.9 U	< 1.8 U	< 1.6 U	< 1.8 U	<1.6 U	< 1.6 U
Perfluorononanoic acid (PFNA)	ng/L	-	0.58 J	0.76 J	0.62 J	<1.9 U	< 1.8 U	1.2 J	< 1.8 U	5.6	0.37 J
Perfluorooctane Sulfonamide (FOSA)	ng/L	-	<1.6 U	< 1.7 U	<1.7 U	<1.9 U	< 1.8 U	< 1.6 U	< 1.8 U	<1.6 U	< 1.6 U
Perfluoropentanesulfonic acid (PFPeS)	ng/L	-	76	83	9.0	8.8	< 1.8 U	1.7	1.0 J	3.5	1.4 J
Perfluoropentanoic acid (PFPeA)	ng/L	-	33	39	8.1	<1.9 U	< 9.1 U	4	12	2.0	6.5
Perfluorotetradecanoic acid (PFTeA)	ng/L	-	<1.6 U	< 1.7 U	<1.7 U	<1.9 U	< 1.8 U	< 1.6 U	< 1.8 U	<1.6 U	< 1.6 U
Perfluorotetradecanoic acid (PFTeA)*	ng/L	-	NA	NA	NA	NA	NA	NA	NA	NA	NA
Perfluorotridecanoic Acid (PFTriA)*	ng/L	-	NA	NA	NA	NA	NA	NA	NA	NA	NA
Perfluorotridecanoic Acid (PFTriA)	ng/L	-	<1.6 U	< 1.7 U	<1.7 U	<1.9 U	< 1.8 U	< 1.6 U	< 1.8 U	<1.6 U	< 1.6 U
Perfluoroundecanoic acid (PFUnA)	ng/L	-	<1.6 U	< 1.7 U	<1.7 U	<1.9 U	< 1.8 U	< 1.6 U	< 1.8 U	<1.6 U	< 1.6 U
4:2 FTS	ng/L	-	<17 U	< 17 U	<19 U	<16 U	< 18 U	<16	< 18 U	<17 U	< 16 U
6:2 FTS	ng/L	-	<17 U	< 17 U	4.2 J	6.2 J	< 91 U	<16	< 18 U	31	< 16 U
8:2 FTS	ng/L	-	<17 U	< 17 U	<19 U	<16 U	< 91 U	<16	< 18 U	<17 U	< 16 U

Notes:
- Not available.
* Sample re-prepared due to Isotope Dilution Analyte percent recovery out of range in the initial analysis.
Bold and shaded - Result above combined PFOA and PFOS Health Advisory Level.
B - Compound was found in the blank and sample.
CI - The peak identified by the data system exhibited chromatographic interference that could not be resolved. There is reason to suspect there may be a high bias.
F1 - MS and/or MSD recovery is outside acceptance limits.
H - Sample was prepped or analyzed beyond the specified holding time.
J - Result is less than the reporting limit but greater than or equal to the method detection limit and the concentration is an approximate value.
NA - Not analyzed.
ng/L - Nanograms per liter.
U - Indicates the analyte was analyzed for but not detected.

Table B-1
Summary of PFAS Data in Groundwater in 2018
RACER Trust Moraine Facilities
Moraine, Ohio

ARCADIS Design & Consultancy for natural and built assets

	Unit	U.S. EPA Health Advisory Level	GM-66		GM-72	GM-75S	HR-1	HR-11	RMW-92	RMW-94		W-1-N	W-4-N
			8/7/2018	12/5/2018	8/7/2018	8/9/2018	8/7/2018	8/7/2018	8/8/2018	8/8/2018	12/5/2018	8/7/2018	8/7/2018
Constituents													
Perfluorooctanesulfonic acid (PFOS)	ng/L	-	4.9	< 1.7 U	4.0	1.3 J	9.3	0.55 J	13	15	14	1.2	< 1.7 U
Perfluorooctanoic acid (PFOA)	ng/L	-	8.6	6.3	3.8	3.9	6.6	4.7	8.4	8.4	6.6	0.76 J	1.8
Combined (PFOS and PFOA)	ng/L	70	14	6.3	7.8	5.2	16	5.3	21	23	21	2.0	1.8
N-methyl perfluorooctane sulfonamidoacetic acid (NMeFOSAA)	ng/L	-	<17 U	< 17 U	<16 U	<18 U	<17 U	< 16 U	<17 U	<17 U	< 18 U	<17 U	<17 U
N-ethyl perfluorooctane sulfonamidoacetic acid (NEtFOSAA)	ng/L	-	<17 U	< 17 U	<16 U	<18 U	<17 U	< 16 U	<17 U	<17 U	< 18 U	<17 U	<17 U
Perfluorobutanesulfonic acid (PFBS)	ng/L	-	8.8	8.8	4.0	2.3	4.6	44	4.7	4.6	4.6	3.7	8.8
Perfluorobutanoic acid (PFBA)	ng/L	-	12	11 B	4.6	8.2	9.2	12	6.7	5.3	4.6 B	3.4	13
Perfluorodecanesulfonic acid (PFDS)	ng/L	-	<1.7 U	< 1.7 U	<1.6 U	<1.8 U	<1.7 U	< 1.6 U	<1.7 U	<1.7 U	< 1.8 U	<1.7 U	<1.7 U
Perfluorodecanoic acid (PFDA)	ng/L	-	0.48 J	< 1.7 U	<1.6 U	1.1 J	<1.7 U	< 1.6 U	<1.7 U	<1.7 U	< 1.8 U	<1.7 U	<1.7 U
Perfluorododecanoic acid (PFDoA)*	ng/L	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Perfluorododecanoic acid (PFDoA)	ng/L	-	<1.7 U	< 1.7 U	<1.6 U	0.56 J	<1.7 U	< 1.6 U	<1.7 U	<1.7 U	< 1.8 U	<1.7 U	<1.7 U
Perfluoroheptanesulfonic Acid (PFHpS)	ng/L	-	<1.7 U	< 1.7 U	<1.6 U	<1.8 U	0.30 J	< 1.6 U	0.41 J	0.66 J	0.57 J	<1.7 U	<1.7 U
Perfluoroheptanoic acid (PFHpA)	ng/L	-	10	7.9	2.5	2.7	5.7	7.7	3.5	4.2	2.3	1.8	2.1
Perfluorohexanoic acid (PFHxA)	ng/L	-	17	14	4.2	7.1	15	70	7.4	5.1	5.2	2.8	11
Perfluorohexanesulfonic acid (PFHxS)	ng/L	-	3.5 B	1.6 JB	9.4 B	2.6 B	3.3 B	74 B	6.0 B	6.5 B	5.6 B	3.0 B	2.5 B
Perfluorononanesulfonic acid (PFNS)	ng/L	-	<1.7 U	< 1.7 U	<1.6 U	<1.8 U	<1.7 U	< 1.6 U	<1.7 U	<1.7 U	< 1.8 U	<1.7 U	<1.7 U
Perfluorononanoic acid (PFNA)	ng/L	-	2.8	0.32 J	0.22 J	0.74 J	3.3	0.23 J	0.83 J	1.0 J	0.84 J	<1.7 U	<1.7 U
Perfluorooctane Sulfonamide (FOSA)	ng/L	-	<1.7 U	< 1.7 U	<1.6 U	<1.8 U	<1.7 U	< 1.6 U	<1.7 U	<1.7 U	< 1.8 U	<1.7 U	<1.7 U
Perfluoropentanesulfonic acid (PFPeS)	ng/L	-	3.2	2.8	1.0 J	0.48 J	1.1 J	43	1.4 J	1.1 J	1.1 J	1.1 J	2.5
Perfluoropentanoic acid (PFPeA)	ng/L	-	22.0	15	3.6	7.3	13	18	6.6	5.3	4.3	3.0	9.2
Perfluorotetradecanoic acid (PFTeA)	ng/L	-	<1.7 U	< 1.7 U	<1.6 U	<1.8 U	<1.7 U	< 1.6 U	<1.7 U	<1.7 U	< 1.8 U	<1.7 U	<1.7 U
Perfluorotetradecanoic acid (PFTeA)*	ng/L	-	NA	NA	NA	<1.8 U H	NA	NA	NA	NA	NA	NA	NA
Perfluorotridecanoic Acid (PFTriA)*	ng/L	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Perfluorotridecanoic Acid (PFTriA)	ng/L	-	<1.7 U	< 1.7 U	<1.6 U	<1.8 U	<1.7 U	< 1.6 U	<1.7 U	<1.7 U	< 1.8 U	<1.7 U	<1.7 U
Perfluoroundecanoic acid (PFUnA)	ng/L	-	<1.7 U	< 1.7 U	<1.6 U	<1.8 U	<1.7 U	< 1.6 U	<1.7 U	<1.7 U	< 1.8 U	<1.7 U	<1.7 U
4:2 FTS	ng/L	-	<16 U	< 17 U	<18 U	<17 U	<16 U	< 16 U	<17 U	<17 U	< 18 U	< 17 U	< 17 UF1
6:2 FTS	ng/L	-	2.2 J	41	<18 U	<17 U	<16 U	< 16 U	<17 U	<17 U	< 18 U	< 17 U	1.7 J
8:2 FTS	ng/L	-	<16 U	< 17 U	<18 U	<17 U	<16 U	< 16 U	<17 U	<17 U	< 18 U	< 17 U	< 17 U

Notes:
- Not available.
* Sample re-prepared due to Isotope Dilution Analyte percent recovery out of range in the initial analysis.
Bold and shaded - Result above combined PFOA and PFOS Health Advisory Level**.**
B - Compound was found in the blank and sample.
CI - The peak identified by the data system exhibited chromatographic interference that could not be resolved. There is reason to suspect there may be a high bias.
F1 - MS and/or MSD recovery is outside acceptance limits.
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J - Result is less than the reporting limit but greater than or equal to the method detection limit and the concentration is an approximate value.
NA - Not analyzed.
ng/L - Nanograms per liter.
U - Indicates the analyte was analyzed for but not detected.

Table B-1
Summary of PFAS Data in Groundwater in 2018
RACER Trust Moraine Facilities
Moraine, Ohio

	Unit	U.S. EPA Health Advisory Level	EB-01 8/7/2018	EB-02 8/7/2018	EB-03 8/8/2018	EB-04 8/8/2018	EB-05 8/9/2018	DUP-01 8/8/2018 (GM-6)	EB-01 12/4/2018	EB-02 12/4/2018	EB-03 12/5/2018	EB-04 12/5/2018	DUP-01 12/5/2018 (GM-35)
Constituents													
Perfluorooctanesulfonic acid (PFOS)	ng/L	-	< 1.7 U	< 1.6 U	< 1.6 U	< 1.6 U	< 1.7 U	7.2	< 1.8 U	< 1.7 U	< 1.7 U	< 1.9 U	30
Perfluorooctanoic acid (PFOA)	ng/L	-	< 1.7 U	< 1.6 U	< 1.6 U	< 1.6 U	< 1.7 U	6.2	< 1.8 U	< 1.7 U	< 1.7 U	< 1.9 U	23
Combined (PFOS and PFOA)	ng/L	70	< 1.7 U	< 1.6 U	< 1.6 U	< 1.6 U	< 1.7 U	13.4	< 1.8 U	< 1.7 U	< 1.7 U	< 1.9 U	53
N-methyl perfluorooctane sulfonamidoacetic acid (NMeFOSAA)	ng/L	-	<17 U	<16 U	<16 U	<16 U	<17 U	< 19 U	<17 U	<17 U	<17 U	<19 U	<19 U
N-ethyl perfluorooctane sulfonamidoacetic acid (NEtFOSAA)	ng/L	-	<17 U	<16 U	<16 U	<16 U	<17 U	< 19 U	<17 U	<17 U	<17 U	<19 U	<19 U
Perfluorobutanesulfonic acid (PFBS)	ng/L	-	< 1.7 U	< 1.6 U	< 1.6 U	< 1.6 U	< 1.7 U	5.5	< 1.8 U	< 1.7 U	< 1.7 U	< 1.9 U	< 3.3 U
Perfluorobutanoic acid (PFBA)	ng/L	-	< 1.7 U	0.76 J	< 1.6 U	< 1.6 U	< 1.7 U	3.5	0.63 JB	0.74 JB	0.66 JB	0.35 JB	0.35 JB
Perfluorodecanesulfonic acid (PFDS)	ng/L	-	< 1.7 U	< 1.6 U	< 1.6 U	< 1.6 U	< 1.7 U	<1.9 U	< 1.8 U	< 1.7 U	< 1.7 U	< 1.9 U	< 1.9 U
Perfluorodecanoic acid (PFDA)	ng/L	-	< 1.7 U	< 1.6 U	< 1.6 U	< 1.6 U	< 1.7 U	<1.9 U	< 1.8 U	< 1.7 U	< 1.7 U	< 1.9 U	< 1.9 U
Perfluorododecanoic acid (PFDoA)*	ng/L	-	< 1.7 U	< 1.6 U	< 1.6 U	< 1.6 U	< 1.7 U	NA	< 1.8 U	< 1.7 U	< 1.7 U	< 1.9 U	< 1.9 U
Perfluorododecanoic acid (PFDoA)	ng/L	-	< 1.7 U	< 1.6 U	< 1.6 U	< 1.6 U	< 1.7 U	<1.9 U	< 1.8 U	< 1.7 U	< 1.7 U	< 1.9 U	< 1.9 U
Perfluoroheptanesulfonic Acid (PFHpS)	ng/L	-	< 1.7 U	< 1.6 U	< 1.6 U	< 1.6 U	< 1.7 U	<1.9 U	< 1.8 U	< 1.7 U	< 1.7 U	< 1.9 U	< 1.9 U
Perfluoroheptanoic acid (PFHpA)	ng/L	-	< 1.7 U	< 1.6 U	< 1.6 U	< 1.6 U	< 1.7 U	1.2 J	< 1.8 U	< 1.7 U	< 1.7 U	< 1.9 U	0.91 J
Perfluorohexanoic acid (PFHxA)	ng/L	-	< 1.7 U	< 1.6 U	< 1.6 U	< 1.6 U	< 1.7 U	2.7	< 1.8 U	< 1.7 U	< 1.7 U	< 1.9 U	< 1.9 U
Perfluorohexanesulfonic acid (PFHxS)	ng/L	-	0.26 JB	0.23 JB	0.23 JB	0.19 JB	0.21 JB	5.5 B	0.25 JB	< 1.7 U	< 1.7 U	< 1.9 U	3.7 B
Perfluorononanesulfonic acid (PFNS)	ng/L	-	< 1.7 U	< 1.6 U	< 1.6 U	< 1.6 U	< 1.7 U	<1.9 U	< 1.8 U	< 1.7 U	< 1.7 U	< 1.9 U	< 1.9 U
Perfluorononanoic acid (PFNA)	ng/L	-	< 1.7 U	< 1.6 U	< 1.6 U	< 1.6 U	< 1.7 U	0.33 J	< 1.8 U	< 1.7 U	< 1.7 U	< 1.9 U	< 1.9 U
Perfluorooctane Sulfonamide (FOSA)	ng/L	-	< 1.7 U	< 1.6 U	< 1.6 U	< 1.6 U	< 1.7 U	<1.9 U	< 1.8 U	< 1.7 U	< 1.7 U	< 1.9 U	< 1.9 U
Perfluoropentanesulfonic acid (PFPeS)	ng/L	-	< 1.7 U	< 1.6 U	< 1.6 U	< 1.6 U	< 1.7 U	1.0 J	< 1.8 U	< 1.7 U	< 1.7 U	< 1.9 U	< 1.9 U
Perfluoropentanoic acid (PFPeA)	ng/L	-	< 1.7 U	< 1.6 U	< 1.6 U	< 1.6 U	< 1.7 U	3.1	< 1.8 U	< 1.7 U	< 1.7 U	< 1.9 U	< 9.3 U
Perfluorotetradecanoic acid (PFTeA)	ng/L	-	< 1.7 U	< 1.6 U	< 1.6 U	< 1.6 U	< 1.7 U	0.88 J	< 1.8 U	< 1.7 U	< 1.7 U	< 1.9 U	< 1.9 U
Perfluorotetradecanoic acid (PFTeA)*	ng/L	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Perfluorotridecanoic Acid (PFTriA)*	ng/L	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Perfluorotridecanoic Acid (PFTriA)	ng/L	-	< 1.7 U	< 1.6 U	< 1.6 U	< 1.6 U	< 1.7 U	<1.9 U	< 1.8 U	< 1.7 U	< 1.7 U	< 1.9 U	< 1.9 U
Perfluoroundecanoic acid (PFUnA)	ng/L	-	< 1.7 U	< 1.6 U	< 1.6 U	< 1.6 U	< 1.7 U	<1.9 U	< 1.8 U	< 1.7 U	< 1.7 U	< 1.9 U	< 1.9 U
4:2 FTS	ng/L	-	<17 U	<16 U	<16 U	<16 U	<17 U	< 19 U	<18 U	<17 U	<17 U	<19 U	<19 U
6:2 FTS	ng/L	-	<17 U	<16 U	<16 U	<16 U	<17 U	< 19 U	<18 U	<17 U	<17 U	<19 U	<93 U
8:2 FTS	ng/L	-	<17 U	<16 U	<16 U	<16 U	<17 U	< 19 U	<18 U	<17 U	<17 U	<19 U	<93 U

Notes:
- Not available.
* Sample re-prepared due to Isotope Dilution Analyte percent recovery out of range in the initial analysis.
Bold and shaded - Result above combined PFOA and PFOS Health Advisory Level.
B - Compound was found in the blank and sample.
CI - The peak identified by the data system exhibited chromatographic interference that could not be resolved. There is reason to suspect there may be a high bias.
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NA - Not analyzed.
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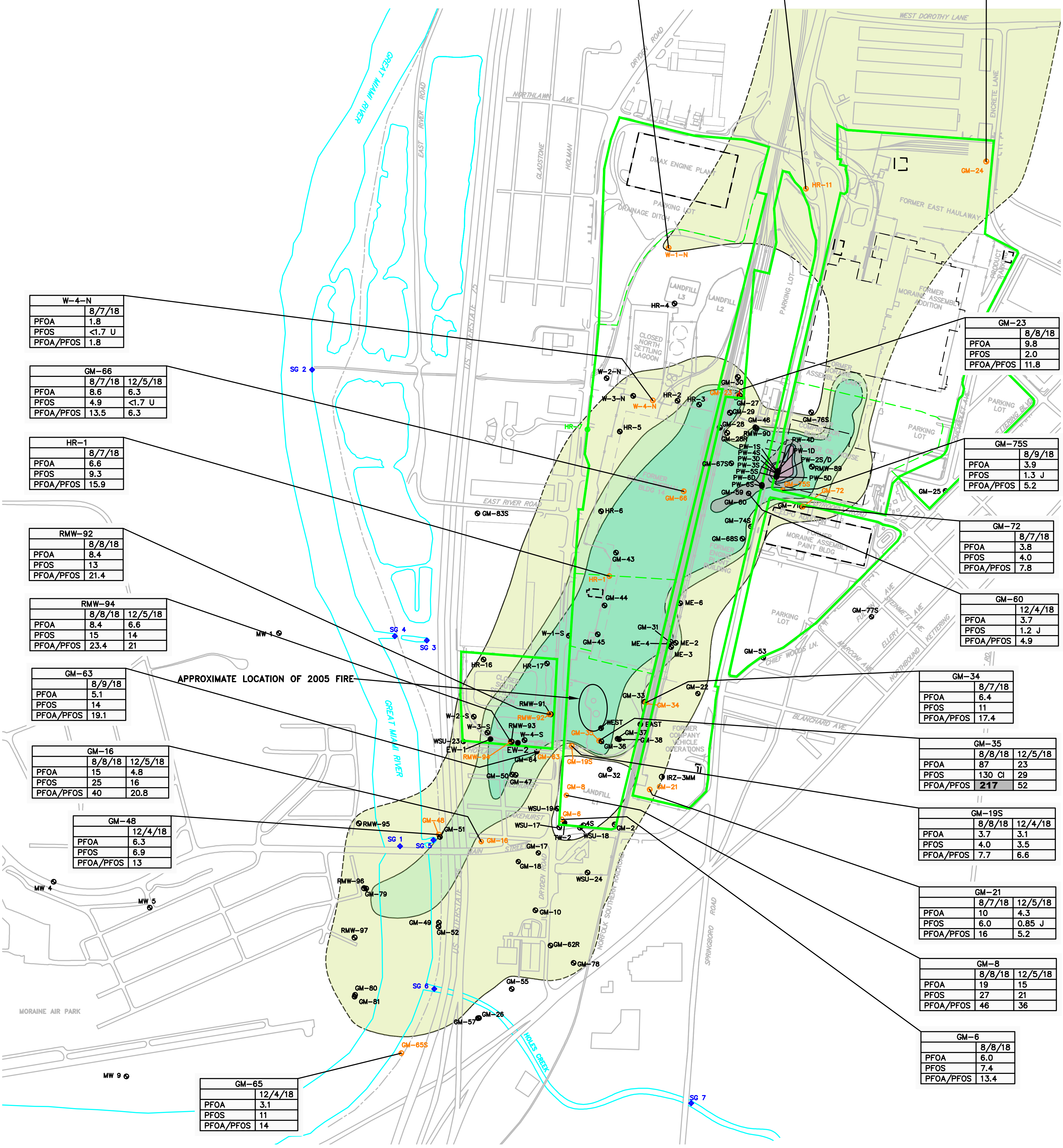
U - Indicates the analyte was analyzed for but not detected.

FIGURE



W-1-N	8/7/18
PFOA	0.76 J
PFOS	1.2
PFOA/PFOS	1.96

HR-11	8/7/18
PFOA	4.7
PFOS	0.55 J
PFOA/PFOS	5.25

GM-24	8/8/18	12/5/18
PFOA	10	10
PFOS	13	11
PFOA/PFOS	23	21

W-4-N	8/7/18
PFOA	1.8
PFOS	<1.7 U
PFOA/PFOS	1.8

GM-66	8/7/18	12/5/18
PFOA	8.6	6.3
PFOS	4.9	<1.7 U
PFOA/PFOS	13.5	6.3

HR-1	8/7/18
PFOA	6.6
PFOS	9.3
PFOA/PFOS	15.9

RMW-92	8/8/18
PFOA	8.4
PFOS	13
PFOA/PFOS	21.4

RMW-94	8/8/18	12/5/18
PFOA	8.4	6.6
PFOS	15	14
PFOA/PFOS	23.4	21

GM-63	8/9/18
PFOA	5.1
PFOS	14
PFOA/PFOS	19.1

GM-16	8/8/18	12/5/18
PFOA	15	4.8
PFOS	25	16
PFOA/PFOS	40	20.8

GM-48	12/4/18
PFOA	6.3
PFOS	6.9
PFOA/PFOS	13

GM-65	12/4/18
PFOA	3.1
PFOS	11
PFOA/PFOS	14

GM-23	8/8/18
PFOA	9.8
PFOS	2.0
PFOA/PFOS	11.8

GM-75S	8/9/18
PFOA	3.9
PFOS	1.3 J
PFOA/PFOS	5.2

GM-72	8/7/18
PFOA	3.8
PFOS	4.0
PFOA/PFOS	7.8

GM-60	12/4/18
PFOA	3.7
PFOS	1.2 J
PFOA/PFOS	4.9

GM-34	8/7/18
PFOA	6.4
PFOS	11
PFOA/PFOS	17.4

GM-35	8/8/18	12/5/18
PFOA	87	23
PFOS	130 CI	29
PFOA/PFOS	**217**	52

GM-19S	8/8/18	12/4/18
PFOA	3.7	3.1
PFOS	4.0	3.5
PFOA/PFOS	7.7	6.6

GM-21	8/7/18	12/5/18
PFOA	10	4.3
PFOS	6.0	0.85 J
PFOA/PFOS	16	5.2

GM-8	8/8/18	12/5/18
PFOA	19	15
PFOS	27	21
PFOA/PFOS	46	36

GM-6	8/8/18
PFOA	6.0
PFOS	7.4
PFOA/PFOS	13.4

LEGEND

- MONITORING WELL (UPPER AQUIFER)
- INACTIVE EXTRACTION WELL (EW-1, EW-2, AND TW-2)
- STREAM GAUGE
- CARBON INTRODUCTION WELL
- WELLS SAMPLED FOR PFAS IN 2018
- FORMER BUILDING FOOTPRINT
- CURRENT BUILDING FOOTPRINT
- RIVER LEVEE
- SURFACE WATER FEATURE
- PROPERTY BOUNDARY
- PARCEL BOUNDARY

GM-23	SAMPLE IDENTIFICATION
8/8/18	DATE OF SAMPLE
PFOA	PERFLUOROOCTANOIC ACID
PFOS	PERFLUOROOCTANESULFONIC ACID
PFOA/PFOS	COMBINED RESULT

BOLD RESULT ABOVE COMBINED PFOA AND PFOS U.S. EPA HEALTH ADVISORY LEVEL OF 70 ng/L

CI THE PEAK IDENTIFIED BY THE DATA SYSTEM EXHIBITED CHROMATOGRAPHIC INTERFERENCE THAT COULD NOT BE RESOLVED. THERE IS REASON TO SUSPECT THERE MAY BE A HIGH BIAS

J RESULT IS LESS THAN THE REPORTING LIMIT BUT GREATER THAN OR EQUAL TO THE METHOD DETECTION LIMIT AND THE CONCENTRATION IS AN APPROXIMATE VALUE

U INDICATES THE ANALYTE WAS ANALYZED FOR BUT NOT DETECTED

NOTE: ALL PFAS RESULTS IN NANOGRAMS PER LITER (ng/L)

TOTAL CHLORINATED VOC CONCENTRATIONS

- >10000 ug/L
- 5000–10000 ug/L
- 1000–5000 ug/L
- 100–1000 ug/L
- 50–100 ug/L
- 5–50 ug/L

NOTE:

1. TOTAL CHLORINATED VOC CONCENTRATIONS REFLECT 2018 MONITORING WELL RESULTS, 2017 THROUGH 2013 MONITORING WELL RESULTS, PRE-2013 MONITORING WELL RESULTS, AND MAXIMUM CONCENTRATION FROM VERTICAL AQUIFER PROFILING FROM 2011 THROUGH 2015. THE INTERPRETATION OF THE ISOCONCENTRATION INCLUDES THE CONCEPTUAL SITE MODEL UNDERSTANDING (I.E. GROUNDWATER FLOW AND INTERIM MEASURES OPERATION).
2. WHEN SAMPLE RESULT IS NON-DETECT, HALF THE REPORTING LIMIT IS HONORED WITH THE CONTOURING.

DRAFT

0 200 1000ft

RACER TRUST
MORAINE, OHIO

OH000294.2019

PFAS SAMPLING RESULTS - AUGUST AND DECEMBER, 2018

ARCADIS Design & Consultancy for natural and built assets

FIGURE
B-1

Attachment B-1

PFAS Sampling Technical Guidance Information

ARCADIS Design & Consultancy for natural and built assets

POLY- AND PERFLUORINATED ALKYL SUBSTANCES (PFAS) FIELD SAMPLING GUIDANCE

Rev: 0

Rev Date: April 27, 2017

VERSION CONTROL

Revision No	Revision Date	Page No(s)	Description	Reviewed by
0	April 27, 2017	All	Initial Release	Erica Kalve Erika Houtz Sue Tauro

APPROVAL SIGNATURES

Prepared by:		04/26/2017
	Erika F. Houtz, PhD Environmental Engineer and PFAS Analytical Lead	Date
Reviewed by:		04/27/2017
	Erica Kalve, PG-CA Emerging Contaminants Focus Group Leader	Date:

1 INTRODUCTION

This document describes general and/or specific procedures, methods, actions, steps, and considerations to be used and observed by Arcadis staff when performing work, tasks, or actions under the scope and relevancy of this document. This document may describe expectations, requirements, guidance, recommendations, and/or instructions pertinent to the service, work task, or activity it covers.

It is the responsibility of the Arcadis Certified Project Manager (CPM) to provide this document to the persons conducting services that fall under the scope and purpose of this procedure, instruction, and/or guidance. The Arcadis CPM will also ensure that the persons conducting the work falling under this document are appropriately trained and familiar with its content. The persons conducting the work under this document are required to meet the minimum competency requirements outlined herein, and inquire to the CPM regarding any questions, misunderstanding, or discrepancy related to the work under this document.

This document is not considered to be all inclusive nor does it apply to any and all projects. It is the CPM's responsibility to determine the proper scope and personnel required for each project. There may be project- and/or client- and/or state-specific requirements that may be more or less stringent than what is described herein. The CPM is responsible for informing Arcadis and/or Subcontractor personnel of omissions and/or deviations from this document that may be required for the project. In turn, project staff are required to inform the CPM if or when there is a deviation or omission from work performed as compared to what is described herein.

In following this document to execute the scope of work for a project, it may be necessary for staff to make professional judgment decisions to meet the project's scope of work based upon site conditions, staffing expertise, state-specific requirements, health and safety concerns, etc. Staff are required to consult with the CPM when or if a deviation or omission from this document is required that has not already been previously approved by the CPM. Upon approval by the CPM, the staff can perform the deviation or omission as confirmed by the CPM.

2 SCOPE AND APPLICATION

The purpose of this Technical Guidance Instructions (TGI) is to provide guidance on field sampling to be used for poly-and perfluorinated alkyl substances (PFAS). This protocol was adapted from various sources including Arcadis Australia, Transport Canada, and the U.S Army Corp of Engineers (USACE) Omaha.

Given the extremely low detection limits associated with PFAS analysis and the many potential sources of trace levels of PFAS, field personnel are advised to err on the side of caution by strictly following these protocols, frequently replacing nitrile gloves, and rinsing field equipment to help mitigate the potential for false detections of PFAS. Other specific items related to field sampling for PFAS are discussed in the sections below.

This TGI applies to all Arcadis and subcontractor personnel involved in field sampling for PFAS.

3 PERSONNEL QUALIFICATIONS

3.1 Sampling Personnel

Field personnel must have current health and safety training, including 40-hour HAZWOPER training, site supervisor training, and site-specific training, as needed. In addition, field personnel will be versed in the other relevant SOPs (e.g., low flow sampling) and will possess the skills and experience necessary to successfully complete the desired field work. The site Health and Safety Plan (HASP) and other documents will identify any other training requirements such as site-specific safety training or access control requirements.

3.2 Laboratories

These laboratories may be used to analyze environmental media for PFAS:

- United States: Test America, SGS, Vista, ALS, RTI, and Eurofins
- Canada: Axys-SGS and Maxxam Laboratories

Other laboratories may be used if they are accredited for PFAS analysis.

4 EQUIPMENT LIST

The following equipment and materials must be available for sampling:

- Site plan of sampling locations, relevant work plan (or equivalent), and this TGI;
- Appropriate health and safety equipment, as specified in the site HASP;
- Dedicated plastic sheeting (preferably high-density polyethylene [HDPE]) or other clean surface to prevent sample contact with the ground;
- Conductivity/temperature/pH meter;
- Dissolved oxygen meter, oxidation reduction potential meter, and turbidity meter;
- Depth to water meter;
- If using low-flow groundwater sampling techniques, peristaltic pump (groundwater sampling)/bladder pump (with PFAS free bladder/ HDPE bladder), flow through cell, and accompanying HDPE and silicone tubing;
- Hydrasleeves, if using Hydrasleeves for groundwater sampling;
- Metal trowel for soil samples; specialized soil/sediment sampling equipment as required;
- Brushes for scrubbing sampling equipment;
- Pens, pencils, and/or Sharpies for writing;
- Clipboards, field binders, and field note pages that are not waterproof;
- Labeled sample bottles:
    - Water: HDPE bottles fitted with polypropylene screw cap only; some types of PFAS samples (primarily drinking water) may require preservative, which will be indicated by the laboratory conducting the analysis. The laboratory will specify the sample bottle volume.
    - Soil and sediment: HDPE bottles fitted with polypropylene screw cap only; no preservatives. The laboratory will specify the sample bottle volume.
- If high concentrations of PFAS related to class B firefighting foams are expected, bring ‘shaker test' vials;

- Ziploc® bags to hold ice and samples;
- Appropriate blanks (field reagent blanks supplied by the laboratory);
- Appropriate transport bottles (coolers) with ice and appropriate labeling, no blue ice;
- Deionized water for initial decontamination rinsing;
- “PFAS-free” water provided by the laboratory for final decontamination rinsing;
- Methanol, if readily available; especially important for soil sampling;
- Alconox or Liquinox®;
- Packing and shipping materials;
- Groundwater Sampling Log; and
- Chain-of-Custody (COC) Forms.

5 CAUTIONS

5.1 Food Packaging

Some food packaging may be treated with PFAS-containing chemicals to prevent permeation of oil and water in the food outside of the packaging. To avoid potential food packaging-related PFAS contact:

- Do not bring any food outside of the field vehicles onsite and eat snacks and meals offsite.
- Wash hands after eating.
- Remove any field garments or outer layers prior to eating. Do not put them back on until done eating and hands are washed.

5.2 Field Gear

5.2.1 Clothing

Many types of clothing are treated with PFAS for stain and water resistance, in particular outdoor performance wear under brand names such as Gore-Tex®. To avoid potential clothing-related PFAS contact:

- Do not wear any outdoor performance wear that is water or stain resistant, or appears to be. Err on the side of caution.
- Wear pre-laundered (multiple washings, i.e. 6+) clothing that is not stain resistant or water proof.
- Natural fabrics such as cotton are preferred. Synthetic fabrics may also be acceptable if there is no indication on the label that the fabric is water and stain resistant.
- Most importantly, avoid contacting your clothing with sampling equipment, bottles, and samples.

5.2.2 Personal Protective Equipment

Safety Footwear

Some safety footwear has been treated to provide a degree of waterproofing and increased durability, and may represent a source of trace PFAS. For the health and safety of field personnel, footwear must be protected at all times to avoid potential PFAS contamination. To do this:

- Do not touch your safety footwear in the immediate vicinity of the sampling port (i.e., within 10 meters [m]).

- Do not allow gloves used for sampling to come in contact with safety footwear.

Nitrile Gloves

Wear disposable nitrile gloves at all times. Don a new pair of nitrile gloves **before** the following activities at each sample location:

- Decontamination of re-usable sampling equipment;
- Contact with sample bottles or "PFAS-free" water bottles;
- Insertion of anything into the sample ports (e.g., HDPE tubing); and
- Handling of any quality assurance/quality control (QA/QC) samples including field blanks and equipment blanks.

Don a new pair of nitrile gloves **after** the following activities:

- Handling of any non-dedicated sampling equipment;
- Contact with contaminated surfaces; or
- When judged necessary by field personnel.

5.3 Personal Hygiene

- Shower at night.
- Do not use personal care products after showering such as lotions, makeup, and perfumes, UNLESS medically necessary.
- Use sunscreen and insect repellent ONLY if necessary for health and safety. If they are necessary, apply sunscreen and repellant prior to initiating field sampling. If sunscreen and/or repellant need to be reapplied, ensure a safe distance away from the sampling locations and equipment (i.e., more than 10 m away). Wash hands after application.

5.4 Visitors

Visitors to the site are asked to remain at least 10 m from sampling areas.

5.5 Rain Events

Special care should be taken when rain is falling at the project site:

- Do not perform field sampling when rain fall is persistent at a consistent rate that saturates the ground (i.e., formation of puddles) because rain gear is not permitted while sampling. Intermittent showers or fog are acceptable conditions to proceed. If rain showers occur; field gear must be removed from the monitoring well location until the rain subsides.
- If project timelines are tight, consider the use of a gazebo tent that can be erected over the top of the monitoring well to provide shelter from the rain. The canopy material is possibly a PFAS-treated surface and should be managed as such; therefore, wear gloves when moving the tent, change them immediately after moving the tent, and avoid further contact with the tent until all sampling activities have been finished and the team is ready to move on to the next site.

6 HEALTH AND SAFETY CONSIDERATIONS

- The ability to safely access the surface water sampling locations must be verified before sampling.

- Field activities must be performed in accordance with the site HASP, a copy of which will be present onsite during such activities.
- Safety hazards associated with sampling surface water include fast-moving water, deep water, and steep slopes close to sampling sites. Use extreme caution when approaching sampling sites.
- If thunder or lighting is present, discontinue sampling and take cover until 30 minutes have passed after the last occurrence of thunder or lighting.
- Use caution when removing well caps as well may be under pressure, cap can dislodge forcefully and cause injury.

7 PROCEDURE

7.1 Field Equipment Cleaning

Field sampling equipment will require cleaning between uses. For groundwater sampling, between uses, decontaminate the flow-through cell and any non-dedicated equipment (i.e., interface probe of depth to water meter) that comes into contact with well water. Trowels and other materials used to sample soil samples will also require decontamination.

After donning a new pair of nitrile gloves:

- Rinse sampling equipment with Alconox or Liquinox® cleaning solution; Scrub equipment with a plastic brush if needed;
- Rinse two times with distilled water or deionized water;
- Rinse one time with "PFAS-free" water or once with methanol, if it is available, and once with "PFAS-free" water; methanol is especially useful for decontaminating soil sampling equipment; and
- Collect all rinsate in a sealed pail for disposal. Do not reuse decontamination solutions between sampling locations.

Clean all field equipment used at locations that are suspected of containing class B firefighting foam (i.e., those that foam during shaking or are known to be near a class B firefighting foam source zone) using each of the above steps repeated twice.

7.2 Borehole/Monitoring Well Development

If a drill rig is being used to drill for soil cores or to install monitoring wells, wear clean nitrile gloves before collecting each continuous soil sample. Additional requirements include the following:

- Verify in writing with the manufacturer that single-use liners used to collect each sample are made of a material that does not contain PFAS;
- Collect soil samples in laboratory-supplied HDPE bottles.
- Store the sample bottles in coolers and keep at a temperature of 0 to 6ºC until transported to the laboratory.

7.2.1 Well Condition Survey/ Water Level Monitoring

Using equipment that has been thoroughly decontaminated according to the procedures in Section 7.1, conduct the well condition surveys and water level monitoring:

- Conduct monitoring well inspections and record water levels.
- Use an interface probe to evaluate presence/absence of non-aqueous phase liquid (NAPL).
- Measure the depth to water from the top of the polyvinyl chloride (PVC) riser and the total depth of the well.
- Record information in the field notes.

7.2.2 Monitoring Well Development and Purging

Follow these requirements for monitoring well development and purging:

- Do not use Teflon™ tubing for purging or sample collection. HDPE tubing is acceptable.
- Do not re-use materials between wells. Upon completion of use, remove all disposable materials (such as HDPE and/or silicone tubing) and place in heavy duty garbage bags for disposal.
- During development of the well, create sufficient energy to agitate the water column and create flow reversals in the well screen, filter pack and formation to loosen fine-grained materials and draw them into the well. The pumping or bailing action should then draw all drilling fluids and fine-grained material out of the borehole and adjacent formation and then out of the well. Review the Arcadis Monitoring Well Development guidance (Arcadis 2010) for more detailed information.
- Follow the low-flow purge and sampling techniques per the U.S. Protection Agency's (EPA's) guidance document titled *Low Stress (Low Flow) purging and Sampling Procedure for the Collection of Ground Water Samples from Monitoring Wells* (2010) and ASTM's standard titled *Standard Practice for Low-Flow Purging and Sampling for Wells and Devices Used for Ground-Water Quality Investigations* (2002). Also available for review is the Arcadis Low-Flow Groundwater Purging and Sampling Procedures for Monitoring Wells (Arcadis 2011).
- To purge the well, if using HDPE tubing and a peristaltic pump, insert the end of the tubing to the approximate depth of the midpoint of the screened section of the monitoring wells. Measure the length of HDPE tubing to be inserted into each monitoring well and pre-cut it to approximate lengths (such as the previously measured arm span of a field technician) to avoid contact with any materials other than the monitoring well and peristaltic pump. Flow rates should be as low as can be reasonably achieved. Collect and appropriately dispose of purge water.
- Silicone tubing should direct the purge water through a flow-through cell for field parameter measurements of pH, conductivity, temperature, dissolved oxygen, and turbidity. Calibrate the instrument in the field prior to use. Decontaminate the instrument and flow-through cell at each monitoring well location before purging.
- Record field parameters in intervals (generally of 3-minute duration) to ensure purge water has cycled through the flow-through cell. Sample the wells after field parameter measurements indicate stabilization, which allows collection of representative formation water (generally acceptable standards are three consecutive pH readings to within ±0.1 units, and three consecutive conductivity, temperature and dissolved oxygen measurements to within 3%). Turbidity must be monitored, but does not need to be used as a stabilization indicator of purge completion. Record field parameter measurements at each well. Drawdown should be monitored throughout the purge.
- If wells are suspected to be dewatering throughout the purge (i.e., reduced flow rate/difficulty pumping water or bubbles begin to come through the flow through cell), turn off the pump and allow the water level to recover for ½ hour, followed by sample collection. Document these activities in the field notes.

7.3 Sample Collection

Different laboratories may supply sample collection bottles of varying sizes depending on the type of media to be sampled.

7.3.1 Sample Containers

- Collect samples in HDPE bottles fitted with an unlined (no Teflon™), polypropylene screw cap.
- Complete bottle labels after the caps have been placed back on each bottle.
- Do not use glass bottles due to potential loss of analyte through adsorption. This is particularly important for aqueous samples.

7.3.2 Soil Sampling

Before Sample Collection

- Place plastic sheeting (preferably HDPE) adjacent to the sample port for use as a clean work area, if conditions allow. Otherwise, prevent sampling equipment from contacting the ground or other surface that could compromise sample integrity.
- Trowels or drilling equipment that will come into contact with a sample should be decontaminated prior to sample collection, preferably with methanol;
- Don a new set of nitrile gloves. Do not use gloved hands to subsequently handle papers, pens, clothes, etc., before collecting samples.
- Use the HDPE bottles that are supplied by the laboratory. Make sure that the caps remain on the bottle until immediately prior to sample collection.

During Sample Collection

- Collect soil samples using a clean stainless steel trowel or with single-use PFAS-free liners;
- Place soil samples in labeled HDPE bottles supplied by the laboratory.
- Collect any necessary duplicates/co-located samples and matrix spikes – verify with laboratory whether they need to be collected in separate sample bottles.
- Note the time on the sample label.

After Sample Collection

- Place soil sample bottles in a sealed Ziploc© bag (optional).
- Record the label information and time of sampling in the field notes.
- Place soil sample bottles in coolers that are durable in transportation and keep the temperature between 0 and 6ºC until transported to the laboratory. **Do not use blue ice.**

7.3.3 Groundwater Sampling

Before Sample Collection

- Place plastic sheeting (preferably HDPE) adjacent to the sample port for use as a clean work area, if conditions allow. Otherwise, prevent sampling equipment from contacting the ground or other surface that could compromise sample integrity.
- Don a new set of nitrile gloves. Do not use gloved hands to subsequently handle papers, pens, clothes, etc., before collecting samples.

- Use the labeled HDPE bottles that are supplied by the laboratory. Make sure that the caps remain on the bottle until immediately prior to sample collection.
- Measure depth to water and field parameters. Turbidity and the physical appearance of the purged water should be noted on the Groundwater Sampling Log.

During Sample Collection

- Start groundwater sample collection upon stabilization of field parameters.
- If low-flow groundwater sampling techniques are being used, disconnect the silicone tubing from the flow-through cell, enabling collection of groundwater samples prior to passing through the cell.
- Hydrasleeves are also considered acceptable for sampling of PFAS in groundwater – consult the project manager to determine which technique should be used. In general, low flow sampling is preferable.
- Collect groundwater samples (to the neck of the bottle, some headspace is acceptable) from the dedicated sampling ports at the center of the well screen. While collecting the sample, make sure the bottle cap remains in the other hand of the sampler, until replaced on the bottle.
- To mitigate cross contamination, collect groundwater samples in a pre-determined order from least impacted to greater impacted based on previous analytical data or knowledge about past activities at the site. If no analytical data are available, samples are to be collected in the following order:
  1. First sample the upgradient well(s).
  2. Next, sample the well located furthest downgradient of the interpreted or known source.
  3. The remaining wells should be progressively sampled in order from downgradient to upgradient, such that the wells closest to the interpreted or known source are sampled last.
- NOTE: If high concentrations of PFAS related to class B firefighting foams are expected in a groundwater sample, collect and shake a small portion of the sample (~10 to 25 mL) on site. If foaming is noted within the sample, document the foaming when samples are submitted for analysis; the 'shaker test' vial can then be disposed. This shaker test provides information about how each of the samples should be handled analytically.
- After collecting the sample, tightly screw on the polypropylene cap (snug, but not too tight). This will minimize leaking or cross contamination of the sample. Most PFAS, including all analytes measured by USEPA Method 537, are not volatile at environmental pH.
- Note the time on the sample label.
- Collect any necessary duplicates and matrix spikes. As the laboratory should be analyzing the entire aqueous sample rather than sub-sampling, separate bottles will be required for these samples.
- Do not rinse PFAS sample bottles during sampling. Do not filter samples.

After Sample Collection

- Place groundwater sample bottles in a sealed Ziploc© bag (optional).
- Record the label information and time of sampling in the field notes and COC. Note 'shake test' results if appropriate.
- Place groundwater samples in coolers that are durable in transportation and keep the temperature between 0 and 6ºC until transported to the laboratory. **Do not use blue ice. Store PFAS samples in a separate cooler from other types of samples.**
- Treat all disposable sampling materials as single use and dispose of them appropriately after sampling at each monitoring well.

7.3.4 Sediment Sampling

Before Sample Collection

- Place plastic sheeting (preferably HDPE) adjacent to the sample port for use as a clean work area, if conditions allow. Otherwise, prevent sampling equipment from contacting the ground or other surface that could compromise sample integrity.
- Don a new set of nitrile gloves. Do not use gloved hands to subsequently handle papers, pens, clothes, etc., before collecting samples.
- Use the HDPE bottles that are supplied by the laboratory. Make sure that the caps remain on the bottle until immediately prior to sample collection.

During Sample Collection

- Where surface water samples and sediment samples are collected at the same location, collect surface water samples first to minimize siltation.
- Collect sediment samples either manually using a stainless steel trowel or using a petite ponar grab sampler, depending on field conditions at each sampling location during sampling program.
- Collect sediment samples from the upper 10 cm of sediment.
- For a sample to be acceptable overlying, low turbidity water must be present.
- Decant the overlying water and use a stainless steel trowel to collect only the upper 5 centimeters (cm) of sediment.
- Collect sediment samples directly into laboratory-supplied bottles that are suitable in both material and size.
- Do not overfill the sample bottle.
- Make sure that the sample does not contain vegetation, that the sediment is undisturbed, and that the sampler shows no signs of winnowing or leaking.
- Make sure bottle caps remain in the gloved hand of the sampler until sampling is complete and caps are replaced on the bottle.
- Collect any necessary duplicates and matrix spikes.

After Sample Collection

- Place sample bottles in a sealed Ziploc© bag (optional).
- Record the label information and time of sampling in the field notes.
- Place samples in coolers that are durable in transportation and keep the temperature between 0 and 6ºC until transported to the laboratory. **Do not use blue ice. Store PFAS samples in a separate cooler from other types of samples.**
- Measure surface water pH, conductivity, temperature, and total dissolved solids (TDS) at each location **after** both surface water and sediment sampling is completed.

7.3.5 Surface Water Sampling

Before Sample Collection

- Place plastic sheeting (preferably HDPE) adjacent to the sample port for use as a clean work area, if conditions allow. Otherwise, prevent sampling equipment from contacting the ground or other surface that could compromise sample integrity.
- Don a new set of nitrile gloves. Do not use gloved hands to subsequently handle papers, pens, clothes, etc., before collecting samples.

- Use the HDPE bottles that are supplied by the laboratory. Make sure that the caps remain on the bottle until immediately prior to sample collection.

During Sample Collection

- Avoid sampling the surface.
- Where surface water samples and sediment samples are collected at the same location, collect surface water samples first to minimize siltation.
- Collect surface water samples directly into laboratory-supplied bottles; wide-mouth bottles may be preferable to narrow mouth bottles for ease of surface water collection.
- Collect any necessary duplicates and matrix spikes. As the laboratory should be analyzing the entire aqueous sample rather than sub-sampling, separate bottles will be required for these samples.
- Make sure bottle caps remain in the gloved hand of the sampler until sampling is complete and caps are replaced on the bottle.

After Sample Collection

- Place sample bottles in a sealed Ziploc© bag (optional).
- Record the label information and time of sampling in the field notes.
- Place samples in coolers that are durable in transportation and keep the temperature between 0 and 6ºC until transported to the laboratory. **Do not use blue ice. Store PFAS samples in a separate cooler from other types of samples.**
- Measure surface water pH, conductivity, temperature, and TDS at each location **after** both surface water and sediment sampling.

7.4 Shipping

- If samples cannot be shipped the same day as collected, arrange an appropriate means of keeping the samples cool overnight and maintain the temperature between 0 and 10°C for the first 48 hours after collection, and then between 0 and 6°C thereafter.
- Store samples in appropriate transport bottles (coolers) with ice (Ziploc© bags for use as ice containers) with appropriate labeling. **Do not use blue ice. Store PFAS samples in a separate cooler from other types of samples.**
- Complete the appropriate procedures for COC, handling, packing, and shipping.
- Fill out and check COC Forms against the labels on the sample bottles progressively after each sample is collected.
- Place all disposable sampling materials (such as plastic sheeting, and health and safety equipment) in appropriate containers.
- Ship samples via courier service with priority overnight delivery. Tracking numbers for all shipments should be provided and recorded after they have been sent out to ensure their timely delivery.
- Do not ship samples via Fed Ex for Saturday delivery.

8 WASTE MANAGEMENT

All rinsate should be collected in a sealed pail for disposal. Drill cuttings and purge water will be managed as specified in the Field Sampling Plan (FSP) or Work Plan, and according to state and/or federal requirements. PPE and decontaminated fluids will be contained separately and staged at the sampling location. Containers must be labeled at the time of collection. Labels will include date, location(s), site name, city, state, and description of matrix contained (e.g., soil, groundwater, PPE). General guidelines for investigation derived waste (IDW) handling and storage are set forth in a separate IDW guidance document (Arcadis 2009).

Typical waste characterization procedures include collection of a composite sample of the drill cutting material and a composite sample of the purge water for laboratory analysis. Samples are typically analyzed for disposal toxicity characteristic leaching procedure (TCLP) analysis for metals and VOCs. For PFAS, a simple leach test with neutral pH water may be more indicative of actual risk. Additionally, generators of waste are required to include analysis of other constituents that are reasonably believed to be present including (in this case) PFAS.

Emerging contaminants pose a unique challenge for disposal because acceptance of such waste will be based on the local facility and their permit restrictions. Project teams will be required to identify appropriate facilities based on the facility's legal ability to accept the waste and the team should confirm that the facility is meeting the regulatory requirements for accepting waste containing PFAS. In general, facilities that provide solidification and/or incineration will be likely to meet the necessary requirements to accept PFAS-containing waste. The facility will then provide the definitive laboratory analysis requirements needed to meet their permit requirements for waste classification.

9 DATA RECORDING AND MANAGEMENT

9.1 Field Notes

Waterproof field books must not be used for field notes. Instead, field notes should be on loose paper on Masonite, plastic, or aluminum clip boards. Other requirements for field notes include:

- Pens, pencils, and Sharpies may be used.
- Keep field notes and writing implements away from samples and sampling materials.
- One person should conduct sampling while another records field notes.
- Do not write on sampling bottles unless they are closed.

9.2 Other Project Documentation

- Complete Groundwater Sampling Logs.
- Make sure COC Forms are properly completed. Verify which PFAS analytes (e.g., just PFOS and PFOA, some or all of the 537 list, etc.) are required for analysis and note on the COC.

10 QUALITY CONTROL

Refer to quality control requirements for the project to ensure that appropriate quality assurance and quality control (QA/QC) samples are collected. When collecting QA/QC samples, the same guidelines apply as when collecting regular samples – specifically that:

- Samples should be collected in laboratory-supplied HDPE bottles;
- Bottle caps must remain in the hand of the sampler until replaced on the bottle;
- Labels must be completed after the caps have been placed back on each bottle; and

- Samples must be stored in appropriate transport bottles (coolers) with ice (Ziploc© bags for use as ice containers) with appropriate labeling. **Do not use blue ice. Store PFAS samples in a separate cooler from other types of samples.**

10.1 Equipment Blanks (if relevant)

QA/QC sampling typically includes daily collection of equipment blanks using the laboratory-supplied "PFAS-free" water. For peristaltic pump tubing, laboratory supplied "PFAS-free" water should be poured into a clean HDPE sample bottle and then pumped through new HDPE tubing using the peristaltic pump (with new silicone tubing).

10.2 Field Duplicates

QA/QC sampling typically includes the collection of one field duplicate for every 10 or 20 samples collected. Each duplicate sample will be collected immediately after the initial sample of which it is a duplicate into a separate laboratory-provided sample bottle. Do not indicate to the laboratory which sample the duplicate replicates, i.e. it should be given a blind reference on the COC and sample name such as "duplicate".

10.3 Field Blanks

QA/QC sampling for PFAS typically includes the submission of one laboratory supplied reagent field blank per day. The reagent field blank sample is brought to the site in a laboratory-supplied sample bottle. Field staff transfer the laboratory-supplied reagent blank to an empty sample bottle. This reagent field blank should be placed in the same cooler as the other PFAS samples.

10.4 Matrix Spikes (optional in some cases)

QA/QC sampling includes submitting a sample to be used as a matrix spike if the project requires it. If a separate sample bottle is required, an additional sample will be collected immediately after the initial sample of which it is a duplicate into a separate laboratory-supplied sample bottle.

10.5 Laboratory Analytical QA/QC

- Internal laboratory QA/QC should consist of one laboratory blank and one laboratory control sample (or blank spike) per batch of samples, and additional QA/QCs as indicated by the laboratory QAQC procedures. Isotope dilution should be used for quantification with isotope-labeled surrogate standards, as available.
- For groundwater and surface water samples, extract the entire groundwater and surface water sample and at least two sampling bottle solvent rinsates for analysis to increase sample accuracy. Avoid sub-sampling an aliquot of the sample bottle.
- Soil samples should be analyzed in their entirety or thoroughly homogenized before extraction and analysis.
- As part of the internal QA/QC, relative percent difference (RPD) should be calculated between samples and corresponding field or laboratory duplicates. The laboratory quality assurance portion of the laboratory certificates should be reviewed to verify that all calculations/recoveries were within acceptable limits as established by the laboratory method.

- In January 2017, the U.S. Department of Defense (DOD) and U.S. Department of Energy (DOE) Quality Systems Manual (QSM) 5.1 was finalized and introduced laboratory guidance for the measurement of PFAS in matrices other than drinking water. This guidance is not a detailed procedural method such as an EPA method, but it does recommend best practices around the analysis of PFAS. Laboratories are not required to comply with QSM 5.1 until 2019, although the recommendations around PFAS analysis are similar to what most laboratories are already implementing. Arcadis recommends that any request for PFAS analysis in groundwater or soil should specifically reference the need to comply with Table B-15 in the QSM 5.1.

11 REFERENCES

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APPENDIX C

Annual Groundwater Sampling Event Field Parameters Data Sheet for 2018

Appendix C
Annual Groundwater Sampling Event Field Parameters Data Sheet for 2018
RACER Trust Moraine Facilities
Moraine, Ohio

Well ID	Sample ID	pH (s.u.)	Temp (°C)	ORP (mV)	Conductivity (mS/cm)	DO (mg/L)	Purge Rate (L/min)	Time Start Purge	Time End Purge	Volume Purged (L)	Sample Date	Time Sampled	Sampler
Upper Aquifer Wells													
GM-6 Annual	GM-6/07242018/	7.26	16.07	-165	1.190	0.00	0.631	10:25	10:55	18.9	7/24/2018	11:05	J. Bochner
GM-6 PFAS	GM-6/08082018/	7.12	17.10	200	0.979	2.39	--	--	--	--	--	--	A. Reibel
GM-8 Annual	GM-8/07242018/	7.68	16.03	-214	1.340	0.21	0.429	9:05	9:35	12.9	7/24/2018	9:45	J. Bochner
GM-8 PFAS	GM-8/08082018/	7.60	17.90	140	1.114	0.74	--	--	--	--	--	--	A. Reibel
GM-8 PFAS	GM-8/12052018/	7.44	14.10	-152	1.127	0.19	0.341	12:45	13:10	8.5	12/5/2018	13:15	D. Gossett
GM-16 PFAS	GM-16/08082018/	7.29	15.00	199	0.831	0.99	0.353	13:30	13:45	5.3	8/8/2018	13:50	J. Bochner
GM-16 PFAS	GM-16/12052018/	6.98	14.73	116	0.924	0.07	0.984	10:35	11:00	24.6	12/5/2018	11:05	D. Gossett
GM-19S Annual	GM-19S/07242018/	7.11	16.87	-143	1.130	0.00	0.580	13:35	14:35	34.8	7/24/2018	14:45	J. Bochner
GM-19S PFAS	GM-19S/08082018	7.25	18.00	66	0.949	3.43	--	--	--	--	--	--	A. Reibel
GM-19S PFAS	GM-19S/12042018/	6.94	15.31	-90	0.981	39.2	0.597	13:45	14:50	38.8	12/4/2018	14:55	D. Gossett
GM-21 Annual	GM-21/07252018/	6.40	17.20	-116	2.350	NM	0.361	10:10	11:05	19.9	7/25/2018	11:20	S. Clark
GM-21 PFAS	GM-21/08082018/	6.91	19.90	122	0.914	0.47	--	--	--	--	--	--	A. Reibel
GM-23 Annual	GM-23/07262018/	6.90	16.70	NM	1.180	NM	0.315	7:40	8:10	9.5	7/26/2018	8:20	S. Clark
GM-23 PFAS	GM-23/08092018/	7.04	18.40	-104	1.111	0.87	--	--	--	--	--	--	A. Reibel
GM-24 PFAS	GM-24/08082018/	6.91	17.12	212	1.021	1.95	0.255	11:25	12:20	14.0	8/8/2018	12:25	J. Bochner
GM-24 PFAS	GM-24/12/052018/	7.14	13.87	64	1.642	2.84	0.300	9:55	10:40	12.0	12/5/2018	10:45	J. Bochner
GM-28R Annual	GM-28R/07252018/	7.00	19.10	-177	0.593	NM	0.331	12:15	13:15	19.9	7/25/2018	14:20	S. Clark
GM-29 Annual	GM-29/07252018/	6.90	16.70	-183	1.090	NM	0.520	17:00	18:00	31.2	7/25/2018	18:15	S. Clark
GM-32 Annual	GM-32/07242018/	7.15	16.21	-167	1.140	0.00	0.681	11:40	12:30	34.1	7/24/2018	12:35	J. Bochner
GM-34 PFAS	GM-34/08082018/	7.07	16.39	176	0.791	4.48	0.216	16:20	16:55	7.6	8/7/2018	17:00	J. Bochner
GM-35 PFAS	GM-35/08082018/	8.70	18.70	-56	4.566	0.65	--	--	--	--	--	--	A. Reibel
GM-35 PFAS	GM-35/12052018/	8.25	13.18	-77	2.126	0.07	0.250	14:25	15:20	12.5	12/5/2018	15:25	D. Gossett
GM-48 PFAS	GM-48/12042018/	7.57	12.62	7	1.086	0.22	0.200	13:15	14:15	10.6	12/4/2018	14:20	J. Bochner
GM-60 PFAS	GM-60/12042018/	6.98	15.23	103	1.116	0.97	0.491	11:19	12:13	26.5	12/4/2018	12:20	D. Gossett
GM-63 PFAS	GM-63/08092018/	6.98	17.70	87	0.908	0.43	--	--	--	--	--	--	A. Reibel
GM-65S PFAS	GM-65S/12042018/	7.34	13.43	32	1.011	2.00	0.200	11:05	12:05	12.743	12/4/2018	12:10	J. Bochner
GM-66 PFAS	GM-66/12052018/	7.42	14.72	-7	1.425	0.44	0.300	13:00	13:55	14.764	12/5/2018	14:00	J. Bochner
GM-72 PFAS	GM-72/08072018/	7.10	18.50	173	1.549	7.05	--	--	--	--	--	--	A. Reibel
GM-75S PFAS	GM-75S/08092018/	10.03	19.90	54	0.160	8.70	--	--	--	--	--	--	A. Reibel
GM-79 Annual	GM-79/07232018/	7.09	15.51	74	1.040	0.00	0.606	15:10	16:00	30.3	7/23/2018	16:05	J. Bochner
GM-80 Annual	GM-80/07232018/	6.98	15.30	90	1.010	0.19	0.539	12:55	13:35	21.6	7/23/2018	13:40	J. Bochner
GM-81 Annual	GM-81/07232018/	6.97	14.81	90	1.070	0.00	0.473	10:00	10:40	18.9	7/23/2018	10:45	J. Bochner
MW-5 Annual	MW-5/07232018/	7.20	15.00	104	1.040	NM	0.505	12:20	13:20	30.3	7/23/2018	13:30	S. Clark
MW-21 PFAS	MW-21/12052018/	6.66	13.89	-7	2.306	1.25	0.273	11:25	12:10	12.3	12/5/2018	12:15	J. Bochner
HR-1 Annual	HR-1/07252018/	6.79	18.25	69	1.250	0.15	NM	16:10	16:50	15.1	7/25/2018	17:00	J. Bochner
HR-1 PFAS	HR-1/08072018/	7.10	22.80	153	1.407	1.81	--	--	--	--	--	--	A. Reibel
HR-4 Annual	HR-4/07242018/	7.10	16.30	25	1.020	0.00	0.442	11:05	11:50	19.9	7/24/2018	12:00	S. Clark
HR-11 PFAS	HR-11/08072018/	6.90	16.59	111	0.877	0.99	0.278	11:05	11:35	8.3	8/7/2018	11:30	J. Bochner
HR-17 Annual	HR-17/07252018/	6.83	17.01	30	1.180	0.03	0.447	13:50	14:45	24.6	7/25/2018	14:50	J. Bochner
RMW-92 PFAS	RMW-92/08082018/	7.14	16.82	241	0.842	1.54	0.278	15:15	15:30	4.2	8/8/2018	15:35	J. Bochner
RMW-94 PFAS	RMW-94/08082018/	7.11	16.43	237	0.856	1.52	0.379	14:25	14:40	5.7	8/8/2018	14:45	J. Bochner
RMW-94 PFAS	RMW-94/12052018/	6.79	15.04	96	0.940	0.35	0.703	9:10	9:45	24.6	12/5/2018	9:50	D. Gossett
RMW-95 Annual	RMW-95/07232018/	7.20	15.50	174	1.030	NM	0.410	14:20	15:20	24.6	7/23/2018	15:30	S. Clark
RMW-96 Annual	RMW-96/07232018/	7.10	17.04	108	0.822	1.33	0.631	14:05	15:05	37.9	7/23/2018	15:10	J. Bochner
RMW-97 Annual	RMW-97/07232018/	7.10	12.90	98	0.941	NM	0.410	10:35	11:35	24.6	7/23/2018	11:45	S. Clark
W-1-N PFAS	W-1-N/08072018/	7.05	17.38	209	0.949	1.14	0.158	13:05	13:35	4.7	8/7/2018	13:40	J. Bochner
W-2-N Annual	W-2-N/07242018/	7.10	15.60	-132	1.040	NM	0.568	9:15	10:10	31.2	7/24/2018	10:20	S. Clark
W-2-S Annual	W-2-S/07252018/	6.84	17.29	32	0.998	0.00	0.460	9:30	10:40	32.2	7/25/2018	10:45	J. Bochner
W-3-N Annual	W-3-N/07242018/	7.10	16.40	-153	1.130	NM	0.694	12:35	13:35	41.6	7/24/2018	13:45	S. Clark
W-3-S Annual	W-3-S/07252018/	6.77	16.24	-51	1.050	0.00	0.660	11:05	11:40	23.1	7/25/2018	11:45	J. Bochner
W-4-N Annual	W-4-N/07252018/	6.80	15.10	1	1.430	NM	0.315	7:35	8:35	18.9	7/25/2018	8:45	S. Clark
W-4-N PFAS	W-4-N/08072018/	6.95	15.78	13	1.124	1.08	0.197	14:55	15:20	4.9	8/7/2018	15:25	J. Bochner
W-4-S Annual	W-4-S/07252018/	6.78	16.20	78	1.200	0.00	0.541	12:10	12:45	18.9	7/25/2018	12:50	J. Bochner
Lower Aquifer Wells													
DN-13 Annual	DN-13/07242018/	7.38	15.96	21	1.020	4.22	NM	17:20	17:24	NM	7/24/2018	17:25	J. Bochner
GM-9 Annual	GM-9/07242018/	7.20	17.20	-27	0.876	0.00	0.361	16:30	17:25	19.9	7/24/2018	17:35	S. Clark
GM-15 Annual	GM-15/07242018/	6.93	15.47	-6	1.140	0.00	0.730	16:10	16:45	25.6	7/24/2018	16:50	J. Bochner
GM-20D Annual	GM-20D/07242018/	7.00	15.00	NM	0.919	NM	0.520	14:50	15:50	31.2	7/24/2018	16:00	S. Clark

NOTES:
ºC - Degrees Celsius.
DO - Dissolved Oxygen.
L/min - Liters per Minute.
L - Liters.
mg/L - Milligrams per Liter.
mS/cm - Millisiemens per Centimeter.
mV - Millivolts.
NM - Not Measured.
ORP - Oxidation Reduction Potential.
s.u. - Standard Units.
Temp - Temperature.

APPENDIX D

Groundwater Analytical Database for 2018

Appendix D
Groundwater Analytical Database for 2018
RACER Trust Moraine Facilities
Moraine, Ohio

	Units	MCL[1]	Downgradient Reactive Zone Performance Wells						
			GM-23 07/26/2018 Upper Aquifer	GM-28R 07/25/2018 Upper Aquifer	GM-29 07/25/2018 Upper Aquifer	GM-21 07/25/2018 Upper Aquifer	GM-6 7/24/2018 Upper Aquifer	GM-8 07/24/2018 Upper Aquifer	GM-19S 07/24/2018 Upper Aquifer
Site-Specific Volatile Organic Compounds									
1,1,1-Trichloroethane	ug/L	200	< 1.0 U	< 1.0 U	8.1	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,1-Dichloroethane	ug/L		8	< 1.0 U	10	9.3	0.26 J	0.47 J	2.3
1,1-Dichloroethene	ug/L	7	0.81 J	< 1.0 U	< 2.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Benzene	ug/L	5	0.47 J	< 1.0 U	< 2.0 U	< 1.0 U	< 1.0 U	1.3	< 1.0 U
cis-1,2-Dichloroethene	ug/L	70	**260**	3.5	**420**	23	0.40 J	0.30 J	31
Ethylbenzene	ug/L	700	< 1.0 U	< 1.0 U	< 2.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Tetrachloroethene	ug/L	5	**8.4**	3.5	**13**	< 1.0 U	< 1.0 U	< 1.0 U	0.37 J
Toluene	ug/L	1,000	0.16 J	< 1.0 U	< 2.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
trans-1,2-Dichloroethene	ug/L	100	16	< 1.0 U	13	1.6	< 1.0 U	< 1.0 U	0.66 J
Trichloroethene	ug/L	5	5	0.30 J	**310**	3.9	< 1.0 U	< 1.0 U	2.4
Vinyl chloride	ug/L	2	**210**	0.70 J	**41**	**15**	0.65 J	0.91 J	**8.8**
Xylene (total)	ug/L	10,000	< 2.0 U	< 2.0 U	< 4.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U
Total Site-Specific VOCs	ug/L		509	8.0	815	53	1.3	3.0	46

NOTES:

< - Constituent not detected above laboratory reporting limit shown.

[1] - A MCL is not listed for 1,1-dichloroethane.

BOLD - Result above MCL.

ug/L - Micrograms per Liter.

MCL - Maximum Contaminant Level.

J - Value is estimated.

U - Constituent not detected above laboratory reporting limit shown.

			Closed North Settling Lagoon Monitoring Results				Closed South Settling Lagoon Monitoring Results				Downgradient On-Site
	Units	MCL[1]	HR-4 07/24/2018 Upper Aquifer	W-2-N 07/24/2018 Upper Aquifer	W-3-N 07/24/2018 Upper Aquifer	W-4-N 7/25/2018 Upper Aquifer	HR-17 7/25/2018 Upper Aquifer	W-2-S 7/25/2018 Upper Aquifer	W-3-S 7/25/2018 Upper Aquifer	W-4-S 7/25/2018 Upper Aquifer	HR-1 7/25/2018 Upper Aquifer
Site-Specific Volatile Organic Compounds											
1,1,1-Trichloroethane	ug/L	200	1.6	0.38 J	< 1.0 U	< 1.0 U	4.8	0.98 J	0.87 J	1.8	0.77 J
1,1-Dichloroethane	ug/L		1.6	0.31 J	< 1.0 U	6.9	2.2	0.83 J	0.61 J	2.1	0.96 J
1,1-Dichloroethene	ug/L	7	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Benzene	ug/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
cis-1,2-Dichloroethene	ug/L	70	0.45 J	2.7	16	8.7	1.1	2.2	1.1	17	20
Ethylbenzene	ug/L	700	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Tetrachloroethene	ug/L	5	0.16 J	< 1.0 U	< 1.0 U	0.26 J	**180**	2	**19**	**68**	**99**
Toluene	ug/L	1,000	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
trans-1,2-Dichloroethene	ug/L	100	< 1.0 U	0.28 J	0.33 J	1.3	< 1.0 U	0.32 J	0.19 J	1.5	1.3
Trichloroethene	ug/L	5	0.29 J	1.9	< 1.0 U	**6.1**	0.92 J	4.6	**27**	**42**	**40**
Vinyl chloride	ug/L	2	< 1.0 U	< 1.0 U	1.1	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Xylene (total)	ug/L	10,000	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U
Total Site-Specific VOCs	ug/L		4.1	5.6	17	23	189	11	49	132	162

NOTES:

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BOLD - Result above MCL.

ug/L - Micrograms per Liter.

MCL - Maximum Contaminant Level.

J - Value is estimated.

U - Constituent not detected above laboratory reporting limit shown.

Appendix D
Groundwater Analytical Database for 2018
RACER Trust Moraine Facilities
Moraine, Ohio

ARCADIS Design & Consultancy for natural and built assets

	Units	MCL[1]	Off-Site Downgradient of the Site										
			GM-79 7/23/2018 Upper Aquifer	GM-80 7/23/2018 Upper Aquifer	GM-81 7/23/2018 Upper Aquifer	MW-5 7/23/2018 Upper Aquifer	RMW-95 7/23/2018 Upper Aquifer	RMW-96 7/23/2018 Upper Aquifer	RMW-97 7/24/2018 Upper Aquifer	GM-15 7/24/2018 Lower Aquifer	GM-20D 7/24/2018 Lower Aquifer	GM-9 7/24/2018 Lower Aquifer	DN-13 7/24/2018 Lower Aquifer
Site-Specific Volatile Organic Compounds													
1,1,1-Trichloroethane	ug/L	200	0.39 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.49 J	0.52 J
1,1-Dichloroethane	ug/L		1.7	0.54 J	1.1	0.64 J	0.57 J	0.28 J	< 1.0 U	1.9	< 1.0 U	0.18 J	1.1
1,1-Dichloroethene	ug/L	7	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Benzene	ug/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.13 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
cis-1,2-Dichloroethene	ug/L	70	4.5	1.5	1.6	0.92 J	0.38 J	0.80 J	0.93 J	6.6	< 1.0 U	< 1.0 U	4.7
Ethylbenzene	ug/L	700	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.13 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Tetrachloroethene	ug/L	5	**13**	**18**	< 1.0 U	< 1.0 U	3.4	**7.0**	4.7	< 1.0 U	1.0	< 1.0 U	1.4
Toluene	ug/L	1,000	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.33 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
trans-1,2-Dichloroethene	ug/L	100	< 1.0 U	< 1.0 U	0.19 J	<1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.66 J	< 1.0 U	< 1.0 U	0.28 J
Trichloroethene	ug/L	5	**21**	**5.3**	1.5	1.6	1.6	2.1	1.1	**5.8**	0.63 J	**9.1**	**6.2**
Vinyl chloride	ug/L	2	0.27 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.50 J	< 1.0 U	< 1.0 U	0.53 J
Xylene (total)	ug/L	10,000	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	0.19 J	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U
Total Site-Specific VOCs	ug/L		41	25	4.4	3.2	3.3	10	6.7	15	12	10	15

NOTES:

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[1] - A MCL is not listed for 1,1-dichloroethane.

BOLD - Result above MCL.

ug/L - Micrograms per Liter.

MCL - Maximum Contaminant Level.

J - Value is estimated.

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	Units	MCL[1]	DUPLICATE (HR-01) 7/25/2018 QA/QC	DUPLICATE (GM-28R) 7/25/2018 QA/QC	EQUIPMENT BLANK 01/10/2018 QA/QC	EQUIPMENT BLANK 01/11/2018 QA/QC	EQUIPMENT BLANK 01/12/2018 QA/QC	EQUIPMENT BLANK 07/23/2018 QA/QC	EQUIPMENT BLANK 07/23/2018 QA/QC
Site-Specific Volatile Organic Compounds									
1,1,1-Trichloroethane	ug/L	200	0.80 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,1-Dichloroethane	ug/L		0.73 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,1-Dichloroethene	ug/L	7	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Benzene	ug/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
cis-1,2-Dichloroethene	ug/L	70	15	2.9	1.6	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Ethylbenzene	ug/L	700	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Tetrachloroethene	ug/L	5	**98**	3.7	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Toluene	ug/L	1,000	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
trans-1,2-Dichloroethene	ug/L	100	0.99 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Trichloroethene	ug/L	5	**34**	0.31 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Vinyl chloride	ug/L	2	< 1.0 U	0.65 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Xylene (total)	ug/L	10,000	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U
Total Site-Specific VOCs	ug/L		150	7.6	1.6	Not Detected	Not Detected	Not Detected	Not Detected

NOTES:

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1 - A MCL is not listed for 1,1-dichloroethane.

BOLD - Result above MCL.

ug/L - Micrograms per Liter.

MCL - Maximum Contaminant Level.

J - Value is estimated.

U - Constituent not detected above laboratory reporting limit shown.

	Units	MCL[1]	EQUIPMENT BLANK 07/24/2018 QA/QC	EQUIPMENT BLANK 07/24/2018 QA/QC	EQUIPMENT BLANK 07/25/2018 QA/QC	EQUIPMENT BLANK 07/25/2018 QA/QC	EQUIPMENT BLANK 09/14/2018 QA/QC	TRIP BLANK 01/12/2018 QA/QC	TRIP BLANK 07/23/2018 QA/QC	TRIP BLANK 07/25/2018 QA/QC	TRIP BLANK 09/14/2018 QA/QC
Site-Specific Volatile Organic Compounds											
1,1,1-Trichloroethane	ug/L	200	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,1-Dichloroethane	ug/L		< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,1-Dichloroethene	ug/L	7	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Benzene	ug/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
cis-1,2-Dichloroethene	ug/L	70	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Ethylbenzene	ug/L	700	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Tetrachloroethene	ug/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.18 J	< 1.0 U
Toluene	ug/L	1,000	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
trans-1,2-Dichloroethene	ug/L	100	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Trichloroethene	ug/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Vinyl chloride	ug/L	2	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Xylene (total)	ug/L	10,000	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U
Total Site-Specific VOCs	ug/L		Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	0.2	Not Detected

NOTES:

< - Constituent not detected above laboratory reporting limit shown.

[1] - A MCL is not listed for 1,1-dichloroethane.

BOLD - Result above MCL.

ug/L - Micrograms per Liter.

MCL - Maximum Contaminant Level.

J - Value is estimated.

U - Constituent not detected above laboratory reporting limit shown.

APPENDIX E

Groundwater VOC Analytical Results from 1999 to 2017

Table E-1
Groundwater VOC Analytical Results for the Upper Aquifer Wells from 1999 to 2017
RACER Trust Moraine Facilities
Moraine, Ohio

Well	Date	VOCs (ug/L)											
		1,1,1-TCA	1,1-DCA	1,1-DCE	Benzene	cis-1,2-DCE	Ethyl-benzene	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes (total)
MCL		200		7	5	70	700	5	1000	100	5	2	10,000
Upgradient of the Site													
GM-24	9/23/1999	2.7	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
	12/11/2015	8.1	0.67 J	< 1.0 U	< 1.0 U	0.82 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	4.4	< 1.0 U	< 2.0 U
	8/16/2016	10	0.84 J	< 1.0 U	1.5	1.2	< 1.0 U	< 1.0 U	0.94 J	< 1.0 U	4.5	< 1.0 U	< 2.0 U
HR-11	9/14/1999	< 1.0 U	14	< 1.0 U	< 1.0 U	3.3	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
	9/18/2000	< 1.0 U	33	< 1.0 U	< 1.0 U	19	< 1.0 U	< 1.0 U	< 1.0 U	2.6	< 1.0 U	< 1.0 U	< 1.0 U
	11/6/2001	0.30 J	33	< 1.0 U	< 1.0 U	18	< 1.0 U	< 1.0 U	< 1.0 U	2.3	< 1.0 U	< 1.0 U	< 1.0 U
	9/26/2002	< 1.0 U	18	< 1.0 U	< 1.0 U	6.1	< 1.0 U	< 1.0 U	< 1.0 U	0.72	< 1.0 U	< 1.0 U	< 1.0 U
	9/18/2003	< 1.0 U	10	< 1.0 U	< 1.0 U	1.7	< 1.0 U	< 1.0 U	< 1.0 U	< 0.50 U	< 1.0 U	< 1.0 U	< 1.0 U
	9/15/2004	< 1.0 U	7.3	< 1.0 U	< 1.0 U	0.45 J	< 1.0 U	2.2	< 1.0 U	< 0.50 U	< 1.0 U	< 1.0 U	< 1.0 U
	10/17/2005	< 1.0 U	6.5	< 1.0 U	< 1.0 U	0.72 J	< 1.0 U	**6.0**	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U
	9/25/2006	< 1.0 U	6.7	< 1.0 U	< 1.0 U	0.31 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U
	9/19/2007	< 1.0 U	7.1	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U
	9/25/2008	< 1.0 U	5.2	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U
	9/26/2013	< 1.0 U	4.4	< 1.0 U	< 1.0 U	1.6	< 1.0 U	< 1.0 U	< 1.0 U	0.24 J	< 1.0 U	< 1.0 U	< 2.0 U
On-Site													
GM-6	9/20/1999	25	33	1.2	< 1.0 U	53	< 10 U	**81**	< 1.0 U	2.0	**78**	1.6	< 10 U
	9/26/2000	12	13	< 1.0 U	< 1.0 U	41	< 1.0 U	**52**	< 1.0 U	2.2	**57**	**3.7**	< 1.0 U
	11/9/2001	3.9	14	< 2.0 U	< 2.0 U	8.2	< 2.0 U	**14**	< 2.0 U	1.8	**48**	1.9J	< 2.0 U
	9/20/2002	1.4 J	60	< 2.0 U	2.2	43	< 2.0 U	**14**	< 2.0 U	8.6	**33**	**12**	< 2.0 U
	10/2/2003	0.19 J	20	< 1.0 U	1.0	13	0.22 J	**11**	< 1.0 U	2.5	**23**	**3.3**	< 1.0 U
	9/14/2004	< 1.0 U	18	< 1.0 U	1.7	10	< 1.0 U	2.6	< 1.0 U	1.9	**5.7**	**3.0**	< 1.0 U
	10/19/2005	< 1.0 U	21	< 1.0 U	0.49 J	20	< 1.0 U	0.34 J	< 1.0 U	2.1	1.4	**11**	< 2.0 U
	9/19/2006	< 1.0 U	16	< 1.0 U	< 1.0 U	18	< 1.0 U	< 1.0 U	< 1.0 U	1.6	0.35 J	**7.3**	< 2.0 U
	9/18/2007	< 1.0 U	26	< 1.0 U	0.42 J	16	< 1.0 U	< 1.0 U	< 1.0 U	2.6	0.34 J	**6.7**	< 2.0 U
	9/24/2008	< 1.0 U	< 8.0 U	< 1.0 U	1.2	6.7	< 1.0 U	< 1.0 U	< 1.0 U	1.3	< 1.0 U	**2.1**	< 2.0 U
	11/11/2009	< 1.0 U	6.9	< 1.0 U	1.3	3.4	< 1.0 U	< 1.0 U	< 1.0 U	0.68 J	3.8	1.2	< 2.0 U
	9/27/2010	< 1.0 U	6.2	< 1.0 U	1.1	4.9	< 1.0 U	0.38 J	< 1.0 U	0.89 J	**6.6**	1.6	< 2.0 U
	9/29/2011	< 1.0 U	4.5	< 1.0 U	1.0	3.7	< 1.0 U	< 1.0 U	< 1.0 U	0.84 J	< 1.0 U	1.5	< 2.0 U
	9/6/2012	< 1.0 U	< 1.0 U	< 1.0 U	2.5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U
	9/25/2013	< 1.0 U	0.66 J	< 1.0 U	< 1.0 U	1.9	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.26 J	0.79 J	< 2.0 U
	10/7/2014	< 1.0 U	0.36 J	< 1.0 U	< 1.0 U	0.23 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U
	12/8/2015	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.26 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U
	8/22/2016	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.29 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U
	8/16/2017	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.33 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U

Table E-1
Groundwater VOC Analytical Results for the Upper Aquifer Wells from 1999 to 2017
RACER Trust Moraine Facilities
Moraine, Ohio

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Well	Date	VOCs (ug/L)											
		1,1,1-TCA	1,1-DCA	1,1-DCE	Benzene	cis-1,2-DCE	Ethyl-benzene	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes (total)
MCL		200		7	5	70	700	5	1000	100	5	2	10,000
GM-8	9/20/1999	1.9	30.2	< 1.0 U	3.4	26.2	20.7	14.8	< 1.0 U	12	30.4	8.4	2.3
	9/26/2000	< 1.0 U	37	< 1.0 U	1.1	1.5	13	< 1.0 U	< 1.0 U	5.4	**6.6**	**2.4**	1.9
	11/9/2001	0.40 J	40	< 1.0 U	0.78 J	2.0	0.40 J	< 1.0 U	< 1.0 U	3.6	4.4	1.9	0.39J
	9/20/2002	< 2.0 U	63	< 2.0 U	**5.5**	5.5	7.5	< 2.0 U	1.8 J	9	< 2.0 U	**5.8**	1.5J
	10/1/2003	< 2.0 U	48	< 2.0 U	**5.4**	< 1.0 U	11	< 2.0 U	< 2.0 U	4.4	< 2.0 U	< 2.0 U	< 2.0 U
	9/14/2004	< 1.0 U	15	< 1.0 U	4.2	< 0.50 U	19	< 1.0 U	< 1.0 U	1.1	< 1.0 U	0.48 J	1.1
	10/19/2005	< 1.0 U	16	< 1.0 U	3.5	0.24 J	29	< 1.0 U	0.39 J	0.99 J	< 1.0 U	0.73 J	< 2.0 U
	9/19/2006	< 5.0 U	18	< 5.0 U	2.1 J	2.1 J	< 5.0 U	< 5.0 U	< 5.0 U	1.0 J	< 5.0 U	**3.2 J**	< 1.0 U
	9/18/2007	< 2.0 U	9.1	< 2.0 U	2.4	< 2.0 U	1.7 J	< 2.0 U	< 2.0 U	0.9 J	< 2.0 U	< 2.0 U	0.9 J
	9/23/2008	< 1.0 U	1.7	< 1.0 U	**6.8**	< 1.0 U	8.6	< 1.0 U	< 1.0 U	0.27 J	< 1.0 U	0.48 J	3.9
	11/16/2009	< 1.0 U	2.9	< 1.0 U	3.9	< 1.0 U	5.5	0.34 J	0.13 J	0.22 J	< 1.0 U	< 1.0 U	1.3 J
	9/27/2010	< 1.0 U	3.0	< 1.0 U	4.7	< 1.0 U	0.33 J	< 1.0 U	0.18 J	0.29 J	< 1.0 U	0.44 J	< 2.0 U
	9/29/2011	< 1.0 U	1.9	< 1.0 U	3.5	< 1.0 U	5.4	< 1.0 U	< 1.0 U	0.20 J	< 1.0 U	0.24 J	0.99 J
	9/6/2012	< 1.0 U	0.66 J	< 1.0 U	3.5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U
	9/26/2013	< 1.0 U	0.88 J	< 1.0 U	1.9	0.27 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.21 J	< 1.0 U	< 2.0 U
	10/7/2014	< 1.0 U	0.59 J	< 1.0 U	1.2	0.23 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.58 J	< 2.0 U
	12/8/2015	< 1.0 U	0.43 J	< 1.0 U	< 1.0 U	0.31 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.53 J	< 2.0 U
	8/22/2016	< 1.0 U	0.37 J	< 1.0 U	0.79 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U
	8/16/2017	< 1.0 U	0.44 J	< 1.0 U	0.86 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.31 J
GM-19S	9/20/1999	16	7.7	1.0	< 1.0 U	35	< 10	**46**	< 1.0 U	2.3	**71**	< 1.0 U	< 10
	9/22/2000	15	4.4	< 1.0 U	< 1.0 U	38	< 1.0 U	**68**	< 1.0 U	2.6	**104**	< 1.0 U	< 1.0 U
	11/12/2001	7.6	2.9J	< 3.3 U	< 3.3 U	26	< 3.3 U	**64**	< 3.3 U	2.0	**97**	< 3.3 U	< 3.3 U
	9/26/2002	6.3	6.3	< 4.0 U	< 4.0 U	39	< 4.0 U	**52**	< 4.0 U	2.7	**110**	**5.2**	< 4.0 U
	9/25/2003	13	8.3	1.6 J	< 5.0 U	**89**	< 5.0 U	**62**	< 5.0 U	2.9	**140**	< 5.0 U	< 5.0 U
	9/13/2004	14	8.1	1.9 J	< 4.0 U	61	< 4.0 U	**71**	< 4.0 U	2.4	**120**	< 4.0 U	< 4.0 U
	10/18/2005	13	9.0	1.2 J	< 1.0 U	29	< 1.0 U	**95**	< 1.0 U	1.0 J	**140**	1.8	< 3.3 U
	9/21/2006	9.7 J	7.0 J	< 22 U	< 22 U	**660**	< 22 U	**9.1 J**	< 22 U	10 J	**11 J**	< 22 U	< 4.0 U
	9/17/2007	0.59 J	10	< 1.0 U	< 1.0 U	0.30 J	< 1.0 U	1.5	< 1.0 U	0.29 J	0.46 J	< 1.0 U	< 2.0 U
	9/23/2008	< 1.0 U	13	< 1.0 U	< 1.0 U	0.68 J	< 1.0 U	0.94 J	< 1.0 U	0.52 J	3.0	**9.3**	< 2.0 U
	11/17/2009	< 1.0 U	12	< 1.0 U	< 1.0 U	0.27 J	< 1.0 U	< 1.0 U	< 1.0 U	0.37 J	0.22 J	< 1.0 U	< 2.0 U
	4/7/2010	< 1.0 U	9.6	< 1.0 U	< 1.0 U	0.27 J	< 1.0 U	< 1.0 U	< 1.0 U	0.45 J	< 1.0 U	< 1.0 U	< 2.0 U
	9/27/2010	< 1.0 U	9.5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.46 J	< 1.0 U	< 1.0 U	< 2.0 U
	9/29/2011	< 1.0 U	10	< 1.0 U	< 1.0 U	5.3	< 1.0 U	< 1.0 U	< 1.0 U	1.1	< 1.0 U	**12**	< 2.0 U
	9/6/2012	< 1.0 U	8.4	< 1.0 U	< 1.0 U	7.3	< 1.0 U	< 1.0 U	< 1.0 U	0.84 J	0.30 J	**10**	< 2.0 U
	9/26/2013	< 1.0 U	8.3	< 1.0 U	< 1.0 U	26	< 1.0 U	< 1.0 U	< 1.0 U	1.1	0.46 J	**17**	< 2.0 U
	10/7/2014	< 1.0 U	7.6	< 1.0 U	< 1.0 U	37	< 1.0 U	< 1.0 U	< 1.0 U	0.91 J	0.81 J	**15**	< 2.9 U
	12/8/2015	< 1.0 U	3.1	< 1.0 U	< 1.0 U	37	< 1.0 U	< 1.0 U	< 1.0 U	0.66 J	1.3	**6.4**	< 2.0 U
	8/22/2016	< 1.0 U	3.4	< 1.0 U	< 1.0 U	44	< 1.0 U	< 1.0 U	< 1.0 U	0.64 J	1.8	**4.6**	< 2.0 U
	8/17/2017	< 1.0 U	2.3	< 1.0 U	< 1.0 U	39	< 1.0 U	< 1.0 U	< 1.0 U	0.52 J	1.9	**4.0**	< 2.0 U

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RACER Trust Moraine Facilities
Moraine, Ohio

Well	Date	VOCs (ug/L)											
		1,1,1-TCA	1,1-DCA	1,1-DCE	Benzene	cis-1,2-DCE	Ethyl-benzene	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes (total)
MCL		200		7	5	70	700	5	1000	100	5	2	10,000
GM-21	9/22/1999	53	9.0	3.9	< 1.0 U	66	< 1.0 U	< 1.0 U	< 1.0 U	7.8	**29**	< 1.0 U	< 1.0 U
	9/22/2000	16	5.6	1.6	< 1.0 U	39	< 1.0 U	< 1.0 U	< 1.0 U	13	**189**	< 1.0 U	< 1.0 U
	11/13/2001	6.9	3.8 J	< 5.0 U	< 5.0 U	39	< 5.0 U	< 5.0 U	< 5.0 U	15	**160**	< 5.0 U	< 5.0 U
	9/25/2002	31	5.0 J	2.6 J	< 6.7 U	43	< 6.7 U	< 6.7 U	< 6.7 U	5.1	**230**	< 6.7 U	< 6.7 U
	9/24/2003	31	6.9 J	2.0 J	< 8.0 U	**100**	< 8.0 U	< 8.0 U	< 8.0 U	2.9 J	**200**	< 8.0 U	< 8.0 U
	9/14/2004	26	4.2 J	3.1 J	< 9.1 U	56	< 9.1 U	< 9.1 U	< 9.1 U	7.9	**180**	< 9.1 U	< 9.1 U
	10/17/2005	4.3	3.4	< 1.0 U	< 1.0 U	20	< 1.0 U	< 1.0 U	< 1.0 U	22	1.8	**13**	< 2.0 U
	9/20/2006	12	8.6	0.19 J	< 1.0 U	14	< 1.0 U	< 1.0 U	< 1.0 U	4.3	**5.9**	**9.3**	< 2.0 U
	9/26/2007	8.5	18	<1.4 U	<1.4 U	26	<1.4 U	<1.4 U	<1.4 U	2.5	2.8	**12**	< 2.9 U
	10/3/2008	8.7	15	0.33 J	< 1.0 U	38	< 1.0 U	0.56 J	< 1.0 U	4.7	**18**	**19**	< 2.9 U
	11/16/2009	2.4	22	< 1.0 U	< 1.0 U	7.8	< 1.0 U	< 1.0 U	< 1.0 U	4.4	2.4	**6.6**	< 2.0 U
	9/28/2010	0.75 J	20	< 1.0 U	< 1.0 U	3.9	< 1.0 U	< 1.0 U	< 1.0 U	3	3.2	**3.6**	< 2.0 U
	9/29/2011	1.0	16	< 1.0 U	< 1.0 U	9.9	< 1.0 U	< 1.0 U	< 1.0 U	1.9	**19**	**6.2**	< 2.0 U
	9/7/2012	< 2.0 U	18	< 2.0 U	< 2.0 U	8.5	< 2.0 U	< 2.0 U	< 2.0 U	1.7 J	**14**	**5.1**	< 4.0 U
	9/26/2013	< 1.0 U	9.5	< 1.0 U	< 1.0 U	5.1	< 1.0 U	< 1.0 U	< 1.0 U	1.1	**12**	**3.8**	< 2.0 U
	10/9/2014	< 1.0 U	16	< 1.0 U	< 1.0 U	12	< 1.0 U	< 1.0 U	< 1.0 U	1.6	**18**	**5.8**	< 2.0 U
	12/11/2015	< 2.0 U	12	< 2.0 U	< 2.0 U	22	< 2.0 U	< 2.0 U	< 2.0 U	1.6 J	**16**	**8.9**	< 4.0 U
	8/22/2016	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U
	8/17/2017	< 1.0 U	11	< 1.0 U	< 1.0 U	19	< 1.0 U	< 1.0 U	< 1.0 U	1.5	2.4	**9.7**	< 2.0 U
GM-22	9/1/1999	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	3.6	< 1.0 U	< 1.0 U	4.0	< 1.0 U	< 1.0 U
	9/21/2000	< 1.0 U	2.4	< 1.0 U	< 1.0 U	1.9	< 1.0 U	1.6	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
	11/13/2001	4.4	6.8	0.58J	< 1.0 U	8.5	< 1.0 U	4.9	< 1.0 U	0.17 J	**7.5**	0.60 J	< 1.0 U
	9/25/2002	0.93 J	< 2.0 U	< 2.0 U	< 2.0 U	< 1.0 U	< 2.0 U	2.3	< 2.0 U	< 1.0 U	**7.6**	< 2.0 U	< 2.0 U
	9/24/2003	1.2	1.0	< 1.0 U	< 1.0 U	0.45 J	< 1.0 U	2.9	< 1.0 U	< 0.50 U	**7.6**	< 1.0 U	< 1.0 U
	9/14/2004	1.7	2.1	< 1.0 U	< 1.0 U	0.9	< 1.0 U	2.9	< 1.0 U	< 0.50 U	**10**	< 1.0 U	< 1.0 U
	10/17/2005	0.96 J	1.0	< 1.0 U	< 1.0 U	0.36 J	< 1.0 U	3.6	< 1.0 U	< 1.0 U	4.7	< 1.0 U	< 2.0 U
	9/20/2006	0.47 J	1.1	< 1.0 U	< 1.0 U	0.28 J	< 1.0 U	3.2	< 1.0 U	< 1.0 U	3.0	< 1.0 U	< 2.0 U
	9/26/2007	0.66 J	0.72 J	< 1.0 U	< 1.0 U	0.24 J	< 1.0 U	3.3	< 1.0 U	< 1.0 U	3.3	< 1.0 U	< 2.0 U
	10/3/2008	0.73 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**5.7**	< 1.0 U	< 1.0 U	**5.7**	< 1.0 U	< 2.0 U
	9/26/2013	0.65 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	4.3	< 1.0 U	< 1.0 U	3.9	< 1.0 U	< 2.0 U

Table E-1
Groundwater VOC Analytical Results for the Upper Aquifer Wells from 1999 to 2017
RACER Trust Moraine Facilities
Moraine, Ohio

Well	Date	VOCs (ug/L)											
		1,1,1-TCA	1,1-DCA	1,1-DCE	Benzene	cis-1,2-DCE	Ethyl-benzene	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes (total)
MCL		200		7	5	70	700	5	1000	100	5	2	10,000
GM-23	9/2/1999	7.2	33	**17**	1.9	**7530**	< 1.0 U	**6250**	< 1.0 U	55	**1460**	**2500**	7.0
	9/20/2000	2.0	16	5.1	< 1.0 U	**5620**	< 1.0 U	**3470**	< 1.0 U	33	**609**	**801**	< 1.0 U
	11/12/2001	< 4.0 U20	< 4.0 U20	< 4.0 U20	< 4.0 U20	**8400**	< 4.0 U20	**15000**	< 4.0 U20	< 210	**2200**	**1200**	< 4.0 U20
	9/26/2002	< 4.0 U0	< 4.0 U0	< 4.0 U0	< 4.0 U0	**7700**	< 4.0 U0	**10000**	< 4.0 U0	< 200	**1700**	**540**	< 4.0 U0
	9/23/2003	< 50 U0 U	< 50 U0 U	< 50 U0 U	< 50 U0 U	**5800**	< 50 U0 U	**12000**	< 50 U0 U	< 250 U	**1600**	**690**	< 50 U0 U
	9/14/2004	< 50 U0 U	< 50 U0 U	< 50 U0 U	< 50 U0 U	**4600**	< 50 U0 U	**6700**	< 50 U0 U	< 250 U	**1100**	**870**	< 50 U0 U
	10/17/2005	< 560 U	< 560 U	< 560 U	< 560 U	**19000**	< 560 U	**2300**	< 560 U	< 560 U	**490 J**	**2800**	< 100 U
	9/28/2006	< 330 U	< 330 U	< 330 U	< 330 U	**11000**	< 330 U	**370**	< 330 U	**270 J**	**95 J**	**4100**	< 670 U
	9/27/2007	< 200 U	< 200 U	< 200 U	< 200 U	**4700**	< 200 U	**280**	< 200 U	**130 J**	**82 J**	**2600**	< 4.0 U0 U
	10/23/2008	< 62 U	< 62 U	< 62 U	< 62 U	**2000**	< 62 U	**71**	< 62 U	58 J	< 62 U	**2100**	< 1.0 U
	11/17/2009	< 20 U	5.0 J	< 20 U	< 20 U	**1100**	< 20 U	**19 J**	< 20 U	31	**8.3 J**	**1100**	< 4.0 U
	9/29/2010	< 22 U	< 22 U	< 22 U	< 22 U	**490**	< 22 U	**50**	< 22 U	16 J	**17 J**	**500**	< 4.0 U
	9/30/2011	< 20 U	< 20 U	< 20 U	< 20 U	**580**	< 20 U	**57**	< 20 U	21	**33**	**840**	< 4.0 U
	9/7/2012	< 25 U	< 25 U	< 25 U	< 25 U	**580**	< 25 U	**33**	< 25 U	21 J	**15 J**	**390**	< 50 U
	9/27/2013	< 1.0 U	2.6	1.7	0.28 J	**470**	< 1.0 U	**37**	< 1.0 U	15	**28**	**210**	< 2.0 U
	10/10/2014	< 1.0 U	8.4 J	< 1.0 U	< 1.0 U	**210**	< 1.0 U	**3.6 J**	< 1.0 U	20	**4.1 J**	**220**	< 20 U
	12/8/2015	< 1.0 U	15	0.47 J	0.69 J	**100**	< 1.0 U	0.58 J	< 1.0 U	13	5.0	**120**	< 2.0 U
	8/22/2016	< 2.0 U	8.6	1.1 J	< 2.0 U	**530**	< 2.0 U	**8.0**	< 2.0 U	18	**7.6**	**280**	< 4.0 U
	8/17/2017	< 2.0 U	5.4	1.4 J	< 2.0 U	**580**	< 2.0 U	**30**	< 2.0 U	22	**8.6**	**360**	< 4.0 U
GM-25	9/22/1999	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
	10/21/2010	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
GM-27	9/1/1999	< 1.0 U	2.4	< 1.0 U	< 1.0 U	21	< 1.0 U	1.7	< 1.0 U	< 1.0 U	**121**	< 1.0 U	< 1.0 U
	9/20/2000	< 1.0 U	2.2	< 1.0 U	< 1.0 U	14	< 1.0 U	1.2	< 1.0 U	< 1.0 U	**112**	< 1.0 U	< 1.0 U
	11/13/2001	< 3.3 U	1.8 J	< 3.3 U	< 3.3 U	13	< 3.3 U	**6.8**	< 3.3 U	< 1.0 U	**110**	< 3.3 U	< 3.3 U
	9/26/2002	< 3.3 U	1.7 J	< 3.3 U	< 3.3 U	14	< 3.3 U	< 3.3 U	< 3.3 U	< 1.0 U	**100**	< 3.3 U	< 3.3 U
	9/23/2003	< 5.0 U	1.9 J	< 5.0 U	< 5.0 U	12	< 5.0 U	2.1 J	< 5.0 U	< 2.5 U	**100**	< 5.0 U	< 5.0 U
	9/15/2004	< 3.3 U	2.0 J	< 3.3 U	< 3.3 U	13	< 3.3 U	1.8 J	< 3.3 U	< 1.0 U	**81**	< 3.3 U	< 3.3 U
	10/17/2005	< 2.5 U	2.2 J	< 2.5 U	< 2.5 U	14	< 2.5 U	0.94 J	< 2.5 U	0.49 J	**76**	0.82 J	< 5.0 U
	9/28/2006	< 2.5 U	2.6	< 2.5 U	< 2.5 U	14	< 2.5 U	1.0 J	< 2.5 U	1.0 J	**80**	< 2.5 U	< 5.0 U
	9/27/2007	< 2.0 U	2.3	< 2.0 U	< 2.0 U	12	< 2.0 U	0.9 J	< 2.0 U	0.41 J	**70**	< 2.0 U	< 4.0 U
	10/23/2008	< 1.0 U	2	< 1.0 U	< 1.0 U	11	< 1.0 U	0.9 J	< 1.0 U	0.51 J	**57**	0.44 J	< 2.9 U
	9/27/2013	< 1.0 U	2.3	< 1.0 U	< 1.0 U	12	< 1.0 U	1.8	< 1.0 UB	0.51 J	**42**	0.18 J	< 2.0 U

Table E-1
Groundwater VOC Analytical Results for the Upper Aquifer Wells from 1999 to 2017
RACER Trust Moraine Facilities
Moraine, Ohio

Well	Date	VOCs (ug/L)											
		1,1,1-TCA	1,1-DCA	1,1-DCE	Benzene	cis-1,2-DCE	Ethyl-benzene	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes (total)
MCL		200		7	5	70	700	5	1000	100	5	2	10,000
GM-28	9/1/1999	18	3.3	< 1.0 U	< 1.0 U	**175**	< 1.0 U	**316**	< 1.0 U	9.2	**768**	**3.2**	< 1.0 U
	9/21/2000	5.0	9.9	< 1.0 U	< 1.0 U	37	< 1.0 U	2.3	< 1.0 U	22	1.6	**12**	< 1.0 U
	11/15/2001	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U	11	< 1.0 U	< 1.0 U	< 1.0 U
	9/24/2002	< 1.0 U	2.7	< 1.0 U	< 1.0 U	1.1	< 1.0 U	< 1.0 U	< 1.0 U	11	0.86 J	< 1.0 U	< 1.0 U
	10/1/2003	< 1.0 U	3.3	< 1.0 U	< 1.0 U	0.58	< 1.0 U	< 1.0 U	< 1.0 U	4.0	1.6	0.53 J	< 1.0 U
	9/15/2004	< 1.0 U	3.3	< 1.0 U	< 1.0 U	0.41 J	< 1.0 U	0.88 J	< 1.0 U	1.2	1.4	0.44 J	< 1.0 U
	10/18/2005	< 1.0 U	4.0	< 1.0 U	< 1.0 U	0.32 J	< 1.0 U	< 1.0 U	< 1.0 U	0.63 J	0.66 J	1.1	< 2.0 U
	9/27/2006	< 1.0 U	4.2	< 1.0 U	< 1.0 U	0.26 J	< 1.0 U	< 1.0 U	< 1.0 U	0.66 J	0.43 J	0.42 J	< 2.0 U
	9/20/2007	< 1.0 U	4.6	< 1.0 U	< 1.0 U	0.72 J	< 1.0 U	< 1.0 U	< 1.0 U	0.58 J	0.51 J	1.2	< 2.0 U
	10/22/2008	< 5.0 U	2.2 J	< 5.0 U	< 5.0 U	6.9	< 5.0 U	< 5.0 U	< 5.0 U	1.3 J	< 5.0 U	**6.5**	< 1.0 U
	11/16/2009	< 1.0 U	3.6	< 1.0 U	< 1.0 U	2.3	< 1.0 U	< 1.0 U	< 1.0 U	1.7	0.58 J	**3.3**	< 2.0 U
	9/28/2010	< 1.0 U	4.6	< 1.0 U	< 1.0 U	2.1	< 1.0 U	< 1.0 U	< 1.0 U	1.5	< 1.0 U	**2.2**	< 2.0 U
	10/5/2011	< 1.0 U	2.1	< 1.0 U	< 1.0 U	0.72 J	< 1.0 U	0.63 J	< 1.0 U	0.69 J	0.41 J	0.57 J	< 2.0 U
GM-28R	12/28/2015	< 1.0 U	0.55 J	< 1.0 U	< 1.0 U	5.6	< 1.0 U	**49**	< 1.0 U	0.38 J	**24**	0.99 J	< 2.0 U
	8/22/2016	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	13	< 1.0 U	1.3	< 1.0 U	0.31 J	0.29 J	< 1.0 U	< 2.0 U
	8/17/2017	< 1.0 U	0.25 J	< 1.0 U	< 1.0 U	6.0	< 1.0 U	4.6	< 1.0 U	< 1.0 U	0.33 J	0.72 J	< 2.0 U
GM-29	9/1/1999	38	4.3	1.3	< 1.0 U	**320**	< 1.0 U	< 20 U	< 1.0 U	11	**878**	**3.8**	< 1.0 U
	9/21/2000	25	17	3.1	< 1.0 U	**2871**	< 1.0 U	**20**	2.2	14	**289**	**788**	< 1.0 U
	11/13/2001	< 50 U	< 50 U	< 50 U	< 50 U	**1800**	21 J	**17 J**	< 50 U	26	**270**	**230**	52
	9/25/2002	16 J	< 4.0 U	< 4.0 U	< 4.0 U	**1300**	< 4.0 U	**18 J**	< 4.0 U	21	**310**	**140**	< 4.0 U
	9/24/2003	18 J	< 33 U	< 33 U	< 33 U	**1200**	< 33 U	**18 J**	< 33 U	20	**390**	**150**	< 33 U
	9/15/2004	21 J	< 50 U	< 50 U	< 50 U	**1200**	< 50 U	**20 J**	< 50 U	21 J	**440**	**230**	< 50 U
	10/17/2005	19 J	18 J	< 50 U	< 50 U	**1600**	< 50 U	**15 J**	< 50 U	27 J	**390**	**490**	< 1.0 U
	9/28/2006	17 J	15 J	< 33 U	< 33 U	**1300**	< 33 U	**15 J**	< 33 U	20 J	**310**	**210**	< 67 U
	9/26/2007	15 J	15 J	< 50 U	< 50 U	**1200**	< 50 U	**18 J**	< 50 U	19 J	**350**	**290**	< 1.0 U
	10/6/2008	12 J	11 J	< 33 U	< 33 U	**900**	< 33 U	**17 J**	< 33 U	16 J	**300**	**150**	< 67 U
	11/17/2009	18	12	< 1.0 U	< 1.0 U	**600**	< 1.0 U	**21 J**	< 1.0 U	20	**370**	**70**	< 20 U
	9/29/2010	11 J	11 J	< 20 U	< 20 U	**660**	< 20 U	**17 J**	< 20 U	19 J	**330**	**59**	< 4.0 U
	9/30/2011	11 J	8.5 J	< 1.0 U	< 1.0 U	**470**	< 1.0 U	**13**	< 1.0 U	17	**320**	**52**	< 25 U
	9/26/2012	10 J	8.2 J	< 20 U	< 20 U	**520**	< 20 U	**14 J**	< 20 U	15 J	**310**	**45**	< 4.0 U
	9/27/2013	15	12	1.7	0.20 J	**530**	< 1.0 U	**15**	< 1.0 U	20	**280**	**60**	< 2.0 U
	10/9/2014	9.1 J	9.5 J	< 1.0 U	< 1.0 U	**480**	< 1.0 U	**12 J**	< 1.0 U	15	**260**	**40**	< 29 U
	12/8/2015	9.9	10	1.2 J	< 1.7 U	**440**	< 1.7 U	**11**	< 1.7 U	15	**270**	**48**	< 3.3 U
	8/22/2016	10	10	< 2.0 U	< 2.0 U	**470**	< 2.0 U	**13**	< 2.0 U	14	**360**	**42**	< 4.0 U
	8/17/2017	9.6	13	1.0 J	< 2.0 U	**430**	< 2.0 U	**11**	< 2.0 U	16	**280**	**53**	< 4.0 U

Table E-1
Groundwater VOC Analytical Results for the Upper Aquifer Wells from 1999 to 2017
RACER Trust Moraine Facilities
Moraine, Ohio

Well	Date	VOCs (ug/L)											
		1,1,1-TCA	1,1-DCA	1,1-DCE	Benzene	cis-1,2-DCE	Ethyl-benzene	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes (total)
MCL		200		7	5	70	700	5	1000	100	5	2	10,000
GM-30	9/2/1999	< 1.0 U	54 J	< 1.0 U	< 1.0 U	7.5 J	**7030 J**	**9.5 J**	**6950 J**	< 1.0 U	< 1.0 U	< 1.0 U	**23300 J**
	9/20/2000	< 1.0 U	50.6	< 1.0 U	2.7	< 1.0 U	**2290**	< 1.0 U	98.9	< 1.0 U	< 1.0 U	< 1.0 U	6770
	11/13/2001	< 25	31	< 25	< 25	< 1.0 U2	**840**	< 25	5.0 J	< 1.0 U2	**12 J**	< 25	2000
	9/27/2002	< 33	34	< 33	< 33	< 1.0 U7	350	< 33	< 33	< 1.0 U7	< 33	< 33	1400
	9/23/2003	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 62 U	**1000**	< 1.0 U	240	< 62 U	< 1.0 U	< 1.0 U	7000
	9/14/2004	< 4.0 U	33 J	< 4.0 U	< 4.0 U	< 20 U	530	< 4.0 U	< 4.0 U	< 20 U	< 4.0 U	< 4.0 U	3000
	10/17/2005	< 50 U	23 J	< 50 U	< 50 U	< 50 U	620	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U	3800
	9/20/2006	< 33 U	25 J	< 33 U	< 33 U	< 33 U	570	< 33 U	5.8 J	< 33 U	< 33 U	< 33 U	2500
	9/26/2007	< 1.0 U	16 J	< 1.0 U	< 1.0 U	< 1.0 U	380	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1300
	10/6/2008	< 1.0 U	11	< 1.0 U	< 1.0 U	< 1.0 U	300	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	670
	9/27/2013	< 1.0 U	5.3	< 1.0 U	4.0	< 1.0 U	20	0.23 J	1.1	0.63 J	0.28 J	0.34 J	7.2
	10/9/2014	< 1.0 U	3.2	< 1.0 U	2.3	0.29 J	54	< 1.0 U	0.71 J	0.51 J	< 1.0 U	< 1.0 U	12
	12/11/2015	< 2.0 U	3	< 2.0 U	2.9	< 2.0 U	260	< 2.0 U	0.87 J	< 2.0 U	< 2.0 U	< 2.0 U	14
	8/26/2016	< 1.0 U	7.6	< 1.0 U	**8.9**	< 1.0 U	4.7	< 1.0 U	1.1	6.5	< 1.0 U	0.29 J	9.6
GM-31	9/1/1999	< 1.0 U	1.3	< 1.0 U	< 1.0 U	7.8	< 1.0 U	1.3	< 1.0 U	< 1.0 U	**27**	< 1.0 U	< 1.0 U
	9/21/2000	< 1.0 U	1.1	< 1.0 U	< 1.0 U	40	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**8.5**	< 1.0 U	< 1.0 U
	11/15/2001	< 4.0 U	3.1 J	< 4.0 U	< 4.0 U	**120**	< 4.0 U	< 4.0 U	< 4.0 U	1.8J	**11**	**7.4**	< 4.0 U
	9/24/2002	< 6.0 U	5.9 J	< 6.0 U	< 6.0 U	**200**	< 6.0 U	< 6.0 U	< 6.0 U	3.5	**10**	**19**	< 6.0 U
	10/1/2003	< 5.0 U	6	< 5.0 U	< 5.0 U	**170**	< 5.0 U	< 5.0 U	< 5.0 U	3.5	**28**	**10**	< 5.0 U
	9/15/2004	1.4 J	4 J	< 5.0 U	< 5.0 U	**120**	< 5.0 U	2.5 J	< 5.0 U	2.7	**29**	**2.4 J**	< 5.0 U
	10/18/2005	3.4	6.2	0.42 J	< 2.0 U	**120**	< 2.0 U	< 2.0 U	< 2.0 U	3.7	**67**	**3.1**	< 4.0 U
	9/27/2006	2.3 J	5.1	< 4.0 U	< 4.0 U	**110**	< 4.0 U	< 4.0 U	< 4.0 U	2.9 J	**65**	1.2 J	< 8.0 U
	9/20/2007	3.7	4.8	< 3.3 U	< 3.3 U	**100**	< 3.3 U	< 3.3 U	< 3.3 U	2.8 J	**90**	1.1 J	< 6.7 U
	10/23/2008	2.9	3.2	< 2.5 U	< 2.5 U	**76**	< 2.5 U	< 2.5 U	< 2.5 U	3	**78**	0.9 J	< 5.0 U
	9/27/2013	9.8	2.3	< 1.0 U	< 1.0 U	21	< 1.0 U	0.43 J	< 1.0 U	1.2	**120**	< 1.0 U	< 2.0 U
	10/9/2014	3.8	2.8	< 2.0 U	< 2.0 U	54	< 2.0 U	0.48 J	< 2.0 U	1.6 J	**79**	< 2.0 U	< 4.0 U
	12/8/2015	2.9	2.5	< 1.0 U	< 1.0 U	48	< 1.0 U	< 1.0 U	< 1.0 U	1.5	**75**	0.64 J	< 2.0 U
GM-32	9/22/1999	< 1.0 U	3.3	< 1.0 U	< 1.0 U	2.6	< 1.0 U	1.2	1.0	4.2	3.2	**3.0**	< 1.0 U
	9/25/2000	< 1.0 U	36	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	10	20	< 1.0 U	< 1.0 U	< 1.0 U
	11/12/2001	< 5.0 U	6.2	< 5.0 U	4.3 J	< 2.5	0.79 J	< 5.0 U	12	2.9	< 5.0 U	1.1 J	3.0 J
	9/20/2002	< 1.0 U	9.7 J	< 1.0 U	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U
	10/1/2003	< 2.0 U	5.5	< 2.0 U	1.5 J	< 1.0 U	< 2.0 U	< 2.0 U	< 2.0 U	1.0	< 2.0 U	< 2.0 U	< 2.0 U
	9/14/2004	< 1.0 U	3.0 J	< 1.0 U	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U
	10/19/2005	< 1.0 U	4.9 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 20 U
	9/19/2006	< 1.0 U	3.7 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 20 U
	9/18/2007	< 5.0 U	4.3 J	< 5.0 U	1.6 J	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	1.0 J	< 5.0 U	< 5.0 U	3.4 J
	9/23/2008	< 1.0 U	4.0 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 20 U

ARCADIS

Well	Date	VOCs (ug/L)											
		1,1,1-TCA	1,1-DCA	1,1-DCE	Benzene	cis-1,2-DCE	Ethyl-benzene	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes (total)
MCL		200		7	5	70	700	5	1000	100	5	2	10,000
GM-33	9/25/2003	21	8.4	1.0 J	< 2.5 U	19	< 2.5 U	**37**	< 2.0 U	0.72 J	**75**	< 2.5 U	< 2.5 U
	9/13/2004	17	5.4	1.1 J	< 2.0 U	9.5	< 2.0 U	**37**	< 2.0 U	0.45 J	**55**	< 2.0 U	< 2.0 U
	10/18/2005	18	6.4	0.69 J	< 1.0 U	7.4	< 1.0 U	**50**	< 1.0 U	0.36 J	**71**	1.0	< 2.0 U
	9/21/2006	18	4.5	1.1 J	< 1.0 U	6.9	< 1.0 U	**37**	< 1.0 U	0.44 J	**64**	< 1.0 U	< 3.3 U
	9/24/2007	15	4.9	0.68 J	< 1.0 U	5.5	< 1.0 U	**32**	< 1.0 U	0.34 J	**49**	< 1.0 U	< 3.3 U
	10/23/2008	8.4	2.9	0.58 J	< 1.0 U	4.1	< 1.0 U	**38**	< 1.0 U	< 1.0 U	**36**	< 1.0 U	< 2.9 U
	9/26/2013	3.4	1.1	< 1.0 U	< 1.0 U	1.3	< 1.0 U	**28**	< 1.0 U	< 1.0 U	**14**	< 1.0 U	< 2.0 U
	8/24/2015	0.61 J	< 1.0 U	< 1.0 U	< 1.0 U	0.44 J	< 1.0 U	**13**	< 1.0 U	< 1.0 U	**5.9**	< 1.0 U	< 2.0 U
GM-34	8/7/2002	4.8	2.7	< 1.0 U	< 1.0 U	3.0	< 1.0 U	**20**	< 1.0 U	0.4 J	**11**	< 1.0 U	< 1.0 U
GM-35	9/25/2003	17	46	4.0 J	< 8.0 U	**300**	< 8.0 U	**21**	< 8.0 U	12	**270**	**59**	< 8.0 U
	9/13/2004	17	36	4.1 J	< 1.0 U	**270**	< 1.0 U	**21**	< 1.0 U	9.1	**230**	**50**	< 1.0 U
	10/18/2005	12	36	1.8 J	< 5.0 U	**190**	< 5.0 U	**29**	< 5.0 U	9.3	**240**	**23**	< 1.0 U
	9/22/2006	5.5 J	26 J	< 5.0 UJ	< 5.0 UJ	**160 J**	< 5.0 UJ	**14 J**	< 5.0 UJ	11 J	**130 J**	**13 J**	< 1.0 UJ
	9/24/2007	5.8 J	26	< 1.0 U	< 1.0 U	**140**	< 1.0 U	**22**	< 1.0 U	8 J	**110**	**12**	< 20 U
	9/29/2008	4.6 J	20	< 1.0 U	< 1.0 U	**92**	< 1.0 U	**20**	< 1.0 U	9.4 J	**88**	**7.9 J**	< 20 U
	11/13/2009	4.7	17	1.0 J	< 3.3 U	**74**	< 3.3 U	**33**	< 3.3 U	8.2	**120**	**4.6**	< 6.7 U
	9/27/2010	4.8	19	0.97 J	< 4.0 U	**73**	< 4.0 U	**37**	< 4.0 U	8.9	**120**	**4.3**	< 8.0 U
	9/30/2011	2.6 J	20	0.64 J	< 3.3 U	66	< 3.3 U	**17**	< 3.3 U	11	**59**	**7.7**	< 6.7 U
	9/6/2012	< 20 U	27	< 20 U	< 20 U	**84**	< 20 U	< 20 U	< 20 U	17 J	**9.9 J**	**14 J**	< 4.0 U
	9/26/2013	< 50 U	30 J	< 50 U	< 50 U	69	< 50 U	< 50 U	< 50 U	18 J	**18 J**	**11 J**	< 1.0 U
	10/8/2014	< 25 U	22 J	< 25 U	< 25 U	57	< 25 U	**6.0 J**	< 25 U	14 J	**28**	< 25 U	< 50 U
	11/4/2015	4	34	3.7	0.52 J	**300**	< 1.0 U	**47**	< 1.0 U	19	**200**	**14**	< 2.0 U
	8/23/2016	<50 U	19 J	<50 U	<50 U	**120**	<50 U	**27 J**	<50 U	<50 U	**120**	<50 U	<100 U
GM-36	8/5/2002	5.5	21	< 2.0 U	< 2.0 U	55	< 2.0 U	**54**	< 2.0 U	1.6 J	**50**	< 2.0 U	< 2.0 U
GM-37	8/6/2002	17	7.1	0.98 J	< 2.5 U	41	< 2.5 U	**58**	< 2.5 U	1.6	**84**	< 2.5 U	< 2.5 U
	8/24/2015	2.0	0.65 J	< 1.0 U	< 1.0 U	5.9	< 1.0 U	**24**	< 1.0 U	< 1.0 U	**48**	< 1.0 U	< 2.0 U
GM-38	8/6/2002	6	6.5	< 2.0 U	< 2.0 U	22	< 2.0 U	**50**	< 2.0 U	1.0	**25**	< 2.0 U	< 2.0 U
GM-43	8/19/2004	< 9.1 U	6.9 J	< 9.1 U	< 9.1 U	**210**	< 9.1 U	**16**	< 9.1 U	8.7	**100**	**2.8 J**	< 9.1 U
	9/22/2006	< 5.0 UJ	3.7 J	< 5.0 UJ	< 5.0 UJ	**120 J**	< 5.0 UJ	**21 J**	< 5.0 UJ	5.7 J	**98 J**	< 5.0 UJ	< 1.0 UJ
	11/17/2009	2.5	5.7	0.74 J	<2.5 U	**150**	<2.5 U	**28 J**	<2.5 U	6.2	**180**	1.0 J	<5.0 U
	9/24/2010	< 8.0 U	6.8 J	< 8.0 U	< 8.0 U	**220**	< 8.0 U	**26**	< 8.0 U	8.1	**170**	< 8.0 U	< 1.0 U
	9/30/2011	< 4.0 U	4.2	1.0 J	< 4.0 U	**130**	< 4.0 U	**22**	< 4.0 U	5.3	**180**	1.0 J	< 8.0 U
	9/6/2012	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**79**	< 1.0 U	**28**	< 1.0 U	4.1 J	**230**	< 1.0 U	< 20 U
	9/26/2013	1.0	2.0	< 1.0 U	< 1.0 U	32	< 1.0 U	**22**	< 1.0 U	3.7	**170**	0.21 J	< 2.0 U
	10/8/2014	1.8 J	< 5.7 U	< 5.7 U	< 5.7 U	25	< 5.7 U	**35**	< 5.7 U	1.5 J	**220**	< 5.7 U	< 1.0 U
	11/5/2015	1.4	0.63 J	< 1.0 U	< 1.0 U	14	< 1.0 U	**42**	< 1.0 U	0.89 J	**270**	< 1.0 U	< 2.0 U
	8/23/2016	1.6 J	0.72 J	< 2.0 U	< 2.0 U	11	< 2.0 U	**41**	< 2.0 U	0.83 J	**260**	< 2.0 U	< 4.0 U

Table E-1
Groundwater VOC Analytical Results for the Upper Aquifer Wells from 1999 to 2017
RACER Trust Moraine Facilities
Moraine, Ohio

Well	Date	VOCs (ug/L)											
		1,1,1-TCA	1,1-DCA	1,1-DCE	Benzene	cis-1,2-DCE	Ethyl-benzene	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes (total)
MCL		200		7	5	70	700	5	1000	100	5	2	10,000
GM-44	8/19/2004	4 J	3.3 J	< 6.0 U	< 6.0 U	**130**	< 6.0 U	**57**	< 6.0 U	4.4	**140**	< 6.0 U	< 6.0 U
	4/9/2010	1.8 J	2.5 J	0.70 J	< 3.3 U	48	< 3.3 U	**70**	< 3.3 U	4.4	**110**	< 3.3 U	< 6.7 U
	10/8/2014	< 6.7 U	< 6.7 U	< 6.7 U	< 6.7 U	16	< 6.7 U	**100**	< 6.7 U	< 6.7 U	**180**	< 6.7 U	< 1.0 U
	11/5/2015	1.5	0.94 J	< 1.0 U	< 1.0 U	18	< 1.0 U	**110**	< 1.0 U	0.81 J	**180**	< 1.0 U	< 2.0 U
GM-45	8/19/2004	5.8 J	8.5 J	< 9.1 U	< 9.1 U	**79**	< 9.1 U	**220**	< 9.1 U	3.5 J	**220**	< 9.1 U	< 9.1 U
	9/22/2006	3.5 J	3.1 J	< 8.0 UJ	< 8.0 UJ	54 J	< 8.0 UJ	**230 J**	< 8.0 UJ	2.7 J	**230 J**	< 8.0 UJ	< 1.0 UJ
	4/9/2010	2.7 J	2.5 J	< 5.7 U	< 5.7 U	36	< 5.7 U	**200**	< 5.7 U	3.3 J	**180**	< 5.7 U	< 1.0 U
	10/8/2014	3.2 J	2.2 J	< 4.0 U	< 4.0 U	37	< 4.0 U	**150**	< 4.0 U	2.0 J	**140**	< 4.0 U	< 8.0 U
	11/4/2015	6.5	3.3	< 1.0 U	< 1.0 U	36	< 1.0 U	**190**	< 1.0 U	2.7	**180**	0.50 J	< 2.0 U
GM-46	3/2/2006	< 1.0 U	2.7	< 1.0 U	< 1.0 U	6.8	< 1.0 U	< 1.0 U	< 1.0 U	0.35 J	22	1.9	< 2.0 U
	11/30/2006	< 1.0 U	0.43 J	< 1.0 U	< 1.0 U	5.2	< 1.0 U	0.67 J	< 1.0 U	< 1.0 U	1.5	1.5	< 2.0 U
	10/9/2014	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.30 J	< 1.0 U	0.46 J	< 1.0 U	< 1.0 U	< 1.0 UB	< 1.0 U	< 2.0 U
	11/3/2015	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.41 J	< 1.0 U	0.47 J	< 1.0 U	< 1.0 U	0.30 J	< 1.0 U	< 2.0 U
GM-53	9/14/2006	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U
GM-59	9/15/2006	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	4.0 J	< 1.0 U	**310**	< 1.0 U	< 1.0 U	**94**	< 1.0 U	< 29 U
	10/3/2008	< 33 U	< 33 U	< 33 U	< 33 U	41	< 33 U	**750**	< 33 U	< 33 U	**750**	< 33 U	< 67 U
	11/17/2009	< 6.7 U	< 6.7 U	< 6.7 U	< 6.7 U	3.3 J	< 6.7 U	**500 J**	< 6.7 U	< 6.7 U	**170**	< 6.7 U	< 1.0 U
	4/8/2010	< 8.0 U	< 8.0 U	< 8.0 U	< 8.0 U	2.9 J	< 8.0 U	**280**	< 8.0 U	< 8.0 U	**69**	< 8.0 U	< 1.0 U
	9/29/2010	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	5.7 J	< 1.0 U	**520**	< 1.0 U	< 1.0 U	**350**	< 1.0 U	< 31 U
	9/30/2011	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	6.4 J	< 1.0 U	**520**	< 1.0 U	< 1.0 U	**510**	< 1.0 U	< 25 U
	9/7/2012	< 50 U	< 50 U	< 50 U	< 50 U	16 J	< 50 U	**800**	< 50 U	< 50 U	**710**	< 50 U	< 1.0 U
	9/27/2013	1.0	< 1.0 U	< 1.0 U	< 1.0 U	11	< 1.0 U	**1000**	< 1.0 U	0.56 J	**1100**	< 1.0 U	< 2.0 U
	10/10/2014	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	6.7 J	< 1.0 U	**420**	< 1.0 U	< 1.0 U	**110**	< 1.0 U	< 27 U
	12/8/2015	0.48 J	< 1.0 U	< 1.0 U	< 1.0 U	2.4	< 1.0 U	**270**	< 1.0 U	0.34 J	**97**	< 1.0 U	< 2.0 U
	8/23/2016	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	2.6	< 2.0 U	**280**	< 2.0 U	< 2.0 U	**170**	< 2.0 U	< 4.0 U
GM-60	9/15/2006	< 25 U	< 25 U	< 25 U	< 25 U	**220**	< 25 U	**510**	< 25 U	< 25 U	**570**	< 25 U	< 50 U
	10/3/2008	< 25 U	< 25 U	< 25 U	< 25 U	**360**	< 25 U	**900**	< 25 U	< 25 U	**920**	< 25 U	< 50 U
	11/17/2009	< 20 U	< 20 U	< 20 U	< 20 U	**160**	< 20 U	**1100 J**	< 20 U	< 20 U	**1400**	< 20 U	< 4.0 U
	4/8/2010	< 22 U	< 22 U	< 22 U	< 22 U	17 J	< 22 U	**820**	< 22 U	< 22 U	**740**	< 22 U	< 4.0 U
	9/29/2010	< 4.0 U	< 4.0 U	< 4.0 U	< 4.0 U	**940**	< 4.0 U	**970**	< 4.0 U	10 J	**1300**	**18 J**	< 8.0 U
	9/30/2011	< 20 U	< 20 U	< 20 U	< 20 U	**370**	< 20 U	**620**	< 20 U	3.8 J	**810**	**11 J**	< 4.0 U
	9/7/2012	< 59 U	< 59 U	< 59 U	< 59 U	**480**	< 59 U	**610**	< 59 U	< 59 U	**980**	< 59 U	< 1.0 U
	9/27/2013	1.4	1.3	1.5	< 1.0 U	**400**	< 1.0 U	**670**	< 1.0 U	4.2	**1100**	**2.1**	< 2.0 U
	10/9/2014	< 67 U	< 67 U	< 67 U	< 67 U	**96**	< 67 U	**860**	< 67 U	< 67 U	**1400**	< 67 U	< 1.0 U
	11/5/2015	< 4.0 U	< 4.0 U	< 4.0 U	< 4.0 U	16	< 4.0 U	**770**	< 4.0 U	< 4.0 U	**910**	< 4.0 U	< 8.0 U
	8/23/2016	1.1 J	0.69 J	< 2.0 U	< 2.0 U	12	< 2.0 U	**530**	< 2.0 U	< 2.0 U	**700**	< 2.0 U	< 4.0 U

Table E-1
Groundwater VOC Analytical Results for the Upper Aquifer Wells from 1999 to 2017
RACER Trust Moraine Facilities
Moraine, Ohio

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Well	Date	VOCs (ug/L)											
		1,1,1-TCA	1,1-DCA	1,1-DCE	Benzene	cis-1,2-DCE	Ethyl-benzene	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes (total)
MCL		200		7	5	70	700	5	1000	100	5	2	10,000
GM-66	5/2/2007	< 2.9 U	8.3	< 2.9 U	< 2.9 U	**84**	< 2.9 U	< 2.9 U	< 2.9 U	3.3	**31**	**4.1**	< 5.7 U
	10/8/2014	< 1.0 U	12	< 1.0 U	< 1.0 U	**280**	< 1.0 U	< 1.0 U	< 1.0 U	11	**110**	**3.0 J**	< 20 U
	12/8/2015	< 1.0 U	12	2.5	< 1.0 U	**280**	< 1.0 U	< 1.0 U	< 1.0 U	11	**110**	**3.0**	< 2.0 U
GM-67S	5/3/2007	< 5.7 U	2.8 J	< 5.7 U	< 5.7 U	5.2 J	< 5.7 U	1.1 J	< 5.7 U	< 5.7 U	**140**	< 5.7 U	< 1.0 U
	10/10/2014	< 5.0 U	1.6 J	< 5.0 U	< 5.0 U	2.3 J	< 5.0 U	1.1 J	< 5.0 U	< 5.0 U	**140**	< 5.0 U	< 1.0 U
	11/4/2015	< 1.0 U	2.1	< 1.0 U	< 1.0 U	2.3	< 1.0 U	1.6	< 1.0 U	0.34 J	**130**	< 1.0 U	< 2.0 UJ
GM-68S	5/4/2007	0.62 J	< 2.5 U	< 2.5 U	< 2.5 U	< 2.5 U	< 2.5 U	**28**	< 2.5 U	< 2.5 U	**78**	< 2.5 U	< 5.0 U
GM-71	5/3/2007	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	**62**	< 2.0 U	< 2.0 U	**11**	< 2.0 U	< 4.0 U
	10/9/2014	0.31 J	< 1.0 U	< 1.0 U	< 1.0 U	0.21 J	< 1.0 U	**19**	< 1.0 U	< 1.0 U	**12**	< 1.0 U	< 2.0 U
	11/3/2015	0.51 J	0.35 J	< 1.0 U	< 1.0 U	0.46 J	< 1.0 U	**19**	< 1.0 U	< 1.0 U	**20**	< 1.0 U	< 2.0 U
GM-72	5/3/2007	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**53**	< 1.0 U	< 1.0 U	0.66 J	< 1.0 U	< 3.3 U
	10/9/2014	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	2.1	< 1.0 U	< 1.0 U	< 1.0 UB	< 1.0 U	< 2.0 U
	11/3/2015	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	2.2	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U
GM-74S	9/27/2007	< 4.0 U	< 4.0 U	< 4.0 U	< 4.0 U	< 4.0 U	< 4.0 U	**140**	< 4.0 U	< 4.0 U	**83**	< 4.0 U	< 8.0 U
	4/9/2010	< 5.7 U	< 5.7 U	< 5.7 U	< 5.7 U	< 5.7 U	< 5.7 U	**200**	< 5.7 U	< 5.7 U	**44**	< 5.7 U	< 1.0 U
	8/23/2016	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	**69**	< 2.0 U	< 2.0 U	**14 K**	< 2.0 U	< 4.0 U
GM-75S	9/26/2007	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**490**	< 1.0 U	< 1.0 U	**210**	< 1.0 U	< 29 U
	10/6/2008	< 20 U	< 20 U	< 20 U	< 20 U	< 20 U	< 20 U	**690**	< 20 U	< 20 U	**250**	< 20 U	< 4.0 U
	11/16/2009	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	4.9 J	< 1.0 U	**640**	< 1.0 U	< 1.0 U	**260**	< 1.0 U	< 20 U
	9/29/2010	< 29 U	< 29 U	< 29 U	< 29 U	14 J	< 29 U	**650**	< 29 U	< 29 U	**890**	< 29 U	< 57 U
	9/30/2011	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	4.4 J	< 1.0 U	**430**	< 1.0 U	< 1.0 U	**720**	< 1.0 U	< 33 U
	9/7/2012	< 29 U	< 29 U	< 29 U	< 29 U	< 29 U	< 29 U	**420**	< 29 U	< 29 U	**250**	< 29 U	< 57 U
	9/27/2013	1.8	0.53 J	< 1.0 U	< 1.0 U	4.5	< 1.0 U	**480**	< 1.0 U	0.29 J	**350**	< 1.0 U	< 2.0 U
	10/9/2014	< 20 U	< 20 U	< 20 U	< 20 U	< 20 U	< 20 U	**460**	< 20 U	< 20 U	**170**	< 20 U	< 4.0 U
	12/11/2015	0.58 J	< 1.3 U	< 1.3 U	< 1.3 U	< 1.3 U	< 1.3 U	**420**	< 1.3 U	< 1.3 U	**68**	< 1.3 U	< 2.5 U
	8/24/2016	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	**520**	< 2.0 U	< 2.0 U	**68**	< 2.0 U	< 4.0 U
GM-76S	9/23/2007	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.2	< 1.0 U	< 1.0 U	1.6	< 1.0 U	< 2.0 U
	10/9/2014	< 1.0 U	< 1.0 U	< 1.0 U	0.39 J	< 1.0 U	< 1.0 U	1.5	< 1.0 U	< 1.0 U	1.1	< 1.0 U	< 2.0 U
	10/30/2015	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.1	< 1.0 U	< 1.0 U	0.64 J	< 1.0 U	< 2.0 U
GM-83S	2/26/2008	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	2.9	< 1.0 U	< 1.0 U	0.18 J	0.3 J	< 1.0 U	< 1.0 U	< 2.0 U
	9/7/2012	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.1	< 1.0 U	< 1.0 U	0.45 J	< 1.0 U	0.19 J	< 1.0 U	< 2.0 U
	9/26/2013	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.1	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U

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RACER Trust Moraine Facilities
Moraine, Ohio

Well	Date	VOCs (ug/L)											
		1,1,1-TCA	1,1-DCA	1,1-DCE	Benzene	cis-1,2-DCE	Ethyl-benzene	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes (total)
MCL		200		7	5	70	700	5	1000	100	5	2	10,000
HR-1	9/16/1999	1.6	2.4	< 1.0 U	< 1.0 U	5.8	< 1.0 U	**44**	< 1.0 U	3.9	**56**	< 1.0 U	< 1.0 U
	9/25/2000	1.3	2.4	< 1.0 U	< 1.0 U	8.5	< 1.0 U	**33**	< 1.0 U	3.2	**56**	< 1.0 U	< 1.0 U
	11/8/2001	2.2 J	2.8 J	< 3.3 U	< 3.3 U	9.9	< 3.3 U	**36**	< 3.3 U	2.8	**86 B**	< 3.3 U	< 3.3 U
	9/23/2002	< 2.0 U	2.8	< 2.0 U	< 2.0 U	4.5	< 2.0 U	**33**	< 2.0 U	3.2	**33**	< 2.0 U	< 2.0 U
	9/18/2003	1 J	2.6	< 2.0 U	< 2.0 U	2.3	< 2.0 U	**27**	< 2.0 U	3.2	**56**	< 2.0 U	< 2.0 U
	9/13/2004	0.56 J	2.5	< 1.0 U	< 1.0 U	24	< 1.0 U	**23**	< 1.0 U	2.3	**30**	0.55 J	< 1.0 U
	10/18/2005	1.2	2.7	< 1.0 U	< 1.0 U	19	< 1.0 U	**28**	< 1.0 U	2.3	**43**	1.1	< 2.0 U
	9/25/2006	0.57 J	1.7	< 1.0 U	< 1.0 U	14	< 1.0 U	< 1.0 U	< 1.0 U	1.4 J	**50**	< 1.0 U	< 3.3 U
	9/24/2007	0.45 J	2.2	0.21J	< 1.0 U	9.5	< 1.0 U	**20**	< 1.0 U	1.9	**40**	< 1.0 U	< 2.0 U
	9/29/2008	0.77 J	1.8 J	< 2.5 U	< 2.5 U	5	< 2.5 U	**27**	< 2.5 U	2 J	**70**	< 2.5 U	< 5.0 U
	9/26/2013	0.99 J	1.2	< 1.0 U	< 1.0 U	3.1	< 1.0 U	**30**	< 1.0 U	0.90 J	**100**	< 1.0 U	< 2.0 U
	10/8/2014	1.3 J	1.4 J	< 5.0 U	< 5.0 U	20	< 5.0 U	**36**	< 5.0 U	1.5 J	**120**	< 5.0 U	< 1.0 U
	11/5/2015	1.2	0.51 J	< 1.0 U	< 1.0 U	6.6	< 1.0 U	**76**	< 1.0 U	0.43 J	**210**	< 1.0 U	< 2.0 U
	8/23/2016	1.1 J	< 2.0 U	< 2.0 U	< 2.0 U	3.3	< 2.0 U	**63**	< 2.0 U	< 2.0 U	**190**	< 2.0 U	< 4.0 U
	8/17/2017	1.0	0.39 J	< 1.0 U	< 1.0 U	0.32 J	< 1.0 U	**56**	< 1.0 U	< 1.0 U	0.65 J	< 1.0 U	< 2.0 U
HR-2	9/16/1999	< 1.0 U	3.9	< 1.0 U	< 1.0 U	9.6	< 1.0 U	< 1.0 U	< 1.0 U	1.5	< 1.0 U	< 1.0 U	< 1.0 U
	9/19/2000	< 1.0 U	4.6	< 1.0 U	< 1.0 U	8.6	< 1.0 U	< 1.0 U	< 1.0 U	1.1	< 1.0 U	< 1.0 U	< 1.0 U
	11/7/2001	< 1.0 U	4.2	< 1.0 U	< 1.0 U	8.3	< 1.0 U	< 1.0 U	< 1.0 U	1.1	0.56 J	< 1.0 U	< 1.0 U
	9/24/2002	< 1.0 U	4.9	< 1.0 U	< 1.0 U	8.8	< 1.0 U	< 1.0 U	< 1.0 U	1.2	0.46 J	< 1.0 U	< 1.0 U
	9/16/2003	< 1.0 U	4.5	< 1.0 U	< 1.0 U	7.2	< 1.0 U	< 1.0 U	< 1.0 U	0.96	0.40 J	< 1.0 U	< 1.0 U
	9/16/2004	< 1.0 U	5.6	< 1.0 U	< 1.0 U	7.8	< 1.0 U	0.37 J	< 1.0 U	1.1	0.53 J	0.23 J	< 1.0 U
	10/20/2005	< 1.0 U	4.4	< 1.0 U	< 1.0 U	5.0	< 1.0 U	< 1.0 U	< 1.0 U	0.78 J	0.35 J	0.29 J	< 2.0 U
	9/25/2006	< 1.0 U	5.2	< 1.0 U	< 1.0 U	5.6	< 1.0 U	< 1.0 U	< 1.0 U	0.79 J	0.48 J	< 1.0 U	< 2.0 U
	9/26/2007	< 1.0 U	5.3	< 1.0 U	< 1.0 U	5.0	< 1.0 U	< 1.0 U	< 1.0 U	0.76 J	0.45 J	< 1.0 U	< 2.0 U
	10/1/2008	< 1.0 U	4.6	< 1.0 U	< 1.0 U	3.4	< 1.0 U	< 1.0 U	< 1.0 U	0.47 J	0.36 J	< 1.0 U	< 2.0 U
	11/13/2009	< 1.0 U	5.6	< 1.0 U	< 1.0 U	3.7	< 1.0 U	< 1.0 U	< 1.0 U	0.58 J	0.45 J	< 1.0 U	< 2.0 U
	9/28/2010	< 1.0 U	5.6	< 1.0 U	< 1.0 U	2.8	< 1.0 U	< 1.0 U	< 1.0 U	0.41 J	0.39 J	< 1.0 U	< 1.0 U
	9/28/2011	< 1.0 U	6.4	< 1.0 U	< 1.0 U	2.1	< 1.0 U	< 1.0 U	< 1.0 U	0.32 J	0.43 J	< 1.0 U	< 2.0 U
	9/7/2012	< 1.0 U	7.7	< 1.0 U	< 1.0 U	1.8	< 1.0 U	< 1.0 U	< 1.0 U	0.28 J	0.41 J	< 1.0 U	< 2.0 U
	9/27/2013	< 1.0 U	7.5	< 1.0 U	< 1.0 U	1.6	< 1.0 U	< 1.0 U	< 1.0 U	0.28 J	0.40 J	< 1.0 U	< 2.0 U
	10/8/2014	< 1.0 U	7.3	< 1.0 U	< 1.0 U	1.8	< 1.0 U	< 1.0 U	< 1.0 U	0.29 J	< 1.0 UB	< 1.0 U	< 2.0 U
	10/30/2015	< 1.0 U	8.3	< 1.0 U	< 1.0 U	2.1	< 1.0 U	< 1.0 U	< 1.0 U	0.30 J	< 1.0 U	< 1.0 U	< 2.0 U
	8/25/2016	< 1.0 U	9.5	< 1.0 U	< 1.0 U	2.9	< 1.0 U	< 1.0 U	< 1.0 U	0.39 J	< 1.0 UB	< 1.0 U	< 2.0 U

Table E-1
Groundwater VOC Analytical Results for the Upper Aquifer Wells from 1999 to 2017
RACER Trust Moraine Facilities
Moraine, Ohio

Well	Date	VOCs (ug/L)											
		1,1,1-TCA	1,1-DCA	1,1-DCE	Benzene	cis-1,2-DCE	Ethyl-benzene	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes (total)
MCL		200		7	5	70	700	5	1000	100	5	2	10,000
HR-3	9/16/1999	< 1.0 U	6.2	< 1.0 U	< 1.0 U	6.1	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
	9/19/2000	< 1.0 U	5.1	< 1.0 U	< 1.0 U	4.6	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
	11/7/2001	< 1.0 U	6.9	< 1.0 U	< 1.0 U	5.1	< 1.0 U	< 1.0 U	< 1.0 U	0.60	0.66 J	< 1.0 U	< 1.0 U
	9/24/2002	< 1.0 U	15	< 1.0 U	< 1.0 U	9.9	< 1.0 U	< 1.0 U	< 1.0 U	1.0	1.4	< 1.0 U	< 1.0 U
	9/16/2003	< 1.0 U	13	< 1.0 U	< 1.0 U	9.9	< 1.0 U	< 1.0 U	< 1.0 U	1.1	1.6	< 1.0 U	< 1.0 U
	9/16/2004	0.27 J	23	< 1.0 U	< 1.0 U	18	< 1.0 U	0.32 J	< 1.0 U	1.8	**8.1**	< 1.0 U	< 1.0 U
	10/20/2005	0.34 J	18	< 1.0 U	< 1.0 U	11	< 1.0 U	< 1.0 U	< 1.0 U	1.5	**10**	< 1.0 U	< 2.0 U
	9/25/2006	< 1.0 U	10	< 1.0 U	< 1.0 U	8.2	< 1.0 U	< 1.0 U	< 1.0 U	0.99 J	**7.2**	< 1.0 U	< 2.0 U
	10/2/2008	0.84 J	16	0.27 J	< 1.0 UJ	17	< 1.0 U	< 1.0 U	< 1.0 U	1.6	**32**	**2.2**	< 2.0 U
	9/27/2013	6.9	12	0.51 J	< 1.0 U	59	< 1.0 U	< 1.0 U	< 1.0 U	2.2	**190**	0.93 J	< 2.0 U
	10/8/2014	7.6 J	11	< 1.0 U	< 1.0 U	**82**	< 1.0 U	< 1.0 U	< 1.0 U	2.7 J	**220**	**6.4 J**	< 2.0 U
	11/4/2015	7.3	9.6	0.68 J	< 1.0 U	**82**	< 1.0 U	< 1.0 U	< 1.0 U	2.6	**200**	**13**	< 2.0 U
	8/25/2016	7.1	6.6	< 2.0 U	< 2.0 U	**93**	< 2.0 U	0.95 J	< 2.0 U	2.5	**200**	**4.2**	< 4.0 U
HR-4	9/14/1999	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.2	< 1.0 U	< 1.0 U	1.4	< 1.0 U	< 1.0 U
	9/20/2000	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
	11/6/2001	0.17 J	< 1.0 U	< 1.0 U	< 1.0 U	0.28 J	< 1.0 U	0.88 J	< 1.0 U	< 0.50 U	1.0	< 1.0 U	< 1.0 U
	9/27/2002	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 0.50 U	< 1.0 U	0.59 J	< 1.0 U	< 0.50 U	0.71 J	< 1.0 U	< 1.0 U
	9/18/2003	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 0.50 U	< 1.0 U	0.55 J	< 1.0 U	< 0.50 U	0.71 J	< 1.0 U	< 1.0 U
	9/16/2004	< 1.0 U	0.77 J	< 1.0 U	< 1.0 U	< 0.50 U	< 1.0 U	1.3	< 1.0 U	< 0.50 U	0.50 J	< 1.0 U	< 1.0 U
	10/20/2005	< 1.0 U	1.5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.39 J	< 1.0 U	< 1.0 U	0.32 J	< 1.0 U	< 2.0 U
	9/25/2006	< 1.0 U	1.6	< 1.0 U	< 1.0 U	0.26 J	< 1.0 U	0.41 J	< 1.0 U	< 1.0 U	0.34 J	< 1.0 U	< 2.0 U
	9/26/2007	< 1.0 U	3.6	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.33 J	< 1.0 U	< 1.0 U	0.31 J	< 1.0 U	< 2.0 U
	9/30/2008	< 1.0 U	4.1	< 1.0 U	< 1.0 U	0.23 J	< 1.0 U	0.44 J	< 1.0 U	< 1.0 U	0.31 J	< 1.0 U	< 2.0 U
	11/13/2009	< 1.0 U	5.5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.37 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U
	9/28/2010	< 1.0 U	3.9	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.34 J	< 1.0 U	< 1.0 U	0.28 J	< 1.0 U	< 2.0 U
	9/28/2011	< 1.0 U	4.5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.27 J	< 1.0 U	< 2.0 U
	9/7/2012	0.23 J	5	< 1.0 U	< 1.0 U	0.35 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.32 J	< 1.0 U	< 2.0 U
	9/27/2013	0.29 J	3.0	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.21 J	< 1.0 U	< 1.0 U	0.27 J	< 1.0 U	< 2.0 U
	10/7/2014	0.71 J	2.0	< 1.0 U	< 1.0 U	0.26 J	< 1.0 U	0.28 J	< 1.0 U	< 1.0 U	< 1.0 UB	< 1.0 U	< 2.0 U
	10/30/2015	1.2	1.6	< 1.0 U	< 1.0 U	0.32 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.33 J	< 1.0 U	< 2.0 U
	8/19/2016	2	1.6	< 1.0 U	< 1.0 U	0.42 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.36 J	< 1.0 U	< 2.0 U
	8/16/2017	1.9	2.1	< 1.0 U	< 1.0 U	0.45 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U

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Groundwater VOC Analytical Results for the Upper Aquifer Wells from 1999 to 2017
RACER Trust Moraine Facilities
Moraine, Ohio

Well	Date	VOCs (ug/L)											
		1,1,1-TCA	1,1-DCA	1,1-DCE	Benzene	cis-1,2-DCE	Ethyl-benzene	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes (total)
MCL		200		7	5	70	700	5	1000	100	5	2	10,000
HR-5	9/16/1999	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	10.5	< 1.0 U	< 1.0 U	< 1.0 U	1.1	**12**	< 1.0 U	< 1.0 U
	9/19/2000	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	5.6	< 1.0 U	< 1.0 U	3.0	< 1.0 U	**8.1**	< 1.0 U	2.0
	11/7/2001	0.17 J	0.55 J	< 1.0 U	< 1.0 U	7.8	< 1.0 U	< 1.0 U	< 1.0 U	0.74	**11**	< 1.0 U	< 1.0 U
	9/23/2002	< 1.0 U	0.55 J	< 1.0 U	< 1.0 U	7.5	< 1.0 U	< 1.0 U	< 1.0 U	0.58	**13**	< 1.0 U	< 1.0 U
	9/18/2003	< 1.0 U	0.42 J	< 1.0 U	< 1.0 U	5.0	< 1.0 U	< 1.0 U	< 1.0 U	0.46 J	**11**	< 1.0 U	< 1.0 U
	9/13/2004	< 1.0 U	0.43 J	< 1.0 U	< 1.0 U	4.8	< 1.0 U	< 1.0 U	< 1.0 U	0.44 J	**11**	< 1.0 U	< 1.0 U
	10/18/2005	< 1.0 U	0.54 J	< 1.0 U	< 1.0 U	4.6	< 1.0 U	< 1.0 U	< 1.0 U	0.52 J	**13**	1.1	< 2.0 U
	9/22/2006	< 1.0 UJ	0.41 J	< 1.0 UJ	< 1.0 UJ	5.2 J	< 1.0 UJ	0.27 J	< 1.0 UJ	0.46 J	**13 J**	0.22 J	< 2.0 UJ
	9/24/2007	< 1.0 U	0.51J	< 1.0 U	< 1.0 U	5.4	< 1.0 U	< 1.0 U	< 1.0 U	0.41J	**13**	< 1.0 U	< 2.0 U
	9/29/2008	< 1.0 U	0.48 J	< 1.0 U	< 1.0 U	5.4	< 1.0 U	< 1.0 U	< 1.0 U	0.59 J	**13**	< 1.0 U	< 2.0 U
	9/26/2013	< 1.0 U	0.70 J	< 1.0 U	< 1.0 U	7.0	< 1.0 U	0.57 J	< 1.0 U	0.63 J	**14**	0.36 J	< 2.0 U
HR-6	9/16/1999	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	2.0	< 1.0 U	< 1.0 U
	9/23/2002	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 0.50 U	< 1.0 U	< 1.0 U	< 1.0 U	< 0.50 U	1.5	< 1.0 U	< 1.0 U
HR-7	9/17/1999	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**9.8**	< 1.0 U	< 1.0 U
	9/19/2002	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.65	< 1.0 U	< 1.0 U	< 1.0 U	< 0.50 U	**9.4**	< 1.0 U	< 1.0 U
	9/19/2002	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.65	< 1.0 U	< 1.0 U	< 1.0 U	< 0.50 U	**9.4**	< 1.0 U	< 1.0 U
	2/26/2008	< 1.0 U	0.26 J	< 1.0 U	< 1.0 U	0.94 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**7.3**	< 1.0 U	< 2.0 U
	9/23/2010	< 1.0 U	0.26 J	< 1.0 U	< 1.0 U	1.4	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**7.5**	< 1.0 U	< 2.0 U
	9/28/2011	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.7	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**7.3**	< 1.0 U	< 2.0 U
	9/6/2012	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.6	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**7.0**	< 1.0 U	< 2.0 U
	9/26/2013	< 1.0 U	0.35 J	< 1.0 U	< 1.0 U	1.9	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**6.2**	< 1.0 U	< 2.0 U
	10/7/2014	< 1.0 U	0.27 J	< 1.0 U	< 1.0 U	1.7	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**6.2**	< 1.0 U	< 2.0 U
	11/5/2015	< 1.0 U	< 1.0 U	< 1.0 UF2J	< 1.0 U	1.4	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**6.9**	< 1.0 U	< 2.0 U
	8/15/2016	< 1.0 U	0.34 J	< 1.0 U	< 1.0 U	1.9	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**7.0**	< 1.0 U	< 2.0 U
HR-16	9/23/1999	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	2.7	< 1.0 U	< 1.0 U
	9/18/2002	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.46J	< 1.0 U	< 1.0 U	< 1.0 U	< 0.50 U	1.5	< 1.0 U	< 1.0 U
	1/21/2008	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.3	< 1.0 U	< 2.0 U
	9/6/2012	0.62 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.4	< 1.0 U	< 2.0 U
	9/25/2013	0.61 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.14 J	< 1.0 U	< 1.0 U	1.3	< 1.0 U	< 2.0 U
	10/7/2014	0.58 J	0.64 J	< 1.0 U	< 1.0 U	0.44 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.9	< 1.0 U	< 2.0 U
	11/5/2015	< 1.0 U	1.3	< 1.0 U	< 1.0 U	1.0	< 1.0 U	< 1.0 U	< 1.0 U	0.63 J	2.7	< 1.0 U	< 2.0 U
	8/22/2016	< 1.0 U	1.5	< 1.0 U	< 1.0 U	1.0	< 1.0 U	< 1.0 U	< 1.0 U	0.67 J	3.6	< 1.0 U	< 2.0 U

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RACER Trust Moraine Facilities
Moraine, Ohio

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Well	Date	VOCs (ug/L)											
		1,1,1-TCA	1,1-DCA	1,1-DCE	Benzene	cis-1,2-DCE	Ethyl-benzene	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes (total)
MCL		200		7	5	70	700	5	1000	100	5	2	10,000
HR-17	9/23/1999	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	6.2	< 1.0 U	**16**	< 1.0 U	< 1.0 U	**7.4**	< 1.0 U	< 1.0 U
	9/28/2000	1.9	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	3.7	< 1.0 U	< 1.0 U	4.4	< 1.0 U	< 1.0 U
	11/8/2001	1.4	< 1.0 U	< 1.0 U	< 1.0 U	< 0.50 U	< 1.0 U	3.3	< 1.0 U	< 0.50 U	4.2 B	< 1.0 U	< 1.0 U
	9/18/2002	0.39 J	1.5	< 1.0 U	< 1.0 U	5.1	< 1.0 U	**22**	< 1.0 U	1.4	**12**	< 1.0 U	< 1.0 U
	9/25/2003	< 2.0 U	0.75 J	< 2.0 U	< 2.0 U	2.2	< 2.0 U	**64**	< 2.0 U	0.7 J	**10**	< 2.0 U	< 2.0 U
	9/17/2004	< 5.0 U	2.0 J	< 5.0 U	< 5.0 U	7.1	< 5.0 U	**82**	< 5.0 U	1.6 J	**18**	< 5.0 U	< 5.0 U
	10/19/2005	< 1.0 U	0.70 J	< 1.0 U	< 1.0 U	3.1	< 1.0 U	**45**	< 1.0 U	0.57 J	**8.3**	< 1.0 U	< 3.7 U
	9/18/2006	< 1.0 U	0.6 J	< 1.0 U	< 1.0 U	4.6	< 1.0 U	**34**	< 1.0 U	0.46 J	**5.6**	< 1.0 U	< 2.0 U
	9/25/2007	< 2.5 U	1.2 J	< 2.5 U	< 2.5 U	1.9 J	< 2.5 U	**51**	< 2.5 U	0.69 J	**16**	< 2.5 U	< 5.0 U
	9/26/2008	< 4.0 U	1.1 J	< 4.0 U	< 4.0 U	2.7 J	< 4.0 U	**120**	< 4.0 U	1.0 J	**31**	< 4.0 U	< 8.0 U
	11/12/2009	< 2.5 U	1.7 J	< 2.5 U	< 2.5 U	1.9 J	< 2.5 U	**85**	< 2.5 U	1.3 J	**21**	< 2.5 U	< 5.0 U
	9/23/2010	< 1.0 U	1.9	< 1.0 U	< 1.0 U	2.2	< 1.0 U	**60**	< 1.0 U	1.2 J	**18**	< 1.0 U	< 3.3 U
	9/29/2011	< 5.7 U	< 5.7 U	< 5.7 U	< 5.7 U	< 5.7 U	< 5.7 U	**110**	< 5.7 U	< 5.7 U	**57**	< 5.7 U	< 1.0 U
	9/6/2012	< 9.1 U	< 9.1 U	< 9.1 U	< 9.1 U	2.4 J	< 9.1 U	**140**	< 9.1 U	< 9.1 U	**75**	< 9.1 U	< 1.0 U
	9/25/2013	1.3	0.93 J	< 1.0 U	< 1.0 U	1.4	< 1.0 U	**150**	< 1.0 U	0.92 J	**100**	< 1.0 U	< 2.0 U
	10/7/2014	< 5.0 U	2.0 J	< 5.0 U	< 5.0 U	2.2 J	< 5.0 U	**170**	< 5.0 U	< 5.0 U	**160**	< 5.0 U	< 1.0 U
	11/4/2015	1.5	0.61 J	< 1.0 U	< 1.0 U	1.7	< 1.0 U	**150**	< 1.0 U	0.73 J	**160**	< 1.0 U	< 2.0 U
	8/25/2016	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	**170**	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 4.0 U
	8/17/2017	0.80 J	0.60 J	< 1.0 U	< 1.0 U	2.3	< 1.0 U	**150**	< 1.0 U	< 1.0 U	**24**	< 1.0 U	< 2.0 U
ME-1	8/31/1999	14	2.4	< 1.0 U	< 1.0 U	38	< 1.0 U	**84**	< 1.0 U	1.5	**292**	**36**	< 1.0 U
ME-3	8/31/1999	43	6.1	< 1.0 U	< 1.0 U	5.7	< 1.0 U	**58**	< 1.0 U	< 1.0 U	**48**	< 1.0 U	< 1.0 U
	9/21/2000	6.4	3.4	< 1.0 U	< 1.0 U	2.9	< 1.0 U	< 1.0 U	1.4	2.9	< 1.0 U	**2.1**	< 1.0 U
	11/15/2001	1.6	5.9	< 1.0 U	< 1.0 U	16	< 1.0 U	1.3	0.34 J	2.7	3.8	**7.3**	< 1.0 U
	9/24/2002	< 2.5 U	< 2.5 U	< 2.5 U	< 2.5 U	< 1.0 U	< 2.5 U	< 2.5 U	< 2.5 U	< 1.0 U	< 2.5 U	< 2.5 U	< 2.5 U
	10/1/2003	0.31 J	24	< 1.0 U	0.6 J	0.96	< 1.0 U	< 1.0 U	< 1.0 U	< 0.50 U	1.5	< 1.0 U	< 1.0 U
	9/15/2004	0.53 J	18	< 1.0 U	< 1.0 U	2.2	< 1.0 U	0.21 J	< 1.0 U	< 0.50 U	1.5	1.1	< 1.0 U
	10/18/2005	1.6	15	< 1.0 U	< 1.0 U	1.1	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.9	1.6	< 2.0 U
	9/27/2006	1.1	8.5	< 1.0 U	< 1.0 U	3.5	< 1.0 U	1.9	< 1.0 U	0.34 J	2.4	**2.2**	< 2.0 U
	9/20/2007	2.0	3.8	< 1.0 U	< 1.0 U	1.2	< 1.0 U	**5.2**	< 1.0 U	< 1.0 U	3.6	0.82 J	< 2.0 U
	10/22/2008	2.1	1.8	< 1.0 U	< 1.0 U	1.4	< 1.0 U	**8.1**	< 1.0 U	< 1.0 U	4.9	0.7 J	< 2.0 U
	9/27/2013	1.0	0.41 J	< 1.0 U	< 1.0 U	0.35 J	< 1.0 U	**7.1**	< 1.0 U	< 1.0 U	4.6	< 1.0 U	< 2.0 U

Table E-1
Groundwater VOC Analytical Results for the Upper Aquifer Wells from 1999 to 2017
RACER Trust Moraine Facilities
Moraine, Ohio

ARCADIS

Well	Date	VOCs (ug/L)											
		1,1,1-TCA	1,1-DCA	1,1-DCE	Benzene	cis-1,2-DCE	Ethyl-benzene	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes (total)
MCL		200		7	5	70	700	5	1000	100	5	2	10,000
ME-6	8/31/1999	2.9	< 1.0 U	< 1.0 U	< 1.0 U	**255**	< 1.0 U	**213**	< 1.0 U	< 1.0 U	**474**	< 1.0 U	< 1.0 U
	9/21/2000	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**99**	< 1.0 U	**6.7**	1.9	2.5	**19**	**6.1**	< 1.0 U
	11/15/2001	2.2	2.7	< 2.0 U	< 2.0 U	65	< 2.0 U	**8.2**	0.42 J	1.8	**23**	**13**	< 2.0 U
	9/25/2002	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	5.2	< 1.0 U	< 1.0 U	6.6J	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U
	10/1/2003	13	7.2	< 2.0 U	0.46 J	20	< 2.0 U	**12**	< 2.0 U	< 1.0 U	**31**	**2.9**	< 2.0 U
	9/15/2004	4.1	6.3	0.26 J	< 1.0 U	14	< 1.0 U	**5.3**	< 1.0 U	0.56	**9.2**	**2.4**	< 1.0 U
	10/18/2005	2.2	7.0	< 1.0 U	< 1.0 U	13	< 1.0 U	**9.8**	< 1.0 U	0.93 J	**25**	**5.6**	< 2.0 U
	9/27/2006	1.4	6.3	< 1.0 U	< 1.0 U	27	< 1.0 U	**13**	< 1.0 U	1.3 J	**32**	**11**	< 2.9 U
	9/20/2007	0.61 J	6.4	< 1.0 U	< 1.0 U	9.2	< 1.0 U	4.5	< 1.0 U	0.51 J	**12**	**4.5**	< 2.0 U
	10/22/2008	2.7	11	< 1.0 U	< 1.0 U	5.2	< 1.0 U	**7.7**	< 1.0 U	0.25 J	**9**	1.7	< 2.0 U
	9/27/2013	5.9	20	< 1.0 U	< 1.0 U	1.5	< 1.0 U	**5.1**	< 1.0 U	< 1.0 U	2.8	0.28 J	< 2.0 U
RMW-89	1/15/2016	0.99 J	< 1.0 U	< 1.0 U	< 1.0 U	2.0	< 1.0 U	**46**	< 1.0 U	< 1.0 U	**22**	< 1.0 U	< 2.0 U
	8/24/2016	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	4.4	< 2.0 U	**61**	< 2.0 U	< 2.0 U	**21**	< 2.0 U	< 4.0 U
RMW-90	1/15/2016	7.1	8.7	0.49 J	< 1.0 U	38	< 1.0 U	0.86 J	< 1.0 U	1.0	**29**	1.0	< 2.0 U
	8/17/2016	12	8.4	0.96 J	< 1.0 U	31	< 1.0 U	1.5	< 1.0 U	0.99 J	**55**	0.81 J	< 2.0 U
RZ-1A	9/29/1999	5.7	1.8	< 1.0 U	< 1.0 U	68.6	< 1.0 U	**252**	< 1.0 U	3.6	**158**	**3.3**	< 1.0 U
RZ-1G	9/29/1999	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	14.8	< 1.0 U	**91.5**	< 1.0 U	< 1.0 U	**44.1**	< 1.0 U	< 1.0 U
RZ-3E	9/30/1999	28.4	20.9	1.6	< 1.0 U	**112**	< 1.0 U	**58.2**	< 1.0 U	2.0	**124**	**2.7**	< 1.0 U
RZ-3L	9/30/1999	2.4	59.7	< 1.0 U	**8.2**	**96.6**	22.1	< 1.0 U	124	2.0	**18.2**	**14.1**	182.4
RZ-3PP	10/8/1999	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	2.0	1.3	< 1.0 U	**14.7**	< 1.0 U	< 1.0 U
RZ-3T	9/30/1999	7.2	4.9	< 1.0 U	< 1.0 U	23.8	< 1.0 U	**19.8**	< 1.0 U	< 1.0 U	**97.3**	< 1.0 U	< 1.0 U
RZ-3Z	9/29/1999	3.8	1.5	< 1.0 U	< 1.0 U	3.2	< 1.0 U	**20.6**	< 1.0 U	< 1.0 U	**33.9**	< 1.0 U	< 1.0 U
RZ-4B	8/3/2006	6.1	3.7 J	< 4.0 U	< 4.0 U	11	< 4.0 U	**89**	< 4.0 U	1.1 J	**93**	< 4.0 U	< 8.0 U
RZ-4O	8/3/2006	3.8 J	2.6 J	< 4.0 U	< 4.0 U	13	< 4.0 U	**110**	< 4.0 U	1.6 J	**82**	< 4.0 U	< 8.0 U
W-1-N	9/17/1999	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
	9/19/2002	< 1.0 U	0.36 J	< 1.0 U	< 1.0 U	< 0.50 U	< 1.0 U	< 1.0 U	< 1.0 U	< 0.50 U	< 1.0 U	< 1.0 U	< 1.0 U
	9/27/2013	< 1.0 U	1.6	< 1.0 U	< 1.0 U	0.27 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U
	10/8/2014	< 1.0 U	1.8	< 1.0 U	< 1.0 U	0.21 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 UB	< 1.0 U	< 2.0 U
	11/4/2015	< 1.0 U	4.2	< 1.0 U	< 1.0 U	0.32 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.25 J	< 1.0 U	< 2.0 U
	8/18/2016	< 1.0 U	4.8	< 1.0 U	< 1.0 U	0.36 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U

Table E-1
Groundwater VOC Analytical Results for the Upper Aquifer Wells from 1999 to 2017
RACER Trust Moraine Facilities
Moraine, Ohio

ARCADIS

Well	Date	VOCs (ug/L)											
		1,1,1-TCA	1,1-DCA	1,1-DCE	Benzene	cis-1,2-DCE	Ethyl-benzene	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes (total)
MCL		200		7	5	70	700	5	1000	100	5	2	10,000
W-2-N	9/14/1999	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.6	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.7	< 1.0 U	< 1.0 U
	9/19/2000	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.2	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
	11/6/2001	0.48 J	0.33 J	< 1.0 U	< 1.0 U	1.1	< 1.0 U	< 1.0 U	< 1.0 U	< 0.50 U	1.3	< 1.0 U	< 1.0 U
	9/19/2002	< 1.0 U	0.31 J	< 1.0 U	< 1.0 U	1.6	< 1.0 U	< 1.0 U	< 1.0 U	< 0.50 U	1.4	< 1.0 U	< 1.0 U
	9/18/2003	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.3	< 1.0 U	< 1.0 U	< 1.0 U	< 0.50 U	< 1.0 U	< 1.0 U	< 1.0 U
	9/16/2004	0.30 J	0.36 J	< 1.0 U	< 1.0 U	1.8	< 1.0 U	0.31 J	< 1.0 U	0.20 J	1.4	< 1.0 U	< 1.0 U
	10/20/2005	< 1.0 U	0.28 J	< 1.0 U	< 1.0 U	1.3	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.91 J	< 1.0 U	< 2.0 U
	9/22/2006	0.25 J	0.29 J	< 1.0 UJ	< 1.0 U	1.4 J	< 1.0 UJ	< 1.0 UJ	< 1.0 UJ	0.18 J	1 J	< 1.0 UJ	< 2.0 UJ
	9/25/2007	< 1.0 U	0.22 J	< 1.0 U	< 1.0 U	1.6	< 1.0 U	< 1.0 U	0.28 J	< 1.0 U	0.88 J	< 1.0 U	< 2.0 U
	9/29/2008	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.7	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.47 J	< 1.0 U	< 2.0 U
	11/13/2009	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.37 J	< 1.0 U	< 2.0 U
	9/24/2010	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.4	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U
	9/28/2011	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.4	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U
	9/6/2012	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.3	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U
	9/26/2013	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.89 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U
	10/7/2014	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.3	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.20 J	< 1.0 U	< 2.0 U
	10/30/2015	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.4	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.25 J	< 1.0 U	< 2.0 U
	8/15/2016	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	2.8	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.6	< 1.0 U	< 2.0 U
	8/15/2017	0.28 J	< 1.0 U	< 1.0 U	< 1.0 U	2.1	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.2	< 1.0 U	< 2.0 U
W-3-N	9/17/1999	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**291**	< 1.0 U	2.5	< 1.0 U	2.6	< 1.0 U	**13**	< 1.0 U
	9/19/2000	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**282**	< 1.0 U	< 1.0 U	< 1.0 U	3.9	< 1.0 U	**24**	< 1.0 U
	11/7/2001	< 5.6 U	< 5.6 U	< 5.6 U	< 5.6 U	**160**	< 5.6 U	**9.0**	< 5.6 U	2.2 J	2.1 J	**7.6**	< 5.6 U
	9/23/2002	< 6.7 U	< 6.7 U	< 6.7 U	< 6.7 U	**150**	< 6.7 U	< 6.7 U	< 6.7 U	< 3.3 U	< 6.7 U	**6.5 J**	< 6.7 U
	9/17/2003	< 4.0 U	< 4.0 U	< 4.0 U	< 4.0 U	**100**	< 4.0 U	**5.1**	< 4.0 U	1.6 J	1.7 J	**6.6**	< 4.0 U
	9/16/2004	< 4.0 U	< 4.0 U	< 4.0 U	< 4.0 U	**120**	< 4.0 U	0.94 J	< 4.0 U	1.6 J	< 4.0 U	**6.1**	< 4.0 U
	10/20/2005	< 4.0 U	< 4.0 U	< 4.0 U	< 4.0 U	**84**	< 4.0 U	1.4 J	< 4.0 U	1.0 J	< 4.0 U	**8.0**	< 8.0 U
	9/25/2006	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	**140**	< 5.0 U	< 5.0 U	< 5.0 U	1.9 J	< 5.0 U	**9.6**	< 1.0 U
	9/26/2007	< 4.0 U	< 4.0 U	< 4.0 U	< 4.0 U	**110**	< 4.0 U	< 4.0 U	< 4.0 U	1.4 J	< 4.0 U	**5.6**	< 8.0 U
	9/29/2008	< 3.3 U	< 3.3 U	< 3.3 U	< 3.3 U	**98**	< 3.3 U	< 3.3 U	< 3.3 U	1.4 J	< 3.3 U	**3.8**	< 6.7 U
	11/13/2009	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	**72**	< 2.0 U	< 2.0 U	< 2.0 U	0.99 J	< 2.0 U	**3.2**	< 4.0 U
	9/24/2010	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	56	< 2.0 U	< 2.0 U	< 2.0 U	0.79 J	< 2.0 U	**2.4**	< 4.0 U
	9/28/2011	< 2.5 U	< 2.5 U	< 2.5 U	< 2.5 U	53	< 2.5 U	0.94 J	< 2.5 U	0.80 J	< 2.5 U	**2.7**	< 5.0 U
	9/6/2012	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	41	< 2.0 U	0.60 J	< 2.0 U	0.79 J	< 2.0 U	1.4 J	< 4.0 U
	9/26/2013	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	34	< 1.0 U	0.96 J	< 1.0 U	0.64 J	< 1.0 U	1.6	< 2.0 U
	10/7/2014	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	31	< 1.0 U	0.52 J	< 1.0 U	0.47 J	< 1.0 U	1.0	< 2.0 U
	11/4/2015	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	29	< 1.0 U	< 1.0 U	< 1.0 U	0.42 J	< 1.0 U	1.3	< 2.0 U
	8/19/2016	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	22	< 1.0 U	< 1.0 U	< 1.0 U	0.34 J	< 1.0 U	1.9	< 2.0 U
	8/15/2017	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	24	< 1.0 U	< 1.0 U	< 1.0 U	0.38 J	< 1.0 U	1.4	< 2.0 U

Well	Date	VOCs (ug/L)											
		1,1,1-TCA	1,1-DCA	1,1-DCE	Benzene	cis-1,2-DCE	Ethyl-benzene	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes (total)
MCL		200		7	5	70	700	5	1000	100	5	2	10,000
W-4-N	9/17/1999	< 1.0 U	1.3	< 1.0 U	< 1.0 U	2.2	< 1.0 U	2.1	< 1.0 U	< 1.0 U	**9.8**	< 1.0 U	< 1.0 U
	9/19/2000	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	2.0	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**7.3**	< 1.0 U	< 1.0 U
	11/7/2001	0.33 J	0.89 J	< 1.0 U	< 1.0 U	1.6	< 1.0 U	0.92 J	< 1.0 U	< 0.50 U	**7.1**	< 1.0 U	< 1.0 U
	9/24/2002	0.44 J	1.7	< 1.0 U	< 1.0 U	5.2	< 1.0 U	0.94 J	< 1.0 U	0.33 J	**8.5**	0.77 J	< 1.0 U
	9/17/2003	0.26 J	0.94 J	< 1.0 U	< 1.0 U	1.7	< 1.0 U	1.1	< 1.0 U	< 0.50 U	**8.1**	0.48 J	< 1.0 U
	9/16/2004	0.40 J	1.7	< 1.0 U	< 1.0 U	5.8	< 1.0 U	1.7	< 1.0 U	0.38 J	**12**	0.49 J	< 1.0 U
	10/20/2005	< 1.0 U	1.2	< 1.0 U	< 1.0 U	2.0	< 1.0 U	1.0	< 1.0 U	< 1.0 U	**7.2**	0.54 J	< 2.0 U
	9/25/2006	< 1.0 U	1.3	< 1.0 U	< 1.0 U	2.4	< 1.0 U	0.96 J	< 1.0 U	0.19 J	**7.6**	0.56 J	< 2.0 U
	9/26/2007	0.34 J	1.6	< 1.0 U	< 1.0 U	2.6	< 1.0 U	0.88 J	< 1.0 U	0.24 J	**10**	0.96 J	< 2.0 U
	9/29/2008	0.39 J	1.9	< 1.0 U	< 1.0 U	11	< 1.0 U	0.38 J	< 1.0 U	0.92 J	**8.4**	0.34 J	< 2.0 U
	11/13/2009	0.47 J	1.6	< 1.0 U	< 1.0 U	5.7	< 1.0 U	0.68 J	< 1.0 U	0.39 J	**15**	0.25 J	< 2.0 U
	9/24/2010	0.41 J	2.1	< 1.0 U	< 1.0 U	7.9	< 1.0 U	0.67 J	< 1.0 U	0.51 J	**13**	< 1.0 U	< 2.0 U
	9/28/2011	< 1.0 U	2.4	< 1.0 U	< 1.0 U	9.7	< 1.0 U	1.1	< 1.0 U	0.59 J	**9.9**	< 1.0 U	< 2.0 U
	9/7/2012	< 1.0 U	5.6	< 1.0 U	< 1.0 U	14	< 1.0 U	0.52 J	< 1.0 U	1.2	**6.3**	< 1.0 U	< 2.0 U
	9/27/2013	< 1.0 U	7.1	< 1.0 U	< 1.0 U	11	< 1.0 U	0.63 J	< 1.0 U	0.76 J	**7.4**	0.18 J	< 2.0 U
	10/7/2014	< 1.0 U	5.7	< 1.0 U	< 1.0 U	11	< 1.0 U	0.49 J	< 1.0 U	0.69 J	**9.2**	< 1.0 U	< 2.0 U
	11/4/2015	< 1.0 U	4.2	< 1.0 U	< 1.0 U	7.0	< 1.0 U	< 1.0 U	< 1.0 U	0.51 J	**12**	< 1.0 U	< 2.0 U
	8/19/2016	< 1.0 U	4.6	< 1.0 U	< 1.0 U	9.5	< 1.0 U	< 1.0 U	< 1.0 U	0.63 J	**10**	< 1.0 U	< 2.0 U
	8/16/2017	< 1.0 U	6.5	< 1.0 U	< 1.0 U	9.2	< 1.0 U	0.38 J	< 1.0 U	0.64 J	**8.8**	< 1.0 U	< 2.0 U
W-1-S	9/22/1999	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	8.0	< 1.0 U	**31**	< 1.0 U	1.1	**11.6**	< 1.0 U	< 1.0 U
	9/19/2002	< 2.0 U	0.97 J	< 2.0 U	< 2.0 U	6.0	< 2.0 U	**62**	< 2.0 U	1.3	**16**	< 2.0 U	< 2.0 U
W-2-S	9/23/1999	1.9 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**6.1**	< 1.0 U	< 1.0 U
	9/27/2000	1.6	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	5.0	< 1.0 U	< 1.0 U
	11/8/2001	1.7	0.58 J	< 1.0 U	< 1.0 U	0.49 J	< 1.0 U	< 1.0 U	< 1.0 U	< 0.50 U	**5.2 B**	< 1.0 U	< 1.0 U
	9/18/2002	1.5	0.98 J	< 1.0 U	< 1.0 U	0.90	< 1.0 U	< 1.0 U	< 1.0 U	< 0.50 U	4.9	< 1.0 U	< 1.0 U
	9/26/2003	1.4	0.99 J	< 1.0 U	< 1.0 U	0.74	< 1.0 U	< 1.0 U	0.25 J	< 0.50 U	**5.5**	< 1.0 U	< 1.0 U
	9/17/2004	1.5	1.3	< 1.0 U	< 1.0 U	1.1	< 1.0 U	0.55 J	< 1.0 U	< 0.50 U	**6.0**	< 1.0 U	< 1.0 U
	10/19/2005	1.6	1.2	< 1.0 U	< 1.0 U	0.78 J	< 1.0 U	0.36 J	< 1.0 U	< 1.0 U	**5.4**	< 1.0 U	< 2.0 U
	9/18/2006	1.8	1.2	< 1.0 U	< 1.0 U	1.2	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**5.1**	< 1.0 U	< 2.0 U
	9/24/2007	1.4	1.1	< 1.0 U	< 1.0 U	0.89 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**5.3**	< 1.0 U	< 2.0 U
	9/25/2008	1.4	0.92 J	< 1.0 U	< 1.0 U	0.78 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**5.2**	< 1.0 U	< 2.0 U
	11/12/2009	1.7	1.2	< 1.0 U	0.43 J	0.90 J	< 1.0 UJ	0.35 J	< 1.0 U	< 1.0 U	**6.6**	< 1.0 U	< 2.0 U
	9/24/2010	1.4	1.1	< 1.0 U	< 1.0 U	0.82 J	< 1.0 U	0.33 J	< 1.0 U	< 1.0 U	**5.9**	< 1.0 U	< 2.0 U
	9/29/2011	1.6	1.2	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.44 J	< 1.0 U	< 1.0 U	**7.1**	< 1.0 U	< 2.0 U
	9/6/2012	1.6	1.1	< 1.0 U	< 1.0 U	1.1	< 1.0 U	0.35 J	< 1.0 U	< 1.0 U	**6.1**	< 1.0 U	< 2.0 U
	9/25/2013	1.8	0.86 J	< 1.0 U	< 1.0 U	1.1	< 1.0 U	0.31 J	< 1.0 U	< 1.0 U	**6.4**	< 1.0 U	< 2.0 U
	10/7/2014	0.79 J	0.80 J	< 1.0 U	< 1.0 U	1.6	< 1.0 U	0.33 J	< 1.0 U	0.34 J	5.0	< 1.0 U	< 2.0 U
	11/5/2015	< 1.0 U	0.63 J	< 1.0 U	< 1.0 U	1.1	< 1.0 U	0.36 J	< 1.0 U	0.47 J	23	< 1.0 U	< 2.0 U
	8/23/2016	1.4	1.0	< 1.0 U	< 1.0 U	1.9	< 1.0 U	0.34 J	< 1.0 U	0.30 J	**6.6**	< 1.0 U	< 2.0 U
	8/16/2017	1.3	1.1	< 1.0 U	< 1.0 U	2.4	< 1.0 U	< 1.0 U	< 1.0 U	0.40 J	**5.9**	< 1.0 U	< 2.0 U

Table E-1
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RACER Trust Moraine Facilities
Moraine, Ohio

Well	Date	VOCs (ug/L)											
		1,1,1-TCA	1,1-DCA	1,1-DCE	Benzene	cis-1,2-DCE	Ethyl-benzene	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes (total)
MCL		200		7	5	70	700	5	1000	100	5	2	10,000
W-3-S	9/23/1999	3.9	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.1	< 1.0 U	< 1.0 U	2.6	< 1.0 U	< 1.0 U
	9/28/2000	2.8	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	2.5	< 1.0 U	< 1.0 U
	11/8/2001	1.6	< 1.0 U	< 1.0 U	< 1.0 U	< 0.50 U	< 1.0 U	0.44 J	< 1.0 U	< 0.50 U	1.5 B	< 1.0 U	< 1.0 U
	9/18/2002	2.1	< 1.0 U	< 1.0 U	< 1.0 U	< 0.50 U	< 1.0 U	0.61 J	< 1.0 U	< 0.50 U	2.4	< 1.0 U	< 1.0 U
	9/26/2003	1.8	< 1.0 U	< 1.0 U	< 1.0 U	0.34 J	< 1.0 U	0.81 J	< 1.0 U	< 0.50 U	2.0	< 1.0 U	< 1.0 U
	9/17/2004	2.4	0.21 J	< 1.0 U	< 1.0 U	< 0.50 U	< 1.0 U	1.2	< 1.0 U	< 0.50 U	2.9	< 1.0 U	< 1.0 U
	10/19/2005	2.5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.0	< 1.0 U	< 1.0 U	2.9	< 1.0 U	< 2.0 U
	9/18/2006	2.5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.60 J	< 1.0 U	< 1.0 U	3.4	< 1.0 U	< 2.0 U
	9/24/2007	1.4	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.72 J	< 1.0 U	< 1.0 U	2.0	< 1.0 U	< 2.0 U
	9/26/2008	1.2	0.21 J	< 1.0 U	< 1.0 U	0.52 J	< 1.0 U	1.3	< 1.0 U	< 1.0 U	2.1	< 1.0 U	< 2.0 U
	11/12/2009	1.2	< 1.0 U	< 1.0 U	< 1.0 U	0.33 J	< 1.0 UJ	0.87 J	< 1.0 U	< 1.0 U	2.5	< 1.0 U	< 2.0 U
	9/23/2010	0.87 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.95 J	< 1.0 U	< 1.0 U	2.3	< 1.0 U	< 2.0 U
	9/29/2011	0.51 J	0.38 J	< 1.0 U	< 1.0 U	0.72 J	< 1.0 U	2.8	< 1.0 U	0.19 J	2.6	< 1.0 U	< 2.0 U
	9/6/2012	0.60 J	0.89 J	< 1.0 U	< 1.0 U	1.0	< 1.0 U	4.4	< 1.0 U	0.49 J	**5.7**	< 1.0 U	< 2.0 U
	9/25/2013	0.49 J	1.2	< 1.0 U	< 1.0 U	1.4	< 1.0 U	**25**	< 1.0 U	0.59 J	**21**	< 1.0 U	< 2.0 U
	10/7/2014	0.76 J	0.96 J	< 1.0 U	< 1.0 U	2.3	< 1.0 U	**38**	< 1.0 U	0.59 J	**35**	< 1.0 U	< 2.0 U
	11/4/2015	< 1.0 U	0.41 J	< 1.0 U	< 1.0 U	2.6	< 1.0 U	**65**	< 1.0 U	0.31 J	**97**	< 1.0 U	< 2.0 U
	8/23/2016	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	2.1	< 2.0 U	**62**	< 2.0 U	< 2.0 U	**11**	< 2.0 U	< 4.0 U
	8/16/2017	0.62 J	0.66 J	< 1.0 U	< 1.0 U	1.6	< 1.0 U	**68**	< 1.0 U	< 1.0 U	**7.6**	< 1.0 U	< 2.0 U
W-4-S	9/23/1999	3.3	1.2	< 1.0 U	< 1.0 U	4.4	< 1.0 U	**31 J**	< 1.0 U	< 1.0 U	**15 J**	< 1.0 U	< 1.0 U
	9/28/2000	3.0	1.0	< 1.0 U	< 1.0 U	4.0	< 1.0 U	**15**	< 1.0 U	< 1.0 U	**11**	< 1.0 U	< 1.0 U
	11/8/2001	2.9	1.1	< 1.0 U	< 1.0 U	3.3	< 1.0 U	**13**	< 1.0 U	0.43 J	**8.9 B**	< 1.0 U	< 1.0 U
	9/18/2002	2.3	0.87 J	< 1.0 U	< 1.0 U	3.6	< 1.0 U	**17**	< 1.0 U	0.60	**9.8**	< 1.0 U	< 1.0 U
	9/26/2003	2.0	0.92 J	< 1.0 U	< 1.0 U	3.6	< 1.0 U	**24**	0.25 J	0.78	**13**	< 1.0 U	< 1.0 U
	9/17/2004	2.3	1.2	< 1.0 U	< 1.0 U	4.4	< 1.0 U	**18**	< 1.0 U	0.97	**13**	< 1.0 U	< 1.0 U
	10/19/2005	2.4	1.4	< 1.0 U	< 1.0 U	4.3	< 1.0 U	**20**	< 1.0 U	1.1	**13**	< 1.0 U	< 2.0 U
	9/19/2006	1.7	1.3	< 1.0 U	< 1.0 U	4.3	< 1.0 U	**18**	< 1.0 U	1.0	**12**	< 1.0 U	< 2.0 U
	9/24/2007	1.5	1.8	< 1.0 U	< 1.0 U	5.9	< 1.0 U	**26**	< 1.0 U	1.3	**16**	< 1.0 U	< 2.0 U
	9/26/2008	0.95 J	1.3	0.21 J	< 1.0 U	6	< 1.0 U	**32**	< 1.0 U	1.2	**16**	< 1.0 U	< 2.0 U
	11/12/2009	1.3	1.6	< 1.0 U	< 1.0 U	9.1	< 1.0 U	**39**	< 1.0 U	1.5	**23**	< 1.0 U	< 2.0 U
	9/23/2010	1.1	1.6	< 1.0 U	< 1.0 U	9.1	< 1.0 U	**31**	< 1.0 U	1.5	**20**	< 1.0 U	< 2.0 U
	9/29/2011	1.1	1.5	< 1.0 U	< 1.0 U	8.9	< 1.0 U	**31**	< 1.0 U	1.4	**21**	< 1.0 U	< 2.0 U
	9/6/2012	1.0 J	1.6 J	< 1.0 U	< 1.0 U	9.4	< 1.0 U	**26**	< 1.0 U	1.4 J	**21**	< 1.0 U	< 3.3 U
	9/25/2013	1.6	1.9	< 1.0 U	< 1.0 U	6.3	< 1.0 U	**60**	< 1.0 U	1.2	**50**	< 1.0 U	< 2.0 U
	10/7/2014	1.4 J	1.3 J	< 2.5 U	< 2.5 U	6.1	< 2.5 U	**65**	< 2.5 U	1.1 J	**63**	< 2.5 U	< 5.0 U
	11/4/2015	1.9 J	2.3	< 2.0 U	< 2.0 U	9.7	< 2.0 U	**74**	< 2.0 U	1.4 J	**72**	< 2.0 U	< 4.0 U
	8/23/2016	1.6 J	1.7 J	< 2.0 U	< 2.0 U	12	< 2.0 U	**54**	< 2.0 U	1.1 J	**45**	< 2.0 U	< 4.0 U
	8/16/2017	1.5	2.7	< 1.0 U	< 1.0 U	22	< 1.0 U	**39**	< 1.0 U	2.1	**40**	< 1.0 U	< 2.0 U

Table E-1
Groundwater VOC Analytical Results for the Upper Aquifer Wells from 1999 to 2017
RACER Trust Moraine Facilities
Moraine, Ohio

Well	Date	VOCs (ug/L)											
		1,1,1-TCA	1,1-DCA	1,1-DCE	Benzene	cis-1,2-DCE	Ethyl-benzene	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes (total)
MCL		200		7	5	70	700	5	1000	100	5	2	10,000
EAST	9/21/1999	21	5.4	< 1.0 U	< 1.0 U	9.1	< 1.0 U	**61**	< 1.0 U	< 1.0 U	**56**	< 1.0 U	< 1.0 U
	9/22/2000	22	7.7	1.2	< 1.0 U	**77**	< 1.0 U	**56**	< 1.0 U	1.8	**97**	**3.0**	< 1.0 U
	11/12/2001	13	6.2	0.90 J	< 3.3 U	51	< 3.3 U	**56**	< 3.3 U	2.7	**92**	1.5 J	< 3.3 U
	9/23/2002	10	3.9	0.73 J	< 2.0 U	8.8	< 2.0 U	**49**	< 2.0 U	< 1.0 U	**46**	< 2.0 U	< 2.0 U
	9/25/2003	7.1	2.3	< 2.0 U	< 2.0 U	4.3	< 2.0 U	**47**	< 2.0 U	< 1.0 U	**35**	< 2.0 U	< 2.0 U
	9/13/2004	5.7	0.72 J	0.34 J	< 1.0 U	1.6	< 1.0 U	**40**	< 1.0 U	< 0.50 U	**23**	< 1.0 U	< 1.0 U
	10/18/2005	5.9	3.0	< 1.0 U	< 1.0 U	3.1	< 1.0 U	**47**	< 1.0 U	< 1.0 U	**23**	1.2	< 2.0 U
	9/21/2006	10	3.2	0.59 J	< 1.0 U	4.1	< 1.0 U	**41**	< 1.0 U	< 1.0 U	**29**	< 1.0 U	< 2.9 U
WEST	9/21/1999	25	26	< 1.0 U	< 1.0 U	**125**	< 1.0 U	**41**	< 1.0 U	< 1.0 U	**37**	< 1.0 U	< 1.0 U
Downgradient of the Site													
4S	9/20/1999	< 1.0 U	1.6	< 1.0 U	1.6	< 1.0 U	<10	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 10 U
	10/2/2003	< 2.0 U	7.0	< 2.0 U	1.6 J	< 1.0 U	1.7 J	< 2.0 U	< 2.0 U	1.7	< 2.0 U	< 2.0 U	< 2.0 U
	9/14/2004	< 5.0 U	7.5	< 5.0 U	4.5 J	< 2.5 U	4.7 J	< 5.0 U	1.1 J	< 2.5 U	< 5.0 U	< 5.0 U	2.4 J
	10/19/2005	< 4.0 U	2.3 J	< 4.0 U	1.6 J	< 4.0 U	1.6 J	< 4.0 U	< 4.0 U	0.95 J	< 4.0 U	< 4.0 U	< 8.0 U
	9/20/2006	< 1.0 U	5.6	< 1.0 U	0.7 J	0.25 J	0.52 J	< 1.0 U	< 1.0 U	0.75 J	< 1.0 U	< 1.0 U	< 2.0 U
GM-2	9/20/1999	5.5	1.4	< 1.0 U	< 1.0 U	8.4	<10	**6.0**	< 1.0 U	< 1.0 U	**62**	< 1.0 U	< 10 U
	9/25/2000	5.7	3.7	< 1.0 U	< 1.0 U	39	< 1.0 U	**7.7**	< 1.0 U	1.3	**83**	1.7	< 1.0 U
	11/9/2001	6.1	6.1	< 3.3 U	< 3.3 U	26	< 3.3 U	**8.4**	< 3.3 U	1.1J	**65**	< 3.3 U	< 3.3 U
	9/20/2002	0.75 J	3.4	< 1.0 U	< 1.0 U	7.6	< 1.0 U	**8.7**	< 1.0 U	0.37J	**26**	< 1.0 U	< 1.0 U
	10/2/2003	0.21 J	1.7	< 1.0 U	< 1.0 U	4.7	0.21 J	**5.7**	< 1.0 U	< 0.50 U	**13**	0.46 J	< 1.0 U
	9/14/2004	< 1.0 U	1.6	< 1.0 U	< 1.0 U	5.6	< 1.0 U	4.0	< 1.0 U	0.23 J	**6.2**	< 1.0 U	< 1.0 U
	10/19/2005	< 1.0 U	2.0	< 1.0 U	< 1.0 U	6.8	< 1.0 U	3.6	< 1.0 U	0.26 J	4.6	0.24 J	< 2.0 U
	9/20/2006	< 1.0 U	2.1	< 1.0 U	< 1.0 U	7.7	< 1.0 U	2.6	< 1.0 U	0.34 J	**5.1**	0.61 J	< 2.0 U
	9/18/2007	< 1.0 U	1.4	< 1.0 U	< 1.0 U	4.9	< 1.0 U	1.6	< 1.0 U	0.28 J	2.3	1.1	< 2.0 U
	9/24/2008	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	6.7	< 1.0 U	1.3	< 1.0 U	0.19 J	2.4	< 1.0 U	< 2.0 U
	11/11/2009	< 1.0 U	1.0	< 1.0 U	< 1.0 U	3.2	< 1.0 U	0.90 J	< 1.0 U	< 1.0 U	1.4	**2.3**	< 2.0 U
	9/27/2010	< 1.0 U	1.2	< 1.0 U	< 1.0 U	3.8	< 1.0 U	0.44 J	< 1.0 U	< 1.0 U	0.95 J	**2.5**	< 2.0 U
	9/29/2011	< 1.0 U	0.92 J	< 1.0 U	< 1.0 U	9.0	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.75 J	0.69 J	< 2.0 U
	9/6/2012	< 1.0 U	0.71 J	< 1.0 U	< 1.0 U	15	< 1.0 U	< 1.0 U	0.46 J	< 1.0 U	0.96 J	1.2	< 2.0 U
	9/25/2013	< 1.0 U	1.0	< 1.0 U	< 1.0 U	13	< 1.0 U	0.31 J	< 1.0 U	0.26 J	0.70 J	1.3	< 2.0 U
	10/7/2014	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.6	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	2.9	< 1.0 U	< 2.0 U
	12/8/2015	< 1.0 U	0.40 J	< 1.0 U	< 1.0 U	3.2	< 1.0 U	3.6	< 1.0 U	< 1.0 U	**6.7**	< 1.0 U	< 2.0 U
	8/19/2016	< 1.0 U	0.43 J	< 1.0 U	< 1.0 U	8.9	< 1.0 U	**8.5**	< 1.0 U	< 1.0 U	**6.3**	< 1.0 U	< 2.0 U

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Moraine, Ohio

Well	Date	VOCs (ug/L)											
		1,1,1-TCA	1,1-DCA	1,1-DCE	Benzene	cis-1,2-DCE	Ethyl-benzene	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes (total)
MCL		200		7	5	70	700	5	1000	100	5	2	10,000
GM-10	9/21/1999	1.7	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**15**	< 1.0 U	< 1.0 U
	9/27/2000	2.5	1.4	< 1.0 U	< 1.0 U	5.7	< 1.0 U	1.4	< 1.0 U	< 1.0 U	**23**	< 1.0 U	< 1.0 U
	11/8/2001	2.7	3.4	< 1.0 U	< 1.0 U	16	< 1.0 U	1.9	< 1.0 U	0.93	**27**	1.2	< 1.0 U
	9/18/2002	1.8	0.61 J	< 1.0 U	< 1.0 U	2.3	< 1.0 U	1.1	< 1.0 U	< 0.50 U	**19**	< 1.0 U	< 1.0 U
	9/24/2003	0.96 J	< 1.0 U	< 1.0 U	< 1.0 U	< 0.50 U	< 1.0 U	2.2	< 1.0 U	< 0.50 U	**33**	< 1.0 U	< 1.0 U
	9/14/2004	1.2	< 1.0 U	< 1.0 U	< 1.0 U	0.38 J	< 1.0 U	1.5	< 1.0 U	< 0.50 U	**15**	< 1.0 U	< 1.0 U
	10/20/2005	1.6	< 1.0 U	< 1.0 U	< 1.0 U	0.31 J	< 1.0 U	1.2	< 1.0 U	< 1.0 U	**12**	< 1.0 U	< 2.0 U
	9/27/2006	0.90 J	0.29 J	< 1.0 U	< 1.0 U	0.77 J	< 1.0 U	0.98 J	< 1.0 U	< 1.0 U	**11**	< 1.0 U	< 2.0 U
	9/19/2007	0.75 J	< 1.0 U	< 1.0 U	< 1.0 U	0.35 J	< 1.0 U	0.93 J	< 1.0 U	< 1.0 U	**8.8**	< 1.0 U	< 2.0 U
	9/24/2008	0.53 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.85 J	< 1.0 U	< 1.0 U	**5.9**	< 1.0 U	< 2.0 U
	9/25/2013	0.20 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.1	< 1.0 U	< 1.0 U	3.1	< 1.0 U	< 2.0 U
	10/6/2014	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.0	< 1.0 U	< 1.0 U	3.1	< 1.0 U	< 2.0 U
	11/3/2015	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.85 J	< 1.0 U	< 1.0 U	2.2	< 1.0 U	< 2.0 U
GM-16	9/21/1999	2.2	< 1.0 U	< 1.0 U	< 1.0 U	1.7	< 1.0 U	**44**	< 1.0 U	< 1.0 U	**8.5**	< 1.0 U	< 1.0 U
	9/26/2000	2.5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**16**	< 1.0 U	< 1.0 U	3.5	< 1.0 U	< 1.0 U
	11/8/2001	2.2	0.31 J	< 1.0 U	< 1.0 U	0.39 J	< 1.0 U	**17**	< 1.0 U	< 0.50 U	3.6	< 1.0 U	< 1.0 U
	9/24/2002	1.4 J	4.1	< 2.0 U	< 2.0 U	6.2	< 2.0 U	**63**	< 2.0 U	1.6	**28**	< 2.0 U	< 2.0 U
	9/22/2003	1.9 J	2.8 J	< 4.0 U	< 4.0 U	5.8	< 4.0 U	**110**	< 4.0 U	1.1 J	**57**	< 4.0 U	< 4.0 U
	9/16/2004	3.1 J	4.3	< 3.3 U	< 3.3 U	7.4	< 3.3 U	**130**	< 3.3 U	1.0 J	**90**	< 3.3 U	< 3.3 U
	10/19/2005	1.7 J	1.1 J	< 3.3 U	< 3.3 U	2.8 J	< 3.3 U	**100**	< 3.3 U	0.90 J	**55**	< 3.3 U	< 6.7 U
	9/18/2006	2.1	1.1 J	< 1.0 U	< 1.0 U	3.8	< 1.0 U	**98**	< 1.0 U	1 J	**51**	< 1.0 U	< 2.9 U
	9/25/2007	1.4 J	1.5 J	< 4.0 U	< 4.0 U	43	< 4.0 U	**94**	< 4.0 U	1.3 J	**52**	< 4.0 U	< 8.0 U
	9/30/2008	1.8 J	3.8	< 3.3 U	< 3.3 U	20	< 3.3 U	**100**	< 3.3 U	1.1 J	**48**	< 3.3 U	< 6.7 U
	11/16/2009	1.4 J	1.6 J	< 3.3 U	< 3.3 U	12	< 3.3 U	**110**	< 3.3 U	1.5 J	**74**	< 3.3 U	< 6.7 U
	9/23/2010	1.1 J	1.3 J	< 4.0 U	< 4.0 U	2.2 J	< 4.0 U	**110**	< 4.0 U	1.2 J	**75**	< 4.0 U	< 8.0 U
	9/29/2011	< 3.3 U	5.5	< 3.3 U	< 3.3 U	23	< 3.3 U	**64**	< 3.3 U	0.77 J	**45**	1.2 J	< 6.7 U
	9/5/2012	0.94 J	3.8 J	< 4.0 U	< 4.0 U	12	< 4.0 U	**66**	< 4.0 U	< 4.0 U	**41**	< 4.0 U	< 8.0 U
	9/25/2013	0.36 J	4.4	< 1.0 U	< 1.0 U	12	< 1.0 U	**51**	< 1.0 U	0.40 J	**17**	0.55 J	< 2.0 U
	10/7/2014	< 1.0 U	1.4	< 1.0 U	< 1.0 U	7.7	< 1.0 U	**31**	< 1.0 U	0.26 J	**7.5**	0.97 J	< 2.0 U
	11/4/2015	< 1.0 U	1.5	< 1.0 U	< 1.0 U	12	< 1.0 U	**35**	< 1.0 U	0.34 J	**8.3**	10	< 2.0 U
	8/18/2016	< 1.0 U	1.8	< 1.0 U	< 1.0 U	7.4	< 1.0 U	**23**	< 1.0 U	< 1.0 U	**5.7**	0.31 J	< 2.0 U

Table E-1
Groundwater VOC Analytical Results for the Upper Aquifer Wells from 1999 to 2017
RACER Trust Moraine Facilities
Moraine, Ohio

Well	Date	VOCs (ug/L)											
		1,1,1-TCA	1,1-DCA	1,1-DCE	Benzene	cis-1,2-DCE	Ethyl-benzene	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes (total)
MCL		200		7	5	70	700	5	1000	100	5	2	10,000
GM-17	9/21/1999	6.4	26	< 1.0 U	< 1.0 U	30	< 1.0 U	< 1.0 U	< 1.0 U	2.6	**29**	1.4	< 1.0 U
	9/27/2000	6.7	24	< 1.0 U	< 1.0 U	42	< 1.0 U	**25**	< 1.0 U	2.5	**48**	< 1.0 U	< 1.0 U
	11/8/2001	6.8	7.3	< 3.3 U	< 3.3 U	16	< 3.3 U	**48**	< 3.3 U	1.8	**79**	< 3.3 U	< 3.3 U
	9/19/2002	2.3	6.0	< 1.0 U	< 1.0 U	13	< 1.0 U	**22**	< 1.0 U	0.67	**39**	0.79 J	< 1.0 U
	9/24/2003	1.3	1.2	< 1.0 U	< 1.0 U	2.9	< 1.0 U	**12**	< 1.0 U	< 0.50 U	**24**	< 1.0 U	< 1.0 U
	9/15/2004	1.1	4	< 1.0 U	< 1.0 U	11	< 1.0 U	3.6	< 1.0 U	0.64	**22**	0.49 J	< 1.0 U
	10/20/2005	1.4	5.5	< 1.0 U	< 1.0 U	9.0	< 1.0 U	**8.1**	< 1.0 U	0.57 J	**29**	2.0	< 2.0 U
	9/27/2006	0.46 J	3.2	< 1.0 U	< 1.0 U	9.5	< 1.0 U	**11**	< 1.0 U	0.49 J	**24**	0.54 J	< 2.0 U
	9/18/2007	0.31 J	1.5	< 1.0 U	< 1.0 U	4.0	< 1.0 U	**7.3**	< 1.0 U	0.22 J	**15**	< 1.0 U	< 2.0 U
	9/24/2008	0.29 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	4.8	< 1.0 U	< 1.0 U	**10**	< 1.0 U	< 2.0 U
	9/27/2013	< 1.0 U	0.36 J	< 1.0 U	< 1.0 U	2.6	< 1.0 U	2.8	< 1.0 U	< 1.0 U	4.7	< 1.0 U	< 2.0 U
GM-18	9/22/1999	43	23	1.3	< 1.0 U	35	< 1.0 U	4.9	< 1.0 U	2.2	**131**	< 1.0 U	< 1.0 U
	9/27/2000	32	10	< 1.0 U	< 1.0 U	24	< 1.0 U	**7.8**	< 1.0 U	1.8	**115**	< 1.0 U	< 1.0 U
	11/8/2001	23	3.3	1.3J	< 3.3 U	14	< 3.3 U	**12**	< 3.3 U	1.6 J	**93**	< 3.3 U	< 3.3 U
	9/19/2002	18	6.0	< 3.3 U	< 3.3 U	15	< 3.3 U	**28**	< 3.3 U	1.6 J	**98**	< 3.3 U	< 3.3 U
	9/22/2003	10	3.7	< 2.0 U	< 2.0 U	8.8	< 2.0 U	**24**	< 2.0 U	< 1.0 U	**77**	0.75 J	< 2.0 U
	9/15/2004	5.2	2.2	0.46 J	< 2.0 U	5.9	< 2.0 U	**20**	< 2.0 U	< 1.0 U	**53**	< 2.0 U	< 2.0 U
	10/20/2005	7.0	15	0.30 J	< 1.0 U	14	< 1.0 U	**21**	< 1.0 U	1.2	**70 J**	**3.0**	< 2.0 U
	9/27/2006	6.2	17	< 2.9 U	< 2.9 U	21	< 2.9 U	**15**	< 2.9 U	2 J	**72**	**2.5 J**	< 5.7 U
	9/19/2007	5.4	13	< 2.5 U	< 2.5 U	19	< 2.5 U	**14**	< 2.5 U	1.2 J	**64**	1.1 J	< 5.0 U
	9/24/2008	2.3	< 6.1 U	< 1.0 U	< 1.0 U	13	< 1.0 U	**16**	< 1.0 U	0.79 J	**38**	< 1.0 U	< 2.9 U
	9/25/2013	0.22 J	0.68 J	< 1.0 U	< 1.0 U	3.7	< 1.0 U	**17**	< 1.0 U	< 1.0 U	**10**	< 1.0 U	< 2.0 U
	12/11/2015	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.78 J	< 1.0 U	**6.2**	< 1.0 U	< 1.0 U	**6.5**	< 1.0 U	< 2.0 U
GM-25	9/22/1999	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
	10/21/2010	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U

Table E-1
Groundwater VOC Analytical Results for the Upper Aquifer Wells from 1999 to 2017
RACER Trust Moraine Facilities
Moraine, Ohio

Well	Date	VOCs (ug/L)											
		1,1,1-TCA	1,1-DCA	1,1-DCE	Benzene	cis-1,2-DCE	Ethyl-benzene	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes (total)
MCL		200		7	5	70	700	5	1000	100	5	2	10,000
GM-26	9/22/1999	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
	9/27/2000	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
	11/12/2001	0.19 J	< 1.0 U	< 1.0 U	< 1.0 U	< 0.50 U	< 1.0 U	1.1	< 1.0 U	< 0.50 U	< 1.0 U	< 1.0 U	< 1.0 U
	9/25/2002	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 0.50 U	< 1.0 U	0.92 J	< 1.0 U	< 0.50 U	< 1.0 U	< 1.0 U	< 1.0 U
	10/1/2003	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 0.50 U	< 1.0 U	0.85 J	< 1.0 U	< 0.50 U	< 1.0 U	< 1.0 U	< 1.0 U
	9/16/2004	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 0.50 U	< 1.0 U	1.3	< 1.0 U	< 0.50 U	< 1.0 U	< 1.0 U	< 1.0 U
	10/20/2005	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.0	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U
	9/21/2006	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.91 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U
	9/27/2007	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.2	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U
	1/21/2008	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 UJ	< 1.0 U	< 1.0 U	1.2	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U
	10/1/2008	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.4	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U
	11/12/2009	< 1.0 U	< 1.0 U	< 1.0 U	0.51 J	< 1.0 U	< 1.0 U	1.6	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U
	9/22/2010	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.6	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U
	9/28/2011	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.6	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U
	9/5/2012	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.6	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U
	9/25/2013	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.6	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U
	10/6/2014	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.3	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U
	10/30/2015	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.1	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U
	8/15/2016	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.3	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U
GM-46	3/2/2006	< 1.0 U	2.7	< 1.0 U	< 1.0 U	6.8	< 1.0 U	< 1.0 U	< 1.0 U	0.35 J	**22**	1.9	< 2.0 U
	11/30/2006	< 1.0 U	0.43 J	< 1.0 U	< 1.0 U	5.2	< 1.0 U	0.67 J	< 1.0 U	< 1.0 U	1.5	1.5	< 2.0 U
	10/9/2014	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.30 J	< 1.0 U	0.46 J	< 1.0 U	< 1.0 U	< 1.0 UB	< 1.0 U	< 2.0 U
	11/3/2015	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.41 J	< 1.0 U	0.47 J	< 1.0 U	< 1.0 U	0.30 J	< 1.0 U	< 2.0 U
GM-47	3/1/2006	2.2	1.8	< 1.0 U	< 1.0 U	7.2	< 1.0 U	**78**	0.28 J	1.5	**50**	< 1.0 U	< 2.0 U
	9/19/2006	2.2	1.7 J	< 2.0 U	< 2.0 U	9.5	< 2.0 U	**64**	< 2.0 U	1.4 J	**44**	< 2.0 U	< 4.0 U
	11/30/2006	1.9 J	1.7 J	< 2.0 U	< 2.0 U	8.9	< 2.0 U	**69**	< 2.0 U	1.4 J	**51**	< 2.0 U	< 4.0 U
	9/25/2007	2.2 J	2.4 J	< 7.1 U	< 7.1 U	**170**	< 7.1 U	**71**	< 7.1 U	4.6 J	**53**	< 7.1 U	< 1.0 U
	10/1/2008	1.4 J	2 J	< 5.0 U	< 5.0 U	**160**	< 5.0 U	**86**	< 5.0 U	3.9 J	**36**	1.9 J	< 1.0 U
	11/13/2009	1.0 J	2.4 J	< 2.5 U	< 2.5 U	61	< 2.5 U	**61**	< 2.5 U	2.8	**29**	0.66 J	< 5.0 U
	1/28/2010	0.85 J	2.3 J	< 2.5 U	< 2.5 U	51	< 2.5 U	**60**	< 2.5 U	2.5	**24**	< 2.5 U	< 5.0 U
	9/23/2010	0.77 J	2.7	< 1.0 U	< 1.0 U	42	< 1.0 U	**60**	< 1.0 U	2.4	**22**	0.39 J	< 3.3 U
	9/29/2011	< 2.5 U	2.9	< 2.5 U	< 2.5 U	34	< 2.5 U	**52**	< 2.5 U	2.3 J	**18**	< 2.5 U	< 5.0 U
	9/6/2012	< 2.5 U	3.0	< 2.5 U	< 2.5 U	23	< 2.5 U	**42**	< 2.5 U	2.0 J	**13**	< 2.5 U	< 5.0 U
	9/25/2013	0.65 J	3.7	< 1.0 U	< 1.0 U	26	< 1.0 U	**47**	< 1.0 U	2.4	**14**	0.42 J	< 2.0 U
	10/7/2014	< 1.0 U	4.5	< 1.0 U	< 1.0 U	28	< 1.0 U	**46**	< 1.0 U	1.8	**8.1**	< 1.0 U	< 3.3 U
	11/4/2015	< 1.7 U	4.9	< 1.7 U	< 1.0 U	46	< 1.7 U	**49**	< 1.7 U	2.3	**8.3**	< 1.7 U	< 3.3 U
	8/24/2016	< 2.0 U	3.8	< 2.0 U	< 2.0 U	38	< 2.0 U	**39**	< 2.0 U	1.8 J	4.4	< 2.0 U	< 4.0 U
GM-48	3/1/2006	0.62 J	0.71 J	< 1.0 U	< 1.0 U	0.7 J	< 1.0 U	< 1.0 U	0.25 J	< 1.0 U	2.1	< 1.0 U	< 2.0 U
	11/30/2006	0.97 J	0.72 J	< 1.0 U	< 1.0 U	0.83 J	< 1.0 U	0.26 J	< 1.0 U	0.19 J	2.4	< 1.0 U	< 2.0 U

Table E-1
Groundwater VOC Analytical Results for the Upper Aquifer Wells from 1999 to 2017
RACER Trust Moraine Facilities
Moraine, Ohio

ARCADIS

Well	Date	VOCs (ug/L)											
		1,1,1-TCA	1,1-DCA	1,1-DCE	Benzene	cis-1,2-DCE	Ethyl-benzene	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes (total)
MCL		200		7	5	70	700	5	1000	100	5	2	10,000
GM-49	3/1/2006	2.4	3.4	< 1.0 U	< 1.0 U	4.7	< 1.0 U	2.5	0.25 J	0.66 J	**8.4**	< 1.0 U	< 2.0 U
	11/30/2006	1.8	2.6	< 1.0 U	< 1.0 U	3.8	< 1.0 U	3.1	< 1.0 U	0.53 J	**11**	< 1.0 U	< 2.0 U
GM-50	4/28/2006	2.4 J	1.9 J	< 5.0 U	< 5.0 U	5.2	< 5.0 U	**180**	< 5.0 U	1.6 J	**120**	< 5.0 U	< 1.0 U
	9/19/2006	1.4 J	1.5 J	< 5.6 U	< 5.6 U	13	< 5.6 U	**150**	< 5.6 U	1.7 J	**84**	< 5.6 U	< 1.0 U
	11/30/2006	1.6 J	1.5 J	< 5.0 U	< 5.0 U	34	< 5.0 U	**140**	< 5.0 U	1.5 J	**86**	< 5.0 U	< 1.0 U
	9/25/2007	1.4 J	1.9 J	< 5.9 U	< 5.9 U	**130**	< 5.9 U	**100**	< 5.9 U	2.5 J	**44**	< 5.9 U	< 1.0 U
	10/1/2008	1.6 J	1.7 J	< 2.5 U	< 2.5 U	13	< 2.5 U	**82**	< 2.5 U	0.68 J	**54**	< 2.5 U	< 5.0 U
	11/13/2009	1.8 J	1.3 J	< 5.0 U	< 5.0 U	11	< 5.0 U	**110**	< 5.0 U	< 5.0 U	**120**	< 5.0 U	< 1.0 U
	1/28/2010	1.5 J	1.2 J	< 5.0 U	< 5.0 U	8.1	< 5.0 U	**130**	< 5.0 U	< 5.0 U	**120**	< 5.0 U	< 1.0 U
	9/23/2010	1.6 J	< 5.0 U	< 5.0 U	< 5.0 U	4.0 J	< 5.0 U	**130**	< 5.0 U	0.95 J	**140**	< 5.0 U	< 1.0 U
	9/30/2011	1.7 J	2.3	< 2.0 U	< 2.0 U	7.1	< 2.0 U	**95**	< 2.0 U	0.62 J	**86**	< 2.0 U	< 4.0 U
	9/6/2012	2.7 J	< 5.0 U	< 5.0 U	< 5.0 U	3.4 J	< 5.0 U	**84**	< 5.0 U	< 5.0 U	**63**	< 5.0 U	< 1.0 U
	9/25/2013	2.5	3.5	< 1.0 U	< 1.0 U	5.7	< 1.0 U	**73**	< 1.0 U	0.29 J	**40**	0.30 J	< 2.0 U
	10/7/2014	< 1.0 U	7.1	< 1.0 U	< 1.0 U	5.1	< 1.0 U	**39**	< 1.0 U	< 1.0 U	**5.5**	1.8	< 2.9 U
	11/4/2015	< 1.0 U	4.0	< 1.0 U	< 1.0 U	5.6	< 1.0 U	**26**	< 1.0 U	< 1.0 U	4.0	1.7	< 2.0 U
	8/23/2016	< 1.0 U	2.1	< 1.0 U	< 1.0 U	5.1	< 1.0 U	**14**	< 1.0 U	< 1.0 U	4.1	< 1.0 U	< 2.0 U
GM-51	4/28/2006	0.9 J	< 1.0 U	< 1.0 U	< 1.0 U	0.32 J	< 1.0 U	**6.7**	< 1.0 U	< 1.0 U	4.9	< 1.0 U	< 2.0 U
	11/30/2006	0.76 J	< 1.0 U	< 1.0 U	< 1.0 U	0.26 J	< 1.0 U	**6.6**	< 1.0 U	< 1.0 U	5.0	< 1.0 U	< 2.0 U
	9/27/2007	0.61 J	0.23 J	< 1.0 U	< 1.0 U	1.0	< 1.0 U	**7.2**	0.29 J	< 1.0 U	3.9	< 1.0 U	< 2.0 U
	9/30/2008	0.6 J	0.78 J	< 1.0 U	< 1.0 U	2.0	< 1.0 U	**9.3**	< 1.0 U	0.70 J	**7.7**	< 1.0 U	< 2.0 U
	9/25/2013	1.9	1.8	< 1.0 U	< 1.0 U	2.8	< 1.0 U	**46**	< 1.0 U	0.30 J	**64**	< 1.0 U	< 2.0 U
	10/6/2014	0.70 J	1.7 J	< 2.0 U	< 2.0 U	5.0	< 2.0 U	**67**	< 2.0 U	< 2.0 U	**33**	< 2.0 U	< 4.0 U
	10/30/2015	< 2.0 U	2.8	< 2.0 U	< 2.0 U	6.5	< 2.0 U	**63**	< 2.0 U	< 2.0 U	**16**	< 2.0 U	< 4.0 U
	8/25/2016	1.2	2.5	< 1.0 U	< 1.0 U	6.4	< 1.0 U	**6.5**	< 1.0 U	< 1.0 U	**33**	< 1.0 U	< 2.0 U
GM-52	4/28/2006	2.0	0.94 J	< 2.0 U	< 2.0 U	1.9 J	< 2.0 U	**75**	< 2.0 U	0.67 J	**61**	< 2.0 U	< 4.0 U
	11/30/2006	1.3 J	0.93 J	< 2.0 U	< 2.0 U	2.7	< 2.0 U	**67**	< 2.0 U	0.76 J	**47**	< 2.0 U	< 4.0 U
	9/26/2007	1.3 J	1.5 J	< 2.5 U	< 2.5 U	18	< 2.5 U	**88**	< 2.5 U	1.0 J	**47**	< 2.5 U	< 5.0 U
	9/30/2008	1.9 J	3.0	< 2.5 U	< 2.5 U	14	< 2.5 U	**88**	< 2.5 U	< 2.5 U	**43**	< 2.5 U	< 5.0 U
	11/12/2009	1.1 J	1.1 J	< 2.5 U	< 2.5 U	1.5 J	< 2.5 U	**94**	< 2.5 U	0.83 J	**43**	< 2.5 U	< 5.0 U
	1/27/2010	1.0 J	1.0 J	< 4.0 U	< 4.0 U	1.6 J	< 4.0 U	**94**	< 4.0 U	0.99 J	**42**	< 4.0 U	< 8.0 U
	9/22/2010	0.92 J	0.94 J	< 3.3 U	< 3.3 U	1.8 J	< 3.3 U	**90**	< 3.3 U	0.74 J	**50**	< 3.3 U	< 6.7 U
	9/29/2011	< 4.0 U	1.9 J	< 4.0 U	< 4.0 U	4.2	< 4.0 U	**73**	< 4.0 U	< 4.0 U	**38**	< 4.0 U	< 8.0 U
	9/5/2012	< 4.0 U	4.1	< 4.0 U	< 4.0 U	7.9	< 4.0 U	**66**	< 4.0 U	< 4.0 U	**29**	< 4.0 U	< 8.0 U
	9/25/2013	0.47 J	1.2	< 1.0 U	< 1.0 U	3.1	< 1.0 U	**53**	< 1.0 U	< 1.0 U	**18**	< 1.0 U	< 2.0 U
	10/6/2014	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	**44**	< 2.0 U	< 2.0 U	**8.2**	< 2.0 U	< 4.0 U
	10/30/2015	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	**32**	< 2.0 U	< 2.0 U	**5.8**	< 2.0 U	< 4.0 U
	8/25/2016	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.28 J	< 1.0 U	**30**	< 1.0 U	< 1.0 U	< 1.0 UB	< 1.0 U	< 2.0 U

Table E-1
Groundwater VOC Analytical Results for the Upper Aquifer Wells from 1999 to 2017
RACER Trust Moraine Facilities
Moraine, Ohio

Well	Date	VOCs (ug/L)											
		1,1,1-TCA	1,1-DCA	1,1-DCE	Benzene	cis-1,2-DCE	Ethyl-benzene	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes (total)
MCL		200		7	5	70	700	5	1000	100	5	2	10,000
GM-55	9/14/2006	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**7.4**	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U
	11/12/2009	< 1.0 U	< 1.0 U	< 1.0 U	0.46 J	< 1.0 U	< 1.0 U	**7.7**	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U
	9/22/2010	< 1.0 U	< 1.0 U	< 1.0 U	0.23 J	< 1.0 U	< 1.0 U	**7.2**	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U
	9/28/2011	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**6.1**	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U
	9/5/2012	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	4.6	0.26 J	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U
	9/25/2013	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	4.6	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U
	10/6/2014	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	3.3	0.34 J	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U
	11/3/2015	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	2.5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U
	8/15/2016	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	2.0	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U
GM-57	9/14/2006	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.21 J	1.9	0.48 J	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U
	1/21/2008	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.9	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U
GM-62(1)	9/14/2006	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**15**	0.24 J	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U
	4/8/2010	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**20**	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U
	10/6/2014	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**12**	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U
	11/3/2015	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**13**	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U
GM-63	9/14/2006	2.3 J	1.9 J	< 5.0 U	< 5.0 U	5.6	< 5.0 U	**160**	< 5.0 U	1.4 J	**120**	< 5.0 U	< 1.0 U
	12/1/2006	2.3 J	1.9 J	< 4.0 U	< 4.0 U	8.8	< 4.0 U	**140**	< 4.0 U	1.3 J	**100**	< 4.0 U	< 8.0 U
	9/25/2007	2.7 J	1.8 J	< 6.7 U	< 6.7 U	5.0 J	< 6.7 U	**130**	< 6.7 U	< 6.7 U	**120**	< 6.7 U	< 1.0 U
	10/1/2008	4.0 J	2.2 J	< 5.0 U	< 5.0 U	4.9 J	< 5.0 U	**140**	< 5.0 U	< 5.0 U	**92**	< 5.0 U	< 1.0 U
	1/28/2010	2.0 J	< 5.7 U	< 5.7 U	< 5.7 U	3.2 J	< 5.7 U	**150**	< 5.7 U	< 5.7 U	**140**	< 5.7 U	< 1.0 U
	9/6/2012	3.2 J	1.6 J	< 5.7 U	< 5.7 U	2.2 J	< 5.7 U	**89**	< 5.7 U	< 5.7 U	**58**	< 5.7 U	< 1.0 U
	9/25/2013	4.4	1.6	< 1.0 U	< 1.0 U	1.9	< 1.0 U	**81**	< 1.0 U	0.33 J	**48**	< 1.0 U	< 2.0 U
	10/7/2014	2.8	1.9	< 1.0 U	< 1.0 U	2.4	< 1.0 U	**53**	< 1.0 U	< 1.0 U	**20**	< 1.0 U	< 2.9 U
	11/4/2015	2.2	1.9	< 1.7 U	< 1.7 U	3.4	< 1.7 U	**46**	< 1.7 U	< 1.7 U	**19**	< 1.7 U	< 3.3 U
	8/24/2016	2.2	0.84 J	< 1.7 U	< 1.7 U	1.2 J	< 1.7 U	**38**	< 1.7 U	< 1.7 U	5.0	< 1.7 U	< 3.3 U
GM-64	9/14/2006	1.8 J	1.8 J	< 2.5 U	< 2.5 U	16	< 2.5 U	**77**	< 2.5 U	1.6 J	**34**	< 2.5 U	< 5.0 U
	12/1/2006	2.1 J	2.1 J	< 2.5 U	< 2.5 U	42	< 2.5 U	**85**	< 2.5 U	2 J	**35**	< 2.5 U	< 5.0 U
	9/25/2007	< 3.3 U	2.7 J	< 3.3 U	< 3.3 U	**74**	< 3.3 U	**11**	< 3.3 U	6.6	4.5	**18**	< 6.7 U
	10/1/2008	0.55 J	2.7	< 1.0 U	< 1.0 U	15	< 1.0 U	**31**	< 1.0 U	2.3	**14**	**2.3**	< 2.0 U
	9/26/2013	0.71 J	4.2	< 1.0 U	< 1.0 U	44	< 1.0 U	**41**	< 1.0 U	2.8	**31**	**5.8**	< 2.0 U

Table E-1
Groundwater VOC Analytical Results for the Upper Aquifer Wells from 1999 to 2017
RACER Trust Moraine Facilities
Moraine, Ohio

Well	Date	VOCs (ug/L)											
		1,1,1-TCA	1,1-DCA	1,1-DCE	Benzene	cis-1,2-DCE	Ethyl-benzene	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes (total)
MCL		200		7	5	70	700	5	1000	100	5	2	10,000
GM-65S	5/2/2007	0.62 J	0.78 J	< 1.0 U	< 1.0 U	1.7	< 1.0 U	**11**	< 1.0 U	< 1.0 U	**8.0**	< 1.0 U	< 2.0 U
	1/21/2008	0.58 J	0.54 J	< 1.0 U	< 1.0 U	1.5	< 1.0 U	**13**	< 1.0 U	< 1.0 U	**7.9**	< 1.0 U	< 2.0 U
	10/6/2008	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**8.7**	< 1.0 U	< 1.0 U	3.8	< 1.0 U	< 2.0 U
	11/12/2009	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 UJ	**11**	< 1.0 U	< 1.0 U	2.5	< 1.0 U	< 2.0 U
	1/27/2010	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.22 J	< 1.0 U	**13**	< 1.0 U	< 1.0 U	2.8	< 1.0 U	< 2.0 U
	9/22/2010	< 1.0 U	0.34 J	< 1.0 U	< 1.0 U	0.63 J	< 1.0 U	**9.9**	< 1.0 U	< 1.0 U	2.3	< 1.0 U	< 2.0 U
	9/28/2011	< 1.0 U	0.16 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**7.8**	< 1.0 U	< 1.0 U	2.3	< 1.0 U	< 2.0 U
	9/5/2012	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**6.5**	< 1.0 U	< 1.0 U	2.0	< 1.0 U	< 2.0 U
	9/25/2013	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**5.6**	< 1.0 U	< 1.0 U	0.82 J	< 1.0 U	< 2.0 U
	10/6/2014	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**5.4**	< 1.0 U	< 1.0 U	0.24 J	< 1.0 U	< 2.0 U
	11/5/2015	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**3.8**	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U
	8/17/2016	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	3.4	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U
GM-77S	9/27/2007	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U
	10/21/2010	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U
GM-78	10/23/2007	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**8.9**	0.23 J	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U
	1/21/2008	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**11**	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U
	10/2/2008	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 UJ	< 1.0 U	< 1.0 U	**11**	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U
	11/12/2009	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 UJ	**12**	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U
	9/28/2010	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**11**	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U
	9/29/2011	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	4.3	0.18 J	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U
	9/5/2012	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**9.5**	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U
	9/25/2013	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**11**	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U
	10/6/2014	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**9.5**	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U
	11/3/2015	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**7.1**	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U
	8/25/2016	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**6.2**	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U
GM-79	10/23/2007	0.66 J	0.24 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.6	< 1.0 U	< 2.0 U
	10/2/2008	0.65 J	< 1.0 U	< 1.0 U	< 1.0 UJ	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.8	< 1.0 U	< 2.0 U
	11/12/2009	0.72 J	0.31 J	< 1.0 U	0.48 J	0.28 J	< 1.0 UJ	< 1.0 U	< 1.0 U	< 1.0 U	2.1	< 1.0 U	< 2.0 U
	9/22/2010	0.51 J	0.23 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.6	< 1.0 U	< 2.0 U
	9/28/2011	< 1.0 U	0.22 J	< 1.0 U	< 1.0 U	0.19 J	< 1.0 U	0.34 J	< 1.0 U	< 1.0 U	1.3	< 1.0 U	< 2.0 U
	9/5/2012	0.72 J	0.94 J	< 1.0 U	< 1.0 U	1.9	< 1.0 U	< 1.0 U	< 1.0 U	0.29 J	2.2	< 1.0 U	< 2.0 U
	9/25/2013	0.88 J	1.1	< 1.0 U	< 1.0 U	1.4	< 1.0 U	0.31 J	< 1.0 U	0.42 J	3.9	< 1.0 U	< 2.0 U
	10/6/2014	1.0	3.2	< 1.0 U	< 1.0 U	8.4	< 1.0 U	1.0	< 1.0 U	0.43 J	**23**	< 1.0 U	< 2.0 U
	11/4/2015	0.71 J	2.2	< 1.4 U	< 1.4 U	7.4	< 1.4 U	0.97 J	< 1.4 U	< 1.4 U	**31**	< 1.4 U	< 2.9 U
	10/27/2016	0.70 J	2.6	< 1.0 U	< 1.0 U	7.4	< 1.0 U	2.1	< 1.0 U	< 1.0 U	**36**	< 1.0 U	< 2.0 U
	8/1/2017	0.60 J	2.3	< 1.0 U	< 1.0 U	5.4	< 1.0 U	4.3	< 1.0 U	< 1.0 U	**34**	< 1.0 U	< 2.0 U

Table E-1
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RACER Trust Moraine Facilities
Moraine, Ohio

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Well	Date	VOCs (ug/L)											
		1,1,1-TCA	1,1-DCA	1,1-DCE	Benzene	cis-1,2-DCE	Ethyl-benzene	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes (total)
MCL		200		7	5	70	700	5	1000	100	5	2	10,000
GM-80	10/23/2007	< 1.0 U	0.38 J	< 1.0 U	< 1.0 U	1.5	< 1.0 U	0.68 J	< 1.0 U	0.21 J	4.0	< 1.0 U	< 2.0 U
	9/22/2008	< 1.0 U	0.39 J	< 1.0 U	< 1.0 U	3.6	< 1.0 U	0.93 J	< 1.0 U	0.19 J	**5.4**	< 1.0 U	< 2.0 U
	11/12/2009	0.24 J	0.55 J	< 1.0 U	< 1.0 U	3.2	< 1.0 U	1.6	< 1.0 U	0.25 J	**9.8**	< 1.0 U	< 2.0 U
	4/9/2010	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.85 J	< 1.0 U	1.9	< 1.0 U	< 1.0 U	**6.6**	< 1.0 U	< 2.0 U
	9/21/2010	< 1.0 U	0.30 J	< 1.0 U	< 1.0 U	1.3	< 1.0 U	2.6	< 1.0 U	< 1.0 U	**6**	< 1.0 U	< 2.0 U
	9/28/2011	< 1.0 U	0.47 J	< 1.0 U	< 1.0 U	2.7	< 1.0 U	4.1	< 1.0 U	0.24 J	**5.9**	< 1.0 U	< 2.0 U
	9/5/2012	0.43 J	1.7	< 1.0 U	< 1.0 U	8.3	< 1.0 U	**5.2**	< 1.0 U	0.30 J	**13**	< 1.0 U	< 2.0 U
	9/25/2013	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**6.7**	< 1.0 U	< 1.0 U	4.6	< 1.0 U	< 2.0 U
	10/6/2014	0.50 J	0.66 J	< 1.0 U	< 1.0 U	2.5	< 1.0 U	**3.5**	< 1.0 U	< 1.0 U	**12**	< 1.0 U	< 2.0 U
	11/4/2015	< 1.0 U	0.96 J	< 1.0 U	< 1.0 U	2.9	< 1.0 U	**18**	< 1.0 U	< 1.0 U	**15**	< 1.0 U	< 2.0 U
	10/27/2016	0.54 J	0.60 J	< 1.0 U	< 1.0 U	3.6	< 1.0 U	**20**	< 1.0 U	< 1.0 U	**12**	< 1.0 U	< 2.0 U
	8/1/2017	0.32 J	0.38 J	< 1.0 U	< 1.0 U	1.7	< 1.0 U	**20**	< 1.0 U	< 1.0 U	**7.5**	< 1.0 U	< 2.0 U
GM-81	10/23/2007	0.22 J	0.93 J	< 1.0 U	< 1.0 U	0.98 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.61 J	< 1.0 U	< 2.0 U
	4/9/2010	0.23 J	0.92 J	< 1.0 U	< 1.0 U	1.5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.2	< 1.0 U	< 2.0 U
	7/31/2017	0.26 J	1.1	< 1.0 U	< 1.0 U	1.5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	2	< 1.0 U	< 2.0 U
MW-5	7/31/2017	< 1.0 U	0.89 J	< 1.0 U	< 1.0 U	1.1 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.7 J	< 1.0 U	< 2.0 U
RMW-95	8/1/2017	< 1.0 U	0.27 J	< 1.0 U	< 1.0 U	1.4	< 1.0 U	0.48 J	< 1.0 U	< 1.0 U	**5.1**	< 1.0 U	< 2.0 U
RMW-96	8/2/2017	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.95 J	0.31 J	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U
RMW-97	8/1/2017	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.62 J	< 1.0 U	3.2	< 1.0 U	< 1.0 U	0.63 J	< 1.0 U	< 1.0 U
TW-2	9/26/2000	4.5	27.8	< 1.0 U	< 1.0 U	23	10	5.0	< 1.0 U	2.9	**43**	**5.9**	3.2
	11/9/2001	3.9	20	< 2.0 U	< 2.0 U	8.8	0.38 J	**8.5**	< 2.0 U	2.4	**48**	**2.7**	< 2.0 U
	9/20/2002	2.2	9.0	< 2.0 U	< 2.0 U	26	< 2.0 U	**5.9**	< 2.0 U	1.4	**70**	**2.5**	< 2.0 U
	10/2/2003	0.66 J	5.7	< 1.0 U	1.5	8.3	0.86 J	4.7	< 1.0 U	0.59	**24**	1.4	< 1.0 U
	9/14/2004	< 1.0 U	22	< 1.0 U	2.9	5.5	< 1.0 U	< 1.0 U	< 1.0 U	2.0	1.5	**2.5**	< 1.0 U
	10/20/2005	< 1.0 U	12	< 1.0 U	2.5	5.3	12	< 1.0 U	3.4	1.4	< 1.0 U	**4.4**	5.0
	9/19/2006	0.55 J	3.4	< 1.0 U	< 1.0 U	11	< 1.0 U	**7.0**	< 1.0 U	0.38 J	**32**	0.27 J	< 2.0 U
	9/18/2007	< 1.0 U	1.7	< 1.0 U	0.81 J	7.9	< 1.0 U	1.9	< 1.0 U	0.25 J	**24**	0.97 J	< 2.0 U
	9/24/2008	< 1.0 U	< 1.0 U	< 1.0 U	1.4	< 5.2 U	0.76 J	1.4	< 1.0 U	0.36 J	**7.5**	1.0	< 2.0 U
	11/11/2009	< 2.5 U	1.1 J	< 2.5 U	< 2.5 U	1.6 J	< 2.5 U	< 2.5 U	< 2.5 U	< 2.5 U	1.1 J	< 2.5 U	< 5.0 U
	9/28/2010	< 1.0 U	2.0	< 1.0 U	1.2	2.1	< 1.0 U	0.52 J	< 1.0 U	0.30 J	1.6	0.71 J	< 2.0 U
	9/28/2011	< 1.0 U	1.8	< 1.0 U	1.2	5.7	0.45 J	1.2	< 1.0 U	0.25 J	**5.9**	1.1	< 2.0 U
	9/6/2012	< 1.0 U	1.3	< 1.0 U	0.51 J	3.6	< 1.0 U	< 1.0 U	0.18 J	0.23 J	0.26 J	0.56 J	< 2.0 U
	9/25/2013	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U
	10/9/2014	< 1.0 U	0.48 J	< 1.0 U	< 1.0 U	0.56 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 UB	0.64 J	< 2.0 U
	11/4/2015	< 1.0 U	0.31 J	< 1.0 U	< 1.0 U	0.27 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.29 J	< 2.0 U
	8/17/2016	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U
WSU-22	3/1/2006	3.1	1.7	< 1.0 U	< 1.0 U	4.3	< 1.0 U	**110**	< 1.0 U	1.2 J	**88**	< 1.0 U	< 3.3 U
WSU-23	3/1/2006	2.5	0.97 J	< 1.0 U	< 1.0 U	0.44 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**7.1**	< 1.0 U	< 2.0 U
	11/30/2006	2.1	0.73 J	0.2 J	< 1.0 U	0.46 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**6.1**	< 1.0 U	< 2.0 U

Table E-1
Groundwater VOC Analytical Results for the Upper Aquifer Wells from 1999 to 2017
RACER Trust Moraine Facilities
Moraine, Ohio

Well	Date	VOCs (ug/L)											
		1,1,1-TCA	1,1-DCA	1,1-DCE	Benzene	cis-1,2-DCE	Ethyl-benzene	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes (total)
MCL		200		7	5	70	700	5	1000	100	5	2	10,000
WSU-24	9/23/1999	2.4	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.9	< 1.0 U	< 1.0 U	**17**	< 1.0 U	< 1.0 U
	9/26/2000	2.1	< 1.0 U	< 1.0 U	< 1.0 U	2.7	< 1.0 U	1.2.	< 1.0 U	< 1.0 U	**17**	< 1.0 U	< 1.0 U
	11/9/2001	2.4	0.81 J	< 1.0 U	< 1.0 U	4.0	< 1.0 U	1.6	< 1.0 U	< 0.50 U	**18**	< 1.0 U	< 1.0 U
	9/24/2002	1.4	< 1.0 U	< 1.0 U	< 1.0 U	< 0.50 U	< 1.0 U	1.2	< 1.0 U	< 0.50 U	**13**	< 1.0 U	< 1.0 U
	9/22/2003	0.67 J	< 1.0 U	< 1.0 U	< 1.0 U	< 0.50 U	< 1.0 U	1.0	< 1.0 U	< 0.50 U	**7.9**	< 1.0 U	< 1.0 U
	9/16/2004	0.58 J	< 1.0 U	< 1.0 U	< 1.0 U	< 0.50 U	< 1.0 U	1.3	< 1.0 U	< 0.50 U	**8.0**	< 1.0 U	< 1.0 U
	10/20/2005	1.5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.2	< 1.0 U	< 1.0 U	**11**	< 1.0 U	< 2.0 U
	9/26/2006	0.65 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.81 J	< 1.0 U	< 1.0 U	**10**	< 1.0 U	< 2.0 U
	9/19/2007	0.66 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.89 J	< 1.0 U	< 1.0 U	**7.9**	< 1.0 U	< 2.0 U
	9/25/2008	0.62 J	0.85 J	< 1.0 U	< 1.0 U	2.4 J	< 1.0 U	1.7	< 1.0 U	0.35 J	**12 J**	< 1.0 U	< 2.0 U
	9/25/2013	0.23 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**13**	< 1.0 U	< 1.0 U	2.5	< 1.0 U	< 2.0 U
	12/4/2014	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**7.2**	< 1.0 U	< 1.0 U	2.0	< 1.0 U	< 2.0 U
	11/3/2015	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**8.4**	< 1.0 U	< 1.0 U	1.3	< 1.0 U	< 2.0 U

NOTES:
< - Constituent not detected above laboratory reporting limit shown.
(1) - Well abandoned.
1,1,1-TCA - 1,1,1-Trichloroethane.
1,1-DCA - 1,1-Dichloroethane.
1,1-DCE - 1,1-Dichloroethene.
BOLD - Result above MCL.
cis-1,2-DCE - cis-1,1-Dichloroethene.
F2 - MS/MSD Relative Percent Difference exceeds control limits.
J - Value is estimated.
K - The compound was positively identified; however, the associated numerical value is an estimated concentration only and the reported value may be biased high.
MCL - Maximum Contaminant Level.
PCE - Tetrachloroethene.
trans-1,2-DCE - trans-1,2-Dichloroethene.
TCE - Trichloroethene.
U - Constituent not detected above laboratory reporting limit shown.
UB - Analyte considered non-detect at listed value due to associated blank contamination.
ug/L - Micrograms per Liter.
VOCs - Volatile Organic Compounds.

Table E-2
Groundwater VOC Analytical Results for the Lower Aquifer Wells from 1999-2017
RACER Trust Moraine Facilities
Moraine, Ohio

Well	Date	VOCs (ug/L)											
		1,1,1-TCA	1,1-DCA	1,1-DCE	Benzene	cis-1,2-DCE	Ethyl-benzene	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes
MCL		200		7	5	70	700	5	1000	100	5	2	10,000
Upgradient of the Site													
HR-12	9/14/1999	< 1.0 UJ	2.7	< 1.0 U	1.2	1.8	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.7	< 1.0 U
	9/28/2000	< 1.0 U	2.2	< 1.0 U	< 1.0 U	2.0	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**2.5**	< 1.0 U
	11/14/2001	< 1.0 U	3.6	< 1.0 U	< 1.0 U	2.7	< 1.0 U	< 1.0 U	< 1.0 U	0.23	< 1.0 U	**3.8**	< 1.0 U
	9/26/2002	< 1.0 U	2.4	< 1.0 U	< 1.0 U	2.1	< 1.0 U	< 1.0 U	< 1.0 U	< 0.50 U	< 1.0 U	1.7	< 1.0 U
	9/18/2003	< 1.0 U	1.7	< 1.0 U	< 1.0 U	1.4	< 1.0 U	< 1.0 U	< 1.0 U	< 0.50 U	< 1.0 U	1.6	< 1.0 U
	9/21/2004	< 1.0 U	1.8	< 1.0 U	< 1.0 U	1.2	< 1.0 U	< 1.0 U	< 1.0 U	< 0.50 U	< 1.0 U	1.1	< 1.0 U
	10/24/2005	< 1.0 U	2.1	< 1.0 U	< 1.0 U	1.5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.36 J	< 2.0 U
	9/26/2006	< 1.0 U	2.1	< 1.0 U	< 1.0 U	1.3	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U
	9/19/2007	< 1.0 U	2.2	< 1.0 U	< 1.0 U	1.3	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U
	9/25/2008	0.39 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.3	< 1.0 U	< 1.0 U	**5.1**	< 1.0 U	< 2.0 U
	11/13/2009	< 1.0 U	2	< 1.0 U	< 1.0 U	1.1	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U
	9/28/2010	< 1.0 U	2.1	< 1.0 U	< 1.0 U	1.2	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U
	9/28/2011	< 1.0 U	2.8	< 1.0 U	< 1.0 U	1.6	< 1.0 U	< 1.0 U	< 1.0 U	0.24 J	< 1.0 U	< 1.0 U	< 2.0 U
	9/7/2012	< 1.0 U	2.1	< 1.0 U	< 1.0 U	0.31 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U
	9/26/2013	< 1.0 U	1.8	< 1.0 U	< 1.0 U	0.24 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U
	10/8/2014	< 1.0 U	3.4	< 1.0 U	< 1.0 U	1.9	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 UB	< 1.0 U	< 2.0 U
	12/8/2015	< 1.0 U	2.4	< 1.0 U	< 1.0 U	1.5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.31 J	< 2.0 U
	8/16/2016	< 1.0 U	3.1	< 1.0 U	< 1.0 U	1.8	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U
RMW-88	9/26/2012	< 1.4 U	17	< 1.4 U	< 1.4 U	43	< 1.4 U	< 1.4 U	0.21 J	1.5	< 1.4 U	1.1 J	< 2.9 U
	9/27/2013	< 1.0 U	35	< 1.0 U	< 1.0 U	**75**	< 1.0 U	< 1.0 U	< 1.0 U	4.5	< 1.0 U	2.0	< 2.0 U
	10/8/2014	< 2.5 U	32	< 2.5 U	< 2.5 U	**78**	< 2.5 U	< 2.5 U	< 2.5 U	4.3	< 2.5 U	1.2 J	< 5.0 U
	8/26/2015	< 1.0 U	30	< 1.0 U	< 1.0 U	60	< 1.0 U	< 1.0 U	< 1.0 U	3.8	< 1.0 U	3.3	< 2.0 U
	10/30/2015	< 2.0 U	27	< 2.0 U	< 2.0 U	61	< 2.0 U	< 2.0 U	< 2.0 U	3.2	< 2.0 U	1.5 J	< 4.0 U
	8/26/2016	< 2.0 U	24	< 2.0 U	< 2.0 U	55	< 2.0 U	< 2.0 U	< 2.0 U	3.2	< 2.0 U	< 2.0 U	< 4.0 U
On-Site													
31	9/29/2000	< 1.0 U	7.4	< 1.0 U	< 1.0 U	8.4	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**12.9**	**4.4**	< 1.0 U
	11/15/2001	< 1.0 U	3.1	< 1.0 U	< 1.0 U	2.4	< 1.0 U	< 1.0 U	< 1.0 U	< 0.50 U	**5.1**	**2.5**	< 1.0 U
39	9/27/2002	< 1.0 U	1.6	< 1.0 U	< 1.0 U	1.3	< 1.0 U	< 1.0 U	< 1.0 U	< 0.50 U	3.8	0.51J	< 1.0 U
	9/24/2003	< 1.0 U	0.58 J	< 1.0 U	< 1.0 U	0.71	< 1.0 U	< 1.0 U	< 1.0 U	< 0.50 U	0.89 J	< 1.0 U	< 1.0 U
GM-7R	9/28/1999	4.2	< 1.0 U	< 1.0 U	< 1.0 U	2.1	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**76.1**	< 1.0 U	< 1.0 U
	8/25/2015	< 1.0 U	0.86 J	< 1.0 U	< 1.0 U	1.7	< 1.0 U	**53**	< 1.0 U	0.47 J	**23**	0.60 J	< 2.0 U

Table E-2
Groundwater VOC Analytical Results for the Lower Aquifer Wells from 1999-2017
RACER Trust Moraine Facilities
Moraine, Ohio

Well	Date	VOCs (ug/L)											
		1,1,1-TCA	1,1-DCA	1,1-DCE	Benzene	cis-1,2-DCE	Ethyl-benzene	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes
MCL		200		7	5	70	700	5	1000	100	5	2	10,000
GM-19D	9/28/1999	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.2	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**13.5**	1.5	< 1.0 U
	10/2/2000	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	3.5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	2.9	**15.7**	< 1.0 U
	11/14/2001	0.18 J	< 1.0 U	< 1.0 U	< 1.0 U	0.92	< 1.0 U	< 1.0 U	0.38J	< 0.50 U	3.7	**13**	< 1.0 U
	9/26/2002	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.81	< 1.0 U	< 1.0 U	< 1.0 U	< 0.50 U	3.1	0.36 J	< 1.0 U
	9/25/2003	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.8	< 1.0 U	< 1.0 U	< 1.0 U	< 0.50 U	0.24 J	**17**	< 1.0 U
	9/20/2004	0.31 J	< 1.0 U	< 1.0 U	< 1.0 U	2	< 1.0 U	< 1.0 U	< 1.0 U	< 0.50 U	3.5	**18**	< 1.0 U
	10/25/2005	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	2.7	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.2	**15**	< 2.0 U
	9/26/2006	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	2	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.4	**18**	< 2.0 U
	9/17/2007	0.25 J	< 1.0 U	< 1.0 U	< 1.0 U	1.4	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	3.2	**16**	< 2.0 U
	9/23/2008	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	2.4	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**9.8**	< 2.0 U
	11/11/2009	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	2.1	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.7	**14**	< 2.0 U
	9/27/2010	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	2.4	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.98 J	**9.9**	< 2.0 U
	9/29/2011	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.7	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.8	**8.6**	< 2.0 U
	9/6/2012	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	3.5	< 1.0 U	< 1.0 U	0.82 J	< 1.0 U	**7.4**	**2.4**	0.32 J
	9/26/2013	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	2.7	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.0	**7.8**	< 2.0 U
	10/7/2014	< 1.0 U	0.27 J	< 1.0 U	< 1.0 U	5.8	< 1.0 U	0.36 J	< 1.0 U	< 1.0 U	5.0	**4.1**	< 2.0 U
	11/4/2015	< 2.0 U	3	< 2.0 U	< 2.0 U	39	< 2.0 U	11	< 2.0 U	1.0 J	69.0	**1.0 J**	< 4.0 U
	8/16/2016	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	2.4	< 1.0 U	0.62 J	< 1.0 U	< 1.0 U	4.9	**6.2**	< 2.0 U
GM-39	12/10/2003	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 0.50 U	< 1.0 U	< 1.0 U	0.18 J	< 0.50 U	< 1.0 U	1.3	< 1.0 U
	9/20/2004	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 0.50 U	< 1.0 U	< 1.0 U	< 1.0 U	< 0.50 U	< 1.0 U	1.8	< 1.0 U
	10/24/2005	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.77 J	< 2.0 U
	9/27/2006	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.7	< 2.0 U
	9/26/2007	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	19 J	< 1.0 U	< 1.0 U	< 1.0 U	0.23 J	< 1.0 U	1.6	< 2.0 U
	10/1/2008	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.67 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**3.2**	< 2.0 U
	9/27/2013	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.68 J	< 1.0 U	< 1.0 U	0.63 J	1.5	< 2.0 U
GM-40	12/10/2003	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 0.50 U	< 1.0 U	< 1.0 U	< 1.0 U	< 0.50 U	< 1.0 U	**3.1**	< 1.0 U
	9/20/2004	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 0.50 U	< 1.0 U	< 1.0 U	< 1.0 U	< 0.50 U	< 1.0 U	**3.2**	< 1.0 U
	10/25/2005	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**2.9**	< 2.0 U
	9/26/2006	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**3.9**	< 2.0 U
	9/25/2007	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**4.0**	< 2.0 U
	9/30/2008	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**3.6**	< 2.0 U

Table E-2
Groundwater VOC Analytical Results for the Lower Aquifer Wells from 1999-2017
RACER Trust Moraine Facilities
Moraine, Ohio

Well	Date	VOCs (ug/L)											
		1,1,1-TCA	1,1-DCA	1,1-DCE	Benzene	cis-1,2-DCE	Ethyl-benzene	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes
MCL		200		7	5	70	700	5	1000	100	5	2	10,000
GM-41	12/10/2003	< 11 U	< 11 U	< 11 U	< 1.0 U	10	< 11 U	< 11 U	< 11 U	< 5.6 U	**320**	< 11 U	< 11 U
	9/21/2004	< 6.2 U	< 6.2 U	< 6.2 U	< 6.2 U	24	< 6.2 U	< 6.2 U	< 6.2 U	< 3.1 U	**180**	< 6.2 U	< 6.2 U
	10/24/2005	< 10 U	< 10 U	< 10 U	< 10 U	16	< 10 U	< 10 U	< 10 U	< 10 U	**250**	< 10 U	< 20 U
	9/18/2006	< 4.0 U	< 4.0 U	< 4.0 U	< 4.0 U	11	< 4.0 U	< 4.0 U	< 4.0 U	< 4.0 U	**210**	< 4.0 U	< 8.0 U
	5/3/2007	< 6.7 U	< 6.7 U	< 6.7 U	< 6.7 U	15	< 6.7 U	< 6.7 U	< 6.7 U	< 6.7 U	**170**	**2.4 J**	< 13 U
	9/20/2007	< 6.7 U	< 6.7 U	< 6.7 U	< 6.7 U	17	< 6.7 U	< 6.7 U	< 6.7 U	1.4 J	**230**	1.9 J	< 13 U
	9/26/2008	< 7.1 U	< 7.1 U	< 7.1 U	< 7.1 U	11	< 7.1 U	< 7.1 U	< 7.1 U	< 7.1 U	**180**	< 7.1 U	< 14 U
	9/27/2013	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	12	< 1.0 U	< 1.0 U	< 1.0 U	0.89 J	**79**	1.9	< 2.0 U
GM-42	12/9/2003	< 1.0 U	0.46 J	< 1.0 U	< 1.0 U	11	< 1.0 U	0.27 J	< 1.0 U	0.34 J	0.37 J	1.0	< 1.0 U
	9/20/2004	< 1.0 U	0.70 J	0.25 J	< 1.0 U	16	< 1.0 U	< 1.0 U	< 1.0 U	0.44 J	0.43 J	0.92 J	< 1.0 U
	10/25/2005	< 1.0 U	0.64 J	0.21 J	< 1.0 U	17	< 1.0 U	0.19 J	< 1.0 U	0.59 J	0.85 J	0.56 J	< 2.0 U
	9/26/2006	< 1.0 U	0.50 J	< 1.0 U	< 1.0 U	14	< 1.0 U	< 1.0 U	< 1.0 U	0.44 J	0.64 J	0.45 J	< 2.0 U
	9/25/2007	< 1.0 U	0.67 J	< 1.0 U	< 1.0 U	18	< 1.0 U	< 1.0 U	0.18 J	0.69 J	2.2	0.44 J	< 2.0 U
	9/30/2008	< 1.0 U	0.66 J	0.53 J	< 1.0 U	20	< 1.0 U	< 1.0 U	< 1.0 U	0.89 J	**9.9**	0.31 J	< 2.0 U
	9/6/2012	< 1.0 U	0.41 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.25 J	< 1.0 U	**6.4**	< 2.0 U
GM-54	9/14/2006	< 6.7 U	< 6.7 U	< 6.7 U	< 6.7 U	< 6.7 U	< 6.7 U	**180**	< 6.7 U	< 6.7 U	3.2 J	< 6.7 U	< 13 U
	5/2/2007	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	**160**	< 5.0 U	< 5.0 U	2.9 J	< 5.0 U	< 10 U
	9/20/2007	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	**150**	< 5.0 U	< 5.0 U	2.4 J	< 5.0 U	< 10 U
	9/30/2008	< 5.7 U	< 5.7 U	< 5.7 U	< 5.7 U	< 5.7 U	< 5.7 U	**190**	< 5.7 U	< 5.7 U	2.5 J	< 5.7 U	< 11 U
	11/13/2009	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	**120**	< 5.0 U	< 5.0 U	2.9 J	< 5.0 U	< 10 U
	1/28/2010	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	**120**	< 5.0 U	< 5.0 U	2.4 J	< 5.0 U	< 10 U
	9/23/2010	< 2.5 U	< 2.5 U	< 2.5 U	< 2.5 U	< 2.5 U	< 2.5 U	**92**	< 2.5 U	< 2.5 U	2.2 J	< 2.5 U	< 5.0 U
	9/29/2011	< 4.0 U	< 4.0 U	< 4.0 U	< 4.0 U	< 4.0 U	< 4.0 U	**83**	< 4.0 U	< 4.0 U	2.6 J	< 4.0 U	< 8.0 U
	9/7/2012	< 4.0 U	< 4.0 U	< 4.0 U	< 4.0 U	< 4.0 U	< 4.0 U	**64**	< 4.0 U	< 4.0 U	2.8 J	< 4.0 U	< 8.0 U
	9/26/2013	< 1.0 U	0.31 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**69**	< 1.0 U	< 1.0 U	2.7	< 1.0 U	< 2.0 U
	10/8/2014	< 1.7 U	< 1.7 U	< 1.7 U	< 1.7 U	< 1.7 U	< 1.7 U	**66**	< 1.7 U	< 1.7 U	< 1.7 UB	< 1.7 U	< 3.3 U
	11/3/2015	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	**62**	< 2.0 U	< 2.0 U	1.3 J	< 2.0 U	< 4.0 U
	8/18/2016	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**61**	< 1.0 U	< 1.0 U	1.6	< 1.0 U	< 2.0 U
GM-58	9/14/2006	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.73 J	< 1.0 U	4.4	0.4 J	< 1.0 U	0.72 J	< 1.0 U	< 2.0 U
	11/30/2006	< 3.3 U	< 3.3 U	< 3.3 U	< 3.3 U	< 3.3 U	< 3.3 U	**85**	< 3.3 U	< 3.3 U	< 3.3 U	< 3.3 U	< 6.7 U
	5/3/2007	< 2.9 U	< 2.9 U	< 2.9 U	< 2.9 U	< 2.9 U	< 2.9 U	**82**	< 2.9 U	< 2.9 U	< 2.9 U	< 2.9 U	< 5.7 U
	9/20/2007	< 3.3 U	< 3.3 U	< 3.3 U	< 3.3 U	< 3.3 U	< 3.3 U	**69**	< 3.3 U	< 3.3 U	< 3.3 U	< 3.3 U	< 6.7 U
	9/26/2008	< 2.5 U	< 2.5 U	< 2.5 U	< 2.5 U	< 2.5 U	< 2.5 U	**80**	< 2.5 U	< 2.5 U	< 2.5 U	< 2.5 U	< 5.0 U
	9/27/2013	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**34**	< 1.0 U	< 1.0 U	0.41 J	< 1.0 U	< 2.0 U

Table E-2
Groundwater VOC Analytical Results for the Lower Aquifer Wells from 1999-2017
RACER Trust Moraine Facilities
Moraine, Ohio

Well	Date	VOCs (ug/L)											
		1,1,1-TCA	1,1-DCA	1,1-DCE	Benzene	cis-1,2-DCE	Ethyl-benzene	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes
MCL		200		7	5	70	700	5	1000	100	5	2	10,000
GM-61	9/15/2006	0.5.0 J	2.2	< 1.7 U	< 1.7 U	2.6	< 1.7 U	**20**	0.44 J	< 1.7 U	**36**	< 1.7 U	< 3.3 U
	9/26/2007	0.59 J	1.6 J	< 1.7 U	< 1.7 U	3.9	< 1.7 U	**28**	< 1.7 U	< 1.7 U	**56**	< 1.7 U	< 3.3 U
	10/1/2008	< 1.0 U	0.94 J	0.19 J	< 1.0 U	20	< 1.0 U	**13**	< 1.0 U	0.92 J	**23**	0.75 J	< 2.0 U
	9/26/2013	< 1.0 U	1.3	< 1.0 U	< 1.0 U	17	< 1.0 U	**7.2**	< 1.0 U	1.1	**5.2**	1.2	< 2.0 U
	8/26/2015	< 1.0 U	3.3	< 1.0 U	< 1.0 U	25	< 1.0 U	**32**	< 1.0 U	1.5	**12**	0.45 J	< 2.0 U
GM-67D	5/3/2007	0.59 J	3.0	0.36 J	< 1.7 U	23	< 1.7 U	**54**	< 1.7 U	0.83 J	**45**	< 1.7 U	< 3.3 U
	10/10/2014	1.2 J	3.7	< 3.3 U	< 3.3 U	**120.0**	< 3.3 U	0.84 J	< 3.3 U	2.6 J	**15.0**	3.5	< 6.7 U
	11/4/2015	2.5	6.8	1.8	< 1.0 U	**140 F1K**	< 1.0 U	1.7	< 1.0 U	4.6	**76**	0.70 J	< 2.0 U
GM-68D	5/4/2007	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U	**1500**	< 50 U	< 50 U	**750**	< 50 U	< 100 U
	10/3/2008	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	14	< 5.0 U	**190**	< 5.0 U	< 5.0 U	**46**	< 5.0 U	< 10 U
	11/16/2009	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	4.5	< 2.0 U	**130 J**	< 2.0 U	< 2.0 U	**35**	< 2.0 U	< 4.0 U
	9/29/2010	< 3.3 U	< 3.3 U	< 3.3 U	< 3.3 U	3.0 J	< 3.3 U	**100**	< 3.3 U	< 3.3 U	**22**	< 3.3 U	< 6.7 U
	9/30/2011	< 1.7 U	< 1.7 U	< 1.7 U	< 1.7 U	1.5 J	< 1.7 U	**62**	< 1.7 U	< 1.7 U	**13**	< 1.7 U	< 3.3 U
	9/7/2012	< 3.3 U	< 3.3 U	< 3.3 U	< 3.3 U	< 3.3 U	< 3.3 U	**49**	< 3.3 U	< 3.3 U	**6.9**	< 3.3 U	< 6.7 U
	9/26/2013	0.47 J	< 1.0 U	< 1.0 U	< 1.0 U	0.77 J	< 1.0 U	**45**	< 1.0 U	< 1.0 U	**5.6**	< 1.0 U	< 2.0 U
	10/10/2014	0.71 J	< 1.4 U	< 1.4 U	< 1.4 U	1.1 J	< 1.4 U	**36**	< 1.4 U	< 1.4 U	3.7	< 1.4 U	< 2.9 U
	11/3/2015	1.1	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**30**	< 1.0 U	< 1.0 U	2.2	< 1.0 U	< 2.0 U
	8/17/2016	1.1	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**31**	< 1.0 U	< 1.0 U	2.6	< 1.0 U	< 2.0 U
GM-69	5/3/2007	< 12 U	8.7 J	< 12 U	< 12 U	29	< 12 U	**6.5 J**	< 12 U	< 12 U	**300**	< 12 U	< 24 U
GM-70	5/3/2007	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**11**	< 1.0 U	< 1.0 U	0.32 J	< 1.0 U	< 2.0 U
GM-73	10/23/2007	< 6.7 U	< 6.7 U	< 6.7 U	< 6.7 U	< 6.7 U	< 6.7 U	**160**	< 6.7 U	< 6.7 U	**22**	< 6.7 U	< 13 U
GM-74D	9/27/2007	< 8.0 U	< 8.0 U	< 8.0 U	< 8.0 U	< 8.0 U	< 8.0 U	**250**	< 8.0 U	< 8.0 U	**130**	< 8.0 U	< 16 U
	4/9/2010	< 2.5 U	< 2.5 U	< 2.5 U	< 2.5 U	8.0	< 2.5 U	**98**	< 2.5 U	< 2.5 U	**50**	< 2.5 U	< 5.0 U
	8/24/2015	0.98 J	< 1.0 U	< 1.0 U	< 1.0 U	3.0	< 1.0 U	**26**	< 1.0 U	< 1.0 U	**5.3**	1.3	< 2.0 U
GM-75D	9/26/2007	< 50 U	< 50 U	< 50 U	< 50 U	24 J	< 50 U	**470**	< 50 U	< 50 U	**1700 J**	< 50 U	< 100 U
	10/6/2008	< 33 U	< 33 U	< 33 U	< 33 U	**120**	< 33 U	**220**	< 33 U	< 33 U	**750**	< 33 U	< 67 U
	11/16/2009	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	15	< 5.0 U	**320**	< 5.0 U	< 5.0 U	**210**	< 5.0 U	< 10 U
	4/8/2010	< 9.1 U	< 9.1 U	< 9.1 U	< 9.1 U	19	< 9.1 U	**320**	< 9.1 U	< 9.1 U	**200**	< 9.1 U	< 18 U
	9/29/2010	< 9.1 U	< 9.1 U	< 9.1 U	< 9.1 U	12	< 9.1 U	**260**	< 9.1 U	< 9.1 U	**190**	< 9.1 U	< 18 U
	9/30/2011	< 4.0 U	< 4.0 U	< 4.0 U	< 4.0 U	12	< 4.0 U	**200**	< 4.0 U	< 4.0 U	**180**	**2.1 J**	< 8.0 U
	9/7/2012	< 11 U	< 11 U	< 11 U	< 11 U	31	< 11 U	**150**	< 11 U	< 11 U	**150**	**4.7 J**	< 22 U
	9/27/2013	< 1.0 U	0.40 J	0.28 J	< 1.0 U	25	< 1.0 U	**180**	< 1.0 U	0.58 J	**180**	**3.2**	< 2.0 U
	12/4/2014	< 5.7 U	< 5.7 U	< 5.7 U	< 5.7 U	11	< 5.7 U	**190**	< 5.7 U	< 5.7 U	**180**	< 5.7 U	< 11 U
	12/8/2015	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	22	< 1.0 U	**140**	< 1.0 U	0.38 J	**150**	0.37 J	< 2.0 U
	8/24/2016	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	9.6	< 2.0 U	**200**	< 2.0 U	< 2.0 U	**220**	< 2.0 U	< 4.0 U

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RACER Trust Moraine Facilities
Moraine, Ohio

Well	Date	VOCs (ug/L)											
		1,1,1-TCA	1,1-DCA	1,1-DCE	Benzene	cis-1,2-DCE	Ethyl-benzene	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes
MCL		200		7	5	70	700	5	1000	100	5	2	10,000
GM-76D	9/23/2007	< 1.0 U	0.30 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.63 J	< 1.0 U	< 1.0 U	2.7	< 1.0 U	< 2.0 U
	10/9/2014	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.24 J	< 1.0 U	**35**	< 1.0 U	< 1.0 U	**8.5**	< 1.0 U	< 2.0 U
	8/24/2015	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.36 J	< 1.0 U	**27**	< 1.0 U	< 1.0 U	**6.5**	< 1.0 U	< 2.0 U
	10/30/2015	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	**49**	< 2.0 U	< 2.0 U	**6.9**	< 2.0 U	< 4.0 U
GM-82	2/26/2008	< 2.0 U	2.3	< 2.0 U	< 2.0 U	47	< 2.0 U	**60**	< 2.0 U	1.9 J	**91**	< 2.0 U	< 4.0 U
	10/2/2008	1.0 J	2.4 J	0.64 J	< 3.3 U	46	< 3.3 U	**51**	< 3.3 U	2.0 J	**100**	< 3.3 U	< 6.7 U
	9/26/2013	0.49 J	1.4	0.60 J	< 1.0 U	41	< 1.0 U	**20**	< 1.0 U	1.3	**56**	**7.4**	< 2.0 U
	12/11/2015	< 2.0 U	1.5 J	< 2.0 U	< 2.0 U	30	< 2.0 U	**23**	< 2.0 U	1.2 J	**57**	0.63 J	< 4.0 U
GM-83D	2/26/2008	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.28 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.5	< 2.0 U
	10/2/2008	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 UJ	0.30 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.3	< 2.0 U
	11/11/2009	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.31 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**2.1**	< 2.0 U
	9/22/2010	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.31 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	2.0	< 2.0 U
	9/28/2011	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.8	< 2.0 U
	9/7/2012	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.7	< 2.0 U
	9/26/2013	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.9	< 2.0 U
	10/9/2014	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**2.6**	< 2.0 U
	10/30/2015	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**2.0**	< 2.0 U
	8/19/2016	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**3.1**	< 2.0 U
GM-84	2/26/2008	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.57 J	< 1.0 U	**5.5**	< 1.0 U	< 2.0 U
	10/2/2008	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 UJ	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**6.6**	< 1.0 U	< 2.0 U
	11/16/2009	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**6.3**	< 1.0 U	< 2.0 U
	1/27/2010	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**6.4**	< 1.0 U	< 2.0 U
	9/23/2010	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**5.9**	< 1.0 U	< 2.0 U
	9/29/2011	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**5.7**	< 1.0 U	< 2.0 U
	9/7/2012	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	4.9	< 1.0 U	< 2.0 U
	9/26/2013	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	3.6	< 1.0 U	< 2.0 U
	10/8/2014	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	4.9	< 1.0 U	< 2.0 U
	10/30/2015	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	5	< 1.0 U	< 2.0 U
	8/17/2016	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	4.7	< 1.0 U	< 2.0 U

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RACER Trust Moraine Facilities
Moraine, Ohio

Well	Date	VOCs (ug/L)											
		1,1,1-TCA	1,1-DCA	1,1-DCE	Benzene	cis-1,2-DCE	Ethyl-benzene	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes
MCL		200		7	5	70	700	5	1000	100	5	2	10,000
HR-13	9/15/1999	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	4.7	< 1.0 U	< 2.0 U
	9/29/2000	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	4.7	< 1.0 U	< 2.0 U
	11/14/2001	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	4.7	< 1.0 U	< 2.0 U
	9/30/2002	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	4.7	< 1.0 U	< 2.0 U
	9/16/2003	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	4.7	< 1.0 U	< 2.0 U
	9/21/2004	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	4.7	< 1.0 U	< 2.0 U
	10/25/2005	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	4.7	< 1.0 U	< 2.0 U
	9/25/2006	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	4.7	< 1.0 U	< 2.0 U
	8/26/2015	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	4.7	< 1.0 U	< 2.0 U
HR-14	9/15/1999	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	4.7	< 1.0 U	< 2.0 U
	9/30/2002	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	4.7	< 1.0 U	< 2.0 U
	8/26/2015	< 1.0 U	4.0	< 1.0 U	< 1.0 U	11	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**6.0**	0.40 J	< 2.0 U
HR-15	9/15/1999	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	2.5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**11**	< 1.0 U
	9/29/2000	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	2.8	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**11**	< 1.0 U
	11/14/2001	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.86	< 1.0 U	< 1.0 U	< 1.0 U	< 0.50 U	< 1.0 U	< 1.0 U	< 1.0 U
	9/30/2002	< 1.0 U	< 1.0 UJ	< 1.0 U	< 1.0 U	1.0	< 1.0 U	< 1.0 U	< 1.0 U	< 0.50 U	< 1.0 U	< 1.0 U	< 1.0 U
	9/17/2003	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	2.2	< 1.0 U	< 1.0 U	< 1.0 U	< 0.50 U	0.29 J	**14**	< 1.0 U
	9/21/2004	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	2.5	< 1.0 U	< 1.0 U	< 1.0 U	< 0.50 U	0.38 J	**19**	< 1.0 U
	10/25/2005	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	2.2	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.40 J	**14**	< 2.0 U
	9/25/2006	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	2.2	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.50 J	**13**	< 2.0 U
	9/26/2007	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	2.5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.37 J	**15**	< 2.0 U
	9/29/2008	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	3.6	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.47 J	**9.7**	< 2.0 U
	11/13/2009	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	3.1	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.70 J	**6.5**	< 2.0 U
	9/24/2010	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	3.0	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.60 J	**3.8**	< 2.0 U
	9/28/2011	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	3.5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.78 J	**2.4**	< 2.0 U
	9/6/2012	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	3.9	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.87 J	1.1	< 2.0 U
	9/26/2013	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	3.5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.75 J	1.4	< 2.0 U
	10/7/2014	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	3.5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.71 J	1.9	< 2.0 U
	11/4/2015	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	3.5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.5	0.78 J	< 2.0 U
	8/19/2016	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	3.6	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.5	0.90 J	< 2.0 U
RMW-85	9/26/2012	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	**280**	< 10 U	< 10 U	**120**	< 10 U	< 20 U
	9/27/2013	0.19 J	0.84 J	0.26 J	< 1.0 U	60	< 1.0 U	**61**	< 1.0 U	0.48 J	**95**	0.31 J	< 2.0 U
	10/9/2014	< 2.0 U	< 2.0 U	< 2.0 U	0.75 J	55	< 2.0 U	**40**	< 2.0 U	1.8 J	**78**	**5.0**	< 4.0 U
	12/8/2015	< 1.0 U	0.41 J	< 1.0 U	< 1.0 U	18	< 1.0 U	**49**	< 1.0 U	< 1.0 U	**82**	**0.31 J**	< 2.0 U
	8/24/2016	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	18	< 2.0 U	**62**	< 2.0 U	< 2.0 U	**110**	< 2.0 U	< 4.0 U

Table E-2
Groundwater VOC Analytical Results for the Lower Aquifer Wells from 1999-2017
RACER Trust Moraine Facilities
Moraine, Ohio

Well	Date	VOCs (ug/L)											
		1,1,1-TCA	1,1-DCA	1,1-DCE	Benzene	cis-1,2-DCE	Ethyl-benzene	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes
MCL		200		7	5	70	700	5	1000	100	5	2	10,000
RMW-86	9/26/2012	12	13	1.6 J	< 6.7 U	52	< 6.7 U	**48**	< 6.7 U	1.6 J	**190**	< 6.7 U	< 13 U
	9/26/2013	15	16	2.3	< 1.0 U	**110**	< 1.0 U	**41**	< 1.0 U	2.9	**190**	1.3	< 2.0 U
	10/8/2014	9.4	7.6	< 6.7 U	< 6.7 U	33	< 6.7 U	**29**	< 6.7 U	< 6.7 U	**140**	< 6.7 U	< 13 U
	12/8/2015	6.1	11	1.6	< 1.0 U	37	< 1.0 U	**40**	< 1.0 U	1.3	**110**	0.45 J	< 2.0 U
	8/17/2016	7.9	13	1.9	< 1.0 U	39	< 1.0 U	**59**	< 1.0 U	1.6	**120**	0.42 J	< 2.0 U
RMW-87	9/26/2012	< 1.0 U	15	< 1.0 U	0.13 J	23	< 1.0 U	< 1.0 U	0.39 J	1.3	**7.5**	0.93 J	< 2.0 U
	9/26/2013	< 1.0 U	18	< 1.0 U	< 1.0 U	43	< 1.0 U	< 1.0 U	< 1.0 U	2.2	**9.8**	1.3	< 2.0 U
	10/9/2014	< 2.2 U	13	< 2.2 U	< 2.2 U	62	< 2.2 U	< 2.2 U	< 2.2 U	2.7	**10**	< 2.2 U	< 4.4 U
	11/5/2015	< 1.0 U	7.8	< 1.0 U	< 1.0 U	58	< 1.0 U	< 1.0 U	< 1.0 U	2.1	**10**	0.42 J	< 2.0 U
	8/19/2016	< 1.0 U	7.8	< 1.0 U	< 1.0 U	43 K	< 1.0 U	< 1.0 U	< 1.0 U	2.3	**11**	0.35 J	< 2.0 U
Downgradient of the Site													
DN-13	11/14/2001	1.1	2.5	< 1.0 U	< 1.0 U	6.2	< 1.0 U	< 1.0 U	< 1.0 U	0.37J	5.0	1.2	< 1.0 U
	9/27/2002	1.1	2.5	< 1.0 U	< 1.0 U	7.3	< 1.0 U	< 1.0 U	< 1.0 U	0.48J	**6.1**	1.3	< 1.0 U
	9/22/2003	1.1	2.4	< 1.0 U	< 1.0 U	6.8	< 1.0 U	0.31 J	< 1.0 U	0.4 J	**6.4**	1.1	< 1.0 U
	9/16/2004	0.84 J	2.2	< 1.0 U	< 1.0 U	6.7	< 1.0 U	0.44 J	< 1.0 U	0.49 J	**6.8**	**2.1**	< 1.0 U
	10/20/2005	1.5	2.0	< 1.0 U	< 1.0 U	5.5	< 1.0 U	0.38 J	< 1.0 U	< 1.0 U	**7.2**	**2.6**	< 2.0 U
	9/27/2006	0.51 J	1.5	< 1.0 U	< 1.0 U	6.1	< 1.0 U	0.33 J	< 1.0 U	0.41 J	**5.7**	**2.3**	< 2.0 U
	9/19/2007	0.48 J	2.0	< 1.0 U	< 1.0 U	6.4	< 1.0 U	< 1.0 U	< 1.0 U	0.4 J	3.3	**2.6**	< 2.0 U
	9/24/2008	0.63 J	< 1.7 U	< 1.0 U	< 1.0 U	6.2	< 1.0 U	< 1.0 U	< 1.0 U	0.44 J	4.5	1.4	< 2.0 U
	11/11/2009	0.77 J	2.1	< 1.0 U	< 1.0 U	7.9	< 1.0 U	0.33 J	< 1.0 U	0.50 J	**6.5**	1.7	< 2.0 U
	9/22/2010	0.48 J	1.6	< 1.0 U	< 1.0 U	6.9	< 1.0 U	< 1.0 U	< 1.0 U	0.44 J	5.0	1.3	< 2.0 U
	9/28/2011	< 1.0 U	1.5	< 1.0 U	< 1.0 U	6.3	< 1.0 U	0.40 J	< 1.0 U	0.38 J	4.8	1.3	< 2.0 U
	9/6/2012	0.99 J	2.0	< 1.0 U	< 1.0 U	7.5	< 1.0 U	0.76 J	< 1.0 U	0.47 J	**7.9**	1.2	< 2.0 U
	9/27/2013	0.93 J	1.9	< 1.0 U	< 1.0 U	6.9	< 1.0 U	0.58 J	< 1.0 U	0.55 J	**8.4**	1.1	< 2.0 U
	12/4/2014	0.86 J	1.6	< 1.0 U	< 1.0 U	5.9	< 1.0 U	3.5	< 1.0 U	0.41 J	**10**	0.79 J	< 2.0 U
	11/5/2015	0.81 J	1.3	< 1.0 U	< 1.0 U	5.5	< 1.0 U	2.5	< 1.0 U	0.42 J	**9**	0.70 J	< 2.0 U
	8/25/2016	0.97 J	1.3	< 1.0 U	< 1.0 U	5.6	< 1.0 U	1.5	< 1.0 U	0.37 J	**8.1**	< 1.0 U	< 2.0 U
	8/15/2017	0.93 J	1.5	< 1.0 U	< 1.0 U	5.8	< 1.0 U	2.1	< 1.0 U	0.43 J	**8.0**	0.86 J	< 2.0 U

Table E-2
Groundwater VOC Analytical Results for the Lower Aquifer Wells from 1999-2017
RACER Trust Moraine Facilities
Moraine, Ohio

ARCADIS

Well	Date	VOCs (ug/L)											
		1,1,1-TCA	1,1-DCA	1,1-DCE	Benzene	cis-1,2-DCE	Ethyl-benzene	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes
MCL		200		7	5	70	700	5	1000	100	5	2	10,000
GM-1	9/28/1999	1.1	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	2.0	5.2	< 1.0 U	**31**	< 1.0 U	< 1.0 U
	10/2/2000	2.2	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	2.8	< 1.0 U	< 1.0 U	**37**	< 1.0 U	< 1.0 U
	11/14/2001	0.80J	0.29J	< 1.0 U	< 1.0 U	< 0.50 U	< 1.0 U	1.3	< 1.0 U	< 0.50 U	**19**	< 1.0 U	< 1.0 U
	10/1/2002	1.3 J	0.48 J	< 1.4 U	< 1.4 U	0.95	< 1.4 U	2.3	< 1.4 U	< 0.72 U	**39**	< 1.4 U	< 1.4 U
	10/2/2003	1.2	< 1.0 U	< 1.0 U	< 1.0 U	< 0.50 U	< 1.0 U	2.0	< 1.0 U	< 0.50 U	**34**	< 1.0 U	< 1.0 U
	9/21/2004	1.2	< 1.0 U	< 1.0 U	< 1.0 U	< 0.50 U	< 1.0 U	2.1	< 1.0 U	< 0.50 U	**35**	< 1.0 U	< 1.0 U
	10/25/2005	0.95 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	2.1	< 1.0 U	< 1.0 U	**34**	< 1.0 U	< 2.0 U
	9/20/2006	0.76 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	2.1	< 1.0 U	< 1.0 U	**34**	< 1.0 U	< 2.0 U
	9/18/2007	0.74 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.8	< 1.0 U	< 1.0 U	**32**	< 1.0 U	< 2.0 U
	9/24/2008	0.69 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.8	< 1.0 U	< 1.0 U	**31**	< 1.0 U	< 2.0 U
	9/5/2012	0.42 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.1	< 1.0 U	< 1.0 U	**26**	< 1.0 U	< 2.0 U
	9/25/2013	0.41 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.83 J	< 1.0 U	< 1.0 U	**21**	< 1.0 U	< 2.0 U
GM-3	9/28/1999	1.7	< 1.0 U	< 1.0 U	< 1.0 U	1.1	< 1.0 U	1.2	< 1.0 U	< 1.0 U	**7.5**	< 1.0 U	< 1.0 U
	10/2/2000	1.0	2.1	< 1.0 U	< 1.0 U	8.3	< 1.0 U	1.5	< 1.0 U	1.1	**9.4**	< 1.0 U	< 1.0 U
	11/14/2001	0.16 J	0.95 J	< 1.0 U	< 1.0 U	2.6	< 1.0 U	0.48 J	< 1.0 U	0.25 J	2.9	< 1.0 U	< 1.0 U
	10/1/2002	0.74 J	1.8	< 1.0 U	< 1.0 U	8.9	< 1.0 U	1.4	< 1.0 U	1.2	**9.5**	0.63 J	< 1.0 U
	10/2/2003	0.96 J	1.6	< 1.0 U	< 1.0 U	5.5	0.26 J	1.7	< 1.0 U	0.77	**12**	< 1.0 U	< 1.0 U
	9/21/2004	1.0	1.8	< 1.0 U	< 1.0 U	4.9	< 1.0 U	2.0	< 1.0 U	0.75	**13**	< 1.0 U	< 1.0 U
	10/25/2005	0.83 J	1.6	< 1.0 U	< 1.0 U	4.7	< 1.0 U	2.0	< 1.0 U	0.66 J	**14**	< 1.0 U	< 2.0 U
	9/22/2006	0.59 J	2.0 J	< 1.0 UJ	< 1.0 UJ	6.1 J	< 1.0 UJ	2.1 J	< 1.0 UJ	1.0 J	**13 J**	0.27 J	< 2.0 UJ
	9/18/2007	0.67 J	1.5	< 1.0 U	< 1.0 U	3.8	< 1.0 U	1.9	< 1.0 U	0.77 J	**14**	< 1.0 U	< 2.0 U
	9/24/2008	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 UJ	< 1.0 U	< 1.0 U	< 1.0 UJ	< 1.0 U	< 2.0 U
	9/25/2013	0.54 J	0.86 J	< 1.0 U	< 1.0 U	1.7	< 1.0 U	2.3	< 1.0 U	0.29 J	**15**	< 1.0 U	< 2.0 U
GM-4	9/28/1999	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	2.3	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**13.4**	< 1.0 U	< 1.0 U
GM-5	9/28/1999	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	3.9	< 1.0 U	1.3	< 1.0 U	< 1.0 U

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RACER Trust Moraine Facilities
Moraine, Ohio

Well	Date	VOCs (ug/L)											
		1,1,1-TCA	1,1-DCA	1,1-DCE	Benzene	cis-1,2-DCE	Ethyl-benzene	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes
MCL		200		7	5	70	700	5	1000	100	5	2	10,000
GM-9	9/24/1999	1.0	< 1.0 U	< 1.0 U	< 1.0 U	1.0	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**14**	< 1.0 U	< 1.0 U
	10/3/2000	1.2	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**17**	< 1.0 U	< 1.0 U
	11/14/2001	0.48J	0.58J	< 1.0 U	< 1.0 U	1.1	< 1.0 U	0.38 J	< 1.0 U	< 0.50 U	**8.6**	< 1.0 U	< 1.0 U
	9/30/2002	0.99J	0.48J	< 1.0 U	< 1.0 U	0.66	< 1.0 U	< 1.0 U	< 1.0 U	< 0.50 U	**16**	< 1.0 U	< 1.0 U
	9/24/2003	1.3	0.45 J	< 1.0 U	< 1.0 U	0.56	< 1.0 U	< 1.0 U	< 1.0 U	< 0.50 U	**20**	< 1.0 U	< 1.0 U
	9/21/2004	1.1	0.6 J	< 1.0 U	< 1.0 U	0.97	< 1.0 U	< 1.0 U	< 1.0 U	< 0.50 U	**16**	< 1.0 U	< 1.0 U
	10/26/2005	0.85 J	0.59 J	< 1.0 U	< 1.0 U	0.99 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**15**	< 1.0 U	< 2.0 U
	9/25/2006	0.44 J	0.48 J	< 1.0 U	< 1.0 U	0.85 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**6.6**	< 1.0 U	< 2.0 U
	9/19/2007	1.2	0.48 J	< 1.0 U	< 1.0 U	0.71 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**18**	< 1.0 U	< 2.0 U
	9/24/2008	1.2	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**18**	< 1.0 U	< 2.0 U
	9/22/2010	1.0	0.35 J	< 1.0 U	< 1.0 U	0.46 J	< 1.0 U	< 1.0 UJ	< 1.0 U	< 1.0 U	**17 J**	< 1.0 U	< 2.0 U
	9/28/2011	< 1.0 U	0.50 J	< 1.0 U	< 1.0 U	1.0	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**13**	< 1.0 U	< 2.0 U
	9/5/2012	24	<22 U	<22 U	<22 U	7.9 J	<22 U	<22 U	<22 U	<22 U	**340**	<22 U	<44 U
	9/26/2012	1.1	0.24 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**16**	< 1.0 U	< 2.0 U
	9/25/2013	1.4	< 1.0 U	< 1.0 U	< 1.0 U	0.44 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**19**	< 1.0 U	< 2.0 U
	10/6/2014	1.2	0.39 J	< 1.0 U	< 1.0 U	0.54 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**17**	< 1.0 U	< 2.0 U
	12/11/2015	0.92 J	< 1.0 U	< 1.0 U	< 1.0 U	0.26 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**12**	< 1.0 U	< 2.0 U
	8/17/2016	1.0	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**13**	< 1.0 U	< 2.0 U
	08/15/2017	0.84 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**12**	< 1.0 U	< 2.0 U
GM-11	9/24/1999	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.5	< 1.0 U	< 1.0 U	**15**	< 1.0 U	< 1.0 U
	10/2/2000	1.4	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	3.0	< 1.0 U	< 1.0 U	**41**	< 1.0 U	< 1.0 U
	11/14/2001	0.33J	< 1.0 U	< 1.0 U	< 1.0 U	< 0.50 U	< 1.0 U	1.0	< 1.0 U	< 0.50 U	**12**	< 1.0 U	< 1.0 U
	10/1/2002	1.0	0.34J	< 1.0 U	< 1.0 U	0.62	< 1.0 U	2.2	< 1.0 U	< 0.50 U	**35**	< 1.0 U	< 1.0 U
	9/24/2003	0.96 J	< 1.0 U	< 1.0 U	< 1.0 U	< 0.50 U	< 1.0 U	2.2	< 1.0 U	< 0.50 U	**33**	< 1.0 U	< 1.0 U
	9/21/2004	0.89 J	< 1.0 U	< 1.0 U	< 1.0 U	< 0.50 U	< 1.0 U	2.1	< 1.0 U	< 0.50 U	**33**	< 1.0 U	< 1.0 U
	10/26/2005	0.75 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.7	< 1.0 U	< 1.0 U	**32**	< 1.0 U	< 2.0 U
	9/25/2006	0.75 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	2.0	< 1.0 U	< 1.0 U	**34**	< 1.0 U	< 2.0 U
	9/18/2007	0.6 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.5	< 1.0 U	< 1.0 U	**35**	< 1.0 U	< 2.0 U
	9/24/2008	0.47 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.7	< 1.0 U	< 1.0 U	**31**	< 1.0 U	< 2.0 U
	11/12/2009	0.47 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.8	< 1.0 U	< 1.0 U	**37**	< 1.0 U	< 2.0 U
	9/22/2010	0.36 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.5	< 1.0 U	< 1.0 U	**31**	< 1.0 U	< 2.0 U
	9/28/2011	< 1.4 U	< 1.4 U	< 1.4 U	< 1.4 U	< 1.4 U	< 1.4 U	1.1 J	< 1.4 U	< 1.4 U	**24**	< 1.4 U	< 2.9 U
	9/5/2012	0.32 J	< 1.0 U	< 1.0 U	< 1.0 U	0.39 J	< 1.0 U	1.2	< 1.0 U	< 1.0 U	**25**	< 1.0 U	< 2.0 U
	9/25/2013	0.32 J	< 1.0 U	< 1.0 U	< 1.0 U	0.40 J	< 1.0 U	1.3	< 1.0 U	< 1.0 U	**23**	< 1.0 U	< 2.0 U
	10/7/2014	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.1	< 1.0 U	< 1.0 U	**17**	< 1.0 U	< 2.0 U
	11/3/2015	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.89 J	< 1.0 U	< 1.0 U	**13**	< 1.0 U	< 2.0 U
	8/18/2016	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.2	< 1.0 U	< 1.0 U	**12**	< 1.0 U	< 2.0 U

Table E-2
Groundwater VOC Analytical Results for the Lower Aquifer Wells from 1999-2017
RACER Trust Moraine Facilities
Moraine, Ohio

Well	Date	VOCs (ug/L)											
		1,1,1-TCA	1,1-DCA	1,1-DCE	Benzene	cis-1,2-DCE	Ethyl-benzene	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes
MCL		200		7	5	70	700	5	1000	100	5	2	10,000
GM-13	9/24/1999	1.9	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	3.6	< 1.0 U	< 1.0 U	**31**	< 1.0 U	< 1.0 U
GM-14	9/24/1999	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
GM-15	9/24/1999	< 1.0 U	2.4	< 1.0 U	< 1.0 U	4.3	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	4.1	< 1.0 U	< 1.0 U
	10/2/2000	< 1.0 U	2.3	< 1.0 U	< 1.0 U	2.6	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	4.7	< 1.0 U	< 1.0 U
	11/14/2001	< 1.0 U	1.4	< 1.0 U	< 1.0 U	1.2	< 1.0 U	< 1.0 U	< 1.0 U	< 0.50 U	4.9	< 1.0 U	< 1.0 U
	9/27/2002	< 1.0 U	1.6	< 1.0 U	< 1.0 U	1.8	< 1.0 U	< 1.0 U	< 1.0 U	< 0.50 U	4.7	< 1.0 U	< 1.0 U
	9/22/2003	< 1.0 U	1.7	< 1.0 U	< 1.0 U	1.6	< 1.0 U	< 1.0 U	< 1.0 U	< 0.50 U	**5.9**	< 1.0 U	< 1.0 U
	9/20/2004	< 1.0 U	1.8	< 1.0 U	< 1.0 U	1.4	< 1.0 U	< 1.0 U	< 1.0 U	< 0.50 U	**5.8**	< 1.0 U	< 1.0 U
	10/26/2005	< 1.0 U	1.7	< 1.0 U	< 1.0 U	1.7	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**5.9**	< 1.0 U	< 2.0 U
	9/18/2006	< 1.0 U	1.6	< 1.0 U	< 1.0 U	1.2	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**6.3**	< 1.0 U	< 2.0 U
	9/25/2007	< 1.0 U	1.5	< 1.0 U	< 1.0 U	1.1	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**5.1**	< 1.0 U	< 2.0 U
	9/30/2008	< 1.0 U	1.1	< 1.0 U	< 1.0 U	0.79 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**6.2**	< 1.0 U	< 2.0 U
	11/13/2009	< 1.0 U	1.2	< 1.0 U	< 1.0 U	1.0	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**6.5**	< 1.0 U	< 2.0 U
	9/23/2010	< 1.0 U	1.2	< 1.0 U	< 1.0 U	1.0	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**6.5**	< 1.0 U	< 2.0 U
	9/29/2011	< 1.0 U	1.1	< 1.0 U	< 1.0 U	1.1	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	4.7	< 1.0 U	< 2.0 U
	9/5/2012	0.23 J	1.3	< 1.0 U	< 1.0 U	2.2	< 1.0 U	< 1.0 U	0.33 J	0.31 J	**6.1**	< 1.0 U	< 2.0 U
	9/25/2013	< 1.0 U	1.3	< 1.0 U	< 1.0 U	1.8	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	4.5	0.19 J	< 2.0 U
	10/7/2014	< 1.0 U	1.5	< 1.0 U	< 1.0 U	2.4	< 1.0 U	< 1.0 U	< 1.0 U	0.42 J	4.1	0.38 J	< 2.0 U
	11/4/2015	< 1.0 U	1.8	< 1.0 U	< 1.0 U	7.7	< 1.0 U	< 1.0 U	< 1.0 U	0.77 J	**6.6**	0.47 J	< 2.0 U
	8/18/2016	< 1.0 U	2.0	< 1.0 U	< 1.0 U	8.3	< 1.0 U	< 1.0 U	< 1.0 U	0.75 J	**6.3**	0.69 J	< 2.0 U
	7/31/2017	< 1.0 U	2.1	< 1.0 U	< 1.0 U	7.7	< 1.0 U	< 1.0 U	< 1.0 U	0.77 J	**5.7**	0.58 J	< 2.0 U
GM-20D	9/24/1999	< 1.0 U	2.0	< 1.0 U	< 1.0 U	8.3	< 1.0 U	< 1.0 U	< 1.0 U	0.75 J	**6.3**	0.69 J	< 2.0 U
	10/3/2000	< 1.0 U	2.0	< 1.0 U	< 1.0 U	8.3	< 1.0 U	< 1.0 U	< 1.0 U	0.75 J	**6.3**	0.69 J	< 2.0 U
	11/14/2001	< 1.0 U	2.0	< 1.0 U	< 1.0 U	8.3	< 1.0 U	< 1.0 U	< 1.0 U	0.75 J	**6.3**	0.69 J	< 2.0 U
	9/30/2002	< 1.0 U	2.0	< 1.0 U	< 1.0 U	8.3	< 1.0 U	< 1.0 U	< 1.0 U	0.75 J	**6.3**	0.69 J	< 2.0 U
	9/22/2003	< 1.0 U	2.0	< 1.0 U	< 1.0 U	8.3	< 1.0 U	< 1.0 U	< 1.0 U	0.75 J	**6.3**	0.69 J	< 2.0 U
	9/21/2004	< 1.0 U	2.0	< 1.0 U	< 1.0 U	8.3	< 1.0 U	< 1.0 U	< 1.0 U	0.75 J	**6.3**	0.69 J	< 2.0 U
	10/26/2005	< 1.0 U	2.0	< 1.0 U	< 1.0 U	8.3	< 1.0 U	< 1.0 U	< 1.0 U	0.75 J	**6.3**	0.69 J	< 2.0 U
	9/26/2006	< 1.0 U	2.0	< 1.0 U	< 1.0 U	8.3	< 1.0 U	< 1.0 U	< 1.0 U	0.75 J	**6.3**	0.69 J	< 2.0 U
	9/19/2007	< 1.0 U	2.0	< 1.0 U	< 1.0 U	8.3	< 1.0 U	< 1.0 U	< 1.0 U	0.75 J	**6.3**	0.69 J	< 2.0 U
	9/25/2008	< 1.0 U	2.0	< 1.0 U	< 1.0 U	8.3	< 1.0 U	< 1.0 U	< 1.0 U	0.75 J	**6.3**	0.69 J	< 2.0 U
	11/13/2009	< 1.0 U	2.0	< 1.0 U	< 1.0 U	8.3	< 1.0 U	< 1.0 U	< 1.0 U	0.75 J	**6.3**	0.69 J	< 2.0 U
	9/22/2010	0.32 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	2.2	< 1.0 U	< 1.0 U	**6.5**	< 1.0 U	< 2.0 U
	9/28/2011	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	2.2	< 1.0 U	< 1.0 U	5.0	< 1.0 U	< 2.0 U
	9/5/2012	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	3.7	< 1.0 U	< 2.0 U
	9/25/2013	0.32 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.3	< 1.0 U	< 1.0 U	**5.3**	< 1.0 U	< 2.0 U
	10/6/2014	0.32 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.7	< 1.0 U	< 1.0 U	3.1	< 1.0 U	< 2.0 U
	11/3/2015	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	2.5	< 1.0 U	< 1.0 U	1.6	< 1.0 U	< 2.0 U
	8/19/2016	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.3	< 1.0 U	< 1.0 U	1.5	< 1.0 U	< 2.0 U
	08/15/2017	0.23 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.9	< 1.0 U	< 1.0 U	1.1	< 1.0 U	< 2.0 U

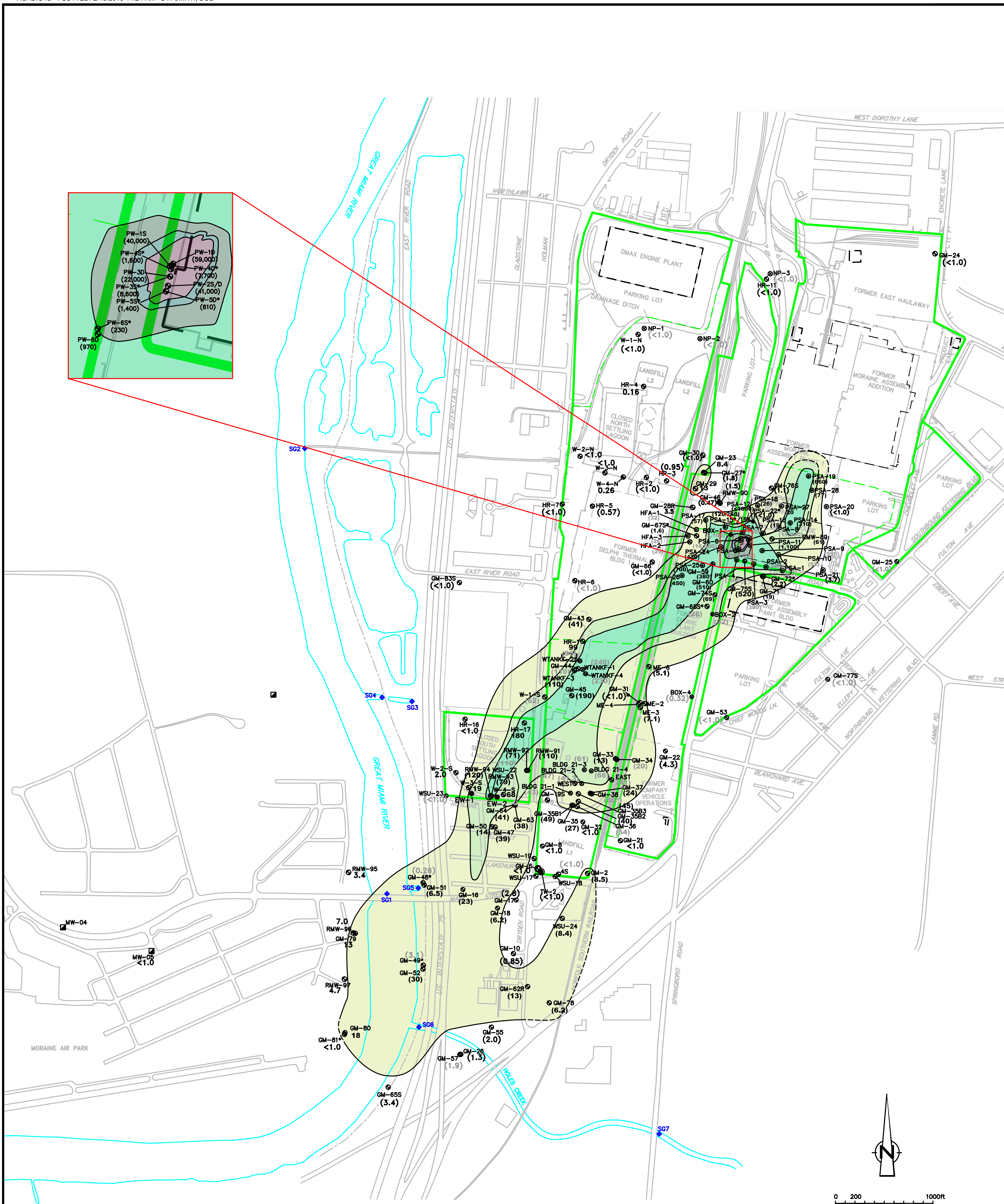
Table E-2
Groundwater VOC Analytical Results for the Lower Aquifer Wells from 1999-2017
RACER Trust Moraine Facilities
Moraine, Ohio

Well	Date	VOCs (ug/L)											
		1,1,1-TCA	1,1-DCA	1,1-DCE	Benzene	cis-1,2-DCE	Ethyl-benzene	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes
MCL		200		7	5	70	700	5	1000	100	5	2	10,000
GM-56	9/14/2006	0.35 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.57 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U
	9/5/2012	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	2.4	0.47 J	< 1.0 U	< 1.0 U	< 1.0 U	0.28 J
GM-65D	5/2/2007	0.40 J	1.4	< 1.0 U	< 1.0 U	1.5	< 1.0 U	< 1.0 U	< 1.0 U	0.21 J	1.3	< 1.0 U	< 2.0 U
	1/21/2008	0.32 J	0.94 J	< 1.0 U	< 1.0 U	1.0	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.1	< 1.0 U	< 2.0 U
	1/27/2010	0.88 J	1.2	< 1.0 U	< 1.0 U	1.1	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.5	< 1.0 U	< 2.0 U
GM-77D	9/27/2007	< 1.4 U	< 1.4 U	< 1.4 U	< 1.4 U	< 1.4 U	< 1.4 U	**45**	< 1.4 U	< 1.4 U	< 1.4 U	< 1.4 U	< 2.9 U
	1/28/2010	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**18**	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U
	9/7/2012	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**11**	0.17 J	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U
	9/26/2013	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**12**	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U
	10/8/2014	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**14**	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U
	11/3/2015	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**18**	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U
	8/17/2016	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**17**	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U
MT-69 (1)	9/24/1999	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
	10/3/2000	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
	11/15/2001	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 0.50 U	< 1.0 U	< 1.0 U	< 1.0 U	< 0.50 U	< 1.0 U	< 1.0 U	< 1.0 U
	9/30/2002	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 0.50 U	< 1.0 U	< 1.0 U	< 1.0 U	< 0.50 U	< 1.0 U	< 1.0 U	< 1.0 U
	10/1/2003	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 0.50 U	< 1.0 U	< 1.0 U	< 1.0 U	< 0.50 U	< 1.0 U	< 1.0 U	< 1.0 U
	9/27/2004	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 0.50 U	< 1.0 U	< 1.0 U	< 1.0 U	< 0.50 U	< 1.0 U	< 1.0 U	< 1.0 U
	10/24/2005	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U
	9/26/2006	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U
	9/27/2007	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U

NOTES:
< - Constituent not detected above laboratory reporting limit shown.
(1) - Well unusable - collapsed screen.
1,1,1-TCA - 1,1,1-Trichloroethane.
1,1-DCA - 1,1-Dichloroethane.
1,1-DCE - 1,1-Dichloroethene.
BOLD - Result above MCL.
cis-1,2-DCE - cis-1,1-Dichloroethene.
F1 - MS and/or MSD Recovery is outside acceptance limits.
J - Value is estimated.
K - The compound was positively identified; however, the associated numerical value is an estimated concentration only and the reported value may be biased high. Actual concentration is expect lower.
MCL - Maximum Contaminant Level.
PCE - Tetrachloroethene.
trans-1,2-DCE - trans-1,2-Dichloroethene.
TCE - Trichloroethene.
U - Constituent not detected above laboratory limit shown.
ug/L - Micrograms per Liter.
VOCs - Volatile Organic Compounds.

APPENDIX F

Isoconcentration Maps



LEGEND

(symbol)	MONITORING WELL (UPPER AQUIFER)
(symbol)	INACTIVE EXTRACTION WELL (EW–1, EW–2, AND TW–2)
(symbol)	STREAM GAUGE
⊗/◉	BORING LOCATION
(symbol)	CITY OF MORAINE MONITORING WELL
(line)	RIVER LEVEE
(line)	FORMER BUILDING FOOTPRINT
(line)	SURFACE WATER FEATURE
(line)	PROPERTY BOUNDARY
(line)	PARCEL BOUNDARY
ug/L	MICROGRAMS PER LITER
<1.0	CONSTITUENT NOT DETECTED ABOVE LABORATORY LIMIT SHOWN
MCL	MAXIMUM CONTAMINANT LEVEL
<1.0	2018 CONCENTRATIONS
(<1.0)	2017–2013 CONCENTRATIONS
(<1.0)	PRE–2013 CONCENTRATIONS
BOLD	CONCENTRATION EXCEEDS MCL
*	DATA NOT USED FOR CONTOURING PURPOSES

- >10000 ug/L
- 5000–10000 ug/L
- 1000–5000 ug/L
- 100–1000 ug/L
- 50–100 ug/L
- 5–50 ug/L

SITE–SPECIFIC VOLATILE ORGANIC COMPOUNDS	MCL (ug/L)
1,1,1–Trichloroethane	**200**
1,1–Dichloroethane	--
1,1–Dichloroethene	**7**
Benzene	**5**
cis–1,2–Dichloroethene	**70**
Ethylbenzene	**700**
Tetrachloroethene	**5**
Toluene	**1000**
trans–1,2–Dichloroethene	**100**
Trichloroethene	**5**
Vinyl chloride	**2**
Xylene (total)	**10,000**

NOTE:

1. CONCENTRATIONS POSTED REFLECT 2018 MONITORING WELL RESULTS, 2017 THROUGH 2013 MONITORING WELL RESULTS, PRE–2013 MONITORING WELL RESULTS, AND MAXIMUM CONCENTRATION FROM VERTICAL AQUIFER PROFILING FROM 2011 THROUGH 2015. THE INTERPRETATION OF THE ISOCONCENTRATION INCLUDES THE CONCEPTUAL SITE MODEL UNDERSTANDING (I.E. GROUNDWATER FLOW AND INTERIM MEASURES OPERATION).
2. WHEN SAMPLE RESULT IS NON–DETECT, HALF THE REPORTING LIMIT IS HONORED WITH THE CONTOURING.
3. RELATIVE UNDERSTANDING OF PRE–2013 CONCENTRATIONS (GRAY) WAS USED TO DEVELOP THE OVERALL PLUME GEOMETRY IN THE VICINITY OF THESE WELLS.

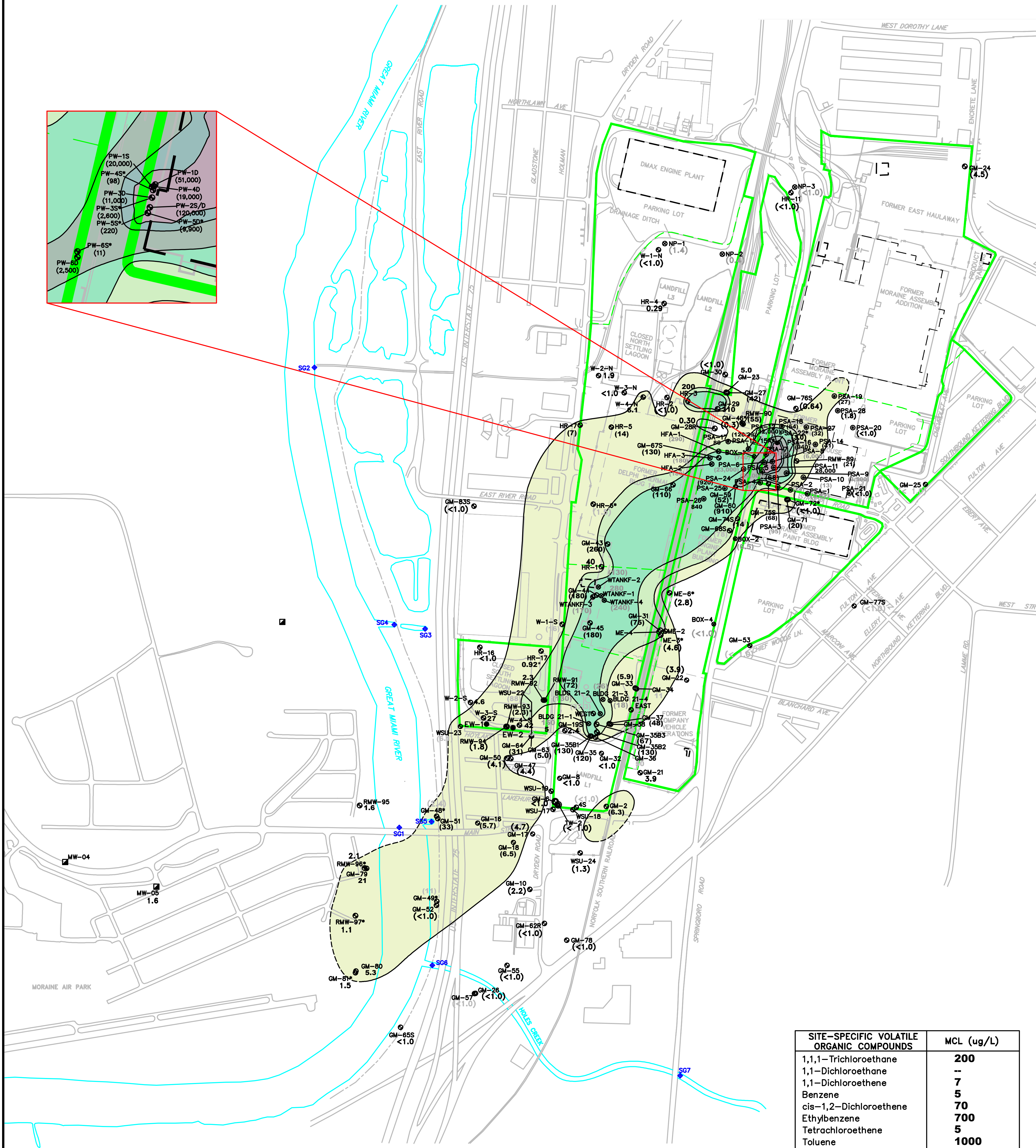
RACER TRUST
MORAINE, OHIO

OH000294.2019

ISOCONCENTRATION MAP (UPPER AQUIFER) TETRACHLOROETHENE - 2018

ARCADIS Design & Consultancy for natural and built assets

FIGURE
F-1



LEGEND

⊗	MONITORING WELL (UPPER AQUIFER)
●	INACTIVE EXTRACTION WELL (EW-1, EW-2, AND TW-2)
◈	STREAM GAUGE
⊗ / ◉	BORING LOCATION
◪	CITY OF MORAINE MONITORING WELL
— - —	RIVER LEVEE
— — —	FORMER BUILDING FOOTPRINT
———	SURFACE WATER FEATURE
———	PROPERTY BOUNDARY
— — —	PARCEL BOUNDARY
ug/L	MICROGRAMS PER LITER
<1.0	CONSTITUENT NOT DETECTED ABOVE LABORATORY LIMIT SHOWN
MCL	MAXIMUM CONTAMINANT LEVEL
<1.0	2018 CONCENTRATIONS
(<1.0)	2017–2013 CONCENTRATIONS
(<1.0)	PRE–2013 CONCENTRATIONS
BOLD	CONCENTRATION EXCEEDS MCL
*	DATA NOT USED FOR CONTOURING PURPOSES

>10000 ug/L
5000–10000 ug/L
1000–5000 ug/L
100–1000 ug/L
50–100 ug/L
5–50 ug/L

SITE-SPECIFIC VOLATILE ORGANIC COMPOUNDS	MCL (ug/L)
1,1,1–Trichloroethane	200
1,1–Dichloroethane	--
1,1–Dichloroethene	7
Benzene	5
cis–1,2–Dichloroethene	70
Ethylbenzene	700
Tetrachloroethene	5
Toluene	1000
trans–1,2–Dichloroethene	100
Trichloroethene	5
Vinyl chloride	2
Xylene (total)	10,000

0 200 1000ft

NOTE:

1. CONCENTRATIONS POSTED REFLECT 2018 MONITORING WELL RESULTS, 2017 THROUGH 2013 MONITORING WELL RESULTS, PRE–2013 MONITORING WELL RESULTS, AND MAXIMUM CONCENTRATION FROM VERTICAL AQUIFER PROFILING FROM 2011 THROUGH 2015. THE INTERPRETATION OF THE ISOCONCENTRATION INCLUDES THE CONCEPTUAL SITE MODEL UNDERSTANDING (I.E. GROUNDWATER FLOW AND INTERIM MEASURES OPERATION).
2. WHEN SAMPLE RESULT IS NON–DETECT, HALF THE REPORTING LIMIT IS HONORED WITH THE CONTOURING.
3. RELATIVE UNDERSTANDING OF PRE–2013 CONCENTRATIONS (GRAY) WAS USED TO DEVELOP THE OVERALL PLUME GEOMETRY IN THE VICINITY OF THESE WELLS.

RACER TRUST
MORAINE, OHIO

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ISOCONCENTRATION MAP (UPPER AQUIFER) TRICHLOROETHENE - 2018

ARCADIS Design & Consultancy for natural and built assets

FIGURE
F-2

LEGEND

	MONITORING WELL (UPPER AQUIFER)
	INACTIVE RECOVERY WELL (TW-2)
	STREAM GAUGE
	BORING LOCATION
	CITY OF MORAINE MONITORING WELL
	RIVER LEVEE
	FORMER BUILDING FOOTPRINT
	SURFACE WATER FEATURE
	PROPERTY BOUNDARY
	PARCEL BOUNDARY
ug/L	MICROGRAMS PER LITER
<1.0	CONSTITUENT NOT DETECTED ABOVE LABORATORY LIMIT SHOWN
MCL	MAXIMUM CONTAMINANT LEVEL
<1.0	2018 CONCENTRATIONS
(<1.0)	2017–2013 CONCENTRATIONS
(<1.0)	PRE–2013 CONCENTRATIONS

*	DATA NOT USED FOR CONTOURING PURPOSES
	>10000 ug/L
	5000–10000 ug/L
	1000–5000 ug/L
	100–1000 ug/L
	50–100 ug/L
	5–50 ug/L

N

0 200 1000ft

NOTE:
1. CONCENTRATIONS POSTED REFLECT 2018 MONITORING WELL RESULTS, 2017 THROUGH 2013 MONITORING WELL RESULTS, PRE–2013 MONITORING WELL RESULTS, AND MAXIMUM CONCENTRATION FROM VERTICAL AQUIFER PROFILING FROM 2011 THROUGH 2015. THE INTERPRETATION OF THE ISOCONCENTRATION INCLUDES THE CONCEPTUAL SITE MODEL UNDERSTANDING (I.E. GROUNDWATER FLOW AND INTERIM MEASURES OPERATION).
2. WHEN SAMPLE RESULT IS NON–DETECT, HALF THE REPORTING LIMIT IS HONORED WITH THE CONTOURING.
3. RELATIVE UNDERSTANDING OF PRE–2013 CONCENTRATIONS (GRAY) WAS USED TO DEVELOP THE OVERALL PLUME GEOMETRY IN THE VICINITY OF THESE WELLS.

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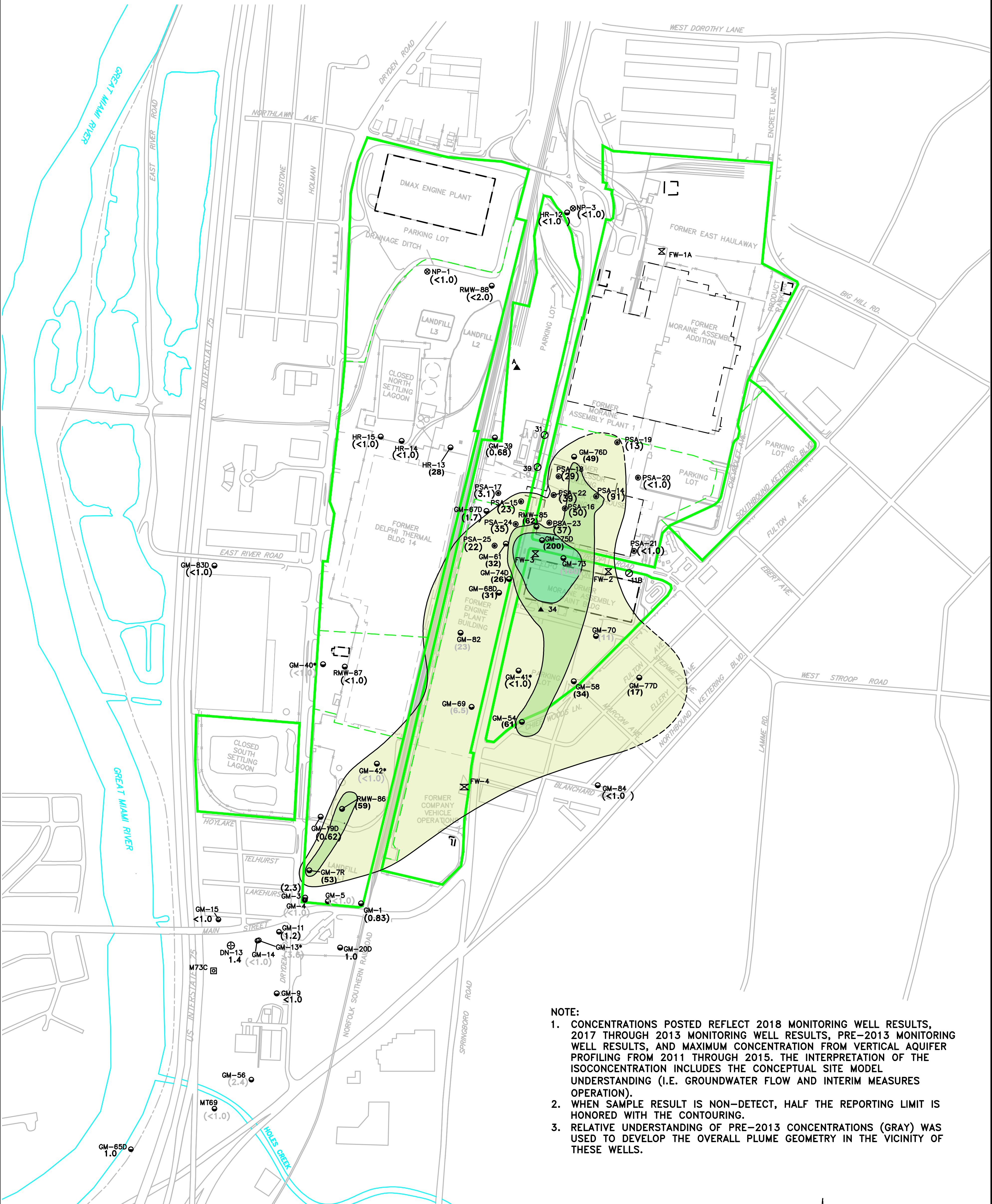
ISOCONCENTRATION MAP (UPPER AQUIFER) TOTAL CHLORINATED VOCs - 2018

ARCADIS Design & Consultancy for natural and built assets

FIGURE
F-3



NOTE:

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3. RELATIVE UNDERSTANDING OF PRE-2013 CONCENTRATIONS (GRAY) WAS USED TO DEVELOP THE OVERALL PLUME GEOMETRY IN THE VICINITY OF THESE WELLS.

LEGEND

- MONITORING WELL (LOWER AQUIFER)
- PIEZOMETER
- FIRE WELL
- PRODUCTION WELL CONVERTED TO MONITORING WELL (A, 34)
- INACTIVE PRODUCTION WELL
- MONTGOMERY COUNTY WELL (USED BY RACER TRUST AS A LOWER AQUIFER RECOVERY WELL)
- BORING LOCATION
- PRIVATE WELL
- RIVER LEVEE
- FORMER BUILDING FOOTPRINT
- SURFACE WATER FEATURE
- PROPERTY BOUNDARY
- PARCEL BOUNDARY
- <1.0 CONSTITUENT NOT DETECTED ABOVE LABORATORY LIMIT SHOWN
- ug/L MICROGRAMS PER LITER
- >100 ug/L
- 50–100 ug/L
- 5–50 ug/L

MCL	MAXIMUM CONTAMINANT LEVEL
<1.0	2018 CONCENTRATIONS
(<1.0)	2017–2013 CONCENTRATIONS
(<1.0)	PRE–2013 CONCENTRATIONS
BOLD	CONCENTRATION EXCEEDS MCL
*	DATA NOT USED FOR CONTOURING PURPOSES

SITE-SPECIFIC VOLATILE ORGANIC COMPOUNDS	MCL (ug/L)
1,1,1–Trichloroethane	200
1,1–Dichloroethane	--
1,1–Dichloroethene	7
Benzene	5
cis–1,2–Dichloroethene	70
Ethylbenzene	700
Tetrachloroethene	5
Toluene	1000
trans–1,2–Dichloroethene	100
Trichloroethene	5
Vinyl chloride	2
Xylene (total)	10,000

RACER TRUST
MORAINE, OHIO

OH000294.2019

ISOCONCENTRATION MAP (LOWER AQUIFER) TETRACHLOROETHENE - 2018

ARCADIS Design & Consultancy for natural and built assets

FIGURE
F-4

CITY:DUBLIN DIV/GROUP:SER2 DB:R. SMITH LD:(Opt) PIC:(Opt) PM:N. GILLOTTI TM:T. FORTNER LYR:(Opt)ON=*;OFF=*REF*
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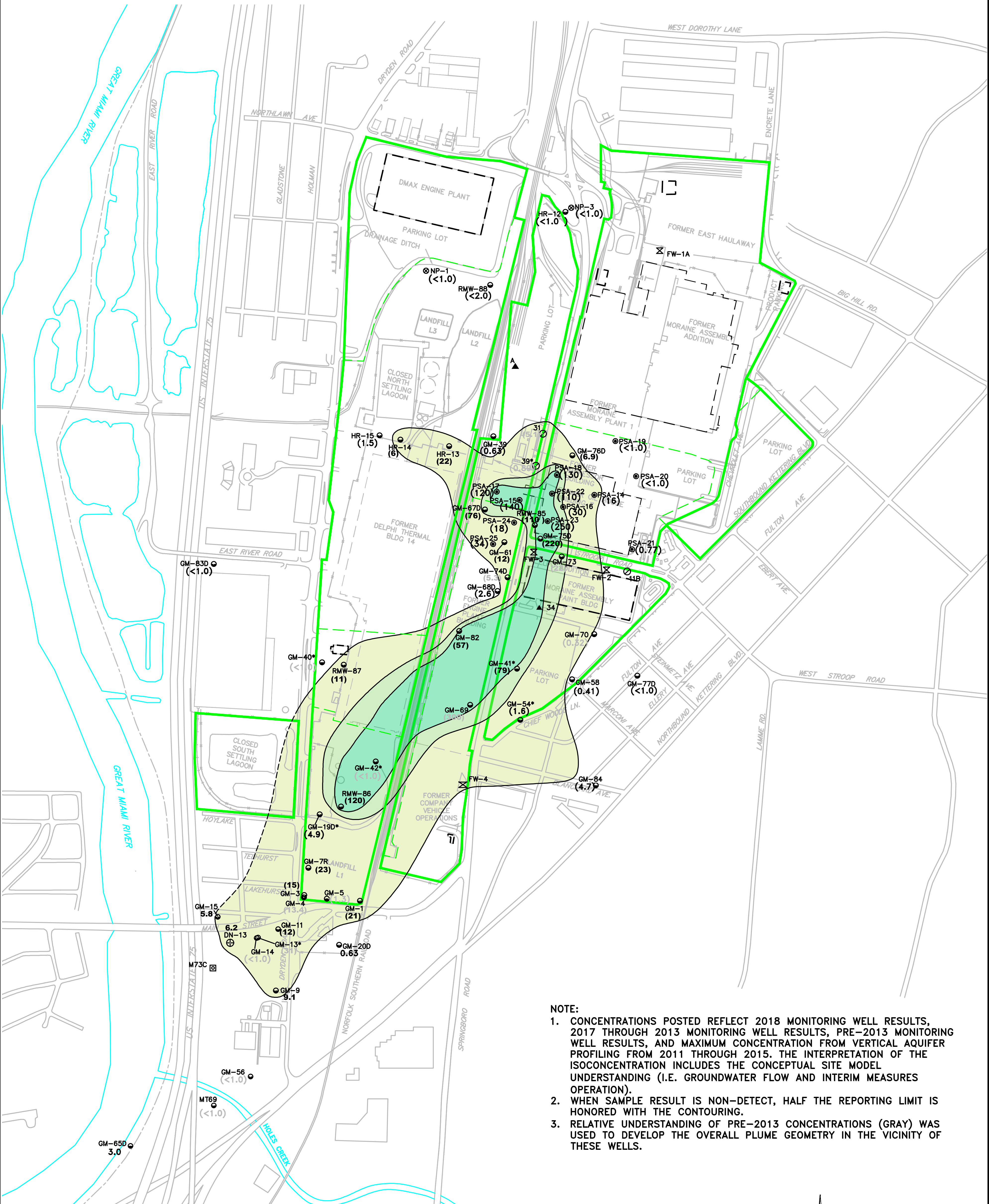

NOTE:
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LEGEND

- MONITORING WELL (LOWER AQUIFER)
- PIEZOMETER
- FIRE WELL
- PRODUCTION WELL CONVERTED TO MONITORING WELL (A, 34)
- INACTIVE PRODUCTION WELL
- MONTGOMERY COUNTY WELL (USED BY RACER TRUST AS A LOWER AQUIFER RECOVERY WELL)
- BORING LOCATION
- PRIVATE WELL
- RIVER LEVEE
- FORMER BUILDING FOOTPRINT
- SURFACE WATER FEATURE
- PROPERTY BOUNDARY
- PARCEL BOUNDARY
- <1.0 CONSTITUENT NOT DETECTED ABOVE LABORATORY LIMIT SHOWN
- ug/L MICROGRAMS PER LITER
- >100 ug/L
- 50–100 ug/L
- 5–50 ug/L

MCL MAXIMUM CONTAMINANT LEVEL
<1.0 2018 CONCENTRATIONS
(<1.0) 2017–2013 CONCENTRATIONS
(<1.0) PRE–2013 CONCENTRATIONS
BOLD CONCENTRATION EXCEEDS MCL
* DATA NOT USED FOR CONTOURING PURPOSES

SITE–SPECIFIC VOLATILE ORGANIC COMPOUNDS	MCL (ug/L)
1,1,1–Trichloroethane	200
1,1–Dichloroethane	--
1,1–Dichloroethene	7
Benzene	5
cis–1,2–Dichloroethene	70
Ethylbenzene	700
Tetrachloroethene	5
Toluene	1000
trans–1,2–Dichloroethene	100
Trichloroethene	5
Vinyl chloride	2
Xylene (total)	10,000

0 100 850ft

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MORAINE, OHIO

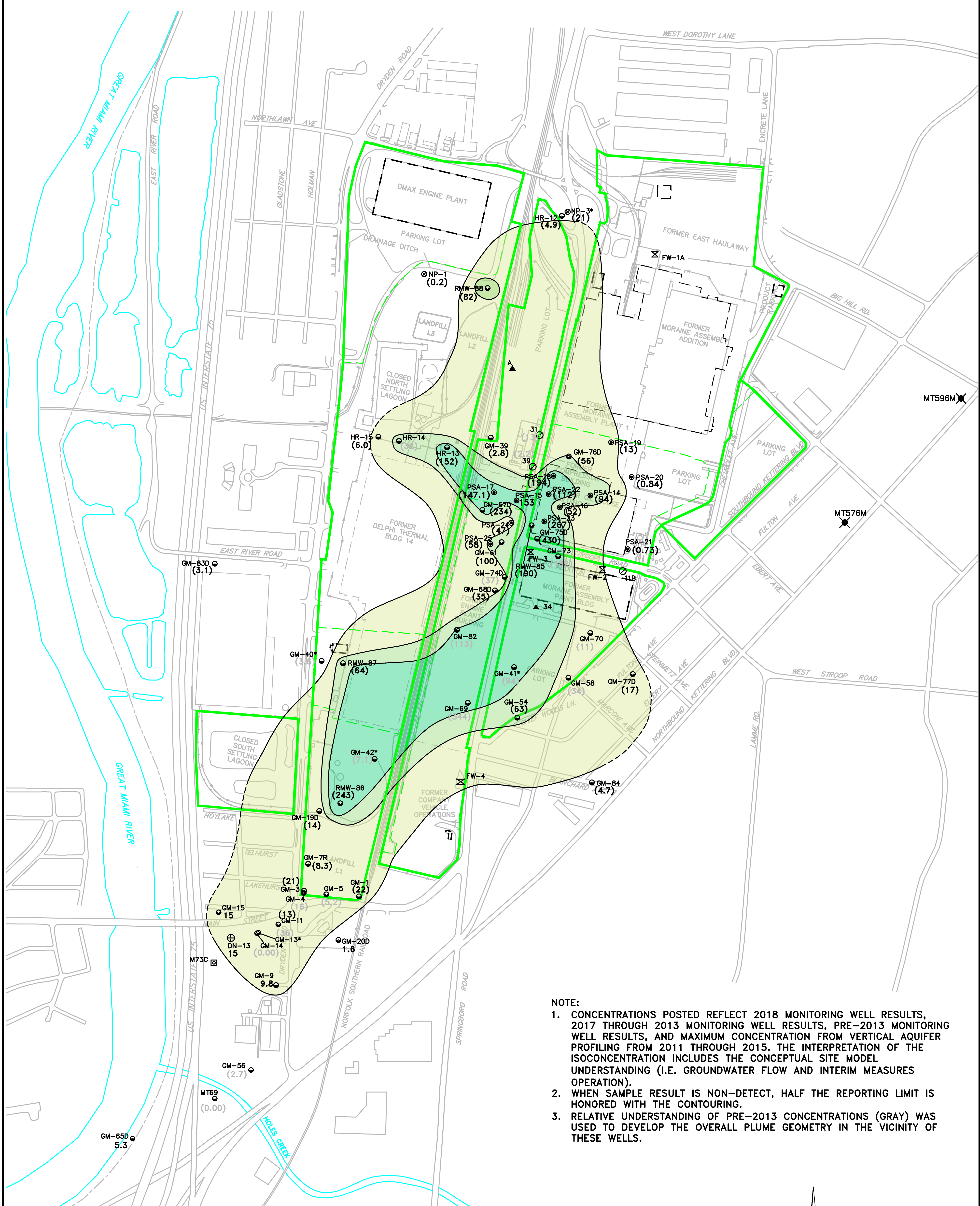
OH000294.2019

ISOCONCENTRATION MAP (LOWER AQUIFER) TRICHLOROETHENE - 2018

ARCADIS Design & Consultancy for natural and built assets

FIGURE
F-5

CITY:DUBLIN DIV/GROUP:SER2 DB:R. SMITH LD:(Opt) PIC:(Opt) PM:N. GILLOTTI TM:T. FORTNER LYR:(Opt)ON=*;OFF=*REF*
C:\BIM\OneDrive - ARCADIS\BIM 360 Docs\RACER TRUST\RACER\MORAINE OH 2017 ACTIVITI\2019\OH000294.2018\01-DWG\0004B\ANN294-04B-2019-PLUMES-LOWER.dwg LAYOUT: TOTAL VOCS 2018 SAVED: 2/13/2019 2:40 PM ACADVER: 23.0S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: ACAD.CTB PLOTTED: 2/15/2019 11:48 AM BY: SMITH, BOB



NOTE:
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LEGEND

- MONITORING WELL (LOWER AQUIFER)
- PIEZOMETER
- FIRE WELL
- PRODUCTION WELL CONVERTED TO MONITORING WELL (A, 34)
- INACTIVE PRODUCTION WELL
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- BORING LOCATION
- PRIVATE WELL
- RIVER LEVEE
- FORMER BUILDING FOOTPRINT
- SURFACE WATER FEATURE
- PROPERTY BOUNDARY
- PARCEL BOUNDARY
- >100 ug/L
- 50–100 ug/L
- 5–50 ug/L

ug/L	MICROGRAMS PER LITER
VOCs	VOLATILE ORGANIC COMPOUNDS
<1.0	2018 CONCENTRATIONS
(<1.0)	2017–2013 CONCENTRATIONS
(<1.0)	PRE-2013 CONCENTRATIONS
*	DATA NOT USED FOR CONTOURING PURPOSES

N

0 100 850ft

RACER TRUST
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OH000294.2019

ISOCONCENTRATION MAP (LOWER AQUIFER) TOTAL CHLORINATED VOCs - 2018

ARCADIS Design & Consultancy for natural and built assets

FIGURE
F-6

APPENDIX G

2018 Supplemental Annual Report

MEMO

To:

Brian Gitzinger, Ohio EPA

Copies:

Pam Barnett, RACER Trust

Mirtha Capiro, U.S. EPA

Arcadis U.S., Inc.
100 E. Campus View Blvd
Suite 230
Columbus, Ohio 43235
Tel 614 985 9100
Fax 614 985 9170

From:

Arcadis, Inc.

Date:

February 28, 2019

Arcadis Project No.:

OH000294.2019

Subject:

2018 Supplementary Annual Report

On August 10, 2018, the Ohio Environmental Protection Agency (Ohio EPA) provided comments regarding the 2017 Groundwater Monitoring Report (Ohio EPA 2018). In this letter, a request was made regarding the structure and content of the Supplementary Annual Reports. This appendix is the outcome of that request and includes a detailed description of the methods and results for monitoring and evaluating data associated with the former north and south settling lagoons.

GROUNDWATER SAMPLING PROGRAM

The Site-Wide Groundwater Monitoring Plan (Arcadis G&M, Inc. 2002) was developed to meet the objectives of the Ohio EPA post-closure monitoring for the closed North and South Settling Lagoons. For 2018, the site-specific Volatile Organic Compound (VOC) groundwater data is summarized in Table 3 of the Main Report. The following sections summarize collection of the annual groundwater elevation measurements, groundwater monitoring, and statistical evaluation.

Groundwater samples were analyzed for the site-specific VOC parameter list using SW846 Method 8260B. This parameter list was developed after evaluating data from the September 1999 baseline groundwater sampling event and the one-time sampling event conducted in September/October 2000 (which included analysis of Appendix IX VOCs, cis-1,2-DCE, SVOCs, and metals) as part of the Former Oil House Area interim measures. The site-specific VOCs include: benzene, 1,1-dichloroethane (1,1-DCA), 1,1-dichloroethene (1,1-DCE), cis-1,2-DCE, trans-1,2-dichloroethene (trans-1,2-DCE), ethylbenzene, PCE, toluene, 1,1,1-trichloroethane (1,1,1-TCA), TCE, vinyl chloride, and xylenes.

The groundwater samples were submitted to TestAmerica Laboratories, Inc. in North Canton, Ohio.

Groundwater Elevation Monitoring

Groundwater levels for the upper aquifer well network associated with the close lagoons were measured on July 26, 2018. Groundwater levels were measured in accordance with procedures defined in the Site-Wide Groundwater Monitoring Plan (Arcadis G&M, Inc. 2002), Standard Operating Procedure (SOP) #4.

Monitoring results indicate that groundwater flow is generally from northeast to southwest. The general groundwater flow conditions for 2018 are consistent with historical groundwater flow conditions documented in the previous annual groundwater monitoring reports. The potentiometric surface for the closed North Settling Lagoon and closed South Settling Lagoon is illustrated in Figures G-1 and G-2, respectively.

Groundwater Sampling

In 2018, the following wells were sampled to assess the groundwater monitoring program objectives, as detailed in the Main Report:

- Closed North and South Settling Lagoons:
  - Closed North Settling Lagoon: HR-4, W-2-N, W-3-N, and W-4-N
  - Closed South Settling Lagoon: HR-1, HR-17, W-2-S, W-3-S, and W-4-S

A summary of the 2018 groundwater monitoring activities, including the number of monitoring wells and analytical parameters, is presented on Table 1 in the Main Report. Well construction data for the wells used in the program are presented in Table 6 in the Main Report.

Groundwater samples were collected from the specified wells using the low-flow methodology and following procedures outlined in SOP #21 (Arcadis G&M, Inc., 2002). Field parameters including pH, specific conductance, temperature, oxidation/reduction potential, and dissolved oxygen were measured during purging of each well using a multi-parameter groundwater quality flow-through cell (Appendix C in the Main Report).

The groundwater samples were collected and managed under standard chain-of-custody procedures and validated in accordance with the approved Supplemental RFI Work Plan and the RFI Quality Assurance Project Plan (Geraghty & Miller, Inc. 1997) and as presented in the draft Amended Quality Assurance Project Plan (Arcadis, Inc. 2011). Groundwater sampling forms are included in Attachment G-1. The analytical results are summarized below and are included as Attachment G-2 and Table 3 in the Main Report.

Closed North Settling Lagoon

- Concentrations of site-specific VOCs were detected at relatively low concentrations or below reporting limits in monitoring wells HR-4, W-2-N, and W-3-N in 2018.
- Concentrations of PCE and vinyl chloride in monitoring well W-4-N have been relatively low or below reporting limits since 1999. TCE had a peak concentration of 15 ug/L in 2009 and has remained relatively consistent, with a concentration of 6.1 ug/L in 2018. Concentrations of cis-1,2-DCE has also remained relatively consistent with a concentration of 8.7 ug/L in 2018. The other site-specific VOCs were detected at relatively low concentrations or below reporting limits.

Closed South Settling Lagoon

- Concentrations of PCE and TCE in monitoring well HR-1 have fluctuated with a concentration of 99 ug/L and 40 ug/L in 2018, respectively. Concentrations of the other site-specific VOCs were detected at relatively low concentrations or below reporting limits in monitoring well HR-1.
- Concentrations of PCE in monitoring well HR-17 have been relatively consistent since 2011 with a concentration of 180 ug/L in 2018. Concentrations of the other site-specific VOCs were detected at relatively low concentrations or below reporting limits in monitoring well HR-17.
- Concentrations of site-specific VOCs at W-2-S were detected at relatively low concentrations or below reporting limits in 2018.
- The PCE and TCE were above the applicable MCLs at W-3-S in 2018 at 19 ug/L and 27 ug/L, respectively. All other site-specific VOCs were detected at relatively low concentrations or below reporting limits in 2018.
- The PCE and TCE were above the applicable MCLs at W-4-S in 2018 at 68 ug/L and 42 ug/L, respectively. All other site-specific VOCs were detected at relatively low concentrations or below reporting limits in 2018.

STATISTICAL EVALUATION

Methods

The 2018 groundwater monitoring program was completed to meet the objectives of RCRA corrective action and the post-closure groundwater monitoring requirements for the closed lagoons. The program monitors potentially significant contributions of hazardous waste constituents to existing groundwater quality from the closed lagoons. To determine if the closed lagoons may be significant contributors of hazardous waste constituents to existing groundwater concentrations, monitoring data collected from the designated post-closure monitoring wells located downgradient of each of the closed lagoons are evaluated for temporal trends. This assessment includes, as an initial approach, the application of linear regression to determine if the concentration data for site-specific VOCs suggests a strong positive correlation with time as indicated by the coefficient of determination (R^2). Further statistical assessment of these well constituent concentrations was performed using the Mann-Kendall trend test and the Sen's slope estimator test (Table G-1).

Results

Data considered in the evaluation included results through the July 2018 monitoring event and data ranging back to the initial post-closure monitoring event conducted in November 2001. For the Mann-Kendall trend analysis, values below the reporting limit were replaced by a common value lower than the minimum detected value (i.e., 95% of the minimum detected value) for each dataset as per U.S. EPA (2009), so that any pair of tied values or any pair of non-detects is simply given a score of zero in the calculation of the Mann-Kendall statistic *S*. For consistency in data analysis, the same substitution method is used for the Sen's slope estimator and linear regression analyses. Field duplicate results were not included.

As proposed in the Site-Wide Groundwater Monitoring Plan (Arcadis G&M, Inc. 2002), post-closure monitoring data collected from those wells assigned to the closed North and South Settling Lagoons were reviewed for temporal trends. Summary statistics and results from the statistical trend tests for each dataset are presented in Table G-1. A summary matrix of trend test results is presented in Table G-2. The data plots for key constituents are provided on Figure G-3 for the closed North Settling Lagoon (NSL) and Figure G-4 for the closed South Settling Lagoon (SSL). Individual time series plots for each dataset together with results from the Mann-Kendall and Sen's slope estimator trend tests are presented in Figures G-5 to G-24.

North Settling Lagoon

For the wells used to assess conditions at the North Settling Lagoon, the linear regression analysis suggest increasing concentrations of 1,1-DCA, cis-1,2-DCE, and trans-1,2-DCE in downgradient well W-4-N (Figures G-7, G-9, and G-10, respectively). As detailed in Table G-1, the slope is positive, and the linear regression had a coefficient of determination (R^2) greater than or nearly equal to 0.5 (R^2 for trans-1,2-DCE was 0.497). Further assessment of these trends was performed using the Mann-Kendall trend test. The results of this test indicate a statistically significant increasing trend for the 1,1-DCA, cis-1,2-DCE, and trans-1,2-DCE concentrations in downgradient well W-4-N. These increasing trends are also confirmed by the Sen's slope estimator trend test. Concentrations of cis-1,2-DCE and trans-1,2-DCE were well below the applicable MCL (no MCL is available for 1,1-DCA). Increasing trends were not observed in downgradient monitoring wells W-2-N and W-3-N.

In the upgradient well HR-04, increasing trends were identified for 1,1,1-TCA, 1,1-DCA, and cis-1,2-DCE by the Mann-Kendall trend test (Figures G-5, G-6, and G-8, respectively), although the magnitude of these trends was not statistically significant using the Sen's slope estimator trend test. The R^2 was less than 0.5 for 1,1-DCA and cis-1,2-DCE, while the R^2 for 1,1,1-TCA was greater than 0.5. Concentrations of all three constituents were significantly less than the MCL, where an MCL was available.

In summary, the North Settling Lagoon data indicate a statistically significant increasing trend in cis-1,2-DCE, 1,1-DCA, and trans-1,2-DCE in downgradient monitoring well W-4-N. Several observations suggest a source (upgradient) other than the North Settling Lagoon for cis-1,2-DCE, 1,1-DCA, and trans-1,2-DCE in monitoring well W-4-N:

- The absence of concentrations of cis-1,2-DCE and trans-1,2-DCE above MCLs and the low-level detections of 1,1-DCA (less than 6.9 ug/L with no MCL available).
- The fact that these constituents (1,1-DCA, cis-1,2-DCE, and trans-1,2-DCE) are daughter products of VOCs that have been detected upgradient of the North Settling Lagoon.

South Settling Lagoon

For the wells used to assess conditions at the South Settling Lagoon, increasing trends were identified in the four wells for at least two to five of the following five constituents: 1,1-DCA, cis-1,2-DCE, trans-1,2-DCE, PCE, and TCE (Table G-1 and Figure G-4).

- **Upgradient well HR-17**. A statistically significant increasing trend for PCE was identified with both the Mann-Kendall and Sen's slope estimator trend tests, and the R^2 was greater than 0.5. PCE concentrations over the past five sampling events ranged from 150 ug/L to 180 ug/L which were above the MCL of 5 ug/L (Figure G-16). A statistically significant increasing trend for TCE was also identified with the Mann-Kendall, but not confirmed by the Sen's slope estimator trend tests – the R^2 was also less than 0.5. Concentrations over the past five sampling events ranged from <2.0 to 160 ug/L and were above the MCL of 5 ug/L in four of the last five sampling events (Figure G-22).

- **W-2-S**. A statistically significant increasing trend for cis-1,2-DCE was identified with both the Mann-Kendall and Sen's slope estimator trend tests, and the R^2 was greater than 0.5. A statistically significant increasing trend for trans-1,2-DCE was identified with the Mann-Kendall, but not confirmed by the Sen's slope estimator trend tests – the R^2 was also less than 0.5. Concentrations for cis-1,2-DCE and trans-1,2-DCE were both below the MCL (Figures G-13 and G-19, respectively).

- **W-3-S**. Statistically significant increasing trends for both cis-1,2-DCE, PCE, and TCE were identified by the Mann-Kendall and Sen's slope estimator trend tests, and the R^2 was greater than 0.5 for cis-1,2-DCE and PCE (Figures G-14 and G-17, respectively), but was less than 0.5 for TCE (Figure G-23). Statistically significant increasing trends for both 1,1-DCA and trans-1,2-DCE were identified with the Mann-Kendall, but not confirmed by the Sen's slope estimator trend tests – the R^2 was less than 0.5 for both (Figures G-11 and G-20, respectively). Concentrations for all constituents but PCE and TCE were less than the applicable MCL. Concentrations of PCE over the past five sampling events ranged from 19 to 68 ug/L and were above the MCL of 5 ug/L. Concentrations of TCE over the past five sampling events ranged from 7.6 to 97 ug/L and were above the MCL of 5 ug/L.

- **W-4-S**. A statistically significant increasing trend for 1,1-DCA (Figure G-12), cis-1,2-DCE (Figure G-15), PCE (Figure G-18), trans-1,2-DCE (Figure G-20), and TCE (Figure G-24) was identified with both the Mann-Kendall and Sen's slope estimator trend tests, and the R^2 was greater than 0.5 for the five constituents. Concentrations for all constituents but PCE and TCE were less than the applicable MCL. Concentrations of PCE over the past five sampling events ranged from 39 to 74 ug/L and were above the MCL of 5 ug/L. Concentrations of TCE over the past five sampling events ranged from 40 to 72 ug/L and were above the MCL of 5 ug/L.

The detected concentrations for PCE and TCE in the upgradient monitoring well HR-17 in the 2018 sampling event were 180 ug/L and 0.92 J ug/L, respectively. A statistically significant increasing trend for PCE was identified by the Mann-Kendall and Sen's slope estimator trend tests, and the R^2 was greater than 0.5 (Figures G-16). A statistically significant increasing trend for TCE was identified by the Mann-Kendall trend test, but not confirmed by the Sen's slope estimator trend tests – the R^2 was less than 0.5 (Table G-1). The observed concentration increase identified in downgradient monitoring well W-4-S for PCE and TCE appears to correlate with the concentrations and increasing trends also observed in upgradient well HR-17. The correlations between concentrations in upgradient well HR-17 and downgradient well W-4-S for TCE and PCE were tested statistically using Pearson correlation coefficients and were found to be statistically correlated at the 5% significance level (Figure G-25). This correlation suggests a source (upgradient) other than the South Settling Lagoon for the TCE and PCE increases. Although the concentrations for cis-1,2-DCE, trans-1,2-DCE, and 1,1-DCA in wells W-4-S and HR-17 are not statistically correlated, the concentrations are still below applicable drinking water standards. Further, the presence of daughter products 1,1-DCA, cis-1,2-DCE, and trans-1,2-DCE is expected from the natural attenuation processes.

Data collected from HR-1, approximately 1,000 feet upgradient of HR-17 and the South Settling Lagoon corroborate the statistical analysis. TCE was detected at 0.65 J ug/L in 2017 and at 40 ug/L in 2018. PCE was detected at 56 ug/L in 2017 and at 99 ug/L in 2018. Overall, concentrations of PCE and TCE both show an increasing trend at HR-01 (Figure G-26). Concentrations of cis-1,2-DCE, trans-1,2-DCE, and 1,1-DCA show decreasing trends and were detected at concentrations below MCLs, similar to the results in HR-17. Increasing trends at both upgradient wells HR-01 and HR-17 suggest a source other than the SSL for the TCE and PCE increases.

CONCLUSIONS AND RECOMMENDATIONS

In conclusion, the monitoring of the closed North and South Settling Lagoons showed that the closed lagoons do not appear to be contributing hazardous waste constituents to existing groundwater concentrations in the area. Based on these results, it is proposed that the 2019 groundwater monitoring program remain consistent with the sampling program for 2018.

Tables

Table G-1 – Summary Statistics and Trend Results

Table G-2 – Matrix of Trend Results

Figures

Figure G-1 – Potentiometric Surface – North Settling Lagoon (Upper Aquifer) July 2018

Figure G-2 – Potentiometric Surface – South Settling Lagoon (Upper Aquifer) July 2018

Figure G-3 – North Settling Lagoon (NSL) Data Plots for Key Constituents

Figure G-4 – South Settling Lagoon (SSL) Data Plots for Key Constituents

Figures G-5 through G-24 – Temporal Data Plots of Select Concentrations

Figure G-25 – PCE and TCE Concentrations in SSL Upgradient vs. Downgradient Wells

Figure G-26 – SSL Upgradient Well Data Plots for Key Constituents

Attachments

Attachment G-1 – Groundwater Sampling Forms

Attachment G-2 – Ohio EPA eBusiness Forms

References

Arcadis, Inc. 2011. Draft Amended Quality Assurance Project Plan for RCRA Corrective Action, RACER Trust, Moraine, Ohio. November 28, 2011.

Arcadis Geraghty & Miller, Inc. 2002. Site-Wide Groundwater Monitoring Plan, General Motors Corporation, Moraine, Ohio. May 2002.

Geraghty & Miller, Inc. 1997. Supplemental RFI Work Plan, General Motors Powertrain Group Moraine Engine Plant and General Motors Truck Group Moraine Assembly Plant, Moraine, Ohio. July 1997.

Ohio EPA, 2018. Ohio EPA Report Review – 2017 Groundwater Monitoring Report Dated February 27, 2018. August 2018.

U.S. EPA. 2009. Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities - Unified Guidance.

TABLES

TABLE G-1
Summary Statistics and Trend Results
RACER Trust
Moraine, Ohio
February 2019

Well ID	Up or Down Gradient	Analyte	Figure	Date Range	FOD	Detected Results Summary (µg/L)			MCL (µg/L)	Linear Correlation R^2	Mann-Kendall Test			Sen's Estimator of Slope	
						Range	Mean	SD			Result	P-Value	S Value	Result	Slope (Units/Day)
HR-04	North	1,1,1-Trichloroethane	G-5	11/01 - 07/18	8 / 18	0.17 - 2.0	1.0	0.76	200	**0.592**	UP	<0.001	82	NT	0.0000965
W-2-N	North	1,1,1-Trichloroethane	--	11/01 - 07/18	5 / 18	0.25 - 0.48	0.34	0.093	200	0.0250	NST	0.423	-5	NT	0
W-3-N	North	1,1,1-Trichloroethane	--	11/01 - 07/18	0 / 18	--	--	--	200	--	--	--	--	--	--
W-4-N	North	1,1,1-Trichloroethane	--	11/01 - 07/18	8 / 18	0.26 - 0.47	0.38	0.067	200	0.235	DWN	0.013	-54	NT	-0.00000322
HR-04	North	1,1-Dichloroethane	G-6	11/01 - 07/18	15 / 18	0.77 - 5.5	2.8	1.5	--	0.0740	UP	0.043	46	NT	0.000182
W-2-N	North	1,1-Dichloroethane	--	11/01 - 07/18	7 / 18	0.22 - 0.36	0.30	0.044	--	0.255	DWN	0.010	-55	NT	0
W-3-N	North	1,1-Dichloroethane	--	11/01 - 07/18	0 / 18	--	--	--	--	--	--	--	--	--	--
W-4-N	North	1,1-Dichloroethane	G-7	11/01 - 07/18	18 / 18	0.89 - 7.1	3.2	2.2	--	**0.742**	UP	<0.001	113	UP	0.000878
HR-04	North	1,1-Dichloroethene	--	11/01 - 07/18	0 / 18	--	--	--	7	--	--	--	--	--	--
W-2-N	North	1,1-Dichloroethene	--	11/01 - 07/18	0 / 18	--	--	--	7	--	--	--	--	--	--
W-3-N	North	1,1-Dichloroethene	--	11/01 - 07/18	0 / 18	--	--	--	7	--	--	--	--	--	--
W-4-N	North	1,1-Dichloroethene	--	11/01 - 07/18	0 / 18	--	--	--	7	--	--	--	--	--	--
HR-04	North	Benzene	--	11/01 - 07/18	0 / 18	--	--	--	5	--	--	--	--	--	--
W-2-N	North	Benzene	--	11/01 - 07/18	0 / 18	--	--	--	5	--	--	--	--	--	--
W-3-N	North	Benzene	--	11/01 - 07/18	0 / 18	--	--	--	5	--	--	--	--	--	--
W-4-N	North	Benzene	--	11/01 - 07/18	0 / 18	--	--	--	5	--	--	--	--	--	--
HR-04	North	cis-1,2-Dichloroethene	G-8	11/01 - 07/18	9 / 18	0.23 - 0.45	0.34	0.086	70	0.491	UP	0.005	65	NT	0.0000212
W-2-N	North	cis-1,2-Dichloroethene	--	11/01 - 07/18	18 / 18	0.89 - 2.8	1.6	0.50	70	0.226	NST	0.150	28	NT	0.0000505
W-3-N	North	cis-1,2-Dichloroethene	--	11/01 - 07/18	18 / 18	16 - 160	74.4	47.4	70	0.881	DWN	<0.001	-137	DWN	-0.0229
W-4-N	North	cis-1,2-Dichloroethene	G-9	11/01 - 07/18	18 / 18	1.6 - 14	7.0	3.8	70	**0.502**	UP	0.002	76	UP	0.00137
HR-04	North	Ethylbenzene	--	11/01 - 07/18	0 / 18	--	--	--	700	--	--	--	--	--	--
W-2-N	North	Ethylbenzene	--	11/01 - 07/18	0 / 18	--	--	--	700	--	--	--	--	--	--
W-3-N	North	Ethylbenzene	--	11/01 - 07/18	0 / 18	--	--	--	700	--	--	--	--	--	--
W-4-N	North	Ethylbenzene	--	11/01 - 07/18	0 / 18	--	--	--	700	--	--	--	--	--	--
HR-04	North	Tetrachloroethene	--	11/01 - 07/18	13 / 18	0.16 - 1.3	0.48	0.31	5	0.566	DWN	<0.001	-105	DWN	-0.0000855
W-2-N	North	Tetrachloroethene	--	11/01 - 07/18	1 / 18	0.31 - 0.31	0.31	0.0	5	0.0675	NST	0.168	-11	NT	0
W-3-N	North	Tetrachloroethene	--	11/01 - 07/18	8 / 18	0.52 - 9.0	2.4	3.0	5	0.283	DWN	0.033	-45	NT	0
W-4-N	North	Tetrachloroethene	--	11/01 - 07/18	16 / 18	0.26 - 1.7	0.79	0.36	5	0.590	DWN	<0.001	-94	DWN	-0.000145
HR-04	North	Toluene	--	11/01 - 07/18	0 / 18	--	--	--	1000	--	--	--	--	--	--
W-2-N	North	Toluene	--	11/01 - 07/18	1 / 18	0.28 - 0.28	0.28	0.0	1000	0.0138	NST	0.350	-5	NT	0
W-3-N	North	Toluene	--	11/01 - 07/18	0 / 18	--	--	--	1000	--	--	--	--	--	--
W-4-N	North	Toluene	--	11/01 - 07/18	0 / 18	--	--	--	1000	--	--	--	--	--	--
HR-04	North	trans-1,2-Dichloroethene	--	11/01 - 07/18	0 / 18	--	--	--	100	--	--	--	--	--	--
W-2-N	North	trans-1,2-Dichloroethene	--	11/01 - 07/18	3 / 18	0.18 - 0.28	0.22	0.053	100	0.0926	NST	0.523	0	NT	0
W-3-N	North	trans-1,2-Dichloroethene	--	11/01 - 07/18	17 / 18	0.33 - 2.2	1.0	0.58	100	0.544	DWN	<0.001	-104	DWN	-0.000263
W-4-N	North	trans-1,2-Dichloroethene	G-10	11/01 - 07/18	15 / 18	0.19 - 1.3	0.62	0.32	100	0.497	UP	<0.001	93	UP	0.000106
HR-04	North	Trichloroethene	--	11/01 - 07/18	15 / 18	0.27 - 1.0	0.42	0.22	5	0.500	DWN	0.002	-76	DWN	-0.0000360
W-2-N	North	Trichloroethene	--	11/01 - 07/18	13 / 18	0.20 - 1.9	0.99	0.54	5	0.00174	NST	0.309	-14	NT	-0.0000367
W-3-N	North	Trichloroethene	--	11/01 - 07/18	2 / 18	1.7 - 2.1	1.9	0.28	5	0.199	DWN	0.018	-31	NT	0
W-4-N	North	Trichloroethene	--	11/01 - 07/18	18 / 18	6.1 - 15	9.3	2.4	5	0.00123	NST	0.410	7	NT	0.0000690
HR-04	North	Vinyl chloride	--	11/01 - 07/18	0 / 18	--	--	--	2	--	--	--	--	--	--
W-2-N	North	Vinyl chloride	--	11/01 - 07/18	0 / 18	--	--	--	2	--	--	--	--	--	--
W-3-N	North	Vinyl chloride	--	11/01 - 07/18	18 / 18	1.0 - 9.6	4.0	2.8	2	0.767	DWN	<0.001	-112	DWN	-0.00122
W-4-N	North	Vinyl chloride	--	11/01 - 07/18	9 / 18	0.18 - 0.96	0.51	0.24	2	0.384	DWN	0.002	-71	NT	-0.0000652
HR-04	North	Xylene (total)	--	11/01 - 07/18	0 / 18	--	--	--	10000	--	--	--	--	--	--
W-2-N	North	Xylene (total)	--	11/01 - 07/18	0 / 18	--	--	--	10000	--	--	--	--	--	--
W-3-N	North	Xylene (total)	--	11/01 - 07/18	0 / 18	--	--	--	10000	--	--	--	--	--	--
W-4-N	North	Xylene (total)	--	11/01 - 07/18	0 / 18	--	--	--	10000	--	--	--	--	--	--

Well ID	Up or Down Grad-ient	Analyte	Figure	Date Range	FOD	Detected Results Summary (µg/L)			MCL (µg/L)	Linear Correlation R^2	Mann-Kendall Test			Sen's Estimator of Slope	
						Range	Mean	SD			Result	P-Value	S Value	Result	Slope (Units/Day)
Table G-1 continued															
HR-17	South	1,1,1-Trichloroethane	--	11/01 - 07/18	6 / 18	0.39 - 4.8	1.7	1.6	200	0.184	NST	0.159	23	NT	0
W-2-S	South	1,1,1-Trichloroethane	--	11/01 - 07/18	17 / 18	0.79 - 1.8	1.5	0.27	200	0.280	DWN	0.032	-49	NT	-0.0000681
W-3-S	South	1,1,1-Trichloroethane	--	11/01 - 07/18	16 / 18	0.49 - 2.5	1.3	0.73	200	0.666	DWN	<0.001	-91	DWN	-0.000286
W-4-S	South	1,1,1-Trichloroethane	--	11/01 - 07/18	22 / 22	0.95 - 2.9	1.7	0.49	200	0.281	DWN	0.004	-96	DWN	-0.000202
HR-17	South	1,1-Dichloroethane	--	11/01 - 07/18	14 / 18	0.60 - 2.2	1.3	0.60	--	0.00301	NST	0.470	3	NT	0
W-2-S	South	1,1-Dichloroethane	--	11/01 - 07/18	18 / 18	0.58 - 1.3	1.0	0.20	--	0.0320	NST	0.141	-29	NT	-0.0000307
W-3-S	South	1,1-Dichloroethane	G-11	11/01 - 07/18	9 / 18	0.21 - 1.2	0.61	0.35	--	0.341	UP	0.004	66	NT	0.0000500
W-4-S	South	1,1-Dichloroethane	G-12	11/01 - 07/18	22 / 22	0.87 - 2.7	1.5	0.43	--	**0.637**	UP	<0.001	140	UP	0.000182
HR-17	South	1,1-Dichloroethene	--	11/01 - 07/18	0 / 18	--	--	--	7	--	--	--	--	--	--
W-2-S	South	1,1-Dichloroethene	--	11/01 - 07/18	0 / 18	--	--	--	7	--	--	--	--	--	--
W-3-S	South	1,1-Dichloroethene	--	11/01 - 07/18	0 / 18	--	--	--	7	--	--	--	--	--	--
W-4-S	South	1,1-Dichloroethene	--	11/01 - 07/18	1 / 22	0.21 - 0.21	0.21	0.0	7	0.00199	NST	0.500	1	NT	0
HR-17	South	Benzene	--	11/01 - 07/18	0 / 18	--	--	--	5	--	--	--	--	--	--
W-2-S	South	Benzene	--	11/01 - 07/18	1 / 18	0.43 - 0.43	0.43	0.0	5	0.000299	NST	0.500	-1	NT	0
W-3-S	South	Benzene	--	11/01 - 07/18	0 / 18	--	--	--	5	--	--	--	--	--	--
W-4-S	South	Benzene	--	11/01 - 07/18	0 / 22	--	--	--	5	--	--	--	--	--	--
HR-17	South	cis-1,2-Dichloroethene	--	11/01 - 07/18	15 / 18	1.1 - 7.1	2.8	1.6	70	0.247	DWN	0.031	-50	NT	-0.000333
W-2-S	South	cis-1,2-Dichloroethene	G-13	11/01 - 07/18	17 / 18	0.49 - 2.4	1.2	0.54	70	**0.538**	UP	0.001	81	UP	0.000175
W-3-S	South	cis-1,2-Dichloroethene	G-14	11/01 - 07/18	11 / 18	0.33 - 2.6	1.3	0.80	70	**0.613**	UP	<0.001	94	UP	0.000236
W-4-S	South	cis-1,2-Dichloroethene	G-15	11/01 - 07/18	22 / 22	3.3 - 22	7.5	4.6	70	**0.678**	UP	<0.001	187	UP	0.00173
HR-17	South	Ethylbenzene	--	11/01 - 07/18	0 / 18	--	--	--	700	--	--	--	--	--	--
W-2-S	South	Ethylbenzene	--	11/01 - 07/18	0 / 18	--	--	--	700	--	--	--	--	--	--
W-3-S	South	Ethylbenzene	--	11/01 - 07/18	0 / 18	--	--	--	700	--	--	--	--	--	--
W-4-S	South	Ethylbenzene	--	11/01 - 07/18	0 / 22	--	--	--	700	--	--	--	--	--	--
HR-17	South	Tetrachloroethene	G-16	11/01 - 07/18	18 / 18	3.3 - 180	99.8	57.2	5	**0.842**	UP	<0.001	119	UP	0.0273
W-2-S	South	Tetrachloroethene	--	11/01 - 07/18	11 / 18	0.31 - 2.0	0.52	0.50	5	0.148	NST	0.068	39	NT	0.00000753
W-3-S	South	Tetrachloroethene	G-17	11/01 - 07/18	18 / 18	0.44 - 68	16.3	24.7	5	**0.559**	UP	<0.001	113	UP	0.00462
W-4-S	South	Tetrachloroethene	G-18	11/01 - 07/18	22 / 22	13 - 74	34	18.3	5	**0.719**	UP	<0.001	169	UP	0.00812
HR-17	South	Toluene	--	11/01 - 07/18	0 / 18	--	--	--	1000	--	--	--	--	--	--
W-2-S	South	Toluene	--	11/01 - 07/18	1 / 18	0.25 - 0.25	0.25	0.0	1000	0.0935	NST	0.124	-13	NT	0
W-3-S	South	Toluene	--	11/01 - 07/18	0 / 18	--	--	--	1000	--	--	--	--	--	--
W-4-S	South	Toluene	--	11/01 - 07/18	1 / 22	0.25 - 0.25	0.25	0.0	1000	0.0741	NST	0.104	-17	NT	0
HR-17	South	trans-1,2-Dichloroethene	--	11/01 - 07/18	11 / 18	0.46 - 1.6	0.96	0.37	100	0.164	DWN	0.033	-48	NT	-0.0000486
W-2-S	South	trans-1,2-Dichloroethene	G-19	11/01 - 07/18	5 / 18	0.30 - 0.47	0.37	0.069	100	0.312	UP	0.001	63	NT	0
W-3-S	South	trans-1,2-Dichloroethene	G-20	11/01 - 07/18	6 / 18	0.19 - 0.59	0.39	0.19	100	0.139	UP	0.011	51	NT	0
W-4-S	South	trans-1,2-Dichloroethene	G-21	11/01 - 07/18	22 / 22	0.43 - 2.1	1.2	0.35	100	**0.514**	UP	<0.001	122	UP	0.000149
HR-17	South	Trichloroethene	G-22	11/01 - 07/18	17 / 18	0.92 - 160	42.5	51.6	5	0.192	UP	0.024	53	NT	0.00822
W-2-S	South	Trichloroethene	--	11/01 - 07/18	18 / 18	4.6 - 23	6.7	4.1	5	0.0908	NST	0.105	34	NT	0.000184
W-3-S	South	Trichloroethene	G-23	11/01 - 07/18	18 / 18	1.5 - 97	12.8	23.2	5	0.255	UP	<0.001	93	UP	0.00169
W-4-S	South	Trichloroethene	G-24	11/01 - 07/18	22 / 22	8.9 - 72	25.2	18.3	5	**0.672**	UP	<0.001	171	UP	0.00567
HR-17	South	Vinyl chloride	--	11/01 - 07/18	0 / 18	--	--	--	2	--	--	--	--	--	--
W-2-S	South	Vinyl chloride	--	11/01 - 07/18	0 / 18	--	--	--	2	--	--	--	--	--	--
W-3-S	South	Vinyl chloride	--	11/01 - 07/18	0 / 18	--	--	--	2	--	--	--	--	--	--
W-4-S	South	Vinyl chloride	--	11/01 - 07/18	0 / 22	--	--	--	2	--	--	--	--	--	--
HR-17	South	Xylene (total)	--	11/01 - 07/18	0 / 18	--	--	--	10000	--	--	--	--	--	--
W-2-S	South	Xylene (total)	--	11/01 - 07/18	0 / 18	--	--	--	10000	--	--	--	--	--	--
W-3-S	South	Xylene (total)	--	11/01 - 07/18	0 / 18	--	--	--	10000	--	--	--	--	--	--
W-4-S	South	Xylene (total)	--	11/01 - 07/18	0 / 22	--	--	--	10000	--	--	--	--	--	--

Abbreviations:

-- = insufficient data for calculating statistics (n < 4)
FOD = frequency of detection (# detects / # samples)
MCL = maximum contaminant level
mean = arithmetic mean
R^2 = linear regression coefficient of determination
SD = standard deviation

NST = no significant trend
NT = no trend
DWN = downward trend
UP = upward trend

Notes:

1. All analytical results are in µg/L. Result values less than 10 are reported to 2 significant figures; values greater than 10 are reported to 3 significant figures.
   P-values are reported to 3 decimal places.
2. Trend results are presented when at least four samples and one detected value are available.
   Non-detects were assigned a common value less than the minimum detected value (95% of the minimum detected value) (USEPA, 2009).
3. Field duplicate results were not included.
4. Statistical testing of the null hypothesis: no significant trend (slope = 0) and the alternative hypothesis: significant trend (slope ≠ 0) with 95% confidence.
5. R^2 values are bolded if R^2>0.5 and MK results shows siginficant upward trend.

Reference:

USEPA. 2009. Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities. Unified Guidance. EPA/530/R-09/007, 2009.

TABLE G-2
Matrix of Trend Results
RACER Trust
Moraine, Ohio
February 2019

Lagoon:	North											
Well:	**HR-04**			**W-2-N**			**W-3-N**			**W-4-N**		
VOC Constituent	**R^2**	**MK**	**SSE**	**R^2**	**MK**	**SSE**	**R^2**	**MK**	**SSE**	**R^2**	**MK**	**SSE**
1,1,1-Trichloroethane	>0.5	▲	↔	--	↔	↔	--	ND	ND	--	▼	↔
1,1-Dichloroethane	--	▲	↔	--	▼	↔	--	ND	ND	>0.5	▲	▲
1,1-Dichloroethene	--	ND	ND	--	ND	ND	--	ND	ND	--	ND	ND
Benzene	--	ND	ND	--	ND	ND	--	ND	ND	--	ND	ND
cis-1,2-Dichloroethene	--	▲	↔	--	↔	↔	>0.5	▼	▼	>0.5	▲	▲
Ethylbenzene	--	ND	ND	--	ND	ND	--	ND	ND	--	ND	ND
Tetrachloroethene	>0.5	▼	▼	--	↔	↔	--	▼	↔	>0.5	▼	▼
Toluene	--	ND	ND	--	↔	↔	--	ND	ND	--	ND	ND
trans-1,2-Dichloroethene	--	ND	ND	--	↔	↔	>0.5	▼	▼	--	▲	▲
Trichloroethene	--	▼	▼	--	↔	↔	--	▼	↔	--	↔	↔
Vinyl chloride	--	ND	ND	--	ND	ND	>0.5	▼	▼	--	▼	↔
Xylene (total)	--	ND	ND	--	ND	ND	--	ND	ND	--	ND	ND
Lagoon:	**South**											
Well:	**HR-17**			**W-2-S**			**W-3-S**			**W-4-S**		
VOC Constituent	**R^2**	**MK**	**SSE**	**R^2**	**MK**	**SSE**	**R^2**	**MK**	**SSE**	**R^2**	**MK**	**SSE**
1,1,1-Trichloroethane	--	↔	↔	--	▼	↔	>0.5	▼	▼	--	▼	▼
1,1-Dichloroethane	--	↔	↔	--	↔	↔	--	▲	↔	>0.5	▲	▲
1,1-Dichloroethene	--	ND	ND	--	ND	ND	--	ND	ND	--	↔	↔
Benzene	--	ND	ND	--	↔	↔	--	ND	ND	--	ND	ND
cis-1,2-Dichloroethene	--	▼	↔	>0.5	▲	▲	>0.5	▲	▲	>0.5	▲	▲
Ethylbenzene	--	ND	ND	--	ND	ND	--	ND	ND	--	ND	ND
Tetrachloroethene	>0.5	▲	▲	--	↔	↔	>0.5	▲	▲	>0.5	▲	▲
Toluene	--	ND	ND	--	↔	↔	--	ND	ND	--	↔	↔
trans-1,2-Dichloroethene	--	▼	↔	--	▲	↔	--	▲	↔	>0.5	▲	▲
Trichloroethene	--	▲	↔	--	↔	↔	--	▲	▲	>0.5	▲	▲
Vinyl chloride	--	ND	ND	--	ND	ND	--	ND	ND	--	ND	ND
Xylene (total)	--	ND	ND	--	ND	ND	--	ND	ND	--	ND	ND

Abbreviations:

R^2 = Linear regression coefficient of determination

MK = Mann-Kendall

SSE = Sen's Slope Estimator

-- = R^2 less than 0.5

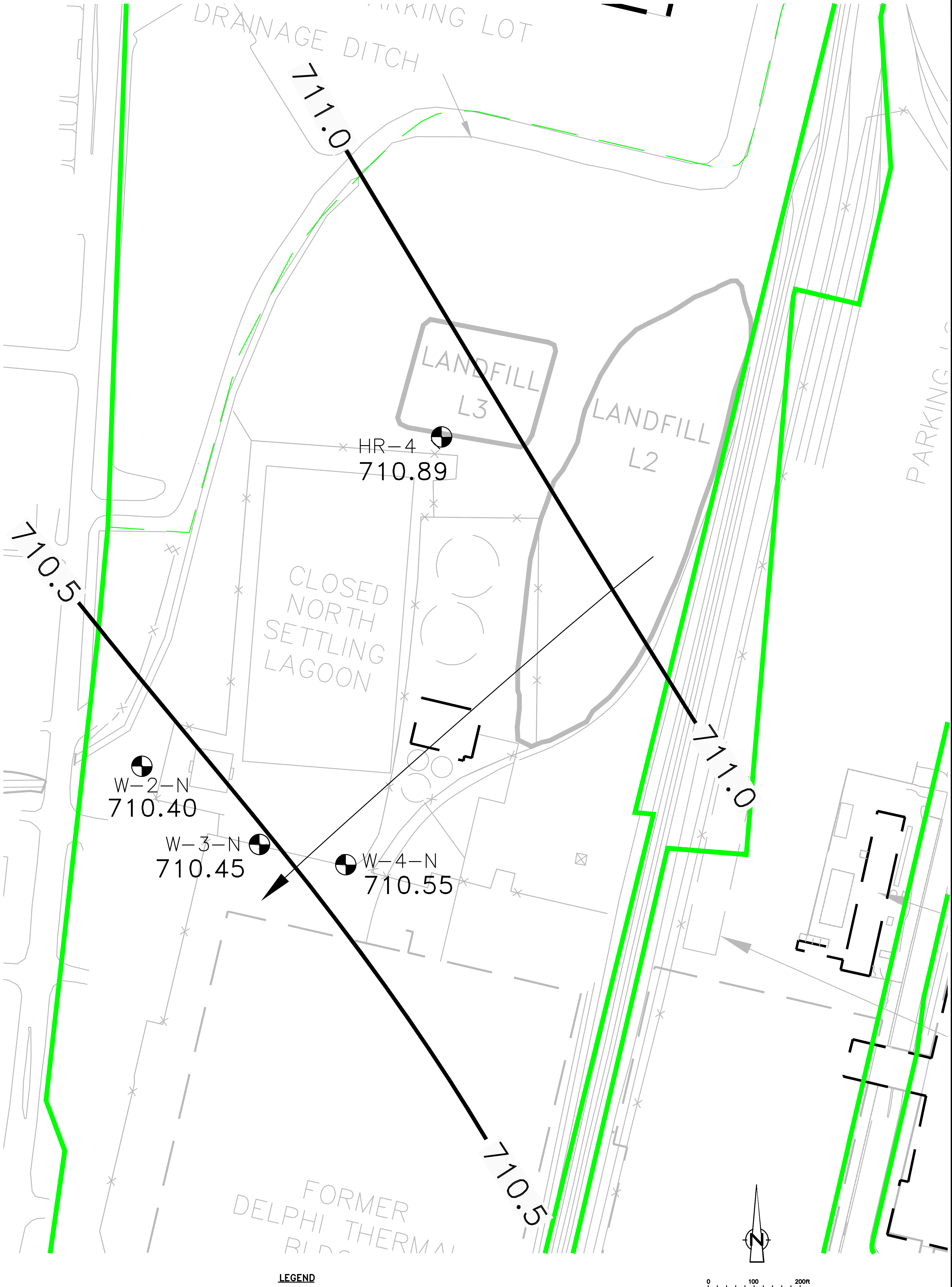
▲ = Increasing trend (alpha = 0.05)

▼ = Decreasing trend (alpha = 0.05)

ND = 100% Non-detect

↔ = No trend

FIGURES



LEGEND

⊕	MONITORING WELL (UPPER AQUIFER)
	PROPERTY BOUNDRY
	PARCEL BOUNDARY
710.40	GROUNDWATER ELEVATION (FEET ABOVE MEAN SEA LEVEL)
710.5 —	GROUNDWATER CONTOUR (FEET ABOVE MEAN SEA LEVEL) CONTOUR INTERVAL = 0.5 FOOT
NM	NOT MEASURED
	GROUNDWATER FLOW DIRECTION
	FORMER BUILDING FOOTPRINT
	CURRENT BUILDING FOOTPRINT

NOTES:

1. DEPTH TO WATER MEASUREMENTS COLLECTED FROM TOP OF WELL CASING ON JULY 26, 2018.
2. SURVEY OF WELL COORDINATES WERE ORIGINALLY TO A SITE-SPECIFIC COORDINATE SYSTEM IN FEET IN NATIONAL GEODETIC VERTICAL DATUM OF 1929 (NGVD 29) USING AN ON-SITE BENCHMARK. BASE MAP AND WELL COORDINATES WERE CONVERTED IN 2011 TO OHIO SOUTH STATE PLANE COORDINATE SYSTEM AND NGVD 29 WAS RETAINED AS THE VERTICAL DATUM.
3. GROUNDWATER ELEVATION CONTOURS DEPICT LOSING STREAM CONDITIONS BASED ON GREAT MIAMI RIVER STREAM GAUGE LEVELS AND RESULTS FROM THE GROUNDWATER-SURFACE WATER INTERACTION ASSESSMENT AND REFINEMENT TO THE GROUNDWATER FLOW MODEL.

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OH000294.2019

POTENTIOMETRIC SURFACE (UPPER AQUIFER) JULY 2018

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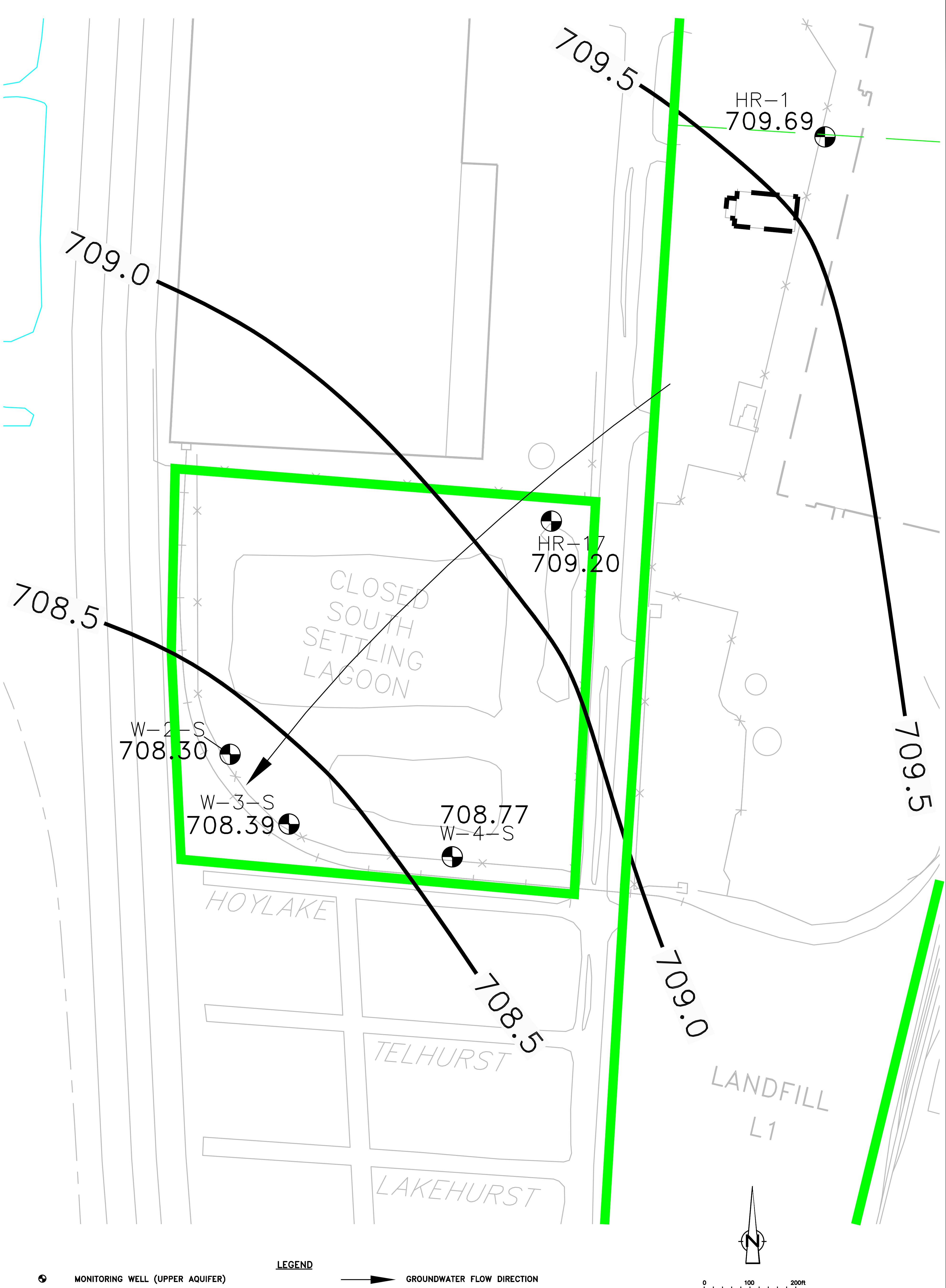
FIGURE
G-1



LEGEND

- MONITORING WELL (UPPER AQUIFER)
- CARBON INTRODUCTION WELL
- PROPERTY BOUNDRY
- PARCEL BOUNDARY
- 708.39 GROUNDWATER ELEVATION (FEET ABOVE MEAN SEA LEVEL)
- 708.5 — GROUNDWATER CONTOUR (FEET ABOVE MEAN SEA LEVEL) CONTOUR INTERVAL = 0.5 FOOT
- GROUNDWATER FLOW DIRECTION
- FORMER BUILDING FOOTPRINT
- CURRENT BUILDING FOOTPRINT

NOTES:

1. DEPTH TO WATER MEASUREMENTS COLLECTED FROM TOP OF WELL CASING ON JULY 26, 2018.
2. SURVEY OF WELL COORDINATES WERE ORIGINALLY TO A SITE–SPECIFIC COORDINATE SYSTEM IN FEET IN NATIONAL GEODETIC VERTICAL DATUM OF 1929 (NGVD 29) USING AN ON–SITE BENCHMARK. BASE MAP AND WELL COORDINATES WERE CONVERTED IN 2011 TO OHIO SOUTH STATE PLANE COORDINATE SYSTEM AND NGVD 29 WAS RETAINED AS THE VERTICAL DATUM.
3. GROUNDWATER ELEVATION CONTOURS DEPICT LOSING STREAM CONDITIONS BASED ON GREAT MIAMI RIVER STREAM GAUGE LEVELS AND RESULTS FROM THE GROUNDWATER–SURFACE WATER INTERACTION ASSESSMENT AND REFINEMENT TO THE GROUNDWATER FLOW MODEL.

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OH000294.2019

POTENTIOMETRIC SURFACE (UPPER AQUIFER) JULY 2018

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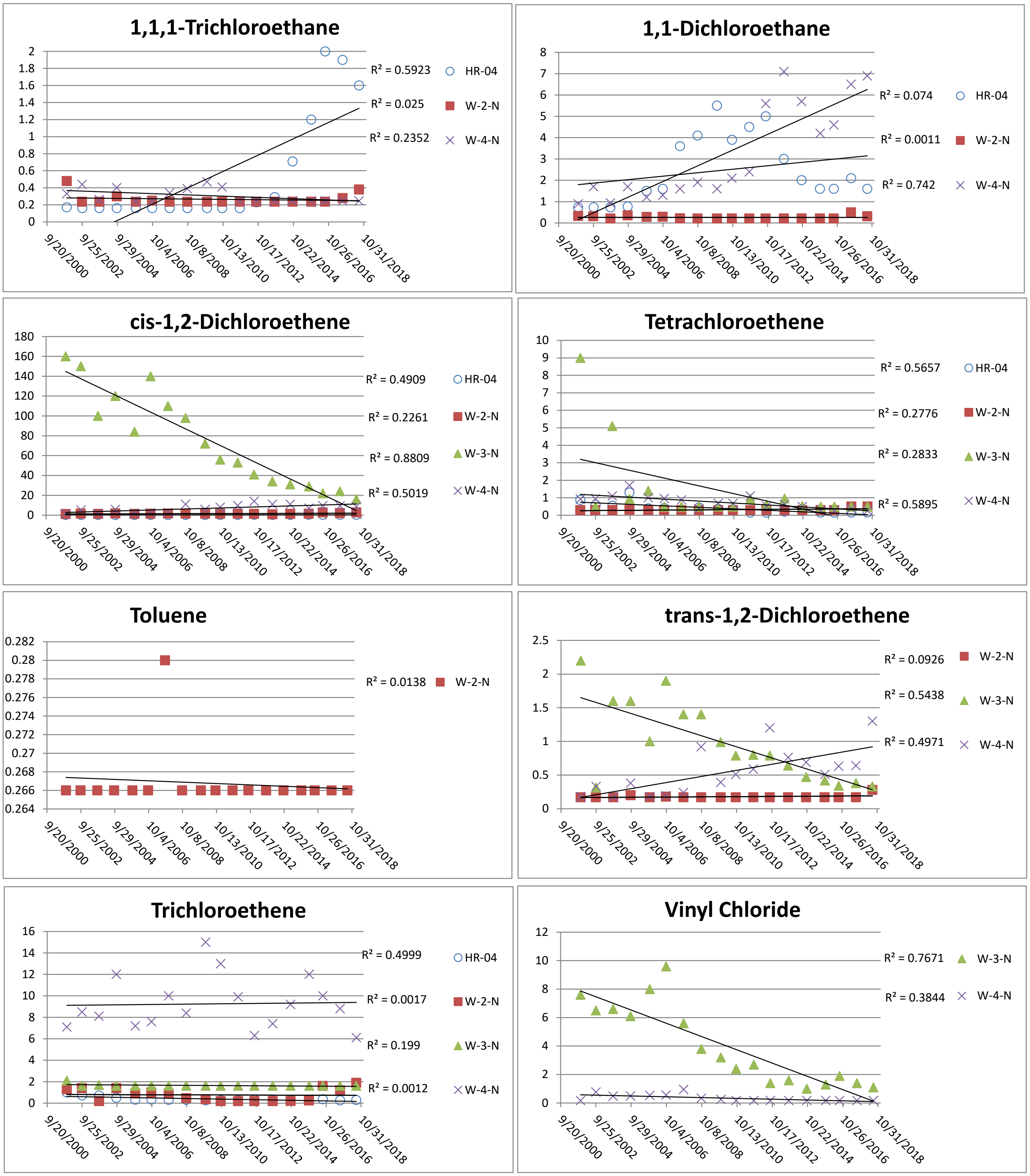
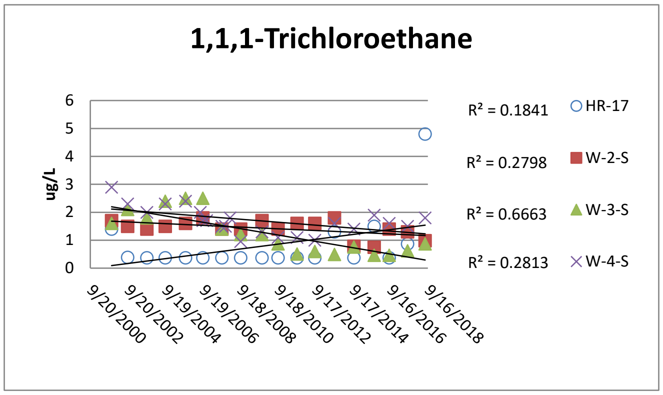
FIGURE
G-2

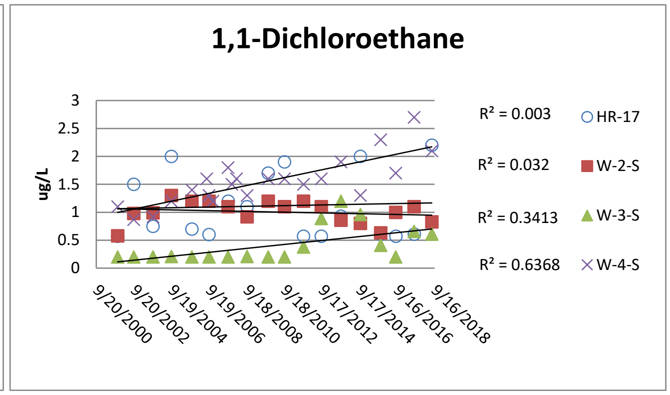
Figure G-3:
North Settling Lagoon

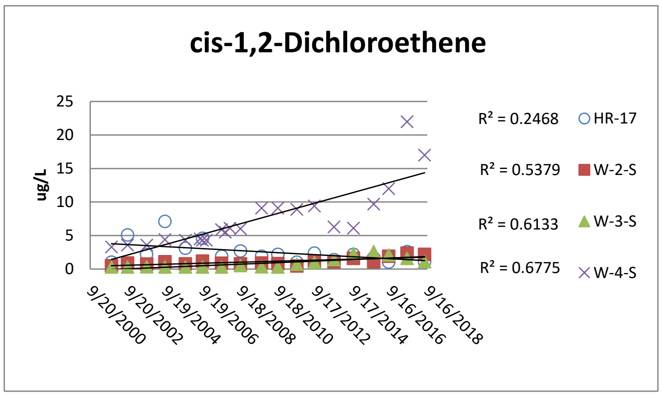


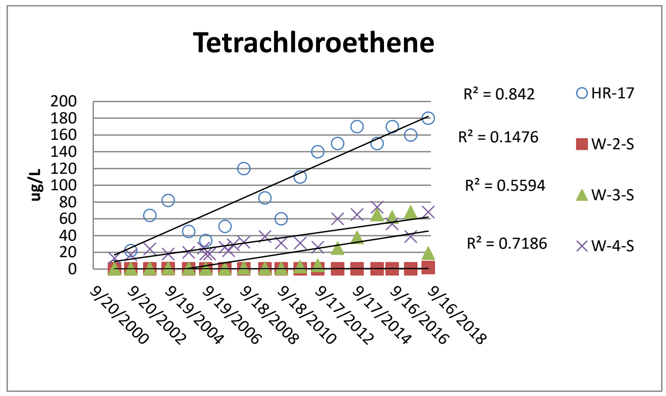
Notes:
All results are in micrograms per liter.
Only datasets with at least one detected value are shown.
There were no detections for 1,1-dichloroethene, benzene, ethylbenzene, or total xylenes.

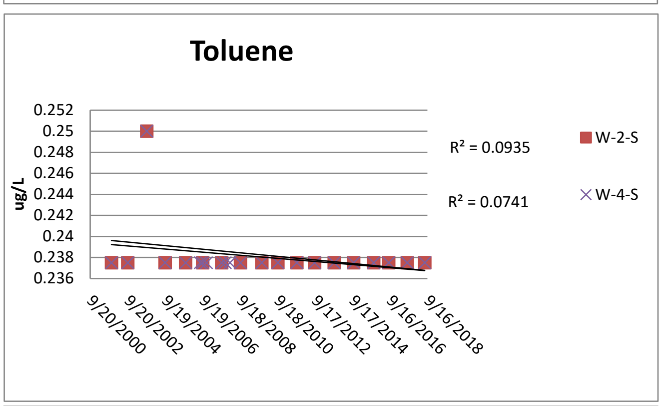
Figure G-4
South Settling Lagoon

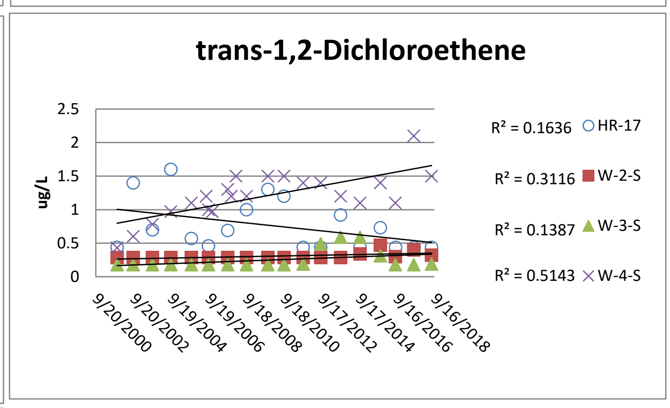


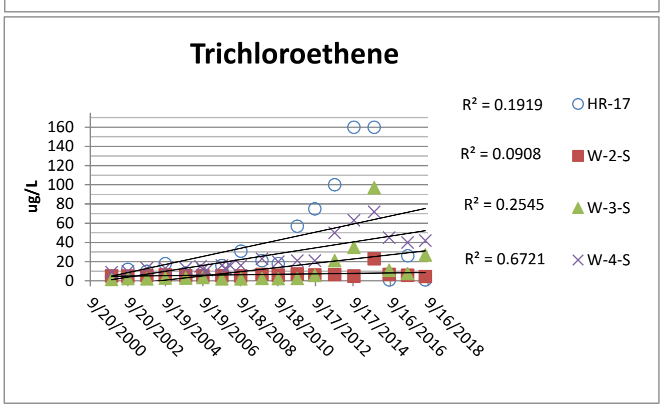


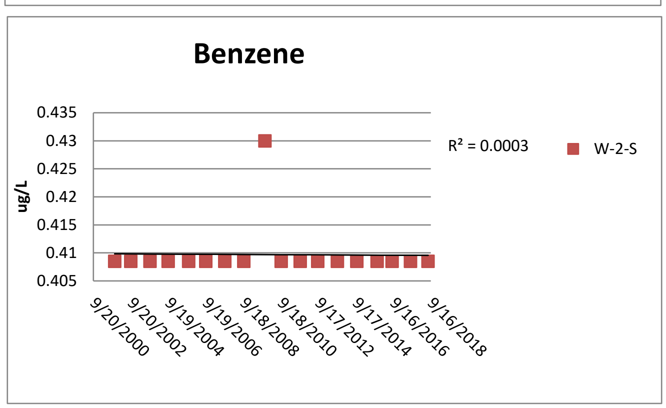












Notes:

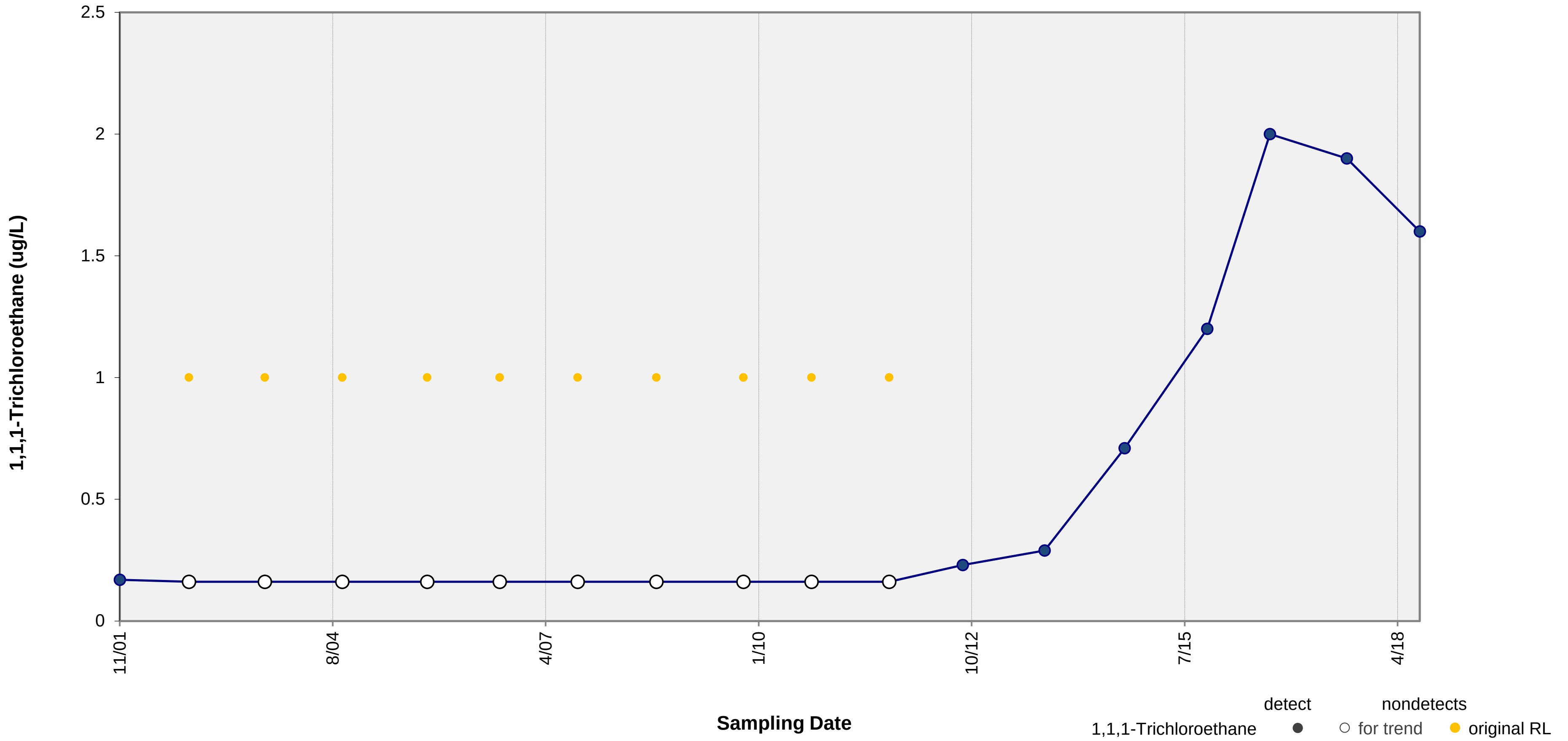
All results are in micrograms per liter.

Only datasets with at least one detected value are shown.

There were no detections for 1,1-dichloroethene, ethylbenzene, vinyl chloride, or total xylenes.

NA = not available

ND = not detected



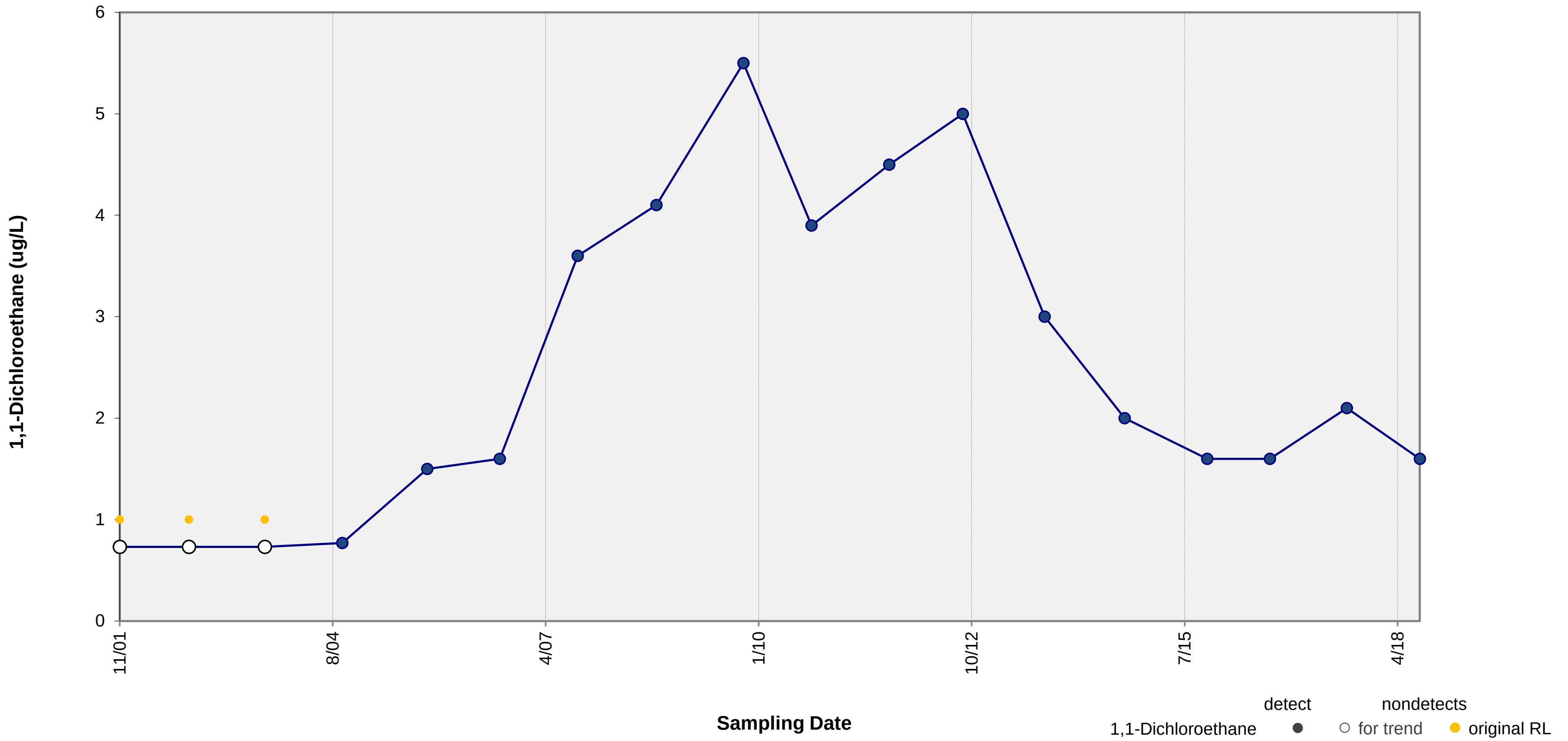
Results of Mann-Kendall Test for Trend:	**INCREASING TREND**				
	p value =	<0.001	Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).		
Results of Sen's Estimator of Slope:	**No trend**				
	Median Slope Estimate =	9.6E-05	ug/L Per Day		
	95% Confidence Interval =	0.0E+00	to	3.1E-04	ug/L Per Day

ARCADIS

Concentration vs. Time Plot – 1,1,1-Trichloroethane in Well HR-04

RACER Trust, Moraine, Ohio

Figure G-5



Results of Mann-Kendall Test for Trend: **INCREASING TREND**

p value = 0.043 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **No trend**

Median Slope Estimate = 1.8E-04 ug/L Per Day

95% Confidence Interval = 0.0E+00 to 6.3E-04 ug/L Per Day

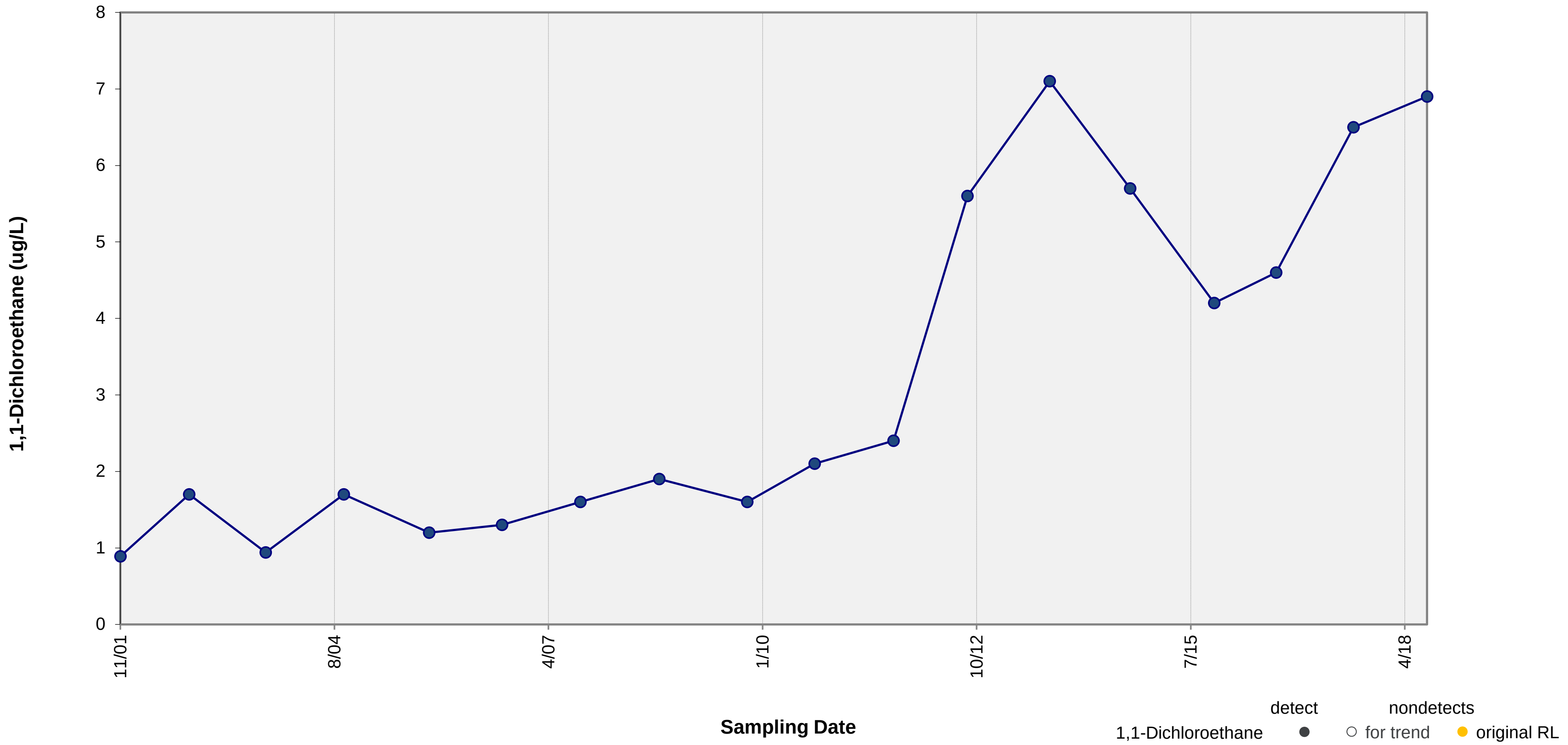
ARCADIS

Concentration vs. Time Plot – 1,1-Dichloroethane in Well HR-04

RACER Trust, Moraine, Ohio

Figure G-6

\\OH02FP01\Data\Public\MOTORS\04- OMM Lagoon_Landfills_GWM\Lagoons and Landfills\OMM Lagoons\Supplemental Annual Report\Supplemental Annual Report 2018\Memo for Annual Report\Reference\Table G-1 and 2_Fig G-3 thru 22 - 2/13/2019



Results of Mann-Kendall Test for Trend:	**INCREASING TREND**				
	p value =	<0.001	Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).		
Results of Sen's Estimator of Slope:	**INCREASING TREND**				
	Median Slope Estimate =	8.8E-04	ug/L Per Day		
	95% Confidence Interval =	5.1E-04	to	1.2E-03	ug/L Per Day

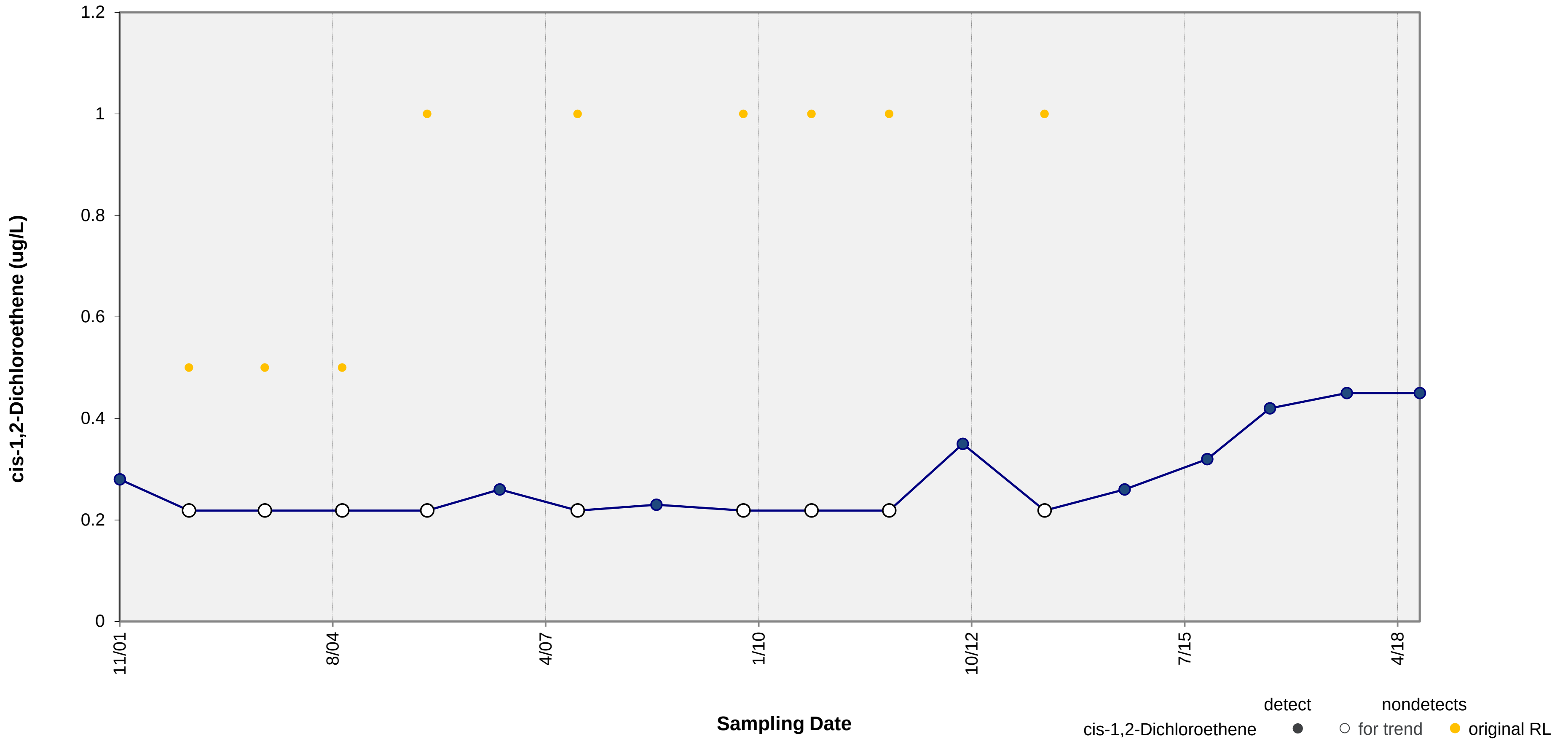
ARCADIS

Concentration vs. Time Plot – 1,1-Dichloroethane in Well W-4-N

RACER Trust, Moraine, Ohio

Figure G-7

\\OH02FP01\Data\Public\MOTORS\04- OMM Lagoon_Landfills_GWM\Lagoons and Landfills\OMM Lagoons\Supplemental Annual Report\Supplemental Annual Report 2018\Memo for Annual Report\Reference\Table G-1 and 2_Fig G-3 thru 22 - 2/13/2019



Results of Mann-Kendall Test for Trend: **INCREASING TREND**

p value = 0.005 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **No trend**

Median Slope Estimate = 2.1E-05 ug/L Per Day

95% Confidence Interval = 0.0E+00 to 4.3E-05 ug/L Per Day

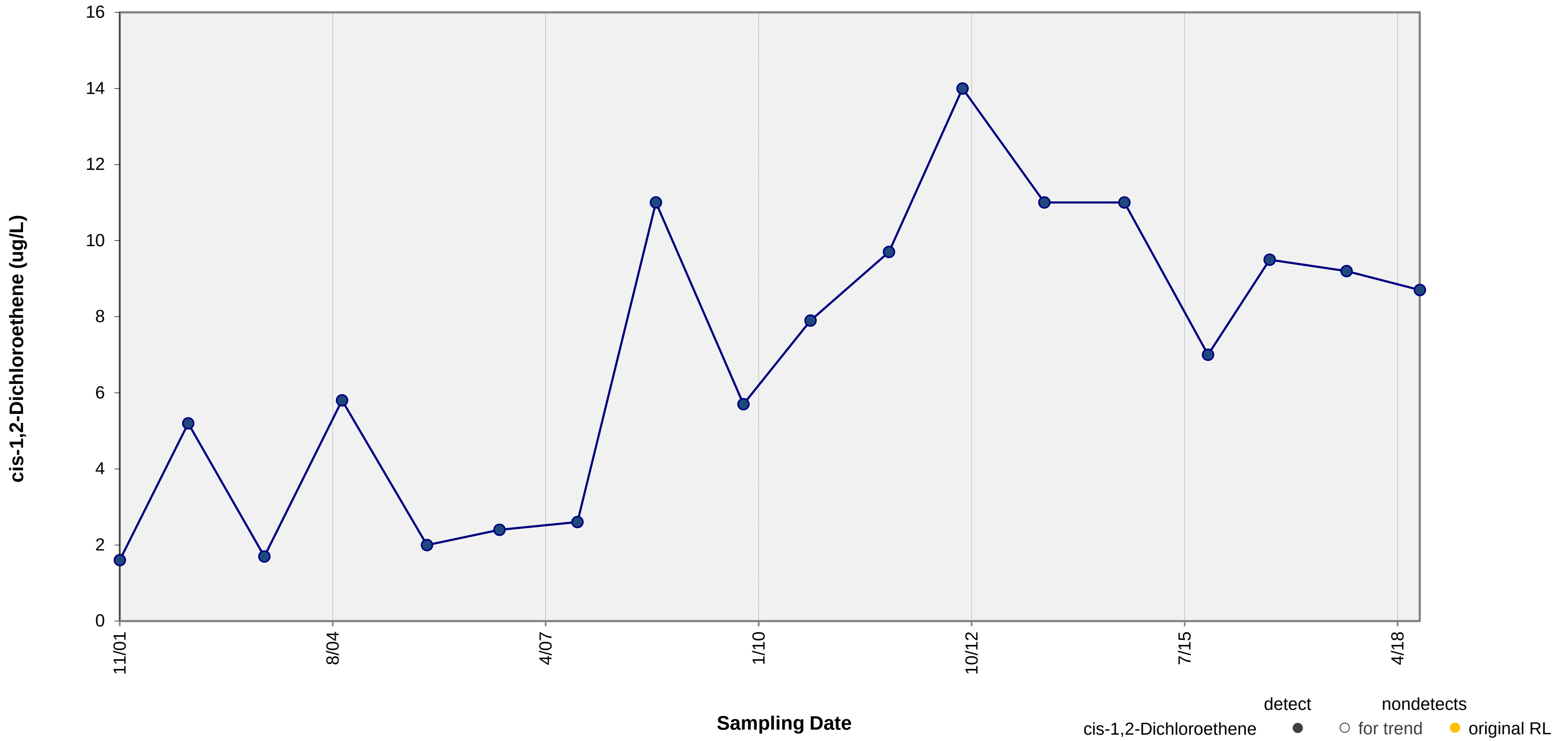
ARCADIS

Concentration vs. Time Plot – cis-1,2-Dichloroethene in Well HR-04

RACER Trust, Moraine, Ohio

Figure G-8

\\OH02FP01\Data\Public\MOTORS\04- OMM Lagoon_Landfills_GWM\Lagoons and Landfills\OMM Lagoons\Supplemental Annual Report\Supplemental Annual Report 2018\Memo for Annual Report\Reference\Table G-1 and 2_Fig G-3 thru 22 - 2/13/2019



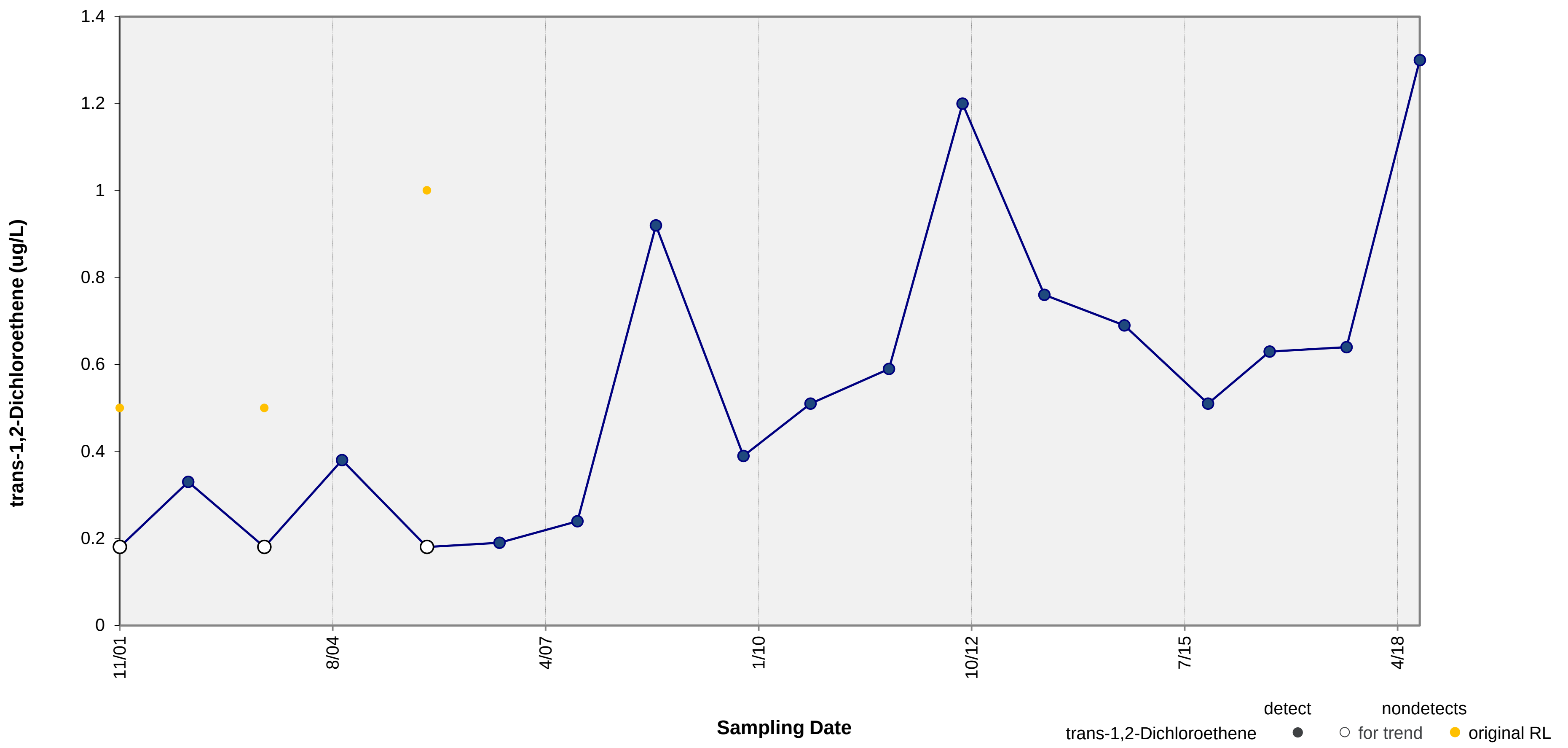
Results of Mann-Kendall Test for Trend: **INCREASING TREND**
p value = 0.002 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **INCREASING TREND**
Median Slope Estimate = 1.4E-03 ug/L Per Day
95% Confidence Interval = 5.4E-04 to 2.1E-03 ug/L Per Day

ARCADIS

Concentration vs. Time Plot – cis-1,2-Dichloroethene in Well W-4-N
RACER Trust, Moraine, Ohio

Figure G-9



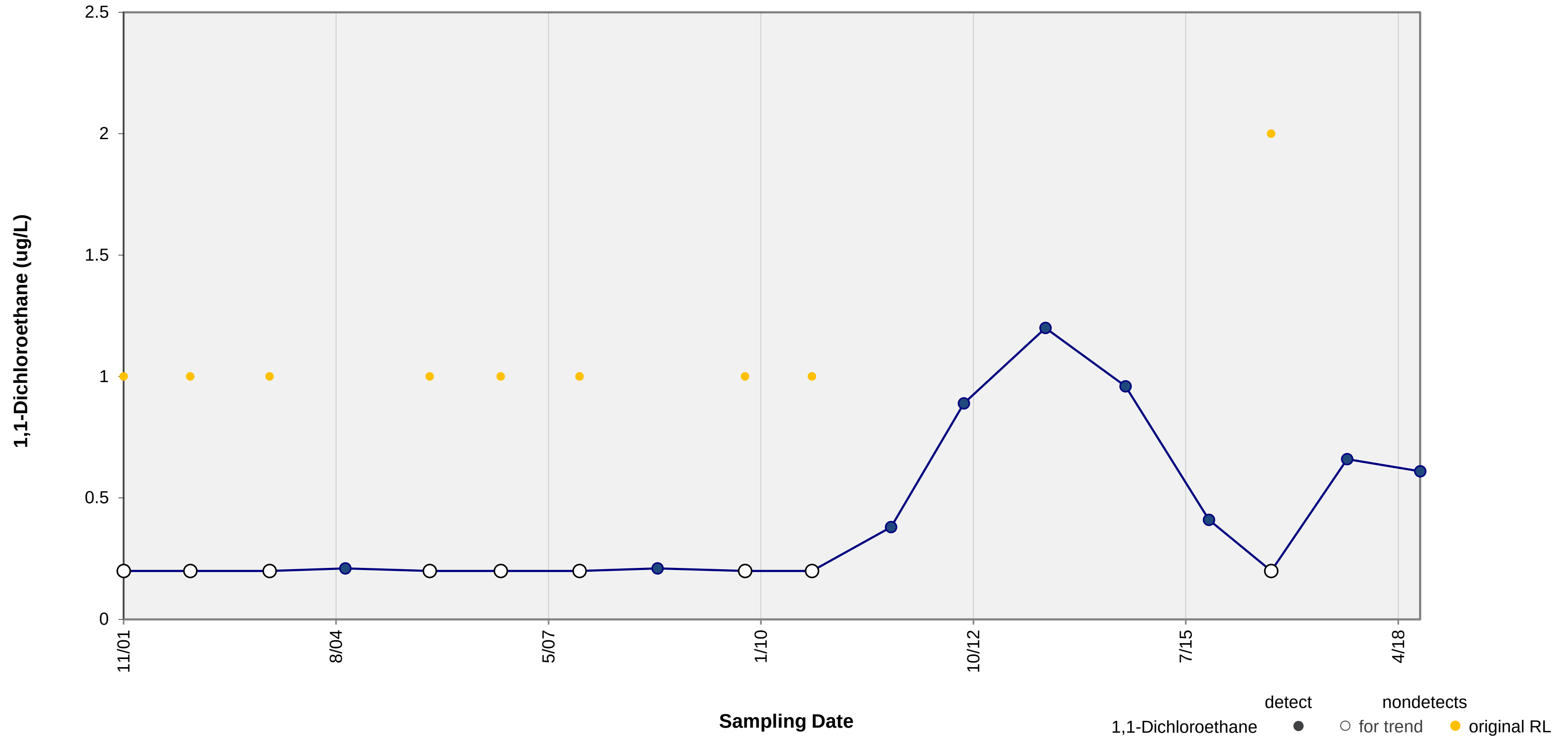
Results of Mann-Kendall Test for Trend: **INCREASING TREND**
p value = <0.001 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **INCREASING TREND**
Median Slope Estimate = 1.1E-04 ug/L Per Day
95% Confidence Interval = 5.7E-05 to 1.8E-04 ug/L Per Day

ARCADIS

Concentration vs. Time Plot – trans-1,2-Dichloroethene in Well W-4-N
RACER Trust, Moraine, Ohio

Figure G-10



Results of Mann-Kendall Test for Trend: **INCREASING TREND**

p value = 0.004 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **No trend**

Median Slope Estimate = 5.0E-05 ug/L Per Day

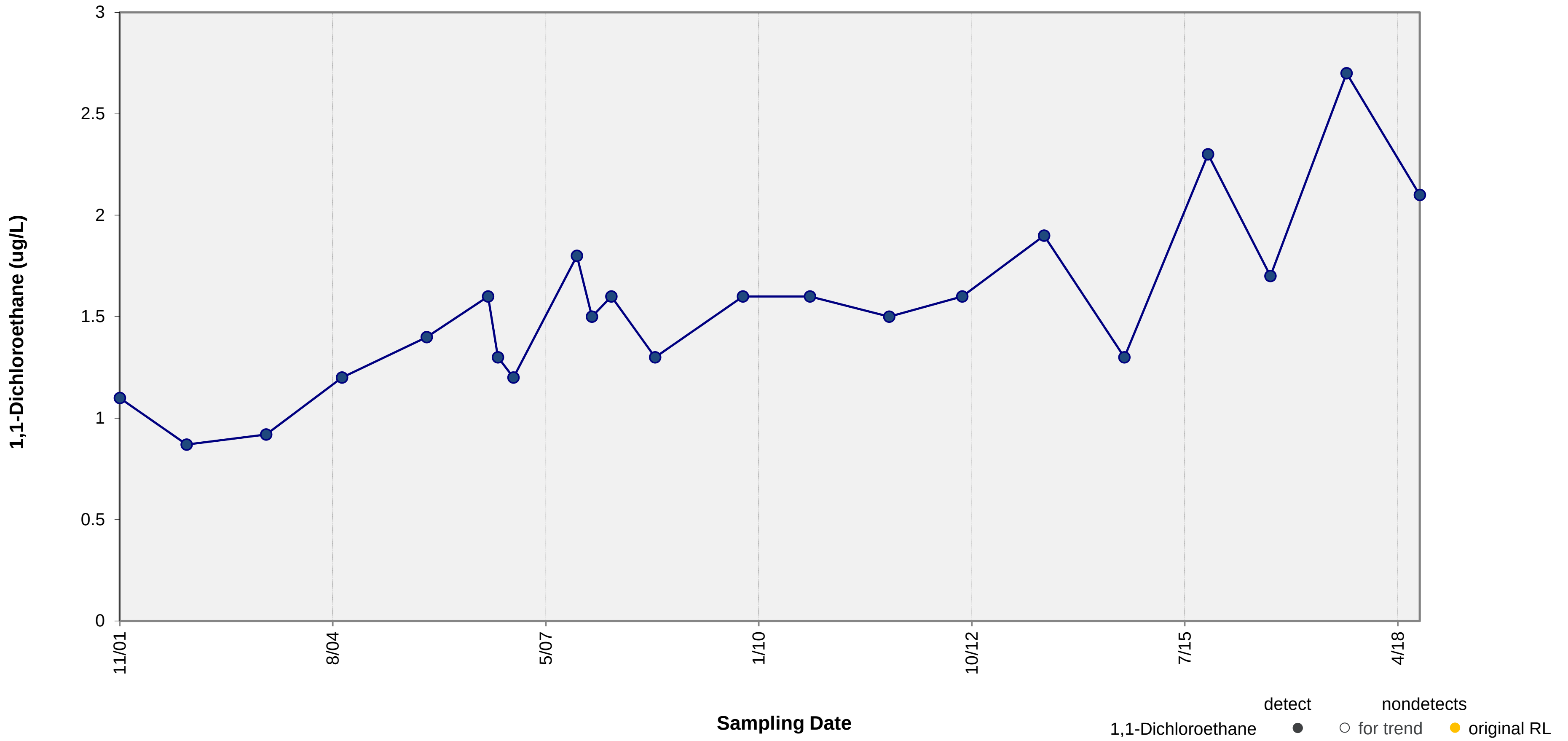
95% Confidence Interval = 0.0E+00 to 1.1E-04 ug/L Per Day

ARCADIS

Concentration vs. Time Plot – 1,1-Dichloroethane in Well W-3-S

RACER Trust, Moraine, Ohio

Figure G-11



Results of Mann-Kendall Test for Trend:	**INCREASING TREND**			
	p value =	<0.001	Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).	
Results of Sen's Estimator of Slope:	**INCREASING TREND**			
	Median Slope Estimate =	1.8E-04	ug/L Per Day	
	95% Confidence Interval =	1.1E-04	to 2.6E-04	ug/L Per Day

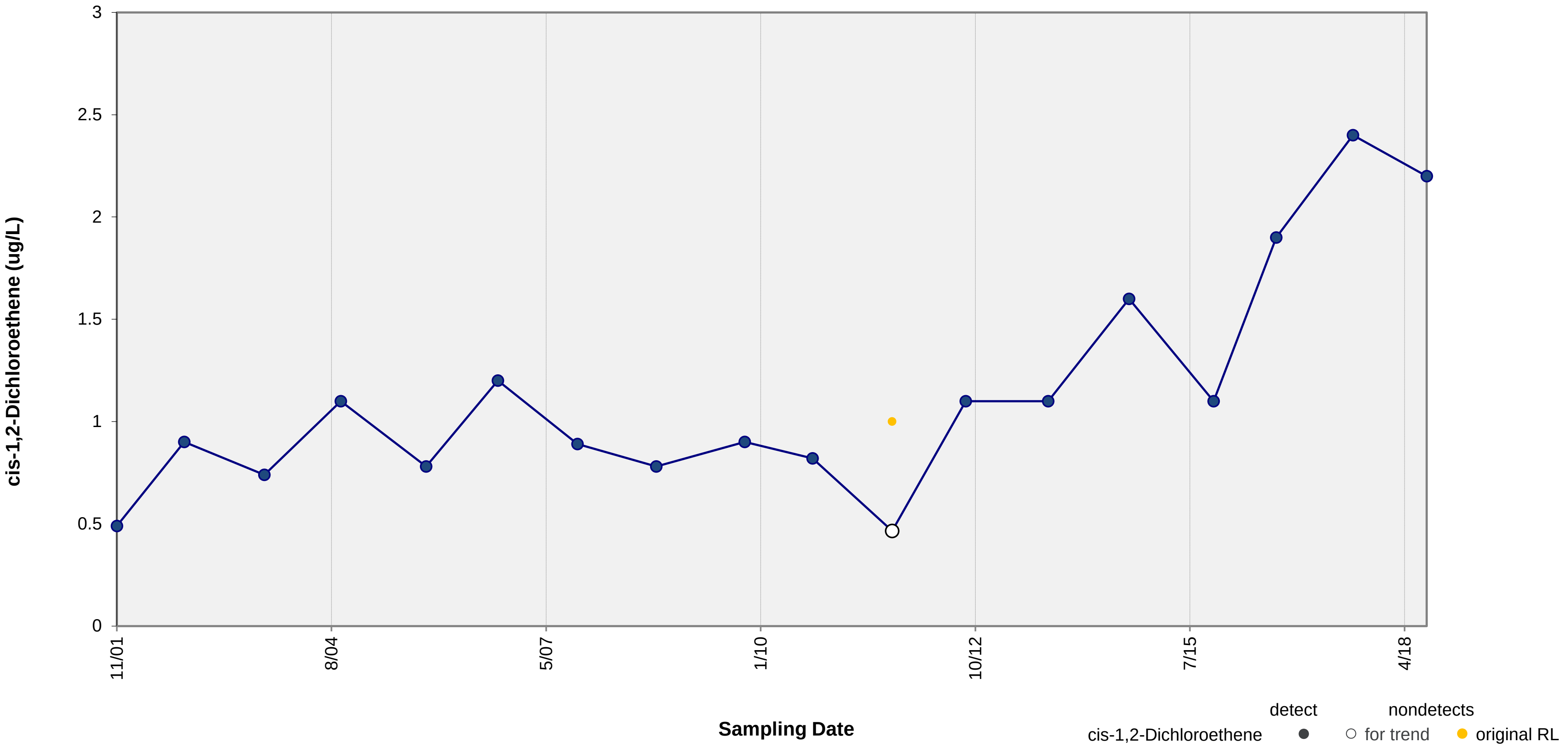
ARCADIS

Concentration vs. Time Plot – 1,1-Dichloroethane in Well W-4-S

RACER Trust, Moraine, Ohio

Figure G-12

\\OH02FP01\Data\Public\MOTORS\04- OMM Lagoon_Landfills_GWM\Lagoons and Landfills\OMM Lagoons\Supplemental Annual Report\Supplemental Annual Report 2018\Memo for Annual Report\Reference\Table G-1 and 2_Fig G-3 thru 22 - 2/13/2019



Results of Mann-Kendall Test for Trend:	**INCREASING TREND**			
	p value =	0.001	Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).	
Results of Sen's Estimator of Slope:	**INCREASING TREND**			
	Median Slope Estimate =	1.8E-04	ug/L Per Day	
	95% Confidence Interval =	7.1E-05	to	2.9E-04 ug/L Per Day

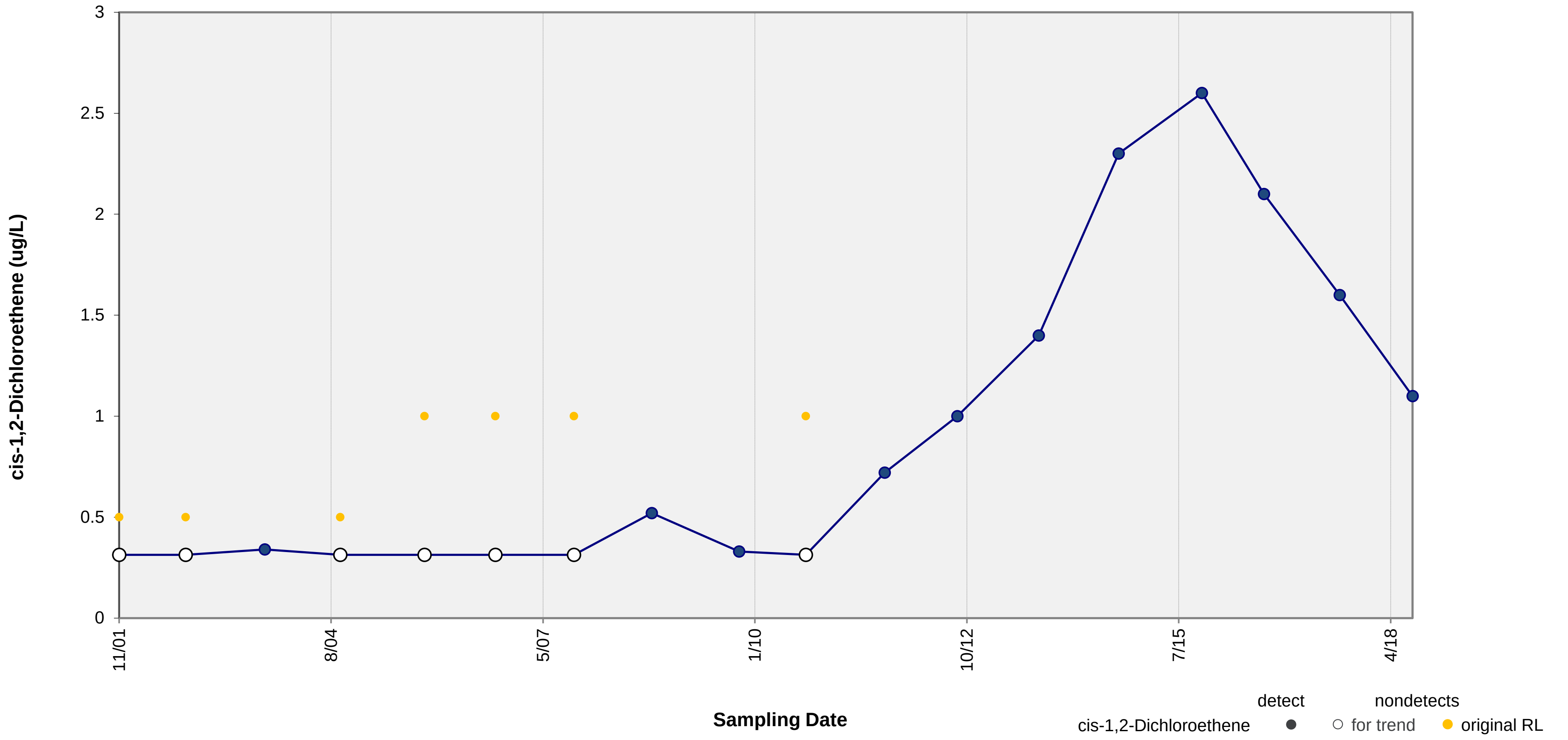
ARCADIS

Concentration vs. Time Plot – cis-1,2-Dichloroethene in Well W-2-S

RACER Trust, Moraine, Ohio

Figure G-13

\\OH02FP01\Data\Public\MOTORS\04- OMM Lagoon_Landfills_GWM\Lagoons and Landfills\OMM Lagoons\Supplemental Annual Report\Supplemental Annual Report 2018\Memo for Annual Report\Reference\Table G-1 and 2_Fig G-3 thru 22 - 2/13/2019



Results of Mann-Kendall Test for Trend: **INCREASING TREND**

p value = <0.001 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **INCREASING TREND**

Median Slope Estimate = 2.4E-04 ug/L Per Day

95% Confidence Interval = 9.6E-05 to 4.1E-04 ug/L Per Day

ARCADIS

Concentration vs. Time Plot – cis-1,2-Dichloroethene in Well W-3-S

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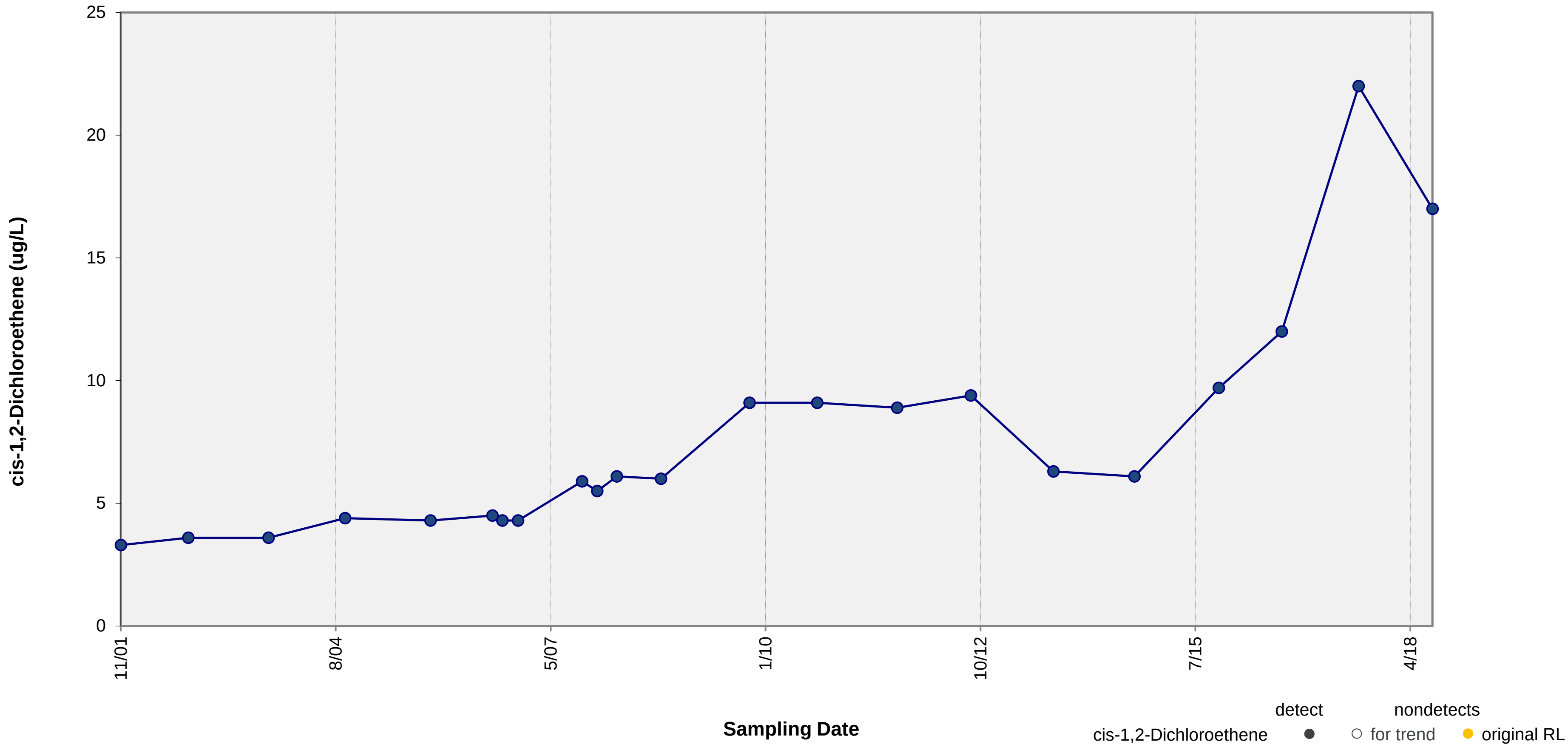
Figure G-14

\\OH02FP01\Data\Public\MOTORS\04- OMM Lagoon_Landfills_GWM\Lagoons and Landfills\OMM Lagoons\Supplemental Annual Report\Supplemental Annual Report 2018\Memo for Annual Report\Reference\Table G-1 and 2_Fig G-3 thru 22 - 2/13/2019



Results of Mann-Kendall Test for Trend:	**INCREASING TREND**			
	p value =	<0.001	Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).	
Results of Sen's Estimator of Slope:	**INCREASING TREND**			
	Median Slope Estimate =	1.7E-03	ug/L Per Day	
	95% Confidence Interval =	1.2E-03	to 2.3E-03	ug/L Per Day

ARCADIS

Concentration vs. Time Plot – cis-1,2-Dichloroethene in Well W-4-S

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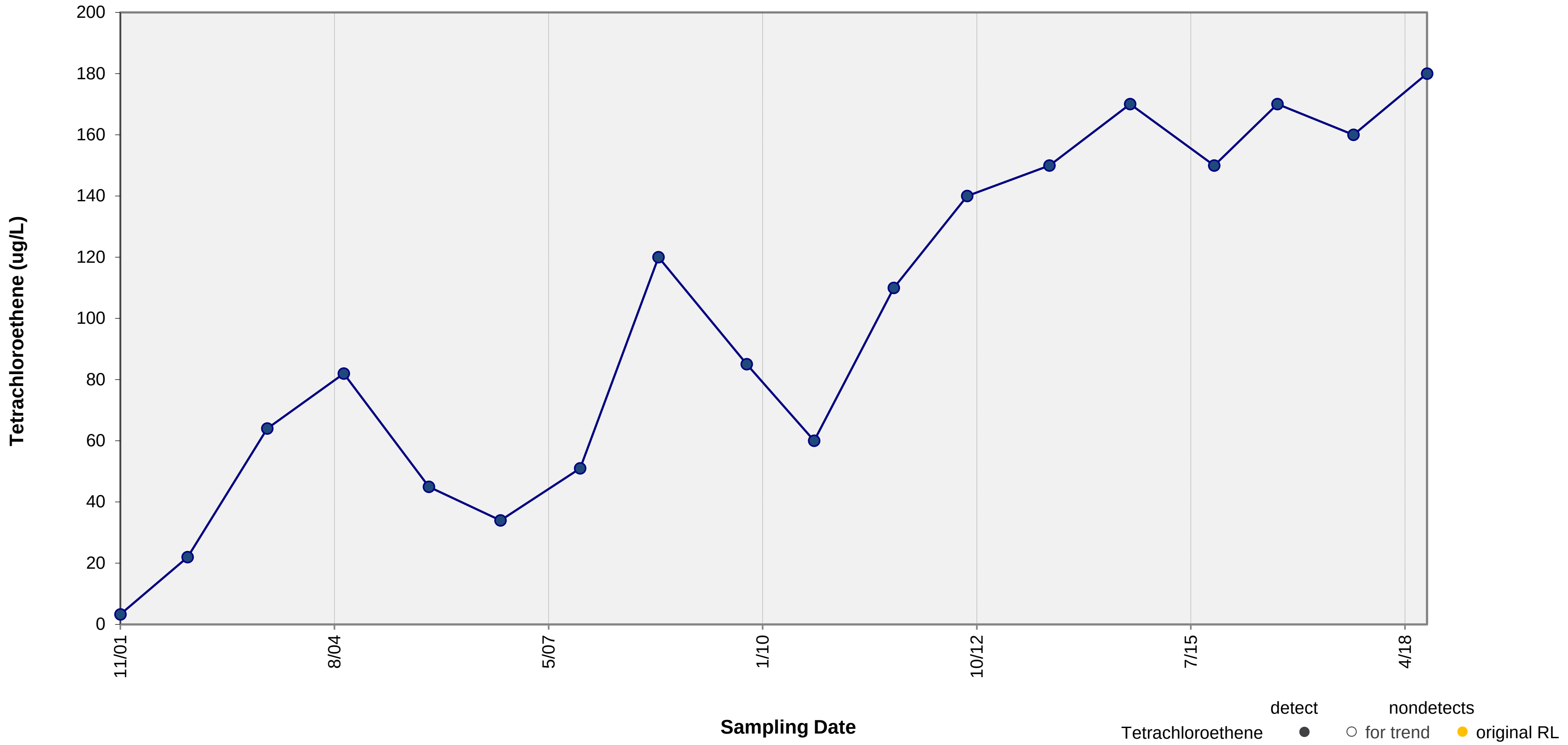
Figure G-15

\\OH02FP01\Data\Public\MOTORS\04- OMM Lagoon_Landfills_GWM\Lagoons and Landfills\OMM Lagoons\Supplemental Annual Report\Supplemental Annual Report 2018\Memo for Annual Report\Reference\Table G-1 and 2_Fig G-3 thru 22 - 2/13/2019



Results of Mann-Kendall Test for Trend: **INCREASING TREND**

p value = <0.001 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **INCREASING TREND**

Median Slope Estimate = 2.7E-02 ug/L Per Day

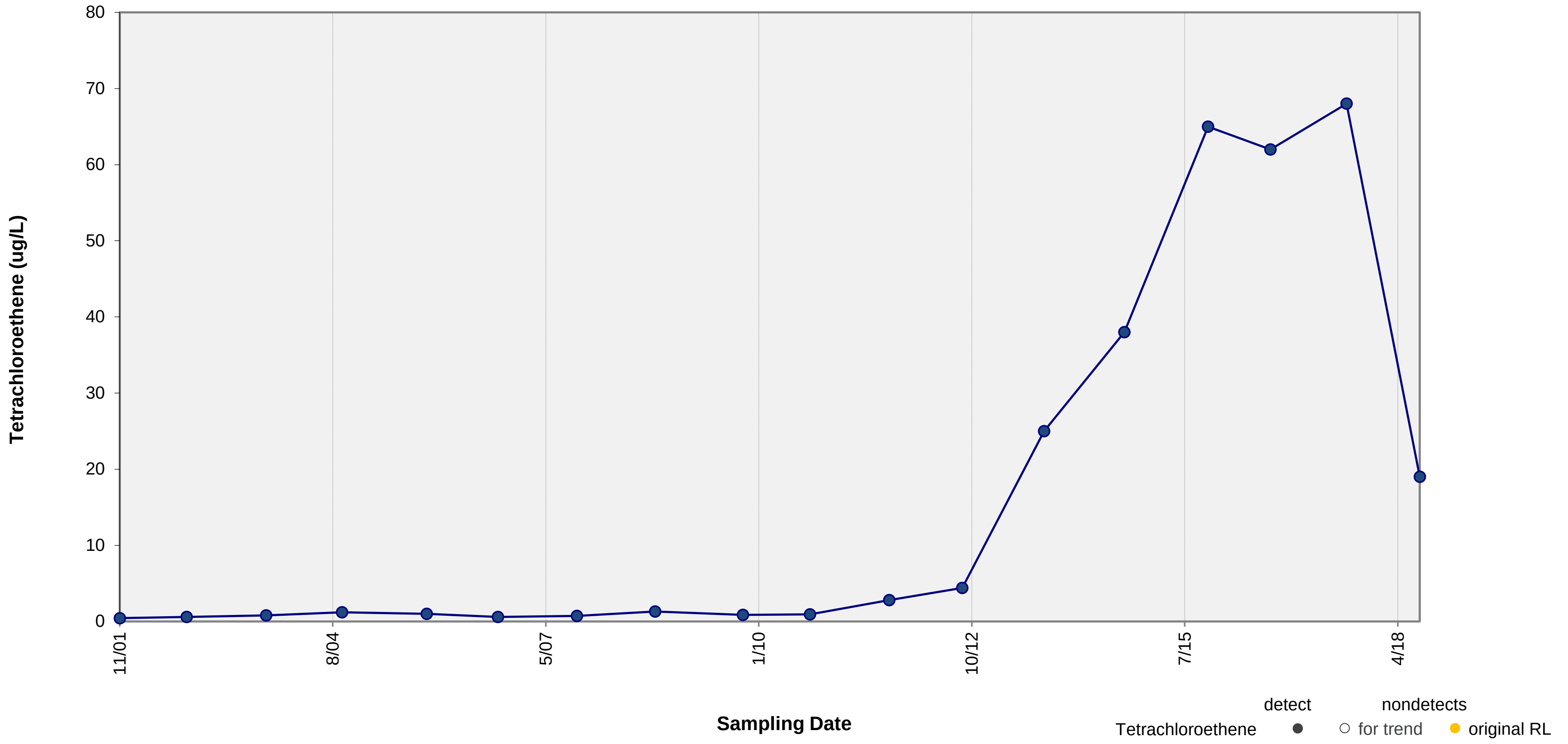
95% Confidence Interval = 1.9E-02 to 3.4E-02 ug/L Per Day

ARCADIS

Concentration vs. Time Plot – Tetrachloroethene in Well HR-17

RACER Trust, Moraine, Ohio

Figure G-16



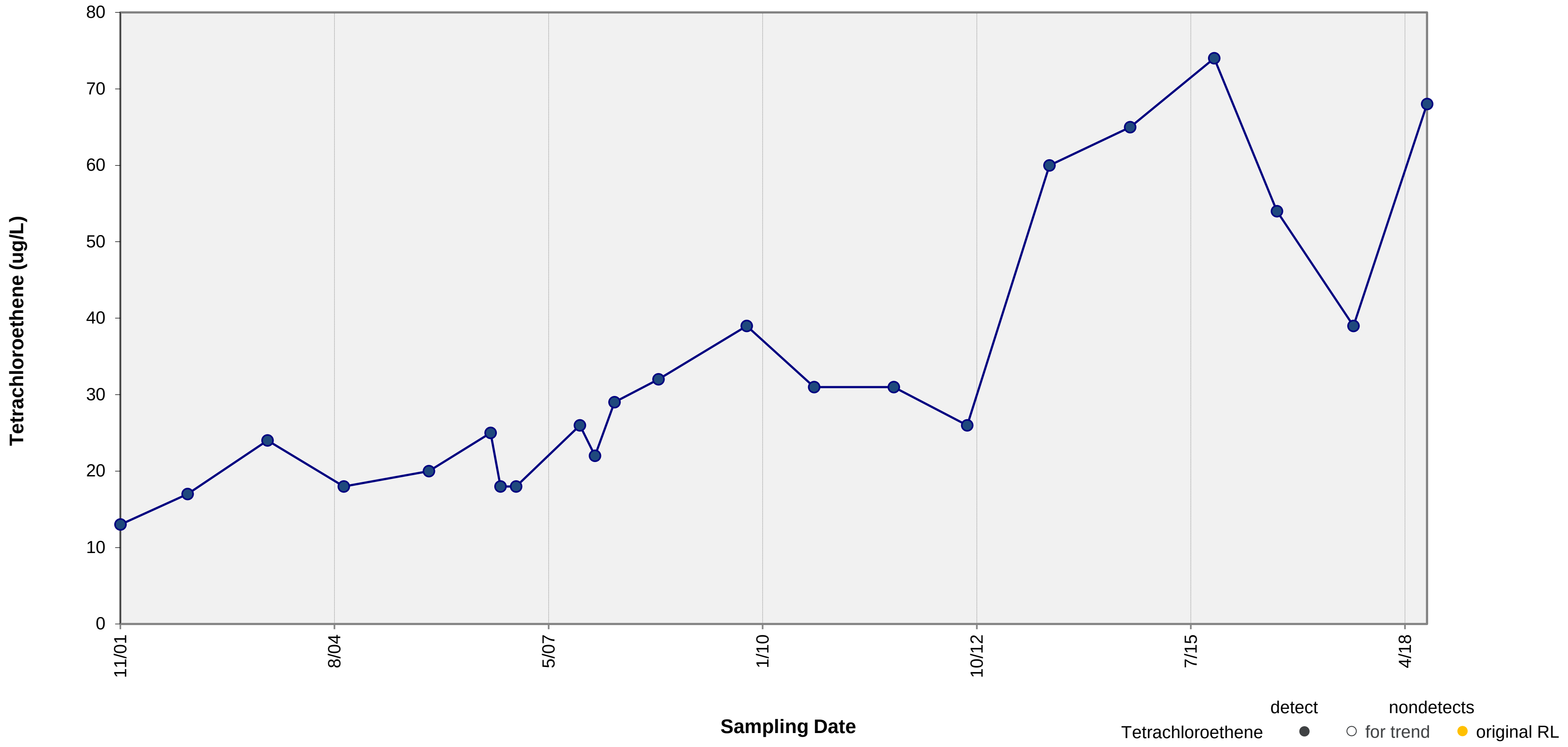
Results of Mann-Kendall Test for Trend: **INCREASING TREND**
p value = <0.001 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **INCREASING TREND**
Median Slope Estimate = 4.6E-03 ug/L Per Day
95% Confidence Interval = 7.1E-04 to 1.3E-02 ug/L Per Day

ARCADIS

Concentration vs. Time Plot – Tetrachloroethene in Well W-3-S
RACER Trust, Moraine, Ohio

Figure G-17



Results of Mann-Kendall Test for Trend: **INCREASING TREND**

p value = <0.001 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **INCREASING TREND**

Median Slope Estimate = 8.1E-03 ug/L Per Day

95% Confidence Interval = 4.7E-03 to 1.1E-02 ug/L Per Day

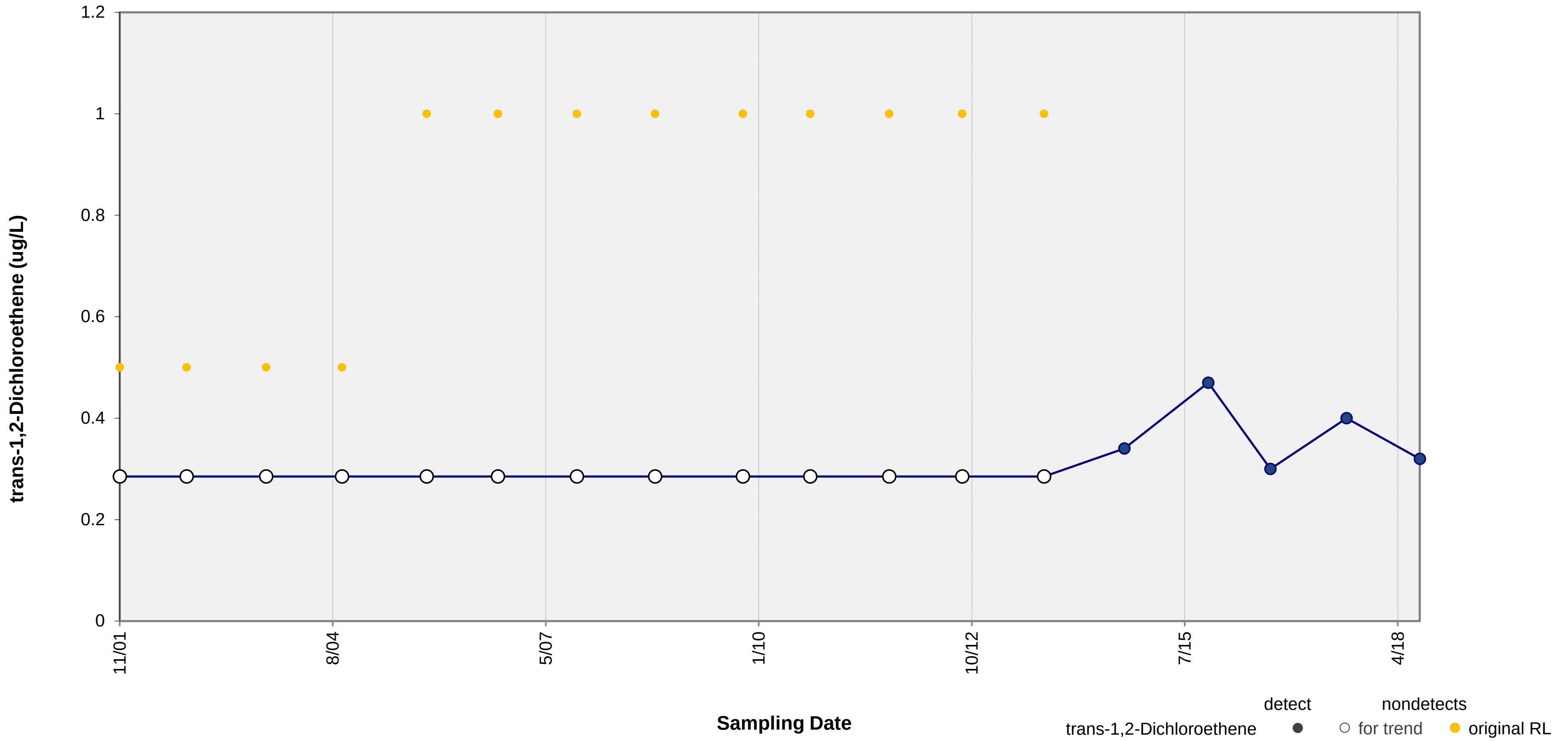
ARCADIS

Concentration vs. Time Plot – Tetrachloroethene in Well W-4-S

RACER Trust, Moraine, Ohio

Figure G-18

\\OH02FP01\Data\Public\MOTORS\04- OMM Lagoon_Landfills_GWM\Lagoons and Landfills\OMM Lagoons\Supplemental Annual Report\Supplemental Annual Report 2018\Memo for Annual Report\Reference\Table G-1 and 2_Fig G-3 thru 22 - 2/13/2019



Results of Mann-Kendall Test for Trend: **INCREASING TREND**

p value = 0.001 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **No trend**

Median Slope Estimate = 0.0E+00 ug/L Per Day

95% Confidence Interval = 0.0E+00 to 6.8E-06 ug/L Per Day

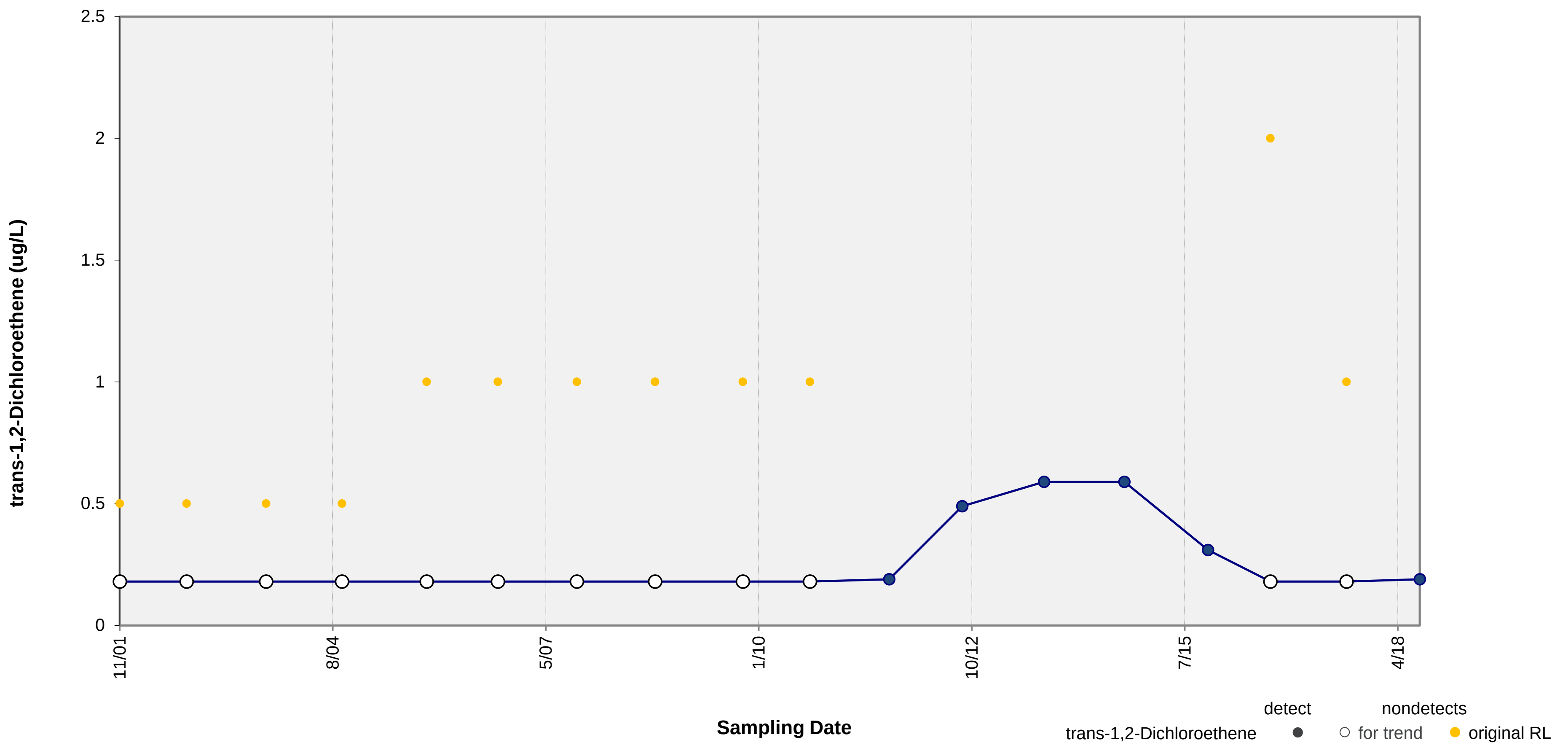
ARCADIS

Concentration vs. Time Plot – trans-1,2-Dichloroethene in Well W-2-S

RACER Trust, Moraine, Ohio

Figure G-19

\\OH02FP01\Data\Public\MOTORS\04- OMM Lagoon_Landfills_GWM\Lagoons and Landfills\OMM Lagoons\Supplemental Annual Report\Supplemental Annual Report 2018\Memo for Annual Report\Reference\Table G-1 and 2_Fig G-3 thru 22 - 2/13/2019



Results of Mann-Kendall Test for Trend:	**INCREASING TREND**			
	p value =	0.011	Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).	
Results of Sen's Estimator of Slope:	**No trend**			
	Median Slope Estimate =	0.0E+00	ug/L Per Day	
	95% Confidence Interval =	0.0E+00	to 3.3E-06	ug/L Per Day

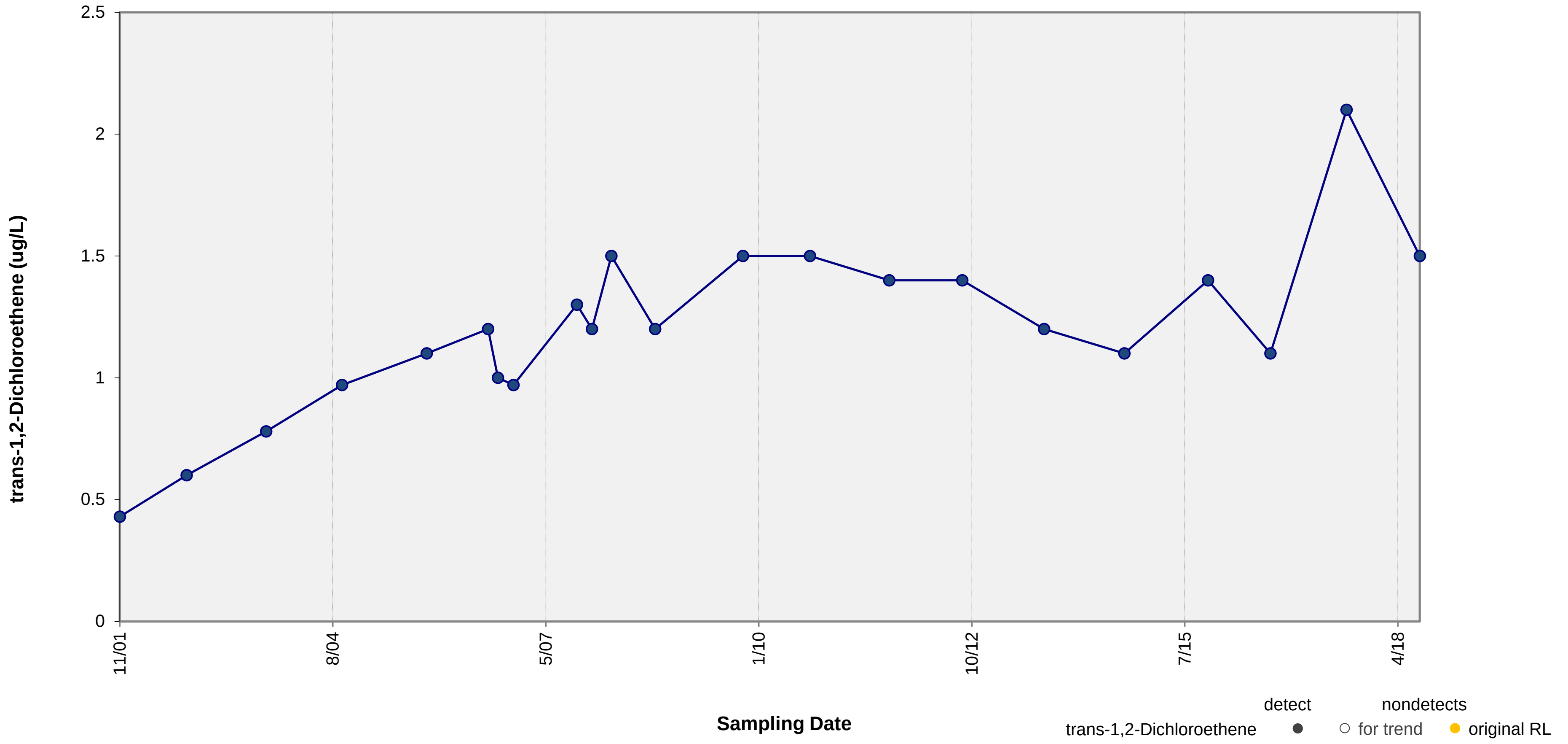
ARCADIS

Concentration vs. Time Plot – trans-1,2-Dichloroethene in Well W-3-S

RACER Trust, Moraine, Ohio

Figure G-20

\\OH02FP01\Data\Public\MOTORS\04- OMM Lagoon_Landfills_GWM\Lagoons and Landfills\OMM Lagoons\Supplemental Annual Report\Supplemental Annual Report 2018\Memo for Annual Report\Reference\Table G-1 and 2_Fig G-3 thru 22 - 2/13/2019



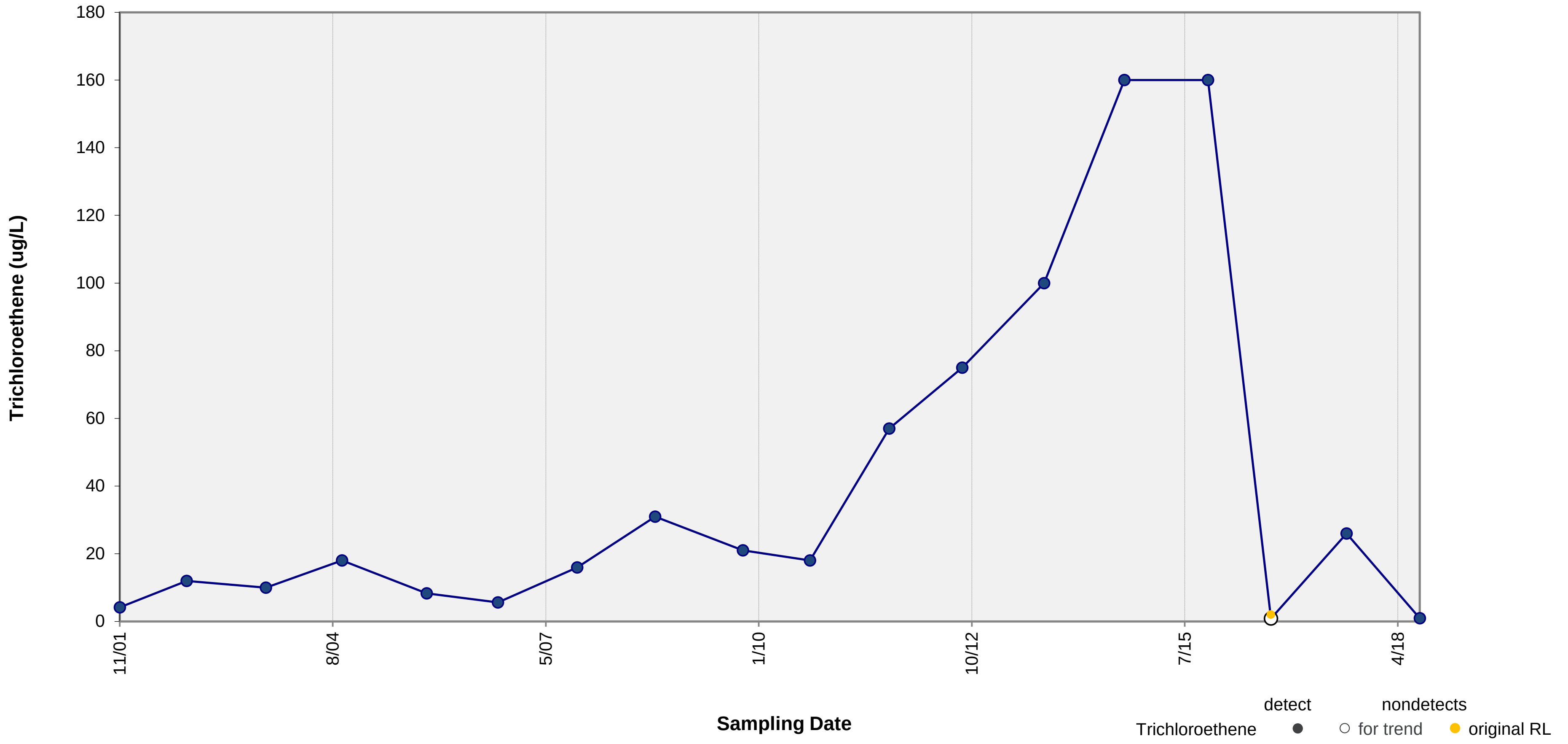
Results of Mann-Kendall Test for Trend:	**INCREASING TREND**			
	p value =	<0.001	Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).	
Results of Sen's Estimator of Slope:	**INCREASING TREND**			
	Median Slope Estimate =	1.5E-04	ug/L Per Day	
	95% Confidence Interval =	6.9E-05	to 2.4E-04	ug/L Per Day

ARCADIS

Concentration vs. Time Plot – trans-1,2-Dichloroethene in Well W-4-S

RACER Trust, Moraine, Ohio

Figure G-21



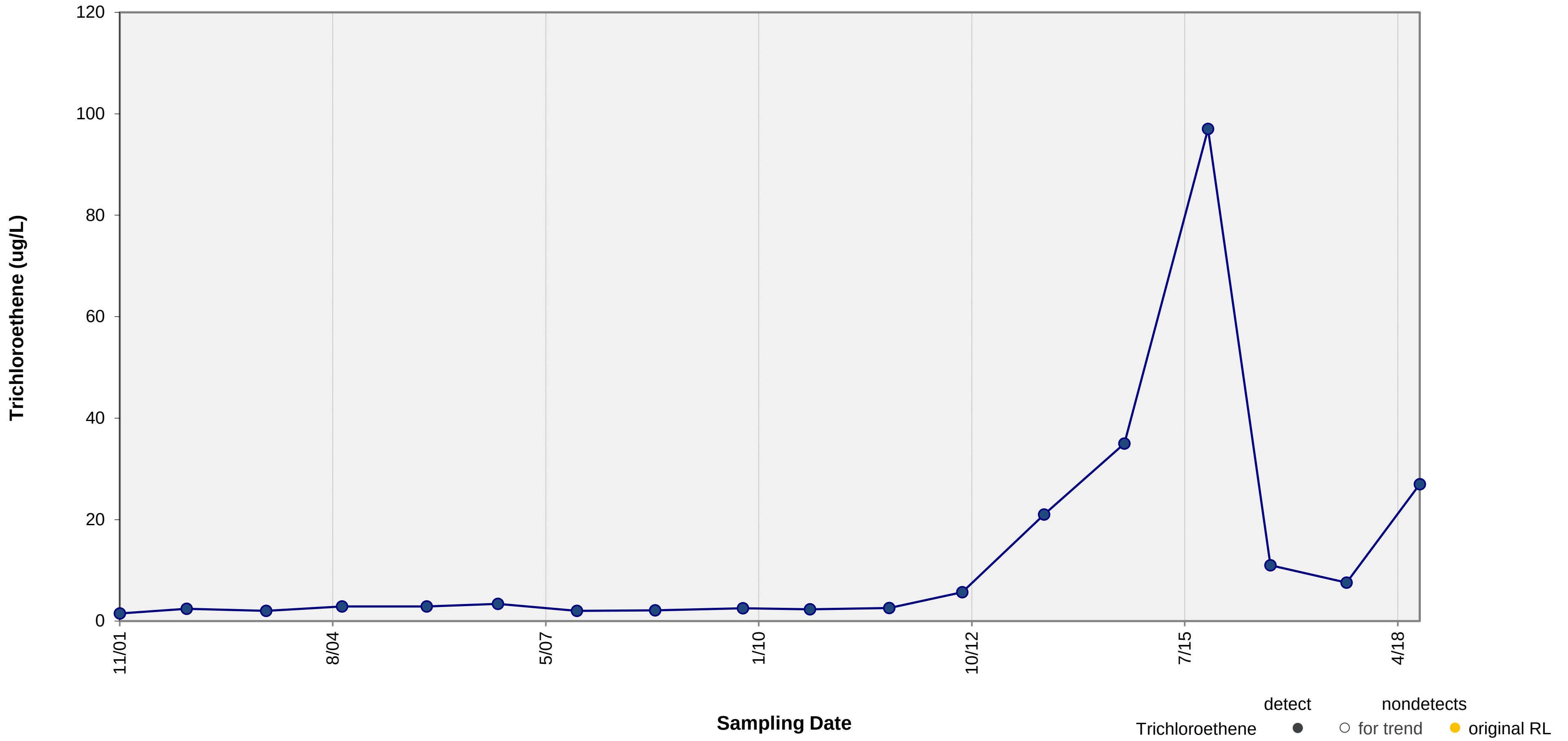
Results of Mann-Kendall Test for Trend:	**INCREASING TREND**					
	p value =	0.024	Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).			
Results of Sen's Estimator of Slope:	**No trend**					
	Median Slope Estimate =		8.2E-03	ug/L Per Day		
	95% Confidence Interval =		0.0E+00	to	2.5E-02	ug/L Per Day

ARCADIS

Concentration vs. Time Plot – Trichloroethene in Well HR-17
RACER Trust, Moraine, Ohio

Figure G-22

\\OH02FP01\Data\Public\MOTORS\04- OMM Lagoon_Landfills_GWM\Lagoons and Landfills\OMM Lagoons\Supplemental Annual Report\Supplemental Annual Report 2018\Memo for Annual Report\Reference\Table G-1 and 2_Fig G-3 thru 22 - 2/13/2019



Results of Mann-Kendall Test for Trend: **INCREASING TREND**

p value = <0.001 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **INCREASING TREND**

Median Slope Estimate = 1.7E-03 ug/L Per Day

95% Confidence Interval = 6.7E-04 to 4.6E-03 ug/L Per Day

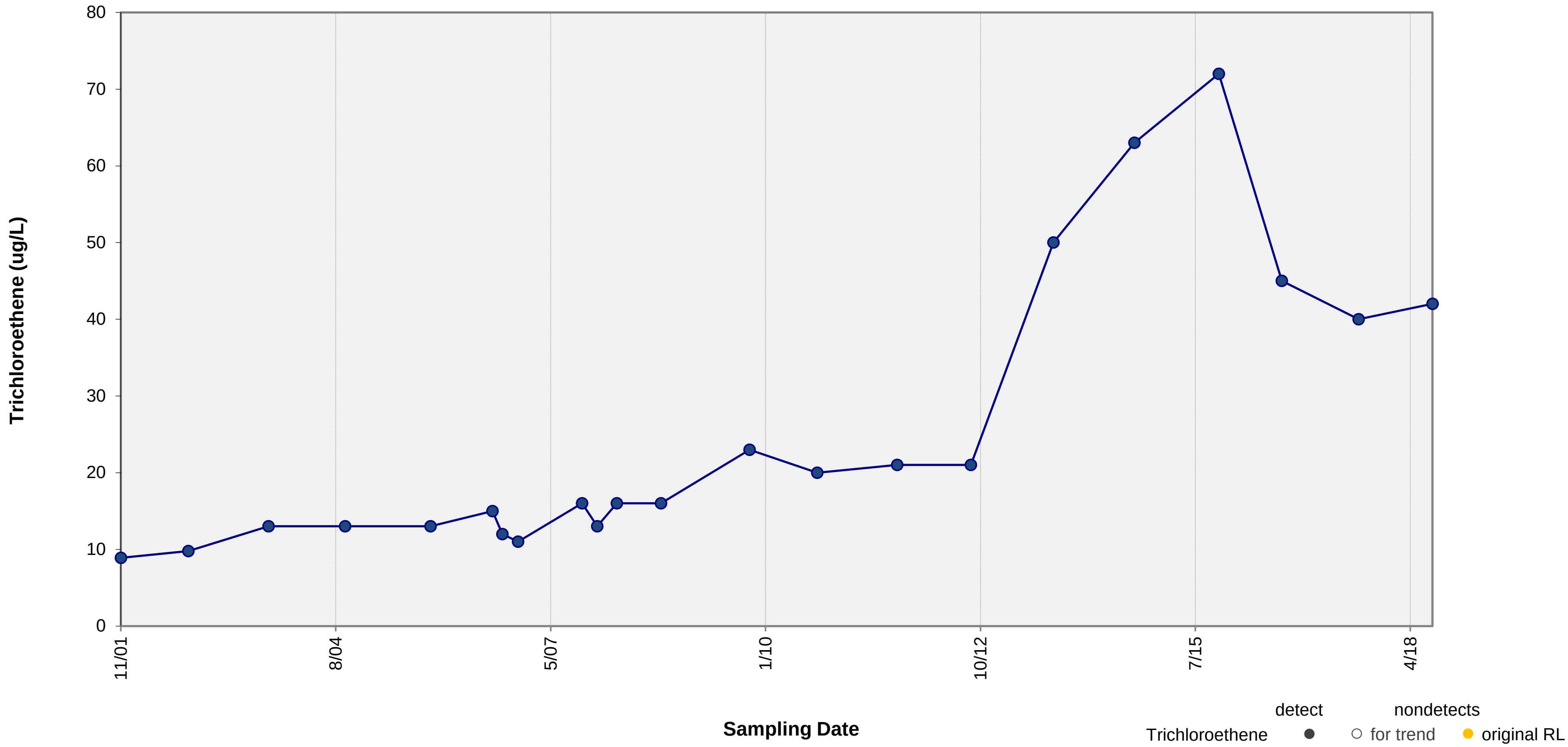
ARCADIS

Concentration vs. Time Plot – Trichloroethene in Well W-3-S

RACER Trust, Moraine, Ohio

Figure G-23

\\OH02FP01\Data\Public\MOTORS\04- OMM Lagoon_Landfills_GWM\Lagoons and Landfills\OMM Lagoons\Supplemental Annual Report\Supplemental Annual Report 2018\Memo for Annual Report\Reference\Table G-1 and 2_Fig G-3 thru 22 - 2/13/2019



Results of Mann-Kendall Test for Trend: **INCREASING TREND**

p value = <0.001 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **INCREASING TREND**

Median Slope Estimate = 5.7E-03 ug/L Per Day

95% Confidence Interval = 3.4E-03 to 7.6E-03 ug/L Per Day

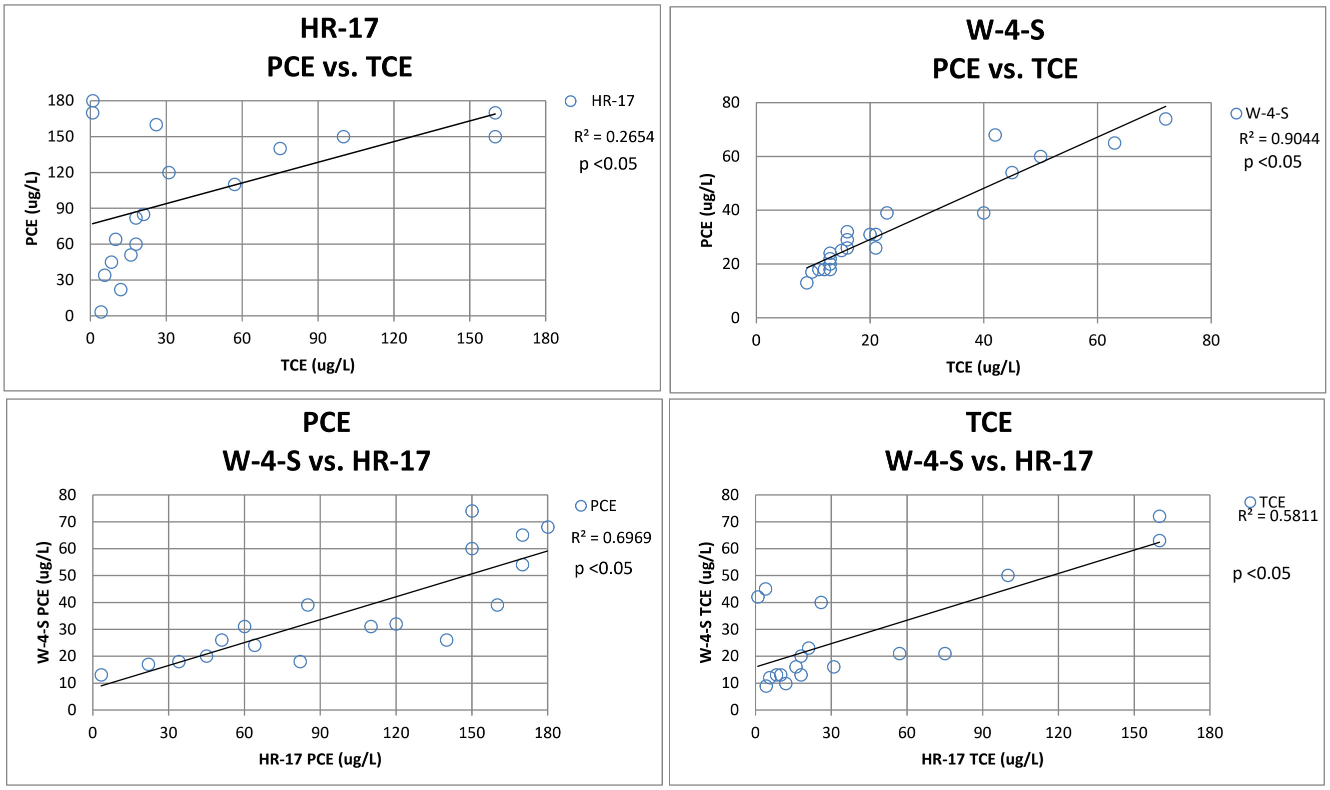
ARCADIS

Concentration vs. Time Plot – Trichloroethene in Well W-4-S

RACER Trust, Moraine, Ohio

Figure G-24

Figure G-25
South Settling Lagoon Upgradient vs Downgradient Wells



Notes:

All results are in micrograms per liter.

Coefficient of determination was calculated in Excel 2016.

Pearson product moment correlation significance was tested using Excel 2016.

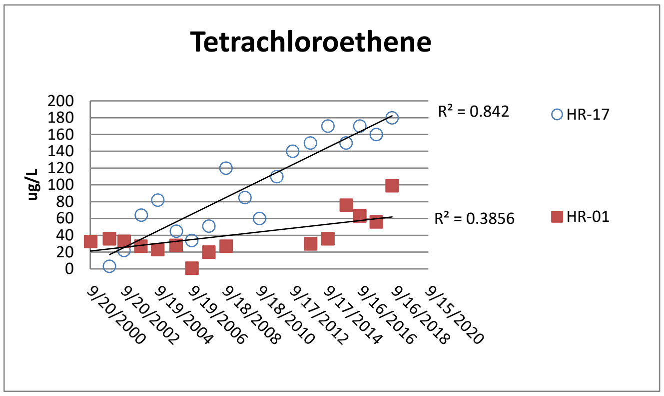
PCE = Tetrachloroethene

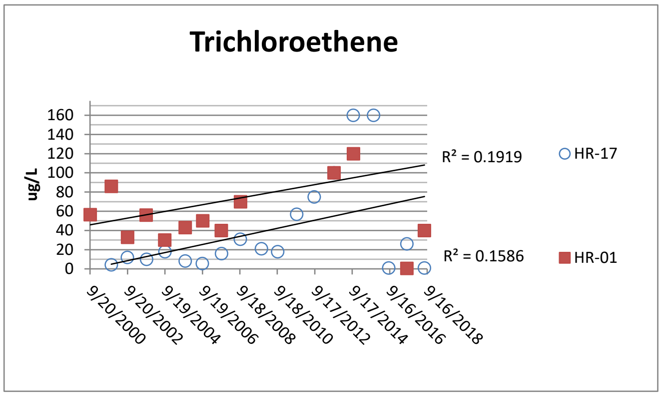
TCE = Trichloroethene

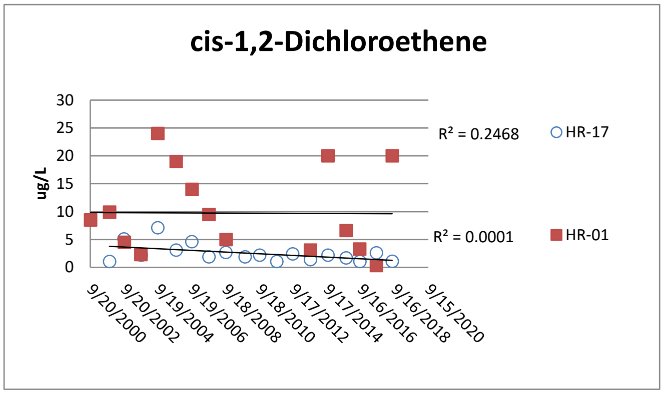
p = p-value for significance of the correlation

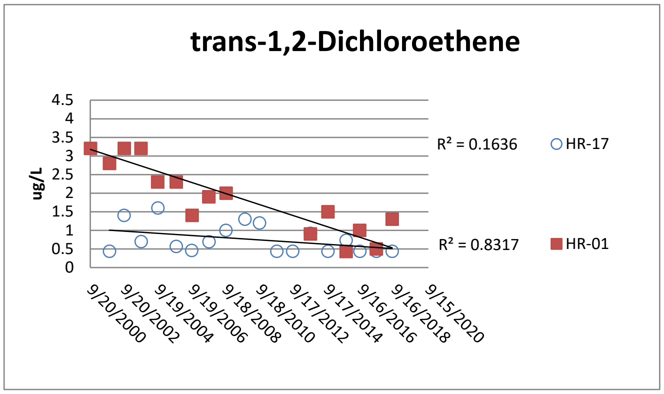
R^2 = coeffiecient of determination

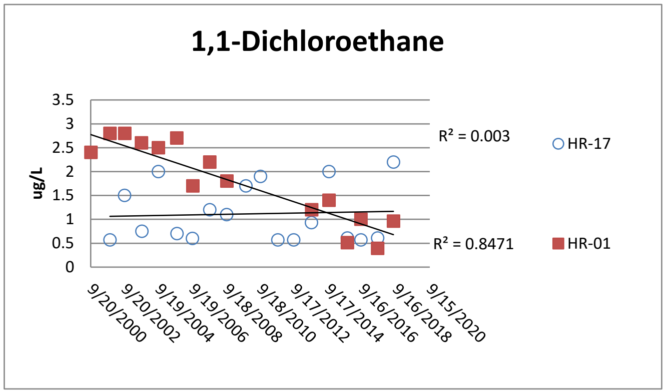
Figure G-26
South Settling Lagoon Upgradient Wells











Notes:

All results are in micrograms per liter.

Coefficient of determination was calculated in Excel 2016.

R^2 = coeffiecient of determination

ATTACHMENT G-1

Groundwater Sampling Forms

Groundwater Sampling Form

Project No. OH000294.2018.0004B
Well ID HR-4
Date 07.24.2018

Project Name/Location Racer Trust-Moraine Ohio
Weather Clouds 70s

Measuring Pt. Description Top of Casing
Screen Setting (ft-bmp) 55-65
Casing Diameter (in.) 2
Well Material X PVC / SS

Static Water Level (ft-bmp) 31.73
Total Depth (ft-bmp) 66.8
Water Column 35.07
Gallons in Well 5.6

MP Elevation
Pump Intake (ft-bmp) 60
Purge Method: Low Flow
Centrifugal
Submersible X
Other
Sample Method Low Flow

Pump On
Off
Volumes Purged 0.94

Sample Time: Label 12:00
Gallons Purged 5.25
Purge Start 11:05
Purge End 11:50
Replicate/ Code No. NA
Sampled by SEC

Time	Minutes Elapsed	Rate (gpm) (mL/min)	Depth to Water (ft)	Gallons Purged	pH	Cond. (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temp. (^oC)	Redox (mV)	Appearance Color	Appearance Odor
1105	0	NM	NM	0	7.6	0.951	27	2.1	19.4	104	Colorless	No
1110	5	442	NM	0.6	7.3	0.966	45	0	17.9	104	Colorless	No
1115	10	442	NM	1.2	7.1	1.03	63	0	15.6	72	Colorless	No
1120	15	442	NM	1.8	7.1	1.03	61	0	15.8	58	Colorless	No
1125	20	442	NM	2.3	7.1	1.03	22	0	15.5	46	Colorless	No
1130	25	442	NM	2.9	7.1	1.03	13	0	15.7	37	Colorless	No
1135	30	442	NM	3.5	7.1	1.02	7.5	0	15.8	31	Colorless	No
1140	35	442	NM	4.1	7.1	1.02	5.3	0	15.9	27	Colorless	No
1145	40	442	NM	4.7	7.1	1.02	4.6	0	16.1	26	Colorless	No
1150	45	442	NM	5.25	7.1	1.02	4.4	0	16.3	25	Colorless	No

Constituents Sampled	Container	Number	Preservative
VOCs	40 mL Glass Vial	3	HCL

Comments DO probe not functioning properly.

Well Casing Volumes

Gallons/Foot 1" = 0.04; 1.25" = 0.06; 1.5" = 0.09; 2" = 0.16; 2.5" = 0.26; 3" = 0.37; 3.5" = 0.50; 4" = 0.65; 6" = 1.47

Well Information

Well Location:		Well Locked at Arrival:	Yes / No
Condition of Well:		Well Locked at Departure:	Yes / No
Well Completion:	Flush Mount / Stick Up	Key Number To Well:	

ARCADIS Design & Consultancy for natural and built assets

Groundwater Sampling Form

Project No. OH000294.2018.0004B Well ID W-2-N Date 07.24.2018

Project Name/Location Racer Trust-Moraine Ohio Weather Clouds 70s

Measuring Pt. Description Top of Casing Screen Setting (ft-bmp) 35-60 Casing Diameter (in.) 4 Well Material X PVC ___ SS

Static Water Level (ft-bmp) 21.3 Total Depth (ft-bmp) 59.7 Water Column 38.4 Gallons in Well 25.0

MP Elevation ____ Pump Intake (ft-bmp) 48 Purge Method: Low Flow Sample Method Low Flow

Pump On ____ Off ____ Volumes Purged 0.33 Centrifugal ____ Submersible X Other ____

Sample Time: Label 10:20 Gallons Purged 8.25

Purge Start 9:15 Replicate/ Code No. NA Sampled by SEC

Purge End 10:10

Time	Minutes Elapsed	Rate (gpm) (mL/min)	Depth to Water (ft)	Gallons Purged	pH	Cond. (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temp. (^oC)	Redox (mV)	Appearance Color	Appearance Odor
915	0	NM	NM	0	7.0	1.1	287	0	16.2	-107	Orange	No
920	5	568	21.3	0.8	7.0	1.07	258	0	15.5	-142	Orange	No
925	10	568	21.3	1.5	7.1	1.06	197	0	15.6	-146	Orange	No
930	15	568	21.3	2.3	7.1	1.05	145	NM	15.5	-147	Orange	No
935	20	568	21.3	3.0	7.1	1.05	124	NM	15.6	-146	Tan	No
940	25	568	21.3	3.8	7.1	1.04	129	NM	15.6	-134	Tan	No
945	30	568	21.3	4.5	7.1	1.06	138	NM	15.6	-129	Tan	No
950	35	568	21.3	5.3	7.1	1.05	75	NM	15.2	-133	Colorless	No
955	40	568	21.3	6.0	7.1	1.04	43	NM	15.1	-131	Colorless	No
1000	45	568	21.3	6.8	7.1	1.04	37	NM	15.5	-131	Colorless	No
1005	50	568	21.3	7.5	7.1	1.04	37	NM	15.6	-131	Colorless	No
1010	55	568	21.3	8.25	7.1	1.04	38	NM	15.6	-132	Colorless	No

Constituents Sampled	**Container**	**Number**	**Preservative**
VOCs	40 mL Glass Vial	3	HCL

Comments DO probe not functioning properly.

Well Casing Volumes

Gallons/Foot 1" = 0.04 1.25" = 0.06 1.5" = 0.09 2" = 0.16 2.5" = 0.26 3" = 0.37 3.5" = 0.50 4" = 0.65 6" = 1.47

Well Information

Well Location:		Well Locked at Arrival:	Yes / No
Condition of Well:		Well Locked at Departure:	Yes / No
Well Completion:	Flush Mount / Stick Up	Key Number To Well:	

ARCADIS Design & Consultancy for natural and built assets

Groundwater Sampling Form

Project No. OH000294.2018.0004B Well ID W-3-N Date 07.24.2018

Project Name/Location Racer Trust-Moraine Ohio Weather Sun 70s

Measuring Pt. Description Top of Casing Screen Setting (ft-bmp) 35-57 Casing Diameter (in.) 4 Well Material X PVC ___ SS

Static Water Level (ft-bmp) 23.23 Total Depth (ft-bmp) 57.6 Water Column 34.37 Gallons in Well 22.3

MP Elevation ______ Pump Intake (ft-bmp) 46 Purge Method: Low Flow Sample Method Low Flow

Centrifugal ______ Submersible X Other ______

Pump On ______ Off ______ Volumes Purged 0.49

Sample Time: Label 13:45 Gallons Purged 11

Purge Start 12:35 Replicate/ Code No. NA Sampled by SEC

Purge End 13:35

Time	Minutes Elapsed	Rate (gpm) (mL/min)	Depth to Water (ft)	Gallons Purged	pH	Cond. (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temp. (^oC)	Redox (mV)	Appearance Color	Appearance Odor
1235	0	NM	23.2	0	7.2	1.1	255	NM	17.7	-135	Orange	No
1240	5	694	23.3	0.9	7.1	1.14	910	NM	15.6	-145	Orange	No
1245	10	694	23.3	1.8	7	1.13	743	NM	16.1	-147	Orange	No
1250	15	694	23.3	2.8	7	1.13	737	NM	16.2	-149	Orange	No
1255	20	694	23.3	3.7	7.1	1.13	622	NM	16.2	-151	Orange	No
1300	25	694	23.3	4.6	7.1	1.12	438	NM	16	-151	Tan	No
1305	30	694	23.3	5.5	7.1	1.14	315	NM	15.9	-151	Tan	No
1310	35	694	23.3	6.4	7.1	1.12	222	NM	16.2	-151	Tan	No
1315	40	694	23.3	7.3	7.1	1.12	191	NM	16.7	-152	Tan	No
1320	45	694	23.3	8.3	7.1	1.13	147	NM	16.5	-152	Tan	No
1325	50	694	23.3	9.2	7.1	1.13	119	NM	16.5	-152	Tan	No
1330	55	694	23.3	10.1	7.1	1.12	108	NM	16.8	-152	Tan	No
1335	60	694	23.3	11	7.1	1.13	100	NM	16.4	-153	Tan	No

Constituents Sampled	**Container**	**Number**	**Preservative**
VOCs	40 mL Glass Vial	3	HCL

Comments DO probe not functioning properly.

Well Casing Volumes

Gallons/Foot					
	1" = 0.04	1.5" = 0.09	2.5" = 0.26	3.5" = 0.50	6" = 1.47
	1.25" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65	

Well Information

Well Location:		Well Locked at Arrival:	Yes / No
Condition of Well:		Well Locked at Departure:	Yes / No
Well Completion:	Flush Mount / Stick Up	Key Number To Well:	

ARCADIS Design & Consultancy for natural and built assets

Groundwater Sampling Form

Project No. OH000294.2018.0004B   Well ID W-4-N   Date 07.25.2018

Project Name/Location Racer Trust-Moraine Ohio   Weather Sun 70s

Measuring Pt. Description Top of Casing   Screen Setting (ft-bmp) 40-65   Casing Diameter (in.) 4   Well Material X PVC ___ SS

Static Water Level (ft-bmp) 21.1   Total Depth (ft-bmp) 66.6   Water Column 45.5   Gallons in Well 29.6

MP Elevation ______   Pump Intake (ft-bmp) 43   Purge Method: Low Flow   Centrifugal ______ Submersible X   Other ______   Sample Method Low Flow

Pump On ______ Off ______   Volumes Purged 0.17

Sample Time: Label 8:45   Gallons Purged 5

Purge Start 7:35   Replicate/ Code No. NA   Sampled by SEC

Purge End 8:35

Time	Minutes Elapsed	Rate (gpm) (mL/min)	Depth to Water (ft)	Gallons Purged	pH	Cond. (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temp. (^oC)	Redox (mV)	Appearance Color	Appearance Odor
735	0	NM	21.1	0	6.6	1.46	247		15.1	-56	Tan	No
740	5	315	21.1	0.4	6.7	1.45	200		15	-69	Tan	No
745	10	315	21.1	0.8	6.7	1.44	266		15.4	-68	Tan	No
750	15	315	21.1	1.2	6.7	1.44	236		15.9	-67	Tan	No
755	20	315	21.1	1.7	6.8	1.44	282		15.8	-40	Tan	No
800	25	315	21.1	2.1	6.8	1.44	354		15.7	-27	Tan	No
805	30	315	21.1	2.5	6.8	1.46	371		15.3	-20	Tan	No
810	35	315	21.1	2.9	6.8	1.43	333		15.6	-11	Tan	No
815	40	315	21.1	3.3	6.8	1.45	306		15.2	-4	Tan	No
820	45	315	21.1	3.7	6.8	1.43	268		15.2	-6	Tan	No
825	50	315	21.1	4.2	6.8	1.42	241		15.2	-5	Tan	No
830	55	315	21.1	4.6	6.8	1.43	216		15.2	-3	Tan	No
835	60	315	21.1	5	6.8	1.43	191		15.1	1	Tan	No

Constituents Sampled	**Container**	**Number**	**Preservative**
VOCs	40 mL Glass Vial	3	HCL

Comments ______

Well Casing Volumes

Gallons/Foot					
	1" = 0.04	1.5" = 0.09	2.5" = 0.26	3.5" = 0.50	6" = 1.47
	1.25" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65	

Well Information

Well Location:		Well Locked at Arrival:	Yes / No
Condition of Well:		Well Locked at Departure:	Yes / No
Well Completion:	Flush Mount / Stick Up	Key Number To Well:	

ARCADIS Design & Consultancy for natural and built assets

Groundwater Sampling Form

Project No. OH000294.2018.0004B Well ID HR-1 Date 07.25.2018

Project Name/Location Racer Trust-Moraine Ohio Weather Sun 80s

Measuring Pt. Description Top of Casing Screen Setting (ft-bmp) 47-57 Casing Diameter (in.) 2 Well Material X PVC ___ SS

Static Water Level (ft-bmp) 23.02 Total Depth (ft-bmp) 59 Water Column 35.98 Gallons in Well 23.4

MP Elevation ______ Pump Intake (ft-bmp) 54 Purge Method: Low Flow Sample Method Low Flow

Pump On 1610 Volumes Purged 0.17 Centrifugal ___ Submersible X

Off 1705 Other ______

Sample Time: Label 1700 Gallons Purged 4

Purge Start 1610 Replicate/ Code No. DUP and MS/MSD Sampled by JB

Purge End 1650

Time	Minutes Elapsed	Rate (gpm) (mL/min)	Depth to Water (ft)	Gallons Purged	pH	Cond. (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temp. (°C)	Redox (mV)	Appearance Color	Appearance Odor
1615	5	350	23.02	0.30	7.17	1.09	78.1	3.72	19.73	84	Clear	No
1620	10	350	23.02	1.0	6.81	1.21	54.8	1.05	21.21	76	Clear	No
1625	15	300	23.02	1.4	6.60	1.27	0	0.30	16.96	84	Clear	No
1630	20	300	23.02	1.6	6.64	1.27	0	0.25	17.55	80	Clear	No
1635	25	300	23.02	1.9	6.77	1.26	0	0.29	20.58	72	Clear	No
1640	30	300	23.02	2.5	6.79	1.25	0	0.18	18.17	71	Clear	No
1645	35	300	23.02	3.3	6.79	1.25	0	0.16	18.31	70	Clear	No
1650	40	300	23.02	4.0	6.79	1.25	0	0.15	18.25	69	Clear	No

Constituents Sampled	Container	Number	Preservative
VOCs	40 mL Glass Vial	12	HCL

Comments DO probe not functioning properly.

Well Casing Volumes

Gallons/Foot	1" = 0.04	1.5" = 0.09	2.5" = 0.26	3.5" = 0.50	6" = 1.47
	1.25" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65	

Well Information

Well Location:		Well Locked at Arrival:	**Yes** / No
Condition of Well:		Well Locked at Departure:	**Yes** / No
Well Completion:	Flush Mount / Stick Up	Key Number To Well:	

ARCADIS Design & Consultancy for natural and built assets

Groundwater Sampling Form

Project No. OH000294.2018.0004B   Well ID HR-17   Date 07.25.2018

Project Name/Location Racer Trust-Moraine Ohio   Weather Sun 80s

Measuring Pt. Description Top of Casing   Screen Setting (ft-bmp) 27-47   Casing Diameter (in.) 4   Well Material X PVC ___ SS

Static Water Level (ft-bmp) 17.23   Total Depth (ft-bmp) 48.3   Water Column 31.07   Gallons in Well 20.2

MP Elevation ____   Pump Intake (ft-bmp) 43.3   Purge Method: Low Flow   Sample Method Low Flow

Centrifugal ____
Submersible X
Other ____

Pump On 1350   Volumes Purged 0.32
Off 1455

Sample Time: Label 1450   Gallons Purged 6.5
Purge Start 1350   Replicate/ Code No. NA   Sampled by JB
Purge End 1445

Time	Minutes Elapsed	Rate (gpm) (mL/min)	Depth to Water (ft)	Gallons Purged	pH	Cond. (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temp. (^oC)	Redox (mV)	Appearance Color	Appearance Odor
1355	5	300	17.23	0.20	6.96	1.17	269	0.85	17.99	101	Clear	No
1400	10	300	17.23	0.60	6.96	1.15	120	0.96	17.05	94	Clear	No
1405	15	300	17.23	1.5	6.83	1.14	22.5	0.24	17.37	65	Clear	No
1410	20	300	17.23	2.3	6.83	1.14	8.1	0.18	17.92	42	Clear	No
1415	25	300	17.23	2.5	6.83	1.13	5.0	0.16	18.06	39	Clear	No
1420	30	300	17.23	2.8	6.83	1.17	0	0.29	18.41	33	Clear	No
1425	35	300	17.23	3.4	6.83	1.17	0	0.25	18.55	33	Clear	No
1430	40	300	17.23	4.2	6.84	1.18	0	0.12	17.64	30	Clear	No
1435	45	300	17.23	5.0	6.84	1.18	0	0.06	17.09	29	Clear	No
1440	50	300	17.23	5.8	6.83	1.19	0	0.04	16.91	29	Clear	No
1445	55	300	17.23	6.5	6.83	1.18	0	0.03	17.01	30	Clear	No

Constituents Sampled	Container	Number	Preservative
VOCs	40 mL Glass Vial	3	HCL

Comments DO probe not functioning properly.

Well Casing Volumes

Gallons/Foot					
	1" = 0.04	1.5" = 0.09	2.5" = 0.26	3.5" = 0.50	6" = 1.47
	1.25" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65	

Well Information

Well Location: ____   Well Locked at Arrival: **Yes** / No
Condition of Well: ____   Well Locked at Departure: **Yes** / No
Well Completion: Flush Mount / **Stick Up**   Key Number To Well:

ARCADIS Design & Consultancy for natural and built assets

Groundwater Sampling Form

Project No. OH000294.2018.0004B Well ID W-2-S Date 07.25.2018

Project Name/Location Racer Trust-Moraine Ohio Weather Sun 80s

Measuring Pt. Description Top of Casing
Screen Setting (ft-bmp) 30-65
Casing Diameter (in.) 4
Well Material X PVC ___ SS

Static Water Level (ft-bmp) 18.34
Total Depth (ft-bmp) 67
Water Column 48.66
Gallons in Well 31.6

MP Elevation ______
Pump Intake (ft-bmp) 62
Purge Method: Low Flow
Centrifugal ______
Submersible X
Other ______
Sample Method Low Flow

Pump On 930
Off 1050
Volumes Purged 0.27

Sample Time: Label 1045
Purge Start 0930
Purge End 1040
Gallons Purged 8.5

Replicate/ Code No. NA
Sampled by JB

Time	Minutes Elapsed	Rate (gpm) (mL/min)	Depth to Water (ft)	Gallons Purged	pH	Cond. (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temp. (^oC)	Redox (mV)	Appearance Color	Appearance Odor
935	5	450	18.36	0.30	6.75	1.01	>1000	0	17.48	-2	Brown	No
940	10	450	18.36	0.60	6.78	1.01	>1000	0	17.28	-10	Brown	No
945	15	350	18.36	1.5	6.84	0.998	>1000	0.67	18.05	26	Brown	No
950	20	200	18.36	2.1	6.91	1.00	>1000	0.92	18.54	21	Brown	No
955	25	300	18.36	2.2	6.85	0.994	738	0	18.05	15	Tan	No
1000	30	300	18.36	2.5	6.84	0.996	671	0	18.47	14	Tan	No
1005	35	300	18.36	2.8	6.85	0.994	584	0	18.42	15	Tan	No
1010	40	300	18.36	3.6	6.85	0.996	561	0	17.74	16	Tan	No
1015	45	300	18.36	4.4	6.85	0.996	421	0	17.63	18	Tan	No
1020	50	300	18.36	5.1	6.84	0.998	330	0	17.47	22	Tan	No
1025	55	300	18.36	6.0	6.84	0.999	274	0.01	17.37	25	Tan	No
1030	60	300	18.36	7.0	6.84	0.999	225	0	17.30	29	Clear	No
1035	65	300	18.36	7.5	6.84	0.997	194	0	17.30	30	Clear	No
1040	70	300	18.36	8.5	6.84	0.998	176	0	17.29	32	Clear	No

Constituents Sampled	Container	Number	Preservative
VOCs	40 mL Glass Vial	3	HCL

Comments DO probe not functioning properly.

Well Casing Volumes

Gallons/Foot					
	1" = 0.04	1.5" = 0.09	2.5" = 0.26	3.5" = 0.50	6" = 1.47
	1.25" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65	

Well Information

Well Location: ______ Well Locked at Arrival: Yes / No

Condition of Well: ______ Well Locked at Departure: Yes / No

Well Completion: Flush Mount / **Stick Up** Key Number To Well: ______

ARCADIS Design & Consultancy for natural and built assets

Groundwater Sampling Form

Project No. OH000294.2018.0004B Well ID W-3-S Date 07.25.2018

Project Name/Location Racer Trust-Moraine Ohio Weather Sun 80s

Measuring Pt. Description Top of Casing

Screen Setting (ft-bmp) 36-76

Casing Diameter (in.) 4

Well Material X PVC ___ SS

Static Water Level (ft-bmp) 20.78

Total Depth (ft-bmp) 74.7

Water Column 53.92

Gallons in Well 35.0

MP Elevation ______

Pump Intake (ft-bmp) 71

Purge Method: Low Flow
Centrifugal ______
Submersible X
Other ______

Sample Method Low Flow

Pump On 1105
Off 1150

Volumes Purged 0.17

Sample Time: Label 1145
Purge Start 1105
Purge End 1140

Gallons Purged 6.1

Replicate/ Code No. NA

Sampled by JB

Time	Minutes Elapsed	Rate (gpm) (mL/min)	Depth to Water (ft)	Gallons Purged	pH	Cond. (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temp. (^oC)	Redox (mV)	Appearance Color	Appearance Odor
1110	5	250	20.80	0.70	6.91	1.02	67.2	0	17.77	-73	Clear	No
1115	10	250	20.80	1.4	6.90	1.03	19.7	0	17.59	-72	Clear	No
1120	15	250	20.80	2.4	6.82	1.04	14.7	0	16.68	-69	Clear	No
1125	20	250	20.80	2.9	6.80	1.03	5.4	0	16.81	-65	Clear	No
1130	25	250	20.80	3.5	6.79	1.04	0.9	0	16.34	-59	Clear	No
1135	30	250	20.80	5.0	6.77	1.04	0	0	16.28	-54	Clear	No
1140	35	250	20.80	6.1	6.77	1.05	0	0	16.24	-51	Clear	No

Constituents Sampled	**Container**	**Number**	**Preservative**
VOCs	40 mL Glass Vial	3	HCL

Comments DO probe not functioning properly.

Well Casing Volumes

Gallons/Foot 1" = 0.04 1.5" = 0.09 2.5" = 0.26 3.5" = 0.50 6" = 1.47
1.25" = 0.06 2" = 0.16 3" = 0.37 4" = 0.65

Well Information

Well Location:		Well Locked at Arrival:	**Yes** / No
Condition of Well:		Well Locked at Departure:	**Yes** / No
Well Completion:	Flush Mount / **Stick Up**	Key Number To Well:	

ARCADIS Design & Consultancy for natural and built assets

Groundwater Sampling Form

Project No. OH000294.2018.0004B   Well ID W-4-S   Date 07.25.2018

Project Name/Location Racer Trust-Moraine Ohio   Weather Sun 80s

Measuring Pt. Description Top of Casing   Screen Setting (ft-bmp) 30-70   Casing Diameter (in.) 4   Well Material X PVC ___ SS

Static Water Level (ft-bmp) 19.15   Total Depth (ft-bmp) 72.5   Water Column 53.35   Gallons in Well 34.7

MP Elevation ______   Pump Intake (ft-bmp) 67.5   Purge Method: Low Flow   Sample Method Low Flow

Centrifugal ______
Submersible X
Other ______

Pump On 1210   Off 1255   Volumes Purged 0.14

Sample Time: Label 1250   Gallons Purged 5
Purge Start 1210
Purge End 1245

Replicate/ Code No. NA   Sampled by JB

Time	Minutes Elapsed	Rate (gpm) (mL/min)	Depth to Water (ft)	Gallons Purged	pH	Cond. (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temp. (°C)	Redox (mV)	Appearance Color	Appearance Odor
1215	5	300	19.10	0.50	6.88	1.15	78.7	0.18	18.46	77	Clear	No
1220	10	300	19.10	0.7	7.00	1.19	73.4	0.63	16.51	83	Clear	No
1225	15	300	19.10	1.4	6.84	1.20	58.5	0	16.28	82	Clear	No
1230	20	300	19.10	2.5	6.81	1.20	31.8	0	16.37	80	Clear	No
1235	25	300	19.10	3.8	6.79	1.20	16.5	0	16.16	78	Clear	No
1240	30	300	19.10	4.3	6.79	1.20	14.9	0	16.14	79	Clear	No
1245	35	300	19.10	5.0	6.78	1.20	10.3	0	16.20	78	Clear	No

Constituents Sampled	**Container**	**Number**	**Preservative**
VOCs	40 mL Glass Vial	3	HCL

Comments DO probe not functioning properly.

Well Casing Volumes

Gallons/Foot 1" = 0.04 1.5" = 0.09 2.5" = 0.26 3.5" = 0.50 6" = 1.47
1.25" = 0.06 2" = 0.16 3" = 0.37 4" = 0.65

Well Information

Well Location:		Well Locked at Arrival:	**Yes** / No
Condition of Well:		Well Locked at Departure:	**Yes** / No
Well Completion:	Flush Mount / **Stick Up**	Key Number To Well:	

ATTACHMENT G-2

Ohio EPA eBusiness Forms

2018 Supplementary Annual Report Form
Ground Water Monitoring Information

NOTE - Section 1 of this Supplementary Annual Report Form should be completed by all facilities required by OAC Rule 3745-65-90 to conduct ground water monitoring.

SECTION 1 - FACILITY INFORMATION

F-1 **FACILITY NAME** Name Former Delphi Harrison Thermal Systems

F-2 **EPA ID** OHD 000817577 HWFAB Permit # 05-57-0272 NPDES No. 1IC00008*LD

Drinking Water Supply ID________________________

F-3 **LOCATION** Street 3600 Dryden Road City Moraine

Zip 45439 County Montgomery

F-3A **FACILITY OWNER** ICP Moraine, LLC for the closed North Settling Lagoon
RACER Properties, LLC for the closed South Settling Lagoon
County Montgomery
ICP Moraine, LLC:
Street 6675 Parkland Blvd City Solon, OH Zip 44139

RACER Properties, LLC:
Street 500 Woodward Avenue, Suite 2650 City Detroit, MI Zip 48226

F-3B **FACILITY OPERATOR** RACER Trust County____________________________

Street 500 Woodward Avenue, Suite 2650 City Detroit, MI Zip 48226

F-4 **FACILITY CONTACT** Pam Barnett Phone Number (313) 486-2908

Street 500 Woodward Avenue, Suite 2650 City Detroit, MI Zip 48226

F-5 **FACILITY LOCATION** Latitude 39.692375 Longitude -84.226169

F-6 **LATITUDE/LONGITUDE METHOD** __G

D=Digitized from a map or photo | P=Digitized from a USGS 7.5' map

G=Calculated from a USGS 7.5' map | R=Calculated from Section/Township

C=Calculated from county center | A=Obtained from satellite data

F=Field checked with tape measure | T=Calculated from Universal Transverse Mercator (UTM)

M=Obtained from a manual | S=Surveyed | O=Other

F-7 **SECTION, TOWNSHIP, RANGE**

Section__16, 17____ Township__1N_____ Range__6E___ (Example: Section 21, Township 9E, Range 4W)

F-8 **PROCESS CODES** from Part A Application (give number of each present at the site):

_____ S04 - Storage in Surface Impoundment

_____ T02 - Treatment in Surface Impoundment

_____ D80 - Disposal in Landfill

_____ D81 - Disposal by Land Application

_____ D83 - Disposal in Surface Impoundment

SECTION 6 – OTHER REQUIRED INFORMATION

This section identifies the information required for Section 6 of the Supplementary Annual Report for the closed North Settling Lagoon and the closed South Settling Lagoon Post-Closure Monitoring Program for 2018 for former Delphi Harrison Thermal Systems (Site) in Moraine, Ohio. Groundwater surface elevation data, data associated with the groundwater flow system, sampling information, the extent of contamination migration, and concentrations of hazardous constituents information for the upper aquifer at the Site can be found in the 2018 Groundwater Monitoring Report (referred to as 'main report'). Additionally, the main report can be referred to for other pertinent site-specific information.

1. Signed Certification Statement
   See attached document titled Signed_Certification_Statement.doc

2. Groundwater Flow Data

   Groundwater surface elevation measurements:
   Groundwater surface elevation data is included in Table 6 and Figure 8 in the main report.

   Groundwater flow system:
   For the upper aquifer flow, the potentiometric surface map for July 2018 is presented as Figure 8 in the main report and G-25 and G-26 of the Supplementary Report.
   The estimated groundwater velocity ranges from of 0.8 to 16 feet per day for the upper aquifer sand and gravel unit and 0.9 feet per day for the upper aquifer interbedded facies as determined in the 2012 Corrective Measures Proposal (ARCADIS, Inc. 2012).

   Response necessary to restore compliance:
   There was no need to restore compliance with the number, location, or depth of monitoring wells associated with the closed North Settling Lagoon or the closed South Settling Lagoon.

3. Sampling Data

   Sampling information:
   Dates, time and place of sampling and associated measurements, individuals who performed the sampling, copies of chains of custody forms, and preservation methods can be viewed in the attached documents Lab_Report_2018.pdf.
   Groundwater sampling information (e.g., field analyses) can be found in Appendix C of the main report.

   Sampling or statistical problems:
   There were no problems encountered during groundwater sampling or statistical analysis of the data.

   Background data:
   Background data from past years is supplied in Appendix E of the main report.

4. Lab Data

   The laboratory analytical report can be viewed in the attached documents Lab_Report_2018.pdf.

5. Tables

   Tables relative to the closed North and South Settling Lagoons are Tables 1, 3, 6, and 7 and the tables included in Appendices C, D, E, and G of the main report.

6. Maps

   Positions of the waste management units in relation to the monitoring wells are shown on Figure 3 of the main report.

   The July 2018 potentiometric surface maps for the upper aquifer are presented in Figure 8 in the main report.

7. Calculations

Extent of contamination migration:

Refer to Section 2.5.3.4 in the main report. Additionally, the trend analysis discussion is included in Appendix G in the main report.

REFERENCES

ARCADIS, Inc. 2012. Corrective Measures Proposal, RACER Trust, Moraine, Ohio. December 31, 2012.

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Canton
4101 Shuffel Street NW
North Canton, OH 44720
Tel: (330)497-9396

TestAmerica Job ID: 240-99126-1
Client Project/Site: Racer Moraine

For:
ARCADIS U.S., Inc.
100 E. Campus View Blvd
Suite 200
Columbus, Ohio 43235

Attn: Carolyn Grogan

Authorized for release by:
8/13/2018 11:57:36 AM

Michael DelMonico, Project Manager I
(330)497-9396
michael.delmonico@testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.testamericainc.com

Table of Contents

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Metals

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

General Chemistry

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
F2	MS/MSD RPD exceeds control limits

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

1 2 3 4 5 6 7 8 9 10 11 12 13 14

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Job ID: 240-99126-1

Laboratory: TestAmerica Canton

Narrative

CASE NARRATIVE

Client: ARCADIS U.S., Inc.

Project: Racer Moraine

Report Number: 240-99126-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

The 9060A Total Organic Carbon and 9251 Chloride analyses were performed at the TestAmerica Nashville laboratory.

TestAmerica Canton attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header.

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

RECEIPT
The samples were received on 7/27/2018 8:00 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 6 coolers at receipt time were 0.6º C, 0.8º C, 1.0º C, 1.2º C, 1.4º C and 1.6º C.

VOLATILE ORGANIC COMPOUNDS (GCMS)
Samples GM-19S/072418/ (240-99126-1), GM-6/072418/ (240-99126-3), GM-8/072418/ (240-99126-4), EB-03/072418/ (240-99126-5), GM-15/072418/ (240-99126-6), DN-13/072418/ (240-99126-7), W-4-S/072518/ (240-99126-8), W-3-S/072518/ (240-99126-9), W-2-S/072518/ (240-99126-10), HR-17/072518/ (240-99126-11), HR-1/072518/ (240-99126-12), DUP-02/072518/ (240-99126-13), TRIP BLANK/072518/ (240-99126-14), EB-05/072518/ (240-99126-15), GM-29/072518/ (240-99126-16), GM-28/072518/ (240-99126-17), EB-6/072518/ (240-99126-18), W-2-N/072418/ (240-99126-19), HR-4/072418/ (240-99126-20), W-3-N/072418/ (240-99126-21), GM-20D/072418/ (240-99126-22), GM-9/072418/ (240-99126-23), EB-4/072418/ (240-99126-24), W-4-N/072518 (240-99126-25), GM-21/072518/ (240-99126-26), GM-28R/072518/ (240-99126-27) and DUP-1/072518/ (240-99126-28) were analyzed for volatile organic compounds (GCMS) in accordance with EPA SW-846 Method 8260B. The samples were analyzed on 08/06/2018 and 08/07/2018.

Samples HR-17/072518/ (240-99126-11)[4X], HR-1/072518/ (240-99126-12)[4X], DUP-02/072518/ (240-99126-13)[4X], GM-29/072518/ (240-99126-16)[2X], GM-29/072518/ (240-99126-16)[20X] and GM-28/072518/ (240-99126-17)[10X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

Job ID: 240-99126-1 (Continued)

Laboratory: TestAmerica Canton (Continued)

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

DISSOLVED METALS (ICP)
Samples GM-19S/072418/ (240-99126-1), GM-6/072418/ (240-99126-3), GM-8/072418/ (240-99126-4), GM-29/072518/ (240-99126-16), GM-28/072518/ (240-99126-17), GM-21/072518/ (240-99126-26), GM-28R/072518/ (240-99126-27) and DUP-1/072518/ (240-99126-28) were analyzed for dissolved metals (ICP) in accordance with EPA SW-846 Method 6010B. The samples were prepared on 07/30/2018 and analyzed on 07/31/2018.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

TOTAL RECOVERABLE METALS (ICP)
Samples GM-19S/072418/ (240-99126-1), GM-6/072418/ (240-99126-3), GM-8/072418/ (240-99126-4), EB-03/072418/ (240-99126-5), GM-29/072518/ (240-99126-16), GM-28/072518/ (240-99126-17), EB-6/072518/ (240-99126-18), GM-21/072518/ (240-99126-26), GM-28R/072518/ (240-99126-27) and DUP-1/072518/ (240-99126-28) were analyzed for total recoverable metals (ICP) in accordance with EPA SW-846 Method 6010B. The samples were prepared on 07/30/2018 and analyzed on 07/31/2018.

Iron failed the recovery criteria high for the MS of sample GM-28R/072518/MS (240-99126-27) in batch 240-338901. Refer to the QC report for details.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

ANIONS
Samples GM-19S/072418/ (240-99126-1), GM-6/072418/ (240-99126-3), GM-8/072418/ (240-99126-4), EB-03/072418/ (240-99126-5), GM-29/072518/ (240-99126-16), GM-28/072518/ (240-99126-17), EB-6/072518/ (240-99126-18), GM-21/072518/ (240-99126-26), GM-28R/072518/ (240-99126-27) and DUP-1/072518/ (240-99126-28) were analyzed for anions in accordance with EPA Method 300.0. The samples were analyzed on 07/31/2018 and 08/01/2018.

Samples GM-19S/072418/ (240-99126-1)[5X], GM-6/072418/ (240-99126-3)[5X], GM-8/072418/ (240-99126-4)[5X], GM-29/072518/ (240-99126-16)[5X], GM-28/072518/ (240-99126-17)[5X], GM-21/072518/ (240-99126-26)[10X], GM-28R/072518/ (240-99126-27)[2X] and DUP-1/072518/ (240-99126-28)[2X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

TOTAL ORGANIC CARBON
Samples GM-19S/072418/ (240-99126-1), GM-32/072418/ (240-99126-2), GM-6/072418/ (240-99126-3), GM-8/072418/ (240-99126-4), EB-03/072418/ (240-99126-5), GM-29/072518/ (240-99126-16), GM-28/072518/ (240-99126-17), EB-6/072518/ (240-99126-18), GM-21/072518/ (240-99126-26), GM-28R/072518/ (240-99126-27) and DUP-1/072518/ (240-99126-28) were analyzed for total organic carbon in accordance with EPA SW-846 Method 9060A. The samples were analyzed on 08/04/2018 and 08/09/2018.

Sample GM-21/072518/ (240-99126-26)[2X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

CHLORIDE
Samples GM-19S/072418/ (240-99126-1), GM-6/072418/ (240-99126-3), GM-8/072418/ (240-99126-4), EB-03/072418/ (240-99126-5), GM-29/072518/ (240-99126-16), GM-28/072518/ (240-99126-17), EB-6/072518/ (240-99126-18), GM-21/072518/ (240-99126-26), GM-28R/072518/ (240-99126-27) and DUP-1/072518/ (240-99126-28) were analyzed for chloride in accordance with EPA SW-846 Method 9251. The samples were analyzed on 07/30/2018.

Samples GM-19S/072418/ (240-99126-1)[10X], GM-6/072418/ (240-99126-3)[10X], GM-8/072418/ (240-99126-4)[10X], GM-29/072518/ (240-99126-16)[10X], GM-28/072518/ (240-99126-17)[10X] and GM-21/072518/ (240-99126-26)[10X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Job ID: 240-99126-1 (Continued)

Laboratory: TestAmerica Canton (Continued)

SULFIDE
Samples GM-19S/072418/ (240-99126-1), GM-6/072418/ (240-99126-3), GM-8/072418/ (240-99126-4), EB-03/072418/ (240-99126-5), GM-29/072518/ (240-99126-16), GM-28/072518/ (240-99126-17), EB-6/072518/ (240-99126-18), GM-21/072518/ (240-99126-26), GM-28R/072518/ (240-99126-27) and DUP-1/072518/ (240-99126-28) were analyzed for sulfide in accordance with SM 4500 S2 E. The samples were analyzed on 07/31/2018.

Sulfide exceeded the RPD limit for the MSD of sample GM-28R/072518/MSD (240-99126-27) in batch 240-338795. Refer to the QC report for details.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Method Summary

Method	Method Description	Protocol	Laboratory
8260B	Volatile Organic Compounds (GC/MS)	SW846	TAL CAN
6010B	Metals (ICP)	SW846	TAL CAN
300.0	Anions, Ion Chromatography	MCAWW	TAL CAN
4500 S2 F-2000	Sulfide, Total	SM	TAL CAN
9060A	Organic Carbon, Total (TOC)	SW846	TAL NSH
9251	Chloride	SW846	TAL NSH
3005A	Preparation, Total Recoverable or Dissolved Metals	SW846	TAL CAN
5030B	Purge and Trap	SW846	TAL CAN

Protocol References:

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

SM = "Standard Methods For The Examination Of Water And Wastewater"

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL CAN = TestAmerica Canton, 4101 Shuffel Street NW, North Canton, OH 44720, TEL (330)497-9396

TAL NSH = TestAmerica Nashville, 2960 Foster Creighton Drive, Nashville, TN 37204, TEL (615)726-0177

Sample Summary

Client: ARCADIS U.S., Inc.
Project/Site: Racer Moraine

TestAmerica Job ID: 240-99126-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
240-99126-1	GM-19S/072418/	Water	07/24/18 14:45	07/27/18 08:00
240-99126-2	GM-32/072418/	Water	07/24/18 12:35	07/27/18 08:00
240-99126-3	GM-6/072418/	Water	07/24/18 11:05	07/27/18 08:00
240-99126-4	GM-8/072418/	Water	07/24/18 09:45	07/27/18 08:00
240-99126-5	EB-03/072418/	Water	07/24/18 15:25	07/27/18 08:00
240-99126-6	GM-15/072418/	Water	07/24/18 16:50	07/27/18 08:00
240-99126-7	DN-13/072418/	Water	07/24/18 17:25	07/27/18 08:00
240-99126-8	W-4-S/072518/	Water	07/25/18 12:50	07/27/18 08:00
240-99126-9	W-3-S/072518/	Water	07/25/18 11:45	07/27/18 08:00
240-99126-10	W-2-S/072518/	Water	07/25/18 10:45	07/27/18 08:00
240-99126-11	HR-17/072518/	Water	07/25/18 14:50	07/27/18 08:00
240-99126-12	HR-1/072518/	Water	07/25/18 17:00	07/27/18 08:00
240-99126-13	DUP-02/072518/	Water	07/25/18 00:00	07/27/18 08:00
240-99126-14	TRIP BLANK/072518/	Water	07/25/18 00:00	07/27/18 08:00
240-99126-15	EB-05/072518/	Water	07/25/18 17:20	07/27/18 08:00
240-99126-16	GM-29/072518/	Water	07/25/18 18:00	07/27/18 08:00
240-99126-17	GM-28/072518/	Water	07/25/18 08:20	07/27/18 08:00
240-99126-18	EB-6/072518/	Water	07/25/18 18:45	07/27/18 08:00
240-99126-19	W-2-N/072418/	Water	07/24/18 10:20	07/27/18 08:00
240-99126-20	HR-4/072418/	Water	07/24/18 12:00	07/27/18 08:00
240-99126-21	W-3-N/072418/	Water	07/24/18 13:45	07/27/18 08:00
240-99126-22	GM-20D/072418/	Water	07/24/18 16:00	07/27/18 08:00
240-99126-23	GM-9/072418/	Water	07/24/18 17:35	07/27/18 08:00
240-99126-24	EB-4/072418/	Water	07/24/18 17:45	07/27/18 08:00
240-99126-25	W-4-N/072518	Water	07/25/18 08:45	07/27/18 08:00
240-99126-26	GM-21/072518/	Water	07/25/18 11:20	07/27/18 08:00
240-99126-27	GM-28R/072518/	Water	07/25/18 14:20	07/27/18 08:00
240-99126-28	DUP-1/072518/	Water	07/25/18 14:20	07/27/18 08:00

Detection Summary

Client: ARCADIS U.S., Inc.
Project/Site: Racer Moraine

TestAmerica Job ID: 240-99126-1

Client Sample ID: GM-19S/072418/ Lab Sample ID: 240-99126-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	31		1.0	0.16	ug/L	1		8260B	Total/NA
1,1-Dichloroethane	2.3		1.0	0.17	ug/L	1		8260B	Total/NA
Tetrachloroethene	0.37	J	1.0	0.15	ug/L	1		8260B	Total/NA
trans-1,2-Dichloroethene	0.66	J	1.0	0.19	ug/L	1		8260B	Total/NA
Trichloroethene	2.4		1.0	0.10	ug/L	1		8260B	Total/NA
Vinyl chloride	8.8		1.0	0.20	ug/L	1		8260B	Total/NA
Iron	6000		100	26	ug/L	1		6010B	Total Recoverable
Manganese	290		15	2.1	ug/L	1		6010B	Total Recoverable
Iron	5400		100	26	ug/L	1		6010B	Dissolved
Manganese	280		15	2.1	ug/L	1		6010B	Dissolved
Sulfate	53		5.0	1.7	mg/L	5		300.0	Total/NA
Total Organic Carbon	1.7		1.0	0.50	mg/L	1		9060A	Total/NA
Chloride	140		10	6.0	mg/L	10		9251	Total/NA

Client Sample ID: GM-32/072418/ Lab Sample ID: 240-99126-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Total Organic Carbon	3.8		1.0	0.50	mg/L	1		9060A	Total/NA

Client Sample ID: GM-6/072418/ Lab Sample ID: 240-99126-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	0.40	J	1.0	0.16	ug/L	1		8260B	Total/NA
1,1-Dichloroethane	0.26	J	1.0	0.17	ug/L	1		8260B	Total/NA
Vinyl chloride	0.65	J	1.0	0.20	ug/L	1		8260B	Total/NA
Iron	6000		100	26	ug/L	1		6010B	Total Recoverable
Manganese	160		15	2.1	ug/L	1		6010B	Total Recoverable
Iron	5500		100	26	ug/L	1		6010B	Dissolved
Manganese	150		15	2.1	ug/L	1		6010B	Dissolved
Sulfate	44		5.0	1.7	mg/L	5		300.0	Total/NA
Total Organic Carbon	3.1		1.0	0.50	mg/L	1		9060A	Total/NA
Chloride	140		10	6.0	mg/L	10		9251	Total/NA

Client Sample ID: GM-8/072418/ Lab Sample ID: 240-99126-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Benzene	1.3		1.0	0.13	ug/L	1		8260B	Total/NA
cis-1,2-Dichloroethene	0.30	J	1.0	0.16	ug/L	1		8260B	Total/NA
1,1-Dichloroethane	0.47	J	1.0	0.17	ug/L	1		8260B	Total/NA
Vinyl chloride	0.91	J	1.0	0.20	ug/L	1		8260B	Total/NA
Iron	2900		100	26	ug/L	1		6010B	Total Recoverable
Manganese	68		15	2.1	ug/L	1		6010B	Total Recoverable
Iron	3000		100	26	ug/L	1		6010B	Dissolved
Manganese	71		15	2.1	ug/L	1		6010B	Dissolved
Sulfate	38		5.0	1.7	mg/L	5		300.0	Total/NA
Total Organic Carbon	6.2		1.0	0.50	mg/L	1		9060A	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: GM-8/072418/ (Continued) — Lab Sample ID: 240-99126-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	130		10	6.0	mg/L	10		9251	Total/NA

Client Sample ID: EB-03/072418/ — Lab Sample ID: 240-99126-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Iron	47	J	100	26	ug/L	1		6010B	Total Recoverable

Client Sample ID: GM-15/072418/ — Lab Sample ID: 240-99126-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	6.6		1.0	0.16	ug/L	1		8260B	Total/NA
1,1-Dichloroethane	1.9		1.0	0.17	ug/L	1		8260B	Total/NA
trans-1,2-Dichloroethene	0.66	J	1.0	0.19	ug/L	1		8260B	Total/NA
Trichloroethene	5.8		1.0	0.10	ug/L	1		8260B	Total/NA
Vinyl chloride	0.50	J	1.0	0.20	ug/L	1		8260B	Total/NA

Client Sample ID: DN-13/072418/ — Lab Sample ID: 240-99126-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	4.7		1.0	0.16	ug/L	1		8260B	Total/NA
1,1-Dichloroethane	1.1		1.0	0.17	ug/L	1		8260B	Total/NA
Tetrachloroethene	1.4		1.0	0.15	ug/L	1		8260B	Total/NA
trans-1,2-Dichloroethene	0.28	J	1.0	0.19	ug/L	1		8260B	Total/NA
1,1,1-Trichloroethane	0.52	J	1.0	0.24	ug/L	1		8260B	Total/NA
Trichloroethene	6.2		1.0	0.10	ug/L	1		8260B	Total/NA
Vinyl chloride	0.53	J	1.0	0.20	ug/L	1		8260B	Total/NA

Client Sample ID: W-4-S/072518/ — Lab Sample ID: 240-99126-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	17		1.0	0.16	ug/L	1		8260B	Total/NA
1,1-Dichloroethane	2.1		1.0	0.17	ug/L	1		8260B	Total/NA
Tetrachloroethene	68		1.0	0.15	ug/L	1		8260B	Total/NA
trans-1,2-Dichloroethene	1.5		1.0	0.19	ug/L	1		8260B	Total/NA
1,1,1-Trichloroethane	1.8		1.0	0.24	ug/L	1		8260B	Total/NA
Trichloroethene	42		1.0	0.10	ug/L	1		8260B	Total/NA

Client Sample ID: W-3-S/072518/ — Lab Sample ID: 240-99126-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	1.1		1.0	0.16	ug/L	1		8260B	Total/NA
1,1-Dichloroethane	0.61	J	1.0	0.17	ug/L	1		8260B	Total/NA
Tetrachloroethene	19		1.0	0.15	ug/L	1		8260B	Total/NA
trans-1,2-Dichloroethene	0.19	J	1.0	0.19	ug/L	1		8260B	Total/NA
1,1,1-Trichloroethane	0.87	J	1.0	0.24	ug/L	1		8260B	Total/NA
Trichloroethene	27		1.0	0.10	ug/L	1		8260B	Total/NA

Client Sample ID: W-2-S/072518/ — Lab Sample ID: 240-99126-10

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: ARCADIS U.S., Inc.
Project/Site: Racer Moraine

TestAmerica Job ID: 240-99126-1

Client Sample ID: W-2-S/072518/ (Continued) — Lab Sample ID: 240-99126-10

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	2.2		1.0	0.16	ug/L	1		8260B	Total/NA
1,1-Dichloroethane	0.83	J	1.0	0.17	ug/L	1		8260B	Total/NA
Tetrachloroethene	2.0		1.0	0.15	ug/L	1		8260B	Total/NA
trans-1,2-Dichloroethene	0.32	J	1.0	0.19	ug/L	1		8260B	Total/NA
1,1,1-Trichloroethane	0.98	J	1.0	0.24	ug/L	1		8260B	Total/NA
Trichloroethene	4.6		1.0	0.10	ug/L	1		8260B	Total/NA

Client Sample ID: HR-17/072518/ — Lab Sample ID: 240-99126-11

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	1.1		1.0	0.16	ug/L	1		8260B	Total/NA
1,1-Dichloroethane	2.2		1.0	0.17	ug/L	1		8260B	Total/NA
Tetrachloroethene	180		4.0	0.60	ug/L	4		8260B	Total/NA
1,1,1-Trichloroethane	4.8		1.0	0.24	ug/L	1		8260B	Total/NA
Trichloroethene	0.92	J	1.0	0.10	ug/L	1		8260B	Total/NA

Client Sample ID: HR-1/072518/ — Lab Sample ID: 240-99126-12

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	20		1.0	0.16	ug/L	1		8260B	Total/NA
1,1-Dichloroethane	0.96	J	1.0	0.17	ug/L	1		8260B	Total/NA
Tetrachloroethene	99		4.0	0.60	ug/L	4		8260B	Total/NA
trans-1,2-Dichloroethene	1.3		1.0	0.19	ug/L	1		8260B	Total/NA
1,1,1-Trichloroethane	0.77	J	1.0	0.24	ug/L	1		8260B	Total/NA
Trichloroethene	40		1.0	0.10	ug/L	1		8260B	Total/NA

Client Sample ID: DUP-02/072518/ — Lab Sample ID: 240-99126-13

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	15		1.0	0.16	ug/L	1		8260B	Total/NA
1,1-Dichloroethane	0.73	J	1.0	0.17	ug/L	1		8260B	Total/NA
Tetrachloroethene	98		4.0	0.60	ug/L	4		8260B	Total/NA
trans-1,2-Dichloroethene	0.99	J	1.0	0.19	ug/L	1		8260B	Total/NA
1,1,1-Trichloroethane	0.80	J	1.0	0.24	ug/L	1		8260B	Total/NA
Trichloroethene	34		1.0	0.10	ug/L	1		8260B	Total/NA

Client Sample ID: TRIP BLANK/072518/ — Lab Sample ID: 240-99126-14

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Tetrachloroethene	0.18	J	1.0	0.15	ug/L	1		8260B	Total/NA

Client Sample ID: EB-05/072518/ — Lab Sample ID: 240-99126-15

No Detections.

Client Sample ID: GM-29/072518/ — Lab Sample ID: 240-99126-16

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	420		20	3.2	ug/L	20		8260B	Total/NA
1,1-Dichloroethane	10		2.0	0.34	ug/L	2		8260B	Total/NA
Tetrachloroethene	13		2.0	0.30	ug/L	2		8260B	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: GM-29/072518/ (Continued) Lab Sample ID: 240-99126-16

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
trans-1,2-Dichloroethene	13		2.0	0.38	ug/L	2		8260B	Total/NA
1,1,1-Trichloroethane	8.1		2.0	0.48	ug/L	2		8260B	Total/NA
Trichloroethene	310		20	2.0	ug/L	20		8260B	Total/NA
Vinyl chloride	41		2.0	0.40	ug/L	2		8260B	Total/NA
Iron	4600		100	26	ug/L	1		6010B	Total Recoverable
Manganese	150		15	2.1	ug/L	1		6010B	Total Recoverable
Iron	3600		100	26	ug/L	1		6010B	Dissolved
Manganese	120		15	2.1	ug/L	1		6010B	Dissolved
Sulfate	49		5.0	1.7	mg/L	5		300.0	Total/NA
Total Organic Carbon	8.8		1.0	0.50	mg/L	1		9060A	Total/NA
Chloride	120		10	6.0	mg/L	10		9251	Total/NA

Client Sample ID: GM-28/072518/ Lab Sample ID: 240-99126-17

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Benzene	0.47	J	1.0	0.13	ug/L	1		8260B	Total/NA
cis-1,2-Dichloroethene	260		10	1.6	ug/L	10		8260B	Total/NA
1,1-Dichloroethane	8.0		1.0	0.17	ug/L	1		8260B	Total/NA
1,1-Dichloroethene	0.81	J	1.0	0.19	ug/L	1		8260B	Total/NA
Tetrachloroethene	8.4		1.0	0.15	ug/L	1		8260B	Total/NA
Toluene	0.16	J	1.0	0.14	ug/L	1		8260B	Total/NA
trans-1,2-Dichloroethene	16		1.0	0.19	ug/L	1		8260B	Total/NA
Trichloroethene	5.0		1.0	0.10	ug/L	1		8260B	Total/NA
Vinyl chloride	210		10	2.0	ug/L	10		8260B	Total/NA
Iron	3200		100	26	ug/L	1		6010B	Total Recoverable
Manganese	240		15	2.1	ug/L	1		6010B	Total Recoverable
Iron	2800		100	26	ug/L	1		6010B	Dissolved
Manganese	220		15	2.1	ug/L	1		6010B	Dissolved
Sulfate	38		5.0	1.7	mg/L	5		300.0	Total/NA
Total Organic Carbon	6.6		1.0	0.50	mg/L	1		9060A	Total/NA
Chloride	130		10	6.0	mg/L	10		9251	Total/NA

Client Sample ID: EB-6/072518/ Lab Sample ID: 240-99126-18

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	0.62	J	1.0	0.60	mg/L	1		9251	Total/NA

Client Sample ID: W-2-N/072418/ Lab Sample ID: 240-99126-19

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	2.7		1.0	0.16	ug/L	1		8260B	Total/NA
1,1-Dichloroethane	0.31	J	1.0	0.17	ug/L	1		8260B	Total/NA
trans-1,2-Dichloroethene	0.28	J	1.0	0.19	ug/L	1		8260B	Total/NA
1,1,1-Trichloroethane	0.38	J	1.0	0.24	ug/L	1		8260B	Total/NA
Trichloroethene	1.9		1.0	0.10	ug/L	1		8260B	Total/NA

Client Sample ID: HR-4/072418/ Lab Sample ID: 240-99126-20

This Detection Summary does not include radiochemical test results.

Client Sample ID: HR-4/072418/ (Continued) — Lab Sample ID: 240-99126-20

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	0.45	J	1.0	0.16	ug/L	1		8260B	Total/NA
1,1-Dichloroethane	1.6		1.0	0.17	ug/L	1		8260B	Total/NA
Tetrachloroethene	0.16	J	1.0	0.15	ug/L	1		8260B	Total/NA
1,1,1-Trichloroethane	1.6		1.0	0.24	ug/L	1		8260B	Total/NA
Trichloroethene	0.29	J	1.0	0.10	ug/L	1		8260B	Total/NA

Client Sample ID: W-3-N/072418/ — Lab Sample ID: 240-99126-21

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	16		1.0	0.16	ug/L	1		8260B	Total/NA
trans-1,2-Dichloroethene	0.33	J	1.0	0.19	ug/L	1		8260B	Total/NA
Vinyl chloride	1.1		1.0	0.20	ug/L	1		8260B	Total/NA

Client Sample ID: GM-20D/072418/ — Lab Sample ID: 240-99126-22

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Tetrachloroethene	1.0		1.0	0.15	ug/L	1		8260B	Total/NA
Trichloroethene	0.63	J	1.0	0.10	ug/L	1		8260B	Total/NA

Client Sample ID: GM-9/072418/ — Lab Sample ID: 240-99126-23

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1-Dichloroethane	0.18	J	1.0	0.17	ug/L	1		8260B	Total/NA
1,1,1-Trichloroethane	0.49	J	1.0	0.24	ug/L	1		8260B	Total/NA
Trichloroethene	9.1		1.0	0.10	ug/L	1		8260B	Total/NA

Client Sample ID: EB-4/072418/ — Lab Sample ID: 240-99126-24

No Detections.

Client Sample ID: W-4-N/072518 — Lab Sample ID: 240-99126-25

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	8.7		1.0	0.16	ug/L	1		8260B	Total/NA
1,1-Dichloroethane	6.9		1.0	0.17	ug/L	1		8260B	Total/NA
Tetrachloroethene	0.26	J	1.0	0.15	ug/L	1		8260B	Total/NA
trans-1,2-Dichloroethene	1.3		1.0	0.19	ug/L	1		8260B	Total/NA
Trichloroethene	6.1		1.0	0.10	ug/L	1		8260B	Total/NA

Client Sample ID: GM-21/072518/ — Lab Sample ID: 240-99126-26

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	23		1.0	0.16	ug/L	1		8260B	Total/NA
1,1-Dichloroethane	9.3		1.0	0.17	ug/L	1		8260B	Total/NA
trans-1,2-Dichloroethene	1.6		1.0	0.19	ug/L	1		8260B	Total/NA
Trichloroethene	3.9		1.0	0.10	ug/L	1		8260B	Total/NA
Vinyl chloride	15		1.0	0.20	ug/L	1		8260B	Total/NA
Iron	27000		100	26	ug/L	1		6010B	Total Recoverable
Manganese	570		15	2.1	ug/L	1		6010B	Total Recoverable

This Detection Summary does not include radiochemical test results.

Client Sample ID: GM-21/072518/ (Continued) Lab Sample ID: 240-99126-26

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Iron	27000		100	26	ug/L	1		6010B	Dissolved
Manganese	540		15	2.1	ug/L	1		6010B	Dissolved
Sulfate	32		10	3.5	mg/L	10		300.0	Total/NA
Sulfide	0.80	J	1.0	0.58	mg/L	1		4500 S2 F-2000	Total/NA
Total Organic Carbon	95		2.0	1.0	mg/L	2		9060A	Total/NA
Chloride	250		10	6.0	mg/L	10		9251	Total/NA

Client Sample ID: GM-28R/072518/ Lab Sample ID: 240-99126-27

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	3.5		1.0	0.16	ug/L	1		8260B	Total/NA
Tetrachloroethene	3.5		1.0	0.15	ug/L	1		8260B	Total/NA
Trichloroethene	0.30	J	1.0	0.10	ug/L	1		8260B	Total/NA
Vinyl chloride	0.70	J	1.0	0.20	ug/L	1		8260B	Total/NA
Iron	5900		100	26	ug/L	1		6010B	Total Recoverable
Manganese	290		15	2.1	ug/L	1		6010B	Total Recoverable
Iron	4500		100	26	ug/L	1		6010B	Dissolved
Manganese	250		15	2.1	ug/L	1		6010B	Dissolved
Sulfate	24		2.0	0.70	mg/L	2		300.0	Total/NA
Total Organic Carbon	6.7		1.0	0.50	mg/L	1		9060A	Total/NA
Chloride	18		1.0	0.60	mg/L	1		9251	Total/NA

Client Sample ID: DUP-1/072518/ Lab Sample ID: 240-99126-28

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	2.9		1.0	0.16	ug/L	1		8260B	Total/NA
Tetrachloroethene	3.7		1.0	0.15	ug/L	1		8260B	Total/NA
Trichloroethene	0.31	J	1.0	0.10	ug/L	1		8260B	Total/NA
Vinyl chloride	0.65	J	1.0	0.20	ug/L	1		8260B	Total/NA
Iron	6500		100	26	ug/L	1		6010B	Total Recoverable
Manganese	300		15	2.1	ug/L	1		6010B	Total Recoverable
Iron	5100		100	26	ug/L	1		6010B	Dissolved
Manganese	290		15	2.1	ug/L	1		6010B	Dissolved
Sulfate	24		2.0	0.70	mg/L	2		300.0	Total/NA
Total Organic Carbon	6.7		1.0	0.50	mg/L	1		9060A	Total/NA
Chloride	18		1.0	0.60	mg/L	1		9251	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: GM-19S/072418/

Date Collected: 07/24/18 14:45
Date Received: 07/27/18 08:00

Lab Sample ID: 240-99126-1
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	1.0	U	1.0	0.13	ug/L			08/07/18 13:08	1
cis-1,2-Dichloroethene	**31**		1.0	0.16	ug/L			08/07/18 13:08	1
1,1-Dichloroethane	**2.3**		1.0	0.17	ug/L			08/07/18 13:08	1
1,1-Dichloroethene	1.0	U	1.0	0.19	ug/L			08/07/18 13:08	1
Ethylbenzene	1.0	U	1.0	0.11	ug/L			08/07/18 13:08	1
Tetrachloroethene	**0.37**	**J**	1.0	0.15	ug/L			08/07/18 13:08	1
Toluene	1.0	U	1.0	0.14	ug/L			08/07/18 13:08	1
trans-1,2-Dichloroethene	**0.66**	**J**	1.0	0.19	ug/L			08/07/18 13:08	1
1,1,1-Trichloroethane	1.0	U	1.0	0.24	ug/L			08/07/18 13:08	1
Trichloroethene	**2.4**		1.0	0.10	ug/L			08/07/18 13:08	1
Vinyl chloride	**8.8**		1.0	0.20	ug/L			08/07/18 13:08	1
Xylenes, Total	2.0	U	2.0	0.15	ug/L			08/07/18 13:08	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*77*		*69 - 120*		*08/07/18 13:08*	*1*
Dibromofluoromethane (Surr)	*99*		*69 - 124*		*08/07/18 13:08*	*1*
1,2-Dichloroethane-d4 (Surr)	*94*		*61 - 138*		*08/07/18 13:08*	*1*
Toluene-d8 (Surr)	*90*		*73 - 120*		*08/07/18 13:08*	*1*

Method: 6010B - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	**6000**		100	26	ug/L		07/30/18 14:00	07/31/18 17:37	1
Manganese	**290**		15	2.1	ug/L		07/30/18 14:00	07/31/18 17:37	1

Method: 6010B - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	**5400**		100	26	ug/L		07/30/18 14:00	07/31/18 17:42	1
Manganese	**280**		15	2.1	ug/L		07/30/18 14:00	07/31/18 17:42	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	**53**		5.0	1.7	mg/L			07/31/18 18:30	5
Sulfide	1.0	U	1.0	0.58	mg/L			07/31/18 14:22	1
Total Organic Carbon	**1.7**		1.0	0.50	mg/L			08/04/18 16:11	1
Chloride	**140**		10	6.0	mg/L			07/30/18 15:34	10

Client Sample ID: GM-32/072418/

Date Collected: 07/24/18 12:35
Date Received: 07/27/18 08:00

Lab Sample ID: 240-99126-2

Matrix: Water

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon	3.8		1.0	0.50	mg/L			08/04/18 16:11	1

Client Sample ID: GM-6/072418/

Date Collected: 07/24/18 11:05
Date Received: 07/27/18 08:00

Lab Sample ID: 240-99126-3
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	1.0	U	1.0	0.13	ug/L			08/06/18 18:17	1
cis-1,2-Dichloroethene	**0.40**	**J**	1.0	0.16	ug/L			08/06/18 18:17	1
1,1-Dichloroethane	**0.26**	**J**	1.0	0.17	ug/L			08/06/18 18:17	1
1,1-Dichloroethene	1.0	U	1.0	0.19	ug/L			08/06/18 18:17	1
Ethylbenzene	1.0	U	1.0	0.11	ug/L			08/06/18 18:17	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			08/06/18 18:17	1
Toluene	1.0	U	1.0	0.14	ug/L			08/06/18 18:17	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			08/06/18 18:17	1
1,1,1-Trichloroethane	1.0	U	1.0	0.24	ug/L			08/06/18 18:17	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			08/06/18 18:17	1
Vinyl chloride	**0.65**	**J**	1.0	0.20	ug/L			08/06/18 18:17	1
Xylenes, Total	2.0	U	2.0	0.15	ug/L			08/06/18 18:17	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*83*		*69 - 120*		*08/06/18 18:17*	*1*
Dibromofluoromethane (Surr)	*100*		*69 - 124*		*08/06/18 18:17*	*1*
1,2-Dichloroethane-d4 (Surr)	*93*		*61 - 138*		*08/06/18 18:17*	*1*
Toluene-d8 (Surr)	*91*		*73 - 120*		*08/06/18 18:17*	*1*

Method: 6010B - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	**6000**		100	26	ug/L		07/30/18 14:00	07/31/18 17:46	1
Manganese	**160**		15	2.1	ug/L		07/30/18 14:00	07/31/18 17:46	1

Method: 6010B - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	**5500**		100	26	ug/L		07/30/18 14:00	07/31/18 17:50	1
Manganese	**150**		15	2.1	ug/L		07/30/18 14:00	07/31/18 17:50	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	**44**		5.0	1.7	mg/L			07/31/18 19:32	5
Sulfide	1.0	U	1.0	0.58	mg/L			07/31/18 14:29	1
Total Organic Carbon	**3.1**		1.0	0.50	mg/L			08/04/18 16:11	1
Chloride	**140**		10	6.0	mg/L			07/30/18 15:34	10

Client Sample ID: GM-8/072418/
Date Collected: 07/24/18 09:45
Date Received: 07/27/18 08:00

Lab Sample ID: 240-99126-4
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	**1.3**		1.0	0.13	ug/L			08/06/18 18:42	1
cis-1,2-Dichloroethene	**0.30**	**J**	1.0	0.16	ug/L			08/06/18 18:42	1
1,1-Dichloroethane	**0.47**	**J**	1.0	0.17	ug/L			08/06/18 18:42	1
1,1-Dichloroethene	1.0	U	1.0	0.19	ug/L			08/06/18 18:42	1
Ethylbenzene	1.0	U	1.0	0.11	ug/L			08/06/18 18:42	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			08/06/18 18:42	1
Toluene	1.0	U	1.0	0.14	ug/L			08/06/18 18:42	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			08/06/18 18:42	1
1,1,1-Trichloroethane	1.0	U	1.0	0.24	ug/L			08/06/18 18:42	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			08/06/18 18:42	1
Vinyl chloride	**0.91**	**J**	1.0	0.20	ug/L			08/06/18 18:42	1
Xylenes, Total	2.0	U	2.0	0.15	ug/L			08/06/18 18:42	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*84*		*69 - 120*		*08/06/18 18:42*	*1*
Dibromofluoromethane (Surr)	*101*		*69 - 124*		*08/06/18 18:42*	*1*
1,2-Dichloroethane-d4 (Surr)	*96*		*61 - 138*		*08/06/18 18:42*	*1*
Toluene-d8 (Surr)	*91*		*73 - 120*		*08/06/18 18:42*	*1*

Method: 6010B - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	**2900**		100	26	ug/L		07/30/18 14:00	07/31/18 17:55	1
Manganese	**68**		15	2.1	ug/L		07/30/18 14:00	07/31/18 17:55	1

Method: 6010B - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	**3000**		100	26	ug/L		07/30/18 14:00	07/31/18 17:59	1
Manganese	**71**		15	2.1	ug/L		07/30/18 14:00	07/31/18 17:59	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	**38**		5.0	1.7	mg/L			07/31/18 19:53	5
Sulfide	1.0	U	1.0	0.58	mg/L			07/31/18 14:35	1
Total Organic Carbon	**6.2**		1.0	0.50	mg/L			08/04/18 16:11	1
Chloride	**130**		10	6.0	mg/L			07/30/18 15:34	10

1 2 3 4 5 6 7 8 9 10 11 12 13 14

Client Sample ID: EB-03/072418/

Lab Sample ID: 240-99126-5

Date Collected: 07/24/18 15:25

Matrix: Water

Date Received: 07/27/18 08:00

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	1.0	U	1.0	0.13	ug/L			08/06/18 19:07	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			08/06/18 19:07	1
1,1-Dichloroethane	1.0	U	1.0	0.17	ug/L			08/06/18 19:07	1
1,1-Dichloroethene	1.0	U	1.0	0.19	ug/L			08/06/18 19:07	1
Ethylbenzene	1.0	U	1.0	0.11	ug/L			08/06/18 19:07	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			08/06/18 19:07	1
Toluene	1.0	U	1.0	0.14	ug/L			08/06/18 19:07	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			08/06/18 19:07	1
1,1,1-Trichloroethane	1.0	U	1.0	0.24	ug/L			08/06/18 19:07	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			08/06/18 19:07	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			08/06/18 19:07	1
Xylenes, Total	2.0	U	2.0	0.15	ug/L			08/06/18 19:07	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*81*		*69 - 120*		*08/06/18 19:07*	*1*
Dibromofluoromethane (Surr)	*96*		*69 - 124*		*08/06/18 19:07*	*1*
1,2-Dichloroethane-d4 (Surr)	*94*		*61 - 138*		*08/06/18 19:07*	*1*
Toluene-d8 (Surr)	*90*		*73 - 120*		*08/06/18 19:07*	*1*

Method: 6010B - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	**47**	**J**	100	26	ug/L		07/30/18 14:00	07/31/18 18:03	1
Manganese	15	U	15	2.1	ug/L		07/30/18 14:00	07/31/18 18:03	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	1.0	U	1.0	0.35	mg/L			07/31/18 20:14	1
Sulfide	1.0	U	1.0	0.58	mg/L			07/31/18 14:41	1
Total Organic Carbon	1.0	U	1.0	0.50	mg/L			08/04/18 16:11	1
Chloride	1.0	U	1.0	0.60	mg/L			07/30/18 15:34	1

Client Sample ID: GM-15/072418/

Lab Sample ID: 240-99126-6

Date Collected: 07/24/18 16:50
Date Received: 07/27/18 08:00

Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	1.0	U	1.0	0.13	ug/L			08/06/18 19:32	1
cis-1,2-Dichloroethene	**6.6**		1.0	0.16	ug/L			08/06/18 19:32	1
1,1-Dichloroethane	**1.9**		1.0	0.17	ug/L			08/06/18 19:32	1
1,1-Dichloroethene	1.0	U	1.0	0.19	ug/L			08/06/18 19:32	1
Ethylbenzene	1.0	U	1.0	0.11	ug/L			08/06/18 19:32	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			08/06/18 19:32	1
Toluene	1.0	U	1.0	0.14	ug/L			08/06/18 19:32	1
trans-1,2-Dichloroethene	**0.66**	**J**	1.0	0.19	ug/L			08/06/18 19:32	1
1,1,1-Trichloroethane	1.0	U	1.0	0.24	ug/L			08/06/18 19:32	1
Trichloroethene	**5.8**		1.0	0.10	ug/L			08/06/18 19:32	1
Vinyl chloride	**0.50**	**J**	1.0	0.20	ug/L			08/06/18 19:32	1
Xylenes, Total	2.0	U	2.0	0.15	ug/L			08/06/18 19:32	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*83*		*69 - 120*		*08/06/18 19:32*	*1*
Dibromofluoromethane (Surr)	*98*		*69 - 124*		*08/06/18 19:32*	*1*
1,2-Dichloroethane-d4 (Surr)	*94*		*61 - 138*		*08/06/18 19:32*	*1*
Toluene-d8 (Surr)	*93*		*73 - 120*		*08/06/18 19:32*	*1*

Client Sample ID: DN-13/072418/

Lab Sample ID: 240-99126-7

Date Collected: 07/24/18 17:25

Matrix: Water

Date Received: 07/27/18 08:00

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	1.0	U	1.0	0.13	ug/L			08/06/18 19:57	1
cis-1,2-Dichloroethene	**4.7**		1.0	0.16	ug/L			08/06/18 19:57	1
1,1-Dichloroethane	**1.1**		1.0	0.17	ug/L			08/06/18 19:57	1
1,1-Dichloroethene	1.0	U	1.0	0.19	ug/L			08/06/18 19:57	1
Ethylbenzene	1.0	U	1.0	0.11	ug/L			08/06/18 19:57	1
Tetrachloroethene	**1.4**		1.0	0.15	ug/L			08/06/18 19:57	1
Toluene	1.0	U	1.0	0.14	ug/L			08/06/18 19:57	1
trans-1,2-Dichloroethene	**0.28**	**J**	1.0	0.19	ug/L			08/06/18 19:57	1
1,1,1-Trichloroethane	**0.52**	**J**	1.0	0.24	ug/L			08/06/18 19:57	1
Trichloroethene	**6.2**		1.0	0.10	ug/L			08/06/18 19:57	1
Vinyl chloride	**0.53**	**J**	1.0	0.20	ug/L			08/06/18 19:57	1
Xylenes, Total	2.0	U	2.0	0.15	ug/L			08/06/18 19:57	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*81*		*69 - 120*		*08/06/18 19:57*	*1*
Dibromofluoromethane (Surr)	*100*		*69 - 124*		*08/06/18 19:57*	*1*
1,2-Dichloroethane-d4 (Surr)	*94*		*61 - 138*		*08/06/18 19:57*	*1*
Toluene-d8 (Surr)	*92*		*73 - 120*		*08/06/18 19:57*	*1*

Client Sample ID: W-4-S/072518/
Lab Sample ID: 240-99126-8
Date Collected: 07/25/18 12:50
Matrix: Water
Date Received: 07/27/18 08:00

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	1.0	U	1.0	0.13	ug/L			08/06/18 18:48	1
cis-1,2-Dichloroethene	**17**		1.0	0.16	ug/L			08/06/18 18:48	1
1,1-Dichloroethane	**2.1**		1.0	0.17	ug/L			08/06/18 18:48	1
1,1-Dichloroethene	1.0	U	1.0	0.19	ug/L			08/06/18 18:48	1
Ethylbenzene	1.0	U	1.0	0.11	ug/L			08/06/18 18:48	1
Tetrachloroethene	**68**		1.0	0.15	ug/L			08/06/18 18:48	1
Toluene	1.0	U	1.0	0.14	ug/L			08/06/18 18:48	1
trans-1,2-Dichloroethene	**1.5**		1.0	0.19	ug/L			08/06/18 18:48	1
1,1,1-Trichloroethane	**1.8**		1.0	0.24	ug/L			08/06/18 18:48	1
Trichloroethene	**42**		1.0	0.10	ug/L			08/06/18 18:48	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			08/06/18 18:48	1
Xylenes, Total	2.0	U	2.0	0.15	ug/L			08/06/18 18:48	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*98*		*69 - 120*		*08/06/18 18:48*	*1*
Dibromofluoromethane (Surr)	*99*		*69 - 124*		*08/06/18 18:48*	*1*
1,2-Dichloroethane-d4 (Surr)	*103*		*61 - 138*		*08/06/18 18:48*	*1*
Toluene-d8 (Surr)	*105*		*73 - 120*		*08/06/18 18:48*	*1*

Client: ARCADIS U.S., Inc. TestAmerica Job ID: 240-99126-1
Project/Site: Racer Moraine

Client Sample ID: W-3-S/072518/ Lab Sample ID: 240-99126-9

Date Collected: 07/25/18 11:45 **Matrix: Water**
Date Received: 07/27/18 08:00

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	1.0	U	1.0	0.13	ug/L			08/06/18 19:10	1
cis-1,2-Dichloroethene	**1.1**		1.0	0.16	ug/L			08/06/18 19:10	1
1,1-Dichloroethane	**0.61**	**J**	1.0	0.17	ug/L			08/06/18 19:10	1
1,1-Dichloroethene	1.0	U	1.0	0.19	ug/L			08/06/18 19:10	1
Ethylbenzene	1.0	U	1.0	0.11	ug/L			08/06/18 19:10	1
Tetrachloroethene	**19**		1.0	0.15	ug/L			08/06/18 19:10	1
Toluene	1.0	U	1.0	0.14	ug/L			08/06/18 19:10	1
trans-1,2-Dichloroethene	**0.19**	**J**	1.0	0.19	ug/L			08/06/18 19:10	1
1,1,1-Trichloroethane	**0.87**	**J**	1.0	0.24	ug/L			08/06/18 19:10	1
Trichloroethene	**27**		1.0	0.10	ug/L			08/06/18 19:10	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			08/06/18 19:10	1
Xylenes, Total	2.0	U	2.0	0.15	ug/L			08/06/18 19:10	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*103*		*69 - 120*		*08/06/18 19:10*	*1*
Dibromofluoromethane (Surr)	*105*		*69 - 124*		*08/06/18 19:10*	*1*
1,2-Dichloroethane-d4 (Surr)	*110*		*61 - 138*		*08/06/18 19:10*	*1*
Toluene-d8 (Surr)	*107*		*73 - 120*		*08/06/18 19:10*	*1*

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: Racer Moraine

TestAmerica Job ID: 240-99126-1

Client Sample ID: W-2-S/072518/

Lab Sample ID: 240-99126-10

Date Collected: 07/25/18 10:45
Matrix: Water
Date Received: 07/27/18 08:00

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	1.0	U	1.0	0.13	ug/L			08/06/18 19:32	1
cis-1,2-Dichloroethene	**2.2**		1.0	0.16	ug/L			08/06/18 19:32	1
1,1-Dichloroethane	**0.83**	**J**	1.0	0.17	ug/L			08/06/18 19:32	1
1,1-Dichloroethene	1.0	U	1.0	0.19	ug/L			08/06/18 19:32	1
Ethylbenzene	1.0	U	1.0	0.11	ug/L			08/06/18 19:32	1
Tetrachloroethene	**2.0**		1.0	0.15	ug/L			08/06/18 19:32	1
Toluene	1.0	U	1.0	0.14	ug/L			08/06/18 19:32	1
trans-1,2-Dichloroethene	**0.32**	**J**	1.0	0.19	ug/L			08/06/18 19:32	1
1,1,1-Trichloroethane	**0.98**	**J**	1.0	0.24	ug/L			08/06/18 19:32	1
Trichloroethene	**4.6**		1.0	0.10	ug/L			08/06/18 19:32	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			08/06/18 19:32	1
Xylenes, Total	2.0	U	2.0	0.15	ug/L			08/06/18 19:32	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*104*		*69 - 120*		*08/06/18 19:32*	*1*
Dibromofluoromethane (Surr)	*105*		*69 - 124*		*08/06/18 19:32*	*1*
1,2-Dichloroethane-d4 (Surr)	*112*		*61 - 138*		*08/06/18 19:32*	*1*
Toluene-d8 (Surr)	*111*		*73 - 120*		*08/06/18 19:32*	*1*

Client Sample ID: HR-17/072518/

Date Collected: 07/25/18 14:50
Date Received: 07/27/18 08:00

Lab Sample ID: 240-99126-11

Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	1.0	U	1.0	0.13	ug/L			08/06/18 19:55	1
cis-1,2-Dichloroethene	**1.1**		1.0	0.16	ug/L			08/06/18 19:55	1
1,1-Dichloroethane	**2.2**		1.0	0.17	ug/L			08/06/18 19:55	1
1,1-Dichloroethene	1.0	U	1.0	0.19	ug/L			08/06/18 19:55	1
Ethylbenzene	1.0	U	1.0	0.11	ug/L			08/06/18 19:55	1
Tetrachloroethene	**180**		4.0	0.60	ug/L			08/06/18 20:17	4
Toluene	1.0	U	1.0	0.14	ug/L			08/06/18 19:55	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			08/06/18 19:55	1
1,1,1-Trichloroethane	**4.8**		1.0	0.24	ug/L			08/06/18 19:55	1
Trichloroethene	**0.92**	**J**	1.0	0.10	ug/L			08/06/18 19:55	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			08/06/18 19:55	1
Xylenes, Total	2.0	U	2.0	0.15	ug/L			08/06/18 19:55	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*96*		*69 - 120*		*08/06/18 19:55*	*1*
4-Bromofluorobenzene (Surr)	*99*		*69 - 120*		*08/06/18 20:17*	*4*
Dibromofluoromethane (Surr)	*102*		*69 - 124*		*08/06/18 19:55*	*1*
Dibromofluoromethane (Surr)	*103*		*69 - 124*		*08/06/18 20:17*	*4*
1,2-Dichloroethane-d4 (Surr)	*106*		*61 - 138*		*08/06/18 19:55*	*1*
1,2-Dichloroethane-d4 (Surr)	*105*		*61 - 138*		*08/06/18 20:17*	*4*
Toluene-d8 (Surr)	*104*		*73 - 120*		*08/06/18 19:55*	*1*
Toluene-d8 (Surr)	*105*		*73 - 120*		*08/06/18 20:17*	*4*

Client Sample ID: HR-1/072518/

Lab Sample ID: 240-99126-12

Date Collected: 07/25/18 17:00

Matrix: Water

Date Received: 07/27/18 08:00

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	1.0	U	1.0	0.13	ug/L			08/06/18 20:39	1
cis-1,2-Dichloroethene	**20**		1.0	0.16	ug/L			08/06/18 20:39	1
1,1-Dichloroethane	**0.96**	**J**	1.0	0.17	ug/L			08/06/18 20:39	1
1,1-Dichloroethene	1.0	U	1.0	0.19	ug/L			08/06/18 20:39	1
Ethylbenzene	1.0	U	1.0	0.11	ug/L			08/06/18 20:39	1
Tetrachloroethene	**99**		4.0	0.60	ug/L			08/07/18 21:09	4
Toluene	1.0	U	1.0	0.14	ug/L			08/06/18 20:39	1
trans-1,2-Dichloroethene	**1.3**		1.0	0.19	ug/L			08/06/18 20:39	1
1,1,1-Trichloroethane	**0.77**	**J**	1.0	0.24	ug/L			08/06/18 20:39	1
Trichloroethene	**40**		1.0	0.10	ug/L			08/06/18 20:39	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			08/06/18 20:39	1
Xylenes, Total	2.0	U	2.0	0.15	ug/L			08/06/18 20:39	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*90*		*69 - 120*		*08/06/18 20:39*	*1*
4-Bromofluorobenzene (Surr)	*82*		*69 - 120*		*08/07/18 21:09*	*4*
Dibromofluoromethane (Surr)	*95*		*69 - 124*		*08/06/18 20:39*	*1*
Dibromofluoromethane (Surr)	*80*		*69 - 124*		*08/07/18 21:09*	*4*
1,2-Dichloroethane-d4 (Surr)	*98*		*61 - 138*		*08/06/18 20:39*	*1*
1,2-Dichloroethane-d4 (Surr)	*80*		*61 - 138*		*08/07/18 21:09*	*4*
Toluene-d8 (Surr)	*99*		*73 - 120*		*08/06/18 20:39*	*1*
Toluene-d8 (Surr)	*83*		*73 - 120*		*08/07/18 21:09*	*4*

1 2 3 4 5 6 7 8 9 10 11 12 13 14

Client Sample ID: DUP-02/072518/

Lab Sample ID: 240-99126-13

Date Collected: 07/25/18 00:00

Matrix: Water

Date Received: 07/27/18 08:00

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	1.0	U	1.0	0.13	ug/L			08/06/18 21:01	1
cis-1,2-Dichloroethene	**15**		1.0	0.16	ug/L			08/06/18 21:01	1
1,1-Dichloroethane	**0.73**	**J**	1.0	0.17	ug/L			08/06/18 21:01	1
1,1-Dichloroethene	1.0	U	1.0	0.19	ug/L			08/06/18 21:01	1
Ethylbenzene	1.0	U	1.0	0.11	ug/L			08/06/18 21:01	1
Tetrachloroethene	**98**		4.0	0.60	ug/L			08/07/18 21:32	4
Toluene	1.0	U	1.0	0.14	ug/L			08/06/18 21:01	1
trans-1,2-Dichloroethene	**0.99**	**J**	1.0	0.19	ug/L			08/06/18 21:01	1
1,1,1-Trichloroethane	**0.80**	**J**	1.0	0.24	ug/L			08/06/18 21:01	1
Trichloroethene	**34**		1.0	0.10	ug/L			08/06/18 21:01	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			08/06/18 21:01	1
Xylenes, Total	2.0	U	2.0	0.15	ug/L			08/06/18 21:01	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*100*		*69 - 120*		*08/06/18 21:01*	*1*
4-Bromofluorobenzene (Surr)	*85*		*69 - 120*		*08/07/18 21:32*	*4*
Dibromofluoromethane (Surr)	*104*		*69 - 124*		*08/06/18 21:01*	*1*
Dibromofluoromethane (Surr)	*79*		*69 - 124*		*08/07/18 21:32*	*4*
1,2-Dichloroethane-d4 (Surr)	*107*		*61 - 138*		*08/06/18 21:01*	*1*
1,2-Dichloroethane-d4 (Surr)	*79*		*61 - 138*		*08/07/18 21:32*	*4*
Toluene-d8 (Surr)	*105*		*73 - 120*		*08/06/18 21:01*	*1*
Toluene-d8 (Surr)	*82*		*73 - 120*		*08/07/18 21:32*	*4*

Client Sample ID: TRIP BLANK/072518/

Lab Sample ID: 240-99126-14

Date Collected: 07/25/18 00:00

Matrix: Water

Date Received: 07/27/18 08:00

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	1.0	U	1.0	0.13	ug/L			08/06/18 21:24	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			08/06/18 21:24	1
1,1-Dichloroethane	1.0	U	1.0	0.17	ug/L			08/06/18 21:24	1
1,1-Dichloroethene	1.0	U	1.0	0.19	ug/L			08/06/18 21:24	1
Ethylbenzene	1.0	U	1.0	0.11	ug/L			08/06/18 21:24	1
Tetrachloroethene	**0.18**	**J**	1.0	0.15	ug/L			08/06/18 21:24	1
Toluene	1.0	U	1.0	0.14	ug/L			08/06/18 21:24	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			08/06/18 21:24	1
1,1,1-Trichloroethane	1.0	U	1.0	0.24	ug/L			08/06/18 21:24	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			08/06/18 21:24	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			08/06/18 21:24	1
Xylenes, Total	2.0	U	2.0	0.15	ug/L			08/06/18 21:24	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*98*		*69 - 120*		*08/06/18 21:24*	*1*
Dibromofluoromethane (Surr)	*98*		*69 - 124*		*08/06/18 21:24*	*1*
1,2-Dichloroethane-d4 (Surr)	*102*		*61 - 138*		*08/06/18 21:24*	*1*
Toluene-d8 (Surr)	*105*		*73 - 120*		*08/06/18 21:24*	*1*

Client Sample ID: EB-05/072518/

Lab Sample ID: 240-99126-15

Date Collected: 07/25/18 17:20
Matrix: Water
Date Received: 07/27/18 08:00

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	1.0	U	1.0	0.13	ug/L			08/06/18 21:46	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			08/06/18 21:46	1
1,1-Dichloroethane	1.0	U	1.0	0.17	ug/L			08/06/18 21:46	1
1,1-Dichloroethene	1.0	U	1.0	0.19	ug/L			08/06/18 21:46	1
Ethylbenzene	1.0	U	1.0	0.11	ug/L			08/06/18 21:46	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			08/06/18 21:46	1
Toluene	1.0	U	1.0	0.14	ug/L			08/06/18 21:46	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			08/06/18 21:46	1
1,1,1-Trichloroethane	1.0	U	1.0	0.24	ug/L			08/06/18 21:46	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			08/06/18 21:46	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			08/06/18 21:46	1
Xylenes, Total	2.0	U	2.0	0.15	ug/L			08/06/18 21:46	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*100*		*69 - 120*		*08/06/18 21:46*	*1*
Dibromofluoromethane (Surr)	*106*		*69 - 124*		*08/06/18 21:46*	*1*
1,2-Dichloroethane-d4 (Surr)	*109*		*61 - 138*		*08/06/18 21:46*	*1*
Toluene-d8 (Surr)	*106*		*73 - 120*		*08/06/18 21:46*	*1*

Client Sample ID: GM-29/072518/

Lab Sample ID: 240-99126-16

Date Collected: 07/25/18 18:00
Matrix: Water
Date Received: 07/27/18 08:00

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	2.0	U	2.0	0.26	ug/L			08/06/18 22:08	2
cis-1,2-Dichloroethene	**420**		20	3.2	ug/L			08/06/18 22:31	20
1,1-Dichloroethane	**10**		2.0	0.34	ug/L			08/06/18 22:08	2
1,1-Dichloroethene	2.0	U	2.0	0.38	ug/L			08/06/18 22:08	2
Ethylbenzene	2.0	U	2.0	0.22	ug/L			08/06/18 22:08	2
Tetrachloroethene	**13**		2.0	0.30	ug/L			08/06/18 22:08	2
Toluene	2.0	U	2.0	0.28	ug/L			08/06/18 22:08	2
trans-1,2-Dichloroethene	**13**		2.0	0.38	ug/L			08/06/18 22:08	2
1,1,1-Trichloroethane	**8.1**		2.0	0.48	ug/L			08/06/18 22:08	2
Trichloroethene	**310**		20	2.0	ug/L			08/06/18 22:31	20
Vinyl chloride	**41**		2.0	0.40	ug/L			08/06/18 22:08	2
Xylenes, Total	4.0	U	4.0	0.30	ug/L			08/06/18 22:08	2

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*98*		*69 - 120*		*08/06/18 22:08*	*2*
4-Bromofluorobenzene (Surr)	*96*		*69 - 120*		*08/06/18 22:31*	*20*
Dibromofluoromethane (Surr)	*100*		*69 - 124*		*08/06/18 22:08*	*2*
Dibromofluoromethane (Surr)	*101*		*69 - 124*		*08/06/18 22:31*	*20*
1,2-Dichloroethane-d4 (Surr)	*103*		*61 - 138*		*08/06/18 22:08*	*2*
1,2-Dichloroethane-d4 (Surr)	*104*		*61 - 138*		*08/06/18 22:31*	*20*
Toluene-d8 (Surr)	*103*		*73 - 120*		*08/06/18 22:08*	*2*
Toluene-d8 (Surr)	*102*		*73 - 120*		*08/06/18 22:31*	*20*

Method: 6010B - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	**4600**		100	26	ug/L		07/30/18 14:00	07/31/18 18:16	1
Manganese	**150**		15	2.1	ug/L		07/30/18 14:00	07/31/18 18:16	1

Method: 6010B - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	**3600**		100	26	ug/L		07/30/18 14:00	07/31/18 18:21	1
Manganese	**120**		15	2.1	ug/L		07/30/18 14:00	07/31/18 18:21	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	**49**		5.0	1.7	mg/L			07/31/18 20:35	5
Sulfide	1.0	U	1.0	0.58	mg/L			07/31/18 14:48	1
Total Organic Carbon	**8.8**		1.0	0.50	mg/L			08/04/18 16:11	1
Chloride	**120**		10	6.0	mg/L			07/30/18 15:34	10

Client Sample ID: GM-28/072518/

Date Collected: 07/25/18 08:20
Date Received: 07/27/18 08:00

Lab Sample ID: 240-99126-17

Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	**0.47**	**J**	1.0	0.13	ug/L			08/06/18 22:53	1
cis-1,2-Dichloroethene	**260**		10	1.6	ug/L			08/07/18 21:55	10
1,1-Dichloroethane	**8.0**		1.0	0.17	ug/L			08/06/18 22:53	1
1,1-Dichloroethene	**0.81**	**J**	1.0	0.19	ug/L			08/06/18 22:53	1
Ethylbenzene	1.0	U	1.0	0.11	ug/L			08/06/18 22:53	1
Tetrachloroethene	**8.4**		1.0	0.15	ug/L			08/06/18 22:53	1
Toluene	**0.16**	**J**	1.0	0.14	ug/L			08/06/18 22:53	1
trans-1,2-Dichloroethene	**16**		1.0	0.19	ug/L			08/06/18 22:53	1
1,1,1-Trichloroethane	1.0	U	1.0	0.24	ug/L			08/06/18 22:53	1
Trichloroethene	**5.0**		1.0	0.10	ug/L			08/06/18 22:53	1
Vinyl chloride	**210**		10	2.0	ug/L			08/07/18 21:55	10
Xylenes, Total	2.0	U	2.0	0.15	ug/L			08/06/18 22:53	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*96*		*69 - 120*		*08/06/18 22:53*	*1*
4-Bromofluorobenzene (Surr)	*86*		*69 - 120*		*08/07/18 21:55*	*10*
Dibromofluoromethane (Surr)	*102*		*69 - 124*		*08/06/18 22:53*	*1*
Dibromofluoromethane (Surr)	*83*		*69 - 124*		*08/07/18 21:55*	*10*
1,2-Dichloroethane-d4 (Surr)	*102*		*61 - 138*		*08/06/18 22:53*	*1*
1,2-Dichloroethane-d4 (Surr)	*82*		*61 - 138*		*08/07/18 21:55*	*10*
Toluene-d8 (Surr)	*103*		*73 - 120*		*08/06/18 22:53*	*1*
Toluene-d8 (Surr)	*87*		*73 - 120*		*08/07/18 21:55*	*10*

Method: 6010B - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	**3200**		100	26	ug/L		07/30/18 14:00	07/31/18 18:25	1
Manganese	**240**		15	2.1	ug/L		07/30/18 14:00	07/31/18 18:25	1

Method: 6010B - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	**2800**		100	26	ug/L		07/30/18 14:00	07/31/18 18:29	1
Manganese	**220**		15	2.1	ug/L		07/30/18 14:00	07/31/18 18:29	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	**38**		5.0	1.7	mg/L			07/31/18 20:56	5
Sulfide	1.0	U	1.0	0.58	mg/L			07/31/18 14:54	1
Total Organic Carbon	**6.6**		1.0	0.50	mg/L			08/04/18 16:11	1
Chloride	**130**		10	6.0	mg/L			07/30/18 15:34	10

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: Racer Moraine

TestAmerica Job ID: 240-99126-1

Client Sample ID: EB-6/072518/

Date Collected: 07/25/18 18:45
Date Received: 07/27/18 08:00

Lab Sample ID: 240-99126-18

Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	1.0	U	1.0	0.13	ug/L			08/07/18 20:46	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			08/07/18 20:46	1
1,1-Dichloroethane	1.0	U	1.0	0.17	ug/L			08/07/18 20:46	1
1,1-Dichloroethene	1.0	U	1.0	0.19	ug/L			08/07/18 20:46	1
Ethylbenzene	1.0	U	1.0	0.11	ug/L			08/07/18 20:46	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			08/07/18 20:46	1
Toluene	1.0	U	1.0	0.14	ug/L			08/07/18 20:46	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			08/07/18 20:46	1
1,1,1-Trichloroethane	1.0	U	1.0	0.24	ug/L			08/07/18 20:46	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			08/07/18 20:46	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			08/07/18 20:46	1
Xylenes, Total	2.0	U	2.0	0.15	ug/L			08/07/18 20:46	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*85*		*69 - 120*		*08/07/18 20:46*	*1*
Dibromofluoromethane (Surr)	*80*		*69 - 124*		*08/07/18 20:46*	*1*
1,2-Dichloroethane-d4 (Surr)	*79*		*61 - 138*		*08/07/18 20:46*	*1*
Toluene-d8 (Surr)	*87*		*73 - 120*		*08/07/18 20:46*	*1*

Method: 6010B - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	100	U	100	26	ug/L		07/30/18 14:00	07/31/18 18:34	1
Manganese	15	U	15	2.1	ug/L		07/30/18 14:00	07/31/18 18:34	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	1.0	U	1.0	0.35	mg/L			07/31/18 22:39	1
Sulfide	1.0	U	1.0	0.58	mg/L			07/31/18 15:00	1
Total Organic Carbon	1.0	U	1.0	0.50	mg/L			08/04/18 16:11	1
Chloride	**0.62**	**J**	1.0	0.60	mg/L			07/30/18 15:34	1

Client Sample ID: W-2-N/072418/

Lab Sample ID: 240-99126-19

Date Collected: 07/24/18 10:20
Matrix: Water
Date Received: 07/27/18 08:00

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	1.0	U	1.0	0.13	ug/L			08/06/18 20:21	1
cis-1,2-Dichloroethene	**2.7**		1.0	0.16	ug/L			08/06/18 20:21	1
1,1-Dichloroethane	**0.31**	**J**	1.0	0.17	ug/L			08/06/18 20:21	1
1,1-Dichloroethene	1.0	U	1.0	0.19	ug/L			08/06/18 20:21	1
Ethylbenzene	1.0	U	1.0	0.11	ug/L			08/06/18 20:21	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			08/06/18 20:21	1
Toluene	1.0	U	1.0	0.14	ug/L			08/06/18 20:21	1
trans-1,2-Dichloroethene	**0.28**	**J**	1.0	0.19	ug/L			08/06/18 20:21	1
1,1,1-Trichloroethane	**0.38**	**J**	1.0	0.24	ug/L			08/06/18 20:21	1
Trichloroethene	**1.9**		1.0	0.10	ug/L			08/06/18 20:21	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			08/06/18 20:21	1
Xylenes, Total	2.0	U	2.0	0.15	ug/L			08/06/18 20:21	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*81*		*69 - 120*		*08/06/18 20:21*	*1*
Dibromofluoromethane (Surr)	*101*		*69 - 124*		*08/06/18 20:21*	*1*
1,2-Dichloroethane-d4 (Surr)	*97*		*61 - 138*		*08/06/18 20:21*	*1*
Toluene-d8 (Surr)	*91*		*73 - 120*		*08/06/18 20:21*	*1*

Client Sample ID: HR-4/072418/
Date Collected: 07/24/18 12:00
Date Received: 07/27/18 08:00

Lab Sample ID: 240-99126-20
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	1.0	U	1.0	0.13	ug/L			08/06/18 20:46	1
cis-1,2-Dichloroethene	**0.45**	**J**	1.0	0.16	ug/L			08/06/18 20:46	1
1,1-Dichloroethane	**1.6**		1.0	0.17	ug/L			08/06/18 20:46	1
1,1-Dichloroethene	1.0	U	1.0	0.19	ug/L			08/06/18 20:46	1
Ethylbenzene	1.0	U	1.0	0.11	ug/L			08/06/18 20:46	1
Tetrachloroethene	**0.16**	**J**	1.0	0.15	ug/L			08/06/18 20:46	1
Toluene	1.0	U	1.0	0.14	ug/L			08/06/18 20:46	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			08/06/18 20:46	1
1,1,1-Trichloroethane	**1.6**		1.0	0.24	ug/L			08/06/18 20:46	1
Trichloroethene	**0.29**	**J**	1.0	0.10	ug/L			08/06/18 20:46	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			08/06/18 20:46	1
Xylenes, Total	2.0	U	2.0	0.15	ug/L			08/06/18 20:46	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*82*		*69 - 120*		*08/06/18 20:46*	*1*
Dibromofluoromethane (Surr)	*99*		*69 - 124*		*08/06/18 20:46*	*1*
1,2-Dichloroethane-d4 (Surr)	*96*		*61 - 138*		*08/06/18 20:46*	*1*
Toluene-d8 (Surr)	*90*		*73 - 120*		*08/06/18 20:46*	*1*

Client Sample ID: W-3-N/072418/
Date Collected: 07/24/18 13:45
Date Received: 07/27/18 08:00

Lab Sample ID: 240-99126-21
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	1.0	U	1.0	0.13	ug/L			08/06/18 21:11	1
cis-1,2-Dichloroethene	**16**		1.0	0.16	ug/L			08/06/18 21:11	1
1,1-Dichloroethane	1.0	U	1.0	0.17	ug/L			08/06/18 21:11	1
1,1-Dichloroethene	1.0	U	1.0	0.19	ug/L			08/06/18 21:11	1
Ethylbenzene	1.0	U	1.0	0.11	ug/L			08/06/18 21:11	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			08/06/18 21:11	1
Toluene	1.0	U	1.0	0.14	ug/L			08/06/18 21:11	1
trans-1,2-Dichloroethene	**0.33**	**J**	1.0	0.19	ug/L			08/06/18 21:11	1
1,1,1-Trichloroethane	1.0	U	1.0	0.24	ug/L			08/06/18 21:11	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			08/06/18 21:11	1
Vinyl chloride	**1.1**		1.0	0.20	ug/L			08/06/18 21:11	1
Xylenes, Total	2.0	U	2.0	0.15	ug/L			08/06/18 21:11	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*80*		*69 - 120*		*08/06/18 21:11*	*1*
Dibromofluoromethane (Surr)	*100*		*69 - 124*		*08/06/18 21:11*	*1*
1,2-Dichloroethane-d4 (Surr)	*98*		*61 - 138*		*08/06/18 21:11*	*1*
Toluene-d8 (Surr)	*90*		*73 - 120*		*08/06/18 21:11*	*1*

Client Sample ID: GM-20D/072418/
Date Collected: 07/24/18 16:00
Date Received: 07/27/18 08:00

Lab Sample ID: 240-99126-22
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	1.0	U	1.0	0.13	ug/L			08/06/18 21:36	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			08/06/18 21:36	1
1,1-Dichloroethane	1.0	U	1.0	0.17	ug/L			08/06/18 21:36	1
1,1-Dichloroethene	1.0	U	1.0	0.19	ug/L			08/06/18 21:36	1
Ethylbenzene	1.0	U	1.0	0.11	ug/L			08/06/18 21:36	1
Tetrachloroethene	**1.0**		1.0	0.15	ug/L			08/06/18 21:36	1
Toluene	1.0	U	1.0	0.14	ug/L			08/06/18 21:36	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			08/06/18 21:36	1
1,1,1-Trichloroethane	1.0	U	1.0	0.24	ug/L			08/06/18 21:36	1
Trichloroethene	**0.63**	**J**	1.0	0.10	ug/L			08/06/18 21:36	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			08/06/18 21:36	1
Xylenes, Total	2.0	U	2.0	0.15	ug/L			08/06/18 21:36	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*77*		*69 - 120*		*08/06/18 21:36*	*1*
Dibromofluoromethane (Surr)	*100*		*69 - 124*		*08/06/18 21:36*	*1*
1,2-Dichloroethane-d4 (Surr)	*91*		*61 - 138*		*08/06/18 21:36*	*1*
Toluene-d8 (Surr)	*90*		*73 - 120*		*08/06/18 21:36*	*1*

Client Sample ID: GM-9/072418/

Date Collected: 07/24/18 17:35
Date Received: 07/27/18 08:00

Lab Sample ID: 240-99126-23

Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	1.0	U	1.0	0.13	ug/L			08/06/18 22:01	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			08/06/18 22:01	1
1,1-Dichloroethane	**0.18**	**J**	1.0	0.17	ug/L			08/06/18 22:01	1
1,1-Dichloroethene	1.0	U	1.0	0.19	ug/L			08/06/18 22:01	1
Ethylbenzene	1.0	U	1.0	0.11	ug/L			08/06/18 22:01	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			08/06/18 22:01	1
Toluene	1.0	U	1.0	0.14	ug/L			08/06/18 22:01	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			08/06/18 22:01	1
1,1,1-Trichloroethane	**0.49**	**J**	1.0	0.24	ug/L			08/06/18 22:01	1
Trichloroethene	**9.1**		1.0	0.10	ug/L			08/06/18 22:01	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			08/06/18 22:01	1
Xylenes, Total	2.0	U	2.0	0.15	ug/L			08/06/18 22:01	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*79*		*69 - 120*		*08/06/18 22:01*	*1*
Dibromofluoromethane (Surr)	*103*		*69 - 124*		*08/06/18 22:01*	*1*
1,2-Dichloroethane-d4 (Surr)	*99*		*61 - 138*		*08/06/18 22:01*	*1*
Toluene-d8 (Surr)	*91*		*73 - 120*		*08/06/18 22:01*	*1*

Client Sample ID: EB-4/072418/　　Lab Sample ID: 240-99126-24

Date Collected: 07/24/18 17:45　　**Matrix: Water**
Date Received: 07/27/18 08:00

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	1.0	U	1.0	0.13	ug/L			08/06/18 22:25	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			08/06/18 22:25	1
1,1-Dichloroethane	1.0	U	1.0	0.17	ug/L			08/06/18 22:25	1
1,1-Dichloroethene	1.0	U	1.0	0.19	ug/L			08/06/18 22:25	1
Ethylbenzene	1.0	U	1.0	0.11	ug/L			08/06/18 22:25	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			08/06/18 22:25	1
Toluene	1.0	U	1.0	0.14	ug/L			08/06/18 22:25	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			08/06/18 22:25	1
1,1,1-Trichloroethane	1.0	U	1.0	0.24	ug/L			08/06/18 22:25	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			08/06/18 22:25	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			08/06/18 22:25	1
Xylenes, Total	2.0	U	2.0	0.15	ug/L			08/06/18 22:25	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*77*		*69 - 120*		*08/06/18 22:25*	*1*
Dibromofluoromethane (Surr)	*98*		*69 - 124*		*08/06/18 22:25*	*1*
1,2-Dichloroethane-d4 (Surr)	*96*		*61 - 138*		*08/06/18 22:25*	*1*
Toluene-d8 (Surr)	*86*		*73 - 120*		*08/06/18 22:25*	*1*

Client Sample ID: W-4-N/072518

Date Collected: 07/25/18 08:45
Date Received: 07/27/18 08:00

Lab Sample ID: 240-99126-25

Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	1.0	U	1.0	0.13	ug/L			08/07/18 16:28	1
cis-1,2-Dichloroethene	**8.7**		1.0	0.16	ug/L			08/07/18 16:28	1
1,1-Dichloroethane	**6.9**		1.0	0.17	ug/L			08/07/18 16:28	1
1,1-Dichloroethene	1.0	U	1.0	0.19	ug/L			08/07/18 16:28	1
Ethylbenzene	1.0	U	1.0	0.11	ug/L			08/07/18 16:28	1
Tetrachloroethene	**0.26**	**J**	1.0	0.15	ug/L			08/07/18 16:28	1
Toluene	1.0	U	1.0	0.14	ug/L			08/07/18 16:28	1
trans-1,2-Dichloroethene	**1.3**		1.0	0.19	ug/L			08/07/18 16:28	1
1,1,1-Trichloroethane	1.0	U	1.0	0.24	ug/L			08/07/18 16:28	1
Trichloroethene	**6.1**		1.0	0.10	ug/L			08/07/18 16:28	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			08/07/18 16:28	1
Xylenes, Total	2.0	U	2.0	0.15	ug/L			08/07/18 16:28	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*75*		*69 - 120*		*08/07/18 16:28*	*1*
Dibromofluoromethane (Surr)	*103*		*69 - 124*		*08/07/18 16:28*	*1*
1,2-Dichloroethane-d4 (Surr)	*95*		*61 - 138*		*08/07/18 16:28*	*1*
Toluene-d8 (Surr)	*89*		*73 - 120*		*08/07/18 16:28*	*1*

Client Sample ID: GM-21/072518/
Lab Sample ID: 240-99126-26
Date Collected: 07/25/18 11:20
Matrix: Water
Date Received: 07/27/18 08:00

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	1.0	U	1.0	0.13	ug/L			08/07/18 16:53	1
cis-1,2-Dichloroethene	**23**		1.0	0.16	ug/L			08/07/18 16:53	1
1,1-Dichloroethane	**9.3**		1.0	0.17	ug/L			08/07/18 16:53	1
1,1-Dichloroethene	1.0	U	1.0	0.19	ug/L			08/07/18 16:53	1
Ethylbenzene	1.0	U	1.0	0.11	ug/L			08/07/18 16:53	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			08/07/18 16:53	1
Toluene	1.0	U	1.0	0.14	ug/L			08/07/18 16:53	1
trans-1,2-Dichloroethene	**1.6**		1.0	0.19	ug/L			08/07/18 16:53	1
1,1,1-Trichloroethane	1.0	U	1.0	0.24	ug/L			08/07/18 16:53	1
Trichloroethene	**3.9**		1.0	0.10	ug/L			08/07/18 16:53	1
Vinyl chloride	**15**		1.0	0.20	ug/L			08/07/18 16:53	1
Xylenes, Total	2.0	U	2.0	0.15	ug/L			08/07/18 16:53	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*81*		*69 - 120*		*08/07/18 16:53*	*1*
Dibromofluoromethane (Surr)	*99*		*69 - 124*		*08/07/18 16:53*	*1*
1,2-Dichloroethane-d4 (Surr)	*90*		*61 - 138*		*08/07/18 16:53*	*1*
Toluene-d8 (Surr)	*89*		*73 - 120*		*08/07/18 16:53*	*1*

Method: 6010B - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	**27000**		100	26	ug/L		07/30/18 14:00	07/31/18 18:38	1
Manganese	**570**		15	2.1	ug/L		07/30/18 14:00	07/31/18 18:38	1

Method: 6010B - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	**27000**		100	26	ug/L		07/30/18 14:00	07/31/18 18:42	1
Manganese	**540**		15	2.1	ug/L		07/30/18 14:00	07/31/18 18:42	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	**32**		10	3.5	mg/L			07/31/18 23:00	10
Sulfide	**0.80**	**J**	1.0	0.58	mg/L			07/31/18 15:07	1
Total Organic Carbon	**95**		2.0	1.0	mg/L			08/09/18 04:46	2
Chloride	**250**		10	6.0	mg/L			07/30/18 15:34	10

Client Sample ID: GM-28R/072518/

Lab Sample ID: 240-99126-27

Date Collected: 07/25/18 14:20
Matrix: Water
Date Received: 07/27/18 08:00

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	1.0	U	1.0	0.13	ug/L			08/06/18 23:37	1
cis-1,2-Dichloroethene	**3.5**		1.0	0.16	ug/L			08/06/18 23:37	1
1,1-Dichloroethane	1.0	U	1.0	0.17	ug/L			08/06/18 23:37	1
1,1-Dichloroethene	1.0	U	1.0	0.19	ug/L			08/06/18 23:37	1
Ethylbenzene	1.0	U	1.0	0.11	ug/L			08/06/18 23:37	1
Tetrachloroethene	**3.5**		1.0	0.15	ug/L			08/06/18 23:37	1
Toluene	1.0	U	1.0	0.14	ug/L			08/06/18 23:37	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			08/06/18 23:37	1
1,1,1-Trichloroethane	1.0	U	1.0	0.24	ug/L			08/06/18 23:37	1
Trichloroethene	**0.30**	**J**	1.0	0.10	ug/L			08/06/18 23:37	1
Vinyl chloride	**0.70**	**J**	1.0	0.20	ug/L			08/06/18 23:37	1
Xylenes, Total	2.0	U	2.0	0.15	ug/L			08/06/18 23:37	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*101*		*69 - 120*		*08/06/18 23:37*	*1*
Dibromofluoromethane (Surr)	*106*		*69 - 124*		*08/06/18 23:37*	*1*
1,2-Dichloroethane-d4 (Surr)	*108*		*61 - 138*		*08/06/18 23:37*	*1*
Toluene-d8 (Surr)	*105*		*73 - 120*		*08/06/18 23:37*	*1*

Method: 6010B - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	**5900**		100	26	ug/L		07/30/18 14:00	07/31/18 17:00	1
Manganese	**290**		15	2.1	ug/L		07/30/18 14:00	07/31/18 17:00	1

Method: 6010B - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	**4500**		100	26	ug/L		07/30/18 14:00	07/31/18 17:25	1
Manganese	**250**		15	2.1	ug/L		07/30/18 14:00	07/31/18 17:25	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	**24**		2.0	0.70	mg/L			07/31/18 23:21	2
Sulfide	1.0	U F2	1.0	0.58	mg/L			07/31/18 15:13	1
Total Organic Carbon	**6.7**		1.0	0.50	mg/L			08/09/18 05:07	1
Chloride	**18**		1.0	0.60	mg/L			07/30/18 15:34	1

Client Sample ID: DUP-1/072518/

Date Collected: 07/25/18 14:20
Date Received: 07/27/18 08:00

Lab Sample ID: 240-99126-28

Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	1.0	U	1.0	0.13	ug/L			08/07/18 01:07	1
cis-1,2-Dichloroethene	**2.9**		1.0	0.16	ug/L			08/07/18 01:07	1
1,1-Dichloroethane	1.0	U	1.0	0.17	ug/L			08/07/18 01:07	1
1,1-Dichloroethene	1.0	U	1.0	0.19	ug/L			08/07/18 01:07	1
Ethylbenzene	1.0	U	1.0	0.11	ug/L			08/07/18 01:07	1
Tetrachloroethene	**3.7**		1.0	0.15	ug/L			08/07/18 01:07	1
Toluene	1.0	U	1.0	0.14	ug/L			08/07/18 01:07	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			08/07/18 01:07	1
1,1,1-Trichloroethane	1.0	U	1.0	0.24	ug/L			08/07/18 01:07	1
Trichloroethene	**0.31**	**J**	1.0	0.10	ug/L			08/07/18 01:07	1
Vinyl chloride	**0.65**	**J**	1.0	0.20	ug/L			08/07/18 01:07	1
Xylenes, Total	2.0	U	2.0	0.15	ug/L			08/07/18 01:07	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*102*		*69 - 120*		*08/07/18 01:07*	*1*
Dibromofluoromethane (Surr)	*106*		*69 - 124*		*08/07/18 01:07*	*1*
1,2-Dichloroethane-d4 (Surr)	*111*		*61 - 138*		*08/07/18 01:07*	*1*
Toluene-d8 (Surr)	*107*		*73 - 120*		*08/07/18 01:07*	*1*

Method: 6010B - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	**6500**		100	26	ug/L		07/30/18 14:00	07/31/18 18:47	1
Manganese	**300**		15	2.1	ug/L		07/30/18 14:00	07/31/18 18:47	1

Method: 6010B - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	**5100**		100	26	ug/L		07/30/18 14:00	07/31/18 18:51	1
Manganese	**290**		15	2.1	ug/L		07/30/18 14:00	07/31/18 18:51	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	**24**		2.0	0.70	mg/L			08/01/18 00:23	2
Sulfide	1.0	U	1.0	0.58	mg/L			07/31/18 15:32	1
Total Organic Carbon	**6.7**		1.0	0.50	mg/L			08/09/18 06:17	1
Chloride	**18**		1.0	0.60	mg/L			07/30/18 15:34	1

Method: 8260B - Volatile Organic Compounds (GC/MS)

Matrix: Water **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		BFB	DBFM	DCA	TOL
Lab Sample ID	Client Sample ID	(69-120)	(69-124)	(61-138)	(73-120)
240-99126-1	GM-19S/072418/	77	99	94	90
240-99126-3	GM-6/072418/	83	100	93	91
240-99126-4	GM-8/072418/	84	101	96	91
240-99126-5	EB-03/072418/	81	96	94	90
240-99126-6	GM-15/072418/	83	98	94	93
240-99126-7	DN-13/072418/	81	100	94	92
240-99126-8	W-4-S/072518/	98	99	103	105
240-99126-9	W-3-S/072518/	103	105	110	107
240-99126-10	W-2-S/072518/	104	105	112	111
240-99126-11	HR-17/072518/	96	102	106	104
240-99126-11	HR-17/072518/	99	103	105	105
240-99126-12	HR-1/072518/	90	95	98	99
240-99126-12	HR-1/072518/	82	80	80	83
240-99126-13	DUP-02/072518/	100	104	107	105
240-99126-13	DUP-02/072518/	85	79	79	82
240-99126-14	TRIP BLANK/072518/	98	98	102	105
240-99126-15	EB-05/072518/	100	106	109	106
240-99126-16	GM-29/072518/	98	100	103	103
240-99126-16	GM-29/072518/	96	101	104	102
240-99126-17	GM-28/072518/	96	102	102	103
240-99126-17	GM-28/072518/	86	83	82	87
240-99126-17 MS	GM-28/072518/	97	87	80	84
240-99126-17 MSD	GM-28/072518/	93	81	77	81
240-99126-18	EB-6/072518/	85	80	79	87
240-99126-19	W-2-N/072418/	81	101	97	91
240-99126-20	HR-4/072418/	82	99	96	90
240-99126-21	W-3-N/072418/	80	100	98	90
240-99126-22	GM-20D/072418/	77	100	91	90
240-99126-23	GM-9/072418/	79	103	99	91
240-99126-24	EB-4/072418/	77	98	96	86
240-99126-25	W-4-N/072518	75	103	95	89
240-99126-26	GM-21/072518/	81	99	90	89
240-99126-27	GM-28R/072518/	101	106	108	105
240-99126-27 MS	GM-28R/072518/	101	105	105	107
240-99126-27 MSD	GM-28R/072518/	99	106	108	104
240-99126-28	DUP-1/072518/	102	106	111	107
LCS 240-339543/4	Lab Control Sample	87	94	91	92
LCS 240-339617/4	Lab Control Sample	100	101	102	106
LCS 240-339699/4	Lab Control Sample	89	94	91	92
LCS 240-339819/4	Lab Control Sample	91	80	72	82
MB 240-339543/6	Method Blank	83	98	94	92
MB 240-339617/6	Method Blank	102	104	108	109
MB 240-339699/6	Method Blank	83	98	94	90
MB 240-339819/7	Method Blank	91	85	85	87

Surrogate Legend

BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
DCA = 1,2-Dichloroethane-d4 (Surr)

TOL = Toluene-d8 (Surr)

Client: ARCADIS U.S., Inc.
Project/Site: Racer Moraine

TestAmerica Job ID: 240-99126-1

Method: 8260B - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 240-339543/6
Matrix: Water
Analysis Batch: 339543

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	1.0	U	1.0	0.13	ug/L			08/06/18 14:22	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			08/06/18 14:22	1
1,1-Dichloroethane	1.0	U	1.0	0.17	ug/L			08/06/18 14:22	1
1,1-Dichloroethene	1.0	U	1.0	0.19	ug/L			08/06/18 14:22	1
Ethylbenzene	1.0	U	1.0	0.11	ug/L			08/06/18 14:22	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			08/06/18 14:22	1
Toluene	1.0	U	1.0	0.14	ug/L			08/06/18 14:22	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			08/06/18 14:22	1
1,1,1-Trichloroethane	1.0	U	1.0	0.24	ug/L			08/06/18 14:22	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			08/06/18 14:22	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			08/06/18 14:22	1
Xylenes, Total	2.0	U	2.0	0.15	ug/L			08/06/18 14:22	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*83*		*69 - 120*		*08/06/18 14:22*	*1*
Dibromofluoromethane (Surr)	*98*		*69 - 124*		*08/06/18 14:22*	*1*
1,2-Dichloroethane-d4 (Surr)	*94*		*61 - 138*		*08/06/18 14:22*	*1*
Toluene-d8 (Surr)	*92*		*73 - 120*		*08/06/18 14:22*	*1*

Lab Sample ID: LCS 240-339543/4
Matrix: Water
Analysis Batch: 339543

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Benzene	10.0	10.4		ug/L		104	79 - 120
cis-1,2-Dichloroethene	10.0	10.6		ug/L		106	77 - 120
1,1-Dichloroethane	10.0	10.3		ug/L		103	74 - 120
1,1-Dichloroethene	10.0	10.8		ug/L		108	65 - 127
Ethylbenzene	10.0	10.4		ug/L		104	80 - 120
m-Xylene & p-Xylene	10.0	10.4		ug/L		104	80 - 120
o-Xylene	10.0	10.4		ug/L		104	80 - 120
Tetrachloroethene	10.0	11.5		ug/L		115	80 - 122
Toluene	10.0	10.4		ug/L		104	78 - 120
trans-1,2-Dichloroethene	10.0	11.2		ug/L		112	74 - 124
1,1,1-Trichloroethane	10.0	8.72		ug/L		87	64 - 147
Trichloroethene	10.0	10.5		ug/L		105	76 - 124
Vinyl chloride	10.0	9.70		ug/L		97	65 - 124
Xylenes, Total	20.0	20.8		ug/L		104	80 - 120

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*87*		*69 - 120*
Dibromofluoromethane (Surr)	*94*		*69 - 124*
1,2-Dichloroethane-d4 (Surr)	*91*		*61 - 138*
Toluene-d8 (Surr)	*92*		*73 - 120*

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 240-339617/6
Matrix: Water
Analysis Batch: 339617

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	1.0	U	1.0	0.13	ug/L			08/06/18 18:26	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			08/06/18 18:26	1
1,1-Dichloroethane	1.0	U	1.0	0.17	ug/L			08/06/18 18:26	1
1,1-Dichloroethene	1.0	U	1.0	0.19	ug/L			08/06/18 18:26	1
Ethylbenzene	1.0	U	1.0	0.11	ug/L			08/06/18 18:26	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			08/06/18 18:26	1
Toluene	1.0	U	1.0	0.14	ug/L			08/06/18 18:26	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			08/06/18 18:26	1
1,1,1-Trichloroethane	1.0	U	1.0	0.24	ug/L			08/06/18 18:26	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			08/06/18 18:26	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			08/06/18 18:26	1
Xylenes, Total	2.0	U	2.0	0.15	ug/L			08/06/18 18:26	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*102*		*69 - 120*		*08/06/18 18:26*	*1*
Dibromofluoromethane (Surr)	*104*		*69 - 124*		*08/06/18 18:26*	*1*
1,2-Dichloroethane-d4 (Surr)	*108*		*61 - 138*		*08/06/18 18:26*	*1*
Toluene-d8 (Surr)	*109*		*73 - 120*		*08/06/18 18:26*	*1*

Lab Sample ID: LCS 240-339617/4
Matrix: Water
Analysis Batch: 339617

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Benzene	20.0	19.5		ug/L		97	79 - 120
cis-1,2-Dichloroethene	20.0	19.0		ug/L		95	77 - 120
1,1-Dichloroethane	20.0	19.2		ug/L		96	74 - 120
1,1-Dichloroethene	20.0	19.2		ug/L		96	65 - 127
Ethylbenzene	20.0	20.2		ug/L		101	80 - 120
m-Xylene & p-Xylene	20.0	20.0		ug/L		100	80 - 120
o-Xylene	20.0	19.8		ug/L		99	80 - 120
Tetrachloroethene	20.0	20.2		ug/L		101	80 - 122
Toluene	20.0	19.7		ug/L		99	78 - 120
trans-1,2-Dichloroethene	20.0	18.9		ug/L		94	74 - 124
1,1,1-Trichloroethane	20.0	19.2		ug/L		96	64 - 147
Trichloroethene	20.0	19.4		ug/L		97	76 - 124
Vinyl chloride	20.0	18.6		ug/L		93	65 - 124
Xylenes, Total	40.0	39.8		ug/L		100	80 - 120

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*100*		*69 - 120*
Dibromofluoromethane (Surr)	*101*		*69 - 124*
1,2-Dichloroethane-d4 (Surr)	*102*		*61 - 138*
Toluene-d8 (Surr)	*106*		*73 - 120*

Client: ARCADIS U.S., Inc.
Project/Site: Racer Moraine

TestAmerica Job ID: 240-99126-1

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 240-99126-27 MS
Matrix: Water
Analysis Batch: 339617

Client Sample ID: GM-28R/072518/
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Benzene	1.0	U	20.0	18.8		ug/L		94	69 - 127
cis-1,2-Dichloroethene	3.5		20.0	21.4		ug/L		89	69 - 127
1,1-Dichloroethane	1.0	U	20.0	18.7		ug/L		93	69 - 122
1,1-Dichloroethene	1.0	U	20.0	18.5		ug/L		92	62 - 127
Ethylbenzene	1.0	U	20.0	19.6		ug/L		98	72 - 121
m-Xylene & p-Xylene	2.0	U	20.0	19.2		ug/L		96	70 - 121
o-Xylene	1.0	U	20.0	19.3		ug/L		96	71 - 125
Tetrachloroethene	3.5		20.0	23.0		ug/L		98	69 - 126
Toluene	1.0	U	20.0	19.0		ug/L		95	69 - 125
trans-1,2-Dichloroethene	1.0	U	20.0	18.2		ug/L		91	66 - 131
1,1,1-Trichloroethane	1.0	U	20.0	18.3		ug/L		91	57 - 156
Trichloroethene	0.30	J	20.0	18.9		ug/L		93	68 - 129
Vinyl chloride	0.70	J	20.0	18.9		ug/L		91	55 - 123
Xylenes, Total	2.0	U	40.0	38.5		ug/L		96	71 - 122

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*101*		*69 - 120*
Dibromofluoromethane (Surr)	*105*		*69 - 124*
1,2-Dichloroethane-d4 (Surr)	*105*		*61 - 138*
Toluene-d8 (Surr)	*107*		*73 - 120*

Lab Sample ID: 240-99126-27 MSD
Matrix: Water
Analysis Batch: 339617

Client Sample ID: GM-28R/072518/
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Benzene	1.0	U	20.0	18.7		ug/L		94	69 - 127	0	10
cis-1,2-Dichloroethene	3.5		20.0	22.0		ug/L		92	69 - 127	3	11
1,1-Dichloroethane	1.0	U	20.0	19.0		ug/L		95	69 - 122	2	11
1,1-Dichloroethene	1.0	U	20.0	18.6		ug/L		93	62 - 127	1	14
Ethylbenzene	1.0	U	20.0	19.0		ug/L		95	72 - 121	3	15
m-Xylene & p-Xylene	2.0	U	20.0	18.9		ug/L		95	70 - 121	1	15
o-Xylene	1.0	U	20.0	19.2		ug/L		96	71 - 125	0	15
Tetrachloroethene	3.5		20.0	21.9		ug/L		92	69 - 126	5	18
Toluene	1.0	U	20.0	18.3		ug/L		91	69 - 125	4	14
trans-1,2-Dichloroethene	1.0	U	20.0	18.6		ug/L		93	66 - 131	2	11
1,1,1-Trichloroethane	1.0	U	20.0	18.2		ug/L		91	57 - 156	0	13
Trichloroethene	0.30	J	20.0	18.6		ug/L		91	68 - 129	2	12
Vinyl chloride	0.70	J	20.0	18.8		ug/L		90	55 - 123	1	12
Xylenes, Total	2.0	U	40.0	38.1		ug/L		95	71 - 122	1	14

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*99*		*69 - 120*
Dibromofluoromethane (Surr)	*106*		*69 - 124*
1,2-Dichloroethane-d4 (Surr)	*108*		*61 - 138*
Toluene-d8 (Surr)	*104*		*73 - 120*

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 240-339699/6
Matrix: Water
Analysis Batch: 339699

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	1.0	U	1.0	0.13	ug/L			08/07/18 11:55	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			08/07/18 11:55	1
1,1-Dichloroethane	1.0	U	1.0	0.17	ug/L			08/07/18 11:55	1
1,1-Dichloroethene	1.0	U	1.0	0.19	ug/L			08/07/18 11:55	1
Ethylbenzene	1.0	U	1.0	0.11	ug/L			08/07/18 11:55	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			08/07/18 11:55	1
Toluene	1.0	U	1.0	0.14	ug/L			08/07/18 11:55	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			08/07/18 11:55	1
1,1,1-Trichloroethane	1.0	U	1.0	0.24	ug/L			08/07/18 11:55	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			08/07/18 11:55	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			08/07/18 11:55	1
Xylenes, Total	2.0	U	2.0	0.15	ug/L			08/07/18 11:55	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*83*		*69 - 120*		*08/07/18 11:55*	*1*
Dibromofluoromethane (Surr)	*98*		*69 - 124*		*08/07/18 11:55*	*1*
1,2-Dichloroethane-d4 (Surr)	*94*		*61 - 138*		*08/07/18 11:55*	*1*
Toluene-d8 (Surr)	*90*		*73 - 120*		*08/07/18 11:55*	*1*

Lab Sample ID: LCS 240-339699/4
Matrix: Water
Analysis Batch: 339699

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Benzene	10.0	10.5		ug/L		105	79 - 120
cis-1,2-Dichloroethene	10.0	10.3		ug/L		103	77 - 120
1,1-Dichloroethane	10.0	10.4		ug/L		104	74 - 120
1,1-Dichloroethene	10.0	11.0		ug/L		110	65 - 127
Ethylbenzene	10.0	10.5		ug/L		105	80 - 120
m-Xylene & p-Xylene	10.0	10.5		ug/L		105	80 - 120
o-Xylene	10.0	10.2		ug/L		102	80 - 120
Tetrachloroethene	10.0	11.5		ug/L		115	80 - 122
Toluene	10.0	10.5		ug/L		105	78 - 120
trans-1,2-Dichloroethene	10.0	11.3		ug/L		113	74 - 124
1,1,1-Trichloroethane	10.0	8.52		ug/L		85	64 - 147
Trichloroethene	10.0	10.5		ug/L		105	76 - 124
Vinyl chloride	10.0	10.1		ug/L		101	65 - 124
Xylenes, Total	20.0	20.7		ug/L		104	80 - 120

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*89*		*69 - 120*
Dibromofluoromethane (Surr)	*94*		*69 - 124*
1,2-Dichloroethane-d4 (Surr)	*91*		*61 - 138*
Toluene-d8 (Surr)	*92*		*73 - 120*

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 240-339819/7
Matrix: Water
Analysis Batch: 339819

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	1.0	U	1.0	0.13	ug/L			08/07/18 20:23	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			08/07/18 20:23	1
1,1-Dichloroethane	1.0	U	1.0	0.17	ug/L			08/07/18 20:23	1
1,1-Dichloroethene	1.0	U	1.0	0.19	ug/L			08/07/18 20:23	1
Ethylbenzene	1.0	U	1.0	0.11	ug/L			08/07/18 20:23	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			08/07/18 20:23	1
Toluene	1.0	U	1.0	0.14	ug/L			08/07/18 20:23	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			08/07/18 20:23	1
1,1,1-Trichloroethane	1.0	U	1.0	0.24	ug/L			08/07/18 20:23	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			08/07/18 20:23	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			08/07/18 20:23	1
Xylenes, Total	2.0	U	2.0	0.15	ug/L			08/07/18 20:23	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*91*		*69 - 120*		*08/07/18 20:23*	*1*
Dibromofluoromethane (Surr)	*85*		*69 - 124*		*08/07/18 20:23*	*1*
1,2-Dichloroethane-d4 (Surr)	*85*		*61 - 138*		*08/07/18 20:23*	*1*
Toluene-d8 (Surr)	*87*		*73 - 120*		*08/07/18 20:23*	*1*

Lab Sample ID: LCS 240-339819/4
Matrix: Water
Analysis Batch: 339819

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Benzene	20.0	19.9		ug/L		99	79 - 120
cis-1,2-Dichloroethene	20.0	19.2		ug/L		96	77 - 120
1,1-Dichloroethane	20.0	19.2		ug/L		96	74 - 120
1,1-Dichloroethene	20.0	20.8		ug/L		104	65 - 127
Ethylbenzene	20.0	19.7		ug/L		98	80 - 120
m-Xylene & p-Xylene	20.0	19.5		ug/L		98	80 - 120
o-Xylene	20.0	19.8		ug/L		99	80 - 120
Tetrachloroethene	20.0	20.7		ug/L		104	80 - 122
Toluene	20.0	19.4		ug/L		97	78 - 120
trans-1,2-Dichloroethene	20.0	19.2		ug/L		96	74 - 124
1,1,1-Trichloroethane	20.0	22.0		ug/L		110	64 - 147
Trichloroethene	20.0	20.2		ug/L		101	76 - 124
Vinyl chloride	20.0	20.7		ug/L		104	65 - 124
Xylenes, Total	40.0	39.3		ug/L		98	80 - 120

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*91*		*69 - 120*
Dibromofluoromethane (Surr)	*80*		*69 - 124*
1,2-Dichloroethane-d4 (Surr)	*72*		*61 - 138*
Toluene-d8 (Surr)	*82*		*73 - 120*

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 240-99126-17 MS
Matrix: Water
Analysis Batch: 339819

Client Sample ID: GM-28/072518/
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Benzene	10	U	200	209		ug/L		104	69 - 127
cis-1,2-Dichloroethene	260		200	466		ug/L		104	69 - 127
1,1-Dichloroethane	7.7	J	200	215		ug/L		104	69 - 122
1,1-Dichloroethene	10	U	200	216		ug/L		108	62 - 127
Ethylbenzene	10	U	200	197		ug/L		99	72 - 121
m-Xylene & p-Xylene	20	U	200	201		ug/L		101	70 - 121
o-Xylene	10	U	200	201		ug/L		100	71 - 125
Tetrachloroethene	7.1	J	200	203		ug/L		98	69 - 126
Toluene	10	U	200	197		ug/L		98	69 - 125
trans-1,2-Dichloroethene	14		200	206		ug/L		96	66 - 131
1,1,1-Trichloroethane	10	U	200	220		ug/L		110	57 - 156
Trichloroethene	4.9	J	200	208		ug/L		101	68 - 129
Vinyl chloride	210		200	428		ug/L		108	55 - 123
Xylenes, Total	20	U	400	402		ug/L		101	71 - 122

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*97*		*69 - 120*
Dibromofluoromethane (Surr)	*87*		*69 - 124*
1,2-Dichloroethane-d4 (Surr)	*80*		*61 - 138*
Toluene-d8 (Surr)	*84*		*73 - 120*

Lab Sample ID: 240-99126-17 MSD
Matrix: Water
Analysis Batch: 339819

Client Sample ID: GM-28/072518/
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Benzene	10	U	200	200		ug/L		100	69 - 127	4	10
cis-1,2-Dichloroethene	260		200	437		ug/L		90	69 - 127	6	11
1,1-Dichloroethane	7.7	J	200	194		ug/L		93	69 - 122	10	11
1,1-Dichloroethene	10	U	200	200		ug/L		100	62 - 127	8	14
Ethylbenzene	10	U	200	196		ug/L		98	72 - 121	1	15
m-Xylene & p-Xylene	20	U	200	194		ug/L		97	70 - 121	3	15
o-Xylene	10	U	200	195		ug/L		98	71 - 125	3	15
Tetrachloroethene	7.1	J	200	204		ug/L		98	69 - 126	0	18
Toluene	10	U	200	187		ug/L		93	69 - 125	5	14
trans-1,2-Dichloroethene	14		200	198		ug/L		92	66 - 131	4	11
1,1,1-Trichloroethane	10	U	200	209		ug/L		105	57 - 156	5	13
Trichloroethene	4.9	J	200	207		ug/L		101	68 - 129	0	12
Vinyl chloride	210		200	392		ug/L		90	55 - 123	9	12
Xylenes, Total	20	U	400	389		ug/L		97	71 - 122	3	14

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*93*		*69 - 120*
Dibromofluoromethane (Surr)	*81*		*69 - 124*
1,2-Dichloroethane-d4 (Surr)	*77*		*61 - 138*
Toluene-d8 (Surr)	*81*		*73 - 120*

QC Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: Racer Moraine

TestAmerica Job ID: 240-99126-1

Method: 6010B - Metals (ICP)

Lab Sample ID: MB 240-338579/1-A
Matrix: Water
Analysis Batch: 338901

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 338579

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	100	U	100	26	ug/L		07/30/18 14:00	07/31/18 16:51	1
Manganese	15	U	15	2.1	ug/L		07/30/18 14:00	07/31/18 16:51	1

Lab Sample ID: LCS 240-338579/2-A
Matrix: Water
Analysis Batch: 338901

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 338579

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Iron	1000	1020		ug/L		102	80 - 120
Manganese	500	527		ug/L		105	80 - 120

Lab Sample ID: 240-99126-27 MS
Matrix: Water
Analysis Batch: 338901

Client Sample ID: GM-28R/072518/
Prep Type: Total Recoverable
Prep Batch: 338579

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Iron	5900		1000	7230	4	ug/L		134	75 - 125
Manganese	290		500	821		ug/L		106	75 - 125

Lab Sample ID: 240-99126-27 MSD
Matrix: Water
Analysis Batch: 338901

Client Sample ID: GM-28R/072518/
Prep Type: Total Recoverable
Prep Batch: 338579

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Iron	5900		1000	7040	4	ug/L		114	75 - 125	3	20
Manganese	290		500	793		ug/L		101	75 - 125	3	20

Lab Sample ID: 240-99126-27 MS
Matrix: Water
Analysis Batch: 338901

Client Sample ID: GM-28R/072518/
Prep Type: Dissolved
Prep Batch: 338579

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Iron	4500		1000	5750	4	ug/L		123	75 - 125
Manganese	250		500	785		ug/L		106	75 - 125

Lab Sample ID: 240-99126-27 MSD
Matrix: Water
Analysis Batch: 338901

Client Sample ID: GM-28R/072518/
Prep Type: Dissolved
Prep Batch: 338579

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Iron	4500		1000	5700	4	ug/L		117	75 - 125	1	20
Manganese	250		500	796		ug/L		108	75 - 125	1	20

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 240-338784/27
Matrix: Water
Analysis Batch: 338784

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	1.0	U	1.0	0.35	mg/L			07/31/18 21:58	1

Lab Sample ID: MB 240-338784/3
Matrix: Water
Analysis Batch: 338784

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	1.0	U	1.0	0.35	mg/L			07/31/18 13:39	1

Lab Sample ID: LCS 240-338784/28
Matrix: Water
Analysis Batch: 338784

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Sulfate	50.0	48.2		mg/L		96	90 - 110

Lab Sample ID: LCS 240-338784/4
Matrix: Water
Analysis Batch: 338784

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Sulfate	50.0	48.3		mg/L		97	90 - 110

Lab Sample ID: 240-99126-1 MS
Matrix: Water
Analysis Batch: 338784

Client Sample ID: GM-19S/072418/
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Sulfate	53		250	289		mg/L		94	80 - 120

Lab Sample ID: 240-99126-1 MSD
Matrix: Water
Analysis Batch: 338784

Client Sample ID: GM-19S/072418/
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Sulfate	53		250	286		mg/L		93	80 - 120	1	15

Lab Sample ID: 240-99126-27 MS
Matrix: Water
Analysis Batch: 338784

Client Sample ID: GM-28R/072518/
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Sulfate	24		100	116		mg/L		93	80 - 120

Lab Sample ID: 240-99126-27 MSD
Matrix: Water
Analysis Batch: 338784

Client Sample ID: GM-28R/072518/
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Sulfate	24		100	117		mg/L		93	80 - 120	1	15

Method: 4500 S2 F-2000 - Sulfide, Total

Lab Sample ID: MB 240-338795/1
Matrix: Water
Analysis Batch: 338795

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfide	1.0	U	1.0	0.58	mg/L			07/31/18 13:32	1

Lab Sample ID: LCS 240-338795/2
Matrix: Water
Analysis Batch: 338795

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Sulfide	20.0	20.0		mg/L		100	80 - 120

Lab Sample ID: 240-99126-27 MS
Matrix: Water
Analysis Batch: 338795

Client Sample ID: GM-28R/072518/
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Sulfide	1.0	U F2	20.0	18.8		mg/L		94	67 - 126

Lab Sample ID: 240-99126-27 MSD
Matrix: Water
Analysis Batch: 338795

Client Sample ID: GM-28R/072518/
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Sulfide	1.0	U F2	20.0	22.6	F2	mg/L		113	67 - 126	18	10

Method: 9060A - Organic Carbon, Total (TOC)

Lab Sample ID: MB 490-534423/1
Matrix: Water
Analysis Batch: 534423

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon	1.0	U	1.0	0.50	mg/L			08/04/18 16:11	1

Lab Sample ID: LCS 490-534423/5
Matrix: Water
Analysis Batch: 534423

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Organic Carbon	10.0	9.87		mg/L		99	90 - 110

Lab Sample ID: 240-99126-1 MS
Matrix: Water
Analysis Batch: 534423

Client Sample ID: GM-19S/072418/
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Organic Carbon	1.7		20.0	21.8		mg/L		100	75 - 122

Method: 9060A - Organic Carbon, Total (TOC) (Continued)

Lab Sample ID: 240-99126-1 MSD
Client Sample ID: GM-19S/072418/
Matrix: Water
Prep Type: Total/NA
Analysis Batch: 534423

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Total Organic Carbon	1.7		20.0	21.9		mg/L		101	75 - 122	0	20

Lab Sample ID: MB 490-535239/3
Client Sample ID: Method Blank
Matrix: Water
Prep Type: Total/NA
Analysis Batch: 535239

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon	1.0	U	1.0	0.50	mg/L			08/08/18 22:17	1

Lab Sample ID: LCS 490-535239/6
Client Sample ID: Lab Control Sample
Matrix: Water
Prep Type: Total/NA
Analysis Batch: 535239

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Organic Carbon	10.0	9.77		mg/L		98	90 - 110

Lab Sample ID: 240-99126-27 MS
Client Sample ID: GM-28R/072518/
Matrix: Water
Prep Type: Total/NA
Analysis Batch: 535239

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Organic Carbon	6.7		20.0	26.9		mg/L		101	75 - 122

Lab Sample ID: 240-99126-27 MSD
Client Sample ID: GM-28R/072518/
Matrix: Water
Prep Type: Total/NA
Analysis Batch: 535239

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Total Organic Carbon	6.7		20.0	27.2		mg/L		103	75 - 122	1	20

Method: 9251 - Chloride

Lab Sample ID: MB 490-532537/18
Client Sample ID: Method Blank
Matrix: Water
Prep Type: Total/NA
Analysis Batch: 532537

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	1.0	U	1.0	0.60	mg/L			07/30/18 15:34	1

Lab Sample ID: MB 490-532537/3
Client Sample ID: Method Blank
Matrix: Water
Prep Type: Total/NA
Analysis Batch: 532537

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	1.0	U	1.0	0.60	mg/L			07/30/18 15:34	1

1 2 3 4 5 6 7 8 9 10 11 12 13 14

Method: 9251 - Chloride (Continued)

Lab Sample ID: LCS 490-532537/19
Matrix: Water
Analysis Batch: 532537
Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	10.0	10.5		mg/L		105	90 - 110

Lab Sample ID: LCS 490-532537/4
Matrix: Water
Analysis Batch: 532537
Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	10.0	10.6		mg/L		106	90 - 110

Lab Sample ID: LCSD 490-532537/20
Matrix: Water
Analysis Batch: 532537
Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	10.0	10.5		mg/L		105	90 - 110	0	20

Lab Sample ID: LCSD 490-532537/5
Matrix: Water
Analysis Batch: 532537
Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	10.0	10.6		mg/L		106	90 - 110	1	20

Lab Sample ID: 240-99126-27 MS
Matrix: Water
Analysis Batch: 532537
Client Sample ID: GM-28R/072518/
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	18		10.0	28.8		mg/L		108	76 - 126

Lab Sample ID: 240-99126-27 MSD
Matrix: Water
Analysis Batch: 532537
Client Sample ID: GM-28R/072518/
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	18		10.0	29.2		mg/L		112	76 - 126	1	20

Lab Sample ID: 240-99126-28 MS
Matrix: Water
Analysis Batch: 532537
Client Sample ID: DUP-1/072518/
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	18		10.0	29.2		mg/L		110	76 - 126

Lab Sample ID: 240-99126-28 MSD
Matrix: Water
Analysis Batch: 532537
Client Sample ID: DUP-1/072518/
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	18		10.0	29.5		mg/L		114	76 - 126	1	20

QC Sample Results

Lab Sample ID: 240-99126-27 DU
Matrix: Water
Analysis Batch: 532537

Client Sample ID: GM-28R/072518/
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Chloride	18		18.1		mg/L		0.3	20

Lab Sample ID: 240-99126-28 DU
Matrix: Water
Analysis Batch: 532537

Client Sample ID: DUP-1/072518/
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Chloride	18		18.0		mg/L		0.7	20

1 2 3 4 5 6 7 8 9 10 11 12 13 14

GC/MS VOA

Analysis Batch: 339543

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-99126-3	GM-6/072418/	Total/NA	Water	8260B	
240-99126-4	GM-8/072418/	Total/NA	Water	8260B	
240-99126-5	EB-03/072418/	Total/NA	Water	8260B	
240-99126-6	GM-15/072418/	Total/NA	Water	8260B	
240-99126-7	DN-13/072418/	Total/NA	Water	8260B	
240-99126-19	W-2-N/072418/	Total/NA	Water	8260B	
240-99126-20	HR-4/072418/	Total/NA	Water	8260B	
240-99126-21	W-3-N/072418/	Total/NA	Water	8260B	
240-99126-22	GM-20D/072418/	Total/NA	Water	8260B	
240-99126-23	GM-9/072418/	Total/NA	Water	8260B	
240-99126-24	EB-4/072418/	Total/NA	Water	8260B	
MB 240-339543/6	Method Blank	Total/NA	Water	8260B	
LCS 240-339543/4	Lab Control Sample	Total/NA	Water	8260B	

Analysis Batch: 339617

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-99126-8	W-4-S/072518/	Total/NA	Water	8260B	
240-99126-9	W-3-S/072518/	Total/NA	Water	8260B	
240-99126-10	W-2-S/072518/	Total/NA	Water	8260B	
240-99126-11	HR-17/072518/	Total/NA	Water	8260B	
240-99126-11	HR-17/072518/	Total/NA	Water	8260B	
240-99126-12	HR-1/072518/	Total/NA	Water	8260B	
240-99126-13	DUP-02/072518/	Total/NA	Water	8260B	
240-99126-14	TRIP BLANK/072518/	Total/NA	Water	8260B	
240-99126-15	EB-05/072518/	Total/NA	Water	8260B	
240-99126-16	GM-29/072518/	Total/NA	Water	8260B	
240-99126-16	GM-29/072518/	Total/NA	Water	8260B	
240-99126-17	GM-28/072518/	Total/NA	Water	8260B	
240-99126-27	GM-28R/072518/	Total/NA	Water	8260B	
240-99126-28	DUP-1/072518/	Total/NA	Water	8260B	
MB 240-339617/6	Method Blank	Total/NA	Water	8260B	
LCS 240-339617/4	Lab Control Sample	Total/NA	Water	8260B	
240-99126-27 MS	GM-28R/072518/	Total/NA	Water	8260B	
240-99126-27 MSD	GM-28R/072518/	Total/NA	Water	8260B	

Analysis Batch: 339699

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-99126-1	GM-19S/072418/	Total/NA	Water	8260B	
240-99126-25	W-4-N/072518	Total/NA	Water	8260B	
240-99126-26	GM-21/072518/	Total/NA	Water	8260B	
MB 240-339699/6	Method Blank	Total/NA	Water	8260B	
LCS 240-339699/4	Lab Control Sample	Total/NA	Water	8260B	

Analysis Batch: 339819

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-99126-12	HR-1/072518/	Total/NA	Water	8260B	
240-99126-13	DUP-02/072518/	Total/NA	Water	8260B	
240-99126-17	GM-28/072518/	Total/NA	Water	8260B	
240-99126-18	EB-6/072518/	Total/NA	Water	8260B	
MB 240-339819/7	Method Blank	Total/NA	Water	8260B	
LCS 240-339819/4	Lab Control Sample	Total/NA	Water	8260B	

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GC/MS VOA (Continued)

Analysis Batch: 339819 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-99126-17 MS	GM-28/072518/	Total/NA	Water	8260B	
240-99126-17 MSD	GM-28/072518/	Total/NA	Water	8260B	

Metals

Prep Batch: 338579

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-99126-1	GM-19S/072418/	Dissolved	Water	3005A	
240-99126-1	GM-19S/072418/	Total Recoverable	Water	3005A	
240-99126-3	GM-6/072418/	Dissolved	Water	3005A	
240-99126-3	GM-6/072418/	Total Recoverable	Water	3005A	
240-99126-4	GM-8/072418/	Dissolved	Water	3005A	
240-99126-4	GM-8/072418/	Total Recoverable	Water	3005A	
240-99126-5	EB-03/072418/	Total Recoverable	Water	3005A	
240-99126-16	GM-29/072518/	Dissolved	Water	3005A	
240-99126-16	GM-29/072518/	Total Recoverable	Water	3005A	
240-99126-17	GM-28/072518/	Dissolved	Water	3005A	
240-99126-17	GM-28/072518/	Total Recoverable	Water	3005A	
240-99126-18	EB-6/072518/	Total Recoverable	Water	3005A	
240-99126-26	GM-21/072518/	Dissolved	Water	3005A	
240-99126-26	GM-21/072518/	Total Recoverable	Water	3005A	
240-99126-27	GM-28R/072518/	Dissolved	Water	3005A	
240-99126-27	GM-28R/072518/	Total Recoverable	Water	3005A	
240-99126-28	DUP-1/072518/	Dissolved	Water	3005A	
240-99126-28	DUP-1/072518/	Total Recoverable	Water	3005A	
MB 240-338579/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 240-338579/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
240-99126-27 MS	GM-28R/072518/	Dissolved	Water	3005A	
240-99126-27 MS	GM-28R/072518/	Total Recoverable	Water	3005A	
240-99126-27 MSD	GM-28R/072518/	Dissolved	Water	3005A	
240-99126-27 MSD	GM-28R/072518/	Total Recoverable	Water	3005A	

Analysis Batch: 338901

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-99126-1	GM-19S/072418/	Dissolved	Water	6010B	338579
240-99126-1	GM-19S/072418/	Total Recoverable	Water	6010B	338579
240-99126-3	GM-6/072418/	Dissolved	Water	6010B	338579
240-99126-3	GM-6/072418/	Total Recoverable	Water	6010B	338579
240-99126-4	GM-8/072418/	Dissolved	Water	6010B	338579
240-99126-4	GM-8/072418/	Total Recoverable	Water	6010B	338579
240-99126-5	EB-03/072418/	Total Recoverable	Water	6010B	338579
240-99126-16	GM-29/072518/	Dissolved	Water	6010B	338579
240-99126-16	GM-29/072518/	Total Recoverable	Water	6010B	338579
240-99126-17	GM-28/072518/	Dissolved	Water	6010B	338579
240-99126-17	GM-28/072518/	Total Recoverable	Water	6010B	338579
240-99126-18	EB-6/072518/	Total Recoverable	Water	6010B	338579
240-99126-26	GM-21/072518/	Dissolved	Water	6010B	338579
240-99126-26	GM-21/072518/	Total Recoverable	Water	6010B	338579
240-99126-27	GM-28R/072518/	Dissolved	Water	6010B	338579
240-99126-27	GM-28R/072518/	Total Recoverable	Water	6010B	338579

Metals (Continued)

Analysis Batch: 338901 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-99126-28	DUP-1/072518/	Dissolved	Water	6010B	338579
240-99126-28	DUP-1/072518/	Total Recoverable	Water	6010B	338579
MB 240-338579/1-A	Method Blank	Total Recoverable	Water	6010B	338579
LCS 240-338579/2-A	Lab Control Sample	Total Recoverable	Water	6010B	338579
240-99126-27 MS	GM-28R/072518/	Dissolved	Water	6010B	338579
240-99126-27 MS	GM-28R/072518/	Total Recoverable	Water	6010B	338579
240-99126-27 MSD	GM-28R/072518/	Dissolved	Water	6010B	338579
240-99126-27 MSD	GM-28R/072518/	Total Recoverable	Water	6010B	338579

General Chemistry

Analysis Batch: 338784

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-99126-1	GM-19S/072418/	Total/NA	Water	300.0	
240-99126-3	GM-6/072418/	Total/NA	Water	300.0	
240-99126-4	GM-8/072418/	Total/NA	Water	300.0	
240-99126-5	EB-03/072418/	Total/NA	Water	300.0	
240-99126-16	GM-29/072518/	Total/NA	Water	300.0	
240-99126-17	GM-28/072518/	Total/NA	Water	300.0	
240-99126-18	EB-6/072518/	Total/NA	Water	300.0	
240-99126-26	GM-21/072518/	Total/NA	Water	300.0	
240-99126-27	GM-28R/072518/	Total/NA	Water	300.0	
240-99126-28	DUP-1/072518/	Total/NA	Water	300.0	
MB 240-338784/27	Method Blank	Total/NA	Water	300.0	
MB 240-338784/3	Method Blank	Total/NA	Water	300.0	
LCS 240-338784/28	Lab Control Sample	Total/NA	Water	300.0	
LCS 240-338784/4	Lab Control Sample	Total/NA	Water	300.0	
240-99126-1 MS	GM-19S/072418/	Total/NA	Water	300.0	
240-99126-1 MSD	GM-19S/072418/	Total/NA	Water	300.0	
240-99126-27 MS	GM-28R/072518/	Total/NA	Water	300.0	
240-99126-27 MSD	GM-28R/072518/	Total/NA	Water	300.0	

Analysis Batch: 338795

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-99126-1	GM-19S/072418/	Total/NA	Water	4500 S2 F-2000	
240-99126-3	GM-6/072418/	Total/NA	Water	4500 S2 F-2000	
240-99126-4	GM-8/072418/	Total/NA	Water	4500 S2 F-2000	
240-99126-5	EB-03/072418/	Total/NA	Water	4500 S2 F-2000	
240-99126-16	GM-29/072518/	Total/NA	Water	4500 S2 F-2000	
240-99126-17	GM-28/072518/	Total/NA	Water	4500 S2 F-2000	
240-99126-18	EB-6/072518/	Total/NA	Water	4500 S2 F-2000	
240-99126-26	GM-21/072518/	Total/NA	Water	4500 S2 F-2000	
240-99126-27	GM-28R/072518/	Total/NA	Water	4500 S2 F-2000	
240-99126-28	DUP-1/072518/	Total/NA	Water	4500 S2 F-2000	
MB 240-338795/1	Method Blank	Total/NA	Water	4500 S2 F-2000	
LCS 240-338795/2	Lab Control Sample	Total/NA	Water	4500 S2 F-2000	
240-99126-27 MS	GM-28R/072518/	Total/NA	Water	4500 S2 F-2000	
240-99126-27 MSD	GM-28R/072518/	Total/NA	Water	4500 S2 F-2000	

General Chemistry (Continued)

Analysis Batch: 532537

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-99126-1	GM-19S/072418/	Total/NA	Water	9251	
240-99126-3	GM-6/072418/	Total/NA	Water	9251	
240-99126-4	GM-8/072418/	Total/NA	Water	9251	
240-99126-5	EB-03/072418/	Total/NA	Water	9251	
240-99126-16	GM-29/072518/	Total/NA	Water	9251	
240-99126-17	GM-28/072518/	Total/NA	Water	9251	
240-99126-18	EB-6/072518/	Total/NA	Water	9251	
240-99126-26	GM-21/072518/	Total/NA	Water	9251	
240-99126-27	GM-28R/072518/	Total/NA	Water	9251	
240-99126-28	DUP-1/072518/	Total/NA	Water	9251	
MB 490-532537/18	Method Blank	Total/NA	Water	9251	
MB 490-532537/3	Method Blank	Total/NA	Water	9251	
LCS 490-532537/19	Lab Control Sample	Total/NA	Water	9251	
LCS 490-532537/4	Lab Control Sample	Total/NA	Water	9251	
LCSD 490-532537/20	Lab Control Sample Dup	Total/NA	Water	9251	
LCSD 490-532537/5	Lab Control Sample Dup	Total/NA	Water	9251	
240-99126-27 MS	GM-28R/072518/	Total/NA	Water	9251	
240-99126-27 MSD	GM-28R/072518/	Total/NA	Water	9251	
240-99126-28 MS	DUP-1/072518/	Total/NA	Water	9251	
240-99126-28 MSD	DUP-1/072518/	Total/NA	Water	9251	
240-99126-27 DU	GM-28R/072518/	Total/NA	Water	9251	
240-99126-28 DU	DUP-1/072518/	Total/NA	Water	9251	

Analysis Batch: 534423

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-99126-1	GM-19S/072418/	Total/NA	Water	9060A	
240-99126-2	GM-32/072418/	Total/NA	Water	9060A	
240-99126-3	GM-6/072418/	Total/NA	Water	9060A	
240-99126-4	GM-8/072418/	Total/NA	Water	9060A	
240-99126-5	EB-03/072418/	Total/NA	Water	9060A	
240-99126-16	GM-29/072518/	Total/NA	Water	9060A	
240-99126-17	GM-28/072518/	Total/NA	Water	9060A	
240-99126-18	EB-6/072518/	Total/NA	Water	9060A	
MB 490-534423/1	Method Blank	Total/NA	Water	9060A	
LCS 490-534423/5	Lab Control Sample	Total/NA	Water	9060A	
240-99126-1 MS	GM-19S/072418/	Total/NA	Water	9060A	
240-99126-1 MSD	GM-19S/072418/	Total/NA	Water	9060A	

Analysis Batch: 535239

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-99126-26	GM-21/072518/	Total/NA	Water	9060A	
240-99126-27	GM-28R/072518/	Total/NA	Water	9060A	
240-99126-28	DUP-1/072518/	Total/NA	Water	9060A	
MB 490-535239/3	Method Blank	Total/NA	Water	9060A	
LCS 490-535239/6	Lab Control Sample	Total/NA	Water	9060A	
240-99126-27 MS	GM-28R/072518/	Total/NA	Water	9060A	
240-99126-27 MSD	GM-28R/072518/	Total/NA	Water	9060A	

Client Sample ID: GM-19S/072418/

Lab Sample ID: 240-99126-1

Date Collected: 07/24/18 14:45
Matrix: Water
Date Received: 07/27/18 08:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	339699	08/07/18 13:08	LRW	TAL CAN
Dissolved	Prep	3005A			338579	07/30/18 14:00	MBB	TAL CAN
Dissolved	Analysis	6010B		1	338901	07/31/18 17:42	RKT	TAL CAN
Total Recoverable	Prep	3005A			338579	07/30/18 14:00	MBB	TAL CAN
Total Recoverable	Analysis	6010B		1	338901	07/31/18 17:37	RKT	TAL CAN
Total/NA	Analysis	300.0		5	338784	07/31/18 18:30	LKG	TAL CAN
Total/NA	Analysis	4500 S2 F-2000		1	338795	07/31/18 14:22	BLW	TAL CAN
Total/NA	Analysis	9060A		1	534423	08/04/18 16:11	VRP	TAL NSH
Total/NA	Analysis	9251		10	532537	07/30/18 15:34	MSJ	TAL NSH

Client Sample ID: GM-32/072418/

Lab Sample ID: 240-99126-2

Date Collected: 07/24/18 12:35
Matrix: Water
Date Received: 07/27/18 08:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9060A		1	534423	08/04/18 16:11	VRP	TAL NSH

Client Sample ID: GM-6/072418/

Lab Sample ID: 240-99126-3

Date Collected: 07/24/18 11:05
Matrix: Water
Date Received: 07/27/18 08:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	339543	08/06/18 18:17	LRW	TAL CAN
Dissolved	Prep	3005A			338579	07/30/18 14:00	MBB	TAL CAN
Dissolved	Analysis	6010B		1	338901	07/31/18 17:50	RKT	TAL CAN
Total Recoverable	Prep	3005A			338579	07/30/18 14:00	MBB	TAL CAN
Total Recoverable	Analysis	6010B		1	338901	07/31/18 17:46	RKT	TAL CAN
Total/NA	Analysis	300.0		5	338784	07/31/18 19:32	LKG	TAL CAN
Total/NA	Analysis	4500 S2 F-2000		1	338795	07/31/18 14:29	BLW	TAL CAN
Total/NA	Analysis	9060A		1	534423	08/04/18 16:11	VRP	TAL NSH
Total/NA	Analysis	9251		10	532537	07/30/18 15:34	MSJ	TAL NSH

Client Sample ID: GM-8/072418/

Lab Sample ID: 240-99126-4

Date Collected: 07/24/18 09:45
Matrix: Water
Date Received: 07/27/18 08:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	339543	08/06/18 18:42	LRW	TAL CAN
Dissolved	Prep	3005A			338579	07/30/18 14:00	MBB	TAL CAN
Dissolved	Analysis	6010B		1	338901	07/31/18 17:59	RKT	TAL CAN
Total Recoverable	Prep	3005A			338579	07/30/18 14:00	MBB	TAL CAN
Total Recoverable	Analysis	6010B		1	338901	07/31/18 17:55	RKT	TAL CAN

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		5	338784	07/31/18 19:53	LKG	TAL CAN
Total/NA	Analysis	4500 S2 F-2000		1	338795	07/31/18 14:35	BLW	TAL CAN
Total/NA	Analysis	9060A		1	534423	08/04/18 16:11	VRP	TAL NSH
Total/NA	Analysis	9251		10	532537	07/30/18 15:34	MSJ	TAL NSH

Client Sample ID: EB-03/072418/ Lab Sample ID: 240-99126-5

Date Collected: 07/24/18 15:25 **Matrix: Water**
Date Received: 07/27/18 08:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	339543	08/06/18 19:07	LRW	TAL CAN
Total Recoverable	Prep	3005A			338579	07/30/18 14:00	MBB	TAL CAN
Total Recoverable	Analysis	6010B		1	338901	07/31/18 18:03	RKT	TAL CAN
Total/NA	Analysis	300.0		1	338784	07/31/18 20:14	LKG	TAL CAN
Total/NA	Analysis	4500 S2 F-2000		1	338795	07/31/18 14:41	BLW	TAL CAN
Total/NA	Analysis	9060A		1	534423	08/04/18 16:11	VRP	TAL NSH
Total/NA	Analysis	9251		1	532537	07/30/18 15:34	MSJ	TAL NSH

Client Sample ID: GM-15/072418/ Lab Sample ID: 240-99126-6

Date Collected: 07/24/18 16:50 **Matrix: Water**
Date Received: 07/27/18 08:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	339543	08/06/18 19:32	LRW	TAL CAN

Client Sample ID: DN-13/072418/ Lab Sample ID: 240-99126-7

Date Collected: 07/24/18 17:25 **Matrix: Water**
Date Received: 07/27/18 08:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	339543	08/06/18 19:57	LRW	TAL CAN

Client Sample ID: W-4-S/072518/ Lab Sample ID: 240-99126-8

Date Collected: 07/25/18 12:50 **Matrix: Water**
Date Received: 07/27/18 08:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	339617	08/06/18 18:48	TJL1	TAL CAN

Client Sample ID: W-3-S/072518/ Lab Sample ID: 240-99126-9

Date Collected: 07/25/18 11:45 **Matrix: Water**
Date Received: 07/27/18 08:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	339617	08/06/18 19:10	TJL1	TAL CAN

Lab Chronicle

Client: ARCADIS U.S., Inc. | TestAmerica Job ID: 240-99126-1
Project/Site: Racer Moraine

Client Sample ID: W-2-S/072518/ | Lab Sample ID: 240-99126-10
Date Collected: 07/25/18 10:45 | **Matrix: Water**
Date Received: 07/27/18 08:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	339617	08/06/18 19:32	TJL1	TAL CAN

Client Sample ID: HR-17/072518/ | Lab Sample ID: 240-99126-11
Date Collected: 07/25/18 14:50 | **Matrix: Water**
Date Received: 07/27/18 08:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	339617	08/06/18 19:55	TJL1	TAL CAN
Total/NA	Analysis	8260B		4	339617	08/06/18 20:17	TJL1	TAL CAN

Client Sample ID: HR-1/072518/ | Lab Sample ID: 240-99126-12
Date Collected: 07/25/18 17:00 | **Matrix: Water**
Date Received: 07/27/18 08:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	339617	08/06/18 20:39	TJL1	TAL CAN
Total/NA	Analysis	8260B		4	339819	08/07/18 21:09	TJL1	TAL CAN

Client Sample ID: DUP-02/072518/ | Lab Sample ID: 240-99126-13
Date Collected: 07/25/18 00:00 | **Matrix: Water**
Date Received: 07/27/18 08:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	339617	08/06/18 21:01	TJL1	TAL CAN
Total/NA	Analysis	8260B		4	339819	08/07/18 21:32	TJL1	TAL CAN

Client Sample ID: TRIP BLANK/072518/ | Lab Sample ID: 240-99126-14
Date Collected: 07/25/18 00:00 | **Matrix: Water**
Date Received: 07/27/18 08:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	339617	08/06/18 21:24	TJL1	TAL CAN

Client Sample ID: EB-05/072518/ | Lab Sample ID: 240-99126-15
Date Collected: 07/25/18 17:20 | **Matrix: Water**
Date Received: 07/27/18 08:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	339617	08/06/18 21:46	TJL1	TAL CAN

Client Sample ID: GM-29/072518/

Lab Sample ID: 240-99126-16

Date Collected: 07/25/18 18:00
Matrix: Water
Date Received: 07/27/18 08:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		2	339617	08/06/18 22:08	TJL1	TAL CAN
Total/NA	Analysis	8260B		20	339617	08/06/18 22:31	TJL1	TAL CAN
Dissolved	Prep	3005A			338579	07/30/18 14:00	MBB	TAL CAN
Dissolved	Analysis	6010B		1	338901	07/31/18 18:21	RKT	TAL CAN
Total Recoverable	Prep	3005A			338579	07/30/18 14:00	MBB	TAL CAN
Total Recoverable	Analysis	6010B		1	338901	07/31/18 18:16	RKT	TAL CAN
Total/NA	Analysis	300.0		5	338784	07/31/18 20:35	LKG	TAL CAN
Total/NA	Analysis	4500 S2 F-2000		1	338795	07/31/18 14:48	BLW	TAL CAN
Total/NA	Analysis	9060A		1	534423	08/04/18 16:11	VRP	TAL NSH
Total/NA	Analysis	9251		10	532537	07/30/18 15:34	MSJ	TAL NSH

Client Sample ID: GM-28/072518/

Lab Sample ID: 240-99126-17

Date Collected: 07/25/18 08:20
Matrix: Water
Date Received: 07/27/18 08:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	339617	08/06/18 22:53	TJL1	TAL CAN
Total/NA	Analysis	8260B		10	339819	08/07/18 21:55	TJL1	TAL CAN
Dissolved	Prep	3005A			338579	07/30/18 14:00	MBB	TAL CAN
Dissolved	Analysis	6010B		1	338901	07/31/18 18:29	RKT	TAL CAN
Total Recoverable	Prep	3005A			338579	07/30/18 14:00	MBB	TAL CAN
Total Recoverable	Analysis	6010B		1	338901	07/31/18 18:25	RKT	TAL CAN
Total/NA	Analysis	300.0		5	338784	07/31/18 20:56	LKG	TAL CAN
Total/NA	Analysis	4500 S2 F-2000		1	338795	07/31/18 14:54	BLW	TAL CAN
Total/NA	Analysis	9060A		1	534423	08/04/18 16:11	VRP	TAL NSH
Total/NA	Analysis	9251		10	532537	07/30/18 15:34	MSJ	TAL NSH

Client Sample ID: EB-6/072518/

Lab Sample ID: 240-99126-18

Date Collected: 07/25/18 18:45
Matrix: Water
Date Received: 07/27/18 08:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	339819	08/07/18 20:46	TJL1	TAL CAN
Total Recoverable	Prep	3005A			338579	07/30/18 14:00	MBB	TAL CAN
Total Recoverable	Analysis	6010B		1	338901	07/31/18 18:34	RKT	TAL CAN
Total/NA	Analysis	300.0		1	338784	07/31/18 22:39	LKG	TAL CAN
Total/NA	Analysis	4500 S2 F-2000		1	338795	07/31/18 15:00	BLW	TAL CAN
Total/NA	Analysis	9060A		1	534423	08/04/18 16:11	VRP	TAL NSH
Total/NA	Analysis	9251		1	532537	07/30/18 15:34	MSJ	TAL NSH

Client Sample ID: W-2-N/072418/

Lab Sample ID: 240-99126-19

Date Collected: 07/24/18 10:20
Date Received: 07/27/18 08:00

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	339543	08/06/18 20:21	LRW	TAL CAN

Client Sample ID: HR-4/072418/

Lab Sample ID: 240-99126-20

Date Collected: 07/24/18 12:00
Date Received: 07/27/18 08:00

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	339543	08/06/18 20:46	LRW	TAL CAN

Client Sample ID: W-3-N/072418/

Lab Sample ID: 240-99126-21

Date Collected: 07/24/18 13:45
Date Received: 07/27/18 08:00

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	339543	08/06/18 21:11	LRW	TAL CAN

Client Sample ID: GM-20D/072418/

Lab Sample ID: 240-99126-22

Date Collected: 07/24/18 16:00
Date Received: 07/27/18 08:00

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	339543	08/06/18 21:36	LRW	TAL CAN

Client Sample ID: GM-9/072418/

Lab Sample ID: 240-99126-23

Date Collected: 07/24/18 17:35
Date Received: 07/27/18 08:00

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	339543	08/06/18 22:01	LRW	TAL CAN

Client Sample ID: EB-4/072418/

Lab Sample ID: 240-99126-24

Date Collected: 07/24/18 17:45
Date Received: 07/27/18 08:00

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	339543	08/06/18 22:25	LRW	TAL CAN

1 2 3 4 5 6 7 8 9 10 11 12 13 14

Client Sample ID: W-4-N/072518 — Lab Sample ID: 240-99126-25
Date Collected: 07/25/18 08:45 — **Matrix: Water**
Date Received: 07/27/18 08:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	339699	08/07/18 16:28	LRW	TAL CAN

Client Sample ID: GM-21/072518/ — Lab Sample ID: 240-99126-26
Date Collected: 07/25/18 11:20 — **Matrix: Water**
Date Received: 07/27/18 08:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	339699	08/07/18 16:53	LRW	TAL CAN
Dissolved	Prep	3005A			338579	07/30/18 14:00	MBB	TAL CAN
Dissolved	Analysis	6010B		1	338901	07/31/18 18:42	RKT	TAL CAN
Total Recoverable	Prep	3005A			338579	07/30/18 14:00	MBB	TAL CAN
Total Recoverable	Analysis	6010B		1	338901	07/31/18 18:38	RKT	TAL CAN
Total/NA	Analysis	300.0		10	338784	07/31/18 23:00	LKG	TAL CAN
Total/NA	Analysis	4500 S2 F-2000		1	338795	07/31/18 15:07	BLW	TAL CAN
Total/NA	Analysis	9060A		2	535239	08/09/18 04:46	VRP	TAL NSH
Total/NA	Analysis	9251		10	532537	07/30/18 15:34	MSJ	TAL NSH

Client Sample ID: GM-28R/072518/ — Lab Sample ID: 240-99126-27
Date Collected: 07/25/18 14:20 — **Matrix: Water**
Date Received: 07/27/18 08:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	339617	08/06/18 23:37	TJL1	TAL CAN
Dissolved	Prep	3005A			338579	07/30/18 14:00	MBB	TAL CAN
Dissolved	Analysis	6010B		1	338901	07/31/18 17:25	RKT	TAL CAN
Total Recoverable	Prep	3005A			338579	07/30/18 14:00	MBB	TAL CAN
Total Recoverable	Analysis	6010B		1	338901	07/31/18 17:00	RKT	TAL CAN
Total/NA	Analysis	300.0		2	338784	07/31/18 23:21	LKG	TAL CAN
Total/NA	Analysis	4500 S2 F-2000		1	338795	07/31/18 15:13	BLW	TAL CAN
Total/NA	Analysis	9060A		1	535239	08/09/18 05:07	VRP	TAL NSH
Total/NA	Analysis	9251		1	532537	07/30/18 15:34	MSJ	TAL NSH

Client Sample ID: DUP-1/072518/ — Lab Sample ID: 240-99126-28
Date Collected: 07/25/18 14:20 — **Matrix: Water**
Date Received: 07/27/18 08:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	339617	08/07/18 01:07	TJL1	TAL CAN
Dissolved	Prep	3005A			338579	07/30/18 14:00	MBB	TAL CAN
Dissolved	Analysis	6010B		1	338901	07/31/18 18:51	RKT	TAL CAN
Total Recoverable	Prep	3005A			338579	07/30/18 14:00	MBB	TAL CAN
Total Recoverable	Analysis	6010B		1	338901	07/31/18 18:47	RKT	TAL CAN

Lab Chronicle

Client: ARCADIS U.S., Inc.
Project/Site: Racer Moraine

TestAmerica Job ID: 240-99126-1

Client Sample ID: DUP-1/072518/
Date Collected: 07/25/18 14:20
Date Received: 07/27/18 08:00

Lab Sample ID: 240-99126-28
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	338784	08/01/18 00:23	LKG	TAL CAN
Total/NA	Analysis	4500 S2 F-2000		1	338795	07/31/18 15:32	BLW	TAL CAN
Total/NA	Analysis	9060A		1	535239	08/09/18 06:17	VRP	TAL NSH
Total/NA	Analysis	9251		1	532537	07/30/18 15:34	MSJ	TAL NSH

Laboratory References:

TAL CAN = TestAmerica Canton, 4101 Shuffel Street NW, North Canton, OH 44720, TEL (330)497-9396
TAL NSH = TestAmerica Nashville, 2960 Foster Creighton Drive, Nashville, TN 37204, TEL (615)726-0177

Accreditation/Certification Summary

Client: ARCADIS U.S., Inc.
Project/Site: Racer Moraine

TestAmerica Job ID: 240-99126-1

Laboratory: TestAmerica Canton

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
California	State Program	9	2927	02-23-19
Connecticut	State Program	1	PH-0590	12-31-19
Florida	NELAP	4	E87225	06-30-19
Illinois	NELAP	5	200004	07-31-18 *
Kansas	NELAP	7	E-10336	01-31-19
Kentucky (UST)	State Program	4	58	02-23-19
Kentucky (WW)	State Program	4	98016	12-31-18
Minnesota	NELAP	5	039-999-348	12-31-18
Minnesota (Petrofund)	State Program	1	3506	07-31-18 *
Nevada	State Program	9	OH00048	07-31-19
New Jersey	NELAP	2	OH001	06-30-19
New York	NELAP	2	10975	03-31-19
Ohio VAP	State Program	5	CL0024	09-06-19
Oregon	NELAP	10	4062	02-23-19
Pennsylvania	NELAP	3	68-00340	08-31-19 *
Texas	NELAP	6	T104704517-17-9	08-31-18 *
USDA	Federal		P330-16-00404	12-28-19
Virginia	NELAP	3	460175	09-14-18 *
Washington	State Program	10	C971	01-12-19
West Virginia DEP	State Program	3	210	12-31-18

Laboratory: TestAmerica Nashville

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
A2LA	ISO/IEC 17025		0453.07	12-31-19
Alaska (UST)	State Program	10	UST-087	06-30-18 *
Arizona	State Program	9	AZ0473	05-05-19
Arkansas DEQ	State Program	6	88-0737	04-25-19
California	State Program	9	2938	10-31-18
Connecticut	State Program	1	PH-0220	12-31-19
Florida	NELAP	4	E87358	06-30-19
Georgia	State Program	4	NA: NELAP & A2LA	12-31-19
Illinois	NELAP	5	200010	12-09-18
Iowa	State Program	7	131	04-01-20
Kansas	NELAP	7	E-10229	10-31-18
Kentucky (UST)	State Program	4	19	06-30-19
Kentucky (WW)	State Program	4	90038	12-31-18
Louisiana	NELAP	6	30613	06-30-19
Maine	State Program	1	TN00032	11-03-19
Maryland	State Program	3	316	03-31-19
Massachusetts	State Program	1	M-TN032	06-30-19
Minnesota	NELAP	5	047-999-345	12-31-18
Mississippi	State Program	4	N/A	06-30-19
Montana (UST)	State Program	8	NA	02-24-20
Nevada	State Program	9	TN00032	07-31-19
New Hampshire	NELAP	1	2963	10-09-18
New Jersey	NELAP	2	TN965	06-30-19
New York	NELAP	2	11342	03-31-19
North Carolina (WW/SW)	State Program	4	387	12-31-18

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Laboratory: TestAmerica Nashville (Continued)

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
North Dakota	State Program	8	R-146	06-30-19
Ohio VAP	State Program	5	CL0033	07-06-19
Oklahoma	State Program	6	9412	08-31-18
Oregon	NELAP	10	TN200001	04-26-19
Pennsylvania	NELAP	3	68-00585	07-31-19
Rhode Island	State Program	1	LAO00268	12-30-18
South Carolina	State Program	4	84009 (001)	02-28-19
Tennessee	State Program	4	2008	02-23-20
Texas	NELAP	6	T104704077	08-31-18
USDA	Federal		P330-13-00306	12-01-19
Utah	NELAP	8	TN00032	07-31-18 *
Virginia	NELAP	3	460152	06-14-19
Washington	State Program	10	C789	07-19-19
West Virginia DEP	State Program	3	219	02-28-19
Wisconsin	State Program	5	998020430	08-31-18
Wyoming (UST)	A2LA	8	453.07	12-31-19

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

TestAmerica Canton
4101 Shuffel Street NW
North Canton, OH 44720
Phone (330) 497-9396 Fax (330) 497-0772

1.4/C1.4 1.2/C1.2 0.6/C0.6
1.0/C1.0 0.8/C0.8 1.6/C1.6

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Jordan Bochner	Lab PM: DelMonico, Michael	Carrier Tracking No(s):	COC No: 240-53026-22841.4
Client Contact: Will Stephens	Phone: 317-217-0336	E-Mail: michael.delmonico@testamericainc.com		Page: Page 1 of 3
Company: ARCADIS U.S., Inc.				Job #:
Address: 150 West Market Street Suite 728	Due Date Requested:			
City: Indianapolis	TAT Requested (days):			
State, Zip: IN, 46204				
Phone:	PO #: OH000294.2018.0004B			
Email: william.stephens@arcadis.com	WO #: Project #: OH000294.2018.0004B			
Project Name: Racer Moraine Annual	Project #: 24006917			
Site: RACER MORAINE	SSOW#:			

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA
M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Z - other (specify)
Other:

Analysis Requested

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8260B - (MOD) Custom Sublist	9060A - Total Organic Carbon (Average Quadruplic	SM4500_S2_F - (MOD) Local Method	6010B - (MOD) Custom Sublist	300.0_28D - Sulfate	6010B - Fe-Mn - FF	9251 - Chloride	Total Number of containers	Special Instructions/Note:
				Preservation Code:			A	S	CB	D	N	D	N		
GM-195/072418	7/24/18	1445	G	Water			X	X	X	X	X	X	X		210
GM-32/072418	7/24/18	1235	G	Water				X							
GM-6/072418	7/24/18	1105	G	Water			X	X	X	X	X	X	X		Dayton
GM-8/072418	7/24/18	0945	G	Water			X	X	X	X	X	X	X		
EB-03/072418	7/24/18	1525	G	Water			X	X	X	X	X		X		
GM-15/072418	7/24/18	1650	G	Water			X								
DM-13/072418	7/24/18	1725	G	Water			X								
W-4-S/072518	7/25/18	1250	G	Water			X								Extra VOA for 10x Dilution
W-3-S/072518	7/25/18	1145	G	Water			X								
W-2-S/072518	7/25/18	1045	G	Water			X								
HR-17/072518	7/25/18	1450	G	Water			X								Extra VOA for 10x Dilution

240-99126 Chain of Custody

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For ____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:	
Relinquished by: Jordan Bochner / [signature]	Date/Time: 7/26/18 / 1450	Company: ARCADIS	Received by: [signature]	Date/Time: 7-26-18 1450	Company: TA
Relinquished by:	Date/Time:	Company:	Received by: [signature]	Date/Time: 7/27/18 800	Company: TAC
Relinquished by:	Date/Time:	Company:	Received by:	Date/Time:	Company:

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.: | Cooler Temperature(s) °C and Other Remarks:

Ver: 08/04/2016

TestAmerica Canton
4101 Shuffel Street NW
North Canton, OH 44720
Phone (330) 497-9396 Fax (330) 497-0772

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Jordan Bochner SCLARK	Lab PM: DelMonico, Michael	Carrier Tracking No(s):	COC No: 240-53026-22841.5
Client Contact: Will Stephens	Phone: 317-217-0336 [illegible]	E-Mail: michael.delmonico@testamericainc.com		Page: Page 2 of 2
Company: ARCADIS U.S., Inc.				Job #:
Address: 150 West Market Street Suite 728	Due Date Requested:			
City: Indianapolis	TAT Requested (days):			
State, Zip: IN, 46204				
Phone:	PO #: OH000294.2018.0004B			
Email: william.stephens@arcadis.com	WO #: Project #: OH000294.2018.0004B			
Project Name: Racer Moraine Annual	Project #: 24006917			
Site: RACER MORAENE	SSOW#:			

Analysis Requested

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA
M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Z - other (specify)
Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8260B - (MOD) Custom Sublist	9060A - Total Organic Carbon (Average Quadruplic	SM4500_S2_F - (MOD) Local Method	6010B - (MOD) Custom Sublist	300.0_28D - Sulfate	6010B - Fe-Mn (FF)	9261 - Chloride	Total Number of containers	Special Instructions/Note:
			Preservation Code:				A	S	CB	D	N	D	N		
HR-1/072518	7/25/18	1700	G	Water			X								Extra VOA for 10x Dilution + MS/MSD
DUP-02/072518	7/25/18		G	Water			X								Extra VOA for 10x Dilution
TRIP BLANK/072518				Water			X								1 per Cooler w/ VOC / 5 Total
EB-05/072518	7/25/18	1720	G	Water			X								
GM-29/072518	072518	1800	G	Water			X	X	X	X	X	X	X		+1 VOA FOR 10X DILUTION
GM-28/072618	072618	0820	G	Water			X	X	X	X	X	X	X		+1 VOA FOR 10X DILUTION
EB-6/072518	072618	1845	G	Water			X	X	X	X	X	X	X		
				Water											
				Water											
				Water											
				Water											

210

Dayton

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For ______ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:		
Relinquished by: SCLARK [signature]	Date/Time: 072618 1430	Company: ARCADIS	Received by: Jordan Bochner [signature]	Date/Time: 072618 1430	Company: ARCADIS
Relinquished by: Jordan Bochner [signature]	Date/Time: 072618 /1450	Company: ARCADIS	Received by: [signature]	Date/Time: 7-26-18 1450	Company: TA
Relinquished by:	Date/Time:	Company:	Received by: [signature]	Date/Time: 7/27/18 600	Company: TAL
Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:		Cooler Temperature(s) °C and Other Remarks:		

Ver: 08/04/2016

TestAmerica Canton
4101 Shuffel Street NW
North Canton, OH 44720
Phone (330) 497-9396 Fax (330) 497-0772

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: S CLARK	Lab PM: DelMonico, Michael	Carrier Tracking No(s):	COC No: 240-53026-22841.6
Client Contact: Will Stephens	Phone: 614 940 2210	E-Mail: michael.delmonico@testamericainc.com		Page: Page 3 of 3
Company: ARCADIS U.S., Inc.				Job #:
Address: 150 West Market Street Suite 728	Due Date Requested:			
City: Indianapolis	TAT Requested (days):			
State, Zip: IN, 46204				
Phone:	PO #: OH000294.2018.0004B			
Email: william.stephens@arcadis.com	WO #: Project #: OH000294.2018.0004B			
Project Name: Racer Moraine Annual	Project #: 24006917			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA
M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Z - other (specify)
Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8260B - (MOD) Custom Sublist	9060A - Total Organic Carbon (Average Quadruplic	SM4500_S2_F - (MOD) Local Method	6010B - (MOD) Custom Sublist	300.0_28D - Sulfate	6010B - Fe-Mn (FF)	9261 - Chloride	Total Number of containers	Special Instructions/Note:
			Preservation Code:				A	S	CB	D	N	D	N		
W.2.D/072418	072418	1020	G	Water			X								
HR.4/072418	072418	1200	G	Water			X								210
W.3.N/072418/	072418	1345	G	Water			X								
GM.20D/072418/	072418	1600	G	Water			X								Dayton
GM.9/072418/	072418	1735	G	Water			X								
EB.4/072418/	072418	1745	G	Water			X								
W.4.N/072518/	072518	0845	G	Water			X								
GM.21/072518/	072518	1120	G	Water			X	X	X	X	X	X	X		
GM.28R/072518/	072518	1420	G	Water			X	X	X	X	X	X	X		~~[illegible]~~
GM.28R/072518/MS/MSD	072518	1420	G	Water			X	X	X	X	X	X	X		
DUP.1/072518/	072518	1420	G	Water			X	X	X	X	X	X	X		

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For ____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:		Date:	Time:		Method of Shipment:	
Relinquished by: S CLARK [signature]	Date/Time: 072618 1430	Company: ARCADIS	Received by: Jordan Bochner [signature]		Date/Time: 072618 1430	Company: ARCADIS
Relinquished by: Jordan Bochner [signature]	Date/Time: 072618 / 1450	Company: ARCADIS	Received by: [signature]		Date/Time: 7-26-18 1450	Company: TA
Relinquished by:	Date/Time:	Company:	Received by: [signature]		Date/Time: 7/27/18 800	Company: TAC
Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:		Cooler Temperature(s) °C and Other Remarks:			

Ver: 08/04/2016

TestAmerica Canton Sample Receipt Form/Narrative Login # : 99126
Canton Facility

Client Arcadis Site Name ______ Cooler unpacked by: DSD

Cooler Received on 7/27/18 Opened on 7/27/18

FedEx: 1st Grd Exp UPS FAS Clipper Client Drop Off TestAmerica Courier Other ______

Receipt After-hours: Drop-off Date/Time ______ Storage Location ______

TestAmerica Cooler # TA Foam Box Client Cooler Box Other ______

Packing material used: Bubble Wrap Foam Plastic Bag None Other ______

COOLANT: Wet Ice Blue Ice Dry Ice Water None

1. Cooler temperature upon receipt ☒ See Multiple Cooler Form
   IR GUN# IR-8 (CF +0 °C) Observed Cooler Temp.______°C Corrected Cooler Temp.______°C
   IR GUN #36 (CF -0.3°C) Observed Cooler Temp.______°C Corrected Cooler Temp.______°C
2. Were tamper/custody seals on the outside of the cooler(s)? If Yes Quantity 1 each Yes No
   -Were the seals on the outside of the cooler(s) signed & dated? Yes No NA
   -Were tamper/custody seals on the bottle(s) or bottle kits (LLHg/MeHg)? Yes No
   -Were tamper/custody seals intact and uncompromised? Yes No NA
3. Shippers' packing slip attached to the cooler(s)? Yes No
4. Did custody papers accompany the sample(s)? Yes No
5. Were the custody papers relinquished & signed in the appropriate place? Yes No
6. Was/were the person(s) who collected the samples clearly identified on the COC? Yes No
7. Did all bottles arrive in good condition (Unbroken)? Yes No
8. Could all bottle labels be reconciled with the COC? Yes No
9. Were correct bottle(s) used for the test(s) indicated? Yes No
10. Sufficient quantity received to perform indicated analyses? Yes No
11. Are these work share samples? Yes No
    If yes, Questions 12-16 have been checked at the originating laboratory.
12. Were all preserved sample(s) at the correct pH upon receipt? Yes No NA pH Strip Lot# **HC849161**
13. Were VOAs on the COC? Yes No
14. Were air bubbles >6 mm in any VOA vials? ⬤ ⬅ Larger than this. Yes No NA
15. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot # N/A Yes No
16. Was a LL Hg or Me Hg trip blank present? ______ Yes No

Tests that are not checked for pH by Receiving:

VOAs
Oil and Grease
TOC

Contacted PM ______ Date ______ by ______ via Verbal Voice Mail Other

Concerning ______

17. CHAIN OF CUSTODY & SAMPLE DISCREPANCIES Samples processed by: JR

Received Sample "GM-28/072618/" as "GM-23/072618/" Same date/time. Will log per chain.

18. SAMPLE CONDITION

Sample(s) ______ were received after the recommended holding time had expired.

Sample(s) ______ were received in a broken container.

Sample(s) W-3-N/072418 x3 VOAs were received with bubble >6 mm in diameter. (Notify PM)

19. SAMPLE PRESERVATION

Sample(s) ______ were further preserved in the laboratory.

Time preserved: ______ Preservative(s) added/Lot number(s): ______.

WI-NC-099

TestAmerica Multiple Cooler Receipt Form/Narrative
Canton Facility

Login # : 99126

Cooler #	IR Gun #	Observed Temp °C	Corrected Temp °C	Coolant
TA	8	1.4	1.4	ICL
		1.0	1.0	
		1.2	1.2	
		0.8	0.8	
		0.6	0.6	
		1.6	1.6	

X:\X-Drive Document Control\SOPs\Work Instructions\Word Version Work Instructions\WI-NC-099H-071615 Cooler Receipt Form_page 2 - Multiple Coolers.doc rls

Temperature readings: ______________________________

Client Sample ID	Lab ID	Container Type	Container pH	Preservative Added (mls)	Lot #
GM-19S/072418/	240-99126-E-1	Amber Glass 250ml - Sulfuric Acid	<2		
GM-19S/072418/	240-99126-G-1	Plastic 500ml - with Zn Acetate and	>9		
GM-19S/072418/	240-99126-H-1	Plastic 500ml - with Nitric Acid	<2		
GM-19S/072418/	240-99126-I-1	Plastic 500ml - w/ Nitric - Dis.	<2		
GM-32/072418/	240-99126-A-2	Amber Glass 250ml - Sulfuric Acid	<2		
GM-6/072418/	240-99126-E-3	Amber Glass 250ml - Sulfuric Acid	<2		
GM-6/072418/	240-99126-G-3	Plastic 500ml - with Zn Acetate and	>9		
GM-6/072418/	240-99126-H-3	Plastic 500ml - with Nitric Acid	<2		
GM-6/072418/	240-99126-I-3	Plastic 500ml - w/ Nitric - Dis.	<2		
GM-8/072418/	240-99126-E-4	Amber Glass 250ml - Sulfuric Acid	<2		
GM-8/072418/	240-99126-G-4	Plastic 500ml - with Zn Acetate and	>9		
GM-8/072418/	240-99126-H-4	Plastic 500ml - with Nitric Acid	<2		
GM-8/072418/	240-99126-I-4	Plastic 500ml - w/ Nitric - Dis.	<2		
EB-03/072418/	240-99126-E-5	Amber Glass 250ml - Sulfuric Acid	<2		
EB-03/072418/	240-99126-G-5	Plastic 500ml - with Zn Acetate and	>9		
EB-03/072418/	240-99126-H-5	Plastic 500ml - with Nitric Acid	<2		
TRIP BLANK/072518/	240-99126-E-14	Amber Glass 250ml - Sulfuric Acid	<2		
TRIP BLANK/072518/	240-99126-G-14	Plastic 500ml - with Zn Acetate and	>9		
TRIP BLANK/072518/	240-99126-H-14	Plastic 500ml - with Nitric Acid	<2		
GM-29/072518/	240-99126-F-16	Amber Glass 250ml - Sulfuric Acid	<2		
GM-29/072518/	240-99126-H-16	Plastic 500ml - with Zn Acetate and	>9		
GM-29/072518/	240-99126-I-16	Plastic 500ml - with Nitric Acid	<2		
GM-29/072518/	240-99126-J-16	Plastic 500ml - w/ Nitric - Dis.	<2		
GM-28/072518/	240-99126-F-17	Amber Glass 250ml - Sulfuric Acid	<2		
GM-28/072518/	240-99126-H-17	Plastic 500ml - with Zn Acetate and	>9		
GM-28/072518/	240-99126-I-17	Plastic 500ml - with Nitric Acid	<2		
GM-28/072518/	240-99126-J-17	Plastic 500ml - w/ Nitric - Dis.	<2		
EB-6/072518/	240-99126-E-18	Amber Glass 250ml - Sulfuric Acid	<2		
EB-6/072518/	240-99126-G-18	Plastic 500ml - with Zn Acetate and	>9		
EB-6/072518/	240-99126-H-18	Plastic 500ml - with Nitric Acid	<2		
GM-21/072518/	240-99126-E-26	Amber Glass 250ml - Sulfuric Acid	<2		
GM-21/072518/	240-99126-G-26	Plastic 500ml - with Zn Acetate and	>9		
GM-21/072518/	240-99126-H-26	Plastic 500ml - with Nitric Acid	<2		
GM-21/072518/	240-99126-I-26	Plastic 500ml - w/ Nitric - Dis.	<2		
GM-28R/072518/	240-99126-AA-27	Plastic 500ml - w/ Nitric - Dis.	<2		
GM-28R/072518/	240-99126-M-27	Amber Glass 250ml - Sulfuric Acid	<2		
GM-28R/072518/	240-99126-N-27	Amber Glass 250ml - Sulfuric Acid	<2		

Client Sample ID	Lab ID	Container Type	Container pH	Preservative Added (mls)	Lot #
GM-28R/072518/	240-99126-O-27	Amber Glass 250ml - Sulfuric Acid	<2		
GM-28R/072518/	240-99126-S-27	Plastic 500ml - with Zn Acetate and	>9		
GM-28R/072518/	240-99126-T-27	Plastic 500ml - with Zn Acetate and	>9		
GM-28R/072518/	240-99126-U-27	Plastic 500ml - with Zn Acetate and	>9		
GM-28R/072518/	240-99126-V-27	Plastic 500ml - with Nitric Acid	<2		
GM-28R/072518/	240-99126-W-27	Plastic 500ml - with Nitric Acid	<2		
GM-28R/072518/	240-99126-X-27	Plastic 500ml - with Nitric Acid	<2		
GM-28R/072518/	240-99126-Y-27	Plastic 500ml - w/ Nitric - Dis.	<2		
GM-28R/072518/	240-99126-Z-27	Plastic 500ml - w/ Nitric - Dis.	<2		
DUP-1/072518/	240-99126-E-28	Amber Glass 250ml - Sulfuric Acid	<2		
DUP-1/072518/	240-99126-G-28	Plastic 500ml - with Zn Acetate and	>9		
DUP-1/072518/	240-99126-H-28	Plastic 500ml - with Nitric Acid	<2		
DUP-1/072518/	240-99126-I-28	Plastic 500ml - w/ Nitric - Dis.	<2		

1 2 3 4 5 6 7 8 9 10 11 12 13 14

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
Nashville, TN

COOLER RECEIPT FORM

240-99126 Chain of Custody

Cooler Received/Opened On ~~7/21/2018~~ 7-24-18 @ ~~1010~~ 1020

Time Samples Removed From Cooler______ Time Samples Placed In Storage______ (2 Hour Window)

1. Tracking # 6137 (last 4 digits, FedEx)

IR Gun ID 17610176 pH Strip Lot N/A Courier: FedEx

2. Temperature of rep. sample or temp blank when opened: 5.9 Degrees Celsius Chlorine Strip Lot N/A
3. If Item #2 temperature is 0°C or less, was the representative sample or temp blank frozen? YES NO...NA
4. Were custody seals on outside of cooler? YES...NO...NA

If yes, how many and where: 2 (Front)

5. Were the seals intact, signed, and dated correctly? YES...NO...NA 2 not signed
6. Were custody papers inside cooler? YES...NO...NA

I certify that I opened the cooler and answered questions 1-6 (intial) 22

7. Were custody seals on containers: YES NO and Intact YES...NO...NA

Were these signed and dated correctly? YES...NO...NA

8. Packing mat'l used? Bubblewrap Plastic bag Peanuts Vermiculite Foam Insert Paper Other None
9. Cooling process: Ice Ice-pack Ice (direct contact) Dry ice Other None
10. Did all containers arrive in good condition (unbroken)? YES...NO...NA
11. Were all container labels complete (#, date, signed, pres., etc)? YES...NO...NA
12. Did all container labels and tags agree with custody papers? YES...NO...NA

13a. Were VOA vials received? YES...NO...NA

b. Was there any observable headspace present in any VOA vial? YES...NO...NA

Larger than this.

14. Was there a Trip Blank in this cooler? YES...NO...NA If multiple coolers, sequence #______

I certify that I unloaded the cooler and answered questions 7-14 (intial)

15a. On pres'd bottles, did pH test strips suggest preservation reached the correct pH level? YES...NO...NA

b. Did the bottle labels indicate that the correct preservatives were used YES...NO...NA

16. Was residual chlorine present? YES...NO...NA

I certify that I checked for chlorine and pH as per SOP and answered questions 15-16 (intial)

17. Were custody papers properly filled out (ink, signed, etc)? YES...NO...NA
18. Did you sign the custody papers in the appropriate place? YES...NO...NA
19. Were correct containers used for the analysis requested? YES...NO...NA
20. Was sufficient amount of sample sent in each container? YES...NO...NA

I certify that I entered this project into LIMS and answered questions 17-20 (intial)

I certify that I attached a label with the unique LIMS number to each container (intial)

21. Were there Non-Conformance issues at login? YES..NO Was a NCM generated? YES...NO...#______

BIS = Broken in shipment
Cooler Receipt Form.doc

LF-1
End of Form

Revised 8/23/17

TestAmerica Canton

4101 Shuffel Street NW
North Canton, OH 44720
Phone (330) 497-9396 Fax (330) 497-0772

Chain of Custody Record

Loc: 240
99126

Loc: 240
99126

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information (Sub Contract Lab)	Sampler:	Lab PM: DelMonico, Michael		COC No: 240-90256.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: michael.delmonico@testamericainc.com	State of Origin: Ohio	Page: Page 1 of 2
Company: TestAmerica Laboratories, Inc		Accreditations Required (See note):		Job #: 240-99126-1
Address: 2960 Foster Creighton Drive,	Due Date Requested: 8/8/2018	Analysis Requested		Preservation Codes:
City: Nashville	TAT Requested (days):			
State, Zip: TN, 37204				
Phone: 615-726-0177(Tel) 615-726-3404(Fax)	PO #:			
Email:	WO #:			
Project Name: Racer Moraine	Project #: 24006917			
Site:	SSOW#:			Other:

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA
M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Z - other (specify)

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	9060A/ Total Organic Carbon (Average Quadruplic	9251/ Chloride	Total Number of containers	Special Instructions/Note:
			Preservation Code:							
GM-19S/072418/ (240-99126-1)	7/24/18	14:45 Eastern		Water			X	X	2	
GM-32/072418/ (240-99126-2)	7/24/18	12:35 Eastern		Water			X		1	
GM-6/072418/ (240-99126-3)	7/24/18	11:05 Eastern		Water			X	X	2	
GM-8/072418/ (240-99126-4)	7/24/18	09:45 Eastern		Water			X	X	2	
EB-03/072418/ (240-99126-5)	7/24/18	15:25 Eastern		Water			X	X	2	
GM-29/072518/ (240-99126-16)	7/25/18	18:00 Eastern		Water			X	X	2	
GM-28/072518/ (240-99126-17)	7/25/18	08:20 Eastern		Water			X	X	2	
EB-6/072518/ (240-99126-18)	7/25/18	18:45 Eastern		Water			X	X	2	
GM-21/072518/ (240-99126-26)	7/25/18	11:20 Eastern		Water			X	X	2	

Note: Since laboratory accreditations are subject to change, TestAmerica Laboratories, Inc. places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to TestAmerica Laboratories, Inc. attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to TestAmerica Laboratories, Inc.

Possible Hazard Identification
Unconfirmed

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* ______ *Months*

Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:		
Relinquished by: [signature]	Date/Time: 7/27/18 1830	Company: TA	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by: [signature]	Date/Time: 7-28-18 1020	Company: TA-NAS
Custody Seals Intact: △ Yes △ No	Custody Seal No.:		Cooler Temperature(s) °C and Other Remarks: 5.5		

Ver: 09/20/2016

TestAmerica Canton
4101 Shuffel Street NW
North Canton, OH 44720
Phone (330) 497-9396 Fax (330) 497-0772

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information (Sub Contract Lab)	Sampler:	Lab PM: DelMonico, Michael	Carrier Tracking No(s):	COC No: 240-90256.2
Client Contact: Shipping/Receiving	Phone:	E-Mail: michael.delmonico@testamericainc.com	State of Origin: Ohio	Page: Page 2 of 2
Company: TestAmerica Laboratories, Inc		Accreditations Required (See note):		Job #: 240-99126-1
Address: 2960 Foster Creighton Drive,	Due Date Requested: 8/8/2018	Analysis Requested		Preservation Codes:
City: Nashville	TAT Requested (days):			
State, Zip: TN, 37204				
Phone: 615-726-0177(Tel) 615-726-3404(Fax)	PO #:			
Email:	WO #:			
Project Name: Racer Moraine	Project #: 24006917			
Site:	SSOW#:			

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA
M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Z - other (specify)
Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	9060A/ Total Organic Carbon (Average Quadruplic	9251/ Chloride	Total Number of containers	Special Instructions/Note:
				Preservation Code:						
GM-28R/072518/ (240-99126-27)	7/25/18	14:20 Eastern		Water			X	X	6	
DUP-1/072518/ (240-99126-28)	7/25/18	14:20 Eastern		Water			X	X	2	

Loc: 240
99126
#1
D

Note: Since laboratory accreditations are subject to change, TestAmerica Laboratories, Inc. places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody. I

Possible Hazard Identification		Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)	
Unconfirmed		☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* ______ *Months*	
Deliverable Requested: I, II, III, IV, Other (specify)	Primary Deliverable Rank: 2	Special Instructions/QC Requirements:	

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:		
Relinquished by: [signature]	Date/Time: 7/27/18 1830	Company: TAL	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by: [signature]	Date/Time: 7-28-18 1020	Company: TA-NAS
Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:		Cooler Temperature(s) °C and Other Remarks: 5.9		

Ver: 09/20/2016

Section 7

STATISTICAL EVALUATIONS

Groundwater quality was evaluated using the Mann-Kendall test for trends and Sen's Slope Estimator. The purpose of the tests was to identify statistically significant increases in the concentrations of the constituents of concern. As proposed in the Site-Wide Groundwater Monitoring Plan (Arcadis G&M, Inc. 2002), post-closure monitoring data collected from those wells assigned to the closed North and South Settling Lagoons were reviewed. Data considered in the evaluation included results from the July 2018 monitoring event and data ranging back to the initial post-closure monitoring event conducted in November 2001. These data are also included in Section 5 of this report. Results are provided in Appendix G of the 2018 Groundwater Monitoring Report (referred to as 'main report').

OHIO EPA
SUPPLEMENTARY ANNUAL REPORT
FOR 2018 GROUNDWATER
MONITORING INFORMATION

February 28, 2019

Prepared by Arcadis

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Pamela L. Barnett

Pamela L. Barnett
Cleanup Manager
RACER Trust

NAME	FCID	ADDR1	ADDR2	CITY	STATE	ZIP	PHONE	CONTACT	SECTION	TWNSHIP	RANGE	LATITUDE	LONGITUDE	GEOG_METHOD	NUM_WELLS	COUNTY_NAM	FIPS_CO	FIPS_ST
Former Delphi Harrison Ther	OHD000817577	3600 Dryden Road		MORAINE	OH	45439	313.486.2908	Pam Barnett	Section 16	1N	6E	39.692375	-84.226169	A	8	Montgomery		39

FACILITY	FCID	WELL_ID	DATUM	DEPTH	TOP_CAS_EL	TOP_SCR_EL	BOT_SCR_EL	GRAD_POSTN	CAS_MATERL	PIPE_DIA
Former Delphi Harrison Thermal Systems	OHD000817577	HR-04	MSL	66.80	742.60	685.61	675.61	U	PVC	2
Former Delphi Harrison Thermal Systems	OHD000817577	W-2-N	MSL	59.70	731.68	694.68	669.68	D	PVC	4
Former Delphi Harrison Thermal Systems	OHD000817577	W-3-N	MSL	57.60	733.66	699.98	674.98	D	PVC	4
Former Delphi Harrison Thermal Systems	OHD000817577	W-4-N	MSL	66.60	731.63	689.88	664.88	D	PVC	4
Former Delphi Harrison Thermal Systems	OHD000817577	W-2-S	MSL	67.00	726.64	695.01	660.01	D	PVC	4
Former Delphi Harrison Thermal Systems	OHD000817577	W-3-S	MSL	76.40	729.17	691.17	651.17	D	PVC	4
Former Delphi Harrison Thermal Systems	OHD000817577	W-4-S	MSL	72.50	727.92	696.66	656.66	D	PVC	4
Former Delphi Harrison Thermal Systems	OHD000817577	HR-17	MSL	59.55	726.43	698.4	678.40	U	PVC	4
Former Delphi Harrison Thermal Systems	OHD000817577	TRIP BLANK/072518/								
Former Delphi Harrison Thermal Systems	OHD000817577	EB-04/072418/								
Former Delphi Harrison Thermal Systems	OHD000817577	EB-05/072518/								
Former Delphi Harrison Thermal Systems	OHD000817578	EB-06/072518/								

COMMENT	SURFACE_EL	LATITUDE	LONGITUDE	X_VAR	Y_VAR	GEOG_METHOD	ELEV_METHOD	WELL_USE
These wells were sampled as part of the on-going Resource Conservation and Recovery Act (RCRA)	740.61	39.70216529	-84.22206834			S	C	8A
Corrective Action being implemented at the facilities.	729.68	39.70016554	-84.2243363			S	C	8A
The groundwater monitoring program is also designed to meet the objectives of Ohio EPA's RCRA post-closure agreement	731.98	39.69971223	-84.2234164			S	C	8A
monitoring at the two closed lagoons located at the former Delphi Thermal Moraine facility.	729.88	39.69960138	-84.22274645			S	C	8A
Duplicate samples were collected as specified in the approved groundwater monitoring plan.	725.01	39.69118577	-84.22863853			S	C	8A
	727.17	39.690775	-84.22817098			S	C	8A
	726.66	39.6905969	-84.22689858			S	C	8A
	725.40	39.6926216	-84.22617987			S	C	8A
Trip Blank for samples collected 7/25/2018.								
Equipment Blank collected 7/24/2018.								
Equipment Blank collected 7/25/2018.								
Equipment Blank collected 7/25/2018.								

WELL_LOG_T	DATE_INSTL	DPTH_INSTL	GWL_INSTL	GWElv_INSTL
M	07/15/83	65.00	41.00	699.61
M	09/22/81	60.00	32.00	697.68
M	09/09/81	57.00	25.50	706.48
M	09/24/81	65.00	32.00	697.88
M	09/21/81	65.00	35.50	689.51
M	09/23/81	76.00	41.00	686.54
M	09/28/81	70.00	37.50	689.16
M	11/13/89	47.00	20.87	704.53

FACILITY	FCID	SAMP_DATE	SAMP_SCHEM	COMMENT
Former Delphi Harrison Thermal Systems	OHD000817577	07/23/18	A	Annual Sampling Event - July 23-26, 2018
	OHD000817577	07/26/18	A	Groundwater level measurements
	OHD000817577	07/27/18	A	Groundwater level measurements

FACILITY	FCID	NAME	UNITS	DET_LMT	ACL	MCL	METH_CODE
Former Delphi Harrison T	OHD000817577	111Tri	ug/l	1.000			8260B
Former Delphi Harrison T	OHD000817577	11-DCEE	ug/l	1.000			8260B
Former Delphi Harrison T	OHD000817577	11DCA	ug/l	1.000			8260B
Former Delphi Harrison T	OHD000817577	Benzene	ug/l	1.000			8260B
Former Delphi Harrison T	OHD000817577	EthBenz	ug/l	1.000			8260B
Former Delphi Harrison T	OHD000817577	TetCEthy	ug/l	1.000			8260B
Former Delphi Harrison T	OHD000817577	Toluen	ug/l	1.000			8260B
Former Delphi Harrison T	OHD000817577	TCE	ug/l	1.000			8260B
Former Delphi Harrison T	OHD000817577	VC	ug/l	1.000			8260B
Former Delphi Harrison T	OHD000817577	Xylene	ug/l	2.000			8260B
Former Delphi Harrison T	OHD000817577	CisDCEE	ug/l	1.000			8260B
Former Delphi Harrison T	OHD000817577	TranDCEE	ug/l	1.000			8260B
Former Delphi Harrison T	OHD000817577	pH F	SU				field
Former Delphi Harrison T	OHD000817577	GWL	feet				field

FACILITY	FCID	WELL_ID	PARAMETER	SAMP_DATE	CHR_DATA	REAL_DATA	UNITS	DUP_CODE	REP_CODE	METH_CODE	DATA_QUAL
Former Delphi Harrison Thermal Systems	OHD000817577	HR-04	111Tri	07/24/2018	1.6	1.6	ug/L			SW8260B	
Former Delphi Harrison Thermal Systems	OHD000817577	HR-04	11DCA	07/24/2018	1.6	1.6	ug/L			SW8260B	
Former Delphi Harrison Thermal Systems	OHD000817577	HR-04	11DCEE	07/24/2018	ND<1.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	HR-04	Benzene	07/24/2018	ND<1.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	HR-04	CisDCEE	07/24/2018	0.45	0.45	ug/L			SW8260B	J
Former Delphi Harrison Thermal Systems	OHD000817577	HR-04	EthBenz	07/24/2018	ND<1.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	HR-04	TCE	07/24/2018	0.29	0.29	ug/L			SW8260B	J
Former Delphi Harrison Thermal Systems	OHD000817577	HR-04	TetCEthy	07/24/2018	0.16	0.16	ug/L			SW8260B	J
Former Delphi Harrison Thermal Systems	OHD000817577	HR-04	Toluen	07/24/2018	ND<1.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	HR-04	TranDCEE	07/24/2018	ND<1.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	HR-04	VC	07/24/2018	ND<1.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	HR-04	Xylene	07/24/2018	ND<2.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	HR-04	pH F	07/24/2018	7.1	7.1	feet			Field	
Former Delphi Harrison Thermal Systems	OHD000817577	HR-04	GWL	07/26/2018	710.89	710.89	feet			Field	
Former Delphi Harrison Thermal Systems	OHD000817577	HR-17	111Tri	07/25/2018	4.8	4.8	ug/L			SW8260B	
Former Delphi Harrison Thermal Systems	OHD000817577	HR-17	11DCA	07/25/2018	2.2	2.2	ug/L			SW8260B	
Former Delphi Harrison Thermal Systems	OHD000817577	HR-17	11DCEE	07/25/2018	ND<1.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	HR-17	Benzene	07/25/2018	ND<1.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	HR-17	CisDCEE	07/25/2018	1.1	1.1	ug/L			SW8260B	
Former Delphi Harrison Thermal Systems	OHD000817577	HR-17	EthBenz	07/25/2018	ND<1.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	HR-17	TCE	07/25/2018	0.92	0.92	ug/L			SW8260B	J
Former Delphi Harrison Thermal Systems	OHD000817577	HR-17	TetCEthy	07/25/2018	180	180	ug/L			SW8260B	
Former Delphi Harrison Thermal Systems	OHD000817577	HR-17	Toluen	07/25/2018	ND<1.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	HR-17	TranDCEE	07/25/2018	ND<1.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	HR-17	VC	07/25/2018	ND<1.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	HR-17	Xylene	07/25/2018	ND<2.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	HR-17	pH F	07/25/2018	6.83	6.83	SU			Field	
Former Delphi Harrison Thermal Systems	OHD000817577	HR-17	GWL	07/26/2018	709.20	709.20	feet			Field	
Former Delphi Harrison Thermal Systems	OHD000817577	W-2-N	111Tri	07/24/2018	0.38	0.38	ug/L			SW8260B	J
Former Delphi Harrison Thermal Systems	OHD000817577	W-2-N	11DCA	07/24/2018	0.31	0.31	ug/L			SW8260B	J
Former Delphi Harrison Thermal Systems	OHD000817577	W-2-N	11DCEE	07/24/2018	ND<1.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	W-2-N	Benzene	07/24/2018	ND<1.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	W-2-N	CisDCEE	07/24/2018	2.7	2.7	ug/L			SW8260B	
Former Delphi Harrison Thermal Systems	OHD000817577	W-2-N	EthBenz	07/24/2018	ND<1.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	W-2-N	TCE	07/24/2018	1.9	1.9	ug/L			SW8260B	
Former Delphi Harrison Thermal Systems	OHD000817577	W-2-N	TetCEthy	07/24/2018	ND<1.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	W-2-N	Toluen	07/24/2018	ND<1.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	W-2-N	TranDCEE	07/24/2018	0.28	0.28	ug/L			SW8260B	J
Former Delphi Harrison Thermal Systems	OHD000817577	W-2-N	VC	07/24/2018	ND<1.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	W-2-N	Xylene	07/24/2018	ND<2.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	W-2-N	pH F	07/26/2018	7.10	7.10	SU			Field	
Former Delphi Harrison Thermal Systems	OHD000817577	W-2-N	GWL	07/26/2018	710.40	710.40	feet			Field	
Former Delphi Harrison Thermal Systems	OHD000817577	W-2-S	111Tri	07/25/2018	0.98	0.98	ug/L			SW8260B	J
Former Delphi Harrison Thermal Systems	OHD000817577	W-2-S	11DCA	07/25/2018	0.83	0.83	ug/L			SW8260B	J
Former Delphi Harrison Thermal Systems	OHD000817577	W-2-S	11DCEE	07/25/2018	ND<1.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	W-2-S	Benzene	07/25/2018	ND<1.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	W-2-S	CisDCEE	07/25/2018	2.2	2.2	ug/L			SW8260B	
Former Delphi Harrison Thermal Systems	OHD000817577	W-2-S	EthBenz	07/25/2018	ND<1.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	W-2-S	TCE	07/25/2018	4.6	4.6	ug/L			SW8260B	
Former Delphi Harrison Thermal Systems	OHD000817577	W-2-S	TetCEthy	07/25/2018	2.0	2.0	ug/L			SW8260B	
Former Delphi Harrison Thermal Systems	OHD000817577	W-2-S	Toluen	07/25/2018	ND<1.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	W-2-S	TranDCEE	07/25/2018	0.32	0.32	ug/L			SW8260B	J
Former Delphi Harrison Thermal Systems	OHD000817577	W-2-S	VC	07/25/2018	ND<1.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	W-2-S	Xylene	07/25/2018	ND<2.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	W-2-S	pH F	07/25/2018	6.84	6.84	SU			Field	
Former Delphi Harrison Thermal Systems	OHD000817577	W-2-S	GWL	07/26/2018	708.3	708.3	feet			Field	
Former Delphi Harrison Thermal Systems	OHD000817577	W-3-N	111Tri	07/24/2018	ND<1.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	W-3-N	11DCA	07/24/2018	ND<1.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	W-3-N	11DCEE	07/24/2018	ND<1.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	W-3-N	Benzene	07/24/2018	ND<1.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	W-3-N	CisDCEE	07/24/2018	16	16	ug/L			SW8260B	
Former Delphi Harrison Thermal Systems	OHD000817577	W-3-N	EthBenz	07/24/2018	ND<1.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	W-3-N	TCE	07/24/2018	ND<1.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	W-3-N	TetCEthy	07/24/2018	ND<1.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	W-3-N	Toluen	07/24/2018	ND<1.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	W-3-N	TranDCEE	07/24/2018	0.33	0.33	ug/L			SW8260B	J
Former Delphi Harrison Thermal Systems	OHD000817577	W-3-N	VC	07/24/2018	1.1	1.1	ug/L			SW8260B	
Former Delphi Harrison Thermal Systems	OHD000817577	W-3-N	Xylene	07/24/2018	ND<2.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	W-3-N	pH F	07/24/2018	7.10	7.10	SU			Field	
Former Delphi Harrison Thermal Systems	OHD000817577	W-3-N	GWL	07/26/2018	710.45	710.45	feet			Field	
Former Delphi Harrison Thermal Systems	OHD000817577	W-3-S	111Tri	07/25/2018	0.87	0.87	ug/L			SW8260B	J
Former Delphi Harrison Thermal Systems	OHD000817577	W-3-S	11DCA	07/25/2018	0.61	0.61	ug/L			SW8260B	J
Former Delphi Harrison Thermal Systems	OHD000817577	W-3-S	11DCEE	07/25/2018	ND<1.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	W-3-S	Benzene	07/25/2018	ND<1.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	W-3-S	CisDCEE	07/25/2018	1.1	1.1	ug/L			SW8260B	
Former Delphi Harrison Thermal Systems	OHD000817577	W-3-S	EthBenz	07/25/2018	ND<1.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	W-3-S	TCE	07/25/2018	27	27	ug/L			SW8260B	
Former Delphi Harrison Thermal Systems	OHD000817577	W-3-S	TetCEthy	07/25/2018	19	19	ug/L			SW8260B	
Former Delphi Harrison Thermal Systems	OHD000817577	W-3-S	Toluen	07/25/2018	ND<1.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	W-3-S	TranDCEE	07/25/2018	0.19	0.19	ug/L			SW8260B	J
Former Delphi Harrison Thermal Systems	OHD000817577	W-3-S	VC	07/25/2018	ND<1.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	W-3-S	Xylene	07/25/2018	ND<2.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	W-3-S	pH F	07/25/2018	6.77	6.77	SU			Field	
Former Delphi Harrison Thermal Systems	OHD000817577	W-3-S	GWL	07/26/2018	708.39	708.39	feet			Field	
Former Delphi Harrison Thermal Systems	OHD000817577	W-4-N	111Tri	07/25/2018	ND<1.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	W-4-N	11DCA	07/25/2018	6.9	6.9	ug/L			SW8260B	
Former Delphi Harrison Thermal Systems	OHD000817577	W-4-N	11DCEE	07/25/2018	ND<1.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	W-4-N	Benzene	07/25/2018	ND<1.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	W-4-N	CisDCEE	07/25/2018	8.7	8.7	ug/L			SW8260B	
Former Delphi Harrison Thermal Systems	OHD000817577	W-4-N	EthBenz	07/25/2018	ND<1.0	ND	ug/L			SW8260B	U

FACILITY	FCID	WELL_ID	PARAMETER	SAMP_DATE	CHR_DATA	REAL_DATA	UNITS	DUP_CODE	REP_CODE	METH_CODE	DATA_QUAL
Former Delphi Harrison Thermal Systems	OHD000817577	W-4-N	TCE	07/25/2018	6.1	6.1	ug/L			SW8260B	
Former Delphi Harrison Thermal Systems	OHD000817577	W-4-N	TetCEthy	07/25/2018	0.26	0.26	ug/L			SW8260B	J
Former Delphi Harrison Thermal Systems	OHD000817577	W-4-N	Toluen	07/25/2018	ND<1.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	W-4-N	TranDCEE	07/25/2018	1.3	1.3	ug/L			SW8260B	
Former Delphi Harrison Thermal Systems	OHD000817577	W-4-N	VC	07/25/2018	ND<1.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	W-4-N	Xylene	07/25/2018	ND<2.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	W-4-N	pH F	07/25/2018	6.80	6.80	SU			Field	
Former Delphi Harrison Thermal Systems	OHD000817577	W-4-N	GWL	07/26/2018	710.55	710.55	feet			Field	
Former Delphi Harrison Thermal Systems	OHD000817577	W-4-S	111Tri	07/25/2018	1.8	1.8	ug/L			SW8260B	
Former Delphi Harrison Thermal Systems	OHD000817577	W-4-S	11DCA	07/25/2018	2.1	2.1	ug/L			SW8260B	
Former Delphi Harrison Thermal Systems	OHD000817577	W-4-S	11DCEE	07/25/2018	ND<1.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	W-4-S	Benzene	07/25/2018	ND<1.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	W-4-S	CisDCEE	07/25/2018	17	17	ug/L			SW8260B	
Former Delphi Harrison Thermal Systems	OHD000817577	W-4-S	EthBenz	07/25/2018	ND<1.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	W-4-S	TCE	07/25/2018	42	42	ug/L			SW8260B	
Former Delphi Harrison Thermal Systems	OHD000817577	W-4-S	TetCEthy	07/25/2018	68	68	ug/L			SW8260B	
Former Delphi Harrison Thermal Systems	OHD000817577	W-4-S	Toluen	07/25/2018	ND<1.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	W-4-S	TranDCEE	07/25/2018	1.5	1.5	ug/L			SW8260B	
Former Delphi Harrison Thermal Systems	OHD000817577	W-4-S	VC	07/25/2018	ND<1.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	W-4-S	Xylene	07/25/2018	ND<2.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	W-4-S	pH F	07/25/2018	6.78	6.78	SU			Field	
Former Delphi Harrison Thermal Systems	OHD000817577	W-4-S	GWL	07/26/2018	707.77	707.77	feet			Field	
Former Delphi Harrison Thermal Systems	OHD000817577	TRIP BLANK	111Tri	07/25/2018	ND<1.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	TRIP BLANK	11DCA	07/25/2018	ND<1.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	TRIP BLANK	11DCEE	07/25/2018	ND<1.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	TRIP BLANK	Benzene	07/25/2018	ND<1.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	TRIP BLANK	CisDCEE	07/25/2018	ND<1.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	TRIP BLANK	EthBenz	07/25/2018	ND<1.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	TRIP BLANK	TCE	07/25/2018	ND<1.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	TRIP BLANK	TetCEthy	07/25/2018	0.18	0.18	ug/L			SW8260B	J
Former Delphi Harrison Thermal Systems	OHD000817577	TRIP BLANK	Toluen	07/25/2018	ND<1.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	TRIP BLANK	TranDCEE	07/25/2018	ND<1.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	TRIP BLANK	VC	07/25/2018	ND<1.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	TRIP BLANK	Xylene	07/25/2018	ND<2.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	EB-04	111Tri	07/24/2018	ND<1.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	EB-04	11DCA	07/24/2018	ND<1.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	EB-04	11DCEE	07/24/2018	ND<1.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	EB-04	Benzene	07/24/2018	ND<1.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	EB-04	CisDCEE	07/24/2018	ND<1.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	EB-04	EthBenz	07/24/2018	ND<1.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	EB-04	TCE	07/24/2018	ND<1.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	EB-04	TetCEthy	07/24/2018	ND<1.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	EB-04	Toluen	07/24/2018	ND<1.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	EB-04	TranDCEE	07/24/2018	ND<1.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	EB-04	VC	07/24/2018	ND<1.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	EB-04	Xylene	07/24/2018	ND<2.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	EB-05	111Tri	07/25/2018	ND<1.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	EB-05	11DCA	07/25/2018	ND<1.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	EB-05	11DCEE	07/25/2018	ND<1.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	EB-05	Benzene	07/25/2018	ND<1.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	EB-05	CisDCEE	07/25/2018	ND<1.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	EB-05	EthBenz	07/25/2018	ND<1.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	EB-05	TCE	07/25/2018	ND<1.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	EB-05	TetCEthy	07/25/2018	ND<1.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	EB-05	Toluen	07/25/2018	ND<1.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	EB-05	TranDCEE	07/25/2018	ND<1.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	EB-05	VC	07/25/2018	ND<1.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	EB-05	Xylene	07/25/2018	ND<2.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	EB-06	111Tri	07/25/2018	ND<1.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	EB-06	11DCA	07/25/2018	ND<1.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	EB-06	11DCEE	07/25/2018	ND<1.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	EB-06	Benzene	07/25/2018	ND<1.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	EB-06	CisDCEE	07/25/2018	ND<1.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	EB-06	EthBenz	07/25/2018	ND<1.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	EB-06	TCE	07/25/2018	ND<1.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	EB-06	TetCEthy	07/25/2018	ND<1.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	EB-06	Toluen	07/25/2018	ND<1.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	EB-06	TranDCEE	07/25/2018	ND<1.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	EB-06	VC	07/25/2018	ND<1.0	ND	ug/L			SW8260B	U
Former Delphi Harrison Thermal Systems	OHD000817577	EB-06	Xylene	07/25/2018	ND<2.0	ND	ug/L			SW8260B	U

APPENDIX H

DN-13 Pumping Well Operation and Maintenance for 2018

DN-13 Operation and Maintenance

Background

Extraction well DN-13 is a lower aquifer extraction well that is owned by Montgomery County and operated by Montgomery County and RACER Trust. Well DN-13 was part of the former Greater Moraine Water System located in the former North Dryden Road well field. The well has been used in a Pump-to-Waste Program since March 1990 in cooperation with former GM Corporation/MLC until March 31, 2011 and has continued operation since that time in cooperation with the RACER Trust.

The interim measure for the lower aquifer at the Site consists of continued pumping of DN-13 to capture impacted groundwater. The outfall for DN-13 discharges to the Great Miami River and, as required by the NPDES permit regulated by the Ohio EPA, monthly sampling is performed at the well head and outfall to monitor water quality along with the discharge flow rate. Additional information regarding DN-13 capture is in Section 3.2 of the main report.

Per the operation and maintenance (O&M) plan, defined in the Extraction Well DN-13 Operation and Maintenance Memorandum (Arcadis, Inc. 2015a) and the RACER Trust Moraine Facilities: Extraction Well DN-13 Operation and Maintenance Status (Arcadis, Inc. 2015b), data collected monthly since April 2015 is used to evaluate and maintain the performance of extraction well DN-13 and includes the following:

1. Date and time of measurements
2. Electric motor power consumption
3. Flow meter readings (totalizer)
4. Flow control valve setting
5. Wellhead pressure
6. Water-level measurements including both manual depth-to-water measurements during pumping and high frequency water-level data from the pressure transducers deployed in well DN-13 and monitoring wells GM-14 (up-gradient), GM-9 (cross-gradient), and GM-19D (up-gradient, manual readings only).

The objective of the data collection and subsequent analysis is to recognize, in a timely manner, indications of deteriorating pump/motor and/or fouling/encrustation of the well screen through evaluation of specific performance criteria that will prompt appropriate action.

Data is analyzed and summarized in quarterly progress reports submitted to the U.S. EPA and the Ohio EPA. As outlined in the RACER Trust Moraine Facilities: Extraction Well DN-13 Operation and Maintenance Status (Arcadis, Inc. 2015b), Arcadis indicated the following items would be reported in the Annual Site-Wide Groundwater Monitoring Report:

- An annual data summary
- Corresponding figures and tables
- An evaluation and recommendations regarding future data collection and/or corrective actions
- Documentation of O&M activities/actions performed during the reporting year

As part of this annual performance summary, DN-13 groundwater elevation data are shown graphically on **Figure H-1**, and specific capacity (SC) and average monthly flow rate data are shown on **Figure H-2**. Annual average flow rate data for the year is summarized in Section 2.5.1.1 of the main report.

As part of the quarterly evaluations in 2018, corrective actions were prompted and are summarized below:

First Quarter

No questionable items were identified during the first quarterly evaluation. Extraction well DN-13 was operational for 100% of the first quarter. Well maintenance was not recommended or necessary.

Second Quarter

Extraction well DN-13 was operational for 88% of the second quarter. Downtime was associated with power outages occurring on April 3, 2019 (1%) and April 16, 2019 (11%). Well maintenance was not recommended or necessary.

Third Quarter

Extraction well DN-13 was operational for 86% of the third quarter. Downtime was associated with power outages occurring from August 7 through 14, 2018 (7.3%) and from September 25 through 30, 2018 (6.7%). The power outage beginning September 25, 2018 extended to October 1, 2018; however, the downtime percentages presented only represent downtime in the third quarter of 2018. Well maintenance and redevelopment were not recommended or necessary.

Fourth Quarter

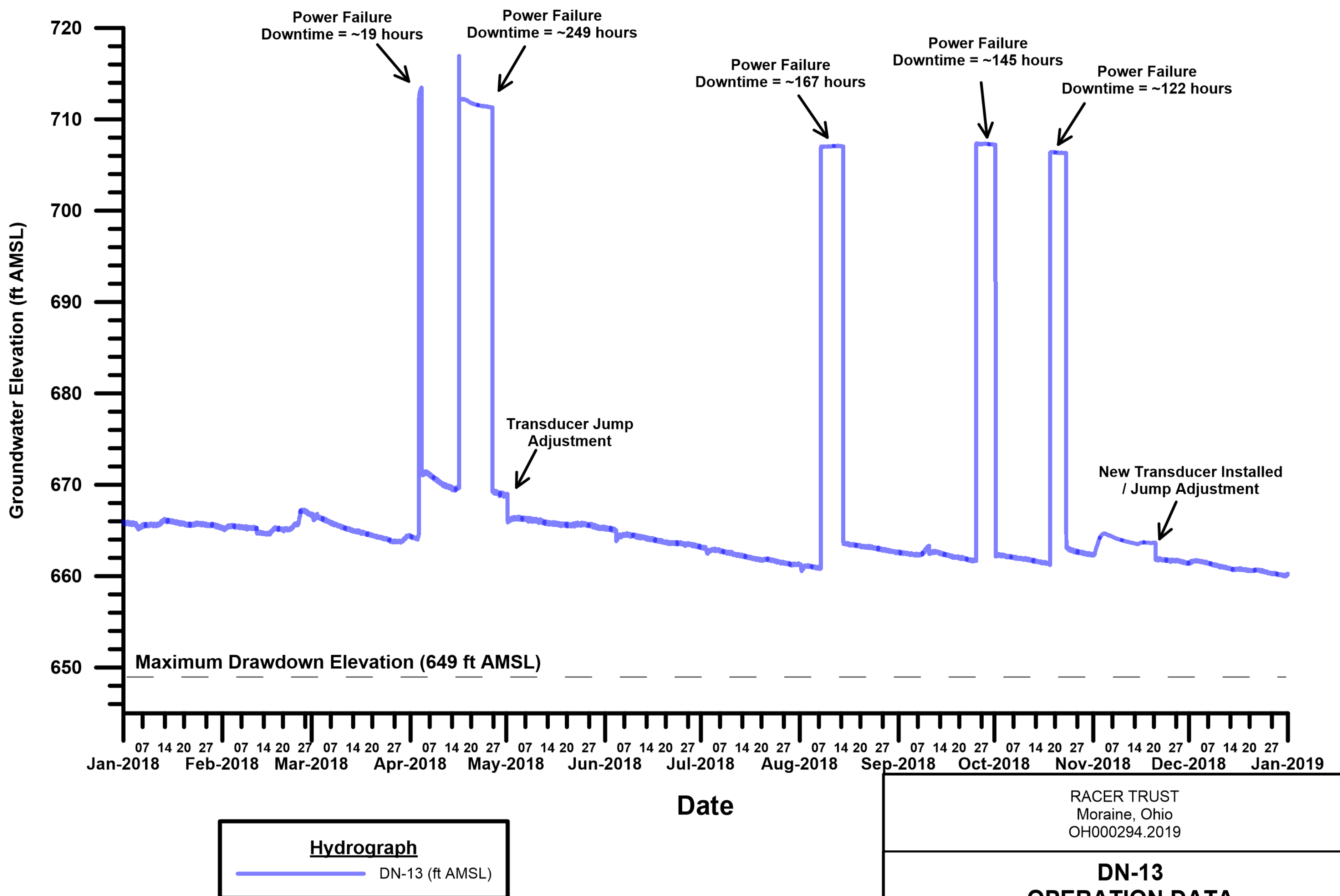
Extraction well DN-13 was operational for 94% of the fourth quarter. Downtime was associated with power outages occurring from October 1 through 2, 2018 (0.4%) and from October 18 through 23, 2018 (5.6%). Well maintenance and redevelopment were not recommended or necessary.

Specific capacity has slowly declined since the last redevelopment of extraction well DN-13 in May of 2017. Biofouling and scaling occur over time and decrease well performance. All parameters are within the recommended ranges. Well maintenance and redevelopment were not recommended or necessary.

References

Arcadis, Inc. 2015a. Extraction Well DN-13 Operation and Maintenance Memorandum, RACER Trust, Moraine, Ohio. April 8, 2015.

Arcadis, Inc. 2015b. RACER Trust Moraine Facilities: Extraction Well DN-13 Operation and Maintenance Status, RACER Trust, Moraine, Ohio. September 24, 2015.



Note: DN-13 Screen Elevation from 619 to 559 feet AMSL

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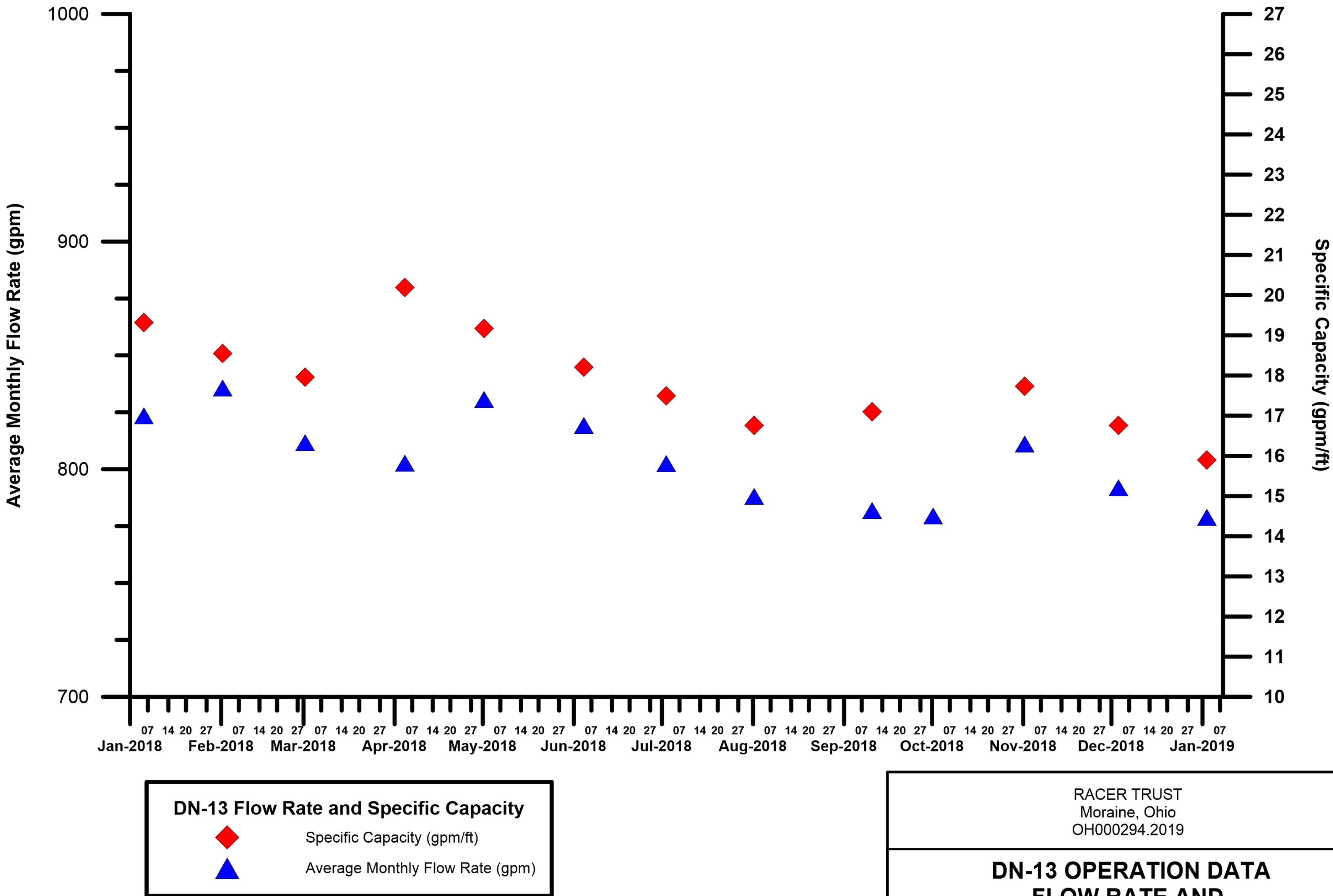
OH000294.2019

DN-13
OPERATION DATA
WATER-LEVEL ELEVATION

ARCADIS

FIGURE
G-1



Notes:
1. Specific Capacity in gallons per minute per foot (gpm/ft)
2. Flow Rate in gallons per minute (gpm)
3. Measurements are taken near the end or beginning of each reporting month

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OH000294.2019

DN-13 OPERATION DATA FLOW RATE AND SPECIFIC CAPACITY

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FIGURE
G-2

APPENDIX I

Capture Zone Trends

TABLES

Table I-1
Analytical Data
RACER Trust Moraine Facilities
Moraine, Ohio

ARCADIS Design & Consultancy for natural and built assets

GM-9		GM-15		GM-20D	
Date	μg/L	Date	μg/L	Date	μg/L
9/24/1999	15.80	9/24/1999	10.80	9/24/1999	0
10/3/2000	18.40	10/2/2000	9.60	10/3/2000	20.10
11/14/2001	11.14	11/14/2001	7.50	11/14/2001	8.54
9/30/2002	18.13	9/27/2002	8.10	9/30/2002	5.10
9/24/2003	22.31	9/22/2003	9.20	9/22/2003	16.49
9/21/2004	18.67	9/20/2004	9.00	9/21/2004	14.86
10/26/2005	17.43	10/26/2005	9.30	10/26/2005	14.43
9/25/2006	8.37	9/18/2006	9.10	9/26/2006	13.61
9/19/2007	20.39	9/25/2007	7.70	9/19/2007	11.80
9/24/2008	19.20	9/30/2008	8.09	9/25/2008	9.65
NS	NS	11/13/2009	8.70	11/13/2009	10.00
9/22/2010	18.81	9/23/2010	8.70	9/22/2010	9.02
9/28/2011	14.50	9/29/2011	6.90	9/28/2011	7.20
9/26/2012	17.34	9/5/2012	10.14	9/5/2012	3.70
9/25/2013	20.84	9/25/2013	7.79	9/25/2013	6.92
10/6/2014	19.13	10/7/2014	8.80	10/6/2014	5.12
12/11/2015	13.18	11/4/2015	17.34	11/3/2015	4.10
8/17/2016	14.00	8/18/2016	18.04	8/19/2016	2.80
8/15/2017	12.84	8/16/2017	16.85	8/15/2017	3.23
7/24/2018	9.77	7/24/2018	15.46	7/24/2018	1.63

ABBREVIATIONS:

μg/L = micrograms per liter

NS: Not sampled

NOTES:

1. All detected concentrations of individual VOC constituents were included in the sum.

2. Field duplicate results were not included.

Table I-2
Summary of Statistics and Trend Results
RACER Trust Moraine Facilities
Moraine, Ohio

ARCADIS Design & Consultancy for natural and built assets

Well ID	Analyte	Date Range	Figure	n	Detected Results Summary (µg/L)				Mann-Kendall Test			Sen's Estimator of Slope	
					Range	Mean	SD	CV	Result	P-Value	S Value	Result	Slope (Units/Day)
Full Data Set													
GM-09	Total VOCs	09/99 - 07/18	I-1	19	8.4 - 22.3	16.3	3.9	0.24	NST	0.147	-31	NST	-0.000536
GM-15	Total VOCs	09/99 - 07/18	I-2	20	6.9 - 18	10.4	3.5	0.34	NST	0.149	33	NST	0.000353
GM-20D	Total VOCs	09/99 - 07/18	I-3	20	0 - 20.1	8.4	5.4	0.64	DWN	<0.001	-104	DWN	-0.00260
After July 2008													
GM-09	Total VOCs	09/08 - 07/18	I-4	10	9.8 - 20.8	16	3.6	0.23	DWN	0.008	-27	DWN	-0.00235
GM-15	Total VOCs	09/08 - 07/18	I-5	11	6.9 - 18	11.5	4.4	0.38	UP	0.018	28	UP	0.00243
GM-20D	Total VOCs	09/08 - 07/18	I-6	11	1.6 - 10	5.8	2.9	0.50	DWN	<0.001	-45	DWN	-0.00239

ABBREVIATIONS:

CV = coefficient of variation
mean = arithmetic mean
n = sample size
SD = standard deviation

NST = no significant trend
DWN = downward trend
UP = upward trend

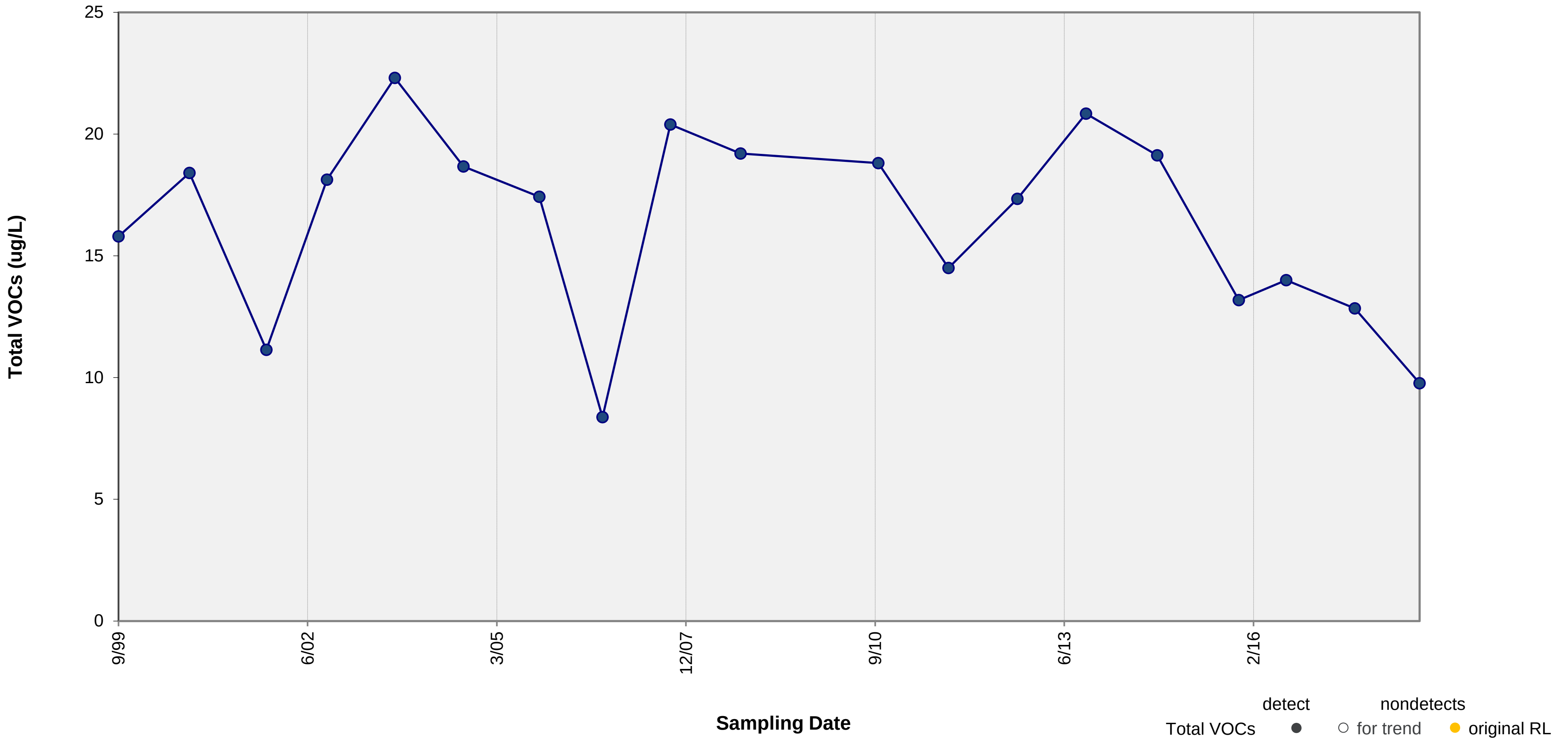
NOTES:

1. All analytical results are in µg/L. Result values less than 10 are reported to 2 significant figures; values greater than 10 are reported to 3 significant figures. P-values are reported to 3 decimal places.
2. Total VOCs represent the sum of all detected concentrations of individual VOC constituents.
3. Field duplicate results were not included.
4. Statistical testing of the null hypothesis: no significant trend (slope = 0) and the alternative hypothesis: significant trend (slope ≠ 0) with 95% confidence.

REFERENCE:

USEPA. 2009. Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities. Unified Guidance. EPA/530/R-09/007, 2009.

FIGURES



Results of Mann-Kendall Test for Trend: **No Significant Trend**

p value = 0.147 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **No Significant Trend**

Median Slope Estimate = -5.4E-04 ug/L Per Day

95% Confidence Interval = -1.5E-03 to 3.2E-04 ug/L Per Day

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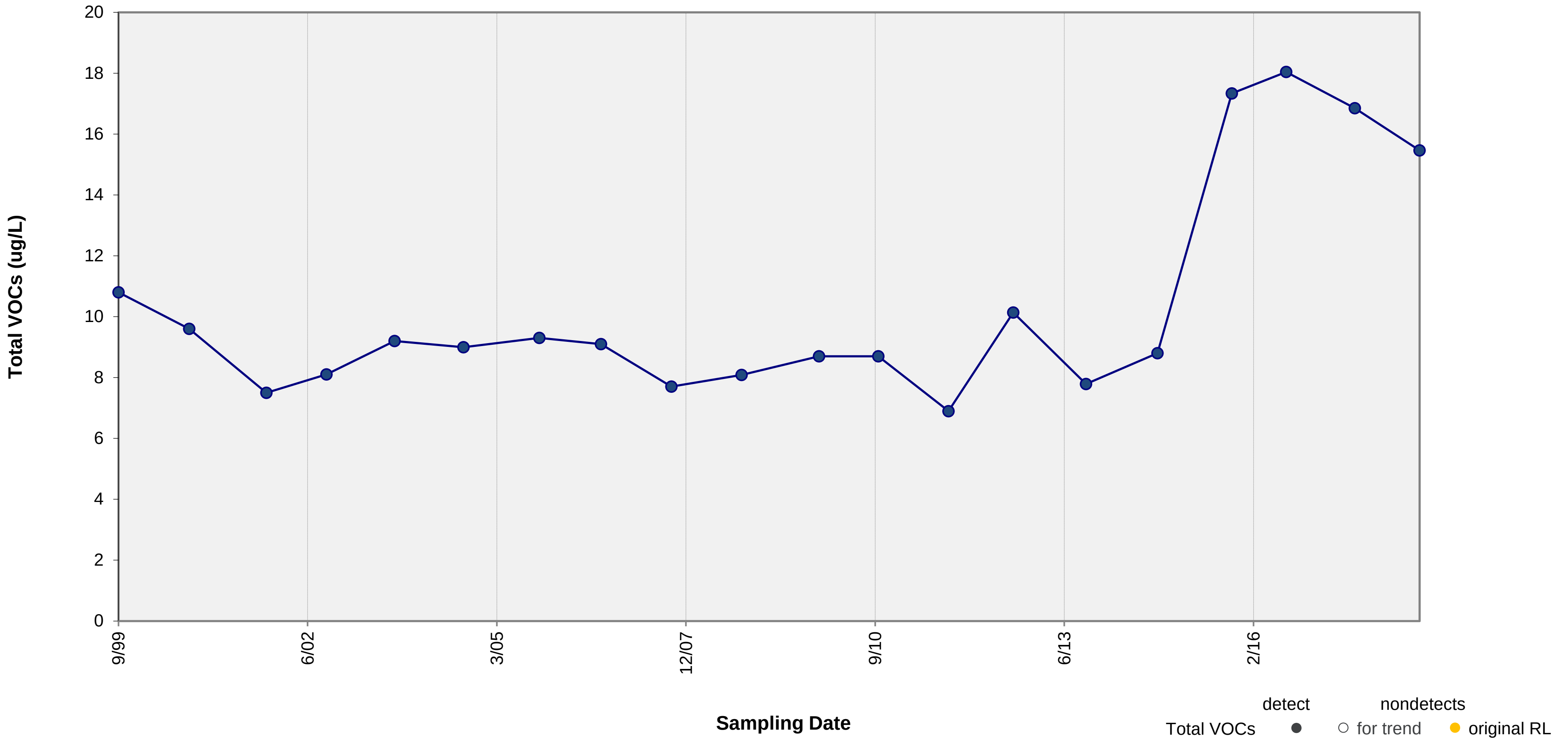
Concentration vs. Time Plot – Total VOCs in Well GM-09

RACER Trust, Moraine, Ohio

Figure I-1



Results of Mann-Kendall Test for Trend: **No Significant Trend**

p value = 0.149 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **No Significant Trend**

Median Slope Estimate = 3.5E-04 ug/L Per Day

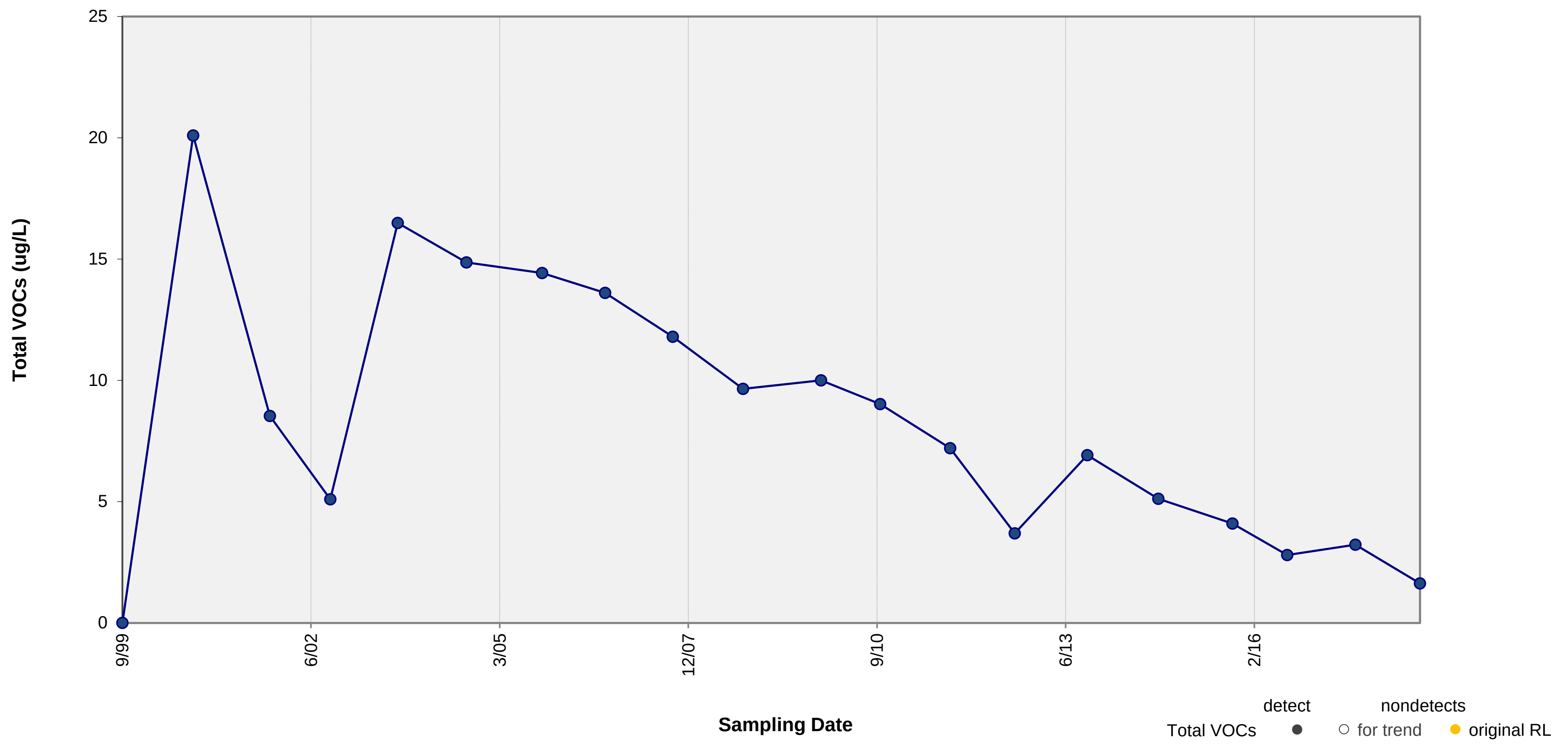
95% Confidence Interval = -1.7E-04 to 1.4E-03 ug/L Per Day

ARCADIS

Concentration vs. Time Plot – Total VOCs in Well GM-15

RACER Trust, Moraine, Ohio

Figure I-2



Results of Mann-Kendall Test for Trend: **DECREASING TREND**

p value = <0.001 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **DECREASING TREND**

Median Slope Estimate = -2.6E-03 ug/L Per Day

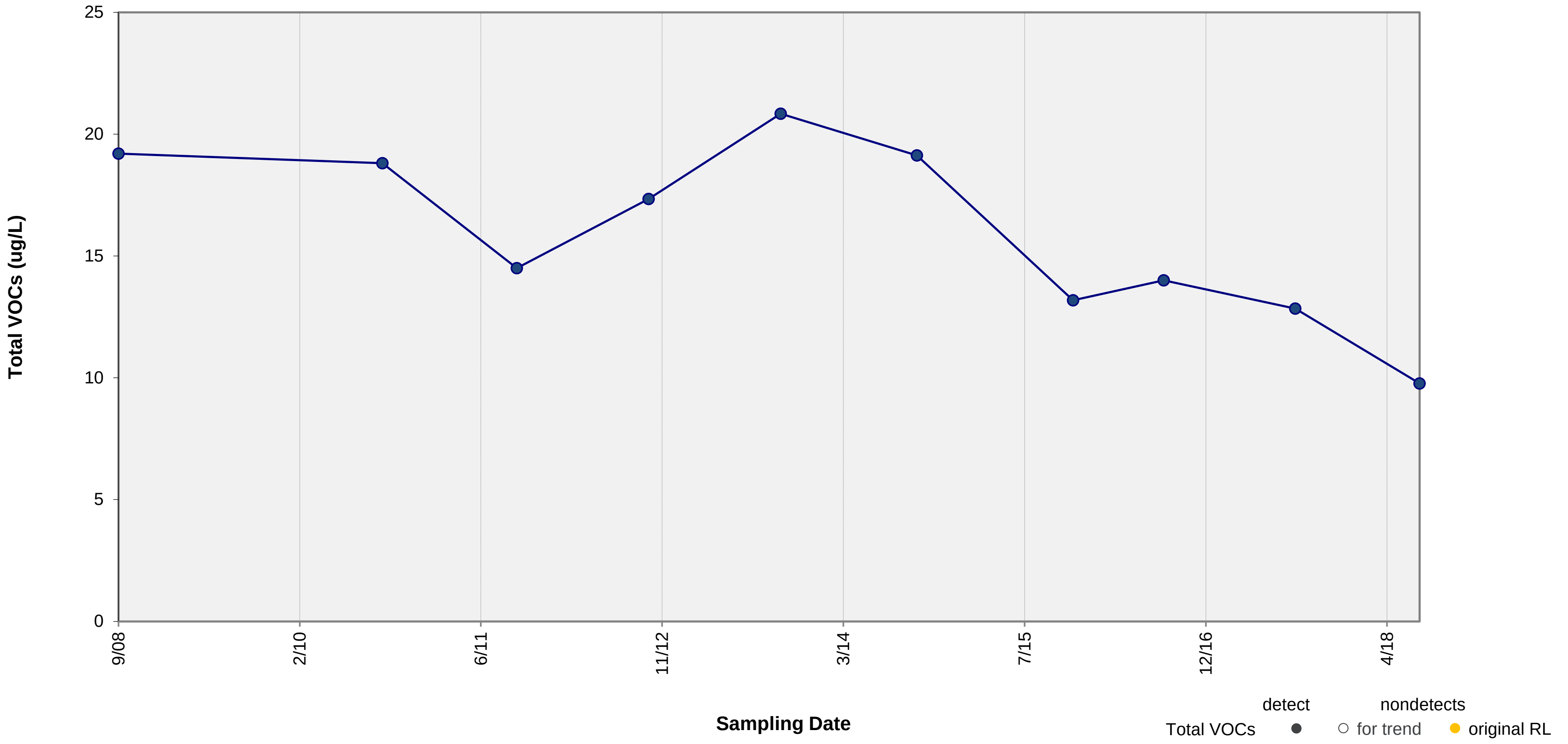
95% Confidence Interval = -2.8E-03 to -1.7E-03 ug/L Per Day

ARCADIS

Concentration vs. Time Plot – Total VOCs in Well GM-20D

RACER Trust, Moraine, Ohio

Figure I-3



Results of Mann-Kendall Test for Trend: **DECREASING TREND**

p value = 0.008 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **DECREASING TREND**

Median Slope Estimate = -2.4E-03 ug/L Per Day

95% Confidence Interval = -5.0E-03 to -5.5E-04 ug/L Per Day

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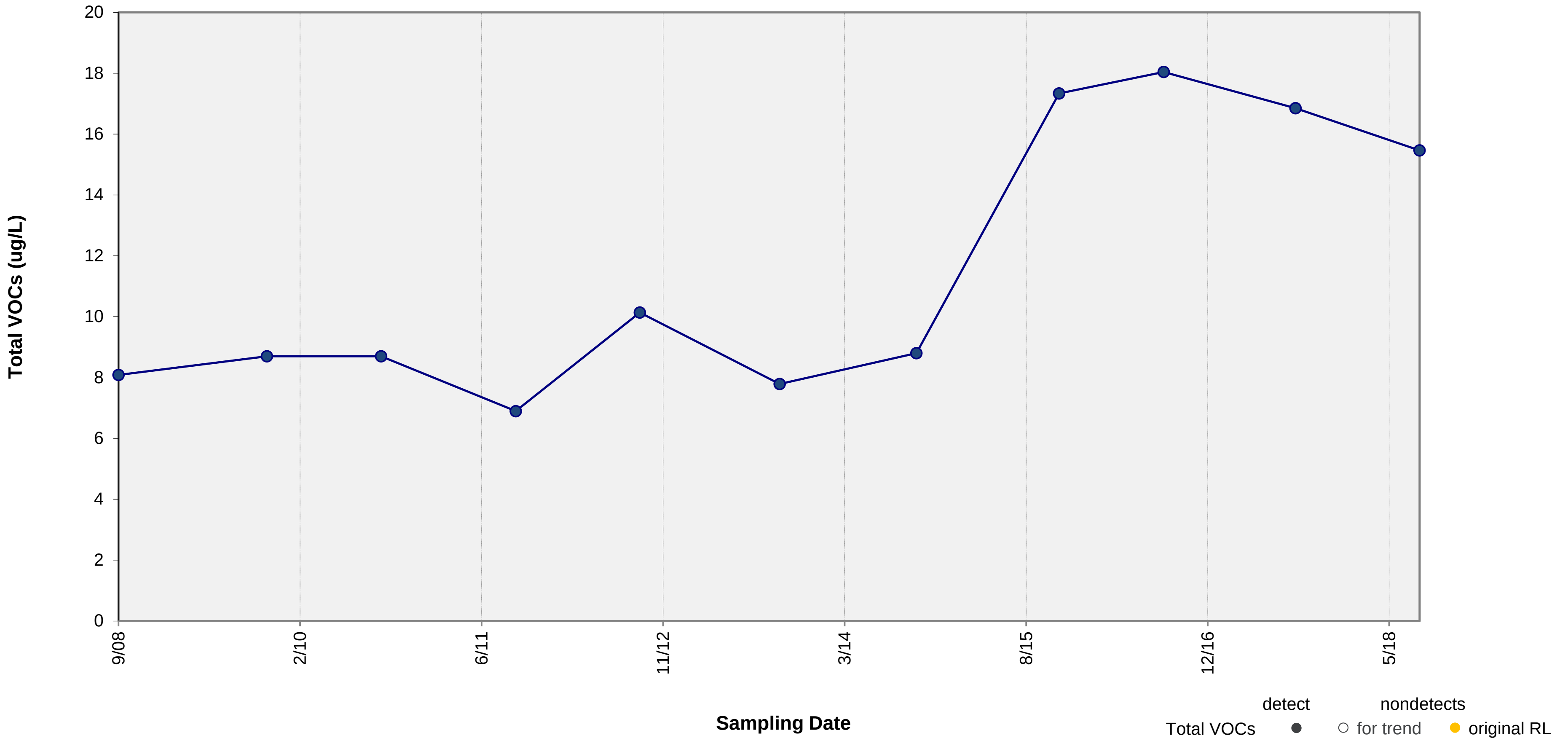
Concentration vs. Time Plot – Total VOCs in Well GM-09 (After July 2008)

RACER Trust, Moraine, Ohio

Figure I-4



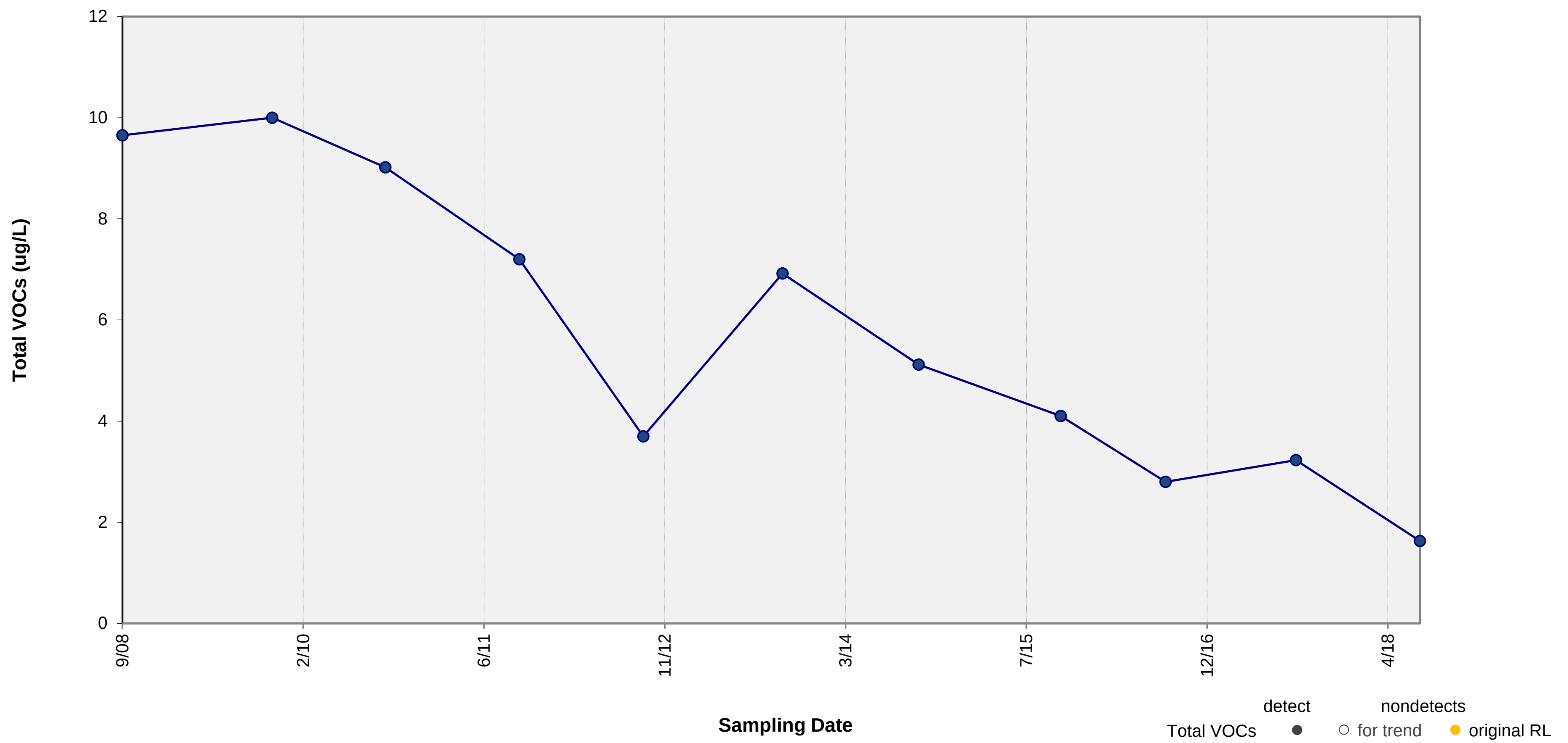
Results of Mann-Kendall Test for Trend: **INCREASING TREND**
p value = 0.018 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **INCREASING TREND**
Median Slope Estimate = 2.4E-03 ug/L Per Day
95% Confidence Interval = 5.3E-05 to 4.3E-03 ug/L Per Day

ARCADIS

Concentration vs. Time Plot – Total VOCs in Well GM-15 (After July 2008)
RACER Trust, Moraine, Ohio

Figure I-5



Results of Mann-Kendall Test for Trend: **DECREASING TREND**

p value = <0.001 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

Results of Sen's Estimator of Slope: **DECREASING TREND**

Median Slope Estimate = -2.4E-03 ug/L Per Day

95% Confidence Interval = -2.9E-03 to -1.9E-03 ug/L Per Day

ARCADIS

Concentration vs. Time Plot – Total VOCs in Well GM-20D (After July 2008)

RACER Trust, Moraine, Ohio

Figure I-6