

**2023 ANNUAL GROUNDWATER MONITORING  
AND CORRECTIVE ACTION REPORT  
COAL COMBUSTION RESIDUALS (CCR) RULE**

**HOLLOW ROCK FACILITY  
JEFFERSON COUNTY, OHIO**

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**January 31, 2024**

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## **ABBREVIATIONS/ACRONYMS**

ACM	Assessment of Corrective Measures
ASD	Alternative Source Demonstration
CCR	Coal Combustion Residuals
CFR	Code of Federal Regulations
cm/s	Centimeters per Second
ETEM	ETEM Remediation One, LLC
FTS	Field & Technical Services LLC
ft/yr	Feet per Year
HRF	Hollow Rock Facility Landfill, Jefferson County, Ohio
MCL	Maximum Contaminant Limit
mg/L	Milligrams per Liter
SSI	Statistical Significant Increase
SSD	Statistical Significant Decrease
SSL	Statistical Significant Level
TDS	Total Dissolved Solids
USEPA	United States Environmental Protection Agency



## **EXECUTIVE SUMMARY**

This report summarizes groundwater monitoring activities completed between January 1 and December 31, 2023 at the ETEM Remediation One, LLC (ETEM) Hollow Rock Facility Landfill (HRF) as required by 40 CFR 257.90(e) of the United States Environmental Protection Agency (USEPA) Coal Combustion Residuals (CCR) Rule. No monitoring wells were installed, modified or abandoned during the reporting period.

Detection mode groundwater monitoring of HRF was initiated in August 2017 following the Baseline monitoring period (establishment of background per 257.93(d)). Statistically significant increases (SSIs) of the Appendix III constituents chloride, sulfate, and total dissolved solids (TDS) were present in the downgradient monitoring wells MW-23S and MW-41. An Alternative Source Demonstration (ASD) was conducted in March 2018 to evaluate whether a source other than HRF was responsible for the SSIs. The ASD determined that the source of the observed impacts was not the landfill. Instead, the source of impact was attributed to the presence of mine spoils and the natural variability of groundwater conditions and chemistry. The original ASD and subsequent updates were prepared and included in annual groundwater monitoring reports.

The ASD determination allowed the groundwater monitoring program to remain in detection mode. Detection monitoring was in place at the start and the end of the current annual reporting period (2023). Conditions presented in 40 CFR 257.90(e)(6) of the CCR Rule are not addressed in this report as HRF is not in the assessment monitoring phase.

Groundwater monitoring data for 2023 have reported the detection of the Appendix III constituents boron, calcium, chloride, pH, sulfate, and TDS in downgradient wells at concentrations that represent SSIs over background. SSIs identified in the 2023 annual reporting period are as follows:

<b>Appendix III Constituent</b>	<b>Downgradient Wells with SSIs</b>
Boron	MW-12S, MW-24S
Calcium	MW-12S
Chloride	MW-11S, MW-12S, MW-13S, MW-22S, MW-23S, MW-25S, MW-40, MW-41, MW-42, MW-43

Appendix III Constituent	Downgradient Wells with SSIs
pH	SSI at MW-11S and SSDs at MW-12S and MW-13S
Sulfate	MW-11S, MW-12S, MW-13S, MW-23S, MW-25S, MW-41, MW-43
TDS	MW-22S

Other activities and conditions for the 2023 annual reporting period include:

- Semiannual detection mode groundwater monitoring events were conducted June 19 through 21, 2023 and October 9 through 11, 2023. Monitoring involved sampling of eleven (11) downgradient monitoring wells (MW-11S, MW-12S, MW-13S, MW-22S, MW-23S, MW-24S, MW-25S, MW-40, MW-41, MW-42, and MW-43);
- An ASD update was prepared and included in this report;
- No monitoring well installation, repair, or decommissioning was conducted;
- No program transitions (detection to assessment or vice versa) were triggered; and,
- No programmatic problems were encountered, so no remedies were required.

Anticipated activities for the next annual reporting period include:

- Completion of two semiannual detection mode groundwater monitoring events; and,
- Prepare an ASD update as appropriate.

## **1.0 INTRODUCTION**

On behalf of ETEM Remediation One, LLC (ETEM), Field & Technical Services, LLC (FTS) has prepared this Annual Groundwater Monitoring and Corrective Action Report for the Hollow Rock Facility Landfill (HRF), located near Toronto, in Know Township, Jefferson County, Ohio. The HRF, a state-permitted landfill subject to the Coal Combustion Residuals (CCR) Rule, operates pursuant to the detection monitoring program under 40 Code of Federal Regulations (CFR) 257.94. Detection monitoring at HRF began in August 2017. Statistically significant increases (SSIs) identified during 2023 include: boron in monitoring wells MW-12S and MW-24S, calcium in monitoring well MW-12S; chloride in monitoring wells MW-11S, MW-12S, MW-13S, MW-22S, MW-23S, MW-25S, MW-40, MW-41, MW-42, and MW-43; sulfate in monitoring wells MW-11S, MW-12S, MW-13S, MW-23S, MW-25S, MW-41, MW-43; pH in monitoring well MW-11S; and total dissolved solids (TDS) in monitoring well MW-22S. Statistically significant decreases (SSDs) in pH were identified in monitoring wells MW-12S and MW-13S. Alternative Source Demonstrations (ASD) were previously completed and indicated, through multiple lines of evidence, that detection monitoring thresholds (SSIs or SSDs) were related to historic mine spoils placed throughout the area.

This report was prepared in accordance with 40 CFR 257.90(e), of the United States Environmental Protection Agency (USEPA) CCR Rule, which requires annual groundwater monitoring and corrective action reports to include the information listed below:

- 1) A map, aerial image, or diagram showing the CCR unit and all background (or upgradient) and downgradient monitoring wells, to include the well identification numbers, that are part of the groundwater monitoring program for the CCR unit (see Figure 3);
- 2) Identification of any monitoring wells that were installed or decommissioned during the preceding year, along with a narrative description of why those actions were taken (no monitoring wells were installed or decommissioned in 2023);
- 3) In addition to all the monitoring data obtained under 40 CFR 257.90 through 257.98, a summary including the number of groundwater samples that were collected for analysis for each background and downgradient well, the dates the samples were collected, and whether the sample was required by the detection monitoring or assessment monitoring programs (referenced in Section 4.2 and presented in full in Appendix A);

- 4) A narrative discussion regarding a transition between monitoring programs, if any has occurred; and,
- 5) Other information required to be included in the annual report as specified in 40 CFR 257.90 through 257.98 (i.e., groundwater monitoring results, alternative sources, and extension of schedules) (an ASD update is provided in Section 4.3).

## **2.0 SITE BACKGROUND**

The HRF is located in Knox Township, Jefferson County, Ohio (Figure 1), and is approximately 2.5 miles west of the Sammis Power Station, on Route 152. HRF is a state-permitted landfill that receives residual solid wastes generated by burning coal (CCRs) from the Sammis Power Station located in Stratton, Ohio. A site location map of the HRF is provided as Figure 1. The permitted HRF footprint (approximately 140 acres) is divided into fourteen (14) cells as shown on Figure 2.

The HRF is located in the upland area of Jefferson County where numerous surface coal mines operated. HRF occupies one such formerly mined area that has been re-contoured/reclaimed with mine spoil. At the HRF, the uppermost weathered bedrock near the interface between mine spoil deposits and the underlying bedrock comprises the uppermost aquifer system on site. The direction of groundwater flow at the site is partly controlled by the topography of the mine spoil/bedrock interface, which generally directs flow towards nearby stream valleys. In general, the landfill occupies the upgradient position such that the downgradient direction is generally away from the HRF in all directions, though the flow is likely to be more pronounced to the southeast along the southern boundary as shown in Figures 4A and 4B.

### 3.0 2023 ACTIVITIES SUMMARY

The first semiannual 2023 detection monitoring sampling event was performed on June 19 through 21, 2023. The second semiannual 2023 detection monitoring sampling event was performed on October 9 through 11, 2023. All eleven (11) CCR program wells were sampled during the April and October 2023 events.

The CCR monitoring well system at HRF consists of eleven (11) monitoring well locations (MW-11S, MW-12S, MW-13S, MW-22S, MW-23S, MW-24, MW-25S, MW-40, MW-41, MW-42, and MW-43). Monitoring wells MW-12S and MW-13S were incorporated into CCR monitoring program in August 2017, and their baseline monitoring was completed in 2018. Prior to incorporation into the CCR monitoring program, monitoring wells MW-12S and MW-13S were used for potentiometric evaluations under the CCR program. Monitoring well locations are shown on Figure 3. Table 1 contains information regarding CCR well locations, pump depths, and construction details. Details regarding the establishment of the monitoring well system are presented in the *Hydrogeologic Investigation Report* and *Groundwater Monitoring System Certification* document both dated October 2017.

A comprehensive round of groundwater elevations were measured within a 24-hour time period to avoid temporal variations in groundwater flow in accordance with 40 CFR 257.93(c). Monitoring wells were sampled using low-flow sampling methods in accordance with the *Groundwater Evaluation Work Plan* dated April 2016 (AECOM, 2016). All wells were sampled for Appendix III parameters in accordance with 40 CFR 257.94(a).

## 4.0 MONITORING RESULTS

The following sections present details about the HRF groundwater flow evaluations, groundwater sampling results, and ASD update.

### 4.1 GROUNDWATER FLOW

Water level data and calculated groundwater elevations for 2023 are presented in Table 2 and groundwater flow maps for the 2023 monitoring period are presented as Figures 4A and 4B. Flow rates were calculated using estimated aquifer porosity and hydraulic conductivity values from historical reports, and hydraulic gradients that were calculated using potentiometric contour elevations over distance. Generally, groundwater elevations are highest at monitoring wells MW-23S, MW-24S, and MW-25S with flow radiating outward from the vicinity of these wells towards stream valleys. Estimated groundwater flow velocity in the vicinity of these wells is approximately 8 ft/yr during the first 2023 event and 4 ft/year during the second 2023 event. The landfill occupies the upgradient position and downgradient is generally radially away from the HRF, though the flow is likely to be more pronounced to the southeast along the southern site boundary. Groundwater flow patterns observed during the 2023 detection monitoring events were consistent with the patterns observed throughout the baseline sampling periods and previous detection monitoring events.

### 4.2 SAMPLING RESULTS

The results of groundwater monitoring conducted for detection monitoring events in 2023 are presented below.

#### 2023 Semiannual Detection Monitoring

Analytical results from the June and October 2023 semiannual detection monitoring events are summarized on Table 3 with the full laboratory reports available in Appendix A. The data were generally consistent with previous analytical results.

#### Statistical Evaluations

The following is a summary of the statistical evaluations conducted in 2023. Appendix III statistical evaluations were performed, using an intrawell approach, in accordance with 40 CFR 257.93 (f)(1) and the rationale for each method selected is outlined in *Statistical Methods Certification* document dated October 17, 2017 (AECOM, 2017). The intrawell statistical approach is appropriate for the monitored aquifer because the CCR Unit occupies the upgradient position on a topographic high with radial groundwater flow away from the landfill in all directions.



The following Appendix III constituents were identified as having SSIs during 2023:

- Boron in monitoring wells: MW-12S and MW-24S.
- Calcium in monitoring well: MW-12S.
- Chloride in monitoring wells MW-11S, MW-12S, MW-13S, MW-22S, MW-23S, MW-25S, MW-40, MW-41, MW-42, and MW-43.
- pH in monitoring wells: SSI in MW-11S and SSDs in MW-12S and MW-13S.
- Sulfate in monitoring wells MW-11S, MW-12S, MW-13S, MW-23S, MW-25S, MW-41, and MW-43.
- TDS in monitoring well MW-22S.

The Appendix III constituent fluoride was detected above the baseline UPLs in downgradient monitoring wells MW-13S, MW-22S, MW-23S, MW-24S, MW-40, MW-41, MW-42, and MW-43 during the June 2023 event. During the June 2023 event, fluoride was also detected in the method blank at a concentration of 0.0708 J mg/l, which is below the quantitation limit (QL) of 0.10 mg/l. During the June 2023 data review, the fluoride result from sample MW-25S was qualified as “U” not detected at the QL and the fluoride results from samples MW-13S, MW-22S, MW-23S, MW-24S, MW-40, MW-41, MW-42, and MW-43 were qualified “J+” estimated value, biased high on Table 3. Due to fluoride being detected in the method blank associated with the June 2023 sampling of the CCR groundwater monitoring network, the resulting detections are not considered valid SSIs. Fluoride monitoring data historically is an order of magnitude below the fluoride primary maximum contaminant limit (MCL) of 4 mg/L or has been below detection limits.

#### **4.3 ALTERNATIVE SOURCE DEMONSTRATION UPDATE**

An ASD was completed for detection monitoring constituents at the HRF in March 2018. The ASD was included in the *2018 Annual Groundwater Monitoring and Corrective Action Report* (AECOM, January 2019) and subsequent ASD updates have been provided with each annual report. This ASD update is provided to further document previous findings that historic mine spoil material placed at the site serves as an alternative source of detection monitoring constituents in groundwater. Technical evaluations and multiple lines of evidence that were completed in previous ASD updates remain valid. Multiple lines of evidence including, but not limited to, the following demonstrate that groundwater impacts are not related to the HRF, but are a result of the mine spoils that have been historically placed throughout the site:





## **Landfill Design, Construction and Operation**

The Hollow Rock Facility is an engineered landfill designed with protective measures in place (e.g., composite liner installed in each landfill cell and leachate collection systems) to mitigate the potential for fluids to leach into the underlying groundwater zones. Records of landfill construction and operation do not suggest any potential failure of the engineered containment, which indicates that the observed SSIs are attributable to an alternate source and are not a result of leaching of fluids from the landfill.

## **Reduced Infiltration to Groundwater**

As evidenced by the radial flow of groundwater away from the current landfill footprint in Figures 4A and 4B, the primary source of groundwater recharge is infiltration within the areas adjacent to the closed landfill cells. As landfill construction has progressed, more of the existing land surface is covered by engineered surfaces that do not allow for infiltration. As a consequence, there is less recharge to groundwater, less difference in hydraulic head to drive groundwater movement (i.e., slower groundwater flow rates), and longer residence time for groundwater before reaching the groundwater monitoring system wells. This condition is expected to continue to influence the character of groundwater quality over the operational life of the unit and into closure, however, the changes in groundwater quality are not the result of leaching from CCR materials placed in the lined cells.

## **Historical Background Concentrations**

Historical background concentrations from monitoring wells sampled prior to the landfill construction indicated detection monitoring constituents at similar or higher levels in comparison to SSIs. Chloride SSIs, reported under the solid waste permit monitoring program, have been attributed to natural variability in groundwater owing to the presence of mine spoil in the saturated zone, the irregularity of groundwater quality resulting from the heterogeneous nature of those deposits, and the marine origin of the bedrock formations. The mine spoils consist primarily of clayey gravel and silty gravel extending from, or near, the ground surface to the underlying bedrock. These materials are the result of extensive surface mining performed in the area during the 1980s. The mining removed shale, sandstone, siltstone, coal and limestone seams of the Conemaugh Group bedrock. Following mining, the area was re-contoured/reclaimed with mine spoil material.

## **5.0 GENERAL INFORMATION**

The following sections summarize any problems encountered in the CCR program through 2023, if any, and resolutions to those problems if needed, and upcoming actions planned for 2024.

### **5.1 PROBLEMS ENCOUNTERED AND RESOLUTIONS**

No issues were encountered under the groundwater monitoring program for the HRF in 2023.

### **5.2 ACTIONS PLAN**

The following CCR groundwater compliance activities are planned for 2024:

- Continue with semiannual detection monitoring events in accordance with 40 CFR 257.94(a);
- Perform statistical analysis of detection monitoring results in accordance with 40 CFR 257.93 (f);
- If appropriate, prepare an ASD update to determine if a source other than the CCR unit may be causing any new SSIs (or changes in previously detected constituents) at the HRF; and,
- Perform any notifications required by 40 CFR 257.106(h), and its sub-parts, as applicable.

## **6.0 REFERENCES**

- AECOM, January 2023. *Annual Groundwater Monitoring and Corrective Action Report, Coal Combustion Residuals (CCR) Rule, Hollow Rock Facility.*
- AECOM, January 2022. *Annual Groundwater Monitoring and Corrective Action Report, Coal Combustion Residuals (CCR) Rule, Hollow Rock Facility.*
- AECOM, January 2021. *Annual Groundwater Monitoring and Corrective Action Report, Coal Combustion Residuals (CCR) Rule, Hollow Rock Facility.*
- AECOM, January 2020. *Annual Groundwater Monitoring and Corrective Action Report, Coal Combustion Residuals (CCR) Rule, Hollow Rock Facility.*
- AECOM, January 2019. *Annual Groundwater Monitoring and Corrective Action Report, Coal Combustion Residuals (CCR) Rule, Hollow Rock Facility.*
- AECOM, January 2018. *Annual Groundwater Monitoring and Corrective Action Report, Coal Combustion Residuals (CCR) Rule, Hollow Rock Facility.*
- AECOM, October 2017. *Coal Combustion Residuals Rule Groundwater Monitoring System Certification, Hollow Rock Facility, October 17, 2017.*
- AECOM, October 2017. *Coal Combustion Residual Rule Statistical Methods Certification, Hollow Rock Facility, October 17, 2017.*
- AECOM, October 2017. *Hydrogeologic Investigation Report Coal Combustion Residuals (CCR) Rule, Hollow Rock Facility, October 13, 2017.*
- AECOM, April 2016. *Groundwater Evaluation Work Plan Coal Combustion Residuals (CCR) Rule (Work Plan), Hollow Rock Facility, April 7, 2016.*
- United States Environmental Protection Agency, 2015. Part 257, Coal Combustion Residuals Rule, last amended December 29, 2023.

## TABLES

Table 1  
Monitoring Well Construction Summary  
2023 Annual Groundwater Monitoring and Corrective Action Report  
Coal Combustion Residuals (CCR) Rule  
Hollow Rock Facility  
Jefferson County, Ohio

Well ID	Latitude	Longitude	Well Installation Date	TOC Elevation (ft MSL)	Ground Surface Elevation (ft MSL)	Total Depth (feet)	Bottom Elevation (ft MSL)	Screen Length (feet)	Top of Screen (feet bgs)	Bottom of Screen (feet bgs)	Top of Screen Elevation (ft MSL)	Bottom of Screen Elevation (ft MSL)	Pump Depth (ft bgs)	Well Casing Material	Well Screen Material and Slot Size	Groundwater Flow Location	Program Use
MW-11S	314336.5	2476224.3	Sep-08	1165.82	1166.00 <sup>a</sup>	80.00 <sup>b</sup>	1086.00	10	70	80	1096.00 <sup>c</sup>	1086.00 <sup>c</sup>	79.00	2-inch Schedule 40 PVC	2-inch Schedule 40 PVC and 0.01-inch slot	Downgradient	Detection
MW-12S	313417.0	2475970.0	Nov-08	1143.34	1143.00 <sup>a</sup>	56.00 <sup>b</sup>	1087.00	10	46	56	1097.00 <sup>c</sup>	1087.00 <sup>c</sup>	53.00				
MW-13S	313064.2	2475709.0	Sep-08	1162.69	1163.00 <sup>a</sup>	68.00 <sup>b</sup>	1095.00	10	56	66	1107.00 <sup>c</sup>	1097.00 <sup>c</sup>	65.00				
MW-22S	314217.5	2474457.6	Sep-08	1182.16	1175.00 <sup>a</sup>	88.00 <sup>b</sup>	1087.00	10	78	88	1097.00 <sup>c</sup>	1087.00 <sup>c</sup>	90.00				
MW-23S	315044.4	2474963.6	Sep-08	1156.56	1148.00 <sup>a</sup>	43.00 <sup>b</sup>	1105.00	10	33	43	1115.00 <sup>c</sup>	1105.00 <sup>c</sup>	55.00				
MW-24S	315406.9	2475841.0	Sep-08	1166.82	1167.00 <sup>a</sup>	75.00 <sup>b</sup>	1092.00	10	65	75	1102.00 <sup>c</sup>	1092.00 <sup>c</sup>	78.00				
MW-25S	315002.8	2476190.1	Sep-08	1191.81	1192.00 <sup>a</sup>	100.00 <sup>b</sup>	1092.50	15	89.5	100	1102.50 <sup>c</sup>	1092.50 <sup>c</sup>	96.00				
MW-40	313860.6	2474212.6	May-16	1166.74	1164.59	84.49	1082.25	10	72	82	1094.74	1084.74	81.00				
MW-41	313303.6	2474918.7	May-16	1188.15	1186.16	91.26	1096.89	10	79	89	1109.15	1099.15	88.00				
MW-42	312814.1	2475602.5	May-16	1184.04	1182.10	91.57	1092.47	10	79	89	1105.04	1095.04	88.00				
MW-43	312990.9	2474613.6	May-16	1168.74	1166.44	80.36	1088.38	10	68	78	1100.74	1090.74	77.00				

Notes:  
bgs - below ground surface  
TOC - Top of Casing  
ft MSL - feet above Mean Sea Level  
ft BTOC - feet below top of casing  
PVC - Polyvinyl Chloride  
a - Ground Surface Elevation are approximate values from well construction logs  
b - Total Depth is based on feet below ground surface from well construction logs  
c - Screen Elevation calculated from approximate ground surface elvation from well construction logs

**Table 2**  
**Monitoring Well Groundwater Elevations**  
**2023 Annual Groundwater Monitoring and Corrective Action Report**  
**Coal Combustion Residuals (CCR) Rule**  
**Hollow Rock Facility**  
**Jefferson County, Ohio**

Well ID		Reference Elevation Top of Casing (feet, msl)	Detection Monitoring Event 12		Detection Monitoring Event 13	
			6/19/2023		10/9/2023	
			Depth to Water (feet)	Groundwater Elevation (feet, msl)	Depth to Water (feet)	Groundwater Elevation (feet, msl)
MW-11S	CCR Program Well	1165.82	64.28	1101.54	66.44	1099.38
MW-12S		1143.34	42.58	1100.76	42.93	1100.41
MW-13S		1162.69	58.72	1103.97	61.25	1101.44
MW-22S		1182.16	72.80	1109.36	74.39	1107.77
MW-23S		1156.56	44.79	1111.77	46.21	1110.35
MW-24S		1166.82	58.63	1108.19	62.94	1103.88
MW-25S		1191.81	78.86	1112.95	79.67	1112.14
MW-40		1166.74	62.19	1104.55	63.87	1102.87
MW-41		1188.15	81.94	1106.21	83.10	1105.05
MW-42		1184.04	81.13	1102.91	83.66	1100.38
MW-43		1168.74	65.61	1103.13	68.11	1100.63
MW-14S	Non-program Well	1124.89	27.21	1097.68	24.59	1100.30
MW-15S		1137.44	45.60	1091.84	46.42	1091.02
MW-16S		1126.97	29.10	1097.87	30.37	1096.60
MW-17S		1143.06	44.52	1098.54	46.75	1096.31
MW-18S		1125.39	33.84	1091.55	36.92	1088.47
MW-19S		1175.32	72.15	1103.17	74.75	1100.57
MW-20S		1175.85	73.49	1102.36	76.00	1099.85
MW-21S		1152.67	50.28	1102.39	52.44	1100.23
MW-26S		1156.81	55.73	1101.08	56.15	1100.66
MW-27S		1158.36	70.58	1087.78	70.01	1088.35
MW-33S		1182.64	80.08	1102.56	82.55	1100.09
MW-34S		1144.91	42.60	1102.31	45.03	1099.88

**Notes:**

msl = mean sea level

**Table 3**  
**Groundwater Analytical Results**  
**2023 Annual Groundwater Monitoring and Corrective Action Report**  
**Coal Combustion Residuals (CCR) Rule**  
**Hollow Rock Facility**  
**Jefferson County, Ohio**

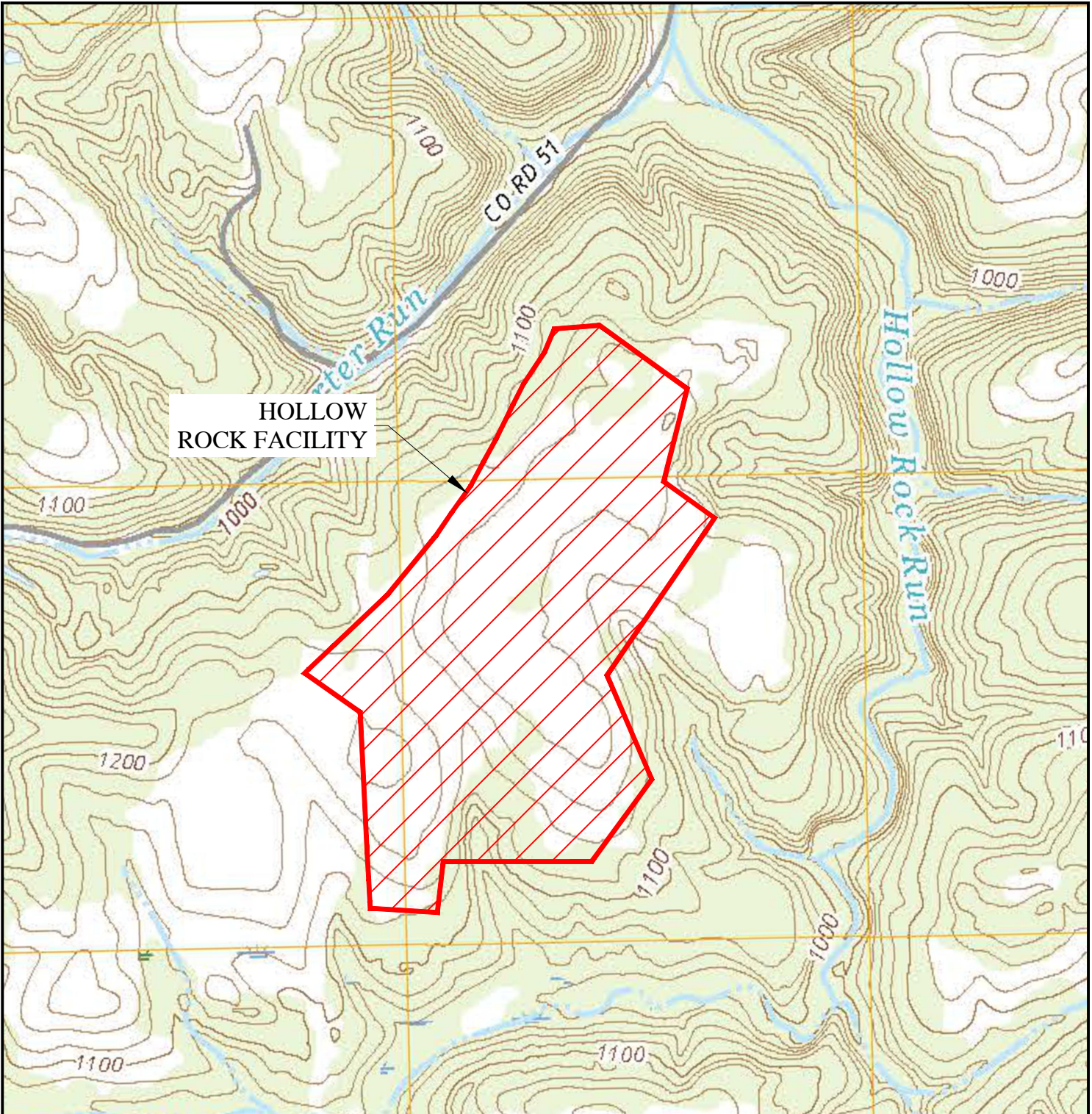
Appendix III Constituents										
Analyte Name		Boron	Calcium	Chloride	Fluoride	pH	Sulfate	TDS		
Units		mg/L	mg/L	mg/L	mg/L	SU	mg/L	mg/L		
MCL		NE	NE	NE	4		NE	NE		
MW-11S		UPL	0.074	566	13.6	0.070	6.47-7.11	1234	2834	
		10/24/2022	0.034	470	17.0	0.1	7.3	1300	2000	
		6/19/2023	0.038	490	15.9	0.1	6.47	1380	2300	
		10/10/2023	0.037	470	14.9	0.1	6.61	1210	2200	
MW-12S		UPL	0.365	548	73.7	0.330	6.38-6.72	1492	3802	
		10/24/2022	0.66	540	250	0.1	6.56	1500	3100	
		6/19/2023	1.3	580	319	0.1	6.26	1770	3100	
		10/11/2023	1.7	700	358	0.1	6.39	1620	3400	
MW-13S		UPL	0.271	539	3.4	0.170	6.30-7.08	1194	2778	
		10/24/2022	0.037	430	8.4	0.1	6.82	1100	1900	
		6/19/2023	0.049	480	22.1	0.225	6.17	1210	2200	
		10/10/2023	0.036	460	6.21	0.1	6.47	1030	2100	
MW-22S		UPL	0.369	463	6.8	0.220	6.14-7.21	1620	3329	
		10/24/2022	0.17	430	19.0	1.4	6.45	1400	2300	
		6/20/2023	0.18	450	17.7	0.383	6.57	1400	24000	
		10/10/2023	0.18	440	18.1	0.1	6.52	1410	2300	
MW-23S		UPL	0.286	408	14.8	0.170	6.10-7.19	1264	2834	
		10/25/2022	0.21	360	18.0	1.2	6.19	1300	2200	
		6/20/2023	0.24	380	17.1	0.235	6.26	1320	2100	
		10/10/2023	0.18	370	14.4	0.1	6.44	1090	1800	
MW-24S		UPL	0.122	649	30.7	0.060	6.23-6.92	2400	4064	
		10/25/2022	0.1	550	30	1.2	6.58	1300	2500	
		6/20/2023	0.1	400	23.5	0.371	6.40	1150	2500	
		10/11/2023	0.14	460	21.4	0.1	6.35	1310	2200	
MW-25S		UPL	0.403	167	3.8	0.009	6.86-7.59	312	959	
		10/25/2022	0.30	150	8.2	1.1	7.00	310	840	
		6/20/2023	0.34	150	6.48	0.1	7.08	327	790	
		10/10/2023	0.34	140	7.4	0.1	7.07	328	770	
MW-40		UPL	0.237	307	4.6	0.310	6.35-7.45	854	1941	
		10/25/2022	0.12	240	11	1.4	6.90	710	1300	
		6/21/2023	0.14	260	9.29	0.368	6.95	710	1500	
		10/10/2023	0.16	250	8.79	0.1	6.81	685	1400	
MW-41		Duplicate	0.16	240	8.74	0.1	-	642	1300	
		UPL	0.292	445	10.2	0.210	5.95-7.16	1501	3258	
		10/25/2022	0.22	390	26.0	1.600	6.59	1500	2700	
		6/21/2023	0.26	430	22.5	0.301	6.55	1650	2500	
MW-42		10/11/2023	0.28	440	27.3	0.1	6.29	1510	2600	
		UPL	0.119	667	3.7	0.270	6.11-7.16	2539	4774	
		10/25/2022	0.079	450	7.30	1.500	6.57	1800	3100	
		6/21/2023	0.094	460	4.76	0.249	6.57	1810	2800	
MW-43		10/11/2023	0.11	460	5.16	0.1	6.31	1630	2900	
		UPL	0.317	551	8.2	0.270	6.15-7.18	1753	4099	
		10/25/2022	0.23	440	18	0.140	6.58	1700	2900	
		6/21/2023	0.3	470	19	0.238	6.53	1820	2800	
		10/11/2023	0.24	490	19.2	0.1	6.45	1640	2800	

**Notes:**  
 = Statistically Significant Increase or Decrease  
 UPL = Upper Prediction Limit  
 TDS = Total Dissolved Solids  
 Both UPL and lower prediction limit (LPL) provided for pH  
 mg/L = milligrams per liter  
 SU = Standard Units  
 0.1 = Concentration below the Reporting Limit  
 NE = Not established  
 J = Estimated value  
 J+ = Estimated value; biased high  
 U = Not detected at reported limit

## FIGURES



q:\projects\key projects\etem\hollow rock landfill\2023 annual ccr report\figure 1 site location map.dwg Last Saved By: SConner 1/10/2024 6:03 AM Plotted By: Shelly Comer 1/10/2024 6:06 AM Scale: 1:1



OHIO

PROJECT LOCATION  
(JEFFERSON COUNTY)

### LEGEND

 PERMIT BOUNDARY

REFERENCE: USGS 7.5 MINUTE TOPOGRAPHIC QUADRANGLE:  
- KNOXVILLE AND WELLSVILLE, OH, 2019

0 1000 2000  
FEET

ETEM REMEDIATION ONE, LLC

DRWN:	SCC	DATE:	10/31/23
CHKD:	JK	DATE:	11/06/23
APPD:	DRF	DATE:	
SCALE:	AS SHOWN		
ISSUE DATE:			



FIELD & TECHNICAL  
SERVICES, LLC.  
200 THIRD AVENUE  
CARNEGIE, PA 15106

2023 ANNUAL CCR REPORT  
HOLLOW ROCK FACILITY  
JEFFERSON COUNTY, OHIO

SITE LOCATION MAP





PROJECT NO: 22-497  
DRAWING NUMBER  
FIGURE 1



q:\projects\key projects\etem\hollow rock landfill\cadd\2023 annual ccr report\figure 2 hollow rock facility map.dwg Last Saved By: SComer 11/1/2023 7:53 AM Plotted By: Shelly Comer 11/1/2023 9:56 AM Scale: 1:1



## LEGEND

-  INACTIVE CELL (CLOSED 2010)
-  ACTIVE CELL
-  CELLS TO BE USED NEXT IN SERIES
-  CELLS TO BE USED FOR FURTHER EXPANSION



0 1000 2000  
FEET

### ETEM REMEDIATION ONE, LLC

DRWN:	SCC	DATE:	10/31/23
CHKD:	JK	DATE:	11/06/23
APPD:	DRF	DATE:	
SCALE:	AS SHOWN		
ISSUE DATE:			



FIELD & TECHNICAL  
SERVICES, LLC.  
200 THIRD AVENUE  
CARNEGIE, PA 15106

2023 ANNUAL CCR REPORT  
HOLLOW ROCK LFACILITY  
JEFFERSON COUNTY, OHIO

HOLLOW ROCK FACILITY MAP

PROJECT NO: 22-497  
DRAWING NUMBER  
FIGURE 2

REFERENCE:





LEGEND

- HRF FACILITY FOOTPRINT
- ⊕ CCR MONITORING WELLS



△			
△			
△			
REV #	DATE	DESCRIPTION	APPD

REFERENCE:

ETEM REMEDIATION ONE, LLC

DRWN: SCC	DATE: 10/31/23
CHKD: JK	DATE: 11/06/23
APPD: DRF	DATE:
SCALE:	AS SHOWN
ISSUE DATE:	



FIELD & TECHNICAL SERVICES, LLC.  
200 THIRD AVENUE  
CARNEGIE, PA 15106

2023 ANNUAL CCR REPORT  
HOLLOW ROCK FACILITY  
JEFFERSON COUNTY, OHIO

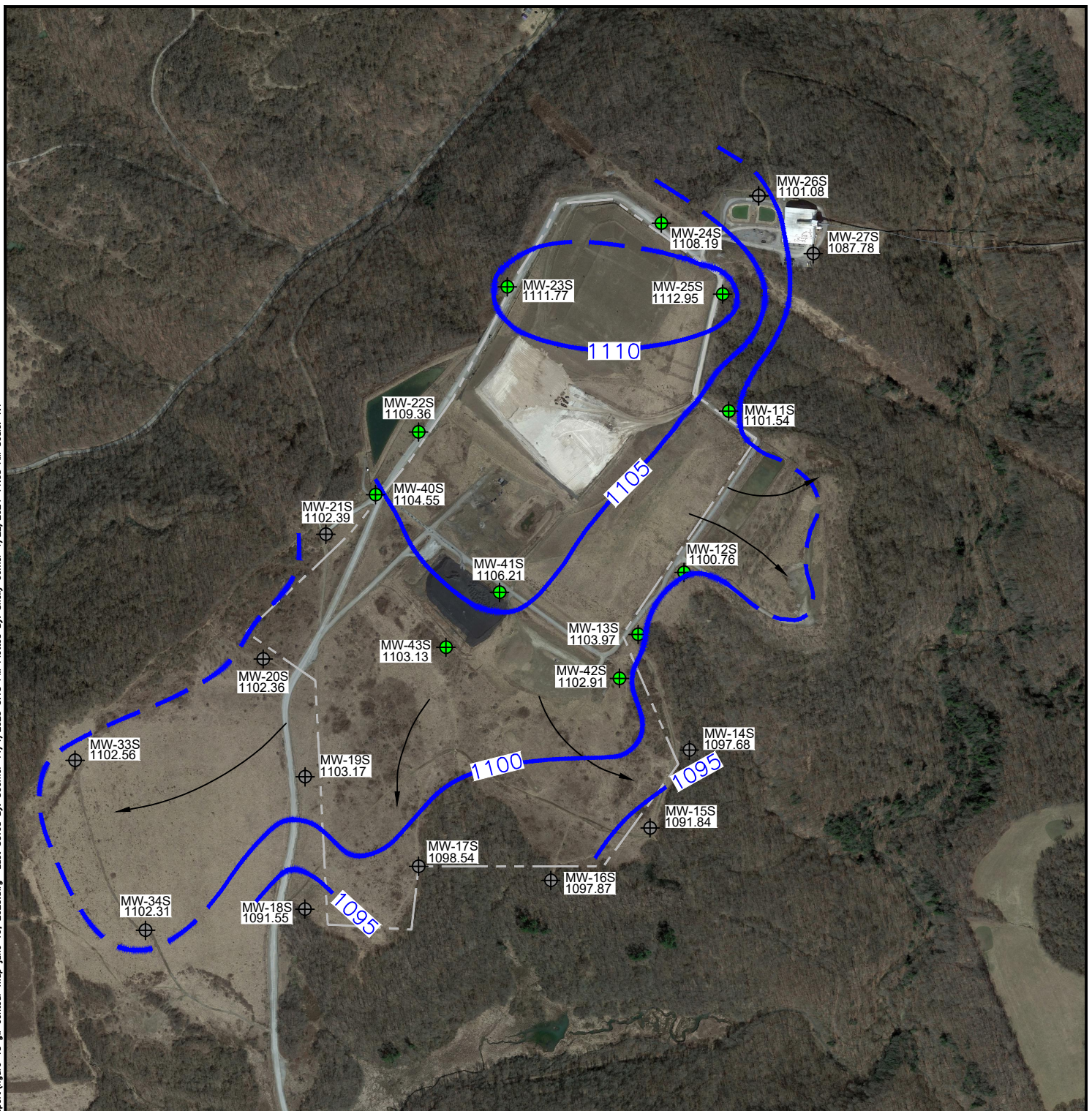
CCR GROUNDWATER MONITORING SYSTEM

PROJECT NO: 22-497  
DRAWING NUMBER  
FIGURE 3

q:\projects\key\_projects\etem\hollow rock landfill\cadd\2023 annual ccr report\figure 3 ccr gw mon sys.dwg Last Saved By: SComer 11/1/2023 9:57 AM Plotted By: Shelly Comer 1/10/2024 6:07 AM Scale: 1:1



q:\projects\key projects\etem\hollow rock landfill\cadd\2023 annual ccr report\figure 4a gw contour map June 19, 2023.dwg Last Saved By: SComer 11/1/2023 3:18 PM Plotted By: Shelly Comer 1/22/2024 11:03 AM Scale: 1:1



## LEGEND

- HRF FACILITY PERMIT BOUNDARY
- CCR PROGRAM WELL
- ⊕ HRF PERMIT WELL
- 1100 — GROUNDWATER CONTOUR (FT, MSL)  
DASHED WHERE INFERRED
- 1110.00 GROUNDWATER ELEVATION JUNE 19, 2023
- GROUNDWATER FLOW DIRECTION



0 800 1600  
FEET

### ETEM REMEDIATION ONE, LLC

DRWN: SCC	DATE: 11/01/23
CHKD: JK	DATE: 11/06/23
APPD: DRF	DATE:
SCALE: AS SHOWN	
ISSUE DATE:	



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200 THIRD AVENUE  
CARNEGIE, PA 15106

2023 ANNUAL CCR REPORT  
HOLLOW ROCK FACILITY  
JEFFERSON COUNTY, OHIO

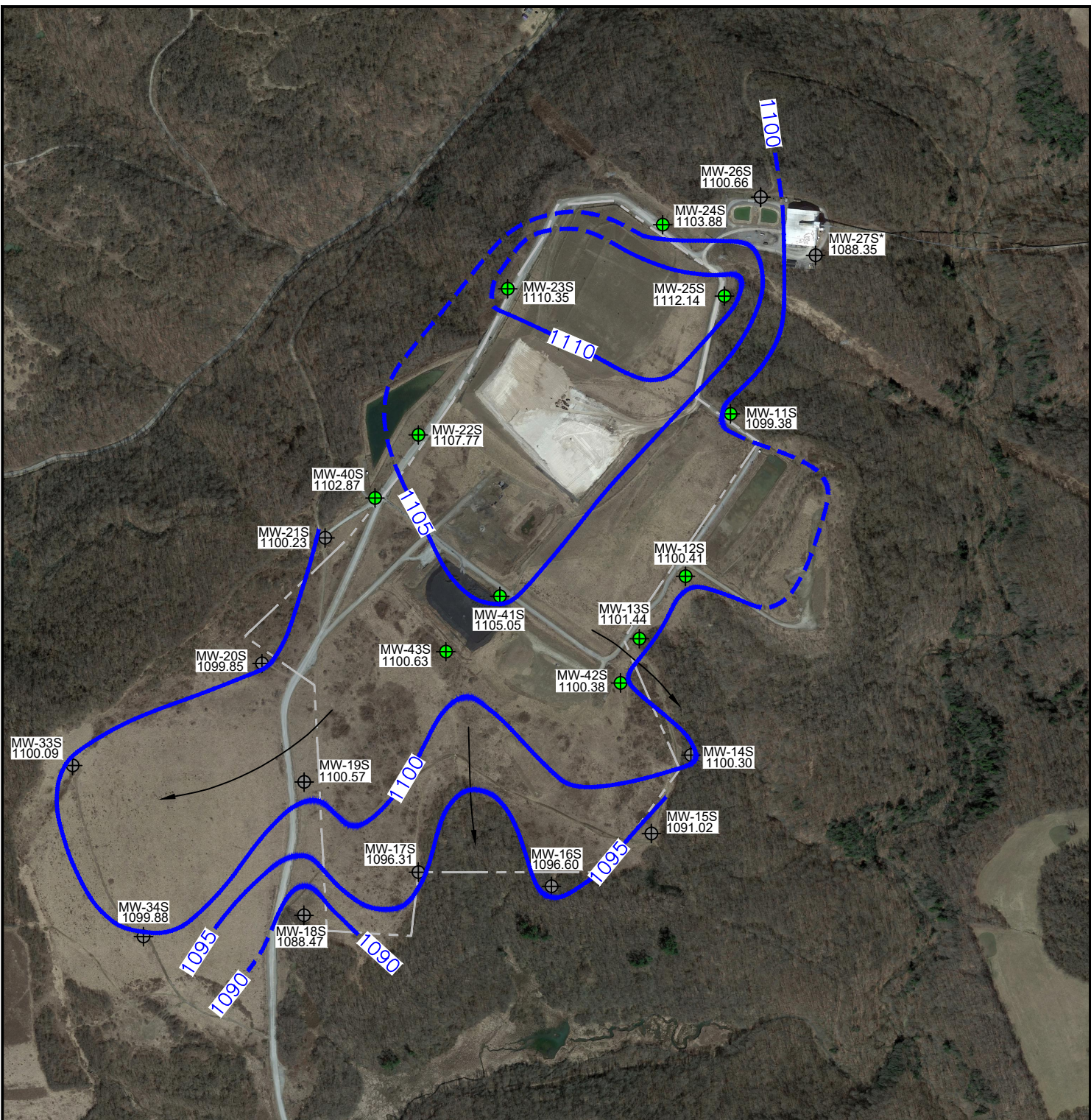
DETECTION MONITORING EVENT 12  
GROUNDWATER ELEVATION CONTOUR MAP  
JUNE 19, 2023

PROJECT NO: 22-497  
DRAWING NUMBER  
FIGURE 4A

REFERENCE:



q:\projects\key projects\etem\hollow rock landfill\cadd\2023 annual ccr report\figure 4b gw contour map october 09, 2023.dwg Last Saved By: SComer 12/19/2023 2:41 PM Plotted By: Shelly Comer 1/10/2024 6:08 AM Scale: 1:1



## LEGEND

- HRF FACILITY PERMIT BOUNDARY
- CCR PROGRAM WELL
- HRF PERMIT WELL
- 1100 GROUNDWATER CONTOUR (FT, MSL)  
DASHED WHERE INFERRED
- 1110.00 GROUNDWATER ELEVATION OCTOBER 09, 2023
- GROUNDWATER FLOW DIRECTION

NOTE:  
\* - WATER LEVEL OMITTED FROM POTENTIOMETRIC INTERPELLATION.

REFERENCE:



0 800 1600  
FEET

### ETEM REMEDIATION ONE, LLC

DRWN: SCC	DATE: 11/03/23
CHKD: RMW	DATE: 11/06/23
APPD: DRF	DATE:
SCALE: AS SHOWN	
ISSUE DATE:	



FIELD & TECHNICAL  
SERVICES, LLC.  
200 THIRD AVENUE  
CARNEGIE, PA 15106

2023 ANNUAL CCR REPORT  
HOLLOW ROCK FACILITY  
JEFFERSON COUNTY, OHIO

DETECTION MONITORING EVENT 13  
GROUNDWATER ELEVATION CONTOUR MAP  
OCTOBER 09, 2023

PROJECT NO: 22-497  
DRAWING NUMBER  
FIGURE 4B

**APPENDIX A**  
**Laboratory Reports**





06-Jul-2023

Cory Portwood  
ERM, Inc.  
800 Cranberry Woods Drive  
Suite 290  
Cranberry Township, PA 16066

Re: **Hollow Rock CCR Spring 2023**

Work Order: **23062083**

Dear Cory,

ALS Environmental received 11 samples on 22-Jun-2023 09:00 AM for the analyses presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental - Holland and for only the analyses requested.

Sample results are compliant with industry accepted practices and Quality Control results achieved laboratory specifications. Any exceptions are noted in the Case Narrative, or noted with qualifiers in the report or QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained from ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

The total number of pages in this report is 33.

If you have any questions regarding this report, please feel free to contact me:

ADDRESS: 3352 128th Avenue, Holland, MI, USA  
PHONE: +1 (616) 399-6070 FAX: +1 (616) 399-6185

Sincerely,

Electronically approved by: Jodi Blouw

Jodi Blouw

### **Report of Laboratory Analysis**

Certificate No: PA: 68-03827

ALS GROUP USA, CORP Part of the ALS Laboratory Group A Campbell Brothers Limited Company

**Client:** ERM, Inc.  
**Project:** Hollow Rock CCR Spring 2023  
**Work Order:** 23062083

**Work Order Sample Summary**

<u>Lab Samp ID</u>	<u>Client Sample ID</u>	<u>Matrix</u>	<u>Tag Number</u>	<u>Collection Date</u>	<u>Date Received</u>	<u>Hold</u>
23062083-01	MW-11S CCR	Groundwater		6/19/2023 12:15	6/22/2023 09:00	<input type="checkbox"/>
23062083-02	MW-12S CCR	Groundwater		6/19/2023 12:00	6/22/2023 09:00	<input type="checkbox"/>
23062083-03	MW-13S CCR	Groundwater		6/19/2023 12:50	6/22/2023 09:00	<input type="checkbox"/>
23062083-04	MW-22S CCR	Groundwater		6/20/2023 09:35	6/22/2023 09:00	<input type="checkbox"/>
23062083-05	MW-23S CCR	Groundwater		6/20/2023 10:20	6/22/2023 09:00	<input type="checkbox"/>
23062083-06	MW-24S CCR	Groundwater		6/20/2023 09:45	6/22/2023 09:00	<input type="checkbox"/>
23062083-07	MW-25S CCR	Groundwater		6/20/2023 11:15	6/22/2023 09:00	<input type="checkbox"/>
23062083-08	MW-40 CCR	Groundwater		6/21/2023 10:30	6/22/2023 09:00	<input type="checkbox"/>
23062083-09	MW-41 CCR	Groundwater		6/21/2023 09:55	6/22/2023 09:00	<input type="checkbox"/>
23062083-10	MW-42 CCR	Groundwater		6/21/2023 09:25	6/22/2023 09:00	<input type="checkbox"/>
23062083-11	MW-43 CCR	Groundwater		6/21/2023 10:30	6/22/2023 09:00	<input type="checkbox"/>



---

**Client:** ERM, Inc.  
**Project:** Hollow Rock CCR Spring 2023  
**WorkOrder:** 23062083

---

**QUALIFIERS,  
ACRONYMS, UNITS**

<b><u>Qualifier</u></b>	<b><u>Description</u></b>
*	Value exceeds Regulatory Limit
**	Estimated Value
a	Analyte is non-accredited
B	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
H	Analyzed outside of Holding Time
Hr	BOD/CBOD - Sample was reset outside Hold Time, value should be considered estimated.
J	Analyte is present at an estimated concentration between the MDL and Report Limit
n	Analyte accreditation is not offered
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL
X	Analyte was detected in the Method Blank between the MDL and Reporting Limit, sample results may exhibit background or reagent contamination at the observed level.

<b><u>Acronym</u></b>	<b><u>Description</u></b>
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
LOD	Limit of Detection (see MDL)
LOQ	Limit of Quantitation (see PQL)
MBLK	Method Blank
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PQL	Practical Quantitation Limit
RPD	Relative Percent Difference
TDL	Target Detection Limit
TNTC	Too Numerous To Count
A	APHA Standard Methods
D	ASTM
E	EPA
SW	SW-846 Update III

<b><u>Units Reported</u></b>	<b><u>Description</u></b>
mg/L	Milligrams per Liter
s.u.	Standard Units

---

**Client:** ERM, Inc.  
**Project:** Hollow Rock CCR Spring 2023  
**Work Order:** 23062083

---

**Case Narrative**

Samples for the above noted Work Order were received on 6/22/2023. The attached "Sample Receipt Checklist" documents the status of custody seals, container integrity, preservation, and temperature compliance.

Samples were analyzed according to the analytical methodology previously transmitted in the "Work Order Acknowledgement". Methodologies are also documented in the "Analytical Result" section for each sample. Quality control results are listed in the "QC Report" section. Sample association for the reported quality control is located at the end of each batch summary. If applicable, results are appropriately qualified in the Analytical Result and QC Report sections. The "Qualifiers" section documents the various qualifiers, units, and acronyms utilized in reporting. A copy of the laboratory's scope of accreditation is available upon request.

With the following exceptions, all sample analyses achieved analytical criteria.

**Metals:**

No deviations or anomalies were noted.

**Wet Chemistry:**

No deviations or anomalies were noted.

# ALS Group, USA

Date: 06-Jul-23

Client: ERM, Inc.

Project: Hollow Rock CCR Spring 2023

Sample ID: MW-11S CCR

Collection Date: 6/19/2023 12:15 PM

Work Order: 23062083

Lab ID: 23062083-01

Matrix: GROUNDWATER

Analyses	Result	Qual	MDL	Report Limit	Units	Dilution Factor	Date Analyzed
<b>PH (FIELD)</b>							
			Method: A4500-H B-11				Analyst: CLJEN
pH (field)	6.47		0		s.u.	1	6/19/2023
<b>METALS BY ICP-MS</b>							
			Method: SW6020B			Prep: SW3015A / 6/29/23	Analyst: STP
Boron	0.038		0.015	0.020	mg/L	1	6/30/2023 12:18
Calcium	490		2.2	5.0	mg/L	10	6/30/2023 12:16
Magnesium	130		0.037	0.20	mg/L	1	6/29/2023 16:07
Potassium	2.6		0.034	0.20	mg/L	1	6/29/2023 16:07
Sodium	13		0.13	0.20	mg/L	1	6/29/2023 16:07
<b>ALKALINITY</b>							
			Method: A2320 B-11				Analyst: CLJ
Alkalinity, Total (as CaCO <sub>3</sub> )	461		8.4	10	mg/L	1	6/23/2023 10:03
<b>ANIONS BY ION CHROMATOGRAPHY</b>							
			Method: SW9056A				Analyst: QTN
Chloride	15.9		0.31	1.0	mg/L	1	6/27/2023 18:51
Fluoride	U		0.067	0.10	mg/L	1	6/27/2023 18:51
Sulfate	1,380		30	160	mg/L	160	6/29/2023 19:29
<b>TOTAL DISSOLVED SOLIDS</b>							
			Method: A2540 C-15			Prep: FILTER / 6/23/23	Analyst: LAD
Total Dissolved Solids	2,300		74	100	mg/L	1	6/27/2023 09:21

**Note:** See Qualifiers page for a list of qualifiers and their definitions.

# ALS Group, USA

Date: 06-Jul-23

Client: ERM, Inc.

Project: Hollow Rock CCR Spring 2023

Sample ID: MW-12S CCR

Collection Date: 6/19/2023 12:00 PM

Work Order: 23062083

Lab ID: 23062083-02

Matrix: GROUNDWATER

Analyses	Result	Qual	MDL	Report Limit	Units	Dilution Factor	Date Analyzed
<b>PH (FIELD)</b>							
			Method: A4500-H B-11				Analyst: CLJEN
pH (field)	6.26		0		s.u.	1	6/19/2023
<b>METALS BY ICP-MS</b>							
			Method: SW6020B				Analyst: STP
					Prep: SW3015A / 6/29/23		
Boron	1.3		0.015	0.020	mg/L	1	6/29/2023 16:43
Calcium	580		2.2	5.0	mg/L	10	6/30/2023 12:23
Magnesium	190		0.037	0.20	mg/L	1	6/29/2023 16:43
Potassium	6.3		0.034	0.20	mg/L	1	6/29/2023 16:43
Sodium	62		0.13	0.20	mg/L	1	6/29/2023 16:43
<b>ALKALINITY</b>							
			Method: A2320 B-11				Analyst: CLJ
Alkalinity, Total (as CaCO3)	405		8.4	10	mg/L	1	6/23/2023 10:03
<b>ANIONS BY ION CHROMATOGRAPHY</b>							
			Method: SW9056A				Analyst: QTN
Chloride	319		50	160	mg/L	160	6/29/2023 19:39
Fluoride	U		0.067	0.10	mg/L	1	6/27/2023 19:01
Sulfate	1,770		30	160	mg/L	160	6/29/2023 19:39
<b>TOTAL DISSOLVED SOLIDS</b>							
			Method: A2540 C-15				Analyst: LAD
					Prep: FILTER / 6/23/23		
Total Dissolved Solids	3,100		110	150	mg/L	1	6/27/2023 09:21

**Note:** See Qualifiers page for a list of qualifiers and their definitions.

# ALS Group, USA

Date: 06-Jul-23

Client: ERM, Inc.

Project: Hollow Rock CCR Spring 2023

Sample ID: MW-13S CCR

Collection Date: 6/19/2023 12:50 PM

Work Order: 23062083

Lab ID: 23062083-03

Matrix: GROUNDWATER

Analyses	Result	Qual	MDL	Report Limit	Units	Dilution Factor	Date Analyzed
<b>PH (FIELD)</b>							
			Method: A4500-H B-11				Analyst: <b>CLIEN</b>
pH (field)	6.17		0		s.u.	1	6/19/2023
<b>METALS BY ICP-MS</b>							
			Method: SW6020B				Analyst: <b>STP</b>
					Prep: SW3015A / 6/29/23		
Boron	0.049		0.015	0.020	mg/L	1	6/29/2023 16:44
Calcium	480		2.2	5.0	mg/L	10	6/30/2023 12:24
Magnesium	130		0.037	0.20	mg/L	1	6/29/2023 16:44
Potassium	5.1		0.034	0.20	mg/L	1	6/29/2023 16:44
Sodium	4.9		0.13	0.20	mg/L	1	6/29/2023 16:44
<b>ALKALINITY</b>							
			Method: A2320 B-11				Analyst: <b>CLJ</b>
Alkalinity, Total (as CaCO3)	532		8.4	10	mg/L	1	6/23/2023 13:44
<b>ANIONS BY ION CHROMATOGRAPHY</b>							
			Method: SW9056A				Analyst: <b>QTN</b>
Chloride	22.1		1.2	4.0	mg/L	4	6/29/2023 19:48
Fluoride	0.225		0.067	0.10	mg/L	1	6/27/2023 19:10
Sulfate	1,210		19	100	mg/L	100	6/29/2023 19:58
<b>TOTAL DISSOLVED SOLIDS</b>							
			Method: A2540 C-15				Analyst: <b>LAD</b>
					Prep: FILTER / 6/23/23		
Total Dissolved Solids	2,200		74	100	mg/L	1	6/27/2023 09:21

**Note:** See Qualifiers page for a list of qualifiers and their definitions.

# ALS Group, USA

Date: 06-Jul-23

Client: ERM, Inc.

Project: Hollow Rock CCR Spring 2023

Sample ID: MW-22S CCR

Collection Date: 6/20/2023 09:35 AM

Work Order: 23062083

Lab ID: 23062083-04

Matrix: GROUNDWATER

Analyses	Result	Qual	MDL	Report Limit	Units	Dilution Factor	Date Analyzed
<b>PH (FIELD)</b>							
			Method: A4500-H B-11				Analyst: CLJEN
pH (field)	6.57		0		s.u.	1	6/20/2023
<b>METALS BY ICP-MS</b>							
			Method: SW6020B			Prep: SW3015A / 6/29/23	Analyst: STP
Boron	0.18		0.015	0.020	mg/L	1	6/29/2023 16:46
Calcium	450		2.2	5.0	mg/L	10	6/30/2023 12:26
Magnesium	180		0.037	0.20	mg/L	1	6/29/2023 16:46
Potassium	4.8		0.034	0.20	mg/L	1	6/29/2023 16:46
Sodium	22		0.13	0.20	mg/L	1	6/29/2023 16:46
<b>ALKALINITY</b>							
			Method: A2320 B-11				Analyst: CLJ
Alkalinity, Total (as CaCO3)	483		8.4	10	mg/L	1	6/23/2023 13:44
<b>ANIONS BY ION CHROMATOGRAPHY</b>							
			Method: SW9056A				Analyst: QTN
Chloride	17.7		0.31	1.0	mg/L	1	6/27/2023 19:40
Fluoride	0.383		0.067	0.10	mg/L	1	6/27/2023 19:40
Sulfate	1,400		30	160	mg/L	160	6/29/2023 20:08
<b>TOTAL DISSOLVED SOLIDS</b>							
			Method: A2540 C-15			Prep: FILTER / 6/23/23	Analyst: LAD
Total Dissolved Solids	24,000		74	100	mg/L	1	6/27/2023 09:21

**Note:** See Qualifiers page for a list of qualifiers and their definitions.

# ALS Group, USA

Date: 06-Jul-23

Client: ERM, Inc.

Project: Hollow Rock CCR Spring 2023

Sample ID: MW-23S CCR

Collection Date: 6/20/2023 10:20 AM

Work Order: 23062083

Lab ID: 23062083-05

Matrix: GROUNDWATER

Analyses	Result	Qual	MDL	Report Limit	Units	Dilution Factor	Date Analyzed
<b>PH (FIELD)</b>							
			Method: A4500-H B-11				Analyst: <b>CLIEN</b>
pH (field)	6.26		0		s.u.	1	6/20/2023
<b>METALS BY ICP-MS</b>							
			Method: SW6020B				Analyst: <b>STP</b>
					Prep: SW3015A / 6/29/23		
Boron	0.24		0.015	0.020	mg/L	1	6/29/2023 16:48
Calcium	380		2.2	5.0	mg/L	10	6/30/2023 12:32
Magnesium	150		0.037	0.20	mg/L	1	6/29/2023 16:48
Potassium	5.3		0.034	0.20	mg/L	1	6/29/2023 16:48
Sodium	11		0.13	0.20	mg/L	1	6/29/2023 16:48
<b>ALKALINITY</b>							
			Method: A2320 B-11				Analyst: <b>CLJ</b>
Alkalinity, Total (as CaCO3)	262		8.4	10	mg/L	1	6/23/2023 13:44
<b>ANIONS BY ION CHROMATOGRAPHY</b>							
			Method: SW9056A				Analyst: <b>QTN</b>
Chloride	17.1		0.31	1.0	mg/L	1	6/27/2023 19:49
Fluoride	0.235		0.067	0.10	mg/L	1	6/27/2023 19:49
Sulfate	1,320		30	160	mg/L	160	6/29/2023 20:18
<b>TOTAL DISSOLVED SOLIDS</b>							
			Method: A2540 C-15				Analyst: <b>LAD</b>
					Prep: FILTER / 6/23/23		
Total Dissolved Solids	2,100		74	100	mg/L	1	6/27/2023 09:21

**Note:** See Qualifiers page for a list of qualifiers and their definitions.



# ALS Group, USA

Date: 06-Jul-23

Client: ERM, Inc.

Project: Hollow Rock CCR Spring 2023

Sample ID: MW-24S CCR

Collection Date: 6/20/2023 09:45 AM

Work Order: 23062083

Lab ID: 23062083-06

Matrix: GROUNDWATER

Analyses	Result	Qual	MDL	Report Limit	Units	Dilution Factor	Date Analyzed
<b>PH (FIELD)</b>							
			Method: A4500-H B-11				Analyst: <b>CLIEN</b>
pH (field)	6.40		0		s.u.	1	6/21/2023
<b>METALS BY ICP-MS</b>							
			Method: SW6020B				Analyst: <b>STP</b>
					Prep: SW3015A / 6/29/23		
Boron	0.10		0.015	0.020	mg/L	1	6/29/2023 16:53
Calcium	400		2.2	5.0	mg/L	10	6/30/2023 12:34
Magnesium	100		0.037	0.20	mg/L	1	6/29/2023 16:53
Potassium	5.9		0.034	0.20	mg/L	1	6/29/2023 16:53
Sodium	4.3		0.13	0.20	mg/L	1	6/29/2023 16:53
<b>ALKALINITY</b>							
			Method: A2320 B-11				Analyst: <b>CLJ</b>
Alkalinity, Total (as CaCO3)	272		8.4	10	mg/L	1	6/23/2023 13:44
<b>ANIONS BY ION CHROMATOGRAPHY</b>							
			Method: SW9056A				Analyst: <b>QTN</b>
Chloride	23.5		1.2	4.0	mg/L	4	6/29/2023 20:47
Fluoride	0.371		0.067	0.10	mg/L	1	6/27/2023 19:59
Sulfate	1,150		30	160	mg/L	160	6/29/2023 20:56
<b>TOTAL DISSOLVED SOLIDS</b>							
			Method: A2540 C-15				Analyst: <b>LAD</b>
					Prep: FILTER / 6/23/23		
Total Dissolved Solids	2,500		74	100	mg/L	1	6/27/2023 09:21

**Note:** See Qualifiers page for a list of qualifiers and their definitions.

# ALS Group, USA

Date: 06-Jul-23

Client: ERM, Inc.

Project: Hollow Rock CCR Spring 2023

Sample ID: MW-25S CCR

Collection Date: 6/20/2023 11:15 AM

Work Order: 23062083

Lab ID: 23062083-07

Matrix: GROUNDWATER

Analyses	Result	Qual	MDL	Report Limit	Units	Dilution Factor	Date Analyzed
<b>PH (FIELD)</b>							
			Method: A4500-H B-11				Analyst: <b>CLIEN</b>
pH (field)	7.08		0		s.u.	1	6/20/2023
<b>METALS BY ICP-MS</b>							
			Method: SW6020B				Analyst: <b>STP</b>
					Prep: SW3015A / 6/29/23		
Boron	0.34		0.015	0.020	mg/L	1	6/29/2023 16:55
Calcium	150		0.22	0.50	mg/L	1	6/29/2023 16:55
Magnesium	50		0.037	0.20	mg/L	1	6/29/2023 16:55
Potassium	5.9		0.034	0.20	mg/L	1	6/29/2023 16:55
Sodium	35		0.13	0.20	mg/L	1	6/29/2023 16:55
<b>ALKALINITY</b>							
			Method: A2320 B-11				Analyst: <b>CLJ</b>
Alkalinity, Total (as CaCO3)	306		8.4	10	mg/L	1	6/23/2023 13:44
<b>ANIONS BY ION CHROMATOGRAPHY</b>							
			Method: SW9056A				Analyst: <b>QTN</b>
Chloride	6.48		0.31	1.0	mg/L	1	6/27/2023 20:09
Fluoride	0.0696	J	0.067	0.10	mg/L	1	6/27/2023 20:09
Sulfate	327		7.6	40	mg/L	40	6/29/2023 21:06
<b>TOTAL DISSOLVED SOLIDS</b>							
			Method: A2540 C-15				Analyst: <b>LAD</b>
					Prep: FILTER / 6/23/23		
Total Dissolved Solids	790		37	50	mg/L	1	6/27/2023 09:21

**Note:** See Qualifiers page for a list of qualifiers and their definitions.

# ALS Group, USA

Date: 06-Jul-23

Client: ERM, Inc.

Project: Hollow Rock CCR Spring 2023

Sample ID: MW-40 CCR

Collection Date: 6/21/2023 10:30 AM

Work Order: 23062083

Lab ID: 23062083-08

Matrix: GROUNDWATER

Analyses	Result	Qual	MDL	Report Limit	Units	Dilution Factor	Date Analyzed
<b>PH (FIELD)</b>							
			Method: A4500-H B-11				Analyst: <b>CLIEN</b>
pH (field)	6.95		0		s.u.	1	6/21/2023
<b>METALS BY ICP-MS</b>							
			Method: SW6020B				Analyst: <b>STP</b>
					Prep: SW3015A / 6/29/23		
Boron	0.14		0.015	0.020	mg/L	1	6/29/2023 16:56
Calcium	260		2.2	5.0	mg/L	10	6/30/2023 13:34
Magnesium	110		0.037	0.20	mg/L	1	6/29/2023 16:56
Potassium	4.1		0.034	0.20	mg/L	1	6/29/2023 16:56
Sodium	30		0.13	0.20	mg/L	1	6/29/2023 16:56
<b>ALKALINITY</b>							
			Method: A2320 B-11				Analyst: <b>CLJ</b>
Alkalinity, Total (as CaCO3)	386		8.4	10	mg/L	1	6/27/2023 13:54
<b>ANIONS BY ION CHROMATOGRAPHY</b>							
			Method: SW9056A				Analyst: <b>QTN</b>
Chloride	9.29		0.31	1.0	mg/L	1	6/27/2023 20:19
Fluoride	0.368		0.067	0.10	mg/L	1	6/27/2023 20:19
Sulfate	710		19	100	mg/L	100	6/29/2023 21:16
<b>TOTAL DISSOLVED SOLIDS</b>							
			Method: A2540 C-15				Analyst: <b>LAD</b>
					Prep: FILTER / 6/23/23		
Total Dissolved Solids	1,500		74	100	mg/L	1	6/27/2023 09:21

**Note:** See Qualifiers page for a list of qualifiers and their definitions.

# ALS Group, USA

Date: 06-Jul-23

Client: ERM, Inc.

Project: Hollow Rock CCR Spring 2023

Sample ID: MW-41 CCR

Collection Date: 6/21/2023 09:55 AM

Work Order: 23062083

Lab ID: 23062083-09

Matrix: GROUNDWATER

Analyses	Result	Qual	MDL	Report Limit	Units	Dilution Factor	Date Analyzed
<b>PH (FIELD)</b>							
			Method: A4500-H B-11				Analyst: <b>CLIEN</b>
pH (field)	6.55		0		s.u.	1	6/21/2023
<b>METALS BY ICP-MS</b>							
			Method: SW6020B				Analyst: <b>STP</b>
					Prep: SW3015A / 6/29/23		
Boron	0.26		0.015	0.020	mg/L	1	6/29/2023 16:58
Calcium	430		2.2	5.0	mg/L	10	6/30/2023 12:37
Magnesium	260		0.37	2.0	mg/L	10	6/30/2023 12:37
Potassium	7.6		0.034	0.20	mg/L	1	6/29/2023 16:58
Sodium	17		0.13	0.20	mg/L	1	6/29/2023 16:58
<b>ALKALINITY</b>							
			Method: A2320 B-11				Analyst: <b>CLJ</b>
Alkalinity, Total (as CaCO3)	520		8.4	10	mg/L	1	6/27/2023 13:54
<b>ANIONS BY ION CHROMATOGRAPHY</b>							
			Method: SW9056A				Analyst: <b>QTN</b>
Chloride	22.5		1.2	4.0	mg/L	4	6/29/2023 21:26
Fluoride	0.301		0.067	0.10	mg/L	1	6/27/2023 20:29
Sulfate	1,650		30	160	mg/L	160	6/29/2023 21:35
<b>TOTAL DISSOLVED SOLIDS</b>							
			Method: A2540 C-15				Analyst: <b>LAD</b>
					Prep: FILTER / 6/23/23		
Total Dissolved Solids	2,500		74	100	mg/L	1	6/27/2023 09:21

**Note:** See Qualifiers page for a list of qualifiers and their definitions.

# ALS Group, USA

Date: 06-Jul-23

Client: ERM, Inc.

Project: Hollow Rock CCR Spring 2023

Sample ID: MW-42 CCR

Collection Date: 6/21/2023 09:25 AM

Work Order: 23062083

Lab ID: 23062083-10

Matrix: GROUNDWATER

Analyses	Result	Qual	MDL	Report Limit	Units	Dilution Factor	Date Analyzed
<b>PH (FIELD)</b>							
			Method: A4500-H B-11				Analyst: <b>CLIEN</b>
pH (field)	6.57		0		s.u.	1	6/21/2023
<b>METALS BY ICP-MS</b>							
			Method: SW6020B				Analyst: <b>STP</b>
					Prep: SW3015A / 6/30/23		
Boron	0.094		0.015	0.020	mg/L	1	6/30/2023 14:55
Calcium	460		2.2	5.0	mg/L	10	6/30/2023 15:53
Magnesium	270		0.37	2.0	mg/L	10	6/30/2023 15:53
Potassium	7.9		0.034	0.20	mg/L	1	6/30/2023 14:55
Sodium	18		0.13	0.20	mg/L	1	6/30/2023 14:55
<b>ALKALINITY</b>							
			Method: A2320 B-11				Analyst: <b>CLJ</b>
Alkalinity, Total (as CaCO3)	598		8.4	10	mg/L	1	6/27/2023 13:54
<b>ANIONS BY ION CHROMATOGRAPHY</b>							
			Method: SW9056A				Analyst: <b>QTN</b>
Chloride	4.76		0.31	1.0	mg/L	1	6/27/2023 20:38
Fluoride	0.249		0.067	0.10	mg/L	1	6/27/2023 20:38
Sulfate	1,810		30	160	mg/L	160	6/29/2023 21:45
<b>TOTAL DISSOLVED SOLIDS</b>							
			Method: A2540 C-15				Analyst: <b>LAD</b>
					Prep: FILTER / 6/23/23		
Total Dissolved Solids	2,800		110	150	mg/L	1	6/27/2023 09:19

**Note:** See Qualifiers page for a list of qualifiers and their definitions.

# ALS Group, USA

Date: 06-Jul-23

Client: ERM, Inc.

Project: Hollow Rock CCR Spring 2023

Sample ID: MW-43 CCR

Collection Date: 6/21/2023 10:30 AM

Work Order: 23062083

Lab ID: 23062083-11

Matrix: GROUNDWATER

Analyses	Result	Qual	MDL	Report Limit	Units	Dilution Factor	Date Analyzed
<b>PH (FIELD)</b>							
			Method: A4500-H B-11				Analyst: <b>CLIEN</b>
pH (field)	6.53		0		s.u.	1	6/21/2023
<b>METALS BY ICP-MS</b>							
			Method: SW6020B				Analyst: <b>STP</b>
					Prep: SW3015A / 6/30/23		
Boron	0.30		0.015	0.020	mg/L	1	6/30/2023 14:56
Calcium	470		2.2	5.0	mg/L	10	6/30/2023 15:54
Magnesium	280		0.37	2.0	mg/L	10	6/30/2023 15:54
Potassium	8.8		0.034	0.20	mg/L	1	6/30/2023 14:56
Sodium	20		0.13	0.20	mg/L	1	6/30/2023 14:56
<b>ALKALINITY</b>							
			Method: A2320 B-11				Analyst: <b>CLJ</b>
Alkalinity, Total (as CaCO3)	574		8.4	10	mg/L	1	6/27/2023 13:54
<b>ANIONS BY ION CHROMATOGRAPHY</b>							
			Method: SW9056A				Analyst: <b>QTN</b>
Chloride	19.0		0.31	1.0	mg/L	1	6/27/2023 20:48
Fluoride	0.238		0.067	0.10	mg/L	1	6/27/2023 20:48
Sulfate	1,820		30	160	mg/L	160	6/29/2023 21:55
<b>TOTAL DISSOLVED SOLIDS</b>							
			Method: A2540 C-15				Analyst: <b>LAD</b>
					Prep: FILTER / 6/23/23		
Total Dissolved Solids	2,800		110	150	mg/L	1	6/27/2023 09:19

**Note:** See Qualifiers page for a list of qualifiers and their definitions.

## ALS Group, USA

Date: 06-Jul-23

Client: ERM, Inc.

Work Order: 23062083

Project: Hollow Rock CCR Spring 2023

## QC BATCH REPORT

Batch ID: 219075 Instrument ID ICPMS3 Method: SW6020B

MBLK		Sample ID: MBLK-219075-219075				Units: mg/L		Analysis Date: 6/29/2023 03:54 PM			
Client ID:		Run ID: ICPMS3_230629A				SeqNo: 9718880		Prep Date: 6/29/2023		DF: 1	
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Calcium	U	0.22	0.50								
Magnesium	U	0.037	0.20								
Potassium	U	0.034	0.20								
Sodium	U	0.13	0.20								

MBLK		Sample ID: MBLK-219075-219075				Units: mg/L		Analysis Date: 6/30/2023 12:11 PM			
Client ID:		Run ID: ICPMS3_230630A				SeqNo: 9721674		Prep Date: 6/29/2023		DF: 1	
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Boron	U	0.015	0.020								

LCS		Sample ID: LCS-219075-219075				Units: mg/L		Analysis Date: 6/29/2023 03:55 PM			
Client ID:		Run ID: ICPMS3_230629A				SeqNo: 9718881		Prep Date: 6/29/2023		DF: 1	
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Calcium	10.11	0.22	0.50	10	0	101	80-120	0			
Magnesium	10.4	0.037	0.20	10	0	104	80-120	0			
Potassium	10.19	0.034	0.20	10	0	102	80-120	0			
Sodium	10.33	0.13	0.20	10	0	103	80-120	0			

LCS		Sample ID: LCS-219075-219075				Units: mg/L		Analysis Date: 6/30/2023 12:13 PM			
Client ID:		Run ID: ICPMS3_230630A				SeqNo: 9721675		Prep Date: 6/29/2023		DF: 1	
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Boron	0.489	0.015	0.020	0.5	0	97.8	80-120	0			

MS		Sample ID: 23062086-01CMS				Units: mg/L		Analysis Date: 6/29/2023 04:13 PM			
Client ID:		Run ID: ICPMS3_230629A				SeqNo: 9718892		Prep Date: 6/29/2023		DF: 1	
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Boron	0.5316	0.015	0.020	0.5	0.03507	99.3	75-125	0			
Calcium	11.87	0.22	0.50	10	1.755	101	75-125	0			
Magnesium	12.79	0.037	0.20	10	2.408	104	75-125	0			
Potassium	10.81	0.034	0.20	10	0.5464	103	75-125	0			
Sodium	21.15	0.13	0.20	10	11.29	98.6	75-125	0			

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: ERM, Inc.  
Work Order: 23062083  
Project: Hollow Rock CCR Spring 2023

QC BATCH REPORT

Batch ID: 219075      Instrument ID ICPMS3      Method: SW6020B

MSD		Sample ID: 23062086-01CMSD				Units: mg/L		Analysis Date: 6/29/2023 04:15 PM			
Client ID:		Run ID: ICPMS3_230629A				SeqNo: 9718893		Prep Date: 6/29/2023		DF: 1	
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Boron	0.554	0.015	0.020	0.5	0.03507	104	75-125	0.5316	4.14	20	
Calcium	12.15	0.22	0.50	10	1.755	104	75-125	11.87	2.36	20	
Magnesium	13.15	0.037	0.20	10	2.408	107	75-125	12.79	2.74	20	
Potassium	10.97	0.034	0.20	10	0.5464	104	75-125	10.81	1.46	20	
Sodium	21.15	0.13	0.20	10	11.29	98.6	75-125	21.15	0.0232	20	

The following samples were analyzed in this batch: 23062083-01C

Note: See Qualifiers Page for a list of Qualifiers and their explanation.



Client: ERM, Inc.  
 Work Order: 23062083  
 Project: Hollow Rock CCR Spring 2023

## QC BATCH REPORT

Batch ID: **219080** Instrument ID **ICPMS3** Method: **SW6020B**

<b>MBLK</b>		Sample ID: <b>MBLK-219080-219080</b>				Units: <b>mg/L</b>		Analysis Date: <b>6/29/2023 04:39 PM</b>			
Client ID:		Run ID: <b>ICPMS3_230629A</b>				SeqNo: <b>9718908</b>		Prep Date: <b>6/29/2023</b>		DF: <b>1</b>	
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Boron	U	0.015	0.020								
Calcium	U	0.22	0.50								
Magnesium	U	0.037	0.20								
Potassium	U	0.034	0.20								

<b>MBLK</b>		Sample ID: <b>MBLK-219080-219080</b>				Units: <b>mg/L</b>		Analysis Date: <b>6/30/2023 12:31 PM</b>			
Client ID:		Run ID: <b>ICPMS3_230630A</b>				SeqNo: <b>9721686</b>		Prep Date: <b>6/29/2023</b>		DF: <b>1</b>	
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Sodium	U	0.13	0.20								

<b>LCS</b>		Sample ID: <b>LCS-219080-219080</b>				Units: <b>mg/L</b>		Analysis Date: <b>6/29/2023 04:41 PM</b>			
Client ID:		Run ID: <b>ICPMS3_230629A</b>				SeqNo: <b>9718909</b>		Prep Date: <b>6/29/2023</b>		DF: <b>1</b>	
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Boron	0.5265	0.015	0.020	0.5	0	105	80-120	0			
Calcium	10.58	0.22	0.50	10	0	106	80-120	0			
Magnesium	10.58	0.037	0.20	10	0	106	80-120	0			
Potassium	10.51	0.034	0.20	10	0	105	80-120	0			
Sodium	10.8	0.13	0.20	10	0	108	80-120	0			

<b>MS</b>		Sample ID: <b>23062476-04CMS</b>				Units: <b>mg/L</b>		Analysis Date: <b>6/29/2023 05:20 PM</b>			
Client ID:		Run ID: <b>ICPMS3_230629A</b>				SeqNo: <b>9718932</b>		Prep Date: <b>6/29/2023</b>		DF: <b>1</b>	
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Calcium	159.8	0.22	0.50	10	156.6	31	75-125	0			SO
Magnesium	93.55	0.037	0.20	10	87.99	55.5	75-125	0			SO
Potassium	25.03	0.034	0.20	10	15.64	94	75-125	0			
Sodium	190.4	0.13	0.20	10	188	23.7	75-125	0			SO

<b>MS</b>		Sample ID: <b>23062476-04CMS</b>				Units: <b>mg/L</b>		Analysis Date: <b>6/30/2023 12:44 PM</b>			
Client ID:		Run ID: <b>ICPMS3_230630A</b>				SeqNo: <b>9721694</b>		Prep Date: <b>6/29/2023</b>		DF: <b>10</b>	
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Boron	1.023	0.15	0.20	0.5	0.6057	83.5	75-125	0			

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.

**Client:** ERM, Inc.  
**Work Order:** 23062083  
**Project:** Hollow Rock CCR Spring 2023

## QC BATCH REPORT

Batch ID: **219080**      Instrument ID **ICPMS3**      Method: **SW6020B**

MSD					Units: mg/L			Analysis Date: 6/29/2023 05:22 PM			
Sample ID: 23062476-04CMSD											
Client ID:		Run ID: ICPMS3_230629A			SeqNo: 9718933		Prep Date: 6/29/2023		DF: 1		
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Calcium	160.6	0.22	0.50	10	156.6	39.3	75-125	159.8	0.513	20	SO
Magnesium	94.04	0.037	0.20	10	87.99	60.5	75-125	93.55	0.526	20	SO
Potassium	24.94	0.034	0.20	10	15.64	93	75-125	25.03	0.386	20	
Sodium	189.3	0.13	0.20	10	188	12.3	75-125	190.4	0.601	20	SO

MSD					Units: mg/L			Analysis Date: 6/30/2023 12:45 PM			
Sample ID: 23062476-04CMSD											
Client ID:		Run ID: ICPMS3_230630A			SeqNo: 9721695		Prep Date: 6/29/2023		DF: 10		
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Boron	1.029	0.15	0.20	0.5	0.6057	84.6	75-125	1.023	0.551	20	

The following samples were analyzed in this batch:

23062083-02C	23062083-03C	23062083-04C
23062083-05C	23062083-06C	23062083-07C
23062083-08C	23062083-09C	

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.

Client: ERM, Inc.  
 Work Order: 23062083  
 Project: Hollow Rock CCR Spring 2023

## QC BATCH REPORT

Batch ID: **219151** Instrument ID **ICPMS3** Method: **SW6020B**

MBLK		Sample ID: <b>MBLK-219151-219151</b>				Units: <b>mg/L</b>		Analysis Date: <b>6/30/2023 02:52 PM</b>			
Client ID:		Run ID: <b>ICPMS3_230630A</b>				SeqNo: <b>9722733</b>		Prep Date: <b>6/30/2023</b>		DF: <b>1</b>	
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Boron	U	0.015	0.020								
Calcium	U	0.22	0.50								
Magnesium	U	0.037	0.20								
Potassium	U	0.034	0.20								
Sodium	U	0.13	0.20								

LCS		Sample ID: <b>LCS-219151-219151</b>				Units: <b>mg/L</b>		Analysis Date: <b>6/30/2023 02:53 PM</b>			
Client ID:		Run ID: <b>ICPMS3_230630A</b>				SeqNo: <b>9722734</b>		Prep Date: <b>6/30/2023</b>		DF: <b>1</b>	
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Boron	0.4685	0.015	0.020	0.5	0	93.7	80-120	0			
Calcium	9.93	0.22	0.50	10	0	99.3	80-120	0			
Magnesium	10.32	0.037	0.20	10	0	103	80-120	0			
Potassium	10.02	0.034	0.20	10	0	100	80-120	0			
Sodium	10.26	0.13	0.20	10	0	103	80-120	0			

MS		Sample ID: <b>23062308-01CMS</b>				Units: <b>mg/L</b>		Analysis Date: <b>6/30/2023 03:15 PM</b>			
Client ID:		Run ID: <b>ICPMS3_230630A</b>				SeqNo: <b>9722747</b>		Prep Date: <b>6/30/2023</b>		DF: <b>1</b>	
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Boron	0.5121	0.015	0.020	0.5	0.02257	97.9	75-125	0			
Calcium	16.62	0.22	0.50	10	6.76	98.6	75-125	0			
Magnesium	16.86	0.037	0.20	10	6.613	102	75-125	0			
Potassium	10.8	0.034	0.20	10	0.422	104	75-125	0			
Sodium	12.8	0.13	0.20	10	2.489	103	75-125	0			

MSD		Sample ID: <b>23062308-01CMSD</b>				Units: <b>mg/L</b>		Analysis Date: <b>6/30/2023 03:17 PM</b>			
Client ID:		Run ID: <b>ICPMS3_230630A</b>				SeqNo: <b>9722748</b>		Prep Date: <b>6/30/2023</b>		DF: <b>1</b>	
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Boron	0.4988	0.015	0.020	0.5	0.02257	95.2	75-125	0.5121	2.65	20	
Calcium	16.28	0.22	0.50	10	6.76	95.2	75-125	16.62	2.06	20	
Magnesium	16.26	0.037	0.20	10	6.613	96.5	75-125	16.86	3.62	20	
Potassium	10.15	0.034	0.20	10	0.422	97.3	75-125	10.8	6.16	20	
Sodium	12.23	0.13	0.20	10	2.489	97.4	75-125	12.8	4.58	20	

The following samples were analyzed in this batch: 23062083-10C 23062083-11C

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

**Client:** ERM, Inc.  
**Work Order:** 23062083  
**Project:** Hollow Rock CCR Spring 2023

## QC BATCH REPORT

Batch ID: **218738**      Instrument ID **TDS**      Method: **A2540 C-15**

<b>MBLK</b>		Sample ID: <b>MBLK-218738-218738</b>				Units: <b>mg/L</b>		Analysis Date: <b>6/27/2023 09:21 AM</b>			
Client ID:		Run ID: <b>TDS_230627B</b>				SeqNo: <b>9704338</b>		Prep Date: <b>6/23/2023</b>		DF: <b>1</b>	
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Solids	U	22	30								

<b>LCS</b>		Sample ID: <b>LCS-218738-218738</b>				Units: <b>mg/L</b>		Analysis Date: <b>6/27/2023 09:21 AM</b>			
Client ID:		Run ID: <b>TDS_230627B</b>				SeqNo: <b>9704337</b>		Prep Date: <b>6/23/2023</b>		DF: <b>1</b>	
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Solids	500	22	30	495	0	101	85-109	0			

<b>DUP</b>		Sample ID: <b>23062077-09B DUP</b>				Units: <b>mg/L</b>		Analysis Date: <b>6/27/2023 09:21 AM</b>			
Client ID:		Run ID: <b>TDS_230627B</b>				SeqNo: <b>9704316</b>		Prep Date: <b>6/23/2023</b>		DF: <b>1</b>	
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Solids	2607	74	100	0	0	0	0-0	2540	2.59	10	

<b>DUP</b>		Sample ID: <b>23062077-07B DUP</b>				Units: <b>mg/L</b>		Analysis Date: <b>6/27/2023 09:21 AM</b>			
Client ID:		Run ID: <b>TDS_230627B</b>				SeqNo: <b>9704324</b>		Prep Date: <b>6/23/2023</b>		DF: <b>1</b>	
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Solids	2033	74	100	0	0	0	0-0	2060	1.3	10	

The following samples were analyzed in this batch:

23062083-01B	23062083-02B	23062083-03B
23062083-04B	23062083-05B	23062083-06B
23062083-07B	23062083-08B	23062083-09B

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.

**Client:** ERM, Inc.  
**Work Order:** 23062083  
**Project:** Hollow Rock CCR Spring 2023

## QC BATCH REPORT

Batch ID: **218753**      Instrument ID **TDS**      Method: **A2540 C-15**

<b>MBLK</b>		Sample ID: <b>MBLK-218753-218753</b>				Units: <b>mg/L</b>		Analysis Date: <b>6/27/2023 09:19 AM</b>			
Client ID:		Run ID: <b>TDS_230627C</b>				SeqNo: <b>9704409</b>		Prep Date: <b>6/23/2023</b>		DF: <b>1</b>	
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Solids	U	22	30								

<b>LCS</b>		Sample ID: <b>LCS-218753-218753</b>				Units: <b>mg/L</b>		Analysis Date: <b>6/27/2023 09:19 AM</b>			
Client ID:		Run ID: <b>TDS_230627C</b>				SeqNo: <b>9704408</b>		Prep Date: <b>6/23/2023</b>		DF: <b>1</b>	
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Solids	482	22	30	495	0	97.4	85-109	0			

<b>DUP</b>		Sample ID: <b>23062171-01B DUP</b>				Units: <b>mg/L</b>		Analysis Date: <b>6/27/2023 09:19 AM</b>			
Client ID:		Run ID: <b>TDS_230627C</b>				SeqNo: <b>9704405</b>		Prep Date: <b>6/23/2023</b>		DF: <b>1</b>	
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Solids	3190	110	150	0	0	0	0-0	3230	1.25	10	

The following samples were analyzed in this batch:

23062083-10B      23062083-11B

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.

**Client:** ERM, Inc.  
**Work Order:** 23062083  
**Project:** Hollow Rock CCR Spring 2023

## QC BATCH REPORT

Batch ID: **R375032**      Instrument ID **Titration 1**      Method: **A2320 B-11**

<b>MBLK</b>		Sample ID: <b>MB-R375032-R375032</b>				Units: <b>mg/L</b>		Analysis Date: <b>6/23/2023 10:03 AM</b>			
Client ID:		Run ID: <b>TITRATOR 1_230623A</b>				SeqNo: <b>9694249</b>		Prep Date:		DF: <b>1</b>	
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Alkalinity, Total (as CaCO <sub>3</sub> )	U	8.4	10								

<b>LCS</b>		Sample ID: <b>LCS-R375032-R375032</b>				Units: <b>mg/L</b>		Analysis Date: <b>6/23/2023 10:03 AM</b>			
Client ID:		Run ID: <b>TITRATOR 1_230623A</b>				SeqNo: <b>9694250</b>		Prep Date:		DF: <b>1</b>	
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Alkalinity, Total (as CaCO <sub>3</sub> )	940.8	8.4	10	1000	0	94.1	90-110	0			

<b>DUP</b>		Sample ID: <b>23062077-01B DUP</b>				Units: <b>mg/L</b>		Analysis Date: <b>6/23/2023 10:03 AM</b>			
Client ID:		Run ID: <b>TITRATOR 1_230623A</b>				SeqNo: <b>9694252</b>		Prep Date:		DF: <b>1</b>	
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Alkalinity, Total (as CaCO <sub>3</sub> )	462.4	8.4	10	0	0	0	0-0	461	0.299	10	

<b>DUP</b>		Sample ID: <b>23062077-11B DUP</b>				Units: <b>mg/L</b>		Analysis Date: <b>6/23/2023 10:03 AM</b>			
Client ID:		Run ID: <b>TITRATOR 1_230623A</b>				SeqNo: <b>9694263</b>		Prep Date:		DF: <b>1</b>	
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Alkalinity, Total (as CaCO <sub>3</sub> )	396.2	8.4	10	0	0	0	0-0	409.3	3.25	10	

The following samples were analyzed in this batch:

23062083-01A      23062083-02A

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.

**Client:** ERM, Inc.  
**Work Order:** 23062083  
**Project:** Hollow Rock CCR Spring 2023

## QC BATCH REPORT

Batch ID: **R375078** Instrument ID **Titration 1** Method: **A2320 B-11**

<b>MBLK</b>		Sample ID: <b>MB-R375078-R375078</b>				Units: <b>mg/L</b>		Analysis Date: <b>6/23/2023 01:44 PM</b>			
Client ID:		Run ID: <b>TITRATOR 1_230623B</b>				SeqNo: <b>9696141</b>		Prep Date:		DF: <b>1</b>	
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Alkalinity, Total (as CaCO3)	U	8.4	10								

<b>LCS</b>		Sample ID: <b>LCS-R375078-R375078</b>				Units: <b>mg/L</b>		Analysis Date: <b>6/23/2023 01:44 PM</b>			
Client ID:		Run ID: <b>TITRATOR 1_230623B</b>				SeqNo: <b>9696142</b>		Prep Date:		DF: <b>1</b>	
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Alkalinity, Total (as CaCO3)	941.9	8.4	10	1000	0	94.2	90-110	0			

<b>DUP</b>		Sample ID: <b>23062083-03A DUP</b>				Units: <b>mg/L</b>		Analysis Date: <b>6/23/2023 01:44 PM</b>			
Client ID: <b>MW-13S CCR</b>		Run ID: <b>TITRATOR 1_230623B</b>				SeqNo: <b>9696147</b>		Prep Date:		DF: <b>1</b>	
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Alkalinity, Total (as CaCO3)	535.2	8.4	10	0	0	0	0-0	532.3	0.555	10	

The following samples were analyzed in this batch:

23062083-03A	23062083-04A	23062083-05A
23062083-06A	23062083-07A	

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.

**Client:** ERM, Inc.  
**Work Order:** 23062083  
**Project:** Hollow Rock CCR Spring 2023

## QC BATCH REPORT

Batch ID: **R375315**      Instrument ID **Titration 1**      Method: **A2320 B-11**

<b>MBLK</b>		Sample ID: <b>MB-R375315-R375315</b>				Units: <b>mg/L</b>		Analysis Date: <b>6/27/2023 01:54 PM</b>			
Client ID:		Run ID: <b>TITRATOR 1_230627B</b>				SeqNo: <b>9707787</b>		Prep Date:		DF: <b>1</b>	
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Alkalinity, Total (as CaCO <sub>3</sub> )	U	8.4	10								

<b>LCS</b>		Sample ID: <b>LCS-R375315-R375315</b>				Units: <b>mg/L</b>		Analysis Date: <b>6/27/2023 01:54 PM</b>			
Client ID:		Run ID: <b>TITRATOR 1_230627B</b>				SeqNo: <b>9707788</b>		Prep Date:		DF: <b>1</b>	
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Alkalinity, Total (as CaCO <sub>3</sub> )	951.4	8.4	10	1000	0	95.1	90-110	0			

<b>DUP</b>		Sample ID: <b>23062083-08B DUP</b>				Units: <b>mg/L</b>		Analysis Date: <b>6/27/2023 01:54 PM</b>			
Client ID: <b>MW-40 CCR</b>		Run ID: <b>TITRATOR 1_230627B</b>				SeqNo: <b>9707790</b>		Prep Date:		DF: <b>1</b>	
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Alkalinity, Total (as CaCO <sub>3</sub> )	390.6	8.4	10	0	0	0	0-0	386.5	1.07	10	

<b>DUP</b>		Sample ID: <b>23062318-15A DUP</b>				Units: <b>mg/L</b>		Analysis Date: <b>6/27/2023 01:54 PM</b>			
Client ID:		Run ID: <b>TITRATOR 1_230627B</b>				SeqNo: <b>9707801</b>		Prep Date:		DF: <b>1</b>	
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Alkalinity, Total (as CaCO <sub>3</sub> )	214.2	8.4	10	0	0	0	0-0	211.6	1.22	10	

The following samples were analyzed in this batch:

23062083-08B	23062083-09B	23062083-10B
23062083-11B		

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.



Client: ERM, Inc.  
 Work Order: 23062083  
 Project: Hollow Rock CCR Spring 2023

## QC BATCH REPORT

Batch ID: **R375372A** Instrument ID **IC4** Method: **SW9056A**

MBLK				Sample ID: <b>CCB/MBLK-A-R375372A</b>				Units: <b>mg/L</b>		Analysis Date: <b>6/27/2023 11:44 AM</b>		
Client ID:				Run ID: <b>IC4_230627A</b>				SeqNo: <b>9710995</b>		Prep Date:		DF: <b>1</b>
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Chloride	U	0.31	1.0									
Fluoride	U	0.067	0.10									

MBLK				Sample ID: <b>CCB/MBLK-B-R375372A</b>				Units: <b>mg/L</b>		Analysis Date: <b>6/27/2023 07:30 PM</b>		
Client ID:				Run ID: <b>IC4_230627A</b>				SeqNo: <b>9711007</b>		Prep Date:		DF: <b>1</b>
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Chloride	U	0.31	1.0									
Fluoride	0.0708	0.067	0.10								J	

MBLK				Sample ID: <b>CCB/MBLK-C-R375372A</b>				Units: <b>mg/L</b>		Analysis Date: <b>6/27/2023 09:27 PM</b>		
Client ID:				Run ID: <b>IC4_230627A</b>				SeqNo: <b>9711019</b>		Prep Date:		DF: <b>1</b>
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Chloride	U	0.31	1.0									
Fluoride	U	0.067	0.10									

LCS				Sample ID: <b>MLCCV/LCS-A-R375372A</b>				Units: <b>mg/L</b>		Analysis Date: <b>6/27/2023 11:34 AM</b>		
Client ID:				Run ID: <b>IC4_230627A</b>				SeqNo: <b>9710994</b>		Prep Date:		DF: <b>1</b>
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Chloride	10.01	0.31	1.0	10	0	100	88-110	0				
Fluoride	2.041	0.067	0.10	2	0	102	86-121	0				

LCS				Sample ID: <b>MLCCV/LCS-B-R375372A</b>				Units: <b>mg/L</b>		Analysis Date: <b>6/27/2023 07:20 PM</b>		
Client ID:				Run ID: <b>IC4_230627A</b>				SeqNo: <b>9711006</b>		Prep Date:		DF: <b>1</b>
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Chloride	9.851	0.31	1.0	10	0	98.5	88-110	0				
Fluoride	2.098	0.067	0.10	2	0	105	86-121	0				

LCS				Sample ID: <b>MLCCV/LCS-C-R375372A</b>				Units: <b>mg/L</b>		Analysis Date: <b>6/27/2023 09:17 PM</b>		
Client ID:				Run ID: <b>IC4_230627A</b>				SeqNo: <b>9711018</b>		Prep Date:		DF: <b>1</b>
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Chloride	9.938	0.31	1.0	10	0	99.4	88-110	0				
Fluoride	1.906	0.067	0.10	2	0	95.3	86-121	0				

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.

**Client:** ERM, Inc.  
**Work Order:** 23062083  
**Project:** Hollow Rock CCR Spring 2023

## QC BATCH REPORT

Batch ID: **R375372A**      Instrument ID **IC4**      Method: **SW9056A**

MS					Units: mg/L		Analysis Date: 6/27/2023 06:12 PM				
Sample ID: 23062077-18B MS											
Client ID:					Run ID: IC4_230627A		SeqNo: 9710999		Prep Date:		DF: 160
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	1561	50	160	1600	0	97.6	88-110	0			
Fluoride	331.2	11	16	320	0	103	86-121	0			

MSD					Units: mg/L		Analysis Date: 6/27/2023 06:22 PM				
Sample ID: 23062077-18B MSD											
Client ID:					Run ID: IC4_230627A		SeqNo: 9711000		Prep Date:		DF: 160
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	1563	50	160	1600	0	97.7	88-110	1561	0.104	15	
Fluoride	329.3	11	16	320	0	103	86-121	331.2	0.562	15	

The following samples were analyzed in this batch:

23062083-01A	23062083-02A	23062083-03A
23062083-04A	23062083-05A	23062083-06A
23062083-07A	23062083-08B	23062083-09B
23062083-10B	23062083-11B	

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.

Client: ERM, Inc.  
 Work Order: 23062083  
 Project: Hollow Rock CCR Spring 2023

## QC BATCH REPORT

Batch ID: **R375592B** Instrument ID **IC4** Method: **SW9056A**

MBLK				Sample ID: <b>CCB/MBLK-D-R375592B</b>				Units: <b>mg/L</b>		Analysis Date: <b>6/29/2023 06:40 PM</b>		
Client ID:				Run ID: <b>IC4_230629A</b>				SeqNo: <b>9720710</b>		Prep Date:		DF: <b>1</b>
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Chloride	U	0.31	1.0									
Sulfate	U	0.19	1.0									

MBLK				Sample ID: <b>CCB/MBLK-E-R375592B</b>				Units: <b>mg/L</b>		Analysis Date: <b>6/29/2023 08:37 PM</b>		
Client ID:				Run ID: <b>IC4_230629A</b>				SeqNo: <b>9720722</b>		Prep Date:		DF: <b>1</b>
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Chloride	U	0.31	1.0									
Sulfate	U	0.19	1.0									

MBLK				Sample ID: <b>CCB/MBLK-F-R375592B</b>				Units: <b>mg/L</b>		Analysis Date: <b>6/29/2023 10:34 PM</b>		
Client ID:				Run ID: <b>IC4_230629A</b>				SeqNo: <b>9720734</b>		Prep Date:		DF: <b>1</b>
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Chloride	U	0.31	1.0									
Sulfate	U	0.19	1.0									

LCS				Sample ID: <b>MLCCV/LCS-D-R375592B</b>				Units: <b>mg/L</b>		Analysis Date: <b>6/29/2023 06:30 PM</b>		
Client ID:				Run ID: <b>IC4_230629A</b>				SeqNo: <b>9720709</b>		Prep Date:		DF: <b>1</b>
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Chloride	9.843	0.31	1.0	10	0	98.4	88-110	0				
Sulfate	10.02	0.19	1.0	10	0	100	90-110	0				

LCS				Sample ID: <b>MLCCV/LCS-E-R375592B</b>				Units: <b>mg/L</b>		Analysis Date: <b>6/29/2023 08:27 PM</b>		
Client ID:				Run ID: <b>IC4_230629A</b>				SeqNo: <b>9720721</b>		Prep Date:		DF: <b>1</b>
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Chloride	9.808	0.31	1.0	10	0	98.1	88-110	0				
Sulfate	9.915	0.19	1.0	10	0	99.2	90-110	0				

LCS				Sample ID: <b>MLCCV/LCS-F-R375592B</b>				Units: <b>mg/L</b>		Analysis Date: <b>6/29/2023 10:24 PM</b>		
Client ID:				Run ID: <b>IC4_230629A</b>				SeqNo: <b>9720733</b>		Prep Date:		DF: <b>1</b>
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Chloride	9.816	0.31	1.0	10	0	98.2	88-110	0				
Sulfate	10.1	0.19	1.0	10	0	101	90-110	0				

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.

**Client:** ERM, Inc.  
**Work Order:** 23062083  
**Project:** Hollow Rock CCR Spring 2023

## QC BATCH REPORT

Batch ID: **R375592B**      Instrument ID **IC4**      Method: **SW9056A**

MS					Units: mg/L		Analysis Date: 6/29/2023 07:00 PM				
Sample ID: 23061894-01B MS											
Client ID:		Run ID: IC4_230629A			SeqNo: 9720712		Prep Date:		DF: 40		
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	931.5	12	40	400	501	108	88-110	0			E
Sulfate	490.9	7.6	40	400	83.86	102	90-110	0			

MSD					Units: mg/L		Analysis Date: 6/29/2023 07:09 PM				
Sample ID: 23061894-01B MSD											
Client ID:		Run ID: IC4_230629A			SeqNo: 9720713		Prep Date:		DF: 40		
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	901.3	12	40	400	501	100	88-110	931.5	3.3	15	E
Sulfate	482.7	7.6	40	400	83.86	99.7	90-110	490.9	1.69	15	

The following samples were analyzed in this batch:

23062083-01A	23062083-02A	23062083-03A
23062083-04A	23062083-05A	23062083-06A
23062083-07A	23062083-08B	23062083-09B
23062083-10B	23062083-11B	

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.



# Chain of Custody

Page 1 of 1

## 23062083

ERM-CRANBERRY: ERM, Inc.  
Project: Hollow Rock CCR



ALS Project Manager:

Customer Information		Project Information		Parameter/Method Request for Analysis												
Purchase Order		Project Name	Hollow Rock CCR Spring 2023	A	Chloride, Sulfate, Fluoride											
Work Order		Project Number		B	Total Dissolved Solids											
Company Name	ERM	Bill To Company	ERM	C	Total B,Ca, K, Na											
Send Report To	Cory Portwood	Invoice Attn.	Cory Portwood	D	Total Trace Mg											
Address	800 Cranberry Woods Dr	Address		E	pH (field)											
City/State/Zip	Cranberry, PA 16006	City/State/Zip		F	Alkalinity											
Phone	502-974-5041	Phone		G												
Fax		Fax		H												
e-Mail Address	Cory.Portwood@erm.com			I												
				J												

No.	Sample Description	Date	Time	Matrix	Pres. Key Numbers	# Bottles	A	B	C	D	E	F	G	H	I	J	Hold
1	MW-11S CCR	6-19	1215	GW			X	X	X	X	X	X					
2	MW-12S CCR	6-19	1200	GW			X	X	X	X	X	X					
3	MW-13S CCR	6-19	1250	GW			X	X	X	X	X	X					
4	MW-22S CCR	6-20	0935	GW			X	X	X	X	X	X					
5	MW-23S CCR	6-20	1020	GW			X	X	X	X	X	X					
6	MW-24S CCR	6-21	0945	GW			X	X	X	X	X	X					
7	MW-25S CCR	6-20	1115	GW			X	X	X	X	X	X					
8	MW-40 CCR	6-21	1030	GW			X	X	X	X	X	X					
9	MW-41 CCR	6-21	0955	GW			X	X	X	X	X	X					
10	MW-42 CCR	6-21-23	1235 08	GW			X	X	X	X	X	X					

Sampler(s): Please Print & Sign		Shipment Method:		Turnaround Time: (Business Days)				Results Due Date:			
<i>C. Portwood</i>				<input checked="" type="checkbox"/> 10 BD <input type="checkbox"/> 5 BD <input type="checkbox"/> 3 BD <input type="checkbox"/> 2 BD <input type="checkbox"/> 1 BD <input type="checkbox"/> Other							
Relinquished by:	Date:	Time:	Received by:	Date:	Time:	Notes:					
<i>C. Portwood</i>	6-21	1301	<i>[Signature]</i>	6-21-23	1301						
Relinquished by:	Date:	Time:	Received by (Laboratory):	Date:	Time:	ALS Cooler ID	Cooler Temp	QC Package: (Check Box Below)			
<i>[Signature]</i>	6-21-23	1700	<i>[Signature]</i>	6/22/23	0900	123	29.9	<input type="checkbox"/> Level II: Standard QC	<input type="checkbox"/> Level III: Raw Data		
Logged by (Laboratory):	Date:	Time:	Checked by (Laboratory):					<input type="checkbox"/> TRRP LRC	<input type="checkbox"/> TRRP Level IV		
<i>KL</i>	6/22/23	0900	<i>[Signature]</i>					<input type="checkbox"/> Level IV: SW846 Methods/CLP like			
								<input type="checkbox"/> Other:			

Preservative Key: 1-HCl 2-HNO<sub>3</sub> 3-H<sub>2</sub>SO<sub>4</sub> 4-NaOH 5-Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub> 6-NaHSO<sub>4</sub> 7-Other 8-4°C

Revision 2 - Effective 11/9/2016

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Note: Any changes must be made in writing once samples and COC Form have been submitted to ALS.

3,10



# Chain of Custody

Page 2 of 2

## 23062083

ERM-CRANBERRY: ERM, Inc.  
Project: Hollow Rock CCR



ALS Project Manager

Customer Information			Project Information			Parameter/Method Request for Analysis														
Purchase Order		Project Name	Hollow Rock CCR Spring 2023			A	Chloride, Sulfate, Fluoride													
Work Order		Project Number				B	Total Dissolved Solids													
Company Name	ERM	Bill To Company	ERM			C	Total B,Ca, K, Na													
Send Report To	Cory Portwood	Invoice Attn.	Cory Portwood			D	Total Trace Mg													
Address	800 Cranberry Woods Dr	Address				E	pH (field)													
City/State/Zip	Cranberry, PA 16006	City/State/Zip				F	Alkalinity													
Phone	502-974-5041	Phone				G														
Fax		Fax				H														
e-Mail Address	Cory.Portwood@erm.com					I														
J																				
No.	Sample Description	Date	Time	Matrix	Pres. Key Numbers	# Bottles	A	B	C	D	E	F	G	H	I	J	Hold			
1	MW-43 CCR	6-21	1630	GW			X	X	X	X	X	X								
2				GW																
3				GW																
4				GW																
5				GW																
6				GW																
7				GW																
8				GW																
9				GW																
10				GW																
Sampler(s): Please Print & Sign		Shipment Method:		Turnaround Time: (Business Days)				<input type="checkbox"/> Other				Results Due Date:								
<i>C. Portwood</i>				<input checked="" type="checkbox"/> 10 BD <input type="checkbox"/> 5 BD <input type="checkbox"/> 3 BD <input type="checkbox"/> 2 BD <input type="checkbox"/> 1 BD																
Relinquished by:	Date:	Time:	Received by:	Date:	Time:	Notes:														
<i>C. Portwood</i>	6-21	1301	<i>ALS</i>	6-21-23	1301															
Relinquished by:	Date:	Time:	Received by (Laboratory):	Date:	Time:	QC Package: (Check Box Below)														
<i>ALS</i>	6-21-23	1700	<i>ALS</i>	6/22/23	0900	<input type="checkbox"/> Level II: Standard QC <input type="checkbox"/> Level III: Raw Data														
Logged by (Laboratory):	Date:	Time:	Checked by (Laboratory):	<input type="checkbox"/> TRRP LRC <input type="checkbox"/> TRRP Level IV																
<i>Kew</i>	6/22/23	0900		<input type="checkbox"/> Level IV: SW846 Methods/CLP like																
						<input type="checkbox"/> Other:														

Preservative Key: 1-HCl 2-HNO<sub>3</sub> 3-H<sub>2</sub>SO<sub>4</sub> 4-NaOH 5-Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub> 6-NaHSO<sub>4</sub> 7-Other 8-4°C

Note: Any changes must be made in writing once samples and COC Form have been submitted to ALS.

Sample Receipt Checklist

Client Name: ERM-CRANBERRY

Date/Time Received: 22-Jun-23 09:00

Work Order: 23062083

Received by: KRW

Checklist completed by Keith Warenga  
eSignature

22-Jun-23  
Date

Reviewed by: Jodi Blauw  
eSignature

23-Jun-23  
Date

Matrices: Water

Carrier name: FedEx

Shipping container/cooler in good condition?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Present <input type="checkbox"/>
Custody seals intact on shipping container/cooler?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Custody seals intact on sample bottles?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Chain of custody present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody signed when relinquished and received?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody agrees with sample labels?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Samples in proper container/bottle?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sample containers intact?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sufficient sample volume for indicated test?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
All samples received within holding time?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Container/Temp Blank temperature in compliance?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sample(s) received on ice?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	

Temperature(s)/Thermometer(s):

2.9/3.9, 2.7/3.7, 2.8/3.8, 3.1/4.1 C

IR3

Cooler(s)/Kit(s):

Date/Time sample(s) sent to storage:

6/22/2023 2:52:43 PM

Water - VOA vials have zero headspace?

Yes ☐ No ☐ No VOA vials submitted ☒

Water - pH acceptable upon receipt?

Yes ☒ No ☐ N/A ☐

pH adjusted?

Yes ☐ No ☒ N/A ☐

pH adjusted by:

-

Login Notes: pH Check <2

Client Contacted:

Date Contacted:

Person Contacted:

Contacted By:

Regarding:

Comments:

CorrectiveAction:



31-Oct-2023

Angela Gatchie  
ETEM  
200 Third Ave.  
Carnegie, PA 15106

Re: **Hollow Rock 2023 2SA Sampling**

Work Order: **23101240**

Dear Angela,

Revision: **1**

ALS Environmental received 3 samples on 13-Oct-2023 09:30 AM for the analyses presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental - Holland and for only the analyses requested.

Sample results are compliant with industry accepted practices and Quality Control results achieved laboratory specifications. Any exceptions are noted in the Case Narrative, or noted with qualifiers in the report or QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained from ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

The total number of pages in this report is 19.

If you have any questions regarding this report, please feel free to contact me:

ADDRESS: 3352 128th Avenue, Holland, MI, USA  
PHONE: +1 (616) 399-6070 FAX: +1 (616) 399-6185

Sincerely,

Electronically approved by: Jodi Blouw

Jodi Blouw

## Report of Laboratory Analysis

Certificate No: PA: 68-03827

ALS GROUP USA, CORP Part of the ALS Laboratory Group A Campbell Brothers Limited Company



Client: ETEM  
Project: Hollow Rock 2023 2SA Sampling  
Work Order: 23101240

Work Order Sample Summary

<u>Lab Samp ID</u>	<u>Client Sample ID</u>	<u>Matrix</u>	<u>Tag Number</u>	<u>Collection Date</u>	<u>Date Received</u>	<u>Hold</u>
23101240-01	HLRK-MW-40-101023	Groundwater		10/10/2023 09:41	10/13/2023 09:30	<input type="checkbox"/>
23101240-02	HLRK-MW-13S-101023	Groundwater		10/10/2023 12:27	10/13/2023 09:30	<input type="checkbox"/>
23101240-03	HLRK-M-99A-101023	Groundwater		10/10/2023 13:26	10/13/2023 09:30	<input type="checkbox"/>

**Client:** ETEM  
**Project:** Hollow Rock 2023 2SA Sampling  
**WorkOrder:** 23101240

## QUALIFIERS, ACRONYMS, UNITS

<u>Qualifier</u>	<u>Description</u>
*	Value exceeds Regulatory Limit
**	Estimated Value
a	Analyte is non-accredited
B	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
H	Analyzed outside of Holding Time
Hr	BOD/CBOD - Sample was reset outside Hold Time, value should be considered estimated.
J	Analyte is present at an estimated concentration between the MDL and Report Limit
n	Analyte accreditation is not offered
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL
X	Analyte was detected in the Method Blank between the MDL and Reporting Limit, sample results may exhibit background or reagent contamination at the observed level.

<u>Acronym</u>	<u>Description</u>
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
LOD	Limit of Detection (see MDL)
LOQ	Limit of Quantitation (see PQL)
MBLK	Method Blank
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PQL	Practical Quantitation Limit
RPD	Relative Percent Difference
TDL	Target Detection Limit
TNTC	Too Numerous To Count
A	APHA Standard Methods
D	ASTM
E	EPA
SW	SW-846 Update III

<u>Units Reported</u>	<u>Description</u>
mg/L	Milligrams per Liter

---

**Client:** ETEM  
**Project:** Hollow Rock 2023 2SA Sampling  
**Work Order:** 23101240

---

**Case Narrative**

Samples for the above noted Work Order were received on 10/13/2023. The attached "Sample Receipt Checklist" documents the status of custody seals, container integrity, preservation, and temperature compliance.

Samples were analyzed according to the analytical methodology previously transmitted in the "Work Order Acknowledgement". Methodologies are also documented in the "Analytical Result" section for each sample. Quality control results are listed in the "QC Report" section. Sample association for the reported quality control is located at the end of each batch summary. If applicable, results are appropriately qualified in the Analytical Result and QC Report sections. The "Qualifiers" section documents the various qualifiers, units, and acronyms utilized in reporting. A copy of the laboratory's scope of accreditation is available upon request.

With the following exceptions, all sample analyses achieved analytical criteria.

**Metals:**  
No deviations or anomalies were noted.

**Wet Chemistry:**  
No deviations or anomalies were noted.

Rev1 - revised to report correct metals list

Client:	ETEM	
Project:	Hollow Rock 2023 2SA Sampling	Work Order: 23101240
Sample ID:	HLRK-MW-40-101023	Lab ID: 23101240-01
Collection Date:	10/10/2023 09:41 AM	Matrix: GROUNDWATER

Analyses	Result	Qual	MDL	Report Limit	Units	Dilution Factor	Date Analyzed
METALS BY ICP-MS			Method: SW6020B		Prep: SW3015A / 10/17/23		Analyst: STP
Boron	0.16		0.015	0.020	mg/L	1	10/17/2023 22:24
Calcium	250		2.2	5.0	mg/L	10	10/18/2023 16:09
Magnesium	100		0.037	0.20	mg/L	1	10/17/2023 22:24
Potassium	4.1		0.034	0.20	mg/L	1	10/17/2023 22:24
Sodium	33		0.13	0.20	mg/L	1	10/17/2023 22:24
ALKALINITY			Method: A2320 B-11				Analyst: CLJ
Alkalinity, Total (as CaCO3)	431		8.4	10	mg/L	1	10/19/2023 09:40
ANIONS BY ION CHROMATOGRAPHY			Method: SW9056A				Analyst: QTN
Chloride	8.79		0.31	1.0	mg/L	1	10/17/2023 15:09
Fluoride	U		0.067	0.10	mg/L	1	10/17/2023 15:09
Sulfate	685		19	100	mg/L	100	10/18/2023 13:19
TOTAL DISSOLVED SOLIDS			Method: A2540 C-15		Prep: FILTER / 10/16/23		Analyst: LAD
Total Dissolved Solids	1,400		74	100	mg/L	1	10/18/2023 13:37

Client:	ETEM	
Project:	Hollow Rock 2023 2SA Sampling	Work Order: 23101240
Sample ID:	HLRK-MW-13S-101023	Lab ID: 23101240-02
Collection Date:	10/10/2023 12:27 PM	Matrix: GROUNDWATER

Analyses	Result	Qual	MDL	Report Limit	Units	Dilution Factor	Date Analyzed
METALS BY ICP-MS			Method: SW6020B		Prep: SW3015A / 10/16/23	Analyst: STP	
Boron	0.036		0.015	0.020	mg/L	1	10/16/2023 16:13
Calcium	460		2.2	5.0	mg/L	10	10/17/2023 13:36
Magnesium	120		0.037	0.20	mg/L	1	10/16/2023 16:13
Potassium	4.9		0.034	0.20	mg/L	1	10/16/2023 16:13
Sodium	4.7		0.13	0.20	mg/L	1	10/16/2023 16:13
ALKALINITY			Method: A2320 B-11			Analyst: CLJ	
Alkalinity, Total (as CaCO3)	608		8.4	10	mg/L	1	10/19/2023 09:40
ANIONS BY ION CHROMATOGRAPHY			Method: SW9056A			Analyst: QTN	
Chloride	6.21		0.31	1.0	mg/L	1	10/17/2023 15:19
Fluoride	U		0.067	0.10	mg/L	1	10/17/2023 15:19
Sulfate	1,030		19	100	mg/L	100	10/18/2023 13:29
TOTAL DISSOLVED SOLIDS			Method: A2540 C-15		Prep: FILTER / 10/16/23	Analyst: LAD	
Total Dissolved Solids	2,100		74	100	mg/L	1	10/18/2023 13:37

Note: See Qualifiers page for a list of qualifiers and their definitions.

Client:	ETEM	
Project:	Hollow Rock 2023 2SA Sampling	Work Order: 23101240
Sample ID:	HLRK-M-99A-101023	Lab ID: 23101240-03
Collection Date:	10/10/2023 01:26 PM	Matrix: GROUNDWATER

Analyses	Result	Qual	MDL	Report Limit	Units	Dilution Factor	Date Analyzed
METALS BY ICP-MS			Method: SW6020B		Prep: SW3015A / 10/17/23		Analyst: STP
Boron	0.16		0.015	0.020	mg/L	1	10/17/2023 22:26
Calcium	240		2.2	5.0	mg/L	10	10/18/2023 16:11
Magnesium	100		0.037	0.20	mg/L	1	10/17/2023 22:26
Potassium	4.1		0.034	0.20	mg/L	1	10/17/2023 22:26
Sodium	33		0.13	0.20	mg/L	1	10/17/2023 22:26
ALKALINITY			Method: A2320 B-11				Analyst: CLJ
Alkalinity, Total (as CaCO3)	428		8.4	10	mg/L	1	10/19/2023 09:40
ANIONS BY ION CHROMATOGRAPHY			Method: SW9056A				Analyst: QTN
Chloride	8.74		0.31	1.0	mg/L	1	10/17/2023 15:29
Fluoride	U		0.067	0.10	mg/L	1	10/17/2023 15:29
Sulfate	642		19	100	mg/L	100	10/18/2023 13:39
TOTAL DISSOLVED SOLIDS			Method: A2540 C-15		Prep: FILTER / 10/16/23		Analyst: LAD
Total Dissolved Solids	1,300		74	100	mg/L	1	10/18/2023 13:56

Note: See Qualifiers page for a list of qualifiers and their definitions.

Batch ID: 227387

Instrument ID ICPMS3

Method: SW6020B

MBLK		Sample ID: MBLK-227387-227387				Units: mg/L		Analysis Date: 10/16/2023 03:58 PM		
Client ID:		Run ID: ICPMS3_231016A				SeqNo: 10091694		Prep Date: 10/16/2023		DF: 1
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Boron	U	0.020								
Calcium	U	0.50								
Magnesium	U	0.20								
Potassium	U	0.20								
Sodium	U	0.20								

LCS		Sample ID: LCS-227387-227387				Units: mg/L		Analysis Date: 10/16/2023 03:59 PM		
Client ID:		Run ID: ICPMS3_231016A				SeqNo: 10091695		Prep Date: 10/16/2023		DF: 1
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Boron	0.5196	0.020	0.5	0	104	80-120	0			
Calcium	10.16	0.50	10	0	102	80-120	0			
Magnesium	10.58	0.20	10	0	106	80-120	0			
Potassium	10.27	0.20	10	0	103	80-120	0			
Sodium	10.54	0.20	10	0	105	80-120	0			

MS		Sample ID: 23101246-01BMS				Units: mg/L		Analysis Date: 10/16/2023 04:20 PM		
Client ID:		Run ID: ICPMS3_231016A				SeqNo: 10091709		Prep Date: 10/16/2023		DF: 1
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Boron	0.5195	0.020	0.5	0.02394	99.1	75-125	0			
Magnesium	124.6	0.20	10	119.4	51.7	75-125	0			SO
Potassium	15.71	0.20	10	5.875	98.3	75-125	0			
Sodium	13.54	0.20	10	3.352	102	75-125	0			

MS		Sample ID: 23101246-01BMS				Units: mg/L		Analysis Date: 10/17/2023 01:46 PM		
Client ID:		Run ID: ICPMS3_231017A				SeqNo: 10095857		Prep Date: 10/16/2023		DF: 10
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Calcium	458.9	5.0	10	464.6	-56.6	75-125	0			SO

Client: ETEM  
Work Order: 23101240  
Project: Hollow Rock 2023 2SA Sampling

QC BATCH REPORT

Batch ID: 227387      Instrument ID ICPMS3      Method: SW6020B

MSD		Sample ID: 23101246-01BMSD				Units: mg/L		Analysis Date: 10/16/2023 04:21 PM		
Client ID:		Run ID: ICPMS3_231016A			SeqNo: 10091710		Prep Date: 10/16/2023		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Boron	0.5447	0.020	0.5	0.02394	104	75-125	0.5195	4.73	20	
Magnesium	125	0.20	10	119.4	55.2	75-125	124.6	0.283	20	SO
Potassium	15.9	0.20	10	5.875	100	75-125	15.71	1.21	20	
Sodium	13.79	0.20	10	3.352	104	75-125	13.54	1.81	20	

MSD		Sample ID: 23101246-01BMSD				Units: mg/L		Analysis Date: 10/17/2023 01:47 PM		
Client ID:		Run ID: ICPMS3_231017A			SeqNo: 10095858		Prep Date: 10/16/2023		DF: 10	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Calcium	466.8	5.0	10	464.6	22.3	75-125	458.9	1.7	20	SO

The following samples were analyzed in this batch: 23101240-02B



Batch ID: 227480

Instrument ID ICPMS3

Method: SW6020B

MBLK		Sample ID: MBLK-227480-227480				Units: mg/L		Analysis Date: 10/17/2023 09:58 PM		
Client ID:		Run ID: ICPMS3_231017A				SeqNo: 10097580		Prep Date: 10/17/2023		DF: 1
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Boron	U	0.020								
Calcium	U	0.50								
Magnesium	U	0.20								
Potassium	U	0.20								
Sodium	0.1643	0.20								J

LCS		Sample ID: LCS-227480-227480				Units: mg/L		Analysis Date: 10/17/2023 10:00 PM		
Client ID:		Run ID: ICPMS3_231017A				SeqNo: 10097581		Prep Date: 10/17/2023		DF: 1
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Boron	0.5308	0.020	0.5	0	106	80-120	0			
Calcium	10.61	0.50	10	0	106	80-120	0			
Magnesium	10.63	0.20	10	0	106	80-120	0			
Potassium	10.62	0.20	10	0	106	80-120	0			
Sodium	10.72	0.20	10	0	107	80-120	0			

MS		Sample ID: 23100452-03BMS				Units: mg/L		Analysis Date: 10/17/2023 10:10 PM		
Client ID:		Run ID: ICPMS3_231017A				SeqNo: 10097587		Prep Date: 10/17/2023		DF: 1
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Boron	1.247	0.020	0.5	0.7108	107	75-125	0			
Calcium	101.3	0.50	10	95.71	56	75-125	0			SO
Magnesium	47.29	0.20	10	39.5	77.9	75-125	0			
Potassium	27.95	0.20	10	18.69	92.7	75-125	0			
Sodium	136.4	0.20	10	134	24.2	75-125	0			SO

MSD		Sample ID: 23100452-03BMSD				Units: mg/L		Analysis Date: 10/17/2023 10:12 PM		
Client ID:		Run ID: ICPMS3_231017A				SeqNo: 10097588		Prep Date: 10/17/2023		DF: 1
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Boron	1.276	0.020	0.5	0.7108	113	75-125	1.247	2.25	20	
Calcium	101.5	0.50	10	95.71	58.2	75-125	101.3	0.218	20	SO
Magnesium	45.78	0.20	10	39.5	62.9	75-125	47.29	3.24	20	S
Potassium	27.39	0.20	10	18.69	87	75-125	27.95	2.03	20	
Sodium	131.8	0.20	10	134	-21.4	75-125	136.4	3.4	20	SO

The following samples were analyzed in this batch:

23101240-01B23101240-03B

Batch ID: 227401Instrument ID TDSMethod: A2540 C-15

MBLK		Sample ID: MBLK-227401-227401				Units: mg/L		Analysis Date: 10/18/2023 01:37 PM		
Client ID:		Run ID: TDS_231018A				SeqNo: 10101432		Prep Date: 10/16/2023		DF: 1
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Solids		U	30							

LCS		Sample ID: LCS-227401-227401				Units: mg/L		Analysis Date: 10/18/2023 01:37 PM		
Client ID:		Run ID: TDS_231018A				SeqNo: 10101431		Prep Date: 10/16/2023		DF: 1
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Solids		490	30	495	0	99	85-109	0		

DUP		Sample ID: 23101240-01A DUP				Units: mg/L		Analysis Date: 10/18/2023 01:37 PM		
Client ID: HLRK-MW-40-101023		Run ID: TDS_231018A				SeqNo: 10101426		Prep Date: 10/16/2023		DF: 1
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Solids		1387	100	0	0	0	0-0	1433	3.31	10

DUP		Sample ID: 23101246-01A DUP				Units: mg/L		Analysis Date: 10/18/2023 01:37 PM		
Client ID:		Run ID: TDS_231018A				SeqNo: 10101429		Prep Date: 10/16/2023		DF: 1
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Solids		2140	100	0	0	0	0-0	2147	0.311	10

The following samples were analyzed in this batch:

23101240-01A23101240-02A

Batch ID: 227418Instrument ID TDSMethod: A2540 C-15

MBLK		Sample ID: MBLK-227418-227418				Units: mg/L		Analysis Date: 10/18/2023 01:56 PM		
Client ID:		Run ID: TDS_231018B				SeqNo: 10101453		Prep Date: 10/16/2023		DF: 1
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual

Total Dissolved SolidsU30

LCS		Sample ID: LCS-227418-227418				Units: mg/L		Analysis Date: 10/18/2023 01:56 PM		
Client ID:		Run ID: TDS_231018B				SeqNo: 10101452		Prep Date: 10/16/2023		DF: 1
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual

Total Dissolved Solids48430495097.885-1090

DUP		Sample ID: 23101246-05A DUP				Units: mg/L		Analysis Date: 10/18/2023 01:56 PM		
Client ID:		Run ID: TDS_231018B				SeqNo: 10101444		Prep Date: 10/16/2023		DF: 1
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual

Total Dissolved Solids21671000000-021600.30810

DUP		Sample ID: 23101263-02A DUP				Units: mg/L		Analysis Date: 10/18/2023 01:56 PM		
Client ID:		Run ID: TDS_231018B				SeqNo: 10101451		Prep Date: 10/16/2023		DF: 1
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual

Total Dissolved Solids18931000000-018671.4210

The following samples were analyzed in this batch:23101240-03A

Batch ID: R385862A

Instrument ID IC4

Method: SW9056A

MBLK		Sample ID: CCB/MBLK-A-R385862A				Units: mg/L		Analysis Date: 10/17/2023 01:51 PM		
Client ID:		Run ID: IC4_231017A				SeqNo: 10098751		Prep Date:		DF: 1
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual

ChlorideU1.0

FluorideU0.10

MBLK		Sample ID: CCB/MBLK-B-R385862A				Units: mg/L		Analysis Date: 10/17/2023 03:48 PM		
Client ID:		Run ID: IC4_231017A				SeqNo: 10098763		Prep Date:		DF: 1
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual

ChlorideU1.0

FluorideU0.10

MBLK		Sample ID: CCB/MBLK-C-R385862A				Units: mg/L		Analysis Date: 10/17/2023 05:45 PM		
Client ID:		Run ID: IC4_231017A				SeqNo: 10098775		Prep Date:		DF: 1
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual

ChlorideU1.0

FluorideU0.10

LCS		Sample ID: MLCCV/LCS-A-R385862A				Units: mg/L		Analysis Date: 10/17/2023 01:41 PM		
Client ID:		Run ID: IC4_231017A				SeqNo: 10098750		Prep Date:		DF: 1
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual

Chloride9.7781.010097.888-1100

Fluoride2.1170.102010686-1210

LCS		Sample ID: MLCCV/LCS-B-R385862A				Units: mg/L		Analysis Date: 10/17/2023 03:38 PM		
Client ID:		Run ID: IC4_231017A				SeqNo: 10098762		Prep Date:		DF: 1
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual

Chloride9.71.01009788-1100

Fluoride1.9640.102098.286-1210

LCS		Sample ID: MLCCV/LCS-C-R385862A				Units: mg/L		Analysis Date: 10/17/2023 05:35 PM		
Client ID:		Run ID: IC4_231017A				SeqNo: 10098774		Prep Date:		DF: 1
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual

Chloride9.7281.010097.388-1100

Fluoride2.1310.102010786-1210

Client: ETEM  
Work Order: 23101240  
Project: Hollow Rock 2023 2SA Sampling

QC BATCH REPORT

Batch ID: R385862A Instrument ID IC4 Method: SW9056A

MS		Sample ID: 23101247-01E MS				Units: mg/L		Analysis Date: 10/17/2023 02:11 PM		
Client ID:		Run ID: IC4_231017A				SeqNo: 10098753		Prep Date:		DF: 10
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual

Chloride	944.6	10	100	986.3	-41.7	88-110	0			SEO
Fluoride	20.73	1.0	20	0	104	86-121	0			

MS		Sample ID: 23101246-01A MS				Units: mg/L		Analysis Date: 10/17/2023 05:16 PM		
Client ID:		Run ID: IC4_231017A				SeqNo: 10098772		Prep Date:		DF: 40
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual

Chloride	384.5	40	400	6.608	94.5	88-110	0			
Fluoride	98.44	4.0	80	0	123	86-121	0			S

MSD		Sample ID: 23101247-01E MSD				Units: mg/L		Analysis Date: 10/17/2023 02:20 PM		
Client ID:		Run ID: IC4_231017A				SeqNo: 10098754		Prep Date:		DF: 10
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual

Chloride	948.4	10	100	986.3	-37.9	88-110	944.6	0.399	15	SEO
Fluoride	20.96	1.0	20	0	105	86-121	20.73	1.13	15	

MSD		Sample ID: 23101246-01A MSD				Units: mg/L		Analysis Date: 10/17/2023 05:26 PM		
Client ID:		Run ID: IC4_231017A				SeqNo: 10098773		Prep Date:		DF: 40
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual

Chloride	387.2	40	400	6.608	95.1	88-110	384.5	0.689	15	
Fluoride	97.69	4.0	80	0	122	86-121	98.44	0.767	15	S

The following samples were analyzed in this batch:

23101240-01A	23101240-02A	23101240-03A
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Batch ID: R385970A

Instrument ID IC4

Method: SW9056A

MBLK		Sample ID: CCB/MBLK-A-R385970A				Units: mg/L		Analysis Date: 10/18/2023 11:52 AM		
Client ID:		Run ID: IC4_231018A				SeqNo: 10105169		Prep Date:		DF: 1
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Sulfate	U	1.0								

MBLK		Sample ID: CCB/MBLK-B-R385970A				Units: mg/L		Analysis Date: 10/18/2023 03:07 PM		
Client ID:		Run ID: IC4_231018A				SeqNo: 10105181		Prep Date:		DF: 1
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Sulfate	U	1.0								

MBLK		Sample ID: CCB/MBLK-C-R385970A				Units: mg/L		Analysis Date: 10/18/2023 05:05 PM		
Client ID:		Run ID: IC4_231018A				SeqNo: 10105193		Prep Date:		DF: 1
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Sulfate	0.3043	1.0								J

LCS		Sample ID: MLCCV/LCS-A-R385970A				Units: mg/L		Analysis Date: 10/18/2023 11:42 AM		
Client ID:		Run ID: IC4_231018A				SeqNo: 10105168		Prep Date:		DF: 1
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Sulfate	9.669	1.0	10	0	96.7	90-110	0			

LCS		Sample ID: MLCCV/LCS-B-R385970A				Units: mg/L		Analysis Date: 10/18/2023 02:57 PM		
Client ID:		Run ID: IC4_231018A				SeqNo: 10105180		Prep Date:		DF: 1
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Sulfate	10.07	1.0	10	0	101	90-110	0			

LCS		Sample ID: MLCCV/LCS-C-R385970A				Units: mg/L		Analysis Date: 10/18/2023 04:55 PM		
Client ID:		Run ID: IC4_231018A				SeqNo: 10105192		Prep Date:		DF: 1
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Sulfate	10.46	1.0	10	0	105	90-110	0			

MS		Sample ID: 23101246-01A MS				Units: mg/L		Analysis Date: 10/18/2023 03:26 PM		
Client ID:		Run ID: IC4_231018A				SeqNo: 10105183		Prep Date:		DF: 100
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Sulfate	2029	100	1000	1038	99.1	90-110	0			E

Client: ETEM  
Work Order: 23101240  
Project: Hollow Rock 2023 2SA Sampling

QC BATCH REPORT

Batch ID: R385970A Instrument ID IC4 Method: SW9056A

MSD		Sample ID: 23101246-01A MSD				Units: mg/L		Analysis Date: 10/18/2023 03:37 PM		
Client ID:			Run ID: IC4_231018A			SeqNo: 10105184		Prep Date:		DF: 100
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Sulfate	2034	100	1000	1038	99.6	90-110	2029	0.232	15	E

The following samples were analyzed in this batch:

23101240-01A	23101240-02A	23101240-03A
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Batch ID: R386006

Instrument ID Titrator 1

Method: A2320 B-11

MBLK		Sample ID: MB-R386006-R386006				Units: mg/L		Analysis Date: 10/19/2023 09:40 AM		
Client ID:		Run ID: TITRATOR 1_231019A				SeqNo: 10106331		Prep Date:		DF: 1
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Alkalinity, Total (as CaCO3)	U	10								

LCS		Sample ID: LCS-R386006-R386006				Units: mg/L		Analysis Date: 10/19/2023 09:40 AM		
Client ID:		Run ID: TITRATOR 1_231019A				SeqNo: 10106332		Prep Date:		DF: 1
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Alkalinity, Total (as CaCO3)	1005	10	1000		0	101	90-110	0		

DUP		Sample ID: 23101009-07B DUP				Units: mg/L		Analysis Date: 10/19/2023 09:40 AM		
Client ID:		Run ID: TITRATOR 1_231019A				SeqNo: 10106334		Prep Date:		DF: 1
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Alkalinity, Total (as CaCO3)	324.4	10	0		0	0	0-0	298.4	8.35	10

DUP		Sample ID: 23101240-03A DUP				Units: mg/L		Analysis Date: 10/19/2023 09:40 AM		
Client ID: HLRK-M-99A-101023		Run ID: TITRATOR 1_231019A				SeqNo: 10106345		Prep Date:		DF: 1
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Alkalinity, Total (as CaCO3)	445.1	10	0		0	0	0-0	427.9	3.94	10

DUP		Sample ID: 23101246-01A DUP				Units: mg/L		Analysis Date: 10/19/2023 09:40 AM		
Client ID:		Run ID: TITRATOR 1_231019A				SeqNo: 10106353		Prep Date:		DF: 1
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Alkalinity, Total (as CaCO3)	589.3	10	0		0	0	0-0	584.8	0.768	10

The following samples were analyzed in this batch:

23101240-01A

23101240-02A

23101240-03A





# CHAIN OF CUSTODY RECORD/LABORATORY ANALYSIS REQUEST FORM

23101240

ETEM: ETEM  
Project: Hollow Rock 2023 2SA Sampling

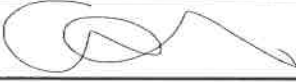





Ref 210311

Project Name: Hollow Rock 2023 Sampling  
Project Number: HLRK-1005-23  
Laboratory: ALS  
Shipment Method: FTS  
Program: Hollow Rock 2023 2SA Sampling

Company: Field & Technical Services  
Address: 200 Third Avenue  
Carnegie, PA 15106  
(412) 279-3363

Sample Date	Sample Time	Matrix	Sample Identification	Analysis	6020B-5 Total Metals	2320B_9056A_2540C														
				Preservative	HNO3	None														
				Total Bottle Count																Notes:
10/10/2023	0941	GW	HLRK-MW-40-101023	2	1	1														
10/10/2023	1227	GW	HLRK-MW-13S-101023	2	1	1														
10/10/2023	1326	GW	HLRK-M-99A-101023	2	1	1														

Relinquished by:	Received by:	Relinquished by:	Received by:	Turnaround Requirements
	Signature: 	Signature: 	Signature: 	<input type="checkbox"/> Rush  <input checked="" type="checkbox"/> Standard
Printed Name: Carter Auch	Printed Name: KM	Printed Name: KM	Printed Name: Diane F. Shaw	
Firm: FTS	Firm: ALS	Firm: ALS	Firm: ALS	
Date/Time: 10/12/23 1240	Date/Time: 10-12-23 1240	Date/Time: 10-12-23 1700	Date/Time: 10/13/23 0930	

IR3  
2.0%  
PH3S

# ALS Group, USA

Holland, Michigan

## Sample Receipt Checklist

Client Name: **ETEM**

Date/Time Received: **13-Oct-23 09:30**

Work Order: **23101240**

Received by: **DS**

Checklist completed by <i>Diane Shaw</i>	13-Oct-23	Reviewed by: <i>Jodi Blauw</i>	16-Oct-23
eSignature	Date	eSignature	Date

Matrices: **Groundwater**

Carrier name: **FedEx**

Shipping container/cooler in good condition?

Yes ☒

No ☐

Not Present ☐

Custody seals intact on shipping container/cooler?

Yes ☐

No ☐

Not Present ☒

Custody seals intact on sample bottles?

Yes ☐

No ☐

Not Present ☒

Chain of custody present?

Yes ☒

No ☐

Chain of custody signed when relinquished and received?

Yes ☒

No ☐

Chain of custody agrees with sample labels?

Yes ☒

No ☐

Samples in proper container/bottle?

Yes ☒

No ☐

Sample containers intact?

Yes ☒

No ☐

Sufficient sample volume for indicated test?

Yes ☒

No ☐

All samples received within holding time?

Yes ☒

No ☐

Container/Temp Blank temperature in compliance?

Yes ☒

No ☐

Sample(s) received on ice?

Yes ☒

No ☐

Temperature(s)/Thermometer(s):

2.0/3.0 c

IR3

Cooler(s)/Kit(s):

Date/Time sample(s) sent to storage:

10/13/2023 12:22:34 PM

Water - VOA vials have zero headspace?

Yes ☐

No ☐

No VOA vials submitted ☒

Water - pH acceptable upon receipt?

Yes ☒

No ☐

N/A ☐

pH adjusted?

Yes ☐

No ☒

N/A ☐

pH adjusted by:

-

Login Notes: **pH check <2.**

Client Contacted:

Date Contacted:

Person Contacted:

Contacted By:

Regarding:

Comments:

CorrectiveAction:

Revision: 1  
SRC Page 1 of 1



31-Oct-2023

Angela Gatchie  
ETEM  
200 Third Ave.  
Carnegie, PA 15106

Re: **Hollow Rock 2023 2SA Sampling**

Work Order: **23101242**

Dear Angela,

Revision: **1**

ALS Environmental received 1 sample on 13-Oct-2023 09:30 AM for the analyses presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental - Holland and for only the analyses requested.

Sample results are compliant with industry accepted practices and Quality Control results achieved laboratory specifications. Any exceptions are noted in the Case Narrative, or noted with qualifiers in the report or QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained from ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

The total number of pages in this report is 16.

If you have any questions regarding this report, please feel free to contact me:

ADDRESS: 3352 128th Avenue, Holland, MI, USA  
PHONE: +1 (616) 399-6070 FAX: +1 (616) 399-6185

Sincerely,

Electronically approved by: Jodi Blouw

Jodi Blouw

## Report of Laboratory Analysis

Certificate No: PA: 68-03827

ALS GROUP USA, CORP Part of the ALS Laboratory Group A Campbell Brothers Limited Company

Client: ETEM  
Project: Hollow Rock 2023 2SA Sampling  
Work Order: 23101242

Work Order Sample Summary

<u>Lab Samp ID</u>	<u>Client Sample ID</u>	<u>Matrix</u>	<u>Tag Number</u>	<u>Collection Date</u>	<u>Date Received</u>	<u>Hold</u>
23101242-01	HLRK-MW-43-101123	Groundwater		10/11/2023 09:14	10/13/2023 09:30	<input type="checkbox"/>

**Client:** ETEM  
**Project:** Hollow Rock 2023 2SA Sampling  
**WorkOrder:** 23101242

**QUALIFIERS,  
ACRONYMS, UNITS**

<u>Qualifier</u>	<u>Description</u>
*	Value exceeds Regulatory Limit
**	Estimated Value
a	Analyte is non-accredited
B	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
H	Analyzed outside of Holding Time
Hr	BOD/CBOD - Sample was reset outside Hold Time, value should be considered estimated.
J	Analyte is present at an estimated concentration between the MDL and Report Limit
n	Analyte accreditation is not offered
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL
X	Analyte was detected in the Method Blank between the MDL and Reporting Limit, sample results may exhibit background or reagent contamination at the observed level.
<u>Acronym</u>	<u>Description</u>
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
LOD	Limit of Detection (see MDL)
LOQ	Limit of Quantitation (see PQL)
MBLK	Method Blank
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PQL	Practical Quantitation Limit
RPD	Relative Percent Difference
TDL	Target Detection Limit
TNTC	Too Numerous To Count
A	APHA Standard Methods
D	ASTM
E	EPA
SW	SW-846 Update III
<u>Units Reported</u>	<u>Description</u>
mg/L	Milligrams per Liter

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**Client:** ETEM  
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**Work Order:** 23101242

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**Case Narrative**

Samples for the above noted Work Order were received on 10/13/2023. The attached "Sample Receipt Checklist" documents the status of custody seals, container integrity, preservation, and temperature compliance.

Samples were analyzed according to the analytical methodology previously transmitted in the "Work Order Acknowledgement". Methodologies are also documented in the "Analytical Result" section for each sample. Quality control results are listed in the "QC Report" section. Sample association for the reported quality control is located at the end of each batch summary. If applicable, results are appropriately qualified in the Analytical Result and QC Report sections. The "Qualifiers" section documents the various qualifiers, units, and acronyms utilized in reporting. A copy of the laboratory's scope of accreditation is available upon request.

With the following exceptions, all sample analyses achieved analytical criteria.

Metals:  
No deviations or anomalies were noted.

Wet Chemistry:  
No deviations or anomalies were noted.

Rev1 - revised to report correct metals list

Client:	ETEM	
Project:	Hollow Rock 2023 2SA Sampling	Work Order: 23101242
Sample ID:	HLRK-MW-43-101123	Lab ID: 23101242-01
Collection Date:	10/11/2023 09:14 AM	Matrix: GROUNDWATER

Analyses	Result	Qual	MDL	Report Limit	Units	Dilution Factor	Date Analyzed
METALS BY ICP-MS			Method: SW6020B		Prep: SW3015A / 10/16/23		Analyst: STP
Boron	0.24		0.015	0.020	mg/L	1	10/16/2023 16:14
Calcium	490		2.2	5.0	mg/L	10	10/17/2023 13:38
Magnesium	280		0.37	2.0	mg/L	10	10/17/2023 13:38
Potassium	8.3		0.034	0.20	mg/L	1	10/16/2023 16:14
Sodium	23		0.13	0.20	mg/L	1	10/16/2023 16:14
ALKALINITY			Method: A2320 B-11				Analyst: CLJ
Alkalinity, Total (as CaCO3)	677		8.4	10	mg/L	1	10/19/2023 09:40
ANIONS BY ION CHROMATOGRAPHY			Method: SW9056A				Analyst: QTN
Chloride	19.2		1.2	4.0	mg/L	4	10/18/2023 14:28
Fluoride	U		0.067	0.10	mg/L	1	10/17/2023 16:37
Sulfate	1,640		30	160	mg/L	160	10/19/2023 14:44
TOTAL DISSOLVED SOLIDS			Method: A2540 C-15		Prep: FILTER / 10/17/23		Analyst: LAD
Total Dissolved Solids	2,800		110	150	mg/L	1	10/19/2023 13:11

Note: See Qualifiers page for a list of qualifiers and their definitions.

Batch ID: 227387

Instrument ID ICPMS3

Method: SW6020B

MBLK					Sample ID: MBLK-227387-227387			Units: mg/L		Analysis Date: 10/16/2023 03:58 PM		
Client ID:					Run ID: ICPMS3_231016A			SeqNo: 10091694		Prep Date: 10/16/2023		DF: 1
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Boron	U	0.015	0.020									
Calcium	U	0.22	0.50									
Magnesium	U	0.037	0.20									
Potassium	U	0.034	0.20									
Sodium	U	0.13	0.20									

LCS					Sample ID: LCS-227387-227387			Units: mg/L		Analysis Date: 10/16/2023 03:59 PM		
Client ID:					Run ID: ICPMS3_231016A			SeqNo: 10091695		Prep Date: 10/16/2023		DF: 1
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Boron	0.5196	0.015	0.020	0.5	0	104	80-120	0				
Calcium	10.16	0.22	0.50	10	0	102	80-120	0				
Magnesium	10.58	0.037	0.20	10	0	106	80-120	0				
Potassium	10.27	0.034	0.20	10	0	103	80-120	0				
Sodium	10.54	0.13	0.20	10	0	105	80-120	0				

MS					Sample ID: 23101246-01BMS			Units: mg/L		Analysis Date: 10/16/2023 04:20 PM		
Client ID:					Run ID: ICPMS3_231016A			SeqNo: 10091709		Prep Date: 10/16/2023		DF: 1
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Boron	0.5195	0.015	0.020	0.5	0.02394	99.1	75-125	0				
Magnesium	124.6	0.037	0.20	10	119.4	51.7	75-125	0			SO	
Potassium	15.71	0.034	0.20	10	5.875	98.3	75-125	0				
Sodium	13.54	0.13	0.20	10	3.352	102	75-125	0				

MS					Sample ID: 23101246-01BMS			Units: mg/L		Analysis Date: 10/17/2023 01:46 PM		
Client ID:					Run ID: ICPMS3_231017A			SeqNo: 10095857		Prep Date: 10/16/2023		DF: 10
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Calcium	458.9	2.2	5.0	10	464.6	-56.6	75-125	0			SO	

MSD					Sample ID: 23101246-01BMSD			Units: mg/L		Analysis Date: 10/16/2023 04:21 PM		
Client ID:					Run ID: ICPMS3_231016A			SeqNo: 10091710		Prep Date: 10/16/2023		DF: 1
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Boron	0.5447	0.015	0.020	0.5	0.02394	104	75-125	0.5195	4.73	20		
Magnesium	125	0.037	0.20	10	119.4	55.2	75-125	124.6	0.283	20	SO	
Potassium	15.9	0.034	0.20	10	5.875	100	75-125	15.71	1.21	20		
Sodium	13.79	0.13	0.20	10	3.352	104	75-125	13.54	1.81	20		



Client: ETEM  
Work Order: 23101242  
Project: Hollow Rock 2023 2SA Sampling

QC BATCH REPORT

Batch ID: 227387 Instrument ID ICPMS3 Method: SW6020B

MSD		Sample ID: 23101246-01BMSD				Units: mg/L		Analysis Date: 10/17/2023 01:47 PM			
Client ID:		Run ID: ICPMS3_231017A				SeqNo: 10095858		Prep Date: 10/16/2023		DF: 10	
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Calcium	466.8	2.2	5.0	10	464.6	22.3	75-125	458.9	1.7	20	SO

The following samples were analyzed in this batch: 23101242-01B

Client: ETEM  
Work Order: 23101242  
Project: Hollow Rock 2023 2SA Sampling

QC BATCH REPORT

Batch ID: 227486 Instrument ID TDS Method: A2540 C-15

MBLK		Sample ID: MBLK-227486-227486					Units: mg/L		Analysis Date: 10/19/2023 01:11 PM			
Client ID:		Run ID: TDS_231019A					SeqNo: 10106012		Prep Date: 10/17/2023		DF: 1	
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Total Dissolved Solids	U	22	30									

LCS		Sample ID: LCS-227486-227486					Units: mg/L		Analysis Date: 10/19/2023 01:11 PM			
Client ID:		Run ID: TDS_231019A					SeqNo: 10106011		Prep Date: 10/17/2023		DF: 1	
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Total Dissolved Solids	480	22	30	495	0	97	85-109	0				

DUP		Sample ID: 23101202-01F DUP					Units: mg/L		Analysis Date: 10/19/2023 01:11 PM			
Client ID:		Run ID: TDS_231019A					SeqNo: 10105995		Prep Date: 10/17/2023		DF: 1	
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Total Dissolved Solids	2273	74	100	0	0	0	0-0	2293	0.876	10		

DUP		Sample ID: 23101202-02F DUP					Units: mg/L		Analysis Date: 10/19/2023 01:11 PM			
Client ID:		Run ID: TDS_231019A					SeqNo: 10105997		Prep Date: 10/17/2023		DF: 1	
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Total Dissolved Solids	1003	37	50	0	0	0	0-0	983.3	2.01	10		

The following samples were analyzed in this batch: 23101242-01A

Batch ID: R385862A

Instrument ID IC4

Method: SW9056A

MBLK		Sample ID: CCB/MBLK-A-R385862A					Units: mg/L		Analysis Date: 10/17/2023 01:51 PM			
Client ID:		Run ID: IC4_231017A				SeqNo: 10098751		Prep Date:		DF: 1		
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Fluoride	U	0.067	0.10									

MBLK		Sample ID: CCB/MBLK-B-R385862A					Units: mg/L		Analysis Date: 10/17/2023 03:48 PM			
Client ID:		Run ID: IC4_231017A				SeqNo: 10098763		Prep Date:		DF: 1		
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Fluoride	U	0.067	0.10									

MBLK		Sample ID: CCB/MBLK-C-R385862A					Units: mg/L		Analysis Date: 10/17/2023 05:45 PM			
Client ID:		Run ID: IC4_231017A				SeqNo: 10098775		Prep Date:		DF: 1		
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Fluoride	U	0.067	0.10									

LCS		Sample ID: MLCCV/LCS-A-R385862A					Units: mg/L		Analysis Date: 10/17/2023 01:41 PM			
Client ID:		Run ID: IC4_231017A				SeqNo: 10098750		Prep Date:		DF: 1		
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Fluoride	2.117	0.067	0.10	2	0	106	86-121	0				

LCS		Sample ID: MLCCV/LCS-B-R385862A					Units: mg/L		Analysis Date: 10/17/2023 03:38 PM			
Client ID:		Run ID: IC4_231017A				SeqNo: 10098762		Prep Date:		DF: 1		
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Fluoride	1.964	0.067	0.10	2	0	98.2	86-121	0				

LCS		Sample ID: MLCCV/LCS-C-R385862A					Units: mg/L		Analysis Date: 10/17/2023 05:35 PM			
Client ID:		Run ID: IC4_231017A				SeqNo: 10098774		Prep Date:		DF: 1		
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Fluoride	2.131	0.067	0.10	2	0	107	86-121	0				

MS		Sample ID: 23101247-01E MS					Units: mg/L		Analysis Date: 10/17/2023 02:11 PM			
Client ID:		Run ID: IC4_231017A				SeqNo: 10098753		Prep Date:		DF: 10		
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Fluoride	20.73	0.67	1.0	20	0	104	86-121	0				

Client: ETEM  
Work Order: 23101242  
Project: Hollow Rock 2023 2SA Sampling

QC BATCH REPORT

Batch ID: R385862A Instrument ID IC4 Method: SW9056A

MS		Sample ID: 23101246-01A MS					Units: mg/L			Analysis Date: 10/17/2023 05:16 PM		
Client ID:		Run ID: IC4_231017A					SeqNo: 10098772			Prep Date:		DF: 40
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Fluoride	98.44	2.7	4.0	80	0	123	86-121	0			S	

MSD		Sample ID: 23101247-01E MSD					Units: mg/L			Analysis Date: 10/17/2023 02:20 PM		
Client ID:		Run ID: IC4_231017A					SeqNo: 10098754			Prep Date:		DF: 10
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Fluoride	20.96	0.67	1.0	20	0	105	86-121	20.73	1.13	15		

MSD		Sample ID: 23101246-01A MSD					Units: mg/L			Analysis Date: 10/17/2023 05:26 PM		
Client ID:		Run ID: IC4_231017A					SeqNo: 10098773			Prep Date:		DF: 40
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Fluoride	97.69	2.7	4.0	80	0	122	86-121	98.44	0.767	15	S	

The following samples were analyzed in this batch: 23101242-01A

Batch ID: R385970A

Instrument ID IC4

Method: SW9056A

MBLK		Sample ID: CCB/MBLK-A-R385970A					Units: mg/L		Analysis Date: 10/18/2023 11:52 A			
Client ID:		Run ID: IC4_231018A					SeqNo: 10105169		Prep Date:		DF: 1	
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Chloride	U	0.31	1.0									

MBLK		Sample ID: CCB/MBLK-B-R385970A					Units: mg/L		Analysis Date: 10/18/2023 03:07 PM			
Client ID:		Run ID: IC4_231018A					SeqNo: 10105181		Prep Date:		DF: 1	
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Chloride	U	0.31	1.0									

MBLK		Sample ID: CCB/MBLK-C-R385970A					Units: mg/L		Analysis Date: 10/18/2023 05:05 PM			
Client ID:		Run ID: IC4_231018A					SeqNo: 10105193		Prep Date:		DF: 1	
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Chloride	0.8377	0.31	1.0								J	

LCS		Sample ID: MLCCV/LCS-A-R385970A					Units: mg/L		Analysis Date: 10/18/2023 11:42 A			
Client ID:		Run ID: IC4_231018A					SeqNo: 10105168		Prep Date:		DF: 1	
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Chloride	9.512	0.31	1.0	10	0	95.1	88-110	0				

LCS		Sample ID: MLCCV/LCS-B-R385970A					Units: mg/L		Analysis Date: 10/18/2023 02:57 PM			
Client ID:		Run ID: IC4_231018A					SeqNo: 10105180		Prep Date:		DF: 1	
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Chloride	9.682	0.31	1.0	10	0	96.8	88-110	0				

The following samples were analyzed in this batch:

23101242-01A

Batch ID: R386006

Instrument ID Titrator 1

Method: A2320 B-11

MBLK		Sample ID: MB-R386006-R386006					Units: mg/L		Analysis Date: 10/19/2023 09:40 A			
Client ID:		Run ID: TITRATOR 1_231019A				SeqNo: 10106331		Prep Date:		DF: 1		
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	

Alkalinity, Total (as CaCO3)

U

8.4

10

LCS		Sample ID: LCS-R386006-R386006					Units: mg/L		Analysis Date: 10/19/2023 09:40 A			
Client ID:		Run ID: TITRATOR 1_231019A				SeqNo: 10106332		Prep Date:		DF: 1		
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	

Alkalinity, Total (as CaCO3)

1005

8.4

10

1000

0

101

90-110

0

DUP		Sample ID: 23101009-07B DUP					Units: mg/L		Analysis Date: 10/19/2023 09:40 A			
Client ID:		Run ID: TITRATOR 1_231019A				SeqNo: 10106334		Prep Date:		DF: 1		
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	

Alkalinity, Total (as CaCO3)

324.4

8.4

10

0

0

0

0-0

298.4

8.35

10

DUP		Sample ID: 23101240-03A DUP					Units: mg/L		Analysis Date: 10/19/2023 09:40 A			
Client ID:		Run ID: TITRATOR 1_231019A				SeqNo: 10106345		Prep Date:		DF: 1		
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	

Alkalinity, Total (as CaCO3)

445.1

8.4

10

0

0

0

0-0

427.9

3.94

10

DUP		Sample ID: 23101246-01A DUP					Units: mg/L		Analysis Date: 10/19/2023 09:40 A			
Client ID:		Run ID: TITRATOR 1_231019A				SeqNo: 10106353		Prep Date:		DF: 1		
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	

Alkalinity, Total (as CaCO3)

589.3

8.4

10

0

0

0

0-0

584.8

0.768

10

The following samples were analyzed in this batch:

23101242-01A

Batch ID: R386075A

Instrument ID IC4

Method: SW9056A

MBLK		Sample ID: CCB/MBLK-A-R386075A					Units: mg/L		Analysis Date: 10/19/2023 09:27 A			
Client ID:		Run ID: IC4_231019A				SeqNo: 10110028		Prep Date:		DF: 1		
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Sulfate	U	0.19	1.0									

MBLK		Sample ID: CCB/MBLK-B-R386075A					Units: mg/L		Analysis Date: 10/19/2023 02:34 PM			
Client ID:		Run ID: IC4_231019A				SeqNo: 10110045		Prep Date:		DF: 1		
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Sulfate	U	0.19	1.0									

MBLK		Sample ID: CCB/MBLK-C-R386075A					Units: mg/L		Analysis Date: 10/19/2023 07:35 PM			
Client ID:		Run ID: IC4_231019A				SeqNo: 10110063		Prep Date:		DF: 1		
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Sulfate	U	0.19	1.0									

LCS		Sample ID: MLCCV/LCS-A-R386075A					Units: mg/L		Analysis Date: 10/19/2023 09:17 A			
Client ID:		Run ID: IC4_231019A				SeqNo: 10110026		Prep Date:		DF: 1		
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Sulfate	9.794	0.19	1.0	10	0	97.9	90-110	0				

LCS		Sample ID: MLCCV/LCS-B-R386075A					Units: mg/L		Analysis Date: 10/19/2023 02:24 PM			
Client ID:		Run ID: IC4_231019A				SeqNo: 10110043		Prep Date:		DF: 1		
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Sulfate	10.06	0.19	1.0	10	0	101	90-110	0				

LCS		Sample ID: MLCCV/LCS-C-R386075A					Units: mg/L		Analysis Date: 10/19/2023 07:25 PM			
Client ID:		Run ID: IC4_231019A				SeqNo: 10110061		Prep Date:		DF: 1		
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Sulfate	10.1	0.19	1.0	10	0	101	90-110	0				

MS		Sample ID: 23101649-01B MS					Units: mg/L		Analysis Date: 10/19/2023 01:14 PM			
Client ID:		Run ID: IC4_231019A				SeqNo: 10110034		Prep Date:		DF: 40		
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Sulfate	398.3	7.6	40	400	0	99.6	90-110	0				

Client: ETEM  
Work Order: 23101242  
Project: Hollow Rock 2023 2SA Sampling

QC BATCH REPORT

Batch ID: R386075A Instrument ID IC4 Method: SW9056A

MSD		Sample ID: 23101649-01B MSD				Units: mg/L		Analysis Date: 10/19/2023 01:23 PM			
Client ID:		Run ID: IC4_231019A				SeqNo: 10110035		Prep Date:		DF: 40	
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Sulfate	395.3	7.6	40	400	0	98.8	90-110	398.3	0.762	15	

The following samples were analyzed in this batch: 23101242-01A





Ref 210311

# CHAIN OF CUSTODY RECORD/LABORATORY ANALYSIS REQUEST FORM

23101242

ELEM: ELEM  
Project: Hollow Rock 2023 2SA Sampling







cauch.2006@t-ts.com

Project Name: Hollow Rock 2023 Sampling  
Project Number: HLRK-1005-23  
Laboratory: ALS  
Shipment Method: FTS  
Program: Hollow Rock 2023 2SA Sampling

Company: Field & Technical Services  
Address: 200 Third Avenue  
Carnegie, PA 15106  
(412) 279-3363

Sample Date	Sample Time	Matrix	Sample Identification	Analysis	6020B-5 Total Metals	2320B_9056A_2540C														
				Preservative	HNO3	None														
				Total Bottle Count																Notes:
10/11/2023	0914	GW	HLRK-MW-43-101123	2	1	1														

Relinquished by:	Received by:	Relinquished by:	Received by:	Turnaround Requirements
	Signature: 	Signature: 	Signature: 	<input type="checkbox"/> Rush  <input checked="" type="checkbox"/> Standard
Printed Name: Carter Auch	Printed Name: KM	Printed Name: KM	Printed Name: Diane F. Shaw	
Firm: FTS	Firm: ALS	Firm: ALS	Firm: ALS	
Date/Time: 10/12/23 1240	Date/Time: 10-12-23 1240	Date/Time: 10-12-23 1700	Date/Time: 10/13/23 0930	

1R3  
2.0°C  
PH35

# ALS Group, USA

Holland, Michigan

## Sample Receipt Checklist

Client Name: **ETEM**

Date/Time Received: **13-Oct-23 09:30**

Work Order: **23101242**

Received by: **DS**

Checklist completed by <u>Diane Shaw</u>	13-Oct-23	Reviewed by: <u>Jodi Blauw</u>	16-Oct-23
eSignature	Date	eSignature	Date

Matrices: **Groundwater**

Carrier name: **FedEx**

Shipping container/cooler in good condition?

Yes ☒

No ☐

Not Present ☐

Custody seals intact on shipping container/cooler?

Yes ☐

No ☐

Not Present ☒

Custody seals intact on sample bottles?

Yes ☐

No ☐

Not Present ☒

Chain of custody present?

Yes ☒

No ☐

Chain of custody signed when relinquished and received?

Yes ☒

No ☐

Chain of custody agrees with sample labels?

Yes ☒

No ☐

Samples in proper container/bottle?

Yes ☒

No ☐

Sample containers intact?

Yes ☒

No ☐

Sufficient sample volume for indicated test?

Yes ☒

No ☐

All samples received within holding time?

Yes ☒

No ☐

Container/Temp Blank temperature in compliance?

Yes ☒

No ☐

Sample(s) received on ice?

Yes ☒

No ☐

Temperature(s)/Thermometer(s):

2.0/3.0 c

IR3

Cooler(s)/Kit(s):

Date/Time sample(s) sent to storage:

10/13/2023 12:29:32 PM

Water - VOA vials have zero headspace?

Yes ☐

No ☐

No VOA vials submitted ☒

Water - pH acceptable upon receipt?

Yes ☒

No ☐

N/A ☐

pH adjusted?

Yes ☐

No ☒

N/A ☐

pH adjusted by:

-

Login Notes: **pH check <2.**

Client Contacted:

Date Contacted:

Person Contacted:

Contacted By:

Regarding:

Comments:

CorrectiveAction:

Revision: 1



31-Oct-2023

Angela Gatchie  
ETEM  
200 Third Ave.  
Carnegie, PA 15106

Re: **Hollow Rock 2023 2SA Sampling**

Work Order: **23101252**

Dear Angela,

Revision: **1**

ALS Environmental received 4 samples on 13-Oct-2023 09:30 AM for the analyses presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental - Holland and for only the analyses requested.

Sample results are compliant with industry accepted practices and Quality Control results achieved laboratory specifications. Any exceptions are noted in the Case Narrative, or noted with qualifiers in the report or QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained from ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

The total number of pages in this report is 25.

If you have any questions regarding this report, please feel free to contact me:

ADDRESS: 3352 128th Avenue, Holland, MI, USA  
PHONE: +1 (616) 399-6070 FAX: +1 (616) 399-6185

Sincerely,

Electronically approved by: Jodi Blouw

Jodi Blouw

## Report of Laboratory Analysis

Certificate No: PA: 68-03827

ALS GROUP USA, CORP Part of the ALS Laboratory Group A Campbell Brothers Limited Company

Client: ETEM  
Project: Hollow Rock 2023 2SA Sampling  
Work Order: 23101252

Work Order Sample Summary

<u>Lab Samp ID</u>	<u>Client Sample ID</u>	<u>Matrix</u>	<u>Tag Number</u>	<u>Collection Date</u>	<u>Date Received</u>	<u>Hold</u>
23101252-01	HLRK-MW-41-101123	Groundwater		10/11/2023 09:31	10/13/2023 09:30	<input type="checkbox"/>
23101252-02	HLRK-MW-24S-101123	Groundwater		10/11/2023 11:16	10/13/2023 09:30	<input type="checkbox"/>
23101252-03	HLRK-MW-12S-101123	Groundwater		10/11/2023 12:36	10/13/2023 09:30	<input type="checkbox"/>
23101252-04	HLRK-MW-42-101123	Groundwater		10/11/2023 13:36	10/13/2023 09:30	<input type="checkbox"/>

**Client:** ETEM  
**Project:** Hollow Rock 2023 2SA Sampling  
**WorkOrder:** 23101252

## QUALIFIERS, ACRONYMS, UNITS

<u>Qualifier</u>	<u>Description</u>
*	Value exceeds Regulatory Limit
**	Estimated Value
a	Analyte is non-accredited
B	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
H	Analyzed outside of Holding Time
Hr	BOD/CBOD - Sample was reset outside Hold Time, value should be considered estimated.
J	Analyte is present at an estimated concentration between the MDL and Report Limit
n	Analyte accreditation is not offered
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL
X	Analyte was detected in the Method Blank between the MDL and Reporting Limit, sample results may exhibit background or reagent contamination at the observed level.

<u>Acronym</u>	<u>Description</u>
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
LOD	Limit of Detection (see MDL)
LOQ	Limit of Quantitation (see PQL)
MBLK	Method Blank
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PQL	Practical Quantitation Limit
RPD	Relative Percent Difference
TDL	Target Detection Limit
TNTC	Too Numerous To Count
A	APHA Standard Methods
D	ASTM
E	EPA
SW	SW-846 Update III

<u>Units Reported</u>	<u>Description</u>
mg/L	Milligrams per Liter

**Client:** ETEM  
**Project:** Hollow Rock 2023 2SA Sampling  
**Work Order:** 23101252

## Case Narrative

Samples for the above noted Work Order were received on 10/13/2023. The attached "Sample Receipt Checklist" documents the status of custody seals, container integrity, preservation, and temperature compliance.

Samples were analyzed according to the analytical methodology previously transmitted in the "Work Order Acknowledgement". Methodologies are also documented in the "Analytical Result" section for each sample. Quality control results are listed in the "QC Report" section. Sample association for the reported quality control is located at the end of each batch summary. If applicable, results are appropriately qualified in the Analytical Result and QC Report sections. The "Qualifiers" section documents the various qualifiers, units, and acronyms utilized in reporting. A copy of the laboratory's scope of accreditation is available upon request.

With the following exceptions, all sample analyses achieved analytical criteria.

### Metals:

Batch 227389, Method SW6020B, Sample 23101252-02BMS/MSD: The MS/MSD recovery was outside of the control limit; however, the result in the parent sample is greater than 4x the spike amount. No qualification is required for this analyte: Mg

Batch 227389, Method SW6020B, Sample 23101252-02BMS/MSD: The MS/MSD recovery was outside of the control limit; however, the result in the parent sample is greater than 4x the spike amount. No qualification is required for this analyte: Ca

No other deviations or anomalies were noted.

### Wet Chemistry:

Batch R385862B, Method SW9056A, Sample 23101252-02A MS/MSD: The MS/MSD recovery was above the upper control limit. The corresponding result in the parent sample may be biased high for this analyte: Sulfate

Batch R385862B, Method SW9056A, Sample 23101252-02A MS: Matrix spike value was outside upper limit of calibration. Processed at equivalent dilution level as the parent. Sulfate

Batch R385862B, Method SW9056A, Sample 23101252-02A MSD: Matrix spike duplicate value was outside upper limit of calibration. Processed at equivalent dilution level as the parent. Sulfate

No other deviations or anomalies were noted.

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**Client:** ETEM  
**Project:** Hollow Rock 2023 2SA Sampling  
**Work Order:** 23101252

**Case Narrative**

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Rev1 - revised to report correct metals list

Client:	ETEM	
Project:	Hollow Rock 2023 2SA Sampling	Work Order: 23101252
Sample ID:	HLRK-MW-41-101123	Lab ID: 23101252-01
Collection Date:	10/11/2023 09:31 AM	Matrix: GROUNDWATER

Analyses	Result	Qual	MDL	Report Limit	Units	Dilution Factor	Date Analyzed
METALS BY ICP-MS			Method: SW6020B		Prep: SW3015A / 10/16/23		Analyst: STP
Boron	0.28		0.015	0.020	mg/L	1	10/16/2023 17:16
Calcium	440		2.2	5.0	mg/L	10	10/17/2023 14:07
Magnesium	270		0.37	2.0	mg/L	10	10/17/2023 14:07
Potassium	7.9		0.034	0.20	mg/L	1	10/16/2023 17:16
Sodium	15		0.13	0.20	mg/L	1	10/16/2023 17:16
ALKALINITY			Method: A2320 B-11				Analyst: JB
Alkalinity, Total (as CaCO3)	577		8.4	10	mg/L	1	10/20/2023 09:22
ANIONS BY ION CHROMATOGRAPHY			Method: SW9056A				Analyst: QTN
Chloride	27.3		1.2	4.0	mg/L	4	10/19/2023 14:54
Fluoride	U		0.067	0.10	mg/L	1	10/17/2023 19:13
Sulfate	1,510		30	160	mg/L	160	10/18/2023 16:26
TOTAL DISSOLVED SOLIDS			Method: A2540 C-15		Prep: FILTER / 10/17/23		Analyst: LAD
Total Dissolved Solids	2,600		74	100	mg/L	1	10/19/2023 13:11

Note: See Qualifiers page for a list of qualifiers and their definitions.



Client:	ETEM	
Project:	Hollow Rock 2023 2SA Sampling	Work Order: 23101252
Sample ID:	HLRK-MW-24S-101123	Lab ID: 23101252-02
Collection Date:	10/11/2023 11:16 AM	Matrix: GROUNDWATER

Analyses	Result	Qual	MDL	Report Limit	Units	Dilution Factor	Date Analyzed
METALS BY ICP-MS			Method: SW6020B		Prep: SW3015A / 10/16/23		Analyst: STP
Boron	0.14		0.015	0.020	mg/L	1	10/16/2023 17:17
Calcium	460		2.2	5.0	mg/L	10	10/17/2023 14:08
Magnesium	130		0.037	0.20	mg/L	1	10/16/2023 17:17
Potassium	4.9		0.034	0.20	mg/L	1	10/16/2023 17:17
Sodium	5.0		0.13	0.20	mg/L	1	10/16/2023 17:17
ALKALINITY			Method: A2320 B-11				Analyst: CLJ
Alkalinity, Total (as CaCO3)	406		8.4	10	mg/L	1	10/19/2023 09:40
ANIONS BY ION CHROMATOGRAPHY			Method: SW9056A				Analyst: QTN
Chloride	21.4		1.2	4.0	mg/L	4	10/18/2023 17:55
Fluoride	U		0.067	0.10	mg/L	1	10/17/2023 19:23
Sulfate	1,310		30	160	mg/L	160	10/18/2023 18:05
TOTAL DISSOLVED SOLIDS			Method: A2540 C-15		Prep: FILTER / 10/17/23		Analyst: LAD
Total Dissolved Solids	2,200		74	100	mg/L	1	10/19/2023 13:11

Client:	ETEM	
Project:	Hollow Rock 2023 2SA Sampling	Work Order: 23101252
Sample ID:	HLRK-MW-12S-101123	Lab ID: 23101252-03
Collection Date:	10/11/2023 12:36 PM	Matrix: GROUNDWATER

Analyses	Result	Qual	MDL	Report Limit	Units	Dilution Factor	Date Analyzed
METALS BY ICP-MS			Method: SW6020B		Prep: SW3015A / 10/16/23		Analyst: STP
Boron	1.7		0.015	0.020	mg/L	1	10/16/2023 17:23
Calcium	700		2.2	5.0	mg/L	10	10/17/2023 14:18
Magnesium	250		0.37	2.0	mg/L	10	10/17/2023 14:18
Potassium	5.8		0.034	0.20	mg/L	1	10/16/2023 17:23
Sodium	31		0.13	0.20	mg/L	1	10/16/2023 17:23
ALKALINITY			Method: A2320 B-11				Analyst: JB
Alkalinity, Total (as CaCO3)	457		8.4	10	mg/L	1	10/20/2023 09:22
ANIONS BY ION CHROMATOGRAPHY			Method: SW9056A				Analyst: QTN
Chloride	358		50	160	mg/L	160	10/19/2023 15:03
Fluoride	U		0.067	0.10	mg/L	1	10/17/2023 20:02
Sulfate	1,620		30	160	mg/L	160	10/18/2023 16:36
TOTAL DISSOLVED SOLIDS			Method: A2540 C-15		Prep: FILTER / 10/17/23		Analyst: LAD
Total Dissolved Solids	3,400		110	150	mg/L	1	10/19/2023 13:11

Client:	ETEM	
Project:	Hollow Rock 2023 2SA Sampling	Work Order: 23101252
Sample ID:	HLRK-MW-42-101123	Lab ID: 23101252-04
Collection Date:	10/11/2023 01:36 PM	Matrix: GROUNDWATER

Analyses	Result	Qual	MDL	Report Limit	Units	Dilution Factor	Date Analyzed
METALS BY ICP-MS			Method: SW6020B		Prep: SW3015A / 10/16/23		Analyst: STP
Boron	0.11		0.015	0.020	mg/L	1	10/16/2023 17:24
Calcium	460		2.2	5.0	mg/L	10	10/17/2023 14:27
Magnesium	290		0.37	2.0	mg/L	10	10/17/2023 14:27
Potassium	7.0		0.034	0.20	mg/L	1	10/16/2023 17:24
Sodium	21		0.13	0.20	mg/L	1	10/16/2023 17:24
ALKALINITY			Method: A2320 B-11				Analyst: JB
Alkalinity, Total (as CaCO3)	648		8.4	10	mg/L	1	10/20/2023 09:22
ANIONS BY ION CHROMATOGRAPHY			Method: SW9056A				Analyst: QTN
Chloride	5.16		0.31	1.0	mg/L	1	10/17/2023 20:31
Fluoride	U		0.067	0.10	mg/L	1	10/17/2023 20:31
Sulfate	1,630		19	100	mg/L	100	10/18/2023 16:46
TOTAL DISSOLVED SOLIDS			Method: A2540 C-15		Prep: FILTER / 10/17/23		Analyst: LAD
Total Dissolved Solids	2,900		110	150	mg/L	1	10/19/2023 13:24

Note: See Qualifiers page for a list of qualifiers and their definitions.

Batch ID: 227389

Instrument ID ICPMS3

Method: SW6020B

MBLK					Sample ID: MBLK-227389-227389			Units: mg/L		Analysis Date: 10/16/2023 04:52 PM		
Client ID:					Run ID: ICPMS3_231016A			SeqNo: 10092454		Prep Date: 10/16/2023		DF: 1
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Boron	U	0.015	0.020									
Calcium	U	0.22	0.50									
Magnesium	U	0.037	0.20									
Potassium	U	0.034	0.20									
Sodium	U	0.13	0.20									

LCS					Sample ID: LCS-227389-227389			Units: mg/L		Analysis Date: 10/16/2023 04:54 PM		
Client ID:					Run ID: ICPMS3_231016A			SeqNo: 10092455		Prep Date: 10/16/2023		DF: 1
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Boron	0.5154	0.015	0.020	0.5	0	103	80-120	0				
Calcium	10.1	0.22	0.50	10	0	101	80-120	0				
Magnesium	10.58	0.037	0.20	10	0	106	80-120	0				
Potassium	10.17	0.034	0.20	10	0	102	80-120	0				
Sodium	10.62	0.13	0.20	10	0	106	80-120	0				

MS					Sample ID: 23101252-02BMS			Units: mg/L		Analysis Date: 10/16/2023 05:19 PM		
Client ID: HLRK-MW-24S-101123					Run ID: ICPMS3_231016A			SeqNo: 10092470		Prep Date: 10/16/2023		DF: 1
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Boron	0.6568	0.015	0.020	0.5	0.1384	104	75-125	0				
Magnesium	132.1	0.037	0.20	10	127.5	46	75-125	0			SO	
Potassium	14.83	0.034	0.20	10	4.87	99.6	75-125	0				
Sodium	15.36	0.13	0.20	10	4.967	104	75-125	0				

MS					Sample ID: 23101255-01BMS			Units: mg/L		Analysis Date: 10/16/2023 05:19 PM		
Client ID:					Run ID: ICPMS3_231016A			SeqNo: 10092654		Prep Date: 10/16/2023		DF: 1
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Boron	0.6568	0.015	0.020	0.5	0.1384	104	75-125	0				
Magnesium	132.1	0.037	0.20	10	127.5	46	75-125	0			SO	
Potassium	14.83	0.034	0.20	10	4.87	99.6	75-125	0				
Sodium	15.36	0.13	0.20	10	4.967	104	75-125	0				

MS					Sample ID: 23101252-02BMS			Units: mg/L		Analysis Date: 10/17/2023 02:10 PM		
Client ID: HLRK-MW-24S-101123					Run ID: ICPMS3_231017A			SeqNo: 10095872		Prep Date: 10/16/2023		DF: 10
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Calcium	455.6	2.2	5.0	10	463.7	-80.3	75-125	0			SO	

Batch ID: 227389

Instrument ID ICPMS3

Method: SW6020B

MS					Sample ID: 23101255-01BMS			Units: mg/L		Analysis Date: 10/17/2023 02:10 PM		
Client ID:					Run ID: ICPMS3_231017A			SeqNo: 10103380		Prep Date: 10/16/2023		DF: 10
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Calcium	455.6	2.2	5.0	10	463.7	-80.3	75-125	0			SO	

MSD					Sample ID: 23101252-02BMSD			Units: mg/L		Analysis Date: 10/16/2023 05:21 PM		
Client ID: HLRK-MW-24S-101123					Run ID: ICPMS3_231016A			SeqNo: 10092471		Prep Date: 10/16/2023		DF: 1
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Boron	0.658	0.015	0.020	0.5	0.1384	104	75-125	0.6568	0.182	20		
Magnesium	132.3	0.037	0.20	10	127.5	47.8	75-125	132.1	0.137	20	SO	
Potassium	14.73	0.034	0.20	10	4.87	98.6	75-125	14.83	0.676	20		
Sodium	15.38	0.13	0.20	10	4.967	104	75-125	15.36	0.141	20		

MSD					Sample ID: 23101255-01BMSD			Units: mg/L		Analysis Date: 10/16/2023 05:21 PM		
Client ID:					Run ID: ICPMS3_231016A			SeqNo: 10092655		Prep Date: 10/16/2023		DF: 1
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Boron	0.658	0.015	0.020	0.5	0.1384	104	75-125	0.6568	0.182	20		
Magnesium	132.3	0.037	0.20	10	127.5	47.8	75-125	132.1	0.137	20	SO	
Potassium	14.73	0.034	0.20	10	4.87	98.6	75-125	14.83	0.676	20		
Sodium	15.38	0.13	0.20	10	4.967	104	75-125	15.36	0.141	20		

MSD					Sample ID: 23101252-02BMSD			Units: mg/L		Analysis Date: 10/17/2023 02:11 PM		
Client ID: HLRK-MW-24S-101123					Run ID: ICPMS3_231017A			SeqNo: 10095873		Prep Date: 10/16/2023		DF: 10
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Calcium	469.7	2.2	5.0	10	463.7	60.4	75-125	455.6	3.04	20	SO	

MSD					Sample ID: 23101255-01BMSD			Units: mg/L		Analysis Date: 10/17/2023 02:11 PM		
Client ID:					Run ID: ICPMS3_231017A			SeqNo: 10103381		Prep Date: 10/16/2023		DF: 10
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Calcium	469.7	2.2	5.0	10	463.7	60.4	75-125	422.5	10.6	20	SO	

The following samples were analyzed in this batch:

23101252-01B

23101252-02B

23101252-03B

23101252-04B

Client: ETEM  
Work Order: 23101252  
Project: Hollow Rock 2023 2SA Sampling

QC BATCH REPORT

Batch ID: 227486 Instrument ID TDS Method: A2540 C-15

MBLK		Sample ID: MBLK-227486-227486				Units: mg/L		Analysis Date: 10/19/2023 01:11 PM			
Client ID:		Run ID: TDS_231019A				SeqNo: 10106012		Prep Date: 10/17/2023		DF: 1	
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Solids	U	22	30								

LCS		Sample ID: LCS-227486-227486				Units: mg/L		Analysis Date: 10/19/2023 01:11 PM			
Client ID:		Run ID: TDS_231019A				SeqNo: 10106011		Prep Date: 10/17/2023		DF: 1	
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Solids	480	22	30	495	0	97	85-109	0			

DUP		Sample ID: 23101202-01F DUP				Units: mg/L		Analysis Date: 10/19/2023 01:11 PM			
Client ID:		Run ID: TDS_231019A				SeqNo: 10105995		Prep Date: 10/17/2023		DF: 1	
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Solids	2273	74	100	0	0	0	0-0	2293	0.876	10	

DUP		Sample ID: 23101202-02F DUP				Units: mg/L		Analysis Date: 10/19/2023 01:11 PM			
Client ID:		Run ID: TDS_231019A				SeqNo: 10105997		Prep Date: 10/17/2023		DF: 1	
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Solids	1003	37	50	0	0	0	0-0	983.3	2.01	10	

The following samples were analyzed in this batch:

23101252-01A	23101252-02A	23101252-03A
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Client: ETEM  
Work Order: 23101252  
Project: Hollow Rock 2023 2SA Sampling

QC BATCH REPORT

Batch ID: 227493 Instrument ID TDS Method: A2540 C-15

MBLK		Sample ID: MBLK-227493-227493					Units: mg/L		Analysis Date: 10/19/2023 01:24 PM			
Client ID:		Run ID: TDS_231019B					SeqNo: 10106221		Prep Date: 10/17/2023		DF: 1	
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Total Dissolved Solids	U	22	30									

LCS		Sample ID: LCS-227493-227493					Units: mg/L		Analysis Date: 10/19/2023 01:24 PM			
Client ID:		Run ID: TDS_231019B					SeqNo: 10106220		Prep Date: 10/17/2023		DF: 1	
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Total Dissolved Solids	476	22	30	495	0	96.2	85-109		0			

DUP		Sample ID: 23101136-01C DUP					Units: mg/L		Analysis Date: 10/19/2023 01:24 PM			
Client ID:		Run ID: TDS_231019B					SeqNo: 10106211		Prep Date: 10/17/2023		DF: 1	
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Total Dissolved Solids	1967	74	100	0	0	0	0-0	2007	2.01	10		

The following samples were analyzed in this batch: 23101252-04A

Batch ID: R385862B

Instrument ID IC4

Method: SW9056A

MBLK		Sample ID: CCB/MBLK-D-R385862B					Units: mg/L		Analysis Date: 10/17/2023 06:24 PM			
Client ID:		Run ID: IC4_231017A					SeqNo: 10098779		Prep Date:		DF: 1	
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Chloride	U	0.31	1.0									
Fluoride	U	0.067	0.10									

MBLK		Sample ID: CCB/MBLK-E-R385862B					Units: mg/L		Analysis Date: 10/17/2023 08:22 PM			
Client ID:		Run ID: IC4_231017A					SeqNo: 10098791		Prep Date:		DF: 1	
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Chloride	U	0.31	1.0									
Fluoride	U	0.067	0.10									

MBLK		Sample ID: CCB/MBLK-F-R385862B					Units: mg/L		Analysis Date: 10/17/2023 09:01 PM			
Client ID:		Run ID: IC4_231017A					SeqNo: 10098795		Prep Date:		DF: 1	
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Chloride	U	0.31	1.0									
Fluoride	U	0.067	0.10									

LCS		Sample ID: MLCCV/LCS-D-R385862B					Units: mg/L		Analysis Date: 10/17/2023 06:15 PM			
Client ID:		Run ID: IC4_231017A					SeqNo: 10098778		Prep Date:		DF: 1	
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Chloride	9.691	0.31	1.0	10	0	96.9	88-110	0				
Fluoride	2.16	0.067	0.10	2	0	108	86-121	0				

LCS		Sample ID: MLCCV/LCS-E-R385862B					Units: mg/L		Analysis Date: 10/17/2023 08:12 PM			
Client ID:		Run ID: IC4_231017A					SeqNo: 10098790		Prep Date:		DF: 1	
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Chloride	9.777	0.31	1.0	10	0	97.8	88-110	0				
Fluoride	2.132	0.067	0.10	2	0	107	86-121	0				

LCS		Sample ID: MLCCV/LCS-F-R385862B					Units: mg/L		Analysis Date: 10/17/2023 08:51 PM			
Client ID:		Run ID: IC4_231017A					SeqNo: 10098794		Prep Date:		DF: 1	
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Chloride	9.724	0.31	1.0	10	0	97.2	88-110	0				
Fluoride	2.111	0.067	0.10	2	0	106	86-121	0				



Batch ID: R385862B

Instrument ID IC4

Method: SW9056A

MS					Sample ID: 23101252-02A MS			Units: mg/L		Analysis Date: 10/17/2023 07:42 PM		
Client ID: HLRK-MW-24S-101123					Run ID: IC4_231017A			SeqNo: 10098787		Prep Date:		DF: 40
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Chloride	403.6	12	40	400	23.76	95	88-110	0				
Fluoride	94.18	2.7	4.0	80	0	118	86-121	0				

MS					Sample ID: 23101255-01A MS			Units: mg/L		Analysis Date: 10/17/2023 07:42 PM		
Client ID:					Run ID: IC4_231017A			SeqNo: 10098827		Prep Date:		DF: 40
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Chloride	403.6	12	40	400	23.76	95	88-110	0				
Fluoride	94.18	2.7	4.0	80	0	118	86-121	0				

MSD					Sample ID: 23101252-02A MSD			Units: mg/L		Analysis Date: 10/17/2023 07:52 PM		
Client ID: HLRK-MW-24S-101123					Run ID: IC4_231017A			SeqNo: 10098788		Prep Date:		DF: 40
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Chloride	405.4	12	40	400	23.76	95.4	88-110	403.6	0.444	15		
Fluoride	94.45	2.7	4.0	80	0	118	86-121	94.18	0.28	15		

MSD					Sample ID: 23101255-01A MSD			Units: mg/L		Analysis Date: 10/17/2023 07:52 PM		
Client ID:					Run ID: IC4_231017A			SeqNo: 10098828		Prep Date:		DF: 40
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Chloride	405.4	12	40	400	23.76	95.4	88-110	403.6	0.444	15		
Fluoride	94.45	2.7	4.0	80	0	118	86-121	94.18	0.28	15		

The following samples were analyzed in this batch:

23101252-01A

23101252-02A

23101252-03A

23101252-04A

Batch ID: R385970A

Instrument ID IC4

Method: SW9056A

MBLK		Sample ID: CCB/MBLK-A-R385970A					Units: mg/L		Analysis Date: 10/18/2023 11:52 A			
Client ID:		Run ID: IC4_231018A				SeqNo: 10105169		Prep Date:		DF: 1		
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Sulfate	U	0.19	1.0									

MBLK		Sample ID: CCB/MBLK-B-R385970A					Units: mg/L		Analysis Date: 10/18/2023 03:07 PM			
Client ID:		Run ID: IC4_231018A				SeqNo: 10105181		Prep Date:		DF: 1		
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Sulfate	U	0.19	1.0									

MBLK		Sample ID: CCB/MBLK-C-R385970A					Units: mg/L		Analysis Date: 10/18/2023 05:05 PM			
Client ID:		Run ID: IC4_231018A				SeqNo: 10105193		Prep Date:		DF: 1		
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Sulfate	0.3043	0.19	1.0								J	

LCS		Sample ID: MLCCV/LCS-A-R385970A					Units: mg/L		Analysis Date: 10/18/2023 11:42 A			
Client ID:		Run ID: IC4_231018A				SeqNo: 10105168		Prep Date:		DF: 1		
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Sulfate	9.669	0.19	1.0	10		0	96.7	90-110	0			

LCS		Sample ID: MLCCV/LCS-B-R385970A					Units: mg/L		Analysis Date: 10/18/2023 02:57 PM			
Client ID:		Run ID: IC4_231018A				SeqNo: 10105180		Prep Date:		DF: 1		
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Sulfate	10.07	0.19	1.0	10		0	101	90-110	0			

LCS		Sample ID: MLCCV/LCS-C-R385970A					Units: mg/L		Analysis Date: 10/18/2023 04:55 PM			
Client ID:		Run ID: IC4_231018A				SeqNo: 10105192		Prep Date:		DF: 1		
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Sulfate	10.46	0.19	1.0	10		0	105	90-110	0			

MS		Sample ID: 23101246-01A MS					Units: mg/L		Analysis Date: 10/18/2023 03:26 PM			
Client ID:		Run ID: IC4_231018A				SeqNo: 10105183		Prep Date:		DF: 100		
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Sulfate	2029	19	100	1000		1038	99.1	90-110	0		E	

Client: ETEM  
Work Order: 23101252  
Project: Hollow Rock 2023 2SA Sampling

QC BATCH REPORT

Batch ID: R385970A Instrument ID IC4 Method: SW9056A

MSD		Sample ID: 23101246-01A MSD				Units: mg/L		Analysis Date: 10/18/2023 03:37 PM			
Client ID:		Run ID: IC4_231018A				SeqNo: 10105184		Prep Date:		DF: 100	
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Sulfate	2034	19	100	1000	1038	99.6	90-110	2029	0.232	15	E

The following samples were analyzed in this batch:

23101252-01A	23101252-03A	23101252-04A
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Batch ID: R385970B

Instrument ID IC4

Method: SW9056A

MBLK		Sample ID: CCB/MBLK-D-R385970B					Units: mg/L		Analysis Date: 10/18/2023 05:46 PM			
Client ID:		Run ID: IC4_231018A				SeqNo: 10105197		Prep Date:		DF: 1		
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Sulfate	U	0.19	1.0									

MBLK		Sample ID: CCB/MBLK-E-R385970B					Units: mg/L		Analysis Date: 10/18/2023 07:43 PM			
Client ID:		Run ID: IC4_231018A				SeqNo: 10105209		Prep Date:		DF: 1		
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Sulfate	U	0.19	1.0									

MBLK		Sample ID: CCB/MBLK-F-R385970B					Units: mg/L		Analysis Date: 10/18/2023 08:41 PM			
Client ID:		Run ID: IC4_231018A				SeqNo: 10105215		Prep Date:		DF: 1		
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Sulfate	U	0.19	1.0									

LCS		Sample ID: MLCCV/LCS-D-R385970B					Units: mg/L		Analysis Date: 10/18/2023 05:36 PM			
Client ID:		Run ID: IC4_231018A				SeqNo: 10105196		Prep Date:		DF: 1		
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Sulfate	9.843	0.19	1.0	10	0	98.4	90-110	0				

LCS		Sample ID: MLCCV/LCS-E-R385970B					Units: mg/L		Analysis Date: 10/18/2023 07:33 PM			
Client ID:		Run ID: IC4_231018A				SeqNo: 10105208		Prep Date:		DF: 1		
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Sulfate	10.15	0.19	1.0	10	0	101	90-110	0				

LCS		Sample ID: MLCCV/LCS-F-R385970B					Units: mg/L		Analysis Date: 10/18/2023 08:32 PM			
Client ID:		Run ID: IC4_231018A				SeqNo: 10105214		Prep Date:		DF: 1		
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Sulfate	10.09	0.19	1.0	10	0	101	90-110	0				

MS		Sample ID: 23101252-02A MS					Units: mg/L		Analysis Date: 10/18/2023 06:15 PM			
Client ID: HLRK-MW-24S-101123		Run ID: IC4_231018A				SeqNo: 10105200		Prep Date:		DF: 160		
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Sulfate	2964	30	160	1600	1305	104	90-110	0				

Client: ETEM  
Work Order: 23101252  
Project: Hollow Rock 2023 2SA Sampling

QC BATCH REPORT

Batch ID: R385970B Instrument ID IC4 Method: SW9056A

MS				Sample ID: 23101255-01A MS				Units: mg/L			Analysis Date: 10/18/2023 06:15 PM		
Client ID:				Run ID: IC4_231018A				SeqNo: 10105224		Prep Date:		DF: 160	
Analyte		Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	

MSD		Sample ID: 23101252-02A MSD					Units: mg/L		Analysis Date: 10/18/2023 06:25 PM			
Client ID: HLRK-MW-24S-101123		Run ID: IC4_231018A				SeqNo: 10105201		Prep Date:		DF: 160		
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Sulfate	2904	30	160	1600	1305	99.9	90-110	2964	2.03	15		

MSD		Sample ID: 23101255-01A MSD					Units: mg/L		Analysis Date: 10/18/2023 06:25 PM			
Client ID:		Run ID: IC4_231018A				SeqNo: 10105225		Prep Date:		DF: 160		
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Sulfate	2904	30	160	1600	1305	99.9	90-110	2964	2.03	15		

The following samples were analyzed in this batch:

23101252-02A

Batch ID: R386006Instrument ID Titrator 1Method: A2320 B-11

MBLK		Sample ID: MB-R386006-R386006					Units: mg/L		Analysis Date: 10/19/2023 09:40 A			
Client ID:		Run ID: TITRATOR 1_231019A				SeqNo: 10106331		Prep Date:		DF: 1		
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Alkalinity, Total (as CaCO3)	U	8.4	10									

LCS		Sample ID: LCS-R386006-R386006					Units: mg/L		Analysis Date: 10/19/2023 09:40 A			
Client ID:		Run ID: TITRATOR 1_231019A				SeqNo: 10106332		Prep Date:		DF: 1		
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Alkalinity, Total (as CaCO3)	1005	8.4	10	1000	0	101	90-110	0				

DUP		Sample ID: 23101009-07B DUP					Units: mg/L		Analysis Date: 10/19/2023 09:40 A			
Client ID:		Run ID: TITRATOR 1_231019A				SeqNo: 10106334		Prep Date:		DF: 1		
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Alkalinity, Total (as CaCO3)	324.4	8.4	10	0	0	0	0-0	298.4	8.35	10		

DUP		Sample ID: 23101240-03A DUP					Units: mg/L		Analysis Date: 10/19/2023 09:40 A			
Client ID:		Run ID: TITRATOR 1_231019A				SeqNo: 10106345		Prep Date:		DF: 1		
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Alkalinity, Total (as CaCO3)	445.1	8.4	10	0	0	0	0-0	427.9	3.94	10		

DUP		Sample ID: 23101246-01A DUP					Units: mg/L		Analysis Date: 10/19/2023 09:40 A			
Client ID:		Run ID: TITRATOR 1_231019A				SeqNo: 10106353		Prep Date:		DF: 1		
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Alkalinity, Total (as CaCO3)	589.3	8.4	10	0	0	0	0-0	584.8	0.768	10		

The following samples were analyzed in this batch:

23101252-02A

Batch ID: R386075A

Instrument ID IC4

Method: SW9056A

MBLK		Sample ID: CCB/MBLK-A-R386075A					Units: mg/L		Analysis Date: 10/19/2023 09:27 A			
Client ID:		Run ID: IC4_231019A				SeqNo: 10110028		Prep Date:		DF: 1		
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Chloride	U	0.31	1.0									

MBLK		Sample ID: CCB/MBLK-B-R386075A					Units: mg/L		Analysis Date: 10/19/2023 02:34 PM			
Client ID:		Run ID: IC4_231019A				SeqNo: 10110045		Prep Date:		DF: 1		
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Chloride	U	0.31	1.0									

MBLK		Sample ID: CCB/MBLK-C-R386075A					Units: mg/L		Analysis Date: 10/19/2023 07:35 PM			
Client ID:		Run ID: IC4_231019A				SeqNo: 10110063		Prep Date:		DF: 1		
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Chloride	U	0.31	1.0									

LCS		Sample ID: MLCCV/LCS-A-R386075A					Units: mg/L		Analysis Date: 10/19/2023 09:17 A			
Client ID:		Run ID: IC4_231019A				SeqNo: 10110026		Prep Date:		DF: 1		
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Chloride	9.62	0.31	1.0	10	0	96.2	88-110	0				

LCS		Sample ID: MLCCV/LCS-B-R386075A					Units: mg/L		Analysis Date: 10/19/2023 02:24 PM			
Client ID:		Run ID: IC4_231019A				SeqNo: 10110043		Prep Date:		DF: 1		
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Chloride	9.698	0.31	1.0	10	0	97	88-110	0				

LCS		Sample ID: MLCCV/LCS-C-R386075A					Units: mg/L		Analysis Date: 10/19/2023 07:25 PM			
Client ID:		Run ID: IC4_231019A				SeqNo: 10110061		Prep Date:		DF: 1		
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Chloride	9.552	0.31	1.0	10	0	95.5	88-110	0				

MS		Sample ID: 23101649-01B MS					Units: mg/L		Analysis Date: 10/19/2023 01:14 PM			
Client ID:		Run ID: IC4_231019A				SeqNo: 10110034		Prep Date:		DF: 40		
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Chloride	551.3	12	40	400	157.4	98.5	88-110	0				

Client: ETEM  
Work Order: 23101252  
Project: Hollow Rock 2023 2SA Sampling

QC BATCH REPORT

Batch ID: R386075A Instrument ID IC4 Method: SW9056A

MSD		Sample ID: 23101649-01B MSD				Units: mg/L		Analysis Date: 10/19/2023 01:23 PM			
Client ID:		Run ID: IC4_231019A				SeqNo: 10110035		Prep Date:		DF: 40	
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	542.5	12	40	400	157.4	96.3	88-110	551.3	1.6	15	

The following samples were analyzed in this batch:

23101252-01A23101252-03A



Client: ETEM  
Work Order: 23101252  
Project: Hollow Rock 2023 2SA Sampling

QC BATCH REPORT

Batch ID: R386147 Instrument ID Titrator 1 Method: A2320 B-11

MBLK		Sample ID: MB-R386147-R386147				Units: mg/L			Analysis Date: 10/20/2023 09:22 A			
Client ID:		Run ID: TITRATOR 1_231020A				SeqNo: 10112523			Prep Date:		DF: 1	
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Alkalinity, Total (as CaCO3)		U	8.4	10								

LCS		Sample ID: LCS-R386147-R386147				Units: mg/L			Analysis Date: 10/20/2023 09:22 A			
Client ID:		Run ID: TITRATOR 1_231020A				SeqNo: 10112524			Prep Date:		DF: 1	
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Alkalinity, Total (as CaCO3)		987.7	8.4	10	1000	0	98.8	90-110	0			

DUP		Sample ID: 23101125-10A DUP				Units: mg/L			Analysis Date: 10/20/2023 09:22 A			
Client ID:		Run ID: TITRATOR 1_231020A				SeqNo: 10112528			Prep Date:		DF: 1	
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Alkalinity, Total (as CaCO3)		298.4	8.4	10	0	0	0	0-0	293.3	1.71	10	

DUP		Sample ID: 23101246-06A DUP				Units: mg/L			Analysis Date: 10/20/2023 09:22 A			
Client ID:		Run ID: TITRATOR 1_231020A				SeqNo: 10112536			Prep Date:		DF: 1	
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Alkalinity, Total (as CaCO3)		627.2	8.4	10	0	0	0	0-0	636	1.41	10	

The following samples were analyzed in this batch:

23101252-01A	23101252-03A	23101252-04A
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Ref 210311

CHAIN OF CUSTODY RECORD/LABORATORY ANALYSIS  
REQUEST FORM

23101252

ETEM: ETEM  
Project: Hollow Rock 2023 2SA Sampling

dbrooks.2006@f-ts.com

Project Name: Hollow Rock 2023 Sampling

Project Number: HLRK-1005-23

Laboratory: ALS

Shipment Method: FTS

Program: Hollow Rock 2023 2SA Sampling




Company: Field &amp; Technical Services

Address: 200 Third Avenue

Carnegie, PA 15106

(412) 279-3363

Sample Date	Sample Time	Matrix	Sample Identification	Analysis	2320B_9056A_2540C	6020B-5 Total Metals														
				Preservative	None	HNO3														
				Total Bottle Count																Notes:
10/11/2023	0931	GW	HLRK-MW-41-101123	2	1	1														
10/11/2023	1116	GW	HLRK-MW-24S-101123	2	1	1														
10/11/2023	1116	GW	HLRK-MW-24SMS/MSD-101123	4	2	2														
10/11/2023	1236	GW	HLRK-MW-12S-101123	2	1	1														
10/11/2023	1336	GW	HLRK-MW-42-101123	2	1	1														

Relinquished by:	Received by:	Relinquished by:	Received by:	Turnaround Requirements
	Signature: 	Signature: 	Signature: 	<input type="checkbox"/> Rush  <input checked="" type="checkbox"/> Standard
Printed Name: Dakota Brooks	Printed Name: Carter Arch	Printed Name: Carter Arch	Printed Name: KJM	
Firm: FTS	Firm: FTS	Firm: FTS	Firm: ALS	
Date/Time: 10/11/2023 1619	Date/Time: 10/11/23 1619	Date/Time: 10/12/23 1240	Date/Time: 10-12-23 1240	

Rel: 10/13/23 0930 16-12-23 1700  
Recd 10/13/23 0930  
Q20  
1R3 4.1°C  
PH35

# ALS Group, USA

Holland, Michigan

## Sample Receipt Checklist

Client Name: **ETEM**

Date/Time Received: **13-Oct-23 09:30**

Work Order: **23101252**

Received by: **DS**

Checklist completed by <u>Diane Shaw</u>	13-Oct-23	Reviewed by: <u>Jodi Blauw</u>	16-Oct-23
eSignature	Date	eSignature	Date

Matrices: **Groundwater**

Carrier name: **FedEx**

Shipping container/cooler in good condition? Yes ☒ No ☐ Not Present ☐

Custody seals intact on shipping container/cooler? Yes ☐ No ☐ Not Present ☒

Custody seals intact on sample bottles? Yes ☐ No ☐ Not Present ☒

Chain of custody present? Yes ☒ No ☐

Chain of custody signed when relinquished and received? Yes ☒ No ☐

Chain of custody agrees with sample labels? Yes ☒ No ☐

Samples in proper container/bottle? Yes ☒ No ☐

Sample containers intact? Yes ☒ No ☐

Sufficient sample volume for indicated test? Yes ☒ No ☐

All samples received within holding time? Yes ☒ No ☐

Container/Temp Blank temperature in compliance? Yes ☒ No ☐

Sample(s) received on ice? Yes ☒ No ☐

Temperature(s)/Thermometer(s): 4.1/5.1 c IR3

Cooler(s)/Kit(s):

Date/Time sample(s) sent to storage: 10/13/2023 1:04:21 PM

Water - VOA vials have zero headspace? Yes ☐ No ☐ No VOA vials submitted ☒

Water - pH acceptable upon receipt? Yes ☒ No ☐ N/A ☐

pH adjusted? Yes ☐ No ☒ N/A ☐

pH adjusted by: -

Login Notes: pH check <2.

Client Contacted:

Date Contacted:

Person Contacted:

Contacted By:

Regarding:

Comments:

CorrectiveAction:

Revision: 1  
SRC Page 1 of 1



31-Oct-2023

Angela Gatchie  
ETEM  
200 Third Ave.  
Carnegie, PA 15106

Re: **Hollow Rock 2023 2SA Sampling**

Work Order: **23101261**

Dear Angela,

Revision: **1**

ALS Environmental received 4 samples on 13-Oct-2023 09:30 AM for the analyses presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental - Holland and for only the analyses requested.

Sample results are compliant with industry accepted practices and Quality Control results achieved laboratory specifications. Any exceptions are noted in the Case Narrative, or noted with qualifiers in the report or QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained from ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

The total number of pages in this report is 18.

If you have any questions regarding this report, please feel free to contact me:

ADDRESS: 3352 128th Avenue, Holland, MI, USA  
PHONE: +1 (616) 399-6070 FAX: +1 (616) 399-6185

Sincerely,

Electronically approved by: Jodi Blouw

Jodi Blouw

## Report of Laboratory Analysis

Certificate No: FL E871106

ALS GROUP USA, CORP Part of the ALS Laboratory Group A Campbell Brothers Limited Company

Client: ETEM  
Project: Hollow Rock 2023 2SA Sampling  
Work Order: 23101261

Work Order Sample Summary

<u>Lab Samp ID</u>	<u>Client Sample ID</u>	<u>Matrix</u>	<u>Tag Number</u>	<u>Collection Date</u>	<u>Date Received</u>	<u>Hold</u>
23101261-01	HLRK-MW-25S-101023	Groundwater		10/10/2023 10:43	10/13/2023 09:30	<input type="checkbox"/>
23101261-02	HLRK-MW-23S-101023	Groundwater		10/10/2023 13:16	10/13/2023 09:30	<input type="checkbox"/>
23101261-03	HLRK-MW-11S-101023	Groundwater		10/10/2023 14:26	10/13/2023 09:30	<input type="checkbox"/>
23101261-04	HLRK-MW-22S-101023	Groundwater		10/10/2023 16:24	10/13/2023 09:30	<input type="checkbox"/>

**Client:** ETEM  
**Project:** Hollow Rock 2023 2SA Sampling  
**WorkOrder:** 23101261

**QUALIFIERS,  
ACRONYMS, UNITS**

<u>Qualifier</u>	<u>Description</u>
*	Value exceeds Regulatory Limit
**	Estimated Value
a	Analyte is non-accredited
B	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
H	Analyzed outside of Holding Time
Hr	BOD/CBOD - Sample was reset outside Hold Time, value should be considered estimated.
J	Analyte is present at an estimated concentration between the MDL and Report Limit
n	Analyte accreditation is not offered
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL
X	Analyte was detected in the Method Blank between the MDL and Reporting Limit, sample results may exhibit background or reagent contamination at the observed level.

<u>Acronym</u>	<u>Description</u>
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
LOD	Limit of Detection (see MDL)
LOQ	Limit of Quantitation (see PQL)
MBLK	Method Blank
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PQL	Practical Quantitation Limit
RPD	Relative Percent Difference
TDL	Target Detection Limit
TNTC	Too Numerous To Count
A	APHA Standard Methods
D	ASTM
E	EPA
SW	SW-846 Update III

<u>Units Reported</u>	<u>Description</u>
mg/L	Milligrams per Liter

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**Client:** ETEM  
**Project:** Hollow Rock 2023 2SA Sampling  
**Work Order:** 23101261

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**Case Narrative**

Samples for the above noted Work Order were received on 10/13/2023. The attached "Sample Receipt Checklist" documents the status of custody seals, container integrity, preservation, and temperature compliance.

Samples were analyzed according to the analytical methodology previously transmitted in the "Work Order Acknowledgement". Methodologies are also documented in the "Analytical Result" section for each sample. Quality control results are listed in the "QC Report" section. Sample association for the reported quality control is located at the end of each batch summary. If applicable, results are appropriately qualified in the Analytical Result and QC Report sections. The "Qualifiers" section documents the various qualifiers, units, and acronyms utilized in reporting. A copy of the laboratory's scope of accreditation is available upon request.

With the following exceptions, all sample analyses achieved analytical criteria.

**Metals:**

No deviations or anomalies were noted.

**Wet Chemistry:**

No deviations or anomalies were noted.

Rev1 - revised to report correct metals list

Client:	ETEM	
Project:	Hollow Rock 2023 2SA Sampling	Work Order: 23101261
Sample ID:	HLRK-MW-25S-101023	Lab ID: 23101261-01
Collection Date:	10/10/2023 10:43 AM	Matrix: GROUNDWATER

Analyses	Result	Qual	MDL	Report Limit	Units	Dilution Factor	Date Analyzed
METALS BY ICP-MS			Method: SW6020B		Prep: SW3015A / 10/16/23		Analyst: STP
Boron	0.34		0.015	0.020	mg/L	1	10/16/2023 17:28
Calcium	140		0.22	0.50	mg/L	1	10/16/2023 17:28
Magnesium	49		0.037	0.20	mg/L	1	10/16/2023 17:28
Potassium	5.5		0.034	0.20	mg/L	1	10/16/2023 17:28
Sodium	36		0.13	0.20	mg/L	1	10/16/2023 17:28
ALKALINITY			Method: A2320 B-11				Analyst: JB
Alkalinity, Total (as CaCO3)	338		8.4	10	mg/L	1	10/20/2023 09:22
ANIONS BY ION CHROMATOGRAPHY			Method: SW9056A				Analyst: QTN
Chloride	7.40		0.31	1.0	mg/L	1	10/19/2023 18:17
Fluoride	U		0.067	0.10	mg/L	1	10/19/2023 18:17
Sulfate	328		7.6	40	mg/L	40	10/20/2023 12:12
TOTAL DISSOLVED SOLIDS			Method: A2540 C-15		Prep: FILTER / 10/16/23		Analyst: LAD
Total Dissolved Solids	770		37	50	mg/L	1	10/18/2023 13:56



Client:	ETEM	
Project:	Hollow Rock 2023 2SA Sampling	Work Order: 23101261
Sample ID:	HLRK-MW-23S-101023	Lab ID: 23101261-02
Collection Date:	10/10/2023 01:16 PM	Matrix: GROUNDWATER

Analyses	Result	Qual	MDL	Report Limit	Units	Dilution Factor	Date Analyzed
METALS BY ICP-MS			Method: SW6020B		Prep: SW3015A / 10/16/23		Analyst: STP
Boron	0.18		0.015	0.020	mg/L	1	10/16/2023 17:35
Calcium	370		2.2	5.0	mg/L	10	10/17/2023 14:28
Magnesium	100		0.037	0.20	mg/L	1	10/16/2023 17:35
Potassium	3.6		0.034	0.20	mg/L	1	10/16/2023 17:35
Sodium	8.6		0.13	0.20	mg/L	1	10/16/2023 17:35
ALKALINITY			Method: A2320 B-11				Analyst: JB
Alkalinity, Total (as CaCO3)	363		8.4	10	mg/L	1	10/20/2023 09:22
ANIONS BY ION CHROMATOGRAPHY			Method: SW9056A				Analyst: QTN
Chloride	14.4		0.31	1.0	mg/L	1	10/19/2023 18:27
Fluoride	U		0.067	0.10	mg/L	1	10/19/2023 18:27
Sulfate	1,090		19	100	mg/L	100	10/20/2023 12:41
TOTAL DISSOLVED SOLIDS			Method: A2540 C-15		Prep: FILTER / 10/16/23		Analyst: LAD
Total Dissolved Solids	1,800		74	100	mg/L	1	10/18/2023 13:56

Note: See Qualifiers page for a list of qualifiers and their definitions.

Client:	ETEM	
Project:	Hollow Rock 2023 2SA Sampling	Work Order: 23101261
Sample ID:	HLRK-MW-11S-101023	Lab ID: 23101261-03
Collection Date:	10/10/2023 02:26 PM	Matrix: GROUNDWATER

Analyses	Result	Qual	MDL	Report Limit	Units	Dilution Factor	Date Analyzed
METALS BY ICP-MS			Method: SW6020B		Prep: SW3015A / 10/16/23		Analyst: STP
Boron	0.037		0.015	0.020	mg/L	1	10/16/2023 17:37
Calcium	470		2.2	5.0	mg/L	10	10/17/2023 14:30
Magnesium	120		0.037	0.20	mg/L	1	10/16/2023 17:37
Potassium	2.3		0.034	0.20	mg/L	1	10/16/2023 17:37
Sodium	12		0.13	0.20	mg/L	1	10/16/2023 17:37
ALKALINITY			Method: A2320 B-11				Analyst: JB
Alkalinity, Total (as CaCO3)	506		8.4	10	mg/L	1	10/20/2023 09:22
ANIONS BY ION CHROMATOGRAPHY			Method: SW9056A				Analyst: QTN
Chloride	14.9		0.31	1.0	mg/L	1	10/19/2023 18:36
Fluoride	U		0.067	0.10	mg/L	1	10/19/2023 18:36
Sulfate	1,210		30	160	mg/L	160	10/20/2023 12:51
TOTAL DISSOLVED SOLIDS			Method: A2540 C-15		Prep: FILTER / 10/16/23		Analyst: LAD
Total Dissolved Solids	2,200		74	100	mg/L	1	10/18/2023 13:56

Client:	ETEM		
Project:	Hollow Rock 2023 2SA Sampling	Work Order:	23101261
Sample ID:	HLRK-MW-22S-101023	Lab ID:	23101261-04
Collection Date:	10/10/2023 04:24 PM	Matrix:	GROUNDWATER

Analyses	Result	Qual	MDL	Report Limit	Units	Dilution Factor	Date Analyzed
METALS BY ICP-MS			Method: SW6020B		Prep: SW3015A / 10/16/23		Analyst: STP
Boron	0.18		0.015	0.020	mg/L	1	10/16/2023 17:39
Calcium	440		2.2	5.0	mg/L	10	10/17/2023 14:32
Magnesium	170		0.037	0.20	mg/L	1	10/16/2023 17:39
Potassium	4.6		0.034	0.20	mg/L	1	10/16/2023 17:39
Sodium	21		0.13	0.20	mg/L	1	10/16/2023 17:39
ALKALINITY			Method: A2320 B-11				Analyst: JB
Alkalinity, Total (as CaCO3)	546		8.4	10	mg/L	1	10/20/2023 09:22
ANIONS BY ION CHROMATOGRAPHY			Method: SW9056A				Analyst: QTN
Chloride	18.1		0.31	1.0	mg/L	1	10/19/2023 18:46
Fluoride	U		0.067	0.10	mg/L	1	10/19/2023 18:46
Sulfate	1,410		30	160	mg/L	160	10/20/2023 13:00
TOTAL DISSOLVED SOLIDS			Method: A2540 C-15		Prep: FILTER / 10/16/23		Analyst: LAD
Total Dissolved Solids	2,300		74	100	mg/L	1	10/18/2023 13:56

Note: See Qualifiers page for a list of qualifiers and their definitions.

Batch ID: 227389

Instrument ID ICPMS3

Method: SW6020B

MBLK					Sample ID: MBLK-227389-227389			Units: mg/L		Analysis Date: 10/16/2023 04:52 PM		
Client ID:					Run ID: ICPMS3_231016A			SeqNo: 10092454		Prep Date: 10/16/2023		DF: 1
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Boron	U	0.015	0.020									
Calcium	U	0.22	0.50									
Magnesium	U	0.037	0.20									
Potassium	U	0.034	0.20									
Sodium	U	0.13	0.20									

LCS					Sample ID: LCS-227389-227389			Units: mg/L		Analysis Date: 10/16/2023 04:54 PM		
Client ID:					Run ID: ICPMS3_231016A			SeqNo: 10092455		Prep Date: 10/16/2023		DF: 1
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Boron	0.5154	0.015	0.020	0.5	0	103	80-120	0				
Calcium	10.1	0.22	0.50	10	0	101	80-120	0				
Magnesium	10.58	0.037	0.20	10	0	106	80-120	0				
Potassium	10.17	0.034	0.20	10	0	102	80-120	0				
Sodium	10.62	0.13	0.20	10	0	106	80-120	0				

MS					Sample ID: 23101252-02BMS			Units: mg/L		Analysis Date: 10/16/2023 05:19 PM		
Client ID:					Run ID: ICPMS3_231016A			SeqNo: 10092470		Prep Date: 10/16/2023		DF: 1
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Boron	0.6568	0.015	0.020	0.5	0.1384	104	75-125	0				
Magnesium	132.1	0.037	0.20	10	127.5	46	75-125	0			SO	
Potassium	14.83	0.034	0.20	10	4.87	99.6	75-125	0				
Sodium	15.36	0.13	0.20	10	4.967	104	75-125	0				

MS					Sample ID: 23101255-01BMS			Units: mg/L		Analysis Date: 10/16/2023 05:19 PM		
Client ID:					Run ID: ICPMS3_231016A			SeqNo: 10092654		Prep Date: 10/16/2023		DF: 1
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Boron	0.6568	0.015	0.020	0.5	0.1384	104	75-125	0				
Magnesium	132.1	0.037	0.20	10	127.5	46	75-125	0			SO	
Potassium	14.83	0.034	0.20	10	4.87	99.6	75-125	0				
Sodium	15.36	0.13	0.20	10	4.967	104	75-125	0				

MS					Sample ID: 23101252-02BMS			Units: mg/L		Analysis Date: 10/17/2023 02:10 PM		
Client ID:					Run ID: ICPMS3_231017A			SeqNo: 10095872		Prep Date: 10/16/2023		DF: 10
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Calcium	455.6	2.2	5.0	10	463.7	-80.3	75-125	0			SO	

Batch ID: 227389

Instrument ID ICPMS3

Method: SW6020B

MS		Sample ID: 23101255-01BMS				Units: mg/L		Analysis Date: 10/17/2023 02:10 PM			
Client ID:		Run ID: ICPMS3_231017A				SeqNo: 10103380		Prep Date: 10/16/2023		DF: 10	
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Calcium	455.6	2.2	5.0	10	463.7	-80.3	75-125	0			SO

MSD		Sample ID: 23101252-02BMSD				Units: mg/L		Analysis Date: 10/16/2023 05:21 PM			
Client ID:		Run ID: ICPMS3_231016A				SeqNo: 10092471		Prep Date: 10/16/2023		DF: 1	
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Boron	0.658	0.015	0.020	0.5	0.1384	104	75-125	0.6568	0.182	20	
Magnesium	132.3	0.037	0.20	10	127.5	47.8	75-125	132.1	0.137	20	SO
Potassium	14.73	0.034	0.20	10	4.87	98.6	75-125	14.83	0.676	20	
Sodium	15.38	0.13	0.20	10	4.967	104	75-125	15.36	0.141	20	

MSD		Sample ID: 23101255-01BMSD				Units: mg/L		Analysis Date: 10/16/2023 05:21 PM			
Client ID:		Run ID: ICPMS3_231016A				SeqNo: 10092655		Prep Date: 10/16/2023		DF: 1	
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Boron	0.658	0.015	0.020	0.5	0.1384	104	75-125	0.6568	0.182	20	
Magnesium	132.3	0.037	0.20	10	127.5	47.8	75-125	132.1	0.137	20	SO
Potassium	14.73	0.034	0.20	10	4.87	98.6	75-125	14.83	0.676	20	
Sodium	15.38	0.13	0.20	10	4.967	104	75-125	15.36	0.141	20	

MSD		Sample ID: 23101252-02BMSD				Units: mg/L		Analysis Date: 10/17/2023 02:11 PM			
Client ID:		Run ID: ICPMS3_231017A				SeqNo: 10095873		Prep Date: 10/16/2023		DF: 10	
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Calcium	469.7	2.2	5.0	10	463.7	60.4	75-125	455.6	3.04	20	SO

MSD		Sample ID: 23101255-01BMSD				Units: mg/L		Analysis Date: 10/17/2023 02:11 PM			
Client ID:		Run ID: ICPMS3_231017A				SeqNo: 10103381		Prep Date: 10/16/2023		DF: 10	
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Calcium	469.7	2.2	5.0	10	463.7	60.4	75-125	422.5	10.6	20	SO

The following samples were analyzed in this batch:

23101261-01B

23101261-02B

23101261-03B

23101261-04B

Batch ID: 227418Instrument ID TDSMethod: A2540 C-15

MBLK		Sample ID: MBLK-227418-227418					Units: mg/L		Analysis Date: 10/18/2023 01:56 PM			
Client ID:		Run ID: TDS_231018B					SeqNo: 10101453		Prep Date: 10/16/2023		DF: 1	
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Total Dissolved Solids	U	22	30									

LCS		Sample ID: LCS-227418-227418					Units: mg/L		Analysis Date: 10/18/2023 01:56 PM			
Client ID:		Run ID: TDS_231018B					SeqNo: 10101452		Prep Date: 10/16/2023		DF: 1	
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Total Dissolved Solids	484	22	30	495	0	97.8	85-109	0				

DUP		Sample ID: 23101246-05A DUP					Units: mg/L		Analysis Date: 10/18/2023 01:56 PM			
Client ID:		Run ID: TDS_231018B					SeqNo: 10101444		Prep Date: 10/16/2023		DF: 1	
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Total Dissolved Solids	2167	74	100	0	0	0	0-0	2160	0.308	10		

DUP		Sample ID: 23101263-02A DUP					Units: mg/L		Analysis Date: 10/18/2023 01:56 PM			
Client ID:		Run ID: TDS_231018B					SeqNo: 10101451		Prep Date: 10/16/2023		DF: 1	
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Total Dissolved Solids	1893	74	100	0	0	0	0-0	1867	1.42	10		

The following samples were analyzed in this batch:

23101261-01A

23101261-02A

23101261-03A

23101261-04A

Batch ID: R386075A

Instrument ID IC4

Method: SW9056A

MBLK		Sample ID: CCB/MBLK-A-R386075A					Units: mg/L		Analysis Date: 10/19/2023 09:27 A			
Client ID:		Run ID: IC4_231019A					SeqNo: 10110028		Prep Date:		DF: 1	
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	

Chloride	U	0.31	1.0
Fluoride	U	0.067	0.10

MBLK		Sample ID: CCB/MBLK-B-R386075A					Units: mg/L		Analysis Date: 10/19/2023 02:34 PM			
Client ID:		Run ID: IC4_231019A					SeqNo: 10110045		Prep Date:		DF: 1	
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	

Chloride	U	0.31	1.0
Fluoride	U	0.067	0.10

MBLK		Sample ID: CCB/MBLK-C-R386075A					Units: mg/L		Analysis Date: 10/19/2023 07:35 PM			
Client ID:		Run ID: IC4_231019A					SeqNo: 10110063		Prep Date:		DF: 1	
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	

Chloride	U	0.31	1.0
Fluoride	U	0.067	0.10

LCS		Sample ID: MLCCV/LCS-A-R386075A					Units: mg/L		Analysis Date: 10/19/2023 09:17 A			
Client ID:		Run ID: IC4_231019A					SeqNo: 10110026		Prep Date:		DF: 1	
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	

Chloride	9.62	0.31	1.0	10	0	96.2	88-110	0
Fluoride	2.062	0.067	0.10	2	0	103	86-121	0

LCS		Sample ID: MLCCV/LCS-B-R386075A					Units: mg/L		Analysis Date: 10/19/2023 02:24 PM			
Client ID:		Run ID: IC4_231019A					SeqNo: 10110043		Prep Date:		DF: 1	
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	

Chloride	9.698	0.31	1.0	10	0	97	88-110	0
Fluoride	2.059	0.067	0.10	2	0	103	86-121	0

LCS		Sample ID: MLCCV/LCS-C-R386075A					Units: mg/L		Analysis Date: 10/19/2023 07:25 PM			
Client ID:		Run ID: IC4_231019A					SeqNo: 10110061		Prep Date:		DF: 1	
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	

Chloride	9.552	0.31	1.0	10	0	95.5	88-110	0
Fluoride	2.076	0.067	0.10	2	0	104	86-121	0

Client: ETEM  
Work Order: 23101261  
Project: Hollow Rock 2023 2SA Sampling

QC BATCH REPORT

Batch ID: R386075A Instrument ID IC4 Method: SW9056A

MS		Sample ID: 23101649-01B MS				Units: mg/L		Analysis Date: 10/19/2023 01:14 PM			
Client ID:		Run ID: IC4_231019A				SeqNo: 10110034		Prep Date:		DF: 40	
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual

Chloride	551.3	12	40	400	157.4	98.5	88-110	0			
Fluoride	88.56	2.7	4.0	80	0	111	86-121	0			

MSD		Sample ID: 23101649-01B MSD				Units: mg/L		Analysis Date: 10/19/2023 01:23 PM			
Client ID:		Run ID: IC4_231019A				SeqNo: 10110035		Prep Date:		DF: 40	
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual

Chloride	542.5	12	40	400	157.4	96.3	88-110	551.3	1.6	15	
Fluoride	87.87	2.7	4.0	80	0	110	86-121	88.56	0.784	15	

The following samples were analyzed in this batch:

23101261-01A	23101261-02A	23101261-03A
23101261-04A		



Client: ETEM  
Work Order: 23101261  
Project: Hollow Rock 2023 2SA Sampling

QC BATCH REPORT

Batch ID: R386147 Instrument ID Titrator 1 Method: A2320 B-11

MBLK		Sample ID: MB-R386147-R386147				Units: mg/L			Analysis Date: 10/20/2023 09:22 A			
Client ID:		Run ID: TITRATOR 1_231020A				SeqNo: 10112523			Prep Date:		DF: 1	
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	

Alkalinity, Total (as CaCO3) U 8.4 10

LCS		Sample ID: LCS-R386147-R386147				Units: mg/L			Analysis Date: 10/20/2023 09:22 A			
Client ID:		Run ID: TITRATOR 1_231020A				SeqNo: 10112524			Prep Date:		DF: 1	
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	

Alkalinity, Total (as CaCO3) 987.7 8.4 10 1000 0 98.8 90-110 0

DUP		Sample ID: 23101125-10A DUP				Units: mg/L			Analysis Date: 10/20/2023 09:22 A			
Client ID:		Run ID: TITRATOR 1_231020A				SeqNo: 10112528			Prep Date:		DF: 1	
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	

Alkalinity, Total (as CaCO3) 298.4 8.4 10 0 0 0 0-0 293.3 1.71 10

DUP		Sample ID: 23101246-06A DUP				Units: mg/L			Analysis Date: 10/20/2023 09:22 A			
Client ID:		Run ID: TITRATOR 1_231020A				SeqNo: 10112536			Prep Date:		DF: 1	
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	

Alkalinity, Total (as CaCO3) 627.2 8.4 10 0 0 0 0-0 636 1.41 10

The following samples were analyzed in this batch:

23101261-01A	23101261-02A	23101261-03A
23101261-04A		

Batch ID: R386178A

Instrument ID IC4

Method: SW9056A

MBLK		Sample ID: CCB/MBLK-A-R386178A					Units: mg/L		Analysis Date: 10/20/2023 11:07 A			
Client ID:		Run ID: IC4_231020A				SeqNo: 10114248		Prep Date:		DF: 1		
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Sulfate	U	0.19	1.0									

MBLK		Sample ID: CCB/MBLK-B-R386178A					Units: mg/L		Analysis Date: 10/20/2023 01:59 PM			
Client ID:		Run ID: IC4_231020A				SeqNo: 10114260		Prep Date:		DF: 1		
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Sulfate	U	0.19	1.0									

MBLK		Sample ID: CCB/MBLK-C-R386178A					Units: mg/L		Analysis Date: 10/20/2023 05:31 PM			
Client ID:		Run ID: IC4_231020A				SeqNo: 10114272		Prep Date:		DF: 1		
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Sulfate	U	0.19	1.0									

LCS		Sample ID: MLCCV/LCS-A-R386178A					Units: mg/L		Analysis Date: 10/20/2023 10:58 A			
Client ID:		Run ID: IC4_231020A				SeqNo: 10114247		Prep Date:		DF: 1		
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Sulfate	9.704	0.19	1.0	10	0	97	90-110	0				

LCS		Sample ID: MLCCV/LCS-B-R386178A					Units: mg/L		Analysis Date: 10/20/2023 01:49 PM			
Client ID:		Run ID: IC4_231020A				SeqNo: 10114259		Prep Date:		DF: 1		
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Sulfate	9.996	0.19	1.0	10	0	100	90-110	0				

LCS		Sample ID: MLCCV/LCS-C-R386178A					Units: mg/L		Analysis Date: 10/20/2023 05:22 PM			
Client ID:		Run ID: IC4_231020A				SeqNo: 10114271		Prep Date:		DF: 1		
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Sulfate	10.29	0.19	1.0	10	0	103	90-110	0				

MS		Sample ID: 23101261-01A MS					Units: mg/L		Analysis Date: 10/20/2023 12:21 PM			
Client ID: HLRK-MW-25S-101023		Run ID: IC4_231020A				SeqNo: 10114250		Prep Date:		DF: 40		
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Sulfate	722.8	7.6	40	400	327.9	98.7	90-110	0				

Client: ETEM  
Work Order: 23101261  
Project: Hollow Rock 2023 2SA Sampling

QC BATCH REPORT

Batch ID: R386178A Instrument ID IC4 Method: SW9056A

MS		Sample ID: 23101263-01A MS				Units: mg/L		Analysis Date: 10/20/2023 12:21 PM			
Client ID:		Run ID: IC4_231020A				SeqNo: 10115510		Prep Date:		DF: 40	
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Sulfate	722.8	7.6	40	400	327.9	98.7	90-110	0			

MSD		Sample ID: 23101261-01A MSD				Units: mg/L		Analysis Date: 10/20/2023 12:31 PM			
Client ID: HLRK-MW-25S-101023		Run ID: IC4_231020A				SeqNo: 10114251		Prep Date:		DF: 40	
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Sulfate	733.9	7.6	40	400	327.9	101	90-110	722.8	1.52	15	

MSD		Sample ID: 23101263-01A MSD				Units: mg/L		Analysis Date: 10/20/2023 12:31 PM			
Client ID:		Run ID: IC4_231020A				SeqNo: 10115511		Prep Date:		DF: 40	
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Sulfate	733.9	7.6	40	400	327.9	101	90-110	722.8	1.52	15	

The following samples were analyzed in this batch:

23101261-01A	23101261-02A	23101261-03A
23101261-04A		



Ref 210311

# CHAIN OF CUSTODY RECORD/LABORATORY ANALYSIS REQUEST FORM

23101261

ELEM: ELEM

Project: Hollow Rock 2023 2SA Sampling



dbrooks.2006@f-ts.com

Project Name: Hollow Rock 2023 Sampling

Project Number: HLRK-1005-23

Laboratory: ALS

Shipment Method: FTS

Program: Hollow Rock 2023 2SA Sampling

Company: Field & Technical Services

Address: 200 Third Avenue

Carnegie, PA 15106

(412) 279-3363

Sample Date	Sample Time	Matrix	Sample Identification	Analysis	2320B_9056A_2540C	6020B-5 Total Metals														
				Preservative	None	HNO3														
				Total Bottle Count																Notes:
10/10/2023	1043	GW	HLRK-MW-25S-101023	2	1	1														
10/10/2023	1316	GW	HLRK-MW-23S-101023	2	1	1														
10/10/2023	1426	GW	HLRK-MW-11S-101023	2	1	1														
10/10/2023	1624	GW	HLRK-MW-22S-101023	2	1	1														

Relinquished by:	Received by:	Relinquished by:	Received by:	Turnaround Requirements
	Signature: 	Signature: 	Signature: 	<input type="checkbox"/> Rush  <input checked="" type="checkbox"/> Standard
Printed Name: Dakota Brooks	Printed Name: Carter Aulh	Printed Name: Carter Aulh	Printed Name: KM	
Firm FTS	Firm FTS	Firm FTS	Firm ALS	
Date/Time: 10/10/2023 1644	Date/Time: 10/10/23 1644	Date/Time: 10/12/23 1240	Date/Time: 10-12-23 1240	

Rel: 10/13/23 0930  
10-12-23 1700  
Reg'd 10/13/23 0930  
QZ  
IR3 4.1c  
PH35  
Page 1 of 1

# ALS Group, USA

Holland, Michigan

## Sample Receipt Checklist

Client Name: **ETEM**

Date/Time Received: **13-Oct-23 09:30**

Work Order: **23101261**

Received by: **DS**

Checklist completed by <u>Diane Shaw</u>	13-Oct-23	Reviewed by: <u>Jodi Blauw</u>	16-Oct-23
eSignature	Date	eSignature	Date

Matrices: **Groundwater**

Carrier name: **FedEx**

Shipping container/cooler in good condition?

Yes ☒

No ☐

Not Present ☐

Custody seals intact on shipping container/cooler?

Yes ☐

No ☐

Not Present ☒

Custody seals intact on sample bottles?

Yes ☐

No ☐

Not Present ☒

Chain of custody present?

Yes ☒

No ☐

Chain of custody signed when relinquished and received?

Yes ☒

No ☐

Chain of custody agrees with sample labels?

Yes ☒

No ☐

Samples in proper container/bottle?

Yes ☒

No ☐

Sample containers intact?

Yes ☒

No ☐

Sufficient sample volume for indicated test?

Yes ☒

No ☐

All samples received within holding time?

Yes ☒

No ☐

Container/Temp Blank temperature in compliance?

Yes ☒

No ☐

Sample(s) received on ice?

Yes ☒

No ☐

Temperature(s)/Thermometer(s):

4.1/5.1 c

IR3

Cooler(s)/Kit(s):

Date/Time sample(s) sent to storage:

10/13/2023 1:32:20 PM

Water - VOA vials have zero headspace?

Yes ☐

No ☐

No VOA vials submitted ☒

Water - pH acceptable upon receipt?

Yes ☒

No ☐

N/A ☐

pH adjusted?

Yes ☐

No ☒

N/A ☐

pH adjusted by:

-

Login Notes: **pH check <2.**

Client Contacted:

Date Contacted:

Person Contacted:

Contacted By:

Regarding:

Comments:

CorrectiveAction: