Ms. Christine Matlock
Senior Environmental Engineer
Michigan Department of Environment, Great Lakes, and Energy
525 West Allegan Street
P.O. Box 30473
Lansing, MI 48909-7973

Arcadis of Michigan, LLC
28550 Cabot Drive
Suite 500
Novi
Michigan 48377
Phone: 248 994 2240
www.arcadis.com

Date: February 3, 2022
Our Ref: 30112892

Subject: MW-14-58R Area Data Summary and Proposed Additional Work,
RACER Trust Plant 2, Lansing, Michigan

Dear Christine,

On behalf of Revitalizing Auto Communities Environmental Response (RACER) Trust, Arcadis has completed additional characterization along the west property boundary of Plant 2 (Site) located in Lansing, Michigan. The objective of the investigation was to characterize 1,4-dioxane impacts in groundwater detected in and around the replacement monitoring well MW-14-58R. The location of Plant 2 and the area of the investigation are shown on **Figure 1**. The following provides a summary of work completed to date to characterize the MW-14-58R area.

Area 4 (AOI 2-8) Background

Monitoring well MW-14-58R is in Area 4 (AOI 2-8), which is a former outdoor waste storage area. According to the Current Conditions Report (CCR; Arcadis 2008), AOI 2-8 was initially identified on the Plant 2 Part A permit application in 1980; however, subsequent documents do not mention this unit. The unit was a 10X10 ft concrete paved area located northwest of Building 241. No secondary containment existed at the unit, and two drains were located near the unit and drained to the storm sewer system and ultimately to the Plant 3 Clarifier. The unit began operation sometime before 1980 and ceased in 1982.

The former Adams Plating Company (APC) Superfund site is located along South Rosemary Avenue to the northwest of Plant 2 and is currently managed and regulated under the United States Environmental Protection Agency (USEPA) Region 5 Superfund Program. Electroplating operations were performed at the APC Site from 1964 until it was destroyed by fire in 2010. Remedial action at the APC Site included excavation of former tanks and shallow soil impacted by volatile organic compounds (VOCs) and metals. Subsequent investigations have shown impacts to shallow groundwater, including metals; VOCs; 1,4-dioxane; and per- and polyfluoroalkyl substances (PFAS). Our understanding is 1,4-dioxane has not been sampled at the APC site since 2016. In 2016, concentrations of 1,4-dioxane ranged from less than 10 micrograms per liter (µg/L) up to 1,700 µg/L at monitoring well MW-09D (screened 15-20 ft bgs) located near the former APC building. The lateral extent of the perched 1,4-dioxane at the APC Site has not been delineated to EGLE Part 201 Criteria, and 1,4-dioxane impacts to the perched zone extend east toward RACER property (Arcadis 2021). Commingling of impacts from the APC Site and RACER Site may occur within the perched zone and complicates delineation of Site-related 1,4-dioxane along the western Plant 2 property boundary.

Monitoring well MW-14-58 was installed in 2014 at Area 4 following the initial investigation activities in 2014. Monitoring well MW-14-58R was installed in October 2021 as a replacement well following damage to MW-14-58 that occurred in 2021. Monitoring well MW-14-58 was last sampled for 1,4-dioxane in June 2020 and at that time the 1,4-dioxane concentration was 38 micrograms per liter (µg/L). Following installation of the replacement well MW-14-58R, a sample collected in December 2021 indicated a 1,4-dioxane concentration of 430 µg/L, followed by 520 µg/L in February 2022. The 1,4-dioxane concentration at MW-14-58R has recently decreased to 410 µg/L in April 2022, 187 µg/L in September 2022, and 173 µg/L in October 2022. Both monitoring wells MW-14-58 and MW-14-58R were/are installed within the perched zone and screened at a depth of 22 to 27 ft bgs within a zone of saturated medium sand. The boring logs for both wells are included as part of **Attachment 1**.

Site Geology and Hydrogeology

The geology of the Site is complex, consisting of an interbedded series of glacially-derived sediments. The geology of the Site is divided into six general hydrostratigraphic units. From shallow to deep, these units include the shallow fill, interbedded zone, glacial till (confining unit), deep overburden, weathered bedrock, and bedrock units. The shallow fill and interbedded zones collectively make up the perched aquifer and are underlain by the glacial till confining unit. The shallow fill is typically 1 to 10 feet thick, consisting of sand and gravel mixtures brought to the Site as part of previous construction activities. The shallow fill can be saturated when present below 5 feet below ground surface (ft bgs) and include localized areas of unconfined perched groundwater. The interbedded zone is generally encountered between 5 and 30 ft bgs and typically composed of interbedded soft clay, glacial tills with isolated lenses of silt and sand. Sand and silt lenses are typically saturated, forming thin discontinuous zones of perched groundwater. Near Area 4, a relatively consistent sand zone is present at depths of approximately 25 to 30 ft bgs and appears to be the primary conduit for 1,4-dioxane migration in this area. Based on the surrounding boring logs, the general extent of this sand seam is illustrated on **Figure 1**. The underlying glacial till depth and thickness is variable but typically encountered between 25 and 45 ft bgs. It is composed of a compact, dense silt/sand/gravel/clay mix that creates a confining unit and barrier to most vertical migration. The glacial till separates the perched water from the saturated deep overburden, weathered bedrock, and bedrock aquifer zones.

Two cross-sections are included to illustrate the local geologic conditions of the perched zone. Cross-section A-A' (**Figure 2**) illustrates the geology on a west to east transect extending from off-site to on-site through Area 4. Cross-section B-B' (**Figure 3**) is a southwest to northeast transect along the western Plant 2 property boundary. Both cross-sections show the interbedded sand and clays of the perched zone and a generally consistent sand seam at depths between 25 and 30 ft bgs, coincident with the screened interval of MW-14-58R.

There is a large 60-inch sanitary main that runs north-south along the east side of Rosemary Avenue. The sanitary main is installed above the sand zone at a depth of approximately 10-20 ft below grade and sanitary wastewater flows by gravity within the main to the north. The depth to local perched groundwater on-site is approximately 10 to 13 ft bgs. The groundwater gradient parallels the sanitary main with the apparent groundwater flow to the north. The perched groundwater elevation and apparent flow direction may be influenced by the sanitary main if the fill material placed around the main creates a preferential pathway for groundwater migration.

Two groundwater gauging events were completed in September and October 2022. Groundwater elevations are summarized on **Table 1** and groundwater elevation contour maps are included as **Figure 4**.

Site Activities

Additional investigation work was completed between 2021 and 2022 to characterize soil and groundwater in the vicinity of MW-14-58R. Four vertical aquifer profile (VAP) borings were completed adjacent to MW-14-58R, and four new monitoring wells were installed near the Plant 2 property boundary. All soil boring logs are included in **Attachment 1**. All groundwater samples were compared to the Michigan Part 201 Drinking Water (DW) Criteria for 1,4-dioxane (7.2 µg/L) as a frame of reference. The location of the new soil borings and new and existing monitoring wells are presented on **Figure 1**. Groundwater and soil analytical results are summarized in **Tables 2** and **3** and included on **Figure 5**.

The sequence of site activities was as follows:

- June 9, 2020: The last groundwater sample analyzed for 1,4-dioxane was collected from MW-14-58 and contained a concentration of 38 µg/L.
- October 27, 2021: MW-14-58R was installed as a replacement well to MW-14-58, which had been damaged during on-site activities. Both wells were screened 22-27 feet bgs and the geology encountered at both locations were similar. Boring logs for both wells are provided in **Attachment 1**.
- December 1, 2021: The first groundwater sample was collected from MW-14-58R and analyzed for 1,4-dioxane and contained a concentration of 430 µg/L.
- February 10, 2022: MW-14-58R was resampled and analyzed for 1,4-dioxane and contained a concentration of 520 µg/L.
- March 22 - 23, 2022: Four step-out VAP borings were completed near MW-14-58R.
- April 6, 2022: Groundwater from MW-14-58R was sampled and contained a 1,4-dioxane concentration of 410 µg/L. Perimeter well MW-22-153 (located at previous step-out VAP location SB-A4-MY55) was installed, sampled and contained a 1,4-dioxane at a concentration of 92 µg/L.
- September 7 - 8, 2022: Installation of MW-22-155, MW-22-156, and MW-22-157 and step-out boring SB-A4-MX60.
- September 12, 2022: Groundwater gauging and sampling event. Groundwater sample collected from MW-14-58R and analyzed for 1,4-dioxane and contained a concentration of 187 µg/L.
- October 14, 2022: Groundwater gauging event. Groundwater sample collected from MW-14-58R and analyzed for 1,4-dioxane and contained a concentration of 173 µg/L.

VAP Sampling

In March 2022, a total of four step-out VAP borings were completed using direct-push (DPT) drilling methods. The borings were completed around MW-14-58R and included SB-A4-MV60, SB-A4-MY55, SB-A4-MY63, and SB-A4-NB60. All VAP boring locations are shown on **Figure 1**. The borings were completed to a maximum depth of 35 ft below grade, and two groundwater samples were collected at each location, biased to sandy intervals, to further characterize 1,4-dioxane in groundwater.

At each VAP boring location:

- Borings were advanced to a total depth of approximately 30 to 35 feet bgs.

- Continuous soil cores were obtained from the ground surface to the target depth at each boring location. An Arcadis geologist logged and described the soils in the field in accordance with the Arcadis Soil Description Technical Guidance Instruction (TGI). Soil boring logs are included as **Attachment 1**.
- VAP groundwater samples were collected biased to sandy zones using a Geoprobe® screen point sampling device and a peristaltic pump.
- The VAP boring locations were abandoned with bentonite to grade.

Groundwater samples were submitted to Merit Laboratories (Merit) for 1,4-dioxane analysis using USEPA Method SW-846 8260B SIM. Groundwater analytical laboratory reports are included in **Attachment 2** and a summary of all analytical data is included in **Table 2** and shown on **Figure 5** and on the cross-sections (**Figures 2** and **3**).

The VAP boring groundwater samples were generally collected from sand seams located at approximately 20 feet below grade and the consistent sand seam encountered between 25 and 30 ft bgs. The results of the VAP sampling show that, at each boring, the deeper interval had higher concentrations of 1,4-dioxane ranging between 32 and 91 µg/L.

Soil Sampling

Based on the March VAP analytical results, one soil boring (SB-A4-MX60) was completed adjacent to MW-14-58R in September 2022 to assess potential sources of 1,4-dioxane in the vadose zone near MW-14-58R. The boring was completed via DPT to a depth of 15 ft bgs. Five soil samples were collected at nominal 2 ft intervals below the concrete slab (~1' bgs) to a depth of 12 ft bgs. Samples were submitted to Merit for analysis of 1,4-dioxane by USEPA Method SW-846 8260B SIM and VOCs by USEPA Method SW-846 8260C with analysis. Soil analytical results are summarized on **Table 3**. No detections of 1,4-dioxane or VOCs were observed in the five soil samples, indicating the source of the 1,4-dioxane at MW-14-58R was not related to overlying vadose zone soil impacts at this location.

Monitoring Well Installation and Sampling

Based on the analytical results from the March 2022 VAP borings, a perimeter well (MW-22-153) was installed via hollow-stem auger within the perched zone at previous step-out VAP location SB-A4-MY55 to monitor 1,4-dioxane at the property boundary. Three additional perched monitoring wells MW-22-155, MW-22-156, and MW-22-157 were installed via hollow-stem auger to the north, south, and off-site to the west of MW-22-153, respectively, in September 2022. These wells were installed to assist with delineation (off-site), characterize the extent of perched 1,4-dioxane impacts, and to support evaluation of local perched groundwater gradient. All monitoring well locations are shown on **Figure 1** with analytical results posted on **Figure 5** and on the cross-sections (**Figures 2** and **3**).

At each monitoring well location continuous soil cores were obtained from the ground surface to a maximum depth of 30 ft bgs. An Arcadis geologist logged and described the soils in accordance with the Arcadis Soil Description TGI. Soil Boring Logs were generated based on the field descriptions and are included in **Attachment 1**. The monitoring wells were installed to a maximum depth of 30.5 feet below grade and constructed with a 5-foot stainless-steel wire-wrapped 0.010-slot screen and 2-inch diameter PVC riser. The borings were backfilled with bentonite at the base of the borehole beneath the screen interval. An appropriate sand pack was placed around each screen interval to a depth of 2 feet above the well screen followed by bentonite grout to grade. The wells were completed with a steel 8-inch diameter flush-mount cover and locking cap. Soil boring log and well

construction details can be found in **Attachment 1**. The new monitoring wells were developed using surge-and-purge methods until reasonably free of fine-grained material.

Following installation and development, monitoring wells MW-14-58R, MW-22-153, MW-22-155, MW-22-156, and MW-22-157 were surveyed. All five wells were sampled in September and October 2022 using low-flow sampling methods. Groundwater samples were submitted to Merit for 1,4-dioxane analysis using USEPA Method SW-846 8260B SIM. Groundwater analytical laboratory reports are included in **Attachment 2** and groundwater sampling field records are included in **Attachment 3**. A summary of all groundwater analytical data is included in **Table 2** and summarized on **Figure 5**. All four of the new monitoring wells will be integrated into the revised Interim Groundwater Monitoring Plan for 1,4-dioxane monitoring (Arcadis 2022).

Discussion

The additional characterization completed in the vicinity of MW-14-58R confirmed that the extent of elevated 1,4-dioxane in groundwater in this area is not limited to the immediate vicinity of MW-14-58R. The new monitoring wells were sampled twice, in September and October 2022. To the south (MW-22-156) and west (MW-22-153), 1,4-dioxane exceeded the residential DW criteria but were generally lower than the concentrations observed at MW-14-58R. To the west of Rosemary Avenue, at off-site monitoring well MW-22-157, the concentration of 1,4-dioxane is less than the DW Criteria (3 µg/L). The northern, and apparent downgradient well, MW-22-155 had 1,4-dioxane concentrations of 410 µg/L and 400 µg/L in September and October 2022, respectively.

As noted above, the groundwater elevation measured using the new monitoring wells was about 10 to 13 ft bgs on-site and suggests a northerly gradient parallel to the sanitary main installed along Rosemary Avenue (**Figure 4**). This result suggest 1,4-dioxane is migrating south to north and may be influenced by the sanitary main alignment. If the sanitary main is surrounded by relatively more permeable fill material, it may act as a groundwater sink and create a shallow hydraulic boundary between the RACER site and locations further west.

The source of the 1,4-dioxane is unknown. Based on the data collected to date, there does not appear to be a source of 1,4-dioxane associated with Area 4. The depth of groundwater impact and the northerly groundwater gradient suggest 1,4-dioxane is migrating into the MW-14-58R area from an unknown source located to the south. However, based on the currently available data, the 1,4-dioxane concentration increases from south to the north, which is not consistent with the source being south of MW-14-58R. Currently available information suggests source of the 1,4-dioxane could be associated with the RACER site or could be associated with an off-site source entering and migrating along the Rosemary Avenue sanitary corridor.

Recommendations

Groundwater 1,4-dioxane concentrations appear to be decreasing in the monitoring wells within the area (e.g., MW-14-58R: 430, 520, 410, 187, 173 µg/L). The new monitoring wells will be sampled during the first quarter 2023 groundwater sampling event, scheduled for February 2023. Based on the results of the additional sampling, and further discussion with EGLE, additional investigation activities will be considered at that time. Additional investigation may include, but not limited to, monitoring well installation further north of MW-22-155 and to the south of MW-22-156.

If you should have any questions regarding the enclosed data, please do not hesitate to contact David Favero at dfavero@racertrust.com or at (734) 879-9525 or Patrick Curry at patrick.curry@arcadis.com or at (810) 225-1926.

Ms. Christine Matlock
EGLE
February 3, 2022

Sincerely,
Arcadis of Michigan, LLC

Patrick Curry, PG, CPG
Technical Expert / Associate Vice President
Email: patrick.curry@arcadis.com
Direct Line: (810) 225-1926

CC. Dave Favero, RACER Trust
John McCabe, EGLE
Joe Rogers, EGLE
Shaun Shields, EGLE

Enclosures:

Table 1 – Summary of Groundwater Elevations
Table 2 – Summary of Groundwater Analytical Results
Table 3 – Summary of Soil Analytical Results
Figure 1 – Area of Interest Map
Figure 2 – Cross-Section A-A'
Figure 3 – Cross-Section B-B'
Figure 4 – Groundwater Elevation Contour Map
Figure 5 – Groundwater Analytical Map
Attachment 1 – Soil Boring Logs
Attachment 2 – Analytical Reports
Attachment 3 – Groundwater Sampling Logs

References:

Arcadis. 2008. Current Conditions Report (CCR) for GM Lansing Plants 2, 3 and 6. Lansing, Michigan. August 1.

Arcadis. 2013. Resource Conservation and Recovery Act Facility Investigation (RFI) Phase 2 Activities Summary Report. RACER Trust, Lansing, Michigan, Plants 2, 3, and 6, Industrial Land. April 4.

Arcadis. 2021. Lower 1,4-Dioxane Conceptual Site Model. Lansing Industrial Land, Lansing, Michigan. January 6.

Arcadis. 2022. Revised Interim Groundwater Monitoring Work Plan - 2022. RACER Trust, Plants 2, 3, &6, Lansing, Michigan. December 8.

TABLES

Table 1 - Summary of Groundwater Elevations
2022 MW-14-58R Investigation Report
RACER Trust Plant 2 - Lansing, Michigan

Well ID	Date Collected	Screened Interval Top (feet bgs)	Screened Interval Bottom (feet bgs)	Reference Elevation (TOC)	Ground Surface Elevation (feet msl)	Total Well Depth (feet below TOC)	Depth to Water (feet below TOC)	Groundwater Elevation (feet msl)
MW-14-58R	5/31/2022	22.0	27.0	862.93	860.09	29.63	9.75	853.18
MW-14-58R	9/12/2022	22.0	27.0	862.93	860.09	29.60	13.30	849.63
MW-14-58R	10/14/2022	22.0	27.0	862.93	860.09	29.61	13.63	849.30
MW-22-153	5/31/2022	25.0	30.0	860.43	859.44	31.15	10.25	850.18
MW-22-153	9/12/2022	25.0	30.0	860.43	859.44	31.17	10.80	849.63
MW-22-153	10/14/2022	25.0	30.0	860.43	859.44	31.18	11.12	849.31
MW-22-155	9/12/2022	25.5	30.5	861.58	858.99	31.50	12.08	849.50
MW-22-155	10/14/2022	25.5	30.5	861.58	858.99	31.43	12.41	849.17
MW-22-156	9/12/2022	23.0	28.0	863.07	860.13	31.06	13.29	849.78
MW-22-156	10/14/2022	23.0	28.0	863.07	860.13	31.06	13.57	849.50
MW-22-157	9/12/2022	24.0	29.0	852.38	853.06	27.55	2.75	849.63
MW-22-157	10/14/2022	24.0	29.0	852.38	853.06	27.61	3.08	849.30

Notes:
bgs = below ground surface
msl = mean sea level
NM = not measured
NS = not surveyed
RACER = Revitalizing Auto Communities Environmental Response
TOC = top of casing

Table 2 - Summary of Groundwater Analytical Results
2022 MW-14-58R Investigation Report
RACER Trust Plant 2 - Lansing, Michigan

ARCADIS

Location ID:	P201 Residential Drinking Water	P201 Groundwater Surface Water Interface	Units	MW-14-58R	MW-14-58R	MW-14-58R	MW-14-58R	MW-22-153	MW-22-153	MW-22-153	MW-22-155	MW-22-155	MW-22-156	MW-22-156	MW-22-157	MW-22-157	SB-A4-NB60	SB-A4-NB60	SB-A4-MV60
Date Collected:				02/10/22	04/06/22	09/12/22	10/14/22	04/06/22	09/12/22	10/14/22	09/12/22	10/14/22	09/12/22	10/14/22	09/12/22	10/14/22	03/22/22	03/22/22	03/23/22
Sample Name:				MW-14-58R_021022	MW-14-58R_040622	MW-14-58R_091222	MW-14-58R_101422	MW-22-153_040622	MW-22-153_091222	MW-22-153_101422	MW-22-155_091222	MW-22-155_101422	MW-22-156_091222	MW-22-156_101422	MW-22-157_091222	MW-22-157_101422	SB-A4-NB60_22-26	SB-A4-NB60_30-34	SB-A4-MV60_21-25
Sample Depth (ft. bgs):				22-27	22-27	22-27	22-27	25-30	25-30	25-30	25.5-30.5	25.5-30.5	23-28	23-28	24-29	24-29	22-26	30-34	21-25
Field																			
pH	6.5 to 8.5	6.5 to 9.0	s.u.	7.04	6.99	6.93	7.07	7.08	6.97	7.13	7.03	7.17	6.94	7.18	7.01	7.14	NR	NR	NR
Conductivity	- -	- -	µS/cm	1.46	1.98	2.65	2.29	1.56	1.67	1.49	1.70	1.49	1.41	1.32	1.46	1.36	NR	NR	NR
Turbidity	- -	- -	NTU	1.77	1.22	1.60	11.94	1.21	1.43	11.01	3.78	16.85	3.21	12.03	1.51	20.01	NR	NR	NR
Dissolved oxygen (DO)	- -	- -	mg/L	0.19	0.69	0.21	0.06	1.22	0.05	0.12	0.05	0.06	3.17	0.11	0.23	0.09	NR	NR	NR
Temperature	- -	- -	Deg C	7.1	9.8	16.6	15.2	12.1	15.1	14.3	13.9	13.6	14.8	15.1	16.6	15.4	NR	NR	NR
Oxidation reduction potential (ORP)	- -	- -	millivolts	-55.8	-37.1	-72.7	-77.3	-48.9	-76.1	-66.3	-106.9	-85.0	-69.8	-69.2	-95.2	-87.8	NR	NR	NR
Volatile Organics (via EPA Method 537 Modified or EPA Method SW5030C/8260C)																			
1,1,1,2-Tetrachloroethane	77	- -	µg/L	NA	< 1	NA	NA	< 1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1,1-Trichloroethane	200	89	µg/L	NA	< 1	NA	NA	< 1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1,2,2-Tetrachloroethane	8.5	78	µg/L	NA	< 1	NA	NA	< 1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1,2-Trichloroethane	5.0	330	µg/L	NA	< 1	NA	NA	< 1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1-Dichloroethane	880	740	µg/L	NA	< 1	NA	NA	**2**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1-Dichloroethene	7.0	130	µg/L	NA	< 1	NA	NA	< 1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3-Trichlorobenzene	- -	- -	µg/L	NA	< 5	NA	NA	< 5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3-Trichloropropane	42	- -	µg/L	NA	< 1	NA	NA	< 1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3-Trimethylbenzene	- -	- -	µg/L	NA	< 1	NA	NA	< 1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,4-Trichlorobenzene	70	99	µg/L	NA	< 5	NA	NA	< 5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,4-Trimethylbenzene	63	17	µg/L	NA	< 1	NA	NA	< 1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dibromo-3-chloropropane (DBCP)	0.2	- -	µg/L	NA	< 5	NA	NA	< 5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dibromoethane (Ethylene dibromide)	0.05	5.7	µg/L	NA	< 1	NA	NA	< 1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichlorobenzene	600	13	µg/L	NA	< 1	NA	NA	< 1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloroethane	5.0	360	µg/L	NA	< 1	NA	NA	< 1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloropropane	5.0	230	µg/L	NA	< 1	NA	NA	< 1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,3,5-Trimethylbenzene	72	45	µg/L	NA	< 1	NA	NA	< 1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,3-Dichlorobenzene	6.6	28	µg/L	NA	< 1	NA	NA	< 1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	75	17	µg/L	NA	< 1	NA	NA	< 1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,4-Dioxane	7.2	280	µg/L	**520**	**410 Y**	**187**	**173 [173]**	**92**	**55**	**52**	**410 Y**	**400 Y**	**76**	**81**	**3**	**3**	**18**	**191**	**13**
2-Butanone (Methyl ethyl ketone) (MEK)	13,000	2,200	µg/L	NA	< 25	NA	NA	< 25	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Hexanone	1,000	- -	µg/L	NA	< 50	NA	NA	< 50	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	260	19	µg/L	NA	< 5	NA	NA	< 5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Phenylbutane (sec-Butylbenzene)	80	- -	µg/L	NA	< 1	NA	NA	< 1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	1,800	- -	µg/L	NA	< 50	NA	NA	< 50	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acetone	730	1,700	µg/L	NA	< 50	NA	NA	< 50	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acrylonitrile	2.6	2	µg/L	NA	< 2	NA	NA	< 2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	5.0	200	µg/L	NA	< 1	NA	NA	< 1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromobenzene	18	- -	µg/L	NA	< 1	NA	NA	< 1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromodichloromethane	80	- -	µg/L	NA	< 1	NA	NA	< 1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromoform	80	- -	µg/L	NA	< 1	NA	NA	< 1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromomethane (Methyl bromide)	10	5.0	µg/L	NA	< 5	NA	NA	< 5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Carbon disulfide	800	- -	µg/L	NA	< 5	NA	NA	< 5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Carbon tetrachloride	5.0	38	µg/L	NA	< 1	NA	NA	< 1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chlorobenzene	100	25	µg/L	NA	< 1	NA	NA	< 1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chlorobromomethane (Bromochloromethane)	- -	- -	µg/L	NA	< 1	NA	NA	< 1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloroethane	430	1,100	µg/L	NA	< 5	NA	NA	**10**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloroform (Trichloromethane)	80	350	µg/L	NA	< 1	NA	NA	< 1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloromethane (Methyl chloride)	260	- -	µg/L	NA	< 5	NA	NA	< 5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
cis-1,2-Dichloroethene	70	620	µg/L	NA	< 1	NA	NA	< 1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
cis-1,3-Dichloropropene	- -	- -	µg/L	NA	< 1	NA	NA	< 1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cymene (p-Isopropyltoluene)	- -	- -	µg/L	NA	< 5	NA	NA	< 5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibromochloromethane	80	- -	µg/L	NA	< 5	NA	NA	< 5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibromomethane	80	- -	µg/L	NA	< 5	NA	NA	< 5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dichlorodifluoromethane (CFC-12)	1,700	- -	µg/L	NA	< 5	NA	NA	< 5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethyl ether	10	- -	µg/L	NA	< 10	NA	NA	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	74	18	µg/L	NA	< 1	NA	NA	< 1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachloroethane	7.3	6.7	µg/L	NA	< 5	NA	NA	< 5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iodomethane (Methyl Iodide)	- -	- -	µg/L	NA	< 1	NA	NA	< 1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Isopropyl benzene	800	28	µg/L	NA	< 5	NA	NA	< 5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methyl tert butyl ether (MTBE)	40	7,100	µg/L	NA	< 5	NA	NA	< 5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methylene chloride	5.0	1,500	µg/L	NA	< 5	NA	NA	< 5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	520	11	µg/L	NA	< 5	NA	NA	< 5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
N-Butylbenzene	80	- -	µg/L	NA	< 1	NA	NA	< 1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
N-Propylbenzene	80	- -	µg/L	NA	< 1	NA	NA	< 1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Styrene	100	80	µg/L	NA	< 1	NA	NA	< 1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
tert-Butylbenzene	80	- -	µg/L	NA	< 1	NA	NA	< 1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tetrachloroethene	5.0	60	µg/L	NA	< 1	NA	NA	< 1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tetrahydrofuran	95	11,000	µg/L	NA	< 90	NA	NA	< 90	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Toluene	790	270	µg/L	NA	< 1	NA	NA	< 1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
trans-1,2-Dichloroethene	100	1,500	µg/L	NA	< 1	NA	NA	< 1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
trans-1,3-Dichloropropene	- -	- -	µg/L	NA	< 1	NA	NA	< 1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
trans-1,4-Dichloro-2-butene	- -	- -	µg/L	NA	< 1	NA	NA	< 1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Trichloroethene	5.0	200	µg/L	NA	< 1	NA	NA	< 1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Trichlorofluoromethane (CFC-11)	2,600	- -	µg/L	NA	< 1	NA	NA	< 1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vinyl chloride	2.0	13	µg/L	NA	< 1	NA	NA	**1**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
m&p-Xylene	- -	- -	µg/L	NA	< 2	NA	NA	< 2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
o-Xylene	- -	- -	µg/L	NA	< 1	NA	NA	< 1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Xylenes (total)	280	49	µg/L	NA	< 2	NA	NA	< 2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

See notes on last page.

Location ID: / Date Collected: / Sample Name: / Sample Depth (ft. bgs):	P201 Residential Drinking Water	P201 Groundwater Surface Water Interface	Units	SB-A4-MV60 03/23/22 SB-A4-MV60_29.5-33.5 29.5-33.5	SB-A4-MY55 03/23/22 SB-A4-MY55_15-19 15-19	SB-A4-MY55 03/23/22 SB-A4-MY55_25.5-29.5 25.5-29.5	SB-A4-MY63 03/22/22 SB-A4-MY63_18-22 18-22	SB-A4-MY63 03/22/22 SB-A4-MY63_26-30 26-30
Field								
pH	6.5 to 8.5	6.5 to 9.0	s.u.	NR	NR	NR	NR	NR
Conductivity	- -	- -	µS/cm	NR	NR	NR	NR	NR
Turbidity	- -	- -	NTU	NR	NR	NR	NR	NR
Dissolved oxygen (DO)	- -	- -	mg/L	NR	NR	NR	NR	NR
Temperature	- -	- -	Deg C	NR	NR	NR	NR	NR
Oxidation reduction potential (ORP)	- -	- -	millivolts	NR	NR	NR	NR	NR
Volatile Organics (via EPA Method 537 Modified or EPA Method SW5030C/8260C)								
1,1,1,2-Tetrachloroethane	77	- -	µg/L	NA	NA	NA	NA	NA
1,1,1-Trichloroethane	200	89	µg/L	NA	NA	NA	NA	NA
1,1,2,2-Tetrachloroethane	8.5	78	µg/L	NA	NA	NA	NA	NA
1,1,2-Trichloroethane	5.0	330	µg/L	NA	NA	NA	NA	NA
1,1-Dichloroethane	880	740	µg/L	NA	NA	NA	NA	NA
1,1-Dichloroethene	7.0	130	µg/L	NA	NA	NA	NA	NA
1,2,3-Trichlorobenzene	- -	- -	µg/L	NA	NA	NA	NA	NA
1,2,3-Trichloropropane	42	- -	µg/L	NA	NA	NA	NA	NA
1,2,3-Trimethylbenzene	- -	- -	µg/L	NA	NA	NA	NA	NA
1,2,4-Trichlorobenzene	70	99	µg/L	NA	NA	NA	NA	NA
1,2,4-Trimethylbenzene	63	17	µg/L	NA	NA	NA	NA	NA
1,2-Dibromo-3-chloropropane (DBCP)	0.2	- -	µg/L	NA	NA	NA	NA	NA
1,2-Dibromoethane (Ethylene dibromide)	0.05	5.7	µg/L	NA	NA	NA	NA	NA
1,2-Dichlorobenzene	600	13	µg/L	NA	NA	NA	NA	NA
1,2-Dichloroethane	5.0	360	µg/L	NA	NA	NA	NA	NA
1,2-Dichloropropane	5.0	230	µg/L	NA	NA	NA	NA	NA
1,3,5-Trimethylbenzene	72	45	µg/L	NA	NA	NA	NA	NA
1,3-Dichlorobenzene	6.6	28	µg/L	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	75	17	µg/L	NA	NA	NA	NA	NA
1,4-Dioxane	7.2	280	µg/L	**32 Y [31 Y]**	< 1	**128**	**51**	**100**
2-Butanone (Methyl ethyl ketone) (MEK)	13,000	2,200	µg/L	NA	NA	NA	NA	NA
2-Hexanone	1,000	- -	µg/L	NA	NA	NA	NA	NA
2-Methylnaphthalene	260	19	µg/L	NA	NA	NA	NA	NA
2-Phenylbutane (sec-Butylbenzene)	80	- -	µg/L	NA	NA	NA	NA	NA
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	1,800	- -	µg/L	NA	NA	NA	NA	NA
Acetone	730	1,700	µg/L	NA	NA	NA	NA	NA
Acrylonitrile	2.6	2	µg/L	NA	NA	NA	NA	NA
Benzene	5.0	200	µg/L	NA	NA	NA	NA	NA
Bromobenzene	18	- -	µg/L	NA	NA	NA	NA	NA
Bromodichloromethane	80	- -	µg/L	NA	NA	NA	NA	NA
Bromoform	80	- -	µg/L	NA	NA	NA	NA	NA
Bromomethane (Methyl bromide)	10	5.0	µg/L	NA	NA	NA	NA	NA
Carbon disulfide	800	- -	µg/L	NA	NA	NA	NA	NA
Carbon tetrachloride	5.0	38	µg/L	NA	NA	NA	NA	NA
Chlorobenzene	100	25	µg/L	NA	NA	NA	NA	NA
Chlorobromomethane (Bromochloromethane)	- -	- -	µg/L	NA	NA	NA	NA	NA
Chloroethane	430	1,100	µg/L	NA	NA	NA	NA	NA
Chloroform (Trichloromethane)	80	350	µg/L	NA	NA	NA	NA	NA
Chloromethane (Methyl chloride)	260	- -	µg/L	NA	NA	NA	NA	NA
cis-1,2-Dichloroethene	70	620	µg/L	NA	NA	NA	NA	NA
cis-1,3-Dichloropropene	- -	- -	µg/L	NA	NA	NA	NA	NA
Cymene (p-Isopropyltoluene)	- -	- -	µg/L	NA	NA	NA	NA	NA
Dibromochloromethane	80	- -	µg/L	NA	NA	NA	NA	NA
Dibromomethane	80	- -	µg/L	NA	NA	NA	NA	NA
Dichlorodifluoromethane (CFC-12)	1,700	- -	µg/L	NA	NA	NA	NA	NA
Ethyl ether	10	- -	µg/L	NA	NA	NA	NA	NA
Ethylbenzene	74	18	µg/L	NA	NA	NA	NA	NA
Hexachloroethane	7.3	6.7	µg/L	NA	NA	NA	NA	NA
Iodomethane (Methyl Iodide)	- -	- -	µg/L	NA	NA	NA	NA	NA
Isopropyl benzene	800	28	µg/L	NA	NA	NA	NA	NA
Methyl tert butyl ether (MTBE)	40	7,100	µg/L	NA	NA	NA	NA	NA
Methylene chloride	5.0	1,500	µg/L	NA	NA	NA	NA	NA
Naphthalene	520	11	µg/L	NA	NA	NA	NA	NA
N-Butylbenzene	80	- -	µg/L	NA	NA	NA	NA	NA
N-Propylbenzene	80	- -	µg/L	NA	NA	NA	NA	NA
Styrene	100	80	µg/L	NA	NA	NA	NA	NA
tert-Butylbenzene	80	- -	µg/L	NA	NA	NA	NA	NA
Tetrachloroethene	5.0	60	µg/L	NA	NA	NA	NA	NA
Tetrahydrofuran	95	11,000	µg/L	NA	NA	NA	NA	NA
Toluene	790	270	µg/L	NA	NA	NA	NA	NA
trans-1,2-Dichloroethene	100	1,500	µg/L	NA	NA	NA	NA	NA
trans-1,3-Dichloropropene	- -	- -	µg/L	NA	NA	NA	NA	NA
trans-1,4-Dichloro-2-butene	- -	- -	µg/L	NA	NA	NA	NA	NA
Trichloroethene	5.0	200	µg/L	NA	NA	NA	NA	NA
Trichlorofluoromethane (CFC-11)	2,600	- -	µg/L	NA	NA	NA	NA	NA
Vinyl chloride	2.0	13	µg/L	NA	NA	NA	NA	NA
m&p-Xylene	- -	- -	µg/L	NA	NA	NA	NA	NA
o-Xylene	- -	- -	µg/L	NA	NA	NA	NA	NA
Xylenes (total)	280	49	µg/L	NA	NA	NA	NA	NA

See notes on last page.

Table 2
Summary of Groundwater Analytical Results
2019 Annual Groundwater Report
RACER Trust Plants 2, 3, and 6 - Lansing, Michigan

Data Flagging:

Bold font represents data where detections were noted above the laboratory method detection limit.

Gray shading represents result exceeding either or both the EGLE Part 201 Generic Cleanup Criteria and Screening Levels (dated January 10, 2018) or the EGLE GSI Criteria (Updated June 25, 2018)

Notes:

Deg C = degrees Celsius
EGLE = Michigan Department of Environment, Great Lakes, and Energy
mg/L = milligrams per liter
NA = Not Analyzed
NR = Not Recorded
NTU = Nephelometric Turbidity Unit
s.u. = standard unit
ug/L = micrograms per liter
µS/cm = microSiemens per centimeter

Lab and Validation Data Qualifiers:

F1 = Matrix spike and/or matrix spike duplicate recovery is outside acceptance limits.
J = The compound was positively identified, however, the associated numerical value is an estimated concentration only.
Y = Elevated reporting limit due to high target concentration.

ARCADIS

Location ID: Date Collected: Sample Name: Sample Depth (ft. bgs):	Residential Drinking Water Protection (DWP) Criteria	Groundwater Surface Water Interface Protection (GSIP) Criteria	Units	SB-A4-MX60 09/07/22 SB-A4-MX60_1-3 1-3	SB-A4-MX60 09/07/22 SB-A4-MX60_4-6 4-6	SB-A4-MX60 09/07/22 SB-A4-MX60_6-8 6-8	SB-A4-MX60 09/07/22 SB-A4-MX60_8.5-10 8.5-10	SB-A4-MX60 09/07/22 SB-A4-MX60_10-12 10-12
Volatile Organics (via EPA Method SW8260B - SIM)								
1,4-Dioxane	1,700	5,600	µg/kg	< 60	< 60	< 60	< 60	< 80
Volatile Organics (via EPA Method SW5035A/8260C)								
1,1,1,2-Tetrachloroethane	1,500	- -	µg/kg	< 100	< 100	< 100	< 100	< 200
1,1,1-Trichloroethane	4,000	1,800	µg/kg	< 60	< 60	< 60	< 60	< 80
1,1,2,2-Tetrachloroethane	170	1,600	µg/kg	< 60	< 60	< 60	< 60	< 80
1,1,2-Trichloroethane	100	6,600	µg/kg	< 60	< 60	< 60	< 60	< 80
1,1-Dichloroethane	18,000	15,000	µg/kg	< 60	< 60	< 60	< 60	< 80
1,1-Dichloroethene	140	2,600	µg/kg	< 60	< 60	< 60	< 60	< 80
1,2,3-Trichlorobenzene	- -	- -	µg/kg	< 370	< 420	< 390	< 410	< 520
1,2,3-Trichloropropane	840	- -	µg/kg	< 100	< 100	< 100	< 100	< 200
1,2,3-Trimethylbenzene	- -	- -	µg/kg	< 60	< 60	< 60	< 60	< 80
1,2,4-Trichlorobenzene	4,200	5,900	µg/kg	< 370	< 420	< 390	< 410	< 520
1,2,4-Trimethylbenzene	2,100	570	µg/kg	< 60	< 60	< 60	< 60	< 80
1,2-Dibromo-3-chloropropane (DBCP)	10	- -	µg/kg	< 300	< 300	< 300	< 300	< 400
1,2-Dibromoethane (Ethylene dibromide)	20	110	µg/kg	< 20	< 30	< 20	< 20	< 30
1,2-Dichlorobenzene	14,000	280	µg/kg	< 100	< 100	< 100	< 100	< 200
1,2-Dichloroethane	100	7,200	µg/kg	< 60	< 60	< 60	< 60	< 80
1,2-Dichloropropane	100	4,600	µg/kg	< 60	< 60	< 60	< 60	< 80
1,3,5-Trimethylbenzene	1,800	1,100	µg/kg	< 60	< 60	< 60	< 60	< 80
1,3-Dichlorobenzene	170	680	µg/kg	< 100	< 100	< 100	< 100	< 200
1,4-Dichlorobenzene	1,700	360	µg/kg	< 100	< 100	< 100	< 100	< 200
2-Butanone (Methyl ethyl ketone) (MEK)	260,000	44,000	µg/kg	< 830	< 960	< 880	< 930	< 1,200
2-Hexanone	20,000	- -	µg/kg	< 3,000	< 3,000	< 3,000	< 3,000	< 4,000
2-Methylnaphthalene	57,000	4,200	µg/kg	< 100	< 100	< 100	< 100	< 200
2-Phenylbutane (sec-Butylbenzene)	1,600	- -	µg/kg	< 60	< 60	< 60	< 60	< 80
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	36,000	- -	µg/kg	< 3,000	< 3,000	< 3,000	< 3,000	< 4,000
Acetone	15,000	34,000	µg/kg	< 1,000	< 1,000	< 1,000	< 1,000	< 2,000
Acrylonitrile	100	100	µg/kg	< 100	< 100	< 100	< 100	< 200
Benzene	100	4,000	µg/kg	< 60	< 60	< 60	< 60	< 80
Bromobenzene	550	- -	µg/kg	< 100	< 100	< 100	< 100	< 200
Bromochloromethane	- -	- -	µg/kg	< 100	< 100	< 100	< 100	< 200
Bromodichloromethane	1,600	- -	µg/kg	< 100	< 100	< 100	< 100	< 200
Bromoform	1,600	- -	µg/kg	< 100	< 100	< 100	< 100	< 200
Bromomethane (Methyl bromide)	200	100	µg/kg	< 200	< 300	< 200	< 200	< 300
Carbon disulfide	16,000	- -	µg/kg	< 300	< 300	< 300	< 300	< 400
Carbon tetrachloride	100	760	µg/kg	< 60	< 60	< 60	< 60	< 80
Chlorobenzene	2,000	500	µg/kg	< 60	< 60	< 60	< 60	< 80
Chloroethane	8,600	22,000	µg/kg	< 300	< 300	< 300	< 300	< 400
Chloroform (Trichloromethane)	1,600	7,000	µg/kg	< 60	< 60	< 60	< 60	< 80
Chloromethane (Methyl chloride)	5,200	- -	µg/kg	< 300	< 300	< 300	< 300	< 400
cis-1,2-Dichloroethene	1,400	12,000	µg/kg	< 60	< 60	< 60	< 60	< 80
cis-1,3-Dichloropropene	- -	- -	µg/kg	< 60	< 60	< 60	< 60	< 80
Cymene (p-Isopropyltoluene)	- -	- -	µg/kg	< 100	< 100	< 100	< 100	< 200
Dibromochloromethane	1,600	- -	µg/kg	< 100	< 100	< 100	< 100	< 200
Dibromomethane	1,600	- -	µg/kg	< 300	< 300	< 300	< 300	< 400
Dichlorodifluoromethane (CFC-12)	95,000	- -	µg/kg	< 300	< 300	< 300	< 300	< 400
Diethyl ether	200	- -	µg/kg	< 200	< 300	< 200	< 200	< 300
Ethylbenzene	1,500	360	µg/kg	< 60	< 60	< 60	< 60	< 80
Hexachloroethane	430	1,800	µg/kg	< 300	< 400	< 400	< 400	< 500
Isopropyl benzene	91,000	3,200	µg/kg	< 300	< 300	< 300	< 300	< 400
Methyl iodide	- -	- -	µg/kg	< 100	< 100	< 100	< 100	< 200
Methyl tert butyl ether (MTBE)	800	140,000	µg/kg	< 200	< 300	< 200	< 200	< 300
Methylene chloride	100	30,000	µg/kg	< 100	< 100	< 100	< 100	< 200
Naphthalene	35,000	730	µg/kg	< 300	< 300	< 300	< 300	< 400
N-Butylbenzene	1,600	- -	µg/kg	< 60	< 60	< 60	< 60	< 80
N-Propylbenzene	1,600	- -	µg/kg	< 60	< 60	< 60	< 60	< 80
Styrene	2,700	2,100	µg/kg	< 60	< 60	< 60	< 60	< 80
tert-Butylbenzene	1,600	- -	µg/kg	< 60	< 60	< 60	< 60	< 80
Tetrachloroethene	100	1,200	µg/kg	< 60	< 60	< 60	< 60	< 80
Tetrahydrofuran	1,900	220,000	µg/kg	< 1,000	< 1,000	< 1,000	< 1,000	< 2,000
Toluene	16,000	5,400	µg/kg	< 60	< 60	< 60	< 60	< 80
trans-1,2-Dichloroethene	2,000	30,000	µg/kg	< 60	< 60	< 60	< 60	< 80
trans-1,3-Dichloropropene	- -	- -	µg/kg	< 60	< 60	< 60	< 60	< 80
trans-1,4-Dichloro-2-butene	- -	- -	µg/kg	< 60	< 60	< 60	< 60	< 80
Trichloroethene	100	4,000	µg/kg	< 60	< 60	< 60	< 60	< 80
Trichlorofluoromethane (CFC-11)	52,000	- -	µg/kg	< 100	< 100	< 100	< 100	< 200
Vinyl chloride	40	260	µg/kg	< 60	< 60	< 60	< 60	< 80
m&p-Xylene	- -	- -	µg/kg	< 100	< 100	< 100	< 100	< 200
o-Xylene	- -	- -	µg/kg	< 60	< 60	< 60	< 60	< 80
Xylene (total)	5,600	980	µg/kg	< 100	< 100	< 100	< 100	< 200

See notes on last page.

Data Flagging:
Bold font represents data where detections were noted above the laboratory method detection limit.
Gray shading represents result exceeding either or both the EGLE Part 201 Generic Cleanup Criteria and Screening Levels (dated January 10, 2018) or the EGLE GSI Criteria (Updated June 25, 2018)

Notes:
Deg. C. = degrees Celsius
EGLE = Michigan Department of Environment, Great Lakes, and Energy
mg/L = milligrams per liter
NA = Not Analyzed
NR = Not Recorded
NTU = Nephelometric Turbidity Unit
s.u. = standard unit
ug/L = micrograms per liter
µS/cm = microSiemens per centimeter

Lab and Validation Data Qualifiers:
F1 = Matrix spike and/or matrix spike duplicate recovery is outside acceptance limits.
J = The compound was positively identified, however, the associated numerical value is an estimated concentration only.
Y = Elevated reporting limit due to high target concentration.

FIGURES

APC MW-7S
4.5-9.5 ft

APC MW-7D
13-18 ft

APC MW-8S
11.5-16.5 ft

APC MW-8D
31-36 ft

NO DATA AVAILABLE

APC MW-01
N/A ft

APC MW-9D
15-20 ft

P2-MW-03
27-32 ft

APC MW-15
16-23 ft

APC MW-13S
9-14 ft

APC MW-13D
15-20 ft

MW-16-80
68-73 ft

APC MW-14D
24-29 ft

APC MW-14S
13-18 ft

NO DATA AVAILABLE

APC MW-4D
17-22 ft

MW-20-126
69-74 ft

APC MW-4S
6-16 ft

TW-15-12
73-78 ft

APC MW-6D
19.2-24.2 ft

MW-13-42
70-75 ft

MW-13-43
72-77 ft

APC MW-6S
6-16 ft

MW-15-73
78-83 ft

APC MW-12S
15-19 ft

MW-22-155
Drilled to 35 ft bgs
Screened 25.5-30.5 ft bgs

APC MW-12D
24-29 ft

MW-20-127
72-77 ft

MW-19-118D
175-190 ft

MW-19-118S
145-160 ft

AREA 4

APC MW-11S
13.5-18.5 ft

MW-22-153
25-30 ft

MW-19-125
100-115 ft

SB-A4-MV60

AOI 2-8

MW-22-157
24-29 ft

SB-A4-MX60

SB-A4-MY63

APC MW-11D
24-29 ft

MW-14-58R
22-27 ft

MW-14-58
22-27 ft

SB-A4-NB60

MW-16-83
71-76 ft

MW-17-87
100-112 ft

MW-22-156
23-28 ft

NO DATA AVAILABLE

NO DATA AVAILABLE

MW-19-115
72.5-77.5 ft

MW-12-09
14-19 ft

MW-14-57
15-20 ft

LMW-12-06
4-9 ft

MW-14-56
71-76 ft

Legend

- VAP BORING
- LNAPL MONITORING WELL
- PERCHED ZONE MONITORING WELL
- DEEP OVERBURDEN MONITORING WELL
- WEATHERED BEDROCK MONITORING WELL
- BEDROCK MONITORING WELL
- APC MW
- ABANDONED WELL
- AREA OF INTEREST
- WORKPLAN AREA
- ESTIMATED EXTENT OF DEEPER SAND UNIT (~825 - 835 FEET AMSL) (LINE DASHED WHERE INFERRED)
- INDICATES LITHOLOGIC DATA NOT AVAILABLE
- PLANT 2
- PLANT 3
- PLANT 6

NOTES:

ALL DRILLING ACTIVITIES (INCLUDING SOIL SAMPLING AND WELL DEVELOPMENT) WERE COMPLETED BETWEEN SEPTEMBER 6 THROUGH 8, 2022. GROUNDWATER SAMPLING WAS COMPLETED ON SEPTEMBER 12, 2022.

APC: ADAMS PLATING COMPANY
ft bgs: FEET BELOW GROUND SURFACE
LNAPL: LIGHT NON-AQUEOUS PHASE LIQUID
MW: MONITORING WELL
VAP: VERTICAL AQUIFER PROFILE

0 50 100
SCALE IN FEET

RACER TRUST
PLANT 2
LANSING, MICHIGAN

AREA OF INTEREST MAP

ARCADIS

FIGURE
1

CITY: Novi DIV: ENV PIC: J. BARRETT PM: T. LINDER TM: A. VILLHAUER TR: PROJECT NUMBER: 30112892 COORDINATE SYSTEM: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl
T:_ENV\RACER\Buffalo\MXDs\2022 MW-14-58R Evaluation\Figure 2 - Plant 2 MW-14-58R Evaluation-V2.mxd PLOTTED: 2/2/2023 12:41:33 PM BY: MJoye

← West

East →

A

A’

Elevation (feet amsl)

860

850

840

830

820

MW-11S/D

MW-22-157

S Rosemary Ave

Theoretical area of backfill

RACER Lansing western property boundary

SB-A4-MY55 / MW-22-153

MW-14-58 / -58R

SB-A4-MY63

3/23/16: 1.3 J

3/23/16: 1.6 J

10/14/22: 3

60” sanitary main

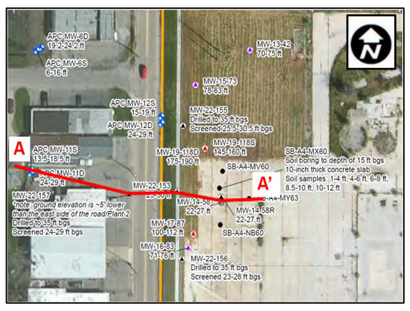
3/23/22: ND (< 1)

10/14/22: 52

10/14/22: 173

3/22/22: 51

3/22/22: 100



LEGEND

Geology

- Asphalt
- Concrete
- Sand
- Clay
- Silt

Approximate Water Table

Vinyl Chloride Concentration (µg/L)

- ND – 7.2
- 7.2 – 280
- 280 – 1,000

Notes:

1. The Michigan Department of Environment, Great Lakes, and Energy (EGLE) Residential Drinking Water (DW) screening level for 1,4-dioxane is 7.2 µg/L.
2. The EGLE Groundwater Surface Water Interface (GSI) screening level for 1,4-dioxane is 280 µg/L.
3. The highest concentration from each monitoring well (MW) and soil boring (SB) location is shown. Refer to Tables 2 and 3 for analytical results.
4. Samples were analyzed under USEPA Method SW8260B SIM.
5. Sanitary sewer line locations are approximate and not drawn to scale.
6. All groundwater analytical results are listed in micrograms per liter (µg/L).
7. J = estimated value

RACER TRUST
PLANT 2
LANSING, MICHIGAN

CROSS-SECTION A-A’

ARCADIS

FIGURE
2

CITY: Nov/DIV: ENV PIC: J. BARRETT PM: T. Linder TM: A. VILLHAUER TR: PROJECT NUMBER: 30112892

← **Southwest** **Northeast** →

B’ **B**

MW-22-156 | MW-16-83 | MW-17-87 | SB-A4-MY55 / MW-22-153 | MW-19-118S / MW-19-118D | MW-22-155 | MW-15-73 | MW-13-42

Elevation (feet amsl)

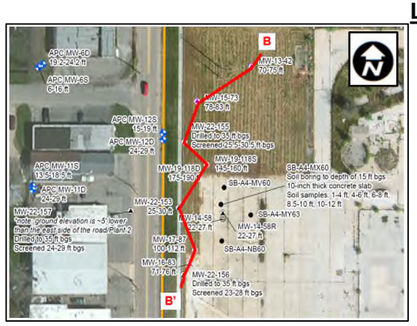
860
850
840
830
820
810

3/23/22: ND (< 1)

10/14/22: 81

10/14/22: 52

10/14/22: 400 Y



LEGEND

Geology

- Grass/Topsoil
- Concrete
- Sand
- Clay
- Silt
- Sandy Clay
- Silty Sand
- Silty Clay

Vinyl Chloride Concentration (µg/L)

- ND – 7.2
- 7.2 – 280
- 280 – 1,000
- Boring log continues, full vertical extent not shown on cross-section
- Approximate Water Table

Notes:

1. The Michigan Department of Environment, Great Lakes, and Energy (EGLE) Residential Drinking Water (DW) screening level for 1,4-dioxane is 7.2 µg/L.
2. The EGLE Groundwater Surface Water Interface (GSI) screening level for 1,4-dioxane is 280 µg/L.
3. The highest concentration from each monitoring well (MW) and soil boring (SB) location is shown. Refer to Tables 2 and 3 for analytical results.
4. Samples were analyzed under USEPA Method SW8260B SIM.
5. Sanitary sewer line locations are approximate and not drawn to scale.
6. All groundwater analytical results are listed in micrograms per liter (µg/L).
7. J = estimated value
8. Y = elevated reporting limit due to high target concentration
9. Deep wells (e.g., MW-19-118S/D, MW-16-83, etc.) are screened within the weathered bedrock zone or deeper. Perched groundwater data is not available at these locations.

RACER TRUST
PLANT 2
LANSING, MICHIGAN

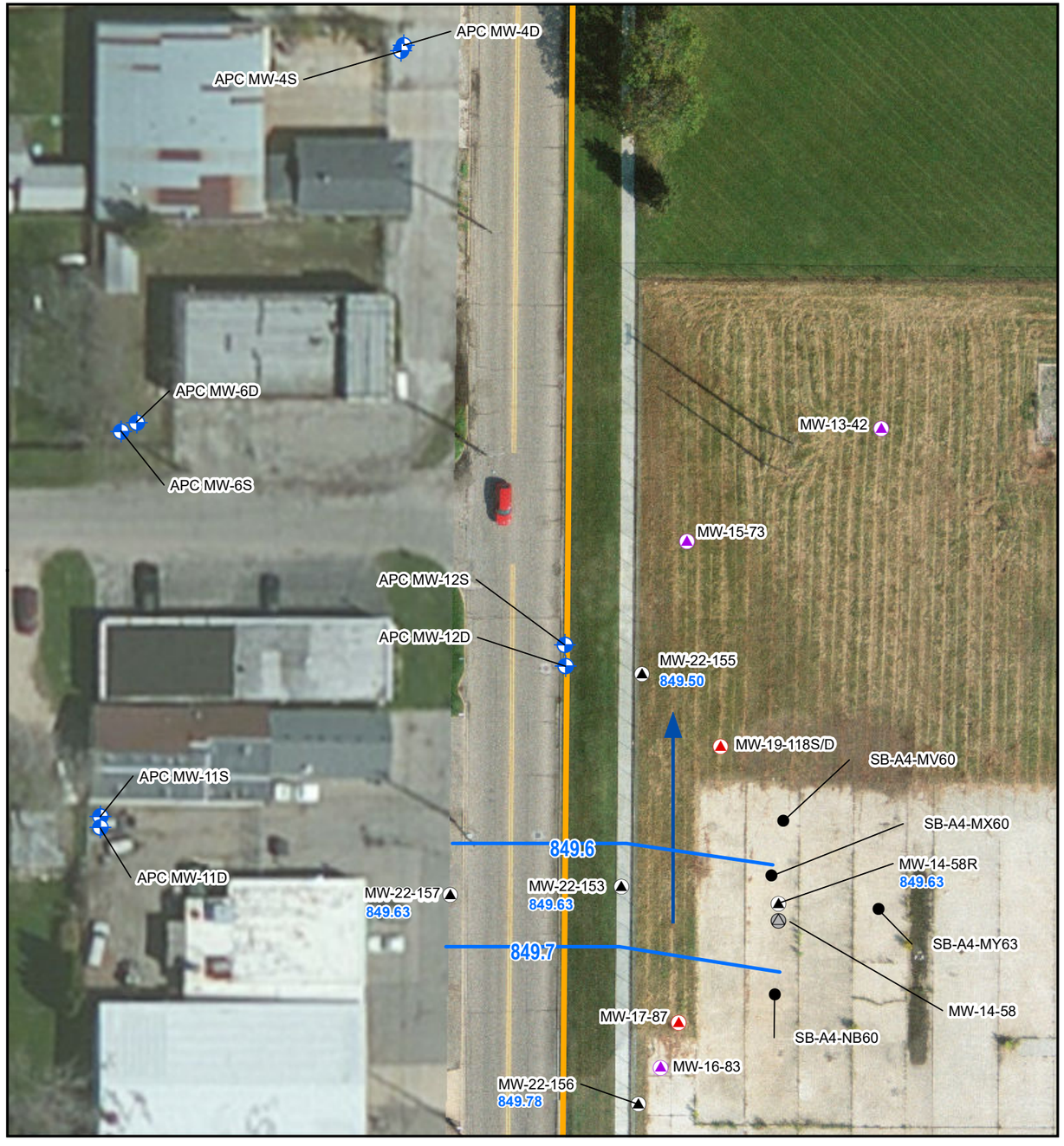
CROSS-SECTION B-B’

ARCADIS

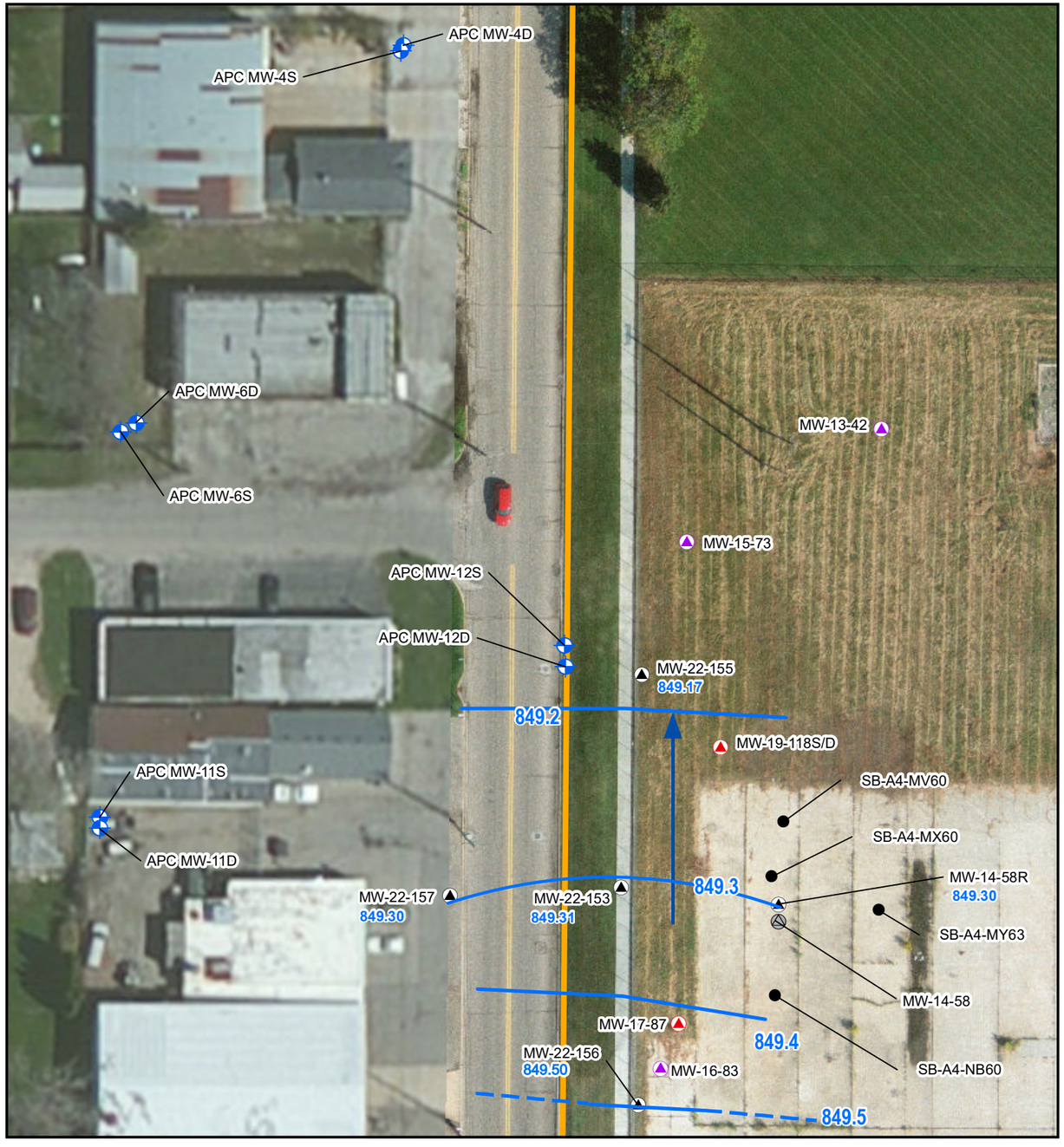
FIGURE
3

CITY: Novi DIV: ENV PIC: J. BARRETT PM: T. Linder TM: A. VILLHAUER TR: PROJECT NUMBER: 30112892

CITY: Novi DIV: ENV PIC: J. BARRETT PM: T. LINDER TM: A. VILLHAUER TR: PROJECT NUMBER: 30112892 COORDINATE SYSTEM: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl
T:\ ENVIRACER\Buffalo\MXDs\2022 MW-14-58R Evaluation\Figure 1 - Plant 2 MW-14-58R Evaluation_LandscapeCombined.mxd PLOTTED: 12/8/2022 4:44:06 PM BY: KPullen



PLANT 2 - GROUNDWATER ELEVATON CONTOUR MAP - SEPTEMBER 2022



PLANT 2 - GROUNDWATER ELEVATON CONTOUR MAP - OCTOBER 2022

Legend

- VAP BORING
- LNAPL MONITORING WELL
- PERCHED ZONE MONITORING WELL
- DEEP OVERBURDEN MONITORING WELL
- WEATHERED BEDROCK MONITORING WELL
- BEDROCK MONITORING WELL
- APC MW
- ABANDONED WELL
- PLANT 2
- PLANT 3
- PLANT 6
- GROUNDWATER ELEVATION CONTOUR (DASHED WHERE INFERRED)
- APPROXIMATE GROUNDWATER FLOW DIRECTION

0 50 100
SCALE IN FEET

NOTES:

1. GROUNDWATER ELEVATION DATA COLLECTED DURING GAUGING EVENTS COMPLETED ON SEPTEMBER 12, 2022 AND OCTOBER 14, 2022.
2. GROUNDWATER ELEVATIONS ARE SHOWN IN FEET ABOVE MEAN SEA LEVEL (FT AMSL).

APC: ADAMS PLATING COMPANY
LNAPL: LIGHT NON-AQUEOUS PHASE LIQUID
MW: MONITORING WELL
VAP: VERTICAL AQUIFER PROFILE

RACER TRUST
PLANT 2
LANSING, MICHIGAN

GROUNDWATER ELEVATON CONTOUR MAP

ARCADIS

FIGURE
4

APC MW-14D
APC MW-14S
APC MW-4D
APC MW-4S
APC MW-6D
APC MW-6S
MW-22-155
9/12/2022: 410
10/14/2022: 400
MW-15-73
APC MW-12S
APC MW-12D
SB-A4-MX60
SOIL RESULTS
9/7/2022:
1-3 FT BGS: <60 UG/KG
4-6 FT BGS: <60 UG/KG
6-8 FT BGS: <60 UG/KG
8.5-10 FT BGS: <60 UG/KG
10-12 FT BGS: <60 UG/KG
SB-A4-MV60
3/23/2022: 13
3/23/2022: 32 [31]
MW-19-118S/D
APC MW-11S
APC MW-11D
MW-22-157
9/12/2022: 3
10/14/2022: 3
SB-A4-MY63
3/22/2022:
18-22 FT BGS: 51
26-30 FT BGS: 100
MW-22-153 (SB-A4-MY55)
3/22/2022:
15-19 FT BGS: <1
25.5-29.5 FT BGS: 128
4/6/2022: 92
9/12/2022: 55
10/14/2022: 52
MW-17-87
MW-16-83
MW-22-156
9/12/2022: 76
10/14/2022: 81
MW-14-58R
2/10/2022: 520
4/6/2022: 410
9/12/2022: 187
10/14/2022: 173 [173]
SB-A4-NB60
3/22/2022:
22-26 FT BGS: 18
30-34 FT BGS: 191
MW-13-42
MW-14-57

0 50 100
SCALE IN FEET

Legend

- LNAPL MONITORING WELL
- PERCHED ZONE MONITORING
- DEEP OVERBURDEN MONITORING
- WEATHERED BEDROCK MONITORING
- BEDROCK MONITORING
- APC MW
- VAP BORING
- WELL SAMPLED AND NON-DETECT ORDOES NOT EXCEED DW CRITERIA
- WELL SAMPLED AND EXCEEDS DW CRITERIA (7.2
- FORMER APC BUILDING
- PROPERTY BOUNDARY
- PLANT 2
- PLANT 3
- PLANT 6

NOTES:

APPROXIMATE EXTENT OF IMPACTS/PLUMES SHOWN ARE BASED ON SEVERAL INVESTIGATIONS PREVIOUSLY COMPLETED AT THE SITE.

SAMPLES ANALYZED VIA EPA METHOD SW-846 8260B SIM.

ALL DRILLING ACTIVITIES (INCLUDING SOIL SAMPLING AND WELL DEVELOPMENT) WERE COMPLETED BETWEEN SEPTEMBER 6 THROUGH 8, 2022. GROUNDWATER SAMPLING WAS COMPLETED ON SEPTEMBER 12, 2022.

ALL ANALYTICAL DATA IS IN ug/L.

APC: ADAMS PLATING COMPANY
DW: EGLE Part 201 RESIDENTIAL DRINKING WATER CRITERIA
EGLE: MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY
EPA: UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
LNAPL: LIGHT NON-AQUEOUS PHASE LIQUID
MW: MONITORING WELL
VAP: VERTICAL AQUIFER PROFILE
ug/L: MICROGRAMS PER LITER

RACER TRUST
PLANT 2
LANSING, MICHIGAN

GROUNDWATER ANALYTICAL MAP

ARCADIS

FIGURE
5

CITY: Novi DIV: ENV PIC: J. BARRETT PM: T. LINDER TM: A. VILLHAUER TR: PROJECT NUMBER: 30112892 COORDINATE SYSTEM: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl
T:_ENV\RACER\Buffalo\MXDs\2022 MW-14-58R Evaluation\Figure 6 - Groundwater Analytical Map.mxd PLOTTED: 1/27/2023 11:43:17 AM BY: MJoye

Attachment 1

Soil Boring Logs

Date Start: 8/13/2014
Date Finish: 8/13/2014
Drilling Company: Cascade
Driller's Name: S.Parks/T.Michael/R.Adkison
Drilling Method: Continuous
Sampling Method: 10', 5" core barrel
Rig Type: Sonic
Water Level Start (ft. bgs.): 24.0
Water Level Finish (ft. btoc.): 14.63

Northing:
Easting:
Casing Elevation: NA

Borehole Depth (ft. bgs.): 28.0
Surface Elevation:

Descriptions By: A.Richmond

Well/Boring ID: **MW-14-58**

Client: RACER

Location: RACER Lansing Plant 2

Weather Conditions: Sunny 75 F

DEPTH (feet bgs.) / ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Water Level (ft. bgs.)	Well/Boring Construction
0 / 0				--			(0.0'-1.0') CONCRETE.		
				0.2			(1.0'-6.0') SAND, medium; little granules, subround to subangular;little silt; well sorted; moist; dark yellowish brown (10YR 4/4).		
	1	0.0-7.0	5.0	0.3					
				0.2					
5 / -5				0.2					
				0.2					
				0.1			(6.0'-7.0') CLAY, little silt, low plasticity, rapid dilatancy; little sand; little small pebbles, subround to subangular; dry; mediums tiff; very dark gray (10YR 3/1).		
				0.0			(7.0'-10.0') SAND, medium; little small pebbles, subangular; little silt; poorly sorted; moist; dark yellowish brown (10YR 4/4).		
				0.0					
10 / -10				0.0					0.0-18.0' bgs. (Bentonite Grout)
	2	7.0-17.0	9.4	0.0			(10.0'-14.0') CLAY, some silt, low plasticity, slow dilatancy; little small pebbles, subangular to subround; dry; medium stiff; very dark gray (10YR 3/1).		3.0' ags.-22.0' bgs. (2.0" PVC Well Casing)
				0.0					
				0.0					
				0.0					
15 / -15				0.0			(14.0'-20.0') CLAY, high plasticity, no dilatancy; trace sand; little small pebbles, subangular to subround; moist; very soft; dark gray (10YR 4/1).		
				0.0					
				0.0					

ARCADIS
Infrastructure · Water · Environment · Buildings

Remarks: bgs = below ground surface
Groundwater encountered from 20.0'-28.0' bgs.
No odor or staining observed.

Date Start: 8/13/2014
Date Finish: 8/13/2014
Drilling Company: Cascade
Driller's Name: S.Parks/T.Michael/R.Adkison
Drilling Method: Continuous
Sampling Method: 10', 5" core barrel
Rig Type: Sonic
Water Level Start (ft. bgs.): 24.0
Water Level Finish (ft. btoc.): 14.63

Northing:
Easting:
Casing Elevation: NA

Borehole Depth (ft. bgs.): 28.0
Surface Elevation:

Descriptions By: A.Richmond

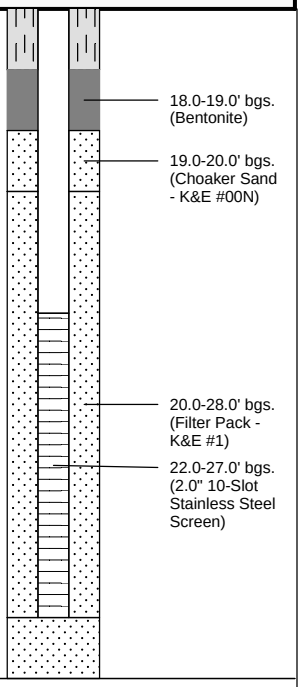
Well/Boring ID: **MW-14-58**

Client: RACER

Location: RACER Lansing Plant 2

Weather Conditions: Sunny 75 F

DEPTH (feet bgs.) / ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Water Level (ft. bgs.)	Well/Boring Construction
				0.0					
				0.0					
				0.0					
20 -20	3	17.0-25.0	8.0	0.0			(20.0'-24.0') CLAY, medium plasticity; and SAND, medium; trace granules, subangular; wet; dark gray (10YR 4/1).		
				0.0					
				0.0					
				0.0					
				0.0					
25 -25	4	25.0-28.0	3.0	0.0			(24.0'-28.0') SAND, medium; trace granules, subangular; trace silt; well sorted; wet; dark grayish brown (10YR 4/2).		
				0.0					
				0.0					
				0.0			End of boring at 28.0' bgs.		
30 -30									
35 -35									



ARCADIS
Infrastructure · Water · Environment · Buildings

Remarks: bgs = below ground surface
Groundwater encountered from 20.0'-28.0' bgs.
No odor or staining observed.

ARCADIS Design & Consultancy for natural and built assets

Soil Boring Log

Boring No.: MW-14-58R

Sheet: 1 of 2

Project Name: RACER Lansing
Project Number: 30042872
Project Location: Lansing, MI

Date Started: 10/27/2021
Date Completed: 10/27/2021

Logger: A.Westhuis
Editor: C. Cisco
Weather Conditions: 50° F, Cloudy

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details	Well
1			84		0.3		(0.0-1.0') CONCRETE.	(0.0-0.5') Concrete Well Pad	
2					0.2		(1.0-6.0') SAND, medium, subrounded; little silt; trace granules, subrounded; well sorted; moist; dark yellowish brown (10YR 4/4).		
3					0.0				
4					0.0				
5					0.0			(0.0-27.0') 6.0" dia. drilled hole	
6					0.0				
7					0.0		(6.0-7.0') CLAY, medium plasticity, slow dilatancy; little silt; trace to little sand, fine to medium, subrounded; moist to wet; stiff; very dark gray (10YR 3/1).		
8			120		0.0		(7.0-9.0') SAND, medium, subrounded; little silt; trace granules, subrounded; trace pebbles, small, subrounded; poorly sorted; moist; dark yellowish brown (10YR 4/4).		
9					0.0			(0.5-18.0') Filter Pack Sand	
10					0.0		(9.0-14.0') CLAY, low plasticity, slow to no dilatancy; some silt; trace sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small to large, subrounded; dry to moist; medium stiff to stiff; very dark gray (10YR 3/1).		
11					0.0				
12					0.0			(0.0-22.0') 2.0" dia. PVC casing	
13					0.0				
14					0.0				
15					0.0		(14.0-20.0') CLAY, medium to high plasticity, no dilatancy; trace sand, very fine; trace granules, subrounded; trace pebbles, small to medium, subrounded; moist; soft; dark gray (10YR 4/1).		
16					0.0				
17					0.0				
18					0.0				
19					0.0			(18.0-19.0') Bentonite Pellets	
20					0.0			(19.0-20.0') Choker Sand	

Drilling Co.: Cascade
Driller: Chris Barden
Drilling Method: Sonic Drilling
Drilling Fluid: None
Remarks: ' / ft = feet. bgs = below ground surface.

Sampling Method: 10.0' Core Barrel
Sampling Interval: Continuous
Water Level Start (ft. bgs.): NA
Water Level Finish (ft. btoc.): NA
Converted to Well: ☒ Yes ☐ No
Surface Elev.:
North Coor:
East Coor:

SOIL BORING LOG_2013 \\ARCADIS-US.COM\OFFICE\DATA\NOV1-MI\COMMON\RACER LANSING\WORKING DATA ANALYSIS\BORING LOGS\RACER LANSING MASTER DATABASE_121621_NEW ONLY.GPJ ARCADIS_2013.GDT 12/20/21

ARCADIS Design & Consultancy for natural and built assets

Soil Boring Log

Boring No.: MW-14-58R

Sheet: 2 of 2

Project Name: RACER Lansing
Project Number: 30042872
Project Location: Lansing, MI

Date Started: 10/27/2021
Date Completed: 10/27/2021

Logger: A.Westhuis
Editor: C. Cisco
Weather Conditions: 50° F, Cloudy

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details	Well
21					0.0		(20.0-24.0') CLAY, medium to low plasticity, no dilatancy; some sand, fine, subrounded; trace granules, subrounded; trace pebbles, small to large, subrounded; moist; stiff; dark gray (10YR 4/1).	(20.0-27.0') Filter Pack Sand	
22			120		0.0				
23					0.0				
24					0.0			(22.0-27.0') 2.0" dia. Stainless-Steel 0.010-Slot Screen	
25					0.0		(24.0-27.0') SAND, fine to medium, subrounded; trace to little silt; well sorted; wet; dark grayish brown (10YR 4/2).		
26					0.0				
27					0.0				
							End of boring at 27.0' bgs.		
28									
29									
30									
31									
32									
33									
34									
35									
36									
37									
38									
39									
40									
41									

Remarks:

SOIL BORING LOG_2013 \\ARCADIS-US.COM\OFFICE\DATA\NOV1-MI\COMMON\RACER LANSING\WORKING DATA ANALYSIS\BORING LOGS\RACER LANSING MASTER DATABASE_121621_NEW ONLY.GPJ ARCADIS_2013.GDT 12/20/21

ARCADIS Design & Consultancy for natural and built assets

Soil Boring Log

Boring No.: MW-22-153 (SB-A4-MY55)

Sheet: 1 of 2

Project Name: RACER Lansing
Project Number: 30042872
Project Location: Lansing, MI

Date Started: 03/23/2022
Date Completed: 03/23/2022

Logger: A.Westhuis
Editor: C. Cisco
Weather Conditions: 25° F, Cloudy

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details	Well
1			60		0.4		(0.0-3.0') SAND, very fine to fine, subrounded; little silt, nonplastic, no dilatancy; little clay; trace granules, subrounded; trace pebbles, small, subrounded; well sorted; dry to moist; loose; yellowish brown (10YR 5/4).	(0.0-0.5') Concrete Well Pad with Stick-Up Casing (0.5-1.5') Filter Pack Sand	
2					0.3				
3					0.2				
4					0.1		(3.0-8.5') CLAY, high plasticity, no dilatancy; little silt; little sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small to medium, subrounded; dry to moist; medium stiff; brown (10YR 4/3) to dark gray (10YR 4/1).		
5					0.2			(0.5-25.0') 2.0" dia. SCH-40 PVC casing	
6			43		0.0				
7					0.0				
8					0.0				
9					0.0		(8.5-9.0') SAND, very fine to coarse, subangular to subrounded; little silt; trace granules, subangular to subrounded; trace pebbles, small to medium, subangular to subrounded; poorly sorted; moist; loose; grayish brown (10YR 5/2).		
10					0.0				
11			55		0.0		(9.0-11.5') CLAY, low plasticity, no dilatancy; little silt; little sand, very fine to medium, subrounded; trace pebbles, small, subrounded; dry to moist; stiff; dark gray (10YR 4/1). Note: Organic-rich layer present from 9.5-10.5' bgs.	(1.5-22.0') Bentonite Slurry	
12					0.0		(11.5-15.0') CLAY, high plasticity, no dilatancy; little silt; trace sand, very fine; moist; soft; gray (10YR 5/1).	(0.0-30.0') 8.0" dia. drilled hole	
13					0.0				
14					0.0				
15					0.0				
16			35	SB-A4-MY55_15-19_03232022 @ 14:40	0.0		(15.0-22.5') CLAY, medium plasticity, no dilatancy; little silt; trace sand, very fine to fine, subrounded; trace pebbles, small to medium, subrounded; trace granules, subrounded; dry to moist; stiff; grayish brown (10YR 5/2). Note: Sand seam, small, very fine, wet present at 16.0' bgs.		
17					0.0				
18					0.0				
19					0.0				
20					0.0				

Drilling Co.: Fibertec Environmental Services
Driller: Nick Wiseman
Drilling Method: Direct Push
Drilling Fluid: None
Remarks: ' / ft = feet. bgs = below ground surface. Step-out location west of MW-14-58R.

Sampling Method: 5.0' Macro Core
Sampling Interval: Continuous
Water Level Start (ft. bgs.): NA
Water Level Finish (ft. btoc.): NA
Converted to Well: ☒ Yes ☐ No
Surface Elev.: NA
North Coor:
East Coor:

SOIL BORING LOG_2013 \\ARCADIS-US.COM\OFFICE\DATA\NOV1-MI\COMMON\RACER LANSING\WORKING DATA ANALYSIS\BORING LOGS\RACER LANSING MASTER DATABASE_042722_NEW ONLY.GPJ ARCADIS_2013.GDT 5/17/22

ARCADIS Design & Consultancy for natural and built assets

Soil Boring Log

Boring No.: MW-22-153 (SB-A4-MY55)

Sheet: 2 of 2

Project Name: RACER Lansing
Project Number: 30042872
Project Location: Lansing, MI

Date Started: 03/23/2022
Date Completed: 03/23/2022

Logger: A.Westhuis
Editor: C. Cisco
Weather Conditions: 25° F, Cloudy

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details	Well
21					0.0		(15.0-22.5') CLAY, medium plasticity, no dilatancy; little silt; trace sand, very fine to fine, subrounded; trace pebbles, small to medium, subrounded; trace granules, subrounded; dry to moist; stiff; grayish brown (10YR 5/2).	(1.5-22.0') Bentonite Slurry	
22					0.0				
23			34		0.0		(22.5-29.5') SAND, very fine to coarse, subangular to subrounded; little silt; trace granules, subangular to subrounded; trace pebbles, small to medium, subangular to subrounded; poorly sorted; wet; loose; pale brown (10YR 6/3).	(22.0-23.0') Bentonite Pellets	
24					0.0			(23.0-30.0') Filter Pack Sand	
25					0.0				
26					0.0				
27				SB-A4-MY55_25.5-29.5_03232022 35 @ 13:15	0.0			(25.0-30.0') 2.0" dia. Stainless-Steel 0.010-Slot Screen	
28					0.0				
29					0.0				
30					0.0		(29.5-30.0') CLAY, medium plasticity, no dilatancy; some silt; trace pebbles, small to medium, subrounded; trace granules, subrounded; dry to moist; stiff; gray (10YR 5/1). End of boring at 30.0' bgs.		
31									
32									
33									
34									
35									
36									
37									
38									
39									
40									
41									

Remarks:

SOIL BORING LOG_2013 \\ARCADIS-US.COM\OFFICE\DATA\NOV1-MI\COMMON\RACER LANSING\WORKING DATA ANALYSIS\BORING LOGS\RACER LANSING MASTER DATABASE_042722_NEW ONLY.GPJ ARCADIS_2013.GDT 5/17/22

ARCADIS Design & Consultancy for natural and built assets

Soil Boring Log

Boring No.: MW-22-155

Sheet: 1 of 2

Project Name: RACER Lansing
Project Number: 30112892
Project Location: Lansing, MI

Date Started: 09/07/2022
Date Completed: 09/07/2022

Logger: A.Westhuis
Editor: C. Cisco
Weather Conditions: 78° F, Cloudy

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details	Well
1					0.0		(0.0-1.5') GRASS/TOPSOIL.	(0.0-0.5') Concrete Well Pad with Stick-Up Casing (0.5-1.5') Filter Pack Sand	
2					0.0				
3			60		0.0		(1.5-11.0') CLAY, low plasticity, no dilatancy; little silt; trace sand, fine to medium, subrounded; trace pebbles, small to medium, subrounded; trace granules, subrounded; dry; very stiff; dark yellowish brown (10YR 3/4).		
4					0.0				
5					0.0				
6					0.0				
7					0.0				
8			60		0.0				
9					0.0				
10					0.0			(0.5-25.5') 2.0" dia. SCH-40 PVC casing (1.5-23.5') Bentonite Slurry	
11					0.0				
12					0.0		(11.0-21.0') CLAY, high plasticity, no dilatancy; little silt; trace sand, fine to medium, subrounded; trace pebbles, small to medium, subrounded; trace granules, subrounded; dry to moist; medium stiff; gray (10YR 5/1).		
13			40		0.0				
14					0.0				
15					0.0				
16					0.0				
17					0.0				
18			30		0.0				
19					0.0				
20					0.0				

Drilling Co.: Fibertec Environmental Services
Driller: Nick Wiseman
Drilling Method: Direct Push
Drilling Fluid: None
Remarks: ' / ft = feet. bgs = below ground surface. Stick-up well casing approx. 3' tall.

Sampling Method: 5.0' Macro Core
Sampling Interval: Continuous
Water Level Start (ft. bgs.): NA
Water Level Finish (ft. btoc.): NA
Converted to Well: ☒ Yes ☐ No
Surface Elev.: NA
North Coor:
East Coor:

SOIL BORING LOG_2013 \\ARCADIS-US.COM\OFFICE\DATA\NOV\-MI\COMMON\RACER LANSING\WORKING DATA ANALYSIS\BORING LOGS\RACER LANSING MASTER DATABASE_082522_NEW LOGS ONLY.GPJ ARCADIS_2013.GDT 10/10/22

ARCADIS Design & Consultancy for natural and built assets

Soil Boring Log

Boring No.: MW-22-155

Sheet: 2 of 2

Project Name: RACER Lansing
Project Number: 30112892
Project Location: Lansing, MI

Date Started: 09/07/2022
Date Completed: 09/07/2022

Logger: A.Westhuis
Editor: C. Cisco
Weather Conditions: 78° F, Cloudy

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details	Well
21					0.0				
22					0.0		(21.0-25.0') CLAY, medium plasticity, no dilatancy; little silt; trace sand, fine to medium, subrounded; trace pebbles, small to medium, subrounded; trace granules, subrounded; dry to moist; stiff; grayish brown (10YR 5/2).	(1.5-23.5') Bentonite Slurry	
23			32		0.0				
24					0.0				
25					0.0			(23.5-30.5') Filter Pack Sand	
26					0.0		(25.0-27.0') SAND, very fine to fine, subrounded; little silt; well sorted; wet; grayish brown (10YR 5/2).		
27					0.0				
28			30		0.0		(27.0-28.0') CLAY, low plasticity, no dilatancy; little silt; little sand, fine to medium, subrounded; trace pebbles, small to medium, subrounded; trace granules, subrounded; moist to wet; stiff; grayish brown (10YR 5/2).	(25.5-30.5') 2.0" dia. Stainless-Steel 0.010-Slot Screen	
29					0.0		(28.0-30.5') SAND, very fine to medium, subrounded; little silt; poorly sorted; wet; loose; grayish brown (10YR 5/2).		
30					0.0				
31					0.0		(30.5-35.0') CLAY, high plasticity, no dilatancy; little silt; trace sand, fine to medium, subrounded; trace pebbles, small to medium, subrounded; trace granules, subrounded; dry to moist; medium stiff; gray (10YR 5/1).		
32					0.0				
33			30		0.0			(30.5-35.0') Backfilled with bentonite	
34					0.0				
35					0.0				
36							End of boring at 35.0' bgs.		
37									
38									
39									
40									
41									

Remarks:

SOIL BORING LOG_2013 \\ARCADIS-US.COM\OFFICE\DATA\NOV\-MI\COMMON\RACER LANSING\WORKING DATA ANALYSIS\BORING LOGS\RACER LANSING MASTER DATABASE_082522_NEW LOGS ONLY.GPJ ARCADIS_2013.GDT 10/10/22

ARCADIS Design & Consultancy for natural and built assets

Soil Boring Log

Boring No.: MW-22-156

Sheet: 1 of 2

Project Name: RACER Lansing
Project Number: 30112892
Project Location: Lansing, MI

Date Started: 09/07/2022
Date Completed: 09/07/2022

Logger: A.Westhuis
Editor: C. Cisco
Weather Conditions: 78° F, Cloudy

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details	Well
1					0.0		(0.0-0.7') CONCRETE.	(0.0-0.5') Concrete Well Pad with Stick-Up Casing	
2					0.0		(0.7-13.0') CLAY, low plasticity, no dilatancy; little silt; trace sand, fine to medium, subrounded; trace pebbles, small to medium, subrounded; trace granules, subrounded; dry; very stiff; dark yellowish brown (10YR 3/4).		
3			60		0.0			(0.5-1.0') Filter Pack Sand	
4					0.0				
5					0.0				
6					0.0				
7					0.0				
8			48		0.0				
9					0.0				
10					0.0			(0.5-23.0') 2.0" dia. SCH-40 PVC casing	
11					0.0				
12					0.0				
13			48		0.0				
14					0.0		(13.0-20.5') CLAY, medium to high plasticity, no dilatancy; little silt; trace sand, fine to medium, subrounded; trace pebbles, small to medium, subrounded; trace granules, subrounded; dry to moist; medium stiff; gray (10YR 5/1). Note: Small, wet, very fine sand lens present at 14.0' bgs and 14.5' bgs.		
15					0.0			(1.5-21.0') Bentonite Slurry	
16					0.0				
17					0.0				
18			42		0.0				
19					0.0				
20					0.0				

Drilling Co.: Fibertec Environmental Services
Driller: Nick Wiseman
Drilling Method: Direct Push
Drilling Fluid: None
Remarks: ' / ft = feet. bgs = below ground surface. Stick-up well casing approx. 3' tall.

Sampling Method: 5.0' Macro Core
Sampling Interval: Continuous
Water Level Start (ft. bgs.): NA
Water Level Finish (ft. btoc.): NA
Converted to Well: ☒ Yes ☐ No
Surface Elev.: NA
North Coor:
East Coor:

SOIL BORING LOG_2013 \\ARCADIS-US.COM\OFFICE\DATA\NOV\-MI\COMMON\RACER LANSING\WORKING DATA ANALYSIS\BORING LOGS\RACER LANSING MASTER DATABASE_101022.GPJ ARCADIS_2013.GDT 12/2/22

ARCADIS Design & Consultancy for natural and built assets

Soil Boring Log

Boring No.: MW-22-156

Sheet: 2 of 2

Project Name: RACER Lansing
Project Number: 30112892
Project Location: Lansing, MI

Date Started: 09/07/2022
Date Completed: 09/07/2022
Weather Conditions: 78° F, Cloudy

Logger: A.Westhuis
Editor: C. Cisco

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details	Well
21					0.0		(20.5-21.5') SAND, very fine to fine, subrounded; little silt; well sorted; wet; grayish brown (10YR 5/2).	(1.5-21.0') Bentonite Slurry	
22					0.0		(21.5-22.5') CLAY, low plasticity, no dilatancy; little silt; little sand, fine to medium, subrounded; trace pebbles, small to medium, subrounded; trace granules, subrounded; moist to wet; stiff; grayish brown (10YR 5/2).	(21.0-29.0') Filter Pack Sand	
23			42		0.0		(22.5-28.0') SAND, very fine to fine, subrounded; little silt; well sorted; wet; grayish brown (10YR 5/2).		
24					0.0				
25					0.0			(23.0-28.0') 2.0" dia. Stainless-Steel 0.010-Slot Screen	
26					0.0				
27					0.0				
28			40		0.0				
29					0.0		(28.0-31.0') CLAY, high plasticity, no dilatancy; little silt; trace sand, fine to medium, subrounded; trace pebbles, small to medium, subrounded; trace granules, subrounded; dry to moist; medium stiff; gray (10YR 5/1).		
30					0.0				
31					0.0				
32					0.0		(31.0-33.0') SAND, very fine to fine, subrounded; little silt; well sorted; wet; dry; light (10YR 7/2).	(29.0-35.0') Backfilled with bentonite	
33			40		0.0				
34					0.0		(33.0-35.0') CLAY, nnplastic to low plasticity, no dilatancy; little silt; trace sand, fine to medium, subrounded; trace pebbles, small to medium, subrounded; trace granules, subrounded; dry; very stiff; gray (10YR 5/1).		
35					0.0				
36							End of boring at 35.0' bgs.		
37									
38									
39									
40									
41									

Remarks:

SOIL BORING LOG_2013 \\ARCADIS-US.COM\OFFICE\DATANOV1-MI\COMMON\RACER LANSING\WORKING DATA ANALYSIS\BORING LOGS\RACER LANSING MASTER DATABASE_101022.GPJ ARCADIS_2013.GDT 12/2/22

ARCADIS Design & Consultancy for natural and built assets

Soil Boring Log

Boring No.: MW-22-157

Sheet: 1 of 2

Project Name: RACER Lansing
Project Number: 30112892
Project Location: Lansing, MI

Date Started: 09/08/2022
Date Completed: 09/08/2022

Logger: A.Westhuis
Editor: C. Cisco
Weather Conditions: 78° F, Cloudy

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details	Well
1					0.0		(0.0-0.4') ASPHALT.	(0.0-0.5') Concrete Well Pad with Flushmount Casing	
					0.0		(0.4-2.0') SAND, very fine to coarse, subrounded; little silt; trace pebbles, small to medium, subrounded; trace granules, subrounded; poorly sorted; dry; dark yellowish brown (10YR 3/4). Note: Fill material.	(0.5-2.0') Filter Pack Sand	
2									
3			60		0.0		(2.0-7.5') CLAY, low to medium plasticity, no dilatancy; little silt; trace sand, fine to medium, subrounded; trace pebbles, small to medium, subrounded; trace granules, subrounded; dry to moist; medium stiff; dark grayish brown (10YR 4/2).		
4					0.0				
5					0.0			(0.5-24.0') 2.0" dia. SCH-40 PVC casing	
6					0.0				
7					0.0				
8			60		0.0		(7.5-16.0') CLAY, high plasticity, no dilatancy; little silt; trace sand, fine to medium, subrounded; moist; medium stiff; gray (10YR 5/1).		
9					0.0				
10					0.0				
11					0.0			(2.0-22.0') Bentonite Slurry	
					0.0				
12									
13			30		0.0				
14					0.0				
15					0.0				
16					0.0		(16.0-16.8') SAND, very fine to fine, subrounded; little silt; well sorted; wet; grayish brown (10YR 5/2).		
17					0.0		(16.8-17.5') CLAY, high plasticity, no dilatancy; little silt; trace sand, fine to medium, subrounded; trace pebbles, small to medium, subrounded; trace granules, subrounded; dry to moist; medium stiff; gray (10YR 5/1).		
18			36		0.0		(17.5-18.3') SAND, very fine to fine, subrounded; little silt; well sorted; wet; light gray (10YR 7/2).		
19					0.0		(18.3-18.5') CLAY, low plasticity, no dilatancy; little silt; trace sand, fine to medium, subrounded; trace pebbles, small to medium, subrounded; trace granules, subrounded; moist; stiff; gray (10YR 5/1).		
20									

Drilling Co.: Fibertec Environmental Services
Driller: Nick Wiseman
Drilling Method: Direct Push
Drilling Fluid: None
Remarks: ' / ft = feet. bgs = below ground surface. Flushmount well.

Sampling Method: 5.0' Macro Core
Sampling Interval: Continuous
Water Level Start (ft. bgs.): NA
Water Level Finish (ft. btoc.): NA
Converted to Well: ☒ Yes ☐ No
Surface Elev.: NA
North Coor:
East Coor:

SOIL BORING LOG_2013 \\ARCADIS-US.COM\OFFICE\DATA\NOVI-MI\COMMON\RACER LANSING\WORKING DATA ANALYSIS\BORING LOGS\RACER LANSING MASTER DATABASE_082522_NEW LOGS ONLY.GPJ ARCADIS_2013.GDT 10/10/22

ARCADIS Design & Consultancy for natural and built assets

Soil Boring Log

Boring No.: MW-22-157

Sheet: 2 of 2

Project Name: RACER Lansing
Project Number: 30112892
Project Location: Lansing, MI

Date Started: 09/08/2022
Date Completed: 09/08/2022

Logger: A.Westhuis
Editor: C. Cisco
Weather Conditions: 78° F, Cloudy

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details	Well
21					0.0		(18.5-19.0') SAND, very fine to fine, subrounded; little silt; well sorted; wet; light gray (10YR 7/2).		
22					0.0		(19.0-22.0') CLAY, nonplastic to low plasticity, no dilatancy; little silt; little sand, fine to medium, subrounded; trace pebbles, small to medium, subrounded; trace granules, subrounded; moist; stiff; gray (10YR 5/1).	(2.0-22.0') Bentonite Slurry	
23			36		0.0		(22.0-24.0') SAND, very fine to medium, subrounded; little silt; trace granules, subrounded; trace pebbles, small, subrounded; poorly sorted; wet; grayish brown (10YR 5/2).	(22.0-30.0') Filter Pack Sand	
24					0.0				
25					0.0		(24.0-27.0') CLAY, nonplastic to low plasticity, no dilatancy; little silt; little sand, fine to medium, subrounded; trace pebbles, small to medium, subrounded; trace granules, subrounded; moist; stiff; gray (10YR 5/1).		
26					0.0				
27					0.0			(24.0-29.0') 2.0" dia. Stainless-Steel 0.010-Slot Screen	
28			36		0.0		(27.0-29.0') SAND, fine to medium, subrounded; little silt; trace granules, subrounded; well sorted; wet; brown (10YR 5/3).		
29					0.0				
30					0.0		(29.0-33.0') CLAY, medium plasticity, no dilatancy; little silt; little sand, fine to medium, subrounded; trace pebbles, small to medium, subrounded; trace granules, subrounded; moist; stiff; grayish brown (10YR 5/2).		
31					0.0				
32					0.0				
33			36		0.0			(30.0-35.0') Backfilled with bentonite	
34					0.0		(33.0-35.0') SAND, very fine to fine, subrounded; little silt; well sorted; dry; light gray (10YR 7/1).		
35					0.0				
36							End of boring at 35.0' bgs.		
37									
38									
39									
40									
41									

Remarks:

SOIL BORING LOG_2013 \\ARCADIS-US.COM\OFFICE\DATA\NOV\-MI\COMMON\RACER LANSING\WORKING DATA ANALYSIS\BORING LOGS\RACER LANSING MASTER DATABASE_082522_NEW LOGS ONLY.GPJ ARCADIS_2013.GDT 10/10/22

ARCADIS Design & Consultancy for natural and built assets

Soil Boring Log

Boring No.: SB-A4-MV60

Sheet: 1 of 2

Project Name: RACER Lansing
Project Number: 30042872
Project Location: Lansing, MI

Date Started: 03/23/2022
Date Completed: 03/23/2022

Logger: A.Westhuis
Editor: C. Cisco
Weather Conditions: 25° F, Cloudy

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details	Well
1					0.0		(0.0-1.0') CONCRETE.		
2					0.0		(1.0-6.5') SAND, very fine to fine, subrounded; trace silt, nonplastic, no dilatancy; well sorted; moist to wet; loose; yellowish brown (10YR 5/4).		
3			60		0.0				
4					0.0				
5					0.1				
6					0.0				
7					0.0		(6.5-12.5') CLAY, low plasticity, no dilatancy; some sand, very fine to fine, subrounded; little silt, nonplastic, no dilatancy; trace pebbles, small, subrounded; trace granules, subrounded; dry to moist; stiff; dark grayish brown (10YR 4/2).		
8			47		0.0				
9					0.0				
10					0.0			(0.0-35.0') Backfilled with bentonite	
11					0.0				
12					0.0				
13			44		0.0		(12.5-19.0') CLAY, high plasticity, no dilatancy; little silt; little sand, very fine; trace pebbles, small, subrounded; trace granules, subrounded; moist; medium stiff; gray (10YR 5/1).		
14					0.0				
15					0.0				
16					0.0				
17					0.0				
18			39		0.0				
19					0.0				
20					0.0				

Drilling Co.: Fibertec Environmental Services
Driller: Nick Wiseman
Drilling Method: Direct Push
Drilling Fluid: None
Remarks: ' / ft = feet. bgs = below ground surface. Step-out location north of MW-14-58R. VAP samples collected from 21-25' bgs and 29.5-33.5' bgs.

Sampling Method: 5.0' Macro Core
Sampling Interval: Continuous
Water Level Start (ft. bgs.): NA
Water Level Finish (ft. btoc.): NA
Converted to Well: ☐ Yes ☒ No
Surface Elev.: NA
North Coor:
East Coor:

SOIL BORING LOG_2013 \\ARCADIS-US.COM\OFFICE\DATA\NOV1-MI\COMMON\RACER LANSING\WORKING DATA ANALYSIS\BORING LOGS\RACER LANSING MASTER DATABASE_042722_NEW ONLY.GPJ ARCADIS_2013.GDT 5/17/22

ARCADIS Design & Consultancy for natural and built assets

Soil Boring Log

Boring No.: SB-A4-MV60

Sheet: 2 of 2

Project Name: RACER Lansing
Project Number: 30042872
Project Location: Lansing, MI

Date Started: 03/23/2022
Date Completed: 03/23/2022

Logger: A.Westhuis
Editor: C. Cisco
Weather Conditions: 25° F, Cloudy

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details	Well
21			35	SB-A4-MV60_21-25_03232022 @ 11:00	0.0		(19.0-30.0') SILT, nonplastic, slow dilatancy; some sand, very fine to fine, subrounded; little clay, nonplastic, slow dilatancy; trace pebbles, small to medium, subrounded; trace granules, subrounded; poorly sorted; wet; medium stiff; grayish brown (10YR 5/2).	(0.0-35.0') Backfilled with bentonite	
22					0.0				
23					0.0				
24					0.0				
25					0.0				
26			37		0.0				
27					0.0				
28					0.0				
29					0.0				
30					0.0				
31			33	SB-A4-MV60_29.5-33.5_03232022 @ 10:20	0.0		(30.0-33.5') SAND, fine to medium, subrounded; little silt, nonplastic, rapid dilatancy; well sorted; wet; loose; brown (10YR 5/3).		
32					0.0				
33					0.0				
34					0.0		(33.5-35.0') CLAY, medium plasticity, no dilatancy; little silt, low plasticity, no dilatancy; little sand, very fine to fine, subrounded; trace pebbles, small to medium, subrounded; trace granules, subrounded; dry to moist; stiff; grayish brown (10YR 5/2).		
35					0.0		End of boring at 35.0' bgs.		
36									
37									
38									
39									
40									
41									

Remarks:

SOIL BORING LOG_2013 \\ARCADIS-US.COM\OFFICE\DATA\NOV\-MI\COMMON\RACER LANSING\WORKING DATA ANALYSIS\BORING LOGS\RACER LANSING MASTER DATABASE_042722_NEW ONLY.GPJ ARCADIS_2013.GDT 5/17/22

ARCADIS Design & Consultancy for natural and built assets

Soil Boring Log

Boring No.: SB-A4-MX60

Sheet: 1 of 1

Project Name: RACER Lansing
Project Number: 30112892
Project Location: Lansing, MI

Date Started: 09/07/2022
Date Completed: 09/07/2022

Logger: A.Westhuis
Editor: C. Cisco
Weather Conditions: 78° F, Cloudy

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details	Well
1					0.0		(0.0-0.7') CONCRETE.	(0.0-1.0') Concrete	
2			60	SB-A4-MX60_1-3 _090722 @ 10:00	0.0		(0.7-6.0') SAND, medium, subrounded; little silt; trace granules, subrounded; well sorted; moist; dark yellowish brown (10YR 4/4).	(1.0-2.0') Filter Pack Sand	
3					0.0				
4					0.0				
5					0.0				
6				SB-A4-MX60_4-6 _090722 @ 10:05	0.0				
7				SB-A4-MX60_6-8 _090722 @ 10:09	0.0		(6.0-8.5') CLAY, medium plasticity, no dilatancy; little silt; trace sand, fine to medium, subrounded; trace pebbles, small to medium, subrounded; trace granules, subrounded; moist; stiff; very dark gray (10YR 3/1).		
8			48		0.0				
9				SB-A4-MX60_8.5-10 _090722 @ 10:14	0.0		(8.5-10.0') SAND, medium, subrounded; little clay, low plasticity, no dilatancy; little silt; trace pebbles, small to medium, subrounded; trace granules, subrounded; poorly sorted; moist; dark yellowish brown (10YR 4/4).	(2.0-15.0') Bentonite Pellets	
10					0.0				
11				SB-A4-MX60_10-12 _090722 @ 10:19	0.0		(10.0-15.0') CLAY, medium plasticity, no dilatancy; little silt; trace sand, fine to medium, subrounded; trace pebbles, small to medium, subrounded; trace granules, subrounded; moist; stiff; very dark gray (10YR 3/1).		
12					0.0				
13			44		0.0				
14					0.0				
15					0.0				
16							End of boring at 15.0' bgs.		
17									
18									
19									
20									

Drilling Co.: Fibertec Environmental Services
Driller: Nick Wiseman
Drilling Method: Direct Push
Drilling Fluid: None
Remarks: ' / ft = feet. bgs = below ground surface.

Sampling Method: 5.0' Macro Core
Sampling Interval: Continuous
Water Level Start (ft. bgs.): NA
Water Level Finish (ft. btoc.): NA
Converted to Well: ☐ Yes ☒ No
Surface Elev.: NA
North Coor:
East Coor:

SOIL BORING LOG_2013 \\ARCADIS-US.COM\OFFICE\DATA\NOV1-MI\COMMON\RACER LANSING\WORKING DATA ANALYSIS\BORING LOGS\RACER LANSING MASTER DATABASE_082522_NEW LOGS ONLY.GPJ_ARCADIS_2013.GDT 10/10/22

ARCADIS Design & Consultancy for natural and built assets

Soil Boring Log

Boring No.: SB-A4-MY63

Sheet: 1 of 2

Project Name: RACER Lansing
Project Number: 30042872
Project Location: Lansing, MI

Date Started: 03/22/2022
Date Completed: 03/22/2022

Logger: A.Westhuis
Editor: C. Cisco
Weather Conditions: 25° F, Cloudy

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details	Well
1					0.0		(0.0-1.0') CONCRETE.		
2					0.1		(1.0-5.0') SAND, very fine to fine, subrounded; trace silt, nonplastic, no dilatancy; well sorted; moist to wet; loose; yellowish brown (10YR 5/4).		
3			60		0.1				
4					0.1				
5					0.2				
6					0.0		(5.0-15.0') CLAY, low plasticity, no dilatancy; some sand, very fine to fine, subrounded; little silt, nonplastic, no dilatancy; trace pebbles, small, subrounded; trace granules, subrounded; dry to moist; stiff; dark grayish brown (10YR 4/2).		
7					0.0				
8			46		0.0				
9					0.0				
10					0.0			(0.0-35.0') Backfilled with bentonite	
11					0.0				
12					0.0				
13			9		0.0				
14					0.0				
15					0.0				
16					0.0		(15.0-21.0') CLAY, high plasticity, no dilatancy; little silt; little sand, very fine; trace pebbles, small, subrounded; trace granules, subrounded; moist; medium stiff; gray (10YR 5/1).		
17					0.0				
18			34		0.0				
19					0.0				
20					0.0				

Drilling Co.: Fibertec Environmental Services
Driller: Nick Wiseman
Drilling Method: Direct Push
Drilling Fluid: None
Remarks: ' / ft = feet. bgs = below ground surface. Step-out location east of MW-14-58R. VAP samples collected from 18-22' bgs and 26-30' bgs.

Sampling Method: 5.0' Macro Core
Sampling Interval: Continuous
Water Level Start (ft. bgs.): 4.0
Water Level Finish (ft. btoc.): NA
Converted to Well: ☐ Yes ☒ No
Surface Elev.: NA
North Coor:
East Coor:

SOIL BORING LOG_2013 \\ARCADIS-US.COM\OFFICE\DATA\NOV\-MI\COMMON\RACER LANSING\WORKING DATA ANALYSIS\BORING LOGS\RACER LANSING MASTER DATABASE_042722_NEW ONLY.GPJ ARCADIS_2013.GDT 5/17/22

ARCADIS Design & Consultancy for natural and built assets

Soil Boring Log

Boring No.: SB-A4-MY63

Sheet: 2 of 2

Project Name: RACER Lansing
Project Number: 30042872
Project Location: Lansing, MI

Date Started: 03/22/2022
Date Completed: 03/22/2022

Logger: A.Westhuis
Editor: C. Cisco
Weather Conditions: 25° F, Cloudy

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details	Well
21				SB-A4-MY63_18-22 _03222022 @ 13:25	0.0				
22					0.0		(21.0-22.0') SILT, nonplastic, slow dilatancy; some sand, very fine to fine, subrounded; little clay, nonplastic, slow dilatancy; well sorted; moist to wet; medium stiff; grayish brown (10YR 5/2).		
23			47		0.0		(22.0-26.0') CLAY, low plasticity to nonplastic, no dilatancy; little silt; little sand, very fine to fine, subrounded; trace pebbles, small to large, subrounded; trace granules, subrounded; moist; stiff; gray (10YR 5/1).		
24					0.0				
25					0.0				
26					0.0				
27					0.0		(26.0-29.5') SAND, very fine to medium, subrounded; some silt, nonplastic, slow dilatancy; little clay; trace pebbles, small to large, subrounded; trace granules, subrounded; poorly sorted; moist to wet; dense; gray (10YR 5/1).	(0.0-35.0') Backfilled with bentonite	
28			42	SB-A4-MY63_26-30 _03222022 @ 12:55	0.0				
29					0.0				
30					0.0		(29.5-30.0') SAND, very fine to coarse, subangular to subrounded; trace granules, subrounded; trace silt, nonplastic, rapid dilatancy; poorly sorted; wet; loose; grayish brown (10YR 5/2).		
31					0.0		(30.0-35.0') CLAY, high plasticity, no dilatancy; little silt; little sand, very fine; trace pebbles, small, subrounded; trace granules, subrounded; moist; medium stiff; gray (10YR 5/1).		
32					0.0				
33			40		0.0				
34					0.0				
35					0.0				
36							End of boring at 35.0' bgs.		
37									
38									
39									
40									
41									

Remarks:

SOIL BORING LOG_2013 \\ARCADIS-US.COM\OFFICE\DATA\NOV\-MI\COMMON\RACER LANSING\WORKING DATA ANALYSIS\BORING LOGS\RACER LANSING MASTER DATABASE_042722_NEW ONLY.GPJ ARCADIS_2013.GDT 5/17/22

ARCADIS Design & Consultancy for natural and built assets

Soil Boring Log

Boring No.: SB-A4-NB60

Sheet: 1 of 2

Project Name: RACER Lansing
Project Number: 30042872
Project Location: Lansing, MI

Date Started: 03/22/2022
Date Completed: 03/22/2022

Logger: A.Westhuis
Editor: C. Cisco
Weather Conditions: 25° F, Cloudy

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details	Well
1			60		0.0		(0.0-1.0') CONCRETE.	(0.0-35.0') Backfilled with bentonite	
2					0.1		(1.0-6.0') SAND, very fine to fine, subrounded; trace silt, nonplastic, no dilatancy; well sorted; moist to wet; loose; yellowish brown (10YR 5/4).		
3					0.1				
4					0.1				
5					0.1				
6			52		0.0				
7					0.8		(6.0-12.0') CLAY, low plasticity, no dilatancy; some sand, very fine to fine, subrounded; little silt, nonplastic, no dilatancy; trace pebbles, small, subrounded; trace granules, subrounded; dry to moist; stiff; dark grayish brown (10YR 4/2).		
8					0.0				
9					0.0				
10					0.0				
11			36		0.0				
12					0.0				
13					0.0		(12.0-20.0') CLAY, high plasticity, no dilatancy; little silt; little sand, very fine; trace pebbles, small, subrounded; trace granules, subrounded; moist; medium stiff; gray (10YR 5/1).		
14					0.0				
15					0.0				
16			22		0.0				
17					0.0				
18					0.0				
19					0.0				
20					0.0				

Drilling Co.: Fibertec Environmental Services
Driller: Nick Wiseman
Drilling Method: Direct Push
Drilling Fluid: None
Remarks: ' / ft = feet. bgs = below ground surface. Step-out location south of MW-14-58R. VAP samples collected from 22-26' bgs and 30-34' bgs.

Sampling Method: 5.0' Macro Core
Sampling Interval: Continuous
Water Level Start (ft. bgs.): NA
Water Level Finish (ft. btoc.): NA
Converted to Well: ☐ Yes ☒ No
Surface Elev.: NA
North Coor:
East Coor:

SOIL BORING LOG_2013 \\ARCADIS-US.COM\OFFICE\DATA\NOV1-MI\COMMON\RACER LANSING\WORKING DATA ANALYSIS\BORING LOGS\RACER LANSING MASTER DATABASE_042722_NEW ONLY.GPJ ARCADIS_2013.GDT 5/17/22

ARCADIS Design & Consultancy for natural and built assets

Soil Boring Log

Boring No.: SB-A4-NB60

Sheet: 2 of 2

Project Name: RACER Lansing
Project Number: 30042872
Project Location: Lansing, MI

Date Started: 03/22/2022
Date Completed: 03/22/2022

Logger: A.Westhuis
Editor: C. Cisco
Weather Conditions: 25° F, Cloudy

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details	Well
21			30	SB-A4-NB60_22-26 _03222022 @ 16:00	0.0		(20.0-29.0') SILT, nonplastic, slow dilatancy; some sand, very fine to fine, subrounded; little clay, nonplastic, slow dilatancy; trace pebbles, small to medium, subrounded; trace granules, subrounded; poorly sorted; wet; medium stiff; grayish brown (10YR 5/2).	(0.0-35.0') Backfilled with bentonite	
22					0.0				
23					0.0				
24					0.0				
25					0.0				
26			35		0.0				
27					0.0				
28					0.0				
29					0.0				
30					0.0		(29.0-30.0') CLAY, low plasticity, no dilatancy; little silt, nonplastic, no dilatancy; little sand, very fine to fine, subrounded; trace pebbles, small to large, subrounded; trace granules, subrounded; moist; stiff; gray (10YR 5/1).		
31			34	SB-A4-NB60_30-34 _03222022 @ 15:15	0.0		(30.0-34.0') SAND, fine to medium, subrounded; little silt, nonplastic, rapid dilatancy; well sorted; wet; loose; brown (10YR 5/3).		
32					0.0				
33					0.0				
34					0.0				
35					0.0		(34.0-35.0') CLAY, medium plasticity, no dilatancy; little silt, low plasticity, no dilatancy; little sand, very fine to fine, subrounded; trace pebbles, small to medium, subrounded; trace granules, subrounded; dry to moist; stiff; grayish brown (10YR 5/2).		
36							End of boring at 35.0' bgs.		
37									
38									
39									
40									
41									

Remarks:

SOIL BORING LOG_2013 \\ARCADIS-US.COM\OFFICE\DATA\NOV1-MI\COMMON\RACER LANSING\WORKING DATA ANALYSIS\BORING LOGS\RACER LANSING MASTER DATABASE_042722_NEW ONLY.GPJ ARCADIS_2013.GDT 5/17/22

Attachment 2

Analytical Reports

Analytical Laboratory Report

Report ID: S32761.01(01)+QC01
Generated on 02/14/2022

Report to

Attention: Kaitlyn Hunt
Arcadis
28550 Cabot Drive
Suite 500
Novi, MI 48377

Phone: O:248-809-4013 C:947-777-5215 FAX:
Email: Kaitlyn.Hunt@arcadis.com

Addtional Contacts: Alex Villhauer, Marina Samp, Tiffany Linder, Patrick Curry

Report produced by

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

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

Contacts for report questions:
John Laverty (johnlaverty@meritlabs.com)
Barbara Ball (bball@meritlabs.com)

Report Summary

Lab Sample ID(s): S32761.01
Project: 30112892.47A / RACER Lansing
Collected Date(s): 02/10/2022
Submitted Date/Time: 02/10/2022 12:00
Sampled by: Unknown
P.O. #: 30112892.47A

Table of Contents

Cover Page (Page 1)
General Report Notes (Page 2)
Report Narrative (Page 2)
Laboratory Certifications (Page 3)
Qualifier Descriptions (Page 3)
Glossary of Abbreviations (Page 3)
Method Summary (Page 4)
Sample Summary (Page 5)
QC Report (Pages 7-13)

Maya Murshak
Technical Director

General Report Notes

Analytical results relate only to the samples tested, in the condition received by the laboratory.
Methods may be modified for improved performance.
Results reported on a dry weight basis where applicable.
'Not detected' indicates that parameter was not found at a level equal to or greater than the reporting limit (RL).
When MDL results are provided, then 'Not detected' indicates that parameter was not found at a level equal to or greater than the MDL.
40 CFR Part 136 Table II Required Containers, Preservation Techniques and Holding Times for the Clean Water Act specify that samples for acrolein and acrylonitrile need to be preserved at a pH in the range of 4 to 5 or if not preserved, analyzed within 3 days of sampling.
QA/QC corresponding to this analytical report is a separate document with the same Merit ID reference and is available upon request.
Full accreditation certificates are available upon request. Starred (*) analytes are not NELAP accredited.
Samples are held by the lab for 30 days from the final report date unless a written request to hold longer is provided by the client.
Report shall not be reproduced except in full, without the written approval of Merit Laboratories, Inc.
Limits for drinking water samples, are listed as the MCL Limits (Maximum Contaminant Level Concentrations)
PFAS requirement: Section 9.3.8 of U.S. EPA Method 537.1 states "If the method analyte(s) found in the Field Sample is present in the FRB at a concentration greater than 1/3 the MRL, then all samples collected with that FRB are invalid and must be recollected and reanalyzed."
Samples submitted without an accompanying FRB may not be acceptable for compliance purposes.
Wisconsin PFAs analysis: MDL = LOD; RL = LOQ. LOD and LOQ are adjusted for dilution.

Report Narrative

There is no additional narrative for this analytical report

Laboratory Certifications

Authority	Certification ID
Michigan DEQ	#9956
DOD ELAP/ISO 17025	#69699
WBENC	#2005110032
Ohio VAP	#CL0002
Indiana DOH	#C-MI-07
New York NELAC	#11814
North Carolina DENR	#680
North Carolina DOH	#26702
Alaska CSLAP	#17-001
Pennsylvania DEP	#68-05884
Wisconsin DNR	FID# 399147320

Qualifier Descriptions

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

Glossary of Abbreviations

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

Method Summary

Method	Version
N/A	Not Applicable
SW8260B - SIM	SW 846 Method 8260B Revision 2 December 1996 SIMs

Analytical Laboratory Report

Sample Summary (1 samples)

Sample ID	Sample Tag	Matrix	Collected Date/Time
S32761.01	MW-14-58R_021022	Groundwater	02/10/22 11:20

Analytical Laboratory Report

Lab Sample ID: S32761.01
Sample Tag: MW-14-58R_021022
Collected Date/Time: 02/10/2022 11:20
Matrix: Groundwater
COC Reference: 141667

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	6.0	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	02/11/22 15:30	BML	

Organics - Volatiles

Method: SW8260B - SIM, Run Date: 02/11/22 14:18, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,4-Dioxane*	520	10		ug/L	10	123-91-1	Y

Y-Elevated reporting limit due to high target concentration

Quality Control Report

Report ID: S32761.01(01)+QC01
Generated on 02/14/2022

Report to

Attention: Kaitlyn Hunt
Arcadis
28550 Cabot Drive
Suite 500
Novi, MI 48377

Phone: O:248-809-4013 C:947-777-5215 FAX:

Report Produced by

Merit Laboratories
2680 East Lansing Drive
East Lansing, MI 48823

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

Report Summary

Lab Sample ID(s): S32761.01
Project: 30112892.47A / RACER Lansing
Submitted Date/Time: 02/10/2022 12:00
Sampled by: Unknown
P.O. #: 30112892.47A

QC Report Sections

Cover Page (Page 7)
Analysis Summary (Page 8)
Prep Batch Summary (Page 9)
Surrogates per QC Sample (Page 10)
Internal Standards per Lab Sample (Page 11)
Internal Standards per QC Sample (Page 12)
Batch QC Results (Page 13)

Report Flag Descriptions

*: QC result is outside of indicated control limits
W: Surrogate result not applicable due to sample dilution

I certify that this data package is in compliance with the terms and conditions of the program, and project, and contractual requirements both technically and for completeness. Release of the data contained in this hardcopy data package and its computer-readable data submitted has been authorized by the Quality Assurance Manager and his/her designee, as verified by the following signature.

Barbara Ball
Quality Assurance Manager

Lab Sample ID: S32761.01
Sample Tag: MW-14-58R_021022
Collected Date/Time: 02/10/2022 11:20
Matrix: Groundwater
COC Reference: 141667

Analysis	Method	Run Date/Time	Batch ID	Prep ID	Surr	QC Types
Organics - Volatiles						
1,4-Dioxane	SW8260B - SIM	02/11/22 14:18	220211A9	VS220211W1	Yes	BLK/LCS/LCSD

QC Report - Prep Batch Summary

Organics - Volatiles, Prep Batch ID: VS220211W1

Surrogates: Yes, QC Types: BLK/LCS/LCSD

Sample ID	Analysis	Method	Run Date/Time	Batch ID
S32761.01	1,4-Dioxane	SW8260B - SIM	02/11/22 14:18	220211A9

QC Report - Surrogates per QC Sample

Organics - Volatiles, Prep Batch ID: VS220211W1

QC Types: BLK/LCS/LCSD

Blank (BLK)

Lab Sample ID: 220211A9.BLKW11A

Run in Batch: 220211A9, Run Date: 02/11/2022 13:37, Prep Date: 02/11/2022, Matrix: WW, Dilution: 1

Surrogate	Flags	**%Rec**	LCL	UCL

No Surrogates

Laboratory Control Sample (LCS)

Lab Sample ID: 220211A9.LCSW11A

Run in Batch: 220211A9, Run Date: 02/11/2022 11:56, Prep Date: 02/11/2022, Matrix: WW, Dilution: 1

Surrogate	Flags	**%Rec**	LCL	UCL

No Surrogates

Laboratory Control Sample Duplicate (LCSD)

Lab Sample ID: 220211A9.LCSDW11A, Parent Sample ID: 220211A9.LCSW11A

Run in Batch: 220211A9, Run Date: 02/11/2022 12:16, Prep Date: 02/11/2022, Matrix: WW, Dilution: 1

Surrogate	Flags	**%Rec**	LCL	UCL

No Surrogates

QC Report - Internal Standards per Lab Sample

Lab Sample ID: S32761.01

Sample Tag: MW-14-58R_021022

Collected Date/Time: 02/10/2022 11:20

Matrix: Groundwater

COC Reference: 141667

Organics - Volatiles, Analysis: 1,4-Dioxane

Run in Batch: 220211A9, Run Date: 02/11/2022 14:18, Matrix: WW, Dilution: 10

Internal Standard	Flags	**%Rec**	LCL	UCL
1,4-Dioxane-D8		**88.4**	50.0	200.0

QC Report - Internal Standards per QC Sample

Organics - Volatiles, Prep Batch ID: VS220211W1

QC Types: BLK/LCS/LCSD

Blank (BLK)

Lab Sample ID: 220211A9.BLKW11A

Run in Batch: 220211A9, Run Date: 02/11/2022 13:37, Prep Date: 02/11/2022, Matrix: WW, Dilution: 1

Internal Standard	Flags	**%Rec**	LCL	UCL
1,4-Dioxane-D8		**88.0**	50.0	200.0

Laboratory Control Sample (LCS)

Lab Sample ID: 220211A9.LCSW11A

Run in Batch: 220211A9, Run Date: 02/11/2022 11:56, Prep Date: 02/11/2022, Matrix: WW, Dilution: 1

Internal Standard	Flags	**%Rec**	LCL	UCL
1,4-Dioxane-D8		**102.6**	50.0	200.0

Laboratory Control Sample Duplicate (LCSD)

Lab Sample ID: 220211A9.LCSDW11A, Parent Sample ID: 220211A9.LCSW11A

Run in Batch: 220211A9, Run Date: 02/11/2022 12:16, Prep Date: 02/11/2022, Matrix: WW, Dilution: 1

Internal Standard	Flags	**%Rec**	LCL	UCL
1,4-Dioxane-D8		**99.0**	50.0	200.0

Organics - Volatiles, Prep Batch ID: VS220211W1

Surrogates: Yes, QC Types: BLK/LCS/LCSD

Blank (BLK)

Lab Sample ID: 220211A9.BLKW11A

Run in Batch: 220211A9, Run Date: 02/11/2022 13:37, Prep Date: 02/11/2022, Matrix: WW, Dilution: 1

Analyte	Flags	Conc	RDL	Units
1,4-Dioxane	*	0.88	0.02	ug/l

Laboratory Control Sample (LCS)

Lab Sample ID: 220211A9.LCSW11A

Run in Batch: 220211A9, Run Date: 02/11/2022 11:56, Prep Date: 02/11/2022, Matrix: WW, Dilution: 1

Analyte	Flags	% Rec	LCL	UCL
1,4-Dioxane		91.8	70.0	130.0

Laboratory Control Sample Duplicate (LCSD)

Lab Sample ID: 220211A9.LCSDW11A, Parent Sample ID: 220211A9.LCSW11A

Run in Batch: 220211A9, Run Date: 02/11/2022 12:16, Prep Date: 02/11/2022, Matrix: WW, Dilution: 1

Analyte	Flags	% Rec	LCL	UCL	RPD	RPD CL
1,4-Dioxane		94.7	70.0	130.0	3.1	30.0

Merit Laboratories Login Checklist

Lab Set ID: S32761
Client: ARCADIS_NOVI (ARCADIS U.S., Inc.)
Project: 30112892.47A / RACER Lansing
Submitted: 02/10/2022 12:00 Login User: MMC

Attention: Kaitlyn Hunt
Address: Arcadis
28550 Cabot Drive
Suite 500
Novi, MI 48377

Phone: O:248-809-4013 FAX:
Email: Kaitlyn.Hunt@arcadis.com

Selection				Description	Note
Sample Receiving					
01.	[X] Yes	[ ] No	[ ] N/A	Samples are received at 4C +/- 2C Thermometer #	IR 6.0
02.	[X] Yes	[ ] No	[ ] N/A	Received on ice/ cooling process begun	
03.	[ ] Yes	[X] No	[ ] N/A	Samples shipped	
04.	[ ] Yes	[X] No	[ ] N/A	Samples left in 24 hr. drop box	
05.	[ ] Yes	[ ] No	[X] N/A	Are there custody seals/tape or is the drop box locked	
Chain of Custody					
06.	[X] Yes	[ ] No	[ ] N/A	COC adequately filled out	
07.	[X] Yes	[ ] No	[ ] N/A	COC signed and relinquished to the lab	
08.	[X] Yes	[ ] No	[ ] N/A	Sample tag on bottles match COC	
09.	[ ] Yes	[X] No	[ ] N/A	Subcontracting needed? Subcontacted to:	
Preservation					
10.	[X] Yes	[ ] No	[ ] N/A	Do sample have correct chemical preservation	
11.	[ ] Yes	[ ] No	[X] N/A	Completed pH checks on preserved samples? (no VOAs)	
12.	[ ] Yes	[X] No	[ ] N/A	Did any samples need to be preserved in the lab?	
Bottle Conditions					
13.	[X] Yes	[ ] No	[ ] N/A	All bottles intact	
14.	[X] Yes	[ ] No	[ ] N/A	Appropriate analytical bottles are used	
15.	[X] Yes	[ ] No	[ ] N/A	Merit bottles used	
16.	[X] Yes	[ ] No	[ ] N/A	Sufficient sample volume received	
17.	[ ] Yes	[X] No	[ ] N/A	Samples require laboratory filtration	
18.	[X] Yes	[ ] No	[ ] N/A	Samples submitted within holding time	
19.	[ ] Yes	[ ] No	[X] N/A	Do water VOC or TOX bottles contain headspace	

Corrective action for all exceptions is to call the client and to notify the project manager.

Client Review By: _____ Date: _____

Merit Laboratories, Inc.

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

C.O.C. PAGE # 1 OF 1

141667

CHAIN OF CUSTODY RECORD

Plant 2

REPORT TO

CONTACT NAME: Tiffany Linder
COMPANY: Arcadis
ADDRESS: 28550 Cabot Drive, Suite 500
CITY: Novi STATE: MI ZIP CODE: 48377
PHONE NO.: 810-225-1928 FAX NO.: P.O. NO.:
E-MAIL ADDRESS: Tiffany.Linder@arcadis.com QUOTE NO.:

INVOICE TO

CONTACT NAME: ☒ SAME
COMPANY:
ADDRESS:
CITY: STATE: ZIP CODE:
PHONE NO.: E-MAIL ADDRESS:

PROJECT NO./NAME: 30112892.47A / RACER Lansing
SAMPLER(S) - PLEASE PRINT/SIGN NAME:

TURNAROUND TIME REQUIRED ☐ 1 DAY ☐ 2 DAYS ☐ 3 DAYS ☒ STANDARD ☐ OTHER

DELIVERABLES REQUIRED ☐ STD ☐ LEVEL II ☐ LEVEL III ☐ LEVEL IV ☐ EDD ☐ OTHER

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

ANALYSIS (ATTACH LIST IF MORE SPACE IS REQUIRED)

Certifications
☐ OHIO VAP ☐ Drinking Water
☐ DoD ☐ NPDES

Project Locations
☐ Detroit ☐ New York
☒ Other MI

Special Instructions

MERIT LAB NO. (FOR LAB USE ONLY)	YEAR DATE	YEAR TIME	SAMPLE TAG IDENTIFICATION-DESCRIPTION	MATRIX	# OF BOTTLES	# Containers & Preservatives: NONE	HCl	HNO_3	H_2SO_4	NaOH	MeOH	OTHER	1,4-Dioxane 8260 SIMS
32761.01	2/10/22	1120	MW-14-58R_021022	GW	3		3						X

RELINQUISHED BY: SIGNATURE/ORGANIZATION: [signature] / Arcadis ☒ Sampler DATE: 2/10/22 TIME: 1200
RECEIVED BY: SIGNATURE/ORGANIZATION: Merit Drop Box DATE: 2/10/22 TIME: 1200

RELINQUISHED BY: SIGNATURE/ORGANIZATION: Merit Drop Box DATE: 2/10/22 TIME: 1200
RECEIVED BY: SIGNATURE/ORGANIZATION: [signature] DATE: 2/10/22 TIME: 1200

RELINQUISHED BY: SIGNATURE/ORGANIZATION: DATE: TIME:
RECEIVED BY: SIGNATURE/ORGANIZATION: DATE: TIME:

SEAL NO. SEAL INTACT YES ☐ NO ☐ INITIALS
SEAL NO. SEAL INTACT YES ☐ NO ☐ INITIALS

NOTES: TEMP. ON ARRIVAL 6.0

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

Rev. 5.18.12

* Please also email results to: Patrick.Curry@arcadis.com and Alex.Villhauer@arcadis.com

Analytical Laboratory Report

Report ID: S34187.01(01)
Generated on 03/31/2022

Report to

Attention: Tiffany Linder
Arcadis US, Inc.
28550 Cabot Drive
Suite 500
Novi, MI 48377

Phone: 248-994-2272 FAX:
Email: tiffany.linder@arcadis.com

Addtional Contacts: Alex Villhauer, Caitlin Cisco

Report produced by

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

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

Contacts for report questions:
John Laverty (johnlaverty@meritlabs.com)
Barbara Ball (bball@meritlabs.com)

Report Summary

Lab Sample ID(s): S34187.01-S34187.11
Project: 30075941.04100 / RACER Lansing
Collected Date(s): 03/22/2022 - 03/23/2022
Submitted Date/Time: 03/23/2022 15:45
Sampled by: Austin Westhuis
P.O. #: 30075941.04100

Table of Contents

Cover Page (Page 1)
General Report Notes (Page 2)
Report Narrative (Page 2)
Laboratory Certifications (Page 3)
Qualifier Descriptions (Page 3)
Glossary of Abbreviations (Page 3)
Method Summary (Page 4)
Sample Summary (Page 5)

Maya Murshak
Technical Director

General Report Notes

Analytical results relate only to the samples tested, in the condition received by the laboratory.
Methods may be modified for improved performance.
Results reported on a dry weight basis where applicable.
'Not detected' indicates that parameter was not found at a level equal to or greater than the reporting limit (RL).
When MDL results are provided, then 'Not detected' indicates that parameter was not found at a level equal to or greater than the MDL.
40 CFR Part 136 Table II Required Containers, Preservation Techniques and Holding Times for the Clean Water Act specify that samples for acrolein and acrylonitrile need to be preserved at a pH in the range of 4 to 5 or if not preserved, analyzed within 3 days of sampling.
QA/QC corresponding to this analytical report is a separate document with the same Merit ID reference and is available upon request.
Full accreditation certificates are available upon request. Starred (*) analytes are not NELAP accredited.
Samples are held by the lab for 30 days from the final report date unless a written request to hold longer is provided by the client.
Report shall not be reproduced except in full, without the written approval of Merit Laboratories, Inc.
Limits for drinking water samples, are listed as the MCL Limits (Maximum Contaminant Level Concentrations)
PFAS requirement: Section 9.3.8 of U.S. EPA Method 537.1 states "If the method analyte(s) found in the Field Sample is present in the FRB at a concentration greater than 1/3 the MRL, then all samples collected with that FRB are invalid and must be recollected and reanalyzed."
Samples submitted without an accompanying FRB may not be acceptable for compliance purposes.
Wisconsin PFAs analysis: MDL = LOD; RL = LOQ. LOD and LOQ are adjusted for dilution.

Report Narrative

There is no additional narrative for this analytical report

Laboratory Certifications

Authority	Certification ID
Michigan DEQ	#9956
DOD ELAP/ISO 17025	#69699
WBENC	#2005110032
Ohio VAP	#CL0002
Indiana DOH	#C-MI-07
New York NELAC	#11814
North Carolina DENR	#680
North Carolina DOH	#26702
Alaska CSLAP	#17-001
Pennsylvania DEP	#68-05884
Wisconsin DNR	FID# 399147320

Qualifier Descriptions

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

Glossary of Abbreviations

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

Method Summary

Method	Version
N/A	Not Applicable
SW8260B - SIM	SW 846 Method 8260B Revision 2 December 1996 SIMs

Sample Summary (11 samples)

Sample ID	Sample Tag	Matrix	Collected Date/Time
S34187.01	SB-A4-MY63_26-30	Groundwater	03/22/22 12:55
S34187.02	SB-A4-MY63_18-22	Groundwater	03/22/22 13:25
S34187.03	SB-A4-NB60_30-34	Groundwater	03/22/22 15:15
S34187.04	SB-A4-NB60_22-26	Groundwater	03/22/22 16:00
S34187.05	SB-A4-MV60_29.5-33.5	Groundwater	03/23/22 10:20
S34187.06	SB-A4-MV60_21-25	Groundwater	03/23/22 11:00
S34187.07	SB-A4-MY55_25.5-29.5	Groundwater	03/23/22 13:15
S34187.08	SB-A4-MY55_25.5-29.5 MS	Groundwater	03/23/22 13:15
S34187.09	SB-A4-MY55_25.5-29.5 MSD	Groundwater	03/23/22 13:15
S34187.10	SB-A4-MY55_15-19	Groundwater	03/23/22 14:40
S34187.11	Dup-01	Groundwater	03/23/22 00:01

Lab Sample ID: S34187.01
Sample Tag: SB-A4-MY63_26-30
Collected Date/Time: 03/22/2022 12:55
Matrix: Groundwater
COC Reference: 140688

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	2.6	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	03/31/22 11:45	NDK	

Organics - Volatiles

Method: SW8260B - SIM, Run Date: 03/30/22 18:15, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,4-Dioxane*	100	1		ug/L	1	123-91-1	

Lab Sample ID: S34187.02
Sample Tag: SB-A4-MY63_18-22
Collected Date/Time: 03/22/2022 13:25
Matrix: Groundwater
COC Reference: 140688

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	2.6	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	03/31/22 11:45	NDK	

Organics - Volatiles

Method: SW8260B - SIM, Run Date: 03/30/22 19:57, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,4-Dioxane*	51	1		ug/L	1	123-91-1	

Lab Sample ID: S34187.03
Sample Tag: SB-A4-NB60_30-34
Collected Date/Time: 03/22/2022 15:15
Matrix: Groundwater
COC Reference: 140688

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	2.6	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	03/31/22 11:45	NDK	

Organics - Volatiles

Method: SW8260B - SIM, Run Date: 03/30/22 19:36, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,4-Dioxane*	191	1		ug/L	1	123-91-1	

Lab Sample ID: S34187.04
Sample Tag: SB-A4-NB60_22-26
Collected Date/Time: 03/22/2022 16:00
Matrix: Groundwater
COC Reference: 140688

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	2.6	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	>2	N/A	03/31/22 11:45	NDK	

Organics - Volatiles

Method: SW8260B - SIM, Run Date: 03/30/22 20:19, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,4-Dioxane*	18	1		ug/L	1	123-91-1	

Lab Sample ID: S34187.05
Sample Tag: SB-A4-MV60_29.5-33.5
Collected Date/Time: 03/23/2022 10:20
Matrix: Groundwater
COC Reference: 140688

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	2.6	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	>2	N/A	03/31/22 11:45	NDK	

Organics - Volatiles

Method: SW8260B - SIM, Run Date: 03/31/22 11:32, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,4-Dioxane*	32	1		ug/L	1	123-91-1	Y

Y-Elevated reporting limit due to high target concentration

Analytical Laboratory Report

Lab Sample ID: S34187.06
Sample Tag: SB-A4-MV60_21-25
Collected Date/Time: 03/23/2022 11:00
Matrix: Groundwater
COC Reference: 140688

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	2.6	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	03/31/22 11:45	NDK	

Organics - Volatiles

Method: SW8260B - SIM, Run Date: 03/30/22 21:03, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,4-Dioxane*	13	1		ug/L	1	123-91-1	

Lab Sample ID: S34187.07
Sample Tag: SB-A4-MY55_25.5-29.5
Collected Date/Time: 03/23/2022 13:15
Matrix: Groundwater
COC Reference: 140688

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	2.6	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	>2	N/A	03/31/22 11:45	NDK	

Organics - Volatiles

Method: SW8260B - SIM, Run Date: 03/30/22 13:32, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,4-Dioxane*	128	1		ug/L	1	123-91-1	

Lab Sample ID: S34187.08
Sample Tag: SB-A4-MY55_25.5-29.5 MS
Collected Date/Time: 03/23/2022 13:15
Matrix: Groundwater
COC Reference: 140688

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	2.6	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	03/31/22 11:45	NDK	

Organics - Volatiles

Method: SW8260B - SIM, Run Date: 03/30/22 12:09, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,4-Dioxane*	192	1		ug/L	1	123-91-1	1

1-Spiked at 50ug/L

Analytical Laboratory Report

Lab Sample ID: S34187.09
Sample Tag: SB-A4-MY55_25.5-29.5 MSD
Collected Date/Time: 03/23/2022 13:15
Matrix: Groundwater
COC Reference: 140688

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	2.6	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	03/31/22 11:45	NDK	

Organics - Volatiles

Method: SW8260B - SIM, Run Date: 03/30/22 12:30, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,4-Dioxane*	172	1		ug/L	1	123-91-1	1

1-Spiked at 50ug/L

Lab Sample ID: S34187.10
Sample Tag: SB-A4-MY55_15-19
Collected Date/Time: 03/23/2022 14:40
Matrix: Groundwater
COC Reference: 140688

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	2.6	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	03/31/22 11:45	NDK	

Organics - Volatiles

Method: SW8260B - SIM, Run Date: 03/30/22 21:25, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,4-Dioxane*	Not detected	1		ug/L	1	123-91-1	

Analytical Laboratory Report

Lab Sample ID: S34187.11
Sample Tag: Dup-01
Collected Date/Time: 03/23/2022 00:01
Matrix: Groundwater
COC Reference: 140688

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	2.6	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	>2	N/A	03/31/22 11:45	NDK	

Organics - Volatiles

Method: SW8260B - SIM, Run Date: 03/31/22 11:53, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,4-Dioxane*	31	1		ug/L	1	123-91-1	Y

Y-Elevated reporting limit due to high target concentration

Merit Laboratories Login Checklist

Lab Set ID: S34187
Client: ARCADIS_NOVI (ARCADIS U.S., Inc.)
Project: 30075941.04100 / RACER Lansing
Submitted: 03/23/2022 15:45 Login User: PFD

Attention: Tiffany Linder
Address: Arcadis US, Inc.
28550 Cabot Drive
Suite 500
Novi, MI 48377

Phone: 248-994-2272 FAX:
Email: tiffany.linder@arcadis.com

Selection				Description	Note
Sample Receiving					
01.	[X] Yes	[ ] No	[ ] N/A	Samples are received at 4C +/- 2C Thermometer #	IR 2.6
02.	[X] Yes	[ ] No	[ ] N/A	Received on ice/ cooling process begun	
03.	[ ] Yes	[X] No	[ ] N/A	Samples shipped	
04.	[ ] Yes	[X] No	[ ] N/A	Samples left in 24 hr. drop box	
05.	[ ] Yes	[ ] No	[X] N/A	Are there custody seals/tape or is the drop box locked	
Chain of Custody					
06.	[X] Yes	[ ] No	[ ] N/A	COC adequately filled out	
07.	[X] Yes	[ ] No	[ ] N/A	COC signed and relinquished to the lab	
08.	[X] Yes	[ ] No	[ ] N/A	Sample tag on bottles match COC	
09.	[ ] Yes	[X] No	[ ] N/A	Subcontracting needed? Subcontacted to:	
Preservation					
10.	[X] Yes	[ ] No	[ ] N/A	Do sample have correct chemical preservation	
11.	[ ] Yes	[ ] No	[X] N/A	Completed pH checks on preserved samples? (no VOAs)	
12.	[ ] Yes	[X] No	[ ] N/A	Did any samples need to be preserved in the lab?	
Bottle Conditions					
13.	[X] Yes	[ ] No	[ ] N/A	All bottles intact	
14.	[X] Yes	[ ] No	[ ] N/A	Appropriate analytical bottles are used	
15.	[X] Yes	[ ] No	[ ] N/A	Merit bottles used	
16.	[X] Yes	[ ] No	[ ] N/A	Sufficient sample volume received	
17.	[ ] Yes	[X] No	[ ] N/A	Samples require laboratory filtration	
18.	[X] Yes	[ ] No	[ ] N/A	Samples submitted within holding time	
19.	[ ] Yes	[X] No	[ ] N/A	Do water VOC or TOX bottles contain headspace	

Corrective action for all exceptions is to call the client and to notify the project manager.

Client Review By: _____ Date: _____

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

C.O.C. PAGE # 1 OF 1

140688

CHAIN OF CUSTODY RECORD

REPORT TO

CONTACT NAME: Tiffany Linder
COMPANY: Arcadis
ADDRESS: 28550 Cabot Drive, Suite 500
CITY: Novi STATE: MI ZIP CODE: 48377
PHONE NO.: 810-225-1928 FAX NO.: P.O. NO.:
E-MAIL ADDRESS: Tiffany.Linder@arcadis.com QUOTE NO.:

INVOICE TO

CONTACT NAME: ☒SAME
COMPANY:
ADDRESS:
CITY: STATE: ZIP CODE:
PHONE NO.: E-MAIL ADDRESS:

PROJECT NO./NAME: 30075941.04100 / RACER Lansing
SAMPLER(S) - PLEASE PRINT/SIGN NAME: Austin Westhuis / AuCW.C

TURNAROUND TIME REQUIRED ☐ 1 DAY ☐ 2 DAYS ☐ 3 DAYS ☒ STANDARD ☐ OTHER

DELIVERABLES REQUIRED ☐ STD ☐ LEVEL II ☐ LEVEL III ☐ LEVEL IV ☐ EDD ☐ OTHER

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

ANALYSIS (ATTACH LIST IF MORE SPACE IS REQUIRED)

Certifications
☐ OHIO VAP ☐ Drinking Water
☐ DoD ☐ NPDES
Project Locations
☐ Detroit ☐ New York
☒ Other MI
Special Instructions

MERIT LAB NO. (FOR LAB USE ONLY)	YEAR DATE	YEAR TIME	SAMPLE TAG, IDENTIFICATION-DESCRIPTION	MATRIX	# OF BOTTLES	# Containers & Preservatives: NONE	HCl	HNO_3	H_2SO_4	NaOH	MeOH	OTHER	1,4-Dioxane 8260 SIM	
341870 1	3/22/22	1255	SB-A4-MW63_26-30	GW	3		3						X	
.02	3/22/22	1325	SB-A4-MW63_18-22	GW	3		3						X	
.03	3/22/22	1515	SB-A4-NB60_30-34	GW	3		3						X	
.04	3/22/22	1600	SB-A4-NB60_22-26	GW	3		3						X	
.05	3/23/22	1020	SB-A4-MW60_29.5-33.5	GW	3		3						X	
.06	3/23/22	1100	SB-A4-MW60_21-25	GW	3		3						X	
.07,.08,.09	3/23/22	1315	SB-A4-MW55_25.5-29.5	GW	9		9						X	ms/msD
.10 ~~.09~~	3/23/22	1440	SB-A4-MW55_15-19	GW	3		3						X	
.11 ~~.04~~	3/23/22	——	Dup-01	GW	3		3						X	

RELINQUISHED BY: SIGNATURE/ORGANIZATION		DATE	TIME
	Au CW.C / Arcadis ☒Sampler	3/23/22	1545
RECEIVED BY: SIGNATURE/ORGANIZATION	Merit Drop Box	3/23/22	1545
RELINQUISHED BY: SIGNATURE/ORGANIZATION		DATE	TIME
RECEIVED BY: SIGNATURE/ORGANIZATION		DATE	TIME

RELINQUISHED BY: SIGNATURE/ORGANIZATION		DATE	TIME
	Merit Drop Box	3/23/22	1545
RECEIVED BY: SIGNATURE/ORGANIZATION	M Chilcote	3/23/22	1545

SEAL NO. SEAL INTACT YES ☐ NO ☐ INITIALS
SEAL NO. SEAL INTACT YES ☐ NO ☐ INITIALS

NOTES: TEMP. ON ARRIVAL 2.6

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

Rev. 5.18.12

Quality Control Report

Report ID: QC-S34187-01
Generated on 04/04/2022

Report to

Attention: Tiffany Linder
Arcadis US, Inc.
28550 Cabot Drive
Suite 500
Novi, MI 48377

Phone: 248-994-2272 FAX:

Report Produced by

Merit Laboratories
2680 East Lansing Drive
East Lansing, MI 48823

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

Report Summary

Lab Sample ID(s): S34187.01-S34187.11
Project: 30075941.04100 / RACER Lansing
Submitted Date/Time: 03/23/2022 15:45
Sampled by: Austin Westhuis
P.O. #: 30075941.04100

QC Report Sections

Cover Page (Page 1)
Analysis Summary (Pages 2-12)
Prep Batch Summary (Page 13)
Surrogates per QC Sample (Pages 14-15)
Batch QC Results (Pages 16-17)

Report Flag Descriptions

*: QC result is outside of indicated control limits
W: Surrogate result not applicable due to sample dilution

I certify that this data package is in compliance with the terms and conditions of the program, and project, and contractual requirements both technically and for completeness. Release of the data contained in this hardcopy data package and its computer-readable data submitted has been authorized by the Quality Assurance Manager and his/her designee, as verified by the following signature.

Barbara Ball
Quality Assurance Manager

QC Report - Analysis Summary

Lab Sample ID: S34187.01
Sample Tag: SB-A4-MY63_26-30
Collected Date/Time: 03/22/2022 12:55
Matrix: Groundwater
COC Reference: 140688

Analysis	Method	Run Date/Time	Batch ID	Prep ID	Surr	QC Types
Organics - Volatiles						
1,4-Dioxane	SW8260B - SIM	03/30/22 18:15	220330A9	VS220330S2	Yes	BLK/LCS/LCSD/MS/MS

QC Report - Analysis Summary

Lab Sample ID: S34187.02
Sample Tag: SB-A4-MY63_18-22
Collected Date/Time: 03/22/2022 13:25
Matrix: Groundwater
COC Reference: 140688

Analysis	Method	Run Date/Time	Batch ID	Prep ID	Surr	QC Types
Organics - Volatiles						
1,4-Dioxane	SW8260B - SIM	03/30/22 19:57	220330A9	VS220330S2	Yes	BLK/LCS/LCSD/MS/MS

QC Report - Analysis Summary

Lab Sample ID: S34187.03
Sample Tag: SB-A4-NB60_30-34
Collected Date/Time: 03/22/2022 15:15
Matrix: Groundwater
COC Reference: 140688

Analysis	Method	Run Date/Time	Batch ID	Prep ID	Surr	QC Types
Organics - Volatiles						
1,4-Dioxane	SW8260B - SIM	03/30/22 19:36	220330A9	VS220330S2	Yes	BLK/LCS/LCSD/MS/MS

Lab Sample ID: S34187.04

Sample Tag: SB-A4-NB60_22-26

Collected Date/Time: 03/22/2022 16:00

Matrix: Groundwater

COC Reference: 140688

Analysis	Method	Run Date/Time	Batch ID	Prep ID	Surr	QC Types
Organics - Volatiles						
1,4-Dioxane	SW8260B - SIM	03/30/22 20:19	220330A9	VS220330S2	Yes	BLK/LCS/LCSD/MS/MS

QC Report - Analysis Summary

Lab Sample ID: S34187.05
Sample Tag: SB-A4-MV60_29.5-33.5
Collected Date/Time: 03/23/2022 10:20
Matrix: Groundwater
COC Reference: 140688

Analysis	Method	Run Date/Time	Batch ID	Prep ID	Surr	QC Types
Organics - Volatiles						
1,4-Dioxane	SW8260B - SIM	03/31/22 11:32	220331A9	VS220331S2	Yes	BLK/LCS/LCSD

Lab Sample ID: S34187.06

Sample Tag: SB-A4-MV60_21-25

Collected Date/Time: 03/23/2022 11:00

Matrix: Groundwater

COC Reference: 140688

Analysis	Method	Run Date/Time	Batch ID	Prep ID	Surr	QC Types
Organics - Volatiles						
1,4-Dioxane	SW8260B - SIM	03/30/22 21:03	220330A9	VS220330S2	Yes	BLK/LCS/LCSD/MS/MS

Lab Sample ID: S34187.07

Sample Tag: SB-A4-MY55_25.5-29.5

Collected Date/Time: 03/23/2022 13:15

Matrix: Groundwater

COC Reference: 140688

Analysis	Method	Run Date/Time	Batch ID	Prep ID	Surr	QC Types
Organics - Volatiles						
1,4-Dioxane	SW8260B - SIM	03/30/22 13:32	220330A9	VS220330S2	Yes	BLK/LCS/LCSD/MS/MS

QC Report - Analysis Summary

Lab Sample ID: S34187.08
Sample Tag: SB-A4-MY55_25.5-29.5 MS
Collected Date/Time: 03/23/2022 13:15
Matrix: Groundwater
COC Reference: 140688

Analysis	Method	Run Date/Time	Batch ID	Prep ID	Surr	QC Types
Organics - Volatiles						
1,4-Dioxane	SW8260B - SIM	03/30/22 12:09	220330A9	VS220330S2	Yes	BLK/LCS/LCSD/MS/MS

Lab Sample ID: S34187.09

Sample Tag: SB-A4-MY55_25.5-29.5 MSD

Collected Date/Time: 03/23/2022 13:15

Matrix: Groundwater

COC Reference: 140688

Analysis	Method	Run Date/Time	Batch ID	Prep ID	Surr	QC Types
Organics - Volatiles						
1,4-Dioxane	SW8260B - SIM	03/30/22 12:30	220330A9	VS220330S2	Yes	BLK/LCS/LCSD/MS/MS

Lab Sample ID: S34187.10

Sample Tag: SB-A4-MY55_15-19

Collected Date/Time: 03/23/2022 14:40

Matrix: Groundwater

COC Reference: 140688

Analysis	Method	Run Date/Time	Batch ID	Prep ID	Surr	QC Types
Organics - Volatiles						
1,4-Dioxane	SW8260B - SIM	03/30/22 21:25	220330A9	VS220330S2	Yes	BLK/LCS/LCSD/MS/MS

Lab Sample ID: S34187.11

Sample Tag: Dup-01

Collected Date/Time: 03/23/2022 00:01

Matrix: Groundwater

COC Reference: 140688

Analysis	Method	Run Date/Time	Batch ID	Prep ID	Surr	QC Types
Organics - Volatiles						
1,4-Dioxane	SW8260B - SIM	03/31/22 11:53	220331A9	VS220331S2	Yes	BLK/LCS/LCSD

QC Report - Prep Batch Summary

Organics - Volatiles, Prep Batch ID: VS220330S2

Surrogates: Yes, QC Types: BLK/LCS/LCSD/MS/MSD

Sample ID	Analysis	Method	Run Date/Time	Batch ID
S34187.01	1,4-Dioxane	SW8260B - SIM	03/30/22 18:15	220330A9
S34187.02	1,4-Dioxane	SW8260B - SIM	03/30/22 19:57	220330A9
S34187.03	1,4-Dioxane	SW8260B - SIM	03/30/22 19:36	220330A9
S34187.04	1,4-Dioxane	SW8260B - SIM	03/30/22 20:19	220330A9
S34187.06	1,4-Dioxane	SW8260B - SIM	03/30/22 21:03	220330A9
S34187.07	1,4-Dioxane	SW8260B - SIM	03/30/22 13:32	220330A9
S34187.08	1,4-Dioxane	SW8260B - SIM	03/30/22 12:09	220330A9
S34187.09	1,4-Dioxane	SW8260B - SIM	03/30/22 12:30	220330A9
S34187.10	1,4-Dioxane	SW8260B - SIM	03/30/22 21:25	220330A9

Organics - Volatiles, Prep Batch ID: VS220331S2

Surrogates: Yes, QC Types: BLK/LCS/LCSD

Sample ID	Analysis	Method	Run Date/Time	Batch ID
S34187.05	1,4-Dioxane	SW8260B - SIM	03/31/22 11:32	220331A9
S34187.11	1,4-Dioxane	SW8260B - SIM	03/31/22 11:53	220331A9

QC Report - Surrogates per QC Sample

Organics - Volatiles, Prep Batch ID: VS220330S2

QC Types: BLK/LCS/LCSD/MS/MSD

Blank (BLK)

Lab Sample ID: 220330A9.BLKS30A

Run in Batch: 220330A9, Run Date: 03/30/2022 13:11, Prep Date: 03/30/2022, Matrix: WW, Dilution: 1

Surrogate	Flags	**%Rec**	LCL	UCL

No Surrogates

Laboratory Control Sample (LCS)

Lab Sample ID: 220330A9.LCSS30A

Run in Batch: 220330A9, Run Date: 03/30/2022 11:28, Prep Date: 03/30/2022, Matrix: WW, Dilution: 1

Surrogate	Flags	**%Rec**	LCL	UCL

No Surrogates

Laboratory Control Sample Duplicate (LCSD)

Lab Sample ID: 220330A9.LCSDS30A, Parent Sample ID: 220330A9.LCSS30A

Run in Batch: 220330A9, Run Date: 03/30/2022 11:49, Prep Date: 03/30/2022, Matrix: WW, Dilution: 1

Surrogate	Flags	**%Rec**	LCL	UCL

No Surrogates

Matrix Spike (MS)

Lab Sample ID: 220330A9.3418708M, Parent Sample ID: S34187.07

Run in Batch: 220330A9, Run Date: 03/30/2022 12:09, Prep Date: 03/30/2022, Matrix: WW, Dilution: 1

Surrogate	Flags	**%Rec**	LCL	UCL

No Surrogates

Matrix Spike Duplicate (MSD)

Lab Sample ID: 220330A9.3418709N, Parent Sample ID: 220330A9.3418708M

Run in Batch: 220330A9, Run Date: 03/30/2022 12:30, Prep Date: 03/30/2022, Matrix: WW, Dilution: 1

Surrogate	Flags	**%Rec**	LCL	UCL

No Surrogates

QC Report - Surrogates per QC Sample

Organics - Volatiles, Prep Batch ID: VS220331S2

QC Types: BLK/LCS/LCSD

Blank (BLK)

Lab Sample ID: 220331A9.BLKS31A

Run in Batch: 220331A9, Run Date: 03/31/2022 11:12, Prep Date: 03/31/2022, Matrix: WW, Dilution: 1

Surrogate	Flags	**%Rec**	LCL	UCL

No Surrogates

Laboratory Control Sample (LCS)

Lab Sample ID: 220331A9.LCSS31A

Run in Batch: 220331A9, Run Date: 03/31/2022 10:10, Prep Date: 03/31/2022, Matrix: WW, Dilution: 1

Surrogate	Flags	**%Rec**	LCL	UCL

No Surrogates

Laboratory Control Sample Duplicate (LCSD)

Lab Sample ID: 220331A9.LCSDS31A, Parent Sample ID: 220331A9.LCSS31A

Run in Batch: 220331A9, Run Date: 03/31/2022 10:31, Prep Date: 03/31/2022, Matrix: WW, Dilution: 1

Surrogate	Flags	**%Rec**	LCL	UCL

No Surrogates

Organics - Volatiles, Prep Batch ID: VS220330S2

Surrogates: Yes, QC Types: BLK/LCS/LCSD/MS/MSD

Blank (BLK)

Lab Sample ID: 220330A9.BLKS30A

Run in Batch: 220330A9, Run Date: 03/30/2022 13:11, Prep Date: 03/30/2022, Matrix: WW, Dilution: 1

Analyte	Flags	Conc	RDL	Units
1,4-Dioxane	*	0.51	0.02	ug/l

Laboratory Control Sample (LCS)

Lab Sample ID: 220330A9.LCSS30A

Run in Batch: 220330A9, Run Date: 03/30/2022 11:28, Prep Date: 03/30/2022, Matrix: WW, Dilution: 1

Analyte	Flags	% Rec	LCL	UCL
1,4-Dioxane		95.0	70.0	130.0

Laboratory Control Sample Duplicate (LCSD)

Lab Sample ID: 220330A9.LCSDS30A, Parent Sample ID: 220330A9.LCSS30A

Run in Batch: 220330A9, Run Date: 03/30/2022 11:49, Prep Date: 03/30/2022, Matrix: WW, Dilution: 1

Analyte	Flags	% Rec	LCL	UCL	RPD	RPD CL
1,4-Dioxane		97.8	70.0	130.0	2.9	30.0

Matrix Spike (MS)

Lab Sample ID: 220330A9.3418708M, Parent Sample ID: S34187.07

Run in Batch: 220330A9, Run Date: 03/30/2022 12:09, Prep Date: 03/30/2022, Matrix: WW, Dilution: 1

Analyte	Flags	% Rec	LCL	UCL
1,4-Dioxane		127.9	70.0	130.0

Matrix Spike Duplicate (MSD)

Lab Sample ID: 220330A9.3418709N, Parent Sample ID: 220330A9.3418708M

Run in Batch: 220330A9, Run Date: 03/30/2022 12:30, Prep Date: 03/30/2022, Matrix: WW, Dilution: 1

Analyte	Flags	% Rec	LCL	UCL	RPD	RPD CL
1,4-Dioxane		89.4	70.0	130.0	10.6	30.0

Organics - Volatiles, Prep Batch ID: VS220331S2

Surrogates: Yes, QC Types: BLK/LCS/LCSD

Blank (BLK)

Lab Sample ID: 220331A9.BLKS31A

Run in Batch: 220331A9, Run Date: 03/31/2022 11:12, Prep Date: 03/31/2022, Matrix: WW, Dilution: 1

Analyte	Flags	Conc	RDL	Units
1,4-Dioxane	*	0.57	0.02	ug/l

Laboratory Control Sample (LCS)

Lab Sample ID: 220331A9.LCSS31A

Run in Batch: 220331A9, Run Date: 03/31/2022 10:10, Prep Date: 03/31/2022, Matrix: WW, Dilution: 1

Analyte	Flags	% Rec	LCL	UCL
1,4-Dioxane		85.3	70.0	130.0

Laboratory Control Sample Duplicate (LCSD)

Lab Sample ID: 220331A9.LCSDS31A, Parent Sample ID: 220331A9.LCSS31A

Run in Batch: 220331A9, Run Date: 03/31/2022 10:31, Prep Date: 03/31/2022, Matrix: WW, Dilution: 1

Analyte	Flags	% Rec	LCL	UCL	RPD	RPD CL
1,4-Dioxane		86.3	70.0	130.0	1.1	30.0

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

C.O.C. PAGE # 1 OF 1

140688

CHAIN OF CUSTODY RECORD

REPORT TO

CONTACT NAME: Tiffany Linder
COMPANY: Arcadis
ADDRESS: 28550 Cabot Drive, Suite 500
CITY: Novi STATE: MI ZIP CODE: 48377
PHONE NO.: 810-225-1928 FAX NO.: P.O. NO.:
E-MAIL ADDRESS: Tiffany.Linder@arcadis.com QUOTE NO.:

INVOICE TO

CONTACT NAME: ☒SAME
COMPANY:
ADDRESS:
CITY: STATE: ZIP CODE:
PHONE NO.: E-MAIL ADDRESS:

PROJECT NO./NAME: 30075941.04100 / RACER Lansing
SAMPLER(S) - PLEASE PRINT/SIGN NAME: Austin Westhuis / AuCW.C

TURNAROUND TIME REQUIRED ☐ 1 DAY ☐ 2 DAYS ☐ 3 DAYS ☒ STANDARD ☐ OTHER

DELIVERABLES REQUIRED ☐ STD ☐ LEVEL II ☐ LEVEL III ☐ LEVEL IV ☐ EDD ☐ OTHER

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

ANALYSIS (ATTACH LIST IF MORE SPACE IS REQUIRED)

Certifications
☐ OHIO VAP ☐ Drinking Water
☐ DoD ☐ NPDES
Project Locations
☐ Detroit ☐ New York
☒ Other MI
Special Instructions

MERIT LAB NO. (FOR LAB USE ONLY)	YEAR DATE	YEAR TIME	SAMPLE TAG, IDENTIFICATION-DESCRIPTION	MATRIX	# OF BOTTLES	# Containers & Preservatives: NONE	HCl	HNO_3	H_2SO_4	NaOH	MeOH	OTHER	1,4-Dioxane 8260 SIM	
341870 1	3/22/22	1255	SB-A4-MW63_26-30	GW	3		3						X	
.02	3/22/22	1325	SB-A4-MW63_18-22	GW	3		3						X	
.03	3/22/22	1515	SB-A4-NB60_30-34	GW	3		3						X	
.04	3/22/22	1600	SB-A4-NB60_22-26	GW	3		3						X	
.05	3/23/22	1020	SB-A4-MW60_29.5-33.5	GW	3		3						X	
.06	3/23/22	1100	SB-A4-MW60_21-25	GW	3		3						X	
.07,.08,.09	3/23/22	1315	SB-A4-MW55_25.5-29.5	GW	9		9						X	ms/msD
.10 ~~.09~~	3/23/22	1440	SB-A4-MW55_15-19	GW	3		3						X	
.11 ~~.04~~	3/23/22	——	Dup-01	GW	3		3						X	

RELINQUISHED BY: SIGNATURE/ORGANIZATION		DATE	TIME
	Au CW.C / Arcadis ☒Sampler	3/23/22	1545
RECEIVED BY: SIGNATURE/ORGANIZATION	Merit Drop Box	3/23/22	1545
RELINQUISHED BY: SIGNATURE/ORGANIZATION		DATE	TIME
RECEIVED BY: SIGNATURE/ORGANIZATION		DATE	TIME

RELINQUISHED BY: SIGNATURE/ORGANIZATION		DATE	TIME
	Merit Drop Box	3/23/22	1545
RECEIVED BY: SIGNATURE/ORGANIZATION	M Chilcote	3/23/22	1545

SEAL NO. SEAL INTACT YES ☐ NO ☐ INITIALS
SEAL NO. SEAL INTACT YES ☐ NO ☐ INITIALS

NOTES: TEMP. ON ARRIVAL 2.6

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

Rev. 5.18.12

Analytical Laboratory Report

Report ID: S34620.01(01)
Generated on 04/19/2022

Report to

Attention: Tiffany Linder
Arcadis US, Inc.
28550 Cabot Drive
Suite 500
Novi, MI 48377

Phone: 248-994-2272 FAX:
Email: tiffany.linder@arcadis.com

Addtional Contacts: Alex Villhauer, Caitlin Cisco, Patrick Curry

Report produced by

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

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

Contacts for report questions:
John Laverty (johnlaverty@meritlabs.com)
Barbara Ball (bball@meritlabs.com)

Report Summary

Lab Sample ID(s): S34620.01-S34620.02
Project: 30075941.04100 / RACER Lansing
Collected Date(s): 04/06/2022
Submitted Date/Time: 04/06/2022 13:45
Sampled by: Austin Westhuis
P.O. #: 30075941.04100

Table of Contents

Cover Page (Page 1)
General Report Notes (Page 2)
Report Narrative (Page 2)
Laboratory Certifications (Page 3)
Qualifier Descriptions (Page 3)
Glossary of Abbreviations (Page 3)
Method Summary (Page 4)
Sample Summary (Page 5)

Maya Murshak
Technical Director

General Report Notes

Analytical results relate only to the samples tested, in the condition received by the laboratory.
Methods may be modified for improved performance.
Results reported on a dry weight basis where applicable.
'Not detected' indicates that parameter was not found at a level equal to or greater than the reporting limit (RL).
When MDL results are provided, then 'Not detected' indicates that parameter was not found at a level equal to or greater than the MDL.
40 CFR Part 136 Table II Required Containers, Preservation Techniques and Holding Times for the Clean Water Act specify that samples for acrolein, acrylonitrile, and 2-chlorovinylethyl ether need to be preserved at a pH in the range of 4 to 5 or if not preserved, analyzed within 3 days of sampling.
QA/QC corresponding to this analytical report is a separate document with the same Merit ID reference and is available upon request.
Full accreditation certificates are available upon request. Starred (*) analytes are not NELAP accredited.
Samples are held by the lab for 30 days from the final report date unless a written request to hold longer is provided by the client.
Report shall not be reproduced except in full, without the written approval of Merit Laboratories, Inc.
Limits for drinking water samples, are listed as the MCL Limits (Maximum Contaminant Level Concentrations)
PFAS requirement: Section 9.3.8 of U.S. EPA Method 537.1 states "If the method analyte(s) found in the Field Sample is present in the FRB at a concentration greater than 1/3 the MRL, then all samples collected with that FRB are invalid and must be recollected and reanalyzed."
Samples submitted without an accompanying FRB may not be acceptable for compliance purposes.
Wisconsin PFAs analysis: MDL = LOD; RL = LOQ. LOD and LOQ are adjusted for dilution.

Report Narrative

There is no additional narrative for this analytical report

Laboratory Certifications

Authority	Certification ID
Michigan DEQ	#9956
DOD ELAP/ISO 17025	#69699
WBENC	#2005110032
Ohio VAP	#CL0002
Indiana DOH	#C-MI-07
New York NELAC	#11814
North Carolina DENR	#680
North Carolina DOH	#26702
Alaska CSLAP	#17-001
Pennsylvania DEP	#68-05884
Wisconsin DNR	FID# 399147320

Qualifier Descriptions

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

Glossary of Abbreviations

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

Method Summary

Method	Version
N/A	Not Applicable
SW5030C/8260C	SW 846 Method 8260C Revision 3 August 2006 / 5030C Revision 3 May 2003
SW8260B - SIM	SW 846 Method 8260B Revision 2 December 1996 SIMs

Analytical Laboratory Report

Sample Summary (2 samples)

Sample ID	Sample Tag	Matrix	Collected Date/Time
S34620.01	MW-22-153_040622	Groundwater	04/06/22 11:45
S34620.02	MW-14-58R_040622	Groundwater	04/06/22 12:20

Lab Sample ID: S34620.01
Sample Tag: MW-22-153_040622
Collected Date/Time: 04/06/2022 11:45
Matrix: Groundwater
COC Reference: 139926

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	2.4	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	04/08/22 09:30	BML	

Organics - Volatiles

Method: SW8260B - SIM, Run Date: 04/18/22 12:49, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,4-Dioxane*	92	1		ug/L	1	123-91-1	

Volatile Organics - DEQ List, Method: SW5030C/8260C, Run Date: 04/07/22 13:20, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Diethyl ether	Not detected	10		ug/L	1	60-29-7	
Acetone	Not detected	50		ug/L	1	67-64-1	
Methyl iodide	Not detected	1		ug/L	1	74-88-4	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Acrylonitrile	Not detected	2		ug/L	1	107-13-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
Vinyl chloride	1	1		ug/L	1	75-01-4	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Chloroethane	10	5		ug/L	1	75-00-3	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	
1,1-Dichloroethane	2	1		ug/L	1	75-34-3	
cis-1,2-Dichloroethene	Not detected	1		ug/L	1	156-59-2	
Tetrahydrofuran*	Not detected	90		ug/L	1	109-99-9	
Chloroform	Not detected	1		ug/L	1	67-66-3	
Bromochloromethane	Not detected	1		ug/L	1	74-97-5	
1,1,1-Trichloroethane	Not detected	1		ug/L	1	71-55-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Benzene	Not detected	1		ug/L	1	71-43-2	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
Trichloroethene	Not detected	1		ug/L	1	79-01-6	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Dibromomethane	Not detected	5		ug/L	1	74-95-3	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
Toluene	Not detected	1		ug/L	1	108-88-3	

Lab Sample ID: S34620.01 (continued)
Sample Tag: MW-22-153_040622

Volatile Organics - DEQ List, Method: SW5030C/8260C, Run Date: 04/07/22 13:20, Analyst: KAG (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
Tetrachloroethene	Not detected	1		ug/L	1	127-18-4	
trans-1,4-Dichloro-2-butene	Not detected	1		ug/L	1	110-57-6	
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
1,1,1,2-Tetrachloroethane	Not detected	1		ug/L	1	630-20-6	
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
p,m-Xylene*	Not detected	2		ug/L	1		
o-Xylene	Not detected	1		ug/L	1	95-47-6	
Styrene	Not detected	1		ug/L	1	100-42-5	
Isopropylbenzene	Not detected	5		ug/L	1	98-82-8	
Bromoform	Not detected	1		ug/L	1	75-25-2	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
1,2,3-Trichloropropane	Not detected	1		ug/L	1	96-18-4	
n-Propylbenzene	Not detected	1		ug/L	1	103-65-1	
Bromobenzene	Not detected	1		ug/L	1	108-86-1	
1,3,5-Trimethylbenzene	Not detected	1		ug/L	1	108-67-8	
tert-Butylbenzene	Not detected	1		ug/L	1	98-06-6	
1,2,4-Trimethylbenzene	Not detected	1		ug/L	1	95-63-6	
sec-Butylbenzene	Not detected	1		ug/L	1	135-98-8	
p-Isopropyltoluene	Not detected	5		ug/L	1	99-87-6	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2,3-Trimethylbenzene	Not detected	1		ug/L	1	526-73-8	
n-Butylbenzene	Not detected	1		ug/L	1	104-51-8	
Hexachloroethane	Not detected	5		ug/L	1	67-72-1	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
1,2,3-Trichlorobenzene	Not detected	5		ug/L	1	87-61-6	
Naphthalene	Not detected	5		ug/L	1	91-20-3	
2-Methylnaphthalene	Not detected	5		ug/L	1	91-57-6	

Lab Sample ID: S34620.02
Sample Tag: MW-14-58R_040622
Collected Date/Time: 04/06/2022 12:20
Matrix: Groundwater
COC Reference: 139926

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	2.4	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	04/08/22 09:30	BML	

Organics - Volatiles

Method: SW8260B - SIM, Run Date: 04/18/22 16:37, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,4-Dioxane*	410	10		ug/L	10	123-91-1	Y

Volatile Organics - DEQ List, Method: SW5030C/8260C, Run Date: 04/07/22 13:40, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Diethyl ether	Not detected	10		ug/L	1	60-29-7	
Acetone	Not detected	50		ug/L	1	67-64-1	
Methyl iodide	Not detected	1		ug/L	1	74-88-4	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Acrylonitrile	Not detected	2		ug/L	1	107-13-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
Vinyl chloride	Not detected	1		ug/L	1	75-01-4	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	
1,1-Dichloroethane	Not detected	1		ug/L	1	75-34-3	
cis-1,2-Dichloroethene	Not detected	1		ug/L	1	156-59-2	
Tetrahydrofuran*	Not detected	90		ug/L	1	109-99-9	
Chloroform	Not detected	1		ug/L	1	67-66-3	
Bromochloromethane	Not detected	1		ug/L	1	74-97-5	
1,1,1-Trichloroethane	Not detected	1		ug/L	1	71-55-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Benzene	Not detected	1		ug/L	1	71-43-2	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
Trichloroethene	Not detected	1		ug/L	1	79-01-6	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Dibromomethane	Not detected	5		ug/L	1	74-95-3	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	

Y-Elevated reporting limit due to high target concentration

Lab Sample ID: S34620.02 (continued)
Sample Tag: MW-14-58R_040622

Volatile Organics - DEQ List, Method: SW5030C/8260C, Run Date: 04/07/22 13:40, Analyst: KAG (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Toluene	Not detected	1		ug/L	1	108-88-3	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
Tetrachloroethene	Not detected	1		ug/L	1	127-18-4	
trans-1,4-Dichloro-2-butene	Not detected	1		ug/L	1	110-57-6	
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
1,1,1,2-Tetrachloroethane	Not detected	1		ug/L	1	630-20-6	
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
p,m-Xylene*	Not detected	2		ug/L	1		
o-Xylene	Not detected	1		ug/L	1	95-47-6	
Styrene	Not detected	1		ug/L	1	100-42-5	
Isopropylbenzene	Not detected	5		ug/L	1	98-82-8	
Bromoform	Not detected	1		ug/L	1	75-25-2	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
1,2,3-Trichloropropane	Not detected	1		ug/L	1	96-18-4	
n-Propylbenzene	Not detected	1		ug/L	1	103-65-1	
Bromobenzene	Not detected	1		ug/L	1	108-86-1	
1,3,5-Trimethylbenzene	Not detected	1		ug/L	1	108-67-8	
tert-Butylbenzene	Not detected	1		ug/L	1	98-06-6	
1,2,4-Trimethylbenzene	Not detected	1		ug/L	1	95-63-6	
sec-Butylbenzene	Not detected	1		ug/L	1	135-98-8	
p-Isopropyltoluene	Not detected	5		ug/L	1	99-87-6	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2,3-Trimethylbenzene	Not detected	1		ug/L	1	526-73-8	
n-Butylbenzene	Not detected	1		ug/L	1	104-51-8	
Hexachloroethane	Not detected	5		ug/L	1	67-72-1	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
1,2,3-Trichlorobenzene	Not detected	5		ug/L	1	87-61-6	
Naphthalene	Not detected	5		ug/L	1	91-20-3	
2-Methylnaphthalene	Not detected	5		ug/L	1	91-57-6	

Merit Laboratories Login Checklist

Lab Set ID: S34620
Client: ARCADIS_NOVI (ARCADIS U.S., Inc.)
Project: 30075941.04100 / RACER Lansing
Submitted: 04/06/2022 13:45 Login User: MMC

Attention: Tiffany Linder
Address: Arcadis US, Inc.
28550 Cabot Drive
Suite 500
Novi, MI 48377

Phone: 248-994-2272 FAX:
Email: tiffany.linder@arcadis.com

Selection				Description	Note
Sample Receiving					
01.	[X] Yes	[ ] No	[ ] N/A	Samples are received at 4C +/- 2C Thermometer #	IR 2.4
02.	[X] Yes	[ ] No	[ ] N/A	Received on ice/ cooling process begun	
03.	[ ] Yes	[X] No	[ ] N/A	Samples shipped	
04.	[ ] Yes	[X] No	[ ] N/A	Samples left in 24 hr. drop box	
05.	[ ] Yes	[ ] No	[X] N/A	Are there custody seals/tape or is the drop box locked	
Chain of Custody					
06.	[X] Yes	[ ] No	[ ] N/A	COC adequately filled out	
07.	[X] Yes	[ ] No	[ ] N/A	COC signed and relinquished to the lab	
08.	[X] Yes	[ ] No	[ ] N/A	Sample tag on bottles match COC	
09.	[ ] Yes	[X] No	[ ] N/A	Subcontracting needed? Subcontacted to:	
Preservation					
10.	[X] Yes	[ ] No	[ ] N/A	Do sample have correct chemical preservation	
11.	[ ] Yes	[ ] No	[X] N/A	Completed pH checks on preserved samples? (no VOAs)	
12.	[ ] Yes	[X] No	[ ] N/A	Did any samples need to be preserved in the lab?	
Bottle Conditions					
13.	[X] Yes	[ ] No	[ ] N/A	All bottles intact	
14.	[X] Yes	[ ] No	[ ] N/A	Appropriate analytical bottles are used	
15.	[X] Yes	[ ] No	[ ] N/A	Merit bottles used	
16.	[X] Yes	[ ] No	[ ] N/A	Sufficient sample volume received	
17.	[ ] Yes	[X] No	[ ] N/A	Samples require laboratory filtration	
18.	[X] Yes	[ ] No	[ ] N/A	Samples submitted within holding time	
19.	[ ] Yes	[X] No	[ ] N/A	Do water VOC or TOX bottles contain headspace	

Corrective action for all exceptions is to call the client and to notify the project manager.

Client Review By: _____ Date: _____

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

C.O.C. PAGE # 1 OF 1

139926

CHAIN OF CUSTODY RECORD

REPORT TO

CONTACT NAME: Tiffany Linder
COMPANY: Arcadis
ADDRESS: 28550 Cabot Drive, Suite 500
CITY: Novi STATE: MI ZIP CODE: 48377
PHONE NO.: 810-225-1928 FAX NO.: P.O. NO.:
E-MAIL ADDRESS: Tiffany.Linder@arcadis.com QUOTE NO.:

INVOICE TO

CONTACT NAME: ☒ SAME
COMPANY:
ADDRESS:
CITY: STATE: ZIP CODE:
PHONE NO.: E-MAIL ADDRESS:

PROJECT NO./NAME: 30112892.04100 / RACER Lansing
SAMPLER(S) - PLEASE PRINT/SIGN NAME: Austin Westhuis / [signature]

TURNAROUND TIME REQUIRED ☐ 1 DAY ☐ 2 DAYS ☐ 3 DAYS ☒ STANDARD ☐ OTHER

DELIVERABLES REQUIRED ☐ STD ☐ LEVEL II ☐ LEVEL III ☐ LEVEL IV ☐ EDD ☐ OTHER

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

ANALYSIS (ATTACH LIST IF MORE SPACE IS REQUIRED)

Certifications
☐ OHIO VAP ☐ Drinking Water
☐ DoD ☐ NPDES
Project Locations
☐ Detroit ☐ New York
☒ Other MI
Special Instructions

MERIT LAB NO. (FOR LAB USE ONLY)	YEAR DATE	YEAR TIME	SAMPLE TAG IDENTIFICATION-DESCRIPTION	MATRIX	# OF BOTTLES	# Containers & Preservatives: NONE	HCl	HNO_3	H_2SO_4	NaOH	MeOH	OTHER	VOCs 8260 (Full Scan)	1,4-Dioxane 8260 SIMS
34620.01	4/6/22	1145	mw-22-153_040622	GW	3		3						X	X
.02	4/6/22	1220	mw-14-58R_040622	GW	3		3						X	X

RELINQUISHED BY: SIGNATURE/ORGANIZATION: [signature] / Arcadis ☒ Sampler DATE: 4/6/22 TIME: 1345
RECEIVED BY: SIGNATURE/ORGANIZATION: Merit Drop Box DATE: 4/6/22 TIME: 1345
RELINQUISHED BY: SIGNATURE/ORGANIZATION: DATE: TIME:
RECEIVED BY: SIGNATURE/ORGANIZATION: DATE: TIME:

RELINQUISHED BY: SIGNATURE/ORGANIZATION: ~~Volatile~~ Merit Drop Box DATE: 4/6/22 TIME: 1345
RECEIVED BY: SIGNATURE/ORGANIZATION: M Chilcott DATE: 4/6/22 TIME: 1345

SEAL NO. SEAL INTACT YES ☐ NO ☐ INITIALS
SEAL NO. SEAL INTACT YES ☐ NO ☐ INITIALS

NOTES: TEMP. ON ARRIVAL 2.4

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

Rev. 5.18.12

* Please also email results to: Patrick.Cunny@arcadis.com, Alex.Villhauer@arcadis.com, and Caitlin.Cisco@arcadis.com

Quality Control Report

Report ID: QC-S34620-01
Generated on 04/19/2022

Report to

Attention: Tiffany Linder
Arcadis US, Inc.
28550 Cabot Drive
Suite 500
Novi, MI 48377

Phone: 248-994-2272 FAX:

Report Produced by

Merit Laboratories
2680 East Lansing Drive
East Lansing, MI 48823

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

Report Summary

Lab Sample ID(s): S34620.01-S34620.02
Project: 30075941.04100 / RACER Lansing
Submitted Date/Time: 04/06/2022 13:45
Sampled by: Austin Westhuis
P.O. #: 30075941.04100

QC Report Sections

Cover Page (Page 1)
Analysis Summary (Pages 2-3)
Prep Batch Summary (Page 4)
Surrogates per Lab Sample (Pages 5-6)
Surrogates per QC Sample (Pages 7-8)
Batch QC Results (Pages 9-14)

Report Flag Descriptions

*: QC result is outside of indicated control limits
W: Surrogate result not applicable due to sample dilution

I certify that this data package is in compliance with the terms and conditions of the program, and project, and contractual requirements both technically and for completeness. Release of the data contained in this hardcopy data package and its computer-readable data submitted has been authorized by the Quality Assurance Manager and his/her designee, as verified by the following signature.

Barbara Ball
Quality Assurance Manager

QC Report - Analysis Summary

Lab Sample ID: S34620.01
Sample Tag: MW-22-153_040622
Collected Date/Time: 04/06/2022 11:45
Matrix: Groundwater
COC Reference: 139926

Analysis	Method	Run Date/Time	Batch ID	Prep ID	Surr	QC Types
Organics - Volatiles						
1,4-Dioxane	SW8260B - SIM	04/18/22 12:49	220418A9	VS220418W2	Yes	BLK/LCS/LCSD
Volatile Organics - DEQ List	SW5030C/8260C	04/07/22 13:20	220407A9	VF220407W2	Yes	BLK/LCS/LCSD

QC Report - Analysis Summary

Lab Sample ID: S34620.02
Sample Tag: MW-14-58R_040622
Collected Date/Time: 04/06/2022 12:20
Matrix: Groundwater
COC Reference: 139926

Analysis	Method	Run Date/Time	Batch ID	Prep ID	Surr	QC Types
Organics - Volatiles						
1,4-Dioxane	SW8260B - SIM	04/18/22 16:37	220418A9	VS220418W2	Yes	BLK/LCS/LCSD
Volatile Organics - DEQ List	SW5030C/8260C	04/07/22 13:40	220407A9	VF220407W2	Yes	BLK/LCS/LCSD

QC Report - Prep Batch Summary

Organics - Volatiles, Prep Batch ID: VF220407W2

Surrogates: Yes, QC Types: BLK/LCS/LCSD

Sample ID	Analysis	Method	Run Date/Time	Batch ID
S34620.01	Volatile Organics - DEQ List	SW5030C/8260C	04/07/22 13:20	220407A9
S34620.02	Volatile Organics - DEQ List	SW5030C/8260C	04/07/22 13:40	220407A9

Organics - Volatiles, Prep Batch ID: VS220418W2

Surrogates: Yes, QC Types: BLK/LCS/LCSD

Sample ID	Analysis	Method	Run Date/Time	Batch ID
S34620.01	1,4-Dioxane	SW8260B - SIM	04/18/22 12:49	220418A9
S34620.02	1,4-Dioxane	SW8260B - SIM	04/18/22 16:37	220418A9

QC Report - Surrogates per Lab Sample

Lab Sample ID: S34620.01

Sample Tag: MW-22-153_040622

Collected Date/Time: 04/06/2022 11:45

Matrix: Groundwater

COC Reference: 139926

Organics - Volatiles, Analysis: Volatile Organics - DEQ List

Run in Batch: 220407A9, Run Date: 04/07/2022 13:20, Matrix: WW, Dilution: 1

Surrogate	Flags	**%Rec**	LCL	UCL
4-Bromofluorobenzene		**96.5**	80.0	124.0
1,2-Dichloroethane-D4		**112.5**	72.0	125.0
Toluene-D8		**106.6**	89.0	112.0

QC Report - Surrogates per Lab Sample

Lab Sample ID: S34620.02

Sample Tag: MW-14-58R_040622

Collected Date/Time: 04/06/2022 12:20

Matrix: Groundwater

COC Reference: 139926

Organics - Volatiles, Analysis: Volatile Organics - DEQ List

Run in Batch: 220407A9, Run Date: 04/07/2022 13:40, Matrix: WW, Dilution: 1

Surrogate	Flags	**%Rec**	LCL	UCL
4-Bromofluorobenzene		**95.8**	80.0	124.0
1,2-Dichloroethane-D4		**115.3**	72.0	125.0
Toluene-D8		**106.2**	89.0	112.0

QC Report - Surrogates per QC Sample

Organics - Volatiles, Prep Batch ID: VF220407W2

QC Types: BLK/LCS/LCSD

Blank (BLK)

Lab Sample ID: 220407A9.BLKW07A

Run in Batch: 220407A9, Run Date: 04/07/2022 12:26, Prep Date: 04/07/2022, Matrix: WW, Dilution: 1

Surrogate	Flags	%Rec	LCL	UCL
4-Bromofluorobenzene		**95.3**	80.0	124.0
1,2-Dichloroethane-D4		**111.5**	72.0	125.0
Toluene-D8		**106.3**	89.0	112.0

Blank (BLK)

Lab Sample ID: 220407B9.BLKW07A

Run in Batch: 220407B9, Run Date: 04/07/2022 12:26, Prep Date: 04/07/2022, Matrix: WW, Dilution: 1

Surrogate	Flags	%Rec	LCL	UCL
Toluene-D8		**98.6**	86.0	118.0

Laboratory Control Sample (LCS)

Lab Sample ID: 220407A9.LCSW07A

Run in Batch: 220407A9, Run Date: 04/07/2022 10:49, Prep Date: 04/07/2022, Matrix: WW, Dilution: 1

Surrogate	Flags	%Rec	LCL	UCL
4-Bromofluorobenzene		**113.3**	80.0	124.0
1,2-Dichloroethane-D4		**100.4**	72.0	125.0
Toluene-D8		**99.6**	89.0	112.0

Laboratory Control Sample (LCS)

Lab Sample ID: 220407B9.LCSG07A

Run in Batch: 220407B9, Run Date: 04/07/2022 11:47, Prep Date: 04/07/2022, Matrix: WW, Dilution: 1

Surrogate	Flags	%Rec	LCL	UCL
Toluene-D8		**98.6**	86.0	118.0

Laboratory Control Sample Duplicate (LCSD)

Lab Sample ID: 220407A9.LCSDW07A, Parent Sample ID: 220407A9.LCSW07A

Run in Batch: 220407A9, Run Date: 04/07/2022 11:09, Prep Date: 04/07/2022, Matrix: WW, Dilution: 1

Surrogate	Flags	%Rec	LCL	UCL
4-Bromofluorobenzene		**114.8**	80.0	124.0
1,2-Dichloroethane-D4		**99.5**	72.0	125.0
Toluene-D8		**97.2**	89.0	112.0

Laboratory Control Sample Duplicate (LCSD)

Lab Sample ID: 220407B9.LCSDG07A, Parent Sample ID: 220407B9.LCSG07A

Run in Batch: 220407B9, Run Date: 04/07/2022 12:06, Prep Date: 04/07/2022, Matrix: WW, Dilution: 1

Surrogate	Flags	%Rec	LCL	UCL
Toluene-D8		**100.0**	86.0	118.0

Organics - Volatiles, Prep Batch ID: VS220418W2

QC Types: BLK/LCS/LCSD

Blank (BLK)

Lab Sample ID: 220418A9.BLKW18A

Run in Batch: 220418A9, Run Date: 04/18/2022 12:28, Prep Date: 04/18/2022, Matrix: WW, Dilution: 1

Surrogate	Flags	**%Rec**	LCL	UCL

No Surrogates

Laboratory Control Sample (LCS)

Lab Sample ID: 220418A9.LCSW18A

Run in Batch: 220418A9, Run Date: 04/18/2022 11:25, Prep Date: 04/18/2022, Matrix: WW, Dilution: 1

Surrogate	Flags	**%Rec**	LCL	UCL

No Surrogates

Laboratory Control Sample Duplicate (LCSD)

Lab Sample ID: 220418A9.LCSDW18A, Parent Sample ID: 220418A9.LCSW18A

Run in Batch: 220418A9, Run Date: 04/18/2022 11:46, Prep Date: 04/18/2022, Matrix: WW, Dilution: 1

Surrogate	Flags	**%Rec**	LCL	UCL

No Surrogates

Organics - Volatiles, Prep Batch ID: VF220407W2

Surrogates: Yes, QC Types: BLK/LCS/LCSD

Blank (BLK)

Lab Sample ID: 220407A9.BLKW07A

Run in Batch: 220407A9, Run Date: 04/07/2022 12:26, Prep Date: 04/07/2022, Matrix: WW, Dilution: 1

Analyte	Flags	Conc	RDL	Units
Diethyl ether		ND	1.00	ug/l
Acetone		ND	10.00	ug/l
Methyl iodide		ND	1.00	ug/l
Carbon disulfide		ND	1.00	ug/l
tert-Methyl butyl ether (MTBE)		ND	1.00	ug/l
Acrylonitrile		ND	1.00	ug/l
2-Butanone (MEK)		ND	10.00	ug/l
Dichlorodifluoromethane		ND	1.00	ug/l
Chloromethane		ND	1.00	ug/l
Vinyl chloride		ND	1.00	ug/l
Bromomethane		ND	1.00	ug/l
Chloroethane		ND	1.00	ug/l
Trichlorofluoromethane		ND	1.00	ug/l
1,1-Dichloroethene		ND	1.00	ug/l
Methylene chloride		ND	1.00	ug/l
trans-1,2-Dichloroethene		ND	1.00	ug/l
1,1-Dichloroethane		ND	1.00	ug/l
cis-1,2-Dichloroethene		ND	1.00	ug/l
Tetrahydrofuran		ND	10.00	ug/l
Chloroform		ND	1.00	ug/l
Bromochloromethane		ND	1.00	ug/l
1,1,1-Trichloroethane		ND	1.00	ug/l
4-Methyl-2-pentanone (MIBK)		ND	10.00	ug/l
2-Hexanone		ND	10.00	ug/l
Carbon tetrachloride		ND	1.00	ug/l
Benzene		ND	1.00	ug/l
1,2-Dichloroethane		ND	1.00	ug/l
Trichloroethene		ND	1.00	ug/l
1,2-Dichloropropane		ND	1.00	ug/l
Bromodichloromethane		ND	1.00	ug/l
Dibromomethane		ND	1.00	ug/l
cis-1,3-Dichloropropene		ND	1.00	ug/l
Toluene		ND	1.00	ug/l
trans-1,3-Dichloropropene		ND	1.00	ug/l
1,1,2-Trichloroethane		ND	1.00	ug/l
Tetrachloroethene		ND	1.00	ug/l
trans-1,4-Dichloro-2-butene		ND	1.00	ug/l
Dibromochloromethane		ND	1.00	ug/l
1,2-Dibromoethane		ND	1.00	ug/l
Chlorobenzene		ND	1.00	ug/l
1,1,1,2-Tetrachloroethane		ND	1.00	ug/l
Ethylbenzene		ND	1.00	ug/l
p,m-Xylene		ND	1.00	ug/l
o-Xylene		ND	1.00	ug/l
Styrene		ND	1.00	ug/l
Isopropylbenzene		ND	1.00	ug/l

Organics - Volatiles, Prep Batch ID: VF220407W2 (continued)

Surrogates: Yes, QC Types: BLK/LCS/LCSD

Blank (BLK) (continued)

Lab Sample ID: 220407A9.BLKW07A

Run in Batch: 220407A9, Run Date: 04/07/2022 12:26, Prep Date: 04/07/2022, Matrix: WW, Dilution: 1

Analyte	Flags	Conc	RDL	Units
Bromoform		ND	1.00	ug/l
1,1,2,2-Tetrachloroethane		ND	1.00	ug/l
1,2,3-Trichloropropane		ND	1.00	ug/l
n-Propylbenzene		ND	1.00	ug/l
Bromobenzene		ND	1.00	ug/l
1,3,5-Trimethylbenzene		ND	1.00	ug/l
tert-Butylbenzene		ND	1.00	ug/l
1,2,4-Trimethylbenzene		ND	1.00	ug/l
sec-Butylbenzene		ND	1.00	ug/l
p-Isopropyltoluene		ND	1.00	ug/l
1,3-Dichlorobenzene		ND	1.00	ug/l
1,4-Dichlorobenzene		ND	1.00	ug/l
1,2-Dichlorobenzene		ND	1.00	ug/l
1,2,3-Trimethylbenzene		ND	1.00	ug/l
n-Butylbenzene		ND	1.00	ug/l
Hexachloroethane		ND	1.00	ug/l
1,2-Dibromo-3-chloropropane		ND	1.00	ug/l
1,2,4-Trichlorobenzene		ND	1.00	ug/l
1,2,3-Trichlorobenzene		ND	1.00	ug/l
Naphthalene		ND	1.00	ug/l
2-Methylnaphthalene		ND	1.00	ug/l

Laboratory Control Sample (LCS)

Lab Sample ID: 220407A9.LCSW07A

Run in Batch: 220407A9, Run Date: 04/07/2022 10:49, Prep Date: 04/07/2022, Matrix: WW, Dilution: 1

Analyte	Flags	% Rec	LCL	UCL
Diethyl ether		87.2	67.4	121.2
Acetone		82.6	29.9	161.5
Methyl iodide		95.1	68.8	116.4
Carbon disulfide		104.6	63.8	137.4
tert-Methyl butyl ether (MTBE)		94.7	73.2	122.4
Acrylonitrile		97.8	69.9	128.9
2-Butanone (MEK)		100.4	44.0	134.4
Dichlorodifluoromethane		80.0	10.0	222.8
Chloromethane		77.1	23.8	166.5
Vinyl chloride		83.7	43.5	149.1
Bromomethane		73.0	56.8	151.3
Chloroethane		76.7	53.4	149.4
Trichlorofluoromethane		78.7	59.7	151.8
1,1-Dichloroethene		92.4	69.6	139.4
Methylene chloride		95.1	73.3	121.1
trans-1,2-Dichloroethene		100.1	73.6	129.3
1,1-Dichloroethane		97.3	71.5	126.2
cis-1,2-Dichloroethene		101.2	76.6	122.1
Tetrahydrofuran		93.9	59.0	117.9
Chloroform		99.3	78.4	124.0

Organics - Volatiles, Prep Batch ID: VF220407W2 (continued)

Surrogates: Yes, QC Types: BLK/LCS/LCSD

Laboratory Control Sample (LCS) (continued)

Lab Sample ID: 220407A9.LCSW07A

Run in Batch: 220407A9, Run Date: 04/07/2022 10:49, Prep Date: 04/07/2022, Matrix: WW, Dilution: 1

Analyte	Flags	% Rec	LCL	UCL
Bromochloromethane		101.2	78.2	120.8
1,1,1-Trichloroethane		98.7	79.4	130.9
4-Methyl-2-pentanone (MIBK)		99.2	71.6	125.2
2-Hexanone		95.7	55.4	136.9
Carbon tetrachloride		99.9	72.6	133.0
Benzene		98.9	79.9	124.9
1,2-Dichloroethane		93.3	76.0	126.3
Trichloroethene		103.6	79.7	124.2
1,2-Dichloropropane		94.8	78.6	126.4
Bromodichloromethane		101.8	80.4	128.2
Dibromomethane		103.7	76.9	122.1
cis-1,3-Dichloropropene		105.2	79.8	129.9
Toluene		96.9	79.8	124.5
trans-1,3-Dichloropropene		108.6	74.0	131.3
1,1,2-Trichloroethane		97.1	78.7	123.1
Tetrachloroethene		102.5	74.5	124.5
trans-1,4-Dichloro-2-butene	*	188.3	68.6	135.4
Dibromochloromethane	*	130.4	74.6	127.2
1,2-Dibromoethane		118.9	70.3	133.7
Chlorobenzene		114.2	79.2	122.7
1,1,1,2-Tetrachloroethane		117.2	80.3	128.2
Ethylbenzene		112.7	79.5	129.1
p,m-Xylene		113.5	79.4	132.2
o-Xylene		107.3	80.2	131.0
Styrene		112.9	69.5	126.7
Isopropylbenzene		113.3	74.4	121.5
Bromoform	*	136.9	69.4	128.0
1,1,2,2-Tetrachloroethane		113.4	79.8	126.3
1,2,3-Trichloropropane		119.4	78.3	138.8
n-Propylbenzene		114.2	82.0	130.7
Bromobenzene		121.6	78.7	124.6
1,3,5-Trimethylbenzene		114.9	81.3	128.9
tert-Butylbenzene		107.8	80.7	128.9
1,2,4-Trimethylbenzene		113.7	81.4	130.8
sec-Butylbenzene		112.9	77.4	129.8
p-Isopropyltoluene		113.7	79.8	137.5
1,3-Dichlorobenzene		116.1	77.0	131.3
1,4-Dichlorobenzene		115.0	20.7	137.7
1,2-Dichlorobenzene		116.6	10.0	166.2
1,2,3-Trimethylbenzene		108.0	76.3	124.2
n-Butylbenzene		111.0	80.0	133.3
Hexachloroethane		125.9	23.8	138.1
1,2-Dibromo-3-chloropropane		133.3	21.2	189.4
1,2,4-Trichlorobenzene		122.7	27.4	143.4
1,2,3-Trichlorobenzene		118.2	75.4	131.4
Naphthalene		118.6	32.9	135.8

Organics - Volatiles, Prep Batch ID: VF220407W2 (continued)

Surrogates: Yes, QC Types: BLK/LCS/LCSD

Laboratory Control Sample (LCS) (continued)

Lab Sample ID: 220407A9.LCSW07A

Run in Batch: 220407A9, Run Date: 04/07/2022 10:49, Prep Date: 04/07/2022, Matrix: WW, Dilution: 1

Analyte	Flags	% Rec	LCL	UCL
2-Methylnaphthalene		112.6	25.5	165.5

Laboratory Control Sample Duplicate (LCSD)

Lab Sample ID: 220407A9.LCSDW07A, Parent Sample ID: 220407A9.LCSW07A

Run in Batch: 220407A9, Run Date: 04/07/2022 11:09, Prep Date: 04/07/2022, Matrix: WW, Dilution: 1

Analyte	Flags	% Rec	LCL	UCL	RPD	RPD CL
Diethyl ether		83.8	67.4	121.2	4.0	30.0
Acetone		73.6	29.9	161.5	11.5	30.0
Methyl iodide		95.2	68.8	116.4	0.0	30.0
Carbon disulfide		97.9	63.8	137.4	6.7	30.0
tert-Methyl butyl ether (MTBE)		91.2	73.2	122.4	3.8	30.0
Acrylonitrile		90.9	69.9	128.9	7.3	30.0
2-Butanone (MEK)		91.7	44.0	134.4	9.0	30.0
Dichlorodifluoromethane		73.6	10.0	222.8	8.3	30.0
Chloromethane		75.3	23.8	166.5	2.3	30.0
Vinyl chloride		79.2	43.5	149.1	5.6	30.0
Bromomethane		69.5	56.8	151.3	4.9	30.0
Chloroethane		73.0	53.4	149.4	4.9	30.0
Trichlorofluoromethane		73.7	59.7	151.8	6.6	30.0
1,1-Dichloroethene		88.2	69.6	139.4	4.6	30.0
Methylene chloride		94.4	73.3	121.1	0.8	30.0
trans-1,2-Dichloroethene		94.0	73.6	129.3	6.3	30.0
1,1-Dichloroethane		93.1	71.5	126.2	4.4	30.0
cis-1,2-Dichloroethene		97.7	76.6	122.1	3.5	30.0
Tetrahydrofuran		80.8	59.0	117.9	14.9	30.0
Chloroform		94.6	78.4	124.0	4.8	30.0
Bromochloromethane		99.5	78.2	120.8	1.7	30.0
1,1,1-Trichloroethane		92.9	79.4	130.9	6.0	30.0
4-Methyl-2-pentanone (MIBK)		86.8	71.6	125.2	13.3	30.0
2-Hexanone		87.3	55.4	136.9	9.1	30.0
Carbon tetrachloride		94.2	72.6	133.0	5.9	30.0
Benzene		93.7	79.9	124.9	5.4	30.0
1,2-Dichloroethane		86.9	76.0	126.3	7.2	30.0
Trichloroethene		96.6	79.7	124.2	7.0	30.0
1,2-Dichloropropane		89.3	78.6	126.4	6.0	30.0
Bromodichloromethane		96.0	80.4	128.2	5.8	30.0
Dibromomethane		102.5	76.9	122.1	1.1	30.0
cis-1,3-Dichloropropene		98.8	79.8	129.9	6.3	30.0
Toluene		88.7	79.8	124.5	8.8	30.0
trans-1,3-Dichloropropene		100.9	74.0	131.3	7.3	30.0
1,1,2-Trichloroethane		89.7	78.7	123.1	8.0	30.0
Tetrachloroethene		95.8	74.5	124.5	6.8	30.0
trans-1,4-Dichloro-2-butene	*	169.2	68.6	135.4	10.7	30.0
Dibromochloromethane	*	127.4	74.6	127.2	2.3	30.0
1,2-Dibromoethane		114.8	70.3	133.7	3.5	30.0
Chlorobenzene		109.0	79.2	122.7	4.6	30.0

Organics - Volatiles, Prep Batch ID: VF220407W2 (continued)

Surrogates: Yes, QC Types: BLK/LCS/LCSD

Laboratory Control Sample Duplicate (LCSD) (continued)

Lab Sample ID: 220407A9.LCSDW07A, Parent Sample ID: 220407A9.LCSW07A

Run in Batch: 220407A9, Run Date: 04/07/2022 11:09, Prep Date: 04/07/2022, Matrix: WW, Dilution: 1

Analyte	Flags	% Rec	LCL	UCL	RPD	RPD CL
1,1,1,2-Tetrachloroethane		116.1	80.3	128.2	0.9	30.0
Ethylbenzene		106.8	79.5	129.1	5.3	30.0
p,m-Xylene		106.7	79.4	132.2	6.1	30.0
o-Xylene		101.1	80.2	131.0	5.9	30.0
Styrene		107.5	69.5	126.7	4.9	30.0
Isopropylbenzene		105.8	74.4	121.5	6.8	30.0
Bromoform	*	131.5	69.4	128.0	4.1	30.0
1,1,2,2-Tetrachloroethane		105.8	79.8	126.3	7.0	30.0
1,2,3-Trichloropropane		110.5	78.3	138.8	7.7	30.0
n-Propylbenzene		105.8	82.0	130.7	7.7	30.0
Bromobenzene		117.0	78.7	124.6	3.9	30.0
1,3,5-Trimethylbenzene		107.2	81.3	128.9	6.9	30.0
tert-Butylbenzene		100.1	80.7	128.9	7.4	30.0
1,2,4-Trimethylbenzene		108.4	81.4	130.8	4.8	30.0
sec-Butylbenzene		105.4	77.4	129.8	6.8	30.0
p-Isopropyltoluene		106.7	79.8	137.5	6.3	30.0
1,3-Dichlorobenzene		109.9	77.0	131.3	5.5	30.0
1,4-Dichlorobenzene		109.4	20.7	137.7	5.0	30.0
1,2-Dichlorobenzene		111.1	10.0	166.2	4.9	30.0
1,2,3-Trimethylbenzene		103.4	76.3	124.2	4.3	30.0
n-Butylbenzene		101.8	80.0	133.3	8.6	30.0
Hexachloroethane		119.9	23.8	138.1	4.9	30.0
1,2-Dibromo-3-chloropropane		121.8	21.2	189.4	9.0	30.0
1,2,4-Trichlorobenzene		120.6	27.4	143.4	1.7	30.0
1,2,3-Trichlorobenzene		117.6	75.4	131.4	0.5	30.0
Naphthalene		114.3	32.9	135.8	3.6	30.0
2-Methylnaphthalene		112.6	25.5	165.5	0.0	30.0

Organics - Volatiles, Prep Batch ID: VS220418W2

Surrogates: Yes, QC Types: BLK/LCS/LCSD

Blank (BLK)

Lab Sample ID: 220418A9.BLKW18A

Run in Batch: 220418A9, Run Date: 04/18/2022 12:28, Prep Date: 04/18/2022, Matrix: WW, Dilution: 1

Analyte	Flags	Conc	RDL	Units
1,4-Dioxane	*	0.30	0.02	ug/l

Laboratory Control Sample (LCS)

Lab Sample ID: 220418A9.LCSW18A

Run in Batch: 220418A9, Run Date: 04/18/2022 11:25, Prep Date: 04/18/2022, Matrix: WW, Dilution: 1

Analyte	Flags	% Rec	LCL	UCL
1,4-Dioxane		78.3	70.0	130.0

Laboratory Control Sample Duplicate (LCSD)

Lab Sample ID: 220418A9.LCSDW18A, Parent Sample ID: 220418A9.LCSW18A

Run in Batch: 220418A9, Run Date: 04/18/2022 11:46, Prep Date: 04/18/2022, Matrix: WW, Dilution: 1

Analyte	Flags	% Rec	LCL	UCL	RPD	RPD CL
1,4-Dioxane		79.1	70.0	130.0	1.1	30.0

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

C.O.C. PAGE # 1 OF 1

139926

CHAIN OF CUSTODY RECORD

REPORT TO

CONTACT NAME: Tiffany Linder
COMPANY: Arcadis
ADDRESS: 28550 Cabot Drive, Suite 500
CITY: Novi STATE: MI ZIP CODE: 48377
PHONE NO.: 810-225-1928 FAX NO.: P.O. NO.:
E-MAIL ADDRESS: Tiffany.Linder@arcadis.com QUOTE NO.:

INVOICE TO

CONTACT NAME: ☒ SAME
COMPANY:
ADDRESS:
CITY: STATE: ZIP CODE:
PHONE NO.: E-MAIL ADDRESS:

PROJECT NO./NAME: 30112892.04100 / RACER Lansing
SAMPLER(S) - PLEASE PRINT/SIGN NAME: Austin Westhuis / [signature]

TURNAROUND TIME REQUIRED ☐ 1 DAY ☐ 2 DAYS ☐ 3 DAYS ☒ STANDARD ☐ OTHER

DELIVERABLES REQUIRED ☐ STD ☐ LEVEL II ☐ LEVEL III ☐ LEVEL IV ☐ EDD ☐ OTHER

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

ANALYSIS (ATTACH LIST IF MORE SPACE IS REQUIRED)

Certifications
☐ OHIO VAP ☐ Drinking Water
☐ DoD ☐ NPDES
Project Locations
☐ Detroit ☐ New York
☒ Other MI
Special Instructions

MERIT LAB NO. (FOR LAB USE ONLY)	YEAR DATE	YEAR TIME	SAMPLE TAG IDENTIFICATION-DESCRIPTION	MATRIX	# OF BOTTLES	# Containers & Preservatives: NONE	HCl	HNO_3	H_2SO_4	NaOH	MeOH	OTHER	VOCs 8260 (Full Scan)	1,4-Dioxane 8260 SIMS
34620.01	4/6/22	1145	mw-22-153_040622	GW	3		3						X	X
.02	4/6/22	1220	mw-14-58R_040622	GW	3		3						X	X

RELINQUISHED BY: SIGNATURE/ORGANIZATION: [signature] / Arcadis ☒ Sampler DATE: 4/6/22 TIME: 1345
RECEIVED BY: SIGNATURE/ORGANIZATION: Merit Drop Box DATE: 4/6/22 TIME: 1345
RELINQUISHED BY: SIGNATURE/ORGANIZATION: DATE: TIME:
RECEIVED BY: SIGNATURE/ORGANIZATION: DATE: TIME:

RELINQUISHED BY: SIGNATURE/ORGANIZATION: ~~Volatile~~ Merit Drop Box DATE: 4/6/22 TIME: 1345
RECEIVED BY: SIGNATURE/ORGANIZATION: M Chilcott DATE: 4/6/22 TIME: 1345

SEAL NO. SEAL INTACT YES ☐ NO ☐ INITIALS
SEAL NO. SEAL INTACT YES ☐ NO ☐ INITIALS

NOTES: TEMP. ON ARRIVAL 2.4

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

Rev. 5.18.12

* Please also email results to: Patrick.Cunny@arcadis.com, Alex.Villhauer@arcadis.com, and Caitlin.Cisco@arcadis.com

Analytical Laboratory Report

Report ID: S40011.01(01)+QC01
Generated on 09/14/2022

Report to

Attention: Kaitlyn Hunt
Arcadis
28550 Cabot Drive
Suite 500
Novi, MI 48377

Phone: O:248-809-4013 C:947-777-5215 FAX:
Email: Kaitlyn.Hunt@arcadis.com

Addtional Contacts: Alex Villhauer, Marina Samp, Tiffany Linder, Caitlin Cisco

Report produced by

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

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

Contacts for report questions:
John Laverty (johnlaverty@meritlabs.com)
Barbara Ball (bball@meritlabs.com)

Report Summary

Lab Sample ID(s): S40011.01-S40011.06
Project: 30112892.04100 / RACER Lansing
Collected Date(s): 09/07/2022
Submitted Date/Time: 09/07/2022 12:50
Sampled by: Austin Westhuis
P.O. #: 30112892.04100

Table of Contents

Cover Page (Page 1)
General Report Notes (Page 2)
Report Narrative (Page 2)
Laboratory Certifications (Page 3)
Qualifier Descriptions (Page 3)
Glossary of Abbreviations (Page 3)
Method Summary (Page 4)
Sample Summary (Page 5)
QC Report (Pages 18-51)

Maya Murshak
Technical Director

General Report Notes

Analytical results relate only to the samples tested, in the condition received by the laboratory.
Methods may be modified for improved performance.
Results reported on a dry weight basis where applicable.
'Not detected' indicates that parameter was not found at a level equal to or greater than the reporting limit (RL).
When MDL results are provided, then 'Not detected' indicates that parameter was not found at a level equal to or greater than the MDL.
40 CFR Part 136 Table II Required Containers, Preservation Techniques and Holding Times for the Clean Water Act specify that samples for acrolein and acrylonitrile, and 2-chloroethylvinyl ether need to be preserved at a pH in the range of 4 to 5 or if not preserved, analyzed within 3 days of sampling.
QA/QC corresponding to this analytical report is a separate document with the same Merit ID reference and is available upon request.
Full accreditation certificates are available upon request. Starred (*) analytes are not NELAP accredited.
Samples are held by the lab for 30 days from the final report date unless a written request to hold longer is provided by the client.
Report shall not be reproduced except in full, without the written approval of Merit Laboratories, Inc.
Limits for drinking water samples, are listed as the MCL Limits (Maximum Contaminant Level Concentrations)
PFAS requirement: Section 9.3.8 of U.S. EPA Method 537.1 states "If the method analyte(s) found in the Field Sample is present in the FRB at a concentration greater than 1/3 the MRL, then all samples collected with that FRB are invalid and must be recollected and reanalyzed."
Samples submitted without an accompanying FRB may not be acceptable for compliance purposes.
Wisconsin PFAs analysis: MDL = LOD; RL = LOQ. LOD and LOQ are adjusted for dilution.

Report Narrative

There is no additional narrative for this analytical report

Laboratory Certifications

Authority	Certification ID
Michigan DEQ	#9956
DOD ELAP/ISO 17025	#69699
WBENC	#2005110032
Ohio VAP	#CL0002
Indiana DOH	#C-MI-07
New York NELAC	#11814
North Carolina DENR	#680
North Carolina DOH	#26702
Alaska CSLAP	#17-001
Pennsylvania DEP	#68-05884
Wisconsin DNR	FID# 399147320

Qualifier Descriptions

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

Glossary of Abbreviations

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

Method Summary

Method	Version
SM2540B	Standard Method 2540 B 2015
SW5035A	SW 846 Method 5035A Revision 1 July 2002
SW5035A/8260C	SW 846 Method 8260C Revision 3 August 2006 / 5035A Revision 1 July 2002
SW8260B - SIM	SW 846 Method 8260B Revision 2 December 1996 SIMs

Sample Summary (6 samples)

Sample ID	Sample Tag	Matrix	Collected Date/Time
S40011.01	SB-A4-MX60_1-3_090722	Soil	09/07/22 10:00
S40011.02	SB-A4-MX60_4-6_090722	Soil	09/07/22 10:05
S40011.03	SB-A4-MX60_6-8_090722	Soil	09/07/22 10:09
S40011.04	SB-A4-MX60_8.5-10_090722	Soil	09/07/22 10:14
S40011.05	SB-A4-MX60_10-12_090722	Soil	09/07/22 10:19
S40011.06	Trip Blank	Methanol	09/07/22 00:01

Lab Sample ID: S40011.01
Sample Tag: SB-A4-MX60_1-3_090722
Collected Date/Time: 09/07/2022 10:00
Matrix: Soil
COC Reference: 157330

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	40ml Glass	MeOH	Yes	5.5	IR
1	4oz Glass	None	Yes	5.5	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Sample wt. (g) / Methanol (ml)*	9.974/10	SW5035A	09/07/22 16:25	BDO	

Inorganics

Method: SM2540B, Run Date: 09/07/22 16:53, Analyst: MAM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Solids*	95	1		%	1		

Organics - Volatiles

Method: SW8260B - SIM, Run Date: 09/13/22 13:52, Analyst: BML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,4-Dioxane*	Not detected	60		ug/kg	55.4	123-91-1	

Volatile Organics 5035, Method: SW5035A/8260C, Run Date: 09/09/22 15:40, Analyst: BML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Diethyl ether	Not detected	200		ug/kg	55.4	60-29-7	
Acetone	Not detected	1,000		ug/kg	55.4	67-64-1	
Methyl iodide	Not detected	100		ug/kg	55.4	74-88-4	
Carbon disulfide	Not detected	300		ug/kg	55.4	75-15-0	
tert-Methyl butyl ether (MTBE)	Not detected	200		ug/kg	55.4	1634-04-4	
Acrylonitrile	Not detected	100		ug/kg	55.4	107-13-1	
2-Butanone (MEK)	Not detected	830		ug/kg	55.4	78-93-3	
Dichlorodifluoromethane	Not detected	300		ug/kg	55.4	75-71-8	
Chloromethane	Not detected	300		ug/kg	55.4	74-87-3	
Vinyl chloride	Not detected	60		ug/kg	55.4	75-01-4	
Bromomethane	Not detected	200		ug/kg	55.4	74-83-9	
Chloroethane	Not detected	300		ug/kg	55.4	75-00-3	
Trichlorofluoromethane	Not detected	100		ug/kg	55.4	75-69-4	
1,1-Dichloroethene	Not detected	60		ug/kg	55.4	75-35-4	
Methylene chloride	Not detected	100		ug/kg	55.4	75-09-2	
trans-1,2-Dichloroethene	Not detected	60		ug/kg	55.4	156-60-5	
1,1-Dichloroethane	Not detected	60		ug/kg	55.4	75-34-3	
cis-1,2-Dichloroethene	Not detected	60		ug/kg	55.4	156-59-2	
Tetrahydrofuran*	Not detected	1,000		ug/kg	55.4	109-99-9	
Chloroform	Not detected	60		ug/kg	55.4	67-66-3	
Bromochloromethane	Not detected	100		ug/kg	55.4	74-97-5	
1,1,1-Trichloroethane	Not detected	60		ug/kg	55.4	71-55-6	
4-Methyl-2-pentanone (MIBK)	Not detected	3,000		ug/kg	55.4	108-10-1	
2-Hexanone	Not detected	3,000		ug/kg	55.4	591-78-6	
Carbon tetrachloride	Not detected	60		ug/kg	55.4	56-23-5	
Benzene	Not detected	60		ug/kg	55.4	71-43-2	
1,2-Dichloroethane	Not detected	60		ug/kg	55.4	107-06-2	

Lab Sample ID: S40011.01 (continued)
Sample Tag: SB-A4-MX60_1-3_090722

Volatile Organics 5035, Method: SW5035A/8260C, Run Date: 09/09/22 15:40, Analyst: BML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Trichloroethene	Not detected	60		ug/kg	55.4	79-01-6	
1,2-Dichloropropane	Not detected	60		ug/kg	55.4	78-87-5	
Bromodichloromethane	Not detected	100		ug/kg	55.4	75-27-4	
Dibromomethane	Not detected	300		ug/kg	55.4	74-95-3	
cis-1,3-Dichloropropene	Not detected	60		ug/kg	55.4	10061-01-5	
Toluene	Not detected	60		ug/kg	55.4	108-88-3	
trans-1,3-Dichloropropene	Not detected	60		ug/kg	55.4	10061-02-6	
1,1,2-Trichloroethane	Not detected	60		ug/kg	55.4	79-00-5	
Tetrachloroethene	Not detected	60		ug/kg	55.4	127-18-4	
trans-1,4-Dichloro-2-butene	Not detected	60		ug/kg	55.4	110-57-6	
Dibromochloromethane	Not detected	100		ug/kg	55.4	124-48-1	
1,2-Dibromoethane	Not detected	20		ug/kg	55.4	106-93-4	M
Chlorobenzene	Not detected	60		ug/kg	55.4	108-90-7	
1,1,1,2-Tetrachloroethane	Not detected	100		ug/kg	55.4	630-20-6	
Ethylbenzene	Not detected	60		ug/kg	55.4	100-41-4	
p,m-Xylene	Not detected	100		ug/kg	55.4		
o-Xylene	Not detected	60		ug/kg	55.4	95-47-6	
Styrene	Not detected	60		ug/kg	55.4	100-42-5	
Isopropylbenzene	Not detected	300		ug/kg	55.4	98-82-8	
Bromoform	Not detected	100		ug/kg	55.4	75-25-2	
1,1,2,2-Tetrachloroethane	Not detected	60		ug/kg	55.4	79-34-5	
1,2,3-Trichloropropane	Not detected	100		ug/kg	55.4	96-18-4	
n-Propylbenzene	Not detected	60		ug/kg	55.4	103-65-1	
Bromobenzene	Not detected	100		ug/kg	55.4	108-86-1	
1,3,5-Trimethylbenzene	Not detected	60		ug/kg	55.4	108-67-8	
tert-Butylbenzene	Not detected	60		ug/kg	55.4	98-06-6	
1,2,4-Trimethylbenzene	Not detected	60		ug/kg	55.4	95-63-6	
sec-Butylbenzene	Not detected	60		ug/kg	55.4	135-98-8	
p-Isopropyltoluene	Not detected	100		ug/kg	55.4	99-87-6	
1,3-Dichlorobenzene	Not detected	100		ug/kg	55.4	541-73-1	
1,4-Dichlorobenzene	Not detected	100		ug/kg	55.4	106-46-7	
1,2-Dichlorobenzene	Not detected	100		ug/kg	55.4	95-50-1	
1,2,3-Trimethylbenzene	Not detected	60		ug/kg	55.4	526-73-8	
n-Butylbenzene	Not detected	60		ug/kg	55.4	104-51-8	
Hexachloroethane	Not detected	300		ug/kg	55.4	67-72-1	
1,2-Dibromo-3-chloropropane	Not detected	300		ug/kg	55.4	96-12-8	
1,2,4-Trichlorobenzene	Not detected	370		ug/kg	55.4	120-82-1	
1,2,3-Trichlorobenzene	Not detected	370		ug/kg	55.4	87-61-6	
Naphthalene	Not detected	300		ug/kg	55.4	91-20-3	
2-Methylnaphthalene	Not detected	100		ug/kg	55.4	91-57-6	

M-Result reported to MDL not RDL

Lab Sample ID: S40011.02
Sample Tag: SB-A4-MX60_4-6_090722
Collected Date/Time: 09/07/2022 10:05
Matrix: Soil
COC Reference: 157330

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	40ml Glass	MeOH	Yes	5.5	IR
1	4oz Glass	None	Yes	5.5	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Sample wt. (g) / Methanol (ml)*	10.146/10	SW5035A	09/07/22 16:25	BDO	

Inorganics

Method: SM2540B, Run Date: 09/07/22 16:53, Analyst: MAM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Solids*	87	1		%	1		

Organics - Volatiles

Method: SW8260B - SIM, Run Date: 09/13/22 14:16, Analyst: BML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,4-Dioxane*	Not detected	60		ug/kg	64.1	123-91-1	

Volatile Organics 5035, Method: SW5035A/8260C, Run Date: 09/09/22 16:04, Analyst: BML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Diethyl ether	Not detected	300		ug/kg	64.1	60-29-7	
Acetone	Not detected	1,000		ug/kg	64.1	67-64-1	
Methyl iodide	Not detected	100		ug/kg	64.1	74-88-4	
Carbon disulfide	Not detected	300		ug/kg	64.1	75-15-0	
tert-Methyl butyl ether (MTBE)	Not detected	300		ug/kg	64.1	1634-04-4	
Acrylonitrile	Not detected	100		ug/kg	64.1	107-13-1	
2-Butanone (MEK)	Not detected	960		ug/kg	64.1	78-93-3	
Dichlorodifluoromethane	Not detected	300		ug/kg	64.1	75-71-8	
Chloromethane	Not detected	300		ug/kg	64.1	74-87-3	
Vinyl chloride	Not detected	60		ug/kg	64.1	75-01-4	
Bromomethane	Not detected	300		ug/kg	64.1	74-83-9	
Chloroethane	Not detected	300		ug/kg	64.1	75-00-3	
Trichlorofluoromethane	Not detected	100		ug/kg	64.1	75-69-4	
1,1-Dichloroethene	Not detected	60		ug/kg	64.1	75-35-4	
Methylene chloride	Not detected	100		ug/kg	64.1	75-09-2	
trans-1,2-Dichloroethene	Not detected	60		ug/kg	64.1	156-60-5	
1,1-Dichloroethane	Not detected	60		ug/kg	64.1	75-34-3	
cis-1,2-Dichloroethene	Not detected	60		ug/kg	64.1	156-59-2	
Tetrahydrofuran*	Not detected	1,000		ug/kg	64.1	109-99-9	
Chloroform	Not detected	60		ug/kg	64.1	67-66-3	
Bromochloromethane	Not detected	100		ug/kg	64.1	74-97-5	
1,1,1-Trichloroethane	Not detected	60		ug/kg	64.1	71-55-6	
4-Methyl-2-pentanone (MIBK)	Not detected	3,000		ug/kg	64.1	108-10-1	
2-Hexanone	Not detected	3,000		ug/kg	64.1	591-78-6	
Carbon tetrachloride	Not detected	60		ug/kg	64.1	56-23-5	
Benzene	Not detected	60		ug/kg	64.1	71-43-2	
1,2-Dichloroethane	Not detected	60		ug/kg	64.1	107-06-2	

Lab Sample ID: S40011.02 (continued)
Sample Tag: SB-A4-MX60_4-6_090722

Volatile Organics 5035, Method: SW5035A/8260C, Run Date: 09/09/22 16:04, Analyst: BML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Trichloroethene	Not detected	60		ug/kg	64.1	79-01-6	
1,2-Dichloropropane	Not detected	60		ug/kg	64.1	78-87-5	
Bromodichloromethane	Not detected	100		ug/kg	64.1	75-27-4	
Dibromomethane	Not detected	300		ug/kg	64.1	74-95-3	
cis-1,3-Dichloropropene	Not detected	60		ug/kg	64.1	10061-01-5	
Toluene	Not detected	60		ug/kg	64.1	108-88-3	
trans-1,3-Dichloropropene	Not detected	60		ug/kg	64.1	10061-02-6	
1,1,2-Trichloroethane	Not detected	60		ug/kg	64.1	79-00-5	
Tetrachloroethene	Not detected	60		ug/kg	64.1	127-18-4	
trans-1,4-Dichloro-2-butene	Not detected	60		ug/kg	64.1	110-57-6	
Dibromochloromethane	Not detected	100		ug/kg	64.1	124-48-1	
1,2-Dibromoethane	Not detected	30		ug/kg	64.1	106-93-4	M
Chlorobenzene	Not detected	60		ug/kg	64.1	108-90-7	
1,1,1,2-Tetrachloroethane	Not detected	100		ug/kg	64.1	630-20-6	
Ethylbenzene	Not detected	60		ug/kg	64.1	100-41-4	
p,m-Xylene	Not detected	100		ug/kg	64.1		
o-Xylene	Not detected	60		ug/kg	64.1	95-47-6	
Styrene	Not detected	60		ug/kg	64.1	100-42-5	
Isopropylbenzene	Not detected	300		ug/kg	64.1	98-82-8	
Bromoform	Not detected	100		ug/kg	64.1	75-25-2	
1,1,2,2-Tetrachloroethane	Not detected	60		ug/kg	64.1	79-34-5	
1,2,3-Trichloropropane	Not detected	100		ug/kg	64.1	96-18-4	
n-Propylbenzene	Not detected	60		ug/kg	64.1	103-65-1	
Bromobenzene	Not detected	100		ug/kg	64.1	108-86-1	
1,3,5-Trimethylbenzene	Not detected	60		ug/kg	64.1	108-67-8	
tert-Butylbenzene	Not detected	60		ug/kg	64.1	98-06-6	
1,2,4-Trimethylbenzene	Not detected	60		ug/kg	64.1	95-63-6	
sec-Butylbenzene	Not detected	60		ug/kg	64.1	135-98-8	
p-Isopropyltoluene	Not detected	100		ug/kg	64.1	99-87-6	
1,3-Dichlorobenzene	Not detected	100		ug/kg	64.1	541-73-1	
1,4-Dichlorobenzene	Not detected	100		ug/kg	64.1	106-46-7	
1,2-Dichlorobenzene	Not detected	100		ug/kg	64.1	95-50-1	
1,2,3-Trimethylbenzene	Not detected	60		ug/kg	64.1	526-73-8	
n-Butylbenzene	Not detected	60		ug/kg	64.1	104-51-8	
Hexachloroethane	Not detected	400		ug/kg	64.1	67-72-1	
1,2-Dibromo-3-chloropropane	Not detected	300		ug/kg	64.1	96-12-8	
1,2,4-Trichlorobenzene	Not detected	420		ug/kg	64.1	120-82-1	
1,2,3-Trichlorobenzene	Not detected	420		ug/kg	64.1	87-61-6	
Naphthalene	Not detected	300		ug/kg	64.1	91-20-3	
2-Methylnaphthalene	Not detected	100		ug/kg	64.1	91-57-6	

M-Result reported to MDL not RDL

Lab Sample ID: S40011.03
Sample Tag: SB-A4-MX60_6-8_090722
Collected Date/Time: 09/07/2022 10:09
Matrix: Soil
COC Reference: 157330

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	40ml Glass	MeOH	Yes	5.5	IR
1	4oz Glass	None	Yes	5.5	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Sample wt. (g) / Methanol (ml)*	10.242/10	SW5035A	09/07/22 16:25	BDO	

Inorganics

Method: SM2540B, Run Date: 09/07/22 16:53, Analyst: MAM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Solids*	91	1		%	1		

Organics - Volatiles

Method: SW8260B - SIM, Run Date: 09/13/22 15:01, Analyst: BML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,4-Dioxane*	Not detected	60		ug/kg	58.6	123-91-1	

Volatile Organics 5035, Method: SW5035A/8260C, Run Date: 09/09/22 16:27, Analyst: BML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Diethyl ether	Not detected	200		ug/kg	58.6	60-29-7	
Acetone	Not detected	1,000		ug/kg	58.6	67-64-1	
Methyl iodide	Not detected	100		ug/kg	58.6	74-88-4	
Carbon disulfide	Not detected	300		ug/kg	58.6	75-15-0	
tert-Methyl butyl ether (MTBE)	Not detected	200		ug/kg	58.6	1634-04-4	
Acrylonitrile	Not detected	100		ug/kg	58.6	107-13-1	
2-Butanone (MEK)	Not detected	880		ug/kg	58.6	78-93-3	
Dichlorodifluoromethane	Not detected	300		ug/kg	58.6	75-71-8	
Chloromethane	Not detected	300		ug/kg	58.6	74-87-3	
Vinyl chloride	Not detected	60		ug/kg	58.6	75-01-4	
Bromomethane	Not detected	200		ug/kg	58.6	74-83-9	
Chloroethane	Not detected	300		ug/kg	58.6	75-00-3	
Trichlorofluoromethane	Not detected	100		ug/kg	58.6	75-69-4	
1,1-Dichloroethene	Not detected	60		ug/kg	58.6	75-35-4	
Methylene chloride	Not detected	100		ug/kg	58.6	75-09-2	
trans-1,2-Dichloroethene	Not detected	60		ug/kg	58.6	156-60-5	
1,1-Dichloroethane	Not detected	60		ug/kg	58.6	75-34-3	
cis-1,2-Dichloroethene	Not detected	60		ug/kg	58.6	156-59-2	
Tetrahydrofuran*	Not detected	1,000		ug/kg	58.6	109-99-9	
Chloroform	Not detected	60		ug/kg	58.6	67-66-3	
Bromochloromethane	Not detected	100		ug/kg	58.6	74-97-5	
1,1,1-Trichloroethane	Not detected	60		ug/kg	58.6	71-55-6	
4-Methyl-2-pentanone (MIBK)	Not detected	3,000		ug/kg	58.6	108-10-1	
2-Hexanone	Not detected	3,000		ug/kg	58.6	591-78-6	
Carbon tetrachloride	Not detected	60		ug/kg	58.6	56-23-5	
Benzene	Not detected	60		ug/kg	58.6	71-43-2	
1,2-Dichloroethane	Not detected	60		ug/kg	58.6	107-06-2	

Lab Sample ID: S40011.03 (continued)
Sample Tag: SB-A4-MX60_6-8_090722

Volatile Organics 5035, Method: SW5035A/8260C, Run Date: 09/09/22 16:27, Analyst: BML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Trichloroethene	Not detected	60		ug/kg	58.6	79-01-6	
1,2-Dichloropropane	Not detected	60		ug/kg	58.6	78-87-5	
Bromodichloromethane	Not detected	100		ug/kg	58.6	75-27-4	
Dibromomethane	Not detected	300		ug/kg	58.6	74-95-3	
cis-1,3-Dichloropropene	Not detected	60		ug/kg	58.6	10061-01-5	
Toluene	Not detected	60		ug/kg	58.6	108-88-3	
trans-1,3-Dichloropropene	Not detected	60		ug/kg	58.6	10061-02-6	
1,1,2-Trichloroethane	Not detected	60		ug/kg	58.6	79-00-5	
Tetrachloroethene	Not detected	60		ug/kg	58.6	127-18-4	
trans-1,4-Dichloro-2-butene	Not detected	60		ug/kg	58.6	110-57-6	
Dibromochloromethane	Not detected	100		ug/kg	58.6	124-48-1	
1,2-Dibromoethane	Not detected	20		ug/kg	58.6	106-93-4	M
Chlorobenzene	Not detected	60		ug/kg	58.6	108-90-7	
1,1,1,2-Tetrachloroethane	Not detected	100		ug/kg	58.6	630-20-6	
Ethylbenzene	Not detected	60		ug/kg	58.6	100-41-4	
p,m-Xylene	Not detected	100		ug/kg	58.6		
o-Xylene	Not detected	60		ug/kg	58.6	95-47-6	
Styrene	Not detected	60		ug/kg	58.6	100-42-5	
Isopropylbenzene	Not detected	300		ug/kg	58.6	98-82-8	
Bromoform	Not detected	100		ug/kg	58.6	75-25-2	
1,1,2,2-Tetrachloroethane	Not detected	60		ug/kg	58.6	79-34-5	
1,2,3-Trichloropropane	Not detected	100		ug/kg	58.6	96-18-4	
n-Propylbenzene	Not detected	60		ug/kg	58.6	103-65-1	
Bromobenzene	Not detected	100		ug/kg	58.6	108-86-1	
1,3,5-Trimethylbenzene	Not detected	60		ug/kg	58.6	108-67-8	
tert-Butylbenzene	Not detected	60		ug/kg	58.6	98-06-6	
1,2,4-Trimethylbenzene	Not detected	60		ug/kg	58.6	95-63-6	
sec-Butylbenzene	Not detected	60		ug/kg	58.6	135-98-8	
p-Isopropyltoluene	Not detected	100		ug/kg	58.6	99-87-6	
1,3-Dichlorobenzene	Not detected	100		ug/kg	58.6	541-73-1	
1,4-Dichlorobenzene	Not detected	100		ug/kg	58.6	106-46-7	
1,2-Dichlorobenzene	Not detected	100		ug/kg	58.6	95-50-1	
1,2,3-Trimethylbenzene	Not detected	60		ug/kg	58.6	526-73-8	
n-Butylbenzene	Not detected	60		ug/kg	58.6	104-51-8	
Hexachloroethane	Not detected	400		ug/kg	58.6	67-72-1	
1,2-Dibromo-3-chloropropane	Not detected	300		ug/kg	58.6	96-12-8	
1,2,4-Trichlorobenzene	Not detected	390		ug/kg	58.6	120-82-1	
1,2,3-Trichlorobenzene	Not detected	390		ug/kg	58.6	87-61-6	
Naphthalene	Not detected	300		ug/kg	58.6	91-20-3	
2-Methylnaphthalene	Not detected	100		ug/kg	58.6	91-57-6	

M-Result reported to MDL not RDL

Lab Sample ID: S40011.04
Sample Tag: SB-A4-MX60_8.5-10_090722
Collected Date/Time: 09/07/2022 10:14
Matrix: Soil
COC Reference: 157330

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	40ml Glass	MeOH	Yes	5.5	IR
1	4oz Glass	None	Yes	5.5	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Sample wt. (g) / Methanol (ml)*	10.071/10	SW5035A	09/07/22 16:25	BDO	

Inorganics

Method: SM2540B, Run Date: 09/07/22 16:53, Analyst: MAM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Solids*	89	1		%	1		

Organics - Volatiles

Method: SW8260B - SIM, Run Date: 09/13/22 15:21, Analyst: BML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,4-Dioxane*	Not detected	60		ug/kg	62	123-91-1	

Volatile Organics 5035, Method: SW5035A/8260C, Run Date: 09/09/22 16:50, Analyst: BML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Diethyl ether	Not detected	200		ug/kg	62	60-29-7	
Acetone	Not detected	1,000		ug/kg	62	67-64-1	
Methyl iodide	Not detected	100		ug/kg	62	74-88-4	
Carbon disulfide	Not detected	300		ug/kg	62	75-15-0	
tert-Methyl butyl ether (MTBE)	Not detected	200		ug/kg	62	1634-04-4	
Acrylonitrile	Not detected	100		ug/kg	62	107-13-1	
2-Butanone (MEK)	Not detected	930		ug/kg	62	78-93-3	
Dichlorodifluoromethane	Not detected	300		ug/kg	62	75-71-8	
Chloromethane	Not detected	300		ug/kg	62	74-87-3	
Vinyl chloride	Not detected	60		ug/kg	62	75-01-4	
Bromomethane	Not detected	200		ug/kg	62	74-83-9	
Chloroethane	Not detected	300		ug/kg	62	75-00-3	
Trichlorofluoromethane	Not detected	100		ug/kg	62	75-69-4	
1,1-Dichloroethene	Not detected	60		ug/kg	62	75-35-4	
Methylene chloride	Not detected	100		ug/kg	62	75-09-2	
trans-1,2-Dichloroethene	Not detected	60		ug/kg	62	156-60-5	
1,1-Dichloroethane	Not detected	60		ug/kg	62	75-34-3	
cis-1,2-Dichloroethene	Not detected	60		ug/kg	62	156-59-2	
Tetrahydrofuran*	Not detected	1,000		ug/kg	62	109-99-9	
Chloroform	Not detected	60		ug/kg	62	67-66-3	
Bromochloromethane	Not detected	100		ug/kg	62	74-97-5	
1,1,1-Trichloroethane	Not detected	60		ug/kg	62	71-55-6	
4-Methyl-2-pentanone (MIBK)	Not detected	3,000		ug/kg	62	108-10-1	
2-Hexanone	Not detected	3,000		ug/kg	62	591-78-6	
Carbon tetrachloride	Not detected	60		ug/kg	62	56-23-5	
Benzene	Not detected	60		ug/kg	62	71-43-2	
1,2-Dichloroethane	Not detected	60		ug/kg	62	107-06-2	

Lab Sample ID: S40011.04 (continued)
Sample Tag: SB-A4-MX60_8.5-10_090722

Volatile Organics 5035, Method: SW5035A/8260C, Run Date: 09/09/22 16:50, Analyst: BML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Trichloroethene	Not detected	60		ug/kg	62	79-01-6	
1,2-Dichloropropane	Not detected	60		ug/kg	62	78-87-5	
Bromodichloromethane	Not detected	100		ug/kg	62	75-27-4	
Dibromomethane	Not detected	300		ug/kg	62	74-95-3	
cis-1,3-Dichloropropene	Not detected	60		ug/kg	62	10061-01-5	
Toluene	Not detected	60		ug/kg	62	108-88-3	
trans-1,3-Dichloropropene	Not detected	60		ug/kg	62	10061-02-6	
1,1,2-Trichloroethane	Not detected	60		ug/kg	62	79-00-5	
Tetrachloroethene	Not detected	60		ug/kg	62	127-18-4	
trans-1,4-Dichloro-2-butene	Not detected	60		ug/kg	62	110-57-6	
Dibromochloromethane	Not detected	100		ug/kg	62	124-48-1	
1,2-Dibromoethane	Not detected	20		ug/kg	62	106-93-4	M
Chlorobenzene	Not detected	60		ug/kg	62	108-90-7	
1,1,1,2-Tetrachloroethane	Not detected	100		ug/kg	62	630-20-6	
Ethylbenzene	Not detected	60		ug/kg	62	100-41-4	
p,m-Xylene	Not detected	100		ug/kg	62		
o-Xylene	Not detected	60		ug/kg	62	95-47-6	
Styrene	Not detected	60		ug/kg	62	100-42-5	
Isopropylbenzene	Not detected	300		ug/kg	62	98-82-8	
Bromoform	Not detected	100		ug/kg	62	75-25-2	
1,1,2,2-Tetrachloroethane	Not detected	60		ug/kg	62	79-34-5	
1,2,3-Trichloropropane	Not detected	100		ug/kg	62	96-18-4	
n-Propylbenzene	Not detected	60		ug/kg	62	103-65-1	
Bromobenzene	Not detected	100		ug/kg	62	108-86-1	
1,3,5-Trimethylbenzene	Not detected	60		ug/kg	62	108-67-8	
tert-Butylbenzene	Not detected	60		ug/kg	62	98-06-6	
1,2,4-Trimethylbenzene	Not detected	60		ug/kg	62	95-63-6	
sec-Butylbenzene	Not detected	60		ug/kg	62	135-98-8	
p-Isopropyltoluene	Not detected	100		ug/kg	62	99-87-6	
1,3-Dichlorobenzene	Not detected	100		ug/kg	62	541-73-1	
1,4-Dichlorobenzene	Not detected	100		ug/kg	62	106-46-7	
1,2-Dichlorobenzene	Not detected	100		ug/kg	62	95-50-1	
1,2,3-Trimethylbenzene	Not detected	60		ug/kg	62	526-73-8	
n-Butylbenzene	Not detected	60		ug/kg	62	104-51-8	
Hexachloroethane	Not detected	400		ug/kg	62	67-72-1	
1,2-Dibromo-3-chloropropane	Not detected	300		ug/kg	62	96-12-8	
1,2,4-Trichlorobenzene	Not detected	410		ug/kg	62	120-82-1	
1,2,3-Trichlorobenzene	Not detected	410		ug/kg	62	87-61-6	
Naphthalene	Not detected	300		ug/kg	62	91-20-3	
2-Methylnaphthalene	Not detected	100		ug/kg	62	91-57-6	

M-Result reported to MDL not RDL

Lab Sample ID: S40011.05
Sample Tag: SB-A4-MX60_10-12_090722
Collected Date/Time: 09/07/2022 10:19
Matrix: Soil
COC Reference: 157330

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	40ml Glass	MeOH	Yes	5.5	IR
1	4oz Glass	None	Yes	5.5	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Sample wt. (g) / Methanol (ml)*	10.344/10	SW5035A	09/07/22 16:25	BDO	

Inorganics

Method: SM2540B, Run Date: 09/07/22 16:53, Analyst: MAM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Solids*	76	1		%	1		

Organics - Volatiles

Method: SW8260B - SIM, Run Date: 09/13/22 15:42, Analyst: BML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,4-Dioxane*	Not detected	80		ug/kg	79.4	123-91-1	

Volatile Organics 5035, Method: SW5035A/8260C, Run Date: 09/09/22 17:14, Analyst: BML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Diethyl ether	Not detected	300		ug/kg	79.4	60-29-7	
Acetone	Not detected	2,000		ug/kg	79.4	67-64-1	
Methyl iodide	Not detected	200		ug/kg	79.4	74-88-4	
Carbon disulfide	Not detected	400		ug/kg	79.4	75-15-0	
tert-Methyl butyl ether (MTBE)	Not detected	300		ug/kg	79.4	1634-04-4	
Acrylonitrile	Not detected	200		ug/kg	79.4	107-13-1	
2-Butanone (MEK)	Not detected	1,200		ug/kg	79.4	78-93-3	
Dichlorodifluoromethane	Not detected	400		ug/kg	79.4	75-71-8	
Chloromethane	Not detected	400		ug/kg	79.4	74-87-3	
Vinyl chloride	Not detected	80		ug/kg	79.4	75-01-4	
Bromomethane	Not detected	300		ug/kg	79.4	74-83-9	
Chloroethane	Not detected	400		ug/kg	79.4	75-00-3	
Trichlorofluoromethane	Not detected	200		ug/kg	79.4	75-69-4	
1,1-Dichloroethene	Not detected	80		ug/kg	79.4	75-35-4	
Methylene chloride	Not detected	200		ug/kg	79.4	75-09-2	
trans-1,2-Dichloroethene	Not detected	80		ug/kg	79.4	156-60-5	
1,1-Dichloroethane	Not detected	80		ug/kg	79.4	75-34-3	
cis-1,2-Dichloroethene	Not detected	80		ug/kg	79.4	156-59-2	
Tetrahydrofuran*	Not detected	2,000		ug/kg	79.4	109-99-9	
Chloroform	Not detected	80		ug/kg	79.4	67-66-3	
Bromochloromethane	Not detected	200		ug/kg	79.4	74-97-5	
1,1,1-Trichloroethane	Not detected	80		ug/kg	79.4	71-55-6	
4-Methyl-2-pentanone (MIBK)	Not detected	4,000		ug/kg	79.4	108-10-1	
2-Hexanone	Not detected	4,000		ug/kg	79.4	591-78-6	
Carbon tetrachloride	Not detected	80		ug/kg	79.4	56-23-5	
Benzene	Not detected	80		ug/kg	79.4	71-43-2	
1,2-Dichloroethane	Not detected	80		ug/kg	79.4	107-06-2	

Lab Sample ID: S40011.05 (continued)
Sample Tag: SB-A4-MX60_10-12_090722

Volatile Organics 5035, Method: SW5035A/8260C, Run Date: 09/09/22 17:14, Analyst: BML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Trichloroethene	Not detected	80		ug/kg	79.4	79-01-6	
1,2-Dichloropropane	Not detected	80		ug/kg	79.4	78-87-5	
Bromodichloromethane	Not detected	200		ug/kg	79.4	75-27-4	
Dibromomethane	Not detected	400		ug/kg	79.4	74-95-3	
cis-1,3-Dichloropropene	Not detected	80		ug/kg	79.4	10061-01-5	
Toluene	Not detected	80		ug/kg	79.4	108-88-3	
trans-1,3-Dichloropropene	Not detected	80		ug/kg	79.4	10061-02-6	
1,1,2-Trichloroethane	Not detected	80		ug/kg	79.4	79-00-5	
Tetrachloroethene	Not detected	80		ug/kg	79.4	127-18-4	
trans-1,4-Dichloro-2-butene	Not detected	80		ug/kg	79.4	110-57-6	
Dibromochloromethane	Not detected	200		ug/kg	79.4	124-48-1	
1,2-Dibromoethane	Not detected	30		ug/kg	79.4	106-93-4	M
Chlorobenzene	Not detected	80		ug/kg	79.4	108-90-7	
1,1,1,2-Tetrachloroethane	Not detected	200		ug/kg	79.4	630-20-6	
Ethylbenzene	Not detected	80		ug/kg	79.4	100-41-4	
p,m-Xylene	Not detected	200		ug/kg	79.4		
o-Xylene	Not detected	80		ug/kg	79.4	95-47-6	
Styrene	Not detected	80		ug/kg	79.4	100-42-5	
Isopropylbenzene	Not detected	400		ug/kg	79.4	98-82-8	
Bromoform	Not detected	200		ug/kg	79.4	75-25-2	
1,1,2,2-Tetrachloroethane	Not detected	80		ug/kg	79.4	79-34-5	
1,2,3-Trichloropropane	Not detected	200		ug/kg	79.4	96-18-4	
n-Propylbenzene	Not detected	80		ug/kg	79.4	103-65-1	
Bromobenzene	Not detected	200		ug/kg	79.4	108-86-1	
1,3,5-Trimethylbenzene	Not detected	80		ug/kg	79.4	108-67-8	
tert-Butylbenzene	Not detected	80		ug/kg	79.4	98-06-6	
1,2,4-Trimethylbenzene	Not detected	80		ug/kg	79.4	95-63-6	
sec-Butylbenzene	Not detected	80		ug/kg	79.4	135-98-8	
p-Isopropyltoluene	Not detected	200		ug/kg	79.4	99-87-6	
1,3-Dichlorobenzene	Not detected	200		ug/kg	79.4	541-73-1	
1,4-Dichlorobenzene	Not detected	200		ug/kg	79.4	106-46-7	
1,2-Dichlorobenzene	Not detected	200		ug/kg	79.4	95-50-1	
1,2,3-Trimethylbenzene	Not detected	80		ug/kg	79.4	526-73-8	
n-Butylbenzene	Not detected	80		ug/kg	79.4	104-51-8	
Hexachloroethane	Not detected	500		ug/kg	79.4	67-72-1	
1,2-Dibromo-3-chloropropane	Not detected	400		ug/kg	79.4	96-12-8	
1,2,4-Trichlorobenzene	Not detected	520		ug/kg	79.4	120-82-1	
1,2,3-Trichlorobenzene	Not detected	520		ug/kg	79.4	87-61-6	
Naphthalene	Not detected	400		ug/kg	79.4	91-20-3	
2-Methylnaphthalene	Not detected	200		ug/kg	79.4	91-57-6	

M-Result reported to MDL not RDL

Lab Sample ID: S40011.06
Sample Tag: Trip Blank
Collected Date/Time: 09/07/2022 00:01
Matrix: Methanol
COC Reference: 157330

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	40ml Glass	MeOH	Yes	5.5	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Sample wt. (g) / Methanol (ml)*	10/10	SW5035A	09/07/22 16:25	BDO	

Organics - Volatiles

Volatile Organics 5035, Method: SW5035A/8260C, Run Date: 09/09/22 15:17, Analyst: BML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Diethyl ether	Not detected	200		ug/kg	50	60-29-7	
Acetone	Not detected	1,000		ug/kg	50	67-64-1	
Methyl iodide	Not detected	100		ug/kg	50	74-88-4	
Carbon disulfide	Not detected	300		ug/kg	50	75-15-0	
tert-Methyl butyl ether (MTBE)	Not detected	200		ug/kg	50	1634-04-4	
Acrylonitrile	Not detected	100		ug/kg	50	107-13-1	
2-Butanone (MEK)	Not detected	750		ug/kg	50	78-93-3	
Dichlorodifluoromethane	Not detected	300		ug/kg	50	75-71-8	
Chloromethane	Not detected	300		ug/kg	50	74-87-3	
Vinyl chloride	Not detected	50		ug/kg	50	75-01-4	
Bromomethane	Not detected	200		ug/kg	50	74-83-9	
Chloroethane	Not detected	300		ug/kg	50	75-00-3	
Trichlorofluoromethane	Not detected	100		ug/kg	50	75-69-4	
1,1-Dichloroethene	Not detected	50		ug/kg	50	75-35-4	
Methylene chloride	Not detected	100		ug/kg	50	75-09-2	
trans-1,2-Dichloroethene	Not detected	50		ug/kg	50	156-60-5	
1,1-Dichloroethane	Not detected	50		ug/kg	50	75-34-3	
cis-1,2-Dichloroethene	Not detected	50		ug/kg	50	156-59-2	
Tetrahydrofuran*	Not detected	1,000		ug/kg	50	109-99-9	
Chloroform	Not detected	50		ug/kg	50	67-66-3	
Bromochloromethane	Not detected	100		ug/kg	50	74-97-5	
1,1,1-Trichloroethane	Not detected	50		ug/kg	50	71-55-6	
4-Methyl-2-pentanone (MIBK)	Not detected	3,000		ug/kg	50	108-10-1	
2-Hexanone	Not detected	3,000		ug/kg	50	591-78-6	
Carbon tetrachloride	Not detected	50		ug/kg	50	56-23-5	
Benzene	Not detected	50		ug/kg	50	71-43-2	
1,2-Dichloroethane	Not detected	50		ug/kg	50	107-06-2	
Trichloroethene	Not detected	50		ug/kg	50	79-01-6	
1,2-Dichloropropane	Not detected	50		ug/kg	50	78-87-5	
Bromodichloromethane	Not detected	100		ug/kg	50	75-27-4	
Dibromomethane	Not detected	300		ug/kg	50	74-95-3	
cis-1,3-Dichloropropene	Not detected	50		ug/kg	50	10061-01-5	
Toluene	Not detected	50		ug/kg	50	108-88-3	
trans-1,3-Dichloropropene	Not detected	50		ug/kg	50	10061-02-6	
1,1,2-Trichloroethane	Not detected	50		ug/kg	50	79-00-5	
Tetrachloroethene	Not detected	50		ug/kg	50	127-18-4	
trans-1,4-Dichloro-2-butene	Not detected	50		ug/kg	50	110-57-6	

Lab Sample ID: S40011.06 (continued)
Sample Tag: Trip Blank

Volatile Organics 5035, Method: SW5035A/8260C, Run Date: 09/09/22 15:17, Analyst: BML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Dibromochloromethane	Not detected	100		ug/kg	50	124-48-1	
1,2-Dibromoethane	Not detected	20		ug/kg	50	106-93-4	M
Chlorobenzene	Not detected	50		ug/kg	50	108-90-7	
1,1,1,2-Tetrachloroethane	Not detected	100		ug/kg	50	630-20-6	
Ethylbenzene	Not detected	50		ug/kg	50	100-41-4	
p,m-Xylene	Not detected	100		ug/kg	50		
o-Xylene	Not detected	50		ug/kg	50	95-47-6	
Styrene	Not detected	50		ug/kg	50	100-42-5	
Isopropylbenzene	Not detected	300		ug/kg	50	98-82-8	
Bromoform	Not detected	100		ug/kg	50	75-25-2	
1,1,2,2-Tetrachloroethane	Not detected	50		ug/kg	50	79-34-5	
1,2,3-Trichloropropane	Not detected	100		ug/kg	50	96-18-4	
n-Propylbenzene	Not detected	50		ug/kg	50	103-65-1	
Bromobenzene	Not detected	100		ug/kg	50	108-86-1	
1,3,5-Trimethylbenzene	Not detected	50		ug/kg	50	108-67-8	
tert-Butylbenzene	Not detected	50		ug/kg	50	98-06-6	
1,2,4-Trimethylbenzene	Not detected	50		ug/kg	50	95-63-6	
sec-Butylbenzene	Not detected	50		ug/kg	50	135-98-8	
p-Isopropyltoluene	Not detected	100		ug/kg	50	99-87-6	
1,3-Dichlorobenzene	Not detected	100		ug/kg	50	541-73-1	
1,4-Dichlorobenzene	Not detected	100		ug/kg	50	106-46-7	
1,2-Dichlorobenzene	Not detected	100		ug/kg	50	95-50-1	
1,2,3-Trimethylbenzene	Not detected	50		ug/kg	50	526-73-8	
n-Butylbenzene	Not detected	50		ug/kg	50	104-51-8	
Hexachloroethane	Not detected	300		ug/kg	50	67-72-1	
1,2-Dibromo-3-chloropropane	Not detected	300		ug/kg	50	96-12-8	
1,2,4-Trichlorobenzene	Not detected	330		ug/kg	50	120-82-1	
1,2,3-Trichlorobenzene	Not detected	330		ug/kg	50	87-61-6	
Naphthalene	Not detected	300		ug/kg	50	91-20-3	
2-Methylnaphthalene	Not detected	100		ug/kg	50	91-57-6	

M-Result reported to MDL not RDL

Quality Control Report

Report ID: S40011.01(01)+QC01
Generated on 09/14/2022

Report to

Attention: Kaitlyn Hunt
Arcadis
28550 Cabot Drive
Suite 500
Novi, MI 48377

Phone: O:248-809-4013 C:947-777-5215 FAX:

Report Produced by

Merit Laboratories
2680 East Lansing Drive
East Lansing, MI 48823

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

Report Summary

Lab Sample ID(s): S40011.01-S40011.06
Project: 30112892.04100 / RACER Lansing
Submitted Date/Time: 09/07/2022 12:50
Sampled by: Austin Westhuis
P.O. #: 30112892.04100

QC Report Sections

Cover Page (Page 18)
Analysis Summary (Pages 19-24)
Prep Batch Summary (Page 25)
Surrogates per Lab Sample (Pages 26-31)
Surrogates per QC Sample (Pages 32-33)
Internal Standards per Lab Sample (Pages 34-39)
Internal Standards per QC Sample (Pages 40-41)
Batch QC Results (Pages 42-51)

Report Flag Descriptions

*: QC result is outside of indicated control limits
W: Surrogate result not applicable due to sample dilution

I certify that this data package is in compliance with the terms and conditions of the program, and project, and contractual requirements both technically and for completeness. Release of the data contained in this hardcopy data package and its computer-readable data submitted has been authorized by the Quality Assurance Manager and his/her designee, as verified by the following signature.

Barbara Ball
Quality Assurance Manager

Lab Sample ID: S40011.01

Sample Tag: SB-A4-MX60_1-3_090722

Collected Date/Time: 09/07/2022 10:00

Matrix: Soil

COC Reference: 157330

Analysis	Method	Run Date/Time	Batch ID	Prep ID	Surr	QC Types
Inorganics						
Total Solids	SM2540B	09/07/22 16:53	TS220907A	TS220907A	No	BLK/LCS/DUP
Organics - Volatiles						
1,4-Dioxane	SW8260B - SIM	09/13/22 13:52	220913A9	VS220913S2	Yes	BLK/LCS/LCSD
Volatile Organics 5035	SW5035A/8260C	09/09/22 15:40	220909A5	VF220909S1	Yes	BLK/LCS/LCSD/MS/MS

Lab Sample ID: S40011.02

Sample Tag: SB-A4-MX60_4-6_090722

Collected Date/Time: 09/07/2022 10:05

Matrix: Soil

COC Reference: 157330

Analysis	Method	Run Date/Time	Batch ID	Prep ID	Surr	QC Types
Inorganics						
Total Solids	SM2540B	09/07/22 16:53	TS220907A	TS220907A	No	BLK/LCS/DUP
Organics - Volatiles						
1,4-Dioxane	SW8260B - SIM	09/13/22 14:16	220913A9	VS220913S2	Yes	BLK/LCS/LCSD
Volatile Organics 5035	SW5035A/8260C	09/09/22 16:04	220909A5	VF220909S1	Yes	BLK/LCS/LCSD/MS/MS

Lab Sample ID: S40011.03

Sample Tag: SB-A4-MX60_6-8_090722

Collected Date/Time: 09/07/2022 10:09

Matrix: Soil

COC Reference: 157330

Analysis	Method	Run Date/Time	Batch ID	Prep ID	Surr	QC Types
Inorganics						
Total Solids	SM2540B	09/07/22 16:53	TS220907A	TS220907A	No	BLK/LCS/DUP
Organics - Volatiles						
1,4-Dioxane	SW8260B - SIM	09/13/22 15:01	220913A9	VS220913S2	Yes	BLK/LCS/LCSD
Volatile Organics 5035	SW5035A/8260C	09/09/22 16:27	220909A5	VF220909S1	Yes	BLK/LCS/LCSD/MS/MS

Lab Sample ID: S40011.04

Sample Tag: SB-A4-MX60_8.5-10_090722

Collected Date/Time: 09/07/2022 10:14

Matrix: Soil

COC Reference: 157330

Analysis	Method	Run Date/Time	Batch ID	Prep ID	Surr	QC Types
Inorganics						
Total Solids	SM2540B	09/07/22 16:53	TS220907A	TS220907A	No	BLK/LCS/DUP
Organics - Volatiles						
1,4-Dioxane	SW8260B - SIM	09/13/22 15:21	220913A9	VS220913S2	Yes	BLK/LCS/LCSD
Volatile Organics 5035	SW5035A/8260C	09/09/22 16:50	220909A5	VF220909S1	Yes	BLK/LCS/LCSD/MS/MS

Lab Sample ID: S40011.05

Sample Tag: SB-A4-MX60_10-12_090722

Collected Date/Time: 09/07/2022 10:19

Matrix: Soil

COC Reference: 157330

Analysis	Method	Run Date/Time	Batch ID	Prep ID	Surr	QC Types
Inorganics						
Total Solids	SM2540B	09/07/22 16:53	TS220907A	TS220907A	No	BLK/LCS/DUP
Organics - Volatiles						
1,4-Dioxane	SW8260B - SIM	09/13/22 15:42	220913A9	VS220913S2	Yes	BLK/LCS/LCSD
Volatile Organics 5035	SW5035A/8260C	09/09/22 17:14	220909A5	VF220909S1	Yes	BLK/LCS/LCSD/MS/MS

Lab Sample ID: S40011.06

Sample Tag: Trip Blank

Collected Date/Time: 09/07/2022 00:01

Matrix: Methanol

COC Reference: 157330

Analysis	Method	Run Date/Time	Batch ID	Prep ID	Surr	QC Types
Organics - Volatiles						
Volatile Organics 5035	SW5035A/8260C	09/09/22 15:17	220909A5	VF220909S1	Yes	BLK/LCS/LCSD/MS/MS

QC Report - Prep Batch Summary

Inorganics, Prep Batch ID: TS220907A

Surrogates: No, QC Types: BLK/LCS/DUP

Sample ID	Analysis	Method	Run Date/Time	Batch ID
S40011.01	Total Solids	SM2540B	09/07/22 16:53	TS220907A
S40011.02	Total Solids	SM2540B	09/07/22 16:53	TS220907A
S40011.03	Total Solids	SM2540B	09/07/22 16:53	TS220907A
S40011.04	Total Solids	SM2540B	09/07/22 16:53	TS220907A
S40011.05	Total Solids	SM2540B	09/07/22 16:53	TS220907A

Organics - Volatiles, Prep Batch ID: VF220909S1

Surrogates: Yes, QC Types: BLK/LCS/LCSD/MS/MSD

Sample ID	Analysis	Method	Run Date/Time	Batch ID
S40011.01	Volatile Organics 5035	SW5035A/8260C	09/09/22 15:40	220909A5
S40011.02	Volatile Organics 5035	SW5035A/8260C	09/09/22 16:04	220909A5
S40011.03	Volatile Organics 5035	SW5035A/8260C	09/09/22 16:27	220909A5
S40011.04	Volatile Organics 5035	SW5035A/8260C	09/09/22 16:50	220909A5
S40011.05	Volatile Organics 5035	SW5035A/8260C	09/09/22 17:14	220909A5
S40011.06	Volatile Organics 5035	SW5035A/8260C	09/09/22 15:17	220909A5

Organics - Volatiles, Prep Batch ID: VS220913S2

Surrogates: Yes, QC Types: BLK/LCS/LCSD

Sample ID	Analysis	Method	Run Date/Time	Batch ID
S40011.01	1,4-Dioxane	SW8260B - SIM	09/13/22 13:52	220913A9
S40011.02	1,4-Dioxane	SW8260B - SIM	09/13/22 14:16	220913A9
S40011.03	1,4-Dioxane	SW8260B - SIM	09/13/22 15:01	220913A9
S40011.04	1,4-Dioxane	SW8260B - SIM	09/13/22 15:21	220913A9
S40011.05	1,4-Dioxane	SW8260B - SIM	09/13/22 15:42	220913A9

QC Report - Surrogates per Lab Sample

Lab Sample ID: S40011.01

Sample Tag: SB-A4-MX60_1-3_090722

Collected Date/Time: 09/07/2022 10:00

Matrix: Soil

COC Reference: 157330

Organics - Volatiles, Analysis: Volatile Organics 5035

Run in Batch: 220909A5, Run Date: 09/09/2022 15:40, Matrix: SO, Dilution: 55.4

Surrogate	Flags	**%Rec**	LCL	UCL
4-Bromofluorobenzene		**105.0**	81.0	124.0
1,2-Dichloroethane-D4		**99.6**	71.0	124.0
Toluene-D8		**106.8**	83.0	120.0

QC Report - Surrogates per Lab Sample

Lab Sample ID: S40011.02

Sample Tag: SB-A4-MX60_4-6_090722

Collected Date/Time: 09/07/2022 10:05

Matrix: Soil

COC Reference: 157330

Organics - Volatiles, Analysis: Volatile Organics 5035

Run in Batch: 220909A5, Run Date: 09/09/2022 16:04, Matrix: SO, Dilution: 64.1

Surrogate	Flags	**%Rec**	LCL	UCL
4-Bromofluorobenzene		**105.6**	81.0	124.0
1,2-Dichloroethane-D4		**107.6**	71.0	124.0
Toluene-D8		**108.2**	83.0	120.0

QC Report - Surrogates per Lab Sample

Lab Sample ID: S40011.03

Sample Tag: SB-A4-MX60_6-8_090722

Collected Date/Time: 09/07/2022 10:09

Matrix: Soil

COC Reference: 157330

Organics - Volatiles, Analysis: Volatile Organics 5035

Run in Batch: 220909A5, Run Date: 09/09/2022 16:27, Matrix: SO, Dilution: 58.6

Surrogate	Flags	**%Rec**	LCL	UCL
4-Bromofluorobenzene		**106.4**	81.0	124.0
1,2-Dichloroethane-D4		**107.8**	71.0	124.0
Toluene-D8		**109.7**	83.0	120.0

QC Report - Surrogates per Lab Sample

Lab Sample ID: S40011.04

Sample Tag: SB-A4-MX60_8.5-10_090722

Collected Date/Time: 09/07/2022 10:14

Matrix: Soil

COC Reference: 157330

Organics - Volatiles, Analysis: Volatile Organics 5035

Run in Batch: 220909A5, Run Date: 09/09/2022 16:50, Matrix: SO, Dilution: 62

Surrogate	Flags	**%Rec**	LCL	UCL
4-Bromofluorobenzene		**106.1**	81.0	124.0
1,2-Dichloroethane-D4		**103.2**	71.0	124.0
Toluene-D8		**108.0**	83.0	120.0

QC Report - Surrogates per Lab Sample

Lab Sample ID: S40011.05

Sample Tag: SB-A4-MX60_10-12_090722

Collected Date/Time: 09/07/2022 10:19

Matrix: Soil

COC Reference: 157330

Organics - Volatiles, Analysis: Volatile Organics 5035

Run in Batch: 220909A5, Run Date: 09/09/2022 17:14, Matrix: SO, Dilution: 79.4

Surrogate	Flags	**%Rec**	LCL	UCL
4-Bromofluorobenzene		**106.6**	81.0	124.0
1,2-Dichloroethane-D4		**105.8**	71.0	124.0
Toluene-D8		**108.3**	83.0	120.0

QC Report - Surrogates per Lab Sample

Lab Sample ID: S40011.06

Sample Tag: Trip Blank

Collected Date/Time: 09/07/2022 00:01

Matrix: Methanol

COC Reference: 157330

Organics - Volatiles, Analysis: Volatile Organics 5035

Run in Batch: 220909A5, Run Date: 09/09/2022 15:17, Matrix: SO, Dilution: 50

Surrogate	Flags	**%Rec**	LCL	UCL
4-Bromofluorobenzene		**104.9**	81.0	124.0
1,2-Dichloroethane-D4		**103.1**	71.0	124.0
Toluene-D8		**107.9**	83.0	120.0

Organics - Volatiles, Prep Batch ID: VF220909S1

QC Types: BLK/LCS/LCSD/MS/MSD

Blank (BLK)

Lab Sample ID: 220909A5.BLKS09A

Run in Batch: 220909A5, Run Date: 09/09/2022 14:02, Prep Date: 09/09/2022, Matrix: SO, Dilution: 50

Surrogate	Flags	%Rec	LCL	UCL
4-Bromofluorobenzene		**107.1**	81.0	124.0
1,2-Dichloroethane-D4		**101.9**	71.0	124.0
Toluene-D8		**108.9**	83.0	120.0

Laboratory Control Sample (LCS)

Lab Sample ID: 220909A5.LCSS09A

Run in Batch: 220909A5, Run Date: 09/09/2022 12:07, Prep Date: 09/09/2022, Matrix: SO, Dilution: 50

Surrogate	Flags	%Rec	LCL	UCL
4-Bromofluorobenzene		**109.2**	81.0	124.0
1,2-Dichloroethane-D4		**113.2**	71.0	124.0
Toluene-D8		**108.3**	83.0	120.0

Laboratory Control Sample Duplicate (LCSD)

Lab Sample ID: 220909A5.LCSDS09A, Parent Sample ID: 220909A5.LCSS09A

Run in Batch: 220909A5, Run Date: 09/09/2022 12:30, Prep Date: 09/09/2022, Matrix: SO, Dilution: 50

Surrogate	Flags	%Rec	LCL	UCL
4-Bromofluorobenzene		**108.4**	81.0	124.0
1,2-Dichloroethane-D4		**112.7**	71.0	124.0
Toluene-D8		**108.4**	83.0	120.0

Matrix Spike (MS)

Lab Sample ID: 220909A5.3987908M, Parent Sample ID: S39879.07

Run in Batch: 220909A5, Run Date: 09/09/2022 12:53, Prep Date: 09/09/2022, Matrix: SO, Dilution: 62.9

Surrogate	Flags	%Rec	LCL	UCL
4-Bromofluorobenzene		**104.9**	81.0	124.0
1,2-Dichloroethane-D4		**105.5**	71.0	124.0
Toluene-D8		**107.6**	83.0	120.0

Matrix Spike Duplicate (MSD)

Lab Sample ID: 220909A5.3987909N, Parent Sample ID: 220909A5.3987908M

Run in Batch: 220909A5, Run Date: 09/09/2022 13:16, Prep Date: 09/09/2022, Matrix: SO, Dilution: 62

Surrogate	Flags	%Rec	LCL	UCL
4-Bromofluorobenzene		**105.5**	81.0	124.0
1,2-Dichloroethane-D4		**108.0**	71.0	124.0
Toluene-D8		**108.1**	83.0	120.0

Organics - Volatiles, Prep Batch ID: VS220913S2

QC Types: BLK/LCS/LCSD

Blank (BLK)

Lab Sample ID: 220913A9.BLKS13A

Run in Batch: 220913A9, Run Date: 09/13/2022 13:17, Prep Date: 09/13/2022, Matrix: SO, Dilution: 50

Surrogate	Flags	%Rec	LCL	UCL

No Surrogates

Laboratory Control Sample (LCS)

Lab Sample ID: 220913A9.LCSS13A

Run in Batch: 220913A9, Run Date: 09/13/2022 12:15, Prep Date: 09/13/2022, Matrix: SO, Dilution: 50

Surrogate	Flags	%Rec	LCL	UCL

No Surrogates

Laboratory Control Sample Duplicate (LCSD)

Lab Sample ID: 220913A9.LCSDS13A, Parent Sample ID: 220913A9.LCSS13A

Run in Batch: 220913A9, Run Date: 09/13/2022 12:35, Prep Date: 09/13/2022, Matrix: SO, Dilution: 50

Surrogate	Flags	%Rec	LCL	UCL

No Surrogates

QC Report - Internal Standards per Lab Sample

Lab Sample ID: S40011.01

Sample Tag: SB-A4-MX60_1-3_090722

Collected Date/Time: 09/07/2022 10:00

Matrix: Soil

COC Reference: 157330

Organics - Volatiles, Analysis: 1,4-Dioxane

Run in Batch: 220913A9, Run Date: 09/13/2022 13:52, Matrix: SO, Dilution: 55.4

Internal Standard	Flags	**%Rec**	LCL	UCL
1,4-Dioxane-D8		**124.4**	50.0	200.0

Organics - Volatiles, Analysis: Volatile Organics 5035

Run in Batch: 220909A5, Run Date: 09/09/2022 15:40, Matrix: SO, Dilution: 55.4

Internal Standard	Flags	**%Rec**	LCL	UCL
Pentafluorobenzene		**90.5**	50.0	200.0
1,4-Difluorobenzene		**88.1**	50.0	200.0
Chlorobenzene-D5		**84.1**	50.0	200.0
1,4-Dichlorobenzene-D4		**81.8**	50.0	200.0

Lab Sample ID: S40011.02

Sample Tag: SB-A4-MX60_4-6_090722

Collected Date/Time: 09/07/2022 10:05

Matrix: Soil

COC Reference: 157330

Organics - Volatiles, Analysis: 1,4-Dioxane

Run in Batch: 220913A9, Run Date: 09/13/2022 14:16, Matrix: SO, Dilution: 64.1

Internal Standard	Flags	**%Rec**	LCL	UCL
1,4-Dioxane-D8		**120.2**	50.0	200.0

Organics - Volatiles, Analysis: Volatile Organics 5035

Run in Batch: 220909A5, Run Date: 09/09/2022 16:04, Matrix: SO, Dilution: 64.1

Internal Standard	Flags	**%Rec**	LCL	UCL
Pentafluorobenzene		**97.3**	50.0	200.0
1,4-Difluorobenzene		**99.6**	50.0	200.0
Chlorobenzene-D5		**100.2**	50.0	200.0
1,4-Dichlorobenzene-D4		**100.2**	50.0	200.0

Lab Sample ID: S40011.03

Sample Tag: SB-A4-MX60_6-8_090722

Collected Date/Time: 09/07/2022 10:09

Matrix: Soil

COC Reference: 157330

Organics - Volatiles, Analysis: 1,4-Dioxane

Run in Batch: 220913A9, Run Date: 09/13/2022 15:01, Matrix: SO, Dilution: 58.6

Internal Standard	Flags	**%Rec**	LCL	UCL
1,4-Dioxane-D8		**117.6**	50.0	200.0

Organics - Volatiles, Analysis: Volatile Organics 5035

Run in Batch: 220909A5, Run Date: 09/09/2022 16:27, Matrix: SO, Dilution: 58.6

Internal Standard	Flags	**%Rec**	LCL	UCL
Pentafluorobenzene		**95.5**	50.0	200.0
1,4-Difluorobenzene		**97.6**	50.0	200.0
Chlorobenzene-D5		**98.2**	50.0	200.0
1,4-Dichlorobenzene-D4		**95.9**	50.0	200.0

Lab Sample ID: S40011.04

Sample Tag: SB-A4-MX60_8.5-10_090722

Collected Date/Time: 09/07/2022 10:14

Matrix: Soil

COC Reference: 157330

Organics - Volatiles, Analysis: 1,4-Dioxane

Run in Batch: 220913A9, Run Date: 09/13/2022 15:21, Matrix: SO, Dilution: 62

Internal Standard	Flags	%Rec	LCL	UCL
1,4-Dioxane-D8		**124.1**	50.0	200.0

Organics - Volatiles, Analysis: Volatile Organics 5035

Run in Batch: 220909A5, Run Date: 09/09/2022 16:50, Matrix: SO, Dilution: 62

Internal Standard	Flags	%Rec	LCL	UCL
Pentafluorobenzene		**94.0**	50.0	200.0
1,4-Difluorobenzene		**94.0**	50.0	200.0
Chlorobenzene-D5		**92.1**	50.0	200.0
1,4-Dichlorobenzene-D4		**89.9**	50.0	200.0

Lab Sample ID: S40011.05

Sample Tag: SB-A4-MX60_10-12_090722

Collected Date/Time: 09/07/2022 10:19

Matrix: Soil

COC Reference: 157330

Organics - Volatiles, Analysis: 1,4-Dioxane

Run in Batch: 220913A9, Run Date: 09/13/2022 15:42, Matrix: SO, Dilution: 79.4

Internal Standard	Flags	**%Rec**	LCL	UCL
1,4-Dioxane-D8		**112.9**	50.0	200.0

Organics - Volatiles, Analysis: Volatile Organics 5035

Run in Batch: 220909A5, Run Date: 09/09/2022 17:14, Matrix: SO, Dilution: 79.4

Internal Standard	Flags	**%Rec**	LCL	UCL
Pentafluorobenzene		**98.1**	50.0	200.0
1,4-Difluorobenzene		**98.8**	50.0	200.0
Chlorobenzene-D5		**97.8**	50.0	200.0
1,4-Dichlorobenzene-D4		**95.9**	50.0	200.0

QC Report - Internal Standards per Lab Sample

Lab Sample ID: S40011.06

Sample Tag: Trip Blank

Collected Date/Time: 09/07/2022 00:01

Matrix: Methanol

COC Reference: 157330

Organics - Volatiles, Analysis: Volatile Organics 5035

Run in Batch: 220909A5, Run Date: 09/09/2022 15:17, Matrix: SO, Dilution: 50

Internal Standard	Flags	**%Rec**	LCL	UCL
Pentafluorobenzene		**95.7**	50.0	200.0
1,4-Difluorobenzene		**96.6**	50.0	200.0
Chlorobenzene-D5		**95.3**	50.0	200.0
1,4-Dichlorobenzene-D4		**92.7**	50.0	200.0

Organics - Volatiles, Prep Batch ID: VF220909S1

QC Types: BLK/LCS/LCSD/MS/MSD

Blank (BLK)

Lab Sample ID: 220909A5.BLKS09A

Run in Batch: 220909A5, Run Date: 09/09/2022 14:02, Prep Date: 09/09/2022, Matrix: SO, Dilution: 50

Internal Standard	Flags	%Rec	LCL	UCL
Pentafluorobenzene		**96.7**	50.0	200.0
1,4-Difluorobenzene		**96.0**	50.0	200.0
Chlorobenzene-D5		**95.0**	50.0	200.0
1,4-Dichlorobenzene-D4		**93.9**	50.0	200.0

Laboratory Control Sample (LCS)

Lab Sample ID: 220909A5.LCSS09A

Run in Batch: 220909A5, Run Date: 09/09/2022 12:07, Prep Date: 09/09/2022, Matrix: SO, Dilution: 50

Internal Standard	Flags	%Rec	LCL	UCL
Pentafluorobenzene		**100.2**	50.0	200.0
1,4-Difluorobenzene		**100.9**	50.0	200.0
Chlorobenzene-D5		**100.1**	50.0	200.0
1,4-Dichlorobenzene-D4		**99.6**	50.0	200.0

Laboratory Control Sample Duplicate (LCSD)

Lab Sample ID: 220909A5.LCSDS09A, Parent Sample ID: 220909A5.LCSS09A

Run in Batch: 220909A5, Run Date: 09/09/2022 12:30, Prep Date: 09/09/2022, Matrix: SO, Dilution: 50

Internal Standard	Flags	%Rec	LCL	UCL
Pentafluorobenzene		**99.6**	50.0	200.0
1,4-Difluorobenzene		**100.1**	50.0	200.0
Chlorobenzene-D5		**100.7**	50.0	200.0
1,4-Dichlorobenzene-D4		**102.2**	50.0	200.0

Matrix Spike (MS)

Lab Sample ID: 220909A5.3987908M, Parent Sample ID: S39879.07

Run in Batch: 220909A5, Run Date: 09/09/2022 12:53, Prep Date: 09/09/2022, Matrix: SO, Dilution: 62.9

Internal Standard	Flags	%Rec	LCL	UCL
Pentafluorobenzene		**96.2**	50.0	200.0
1,4-Difluorobenzene		**94.7**	50.0	200.0
Chlorobenzene-D5		**91.9**	50.0	200.0
1,4-Dichlorobenzene-D4		**88.0**	50.0	200.0

Matrix Spike Duplicate (MSD)

Lab Sample ID: 220909A5.3987909N, Parent Sample ID: 220909A5.3987908M

Run in Batch: 220909A5, Run Date: 09/09/2022 13:16, Prep Date: 09/09/2022, Matrix: SO, Dilution: 62

Internal Standard	Flags	%Rec	LCL	UCL
Pentafluorobenzene		**95.4**	50.0	200.0
1,4-Difluorobenzene		**94.2**	50.0	200.0
Chlorobenzene-D5		**92.4**	50.0	200.0
1,4-Dichlorobenzene-D4		**90.1**	50.0	200.0

Organics - Volatiles, Prep Batch ID: VS220913S2

QC Types: BLK/LCS/LCSD

Blank (BLK)

Lab Sample ID: 220913A9.BLKS13A

Run in Batch: 220913A9, Run Date: 09/13/2022 13:17, Prep Date: 09/13/2022, Matrix: SO, Dilution: 50

Internal Standard	Flags	%Rec	LCL	UCL
1,4-Dioxane-D8		**118.1**	50.0	200.0

Laboratory Control Sample (LCS)

Lab Sample ID: 220913A9.LCSS13A

Run in Batch: 220913A9, Run Date: 09/13/2022 12:15, Prep Date: 09/13/2022, Matrix: SO, Dilution: 50

Internal Standard	Flags	%Rec	LCL	UCL
1,4-Dioxane-D8		**119.3**	50.0	200.0

Laboratory Control Sample Duplicate (LCSD)

Lab Sample ID: 220913A9.LCSDS13A, Parent Sample ID: 220913A9.LCSS13A

Run in Batch: 220913A9, Run Date: 09/13/2022 12:35, Prep Date: 09/13/2022, Matrix: SO, Dilution: 50

Internal Standard	Flags	%Rec	LCL	UCL
1,4-Dioxane-D8		**132.9**	50.0	200.0

Inorganics, Prep Batch ID: TS220907A

Surrogates: No, QC Types: BLK/LCS/DUP

Blank (BLK)

Lab Sample ID: TS220907A.LRB1

Run in Batch: TS220907A, Run Date: 09/07/2022 16:53, Prep Date: 09/07/2022, Matrix: Liquid, Dilution: 1

Analyte	Flags	Conc	RDL	Units
Total Solids		ND	1	%

Laboratory Control Sample (LCS)

Lab Sample ID: TS220907A.LCS1

Run in Batch: TS220907A, Run Date: 09/07/2022 16:53, Prep Date: 09/07/2022, Matrix: Liquid, Dilution: 1

Analyte	Flags	% Rec	LCL	UCL
Total Solids		100	90	110

Duplicate (DUP)

Lab Sample ID: TS220907A.DP1, Parent Sample ID: S39993.01

Run in Batch: TS220907A, Run Date: 09/07/2022 16:53, Prep Date: 09/07/2022, Matrix: Soil, Dilution: 1

Analyte	Flags	RPD	RPD CL
Total Solids		1	5

Duplicate (DUP)

Lab Sample ID: TS220907A.DP2, Parent Sample ID: S40013.03

Run in Batch: TS220907A, Run Date: 09/07/2022 16:53, Prep Date: 09/07/2022, Matrix: Soil, Dilution: 1

Analyte	Flags	RPD	RPD CL
Total Solids		0	5

Organics - Volatiles, Prep Batch ID: VF220909S1

Surrogates: Yes, QC Types: BLK/LCS/LCSD/MS/MSD

Blank (BLK)

Lab Sample ID: 220909A5.BLKS09A

Run in Batch: 220909A5, Run Date: 09/09/2022 14:02, Prep Date: 09/09/2022, Matrix: SO, Dilution: 50

Analyte	Flags	Conc	RDL	Units
Diethyl ether		ND	50.0	ug/kg
Acetone		ND	500.0	ug/kg
Methyl iodide		ND	50.0	ug/kg
Carbon disulfide		ND	50.0	ug/kg
tert-Methyl butyl ether (MTBE)		ND	50.0	ug/kg
Acrylonitrile		ND	50.0	ug/kg
2-Butanone (MEK)		ND	500.0	ug/kg
Dichlorodifluoromethane		ND	50.0	ug/kg
Chloromethane		ND	50.0	ug/kg
Vinyl chloride		ND	50.0	ug/kg
Bromomethane		ND	50.0	ug/kg
Chloroethane		ND	50.0	ug/kg
Trichlorofluoromethane		ND	50.0	ug/kg
1,1-Dichloroethene		ND	50.0	ug/kg
Methylene chloride		ND	50.0	ug/kg
trans-1,2-Dichloroethene		ND	50.0	ug/kg
1,1-Dichloroethane		ND	50.0	ug/kg
cis-1,2-Dichloroethene		ND	50.0	ug/kg
Tetrahydrofuran		ND	500.0	ug/kg
Chloroform		ND	50.0	ug/kg
Bromochloromethane		ND	50.0	ug/kg
1,1,1-Trichloroethane		ND	50.0	ug/kg
4-Methyl-2-pentanone (MIBK)		ND	500.0	ug/kg
2-Hexanone		ND	500.0	ug/kg
Carbon tetrachloride		ND	50.0	ug/kg
Benzene		ND	50.0	ug/kg
1,2-Dichloroethane		ND	50.0	ug/kg
Trichloroethene		ND	50.0	ug/kg
1,2-Dichloropropane		ND	50.0	ug/kg
Bromodichloromethane		ND	50.0	ug/kg
Dibromomethane		ND	50.0	ug/kg
cis-1,3-Dichloropropene		ND	50.0	ug/kg
Toluene		ND	50.0	ug/kg
trans-1,3-Dichloropropene		ND	50.0	ug/kg
1,1,2-Trichloroethane		ND	50.0	ug/kg
Tetrachloroethene		ND	50.0	ug/kg
trans-1,4-Dichloro-2-butene		ND	50.0	ug/kg
Dibromochloromethane		ND	50.0	ug/kg
1,2-Dibromoethane		ND	50.0	ug/kg
Chlorobenzene		ND	50.0	ug/kg
1,1,1,2-Tetrachloroethane		ND	50.0	ug/kg
Ethylbenzene		ND	50.0	ug/kg
p,m-Xylene		ND	50.0	ug/kg
o-Xylene		ND	50.0	ug/kg
Styrene		ND	50.0	ug/kg
Isopropylbenzene		ND	50.0	ug/kg

Organics - Volatiles, Prep Batch ID: VF220909S1 (continued)

Surrogates: Yes, QC Types: BLK/LCS/LCSD/MS/MSD

Blank (BLK) (continued)

Lab Sample ID: 220909A5.BLKS09A

Run in Batch: 220909A5, Run Date: 09/09/2022 14:02, Prep Date: 09/09/2022, Matrix: SO, Dilution: 50

Analyte	Flags	Conc	RDL	Units
Bromoform		ND	50.0	ug/kg
1,1,2,2-Tetrachloroethane		ND	50.0	ug/kg
1,2,3-Trichloropropane		ND	50.0	ug/kg
n-Propylbenzene		ND	50.0	ug/kg
Bromobenzene		ND	50.0	ug/kg
1,3,5-Trimethylbenzene		ND	50.0	ug/kg
tert-Butylbenzene		ND	50.0	ug/kg
1,2,4-Trimethylbenzene		ND	50.0	ug/kg
sec-Butylbenzene		ND	50.0	ug/kg
p-Isopropyltoluene		ND	50.0	ug/kg
1,3-Dichlorobenzene		ND	50.0	ug/kg
1,4-Dichlorobenzene		ND	50.0	ug/kg
1,2-Dichlorobenzene		ND	50.0	ug/kg
1,2,3-Trimethylbenzene		ND	50.0	ug/kg
n-Butylbenzene		ND	50.0	ug/kg
Hexachloroethane		ND	50.0	ug/kg
1,2-Dibromo-3-chloropropane		ND	50.0	ug/kg
1,2,4-Trichlorobenzene		ND	50.0	ug/kg
1,2,3-Trichlorobenzene		ND	50.0	ug/kg
Naphthalene		ND	50.0	ug/kg
2-Methylnaphthalene		ND	50.0	ug/kg

Laboratory Control Sample (LCS)

Lab Sample ID: 220909A5.LCSS09A

Run in Batch: 220909A5, Run Date: 09/09/2022 12:07, Prep Date: 09/09/2022, Matrix: SO, Dilution: 50

Analyte	Flags	% Rec	LCL	UCL
Diethyl ether		95.0	51.7	123.0
Acetone		101.7	25.3	155.1
Methyl iodide		107.0	56.9	110.8
Carbon disulfide		117.6	57.0	123.0
tert-Methyl butyl ether (MTBE)		102.1	67.5	123.7
Acrylonitrile		113.9	58.7	133.0
2-Butanone (MEK)		113.0	38.7	136.9
Dichlorodifluoromethane		113.6	10.0	171.8
Chloromethane		110.3	30.2	152.7
Vinyl chloride		109.7	45.3	138.7
Bromomethane		90.2	10.0	157.4
Chloroethane		82.5	10.0	169.1
Trichlorofluoromethane		106.4	25.7	157.8
1,1-Dichloroethene		106.8	59.2	137.5
Methylene chloride		102.9	70.5	121.5
trans-1,2-Dichloroethene		109.8	72.5	128.8
1,1-Dichloroethane		109.4	72.5	123.4
cis-1,2-Dichloroethene		109.8	75.0	120.5
Tetrahydrofuran		118.2	48.2	125.7
Chloroform		110.2	74.6	123.2

Organics - Volatiles, Prep Batch ID: VF220909S1 (continued)

Surrogates: Yes, QC Types: BLK/LCS/LCSD/MS/MSD

Laboratory Control Sample (LCS) (continued)

Lab Sample ID: 220909A5.LCSS09A

Run in Batch: 220909A5, Run Date: 09/09/2022 12:07, Prep Date: 09/09/2022, Matrix: SO, Dilution: 50

Analyte	Flags	% Rec	LCL	UCL
Bromochloromethane		109.4	72.3	122.8
1,1,1-Trichloroethane		109.7	73.8	128.9
4-Methyl-2-pentanone (MIBK)		117.7	60.4	133.8
2-Hexanone		118.9	45.7	141.9
Carbon tetrachloride		112.4	70.1	132.7
Benzene		111.8	74.6	128.9
1,2-Dichloroethane		109.3	73.2	125.4
Trichloroethene		114.5	74.1	127.6
1,2-Dichloropropane		110.4	77.6	124.4
Bromodichloromethane		118.3	76.7	128.4
Dibromomethane		113.1	72.5	127.3
cis-1,3-Dichloropropene		122.4	79.3	128.3
Toluene		110.1	74.8	129.2
trans-1,3-Dichloropropene		123.7	74.5	129.7
1,1,2-Trichloroethane		113.4	71.3	125.7
Tetrachloroethene		114.7	73.0	124.7
trans-1,4-Dichloro-2-butene		132.8	58.3	143.3
Dibromochloromethane		123.9	68.9	132.7
1,2-Dibromoethane		119.1	71.4	129.3
Chlorobenzene		113.0	74.2	128.1
1,1,1,2-Tetrachloroethane		112.3	76.6	133.0
Ethylbenzene		113.3	77.7	130.4
p,m-Xylene		114.6	79.8	132.0
o-Xylene		111.4	79.4	132.3
Styrene		115.8	71.3	119.3
Isopropylbenzene		111.8	70.3	128.2
Bromoform		126.7	54.7	137.4
1,1,2,2-Tetrachloroethane		117.6	65.4	134.9
1,2,3-Trichloropropane		114.6	67.2	154.5
n-Propylbenzene		114.7	77.3	135.2
Bromobenzene		113.1	74.0	132.4
1,3,5-Trimethylbenzene		112.0	75.6	137.0
tert-Butylbenzene		109.2	75.6	134.6
1,2,4-Trimethylbenzene		112.1	76.9	139.1
sec-Butylbenzene		113.6	72.7	135.6
p-Isopropyltoluene		116.1	77.1	140.9
1,3-Dichlorobenzene		117.3	77.3	131.0
1,4-Dichlorobenzene		117.1	33.1	125.8
1,2-Dichlorobenzene		115.4	73.5	132.7
1,2,3-Trimethylbenzene		105.8	70.9	130.2
n-Butylbenzene		121.8	75.0	138.6
Hexachloroethane		114.1	55.5	129.0
1,2-Dibromo-3-chloropropane		128.4	54.1	156.4
1,2,4-Trichlorobenzene		125.4	37.1	131.3
1,2,3-Trichlorobenzene		118.9	59.4	157.9
Naphthalene		118.6	39.3	129.2

Organics - Volatiles, Prep Batch ID: VF220909S1 (continued)

Surrogates: Yes, QC Types: BLK/LCS/LCSD/MS/MSD

Laboratory Control Sample (LCS) (continued)

Lab Sample ID: 220909A5.LCSS09A

Run in Batch: 220909A5, Run Date: 09/09/2022 12:07, Prep Date: 09/09/2022, Matrix: SO, Dilution: 50

Analyte	Flags	% Rec	LCL	UCL
2-Methylnaphthalene		112.1	10.0	175.9

Laboratory Control Sample Duplicate (LCSD)

Lab Sample ID: 220909A5.LCSDS09A, Parent Sample ID: 220909A5.LCSS09A

Run in Batch: 220909A5, Run Date: 09/09/2022 12:30, Prep Date: 09/09/2022, Matrix: SO, Dilution: 50

Analyte	Flags	% Rec	LCL	UCL	RPD	RPD CL
Diethyl ether		94.0	51.7	123.0	1.0	30.0
Acetone		99.5	25.3	155.1	2.2	30.0
Methyl iodide		110.8	56.9	110.8	3.5	30.0
Carbon disulfide		122.5	57.0	123.0	4.1	30.0
tert-Methyl butyl ether (MTBE)		103.0	67.5	123.7	0.9	30.0
Acrylonitrile		113.3	58.7	133.0	0.5	30.0
2-Butanone (MEK)		108.1	38.7	136.9	4.5	30.0
Dichlorodifluoromethane		116.9	10.0	171.8	2.9	30.0
Chloromethane		107.5	30.2	152.7	2.6	30.0
Vinyl chloride		110.0	45.3	138.7	0.3	30.0
Bromomethane		92.1	10.0	157.4	2.2	30.0
Chloroethane		85.2	10.0	169.1	3.3	30.0
Trichlorofluoromethane		108.3	25.7	157.8	1.7	30.0
1,1-Dichloroethene		109.2	59.2	137.5	2.1	30.0
Methylene chloride		106.0	70.5	121.5	3.0	30.0
trans-1,2-Dichloroethene		110.4	72.5	128.8	0.5	30.0
1,1-Dichloroethane		108.7	72.5	123.4	0.6	30.0
cis-1,2-Dichloroethene		108.4	75.0	120.5	1.3	30.0
Tetrahydrofuran		114.6	48.2	125.7	3.0	30.0
Chloroform		109.1	74.6	123.2	1.0	30.0
Bromochloromethane		108.0	72.3	122.8	1.2	30.0
1,1,1-Trichloroethane		111.6	73.8	128.9	1.7	30.0
4-Methyl-2-pentanone (MIBK)		116.0	60.4	133.8	1.4	30.0
2-Hexanone		114.2	45.7	141.9	4.0	30.0
Carbon tetrachloride		112.6	70.1	132.7	0.2	30.0
Benzene		110.6	74.6	128.9	1.0	30.0
1,2-Dichloroethane		106.1	73.2	125.4	3.0	30.0
Trichloroethene		111.9	74.1	127.6	2.3	30.0
1,2-Dichloropropane		109.9	77.6	124.4	0.5	30.0
Bromodichloromethane		116.7	76.7	128.4	1.4	30.0
Dibromomethane		111.6	72.5	127.3	1.4	30.0
cis-1,3-Dichloropropene		118.6	79.3	128.3	3.1	30.0
Toluene		109.0	74.8	129.2	1.1	30.0
trans-1,3-Dichloropropene		120.6	74.5	129.7	2.6	30.0
1,1,2-Trichloroethane		110.8	71.3	125.7	2.3	30.0
Tetrachloroethene		114.1	73.0	124.7	0.5	30.0
trans-1,4-Dichloro-2-butene		128.0	58.3	143.3	3.7	30.0
Dibromochloromethane		118.9	68.9	132.7	4.1	30.0
1,2-Dibromoethane		115.7	71.4	129.3	2.9	30.0
Chlorobenzene		110.2	74.2	128.1	2.5	30.0

Organics - Volatiles, Prep Batch ID: VF220909S1 (continued)

Surrogates: Yes, QC Types: BLK/LCS/LCSD/MS/MSD

Laboratory Control Sample Duplicate (LCSD) (continued)

Lab Sample ID: 220909A5.LCSDS09A, Parent Sample ID: 220909A5.LCSS09A

Run in Batch: 220909A5, Run Date: 09/09/2022 12:30, Prep Date: 09/09/2022, Matrix: SO, Dilution: 50

Analyte	Flags	% Rec	LCL	UCL	RPD	RPD CL
1,1,1,2-Tetrachloroethane		111.8	76.6	133.0	0.5	30.0
Ethylbenzene		112.1	77.7	130.4	1.1	30.0
p,m-Xylene		111.8	79.8	132.0	2.4	30.0
o-Xylene		110.2	79.4	132.3	1.0	30.0
Styrene		113.5	71.3	119.3	2.0	30.0
Isopropylbenzene		110.9	70.3	128.2	0.8	30.0
Bromoform		122.4	54.7	137.4	3.5	30.0
1,1,2,2-Tetrachloroethane		115.0	65.4	134.9	2.2	30.0
1,2,3-Trichloropropane		112.1	67.2	154.5	2.2	30.0
n-Propylbenzene		113.7	77.3	135.2	0.8	30.0
Bromobenzene		112.1	74.0	132.4	0.9	30.0
1,3,5-Trimethylbenzene		110.2	75.6	137.0	1.6	30.0
tert-Butylbenzene		109.2	75.6	134.6	0.1	30.0
1,2,4-Trimethylbenzene		111.4	76.9	139.1	0.6	30.0
sec-Butylbenzene		111.5	72.7	135.6	1.9	30.0
p-Isopropyltoluene		114.8	77.1	140.9	1.1	30.0
1,3-Dichlorobenzene		113.9	77.3	131.0	3.0	30.0
1,4-Dichlorobenzene		113.3	33.1	125.8	3.3	30.0
1,2-Dichlorobenzene		111.9	73.5	132.7	3.1	30.0
1,2,3-Trimethylbenzene		103.5	70.9	130.2	2.2	30.0
n-Butylbenzene		118.3	75.0	138.6	2.9	30.0
Hexachloroethane		112.0	55.5	129.0	1.8	30.0
1,2-Dibromo-3-chloropropane		122.1	54.1	156.4	5.0	30.0
1,2,4-Trichlorobenzene		123.0	37.1	131.3	1.9	30.0
1,2,3-Trichlorobenzene		117.4	59.4	157.9	1.3	30.0
Naphthalene		116.4	39.3	129.2	1.9	30.0
2-Methylnaphthalene		109.0	10.0	175.9	2.8	30.0

Matrix Spike (MS)

Lab Sample ID: 220909A5.3987908M, Parent Sample ID: S39879.07

Run in Batch: 220909A5, Run Date: 09/09/2022 12:53, Prep Date: 09/09/2022, Matrix: SO, Dilution: 62.9

Analyte	Flags	% Rec	LCL	UCL
Diethyl ether		93.8	51.7	123.0
Acetone		90.6	25.3	155.1
Methyl iodide		105.2	56.9	110.8
Carbon disulfide		115.0	57.0	123.0
tert-Methyl butyl ether (MTBE)		93.0	67.5	123.7
Acrylonitrile		102.4	58.7	133.0
2-Butanone (MEK)		96.8	38.7	136.9
Dichlorodifluoromethane		114.0	10.0	171.8
Chloromethane		106.7	30.2	152.7
Vinyl chloride		108.6	45.3	138.7
Bromomethane		95.2	10.0	157.4
Chloroethane		95.0	10.0	169.1
Trichlorofluoromethane		38.4	25.7	157.8
1,1-Dichloroethene		108.9	59.2	137.5

Organics - Volatiles, Prep Batch ID: VF220909S1 (continued)

Surrogates: Yes, QC Types: BLK/LCS/LCSD/MS/MSD

Matrix Spike (MS) (continued)

Lab Sample ID: 220909A5.3987908M, Parent Sample ID: S39879.07

Run in Batch: 220909A5, Run Date: 09/09/2022 12:53, Prep Date: 09/09/2022, Matrix: SO, Dilution: 62.9

Analyte	Flags	% Rec	LCL	UCL
Methylene chloride		92.4	70.5	121.5
trans-1,2-Dichloroethene		110.4	72.5	128.8
1,1-Dichloroethane		108.5	72.5	123.4
cis-1,2-Dichloroethene		106.1	75.0	120.5
Tetrahydrofuran		105.4	48.2	125.7
Chloroform		105.8	74.6	123.2
Bromochloromethane		101.1	72.3	122.8
1,1,1-Trichloroethane		109.2	73.8	128.9
4-Methyl-2-pentanone (MIBK)		100.0	60.4	133.8
2-Hexanone		101.3	45.7	141.9
Carbon tetrachloride		113.1	70.1	132.7
Benzene		109.9	74.6	128.9
1,2-Dichloroethane		100.8	73.2	125.4
Trichloroethene		114.0	74.1	127.6
1,2-Dichloropropane		107.4	77.6	124.4
Bromodichloromethane		108.9	76.7	128.4
Dibromomethane		103.0	72.5	127.3
cis-1,3-Dichloropropene		113.0	79.3	128.3
Toluene		108.3	74.8	129.2
trans-1,3-Dichloropropene		112.5	74.5	129.7
1,1,2-Trichloroethane		103.5	71.3	125.7
Tetrachloroethene		114.1	73.0	124.7
trans-1,4-Dichloro-2-butene		117.7	58.3	143.3
Dibromochloromethane		111.3	68.9	132.7
1,2-Dibromoethane		108.7	71.4	129.3
Chlorobenzene		110.0	74.2	128.1
1,1,1,2-Tetrachloroethane		109.4	76.6	133.0
Ethylbenzene		113.9	77.7	130.4
p,m-Xylene		113.7	79.8	132.0
o-Xylene		110.5	79.4	132.3
Styrene		111.1	71.3	119.3
Isopropylbenzene		115.1	70.3	128.2
Bromoform		109.5	54.7	137.4
1,1,2,2-Tetrachloroethane		105.4	65.4	134.9
1,2,3-Trichloropropane		103.4	67.2	154.5
n-Propylbenzene		116.4	77.3	135.2
Bromobenzene		108.0	74.0	132.4
1,3,5-Trimethylbenzene		113.0	75.6	137.0
tert-Butylbenzene		111.7	75.6	134.6
1,2,4-Trimethylbenzene		112.7	76.9	139.1
sec-Butylbenzene		121.1	72.7	135.6
p-Isopropyltoluene		122.4	77.1	140.9
1,3-Dichlorobenzene		116.9	77.3	131.0
1,4-Dichlorobenzene		115.8	33.1	125.8
1,2-Dichlorobenzene		113.9	73.5	132.7
1,2,3-Trimethylbenzene		108.2	70.9	130.2

Organics - Volatiles, Prep Batch ID: VF220909S1 (continued)

Surrogates: Yes, QC Types: BLK/LCS/LCSD/MS/MSD

Matrix Spike (MS) (continued)

Lab Sample ID: 220909A5.3987908M, Parent Sample ID: S39879.07

Run in Batch: 220909A5, Run Date: 09/09/2022 12:53, Prep Date: 09/09/2022, Matrix: SO, Dilution: 62.9

Analyte	Flags	% Rec	LCL	UCL
n-Butylbenzene		127.2	75.0	138.6
Hexachloroethane		117.7	55.5	129.0
1,2-Dibromo-3-chloropropane		115.9	54.1	156.4
1,2,4-Trichlorobenzene		125.0	37.1	131.3
1,2,3-Trichlorobenzene		119.1	59.4	157.9
Naphthalene		115.7	39.3	129.2
2-Methylnaphthalene		113.9	10.0	175.9

Matrix Spike Duplicate (MSD)

Lab Sample ID: 220909A5.3987909N, Parent Sample ID: 220909A5.3987908M

Run in Batch: 220909A5, Run Date: 09/09/2022 13:16, Prep Date: 09/09/2022, Matrix: SO, Dilution: 62

Analyte	Flags	% Rec	LCL	UCL	RPD	RPD CL
Diethyl ether		98.5	51.7	123.0	5.0	30.0
Acetone		102.1	25.3	155.1	11.6	30.0
Methyl iodide	*	112.0	56.9	110.8	6.2	30.0
Carbon disulfide	*	123.8	57.0	123.0	7.4	30.0
tert-Methyl butyl ether (MTBE)		101.1	67.5	123.7	8.3	30.0
Acrylonitrile		112.8	58.7	133.0	9.7	30.0
2-Butanone (MEK)		106.3	38.7	136.9	9.4	30.0
Dichlorodifluoromethane		121.6	10.0	171.8	6.5	30.0
Chloromethane		110.4	30.2	152.7	3.4	30.0
Vinyl chloride		113.5	45.3	138.7	4.3	30.0
Bromomethane		99.4	10.0	157.4	4.3	30.0
Chloroethane		101.9	10.0	169.1	7.0	30.0
Trichlorofluoromethane		48.7	25.7	157.8	23.7	30.0
1,1-Dichloroethene		115.8	59.2	137.5	6.1	30.0
Methylene chloride		100.1	70.5	121.5	7.3	30.0
trans-1,2-Dichloroethene		113.2	72.5	128.8	2.5	30.0
1,1-Dichloroethane		110.0	72.5	123.4	1.4	30.0
cis-1,2-Dichloroethene		107.6	75.0	120.5	1.5	30.0
Tetrahydrofuran		116.7	48.2	125.7	10.2	30.0
Chloroform		106.8	74.6	123.2	1.0	30.0
Bromochloromethane		103.8	72.3	122.8	2.6	30.0
1,1,1-Trichloroethane		113.4	73.8	128.9	3.8	30.0
4-Methyl-2-pentanone (MIBK)		109.7	60.4	133.8	9.3	30.0
2-Hexanone		111.9	45.7	141.9	9.9	30.0
Carbon tetrachloride		116.4	70.1	132.7	2.9	30.0
Benzene		111.6	74.6	128.9	1.5	30.0
1,2-Dichloroethane		104.1	73.2	125.4	3.3	30.0
Trichloroethene		113.2	74.1	127.6	0.7	30.0
1,2-Dichloropropane		108.6	77.6	124.4	1.1	30.0
Bromodichloromethane		110.4	76.7	128.4	1.4	30.0
Dibromomethane		106.2	72.5	127.3	3.0	30.0
cis-1,3-Dichloropropene		114.9	79.3	128.3	1.7	30.0
Toluene		109.8	74.8	129.2	1.4	30.0
trans-1,3-Dichloropropene		116.2	74.5	129.7	3.3	30.0

Organics - Volatiles, Prep Batch ID: VF220909S1 (continued)

Surrogates: Yes, QC Types: BLK/LCS/LCSD/MS/MSD

Matrix Spike Duplicate (MSD) (continued)

Lab Sample ID: 220909A5.3987909N, Parent Sample ID: 220909A5.3987908M

Run in Batch: 220909A5, Run Date: 09/09/2022 13:16, Prep Date: 09/09/2022, Matrix: SO, Dilution: 62

Analyte	Flags	% Rec	LCL	UCL	RPD	RPD CL
1,1,2-Trichloroethane		106.8	71.3	125.7	3.2	30.0
Tetrachloroethene		114.5	73.0	124.7	0.4	30.0
trans-1,4-Dichloro-2-butene		123.4	58.3	143.3	4.7	30.0
Dibromochloromethane		113.4	68.9	132.7	1.9	30.0
1,2-Dibromoethane		112.3	71.4	129.3	3.2	30.0
Chlorobenzene		110.5	74.2	128.1	0.5	30.0
1,1,1,2-Tetrachloroethane		110.3	76.6	133.0	0.7	30.0
Ethylbenzene		113.8	77.7	130.4	0.1	30.0
p,m-Xylene		113.3	79.8	132.0	0.3	30.0
o-Xylene		111.3	79.4	132.3	0.7	30.0
Styrene		112.3	71.3	119.3	1.1	30.0
Isopropylbenzene		115.2	70.3	128.2	0.1	30.0
Bromoform		112.4	54.7	137.4	2.6	30.0
1,1,2,2-Tetrachloroethane		111.6	65.4	134.9	5.7	30.0
1,2,3-Trichloropropane		112.5	67.2	154.5	8.4	30.0
n-Propylbenzene		116.1	77.3	135.2	0.2	30.0
Bromobenzene		108.9	74.0	132.4	0.8	30.0
1,3,5-Trimethylbenzene		113.0	75.6	137.0	0.0	30.0
tert-Butylbenzene		112.3	75.6	134.6	0.5	30.0
1,2,4-Trimethylbenzene		112.5	76.9	139.1	0.1	30.0
sec-Butylbenzene		120.4	72.7	135.6	0.6	30.0
p-Isopropyltoluene		120.8	77.1	140.9	1.3	30.0
1,3-Dichlorobenzene		114.0	77.3	131.0	2.6	30.0
1,4-Dichlorobenzene		113.3	33.1	125.8	2.2	30.0
1,2-Dichlorobenzene		111.4	73.5	132.7	2.2	30.0
1,2,3-Trimethylbenzene		107.2	70.9	130.2	0.9	30.0
n-Butylbenzene		123.3	75.0	138.6	3.1	30.0
Hexachloroethane		115.0	55.5	129.0	2.3	30.0
1,2-Dibromo-3-chloropropane		120.6	54.1	156.4	4.0	30.0
1,2,4-Trichlorobenzene		121.1	37.1	131.3	3.2	30.0
1,2,3-Trichlorobenzene		117.0	59.4	157.9	1.8	30.0
Naphthalene		116.6	39.3	129.2	0.8	30.0
2-Methylnaphthalene		112.9	10.0	175.9	0.9	30.0

Organics - Volatiles, Prep Batch ID: VS220913S2

Surrogates: Yes, QC Types: BLK/LCS/LCSD

Blank (BLK)

Lab Sample ID: 220913A9.BLKS13A

Run in Batch: 220913A9, Run Date: 09/13/2022 13:17, Prep Date: 09/13/2022, Matrix: SO, Dilution: 50

Analyte	Flags	Conc	RDL	Units
1,4-Dioxane	*	15	1	ug/kg

Laboratory Control Sample (LCS)

Lab Sample ID: 220913A9.LCSS13A

Run in Batch: 220913A9, Run Date: 09/13/2022 12:15, Prep Date: 09/13/2022, Matrix: SO, Dilution: 50

Analyte	Flags	% Rec	LCL	UCL
1,4-Dioxane		75.3	70.0	130.0

Laboratory Control Sample Duplicate (LCSD)

Lab Sample ID: 220913A9.LCSDS13A, Parent Sample ID: 220913A9.LCSS13A

Run in Batch: 220913A9, Run Date: 09/13/2022 12:35, Prep Date: 09/13/2022, Matrix: SO, Dilution: 50

Analyte	Flags	% Rec	LCL	UCL	RPD	RPD CL
1,4-Dioxane		79.3	70.0	130.0	5.2	30.0

Merit Laboratories Login Checklist

Lab Set ID:S40011
Client:ARCADIS_NOVI (ARCADIS U.S., Inc.)
Project: 30112892.04100 / RACER Lansing
Submitted:09/07/2022 12:50 Login User: MMC

Attention: Kaitlyn Hunt
Address: Arcadis
28550 Cabot Drive
Suite 500
Novi, MI 48377

Phone: O:248-809-4013 FAX:
Email: Kaitlyn.Hunt@arcadis.com

Selection				Description	Note
Sample Receiving					
01.	[X] Yes	[ ] No	[ ] N/A	Samples are received at 4C +/- 2C Thermometer #	IR 5.5
02.	[X] Yes	[ ] No	[ ] N/A	Received on ice/ cooling process begun	
03.	[ ] Yes	[X] No	[ ] N/A	Samples shipped	
04.	[ ] Yes	[X] No	[ ] N/A	Samples left in 24 hr. drop box	
05.	[ ] Yes	[ ] No	[X] N/A	Are there custody seals/tape or is the drop box locked	
Chain of Custody					
06.	[X] Yes	[ ] No	[ ] N/A	COC adequately filled out	
07.	[X] Yes	[ ] No	[ ] N/A	COC signed and relinquished to the lab	
08.	[X] Yes	[ ] No	[ ] N/A	Sample tag on bottles match COC	
09.	[ ] Yes	[X] No	[ ] N/A	Subcontracting needed? Subcontacted to:	
Preservation					
10.	[X] Yes	[ ] No	[ ] N/A	Do sample have correct chemical preservation	
11.	[ ] Yes	[ ] No	[X] N/A	Completed pH checks on preserved samples? (no VOAs)	
12.	[ ] Yes	[X] No	[ ] N/A	Did any samples need to be preserved in the lab?	
Bottle Conditions					
13.	[X] Yes	[ ] No	[ ] N/A	All bottles intact	
14.	[X] Yes	[ ] No	[ ] N/A	Appropriate analytical bottles are used	
15.	[X] Yes	[ ] No	[ ] N/A	Merit bottles used	
16.	[X] Yes	[ ] No	[ ] N/A	Sufficient sample volume received	
17.	[ ] Yes	[X] No	[ ] N/A	Samples require laboratory filtration	
18.	[X] Yes	[ ] No	[ ] N/A	Samples submitted within holding time	
19.	[ ] Yes	[ ] No	[X] N/A	Do water VOC or TOX bottles contain headspace	

Corrective action for all exceptions is to call the client and to notify the project manager.

Client Review By: _____ Date: _____

Merit Laboratories, Inc.

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

C.O.C. PAGE # 1 OF 1

157330

CHAIN OF CUSTODY RECORD

REPORT TO

CONTACT NAME: Tiffany Linder
COMPANY: Arcadis
ADDRESS: 28550 Cabot Drive, Suite 500
CITY: Novi STATE: MI ZIP CODE: 48377
PHONE NO.: 810-225-1928 CELL NO.: 517-861-0138 P.O. NO.:
E-MAIL ADDRESS: Tiffany.Linder@arcadis.com QUOTE NO.:

INVOICE TO

CONTACT NAME: ☒ SAME
COMPANY:
ADDRESS:
CITY: STATE: ZIP CODE:
PHONE NO.: E-MAIL ADDRESS:

PROJECT NO./NAME: 30112892.04100 / RACER Lansing
SAMPLER(S) - PLEASE PRINT/SIGN NAME: Austin Westhuis / [signature]

TURNAROUND TIME REQUIRED ☐ 1 DAY ☐ 2 DAYS ☐ 3 DAYS ☒ STANDARD ☐ OTHER

DELIVERABLES REQUIRED ☐ STD ☐ LEVEL II ☐ LEVEL III ☐ LEVEL IV ☐ EDD ☐ OTHER

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

ANALYSIS (ATTACH LIST IF MORE SPACE IS REQUIRED)

Certifications
☐ OHIO VAP ☐ Drinking Water
☐ DoD ☐ NPDES

Project Locations
☐ Detroit ☐ New York
☐ Other

Special Instructions

MERIT LAB NO. (FOR LAB USE ONLY)	COLLECTION DATE	COLLECTION TIME	SAMPLE TAG IDENTIFICATION-DESCRIPTION	MATRIX	# OF BOTTLES	# Containers & Preservatives: NONE	HCl	HNO_3	H_2SO_4	NaOH	MeOH	OTHER	1,4-Dioxane 8260 SIM	VOCs 8260
10011.01	9/7/22	1000	SB-A4-MX60_1-3_090722	S	2	1					1		X	X
.02	9/7/22	1005	SB-A4-MX60_4-6_090722	S	2	1					1		X	X
.03	9/7/22	1009	SB-A4-MX60_6-8_090722	S	2	1					1		X	X
.04	9/7/22	1014	SB-A4-MX60_8.5-10_090722	S	2	1					1		X	X
.05	9/7/22	1019	SB-A4-MX60_10-12_090722	S	2	1					1		X	X
.06	9/7/22	—	Trip Blank	S	1						1			X

RELINQUISHED BY: SIGNATURE/ORGANIZATION	[signature] / Arcadis ☒ Sampler	DATE 9/7/22	TIME
RECEIVED BY: SIGNATURE/ORGANIZATION	Merit Drop Box	DATE 9/7/22	TIME
RELINQUISHED BY: SIGNATURE/ORGANIZATION		DATE	TIME
RECEIVED BY: SIGNATURE/ORGANIZATION		DATE	TIME

RELINQUISHED BY: SIGNATURE/ORGANIZATION		DATE	TIME
RECEIVED BY: SIGNATURE/ORGANIZATION	Baxter Ball	DATE 9/7/2022	TIME 1250
SEAL NO.	SEAL INTACT YES ☐ NO ☐	INITIALS	NOTES: TEMP. ON ARRIVAL 5.5
SEAL NO.	SEAL INTACT YES ☐ NO ☐	INITIALS	

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

Rev. 1.26.22

* Please also email results to: Caitlin.Cisco@arcadis.com and Alex.Villhauer@arcadis.com

Analytical Laboratory Report

Report ID: S40191.01(01)+QC01
Generated on 09/27/2022

Report to

Attention: Kaitlyn Hunt
Arcadis
28550 Cabot Drive
Suite 500
Novi, MI 48377

Phone: O:248-809-4013 C:947-777-5215 FAX:
Email: Kaitlyn.Hunt@arcadis.com

Addtional Contacts: Marina Samp, Tiffany Linder, Caitlin Cisco, Alex Villhauer

Report produced by

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

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

Contacts for report questions:
John Laverty (johnlaverty@meritlabs.com)
Barbara Ball (bball@meritlabs.com)

Report Summary

Lab Sample ID(s): S40191.01-S40191.05
Project: 30112892.04100/Racer Lansing
Collected Date(s): 09/12/2022
Submitted Date/Time: 09/13/2022 08:45
Sampled by: Austin Westhuis
P.O. #: 30112892.04100

Table of Contents

Cover Page (Page 1)
General Report Notes (Page 2)
Report Narrative (Page 2)
Laboratory Certifications (Page 3)
Qualifier Descriptions (Page 3)
Glossary of Abbreviations (Page 3)
Method Summary (Page 4)
Sample Summary (Page 5)
QC Report (Pages 11-31)

Maya Murshak
Technical Director

General Report Notes

Analytical results relate only to the samples tested, in the condition received by the laboratory.
Methods may be modified for improved performance.
Results reported on a dry weight basis where applicable.
'Not detected' indicates that parameter was not found at a level equal to or greater than the reporting limit (RL).
When MDL results are provided, then 'Not detected' indicates that parameter was not found at a level equal to or greater than the MDL.
40 CFR Part 136 Table II Required Containers, Preservation Techniques and Holding Times for the Clean Water Act specify that samples for acrolein and acrylonitrile, and 2-chloroethylvinyl ether need to be preserved at a pH in the range of 4 to 5 or if not preserved, analyzed within 3 days of sampling.
QA/QC corresponding to this analytical report is a separate document with the same Merit ID reference and is available upon request.
Full accreditation certificates are available upon request. Starred (*) analytes are not NELAP accredited.
Samples are held by the lab for 30 days from the final report date unless a written request to hold longer is provided by the client.
Report shall not be reproduced except in full, without the written approval of Merit Laboratories, Inc.
Limits for drinking water samples, are listed as the MCL Limits (Maximum Contaminant Level Concentrations)
PFAS requirement: Section 9.3.8 of U.S. EPA Method 537.1 states "If the method analyte(s) found in the Field Sample is present in the FRB at a concentration greater than 1/3 the MRL, then all samples collected with that FRB are invalid and must be recollected and reanalyzed."
Samples submitted without an accompanying FRB may not be acceptable for compliance purposes.
Wisconsin PFAs analysis: MDL = LOD; RL = LOQ. LOD and LOQ are adjusted for dilution.

Report Narrative

There is no additional narrative for this analytical report

Laboratory Certifications

Authority	Certification ID
Michigan DEQ	#9956
DOD ELAP/ISO 17025	#69699
WBENC	#2005110032
Ohio VAP	#CL0002
Indiana DOH	#C-MI-07
New York NELAC	#11814
North Carolina DENR	#680
North Carolina DOH	#26702
Alaska CSLAP	#17-001
Pennsylvania DEP	#68-05884
Wisconsin DNR	FID# 399147320

Qualifier Descriptions

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

Glossary of Abbreviations

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

Method Summary

Method	Version
N/A	Not Applicable
SW8260B - SIM	SW 846 Method 8260B Revision 2 December 1996 SIMs

Sample Summary (5 samples)

Sample ID	Sample Tag	Matrix	Collected Date/Time
S40191.01	MW-22-156_091222	Groundwater	09/12/22 11:05
S40191.02	MW-22-155_091222	Groundwater	09/12/22 12:05
S40191.03	MW-22-157_091222	Groundwater	09/12/22 14:10
S40191.04	MW-22-153_091222	Groundwater	09/12/22 15:00
S40191.05	MW-14-58R_091222	Groundwater	09/12/22 15:35

Lab Sample ID: S40191.01
Sample Tag: MW-22-156_091222
Collected Date/Time: 09/12/2022 11:05
Matrix: Groundwater
COC Reference: 157329

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	4.4	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	09/22/22 14:30	BML	

Organics - Volatiles

Method: SW8260B - SIM, Run Date: 09/21/22 15:38, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,4-Dioxane*	76	1		ug/L	1	123-91-1	

Lab Sample ID: S40191.02
Sample Tag: MW-22-155_091222
Collected Date/Time: 09/12/2022 12:05
Matrix: Groundwater
COC Reference: 157329

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	4.4	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	09/22/22 14:30	BML	

Organics - Volatiles

Method: SW8260B - SIM, Run Date: 09/23/22 20:07, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,4-Dioxane*	410	10		ug/L	10	123-91-1	Y

Y-Elevated reporting limit due to high target concentration

Lab Sample ID: S40191.03
Sample Tag: MW-22-157_091222
Collected Date/Time: 09/12/2022 14:10
Matrix: Groundwater
COC Reference: 157329

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	4.4	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	09/22/22 14:30	BML	

Organics - Volatiles

Method: SW8260B - SIM, Run Date: 09/26/22 20:00, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,4-Dioxane*	3	1		ug/L	1	123-91-1	

Analytical Laboratory Report

Lab Sample ID: S40191.04
Sample Tag: MW-22-153_091222
Collected Date/Time: 09/12/2022 15:00
Matrix: Groundwater
COC Reference: 157329

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	4.4	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	09/22/22 14:30	BML	

Organics - Volatiles

Method: SW8260B - SIM, Run Date: 09/21/22 16:43, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,4-Dioxane*	55	1		ug/L	1	123-91-1	

Lab Sample ID: S40191.05
Sample Tag: MW-14-58R_091222
Collected Date/Time: 09/12/2022 15:35
Matrix: Groundwater
COC Reference: 157329

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	4.4	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	09/22/22 14:30	BML	

Organics - Volatiles

Method: SW8260B - SIM, Run Date: 09/23/22 19:24, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,4-Dioxane*	187	1		ug/L	1	123-91-1	

Quality Control Report

Report ID: S40191.01(01)+QC01
Generated on 09/27/2022

Report to

Attention: Kaitlyn Hunt
Arcadis
28550 Cabot Drive
Suite 500
Novi, MI 48377

Phone: O:248-809-4013 C:947-777-5215 FAX:

Report Produced by

Merit Laboratories
2680 East Lansing Drive
East Lansing, MI 48823

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

Report Summary

Lab Sample ID(s): S40191.01-S40191.05
Project: 30112892.04100/Racer Lansing
Submitted Date/Time: 09/13/2022 08:45
Sampled by: Austin Westhuis
P.O. #: 30112892.04100

QC Report Sections

Cover Page (Page 11)
Analysis Summary (Pages 12-16)
Prep Batch Summary (Page 17)
Surrogates per QC Sample (Pages 18-20)
Internal Standards per Lab Sample (Pages 21-25)
Internal Standards per QC Sample (Pages 26-28)
Batch QC Results (Pages 29-31)

Report Flag Descriptions

*: QC result is outside of indicated control limits
W: Surrogate result not applicable due to sample dilution

I certify that this data package is in compliance with the terms and conditions of the program, and project, and contractual requirements both technically and for completeness. Release of the data contained in this hardcopy data package and its computer-readable data submitted has been authorized by the Quality Assurance Manager and his/her designee, as verified by the following signature.

Barbara Ball
Quality Assurance Manager

QC Report - Analysis Summary

Lab Sample ID: S40191.01
Sample Tag: MW-22-156_091222
Collected Date/Time: 09/12/2022 11:05
Matrix: Groundwater
COC Reference: 157329

Analysis	Method	Run Date/Time	Batch ID	Prep ID	Surr	QC Types
Organics - Volatiles						
1,4-Dioxane	SW8260B - SIM	09/21/22 15:38	220921A9	VS220921W1	Yes	BLK/LCS/LCSD

Lab Sample ID: S40191.02
Sample Tag: MW-22-155_091222
Collected Date/Time: 09/12/2022 12:05
Matrix: Groundwater
COC Reference: 157329

Analysis	Method	Run Date/Time	Batch ID	Prep ID	Surr	QC Types
Organics - Volatiles						
1,4-Dioxane	SW8260B - SIM	09/23/22 20:07	220923A9	VS220923W1	Yes	BLK/LCS/LCSD

Lab Sample ID: S40191.03
Sample Tag: MW-22-157_091222
Collected Date/Time: 09/12/2022 14:10
Matrix: Groundwater
COC Reference: 157329

Analysis	Method	Run Date/Time	Batch ID	Prep ID	Surr	QC Types
Organics - Volatiles						
1,4-Dioxane	SW8260B - SIM	09/26/22 20:00	220926A9	VS220926W1	Yes	BLK/LCS/LCSD

Lab Sample ID: S40191.04
Sample Tag: MW-22-153_091222
Collected Date/Time: 09/12/2022 15:00
Matrix: Groundwater
COC Reference: 157329

Analysis	Method	Run Date/Time	Batch ID	Prep ID	Surr	QC Types
Organics - Volatiles						
1,4-Dioxane	SW8260B - SIM	09/21/22 16:43	220921A9	VS220921W1	Yes	BLK/LCS/LCSD

Lab Sample ID: S40191.05
Sample Tag: MW-14-58R_091222
Collected Date/Time: 09/12/2022 15:35
Matrix: Groundwater
COC Reference: 157329

Analysis	Method	Run Date/Time	Batch ID	Prep ID	Surr	QC Types
Organics - Volatiles						
1,4-Dioxane	SW8260B - SIM	09/23/22 19:24	220923A9	VS220923W1	Yes	BLK/LCS/LCSD

QC Report - Prep Batch Summary

Organics - Volatiles, Prep Batch ID: VS220921W1

Surrogates: Yes, QC Types: BLK/LCS/LCSD

Sample ID	Analysis	Method	Run Date/Time	Batch ID
S40191.01	1,4-Dioxane	SW8260B - SIM	09/21/22 15:38	220921A9
S40191.04	1,4-Dioxane	SW8260B - SIM	09/21/22 16:43	220921A9

Organics - Volatiles, Prep Batch ID: VS220923W1

Surrogates: Yes, QC Types: BLK/LCS/LCSD

Sample ID	Analysis	Method	Run Date/Time	Batch ID
S40191.02	1,4-Dioxane	SW8260B - SIM	09/23/22 20:07	220923A9
S40191.05	1,4-Dioxane	SW8260B - SIM	09/23/22 19:24	220923A9

Organics - Volatiles, Prep Batch ID: VS220926W1

Surrogates: Yes, QC Types: BLK/LCS/LCSD

Sample ID	Analysis	Method	Run Date/Time	Batch ID
S40191.03	1,4-Dioxane	SW8260B - SIM	09/26/22 20:00	220926A9

Organics - Volatiles, Prep Batch ID: VS220921W1

QC Types: BLK/LCS/LCSD

Blank (BLK)

Lab Sample ID: 220921A9.BLKW21A

Run in Batch: 220921A9, Run Date: 09/21/2022 15:05, Prep Date: 09/21/2022, Matrix: WW, Dilution: 1

Surrogate	Flags	%Rec	LCL	UCL

No Surrogates

Laboratory Control Sample (LCS)

Lab Sample ID: 220921A9.LCSW21A

Run in Batch: 220921A9, Run Date: 09/21/2022 14:04, Prep Date: 09/21/2022, Matrix: WW, Dilution: 1

Surrogate	Flags	%Rec	LCL	UCL

No Surrogates

Laboratory Control Sample Duplicate (LCSD)

Lab Sample ID: 220921A9.LCSDW21A, Parent Sample ID: 220921A9.LCSW21A

Run in Batch: 220921A9, Run Date: 09/21/2022 14:25, Prep Date: 09/21/2022, Matrix: WW, Dilution: 1

Surrogate	Flags	%Rec	LCL	UCL

No Surrogates

Organics - Volatiles, Prep Batch ID: VS220923W1

QC Types: BLK/LCS/LCSD

Blank (BLK)

Lab Sample ID: 220923A9.BLKW23A

Run in Batch: 220923A9, Run Date: 09/23/2022 18:19, Prep Date: 09/23/2022, Matrix: WW, Dilution: 1

Surrogate	Flags	%Rec	LCL	UCL

No Surrogates

Laboratory Control Sample (LCS)

Lab Sample ID: 220923A9.LCSW23A

Run in Batch: 220923A9, Run Date: 09/23/2022 16:36, Prep Date: 09/23/2022, Matrix: WW, Dilution: 1

Surrogate	Flags	%Rec	LCL	UCL

No Surrogates

Laboratory Control Sample Duplicate (LCSD)

Lab Sample ID: 220923A9.LCSDW23A, Parent Sample ID: 220923A9.LCSW23A

Run in Batch: 220923A9, Run Date: 09/23/2022 16:57, Prep Date: 09/23/2022, Matrix: WW, Dilution: 1

Surrogate	Flags	%Rec	LCL	UCL

No Surrogates

Organics - Volatiles, Prep Batch ID: VS220926W1

QC Types: BLK/LCS/LCSD

Blank (BLK)

Lab Sample ID: 220926A9.BLKW26A

Run in Batch: 220926A9, Run Date: 09/26/2022 19:39, Prep Date: 09/26/2022, Matrix: WW, Dilution: 1

Surrogate	Flags	%Rec	LCL	UCL

No Surrogates

Laboratory Control Sample (LCS)

Lab Sample ID: 220926A9.LCSW26A

Run in Batch: 220926A9, Run Date: 09/26/2022 18:37, Prep Date: 09/26/2022, Matrix: WW, Dilution: 1

Surrogate	Flags	%Rec	LCL	UCL

No Surrogates

Laboratory Control Sample Duplicate (LCSD)

Lab Sample ID: 220926A9.LCSDW26A, Parent Sample ID: 220926A9.LCSW26A

Run in Batch: 220926A9, Run Date: 09/26/2022 18:58, Prep Date: 09/26/2022, Matrix: WW, Dilution: 1

Surrogate	Flags	%Rec	LCL	UCL

No Surrogates

QC Report - Internal Standards per Lab Sample

Lab Sample ID: S40191.01

Sample Tag: MW-22-156_091222

Collected Date/Time: 09/12/2022 11:05

Matrix: Groundwater

COC Reference: 157329

Organics - Volatiles, Analysis: 1,4-Dioxane

Run in Batch: 220921A9, Run Date: 09/21/2022 15:38, Matrix: WW, Dilution: 1

Internal Standard	Flags	**%Rec**	LCL	UCL
1,4-Dioxane-D8		**96.9**	50.0	200.0

QC Report - Internal Standards per Lab Sample

Lab Sample ID: S40191.02

Sample Tag: MW-22-155_091222

Collected Date/Time: 09/12/2022 12:05

Matrix: Groundwater

COC Reference: 157329

Organics - Volatiles, Analysis: 1,4-Dioxane

Run in Batch: 220923A9, Run Date: 09/23/2022 20:07, Matrix: WW, Dilution: 10

Internal Standard	Flags	**%Rec**	LCL	UCL
1,4-Dioxane-D8		**113.4**	50.0	200.0

QC Report - Internal Standards per Lab Sample

Lab Sample ID: S40191.03

Sample Tag: MW-22-157_091222

Collected Date/Time: 09/12/2022 14:10

Matrix: Groundwater

COC Reference: 157329

Organics - Volatiles, Analysis: 1,4-Dioxane

Run in Batch: 220926A9, Run Date: 09/26/2022 20:00, Matrix: WW, Dilution: 1

Internal Standard	Flags	**%Rec**	LCL	UCL
1,4-Dioxane-D8		**99.9**	50.0	200.0

QC Report - Internal Standards per Lab Sample

Lab Sample ID: S40191.04

Sample Tag: MW-22-153_091222

Collected Date/Time: 09/12/2022 15:00

Matrix: Groundwater

COC Reference: 157329

Organics - Volatiles, Analysis: 1,4-Dioxane

Run in Batch: 220921A9, Run Date: 09/21/2022 16:43, Matrix: WW, Dilution: 1

Internal Standard	Flags	**%Rec**	LCL	UCL
1,4-Dioxane-D8		**102.0**	50.0	200.0

QC Report - Internal Standards per Lab Sample

Lab Sample ID: S40191.05

Sample Tag: MW-14-58R_091222

Collected Date/Time: 09/12/2022 15:35

Matrix: Groundwater

COC Reference: 157329

Organics - Volatiles, Analysis: 1,4-Dioxane

Run in Batch: 220923A9, Run Date: 09/23/2022 19:24, Matrix: WW, Dilution: 1

Internal Standard	Flags	**%Rec**	LCL	UCL
1,4-Dioxane-D8		**118.7**	50.0	200.0

Organics - Volatiles, Prep Batch ID: VS220921W1

QC Types: BLK/LCS/LCSD

Blank (BLK)

Lab Sample ID: 220921A9.BLKW21A

Run in Batch: 220921A9, Run Date: 09/21/2022 15:05, Prep Date: 09/21/2022, Matrix: WW, Dilution: 1

Internal Standard	Flags	%Rec	LCL	UCL
1,4-Dioxane-D8		**98.2**	50.0	200.0

Laboratory Control Sample (LCS)

Lab Sample ID: 220921A9.LCSW21A

Run in Batch: 220921A9, Run Date: 09/21/2022 14:04, Prep Date: 09/21/2022, Matrix: WW, Dilution: 1

Internal Standard	Flags	%Rec	LCL	UCL
1,4-Dioxane-D8		**94.2**	50.0	200.0

Laboratory Control Sample Duplicate (LCSD)

Lab Sample ID: 220921A9.LCSDW21A, Parent Sample ID: 220921A9.LCSW21A

Run in Batch: 220921A9, Run Date: 09/21/2022 14:25, Prep Date: 09/21/2022, Matrix: WW, Dilution: 1

Internal Standard	Flags	%Rec	LCL	UCL
1,4-Dioxane-D8		**91.6**	50.0	200.0

Organics - Volatiles, Prep Batch ID: VS220923W1

QC Types: BLK/LCS/LCSD

Blank (BLK)

Lab Sample ID: 220923A9.BLKW23A

Run in Batch: 220923A9, Run Date: 09/23/2022 18:19, Prep Date: 09/23/2022, Matrix: WW, Dilution: 1

Internal Standard	Flags	%Rec	LCL	UCL
1,4-Dioxane-D8		**95.9**	50.0	200.0

Laboratory Control Sample (LCS)

Lab Sample ID: 220923A9.LCSW23A

Run in Batch: 220923A9, Run Date: 09/23/2022 16:36, Prep Date: 09/23/2022, Matrix: WW, Dilution: 1

Internal Standard	Flags	%Rec	LCL	UCL
1,4-Dioxane-D8		**107.1**	50.0	200.0

Laboratory Control Sample Duplicate (LCSD)

Lab Sample ID: 220923A9.LCSDW23A, Parent Sample ID: 220923A9.LCSW23A

Run in Batch: 220923A9, Run Date: 09/23/2022 16:57, Prep Date: 09/23/2022, Matrix: WW, Dilution: 1

Internal Standard	Flags	%Rec	LCL	UCL
1,4-Dioxane-D8		**115.2**	50.0	200.0

Organics - Volatiles, Prep Batch ID: VS220926W1

QC Types: BLK/LCS/LCSD

Blank (BLK)

Lab Sample ID: 220926A9.BLKW26A

Run in Batch: 220926A9, Run Date: 09/26/2022 19:39, Prep Date: 09/26/2022, Matrix: WW, Dilution: 1

Internal Standard	Flags	%Rec	LCL	UCL
1,4-Dioxane-D8		**97.1**	50.0	200.0

Laboratory Control Sample (LCS)

Lab Sample ID: 220926A9.LCSW26A

Run in Batch: 220926A9, Run Date: 09/26/2022 18:37, Prep Date: 09/26/2022, Matrix: WW, Dilution: 1

Internal Standard	Flags	%Rec	LCL	UCL
1,4-Dioxane-D8		**114.6**	50.0	200.0

Laboratory Control Sample Duplicate (LCSD)

Lab Sample ID: 220926A9.LCSDW26A, Parent Sample ID: 220926A9.LCSW26A

Run in Batch: 220926A9, Run Date: 09/26/2022 18:58, Prep Date: 09/26/2022, Matrix: WW, Dilution: 1

Internal Standard	Flags	%Rec	LCL	UCL
1,4-Dioxane-D8		**101.3**	50.0	200.0

Organics - Volatiles, Prep Batch ID: VS220921W1

Surrogates: Yes, QC Types: BLK/LCS/LCSD

Blank (BLK)

Lab Sample ID: 220921A9.BLKW21A

Run in Batch: 220921A9, Run Date: 09/21/2022 15:05, Prep Date: 09/21/2022, Matrix: WW, Dilution: 1

Analyte	Flags	Conc	RDL	Units
1,4-Dioxane	*	0.44	0.02	ug/l

Laboratory Control Sample (LCS)

Lab Sample ID: 220921A9.LCSW21A

Run in Batch: 220921A9, Run Date: 09/21/2022 14:04, Prep Date: 09/21/2022, Matrix: WW, Dilution: 1

Analyte	Flags	% Rec	LCL	UCL
1,4-Dioxane		90.3	70.0	130.0

Laboratory Control Sample Duplicate (LCSD)

Lab Sample ID: 220921A9.LCSDW21A, Parent Sample ID: 220921A9.LCSW21A

Run in Batch: 220921A9, Run Date: 09/21/2022 14:25, Prep Date: 09/21/2022, Matrix: WW, Dilution: 1

Analyte	Flags	% Rec	LCL	UCL	RPD	RPD CL
1,4-Dioxane		92.5	70.0	130.0	2.5	30.0

Organics - Volatiles, Prep Batch ID: VS220923W1

Surrogates: Yes, QC Types: BLK/LCS/LCSD

Blank (BLK)

Lab Sample ID: 220923A9.BLKW23A

Run in Batch: 220923A9, Run Date: 09/23/2022 18:19, Prep Date: 09/23/2022, Matrix: WW, Dilution: 1

Analyte	Flags	Conc	RDL	Units
1,4-Dioxane	*	0.61	0.02	ug/l

Laboratory Control Sample (LCS)

Lab Sample ID: 220923A9.LCSW23A

Run in Batch: 220923A9, Run Date: 09/23/2022 16:36, Prep Date: 09/23/2022, Matrix: WW, Dilution: 1

Analyte	Flags	% Rec	LCL	UCL
1,4-Dioxane		93.8	70.0	130.0

Laboratory Control Sample Duplicate (LCSD)

Lab Sample ID: 220923A9.LCSDW23A, Parent Sample ID: 220923A9.LCSW23A

Run in Batch: 220923A9, Run Date: 09/23/2022 16:57, Prep Date: 09/23/2022, Matrix: WW, Dilution: 1

Analyte	Flags	% Rec	LCL	UCL	RPD	RPD CL
1,4-Dioxane		92.8	70.0	130.0	1.0	30.0

Organics - Volatiles, Prep Batch ID: VS220926W1

Surrogates: Yes, QC Types: BLK/LCS/LCSD

Blank (BLK)

Lab Sample ID: 220926A9.BLKW26A

Run in Batch: 220926A9, Run Date: 09/26/2022 19:39, Prep Date: 09/26/2022, Matrix: WW, Dilution: 1

Analyte	Flags	Conc	RDL	Units
1,4-Dioxane	*	0.42	0.02	ug/l

Laboratory Control Sample (LCS)

Lab Sample ID: 220926A9.LCSW26A

Run in Batch: 220926A9, Run Date: 09/26/2022 18:37, Prep Date: 09/26/2022, Matrix: WW, Dilution: 1

Analyte	Flags	% Rec	LCL	UCL
1,4-Dioxane		88.3	70.0	130.0

Laboratory Control Sample Duplicate (LCSD)

Lab Sample ID: 220926A9.LCSDW26A, Parent Sample ID: 220926A9.LCSW26A

Run in Batch: 220926A9, Run Date: 09/26/2022 18:58, Prep Date: 09/26/2022, Matrix: WW, Dilution: 1

Analyte	Flags	% Rec	LCL	UCL	RPD	RPD CL
1,4-Dioxane		89.1	70.0	130.0	0.9	30.0

Merit Laboratories Login Checklist

Lab Set ID: S40191
Client: ARCADIS_NOVI (ARCADIS U.S., Inc.)
Project: 30112892.04100/Racer Lansing
Submitted: 09/13/2022 08:45 Login User: BJB

Attention: Kaitlyn Hunt
Address: Arcadis
28550 Cabot Drive
Suite 500
Novi, MI 48377

Phone: O:248-809-4013 FAX:
Email: Kaitlyn.Hunt@arcadis.com

Selection				Description	Note
Sample Receiving					
01.	[X] Yes	[ ] No	[ ] N/A	Samples are received at 4C +/- 2C Thermometer #	IR 4.4
02.	[X] Yes	[ ] No	[ ] N/A	Received on ice/ cooling process begun	
03.	[ ] Yes	[X] No	[ ] N/A	Samples shipped	
04.	[X] Yes	[ ] No	[ ] N/A	Samples left in 24 hr. drop box	
05.	[X] Yes	[ ] No	[ ] N/A	Are there custody seals/tape or is the drop box locked	
Chain of Custody					
06.	[X] Yes	[ ] No	[ ] N/A	COC adequately filled out	
07.	[X] Yes	[ ] No	[ ] N/A	COC signed and relinquished to the lab	
08.	[X] Yes	[ ] No	[ ] N/A	Sample tag on bottles match COC	
09.	[ ] Yes	[X] No	[ ] N/A	Subcontracting needed? Subcontacted to:	
Preservation					
10.	[X] Yes	[ ] No	[ ] N/A	Do sample have correct chemical preservation	
11.	[ ] Yes	[ ] No	[X] N/A	Completed pH checks on preserved samples? (no VOAs)	
12.	[ ] Yes	[X] No	[ ] N/A	Did any samples need to be preserved in the lab?	
Bottle Conditions					
13.	[X] Yes	[ ] No	[ ] N/A	All bottles intact	
14.	[X] Yes	[ ] No	[ ] N/A	Appropriate analytical bottles are used	
15.	[X] Yes	[ ] No	[ ] N/A	Merit bottles used	
16.	[X] Yes	[ ] No	[ ] N/A	Sufficient sample volume received	
17.	[ ] Yes	[X] No	[ ] N/A	Samples require laboratory filtration	
18.	[X] Yes	[ ] No	[ ] N/A	Samples submitted within holding time	
19.	[ ] Yes	[X] No	[ ] N/A	Do water VOC or TOX bottles contain headspace	

Corrective action for all exceptions is to call the client and to notify the project manager.

Client Review By: _____ Date: _____

Plant 2

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

C.O.C. PAGE # 1 OF 1

157329

CHAIN OF CUSTODY RECORD

REPORT TO

CONTACT NAME: Tiffany Linder
COMPANY: Arcadis
ADDRESS: 28550 Cabot Drive, Suite 500
CITY: Novi STATE: MI ZIP CODE: 48377
PHONE NO.: 810-225-1928 CELL NO.: 517-861-0138 P.O. NO.:
E-MAIL ADDRESS: QUOTE NO.:

INVOICE TO

CONTACT NAME: SAME
COMPANY:
ADDRESS:
CITY: STATE: ZIP CODE:
PHONE NO.: E-MAIL ADDRESS:

PROJECT NO./NAME: 30112892.04100/RACER Lansing
SAMPLER(S) - PLEASE PRINT/SIGN NAME: Austin Westhuis/AustinWesthuis

TURNAROUND TIME REQUIRED ☐ 1 DAY ☐ 2 DAYS ☐ 3 DAYS ☒ STANDARD ☐ OTHER

DELIVERABLES REQUIRED ☐ STD ☐ LEVEL II ☐ LEVEL III ☐ LEVEL IV ☐ EDD ☐ OTHER

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

ANALYSIS (ATTACH LIST IF MORE SPACE IS REQUIRED)

Certifications
☐ OHIO VAP ☐ Drinking Water
☐ DoD ☐ NPDES
Project Locations
☐ Detroit ☐ New York
☒ Other MI
Special Instructions

MERIT LAB NO. (FOR LAB USE ONLY)	COLLECTION DATE	COLLECTION TIME	SAMPLE TAG IDENTIFICATION-DESCRIPTION	MATRIX	# OF BOTTLES	# Containers & Preservatives: NONE	HCl	HNO_3	H_2SO_4	NaOH	MeOH	OTHER	1,4-Dioxane 8260 SIM
40191.01	9/12/22	1105	MW-22-156_091222	GW	3		3						X
.02	9/12/22	1205	MW-22-155_091222	GW	3		3						X
.03	9/12/22	1410	MW-22-157_091222	GW	3		3						X
.04	9/12/22	1500	MW-22-153_091222	GW	3		3						X
.05	9/12/22	1535	MW-14-58R_091222	GW	3		3						X

RELINQUISHED BY: SIGNATURE/ORGANIZATION: [signature] / Arcadis ☒ Sampler DATE: 9/13/22 TIME: 0845
RECEIVED BY: SIGNATURE/ORGANIZATION: Merit Drop Box DATE: 9/13/22 TIME:
RELINQUISHED BY: SIGNATURE/ORGANIZATION: DATE: TIME:
RECEIVED BY: SIGNATURE/ORGANIZATION: DATE: TIME:

RELINQUISHED BY: SIGNATURE/ORGANIZATION: Merit Drop Box DATE: 9/13/2022 TIME: 0846
RECEIVED BY: SIGNATURE/ORGANIZATION: Barbe Ball DATE: 9/13/2022 TIME: 0846

SEAL NO. SEAL INTACT YES ☐ NO ☐ INITIALS
SEAL NO. SEAL INTACT YES ☐ NO ☐ INITIALS

NOTES: TEMP. ON ARRIVAL 4.4

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

Rev. 1.26.22

Analytical Laboratory Report

Report ID: S41458.01(01)+QC01
Generated on 10/21/2022

Report to

Attention: Kaitlyn Hunt
Arcadis
28550 Cabot Drive
Suite 500
Novi, MI 48377

Phone: O:248-809-4013 C:947-777-5215 FAX:
Email: Kaitlyn.Hunt@arcadis.com

Addtional Contacts: Marina Samp, Tiffany Linder, Caitlin Cisco, Alex Villhauer

Report produced by

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

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

Contacts for report questions:
John Laverty (johnlaverty@meritlabs.com)
Barbara Ball (bball@meritlabs.com)

Report Summary

Lab Sample ID(s): S41458.01-S41458.08
Project: 30112892.04100 / Racer Lansing
Collected Date(s): 10/14/2022
Submitted Date/Time: 10/14/2022 16:15
Sampled by: Austin Westhuis
P.O. #: 30112892.04100

Table of Contents

Cover Page (Page 1)
General Report Notes (Page 2)
Report Narrative (Page 2)
Laboratory Certifications (Page 3)
Qualifier Descriptions (Page 3)
Glossary of Abbreviations (Page 3)
Method Summary (Page 4)
Sample Summary (Page 5)
QC Report (Pages 14-32)

Maya Murshak
Technical Director

General Report Notes

Analytical results relate only to the samples tested, in the condition received by the laboratory.
Methods may be modified for improved performance.
Results reported on a dry weight basis where applicable.
'Not detected' indicates that parameter was not found at a level equal to or greater than the reporting limit (RL).
When MDL results are provided, then 'Not detected' indicates that parameter was not found at a level equal to or greater than the MDL.
40 CFR Part 136 Table II Required Containers, Preservation Techniques and Holding Times for the Clean Water Act specify that samples for acrolein and acrylonitrile, and 2-chloroethylvinyl ether need to be preserved at a pH in the range of 4 to 5 or if not preserved, analyzed within 3 days of sampling.
QA/QC corresponding to this analytical report is a separate document with the same Merit ID reference and is available upon request.
Full accreditation certificates are available upon request. Starred (*) analytes are not NELAP accredited.
Samples are held by the lab for 30 days from the final report date unless a written request to hold longer is provided by the client.
Report shall not be reproduced except in full, without the written approval of Merit Laboratories, Inc.
Limits for drinking water samples, are listed as the MCL Limits (Maximum Contaminant Level Concentrations)
PFAS requirement: Section 9.3.8 of U.S. EPA Method 537.1 states "If the method analyte(s) found in the Field Sample is present in the FRB at a concentration greater than 1/3 the MRL, then all samples collected with that FRB are invalid and must be recollected and reanalyzed."
Samples submitted without an accompanying FRB may not be acceptable for compliance purposes.
Wisconsin PFAs analysis: MDL = LOD; RL = LOQ. LOD and LOQ are adjusted for dilution.

Report Narrative

There is no additional narrative for this analytical report

Laboratory Certifications

Authority	Certification ID
Michigan DEQ	#9956
DOD ELAP/ISO 17025	#69699
WBENC	#2005110032
Ohio VAP	#CL0002
Indiana DOH	#C-MI-07
New York NELAC	#11814
North Carolina DENR	#680
North Carolina DOH	#26702
Alaska CSLAP	#17-001
Pennsylvania DEP	#68-05884
Wisconsin DNR	FID# 399147320

Qualifier Descriptions

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

Glossary of Abbreviations

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

Method Summary

Method	Version
N/A	Not Applicable
SW8260B - SIM	SW 846 Method 8260B Revision 2 December 1996 SIMs

Sample Summary (8 samples)

Sample ID	Sample Tag	Matrix	Collected Date/Time
S41458.01	MW-22-157_101422	Groundwater	10/14/22 10:25
S41458.02	MW-22-157_101422 MS	Groundwater	10/14/22 10:25
S41458.03	MW-22-157_101422 MSD	Groundwater	10/14/22 10:25
S41458.04	MW-22-155_101422	Groundwater	10/14/22 11:50
S41458.05	MW-22-153_101422	Groundwater	10/14/22 12:50
S41458.06	MW-22-156_101422	Groundwater	10/14/22 13:35
S41458.07	MW-14-58R_101422	Groundwater	10/14/22 14:20
S41458.08	Dup-01_101422	Groundwater	10/14/22 00:01

Lab Sample ID: S41458.01
Sample Tag: MW-22-157_101422
Collected Date/Time: 10/14/2022 10:25
Matrix: Groundwater
COC Reference: 154889

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	4.3	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	10/21/22 10:00	KAG	

Organics - Volatiles

Method: SW8260B - SIM, Run Date: 10/20/22 16:03, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,4-Dioxane*	3	1		ug/L	1	123-91-1	

Lab Sample ID: S41458.02
Sample Tag: MW-22-157_101422 MS
Collected Date/Time: 10/14/2022 10:25
Matrix: Groundwater
COC Reference: 154889

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	4.3	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	10/21/22 10:00	KAG	

Organics - Volatiles

Method: SW8260B - SIM, Run Date: 10/20/22 13:53, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,4-Dioxane*	51	1		ug/L	1	123-91-1	1

1-Spiked at 50ug/L

Lab Sample ID: S41458.03
Sample Tag: MW-22-157_101422 MSD
Collected Date/Time: 10/14/2022 10:25
Matrix: Groundwater
COC Reference: 154889

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	4.3	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	10/21/22 10:00	KAG	

Organics - Volatiles

Method: SW8260B - SIM, Run Date: 10/20/22 14:14, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,4-Dioxane*	53	1		ug/L	1	123-91-1	1

1-Spiked at 50ug/L

Lab Sample ID: S41458.04
Sample Tag: MW-22-155_101422
Collected Date/Time: 10/14/2022 11:50
Matrix: Groundwater
COC Reference: 154889

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	4.3	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	10/21/22 10:00	KAG	

Organics - Volatiles

Method: SW8260B - SIM, Run Date: 10/20/22 18:34, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,4-Dioxane*	400	10		ug/L	10	123-91-1	Y

Y-Elevated reporting limit due to high target concentration

Lab Sample ID: S41458.05
Sample Tag: MW-22-153_101422
Collected Date/Time: 10/14/2022 12:50
Matrix: Groundwater
COC Reference: 154889

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	4.3	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	10/21/22 10:00	KAG	

Organics - Volatiles

Method: SW8260B - SIM, Run Date: 10/20/22 18:56, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,4-Dioxane*	52	1		ug/L	1	123-91-1	

Lab Sample ID: S41458.06
Sample Tag: MW-22-156_101422
Collected Date/Time: 10/14/2022 13:35
Matrix: Groundwater
COC Reference: 154889

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	4.3	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	10/21/22 10:00	KAG	

Organics - Volatiles

Method: SW8260B - SIM, Run Date: 10/20/22 19:17, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,4-Dioxane*	81	1		ug/L	1	123-91-1	

Lab Sample ID: S41458.07
Sample Tag: MW-14-58R_101422
Collected Date/Time: 10/14/2022 14:20
Matrix: Groundwater
COC Reference: 154889

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	4.3	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	10/21/22 10:00	KAG	

Organics - Volatiles

Method: SW8260B - SIM, Run Date: 10/20/22 19:38, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,4-Dioxane*	173	1		ug/L	1	123-91-1	

Lab Sample ID: S41458.08
Sample Tag: Dup-01_101422
Collected Date/Time: 10/14/2022 00:01
Matrix: Groundwater
COC Reference: 154889

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	4.3	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	10/21/22 10:00	KAG	

Organics - Volatiles

Method: SW8260B - SIM, Run Date: 10/20/22 20:00, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,4-Dioxane*	173	1		ug/L	1	123-91-1	

Quality Control Report

Report ID: S41458.01(01)+QC01
Generated on 10/21/2022

Report to

Attention: Kaitlyn Hunt
Arcadis
28550 Cabot Drive
Suite 500
Novi, MI 48377

Phone: O:248-809-4013 C:947-777-5215 FAX:

Report Produced by

Merit Laboratories
2680 East Lansing Drive
East Lansing, MI 48823

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

Report Summary

Lab Sample ID(s): S41458.01-S41458.08
Project: 30112892.04100 / Racer Lansing
Submitted Date/Time: 10/14/2022 16:15
Sampled by: Austin Westhuis
P.O. #: 30112892.04100

QC Report Sections

Cover Page (Page 14)
Analysis Summary (Pages 15-22)
Prep Batch Summary (Page 23)
Surrogates per QC Sample (Page 24)
Internal Standards per Lab Sample (Pages 25-30)
Internal Standards per QC Sample (Page 31)
Batch QC Results (Page 32)

Report Flag Descriptions

*: QC result is outside of indicated control limits
W: Surrogate result not applicable due to sample dilution

I certify that this data package is in compliance with the terms and conditions of the program, and project, and contractual requirements both technically and for completeness. Release of the data contained in this hardcopy data package and its computer-readable data submitted has been authorized by the Quality Assurance Manager and his/her designee, as verified by the following signature.

Barbara Ball
Quality Assurance Manager

Lab Sample ID: S41458.01
Sample Tag: MW-22-157_101422
Collected Date/Time: 10/14/2022 10:25
Matrix: Groundwater
COC Reference: 154889

Analysis	Method	Run Date/Time	Batch ID	Prep ID	Surr	QC Types
Organics - Volatiles						
1,4-Dioxane	SW8260B - SIM	10/20/22 16:03	221020A9	VS221020W1	Yes	BLK/LCS/LCSD

Lab Sample ID: S41458.02
Sample Tag: MW-22-157_101422 MS
Collected Date/Time: 10/14/2022 10:25
Matrix: Groundwater
COC Reference: 154889

Analysis	Method	Run Date/Time	Batch ID	Prep ID	Surr	QC Types
Organics - Volatiles						
1,4-Dioxane	SW8260B - SIM	10/20/22 13:53	221020A9	VS221020W1	Yes	BLK/LCS/LCSD

Lab Sample ID: S41458.03
Sample Tag: MW-22-157_101422 MSD
Collected Date/Time: 10/14/2022 10:25
Matrix: Groundwater
COC Reference: 154889

Analysis	Method	Run Date/Time	Batch ID	Prep ID	Surr	QC Types
Organics - Volatiles						
1,4-Dioxane	SW8260B - SIM	10/20/22 14:14	221020A9	VS221020W1	Yes	BLK/LCS/LCSD

Lab Sample ID: S41458.04
Sample Tag: MW-22-155_101422
Collected Date/Time: 10/14/2022 11:50
Matrix: Groundwater
COC Reference: 154889

Analysis	Method	Run Date/Time	Batch ID	Prep ID	Surr	QC Types
Organics - Volatiles						
1,4-Dioxane	SW8260B - SIM	10/20/22 18:34	221020A9	VS221020W1	Yes	BLK/LCS/LCSD

Lab Sample ID: S41458.05
Sample Tag: MW-22-153_101422
Collected Date/Time: 10/14/2022 12:50
Matrix: Groundwater
COC Reference: 154889

Analysis	Method	Run Date/Time	Batch ID	Prep ID	Surr	QC Types
Organics - Volatiles						
1,4-Dioxane	SW8260B - SIM	10/20/22 18:56	221020A9	VS221020W1	Yes	BLK/LCS/LCSD

Lab Sample ID: S41458.06
Sample Tag: MW-22-156_101422
Collected Date/Time: 10/14/2022 13:35
Matrix: Groundwater
COC Reference: 154889

Analysis	Method	Run Date/Time	Batch ID	Prep ID	Surr	QC Types
Organics - Volatiles						
1,4-Dioxane	SW8260B - SIM	10/20/22 19:17	221020A9	VS221020W1	Yes	BLK/LCS/LCSD

Lab Sample ID: S41458.07
Sample Tag: MW-14-58R_101422
Collected Date/Time: 10/14/2022 14:20
Matrix: Groundwater
COC Reference: 154889

Analysis	Method	Run Date/Time	Batch ID	Prep ID	Surr	QC Types
Organics - Volatiles						
1,4-Dioxane	SW8260B - SIM	10/20/22 19:38	221020A9	VS221020W1	Yes	BLK/LCS/LCSD

Lab Sample ID: S41458.08
Sample Tag: Dup-01_101422
Collected Date/Time: 10/14/2022 00:01
Matrix: Groundwater
COC Reference: 154889

Analysis	Method	Run Date/Time	Batch ID	Prep ID	Surr	QC Types
Organics - Volatiles						
1,4-Dioxane	SW8260B - SIM	10/20/22 20:00	221020A9	VS221020W1	Yes	BLK/LCS/LCSD

QC Report - Prep Batch Summary

Organics - Volatiles, Prep Batch ID: VS221020W1

Surrogates: Yes, QC Types: BLK/LCS/LCSD

Sample ID	Analysis	Method	Run Date/Time	Batch ID
S41458.01	1,4-Dioxane	SW8260B - SIM	10/20/22 16:03	221020A9
S41458.02	1,4-Dioxane	SW8260B - SIM	10/20/22 13:53	221020A9
S41458.03	1,4-Dioxane	SW8260B - SIM	10/20/22 14:14	221020A9
S41458.04	1,4-Dioxane	SW8260B - SIM	10/20/22 18:34	221020A9
S41458.05	1,4-Dioxane	SW8260B - SIM	10/20/22 18:56	221020A9
S41458.06	1,4-Dioxane	SW8260B - SIM	10/20/22 19:17	221020A9
S41458.07	1,4-Dioxane	SW8260B - SIM	10/20/22 19:38	221020A9
S41458.08	1,4-Dioxane	SW8260B - SIM	10/20/22 20:00	221020A9

Organics - Volatiles, Prep Batch ID: VS221020W1

QC Types: BLK/LCS/LCSD

Blank (BLK)

Lab Sample ID: 221020A9.BLKS20A

Run in Batch: 221020A9, Run Date: 10/20/2022 14:55, Prep Date: 10/20/2022, Matrix: WW, Dilution: 1

Surrogate	Flags	%Rec	LCL	UCL

No Surrogates

Laboratory Control Sample (LCS)

Lab Sample ID: 221020A9.LCSS20A

Run in Batch: 221020A9, Run Date: 10/20/2022 12:32, Prep Date: 10/20/2022, Matrix: WW, Dilution: 1

Surrogate	Flags	%Rec	LCL	UCL

No Surrogates

Laboratory Control Sample Duplicate (LCSD)

Lab Sample ID: 221020A9.LCSDS20A, Parent Sample ID: 221020A9.LCSS20A

Run in Batch: 221020A9, Run Date: 10/20/2022 12:52, Prep Date: 10/20/2022, Matrix: WW, Dilution: 1

Surrogate	Flags	%Rec	LCL	UCL

No Surrogates

QC Report - Internal Standards per Lab Sample

Lab Sample ID: S41458.01

Sample Tag: MW-22-157_101422

Collected Date/Time: 10/14/2022 10:25

Matrix: Groundwater

COC Reference: 154889

Organics - Volatiles, Analysis: 1,4-Dioxane

Run in Batch: 221020A9, Run Date: 10/20/2022 16:03, Matrix: WW, Dilution: 1

Internal Standard	Flags	**%Rec**	LCL	UCL
1,4-Dioxane-D8		**98.4**	50.0	200.0

Lab Sample ID: S41458.04

Sample Tag: MW-22-155_101422

Collected Date/Time: 10/14/2022 11:50

Matrix: Groundwater

COC Reference: 154889

Organics - Volatiles, Analysis: 1,4-Dioxane

Run in Batch: 221020A9, Run Date: 10/20/2022 18:34, Matrix: WW, Dilution: 10

Internal Standard	Flags	**%Rec**	LCL	UCL
1,4-Dioxane-D8		**81.8**	50.0	200.0

QC Report - Internal Standards per Lab Sample

Lab Sample ID: S41458.05

Sample Tag: MW-22-153_101422

Collected Date/Time: 10/14/2022 12:50

Matrix: Groundwater

COC Reference: 154889

Organics - Volatiles, Analysis: 1,4-Dioxane

Run in Batch: 221020A9, Run Date: 10/20/2022 18:56, Matrix: WW, Dilution: 1

Internal Standard	Flags	**%Rec**	LCL	UCL
1,4-Dioxane-D8		**105.6**	50.0	200.0

QC Report - Internal Standards per Lab Sample

Lab Sample ID: S41458.06

Sample Tag: MW-22-156_101422

Collected Date/Time: 10/14/2022 13:35

Matrix: Groundwater

COC Reference: 154889

Organics - Volatiles, Analysis: 1,4-Dioxane

Run in Batch: 221020A9, Run Date: 10/20/2022 19:17, Matrix: WW, Dilution: 1

Internal Standard	Flags	**%Rec**	LCL	UCL
1,4-Dioxane-D8		**103.3**	50.0	200.0

QC Report - Internal Standards per Lab Sample

Lab Sample ID: S41458.07

Sample Tag: MW-14-58R_101422

Collected Date/Time: 10/14/2022 14:20

Matrix: Groundwater

COC Reference: 154889

Organics - Volatiles, Analysis: 1,4-Dioxane

Run in Batch: 221020A9, Run Date: 10/20/2022 19:38, Matrix: WW, Dilution: 1

Internal Standard	Flags	**%Rec**	LCL	UCL
1,4-Dioxane-D8		**102.6**	50.0	200.0

Lab Sample ID: S41458.08

Sample Tag: Dup-01_101422

Collected Date/Time: 10/14/2022 00:01

Matrix: Groundwater

COC Reference: 154889

Organics - Volatiles, Analysis: 1,4-Dioxane

Run in Batch: 221020A9, Run Date: 10/20/2022 20:00, Matrix: WW, Dilution: 1

Internal Standard	Flags	**%Rec**	LCL	UCL
1,4-Dioxane-D8		**107.5**	50.0	200.0

Organics - Volatiles, Prep Batch ID: VS221020W1

QC Types: BLK/LCS/LCSD

Blank (BLK)

Lab Sample ID: 221020A9.BLKS20A

Run in Batch: 221020A9, Run Date: 10/20/2022 14:55, Prep Date: 10/20/2022, Matrix: WW, Dilution: 1

Internal Standard	Flags	%Rec	LCL	UCL
1,4-Dioxane-D8		**96.2**	50.0	200.0

Laboratory Control Sample (LCS)

Lab Sample ID: 221020A9.LCSS20A

Run in Batch: 221020A9, Run Date: 10/20/2022 12:32, Prep Date: 10/20/2022, Matrix: WW, Dilution: 1

Internal Standard	Flags	%Rec	LCL	UCL
1,4-Dioxane-D8		**97.9**	50.0	200.0

Laboratory Control Sample Duplicate (LCSD)

Lab Sample ID: 221020A9.LCSDS20A, Parent Sample ID: 221020A9.LCSS20A

Run in Batch: 221020A9, Run Date: 10/20/2022 12:52, Prep Date: 10/20/2022, Matrix: WW, Dilution: 1

Internal Standard	Flags	%Rec	LCL	UCL
1,4-Dioxane-D8		**88.5**	50.0	200.0

Organics - Volatiles, Prep Batch ID: VS221020W1

Surrogates: Yes, QC Types: BLK/LCS/LCSD

Blank (BLK)

Lab Sample ID: 221020A9.BLKS20A

Run in Batch: 221020A9, Run Date: 10/20/2022 14:55, Prep Date: 10/20/2022, Matrix: WW, Dilution: 1

Analyte	Flags	Conc	RDL	Units
1,4-Dioxane	*	0.45	0.02	ug/l

Laboratory Control Sample (LCS)

Lab Sample ID: 221020A9.LCSS20A

Run in Batch: 221020A9, Run Date: 10/20/2022 12:32, Prep Date: 10/20/2022, Matrix: WW, Dilution: 1

Analyte	Flags	% Rec	LCL	UCL
1,4-Dioxane		89.7	70.0	130.0

Laboratory Control Sample Duplicate (LCSD)

Lab Sample ID: 221020A9.LCSDS20A, Parent Sample ID: 221020A9.LCSS20A

Run in Batch: 221020A9, Run Date: 10/20/2022 12:52, Prep Date: 10/20/2022, Matrix: WW, Dilution: 1

Analyte	Flags	% Rec	LCL	UCL	RPD	RPD CL
1,4-Dioxane		85.1	70.0	130.0	5.3	30.0

Merit Laboratories Login Checklist

Lab Set ID: S41458
Client: ARCADIS_NOVI (ARCADIS U.S., Inc.)
Project: 30112892.04100 / Racer Lansing
Submitted: 10/14/2022 16:15 Login User: MMC

Attention: Kaitlyn Hunt
Address: Arcadis
28550 Cabot Drive
Suite 500
Novi, MI 48377

Phone: O:248-809-4013 FAX:
Email: Kaitlyn.Hunt@arcadis.com

Selection				Description	Note
Sample Receiving					
01.	[X] Yes	[ ] No	[ ] N/A	Samples are received at 4C +/- 2C Thermometer #	IR 4.3
02.	[X] Yes	[ ] No	[ ] N/A	Received on ice/ cooling process begun	
03.	[ ] Yes	[X] No	[ ] N/A	Samples shipped	
04.	[ ] Yes	[X] No	[ ] N/A	Samples left in 24 hr. drop box	
05.	[ ] Yes	[ ] No	[X] N/A	Are there custody seals/tape or is the drop box locked	
Chain of Custody					
06.	[X] Yes	[ ] No	[ ] N/A	COC adequately filled out	
07.	[X] Yes	[ ] No	[ ] N/A	COC signed and relinquished to the lab	
08.	[X] Yes	[ ] No	[ ] N/A	Sample tag on bottles match COC	
09.	[ ] Yes	[X] No	[ ] N/A	Subcontracting needed? Subcontacted to:	
Preservation					
10.	[X] Yes	[ ] No	[ ] N/A	Do sample have correct chemical preservation	
11.	[ ] Yes	[ ] No	[X] N/A	Completed pH checks on preserved samples? (no VOAs)	
12.	[ ] Yes	[X] No	[ ] N/A	Did any samples need to be preserved in the lab?	
Bottle Conditions					
13.	[X] Yes	[ ] No	[ ] N/A	All bottles intact	
14.	[X] Yes	[ ] No	[ ] N/A	Appropriate analytical bottles are used	
15.	[X] Yes	[ ] No	[ ] N/A	Merit bottles used	
16.	[X] Yes	[ ] No	[ ] N/A	Sufficient sample volume received	
17.	[ ] Yes	[X] No	[ ] N/A	Samples require laboratory filtration	
18.	[X] Yes	[ ] No	[ ] N/A	Samples submitted within holding time	
19.	[ ] Yes	[X] No	[ ] N/A	Do water VOC or TOX bottles contain headspace	

Corrective action for all exceptions is to call the client and to notify the project manager.

Client Review By: _____ Date: _____

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

C.O.C. PAGE # 1 OF 1

154889

CHAIN OF CUSTODY RECORD

Plant 2

REPORT TO

CONTACT NAME: Tiffany Linder
COMPANY: Arcadis
ADDRESS: 28550 Cabot Drive, Suite 500
CITY: Novi STATE: MI ZIP CODE: 48377
PHONE NO.: 517-861-0138 CELL NO.: 810-225-1928 P.O. NO.:
E-MAIL ADDRESS: Tiffany.Linder@arcadis.com QUOTE NO.:

INVOICE TO

CONTACT NAME: ☒ SAME
COMPANY:
ADDRESS:
CITY: STATE: ZIP CODE:
PHONE NO.: E-MAIL ADDRESS:

PROJECT NO./NAME: 30112892.04100/RACER Lansing
SAMPLER(S) - PLEASE PRINT/SIGN NAME: Austin Westhuis/[signature]
TURNAROUND TIME REQUIRED ☐ 1 DAY ☐ 2 DAYS ☐ 3 DAYS ☐ STANDARD ☒ OTHER 1-Week
DELIVERABLES REQUIRED ☐ STD ☐ LEVEL II ☐ LEVEL III ☐ LEVEL IV ☐ EDD ☐ OTHER

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

ANALYSIS (ATTACH LIST IF MORE SPACE IS REQUIRED)

Certifications
☐ OHIO VAP ☐ Drinking Water
☐ DoD ☐ NPDES
Project Locations
☐ Detroit ☐ New York
☒ Other MI
Special Instructions

MERIT LAB NO. (FOR LAB USE ONLY)	COLLECTION DATE	COLLECTION TIME	SAMPLE TAG IDENTIFICATION-DESCRIPTION	MATRIX	# OF BOTTLES	# Containers & Preservatives: NONE	HCl	HNO_3	H_2SO_4	NaOH	MeOH	OTHER	1,4-Dioxane 8260 SIM
41458.01	10/14/22	1025	MW-22-157_101422	GW	9		9						X
.02/.03/.04	10/14/22	1150	MW-22-155_101422	GW	3		3						X
.05	10/14/22	1250	MW-22-153_101422	GW	3		3						X
.06	10/14/22	1335	MW-22-156_101422	GW	3		3						X
.07	10/14/22	1420	MW-14-58R_101422	GW	3		3						X
.08	10/14/22	—	Dup-01_101422	GW	3		3						X

See TAT Request

		DATE	TIME
RELINQUISHED BY: SIGNATURE/ORGANIZATION	[signature]/Arcadis (Sampler)	10/14/22	1615
RECEIVED BY: SIGNATURE/ORGANIZATION	Merit Drop Box	10/14/22	1615
RELINQUISHED BY: SIGNATURE/ORGANIZATION		DATE	TIME
RECEIVED BY: SIGNATURE/ORGANIZATION		DATE	TIME

		DATE	TIME
RELINQUISHED BY: SIGNATURE/ORGANIZATION	Merit Drop Box	10/14/22	1615
RECEIVED BY: SIGNATURE/ORGANIZATION	M Oilcott	10/14/22	1615

SEAL NO. SEAL INTACT YES ☐ NO ☐ INITIALS
SEAL NO. SEAL INTACT YES ☐ NO ☐ INITIALS

NOTES: TEMP. ON ARRIVAL 4.3°C

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

Rev. 1.26.22

Attachment 3

Groundwater Sampling Logs

Groundwater Sampling Form

Project Number	30112892	**Well ID**	MW-14-58R			**Date**	02/10/2022
Project Name/Location	RACER Lansing GWS		**Weather(°F)**	30.0 degrees F and Haze. The wind is blowing W/SW at 12.8 mph.			
Measuring Pt. Description	Top of Inner Casing	**MP Elevation**		**Casing Diameter (in)**	2	**Well Casing Material**	PVC
Static Water Level (ft-bmp)	13.84	**Total Depth (ft-bmp)**	29.6	**Water Column (ft)**	15.76	**Gallons in Well**	2.56
Purge Start	10:50	**Pump Intake (ft-bmp)**	27.1	**Purge Method**	Low-Flow	**Purge Equipment**	Peristaltic
Purge End	11:25	**Volumes Purged**	0.72	**Sample ID**	MW-14-58R_021022	**Sampled by**	Austin Westhuis
Sample Time	11:20	**Gallons Purged**	1.85	**Replicate/ Code No.**	NA	**Sample Type**	Grab

Time	Minutes Elapsed	Total Elapsed Minutes	Rate mL/min	Depth to Water (ft)	Gallons Purged	pH (standard units)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temperature °C	Redox (mV)	Appearance	
												Color	Odor
10:55	0	0	200	13.84	0.26	7.03	1.48	24.6	0.31	7	-35.2	--	--
11:00	5	5	200	13.84	0.53	7.03	1.48	10.6	0.22	7.2	-42.8	--	--
11:05	5	10	200	13.84	0.79	7.03	1.46	3.63	0.2	7.1	-47.8	--	--
11:10	5	15	200	13.84	1.06	7.03	1.48	2.21	0.19	7.2	-51.8	--	--
11:15	5	20	200	13.84	1.32	7.03	1.47	2.01	0.19	7.2	-54.8	--	--
11:20	5	25	200	13.84	1.59	7.04	1.46	1.77	0.19	7.1	-55.8	Clear	None

Constituent Sampled	Container	Number	Preservative
1,4-Dioxane 8260 SIMS	40 mL Glass	3	HCL

Comments:

Well Casing Volume Conversion

Well diameter (inches) = gallons per 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:	See figure	Well Locked at Arrival:	yes
Condition of Well:	Good condition	Well Locked at Departure:	yes
Well Completion:	Stick-up	Key Number To Well:	6000B

ft-bmp = feet below measuring point
in = inches
ft = feet
mL/min = milliliters per minute

mS/cm = milliSiemens per centimeter
NTU = Nephelometric Turbidity Unit
mg/L = milligrams per liter

mV = millivolts
°F = degrees Fahrenheit
°C = degrees Celsius

Groundwater Sampling Form

ARCADIS

Project Number	30112892	**Well ID**	MW-14-58R			**Date**	04/06/2022
Project Name/Location	RACER Lansing GWS		**Weather(°F)**	51.1 degrees F and Mostly Clear. The wind is blowing E at 8.1 mph.			
Measuring Pt. Description	Top of Inner Casing	**MP Elevation**		**Casing Diameter (in)**	2	**Well Casing Material**	PVC
Static Water Level (ft-bmp)	12.06	**Total Depth (ft-bmp)**	29.59	**Water Column (ft)**	17.53	**Gallons in Well**	2.85
Purge Start	12:00	**Pump Intake (ft-bmp)**	27.59	**Purge Method**	Low-Flow	**Purge Equipment**	Peristaltic
Purge End	12:25	**Volumes Purged**	0.46	**Sample ID**	MW-14-58R_040622	**Sampled by**	Austin Westhuis
Sample Time	12:20	**Gallons Purged**	1.32	**Replicate/ Code No.**	NA	**Sample Type**	Grab

Time	Minutes Elapsed	Total Elapsed Minutes	Rate mL/min	Depth to Water (ft)	Gallons Purged	pH (standard units)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temperature °C	Redox (mV)	Appearance	
												Color	Odor
12:05	0	0	200	12.06	0.26	6.95	1.983	4.41	0.75	9.8	-24.3	--	--
12:10	5	5	200	12.06	0.53	6.97	1.988	1.91	0.71	9.8	-35	--	--
12:15	5	10	200	12.06	0.79	6.98	1.983	1.3	0.7	9.8	-36.6	--	--
12:20	5	15	200	12.06	1.06	6.99	1.976	1.22	0.69	9.8	-37.1	Clear	None

Constituent Sampled	Container	Number	Preservative
VOCs 8260 and 1,4-Dioxane 8260	40 mL Glass	3	HCL

Comments:

Well Casing Volume Conversion

Well diameter (inches) = gallons per 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: See figure.

Condition of Well: Good condition

Well Completion: Stick-up

Well Locked at Arrival: yes

Well Locked at Departure: yes

Key Number To Well: NA

ft-bmp = feet below measuring point
in = inches
ft = feet
mL/min = milliliters per minute
mS/cm = milliSiemens per centimeter
NTU = Nephelometric Turbidity Unit
mg/L = milligrams per liter

mV = milliv

Groundwater Sampling Form

Project Number	30112892	**Well ID**	MW-14-58R			**Date**	09/12/2022
Project Name/Location	RACER Lansing GWS 2022		**Weather(°F)**	64.9 degrees F and Cloudy.			
Measuring Pt. Description	Top of Inner Casing	**MP Elevation**		**Casing Diameter (in)**	2	**Well Casing Material**	PVC
Static Water Level (ft-bmp)	13.30	**Total Depth (ft-bmp)**	29.6	**Water Column (ft)**	16.3	**Gallons in Well**	2.65
Purge Start	15:10	**Pump Intake (ft-bmp)**	27.1	**Purge Method**	Low-Flow	**Purge Equipment**	Peristaltic
Purge End	15:40	**Volumes Purged**	0.50	**Sample ID**	MW-14-58R_091222	**Sampled by**	Austin Westhuis
Sample Time	15:35	**Gallons Purged**	1.32	**Replicate/ Code No.**	NA	**Sample Type**	Grab

Time	Minutes Elapsed	Total Elapsed Minutes	Rate mL/min	Depth to Water (ft)	Gallons Purged	pH (standard units)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temperature °C	Redox (mV)	Appearance	
												Color	Odor
15:20	0	0	200	13.30	0.53	7.73	2.49	2.64	2.1	17.1	-45.8	--	--
15:25	5	5	200	13.30	0.79	6.95	2.59	2.14	0.22	16.7	-64.1	--	--
15:30	5	10	200	13.30	1.06	6.93	2.63	1.67	0.21	16.6	-70.5	--	--
15:35	5	15	200	13.30	1.32	6.93	2.65	1.6	0.21	16.6	-72.7	Clear	None

Constituent Sampled	Container	Number	Preservative
1,4-Dioxane 8260 SIM	40 mL Glass	3	HCL

Comments:

Well Casing Volume Conversion

Well diameter (inches) = gallons per 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: See figure.

Condition of Well: Good condition

Well Completion: Stick-up

Well Locked at Arrival: yes

Well Locked at Departure: yes

Key Number To Well: 2035

ft-bmp = feet below measuring point
in = inches
ft = feet
mL/min = milliliters per minute

mS/cm = milliSiemens per centimeter
NTU = Nephelometric Turbidity Unit
mg/L = milligrams per liter

mV = millivolts
°F = degrees Fahrenheit
°C = degrees Celsius

Groundwater Sampling Form

ARCADIS

Project Number	30112892	**Well ID**	MW-14-58R			**Date**	10/14/2022
Project Name/Location	RACER Lansing GWS 2022		**Weather(°F)**	50.0 degrees F and Mostly Cloudy. The wind is blowing SW at 9.2 mph.			
Measuring Pt. Description	Top of Inner Casing	**MP Elevation**		**Casing Diameter (in)**	2	**Well Casing Material**	PVC
Static Water Level (ft-bmp)	13.63	**Total Depth (ft-bmp)**	29.61	**Water Column (ft)**	15.98	**Gallons in Well**	2.6
Purge Start	13:50	**Pump Intake (ft-bmp)**	27.11	**Purge Method**	Low-Flow	**Purge Equipment**	Peristaltic
Purge End	14:25	**Volumes Purged**	0.71	**Sample ID**	MW-14-58R_101422	**Sampled by**	Austin Westhuis
Sample Time	14:20	**Gallons Purged**	1.85	**Replicate/ Code No.**	Dup-01_101422	**Sample Type**	Grab

Time	Minutes Elapsed	Total Elapsed Minutes	Rate mL/min	Depth to Water (ft)	Gallons Purged	pH (standard units)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temperature °C	Redox (mV)	Appearance	
												Color	Odor
13:55	0	0	200	13.68	0.26	7.72	2.01	14.68	0.13	15.6	-113.1	--	--
14:00	5	5	200	13.68	0.53	7.65	2.28	13.94	0.09	15.45	-128.6	--	--
14:05	5	10	200	13.68	0.79	7.31	2.2	13.34	0.08	15.29	-101.7	--	--
14:10	5	15	200	13.68	1.06	7.09	2.28	13.12	0.06	15.28	-82.6	--	--
14:15	5	20	200	13.68	1.32	7.07	2.29	12.51	0.06	15.26	-77.6	--	--
14:20	5	25	200	13.68	1.59	7.07	2.29	11.94	0.06	15.18	-77.3	Clear	None

Constituent Sampled	Container	Number	Preservative
1,4-Dioxane 8260 SIM	40 mL Glass	3	HCL

Comments:

Well Casing Volume Conversion

Well diameter (inches) = gallons per 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:	See figure.	Well Locked at Arrival:	yes
Condition of Well:	Good condition	Well Locked at Departure:	yes
Well Completion:	Stick-up	Key Number To Well:	2035

ft-bmp = feet below measuring point
in = inches
ft = feet
mL/min = milliliters per minute

mS/cm = milliSiemens per centimeter
NTU = Nephelometric Turbidity Unit
mg/L = milligrams per liter

mV = millivolts
°F = degrees Fahrenheit
°C = degrees Celsius

Groundwater Sampling Form

ARCADIS

Project Number	30112892	**Well ID**	MW-22-153			**Date**	04/06/2022
Project Name/Location	RACER Lansing GWS		**Weather(°F)**	51.1 degrees F and Mostly Clear. The wind is blowing E at 8.1 mph.			
Measuring Pt. Description	Top of Inner Casing	**MP Elevation**		**Casing Diameter (in)**	2	**Well Casing Material**	PVC
Static Water Level (ft-bmp)	9.58	**Total Depth (ft-bmp)**	31.2	**Water Column (ft)**	21.62	**Gallons in Well**	3.51
Purge Start	11:15	**Pump Intake (ft-bmp)**	29.2	**Purge Method**	Low-Flow	**Purge Equipment**	Peristaltic
Purge End	11:50	**Volumes Purged**	0.53	**Sample ID**	MW-22-153_040622	**Sampled by**	Austin Westhuis
Sample Time	11:45	**Gallons Purged**	1.85	**Replicate/ Code No.**	NA	**Sample Type**	Grab

Time	Minutes Elapsed	Total Elapsed Minutes	Rate mL/min	Depth to Water (ft)	Gallons Purged	pH (standard units)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temperature °C	Redox (mV)	Appearance	
												Color	Odor
11:35	0	0	200	9.58	1.06	7.09	1.56	1.77	1.26	12	-43.6	--	--
11:40	5	5	200	9.58	1.32	7.08	1.562	1.43	1.24	12.1	-46.6	--	--
11:45	5	10	200	9.58	1.59	7.08	1.557	1.21	1.22	12.1	-48.9	Clear	None

Constituent Sampled	Container	Number	Preservative
VOCs 8260 and 1,4-Dioxane 8260	40 mL Glass	3	HCL

Comments: Lost first three sets of parameter readings after tablet malfunctioned.

Well Casing Volume Conversion

Well diameter (inches) = gallons per 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: See figure.
Condition of Well: Good condition
Well Completion: Stick-up
Well Locked at Arrival: yes
Well Locked at Departure: yes
Key Number To Well: NA

ft-bmp = feet below measuring point
in = inches
ft = feet
mL/min = milliliters per minute
mS/cm = milliSiemens per centimeter
NTU = Nephelometric Turbidity Unit
mg/L = milligrams per liter
mV = milliv

Groundwater Sampling Form

ARCADIS

Project Number	30112892	**Well ID**	MW-22-153			**Date**	09/12/2022
Project Name/Location	RACER Lansing GWS 2022		**Weather(°F)**	64.9 degrees F and Cloudy.			
Measuring Pt. Description	Top of Inner Casing	**MP Elevation**		**Casing Diameter (in)**	2	**Well Casing Material**	PVC
Static Water Level (ft-bmp)	10.80	**Total Depth (ft-bmp)**	31.17	**Water Column (ft)**	20.37	**Gallons in Well**	3.31
Purge Start	14:40	**Pump Intake (ft-bmp)**	28.67	**Purge Method**	Low-Flow	**Purge Equipment**	Peristaltic
Purge End	15:05	**Volumes Purged**	0.40	**Sample ID**	MW-22-153_091222	**Sampled by**	Austin Westhuis
Sample Time	15:00	**Gallons Purged**	1.32	**Replicate/ Code No.**	NA	**Sample Type**	Grab

Time	Minutes Elapsed	Total Elapsed Minutes	Rate mL/min	Depth to Water (ft)	Gallons Purged	pH (standard units)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temperature °C	Redox (mV)	Appearance	
												Color	Odor
14:45	0	0	200	10.80	0.26	6.94	1.63	2.58	0.08	15.4	-62.7	--	--
14:50	5	5	200	10.80	0.53	6.96	1.68	2.12	0.05	15.4	-69.7	--	--
14:55	5	10	200	10.80	0.79	6.96	1.67	1.9	0.05	15.1	-73.2	--	--
15:00	5	15	200	10.80	1.06	6.97	1.67	1.43	0.05	15.1	-76.1	Clear	None

Constituent Sampled	Container	Number	Preservative
1,4-Dioxane 8260 SIM	40 mL Glass	3	HCL

Comments:

Well Casing Volume Conversion

Well diameter (inches) = gallons per 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: See figure.

Condition of Well: Good condition

Well Completion: Stick-up

Well Locked at Arrival: yes

Well Locked at Departure: yes

Key Number To Well: 2035

ft-bmp = feet below measuring point
in = inches
ft = feet
mL/min = milliliters per minute

mS/cm = milliSiemens per centimeter
NTU = Nephelometric Turbidity Unit
mg/L = milligrams per liter

mV = millivolts
°F = degrees Fahrenheit
°C = degrees Celsius

Groundwater Sampling Form

ARCADIS

Project Number	30112892	**Well ID**	MW-22-153			**Date**	10/14/2022
Project Name/Location	RACER Lansing GWS 2022		**Weather(°F)**	46.0 degrees F and Cloudy. The wind is blowing SW at 9.2 mph.			
Measuring Pt. Description	Top of Inner Casing	**MP Elevation**		**Casing Diameter (in)**	2	**Well Casing Material**	PVC
Static Water Level (ft-bmp)	11.12	**Total Depth (ft-bmp)**	31.18	**Water Column (ft)**	20.06	**Gallons in Well**	3.26
Purge Start	12:10	**Pump Intake (ft-bmp)**	28.68	**Purge Method**	Low-Flow	**Purge Equipment**	Peristaltic
Purge End	12:55	**Volumes Purged**	0.73	**Sample ID**	MW-22-153_101422	**Sampled by**	Austin Westhuis
Sample Time	12:50	**Gallons Purged**	2.38	**Replicate/ Code No.**	NA	**Sample Type**	Grab

Time	Minutes Elapsed	Total Elapsed Minutes	Rate mL/min	Depth to Water (ft)	Gallons Purged	pH (standard units)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temperature °C	Redox (mV)	Appearance	
												Color	Odor
12:15	0	0	200	11.16	0.26	7.13	1.49	104	0.28	14.33	-60.6	--	--
12:20	5	5	200	11.16	0.53	7.13	1.5	70.39	0.19	14.21	-62.9	--	--
12:25	5	10	200	11.16	0.79	7.13	1.5	39.11	0.16	14.19	-64.1	--	--
12:30	5	15	200	11.16	1.06	7.13	1.49	19.24	0.15	14.13	-65.2	--	--
12:35	5	20	200	11.16	1.32	7.13	1.49	12.65	0.13	14.22	-65.9	--	--
12:40	5	25	200	11.16	1.59	7.13	1.49	11.5	0.13	14.25	-66.3	--	--
12:45	5	30	200	11.16	1.85	7.13	1.49	11.22	0.13	14.2	-66.2	--	--
12:50	5	35	200	11.16	2.11	7.13	1.49	11.01	0.12	14.25	-66.3	Clear	None

Constituent Sampled	Container	Number	Preservative
1,4-Dioxane 8260 SIM	40 mL Glass	3	HCL

Comments:

Well Casing Volume Conversion

Well diameter (inches) = gallons per 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: See figure.

Condition of Well: Good condition

Well Completion: Stick-up

Well Locked at Arrival: yes

Well Locked at Departure: yes

Key Number To Well: 2035

ft-bmp = feet below measuring point
in = inches
ft = feet
mL/min = milliliters per minute

mS/cm = milliSiemens per centimeter
NTU = Nephelometric Turbidity Unit
mg/L = milligrams per liter

mV = millivolts
°F = degrees Fahrenheit
°C = degrees Celsius

Groundwater Sampling Form

ARCADIS

Project Number	30112892	**Well ID**	MW-22-155			**Date**	09/12/2022
Project Name/Location	RACER Lansing GWS 2022		**Weather(°F)**	61.0 degrees F and Cloudy.			
Measuring Pt. Description	Top of Inner Casing	**MP Elevation**		**Casing Diameter (in)**	2	**Well Casing Material**	PVC
Static Water Level (ft-bmp)	12.08	**Total Depth (ft-bmp)**	31.5	**Water Column (ft)**	19.42	**Gallons in Well**	3.16
Purge Start	11:20	**Pump Intake (ft-bmp)**	29	**Purge Method**	Low-Flow	**Purge Equipment**	Peristaltic
Purge End	12:10	**Volumes Purged**	0.84	**Sample ID**	MW-22-155_091222	**Sampled by**	Austin Westhuis
Sample Time	12:05	**Gallons Purged**	2.64	**Replicate/ Code No.**	NA	**Sample Type**	Grab

Time	Minutes Elapsed	Total Elapsed Minutes	Rate mL/min	Depth to Water (ft)	Gallons Purged	pH (standard units)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temperature °C	Redox (mV)	Appearance	
												Color	Odor
11:25	0	0	200	12.08	0.26	7.1	1.7	512	0.66	14.2	-92.7	--	--
11:30	5	5	200	12.08	0.53	7.09	1.69	212	0.06	14.1	-99.1	--	--
11:35	5	10	200	12.08	0.79	7.08	1.69	124	0.06	14	-102	--	--
11:40	5	15	200	12.08	1.06	7.08	1.69	82.1	0.05	14.1	-104	--	--
11:45	5	20	200	12.08	1.32	7.07	1.69	31.9	0.05	14.1	-105.1	--	--
11:50	5	25	200	12.08	1.59	7.06	1.69	12.8	0.05	14	-105.7	--	--
11:55	5	30	200	12.08	1.85	7.06	1.69	4.49	0.05	14	-105.9	--	--
12:00	5	35	200	12.08	2.11	7.04	1.7	4.1	0.05	13.9	-106.5	--	--
12:05	5	40	200	12.08	2.38	7.03	1.7	3.78	0.05	13.9	-106.9	Clear	None

Constituent Sampled	Container	Number	Preservative
1,4-Dioxane 8260 SIM	40 mL Glass	3	HCL

Comments:

Well Casing Volume Conversion

Well diameter (inches) = gallons per 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: See figure.
Condition of Well: Good condition
Well Completion: Stick-up
Well Locked at Arrival: yes
Well Locked at Departure: yes
Key Number To Well: 2035

ft-bmp = feet below measuring point
in = inches
ft = feet
mL/min = milliliters per minute
mS/cm = milliSiemens per centimeter
NTU = Nephelometric Turbidity Unit
mg/L = milligrams per liter
mV = millivolts
°F = degrees Fahrenheit
°C = degrees Celsius

Groundwater Sampling Form

ARCADIS

Project Number	30112892	**Well ID**	MW-22-155			**Date**	10/14/2022
Project Name/Location	RACER Lansing GWS 2022		**Weather(°F)**	43.0 degrees F and Cloudy. The wind is blowing S/SW at 11.4 mph.			
Measuring Pt. Description	Top of Inner Casing	**MP Elevation**		**Casing Diameter (in)**	2	**Well Casing Material**	PVC
Static Water Level (ft-bmp)	12.41	**Total Depth (ft-bmp)**	31.43	**Water Column (ft)**	19.02	**Gallons in Well**	3.09
Purge Start	11:05	**Pump Intake (ft-bmp)**	28.93	**Purge Method**	Low-Flow	**Purge Equipment**	Peristaltic
Purge End	11:55	**Volumes Purged**	0.77	**Sample ID**	MW-22-155_101422	**Sampled by**	Austin Westhuis
Sample Time	11:50	**Gallons Purged**	2.38	**Replicate/ Code No.**	NA	**Sample Type**	Grab

Time	Minutes Elapsed	Total Elapsed Minutes	Rate mL/min	Depth to Water (ft)	Gallons Purged	pH (standard units)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temperature °C	Redox (mV)	Appearance	
												Color	Odor
11:10	0	0	200	12.50	0.26	7.2	1.48	664.04	0.12	13.84	-83.1	--	--
11:20	10	10	200	12.50	0.79	7.19	1.48	369.72	0.1	13.82	-85.3	--	--
11:25	5	15	200	12.50	1.06	7.18	1.48	181.22	0.06	13.74	-85.3	--	--
11:30	5	20	200	12.50	1.32	7.18	1.48	53.11	0.06	13.85	-85.6	--	--
11:35	5	25	200	12.50	1.59	7.17	1.48	21.03	0.06	13.85	-85.5	--	--
11:40	5	30	200	12.50	1.85	7.17	1.48	17.94	0.06	13.61	-85.7	--	--
11:45	5	35	200	12.50	2.11	7.17	1.48	17.11	0.06	13.56	-85.6	--	--
11:50	5	40	200	12.50	2.38	7.17	1.49	16.85	0.06	13.57	-85	Clear	None

Constituent Sampled	Container	Number	Preservative
1,4-Dioxane 8260 SIM	40 mL Glass	3	HCL

Comments:

Well Casing Volume Conversion

Well diameter (inches) = gallons per 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: See figure.

Condition of Well: Good condition

Well Completion: Stick-up

Well Locked at Arrival: yes

Well Locked at Departure: yes

Key Number To Well: 2035

ft-bmp = feet below measuring point
in = inches
ft = feet
mL/min = milliliters per minute

mS/cm = milliSiemens per centimeter
NTU = Nephelometric Turbidity Unit
mg/L = milligrams per liter

mV = millivolts
°F = degrees Fahrenheit
°C = degrees Celsius

Groundwater Sampling Form

ARCADIS

Project Number	30112892	**Well ID**	MW-22-156			**Date**	09/12/2022
Project Name/Location	RACER Lansing GWS 2022		**Weather(°F)**	61.0 degrees F and Cloudy. The wind is blowing S/SW at 8.1 mph.			
Measuring Pt. Description	Top of Inner Casing	**MP Elevation**		**Casing Diameter (in)**	2	**Well Casing Material**	PVC
Static Water Level (ft-bmp)	13.29	**Total Depth (ft-bmp)**	31.06	**Water Column (ft)**	17.77	**Gallons in Well**	2.89
Purge Start	10:20	**Pump Intake (ft-bmp)**	28.56	**Purge Method**	Low-Flow	**Purge Equipment**	Peristaltic
Purge End	11:10	**Volumes Purged**	0.91	**Sample ID**	MW-22-156_091222	**Sampled by**	Austin Westhuis
Sample Time	11:05	**Gallons Purged**	2.64	**Replicate/ Code No.**	NA	**Sample Type**	Grab

Time	Minutes Elapsed	Total Elapsed Minutes	Rate mL/min	Depth to Water (ft)	Gallons Purged	pH (standard units)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temperature °C	Redox (mV)	Appearance	
												Color	Odor
10:25	0	0	200	13.29	0.26	6.65	1.78	497	7.64	15.6	59.1	--	--
10:30	5	5	200	13.29	0.53	6.74	1.7	243	7.3	15.1	22.1	--	--
10:35	5	10	200	13.29	0.79	6.83	1.57	116	6.61	15	-16.3	--	--
10:40	5	15	200	13.29	1.06	6.86	1.51	73.9	6.28	14.9	-28.9	--	--
10:45	5	20	200	13.29	1.32	6.88	1.48	39.4	6.14	14.9	-40.4	--	--
10:50	5	25	200	13.29	1.59	6.91	1.44	12.6	3.52	14.9	-52.3	--	--
10:55	5	30	200	13.29	1.85	6.92	1.42	4.12	3.35	14.8	-60.6	--	--
11:00	5	35	200	13.29	2.11	6.93	1.42	3.66	3.2	14.8	-65.9	--	--
11:05	5	40	200	13.29	2.38	6.94	1.41	3.21	3.17	14.8	-69.8	Clear	None

Constituent Sampled	Container	Number	Preservative
1,4-Dioxane 8260 SIM	40 mL Glass	3	HCL

Comments:

Well Casing Volume Conversion

Well diameter (inches) = gallons per 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: See figure.

Condition of Well: Good condition

Well Completion: Stick-up

Well Locked at Arrival: yes

Well Locked at Departure: yes

Key Number To Well: 2035

ft-bmp = feet below measuring point
in = inches
ft = feet
mL/min = milliliters per minute

mS/cm = milliSiemens per centimeter
NTU = Nephelometric Turbidity Unit
mg/L = milligrams per liter

mV = millivolts
°F = degrees Fahrenheit
°C = degrees Celsius

Groundwater Sampling Form

ARCADIS

Project Number	30112892	**Well ID**	MW-22-156			**Date**	10/14/2022
Project Name/Location	RACER Lansing GWS 2022		**Weather(°F)**	48.9 degrees F and Mostly Cloudy. The wind is blowing S at 10.3 mph.			
Measuring Pt. Description	Top of Inner Casing	**MP Elevation**		**Casing Diameter (in)**	2	**Well Casing Material**	PVC
Static Water Level (ft-bmp)	13.57	**Total Depth (ft-bmp)**	31.06	**Water Column (ft)**	17.49	**Gallons in Well**	2.84
Purge Start	13:05	**Pump Intake (ft-bmp)**	28.56	**Purge Method**	Low-Flow	**Purge Equipment**	Peristaltic
Purge End	13:40	**Volumes Purged**	0.65	**Sample ID**	MW-22-156_101422	**Sampled by**	Austin Westhuis
Sample Time	13:35	**Gallons Purged**	1.85	**Replicate/ Code No.**	NA	**Sample Type**	Grab

Time	Minutes Elapsed	Total Elapsed Minutes	Rate mL/min	Depth to Water (ft)	Gallons Purged	pH (standard units)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temperature °C	Redox (mV)	Appearance	
												Color	Odor
13:10	0	0	200	13.61	0.26	7.11	1.64	57.93	0.19	15.22	-58.2	--	--
13:15	5	5	200	13.61	0.53	7.12	1.49	25.28	0.13	15.32	-62.4	--	--
13:20	5	10	200	13.61	0.79	7.14	1.39	16.43	0.11	15.14	-63.7	--	--
13:25	5	15	200	13.61	1.06	7.15	1.35	13.28	0.11	15.16	-65	--	--
13:30	5	20	200	13.61	1.32	7.17	1.34	12.75	0.11	15.1	-66.6	--	--
13:35	5	25	200	13.61	1.59	7.18	1.32	12.03	0.11	15.1	-69.2	Clear	None

Constituent Sampled	Container	Number	Preservative
1,4-Dioxane 8260 SIM	40 mL Glass	3	HCL

Comments:

Well Casing Volume Conversion

Well diameter (inches) = gallons per 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:	See figure.	Well Locked at Arrival:	yes
Condition of Well:	Good condition	Well Locked at Departure:	yes
Well Completion:	Stick-up	Key Number To Well:	2035

ft-bmp = feet below measuring point
in = inches
ft = feet
mL/min = milliliters per minute

mS/cm = milliSiemens per centimeter
NTU = Nephelometric Turbidity Unit
mg/L = milligrams per liter

mV = millivolts
°F = degrees Fahrenheit
°C = degrees Celsius

Groundwater Sampling Form

ARCADIS

Project Number	30112892	**Well ID**	MW-22-157			**Date**	09/12/2022
Project Name/Location	RACER Lansing GWS 2022		**Weather(°F)**	64.9 degrees F and Cloudy. The wind is blowing S at 9.2 mph.			
Measuring Pt. Description	Top of Inner Casing	**MP Elevation**		**Casing Diameter (in)**	2	**Well Casing Material**	PVC
Static Water Level (ft-bmp)	2.75	**Total Depth (ft-bmp)**	27.55	**Water Column (ft)**	24.8	**Gallons in Well**	4.03
Purge Start	13:45	**Pump Intake (ft-bmp)**	25.05	**Purge Method**	Low-Flow	**Purge Equipment**	Peristaltic
Purge End	14:10	**Volumes Purged**	0.33	**Sample ID**	MW-22-157_091222	**Sampled by**	Austin Westhuis
Sample Time	14:10	**Gallons Purged**	1.32	**Replicate/ Code No.**	NA	**Sample Type**	Grab

Time	Minutes Elapsed	Total Elapsed Minutes	Rate mL/min	Depth to Water (ft)	Gallons Purged	pH (standard units)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temperature °C	Redox (mV)	Appearance	
												Color	Odor
13:50	0	0	200	2.75	0.26	7.06	1.48	3.09	0.2	16.7	-96.9	--	--
13:55	5	5	200	2.75	0.53	7.03	1.47	2.16	0.25	16.4	-95.7	--	--
14:00	5	10	200	2.75	0.79	7.02	1.47	1.77	0.23	16.4	-95.5	--	--
14:05	5	15	200	2.75	1.06	7.01	1.46	1.51	0.23	16.6	-95.2	Clear	None

Constituent Sampled	Container	Number	Preservative
1,4-Dioxane 8260 SIM	40 mL Glass	3	HCL

Comments:

Well Casing Volume Conversion

Well diameter (inches) = gallons per 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: See figure.

Condition of Well: Good condition

Well Completion: Flush mount

Well Locked at Arrival: yes

Well Locked at Departure: yes

Key Number To Well: 2035

ft-bmp = feet below measuring point
in = inches
ft = feet
mL/min = milliliters per minute

mS/cm = milliSiemens per centimeter
NTU = Nephelometric Turbidity Unit
mg/L = milligrams per liter

mV = millivolts
°F = degrees Fahrenheit
°C = degrees Celsius

Groundwater Sampling Form

Project Number	30112892	**Well ID**	MW-22-157			**Date**	10/14/2022
Project Name/Location	RACER Lansing GWS 2022		**Weather(°F)**	41.0 degrees F and Cloudy.			
Measuring Pt. Description	Top of Inner Casing	**MP Elevation**		**Casing Diameter (in)**	2	**Well Casing Material**	PVC
Static Water Level (ft-bmp)	3.08	**Total Depth (ft-bmp)**	27.61	**Water Column (ft)**	24.53	**Gallons in Well**	3.99
Purge Start	09:50	**Pump Intake (ft-bmp)**	25.11	**Purge Method**	Low-Flow	**Purge Equipment**	Peristaltic
Purge End	10:35	**Volumes Purged**	0.60	**Sample ID**	MW-22-157_101422	**Sampled by**	Austin Westhuis
Sample Time	10:25	**Gallons Purged**	2.38	**Replicate/ Code No.**	NA	**Sample Type**	Grab

Time	Minutes Elapsed	Total Elapsed Minutes	Rate mL/min	Depth to Water (ft)	Gallons Purged	pH (standard units)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temperature °C	Redox (mV)	Appearance	
												Color	Odor
10:05	0	0	200	3.08	0.79	7.13	1.41	25.96	0.12	15.38	-88.2	--	--
10:10	5	5	200	3.08	1.06	7.13	1.4	24.12	0.12	15.22	-89	--	--
10:15	5	10	200	3.08	1.32	7.14	1.39	21.14	0.09	15.32	-88.2	--	--
10:20	5	15	200	3.08	1.59	7.14	1.38	20.65	0.09	15.37	-87.8	--	--
10:25	5	20	200	3.08	1.85	7.14	1.36	20.01	0.09	15.38	-87.8	Clear	None

Constituent Sampled	Container	Number	Preservative
1,4-Dioxane 8260 SIM	40 mL Glass	3	HCL

Comments:

Well Casing Volume Conversion

Well diameter (inches) = gallons per 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: See figure.

Condition of Well: Good condition

Well Completion: Flush mount

Well Locked at Arrival: yes

Well Locked at Departure: yes

Key Number To Well: 2035

ft-bmp = feet below measuring point
in = inches
ft = feet
mL/min = milliliters per minute

mS/cm = milliSiemens per centimeter
NTU = Nephelometric Turbidity Unit
mg/L = milligrams per liter

mV = millivolts
°F = degrees Fahrenheit
°C = degrees Celsius