2021 Annual Groundwater Summary

Brickhaven No.2 Mine Tract "A" Structural Fill Permit 19-10

The Brickhaven No.2 Mine Tract "A" Structural Fill groundwater monitoring system is designed to meet the requirements of the North Carolina Coal Ash Management Act of 2014 (CAMA) and North Carolina Department of Environmental Quality Rule 15A NCAC 13B Section .1631.

HDR conducted the required 2021 semi-annual sampling events on April 12-15 and November 15-19, 2021. Groundwater monitoring and sampling at the site is governed by the following:

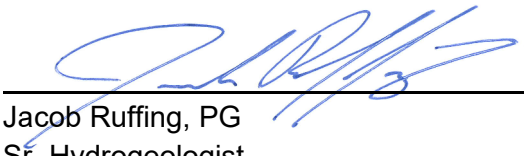
- North Carolina - Coal Ash Management Act (CAMA) of 2014 (Senate Bill 729)
- Water Quality Monitoring Plan Brickhaven No.2 Mine Tract "A" Structural Fill, approved March 2015
- North Carolina Department of Environmental Quality (NCDEQ) Permit No. 1910-STRUC-2015, issued June 5, 2015
- NCDEQ Solid Waste Section Guidelines for Groundwater, Soil, and Surface Water Sampling, April 2008
- NCDEQ Division of Water Management memorandum concerning electronic document submittal for routine groundwater and surface water monitoring, November 5, 2014
- U.S. Environmental Protection Agency (EPA) Region I, *Low Stress (low flow) Purging and Sampling Procedure for the Collection of Ground Water Samples from Monitoring Wells*, January 19, 2010
- EPA 2009, Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance and CFR 40 257.93 (f)(3)

The First and Second Semi-Annual Reports with an EPA method of statistical analyses were submitted to the NCDEQ Division of Waste Management on June 24 and November 5, 2020 respectively. The reports are attached for reference and can be found on the NCDEQ website at this location https://deq.nc.gov/about/divisions/waste-management/laserfiche. The following information has been provided in those reports:

- Status of the groundwater monitoring for the structural fill
- Site conditions and key actions completed during the reporting period
- Key activities proposed for the upcoming year
- A map showing the background (or upgradient) and downgradient monitoring wells
- Monitoring data obtained from sampling of wells, including information on the samples collected

The findings of the groundwater sampling and laboratory testing conducted in 2021 indicate the presence of naturally occurring constituents that were detected at various levels both prior to and after placement of coal combustion products.

As HDR's authorized representative, I have prepared or supervised the preparation of the referenced documents above; which have been prepared in general accordance with industry standards and practices; and the information contained therein is truthful and accurate to the best of my knowledge.



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2021 First Semi-Annual Detection Monitoring Report

Brickhaven No.2 Mine Tract “A” Structural Fill

Charah Solutions, Inc.

Moncure, Chatham County, North Carolina

August 9, 2021

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Select Acronyms

µg/L	micrograms per liter
BGS	below ground surface
BTOC	below top of casing
BTV	background threshold value
CAMA	North Carolina Coal Ash Management Act of 2014
CCP	Coal Combustion Products
CFR	Code of Federal Regulations
CL	lean clay
DEC	Duke Energy Carolinas
DEP	Duke Energy Progress
DO	Dissolved Oxygen
DTW	Depth-to-Water
GW	Groundwater
KM	Kaplan-Meier Method
MDL	Method Detection Limit
MLE	Maximum Likelihood Estimate
MRL	Method Reporting Limit
msl	mean sea level
NCDENR	North Carolina Department of Environment and Natural Resources
NCDEQ	North Carolina Department of Environmental Quality
N	Standard Penetration Resistance
ND	Non-detects
NTU	Nephelometric turbidity units
ORP	Oxidation-Reduction Potential
ROS	Regression on Order Statistics
SSI	Statistically Significant Increase
TD	total depth
TOC	top of casing
UPL	Upper Prediction Limit
USCS	Unified Soil Classification System
USEPA	United States Environmental Protection Agency

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1 Introduction

1.1 Purpose

The purpose of this *2021 First Semi-Annual Detection Monitoring Report* is to summarize quarterly detection monitoring results conducted at the Brickhaven No.2 Mine Tract "A" Structural Fill site in Moncure, Chatham County, North Carolina between January 25 and 29, 2021 and April 12 and 15, 2021.

1.2 Regulatory Compliance

Operating under Facility Permit #1910-STRUT-2015, Charah is required to monitor groundwater and surface water quality at designated locations, in accordance with the following rules and regulations:

- North Carolina - Coal Ash Management Act (CAMA) of 2014 (Senate Bill 729).
- Water Quality Monitoring Plan, Brickhaven No.2 Mine Tract "A" Structural Fill, approved March 2015 (Buxton, 2015a).
- North Carolina Department of Environment and Natural Resources (NCDENR)[1] Permit No. 1910-STRUC-2015, issued June 5, 2015.
- NCDENR Solid Waste Section Guidelines for Groundwater, Soil, and Surface Water Sampling, April 2008 including Groundwater Rules .1600.
- NCDENR Division of Water Management memorandum concerning electronic document submittal for routine groundwater and surface water monitoring, November 5, 2014.
- U.S. Environmental Protection Agency (EPA) Region I, *Low Stress (low flow) Purging and Sampling Procedure for the Collection of Ground Water Samples from Monitoring Wells*, January 19, 2010.

Groundwater monitoring and sampling at the site is also conducted in general accordance with the U.S. EPA's "Disposal of Coal Combustion Residuals from Electric Utilities" rule (CCR Rule).

On June 21, 2019, Charah received correspondence from the North Carolina Department of Environmental Quality (NCDEQ) Solid Waste Section requesting that Charah submit an Assessment Work Plan (Plan) in accordance with 15A NCAC 02L .0106 and 15A NCAC 02B .0211 and .0216. NCDEQ cited exceedances of 2L Standards for barium, chloride, chromium, cobalt, total dissolved solids (TDS), and vanadium, and exceedances of 2B Standards for arsenic, cobalt, copper, lead, TDS, and zinc as cause for the Plan. On behalf of Charah, HDR submitted a *Groundwater and Surface Water Assessment Monitoring Plan* (Plan) to NCDEQ on August 16, 2019 (HDR 2019). The plan was approved by NCDEQ in correspondence dated September 16, 2019 and amended on October 4, 2019. Between November 2019 and July

[1] On September 18, 2015, the North Carolina Department of Environment and Natural Resources (NCDENR) became the North Carolina Department of Environmental Quality (NCDEQ). Both naming conventions are used in this report, as appropriate.

2020, Charah implemented the Plan, which was documented in an *Assessment Monitoring Report* dated July 24, 2020.

On April 9, 2021, Charah received a response letter to the Assessment Monitoring Report from NCDEQ requiring additional activities, including the following field activities, to be implemented at the Site:

- Redevelop (or replace) monitoring wells MW-2 and MW-3 to improve recharge into the wells;
- Collect surface water sample (SW-6) upstream of SW-1 to delineate off-site impacts to surface water;
- Reinstall previously dry monitoring wells MW-9 and MW-10 as close to the original locations as practicable; and,
- Install bedrock monitoring wells adjacent to MW-2 and at a second location approved by NCDEQ.

Per the approved WQMP, and additional requirements set forth by NCDEQ since 2015, Charah is required to monitor the following network on a quarterly basis and report the results semi-annually.

Sampling Locations	Date Initiated	Purpose
MW-1 through MW-6, MW-7R, MW-8, and BG-1; SW-1 and SW-2; leachate	2015	Detection Monitoring Network
BG-2	2018	Additional background location
MW-11; SW-3, SW-4, and SW-5	2020	Assessment Monitoring
MW-2D, MW-9, MW-10, MW-11D; SW-6	2021	Assessment Monitoring

During the January 2021 event, samples were collected from monitoring wells MW-1 through MW-8, MW-11, BG-1, and BG-2, surface water locations SW-1 through SW-5, and the leachate tank. Since monitoring wells MW-2D, MW-9, MW-10, and MW-11D were not installed until March 2021, they were not sampled during the January event, but were sampled during the April event. In addition, the SW-6 location was sampled during the April 2021 event.

Samples are analyzed for constituents listed in North Carolina Department of Environmental Quality (NCDEQ) Solid Waste Appendix I (except VOCs) and II, 40 CFR 257 Appendix III, and 40 CFR 257 Appendix IV. On January 8, 2020, NCDEQ approved the discontinuation of Appendix I VOC analysis based on the historic non-detection of VOC constituents. Per the WQMP, if sampling results indicate impacts to groundwater or surface water, Charah must notify NCDEQ within 14 days. If no impacts are observed, Charah must submit a report of the sampling results to NCDEQ with 120 days of the sampling event.

1.3 Site Location and Operation

The site is located in Chatham County, approximately four miles southeast of Moncure, North Carolina (**Figure 1**). The owner of the site is Green Meadow, LLC (Green Meadow) and Charah Solutions, Inc. (Charah) is responsible for the operation and maintenance of the site. The mine property is approximately 301 acres in total; of which 145 acres is permitted for structural fill placement of coal combustion products (CCP).

The property located within the structural fill area was previously owned by General Shale Brick, Inc., which operated the site and an adjacent property as a mine beginning in 1985 for their off-site brick manufacturing facility. Mined material was stockpiled and then transported approximately 3.5 miles south to Brickhaven, North Carolina for brick manufacturing.

The area immediately surrounding the site primarily consists of rural residential (approximately 2,500 feet east, 1,000 feet southeast, and 1,000 feet southwest), commercial, industrial, wooded and agricultural property. According to information obtained from the Chatham County GIS website (October 2015), municipal water is available to the surrounding area.

Charah began CCP placement in the first composite liner containment system (Cell 1, Sub Cell 1A) on October 23, 2015. CCP placement has occurred in Cell 1, Cell 2, Cell 6A and Cell 6B. Charah has placed just over 7.3 million tons of CCP material in the structural fill. CCP materials (including fly ash, bottom ash, boiler slag, and/or flue gas desulfurization materials) were initially brought to the site by truck through October 2015 until transportation was changed to rail in January 2016. The CCP originated at the Duke Energy Carolinas (DEC) Riverbend Steam Station and Duke Energy Progress (DEP) L.V. Sutton Energy Complex (Sutton Plant) sites.

Leachate (i.e., product generated from the liquids present in the fill at the time of placement and/or stormwater that infiltrates the fill) is managed on-site through the collection, storage, and disposal of the resultant liquid. Green Meadow has approved pump and haul permits to dispose of leachate at the City of Sanford's Big Buffalo Creek Wastewater Treatment Plant and the Town of Spring Lake's South Harnett Regional Wastewater Treatment Plant.

1.4 Groundwater Monitoring System

The groundwater monitoring system was designed to provide background groundwater quality data prior to the placement of CCP in the structural fill and early detection of potential CCP constituents subsequent to CCP placement to be protective of human health and the environment. The groundwater monitoring system was originally comprised of ten (10) wells: eight wells are located downgradient/cross-gradient (MW-1, MW-2, MW-3, MW-4, MW-5, MW-6, MW-7R and MW-8) and two wells are considered to represent background groundwater quality (BG-1 and BG-2). Since 2015, the NCDEQ has required installation of additional monitoring wells (MW-9, MW-10, MW-11, MW-2D, and MW-11D) to further delineate horizontal and vertical groundwater quality conditions.

Background monitoring well BG-1 was installed in July of 2015 near the entrance of the site along Moncure-Flatwood Road. This location was selected to provide groundwater quality data in an area of the site presumed to not be affected by historic or current usage. Upon statistical analysis of groundwater quality data collected pre- and post-CCP placement, concentrations of target constituents in well BG-1 appear to be anomalously low when compared to pre-CCP conditions elsewhere on-site. With approval from NCDEQ, Charah installed a second background well (BG-2) southwest of the structural fill in December 2018 to evaluate spatial variability of inorganic concentrations across the site.

Well MW-7R was installed in April of 2017 as a replacement for monitoring well MW-7, as documented and approved in the May 25, 2017 memorandum to the NCDEQ Solid Waste Section. Well MW-7 has temporarily remained onsite for water level gauging purposes only.

Well MW-11, located downgradient/cross-gradient, was installed in March 2020 during Assessment Monitoring. Monitoring wells MW-2D, MW-9, MW-10, and MW-11D, located downgradient/cross-gradient, were installed in March 2021. Well construction details and groundwater elevations for the January 2021 sampling event are presented in **Table 1**, and well construction details and groundwater elevations for the April 2021 sampling event are presented in **Table 2**.

1.5 Surface Water Monitoring System

Surface water sample locations SW-1 and SW-2 were included in the original sampling event in August 2015. Surface water sample locations SW-3, SW-4, and SW-5 were added during Assessment Monitoring. Surface water sample location SW-6 was added in 2021 to evaluate surface water quality entering the Site north of the Charah offices. Note that Charah has been denied access to the General Shale property north of the Charah offices, so the SW-6 sample was collected as far north as possible, while remaining on the Charah property.

1.6 Leachate Monitoring System

The leachate sample is collected from the on-site holding tank located just north of wells MW-11 and MW-11D.

Table 1: January 2021 Groundwater Elevations

Well ID	Northing[1]	Easting	TOC Elev. (ft.)	TD[2] (ft. BGS)	TD (ft. BTOC)	Screen Length (ft.)	Screened Interval (ft. BGS)	DTW (ft. BTOC)[3]	GW Elevation (ft. MSL)	Lithologic Unit[4]
BG-1	670898.50	1996348.25	228.19	41	43.55	15	26-41	8.48	219.71	Layered Rock/PWR*
BG-2	669278.99	1990476.10	194.23	23	25.82	10	13-23	9.49	184.74	Layered Rock/PWR*
MW-1	674737.98	1993417.69	280.08	72	74.80	15	57-72	57.34	222.74	Layered Rock/PWR*
MW-2	673677.07	1994537.54	231.76	48	50.15	15	33-48	27.86	203.90	Layered Rock/PWR*
MW-3	672474.63	1994834.76	222.56	40	42.56	15	25-40	11.58	210.98	PWR
MW-4	671326.48	1994974.40	217.13	23	25.34	10	13-23	11.20	205.93	Residuum/PWR
MW-5	671081.19	1993779.03	244.86	44	46.14	10	34-44	21.96	222.90	PWR
MW-6	671267.60	1992793.34	230.95	27	29.32	15	12-27	5.59	225.36	Residuum/PWR
MW-7	672306.28	1992642.35	231.71	15	17.18	10	5-15	16.37	215.34	Residuum/PWR
MW-7R	672221.96	1992702.98	242.22	36	38.23	10	26-36	21.77	220.45	Residuum/PWR
MW-8	673304.83	1992200.37	236.47	46	49.06	15	31-46	34.86	201.61	PWR
MW-11	670446.25	1993476.57	219.23	40	42.70	15	25-40	8.92	210.31	PWR

Notes:

1. Wells MW-4 (PZM-1), MW-5 (PZM-22) and MW-7 (PZM-27) surveyed by Lawrence Surveying of Monroe, NC. Wells BG-1, BG-2, MW-1, MW-2, MW-3, MW-6, MW-7R, MW-8, and MW-11 were surveyed by McAdams of Durham, NC. Well locations and elevations based on NAD 83 horizontal datum and NGVD88 vertical datum.
2. TD=total depth; BGS=below ground surface; TOC=top of casing; DTW = Depth-to-Water; BTOC = below top-of-casing; GW = groundwater; MSL = mean sea level.
3. Depth to water measurements obtained on January 25, 2021, to the nearest 0.01 foot with a water level meter.
4. * = interpreted lithologic unit based on relative drilling hardness and geologic judgment during well installation.

Table 2: April 2021 Groundwater Elevations

Well ID	Northing[1]	Easting	TOC Elev. (ft.)	TD[2] (ft. BGS)	TD (ft. BTOC)	Screen Length (ft.)	Screened Interval (ft. BGS)	DTW (ft. BTOC)[3]	GW Elevation (ft. MSL)	Lithologic Unit[4]
BG-1	670898.50	1996348.25	228.19	41	43.55	15	26-41	7.69	220.50	Layered Rock/PWR*
BG-2	669278.99	1990476.10	194.23	23	25.82	10	13-23	9.68	184.55	Layered Rock/PWR*
MW-1	674737.98	1993417.69	280.08	72	74.80	15	57-72	55.48	224.60	Layered Rock/PWR*
MW-2	673677.07	1994537.54	231.76	48	50.15	15	33-48	38.54	193.22	Layered Rock/PWR*
MW-2D	673650.31	1994535.97	232.87	144	147.14	15	129-144	126.40	106.47	Layered Rock/PWR*
MW-3	672474.63	1994834.76	222.56	40	42.56	15	25-40	9.57	212.99	PWR
MW-4	671326.48	1994974.40	217.13	23	25.34	10	13-23	8.65	208.48	Residuum/PWR
MW-5	671081.19	1993779.03	244.86	44	46.14	10	34-44	20.18	224.68	PWR
MW-6	671267.60	1992793.34	230.95	27	29.33	15	12-27	5.75	225.20	Residuum/PWR
MW-7	672306.28	1992642.35	231.71	15	17.18	10	5-15	16.34	215.37	Residuum/PWR
MW-7R	672221.96	1992702.98	242.22	36	38.23	10	26-36	20.80	221.42	Residuum/PWR
MW-8	673304.83	1992200.37	236.47	46	49.06	15	31-46	34.45	202.02	PWR
MW-9	672747.21	1993936.20	240.36	36	39.03	10	26-36	DRY	-	PWR
MW-10	672421.01	1993269.14	257.74	47	50.00	10	37-47	45.93	211.81	PWR
MW-11	670446.25	1993476.57	219.23	40	42.70	15	25-40	8.50	210.73	PWR
MW-11D	670447.41	1993466.72	219.40	65	67.38	15	50-65	5.16	214.24	Layered Rock/PWR*

Notes:

1. Wells MW-4 (PZM-1), MW-5 (PZM-22) and MW-7 (PZM-27) surveyed by Lawrence Surveying of Monroe, NC. Wells BG-1, BG-2, MW-1, MW-2, MW-3, MW-6, MW-8, MW-7R, MW-11, MW-2D, MW-9, MW-10, and MW-11D were surveyed by McAdams of Durham, NC. Well locations and elevations based on NAD 83 horizontal datum and NGVD88 vertical datum.
2. TD=total depth; BGS=below ground surface; TOC=top of casing; DTW = Depth-to-Water; BTOC = below top-of-casing; GW = groundwater; MSL = mean sea level.
3. Depth to water measurements obtained on April 12, 2021, to the nearest 0.01 foot with a water level meter.
4. * = interpreted lithologic unit based on relative drilling hardness and geologic judgment during well installation.

1.7 Site Topography and Geographical Setting

Based on review of the 1993 USGS topographic quadrangle (**Figure 2**) and GIS mapping, the topography of the site and immediately surrounding area can be characterized by moderately rolling hills, which are dissected by dendritic creeks. Prior to mining by General Shale, a topographic ridge was present within the site, extending from the northwestern corner of the present-day structural fill toward the southeast. Thus, historic drainage was assumed to be to the north/northwest/west and to the northeast/east/southeast away from the ridge.

1.8 Geologic and Hydrogeologic Setting

1.8.1 Regional Geology

The site is located within the Piedmont physiographical province of North Carolina, which is a northeast-southwest trending region extending from New York to Alabama.

According to the 1985 North Carolina Geologic Map prepared by the North Carolina Geological Survey, the site is located in the Triassic Basin Belt of the Piedmont physiographic province. The basement rocks of the Triassic Basin Belt include conglomerate, sandstone, mudstone, limestone, coal, and shale. The majority of the site is located within the Sanford Formation which contains conglomerate, fanglomerate, sandstone, and mudstone. The far western portion of the site is located in the Cummock Formation which contains sandstone, mudstone, gray and black coal, and carbonaceous shale. The Triassic Basin is bounded by felsic metavolcanic rock within the Carolina Slate Belt approximately 6.5 miles to the northwest; and is contacted by metamorphosed granite and biotite gneiss and schist of the Raleigh Belt along a normal fault approximately 2.5 miles to the southeast. The Triassic Basin formations have been intruded by north northwest-south southeast trending igneous diabase dikes during the Jurassic Period (~144 to 208 Ma) and contain northeast-southwest trending normal faults. However, none of these faults were indicated to exist at the subject site on the 1985 geologic map (NCDENR, 1985).

In the Piedmont, the bedrock is typically overlain by a mantle of weathered rock (residuum/saprolite), which has an average thickness of approximately 25 feet. The residuum/saprolite consists of varying amounts of unconsolidated clays, silts, and sands, with lesser amounts of rock fragments. Due to the range of the parent rock composition and the variable susceptibility to weathering of each rock type, the residuum/saprolite range widely in color, texture, and thickness. Generally, the residuum/saprolite is thickest near inter-stream divides (ridges) and thins toward stream beds. In profile, the residuum/saprolite normally grades from clayey soils near the land surface to sandier, partially weathered rock above competent bedrock (Buxton, 2015a).

1.8.2 Site Geology

The geology of the site can be subdivided into six units which include fill, flood plain, soil horizon, residuum, partially weathered rock, and layered rock. These units generally grade downward from a soil horizon, to residuum, to partially weathered rock and finally layered rock. Fill materials were limited to the road bed and berm located around the east and west sides of

MW-4. Flood plain sediments were only identified at MW-4 on the southeast corner of the site. The following summary of site-specific units is based on boring logs originally included in the *Design Hydrogeologic Report* (Buxton, 2016).

FILL

Fill materials were primarily identified in the road bed and berm located around the east and west sides near MW-4 and generally consisted of mottled reddish yellow, orange, brown, and light gray sandy silty clay with quartz gravel.

FLOOD PLAIN

Flood plain sediments were only located adjacent to MW-4 on the southeast corner of the site. Sediments were associated with a former adjacent intermittent tributary creek and can be generally characterized as mottled light gray fine sandy silty clay. The flood plain sediments were approximately 5 feet thick in this area and had been deposited above residuum. Based on geotechnical laboratory data, the flood plain sediments were identified as lean clay (CL) under the Unified Soil Classification System (USCS).

RESIDUUM

Residuum is characterized as mottled yellowish, brown, orange, and red silty clay and clayey silt. Root structures were common. Residuum was formed from the continued weathering and biologic reworking of saprolite, and ranges from 2 to 15 feet in thickness, when present. Based on geotechnical laboratory data, the residuum consisted of clayey sand (SC), elastic silt (MH), and lean clay (CL) and had a hydraulic conductivity of 2.86×10^{-7} cm/sec.

SAPROLITE

Saprolite is characterized as mottled (black and gray) red and reddish brown sandy silty clay with infrequent quartz gravel and cobbles. Saprolite is characteristically fissile, often breaking in horizontal sheets. Saprolite generally retains the remnant texture, structure, and mineral content of the rock from which it was formed and ranged from 5 to 15 feet in thickness. Saprolite had a Standard Penetration Resistance (N) of less than 100 blows per foot. Based on geotechnical laboratory data, the saprolite consisted of lean clay (CL) with hydraulic conductivities ranging from 7.69×10^{-8} cm/sec to 3.69×10^{-9} cm/sec.

PARTIALLY WEATHERED ROCK

Partially weathered rock is characterized as mottled (light green and purple) brown, reddish gray, and weak red silty clay and weathered mudstone, which are often fissile. Partially weathered rock generally retains the remnant texture, structure, and mineral content of the rock from which it was formed, and ranges from 5 to 40 feet in thickness. Partially weathered rock has an N-value of 100 blows per foot or greater and can generally be drilled with standard hollow-stem auger drilling technology. Based on geotechnical laboratory data, partially weathered rock consisted of lean clay (CL). Hydraulic conductivity ranged from 2.433×10^{-4} cm/sec to 7.154×10^{-8} cm/sec, according to slug or recovery test data (for wells screened solely in partially weathered rock).

BEDROCK

Based on rock coring activities conducted near MW-7/MW-7R and visual inspection of the rock exposed on the north side of the MW-4 area, bedrock at the site is primarily composed of

reddish to light tan gray mudstone, cross-bedded muddy sandstone, muddy sandy conglomerate (rounded quartz gravel and cobbles), and gray to brown siltstone. Bedrock generally occurs as horizontally oriented and relatively thin intermittent layers (especially within the upper 15 feet of contacting layered rock) across the site. Bedrock contained horizontal to near vertical fracturing. Large fractures, oriented approximately N 40° to 60° E at 70 ° northwest, were observed in weathered mudstone immediately northeast of well MW-8. The occurrence of layered rock at the site was generally defined by auger refusal.

1.8.3 Regional Hydrogeology

The occurrence and movement of groundwater in the Piedmont physiographic province are within two separate but interconnected water-bearing zones that typically comprise one aquifer. A shallow water-bearing zone typically occurs within the residuum/saprolite and a deeper zone within the underlying bedrock.

Groundwater in the residuum/saprolite zone occurs in the interstitial pore spaces between the individual sediment grains. Groundwater in this zone generally flows from topographic highs to topographic lows. The occurrence and movement of groundwater in the underlying bedrock zone are controlled by joints and fractures within the bedrock. Groundwater within this deeper zone may occur under confined or semi-confined conditions, depending on the extent of fracturing at the saprolite/bedrock interface. Deeper groundwater movement is typically controlled by the distribution of openings in the bedrock and can be variable.

1.8.4 Site Hydrogeology

1.8.4.1 JANUARY 2021 EVENT

On January 25, 2021, groundwater depth was measured in each well and ranged from 5.59 feet (MW-6) to 57.34 feet (MW-1) below top of casing in shallow wells. Groundwater elevations ranged from 184.74 feet (BG-2) to 225.36 feet (MW-6). Groundwater gauging data and elevations for the January 2021 event are presented in **Table 1**. Historic and current groundwater elevations are shown in **Figure 3**.

During the Assessment Monitoring phase of work, HDR developed a groundwater model using the groundwater modeling pre- and post-processing software Groundwater Modeling System (GMS) 10.3.4 (Aquaveo; https://www.aquaveo.com/software/gms-groundwater-modeling-system-introduction) as well as ArcMap 10.4.1 (ESRI; https://www.esri.com/en-us/arcgis/products/index). For the groundwater flow model, MODFLOW-2005 (Harbaugh 2005; https://pubs.usgs.gov/tm/2005/tm6A16/) was used to solve the groundwater-flow equations that quantify the flow of groundwater in three dimensions. Since the groundwater model was created, Charah has filled in the mine pond adjacent to well MW-4 and closed the structural fill with an impermeable cap. Thus, the groundwater model was rerun to reflect these conditions by eliminating the pond as a groundwater discharge point and eliminating recharge within the structural fill.

Potentiometric surface maps were created for the groundwater measurements collected on January 25, 2021 using the kriging method of interpolating groundwater contours (**Figure 4**). Regional groundwater flow near the site generally flows northeast to southwest. The

potentiometric surface map for January 2021 indicated a groundwater high near MW-6, and a groundwater low on the western portion of the site near MW-8. Note that while interpolated groundwater flow appears generally similar to flow predicted in the Assessment Monitoring Report, the affects of capping of the structural fill are evident in the kriging performed for the January 2021 event.

1.8.4.2 APRIL 2021 EVENT

On April 12, 2021, groundwater depth was measured in each well and ranged from 5.75 feet (MW-6) to 55.48 feet (MW-1) below top of casing in shallow wells. Groundwater elevations in shallow wells ranged from 184.55 feet (BG-2) to 225.20 feet (MW-6). Note that MW-9 was dry during the April 2021 event.

Groundwater depth in deep wells ranged from 5.16 feet (MW-11D) to 126.40 feet (MW-2D). Groundwater elevations ranged from 106.47 feet (MW-2D) to 214.24 feet (MW-11D) in deep wells. Groundwater gauging data and elevations for the April 2021 event are presented in (**Table 2**:). Historic and current groundwater elevations are shown in **Figure 3**.

Similar to the January 2021 event, groundwater elevations from the April 2021 event were used to estimate groundwater contours using the kriging method. The results indicated similar groundwater highs at wells MW-1 and MW-6 with groundwater lows at well MW-2 and MW-4. Note that groundwater elevations for wells (MW-2D and MW-11D) were not used to contour flow for the water table aquifer during the April 2021 event. Modeled groundwater contours using groundwater elevations derived from the April 12, 2021 gauging event are shown on **Figure 5**.

1.8.5 Horizontal Hydraulic Gradients

Horizontal hydraulic gradient is calculated by taking the difference in hydraulic head over the length of the flow path between two wells of similar construction and (generally) perpendicular to flow. Since groundwater flow direction can vary slightly between gauging events, it is difficult to install permanent monitoring wells in locations consistently perpendicular to groundwater flow. Horizontal hydraulic gradient was calculated between well pairs MW-5/MW-4 and MW-6/BG-2, recognizing that these well pairs are not truly perpendicular to flow, as shown on **Figure 4** and **Figure 5**. Groundwater wells from the northern portion of the site were not used to calculate the hydraulic gradient on site because they are most likely to have significant alterations to natural groundwater recharge caused by the structural fill cap. Hydraulic gradients at the site during the January 2021 and April 2021 sampling events are presented in **Table 3**.

Table 3: Horizontal Hydraulic Gradients

Sampling Event	Upgradient Well	Downgradient Well	Upgradient Groundwater Elevation (ft)	Downgradient Groundwater Elevation (ft)	Linear Flow Distance (ft)	Hydraulic Gradient
January 2021	MW-5	MW-4	222.90	205.93	1,220	0.014
	MW-6	BG-2	225.36	184.74	3,054	0.013
April 2021	MW-5	MW-4	224.68	208.48	1,220	0.013
	MW-6	BG-2	225.20	184.55	3,054	0.013

Notes:
1. Horizontal hydraulic gradients calculated by dividing the difference in hydraulic head between a well pair by the length of the flow path between the well pair. (*i*= dh/dl)
2. All well pairs assumed to be screened in same surficial aquifer unit
3. Groundwater elevations calculated using measurements obtained on January 25, 2021 (January) and April 12, 2021 (April)

1.8.6 Groundwater Flow Velocity

The average linear velocity, or seepage velocity, of groundwater between wells at the site was calculated using Darcy's Law, as follows:

$$V_S = \frac{Ki}{P_e}$$

Where:

V_s = seepage velocity
K = horizontal hydraulic conductivity
i = horizontal hydraulic gradient
P_e = effective porosity

Seepage velocities for groundwater were calculated using horizontal hydraulic gradients, as referenced above, average horizontal hydraulic conductivity and average effective porosity values. Average horizontal hydraulic conductivity (9.79x10-5 cm/sec) was calculated during geotechnical testing from on-site wells, except BG-2, MW-7R, and MW-11. Average effective porosity (0.093) values were calculated from geotechnical testing and from the literature where geotechnical data was not available (Buxton, 2014; Sinhal and Gupta, 2010).

Seepage velocity varies on a well-by-well basis and was calculated between the MW-5/MW-4 and MW-6/BG-2 well pairs, representing the two well pairs that are roughly perpendicular to the direction of groundwater flow and located farthest from the effects of the structural fill cap. Seepage velocity was calculated at 15.1 feet per year between MW-5 and MW-4, and 14.4 feet per year between MW-6 and BG-2 for the January 2021 sampling event. Seepage velocity was calculated at 14.4 feet per year between MW-5 and MW-4 and 14.4 feet per year between MW-6 and BG-2 for the April 2021 sampling event. Flow rate values listed above are estimations; actual rates will vary across the site with local hydrogeologic conditions. Seepage velocities are shown in **Table 4**.

Table 4: Seepage Velocity

Well Pair	Seepage Velocity (ft/yr)	
	Jan-21	***Apr-21***
MW-5/MW-4	15.1	14.4
MW-6/BG-2	14.4	14.4

2 Field Procedures

2.1 Well Redevelopment

In accordance with the April 2021 correspondence from NCDEQ, monitoring wells MW-2 and MW-3 were redeveloped during the April sampling event to promote recharge into the wells. Well MW-2 was redeveloped via surging and low-flow pumping for approximately 7 hours on March 19, 2021. Prior to surging, the water column within well MW-2 was measured at 21.47 feet. The well was surged for approximately 2 hours, then pumped at an initial pumping rate of 150 milliliters per minute (mL/min) for 2 hours. After 2 hours, the pumping rate was reduced to 100 mL/min and was maintained for the remainder of well development. The well was pumped dry after approximately 7 hours of pumping and surging.

Well MW-3 was redeveloped via surging and low-flow pumping for approximately 6 hours on March 18, 2021. Prior to surging, the water column within well MW-3 was measured at 32.71 feet. The well was surged for approximately 2 hours. Pumping rate varied from 100 mL/min to 150 mL/min for the 4-hour pumping portion of re-development. Well development records for wells MW-2 and MW-3 are included in **Appendix A**.

2.2 Groundwater Sampling

2.2.1 January 2021 Groundwater Sampling

HDR collected groundwater samples from monitoring wells MW-1 through MW-6, MW-7R, MW-8, BG-1, BG-2, and MW-11 between January 25 and 29, 2021 (**Figure 6**).

Purging was conducted via low-flow methods and was considered complete when the depth to water and field parameters had stabilized in accordance with the targets specified below.

- Turbidity (10% for values greater than 10 NTU (if three turbidity values are less than 10 NTU, the values are considered stabilized)
- DO (10% for values greater than 2.0 mg/L, if DO values are below 2.0 mg/L, values are considered stable if three readings are within +/- 0.2 mg/L. If three DO values are less than 0.5 mg/L, the values are considered stabilized)
- Specific conductance (5%)
- Temperature (3%)
- pH (± 0.1 unit)
- ORP (± 20 millivolts)

In cases where water level in the well would not stabilize, the well was pumped for as long as possible leaving enough water in the water column to fill groundwater sample bottles. This method was used over pumping the well dry and collecting groundwater samples with disposable bailers due to slow groundwater recharge on the site. Field data sheets are provided in **Appendix B**.

All non-disposable equipment was decontaminated after each use by washing in a Liqunox® detergent solution followed by a tap-water rinse. Purge water was discharged to the ground surface adjacent to each well.

Samples were transferred under Chain of Custody (COC) procedures to Pace Analytical Services, LLC (Pace) for analysis. Sample handling and custody were performed in accordance with the USEPA Guidance for Field Samplers.

2.2.2 April 2021 Groundwater Sampling

HDR collected groundwater samples from monitoring wells MW-1 through MW-6, MW-7R, MW-8 through MW-11, MW-2D, MW-11D, BG-1 and BG-2 between April 12 and 15, 2021 for the April event (**Figure 6**). Please note that well MW-9 was dry and not sampled, and MW-10 was pumped dry and not sampled due to insufficient groundwater recharge.

Purging and sampling methods were consistent with the methods used during the January 2021 event, as described in **Section 2.2.1** above, except in cases where water level in the well would not stabilize. The well was pumped dry and groundwater samples were collected with disposable bailers upon recovery of adequate volume for sampling, unless the well did not recharge. Field data sheets are provided in **Appendix B**.

2.3 Surface Water Sampling

Surface water samples were collected from locations outside of the structural fill boundary to evaluate potential groundwater to surface water interaction. Surface water locations SW-1 through SW-5 were sampled during the January 2021 event. At the request of NCDEQ, one additional location (SW-6) was sampled during the April 2021 event.

Surface water sample SW-1 was collected approximately 500 feet south of MW-4, outside of the property boundary, from an unnamed tributary of Gulf Creek. Surface water sample SW-2 was collected south and adjacent to the rail spur west of the structural fill from an unnamed tributary of Shaddox Creek. Surface water sample SW-3 was collected approximately 1,100 feet southwest of SW-2, outside of the property boundary, from an unnamed tributary of Shaddox Creek. Surface water sample SW-4 was collected approximately 850 feet south of MW-11 from an unnamed tributary of Gulf Creek. Surface water sample SW-5 was collected approximately 1,600 feet southeast of SW-4, outside the property boundary, west of Moncure-Flatwood Road, from an unnamed tributary of Gulf Creek. Surface water sample SW-6 was collected approximately 350 feet north of MW-4 from an unnamed tributary of Gulf Creek. Prior to sample collection, field parameters (temperature, specific conductance, DO, pH, turbidity, and ORP) were measured with a water quality meter and recorded on field data sheets (**Appendix B**). Surface water sampling locations are shown on **Figure 6**.

2.4 Leachate Sampling Procedures

One leachate grab sample (Leachate) was collected from the on-site holding tanks (**Figure 6**).

3 Water Quality

3.1 Background Site Conditions

Two groundwater sampling events were conducted prior to CCP placement (August and October 2015). The background sampling events consisted of sample collection and analysis from nine monitoring wells (MW-1 through MW-8 and BG-1) and two surface water sample locations (SW-1 and SW-2).

During these initial background monitoring events, chloride, pH, TDS, and vanadium were detected at concentrations that exceeded their North Carolina 2L Groundwater Protection Standards (2L Standard) or Interim Maximum Allowable Concentration (IMAC) in groundwater samples collected from background monitoring well BG-1. Antimony, barium, chloride, chromium, cobalt, pH, TDS, and vanadium were detected at concentrations that exceeded their respective 2L Standards or IMACs in other monitoring wells prior to ash placement. Additional target constituents were detected in the samples from well BG-1 and other wells; however, these concentrations did not exceed applicable standards.

Copper and cobalt concentrations that exceeded their respective NC Surface Water & Wetland Standards (2B Standards) were reported in surface water samples collected during the initial background monitoring events, prior to CCP placement. Additionally, all EPA Appendix III constituents were detected in the surface water samples collected prior to CCP material placement, but at concentrations below their respective 2B Standards (if applicable).

During the first monitoring event (August 2015), bromodichloromethane and dibromochloromethane were detected at concentrations above their respective 2L Standards in groundwater samples collected from MW-2, MW-3, and MW-7. Volatile organic compounds (VOCs), including trihalomethanes, are not present naturally at the site. These detections are attributed to the use of municipal water during previous well development activities. VOCs were not detected above laboratory method detection limits (MDLs) in any subsequent (2nd through 8th) background sampling events.

A detailed discussion of background groundwater conditions can be found in the *2016 Background Sampling Report* (HDR, 2016b). Additional discussion of the statistical results can be found in **Section 4** of this report for a better understanding of predictive limits for the background well locations (BG-1 and BG-2), as well as interwell interactions.

3.2 Groundwater Analytical Results

3.2.1 January 2021 Sampling Event

Concentrations of the following constituents exceeded 2L Standards or IMACs in one or more wells during the January 2021 sampling event: barium, chloride, pH, TDS, and vanadium. Three constituents were reported with method reporting limits (MRL) that exceeded the IMAC (antimony, cobalt, and vanadium). The antimony MRL was 5.0 µg/L, and the IMAC is 1.0 µg/L. The cobalt MRL is 5.0 µg/L, and the IMAC is 1 µg/L. The vanadium MRL is 5.0 µg/L and the IMAC is 0.3 µg/L. Concentrations of the following constituents exceed BTV in one or more wells

during the January 2021 sampling event: barium, calcium, chloride, chromium, combined radium, fluoride, lithium, nickel, pH, and TDS. Nine constituents were reported with MRLs that exceeded the BTV (antimony, arsenic, beryllium, cadmium, chromium, cobalt, selenium, nickel, and silver). The antimony MRL was 5.0 µg/L, and the BTV is 3.90 µg/L. The arsenic MRL was 10.0 µg/L, and the BTV is 4.8 µg/L. The beryllium MRL was 1.0 µg/L, and the BTV is 0.700 µg/L. The cadmium MRL was 1.0 µg/L, and the BTV is 0.500 µg/L. The chromium MRL was 5.0 µg/L, and the BTV is 3.70 µg/L. The cobalt MRL was 5.0 µg/L, and the BTV is 3.60 µg/L. The selenium MRL was 10.0 µg/L, and the BTV is 5.00 µg/L. The nickel MRL was 5.0 µg/L, and the BTV was 3.50 µg/L. The silver MRL was 5.0 µg/L, and the BTV was 2.50 µg/L.

- Antimony, arsenic, beryllium, cadmium, cobalt, copper, lead, mercury, selenium, silver, thallium, and zinc were not detected above the MRL.
- Barium exceeded the 2L Standard of 700 µg/L, and the BTV of 443 µg/L, in well MW-8.
- Chloride exceeded the 2L Standard of 250 mg/L in the following wells: BG-2, MW-1, MW-2, MW-3, MW-4, MW-7R, and MW-8. Chloride concentrations also exceeded the BTV of 344 mg/L in the following wells: MW-1, MW-2, MW-3, MW-4, and MW-8. However, chloride concentrations were generally consistent with prior sampling events.
- Field-measured pH values did not fall within 2L Standard range of 6.5-8.5 standard units (SU) in samples collected from the following wells: BG-1, MW-4, and MW-6.
- TDS exceeded the 2L Standard of 500 mg/L in all wells sampled except MW-2 and MW-5. TDS increased in wells BG-2, MW-1, MW-3, and MW-8 when compared to the previous sampling event. However, TDS only exceeded the BTV of 1,270 mg/L in the following wells: MW-1, MW-3, and MW-11.
- Vanadium exceeded the IMAC of 0.3 µg/L in well BG-1.

Analytical results are presented in **Table 5**. Concentration versus time plots generated for two constituents (chloride and TDS) with the most frequent detections and/or exceedances are included in **Appendix C**.

The laboratory report for the January 2021 sampling event is provided in **Appendix D**. Electronic data deliverables (EDDs) are provided in **Appendix E**.

3.2.2 April 2021 Sampling Event

Concentrations of the following constituents exceeded 2L Standards or IMACs in one or more wells during the April 2021 sampling event: antimony, barium, chloride, chromium, pH, TDS, and vanadium. Four constituents were reported with method reporting limits (MRL) that exceeded the IMAC (antimony, cobalt, thallium, and vanadium). The antimony MRL was 5.0 µg/L, and the IMAC is 1.0 µg/L. The cobalt MRL is 5.0 µg/L, and the IMAC is 1 µg/L. The thallium MRL is 1.0 µg/L, and the IMAC is 0.2 µg/L. The vanadium MRL is 5.0 µg/L and the IMAC is 0.3 µg/L. Concentrations of the following constituents exceed the BTV in one or more wells during the April 2021 sampling event: antimony, barium, calcium, chloride, chromium, combined radium, copper, fluoride, lithium, molybdenum, nickel, pH, radium 228, sulfate, and TDS. Nine constituents were reported with MRLs that exceed the BTV (antimony, arsenic, beryllium, cadmium, chromium, cobalt, selenium, nickel, and silver). The antimony MRL was 5.0 µg/L, and the BTV is 3.90 µg/L. The arsenic MRL was 10.0 µg/L, and the BTV is 4.8 µg/L. The

beryllium MRL was 1.0 µg/L, and the BTV is 0.700 µg/L. The cadmium MRL was 1.0 µg/L, and the BTV is 0.500 µg/L. The chromium MRL was 5.0 µg/L, and the BTV is 3.70 µg/L. The cobalt MRL was 5.0 µg/L, and the BTV is 3.60 µg/L. The selenium MRL was 10.0 µg/L, and the BTV is 5.00 µg/L. The nickel MRL was 5.0 µg/L, and the BTV was 3.50 µg/L. The silver MRL was 5.0 µg/L, and the BTV was 2.50 µg/L.

- Arsenic, beryllium, cadmium, cobalt, lead, mercury, selenium, silver, and thallium were not detected above the MRL.
- Antimony exceeded the IMAC of 1 µg/L and BTV of 3.90 µg/L in well MW-2.
- Barium exceeded the 2L Standard of 700 µg/L, and the BTV of 443 µg/L, in wells MW-2D and MW-8.
- Chloride exceeded the 2L Standard of 250 mg/L in the following wells: BG-2, MW-1, MW-2, MW-2D, MW-3, MW-4, MW-7R, and MW-8. Concentrations increased in all wells except MW-4, and MW-6, with higher than previous recorded concentrations measured in BG-2 (268 mg/L) and MW-11 (149 mg/L). Chloride exceeded the BTV of 344 mg/L in the following wells: MW-1, MW-2, MW-2D, MW-3, MW-4, and MW-8.
- Chromium exceeded the 2L Standard of 10 µg/L, and the BTV of 3.70 µg/L, in wells MW-2, MW-7R, and MW-8.
- Field-measured pH values did not fall within 2L Standard range of 6.5-8.5 SU in samples collected from the following wells: BG-1, MW-4, MW-6, and MW-11D. The pH value in MW-11D did not fall within the BTV range of 5.88-7.26 SU.
- TDS exceeded the 2L Standard of 500 mg/L in all wells sampled except MW-5 and MW-11. Concentrations increased in BG-1, BG-2, MW-1, MW-2, MW-5, and MW-8, as compared to the prior sampling event. TDS exceeded the BTV of 1,270 mg/L in the following wells: MW-1, MW-2, MW-2D, MW-3, and MW-8.
- Vanadium exceeded the IMAC of 0.3 µg/L in wells BG-1 and MW-2.

Analytical results are presented in **Table 5**. Concentration versus time plots generated for two constituents (chloride and TDS) with the most frequent detections and/or exceedances are included in **Appendix C**.

The laboratory report for the April 2021 sampling event is provided in **Appendix D**. Electronic data deliverables (EDDs) are provided in **Appendix E**.

The presence of naturally occurring inorganic constituents above regulatory criteria is common in North Carolina due to various geologic conditions. The presence of naturally occurring metals is discussed in more detail in the *Initial Background Groundwater & Surface Water Monitoring Event* (Buxton, 2015c).

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Table 5: Analytical Results January 2021 and April 2021

Analyte	CAS Number	2L Standard / IMAC	BTV (2Q2021)	Groundwater Analysis																								Quality Control				Surface Water Analysis										2B Standard	Leachate Analysis	
				BG-1		BG-2		MW-1		MW-2		MW-2D	MW-3		MW-4		MW-5		MW-6		MW-7R		MW-8		MW-11		MW-11D	EQBL		DUP (MW-6)	DUP (MW-6)	SW-1		SW-2		SW-3		SW-4		SW-5		SW-6		LEACHATE	
				Jan-21	Apr-21	Jan-21	Apr-21	Jan-21	Apr-21	Jan-21	Apr-21	Apr-21	Jan-21	Apr-21	Jan-21	Apr-21	Jan-21	Apr-21	Jan-21	Apr-21	Jan-21	Apr-21	Jan-21	Apr-21	Jan-21	Apr-21	Apr-21	Jan-21	Apr-21	Jan-21	Apr-21	Jan-21	Apr-21	Jan-21	Apr-21	Jan-21	Apr-21	Jan-21	Apr-21	Jan-21	Apr-21	Jan-21	Apr-21		Jan-21	Apr-21
EPA APPENDIX III																																											
Boron (µg/l)	7440-42-8	*700*	*56.5*	7.7 J	56.5	<25.0	36.2 J	8.3 J	10.3 J	46.6	48.9 J	45.0 J	<25.0	25.6 J	7.4 J	8.7 J	11.1 J	11.1 J	9.0 J	<50.0	12.8 J	11.4 J	14.0 J	13.3 J	16.5 J	11.5 J	55.8	<25.0	<50.0	<125	18.0 J	10.3 J	11.6 J	11.9 J	12.4 J	9.8 J	12.8 J	<25.0	13.8 J	10.5 J	15.7 J	8.6 J	*NE*	3,680	3,030
Calcium (µg/l)	7440-70-2	*NE*	*124,000*	20,300	21,100	101,000	105,000	**185,000**	**224,000**	**183,000**	**175,000**	97,300	**178,000**	**150,000**	60,700	63,000	9,040	10,700	34,300	33,900	86,600	92,000	4,170	**145,000**	38,900	26,500	27,800	<100	<100	32,800	32,300	3,710	5,930	14,900	3,480	5,730	3,640	5,710	4,590	3,640	7,260	5,010	*NE*	330,000	276,000
Chloride (mg/l)	16887-00-6	*250*	*344*	176	188	254	268	**731**	**912**	**1,120**	**1,170**	**833**	**1,080**	**1,080**	**467**	**466**	19.6	22.0	208	80.3	278	285	**426**	**570**	123	149	224	<1.0	<1.0	211	207	5.2	5.8	18.9	14.4	28.4	14.3	19.4	13.7	8.2	9.0	6.0	*250*	18.8	21.2
Fluoride (mg/l)	16984-48-8	*2*	*0.254*	0.18	0.19	0.23	0.21	0.13	0.16	0.14	0.24	0.22	0.25	**0.42**	**0.26**	**0.29**	**0.51**	**0.56**	**0.34**	**0.34**	0.10	0.12	0.061 J	0.067 J	0.14	0.14	**0.49**	<0.10	<0.10	**0.33**	**0.35**	0.16	0.26	0.11	0.12	0.077 J	0.12	0.052 J	0.063 J	0.13	0.095 J	0.23	*1.8*	0.24	0.24
pH (standard units)	pH	*6.5-8.5*	*5.88 - 7.26*	6.46	6.18	6.85	6.74	6.65	7.14	**7.54**	**7.53**	**7.79**	**7.38**	**7.43**	6.25	6.21	6.81	7.12	6.32	6.31	**7.31**	**7.38**	7.05	6.93	**7.33**	6.66	**8.84**	NT	NT	6.32	6.31	5.91	NT	6.68	NT	5.92	NT	5.98	NT	5.91	NT	NT	*6.0-9.0*	7.55	NT
Sulfate (mg/l)	14808-79-8	*250*	*182*	22.5	23.0	162	182	6.4	7.0	94.0	53.3	14.7	27.5	33.8	10.4	11.4	3.4	4.2	25.6	28.4	15.1	16.2	6.4	5.7	2.0	3.0	**196**	<1.0	<1.0	25.5	28.3	2.1	2.5	10.8	11.9	14.1	11.9	8.1	19.3	3.1	27.7	2.3	*250*	556	547
Total Dissolved Solids (mg/l)	TDS	*500*	*1,270*	544	563	1,180	1,270	**1,830**	**2,390**	428	**2,700**	**1,900**	**2,650**	**2,400**	1,200	1,160	218	239	638	546	872	860	1,040	**1,400**	**2,760**	410	888	<25.0	<25.0	654	590	709	1,330	150	119	105	125	128	100	549	379	1,430	*500*	1,590	1,380
EPA APPENDIX IV																																											
Antimony (µg/l)	7440-36-0	*1*	*3.90*	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	**5.3**	3.6 J	<5.0	4.3 J	3.1 J	3.1 J	3.9 J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	3.8 J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	*5.6*	<5.0	3.2 J
Arsenic (µg/l)	7440-38-2	*10*	*4.80*	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	7.0 J	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	6.3 J	<10.0	<10.0	<10.0	<10.0	9.4 J	8.8 J	<10.0	<10.0	<10.0	<10.0	6.0 J	<10.0	4.8 J	8.3 J	7.6 J	*10*	20.3	10.5
Barium (µg/l)	7440-39-3	*700*	*443*	249	252	59.1	84.1	218	321	275	**481**	**1,040**	**599**	**597**	316	312	92.0	89.2	57.8	48.4	285	314	**1,060**	**1,360**	66.0	59.6	108	<5.0	<5.0	57.2	50.7	341	605	42.2	49.2	62.2	53.6	46.8	43.6	254	505	690	*1,000*	63.2	54.5
Beryllium (µg/l)	7440-41-7	*4*	*0.700*	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	2.8	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	2.4	3.1	*6.5*	<1.0	<1.0
Cadmium (µg/l)	7440-43-9	*2*	*0.500*	0.40 J	<1.0	<1.0	<1.0	0.57 J	<1.0	0.48 J	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	*2*	0.44 J	<1.0
Chromium (µg/l)	7440-47-3	*10*	*3.70*	<5.0	<5.0	<5.0	<5.0	<5.0	5.0 J	<5.0	**10.2**	**5.7**	<5.0	**9.3**	<5.0	4.1 J	<5.0	<5.0	<5.0	4.7 J	<5.0	**15.7**	**5.7**	**25.6**	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	8.9	15.2	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	7.0	35.0	22.6	*50*	<5.0	<5.0
Cobalt (µg/l)	7440-48-4	*1*	*3.60*	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	5.7	10.5	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	4.5 J	15.1	14.2	*3*	<5.0	<5.0
Fluoride (mg/l)	16984-48-8	*2*	*0.254*	0.18	0.19	0.23	0.21	0.13	0.16	0.14	0.24	0.22	0.25	**0.42**	**0.26**	**0.29**	**0.51**	**0.56**	**0.34**	**0.34**	0.10	0.12	0.061 J	0.067 J	0.140	0.14	**0.49**	<0.10	<0.10	**0.33**	**0.35**	0.16	0.26	0.11	0.12	0.077 J	0.12	0.052 J	0.063 J	0.13	0.095 J	0.23	*1.8*	0.24	0.24
Lead (µg/l)	7439-92-1	*15*	*14.1*	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	4.8 J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	25.5	47.4	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	13.3	47.2	50.8	*25*	<5.0	<5.0
Lithium (µg/l)	7439-93-2	*NE*	*48.1*	15.9	16.4	<2.5	20.3	31.0	41.8	**129**	**116**	**64.1**	<2.5	**88.6**	28.9	29.2	10.6	9.6	28.5	25.1	31.0	28.5	33.4	44.3	10.7	12.6	**58.1**	<2.5	<2.5	26.8	27.4	5.3	9.8	1.6 J	1.2 J	0.48 J	1.3 J	<2.5	<2.5	4.3	18.7	9.7	*NE*	54.6	59.1 J
Mercury (µg/l)	7439-97-6	*1*	*0.200*	0.14 J	0.12 J	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	*0.012*	<0.20	<0.20
Molybdenum (µg/l)	7439-98-7	*NE*	*13.6*	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	6.8	<5.0	**14.2**	7.3	6.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	**42.3**	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	*160*	220	236
Selenium (µg/l)	7782-49-2	*20*	*5.00*	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	*5*	<10.0	<10.0
Thallium (µg/l)	7440-28-0	*0.2*	*13.7*	<0.10	<1.0	<0.10	<1.0	<0.10	<1.0	<0.10	0.068 J	<1.0	<0.10	<1.0	<0.10	<1.0	<0.10	<1.0	<0.10	<1.0	<0.10	<1.0	<0.10	<1.0	<0.10	<1.0	<1.0	<0.10	<1.0	<0.10	<1.0	0.099 J	0.20 J	<0.10	<1.0	<0.10	<1.0	<0.10	<1.0	0.082 J	0.24 J	0.25 J	*0.24*	0.18	<30.0
Radium 226 (pCi/l)	13982-63-3	*NE*	*1.22*	0.0781	0.0828	0.00	0.240	0.24	0.228	0.41	0.931	0.43	1.02	0.802	0.0618	0.0486	-0.138	0.256	-0.199	0.212	-0.0709	0.177	0.261	0.0883	0.399	0.258	0.0418	0.135	0.0945	-0.216	-0.11	0.579	0.787	0.00	-0.0771	-0.0306	-0.0521	0.0661	-0.299	0.219	1.08	0.583	*NE*	0.143	0.00
Radium 228 (pCi/l)	15262-20-1	*NE*	*1.29*	0.33	0.375	0.673	0.551	0.841	0.285	0.881	**2.16**	**1.43**	1.28	0.647	0.465	0.382	1.02	0.307	0.297	0.377	0.339	**2.13**	0.555	**1.74**	0.0999	**2.13**	**2.23**	0.284	-0.299	0.185	0.602	1.81	2.00	-0.21	0.816	0.561	0.201	0.248	-0.267	-0.0442	2.57	4.43	*NE*	0.70	0.678
Combined Radium (pCi/l)	7440-14-4	*NE**	*2.09*	0.408	0.458	0.673	0.791	1.08	0.513	1.29	**3.09**	1.86	**2.30**	1.45	0.527	0.431	1.02	0.563	0.297	0.589	0.34	**2.31**	0.816	1.83	0.499	**2.39**	**2.27**	0.419	0.0945	0.185	0.602	2.39	2.79	0.00	0.816	0.561	0.201	0.314	0.00	0.219	3.65	5.01	*NE*	0.843	0.678
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Copper (mg/l)	7440-50-8	*1*	*0.0114*	<0.005	0.0043J	<0.005	<0.005	<0.005	<0.005	<0.005	**0.0125**	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.0092	0.0141	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.0072	0.0276	0.013	*0.007*	<0.005	<0.005
Nickel (µg/l)	7440-02-0	*100*	*3.50*	<5.0	<5.0	<5.0	<5.0	<5.0	4.9 J	<5.0	**10.2**	**6.0**	<5.0	**7.3**	**7.4**	**7.3**	<5.0	<5.0	<5.0	3.9 J	<5.0	**10.1**	3.5 J	**18.0**	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	5.6	8.8	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	4.7 J	19.2	8.6	*88*	5.0 J	<5.0
Silver (µg/l)	7440-22-4	*20*	*2.50*	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	*0.06*	<5.0	<5.0
Vanadium (µg/l)	7440-62-2	*0.3*	*8.30*	6.8	5.9	<5.0	<5.0	<5.0	<5.0	<5.0	5.9	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	39.2	68.8	<5.0	5.9	<5.0	5.9	<5.0	<5.0	28.9	88.2	75.2	*NE*	<5.0	<5.0
Zinc (mg/l)	7440-66-6	*1*	*0.0342*	<0.01	<0.01	<0.01	0.016	<0.01	<0.01	<0.01	0.0277	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.0418	0.0682	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.0296	0.0834	0.0692	*0.05*	0.0096 J	<0.01

Notes:

* = no established 2L Standard. 5 pCi/l is the Federal Standard

BTV = background threshold value calculated for January 2020

NE = not established

NT = not tested

µg/l = micrograms per liter

pCi/l = picocuries per liter

mg/l = miligrams per liter

EQBL = Equipment Blank

J = Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit

Shaded = concentration reported above (or below for pH) established 2L Standard, IMAC, or 2B Standard

Bold/Underlined = concentration exceeded BTV

2L Standard = North Carolina Groundwater Protection Standard (T15A NCAC 02L .0202)

IMAC = Interim Allowable Maximum Concentration

2B Standard = North Carolina Surface Water and Wetland Standards (15A NCAC 02B) for Gulf Creek (SW-1) and Shaddox Creek (SW-2) which are both Class WS-IV Waters or are National Criteria per EPA

pH was field tested

Groundwater, surface water, and leachate samples collected for **January 2021 from January 25-29** and **April 2021 from April 12-16** and analyzed for above parameters by Pace Analytical Services, LLC

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3.3 Surface Water Analytical Results

Surface water sample results were compared to the North Carolina Water Quality Standards for Surface Waters established under T15A NCAC 02B (2B Standards) or the EPA National Criteria Standard (utilized by the North Carolina Division of Water Quality as default standards for parameters not listed in 15A NCAC 02B).

3.3.1 January 2021 Sampling Event

Concentrations of the following constituents exceeded 2B Standards in one or more surface water sample locations during the January 2021 sampling event: cobalt, copper, lead, pH, TDS, and zinc. Four constituents (cobalt, mercury, selenium, and silver) were reported with MRLs that exceeded the 2B Standards. The cobalt MRL was 5.0 µg/L, and the 2B Standard is 3 µg/L. The mercury MRL was 0.20 µg/L, and the 2B Standard is 0.012 µg/L. The selenium MRL was 10.0 µg/L, and the 2B Standard is 5 µg/L. The silver MRL was 5.0 µg/L, and the 2B Standard is 0.06 µg/L.

- Cobalt exceeded the 2B Standard of 3 µg/L in surface water sample SW-1.
- Copper exceeded the 2B Standard of 0.007 µg/L in surface water samples SW-1 and SW-5.
- Lead exceeded the 2B Standard of 25 µg/L in surface water sample SW-1.
- The pH values did not fall within 2B Standard range of 6.0-9.0 SU in samples collected from the surface water samples SW-1, SW-3, SW-4, and SW-5.
- TDS exceeded the 2B Standard of 500 mg/L in surface water samples SW-1 and SW-5.
- Zinc exceeded the 2B Standard of 0.05 µg/L in surface water sample SW-5.
- No exceedances of 2B Standards were reported in the sample collected from SW-2.

Standards have not been established under T15A NCAC 02B for the following constituents detected: boron, calcium, lithium, radium-226, radium-228, combined radium, and vanadium. Laboratory results are presented in **Table 5**.

3.3.2 April 2021 Sampling Event

Concentrations of the following constituents exceeded 2B Standards in one or more surface water sample locations during the April 2021 sampling event: cobalt, copper, lead, TDS, and zinc. Five constituents (cobalt, mercury, selenium, thallium, and silver) were reported with MRLs that exceeded the 2B Standards. The cobalt MRL was 5.0 µg/L, and the 2B Standard is 3 µg/L. The mercury MRL was 0.20 µg/L, and the 2B Standard is 0.012 µg/L. The selenium MRL was 10.0 µg/L, and the 2B Standard is 5 µg/L. The thallium MRL was 1.0 µg/L, and the 2B Standard is 0.24 µg/L. The silver MRL was 5.0 µg/L, and the 2B Standard is 0.06 µg/L. Please note that field pH of surface samples was not recorded during this sampling event.

- Cobalt exceeded the 2B Standard of 3 µg/L in surface water samples SW-1, SW-5, and SW-6.
- Copper exceeded the 2B Standard of 0.007 µg/L in surface water samples SW-1, SW-5, and SW-6.

- Lead exceeded the 2B Standard of 25 µg/L in surface water samples SW-1, SW-5, and SW-6.
- TDS exceeded the 2B Standard of 500 mg/L in surface water samples SW-1 and SW-6.
- Zinc exceeded the 2B Standard of 0.05 µg/L in surface water samples SW-1, SW-5, and SW-6.
- No exceedances of 2B Standards were reported in the sample collected from SW-2, SW-3, or SW-4 (excluding the lack of recorded data for pH).

Standards have not been established under T15A NCAC 02B for the following constituents detected: boron, calcium, lithium, radium-226, radium-228, combined radium, and vanadium. Laboratory results are presented in **Table 5**.

3.4 Leachate Analytical Results

One sample (LEACHATE) of leachate generated on-site was collected and analyzed during the January 2021 and April 2021 monitoring events.

Boron, pH, arsenic, barium, lithium, nickel, and zinc increased between the October 2020 and January 2021 sampling event; however, results were generally within range of historical concentrations (**Table 5**). Chloride, lithium, and molybdenum increased between the January 2021 and April 2021 sampling event; however, results were generally within range of historical concentrations (**Table 5**). Leachate sampling is required by the Permit to Operate and is disposed of in compliance with the Clean Water Act at either the City of Sanford's Big Buffalo Creek Wastewater Treatment Plant or the Town of Spring Lake's South Harnett Regional Wastewater Treatment Plant.

4 Statistics

4.1 Methodology

Background groundwater quality was evaluated to establish statistically-derived background concentrations for the site. Groundwater quality in downgradient wells was then compared to background concentrations to determine if a statistically significant increase (SSI) over background has occurred, as required by Section .1600 rules of the North Carolina Solid Waste Management Rules 15A NCAC 13B.

Sampling results used to establish background threshold values (BTVs) were obtained during twenty-five monitoring events performed between October 2015 and April 2021. Downgradient sampling results from the detection monitoring event in January 2021 and April 2021 were used to evaluate the potential for SSIs. Software packages ProUCL, NCSS, R and SPSS were used in the production of the statistics (ProUCL is offered by the USEPA; R is a free software environment; NCSS and SPSS are licensed software packages).

Groundwater samples collected as part of the monitoring program were analyzed for NCDEQ Solid Waste Appendix I (except VOCs), 40 CFR 257 Appendix III, and 40 CFR 257 Appendix IV constituents. Only non-filtered sample results were utilized for the statistical analysis of monitored constituents.

4.1.1 Statistical Analysis

The background sample size (i.e., quantity of qualifying samples) was evaluated per constituent. Descriptive statistics were calculated for the background data set including and excluding non-detect (ND) values. When NDs were included in the data set, the method detection limit (MDL) was substituted as the ND value for simple descriptive statistics. The analysis was performed with NDs removed to better understand the central tendency and range of the detected values. Note that for the trend analyses in **Section 4.1.4** and for the establishment of statistically-derived background concentration levels in **Section 4.2**, imputation methods using the maximum likelihood method (MLE) for NDs, regression on order statistics (ROS) or Kaplan-Meier (KM) methods were used, where appropriate.

Following the calculation of descriptive statistics, statistical analyses for the background data set were performed to evaluate for outliers, data distributions, trends, and spatial variability between the background wells for Appendix I Metals, Appendix III and Appendix IV constituents, where data quantity and quality permit. A total of thirty-five samples (twenty-five monitoring events from BG-1 and ten monitoring events from BG-2) were included for the descriptive analysis of the background monitoring well results for the monitored constituents. The first sampling event conducted in August 2015 was not included in the analysis as data obtained during this event were not consistent with data from subsequent rounds; sample analyses for the August 2015 event were performed by a different laboratory, possibly accounting for the disparity in results. The sample collected April 3rd, 2017 for total dissolved solid in well BG-1 is considered an outlier and removed from the analysis. January 2020 samples for boron were removed from the analysis as they were diluted and could not be properly detected.

For downgradient monitoring results, the analysis included the calculation of descriptive statistics for Appendix I Metals, Appendix III and Appendix IV constituents, (for the data sets including and excluding ND values), followed by an evaluation of outliers and trends. A total of twenty-four monitoring events performed between November 2015 and April 2021 were included for the descriptive analysis of the downgradient monitoring well results for the monitored constituents for the January 2021 sampling event.

4.1.2 Outliers

Outliers are values that are not representative of the population from which they are sampled. The background and downgradient data sets were screened for outliers using the Dixon's and Rosner's outlier tests. Dixon's outlier test is suitable for data sets containing less than 25 samples, while Rosner's test is suitable for data sets with 25 or more samples. The outlier test was conducted using a significance of one percent. For constituents that had NDs, the NDs were removed prior to testing for outliers.

Statistical outliers were identified in the background data set evaluated for four Appendix III constituents (boron, calcium, sulfate, and total dissolved solids) and one Appendix IV constituent (lithium). The constituent concentrations identified as statistical outliers were reported in samples collected from background well BG-2, except for boron and lithium.

Statistical outliers were identified intermittently for numerous Appendix III and Appendix IV constituents and Appendix I Metals, in the data sets evaluated for downgradient monitoring wells throughout the monitoring period.

The statistical outliers were investigated as possible data entry or measurement errors. The remaining values were all within one order of magnitude of other observations and deemed correct. Given the variable nature of groundwater samples, the small sample sizes and that it is common for groundwater quality samples to have very low or very high concentrations over time, statistical outliers are expected but do not necessarily signify that the outliers are from different distributions. As additional background samples are collected over time, outlier test results may change, and earlier observations thought to be outliers may no longer be outliers.

4.1.3 Data Distribution

Groundwater data was fitted to known distribution models using Goodness-of-Fit (GOF) tests incorporated into ProUCL. For data sets comprised of 50 or fewer samples, ProUCL's GOF module incorporates the Shapiro-Wilk GOF test to determine normal or lognormal distribution and Anderson-Darling to determine gamma distribution. Normal, lognormal and gamma distributions are parametric distributions. If a data set could not be fit with any of these three parametric distributions, it was considered to follow a nonparametric distribution.

Note that ProUCL does not provide GOF results for data sets with less than three detected values due to insufficient data. For purposes of estimating background concentrations, these data sets were treated under non-parametric distribution assumptions with the maximum detected value chosen to represent the background concentrations.

4.1.4 Trends

Background constituent concentrations in groundwater should demonstrate stationary conditions through time, free of trends. Constituents were analyzed for trends within the data set using a maximum likelihood estimate (MLE) regression for constituents which followed parametric distributions and Mann-Kendall tests for those that were treated under nonparametric distributional assumptions. The MLE regression can be applied to data sets that can be fitted to a specific distribution model, and that contain NDs with multiple MDLs. The Mann-Kendall test is suitable for data series with no discernable distributions and only one MDL value for NDs.

Constituents treated under nonparametric data assumptions (either tested as nonparametric or having more than 50 percent NDs) and with multiple MDLs or with less than three detected values were not assessed for trends.

The background well regression analysis showed a potential increasing trend for fluoride (an Appendix III and Appendix IV constituent) and sulfate (Appendix III). A potential decreasing trend for chloride (Appendix III) and three Appendix IV constituents (barium, lithium, and radium-226). There were no increasing or decreasing trends identified for other constituents with sufficient data quantity and quality for testing with the MLE analysis or Mann-Kendall test. The statistical trends identified for barium, chloride, fluoride, lithium, sulfate, and radium-226 should be closely monitored as additional background samples are collected.

Trends were also evaluated for constituents in each downgradient well using the same methods as described above for the background data set. Trends were identified for select constituents at select monitoring well locations and should be monitored as additional downgradient groundwater data are collected at the site (**Section 4.2**).

4.1.5 Spatial Variability

Spatial variability refers to identifying whether or not there are statistically identifiable differences in mean concentrations or variance levels across the well field (i.e., the pooled background data). To evaluate the potential for spatial variability between the background wells, parametric and nonparametric analysis of variance (ANOVA) tests were used to test differences in sample mean or median levels at the 5 percent level of significance. Side-by-side box plots for each constituent were also used to determine if variation is significant from a visual perspective.

Potential spatial variability between background wells BG-1 and BG-2 was identified for six Appendix III or Appendix IV constituents (barium calcium, fluoride, pH (field), sulfate and total dissolved solids). The observed spatial variability is indicative of the hydrogeological regime at the site and values between the two wells are within an order of magnitude of each other. The distributional patterns for constituents at the background wells will continue to be monitored for spatial variability and should be re-evaluated as the data set grows.

4.2 Evaluation for SSIs over Background

Based on the statistical evaluations performed, BTVs were calculated for the detection monitoring program at the site for Appendix I metals, Appendix III and Appendix IV constituents.

For constituents that have all ND background values, the maximum MDL is chosen to represent background and the double quantification rule (DQR) is used to evaluate whether there is an SSI. The BTV provided for detection monitoring constituents is the statistically-derived background concentration (i.e., upper prediction limit [UPL]), the maximum detected value or the maximum MDL depending on the level of censorship in each of the background samples.

Downgradient sampling results from the detection monitoring event in January 2021 and April 2021 were used to test for SSIs. Downgradient concentrations were compared to BTVs. For constituents that have all ND background values, the DQR is applied; that is, an SSI is registered for the well-constituent pair if the downgradient concentrations exhibit detects in two consecutive sampling events. Downgradient sampling results from the July 2020, January 2021, and April 2021 sampling events were used to test for SSIs for constituents that have all ND background values.

4.3 Statistical Summary

BTVs were calculated using wells BG-1 and BG-2 as the background monitoring wells. However, eight monitoring wells (MW-1 through MW-8) were installed and sampled (October 2015) prior to ash placement, thus representing pre-ash conditions at the site.

SSIs were found for one Appendix I metal (Nickel), five Appendix III constituents (calcium, chloride, fluoride, pH (field), and total dissolved solids), and five Appendix IV constituents (barium, cadmium, fluoride, lithium, and total radium). When the January 2021 sampling event results are compared to the pre-ash sampling results from those eight wells, current downgradient groundwater constituent concentrations are generally similar to concentrations reported prior to ash placement. Additional details regarding statistical methodology and results is provided in **Appendix F.**

5 Summary and Conclusions

5.1 Summary

The 2021 First and second Quarterly Detection Monitoring Events were conducted at the Brickhaven No. 2 Mine Tract "A" Structural Fill site from January 25-29, 2021 and April 12-15, 2021, respectively. A summary of the findings from these events is provided below**.**

5.1.1 Groundwater

January 2021 Sampling Event:

- Antimony, arsenic, beryllium, cadmium, cobalt, copper, lead, mercury, selenium, silver, thallium, and zinc were not detected above the MRL.
- Barium exceeded the 2L Standard of 700 µg/L, and the BTV of 443 µg/L, in well MW-8.
- Chloride exceeded the 2L Standard of 250 mg/L in the following wells: BG-2, MW-1, MW-2, MW-3, MW-4, MW-7R, and MW-8. Chloride concentrations also exceeded the BTV of 344 mg/L in the following wells: MW-1, MW-2, MW-3, MW-4, and MW-8. However, concentrations were generally consistent with prior sampling events.
- Field-measured pH did not fall within 2L Standard range of 6.5-8.5 SU in samples collected from the following wells: BG-1, MW-4, and MW-6.
- TDS exceeded the 2L Standard of 500 mg/L in all wells sampled except MW-2 and MW-5. TDS increased in wells BG-2, MW-1, MW-3, and MW-8 when compared to the previous sampling event. However, TDS exceeded the BTV of 1,270 mg/L in only three wells: MW-1, MW-3, and MW-11.
- Vanadium exceeded the IMAC of 0.3 µg/L in well BG-1.

April 2021 Sampling Event:

- Arsenic, beryllium, cadmium, cobalt, lead, mercury, selenium, silver, and thallium were not detected above the MRL.
- Antimony exceeded the IMAC of 1 µg/L and BTV of 3.90 µg/L in well MW-2.
- Barium exceeded the 2L Standard of 700 µg/L, and the BTV of 443 µg/L, in wells MW-2D and MW-8.
- Chloride exceeded the 2L Standard of 250 mg/L in the following wells: BG-2, MW-1, MW-2, MW-2D, MW-3, MW-4, MW-7R, and MW-8. Concentrations increased in all wells except MW-4, and MW-6, with higher than previous recorded concentrations measured in BG-2 (268 mg/L) and MW-11 (149 mg/L). Chloride exceeded the BTV of 344 mg/L in the following wells: MW-1, MW-2, MW-2D, MW-3, MW-4, and MW-8.
- Chromium exceeded the 2L Standard of 10 µg/L, and the BTV of 3.70 µg/L, in wells MW-2, MW-7R, and MW-8.
- Field-measured pH did not fall within 2L Standard range of 6.5-8.5 SU in samples collected from the following wells: BG-1, MW-4, MW-6, and MW-11D. The pH measured in well MW-11D did not fall within the BTV range of 5.88-7.26 SU.
- TDS exceeded the 2L Standard of 500 mg/L in all wells sampled except MW-5 and MW-11. Concentrations increased in BG-1, BG-2, MW-1, MW-2, MW-5, and MW-8, as

compared to the prior sampling event. TDS exceeded the BTV of 1,270 mg/L in the following wells: MW-1, MW-2, MW-2D, MW-3, and MW-8.
- Vanadium exceeded the IMAC of 0.3 µg/L in wells BG-1 and MW-2.

5.1.2 Surface Water

January 2021 Sampling Event

- Field-measured pH values did not fall within 2B Standard range of 6.0-9.0 SU in samples collected from the surface water samples SW-1, SW-3, SW-4, and SW-5.
- TDS exceeded the 2B Standard of 500 mg/L in surface water samples SW-1 and SW-5.
- Cobalt exceeded the 2B Standard of 3 µg/L in surface water samples SW-1 and SW-5.
- Copper exceeded the 2B Standard of 0.007 µg/L in surface water samples SW-1 and SW-5.
- Lead exceeded the 2B Standard of 25 µg/L in surface water sample SW-1.
- Zinc exceeded the 2B Standard of 0.05 µg/L in surface water sample SW-5.
- No exceedances of 2B Standards were reported in the sample collected from SW-2

April 2021 Sampling Event

- TDS exceeded the 2B Standard of 500 mg/L in surface water samples SW-1 and SW-6.
- Cobalt exceeded the 2B Standard of 3 µg/L in surface water samples SW-1, SW-5, and SW-6.
- Lead exceeded the 2B Standard of 25 µg/L in surface water samples SW-1, SW-5, and SW-6.
- Copper exceeded the 2B Standard of 0.007 µg/L in surface water samples SW-1, SW-5, and SW-6.
- Zinc exceeded the 2B Standard of 0.05 µg/L in surface water samples SW-1, SW-5, and SW-6.
- No exceedances of 2B Standards were reported in the sample collected from SW-2, SW-3, or SW-4 (excluding the lack of recorded data for pH).

5.1.3 Leachate

Boron, pH, arsenic, barium, lithium, nickel, and zinc increased between the October 2020 and January 2021 sampling event; however, results were generally within range of historical concentrations. Chloride, lithium, and molybdenum increased between the January 2021 and April 2021 sampling event; however, results were generally within range of historical concentrations.

5.1.4 Statistical Analysis

- Statistical outliers were identified in the background data set evaluated for barium, calcium, sulfate, and TDS. Intermittent statistical outliers for Appendix III and Appendix IV constituents and Appendix I Metals, in the data sets evaluated for downgradient monitoring wells, were noted throughout the monitoring period.
- Groundwater quality in wells was compared to background concentrations to determine if a SSI over background has occurred:

- Ten constituents were found to have SSIs: barium, cadmium, calcium, chloride, fluoride, lithium, nickel, pH (field), total dissolved solids, and total radium.
    - Comparing January 2021 sampling event results to the pre-ash sampling results, cadmium and lithium are not within the range of pre-ash conditions.

5.2 Conclusions

Based upon the data analyzed during this event and historical events; HDR has made the following conclusions:

- The presence of SSIs is the result of low background concentrations that may not represent data collected prior to CCP placement (August and October 2015 sampling events) and is influenced by natural and seasonal variations at the site. In general, the SSIs reported during this sampling event are either consistent with those evaluated in the Alternate Source Demonstration (ASD) dated March 29, 2019 or are potential SSIs to be verified during the next sampling event.
- Groundwater modeling during Assessment Monitoring in 2020 calculated that, due to the low hydraulic conductivity of the clay-rich soil of the former clay mine, groundwater and any constituents found in the groundwater will move slowly through the aquifer materials. Model-estimated groundwater velocities are too low for the constituents to have been transported from the Structural Fill to the monitoring wells or surface waters where they have been detected.
- Tracer constituents, such as boron, are not present at significant concentrations in either the groundwater or the surface water. Boron is a conservative tracer, so its ratio to the less mobile constituents (e.g. arsenic) should increase down-gradient of the Structural Fill. However, boron is at low concentrations or not present in down-gradient groundwater. This shows that the ash and leachate, which are a source of boron, are not the source of the other constituents in groundwater and/or surface water.
- The Structural Fill is engineered and lined with an active leachate collection system. By collecting and disposing of the leachate off-site, the likelihood that leachate escaped the liner is greatly reduced.

6 Recommendations

Based on the findings, HDR makes the following recommendations:

- Continue quarterly detection monitoring and semi-annual reporting in accordance with permit requirements.
- Evaluate the validity of SSIs by further assessing sampling protocols/performance, spatial variability, and seasonality of constituent concentrations as additional sampling rounds are conducted.

7 References

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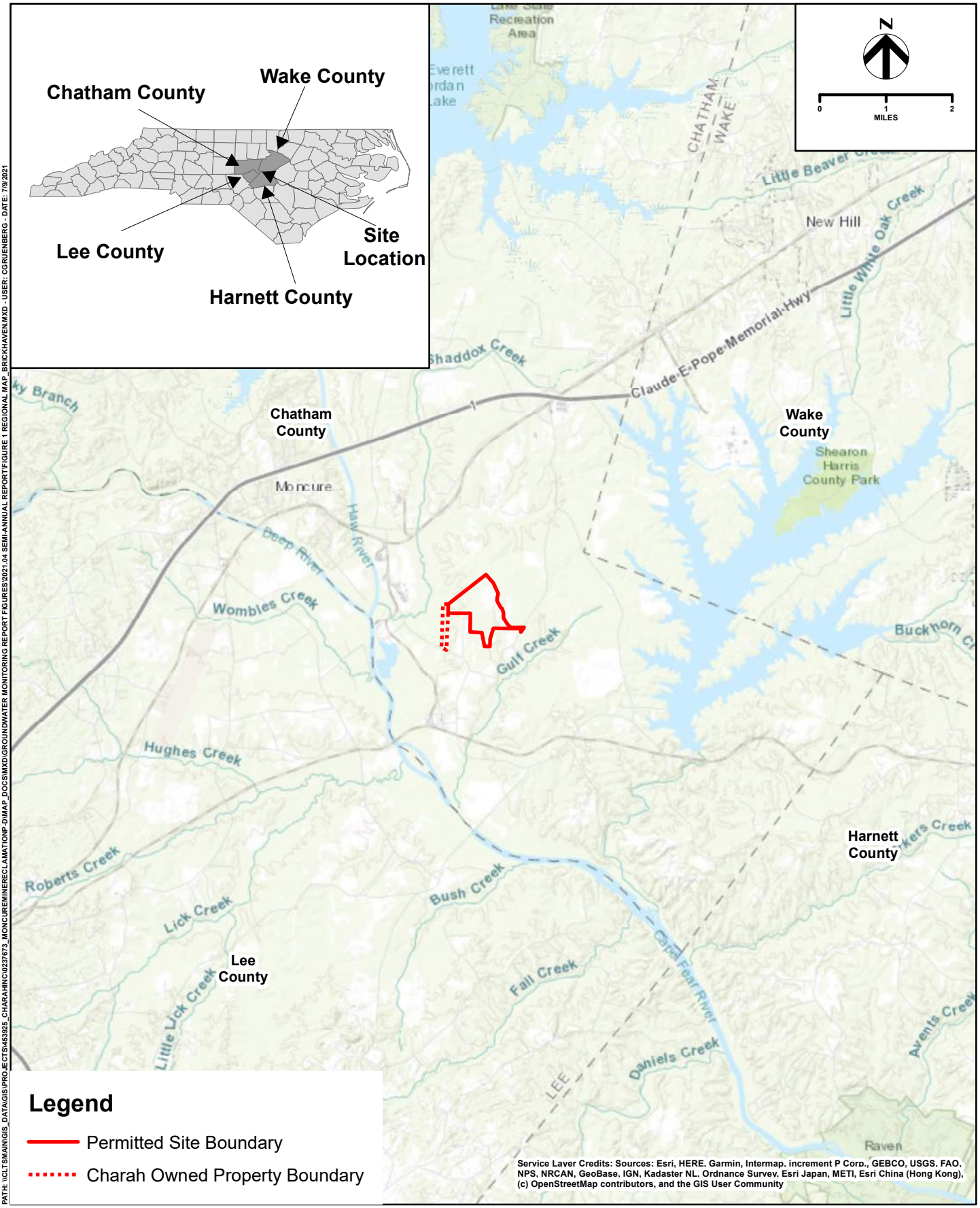
Singhal, B. B.S. and R. P. Gupta. 2010. *Applied Hydrogeology of Fractured Rocks: Springer, 2nd Edition*, 408p. (Table 8-1, p. 140)United States Geological Survey. 2004. *Arsenic, Nitrate, and Chloride in Groundwater, Oakland County, Michigan.*

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Figures

Figure 1: Regional Site Location Map
Figure 2: Regional Topographic Map
Figure 3: Historic Groundwater Elevations
Figure 4: Potentiometric Surface Map – January 2021
Figure 5: Potentiometric Surface Map – April 2021
Figure 6: Sample Location Map

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PATH: \\CLTSMAIN\GIS_DATA\GIS\PROJECTS\453925_CHARAHINC\0237673_MONCUREMINERECLAMATIONP-D\MAP_DOCS\MXD\GROUNDWATER MONITORING REPORT FIGURES\2021.04 SEMI-ANNUAL REPORT\FIGURE 1 REGIONAL MAP_BRICKHAVEN.MXD - USER: CGRUENBERG - DATE: 7/9/2021

REGIONAL SITE LOCATION MAP
CHARAH SOLUTIONS, INC
MONCURE, NORTH CAROLINA

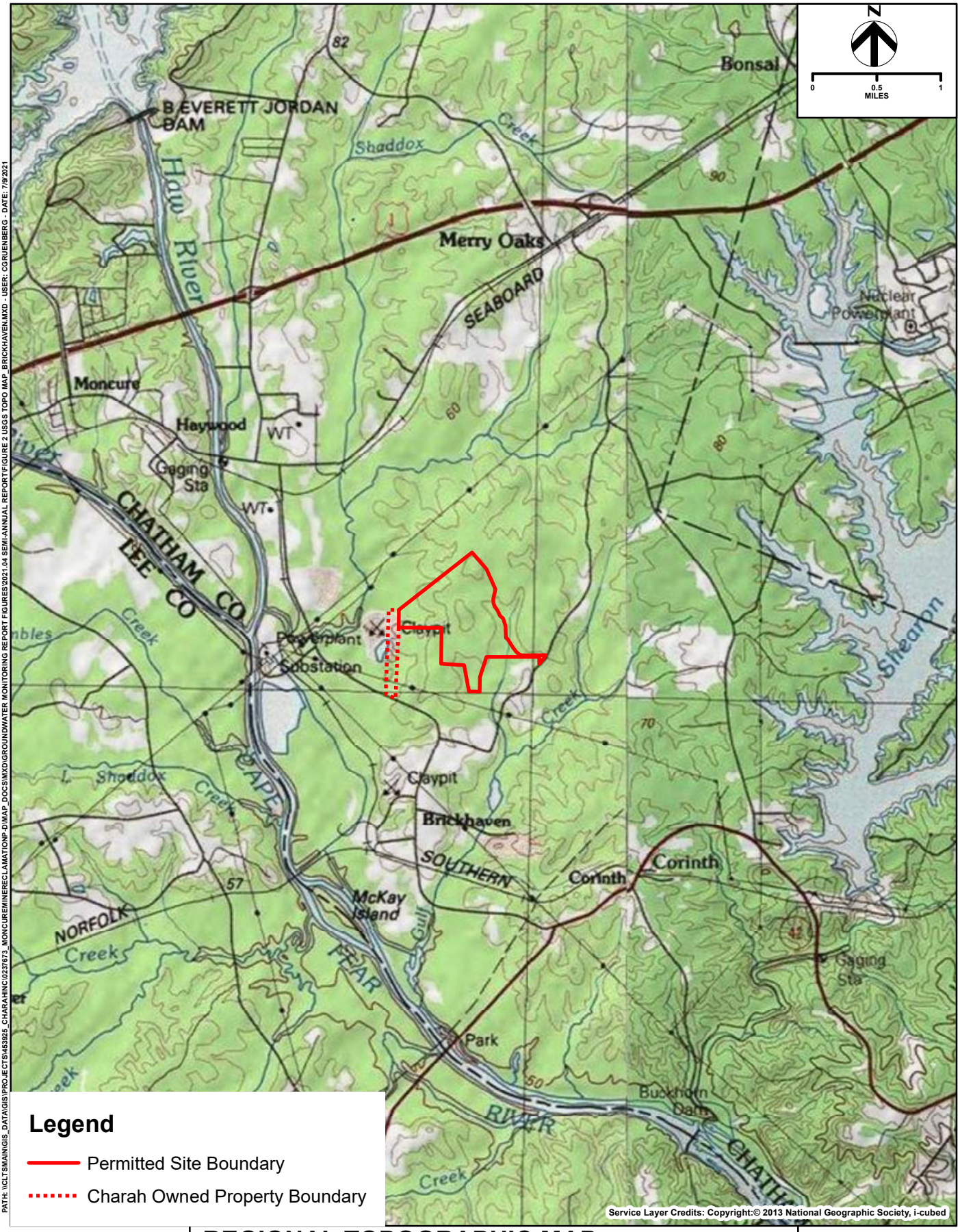
BRICKHAVEN NO. 2 MINE TRACT "A"

DATE

AUGUST 2021

FIGURE

1



Legend

- Permitted Site Boundary
- Charah Owned Property Boundary

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REGIONAL TOPOGRAPHIC MAP
CHARAH SOLUTIONS, INC
MONCURE, NORTH CAROLINA

BRICKHAVEN NO. 2 MINE TRACT "A"

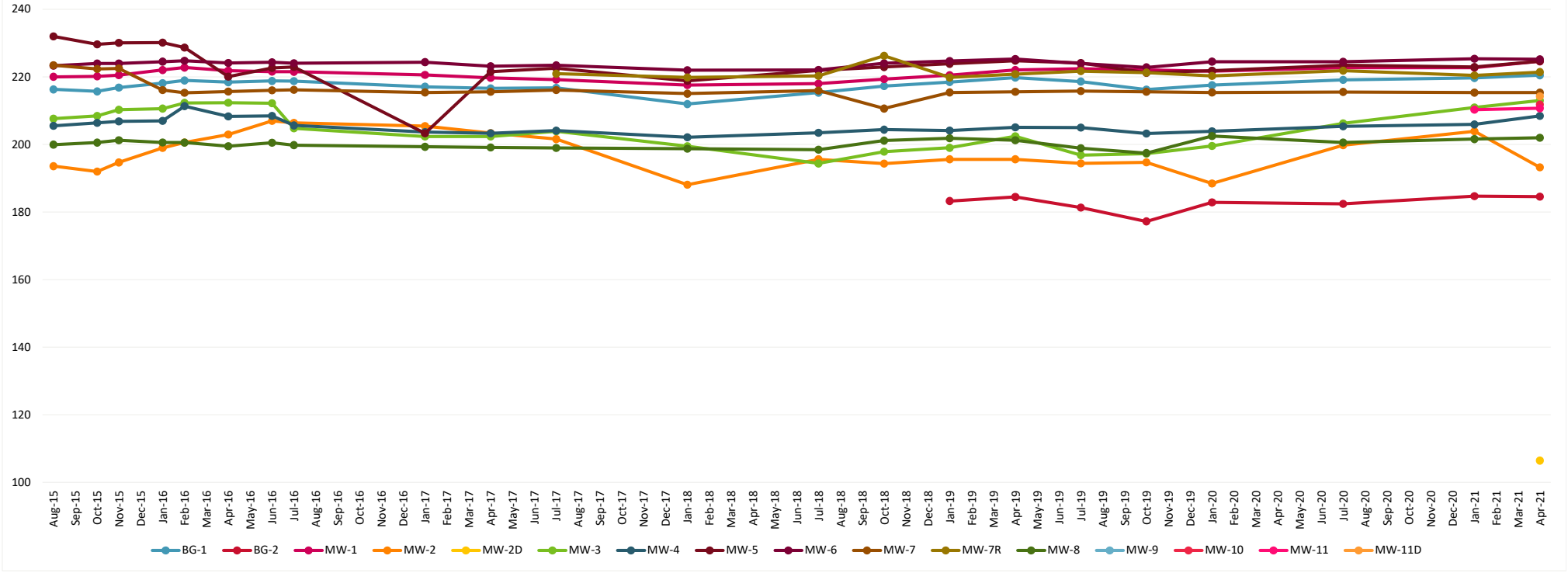
DATE

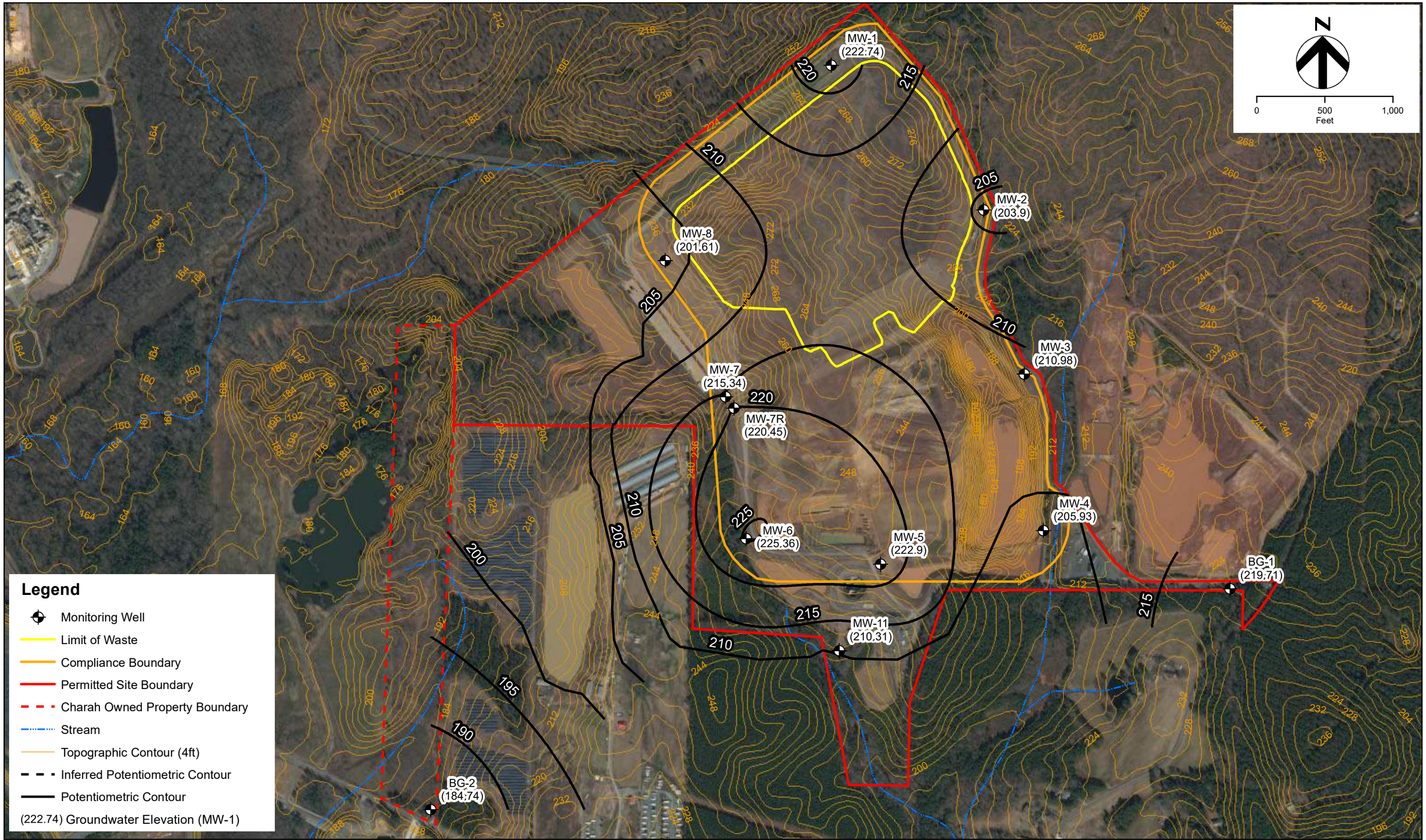
AUGUST 2021

FIGURE

2

Figure 3: Historical Groundwater Elevations





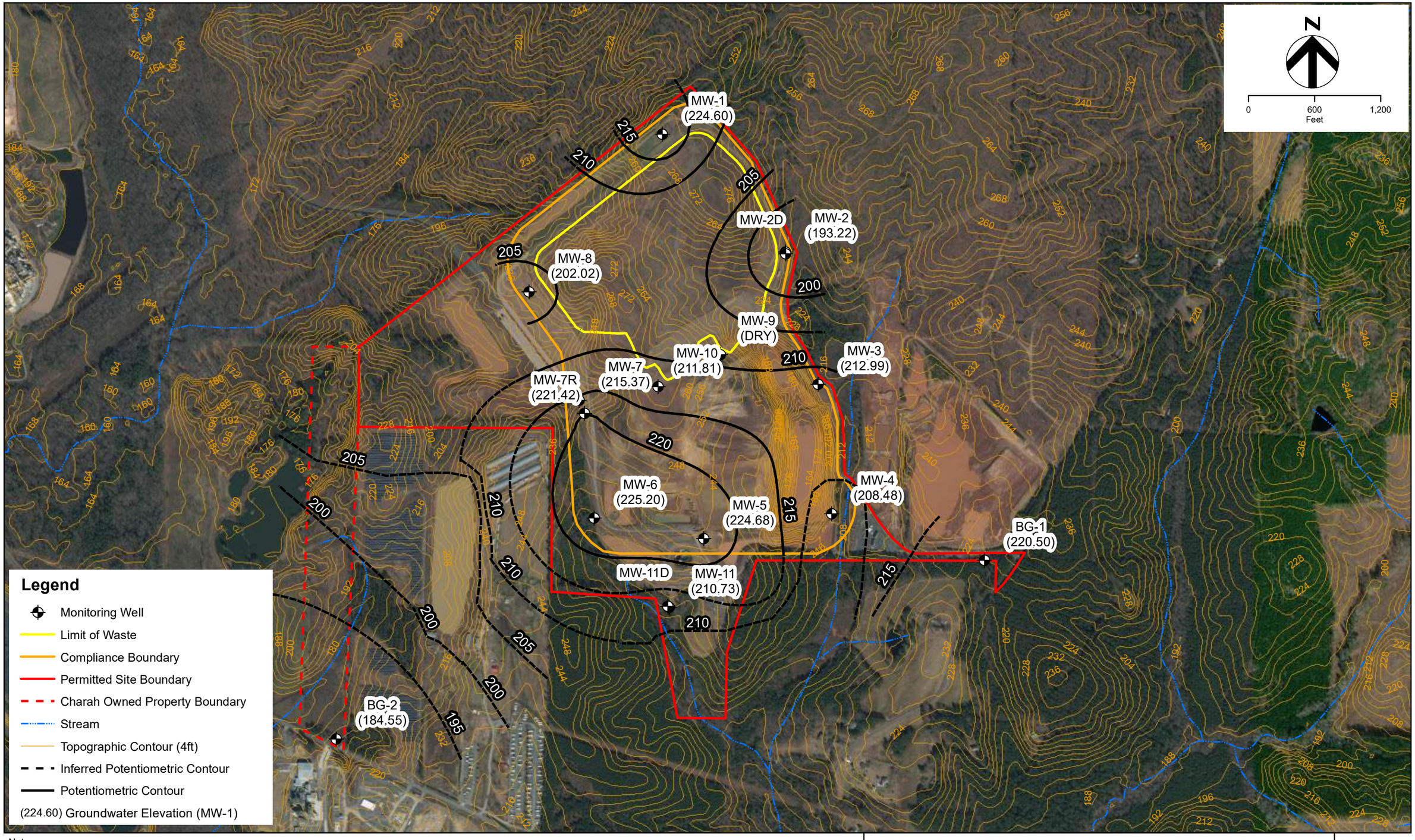
PATH: C:\USERS\JT ROYER\DESKTOP\PROJECTS\CHA RA\FIGURE 4 GW CONTOUR MAP-N1.MXD - USER: - JTROYER - DATE: 8/1/2021

Note:
1. Groundwater elevations derived from depth to water measurements collected on January 25, 2021.
2. Topography data for the site was obtained from NC OneMap Geographic Information System (GIS) website (Dated 2013).
3. Monitoring wells MW-2D, MW-9, MW-10, and MW-11D were not used for contours as they were installed in March 2021.

GROUNDWATER CONTOUR MAP - JANUARY 2021
CHARAH SOLUTIONS, INC.
MONCURE, NORTH CAROLINA
BRICKHAVEN NO. 2 MINE TRACT "A"

DATE
AUGUST 2021

FIGURE
4



PATH: \\CLTSMAIN\GIS_DATA\GIS\PROJECTS\453925_CHARAH\NC\02376\73_MONCURE\MINERECLAMATION\P-D\MAP_DOCS\MXD\GROUNDWATER MONITORING REPORT FIGURES\2021.04 SEMI-ANNUAL REPORT\FIGURE 4 GW CONTOUR MAP.MXD - USER: JTROYER - DATE: 8/2/2021

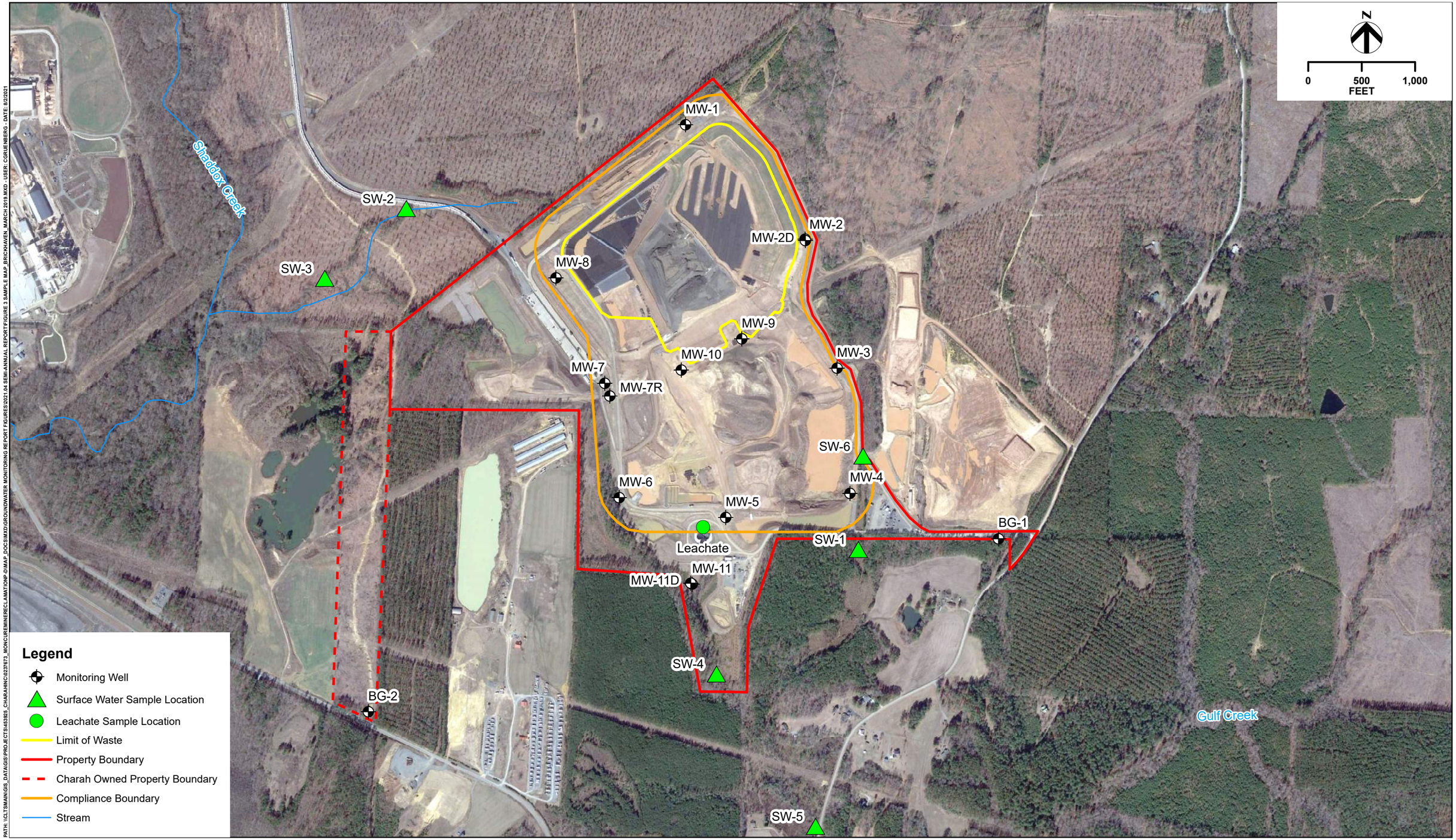
Note:
1. Groundwater elevations derived from depth to water measurements collected on April 12, 2021.
2. Topography data for the site was obtained from NC OneMap Geographic Information System (GIS) website (Dated 2013).
3. Groundwater elevations in MW-2, MW-2D, and MW-11D were not used for contours.

GROUNDWATER CONTOUR MAP - APRIL 2021
CHARAH SOLUTIONS, INC.
MONCURE, NORTH CAROLINA

BRICKHAVEN NO. 2 MINE TRACT "A"

DATE
AUGUST 2021

FIGURE
5



PATH: \\CLTSMAN\GIS_DATA\GIS\PROJECTS\453923_CHARAHINC\223\973_MONCURE\MINERECL\MAT\CNP-DMAP_DOCS\MXD\GROUNDWATER MONITORING REPORT FIGURES\2021-04 SEMI-ANNUAL REPORT\FIGURE 3 SAMPLE MAP_BRICKHAVEN_MARCH 2019.MXD - USER: CGRUENBERG - DATE: 8/2/2021

SAMPLE LOCATION MAP
CHARAH SOLUTIONS, INC.
MONCURE, NORTH CAROLINA

BRICKHAVEN NO. 2 MINE TRACT "A"

DATE
AUGUST 2021

FIGURE
6

A

Appendix A – Well Development Records

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Groundwater Sampling Form

Sample ID: MW-3

Site Information	
Site Name: Charah Brickhaven	**Project Number:** 10021146
Site Location: Moncure, NC	**Sampling Personnel:** Charles Gruenberg
Date: 03/19/21	**Weather:** Foggy

Well Information	
Well Diameter (in): 2"	**Purge Equipment:** Mega Masoch Pro
Screened Interval (ft): ~~25-40'~~ 28.36-43.36	**Pump Type:** ESP
Well Depth (ft): 43.36' 43.35'	**Pump Depth (ft-bTOC):** ~ 37'
Depth-to-Water (ft-bTOC): 10.64'	**Tubing Diameter (in):** 3/8" X 1/2"
Water Column Thickness (ft): 32.71	**Well Volume (ft^3):** ~5.2336

1 Well Volume = (Total Depth - Static Water Level) * Well Capacity

Well Capacity (gallons per feet): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3' = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47

Purging Information

Parameter Instrument(s): YSI Pro / Micro TPW Turbidimeter

TIME	VOLUME PURGED (Liters)	CUMULATIVE VOLUME PURGED (Liters)	PURGE RATE (mL/min)	DEPTH TO WATER (ft-bTOC)	pH (SU) (±0.1)	TEMP. (C°)	COND. (µS/cm) (5%)	DISSOLVED OXYGEN (mg/L) (10%)*	ORP (mV) (±20mV)	TURBIDITY (NTUs) (≤10 or 10%)	COLOR/ ODOR (describe)
1140	0	0	[illegible]	9.51'	7.25	17.0	3705	6.13	147.4	18.30	clear
Surging Well											
After Surging → DTW w/ no Pump =				13.27'							
1350	0	0	100	13.21'	7.39	18.1	4119	5.43	110.9	199.9	light tan
1355	0.5	0.5	100	13.70	7.41	18.1	4235	4.31	101.5	270.1	light tan
1400	0.75	1.25	150	14.86	7.42	17.9	4217	3.64	92.3	279.2	light tan
1405	0.5	1.75	100	15.30	7.43	18.0	4194	3.62	89.5	284.2	light tan

* DO below 2.0 mg/L is stable at ±0.2 mg/L; DO below 0.5 mg/L is stable

Initial Reading ↗

Sample Information

Sample Number	Collection Time	Parameter	Container	Preservative
MW-3	N/A			

Sampled By: Charles Gruenberg	**Sample Time:** N/A
Date Sampled: N/A	**Sampler Signature:** N/A

Notes: Pumprate=

100 @ 1350
150 @ 1400
100 @ 1405
150 @ 1425
100 @ 1430
150 @ 1600
100 @ 1610

Groundwater Sampling Form

Sample ID: MW-3

Purging Information (Page 2)

TIME	VOLUME PURGED (Liters)	CUMULATIVE VOLUME PURGED (Liters)	PURGE RATE (mL/min)	DEPTH TO WATER (ft-bTOC)	pH (SU) (±0.1)	TEMP. (C°) 3%	COND. (µS/cm) 3% ~~(5%)~~	DISSOLVED OXYGEN (mg/L) (10%)*	ORP (mV) (±20mV) ~~10mV~~	TURBIDITY (NTUs) (≤10 or 10%)	COLOR/ ODOR (describe)
1410	0.5	2.25	100	16.60	7.42	17.9	4076	4.04	84.3	246.2	lt tan
1415	0.5	2.75	100	16.90	7.42	18.5	4045	3.96	83.0	273.9	lt tan
1420	0.5	3.25	100	17.68	7.41	18.1	3986	4.06	80.0	230.5	lt tan
1425	0.75	4.00	150	18.24	7.40	17.9	3950	4.25	78.8	241.3	lt tan
1430	0.5	4.5	100	18.64	7.40	18.4	3896	4.24	78.2	233.4	lt tan
1435	0.5	5.0	100	19.10	7.40	18.5	3848	4.38	76.4	171.3	lt tan/Clear
1440	0.5	5.5	100	19.49	7.40	18.5	3796	4.31	74.6	119.3	lt tan/Clear
1445	0.5	6.0	100	19.99	7.40	18.5	3737	4.26	72.8	93.64	Clear
1450	0.5	6.5	100	20.43	7.41	18.4	3701	4.40	71.3	71.44	Clear
1455	0.5	7.0	100	20.84	7.42	18.4	3653	4.55	69.7	49.37	Clear
1500	0.5	7.5	100	21.16	7.44	18.4	3624	4.50	68.9	45.53	Clear
1505	0.5	8.0	100	21.69	7.45	18.5	3635	4.71	68.4	63.27	Clear
1510	0.5	8.5	100	21.84	7.46	18.6	3629	4.75	68.2	52.90	Clear
1515	0.5	9.0	100	22.41	7.46	18.4	3603	4.85	67.1	64.92	Clear
1520	0.5	9.5	100	22.74	7.46	18.2	3587	5.06	66.2	84.81	Clear
1525	0.5	10.0	100	23.22	7.47	18.5	3562	5.08	66.0	78.41	Clear
1530	0.5	10.5	100	23.95	7.49	18.9	3526	5.03	66.3	63.83	Clear
1535	0.5	11.0	100	24.38	7.51	19.3	3513	4.63	66.7	57.71	Clear
1540	0.5	11.5	100	24.65	7.51	19.4	3496	4.71	66.3	47.69	Clear
1545	0.5	12.0	100	24.95	7.51	19.6	3561	4.52	64.7	47.28	Clear
1550	0.5	12.5	100	25.25	7.48	18.7	3550	4.73	63.5	56.59	Clear
1555	0.5	13.0	100	25.68	7.46	18.5	3527	4.79	61.7	61.37	Clear
1600	0.75	13.75	150	26.42	7.44	19.0	3500	4.89	60.8	76.77	Clear
1605	0.75	14.5	150	27.02	7.45	19.6	3481	4.87	60.2	56.52	Clear
1610	0.5	15.0	100	27.48	7.46	19.6	3482	4.76	59.4	42.49	Clear
1615	0.5	15.5	100	27.90	7.45	19.5	3477	4.60	59.2	40.01	Clear
1620	0.5	16.0	100	28.18	7.45	19.1	3476	4.77	59.3	29.88	Clear
1625	0.5	16.5	100	28.62	7.44	19.0	3452	4.78	59.3	38.67	Clear
1630	0.5	17.0	100	28.75	7.44	19.2	3463	4.74	59.3	31.12	Clear
1635	0.5	17.5	100	28.95	7.44	19.4	3443	4.71	59.1	37.00	Clear
1640	0.5	18.0	100	29.11	7.44	19.0	3442	4.81	58.8	34.97	Clear
1645	0.5	18.5	100	29.36	7.44	19.2	3441	4.75	59.0	34.34	Clear
1650	0.5	19.0	100	29.54	7.44	19.5	3450	4.77	59.1	26.80	Clear
1700	0.5	20.0	100	29.89	7.43	19.4	3457	4.67	59.7	28.56	Clear
1705	0.5	20.5	100	30.08	7.41	19.2	3456	4.67	59.1	25.03	Clear
1710	0.5	21.0	100	30.28	7.40	19.3	3464	4.79	59.1	28.75	Clear
1715	0.5	21.5	100	30.51	7.40	19.9	3471	4.66	59.2	25.30	Clear
1720	0.5	22.0	100	30.75	7.39	19.9	3479	4.69	59.3	24.61	Clear

Started for a second to clear Turbidity

* DO below 2.0 mg/L is stable at ±0.2 mg/L; DO below 0.5 mg/L is stable

Turbidity & DTW Not Stable

Done Purging @ 1720

Groundwater Sampling Form

Sample ID: MW-2

Site Information	
Site Name: Charah Brickhaven	**Project Number:** 10021146
Site Location: Moncure, NC	**Sampling Personnel:** Charles Gruenberg
Date: 03/19/2021	**Weather:** Drizzle Cloudy

Well Information	
Well Diameter (in): 2"	**Purge Equipment:** Mega Monsoon P10
Screened Interval (ft): ~~30'-45'~~ 35.15-50.15	**Pump Type:** ESP
Well Depth (ft): 50.15' 50.15'	**Pump Depth (ft-bTOC):** ~47'
Depth-to-Water (ft-bTOC): 28.68	**Tubing Diameter (in):** 3/8" X 1/2"
Water Column Thickness (ft): 21.47	**Well Volume (ft^3):** 3.4352
1 Well Volume = (Total Depth - Static Water Level) * Well Capacity	
Well Capacity (gallons per feet): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3' = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47	

Purging Information

Parameter Instrument(s): YSI PID / MPA TPW Turbidimeter

TIME	VOLUME PURGED (Liters)	CUMULATIVE VOLUME PURGED (Liters)	PURGE RATE (mL/min)	DEPTH TO WATER (ft-bTOC)	pH (SU) (±0.1)	TEMP. (C°) 3%	COND. (µS/cm) 3% (5%)	DISSOLVED OXYGEN (mg/L) (10%)*	ORP (mV) ± (±20mV) 10mV	TURBIDITY (NTUs) (≤10 or 10%)	COLOR/ ODOR (describe)
Initial = 0926	0	0	100	28.24	7.91	15.3	4111	5.70	118.8	16.65	Clear
	Sampled		W/I								
DTW after Sampling			w/	no Pump =		29.97					
1135	0	0	150	28.79	7.76	16.6	4334	4.03	132.0	>1000	Brown
1140	0.75	0.75	150	51.23	7.72	16.6	4315	3.81	116.4	>1000	Brown
1145	0.75	1.50	150	52.69	7.67	16.9	4250	3.81	111.3	>1000	Brown
1150	0.75	2.25	150	53.54	7.65	16.5	4148	3.98	106.9	>1000	

* DO below 2.0 mg/L is stable at ±0.2 mg/L; DO below 0.5 mg/L is stable

Sample Information

Sample Number	Collection Time	Parameter	Container	Preservative
MW-2				

Sampled By: Charles Gruenberg	**Sample Time:** N/A
Date Sampled: N/A	**Sampler Signature:** N/A

Notes: Pumprate= 150 @ 1135
100 @ 1155

Groundwater Sampling Form

Sample ID: MW-2

Purging Information (Page 2)

TIME	VOLUME PURGED (Liters)	CUMULATIVE VOLUME PURGED (Liters)	PURGE RATE (mL/min)	DEPTH TO WATER (ft-bTOC)	pH (SU) (±0.1)	TEMP. (C°) 3%	COND. (µS/cm) 3% (5%)	DISSOLVED OXYGEN (mg/L) (10%)*	ORP (mV) ±10mV (±20mV)	TURBIDITY (NTUs) (≤10 or 10%)	COLOR/ ODOR (describe)
1155	0.5	2.75	100	33.94	8.56	15.9	2031	5.48	135.1	>1000	Brown
1200	0.5	3.25	100	34.25	7.62	16.2	2199	5.04	109.9	>1000	Brown
1205	0.5	3.75	100	34.72	7.66	15.9	2173	5.12	102.6	>1000	Brown
1210	0.5	4.25	100	35.05	7.70	15.8	2174	5.10	100.8	>1000	Brown
1215	0.5	4.75	100	35.14	7.70	15.8	2179	5.09	98.6	>1000	Brown
1220	0.5	5.25	100	35.39	7.69	16.0	2175	5.08	97.0	—	Brown
1225	0.5	5.75	100	35.51	7.75	16.1	2192	5.04	96.1	—	Brown
1230	0.5	6.25	100	35.90	7.72	16.9	1947	5.36	108.6	841.7	Brn / tan
1235	0.5	6.75	100	36.21	7.75	16.9	2078	5.09	98.0	872.4	Brn/tan
1240	0.5	7.25	100	36.41	7.75	17.0	2089	5.02	95.7	687.6	Brown/tan
1245	0.5	7.75	100	37.06	7.72	17.2	2244	5.37	99.7	454.0	Tan lt
1250	0.5	8.25	100	37.29	7.74	17.0	2352	5.33	96.3	333.0	Tan Lt
1255	0.5	8.75	100	37.36	7.75	16.6	2352	5.30	93.7	305.7	Tan Lt
1305	1.0	9.75	100	37.82	7.74	16.6	4343	5.28	83.2	363.7	Tan Lt
1315	1.0	10.75	100	38.45	7.70	16.7	4331	5.41	92.4	487.5	Tan Lt
1325	1.0	11.75	100	38.76	7.70	16.1	4335	5.27	90.4	323.4	Tan Lt
1335	1.0	12.75	100	39.25	7.70	16.5	4329	5.27	88.3	363.2	Tan lt
1345	1.0	13.75	100	39.75	7.70	16.9	4336	15.08	87.6	321.0	lt tan
1355	1.0	14.75	100	40.46	7.69	16.9	4384	5.31	91.4	337.2	lt tan
1405	1.0	15.75	100	40.84	7.70	16.8	4395	5.07	91.6	186.2	Clear
1415	1.0	16.75	100	41.26	7.70	16.4	4396	4.93	92.2	174.1	Clear
1425	1.0	17.75	100	41.69	7.70	16.1	4416	4.90	92.3	173.2	Clear
1435	1.0	18.75	100	42.04	7.70	16.2	4413	4.82	92.5	162.3	Clear
1445	1.0	19.75	100	42.55	7.70	16.9	4391	4.60	92.3	145.0	Clear
a) 1455	~~1.0~~	~~20.75~~	~~100~~	—	—	—	—	—	—	—	—
1500	1.5	21.25	100	43.48	7.68	17.3	3806	4.35	96.4	208.2	lt tan/Clear
1510	1.0	22.25	100	43.90	7.68	17.2	3808	4.29	95.6	152.7	Clear
b) 1520	1.0	23.25	100	44.43	7.68	16.6	3729	3.91	95.0	234.4	lt tan
1530	1.0	24.25	100	44.85	7.67	17.1	4456	3.44	94.0	225.4	lt tan
c) 1540	1.0	25.25	100	45.26	7.66	17.1	4459	3.31	93.2	303.8	lt tan
1550	1.0	26.25	100	45.75	7.65	17.0	4461	2.95	92.4	306.6	lt tan/tan
~~1555~~	0.5	26.75	100	45.91	7.64	16.8	4465	2.90	92.1	467.4	lt tan
1600	0.5	27.25	100	46.21	7.64	17.3	4436	2.77	91.7	596.3	Tan
1605	0.5	27.75	100	46.44	7.64	17.6	4454	2.68	91.3	603.9	Tan
1610	0.5	28.25	100	46.63	7.64	17.6	4449	2.54	91.0	528.6	Tan
1615	0.5	28.75	100	46.88	7.63	17.7	4463	2.47	90.3	654.9	Tan
1620	0.5	29.25	100	47.08	7.63	17.6	4461	2.48	90.1	535.9	Tan
1625	0.5	29.75	100	47.30	7.62	17.4	4463	2.39	89.5	433.6	Tan/lt tan
1630	0.5	30.25	100	47.52	7.63	17.3	4466	2.41	88.6	388.0	Tan

lot of sediment in tube

Turn Pump to purge sediment for ~10sec

* DO below 2.0 mg/L is stable at ±0.2 mg/L; DO below 0.5 mg/L is stable

Water below pump; well dry @ 1633

a) disconnected flow through cell to clean
b) flow stopped, adjusted flow
c) flow stopped, adjusted flow

B

Appendix B – Field Data Sheets

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GROUNDWATER DEPTH

Project Name: Charah – Brickhaven

Project Address: Moncure

Time Started: 0912

Personnel: Charles Gruenberg

Date: 01/25/2021

Project No: 10021146

Time Finished: 1132

Well ID	Depth to Water	Total Depth	Get new Total Depth if well
BG-1	8.48	43.05	43.07
BG-2	9.49	26.11	26.08
MW-1	57.34	75.30	75.54
MW-2	27.86	50.15	50.23
MW-3	11.58	43.36	43.38
MW-4	11.21	25.34	25.77
MW-5	21.96	46.14	46.97
MW-6	3.59	29.47	28.02
MW-7	16.37	17.18	17.66
MW-7R	21.27	39.94	39.96
MW-8	34.86	49.06	49.75
MW-11	8.92	43.50	43.51
No lock on			

Well ID	Depth to Water	Total Depth

Groundwater Sampling Form

Sample ID: BG-1

Site Information	
Site Name: Charah Brickhaven	**Project Number:** 10021146
Site Location: Moncure, NC	**Sampling Personnel:** Charles Gruenberg
Date: 01/26/2021	**Weather:** Overcast

Well Information	
Well Diameter (in): 2"	**Purge Equipment:** Mega Purge Pro
Screened Interval (ft): 26' - 41'	**Pump Type:** ESP
Well Depth (ft): ~~43.05~~ 43.07	**Pump Depth (ft-bTOC):** ~ 39
Depth-to-Water (ft-bTOC): 8.33	**Tubing Diameter (in):** 3/8" X 1/2"
Water Column Thickness (ft): 34.74	**Well Volume (ft^3):** 5.5584

1 Well Volume = (Total Depth - Static Water Level) * Well Capacity

Well Capacity (gallons per feet): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3' = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47

Purging Information

Parameter Instrument(s): YSI Pro / Micro TPW Turbidimeter

TIME	VOLUME PURGED (Liters)	CUMULATIVE VOLUME PURGED (Liters)	PURGE RATE (mL/min)	DEPTH TO WATER (ft-bTOC)	pH (SU) (±0.1)	TEMP. (C°) 3%	COND. (µS/cm) ~~±3%~~ 3%	DISSOLVED OXYGEN (mg/L) (10%)*	ORP (mV) ~~(±20mV)~~ ± 10mV	TURBIDITY (NTUs) (≤10 or 10%)	COLOR/ ODOR (describe)
1100	0	0	200	7.79	6.66	14.5	1083	503.7	181.4	116.1	Clear
1105	1.0	1.0	200	9.32	6.59	14.3	1080	81.2	175.9	419.7	~~Clear~~ Tan
1110	0.75	1.75	150	9.39	6.57	14.4	1081	69.5	173.5	501.6	Tan
1115	0.5	2.25	100	9.48	6.56	14.1	1080	60.7	172.8	474.1	Tan
1120	1.5	3.75	300	9.87	6.54	13.4	1077	57.7	172.5	474.9	Tan
1125	1.5	5.25	300	9.87	6.52	14.9	1073	54.1	172.0	493.5	Tan
1130	1.0	6.25	200	10.02	6.51	15.0	1073	51.1	171.7	430.8	Tan/Clear
1135	1.0	7.25	200	10.19	6.51	15.4	1070	44.1	171.7	904.7	Tan
1140	1.0	8.25	200	10.86	6.48	15.4	1063	38.8	170.3	356.0	light tan
1145	0.5	8.75	100	10.27	6.49	14.2	1059	65.5	179.3	289.6	light tan

* DO below 2.0 mg/L is stable at ±0.2 mg/L; DO below 0.5 mg/L is stable

Sample Information

Sample Number	Collection Time	Parameter	Container	Preservative
BG-1	1352	Radium 226/228	2 - 1 L Poly	HNO3
	1352	6010/6020/7470	1 - 250 mL Poly	HNO3
	1352	Cl, F, SO4	1 - 250 mL Poly	N/A
	1352	TDS	1 - 500 mL Poly	N/A

Sampled By: Charles Gruenberg **Sample Time:** 1352

Date Sampled: 01/26/2021 **Sampler Signature:**

Notes: Pumprate=

200 @ 1100
150 @ 1110
100 @ 1115
300 @ 1120
200 @ 1130
100 @ 1145

HDR

Groundwater Sampling Form

Sample ID: BG-1

Purging Information (Page 2)

TIME	VOLUME PURGED (Liters)	CUMULATIVE VOLUME PURGED (Liters)	PURGE RATE (mL/min)	DEPTH TO WATER (ft-bTOC)	pH (SU) (±0.1)	TEMP. (C°) 3%	COND. (µS/cm) 3% (~~5%~~)	DISSOLVED OXYGEN (mg/L) (10%)*	ORP (mV) (~~±20mV~~) 10%	TURBIDITY (NTUs) (≤10 or 10%)	COLOR/ ODOR (describe)
1150	0.5	9.25	100	9.97	6.50	14.0	1064	63.8	180.1	226.8	Lt brn/clear
1155	0.5	9.75	100	9.68	6.51	14.0	1065	62.0	181.6	193.2	Clear/lt brn
1200	0.5	10.25	100	9.57	6.50	14.2	1061	60.4	182.5	171.9	Clear
1205	0.5	10.75	100	9.48	6.50	14.1	1054	58.9	183.4	132.7	Clear
1210	0.5	11.25	100	9.47	6.50	14.1	1053	58.1	183.7	135.9	Clear
1215	0.5	11.75	100	9.45	6.49	14.0	1049	57.0	184.3	112.4	Clear
1220	0.5	12.25	100	9.44	6.49	14.0	1046	56.0	184.5	111.4	Clear
1225	0.5	12.75	100	9.43	6.49	14.1	1043	54.5	184.8	101.8	Clear
1230	0.5	13.25	100	9.42	6.48	14.1	1040	53.3	185.1	86.25	Clear
1235	0.5	13.75	100	9.42	6.48	14.3	1037	52.0	185.5	84.83	Clear
1240	0.5	14.25	100	9.41	6.48	14.3	1033	51.2	185.6	78.93	Clear
1245	0.5	14.75	100	9.40	6.48	14.3	1033	50.0	185.8	67.95	Clear
1255	~~0.5~~ 1.0	15.75	100	9.39	6.47	14.4	1024	48.1	186.0	49.99	Clear
1305	1.0	16.75	100	9.39	6.47	14.5	1018	51.2	186.0	40.71	Clear
1315	1.0	17.75	100	9.38	6.47	14.4	1012	46.8	185.9	37.31	Clear
1320	0.5	18.25	100	9.38	6.46	14.4	1008	44.6	185.6	30.45	Clear
1325	0.5	18.75	100	9.37	6.46	14.5	1002	43.5	185.6	29.19	Clear
1330	0.5	19.25	100	9.36	6.47	14.3	1004	43.1	185.5	28.78	Clear
1335	0.5	19.75	100	9.34	6.46	14.3	1002	41.9	185.2	25.34	clear
1340	0.5	20.25	100	9.35	6.46	14.3	1001	41.1	185.0	23.31	clear
1345	0.5	20.75	100	9.34	6.46	14.4	999	40.1	185.1	22.93	Clear
		SAMPLE @ 1350									

* DO below 2.0 mg/L is stable at ±0.2 mg/L; DO below 0.5 mg/L is stable

Groundwater Sampling Form

Sample ID: BG-2

Site Information	
Site Name: Charah Brickhaven	**Project Number:** 10021146
Site Location: Moncure, NC	**Sampling Personnel:** Charles Gruenberg
Date: 01/26/2021	**Weather:** Overcast

Well Information	
Well Diameter (in): 2"	**Purge Equipment:** Mega Monsoon Pro
Screened Interval (ft): 13' - 23'	**Pump Type:** ESP
Well Depth (ft): ~~26.11'~~ 26.08'	**Pump Depth (ft-bTOC):** ~ 21
Depth-to-Water (ft-bTOC): 9.83	**Tubing Diameter (in):** 3/8" X 1/2"
Water Column Thickness (ft): 16.25	**Well Volume (ft^3):** 2.600

1 Well Volume = (Total Depth - Static Water Level) * Well Capacity

Well Capacity (gallons per feet): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3' = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47

Purging Information

Parameter Instrument(s): YSI Pro / Micro TPW Turbidimeter

TIME	VOLUME PURGED (Liters)	CUMULATIVE VOLUME PURGED (Liters)	PURGE RATE (mL/min)	DEPTH TO ±0.1 WATER (ft-bTOC)	pH (SU) (±0.1)	TEMP. (C°) 3%	COND. (µS/cm) 3%	DISSOLVED OXYGEN (mg/L) (10%)*	ORP (mV) ±10mV	TURBIDITY (NTUs) (≤10 or 10%)	COLOR/ ODOR (describe)
1438	0	0	100	9.75	6.79	15.5	2947	96.0	95.0	91.24	Clear
1443	0.5	0.5	100	10.18	6.79	14.6	3019	27.5	80.6	100.9	Clear
1448	0.5	1.0	100	10.23	6.79	14.5	3021	29.6	75.0	66.98	Clear
1453	0.5	1.5	100	10.28	6.80	14.7	2996	28.5	68.9	53.61	Clear
1458	0.5	2.0	100	10.32	6.80	14.8	2939	24.6	65.1	46.58	Clear
1503	0.5	2.5	100	10.36	6.80	14.8	2897	25.5	61.2	38.82	Clear
1508	0.5	3.0	100	10.41	6.80	15.0	2832	24.6	58.2	45.77	Clear
1513	0.5	3.5	100	10.45	6.81	15.2	2773	28.9	55.2	43.76	Clear
1518	0.5	4.0	100	10.49	6.81	15.2	2706	32.5	52.4	41.83	Clear
1523	0.75	4.75	150	10.63	6.81	16.1	2660	22.8	51.3	49.81	Clear

* DO below 2.0 mg/L is stable at ±0.2 mg/L; DO below 0.5 mg/L is stable

Sample Information

Sample Number	Collection Time	Parameter	Container	Preservative
BG-2	1635	Radium 226/228	2 - 1 L Poly	HNO3
	1635	6010/6020/7470	1 - 250 mL Poly	HNO3
	1635	Cl, F, SO4	1 - 250 mL Poly	N/A
	1635	TDS	1 - 500 mL Poly	N/A

Sampled By: Charles Gruenberg — **Sample Time:** 1635

Date Sampled: 01/26/2021 — **Sampler Signature:**

Notes: Pumprate=

1438 - 100ml

150 @ 1523

300 @ 1537

200 @ 1538

150 @ 1553

200 @ 1613

Groundwater Sampling Form

Sample ID: BG-2

Purging Information (Page 2)

TIME	VOLUME PURGED (Liters)	CUMULATIVE VOLUME PURGED (Liters)	PURGE RATE (mL/min)	DEPTH TO WATER (ft-bTOC)	pH (SU) (±0.1)	TEMP. (C°)	COND. (µS/cm) ~~(5%)~~	DISSOLVED OXYGEN (mg/L) (10%)*	ORP (mV) (±20mV)	TURBIDITY (NTUs) (≤10 or 10%)	COLOR/ ODOR (describe)
1528	0.75	5.5	150	10.64	6.81	15.6	2588	22.1	30.5	98.35	Clear
1533	1.5	7.0	300	10.93	6.82	16.5	2491	19.6	32.5	35.11	Clear
1538	1.0	8.0	200	10.98	6.82	16.2	2371	19.1	36.6	25.34	Clear
1543	1.0	9.0	201	10.97	6.83	16.1	2265	17.9	40.7	21.39	Clear
1548	1.0	10.0	200	11.01	6.84	16.1	2191	18.8	32.2	20.52	Clear
1553	1.0	11.0	200	11.07	6.85	16.2	2154	15.5	35.9	26.70	Clear
1558	0.75	11.75	150	11.06	6.85	16.0	2110	14.6	33.6	13.81	Clear
1603	0.75	12.50	150	10.98	6.85	15.5	2092	14.2	29.7	15.57	Clear
1608	0.75	13.25	150	10.89	6.85	15.8	2075	14.4	27.0	15.11	Clear
1613	1.0	14.25	200	10.98	6.85	15.8	2072	13.7	25.9	13.24	Clear
1618	1.0	15.25	200	10.95	6.85	15.5	2067	13.5	29.7	12.81	Clear
1623	1.0	16.25	200	10.93	6.84	15.4	2013	13.1	29.1	8.87	Clear
1626	0.6	17.35	200	10.90	6.85	15.4	2030	13.0	28.8	8.97	Clear
1629	0.6	17.95	200	10.94	6.85	15.5	2046	12.9	28.1	8.50	Clear
1632	0.6	18.55	200	11.08	6.85	15.7	2052	12.4	28.4	9.96	Clear
	SAMPLE	@		1635							

* DO below 2.0 mg/L is stable at ±0.2 mg/L; DO below 0.5 mg/L is stable

Groundwater Sampling Form

Sample ID: MW-1

Site Information	
Site Name: Charah Brickhaven	**Project Number:** 10021146
Site Location: Moncure, NC	**Sampling Personnel:** Charles Gruenberg
Date: 01/28/2021	**Weather:** Sunny

Well Information	
Well Diameter (in): 2"	**Purge Equipment:**
Screened Interval (ft): 57' - 72'	**Pump Type:** ESP
Well Depth (ft): 75.80'54	**Pump Depth (ft-bTOC):** ~ 70'
Depth-to-Water (ft-bTOC): 57.45	**Tubing Diameter (in):** 3/8" X 1/2"
Water Column Thickness (ft): 18.09	**Well Volume (ft^3):** 2.8944

1 Well Volume = (Total Depth - Static Water Level) * Well Capacity

Well Capacity (gallons per feet): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3' = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47

Purging Information

Parameter Instrument(s): YSI Pro / MRD TPW Turbidimeter

TIME	VOLUME PURGED (Liters)	CUMULATIVE VOLUME PURGED (Liters)	PURGE RATE (mL/min)	DEPTH TO WATER (ft-bTOC) ±1.3	pH (SU) (±0.1)	TEMP. (C°) 3%	COND. (µS/cm) (±3%)	DISSOLVED OXYGEN (mg/L) (10%)*	ORP (mV) ±10mV	TURBIDITY (NTUs) (≤10 or 10%)	COLOR/ ODOR (describe)
1235	0	0	100	57.35	7.37	14.6	616	32.3	193.6	123.5	lt br/clear
1240	0.5	0.5	100	57.53	7.26	13.3	675	11.3	176.0	167.7	lt br/clear
1245	Pump	Maintain		Change	6.1	to, inc		YSI	Pro		
1250	0.5	1.0	100	57.53	7.26	14.5	956	21.7	168.8	185.0	lt brn
1255	0.5	1.5	100	57.51	7.10	15.3	1071	17.7	168.8	233.5	lt brn
1300	0.5	2.0	100	57.50	±.06	15.9	1136	15.7	165.0	201.5	lt brn
1305	0.5	3.0	100	57.49	6.92	15.9	1576	14.6	164.5	156.5	lt br/clear
1310	0.5	3.5	100	57.47	6.85	16.0	1858	13.9	158.6	84.19	lt br/clear
1315	0.5	4.0	100	57.49	6.83	17.3	1942	7.5	148.3	111.8	lt br/clear
1320	0.5	4.5	100	57.50	6.83	16.7	2011	7.3	148.2	97.66	lt br/clear

* DO below 2.0 mg/L is stable at ±0.2 mg/L; DO below 0.5 mg/L is stable

Sample Information

Sample Number	Collection Time	Parameter	Container	Preservative
MW-1	1420	Radium 226/228	2 - 1 L Poly	HNO3
	1420	6010/6020/7470	1 - 250 mL Poly	HNO3
	1420	Cl, F, SO4	1 - 250 mL Poly	N/A
	1420	TDS	1 - 500 mL Poly	N/A

Sampled By: Charles Gruenberg **Sample Time:** 1420

Date Sampled: 01/28/2021 **Sampler Signature:**

Notes: Pumprate=

100 @ 1235

200 @ 1330

Groundwater Sampling Form

Sample ID: MW-1

Purging Information (Page 2)

TIME	VOLUME PURGED (Liters)	CUMULATIVE VOLUME PURGED (Liters)	PURGE RATE (mL/min)	DEPTH TO WATER (ft-bTOC)	pH (SU) (±0.1)	TEMP. (C°)	COND. (µS/cm) (5%)	DISSOLVED OXYGEN (mg/L) (10%)*	ORP (mV) (±20mV)	TURBIDITY (NTUs) (≤10 or 10%)	COLOR/ ODOR (describe)
1325	0.5	5.0	100	57.49	6.84	16.8	1937	6.2	136.9	92.13	Hthn/clear
1330	1.0	6.0	200	57.51	6.73	18.2	2415	5.8	137.8	57.26	clear
1335	1.0	7.0	200	57.50	6.80	18.4	2228	4.8	138.3	48.03	clear
1340	1.0	8.0	200	57.50	6.67	18.1	2799	7.0	142.2	37.16	Clear
1345	1.0	9.0	200	57.50	6.66	17.8	2992	5.9	141.1	15.29	Clear
1350	1.0	10.0	200	57.50	6.66	17.8	3048	5.7	141.4	17.81	Clear
1355	1.0	11.0	200	57.51	6.66	18.0	3051	5.7	142.2	13.98	clear
1400	1.0	12.0	200	57.51	6.66	18.0	3058	5.5	143.7	11.44	Clear
1405	1.0	13.0	200	57.51	6.66	18.2	3064	5.3	142.6	9.10	Clear
1410	1.0	14.0	200	57.50	6.65	18.0	3109	5.3	142.8	8.47	Clear
1415	1.0	14.5	200	57.50	6.65	18.1	3138	5.2	141.8	8.74	Clear
		SAMPLE @ 1420									

* DO below 2.0 mg/L is stable at ±0.2 mg/L; DO below 0.5 mg/L is stable

Groundwater Sampling Form

Sample ID: MW-2

Site Information	
Site Name: Charah Brickhaven	**Project Number:** 10021146
Site Location: Moncure, NC	**Sampling Personnel:** Charles Gruenberg
Date: 01/28/2021	**Weather:** Sunny

Well Information	
Well Diameter (in): 2"	**Purge Equipment:** Mega Monsoon P10
Screened Interval (ft): 30' - 45'	**Pump Type:** ESP
Well Depth (ft): 50.~~18~~' 23	**Pump Depth (ft-bTOC):** ~ 43'
Depth-to-Water (ft-bTOC): 27.59	**Tubing Diameter (in):** 3/8" X 1/2"
Water Column Thickness (ft): 22.64	**Well Volume (ft^3):** 3.6224

1 Well Volume = (Total Depth - Static Water Level) * Well Capacity

Well Capacity (gallons per feet): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3' = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47

Purging Information

Parameter Instrument(s): YSI Pro / Manta TPW Turbidimeter

TIME	VOLUME PURGED (liters)	CUMULATIVE VOLUME PURGED (Liters)	PURGE RATE (mL/min)	DEPTH TO ±0.3 WATER (ft-bTOC)	pH (SU) (±0.1)	TEMP. (C°) 3%	COND. (µS/cm) (3%)	DISSOLVED OXYGEN (mg/L) (10%)*	ORP (mV) ±10mV	TURBIDITY (NTUs) (≤10 or 10%)	COLOR/ ODOR (describe)
1005	0	0	100	26.90	7.57	14.5	4795	67.5	208.3	23.06	Clear
1010	0.5	0.5	100	28.49	7.56	14.5	4827	63.1	199.1	24.01	Clear
1015	0.5	1.0	100	28.80	7.54	14.7	4855	63.2	197.2	26.70	Clear
1020	0.5	1.5	100	29.30	7.54	14.8	4850	51.4	189.2	21.28	Clear
1025	0.5	2.0	100	29.73	7.54	14.2	4860	47.8	191.8	33.05	Clear
1030	0.5	2.5	100	30.03	7.55	14.1	4853	44.5	193.1	35.94	Clear
1035	0.5	3.0	100	30.37	7.54	14.2	4833	55.8	193.3	32.41	Clear
1040	0.5	3.5	100	30.70	7.54	14.8	4829	52.9	193.8	33.85	Clear
1045	0.5	4.0	100	31.02	7.54	15.1	4836	50.3	193.6	32.64	Clear
1050	0.5	4.5	100	31.56	7.54	15.3	4814	49.8	192.9	39.38	Clear

* DO below 2.0 mg/L is stable at ±0.2 mg/L; DO below 0.5 mg/L is stable

Sample Information

Sample Number	Collection Time	Parameter	Container	Preservative
MW-2	1126	Radium 226/228	2 - 1 L Poly	HNO3
	1128	6010/6020/7470	1 - 250 mL Poly	HNO3
	1128	Cl, F, SO4	1 - 250 mL Poly	N/A
	1128	TDS	1 - 500 mL Poly	N/A

Sampled By: Charles Gruenberg **Sample Time:** 1128

Date Sampled: 01/28/2021 **Sampler Signature:**

Notes: Pumprate= 100 @ 1005

Sample by 39 CL

Groundwater Sampling Form

Sample ID: MW-2

Purging Information (Page 2)

TIME	VOLUME PURGED (Liters)	CUMULATIVE VOLUME PURGED (Liters)	PURGE RATE (mL/min)	DEPTH TO WATER (ft-bTOC)	pH (SU) (±0.1)	TEMP. (C°)	COND. (µS/cm) (5%)	DISSOLVED OXYGEN (mg/L) (10%)*	ORP (mV) (±20mV)	TURBIDITY (NTUs) (≤10 or 10%)	COLOR/ ODOR (describe)
1055	0.5	5.0	100	31.91	7.54	15.2	4836	49.7	192.5	32.20	Clear
1100	0.5	5.5	100	32.34	7.54	15.1	4829	51.6	191.2	32.88	Clear
1105	0.5	6.0	100	32.77	7.54	15.4	4791	50.3	190.9	22.83	Clear
1110	0.5	6.5	100	33.28	7.54	15.6	4813	47.4	190.3	22.87	Clear
1115	0.5	7.0	100	33.76	7.54	16.0	4800	50.4	189.7	21.66	Clear
1120	0.5	7.5	100	34.39	7.54	15.7	4819	48.5	188.6	23.40	Clear
	STABLE	@		11	28						
		OTW	Not	stable							

* DO below 2.0 mg/L is stable at ±0.2 mg/L; DO below 0.5 mg/L is stable

Groundwater Sampling Form

Sample ID: MW-3

Site Information	
Site Name: Charah Brickhaven	**Project Number:** 10021146
Site Location: Moncure, NC	**Sampling Personnel:** Charles Gruenberg
Date: 01/28 /2021	**Weather:** Cloudy / cold

Well Information	
Well Diameter (in): 2"	**Purge Equipment:** MegaMonsoon Pro
Screened Interval (ft): 25' - 40'	**Pump Type:** ESI
Well Depth (ft): 43.36' 8	**Pump Depth (ft-bTOC):** ~ 37
Depth-to-Water (ft-bTOC): 11.55	**Tubing Diameter (in):** 3/8" X 1/2"
Water Column Thickness (ft): 31.83	**Well Volume (ft^3):** 5.0928

1 Well Volume = (Total Depth - Static Water Level) * Well Capacity

Well Capacity (gallons per feet): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3' = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47

Purging Information

Parameter Instrument(s): YSI Pro / TPW Turbidimeter

TIME	VOLUME PURGED (Liters)	CUMULATIVE VOLUME PURGED (Liters)	PURGE RATE (mL/min)	DEPTH TO WATER (ft-bTOC)	pH (SU) (±0.1)	TEMP. (C°) 3%	COND. (µS/cm) 3%	DISSOLVED OXYGEN (mg/L) (10%)*	ORP (mV) ± 10mV	TURBIDITY (NTUs) (≤10 or 10%)	COLOR/ ODOR (describe)
0738	0	0	150	10.34	7.43	13.9	4367	83.4	254.6	11.28	Clear
0743	0.75	0.75	150	11.86	7.42	13.4	4383	89.2	247.8	11.23	Clear
0748	0.5	1.25	100	12.37	7.44	12.9	4619	52.7	240.3	9.50	Clear
0753	0.5	1.75	100	12.86	7.45	13.0	4616	48.9	241.6	10.01	Clear
0758	0.5	2.25	100	13.65	7.44	15.0	4546	50.4	238.4	13.92	Clear
0803	0.5	2.75	100	14.19	7.43	14.4	4638	42.5	230.4	11.67	clear
0808	0.5	3.25	100	14.76	7.42	13.9	4602	40.5	235.4	11.80	clear
0813	0.5	3.75	100	15.15	7.42	13.8	4627	47.4	234.2	15.13	Clear
0818	0.5	4.25	100	15.64	7.42	13.9	4631	42.3	233.6	15.77	Clear
0823	0.5	4.75	100	16.20	7.42	13.4	4607	40.3	233.0	11.94	Clear

* DO below 2.0 mg/L is stable at ±0.2 mg/L; DO below 0.5 mg/L is stable

Sample Information

Sample Number	Collection Time	Parameter	Container	Preservative
MW-3	0855	Radium 226/228	2 - 1 L Poly	HNO3
	0855	6010/6020/7470	1 - 250 mL Poly	HNO3
	0855	Cl, F, SO4	1 - 250 mL Poly	N/A
	0855	TDS	1 - 500 mL Poly	N/A

Sampled By: Charles Gruenberg — **Sample Time:** 0855

Date Sampled: 01/28 /2021 — **Sampler Signature:**

Notes: Pumprate=

150 @ 0738

100 @ 0748

1 ft³ = 28.317 Liters

3 Liters to fill

Must sample @ 34 ft

HDR

Groundwater Sampling Form

Sample ID: MW-3

Purging Information (Page 2)

TIME	VOLUME PURGED (Liters)	CUMULATIVE VOLUME PURGED (Liters)	PURGE RATE (mL/min)	DEPTH TO WATER (ft-bTOC)	pH (SU) (±0.1)	TEMP. (C°)	COND. (µS/cm)	DISSOLVED OXYGEN (mg/L) (10%)*	ORP (mV) ± 10mV	TURBIDITY (NTUs) (≤10 or 10%)	COLOR/ ODOR (describe)
0828	0.5	5.25	100	16.50	7.41	13.3	4629	42.8	232.5	7.89	Clear
0833	0.5	5.75	100	16.83	7.41	13.0	4625	42.8	232.0	9.60	Clear
0838	0.5	6.25	100	17.32	7.40	15.6	4621	44.5	229.7	8.24	Clear
0843	0.5	6.75	100	18.13	7.37	15.5	4620	44.9	228.2	8.32	Clear
0848	0.5	7.25	100	18.60	7.36	15.3	4610	40.8	227.1	8.95	Clear
		SAM	OLE			0855					
		DTW	not	stabilized							

* DO below 2.0 mg/L is stable at ±0.2 mg/L; DO below 0.5 mg/L is stable

Groundwater Sampling Form

Sample ID: MW-4

Site Information	
Site Name: Charah Brickhaven	**Project Number:** 10021146
Site Location: Moncure, NC	**Sampling Personnel:** Charles Gruenberg
Date: 01/27/2021	**Weather:** Cloudy

Well Information	
Well Diameter (in): 2"	**Purge Equipment:** Mega Monsoon Pro
Screened Interval (ft): 13' - 23'	**Pump Type:** ESP
Well Depth (ft): 25.94' ~~77~~	**Pump Depth (ft-bTOC):** ~ 21
Depth-to-Water (ft-bTOC): 11.09	**Tubing Diameter (in):** 3/8" X 1/2"
Water Column Thickness (ft): 14.69	**Well Volume (ft^3):** 2.3504

1 Well Volume = (Total Depth - Static Water Level) * Well Capacity

Well Capacity (gallons per feet): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3' = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47

Purging Information

Parameter Instrument(s): YSI Pro / Mira Pro Turbidimeter

TIME	VOLUME PURGED (Liters)	CUMULATIVE VOLUME PURGED (Liters)	PURGE RATE (mL/min)	DEPTH TO WATER (ft-bTOC)	pH (SU) (±0.1)	TEMP. (C°) 3%	COND. (µS/cm) 3% (5%)	DISSOLVED OXYGEN (mg/L) (10%)*	ORP (mV) ± 10mV (±20mV)	TURBIDITY (NTUs) (≤10 or 10%)	COLOR/ ODOR (describe)
1053	0	0	100	10.73	6.09	16.3	2199	245.9	149.2	687.1	Tan
1058	0.5	0.5	100	11.75	6.09	15.6	2217	41.4	135.0	364.4	Tan
1103	0.5	1.0	100	11.77	6.11	15.9	2237	40.4	107.5	227.5	lt tan
1108	0.5	1.5	100	11.78	6.14	16.1	2259	36.2	93.6	140.5	lt tan/clear
1113	0.5	2.0	100	11.77	6.15	16.1	2281	34.3	81.6	119.5	Clear/lt tan
1118	0.5	2.5	100	11.77	6.18	16.2	2299	32.2	67.9	104.7	Clear/lt tan
1123	0.5	3.0	100	11.78	6.19	16.3	2312	30.5	59.4	95.81	Clear/lt tan
1128	1.25	4.75	350	12.21	6.18	17.5	2304	33.7	58.1	154.2	lt tan/clear
1133	0.75	5.50	150	12.12	6.18	16.9	2332	34.3	62.2	74.44	Clear
1138	0.75	6.25	150	12.12	6.21	17.0	2358	34.5	54.4	45.84	Clear

* DO below 2.0 mg/L is stable at ±0.2 mg/L; DO below 0.5 mg/L is stable

Sample Information

Sample Number	Collection Time	Parameter	Container	Preservative
MW-4	1315	Radium 226/228	2 - 1 L Poly	HNO3
	1315	6010/6020/7470	1 - 250 mL Poly	HNO3
	1315	Cl, F, SO4	1 - 250 mL Poly	N/A
	1315	TDS	1 - 500 mL Poly	N/A

Sampled By: Charles Gruenberg — **Sample Time:** 1315

Date Sampled: 01/27/2021 — **Sampler Signature:** [signature]

Notes: Pumprate=

100 @ 1053

350 @ 1128

150 @ 1133

100 @ 1228

Must Sample @ 18 Ft

Groundwater Sampling Form

Sample ID: MW-4

Purging Information (Page 2)

TIME	VOLUME PURGED (Liters)	CUMULATIVE VOLUME PURGED (Liters)	PURGE RATE (mL/min)	DEPTH TO WATER (ft-bTOC)	pH (SU) (±0.1)	TEMP. (C°) ±3%	COND. (µS/cm) (5%)	DISSOLVED OXYGEN (mg/L) (10%)*	ORP (mV) (±20mV)	TURBIDITY (NTUs) (≤10 or 10%)	COLOR/ ODOR (describe)
1143	0.75	7.0	150	12.13	6.23	17.1	2368	34.0	48.1	33.12	Clear
1148	0.75	7.75	150	12.21	6.24	17.1	2381	33.1	49.0	26.26	Clear
1153	0.75	8.50	150	12.18	6.24	17.0	2389	31.2	48.4	26.13	Clear
1158	0.75	9.25	150	12.18	6.25	17.2	2401	26.3	47.0	21.97	Clear
1203	0.75	10.0	150	12.21	6.25	17.2	2403	25.4	47.4	19.66	Clear
1208	0.75	10.75	150	12.27	6.25	17.3	2401	23.7	52.3	15.43	Clear
1213	0.75	11.5	150	12.27	6.25	17.2	2402	23.6	52.6	12.96	Clear
1218	0.75	12.25	150	12.22	6.26	17.2	2406	22.4	50.7	12.71	Clear
1223	0.75	13.0	150	12.28	6.26	17.2	2405	20.5	50.2	13.60	Clear
1228	0.50	13.50	100	12.17	6.26	16.8	2410	5.1	48.9	18.06	Clear
1233	0.50	14.00	100	12.03	6.26	16.7	2408	4.2	48.3	16.05	Clear
1238	0.5	14.5	100	11.97	6.26	16.7	2400	3.8	49.0	13.28	Clear
1243	0.5	15.0	100	11.93	6.26	16.7	2396	3.4	50.8	14.37	Clear
1248	0.5	15.5	100	11.92	6.25	16.8	2389	3.1	51.6	14.09	Clear
1253	0.5	16.0	100	11.90	6.25	16.7	2387	2.9	52.5	12.17	Clear
1258	0.5	16.5	100	11.90	6.25	16.8	2383	2.8	53.7	9.93	Clear
1303	0.5	17.0	100	11.89	6.25	16.8	2378	2.9	55.2	9.87	Clear
1308	0.5	17.5	100	11.88	6.25	16.7	2377	2.7	56.7	9.73	Clear
	SAMPLE	@		13:15							

* DO below 2.0 mg/L is stable at ±0.2 mg/L; DO below 0.5 mg/L is stable

Groundwater Sampling Form

Sample ID: MW-5

Site Information	
Site Name: Charah Brickhaven	**Project Number:** 10021146
Site Location: Moncure, NC	**Sampling Personnel:** Charles Gruenberg
Date: 01/25/2021	**Weather:** Rainy

Well Information	
Well Diameter (in): 2"	**Purge Equipment:** Mega Monsoon
Screened Interval (ft): 34' - 44'	**Pump Type:** ESP
Well Depth (ft): 46.14'	**Pump Depth (ft-bTOC):** ~43'
Depth-to-Water (ft-bTOC): 21.96	**Tubing Diameter (in):** 3/8" X 1/2"
Water Column Thickness (ft): 25.01	**Well Volume (ft^3):** 4.00 16

1 Well Volume = (Total Depth - Static Water Level) * Well Capacity

Well Capacity (gallons per feet): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3' = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47

Purging Information

Parameter Instrument(s): YSI Pro / Micro TPW Turbidimeter

TIME	VOLUME PURGED (Liters)	CUMULATIVE VOLUME PURGED (Liters)	PURGE RATE (mL/min)	DEPTH TO WATER (ft-bTOC)	pH (SU) (±0.1)	TEMP. (C°) 3%	COND. (µS/cm) 3%	DISSOLVED OXYGEN (mg/L) (10%)*	ORP (mV) (±20mV) ±10 mV	TURBIDITY (NTUs) (≤10 or 10%)	COLOR/ ODOR (describe)
1200	0	0	200	20.98	7.13	16.4	447.2	32.5	128.7	45.26	Clear
1205	1.5	1.5	300	24.81	6.97	16.6	445.9	31.8	126.8	6.87	Clear
1210	.500	2.00	100	26.49	6.99	16.9	396.6	48.4	146.2	106.5	Clear
1215	0.75	2.75	150	27.79	6.76	16.8	381.6	35.6	141.3	33.73	Clear
1220	0.75	3.50	150	28.03	6.75	15.8	378.4	35.9	143.4	15.77	Clear
1225	0.75	4.25	150	28.72	6.50	16.8	366.2	33.1	143.9	28.07	Clear
1230	2	6.25	400	29.94	6.81	17.0	321.1	30.1	142.5	—	Clear
	Pump Maintenance										
1240	1.00	8.05	200	30.30	6.80	17.0	349.4	56.0	151.2	40.33	Clear
1245	1.00	8.25	200	30.64	6.79	16.6	393.1	54.2	151.1	23.35	Clear

* DO below 2.0 mg/L is stable at ±0.2 mg/L; DO below 0.5 mg/L is stable

Sample Information

Sample Number	Collection Time	Parameter	Container	Preservative
MW-5	1325	Radium 226/228	2 - 1 L Poly	HNO3
	1325	6010/6020/7470	1 - 250 mL Poly	HNO3
	1325	Cl, F, SO4	1 - 250 mL Poly	N/A
	1325	TDS	1 - 500 mL Poly	N/A

Sampled By: Charles Gruenberg	**Sample Time:** 1325
Date Sampled: 01/25/2021	**Sampler Signature:**

Notes: Pumprate=

300ml @ 1200

100ml @ 1210

150 @ 1215

400 @ 1230

200 @ 1240

Groundwater Sampling Form

Sample ID: MW-5

Purging Information (Page 2)

TIME	VOLUME PURGED (Liters)	CUMULATIVE VOLUME PURGED (Liters)	PURGE RATE (mL/min)	DEPTH TO WATER (ft-bTOC)	pH (SU) (±0.1)	TEMP. (C°)	COND. (µS/cm) (5%)	DISSOLVED OXYGEN (mg/L) (10%)*	ORP (mV) (±20mV)	TURBIDITY (NTUs) (≤10 or 10%)	COLOR/ ODOR (describe)
1250	1.00	9.25	200	30.99	6.81	16.3	396.1	56.4	152.0	14.2	Clear
1255	1.00	10.25	200	31.33	6.83	16.2	406.2	48.0	151.4	12.56	Clear
1300	1.00	11.25	200	32.50	6.84	16.4	403.3	37.6	149.1	14.70	Clear
1305	1.00	12.25	200	32.74	6.83	16.7	400.9	36.0	149.0	10.35	Clear
1310	1.00	13.25	200	32.91	6.81	16.2	388.7	33.2	148.8	9.19	Clear
1315	1.00	14.25	200	33.06	6.81	15.8	386.4	32.4	149.3	9.18	Clear
1320	1.00	15.25	200	33.17	6.81	15.9	385.3	31.8	149.8	9.98	Clear
		Sampled @ 1325									

* DO below 2.0 mg/L is stable at ±0.2 mg/L; DO below 0.5 mg/L is stable

Groundwater Sampling Form

Sample ID: MW-6

Site Information	
Site Name: Charah Brickhaven	**Project Number:** 10021146
Site Location: Moncure, NC	**Sampling Personnel:** Charles Gruenberg
Date: 01/25/2021	**Weather:** Raining

Well Information	
Well Diameter (in): 2"	**Purge Equipment:** Mega Monsoon
Screened Interval (ft): 12' - 27'	**Pump Type:** ESP
Well Depth (ft): ~~28.47~~ 28.62'	**Pump Depth (ft-bTOC):** ~ 26
Depth-to-Water (ft-bTOC): 5.69	**Tubing Diameter (in):** 3/8" X 1/2"
Water Column Thickness (ft): 22.93	**Well Volume (ft^3):** 3.5888

1 Well Volume = (Total Depth - Static Water Level) * Well Capacity

Well Capacity (gallons per feet): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3' = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47

Purging Information

Parameter Instrument(s): YSI Pro / Micro TPW Turbidimeter

TIME	VOLUME PURGED (Liters)	CUMULATIVE VOLUME PURGED (Liters)	PURGE RATE (mL/min)	DEPTH TO ±0.01' WATER (ft-bTOC)	pH (SU) (±0.1)	TEMP. (C°) 3%	COND. (µS/cm) (3%) 3%	DISSOLVED OXYGEN (mg/L) (10%)*	ORP (mV) ±20mV ±10%	TURBIDITY (NTUs) (≤10 or 10%)	COLOR/ ODOR (describe)
1425	0	0	150	5.65	6.01	15.1	1179	132.4	204.8	453.3	Tan - light tan
1430	0.75	0.75	150	6.26	6.41	13.8	1139	24.2	191.5	896.4	Tan
1435	0.75	1.50	150	6.33	6.40	14.4	1135	19.8	187.4	609.9	tan
1440	0.75	2.25	150	6.29	6.39	14.2	1134	20.3	185.6	321.1	Light tan
1445	0.75	3.00	150	6.26	6.38	13.8	1132	14.7	184.2	502.4	Light tan
1450	0.75	3.75	150	6.20	6.38	13.7	1130	13.2	187.5	435.9	Light tan
1455	0.75	4.50	150	6.43	6.36	14.6	1121	8.4	182.6	321.2	Light tan
1500	0.75	5.25	150	6.41	6.35	14.7	1125	7.8	183.2	348.2	Light tan
1505	0.75	6.00	150	6.79	6.33	15.8	1125	6.8	182.3	158.5	Clear
1510	1.00	7.00	200	7.22	6.32	16.2	1126	6.3	177.4	117.9	Clear

* DO below 2.0 mg/L is stable at ±0.2 mg/L; DO below 0.5 mg/L is stable

Sample Information

Sample Number	Collection Time	Parameter	Container	Preservative
MW-6	1625	Radium 226/228	2 - 1 L Poly	HNO3
	1625	6010/6020/7470	1 - 250 mL Poly	HNO3
	1625	Cl, F, SO4	1 - 250 mL Poly	N/A
	1625	TDS	1 - 500 mL Poly	N/A

Sampled By: Charles Gruenberg — **Sample Time:** 1625

Date Sampled: 01/25/2021 — **Sampler Signature:**

Notes: Pumprate= 150 @ 1425

200 @ 1510

Groundwater Sampling Form

Sample ID: MW-6

Purging Information (Page 2)

TIME	VOLUME PURGED (Liters)	CUMULATIVE VOLUME PURGED (Liters)	PURGE RATE (mL/min)	DEPTH TO WATER (ft-bTOC)	pH (SU) (±0.1)	TEMP. (C°)	COND. (µS/cm) (5%)	DISSOLVED OXYGEN (mg/L) (10%)*	ORP (mV) (±20mV)	TURBIDITY (NTUs) (≤10 or 10%)	COLOR/ ODOR (describe)
1515	1.0	8.00	200	7.23	6.32	15.9	1125	5.9	174.8	115.6	Clear
1520	1.0	9.06	200	7.23	6.32	15.9	1125	5.4	170.1	66.32	Clear
1525	1.0	10.00	200	7.23	6.32	16.0	1124	5.1	167.1	40.17	Clear
1528	0.6	10.60	200	7.23	6.32	16.0	1122	4.9	166.0	38.68	Clear
1531	0.6	11.20	200	7.22	6.32	16.0	1132	5.1	161.6	30.35	Clear
1534	0.6	11.80	200	7.23	6.32	16.0	1132	5.3	160.6	27.10	Clear
1537	0.6	12.40	200	7.23	6.32	16.1	1140	4.6	158.8	28.72	Clear
1540	0.6	13.00	200	7.23	6.32	16.1	1144	4.9	158.9	29.72	Clear
1543	0.6	13.60	200	7.21	6.32	16.1	1146	5.0	157.9	24.01	Clear
1546	0.6	14.20	200	7.23	6.32	16.1	1149	4.8	155.9	21.20	Clear
1549	1.0	15.20	200	7.24	6.31	16.1	1151	4.5	156.7	21.43	Clear
1552	1.0	16.26	200	7.23	6.32	16.2	1154	4.1	156.9	21.22	Clear
1559	0.6	16.80	200	7.26	6.32	16.2	1155	4.1	155.7	15.95	Clear
1602	0.6	17.40	200	7.32	6.32	16.2	1152	4.2	153.6	14.44	Clear
1605	0.6	18.00	200	7.34	6.31	16.3	1153	4.2	152.7	12.36	Clear
1608	0.6	18.60	200	7.36	6.32	16.3	1155	4.1	151.5	11.93	Clear
1611	0.6	19.20	200	7.36	6.32	16.2	1156	4.0	151.2	10.21	Clear
1614	0.6	19.80	200	7.36	6.32	16.2	1158	4.0	151.8	10.52	Clear
1617	0.6	20.40	200	7.37	6.32	16.2	1159	3.9	150.8	10.97	Clear
		SAMPLE @		1625							

* DO below 2.0 mg/L is stable at ±0.2 mg/L; DO below 0.5 mg/L is stable

Groundwater Sampling Form

Sample ID: MW-7R

Site Information	
Site Name: Charah Brickhaven	**Project Number:** 10021146
Site Location: Moncure, NC	**Sampling Personnel:** Charles Gruenberg
Date: 01/26/2021	**Weather:** Overcast

Well Information	
Well Diameter (in): 2"	**Purge Equipment:** Mega Monsoon Pro
Screened Interval (ft): 26' - 36'	**Pump Type:** ESP
Well Depth (ft): 39.96	**Pump Depth (ft-bTOC):** ~ 33
Depth-to-Water (ft-bTOC): 21.63	**Tubing Diameter (in):** 3/8" X 1/2"
Water Column Thickness (ft): 18.33	**Well Volume (ft^3):** 2.9328

1 Well Volume = (Total Depth - Static Water Level) * Well Capacity

Well Capacity (gallons per feet): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3' = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47

Purging Information

Parameter Instrument(s): YSI Pro TPW Turbidimeter

TIME	VOLUME PURGED (Liters)	CUMULATIVE VOLUME PURGED (Liters)	PURGE RATE (mL/min)	DEPTH TO WATER (ft-bTOC)	pH (SU) (±0.1)	TEMP. (C°) 3%	COND. (µS/cm) ~~(5%)~~ 3%	DISSOLVED OXYGEN (mg/L) (10%)*	ORP (mV) ~~(±20mV)~~ ± 10mV	TURBIDITY (NTUs) (≤10 or 10%)	COLOR/ ODOR (describe)
0740	0	0	150	21.14	7.39	16.4	1715	218.6	141.0	235.6	Lt tan/ clear
0745	0.75	0.75	150	22.83	7.38	15.1	1710	167.9	141.5	283.9	Lt tan / clear
0750	1.0	1.75	200	23.45	7.38	16.8	1705	109.3	141.7	276.2	Lt tan / clear
0755	0.75	2.50	150	24.15	7.34	16.7	1700	94.4	143.1	229.5	clear
0800	0.75	3.25	150	24.53	7.33	16.7	1697	88.3	143.5	135.8	clear
0805	0.75	~~4.00~~ 3.75	150	24.93	7.32	16.5	1690	85.0	143.9	86.56	clear
0810	0.50	4.25	100	25.14	7.33	15.8	1689	83.1	144.5	60.83	clear
0815	0.50	4.75	100	25.34	7.34	15.3	1686	82.1	145.1	48.95	clear
0820	0.5	5.25	100	25.55	7.35	15.1	1682	79.9	145.7	37.79	clear
0825	0.5	5.75	100	25.73	7.36	14.8	1681	78.9	146.5	23.66	clear

* DO below 2.0 mg/L is stable at ±0.2 mg/L; DO below 0.5 mg/L is stable

Sample Information

Sample Number	Collection Time	Parameter	Container	Preservative
MW-7R	0945	Radium 226/228	2 - 1 L Poly	HNO3
	0945	6010/6020/7470	1 - 250 mL Poly	HNO3
	0945	Cl, F, SO4	1 - 250 mL Poly	N/A
	0945	TDS	1 - 500 mL Poly	N/A

Sampled By: Charles Gruenberg — **Sample Time:** 0945

Date Sampled: 01/26/2021 — **Sampler Signature:**

Notes: Pumprate=

150 @ 0740

200 @ 0750

180 @ 0755

100 @ 0805

$1 ft^3 = 28.312$

30 mL sample

Version: 07/30/2020

HDR

Groundwater Sampling Form

Sample ID: MW-7R

Purging Information (Page 2)

TIME	VOLUME PURGED (Liters)	CUMULATIVE VOLUME PURGED (Liters)	PURGE RATE (mL/min)	DEPTH TO WATER (ft-bTOC)	pH (SU) (±0.1)	TEMP. (C°) 3%	COND. (µS/cm) (5%) 3%	DISSOLVED OXYGEN (mg/L) (10%)*	ORP (mV) (±20mV) 10%	TURBIDITY (NTUs) (≤10 or 10%)	COLOR/ ODOR (describe)
0830	0.5	6.25	100	25.90	7.36	14.7	1687	77.8	147.2	25.27	Clear
0835	0.5	6.75	100	26.07	7.32	14.5	1687	77.1	147.9	22.45	Clear
0840	0.5	7.25	100	26.41	7.32	15.6	1696	74.6	148.4	22.16	Clear
0845	0.5	7.75	100	26.62	7.35	15.6	1687	75.1	149.2	17.89	Clear
0850	0.5	8.25	100	26.78	7.35	14.7	1682	76.0	149.9	19.78	Clear
0855	0.5	8.75	100	26.94	7.36	14.7	1685	74.1	150.3	20.06	Clear
0900	0.5	9.25	100	27.07	7.38	14.5	1696	31.0	150.9	27.68	Clear
0905	0.5	9.75	100	27.23	7.38	14.7	1697	35.6	151.1	19.23	Clear
0910	0.5	10.25	100	27.44	7.38	15.2	1716	34.2	151.8	19.09	Clear
0915	0.5	10.75	100	27.61	7.37	15.1	1708	31.1	152.5	16.17	Clear
0920	0.5	11.25	100	27.81	7.37	16.8	1690	35.2	153.1	26.97	Clear
0925	0.5	11.75	100	28.31	7.33	16.2	1696	30.5	153.3	19.18	Clear
0930	0.5	12.25	100	28.53	7.33	16.3	1696	30.2	153.6	20.41	Clear
0935	0.5	12.75	100	28.58	7.34	16.2	1689	34.3	153.2	18.50	Clear
0940	0.5	13.25	100	28.92	7.31	16.6	1693	33.2	153.4	18.47	Clear
SAMPLE		@	0945								
		Purged	for	2	hr						
		Sampled	Before	min	out	of	water				
		DTW	not	stable							

* DO below 2.0 mg/L is stable at ±0.2 mg/L; DO below 0.5 mg/L is stable

Groundwater Sampling Form

Sample ID: MW-8

Site Information	
Site Name: Charah Brickhaven	**Project Number:** 10021146
Site Location: Moncure, NC	**Sampling Personnel:** Charles Gruenberg
Date: 01/27/2021	**Weather:** Cloudy

Well Information	
Well Diameter (in): 2"	**Purge Equipment:** Mega Monsoon Pro
Screened Interval (ft): 31' - 46'	**Pump Type:** ESP
Well Depth (ft): ~~45.96~~' 49.75	**Pump Depth (ft-bTOC):** ~43
Depth-to-Water (ft-bTOC): 34.78	**Tubing Diameter (in):** 3/8" X 1/2"
Water Column Thickness (ft): 14.97	**Well Volume (ft^3):** 2.3952

1 Well Volume = (Total Depth - Static Water Level) * Well Capacity

Well Capacity (gallons per feet): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3' = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47

Purging Information

Parameter Instrument(s): YSI Pro / Hach TPW Turbidimeter

TIME	VOLUME PURGED (Liters)	CUMULATIVE VOLUME PURGED (Liters)	PURGE RATE (mL/min)	DEPTH TO WATER (ft-bTOC)	pH (SU) (±0.1)	TEMP. (C°) 3%	COND. (µS/cm) 3%	DISSOLVED OXYGEN (mg/L) (10%)*	ORP (mV) ±10mV	TURBIDITY (NTUs) (≤10 or 10%)	COLOR/ ODOR (describe)
0730	0	0	100	35.13	6.95	15.9	2898	166.7	193.8	200.3	Hazy/clear
0743	0.5	0.5	100	35.11	7.00	15.4	2896	123.2	178.6	168.6	clear
0748	0.5	1.0	100	35.19	7.01	15.3	2892	53.3	169.8	122.9	Clear
0753	0.5	1.5	100	35.23	7.00	16.0	2899	43.9	161.3	91.02	Clear
0758	0.5	2.0	100	35.22	6.99	16.1	2886	41.9	157.9	69.89	Clear
0803	0.5	2.5	100	35.24	7.00	16.1	2876	39.5	158.8	41.92	Clear
0808	0.5	3.0	100	35.26	7.00	16.2	2853	37.5	158.2	34.52	Clear
0813	0.5	3.5	100	35.27	7.01	16.5	2826	35.9	158.1	28.02	Clear
0818	0.5	4.0	100	35.29	7.00	16.7	2795	35.2	155.7	32.78	Clear
0823	0.5	4.5	100	35.31	7.00	16.8	2761	34.0	152.8	23.98	Clear

* DO below 2.0 mg/L is stable at ±0.2 mg/L; DO below 0.5 mg/L is stable

Sample Information

Sample Number	Collection Time	Parameter	Container	Preservative
MW-8	0958	Radium 226/228	2 - 1 L Poly	HNO3
	0958	6010/6020/7470	1 - 250 mL Poly	HNO3
	0958	Cl, F, SO4	1 - 250 mL Poly	N/A
	0958	TDS	1 - 500 mL Poly	N/A

Sampled By: Charles Gruenberg — **Sample Time:** 0958

Date Sampled: 01/27/2021 — **Sampler Signature:** [signature]

Notes: Pumprate= 100 @ 0738

Groundwater Sampling Form

Sample ID: MW-8

Purging Information (Page 2)

TIME	VOLUME PURGED (Liters)	CUMULATIVE VOLUME PURGED (Liters)	PURGE RATE (mL/min)	DEPTH TO WATER (ft-bTOC)	pH (SU) (±0.1)	TEMP. (C°) 3%	COND. (µS/cm) (5%)	DISSOLVED OXYGEN (mg/L) (10%)*	ORP (mV) (±20mV) 10%	TURBIDITY (NTUs) (≤10 or 10%)	COLOR/ ODOR (describe)
0828	0.5	5.0	100	35.35	7.00	17.3	2767	32.8	146.8	23.92	Clear
0833	0.50	5.50	100	35.32	7.01	16.4	2657	29.6	149.9	19.83	Clear
0838	0.5	6.0	100	35.28	7.02	16.0	2631	28.0	150.3	19.13	Clear
0843	0.5	6.5	100	35.28	7.02	16.2	2613	27.9	150.3	15.36	Clear
0848	0.5	7.0	100	35.28	7.02	16.3	2576	27.7	148.2	13.84	Clear
0853	0.5	7.5	100	35.29	7.03	16.5	2524	26.8	145.4	11.92	Clear
0858	0.5	8.0	100	35.31	7.02	16.9	2475	25.9	141.7	10.57	Clear
0903	0.5	8.5	100	35.33	7.03	17.1	2433	25.0	138.3	12.02	Clear
0908	0.5	9.0	100	35.33	7.03	17.3	2402	22.9	136.3	11.45	Clear
0913	0.5	9.5	100	35.35	7.03	17.3	2360	23.4	133.6	10.64	Clear
0918	0.5	10.0	100	35.33	7.03	17.0	2334	21.8	134.2	9.40	Clear
0923	0.5	10.5	100	35.32	7.04	16.7	2302	20.8	133.5	8.01	Clear
0928	0.5	11.0	100	35.32	7.04	16.7	2264	20.7	132.7	7.73	Clear
0933	0.5	11.5	100	35.33	7.04	17.1	2215	19.8	129.0	7.86	Clear
0938	0.5	12.0	100	35.32	7.04	17.3	2203	19.4	126.6	7.58	Clear
0943	0.5	12.5	100	35.33	7.04	17.4	2155	19.4	123.3	6.64	Clear
0948	0.5	13.0	100	35.34	7.05	17.2	2140	18.4	121.9	6.65	Clear
0953	0.5	13.5	100	35.34	7.05	17.1	2114	17.8	119.2	6.54	Clear
	SAMPLE @ 0958										

* DO below 2.0 mg/L is stable at ±0.2 mg/L; DO below 0.5 mg/L is stable

Groundwater Sampling Form

Sample ID: MW-11

Site Information	
Site Name: Charah Brickhaven	**Project Number:** 10021146
Site Location: Moncure, NC	**Sampling Personnel:** Charles Gruenberg
Date: 01/29/2021	**Weather:** Sunny / cold 27°

Well Information	
Well Diameter (in): 2"	**Purge Equipment:** Mega Monsoon Pro
Screened Interval (ft): 28.50' - 43.50'	**Pump Type:** ESP
Well Depth (ft): 43.50'	**Pump Depth (ft-bTOC):** ~ 41
Depth-to-Water (ft-bTOC): 8.86	**Tubing Diameter (in):** 3/8" X 1/2"
Water Column Thickness (ft): 34.65	**Well Volume (ft^3):** 5.544

1 Well Volume = (Total Depth - Static Water Level) * Well Capacity

Well Capacity (gallons per feet): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3' = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47

Purging Information

Parameter Instrument(s): YSI Pro / Mi10 TPW Turbidimeter

TIME	VOLUME PURGED (Liters)	CUMULATIVE VOLUME PURGED (Liters)	PURGE RATE (mL/min)	DEPTH TO ±0.3 WATER (ft-bTOC)	pH (SU) (±0.1)	TEMP. (C°) 3%	COND. (µS/cm) 3% (5%)	DISSOLVED OXYGEN (mg/L) (10%)*	ORP (mV) (±20mV) ± 10 mV	TURBIDITY (NTUs) (≤10 or 10%)	COLOR/ ODOR (describe)
0728	0.0	0.0	150	8.16	7.07	12.5	890	116.6	46.9	53.92	Clear
0733	0.75	0.75	150	10.07	6.90	12.0	880	41.0	41.2	109.3	Clear
0738	0.5	1.25	100	10.15	6.90	10.9	878	23.9	39.2	74.02	Clear
0743	0.5	1.75	100	10.15	6.91	10.3	877	11.3	40.5	81.62	Clear
0748	1.5	8.75	300	10.92	6.91	13.5	884	8.7	46.4	98.71	Clear
0753	0.5	9.25	100	10.85	6.91	12.3	874	7.4	53.9	80.12	Clear
0758	0.5	9.75	100	10.81	6.91	12.2	873	7.3	58.6	70.89	Clear
0803	0.5	10.25	100	10.78	6.92	12.0	879	7.0	64.1	66.49	Clear
0808	0.5	10.75	100	10.78	6.92	12.3	874	6.7	68.4	59.80	Clear
0813	0.5	11.25	100	10.77	6.93	12.0	878	6.3	73.5	47.70	Clear

* DO below 2.0 mg/L is stable at ±0.2 mg/L; DO below 0.5 mg/L is stable

Sample Information

Sample Number	Collection Time	Parameter	Container	Preservative
MW-11	1005	Radium 226/228	2 - 1 L Poly	HNO3
	1005	6010/6020/7470	1 - 250 mL Poly	HNO3
	1005	Cl, F, SO4	1 - 250 mL Poly	N/A
	1005	TDS	1 - 500 mL Poly	N/A

Sampled By: Charles Gruenberg **Sample Time:** 1005

Date Sampled: 01/29/2021 **Sampler Signature:**

Notes: Pumprate=

150 @ 0728

100 @ 0743

300 @ 0748

100 @ 0753

Groundwater Sampling Form

Sample ID: MW-11

Purging Information (Page 2)

TIME	VOLUME PURGED (Liters)	CUMULATIVE VOLUME PURGED (Liters)	PURGE RATE (mL/min)	DEPTH TO WATER (ft-bTOC)	pH (SU) (±0.1)	TEMP. (C°)	COND. (µS/cm) (5%)	DISSOLVED OXYGEN (mg/L) (10%)*	ORP (mV) (±20mV)	TURBIDITY (NTUs) (≤10 or 10%)	COLOR/ ODOR (describe)
0818	0.5	11.75	100	10.74	6.93	12.0	880	5.8	76.7	44.49	Clear
0823	0.5	12.25	100	10.76	6.93	12.7	875	5.5	79.0	44.87	Clear
0828	0.5	12.75	100	10.76	6.94	12.1	868	5.6	80.5	41.83	Clear
0833	0.5	13.25	100	10.75	6.96	12.5	868	5.5	82.0	36.53	Clear
0838	0.5	13.75	100	10.73	6.98	12.4	866	5.8	83.5	30.56	Clear
0843	0.5	14.25	100	10.74	7.02	12.5	859	5.9	85.7	28.43	Clear
0848	0.5	14.75	100	10.75	7.06	12.7	850	6.3	88.2	21.67	Clear
0853	0.5	15.25	100	10.75	7.11	12.6	839	6.9	92.1	22.54	Clear
0858	0.5	15.75	100	10.75	7.16	12.6	832	7.4	94.0	20.58	Clear
0903	0.5	16.25	100	10.72	7.24	12.5	817	7.9	97.3	18.45	Clear
0908	0.5	16.75	100	10.73	7.30	12.3	807	8.4	99.4	20.68	Clear
0913	0.5	17.25	100	10.73	7.36	12.1	805	8.7	101.2	16.83	Clear
0918	0.5	17.75	100	10.76	7.38	12.8	803	9.1	102.4	17.89	Clear
0923	0.5	18.25	100	10.81	7.41	13.1	797	9.3	103.9	16.05	Clear
0928	0.5	18.75	100	10.86	7.41	13.0	795	9.3	104.7	13.54	Clear
0933	0.5	19.25	100	10.92	7.40	13.3	797	9.6	105.6	12.96	Clear
0938	0.5	19.75	100	10.91	7.39	13.3	798	9.3	106.4	11.24	Clear
0943	0.5	20.25	100	10.96	7.37	13.6	799	9.1	107.4	11.02	Clear
0948	0.5	20.75	100	10.95	7.35	13.5	798	9.0	108.0	9.88	Clear
0953	0.5	21.25	100	10.94	7.34	13.3	801	9.0	108.6	9.64	Clear
0958	0.5	21.75	100	10.95	7.33	13.1	801	8.7	109.5	9.31	Clear
		SAMPLE									
		@	100S								

* DO below 2.0 mg/L is stable at ±0.2 mg/L; DO below 0.5 mg/L is stable

Groundwater Sampling Form

Sample ID: LEACHATE

Site Information	
Site Name: Charah Brickhaven	**Project Number:** 10021146
Site Location: Moncure, NC	**Sampling Personnel:** Charles Gruenberg
Date: 01/26/2021	**Weather:** Accsl

Well Information	
Well Diameter (in): N/A	**Purge Equipment:** N/A
Screened Interval (ft): N/A	**Pump Type:** N/A
Well Depth (ft): N/A	**Pump Depth (ft-bTOC):** N/A
Depth-to-Water (ft-bTOC): N/A	**Tubing Diameter (in):** N/A
Water Column Thickness (ft): N/A	**Well Volume (ft^3):** N/A

1 Well Volume = (Total Depth - Static Water Level) * Well Capacity

Well Capacity (gallons per feet): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3' = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47

Purging Information

Parameter Instrument(s): YSI Pro / Micro TPW Turbidimeter

TIME	VOLUME PURGED (Liters)	CUMULATIVE VOLUME PURGED (Liters)	PURGE RATE (mL/min)	DEPTH TO ±0.3 WATER (ft-bTOC)	pH (SU) (±0.1)	TEMP. (C°) 3%	COND. (µS/cm) 3% (±5%)	DISSOLVED OXYGEN (mg/L) (10%)*	ORP (mV) (±10mV) (±20mV)	TURBIDITY (NTUs) (≤10 or 10%)	COLOR/ ODOR (describe)
1015	—	—	—	—	7.55	8.2	2699	125.3	187.7	49.24	Clear

* DO below 2.0 mg/L is stable at ±0.2 mg/L; DO below 0.5 mg/L is stable

Sample Information

Sample Number	Collection Time	Parameter	Container	Preservative
LEACHATE	1020	Radium 226/228	2 - 1 L Poly	HNO3
	1020	6010/6020/7470	1 - 250 mL Poly	HNO3
	1020	Cl, F, SO4	1 - 250 mL Poly	N/A
	1020	TDS	1 - 500 mL Poly	N/A

Sampled By: Charles Gruenberg — **Sample Time:** 1020

Date Sampled: 01/26/2021 — **Sampler Signature:**

Notes: Pumprate= N/A

Groundwater Sampling Form

Sample ID: SW-1

Site Information	
Site Name: Charah Brickhaven	**Project Number:** 10021146
Site Location: Moncure, NC	**Sampling Personnel:** Charles Gruenberg
Date: 01/27/2021	**Weather:** Sunny

Well Information	
Well Diameter (in): N/A	**Purge Equipment:** N/A
Screened Interval (ft): N/A	**Pump Type:** N/A
Well Depth (ft): N/A	**Pump Depth (ft-bTOC):** N/A
Depth-to-Water (ft-bTOC): N/A	**Tubing Diameter (in):** N/A
Water Column Thickness (ft): N/A	**Well Volume (ft^3):** N/A

1 Well Volume = (Total Depth - Static Water Level) * Well Capacity

Well Capacity (gallons per feet): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3' = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47

Purging Information

Parameter Instrument(s): YSI Pro / MiLw TPW Turbidimeter

TIME	VOLUME PURGED (Liters)	CUMULATIVE VOLUME PURGED (Liters)	PURGE RATE (mL/min)	DEPTH TO WATER (ft-bTOC)	pH (SU)* (±0.1)	TEMP. (C°) 3%	COND. (µS/cm) (5%) 3%	DISSOLVED OXYGEN (mg/L) (10%)*	ORP (mV) (±20mV) ±10mV	TURBIDITY (NTUs) (≤10 or 10%)	COLOR/ ODOR (describe)
1355	—	—	—	—	5.91	8.2	40.8	166.3	165.4	554.8	Brown/tan

* DO below 2.0 mg/L is stable at ±0.2 mg/L; DO below 0.5 mg/L is stable

Sample Information

Sample Number	Collection Time	Parameter	Container	Preservative
SW-1	1400	Radium 226/228	2 - 1 L Poly	HNO3
	1400	6010/6020/7470	1 - 250 mL Poly	HNO3
	1400	Cl, F, SO4	1 - 250 mL Poly	N/A
	1400	TDS	1 - 500 mL Poly	N/A

Sampled By: Charles Gruenberg **Sample Time:** 1400

Date Sampled: 01/27/2021 **Sampler Signature:** [signature]

Notes: Pumprate= N/A

Groundwater Sampling Form

Sample ID: SW-2

Site Information	
Site Name: Charah Brickhaven	**Project Number:** 10021146
Site Location: Moncure, NC	**Sampling Personnel:** Charles Gruenberg
Date: 01/27/2021	**Weather:** Sunny

Well Information	
Well Diameter (in): N/A	**Purge Equipment:** N/A
Screened Interval (ft): N/A	**Pump Type:** N/A
Well Depth (ft): N/A	**Pump Depth (ft-bTOC):** N/A
Depth-to-Water (ft-bTOC): N/A	**Tubing Diameter (in):** N/A
Water Column Thickness (ft): N/A	**Well Volume (ft^3):** N/A
1 Well Volume = (Total Depth - Static Water Level) * Well Capacity	
Well Capacity (gallons per feet): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3' = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47	

Purging Information

Parameter Instrument(s): YSI Pro / rico TPW Turbidimeter

TIME	VOLUME PURGED (Liters)	CUMULATIVE VOLUME PURGED (Liters)	PURGE RATE (mL/min)	DEPTH TO ±0.3 WATER (ft-bTOC)	pH (SU) (±0.1)	TEMP. (C°) 3%	COND. (µS/cm) 3%	DISSOLVED OXYGEN (mg/L) (10%)*	ORP (mV) ± ~~±20mV~~ 10mV	TURBIDITY (NTUs) (≤10 or 10%)	COLOR/ ODOR (describe)
1420	—	—	—	—	6.68	8.4	245.5	121.4	160.2	51.39	Clear

DO below 2.0 mg/L is stable at ±0.2 mg/L; DO below 0.5 mg/L is stable

Sample Information

Sample Number	Collection Time	Parameter	Container	Preservative
SW-2	1425	Radium 226/228	2 - 1 L Poly	HNO3
	1425	6010/6020/7470	1 - 250 mL Poly	HNO3
	1425	Cl, F, SO4	1 - 250 mL Poly	N/A
	1425	TDS	1 - 500 mL Poly	N/A

Sampled By: Charles Gruenberg	**Sample Time:** 1425
Date Sampled: 01/27/2021	**Sampler Signature:**

Notes: Pumprate=

Groundwater Sampling Form

Sample ID: SW-3

Site Information	
Site Name: Charah Brickhaven	**Project Number:** 10021146
Site Location: Moncure, NC	**Sampling Personnel:** Charles Gruenberg
Date: 01/27/2021	**Weather:** Sunny

Well Information	
Well Diameter (in): N/A	**Purge Equipment:** N/A
Screened Interval (ft): N/A	**Pump Type:** N/A
Well Depth (ft): N/A	**Pump Depth (ft-bTOC):** N/A
Depth-to-Water (ft-bTOC): N/A	**Tubing Diameter (in):** N/A
Water Column Thickness (ft): N/A	**Well Volume (ft^3):** N/A

1 Well Volume = (Total Depth - Static Water Level) * Well Capacity

Well Capacity (gallons per feet): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3' = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47

Purging Information

Parameter Instrument(s): YSI Pro / Micro TPW Turbidimeter

TIME	VOLUME PURGED (Liters)	CUMULATIVE VOLUME PURGED (Liters)	PURGE RATE (mL/min)	DEPTH TO WATER (ft-bTOC)	pH (SU) (±0.1)	TEMP. (C°) 3%	COND. (µS/cm) 3%	DISSOLVED OXYGEN (mg/L) (10%)*	ORP (mV) ±10 mV	TURBIDITY (NTUs) (≤10 or 10%)	COLOR/ ODOR (describe)
1454	—	—	—	—	5.92	9.07	152.10	108.5	172.3	26.81	Clear

* DO below 2.0 mg/L is stable at ±0.2 mg/L; DO below 0.5 mg/L is stable

Sample Information

Sample Number	Collection Time	Parameter	Container	Preservative
SW-3	1500	Radium 226/228	2 - 1 L Poly	HNO3
	1500	6010/6020/7470	1 - 250 mL Poly	HNO3
	1500	Cl, F, SO4	1 - 250 mL Poly	N/A
	1500	TDS	1 - 500 mL Poly	N/A

Sampled By: Charles Gruenberg **Sample Time:** 1500

Date Sampled: 01/27/2021 **Sampler Signature:**

Notes: Pumprate= N/A

Groundwater Sampling Form

Sample ID: SW-4

Site Information	
Site Name: Charah Brickhaven	**Project Number:** 10021146
Site Location: Moncure, NC	**Sampling Personnel:** Charles Gruenberg
Date: 01/27/2021	**Weather:** Sunny

Well Information	
Well Diameter (in): N/A	**Purge Equipment:** N/A
Screened Interval (ft): N/A	**Pump Type:** N/A
Well Depth (ft): N/A	**Pump Depth (ft-bTOC):** N/A
Depth-to-Water (ft-bTOC): N/A	**Tubing Diameter (in):** N/A
Water Column Thickness (ft): N/A	**Well Volume (ft^3):** N/A

1 Well Volume = (Total Depth - Static Water Level) * Well Capacity

Well Capacity (gallons per feet): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3' = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47

Purging Information

Parameter Instrument(s): YSI PO / MicroTPW Turbidimeter

TIME	VOLUME PURGED (Liters)	CUMULATIVE VOLUME PURGED (Liters)	PURGE RATE (mL/min)	DEPTH TO WATER (ft-bTOC)	pH (SU) (±0.1)	TEMP. (C°) 3%	COND. (µS/cm) 3% (5%)	DISSOLVED OXYGEN (mg/L) (10%)*	ORP (mV) ±10mV (±20mV)	TURBIDITY (NTUs) (≤10 or 10%)	COLOR/ ODOR (describe)
1525	—	—	—	—	5.98	8.6	124.0	105.4	140.3	55.78	Clear

* DO below 2.0 mg/L is stable at ±0.2 mg/L; DO below 0.5 mg/L is stable

Sample Information

Sample Number	Collection Time	Parameter	Container	Preservative
SW-4	1530	Radium 226/228	2 - 1 L Poly	HNO3
	1530	6010/6020/7470	1 - 250 mL Poly	HNO3
	1530	Cl, F, SO4	1 - 250 mL Poly	N/A
	1530	TDS	1 - 500 mL Poly	N/A

Sampled By: Charles Gruenberg — **Sample Time:** 1530

Date Sampled: 01/27/2021 — **Sampler Signature:** [signature]

Notes: Pumprate=

N/A

Groundwater Sampling Form

Sample ID: SW-5

Site Information	
Site Name: Charah Brickhaven	**Project Number:** 10021146
Site Location: Moncure, NC	**Sampling Personnel:** Charles Gruenberg
Date: 01/27/2021	**Weather:** Sunny

Well Information	
Well Diameter (in): N/A	**Purge Equipment:** N/A
Screened Interval (ft): N/A	**Pump Type:** N/A
Well Depth (ft): N/A	**Pump Depth (ft-bTOC):** N/A
Depth-to-Water (ft-bTOC): N/A	**Tubing Diameter (in):** N/A
Water Column Thickness (ft): N/A	**Well Volume (ft^3):** N/A

1 Well Volume = (Total Depth - Static Water Level) * Well Capacity

Well Capacity (gallons per feet): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3' = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47

Purging Information

Parameter Instrument(s): YSI Pro / Micro TA Turbidimeter

TIME	VOLUME PURGED (Liters)	CUMULATIVE VOLUME PURGED (Liters)	PURGE RATE (mL/min)	DEPTH TO WATER (ft-bTOC) ±0.3	pH (SU) (±0.1)	TEMP. (C°) 3%	COND. (µS/cm) 3%	DISSOLVED OXYGEN (mg/L) (10%)*	ORP (mV) ±10mV	TURBIDITY (NTUs) (≤10 or 10%)	COLOR/ ODOR (describe)
1555	—	—	—	—	5.91	8.9	57.7	97.9	188.2	501.6	Tan/Brown

* DO below 2.0 mg/L is stable at ±0.2 mg/L; DO below 0.5 mg/L is stable

Sample Information

Sample Number	Collection Time	Parameter	Container	Preservative
SW-5	1600	Radium 226/228	2 - 1 L Poly	HNO3
	1600	6010/6020/7470	1 - 250 mL Poly	HNO3
	1600	Cl, F, SO4	1 - 250 mL Poly	N/A
	1600	TDS	1 - 500 mL Poly	N/A

Sampled By: Charles Gruenberg — **Sample Time:** 1600

Date Sampled: 01/27/2021 — **Sampler Signature:** [signature]

Notes: Pumprate= N/A

SMITH + GARDNER

Ground Water Sample Collection Record

Client:
Project Name/Number: Charah Brickhaven - Chatham-20-4
Site Location: Charah Brickhaven, Moncure-Flatwood Road
Weather Conditions:
Collector(s): Smith + Gardner, HDR

Well/Peizometer ID: BG-1

WATER LEVEL DATA: (measured from Top of Casing)

Total Well Depth (ft.): 43.78
Water Column Length (ft.): 36.09
Depth to Water (ft.): 7.69
Multiplication Factor: 3
Casing Diameter (in.): 2
One Well Volume (gals.): 6
Casing Material: PVC
Three Well Volumes (gals.): 18.0

ACCEPTANCE CRITERIA:

Min.required vols.purged: 3 Vols.
Max. allowable turbidity: 5 NTUs
Conductivity stabilize within: 3 %
Temperature stabilize within: 5 % or: 0.2 °C
DO stabilize within: 10 % or: <0.5 mg/L
pH stabilize within: 0.1 pH units

WELL PURGING DATA:

Date Purged: 4/12 Time Start: 1115 Time Finish:
Purge Method/Equipmer: Low Flow

Field Testing Equipment Used: Make: Geotech Model: SS GeoSub Serial Number: pump + Controller SN: 04D0079

DTW	Time	Temp. (°C)	Spec. Cond. (mS)	DO (mg/L)	pH (s.u.)	ORP (mV)	Turbidity (NTUs)	Color	Odor	Volume Removed (gal)
9.45	1115	16.8	1063	2.87	6.33	256.8	770	Brown	none	.1
9.93	1120	15.9	1056	2.62	6.29	255.8	485	Brown	none	.3
10.18	1125	16.3	1060	2.21	6.22	243.1	203	clear	"	.8
10.75	1130	16.8	1068	2.06	6.22	242.8	257	clear		.8
10.40	1135	16.9	1071	1.98	6.21	230.1	197			1.0
10.00	1140	17.0	1072	1.73	6.21	218.3	150			1.1
9.73	1145	16.8	1075	1.53	6.21	200.8	123			1.3
9.25	1150	16.6	1078	1.46	6.21	187.1	109			1.6
9.10	1155	16.8	1075	1.27	6.21	173.5	94			1.7
9.00	1200	17.0	1073	1.06	6.21	161.2	87			1.8
9.00	1205	17.0	1075	0.73	6.17	150.3	78			1.9
8.90	1210	17.0	1088	0.57	6.17	146.2	70			2.0
8.85	1215	17.1	1088	0.54	6.17	140.1	66			2.1
8.82	1220	17.1	1088	0.51	6.17	132.4	61			2.2
9.32	1225	17.6	1090	0.58	6.18	135.8	43			2.5
10.00	1230	17.8	1090	0.61	6.18	137.4	29			2.8
10.38	1235	17.8	1083	0.53	6.18	135.1	24			3.0
10.62	1240	17.8	1078	0.45	6.18	130.4	22			3.2
10.65	1245	17.7	1070	0.40	6.18	127.3	17			3.4
10.80	1250	17.9	1063	0.32	6.18	124.9	12			3.5
10.98	1255	17.9	1060	0.34	6.18	125.0	4.7			3.8
	1300									
	1305									
	1310									
	1315									

1300 Sample

SMITH+GARDNER

Ground Water Sample Collection Record

Client:
Project Name/Number: Charah Brickhaven - Chatham-20-4
Site Location: Charah Brickhaven, Moncure-Flatwood Road
Weather Conditions:
Collector(s): Smith + Gardner, HDR

Well/Peizometer ID: BG-2

WATER LEVEL DATA: (measured from Top of Casing)

Total Well Depth (ft.):	26.11	Water Column Length (ft.):	16.43
Depth to Water (ft.):	9.68	Multiplication Factor:	3
Casing Diameter (in.):	2	One Well Volume (gals.):	2.7
Casing Material:	PVC	Three Well Volumes (gals.):	8.25

ACCEPTANCE CRITERIA:

Min.required vols.purged: 3 Vols.
Max. allowable turbidity: 5 NTUs
Conductivity stabilize within: 3 %
Temperature stabilize within: 5 % or: 0.2 °C
DO stabilize within: 10 % or: <0.5 mg/L
pH stabilize within: 0.1 pH units

WELL PURGING DATA:

Date Purged: 4/12 Time Start: 1335 Time Finish: 1555
Purge Method/Equipmen: Low Flow
Field Testing Equipment Used: Make Model Serial Number

DTW 9.68

Time	Temp. (°C)	Spec. Cond. (mS)	DO (mg/L)	pH (s.u.)	ORP (mV)	Turbidity (NTUs)	Color	Odor	Volume Removed (gal)
9.83 1335	23.3	3624	1.96	6.73	57.7	410	Brown	none	.1
10.05 1340	22.0	3482	1.75	6.75	57.9	400	Brown	none	.4
10.48 1345	21.4	3405	1.40	6.77	57.9	398	Brown	none	.7
11.00 1350	19.8	3276	0.97	6.77	57.9	305	Brown	none	1.0
11.30 1355	18.2	3158	0.63	6.78	58.1	323	Brown	none	1.3
11.38 1400	17.6	3087	0.23	6.78	58.1	900	Brown	none	1.5
11.40 1405	17.8	2854	0.17	6.76	53.5	480	Brown	none	1.8
11.42 1410	17.9	2401	0.11	6.76	48.0	280	clear	none	2.0
11.53 1415	17.8	2397	0.11	6.76	48.2	244			2.2
11.60 1420	17.7	2389	0.11	6.76	49.7	220			2.5
11.80 1425	17.6	2303	0.10	6.75	44.8	123			3.0
11.95 1430	17.5	2217	0.09	6.74	50.5	45			3.2
12.38 1435	17.4	2230	0.08	6.74	45.3	78			3.4
15.61 1440	17.4	2230	0.08	6.74	45.3	123			3.8
13.52 1445	17.2	2138	0.10	6.78	44.6	228			3.9
12.71 1450	17.0	2013	0.14	6.78	42.7	1000			4.0
18.60 1455	17.4	1952	0.10	6.75	30.8	821			4.4
12.54 1500	17.6	1880	0.09	6.74	29.1	470			4.8
12.45 1505	17.6	1875	0.07	6.75	25.3	500			5.5
12.40 1510	17.6	1875	0.07	6.75	25.3	510			5.7
12.55 1515	18.0	1953	0.06	6.73	23.7	245			60
12.60 1520	18.2	1981	0.05	6.73	23.0	120			6.2
13.66 1525	17.9	1978	0.05	6.73	21.1	108			6.4
12.23 1530	17.8	2104	0.07	6.72	32.5	97			6.5
12.05 1535	17.8	2139	0.08	6.72	41.9	60			6.6
12.10 1540	18.0	2157	0.06	6.73	38.5	43			6.8
12.08 1545	18.1	2204	0.04	6.73	29.2	31			7.0
1550	17.9	2189	0.03	6.74	28.3	30			7.2
1555	17.9	2140	0.03	6.74	27.8	25			7.4
1600									
1605									
1610									
1615			Sample @ 1555						
1620									

SMITH+GARDNER

Ground Water Sample Collection Record

Client:
Project Name/Number: Charah Brickhaven - Chatham-20-4
Site Location: Charah Brickhaven, Moncure-Flatwood Road
Weather Conditions:
Collector(s): Smith + Gardner, HDR

Well/Peizometer ID: MW-1

WATER LEVEL DATA: (measured from Top of Casing)

Total Well Depth (ft.):	75.55	Water Column Length (ft.):	20.07
Depth to Water (ft.):	55.48	Multiplication Factor:	3
Casing Diameter (in.):	2	One Well Volume (gals.):	3.3
Casing Material:	PVC	Three Well Volumes (gals.):	10

ACCEPTANCE CRITERIA:

Min.required vols.purged: 3 Vols.
Max. allowable turbidity: 5 NTUs
Conductivity stabilize within: 3 %
Temperature stabilize within: 5 % or: 0.2 °C
DO stabilize within: 10 % or: <0.5 mg/L
pH stabilize within: 0.1 pH units

WELL PURGING DATA:

Date Purged: 4/14 Time Start: 1525 Time Finish: 1605

Purge Method/Equipmen: Low Flow

Field Testing Equipment Used: Make Model Serial Number

DTW

Time	Temp. (°C)	Spec. Cond. (mS)	DO (mg/L)	pH (s.u.)	ORP (mV)	Turbidity (NTUs)	Color	Odor	Volume Removed (gal)
55.60 1525	22.7	543	2.38	7.30	202.5	29.5	clear	none	.1
55.50 1530	22.9	550	2.23	7.31	193.5	26.15	Clear	none	.2
55.50 1535	23.2	551	2.17	7.26	182.9	25.3			.3
55.50 1540	23.4	552	2.01	7.20	170.4	22.1			.4
55.50 1545	22.9	574	1.98	7.16	168.3	20.6			.5
55.50 1550	22.2	597	1.96	7.14	159.9	19.1			.6
55.50 1555	22.1	598	1.97	7.14	159.8	13.4			.7
55.50 1600	22.1	598	1.96	7.14	159.8	8.2			.8
55.50 1605	22.1	597	1.97	7.14	160.0	8.0			.9
1610									
1615									
1620									
1625									
1630									
1635									
1640									
1645									

Sample at 1605

SMITH+GARDNER

Ground Water Sample Collection Record

Client:
Project Name/Number: Charah Brickhaven - Chatham-20-4
Site Location: Charah Brickhaven, Moncure-Flatwood Road
Weather Conditions:
Collector(s): Smith + Gardner, HDR

Well/Peizometer ID: MW-2

WATER LEVEL DATA: (measured from Top of Casing)

Total Well Depth (ft.): 50.15
Water Column Length (ft.): 11.61
Depth to Water (ft.): 38.54
Multiplication Factor: 3
Casing Diameter (in.): 2
One Well Volume (gals.): 1.9
Casing Material: PVC
Three Well Volumes (gals.): 5.8

ACCEPTANCE CRITERIA:

Min.required vols.purged: 3 Vols.
Max. allowable turbidity: 5 NTUs
Conductivity stabilize within: 3 %
Temperature stabilize within: 5 % or: 0.2 °C
DO stabilize within: 10 % or: <0.5 mg/L
pH stabilize within: 0.1 pH units

WELL PURGING DATA:

Date Purged: 4/14 Time Start: 0730 Time Finish:
Purge Method/Equipmen: Low Flow
Field Testing Equipment Used: Make Model Serial Number

DTW	Time	Temp. (°C)	Spec. Cond. (mS)	DO (mg/L)	pH (s.u.)	ORP (mV)	Turbidity (NTUs)	Color	Odor	Volume Removed (gal)
37.85	0730	16.9	4738	5.40	7.55	253.2	180	clear	none	.2
39.80	0735	16.7	4752	5.42	7.54	252.7	171			.3
39.90	0740	16.7	4743	5.46	7.54	251.5	163			.4
40.10	0745	16.3	4728	5.37	7.50	238.2	143			.5
40.30	0750	16.0	4716	5.25	7.48	224.9	134			.6
40.50	0755	15.9	4709	5.26	7.48	223.7	155			.7
40.58	0800	15.8	4707	5.27	7.48	221	136			.8
40.75	0805	16.0	4705	5.38	7.47	219.1	128			.8
40.90	0810	16.2	4704	5.40	7.47	214.6	122			.9
41.08	0815	16.4	4700	5.46	7.47	212.9	109			1.0
41.30	0820	16.8	4697	5.54	7.47	210.1	258			1.0
41.70	0825	17.5	4702	5.92	7.48	206.6	175			1.1
42.05	0830	18.3	4712	5.91	7.48	198.1	129.3			1.1
42.38	0835	18.5	4720	6.03	7.49	195.4	92.3			1.2
42.75	0840	18.8	4724	6.27	7.50	193.4	86.7			1.3
43.10	0845	18.7	4728	6.32	7.50	192.8	94.0			1.4
43.42	0850	18.7	4730	6.37	7.51	192.7	81.3			1.5
43.75	0855	18.6	4735	6.42	7.51	191.7	76.8			1.6
44.00	0900	18.6	4738	6.56	7.52	189.8	71.1			1.7
44.30	0905	18.6	4740	6.58	7.52	179.7	66.8			1.8
44.53	0910	18.6	4742	6.61	7.53	176.2	65.1			1.9
44.78	0915	18.8	4741	6.59	7.53	170.1	59.2			2.0
45.00	0920	19.0	4740	6.56	7.53	162.9	55.7			2.1
45.20	0925	19.0	4740	6.60	7.53	160.7	54.1			2.2
45.48	0930	18.9	4741	6.62	7.53	159.5	52.6			2.3
45.80	0935	19.5	4739	6.51	7.53	157.5	55.3			2.2
46.05	0940	19.9	4737	6.51	7.53	156.6	58.9			2.2
46.35	0945	19.4	4735	6.52	7.53	162.9	60.8			2.3
46.60	0950	19.9	4730	6.55	7.53	160.7	65.1			2.4
	0955	DRY								
	1000									
	1005			Sample	at	0910	- 4/15/21			
	1010									
	1015									

SMITH+GARDNER

Ground Water Sample Collection Record

Client:
Project Name/Number: Charah Brickhaven - Chatham-20-4
Site Location: Charah Brickhaven, Moncure-Flatwood Road
Weather Conditions:
Collector(s): Smith + Gardner, HDR

Well/Peizometer ID: MW-2D

WATER LEVEL DATA: (measured from Top of Casing)

Total Well Depth (ft.):	147.4	Water Column Length (ft.):	21.0
Depth to Water (ft.):	126.40	Multiplication Factor:	3
Casing Diameter (in.):	2	One Well Volume (gals.):	3.5
Casing Material:	PVC	Three Well Volumes (gals.):	10.5

ACCEPTANCE CRITERIA:

Min.required vols.purged: 3 Vols.
Max. allowable turbidity: 5 NTUs
Conductivity stabilize within: 3 %
Temperature stabilize within: 5 % or: 0.2 °C
DO stabilize within: 10 % or: <0.5 mg/L
pH stabilize within: 0.1 pH units

WELL PURGING DATA:

Date Purged: 4/15 Time Start: 0735 Time Finish:
Purge Method/Equipmen: Low Flow
Field Testing Equipment Used: Make Model Serial Number

DTW
126.40

Time	Temp. (°C)	Spec. Cond. (mS)	DO (mg/L)	pH (s.u.)	ORP (mV)	Turbidity (NTUs)	Color	Odor	Volume Removed (gal)
0735	17.0	3707	6.94	7.59	101.2	105	clear	none	.1
0740	17.2	3641	6.97	7.57	94.3	81.5	Clear	none.	.2
0745	17.6	3637	6.25	7.56	-23.1	92.4			.3
0750	17.8	3630	5.93	7.55	-115.9	95.1			.4
0755	17.7	3621	5.27	7.61	-119.3	73.8			.4
0800	17.5	3569	5.06	7.69	-121.1	60.4			.5
0805	17.7	3555	5.04	7.73	-112.5	52.7			.6
0810	17.8	3550	5.02	7.76	-102.3	46.8			.7
0815	18.0	3540	5.01	7.81	-109.4	42.7			.8
0820	18.1	3532	3.55	7.83	-111.6	40.9			.9
0825	18.0	3547	3.50	7.79	-110.3	28.6			1.3
0830	18.0	3548	3.49	7.78	-110.2	16.4			1.5
0835	18.0	3547	3.51	7.78	-109.4	11.7			1.8
0840	17.9	3546	3.49	7.79	-110.6	7.1			2.0
0845									
0850									
0855									
0900									
0905									
0910									
0915									
0920									
0925									
0930									
0935									
0940									
0945									

Sample at 0840

SMITH+GARDNER

Ground Water Sample Collection Record

Client:
Project Name/Number: Charah Brickhaven - Chatham-20-4
Site Location: Charah Brickhaven, Moncure-Flatwood Road
Weather Conditions:
Collector(s): Smith + Gardner, HDR

Well/Peizometer ID: MW-3

WATER LEVEL DATA: (measured from Top of Casing)

Total Well Depth (ft.): 43.6
Depth to Water (ft.): 9.57
Casing Diameter (in.): 2
Casing Material: PVC
Water Column Length (ft.): 34.03
Multiplication Factor: 3
One Well Volume (gals.): 5.7
Three Well Volumes (gals.): 17

ACCEPTANCE CRITERIA:

Min.required vols.purged: 3 Vols.
Max. allowable turbidity: 5 NTUs
Conductivity stabilize within: 3 %
Temperature stabilize within: 5 % or: 0.2 °C
DO stabilize within: 10 % or: <0.5 mg/L
pH stabilize within: 0.1 pH units

WELL PURGING DATA:

Date Purged: 4/14 Time Start: 1015 Time Finish:
Purge Method/Equipmen: Low Flow
Field Testing Equipment Used: Make Model Serial Number

DTW	Time	Temp. (°C)	Spec. Cond. (mS)	DO (mg/L)	pH (s.u.)	ORP (mV)	Turbidity (NTUs)	Color	Odor	Volume Removed (gal)
10.00	1015	18.1	4607	1.28	7.37	112.8	503	clear	none	.1
11.60	1020	18.3	4651	1.43	7.50	119.1	378	clear	none	.2
14.20	1025	18.5	4597	1.62	7.49	106.3	482			.2
15.80	1030	18.8	4517	1.98	7.46	82.9	475			.5
17.10	1035	18.9	4428	2.05	7.46	92.7	307			.8
18.90	1040	19.2	4326	2.72	7.46	98.5	30.8			1.0
20.35	1045	19.3	4301	3.17	7.46	102.6	23.4			1.4
21.70	1050	19.5	4276	3.53	7.46	105.6	15.3			1.5
23.28	1055	19.6	4258	3.89	7.45	107.6	12.3			1.8
24.28	1100	19.7	4243	4.13	7.45	109.7	9.9			1.8
25.50	1105	20.2	4237	4.28	7.44	110.2	10.5			2.0
25.95	1110	20.6	4226	4.34	7.44	112.6	13.0			2.2
26.40	1115	19.9	4224	4.46	7.45	114.7	8.5			2.4
27.08	1120	19.5	4223	4.57	7.45	115.8	5.75			2.6
27.80	1125	20.1	4220	4.55	7.45	112.2	9.2			2.6
28.38	1130	20.5	4219	4.54	7.44	111.6	13.2			2.8
28.78	1135	20.6	4197	4.56	7.44	107.2	10.1			2.9
29.02	1140	20.7	4196	4.56	7.44	107.1	7.81			3.0
29.25	1145	20.8	4185	4.57	7.44	106.2	7.00			3.1
29.46	1150	20.9	4185	4.61	7.43	102.6	6.26			3.3
29.65	1155	21.3	4183	4.61	7.43	105.3	8.02			3.5
29.78	1300	21.3	4185	4.62	7.43	102.5	6.02			3.7
29.90	1205	21.3	4186	4.62	7.43	106.3	6.11			3.9
	1210									
	1215									
	1220									
	1225									
	1230									
	1235									
	1240									
	1245									
	1250									
	1255									
	1300									

Sample at 1210

SMITH+GARDNER

Ground Water Sample Collection Record

Client:
Project Name/Number: Charah Brickhaven - Chatham-20-4
Site Location: Charah Brickhaven, Moncure-Flatwood Road
Weather Conditions:
Collector(s): Smith + Gardner, HDR

Well/Peizometer ID: MW-4

WATER LEVEL DATA: (measured from Top of Casing)

Total Well Depth (ft.): 25.74
Water Column Length (ft.): 17.09
Depth to Water (ft.): 8.65
Multiplication Factor: 3
Casing Diameter (in.): 2
One Well Volume (gals.): 2.85
Casing Material: PVC
Three Well Volumes (gals.): 8.545

ACCEPTANCE CRITERIA:

Min.required vols.purged: 3 Vols.
Max. allowable turbidity: 5 NTUs
Conductivity stabilize within: 3 %
Temperature stabilize within: 5 % or: 0.2 °C
DO stabilize within: 10 % or: <0.5 mg/L
pH stabilize within: 0.1 pH units

WELL PURGING DATA:

Date Purged: 4/13 Time Start: 0745 Time Finish: 1015
Purge Method/Equipmer: Low Flow
Field Testing Equipment Used: Make Model Serial Number

DTW 8.65

Time	Temp. (°C)	Spec. Cond. (mS)	DO (mg/L)	pH (s.u.)	ORP (mV)	Turbidity (NTUs)	Color	Odor	Volume Removed (gal)
0745	22.3	2248	0.35	6.27	3.6	780	Brown	none	.2
8.93 0750	22.0	2230	0.39	6.29	3.1	625	Brown	none	.3
9.05 0755	21.9	2193	0.54	6.26	2.7	608	Brown	none	.5
9.48 0800	21.8	2187	0.42	6.25	0.9	540	Brown	none	.7
10.30 0805	21.6	2154	0.35	6.25	-1.1	523	Brown	none	.4
10.54 0810	21.3	2128	0.36	6.25	-1.3	447	Brown	none	1.0
10.90 0815	21.6	2119	0.36	6.25	-1.5	470	clear	none	1.2
11.45 0820	19.0	2180	1.3	6.26	-5.7	423			1.3
12.02 0825	18.7	2192	2.8	6.26	-13.0	410			1.4
11.20 0830	18.0	2190	0.20	6.26	-14.1	345			1.7
12.60 0835	18.3	2103	0.20	6.21	-4.8	142			2.0
11.30 0840	17.2	2049	0.22	6.21	4.0	131			2.2
11.10 0845	19.2	2227	0.18	6.21	-3.8	130			2.5
11.65 0850	18.4	2151	0.18	6.21	-5.7	114			2.7
11.40 0855	18.0	2208	0.14	6.22	-5.6	101			3.0
10.75 0900	17.3	2196	0.13	6.23	-2.8	93			3.2
10.45 0905	17.6	2217	0.13	6.22	-2.2	91			3.4
10.20 0910	18.0	2208	0.12	6.21	-2.2	86			3.5
10.05 0915	18.4	2226	0.13	6.22	-4.6	61			3.6
10.15 0920	18.7	2126	0.12	6.22	-2.1	54			3.9
10.18 0925	18.8	2153	0.13	6.21	-1.3	61			4.1
10.20 0930	18.9	2161	0.13	6.21	0.3	66			4.3
10.20 0935	18.7	2201	0.12	6.22	1.7	46			4.5
10.20 0940	18.9	2200	0.09	6.22	2.2	38			4.6
10.20 0945	18.9	2206	0.09	6.23	2.2	32.1			4.7
10.15 0950	18.9	2201	0.10	6.22	2.3	28.3			4.9
10.20 0955	18.4	2200	0.07	6.21	3.1	33.0			5.0
10.10 1000	18.4	2203	0.07	6.22	5.6	26.1			5.1
10.10 1005	19.0	2202	0.08	6.21	4.3	25.1			5.3
10.15 1010	19.0	2202	0.08	6.21	4.2	20.0			5.5
10.10 1015	19.0	2201	0.07	6.21	4.0	18.9			5.6
1020									
1025			Sample at		1015				
1030									

SMITH+GARDNER

Ground Water Sample Collection Record

Client:
Project Name/Number: Charah Brickhaven - Chatham-20-4
Site Location: Charah Brickhaven, Moncure-Flatwood Road
Weather Conditions:
Collector(s): Smith + Gardner, HDR

Well/Peizometer ID: MW-5

WATER LEVEL DATA: (measured from Top of Casing)

Total Well Depth (ft.): 46.96
Water Column Length (ft.): 26.78
Depth to Water (ft.): 20.18
Multiplication Factor: 3
Casing Diameter (in.): 2
One Well Volume (gals.): 4.5
Casing Material: PVC
Three Well Volumes (gals.): 13.39

ACCEPTANCE CRITERIA:

Min.required vols.purged: 3 Vols.
Max. allowable turbidity: 5 NTUs
Conductivity stabilize within: 3 %
Temperature stabilize within: 5 % or: 0.2 °C
DO stabilize within: 10 % or: <0.5 mg/L
pH stabilize within: 0.1 pH units

WELL PURGING DATA:

Date Purged: 4/13 Time Start: 1335 Time Finish: 1535
Purge Method/Equipmen: Low Flow
Field Testing Equipment Used: Make Model Serial Number

DTW	Time	Temp. (°C)	Spec. Cond. (mS)	DO (mg/L)	pH (s.u.)	ORP (mV)	Turbidity (NTUs)	Color	Odor	Volume Removed (gal)
22.10	1335	20.8	336.1	5.90	7.15	141.1	73.2	clear	none	.2
22.25	1340	21.4	335.0	5.71	7.04	146.2	91.1			.4
22.60	1345	21.9	336.1	5.57	6.93	150.9	69.3			.5
23.85	1350	19.0	329.7	5.04	6.81	134.2	19.4			.7
25.05	1355	19.8	331.5	4.69	6.78	134.0	20.0			.9
26.40	1400	19.3	329.1	4.36	6.74	138.9	23.6			1.1
27.65	1405	19.3	330.1	4.33	6.73	139.0	15.3			1.5
28.60	1410	19.7	330.4	4.10	6.71	135.9	11.7			1.8
29.50	1415	19.9	330.9	3.90	6.69	132.5	12.2			2.2
30.90	1420	19.8	330.8	3.87	6.70	133.6	13.4			2.3
32.05	1425	19.5	329.8	4.29	6.71	131.3	14.4			2.8
	1430									2.5
	1435	Ran Dry, Lowered Pump								2.5
	1440									2.5
33.90	1445	20.7	434.2	6.50	7.18	92.4	30.1			2.6
34.60	1450	21.0	449.8	7.87	7.19	111.2	33.2			2.7
35.40	1455	21.3	461.3	8.15	7.19	128.4	24.6			2.8
35.60	1500	21.2	460.7	8.13	7.19	130.3	23.7			2.8
36.40	1505	21.9	467.9	8.12	7.19	144.7	17.7			2.9
36.55	1510	21.9	468.1	8.14	7.19	145.8	16.2			2.9
37.09	1515	22.2	472.4	8.11	7.19	151.3	14.8			3.0
37.28	1520	22.1	471.3	8.12	7.19	152.7	14.3			3.0
37.45	1525	21.9	458.4	7.82	7.11	159.6	10.8			3.1
37.50	1530	21.8	457.9	7.83	7.11	159.5	9.62			3.2
37.55	1535	21.8	458.3	7.82	7.12	154.6	8.21			3.2

Sample @ 1535

SMITH+GARDNER

Ground Water Sample Collection Record

Client:
Project Name/Number: Charah Brickhaven - Chatham-20-4
Site Location: Charah Brickhaven, Moncure-Flatwood Road
Weather Conditions:
Collector(s): Smith + Gardner, HDR

Well/Peizometer ID: MW-6

WATER LEVEL DATA: (measured from Top of Casing)

Total Well Depth (ft.): 27.93
Water Column Length (ft.): 22.18
Depth to Water (ft.): 5.75
Multiplication Factor: 3
Casing Diameter (in.): 2
One Well Volume (gals.): 3.7
Casing Material: PVC
Three Well Volumes (gals.): 11

ACCEPTANCE CRITERIA:

Min.required vols.purged: 3 Vols.
Max. allowable turbidity: 5 NTUs
Conductivity stabilize within: 3 %
Temperature stabilize within: 5 % or: 0.2 °C
DO stabilize within: 10 % or: <0.5 mg/L
pH stabilize within: 0.1 pH units

WELL PURGING DATA:

Date Purged: 4/15 Time Start: 1140 Time Finish: 1225
Purge Method/Equipmen: Low Flow

Field Testing Equipment Used: Make Model Serial Number

DTW	Time	Temp. (°C)	Spec. Cond. (mS)	DO (mg/L)	pH (s.u.)	ORP (mV)	Turbidity (NTUs)	Color	Odor	Volume Removed (gal)
5.75	1140	16.8	1138	0.79	6.53	178.5	79	clear	none	.1
6.20	1145	16.7	1124	0.82	6.55	152.1	54	clear	none	.2
6.60	1150	16.9	1126	0.55	6.45	145.6	32.6			.3
6.70	1155	17.0	1124	0.37	6.41	141.8	27.3			.4
6.72	1200	17.1	1122	0.29	6.36	137.2	21.6			.5
6.74	1205	17.0	1119	0.23	6.34	138.4	17.8			.6
6.74	1210	17.0	1117	0.17	6.31	139.3	12.3			.7
6.74	1215	17.1	1116	0.15	6.31	138.7	9.8			.9
6.74	1220	17.1	1116	0.15	6.31	139.1	4.5			1.2
	1225									
	1230									
	1235									
	1240									
	1245									
	1250									
	1255									
	1300									

Sample @ 1225

SMITH+GARDNER

Ground Water Sample Collection Record

Client:
Project Name/Number: Charah Brickhaven - Chatham-20-4
Site Location: Charah Brickhaven, Moncure-Flatwood Road
Weather Conditions:
Collector(s): Smith + Gardner, HDR

Well/Peizometer ID: MW-7R

WATER LEVEL DATA: (measured from Top of Casing)

Total Well Depth (ft.): 36.48
Water Column Length (ft.): 15.68
Depth to Water (ft.): 20.80
Multiplication Factor: 3
Casing Diameter (in.): 2
One Well Volume (gals.): 2.6
Casing Material: PVC
Three Well Volumes (gals.): 7.8

ACCEPTANCE CRITERIA:

Min.required vols.purged: 3 Vols.
Max. allowable turbidity: 5 NTUs
Conductivity stabilize within: 3 %
Temperature stabilize within: 5 % or: 0.2 °C
DO stabilize within: 10 % or: <0.5 mg/L
pH stabilize within: 0.1 pH units

WELL PURGING DATA:

Date Purged: 4/14 Time Start: 1240 Time Finish: 1445
Purge Method/Equipmen: Low Flow
Field Testing Equipment Used: Make Model Serial Number

Time	Temp. (°C)	Spec. Cond. (mS)	DO (mg/L)	pH (s.u.)	ORP (mV)	Turbidity (NTUs)	Color	Odor	Volume Removed (gal)
1240	20.7	1697	7.25	7.71	171.1	289	clear	none	.2
1245	20.7	1701	7.38	7.70	168.5	261			.3
1250	21.0	1707	6.79	7.55	167.9	256			.4
1255	21.2	1722	6.83	7.53	162.5	251			.5
1300	21.7	1703	6.60	7.52	126.5	205			.6
1305	21.8	1701	6.51	750	113.7	138			.8
1310	22.0	1697	6.43	7.49	101.3	76.2			1.0
1315	22.2	1695	6.33	7.48	98.4	74.1			1.1
1320	22.3	1692	6.13	7.48	96.5	73.8			1.2
1325	22.8	1691	6.04	7.47	96.1	62.4			1.3
1330	23.0	1690	5.96	7.47	95.5	57.0			1.5
1335	23.3	1690	5.82	7.46	96.3	60.1			1.6
1340	23.6	1690	5.77	7.45	97.0	64.2			1.7
1345	23.6	1715	5.44	7.44	102.6	58.1			1.8
1350	23.6	1731	5.30	7.44	104.5	63.1			1.9
1355	23.8	1732	5.06	7.43	108.1	59.7			1.9
1400	24.0	1732	4.88	7.42	110.1	57.3			2.0
1405	23.5	1723	4.90	7.42	114.8	56.1			2.1
1410	22.7	1715	4.92	7.42	116.5	44.6			2.2
1415	22.8	1713	4.85	7.41	118.1	37.0			2.3
1420	22.9	1710	4.78	7.40	120.6	33.2			2.4
1425	23.2	1707	4.61	7.39	119.3	32.5			2.5
1430	23.7	1702	4.53	7.39	117.6	29.9			2.6
1435	24.2	1703	4.38	7.38	117.5	34.4			2.7
1440	24.7	1704	4.25	7.38	117.3	22.6			2.8
1445									
1450	Water level Stable. Sample at 1445								
1455									
1500									
1505	Historically Runs Dry and gets								
1510									
1515									
1520	More Turbid.								
1525									

pH
22.70
22.95
23.40
23.70
24.18
24.65
24.95
25.26
25.65
25.90
26.05
26.24
26.47
26.60
26.70
26.80
26.78
27.00
27.28
27.38
27.50
27.62
27.74
27.85
27.95

~ 2

SMITH+GARDNER

Ground Water Sample Collection Record

Client:
Project Name/Number: Charah Brickhaven - Chatham-20-4
Site Location: Charah Brickhaven, Moncure-Flatwood Road
Weather Conditions:
Collector(s): Smith + Gardner, HDR

Well/Peizometer ID: MW-8

WATER LEVEL DATA: (measured from Top of Casing)

Total Well Depth (ft.): 49.68
Depth to Water (ft.): 34.45
Casing Diameter (in.): 2
Casing Material: PVC
Water Column Length (ft.): 15.23
Multiplication Factor: 3
One Well Volume (gals.): 2.54
Three Well Volumes (gals.): 7.6

ACCEPTANCE CRITERIA:

Min.required vols.purged: 3 Vols.
Max. allowable turbidity: 5 NTUs
Conductivity stabilize within: 3 %
Temperature stabilize within: 5 % or: 0.2 °C
DO stabilize within: 10 % or: <0.5 mg/L
pH stabilize within: 0.1 pH units

WELL PURGING DATA:

Date Purged: 4/15 Time Start: 1310 Time Finish: 1400
Purge Method/Equipmen: Low Flow
Field Testing Equipment Used: Make Model Serial Number

DTW	Time	Temp. (°C)	Spec. Cond. (mS)	DO (mg/L)	pH (s.u.)	ORP (mV)	Turbidity (NTUs)	Color	Odor	Volume Removed (gal)
34.45	1310	18.7	2941	3.77	6.95	225.4	67.3	clear	none	.1
34.95	1315	19.0	2982	3.65	6.91	218.5	30.1			.2
34.92	1320	19.3	2969	3.49	6.92	209.5	20.4			.3
35.00	1325	20.0	2964	3.47	6.91	194.6	13.52			.5
35.15	1330	20.1	2963	3.43	6.91	189.7	9.78			.7
34.98	1335	21.2	2961	3.37	6.92	168.8	8.26			.9
34.93	1340	21.8	2956	3.31	6.92	168.2	6.74			1.2
34.93	1345	21.7	2967	3.28	6.93	167.4	5.81			1.4
34.93	1350	21.7	2962	3.29	6.93	168.8	5.42			1.6
34.93	1355	21.7	2969	3.23	6.93	167.2	5.03			1.8
34.93	1400	21.6	2961	3.27	6.93	168.5	4.62			2.0
	1405									
	1410									
	1415									
	1420									
	1425									
	1430									
	1435									
	1440									
	1445									
	1450									
	1455									
	1500									
	1505									
	1510									

Sample at 1400

Thos

SMITH+GARDNER

Ground Water Sample Collection Record

Client:
Project Name/Number: Charah Brickhaven - Chatham-20-4
Site Location: Charah Brickhaven, Moncure-Flatwood Road
Weather Conditions:
Collector(s): Smith + Gardner, HDR

Well/Peizometer ID: MW-10

WATER LEVEL DATA: (measured from Top of Casing)

Total Well Depth (ft.): 49.41
Water Column Length (ft.): 3.98
Depth to Water (ft.): 45.93
Multiplication Factor: 3
Casing Diameter (in.): 2
One Well Volume (gals.): .7
Casing Material: PVC
Three Well Volumes (gals.): 2.0

ACCEPTANCE CRITERIA:

Min.required vols.purged: 3 Vols.
Max. allowable turbidity: 5 NTUs
Conductivity stabilize within: 3 %
Temperature stabilize within: 5 % or: 0.2 °C
DO stabilize within: 10 % or: <0.5 mg/L
pH stabilize within: 0.1 pH units

WELL PURGING DATA:

Date Purged: 4/15 Time Start: 1005 Time Finish:
Purge Method/Equipmen: Low Flow

Field Testing Equipment Used: Make Model Serial Number

DTW	Time	Temp. (°C)	Spec. Cond. (mS)	DO (mg/L)	pH (s.u.)	ORP (mV)	Turbidity (NTUs)	Color	Odor	Volume Removed (gal)
46.20	1005	18.2	628	3.92	7.12	-98.2	980	Brown	none	.1
46.35	1010	18.2	621	2.29	7.49	-104.9	935	Brown	none	.2
46.60	1015	18.3	621	3.05	7.53	-90.7	697	Brn	none	.3
46.80	1020	18.4	606	3.27	7.68	-80.8	342	Brown	none	.4
46.95	1025	18.7	602	3.93	7.82	-57.3	256	Brown	none	.5
47.15	1030	18.9	600	4.00	7.91	-29.5	112	clear	none	.6
47.40	1035	19.1	607	3.56	7.94	-10.8	42			.8
47.50	1040	19.2	611	2.96	7.95	4.1	61			1.0
47.70	1045	19.3	618	2.81	7.92	-0.8	53.7			1.2
47.85	1050	19.3	629	2.47	7.85	-25.3	38.2			1.5
48.00	1055	19.2	634	2.09	7.83	-45.1	37.6			1.7
48.15	1100	19.2	646	1.92	7.73	-71.5	35.4			1.9
48.40	1105	19.6	651	1.21	7.68	-93.7	95.6			2.3
48.75	1110	20.2	656	0.89	7.48	-108.2	123			2.4
Top of Pump	1115									
DRY	1120									
	1125									
	1130									
	1135									
	1140									
	1145									
	1150									

SMITH+GARDNER

Ground Water Sample Collection Record

Client:
Project Name/Number: Charah Brickhaven - Chatham-20-4
Site Location: Charah Brickhaven, Moncure-Flatwood Road
Weather Conditions:
Collector(s): Smith + Gardner, HDR

Well/Peizometer ID: MW-11

WATER LEVEL DATA: (measured from Top of Casing)

Total Well Depth (ft.): 43.53
Water Column Length (ft.): 35.03
Depth to Water (ft.): 8.50
Multiplication Factor: 3
Casing Diameter (in.): 2
One Well Volume (gals.): 5.8
Casing Material: PVC
Three Well Volumes (gals.): 17.5

ACCEPTANCE CRITERIA:

Min.required vols.purged: 3 Vols.
Max. allowable turbidity: 5 NTUs
Conductivity stabilize within: 3 %
Temperature stabilize within: 5 % or: 0.2 °C
DO stabilize within: 10 % or: <0.5 mg/L
pH stabilize within: 0.1 pH units

WELL PURGING DATA:

Date Purged: 4/13 Time Start: 1055 Time Finish: 1135
Purge Method/Equipmer: Low Flow
Field Testing Equipment Used: Make Model Serial Number

DTW	Time	Temp. (°C)	Spec. Cond. (mS)	DO (mg/L)	pH (s.u.)	ORP (mV)	Turbidity (NTUs)	Color	Odor	Volume Removed (gal)
10.72	1055	17.9	894	1.27	6.88	151.0	130	Clear	none	.1
11.00	1100	17.4	845	0.41	6.82	132.1	66.8			.3
11.50	1105	17.7	889	0.76	6.78	114.2	51.2			.4
11.50	1110	17.8	891	0.73	6.78	110.6	44.6			.5
12.00	1115	18.0	869	0.80	6.75	93.2	25.4			.6
12.10	1120	18.0	870	0.81	6.75	91.6	22.1			.7
12.35	1125	18.8	838	0.94	6.69	85.4	12.0			.8
12.45	1130	18.4	828	0.99	6.66	85.2	8.1			.9
12.60	1135	18.4	828	0.99	6.66	85.1	5.2			1.0
	1140									
	1145									
	1150									
	1155									

Sample at 1135

SMITH+GARDNER

Ground Water Sample Collection Record

Client:
Project Name/Number: Charah Brickhaven - Chatham-20-4
Site Location: Charah Brickhaven, Moncure-Flatwood Road
Weather Conditions:
Collector(s): Smith + Gardner, HDR

Well/Peizometer ID: MW-11D

WATER LEVEL DATA: (measured from Top of Casing)

Total Well Depth (ft.): 68.18
Water Column Length (ft.): 63.02
Depth to Water (ft.): 5.16
Multiplication Factor: 3
Casing Diameter (in.): 2
One Well Volume (gals.): 10.5
Casing Material: PVC
Three Well Volumes (gals.): 31.51

ACCEPTANCE CRITERIA:

Min.required vols.purged: 3 Vols.
Max. allowable turbidity: 5 NTUs
Conductivity stabilize within: 3 %
Temperature stabilize within: 5 % or: 0.2 °C
DO stabilize within: 10 % or: <0.5 mg/L
pH stabilize within: 0.1 pH units

WELL PURGING DATA:

Date Purged: 4/13 Time Start: 1200 Time Finish:
Purge Method/Equipmen: Low Flow
Field Testing Equipment Used: Make Model Serial Number

DTW	Time	Temp. (°C)	Spec. Cond. (mS)	DO (mg/L)	pH (s.u.)	ORP (mV)	Turbidity (NTUs)	Color	Odor	Volume Removed (gal)
6.90	1200	17.7	3489	5.23	8.86	134.0	48.3	clear	none	.1
7.20	1205	17.5	3223	4.77	8.89	123.1	57.0			.3
7.75	1210	17.5	4432	4.35	8.93	113.4	23.2			.5
8.20	1215	17.6	4263	1.41	8.95	98.0	26.8			.6
8.50	1220	17.7	3924	1.08	8.94	87.9	26.3			.8
8.65	1225	17.6	3880	1.01	8.94	83.0	26.5			1.0
8.90	1230	17.7	3281	0.97	8.92	72.0	28.5			1.3
9.00	1235	17.7	3279	0.95	8.93	71.1	21.8			1.5
9.15	1240	13.0	2812	0.95	8.90	58.3	13.4			1.7
9.20	1245	18.0	2717	0.96	8.89	56.2	9.7			1.9
9.30	1250	17.8	2497	0.96	8.89	49.2	7.4			2.2
9.35	1255	17.8	2499	0.96	8.89	49.1	4.6			2.5
	1300									

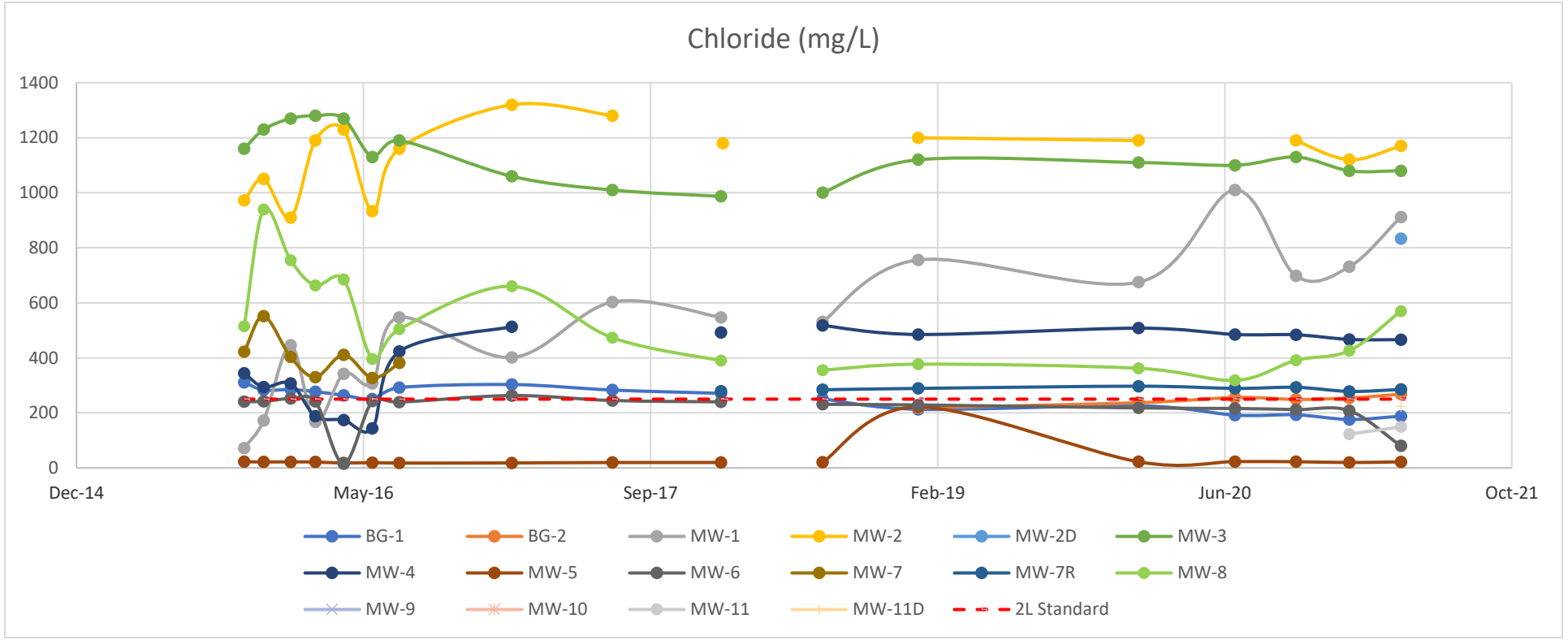
Sample at 1255

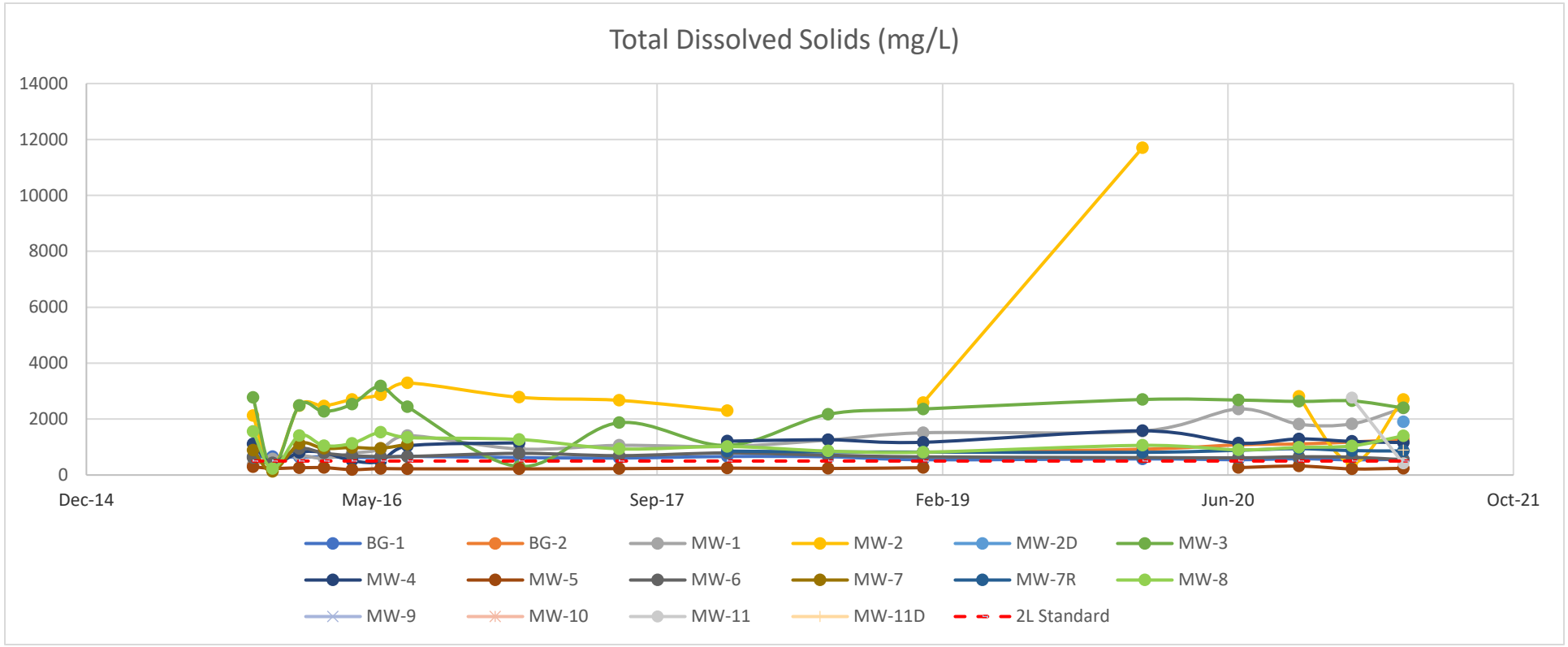
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C

Appendix C – Concentration vs. Time Plots

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Chloride (mg/L)
1400
1200
1000
800
600
400
200
0
Dec-14
May-16
Sep-17
Feb-19
Jun-20
Oct-21
BG-1
BG-2
MW-1
MW-2
MW-2D
MW-3
MW-4
MW-5
MW-6
MW-7
MW-7R
MW-8
MW-9
MW-10
MW-11
MW-11D
2L Standard


Total Dissolved Solids (mg/L)
14000
12000
10000
8000
6000
4000
2000
0
Dec-14
May-16
Sep-17
Feb-19
Jun-20
Oct-21
BG-1
BG-2
MW-1
MW-2
MW-2D
MW-3
MW-4
MW-5
MW-6
MW-7
MW-7R
MW-8
MW-9
MW-10
MW-11
MW-11D
2L Standard

D

Appendix D – Laboratory Reports, Chains of Custody, & Quality Control Data

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Pace Analytical Services, LLC
9800 Kincey Ave. Suite 100
Huntersville, NC 28078
(704)875-9092

February 19, 2021

Mark Filardi
HDR
440 S. Church St
Suite 900
Charlotte, NC 28202

RE: Project: CHARAH GROUNDWATER
Pace Project No.: 92519357

Dear Mark Filardi:

Enclosed are the analytical results for sample(s) received by the laboratory on January 29, 2021. The results relate only to the samples included in this report. Results reported herein conform to the applicable TNI/NELAC Standards and the laboratory's Quality Manual, where applicable, unless otherwise noted in the body of the report.

The test results provided in this final report were generated by each of the following laboratories within the Pace Network:

- Pace Analytical Services - Asheville
- Pace Analytical Services - Greensburg

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Kevin Herring
kevin.herring@pacelabs.com
1(704)875-9092
HORIZON Database Administrator

Enclosures

cc: Charles Gruenberg
Mike Plummer, HDR
Jacob Ruffing

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CERTIFICATIONS

Project: CHARAH GROUNDWATER
Pace Project No.: 92519357

Pace Analytical Services Pennsylvania
1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601
ANAB DOD-ELAP Rad Accreditation #: L2417
Alabama Certification #: 41590
Arizona Certification #: AZ0734
Arkansas Certification
California Certification #: 04222CA
Colorado Certification #: PA01547
Connecticut Certification #: PH-0694
Delaware Certification
EPA Region 4 DW Rad
Florida/TNI Certification #: E87683
Georgia Certification #: C040
Guam Certification
Florida: Cert E871149 SEKS WET
Hawaii Certification
Idaho Certification
Illinois Certification
Indiana Certification
Iowa Certification #: 391
Kansas/TNI Certification #: E-10358
Kentucky Certification #: KY90133
KY WW Permit #: KY0098221
KY WW Permit #: KY0000221
Louisiana DHH/TNI Certification #: LA180012
Louisiana DEQ/TNI Certification #: 4086
Maine Certification #: 2017020
Maryland Certification #: 308
Massachusetts Certification #: M-PA1457
Michigan/PADEP Certification #: 9991
Missouri Certification #: 235
Montana Certification #: Cert0082
Nebraska Certification #: NE-OS-29-14
Nevada Certification #: PA014572018-1
New Hampshire/TNI Certification #: 297617
New Jersey/TNI Certification #: PA051
New Mexico Certification #: PA01457
New York/TNI Certification #: 10888
North Carolina Certification #: 42706
North Dakota Certification #: R-190
Ohio EPA Rad Approval: #41249
Oregon/TNI Certification #: PA200002-010
Pennsylvania/TNI Certification #: 65-00282
Puerto Rico Certification #: PA01457
Rhode Island Certification #: 65-00282
South Dakota Certification
Tennessee Certification #: 02867
Texas/TNI Certification #: T104704188-17-3
Utah/TNI Certification #: PA014572017-9
USDA Soil Permit #: P330-17-00091
Vermont Dept. of Health: ID# VT-0282
Virgin Island/PADEP Certification
Virginia/VELAP Certification #: 9526
Washington Certification #: C868
West Virginia DEP Certification #: 143
West Virginia DHHR Certification #: 9964C
Wisconsin Approve List for Rad
Wyoming Certification #: 8TMS-L

Pace Analytical Services Asheville
2225 Riverside Drive, Asheville, NC 28804
Florida/NELAP Certification #: E87648
North Carolina Drinking Water Certification #: 37712
North Carolina Wastewater Certification #: 40
South Carolina Certification #: 99030001
Virginia/VELAP Certification #: 460222

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SAMPLE SUMMARY

Project: CHARAH GROUNDWATER
Pace Project No.: 92519357

Lab ID	Sample ID	Matrix	Date Collected	Date Received
92519357001	**BG-1**	Water	01/26/21 13:52	01/29/21 13:40
92519357002	**BG-2**	Water	01/26/21 16:35	01/29/21 13:40
92519357003	**MW-1**	Water	01/28/21 14:20	01/29/21 13:40
92519357004	**MW-2**	Water	01/28/21 11:28	01/29/21 13:40
92519357005	**MW-3**	Water	01/28/21 08:55	01/29/21 13:40
92519357006	**MW-4**	Water	01/27/21 13:15	01/29/21 13:40
92519357007	**MW-5**	Water	01/25/21 13:25	01/29/21 13:40
92519357008	**MW-6**	Water	01/25/21 16:25	01/29/21 13:40
92519357009	**MW-7R**	Water	01/26/21 09:45	01/29/21 13:40
92519357010	**MW-8**	Water	01/27/21 09:58	01/29/21 13:40
92519357011	**SW-1**	Water	01/27/21 14:00	01/29/21 13:40
92519357012	**SW-2**	Water	01/27/21 14:25	01/29/21 13:40
92519357013	**LEACHATE**	Water	01/26/21 10:20	01/29/21 13:40
92519357014	**DUP**	Water	01/25/21 16:25	01/29/21 13:40
92519357015	**EQBL**	Water	01/28/21 15:10	01/29/21 13:40

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SAMPLE ANALYTE COUNT

Project: CHARAH GROUNDWATER
Pace Project No.: 92519357

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
92519357001	**BG-1**	EPA 6010D	KQ, RDT	16	PASI-A
		EPA 6020B	JOR	3	PASI-A
		EPA 7470A	SOO	1	PASI-A
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
		SM 2540C-2011	RED	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	3	PASI-A
92519357002	**BG-2**	EPA 6010D	KQ, RDT	16	PASI-A
		EPA 6020B	JOR	3	PASI-A
		EPA 7470A	SOO	1	PASI-A
		EPA 903.1	VAL	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
		SM 2540C-2011	RED	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	3	PASI-A
92519357003	**MW-1**	EPA 6010D	KQ, RDT	16	PASI-A
		EPA 6020B	JOR	3	PASI-A
		EPA 7470A	SOO	1	PASI-A
		EPA 903.1	VAL	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
		SM 2540C-2011	RED	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	3	PASI-A
92519357004	**MW-2**	EPA 6010D	KQ, RDT	16	PASI-A
		EPA 6020B	JOR	3	PASI-A
		EPA 7470A	SOO	1	PASI-A
		EPA 903.1	VAL	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
		SM 2540C-2011	RED	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	3	PASI-A
92519357005	**MW-3**	EPA 6010D	KQ, RDT	16	PASI-A
		EPA 6020B	JOR	3	PASI-A
		EPA 7470A	SOO	1	PASI-A
		EPA 903.1	VAL	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA

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SAMPLE ANALYTE COUNT

Project: CHARAH GROUNDWATER
Pace Project No.: 92519357

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		Total Radium Calculation	CMC	1	PASI-PA
		SM 2540C-2011	RED	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	3	PASI-A
92519357006	**MW-4**	EPA 6010D	KQ, RDT	16	PASI-A
		EPA 6020B	JOR	3	PASI-A
		EPA 7470A	SOO	1	PASI-A
		EPA 903.1	VAL	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
		SM 2540C-2011	RED	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	3	PASI-A
92519357007	**MW-5**	EPA 6010D	KQ, RDT	16	PASI-A
		EPA 6020B	JOR	3	PASI-A
		EPA 7470A	SOO	1	PASI-A
		EPA 903.1	VAL	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
		SM 2540C-2011	RED	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	3	PASI-A
92519357008	**MW-6**	EPA 6010D	KQ, RDT	16	PASI-A
		EPA 6020B	JOR	3	PASI-A
		EPA 7470A	SOO	1	PASI-A
		EPA 903.1	VAL	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
		SM 2540C-2011	RED	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	3	PASI-A
92519357009	**MW-7R**	EPA 6010D	KQ, RDT	16	PASI-A
		EPA 6020B	JOR	3	PASI-A
		EPA 7470A	SOO	1	PASI-A
		EPA 903.1	VAL	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
		SM 2540C-2011	RED	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	3	PASI-A
92519357010	**MW-8**	EPA 6010D	KQ, RDT	16	PASI-A
		EPA 6020B	JOR	3	PASI-A

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SAMPLE ANALYTE COUNT

Project: CHARAH GROUNDWATER
Pace Project No.: 92519357

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		EPA 7470A	SOO	1	PASI-A
		EPA 903.1	VAL	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
		SM 2540C-2011	RED	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	3	PASI-A
92519357011	**SW-1**	EPA 6010D	KQ, RDT	16	PASI-A
		EPA 6020B	JOR	3	PASI-A
		EPA 7470A	SOO	1	PASI-A
		EPA 903.1	VAL	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
		SM 2540C-2011	RED	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	3	PASI-A
92519357012	**SW-2**	EPA 6010D	KQ, RDT	16	PASI-A
		EPA 6020B	JOR	3	PASI-A
		EPA 7470A	SOO	1	PASI-A
		EPA 903.1	VAL	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
		SM 2540C-2011	RED	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	3	PASI-A
92519357013	**LEACHATE**	EPA 6010D	KQ, RDT	16	PASI-A
		EPA 6020B	JOR	3	PASI-A
		EPA 7470A	SOO	1	PASI-A
		EPA 903.1	VAL	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
		SM 2540C-2011	RED	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	3	PASI-A
92519357014	**DUP**	EPA 6010D	KQ, RDT	16	PASI-A
		EPA 6020B	JOR	3	PASI-A
		EPA 7470A	SOO	1	PASI-A
		EPA 903.1	VAL	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
		SM 2540C-2011	RED	1	PASI-A

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(704)875-9092

SAMPLE ANALYTE COUNT

Project: CHARAH GROUNDWATER
Pace Project No.: 92519357

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		EPA 300.0 Rev 2.1 1993	CDC	3	PASI-A
92519357015	**EQBL**	EPA 6010D	KQ, RDT	16	PASI-A
		EPA 6020B	JOR	3	PASI-A
		EPA 7470A	SOO	1	PASI-A
		EPA 903.1	VAL	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
		SM 2540C-2011	RED	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	3	PASI-A

PASI-A = Pace Analytical Services - Asheville
PASI-PA = Pace Analytical Services - Greensburg

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Huntersville, NC 28078
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SUMMARY OF DETECTION

Project: CHARAH GROUNDWATER
Pace Project No.: 92519357

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92519357001	**BG-1**					
EPA 6010D	Barium	249	ug/L	5.0	01/31/21 19:23	
EPA 6010D	Cadmium	0.40J	ug/L	1.0	01/31/21 19:23	
EPA 6010D	Calcium	20300	ug/L	100	01/31/21 19:23	
EPA 6010D	Vanadium	6.8	ug/L	5.0	01/31/21 19:23	
EPA 6020B	Boron	7.7J	ug/L	25.0	02/02/21 16:55	
EPA 6020B	Lithium	15.9	ug/L	2.5	02/02/21 16:55	
EPA 7470A	Mercury	0.14J	ug/L	0.20	02/04/21 14:07	
EPA 903.1	Radium-226	0.0781 ± 0.357 (0.725) C:NA T:87%	pCi/L		02/10/21 15:15	
EPA 904.0	Radium-228	0.330 ± 0.318 (0.651) C:77% T:90%	pCi/L		02/10/21 14:30	
Total Radium Calculation	Total Radium	0.408 ± 0.675 (1.38)	pCi/L		02/17/21 13:48	
SM 2540C-2011	Total Dissolved Solids	544	mg/L	50.0	01/29/21 18:34	
EPA 300.0 Rev 2.1 1993	Chloride	176	mg/L	4.0	02/02/21 08:59	
EPA 300.0 Rev 2.1 1993	Fluoride	0.18	mg/L	0.10	02/02/21 03:27	
EPA 300.0 Rev 2.1 1993	Sulfate	22.5	mg/L	1.0	02/02/21 03:27	
92519357002	**BG-2**					
EPA 6010D	Barium	59.1	ug/L	5.0	01/31/21 19:33	
EPA 6010D	Calcium	101000	ug/L	1000	02/01/21 21:14	
EPA 903.1	Radium-226	0.000 ± 0.284 (0.458) C:NA T:93%	pCi/L		02/11/21 15:52	
EPA 904.0	Radium-228	0.673 ± 0.469 (0.911) C:71% T:81%	pCi/L		02/11/21 14:33	
Total Radium Calculation	Total Radium	0.673 ± 0.753 (1.37)	pCi/L		02/17/21 13:48	
SM 2540C-2011	Total Dissolved Solids	1180	mg/L	125	01/29/21 18:34	
EPA 300.0 Rev 2.1 1993	Chloride	254	mg/L	6.0	02/02/21 09:14	
EPA 300.0 Rev 2.1 1993	Fluoride	0.23	mg/L	0.10	02/02/21 03:42	
EPA 300.0 Rev 2.1 1993	Sulfate	162	mg/L	6.0	02/02/21 09:14	
92519357003	**MW-1**					
EPA 6010D	Barium	218	ug/L	5.0	01/31/21 19:36	
EPA 6010D	Cadmium	0.57J	ug/L	1.0	01/31/21 19:36	
EPA 6010D	Calcium	185000	ug/L	1000	02/01/21 21:17	
EPA 6020B	Boron	8.3J	ug/L	25.0	02/02/21 17:03	
EPA 6020B	Lithium	31.0	ug/L	2.5	02/02/21 17:03	

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SUMMARY OF DETECTION

Project: CHARAH GROUNDWATER
Pace Project No.: 92519357

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92519357003	**MW-1**					
EPA 903.1	Radium-226	0.240 ± 0.373 (0.645) C:NA T:96%	pCi/L		02/11/21 15:52	
EPA 904.0	Radium-228	0.841 ± 0.462 (0.844) C:73% T:84%	pCi/L		02/11/21 14:32	
Total Radium Calculation	Total Radium	1.08 ± 0.835 (1.49)	pCi/L		02/17/21 13:48	
SM 2540C-2011	Total Dissolved Solids	1830	mg/L	250	02/02/21 18:47	
EPA 300.0 Rev 2.1 1993	Chloride	731	mg/L	16.0	02/02/21 09:57	
EPA 300.0 Rev 2.1 1993	Fluoride	0.13	mg/L	0.10	02/02/21 03:56	
EPA 300.0 Rev 2.1 1993	Sulfate	6.4	mg/L	1.0	02/02/21 03:56	
92519357004	**MW-2**					
EPA 6010D	Barium	275	ug/L	5.0	01/31/21 19:39	
EPA 6010D	Cadmium	0.48J	ug/L	1.0	01/31/21 19:39	
EPA 6010D	Calcium	183000	ug/L	1000	02/01/21 21:26	
EPA 6010D	Molybdenum	6.8	ug/L	5.0	01/31/21 19:39	
EPA 6020B	Boron	46.6	ug/L	25.0	02/02/21 17:07	
EPA 6020B	Lithium	129	ug/L	25.0	02/03/21 11:17	
EPA 903.1	Radium-226	0.410 ± 0.384 (0.544) C:NA T:96%	pCi/L		02/11/21 15:52	
EPA 904.0	Radium-228	0.881 ± 0.444 (0.778) C:74% T:87%	pCi/L		02/11/21 14:32	
Total Radium Calculation	Total Radium	1.29 ± 0.828 (1.32)	pCi/L		02/17/21 13:48	
SM 2540C-2011	Total Dissolved Solids	428	mg/L	25.0	02/02/21 18:47	
EPA 300.0 Rev 2.1 1993	Chloride	1120	mg/L	25.0	02/02/21 10:11	
EPA 300.0 Rev 2.1 1993	Fluoride	0.14	mg/L	0.10	02/02/21 04:11	
EPA 300.0 Rev 2.1 1993	Sulfate	94.0	mg/L	1.0	02/02/21 04:11	
92519357005	**MW-3**					
EPA 6010D	Barium	599	ug/L	5.0	01/31/21 19:42	
EPA 6010D	Calcium	178000	ug/L	1000	02/01/21 21:29	
EPA 6010D	Molybdenum	7.3	ug/L	5.0	01/31/21 19:42	
EPA 903.1	Radium-226	1.02 ± 0.679 (0.842) C:NA T:83%	pCi/L		02/11/21 15:52	

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SUMMARY OF DETECTION

Project: CHARAH GROUNDWATER
Pace Project No.: 92519357

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92519357005	**MW-3**					
EPA 904.0	Radium-228	1.28 ± 0.510 (0.815) C:73% T:92%	pCi/L		02/11/21 14:35	
Total Radium Calculation	Total Radium	2.30 ± 1.19 (1.66)	pCi/L		02/17/21 13:48	
SM 2540C-2011	Total Dissolved Solids	2650	mg/L	250	02/02/21 18:47	
EPA 300.0 Rev 2.1 1993	Chloride	1080	mg/L	25.0	02/02/21 10:25	
EPA 300.0 Rev 2.1 1993	Fluoride	0.25	mg/L	0.10	02/02/21 04:25	M1
EPA 300.0 Rev 2.1 1993	Sulfate	27.5	mg/L	1.0	02/02/21 04:25	
92519357006	**MW-4**					
EPA 6010D	Antimony	3.1J	ug/L	5.0	01/31/21 19:45	
EPA 6010D	Barium	316	ug/L	5.0	01/31/21 19:45	
EPA 6010D	Calcium	60700	ug/L	100	01/31/21 19:45	
EPA 6010D	Nickel	7.4	ug/L	5.0	01/31/21 19:45	
EPA 6020B	Boron	7.4J	ug/L	25.0	02/02/21 17:15	
EPA 6020B	Lithium	28.9	ug/L	2.5	02/02/21 17:15	
EPA 903.1	Radium-226	0.0618 ± 0.320 (0.665) C:NA T:93%	pCi/L		02/11/21 15:52	
EPA 904.0	Radium-228	0.465 ± 0.380 (0.758) C:73% T:86%	pCi/L		02/11/21 14:35	
Total Radium Calculation	Total Radium	0.527 ± 0.700 (1.42)	pCi/L		02/17/21 13:48	
SM 2540C-2011	Total Dissolved Solids	1200	mg/L	125	02/01/21 18:51	
EPA 300.0 Rev 2.1 1993	Chloride	467	mg/L	10.0	02/02/21 11:07	
EPA 300.0 Rev 2.1 1993	Fluoride	0.26	mg/L	0.10	02/02/21 05:08	
EPA 300.0 Rev 2.1 1993	Sulfate	10.4	mg/L	1.0	02/02/21 05:08	
92519357007	**MW-5**					
EPA 6010D	Antimony	3.9J	ug/L	5.0	01/31/21 19:48	
EPA 6010D	Barium	92.0	ug/L	5.0	01/31/21 19:48	
EPA 6010D	Calcium	9040	ug/L	100	01/31/21 19:48	
EPA 6020B	Boron	11.1J	ug/L	25.0	02/02/21 17:19	
EPA 6020B	Lithium	10.6	ug/L	2.5	02/02/21 17:19	
EPA 903.1	Radium-226	-0.138 ± 0.316 (0.744) C:NA T:99%	pCi/L		02/11/21 15:52	
EPA 904.0	Radium-228	1.02 ± 0.549 (0.992) C:64% T:83%	pCi/L		02/11/21 14:35	

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SUMMARY OF DETECTION

Project: CHARAH GROUNDWATER
Pace Project No.: 92519357

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92519357007	**MW-5**					
Total Radium Calculation	Total Radium	1.02 ± 0.865 (1.74)	pCi/L		02/17/21 13:48	
SM 2540C-2011	Total Dissolved Solids	218	mg/L	25.0	01/29/21 18:33	
EPA 300.0 Rev 2.1 1993	Chloride	19.6	mg/L	1.0	02/02/21 05:23	
EPA 300.0 Rev 2.1 1993	Fluoride	0.51	mg/L	0.10	02/02/21 05:23	
EPA 300.0 Rev 2.1 1993	Sulfate	3.4	mg/L	1.0	02/02/21 05:23	
92519357008	**MW-6**					
EPA 6010D	Barium	57.8	ug/L	5.0	01/31/21 19:51	
EPA 6010D	Calcium	34300	ug/L	100	01/31/21 19:51	
EPA 6020B	Boron	9.0J	ug/L	25.0	02/02/21 17:23	
EPA 6020B	Lithium	28.5	ug/L	2.5	02/02/21 17:23	
EPA 903.1	Radium-226	-0.199 ± 0.345 (0.869) C:NA T:90%	pCi/L		02/11/21 15:52	
EPA 904.0	Radium-228	0.297 ± 0.447 (0.965) C:69% T:89%	pCi/L		02/11/21 14:35	
Total Radium Calculation	Total Radium	0.297 ± 0.792 (1.83)	pCi/L		02/17/21 13:48	
SM 2540C-2011	Total Dissolved Solids	638	mg/L	50.0	01/29/21 18:33	
EPA 300.0 Rev 2.1 1993	Chloride	208	mg/L	4.0	02/02/21 11:22	
EPA 300.0 Rev 2.1 1993	Fluoride	0.34	mg/L	0.10	02/02/21 05:37	
EPA 300.0 Rev 2.1 1993	Sulfate	25.6	mg/L	1.0	02/02/21 05:37	
92519357009	**MW-7R**					
EPA 6010D	Barium	285	ug/L	5.0	01/31/21 19:54	
EPA 6010D	Calcium	86600	ug/L	100	01/31/21 19:54	
EPA 6020B	Boron	12.8J	ug/L	25.0	02/02/21 17:35	
EPA 6020B	Lithium	31.0	ug/L	2.5	02/02/21 17:35	
EPA 903.1	Radium-226	-0.0709 ± 0.324 (0.658) C:NA T:82%	pCi/L		02/11/21 16:07	
EPA 904.0	Radium-228	0.339 ± 0.419 (0.891) C:70% T:91%	pCi/L		02/11/21 14:35	
Total Radium Calculation	Total Radium	0.339 ± 0.743 (1.55)	pCi/L		02/17/21 13:48	
SM 2540C-2011	Total Dissolved Solids	872	mg/L	50.0	01/29/21 18:34	
EPA 300.0 Rev 2.1 1993	Chloride	278	mg/L	6.0	02/02/21 11:36	
EPA 300.0 Rev 2.1 1993	Fluoride	0.10	mg/L	0.10	02/02/21 06:35	
EPA 300.0 Rev 2.1 1993	Sulfate	15.1	mg/L	1.0	02/02/21 06:35	

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SUMMARY OF DETECTION

Project: CHARAH GROUNDWATER
Pace Project No.: 92519357

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92519357010	**MW-8**					
EPA 6010D	Barium	1060	ug/L	5.0	01/31/21 19:58	
EPA 6010D	Calcium	4170	ug/L	1000	02/01/21 21:33	
EPA 6010D	Chromium	5.7	ug/L	5.0	01/31/21 19:58	
EPA 6010D	Nickel	3.5J	ug/L	5.0	01/31/21 19:58	
EPA 6020B	Boron	14.0J	ug/L	25.0	02/02/21 17:39	
EPA 6020B	Lithium	33.4	ug/L	2.5	02/02/21 17:39	
EPA 903.1	Radium-226	0.261 ± 0.299 (0.177) C:NA T:91%	pCi/L		02/11/21 16:07	
EPA 904.0	Radium-228	0.555 ± 0.422 (0.835) C:74% T:85%	pCi/L		02/11/21 14:35	
Total Radium Calculation	Total Radium	0.816 ± 0.721 (1.01)	pCi/L		02/17/21 13:48	
SM 2540C-2011	Total Dissolved Solids	1040	mg/L	125	02/01/21 18:51	
EPA 300.0 Rev 2.1 1993	Chloride	426	mg/L	9.0	02/02/21 11:50	
EPA 300.0 Rev 2.1 1993	Fluoride	0.061J	mg/L	0.10	02/02/21 06:50	
EPA 300.0 Rev 2.1 1993	Sulfate	6.4	mg/L	1.0	02/02/21 06:50	
92519357011	**SW-1**					
EPA 6010D	Arsenic	9.4J	ug/L	10.0	02/01/21 20:55	
EPA 6010D	Barium	341	ug/L	5.0	01/31/21 20:01	
EPA 6010D	Calcium	3710	ug/L	100	01/31/21 20:01	
EPA 6010D	Chromium	8.9	ug/L	5.0	01/31/21 20:01	
EPA 6010D	Cobalt	5.7	ug/L	5.0	01/31/21 20:01	
EPA 6010D	Copper	9.2	ug/L	5.0	01/31/21 20:01	
EPA 6010D	Lead	25.5	ug/L	5.0	02/01/21 20:55	
EPA 6010D	Nickel	5.6	ug/L	5.0	01/31/21 20:01	
EPA 6010D	Vanadium	39.2	ug/L	5.0	01/31/21 20:01	
EPA 6010D	Zinc	41.8	ug/L	10.0	01/31/21 20:01	
EPA 6020B	Boron	10.3J	ug/L	25.0	02/02/21 17:43	
EPA 6020B	Lithium	5.3	ug/L	2.5	02/02/21 17:43	
EPA 6020B	Thallium	0.099J	ug/L	0.10	02/02/21 17:43	
EPA 903.1	Radium-226	0.579 ± 1.32 (0.784) C:NA T:53%	pCi/L		02/11/21 16:07	
EPA 904.0	Radium-228	1.81 ± 1.05 (1.95) C:63% T:55%	pCi/L		02/11/21 14:35	
Total Radium Calculation	Total Radium	2.39 ± 2.37 (2.73)	pCi/L		02/17/21 13:48	
SM 2540C-2011	Total Dissolved Solids	709	mg/L	25.0	02/01/21 18:51	
EPA 300.0 Rev 2.1 1993	Chloride	5.2	mg/L	1.0	02/02/21 07:04	
EPA 300.0 Rev 2.1 1993	Fluoride	0.16	mg/L	0.10	02/02/21 07:04	
EPA 300.0 Rev 2.1 1993	Sulfate	2.1	mg/L	1.0	02/02/21 07:04	

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SUMMARY OF DETECTION

Project: CHARAH GROUNDWATER
Pace Project No.: 92519357

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92519357012	**SW-2**					
EPA 6010D	Barium	42.2	ug/L	5.0	01/31/21 20:16	
EPA 6010D	Calcium	14900	ug/L	100	01/31/21 20:16	
EPA 6020B	Boron	11.9J	ug/L	25.0	02/02/21 17:48	
EPA 6020B	Lithium	1.6J	ug/L	2.5	02/02/21 17:48	
EPA 903.1	Radium-226	0.000 ± 0.442 (0.935) C:NA T:82%	pCi/L		02/11/21 16:07	
EPA 904.0	Radium-228	-0.210 ± 0.407 (0.982) C:74% T:79%	pCi/L		02/11/21 14:35	
Total Radium Calculation	Total Radium	0.000 ± 0.849 (1.92)	pCi/L		02/17/21 13:48	
SM 2540C-2011	Total Dissolved Solids	150	mg/L	25.0	02/01/21 18:51	
EPA 300.0 Rev 2.1 1993	Chloride	18.9	mg/L	1.0	02/02/21 07:19	
EPA 300.0 Rev 2.1 1993	Fluoride	0.11	mg/L	0.10	02/02/21 07:19	
EPA 300.0 Rev 2.1 1993	Sulfate	10.8	mg/L	1.0	02/02/21 07:19	
92519357013	**LEACHATE**					
EPA 6010D	Arsenic	20.3	ug/L	10.0	01/31/21 20:19	
EPA 6010D	Barium	63.2	ug/L	5.0	01/31/21 20:19	
EPA 6010D	Cadmium	0.44J	ug/L	1.0	01/31/21 20:19	
EPA 6010D	Calcium	330000	ug/L	1000	02/01/21 21:36	
EPA 6010D	Molybdenum	220	ug/L	5.0	01/31/21 20:19	
EPA 6010D	Nickel	5.0J	ug/L	5.0	01/31/21 20:19	
EPA 6010D	Zinc	9.6J	ug/L	10.0	01/31/21 20:19	
EPA 6020B	Boron	3680	ug/L	1250	02/02/21 17:52	
EPA 6020B	Lithium	54.6	ug/L	2.5	02/02/21 01:38	
EPA 6020B	Thallium	0.18	ug/L	0.10	02/02/21 01:38	
EPA 903.1	Radium-226	0.143 ± 0.343 (0.663) C:NA T:86%	pCi/L		02/11/21 16:07	
EPA 904.0	Radium-228	0.700 ± 0.435 (0.824) C:75% T:87%	pCi/L		02/11/21 14:35	
Total Radium Calculation	Total Radium	0.843 ± 0.778 (1.49)	pCi/L		02/17/21 13:48	
SM 2540C-2011	Total Dissolved Solids	1590	mg/L	125	01/29/21 18:34	
EPA 300.0 Rev 2.1 1993	Chloride	18.8	mg/L	1.0	02/02/21 07:33	
EPA 300.0 Rev 2.1 1993	Fluoride	0.24	mg/L	0.10	02/02/21 07:33	
EPA 300.0 Rev 2.1 1993	Sulfate	556	mg/L	12.0	02/02/21 12:04	
92519357014	**DUP**					
EPA 6010D	Barium	57.2	ug/L	5.0	01/31/21 20:22	
EPA 6010D	Calcium	32800	ug/L	100	01/31/21 20:22	

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SUMMARY OF DETECTION

Project: CHARAH GROUNDWATER
Pace Project No.: 92519357

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92519357014	**DUP**					
EPA 6020B	Lithium	26.8	ug/L	2.5	02/02/21 01:42	
EPA 903.1	Radium-226	-0.216 ± 0.374 (0.943) C:NA T:84%	pCi/L		02/11/21 16:07	
EPA 904.0	Radium-228	0.185 ± 0.389 (0.861) C:73% T:78%	pCi/L		02/11/21 14:36	
Total Radium Calculation	Total Radium	0.185 ± 0.763 (1.80)	pCi/L		02/18/21 09:43	
SM 2540C-2011	Total Dissolved Solids	654	mg/L	50.0	01/29/21 18:33	
EPA 300.0 Rev 2.1 1993	Chloride	211	mg/L	4.0	02/02/21 12:47	
EPA 300.0 Rev 2.1 1993	Fluoride	0.33	mg/L	0.10	02/02/21 07:47	
EPA 300.0 Rev 2.1 1993	Sulfate	25.5	mg/L	1.0	02/02/21 07:47	
92519357015	**EQBL**					
EPA 903.1	Radium-226	0.135 ± 0.528 (1.01) C:NA T:90%	pCi/L		02/11/21 16:07	
EPA 904.0	Radium-228	0.284 ± 0.386 (0.827) C:74% T:87%	pCi/L		02/11/21 14:36	
Total Radium Calculation	Total Radium	0.419 ± 0.914 (1.84)	pCi/L		02/18/21 09:43	

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ANALYTICAL RESULTS

Project: CHARAH GROUNDWATER
Pace Project No.: 92519357

Sample: BG-1 **Lab ID: 92519357001** Collected: 01/26/21 13:52 Received: 01/29/21 13:40 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Antimony	ND	ug/L	5.0	3.0	1	01/30/21 01:46	01/31/21 19:23	7440-36-0	
Arsenic	ND	ug/L	10.0	4.7	1	01/30/21 01:46	02/01/21 20:16	7440-38-2	
Barium	**249**	ug/L	5.0	3.5	1	01/30/21 01:46	01/31/21 19:23	7440-39-3	
Beryllium	ND	ug/L	1.0	0.70	1	01/30/21 01:46	01/31/21 19:23	7440-41-7	
Cadmium	**0.40J**	ug/L	1.0	0.40	1	01/30/21 01:46	01/31/21 19:23	7440-43-9	
Calcium	**20300**	ug/L	100	94.2	1	01/30/21 01:46	01/31/21 19:23	7440-70-2	
Chromium	ND	ug/L	5.0	3.7	1	01/30/21 01:46	01/31/21 19:23	7440-47-3	
Cobalt	ND	ug/L	5.0	3.6	1	01/30/21 01:46	01/31/21 19:23	7440-48-4	
Copper	ND	ug/L	5.0	4.3	1	01/30/21 01:46	01/31/21 19:23	7440-50-8	
Lead	ND	ug/L	5.0	4.5	1	01/30/21 01:46	01/31/21 19:23	7439-92-1	
Molybdenum	ND	ug/L	5.0	3.9	1	01/30/21 01:46	01/31/21 19:23	7439-98-7	
Nickel	ND	ug/L	5.0	3.5	1	01/30/21 01:46	01/31/21 19:23	7440-02-0	
Selenium	ND	ug/L	10.0	4.7	1	01/30/21 01:46	02/01/21 20:16	7782-49-2	
Silver	ND	ug/L	5.0	2.5	1	01/30/21 01:46	01/31/21 19:23	7440-22-4	
Vanadium	**6.8**	ug/L	5.0	3.9	1	01/30/21 01:46	01/31/21 19:23	7440-62-2	
Zinc	ND	ug/L	10.0	9.5	1	01/30/21 01:46	01/31/21 19:23	7440-66-6	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Boron	**7.7J**	ug/L	25.0	6.2	1	01/30/21 01:38	02/02/21 16:55	7440-42-8	
Lithium	**15.9**	ug/L	2.5	0.39	1	01/30/21 01:38	02/02/21 16:55	7439-93-2	
Thallium	ND	ug/L	0.10	0.050	1	01/30/21 01:38	02/02/21 16:55	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	**0.14J**	ug/L	0.20	0.12	1	02/03/21 18:44	02/04/21 14:07	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**544**	mg/L	50.0	50.0	1		01/29/21 18:34		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**176**	mg/L	4.0	2.4	4		02/02/21 08:59	16887-00-6	
Fluoride	**0.18**	mg/L	0.10	0.050	1		02/02/21 03:27	16984-48-8	
Sulfate	**22.5**	mg/L	1.0	0.50	1		02/02/21 03:27	14808-79-8	

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ANALYTICAL RESULTS

Project: CHARAH GROUNDWATER
Pace Project No.: 92519357

Sample: BG-2 **Lab ID: 92519357002** Collected: 01/26/21 16:35 Received: 01/29/21 13:40 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Antimony	ND	ug/L	5.0	3.0	1	01/30/21 01:46	01/31/21 19:33	7440-36-0	
Arsenic	ND	ug/L	10.0	4.7	1	01/30/21 01:46	02/01/21 20:19	7440-38-2	
Barium	**59.1**	ug/L	5.0	3.5	1	01/30/21 01:46	01/31/21 19:33	7440-39-3	
Beryllium	ND	ug/L	1.0	0.70	1	01/30/21 01:46	01/31/21 19:33	7440-41-7	
Cadmium	ND	ug/L	1.0	0.40	1	01/30/21 01:46	01/31/21 19:33	7440-43-9	
Calcium	**101000**	ug/L	1000	942	10	01/30/21 01:46	02/01/21 21:14	7440-70-2	
Chromium	ND	ug/L	5.0	3.7	1	01/30/21 01:46	01/31/21 19:33	7440-47-3	
Cobalt	ND	ug/L	5.0	3.6	1	01/30/21 01:46	01/31/21 19:33	7440-48-4	
Copper	ND	ug/L	5.0	4.3	1	01/30/21 01:46	01/31/21 19:33	7440-50-8	
Lead	ND	ug/L	5.0	4.5	1	01/30/21 01:46	02/01/21 20:19	7439-92-1	
Molybdenum	ND	ug/L	5.0	3.9	1	01/30/21 01:46	01/31/21 19:33	7439-98-7	
Nickel	ND	ug/L	5.0	3.5	1	01/30/21 01:46	01/31/21 19:33	7440-02-0	
Selenium	ND	ug/L	10.0	4.7	1	01/30/21 01:46	02/01/21 20:19	7782-49-2	
Silver	ND	ug/L	5.0	2.5	1	01/30/21 01:46	01/31/21 19:33	7440-22-4	
Vanadium	ND	ug/L	5.0	3.9	1	01/30/21 01:46	01/31/21 19:33	7440-62-2	
Zinc	ND	ug/L	10.0	9.5	1	01/30/21 01:46	01/31/21 19:33	7440-66-6	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Boron	ND	ug/L	25.0	6.2	1	01/30/21 01:38	02/02/21 16:59	7440-42-8	
Lithium	ND	ug/L	2.5	0.39	1	01/30/21 01:38	02/02/21 16:59	7439-93-2	
Thallium	ND	ug/L	0.10	0.050	1	01/30/21 01:38	02/02/21 16:59	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	ND	ug/L	0.20	0.12	1	02/03/21 18:44	02/04/21 14:10	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**1180**	mg/L	125	125	1		01/29/21 18:34		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**254**	mg/L	6.0	3.6	6		02/02/21 09:14	16887-00-6	
Fluoride	**0.23**	mg/L	0.10	0.050	1		02/02/21 03:42	16984-48-8	
Sulfate	**162**	mg/L	6.0	3.0	6		02/02/21 09:14	14808-79-8	

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ANALYTICAL RESULTS

Project: CHARAH GROUNDWATER
Pace Project No.: 92519357

Sample: MW-1 **Lab ID: 92519357003** Collected: 01/28/21 14:20 Received: 01/29/21 13:40 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Antimony	ND	ug/L	5.0	3.0	1	01/30/21 01:46	01/31/21 19:36	7440-36-0	
Arsenic	ND	ug/L	10.0	4.7	1	01/30/21 01:46	02/01/21 20:23	7440-38-2	
Barium	**218**	ug/L	5.0	3.5	1	01/30/21 01:46	01/31/21 19:36	7440-39-3	
Beryllium	ND	ug/L	1.0	0.70	1	01/30/21 01:46	01/31/21 19:36	7440-41-7	
Cadmium	**0.57J**	ug/L	1.0	0.40	1	01/30/21 01:46	01/31/21 19:36	7440-43-9	
Calcium	**185000**	ug/L	1000	942	10	01/30/21 01:46	02/01/21 21:17	7440-70-2	
Chromium	ND	ug/L	5.0	3.7	1	01/30/21 01:46	01/31/21 19:36	7440-47-3	
Cobalt	ND	ug/L	5.0	3.6	1	01/30/21 01:46	01/31/21 19:36	7440-48-4	
Copper	ND	ug/L	5.0	4.3	1	01/30/21 01:46	01/31/21 19:36	7440-50-8	
Lead	ND	ug/L	5.0	4.5	1	01/30/21 01:46	02/01/21 20:23	7439-92-1	
Molybdenum	ND	ug/L	5.0	3.9	1	01/30/21 01:46	01/31/21 19:36	7439-98-7	
Nickel	ND	ug/L	5.0	3.5	1	01/30/21 01:46	01/31/21 19:36	7440-02-0	
Selenium	ND	ug/L	10.0	4.7	1	01/30/21 01:46	02/01/21 20:23	7782-49-2	
Silver	ND	ug/L	5.0	2.5	1	01/30/21 01:46	01/31/21 19:36	7440-22-4	
Vanadium	ND	ug/L	5.0	3.9	1	01/30/21 01:46	01/31/21 19:36	7440-62-2	
Zinc	ND	ug/L	10.0	9.5	1	01/30/21 01:46	01/31/21 19:36	7440-66-6	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Boron	**8.3J**	ug/L	25.0	6.2	1	01/30/21 01:38	02/02/21 17:03	7440-42-8	
Lithium	**31.0**	ug/L	2.5	0.39	1	01/30/21 01:38	02/02/21 17:03	7439-93-2	
Thallium	ND	ug/L	0.10	0.050	1	01/30/21 01:38	02/02/21 17:03	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	ND	ug/L	0.20	0.12	1	02/03/21 18:44	02/04/21 14:12	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**1830**	mg/L	250	250	1		02/02/21 18:47		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**731**	mg/L	16.0	9.6	16		02/02/21 09:57	16887-00-6	
Fluoride	**0.13**	mg/L	0.10	0.050	1		02/02/21 03:56	16984-48-8	
Sulfate	**6.4**	mg/L	1.0	0.50	1		02/02/21 03:56	14808-79-8	

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ANALYTICAL RESULTS

Project: CHARAH GROUNDWATER
Pace Project No.: 92519357

Sample: MW-2 **Lab ID: 92519357004** Collected: 01/28/21 11:28 Received: 01/29/21 13:40 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Antimony	ND	ug/L	5.0	3.0	1	01/30/21 01:46	01/31/21 19:39	7440-36-0	
Arsenic	ND	ug/L	10.0	4.7	1	01/30/21 01:46	02/01/21 20:26	7440-38-2	
Barium	**275**	ug/L	5.0	3.5	1	01/30/21 01:46	01/31/21 19:39	7440-39-3	
Beryllium	ND	ug/L	1.0	0.70	1	01/30/21 01:46	01/31/21 19:39	7440-41-7	
Cadmium	**0.48J**	ug/L	1.0	0.40	1	01/30/21 01:46	01/31/21 19:39	7440-43-9	
Calcium	**183000**	ug/L	1000	942	10	01/30/21 01:46	02/01/21 21:26	7440-70-2	
Chromium	ND	ug/L	5.0	3.7	1	01/30/21 01:46	01/31/21 19:39	7440-47-3	
Cobalt	ND	ug/L	5.0	3.6	1	01/30/21 01:46	01/31/21 19:39	7440-48-4	
Copper	ND	ug/L	5.0	4.3	1	01/30/21 01:46	01/31/21 19:39	7440-50-8	
Lead	ND	ug/L	5.0	4.5	1	01/30/21 01:46	02/01/21 20:26	7439-92-1	
Molybdenum	**6.8**	ug/L	5.0	3.9	1	01/30/21 01:46	01/31/21 19:39	7439-98-7	
Nickel	ND	ug/L	5.0	3.5	1	01/30/21 01:46	01/31/21 19:39	7440-02-0	
Selenium	ND	ug/L	10.0	4.7	1	01/30/21 01:46	02/01/21 20:26	7782-49-2	
Silver	ND	ug/L	5.0	2.5	1	01/30/21 01:46	01/31/21 19:39	7440-22-4	
Vanadium	ND	ug/L	5.0	3.9	1	01/30/21 01:46	01/31/21 19:39	7440-62-2	
Zinc	ND	ug/L	10.0	9.5	1	01/30/21 01:46	01/31/21 19:39	7440-66-6	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Boron	**46.6**	ug/L	25.0	6.2	1	01/30/21 01:38	02/02/21 17:07	7440-42-8	
Lithium	**129**	ug/L	25.0	3.9	10	01/30/21 01:38	02/03/21 11:17	7439-93-2	
Thallium	ND	ug/L	0.10	0.050	1	01/30/21 01:38	02/02/21 17:07	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	ND	ug/L	0.20	0.12	1	02/03/21 18:44	02/04/21 14:14	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**428**	mg/L	25.0	25.0	1		02/02/21 18:47		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**1120**	mg/L	25.0	15.0	25		02/02/21 10:11	16887-00-6	
Fluoride	**0.14**	mg/L	0.10	0.050	1		02/02/21 04:11	16984-48-8	
Sulfate	**94.0**	mg/L	1.0	0.50	1		02/02/21 04:11	14808-79-8	

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ANALYTICAL RESULTS

Project: CHARAH GROUNDWATER
Pace Project No.: 92519357

Sample: MW-3 **Lab ID: 92519357005** Collected: 01/28/21 08:55 Received: 01/29/21 13:40 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Antimony	ND	ug/L	5.0	3.0	1	01/30/21 01:46	01/31/21 19:42	7440-36-0	
Arsenic	ND	ug/L	10.0	4.7	1	01/30/21 01:46	02/01/21 20:29	7440-38-2	
Barium	**599**	ug/L	5.0	3.5	1	01/30/21 01:46	01/31/21 19:42	7440-39-3	
Beryllium	ND	ug/L	1.0	0.70	1	01/30/21 01:46	01/31/21 19:42	7440-41-7	
Cadmium	ND	ug/L	1.0	0.40	1	01/30/21 01:46	01/31/21 19:42	7440-43-9	
Calcium	**178000**	ug/L	1000	942	10	01/30/21 01:46	02/01/21 21:29	7440-70-2	
Chromium	ND	ug/L	5.0	3.7	1	01/30/21 01:46	01/31/21 19:42	7440-47-3	
Cobalt	ND	ug/L	5.0	3.6	1	01/30/21 01:46	01/31/21 19:42	7440-48-4	
Copper	ND	ug/L	5.0	4.3	1	01/30/21 01:46	01/31/21 19:42	7440-50-8	
Lead	ND	ug/L	5.0	4.5	1	01/30/21 01:46	02/01/21 20:29	7439-92-1	
Molybdenum	**7.3**	ug/L	5.0	3.9	1	01/30/21 01:46	01/31/21 19:42	7439-98-7	
Nickel	ND	ug/L	5.0	3.5	1	01/30/21 01:46	01/31/21 19:42	7440-02-0	
Selenium	ND	ug/L	10.0	4.7	1	01/30/21 01:46	02/01/21 20:29	7782-49-2	
Silver	ND	ug/L	5.0	2.5	1	01/30/21 01:46	01/31/21 19:42	7440-22-4	
Vanadium	ND	ug/L	5.0	3.9	1	01/30/21 01:46	01/31/21 19:42	7440-62-2	
Zinc	ND	ug/L	10.0	9.5	1	01/30/21 01:46	01/31/21 19:42	7440-66-6	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Boron	ND	ug/L	25.0	6.2	1	01/30/21 01:38	02/02/21 17:10	7440-42-8	
Lithium	ND	ug/L	2.5	0.39	1	01/30/21 01:38	02/02/21 17:10	7439-93-2	
Thallium	ND	ug/L	0.10	0.050	1	01/30/21 01:38	02/02/21 17:10	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	ND	ug/L	0.20	0.12	1	02/03/21 18:44	02/04/21 14:17	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**2650**	mg/L	250	250	1		02/02/21 18:47		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**1080**	mg/L	25.0	15.0	25		02/02/21 10:25	16887-00-6	
Fluoride	**0.25**	mg/L	0.10	0.050	1		02/02/21 04:25	16984-48-8	M1
Sulfate	**27.5**	mg/L	1.0	0.50	1		02/02/21 04:25	14808-79-8	

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ANALYTICAL RESULTS

Project: CHARAH GROUNDWATER
Pace Project No.: 92519357

Sample: MW-4 **Lab ID: 92519357006** Collected: 01/27/21 13:15 Received: 01/29/21 13:40 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Antimony	**3.1J**	ug/L	5.0	3.0	1	01/30/21 01:46	01/31/21 19:45	7440-36-0	
Arsenic	ND	ug/L	10.0	4.7	1	01/30/21 01:46	02/01/21 20:32	7440-38-2	
Barium	**316**	ug/L	5.0	3.5	1	01/30/21 01:46	01/31/21 19:45	7440-39-3	
Beryllium	ND	ug/L	1.0	0.70	1	01/30/21 01:46	01/31/21 19:45	7440-41-7	
Cadmium	ND	ug/L	1.0	0.40	1	01/30/21 01:46	01/31/21 19:45	7440-43-9	
Calcium	**60700**	ug/L	100	94.2	1	01/30/21 01:46	01/31/21 19:45	7440-70-2	
Chromium	ND	ug/L	5.0	3.7	1	01/30/21 01:46	01/31/21 19:45	7440-47-3	
Cobalt	ND	ug/L	5.0	3.6	1	01/30/21 01:46	01/31/21 19:45	7440-48-4	
Copper	ND	ug/L	5.0	4.3	1	01/30/21 01:46	01/31/21 19:45	7440-50-8	
Lead	ND	ug/L	5.0	4.5	1	01/30/21 01:46	02/01/21 20:32	7439-92-1	
Molybdenum	ND	ug/L	5.0	3.9	1	01/30/21 01:46	01/31/21 19:45	7439-98-7	
Nickel	**7.4**	ug/L	5.0	3.5	1	01/30/21 01:46	01/31/21 19:45	7440-02-0	
Selenium	ND	ug/L	10.0	4.7	1	01/30/21 01:46	02/01/21 20:32	7782-49-2	
Silver	ND	ug/L	5.0	2.5	1	01/30/21 01:46	01/31/21 19:45	7440-22-4	
Vanadium	ND	ug/L	5.0	3.9	1	01/30/21 01:46	01/31/21 19:45	7440-62-2	
Zinc	ND	ug/L	10.0	9.5	1	01/30/21 01:46	01/31/21 19:45	7440-66-6	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Boron	**7.4J**	ug/L	25.0	6.2	1	01/30/21 01:38	02/02/21 17:15	7440-42-8	
Lithium	**28.9**	ug/L	2.5	0.39	1	01/30/21 01:38	02/02/21 17:15	7439-93-2	
Thallium	ND	ug/L	0.10	0.050	1	01/30/21 01:38	02/02/21 17:15	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	ND	ug/L	0.20	0.12	1	02/03/21 18:44	02/04/21 14:19	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**1200**	mg/L	125	125	1		02/01/21 18:51		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**467**	mg/L	10.0	6.0	10		02/02/21 11:07	16887-00-6	
Fluoride	**0.26**	mg/L	0.10	0.050	1		02/02/21 05:08	16984-48-8	
Sulfate	**10.4**	mg/L	1.0	0.50	1		02/02/21 05:08	14808-79-8	

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(704)875-9092

ANALYTICAL RESULTS

Project: CHARAH GROUNDWATER
Pace Project No.: 92519357

Sample: MW-5 **Lab ID: 92519357007** Collected: 01/25/21 13:25 Received: 01/29/21 13:40 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Antimony	**3.9J**	ug/L	5.0	3.0	1	01/30/21 01:46	01/31/21 19:48	7440-36-0	
Arsenic	ND	ug/L	10.0	4.7	1	01/30/21 01:46	02/01/21 20:36	7440-38-2	
Barium	**92.0**	ug/L	5.0	3.5	1	01/30/21 01:46	01/31/21 19:48	7440-39-3	
Beryllium	ND	ug/L	1.0	0.70	1	01/30/21 01:46	01/31/21 19:48	7440-41-7	
Cadmium	ND	ug/L	1.0	0.40	1	01/30/21 01:46	01/31/21 19:48	7440-43-9	
Calcium	**9040**	ug/L	100	94.2	1	01/30/21 01:46	01/31/21 19:48	7440-70-2	
Chromium	ND	ug/L	5.0	3.7	1	01/30/21 01:46	01/31/21 19:48	7440-47-3	
Cobalt	ND	ug/L	5.0	3.6	1	01/30/21 01:46	01/31/21 19:48	7440-48-4	
Copper	ND	ug/L	5.0	4.3	1	01/30/21 01:46	01/31/21 19:48	7440-50-8	
Lead	ND	ug/L	5.0	4.5	1	01/30/21 01:46	02/01/21 20:36	7439-92-1	
Molybdenum	ND	ug/L	5.0	3.9	1	01/30/21 01:46	01/31/21 19:48	7439-98-7	
Nickel	ND	ug/L	5.0	3.5	1	01/30/21 01:46	01/31/21 19:48	7440-02-0	
Selenium	ND	ug/L	10.0	4.7	1	01/30/21 01:46	02/01/21 20:36	7782-49-2	
Silver	ND	ug/L	5.0	2.5	1	01/30/21 01:46	01/31/21 19:48	7440-22-4	
Vanadium	ND	ug/L	5.0	3.9	1	01/30/21 01:46	01/31/21 19:48	7440-62-2	
Zinc	ND	ug/L	10.0	9.5	1	01/30/21 01:46	01/31/21 19:48	7440-66-6	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Boron	**11.1J**	ug/L	25.0	6.2	1	01/30/21 01:38	02/02/21 17:19	7440-42-8	
Lithium	**10.6**	ug/L	2.5	0.39	1	01/30/21 01:38	02/02/21 17:19	7439-93-2	
Thallium	ND	ug/L	0.10	0.050	1	01/30/21 01:38	02/02/21 17:19	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	ND	ug/L	0.20	0.12	1	02/03/21 18:44	02/04/21 14:21	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**218**	mg/L	25.0	25.0	1		01/29/21 18:33		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**19.6**	mg/L	1.0	0.60	1		02/02/21 05:23	16887-00-6	
Fluoride	**0.51**	mg/L	0.10	0.050	1		02/02/21 05:23	16984-48-8	
Sulfate	**3.4**	mg/L	1.0	0.50	1		02/02/21 05:23	14808-79-8	

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ANALYTICAL RESULTS

Project: CHARAH GROUNDWATER
Pace Project No.: 92519357

Sample: MW-6 **Lab ID: 92519357008** Collected: 01/25/21 16:25 Received: 01/29/21 13:40 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Antimony	ND	ug/L	5.0	3.0	1	01/30/21 01:46	01/31/21 19:51	7440-36-0	
Arsenic	ND	ug/L	10.0	4.7	1	01/30/21 01:46	02/01/21 20:39	7440-38-2	
Barium	**57.8**	ug/L	5.0	3.5	1	01/30/21 01:46	01/31/21 19:51	7440-39-3	
Beryllium	ND	ug/L	1.0	0.70	1	01/30/21 01:46	01/31/21 19:51	7440-41-7	
Cadmium	ND	ug/L	1.0	0.40	1	01/30/21 01:46	01/31/21 19:51	7440-43-9	
Calcium	**34300**	ug/L	100	94.2	1	01/30/21 01:46	01/31/21 19:51	7440-70-2	
Chromium	ND	ug/L	5.0	3.7	1	01/30/21 01:46	01/31/21 19:51	7440-47-3	
Cobalt	ND	ug/L	5.0	3.6	1	01/30/21 01:46	01/31/21 19:51	7440-48-4	
Copper	ND	ug/L	5.0	4.3	1	01/30/21 01:46	01/31/21 19:51	7440-50-8	
Lead	ND	ug/L	5.0	4.5	1	01/30/21 01:46	02/01/21 20:39	7439-92-1	
Molybdenum	ND	ug/L	5.0	3.9	1	01/30/21 01:46	01/31/21 19:51	7439-98-7	
Nickel	ND	ug/L	5.0	3.5	1	01/30/21 01:46	01/31/21 19:51	7440-02-0	
Selenium	ND	ug/L	10.0	4.7	1	01/30/21 01:46	02/01/21 20:39	7782-49-2	
Silver	ND	ug/L	5.0	2.5	1	01/30/21 01:46	01/31/21 19:51	7440-22-4	
Vanadium	ND	ug/L	5.0	3.9	1	01/30/21 01:46	01/31/21 19:51	7440-62-2	
Zinc	ND	ug/L	10.0	9.5	1	01/30/21 01:46	01/31/21 19:51	7440-66-6	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Boron	**9.0J**	ug/L	25.0	6.2	1	01/30/21 01:38	02/02/21 17:23	7440-42-8	
Lithium	**28.5**	ug/L	2.5	0.39	1	01/30/21 01:38	02/02/21 17:23	7439-93-2	
Thallium	ND	ug/L	0.10	0.050	1	01/30/21 01:38	02/02/21 17:23	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	ND	ug/L	0.20	0.12	1	02/03/21 18:44	02/04/21 14:28	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**638**	mg/L	50.0	50.0	1		01/29/21 18:33		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**208**	mg/L	4.0	2.4	4		02/02/21 11:22	16887-00-6	
Fluoride	**0.34**	mg/L	0.10	0.050	1		02/02/21 05:37	16984-48-8	
Sulfate	**25.6**	mg/L	1.0	0.50	1		02/02/21 05:37	14808-79-8	

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ANALYTICAL RESULTS

Project: CHARAH GROUNDWATER
Pace Project No.: 92519357

Sample: MW-7R **Lab ID: 92519357009** Collected: 01/26/21 09:45 Received: 01/29/21 13:40 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Antimony	ND	ug/L	5.0	3.0	1	01/30/21 01:46	01/31/21 19:54	7440-36-0	
Arsenic	ND	ug/L	10.0	4.7	1	01/30/21 01:46	02/01/21 20:48	7440-38-2	
Barium	**285**	ug/L	5.0	3.5	1	01/30/21 01:46	01/31/21 19:54	7440-39-3	
Beryllium	ND	ug/L	1.0	0.70	1	01/30/21 01:46	01/31/21 19:54	7440-41-7	
Cadmium	ND	ug/L	1.0	0.40	1	01/30/21 01:46	01/31/21 19:54	7440-43-9	
Calcium	**86600**	ug/L	100	94.2	1	01/30/21 01:46	01/31/21 19:54	7440-70-2	
Chromium	ND	ug/L	5.0	3.7	1	01/30/21 01:46	01/31/21 19:54	7440-47-3	
Cobalt	ND	ug/L	5.0	3.6	1	01/30/21 01:46	01/31/21 19:54	7440-48-4	
Copper	ND	ug/L	5.0	4.3	1	01/30/21 01:46	01/31/21 19:54	7440-50-8	
Lead	ND	ug/L	5.0	4.5	1	01/30/21 01:46	02/01/21 20:48	7439-92-1	
Molybdenum	ND	ug/L	5.0	3.9	1	01/30/21 01:46	01/31/21 19:54	7439-98-7	
Nickel	ND	ug/L	5.0	3.5	1	01/30/21 01:46	01/31/21 19:54	7440-02-0	
Selenium	ND	ug/L	10.0	4.7	1	01/30/21 01:46	02/01/21 20:48	7782-49-2	
Silver	ND	ug/L	5.0	2.5	1	01/30/21 01:46	01/31/21 19:54	7440-22-4	
Vanadium	ND	ug/L	5.0	3.9	1	01/30/21 01:46	01/31/21 19:54	7440-62-2	
Zinc	ND	ug/L	10.0	9.5	1	01/30/21 01:46	01/31/21 19:54	7440-66-6	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Boron	**12.8J**	ug/L	25.0	6.2	1	01/30/21 01:38	02/02/21 17:35	7440-42-8	
Lithium	**31.0**	ug/L	2.5	0.39	1	01/30/21 01:38	02/02/21 17:35	7439-93-2	
Thallium	ND	ug/L	0.10	0.050	1	01/30/21 01:38	02/02/21 17:35	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	ND	ug/L	0.20	0.12	1	02/03/21 18:44	02/04/21 14:31	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**872**	mg/L	50.0	50.0	1		01/29/21 18:34		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**278**	mg/L	6.0	3.6	6		02/02/21 11:36	16887-00-6	
Fluoride	**0.10**	mg/L	0.10	0.050	1		02/02/21 06:35	16984-48-8	
Sulfate	**15.1**	mg/L	1.0	0.50	1		02/02/21 06:35	14808-79-8	

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ANALYTICAL RESULTS

Project: CHARAH GROUNDWATER
Pace Project No.: 92519357

Sample: MW-8 **Lab ID: 92519357010** Collected: 01/27/21 09:58 Received: 01/29/21 13:40 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Antimony	ND	ug/L	5.0	3.0	1	01/30/21 01:46	01/31/21 19:58	7440-36-0	
Arsenic	ND	ug/L	10.0	4.7	1	01/30/21 01:46	02/01/21 20:51	7440-38-2	
Barium	**1060**	ug/L	5.0	3.5	1	01/30/21 01:46	01/31/21 19:58	7440-39-3	
Beryllium	ND	ug/L	1.0	0.70	1	01/30/21 01:46	01/31/21 19:58	7440-41-7	
Cadmium	ND	ug/L	1.0	0.40	1	01/30/21 01:46	01/31/21 19:58	7440-43-9	
Calcium	**4170**	ug/L	1000	942	10	01/30/21 01:46	02/01/21 21:33	7440-70-2	
Chromium	**5.7**	ug/L	5.0	3.7	1	01/30/21 01:46	01/31/21 19:58	7440-47-3	
Cobalt	ND	ug/L	5.0	3.6	1	01/30/21 01:46	01/31/21 19:58	7440-48-4	
Copper	ND	ug/L	5.0	4.3	1	01/30/21 01:46	01/31/21 19:58	7440-50-8	
Lead	ND	ug/L	5.0	4.5	1	01/30/21 01:46	02/01/21 20:51	7439-92-1	
Molybdenum	ND	ug/L	5.0	3.9	1	01/30/21 01:46	01/31/21 19:58	7439-98-7	
Nickel	**3.5J**	ug/L	5.0	3.5	1	01/30/21 01:46	01/31/21 19:58	7440-02-0	
Selenium	ND	ug/L	10.0	4.7	1	01/30/21 01:46	02/01/21 20:51	7782-49-2	
Silver	ND	ug/L	5.0	2.5	1	01/30/21 01:46	01/31/21 19:58	7440-22-4	
Vanadium	ND	ug/L	5.0	3.9	1	01/30/21 01:46	01/31/21 19:58	7440-62-2	
Zinc	ND	ug/L	10.0	9.5	1	01/30/21 01:46	01/31/21 19:58	7440-66-6	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Boron	**14.0J**	ug/L	25.0	6.2	1	01/30/21 01:38	02/02/21 17:39	7440-42-8	
Lithium	**33.4**	ug/L	2.5	0.39	1	01/30/21 01:38	02/02/21 17:39	7439-93-2	
Thallium	ND	ug/L	0.10	0.050	1	01/30/21 01:38	02/02/21 17:39	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	ND	ug/L	0.20	0.12	1	02/03/21 18:44	02/04/21 14:33	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**1040**	mg/L	125	125	1		02/01/21 18:51		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**426**	mg/L	9.0	5.4	9		02/02/21 11:50	16887-00-6	
Fluoride	**0.061J**	mg/L	0.10	0.050	1		02/02/21 06:50	16984-48-8	
Sulfate	**6.4**	mg/L	1.0	0.50	1		02/02/21 06:50	14808-79-8	

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ANALYTICAL RESULTS

Project: CHARAH GROUNDWATER
Pace Project No.: 92519357

Sample: SW-1 **Lab ID: 92519357011** Collected: 01/27/21 14:00 Received: 01/29/21 13:40 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Antimony	ND	ug/L	5.0	3.0	1	01/30/21 01:46	01/31/21 20:01	7440-36-0	
Arsenic	**9.4J**	ug/L	10.0	4.7	1	01/30/21 01:46	02/01/21 20:55	7440-38-2	
Barium	**341**	ug/L	5.0	3.5	1	01/30/21 01:46	01/31/21 20:01	7440-39-3	
Beryllium	ND	ug/L	1.0	0.70	1	01/30/21 01:46	01/31/21 20:01	7440-41-7	
Cadmium	ND	ug/L	1.0	0.40	1	01/30/21 01:46	01/31/21 20:01	7440-43-9	
Calcium	**3710**	ug/L	100	94.2	1	01/30/21 01:46	01/31/21 20:01	7440-70-2	
Chromium	**8.9**	ug/L	5.0	3.7	1	01/30/21 01:46	01/31/21 20:01	7440-47-3	
Cobalt	**5.7**	ug/L	5.0	3.6	1	01/30/21 01:46	01/31/21 20:01	7440-48-4	
Copper	**9.2**	ug/L	5.0	4.3	1	01/30/21 01:46	01/31/21 20:01	7440-50-8	
Lead	**25.5**	ug/L	5.0	4.5	1	01/30/21 01:46	02/01/21 20:55	7439-92-1	
Molybdenum	ND	ug/L	5.0	3.9	1	01/30/21 01:46	01/31/21 20:01	7439-98-7	
Nickel	**5.6**	ug/L	5.0	3.5	1	01/30/21 01:46	01/31/21 20:01	7440-02-0	
Selenium	ND	ug/L	10.0	4.7	1	01/30/21 01:46	02/01/21 20:55	7782-49-2	
Silver	ND	ug/L	5.0	2.5	1	01/30/21 01:46	01/31/21 20:01	7440-22-4	
Vanadium	**39.2**	ug/L	5.0	3.9	1	01/30/21 01:46	01/31/21 20:01	7440-62-2	
Zinc	**41.8**	ug/L	10.0	9.5	1	01/30/21 01:46	01/31/21 20:01	7440-66-6	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Boron	**10.3J**	ug/L	25.0	6.2	1	01/30/21 01:38	02/02/21 17:43	7440-42-8	
Lithium	**5.3**	ug/L	2.5	0.39	1	01/30/21 01:38	02/02/21 17:43	7439-93-2	
Thallium	**0.099J**	ug/L	0.10	0.050	1	01/30/21 01:38	02/02/21 17:43	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	ND	ug/L	0.20	0.12	1	02/03/21 18:44	02/04/21 14:36	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**709**	mg/L	25.0	25.0	1		02/01/21 18:51		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**5.2**	mg/L	1.0	0.60	1		02/02/21 07:04	16887-00-6	
Fluoride	**0.16**	mg/L	0.10	0.050	1		02/02/21 07:04	16984-48-8	
Sulfate	**2.1**	mg/L	1.0	0.50	1		02/02/21 07:04	14808-79-8	

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ANALYTICAL RESULTS

Project: CHARAH GROUNDWATER
Pace Project No.: 92519357

Sample: SW-2 **Lab ID: 92519357012** Collected: 01/27/21 14:25 Received: 01/29/21 13:40 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Antimony	ND	ug/L	5.0	3.0	1	01/30/21 01:46	01/31/21 20:16	7440-36-0	
Arsenic	ND	ug/L	10.0	4.7	1	01/30/21 01:46	02/01/21 20:58	7440-38-2	
Barium	**42.2**	ug/L	5.0	3.5	1	01/30/21 01:46	01/31/21 20:16	7440-39-3	
Beryllium	ND	ug/L	1.0	0.70	1	01/30/21 01:46	01/31/21 20:16	7440-41-7	
Cadmium	ND	ug/L	1.0	0.40	1	01/30/21 01:46	01/31/21 20:16	7440-43-9	
Calcium	**14900**	ug/L	100	94.2	1	01/30/21 01:46	01/31/21 20:16	7440-70-2	
Chromium	ND	ug/L	5.0	3.7	1	01/30/21 01:46	01/31/21 20:16	7440-47-3	
Cobalt	ND	ug/L	5.0	3.6	1	01/30/21 01:46	01/31/21 20:16	7440-48-4	
Copper	ND	ug/L	5.0	4.3	1	01/30/21 01:46	01/31/21 20:16	7440-50-8	
Lead	ND	ug/L	5.0	4.5	1	01/30/21 01:46	02/01/21 20:58	7439-92-1	
Molybdenum	ND	ug/L	5.0	3.9	1	01/30/21 01:46	01/31/21 20:16	7439-98-7	
Nickel	ND	ug/L	5.0	3.5	1	01/30/21 01:46	01/31/21 20:16	7440-02-0	
Selenium	ND	ug/L	10.0	4.7	1	01/30/21 01:46	02/01/21 20:58	7782-49-2	
Silver	ND	ug/L	5.0	2.5	1	01/30/21 01:46	01/31/21 20:16	7440-22-4	
Vanadium	ND	ug/L	5.0	3.9	1	01/30/21 01:46	01/31/21 20:16	7440-62-2	
Zinc	ND	ug/L	10.0	9.5	1	01/30/21 01:46	01/31/21 20:16	7440-66-6	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Boron	**11.9J**	ug/L	25.0	6.2	1	01/30/21 01:38	02/02/21 17:48	7440-42-8	
Lithium	**1.6J**	ug/L	2.5	0.39	1	01/30/21 01:38	02/02/21 17:48	7439-93-2	
Thallium	ND	ug/L	0.10	0.050	1	01/30/21 01:38	02/02/21 17:48	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	ND	ug/L	0.20	0.12	1	02/03/21 18:44	02/04/21 14:38	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**150**	mg/L	25.0	25.0	1		02/01/21 18:51		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**18.9**	mg/L	1.0	0.60	1		02/02/21 07:19	16887-00-6	
Fluoride	**0.11**	mg/L	0.10	0.050	1		02/02/21 07:19	16984-48-8	
Sulfate	**10.8**	mg/L	1.0	0.50	1		02/02/21 07:19	14808-79-8	

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ANALYTICAL RESULTS

Project: CHARAH GROUNDWATER
Pace Project No.: 92519357

Sample: LEACHATE **Lab ID: 92519357013** Collected: 01/26/21 10:20 Received: 01/29/21 13:40 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Antimony	ND	ug/L	5.0	3.0	1	01/30/21 01:46	01/31/21 20:19	7440-36-0	
Arsenic	**20.3**	ug/L	10.0	4.7	1	01/30/21 01:46	01/31/21 20:19	7440-38-2	
Barium	**63.2**	ug/L	5.0	3.5	1	01/30/21 01:46	01/31/21 20:19	7440-39-3	
Beryllium	ND	ug/L	1.0	0.70	1	01/30/21 01:46	01/31/21 20:19	7440-41-7	
Cadmium	**0.44J**	ug/L	1.0	0.40	1	01/30/21 01:46	01/31/21 20:19	7440-43-9	
Calcium	**330000**	ug/L	1000	942	10	01/30/21 01:46	02/01/21 21:36	7440-70-2	
Chromium	ND	ug/L	5.0	3.7	1	01/30/21 01:46	01/31/21 20:19	7440-47-3	
Cobalt	ND	ug/L	5.0	3.6	1	01/30/21 01:46	01/31/21 20:19	7440-48-4	
Copper	ND	ug/L	5.0	4.3	1	01/30/21 01:46	01/31/21 20:19	7440-50-8	
Lead	ND	ug/L	5.0	4.5	1	01/30/21 01:46	02/01/21 21:01	7439-92-1	
Molybdenum	**220**	ug/L	5.0	3.9	1	01/30/21 01:46	01/31/21 20:19	7439-98-7	
Nickel	**5.0J**	ug/L	5.0	3.5	1	01/30/21 01:46	01/31/21 20:19	7440-02-0	
Selenium	ND	ug/L	10.0	4.7	1	01/30/21 01:46	02/01/21 21:01	7782-49-2	
Silver	ND	ug/L	5.0	2.5	1	01/30/21 01:46	01/31/21 20:19	7440-22-4	
Vanadium	ND	ug/L	5.0	3.9	1	01/30/21 01:46	01/31/21 20:19	7440-62-2	
Zinc	**9.6J**	ug/L	10.0	9.5	1	01/30/21 01:46	01/31/21 20:19	7440-66-6	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Boron	**3680**	ug/L	1250	311	50	01/30/21 01:38	02/02/21 17:52	7440-42-8	
Lithium	**54.6**	ug/L	2.5	0.39	1	01/30/21 01:38	02/02/21 01:38	7439-93-2	
Thallium	**0.18**	ug/L	0.10	0.050	1	01/30/21 01:38	02/02/21 01:38	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	ND	ug/L	0.20	0.12	1	02/03/21 18:44	02/04/21 14:40	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**1590**	mg/L	125	125	1		01/29/21 18:34		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**18.8**	mg/L	1.0	0.60	1		02/02/21 07:33	16887-00-6	
Fluoride	**0.24**	mg/L	0.10	0.050	1		02/02/21 07:33	16984-48-8	
Sulfate	**556**	mg/L	12.0	6.0	12		02/02/21 12:04	14808-79-8	

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ANALYTICAL RESULTS

Project: CHARAH GROUNDWATER
Pace Project No.: 92519357

Sample: DUP **Lab ID: 92519357014** Collected: 01/25/21 16:25 Received: 01/29/21 13:40 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Antimony	ND	ug/L	5.0	3.0	1	01/30/21 01:46	01/31/21 20:22	7440-36-0	
Arsenic	ND	ug/L	10.0	4.7	1	01/30/21 01:46	01/31/21 20:22	7440-38-2	
Barium	**57.2**	ug/L	5.0	3.5	1	01/30/21 01:46	01/31/21 20:22	7440-39-3	
Beryllium	ND	ug/L	1.0	0.70	1	01/30/21 01:46	01/31/21 20:22	7440-41-7	
Cadmium	ND	ug/L	1.0	0.40	1	01/30/21 01:46	01/31/21 20:22	7440-43-9	
Calcium	**32800**	ug/L	100	94.2	1	01/30/21 01:46	01/31/21 20:22	7440-70-2	
Chromium	ND	ug/L	5.0	3.7	1	01/30/21 01:46	01/31/21 20:22	7440-47-3	
Cobalt	ND	ug/L	5.0	3.6	1	01/30/21 01:46	01/31/21 20:22	7440-48-4	
Copper	ND	ug/L	5.0	4.3	1	01/30/21 01:46	01/31/21 20:22	7440-50-8	
Lead	ND	ug/L	5.0	4.5	1	01/30/21 01:46	02/01/21 21:04	7439-92-1	
Molybdenum	ND	ug/L	5.0	3.9	1	01/30/21 01:46	01/31/21 20:22	7439-98-7	
Nickel	ND	ug/L	5.0	3.5	1	01/30/21 01:46	01/31/21 20:22	7440-02-0	
Selenium	ND	ug/L	10.0	4.7	1	01/30/21 01:46	02/01/21 21:04	7782-49-2	
Silver	ND	ug/L	5.0	2.5	1	01/30/21 01:46	01/31/21 20:22	7440-22-4	
Vanadium	ND	ug/L	5.0	3.9	1	01/30/21 01:46	01/31/21 20:22	7440-62-2	
Zinc	ND	ug/L	10.0	9.5	1	01/30/21 01:46	01/31/21 20:22	7440-66-6	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Boron	ND	ug/L	125	31.1	5	01/30/21 01:38	02/02/21 17:56	7440-42-8	
Lithium	**26.8**	ug/L	2.5	0.39	1	01/30/21 01:38	02/02/21 01:42	7439-93-2	
Thallium	ND	ug/L	0.10	0.050	1	01/30/21 01:38	02/02/21 01:42	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	ND	ug/L	0.20	0.12	1	02/03/21 18:44	02/04/21 14:43	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**654**	mg/L	50.0	50.0	1		01/29/21 18:33		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**211**	mg/L	4.0	2.4	4		02/02/21 12:47	16887-00-6	
Fluoride	**0.33**	mg/L	0.10	0.050	1		02/02/21 07:47	16984-48-8	
Sulfate	**25.5**	mg/L	1.0	0.50	1		02/02/21 07:47	14808-79-8	

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ANALYTICAL RESULTS

Project: CHARAH GROUNDWATER
Pace Project No.: 92519357

Sample: EQBL **Lab ID: 92519357015** Collected: 01/28/21 15:10 Received: 01/29/21 13:40 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Antimony	ND	ug/L	5.0	3.0	1	01/30/21 01:46	01/31/21 20:25	7440-36-0	
Arsenic	ND	ug/L	10.0	4.7	1	01/30/21 01:46	01/31/21 20:25	7440-38-2	
Barium	ND	ug/L	5.0	3.5	1	01/30/21 01:46	01/31/21 20:25	7440-39-3	
Beryllium	ND	ug/L	1.0	0.70	1	01/30/21 01:46	01/31/21 20:25	7440-41-7	
Cadmium	ND	ug/L	1.0	0.40	1	01/30/21 01:46	01/31/21 20:25	7440-43-9	
Calcium	ND	ug/L	100	94.2	1	01/30/21 01:46	01/31/21 20:25	7440-70-2	
Chromium	ND	ug/L	5.0	3.7	1	01/30/21 01:46	01/31/21 20:25	7440-47-3	
Cobalt	ND	ug/L	5.0	3.6	1	01/30/21 01:46	01/31/21 20:25	7440-48-4	
Copper	ND	ug/L	5.0	4.3	1	01/30/21 01:46	01/31/21 20:25	7440-50-8	
Lead	ND	ug/L	5.0	4.5	1	01/30/21 01:46	02/01/21 21:07	7439-92-1	
Molybdenum	ND	ug/L	5.0	3.9	1	01/30/21 01:46	01/31/21 20:25	7439-98-7	
Nickel	ND	ug/L	5.0	3.5	1	01/30/21 01:46	01/31/21 20:25	7440-02-0	
Selenium	ND	ug/L	10.0	4.7	1	01/30/21 01:46	02/01/21 21:07	7782-49-2	
Silver	ND	ug/L	5.0	2.5	1	01/30/21 01:46	01/31/21 20:25	7440-22-4	
Vanadium	ND	ug/L	5.0	3.9	1	01/30/21 01:46	01/31/21 20:25	7440-62-2	
Zinc	ND	ug/L	10.0	9.5	1	01/30/21 01:46	01/31/21 20:25	7440-66-6	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Boron	ND	ug/L	25.0	6.2	1	01/30/21 01:38	02/02/21 18:00	7440-42-8	
Lithium	ND	ug/L	2.5	0.39	1	01/30/21 01:38	02/02/21 18:00	7439-93-2	
Thallium	ND	ug/L	0.10	0.050	1	01/30/21 01:38	02/02/21 18:00	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	ND	ug/L	0.20	0.12	1	02/03/21 18:44	02/04/21 14:54	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	ND	mg/L	25.0	25.0	1		02/02/21 18:47		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	ND	mg/L	1.0	0.60	1		02/02/21 12:24	16887-00-6	
Fluoride	ND	mg/L	0.10	0.050	1		02/02/21 12:24	16984-48-8	
Sulfate	ND	mg/L	1.0	0.50	1		02/02/21 12:24	14808-79-8	

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QUALITY CONTROL DATA

Project: CHARAH GROUNDWATER
Pace Project No.: 92519357

QC Batch: 597299 Analysis Method: EPA 7470A
QC Batch Method: EPA 7470A Analysis Description: 7470 Mercury
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92519357001, 92519357002, 92519357003, 92519357004, 92519357005, 92519357006, 92519357007, 92519357008, 92519357009, 92519357010, 92519357011, 92519357012, 92519357013, 92519357014

METHOD BLANK: 3149641 Matrix: Water
Associated Lab Samples: 92519357001, 92519357002, 92519357003, 92519357004, 92519357005, 92519357006, 92519357007, 92519357008, 92519357009, 92519357010, 92519357011, 92519357012, 92519357013, 92519357014

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury	ug/L	ND	0.20	0.12	02/04/21 13:39	

LABORATORY CONTROL SAMPLE: 3149642

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	2.5	2.7	109	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3149643 3149644

Parameter	Units	92519338001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ug/L	ND	2.5	2.5	2.6	2.6	102	103	75-125	1	25	

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QUALITY CONTROL DATA

Project: CHARAH GROUNDWATER
Pace Project No.: 92519357

QC Batch: 597300
QC Batch Method: EPA 7470A
Analysis Method: EPA 7470A
Analysis Description: 7470 Mercury
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92519357015

METHOD BLANK: 3149645 Matrix: Water
Associated Lab Samples: 92519357015

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury	ug/L	ND	0.20	0.12	02/04/21 14:50	

LABORATORY CONTROL SAMPLE: 3149646

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	2.5	2.7	107	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3149647 3149648

Parameter	Units	92519357015 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ug/L	ND	2.5	2.5	2.7	2.7	104	107	75-125	3	25	

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QUALITY CONTROL DATA

Project: CHARAH GROUNDWATER
Pace Project No.: 92519357

QC Batch: 596488
QC Batch Method: EPA 3010A
Analysis Method: EPA 6010D
Analysis Description: 6010 MET
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92519357001, 92519357002, 92519357003, 92519357004, 92519357005, 92519357006, 92519357007, 92519357008, 92519357009, 92519357010, 92519357011, 92519357012, 92519357013, 92519357014, 92519357015

METHOD BLANK: 3145948 Matrix: Water
Associated Lab Samples: 92519357001, 92519357002, 92519357003, 92519357004, 92519357005, 92519357006, 92519357007, 92519357008, 92519357009, 92519357010, 92519357011, 92519357012, 92519357013, 92519357014, 92519357015

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Antimony	ug/L	ND	5.0	3.0	01/31/21 18:56	
Arsenic	ug/L	ND	10.0	4.7	02/01/21 19:35	
Barium	ug/L	ND	5.0	3.5	01/31/21 18:56	
Beryllium	ug/L	ND	1.0	0.70	01/31/21 18:56	
Cadmium	ug/L	ND	1.0	0.40	01/31/21 18:56	
Calcium	ug/L	ND	100	94.2	01/31/21 18:56	
Chromium	ug/L	ND	5.0	3.7	01/31/21 18:56	
Cobalt	ug/L	ND	5.0	3.6	01/31/21 18:56	
Copper	ug/L	ND	5.0	4.3	01/31/21 18:56	
Lead	ug/L	ND	5.0	4.5	01/31/21 18:56	
Molybdenum	ug/L	ND	5.0	3.9	01/31/21 18:56	
Nickel	ug/L	ND	5.0	3.5	01/31/21 18:56	
Selenium	ug/L	ND	10.0	4.7	02/01/21 19:35	
Silver	ug/L	ND	5.0	2.5	01/31/21 18:56	
Vanadium	ug/L	ND	5.0	3.9	01/31/21 18:56	
Zinc	ug/L	ND	10.0	9.5	01/31/21 18:56	

LABORATORY CONTROL SAMPLE: 3145949

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	500	451	90	80-120	
Arsenic	ug/L	500	470	94	80-120	
Barium	ug/L	500	481	96	80-120	
Beryllium	ug/L	500	470	94	80-120	
Cadmium	ug/L	500	474	95	80-120	
Calcium	ug/L	5000	5010	100	80-120	
Chromium	ug/L	500	473	95	80-120	
Cobalt	ug/L	500	480	96	80-120	
Copper	ug/L	500	484	97	80-120	
Lead	ug/L	500	473	95	80-120	
Molybdenum	ug/L	500	465	93	80-120	
Nickel	ug/L	500	476	95	80-120	
Selenium	ug/L	500	460	92	80-120	
Silver	ug/L	250	226	90	80-120	
Vanadium	ug/L	500	480	96	80-120	

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QUALITY CONTROL DATA

Project: CHARAH GROUNDWATER
Pace Project No.: 92519357

LABORATORY CONTROL SAMPLE: 3145949

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Zinc	ug/L	500	466	93	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3145950 3145951

Parameter	Units	92519353001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Antimony	ug/L	3.8J	500	500	457	469	91	93	75-125	3	20	
Arsenic	ug/L	ND	500	500	496	508	99	101	75-125	2	20	
Barium	ug/L	62.2	500	500	546	566	97	101	75-125	4	20	
Beryllium	ug/L	ND	500	500	488	502	98	100	75-125	3	20	
Cadmium	ug/L	ND	500	500	480	497	96	99	75-125	4	20	
Calcium	ug/L	5730	5000	5000	10500	11000	96	106	75-125	5	20	
Chromium	ug/L	ND	500	500	478	492	95	98	75-125	3	20	
Cobalt	ug/L	ND	500	500	489	506	98	101	75-125	3	20	
Copper	ug/L	ND	500	500	490	505	98	101	75-125	3	20	
Lead	ug/L	ND	500	500	477	489	95	98	75-125	3	20	
Molybdenum	ug/L	ND	500	500	467	481	93	96	75-125	3	20	
Nickel	ug/L	ND	500	500	483	500	97	100	75-125	4	20	
Selenium	ug/L	ND	500	500	519	522	104	104	75-125	1	20	
Silver	ug/L	ND	250	250	229	236	92	95	75-125	3	20	
Vanadium	ug/L	ND	500	500	489	505	98	101	75-125	3	20	
Zinc	ug/L	ND	500	500	481	495	95	98	75-125	3	20	

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QUALITY CONTROL DATA

Project: CHARAH GROUNDWATER
Pace Project No.: 92519357

QC Batch: 596490
QC Batch Method: EPA 3010A
Analysis Method: EPA 6020B
Analysis Description: 6020 MET
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92519357001, 92519357002, 92519357003, 92519357004, 92519357005, 92519357006, 92519357007, 92519357008, 92519357009, 92519357010, 92519357011, 92519357012, 92519357013, 92519357014, 92519357015

METHOD BLANK: 3145956 Matrix: Water
Associated Lab Samples: 92519357001, 92519357002, 92519357003, 92519357004, 92519357005, 92519357006, 92519357007, 92519357008, 92519357009, 92519357010, 92519357011, 92519357012, 92519357013, 92519357014, 92519357015

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Boron	ug/L	ND	25.0	6.2	02/02/21 16:07	
Lithium	ug/L	ND	2.5	0.39	02/02/21 16:07	
Thallium	ug/L	ND	0.10	0.050	02/02/21 16:07	

LABORATORY CONTROL SAMPLE: 3145957

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Boron	ug/L	50	51.7	103	80-120	
Lithium	ug/L	50	48.3	97	80-120	
Thallium	ug/L	10	9.8	98	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3145958 3145959

Parameter	Units	92519353002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Boron	ug/L	ND	50	50	60.4	61.6	117	119	75-125	2	20	
Lithium	ug/L	ND	50	50	50.8	51.1	102	102	75-125	1	20	
Thallium	ug/L	ND	10	10	10.3	10.5	103	105	75-125	2	20	

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QUALITY CONTROL DATA

Project: CHARAH GROUNDWATER
Pace Project No.: 92519357

QC Batch: 596461 | Analysis Method: SM 2540C-2011
QC Batch Method: SM 2540C-2011 | Analysis Description: 2540C Total Dissolved Solids
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92519357001, 92519357002, 92519357007, 92519357008, 92519357009, 92519357013, 92519357014

METHOD BLANK: 3145842 Matrix: Water
Associated Lab Samples: 92519357001, 92519357002, 92519357007, 92519357008, 92519357009, 92519357013, 92519357014

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	ND	25.0	25.0	01/29/21 18:33	

LABORATORY CONTROL SAMPLE: 3145843

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	249	260	104	90-110	

SAMPLE DUPLICATE: 3145844

Parameter	Units	92519357007 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	218	220	1	25	

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QUALITY CONTROL DATA

Project: CHARAH GROUNDWATER
Pace Project No.: 92519357

QC Batch: 596796 | Analysis Method: SM 2540C-2011
QC Batch Method: SM 2540C-2011 | Analysis Description: 2540C Total Dissolved Solids
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92519357006, 92519357010, 92519357011, 92519357012

METHOD BLANK: 3147457 Matrix: Water
Associated Lab Samples: 92519357006, 92519357010, 92519357011, 92519357012

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	ND	25.0	25.0	02/01/21 18:44	

LABORATORY CONTROL SAMPLE: 3147458

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	249	262	105	90-110	

SAMPLE DUPLICATE: 3147459

Parameter	Units	92518942027 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	63.0	57.0	10	25	

SAMPLE DUPLICATE: 3147460

Parameter	Units	92518953007 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	57.0	63.0	10	25	

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QUALITY CONTROL DATA

Project: CHARAH GROUNDWATER
Pace Project No.: 92519357

QC Batch: 597052 | Analysis Method: SM 2540C-2011
QC Batch Method: SM 2540C-2011 | Analysis Description: 2540C Total Dissolved Solids
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92519357003, 92519357004, 92519357005, 92519357015

METHOD BLANK: 3148561 Matrix: Water
Associated Lab Samples: 92519357003, 92519357004, 92519357005, 92519357015

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	ND	25.0	25.0	02/02/21 18:45	

LABORATORY CONTROL SAMPLE: 3148562

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	249	262	105	90-110	

SAMPLE DUPLICATE: 3148563

Parameter	Units	92519207001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	670	670	0	25	

SAMPLE DUPLICATE: 3148564

Parameter	Units	92519331006 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	292000 ug/L	299	2	25	

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QUALITY CONTROL DATA

Project: CHARAH GROUNDWATER
Pace Project No.: 92519357

QC Batch: 596771 | Analysis Method: EPA 300.0 Rev 2.1 1993
QC Batch Method: EPA 300.0 Rev 2.1 1993 | Analysis Description: 300.0 IC Anions
Laboratory: Pace Analytical Services - Asheville

Associated Lab Samples: 92519357001, 92519357002, 92519357003, 92519357004, 92519357005, 92519357006, 92519357007, 92519357008, 92519357009, 92519357010, 92519357011, 92519357012, 92519357013, 92519357014

METHOD BLANK: 3147312 Matrix: Water

Associated Lab Samples: 92519357001, 92519357002, 92519357003, 92519357004, 92519357005, 92519357006, 92519357007, 92519357008, 92519357009, 92519357010, 92519357011, 92519357012, 92519357013, 92519357014

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	ND	1.0	0.60	02/02/21 00:19	
Fluoride	mg/L	ND	0.10	0.050	02/02/21 00:19	
Sulfate	mg/L	ND	1.0	0.50	02/02/21 00:19	

LABORATORY CONTROL SAMPLE: 3147313

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	50	47.4	95	90-110	
Fluoride	mg/L	2.5	2.3	93	90-110	
Sulfate	mg/L	50	48.1	96	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3147314 3147315

Parameter	Units	92519409001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	13.0	50	50	61.8	62.6	98	99	90-110	1	10	
Fluoride	mg/L	0.10	2.5	2.5	2.5	2.5	95	97	90-110	2	10	
Sulfate	mg/L	ND	50	50	49.6	50.4	98	100	90-110	2	10	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3147316 3147317

Parameter	Units	92519357005 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	1080	50	50	1130	1130	101	100	90-110	0	10	
Fluoride	mg/L	0.25	2.5	2.5	1.7	1.8	58	63	90-110	7	10	M1
Sulfate	mg/L	27.5	50	50	77.1	78.7	99	102	90-110	2	10	

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QUALITY CONTROL DATA

Project: CHARAH GROUNDWATER
Pace Project No.: 92519357

QC Batch: 596773
QC Batch Method: EPA 300.0 Rev 2.1 1993
Analysis Method: EPA 300.0 Rev 2.1 1993
Analysis Description: 300.0 IC Anions
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92519357015

METHOD BLANK: 3147322 Matrix: Water
Associated Lab Samples: 92519357015

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	ND	1.0	0.60	02/02/21 11:52	
Fluoride	mg/L	ND	0.10	0.050	02/02/21 11:52	
Sulfate	mg/L	ND	1.0	0.50	02/02/21 11:52	

LABORATORY CONTROL SAMPLE: 3147323

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	50	49.7	99	90-110	
Fluoride	mg/L	2.5	2.5	101	90-110	
Sulfate	mg/L	50	49.7	99	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3147324 3147325

Parameter	Units	92519357015 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	ND	50	50	52.3	53.7	105	107	90-110	3	10	
Fluoride	mg/L	ND	2.5	2.5	2.6	2.7	104	108	90-110	3	10	
Sulfate	mg/L	ND	50	50	52.2	53.6	104	107	90-110	3	10	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3147326 3147327

Parameter	Units	92519216001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	6.5	50	50	59.7	62.9	106	113	90-110	5	10	M1
Fluoride	mg/L	0.60	2.5	2.5	3.4	3.6	111	119	90-110	6	10	M1
Sulfate	mg/L	28.0	50	50	81.0	84.5	106	113	90-110	4	10	M1

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: CHARAH GROUNDWATER
Pace Project No.: 92519357

Sample: BG-1 **Lab ID: 92519357001** Collected: 01/26/21 13:52 Received: 01/29/21 13:40 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.0781 ± 0.357 (0.725) C:NA T:87%**	pCi/L	02/10/21 15:15	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.330 ± 0.318 (0.651) C:77% T:90%**	pCi/L	02/10/21 14:30	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**0.408 ± 0.675 (1.38)**	pCi/L	02/17/21 13:48	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: CHARAH GROUNDWATER
Pace Project No.: 92519357

Sample: BG-2 **Lab ID: 92519357002** Collected: 01/26/21 16:35 Received: 01/29/21 13:40 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.000 ± 0.284 (0.458) C:NA T:93%**	pCi/L	02/11/21 15:52	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.673 ± 0.469 (0.911) C:71% T:81%**	pCi/L	02/11/21 14:33	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**0.673 ± 0.753 (1.37)**	pCi/L	02/17/21 13:48	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: CHARAH GROUNDWATER
Pace Project No.: 92519357

Sample: MW-1 **Lab ID: 92519357003** Collected: 01/28/21 14:20 Received: 01/29/21 13:40 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.240 ± 0.373 (0.645) C:NA T:96%**	pCi/L	02/11/21 15:52	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.841 ± 0.462 (0.844) C:73% T:84%**	pCi/L	02/11/21 14:32	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**1.08 ± 0.835 (1.49)**	pCi/L	02/17/21 13:48	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: CHARAH GROUNDWATER
Pace Project No.: 92519357

Sample: MW-2 **Lab ID: 92519357004** Collected: 01/28/21 11:28 Received: 01/29/21 13:40 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.410 ± 0.384 (0.544) C:NA T:96%**	pCi/L	02/11/21 15:52	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.881 ± 0.444 (0.778) C:74% T:87%**	pCi/L	02/11/21 14:32	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**1.29 ± 0.828 (1.32)**	pCi/L	02/17/21 13:48	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: CHARAH GROUNDWATER
Pace Project No.: 92519357

Sample: MW-3 **Lab ID: 92519357005** Collected: 01/28/21 08:55 Received: 01/29/21 13:40 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**1.02 ± 0.679 (0.842) C:NA T:83%**	pCi/L	02/11/21 15:52	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**1.28 ± 0.510 (0.815) C:73% T:92%**	pCi/L	02/11/21 14:35	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**2.30 ± 1.19 (1.66)**	pCi/L	02/17/21 13:48	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: CHARAH GROUNDWATER
Pace Project No.: 92519357

Sample: MW-4 **Lab ID: 92519357006** Collected: 01/27/21 13:15 Received: 01/29/21 13:40 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.0618 ± 0.320 (0.665) C:NA T:93%**	pCi/L	02/11/21 15:52	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.465 ± 0.380 (0.758) C:73% T:86%**	pCi/L	02/11/21 14:35	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**0.527 ± 0.700 (1.42)**	pCi/L	02/17/21 13:48	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: CHARAH GROUNDWATER
Pace Project No.: 92519357

Sample: MW-5 **Lab ID: 92519357007** Collected: 01/25/21 13:25 Received: 01/29/21 13:40 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**-0.138 ± 0.316 (0.744) C:NA T:99%**	pCi/L	02/11/21 15:52	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**1.02 ± 0.549 (0.992) C:64% T:83%**	pCi/L	02/11/21 14:35	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**1.02 ± 0.865 (1.74)**	pCi/L	02/17/21 13:48	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: CHARAH GROUNDWATER
Pace Project No.: 92519357

Sample: MW-6 **Lab ID: 92519357008** Collected: 01/25/21 16:25 Received: 01/29/21 13:40 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**-0.199 ± 0.345 (0.869) C:NA T:90%**	pCi/L	02/11/21 15:52	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.297 ± 0.447 (0.965) C:69% T:89%**	pCi/L	02/11/21 14:35	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**0.297 ± 0.792 (1.83)**	pCi/L	02/17/21 13:48	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: CHARAH GROUNDWATER
Pace Project No.: 92519357

Sample: MW-7R **Lab ID: 92519357009** Collected: 01/26/21 09:45 Received: 01/29/21 13:40 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**-0.0709 ± 0.324 (0.658) C:NA T:82%**	pCi/L	02/11/21 16:07	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.339 ± 0.419 (0.891) C:70% T:91%**	pCi/L	02/11/21 14:35	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**0.339 ± 0.743 (1.55)**	pCi/L	02/17/21 13:48	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: CHARAH GROUNDWATER
Pace Project No.: 92519357

Sample: MW-8 **Lab ID: 92519357010** Collected: 01/27/21 09:58 Received: 01/29/21 13:40 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.261 ± 0.299 (0.177) C:NA T:91%**	pCi/L	02/11/21 16:07	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.555 ± 0.422 (0.835) C:74% T:85%**	pCi/L	02/11/21 14:35	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**0.816 ± 0.721 (1.01)**	pCi/L	02/17/21 13:48	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: CHARAH GROUNDWATER
Pace Project No.: 92519357

Sample: SW-1 **Lab ID: 92519357011** Collected: 01/27/21 14:00 Received: 01/29/21 13:40 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.579 ± 1.32 (0.784) C:NA T:53%**	pCi/L	02/11/21 16:07	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**1.81 ± 1.05 (1.95) C:63% T:55%**	pCi/L	02/11/21 14:35	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**2.39 ± 2.37 (2.73)**	pCi/L	02/17/21 13:48	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: CHARAH GROUNDWATER
Pace Project No.: 92519357

Sample: SW-2 **Lab ID: 92519357012** Collected: 01/27/21 14:25 Received: 01/29/21 13:40 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.000 ± 0.442 (0.935) C:NA T:82%**	pCi/L	02/11/21 16:07	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**-0.210 ± 0.407 (0.982) C:74% T:79%**	pCi/L	02/11/21 14:35	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**0.000 ± 0.849 (1.92)**	pCi/L	02/17/21 13:48	7440-14-4	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: CHARAH GROUNDWATER
Pace Project No.: 92519357

Sample: LEACHATE **Lab ID: 92519357013** Collected: 01/26/21 10:20 Received: 01/29/21 13:40 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.143 ± 0.343 (0.663) C:NA T:86%**	pCi/L	02/11/21 16:07	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.700 ± 0.435 (0.824) C:75% T:87%**	pCi/L	02/11/21 14:35	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**0.843 ± 0.778 (1.49)**	pCi/L	02/17/21 13:48	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: CHARAH GROUNDWATER
Pace Project No.: 92519357

Sample: DUP **Lab ID: 92519357014** Collected: 01/25/21 16:25 Received: 01/29/21 13:40 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**-0.216 ± 0.374 (0.943) C:NA T:84%**	pCi/L	02/11/21 16:07	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.185 ± 0.389 (0.861) C:73% T:78%**	pCi/L	02/11/21 14:36	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**0.185 ± 0.763 (1.80)**	pCi/L	02/18/21 09:43	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: CHARAH GROUNDWATER
Pace Project No.: 92519357

Sample: EQBL **Lab ID: 92519357015** Collected: 01/28/21 15:10 Received: 01/29/21 13:40 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.135 ± 0.528 (1.01) C:NA T:90%**	pCi/L	02/11/21 16:07	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.284 ± 0.386 (0.827) C:74% T:87%**	pCi/L	02/11/21 14:36	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**0.419 ± 0.914 (1.84)**	pCi/L	02/18/21 09:43	7440-14-4	

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QUALITY CONTROL - RADIOCHEMISTRY

Project: CHARAH GROUNDWATER
Pace Project No.: 92519357

QC Batch: 433317
QC Batch Method: EPA 903.1
Analysis Method: EPA 903.1
Analysis Description: 903.1 Radium-226
Laboratory: Pace Analytical Services - Greensburg
Associated Lab Samples: 92519357001

METHOD BLANK: 2092276 Matrix: Water
Associated Lab Samples: 92519357001

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	0.183 ± 0.398 (0.733) C:NA T:89%	pCi/L	02/10/21 14:40	

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QUALITY CONTROL - RADIOCHEMISTRY

Project: CHARAH GROUNDWATER
Pace Project No.: 92519357

QC Batch: 433478 Analysis Method: EPA 904.0
QC Batch Method: EPA 904.0 Analysis Description: 904.0 Radium 228
Laboratory: Pace Analytical Services - Greensburg
Associated Lab Samples: 92519357002, 92519357003, 92519357004, 92519357005, 92519357006, 92519357007, 92519357008, 92519357009, 92519357010, 92519357011, 92519357012, 92519357013, 92519357014, 92519357015

METHOD BLANK: 2093000 Matrix: Water
Associated Lab Samples: 92519357002, 92519357003, 92519357004, 92519357005, 92519357006, 92519357007, 92519357008, 92519357009, 92519357010, 92519357011, 92519357012, 92519357013, 92519357014, 92519357015

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	0.362 ± 0.368 (0.757) C:73% T:80%	pCi/L	02/11/21 14:37	

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QUALITY CONTROL - RADIOCHEMISTRY

Project: CHARAH GROUNDWATER
Pace Project No.: 92519357

QC Batch: 433318
QC Batch Method: EPA 904.0
Analysis Method: EPA 904.0
Analysis Description: 904.0 Radium 228
Laboratory: Pace Analytical Services - Greensburg
Associated Lab Samples: 92519357001

METHOD BLANK: 2092277 Matrix: Water
Associated Lab Samples: 92519357001

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	0.242 ± 0.366 (0.790) C:68% T:85%	pCi/L	02/10/21 11:25	

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QUALITY CONTROL - RADIOCHEMISTRY

Project: CHARAH GROUNDWATER
Pace Project No.: 92519357

QC Batch: 433477 Analysis Method: EPA 903.1
QC Batch Method: EPA 903.1 Analysis Description: 903.1 Radium-226
Laboratory: Pace Analytical Services - Greensburg
Associated Lab Samples: 92519357002, 92519357003, 92519357004, 92519357005, 92519357006, 92519357007, 92519357008, 92519357009, 92519357010, 92519357011, 92519357012, 92519357013, 92519357014, 92519357015

METHOD BLANK: 2092998 Matrix: Water
Associated Lab Samples: 92519357002, 92519357003, 92519357004, 92519357005, 92519357006, 92519357007, 92519357008, 92519357009, 92519357010, 92519357011, 92519357012, 92519357013, 92519357014, 92519357015

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	0.156 ± 0.270 (0.483) C:NA T:88%	pCi/L	02/11/21 15:52	

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QUALIFIERS

Project: CHARAH GROUNDWATER
Pace Project No.: 92519357

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

Acid preservation may not be appropriate for 2 Chloroethylvinyl ether.

A separate vial preserved to a pH of 4-5 is recommended in SW846 Chapter 4 for the analysis of Acrolein and Acrylonitrile by EPA Method 8260.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Act - Activity

Unc - Uncertainty: SDWA = 1.96 sigma count uncertainty, all other matrices = Expanded Uncertainty (95% confidence interval). Gamma Spec = Expanded Uncertainty (95.4% Confidence Interval)

(MDC) - Minimum Detectable Concentration

Trac - Tracer Recovery (%)

Carr - Carrier Recovery (%)

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

ANALYTE QUALIFIERS

M1 Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: CHARAH GROUNDWATER
Pace Project No.: 92519357

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
92519357001	**BG-1**	EPA 3010A	596488	EPA 6010D	596507
92519357002	**BG-2**	EPA 3010A	596488	EPA 6010D	596507
92519357003	**MW-1**	EPA 3010A	596488	EPA 6010D	596507
92519357004	**MW-2**	EPA 3010A	596488	EPA 6010D	596507
92519357005	**MW-3**	EPA 3010A	596488	EPA 6010D	596507
92519357006	**MW-4**	EPA 3010A	596488	EPA 6010D	596507
92519357007	**MW-5**	EPA 3010A	596488	EPA 6010D	596507
92519357008	**MW-6**	EPA 3010A	596488	EPA 6010D	596507
92519357009	**MW-7R**	EPA 3010A	596488	EPA 6010D	596507
92519357010	**MW-8**	EPA 3010A	596488	EPA 6010D	596507
92519357011	**SW-1**	EPA 3010A	596488	EPA 6010D	596507
92519357012	**SW-2**	EPA 3010A	596488	EPA 6010D	596507
92519357013	**LEACHATE**	EPA 3010A	596488	EPA 6010D	596507
92519357014	**DUP**	EPA 3010A	596488	EPA 6010D	596507
92519357015	**EQBL**	EPA 3010A	596488	EPA 6010D	596507
92519357001	**BG-1**	EPA 3010A	596490	EPA 6020B	596509
92519357002	**BG-2**	EPA 3010A	596490	EPA 6020B	596509
92519357003	**MW-1**	EPA 3010A	596490	EPA 6020B	596509
92519357004	**MW-2**	EPA 3010A	596490	EPA 6020B	596509
92519357005	**MW-3**	EPA 3010A	596490	EPA 6020B	596509
92519357006	**MW-4**	EPA 3010A	596490	EPA 6020B	596509
92519357007	**MW-5**	EPA 3010A	596490	EPA 6020B	596509
92519357008	**MW-6**	EPA 3010A	596490	EPA 6020B	596509
92519357009	**MW-7R**	EPA 3010A	596490	EPA 6020B	596509
92519357010	**MW-8**	EPA 3010A	596490	EPA 6020B	596509
92519357011	**SW-1**	EPA 3010A	596490	EPA 6020B	596509
92519357012	**SW-2**	EPA 3010A	596490	EPA 6020B	596509
92519357013	**LEACHATE**	EPA 3010A	596490	EPA 6020B	596509
92519357014	**DUP**	EPA 3010A	596490	EPA 6020B	596509
92519357015	**EQBL**	EPA 3010A	596490	EPA 6020B	596509
92519357001	**BG-1**	EPA 7470A	597299	EPA 7470A	597689
92519357002	**BG-2**	EPA 7470A	597299	EPA 7470A	597689
92519357003	**MW-1**	EPA 7470A	597299	EPA 7470A	597689
92519357004	**MW-2**	EPA 7470A	597299	EPA 7470A	597689
92519357005	**MW-3**	EPA 7470A	597299	EPA 7470A	597689
92519357006	**MW-4**	EPA 7470A	597299	EPA 7470A	597689
92519357007	**MW-5**	EPA 7470A	597299	EPA 7470A	597689
92519357008	**MW-6**	EPA 7470A	597299	EPA 7470A	597689
92519357009	**MW-7R**	EPA 7470A	597299	EPA 7470A	597689
92519357010	**MW-8**	EPA 7470A	597299	EPA 7470A	597689
92519357011	**SW-1**	EPA 7470A	597299	EPA 7470A	597689
92519357012	**SW-2**	EPA 7470A	597299	EPA 7470A	597689
92519357013	**LEACHATE**	EPA 7470A	597299	EPA 7470A	597689
92519357014	**DUP**	EPA 7470A	597299	EPA 7470A	597689
92519357015	**EQBL**	EPA 7470A	597300	EPA 7470A	597690
92519357001	**BG-1**	EPA 903.1	433317		

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: CHARAH GROUNDWATER
Pace Project No.: 92519357

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
92519357002	**BG-2**	EPA 903.1	433477		
92519357003	**MW-1**	EPA 903.1	433477		
92519357004	**MW-2**	EPA 903.1	433477		
92519357005	**MW-3**	EPA 903.1	433477		
92519357006	**MW-4**	EPA 903.1	433477		
92519357007	**MW-5**	EPA 903.1	433477		
92519357008	**MW-6**	EPA 903.1	433477		
92519357009	**MW-7R**	EPA 903.1	433477		
92519357010	**MW-8**	EPA 903.1	433477		
92519357011	**SW-1**	EPA 903.1	433477		
92519357012	**SW-2**	EPA 903.1	433477		
92519357013	**LEACHATE**	EPA 903.1	433477		
92519357014	**DUP**	EPA 903.1	433477		
92519357015	**EQBL**	EPA 903.1	433477		
92519357001	**BG-1**	EPA 904.0	433318		
92519357002	**BG-2**	EPA 904.0	433478		
92519357003	**MW-1**	EPA 904.0	433478		
92519357004	**MW-2**	EPA 904.0	433478		
92519357005	**MW-3**	EPA 904.0	433478		
92519357006	**MW-4**	EPA 904.0	433478		
92519357007	**MW-5**	EPA 904.0	433478		
92519357008	**MW-6**	EPA 904.0	433478		
92519357009	**MW-7R**	EPA 904.0	433478		
92519357010	**MW-8**	EPA 904.0	433478		
92519357011	**SW-1**	EPA 904.0	433478		
92519357012	**SW-2**	EPA 904.0	433478		
92519357013	**LEACHATE**	EPA 904.0	433478		
92519357014	**DUP**	EPA 904.0	433478		
92519357015	**EQBL**	EPA 904.0	433478		
92519357001	**BG-1**	Total Radium Calculation	435368		
92519357002	**BG-2**	Total Radium Calculation	435368		
92519357003	**MW-1**	Total Radium Calculation	435368		
92519357004	**MW-2**	Total Radium Calculation	435368		
92519357005	**MW-3**	Total Radium Calculation	435368		
92519357006	**MW-4**	Total Radium Calculation	435368		
92519357007	**MW-5**	Total Radium Calculation	435368		
92519357008	**MW-6**	Total Radium Calculation	435368		
92519357009	**MW-7R**	Total Radium Calculation	435368		
92519357010	**MW-8**	Total Radium Calculation	435368		
92519357011	**SW-1**	Total Radium Calculation	435368		
92519357012	**SW-2**	Total Radium Calculation	435368		
92519357013	**LEACHATE**	Total Radium Calculation	435368		
92519357014	**DUP**	Total Radium Calculation	435502		
92519357015	**EQBL**	Total Radium Calculation	435502		
92519357001	**BG-1**	SM 2540C-2011	596461		
92519357002	**BG-2**	SM 2540C-2011	596461		

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: CHARAH GROUNDWATER
Pace Project No.: 92519357

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
92519357003	**MW-1**	SM 2540C-2011	597052		
92519357004	**MW-2**	SM 2540C-2011	597052		
92519357005	**MW-3**	SM 2540C-2011	597052		
92519357006	**MW-4**	SM 2540C-2011	596796		
92519357007	**MW-5**	SM 2540C-2011	596461		
92519357008	**MW-6**	SM 2540C-2011	596461		
92519357009	**MW-7R**	SM 2540C-2011	596461		
92519357010	**MW-8**	SM 2540C-2011	596796		
92519357011	**SW-1**	SM 2540C-2011	596796		
92519357012	**SW-2**	SM 2540C-2011	596796		
92519357013	**LEACHATE**	SM 2540C-2011	596461		
92519357014	**DUP**	SM 2540C-2011	596461		
92519357015	**EQBL**	SM 2540C-2011	597052		
92519357001	**BG-1**	EPA 300.0 Rev 2.1 1993	596771		
92519357002	**BG-2**	EPA 300.0 Rev 2.1 1993	596771		
92519357003	**MW-1**	EPA 300.0 Rev 2.1 1993	596771		
92519357004	**MW-2**	EPA 300.0 Rev 2.1 1993	596771		
92519357005	**MW-3**	EPA 300.0 Rev 2.1 1993	596771		
92519357006	**MW-4**	EPA 300.0 Rev 2.1 1993	596771		
92519357007	**MW-5**	EPA 300.0 Rev 2.1 1993	596771		
92519357008	**MW-6**	EPA 300.0 Rev 2.1 1993	596771		
92519357009	**MW-7R**	EPA 300.0 Rev 2.1 1993	596771		
92519357010	**MW-8**	EPA 300.0 Rev 2.1 1993	596771		
92519357011	**SW-1**	EPA 300.0 Rev 2.1 1993	596771		
92519357012	**SW-2**	EPA 300.0 Rev 2.1 1993	596771		
92519357013	**LEACHATE**	EPA 300.0 Rev 2.1 1993	596771		
92519357014	**DUP**	EPA 300.0 Rev 2.1 1993	596771		
92519357015	**EQBL**	EPA 300.0 Rev 2.1 1993	596773		

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Laboratory receiving samples:
Asheville ☐ Eden ☐ Greenwood ☐ Huntersville ☒ Raleigh ☐ Mechanicsville ☐ Atlanta ☐ Kernersville ☐

Sample Condition Upon Receipt

Client Name: HDR

Project #: WO# : 92519357

92519357

Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☒ Client ☐ Commercial ☐ Pace ☐ Other:____

Custody Seal Present? ☐ Yes ☐ No **Seals Intact?** ☐ Yes ☐ No

Date/Initials Person Examining Contents: 11/29/21 DO

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☐ None ☒ Other

Biological Tissue Frozen? ☐ Yes ☐ No ☒ N/A

Thermometer: ☒ IR Gun ID: 92T064 ☒ Wet ☐ Blue ☐ None

Type of Ice:

Cooler Temp: 0.8, 0.5, 0.7 **Correction Factor:** Add/Subtract (°C) -0.1

Temp should be above freezing to 6°C
☐ Samples out of temp criteria. Samples on ice, cooling process has begun

Cooler Temp Corrected (°C): 0.7, 0.6, 0.4

USDA Regulated Soil (☐ N/A, water sample)
Did samples originate in a quarantine zone within the United States: CA, NY, or SC (check maps)? ☐ Yes ☐ No

Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)? ☐ Yes ☐ No

				Comments/Discrepancy:
Chain of Custody Present?	☒ Yes	☐ No	☐ N/A	1.
Samples Arrived within Hold Time?	☒ Yes	☐ No	☐ N/A	2.
Short Hold Time Analysis (<72 hr.)?	☐ Yes	☒ No	☐ N/A	3.
Rush Turn Around Time Requested?	☐ Yes	☒ No	☐ N/A	4.
Sufficient Volume?	☒ Yes	☐ No	☐ N/A	5.
Correct Containers Used?	☒ Yes	☐ No	☐ N/A	6.
-Pace Containers Used?	☒ Yes	☐ No	☐ N/A	
Containers Intact?	☒ Yes	☐ No	☐ N/A	7.
Dissolved analysis: Samples Field Filtered?	☐ Yes	☒ No	☐ N/A	8.
Sample Labels Match COC? -Includes Date/Time/ID/Analysis Matrix: WT	☒ Yes	☐ No	☐ N/A	9.
Headspace in VOA Vials (>5-6mm)?	☐ Yes	☐ No	☒ N/A	10.
Trip Blank Present?	☐ Yes	☐ No	☒ N/A	11.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☒ N/A	

COMMENTS/SAMPLE DISCREPANCY

Field Data Required? ☐ Yes ☐ No

Lot ID of split containers:

CLIENT NOTIFICATION/RESOLUTION

Person contacted: _____ Date/Time: _____

Project Manager SCURF Review: _____ **Date:** _____

Project Manager SRF Review: _____ **Date:** _____

*Check mark top half of box if pH and/or dechlorination is verified and within the acceptance range for preservation samples.

Exceptions: VOA, Coliform, TOC, Oil and Grease, DRO/8015 (water) DOC, LLHg

**Bottom half of box is to list number of bottles

Project # WO#: 92519357

PM: KLH1 Due Date: 02/05/21

CLIENT: 92-HDR

pg 1

Item#	BP4U-125 mL Plastic Unpreserved (N/A) (Cl-)	BP3U-250 mL Plastic Unpreserved (N/A)	BP2U-500 mL Plastic Unpreserved (N/A)	BP1U-1 liter Plastic Unpreserved (N/A)	BP4S-125 mL Plastic H2SO4 (pH < 2) (Cl-)	BP3N-250 mL plastic HNO3 (pH < 2)	BP4Z-125 mL Plastic ZN Acetate & NaOH (>9)	BP4C-125 mL Plastic NaOH (pH > 12) (Cl-)	WGFU-Wide-mouthed Glass jar Unpreserved	AG1U-1 liter Amber Unpreserved (N/A) (Cl-)	AG1H-1 liter Amber HCl (pH < 2)	AG3U-250 mL Amber Unpreserved (N/A) (Cl-)	AG1S-1 liter Amber H2SO4 (pH < 2)	AG3S-250 mL Amber H2SO4 (pH < 2)	AG3A(DG3A)-250 mL Amber NH4Cl (N/A)(Cl-)	DG9H-40 mL VOA HCl (N/A)	VG9T-40 mL VOA Na2S2O3 (N/A)	VG9U-40 mL VOA Unp (N/A)	DG9P-40 mL VOA H3PO4 (N/A)	VOAK (6 vials per kit)-5035 kit (N/A)	V/GK (3 vials per kit)-VPH/Gas kit (N/A)	SP5T-125 mL Sterile Plastic (N/A – lab)	SP2T-250 mL Sterile Plastic (N/A – lab)	BPIN	BP3A-250 mL Plastic (NH2)2SO4 (9.3-9.7)	AG0U-100 mL Amber Unpreserved vials (N/A)	VSGU-20 mL Scintillation vials (N/A)	DG9U-40 mL Amber Unpreserved vials (N/A)
1		1	1			1																			2				
2		1	1			1																			2				
3		1	1			1																			2				
4		1	1			1																			2				
5		1	1			1																			2				
6		1	1			1																			2				
7		1	1			1																			2				
8		1	1			1																			2				
9		1	1			1																			2				
10		1	1			1																			2				
11		1	1			1																			2				
12		1	1			1																			2				

pH Adjustment Log for Preserved Samples

Sample ID	Type of Preservative	pH upon receipt	Date preservation adjusted	Time preservation adjusted	Amount of Preservative added	Lot #

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. Out of hold, incorrect preservative, out of temp, incorrect containers.

*Check mark top half of box if pH and/or dechlorination is verified and within the acceptance range for preservation samples.

Exceptions: VOA, Coliform, TOC, Oil and Grease, DRO/8015 (water) DOC, LLHg

**Bottom half of box is to list number of bottles

Project # WO#: 92519357

PM: KLH1 Due Date: 02/05/21

CLIENT: 92-HDR

Pg 2

Item#	BP4U-125 mL Plastic Unpreserved (N/A) (Cl-)	BP3U-250 mL Plastic Unpreserved (N/A)	BP2U-500 mL Plastic Unpreserved (N/A)	BP1U-1 liter Plastic Unpreserved (N/A)	BP4S-125 mL Plastic H2SO4 (pH < 2) (Cl-)	BP3N-250 mL plastic HNO3 (pH < 2)	BP4Z-125 mL Plastic ZN Acetate & NaOH (>9)	BP4C-125 mL Plastic NaOH (pH > 12) (Cl-)	WGFU-Wide-mouthed Glass jar Unpreserved	AG1U-1 liter Amber Unpreserved (N/A) (Cl-)	AG1H-1 liter Amber HCl (pH < 2)	AG3U-250 mL Amber Unpreserved (N/A) (Cl-)	AG1S-1 liter Amber H2SO4 (pH < 2)	AG3S-250 mL Amber H2SO4 (pH < 2)	AG3A(DG3A)-250 mL Amber NH4Cl (N/A)(Cl-)	DG9H-40 mL VOA HCl (N/A)	VG9T-40 mL VOA Na2S2O3 (N/A)	VG9U-40 mL VOA Unp (N/A)	DG9P-40 mL VOA H3PO4 (N/A)	VOAK (6 vials per kit)-5035 kit (N/A)	V/GK (3 vials per kit)-VPH/Gas kit (N/A)	SP5T-125 mL Sterile Plastic (N/A – lab)	SP2T-250 mL Sterile Plastic (N/A – lab)	BP3A-250 mL Plastic (NH2)2SO4 (9.3-9.7)	AG0U-100 mL Amber Unpreserved vials (N/A)	VSGU-20 mL Scintillation vials (N/A)	DG9U-40 mL Amber Unpreserved vials (N/A)
1																									2			
2																									2			
3																									2			
4																												
5																												
6																												
7																												
8																												
9																												
10																												
11																												
12																												

pH Adjustment Log for Preserved Samples

Sample ID	Type of Preservative	pH upon receipt	Date preservation adjusted	Time preservation adjusted	Amount of Preservative added	Lot #

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. Out of hold, incorrect preservative, out of temp, incorrect containers.

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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page : 1 Of 1

Section A Required Client Information:	Section B Required Project Information:	Section C Invoice Information:	
Company: HDR	Report To: Mark Filardi / Charles Gruenberg	Attention:	
Address: 440 S. Church St	Copy To:	Company Name:	Regulatory Agency
Suite 900, Charlotte, NC 28202		Address:	
Email: mark.filardi@hdrinc.com	Purchase Order #:	Pace Quote:	
Phone: (704)338-6787 Fax:	Project Name: Charah Groundwater	Pace Project Manager: kevin.herring@pacelabs.com,	State / Location
Requested Due Date:	Project #:	Pace Profile #: 7672	NC

ITEM #	SAMPLE ID (One Character per box. (A-Z, 0-9 / , -) Sample Ids must be unique)	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED START DATE	COLLECTED START TIME	COLLECTED END DATE	COLLECTED END TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H2SO4	HNO3	HCl	NaOH	Na2S2O3	Methanol	Other	Analyses Test: Y/N	6010/6020/7470	Cl, F, SO4	TDS	903.1/904.0/Total Rad	Residual Chlorine (Y/N)	92514357
1	BG-1	WT	G	01/26	1352				5	2		3							x	x	x	x		
2	BG-2	WT	G	01/26	1635				5	2		3							x	x	x	x		
3	MW-1	WT	G	01/28	1420				5	2		3							x	x	x	x		
4	MW-2	WT	G	01/29	1128				5	2		3							x	x	x	x		
5	MW-3	WT	G	01/29	0855				5	2		3							x	x	x	x		
6	MW-4	WT	G	01/27	1315				5	2		3							x	x	x	x		
7	MW-5	WT	G	01/25	1325				5	2		3							x	x	x	x		
8	MW-6	WT	G	01/25	1625				5	2		3							x	x	x	x		
9	MW-7R	WT	G	01/26	0945				5	2		3							x	x	x	x		
10	MW-8	WT	G	01/22	0958				5	2		3							x	x	x	x		
11	SW-1	WT	G	01/27	1400				5	2		3							x	x	x	x		
12	SW-2	WT	G	01/27	1425				5	2		3							x	x	x	x		

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
	Charles Gruenberg / HDR	01/29	1340	MD Pace ITLV	1/29/21	1340	0.7	Y	N	Y
							0.4			
							0.6			

SAMPLER NAME AND SIGNATURE			
PRINT Name of SAMPLER:	Charles Gruenberg		
SIGNATURE of SAMPLER:		DATE Signed:	01/29/2021

TEMP in C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)

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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page : 2 Of 2

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company:	HDR	Report To:	Mark Filardi / Charles Gruenberg	Attention:	
Address:	440 S. Church St	Copy To:		Company Name:	
Suite 900, Charlotte, NC 28202				Address:	
Email:	mark.filardi@hdrinc.com	Purchase Order #:		Pace Quote:	
Phone:	(704)338-6787 Fax:	Project Name:	Charah Groundwater	Pace Project Manager:	kevin.herring@pacelabs.com,
Requested Due Date:		Project #:		Pace Profile #:	7672

Regulatory Agency

State / Location: NC

ITEM #	SAMPLE ID (One Character per box. (A-Z, 0-9 / , -) Sample Ids must be unique)	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED START DATE	COLLECTED START TIME	COLLECTED END DATE	COLLECTED END TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H2SO4	HNO3	HCl	NaOH	Na2S2O3	Methanol	Other	Requested Analysis Filtered (Y/N) Y/N	Analyses Test: 6010/6020/7470	Cl, F, SO4	TDS	903.1/904.0/Total Rad	Residual Chlorine (Y/N)	9265/9357
13	LEACHATE	WT	G	01/26	1020				5	2		3							X	X	X	X		
14	DUP	WT	G	01/25	1625				5	2		3							X	X	X	X		
15	EQBL	WT	G	01/28	1510				5	2		3							X	X	X	X		
16																								
17																								
18																								
19																								
20																								
21																								
22																								
23																								
24																								

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS: TEMP in C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
	Charles Gruenberg / HDR	01/29	1340	MDA Pace HDR	1/29/1	1340	0.7	Y	N	Y
							0.4			
							0.6			

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Charles Gruenberg

SIGNATURE of SAMPLER: [signature] DATE Signed: 01/29/2024

Quality Control Sample Performance Assessment

Pace Analytical
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Test:	Ra-226
Analyst:	MK1
Date:	2/4/2021
Batch ID:	58629
Matrix:	DW

Analyst Must Manually Enter All Fields Highlighted in Yellow.

Method Blank Assessment	
MB Sample ID	2092276
MB concentration:	0.183
M/B Counting Uncertainty:	0.397
MB MDC:	0.733
MB Numerical Performance Indicator:	0.90
MB Status vs Numerical Indicator:	N/A
MB Status vs. MDC:	Pass

Laboratory Control Sample Assessment	LCSD (Y or N)?	Y
	LCS58629	LCSD58629
Count Date:	2/10/2021	2/10/2021
Spike I.D.:	20-032	20-032
Spike Concentration (pCi/mL):	32.178	32.178
Volume Used (mL):	0.10	0.10
Aliquot Volume (L, g, F):	0.654	0.677
Target Conc. (pCi/L, g, F):	4.918	4.754
Uncertainty (Calculated):	0.231	0.223
Result (pCi/L, g, F):	4.589	3.714
LCS/LCSD Counting Uncertainty (pCi/L, g, F):	1.074	0.888
Numerical Performance Indicator:	-0.59	-2.23
Percent Recovery:	93.30%	78.12%
Status vs Numerical Indicator:	N/A	N/A
Status vs Recovery:	Pass	Pass
Upper % Recovery Limits:	135%	135%
Lower % Recovery Limits:	73%	73%

Sample Matrix Spike Control Assessment	MS/MSD 1	MS/MSD 2
Sample Collection Date:		
Sample I.D.		
Sample MS I.D.		
Sample MSD I.D.		
Spike I.D.:		
MS/MSD Decay Corrected Spike Concentration (pCi/mL):		
Spike Volume Used in MS (mL):		
Spike Volume Used in MSD (mL):		
MS Aliquot (L, g, F):		
MS Target Conc.(pCi/L, g, F):		
MSD Aliquot (L, g, F):		
MSD Target Conc. (pCi/L, g, F):		
MS Spike Uncertainty (calculated):		
MSD Spike Uncertainty (calculated):		
Sample Result:		
Sample Result Counting Uncertainty (pCi/L, g, F):		
Sample Matrix Spike Result:		
Matrix Spike Result Counting Uncertainty (pCi/L, g, F):		
Sample Matrix Spike Duplicate Result:		
Matrix Spike Duplicate Result Counting Uncertainty (pCi/L, g, F):		
MS Numerical Performance Indicator:		
MSD Numerical Performance Indicator:		
MS Percent Recovery:		
MSD Percent Recovery:		
MS Status vs Numerical Indicator:		
MSD Status vs Numerical Indicator:		
MS Status vs Recovery:		
MSD Status vs Recovery:		
MS/MSD Upper % Recovery Limits:		
MS/MSD Lower % Recovery Limits:		

Duplicate Sample Assessment		
Sample I.D.:	LCS58629	Enter Duplicate sample IDs if other than LCS/LCSD in the space below.
Duplicate Sample I.D.	LCSD58629	
Sample Result (pCi/L, g, F):	4.589	
Sample Result Counting Uncertainty (pCi/L, g, F):	1.074	
Sample Duplicate Result (pCi/L, g, F):	3.714	
Sample Duplicate Result Counting Uncertainty (pCi/L, g, F):	0.888	
Are sample and/or duplicate results below RL?	NO	
Duplicate Numerical Performance Indicator:	1.230	
(Based on the LCS/LCSD Percent Recoveries) Duplicate RPD:	17.71%	
Duplicate Status vs Numerical Indicator:	N/A	
Duplicate Status vs RPD:	Pass	
% RPD Limit:	32%	

Matrix Spike/Matrix Spike Duplicate Sample Assessment		
Sample I.D.		
Sample MS I.D.		
Sample MSD I.D.		
Sample Matrix Spike Result:		
Matrix Spike Result Counting Uncertainty (pCi/L, g, F):		
Sample Matrix Spike Duplicate Result:		
Matrix Spike Duplicate Result Counting Uncertainty (pCi/L, g, F):		
Duplicate Numerical Performance Indicator:		
(Based on the Percent Recoveries) MS/ MSD Duplicate RPD:		
MS/ MSD Duplicate Status vs Numerical Indicator:		
MS/ MSD Duplicate Status vs RPD:		
% RPD Limit:		

Evaluation of duplicate precision is not applicable if either the sample or duplicate results are below the RL.

Comments:

SLC 2/10/2021

Quality Control Sample Performance Assessment

Pace Analytical
www.pacelabs.com

Test:	Ra-226
Analyst:	VAL
Date:	2/5/2021
Batch ID:	58659
Matrix:	DW

Analyst Must Manually Enter All Fields Highlighted in Yellow.

Method Blank Assessment	
MB Sample ID	2092998
MB concentration:	0.156
M/B Counting Uncertainty:	0.270
MB MDC:	0.483
MB Numerical Performance Indicator:	1.13
MB Status vs Numerical Indicator:	N/A
MB Status vs. MDC:	Pass

Laboratory Control Sample Assessment	LCSD (Y or N)?	Y
	LCS58659	LCSD58659
Count Date:	2/11/2021	2/11/2021
Spike I.D.:	20-032	20-032
Spike Concentration (pCi/mL):	32.178	32.178
Volume Used (mL):	0.10	0.10
Aliquot Volume (L, g, F):	0.656	0.650
Target Conc. (pCi/L, g, F):	4.902	4.948
Uncertainty (Calculated):	0.230	0.233
Result (pCi/L, g, F):	4.225	4.162
LCS/LCSD Counting Uncertainty (pCi/L, g, F):	0.972	0.949
Numerical Performance Indicator:	-1.33	-1.58
Percent Recovery:	86.19%	84.12%
Status vs Numerical Indicator:	N/A	N/A
Status vs Recovery:	Pass	Pass
Upper % Recovery Limits:	135%	135%
Lower % Recovery Limits:	73%	73%

Sample Matrix Spike Control Assessment	MS/MSD 1	MS/MSD 2
Sample Collection Date:	1/7/2021	
Sample I.D.	30400719001	
Sample MS I.D.	30400719001MS	
Sample MSD I.D.		
Spike I.D.:	20-032	
MS/MSD Decay Corrected Spike Concentration (pCi/mL):	32.180	
Spike Volume Used in MS (mL):	0.20	
Spike Volume Used in MSD (mL):		
MS Aliquot (L, g, F):	0.667	
MS Target Conc.(pCi/L, g, F):	9.653	
MSD Aliquot (L, g, F):		
MSD Target Conc. (pCi/L, g, F):		
MS Spike Uncertainty (calculated):	0.454	
MSD Spike Uncertainty (calculated):		
Sample Result:	-0.044	
Sample Result Counting Uncertainty (pCi/L, g, F):	0.195	
Sample Matrix Spike Result:	9.534	
Matrix Spike Result Counting Uncertainty (pCi/L, g, F):	1.538	
Sample Matrix Spike Duplicate Result:		
Matrix Spike Duplicate Result Counting Uncertainty (pCi/L, g, F):		
MS Numerical Performance Indicator:	-0.091	
MSD Numerical Performance Indicator:		
MS Percent Recovery:	99.22%	
MSD Percent Recovery:		
MS Status vs Numerical Indicator:	N/A	
MSD Status vs Numerical Indicator:		
MS Status vs Recovery:	Pass	
MSD Status vs Recovery:		
MS/MSD Upper % Recovery Limits:	136%	
MS/MSD Lower % Recovery Limits:	71%	

Duplicate Sample Assessment		
Sample I.D.:	LCS58659	Enter Duplicate sample IDs if other than LCS/LCSD in the space below.
Duplicate Sample I.D.	LCSD58659	
Sample Result (pCi/L, g, F):	4.225	
Sample Result Counting Uncertainty (pCi/L, g, F):	0.972	
Sample Duplicate Result (pCi/L, g, F):	4.162	
Sample Duplicate Result Counting Uncertainty (pCi/L, g, F):	0.949	
Are sample and/or duplicate results below RL?	NO	
Duplicate Numerical Performance Indicator:	0.090	
(Based on the LCS/LCSD Percent Recoveries) Duplicate RPD:	2.43%	
Duplicate Status vs Numerical Indicator:	N/A	
Duplicate Status vs RPD:	Pass	
% RPD Limit:	32%	

Matrix Spike/Matrix Spike Duplicate Sample Assessment		
Sample I.D.		
Sample MS I.D.		
Sample MSD I.D.		
Sample Matrix Spike Result:		
Matrix Spike Result Counting Uncertainty (pCi/L, g, F):		
Sample Matrix Spike Duplicate Result:		
Matrix Spike Duplicate Result Counting Uncertainty (pCi/L, g, F):		
Duplicate Numerical Performance Indicator:		
(Based on the Percent Recoveries) MS/ MSD Duplicate RPD:		
MS/ MSD Duplicate Status vs Numerical Indicator:		
MS/ MSD Duplicate Status vs RPD:		
% RPD Limit:		

Evaluation of duplicate precision is not applicable if either the sample or duplicate results are below the RL.

Comments:

SLC 2/11/2021

CMT 2/11/21

Quality Control Sample Performance Assessment

Pace Analytical
www.pacelabs.com

Test:	Ra-228
Analyst:	VAL
Date:	2/5/2021
Worklist:	58630
Matrix:	WT

Analyst Must Manually Enter All Fields Highlighted in Yellow.

Method Blank Assessment	
MB Sample ID	2092277
MB concentration:	0.242
M/B 2 Sigma CSU:	0.366
MB MDC:	0.790
MB Numerical Performance Indicator:	1.30
MB Status vs Numerical Indicator:	Pass
MB Status vs. MDC:	Pass

Laboratory Control Sample Assessment	LCSD (Y or N)?	Y
	LCS58630	LCSD58630
Count Date:	2/10/2021	2/10/2021
Spike I.D.:	20-030	20-030
Decay Corrected Spike Concentration (pCi/mL):	36.566	36.566
Volume Used (mL):	0.10	0.10
Aliquot Volume (L, g, F):	0.807	0.811
Target Conc. (pCi/L, g, F):	4.531	4.510
Uncertainty (Calculated):	0.222	0.221
Result (pCi/L, g, F):	5.544	3.522
LCS/LCSD 2 Sigma CSU (pCi/L, g, F):	1.239	0.877
Numerical Performance Indicator:	1.58	-2.14
Percent Recovery:	122.37%	78.08%
Status vs Numerical Indicator:	N/A	N/A
Status vs Recovery:	Pass	Pass
Upper % Recovery Limits:	135%	135%
Lower % Recovery Limits:	60%	60%

Sample Matrix Spike Control Assessment	MS/MSD 1	MS/MSD 2
Sample Collection Date:		
Sample I.D.		
Sample MS I.D.		
Sample MSD I.D.		
Spike I.D.:		
MS/MSD Decay Corrected Spike Concentration (pCi/mL):		
Spike Volume Used in MS (mL):		
Spike Volume Used in MSD (mL):		
MS Aliquot (L, g, F):		
MS Target Conc.(pCi/L, g, F):		
MSD Aliquot (L, g, F):		
MSD Target Conc. (pCi/L, g, F):		
MS Spike Uncertainty (calculated):		
MSD Spike Uncertainty (calculated):		
Sample Result:		
Sample Result 2 Sigma CSU (pCi/L, g, F):		
Sample Matrix Spike Result:		
Matrix Spike Result 2 Sigma CSU (pCi/L, g, F):		
Sample Matrix Spike Duplicate Result:		
Matrix Spike Duplicate Result 2 Sigma CSU (pCi/L, g, F):		
MS Numerical Performance Indicator:		
MSD Numerical Performance Indicator:		
MS Percent Recovery:		
MSD Percent Recovery:		
MS Status vs Numerical Indicator:		
MSD Status vs Numerical Indicator:		
MS Status vs Recovery:		
MSD Status vs Recovery:		
MS/MSD Upper % Recovery Limits:		
MS/MSD Lower % Recovery Limits:		

Duplicate Sample Assessment		
Sample I.D.:	LCS58630	Enter Duplicate sample IDs if other than LCS/LCSD in the space below.
Duplicate Sample I.D.	LCSD58630	
Sample Result (pCi/L, g, F):	5.544	
Sample Result 2 Sigma CSU (pCi/L, g, F):	1.239	
Sample Duplicate Result (pCi/L, g, F):	3.522	
Sample Duplicate Result 2 Sigma CSU (pCi/L, g, F):	0.877	
Are sample and/or duplicate results below RL?	NO	
Duplicate Numerical Performance Indicator:	2.612	
(Based on the LCS/LCSD Percent Recoveries) Duplicate RPD:	44.19%	
Duplicate Status vs Numerical Indicator:	Warning	
Duplicate Status vs RPD:	Fail***	
% RPD Limit:	36%	

Matrix Spike/Matrix Spike Duplicate Sample Assessment		
Sample I.D.		
Sample MS I.D.		
Sample MSD I.D.		
Sample Matrix Spike Result:		
Matrix Spike Result 2 Sigma CSU (pCi/L, g, F):		
Sample Matrix Spike Duplicate Result:		
Matrix Spike Duplicate Result 2 Sigma CSU (pCi/L, g, F):		
Duplicate Numerical Performance Indicator:		
(Based on the Percent Recoveries) MS/ MSD Duplicate RPD:		
MS/ MSD Duplicate Status vs Numerical Indicator:		
MS/ MSD Duplicate Status vs RPD:		
% RPD Limit:		

Evaluation of duplicate precision is not applicable if either the sample or duplicate results are below the MDC.

Comments:

Quality Control Sample Performance Assessment

Pace Analytical
www.pacelabs.com

Test:	Ra-228
Analyst:	VAL
Date:	2/8/2021
Worklist:	58660
Matrix:	WT

Analyst Must Manually Enter All Fields Highlighted in Yellow.

Method Blank Assessment	
MB Sample ID	2093000
MB concentration:	0.362
M/B 2 Sigma CSU:	0.368
MB MDC:	0.757
MB Numerical Performance Indicator:	1.93
MB Status vs Numerical Indicator:	Pass
MB Status vs. MDC:	Pass

Laboratory Control Sample Assessment	LCSD (Y or N)?	Y
	LCS58660	LCSD58660
Count Date:	2/11/2021	2/11/2021
Spike I.D.:	20-030	20-030
Decay Corrected Spike Concentration (pCi/mL):	36.552	36.552
Volume Used (mL):	0.10	0.10
Aliquot Volume (L, g, F):	0.802	0.810
Target Conc. (pCi/L, g, F):	4.557	4.512
Uncertainty (Calculated):	0.223	0.221
Result (pCi/L, g, F):	4.002	4.682
LCS/LCSD 2 Sigma CSU (pCi/L, g, F):	0.897	1.038
Numerical Performance Indicator:	-1.18	0.31
Percent Recovery:	87.82%	103.76%
Status vs Numerical Indicator:	N/A	N/A
Status vs Recovery:	Pass	Pass
Upper % Recovery Limits:	135%	135%
Lower % Recovery Limits:	60%	60%

Sample Matrix Spike Control Assessment	MS/MSD 1	MS/MSD 2
Sample Collection Date:	1/27/2021	
Sample I.D.	30403852001	
Sample MS I.D.	30403852001MS	
Sample MSD I.D.		
Spike I.D.:	20-030	
MS/MSD Decay Corrected Spike Concentration (pCi/mL):	36.737	
Spike Volume Used in MS (mL):	0.20	
Spike Volume Used in MSD (mL):		
MS Aliquot (L, g, F):	0.802	
MS Target Conc.(pCi/L, g, F):	9.157	
MSD Aliquot (L, g, F):		
MSD Target Conc. (pCi/L, g, F):		
MS Spike Uncertainty (calculated):	0.449	
MSD Spike Uncertainty (calculated):		
Sample Result:	0.022	
Sample Result 2 Sigma CSU (pCi/L, g, F):	0.339	
Sample Matrix Spike Result:	10.009	
Matrix Spike Result 2 Sigma CSU (pCi/L, g, F):	1.997	
Sample Matrix Spike Duplicate Result:		
Matrix Spike Duplicate Result 2 Sigma CSU (pCi/L, g, F):		
MS Numerical Performance Indicator:	0.784	
MSD Numerical Performance Indicator:		
MS Percent Recovery:	109.07%	
MSD Percent Recovery:		
MS Status vs Numerical Indicator:	Pass	
MSD Status vs Numerical Indicator:		
MS Status vs Recovery:	Pass	
MSD Status vs Recovery:		
MS/MSD Upper % Recovery Limits:	135%	
MS/MSD Lower % Recovery Limits:	60%	

Duplicate Sample Assessment		
Sample I.D.:	LCS58660	Enter Duplicate sample IDs if other than LCS/LCSD in the space below.
Duplicate Sample I.D.	LCSD58660	
Sample Result (pCi/L, g, F):	4.002	
Sample Result 2 Sigma CSU (pCi/L, g, F):	0.897	
Sample Duplicate Result (pCi/L, g, F):	4.682	
Sample Duplicate Result 2 Sigma CSU (pCi/L, g, F):	1.038	
Are sample and/or duplicate results below RL?	NO	
Duplicate Numerical Performance Indicator:	-0.971	
(Based on the LCS/LCSD Percent Recoveries) Duplicate RPD:	16.64%	
Duplicate Status vs Numerical Indicator:	Pass	
Duplicate Status vs RPD:	Pass	
% RPD Limit:	36%	

Matrix Spike/Matrix Spike Duplicate Sample Assessment		
Sample I.D.		
Sample MS I.D.		
Sample MSD I.D.		
Sample Matrix Spike Result:		
Matrix Spike Result 2 Sigma CSU (pCi/L, g, F):		
Sample Matrix Spike Duplicate Result:		
Matrix Spike Duplicate Result 2 Sigma CSU (pCi/L, g, F):		
Duplicate Numerical Performance Indicator:		
(Based on the Percent Recoveries) MS/ MSD Duplicate RPD:		
MS/ MSD Duplicate Status vs Numerical Indicator:		
MS/ MSD Duplicate Status vs RPD:		
% RPD Limit:		

Evaluation of duplicate precision is not applicable if either the sample or duplicate results are below the MDC.

Comments:

2/12/21

CMC 2/12/21

Pace Analytical Services, LLC
9800 Kincey Ave. Suite 100
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(704)875-9092

February 19, 2021

Mark Filardi
HDR
440 S. Church St
Suite 900
Charlotte, NC 28202

RE: Project: CHARAH GROUNDWATER
Pace Project No.: 92519353

Dear Mark Filardi:

Enclosed are the analytical results for sample(s) received by the laboratory on January 29, 2021. The results relate only to the samples included in this report. Results reported herein conform to the applicable TNI/NELAC Standards and the laboratory's Quality Manual, where applicable, unless otherwise noted in the body of the report.

The test results provided in this final report were generated by each of the following laboratories within the Pace Network:

- Pace Analytical Services - Asheville
- Pace Analytical Services - Greensburg

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Kevin Herring
kevin.herring@pacelabs.com
1(704)875-9092
HORIZON Database Administrator

Enclosures

cc: Charles Gruenberg
Mike Plummer, HDR
Jacob Ruffing

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CERTIFICATIONS

Project: CHARAH GROUNDWATER
Pace Project No.: 92519353

Pace Analytical Services Pennsylvania
1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601
ANAB DOD-ELAP Rad Accreditation #: L2417
Alabama Certification #: 41590
Arizona Certification #: AZ0734
Arkansas Certification
California Certification #: 04222CA
Colorado Certification #: PA01547
Connecticut Certification #: PH-0694
Delaware Certification
EPA Region 4 DW Rad
Florida/TNI Certification #: E87683
Georgia Certification #: C040
Guam Certification
Florida: Cert E871149 SEKS WET
Hawaii Certification
Idaho Certification
Illinois Certification
Indiana Certification
Iowa Certification #: 391
Kansas/TNI Certification #: E-10358
Kentucky Certification #: KY90133
KY WW Permit #: KY0098221
KY WW Permit #: KY0000221
Louisiana DHH/TNI Certification #: LA180012
Louisiana DEQ/TNI Certification #: 4086
Maine Certification #: 2017020
Maryland Certification #: 308
Massachusetts Certification #: M-PA1457
Michigan/PADEP Certification #: 9991
Missouri Certification #: 235
Montana Certification #: Cert0082
Nebraska Certification #: NE-OS-29-14
Nevada Certification #: PA014572018-1
New Hampshire/TNI Certification #: 297617
New Jersey/TNI Certification #: PA051
New Mexico Certification #: PA01457
New York/TNI Certification #: 10888
North Carolina Certification #: 42706
North Dakota Certification #: R-190
Ohio EPA Rad Approval: #41249
Oregon/TNI Certification #: PA200002-010
Pennsylvania/TNI Certification #: 65-00282
Puerto Rico Certification #: PA01457
Rhode Island Certification #: 65-00282
South Dakota Certification
Tennessee Certification #: 02867
Texas/TNI Certification #: T104704188-17-3
Utah/TNI Certification #: PA014572017-9
USDA Soil Permit #: P330-17-00091
Vermont Dept. of Health: ID# VT-0282
Virgin Island/PADEP Certification
Virginia/VELAP Certification #: 9526
Washington Certification #: C868
West Virginia DEP Certification #: 143
West Virginia DHHR Certification #: 9964C
Wisconsin Approve List for Rad
Wyoming Certification #: 8TMS-L

Pace Analytical Services Asheville
2225 Riverside Drive, Asheville, NC 28804
Florida/NELAP Certification #: E87648
North Carolina Drinking Water Certification #: 37712
North Carolina Wastewater Certification #: 40
South Carolina Certification #: 99030001
Virginia/VELAP Certification #: 460222

REPORT OF LABORATORY ANALYSIS

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SAMPLE SUMMARY

Project: CHARAH GROUNDWATER
Pace Project No.: 92519353

Lab ID	Sample ID	Matrix	Date Collected	Date Received
92519353001	**SW-3**	Water	01/27/21 15:00	01/29/21 13:40
92519353002	**SW-4**	Water	01/27/21 15:30	01/29/21 13:40
92519353003	**SW-5**	Water	01/27/21 16:00	01/29/21 13:40
92519353004	**MW-11**	Water	01/29/21 10:05	01/29/21 13:40

REPORT OF LABORATORY ANALYSIS

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SAMPLE ANALYTE COUNT

Project: CHARAH GROUNDWATER
Pace Project No.: 92519353

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
92519353001	**SW-3**	EPA 6010D	KQ, RDT	16	PASI-A
		EPA 6020B	JOR	3	PASI-A
		EPA 7470A	SOO	1	PASI-A
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
		SM 2540C-2011	RED	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	3	PASI-A
92519353002	**SW-4**	EPA 6010D	KQ, RDT	16	PASI-A
		EPA 6020B	JOR	3	PASI-A
		EPA 7470A	SOO	1	PASI-A
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
		SM 2540C-2011	RED	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	3	PASI-A
92519353003	**SW-5**	EPA 6010D	KQ, RDT	16	PASI-A
		EPA 6020B	JOR	3	PASI-A
		EPA 7470A	SOO	1	PASI-A
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
		SM 2540C-2011	RED	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	3	PASI-A
92519353004	**MW-11**	EPA 6010D	KQ, RDT	16	PASI-A
		EPA 6020B	JOR	3	PASI-A
		EPA 7470A	SOO	1	PASI-A
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
		SM 2540C-2011	RED	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	3	PASI-A

PASI-A = Pace Analytical Services - Asheville
PASI-PA = Pace Analytical Services - Greensburg

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SUMMARY OF DETECTION

Project: CHARAH GROUNDWATER
Pace Project No.: 92519353

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92519353001	**SW-3**					
EPA 6010D	Antimony	3.8J	ug/L	5.0	01/31/21 19:02	
EPA 6010D	Barium	62.2	ug/L	5.0	01/31/21 19:02	
EPA 6010D	Calcium	5730	ug/L	100	01/31/21 19:02	
EPA 6020B	Boron	9.8J	ug/L	25.0	02/02/21 16:15	
EPA 6020B	Lithium	0.48J	ug/L	2.5	02/02/21 16:15	
EPA 903.1	Radium-226	-0.0306 ± 0.609 (1.09) C:NA T:75%	pCi/L		02/10/21 15:15	
EPA 904.0	Radium-228	0.561 ± 0.386 (0.734) C:75% T:75%	pCi/L		02/10/21 14:30	
Total Radium Calculation	Total Radium	0.561 ± 0.995 (1.82)	pCi/L		02/17/21 13:04	
SM 2540C-2011	Total Dissolved Solids	105	mg/L	25.0	02/01/21 18:50	
EPA 300.0 Rev 2.1 1993	Chloride	28.4	mg/L	1.0	02/02/21 01:46	
EPA 300.0 Rev 2.1 1993	Fluoride	0.077J	mg/L	0.10	02/02/21 01:46	
EPA 300.0 Rev 2.1 1993	Sulfate	14.1	mg/L	1.0	02/02/21 01:46	
92519353002	**SW-4**					
EPA 6010D	Arsenic	6.0J	ug/L	10.0	02/01/21 19:54	
EPA 6010D	Barium	46.8	ug/L	5.0	01/31/21 19:14	
EPA 6010D	Calcium	5710	ug/L	100	01/31/21 19:14	
EPA 903.1	Radium-226	0.0661 ± 0.343 (0.712) C:NA T:90%	pCi/L		02/10/21 15:15	
EPA 904.0	Radium-228	0.248 ± 0.849 (1.92) C:77% T:33%	pCi/L		02/10/21 14:30	
Total Radium Calculation	Total Radium	0.314 ± 1.19 (2.63)	pCi/L		02/17/21 13:04	
SM 2540C-2011	Total Dissolved Solids	128	mg/L	25.0	02/01/21 18:50	
EPA 300.0 Rev 2.1 1993	Chloride	19.4	mg/L	1.0	02/02/21 02:00	
EPA 300.0 Rev 2.1 1993	Fluoride	0.052J	mg/L	0.10	02/02/21 02:00	
EPA 300.0 Rev 2.1 1993	Sulfate	8.1	mg/L	1.0	02/02/21 02:00	
92519353003	**SW-5**					
EPA 6010D	Arsenic	4.8J	ug/L	10.0	02/01/21 20:10	
EPA 6010D	Barium	254	ug/L	5.0	01/31/21 19:17	
EPA 6010D	Calcium	3640	ug/L	100	01/31/21 19:17	
EPA 6010D	Chromium	7.0	ug/L	5.0	01/31/21 19:17	
EPA 6010D	Cobalt	4.5J	ug/L	5.0	01/31/21 19:17	
EPA 6010D	Copper	7.2	ug/L	5.0	01/31/21 19:17	
EPA 6010D	Lead	13.3	ug/L	5.0	01/31/21 19:17	
EPA 6010D	Nickel	4.7J	ug/L	5.0	01/31/21 19:17	
EPA 6010D	Vanadium	28.9	ug/L	5.0	01/31/21 19:17	

REPORT OF LABORATORY ANALYSIS

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(704)875-9092

SUMMARY OF DETECTION

Project: CHARAH GROUNDWATER
Pace Project No.: 92519353

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92519353003	**SW-5**					
EPA 6010D	Zinc	29.6	ug/L	10.0	01/31/21 19:17	
EPA 6020B	Boron	10.5J	ug/L	25.0	02/02/21 16:47	
EPA 6020B	Lithium	4.3	ug/L	2.5	02/02/21 16:47	
EPA 6020B	Thallium	0.082J	ug/L	0.10	02/02/21 16:47	
EPA 903.1	Radium-226	0.219 ± 0.476 (0.879) C:NA T:92%	pCi/L		02/10/21 15:15	
EPA 904.0	Radium-228	-0.0442 ± 0.340 (0.797) C:75% T:86%	pCi/L		02/10/21 14:30	
Total Radium Calculation	Total Radium	0.219 ± 0.816 (1.68)	pCi/L		02/17/21 13:04	
SM 2540C-2011	Total Dissolved Solids	549	mg/L	25.0	02/01/21 18:50	
EPA 300.0 Rev 2.1 1993	Chloride	8.2	mg/L	1.0	02/02/21 02:15	
EPA 300.0 Rev 2.1 1993	Fluoride	0.13	mg/L	0.10	02/02/21 02:15	
EPA 300.0 Rev 2.1 1993	Sulfate	3.1	mg/L	1.0	02/02/21 02:15	
92519353004	**MW-11**					
EPA 6010D	Barium	66.0	ug/L	5.0	01/31/21 19:20	
EPA 6010D	Calcium	38900	ug/L	100	01/31/21 19:20	
EPA 6020B	Boron	16.5J	ug/L	25.0	02/02/21 16:51	
EPA 6020B	Lithium	10.7	ug/L	2.5	02/02/21 16:51	
EPA 903.1	Radium-226	0.399 ± 0.520 (0.858) C:NA T:78%	pCi/L		02/10/21 15:15	
EPA 904.0	Radium-228	0.0999 ± 0.334 (0.751) C:79% T:87%	pCi/L		02/10/21 14:30	
Total Radium Calculation	Total Radium	0.499 ± 0.854 (1.61)	pCi/L		02/17/21 13:48	
SM 2540C-2011	Total Dissolved Solids	2760	mg/L	357	02/02/21 18:47	
EPA 300.0 Rev 2.1 1993	Chloride	123	mg/L	3.0	02/02/21 08:38	
EPA 300.0 Rev 2.1 1993	Fluoride	0.14	mg/L	0.10	02/02/21 02:29	
EPA 300.0 Rev 2.1 1993	Sulfate	2.0	mg/L	1.0	02/02/21 02:29	

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ANALYTICAL RESULTS

Project: CHARAH GROUNDWATER
Pace Project No.: 92519353

Sample: SW-3 **Lab ID: 92519353001** Collected: 01/27/21 15:00 Received: 01/29/21 13:40 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Antimony	**3.8J**	ug/L	5.0	3.0	1	01/30/21 01:46	01/31/21 19:02	7440-36-0	
Arsenic	ND	ug/L	10.0	4.7	1	01/30/21 01:46	02/01/21 19:41	7440-38-2	
Barium	**62.2**	ug/L	5.0	3.5	1	01/30/21 01:46	01/31/21 19:02	7440-39-3	
Beryllium	ND	ug/L	1.0	0.70	1	01/30/21 01:46	01/31/21 19:02	7440-41-7	
Cadmium	ND	ug/L	1.0	0.40	1	01/30/21 01:46	01/31/21 19:02	7440-43-9	
Calcium	**5730**	ug/L	100	94.2	1	01/30/21 01:46	01/31/21 19:02	7440-70-2	
Chromium	ND	ug/L	5.0	3.7	1	01/30/21 01:46	01/31/21 19:02	7440-47-3	
Cobalt	ND	ug/L	5.0	3.6	1	01/30/21 01:46	01/31/21 19:02	7440-48-4	
Copper	ND	ug/L	5.0	4.3	1	01/30/21 01:46	01/31/21 19:02	7440-50-8	
Lead	ND	ug/L	5.0	4.5	1	01/30/21 01:46	01/31/21 19:02	7439-92-1	
Molybdenum	ND	ug/L	5.0	3.9	1	01/30/21 01:46	01/31/21 19:02	7439-98-7	
Nickel	ND	ug/L	5.0	3.5	1	01/30/21 01:46	01/31/21 19:02	7440-02-0	
Selenium	ND	ug/L	10.0	4.7	1	01/30/21 01:46	02/01/21 19:41	7782-49-2	
Silver	ND	ug/L	5.0	2.5	1	01/30/21 01:46	01/31/21 19:02	7440-22-4	
Vanadium	ND	ug/L	5.0	3.9	1	01/30/21 01:46	01/31/21 19:02	7440-62-2	
Zinc	ND	ug/L	10.0	9.5	1	01/30/21 01:46	01/31/21 19:02	7440-66-6	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Boron	**9.8J**	ug/L	25.0	6.2	1	01/30/21 01:38	02/02/21 16:15	7440-42-8	
Lithium	**0.48J**	ug/L	2.5	0.39	1	01/30/21 01:38	02/02/21 16:15	7439-93-2	
Thallium	ND	ug/L	0.10	0.050	1	01/30/21 01:38	02/02/21 16:15	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	ND	ug/L	0.20	0.12	1	02/03/21 18:44	02/04/21 13:53	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**105**	mg/L	25.0	25.0	1		02/01/21 18:50		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**28.4**	mg/L	1.0	0.60	1		02/02/21 01:46	16887-00-6	
Fluoride	**0.077J**	mg/L	0.10	0.050	1		02/02/21 01:46	16984-48-8	
Sulfate	**14.1**	mg/L	1.0	0.50	1		02/02/21 01:46	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: CHARAH GROUNDWATER
Pace Project No.: 92519353

Sample: SW-4 **Lab ID: 92519353002** Collected: 01/27/21 15:30 Received: 01/29/21 13:40 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Antimony	ND	ug/L	5.0	3.0	1	01/30/21 01:46	01/31/21 19:14	7440-36-0	
Arsenic	**6.0J**	ug/L	10.0	4.7	1	01/30/21 01:46	02/01/21 19:54	7440-38-2	
Barium	**46.8**	ug/L	5.0	3.5	1	01/30/21 01:46	01/31/21 19:14	7440-39-3	
Beryllium	ND	ug/L	1.0	0.70	1	01/30/21 01:46	01/31/21 19:14	7440-41-7	
Cadmium	ND	ug/L	1.0	0.40	1	01/30/21 01:46	01/31/21 19:14	7440-43-9	
Calcium	**5710**	ug/L	100	94.2	1	01/30/21 01:46	01/31/21 19:14	7440-70-2	
Chromium	ND	ug/L	5.0	3.7	1	01/30/21 01:46	01/31/21 19:14	7440-47-3	
Cobalt	ND	ug/L	5.0	3.6	1	01/30/21 01:46	01/31/21 19:14	7440-48-4	
Copper	ND	ug/L	5.0	4.3	1	01/30/21 01:46	01/31/21 19:14	7440-50-8	
Lead	ND	ug/L	5.0	4.5	1	01/30/21 01:46	01/31/21 19:14	7439-92-1	
Molybdenum	ND	ug/L	5.0	3.9	1	01/30/21 01:46	01/31/21 19:14	7439-98-7	
Nickel	ND	ug/L	5.0	3.5	1	01/30/21 01:46	01/31/21 19:14	7440-02-0	
Selenium	ND	ug/L	10.0	4.7	1	01/30/21 01:46	02/01/21 19:54	7782-49-2	
Silver	ND	ug/L	5.0	2.5	1	01/30/21 01:46	01/31/21 19:14	7440-22-4	
Vanadium	ND	ug/L	5.0	3.9	1	01/30/21 01:46	01/31/21 19:14	7440-62-2	
Zinc	ND	ug/L	10.0	9.5	1	01/30/21 01:46	01/31/21 19:14	7440-66-6	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Boron	ND	ug/L	25.0	6.2	1	01/30/21 01:38	02/02/21 16:19	7440-42-8	
Lithium	ND	ug/L	2.5	0.39	1	01/30/21 01:38	02/02/21 16:19	7439-93-2	
Thallium	ND	ug/L	0.10	0.050	1	01/30/21 01:38	02/02/21 16:19	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	ND	ug/L	0.20	0.12	1	02/03/21 18:44	02/04/21 14:00	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**128**	mg/L	25.0	25.0	1		02/01/21 18:50		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**19.4**	mg/L	1.0	0.60	1		02/02/21 02:00	16887-00-6	
Fluoride	**0.052J**	mg/L	0.10	0.050	1		02/02/21 02:00	16984-48-8	
Sulfate	**8.1**	mg/L	1.0	0.50	1		02/02/21 02:00	14808-79-8	

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ANALYTICAL RESULTS

Project: CHARAH GROUNDWATER
Pace Project No.: 92519353

Sample: SW-5 **Lab ID: 92519353003** Collected: 01/27/21 16:00 Received: 01/29/21 13:40 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Antimony	ND	ug/L	5.0	3.0	1	01/30/21 01:46	01/31/21 19:17	7440-36-0	
Arsenic	**4.8J**	ug/L	10.0	4.7	1	01/30/21 01:46	02/01/21 20:10	7440-38-2	
Barium	**254**	ug/L	5.0	3.5	1	01/30/21 01:46	01/31/21 19:17	7440-39-3	
Beryllium	ND	ug/L	1.0	0.70	1	01/30/21 01:46	01/31/21 19:17	7440-41-7	
Cadmium	ND	ug/L	1.0	0.40	1	01/30/21 01:46	01/31/21 19:17	7440-43-9	
Calcium	**3640**	ug/L	100	94.2	1	01/30/21 01:46	01/31/21 19:17	7440-70-2	
Chromium	**7.0**	ug/L	5.0	3.7	1	01/30/21 01:46	01/31/21 19:17	7440-47-3	
Cobalt	**4.5J**	ug/L	5.0	3.6	1	01/30/21 01:46	01/31/21 19:17	7440-48-4	
Copper	**7.2**	ug/L	5.0	4.3	1	01/30/21 01:46	01/31/21 19:17	7440-50-8	
Lead	**13.3**	ug/L	5.0	4.5	1	01/30/21 01:46	01/31/21 19:17	7439-92-1	
Molybdenum	ND	ug/L	5.0	3.9	1	01/30/21 01:46	01/31/21 19:17	7439-98-7	
Nickel	**4.7J**	ug/L	5.0	3.5	1	01/30/21 01:46	01/31/21 19:17	7440-02-0	
Selenium	ND	ug/L	10.0	4.7	1	01/30/21 01:46	02/01/21 20:10	7782-49-2	
Silver	ND	ug/L	5.0	2.5	1	01/30/21 01:46	01/31/21 19:17	7440-22-4	
Vanadium	**28.9**	ug/L	5.0	3.9	1	01/30/21 01:46	01/31/21 19:17	7440-62-2	
Zinc	**29.6**	ug/L	10.0	9.5	1	01/30/21 01:46	01/31/21 19:17	7440-66-6	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Boron	**10.5J**	ug/L	25.0	6.2	1	01/30/21 01:38	02/02/21 16:47	7440-42-8	
Lithium	**4.3**	ug/L	2.5	0.39	1	01/30/21 01:38	02/02/21 16:47	7439-93-2	
Thallium	**0.082J**	ug/L	0.10	0.050	1	01/30/21 01:38	02/02/21 16:47	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	ND	ug/L	0.20	0.12	1	02/03/21 18:44	02/04/21 14:03	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**549**	mg/L	25.0	25.0	1		02/01/21 18:50		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**8.2**	mg/L	1.0	0.60	1		02/02/21 02:15	16887-00-6	
Fluoride	**0.13**	mg/L	0.10	0.050	1		02/02/21 02:15	16984-48-8	
Sulfate	**3.1**	mg/L	1.0	0.50	1		02/02/21 02:15	14808-79-8	

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ANALYTICAL RESULTS

Project: CHARAH GROUNDWATER
Pace Project No.: 92519353

Sample: MW-11 **Lab ID: 92519353004** Collected: 01/29/21 10:05 Received: 01/29/21 13:40 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Antimony	ND	ug/L	5.0	3.0	1	01/30/21 01:46	01/31/21 19:20	7440-36-0	
Arsenic	ND	ug/L	10.0	4.7	1	01/30/21 01:46	02/01/21 20:13	7440-38-2	
Barium	**66.0**	ug/L	5.0	3.5	1	01/30/21 01:46	01/31/21 19:20	7440-39-3	
Beryllium	ND	ug/L	1.0	0.70	1	01/30/21 01:46	01/31/21 19:20	7440-41-7	
Cadmium	ND	ug/L	1.0	0.40	1	01/30/21 01:46	01/31/21 19:20	7440-43-9	
Calcium	**38900**	ug/L	100	94.2	1	01/30/21 01:46	01/31/21 19:20	7440-70-2	
Chromium	ND	ug/L	5.0	3.7	1	01/30/21 01:46	01/31/21 19:20	7440-47-3	
Cobalt	ND	ug/L	5.0	3.6	1	01/30/21 01:46	01/31/21 19:20	7440-48-4	
Copper	ND	ug/L	5.0	4.3	1	01/30/21 01:46	01/31/21 19:20	7440-50-8	
Lead	ND	ug/L	5.0	4.5	1	01/30/21 01:46	01/31/21 19:20	7439-92-1	
Molybdenum	ND	ug/L	5.0	3.9	1	01/30/21 01:46	01/31/21 19:20	7439-98-7	
Nickel	ND	ug/L	5.0	3.5	1	01/30/21 01:46	01/31/21 19:20	7440-02-0	
Selenium	ND	ug/L	10.0	4.7	1	01/30/21 01:46	02/01/21 20:13	7782-49-2	
Silver	ND	ug/L	5.0	2.5	1	01/30/21 01:46	01/31/21 19:20	7440-22-4	
Vanadium	ND	ug/L	5.0	3.9	1	01/30/21 01:46	01/31/21 19:20	7440-62-2	
Zinc	ND	ug/L	10.0	9.5	1	01/30/21 01:46	01/31/21 19:20	7440-66-6	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Boron	**16.5J**	ug/L	25.0	6.2	1	01/30/21 01:38	02/02/21 16:51	7440-42-8	
Lithium	**10.7**	ug/L	2.5	0.39	1	01/30/21 01:38	02/02/21 16:51	7439-93-2	
Thallium	ND	ug/L	0.10	0.050	1	01/30/21 01:38	02/02/21 16:51	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	ND	ug/L	0.20	0.12	1	02/03/21 18:44	02/04/21 14:05	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**2760**	mg/L	357	357	1		02/02/21 18:47		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**123**	mg/L	3.0	1.8	3		02/02/21 08:38	16887-00-6	
Fluoride	**0.14**	mg/L	0.10	0.050	1		02/02/21 02:29	16984-48-8	
Sulfate	**2.0**	mg/L	1.0	0.50	1		02/02/21 02:29	14808-79-8	

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QUALITY CONTROL DATA

Project: CHARAH GROUNDWATER
Pace Project No.: 92519353

QC Batch: 597299 | Analysis Method: EPA 7470A
QC Batch Method: EPA 7470A | Analysis Description: 7470 Mercury
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92519353001, 92519353002, 92519353003, 92519353004

METHOD BLANK: 3149641 Matrix: Water
Associated Lab Samples: 92519353001, 92519353002, 92519353003, 92519353004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury	ug/L	ND	0.20	0.12	02/04/21 13:39	

LABORATORY CONTROL SAMPLE: 3149642

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	2.5	2.7	109	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3149643 3149644

Parameter	Units	92519338001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ug/L	ND	2.5	2.5	2.6	2.6	102	103	75-125	1	25	

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QUALITY CONTROL DATA

Project: CHARAH GROUNDWATER
Pace Project No.: 92519353

QC Batch: 596488
QC Batch Method: EPA 3010A
Analysis Method: EPA 6010D
Analysis Description: 6010 MET
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92519353001, 92519353002, 92519353003, 92519353004

METHOD BLANK: 3145948 Matrix: Water
Associated Lab Samples: 92519353001, 92519353002, 92519353003, 92519353004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Antimony	ug/L	ND	5.0	3.0	01/31/21 18:56	
Arsenic	ug/L	ND	10.0	4.7	02/01/21 19:35	
Barium	ug/L	ND	5.0	3.5	01/31/21 18:56	
Beryllium	ug/L	ND	1.0	0.70	01/31/21 18:56	
Cadmium	ug/L	ND	1.0	0.40	01/31/21 18:56	
Calcium	ug/L	ND	100	94.2	01/31/21 18:56	
Chromium	ug/L	ND	5.0	3.7	01/31/21 18:56	
Cobalt	ug/L	ND	5.0	3.6	01/31/21 18:56	
Copper	ug/L	ND	5.0	4.3	01/31/21 18:56	
Lead	ug/L	ND	5.0	4.5	01/31/21 18:56	
Molybdenum	ug/L	ND	5.0	3.9	01/31/21 18:56	
Nickel	ug/L	ND	5.0	3.5	01/31/21 18:56	
Selenium	ug/L	ND	10.0	4.7	02/01/21 19:35	
Silver	ug/L	ND	5.0	2.5	01/31/21 18:56	
Vanadium	ug/L	ND	5.0	3.9	01/31/21 18:56	
Zinc	ug/L	ND	10.0	9.5	01/31/21 18:56	

LABORATORY CONTROL SAMPLE: 3145949

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	500	451	90	80-120	
Arsenic	ug/L	500	470	94	80-120	
Barium	ug/L	500	481	96	80-120	
Beryllium	ug/L	500	470	94	80-120	
Cadmium	ug/L	500	474	95	80-120	
Calcium	ug/L	5000	5010	100	80-120	
Chromium	ug/L	500	473	95	80-120	
Cobalt	ug/L	500	480	96	80-120	
Copper	ug/L	500	484	97	80-120	
Lead	ug/L	500	473	95	80-120	
Molybdenum	ug/L	500	465	93	80-120	
Nickel	ug/L	500	476	95	80-120	
Selenium	ug/L	500	460	92	80-120	
Silver	ug/L	250	226	90	80-120	
Vanadium	ug/L	500	480	96	80-120	
Zinc	ug/L	500	466	93	80-120	

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QUALITY CONTROL DATA

Project: CHARAH GROUNDWATER
Pace Project No.: 92519353

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3145950 3145951

Parameter	Units	92519353001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Antimony	ug/L	3.8J	500	500	457	469	91	93	75-125	3	20	
Arsenic	ug/L	ND	500	500	496	508	99	101	75-125	2	20	
Barium	ug/L	62.2	500	500	546	566	97	101	75-125	4	20	
Beryllium	ug/L	ND	500	500	488	502	98	100	75-125	3	20	
Cadmium	ug/L	ND	500	500	480	497	96	99	75-125	4	20	
Calcium	ug/L	5730	5000	5000	10500	11000	96	106	75-125	5	20	
Chromium	ug/L	ND	500	500	478	492	95	98	75-125	3	20	
Cobalt	ug/L	ND	500	500	489	506	98	101	75-125	3	20	
Copper	ug/L	ND	500	500	490	505	98	101	75-125	3	20	
Lead	ug/L	ND	500	500	477	489	95	98	75-125	3	20	
Molybdenum	ug/L	ND	500	500	467	481	93	96	75-125	3	20	
Nickel	ug/L	ND	500	500	483	500	97	100	75-125	4	20	
Selenium	ug/L	ND	500	500	519	522	104	104	75-125	1	20	
Silver	ug/L	ND	250	250	229	236	92	95	75-125	3	20	
Vanadium	ug/L	ND	500	500	489	505	98	101	75-125	3	20	
Zinc	ug/L	ND	500	500	481	495	95	98	75-125	3	20	

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QUALITY CONTROL DATA

Project: CHARAH GROUNDWATER
Pace Project No.: 92519353

QC Batch: 596490
QC Batch Method: EPA 3010A
Analysis Method: EPA 6020B
Analysis Description: 6020 MET
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92519353001, 92519353002, 92519353003, 92519353004

METHOD BLANK: 3145956 Matrix: Water
Associated Lab Samples: 92519353001, 92519353002, 92519353003, 92519353004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Boron	ug/L	ND	25.0	6.2	02/02/21 16:07	
Lithium	ug/L	ND	2.5	0.39	02/02/21 16:07	
Thallium	ug/L	ND	0.10	0.050	02/02/21 16:07	

LABORATORY CONTROL SAMPLE: 3145957

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Boron	ug/L	50	51.7	103	80-120	
Lithium	ug/L	50	48.3	97	80-120	
Thallium	ug/L	10	9.8	98	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3145958 3145959

Parameter	Units	92519353002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Boron	ug/L	ND	50	50	60.4	61.6	117	119	75-125	2	20	
Lithium	ug/L	ND	50	50	50.8	51.1	102	102	75-125	1	20	
Thallium	ug/L	ND	10	10	10.3	10.5	103	105	75-125	2	20	

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QUALITY CONTROL DATA

Project: CHARAH GROUNDWATER
Pace Project No.: 92519353

QC Batch: 596796 | Analysis Method: SM 2540C-2011
QC Batch Method: SM 2540C-2011 | Analysis Description: 2540C Total Dissolved Solids
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92519353001, 92519353002, 92519353003

METHOD BLANK: 3147457 Matrix: Water
Associated Lab Samples: 92519353001, 92519353002, 92519353003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	ND	25.0	25.0	02/01/21 18:44	

LABORATORY CONTROL SAMPLE: 3147458

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	249	262	105	90-110	

SAMPLE DUPLICATE: 3147459

Parameter	Units	92518942027 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	63.0	57.0	10	25	

SAMPLE DUPLICATE: 3147460

Parameter	Units	92518953007 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	57.0	63.0	10	25	

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QUALITY CONTROL DATA

Project: CHARAH GROUNDWATER
Pace Project No.: 92519353

QC Batch: 597052
QC Batch Method: SM 2540C-2011
Analysis Method: SM 2540C-2011
Analysis Description: 2540C Total Dissolved Solids
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92519353004

METHOD BLANK: 3148561 Matrix: Water
Associated Lab Samples: 92519353004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	ND	25.0	25.0	02/02/21 18:45	

LABORATORY CONTROL SAMPLE: 3148562

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	249	262	105	90-110	

SAMPLE DUPLICATE: 3148563

Parameter	Units	92519207001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	670	670	0	25	

SAMPLE DUPLICATE: 3148564

Parameter	Units	92519331006 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	292000 ug/L	299	2	25	

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QUALITY CONTROL DATA

Project: CHARAH GROUNDWATER
Pace Project No.: 92519353

QC Batch: 596771
QC Batch Method: EPA 300.0 Rev 2.1 1993
Analysis Method: EPA 300.0 Rev 2.1 1993
Analysis Description: 300.0 IC Anions
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92519353001, 92519353002, 92519353003, 92519353004

METHOD BLANK: 3147312 Matrix: Water
Associated Lab Samples: 92519353001, 92519353002, 92519353003, 92519353004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	ND	1.0	0.60	02/02/21 00:19	
Fluoride	mg/L	ND	0.10	0.050	02/02/21 00:19	
Sulfate	mg/L	ND	1.0	0.50	02/02/21 00:19	

LABORATORY CONTROL SAMPLE: 3147313

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	50	47.4	95	90-110	
Fluoride	mg/L	2.5	2.3	93	90-110	
Sulfate	mg/L	50	48.1	96	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3147314 3147315

Parameter	Units	92519409001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	13.0	50	50	61.8	62.6	98	99	90-110	1	10	
Fluoride	mg/L	0.10	2.5	2.5	2.5	2.5	95	97	90-110	2	10	
Sulfate	mg/L	ND	50	50	49.6	50.4	98	100	90-110	2	10	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3147316 3147317

Parameter	Units	92519357005 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	1080	50	50	1130	1130	101	100	90-110	0	10	
Fluoride	mg/L	0.25	2.5	2.5	1.7	1.8	58	63	90-110	7	10	M1
Sulfate	mg/L	27.5	50	50	77.1	78.7	99	102	90-110	2	10	

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REPORT OF LABORATORY ANALYSIS

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Huntersville, NC 28078
(704)875-9092

ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: CHARAH GROUNDWATER
Pace Project No.: 92519353

Sample: SW-3 **Lab ID: 92519353001** Collected: 01/27/21 15:00 Received: 01/29/21 13:40 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**-0.0306 ± 0.609 (1.09) C:NA T:75%**	pCi/L	02/10/21 15:15	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.561 ± 0.386 (0.734) C:75% T:75%**	pCi/L	02/10/21 14:30	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**0.561 ± 0.995 (1.82)**	pCi/L	02/17/21 13:04	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: CHARAH GROUNDWATER
Pace Project No.: 92519353

Sample: SW-4 **Lab ID: 92519353002** Collected: 01/27/21 15:30 Received: 01/29/21 13:40 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.0661 ± 0.343 (0.712) C:NA T:90%**	pCi/L	02/10/21 15:15	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.248 ± 0.849 (1.92) C:77% T:33%**	pCi/L	02/10/21 14:30	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**0.314 ± 1.19 (2.63)**	pCi/L	02/17/21 13:04	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: CHARAH GROUNDWATER
Pace Project No.: 92519353

Sample: SW-5 **Lab ID: 92519353003** Collected: 01/27/21 16:00 Received: 01/29/21 13:40 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.219 ± 0.476 (0.879) C:NA T:92%**	pCi/L	02/10/21 15:15	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**-0.0442 ± 0.340 (0.797) C:75% T:86%**	pCi/L	02/10/21 14:30	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**0.219 ± 0.816 (1.68)**	pCi/L	02/17/21 13:04	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: CHARAH GROUNDWATER
Pace Project No.: 92519353

Sample: MW-11 **Lab ID: 92519353004** Collected: 01/29/21 10:05 Received: 01/29/21 13:40 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.399 ± 0.520 (0.858) C:NA T:78%**	pCi/L	02/10/21 15:15	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.0999 ± 0.334 (0.751) C:79% T:87%**	pCi/L	02/10/21 14:30	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**0.499 ± 0.854 (1.61)**	pCi/L	02/17/21 13:48	7440-14-4	

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QUALITY CONTROL - RADIOCHEMISTRY

Project: CHARAH GROUNDWATER
Pace Project No.: 92519353

QC Batch: 433317 Analysis Method: EPA 903.1
QC Batch Method: EPA 903.1 Analysis Description: 903.1 Radium-226
Laboratory: Pace Analytical Services - Greensburg
Associated Lab Samples: 92519353001, 92519353002, 92519353003, 92519353004

METHOD BLANK: 2092276 Matrix: Water
Associated Lab Samples: 92519353001, 92519353002, 92519353003, 92519353004

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	0.183 ± 0.398 (0.733) C:NA T:89%	pCi/L	02/10/21 14:40	

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QUALITY CONTROL - RADIOCHEMISTRY

Project: CHARAH GROUNDWATER
Pace Project No.: 92519353

QC Batch: 433318 Analysis Method: EPA 904.0
QC Batch Method: EPA 904.0 Analysis Description: 904.0 Radium 228
Laboratory: Pace Analytical Services - Greensburg
Associated Lab Samples: 92519353001, 92519353002, 92519353003, 92519353004

METHOD BLANK: 2092277 Matrix: Water
Associated Lab Samples: 92519353001, 92519353002, 92519353003, 92519353004

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	0.242 ± 0.366 (0.790) C:68% T:85%	pCi/L	02/10/21 11:25	

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Huntersville, NC 28078
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QUALIFIERS

Project: CHARAH GROUNDWATER
Pace Project No.: 92519353

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

Acid preservation may not be appropriate for 2 Chloroethylvinyl ether.

A separate vial preserved to a pH of 4-5 is recommended in SW846 Chapter 4 for the analysis of Acrolein and Acrylonitrile by EPA Method 8260.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Act - Activity

Unc - Uncertainty: SDWA = 1.96 sigma count uncertainty, all other matrices = Expanded Uncertainty (95% confidence interval). Gamma Spec = Expanded Uncertainty (95.4% Confidence Interval)

(MDC) - Minimum Detectable Concentration

Trac - Tracer Recovery (%)

Carr - Carrier Recovery (%)

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

ANALYTE QUALIFIERS

M1 Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: CHARAH GROUNDWATER
Pace Project No.: 92519353

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
92519353001	**SW-3**	EPA 3010A	596488	EPA 6010D	596507
92519353002	**SW-4**	EPA 3010A	596488	EPA 6010D	596507
92519353003	**SW-5**	EPA 3010A	596488	EPA 6010D	596507
92519353004	**MW-11**	EPA 3010A	596488	EPA 6010D	596507
92519353001	**SW-3**	EPA 3010A	596490	EPA 6020B	596509
92519353002	**SW-4**	EPA 3010A	596490	EPA 6020B	596509
92519353003	**SW-5**	EPA 3010A	596490	EPA 6020B	596509
92519353004	**MW-11**	EPA 3010A	596490	EPA 6020B	596509
92519353001	**SW-3**	EPA 7470A	597299	EPA 7470A	597689
92519353002	**SW-4**	EPA 7470A	597299	EPA 7470A	597689
92519353003	**SW-5**	EPA 7470A	597299	EPA 7470A	597689
92519353004	**MW-11**	EPA 7470A	597299	EPA 7470A	597689
92519353001	**SW-3**	EPA 903.1	433317		
92519353002	**SW-4**	EPA 903.1	433317		
92519353003	**SW-5**	EPA 903.1	433317		
92519353004	**MW-11**	EPA 903.1	433317		
92519353001	**SW-3**	EPA 904.0	433318		
92519353002	**SW-4**	EPA 904.0	433318		
92519353003	**SW-5**	EPA 904.0	433318		
92519353004	**MW-11**	EPA 904.0	433318		
92519353001	**SW-3**	Total Radium Calculation	435355		
92519353002	**SW-4**	Total Radium Calculation	435355		
92519353003	**SW-5**	Total Radium Calculation	435355		
92519353004	**MW-11**	Total Radium Calculation	435368		
92519353001	**SW-3**	SM 2540C-2011	596796		
92519353002	**SW-4**	SM 2540C-2011	596796		
92519353003	**SW-5**	SM 2540C-2011	596796		
92519353004	**MW-11**	SM 2540C-2011	597052		
92519353001	**SW-3**	EPA 300.0 Rev 2.1 1993	596771		
92519353002	**SW-4**	EPA 300.0 Rev 2.1 1993	596771		
92519353003	**SW-5**	EPA 300.0 Rev 2.1 1993	596771		
92519353004	**MW-11**	EPA 300.0 Rev 2.1 1993	596771		

REPORT OF LABORATORY ANALYSIS

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Pace Analytical®	Sample Condition Upon Receipt(SCUR)	Page 1 of 2
	Document No.: F-CAR-CS-033-Rev.07	Issuing Authority: Pace Carolinas Quality Office

Laboratory receiving samples:
Asheville ☐ Eden ☐ Greenwood ☐ Huntersville ☑ Raleigh ☐ Mechanicsville ☐ Atlanta ☐ Kernersville ☐

Sample Condition Upon Receipt

Client Name: HDR **Project #:**

WO# : 92519353

92519353

Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☑ Client ☐ Commercial ☐ Pace ☐ Other:____

Custody Seal Present? ☐ Yes ☑ No **Seals Intact?** ☐ Yes ☑ No

Date/Initials Person Examining Contents: 1-29-21 AMP

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☑ None ☐ Other

Biological Tissue Frozen? ☐ Yes ☐ No ☑ N/A

Thermometer: ☑ IR Gun ID: 92T064 ☑ Wet ☐ Blue ☐ None **Type of Ice:**

Cooler Temp: 1.7 **Correction Factor:** Add/Subtract (°C) -0.1

Cooler Temp Corrected (°C): 1.6

Temp should be above freezing to 6°C
☐ Samples out of temp criteria. Samples on ice, cooling process has begun

USDA Regulated Soil (☑ N/A, water sample)
Did samples originate in a quarantine zone within the United States: CA, NY, or SC (check maps)? ☐ Yes ☐ No

Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)? ☐ Yes ☐ No

				Comments/Discrepancy:
Chain of Custody Present?	☑ Yes	☐ No	☐ N/A	1.
Samples Arrived within Hold Time?	☑ Yes	☐ No	☐ N/A	2.
Short Hold Time Analysis (<72 hr.)?	☐ Yes	☑ No	☐ N/A	3.
Rush Turn Around Time Requested?	☐ Yes	☑ No	☐ N/A	4.
Sufficient Volume?	☑ Yes	☐ No	☐ N/A	5.
Correct Containers Used?	☑ Yes	☐ No	☐ N/A	6.
-Pace Containers Used?	☑ Yes	☐ No	☐ N/A	
Containers Intact?	☑ Yes	☐ No	☐ N/A	7.
Dissolved analysis: Samples Field Filtered?	☐ Yes	☐ No	☑ N/A	8.
Sample Labels Match COC?	☑ Yes	☐ No	☐ N/A	9.
-Includes Date/Time/ID/Analysis Matrix: WT				
Headspace in VOA Vials (>5-6mm)?	☐ Yes	☐ No	☑ N/A	10.
Trip Blank Present?	☐ Yes	☐ No	☑ N/A	11.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☑ N/A	

COMMENTS/SAMPLE DISCREPANCY **Field Data Required?** ☐ Yes ☐ No

Lot ID of split containers:

CLIENT NOTIFICATION/RESOLUTION

Person contacted: _____ Date/Time: _____

Project Manager SCURF Review: _____ **Date:** _____

Project Manager SRF Review: _____ **Date:** _____

*Check mark top half of box if pH and/or dechlorination is verified and within the acceptance range for preservation samples.

Exceptions: VOA, Coliform, TOC, Oil and Grease, DRO/8015 (water) DOC, LLHg

**Bottom half of box is to list number of bottles

Project # **WO# : 92519353**

PM: KLH1 Due Date: 02/05/21

CLIENT: 92-HDR

Item#	BP4U-125 mL Plastic Unpreserved (N/A) (Cl-)	BP3U-250 mL Plastic Unpreserved (N/A)	BP2U-500 mL Plastic Unpreserved (N/A)	BP1U-1 liter Plastic Unpreserved (N/A)	BP4S-125 mL Plastic H2SO4 (pH < 2) (Cl-)	BP3N-250 mL plastic HNO3 (pH < 2)	BP4Z-125 mL Plastic ZN Acetate & NaOH (>9)	BP4C-125 mL Plastic NaOH (pH > 12) (Cl-)	WGFU-Wide-mouthed Glass jar Unpreserved	AG1U-1 liter Amber Unpreserved (N/A) (Cl-)	AG1H-1 liter Amber HCl (pH < 2)	AG3U-250 mL Amber Unpreserved (N/A) (Cl-)	AG1S-1 liter Amber H2SO4 (pH < 2)	AG3S-250 mL Amber H2SO4 (pH < 2)	AG3A(DG3A)-250 mL Amber NH4Cl (N/A)(Cl-)	DG9H-40 mL VOA HCl (N/A)	VG9T-40 mL VOA Na2S2O3 (N/A)	VG9U-40 mL VOA Unp (N/A)	DG9P-40 mL VOA H3PO4 (N/A)	VOAK (6 vials per kit)-5035 kit (N/A)	V/GK (3 vials per kit)-VPH/Gas kit (N/A)	SP5T-125 mL Sterile Plastic (N/A – lab)	SP2T-250 mL Sterile Plastic (N/A – lab)	BPIN	BP3A-250 mL Plastic (NH2)2SO4 (9.3-9.7)	AG0U-100 mL Amber Unpreserved vials (N/A)	VSGU-20 mL Scintillation vials (N/A)	DG9U-40 mL Amber Unpreserved vials (N/A)
1		—	—			1																			2			
2		—	—			1																			2			
3		—	—			1																			2			
4		—	—			1																			2			
5																												
6																												
7																												
8																												
9																												
10																												
11																												
12																												

pH Adjustment Log for Preserved Samples

Sample ID	Type of Preservative	pH upon receipt	Date preservation adjusted	Time preservation adjusted	Amount of Preservative added	Lot #

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. Out of hold, incorrect preservative, out of temp, incorrect containers.

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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page : 1 Of 1

Section A — Required Client Information:

Company:	HDR
Address:	440 S. Church St
	Suite 900, Charlotte, NC 28202
Email:	mark.filardi@hdrinc.com
Phone:	(704)338-6787 Fax:
Requested Due Date:	

Section B — Required Project Information:

Report To:	Mark Filardi / Charles Gruenberg
Copy To:	
Purchase Order #:	
Project Name:	Charah Groundwater
Project #:	

Section C — Invoice Information:

Attention:	
Company Name:	
Address:	
Pace Quote:	
Pace Project Manager:	kevin.herring@pacelabs.com,
Pace Profile #:	7672

Regulatory Agency:

State / Location: NC

SAMPLE ID
One Character per box.
(A-Z, 0-9 / , -)
Sample Ids must be unique

MATRIX	CODE
Drinking Water	DW
Water	WT
Waste Water	WW
Product	P
Soil/Solid	SL
Oil	OL
Wipe	WP
Air	AR
Other	OT
Tissue	TS

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED START DATE	COLLECTED START TIME	COLLECTED END DATE	COLLECTED END TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H2SO4	HNO3	HCl	NaOH	Na2S2O3	Methanol	Other	Analyses Test Y/N	6010/6020/7470	Cl, F, SO4	TDS	903.1/904.0/Total Rad	Residual Chlorine (Y/N)	G25H353
1	SW-3	WT	G	01/27	1500				5	2		3							X	X	X	X		
2	SW-4	WT	G	01/27	1530				5	2		3							X	X	X	X		
3	SW-5	WT	G	01/27	1680				5	2		3							X	X	X	X		
4	MW-11	WT	G	01/29	1005				5	2		3							X	X	X	X		
5																								
6																								
7																								
8																								
9																								
10																								
11																								
12																								

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
	Charles Gruenberg / HDR	01/29	1340	MD G Pace ITL V	1-21-21	1140	1.6	Y	N	Y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Charles Gruenberg

SIGNATURE of SAMPLER: [signature]

DATE Signed: 01/29/2021

TEMP in C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
1.6	Y	N	Y

Quality Control Sample Performance Assessment

Pace Analytical
www.pacelabs.com

Test:	Ra-226
Analyst:	MK1
Date:	2/4/2021
Batch ID:	58629
Matrix:	DW

Analyst Must Manually Enter All Fields Highlighted in Yellow.

Method Blank Assessment	
MB Sample ID	2092276
MB concentration:	0.183
M/B Counting Uncertainty:	0.397
MB MDC:	0.733
MB Numerical Performance Indicator:	0.90
MB Status vs Numerical Indicator:	N/A
MB Status vs. MDC:	Pass

Laboratory Control Sample Assessment	LCSD (Y or N)?	Y
	LCS58629	LCSD58629
Count Date:	2/10/2021	2/10/2021
Spike I.D.:	20-032	20-032
Spike Concentration (pCi/mL):	32.178	32.178
Volume Used (mL):	0.10	0.10
Aliquot Volume (L, g, F):	0.654	0.677
Target Conc. (pCi/L, g, F):	4.918	4.754
Uncertainty (Calculated):	0.231	0.223
Result (pCi/L, g, F):	4.589	3.714
LCS/LCSD Counting Uncertainty (pCi/L, g, F):	1.074	0.888
Numerical Performance Indicator:	-0.59	-2.23
Percent Recovery:	93.30%	78.12%
Status vs Numerical Indicator:	N/A	N/A
Status vs Recovery:	Pass	Pass
Upper % Recovery Limits:	135%	135%
Lower % Recovery Limits:	73%	73%

Sample Matrix Spike Control Assessment	MS/MSD 1	MS/MSD 2
Sample Collection Date:		
Sample I.D.		
Sample MS I.D.		
Sample MSD I.D.		
Spike I.D.:		
MS/MSD Decay Corrected Spike Concentration (pCi/mL):		
Spike Volume Used in MS (mL):		
Spike Volume Used in MSD (mL):		
MS Aliquot (L, g, F):		
MS Target Conc.(pCi/L, g, F):		
MSD Aliquot (L, g, F):		
MSD Target Conc. (pCi/L, g, F):		
MS Spike Uncertainty (calculated):		
MSD Spike Uncertainty (calculated):		
Sample Result:		
Sample Result Counting Uncertainty (pCi/L, g, F):		
Sample Matrix Spike Result:		
Matrix Spike Result Counting Uncertainty (pCi/L, g, F):		
Sample Matrix Spike Duplicate Result:		
Matrix Spike Duplicate Result Counting Uncertainty (pCi/L, g, F):		
MS Numerical Performance Indicator:		
MSD Numerical Performance Indicator:		
MS Percent Recovery:		
MSD Percent Recovery:		
MS Status vs Numerical Indicator:		
MSD Status vs Numerical Indicator:		
MS Status vs Recovery:		
MSD Status vs Recovery:		
MS/MSD Upper % Recovery Limits:		
MS/MSD Lower % Recovery Limits:		

Duplicate Sample Assessment		
Sample I.D.:	LCS58629	Enter Duplicate sample IDs if other than LCS/LCSD in the space below.
Duplicate Sample I.D.	LCSD58629	
Sample Result (pCi/L, g, F):	4.589	
Sample Result Counting Uncertainty (pCi/L, g, F):	1.074	
Sample Duplicate Result (pCi/L, g, F):	3.714	
Sample Duplicate Result Counting Uncertainty (pCi/L, g, F):	0.888	
Are sample and/or duplicate results below RL?	NO	
Duplicate Numerical Performance Indicator:	1.230	
(Based on the LCS/LCSD Percent Recoveries) Duplicate RPD:	17.71%	
Duplicate Status vs Numerical Indicator:	N/A	
Duplicate Status vs RPD:	Pass	
% RPD Limit:	32%	

Matrix Spike/Matrix Spike Duplicate Sample Assessment		
Sample I.D.		
Sample MS I.D.		
Sample MSD I.D.		
Sample Matrix Spike Result:		
Matrix Spike Result Counting Uncertainty (pCi/L, g, F):		
Sample Matrix Spike Duplicate Result:		
Matrix Spike Duplicate Result Counting Uncertainty (pCi/L, g, F):		
Duplicate Numerical Performance Indicator:		
(Based on the Percent Recoveries) MS/ MSD Duplicate RPD:		
MS/ MSD Duplicate Status vs Numerical Indicator:		
MS/ MSD Duplicate Status vs RPD:		
% RPD Limit:		

Evaluation of duplicate precision is not applicable if either the sample or duplicate results are below the RL.

Comments:

SLC 2/10/2021

Quality Control Sample Performance Assessment

Pace Analytical
www.pacelabs.com

Test:	Ra-226
Analyst:	VAL
Date:	2/5/2021
Batch ID:	58659
Matrix:	DW

Analyst Must Manually Enter All Fields Highlighted in Yellow.

Method Blank Assessment	
MB Sample ID	2092998
MB concentration:	0.156
M/B Counting Uncertainty:	0.270
MB MDC:	0.483
MB Numerical Performance Indicator:	1.13
MB Status vs Numerical Indicator:	N/A
MB Status vs. MDC:	Pass

Laboratory Control Sample Assessment	LCSD (Y or N)?	Y
	LCS58659	LCSD58659
Count Date:	2/11/2021	2/11/2021
Spike I.D.:	20-032	20-032
Spike Concentration (pCi/mL):	32.178	32.178
Volume Used (mL):	0.10	0.10
Aliquot Volume (L, g, F):	0.656	0.650
Target Conc. (pCi/L, g, F):	4.902	4.948
Uncertainty (Calculated):	0.230	0.233
Result (pCi/L, g, F):	4.225	4.162
LCS/LCSD Counting Uncertainty (pCi/L, g, F):	0.972	0.949
Numerical Performance Indicator:	-1.33	-1.58
Percent Recovery:	86.19%	84.12%
Status vs Numerical Indicator:	N/A	N/A
Status vs Recovery:	Pass	Pass
Upper % Recovery Limits:	135%	135%
Lower % Recovery Limits:	73%	73%

Sample Matrix Spike Control Assessment	MS/MSD 1	MS/MSD 2
Sample Collection Date:	1/7/2021	
Sample I.D.	30400719001	
Sample MS I.D.	30400719001MS	
Sample MSD I.D.		
Spike I.D.:	20-032	
MS/MSD Decay Corrected Spike Concentration (pCi/mL):	32.180	
Spike Volume Used in MS (mL):	0.20	
Spike Volume Used in MSD (mL):		
MS Aliquot (L, g, F):	0.667	
MS Target Conc.(pCi/L, g, F):	9.653	
MSD Aliquot (L, g, F):		
MSD Target Conc. (pCi/L, g, F):		
MS Spike Uncertainty (calculated):	0.454	
MSD Spike Uncertainty (calculated):		
Sample Result:	-0.044	
Sample Result Counting Uncertainty (pCi/L, g, F):	0.195	
Sample Matrix Spike Result:	9.534	
Matrix Spike Result Counting Uncertainty (pCi/L, g, F):	1.538	
Sample Matrix Spike Duplicate Result:		
Matrix Spike Duplicate Result Counting Uncertainty (pCi/L, g, F):		
MS Numerical Performance Indicator:	-0.091	
MSD Numerical Performance Indicator:		
MS Percent Recovery:	99.22%	
MSD Percent Recovery:		
MS Status vs Numerical Indicator:	N/A	
MSD Status vs Numerical Indicator:		
MS Status vs Recovery:	Pass	
MSD Status vs Recovery:		
MS/MSD Upper % Recovery Limits:	136%	
MS/MSD Lower % Recovery Limits:	71%	

Duplicate Sample Assessment		
Sample I.D.:	LCS58659	Enter Duplicate sample IDs if other than LCS/LCSD in the space below.
Duplicate Sample I.D.	LCSD58659	
Sample Result (pCi/L, g, F):	4.225	
Sample Result Counting Uncertainty (pCi/L, g, F):	0.972	
Sample Duplicate Result (pCi/L, g, F):	4.162	
Sample Duplicate Result Counting Uncertainty (pCi/L, g, F):	0.949	
Are sample and/or duplicate results below RL?	NO	
Duplicate Numerical Performance Indicator:	0.090	
(Based on the LCS/LCSD Percent Recoveries) Duplicate RPD:	2.43%	
Duplicate Status vs Numerical Indicator:	N/A	
Duplicate Status vs RPD:	Pass	
% RPD Limit:	32%	

Matrix Spike/Matrix Spike Duplicate Sample Assessment		
Sample I.D.		
Sample MS I.D.		
Sample MSD I.D.		
Sample Matrix Spike Result:		
Matrix Spike Result Counting Uncertainty (pCi/L, g, F):		
Sample Matrix Spike Duplicate Result:		
Matrix Spike Duplicate Result Counting Uncertainty (pCi/L, g, F):		
Duplicate Numerical Performance Indicator:		
(Based on the Percent Recoveries) MS/ MSD Duplicate RPD:		
MS/ MSD Duplicate Status vs Numerical Indicator:		
MS/ MSD Duplicate Status vs RPD:		
% RPD Limit:		

Evaluation of duplicate precision is not applicable if either the sample or duplicate results are below the RL.

Comments:

SLC 2/11/2021

CMT 2/11/21

Quality Control Sample Performance Assessment

Pace Analytical
www.pacelabs.com

Test: Ra-228
Analyst: VAL
Date: 2/5/2021
Worklist: 58630
Matrix: WT

Analyst Must Manually Enter All Fields Highlighted in Yellow.

Method Blank Assessment	
MB Sample ID	2092277
MB concentration:	0.242
M/B 2 Sigma CSU:	0.366
MB MDC:	0.790
MB Numerical Performance Indicator:	1.30
MB Status vs Numerical Indicator:	Pass
MB Status vs. MDC:	Pass

Laboratory Control Sample Assessment	LCSD (Y or N)?	Y
	LCS58630	LCSD58630
Count Date:	2/10/2021	2/10/2021
Spike I.D.:	20-030	20-030
Decay Corrected Spike Concentration (pCi/mL):	36.566	36.566
Volume Used (mL):	0.10	0.10
Aliquot Volume (L, g, F):	0.807	0.811
Target Conc. (pCi/L, g, F):	4.531	4.510
Uncertainty (Calculated):	0.222	0.221
Result (pCi/L, g, F):	5.544	3.522
LCS/LCSD 2 Sigma CSU (pCi/L, g, F):	1.239	0.877
Numerical Performance Indicator:	1.58	-2.14
Percent Recovery:	122.37%	78.08%
Status vs Numerical Indicator:	N/A	N/A
Status vs Recovery:	Pass	Pass
Upper % Recovery Limits:	135%	135%
Lower % Recovery Limits:	60%	60%

Sample Matrix Spike Control Assessment	MS/MSD 1	MS/MSD 2
Sample Collection Date:		
Sample I.D.		
Sample MS I.D.		
Sample MSD I.D.		
Spike I.D.:		
MS/MSD Decay Corrected Spike Concentration (pCi/mL):		
Spike Volume Used in MS (mL):		
Spike Volume Used in MSD (mL):		
MS Aliquot (L, g, F):		
MS Target Conc.(pCi/L, g, F):		
MSD Aliquot (L, g, F):		
MSD Target Conc. (pCi/L, g, F):		
MS Spike Uncertainty (calculated):		
MSD Spike Uncertainty (calculated):		
Sample Result:		
Sample Result 2 Sigma CSU (pCi/L, g, F):		
Sample Matrix Spike Result:		
Matrix Spike Result 2 Sigma CSU (pCi/L, g, F):		
Sample Matrix Spike Duplicate Result:		
Matrix Spike Duplicate Result 2 Sigma CSU (pCi/L, g, F):		
MS Numerical Performance Indicator:		
MSD Numerical Performance Indicator:		
MS Percent Recovery:		
MSD Percent Recovery:		
MS Status vs Numerical Indicator:		
MSD Status vs Numerical Indicator:		
MS Status vs Recovery:		
MSD Status vs Recovery:		
MS/MSD Upper % Recovery Limits:		
MS/MSD Lower % Recovery Limits:		

Duplicate Sample Assessment		
Sample I.D.:	LCS58630	Enter Duplicate sample IDs if other than LCS/LCSD in the space below.
Duplicate Sample I.D.	LCSD58630	
Sample Result (pCi/L, g, F):	5.544	
Sample Result 2 Sigma CSU (pCi/L, g, F):	1.239	
Sample Duplicate Result (pCi/L, g, F):	3.522	
Sample Duplicate Result 2 Sigma CSU (pCi/L, g, F):	0.877	
Are sample and/or duplicate results below RL?	NO	
Duplicate Numerical Performance Indicator:	2.612	
(Based on the LCS/LCSD Percent Recoveries) Duplicate RPD:	44.19%	
Duplicate Status vs Numerical Indicator:	Warning	
Duplicate Status vs RPD:	Fail***	
% RPD Limit:	36%	

Matrix Spike/Matrix Spike Duplicate Sample Assessment		
Sample I.D.		
Sample MS I.D.		
Sample MSD I.D.		
Sample Matrix Spike Result:		
Matrix Spike Result 2 Sigma CSU (pCi/L, g, F):		
Sample Matrix Spike Duplicate Result:		
Matrix Spike Duplicate Result 2 Sigma CSU (pCi/L, g, F):		
Duplicate Numerical Performance Indicator:		
(Based on the Percent Recoveries) MS/ MSD Duplicate RPD:		
MS/ MSD Duplicate Status vs Numerical Indicator:		
MS/ MSD Duplicate Status vs RPD:		
% RPD Limit:		

Evaluation of duplicate precision is not applicable if either the sample or duplicate results are below the MDC.

Comments:

Quality Control Sample Performance Assessment

Pace Analytical
www.pacelabs.com

Test:	Ra-228
Analyst:	VAL
Date:	2/8/2021
Worklist:	58660
Matrix:	WT

Analyst Must Manually Enter All Fields Highlighted in Yellow.

Method Blank Assessment	
MB Sample ID	2093000
MB concentration:	0.362
M/B 2 Sigma CSU:	0.368
MB MDC:	0.757
MB Numerical Performance Indicator:	1.93
MB Status vs Numerical Indicator:	Pass
MB Status vs. MDC:	Pass

Laboratory Control Sample Assessment	LCSD (Y or N)?	Y
	LCS58660	LCSD58660
Count Date:	2/11/2021	2/11/2021
Spike I.D.:	20-030	20-030
Decay Corrected Spike Concentration (pCi/mL):	36.552	36.552
Volume Used (mL):	0.10	0.10
Aliquot Volume (L, g, F):	0.802	0.810
Target Conc. (pCi/L, g, F):	4.557	4.512
Uncertainty (Calculated):	0.223	0.221
Result (pCi/L, g, F):	4.002	4.682
LCS/LCSD 2 Sigma CSU (pCi/L, g, F):	0.897	1.038
Numerical Performance Indicator:	-1.18	0.31
Percent Recovery:	87.82%	103.76%
Status vs Numerical Indicator:	N/A	N/A
Status vs Recovery:	Pass	Pass
Upper % Recovery Limits:	135%	135%
Lower % Recovery Limits:	60%	60%

Sample Matrix Spike Control Assessment	MS/MSD 1	MS/MSD 2
Sample Collection Date:	1/27/2021	
Sample I.D.	30403852001	
Sample MS I.D.	30403852001MS	
Sample MSD I.D.		
Spike I.D.:	20-030	
MS/MSD Decay Corrected Spike Concentration (pCi/mL):	36.737	
Spike Volume Used in MS (mL):	0.20	
Spike Volume Used in MSD (mL):		
MS Aliquot (L, g, F):	0.802	
MS Target Conc.(pCi/L, g, F):	9.157	
MSD Aliquot (L, g, F):		
MSD Target Conc. (pCi/L, g, F):		
MS Spike Uncertainty (calculated):	0.449	
MSD Spike Uncertainty (calculated):		
Sample Result:	0.022	
Sample Result 2 Sigma CSU (pCi/L, g, F):	0.339	
Sample Matrix Spike Result:	10.009	
Matrix Spike Result 2 Sigma CSU (pCi/L, g, F):	1.997	
Sample Matrix Spike Duplicate Result:		
Matrix Spike Duplicate Result 2 Sigma CSU (pCi/L, g, F):		
MS Numerical Performance Indicator:	0.784	
MSD Numerical Performance Indicator:		
MS Percent Recovery:	109.07%	
MSD Percent Recovery:		
MS Status vs Numerical Indicator:	Pass	
MSD Status vs Numerical Indicator:		
MS Status vs Recovery:	Pass	
MSD Status vs Recovery:		
MS/MSD Upper % Recovery Limits:	135%	
MS/MSD Lower % Recovery Limits:	60%	

Duplicate Sample Assessment		
Sample I.D.:	LCS58660	Enter Duplicate sample IDs if other than LCS/LCSD in the space below.
Duplicate Sample I.D.	LCSD58660	
Sample Result (pCi/L, g, F):	4.002	
Sample Result 2 Sigma CSU (pCi/L, g, F):	0.897	
Sample Duplicate Result (pCi/L, g, F):	4.682	
Sample Duplicate Result 2 Sigma CSU (pCi/L, g, F):	1.038	
Are sample and/or duplicate results below RL?	NO	
Duplicate Numerical Performance Indicator:	-0.971	
(Based on the LCS/LCSD Percent Recoveries) Duplicate RPD:	16.64%	
Duplicate Status vs Numerical Indicator:	Pass	
Duplicate Status vs RPD:	Pass	
% RPD Limit:	36%	

Matrix Spike/Matrix Spike Duplicate Sample Assessment		
Sample I.D.		
Sample MS I.D.		
Sample MSD I.D.		
Sample Matrix Spike Result:		
Matrix Spike Result 2 Sigma CSU (pCi/L, g, F):		
Sample Matrix Spike Duplicate Result:		
Matrix Spike Duplicate Result 2 Sigma CSU (pCi/L, g, F):		
Duplicate Numerical Performance Indicator:		
(Based on the Percent Recoveries) MS/ MSD Duplicate RPD:		
MS/ MSD Duplicate Status vs Numerical Indicator:		
MS/ MSD Duplicate Status vs RPD:		
% RPD Limit:		

Evaluation of duplicate precision is not applicable if either the sample or duplicate results are below the MDC.

Comments:

CWE 2/12/21

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Pace Analytical Services, LLC
9800 Kincey Ave. Suite 100
Huntersville, NC 28078
(704)875-9092

May 17, 2021

Mark Filardi
HDR
440 S. Church St
Suite 900
Charlotte, NC 28202

RE: Project: CHARAH Q2 GW
Pace Project No.: 92533738

Dear Mark Filardi:

Enclosed are the analytical results for sample(s) received by the laboratory on April 16, 2021. The results relate only to the samples included in this report. Results reported herein conform to the applicable TNI/NELAC Standards and the laboratory's Quality Manual, where applicable, unless otherwise noted in the body of the report.

The test results provided in this final report were generated by each of the following laboratories within the Pace Network:

- Pace Analytical Services - Asheville
- Pace Analytical Services - Greensburg

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Kevin Herring
kevin.herring@pacelabs.com
1(704)875-9092
HORIZON Database Administrator

Enclosures

cc: Charles Gruenberg
Mike Plummer, HDR
Jacob Ruffing

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Pace Analytical Services, LLC
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Huntersville, NC 28078
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CERTIFICATIONS

Project: CHARAH Q2 GW
Pace Project No.: 92533738

Pace Analytical Services Pennsylvania
1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601
ANAB DOD-ELAP Rad Accreditation #: L2417
Alabama Certification #: 41590
Arizona Certification #: AZ0734
Arkansas Certification
California Certification #: 04222CA
Colorado Certification #: PA01547
Connecticut Certification #: PH-0694
Delaware Certification
EPA Region 4 DW Rad
Florida/TNI Certification #: E87683
Georgia Certification #: C040
Guam Certification
Florida: Cert E871149 SEKS WET
Hawaii Certification
Idaho Certification
Illinois Certification
Indiana Certification
Iowa Certification #: 391
Kansas/TNI Certification #: E-10358
Kentucky Certification #: KY90133
KY WW Permit #: KY0098221
KY WW Permit #: KY0000221
Louisiana DHH/TNI Certification #: LA180012
Louisiana DEQ/TNI Certification #: 4086
Maine Certification #: 2017020
Maryland Certification #: 308
Massachusetts Certification #: M-PA1457
Michigan/PADEP Certification #: 9991
Missouri Certification #: 235
Montana Certification #: Cert0082
Nebraska Certification #: NE-OS-29-14
Nevada Certification #: PA014572018-1
New Hampshire/TNI Certification #: 297617
New Jersey/TNI Certification #: PA051
New Mexico Certification #: PA01457
New York/TNI Certification #: 10888
North Carolina Certification #: 42706
North Dakota Certification #: R-190
Ohio EPA Rad Approval: #41249
Oregon/TNI Certification #: PA200002-010
Pennsylvania/TNI Certification #: 65-00282
Puerto Rico Certification #: PA01457
Rhode Island Certification #: 65-00282
South Dakota Certification
Tennessee Certification #: 02867
Texas/TNI Certification #: T104704188-17-3
Utah/TNI Certification #: PA014572017-9
USDA Soil Permit #: P330-17-00091
Vermont Dept. of Health: ID# VT-0282
Virgin Island/PADEP Certification
Virginia/VELAP Certification #: 9526
Washington Certification #: C868
West Virginia DEP Certification #: 143
West Virginia DHHR Certification #: 9964C
Wisconsin Approve List for Rad
Wyoming Certification #: 8TMS-L

Pace Analytical Services Asheville
2225 Riverside Drive, Asheville, NC 28804
Florida/NELAP Certification #: E87648
North Carolina Drinking Water Certification #: 37712
North Carolina Wastewater Certification #: 40
South Carolina Certification #: 99030001
Virginia/VELAP Certification #: 460222

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SAMPLE SUMMARY

Project: CHARAH Q2 GW
Pace Project No.: 92533738

Lab ID	Sample ID	Matrix	Date Collected	Date Received
92533738001	BG-1	Water	04/12/21 13:05	04/16/21 13:02
92533738002	BG-2	Water	04/12/21 16:15	04/16/21 13:02
92533738003	MW-1	Water	04/14/21 16:10	04/16/21 13:02
92533738004	MW-2	Water	04/15/21 09:20	04/16/21 13:02
92533738005	MW-2D	Water	04/15/21 08:47	04/16/21 13:02
92533738006	MW-3	Water	04/14/21 12:20	04/16/21 13:02
92533738007	MW-4	Water	04/13/21 10:20	04/16/21 13:02
92533738008	MW-5	Water	04/13/21 16:10	04/16/21 13:02
92533738009	MW-6	Water	04/15/21 12:35	04/16/21 13:02
92533738010	MW-7R	Water	04/14/21 15:00	04/16/21 13:02
92533738011	MW-8	Water	04/15/21 14:15	04/16/21 13:02
92533738012	SW-6	Water	04/16/21 09:00	04/16/21 13:02
92533738013	MW-11	Water	04/13/21 11:45	04/16/21 13:02
92533738014	MW-11D	Water	04/13/21 13:00	04/16/21 13:02
92533738015	SW-1	Water	04/13/21 13:55	04/16/21 13:02
92533738016	SW-2	Water	04/15/21 08:30	04/16/21 13:02
92533738017	SW-3	Water	04/15/21 08:45	04/16/21 13:02
92533738018	SW-4	Water	04/13/21 13:30	04/16/21 13:02
92533738019	SW-5	Water	04/13/21 16:10	04/16/21 13:02
92533738020	LEACHATE	Water	04/16/21 08:45	04/16/21 13:02
92533738021	DUP	Water	04/15/21 00:00	04/16/21 13:02
92533738022	EQBL	Water	04/16/21 08:05	04/16/21 13:02

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SAMPLE ANALYTE COUNT

Project: CHARAH Q2 GW
Pace Project No.: 92533738

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
92533738001	**BG-1**	EPA 6010D	RDT	16	PASI-A
		EPA 6020B	JOR	3	PASI-A
		EPA 7470A	SOO	1	PASI-A
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	JAL	1	PASI-PA
		SM 2540C-2011	ZMC	1	PASI-A
		EPA 300.0 Rev 2.1 1993	JLH	3	PASI-A
92533738002	**BG-2**	EPA 6010D	RDT, SH1	16	PASI-A
		EPA 6020B	JOR	3	PASI-A
		EPA 7470A	SOO	1	PASI-A
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	JAL	1	PASI-PA
		SM 2540C-2011	ZMC	1	PASI-A
		EPA 300.0 Rev 2.1 1993	JLH	3	PASI-A
92533738003	**MW-1**	EPA 6010D	RDT, SH1	16	PASI-A
		EPA 6020B	JOR	3	PASI-A
		EPA 7470A	SOO	1	PASI-A
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	JAL	1	PASI-PA
		SM 2540C-2011	RED	1	PASI-A
		EPA 300.0 Rev 2.1 1993	JLH	3	PASI-A
92533738004	**MW-2**	EPA 6010D	RDT, SH1	16	PASI-A
		EPA 6020B	JOR	3	PASI-A
		EPA 7470A	SOO	1	PASI-A
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	JAL	1	PASI-PA
		SM 2540C-2011	ZMC	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	3	PASI-A
92533738005	**MW-2D**	EPA 6010D	RDT, SH1	16	PASI-A
		EPA 6020B	JOR	3	PASI-A
		EPA 7470A	SOO	1	PASI-A
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA

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SAMPLE ANALYTE COUNT

Project: CHARAH Q2 GW
Pace Project No.: 92533738

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		Total Radium Calculation	JAL	1	PASI-PA
		SM 2540C-2011	ZMC	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	3	PASI-A
92533738006	**MW-3**	EPA 6010D	RDT, SH1	16	PASI-A
		EPA 6020B	JOR	3	PASI-A
		EPA 7470A	SOO	1	PASI-A
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	JAL	1	PASI-PA
		SM 2540C-2011	RED	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	3	PASI-A
92533738007	**MW-4**	EPA 6010D	RDT	16	PASI-A
		EPA 6020B	JOR	3	PASI-A
		EPA 7470A	SOO	1	PASI-A
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	JAL	1	PASI-PA
		SM 2540C-2011	ZMC	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	3	PASI-A
92533738008	**MW-5**	EPA 6010D	RDT	16	PASI-A
		EPA 6020B	JOR	3	PASI-A
		EPA 7470A	SOO	1	PASI-A
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	JAL	1	PASI-PA
		SM 2540C-2011	ZMC	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	3	PASI-A
92533738009	**MW-6**	EPA 6010D	RDT	16	PASI-A
		EPA 6020B	JOR	3	PASI-A
		EPA 7470A	SOO	1	PASI-A
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	JAL	1	PASI-PA
		SM 2540C-2011	RED	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	3	PASI-A
92533738010	**MW-7R**	EPA 6010D	RDT	16	PASI-A
		EPA 6020B	JOR	3	PASI-A

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SAMPLE ANALYTE COUNT

Project: CHARAH Q2 GW
Pace Project No.: 92533738

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		EPA 7470A	SOO	1	PASI-A
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	JAL	1	PASI-PA
		SM 2540C-2011	RED	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	3	PASI-A
92533738011	**MW-8**	EPA 6010D	RDT, SH1	16	PASI-A
		EPA 6020B	JOR	3	PASI-A
		EPA 7470A	SOO	1	PASI-A
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	JAL	1	PASI-PA
		SM 2540C-2011	RED	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	3	PASI-A
92533738012	**SW-6**	EPA 6010D	RDT	16	PASI-A
		EPA 6020B	JOR	3	PASI-A
		EPA 7470A	SOO	1	PASI-A
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	JAL	1	PASI-PA
		SM 2540C-2011	RED	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	3	PASI-A
92533738013	**MW-11**	EPA 6010D	RDT	16	PASI-A
		EPA 6020B	JOR	3	PASI-A
		EPA 7470A	SOO	1	PASI-A
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	JAL	1	PASI-PA
		SM 2540C-2011	ZMC	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	3	PASI-A
92533738014	**MW-11D**	EPA 6010D	RDT	16	PASI-A
		EPA 6020B	JOR	3	PASI-A
		EPA 7470A	SOO	1	PASI-A
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	JAL	1	PASI-PA
		SM 2540C-2011	ZMC	1	PASI-A

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SAMPLE ANALYTE COUNT

Project: CHARAH Q2 GW
Pace Project No.: 92533738

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		EPA 300.0 Rev 2.1 1993	CDC	3	PASI-A
92533738015	**SW-1**	EPA 6010D	RDT	16	PASI-A
		EPA 6020B	JOR	3	PASI-A
		EPA 7470A	SOO	1	PASI-A
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	JAL	1	PASI-PA
		SM 2540C-2011	ZMC	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	3	PASI-A
92533738016	**SW-2**	EPA 6010D	RDT	16	PASI-A
		EPA 6020B	JOR	3	PASI-A
		EPA 7470A	SOO	1	PASI-A
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	JAL	1	PASI-PA
		SM 2540C-2011	RED	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	3	PASI-A
92533738017	**SW-3**	EPA 6010D	RDT	16	PASI-A
		EPA 6020B	JOR	3	PASI-A
		EPA 7470A	SOO	1	PASI-A
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	JAL	1	PASI-PA
		SM 2540C-2011	RED	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	3	PASI-A
92533738018	**SW-4**	EPA 6010D	RDT	16	PASI-A
		EPA 6020B	JOR	3	PASI-A
		EPA 7470A	SOO	1	PASI-A
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	JAL	1	PASI-PA
		SM 2540C-2011	ZMC	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	3	PASI-A
92533738019	**SW-5**	EPA 6010D	RDT	16	PASI-A
		EPA 6020B	JOR	3	PASI-A
		EPA 7470A	SOO	1	PASI-A
		EPA 903.1	MK1	1	PASI-PA

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SAMPLE ANALYTE COUNT

Project: CHARAH Q2 GW
Pace Project No.: 92533738

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	JAL	1	PASI-PA
		SM 2540C-2011	ZMC	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	3	PASI-A
92533738020	**LEACHATE**	EPA 6010D	RDT, SH1	16	PASI-A
		EPA 6020B	JOR	3	PASI-A
		EPA 7470A	SOO	1	PASI-A
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	JAL	1	PASI-PA
		SM 2540C-2011	RED	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	3	PASI-A
92533738021	**DUP**	EPA 6010D	RDT	16	PASI-A
		EPA 6020B	JOR	3	PASI-A
		EPA 7470A	SOO	1	PASI-A
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	JAL	1	PASI-PA
		SM 2540C-2011	RED	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	3	PASI-A
92533738022	**EQBL**	EPA 6010D	SH1	16	PASI-A
		EPA 6020B	JOR	3	PASI-A
		EPA 7470A	SOO	1	PASI-A
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	JAL	1	PASI-PA
		SM 2540C-2011	RED	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	3	PASI-A

PASI-A = Pace Analytical Services - Asheville
PASI-PA = Pace Analytical Services - Greensburg

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SUMMARY OF DETECTION

Project: CHARAH Q2 GW
Pace Project No.: 92533738

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92533738001	**BG-1**					
EPA 6010D	Barium	252	ug/L	5.0	04/26/21 02:09	
EPA 6010D	Calcium	21100	ug/L	100	04/26/21 02:09	
EPA 6010D	Copper	4.3J	ug/L	5.0	04/26/21 02:09	
EPA 6010D	Vanadium	5.9	ug/L	5.0	04/26/21 02:09	
EPA 6020B	Boron	56.5	ug/L	50.0	04/29/21 01:00	
EPA 6020B	Lithium	16.4	ug/L	2.5	04/29/21 01:00	
EPA 7470A	Mercury	0.12J	ug/L	0.20	04/19/21 17:30	
EPA 903.1	Radium-226	0.0828 ± 0.381 (0.721) C:NA T:96%	pCi/L		05/14/21 15:55	
EPA 904.0	Radium-228	0.375 ± 0.300 (0.591) C:76% T:98%	pCi/L		05/12/21 16:18	
Total Radium Calculation	Total Radium	0.458 ± 0.681 (1.31)	pCi/L		05/14/21 17:07	
SM 2540C-2011	Total Dissolved Solids	563	mg/L	25.0	04/17/21 16:48	
EPA 300.0 Rev 2.1 1993	Chloride	188	mg/L	4.0	04/27/21 16:00	
EPA 300.0 Rev 2.1 1993	Fluoride	0.19	mg/L	0.10	04/27/21 04:58	
EPA 300.0 Rev 2.1 1993	Sulfate	23.0	mg/L	1.0	04/27/21 04:58	
92533738002	**BG-2**					
EPA 6010D	Barium	84.1	ug/L	5.0	04/27/21 09:18	
EPA 6010D	Calcium	105000	ug/L	500	04/27/21 18:53	M1
EPA 6010D	Zinc	16.0	ug/L	10.0	04/27/21 09:18	
EPA 6020B	Boron	36.2J	ug/L	50.0	04/29/21 01:05	M1
EPA 6020B	Lithium	20.3	ug/L	2.5	04/29/21 01:05	
EPA 903.1	Radium-226	0.240 ± 0.340 (0.576) C:NA T:86%	pCi/L		05/14/21 15:55	
EPA 904.0	Radium-228	0.551 ± 0.396 (0.756) C:72% T:79%	pCi/L		05/12/21 16:18	
Total Radium Calculation	Total Radium	0.791 ± 0.736 (1.33)	pCi/L		05/14/21 17:07	
SM 2540C-2011	Total Dissolved Solids	1270	mg/L	50.0	04/17/21 16:48	
EPA 300.0 Rev 2.1 1993	Chloride	268	mg/L	6.0	04/27/21 16:14	
EPA 300.0 Rev 2.1 1993	Fluoride	0.21	mg/L	0.10	04/27/21 05:12	
EPA 300.0 Rev 2.1 1993	Sulfate	182	mg/L	6.0	04/27/21 16:14	
92533738003	**MW-1**					
EPA 6010D	Barium	321	ug/L	5.0	04/27/21 09:31	
EPA 6010D	Calcium	224000	ug/L	500	04/27/21 19:06	
EPA 6010D	Chromium	5.0J	ug/L	5.0	04/27/21 09:31	
EPA 6010D	Nickel	4.9J	ug/L	5.0	04/27/21 09:31	

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SUMMARY OF DETECTION

Project: CHARAH Q2 GW
Pace Project No.: 92533738

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92533738003	**MW-1**					
EPA 6020B	Boron	10.3J	ug/L	50.0	04/30/21 15:00	
EPA 6020B	Lithium	41.8	ug/L	2.5	04/29/21 01:37	
EPA 903.1	Radium-226	0.228 ± 0.269 (0.423) C:NA T:98%	pCi/L		05/14/21 15:55	
EPA 904.0	Radium-228	0.285 ± 0.403 (0.864) C:72% T:80%	pCi/L		05/12/21 16:18	
Total Radium Calculation	Total Radium	0.513 ± 0.672 (1.29)	pCi/L		05/14/21 17:07	
SM 2540C-2011	Total Dissolved Solids	2390	mg/L	250	04/19/21 16:44	
EPA 300.0 Rev 2.1 1993	Chloride	912	mg/L	20.0	04/27/21 16:29	
EPA 300.0 Rev 2.1 1993	Fluoride	0.16	mg/L	0.10	04/27/21 05:27	
EPA 300.0 Rev 2.1 1993	Sulfate	7.0	mg/L	1.0	04/27/21 05:27	
92533738004	**MW-2**					
EPA 6010D	Antimony	5.3	ug/L	5.0	04/27/21 09:34	
EPA 6010D	Barium	481	ug/L	5.0	04/27/21 09:34	
EPA 6010D	Calcium	175000	ug/L	500	04/27/21 19:09	
EPA 6010D	Chromium	10.2	ug/L	5.0	04/27/21 09:34	
EPA 6010D	Copper	12.5	ug/L	5.0	04/27/21 09:34	
EPA 6010D	Lead	4.8J	ug/L	5.0	04/27/21 09:34	
EPA 6010D	Nickel	10.2	ug/L	5.0	04/27/21 09:34	
EPA 6010D	Vanadium	5.9	ug/L	5.0	04/27/21 09:34	
EPA 6010D	Zinc	27.7	ug/L	10.0	04/27/21 09:34	
EPA 6020B	Boron	48.9J	ug/L	50.0	04/30/21 15:04	
EPA 6020B	Lithium	116	ug/L	2.5	04/29/21 01:42	
EPA 6020B	Thallium	0.068J	ug/L	1.0	04/29/21 01:42	
EPA 903.1	Radium-226	0.931 ± 0.538 (0.210) C:NA T:95%	pCi/L		05/14/21 15:55	
EPA 904.0	Radium-228	2.16 ± 0.718 (0.980) C:70% T:83%	pCi/L		05/12/21 16:18	
Total Radium Calculation	Total Radium	3.09 ± 1.26 (1.19)	pCi/L		05/14/21 17:07	
SM 2540C-2011	Total Dissolved Solids	2700	mg/L	417	04/20/21 11:30	MW
EPA 300.0 Rev 2.1 1993	Chloride	1170	mg/L	25.0	04/29/21 20:53	M6
EPA 300.0 Rev 2.1 1993	Fluoride	0.24	mg/L	0.10	04/29/21 08:02	
EPA 300.0 Rev 2.1 1993	Sulfate	53.3	mg/L	1.0	04/29/21 08:02	M6
92533738005	**MW-2D**					
EPA 6010D	Antimony	3.6J	ug/L	5.0	04/27/21 09:37	
EPA 6010D	Barium	1040	ug/L	5.0	04/27/21 09:37	
EPA 6010D	Calcium	97300	ug/L	500	04/27/21 19:12	

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SUMMARY OF DETECTION

Project: CHARAH Q2 GW
Pace Project No.: 92533738

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92533738005	**MW-2D**					
EPA 6010D	Chromium	5.7	ug/L	5.0	04/27/21 09:37	
EPA 6010D	Molybdenum	14.2	ug/L	5.0	04/27/21 09:37	
EPA 6010D	Nickel	6.0	ug/L	5.0	04/27/21 09:37	
EPA 6020B	Boron	45.0J	ug/L	50.0	04/30/21 15:09	
EPA 6020B	Lithium	64.1	ug/L	2.5	04/29/21 01:47	
EPA 903.1	Radium-226	0.430 ± 0.389 (0.574) C:NA T:90%	pCi/L		05/14/21 15:55	
EPA 904.0	Radium-228	1.43 ± 0.615 (1.00) C:65% T:105%	pCi/L		05/12/21 18:08	
Total Radium Calculation	Total Radium	1.86 ± 1.00 (1.57)	pCi/L		05/14/21 17:07	
SM 2540C-2011	Total Dissolved Solids	1900	mg/L	312	04/20/21 11:30	
EPA 300.0 Rev 2.1 1993	Chloride	833	mg/L	18.0	04/29/21 21:37	
EPA 300.0 Rev 2.1 1993	Fluoride	0.22	mg/L	0.10	04/29/21 09:15	
EPA 300.0 Rev 2.1 1993	Sulfate	14.7	mg/L	1.0	04/29/21 09:15	
92533738006	**MW-3**					
EPA 6010D	Antimony	4.3J	ug/L	5.0	04/27/21 09:41	
EPA 6010D	Arsenic	7.0J	ug/L	10.0	04/27/21 09:41	
EPA 6010D	Barium	597	ug/L	5.0	04/27/21 09:41	
EPA 6010D	Calcium	150000	ug/L	500	04/27/21 19:15	
EPA 6010D	Chromium	9.3	ug/L	5.0	04/27/21 09:41	
EPA 6010D	Molybdenum	6.0	ug/L	5.0	04/27/21 09:41	
EPA 6010D	Nickel	7.3	ug/L	5.0	04/27/21 09:41	
EPA 6020B	Boron	25.6J	ug/L	50.0	04/30/21 15:14	
EPA 6020B	Lithium	88.6	ug/L	2.5	04/29/21 01:52	
EPA 903.1	Radium-226	0.802 ± 0.499 (0.692) C:NA T:102%	pCi/L		05/14/21 15:55	
EPA 904.0	Radium-228	0.647 ± 0.590 (1.20) C:69% T:79%	pCi/L		05/12/21 18:09	
Total Radium Calculation	Total Radium	1.45 ± 1.09 (1.89)	pCi/L		05/14/21 17:07	
SM 2540C-2011	Total Dissolved Solids	2400	mg/L	250	04/19/21 16:44	
EPA 300.0 Rev 2.1 1993	Chloride	1080	mg/L	23.0	04/29/21 22:21	
EPA 300.0 Rev 2.1 1993	Fluoride	0.42	mg/L	0.10	04/29/21 09:29	
EPA 300.0 Rev 2.1 1993	Sulfate	33.8	mg/L	1.0	04/29/21 09:29	
92533738007	**MW-4**					
EPA 6010D	Antimony	3.1J	ug/L	5.0	04/27/21 09:44	
EPA 6010D	Barium	312	ug/L	5.0	04/27/21 09:44	
EPA 6010D	Calcium	63000	ug/L	100	04/27/21 09:44	

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SUMMARY OF DETECTION

Project: CHARAH Q2 GW
Pace Project No.: 92533738

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92533738007	**MW-4**					
EPA 6010D	Chromium	4.1J	ug/L	5.0	04/27/21 09:44	
EPA 6010D	Nickel	7.3	ug/L	5.0	04/27/21 09:44	
EPA 6020B	Boron	8.7J	ug/L	50.0	04/30/21 15:18	
EPA 6020B	Lithium	29.2	ug/L	2.5	04/29/21 01:56	
EPA 903.1	Radium-226	0.0486 ± 0.437 (0.846) C:NA T:96%	pCi/L		05/14/21 15:55	
EPA 904.0	Radium-228	0.382 ± 0.535 (1.15) C:69% T:81%	pCi/L		05/12/21 18:09	
Total Radium Calculation	Total Radium	0.431 ± 0.972 (2.00)	pCi/L		05/14/21 17:07	
SM 2540C-2011	Total Dissolved Solids	1160	mg/L	125	04/19/21 13:11	
EPA 300.0 Rev 2.1 1993	Chloride	466	mg/L	10.0	04/29/21 22:36	
EPA 300.0 Rev 2.1 1993	Fluoride	0.29	mg/L	0.10	04/29/21 09:43	
EPA 300.0 Rev 2.1 1993	Sulfate	11.4	mg/L	1.0	04/29/21 09:43	
92533738008	**MW-5**					
EPA 6010D	Barium	89.2	ug/L	5.0	04/27/21 10:00	
EPA 6010D	Calcium	10700	ug/L	100	04/27/21 10:00	
EPA 6020B	Boron	11.1J	ug/L	50.0	04/30/21 15:32	
EPA 6020B	Lithium	9.6	ug/L	2.5	04/29/21 02:01	
EPA 903.1	Radium-226	0.256 ± 0.460 (0.811) C:NA T:95%	pCi/L		05/14/21 16:09	
EPA 904.0	Radium-228	0.307 ± 0.507 (1.10) C:68% T:83%	pCi/L		05/12/21 18:09	
Total Radium Calculation	Total Radium	0.563 ± 0.967 (1.91)	pCi/L		05/14/21 17:07	
SM 2540C-2011	Total Dissolved Solids	239	mg/L	25.0	04/19/21 13:11	
EPA 300.0 Rev 2.1 1993	Chloride	22.0	mg/L	1.0	04/29/21 10:43	
EPA 300.0 Rev 2.1 1993	Fluoride	0.56	mg/L	0.10	04/29/21 10:43	
EPA 300.0 Rev 2.1 1993	Sulfate	4.2	mg/L	1.0	04/29/21 10:43	
92533738009	**MW-6**					
EPA 6010D	Barium	48.4	ug/L	5.0	04/27/21 10:03	
EPA 6010D	Calcium	33900	ug/L	100	04/27/21 10:03	
EPA 6010D	Chromium	4.7J	ug/L	5.0	04/27/21 10:03	
EPA 6010D	Nickel	3.9J	ug/L	5.0	04/27/21 10:03	
EPA 6020B	Lithium	25.1	ug/L	2.5	04/29/21 02:06	

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SUMMARY OF DETECTION

Project: CHARAH Q2 GW
Pace Project No.: 92533738

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92533738009	**MW-6**					
EPA 903.1	Radium-226	0.212 ± 0.294 (0.491) C:NA T:88%	pCi/L		05/14/21 16:09	
EPA 904.0	Radium-228	0.377 ± 0.426 (0.888) C:69% T:90%	pCi/L		05/12/21 18:09	
Total Radium Calculation	Total Radium	0.589 ± 0.720 (1.38)	pCi/L		05/14/21 17:07	
SM 2540C-2011	Total Dissolved Solids	546	mg/L	50.0	04/21/21 21:25	
EPA 300.0 Rev 2.1 1993	Chloride	80.3	mg/L	4.0	04/29/21 22:51	
EPA 300.0 Rev 2.1 1993	Fluoride	0.34	mg/L	0.10	04/29/21 10:58	
EPA 300.0 Rev 2.1 1993	Sulfate	28.4	mg/L	1.0	04/29/21 10:58	
92533738010	**MW-7R**					
EPA 6010D	Barium	314	ug/L	5.0	04/27/21 10:06	
EPA 6010D	Calcium	92000	ug/L	100	04/27/21 10:06	
EPA 6010D	Chromium	15.7	ug/L	5.0	04/27/21 10:06	
EPA 6010D	Nickel	10.1	ug/L	5.0	04/27/21 10:06	
EPA 6020B	Boron	11.4J	ug/L	50.0	04/30/21 15:42	
EPA 6020B	Lithium	28.5	ug/L	2.5	04/29/21 02:10	
EPA 903.1	Radium-226	0.177 ± 0.275 (0.476) C:NA T:99%	pCi/L		05/14/21 16:09	
EPA 904.0	Radium-228	2.13 ± 0.738 (1.01) C:69% T:85%	pCi/L		05/12/21 18:09	
Total Radium Calculation	Total Radium	2.31 ± 1.01 (1.49)	pCi/L		05/14/21 17:07	
SM 2540C-2011	Total Dissolved Solids	860	mg/L	125	04/19/21 16:44	
EPA 300.0 Rev 2.1 1993	Chloride	285	mg/L	6.0	04/29/21 23:05	
EPA 300.0 Rev 2.1 1993	Fluoride	0.12	mg/L	0.10	04/29/21 11:12	
EPA 300.0 Rev 2.1 1993	Sulfate	16.2	mg/L	1.0	04/29/21 11:12	
92533738011	**MW-8**					
EPA 6010D	Barium	1360	ug/L	5.0	04/27/21 10:10	
EPA 6010D	Calcium	145000	ug/L	500	04/27/21 19:18	
EPA 6010D	Chromium	25.6	ug/L	5.0	04/27/21 10:10	
EPA 6010D	Nickel	18.0	ug/L	5.0	04/27/21 10:10	
EPA 6020B	Boron	13.3J	ug/L	50.0	04/30/21 15:46	
EPA 6020B	Lithium	44.3	ug/L	2.5	04/29/21 02:24	
EPA 903.1	Radium-226	0.0883 ± 0.367 (0.700) C:NA T:97%	pCi/L		05/14/21 16:09	

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SUMMARY OF DETECTION

Project: CHARAH Q2 GW
Pace Project No.: 92533738

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92533738011	**MW-8**					
EPA 904.0	Radium-228	1.74 ± 1.03 (1.97) C:69% T:81%	pCi/L		05/12/21 19:45	
Total Radium Calculation	Total Radium	1.83 ± 1.40 (2.67)	pCi/L		05/14/21 17:07	
SM 2540C-2011	Total Dissolved Solids	1400	mg/L	125	04/21/21 21:26	
EPA 300.0 Rev 2.1 1993	Chloride	570	mg/L	13.0	04/29/21 23:20	
EPA 300.0 Rev 2.1 1993	Fluoride	0.067J	mg/L	0.10	04/29/21 12:10	
EPA 300.0 Rev 2.1 1993	Sulfate	5.7	mg/L	1.0	04/29/21 12:10	
92533738012	**SW-6**					
EPA 6010D	Arsenic	7.6J	ug/L	10.0	04/27/21 10:13	
EPA 6010D	Barium	690	ug/L	5.0	04/27/21 10:13	
EPA 6010D	Beryllium	3.1	ug/L	1.0	04/27/21 10:13	
EPA 6010D	Calcium	5010	ug/L	100	04/27/21 10:13	
EPA 6010D	Chromium	22.6	ug/L	5.0	04/27/21 10:13	
EPA 6010D	Cobalt	14.2	ug/L	5.0	04/27/21 10:13	
EPA 6010D	Copper	13.0	ug/L	5.0	04/27/21 10:13	
EPA 6010D	Lead	50.8	ug/L	5.0	04/27/21 10:13	
EPA 6010D	Nickel	8.6	ug/L	5.0	04/27/21 10:13	
EPA 6010D	Vanadium	75.2	ug/L	5.0	04/27/21 10:13	
EPA 6010D	Zinc	69.2	ug/L	10.0	04/27/21 10:13	
EPA 6020B	Boron	8.6J	ug/L	50.0	04/30/21 15:51	
EPA 6020B	Lithium	9.7	ug/L	2.5	04/29/21 02:29	
EPA 6020B	Thallium	0.25J	ug/L	1.0	04/29/21 02:29	
EPA 903.1	Radium-226	0.583 ± 0.545 (0.773) C:NA T:80%	pCi/L		05/14/21 16:09	
EPA 904.0	Radium-228	4.43 ± 1.67 (2.66) C:67% T:65%	pCi/L		05/12/21 19:45	
Total Radium Calculation	Total Radium	5.01 ± 2.22 (3.43)	pCi/L		05/14/21 17:07	
SM 2540C-2011	Total Dissolved Solids	1430	mg/L	25.0	04/21/21 21:26	
EPA 300.0 Rev 2.1 1993	Chloride	6.0	mg/L	1.0	04/29/21 12:24	
EPA 300.0 Rev 2.1 1993	Fluoride	0.23	mg/L	0.10	04/29/21 12:24	
EPA 300.0 Rev 2.1 1993	Sulfate	2.3	mg/L	1.0	04/29/21 12:24	
92533738013	**MW-11**					
EPA 6010D	Barium	59.6	ug/L	5.0	04/27/21 10:16	
EPA 6010D	Calcium	26500	ug/L	100	04/27/21 10:16	
EPA 6020B	Boron	11.5J	ug/L	50.0	04/30/21 15:56	
EPA 6020B	Lithium	12.6	ug/L	2.5	04/29/21 02:34	
EPA 903.1	Radium-226	0.258 ± 0.525 (0.934) C:NA T:84%	pCi/L		05/14/21 16:09	

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SUMMARY OF DETECTION

Project: CHARAH Q2 GW
Pace Project No.: 92533738

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92533738013	**MW-11**					
EPA 904.0	Radium-228	2.13 ± 0.893 (1.51) C:67% T:100%	pCi/L		05/12/21 19:45	
Total Radium Calculation	Total Radium	2.39 ± 1.42 (2.44)	pCi/L		05/14/21 17:07	
SM 2540C-2011	Total Dissolved Solids	410	mg/L	25.0	04/19/21 13:11	
EPA 300.0 Rev 2.1 1993	Chloride	149	mg/L	3.0	04/29/21 23:35	
EPA 300.0 Rev 2.1 1993	Fluoride	0.14	mg/L	0.10	04/29/21 12:39	
EPA 300.0 Rev 2.1 1993	Sulfate	3.0	mg/L	1.0	04/29/21 12:39	
92533738014	**MW-11D**					
EPA 6010D	Arsenic	6.3J	ug/L	10.0	04/27/21 10:19	
EPA 6010D	Barium	108	ug/L	5.0	04/27/21 10:19	
EPA 6010D	Calcium	27800	ug/L	100	04/27/21 10:19	
EPA 6010D	Molybdenum	42.3	ug/L	5.0	04/27/21 10:19	
EPA 6020B	Boron	55.8	ug/L	50.0	04/30/21 16:01	
EPA 6020B	Lithium	58.1	ug/L	2.5	04/29/21 02:39	
EPA 903.1	Radium-226	0.0418 ± 0.272 (0.547) C:NA T:99%	pCi/L		05/14/21 16:23	
EPA 904.0	Radium-228	2.23 ± 1.06 (1.89) C:70% T:80%	pCi/L		05/12/21 19:45	
Total Radium Calculation	Total Radium	2.27 ± 1.33 (2.44)	pCi/L		05/14/21 17:07	
SM 2540C-2011	Total Dissolved Solids	888	mg/L	50.0	04/19/21 13:11	
EPA 300.0 Rev 2.1 1993	Chloride	224	mg/L	5.0	04/29/21 23:49	M6
EPA 300.0 Rev 2.1 1993	Fluoride	0.49	mg/L	0.10	04/29/21 12:53	
EPA 300.0 Rev 2.1 1993	Sulfate	196	mg/L	5.0	04/29/21 23:49	M6
92533738015	**SW-1**					
EPA 6010D	Arsenic	8.8J	ug/L	10.0	04/27/21 10:22	
EPA 6010D	Barium	605	ug/L	5.0	04/27/21 10:22	
EPA 6010D	Beryllium	2.8	ug/L	1.0	04/27/21 10:22	
EPA 6010D	Calcium	5930	ug/L	100	04/27/21 10:22	
EPA 6010D	Chromium	15.2	ug/L	5.0	04/27/21 10:22	
EPA 6010D	Cobalt	10.5	ug/L	5.0	04/27/21 10:22	
EPA 6010D	Copper	14.1	ug/L	5.0	04/27/21 10:22	
EPA 6010D	Lead	47.4	ug/L	5.0	04/27/21 10:22	
EPA 6010D	Nickel	8.8	ug/L	5.0	04/27/21 10:22	
EPA 6010D	Vanadium	68.8	ug/L	5.0	04/27/21 10:22	
EPA 6010D	Zinc	68.2	ug/L	10.0	04/27/21 10:22	
EPA 6020B	Boron	11.6J	ug/L	50.0	05/03/21 15:58	
EPA 6020B	Lithium	9.8	ug/L	2.5	05/03/21 15:58	
EPA 6020B	Thallium	0.20J	ug/L	1.0	05/03/21 15:58	

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SUMMARY OF DETECTION

Project: CHARAH Q2 GW
Pace Project No.: 92533738

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92533738015	**SW-1**					
EPA 903.1	Radium-226	0.787 ± 0.522 (0.237) C:NA T:75%	pCi/L		05/14/21 16:23	
EPA 904.0	Radium-228	2.00 ± 1.25 (2.35) C:69% T:37%	pCi/L		05/12/21 16:17	
Total Radium Calculation	Total Radium	2.79 ± 1.77 (2.59)	pCi/L		05/14/21 17:07	
SM 2540C-2011	Total Dissolved Solids	1330	mg/L	25.0	04/19/21 13:12	
EPA 300.0 Rev 2.1 1993	Chloride	5.8	mg/L	1.0	04/29/21 13:37	
EPA 300.0 Rev 2.1 1993	Fluoride	0.26	mg/L	0.10	04/29/21 13:37	
EPA 300.0 Rev 2.1 1993	Sulfate	2.5	mg/L	1.0	04/29/21 13:37	
92533738016	**SW-2**					
EPA 6010D	Barium	49.2	ug/L	5.0	04/27/21 10:26	
EPA 6010D	Calcium	3480	ug/L	100	04/27/21 10:26	
EPA 6010D	Vanadium	5.9	ug/L	5.0	04/27/21 10:26	
EPA 6020B	Boron	12.4J	ug/L	50.0	05/03/21 15:34	
EPA 6020B	Lithium	1.2J	ug/L	2.5	05/03/21 15:34	
EPA 903.1	Radium-226	-0.0771 ± 0.501 (1.09) C:NA T:54%	pCi/L		05/14/21 16:23	
EPA 904.0	Radium-228	0.816 ± 1.09 (2.34) C:67% T:34%	pCi/L		05/12/21 16:17	
Total Radium Calculation	Total Radium	0.816 ± 1.59 (3.43)	pCi/L		05/14/21 17:07	
SM 2540C-2011	Total Dissolved Solids	119	mg/L	25.0	04/21/21 21:26	
EPA 300.0 Rev 2.1 1993	Chloride	14.4	mg/L	1.0	04/29/21 13:51	
EPA 300.0 Rev 2.1 1993	Fluoride	0.12	mg/L	0.10	04/29/21 13:51	
EPA 300.0 Rev 2.1 1993	Sulfate	11.9	mg/L	1.0	04/29/21 13:51	
92533738017	**SW-3**					
EPA 6010D	Barium	53.6	ug/L	5.0	04/27/21 10:29	
EPA 6010D	Calcium	3640	ug/L	100	04/27/21 10:29	
EPA 6010D	Vanadium	5.9	ug/L	5.0	04/27/21 10:29	
EPA 6020B	Boron	12.8J	ug/L	50.0	05/03/21 16:02	
EPA 6020B	Lithium	1.3J	ug/L	2.5	05/03/21 16:02	
EPA 903.1	Radium-226	-0.0521 ± 0.670 (1.31) C:NA T:50%	pCi/L		05/14/21 13:43	
EPA 904.0	Radium-228	0.201 ± 1.19 (2.73) C:66% T:34%	pCi/L		05/13/21 18:46	
Total Radium Calculation	Total Radium	0.201 ± 1.86 (4.04)	pCi/L		05/14/21 17:09	
SM 2540C-2011	Total Dissolved Solids	125	mg/L	25.0	04/21/21 21:26	

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SUMMARY OF DETECTION

Project: CHARAH Q2 GW
Pace Project No.: 92533738

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92533738017	**SW-3**					
EPA 300.0 Rev 2.1 1993	Chloride	14.3	mg/L	1.0	04/29/21 14:05	
EPA 300.0 Rev 2.1 1993	Fluoride	0.12	mg/L	0.10	04/29/21 14:05	
EPA 300.0 Rev 2.1 1993	Sulfate	11.9	mg/L	1.0	04/29/21 14:05	
92533738018	**SW-4**					
EPA 6010D	Barium	43.6	ug/L	5.0	04/27/21 10:38	
EPA 6010D	Calcium	4590	ug/L	100	04/27/21 10:38	
EPA 6020B	Boron	13.8J	ug/L	50.0	05/03/21 16:07	
EPA 903.1	Radium-226	-0.299 ± 0.478 (1.08) C:NA T:90%	pCi/L		05/14/21 13:43	
EPA 904.0	Radium-228	-0.267 ± 0.539 (1.35) C:70% T:59%	pCi/L		05/13/21 18:46	
Total Radium Calculation	Total Radium	0.000 ± 1.02 (2.43)	pCi/L		05/14/21 17:09	
SM 2540C-2011	Total Dissolved Solids	100	mg/L	25.0	04/19/21 13:12	
EPA 300.0 Rev 2.1 1993	Chloride	13.7	mg/L	1.0	04/29/21 14:20	
EPA 300.0 Rev 2.1 1993	Fluoride	0.063J	mg/L	0.10	04/29/21 14:20	
EPA 300.0 Rev 2.1 1993	Sulfate	19.3	mg/L	1.0	04/29/21 14:20	
92533738019	**SW-5**					
EPA 6010D	Arsenic	8.3J	ug/L	10.0	04/27/21 10:42	
EPA 6010D	Barium	505	ug/L	5.0	04/27/21 10:42	
EPA 6010D	Beryllium	2.4	ug/L	1.0	04/27/21 10:42	
EPA 6010D	Calcium	7260	ug/L	100	04/27/21 10:42	
EPA 6010D	Chromium	35.0	ug/L	5.0	04/27/21 10:42	
EPA 6010D	Cobalt	15.1	ug/L	5.0	04/27/21 10:42	
EPA 6010D	Copper	27.6	ug/L	5.0	04/27/21 10:42	
EPA 6010D	Lead	47.2	ug/L	5.0	04/27/21 10:42	
EPA 6010D	Nickel	19.2	ug/L	5.0	04/27/21 10:42	
EPA 6010D	Vanadium	88.2	ug/L	5.0	04/27/21 10:42	
EPA 6010D	Zinc	83.4	ug/L	10.0	04/27/21 10:42	
EPA 6020B	Boron	15.7J	ug/L	50.0	05/03/21 16:12	
EPA 6020B	Lithium	18.7	ug/L	2.5	05/03/21 16:12	
EPA 6020B	Thallium	0.24J	ug/L	1.0	05/03/21 16:12	
EPA 903.1	Radium-226	1.08 ± 0.756 (0.365) C:NA T:56%	pCi/L		05/14/21 16:23	
EPA 904.0	Radium-228	2.57 ± 1.51 (2.78) C:65% T:46%	pCi/L		05/12/21 19:37	
Total Radium Calculation	Total Radium	3.65 ± 2.27 (3.15)	pCi/L		05/14/21 17:09	
SM 2540C-2011	Total Dissolved Solids	379	mg/L	25.0	04/19/21 13:12	
EPA 300.0 Rev 2.1 1993	Chloride	9.0	mg/L	1.0	04/29/21 15:03	

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SUMMARY OF DETECTION

Project: CHARAH Q2 GW
Pace Project No.: 92533738

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92533738019	**SW-5**					
EPA 300.0 Rev 2.1 1993	Fluoride	0.095J	mg/L	0.10	04/29/21 15:03	
EPA 300.0 Rev 2.1 1993	Sulfate	27.7	mg/L	1.0	04/29/21 15:03	
92533738020	**LEACHATE**					
EPA 6010D	Antimony	3.2J	ug/L	5.0	04/27/21 10:45	
EPA 6010D	Arsenic	10.5	ug/L	10.0	04/27/21 10:45	
EPA 6010D	Barium	54.5	ug/L	5.0	04/27/21 10:45	
EPA 6010D	Calcium	276000	ug/L	500	04/27/21 19:21	
EPA 6010D	Molybdenum	236	ug/L	5.0	04/27/21 10:45	
EPA 6020B	Boron	3030	ug/L	1500	05/03/21 16:26	
EPA 6020B	Lithium	59.1J	ug/L	75.0	05/03/21 16:26	
EPA 903.1	Radium-226	0.000 ± 0.259 (0.528) C:NA T:87%	pCi/L		05/10/21 14:55	
EPA 904.0	Radium-228	0.678 ± 0.502 (0.979) C:60% T:80%	pCi/L		05/07/21 11:31	
Total Radium Calculation	Total Radium	0.678 ± 0.761 (1.51)	pCi/L		05/14/21 17:09	
SM 2540C-2011	Total Dissolved Solids	1380	mg/L	125	04/21/21 21:26	
EPA 300.0 Rev 2.1 1993	Chloride	21.2	mg/L	1.0	04/29/21 15:18	
EPA 300.0 Rev 2.1 1993	Fluoride	0.24	mg/L	0.10	04/29/21 15:18	
EPA 300.0 Rev 2.1 1993	Sulfate	547	mg/L	12.0	04/30/21 00:33	
92533738021	**DUP**					
EPA 6010D	Barium	50.7	ug/L	5.0	04/27/21 10:48	
EPA 6010D	Calcium	32300	ug/L	100	04/27/21 10:48	
EPA 6020B	Boron	18.0J	ug/L	50.0	05/03/21 16:31	
EPA 6020B	Lithium	27.4	ug/L	2.5	05/03/21 16:31	
EPA 903.1	Radium-226	-0.110 ± 0.338 (0.791) C:NA T:90%	pCi/L		05/14/21 13:43	
EPA 904.0	Radium-228	0.602 ± 0.557 (1.13) C:73% T:79%	pCi/L		05/13/21 18:46	
Total Radium Calculation	Total Radium	0.602 ± 0.895 (1.92)	pCi/L		05/14/21 17:09	
SM 2540C-2011	Total Dissolved Solids	590	mg/L	50.0	04/21/21 21:26	
EPA 300.0 Rev 2.1 1993	Chloride	207	mg/L	4.0	04/30/21 01:33	
EPA 300.0 Rev 2.1 1993	Fluoride	0.35	mg/L	0.10	04/29/21 15:32	
EPA 300.0 Rev 2.1 1993	Sulfate	28.3	mg/L	1.0	04/29/21 15:32	

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SUMMARY OF DETECTION

Project: CHARAH Q2 GW
Pace Project No.: 92533738

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92533738022	**EQBL**					
EPA 903.1	Radium-226	0.0945 ± 0.628 (1.16) C:NA T:99%	pCi/L		05/14/21 13:43	
EPA 904.0	Radium-228	-0.299 ± 0.401 (1.02) C:68% T:88%	pCi/L		05/13/21 18:46	
Total Radium Calculation	Total Radium	0.0945 ± 1.03 (2.18)	pCi/L		05/14/21 17:09	

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ANALYTICAL RESULTS

Project: CHARAH Q2 GW
Pace Project No.: 92533738

Sample: BG-1 **Lab ID: 92533738001** Collected: 04/12/21 13:05 Received: 04/16/21 13:02 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Antimony	ND	ug/L	5.0	3.0	1	04/21/21 01:46	04/26/21 02:09	7440-36-0	
Arsenic	ND	ug/L	10.0	4.7	1	04/21/21 01:46	04/26/21 02:09	7440-38-2	
Barium	**252**	ug/L	5.0	3.5	1	04/21/21 01:46	04/26/21 02:09	7440-39-3	
Beryllium	ND	ug/L	1.0	0.70	1	04/21/21 01:46	04/26/21 02:09	7440-41-7	
Cadmium	ND	ug/L	1.0	0.40	1	04/21/21 01:46	04/26/21 02:09	7440-43-9	
Calcium	**21100**	ug/L	100	94.2	1	04/21/21 01:46	04/26/21 02:09	7440-70-2	
Chromium	ND	ug/L	5.0	3.7	1	04/21/21 01:46	04/26/21 02:09	7440-47-3	
Cobalt	ND	ug/L	5.0	3.6	1	04/21/21 01:46	04/26/21 02:09	7440-48-4	
Copper	**4.3J**	ug/L	5.0	4.3	1	04/21/21 01:46	04/26/21 02:09	7440-50-8	
Lead	ND	ug/L	5.0	4.5	1	04/21/21 01:46	04/26/21 02:09	7439-92-1	
Molybdenum	ND	ug/L	5.0	3.9	1	04/21/21 01:46	04/26/21 02:09	7439-98-7	
Nickel	ND	ug/L	5.0	3.5	1	04/21/21 01:46	04/26/21 02:09	7440-02-0	
Selenium	ND	ug/L	10.0	4.7	1	04/21/21 01:46	04/26/21 02:09	7782-49-2	
Silver	ND	ug/L	5.0	2.5	1	04/21/21 01:46	04/26/21 02:09	7440-22-4	
Vanadium	**5.9**	ug/L	5.0	3.9	1	04/21/21 01:46	04/26/21 02:09	7440-62-2	
Zinc	ND	ug/L	10.0	9.5	1	04/21/21 01:46	04/26/21 02:09	7440-66-6	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Boron	**56.5**	ug/L	50.0	8.5	1	04/21/21 01:46	04/29/21 01:00	7440-42-8	
Lithium	**16.4**	ug/L	2.5	0.50	1	04/21/21 01:46	04/29/21 01:00	7439-93-2	
Thallium	ND	ug/L	1.0	0.050	1	04/21/21 01:46	04/29/21 01:00	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	**0.12J**	ug/L	0.20	0.12	1	04/19/21 11:40	04/19/21 17:30	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**563**	mg/L	25.0	25.0	1		04/17/21 16:48		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**188**	mg/L	4.0	2.4	4		04/27/21 16:00	16887-00-6	
Fluoride	**0.19**	mg/L	0.10	0.050	1		04/27/21 04:58	16984-48-8	
Sulfate	**23.0**	mg/L	1.0	0.50	1		04/27/21 04:58	14808-79-8	

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ANALYTICAL RESULTS

Project: CHARAH Q2 GW
Pace Project No.: 92533738

Sample: BG-2 **Lab ID: 92533738002** Collected: 04/12/21 16:15 Received: 04/16/21 13:02 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Antimony	ND	ug/L	5.0	3.0	1	04/21/21 01:46	04/27/21 09:18	7440-36-0	
Arsenic	ND	ug/L	10.0	4.7	1	04/21/21 01:46	04/27/21 09:18	7440-38-2	
Barium	**84.1**	ug/L	5.0	3.5	1	04/21/21 01:46	04/27/21 09:18	7440-39-3	
Beryllium	ND	ug/L	1.0	0.70	1	04/21/21 01:46	04/27/21 09:18	7440-41-7	
Cadmium	ND	ug/L	1.0	0.40	1	04/21/21 01:46	04/27/21 09:18	7440-43-9	
Calcium	**105000**	ug/L	500	471	5	04/21/21 01:46	04/27/21 18:53	7440-70-2	M1
Chromium	ND	ug/L	5.0	3.7	1	04/21/21 01:46	04/27/21 09:18	7440-47-3	
Cobalt	ND	ug/L	5.0	3.6	1	04/21/21 01:46	04/27/21 09:18	7440-48-4	
Copper	ND	ug/L	5.0	4.3	1	04/21/21 01:46	04/27/21 09:18	7440-50-8	
Lead	ND	ug/L	5.0	4.5	1	04/21/21 01:46	04/27/21 09:18	7439-92-1	
Molybdenum	ND	ug/L	5.0	3.9	1	04/21/21 01:46	04/27/21 09:18	7439-98-7	
Nickel	ND	ug/L	5.0	3.5	1	04/21/21 01:46	04/27/21 09:18	7440-02-0	
Selenium	ND	ug/L	10.0	4.7	1	04/21/21 01:46	04/27/21 09:18	7782-49-2	
Silver	ND	ug/L	5.0	2.5	1	04/21/21 01:46	04/27/21 09:18	7440-22-4	
Vanadium	ND	ug/L	5.0	3.9	1	04/21/21 01:46	04/27/21 09:18	7440-62-2	
Zinc	**16.0**	ug/L	10.0	9.5	1	04/21/21 01:46	04/27/21 09:18	7440-66-6	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Boron	**36.2J**	ug/L	50.0	8.5	1	04/21/21 01:46	04/29/21 01:05	7440-42-8	M1
Lithium	**20.3**	ug/L	2.5	0.50	1	04/21/21 01:46	04/29/21 01:05	7439-93-2	
Thallium	ND	ug/L	1.0	0.050	1	04/21/21 01:46	04/29/21 01:05	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	ND	ug/L	0.20	0.12	1	04/19/21 11:40	04/19/21 17:33	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**1270**	mg/L	50.0	50.0	1		04/17/21 16:48		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**268**	mg/L	6.0	3.6	6		04/27/21 16:14	16887-00-6	
Fluoride	**0.21**	mg/L	0.10	0.050	1		04/27/21 05:12	16984-48-8	
Sulfate	**182**	mg/L	6.0	3.0	6		04/27/21 16:14	14808-79-8	

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ANALYTICAL RESULTS

Project: CHARAH Q2 GW
Pace Project No.: 92533738

Sample: MW-1 **Lab ID: 92533738003** Collected: 04/14/21 16:10 Received: 04/16/21 13:02 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Antimony	ND	ug/L	5.0	3.0	1	04/21/21 01:46	04/27/21 09:31	7440-36-0	
Arsenic	ND	ug/L	10.0	4.7	1	04/21/21 01:46	04/27/21 09:31	7440-38-2	
Barium	**321**	ug/L	5.0	3.5	1	04/21/21 01:46	04/27/21 09:31	7440-39-3	
Beryllium	ND	ug/L	1.0	0.70	1	04/21/21 01:46	04/27/21 09:31	7440-41-7	
Cadmium	ND	ug/L	1.0	0.40	1	04/21/21 01:46	04/27/21 09:31	7440-43-9	
Calcium	**224000**	ug/L	500	471	5	04/21/21 01:46	04/27/21 19:06	7440-70-2	
Chromium	**5.0J**	ug/L	5.0	3.7	1	04/21/21 01:46	04/27/21 09:31	7440-47-3	
Cobalt	ND	ug/L	5.0	3.6	1	04/21/21 01:46	04/27/21 09:31	7440-48-4	
Copper	ND	ug/L	5.0	4.3	1	04/21/21 01:46	04/27/21 09:31	7440-50-8	
Lead	ND	ug/L	5.0	4.5	1	04/21/21 01:46	04/27/21 09:31	7439-92-1	
Molybdenum	ND	ug/L	5.0	3.9	1	04/21/21 01:46	04/27/21 09:31	7439-98-7	
Nickel	**4.9J**	ug/L	5.0	3.5	1	04/21/21 01:46	04/27/21 09:31	7440-02-0	
Selenium	ND	ug/L	10.0	4.7	1	04/21/21 01:46	04/27/21 09:31	7782-49-2	
Silver	ND	ug/L	5.0	2.5	1	04/21/21 01:46	04/27/21 09:31	7440-22-4	
Vanadium	ND	ug/L	5.0	3.9	1	04/21/21 01:46	04/27/21 09:31	7440-62-2	
Zinc	ND	ug/L	10.0	9.5	1	04/21/21 01:46	04/27/21 09:31	7440-66-6	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Boron	**10.3J**	ug/L	50.0	8.5	1	04/21/21 01:46	04/30/21 15:00	7440-42-8	
Lithium	**41.8**	ug/L	2.5	0.50	1	04/21/21 01:46	04/29/21 01:37	7439-93-2	
Thallium	ND	ug/L	1.0	0.050	1	04/21/21 01:46	04/29/21 01:37	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	ND	ug/L	0.20	0.12	1	04/19/21 11:40	04/19/21 17:35	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**2390**	mg/L	250	250	1		04/19/21 16:44		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**912**	mg/L	20.0	12.0	20		04/27/21 16:29	16887-00-6	
Fluoride	**0.16**	mg/L	0.10	0.050	1		04/27/21 05:27	16984-48-8	
Sulfate	**7.0**	mg/L	1.0	0.50	1		04/27/21 05:27	14808-79-8	

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ANALYTICAL RESULTS

Project: CHARAH Q2 GW
Pace Project No.: 92533738

Sample: MW-2 **Lab ID: 92533738004** Collected: 04/15/21 09:20 Received: 04/16/21 13:02 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Antimony	**5.3**	ug/L	5.0	3.0	1	04/21/21 01:46	04/27/21 09:34	7440-36-0	
Arsenic	ND	ug/L	10.0	4.7	1	04/21/21 01:46	04/27/21 09:34	7440-38-2	
Barium	**481**	ug/L	5.0	3.5	1	04/21/21 01:46	04/27/21 09:34	7440-39-3	
Beryllium	ND	ug/L	1.0	0.70	1	04/21/21 01:46	04/27/21 09:34	7440-41-7	
Cadmium	ND	ug/L	1.0	0.40	1	04/21/21 01:46	04/27/21 09:34	7440-43-9	
Calcium	**175000**	ug/L	500	471	5	04/21/21 01:46	04/27/21 19:09	7440-70-2	
Chromium	**10.2**	ug/L	5.0	3.7	1	04/21/21 01:46	04/27/21 09:34	7440-47-3	
Cobalt	ND	ug/L	5.0	3.6	1	04/21/21 01:46	04/27/21 09:34	7440-48-4	
Copper	**12.5**	ug/L	5.0	4.3	1	04/21/21 01:46	04/27/21 09:34	7440-50-8	
Lead	**4.8J**	ug/L	5.0	4.5	1	04/21/21 01:46	04/27/21 09:34	7439-92-1	
Molybdenum	ND	ug/L	5.0	3.9	1	04/21/21 01:46	04/27/21 09:34	7439-98-7	
Nickel	**10.2**	ug/L	5.0	3.5	1	04/21/21 01:46	04/27/21 09:34	7440-02-0	
Selenium	ND	ug/L	10.0	4.7	1	04/21/21 01:46	04/27/21 09:34	7782-49-2	
Silver	ND	ug/L	5.0	2.5	1	04/21/21 01:46	04/27/21 09:34	7440-22-4	
Vanadium	**5.9**	ug/L	5.0	3.9	1	04/21/21 01:46	04/27/21 09:34	7440-62-2	
Zinc	**27.7**	ug/L	10.0	9.5	1	04/21/21 01:46	04/27/21 09:34	7440-66-6	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Boron	**48.9J**	ug/L	50.0	8.5	1	04/21/21 01:46	04/30/21 15:04	7440-42-8	
Lithium	**116**	ug/L	2.5	0.50	1	04/21/21 01:46	04/29/21 01:42	7439-93-2	
Thallium	**0.068J**	ug/L	1.0	0.050	1	04/21/21 01:46	04/29/21 01:42	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	ND	ug/L	0.20	0.12	1	04/19/21 11:40	04/19/21 17:37	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**2700**	mg/L	417	417	1		04/20/21 11:30		MW
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**1170**	mg/L	25.0	15.0	25		04/29/21 20:53	16887-00-6	M6
Fluoride	**0.24**	mg/L	0.10	0.050	1		04/29/21 08:02	16984-48-8	
Sulfate	**53.3**	mg/L	1.0	0.50	1		04/29/21 08:02	14808-79-8	M6

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ANALYTICAL RESULTS

Project: CHARAH Q2 GW
Pace Project No.: 92533738

Sample: MW-2D **Lab ID: 92533738005** Collected: 04/15/21 08:47 Received: 04/16/21 13:02 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Antimony	**3.6J**	ug/L	5.0	3.0	1	04/21/21 01:46	04/27/21 09:37	7440-36-0	
Arsenic	ND	ug/L	10.0	4.7	1	04/21/21 01:46	04/27/21 09:37	7440-38-2	
Barium	**1040**	ug/L	5.0	3.5	1	04/21/21 01:46	04/27/21 09:37	7440-39-3	
Beryllium	ND	ug/L	1.0	0.70	1	04/21/21 01:46	04/27/21 09:37	7440-41-7	
Cadmium	ND	ug/L	1.0	0.40	1	04/21/21 01:46	04/27/21 09:37	7440-43-9	
Calcium	**97300**	ug/L	500	471	5	04/21/21 01:46	04/27/21 19:12	7440-70-2	
Chromium	**5.7**	ug/L	5.0	3.7	1	04/21/21 01:46	04/27/21 09:37	7440-47-3	
Cobalt	ND	ug/L	5.0	3.6	1	04/21/21 01:46	04/27/21 09:37	7440-48-4	
Copper	ND	ug/L	5.0	4.3	1	04/21/21 01:46	04/27/21 09:37	7440-50-8	
Lead	ND	ug/L	5.0	4.5	1	04/21/21 01:46	04/27/21 09:37	7439-92-1	
Molybdenum	**14.2**	ug/L	5.0	3.9	1	04/21/21 01:46	04/27/21 09:37	7439-98-7	
Nickel	**6.0**	ug/L	5.0	3.5	1	04/21/21 01:46	04/27/21 09:37	7440-02-0	
Selenium	ND	ug/L	10.0	4.7	1	04/21/21 01:46	04/27/21 09:37	7782-49-2	
Silver	ND	ug/L	5.0	2.5	1	04/21/21 01:46	04/27/21 09:37	7440-22-4	
Vanadium	ND	ug/L	5.0	3.9	1	04/21/21 01:46	04/27/21 09:37	7440-62-2	
Zinc	ND	ug/L	10.0	9.5	1	04/21/21 01:46	04/27/21 09:37	7440-66-6	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Boron	**45.0J**	ug/L	50.0	8.5	1	04/21/21 01:46	04/30/21 15:09	7440-42-8	
Lithium	**64.1**	ug/L	2.5	0.50	1	04/21/21 01:46	04/29/21 01:47	7439-93-2	
Thallium	ND	ug/L	1.0	0.050	1	04/21/21 01:46	04/29/21 01:47	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	ND	ug/L	0.20	0.12	1	04/19/21 11:40	04/19/21 17:40	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**1900**	mg/L	312	312	1		04/20/21 11:30		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**833**	mg/L	18.0	10.8	18		04/29/21 21:37	16887-00-6	
Fluoride	**0.22**	mg/L	0.10	0.050	1		04/29/21 09:15	16984-48-8	
Sulfate	**14.7**	mg/L	1.0	0.50	1		04/29/21 09:15	14808-79-8	

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ANALYTICAL RESULTS

Project: CHARAH Q2 GW
Pace Project No.: 92533738

Sample: MW-3 **Lab ID: 92533738006** Collected: 04/14/21 12:20 Received: 04/16/21 13:02 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Antimony	**4.3J**	ug/L	5.0	3.0	1	04/21/21 01:46	04/27/21 09:41	7440-36-0	
Arsenic	**7.0J**	ug/L	10.0	4.7	1	04/21/21 01:46	04/27/21 09:41	7440-38-2	
Barium	**597**	ug/L	5.0	3.5	1	04/21/21 01:46	04/27/21 09:41	7440-39-3	
Beryllium	ND	ug/L	1.0	0.70	1	04/21/21 01:46	04/27/21 09:41	7440-41-7	
Cadmium	ND	ug/L	1.0	0.40	1	04/21/21 01:46	04/27/21 09:41	7440-43-9	
Calcium	**150000**	ug/L	500	471	5	04/21/21 01:46	04/27/21 19:15	7440-70-2	
Chromium	**9.3**	ug/L	5.0	3.7	1	04/21/21 01:46	04/27/21 09:41	7440-47-3	
Cobalt	ND	ug/L	5.0	3.6	1	04/21/21 01:46	04/27/21 09:41	7440-48-4	
Copper	ND	ug/L	5.0	4.3	1	04/21/21 01:46	04/27/21 09:41	7440-50-8	
Lead	ND	ug/L	5.0	4.5	1	04/21/21 01:46	04/27/21 09:41	7439-92-1	
Molybdenum	**6.0**	ug/L	5.0	3.9	1	04/21/21 01:46	04/27/21 09:41	7439-98-7	
Nickel	**7.3**	ug/L	5.0	3.5	1	04/21/21 01:46	04/27/21 09:41	7440-02-0	
Selenium	ND	ug/L	10.0	4.7	1	04/21/21 01:46	04/27/21 09:41	7782-49-2	
Silver	ND	ug/L	5.0	2.5	1	04/21/21 01:46	04/27/21 09:41	7440-22-4	
Vanadium	ND	ug/L	5.0	3.9	1	04/21/21 01:46	04/27/21 09:41	7440-62-2	
Zinc	ND	ug/L	10.0	9.5	1	04/21/21 01:46	04/27/21 09:41	7440-66-6	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Boron	**25.6J**	ug/L	50.0	8.5	1	04/21/21 01:46	04/30/21 15:14	7440-42-8	
Lithium	**88.6**	ug/L	2.5	0.50	1	04/21/21 01:46	04/29/21 01:52	7439-93-2	
Thallium	ND	ug/L	1.0	0.050	1	04/21/21 01:46	04/29/21 01:52	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	ND	ug/L	0.20	0.12	1	04/19/21 11:40	04/19/21 17:42	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**2400**	mg/L	250	250	1		04/19/21 16:44		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**1080**	mg/L	23.0	13.8	23		04/29/21 22:21	16887-00-6	
Fluoride	**0.42**	mg/L	0.10	0.050	1		04/29/21 09:29	16984-48-8	
Sulfate	**33.8**	mg/L	1.0	0.50	1		04/29/21 09:29	14808-79-8	

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ANALYTICAL RESULTS

Project: CHARAH Q2 GW
Pace Project No.: 92533738

Sample: MW-4 **Lab ID: 92533738007** Collected: 04/13/21 10:20 Received: 04/16/21 13:02 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Antimony	**3.1J**	ug/L	5.0	3.0	1	04/21/21 01:46	04/27/21 09:44	7440-36-0	
Arsenic	ND	ug/L	10.0	4.7	1	04/21/21 01:46	04/27/21 09:44	7440-38-2	
Barium	**312**	ug/L	5.0	3.5	1	04/21/21 01:46	04/27/21 09:44	7440-39-3	
Beryllium	ND	ug/L	1.0	0.70	1	04/21/21 01:46	04/27/21 09:44	7440-41-7	
Cadmium	ND	ug/L	1.0	0.40	1	04/21/21 01:46	04/27/21 09:44	7440-43-9	
Calcium	**63000**	ug/L	100	94.2	1	04/21/21 01:46	04/27/21 09:44	7440-70-2	
Chromium	**4.1J**	ug/L	5.0	3.7	1	04/21/21 01:46	04/27/21 09:44	7440-47-3	
Cobalt	ND	ug/L	5.0	3.6	1	04/21/21 01:46	04/27/21 09:44	7440-48-4	
Copper	ND	ug/L	5.0	4.3	1	04/21/21 01:46	04/27/21 09:44	7440-50-8	
Lead	ND	ug/L	5.0	4.5	1	04/21/21 01:46	04/27/21 09:44	7439-92-1	
Molybdenum	ND	ug/L	5.0	3.9	1	04/21/21 01:46	04/27/21 09:44	7439-98-7	
Nickel	**7.3**	ug/L	5.0	3.5	1	04/21/21 01:46	04/27/21 09:44	7440-02-0	
Selenium	ND	ug/L	10.0	4.7	1	04/21/21 01:46	04/27/21 09:44	7782-49-2	
Silver	ND	ug/L	5.0	2.5	1	04/21/21 01:46	04/27/21 09:44	7440-22-4	
Vanadium	ND	ug/L	5.0	3.9	1	04/21/21 01:46	04/27/21 09:44	7440-62-2	
Zinc	ND	ug/L	10.0	9.5	1	04/21/21 01:46	04/27/21 09:44	7440-66-6	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Boron	**8.7J**	ug/L	50.0	8.5	1	04/21/21 01:46	04/30/21 15:18	7440-42-8	
Lithium	**29.2**	ug/L	2.5	0.50	1	04/21/21 01:46	04/29/21 01:56	7439-93-2	
Thallium	ND	ug/L	1.0	0.050	1	04/21/21 01:46	04/29/21 01:56	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	ND	ug/L	0.20	0.12	1	04/19/21 11:40	04/19/21 17:45	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**1160**	mg/L	125	125	1		04/19/21 13:11		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**466**	mg/L	10.0	6.0	10		04/29/21 22:36	16887-00-6	
Fluoride	**0.29**	mg/L	0.10	0.050	1		04/29/21 09:43	16984-48-8	
Sulfate	**11.4**	mg/L	1.0	0.50	1		04/29/21 09:43	14808-79-8	

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ANALYTICAL RESULTS

Project: CHARAH Q2 GW
Pace Project No.: 92533738

Sample: MW-5 **Lab ID: 92533738008** Collected: 04/13/21 16:10 Received: 04/16/21 13:02 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Antimony	ND	ug/L	5.0	3.0	1	04/21/21 01:46	04/27/21 10:00	7440-36-0	
Arsenic	ND	ug/L	10.0	4.7	1	04/21/21 01:46	04/27/21 10:00	7440-38-2	
Barium	**89.2**	ug/L	5.0	3.5	1	04/21/21 01:46	04/27/21 10:00	7440-39-3	
Beryllium	ND	ug/L	1.0	0.70	1	04/21/21 01:46	04/27/21 10:00	7440-41-7	
Cadmium	ND	ug/L	1.0	0.40	1	04/21/21 01:46	04/27/21 10:00	7440-43-9	
Calcium	**10700**	ug/L	100	94.2	1	04/21/21 01:46	04/27/21 10:00	7440-70-2	
Chromium	ND	ug/L	5.0	3.7	1	04/21/21 01:46	04/27/21 10:00	7440-47-3	
Cobalt	ND	ug/L	5.0	3.6	1	04/21/21 01:46	04/27/21 10:00	7440-48-4	
Copper	ND	ug/L	5.0	4.3	1	04/21/21 01:46	04/27/21 10:00	7440-50-8	
Lead	ND	ug/L	5.0	4.5	1	04/21/21 01:46	04/27/21 10:00	7439-92-1	
Molybdenum	ND	ug/L	5.0	3.9	1	04/21/21 01:46	04/27/21 10:00	7439-98-7	
Nickel	ND	ug/L	5.0	3.5	1	04/21/21 01:46	04/27/21 10:00	7440-02-0	
Selenium	ND	ug/L	10.0	4.7	1	04/21/21 01:46	04/27/21 10:00	7782-49-2	
Silver	ND	ug/L	5.0	2.5	1	04/21/21 01:46	04/27/21 10:00	7440-22-4	
Vanadium	ND	ug/L	5.0	3.9	1	04/21/21 01:46	04/27/21 10:00	7440-62-2	
Zinc	ND	ug/L	10.0	9.5	1	04/21/21 01:46	04/27/21 10:00	7440-66-6	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Boron	**11.1J**	ug/L	50.0	8.5	1	04/21/21 01:46	04/30/21 15:32	7440-42-8	
Lithium	**9.6**	ug/L	2.5	0.50	1	04/21/21 01:46	04/29/21 02:01	7439-93-2	
Thallium	ND	ug/L	1.0	0.050	1	04/21/21 01:46	04/29/21 02:01	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	ND	ug/L	0.20	0.12	1	04/19/21 11:40	04/19/21 18:01	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**239**	mg/L	25.0	25.0	1		04/19/21 13:11		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**22.0**	mg/L	1.0	0.60	1		04/29/21 10:43	16887-00-6	
Fluoride	**0.56**	mg/L	0.10	0.050	1		04/29/21 10:43	16984-48-8	
Sulfate	**4.2**	mg/L	1.0	0.50	1		04/29/21 10:43	14808-79-8	

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ANALYTICAL RESULTS

Project: CHARAH Q2 GW
Pace Project No.: 92533738

Sample: MW-6 **Lab ID: 92533738009** Collected: 04/15/21 12:35 Received: 04/16/21 13:02 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Antimony	ND	ug/L	5.0	3.0	1	04/21/21 01:46	04/27/21 10:03	7440-36-0	
Arsenic	ND	ug/L	10.0	4.7	1	04/21/21 01:46	04/27/21 10:03	7440-38-2	
Barium	**48.4**	ug/L	5.0	3.5	1	04/21/21 01:46	04/27/21 10:03	7440-39-3	
Beryllium	ND	ug/L	1.0	0.70	1	04/21/21 01:46	04/27/21 10:03	7440-41-7	
Cadmium	ND	ug/L	1.0	0.40	1	04/21/21 01:46	04/27/21 10:03	7440-43-9	
Calcium	**33900**	ug/L	100	94.2	1	04/21/21 01:46	04/27/21 10:03	7440-70-2	
Chromium	**4.7J**	ug/L	5.0	3.7	1	04/21/21 01:46	04/27/21 10:03	7440-47-3	
Cobalt	ND	ug/L	5.0	3.6	1	04/21/21 01:46	04/27/21 10:03	7440-48-4	
Copper	ND	ug/L	5.0	4.3	1	04/21/21 01:46	04/27/21 10:03	7440-50-8	
Lead	ND	ug/L	5.0	4.5	1	04/21/21 01:46	04/27/21 10:03	7439-92-1	
Molybdenum	ND	ug/L	5.0	3.9	1	04/21/21 01:46	04/27/21 10:03	7439-98-7	
Nickel	**3.9J**	ug/L	5.0	3.5	1	04/21/21 01:46	04/27/21 10:03	7440-02-0	
Selenium	ND	ug/L	10.0	4.7	1	04/21/21 01:46	04/27/21 10:03	7782-49-2	
Silver	ND	ug/L	5.0	2.5	1	04/21/21 01:46	04/27/21 10:03	7440-22-4	
Vanadium	ND	ug/L	5.0	3.9	1	04/21/21 01:46	04/27/21 10:03	7440-62-2	
Zinc	ND	ug/L	10.0	9.5	1	04/21/21 01:46	04/27/21 10:03	7440-66-6	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Boron	ND	ug/L	50.0	8.5	1	04/21/21 01:46	04/30/21 15:37	7440-42-8	
Lithium	**25.1**	ug/L	2.5	0.50	1	04/21/21 01:46	04/29/21 02:06	7439-93-2	
Thallium	ND	ug/L	1.0	0.050	1	04/21/21 01:46	04/29/21 02:06	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	ND	ug/L	0.20	0.12	1	04/19/21 11:40	04/19/21 18:04	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**546**	mg/L	50.0	50.0	1		04/21/21 21:25		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**80.3**	mg/L	4.0	2.4	4		04/29/21 22:51	16887-00-6	
Fluoride	**0.34**	mg/L	0.10	0.050	1		04/29/21 10:58	16984-48-8	
Sulfate	**28.4**	mg/L	1.0	0.50	1		04/29/21 10:58	14808-79-8	

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ANALYTICAL RESULTS

Project: CHARAH Q2 GW
Pace Project No.: 92533738

Sample: MW-7R **Lab ID: 92533738010** Collected: 04/14/21 15:00 Received: 04/16/21 13:02 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Antimony	ND	ug/L	5.0	3.0	1	04/21/21 01:46	04/27/21 10:06	7440-36-0	
Arsenic	ND	ug/L	10.0	4.7	1	04/21/21 01:46	04/27/21 10:06	7440-38-2	
Barium	**314**	ug/L	5.0	3.5	1	04/21/21 01:46	04/27/21 10:06	7440-39-3	
Beryllium	ND	ug/L	1.0	0.70	1	04/21/21 01:46	04/27/21 10:06	7440-41-7	
Cadmium	ND	ug/L	1.0	0.40	1	04/21/21 01:46	04/27/21 10:06	7440-43-9	
Calcium	**92000**	ug/L	100	94.2	1	04/21/21 01:46	04/27/21 10:06	7440-70-2	
Chromium	**15.7**	ug/L	5.0	3.7	1	04/21/21 01:46	04/27/21 10:06	7440-47-3	
Cobalt	ND	ug/L	5.0	3.6	1	04/21/21 01:46	04/27/21 10:06	7440-48-4	
Copper	ND	ug/L	5.0	4.3	1	04/21/21 01:46	04/27/21 10:06	7440-50-8	
Lead	ND	ug/L	5.0	4.5	1	04/21/21 01:46	04/27/21 10:06	7439-92-1	
Molybdenum	ND	ug/L	5.0	3.9	1	04/21/21 01:46	04/27/21 10:06	7439-98-7	
Nickel	**10.1**	ug/L	5.0	3.5	1	04/21/21 01:46	04/27/21 10:06	7440-02-0	
Selenium	ND	ug/L	10.0	4.7	1	04/21/21 01:46	04/27/21 10:06	7782-49-2	
Silver	ND	ug/L	5.0	2.5	1	04/21/21 01:46	04/27/21 10:06	7440-22-4	
Vanadium	ND	ug/L	5.0	3.9	1	04/21/21 01:46	04/27/21 10:06	7440-62-2	
Zinc	ND	ug/L	10.0	9.5	1	04/21/21 01:46	04/27/21 10:06	7440-66-6	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Boron	**11.4J**	ug/L	50.0	8.5	1	04/21/21 01:46	04/30/21 15:42	7440-42-8	
Lithium	**28.5**	ug/L	2.5	0.50	1	04/21/21 01:46	04/29/21 02:10	7439-93-2	
Thallium	ND	ug/L	1.0	0.050	1	04/21/21 01:46	04/29/21 02:10	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	ND	ug/L	0.20	0.12	1	04/19/21 11:40	04/19/21 18:06	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**860**	mg/L	125	125	1		04/19/21 16:44		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**285**	mg/L	6.0	3.6	6		04/29/21 23:05	16887-00-6	
Fluoride	**0.12**	mg/L	0.10	0.050	1		04/29/21 11:12	16984-48-8	
Sulfate	**16.2**	mg/L	1.0	0.50	1		04/29/21 11:12	14808-79-8	

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ANALYTICAL RESULTS

Project: CHARAH Q2 GW
Pace Project No.: 92533738

Sample: MW-8 **Lab ID: 92533738011** Collected: 04/15/21 14:15 Received: 04/16/21 13:02 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Antimony	ND	ug/L	5.0	3.0	1	04/21/21 01:46	04/27/21 10:10	7440-36-0	
Arsenic	ND	ug/L	10.0	4.7	1	04/21/21 01:46	04/27/21 10:10	7440-38-2	
Barium	**1360**	ug/L	5.0	3.5	1	04/21/21 01:46	04/27/21 10:10	7440-39-3	
Beryllium	ND	ug/L	1.0	0.70	1	04/21/21 01:46	04/27/21 10:10	7440-41-7	
Cadmium	ND	ug/L	1.0	0.40	1	04/21/21 01:46	04/27/21 10:10	7440-43-9	
Calcium	**145000**	ug/L	500	471	5	04/21/21 01:46	04/27/21 19:18	7440-70-2	
Chromium	**25.6**	ug/L	5.0	3.7	1	04/21/21 01:46	04/27/21 10:10	7440-47-3	
Cobalt	ND	ug/L	5.0	3.6	1	04/21/21 01:46	04/27/21 10:10	7440-48-4	
Copper	ND	ug/L	5.0	4.3	1	04/21/21 01:46	04/27/21 10:10	7440-50-8	
Lead	ND	ug/L	5.0	4.5	1	04/21/21 01:46	04/27/21 10:10	7439-92-1	
Molybdenum	ND	ug/L	5.0	3.9	1	04/21/21 01:46	04/27/21 10:10	7439-98-7	
Nickel	**18.0**	ug/L	5.0	3.5	1	04/21/21 01:46	04/27/21 10:10	7440-02-0	
Selenium	ND	ug/L	10.0	4.7	1	04/21/21 01:46	04/27/21 10:10	7782-49-2	
Silver	ND	ug/L	5.0	2.5	1	04/21/21 01:46	04/27/21 10:10	7440-22-4	
Vanadium	ND	ug/L	5.0	3.9	1	04/21/21 01:46	04/27/21 10:10	7440-62-2	
Zinc	ND	ug/L	10.0	9.5	1	04/21/21 01:46	04/27/21 10:10	7440-66-6	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Boron	**13.3J**	ug/L	50.0	8.5	1	04/21/21 01:46	04/30/21 15:46	7440-42-8	
Lithium	**44.3**	ug/L	2.5	0.50	1	04/21/21 01:46	04/29/21 02:24	7439-93-2	
Thallium	ND	ug/L	1.0	0.050	1	04/21/21 01:46	04/29/21 02:24	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	ND	ug/L	0.20	0.12	1	04/19/21 11:40	04/19/21 18:08	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**1400**	mg/L	125	125	1		04/21/21 21:26		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**570**	mg/L	13.0	7.8	13		04/29/21 23:20	16887-00-6	
Fluoride	**0.067J**	mg/L	0.10	0.050	1		04/29/21 12:10	16984-48-8	
Sulfate	**5.7**	mg/L	1.0	0.50	1		04/29/21 12:10	14808-79-8	

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ANALYTICAL RESULTS

Project: CHARAH Q2 GW
Pace Project No.: 92533738

Sample: SW-6 **Lab ID: 92533738012** Collected: 04/16/21 09:00 Received: 04/16/21 13:02 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Antimony	ND	ug/L	5.0	3.0	1	04/21/21 01:46	04/27/21 10:13	7440-36-0	
Arsenic	**7.6J**	ug/L	10.0	4.7	1	04/21/21 01:46	04/27/21 10:13	7440-38-2	
Barium	**690**	ug/L	5.0	3.5	1	04/21/21 01:46	04/27/21 10:13	7440-39-3	
Beryllium	**3.1**	ug/L	1.0	0.70	1	04/21/21 01:46	04/27/21 10:13	7440-41-7	
Cadmium	ND	ug/L	1.0	0.40	1	04/21/21 01:46	04/27/21 10:13	7440-43-9	
Calcium	**5010**	ug/L	100	94.2	1	04/21/21 01:46	04/27/21 10:13	7440-70-2	
Chromium	**22.6**	ug/L	5.0	3.7	1	04/21/21 01:46	04/27/21 10:13	7440-47-3	
Cobalt	**14.2**	ug/L	5.0	3.6	1	04/21/21 01:46	04/27/21 10:13	7440-48-4	
Copper	**13.0**	ug/L	5.0	4.3	1	04/21/21 01:46	04/27/21 10:13	7440-50-8	
Lead	**50.8**	ug/L	5.0	4.5	1	04/21/21 01:46	04/27/21 10:13	7439-92-1	
Molybdenum	ND	ug/L	5.0	3.9	1	04/21/21 01:46	04/27/21 10:13	7439-98-7	
Nickel	**8.6**	ug/L	5.0	3.5	1	04/21/21 01:46	04/27/21 10:13	7440-02-0	
Selenium	ND	ug/L	10.0	4.7	1	04/21/21 01:46	04/27/21 10:13	7782-49-2	
Silver	ND	ug/L	5.0	2.5	1	04/21/21 01:46	04/27/21 10:13	7440-22-4	
Vanadium	**75.2**	ug/L	5.0	3.9	1	04/21/21 01:46	04/27/21 10:13	7440-62-2	
Zinc	**69.2**	ug/L	10.0	9.5	1	04/21/21 01:46	04/27/21 10:13	7440-66-6	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Boron	**8.6J**	ug/L	50.0	8.5	1	04/21/21 01:46	04/30/21 15:51	7440-42-8	
Lithium	**9.7**	ug/L	2.5	0.50	1	04/21/21 01:46	04/29/21 02:29	7439-93-2	
Thallium	**0.25J**	ug/L	1.0	0.050	1	04/21/21 01:46	04/29/21 02:29	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	ND	ug/L	0.20	0.12	1	04/19/21 11:40	04/19/21 18:11	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**1430**	mg/L	25.0	25.0	1		04/21/21 21:26		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**6.0**	mg/L	1.0	0.60	1		04/29/21 12:24	16887-00-6	
Fluoride	**0.23**	mg/L	0.10	0.050	1		04/29/21 12:24	16984-48-8	
Sulfate	**2.3**	mg/L	1.0	0.50	1		04/29/21 12:24	14808-79-8	

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ANALYTICAL RESULTS

Project: CHARAH Q2 GW
Pace Project No.: 92533738

Sample: MW-11 **Lab ID: 92533738013** Collected: 04/13/21 11:45 Received: 04/16/21 13:02 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Antimony	ND	ug/L	5.0	3.0	1	04/21/21 01:46	04/27/21 10:16	7440-36-0	
Arsenic	ND	ug/L	10.0	4.7	1	04/21/21 01:46	04/27/21 10:16	7440-38-2	
Barium	**59.6**	ug/L	5.0	3.5	1	04/21/21 01:46	04/27/21 10:16	7440-39-3	
Beryllium	ND	ug/L	1.0	0.70	1	04/21/21 01:46	04/27/21 10:16	7440-41-7	
Cadmium	ND	ug/L	1.0	0.40	1	04/21/21 01:46	04/27/21 10:16	7440-43-9	
Calcium	**26500**	ug/L	100	94.2	1	04/21/21 01:46	04/27/21 10:16	7440-70-2	
Chromium	ND	ug/L	5.0	3.7	1	04/21/21 01:46	04/27/21 10:16	7440-47-3	
Cobalt	ND	ug/L	5.0	3.6	1	04/21/21 01:46	04/27/21 10:16	7440-48-4	
Copper	ND	ug/L	5.0	4.3	1	04/21/21 01:46	04/27/21 10:16	7440-50-8	
Lead	ND	ug/L	5.0	4.5	1	04/21/21 01:46	04/27/21 10:16	7439-92-1	
Molybdenum	ND	ug/L	5.0	3.9	1	04/21/21 01:46	04/27/21 10:16	7439-98-7	
Nickel	ND	ug/L	5.0	3.5	1	04/21/21 01:46	04/27/21 10:16	7440-02-0	
Selenium	ND	ug/L	10.0	4.7	1	04/21/21 01:46	04/27/21 10:16	7782-49-2	
Silver	ND	ug/L	5.0	2.5	1	04/21/21 01:46	04/27/21 10:16	7440-22-4	
Vanadium	ND	ug/L	5.0	3.9	1	04/21/21 01:46	04/27/21 10:16	7440-62-2	
Zinc	ND	ug/L	10.0	9.5	1	04/21/21 01:46	04/27/21 10:16	7440-66-6	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Boron	**11.5J**	ug/L	50.0	8.5	1	04/21/21 01:46	04/30/21 15:56	7440-42-8	
Lithium	**12.6**	ug/L	2.5	0.50	1	04/21/21 01:46	04/29/21 02:34	7439-93-2	
Thallium	ND	ug/L	1.0	0.050	1	04/21/21 01:46	04/29/21 02:34	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	ND	ug/L	0.20	0.12	1	04/19/21 11:40	04/19/21 18:13	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**410**	mg/L	25.0	25.0	1		04/19/21 13:11		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**149**	mg/L	3.0	1.8	3		04/29/21 23:35	16887-00-6	
Fluoride	**0.14**	mg/L	0.10	0.050	1		04/29/21 12:39	16984-48-8	
Sulfate	**3.0**	mg/L	1.0	0.50	1		04/29/21 12:39	14808-79-8	

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ANALYTICAL RESULTS

Project: CHARAH Q2 GW
Pace Project No.: 92533738

Sample: MW-11D **Lab ID: 92533738014** Collected: 04/13/21 13:00 Received: 04/16/21 13:02 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Antimony	ND	ug/L	5.0	3.0	1	04/21/21 01:46	04/27/21 10:19	7440-36-0	
Arsenic	**6.3J**	ug/L	10.0	4.7	1	04/21/21 01:46	04/27/21 10:19	7440-38-2	
Barium	**108**	ug/L	5.0	3.5	1	04/21/21 01:46	04/27/21 10:19	7440-39-3	
Beryllium	ND	ug/L	1.0	0.70	1	04/21/21 01:46	04/27/21 10:19	7440-41-7	
Cadmium	ND	ug/L	1.0	0.40	1	04/21/21 01:46	04/27/21 10:19	7440-43-9	
Calcium	**27800**	ug/L	100	94.2	1	04/21/21 01:46	04/27/21 10:19	7440-70-2	
Chromium	ND	ug/L	5.0	3.7	1	04/21/21 01:46	04/27/21 10:19	7440-47-3	
Cobalt	ND	ug/L	5.0	3.6	1	04/21/21 01:46	04/27/21 10:19	7440-48-4	
Copper	ND	ug/L	5.0	4.3	1	04/21/21 01:46	04/27/21 10:19	7440-50-8	
Lead	ND	ug/L	5.0	4.5	1	04/21/21 01:46	04/27/21 10:19	7439-92-1	
Molybdenum	**42.3**	ug/L	5.0	3.9	1	04/21/21 01:46	04/27/21 10:19	7439-98-7	
Nickel	ND	ug/L	5.0	3.5	1	04/21/21 01:46	04/27/21 10:19	7440-02-0	
Selenium	ND	ug/L	10.0	4.7	1	04/21/21 01:46	04/27/21 10:19	7782-49-2	
Silver	ND	ug/L	5.0	2.5	1	04/21/21 01:46	04/27/21 10:19	7440-22-4	
Vanadium	ND	ug/L	5.0	3.9	1	04/21/21 01:46	04/27/21 10:19	7440-62-2	
Zinc	ND	ug/L	10.0	9.5	1	04/21/21 01:46	04/27/21 10:19	7440-66-6	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Boron	**55.8**	ug/L	50.0	8.5	1	04/21/21 01:46	04/30/21 16:01	7440-42-8	
Lithium	**58.1**	ug/L	2.5	0.50	1	04/21/21 01:46	04/29/21 02:39	7439-93-2	
Thallium	ND	ug/L	1.0	0.050	1	04/21/21 01:46	04/29/21 02:39	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	ND	ug/L	0.20	0.12	1	04/19/21 11:40	04/19/21 18:15	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**888**	mg/L	50.0	50.0	1		04/19/21 13:11		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**224**	mg/L	5.0	3.0	5		04/29/21 23:49	16887-00-6	M6
Fluoride	**0.49**	mg/L	0.10	0.050	1		04/29/21 12:53	16984-48-8	
Sulfate	**196**	mg/L	5.0	2.5	5		04/29/21 23:49	14808-79-8	M6

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ANALYTICAL RESULTS

Project: CHARAH Q2 GW
Pace Project No.: 92533738

Sample: SW-1 **Lab ID: 92533738015** Collected: 04/13/21 13:55 Received: 04/16/21 13:02 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Antimony	ND	ug/L	5.0	3.0	1	04/21/21 01:46	04/27/21 10:22	7440-36-0	
Arsenic	**8.8J**	ug/L	10.0	4.7	1	04/21/21 01:46	04/27/21 10:22	7440-38-2	
Barium	**605**	ug/L	5.0	3.5	1	04/21/21 01:46	04/27/21 10:22	7440-39-3	
Beryllium	**2.8**	ug/L	1.0	0.70	1	04/21/21 01:46	04/27/21 10:22	7440-41-7	
Cadmium	ND	ug/L	1.0	0.40	1	04/21/21 01:46	04/27/21 10:22	7440-43-9	
Calcium	**5930**	ug/L	100	94.2	1	04/21/21 01:46	04/27/21 10:22	7440-70-2	
Chromium	**15.2**	ug/L	5.0	3.7	1	04/21/21 01:46	04/27/21 10:22	7440-47-3	
Cobalt	**10.5**	ug/L	5.0	3.6	1	04/21/21 01:46	04/27/21 10:22	7440-48-4	
Copper	**14.1**	ug/L	5.0	4.3	1	04/21/21 01:46	04/27/21 10:22	7440-50-8	
Lead	**47.4**	ug/L	5.0	4.5	1	04/21/21 01:46	04/27/21 10:22	7439-92-1	
Molybdenum	ND	ug/L	5.0	3.9	1	04/21/21 01:46	04/27/21 10:22	7439-98-7	
Nickel	**8.8**	ug/L	5.0	3.5	1	04/21/21 01:46	04/27/21 10:22	7440-02-0	
Selenium	ND	ug/L	10.0	4.7	1	04/21/21 01:46	04/27/21 10:22	7782-49-2	
Silver	ND	ug/L	5.0	2.5	1	04/21/21 01:46	04/27/21 10:22	7440-22-4	
Vanadium	**68.8**	ug/L	5.0	3.9	1	04/21/21 01:46	04/27/21 10:22	7440-62-2	
Zinc	**68.2**	ug/L	10.0	9.5	1	04/21/21 01:46	04/27/21 10:22	7440-66-6	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Boron	**11.6J**	ug/L	50.0	8.5	1	04/21/21 15:20	05/03/21 15:58	7440-42-8	
Lithium	**9.8**	ug/L	2.5	0.50	1	04/21/21 15:20	05/03/21 15:58	7439-93-2	
Thallium	**0.20J**	ug/L	1.0	0.050	1	04/21/21 15:20	05/03/21 15:58	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	ND	ug/L	0.20	0.12	1	04/19/21 11:40	04/19/21 18:18	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**1330**	mg/L	25.0	25.0	1		04/19/21 13:12		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**5.8**	mg/L	1.0	0.60	1		04/29/21 13:37	16887-00-6	
Fluoride	**0.26**	mg/L	0.10	0.050	1		04/29/21 13:37	16984-48-8	
Sulfate	**2.5**	mg/L	1.0	0.50	1		04/29/21 13:37	14808-79-8	

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ANALYTICAL RESULTS

Project: CHARAH Q2 GW
Pace Project No.: 92533738

Sample: SW-2 **Lab ID: 92533738016** Collected: 04/15/21 08:30 Received: 04/16/21 13:02 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Antimony	ND	ug/L	5.0	3.0	1	04/21/21 01:46	04/27/21 10:26	7440-36-0	
Arsenic	ND	ug/L	10.0	4.7	1	04/21/21 01:46	04/27/21 10:26	7440-38-2	
Barium	**49.2**	ug/L	5.0	3.5	1	04/21/21 01:46	04/27/21 10:26	7440-39-3	
Beryllium	ND	ug/L	1.0	0.70	1	04/21/21 01:46	04/27/21 10:26	7440-41-7	
Cadmium	ND	ug/L	1.0	0.40	1	04/21/21 01:46	04/27/21 10:26	7440-43-9	
Calcium	**3480**	ug/L	100	94.2	1	04/21/21 01:46	04/27/21 10:26	7440-70-2	
Chromium	ND	ug/L	5.0	3.7	1	04/21/21 01:46	04/27/21 10:26	7440-47-3	
Cobalt	ND	ug/L	5.0	3.6	1	04/21/21 01:46	04/27/21 10:26	7440-48-4	
Copper	ND	ug/L	5.0	4.3	1	04/21/21 01:46	04/27/21 10:26	7440-50-8	
Lead	ND	ug/L	5.0	4.5	1	04/21/21 01:46	04/27/21 10:26	7439-92-1	
Molybdenum	ND	ug/L	5.0	3.9	1	04/21/21 01:46	04/27/21 10:26	7439-98-7	
Nickel	ND	ug/L	5.0	3.5	1	04/21/21 01:46	04/27/21 10:26	7440-02-0	
Selenium	ND	ug/L	10.0	4.7	1	04/21/21 01:46	04/27/21 10:26	7782-49-2	
Silver	ND	ug/L	5.0	2.5	1	04/21/21 01:46	04/27/21 10:26	7440-22-4	
Vanadium	**5.9**	ug/L	5.0	3.9	1	04/21/21 01:46	04/27/21 10:26	7440-62-2	
Zinc	ND	ug/L	10.0	9.5	1	04/21/21 01:46	04/27/21 10:26	7440-66-6	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Boron	**12.4J**	ug/L	50.0	8.5	1	04/21/21 15:20	05/03/21 15:34	7440-42-8	
Lithium	**1.2J**	ug/L	2.5	0.50	1	04/21/21 15:20	05/03/21 15:34	7439-93-2	
Thallium	ND	ug/L	1.0	0.050	1	04/21/21 15:20	05/03/21 15:34	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	ND	ug/L	0.20	0.12	1	04/19/21 11:40	04/19/21 18:20	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**119**	mg/L	25.0	25.0	1		04/21/21 21:26		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**14.4**	mg/L	1.0	0.60	1		04/29/21 13:51	16887-00-6	
Fluoride	**0.12**	mg/L	0.10	0.050	1		04/29/21 13:51	16984-48-8	
Sulfate	**11.9**	mg/L	1.0	0.50	1		04/29/21 13:51	14808-79-8	

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ANALYTICAL RESULTS

Project: CHARAH Q2 GW
Pace Project No.: 92533738

Sample: SW-3 **Lab ID: 92533738017** Collected: 04/15/21 08:45 Received: 04/16/21 13:02 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Antimony	ND	ug/L	5.0	3.0	1	04/21/21 01:46	04/27/21 10:29	7440-36-0	
Arsenic	ND	ug/L	10.0	4.7	1	04/21/21 01:46	04/27/21 10:29	7440-38-2	
Barium	**53.6**	ug/L	5.0	3.5	1	04/21/21 01:46	04/27/21 10:29	7440-39-3	
Beryllium	ND	ug/L	1.0	0.70	1	04/21/21 01:46	04/27/21 10:29	7440-41-7	
Cadmium	ND	ug/L	1.0	0.40	1	04/21/21 01:46	04/27/21 10:29	7440-43-9	
Calcium	**3640**	ug/L	100	94.2	1	04/21/21 01:46	04/27/21 10:29	7440-70-2	
Chromium	ND	ug/L	5.0	3.7	1	04/21/21 01:46	04/27/21 10:29	7440-47-3	
Cobalt	ND	ug/L	5.0	3.6	1	04/21/21 01:46	04/27/21 10:29	7440-48-4	
Copper	ND	ug/L	5.0	4.3	1	04/21/21 01:46	04/27/21 10:29	7440-50-8	
Lead	ND	ug/L	5.0	4.5	1	04/21/21 01:46	04/27/21 10:29	7439-92-1	
Molybdenum	ND	ug/L	5.0	3.9	1	04/21/21 01:46	04/27/21 10:29	7439-98-7	
Nickel	ND	ug/L	5.0	3.5	1	04/21/21 01:46	04/27/21 10:29	7440-02-0	
Selenium	ND	ug/L	10.0	4.7	1	04/21/21 01:46	04/27/21 10:29	7782-49-2	
Silver	ND	ug/L	5.0	2.5	1	04/21/21 01:46	04/27/21 10:29	7440-22-4	
Vanadium	**5.9**	ug/L	5.0	3.9	1	04/21/21 01:46	04/27/21 10:29	7440-62-2	
Zinc	ND	ug/L	10.0	9.5	1	04/21/21 01:46	04/27/21 10:29	7440-66-6	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Boron	**12.8J**	ug/L	50.0	8.5	1	04/21/21 15:20	05/03/21 16:02	7440-42-8	
Lithium	**1.3J**	ug/L	2.5	0.50	1	04/21/21 15:20	05/03/21 16:02	7439-93-2	
Thallium	ND	ug/L	1.0	0.050	1	04/21/21 15:20	05/03/21 16:02	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	ND	ug/L	0.20	0.12	1	04/19/21 11:40	04/19/21 18:23	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**125**	mg/L	25.0	25.0	1		04/21/21 21:26		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**14.3**	mg/L	1.0	0.60	1		04/29/21 14:05	16887-00-6	
Fluoride	**0.12**	mg/L	0.10	0.050	1		04/29/21 14:05	16984-48-8	
Sulfate	**11.9**	mg/L	1.0	0.50	1		04/29/21 14:05	14808-79-8	

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ANALYTICAL RESULTS

Project: CHARAH Q2 GW
Pace Project No.: 92533738

Sample: SW-4 **Lab ID: 92533738018** Collected: 04/13/21 13:30 Received: 04/16/21 13:02 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Antimony	ND	ug/L	5.0	3.0	1	04/21/21 01:46	04/27/21 10:38	7440-36-0	
Arsenic	ND	ug/L	10.0	4.7	1	04/21/21 01:46	04/27/21 10:38	7440-38-2	
Barium	**43.6**	ug/L	5.0	3.5	1	04/21/21 01:46	04/27/21 10:38	7440-39-3	
Beryllium	ND	ug/L	1.0	0.70	1	04/21/21 01:46	04/27/21 10:38	7440-41-7	
Cadmium	ND	ug/L	1.0	0.40	1	04/21/21 01:46	04/27/21 10:38	7440-43-9	
Calcium	**4590**	ug/L	100	94.2	1	04/21/21 01:46	04/27/21 10:38	7440-70-2	
Chromium	ND	ug/L	5.0	3.7	1	04/21/21 01:46	04/27/21 10:38	7440-47-3	
Cobalt	ND	ug/L	5.0	3.6	1	04/21/21 01:46	04/27/21 10:38	7440-48-4	
Copper	ND	ug/L	5.0	4.3	1	04/21/21 01:46	04/27/21 10:38	7440-50-8	
Lead	ND	ug/L	5.0	4.5	1	04/21/21 01:46	04/27/21 10:38	7439-92-1	
Molybdenum	ND	ug/L	5.0	3.9	1	04/21/21 01:46	04/27/21 10:38	7439-98-7	
Nickel	ND	ug/L	5.0	3.5	1	04/21/21 01:46	04/27/21 10:38	7440-02-0	
Selenium	ND	ug/L	10.0	4.7	1	04/21/21 01:46	04/27/21 10:38	7782-49-2	
Silver	ND	ug/L	5.0	2.5	1	04/21/21 01:46	04/27/21 10:38	7440-22-4	
Vanadium	ND	ug/L	5.0	3.9	1	04/21/21 01:46	04/27/21 10:38	7440-62-2	
Zinc	ND	ug/L	10.0	9.5	1	04/21/21 01:46	04/27/21 10:38	7440-66-6	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Boron	**13.8J**	ug/L	50.0	8.5	1	04/21/21 15:20	05/03/21 16:07	7440-42-8	
Lithium	ND	ug/L	2.5	0.50	1	04/21/21 15:20	05/03/21 16:07	7439-93-2	
Thallium	ND	ug/L	1.0	0.050	1	04/21/21 15:20	05/03/21 16:07	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	ND	ug/L	0.20	0.12	1	04/19/21 11:40	04/19/21 18:39	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**100**	mg/L	25.0	25.0	1		04/19/21 13:12		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**13.7**	mg/L	1.0	0.60	1		04/29/21 14:20	16887-00-6	
Fluoride	**0.063J**	mg/L	0.10	0.050	1		04/29/21 14:20	16984-48-8	
Sulfate	**19.3**	mg/L	1.0	0.50	1		04/29/21 14:20	14808-79-8	

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ANALYTICAL RESULTS

Project: CHARAH Q2 GW
Pace Project No.: 92533738

Sample: SW-5 **Lab ID: 92533738019** Collected: 04/13/21 16:10 Received: 04/16/21 13:02 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Antimony	ND	ug/L	5.0	3.0	1	04/21/21 01:46	04/27/21 10:42	7440-36-0	
Arsenic	**8.3J**	ug/L	10.0	4.7	1	04/21/21 01:46	04/27/21 10:42	7440-38-2	
Barium	**505**	ug/L	5.0	3.5	1	04/21/21 01:46	04/27/21 10:42	7440-39-3	
Beryllium	**2.4**	ug/L	1.0	0.70	1	04/21/21 01:46	04/27/21 10:42	7440-41-7	
Cadmium	ND	ug/L	1.0	0.40	1	04/21/21 01:46	04/27/21 10:42	7440-43-9	
Calcium	**7260**	ug/L	100	94.2	1	04/21/21 01:46	04/27/21 10:42	7440-70-2	
Chromium	**35.0**	ug/L	5.0	3.7	1	04/21/21 01:46	04/27/21 10:42	7440-47-3	
Cobalt	**15.1**	ug/L	5.0	3.6	1	04/21/21 01:46	04/27/21 10:42	7440-48-4	
Copper	**27.6**	ug/L	5.0	4.3	1	04/21/21 01:46	04/27/21 10:42	7440-50-8	
Lead	**47.2**	ug/L	5.0	4.5	1	04/21/21 01:46	04/27/21 10:42	7439-92-1	
Molybdenum	ND	ug/L	5.0	3.9	1	04/21/21 01:46	04/27/21 10:42	7439-98-7	
Nickel	**19.2**	ug/L	5.0	3.5	1	04/21/21 01:46	04/27/21 10:42	7440-02-0	
Selenium	ND	ug/L	10.0	4.7	1	04/21/21 01:46	04/27/21 10:42	7782-49-2	
Silver	ND	ug/L	5.0	2.5	1	04/21/21 01:46	04/27/21 10:42	7440-22-4	
Vanadium	**88.2**	ug/L	5.0	3.9	1	04/21/21 01:46	04/27/21 10:42	7440-62-2	
Zinc	**83.4**	ug/L	10.0	9.5	1	04/21/21 01:46	04/27/21 10:42	7440-66-6	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Boron	**15.7J**	ug/L	50.0	8.5	1	04/21/21 15:20	05/03/21 16:12	7440-42-8	
Lithium	**18.7**	ug/L	2.5	0.50	1	04/21/21 15:20	05/03/21 16:12	7439-93-2	
Thallium	**0.24J**	ug/L	1.0	0.050	1	04/21/21 15:20	05/03/21 16:12	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	ND	ug/L	0.20	0.12	1	04/19/21 11:40	04/19/21 18:42	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**379**	mg/L	25.0	25.0	1		04/19/21 13:12		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**9.0**	mg/L	1.0	0.60	1		04/29/21 15:03	16887-00-6	
Fluoride	**0.095J**	mg/L	0.10	0.050	1		04/29/21 15:03	16984-48-8	
Sulfate	**27.7**	mg/L	1.0	0.50	1		04/29/21 15:03	14808-79-8	

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ANALYTICAL RESULTS

Project: CHARAH Q2 GW
Pace Project No.: 92533738

Sample: LEACHATE **Lab ID: 92533738020** Collected: 04/16/21 08:45 Received: 04/16/21 13:02 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Antimony	**3.2J**	ug/L	5.0	3.0	1	04/21/21 01:46	04/27/21 10:45	7440-36-0	
Arsenic	**10.5**	ug/L	10.0	4.7	1	04/21/21 01:46	04/27/21 10:45	7440-38-2	
Barium	**54.5**	ug/L	5.0	3.5	1	04/21/21 01:46	04/27/21 10:45	7440-39-3	
Beryllium	ND	ug/L	1.0	0.70	1	04/21/21 01:46	04/27/21 10:45	7440-41-7	
Cadmium	ND	ug/L	1.0	0.40	1	04/21/21 01:46	04/27/21 10:45	7440-43-9	
Calcium	**276000**	ug/L	500	471	5	04/21/21 01:46	04/27/21 19:21	7440-70-2	
Chromium	ND	ug/L	5.0	3.7	1	04/21/21 01:46	04/27/21 10:45	7440-47-3	
Cobalt	ND	ug/L	5.0	3.6	1	04/21/21 01:46	04/27/21 10:45	7440-48-4	
Copper	ND	ug/L	5.0	4.3	1	04/21/21 01:46	04/27/21 10:45	7440-50-8	
Lead	ND	ug/L	5.0	4.5	1	04/21/21 01:46	04/27/21 10:45	7439-92-1	
Molybdenum	**236**	ug/L	5.0	3.9	1	04/21/21 01:46	04/27/21 10:45	7439-98-7	
Nickel	ND	ug/L	5.0	3.5	1	04/21/21 01:46	04/27/21 10:45	7440-02-0	
Selenium	ND	ug/L	10.0	4.7	1	04/21/21 01:46	04/27/21 10:45	7782-49-2	
Silver	ND	ug/L	5.0	2.5	1	04/21/21 01:46	04/27/21 10:45	7440-22-4	
Vanadium	ND	ug/L	5.0	3.9	1	04/21/21 01:46	04/27/21 10:45	7440-62-2	
Zinc	ND	ug/L	10.0	9.5	1	04/21/21 01:46	04/27/21 10:45	7440-66-6	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Boron	**3030**	ug/L	1500	255	30	04/21/21 15:20	05/03/21 16:26	7440-42-8	
Lithium	**59.1J**	ug/L	75.0	15.0	30	04/21/21 15:20	05/03/21 16:26	7439-93-2	
Thallium	ND	ug/L	30.0	1.5	30	04/21/21 15:20	05/03/21 16:26	7440-28-0	D4
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	ND	ug/L	0.20	0.12	1	04/19/21 00:00	04/19/21 18:49	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**1380**	mg/L	125	125	1		04/21/21 21:26		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**21.2**	mg/L	1.0	0.60	1		04/29/21 15:18	16887-00-6	
Fluoride	**0.24**	mg/L	0.10	0.050	1		04/29/21 15:18	16984-48-8	
Sulfate	**547**	mg/L	12.0	6.0	12		04/30/21 00:33	14808-79-8	

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ANALYTICAL RESULTS

Project: CHARAH Q2 GW
Pace Project No.: 92533738

Sample: DUP **Lab ID: 92533738021** Collected: 04/15/21 00:00 Received: 04/16/21 13:02 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Antimony	ND	ug/L	5.0	3.0	1	04/21/21 01:46	04/27/21 10:48	7440-36-0	
Arsenic	ND	ug/L	10.0	4.7	1	04/21/21 01:46	04/27/21 10:48	7440-38-2	
Barium	**50.7**	ug/L	5.0	3.5	1	04/21/21 01:46	04/27/21 10:48	7440-39-3	
Beryllium	ND	ug/L	1.0	0.70	1	04/21/21 01:46	04/27/21 10:48	7440-41-7	
Cadmium	ND	ug/L	1.0	0.40	1	04/21/21 01:46	04/27/21 10:48	7440-43-9	
Calcium	**32300**	ug/L	100	94.2	1	04/21/21 01:46	04/27/21 10:48	7440-70-2	
Chromium	ND	ug/L	5.0	3.7	1	04/21/21 01:46	04/27/21 10:48	7440-47-3	
Cobalt	ND	ug/L	5.0	3.6	1	04/21/21 01:46	04/27/21 10:48	7440-48-4	
Copper	ND	ug/L	5.0	4.3	1	04/21/21 01:46	04/27/21 10:48	7440-50-8	
Lead	ND	ug/L	5.0	4.5	1	04/21/21 01:46	04/27/21 10:48	7439-92-1	
Molybdenum	ND	ug/L	5.0	3.9	1	04/21/21 01:46	04/27/21 10:48	7439-98-7	
Nickel	ND	ug/L	5.0	3.5	1	04/21/21 01:46	04/27/21 10:48	7440-02-0	
Selenium	ND	ug/L	10.0	4.7	1	04/21/21 01:46	04/27/21 10:48	7782-49-2	
Silver	ND	ug/L	5.0	2.5	1	04/21/21 01:46	04/27/21 10:48	7440-22-4	
Vanadium	ND	ug/L	5.0	3.9	1	04/21/21 01:46	04/27/21 10:48	7440-62-2	
Zinc	ND	ug/L	10.0	9.5	1	04/21/21 01:46	04/27/21 10:48	7440-66-6	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Boron	**18.0J**	ug/L	50.0	8.5	1	04/21/21 15:20	05/03/21 16:31	7440-42-8	
Lithium	**27.4**	ug/L	2.5	0.50	1	04/21/21 15:20	05/03/21 16:31	7439-93-2	
Thallium	ND	ug/L	1.0	0.050	1	04/21/21 15:20	05/03/21 16:31	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	ND	ug/L	0.20	0.12	1	04/19/21 00:00	04/19/21 18:56	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**590**	mg/L	50.0	50.0	1		04/21/21 21:26		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**207**	mg/L	4.0	2.4	4		04/30/21 01:33	16887-00-6	
Fluoride	**0.35**	mg/L	0.10	0.050	1		04/29/21 15:32	16984-48-8	
Sulfate	**28.3**	mg/L	1.0	0.50	1		04/29/21 15:32	14808-79-8	

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ANALYTICAL RESULTS

Project: CHARAH Q2 GW
Pace Project No.: 92533738

Sample: EQBL **Lab ID: 92533738022** Collected: 04/16/21 08:05 Received: 04/16/21 13:02 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Antimony	ND	ug/L	5.0	3.0	1	04/30/21 01:55	04/30/21 15:38	7440-36-0	
Arsenic	ND	ug/L	10.0	4.7	1	04/30/21 01:55	04/30/21 15:38	7440-38-2	
Barium	ND	ug/L	5.0	3.5	1	04/30/21 01:55	04/30/21 15:38	7440-39-3	
Beryllium	ND	ug/L	1.0	0.70	1	04/30/21 01:55	04/30/21 15:38	7440-41-7	
Cadmium	ND	ug/L	1.0	0.40	1	04/30/21 01:55	04/30/21 15:38	7440-43-9	
Calcium	ND	ug/L	100	94.2	1	04/30/21 01:55	04/30/21 15:38	7440-70-2	
Chromium	ND	ug/L	5.0	3.7	1	04/30/21 01:55	04/30/21 15:38	7440-47-3	
Cobalt	ND	ug/L	5.0	3.6	1	04/30/21 01:55	04/30/21 15:38	7440-48-4	
Copper	ND	ug/L	5.0	4.3	1	04/30/21 01:55	04/30/21 15:38	7440-50-8	
Lead	ND	ug/L	5.0	4.5	1	04/30/21 01:55	04/30/21 15:38	7439-92-1	
Molybdenum	ND	ug/L	5.0	3.9	1	04/30/21 01:55	04/30/21 15:38	7439-98-7	
Nickel	ND	ug/L	5.0	3.5	1	04/30/21 01:55	04/30/21 15:38	7440-02-0	
Selenium	ND	ug/L	10.0	4.7	1	04/30/21 01:55	04/30/21 15:38	7782-49-2	
Silver	ND	ug/L	5.0	2.5	1	04/30/21 01:55	04/30/21 15:38	7440-22-4	
Vanadium	ND	ug/L	5.0	3.9	1	04/30/21 01:55	04/30/21 15:38	7440-62-2	
Zinc	ND	ug/L	10.0	9.5	1	04/30/21 01:55	04/30/21 15:38	7440-66-6	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Boron	ND	ug/L	50.0	8.5	1	04/21/21 15:20	05/03/21 16:35	7440-42-8	
Lithium	ND	ug/L	2.5	0.50	1	04/21/21 15:20	05/03/21 16:35	7439-93-2	
Thallium	ND	ug/L	1.0	0.050	1	04/21/21 15:20	05/03/21 16:35	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	ND	ug/L	0.20	0.12	1	04/19/21 00:00	04/19/21 18:58	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	ND	mg/L	25.0	25.0	1		04/21/21 21:26		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	ND	mg/L	1.0	0.60	1		04/29/21 15:47	16887-00-6	
Fluoride	ND	mg/L	0.10	0.050	1		04/29/21 15:47	16984-48-8	
Sulfate	ND	mg/L	1.0	0.50	1		04/29/21 15:47	14808-79-8	

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QUALITY CONTROL DATA

Project: CHARAH Q2 GW
Pace Project No.: 92533738

QC Batch: 614564
QC Batch Method: EPA 7470A
Analysis Method: EPA 7470A
Analysis Description: 7470 Mercury
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92533738001, 92533738002, 92533738003, 92533738004, 92533738005, 92533738006, 92533738007, 92533738008, 92533738009, 92533738010, 92533738011, 92533738012, 92533738013, 92533738014, 92533738015, 92533738016, 92533738017, 92533738018, 92533738019

METHOD BLANK: 3234235 Matrix: Water
Associated Lab Samples: 92533738001, 92533738002, 92533738003, 92533738004, 92533738005, 92533738006, 92533738007, 92533738008, 92533738009, 92533738010, 92533738011, 92533738012, 92533738013, 92533738014, 92533738015, 92533738016, 92533738017, 92533738018, 92533738019

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury	ug/L	ND	0.20	0.12	04/19/21 15:48	

LABORATORY CONTROL SAMPLE: 3234236

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	2.5	2.5	100	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3234237 3234238

Parameter	Units	92533772009 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ug/L	ND	2.5	2.5	2.2	2.2	85	86	75-125	1	25	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

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QUALITY CONTROL DATA

Project: CHARAH Q2 GW
Pace Project No.: 92533738

QC Batch: 614565
QC Batch Method: EPA 7470A
Analysis Method: EPA 7470A
Analysis Description: 7470 Mercury
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92533738020, 92533738021, 92533738022

METHOD BLANK: 3234239 Matrix: Water
Associated Lab Samples: 92533738020, 92533738021, 92533738022

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury	ug/L	ND	0.20	0.12	04/19/21 18:44	

LABORATORY CONTROL SAMPLE: 3234240

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	2.5	2.5	99	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3234241 3234242

Parameter	Units	92533738020 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ug/L	ND	2.5	2.5	2.1	2.1	85	83	75-125	2	25	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: CHARAH Q2 GW
Pace Project No.: 92533738

QC Batch: 615058
QC Batch Method: EPA 3010A
Analysis Method: EPA 6010D
Analysis Description: 6010 MET
Laboratory: Pace Analytical Services - Asheville

Associated Lab Samples: 92533738001

METHOD BLANK: 3236811 Matrix: Water
Associated Lab Samples: 92533738001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Antimony	ug/L	4.7J	5.0	3.0	04/26/21 18:05	
Arsenic	ug/L	ND	10.0	4.7	04/26/21 18:05	
Barium	ug/L	ND	5.0	3.5	04/26/21 18:05	
Beryllium	ug/L	ND	1.0	0.70	04/26/21 18:05	
Cadmium	ug/L	ND	1.0	0.40	04/26/21 18:05	
Calcium	ug/L	ND	100	94.2	04/26/21 18:05	
Chromium	ug/L	ND	5.0	3.7	04/26/21 18:05	
Cobalt	ug/L	ND	5.0	3.6	04/26/21 18:05	
Copper	ug/L	ND	5.0	4.3	04/26/21 00:32	
Lead	ug/L	ND	5.0	4.5	04/26/21 18:05	
Molybdenum	ug/L	ND	5.0	3.9	04/26/21 00:32	
Nickel	ug/L	ND	5.0	3.5	04/26/21 18:05	
Selenium	ug/L	ND	10.0	4.7	04/26/21 00:32	
Silver	ug/L	ND	5.0	2.5	04/26/21 18:05	
Vanadium	ug/L	ND	5.0	3.9	04/26/21 18:05	
Zinc	ug/L	ND	10.0	9.5	04/26/21 18:05	

LABORATORY CONTROL SAMPLE: 3236812

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	500	508	102	80-120	
Arsenic	ug/L	500	470	94	80-120	
Barium	ug/L	500	488	98	80-120	
Beryllium	ug/L	500	507	101	80-120	
Cadmium	ug/L	500	486	97	80-120	
Calcium	ug/L	5000	4900	98	80-120	
Chromium	ug/L	500	513	103	80-120	
Cobalt	ug/L	500	484	97	80-120	
Copper	ug/L	500	538	108	80-120	
Lead	ug/L	500	495	99	80-120	
Molybdenum	ug/L	500	500	100	80-120	
Nickel	ug/L	500	480	96	80-120	
Selenium	ug/L	500	508	102	80-120	
Silver	ug/L	250	243	97	80-120	
Vanadium	ug/L	500	517	103	80-120	
Zinc	ug/L	500	507	101	80-120	

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QUALITY CONTROL DATA

Project: CHARAH Q2 GW
Pace Project No.: 92533738

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3236813 3236814

Parameter	Units	92533772001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Antimony	ug/L	ND	500	500	518	516	104	103	75-125	0	20	
Arsenic	ug/L	ND	500	500	470	474	94	94	75-125	1	20	
Barium	ug/L	24.6	500	500	500	496	95	94	75-125	1	20	
Beryllium	ug/L	1.4	500	500	493	491	98	98	75-125	0	20	
Cadmium	ug/L	ND	500	500	493	493	99	99	75-125	0	20	
Calcium	ug/L	29700	5000	5000	35100	34400	108	93	75-125	2	20	
Chromium	ug/L	ND	500	500	510	506	102	101	75-125	1	20	
Cobalt	ug/L	ND	500	500	474	475	95	95	75-125	0	20	
Copper	ug/L	ND	500	500	542	539	108	107	75-125	1	20	
Lead	ug/L	ND	500	500	488	488	97	97	75-125	0	20	
Molybdenum	ug/L	ND	500	500	491	493	98	99	75-125	0	20	
Nickel	ug/L	4.7J	500	500	471	472	93	94	75-125	0	20	
Selenium	ug/L	ND	500	500	545	545	109	109	75-125	0	20	
Silver	ug/L	ND	250	250	245	243	97	97	75-125	1	20	
Vanadium	ug/L	ND	500	500	535	531	107	106	75-125	1	20	
Zinc	ug/L	ND	500	500	510	508	102	102	75-125	0	20	

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QUALITY CONTROL DATA

Project: CHARAH Q2 GW
Pace Project No.: 92533738

QC Batch: 615059
QC Batch Method: EPA 3010A
Analysis Method: EPA 6010D
Analysis Description: 6010 MET
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92533738002, 92533738003, 92533738004, 92533738005, 92533738006, 92533738007, 92533738008, 92533738009, 92533738010, 92533738011, 92533738012, 92533738013, 92533738014, 92533738015, 92533738016, 92533738017, 92533738018, 92533738019, 92533738020, 92533738021

METHOD BLANK: 3236815 Matrix: Water
Associated Lab Samples: 92533738002, 92533738003, 92533738004, 92533738005, 92533738006, 92533738007, 92533738008, 92533738009, 92533738010, 92533738011, 92533738012, 92533738013, 92533738014, 92533738015, 92533738016, 92533738017, 92533738018, 92533738019, 92533738020, 92533738021

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Antimony	ug/L	ND	5.0	3.0	04/27/21 09:05	
Arsenic	ug/L	ND	10.0	4.7	04/27/21 09:05	
Barium	ug/L	ND	5.0	3.5	04/27/21 09:05	
Beryllium	ug/L	ND	1.0	0.70	04/27/21 09:05	
Cadmium	ug/L	ND	1.0	0.40	04/27/21 09:05	
Calcium	ug/L	ND	100	94.2	04/27/21 09:05	
Chromium	ug/L	ND	5.0	3.7	04/27/21 09:05	
Cobalt	ug/L	ND	5.0	3.6	04/27/21 09:05	
Copper	ug/L	ND	5.0	4.3	04/27/21 09:05	
Lead	ug/L	ND	5.0	4.5	04/27/21 09:05	
Molybdenum	ug/L	ND	5.0	3.9	04/27/21 09:05	
Nickel	ug/L	ND	5.0	3.5	04/27/21 09:05	
Selenium	ug/L	ND	10.0	4.7	04/27/21 09:05	
Silver	ug/L	ND	5.0	2.5	04/27/21 09:05	
Vanadium	ug/L	ND	5.0	3.9	04/27/21 09:05	
Zinc	ug/L	ND	10.0	9.5	04/27/21 09:05	

LABORATORY CONTROL SAMPLE: 3236816

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	500	511	102	80-120	
Arsenic	ug/L	500	495	99	80-120	
Barium	ug/L	500	515	103	80-120	
Beryllium	ug/L	500	514	103	80-120	
Cadmium	ug/L	500	502	100	80-120	
Calcium	ug/L	5000	5020	100	80-120	
Chromium	ug/L	500	488	98	80-120	
Cobalt	ug/L	500	492	98	80-120	
Copper	ug/L	500	513	103	80-120	
Lead	ug/L	500	503	101	80-120	
Molybdenum	ug/L	500	523	105	80-120	
Nickel	ug/L	500	500	100	80-120	
Selenium	ug/L	500	510	102	80-120	
Silver	ug/L	250	248	99	80-120	
Vanadium	ug/L	500	495	99	80-120	

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QUALITY CONTROL DATA

Project: CHARAH Q2 GW
Pace Project No.: 92533738

LABORATORY CONTROL SAMPLE: 3236816

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Zinc	ug/L	500	505	101	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3236817 3236818

Parameter	Units	92533738002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Antimony	ug/L	ND	500	500	507	492	101	98	75-125	3	20	
Arsenic	ug/L	ND	500	500	514	506	103	101	75-125	2	20	
Barium	ug/L	84.1	500	500	593	584	102	100	75-125	1	20	
Beryllium	ug/L	ND	500	500	491	480	98	96	75-125	2	20	
Cadmium	ug/L	ND	500	500	508	495	102	99	75-125	3	20	
Calcium	ug/L	105000	5000	5000	111000	111000	126	109	75-125	1	20	M1
Chromium	ug/L	ND	500	500	473	460	94	92	75-125	3	20	
Cobalt	ug/L	ND	500	500	472	458	94	92	75-125	3	20	
Copper	ug/L	ND	500	500	528	513	106	103	75-125	3	20	
Lead	ug/L	ND	500	500	481	468	95	93	75-125	3	20	
Molybdenum	ug/L	ND	500	500	519	508	103	101	75-125	2	20	
Nickel	ug/L	ND	500	500	476	464	95	92	75-125	3	20	
Selenium	ug/L	ND	500	500	531	517	106	103	75-125	3	20	
Silver	ug/L	ND	250	250	257	249	103	100	75-125	3	20	
Vanadium	ug/L	ND	500	500	494	482	98	96	75-125	2	20	
Zinc	ug/L	16.0	500	500	510	495	99	96	75-125	3	20	

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QUALITY CONTROL DATA

Project: CHARAH Q2 GW
Pace Project No.: 92533738

QC Batch: 617289
QC Batch Method: EPA 3010A
Analysis Method: EPA 6010D
Analysis Description: 6010 MET
Laboratory: Pace Analytical Services - Asheville

Associated Lab Samples: 92533738022

METHOD BLANK: 3248071 Matrix: Water
Associated Lab Samples: 92533738022

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Antimony	ug/L	ND	5.0	3.0	04/30/21 15:19	
Arsenic	ug/L	ND	10.0	4.7	04/30/21 15:19	
Barium	ug/L	ND	5.0	3.5	04/30/21 15:19	
Beryllium	ug/L	ND	1.0	0.70	04/30/21 15:19	
Cadmium	ug/L	ND	1.0	0.40	04/30/21 15:19	
Calcium	ug/L	ND	100	94.2	04/30/21 15:19	
Chromium	ug/L	ND	5.0	3.7	04/30/21 15:19	
Cobalt	ug/L	ND	5.0	3.6	04/30/21 15:19	
Copper	ug/L	ND	5.0	4.3	04/30/21 15:19	
Lead	ug/L	ND	5.0	4.5	04/30/21 15:19	
Molybdenum	ug/L	ND	5.0	3.9	04/30/21 15:19	
Nickel	ug/L	ND	5.0	3.5	04/30/21 15:19	
Selenium	ug/L	ND	10.0	4.7	04/30/21 15:19	
Silver	ug/L	ND	5.0	2.5	04/30/21 15:19	
Vanadium	ug/L	ND	5.0	3.9	04/30/21 15:19	
Zinc	ug/L	ND	10.0	9.5	04/30/21 15:19	

LABORATORY CONTROL SAMPLE: 3248072

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	500	473	95	80-120	
Arsenic	ug/L	500	494	99	80-120	
Barium	ug/L	500	483	97	80-120	
Beryllium	ug/L	500	492	98	80-120	
Cadmium	ug/L	500	490	98	80-120	
Calcium	ug/L	5000	4760	95	80-120	
Chromium	ug/L	500	503	101	80-120	
Cobalt	ug/L	500	466	93	80-120	
Copper	ug/L	500	502	100	80-120	
Lead	ug/L	500	474	95	80-120	
Molybdenum	ug/L	500	500	100	80-120	
Nickel	ug/L	500	490	98	80-120	
Selenium	ug/L	500	468	94	80-120	
Silver	ug/L	250	244	98	80-120	
Vanadium	ug/L	500	498	100	80-120	
Zinc	ug/L	500	464	93	80-120	

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QUALITY CONTROL DATA

Project: CHARAH Q2 GW
Pace Project No.: 92533738

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3248073 3248074

Parameter	Units	92534954010 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Antimony	ug/L	ND	500	500	476	485	95	96	75-125	2	20	
Arsenic	ug/L	ND	500	500	513	518	102	103	75-125	1	20	
Barium	ug/L	709	500	500	1190	1210	97	100	75-125	2	20	
Beryllium	ug/L	ND	500	500	485	492	97	98	75-125	1	20	
Cadmium	ug/L	ND	500	500	497	500	99	100	75-125	1	20	
Calcium	ug/L	57000	5000	5000	62100	62900	103	119	75-125	1	20	
Chromium	ug/L	ND	500	500	496	504	99	101	75-125	2	20	
Cobalt	ug/L	5.5	500	500	458	461	90	91	75-125	1	20	
Copper	ug/L	ND	500	500	521	530	104	106	75-125	2	20	
Lead	ug/L	ND	500	500	457	462	91	92	75-125	1	20	
Molybdenum	ug/L	ND	500	500	489	496	98	99	75-125	2	20	
Nickel	ug/L	10.7	500	500	484	489	95	96	75-125	1	20	
Selenium	ug/L	ND	500	500	492	493	98	99	75-125	0	20	
Silver	ug/L	ND	250	250	250	254	100	102	75-125	2	20	
Vanadium	ug/L	ND	500	500	496	505	99	101	75-125	2	20	
Zinc	ug/L	ND	500	500	462	467	92	93	75-125	1	20	

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QUALITY CONTROL DATA

Project: CHARAH Q2 GW
Pace Project No.: 92533738

QC Batch: 615063
QC Batch Method: EPA 3010A
Analysis Method: EPA 6020B
Analysis Description: 6020 MET
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92533738001, 92533738002, 92533738003, 92533738004, 92533738005, 92533738006, 92533738007, 92533738008, 92533738009, 92533738010, 92533738011, 92533738012, 92533738013, 92533738014

METHOD BLANK: 3236831 Matrix: Water
Associated Lab Samples: 92533738001, 92533738002, 92533738003, 92533738004, 92533738005, 92533738006, 92533738007, 92533738008, 92533738009, 92533738010, 92533738011, 92533738012, 92533738013, 92533738014

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Boron	ug/L	ND	50.0	8.5	04/30/21 14:13	
Lithium	ug/L	ND	2.5	0.50	04/30/21 13:46	
Thallium	ug/L	ND	1.0	0.050	04/30/21 13:46	

LABORATORY CONTROL SAMPLE: 3236832

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Boron	ug/L	50	48.2J	96	80-120	
Lithium	ug/L	50	47.0	94	80-120	
Thallium	ug/L	25	24.3	97	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3236833 3236834

Parameter	Units	92533738002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Boron	ug/L	36.2J	50	50	74.5	71.4	77	70	75-125	4	20	M1
Lithium	ug/L	20.3	50	50	68.9	69.4	97	98	75-125	1	20	
Thallium	ug/L	ND	25	25	24.6	24.9	98	100	75-125	1	20	

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QUALITY CONTROL DATA

Project: CHARAH Q2 GW
Pace Project No.: 92533738

QC Batch: 615233
QC Batch Method: EPA 3010A
Analysis Method: EPA 6020B
Analysis Description: 6020 MET
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92533738015, 92533738016, 92533738017, 92533738018, 92533738019, 92533738020, 92533738021, 92533738022

METHOD BLANK: 3237624 Matrix: Water
Associated Lab Samples: 92533738015, 92533738016, 92533738017, 92533738018, 92533738019, 92533738020, 92533738021, 92533738022

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Boron	ug/L	ND	50.0	8.5	05/03/21 15:15	
Lithium	ug/L	ND	2.5	0.50	05/03/21 15:15	
Thallium	ug/L	ND	1.0	0.050	05/03/21 15:15	

LABORATORY CONTROL SAMPLE: 3237626

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Boron	ug/L	50	44.8J	90	80-120	
Lithium	ug/L	50	53.3	107	80-120	
Thallium	ug/L	25	24.4	98	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3237627 3237628

Parameter	Units	92533738016 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Boron	ug/L	12.4J	50	50	58.4	62.6	92	101	75-125	7	20	
Lithium	ug/L	1.2J	50	50	55.8	54.4	109	106	75-125	2	20	
Thallium	ug/L	ND	25	25	25.4	24.6	101	98	75-125	3	20	

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QUALITY CONTROL DATA

Project: CHARAH Q2 GW
Pace Project No.: 92533738

QC Batch: 614459
QC Batch Method: SM 2540C-2011
Analysis Method: SM 2540C-2011
Analysis Description: 2540C Total Dissolved Solids
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92533738001, 92533738002

METHOD BLANK: 3233880 Matrix: Water
Associated Lab Samples: 92533738001, 92533738002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	ND	25.0	25.0	04/17/21 16:48	

LABORATORY CONTROL SAMPLE: 3233881

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	249	250	100	90-110	

SAMPLE DUPLICATE: 3233882

Parameter	Units	92533738001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	563	553	2	25	

SAMPLE DUPLICATE: 3233883

Parameter	Units	92533102001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	160	166	4	25	

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QUALITY CONTROL DATA

Project: CHARAH Q2 GW
Pace Project No.: 92533738

QC Batch: 614567 | Analysis Method: SM 2540C-2011
QC Batch Method: SM 2540C-2011 | Analysis Description: 2540C Total Dissolved Solids
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92533738007, 92533738008, 92533738013, 92533738014, 92533738015, 92533738018, 92533738019

METHOD BLANK: 3234251 Matrix: Water
Associated Lab Samples: 92533738007, 92533738008, 92533738013, 92533738014, 92533738015, 92533738018, 92533738019

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	ND	25.0	25.0	04/21/21 02:03	

LABORATORY CONTROL SAMPLE: 3234252

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	249	264	106	90-110	

SAMPLE DUPLICATE: 3234253

Parameter	Units	92533004003 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	156	155	1	25	

SAMPLE DUPLICATE: 3234254

Parameter	Units	92533738018 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	100	108	8	25	

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QUALITY CONTROL DATA

Project: CHARAH Q2 GW
Pace Project No.: 92533738

QC Batch: 614715
QC Batch Method: SM 2540C-2011
Analysis Method: SM 2540C-2011
Analysis Description: 2540C Total Dissolved Solids
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92533738003, 92533738006, 92533738010

METHOD BLANK: 3235141 Matrix: Water
Associated Lab Samples: 92533738003, 92533738006, 92533738010

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	ND	25.0	25.0	04/19/21 16:38	

LABORATORY CONTROL SAMPLE: 3235142

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	249	250	100	90-110	

SAMPLE DUPLICATE: 3235143

Parameter	Units	92533433002 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	258	260	1	25	

SAMPLE DUPLICATE: 3235144

Parameter	Units	92533319001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	165	167	1	25	

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QUALITY CONTROL DATA

Project: CHARAH Q2 GW
Pace Project No.: 92533738

QC Batch: 614844
QC Batch Method: SM 2540C-2011
Analysis Method: SM 2540C-2011
Analysis Description: 2540C Total Dissolved Solids
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92533738004, 92533738005

METHOD BLANK: 3235515 Matrix: Water
Associated Lab Samples: 92533738004, 92533738005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	ND	25.0	25.0	04/20/21 11:27	

LABORATORY CONTROL SAMPLE: 3235516

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	249	270	108	90-110	

SAMPLE DUPLICATE: 3235517

Parameter	Units	92533521001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	263	264	0	25	

SAMPLE DUPLICATE: 3235518

Parameter	Units	92533574010 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	654	644	2	25	

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QUALITY CONTROL DATA

Project: CHARAH Q2 GW
Pace Project No.: 92533738

QC Batch: 615320 Analysis Method: SM 2540C-2011
QC Batch Method: SM 2540C-2011 Analysis Description: 2540C Total Dissolved Solids
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92533738009, 92533738011, 92533738012, 92533738016, 92533738017, 92533738020, 92533738021, 92533738022

METHOD BLANK: 3238234 Matrix: Water
Associated Lab Samples: 92533738009, 92533738011, 92533738012, 92533738016, 92533738017, 92533738020, 92533738021, 92533738022

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	ND	25.0	25.0	04/21/21 21:25	

LABORATORY CONTROL SAMPLE: 3238235

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	251	254	101	90-110	

SAMPLE DUPLICATE: 3238236

Parameter	Units	92533738009 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	546	580	6	25	

SAMPLE DUPLICATE: 3238237

Parameter	Units	92533944002 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	214	216	1	25	

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QUALITY CONTROL DATA

Project: CHARAH Q2 GW
Pace Project No.: 92533738

QC Batch: 616247
QC Batch Method: EPA 300.0 Rev 2.1 1993
Analysis Method: EPA 300.0 Rev 2.1 1993
Analysis Description: 300.0 IC Anions
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92533738001, 92533738002, 92533738003

METHOD BLANK: 3243084 Matrix: Water
Associated Lab Samples: 92533738001, 92533738002, 92533738003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	ND	1.0	0.60	04/26/21 22:28	
Fluoride	mg/L	ND	0.10	0.050	04/26/21 22:28	
Sulfate	mg/L	ND	1.0	0.50	04/26/21 22:28	

LABORATORY CONTROL SAMPLE: 3243085

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	50	48.4	97	90-110	
Fluoride	mg/L	2.5	2.4	98	90-110	
Sulfate	mg/L	50	48.3	97	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3243086 3243087

Parameter	Units	92534889001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	12.3	50	50	61.9	63.8	99	103	90-110	3	10	
Fluoride	mg/L	ND	2.5	2.5	2.8	2.9	111	114	90-110	3	10	M1
Sulfate	mg/L	4.1	50	50	53.8	55.7	99	103	90-110	3	10	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3243088 3243089

Parameter	Units	92533574013 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	134	50	50	179	178	90	88	90-110	1	10	M6
Fluoride	mg/L	0.090J	2.5	2.5	2.5	2.5	97	96	90-110	0	10	
Sulfate	mg/L	218	50	50	262	260	88	85	90-110	1	10	M6

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QUALITY CONTROL DATA

Project: CHARAH Q2 GW
Pace Project No.: 92533738

QC Batch: 616315
QC Batch Method: EPA 300.0 Rev 2.1 1993
Analysis Method: EPA 300.0 Rev 2.1 1993
Analysis Description: 300.0 IC Anions
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92533738004, 92533738005, 92533738006, 92533738007, 92533738008, 92533738009, 92533738010, 92533738011, 92533738012, 92533738013, 92533738014, 92533738015, 92533738016, 92533738017, 92533738018, 92533738019, 92533738020, 92533738021, 92533738022

METHOD BLANK: 3243494
Matrix: Water
Associated Lab Samples: 92533738004, 92533738005, 92533738006, 92533738007, 92533738008, 92533738009, 92533738010, 92533738011, 92533738012, 92533738013, 92533738014, 92533738015, 92533738016, 92533738017, 92533738018, 92533738019, 92533738020, 92533738021, 92533738022

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	ND	1.0	0.60	04/29/21 07:33	
Fluoride	mg/L	ND	0.10	0.050	04/29/21 07:33	
Sulfate	mg/L	ND	1.0	0.50	04/29/21 07:33	

LABORATORY CONTROL SAMPLE: 3243495

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	50	50.1	100	90-110	
Fluoride	mg/L	2.5	2.3	93	90-110	
Sulfate	mg/L	50	49.6	99	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3243496 3243497

Parameter	Units	92533738004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	1170	50	50	1210	1220	68	81	90-110	1	10	M6
Fluoride	mg/L	0.24	2.5	2.5	2.6	2.8	93	101	90-110	8	10	
Sulfate	mg/L	53.3	50	50	82.9	86.6	59	67	90-110	4	10	M6

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3243498 3243499

Parameter	Units	92533738014 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	224	50	50	267	268	85	88	90-110	0	10	M6
Fluoride	mg/L	0.49	2.5	2.5	2.8	2.9	94	96	90-110	2	10	
Sulfate	mg/L	196	50	50	240	241	87	90	90-110	1	10	M6

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: CHARAH Q2 GW
Pace Project No.: 92533738

Sample: BG-1 **Lab ID: 92533738001** Collected: 04/12/21 13:05 Received: 04/16/21 13:02 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.0828 ± 0.381 (0.721) C:NA T:96%**	pCi/L	05/14/21 15:55	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.375 ± 0.300 (0.591) C:76% T:98%**	pCi/L	05/12/21 16:18	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**0.458 ± 0.681 (1.31)**	pCi/L	05/14/21 17:07	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: CHARAH Q2 GW
Pace Project No.: 92533738

Sample: BG-2 **Lab ID: 92533738002** Collected: 04/12/21 16:15 Received: 04/16/21 13:02 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.240 ± 0.340 (0.576) C:NA T:86%**	pCi/L	05/14/21 15:55	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.551 ± 0.396 (0.756) C:72% T:79%**	pCi/L	05/12/21 16:18	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**0.791 ± 0.736 (1.33)**	pCi/L	05/14/21 17:07	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: CHARAH Q2 GW
Pace Project No.: 92533738

Sample: MW-1 **Lab ID: 92533738003** Collected: 04/14/21 16:10 Received: 04/16/21 13:02 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.228 ± 0.269 (0.423) C:NA T:98%**	pCi/L	05/14/21 15:55	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.285 ± 0.403 (0.864) C:72% T:80%**	pCi/L	05/12/21 16:18	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**0.513 ± 0.672 (1.29)**	pCi/L	05/14/21 17:07	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: CHARAH Q2 GW
Pace Project No.: 92533738

Sample: MW-2 **Lab ID: 92533738004** Collected: 04/15/21 09:20 Received: 04/16/21 13:02 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.931 ± 0.538 (0.210) C:NA T:95%**	pCi/L	05/14/21 15:55	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**2.16 ± 0.718 (0.980) C:70% T:83%**	pCi/L	05/12/21 16:18	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**3.09 ± 1.26 (1.19)**	pCi/L	05/14/21 17:07	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: CHARAH Q2 GW
Pace Project No.: 92533738

Sample: MW-2D **Lab ID: 92533738005** Collected: 04/15/21 08:47 Received: 04/16/21 13:02 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.430 ± 0.389 (0.574) C:NA T:90%**	pCi/L	05/14/21 15:55	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**1.43 ± 0.615 (1.00) C:65% T:105%**	pCi/L	05/12/21 18:08	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**1.86 ± 1.00 (1.57)**	pCi/L	05/14/21 17:07	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: CHARAH Q2 GW
Pace Project No.: 92533738

Sample: MW-3 **Lab ID: 92533738006** Collected: 04/14/21 12:20 Received: 04/16/21 13:02 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.802 ± 0.499 (0.692) C:NA T:102%**	pCi/L	05/14/21 15:55	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.647 ± 0.590 (1.20) C:69% T:79%**	pCi/L	05/12/21 18:09	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**1.45 ± 1.09 (1.89)**	pCi/L	05/14/21 17:07	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: CHARAH Q2 GW
Pace Project No.: 92533738

Sample: MW-4 **Lab ID: 92533738007** Collected: 04/13/21 10:20 Received: 04/16/21 13:02 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.0486 ± 0.437 (0.846) C:NA T:96%**	pCi/L	05/14/21 15:55	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.382 ± 0.535 (1.15) C:69% T:81%**	pCi/L	05/12/21 18:09	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**0.431 ± 0.972 (2.00)**	pCi/L	05/14/21 17:07	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: CHARAH Q2 GW
Pace Project No.: 92533738

Sample: MW-5 **Lab ID: 92533738008** Collected: 04/13/21 16:10 Received: 04/16/21 13:02 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.256 ± 0.460 (0.811) C:NA T:95%**	pCi/L	05/14/21 16:09	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.307 ± 0.507 (1.10) C:68% T:83%**	pCi/L	05/12/21 18:09	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**0.563 ± 0.967 (1.91)**	pCi/L	05/14/21 17:07	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: CHARAH Q2 GW
Pace Project No.: 92533738

Sample: MW-6 **Lab ID: 92533738009** Collected: 04/15/21 12:35 Received: 04/16/21 13:02 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.212 ± 0.294 (0.491) C:NA T:88%**	pCi/L	05/14/21 16:09	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.377 ± 0.426 (0.888) C:69% T:90%**	pCi/L	05/12/21 18:09	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**0.589 ± 0.720 (1.38)**	pCi/L	05/14/21 17:07	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: CHARAH Q2 GW
Pace Project No.: 92533738

Sample: MW-7R **Lab ID: 92533738010** Collected: 04/14/21 15:00 Received: 04/16/21 13:02 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.177 ± 0.275 (0.476) C:NA T:99%**	pCi/L	05/14/21 16:09	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**2.13 ± 0.738 (1.01) C:69% T:85%**	pCi/L	05/12/21 18:09	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**2.31 ± 1.01 (1.49)**	pCi/L	05/14/21 17:07	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: CHARAH Q2 GW
Pace Project No.: 92533738

Sample: MW-8 **Lab ID: 92533738011** Collected: 04/15/21 14:15 Received: 04/16/21 13:02 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.0883 ± 0.367 (0.700) C:NA T:97%**	pCi/L	05/14/21 16:09	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**1.74 ± 1.03 (1.97) C:69% T:81%**	pCi/L	05/12/21 19:45	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**1.83 ± 1.40 (2.67)**	pCi/L	05/14/21 17:07	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: CHARAH Q2 GW
Pace Project No.: 92533738

Sample: SW-6 **Lab ID: 92533738012** Collected: 04/16/21 09:00 Received: 04/16/21 13:02 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.583 ± 0.545 (0.773) C:NA T:80%**	pCi/L	05/14/21 16:09	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**4.43 ± 1.67 (2.66) C:67% T:65%**	pCi/L	05/12/21 19:45	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**5.01 ± 2.22 (3.43)**	pCi/L	05/14/21 17:07	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: CHARAH Q2 GW
Pace Project No.: 92533738

Sample: MW-11 **Lab ID: 92533738013** Collected: 04/13/21 11:45 Received: 04/16/21 13:02 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.258 ± 0.525 (0.934) C:NA T:84%**	pCi/L	05/14/21 16:09	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**2.13 ± 0.893 (1.51) C:67% T:100%**	pCi/L	05/12/21 19:45	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**2.39 ± 1.42 (2.44)**	pCi/L	05/14/21 17:07	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: CHARAH Q2 GW
Pace Project No.: 92533738

Sample: MW-11D **Lab ID: 92533738014** Collected: 04/13/21 13:00 Received: 04/16/21 13:02 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.0418 ± 0.272 (0.547) C:NA T:99%**	pCi/L	05/14/21 16:23	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**2.23 ± 1.06 (1.89) C:70% T:80%**	pCi/L	05/12/21 19:45	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**2.27 ± 1.33 (2.44)**	pCi/L	05/14/21 17:07	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: CHARAH Q2 GW
Pace Project No.: 92533738

Sample: SW-1 **Lab ID: 92533738015** Collected: 04/13/21 13:55 Received: 04/16/21 13:02 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.787 ± 0.522 (0.237) C:NA T:75%**	pCi/L	05/14/21 16:23	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**2.00 ± 1.25 (2.35) C:69% T:37%**	pCi/L	05/12/21 16:17	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**2.79 ± 1.77 (2.59)**	pCi/L	05/14/21 17:07	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: CHARAH Q2 GW
Pace Project No.: 92533738

Sample: SW-2 **Lab ID: 92533738016** Collected: 04/15/21 08:30 Received: 04/16/21 13:02 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**-0.0771 ± 0.501 (1.09) C:NA T:54%**	pCi/L	05/14/21 16:23	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.816 ± 1.09 (2.34) C:67% T:34%**	pCi/L	05/12/21 16:17	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**0.816 ± 1.59 (3.43)**	pCi/L	05/14/21 17:07	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: CHARAH Q2 GW
Pace Project No.: 92533738

Sample: SW-3 **Lab ID: 92533738017** Collected: 04/15/21 08:45 Received: 04/16/21 13:02 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**-0.0521 ± 0.670 (1.31) C:NA T:50%**	pCi/L	05/14/21 13:43	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.201 ± 1.19 (2.73) C:66% T:34%**	pCi/L	05/13/21 18:46	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**0.201 ± 1.86 (4.04)**	pCi/L	05/14/21 17:09	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: CHARAH Q2 GW
Pace Project No.: 92533738

Sample: SW-4 **Lab ID: 92533738018** Collected: 04/13/21 13:30 Received: 04/16/21 13:02 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**-0.299 ± 0.478 (1.08) C:NA T:90%**	pCi/L	05/14/21 13:43	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**-0.267 ± 0.539 (1.35) C:70% T:59%**	pCi/L	05/13/21 18:46	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**0.000 ± 1.02 (2.43)**	pCi/L	05/14/21 17:09	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: CHARAH Q2 GW
Pace Project No.: 92533738

Sample: SW-5 **Lab ID: 92533738019** Collected: 04/13/21 16:10 Received: 04/16/21 13:02 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**1.08 ± 0.756 (0.365) C:NA T:56%**	pCi/L	05/14/21 16:23	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**2.57 ± 1.51 (2.78) C:65% T:46%**	pCi/L	05/12/21 19:37	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**3.65 ± 2.27 (3.15)**	pCi/L	05/14/21 17:09	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: CHARAH Q2 GW
Pace Project No.: 92533738

Sample: LEACHATE **Lab ID: 92533738020** Collected: 04/16/21 08:45 Received: 04/16/21 13:02 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.000 ± 0.259 (0.528) C:NA T:87%**	pCi/L	05/10/21 14:55	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.678 ± 0.502 (0.979) C:60% T:80%**	pCi/L	05/07/21 11:31	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**0.678 ± 0.761 (1.51)**	pCi/L	05/14/21 17:09	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: CHARAH Q2 GW
Pace Project No.: 92533738

Sample: DUP **Lab ID: 92533738021** Collected: 04/15/21 00:00 Received: 04/16/21 13:02 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**-0.110 ± 0.338 (0.791) C:NA T:90%**	pCi/L	05/14/21 13:43	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.602 ± 0.557 (1.13) C:73% T:79%**	pCi/L	05/13/21 18:46	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**0.602 ± 0.895 (1.92)**	pCi/L	05/14/21 17:09	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: CHARAH Q2 GW
Pace Project No.: 92533738

Sample: EQBL **Lab ID: 92533738022** Collected: 04/16/21 08:05 Received: 04/16/21 13:02 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.0945 ± 0.628 (1.16) C:NA T:99%**	pCi/L	05/14/21 13:43	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**-0.299 ± 0.401 (1.02) C:68% T:88%**	pCi/L	05/13/21 18:46	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**0.0945 ± 1.03 (2.18)**	pCi/L	05/14/21 17:09	7440-14-4	

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QUALITY CONTROL - RADIOCHEMISTRY

Project: CHARAH Q2 GW
Pace Project No.: 92533738

QC Batch: 446711 Analysis Method: EPA 903.1
QC Batch Method: EPA 903.1 Analysis Description: 903.1 Radium-226
Laboratory: Pace Analytical Services - Greensburg
Associated Lab Samples: 92533738017, 92533738018, 92533738021, 92533738022

METHOD BLANK: 2155796 Matrix: Water
Associated Lab Samples: 92533738017, 92533738018, 92533738021, 92533738022

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	0.0248 ± 0.351 (0.715) C:NA T:87%	pCi/L	05/14/21 13:22	

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QUALITY CONTROL - RADIOCHEMISTRY

Project: CHARAH Q2 GW
Pace Project No.: 92533738

QC Batch: 443907
QC Batch Method: EPA 903.1
Analysis Method: EPA 903.1
Analysis Description: 903.1 Radium-226
Laboratory: Pace Analytical Services - Greensburg
Associated Lab Samples: 92533738020

METHOD BLANK: 2142893 Matrix: Water
Associated Lab Samples: 92533738020

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	-0.0777 ± 0.264 (0.583) C:NA T:87%	pCi/L	05/10/21 14:55	

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QUALITY CONTROL - RADIOCHEMISTRY

Project: CHARAH Q2 GW
Pace Project No.: 92533738

QC Batch: 443903
QC Batch Method: EPA 903.1
Analysis Method: EPA 903.1
Analysis Description: 903.1 Radium-226
Laboratory: Pace Analytical Services - Greensburg
Associated Lab Samples: 92533738001, 92533738002, 92533738003, 92533738004, 92533738005, 92533738006, 92533738007, 92533738008, 92533738009, 92533738010, 92533738011, 92533738012, 92533738013, 92533738014, 92533738015, 92533738016, 92533738019

METHOD BLANK: 2142889
Matrix: Water
Associated Lab Samples: 92533738001, 92533738002, 92533738003, 92533738004, 92533738005, 92533738006, 92533738007, 92533738008, 92533738009, 92533738010, 92533738011, 92533738012, 92533738013, 92533738014, 92533738015, 92533738016, 92533738019

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	-0.0648 ± 0.284 (0.588) C:NA T:93%	pCi/L	05/14/21 15:55	

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QUALITY CONTROL - RADIOCHEMISTRY

Project: CHARAH Q2 GW
Pace Project No.: 92533738

QC Batch: 443910
QC Batch Method: EPA 904.0
Analysis Method: EPA 904.0
Analysis Description: 904.0 Radium 228
Laboratory: Pace Analytical Services - Greensburg
Associated Lab Samples: 92533738020

METHOD BLANK: 2142896 Matrix: Water
Associated Lab Samples: 92533738020

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	0.856 ± 0.449 (0.786) C:67% T:82%	pCi/L	05/07/21 11:34	

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QUALITY CONTROL - RADIOCHEMISTRY

Project: CHARAH Q2 GW
Pace Project No.: 92533738

QC Batch: 446713
QC Batch Method: EPA 904.0
Analysis Method: EPA 904.0
Analysis Description: 904.0 Radium 228
Laboratory: Pace Analytical Services - Greensburg
Associated Lab Samples: 92533738017, 92533738018, 92533738021, 92533738022

METHOD BLANK: 2155797 Matrix: Water
Associated Lab Samples: 92533738017, 92533738018, 92533738021, 92533738022

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	0.356 ± 0.318 (0.633) C:72% T:88%	pCi/L	05/13/21 16:19	

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QUALITY CONTROL - RADIOCHEMISTRY

Project: CHARAH Q2 GW
Pace Project No.: 92533738

QC Batch: 443904
QC Batch Method: EPA 904.0
Analysis Method: EPA 904.0
Analysis Description: 904.0 Radium 228
Laboratory: Pace Analytical Services - Greensburg
Associated Lab Samples: 92533738001, 92533738002, 92533738003, 92533738004, 92533738005, 92533738006, 92533738007, 92533738008, 92533738009, 92533738010, 92533738011, 92533738012, 92533738013, 92533738014, 92533738015, 92533738016, 92533738019

METHOD BLANK: 2142890
Matrix: Water
Associated Lab Samples: 92533738001, 92533738002, 92533738003, 92533738004, 92533738005, 92533738006, 92533738007, 92533738008, 92533738009, 92533738010, 92533738011, 92533738012, 92533738013, 92533738014, 92533738015, 92533738016, 92533738019

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	0.135 ± 0.295 (0.657) C:70% T:87%	pCi/L	05/12/21 16:18	

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QUALIFIERS

Project: CHARAH Q2 GW
Pace Project No.: 92533738

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

Acid preservation may not be appropriate for 2 Chloroethylvinyl ether.

A separate vial preserved to a pH of 4-5 is recommended in SW846 Chapter 4 for the analysis of Acrolein and Acrylonitrile by EPA Method 8260.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Act - Activity

Unc - Uncertainty: SDWA = 1.96 sigma count uncertainty, all other matrices = Expanded Uncertainty (95% confidence interval). Gamma Spec = Expanded Uncertainty (95.4% Confidence Interval)

(MDC) - Minimum Detectable Concentration

Trac - Tracer Recovery (%)

Carr - Carrier Recovery (%)

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

ANALYTE QUALIFIERS

D4	Sample was diluted due to the presence of high levels of target analytes.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
M6	Matrix spike and Matrix spike duplicate recovery not evaluated against control limits due to sample dilution.
MW	Due to matrix interference, achieving a constant weight is not possible.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: CHARAH Q2 GW
Pace Project No.: 92533738

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
92533738001	**BG-1**	EPA 3010A	615058	EPA 6010D	615080
92533738002	**BG-2**	EPA 3010A	615059	EPA 6010D	615088
92533738003	**MW-1**	EPA 3010A	615059	EPA 6010D	615088
92533738004	**MW-2**	EPA 3010A	615059	EPA 6010D	615088
92533738005	**MW-2D**	EPA 3010A	615059	EPA 6010D	615088
92533738006	**MW-3**	EPA 3010A	615059	EPA 6010D	615088
92533738007	**MW-4**	EPA 3010A	615059	EPA 6010D	615088
92533738008	**MW-5**	EPA 3010A	615059	EPA 6010D	615088
92533738009	**MW-6**	EPA 3010A	615059	EPA 6010D	615088
92533738010	**MW-7R**	EPA 3010A	615059	EPA 6010D	615088
92533738011	**MW-8**	EPA 3010A	615059	EPA 6010D	615088
92533738012	**SW-6**	EPA 3010A	615059	EPA 6010D	615088
92533738013	**MW-11**	EPA 3010A	615059	EPA 6010D	615088
92533738014	**MW-11D**	EPA 3010A	615059	EPA 6010D	615088
92533738015	**SW-1**	EPA 3010A	615059	EPA 6010D	615088
92533738016	**SW-2**	EPA 3010A	615059	EPA 6010D	615088
92533738017	**SW-3**	EPA 3010A	615059	EPA 6010D	615088
92533738018	**SW-4**	EPA 3010A	615059	EPA 6010D	615088
92533738019	**SW-5**	EPA 3010A	615059	EPA 6010D	615088
92533738020	**LEACHATE**	EPA 3010A	615059	EPA 6010D	615088
92533738021	**DUP**	EPA 3010A	615059	EPA 6010D	615088
92533738022	**EQBL**	EPA 3010A	617289	EPA 6010D	617316
92533738001	**BG-1**	EPA 3010A	615063	EPA 6020B	615075
92533738002	**BG-2**	EPA 3010A	615063	EPA 6020B	615075
92533738003	**MW-1**	EPA 3010A	615063	EPA 6020B	615075
92533738004	**MW-2**	EPA 3010A	615063	EPA 6020B	615075
92533738005	**MW-2D**	EPA 3010A	615063	EPA 6020B	615075
92533738006	**MW-3**	EPA 3010A	615063	EPA 6020B	615075
92533738007	**MW-4**	EPA 3010A	615063	EPA 6020B	615075
92533738008	**MW-5**	EPA 3010A	615063	EPA 6020B	615075
92533738009	**MW-6**	EPA 3010A	615063	EPA 6020B	615075
92533738010	**MW-7R**	EPA 3010A	615063	EPA 6020B	615075
92533738011	**MW-8**	EPA 3010A	615063	EPA 6020B	615075
92533738012	**SW-6**	EPA 3010A	615063	EPA 6020B	615075
92533738013	**MW-11**	EPA 3010A	615063	EPA 6020B	615075
92533738014	**MW-11D**	EPA 3010A	615063	EPA 6020B	615075
92533738015	**SW-1**	EPA 3010A	615233	EPA 6020B	615356
92533738016	**SW-2**	EPA 3010A	615233	EPA 6020B	615356
92533738017	**SW-3**	EPA 3010A	615233	EPA 6020B	615356
92533738018	**SW-4**	EPA 3010A	615233	EPA 6020B	615356
92533738019	**SW-5**	EPA 3010A	615233	EPA 6020B	615356
92533738020	**LEACHATE**	EPA 3010A	615233	EPA 6020B	615356
92533738021	**DUP**	EPA 3010A	615233	EPA 6020B	615356
92533738022	**EQBL**	EPA 3010A	615233	EPA 6020B	615356
92533738001	**BG-1**	EPA 7470A	614564	EPA 7470A	614625
92533738002	**BG-2**	EPA 7470A	614564	EPA 7470A	614625

REPORT OF LABORATORY ANALYSIS

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Pace Analytical Services, LLC
9800 Kincey Ave. Suite 100
Huntersville, NC 28078
(704)875-9092

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: CHARAH Q2 GW
Pace Project No.: 92533738

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
92533738003	**MW-1**	EPA 7470A	614564	EPA 7470A	614625
92533738004	**MW-2**	EPA 7470A	614564	EPA 7470A	614625
92533738005	**MW-2D**	EPA 7470A	614564	EPA 7470A	614625
92533738006	**MW-3**	EPA 7470A	614564	EPA 7470A	614625
92533738007	**MW-4**	EPA 7470A	614564	EPA 7470A	614625
92533738008	**MW-5**	EPA 7470A	614564	EPA 7470A	614625
92533738009	**MW-6**	EPA 7470A	614564	EPA 7470A	614625
92533738010	**MW-7R**	EPA 7470A	614564	EPA 7470A	614625
92533738011	**MW-8**	EPA 7470A	614564	EPA 7470A	614625
92533738012	**SW-6**	EPA 7470A	614564	EPA 7470A	614625
92533738013	**MW-11**	EPA 7470A	614564	EPA 7470A	614625
92533738014	**MW-11D**	EPA 7470A	614564	EPA 7470A	614625
92533738015	**SW-1**	EPA 7470A	614564	EPA 7470A	614625
92533738016	**SW-2**	EPA 7470A	614564	EPA 7470A	614625
92533738017	**SW-3**	EPA 7470A	614564	EPA 7470A	614625
92533738018	**SW-4**	EPA 7470A	614564	EPA 7470A	614625
92533738019	**SW-5**	EPA 7470A	614564	EPA 7470A	614625
92533738020	**LEACHATE**	EPA 7470A	614565	EPA 7470A	614630
92533738021	**DUP**	EPA 7470A	614565	EPA 7470A	614630
92533738022	**EQBL**	EPA 7470A	614565	EPA 7470A	614630
92533738001	**BG-1**	EPA 903.1	443903		
92533738002	**BG-2**	EPA 903.1	443903		
92533738003	**MW-1**	EPA 903.1	443903		
92533738004	**MW-2**	EPA 903.1	443903		
92533738005	**MW-2D**	EPA 903.1	443903		
92533738006	**MW-3**	EPA 903.1	443903		
92533738007	**MW-4**	EPA 903.1	443903		
92533738008	**MW-5**	EPA 903.1	443903		
92533738009	**MW-6**	EPA 903.1	443903		
92533738010	**MW-7R**	EPA 903.1	443903		
92533738011	**MW-8**	EPA 903.1	443903		
92533738012	**SW-6**	EPA 903.1	443903		
92533738013	**MW-11**	EPA 903.1	443903		
92533738014	**MW-11D**	EPA 903.1	443903		
92533738015	**SW-1**	EPA 903.1	443903		
92533738016	**SW-2**	EPA 903.1	443903		
92533738017	**SW-3**	EPA 903.1	446711		
92533738018	**SW-4**	EPA 903.1	446711		
92533738019	**SW-5**	EPA 903.1	443903		
92533738020	**LEACHATE**	EPA 903.1	443907		
92533738021	**DUP**	EPA 903.1	446711		
92533738022	**EQBL**	EPA 903.1	446711		
92533738001	**BG-1**	EPA 904.0	443904		
92533738002	**BG-2**	EPA 904.0	443904		
92533738003	**MW-1**	EPA 904.0	443904		

REPORT OF LABORATORY ANALYSIS

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Huntersville, NC 28078
(704)875-9092

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: CHARAH Q2 GW
Pace Project No.: 92533738

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
92533738004	MW-2	EPA 904.0	443904		
92533738005	MW-2D	EPA 904.0	443904		
92533738006	MW-3	EPA 904.0	443904		
92533738007	MW-4	EPA 904.0	443904		
92533738008	MW-5	EPA 904.0	443904		
92533738009	MW-6	EPA 904.0	443904		
92533738010	MW-7R	EPA 904.0	443904		
92533738011	MW-8	EPA 904.0	443904		
92533738012	SW-6	EPA 904.0	443904		
92533738013	MW-11	EPA 904.0	443904		
92533738014	MW-11D	EPA 904.0	443904		
92533738015	SW-1	EPA 904.0	443904		
92533738016	SW-2	EPA 904.0	443904		
92533738017	SW-3	EPA 904.0	446713		
92533738018	SW-4	EPA 904.0	446713		
92533738019	SW-5	EPA 904.0	443904		
92533738020	LEACHATE	EPA 904.0	443910		
92533738021	DUP	EPA 904.0	446713		
92533738022	EQBL	EPA 904.0	446713		
92533738001	BG-1	Total Radium Calculation	448124		
92533738002	BG-2	Total Radium Calculation	448124		
92533738003	MW-1	Total Radium Calculation	448124		
92533738004	MW-2	Total Radium Calculation	448124		
92533738005	MW-2D	Total Radium Calculation	448124		
92533738006	MW-3	Total Radium Calculation	448124		
92533738007	MW-4	Total Radium Calculation	448124		
92533738008	MW-5	Total Radium Calculation	448124		
92533738009	MW-6	Total Radium Calculation	448124		
92533738010	MW-7R	Total Radium Calculation	448124		
92533738011	MW-8	Total Radium Calculation	448124		
92533738012	SW-6	Total Radium Calculation	448124		
92533738013	MW-11	Total Radium Calculation	448124		
92533738014	MW-11D	Total Radium Calculation	448124		
92533738015	SW-1	Total Radium Calculation	448124		
92533738016	SW-2	Total Radium Calculation	448124		
92533738017	SW-3	Total Radium Calculation	448127		
92533738018	SW-4	Total Radium Calculation	448127		
92533738019	SW-5	Total Radium Calculation	448127		
92533738020	LEACHATE	Total Radium Calculation	448127		
92533738021	DUP	Total Radium Calculation	448127		
92533738022	EQBL	Total Radium Calculation	448127		
92533738001	BG-1	SM 2540C-2011	614459		
92533738002	BG-2	SM 2540C-2011	614459		
92533738003	MW-1	SM 2540C-2011	614715		

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9800 Kincey Ave. Suite 100
Huntersville, NC 28078
(704)875-9092

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: CHARAH Q2 GW
Pace Project No.: 92533738

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
92533738004	**MW-2**	SM 2540C-2011	614844		
92533738005	**MW-2D**	SM 2540C-2011	614844		
92533738006	**MW-3**	SM 2540C-2011	614715		
92533738007	**MW-4**	SM 2540C-2011	614567		
92533738008	**MW-5**	SM 2540C-2011	614567		
92533738009	**MW-6**	SM 2540C-2011	615320		
92533738010	**MW-7R**	SM 2540C-2011	614715		
92533738011	**MW-8**	SM 2540C-2011	615320		
92533738012	**SW-6**	SM 2540C-2011	615320		
92533738013	**MW-11**	SM 2540C-2011	614567		
92533738014	**MW-11D**	SM 2540C-2011	614567		
92533738015	**SW-1**	SM 2540C-2011	614567		
92533738016	**SW-2**	SM 2540C-2011	615320		
92533738017	**SW-3**	SM 2540C-2011	615320		
92533738018	**SW-4**	SM 2540C-2011	614567		
92533738019	**SW-5**	SM 2540C-2011	614567		
92533738020	**LEACHATE**	SM 2540C-2011	615320		
92533738021	**DUP**	SM 2540C-2011	615320		
92533738022	**EQBL**	SM 2540C-2011	615320		
92533738001	**BG-1**	EPA 300.0 Rev 2.1 1993	616247		
92533738002	**BG-2**	EPA 300.0 Rev 2.1 1993	616247		
92533738003	**MW-1**	EPA 300.0 Rev 2.1 1993	616247		
92533738004	**MW-2**	EPA 300.0 Rev 2.1 1993	616315		
92533738005	**MW-2D**	EPA 300.0 Rev 2.1 1993	616315		
92533738006	**MW-3**	EPA 300.0 Rev 2.1 1993	616315		
92533738007	**MW-4**	EPA 300.0 Rev 2.1 1993	616315		
92533738008	**MW-5**	EPA 300.0 Rev 2.1 1993	616315		
92533738009	**MW-6**	EPA 300.0 Rev 2.1 1993	616315		
92533738010	**MW-7R**	EPA 300.0 Rev 2.1 1993	616315		
92533738011	**MW-8**	EPA 300.0 Rev 2.1 1993	616315		
92533738012	**SW-6**	EPA 300.0 Rev 2.1 1993	616315		
92533738013	**MW-11**	EPA 300.0 Rev 2.1 1993	616315		
92533738014	**MW-11D**	EPA 300.0 Rev 2.1 1993	616315		
92533738015	**SW-1**	EPA 300.0 Rev 2.1 1993	616315		
92533738016	**SW-2**	EPA 300.0 Rev 2.1 1993	616315		
92533738017	**SW-3**	EPA 300.0 Rev 2.1 1993	616315		
92533738018	**SW-4**	EPA 300.0 Rev 2.1 1993	616315		
92533738019	**SW-5**	EPA 300.0 Rev 2.1 1993	616315		
92533738020	**LEACHATE**	EPA 300.0 Rev 2.1 1993	616315		
92533738021	**DUP**	EPA 300.0 Rev 2.1 1993	616315		
92533738022	**EQBL**	EPA 300.0 Rev 2.1 1993	616315		

REPORT OF LABORATORY ANALYSIS

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Pace Analytical	Document Name: Sample Condition Upon Receipt(SCUR)	Document Revised: October 28, 2020 Page 1 of 2
	Document No.: F-CAR-CS-033-Rev.07	Issuing Authority: Pace Carolinas Quality Office

Laboratory receiving samples:
Asheville ☐ Eden ☐ Greenwood ☐ Huntersville ☒ Raleigh ☐ Mechanicsville ☐ Atlanta ☐ Kernersville ☐

Sample Condition Upon Receipt

Client Name: HDR

Project #: WO# : 92533738

92533738

Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☒ Client ☐ Commercial ☐ Pace ☐ Other:____

Custody Seal Present? ☐ Yes ☒ No **Seals Intact?** ☐ Yes ☒ No

Date/Initials Person Examining Contents: NB 4-16-21

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☒ None ☐ Other

Biological Tissue Frozen? ☐ Yes ☐ No ☒ N/A

Thermometer: ☒ IR Gun ID: 92T064

Type of Ice: ☒ Wet ☐ Blue ☐ None

Cooler Temp: 2.1 **Correction Factor:** Add/Subtract (°C) 0.0°C

Temp should be above freezing to 6°C
☐ Samples out of temp criteria. Samples on ice, cooling process has begun

Cooler Temp Corrected (°C): 2.1

USDA Regulated Soil (☒ N/A, water sample)

Did samples originate in a quarantine zone within the United States: CA, NY, or SC (check maps)? ☐ Yes ☐ No

Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)? ☐ Yes ☐ No

				Comments/Discrepancy:
Chain of Custody Present?	☒ Yes	☐ No	☐ N/A	1.
Samples Arrived within Hold Time?	☒ Yes	☐ No	☐ N/A	2.
Short Hold Time Analysis (<72 hr.)?	☐ Yes	☒ No	☐ N/A	3.
Rush Turn Around Time Requested?	☐ Yes	☒ No	☐ N/A	4.
Sufficient Volume? NB 4-16-21	☒ Yes	☒ No	☐ N/A	5.
Correct Containers Used?	☒ Yes	☐ No	☐ N/A	6.
-Pace Containers Used?	☒ Yes	☐ No	☐ N/A	
Containers Intact?	☒ Yes	☐ No	☐ N/A	7.
Dissolved analysis: Samples Field Filtered?	☐ Yes	☒ No	☐ N/A	8.
Sample Labels Match COC?	☒ Yes	☐ No	☐ N/A	9.
-Includes Date/Time/ID/Analysis Matrix: WT				
Headspace in VOA Vials (>5-6mm)?	☐ Yes	☒ No	☐ N/A	10.
Trip Blank Present?	☐ Yes	☒ No	☐ N/A	11.
Trip Blank Custody Seals Present?	☐ Yes	☒ No	☐ N/A	

COMMENTS/SAMPLE DISCREPANCY

Field Data Required? ☐ Yes ☐ No

BP1N, MW-2, is not carrying a sufficient volume

Lot ID of split containers:

CLIENT NOTIFICATION/RESOLUTION

Person contacted: _____ Date/Time: _____

Project Manager SCURF Review: _____ **Date:** _____

Project Manager SRF Review: _____ **Date:** _____

***Check mark top half of box if pH and/or dechlorination is verified and within the acceptance range for preservation samples.**

Exceptions: VOA, Coliform, TOC, Oil and Grease, DRO/8015 (water) DOC, LLHg

****Bottom half of box is to list number of bottles**

Project #

WO# : 92533738

PM: KLH1 Due Date: 05/07/21

CLIENT: 92-HDR

Item#	BP4U-125 mL Plastic Unpreserved (N/A) (Cl-)	BP3U-250 mL Plastic Unpreserved (N/A)	BP2U-500 mL Plastic Unpreserved (N/A)	BP1U-1 liter Plastic Unpreserved (N/A)	BP4S-125 mL Plastic H2SO4 (pH < 2) (Cl-)	BP3N-250 mL plastic HNO3 (pH < 2)	BP4Z-125 mL Plastic ZN Acetate & NaOH (>9)	BP4C-125 mL Plastic NaOH (pH > 12) (Cl-)	WGFU-Wide-mouthed Glass jar Unpreserved	AG1U-1 liter Amber Unpreserved (N/A) (Cl-)	AG1H-1 liter Amber HCl (pH < 2)	AG3U-250 mL Amber Unpreserved (N/A) (Cl-)	AG1S-1 liter Amber H2SO4 (pH < 2)	AG3S-250 mL Amber H2SO4 (pH < 2)	AG3A(DG3A)-250 mL Amber NH4Cl (N/A)(Cl-)	DG9H-40 mL VOA HCl (N/A)	VG9T-40 mL VOA Na2S2O3 (N/A)	VG9U-40 mL VOA Unp (N/A)	DG9P-40 mL VOA H3PO4 (N/A)	VOAK (6 vials per kit)-5035 kit (N/A)	V/GK (3 vials per kit)-VPH/Gas kit (N/A)	SP5T-125 mL Sterile Plastic (N/A – lab)	SP2T-250 mL Sterile Plastic (N/A – lab)	BP1N	BP3A-250 mL Plastic (NH2)2SO4 (9.3-9.7)	AG0U-100 mL Amber Unpreserved vials (N/A)	VSGU-20 mL Scintillation vials (N/A)	DG9U-40 mL Amber Unpreserved vials (N/A)
1																													
2																													
3																													
4																													
5																													
6																													
7																													
8																													
9																													
10																													
11																													
12																													

pH Adjustment Log for Preserved Samples

Sample ID	Type of Preservative	pH upon receipt	Date preservation adjusted	Time preservation adjusted	Amount of Preservative added	Lot #

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. Out of hold, incorrect preservative, out of temp, incorrect containers.

***Check mark top half of box if pH and/or dechlorination is verified and within the acceptance range for preservation samples.**

Exceptions: VOA, Coliform, TOC, Oil and Grease, DRO/8015 (water) DOC, LLHg

****Bottom half of box is to list number of bottles**

Project #

Item#	BP4U-125 mL Plastic Unpreserved (N/A) (Cl-)	BP3U-250 mL Plastic Unpreserved (N/A)	BP2U-500 mL Plastic Unpreserved (N/A)	BP1U-1 liter Plastic Unpreserved (N/A)	BP4S-125 mL Plastic H2SO4 (pH < 2) (Cl-)	BP3N-250 mL plastic HNO3 (pH < 2)	BP4Z-125 mL Plastic ZN Acetate & NaOH (>9)	BP4C-125 mL Plastic NaOH (pH > 12) (Cl-)	WGFU-Wide-mouthed Glass jar Unpreserved	AG1U-1 liter Amber Unpreserved (N/A) (Cl-)	AG1H-1 liter Amber HCl (pH < 2)	AG3U-250 mL Amber Unpreserved (N/A) (Cl-)	AG1S-1 liter Amber H2SO4 (pH < 2)	AG3S-250 mL Amber H2SO4 (pH < 2)	AG3A(DG3A)-250 mL Amber NH4Cl (N/A)(Cl-)	DG9H-40 mL VOA HCl (N/A)	VG9T-40 mL VOA Na2S2O3 (N/A)	VG9U-40 mL VOA Unp (N/A)	DG9P-40 mL VOA H3PO4 (N/A)	VOAK (6 vials per kit)-504S kit (N/A)	V/GK (3 vials per kit)-VPH/Gas kit (N/A)	SP5T-125 mL Sterile Plastic (N/A – lab)	SP2T-250 mL Sterile Plastic (N/A – lab)	BP1N	BP3A-250 mL Plastic (NH2)2SO4 (9.3-9.7)	AG0U-100 mL Amber Unpreserved vials (N/A)	VSGU-20 mL Scintillation vials (N/A)	DG9U-40 mL Amber Unpreserved vials (N/A)
1		1	1			1 ✓																			2 ✓				
2		1	1			1 ✓																			2 ✓				
3		1	1			1 ✓																			2 ✓				
4		1	1			1 ✓																			2 ✓				
5		1	1			1 ✓																			2 ✓				
6		1	1			1 ✓																			2 ✓				
7		1	1			1 ✓																			2 ✓				
8		1	1			1 ✓																			2 ✓				
9		1	1			1 ✓																			2 ✓				
10		1	1			1 ✓																			2 ✓				
11		X	X	284-168																									
12		X	X																										

pH Adjustment Log for Preserved Samples

Sample ID	Type of Preservative	pH upon receipt	Date preservation adjusted	Time preservation adjusted	Amount of Preservative added	Lot #

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. Out of hold, incorrect preservative, out of temp, incorrect containers.

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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page : 1 Of 1

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company:	HDR	Report To:	Mark Filardi / Charles Gruenberg	Attention:	
Address:	440 S. Church St	Copy To:		Company Name:	
Suite 900, Charlotte, NC 28202				Address:	
Email:	mark.filardi@hdrinc.com	Purchase Order #:		Pace Quote:	
Phone:	(704)338-6787 Fax:	Project Name:	Charah Q2 GW	Pace Project Manager:	kevin.herring@pacelabs.com,
Requested Due Date:		Project #:		Pace Profile #:	7672

Regulatory Agency: NC

State / Location

SAMPLE ID
One Character per box.
(A-Z, 0-9 / , -)
Sample Ids must be unique

MATRIX	CODE
Drinking Water	DW
Water	WT
Waste Water	WW
Product	P
Soil/Solid	SL
Oil	OL
Wipe	WP
Air	AR
Other	OT
Tissue	TS

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED START DATE	COLLECTED START TIME	COLLECTED END DATE	COLLECTED END TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H2SO4	HNO3	HCl	NaOH	Na2S2O3	Methanol	Other	Analyses Test Y/N	6010/6020/7470	Cl, F, SO4	TDS	903.1/904.0 + Total Rad	Residual Chlorine (Y/N)
1	BG-1	WT				4/12/21	1305												X	X	X	X		
2	BG-2	WT				4/12/21	1615												X	X	X	X		
3	MW-1	WT				4/14/21	1610												X	X	X	X		
4	MW-2	WT				4/15/21	0920												X	X	X	X		
5	MW-2D	WT				4/15/21	0847												X	X	X	X		
6	MW-3	WT				4/14/21	1220												X	X	X	X		
7	MW-4	WT				4/13/21	1000												X	X	X	X		
8	MW-5	WT				4/13/21	1610												X	X	X	X		
9	MW-6	WT				4/15/21	1235												X	X	X	X		
10	MW-7R	WT				4/14/21	1500												X	X	X	X		
11	MW-8	WT				4/15/21	1415												X	X	X	X		
12	~~Trip~~ SW-6	WT				4/16/21	0900												X	X	X	X		

Requested Analysis Filtered (Y/N)

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
	[illegible] / HDR	4/16/21	1302	Pace Nashville Lab	4-16-21	13:02

SAMPLE CONDITIONS			
TEMP in C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
2.1	Y	N	Y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: [illegible]

SIGNATURE of SAMPLER: [illegible] DATE Signed: 4/14/21

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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page : 2 Of 2

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company:	HDR	Report To:	Mark Filardi / Charles Gruenberg	Attention:	
Address:	440 S. Church St	Copy To:		Company Name:	
Suite 900, Charlotte, NC 28202				Address:	
Email:	mark.filardi@hdrinc.com	Purchase Order #:		Pace Quote:	
Phone:	(704)338-6787 Fax	Project Name:	Charah Q2 GW	Pace Project Manager:	kevin.herring@pacelabs.com,
Requested Due Date:		Project #:		Pace Profile #:	7672

Regulatory Agency	
State / Location	NC

ITEM #	SAMPLE ID (One Character per box. (A-Z, 0-9 / , -) Sample Ids must be unique)	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED START DATE	COLLECTED START TIME	COLLECTED END DATE	COLLECTED END TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H2SO4	HNO3	HCl	NaOH	Na2S2O3	Methanol	Other	Analyses Test Y/N	6010/6020/7470	Cl, F, SO4	TDS	903.1/904.0 + Total Rad	Residual Chlorine (Y/N)
13	~~MW-10~~	WT																	X	X	X	X	
14	MW-11	WT				4/13/21	1145												X	X	X	X	
15	MW-11D	WT				4/13/21	1300												X	X	X	X	
16	SW-1	WT				4/13/21	1355												X	X	X	X	
17	SW-2	WT				4/15/21	0830												X	X	X	X	
18	SW-3	WT				4/15/21	0845												X	X	X	X	
19	SW-4	WT				4/13/21	1330												X	X	X	X	
20	SW-5	WT				4/13/21	1610												X	X	X	X	
21	LEACHATE	WT				4/16/21	0845												X	X	X	X	
22	DUP	WT				4/15/21	—												X	X	X	X	
23	EQBL	WT				4/16/21	0805												X	X	X	X	
24																							

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS
	[signature]	4/14/21	1302	Pace Nashville Courier	4-16-21	1302	

SAMPLER NAME AND SIGNATURE			TEMP in C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
PRINT Name of SAMPLER:	[illegible]					
SIGNATURE of SAMPLER:	[signature]	DATE Signed: 4/16/21				

Quality Control Sample Performance Assessment

Pace Analytical™ www.pacelabs.com

Test:	Ra-228
Analyst:	VAL
Date:	5/3/2021
Worklist:	60049
Matrix:	WT

Analyst Must Manually Enter All Fields Highlighted in Yellow.

Method Blank Assessment	
MB Sample ID	2142890
MB concentration:	0.135
M/B 2 Sigma CSU:	0.295
MB MDC:	0.657
MB Numerical Performance Indicator:	0.90
MB Status vs Numerical Indicator:	Pass
MB Status vs. MDC:	Pass

Laboratory Control Sample Assessment	LCSD (Y or N)?	Y
	LCS60049	LCSD60049
Count Date:	5/12/2021	5/12/2021
Spike I.D.:	21-003	21-003
Decay Corrected Spike Concentration (pCi/mL):	37.726	37.726
Volume Used (mL):	0.10	0.10
Aliquot Volume (L, g, F):	0.821	0.826
Target Conc. (pCi/L, g, F):	4.593	4.568
Uncertainty (Calculated):	0.225	0.224
Result (pCi/L, g, F):	4.907	4.757
LCS/LCSD 2 Sigma CSU (pCi/L, g, F):	1.126	1.136
Numerical Performance Indicator:	0.54	0.32
Percent Recovery:	106.84%	104.14%
Status vs Numerical Indicator:	N/A	N/A
Status vs Recovery:	Pass	Pass
Upper % Recovery Limits:	135%	135%
Lower % Recovery Limits:	60%	60%

Sample Matrix Spike Control Assessment	MS/MSD 1	MS/MSD 2
Sample Collection Date:		
Sample I.D.		
Sample MS I.D.		
Sample MSD I.D.		
Spike I.D.:		
MS/MSD Decay Corrected Spike Concentration (pCi/mL):		
Spike Volume Used in MS (mL):		
Spike Volume Used in MSD (mL):		
MS Aliquot (L, g, F):		
MS Target Conc.(pCi/L, g, F):		
MSD Aliquot (L, g, F):		
MSD Target Conc. (pCi/L, g, F):		
MS Spike Uncertainty (calculated):		
MSD Spike Uncertainty (calculated):		
Sample Result:		
Sample Result 2 Sigma CSU (pCi/L, g, F):		
Sample Matrix Spike Result:		
Matrix Spike Result 2 Sigma CSU (pCi/L, g, F):		
Sample Matrix Spike Duplicate Result:		
Matrix Spike Duplicate Result 2 Sigma CSU (pCi/L, g, F):		
MS Numerical Performance Indicator:		
MSD Numerical Performance Indicator:		
MS Percent Recovery:		
MSD Percent Recovery:		
MS Status vs Numerical Indicator:		
MSD Status vs Numerical Indicator:		
MS Status vs Recovery:		
MSD Status vs Recovery:		
MS/MSD Upper % Recovery Limits:		
MS/MSD Lower % Recovery Limits:		

Duplicate Sample Assessment		
Sample I.D.:	LCS60049	Enter Duplicate sample IDs if other than LCS/LCSD in the space below.
Duplicate Sample I.D.	LCSD60049	
Sample Result (pCi/L, g, F):	4.907	
Sample Result 2 Sigma CSU (pCi/L, g, F):	1.126	
Sample Duplicate Result (pCi/L, g, F):	4.757	
Sample Duplicate Result 2 Sigma CSU (pCi/L, g, F):	1.136	
Are sample and/or duplicate results below RL?	NO	
Duplicate Numerical Performance Indicator:	0.184	
(Based on the LCS/LCSD Percent Recoveries) Duplicate RPD:	2.56%	
Duplicate Status vs Numerical Indicator:	Pass	
Duplicate Status vs RPD:	Pass	
% RPD Limit:	36%	

Matrix Spike/Matrix Spike Duplicate Sample Assessment		
Sample I.D.		
Sample MS I.D.		
Sample MSD I.D.		
Sample Matrix Spike Result:		
Matrix Spike Result 2 Sigma CSU (pCi/L, g, F):		
Sample Matrix Spike Duplicate Result:		
Matrix Spike Duplicate Result 2 Sigma CSU (pCi/L, g, F):		
Duplicate Numerical Performance Indicator:		
(Based on the Percent Recoveries) MS/ MSD Duplicate RPD:		
MS/ MSD Duplicate Status vs Numerical Indicator:		
MS/ MSD Duplicate Status vs RPD:		
% RPD Limit:		

Evaluation of duplicate precision is not applicable if either the sample or duplicate results are below the MDC.

Comments:

OLS 5/13/21

OLS 5/13/21

Quality Control Sample Performance Assessment

Pace Analytical™ www.pacelabs.com

Test: Ra-228
Analyst: VAL
Date: 5/11/2021
Worklist: 60364
Matrix: WT

Analyst Must Manually Enter All Fields Highlighted in Yellow.

Method Blank Assessment	
MB Sample ID	2155797
MB concentration:	0.356
M/B 2 Sigma CSU:	0.318
MB MDC:	0.633
MB Numerical Performance Indicator:	2.20
MB Status vs Numerical Indicator:	Warning
MB Status vs. MDC:	Pass

Laboratory Control Sample Assessment	LCSD (Y or N)?	Y
	LCS60364	LCSD60364
Count Date:	5/13/2021	5/13/2021
Spike I.D.:	21-003	21-003
Decay Corrected Spike Concentration (pCi/mL):	37.714	37.714
Volume Used (mL):	0.10	0.10
Aliquot Volume (L, g, F):	0.807	0.812
Target Conc. (pCi/L, g, F):	4.673	4.643
Uncertainty (Calculated):	0.229	0.228
Result (pCi/L, g, F):	4.633	4.071
LCS/LCSD 2 Sigma CSU (pCi/L, g, F):	1.098	0.990
Numerical Performance Indicator:	-0.07	-1.10
Percent Recovery:	99.15%	87.68%
Status vs Numerical Indicator:	N/A	N/A
Status vs Recovery:	Pass	Pass
Upper % Recovery Limits:	135%	135%
Lower % Recovery Limits:	60%	60%

Sample Matrix Spike Control Assessment	MS/MSD 1	MS/MSD 2
Sample Collection Date:	4/28/2021	
Sample I.D.	35629454001	
Sample MS I.D.	35629454001MS	
Sample MSD I.D.		
Spike I.D.:	21-003	
MS/MSD Decay Corrected Spike Concentration (pCi/mL):	37.903	
Spike Volume Used in MS (mL):	0.20	
Spike Volume Used in MSD (mL):		
MS Aliquot (L, g, F):	0.807	
MS Target Conc.(pCi/L, g, F):	9.394	
MSD Aliquot (L, g, F):		
MSD Target Conc. (pCi/L, g, F):		
MS Spike Uncertainty (calculated):	0.460	
MSD Spike Uncertainty (calculated):		
Sample Result:	0.320	
Sample Result 2 Sigma CSU (pCi/L, g, F):	0.365	
Sample Matrix Spike Result:	8.505	
Matrix Spike Result 2 Sigma CSU (pCi/L, g, F):	1.747	
Sample Matrix Spike Duplicate Result:		
Matrix Spike Duplicate Result 2 Sigma CSU (pCi/L, g, F):		
MS Numerical Performance Indicator:	-1.285	
MSD Numerical Performance Indicator:		
MS Percent Recovery:	87.14%	
MSD Percent Recovery:		
MS Status vs Numerical Indicator:	Pass	
MSD Status vs Numerical Indicator:		
MS Status vs Recovery:	Pass	
MSD Status vs Recovery:		
MS/MSD Upper % Recovery Limits:	135%	
MS/MSD Lower % Recovery Limits:	60%	

Duplicate Sample Assessment		
Sample I.D.:	LCS60364	Enter Duplicate sample IDs if other than LCS/LCSD in the space below.
Duplicate Sample I.D.	LCSD60364	
Sample Result (pCi/L, g, F):	4.633	
Sample Result 2 Sigma CSU (pCi/L, g, F):	1.098	
Sample Duplicate Result (pCi/L, g, F):	4.071	
Sample Duplicate Result 2 Sigma CSU (pCi/L, g, F):	0.990	
Are sample and/or duplicate results below RL?	NO	
Duplicate Numerical Performance Indicator:	0.745	
(Based on the LCS/LCSD Percent Recoveries) Duplicate RPD:	12.28%	
Duplicate Status vs Numerical Indicator:	Pass	
Duplicate Status vs RPD:	Pass	
% RPD Limit:	36%	

Matrix Spike/Matrix Spike Duplicate Sample Assessment		
Sample I.D.		
Sample MS I.D.		
Sample MSD I.D.		
Sample Matrix Spike Result:		
Matrix Spike Result 2 Sigma CSU (pCi/L, g, F):		
Sample Matrix Spike Duplicate Result:		
Matrix Spike Duplicate Result 2 Sigma CSU (pCi/L, g, F):		
Duplicate Numerical Performance Indicator:		
(Based on the Percent Recoveries) MS/ MSD Duplicate RPD:		
MS/ MSD Duplicate Status vs Numerical Indicator:		
MS/ MSD Duplicate Status vs RPD:		
% RPD Limit:		

Evaluation of duplicate precision is not applicable if either the sample or duplicate results are below the MDC.

Comments:

5/14/21

5/14/21

E

Appendix E – Electronic Data Deliverables (electronic Only)

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F

Appendix F – Statistical Analysis Memo

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Summary of Statistical Analysis and Evaluation for SSIs

Background and Downgradient Wells

Charah, LLC

Moncure, Chatham County, North Carolina
August 9, 2021

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1 Introduction

This report summarizes the statistical analysis of background and downgradient groundwater quality for the Charah, LLC Brickhaven No. Mine Tract 'A' Site (Brickhaven Mine) and operating under the Facility Permit #1910-STRUC-2015 as a municipal solid waste land fill (MSWLF). Background groundwater quality was evaluated such that statistically-derived background concentrations could be established for the site. Groundwater quality in downgradient wells was then compared to background concentrations to determine if a statistically significant increase (SSI) over background has occurred, as required by Section .1600 rules of the North Carolina Solid Waste Management Rules 15A NCAC 13B .1600. Sampling results used to establish background threshold values (BTVs) were obtained during twenty-five monitoring events performed between October 2015 and April 2021. Downgradient sampling results from the detection monitoring round in January 2021 were used to evaluate for SSIs. The current Brickhaven Mine groundwater monitoring network is presented in **Table 1**.

Software packages ProUCL [1], NCSS [2], R [3], and SPSS [4] were used in the production of the statistics. ProUCL is offered by the USEPA, R is a free software environment, NCSS and SPSS are licensed software packages.

Table 1: Brickhaven Mine Monitoring Well Network

Background	Downgradient
BG-1	MW-1
BG-2	MW-2
	MW-3
	MW-4
	MW-5
	MW-6
	MW-7R
	MW-8
	MW-11

Groundwater samples collected as part of the 15A NCAC 13B .1600 monitoring program were analyzed for EPA Appendix III and Appendix IV constituents, and Appendix I metals. Only non-filtered sample results were utilized for the statistical analysis of monitored constituents. A summary of constituents included in the data analysis is provided in **Table 2**.

Table 2: Brickhaven Mine Monitored Constituents

Appendix I Metals	Appendix III Constituents	Appendix IV Constituents
Copper	Boron	Antimony
Nickel	Calcium	Arsenic
Silver	Chloride	Barium
Vanadium	Fluoride	Beryllium
Zinc	pH (Field)	Cadmium
	Sulfate	Chromium
	Total Dissolved Solids	Cobalt
		Fluoride
		Lead
		Lithium
		Mercury
		Molybdenum
		Radium-226
		Radium-228
		Selenium
		Thallium
		Total Radium

2 Statistical Analysis

The background sample size (i.e., quantity of qualifying samples) was evaluated per constituent. Descriptive statistics were calculated for the background data set including non-detect (ND) values and excluding ND values. When NDs were included in the data set, the method detection limit (MDL) was substituted as the ND value for simple descriptive statistics. The analysis was performed with NDs removed to better understand the central tendency and range of the detected values. A summary of the descriptive statistics for the background data set is provided in **Table 3**. Note that for the trend analyses in Section 2.3 and for the establishment of statistically-derived background concentration levels in Section 4, imputation methods using the maximum likelihood method (MLE) for NDs, regression on order statistics (ROS) or Kaplan-Meier (KM) methods, where appropriate, were used.

Following the calculation of descriptive statistics, the statistical analysis for the background data set was performed to evaluate for outliers, data distributions, trends, and spatial variability between the background wells for Appendix I metals, Appendix III and IV constituents, where data quantity and quality permit. Spatial variability between the background wells was evaluated for each consistent to assess whether the data can be pooled for establishing background concentrations. A total of thirty-five samples (twenty-five monitoring events from well BG-1 and ten monitoring events from well BG-2) were included for the descriptive analysis of the background monitoring well results for the monitored constituents. The first monitoring round sampled in August 2015 was not included in the analysis as it was deemed not representative of the other monitoring events as the samples were tested at a different lab. The sample collected April 3rd, 2017 for total dissolved solid in well BG-1 is considered an outlier and removed from the analysis. The January 2020 samples for boron were removed from the analysis as they were diluted and could not be properly detected.

For downgradient monitoring results, the data analysis included the calculation of descriptive statistics for Appendix I metals, Appendix III and IV constituents (for the data sets including and excluding ND values), followed by an evaluation of outliers and trends. A total of twenty-four monitoring events performed between November 2015 and April 2021 were included for the descriptive analysis of the downgradient monitoring well results for the monitored constituents. A summary of the descriptive statistics for each downgradient well is provided in **Appendix E.A**.

Table 3: Summary of Background Data Set Descriptive Statistics (BG-1 and BG-2)

Constituent	Unit	Sample Size	No. of NDs	With NDs=MDLs Included				With NDs Removed			
				Minimum	Maximum	Mean	Median	Minimum	Maximum	Mean	Median
Appendix I Metals											
Copper	ug/L	35	33	2.10	11.4	3.09	2.50	4.30	11.4	7.85	7.85
Nickel	ug/L	35	35	0.900	3.50	2.36	2.50	--	--	--	--
Silver	ug/L	35	35	2.50	2.50	2.50	2.50	--	--	--	--
Vanadium	ug/L	35	22	1.30	8.30	3.83	2.50	5.10	8.30	6.02	5.60
Zinc	ug/L	35	31	3.90	34.2	7.23	5.00	10.0	34.2	18.6	15.0
Appendix III Constituents											
Boron	ug/L	34	18	0.570	56.5	7.41	5.30	5.50	56.5	13.1	6.90
Calcium	ug/L	35	0	20,300	124,000	50,937	29,500	20,300	124,000	50,937	29,500
Chloride	mg/L	35	0	176	311	246	250	176	311	246	250
Fluoride	mg/L	35	0	0.100	0.230	0.158	0.150	0.100	0.230	0.158	0.150
pH (Field)	S.U.	33	0	6.10	7.01	6.55	6.52	6.10	7.01	6.55	6.52
Sulfate	mg/L	35	0	15.1	182	49.0	22.2	15.1	182	49.0	22.2
Total Dissolved Solids	mg/L	34	0	544	1,270	737	647	544	1,270	737	647
Appendix IV Constituents											
Antimony	ug/L	35	35	3.00	3.90	3.47	3.80	--	--	--	--
Arsenic	ug/L	35	34	2.50	5.00	4.37	4.70	4.80	4.80	4.80	4.80
Barium	ug/L	35	0	59.1	443	258	302	59.1	443	258	302
Beryllium	ug/L	35	35	0.200	0.700	0.477	0.500	--	--	--	--
Cadmium	ug/L	35	33	0.400	0.500	0.457	0.500	0.400	0.500	0.450	0.450
Chromium	ug/L	35	35	1.00	3.70	2.43	2.50	--	--	--	--
Cobalt	ug/L	35	35	1.10	3.60	2.43	2.50	--	--	--	--
Fluoride	mg/L	35	0	0.100	0.230	0.158	0.150	0.100	0.230	0.158	0.150
Lead	ug/L	35	34	1.60	14.1	3.11	2.50	14.1	14.1	14.1	14.1
Lithium	ug/L	35	3	0.390	36.8	17.0	16.5	11.9	36.8	18.5	17.1
Mercury	ug/L	35	32	0.100	0.200	0.107	0.100	0.120	0.200	0.153	0.140
Molybdenum	ug/L	35	29	0.900	13.6	3.98	2.50	6.80	13.6	10.1	10.4
Radium-226	pCi/L	32	0	-0.206	1.22	0.290	0.238	-0.206	1.22	0.290	0.238
Radium-228	pCi/L	32	0	0.0108	1.29	0.601	0.588	0.0108	1.29	0.601	0.588
Selenium	ug/L	35	35	4.70	5.00	4.86	5.00	--	--	--	--
Thallium	ug/L	35	34	0.0200	13.7	1.29	0.0600	13.7	13.7	13.7	13.7
Total Radium	pCi/L	32	0	0.271	2.09	0.900	0.857	0.271	2.09	0.900	0.857

Notes:
1. ND = not detected above the laboratory method detection limit.
2. MDL = method detection limit.
3. "--" indicates all results for the respective constituent were NDs, or with the case of total radium, NDs were flagged but the laboratory did not provide a value for the MDL.
4. Numbers are displayed using the same number of significant figures as reported by the laboratory.
5. If a constituent had 100% detections the descriptive statistics provided above are identical for the data including NDs and excluding NDs.

2.1 Outliers

Outliers are values that are not representative of the population from which they are sampled. The background and downgradient data sets were screened for outliers using Dixon's and Rosner's outlier tests. Dixon's outlier test is suitable for data sets containing less than twenty-five samples, while Rosner's test is suitable for data sets with twenty-five or more samples. The outlier test was conducted using a significance of one percent. For constituents that had NDs, the NDs were removed prior to testing for outliers.

2.1.1 Background

The statistical outliers identified in the background data set are listed in **Table 4**. Two concentrations from background well BG-1, Appendix III constituent boron and Appendix IV constituent lithium, were identified as statistical outliers. The concentrations identified as statistical outliers for Appendix III constituents calcium, sulfate and total dissolved solids were sampled from the background well BG-2.

Table 4: Dixon's Outlier Test Results – Background

Well	Constituent Type	Constituent	Potential Outlier Value	Units	Sampling Event	Sample Date
BG-1	Appendix III	Boron	56.5	ug/L	R26	4/12/2021
	Appendix IV	Lithium	36.8	ug/L	R06	4/5/2016
BG-2	Appendix III	Calcium	119,000	ug/L	R18	4/16/2019
			111,000	ug/L	R19	7/11/2019
			109,000	ug/L	R20	10/14/2019
			106,000	ug/L	R21	1/15/2020
			114,000	ug/L	R22	4/14/2020
			117,000	ug/L	R23	7/8/2020
			124,000	ug/L	R24	10/12/2020
			101,000	ug/L	R25	1/26/2021
			105,000	ug/L	R26	4/12/2021
		Sulfate	79.8	mg/L	R18	4/16/2019
			102	mg/L	R19	7/11/2019
			135	mg/L	R20	10/14/2019
			102	mg/L	R21	1/15/2020
			136	mg/L	R22	4/14/2020
			135	mg/L	R23	7/8/2020
			115	mg/L	R24	10/12/2020
			162	mg/L	R25	1/26/2021
			182	mg/L	R26	4/12/2021
		Total Dissolved Solids	810	mg/L	R17	1/22/2019

Well	Constituent Type	Constituent	Potential Outlier Value	Units	Sampling Event	Sample Date
			952	mg/L	R19	7/11/2019
			1,120	mg/L	R20	10/14/2019
			922	mg/L	R21	1/15/2020
			1,050	mg/L	R22	4/14/2020
			1,080	mg/L	R23	7/8/2020
			1,110	mg/L	R24	10/12/2020
			1,180	mg/L	R25	1/26/2021
			1,270	mg/L	R26	4/12/2021

A visual inspection of concentration vs. time scatter plots for boron (**Figure 1**), calcium (**Figure 2**), lithium (**Figure 3**), sulfate (**Figure 4**), and total dissolved solids (Figure 4) reveal the presence of the potential outliers. The statistical outliers were investigated as possible data entry or measurement errors. The remaining values were all within one order of magnitude of other observations and deemed correct. Although the elevated values appear as statistical outliers, it is within a reasonable range of the remaining concentrations throughout the monitoring period and should not be removed from the data set at this time for purposes of determining background concentrations. Given the variable nature of groundwater samples, the small sample sizes and that it is common for groundwater quality samples to have very low or very high concentrations over time, statistical outliers are expected but do not necessarily signify that the outliers are from different distributions. As additional background samples are collected over time, the variability in concentrations will be better understood. Outlier test results may change, and earlier observations thought to be outliers may no longer be outliers.

Figure 1: Boron Concentrations (mg/L) vs. Time

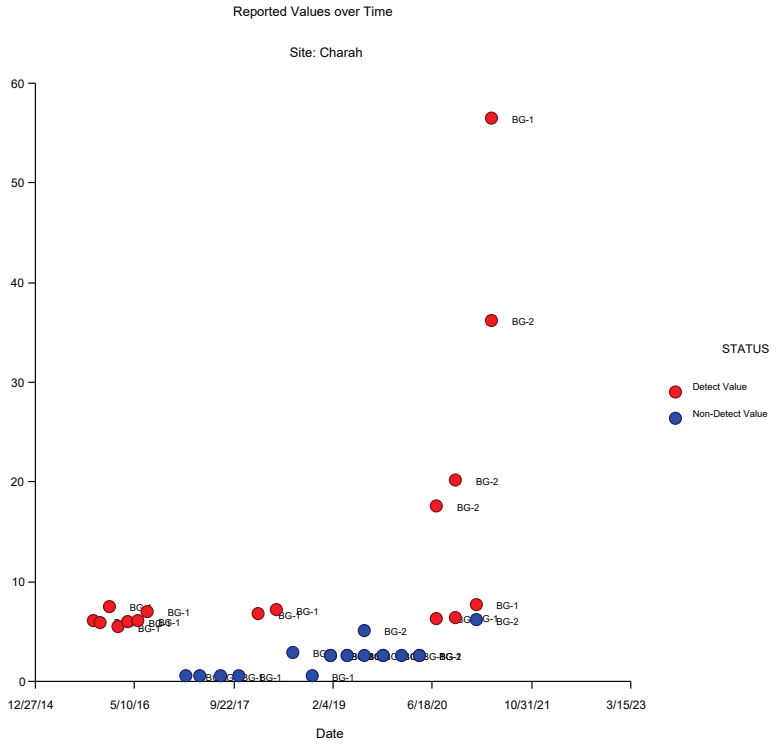


Figure 2: Calcium Concentrations (ug/L) vs. Time

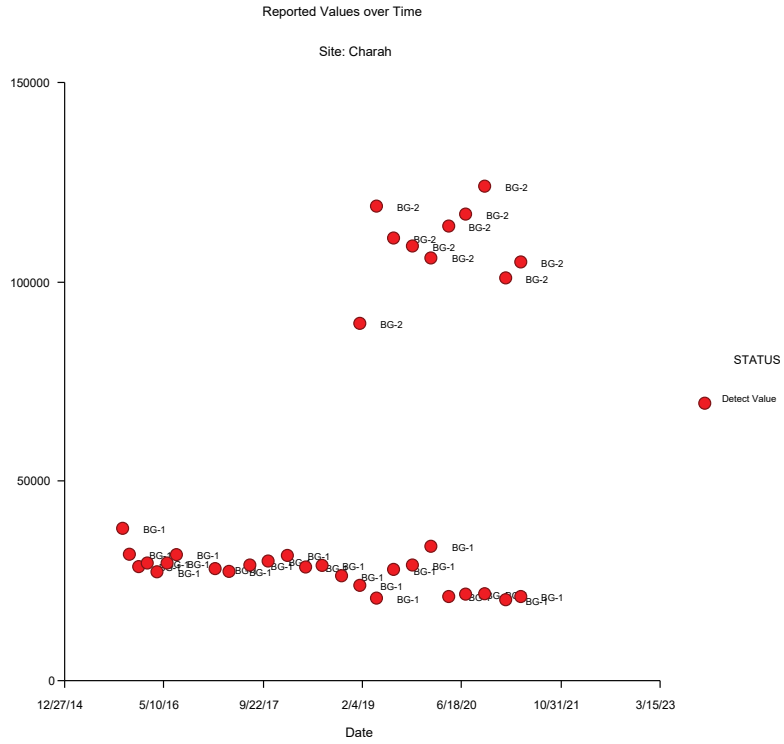


Figure 3: Lithium Concentrations (mg/L) vs. Time

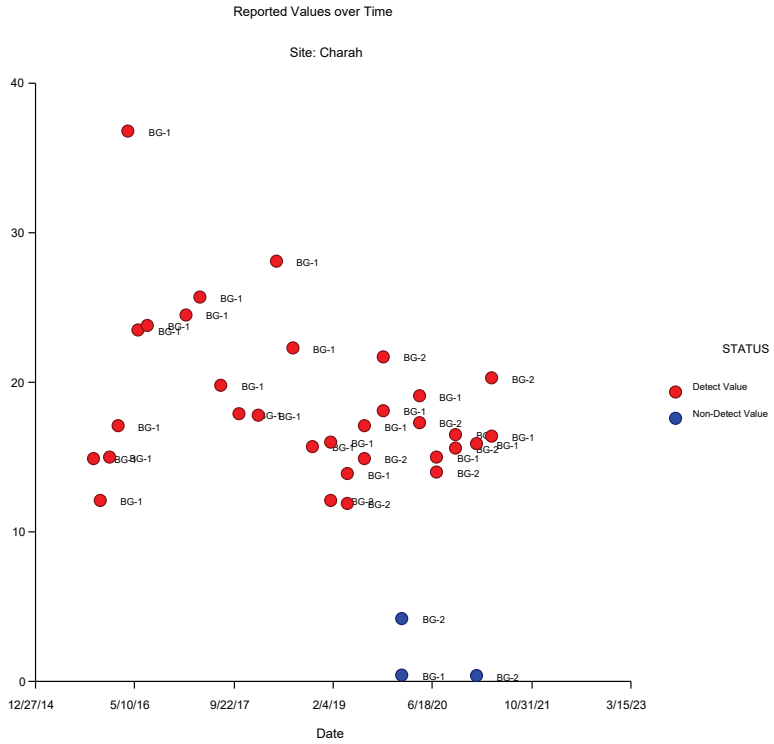


Figure 4: Sulfate Concentrations (ug/L) vs. Time

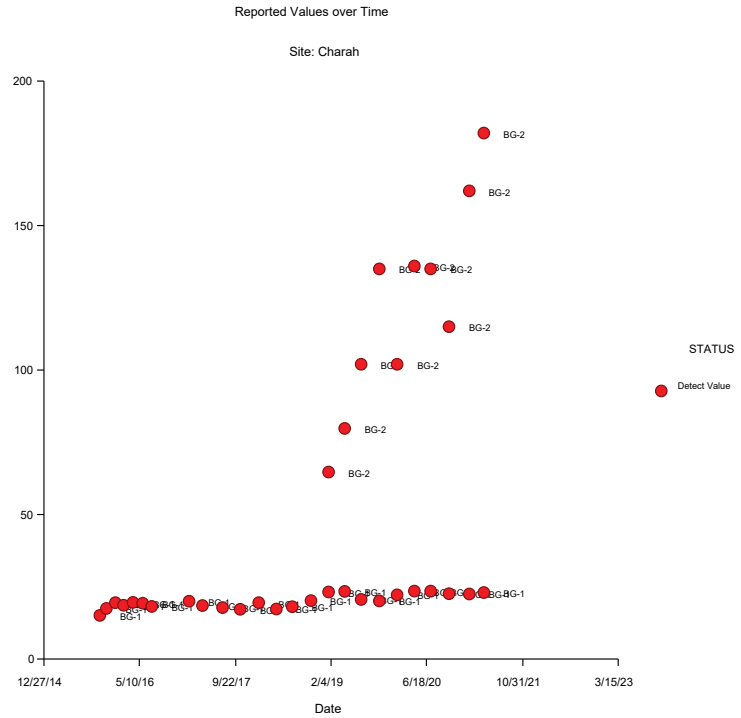
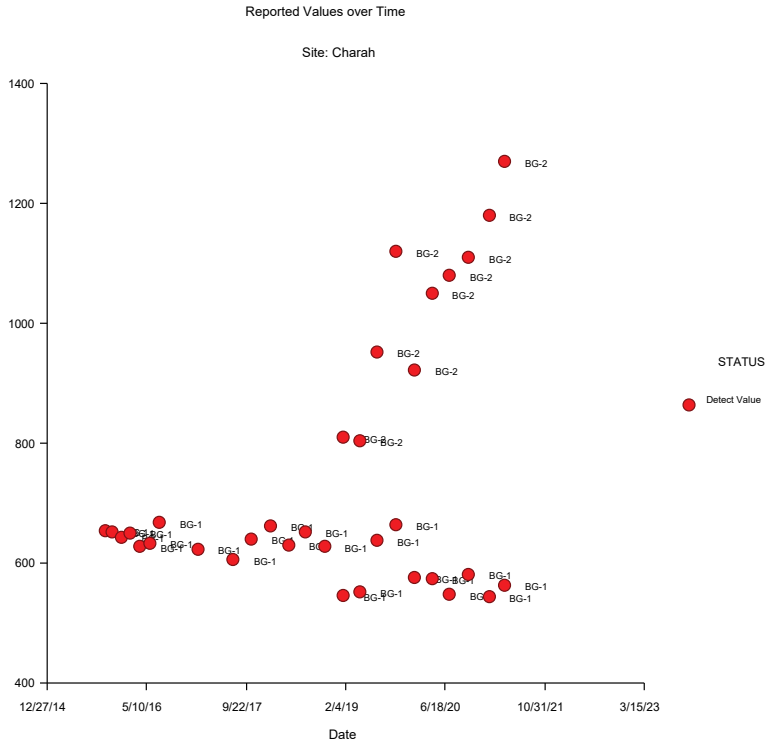


Figure 5: Total Dissolved Solids Concentrations (ug/L) vs. Time



2.1.2 Downgradient

Statistical outliers were identified for Appendix I metals, Appendix III and Appendix IV constituents in the data sets evaluated for downgradient monitoring wells throughout the monitoring period, and are listed in **Table 5**.

Table 5: Dixon's Outlier Test Results – Downgradient

Well	Constituent Type	Constituent	Potential Outlier Value	Units	Sampling Event	Sample Date
MW-1	Appendix IV	Cadmium	0.670	ug/L	R24	10/14/2020
MW-2	Appendix I Metals	Zinc	113	ug/L	R06	4/6/2016
	Appendix III	Total Dissolved Solids	257	mg/L	R03	11/19/2015
		Total Dissolved Solids	1170	mg/L	R21	1/17/2020
	Appendix IV	Lithium	356	ug/L	R08	7/12/2016
		Molybdenum	41.0	ug/L	R21	1/17/2020
MW-3	Appendix III	pH (Field)	6	S.U.	R23	7/7/2020
	Appendix IV	Lithium	236	ug/L	R12	10/18/2017
		Chromium	179.0	ug/L	R17	1/25/2019
		Molybdenum	35.70	ug/L	R21	1/16/2020
MW-4	Appendix III	Boron	165	ug/L	R12	10/17/2017

Well	Constituent Type	Constituent	Potential Outlier Value	Units	Sampling Event	Sample Date
	Appendix IV	Cobalt	21.8	ug/L	R22	4/17/2020
MW-5	Appendix III	Boron	39.3	ug/L	R09	1/23/2017
		Total Dissolved Solids	1,160	mg/L	R12	10/17/2017
		pH (Field)	8.54	S.U.	R22	4/15/2020
MW-6	Appendix III	Chloride	15.3	mg/L	R06	4/5/2016
MW-7R	Appendix I Metals	Nickel	880.000	ug/L	R19	7/10/2019
	Appendix III	Fluoride	0.32	mg/L	R11	7/20/2017
		pH (Field)	9.6	S.U.	R11	7/20/2017
		Sulfate	51.200	mg/L	R11	7/20/2017
	Appendix IV	Fluoride	0	mg/L	R11	7/20/2017
		Chromium	1,940	ug/L	R19	7/10/2019
		Radium-228	2.13	pCi/L	R26	4/14/2021
MW-8	Appendix III	Calcium	4,170	ug/L	R25	1/27/2021

A visual inspection of concentration vs. time scatter plots for constituents included in the outliers listed in **Table 5** reveal the presence of the potential outliers.[1] Following review of the sampling protocols and field sampling records, there were no obvious reasons for the outliers noted on the sampling dates. The value for each statistical outlier listed above is within a reasonable range of the remaining concentrations for each constituent throughout the monitoring period. The variability in concentrations will be better understood as additional samples are obtained.

2.2 Data Distribution

Groundwater data was fitted to known distribution models using Goodness-of-Fit (GOF) tests incorporated into ProUCL. For data sets comprised of 50 or fewer samples, ProUCL's GOF module incorporates the Shapiro-Wilk GOF test to determine normal or lognormal distribution and Anderson-Darling to determine gamma distribution. Normal, lognormal and gamma distributions are parametric distributions. If a data set could not be fit with any of these three parametric distributions, it was considered to follow a nonparametric distribution. Note that ProUCL does not provide GOF results for data sets with less than three detected values due to insufficient data. For purposes of estimating background concentrations, these data sets were treated under non-parametric distribution assumptions with the maximum detected value chosen to represent the background concentrations. In addition, the data for total radium is set to nonparametric as the MDL values were not provided by the laboratory. Data distributions are listed in **Table 6**.

[1] See Appendix E.B for scatter plots of constituents with downgradient statistically-derived outliers.

Table 6: Data Distributions – Background

Constituent	Sample Size	No. of NDs	Distribution Fit[1]
Appendix I Metals			
Copper	35	33	Nonparametric
Nickel	35	35	Nonparametric
Silver	35	35	Nonparametric
Vanadium	35	22	Nonparametric
Zinc	35	31	Nonparametric
Appendix III Constituents			
Boron	34	18	Nonparametric
Calcium	35	0	Nonparametric
Chloride	35	0	Parametric
Fluoride	35	0	Parametric
pH (Field)	33	0	Parametric
Sulfate	35	0	Nonparametric
Total Dissolved Solids	34	0	Nonparametric
Appendix IV Constituents			
Antimony	35	35	Nonparametric
Arsenic	35	34	Nonparametric
Barium	35	0	Nonparametric
Beryllium	35	35	Nonparametric
Cadmium	35	33	Nonparametric
Chromium	35	35	Nonparametric
Cobalt	35	35	Nonparametric
Fluoride	35	0	Parametric
Lead	35	34	Nonparametric
Lithium	35	3	Parametric
Mercury	35	32	Nonparametric
Molybdenum	35	29	Nonparametric
Radium-226	32	0	Nonparametric
Radium-228	32	0	Nonparametric
Selenium	35	35	Nonparametric
Thallium	35	34	Nonparametric
Total Radium	32	0	Nonparametric

[1]Best fit is based on detected data.

2.3 Trends

2.3.1 Background

Background constituent concentrations in groundwater should demonstrate stationary conditions through time, free of trends. Constituents were analyzed for trends within the data set using a maximum likelihood estimate (MLE) regression for constituents which followed parametric distributions and Mann-Kendall tests for those that were treated under nonparametric distributional assumptions. The MLE regression can be applied to data sets that can be fitted to a specific distribution model and that contain NDs with multiple MDLs. The Mann-Kendall test is suitable for data series with no discernable distributions and only one MDL value for NDs.

Constituents treated under nonparametric data assumptions (either tested as nonparametric or having more than 50 percent NDs) and with multiple MDLs or with less than three detected values were not assessed for trends. A summary of the trend analysis results for constituents with sufficient detected values in the background data set is provided in **Table 7**.

The background well regression analysis showed a potential increasing trend for fluoride (an Appendix III and Appendix IV constituent) and sulfate (Appendix III). A potential decreasing trend for chloride (Appendix III) and three Appendix IV constituents (barium, lithium, and radium-226).There were no increasing or decreasing trends identified for other monitoring constituents with sufficient data quantity and quality for testing with the MLE analysis or Mann-Kendall test.

Table 7: Summary of Trend Analysis Results – Background

Constituent	Trend
Appendix III Constituents	
Chloride	↓
Fluoride	↑
Sulfate	↑
Appendix IV Constituents	
Lithium	↓
Barium	↓
Radium-226	↓

2.3.2 Downgradient

Trends were also evaluated for constituents in each downgradient well using the same methods as described above for the background data set. Trends identified for select constituents at select monitoring well locations should be monitored as additional downgradient groundwater data are collected at the site. A summary of the statistical trends identified within the downgradient data set is provided in **Table 8**.

Table 8: Summary of Trend Analysis Results – Downgradient

Constituent	Downgradient Well with Increasing or Decreasing Trend							
	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7R	MW-8
Appendix I Metals								
Nickel				↑				
Appendix III Constituents								
Calcium	↑			↑				↓
Chloride	↑				↑	↓		↓
Fluoride				↓				
pH (Field)		↓				↓	↓	↑
Sulfate	↓	↓		↑		↓	↓	↑
Total Dissolved Solids	↑			↑			↑	
Appendix IV Constituents								
Antimony		↓						
Barium	↑	↑		↑		↓	↑	↓
Fluoride				↓				
Lithium	↑		↓	↑		↓	↑	↓
Molybdenum		↓						

2.4 Spatial Variability

Spatial variability refers to identifying whether or not there are statistically identifiable differences in mean concentrations or variance levels across the well field (i.e., the pooled background data). Parametric and nonparametric analysis of variance (ANOVA) tests and visual aids (i.e., side-by-side box plots and scatter plots), as needed, were used to evaluate for spatial variability within the background data set to confirm that results from background wells BG-1 and BG-2 were appropriate for pooling and calculating background concentrations for constituents.

Statistical tests indicated that five Appendix III constituents (calcium, fluoride, pH, sulfate, and total dissolved solids) exhibited spatial variability. Statistical spatial variability was also identified for one Appendix IV constituent (barium). Review of side-by-side box plots for the constituents listed above indicated that the statistically-identified variability in concentrations are reasonable and the mean concentrations calculated for the monitoring wells are generally within one order of magnitude of the other. Therefore, the concentration distribution across the background wells should be considered reflective of the hydrogeological regime at the site and the background results are appropriate for pooling and calculating background concentrations at this time.

3 Summary of Statistical Analysis

A summary of the statistical analysis results is provided in **Table 9** and discussed below.

- The statistical outliers identified for total dissolved solids, barium, calcium, and sulfate should not be removed from the data set to be used for developing background concentrations for the site at this time.
- For the background data set, all of the five Appendix I metals exhibited high percentages of NDs and will be treated under nonparametric distribution assumptions with the maximum detected value chosen to represent background, until additional results can be included in the data sets.
- For the background data set, there are currently sufficient data to fit the Appendix III constituents to known parametric distribution models (e.g., gamma, lognormal, or normal) using GOF tests, except for boron, calcium, sulfate, and total dissolved solids, which are nonparametric. Statistical tests conducted under parametric distribution assumptions have more power to detect an SSI when compared to tests conducted under nonparametric distribution assumptions.
- For the background data set, eleven of the seventeen Appendix IV constituents exhibited high percentages of NDs and will be treated under nonparametric distribution assumptions with the maximum detected value chosen to represent background, until additional results can be included in the data sets. The data for radium-226, radium-228 and total radium is set to a nonparametric distribution as the MDL values were not provided by the laboratory. Currently, the background data sets for fluoride and lithium can be fitted to known parametric distribution models using GOF tests.
- At this time, for the purpose of calculating background concentrations and testing for SSIs over background for Appendix I metals, Appendix III and Appendix IV constituents, results from thirty-five samples (twenty-five monitoring events taken during October 2015 to April 2021 from BG-1 and ten monitoring events taken January 2019 to April 2021 from BG-2) were used. The statistically-derived background concentrations and the evaluation for SSIs over background for Appendix I metals, Appendix III and Appendix IV constituents are included in **Section 4**.

Table 9: Summary of Background Preliminary Data Analysis

Constituent	Statistical Outlier	Nonparametric Data Distribution	Trend
Appendix I Metals			
Copper		✓	
Nickel		✓	
Silver		✓	
Vanadium		✓	
Zinc		✓	
Appendix III Constituents			
Boron	✓	✓	
Calcium	✓	✓	
Chloride			✓
Fluoride			✓
Sulfate	✓	✓	✓
Total Dissolved Solids	✓	✓	
Appendix IV Constituents			
Antimony		✓	
Arsenic		✓	
Barium		✓	✓
Beryllium		✓	
Cadmium		✓	
Chromium		✓	
Cobalt		✓	
Fluoride			✓
Lead		✓	
Lithium	✓		✓
Mercury		✓	
Molybdenum		✓	
Radium-226		✓	✓
Radium-228		✓	
Selenium		✓	
Thallium		✓	
Total Radium		✓	

✓Constituent was flagged during the statistical analysis

4 Evaluation for SSIs over Background

Based on the statistical evaluations performed, background threshold values (BTVs) were determined for the detection monitoring program at the site for Appendix I metals, Appendix III and Appendix IV constituents. For constituents that have all ND background values, the maximum MDL is chosen to represent background and the double quantification rule (DQR) is used to evaluate whether or not there is an SSI. The BTV provided for detection monitoring constituents is the statistically-derived background concentration (i.e., upper prediction limit [UPL]), the maximum detected value or the maximum MDL depending on the level of censorship in each of the background samples. For pH (field), both the UPL and the lower prediction limit (LPL) were computed as pH values above or below the prediction limits at the downgradient wells can be considered statistically significant. The test significance level per constituent has been estimated such that the cumulative false positive rate over all constituent/well pair comparisons is approximately ten percent. The number of verification samples per constituent has been selected to provide sufficient statistical power to detect an SSI when an SSI has occurred conditional to the background sample size, its distributional properties, and the total number of statistical test comparisons. The calculated background concentrations, or BTVs, for each detection monitoring constituent is provided below in **Table 10**.

Table 10: Background Concentrations for Detection Monitoring Constituents

Constituent	Unit	No. of Verification Samples	BTV (UPL)
Appendix I Metals			
Copper	ug/L	**2**	**11.4**
Nickel	ug/L	**na**	***3.50***
Silver	ug/L	**na**	***2.50***
Vanadium	ug/L	**2**	**8.30**
Zinc	ug/L	**2**	**34.2**
Appendix III Constituents			
Boron	ug/L	**2**	**56.5**
Calcium	ug/L	**2**	**124,000**
Chloride	mg/L	**1**	**342**
Fluoride	mg/L	**1**	**0.250**
pH (Field)	S.U.	**1**	**5.89 - 7.25**
Sulfate	mg/L	**2**	**182**
Total Dissolved Solids	mg/L	**2**	**1,270**
Appendix IV Constituents			
Antimony	ug/L	**na**	***3.90***
Arsenic	ug/L	**2**	**4.80**
Barium	ug/L	**2**	**443**

Constituent	Unit	No. of Verification Samples	BTV (UPL)
Appendix I Metals			
Beryllium	ug/L	na	*0.700*
Cadmium	ug/L	2	0.500
Chromium	ug/L	na	*3.70*
Cobalt	ug/L	na	*3.60*
Fluoride	mg/L	1	0.250
Lead	ug/L	2	14.1
Lithium	ug/L	1	47.6
Mercury	ug/L	2	0.200
Molybdenum	ug/L	2	13.6
Radium-226	pCi/L	2	1.22
Radium-228	pCi/L	2	1.29
Selenium	ug/L	na	*5.00*
Thallium	ug/L	2	13.7
Total Radium	pCi/L	2	2.09

Note:
* indicates the lower bound of the pH range is the lower prediction limit (LPL). The upper bound is the UPL.
Italic concentration indicates a non-detect value and that the DQR is recommended for statistical evaluation.

Downgradient sampling results from the first detection monitoring round in January 2021 were used to test for SSIs. For constituents that have all ND background values, the DQR is applied; that is, an SSI is registered for the well-constituent pair if the downgradient concentrations exhibit detects in two consecutive sampling events. Downgradient sampling results from the October 2020 and January 2021 sampling events were used to test for SSIs for constituents that have all ND background values. Downgradient concentrations were compared to the BTVs and are summarized below in **Table 11** through **Table 13.** Eight monitoring wells (MW-1 through MW-8) were installed and sampled (October 2015) prior to ash placement, thus representing pre-ash conditions at the site. The range of the concentrations of the pre-ash conditions are included in the tables below as a relative comparison to the current downgradient conditions.

Table 11: Summary of Evaluation for SSIs over Background for Appendix I Metals (Detection Monitoring)

	Copper	Nickel	Silver	Vanadium	Zinc
Unit	ug/L	ug/L	ug/L	ug/L	ug/L
BTV (UPL)	11.4	*3.50*	*2.50*	8.30	34.2
Pre-Ash Range	2.50 - 16.4	2.50 - 18.2	2.50 - 2.50	2.50 - 9.90	5.00 - 106
Well	*First Detection Monitoring Round Results*				
MW-1	*4.30*	*3.50*	*2.50*	*3.90*	*9.50*
MW-11	*4.30*	*3.50*	*2.50*	*3.90*	*9.50*
MW-2	4.30	*3.50*	*2.50*	*3.90*	*9.50*

	Copper	Nickel	Silver	Vanadium	Zinc
Unit	ug/L	ug/L	ug/L	ug/L	ug/L
BTV (UPL)	11.4	*3.50*	*2.50*	8.30	34.2
Pre-Ash Range	2.50 - 16.4	2.50 - 18.2	2.50 - 2.50	2.50 - 9.90	5.00 - 106
MW-3	*4.30*	*3.50*	*2.50*	*3.90*	*9.50*
MW-4	*4.30*	***7.40***	*2.50*	*3.90*	*9.50*
MW-5	*4.30*	*3.50*	*2.50*	*3.90*	*9.50*
MW-6	*4.30*	*3.50*	*2.50*	*3.90*	*9.50*
MW-7R	*4.30*	*3.50*	*2.50*	*3.90*	*9.50*
MW-8	*4.30*	*3.50*	*2.50*	*3.90*	*9.50*

Notes:
Underlined concentration indicates a detect value for constituents with 100 percent background non-detects.
Bold and underlined concentration indicates an SSI over background.
Italic concentration indicates a non-detect value and that the DQR is recommended for statistical evaluation.

Table 12: Summary of Evaluation for SSIs over Background for Appendix III Constituents (Detection Monitoring)

	Appendix III Constituents						
	Boron	Calcium	Chloride	Fluoride	pH (Field)	Sulfate	TDS
Unit	ug/L	ug/L	mg/L	mg/L	S.U.	mg/L	mg/L
BTV (UPL)	56.5	124,000	342	0.253	5.89 - 7.25	182	1,270
Pre-Ash Range	6.20 - 53.1	16,900 - 185,000	22.2 - 1,160	0.0200 - 0.590	6.17 - 7.70	3.70 - 199	296 - 2,770
Well	*First Detection Monitoring Round Results*						
MW-1	8.30	**185,000**	**731**	0.130	6.65	6.40	**1,830**
MW-11	16.5	38,900	123	0.140	**7.33**	2.00	**2,760**
MW-2	46.6	**183,000**	**1,120**	0.140	**7.54**	94.0	428
MW-3	6.20	**178,000**	**1,080**	0.250	7.38	27.5	**2,650**
MW-4	7.40	60,700	**467**	**0.260**	6.25	10.4	1,200
MW-5	11.1	9,040	19.6	**0.510**	6.81	3.40	218
MW-6	9.00	34,300	208	**0.340**	**6.32**	25.6	638
MW-7R	12.8	86,600	278	0.100	7.31	15.1	872
MW-8	14.0	4,170	**426**	0.0610	7.05	6.40	1,040

Notes:
The boron samples could not be tested due to dilution.
Underlined concentration indicates a detect value for constituents with 100 percent background non-detects.
Bold and underlined concentration indicates an SSI over background.
Italic concentration indicates a non-detect value and that the DQR is recommended for statistical evaluation.
* indicates the lower bound of the pH range is the LPL. The upper bound is the UPL

Table 13: Summary of Evaluation for SSIs over Background for Appendix IV Constituents (Detection Monitoring)

	Appendix IV Constituents																
	Anti-mony	Ars-enic	Barium	Bery-llium	Cadmium	Chromium	Cobalt	Fluoride	Lead	Lithium	Mercury	Moly-bdenum	Radium-226	Radium-228	Selenium	Thallium	Total Radium
Unit	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	mg/L	ug/L	ug/L	ug/L	ug/L	pCi/L	pCi/L	ug/L	ug/L	pCi/L
BTV (UPL)	*3.90*	*4.80*	443	0.700	0.500	*3.70*	*3.60*	0.253	14.1	47.6	0.200	13.6	1.22	1.29	*5.00*	13.7	2.09
Pre-Ash Range	3.80 - 12.0	2.50 - 2.50	117 - 1,240	0.500 - 0.500	0.500 - 0.500	2.50 - 33.9	2.50 - 7.00	0.0200 - 0.590	2.50 - 6.30	7.50 - 70.4	0.100 - 0.100	2.50 - 20.6	0.0774 - 0.820	0.0230 - 1.56	5.00 - 5.00	5.00 - 5.00	0.304 - 2.93
Well	*First Detection Monitoring Round Results*																
MW-1	*3.00*	*4.70*	218	*0.700*	**0.570**	*3.70*	*3.60*	0.130	*4.50*	31.0	*0.120*	*3.90*	0.240	0.841	*4.70*	*0.0500*	1.08
MW-11	*3.00*	*4.70*	66.0	*0.700*	*0.400*	*3.70*	*3.60*	0.140	*4.50*	10.7	*0.120*	*3.90*	0.399	0.0999	*4.70*	*0.0500*	0.499
MW-2	*3.00*	*4.70*	275	*0.700*	0.480	*3.70*	*3.60*	0.140	*4.50*	**129**	*0.120*	6.80	0.410	0.881	*4.70*	*0.0500*	1.29
MW-3	*3.00*	*4.70*	**599**	*0.700*	*0.400*	*3.70*	*3.60*	0.250	*4.50*	*0.390*	*0.120*	7.30	1.02	1.28	*4.70*	*0.0500*	**2.30**
MW-4	3.10	*4.70*	316	*0.700*	*0.400*	*3.70*	*3.60*	**0.260**	*4.50*	28.9	*0.120*	*3.90*	0.0618	0.465	*4.70*	*0.0500*	0.527
MW-5	3.90	*4.70*	92.0	*0.700*	*0.400*	*3.70*	*3.60*	**0.510**	*4.50*	10.6	*0.120*	*3.90*	-0.138	1.02	*4.70*	*0.0500*	1.02
MW-6	*3.00*	*4.70*	57.8	*0.700*	*0.400*	*3.70*	*3.60*	**0.340**	*4.50*	28.5	*0.120*	*3.90*	-0.199	0.297	*4.70*	*0.0500*	0.297
MW-7R	*3.00*	*4.70*	285	*0.700*	*0.400*	*3.70*	*3.60*	0.100	*4.50*	31.0	*0.120*	*3.90*	-0.0709	0.339	*4.70*	*0.0500*	0.339
MW-8	*3.00*	*4.70*	**1,060**	*0.700*	*0.400*	5.70	*3.60*	0.0610	*4.50*	33.4	*0.120*	*3.90*	0.261	0.555	*4.70*	*0.0500*	0.816

Notes:
Underlined concentration indicates a detect value for constituents with 100 percent background non-detects.
Bold and underlined concentration indicates an SSI over background.
Italic concentration indicates a non-detect value and that the DQR is recommended for statistical evaluation.

SSIs were found for one Appendix I metal (Nickel), five Appendix III constituents (calcium, chloride, fluoride, pH (field), and total dissolved solids), and five Appendix IV constituents (barium, cadmium, fluoride, lithium, and total radium). When the January 2021 sampling event results are compared to the pre-ash sampling results from those eight wells, current downgradient groundwater constituent concentrations are generally similar to concentrations reported prior to ash placement. Depending on the data distribution of the constituent, the BTVs have been computed to allow for one to two verification samples. With verification sampling, the validity of the SSIs can be confirmed.

5 Appendix E.A: Downgradient Well Descriptive Statistics

Table 14: Summary of Well MW-1 Data Set Descriptive Statistics

Constituent	Unit	Sample Size	No. of NDs	With NDs=MDLs Included				With NDs Removed			
				Minimum	Maximum	Mean	Median	Minimum	Maximum	Mean	Median
Appendix I Metals											
Copper	ug/L	24	23	2.10	7.20	2.93	2.50	7.20	7.20	7.20	7.20
Nickel	ug/L	24	20	0.900	13.3	3.26	2.50	4.90	13.3	7.93	6.75
Silver	ug/L	24	24	2.50	2.50	2.50	2.50	--	--	--	--
Vanadium	ug/L	24	19	1.30	7.80	3.18	2.50	4.90	7.80	5.90	5.60
Zinc	ug/L	24	16	3.90	28.0	9.27	7.25	10.2	28.0	16.0	14.0
Appendix III Constituents											
Boron	ug/L	23	12	0.570	14.5	5.60	6.20	6.20	14.5	9.44	9.60
Calcium	ug/L	24	0	43,100	256,000	149,383	138,500	43,100	256,000	149,383	138,500
Chloride	mg/L	24	0	167	1,010	582	575	167	1,010	582	575
Fluoride	mg/L	24	1	0.0200	0.170	0.136	0.135	0.110	0.170	0.141	0.140
pH (Field)	S.U.	22	0	6.41	7.30	6.70	6.70	6.41	7.30	6.70	6.70
Sulfate	mg/L	24	0	6.20	11.2	7.80	7.05	6.20	11.2	7.80	7.05
Total Dissolved Solids	mg/L	24	0	569	2,390	1,333	1,215	569	2,390	1,333	1,215
Appendix IV Constituents											
Antimony	ug/L	24	23	3.00	6.10	3.67	3.80	6.10	6.10	6.10	6.10
Arsenic	ug/L	24	23	2.50	5.20	4.30	4.70	5.20	5.20	5.20	5.20
Barium	ug/L	24	0	61.9	363	199	198	61.9	363	199	198
Beryllium	ug/L	24	24	0.200	0.700	0.483	0.500	--	--	--	--
Cadmium	ug/L	24	21	0.400	0.670	0.492	0.500	0.570	0.670	0.603	0.570
Chromium	ug/L	24	18	1.00	18.4	4.07	2.50	5.00	18.4	9.18	7.10
Cobalt	ug/L	24	24	1.10	3.60	2.45	2.50	--	--	--	--
Fluoride	mg/L	24	1	0.0200	0.170	0.136	0.135	0.110	0.170	0.141	0.140
Lead	ug/L	24	24	1.60	4.50	2.68	2.50	--	--	--	--
Lithium	ug/L	24	0	19.2	42.8	32.1	31.9	19.2	42.8	32.1	31.9
Mercury	ug/L	24	24	0.100	0.120	0.103	0.100	--	--	--	--
Molybdenum	ug/L	24	21	0.900	15.1	3.96	2.50	9.00	15.1	12.9	14.5
Radium-226	pCi/L	22	0	-0.188	1.03	0.361	0.302	-0.188	1.03	0.361	0.302
Radium-228	pCi/L	22	0	-0.0467	1.45	0.547	0.510	-0.0467	1.45	0.547	0.510
Selenium	ug/L	24	24	4.70	5.00	4.90	5.00	--	--	--	--
Thallium	ug/L	24	24	0.0200	5.00	1.30	0.0550	--	--	--	--
Total Radium	pCi/L	22	0	0.237	2.48	0.928	0.844	0.237	2.48	0.928	0.844

Notes:

1. ND = not detected above the method detection limit.
2. MDL = method detection limit.
3. "--" indicates all results for the respective constituent were NDs, or with the case of total radium, NDs were flagged but the laboratory did not provide a value for the MDL.
4. Numbers are displayed using the same number of significant figures as reported by the laboratory.
5. If a constituent had 100% detections the descriptive statistics provided above are identical for the data including NDs and excluding NDs.

Table 15: Summary of Well MW-2 Data Set Descriptive Statistics

Constituent	Unit	Sample Size	No. of NDs	With NDs=MDLs Included				With NDs Removed			
				Minimum	Maximum	Mean	Median	Minimum	Maximum	Mean	Median
Appendix I Metals											
Copper	ug/L	19	12	2.10	17.2	4.83	2.50	4.90	17.2	8.61	6.60
Nickel	ug/L	19	10	0.900	54.4	10.4	3.50	4.50	54.4	19.2	13.5
Silver	ug/L	19	19	2.50	2.50	2.50	2.50	--	--	--	--
Vanadium	ug/L	19	16	1.30	7.60	3.05	2.50	4.20	7.60	5.90	5.90
Zinc	ug/L	19	9	5.00	113	20.6	10.7	10.7	113	34.2	27.5
Appendix III Constituents											
Boron	ug/L	18	0	37.4	63.9	45.5	45.4	37.4	63.9	45.5	45.4
Calcium	ug/L	19	0	130,000	221,000	193,632	195,000	130,000	221,000	193,632	195,000
Chloride	mg/L	19	0	910	1,360	1,168	1,190	910	1,360	1,168	1,190
Fluoride	mg/L	19	1	0.0200	0.400	0.213	0.220	0.130	0.400	0.223	0.220
pH (Field)	S.U.	15	0	7.50	8.50	7.72	7.60	7.50	8.50	7.72	7.60
Sulfate	mg/L	19	0	53.3	338	169	163	53.3	338	169	163
Total Dissolved Solids	mg/L	19	0	257	11,700	2,795	2,480	257	11,700	2,795	2,480
Appendix IV Constituents											
Antimony	ug/L	19	9	3.00	12.3	6.19	5.30	5.30	12.3	8.43	8.80
Arsenic	ug/L	19	18	2.50	5.40	4.18	5.00	5.40	5.40	5.40	5.40
Barium	ug/L	19	0	177	481	278	264	177	481	278	264
Beryllium	ug/L	19	19	0.200	0.700	0.516	0.500	--	--	--	--
Cadmium	ug/L	19	18	0.400	0.500	0.483	0.500	0.480	0.480	0.480	0.480
Chromium	ug/L	19	5	1.00	84.0	17.4	7.20	4.60	84.0	22.7	12.1
Cobalt	ug/L	19	19	1.10	3.60	2.60	2.50	--	--	--	--
Fluoride	mg/L	19	1	0.0200	0.400	0.213	0.220	0.130	0.400	0.223	0.220
Lead	ug/L	19	18	1.60	4.80	2.78	2.50	4.80	4.80	4.80	4.80
Lithium	ug/L	19	0	53.1	356	146	129	53.1	356	146	129
Mercury	ug/L	19	19	0.100	0.120	0.103	0.100	--	--	--	--
Molybdenum	ug/L	19	1	3.90	41.0	11.9	9.50	4.90	41.0	12.4	9.50
Radium-226	pCi/L	18	0	0.410	1.94	0.928	0.938	0.410	1.94	0.928	0.938
Radium-228	pCi/L	18	0	0.433	2.16	1.31	1.32	0.433	2.16	1.31	1.32
Selenium	ug/L	19	19	4.70	5.00	4.94	5.00	--	--	--	--
Thallium	ug/L	19	17	0.0200	10.3	1.91	0.0600	0.0680	10.3	5.18	5.18
Total Radium	pCi/L	18	0	1.12	3.09	2.23	2.36	1.12	3.09	2.23	2.36

Notes:

1. ND = not detected above the method detection limit.
2. MDL = method detection limit.
3. "--" indicates all results for the respective constituent were NDs, or with the case of total radium, NDs were flagged but the laboratory did not provide a value for the MDL.
4. Numbers are displayed using the same number of significant figures as reported by the laboratory.
5. If a constituent had 100% detections the descriptive statistics provided above are identical for the data including NDs and excluding NDs.

Table 16: Summary of Well MW-3 Data Set Descriptive Statistics

Constituent	Unit	Sample Size	No. of NDs	With NDs=MDLs Included				With NDs Removed			
				Minimum	Maximum	Mean	Median	Minimum	Maximum	Mean	Median
Appendix I Metals											
Copper	ug/L	22	16	2.10	36.0	5.66	2.50	5.30	36.0	13.3	7.45
Nickel	ug/L	22	14	0.900	86.0	9.31	2.50	3.70	86.0	21.3	6.55
Silver	ug/L	22	22	2.50	2.50	2.50	2.50	--	--	--	--
Vanadium	ug/L	22	17	1.30	13.9	3.78	2.50	4.10	13.9	7.82	6.90
Zinc	ug/L	22	17	3.90	42.7	9.23	5.00	11.8	42.7	21.1	13.5
Appendix III Constituents											
Boron	ug/L	21	9	0.570	49.4	20.1	16.6	9.70	49.4	33.3	37.4
Calcium	ug/L	22	0	117,000	201,000	167,545	171,500	117,000	201,000	167,545	171,500
Chloride	mg/L	22	0	893	1,280	1,091	1,090	893	1,280	1,091	1,090
Fluoride	mg/L	22	1	0.0200	0.610	0.372	0.405	0.210	0.610	0.389	0.420
pH (Field)	S.U.	18	0	6.18	7.77	7.28	7.30	6.18	7.77	7.28	7.30
Sulfate	mg/L	22	0	9.10	174	68.6	57.9	9.10	174	68.6	57.9
Total Dissolved Solids	mg/L	22	0	256	3,180	2,095	2,235	256	3,180	2,095	2,235
Appendix IV Constituents											
Antimony	ug/L	22	13	3.00	15.0	6.09	3.90	3.80	11.4	8.31	9.20
Arsenic	ug/L	22	19	2.50	9.60	4.58	5.00	5.10	9.60	7.23	7.00
Barium	ug/L	22	0	353	855	614	605	353	855	614	605
Beryllium	ug/L	22	22	0.200	0.700	0.509	0.500	--	--	--	--
Cadmium	ug/L	22	21	0.400	0.500	0.473	0.500	0.410	0.410	0.410	0.410
Chromium	ug/L	22	11	1.00	179	16.4	4.05	4.40	179	30.2	9.30
Cobalt	ug/L	22	21	1.10	6.20	2.74	2.50	6.20	6.20	6.20	6.20
Fluoride	mg/L	22	1	0.0200	0.610	0.372	0.405	0.210	0.610	0.389	0.420
Lead	ug/L	22	21	1.60	7.30	3.00	2.50	7.30	7.30	7.30	7.30
Lithium	ug/L	22	1	0.390	236	94.0	86.6	36.7	236	98.4	87.8
Mercury	ug/L	22	22	0.100	0.120	0.104	0.100	--	--	--	--
Molybdenum	ug/L	22	0	5.10	35.7	9.77	7.95	5.10	35.7	9.77	7.95
Radium-226	pCi/L	21	0	0.213	1.92	0.937	1.02	0.213	1.92	0.937	1.02
Radium-228	pCi/L	21	0	0.387	2.86	1.48	1.61	0.387	2.86	1.48	1.61
Selenium	ug/L	22	22	4.70	5.00	4.92	5.00	--	--	--	--
Thallium	ug/L	22	22	0.0200	5.00	1.42	0.0500	--	--	--	--
Total Radium	pCi/L	21	0	0.857	3.92	2.42	2.41	0.857	3.92	2.42	2.41

Notes:

1. ND = not detected above the method detection limit.
2. MDL = method detection limit.
3. "--" indicates all results for the respective constituent were NDs, or with the case of total radium, NDs were flagged but the laboratory did not provide a value for the MDL.
4. Numbers are displayed using the same number of significant figures as reported by the laboratory.
5. If a constituent had 100% detections the descriptive statistics provided above are identical for the data including NDs and excluding NDs.

Table 17: Summary of Well MW-4 Data Set Descriptive Statistics

Constituent	Unit	Sample Size	No. of NDs	With NDs=MDLs Included				With NDs Removed			
				Minimum	Maximum	Mean	Median	Minimum	Maximum	Mean	Median
Appendix I Metals											
Copper	ug/L	23	22	2.10	7.60	2.98	2.50	7.60	7.60	7.60	7.60
Nickel	ug/L	23	11	0.900	11.5	4.96	5.10	5.10	11.5	7.35	7.10
Silver	ug/L	23	23	2.50	2.50	2.50	2.50	--	--	--	--
Vanadium	ug/L	23	22	1.30	10.7	2.94	2.50	10.7	10.7	10.7	10.7
Zinc	ug/L	23	19	3.90	47.2	9.00	5.00	9.50	47.2	25.2	22.0
Appendix III Constituents											
Boron	ug/L	22	11	0.570	165	11.8	5.75	5.70	165	21.2	6.80
Calcium	ug/L	23	0	17,900	71,600	55,822	63,000	17,900	71,600	55,822	63,000
Chloride	mg/L	23	0	144	567	433	484	144	567	433	484
Fluoride	mg/L	23	0	0.210	0.420	0.310	0.300	0.210	0.420	0.310	0.300
pH (Field)	S.U.	21	0	6.10	6.56	6.31	6.30	6.10	6.56	6.31	6.30
Sulfate	mg/L	23	0	3.40	12.3	9.63	10.7	3.40	12.3	9.63	10.7
Total Dissolved Solids	mg/L	23	0	395	1,580	1,072	1,160	395	1,580	1,072	1,160
Appendix IV Constituents											
Antimony	ug/L	23	18	3.00	7.00	3.81	3.80	3.10	7.00	4.32	3.40
Arsenic	ug/L	23	23	2.50	5.00	4.24	4.70	--	--	--	--
Barium	ug/L	23	0	85.9	431	278	309	85.9	431	278	309
Beryllium	ug/L	23	23	0.200	0.700	0.483	0.500	--	--	--	--
Cadmium	ug/L	23	22	0.400	0.500	0.468	0.500	0.470	0.470	0.470	0.470
Chromium	ug/L	23	20	1.00	8.60	2.93	2.50	4.10	8.60	6.13	5.70
Cobalt	ug/L	23	16	1.10	21.8	4.60	2.50	5.30	21.8	9.31	8.10
Fluoride	mg/L	23	0	0.210	0.420	0.310	0.300	0.210	0.420	0.310	0.300
Lead	ug/L	23	23	1.60	4.50	2.69	2.50	--	--	--	--
Lithium	ug/L	23	0	15.8	31.7	25.9	26.8	15.8	31.7	25.9	26.8
Mercury	ug/L	23	23	0.100	0.120	0.103	0.100	--	--	--	--
Molybdenum	ug/L	23	19	0.900	20.9	5.20	2.50	8.90	20.9	17.1	19.2
Radium-226	pCi/L	21	0	-0.120	0.913	0.397	0.424	-0.120	0.913	0.397	0.424
Radium-228	pCi/L	21	0	0.0190	1.35	0.532	0.481	0.0190	1.35	0.532	0.481
Selenium	ug/L	23	23	4.70	5.00	4.90	5.00	--	--	--	--
Thallium	ug/L	23	23	0.0200	5.00	1.36	0.0500	--	--	--	--
Total Radium	pCi/L	21	0	0.240	2.26	0.934	0.760	0.240	2.26	0.934	0.760

Notes:

1. ND = not detected above the method detection limit.
2. MDL = method detection limit.
3. "--" indicates all results for the respective constituent were NDs, or with the case of total radium, NDs were flagged but the laboratory did not provide a value for the MDL.
4. Numbers are displayed using the same number of significant figures as reported by the laboratory.
5. If a constituent had 100% detections the descriptive statistics provided above are identical for the data including NDs and excluding NDs.

Table 18: Summary of Well MW-5 Data Set Descriptive Statistics

Constituent	Unit	Sample Size	No. of NDs	With NDs=MDLs Included				With NDs Removed			
				Minimum	Maximum	Mean	Median	Minimum	Maximum	Mean	Median
Appendix I Metals											
Copper	ug/L	24	21	2.10	8.00	3.31	2.50	5.60	8.00	6.83	6.90
Nickel	ug/L	24	22	0.900	9.00	2.90	2.50	8.10	9.00	8.55	8.55
Silver	ug/L	24	24	2.50	2.50	2.50	2.50	--	--	--	--
Vanadium	ug/L	24	24	1.30	3.90	2.53	2.50	--	--	--	--
Zinc	ug/L	24	18	3.90	36.1	9.07	5.00	11.4	36.1	18.7	15.1
Appendix III Constituents											
Boron	ug/L	23	9	0.570	39.3	8.97	10.2	9.80	39.3	12.9	11.0
Calcium	ug/L	24	0	9,040	16,900	12,145	12,300	9,040	16,900	12,145	12,300
Chloride	mg/L	24	0	17.6	23.1	20.6	20.9	17.6	23.1	20.6	20.9
Fluoride	mg/L	24	0	0.410	0.680	0.540	0.555	0.410	0.680	0.540	0.555
pH (Field)	S.U.	21	0	5.50	8.54	6.92	7.00	5.50	8.54	6.92	7.00
Sulfate	mg/L	24	0	2.60	5.60	3.63	3.50	2.60	5.60	3.63	3.50
Total Dissolved Solids	mg/L	24	0	194	1,160	280	244	194	1,160	280	244
Appendix IV Constituents											
Antimony	ug/L	24	23	3.00	3.90	3.61	3.80	3.90	3.90	3.90	3.90
Arsenic	ug/L	24	24	2.50	5.00	4.28	4.70	--	--	--	--
Barium	ug/L	24	0	89.2	153	108	107	89.2	153	108	107
Beryllium	ug/L	24	24	0.200	0.700	0.483	0.500	--	--	--	--
Cadmium	ug/L	24	24	0.400	0.500	0.467	0.500	--	--	--	--
Chromium	ug/L	24	20	1.00	16.8	3.80	2.50	5.10	16.8	10.6	10.3
Cobalt	ug/L	24	24	1.10	3.60	2.45	2.50	--	--	--	--
Fluoride	mg/L	24	0	0.410	0.680	0.540	0.555	0.410	0.680	0.540	0.555
Lead	ug/L	24	24	1.60	4.50	2.68	2.50	--	--	--	--
Lithium	ug/L	24	1	4.20	11.6	8.60	8.85	6.30	11.6	8.79	8.90
Mercury	ug/L	24	24	0.100	0.120	0.103	0.100	--	--	--	--
Molybdenum	ug/L	24	24	0.900	3.90	2.47	2.50	--	--	--	--
Radium-226	pCi/L	22	0	-0.142	0.778	0.126	0.0923	-0.142	0.778	0.126	0.0923
Radium-228	pCi/L	22	0	-0.0922	1.08	0.389	0.333	-0.0922	1.08	0.389	0.333
Selenium	ug/L	24	24	4.70	5.00	4.90	5.00	--	--	--	--
Thallium	ug/L	24	23	0.0200	14.8	1.71	0.0550	14.8	14.8	14.8	14.8
Total Radium	pCi/L	22	0	0.0262	1.15	0.550	0.526	0.0262	1.15	0.550	0.526

Notes:

1. ND = not detected above the method detection limit.
2. MDL = method detection limit.
3. "--" indicates all results for the respective constituent were NDs, or with the case of total radium, NDs were flagged but the laboratory did not provide a value for the MDL.
4. Numbers are displayed using the same number of significant figures as reported by the laboratory.
5. If a constituent had 100% detections the descriptive statistics provided above are identical for the data including NDs and excluding NDs.

Table 19: Summary of Well MW-6 Data Set Descriptive Statistics

Constituent	Unit	Sample Size	No. of NDs	With NDs=MDLs Included				With NDs Removed			
				Minimum	Maximum	Mean	Median	Minimum	Maximum	Mean	Median
Appendix I Metals											
Copper	ug/L	24	23	2.10	5.50	2.88	2.50	5.50	5.50	5.50	5.50
Nickel	ug/L	24	22	0.900	8.20	2.61	2.50	3.90	8.20	6.05	6.05
Silver	ug/L	24	24	2.50	2.50	2.50	2.50	--	--	--	--
Vanadium	ug/L	24	24	1.30	3.90	2.53	2.50	--	--	--	--
Zinc	ug/L	24	20	3.90	17.7	6.96	5.00	11.3	17.7	13.4	12.2
Appendix III Constituents											
Boron	ug/L	23	12	0.570	10.8	5.05	6.10	6.10	10.8	8.09	7.70
Calcium	ug/L	24	0	31,300	40,200	35,054	34,500	31,300	40,200	35,054	34,500
Chloride	mg/L	24	0	15.3	279	219	234	15.3	279	219	234
Fluoride	mg/L	24	0	0.180	0.520	0.378	0.380	0.180	0.520	0.378	0.380
pH (Field)	S.U.	21	0	6.15	7.00	6.45	6.40	6.15	7.00	6.45	6.40
Sulfate	mg/L	24	0	25.4	214	78.5	59.2	25.4	214	78.5	59.2
Total Dissolved Solids	mg/L	24	0	371	946	663	660	371	946	663	660
Appendix IV Constituents											
Antimony	ug/L	24	24	3.00	3.90	3.58	3.80	--	--	--	--
Arsenic	ug/L	24	24	2.50	5.00	4.28	4.70	--	--	--	--
Barium	ug/L	24	0	46.9	142	90.3	94.7	46.9	142	90.3	94.7
Beryllium	ug/L	24	24	0.200	0.700	0.483	0.500	--	--	--	--
Cadmium	ug/L	24	24	0.400	0.500	0.467	0.500	--	--	--	--
Chromium	ug/L	24	20	1.00	14.0	3.18	2.50	4.70	14.0	7.50	5.65
Cobalt	ug/L	24	24	1.10	3.60	2.45	2.50	--	--	--	--
Fluoride	mg/L	24	0	0.180	0.520	0.378	0.380	0.180	0.520	0.378	0.380
Lead	ug/L	24	24	1.60	4.50	2.68	2.50	--	--	--	--
Lithium	ug/L	24	0	22.7	60.5	37.2	34.0	22.7	60.5	37.2	34.0
Mercury	ug/L	24	23	0.100	0.320	0.113	0.100	0.320	0.320	0.320	0.320
Molybdenum	ug/L	24	20	0.900	8.30	3.39	2.50	5.40	8.30	6.83	6.80
Radium-226	pCi/L	22	0	-0.225	0.910	0.224	0.226	-0.225	0.910	0.224	0.226
Radium-228	pCi/L	22	0	0.00147	1.07	0.553	0.540	0.00147	1.07	0.553	0.540
Selenium	ug/L	24	24	4.70	5.00	4.90	5.00	--	--	--	--
Thallium	ug/L	24	23	0.0200	6.20	1.33	0.0550	6.20	6.20	6.20	6.20
Total Radium	pCi/L	22	0	0.148	1.47	0.803	0.881	0.148	1.47	0.803	0.881

Notes:

1. ND = not detected above the method detection limit.
2. MDL = method detection limit.
3. "--" indicates all results for the respective constituent were NDs, or with the case of total radium, NDs were flagged but the laboratory did not provide a value for the MDL.
4. Numbers are displayed using the same number of significant figures as reported by the laboratory.
5. If a constituent had 100% detections the descriptive statistics provided above are identical for the data including NDs and excluding NDs.

Table 20: Summary of Well MW-7R Data Set Descriptive Statistics

Constituent	Unit	Sample Size	No. of NDs	With NDs=MDLs Included				With NDs Removed			
				Minimum	Maximum	Mean	Median	Minimum	Maximum	Mean	Median
Appendix I Metals											
Copper	ug/L	15	12	2.10	79.3	9.35	2.50	7.10	79.3	34.6	17.4
Nickel	ug/L	15	8	0.900	880	65.7	3.50	4.70	880	138	17.4
Silver	ug/L	15	15	2.50	2.50	2.50	2.50	--	--	--	--
Vanadium	ug/L	15	11	1.30	18.8	5.75	2.50	4.50	18.8	14.3	16.9
Zinc	ug/L	15	12	3.90	53.4	12.8	5.00	10.7	53.4	39.0	52.8
Appendix III Constituents											
Boron	ug/L	14	6	0.570	25.3	10.1	11.4	10.2	25.3	14.8	13.3
Calcium	ug/L	15	0	74,000	104,000	89,520	89,100	74,000	104,000	89,520	89,100
Chloride	mg/L	15	0	275	312	288	285	275	312	288	285
Fluoride	mg/L	15	1	0.0500	0.320	0.127	0.110	0.100	0.320	0.132	0.115
pH (Field)	S.U.	14	0	7.13	9.60	7.55	7.37	7.13	9.60	7.55	7.37
Sulfate	mg/L	15	0	15.1	51.2	19.9	17.5	15.1	51.2	19.9	17.5
Total Dissolved Solids	mg/L	15	0	740	990	841	828	740	990	841	828
Appendix IV Constituents											
Antimony	ug/L	15	14	3.00	13.6	4.13	3.90	13.6	13.6	13.6	13.6
Arsenic	ug/L	15	15	4.70	5.00	4.84	4.70	--	--	--	--
Barium	ug/L	15	0	50.1	423	272	285	50.1	423	272	285
Beryllium	ug/L	15	15	0.200	0.700	0.473	0.500	--	--	--	--
Cadmium	ug/L	15	15	0.400	0.500	0.447	0.400	--	--	--	--
Chromium	ug/L	15	4	1.00	1,940	142	8.10	5.10	1,940	193	15.7
Cobalt	ug/L	15	13	1.10	20.4	4.08	2.50	6.70	20.4	13.6	13.6
Fluoride	mg/L	15	1	0.0500	0.320	0.127	0.110	0.100	0.320	0.132	0.115
Lead	ug/L	15	13	1.60	6.80	3.48	2.50	6.70	6.80	6.75	6.75
Lithium	ug/L	15	0	5.60	33.8	25.5	27.6	5.60	33.8	25.5	27.6
Mercury	ug/L	15	15	0.100	0.120	0.105	0.100	--	--	--	--
Molybdenum	ug/L	15	12	0.900	49.5	7.47	2.50	10.7	49.5	26.6	19.5
Radium-226	pCi/L	13	0	-0.194	1.05	0.285	0.127	-0.194	1.05	0.285	0.127
Radium-228	pCi/L	13	0	-0.454	2.13	0.627	0.585	-0.454	2.13	0.627	0.585
Selenium	ug/L	15	15	4.70	5.00	4.84	4.70	--	--	--	--
Thallium	ug/L	15	12	0.0200	0.480	0.0839	0.0500	0.110	0.480	0.237	0.120
Total Radium	pCi/L	13	0	0.0741	2.31	0.972	0.845	0.0741	2.31	0.972	0.845

Notes:

1. ND = not detected above the method detection limit.
2. MDL = method detection limit.
3. "--" indicates all results for the respective constituent were NDs, or with the case of total radium, NDs were flagged but the laboratory did not provide a value for the MDL.
4. Numbers are displayed using the same number of significant figures as reported by the laboratory.
5. If a constituent had 100% detections the descriptive statistics provided above are identical for the data including NDs and excluding NDs.

Table 21: Summary of Well MW-8 Data Set Descriptive Statistics

Constituent	Unit	Sample Size	No. of NDs	With NDs=MDLs Included				With NDs Removed			
				Minimum	Maximum	Mean	Median	Minimum	Maximum	Mean	Median
Appendix I Metals											
Copper	ug/L	24	22	2.10	10.2	3.23	2.50	6.40	10.2	8.30	8.30
Nickel	ug/L	24	17	0.900	42.1	6.65	2.50	3.50	42.1	17.5	13.8
Silver	ug/L	24	24	2.50	2.50	2.50	2.50	--	--	--	--
Vanadium	ug/L	24	24	1.30	3.90	2.53	2.50	--	--	--	--
Zinc	ug/L	24	15	3.90	50.7	13.1	9.50	11.4	50.7	25.1	18.7
Appendix III Constituents											
Boron	ug/L	23	10	0.570	14.0	7.07	9.00	8.70	14.0	10.5	10.1
Calcium	ug/L	24	0	4,170	194,000	116,665	109,000	4,170	194,000	116,665	109,000
Chloride	mg/L	24	0	271	939	462	393	271	939	462	393
Fluoride	mg/L	24	20	0.0200	0.0730	0.0429	0.0500	0.0610	0.0730	0.0675	0.0680
pH (Field)	S.U.	22	0	6.70	7.29	6.99	7.00	6.70	7.29	6.99	7.00
Sulfate	mg/L	24	0	4.40	8.00	6.71	6.70	4.40	8.00	6.71	6.70
Total Dissolved Solids	mg/L	24	0	224	1,530	986	939	224	1,530	986	939
Appendix IV Constituents											
Antimony	ug/L	24	17	3.00	10.1	4.68	3.90	5.20	10.1	7.46	7.50
Arsenic	ug/L	24	24	2.50	5.00	4.28	4.70	--	--	--	--
Barium	ug/L	24	0	976	1,550	1,169	1,120	976	1,550	1,169	1,120
Beryllium	ug/L	24	24	0.200	0.700	0.483	0.500	--	--	--	--
Cadmium	ug/L	24	24	0.400	0.500	0.467	0.500	--	--	--	--
Chromium	ug/L	24	16	1.00	82.0	11.3	2.50	5.70	82.0	29.3	25.5
Cobalt	ug/L	24	24	1.10	3.60	2.45	2.50	--	--	--	--
Fluoride	mg/L	24	20	0.0200	0.0730	0.0429	0.0500	0.0610	0.0730	0.0675	0.0680
Lead	ug/L	24	24	1.60	4.50	2.68	2.50	--	--	--	--
Lithium	ug/L	24	1	4.20	50.1	28.1	27.1	18.7	50.1	29.1	27.3
Mercury	ug/L	24	23	0.100	0.370	0.115	0.100	0.370	0.370	0.370	0.370
Molybdenum	ug/L	24	22	0.900	5.60	2.78	2.50	5.20	5.60	5.40	5.40
Radium-226	pCi/L	22	0	0.00	1.16	0.508	0.478	0.00	1.16	0.508	0.478
Radium-228	pCi/L	22	0	0.239	1.74	0.768	0.590	0.239	1.74	0.768	0.590
Selenium	ug/L	24	24	4.70	5.00	4.90	5.00	--	--	--	--
Thallium	ug/L	24	23	0.0200	8.80	1.44	0.0550	8.80	8.80	8.80	8.80
Total Radium	pCi/L	22	0	0.454	1.94	1.28	1.25	0.454	1.94	1.28	1.25

Notes:

1. ND = not detected above the method detection limit.
2. MDL = method detection limit.
3. "--" indicates all results for the respective constituent were NDs, or with the case of total radium, NDs were flagged but the laboratory did not provide a value for the MDL.
4. Numbers are displayed using the same number of significant figures as reported by the laboratory.
5. If a constituent had 100% detections the descriptive statistics provided above are identical for the data including NDs and excluding NDs.

Table 22: Summary of Well MW-11 Data Set Descriptive Statistics

Constituent	Unit	Sample Size	No. of NDs	With NDs=MDLs Included				With NDs Removed			
				Minimum	Maximum	Mean	Median	Minimum	Maximum	Mean	Median
Appendix I Metals											
Copper	ug/L	3	2	4.30	5.90	4.83	4.30	5.90	5.90	5.90	5.90
Nickel	ug/L	3	3	3.50	3.50	3.50	3.50	--	--	--	--
Silver	ug/L	3	3	2.50	2.50	2.50	2.50	--	--	--	--
Vanadium	ug/L	3	3	3.90	3.90	3.90	3.90	--	--	--	--
Zinc	ug/L	3	3	9.50	9.50	9.50	9.50	--	--	--	--
Appendix III Constituents											
Boron	ug/L	3	0	11.5	16.5	14.8	16.4	11.5	16.5	14.8	16.4
Calcium	ug/L	3	0	26,500	38,900	34,533	38,200	26,500	38,900	34,533	38,200
Chloride	mg/L	3	0	123	149	140	148	123	149	140	148
Fluoride	mg/L	3	0	0.140	0.140	0.140	0.140	0.140	0.140	0.140	0.140
pH (Field)	S.U.	3	0	6.66	8.84	7.61	7.33	6.66	8.84	7.61	7.33
Sulfate	mg/L	3	0	2.00	3.00	2.37	2.10	2.00	3.00	2.37	2.10
Total Dissolved Solids	mg/L	3	0	410	2,760	1,229	517	410	2,760	1,229	517
Appendix IV Constituents											
Antimony	ug/L	3	3	3.00	3.00	3.00	3.00	--	--	--	--
Arsenic	ug/L	3	3	4.70	4.70	4.70	4.70	--	--	--	--
Barium	ug/L	3	0	57.4	66.0	61.0	59.6	57.4	66.0	61.0	59.6
Beryllium	ug/L	3	3	0.700	0.700	0.700	0.700	--	--	--	--
Cadmium	ug/L	3	3	0.400	0.400	0.400	0.400	--	--	--	--
Chromium	ug/L	3	3	3.70	3.70	3.70	3.70	--	--	--	--
Cobalt	ug/L	3	3	3.60	3.60	3.60	3.60	--	--	--	--
Fluoride	mg/L	3	0	0.140	0.140	0.140	0.140	0.140	0.140	0.140	0.140
Lead	ug/L	3	3	4.50	4.50	4.50	4.50	--	--	--	--
Lithium	ug/L	3	0	10.4	12.6	11.2	10.7	10.4	12.6	11.2	10.7
Mercury	ug/L	3	3	0.120	0.120	0.120	0.120	--	--	--	--
Molybdenum	ug/L	3	3	3.90	3.90	3.90	3.90	--	--	--	--
Radium-226	pCi/L	3	0	-0.0554	0.399	0.201	0.258	-0.0554	0.399	0.201	0.258
Radium-228	pCi/L	3	0	0.0999	2.13	0.910	0.500	0.0999	2.13	0.910	0.500
Selenium	ug/L	3	3	4.70	4.70	4.70	4.70	--	--	--	--
Thallium	ug/L	3	3	0.0500	0.0500	0.0500	0.0500	--	--	--	--
Total Radium	pCi/L	3	0	0.499	2.39	1.13	0.500	0.499	2.39	1.13	0.500

6 Appendix E.B: Scatter Plots for Constituents with Downgradient Statistical Outliers

Figure 6: Total Dissolved Solids Concentrations (mg/L) vs. Time (MW-2)

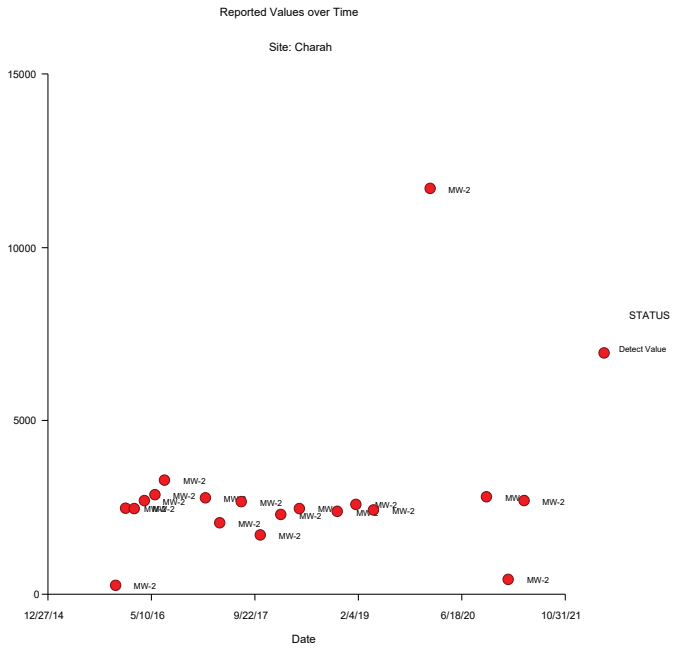


Figure 7: Calcium Concentrations (ug/L) vs. Time (MW-2)

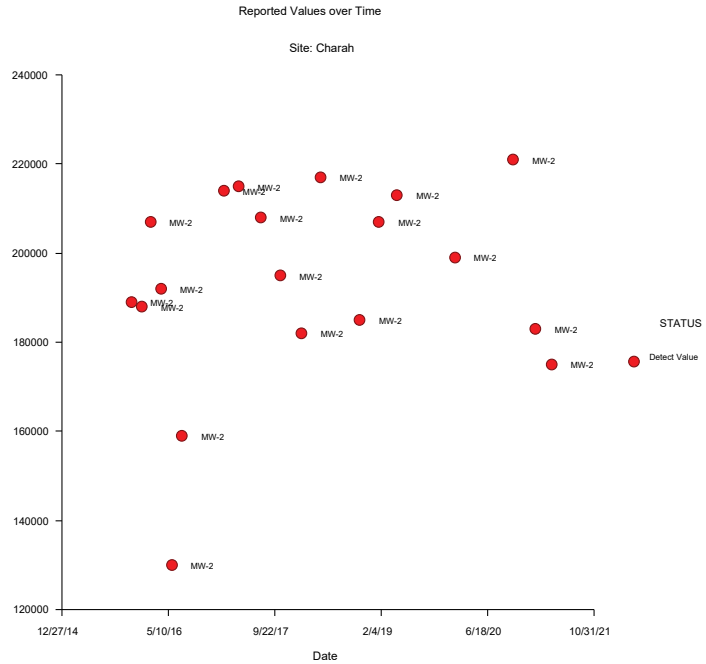


Figure 8: Lithium Concentrations (ug/L) vs. Time (MW-2)

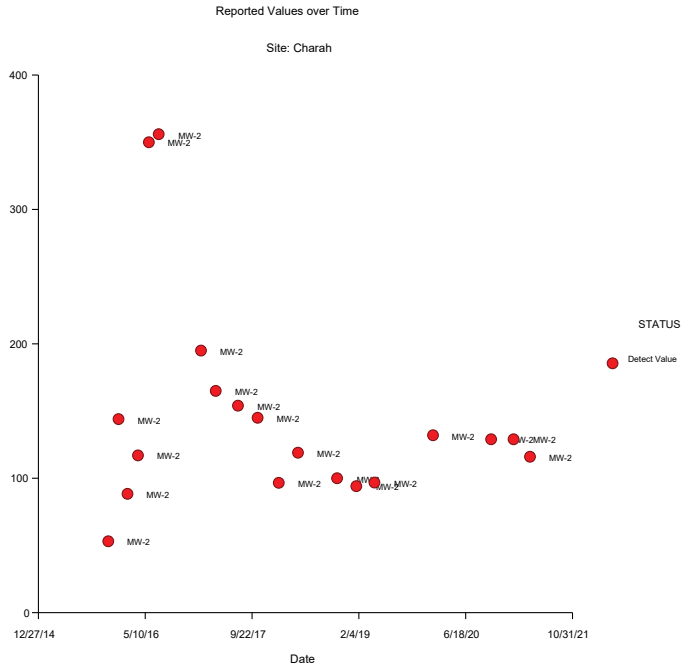


Figure 9: Molybdenum Concentrations (ug/L) vs. Time (MW-2)

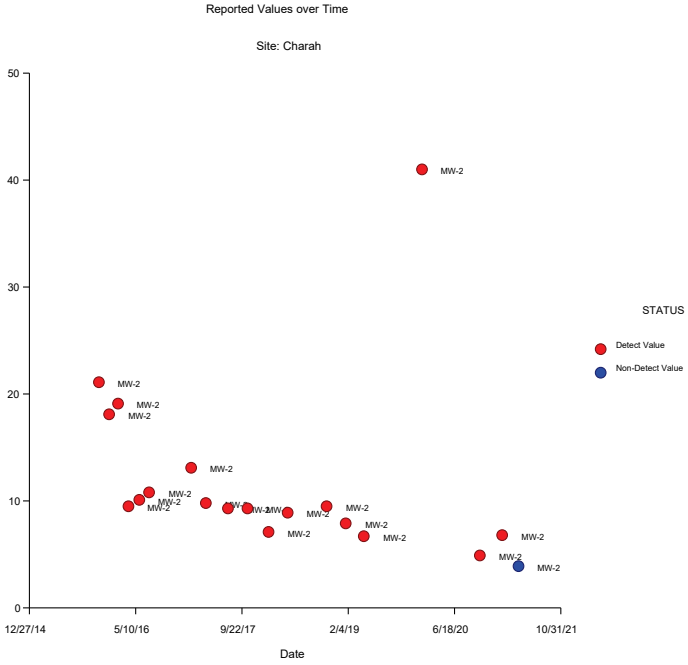


Figure 10: Lithium Concentrations (ug/L) vs. Time (MW-3)

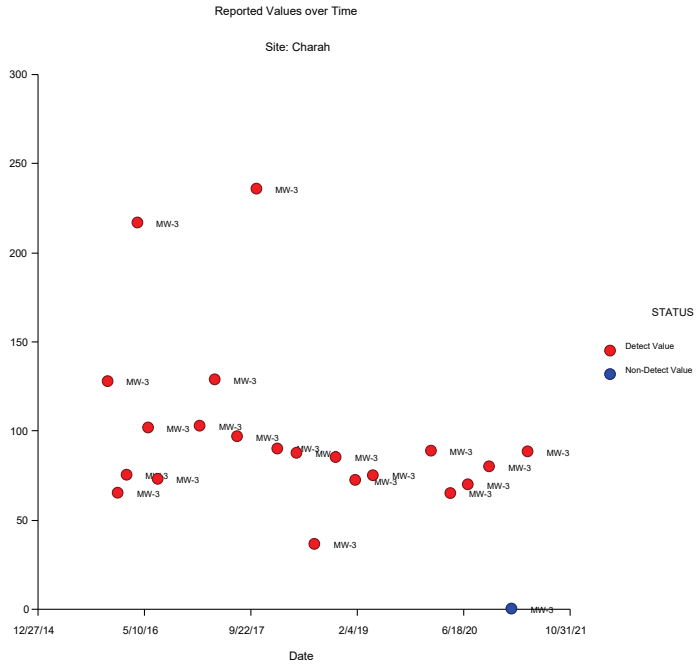


Figure 11: Molybdenum Concentrations (ug/L) vs. Time (MW-3)

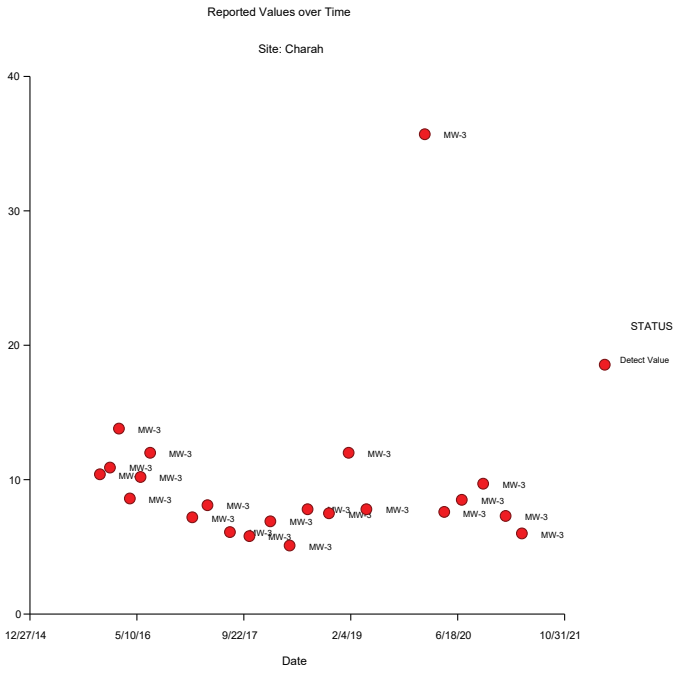


Figure 12: Boron Concentrations (ug/L) vs. Time (MW-4)

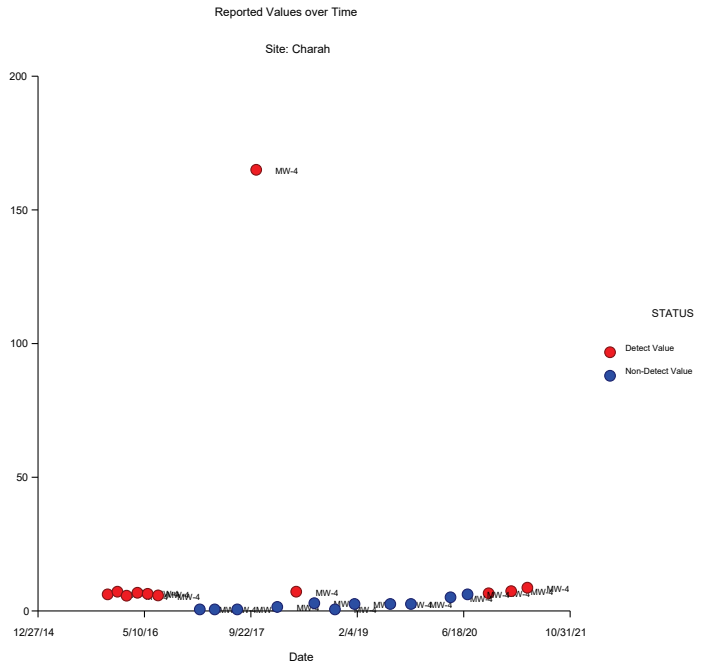


Figure 13: Nickel Concentrations (ug/L) vs. Time (MW-4)

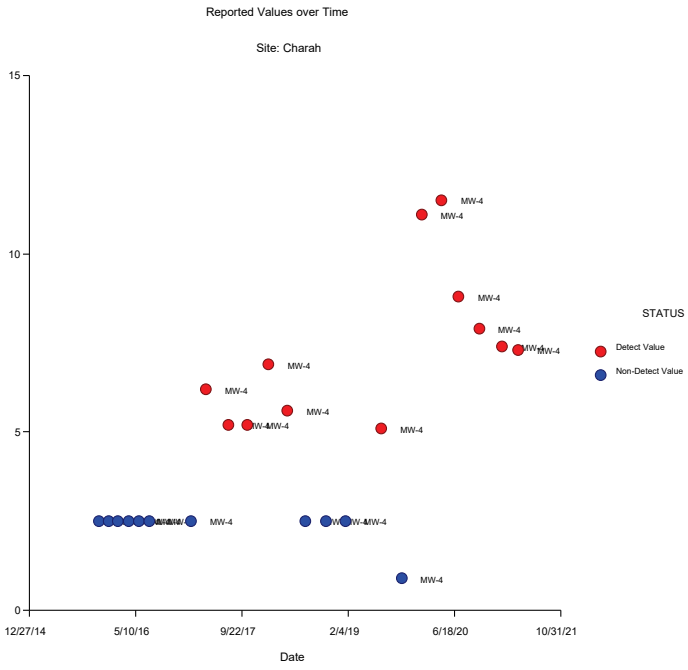


Figure 14: Boron Concentrations (ug/L) vs. Time (MW-5)

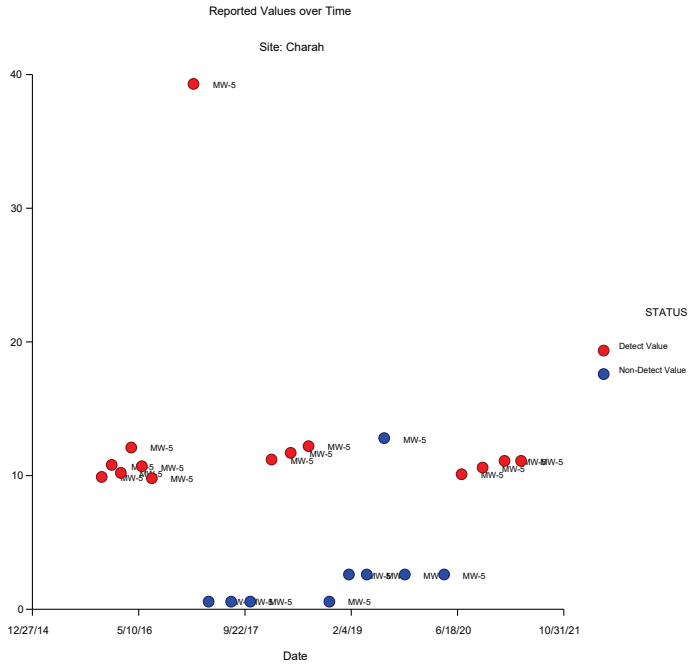


Figure 15: Total Dissolved Solids Concentrations (mg/L) vs. Time (MW-5)

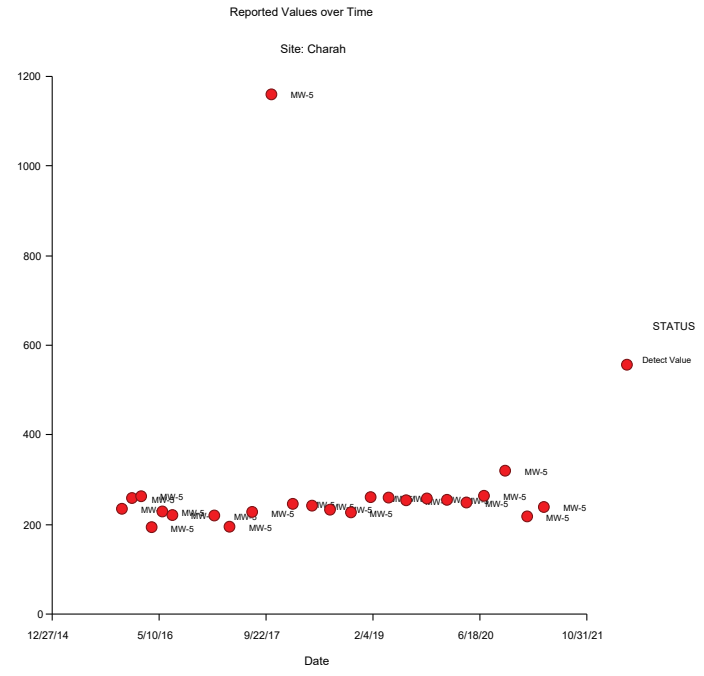


Figure 16: pH (Field) Concentrations (S.U.) vs. Time (MW-5)

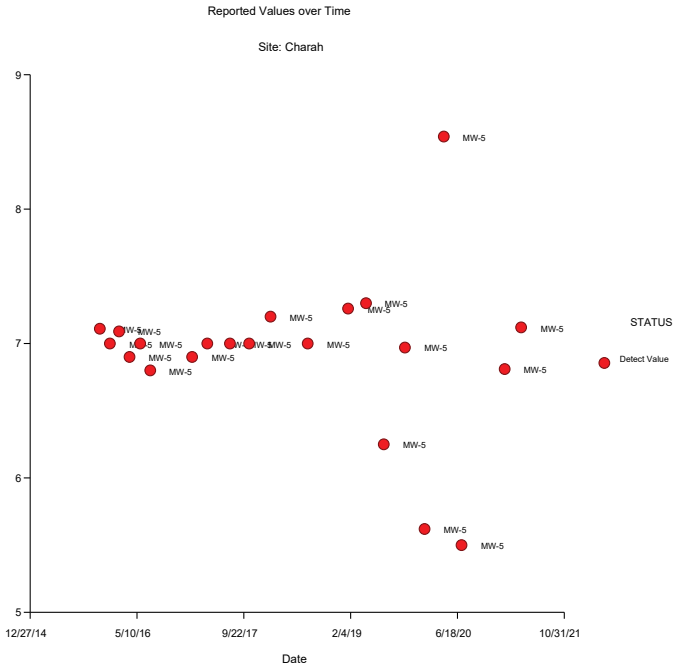


Figure 17: Chloride Concentrations (mg/L) vs. Time (MW-6)

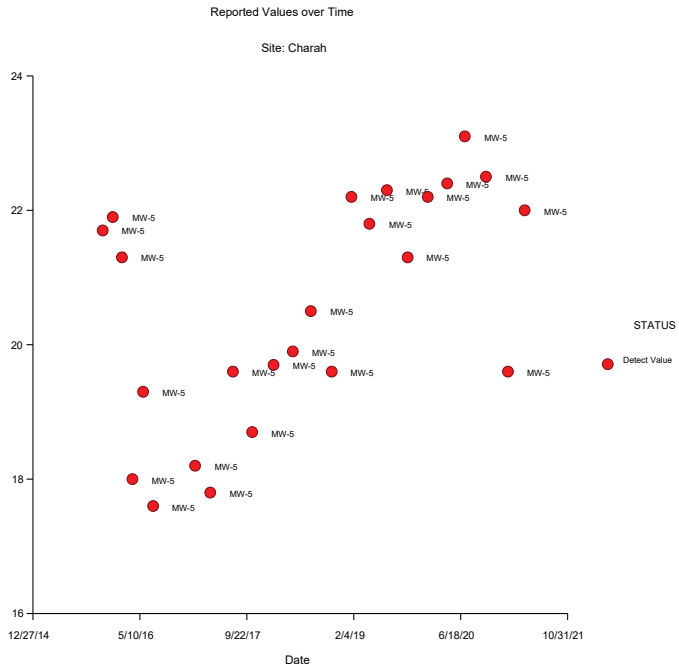


Figure 18: Fluoride Concentrations (mg/L) vs. Time (MW-7R)

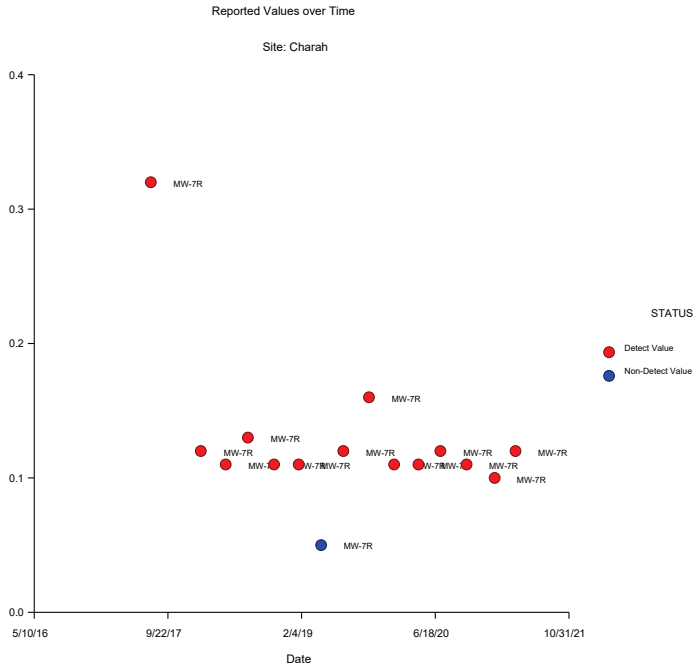


Figure 19: pH (Field) Concentrations (S.U.) vs. Time (MW-7R)

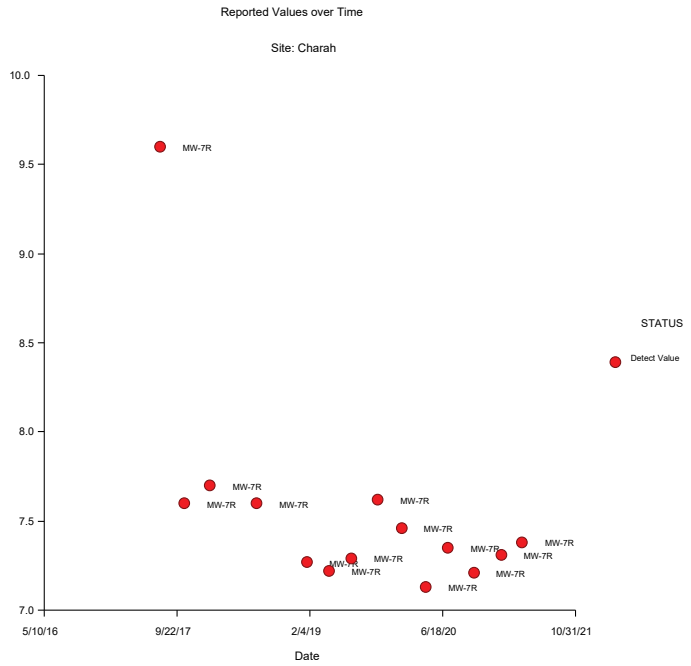


Figure 20: Sulfate Concentrations (mg/L) vs. Time (MW-7R)

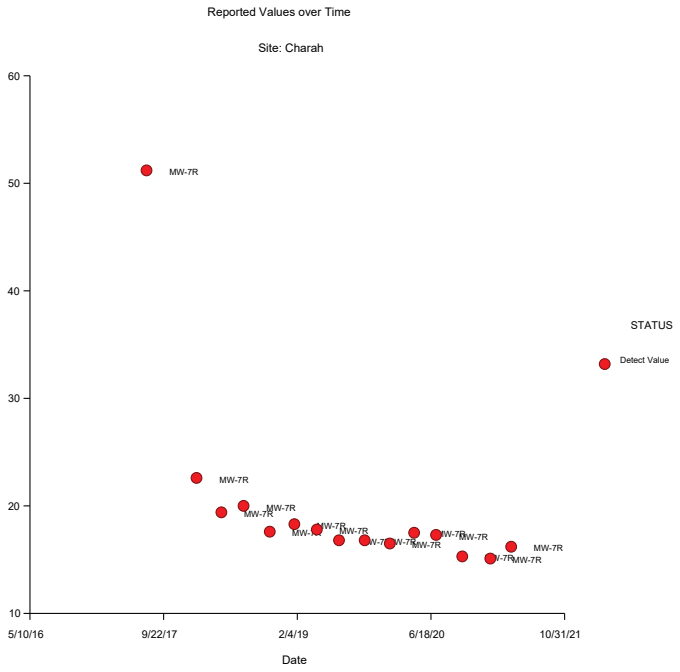


Figure 21: Nickel Concentrations (ug/L) vs. Time (MW-7R)

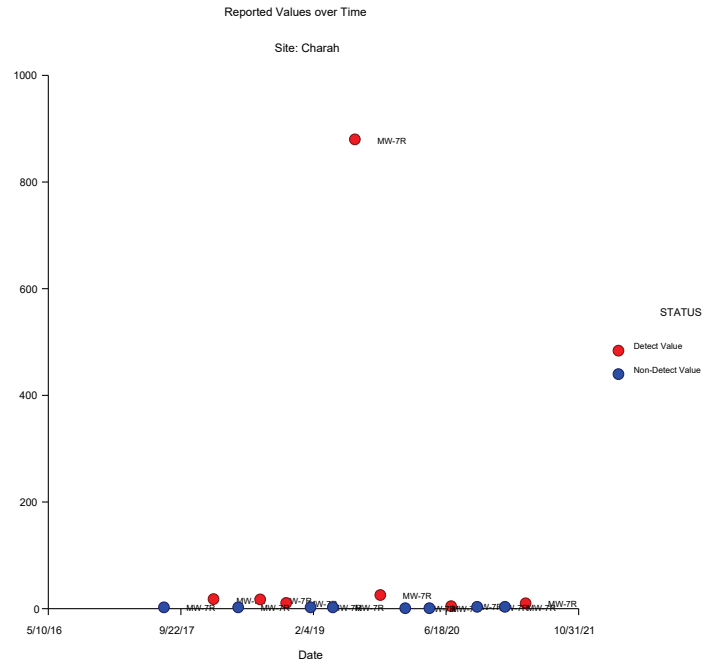


Figure 22: Chromium Concentrations (ug/L) vs. Time (MW-7R)

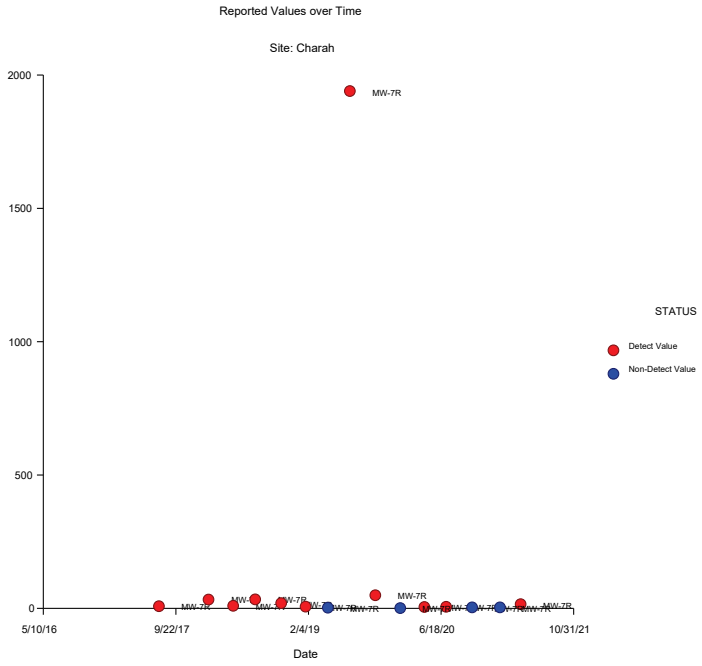


Figure 23: Total Dissolved Solids Concentrations (mg/L) vs. Time (MW-7R)

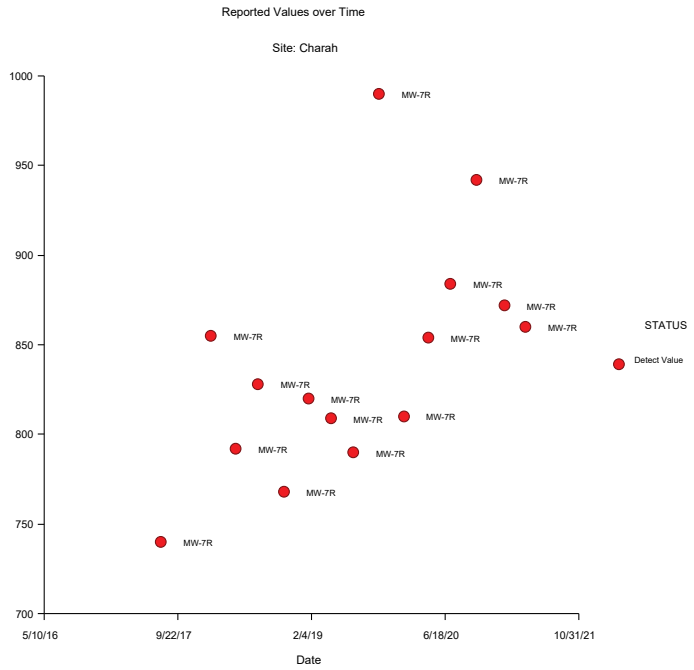
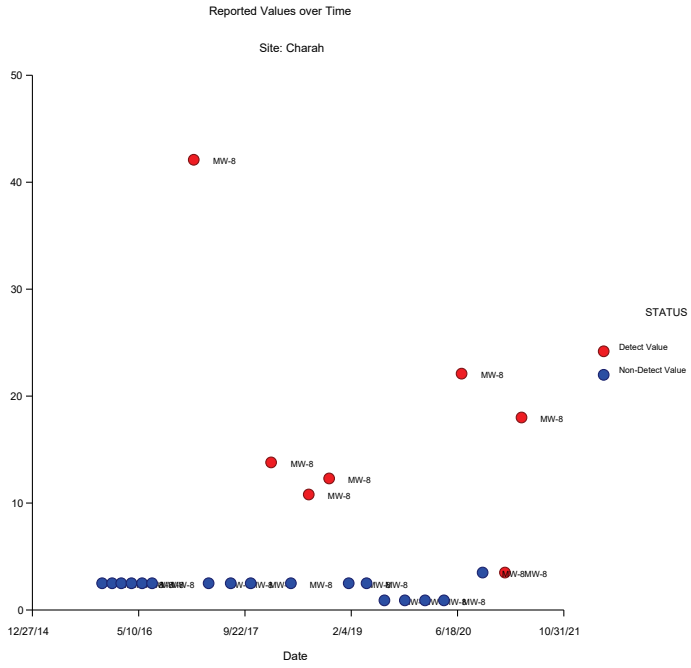


Figure 24: Nickel Concentrations (ug/L) vs. Time (MW-8)



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2021 Second Semi-Annual Detection Monitoring Report

Brickhaven No.2 Mine Tract “A” Structural Fill

Charah Solutions, Inc.

Moncure, Chatham County, North Carolina

January 31, 2022

HDR Engineering, Inc. of the Carolinas
440 S. Church Street, Suite 1200, Charlotte, NC 28202
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Appendix D – Electronic Data Deliverables (electronic only)

Appendix E – Statistical Analysis Memo

Select Acronyms

µg/L	micrograms per liter
BGS	below ground surface
BTOC	below top of casing
BTV	background threshold value
CAMA	North Carolina Coal Ash Management Act of 2014
CCP	coal combustion products
CFR	Code of Federal Regulations
DO	dissolved oxygen
DTW	depth-to-water
MDL	method detection limit
MLE	maximum likelihood estimate
MRL	method reporting limit
NCDENR	North Carolina Department of Environment and Natural Resources
NCDEQ	North Carolina Department of Environmental Quality
ND	Non-detects
NTU	Nephelometric turbidity units
ORP	oxidation-reduction potential
SSI	statistically significant increase
TD	total depth
TDS	total dissolved solids
TOC	top of casing
USCS	Unified Soil Classification System
USEPA	United States Environmental Protection Agency
VOC	volatile organic compounds

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1 Introduction

1.1 Purpose

The purpose of this *2021 Second Semi-Annual Detection Monitoring Report* is to summarize quarterly detection monitoring results conducted at the Brickhaven No.2 Mine Tract "A" Structural Fill site in Moncure, Chatham County, North Carolina between August 9 and 16, 2021 and November 15 and 19, 2021.

1.2 Regulatory Compliance

Operating under Facility Permit #1910-STRUT-2015, Charah is required to monitor groundwater and surface water quality at designated locations, in accordance with the following rules and regulations:

- North Carolina - Coal Ash Management Act (CAMA) of 2014 (Senate Bill 729).
- Water Quality Monitoring Plan, Brickhaven No.2 Mine Tract "A" Structural Fill, approved March 2015 (Buxton 2015a).
- North Carolina Department of Environment and Natural Resources (NCDENR)[1] Permit No. 1910-STRUC-2015, issued June 5, 2015.
- NCDENR Solid Waste Section Guidelines for Groundwater, Soil, and Surface Water Sampling, April 2008 including Groundwater Rules .1600.
- NCDENR Division of Water Management memorandum concerning electronic document submittal for routine groundwater and surface water monitoring, November 5, 2014.
- U.S. Environmental Protection Agency (USEPA) Region I, *Low Stress (low flow) Purging and Sampling Procedure for the Collection of Ground Water Samples from Monitoring Wells*, January 19, 2010.

Groundwater monitoring and sampling at the site is also conducted in general accordance with the USEPA's "Disposal of Coal Combustion Residuals from Electric Utilities" rule (CCR Rule).

On June 21, 2019, Charah received correspondence from the North Carolina Department of Environmental Quality (NCDEQ) Solid Waste Section requesting that Charah submit an assessment work plan in accordance with 15A NCAC 02L .0106 and 15A NCAC 02B .0211 and .0216. NCDEQ cited exceedances of North Carolina 2L Groundwater Protection Standards (2L Standards) for barium, chloride, chromium, cobalt, total dissolved solids (TDS), and vanadium, and exceedances of North Carolina Surface Water & Wetland Standards established under T15A NCAC 02B (2B Standards) for arsenic, cobalt, copper, lead, TDS, and zinc as cause for the plan. On behalf of Charah, HDR submitted a *Groundwater and Surface Water Assessment Monitoring Plan* to NCDEQ on August 16, 2019 (HDR 2019). The plan was approved by NCDEQ in correspondence dated September 16, 2019 and amended on October 4, 2019.

[1] On September 18, 2015, the North Carolina Department of Environment and Natural Resources (NCDENR) became the North Carolina Department of Environmental Quality (NCDEQ). Both naming conventions are used in this report, as appropriate.

Between November 2019 and July 2020, Charah implemented the monitoring plan, which was documented in an Assessment Monitoring Report dated July 24, 2020 (HDR 2020).

On April 9, 2021, Charah received a response letter to the Assessment Monitoring Report from NCDEQ requiring additional activities. During the first and second quarters of 2021, HDR addressed these requirements, as summarized below, and provided responses to NCDEQ comments in a Response Letter dated May 7, 2021.

NCDEQ Comment	Charah Response	Date of Action
Redevelop (or replace) monitoring wells MW-2 and MW-3 to improve recharge into the wells	Wells MW-2 and MW-3 were redeveloped for 6 to 7 hours via surging	March 18 and 19, 2021
Collect a surface water sample (SW-6) upstream of SW-1 to delineate off-site impacts to surface water	Collected surface water sample SW-6 upstream of SW-1 at the Charah property line	Initial sample collected 2Q2021 and each quarterly event thereafter
Reinstall previously dry monitoring wells MW-9 and MW-10 as close to the original locations as practicable	Reinstalled wells MW-9 and MW-10 at top of bedrock (36 feet and 47 feet bgs, respectively)	March 17, 2021
Install bedrock monitoring wells adjacent to MW-2 and at a second location approved by NCDEQ	Installed well MW-2D to 144 feet bgs and well MW-11D to 65 feet bgs	March 19, 2021 (MW-2D) March 22, 2021 (MW-11D)

Per the approved Water Quality Monitoring Plan, and additional requirements set forth by NCDEQ since 2015, Charah is required to monitor the following network and report the results semi-annually.

Sampling Locations	Date Initiated	Purpose
MW-1 through MW-6, MW-7R, MW-8, and BG-1; SW-1 and SW-2; leachate	2015	Detection Monitoring
BG-2	2018	Detection Monitoring
MW-11; SW-3, SW-4, and SW-5	2020	Detection Monitoring
MW-2D, MW-9, MW-10, MW-11D; SW-6	2021	Detection Monitoring

Samples are analyzed for constituents listed in NCDEQ Solid Waste Appendix I (except volatile organic compounds [VOCs]) and II, 40 CFR 257 Appendix III, and 40 CFR 257 Appendix IV. On January 8, 2020, NCDEQ approved the discontinuation of Appendix I VOC analysis based on the historic non-detection of VOC constituents. Per the Water Quality Monitoring Plan, if sampling results indicate impacts to groundwater or surface water, Charah must notify NCDEQ within 14 days. If no impacts are observed, Charah must submit a report of the sampling results to NCDEQ with 120 days of the sampling event.

1.3 Site Location and Operation

The site is located approximately 4 miles southeast of Moncure, in Chatham County North Carolina (**Figure 1**). The owner of the site is Green Meadow, LLC (Green Meadow) and Charah Solutions, Inc. (Charah) is responsible for the operation and maintenance of the site. The mine property is approximately 301 acres in total; of which 145 acres is permitted for structural fill placement of coal combustion products (CCP).

The property located within the structural fill area was previously owned by General Shale Brick, Inc., which operated the site and an adjacent property as a mine beginning in 1985 for their

off-site brick manufacturing facility. Mined material was stockpiled and then transported approximately 3.5 miles south to Brickhaven, North Carolina for brick manufacturing.

The area immediately surrounding the site primarily consists of rural residential, commercial, industrial, wooded and agricultural property. According to information obtained from the Chatham County GIS website (October 2015), municipal water is available to the surrounding area.

Charah began CCP placement in the first composite liner containment system (Cell 1, Sub Cell 1A) on October 23, 2015. CCP placement has occurred in Cell 1, Cell 2, Cell 6A and Cell 6B. Charah has placed just over 7.3 million tons of CCP material in the structural fill. CCP materials (including fly ash, bottom ash, boiler slag, and/or flue gas desulfurization materials) were initially brought to the site by truck through October 2015 until transportation was changed to rail in January 2016. The site ceased accepting CCP on July 11, 2019 and closure of the structural fill concluded in January 2020. The CCP originated at the Duke Energy Carolinas Riverbend Steam Station and Duke Energy Progress L.V. Sutton Energy Complex (Sutton Plant) sites.

Leachate (i.e., product generated from the liquids present in the fill at the time of placement and/or stormwater that infiltrates the fill) is managed on-site through the collection, storage, and disposal of the resultant liquid. Green Meadow has approved pump and haul permits to dispose of leachate at the City of Sanford's Big Buffalo Creek Wastewater Treatment Plant and the Town of Spring Lake's South Harnett Regional Wastewater Treatment Plant.

1.4 Groundwater Monitoring System

The groundwater monitoring system was designed to provide background groundwater quality data prior to the placement of CCP in the structural fill and early detection of potential CCP constituents subsequent to CCP placement to be protective of human health and the environment. The groundwater monitoring system was originally comprised of 10 wells: eight wells are located downgradient/cross-gradient (MW-1, MW-2, MW-3, MW-4, MW-5, MW-6, MW-7R and MW-8) and two wells are considered to represent background groundwater quality (BG-1 and BG-2). Since 2015, the NCDEQ has required installation of additional monitoring wells (MW-9, MW-10, MW-11, MW-2D, and MW-11D) to further evaluate groundwater quality conditions.

Background monitoring well BG-1 was installed in July of 2015 near the entrance of the site along Moncure-Flatwood Road. This location was selected to provide groundwater quality data in an area of the site presumed to not be affected by historic or current usage. Upon statistical analysis of groundwater quality data collected pre- and post-CCP placement, concentrations of target constituents in well BG-1 appear to be anomalously low when compared to pre-CCP conditions elsewhere on-site. With approval from NCDEQ, Charah installed a second background well (BG-2) southwest of the structural fill in December 2018 to evaluate spatial variability of inorganic concentrations across the site.

Well MW-7R was installed in April of 2017 as a replacement for monitoring well MW-7, as documented and approved in the May 25, 2017 memorandum to the NCDEQ Solid Waste Section. Well MW-7 has temporarily remained onsite for water level gauging purposes only.

Well MW-11, located downgradient/cross-gradient, was installed in March 2020 during assessment monitoring. Monitoring wells MW-2D, MW-9, MW-10, and MW-11D, located downgradient/cross-gradient, were installed in March 2021. Well construction details and groundwater elevations for the August 2021 sampling event are presented in **Table 1.** Well construction details and groundwater elevations for the November 2021 sampling event are presented in **Table 2**.

1.5 Surface Water Monitoring System

Surface water sample locations SW-1 and SW-2 were included in the original sampling event in August 2015. Surface water sample locations SW-3 (background location) and SW-4 (on-site location) were proposed by Charah in the Groundwater and Surface Water Assessment Work Plan (dated August 16, 2019) in response to NCDEQ's request to delineate exceedances of surface water standards in surface water sample SW-1. Based on additional discussions with NCDEQ, surface water sample locations SW-5 and SW-6 were added to the monitoring program in 2020 to evaluate potential contribution of contaminants from off-site sources north and east of the structural fill.

1.6 Leachate Monitoring System

The leachate sample is collected from the on-site holding tank located just north of wells MW-11 and MW-11D.

Table 1: August 2021 Groundwater Elevations

Well ID	Northing[1]	Easting	TOC Elev. (ft.)	TD[2] (ft. BGS)	TD (ft. BTOC)	Screen Length (ft.)	Screened Interval (ft. BGS)	DTW (ft. BTOC)[3]	GW Elevation (ft. MSL)	Lithologic Unit[4]
BG-1	670898.50	1996348.25	228.19	41	43.55	15	26-41	9.39	218.80	Layered Rock/PWR*
BG-2	669278.99	1990476.10	194.23	23	25.82	10	13-23	12.34	181.89	Layered Rock/PWR*
MW-1	674737.98	1993417.69	280.08	72	74.80	15	57-72	56.36	223.72	Layered Rock/PWR*
MW-2	673677.07	1994537.54	231.76	48	50.15	15	33-48	24.02	207.74	Layered Rock/PWR*
MW-2D	673650.31	1994535.97	232.87	144	147.1	15	129-144	129.54	103.33	Bedrock*
MW-3	672474.63	1994834.76	222.56	40	42.56	15	25-40	8.29	214.27	PWR
MW-4	671326.48	1994974.40	217.13	23	25.34	10	13-23	8.67	208.46	Residuum/PWR
MW-5	671081.19	1993779.03	244.86	44	46.14	10	34-44	22.97	221.89	PWR
MW-6	671267.60	1992793.34	230.95	27	29.32	15	12-27	7.23	223.72	Residuum/PWR
MW-7	672306.28	1992642.35	231.71	15	17.18	10	5-15	16.21	215.50	Residuum/PWR
MW-7R	672221.96	1992702.98	242.22	36	38.23	10	26-36	20.17	222.05	Residuum/PWR
MW-8	673304.83	1992200.37	236.47	46	49.06	15	31-46	35.59	200.88	PWR
MW-9	672747.21	1993936.20	240.36	36	39.03	10	26-36	DRY	-	PWR
MW-10	672421.01	1993269.14	257.74	47	50.00	10	37-47	37.41	220.33	PWR
MW-11	670446.25	1993476.57	219.23	40	42.70	15	25-40	11.50	207.73	PWR
MW-11D	670447.41	1993466.72	219.40	65	67.38	15	50-65	7.93	211.47	Bedrock*

Notes:

1. Wells MW-4 (PZM-1), MW-5 (PZM-22) and MW-7 (PZM-27) were surveyed by Lawrence Surveying of Monroe, NC. Wells BG-1, BG-2, MW-1, MW-2, MW-3, MW-6, MW-8, MW-7R, MW-11, MW-2D, MW-9, MW-10, and MW-11D were surveyed by McAdams of Durham, NC. Well locations and elevations based on NAD 83 horizontal datum and NGVD88 vertical datum.
2. TD=total depth; BGS=below ground surface; TOC=top of casing; DTW = depth-to-water; BTOC = below top-of-casing; GW = groundwater; MSL = mean sea level.
3. DTW measurements obtained on August 9, 2021, to the nearest 0.01 foot with a water level meter.
4. * = interpreted lithologic unit based on relative drilling hardness and geologic judgment during well installation.

Table 2: November 2021 Groundwater Elevations

Well ID	Northing[1]	Easting	TOC Elev. (ft.)	TD[2] (ft. BGS)	TD (ft. BTOC)	Screen Length (ft.)	Screened Interval (ft. BGS)	DTW (ft. BTOC)[3]	GW Elevation (ft. MSL)	Lithologic Unit[4]
BG-1	670898.50	1996348.25	228.19	41	43.55	15	26-41	12.66	215.53	Layered Rock/PWR*
BG-2	669278.99	1990476.10	194.23	23	25.82	10	13-23	13.52	180.71	Layered Rock/PWR*
MW-1	674737.98	1993417.69	280.08	72	74.80	15	57-72	57.35	222.73	Layered Rock/PWR*
MW-2	673677.07	1994537.54	231.76	48	50.15	15	33-48	23.21	208.55	Layered Rock/PWR*
MW-2D	673650.31	1994535.97	232.87	144	147.14	15	129-144	136.10	96.77	Bedrock*
MW-3	672474.63	1994834.76	222.56	40	42.56	15	25-40	8.59	213.97	PWR
MW-4	671326.48	1994974.40	217.13	23	25.34	10	13-23	10.28	206.85	Residuum/PWR
MW-5	671081.19	1993779.03	244.86	44	46.14	10	34-44	25.18	219.68	PWR
MW-6	671267.60	1992793.34	230.95	27	29.33	15	12-27	8.16	222.79	Residuum/PWR
MW-7	672306.28	1992642.35	231.71	15	17.18	10	5-15	16.42	215.29	Residuum/PWR
MW-7R	672221.96	1992702.98	242.22	36	38.23	10	26-36	21.21	221.01	Residuum/PWR
MW-8	673304.83	1992200.37	236.47	46	49.06	15	31-46	35.90	200.57	PWR
MW-9	672747.21	1993936.20	240.36	36	39.03	10	26-36	DRY	-	PWR
MW-10	672421.01	1993269.14	257.74	47	50.00	10	37-47	36.54	221.20	PWR
MW-11	670446.25	1993476.57	219.23	40	42.70	15	25-40	12.89	206.34	PWR
MW-11D	670447.41	1993466.72	219.40	65	67.38	15	50-65	9.30	210.10	Bedrock*

Notes:

1. Wells MW-4 (PZM-1), MW-5 (PZM-22) and MW-7 (PZM-27) were surveyed by Lawrence Surveying of Monroe, NC. Wells BG-1, BG-2, MW-1, MW-2, MW-3, MW-6, MW-8, MW-7R, MW-11, MW-2D, MW-9, MW-10, and MW-11D were surveyed by McAdams of Durham, NC. Well locations and elevations based on NAD 83 horizontal datum and NGVD88 vertical datum.
2. TD=total depth; BGS=below ground surface; TOC=top of casing; DTW = depth-to-water; BTOC = below top-of-casing; GW = groundwater; MSL = mean sea level.
3. DTW measurements obtained on November 15, 2021, to the nearest 0.01 foot with a water level meter.
4. * = interpreted lithologic unit based on relative drilling hardness and geologic judgment during well installation.

1.7 Site Topography and Geographical Setting

Based on review of the 1993 USGS topographic quadrangle (**Figure 2**) and GIS mapping, the topography of the site and immediately surrounding area can be characterized by moderately rolling hills, which are dissected by dendritic creeks. Prior to mining by General Shale, a topographic ridge was present within the site, extending from the northwestern corner of the present-day structural fill toward the southeast. Thus, historic drainage was assumed to be to the north/northwest/west and to the northeast/east/southeast away from the ridge.

1.8 Geologic and Hydrogeologic Setting

1.8.1 Regional Geology

The site is located within the Piedmont physiographical province of North Carolina, which is a northeast-southwest trending region extending from New York to Alabama.

According to the 1985 North Carolina Geologic Map prepared by the North Carolina Geological Survey, the site is located in the Triassic Basin Belt of the Piedmont physiographic province. The basement rocks of the Triassic Basin Belt include conglomerate, sandstone, mudstone, limestone, coal, and shale. The majority of the site is located within the Sanford Formation which contains conglomerate, fanglomerate, sandstone, and mudstone. The far western portion of the site is located in the Cummock Formation which contains sandstone, mudstone, gray and black coal, and carbonaceous shale. The Triassic Basin is bounded by felsic metavolcanic rock within the Carolina Slate Belt approximately 6.5 miles to the northwest; and is contacted by metamorphosed granite and biotite gneiss and schist of the Raleigh Belt along a normal fault approximately 2.5 miles to the southeast. The Triassic Basin formations have been intruded by north northwest-south southeast trending igneous diabase dikes during the Jurassic Period (~144 to 208 Ma) and contain northeast-southwest trending normal faults. However, none of these faults were indicated to exist at the subject site on the 1985 geologic map (NCDENR 1985).

In the Piedmont, the bedrock is typically overlain by a mantle of weathered rock (residuum/saprolite), which has an average thickness of approximately 25 feet. The residuum/saprolite consists of varying amounts of unconsolidated clays, silts, and sands, with lesser amounts of rock fragments. Due to the range of the parent rock composition and the variable susceptibility to weathering of each rock type, the residuum/saprolite range widely in color, texture, and thickness. Generally, the residuum/saprolite is thickest near inter-stream divides (ridges) and thins toward stream beds. In profile, the residuum/saprolite normally grades from clayey soils near the land surface to sandier, partially weathered rock above competent bedrock (Buxton 2015a).

1.8.2 Site Geology

The geology of the site can be subdivided into six units which include fill, flood plain, soil horizon, residuum, partially weathered rock, and layered rock. These units generally grade downward from a soil horizon, to residuum, to partially weathered rock and finally layered rock. Fill materials were limited to the road bed and berm located around the east and west sides of

MW-4. Flood plain sediments were only identified at MW-4 on the southeast corner of the site. The following summary of site-specific units is based on boring logs originally included in the *Design Hydrogeologic Report* (Buxton 2016).

FILL

Fill materials were primarily identified in the road bed and berm located around the east and west sides near MW-4 and generally consisted of mottled reddish yellow, orange, brown, and light gray sandy silty clay with quartz gravel.

FLOOD PLAIN

Flood plain sediments were only located adjacent to MW-4 on the southeast corner of the site. Sediments were associated with a former adjacent intermittent tributary creek and can be generally characterized as mottled light gray fine sandy silty clay. The flood plain sediments were approximately 5 feet thick in this area and had been deposited above residuum. Based on geotechnical laboratory data, the flood plain sediments were identified as lean clay under the Unified Soil Classification System (USCS).

RESIDUUM

Residuum is characterized as mottled yellowish, brown, orange, and red silty clay and clayey silt. Root structures were common. Residuum was formed from the continued weathering and biologic reworking of saprolite, and ranges from 2 to 15 feet in thickness, when present. Based on geotechnical laboratory data, the residuum consisted of clayey sand, elastic silt, and lean clay and had a hydraulic conductivity of 2.86×10^{-7} cm/sec.

SAPROLITE

Saprolite is characterized as mottled (black and gray) red and reddish brown sandy silty clay with infrequent quartz gravel and cobbles. Saprolite is characteristically fissile, often breaking in horizontal sheets. Saprolite generally retains the remnant texture, structure, and mineral content of the rock from which it was formed and ranged from 5 to 15 feet in thickness. Saprolite had a standard penetration resistance of less than 100 blows per foot. Based on geotechnical laboratory data, the saprolite consisted of lean clay with hydraulic conductivities ranging from 7.69×10^{-8} cm/sec to 3.69×10^{-9} cm/sec.

PARTIALLY WEATHERED ROCK

Partially weathered rock is characterized as mottled (light green and purple) brown, reddish gray, and weak red silty clay and weathered mudstone, which are often fissile. Partially weathered rock generally retains the remnant texture, structure, and mineral content of the rock from which it was formed, and ranges from 5 to 40 feet in thickness. Partially weathered rock has an standard penetration resistance value of 100 blows per foot or greater and can generally be drilled with standard hollow-stem auger drilling technology. Based on geotechnical laboratory data, partially weathered rock consisted of lean clay. Hydraulic conductivity ranged from 2.433×10^{-4} cm/sec to 7.154×10^{-8} cm/sec, according to slug or recovery test data (for wells screened solely in partially weathered rock).

BEDROCK

Based on rock coring activities conducted near MW-7/MW-7R, visual inspection of the rock exposed on the north side of the MW-4 area, and rock fragments produced during installation of

wells MW-2D and MW-11D, bedrock at the site is primarily composed of reddish to light tan gray mudstone, cross-bedded muddy sandstone, muddy sandy conglomerate (rounded quartz gravel and cobbles), and gray to brown siltstone. Bedrock generally occurs as horizontally oriented and relatively thin intermittent layers (especially within the upper 15 feet of contacting layered rock) across the site. Bedrock contained horizontal to near vertical fracturing. Large fractures, oriented approximately N 40° to 60° E at 70 ° northwest, were observed in weathered mudstone immediately northeast of well MW-8. The occurrence of layered rock at the site was generally defined by auger refusal.

1.8.3 Regional Hydrogeology

The occurrence and movement of groundwater in the Piedmont physiographic province are within two separate but interconnected water-bearing zones that typically comprise one aquifer. A shallow water-bearing zone typically occurs within the residuum/saprolite and a deeper zone within the underlying bedrock.

Groundwater in the residuum/saprolite zone occurs in the interstitial pore spaces between the individual sediment grains. Groundwater in this zone generally flows from topographic highs to topographic lows. The occurrence and movement of groundwater in the underlying bedrock zone are controlled by joints and fractures within the bedrock. Groundwater within this deeper zone may occur under confined or semi-confined conditions, depending on the extent of fracturing at the saprolite/bedrock interface. Deeper groundwater movement is typically controlled by the distribution of openings in the bedrock and can be variable.

1.8.4 Site Hydrogeology

AUGUST 2021 EVENT

On August 9, 2021 groundwater elevations in shallow wells ranged from 181.89 feet (BG-2) to 223.72 feet (MW-1 and MW-6). Well MW-9 was dry during the August 2021 event.

Groundwater elevations in deep wells ranged from 103.33 feet (MW-2D) to 211.47 feet (MW-11D). Groundwater gauging data and elevations for the August 2021 event are presented in **Table 1**. Historic and current groundwater elevations are shown in **Figure 3**.

During the assessment monitoring phase of work, HDR developed a groundwater model using the groundwater modeling pre- and post-processing software Groundwater Modeling System (GMS) 10.3.4 (Aquaveo; https://www.aquaveo.com/software/gms-groundwater-modeling-system-introduction) as well as ArcMap 10.4.1 (ESRI; https://www.esri.com/en-us/arcgis/products/index). For the groundwater flow model, MODFLOW-2005 (Harbaugh 2005; https://pubs.usgs.gov/tm/2005/tm6A16/) was used to solve the groundwater-flow equations that quantify the flow of groundwater in three dimensions. Since the groundwater model was created, Charah has filled the mine pond adjacent to well MW-4 and closed the structural fill with an impermeable cap. Thus, the groundwater model was rerun to reflect these conditions by eliminating the pond as a groundwater discharge point and eliminating recharge within the structural fill.

A potentiometric surface map was created using groundwater measurements collected on August 9, 2021, via the kriging method of interpolating groundwater contours (**Figure 4**).

Regional groundwater flow near the site generally flows northeast to southwest. The results indicated groundwater highs at MW-1 and MW-6 with lows at wells MW-8, MW-11, and BG-2. Groundwater elevations for wells (MW-2D and MW-11D) were not used to contour flow for the water table aquifer during the August 2021 event.

NOVEMBER 2021 EVENT

On November 15, 2021, groundwater elevations in shallow wells ranged from 180.71 feet (BG-2) to 222.79 feet (MW-6). Well MW-9 was dry during the November 2021 event.

Groundwater elevations in deep wells ranged from 96.77 feet (MW-2D) to 210.10 feet (MW-11D). Groundwater gauging data and elevations for the November 2021 event are presented in **Table 2**. Historic and current groundwater elevations are shown in **Figure 3**.

Groundwater elevations from the November 2021 event were used to estimate groundwater contours using the kriging method. The results indicated groundwater highs at wells MW-1 and MW-6 with groundwater lows at wells MW-8, MW-11, and BG-2, consistent with data from the August 2021 event. Groundwater elevations for wells (MW-2D and MW-11D) were not used because they are installed in a deeper flow layer. Modeled groundwater contours using groundwater elevations derived from the November 15, 2021, gauging event are shown on **Figure 5**.

1.8.5 Horizontal Hydraulic Gradients

Horizontal hydraulic gradient is calculated by taking the difference in hydraulic head over the length of the flow path between two wells of similar construction and (generally) perpendicular to flow. Since groundwater flow direction can vary slightly between gauging events, it is difficult to install permanent monitoring wells in locations consistently perpendicular to groundwater flow. Horizontal hydraulic gradient was calculated between well pairs MW-5/MW-4 and MW-6/BG-2, recognizing that these well pairs are not truly perpendicular to flow, as shown on **Figure 4** and **Figure 5**. Groundwater wells from the northern portion of the site were not used to calculate the hydraulic gradient on site because they are most likely to have significant alterations to natural groundwater recharge caused by the structural fill cap. Hydraulic gradients at the site during the August 2021 and November 2021 sampling events are presented in **Table 3**.

Table 3: Horizontal Hydraulic Gradients

Sampling Event	Upgradient Well	Downgradient Well	Upgradient Groundwater Elevation (ft)	Downgradient Groundwater Elevation (ft)	Linear Flow Distance (ft)	Hydraulic Gradient
August 2021	MW-5	MW-4	221.89	208.46	1,220	0.011
	MW-6	BG-2	223.72	181.89	3,054	0.014
November 2021	MW-5	MW-4	219.68	206.85	1,220	0.011
	MW-6	BG-2	222.79	180.71	3,054	0.014

Notes:
1. Horizontal hydraulic gradients calculated by dividing the difference in hydraulic head between a well pair by the length of the flow path between the well pair. (*i*= dh/dl)
2. All well pairs assumed to be screened in same surficial aquifer unit
3. Groundwater elevations calculated using measurements obtained on August 9, 2021 (August) and November 15, 2021 (November)

1.8.6 Groundwater Flow Velocity

The average linear velocity, or seepage velocity, of groundwater between wells at the site was calculated using Darcy's Law, as follows:

$$V_S = \frac{Ki}{P_e}$$

Where:

V_s = seepage velocity
K = horizontal hydraulic conductivity
i = horizontal hydraulic gradient
P_e = effective porosity

Seepage velocities for groundwater were calculated using horizontal hydraulic gradients, as referenced above, average horizontal hydraulic conductivity and average effective porosity values. Average horizontal hydraulic conductivity (9.79×10^{-5} cm/sec) was calculated during geotechnical testing from on-site wells, except BG-2, MW-7R, and MW-11. Average effective porosity (0.093) values were calculated from geotechnical testing and from the literature where geotechnical data was not available (Buxton 2014; Sinhal and Gupta 2010).

Seepage velocity varies on a well-by-well basis and was calculated between the MW-5/MW-4 and MW-6/BG-2 well pairs, representing the two well pairs that are roughly perpendicular to the direction of groundwater flow and located farthest from the effects of the structural fill cap. Seepage velocity was calculated at 11.9 feet per year between MW-5 and MW-4, and 14.9 feet per year between MW-6 and BG-2 for the August 2021 sampling event. Seepage velocity was calculated at 11.4 feet per year between MW-5 and MW-4 and 15.0 feet per year between MW-6 and BG-2 for the November 2021 sampling event. Flow rates listed above are estimations; actual rates will vary across the site with local hydrogeologic conditions. Seepage velocities are shown in **Table 4**.

Table 4: Seepage Velocity

Well Pair	Seepage Velocity (ft/yr)	
	Aug-21	Nov-21
MW-5/MW-4	11.9	11.4
MW-6/BG-2	14.9	15.0

2 Field Procedures

2.1 Groundwater Sampling

2.1.1 August 2021 Event

HDR collected groundwater samples from monitoring wells MW-1, MW-2, MW-2D, MW-3, MW-4, MW-5, MW-6, MW-7R, MW-8, MW-10, MW-11, MW-11D, BG-1, and BG-2 between August 9 and 16, 2021 (**Figure 6**). Well MW-9 was dry and not sampled.

Purging was conducted via low-flow methods and was considered complete when the depth to water and field parameters had stabilized in accordance with the targets specified below.

- Turbidity (10% for values greater than 10 nephelometric turbidity units (NTU) (if three turbidity values are less than 10 NTU, the values are considered stabilized)
- Dissolved oxygen (DO) (10% for values greater than 2.0 mg/L, if DO values are below 2.0 mg/L, values are considered stable if three readings are within +/- 0.2 mg/L. If three DO values are less than 0.5 mg/L, the values are considered stabilized)
- Specific conductance (5%)
- Temperature (3%)
- pH (± 0.1 unit)
- Oxygen reduction potential (ORP) (± 20 millivolts)

In cases where water level in the well would not stabilize, the well was pumped for as long as possible leaving enough water in the water column to fill groundwater sample bottles. Note that MW-2D had elevated turbidity during purging, was pumped dry, and was sampled with a disposable bailer. An equipment blank sample was collected by pouring lab provided deionized (DI) water over a decontaminated water level meter. Field data sheets are provided in **Appendix A**.

Non-disposable sampling equipment was decontaminated after each use by washing in a Liqunox® detergent solution followed by a tap-water rinse. Purge water was discharged to the ground surface adjacent to each well.

Samples were transferred under chain of custody procedures to Pace Analytical Services, LLC (Pace) for analysis. Sample handling and custody were performed in accordance with the USEPA Guidance for Field Samplers.

2.1.2 November 2021 Event

Smith and Gardner (S&G) conducted the low-flow purging method on monitoring wells MW-1, MW-2, MW-3, MW-4, MW-5, MW-6, MW-7R, MW-8, MW-10, MW-11, MW-11D, BG-1, and BG-2

during the November 2021 sampling event. Once S&G stabalized the wells, HDR collected groundwater samples from each monitoring well. (**Figure 6**). Well MW-2D was not sampled due to equipment malfunction that could not be remedied during the sampling event. Well MW-9 was dry and not sampled. An equipment blank sample sample was collected by pouring lab provided deionized water over a S&G decontaminated water level meter.

Purging and sampling methods were consistent with the methods described in **Section 2.1.1**. Field data sheets are provided in **Appendix A**.

2.2 Surface Water Sampling

Surface water samples were collected from locations outside of the structural fill boundary to evaluate potential groundwater to surface water interaction. Surface water locations SW-1, SW-2, SW-4, SW-5, and SW-6 were sampled during the August and November 2021 events. Note that locations SW-1, SW-2, SW-4, and SW-6 were sampled from stagnant water; thus results may not reflect true surface water conditions. Location SW-3 was dry and not sampled during the August and November 2021 events. Surface water sampling locations are described as follows:

- SW-1 was sampled approximately 500 feet south of MW-4, outside of the property boundary, from an unnamed tributary of Gulf Creek.
- SW-2 was sampled south and adjacent to the rail spur west of the structural fill from an unnamed tributary of Shaddox Creek.
- SW-3 was located approximately 1,100 feet southwest of SW-2, outside of the property boundary, from an unnamed tributary of Shaddox Creek.
- SW-4 was sampled approximately 850 feet south of MW-11 from an unnamed tributary of Gulf Creek.
- SW-5 was sampled approximately 1,600 feet southeast of SW-4, outside the property boundary, west of Moncure-Flatwood Road, from an unnamed tributary of Gulf Creek.
- SW-6 was sampled approximately 350 feet north of MW-4 from an unnamed tributary of Gulf Creek.

Prior to sample collection, field parameters (temperature, specific conductance, DO, pH, turbidity, and ORP) were measured with a water quality meter and recorded on field data sheets (**Appendix A**). Surface water sampling locations are shown on **Figure 6**.

2.3 Leachate Sampling

One leachate grab sample (leachate) was collected from the on-site holding tanks (**Figure 6**) during the August and November 2021 events.

3 Water Quality

3.1 Background Site Conditions

Two groundwater sampling events were conducted prior to CCP placement (August and October 2015). The background sampling events consisted of sample collection and analysis

from nine monitoring wells (MW-1 through MW-8 and BG-1) and two surface water sample locations (SW-1 and SW-2).

During these initial background monitoring events, chloride, pH, TDS, and vanadium were detected at concentrations that exceeded their 2L Standard or interim maximum allowable concentration (IMAC) in groundwater samples collected from background monitoring well BG-1. Antimony, barium, chloride, chromium, cobalt, pH, TDS, and vanadium were detected at concentrations that exceeded their respective 2L Standards or IMACs in other monitoring wells prior to ash placement. Additional target constituents were detected in the samples from well BG-1 and other wells; however, these concentrations did not exceed applicable standards.

Copper and cobalt concentrations that exceeded their respective 2B Standards were reported in surface water samples collected during the initial background monitoring events, prior to CCP placement. Additionally, all USEPA Appendix III constituents were detected in the surface water samples collected prior to CCP material placement, but at concentrations below their respective 2B Standards (if applicable).

During the first monitoring event (August 2015), bromodichloromethane and dibromochloromethane were detected at concentrations above their respective 2L Standards in groundwater samples collected from MW-2, MW-3, and MW-7. VOCs, including trihalomethanes, are not present naturally at the site. These detections are attributed to the use of municipal water during previous well development activities. VOCs were not detected above laboratory method detection limits (MDLs) in any subsequent (second through eighth) background sampling events.

A detailed discussion of background groundwater conditions can be found in the *2016 Background Sampling Report* (HDR 2016b). Additional discussion of the statistical results can be found in **Section 4** of this report for a better understanding of predictive limits for the background well locations (BG-1 and BG-2), as well as interwell interactions.

3.2 Groundwater Analytical Results

3.2.1 August 2021 Event

Concentrations of the following constituents exceeded 2L Standards or IMACs in one or more wells during the August 2021 sampling event: antimony, arsenic, barium, chloride, pH, sulfate, and TDS. Four constituents were reported with method reporting limits (MRL) that exceeded the IMAC (antimony, cobalt, thallium, and vanadium). The antimony MRL was 5.0 µg/L, and the IMAC is 1.0 µg/L. The cobalt MRL was 5.0 µg/L, and the IMAC is 1 µg/L. The thallium MRL was 0.47 µg/L and the IMAC is 0.2 µg/L. The vanadium MRL was 5.0 µg/L and the IMAC is 0.3 µg/L. Concentrations of the following constituents exceeded background threshold values (BTVs) in one or more wells during the August 2021 sampling event: arsenic, barium, boron, calcium, chloride, chromium, fluoride, lithium, molybdenum, nickel, pH, radium-228, combined radium, sulfate, and TDS.

Nine constituents were reported with MRLs that exceeded the BTV (antimony, arsenic, beryllium, cadmium, chromium, cobalt, selenium, nickel, and silver). The antimony MRL was 5.0

µg/L, and the BTV is 3.90 µg/L. The arsenic MRL was 10.0 µg/L, and the BTV is 4.8 µg/L. The beryllium MRL was 1.0 µg/L, and the BTV is 0.700 µg/L. The cadmium MRL was 1.0 µg/L, and the BTV is 0.500 µg/L. The chromium MRL was 5.0 µg/L, and the BTV is 3.70 µg/L. The cobalt MRL was 5.0 µg/L, and the BTV is 3.60 µg/L. The selenium MRL was 10.0 µg/L, and the BTV is 5.00 µg/L. The nickel MRL was 5.0 µg/L, and the BTV was 3.50 µg/L. The silver MRL was 5.0 µg/L, and the BTV was 2.50 µg/L.

- Beryllium, cadmium, cobalt, copper, lead, mercury, selenium, silver, thallium, vanadium, and zinc were not detected above the MRL.
- Arsenic exceeded the 2L Standard of 10 µg/L, and the BTV of 4.80 µg/L in well MW-11D.
- Barium exceeded the 2L Standard of 700 µg/L in wells MW-2D and MW-8. Barium exceeded the BTV of 443 µg/L in wells MW-2D, MW-3, and MW-8.
- Boron exceeded the BTV of 56.5 µg/L in well MW-11D.
- Calcium exceeded the BTV of 124,000 µg/L in the following wells:MW-1, MW-2, and MW-3.
- Chloride exceeded the 2L Standard of 250 mg/L in the following wells: BG-2, MW-1, MW-2, MW-2D, MW-3, MW-4, MW-7R, MW-8, and MW-11D. Chloride concentrations exceeded the BTV of 344 mg/L in the following wells: MW-1, MW-2, MW-2D, MW-3, MW-4, and MW-11D.
- Chromium exceeded the BTV of 3.70 µg/L in well MW-2.
- Field-measured pH values did not fall within 2L Standard range of 6.5–8.5 standard units (SU) in samples collected from the following wells: MW-4, MW-6, and MW-11D. pH values did not fall within BTV range of 5.88–7.26 SU in samples collected from the following wells: MW-2, MW-2D, MW-3, MW-7R, MW-10, and MW-11D.
- Fluoride exceeded the BTV of 0.254 mg/L in the following wells: MW-3, MW-4, MW-5, MW-6, MW-10, and MW-11D; however, fluoride did not exceed the 2L Standard.
- Lithium exceeded the BTV of 48.1 µg/L in the following wells: MW-2, MW-3, MW-4, and MW-11D.
- Molybdenum exceeded the BTV of 13.6 µg/L in the following wells: MW-2D, MW-10, and MW-11D.
- Nickel exceeded the BTV of 3.50 µg/L in the following wells: MW-2 and MW-2D; however, nickel did not exceed the 2L Standard.
- Radium-228 exceeded the BTV of 1.29 picocuries per liter (pCi/L) in the following wells: MW-2, MW-2D, and MW-10
- Combined radium exceeded the BTV of 2.09 pCi/l in well MW-2.
- Sulfate exceeded the 2L Standard of 250 mg/L, and the BTV of 182 mg/L, in well MW-11D.
- TDS exceeded the 2L Standard of 500 mg/L in each well sampled except MW-5, MW-10, and MW-11. TDS exceeded the BTV of 1,270 mg/L in the following wells: MW-1, MW-2, MW-2D, MW-3, and MW-11D.

Analytical results are presented in **Table 5**. Concentration versus time plots generated for two constituents (chloride and TDS) with the most frequent detections and/or exceedances are included in **Appendix B**.

The laboratory report for the August 2021 sampling event is provided in **Appendix C**. Electronic data deliverables are provided in **Appendix D**.

3.2.2 November 2021 Event

Concentrations of the following constituents exceeded 2L Standards or IMACs in one or more wells during the November 2021 sampling event: barium, chloride, pH, TDS, and vanadium. Four constituents were reported with method reporting limits (MRL) that exceeded the IMAC (antimony, cobalt, thallium, and vanadium). The antimony MRL was 5.0 µg/L, and the IMAC is 1.0 µg/L. The cobalt MRL was 5.0 µg/L, and the IMAC is 1 µg/L. The thallium MRL was 0.47 µg/L, and the IMAC is 0.2 µg/L. The vanadium MRL was 5.0 µg/L and the IMAC is 0.3 µg/L.

Concentrations of the following constituents exceeded the BTVs in one or more wells during the November 2021 sampling event: barium, calcium, chloride, chromium, combined radium, copper, fluoride, lithium, molybdenum, pH, radium-226, radium-228, and TDS.

Ten constituents were reported with MRLs that exceeded the BTV (antimony, arsenic, beryllium, cadmium, chromium, cobalt, fluoride, selenium, nickel, and silver). The antimony MRL was 5.0 µg/L, and the BTV is 3.90 µg/L. The arsenic MRL was 10.0 µg/L, and the BTV is 4.8 µg/L. The beryllium MRL was 1.0 µg/L, and the BTV is 0.700 µg/L. The cadmium MRL was 1.0 µg/L, and the BTV is 0.500 µg/L. The chromium MRL was 5.0 µg/L, and the BTV is 3.70 µg/L. The cobalt MRL was 5.0 µg/L, and the BTV is 3.60 µg/L. The fluoride MRL was 1.0 µg/L, and the BTV was 0.254 µg/L. The selenium MRL was 10.0 µg/L, and the BTV is 5.00 µg/L. The nickel MRL was 5.0 µg/L, and the BTV was 3.50 µg/L. The silver MRL was 5.0 µg/L, and the BTV was 2.50 µg/

- Antimony, arsenic, beryllium, cadmium, cobalt, lead, mercury, nickel, selenium, silver, and thallium were not detected above the MRL.
- Barium exceeded the 2L Standard of 700 µg/L, and the BTV of 443 µg/L, in wells MW-3 and MW-8.
- Calcium exceeded the BTV of 124,000 µg/L in wells MW-1, MW-2, and MW-3.
- Chloride exceeded the 2L Standard of 250 mg/L in the following wells: MW-1, MW-2, MW-3, MW-4, MW-7R, and MW-8. Chloride exceeded the BTV of 344 mg/L in the following wells: MW-1, MW-2, MW-3, and MW-4.
- Chromium exceeded the BTV of 3.70 µg/L in wells MW-2, and MW-10; however, chromium did not exceed the 2L Standard.
- Copper exceeded the BTV of 0.00114 mg/L in samples collected from the following wells: MW-2, MW-3, MW-4, MW-6, MW-11, and MW-11D; however, copper did not exceed the 2L Standard.
- Field-measured pH values did not fall within 2L Standard range of 6.5-8.5 SUs in samples collected from the following wells: BG-1, MW-4, MW-6, and MW-11D. The pH value did not fall within the BTV range of 5.88-7.26 SUs in samples collected from the following wells: MW-2, MW-3, MW-7R, MW-10, and MW-11D.

- Fluoride exceeded the BTV of 0.254 mg/L in the following wells: MW-3, MW-4, MW-5, MW-6, MW-10, and MW-11D; however, fluoride did not exceed the 2L Standard.
- Lithium exceeded the BTV of 48.1 µg/L in the following wells: MW-2 and MW-3.
- Molybdenum exceeded the BTV of 13.6 µg/L in the following wells: MW-10 and MW-11D.
- Radium-226 exceeded the BTV of 1.22 pCi/L in wells MW-2 and MW-3.
- Radium-228 exceeded the BTV of 1.29 pCi/L in well MW-2.
- Combined radium exceeded the BTV of 2.09 pCi/L in wells MW-2 and MW-3.
- TDS exceeded the 2L Standard of 500 mg/L in all wells sampled except MW-5 , MW-10, MW-11, and MW-11D. TDS exceeded the BTV of 1,270 mg/L in the following wells: MW-1, MW-2, and MW-3.
- Vanadium exceeded the IMAC of 0.3 µg/L in well BG-1.

Analytical results are presented in **Table 5**. Concentration versus time plots generated for two constituents (chloride and TDS) with the most frequent detections and/or exceedances are included in **Appendix B**.

The laboratory report for the November 2021 sampling event is provided in **Appendix C**. Electronic data deliverables are provided in **Appendix D**.

The presence of naturally occurring inorganic constituents above regulatory criteria is common in North Carolina due to various geologic conditions. The presence of naturally occurring metals is discussed in more detail in the *Initial Background Groundwater & Surface Water Monitoring Event* (Buxton 2015c).

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Table 5: Analytical Results August 2021 and November 2021

Analyte	CAS Number	2L Standard / IMAC	BTV (2Q2021)	Groundwater Analysis																																		Quality Control				Surface Water Analysis														Leachate Analysis	
				BG-1		BG-2		MW-1		MW-2		MW-2D		MW-3		MW-4		MW-5		MW-6		MW-7R		MW-8		MW-9		MW-10		MW-11		MW-11D		EQBL		DUP (MW-6)		SW-1		SW-2		SW-3		SW-4		SW-5		SW-6		2B Standard	LEACHATE	
				Aug-21	Nov-21	Aug-21	Nov-21	Aug-21	Nov-21	Aug-21	Nov-21	Aug-21	Nov-21	Aug-21	Nov-21	Aug-21	Nov-21	Aug-21	Nov-21	Aug-21	Nov-21	Aug-21	Nov-21	Aug-21	Nov-21	Aug-21	Nov-21	Aug-21	Nov-21	Aug-21	Nov-21	Aug-21	Nov-21	Aug-21	Nov-21	Aug-21	Nov-21	Aug-21	Nov-21	Aug-21	Nov-21	Aug-21	Nov-21	Aug-21	Nov-21	Aug-21	Nov-21	Aug-21	Nov-21	Aug-21	Nov-21	Aug-21	Nov-21		Aug-21	Nov-21
EPA APPENDIX III																																																								
Boron (µg/l)	7440-42-8	700	56.5	<50.0	<50.0	12.0 J	15.6 J	<50.0	<50.0	42.7 J	39.7 J	<50.0	NT	28.5 J	27.2 J	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	8.6 J	Dry	Dry	20.4 J	20.8 J	12.8 J	15.1 J	**109**	50.9	12.5 J	**165**	**58.7**	11.0 J	<50.0	16.2 J	16.5 J	11.0 J	Dry	Dry	16.9J	8.6 J	10.3 J	<50.0	10.3 J	<250	NE	3,390	3,190
Calcium (µg/l)	7440-70-2	NE	124,000	24,100	27,500	123,000	119,000	**227,000**	**247,000**	**156,000**	**185,000**	96,800	NT	**166,000**	**183,000**	58,900	62,000	10,100	9,280	34,200	33,900	91,600	91,100	95,700	101,000	Dry	Dry	17,700	21,500	23,200	25,400	94,400	19,100	<100	8,140	32,900	34,400	6,360	12,200	20,700	22,900	Dry	Dry	6,790	7,870	5,480	5,560	6,560	9,860	NE	264,000	<500
Chloride (mg/l)	16887-00-6	250	344	199	222	260	239	**807**	**875**	**977**	**1,090**	**752**	NT	**1,040**	**1,080**	**398**	**423**	19.1	19.0	177	185	266	279	307	307	Dry	Dry	29.0	29.4	142	132	**538**	103	<1.0	5.0	177	186	<10.0	6.5	15.8	37.8	Dry	Dry	3.5	4.8	<10.0	5.9	<10.0	4.6	250	18.3	18.6
Fluoride (mg/l)	16984-48-8	2	0.254	0.15	0.18	0.23	0.19	0.15	0.17	0.22	<0.10	<0.10	NT	**0.31**	**0.39**	**0.27**	**0.34**	**0.46**	**0.58**	**0.30**	**0.37**	0.11	0.13	0.067 J	0.075 J	Dry	Dry	**0.46**	**0.54**	0.14	0.18	**0.49**	**0.52**	<0.10	**0.33**	**0.32**	**0.38**	<1.0	0.15	0.19	0.12	Dry	Dry	0.12	0.057 J	<1.0	0.14	0.52 J	0.34	1.8	0.18	0.27
pH (standard units)	pH	6.5-8.5	5.88 - 7.26	6.51	6.31	6.96	6.78	6.71	6.66	**7.99**	**7.56**	**7.48**	NT	**7.54**	**7.37**	6.37	6.21	7.09	6.70	6.45	6.28	**7.57**	**7.31**	7.23	7.09	Dry	Dry	**7.89**	**7.79**	6.64	6.61	**8.92**	**8.59**	-	-	6.45	6.28	6.40	6.49	7.36	6.59	Dry	Dry	6.83	6.47	6.61	6.69	6.21	7.64	6.0-9.0	7.30	7.84
Sulfate (mg/l)	14808-79-8	250	182	18.3	18.8	181	122	5.4	6.0	75.8	75.1	1.0	NT	20.9	20.7	9.9	10.3	3.6	3.6	25.1	26.1	14.2	14.5	6.6	6.9	Dry	Dry	5.7	8.0	1.8	2.1	**523**	<1.0	<1.0	3.0	25.1	26.4	<1.0	<1.0	7.8	10.3	Dry	Dry	6.6	17.0	<10.0	4.3	<10.0	1.2	250	502	530
Total Dissolved Solids (mg/l)	TDS	500	1,270	590	604	1,180	998	**2,490**	**2,020**	**2,710**	**2,580**	**1,460**	NT	**2,380**	**2,430**	1,060	1,110	224	202	575	556	790	828	770	788	Dry	Dry	318	335	398	403	**1,740**	396	<25.0	56.0	567	574	1,540	495	134	171	Dry	Dry	66.0	62.0	984	265	1,550	683	500	1,320	1,500
EPA APPENDIX IV																																																							
Antimony (µg/l)	7440-36-0	1	3.90	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	4.6 J	<5.0	3.0 J	NT	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	Dry	Dry	<5.0	<5.0	<5.0	<5.0	5.6	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	Dry	Dry	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	5.6	<5.0	<5.0
Arsenic (µg/l)	7440-38-2	10	4.80	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	4.8 J	<10.0	5.4 J	NT	<10.0	6.1 J	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	5.2 J	Dry	Dry	<10.0	<10.0	<10.0	<10.0	**16.5**	7.0 J	<10.0	<10.0	<10.0	5.8 J	12.0	25.9	<10.0	<10.0	Dry	Dry	<10.0	5.5 J	7.7 J	9.0 J	12.2	15.0	10	7.8 J	19.3
Barium (µg/l)	7440-39-3	700	443	295	335	53.3	78.5	294	310	342	347	**1,240**	NT	**666**	**717**	279	285	120.0	97.3	49.0	61.5	308	304	**1,040**	**1,080**	Dry	Dry	43.2	54.7	34.3	38.7	69.3	100	<5.0	52.7	48.6	52.7	753	805	94.7	69.3	Dry	Dry	30.6	69.9	447	394	767	**1,130**	1,000	48.7	52.7
Beryllium (µg/l)	7440-41-7	4	0.700	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NT	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	Dry	Dry	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	3.3	4.0	<1.0	<1.0	Dry	Dry	<1.0	<1.0	2.0	1.7	3.3	4.9	6.5	<1.0	<1.0
Cadmium (µg/l)	7440-43-9	2	0.500	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NT	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	Dry	Dry	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.59 J	<1.0	<1.0	<1.0	0.50 J	Dry	Dry	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	2	<1.0	0.49 J
Chromium (µg/l)	7440-47-3	10	3.70	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	**9.7**	**5.9**	<5.0	NT	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	Dry	Dry	<5.0	**5.9**	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	17.0	23.2	<5.0	<5.0	Dry	Dry	<5.0	<5.0	10.3	12.8	12.6	22.0	50	<5.0	<5.0
Cobalt (µg/l)	7440-48-4	1	3.60	<5.0	<5.0	<5.0	<5.0	<5.0	<25.0	<5.0	<25.0	<5.0	NT	<5.0	<25.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	Dry	Dry	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	28.5	60.2	<5.0	<5.0	Dry	Dry	<5.0	9.0	8.5	5.0	26.3	21.8	3	<5.0	<5.0
Fluoride (mg/l)	16984-48-8	2	0.253	0.15	0.18	0.23	0.19	0.15	0.17	0.22	<1.0	<0.10	NT	**0.31**	**0.39**	**0.27**	**0.34**	**0.46**	**0.58**	**0.30**	**0.37**	0.11	0.13	0.067 J	0.075 J	Dry	Dry	**0.46**	**0.54**	0.14	0.18	**0.49**	**0.52**	<0.10	**0.33**	**0.32**	**0.38**	<1.0	0.15	0.19	0.12	Dry	Dry	0.12	0.057 J	<1.0	0.14	0.52 J	0.34	1.8	0.18	0.27
Lead (µg/l)	7439-92-1	15	14.1	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	NT	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	Dry	Dry	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	55.0	68.1	<5.0	<5.0	Dry	Dry	<5.0	8.1	37.1	33.4	56.3	73.4	25	<5.0	<5.0
Lithium (µg/l)	7439-93-2	NE	48.1	19.7	17.5	19.0	15.2	34.9	37.5	**512**	**212**	<2.5	NT	**87.5**	**88.4**	**98.0**	30.6	28.6	10.0	10.1	26.7	23.8	28.5	25.3	23.5	Dry	Dry	1.7 J	1.2 J	12.3	9.3	**80.7**	30.2	<2.5	0.50 J	27.4	23.8	7.5	11.3	0.81 J	<2.5	Dry	Dry	<2.5	1.7 J	8.0	3.7	10.6	12.6	NE	61.1	59.6
Mercury (µg/l)	7439-97-6	1	0.200	0.14 J	0.17 J	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	NT	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	Dry	Dry	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	Dry	Dry	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.012	<0.20	<0.20
Molybdenum (µg/l)	7439-98-7	NE	13.6	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	4.8 J	4.9 J	**14.8**	NT	6.3	7.4	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	Dry	Dry	**32.5**	**36.2**	<5.0	<5.0	**127**	**17.0**	<5.0	<5.0	<5.0	<5.0	<5.0	17.2	<5.0	<5.0	Dry	Dry	<5.0	<5.0	<5.0	<5.0	<5.0	5.6	160	205	254
Selenium (µg/l)	7782-49-2	20	5.00	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	NT	<10.0	<10.0	<10.0	5.9 J	<10.0	<10.0	4.9 J	<10.0	<10.0	<10.0	<10.0	<10.0	Dry	Dry	<10.0	5.2 J	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	Dry	Dry	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	5	<10.0	<10.0
Thallium (µg/l)	7440-28-0	0.2	13.7	<0.47	<0.47	<0.47	<0.47	<0.47	<0.47	<0.47	<0.94	<0.47	NT	<0.47	<0.94	<0.47	<0.47	<0.47	<0.47	<0.47	<0.47	<0.47	<0.47	<0.47	<0.47	Dry	Dry	<0.47	<0.47	<0.47	<0.47	<0.47	<0.47	<0.47	<0.47	<0.47	<0.47	0.14 J	0.20 J	<0.47	<0.47	Dry	Dry	<0.47	<0.47	0.15 J	0.072 J	0.21 J	<2.40	0.24	0.13 J	<9.4
Radium 226 (pCi/l)	13982-63-3	NE	1.22	-0.276	0.532	0.265	0.192	0.0594	-0.0643	1.02	**1.25**	0.244	NT	0.848	**1.26**	0.291	0.230	-0.205	0.121	0.0323	-0.252	0.214	0.128	0.311	0.269	Dry	Dry	0.0695	0.537	0.124	-0.0605	0.483	0.431	0.195	0.108	-0.00966	0.326	0.743	0.939	0.804	0.382	Dry	Dry	0.290	0.426	0.267	0.108	0.324	2.09	NE	-0.129	0.195
Radium 228 (pCi/l)	15262-20-1	NE	1.29	0.229	0.534	0.632	0.649	0.761	0.552	**1.83**	**1.56**	**1.40**	NT	0.326	1.18	0.143	0.770	0.574	0.576	0.400	1.12	0.173	0.726	1.04	0.650	Dry	Dry	**1.67**	0.389	-0.135	0.129	0.751	0.283	0.431	0.461	0.928	0.0506	2.00	2.33	-0.0160	0.110	Dry	Dry	0.510	0.729	1.07	1.27	0.520	2.48	NE	0.345	0.722
Combined Radium (pCi/l)	7440-14-4	NE*	2.09	0.229	1.07	0.897	0.841	0.820	0.552	**2.85**	**2.81**	1.64	NT	1.17	**2.44**	0.434	1.000	0.574	0.697	0.432	1.12	0.387	0.854	1.35	0.919	Dry	Dry	1.74	0.926	0.124	0.129	1.23	0.714	0.626	0.569	0.928	0.377	2.74	3.27	0.804	0.492	Dry	Dry	0.800	1.16	1.34	1.38	0.844	4.57	NE	0.345	0.917
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Copper (mg/l)	7440-50-8	1	0.0114	<0.005	0.0071	<0.005	0.0069	<0.005	<0.005	<0.005	**0.294**	<0.005	NT	<0.005	**0.0525**	<0.005	**0.170**	<0.005	0.0054	<0.005	**0.0198**	<0.005	0.0055	<0.005	<0.005	Dry	Dry	<0.005	0.0114	<0.005	**0.0201**	<0.005	**0.0154**	<0.005	<0.005	<0.005	0.0293	0.0161	0.0295	<0.005	<0.005	Dry	Dry	<0.005	0.0054	0.0102	0.0118	0.0151	0.0247	0.007	<0.005	0.0066
Nickel (µg/l)	7440-02-0	100	3.50	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	**8.6**	4.7 J	**7.1**	NT	<5.0	<5.0	4.3 J	4.5 J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	Dry	Dry	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	10.6	19.5	<5.0	<5.0	Dry	Dry	<5.0	<5.0	6.8	6.6	9.2	14.2	88	<5.0	3.9 J
Silver (µg/l)	7440-22-4	20	2.50	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	NT	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	Dry	Dry	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	Dry	Dry	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	0.06	<5.0	<5.0
Vanadium (µg/l)	7440-62-2	0.3	8.30	<5.0	5.5	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	NT	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	Dry	Dry	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	75.8	92.0	<5.0	<5.0	Dry	Dry	<5.0	5.6	45.0	48.6	66.7	102	NE	<5.0	<5.0
Zinc (mg/l)	7440-66-6	1	0.0342	<0.01	<0.01	<0.01	<0.01	<0.01	0.0289	<0.01	<0.01	<0.01	NT	<0.01	<0.01	<0.01	<0.01	0.0096 J	<0.01	<0.01	0.0143	<0.01	<0.01	<0.01	<0.01	Dry	Dry	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	**0.330**	<0.01	0.0102	0.0765	0.114	<0.01	<0.01	Dry	Dry	<0.01	0.0191	0.0418	0.055	0.0948	0.160	0.05	0.0278	0.0147

Notes:

* = no established 2L Standard. 5 pCi/l is the Federal Standard

BTV = background threshold value calculated for April 2021

NE = not established

NT = not tested

µg/l = micrograms per liter

pCi/l = picocuries per liter

mg/l = miligrams per liter

EQBL = Equipment Blank

J = Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit

Shaded = concentration reported above (or below for pH) established 2L Standard, IMAC, or 2B Standard

Bold/Underlined = concentration exceeded BTV

2L Standard = North Carolina Groundwater Protection Standard (T15A NCAC 02L .0202)

IMAC = Interim Allowable Maximum Concentration

2B Standard = North Carolina Surface Water and Wetland Standards (15A NCAC 02B) for Gulf Creek (SW-1) and Shaddox Creek (SW-2) which are both Class WS-IV Waters or are National Criteria per EPA

pH was field tested

Groundwater, surface water, and leachate samples collected for **August 2021 from August 9-16**and November **2021 from November 15-19** and analyzed for above parameters by Pace Analytical Services, LLC

Constituents are only considered exceeding the BTV if the sampling event in question and the previous sampling event had detections for that constituent

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3.3 Surface Water Analytical Results

Surface water sample results were compared to the 2B Standards or the EPA National Criteria Standard (utilized by the North Carolina Division of Water Quality as default standards for parameters not listed in 15A NCAC 02B). Note that sample location SW-3 was dry during both the August and November sampling events.

3.3.1 August 2021 Event

Concentrations of the following constituents exceeded 2B Standards in one or more surface water samples during the August 2021 event: arsenic, cobalt, copper, lead, TDS, and zinc. Five constituents (cobalt, mercury, selenium, silver, and thallium) were reported with MRLs that exceeded the 2B Standards. The cobalt MRL was 5.0 µg/L, and the 2B Standard is 3 µg/L. The mercury MRL was 0.20 µg/L, and the 2B Standard is 0.012 µg/L. The selenium MRL was 10.0 µg/L, and the 2B Standard is 5 µg/L. The silver MRL was 5.0 µg/L, and the 2B Standard is 0.06 µg/L. The thallium MRL was 0.47 µg/L, and the 2B Standard is 0.24 µg/L.

- Arsenic exceeded the 2B Standard of 10 µg/L in surface water samples SW-1 and SW-6.
- Cobalt exceeded the 2B Standard of 3 µg/L in surface water samples SW-1, SW-5, and SW-6.
- Copper exceeded the 2B Standard of 0.007 µg/L in surface water samples SW-1, SW-5, and SW-6.
- Lead exceeded the 2B Standard of 25 µg/L in surface water samples SW-1, SW-5, and SW-6.
- TDS exceeded the 2B Standard of 500 mg/L in surface water samples SW-1, SW-5, and SW-6.
- Zinc exceeded the 2B Standard of 0.05 µg/L in surface water samples SW-1 and SW-6.
- No exceedances of 2B Standards were reported in the samples collected from SW-2 and SW-4.

Standards have not been established under T15A NCAC 02B for the following constituents detected: calcium, lithium, radium-226, radium-228, combined radium, and vanadium. Laboratory results are presented in **Table 5**.

3.3.2 November 2021 Event

Concentrations of the following constituents exceeded 2B Standards in one or more surface water samples during the November 2021 event: arsenic, barium, cobalt, copper, lead, TDS, and zinc. Five constituents (cobalt, mercury, selenium, silver, and thallium) were reported with MRLs that exceeded the 2B Standards. The cobalt MRL was 5.0 µg/L, and the 2B Standard is 3 µg/L. The mercury MRL was 0.20 µg/L, and the 2B Standard is 0.012 µg/L. The selenium MRL was 10.0 µg/L, and the 2B Standard is 5 µg/L. The silver MRL was 5.0 µg/L, and the 2B Standard is 0.06 µg/L. The thallium MRL was 0.47 µg/L (2.40 µg/L in SW-6), and the 2B Standard is 0.24 µg/L.

- Arsenic exceeded the 2B Standard of 10 µg/L in surface water samples SW-1 and SW-6.
- Barium exceeded the 2B Standard of 1,000 µg/L in surface water sample SW-6.
- Cobalt exceeded the 2B Standard of 3 µg/L in surface water samples SW-1, SW-4, SW-5, and SW-6.
- Copper exceeded the 2B Standard of 0.007 µg/L in surface water samples SW-1, SW-5, and SW-6.
- Lead exceeded the 2B Standard of 25 µg/L in surface water samples SW-1, SW-5, and SW-6.
- TDS exceeded the 2B Standard of 500 mg/L in surface water sample SW-6.
- Zinc exceeded the 2B Standard of 0.05 µg/L in surface water samples SW-1, SW-5, and SW-6.
- No exceedances of 2B Standards were reported in the sample collected from SW-2.

Standards have not been established under T15A NCAC 02B for the following constituents detected: calcium, lithium, radium-226, radium-228, combined radium, and vanadium. Laboratory results are presented in **Table 5**.

3.4 Leachate Analytical Results

One sample of leachate generated on-site was collected and analyzed during the August 2021 and November 2021 monitoring events. Boron, lithium, and zinc increased between the April 2021 and August 2021 sampling event, but then decreased from August 2021 to November 2021. Results were generally within range of historical concentrations. Arsenic, barium, chloride, copper, fluoride, molybdenum, pH, sulfate, TDS, radium-226, radium-228, and combined radium increased between the August 2021 and November 2021 sampling event; however, results were generally within range of historical concentrations (**Table 5**).

Leachate sampling is required by the permit to operate and is disposed of in compliance with the Clean Water Act at either the City of Sanford's Big Buffalo Creek Wastewater Treatment Plant or the Town of Spring Lake's South Harnett Regional Wastewater Treatment Plant.

4 Statistics

4.1 Methodology

Background groundwater quality was evaluated to establish statistically derived background concentrations for the site. Groundwater quality in downgradient wells was then compared to background concentrations to determine if a statistically significant increase (SSI) over background has occurred, as required by Section .1600 rules of the North Carolina Solid Waste Management Rules 15A NCAC 13B.

Sampling results used to establish BTVs were obtained during 25 monitoring events performed between October 2015 and April 2021. Downgradient sampling results from the detection monitoring event in November 2021 were used to evaluate the potential for SSIs. Software packages ProUCL, NCSS, R and SPSS were used in the production of the statistics (ProUCL is

offered by the USEPA; R is a free software environment; NCSS and SPSS are licensed software packages).

Groundwater samples collected as part of the monitoring program were analyzed for NCDEQ Solid Waste Appendix I (except VOCs), 40 CFR 257 Appendix III, and 40 CFR 257 Appendix IV constituents. Only non-filtered sample results were utilized for the statistical analysis of monitored constituents.

4.1.1 Statistical Analysis

The background sample size (i.e., quantity of qualifying samples) was evaluated per constituent. Descriptive statistics were calculated for the background data set including and excluding non-detect (ND) values. When NDs were included in the data set, the MDL was substituted as the ND value for simple descriptive statistics. The analysis was performed with NDs removed to better understand the central tendency and range of the detected values. Note that for the trend analyses in **Section 4.1.4** and for the establishment of statistically derived background concentration levels in **Section 4.2**, imputation methods using the maximum likelihood method (MLE) for NDs, regression on order statistics or Kaplan-Meier methods were used, where appropriate.

Following the calculation of descriptive statistics, statistical analyses for the background data set were performed to evaluate for outliers, data distributions, trends, and spatial variability between the background wells for Appendix I Metals, Appendix III and Appendix IV constituents, where data quantity and quality permit. A total of 35 samples (25 monitoring events from BG-1 and 10 monitoring events from BG-2) were included for the descriptive analysis of the background monitoring well results for the monitored constituents. The first sampling event conducted in August 2015 was not included in the analysis as data obtained during this event were not consistent with data from subsequent rounds; sample analyses for the August 2015 event were performed by a different laboratory, possibly accounting for the disparity in results. The sample collected April 3, 2017 for total dissolved solid in well BG-1 is considered an outlier and removed from the analysis. January 2020 samples for boron were removed from the analysis as they were diluted and could not be properly detected.

For downgradient monitoring results, the analysis included the calculation of descriptive statistics for Appendix I metals, Appendix III and Appendix IV constituents, (for the data sets including and excluding ND values), followed by an evaluation of outliers and trends. A total of 24 monitoring events performed between November 2015 and April 2021 were included for the descriptive analysis of the downgradient monitoring well results for the monitored constituents for the January 2021 sampling event.

4.1.2 Outliers

Outliers are values that are not representative of the population from which they are sampled. The background and downgradient data sets were screened for outliers using the Dixon’s and Rosner’s outlier tests. Dixon’s outlier test is suitable for data sets containing less than 25 samples, while Rosner’s test is suitable for data sets with 25 or more samples. The outlier test was conducted using a significance of one percent. For constituents that had NDs, the NDs were removed prior to testing for outliers.

Statistical outliers were identified in the background data set evaluated for four Appendix III constituents (boron, calcium, sulfate, and total dissolved solids) and one Appendix IV constituent (lithium). The constituent concentrations identified as statistical outliers were reported in samples collected from background well BG-2, except for boron and lithium.

Statistical outliers were identified intermittently for numerous Appendix III and Appendix IV constituents and Appendix I metals, in the data sets evaluated for downgradient monitoring wells throughout the monitoring period.

The statistical outliers were investigated as possible data entry or measurement errors. The remaining values were all within one order of magnitude of other observations and deemed correct. Given the variable nature of groundwater samples, the small sample sizes and that it is common for groundwater quality samples to have very low or very high concentrations over time, statistical outliers are expected but do not necessarily signify that the outliers are from different distributions. As additional background samples are collected over time, outlier test results may change, and earlier observations thought to be outliers may no longer be outliers.

4.1.3 Data Distribution

Groundwater data was fitted to known distribution models using goodness-of-fit tests incorporated into ProUCL. For data sets comprised of 50 or fewer samples, ProUCL's goodness-of-fit module incorporates the Shapiro-Wilk goodness-of-fit test to determine normal or lognormal distribution and Anderson-Darling to determine gamma distribution. Normal, lognormal and gamma distributions are parametric distributions. If a data set could not be fit with any of these three parametric distributions, it was considered to follow a nonparametric distribution.

Note that ProUCL does not provide goodness-of-fit results for data sets with less than three detected values due to insufficient data. For purposes of estimating background concentrations, these data sets were treated under non-parametric distribution assumptions with the maximum detected value chosen to represent the background concentrations.

4.1.4 Trends

Background constituent concentrations in groundwater should demonstrate stationary conditions through time, free of trends. Constituents were analyzed for trends within the data set using an MLE regression for constituents which followed parametric distributions and Mann-Kendall tests for those that were treated under nonparametric distributional assumptions. The MLE regression can be applied to data sets that can be fitted to a specific distribution model, and that contain NDs with multiple MDLs. The Mann-Kendall test is suitable for data series with no discernable distributions and only one MDL value for NDs.

Constituents treated under nonparametric data assumptions (either tested as nonparametric or having more than 50 percent NDs) and with multiple MDLs or with less than three detected values were not assessed for trends.

The background well regression analysis showed a potential increasing trend for fluoride (an Appendix III and Appendix IV constituent) and sulfate (Appendix III). A potential decreasing

trend for chloride (Appendix III) and three Appendix IV constituents (barium, lithium, and radium-226). There were no increasing or decreasing trends identified for other constituents with sufficient data quantity and quality for testing with the MLE analysis or Mann-Kendall test. The statistical trends identified for barium, chloride, fluoride, lithium, sulfate, and radium-226 should be closely monitored as additional background samples are collected.

Trends were also evaluated for constituents in each downgradient well using the same methods as described above for the background data set. Trends were identified for select constituents at select monitoring well locations and should be monitored as additional downgradient groundwater data are collected at the site (**Section 4.2**).

4.1.5 Spatial Variability

Spatial variability refers to identifying whether or not there are statistically identifiable differences in mean concentrations or variance levels across the well field (i.e., the pooled background data). To evaluate the potential for spatial variability between the background wells, parametric and nonparametric analysis of variance (ANOVA) tests were used to test differences in sample mean or median levels at the 5 percent level of significance. Side-by-side box plots for each constituent were also used to determine if variation is significant from a visual perspective.

Potential spatial variability between background wells BG-1 and BG-2 was identified for six Appendix III or Appendix IV constituents (barium calcium, fluoride, pH (field), sulfate and total dissolved solids). The observed spatial variability is indicative of the hydrogeological regime at the site and values between the two wells are within an order of magnitude of each other. The distributional patterns for constituents at the background wells will continue to be monitored for spatial variability and should be re-evaluated as the data set grows.

4.2 Evaluation for SSIs over Background

Based on the statistical evaluations performed, BTVs were calculated for the detection monitoring program at the site for Appendix I metals, Appendix III and Appendix IV constituents. For constituents that have all ND background values, the maximum MDL is chosen to represent background and the double quantification rule is used to evaluate whether there is an SSI. The BTV provided for detection monitoring constituents is the statistically derived background concentration (i.e., upper prediction limit), the maximum detected value or the maximum MDL depending on the level of censorship in each of the background samples.

Downgradient sampling results from the detection monitoring event in November 2021 were used to test for SSIs. Downgradient concentrations were compared to BTVs. For constituents that have all ND background values, the double quantification rule is applied; that is, an SSI is registered for the well-constituent pair if the downgradient concentrations exhibit detects in two consecutive sampling events. Downgradient sampling results from the August 2021 sampling events were used to test for SSIs for constituents that have all ND background values.

4.3 Statistical Summary

BTVs were calculated using wells BG-1 and BG-2 as the background monitoring wells. However, eight monitoring wells (MW-1 through MW-8) were installed and sampled (October 2015) prior to ash placement, thus representing pre-ash conditions at the site.

SSIs were found for two Appendix I metals (copper, nickel), five Appendix III constituents (calcium, chloride, fluoride, pH (field), and TDS), and five Appendix IV constituents (arsenic, barium, chromium, fluoride, lithium, radium-226, radium-228, and combined radium). When the November 2021 sampling event results are compared to the pre-ash sampling results from those eight wells, current downgradient groundwater constituent concentrations are generally similar to concentrations reported prior to ash placement. Additional details regarding statistical methodology and results are provided in **Appendix E**

5 Summary and Conclusions

5.1 Summary

Quarterly groundwater monitoring was conducted at the Brickhaven No. 2 Mine Tract "A" Structural Fill site from August 9-16, 2021 and November 15-19, 2021. A summary of the findings from these events is provided below**.**

5.1.1 Groundwater

AUGUST 2021 EVENT

- Concentrations of the following constituents exceeded BTVs in one or more wells during the August 2021 sampling event: arsenic, barium, boron, calcium, chloride, chromium, fluoride, lithium, molybdenum, nickel, pH, radium-228, combined radium, sulfate, and TDS.
- Concentrations of the following constituents exceeded 2L Standards or IMACs in one or more wells during the August 2021 sampling event: antimony, arsenic, barium, chloride, pH, sulfate, and TDS.

NOVEMBER 2021 EVENT

- Concentrations of the following constituents exceeded the BTVs in one or more wells during the November 2021 sampling event: arsenic, barium, calcium, chloride, chromium, combined radium, copper, fluoride, lithium, nickel, molybdenum, pH, radium-226, radium-228, and TDS.
- Concentrations of the following constituents exceeded 2L Standards or IMACs in one or more wells during the November 2021 sampling event: barium, chloride, pH, TDS, and vanadium.
- Statistical outliers were identified in the background data set evaluated for barium, calcium, sulfate, and TDS. Intermittent statistical outliers for Appendix III and Appendix IV constituents and Appendix I metals, in the data sets evaluated for downgradient monitoring wells, were noted throughout the monitoring period.

- Groundwater quality in wells was compared to background concentrations to determine if an SSI over background has occurred:
    - Eleven constituents were found to have SSIs: arsenic, barium, calcium, chloride, chromium, copper, fluoride, lithium, nickel, pH (field), and TDS.
    - Comparing November 2021 sampling event results to the pre-ash sampling results, calcium, pH (field), copper, radium-226, and lithium are not within the range of pre-ash conditions.

5.1.2 Surface Water

AUGUST 2021 EVENT

- Concentrations of the following constituents exceeded 2B Standards in one or more surface water samples during the August 2021 event: arsenic, cobalt, copper, lead, TDS, and zinc.
- No exceedances of 2B Standards were reported in samples SW-2 and SW-4.
- Sample location SW-3 was dry at the time of the sampling event.

NOVEMBER 2021 EVENT

- Concentrations of the following constituents exceeded 2B Standards in one or more surface water samples during the November 2021 event: arsenic, barium, cobalt, copper, lead, TDS, and zinc.
- No exceedances of 2B Standards were reported in the sample collected from SW-2 or SW-3.
- Sample location SW-3 was dry at the time of the sampling event.

5.1.3 Leachate

Boron, lithium, and zinc increased between the April 2021 and August 2021 sampling event, then decreased from August 2021 to November 2021. Results were generally within range of historical concentrations. Arsenic, barium chloride, copper, fluoride, molybdenum, pH, sulfate, TDS, radium-226, radium-228, and combined radium increased between the August 2021 and November 2021 sampling event; however, results were generally within range of historical concentrations.

5.2 Conclusions

Based upon the data analyzed during this event and historical events; HDR has made the following conclusions:

- The presence of SSIs is largely the result of low background concentrations that may not represent data collected prior to CCP placement (August and October 2015 sampling events) and is influenced by natural and seasonal variations at the site. In general, the SSIs reported during this sampling event are either consistent with those evaluated in the Alternate Source Demonstration dated March 29, 2019, or are potential SSIs to be verified during the next sampling event.
- Groundwater modeling during assessment monitoring in 2020 calculated that, due to the low hydraulic conductivity of the clay-rich soil of the former clay mine, groundwater and any constituents found in the groundwater will move slowly through the aquifer materials.

Model-estimated groundwater velocities are too low for the constituents to have been transported from the structural fill to the monitoring wells or surface waters where they have been detected.

- Tracer constituents, such as boron, are not present at significant concentrations in either the groundwater or the surface water. Boron is a conservative tracer, so its ratio to the less mobile constituents (e.g., arsenic) should increase down-gradient of the structural fill. However, boron is at low concentrations or not present in down-gradient groundwater. This shows that the ash and leachate, which are a source of boron, are not the source of the other constituents in groundwater and/or surface water.
- Results of surface water sampling indicate exceedances of 2B Standards in the samples collected from SW-6, located immediately downstream of the General Shale property and away from ash handling activities performed on the Brickhaven site prior to closure of the structural fill. Thus, it appears that the presence of constituents of concern in surface water samples collected downstream (locations SW-1 and SW-5) are likely the result of off-site impacts, and not from activities on the Brickhaven site.
- The structural fill is engineered and lined with an active leachate collection system. By collecting and disposing of the leachate off-site, the likelihood that leachate escaped the liner is greatly reduced.

6 Recommendations

Based on the findings, HDR makes the following recommendations:

- Continue semi-annual detection monitoring and reporting, and laboratory electronic data deliverables during non-reporting quarters, in accordance with permit requirements.
- Evaluate the validity of SSIs by further assessing sampling protocols/performance, spatial variability, and seasonality of constituent concentrations as additional sampling rounds are conducted.

7 References

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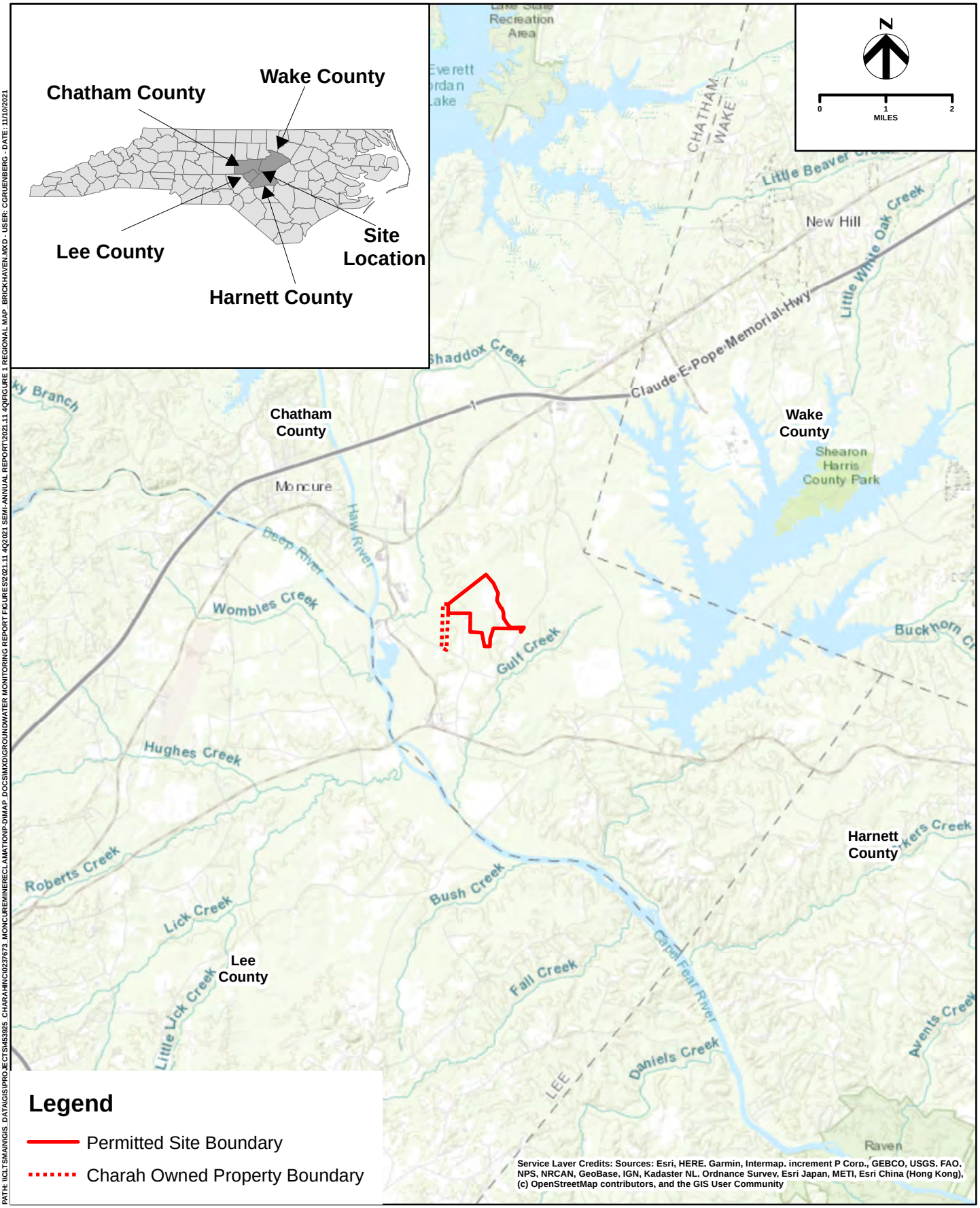
Singhal, B. B.S. and R. P. Gupta. 2010*. Applied Hydrogeology of Fractured Rocks: Springer, 2nd Edition*, 408p. (Table 8-1, p. 140)United States Geological Survey. 2004. *Arsenic, Nitrate, and Chloride in Groundwater, Oakland County, Michigan.*

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Figures

Figure 1: Regional Site Location Map
Figure 2: Regional Topographic Map
Figure 3: Historic Groundwater Elevations
Figure 4: Potentiometric Surface Map – August 2021
Figure 5: Potentiometric Surface Map – November 2021
Figure 6: Sample Location Map

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REGIONAL SITE LOCATION MAP
CHARAH SOLUTIONS, INC
MONCURE, NORTH CAROLINA

BRICKHAVEN NO. 2 MINE TRACT "A"

DATE

DECEMBER 2021

FIGURE

1



Legend

- Permitted Site Boundary
- Charah Owned Property Boundary

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REGIONAL TOPOGRAPHIC MAP
CHARAH SOLUTIONS, INC
MONCURE, NORTH CAROLINA

BRICKHAVEN NO. 2 MINE TRACT "A"

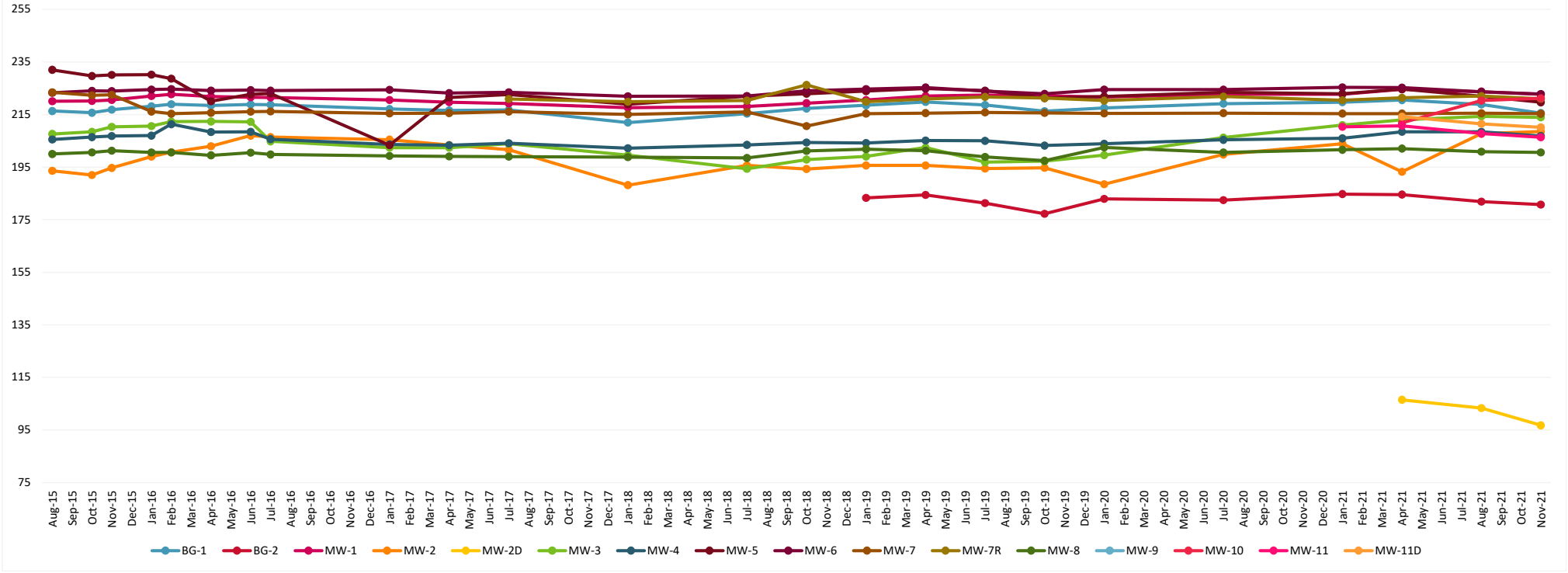
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DECEMBER 2021

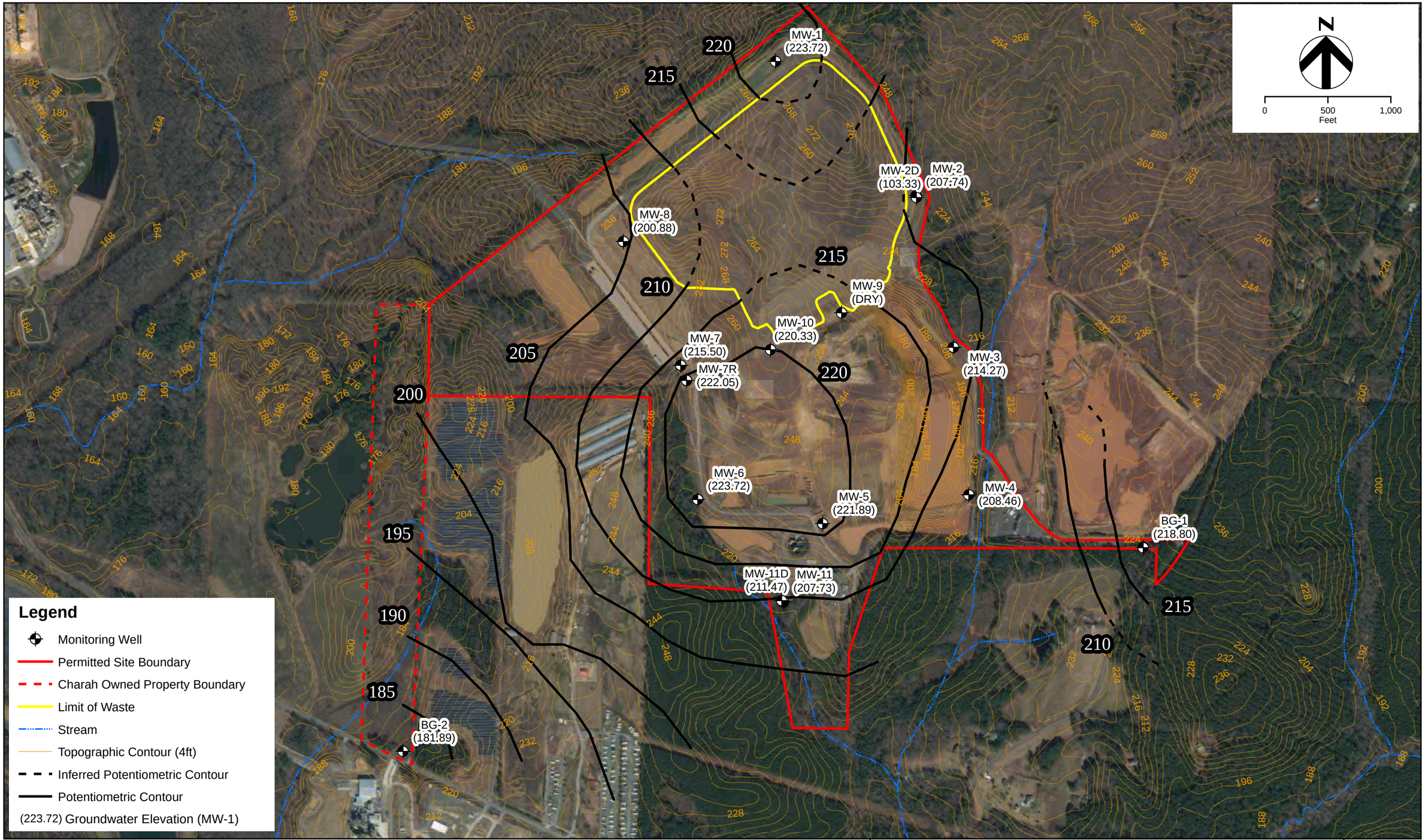
FIGURE

2

Figure 3: Historical Groundwater Elevations



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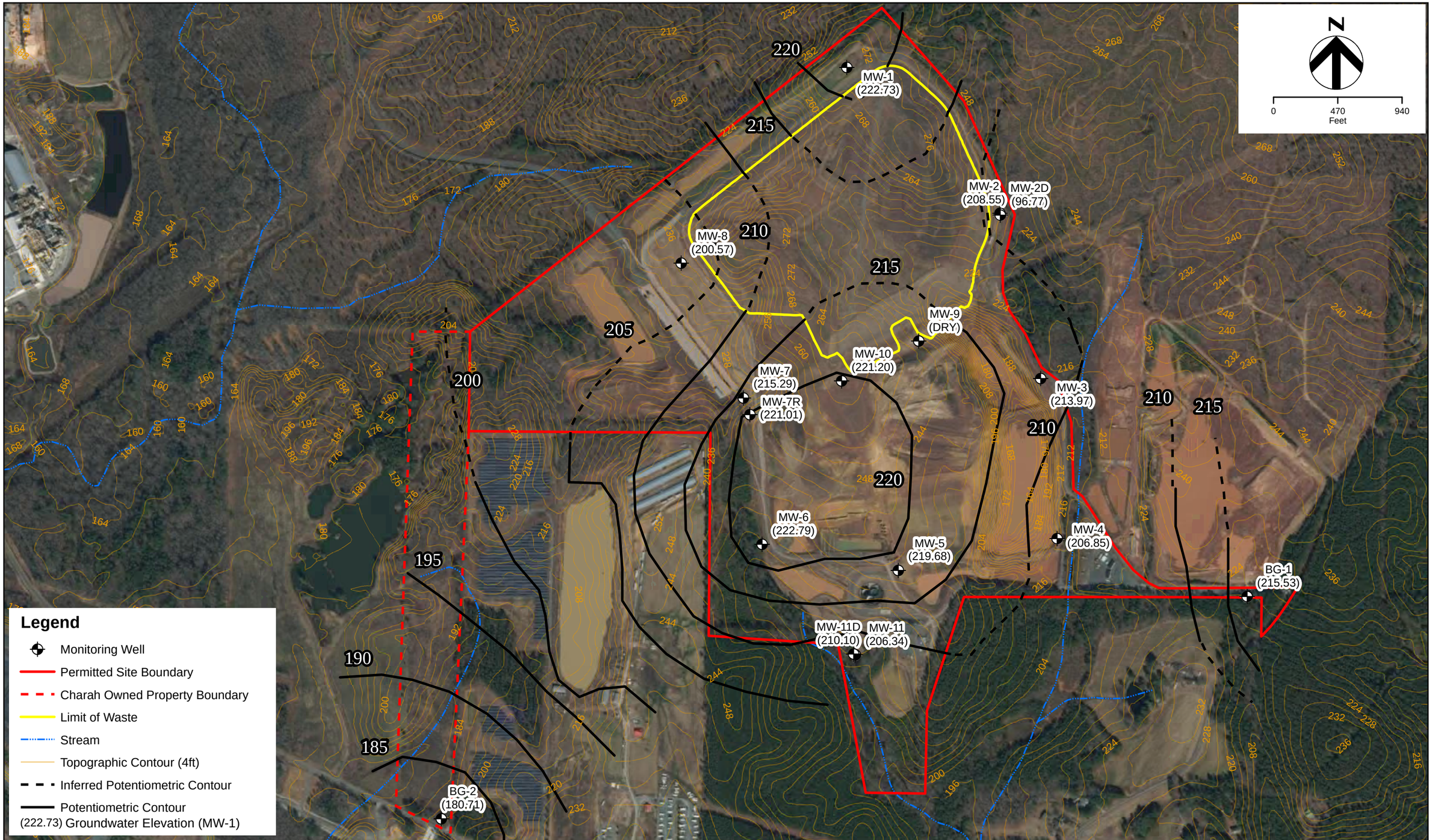
PATH: C:\USERS\JTROYER\DESKTOP\PROJECTS\CHARAH\FIGURE 4 GW CONTOUR MAP AUG2021.MXD - USER: JTROYER - DATE: 01/28/2022

Note:
1. Groundwater elevations derived from depth to water measurements collected on August 9, 2021.
2. Topography data for the site was obtained from NC OneMap Geographic Information System (GIS) website (Dated 2013).
3. Monitoring wells MW-2D and MW-11D were not used for contours as they screened in bedrock.

GROUNDWATER CONTOUR MAP - AUGUST 2021
CHARAH SOLUTIONS, INC.
MONCURE, NORTH CAROLINA
BRICKHAVEN NO. 2 MINE TRACT "A"

DATE
AUGUST 2021

FIGURE
4



PATH: C:\USERS\JTROYER\DESKTOP\PROJECTS\CHARAH\FIGURE 4 GW CONTOUR MAP_NOV2021.MXD - USER: JTROYER - DATE: 01/28/2022

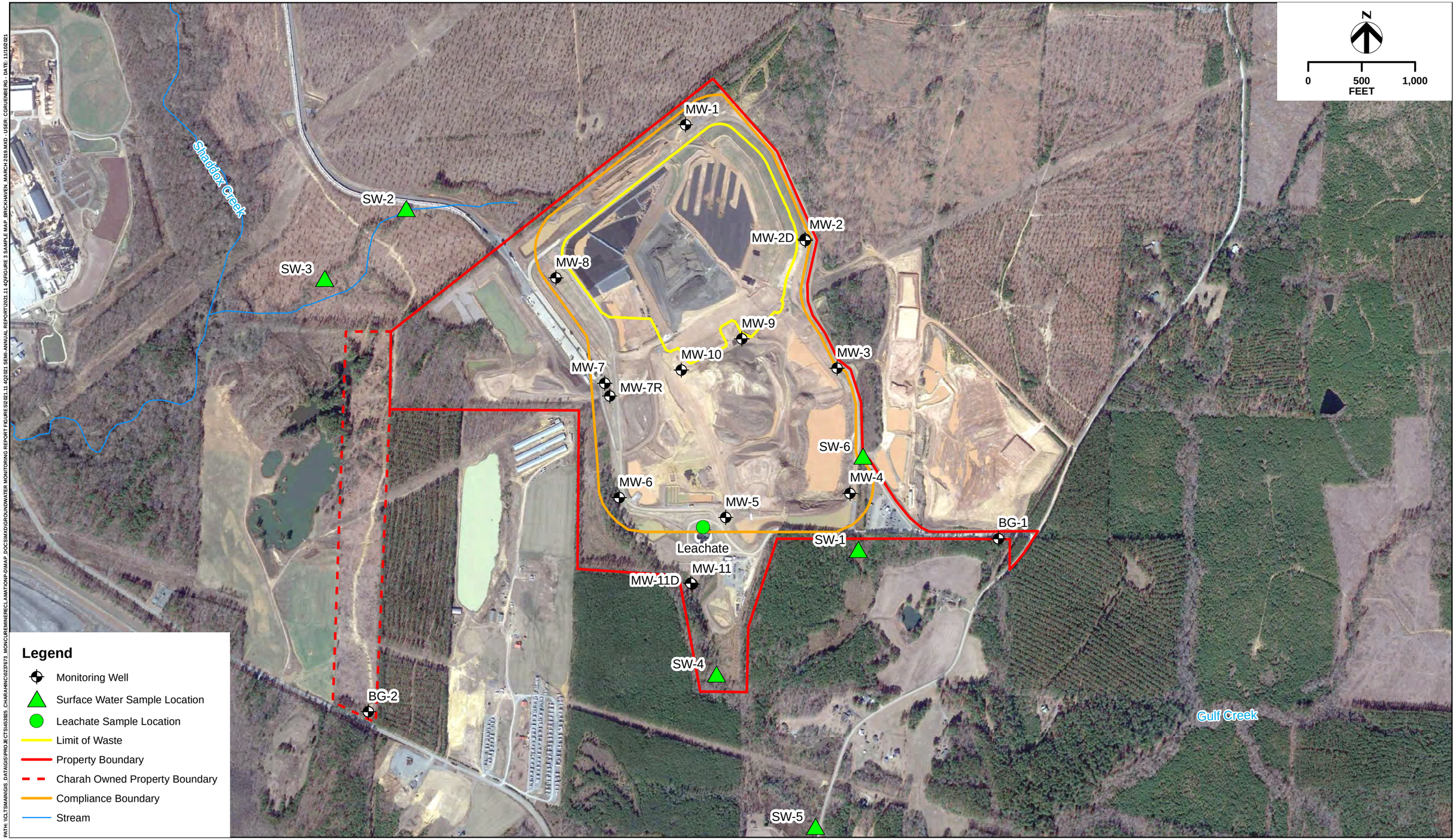
Note:
1. Groundwater elevations derived from depth to water measurements collected on November 15, 2021.
2. Topography data for the site was obtained from NC OneMap Geographic Information System (GIS) website (Dated 2013).
3. Monitoring wells MW-2D and MW-11D were not used for contours as they screened in bedrock.

GROUNDWATER CONTOUR MAP - NOVEMBER 2021
CHARAH SOLUTIONS, INC.
MONCURE, NORTH CAROLINA

BRICKHAVEN NO. 2 MINE TRACT "A"

DATE
NOVEMBER 2021

FIGURE
5



PATH: \\CLT3\MAN\GIS_DATA\GIS\PROJECTS\453925_CHARAH\MXD\223\973_MONCURE\MINERECL\MAT\CNP-DMAP_DOCS\MXD\GROUNDWATER MONITORING REPORT FIGURES\2021.11.4QC\2021 SEMI-ANNUAL REPORT\2021.11.4QC\FIGURE 6 SAMPLE MAP_BRICKHAVEN_MARCH 2016.MXD - USER: CGRUENBERG - DATE: 11/10/2021

HDR

SAMPLE LOCATION MAP
CHARAH SOLUTIONS, INC.
MONCURE, NORTH CAROLINA

BRICKHAVEN NO. 2 MINE TRACT "A"

DATE
DECEMBER 2021

FIGURE
6

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A

Appendix A – Field Data Sheets

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GROUNDWATER DEPTH

Project Name: Charah – Brickhaven

Project Address: Moncure

Time Started: 0910

Personnel: Charles Gruenberg

Date: 08/09/2021

Project No: 10021146

Time Finished: 1100

Well ID	Depth to Water	Total Depth
BG-1	9.39'	
BG-2	12.34'	
MW-1	56.36'	
MW-2	24.02'	
MW-2D	129.54'	
MW-3	8.29'	
MW-4	8.67'	
MW-5	22.97'	
MW-6	7.23'	
MW-7	16.21'	
MW-7R	20.17'	
MW-8	35.59'	
MW-9	DRY	
MW-10	37.41'	
MW-11	11.50'	
MW-11D	7.93'	

Well ID	Depth to Water	Total Depth

Groundwater Sampling Form

Sample ID: BG-1

Site Information	
Site Name: Charah Brickhaven	**Project Number:** 10021146
Site Location: Moncure, NC	**Sampling Personnel: Charles Gruenberg**
Date: 08/10/2021	**Weather:** Sunny

Well Information	
Well Diameter (in): 2"	**Purge Equipment: Mega Monsoon Pro**
Screened Interval (ft): 26' - 41'	**Pump Type:** ESP
Well Depth (ft): 43.05'	**Pump Depth (ft-bTOC):** ~ 41
Depth-to-Water (ft-bTOC): 9.44	**Tubing Diameter (in):** 3/8" X 1/2"
Water Column Thickness (ft): 33.61	**Well Volume (ft^3):** 5.3776

1 Well Volume = (Total Depth - Static Water Level) * Well Capacity

Well Capacity (gallons per feet): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3' = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47

Purging Information

Parameter Instrument(s): YSI Pro / Micro TPW Turbidimeter

TIME	VOLUME PURGED (Liters)	CUMULATIVE VOLUME PURGED (Liters)	PURGE RATE (mL/min)	DEPTH TO WATER (ft-bTOC)	pH (SU) (±0.1)	TEMP. (C°)	COND. (µS/cm) (5%)	DISSOLVED OXYGEN (mg/L) (10%)*	ORP (mV) (±20mV)	TURBIDITY (NTUs) (≤10 or 10%)	COLOR/ ODOR (describe)
1615	0.0	0.0	150	8.56	6.94	21.7	1038	6.15	116.3	28.43	Clear
1620	0.75	0.75	150	10.92	6.67	19.0	1045	6.18	147.5	1058	lt brown/tan
1630	1.50	2.25	150	11.38	6.59	19.6	1049	2.68	168.5	722.5	lt brown/tan
1640	1.50	3.75	150	11.53	6.59	19.7	1055	2.16	171.5	529.1	Tan
1650	1.50	5.25	150	11.10	6.56	19.5	1056	2.07	168.5	392.8	lt tan
1700	2.0	7.25	200	11.25	6.55	18.8	1055	1.98	166.3	237.8	Clear/lt tan
1710	2.0	9.25	200	11.33	6.54	18.8	1054	1.88	164.4	189.7	Clear/cloudy
1720	2.0	11.25	200	11.33	6.60	18.9	1054	1.87	103.3	152.5	Clear
1730	2.0	13.25	200	11.31	6.55	18.9	1055	1.66	122.3	106.2	Clear
1740	2.0	15.25	200	11.21	6.53	19.1	1054	1.49	130.4	81.05	Clear

YSI set off →

* DO below 2.0 mg/L is stable at ±0.2 mg/L; DO below 0.5 mg/L is stable

Sample Information

Sample Number	Collection Time	Parameter	Container	Preservative
BG-1	1900	Radium 226/228	2 - 1 L Poly	HNO3
	1900	6010/6020/7470	1 - 250 mL Poly	HNO3
	1900	Cl, F, SO4	1 - 250 mL Poly	N/A
	1900	TDS	1 - 500 mL Poly	N/A

Sampled By: Charles Gruenberg — **Sample Time:** 1900

Date Sampled: 08/10/2021 — **Sampler Signature:**

Notes: Pumprate= 150 @ 1615

@ 1631 purged sediment out then back down to 150 ml/m

200 ml/m @ 1651

@ 1802 purged sediment out to lower turbidity set back @ 200ml/m

Groundwater Sampling Form

Sample ID: BG-1

Purging Information (Page 2)

TIME	VOLUME PURGED (Liters)	CUMULATIVE VOLUME PURGED (Liters)	PURGE RATE (mL/min)	DEPTH TO WATER (ft-bTOC)	pH (SU) (±0.1)	TEMP. (C°)	COND. (µS/cm) (5%)	DISSOLVED OXYGEN (mg/L) (10%)*	ORP (mV) (±20mV)	TURBIDITY (NTUs) (≤10 or 10%)	COLOR/ ODOR (describe)
1750	2.0	17.25	200	11.23	6.53	19.1	1053	1.41	133.5	73.89	Clear
1800	2.0	19.25	200	11.25	6.53	18.7	1053	0.57	137.8	54.51	Clear
1810	2.0	21.25	200	11.86	6.52	18.5	1051	0.47	140.8	33.73	Clear
1820	2.0	23.25	200	11.84	6.53	18.4	1046	0.49	141.5	23.38	Clear
1830	2.0	25.25	200	11.83	6.54	18.3	1044	0.50	112.7	19.81	Clear
1835	1.0	26.25	200	11.81	6.53	18.3	1043	0.41	114.3	16.74	Clear
1840	1.0	27.25	200	11.81	6.52	18.3	1042	0.39	115.5	13.42	Clear
1843	0.6	27.85	200	11.80	6.51	18.3	1040	0.38	118.0	12.53	Clear
1846	0.6	28.45	200	11.78	6.53	18.3	1039	0.37	120.5	10.51	Clear
1849	0.6	29.05	200	11.77	6.52	18.3	1039	0.34	122.0	9.93	Clear
1852	0.6	29.65	200	11.76	6.51	18.3	1039	0.33	123.1	9.32	Clear
		SAMPLE	(a)	1900			All	Sample			

YSI stabilize →

* DO below 2.0 mg/L is stable at ±0.2 mg/L; DO below 0.5 mg/L is stable

Groundwater Sampling Form

Sample ID: BG-2

Site Information	
Site Name: Charah Brickhaven	**Project Number:** 10021146
Site Location: Moncure, NC	**Sampling Personnel: Charles Gruenberg**
Date: 8/12/21	**Weather:** Sunny

Well Information	
Well Diameter (in): 2"	**Purge Equipment: Mega Monsoon Pro**
Screened Interval (ft): 13' - 23'	**Pump Type:** ESP
Well Depth (ft): 26.11'	**Pump Depth (ft-bTOC):** ~23
Depth-to-Water (ft-bTOC): 12.43	**Tubing Diameter (in):** 3/8" X 1/2"
Water Column Thickness (ft): 13.68	**Well Volume (ft^3):** 2.1888

1 Well Volume = (Total Depth - Static Water Level) * Well Capacity

Well Capacity (gallons per feet): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3' = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47

Purging Information

Parameter Instrument(s): YSI Pro / Micro TPW Turbidimeter

TIME	VOLUME PURGED (Liters)	CUMULATIVE VOLUME PURGED (Liters)	PURGE RATE (mL/min)	DEPTH TO WATER (ft-bTOC)	pH (SU) (±0.1)	TEMP. (C°)	COND. (µS/cm) (5%)	DISSOLVED OXYGEN (mg/L) (10%)*	ORP (mV) (±20mV)	TURBIDITY (NTUs) (≤10 or 10%)	COLOR/ ODOR (describe)
1640	0.0	0.0	300	12.36	7.04	19.8	3082	1.77	92.2	152.9	Clear
1645	1.5	1.5	300	13.22	7.06	17.7	3045	0.91	59.0	145.0	Clear
1655	1.5	3.0	150	13.02	6.98	14.3	2792	0.44	52.0	69.00	Clear
1705	1.5	4.5	150	13.46	6.97	17.7	2693	0.22	48.5	110.2	Clear
1715	2.0	6.5	200	13.45	6.99	17.9	2426	0.15	34.8	58.26	Clear
1735	4.0	10.5	200	13.66	6.99	17.8	2238	0.13	25.3	41.77	Clear
1755	4.0	14.5	200	13.77	6.97	17.8	2051	0.10	18.2	14.83	Clear
1800	1.0	15.5	200	13.81	6.97	17.8	2052	0.10	17.9	9.94	Clear
1805	1.0	16.5	200	13.81	6.97	17.8	2048	0.09	17.2	9.38	Clear
1810	1.0	17.5	200	13.80	6.96	17.9	2036	0.09	16.8	9.27	Clear

* DO below 2.0 mg/L is stable at ±0.2 mg/L; DO below 0.5 mg/L is stable

SAMPLE @ 1815 ALL STABLE

Sample Information

Sample Number	Collection Time	Parameter	Container	Preservative
BG-2	1815	Radium 226/228	2 - 1 L Poly	HNO3
	1815	6010/6020/7470	1 - 250 mL Poly	HNO3
	1815	Cl, F, SO4	1 - 250 mL Poly	N/A
	1815	TDS	1 - 500 mL Poly	N/A

Sampled By: Charles Gruenberg	**Sample Time:** 1815
Date Sampled: 8/12/21	**Sampler Signature:**

Notes: Pumprate=

300 ml/m @ 1640

150 ml/m @ 1646

1706 purged sediment + Set to 200 ml/m

Groundwater Sampling Form

Sample ID: MW-1

Site Information	
Site Name: Charah Brickhaven	**Project Number:** 10021146
Site Location: Moncure, NC	**Sampling Personnel: Charles Gruenberg**
Date: 08/10/2021	**Weather:** Cloudy

Well Information	
Well Diameter (in): 2"	**Purge Equipment: Mega Monsoon Pro**
Screened Interval (ft): 57' - 72'	**Pump Type:** ESP
Well Depth (ft): 75.30'	**Pump Depth (ft-bTOC):** ~73'
Depth-to-Water (ft-bTOC): 56.36	**Tubing Diameter (in):** 3/8" X 1/2"
Water Column Thickness (ft): 18.94	**Well Volume (ft^3):** 3.0304

1 Well Volume = (Total Depth - Static Water Level) * Well Capacity

Well Capacity (gallons per feet): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3' = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47

Purging Information

Parameter Instrument(s): YSI Pro / MPA 4Pro Turbidimeter

TIME	VOLUME PURGED (Liters)	CUMULATIVE VOLUME PURGED (Liters)	PURGE RATE (mL/min)	DEPTH TO WATER (ft-bTOC)	pH (SU) (±0.1)	TEMP. (C°)	COND. (µS/cm) (5%)	DISSOLVED OXYGEN (mg/L) (10%)*	ORP (mV) (±20mV)	TURBIDITY (NTUs) (≤10 or 10%)	COLOR/ ODOR (describe)
0720	0.0	0.0	200	56.46	6.55	19.7	9340	6.56	92.0	916.3	Tan/brown lt
0730	2.0	2.0	200	56.42	6.84	19.2	3178	5.34	67.7	487.7	lt tan
0740	1.5	3.5	150	56.44	6.84	20.5	2567	0.67	65.3	423.1	lt tan
0750	1.0	4.5	100	56.43	6.77	20.8	2580	3.33	68.7	233.6	lt tan/cloudy
0800	2.0	6.5	200	56.45	6.80	20.4	2662	3.24	76.6	135.1	lt tan/clear
0810	2.0	8.5	200	56.47	6.86	20.4	2761	3.12	87.1	60.53	Clear
0820	2.0	10.5	200	56.48	6.81	20.4	2927	3.02	72.3	37.24	Clear
0830	2.0	12.5	200	56.47	6.74	20.4	3040	2.83	94.1	26.16	Clear
0840	2.0	14.5	200	56.49	6.72	20.5	3151	2.63	104.2	14.63	Clear
0845	1.0	15.5	200	56.48	6.72	20.5	3202	2.54	107.8	9.97	Clear

* DO below 2.0 mg/L is stable at ±0.2 mg/L; DO below 0.5 mg/L is stable

Sample Information

Sample Number	Collection Time	Parameter	Container	Preservative
MW-1	0905	Radium 226/228	2 - 1 L Poly	HNO3
	0905	6010/6020/7470	1 - 250 mL Poly	HNO3
	0905	Cl, F, SO4	1 - 250 mL Poly	N/A
	0905	TDS	1 - 500 mL Poly	N/A

Sampled By: Charles Gruenberg	**Sample Time:** 0905
Date Sampled: 08/10/21	**Sampler Signature:**

Notes: Pumprate= 200 @ 0720,
Purged quickly to get sediment out @ 0725
0730 change to 150 ml/m
0742 quick purge to clear sediment out of tubing
0742 100 ml/m
200 @ 0750

HDR

Groundwater Sampling Form

Sample ID: MW-1

Purging Information (Page 2)

TIME	VOLUME PURGED (Liters)	CUMULATIVE VOLUME PURGED (Liters)	PURGE RATE (mL/min)	DEPTH TO WATER (ft-bTOC)	pH (SU) (±0.1)	TEMP. (C°)	COND. (µS/cm) (5%)	DISSOLVED OXYGEN (mg/L) (10%)*	ORP (mV) (±20mV)	TURBIDITY (NTUs) (≤10 or 10%)	COLOR/ ODOR (describe)
0850	1.0	16.5	200	56.49	6.72	20.5	3235	2.45	110.3	9.92	Clear
0855	1.0	17.5	200	56.48	6.72	20.5	3260	2.35	112.5	9.97	Clear
0900	1.0	18.5	200	56.48	6.71	20.5	3268	2.30	115.5	9.72	Clear
	SAMPLED @		0905		All	Stable					

* DO below 2.0 mg/L is stable at ±0.2 mg/L; DO below 0.5 mg/L is stable

DTW After Sampling = 56.47'

Turbidity After Sampling = 9.67 NTUs

Groundwater Sampling Form

Sample ID: MW-2

Site Information	
Site Name: Charah Brickhaven	**Project Number:** 10021146
Site Location: Moncure, NC	**Sampling Personnel: Charles Gruenberg**
Date: 08/10/21	**Weather:** Sunny

Well Information	
Well Diameter (in): 2"	**Purge Equipment: Mega Monsoon Pro**
Screened Interval (ft): 32' - 47'	**Pump Type:** ESP
Well Depth (ft): 50.15'	**Pump Depth (ft-bTOC):** ~ 48
Depth-to-Water (ft-bTOC): 24.01	**Tubing Diameter (in):** 3/8" X 1/2"
Water Column Thickness (ft): 26.14	**Well Volume (ft^3):** 4.1824

1 Well Volume = (Total Depth - Static Water Level) * Well Capacity

Well Capacity (gallons per feet): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3' = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47

Purging Information

Parameter Instrument(s): YSI Pro / Micro TPW Turbidimeter

TIME	VOLUME PURGED (Liters)	CUMULATIVE VOLUME PURGED (Liters)	PURGE RATE (mL/min)	DEPTH TO WATER (ft-bTOC)	pH (SU) (±0.1)	TEMP. (C°)	COND. (µS/cm) (5%)	DISSOLVED OXYGEN (mg/L) (10%)*	ORP (mV) (±20mV)	TURBIDITY (NTUs) (≤10 or 10%)	COLOR/ ODOR (describe)
1215	0.0	0.0	200	24.87	7.22	21.2	4315	5.57	172.3	71000	Brown
1225	1.5	1.5	150	27.03	7.80	20.8	4305	6.04	178.2	1100	Brown
1230	0.75	2.25	150	27.78	7.66	21.4	4349	5.51	184.3	935.4	Brown
1235	6.5	2.75	100	28.85	7.65	19.2	4350	6.35	186.9	698.3	lt brown/ tan
1240	0.5	3.25	160	29.09	7.64	22.1	4329	5.48	188.0	553.0	lt brown/tan
1250	1.0	4.25	100	30.31	7.65	21.3	4319	5.85	192.8	496.2	lt brown/tan
1300	1.0	5.25	100	31.54	7.66	22.4	4319	5.76	191.7	422.1	tan
1310	1.0	6.25	100	32.41	7.65	22.9	4322	5.92	123.8	246.2	lt tan/clear
1320	1.0	7.25	110	53.39	7.62	22.2	4323	5.71	154.7	254.6	clear/lt tan
1330	1.0	8.25	100	34.08	7.68	23.6	4316	5.50	162.3	160.2	Clear

* DO below 2.0 mg/L is stable at ±0.2 mg/L; DO below 0.5 mg/L is stable

Sample Information

Sample Number	Collection Time	Parameter	Container	Preservative
MW-2	1502	Radium 226/228	2 - 1 L Poly	HNO3
	1502	6010/6020/7470	1 - 250 mL Poly	HNO3
	1502	Cl, F, SO4	1 - 250 mL Poly	N/A
	1502	TDS	1 - 500 mL Poly	N/A

Sampled By: Charles Gruenberg — **Sample Time:** 1502

Date Sampled: 08/10/21 — **Sampler Signature:**

Notes: Pumprate=

1215 = 200

Turbid to purge sediment out & decrease flow

1225 = 150

1250 = purged dry, slow sediment set back to 100

PVC Stickup is broken off of PVC pipe

HDR

Groundwater Sampling Form

Sample ID: MW-2

Purging Information (Page 2)

TIME	VOLUME PURGED (Liters)	CUMULATIVE VOLUME PURGED (Liters)	PURGE RATE (mL/min)	DEPTH TO WATER (ft-bTOC)	pH (SU) (±0.1)	TEMP. (C°)	COND. (µS/cm) (5%)	DISSOLVED OXYGEN (mg/L) (10%)*	ORP (mV) (±20mV)	TURBIDITY (NTUs) (≤10 or 10%)	COLOR/ ODOR (describe)
1340	1.0	9.25	100	34.74	7.65	23.4	4315	5.66	171.1	91.20	Clear
1350	1.0	10.25	100	35.29	7.66	23.7	4292	5.49	175.4	63.57	Clear
1400	1.0	11.25	100	35.80	7.68	21.2	4274	6.02	180.1	60.22	Clear
1410	1.0	12.25	100	36.25	7.72	22.3	4241	5.65	122.3	45.49	Clear
1420	1.0	13.25	100	36.82	7.74	21.6	4203	5.68	155.9	44.68	Clear
1430	1.0	14.25	100	37.29	7.75	23.1	4218	5.45	164.2	45.37	Clear
1440	1.0	15.25	100	37.61	7.75	22.8	4172	5.51	173.3	42.91	Clear
1445	0.5	15.75	100	37.93	7.82	22.0	4066	5.71	175.2	45.55	Clear
1450	0.5	16.25	100	38.26	7.96	21.9	3981	5.65	176.1	48.21	Clear
1453	0.3	16.55	100	38.49	8.01	22.2	3910	5.56	177.2	50.01	Clear
1456	0.3	16.85	100	38.81	7.99	22.5	3875	5.56	178.8	46.43	Clear
		SAMPLE AFTER ~2.75 hrs									
			DTW Not stable								
			Turbidity within 10% but not under 10 NTU								
		SAMPLE @ 1502									

Groundwater Sampling Form

Sample ID: MW-2D

Site Information	
Site Name: Charah Brickhaven	**Project Number:** 10021146
Site Location: Moncure, NC	**Sampling Personnel: Charles Gruenberg**
Date: 08/10/21	**Weather:** Sunny

Well Information	
Well Diameter (in): 2"	**Purge Equipment: Mega Monsoon Pro**
Screened Interval (ft): 129' - 144'	**Pump Type:** ESP
Well Depth (ft): 147.4'	**Pump Depth (ft-bTOC):** 142
Depth-to-Water (ft-bTOC): 129.50	**Tubing Diameter (in):** 3/8" X 1/2"
Water Column Thickness (ft): 14.5	**Well Volume (ft^3):** 2.32
1 Well Volume = (Total Depth - Static Water Level) * Well Capacity	
Well Capacity (gallons per feet): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3' = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47	

Purging Information

Parameter Instrument(s): YSI Pro / Mega Pro Turbidimeter

TIME	VOLUME PURGED (Liters)	CUMULATIVE VOLUME PURGED (Liters)	PURGE RATE (mL/min)	DEPTH TO WATER (ft-bTOC)	pH (SU) (±0.1)	TEMP. (C°)	COND. (µS/cm) (5%)	DISSOLVED OXYGEN (mg/L) (10%)*	ORP (mV) (±20mV)	TURBIDITY (NTUs) (≤10 or 10%)	COLOR/ ODOR (describe)
1000	0.0	0.0	150	128.71	7.61	22.2	2990	1.97	-118.9	71000	Dark Brn.
1005	1.0	1.0	200	133.00	7.35	20.9	3251	1.26	-122.5	71000	Dark Brown
1010	0.5	1.5	160	133.11	7.37	22.0	3283	0.99	-125.8	71000	Dark Brn.
~~1020~~	~~1.0~~	2.5	~~160~~								
1020	Pump	stopped	pump	pt.	Lobe	over	discovered	pump Hose	pump	out	
	Pulling	pump	Line	in	Pump		Stuck	in well			
	Changed	pump									
1140				131.14							
1159	Pump	still	0.2	pumping	water		Equip	Equipment	Cold	Muddy	
		to	turbid								

* DO below 2.0 mg/L is stable at ±0.2 mg/L; DO below 0.5 mg/L is stable

Moving to MW-1 well

Sample Information

Sample Number	Collection Time	Parameter	Container	Preservative
MW-2D		Radium 226/228	2 - 1 L Poly	HNO3
		6010/6020/7470	1 - 250 mL Poly	HNO3
		Cl, F, SO4	1 - 250 mL Poly	N/A
		TDS	1 - 500 mL Poly	N/A

Sampled By: Charles Gruenberg	**Sample Time:**
Date Sampled: 08/10/21	**Sampler Signature:**

Notes: Pumprate= 1000 = 150 L/A

Retry

Groundwater Sampling Form

Sample ID: MW-2D

Site Information	
Site Name: Charah Brickhaven	**Project Number:** 10021146
Site Location: Moncure, NC	**Sampling Personnel: Charles Gruenberg**
Date: 8/16/21	**Weather:** Sunny

Well Information	
Well Diameter (in): 2"	**Purge Equipment: Mega Monsoon Pro**
Screened Interval (ft): 129' - 144'	**Pump Type:** ESP
Well Depth (ft): 147.4'	**Pump Depth (ft-bTOC):** ~143.0 (Hard to tell w/ water lvl noise)
Depth-to-Water (ft-bTOC): 131.76'	**Tubing Diameter (in):** 3/8" X 1/2"
Water Column Thickness (ft):	**Well Volume (ft^3):**
1 Well Volume = (Total Depth - Static Water Level) * Well Capacity	
Well Capacity (gallons per feet): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3' = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47	

Purging Information

Parameter Instrument(s): YSI Pro / MP10 TPW Turbidimeter

TIME	VOLUME PURGED (Liters)	CUMULATIVE VOLUME PURGED (Liters)	PURGE RATE (mL/min)	DEPTH TO WATER (ft-bTOC)	pH (SU) (±0.1)	TEMP. (C°)	COND. (µS/cm) (5%)	DISSOLVED OXYGEN (mg/L) (10%)*	ORP (mV) (±20mV)	TURBIDITY (NTUs) (≤10 or 10%)	COLOR/ ODOR (describe)
0950	0.0	0.0	150	131.87	7.68	20.9	3233	0.89	-196.2	466.0	Tan / lt tan / sulfur/rotten odor
0955	0.75	0.75	150	133.91	7.54	21.0	3230	0.33	-154.2	467.5	lt tan / sulfur odor
1010	2.25	3.00	150	134.46	7.55	21.7	3192	1.37	-139.8	470.8	lt tan
1020	1.0	4.00	100	134.76	7.53	21.8	3182	1.11	-138.4	340.1	lt tan
1030	1.0	5.00	100	135.13	7.55	22.4	3153	0.73	-141.1	284.8	lt tan
1040	1.0	6.00	100	135.31	7.56	22.9	3122	0.65	-142.6	267.0	lt tan
1100	2.0	8.00	100	135.97	7.69	23.4	2992	0.97	-140.9	181.9	lt tan
1120	2.0	10.00	100	136.33	7.70	24.1	2998	0.68	-140.5	137.3	cloudy
1140	2.0	12.00	100	136.77	7.69	23.2	2922	0.62	-143.0	89.77	clear
1200	2.0	14.00	100	137.28	7.63	23.4	2923	0.54	-141.2	55.33	clear

* DO below 2.0 mg/L is stable at ±0.2 mg/L; DO below 0.5 mg/L is stable

1210 pumped DRY Will come back w/ Bailer at 08/16/21

Sample Information

Sample Number	Collection Time	Parameter	Container	Preservative
MW-2D	0930	Radium 226/228	2 - 1 L Poly	HNO3
	0930	6010/6020/7470	1 - 250 mL Poly	HNO3
	0930	Cl, F, SO4	1 - 250 mL Poly	N/A
	0930	TDS	1 - 500 mL Poly	N/A

Sampled By: Charles Gruenberg — **Sample Time:** 0930

Date Sampled: ~~8/15/21~~ 8/16/21 — **Sampler Signature:**

Notes: Pumprate=

Pulled pump ~2' higher than first try

150 ml/m @ 0950

100 ml/m @ 1011

Purged sediment out at 1021 back to 100ml/m

Need to sample @ 1400

HDR

Groundwater Sampling Form

Sample ID: MW-2D

Purging Information (Page 2)

TIME	VOLUME PURGED (Liters)	CUMULATIVE VOLUME PURGED (Liters)	PURGE RATE (mL/min)	DEPTH TO WATER (ft-bTOC)	pH (SU) (±0.1)	TEMP. (C°)	COND. (µS/cm) (5%)	DISSOLVED OXYGEN (mg/L) (10%)*	ORP (mV) (±20mV)	TURBIDITY (NTUs) (≤10 or 10%)	COLOR/ ODOR (describe)
1210			100								
1215											
1220			150								
08/16/21			@	0916			w/	Bailer			
DTW	136.11'										
0920	—	—	—	136.11	7.48	22.0	3199	1.14	-113.5	220.7	Cloudy
0945	—	—	—							578.6	Brown
	SAMPLED		w/	Bailer	@	0930					
			Turbidity	high							

Mn, Li/ Cl, F, SO4/ TDS → 0920

Radium → 0945

Sulfur odor

Sulfur odor

* DO below 2.0 mg/L is stable at ±0.2 mg/L; DO below 0.5 mg/L is stable

Groundwater Sampling Form

Sample ID: MW-3

Site Information	
Site Name: Charah Brickhaven	**Project Number:** 10021146
Site Location: Moncure, NC	**Sampling Personnel: Charles Gruenberg**
Date: 8/12/2021	**Weather:** Sunny

Well Information	
Well Diameter (in): 2"	**Purge Equipment: Mega Monsoon Pro**
Screened Interval (ft): 25' - 40'	**Pump Type:** ESP
Well Depth (ft): 43.36'	**Pump Depth (ft-bTOC):** ~39.5
Depth-to-Water (ft-bTOC): 8.34	**Tubing Diameter (in):** 3/8" X 1/2"
Water Column Thickness (ft): 35.02	**Well Volume (ft^3):** 5.6032

1 Well Volume = (Total Depth - Static Water Level) * Well Capacity

Well Capacity (gallons per feet): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3' = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47

Purging Information

Parameter Instrument(s): YSI Pro / Rizin TPW Turbidimeter

TIME	VOLUME PURGED (Liters)	CUMULATIVE VOLUME PURGED (Liters)	PURGE RATE (mL/min)	DEPTH TO WATER (ft-bTOC)	pH (SU) (±0.1)	TEMP. (C°)	COND. (µS/cm) (5%)	DISSOLVED OXYGEN (mg/L) (10%)*	ORP (mV) (±20mV)	TURBIDITY (NTUs) (≤10 or 10%)	COLOR/ ODOR (describe)
1438	0.0	0.0	150	6.91	7.55	21.9	4249	1.40	10.6	2.79	Clear
1443	0.75	0.75	150	10.35	7.67	22.0	4283	1.14	97.7	74.25	Clear
1448	1.0	1.75	200	11.06	7.67	21.2	4228	1.31	77.7	66.36	Clear
1500	2.4	4.15	200	13.40	7.60	21.3	4191	2.22	84.9	70.89	Clear
1510	1.5	5.65	150	15.28	7.55	21.2	4186	2.69	103.1	33.57	Clear
1520	1.5	7.15	150	17.03	7.56	21.1	4167	2.73	111.3	20.09	Clear
1530	1.5	8.65	150	18.99	7.51	21.4	4174	2.78	116.5	10.40	Clear
1533	0.45	9.10	150	19.35	7.56	21.4	4175	2.68	118.2	10.00	Clear
1538	0.45	9.55	150	19.72	7.55	21.5	4190	2.81	110.7	9.68	Clear
1541	0.45	10.00	150	20.10	7.54	21.2	4183	2.89	109.9	8.88	Clear

* DO below 2.0 mg/L is stable at ±0.2 mg/L; DO below 0.5 mg/L is stable SAMPLE @ 1550

OTW not stable All others stable

Sample Information

Sample Number	Collection Time	Parameter	Container	Preservative
MW-3	1550	Radium 226/228	2 - 1 L Poly	HNO3
	1550	6010/6020/7470	1 - 250 mL Poly	HNO3
	1550	Cl, F, SO4	1 - 250 mL Poly	N/A
	1550	TDS	1 - 500 mL Poly	N/A

Sampled By: Charles Gruenberg	**Sample Time:** 1550
Date Sampled: 8/12/21	**Sampler Signature:**

Notes: Pumprate= 150 ml/m @ 1438
200 ml/m @ 1444

Groundwater Sampling Form

Sample ID: MW-4

Site Information	
Site Name: Charah Brickhaven	**Project Number:** 10021146
Site Location: Moncure, NC	**Sampling Personnel: Charles Gruenberg**
Date: 8/12/21	**Weather:** Sunny

Well Information	
Well Diameter (in): 2"	**Purge Equipment: Mega Monsoon Pro**
Screened Interval (ft): 13' - 23'	**Pump Type:** ESP
Well Depth (ft): 25.34'	**Pump Depth (ft-bTOC):** ~ 22'
Depth-to-Water (ft-bTOC): 8.74'	**Tubing Diameter (in):** 3/8" X 1/2"
Water Column Thickness (ft): 16.6	**Well Volume (ft^3):** 2.656

1 Well Volume = (Total Depth - Static Water Level) * Well Capacity

Well Capacity (gallons per feet): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3' = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47

Purging Information

Parameter Instrument(s): YSI Pro / Mi2,0 TPW Turbidimeter

TIME	VOLUME PURGED (Liters)	CUMULATIVE VOLUME PURGED (Liters)	PURGE RATE (mL/min)	DEPTH TO WATER (ft-bTOC)	pH (SU) (±0.1)	TEMP. (C°)	COND. (µS/cm) (5%)	DISSOLVED OXYGEN (mg/L) (10%)*	ORP (mV) (±20mV)	TURBIDITY (NTUs) (≤10 or 10%)	COLOR/ ODOR (describe)
1200	0.0	0.0	150	8.16	6.38	22.3	2054	1.42	14.1	161.6	Cloudy/cloudy
1210	1.5	1.5	150	9.58	6.38	21.6	2031	0.79	8.9	143.3	cloudy/cloudy
1220	1.0	2.5	100	9.73	6.39	21.2	2025	0.55	1.9	116.2	Clear
1240	3.0	5.5	150	10.04	6.38	20.7	2024	0.22	1.4	41.93	Clear
1250	1.5	7.0	150	10.13	6.38	20.4	2024	0.15	5.0	31.68	Clear
1255	1.75	8.75	350	10.70	6.37	19.2	2022	0.14	5.8	51.57	Clear
1315	3.0	11.75	150	10.09	6.41	20.7	2031	0.09	10.4	42.55	Clear
1325	1.50	13.25	150	10.10	6.37	20.5	2024	0.08	10.9	33.39	Clear
1335	1.50	14.75	150	10.10	6.42	20.4	2023	0.09	8.8	24.27	Clear
1345	1.50	16.25	150	—	6.40	20.4	2033	0.08	10.7	13.41	Clear

YSI shut off →

* DO below 2.0 mg/L is stable at ±0.2 mg/L; DO below 0.5 mg/L is stable

Sample Information

Sample Number	Collection Time	Parameter	Container	Preservative
MW-4	1405	Radium 226/228	2 - 1 L Poly	HNO3
	1405	6010/6020/7470	1 - 250 mL Poly	HNO3
	1405	Cl, F, SO4	1 - 250 mL Poly	N/A
	1405	TDS	1 - 500 mL Poly	N/A

Sampled By: Charles Gruenberg — **Sample Time:** 1405

Date Sampled: 8/12/21 — **Sampler Signature:** [signature]

Notes: Pumprate= 150 ml/min @ 1200
100 ml/min @ 1211
150 ml/min @ 1221

HDR

Groundwater Sampling Form

Sample ID: MW-4

Purging Information (Page 2)

TIME	VOLUME PURGED (Liters)	CUMULATIVE VOLUME PURGED (Liters)	PURGE RATE (mL/min)	DEPTH TO WATER (ft-bTOC)	pH (SU) (±0.1)	TEMP. (C°)	COND. (µS/cm) (5%)	DISSOLVED OXYGEN (mg/L) (10%)*	ORP (mV) (±20mV)	TURBIDITY (NTUs) (≤10 or 10%)	COLOR/ ODOR (describe)
1350	1.50	17.75	150	10.11	6.40	20.4	2034	0.08	10.8	9.27	Clear
1355	1.50	19.25	150	10.10	6.37	20.5	2034	0.08	11.1	4.60	Clear
1400	1.50	21.75	150	10.10	6.37	20.6	2041	0.08	11.2	7.04	Clear
		SAMPLE		@	1405		ALL	stable			

* DO below 2.0 mg/L is stable at ±0.2 mg/L; DO below 0.5 mg/L is stable

Groundwater Sampling Form

Sample ID: MW-5

Site Information	
Site Name: Charah Brickhaven	**Project Number:** 10021146
Site Location: Moncure, NC	**Sampling Personnel: Charles Gruenberg**
Date: 08/09/21	**Weather:** Sunny

Well Information	
Well Diameter (in): 2"	**Purge Equipment: Mega Monsoon Pro**
Screened Interval (ft): 34' - 44'	**Pump Type:** ESP
Well Depth (ft): 46.14'	**Pump Depth (ft-bTOC):** ~45
Depth-to-Water (ft-bTOC): 22.97	**Tubing Diameter (in):** 3/8" X 1/2"
Water Column Thickness (ft): 23.17	**Well Volume (ft^3):** 3.7072
1 Well Volume = (Total Depth - Static Water Level) * Well Capacity	
Well Capacity (gallons per feet): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3' = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47	

Purging Information

Parameter Instrument(s): YSI Pro / MP10 Tplw Turbidimeter

TIME	VOLUME PURGED (Liters)	CUMULATIVE VOLUME PURGED (Liters)	PURGE RATE (mL/min)	DEPTH TO WATER (ft-bTOC)	pH (SU) (±0.1)	TEMP. (C°)	COND. (µS/cm) (5%)	DISSOLVED OXYGEN (mg/L) (10%)*	ORP (mV) (±20mV)	TURBIDITY (NTUs) (≤10 or 10%)	COLOR/ ODOR (describe)	
1455	0.0	0.0	100	22.90	7.91	22.4	499	4.30	-109.3	961.4	lt brown/	
1500	0.5	0.5	100	24.45	7.51	21.4	495	2.51	-105.6	858.4	lt brown/	tan
1510	1.5	2.0	150	25.76	7.76	21.1	469	2.12	-92.0	603.9	lt brown/	tan
1520	1.0	3.0	100	26.69	7.03	21.9	425.1	1.76	-64.1	232.5	lt tan	
1530	1.0	4.0	100	27.30	7.24	22.6	406.8	1.83	-50.6	162.9	Clear	
1540	1.0	5.0	100	27.90	7.14	21.4	386.0	2.06	-38.8	116.9	Clear	
1550	1.0	6.0	100	28.76	7.09	21.7	378.3	2.17	-31.5	64.99	Clear	
1600	1.0	7.0	100	29.27	7.25	22.1	371.4	2.48	-28.2	44.16	Clear	
1610	1.0	8.0	100	30.01	7.13	22.0	369.0	2.35	-25.6	38.60	Clear	
1620	1.0	9.0	100	30.54	7.10	22.0	367.7	2.34	-23.7	26.86	Clear	

YSI Turned off →

* DO below 2.0 mg/L is stable at ±0.2 mg/L; DO below 0.5 mg/L is stable

Sample Information

Sample Number	Collection Time	Parameter	Container	Preservative
MW-5	1705	Radium 226/228	2 - 1 L Poly	HNO3
	1705	6010/6020/7470	1 - 250 mL Poly	HNO3
	1705	Cl, F, SO4	1 - 250 mL Poly	N/A
	1705	TDS	1 - 500 mL Poly	N/A

Sampled By: Charles Gruenberg — **Sample Time:** 1705

Date Sampled: 08/09/21 — **Sampler Signature:**

Notes: Pumprate=

100 ml/min

Missing w/ Purple Datum 1455 & 1500

150 ml/m @ 1500

100 ml/m @ 1520

HDR

Groundwater Sampling Form

Sample ID: MW-5

Purging Information (Page 2)

TIME	VOLUME PURGED (Liters)	CUMULATIVE VOLUME PURGED (Liters)	PURGE RATE (mL/min)	DEPTH TO WATER (ft-bTOC)	pH (SU) (±0.1)	TEMP. (C°)	COND. (µS/cm) (5%)	DISSOLVED OXYGEN (mg/L) (10%)*	ORP (mV) (±20mV)	TURBIDITY (NTUs) (≤10 or 10%)	COLOR/ ODOR (describe)
1630	1.0	10.0	100	31.26	7.10	20.6	365.6	2.50	-18.9	26.42	Clear
1635	0.5	10.5	100	31.74	7.11	21.3	362.6	2.42	-18.2	22.89	Clear
1640	0.5	11.0	100	32.16	7.08	21.3	366.7	2.45	-15.1	17.35	Clear
1645	0.5	11.5	100	32.59	7.13	21.4	363.8	2.45	-13.7	15.12	Clear
1650	0.5	12.0	100	33.02	7.11	21.5	364.6	2.49	-12.8	13.71	Clear
1655	0.5	12.5	100	33.36	7.09	21.8	362.3	2.48	-10.9	14.67	Clear
	SAMPLE @ 1705										
		Purged for 2 hrs									
		Turbidity not below 10 NTU						low	visible	10%	
		TDS @ 13.96 NTU after sampling									
		OTW @ 37.27' after sampling									

* DO below 2.0 mg/L is stable at ±0.2 mg/L; DO below 0.5 mg/L is stable

Groundwater Sampling Form

Sample ID: MW-6

Site Information	
Site Name: Charah Brickhaven	**Project Number:** 10021146
Site Location: Moncure, NC	**Sampling Personnel: Charles Gruenberg**
Date: 08/11/21	**Weather:** Sunny

Well Information	
Well Diameter (in): 2"	**Purge Equipment: Mega Monsoon Pro**
Screened Interval (ft): 12' - 27'	**Pump Type:** ESP
Well Depth (ft): 29.47'	**Pump Depth (ft-bTOC):** ~ 26.5
Depth-to-Water (ft-bTOC): 7.28	**Tubing Diameter (in):** 3/8" X 1/2"
Water Column Thickness (ft): 22.19	**Well Volume (ft^3):** 3.5504

1 Well Volume = (Total Depth - Static Water Level) * Well Capacity

Well Capacity (gallons per feet): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3' = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47

Purging Information

Parameter Instrument(s): YSI Pro / Mike Tyler Turbidimeter

TIME	VOLUME PURGED (Liters)	CUMULATIVE VOLUME PURGED (Liters)	PURGE RATE (mL/min)	DEPTH TO WATER (ft-bTOC)	pH (SU) (±0.1)	TEMP. (C°)	COND. (µS/cm) (5%)	DISSOLVED OXYGEN (mg/L) (10%)*	ORP (mV) (±20mV)	TURBIDITY (NTUs) (≤10 or 10%)	COLOR/ ODOR (describe)
1445	0.0	0.0	150	6.81	6.65	20.9	1054	0.54	148.5	294.7	Clear / Hydrocarbon
1450	0.75	0.75	150	7.78	6.62	21.4	1044	0.37	146.3	538.2	Hydrocarbon
1500	1.5	2.25	150	8.07	6.51	20.8	1009	0.25	153.0	406.0	Hydrocarbon
1510	1.5	3.75	150	8.27	6.47	20.0	1003	0.26	156.5	390.8	Hydrocarbon
1530	3.0	6.75	150	8.17	6.44	19.7	998	0.19	155.9	204.9	Cloudy/Clear
1535	1.5	8.25	300	8.68	6.45	18.4	992	0.15	151.0	181.0	Cloudy/Clear
1545	3.0	11.25	300	8.84	6.43	18.4	995	0.11	139.0	100.0	Clear
1555	3.0	14.25	300	8.91	6.45	18.3	993	0.10	131.0	51.02	Clear
1605	3.0	15.25	300	8.94	6.45	18.3	992	0.08	126.0	34.30	Clear
1625	6.0	21.25	300	8.95	6.44	18.3	993	0.08	120.6	23.28	Clear

* DO below 2.0 mg/L is stable at ±0.2 mg/L; DO below 0.5 mg/L is stable

Sample Information

Sample Number	Collection Time	Parameter	Container	Preservative
MW-6 DUP	1720	Radium 226/228	2 - 1 L Poly	HNO3
	1720	6010/6020/7470	1 - 250 mL Poly	HNO3
	1720	Cl, F, SO4	1 - 250 mL Poly	N/A
	1720	TDS	1 - 500 mL Poly	N/A

Sampled By: Charles Gruenberg — **Sample Time:** 1720

Date Sampled: 08/11/21 — **Sampler Signature:**

Notes: Pumprate= 150 mL/m @ 1445

1451 purged sediment then back to

1503 purged sediment out 150mL/m then back to

300mL/m @ 1531

HDR

Groundwater Sampling Form

Sample ID: MW-6

Purging Information (Page 2)

TIME	VOLUME PURGED (Liters)	CUMULATIVE VOLUME PURGED (Liters)	PURGE RATE (mL/min)	DEPTH TO WATER (ft-bTOC)	pH (SU) (±0.1)	TEMP. (C°)	COND. (µS/cm) (5%)	DISSOLVED OXYGEN (mg/L) (10%)*	ORP (mV) (±20mV)	TURBIDITY (NTUs) (≤10 or 10%)	COLOR/ ODOR (describe)
1635	3.0	24.25	300	8.86	6.44	18.4	994	0.08	118.7	19.54	Clear
1640	1.5	25.75	300	8.89	6.45	18.3	995	0.08	118.6	14.27	Clear
1645	1.5	27.25	300	8.91	6.46	18.0	996	0.09	117.9	17.77	Clear
1650	1.5	28.75	300	8.90	6.45	18.4	997	0.08	117.3	16.45	Clear
1655	1.5	30.25	300	8.91	6.45	18.3	996	0.08	117.1	15.63	Clear
1700	1.5	31.75	300	8.84	6.47	18.4	999	0.14	117.2	13.48	Clear
1705	1.5	33.25	300	8.81	6.47	18.5	1000	0.11	100.1	13.73	Clear
1708	0.9	34.15	300	8.82	6.45	18.4	1001	0.16	101.5	13.77	Clear
1711	0.9	35.05	300	8.79	6.45	18.5	1001	0.16	102.8	13.41	Clear
1714	0.9	35.95	300	8.80	6.45	18.6	1000	0.10	103.5	13.69	Clear
		SAMPLED @			1720						
		Turbidity		not	below	10	NTU	5.1	within	10%	

* DO below 2.0 mg/L is stable at ±0.2 mg/L; DO below 0.5 mg/L is stable

Groundwater Sampling Form

Sample ID: MW-7R

Site Information	
Site Name: Charah Brickhaven	**Project Number:** 10021146
Site Location: Moncure, NC	**Sampling Personnel:** Charles Gruenberg
Date: 08/11/21	**Weather:** Sunny

Well Information	
Well Diameter (in): 2"	**Purge Equipment:** Mega Monsoon Pro
Screened Interval (ft): 26' - 36'	**Pump Type:** ESP
Well Depth (ft): 39.94'	**Pump Depth (ft-bTOC):** ~37'
Depth-to-Water (ft-bTOC): 20.19	**Tubing Diameter (in):** 3/8" X 1/2"
Water Column Thickness (ft): 19.75	**Well Volume (ft^3):** 3.16

1 Well Volume = (Total Depth - Static Water Level) * Well Capacity

Well Capacity (gallons per feet): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3' = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47

Purging Information

Parameter Instrument(s): YSI Pro / Micro TPW Turbidimeter

TIME	VOLUME PURGED (Liters)	CUMULATIVE VOLUME PURGED (Liters)	PURGE RATE (mL/min)	DEPTH TO WATER (ft-bTOC)	pH (SU) (±0.1)	TEMP. (C°)	COND. (µS/cm) (5%)	DISSOLVED OXYGEN (mg/L) (10%)*	ORP (mV) (±20mV)	TURBIDITY (NTUs) (≤10 or 10%)	COLOR/ ODOR (describe)
1115	0.0	0.0	100	20.52	7.75	22.3	1555	4.73	134.0	1063	tan/light brown
1120	0.5	0.5	100	20.67	7.60	22.6	1560	4.45	142.8	546.6	tan
1130	1.0	1.5	100	21.71	7.56	21.7	1547	3.44	161.3	832.6	Tan/brown
1140	1.0	2.5	100	22.76	7.59	21.7	1542	3.35	171.1	532.4	Tan
1150	1.0	3.5	100	23.04	7.57	22.6	1557	3.21	178.8	448.1	Tan
1200	1.0	4.5	100	23.62	7.58	21.7	1553	3.16	183.4	307.0	lt tan
YSI shuts off → 1220	2.0	6.5	100	24.25	7.61	22.4	1560	3.19	169.3	110.6	clear
1230	1.0	7.5	100	24.63	7.58	21.6	1555	2.99	153.2	72.32	Clear
1240	1.0	8.5	100	24.85	7.58	22.4	1555	2.89	164.4	48.80	Clear
1250	1.0	9.5	100	25.24	7.58	21.6	1551	2.91	172.7	39.31	Clear

* DO below 2.0 mg/L is stable at ±0.2 mg/L; DO below 0.5 mg/L is stable

water stopped pumping due to low battery voltage

Sample Information

Sample Number	Collection Time	Parameter	Container	Preservative
MW-7R	1345	Radium 226/228	2 - 1 L Poly	HNO3
	1345	6010/6020/7470	1 - 250 mL Poly	HNO3
	1345	Cl, F, SO4	1 - 250 mL Poly	N/A
	1345	TDS	1 - 500 mL Poly	N/A

Sampled By: Charles Gruenberg — **Sample Time:** 1345

Date Sampled: 08/11/21 — **Sampler Signature:**

Notes: Pumprate= 100 @ 1115

1122 purged to get rid of sediment back to 100ml/m

1133 purged to get rid of sediment back to 100 ml/m

1151 purged to get sediment out back down to 100ml/m

HDR

Groundwater Sampling Form

Sample ID: MW-7R

Purging Information (Page 2)

TIME	VOLUME PURGED (Liters)	CUMULATIVE VOLUME PURGED (Liters)	PURGE RATE (mL/min)	DEPTH TO WATER (ft-bTOC)	pH (SU) (±0.1)	TEMP. (C°)	COND. (µS/cm) (5%)	DISSOLVED OXYGEN (mg/L) (10%)*	ORP (mV) (±20mV)	TURBIDITY (NTUs) (≤10 or 10%)	COLOR/ ODOR (describe)
1300	1.0	10.5	100	25.46	7.57	22.0	1559	2.88	176.9	28.60	Clear
1310	1.0	11.5	100	25.72	7.57	22.3	1556	2.76	180.5	20.39	Clear
1320	1.0	12.5	100	25.91	7.57	22.4	1553	2.68	183.0	16.33	Clear
1325	0.5	13.0	100	2606	7.57	21.8	1551	2.77	184.1	13.94	Clear
1330	0.5	13.5	100	26.19	7.57	22.0	1546	2.74	184.2	10.27	Clear
1335	0.5	14.0	100	26.32	7.58	22.1	1547	2.73	184.2	10.13	Clear
1340	0.5	14.5	100	26.41	7.57	22.1	1545	2.72	184.9	9.84	Clear
		SAMPLE (2)		1345			ALL	STABLE			

Groundwater Sampling Form

Sample ID: MW-8

Site Information	
Site Name: Charah Brickhaven	**Project Number:** 10021146
Site Location: Moncure, NC	**Sampling Personnel: Charles Gruenberg**
Date: 08/11/2021	**Weather:** Cloudy

Well Information	
Well Diameter (in): 2"	**Purge Equipment: Mega Monsoon Pro**
Screened Interval (ft): 31' - 46'	**Pump Type:** ESP
Well Depth (ft): 49.06'	**Pump Depth (ft-bTOC):** ~47
Depth-to-Water (ft-bTOC): 35.61	**Tubing Diameter (in):** 3/8" X 1/2"
Water Column Thickness (ft): 13.45	**Well Volume (ft^3):** 2.152

1 Well Volume = (Total Depth - Static Water Level) * Well Capacity

Well Capacity (gallons per feet): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3' = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47

Purging Information

Parameter Instrument(s): YSI Pro / MicroTPW Turbidimeter

TIME	VOLUME PURGED (Liters)	CUMULATIVE VOLUME PURGED (Liters)	PURGE RATE (mL/min)	DEPTH TO WATER (ft-bTOC)	pH (SU) (±0.1)	TEMP. (C°)	COND. (µS/cm) (5%)	DISSOLVED OXYGEN (mg/L) (10%)*	ORP (mV) (±20mV)	TURBIDITY (NTUs) (≤10 or 10%)	COLOR/ ODOR (describe)
0730	0.0	0.0	100	35.01	7.18	20.1	2509	4.05	134.2	640.1	Tan/lt brown
0735	0.5	0.5	100	35.90	7.16	20.4	2515	3.83	158.3	519.3	Tan/lt brown
0745	1.0	1.5	100	35.96	7.13	20.4	2505	3.48	185.6	392.2	Tan
0755	1.0	2.5	100	35.99	7.12	20.7	2412	2.94	191.8	208.5	Cl. Tan/lt brown
0805	1.0	3.5	100	36.04	7.13	20.4	2298	2.73	193.2	155.4	Cl. Tan/clear
0815	1.0	4.5	100	36.02	7.13	21.4	2231	2.09	191.9	147.0	Clear
0825	2.0	6.5	200	36.28	7.15	20.5	2098	2.07	179.2	65.47	Clear
0835	2.0	8.5	200	36.40	7.18	20.6	1894	1.91	101.6	55.73	Clear
0845	2.0	10.5	200	36.45	7.16	20.6	1785	1.41	110.4	35.55	Clear
0855	2.0	12.5	200	36.49	7.17	20.6	1683	1.15	102.3	27.51	Clear

YSI shut off →

* DO below 2.0 mg/L is stable at ±0.2 mg/L; DO below 0.5 mg/L is stable

Sample Information

Sample Number	Collection Time	Parameter	Container	Preservative
MW-8	0955	Radium 226/228	2 - 1 L Poly	HNO3
	0955	6010/6020/7470	1 - 250 mL Poly	HNO3
	0955	Cl, F, SO4	1 - 250 mL Poly	N/A
	0955	TDS	1 - 500 mL Poly	N/A

Sampled By: Charles Gruenberg — **Sample Time:** 0955

Date Sampled: 08/11/2021 — **Sampler Signature:**

Notes: Pumprate=

Weigh next in start up

100 ml/m @ 0730

Purged sediment out @ 0736 back to 100 ml/m

Purged sediment out @ 0802 back to 100 ml/m

200 ml/m @ 0816

Groundwater Sampling Form

Sample ID: MW-8

Purging Information (Page 2)

TIME	VOLUME PURGED (Liters)	CUMULATIVE VOLUME PURGED (Liters)	PURGE RATE (mL/min)	DEPTH TO WATER (ft-bTOC)	pH (SU) (±0.1)	TEMP. (C°)	COND. (µS/cm) (5%)	DISSOLVED OXYGEN (mg/L) (10%)*	ORP (mV) (±20mV)	TURBIDITY (NTUs) (≤10 or 10%)	COLOR/ ODOR (describe)
0905	2.0	14.5	200	36.51	7.19	20.7	1656	0.97	94.6	24.94	Clear
0915	2.0	16.5	200	36.61	7.20	20.7	1585	0.94	85.0	23.45	Clear
0925	2.0	18.5	200	36.63	7.18	20.6	1582	0.81	77.5	19.61	Clear
0935	2.0	20.5	200	36.62	7.21	20.6	1544	0.78	69.3	14.84	Clear
0940	1.0	21.5	200	36.63	7.22	20.8	1526	0.77	63.3	10.02	Clear
0945	1.0	22.5	200	36.61	7.23	20.9	1518	0.74	61.3	9.92	Clear
0950	1.0	23.5	200	36.61	7.23	20.9	1509	0.69	60.3	9.58	Clear
		SAMPLE	D	(2)	0955		All	Stable			

* DO below 2.0 mg/L is stable at ±0.2 mg/L; DO below 0.5 mg/L is stable

HDR

Groundwater Sampling Form

Sample ID: MW-9

Site Information	
Site Name: Charah Brickhaven	**Project Number:** 10021146
Site Location: Moncure, NC	**Sampling Personnel: Charles Gruenberg**
Date: 08/09/2021	**Weather:** Sunny

Well Information	
Well Diameter (in): 2"	**Purge Equipment: Mega Monsoon Pro**
Screened Interval (ft): 26' - 36'	**Pump Type:** ESP
Well Depth (ft): 36'	**Pump Depth (ft-bTOC):** —
Depth-to-Water (ft-bTOC): —	**Tubing Diameter (in):** 3/8" X 1/2"
Water Column Thickness (ft): —	**Well Volume (ft^3):** —

1 Well Volume = (Total Depth - Static Water Level) * Well Capacity

Well Capacity (gallons per feet): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3' = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47

Purging Information

Parameter Instrument(s): —

TIME	VOLUME PURGED (Liters)	CUMULATIVE VOLUME PURGED (Liters)	PURGE RATE (mL/min)	DEPTH TO WATER (ft-bTOC)	pH (SU) (±0.1)	TEMP. (C°)	COND. (µS/cm) (5%)	DISSOLVED OXYGEN (mg/L) (10%)*	ORP (mV) (±20mV)	TURBIDITY (NTUs) (≤10 or 10%)	COLOR/ ODOR (describe)

DRY

* DO below 2.0 mg/L is stable at ±0.2 mg/L; DO below 0.5 mg/L is stable

Sample Information

Sample Number	Collection Time	Parameter	Container	Preservative
MW-9	N/A	Radium 226/228	2 - 1 L Poly	HNO3
	N/A	6010/6020/7470	1 - 250 mL Poly	HNO3
	N/A	Cl, F, SO4	1 - 250 mL Poly	N/A
	N/A	TDS	1 - 500 mL Poly	N/A

Sampled By: Charles Gruenberg — **Sample Time:** N/A

Date Sampled: N/A — **Sampler Signature:**

Notes: Pumprate= N/A

Groundwater Sampling Form

Sample ID: MW-10

Site Information	
Site Name: Charah Brickhaven	**Project Number:** 10021146
Site Location: Moncure, NC	**Sampling Personnel: Charles Gruenberg**
Date: 08/09/2021	**Weather:** Sunny

Well Information	
Well Diameter (in): 2"	**Purge Equipment: Mega Monsoon Pro**
Screened Interval (ft): 37' - 47'	**Pump Type:** ESP
Well Depth (ft): 49.91	**Pump Depth (ft-bTOC):** ~47'
Depth-to-Water (ft-bTOC): 37.41	**Tubing Diameter (in):** 3/8" X 1/2"
Water Column Thickness (ft): 12.5'	**Well Volume (ft^3):** 2.0

1 Well Volume = (Total Depth - Static Water Level) * Well Capacity

Well Capacity (gallons per feet): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3' = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47

Purging Information

Parameter Instrument(s): YSI Pro, Mini TPL Turbidimeter

TIME	VOLUME PURGED (Liters)	CUMULATIVE VOLUME PURGED (Liters)	PURGE RATE (mL/min)	DEPTH TO WATER (ft-bTOC)	pH (SU) (±0.1)	TEMP. (C°)	COND. (µS/cm) (5%)	DISSOLVED OXYGEN (mg/L) (10%)*	ORP (mV) (±20mV)	TURBIDITY (NTUs) (≤10 or 10%)	COLOR/ ODOR (describe)	
1122	0.0	0.0	100	38.40	7.76	23.2	605	6.97	-138.0	747.3	Cloudy	lt brown
1125	.3	0.3	100	38.55	7.52	23.3	602	6.86	-150.6	711.4	Cloudy	lt brown
1130	0.5	0.8	100	38.92	7.75	23.1	593	6.62	-153.3	603.0	Cloudy	lt brown
1135	0.5	1.3	100	39.61	7.52	22.6	593	5.86	-169.1	690.5	Cloudy	tan
1145	1.0	2.3	100	40.38	7.79	24.7	587	5.33	-170.9	321.8	Cloudy	tan
1150	0.5	2.8	100	40.82	7.74	25.0	580	5.35	-159.8	273.3	Cloudy	lt tan
1155	0.5	3.3	100	41.15	7.81	24.0	574	5.32	-154.9	219.2	Clear/cloudy	
1200	0.5	3.8	100	41.61	7.58	22.7	573	5.06	-146.4	281.7	Clear/cloudy	
1205	0.5	4.3	100	41.75	7.85	24.2	575	4.73	-138.3	224.3	Clear/cloudy	
1210	0.5	4.8	100	41.82	7.83	24.9	574	4.62	-127.9	143.6	Clear	

* DO below 2.0 mg/L is stable at ±0.2 mg/L; DO below 0.5 mg/L is stable

Sample Information

Sample Number	Collection Time	Parameter	Container	Preservative
MW-10	1320	Radium 226/228	2 - 1 L Poly	HNO3
	1320	6010/6020/7470	1 - 250 mL Poly	HNO3
	1320	Cl, F, SO4	1 - 250 mL Poly	N/A
	1320	TDS	1 - 500 mL Poly	N/A

Sampled By: Charles Gruenberg	**Sample Time:** 1320
Date Sampled: 08/09/2021	**Sampler Signature:**

Notes: Pumprate= 100 ml/m @ 1122

Turned pumprate up @ 1133 to clear bulk of sediment

100 ml/m @ 1134

Turned pumprate up @ 1156 to clear bulk of sediment

100 ml/m @ 1157

@ 1248 pump stopped to readjust to 100 ml/min

Groundwater Sampling Form

Sample ID: MW-10

Purging Information (Page 2)

TIME	VOLUME PURGED (Liters)	CUMULATIVE VOLUME PURGED (Liters)	PURGE RATE (mL/min)	DEPTH TO WATER (ft-bTOC)	pH (SU) (±0.1)	TEMP. (C°)	COND. (µS/cm) (5%)	DISSOLVED OXYGEN (mg/L) (10%)*	ORP (mV) (±20mV)	TURBIDITY (NTUs) (≤10 or 10%)	COLOR/ ODOR (describe)
1215	0.5	5.3	100	41.90	7.83	25.9	573	4.50	-119.3	102.6	Clear
1220	0.5	5.8	100	41.97	7.79	26.4	573	4.42	-102.1	101.1	Clear
1225	0.5	6.3	100	42.03	7.79	26.8	574	4.40	-89.8	95.08	Clear
1228	0.3	6.6	100	42.09	7.79	27.1	572	4.30	-82.8	90.68	Clear
1231	0.3	6.9	100	42.13	7.79	27.2	573	4.28	-75.8	81.33	Clear
1234	0.3	7.2	100	42.20	7.81	27.3	572	4.26	-67.8	75.87	Clear
1237	0.3	7.5	100	42.24	7.79	27.0	571	4.30	-59.0	66.02	Clear
1240	0.3	7.8	100	42.27	7.78	26.9	571	4.31	-54.3	64.62	Clear
1243	0.3	8.1	100	42.31	7.80	26.9	570	4.25	-46.3	61.79	Clear
1246	0.3	8.4	100	42.39	7.83	26.5	573	4.49	-38.4	58.29	Clear
1249	0.3	8.7	100	42.44	7.83	24.7	566	4.71	-46.7	63.03	Clear
1252	0.3	9.0	100	42.52	7.84	24.3	564	4.39	-66.3	64.14	Clear
1255	0.3	9.3	100	42.56	7.85	24.4	565	4.31	-68.5	62.74	Clear
1258	0.3	9.6	100	42.64	7.86	24.4	561	4.28	-63.0	57.48	Clear
1301	0.3	9.9	100	42.71	7.82	24.2	560	4.18	-60.4	55.20	Clear
1304	0.3	10.2	100	42.78	7.86	25.3	559	4.09	-56.4	51.24	Clear
1307	0.3	10.5	100	42.80	7.88	24.8	562	4.36	-43.2	42.27	Clear
1310	0.3	10.8	100	42.94	7.89	24.6	557	4.17	-39.8	36.16	Clear
1313	0.3	11.1	100	43.01	7.89	24.8	556	4.06	-34.0	36.84	Clear
1316	0.3	11.4	100	43.09	7.89	25.3	556	4.01	-30.7	36.13	Clear

YSI shut off →

SAMPLED Before Well was dry and had Enough water for Sample Bottles

Turbidity not below 10 NTU but within 10%

Turbidity after filling bottles = 31.8 NTU

* DO below 2.0 mg/L is stable at ±0.2 mg/L; DO below 0.5 mg/L is stable

DTW after SAG & HDR Sampling = 44.89'

Groundwater Sampling Form

Sample ID: MW-11

Site Information	
Site Name: Charah Brickhaven	**Project Number:** 10021146
Site Location: Moncure, NC	**Sampling Personnel: Charles Gruenberg**
Date: 08/12/21	**Weather:** Cloudy

Well Information	
Well Diameter (in): 2"	**Purge Equipment: Mega Monsoon Pro**
Screened Interval (ft): ~~28.50' - 43.50'~~ 40 - 25	**Pump Type:** ESP
Well Depth (ft): 43.50'	**Pump Depth (ft-bTOC):** ~40'
Depth-to-Water (ft-bTOC): 11.71'	**Tubing Diameter (in):** 3/8" X 1/2"
Water Column Thickness (ft): 31.79	**Well Volume (ft^3):** 5.0864
1 Well Volume = (Total Depth - Static Water Level) * Well Capacity	
Well Capacity (gallons per feet): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3' = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47	

Purging Information

Parameter Instrument(s): YSI Pro / Myron 7PW Turbidity meter

TIME	VOLUME PURGED (Liters)	CUMULATIVE VOLUME PURGED (Liters)	PURGE RATE (mL/min)	DEPTH TO WATER (ft-bTOC)	pH (SU) (±0.1)	TEMP. (C°)	COND. (µS/cm) (5%)	DISSOLVED OXYGEN (mg/L) (10%)*	ORP (mV) (±20mV)	TURBIDITY (NTUs) (≤10 or 10%)	COLOR/ ODOR (describe)
0725	0.0	0.0	300	10.60	6.43	18.5	761	1.09	85.2	127.4	Clear
0730	0.75	0.75	150	13.19	6.78	18.8	784	0.61	41.9	212.3	Clear/cloudy
0740	1.50	2.25	150	13.64	6.80	19.1	786	0.59	31.4	191.8	Clear/cloudy
0800	3.0	5.25	150	14.23	6.77	18.9	789	0.37	19.8	169.3	Clear/cloudy
0810	2.0	7.25	200	14.83	6.75	18.2	783	0.29	26.1	135.0	Clear/cloudy
0830	4.0	11.25	200	15.71	6.66	18.1	794	0.17	35.3	27.78	Clear
0840	2.0	13.25	200	15.97	6.67	18.3	792	0.14	35.8	20.27	Clear
0845	1.0	14.25	200	15.98	6.66	18.3	796	0.14	36.5	18.47	Clear
0850	1.0	15.25	200	16.13	6.65	18.4	798	0.14	37.2	15.35	Clear
0900	2.0	17.25	200	16.13	6.65	18.3	801	0.13	38.4	13.09	Clear

* DO below 2.0 mg/L is stable at ±0.2 mg/L; DO below 0.5 mg/L is stable

Sample Information

Sample Number	Collection Time	Parameter	Container	Preservative
MW-11	0926	Radium 226/228	2 - 1 L Poly	HNO3
	0926	6010/6020/7470	1 - 250 mL Poly	HNO3
	0926	Cl, F, SO4	1 - 250 mL Poly	N/A
	0920	TDS	1 - 500 mL Poly	N/A

Sampled By: Charles Gruenberg — **Sample Time:** 0926

Date Sampled: 08/12/21 — **Sampler Signature:**

Notes: Pumprate= 300 ml/m @ 0725
150 @ 0730
200 @ 0801

HDR

Groundwater Sampling Form

Sample ID: MW-11

Purging Information (Page 2)

TIME	VOLUME PURGED (Liters)	CUMULATIVE VOLUME PURGED (Liters)	PURGE RATE (mL/min)	DEPTH TO WATER (ft-bTOC)	pH (SU) (±0.1)	TEMP. (C°)	COND. (µS/cm) (5%)	DISSOLVED OXYGEN (mg/L) (10%)*	ORP (mV) (±20mV)	TURBIDITY (NTUs) (≤10 or 10%)	COLOR/ ODOR (describe)
0905	1.0	18.25	200	16.14	6.65	18.3	901	0.14	38.8	10.31	Clear
0910	1.0	19.25	200	16.22	6.65	17.9	908	0.13	39.9	9.67	Clear
0915	1.0	20.25	200	16.28	6.64	18.3	906	0.11	39.9	9.86	Clear
		SAMPLE	@		0920						
				All	Stable						

* DO below 2.0 mg/L is stable at ±0.2 mg/L; DO below 0.5 mg/L is stable

Groundwater Sampling Form

Sample ID: MW-11D

Site Information	
Site Name: Charah Brickhaven	**Project Number:** 10021146
Site Location: Moncure, NC	**Sampling Personnel:** Charles Gruenberg
Date: 08/12/21	**Weather:** Sunny

Well Information	
Well Diameter (in): 2"	**Purge Equipment:** Mega Monsoon Pro
Screened Interval (ft): 50' - 65'	**Pump Type:** ESP
Well Depth (ft): 68.18'	**Pump Depth (ft-bTOC):** ~ 64
Depth-to-Water (ft-bTOC): 8.09'	**Tubing Diameter (in):** 3/8" X 1/2"
Water Column Thickness (ft): 60.09	**Well Volume (ft^3):** 9.6144

1 Well Volume = (Total Depth - Static Water Level) * Well Capacity

Well Capacity (gallons per feet): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3' = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47

Purging Information

Parameter Instrument(s): YSI Pro / Micro TPW Turbidimeter

TIME	VOLUME PURGED (Liters)	CUMULATIVE VOLUME PURGED (Liters)	PURGE RATE (mL/min)	DEPTH TO WATER (ft-bTOC)	pH (SU) (±0.1)	TEMP. (C°)	COND. (µS/cm) (5%)	DISSOLVED OXYGEN (mg/L) (10%)*	ORP (mV) (±20mV)	TURBIDITY (NTUs) (≤10 or 10%)	COLOR/ ODOR (describe)
1000	0.0	0.0	200	8.26	8.71	19.7	6381	1.17	151.6	10.58	Clear
1010	2.0	2.0	200	9.32	8.92	20.8	4628	0.54	139.8	21.28	Clear
1020	2.0	4.0	200	9.82	8.92	20.4	4622	0.38	117.8	29.17	Clear
1030	2.0	6.0	200	10.32	8.90	19.8	4365	0.30	102.1	41.44	Clear
1050	4.0	10.0	200	10.78	8.92	19.6	4089	0.16	83.3	21.58	Clear
1100	2.0	12.0	200	11.29	8.92	18.9	3891	0.14	74.4	12.21	Clear
1105	1.0	13.0	200	11.47	8.92	18.6	3685	0.13	69.2	10.34	Clear
1110	1.0	14.0	200	11.53	8.90	19.2	3596	0.11	65.5	9.56	Clear
1115	1.0	15.0	200	11.69	8.92	18.9	3500	0.12	62.5	9.99	Clear
	SAMPLE	@	1120		ALL	STABLE					

* DO below 2.0 mg/L is stable at ±0.2 mg/L; DO below 0.5 mg/L is stable

Sample Information

Sample Number	Collection Time	Parameter	Container	Preservative
MW-11D	1120	Radium 226/228	2 - 1 L Poly	HNO3
	1120	6010/6020/7470	1 - 250 mL Poly	HNO3
	1120	Cl, F, SO4	1 - 250 mL Poly	N/A
	1120	TDS	1 - 500 mL Poly	N/A

Sampled By: Charles Gruenberg **Sample Time:** 1120

Date Sampled: 08/12/21 **Sampler Signature:**

Notes: Pumprate= 200 @ 1000

Groundwater Sampling Form

Sample ID: LEACHATE

Site Information	
Site Name: Charah Brickhaven	**Project Number:** 10021146
Site Location: Moncure, NC	**Sampling Personnel: Charles Gruenberg**
Date: 8/13/21	**Weather:** Sunny

Well Information	
Well Diameter (in): N/A	**Purge Equipment:** N/A
Screened Interval (ft): N/A	**Pump Type:** N/A
Well Depth (ft): N/A	**Pump Depth (ft-bTOC):** N/A
Depth-to-Water (ft-bTOC): N/A	**Tubing Diameter (in):** N/A
Water Column Thickness (ft): N/A	**Well Volume (ft^3):** N/A
1 Well Volume = (Total Depth - Static Water Level) * Well Capacity	
Well Capacity (gallons per feet): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3' = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47	

Purging Information

Parameter Instrument(s): YSI Pro / Mini TPW Turbidimeter

TIME	VOLUME PURGED (Liters)	CUMULATIVE VOLUME PURGED (Liters)	PURGE RATE (mL/min)	DEPTH TO WATER (ft-bTOC)	pH (SU) (±0.1)	TEMP. (C°)	COND. (µS/cm) (5%)	DISSOLVED OXYGEN (mg/L) (10%)*	ORP (mV) (±20mV)	TURBIDITY (NTUs) (≤10 or 10%)	COLOR/ ODOR (describe)
0805	—	—	—	—	7.36	27.9	1809	4.84	138.6	5.75	Clear

* DO below 2.0 mg/L is stable at ±0.2 mg/L; DO below 0.5 mg/L is stable

Sample Information

Sample Number	Collection Time	Parameter	Container	Preservative
LEACHATE	0808	Radium 226/228	2 - 1 L Poly	HNO3
	0808	6010/6020/7470	1 - 250 mL Poly	HNO3
	0808	Cl, F, SO4	1 - 250 mL Poly	N/A
	0808	TDS	1 - 500 mL Poly	N/A

Sampled By: Charles Gruenberg	**Sample Time:** 0808
Date Sampled: 8/13/21	**Sampler Signature:**

Notes: Pumprate= —

Groundwater Sampling Form

Sample ID: SW-1

Site Information	
Site Name: Charah Brickhaven	**Project Number:** 10021146
Site Location: Moncure, NC	**Sampling Personnel: Charles Gruenberg**
Date: 8/13/21	**Weather:** Sunny

Well Information	
Well Diameter (in): N/A	**Purge Equipment:** N/A
Screened Interval (ft): N/A	**Pump Type:** N/A
Well Depth (ft): N/A	**Pump Depth (ft-bTOC):** N/A
Depth-to-Water (ft-bTOC): N/A	**Tubing Diameter (in):** N/A
Water Column Thickness (ft): N/A	**Well Volume (ft^3):** N/A
1 Well Volume = (Total Depth - Static Water Level) * Well Capacity	
Well Capacity (gallons per feet): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3' = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47	

Purging Information

Parameter Instrument(s): YSI Pro / Micro TPW Turbidimeter

TIME	VOLUME PURGED (Liters)	CUMULATIVE VOLUME PURGED (Liters)	PURGE RATE (mL/min)	DEPTH TO WATER (ft-bTOC)	pH (SU) (±0.1)	TEMP. (C°)	COND. (µS/cm) (5%)	DISSOLVED OXYGEN (mg/L) (10%)*	ORP (mV) (±20mV)	TURBIDITY (NTUs) (≤10 or 10%)	COLOR/ ODOR (describe)
0856	—	—	—	—	6.90	24.0	54.5	0.85	106.5	1016	[illegible] brown

* DO below 2.0 mg/L is stable at ±0.2 mg/L; DO below 0.5 mg/L is stable

Sample Information

Sample Number	Collection Time	Parameter	Container	Preservative
SW-1	0859	Radium 226/228	2 - 1 L Poly	HNO3
	0859	6010/6020/7470	1 - 250 mL Poly	HNO3
	0859	Cl, F, SO4	1 - 250 mL Poly	N/A
	0859	TDS	1 - 500 mL Poly	N/A

Sampled By: Charles Gruenberg	**Sample Time:** 0859
Date Sampled: 08/13/21	**Sampler Signature:** [signature]

Notes: Pumprate= —

Stagnant, Not Flowing

Groundwater Sampling Form

Sample ID: SW-2

Site Information	
Site Name: Charah Brickhaven	**Project Number:** 10021146
Site Location: Moncure, NC	**Sampling Personnel: Charles Gruenberg**
Date: 08/13/2021	**Weather:** Sunny

Well Information	
Well Diameter (in): N/A	**Purge Equipment:** N/A
Screened Interval (ft): N/A	**Pump Type:** N/A
Well Depth (ft): N/A	**Pump Depth (ft-bTOC):** N/A
Depth-to-Water (ft-bTOC): N/A	**Tubing Diameter (in):** N/A
Water Column Thickness (ft): N/A	**Well Volume (ft^3):** N/A

1 Well Volume = (Total Depth - Static Water Level) * Well Capacity

Well Capacity (gallons per feet): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3' = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47

Purging Information

Parameter Instrument(s): YSI Pro / Mpro TPW Turbidimeter

TIME	VOLUME PURGED (Liters)	CUMULATIVE VOLUME PURGED (Liters)	PURGE RATE (mL/min)	DEPTH TO WATER (ft-bTOC)	pH (SU) (±0.1)	TEMP. (C°)	COND. (µS/cm) (5%)	DISSOLVED OXYGEN (mg/L) (10%)*	ORP (mV) (±20mV)	TURBIDITY (NTUs) (≤10 or 10%)	COLOR/ ODOR (describe)
0722	—	—	—	—	7.36	23.5	245.9	2.58	84.8	57.60	cloudy/clear/brown

* DO below 2.0 mg/L is stable at ±0.2 mg/L; DO below 0.5 mg/L is stable

Sample Information

Sample Number	Collection Time	Parameter	Container	Preservative
SW-2	0725	Radium 226/228	2 - 1 L Poly	HNO3
	0725	6010/6020/7470	1 - 250 mL Poly	HNO3
	0725	Cl, F, SO4	1 - 250 mL Poly	N/A
	0725	TDS	1 - 500 mL Poly	N/A

Sampled By: Charles Gruenberg **Sample Time:** 0725

Date Sampled: 08/13/2021 **Sampler Signature:**

Notes: Pumprate= —

Stagnant Water, Not flowing

Groundwater Sampling Form

Sample ID: SW-3

Site Information	
Site Name: Charah Brickhaven	**Project Number:** 10021146
Site Location: Moncure, NC	**Sampling Personnel: Charles Gruenberg**
Date: 08/13/2021	**Weather:** Sunny

Well Information	
Well Diameter (in): N/A	**Purge Equipment:** N/A
Screened Interval (ft): N/A	**Pump Type:** N/A
Well Depth (ft): N/A	**Pump Depth (ft-bTOC):** N/A
Depth-to-Water (ft-bTOC): N/A	**Tubing Diameter (in):** N/A
Water Column Thickness (ft): N/A	**Well Volume (ft^3):** N/A
1 Well Volume = (Total Depth - Static Water Level) * Well Capacity	
Well Capacity (gallons per feet): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3' = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47	

Purging Information

Parameter Instrument(s): YSI Pro / Mini TPW Turbidimeter

TIME	VOLUME PURGED (Liters)	CUMULATIVE VOLUME PURGED (Liters)	PURGE RATE (mL/min)	DEPTH TO WATER (ft-bTOC)	pH (SU) (±0.1)	TEMP. (C°)	COND. (µS/cm) (5%)	DISSOLVED OXYGEN (mg/L) (10%)*	ORP (mV) (±20mV)	TURBIDITY (NTUs) (≤10 or 10%)	COLOR/ ODOR (describe)
0732	—	—	—	—							
					DRY						

* DO below 2.0 mg/L is stable at ±0.2 mg/L; DO below 0.5 mg/L is stable

Sample Information

Sample Number	Collection Time	Parameter	Container	Preservative
SW-3		Radium 226/228	2 - 1 L Poly	HNO3
		6010/6020/7470	1 - 250 mL Poly	HNO3
		Cl, F, SO4	1 - 250 mL Poly	N/A
		TDS	1 - 500 mL Poly	N/A

Sampled By: Charles Gruenberg	**Sample Time:**
Date Sampled: 08/13/2021	**Sampler Signature:**

Notes: Pumprate=

Groundwater Sampling Form

Sample ID: SW-4

Site Information	
Site Name: Charah Brickhaven	**Project Number:** 10021146
Site Location: Moncure, NC	**Sampling Personnel: Charles Gruenberg**
Date: 8/13/21	**Weather:** Sunny

Well Information	
Well Diameter (in): N/A	**Purge Equipment:** N/A
Screened Interval (ft): N/A	**Pump Type:** N/A
Well Depth (ft): N/A	**Pump Depth (ft-bTOC):** N/A
Depth-to-Water (ft-bTOC): N/A	**Tubing Diameter (in):** N/A
Water Column Thickness (ft): N/A	**Well Volume (ft^3):** N/A
1 Well Volume = (Total Depth - Static Water Level) * Well Capacity	
Well Capacity (gallons per feet): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3' = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47	

Purging Information

Parameter Instrument(s): YSI Pro / Micro TPW Turbidimeter

TIME	VOLUME PURGED (Liters)	CUMULATIVE VOLUME PURGED (Liters)	PURGE RATE (mL/min)	DEPTH TO WATER (ft-bTOC)	pH (SU) (±0.1)	TEMP. (C°)	COND. (µS/cm) (5%)	DISSOLVED OXYGEN (mg/L) (10%)*	ORP (mV) (±20mV)	TURBIDITY (NTUs) (≤10 or 10%)	COLOR/ ODOR (describe)
0828	—	—	—	—	6.83	23.6	98.3	1.82	48.7	49.15	H L

* DO below 2.0 mg/L is stable at ±0.2 mg/L; DO below 0.5 mg/L is stable

Sample Information

Sample Number	Collection Time	Parameter	Container	Preservative
SW-4	0830	Radium 226/228	2 - 1 L Poly	HNO3
	0830	6010/6020/7470	1 - 250 mL Poly	HNO3
	0830	Cl, F, SO4	1 - 250 mL Poly	N/A
	0830	TDS	1 - 500 mL Poly	N/A

Sampled By: Charles Gruenberg	**Sample Time:** 0830
Date Sampled: 08/13/21	**Sampler Signature:**

Notes: Pumprate= —

Stagnant; Not flowing

Groundwater Sampling Form

Sample ID: SW-5

Site Information	
Site Name: Charah Brickhaven	**Project Number:** 10021146
Site Location: Moncure, NC	**Sampling Personnel: Charles Gruenberg**
Date: 8/13/21	**Weather:** Sunny

Well Information	
Well Diameter (in): N/A	**Purge Equipment:** N/A
Screened Interval (ft): N/A	**Pump Type:** N/A
Well Depth (ft): N/A	**Pump Depth (ft-bTOC):** N/A
Depth-to-Water (ft-bTOC): N/A	**Tubing Diameter (in):** N/A
Water Column Thickness (ft): N/A	**Well Volume (ft^3):** N/A

1 Well Volume = (Total Depth - Static Water Level) * Well Capacity

Well Capacity (gallons per feet): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3' = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47

Purging Information

Parameter Instrument(s): YSI Pio / Micro TPW Turbidimeter

TIME	VOLUME PURGED (Liters)	CUMULATIVE VOLUME PURGED (Liters)	PURGE RATE (mL/min)	DEPTH TO WATER (ft-bTOC)	pH (SU) (±0.1)	TEMP. (C°)	COND. (µS/cm) (5%)	DISSOLVED OXYGEN (mg/L) (10%)*	ORP (mV) (±20mV)	TURBIDITY (NTUs) (≤10 or 10%)	COLOR/ ODOR (describe)
1259	—	—	—	—	6.66	25.2	57.5	5.68	94.7	925.2	Reddish Brown

* DO below 2.0 mg/L is stable at ±0.2 mg/L; DO below 0.5 mg/L is stable

Sample Information

Sample Number	Collection Time	Parameter	Container	Preservative
SW-5	1300	Radium 226/228	2 - 1 L Poly	HNO3
	1300	6010/6020/7470	1 - 250 mL Poly	HNO3
	1300	Cl, F, SO4	1 - 250 mL Poly	N/A
	1300	TDS	1 - 500 mL Poly	N/A

Sampled By: Charles Gruenberg	**Sample Time:** 1300
Date Sampled: 08/13/21	**Sampler Signature:**

Notes: Pumprate= —

Flowing Slowly

Groundwater Sampling Form

Sample ID: SW-6

Site Information	
Site Name: Charah Brickhaven	**Project Number:** 10021146
Site Location: Moncure, NC	**Sampling Personnel: Charles Gruenberg**
Date: 8/13/21	**Weather:** Sunny

Well Information	
Well Diameter (in): N/A	**Purge Equipment:** N/A
Screened Interval (ft): N/A	**Pump Type:** N/A
Well Depth (ft): N/A	**Pump Depth (ft-bTOC):** N/A
Depth-to-Water (ft-bTOC): N/A	**Tubing Diameter (in):** N/A
Water Column Thickness (ft): N/A	**Well Volume (ft^3):** N/A

1 Well Volume = (Total Depth - Static Water Level) * Well Capacity

Well Capacity (gallons per feet): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3' = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47

Purging Information

Parameter Instrument(s): YSI Pro / MicroTPW Turbidimeter

TIME	VOLUME PURGED (Liters)	CUMULATIVE VOLUME PURGED (Liters)	PURGE RATE (mL/min)	DEPTH TO WATER (ft-bTOC)	pH (SU) (±0.1)	TEMP. (C°)	COND. (µS/cm) (5%)	DISSOLVED OXYGEN (mg/L) (10%)*	ORP (mV) (±20mV)	TURBIDITY (NTUs) (≤10 or 10%)	COLOR/ ODOR (describe)
0913	—	—	—	—	6.21	26.1	49.4	0.30	115.1	953.4	Reddish brown

* DO below 2.0 mg/L is stable at ±0.2 mg/L; DO below 0.5 mg/L is stable

Sample Information

Sample Number	Collection Time	Parameter	Container	Preservative
SW-6	0915	Radium 226/228	2 - 1 L Poly	HNO3
	0915	6010/6020/7470	1 - 250 mL Poly	HNO3
	0915	Cl, F, SO4	1 - 250 mL Poly	N/A
	0915	TDS	1 - 500 mL Poly	N/A

Sampled By: Charles Gruenberg	**Sample Time:** 0915
Date Sampled: 08/13/21	**Sampler Signature:**

Notes: Pumprate= —

Stagnant, NDL flowing

GROUNDWATER DEPTH

Project Name: Charah – Brickhaven
Project Address: Moncure
Time Started: 0934
Personnel: Charles Gruenberg / S&G Lead (Michael L.)

Date: 11/15/2021
Project No: 10021146
Time Finished: 1100

Well ID	Depth to Water	Total Depth
BG-1	12.66'	—
BG-2	13.52'	—
MW-1	57.35'	—
MW-2	23.21'	—
MW-2D	136.10'	—
MW-3	8.59'	—
MW-4	10.28'	—
MW-5	25.18'	—
MW-6	8.16'	—
MW-7	16.42'	—
MW-7R	21.21'	—
MW-8	35.90'	—
MW-9	Dry	—
MW-10	36.54'	—
MW-11	12.89'	—
MW-11D	9.30'	—

Well ID	Depth to Water	Total Depth

SMITH GARDNER

Ground Water Sample Collection Record

Client:
Project Name/Number: Charah Brickhaven - Chatham-20-4
Site Location: Charah Brickhaven, Moncure-Flatwood Road
Weather Conditions:
Collector(s): Smith + Gardner, HDR

Well/Peizometer ID: BG-1

WATER LEVEL DATA: (measured from Top of Casing)

Total Well Depth (ft.): 41.00
Depth to Water (ft.): 12.14
Casing Diameter (in.): 2
Casing Material: PVC
Water Column Length (ft):
Multiplication Factor:
One Well Volume (gals.):
Three Well Volumes (gals.):

ACCEPTANCE CRITERIA:

Min.required vols.purged: 3 Vols.
Max. allowable turbidity: 5 NTUs
Conductivity stabilize within: 3 %
Temperature stabilize within: 5 % or: 0.2 °C
DO stabilize within: 10 % or: <0.5 mg/L
pH stabilize within: 0.1 pH units

WELL PURGING DATA:

Date Purged: 11/16 Time Start: 1515 Time Finish:
Purge Method/Equipmen: Low Flow

Field Testing Equipment Used: Make Model Serial Number

DTW
12.14
14.14
15.98
15.70
17.40
16.91
17.46
16.96
16.80

Time	Temp. (°C)	Spec. Cond. (mS)	DO (mg/L)	pH (s.u.)	ORP (mV)	Turbidity (NTUs)	Color	Odor	Volume Removed (gal)
1515	17.3	1077	2.48	6.71	322.4	540	cloudy	none	.1
1520	17.4	1075	1.00	6.64	325.9	600	cloudy		.3
1525	17.7	1069	0.32	6.48	330.3	460	cloudy		.5
1530	17.9	1089	0.49	6.41	331.4	265	cloudy		1.0
1535	17.8	1094	0.43	6.35	329.7	137	cloudy		1.5
1540	17.7	1096	0.31	6.34	327.9	85	clear		2.0
1545	17.7	1088	0.21	6.32	323.3	59.7	clear		2.5
1550	17.7	1086	0.16	6.31	319.9	17.9			3.0
1555	17.7	1081	0.16	6.31	317.4	11.8			3.5
1600	17.8	1073	0.16	6.31	316.8	9.45			4.0

Sample @ 1600

SMITH GARDNER

Ground Water Sample Collection Record

Client:
Project Name/Number: Charah Brickhaven - Chatham-20-4
Site Location: Charah Brickhaven, Moncure-Flatwood Road
Weather Conditions:
Collector(s): Smith + Gardner, HDR

Well/Peizometer ID: BG-2

WATER LEVEL DATA: (measured from Top of Casing)

Total Well Depth (ft.): 23.00
Depth to Water (ft.): 13.40
Casing Diameter (in.): 2
Casing Material: PVC
Water Column Length (ft.):
Multiplication Factor:
One Well Volume (gals.):
Three Well Volumes (gals.):

ACCEPTANCE CRITERIA:

Min.required vols.purged: 3 Vols.
Max. allowable turbidity: 5 NTUs
Conductivity stabilize within: 3 %
Temperature stabilize within: 5 % or: 0.2 °C
DO stabilize within: 10 % or: <0.5 mg/L
pH stabilize within: 0.1 pH units

WELL PURGING DATA:

Date Purged: 11/17 Time Start: 1605 Time Finish:
Purge Method/Equipmen: Low Flow
Field Testing Equipment Used: Make Model Serial Number

DTW
13.40
14.68
14.82
15.18
15.13
15.48
15.24
15.23
15.49
15.42
15.88
15.59

Time	Temp. (°C)	Spec. Cond. (mS)	DO (mg/L)	pH (s.u.)	ORP (mV)	Turbidity (NTUs)	Color	Odor	Volume Removed (gal)
1605	18.7	2270	1.10	7.03	329.4	167	cloudy	none	.1
1610	18.0	2296	0.40	6.84	325.9	240	cloudy		.8
1615	17.7	2367	0.26	6.81	318.8	196	cloudy		1.2
1620	17.3	2127	0.21	6.81	306.0	174	cloudy		1.6
1625	17.5	1921	0.18	6.81	299.5	131	cloudy		1.8
1630	17.2	1822	0.16	6.80	288.9	89	cloudy		2.2
1635	17.4	1764	0.15	6.78	285.4	41.3	clear		2.6
1640	17.5	1773	0.16	6.78	282.7	35.4			3.0
1646	17.8	1771	0.19	6.77	273.9	21.7			3.4
1650	17.7	1752	0.20	6.77	268.9	16.5			3.8
1655	17.8	1757	0.14	6.78	268.3	10.3			4.2
1700	17.8	1753	0.14	6.78	267.9	9.47			4.5

Sample @ 1700

SMITH GARDNER

Ground Water Sample Collection Record

Client:
Project Name/Number: Charah Brickhaven - Chatham-20-4
Site Location: Charah Brickhaven, Moncure-Flatwood Road
Weather Conditions:
Collector(s): Smith + Gardner, HDR

Well/Peizometer ID: MW-1

WATER LEVEL DATA: (measured from Top of Casing)

Total Well Depth (ft.): 72.00
Depth to Water (ft.): 57.49
Casing Diameter (in.): 2
Casing Material: PVC
Water Column Length (ft.):
Multiplication Factor:
One Well Volume (gals.):
Three Well Volumes (gals.):

ACCEPTANCE CRITERIA:

Min. required vols. purged: 3 Vols.
Max. allowable turbidity: 5 NTUs
Conductivity stabilize within: 3 %
Temperature stabilize within: 5 % or: 0.2 °C
DO stabilize within: 10 % or: <0.5 mg/L
pH stabilize within: 0.1 pH units

WELL PURGING DATA:

Date Purged: 11/16 Time Start: 0725 Time Finish: 0835
Purge Method/Equipmen: Low Flow
Field Testing Equipment Used: Make Model Serial Number

DTW	Time	Temp. (°C)	Spec. Cond. (mS)	DO (mg/L)	pH (s.u.)	ORP (mV)	Turbidity (NTUs)	Color	Odor	Volume Removed (gal)
57.49	0725	15.3	884	2.24	7.26	298.1	750	cloudy	none	.1
57.46	0730	15.4	870	2.25	7.28	297.3	790	cloudy	none	.2
57.50	0735	16.7	819	1.02	7.26	262.6	231	cloudy	none	.4
57.59	0740	18.1	702	0.56	7.25	254.9	57.8	clear	none	.8
57.60	0745	19.8	1173	0.45	7.04	259.1	39.4			1.0
57.60	0750	18.9	1652	0.42	6.92	260.8	37.5			1.2
57.60	0755	18.1	2256	0.41	6.81	258.0	34.3			1.6
57.61	0800	18.1	2638	0.42	6.75	251.1	28.5			2.0
57.61	0805	19.1	2839	0.43	6.72	247.4	24.7			2.4
57.61	0810	18.1	2869	0.44	6.72	247.0	19.9			2.7
57.61	0815	18.2	3026	0.46	6.70	246.0	16.6			3.0
57.61	0820	18.3	3104	0.46	6.69	246.1	14.0			3.3
57.62	0825	18.2	3221	0.48	6.67	246.9	11.5			3.7
57.62	0830	18.2	3322	0.48	6.66	248.3	9.89			4.0
57.62	0835	18.2	3323	0.48	6.66	248.4	9.04			4.4

Sample @ 0835

SMITH GARDNER

Ground Water Sample Collection Record

Client:
Project Name/Number: Charah Brickhaven - Chatham-20-4
Site Location: Charah Brickhaven, Moncure-Flatwood Road
Weather Conditions:
Collector(s): Smith + Gardner, HDR

Well/Peizometer ID: MW-2

WATER LEVEL DATA: (measured from Top of Casing)

Total Well Depth (ft.): 42.00
Water Column Length (ft.):
Depth to Water (ft.): 21.97
Multiplication Factor:
Casing Diameter (in.): 2
One Well Volume (gals.):
Casing Material: PVC
Three Well Volumes (gals.):

ACCEPTANCE CRITERIA:

Min. required vols. purged: 3 Vols.
Max. allowable turbidity: 5 NTUs
Conductivity stabilize within: 3 %
Temperature stabilize within: 5 % or: 0.2 °C
DO stabilize within: 10 % or: <0.5 mg/L
pH stabilize within: 0.1 pH units

WELL PURGING DATA:

Date Purged: 11/18 Time Start: 0915 Time Finish: 1140
Purge Method/Equipmen: SS Geosub Low Flow

Field Testing Equipment Used:

Make	Model	Serial Number
SS GeoSub	Controller and Pump	
Geotech	C-16-10-11	2896612

DTW	Time	Temp. (°C)	Spec. Cond. (mS)	DO (mg/L)	pH (s.u.)	ORP (mV)	Turbidity (NTUs)	Color	Odor	Volume Removed (gal)
21.97	0915	18.2	4316	6.67	7.72	288.8	37.2	clear	none	.1
23.50	0920	18.1	4344	6.52	7.72	289.1	43.0	clear		.2
23.78	0925	18.2	4408	5.66	7.60	292.5	228	clear		.3
25.98	0930	19.3	4382	5.22	7.56	288.5	307	cloudy		.8
26.82	0935	19.0	4377	5.25	7.56	286.5	241	cloudy		1.0
28.28	0940	19.0	4356	5.26	7.56	284.0	174	cloudy		1.2
29.01	0945	18.9	4339	5.26	7.56	280.8	152	cloudy		1.4
29.75	0950	19.2	4328	5.20	7.56	279.3	135	cloudy		1.6
30.48	0955	19.3	4330	5.15	7.56	277.4	97.8	cloudy		1.8
30.81	1000	19.5	4328	5.11	7.55	276.0	67.9	cloudy		2.0
31.16	1005	19.8	4336	5.10	7.55	274.2	52.3	cloudy		2.1
31.58	1010	19.7	4335	5.08	7.56	273.1	47.7	clear		2.2
32.22	1015	19.8	4333	5.04	7.56	271.6	40.6			2.3
32.63	1020	19.8	4343	5.00	7.56	270.5	36.1			2.4
33.10	1025	20.0	4345	4.97	7.56	269.1	33.0			2.5
33.45	1030	20.2	4344	4.92	7.56	268.2	26.2			2.6
33.89	1035	20.4	4355	4.90	7.56	265.7	25.6			2.7
34.28	1040	20.5	4350	4.89	7.56	263.4	19.1			2.8
34.71	1045	20.7	4343	4.86	7.55	261.7	20.0			2.9
35.02	1050	20.5	4352	4.89	7.55	260.9	18.2			3.0
35.35	1055	20.2	4350	4.86	7.56	259.8	18.0			3.1
35.54	1100	20.1	4350	4.86	7.56	258.5	17.3			3.2
35.72	1105	20.3	4336	4.84	7.56	256.9	16.2			3.3
35.88	1110	20.5	4341	4.82	7.56	256.4	16.3			3.4
36.15	1115	20.0	4373	4.86	7.57	256.7	16.3			3.5
36.30	1120	20.1	4322	4.85	7.57	257.1	12.3			3.6
36.45	1125	20.4	4330	4.81	7.56	257.4	11.8			3.7
36.54	1130	20.6	4337	4.80	7.56	257.6	11.6			3.8
36.83	1135	20.8	4339	4.77	7.56	257.8	11.4			3.9
	1140									
	1145									
	1150			Sample @ 1140						
	1155									
	1200									

SMITH GARDNER

Ground Water Sample Collection Record

Client:
Project Name/Number: Charah Brickhaven - Chatham-20-4
Site Location: Charah Brickhaven, Moncure-Flatwood Road
Weather Conditions:
Collector(s): Smith + Gardner, HDR

Well/Peizometer ID: MW-3

WATER LEVEL DATA: (measured from Top of Casing)

Total Well Depth (ft.): 40.00
Depth to Water (ft.): 7.10
Casing Diameter (in.): 2
Casing Material: PVC
Water Column Length (ft.):
Multiplication Factor:
One Well Volume (gals.):
Three Well Volumes (gals.):

ACCEPTANCE CRITERIA:

Min. required vols. purged: 3 Vols.
Max. allowable turbidity: 5 NTUs
Conductivity stabilize within: 3 %
Temperature stabilize within: 5 % or: 0.2 °C
DO stabilize within: 10 % or: <0.5 mg/L
pH stabilize within: 0.1 pH units

WELL PURGING DATA:

Date Purged: 11/18 Time Start: 0730 Time Finish: 0825
Purge Method/Equipmen: Low Flow
Field Testing Equipment Used: Make Model Serial Number

DTW
7.10
8.76
10.90
11.45
12.12
12.68
13.23
14.20
14.72
15.10
15.20

Time	Temp. (°C)	Spec. Cond. (mS)	DO (mg/L)	pH (s.u.)	ORP (mV)	Turbidity (NTUs)	Color	Odor	Volume Removed (gal)
0730	18.5	4005	5.91	7.47	314.0	64.7	clear	none	.1
0735	16.5	4298	2.16	7.42	316.9	91.0	cloudy		.3
0740	19.6	4303	0.88	7.42	314.0	140	cloudy		.8
0745	18.0	4273	0.98	7.44	312.5	169	cloudy		1.0
0750	17.9	4303	1.65	7.44	310.2	42.2	clear		1.2
0755	18.0	4281	2.16	7.43	305.6	35.8	clear		1.5
0800	18.0	4274	2.29	7.42	302.2	26.7	clear		1.7
0805	18.2	4248	2.94	7.40	296.0	16.8			1.8
0810	18.3	4234	2.98	7.38	292.8	13.7			2.0
0815	18.4	4229	3.01	7.37	290.0	11.8			2.1
0820	18.4	4228	3.00	7.37	289.8	9.7			2.2

Sample @ 0825

SMITH GARDNER

Ground Water Sample Collection Record

Client:
Project Name/Number: Charah Brickhaven - Chatham-20-4
Site Location: Charah Brickhaven, Moncure-Flatwood Road
Weather Conditions:
Collector(s): Smith + Gardner, HDR

Well/Peizometer ID: MW-4

WATER LEVEL DATA: (measured from Top of Casing)

Total Well Depth (ft.): 22.00
Depth to Water (ft.): 11.02
Casing Diameter (in.): 2
Casing Material: PVC
Water Column Length (ft.):
Multiplication Factor:
One Well Volume (gals.):
Three Well Volumes (gals.):

ACCEPTANCE CRITERIA:

Min.required vols.purged: 3 Vols.
Max. allowable turbidity: 5 NTUs
Conductivity stabilize within: 3 %
Temperature stabilize within: 5 % or: 0.2 °C
DO stabilize within: 10 % or: <0.5 mg/L
pH stabilize within: 0.1 pH units

WELL PURGING DATA:

Date Purged: 11/17 Time Start: 1330 Time Finish: 1520
Purge Method/Equipmen: Low Flow
Field Testing Equipment Used: Make Model Serial Number

DTW
11.02
11.25
12.29
12.22
13.53
13.15
14.04
13.70
14.30
13.85
13.82
13.60
13.40
13.40
13.20
13.10
13.05
13.00
13.00
13.04
12.98
13.00
13.00

Time	Temp. (°C)	Spec. Cond. (mS)	DO (mg/L)	pH (s.u.)	ORP (mV)	Turbidity (NTUs)	Color	Odor	Volume Removed (gal)
1330	20.3	2073	2.07	6.18	256.6	253	cloudy	none	.1
1335	20.3	2034	1.74	6.15	241.2	300	cloudy	very slight	.3
1340	20.3	2033	0.94	6.10	216.9	222	cloudy		.5
1345	20.4	2037	0.78	6.15	198.8	141	cloudy		.8
1350	20.2	2061	0.74	6.17	207.9	347	cloudy		1.4
1355	20.2	2076	0.26	6.20	177.3	452	cloudy		2.0
1400	19.9	2074	0.15	6.17	192.4	481	cloudy		2.5
1405	19.9	2092	0.19	6.20	175.2	342	cloudy		3.0
1410	19.8	2085	0.47	6.18	190.3	198	cloudy		3.5
1415	19.8	2091	0.15	6.20	179.1	175	cloudy		4.0
1420	19.8	2101	0.18	6.20	176.5	164	cloudy		4.3
1425	19.8	2098	0.12	6.21	166.9	102	cloudy		4.5
1430	19.9	2099	0.13	6.21	170.8	64	clear		5.0
1435	19.9	2097	0.11	6.21	167.4	51			5.2
1440	20.0	2103	0.15	6.21	170.8	38.5			5.5
1445	20.0	2101	0.11	6.21	168.6	36.0			5.9
1450	20.0	2101	0.11	6.21	167.4	24.1			6.0
1455	20.0	2101	0.11	6.21	168.1	24.3			6.2
1500	20.0	2102	0.10	6.20	171.2	18.4			6.5
1505	20.0	2102	0.10	6.20	159.2	14.7			6.8
1510	20.0	2101	0.10	6.20	155.6	12.6			7.2
1515	20.0	2101	0.09	6.21	151.8	10.9			7.5
1520	20.0	2101	0.10	6.21	152.0	9.81			7.7
1525									
1530									
		Sample @	1520						

SMITH GARDNER

Ground Water Sample Collection Record

Client:
Project Name/Number: Charah Brickhaven - Chatham-20-4
Site Location: Charah Brickhaven, Moncure-Flatwood Road
Weather Conditions:
Collector(s): Smith + Gardner, HDR

Well/Peizometer ID: MW-5

WATER LEVEL DATA: (measured from Top of Casing)

Total Well Depth (ft.): 44.01
Depth to Water (ft.): 24.10
Casing Diameter (in.): 2
Casing Material: PVC

Water Column Length (ft.):
Multiplication Factor:
One Well Volume (gals.):
Three Well Volumes (gals.):

ACCEPTANCE CRITERIA:

Min. required vols purged: 3 Vols.
Max. allowable turbidity: 5 NTUs
Conductivity stabilize within: 3 %
Temperature stabilize within: 5 % or: 0.2 °C
DO stabilize within: 10 % or: <0.5 mg/L
pH stabilize within: 0.1 pH units

WELL PURGING DATA:

Date Purged: 11/16 Time Start: 1320 Time Finish: 1435
Purge Method/Equipmen: Low Flow
Field Testing Equipment Used: Make Model Serial Number

DTW
24.10
25.74
26.67
27.13
27.38
27.52
28.01
28.45
28.89
29.18
29.82
30.15
30.48
30.81
30.95

Time	Temp. (°C)	Spec. Cond. (mS)	DO (mg/L)	pH (s.u.)	ORP (mV)	Turbidity (NTUs)	Color	Odor	Volume Removed (gal)
1320	19.4	418.7	3.18	7.14	281.8	268	cloudy	none	.1
1325	19.5	420.3	3.20	7.13	290.4	2.70	cloudy		.2
1330	19.9	419.5	1.33	7.02	292.5	83.2	clear		.3
1335	20.1	388.6	1.54	6.90	291.8	86.2			.4
1340	20.0	383.5	1.61	6.87	290.6	67.4			.5
1345	20.0	378.4	1.64	6.85	288.8	51.5			.6
1350	20.1	365.3	1.78	6.77	282.5	35.6			.7
1355	20.2	347.6	1.80	6.75	281.9	31.8			.8
1400	20.2	344.6	1.80	6.74	279.2	29.4			.9
1405	20.4	340.5	1.78	6.72	277.3	20.5			1.0
1410	20.5	337.9	1.76	6.71	276.2	21.2			1.1
1415	20.4	337.5	1.74	6.71	275.7	13.6			1.2
1420	20.6	335.7	1.72	6.70	276.2	11.6			1.3
1425	20.6	335.8	1.71	6.70	276.3	10.3			1.4
1430	20.6	336.1	1.69	6.70	276.4	9.31			1.5
1435									
1440									

Sample @ 1435

SMITH GARDNER

Ground Water Sample Collection Record

Client:
Project Name/Number: Charah Brickhaven - Chatham-20-4
Site Location: Charah Brickhaven, Moncure-Flatwood Road
Weather Conditions:
Collector(s): Smith + Gardner, HDR

Well/Peizometer ID: MW-6

WATER LEVEL DATA: (measured from Top of Casing)

Total Well Depth (ft.): 27.00
Depth to Water (ft.): 8.00
Casing Diameter (in.): 2
Casing Material: PVC
Water Column Length (ft.):
Multiplication Factor:
One Well Volume (gals.):
Three Well Volumes (gals.):

ACCEPTANCE CRITERIA:

Min required vols.purged: 3 Vols.
Max. allowable turbidity: 5 NTUs
Conductivity stabilize within: 3 %
Temperature stabilize within: 5 % or: 0.2 °C
DO stabilize within: 10 % or: <0.5 mg/L
pH stabilize within: 0.1 pH units

WELL PURGING DATA:

Date Purged: 11/17 Time Start: 1130 Time Finish: 1235
Purge Method/Equipmen: Low Flow
Field Testing Equipment Used: Make Model Serial Number

DTW 8.00

Time	Temp. (°C)	Spec. Cond. (mS)	DO (mg/L)	pH (s.u.)	ORP (mV)	Turbidity (NTUs)	Color	Odor	Volume Removed (gal)
1130	19.3	1011	2.83	6.71	277.9	320	cloudy	none	.1
1135	19.7	1010	1.39	6.52	283.8	300	cloudy		.3
1140	18.5	1006	0.57	6.44	286.1	310	cloudy		1.2
1145	18.7	1007	1.55	6.45	283.3	270	cloudy		1.8
1150	18.4	1001	0.95	6.40	289.1	210	cloudy		2.5
1155	18.3	1014	1.01	6.38	289.0	89.5	cloudy		3.0
1200	18.3	1016	1.06	6.36	289.3	37.4	clear		3.5
1205	18.4	1008	0.27	6.30	289.4	29.1			4.0
1210	18.5	1005	0.19	6.29	289.1	17.4			4.5
1215	18.6	1009	0.28	6.29	282.7	13.2			5.0
1220	18.6	1010	0.29	6.29	278.0	20.7			5.5
1225	18.5	1011	0.30	6.28	269.5	19.4			6.0
1230	18.5	1012	0.31	6.28	262.5	14.5			6.5
1235	17.6	1010	0.30	6.28	269.4	9.81			7.0
~~1240~~									
		Sample @	1235						

3.63
10.60
11.47
11.97
12.00
12.17
11.45
11.30
11.02
10.98
10.76
10.55
10.13

SMITH GARDNER

Ground Water Sample Collection Record

Client:
Project Name/Number: Charah Brickhaven - Chatham-20-4
Site Location: Charah Brickhaven, Moncure-Flatwood Road
Weather Conditions:
Collector(s): Smith + Gardner, HDR

Well/Peizometer ID: MW-7R

WATER LEVEL DATA: (measured from Top of Casing)

Total Well Depth (ft.): 3600 — Water Column Length (ft.):
Depth to Water (ft.): 20.49 — Multiplication Factor:
Casing Diameter (in.): 2 — One Well Volume (gals.):
Casing Material: PVC — Three Well Volumes (gals.):

ACCEPTANCE CRITERIA:

Min.required vols.purged: 3 Vols.
Max. allowable turbidity: 5 NTUs
Conductivity stabilize within: 3 %
Temperature stabilize within: 5 % or: 0.2 °C
DO stabilize within: 10 % or: <0.5 mg/L
pH stabilize within: 0.1 pH units

WELL PURGING DATA:

Date Purged: 11/15 Time Start: 1310 Time Finish: 1450

Purge Method/Equipmen: Low Flow

Field Testing Equipment Used: Make Model Serial Number

DTW	Time	Temp. (°C)	Spec. Cond. (mS)	DO (mg/L)	pH (s.u.)	ORP (mV)	Turbidity (NTUs)	Color	Odor	Volume Removed (gal)
20.49	1310	18.5	1573	4.47	7.49	206.0	621	cloudy	none	.1
21.75	1315	18.6	1571	4.36	7.47	210.4	404	cloudy	none	.2
22.38	1320	18.7	1564	4.12	7.42	228.5	521	cloudy	none	.3
23.06	1325	18.8	1554	3.98	7.39	242.1	308	clear	none	.4
23.41	1330	19.0	1544	3.99	7.38	247.3	183			.5
23.84	1335	19.1	1537	3.86	7.37	250.5	101			.6
24.14	1340	19.0	1532	3.84	7.36	252.3	92.3			.7
25.18	1345	19.3	1552	3.87	7.34	256.3	84.5			.8
25.50	1350	19.3	1548	3.77	7.33	257.4	67.9			.9
25.88	1355	19.2	1538	3.70	7.33	257.4	53.3			1.0
26.23	1400	19.1	1532	3.64	7.23	257.4	54.5			1.1
26.36	1405	19.2	1528	3.60	7.32	258.5	44.6			1.4
26.52	1410	19.2	1530	3.88	7.31	260.6	42.7			1.6
26.69	1415	19.1	1526	3.93	7.31	261.8	37.0			1.8
26.81	1420	19.1	1526	3.80	7.31	262.9	40.5			2.0
27.33	1425	19.2	1517	3.71	7.32	264.2	47.8			2.2
27.71	1430	19.3	1511	3.60	7.30	265.9	37.8			2.4
27.88	1435	19.1	1507	3.56	7.30	267.3	35.4			2.6
28.06	1440	19.0	1494	3.57	7.31	270.9	34.4			2.7
28.72	1445	19.5	1490	3.53	7.31	276.4	32.1			2.9
	1450									

Sample @ 1450
- Stopped pumping due to water level not stabilizing
- Did not want to run out of water before sampling.

SMITH GARDNER

Ground Water Sample Collection Record

Client:
Project Name/Number: Charah Brickhaven - Chatham-20-4
Site Location: Charah Brickhaven, Moncure-Flatwood Road
Weather Conditions:
Collector(s): Smith + Gardner, HDR

Well/Peizometer ID: MW-8

WATER LEVEL DATA: (measured from Top of Casing)

Total Well Depth (ft.): 46.00
Depth to Water (ft.): 35.79
Casing Diameter (in.): 2
Casing Material: PVC
Water Column Length (ft.):
Multiplication Factor:
One Well Volume (gals.):
Three Well Volumes (gals.):

ACCEPTANCE CRITERIA:

Min.required vols.purged: 3 Vols.
Max. allowable turbidity: 5 NTUs
Conductivity stabilize within: 3 %
Temperature stabilize within: 5 % or: 0.2 °C
DO stabilize within: 10 % or: <0.5 mg/L
pH stabilize within: 0.1 pH units

WELL PURGING DATA:

Date Purged: 11/16 Time Start: 0915 Time Finish: 1105
Purge Method/Equipmen: Low Flow
Field Testing Equipment Used: Make Model Serial Number

DTW	Time	Temp. (°C)	Spec. Cond. (mS)	DO (mg/L)	pH (s.u.)	ORP (mV)	Turbidity (NTUs)	Color	Odor	Volume Removed (gal)
35.79	0915	17.3	2417	5.65	7.30	311.7	244	cloudy	none	.1
36.44	0920	17.5	2406	4.95	7.19	300.8	398	cloudy	none	.2
36.58	0925	18.1	2412	4.69	7.12	293.5	351	cloudy	none	.4
36.90	0930	19.0	2405	4.56	7.10	244.0	322	cloudy	none	.7
36.95	0935	18.3	2345	4.32	7.09	297.2	357	cloudy	none	.9
37.17	0940	19.1	2190	3.72	7.09	298.1	243	cloudy	none	1.2
37.11	0945	18.7	2105	3.51	7.10	298.0	138	cloudy	none	1.4
37.19	0950	19.0	1972	2.74	7.10	297.0	131	cloudy	none	1.8
37.14	0955	18.9	1954	2.64	7.10	296.1	92.3	clear	none	2.2
37.28	1000	19.2	1964	2.67	7.08	294.8	63	clear	none	2.5
37.41	1005	19.0	1763	1.82	7.11	291.2	42.1	clear	none	2.7
37.34	1010	19.0	1692	1.55	7.10	288.4	39.9			3.0
37.21	1015	18.9	1656	1.44	7.10	286.0	30.3			3.4
37.20	1020	19.1	1609	1.25	7.10	282.9	32.4			3.6
37.26	1025	19.2	1593	1.15	7.10	279.7	30.4			3.8
37.30	1030	19.2	1593	1.15	7.10	279.4	43.8			4.2
37.34	1035	19.3	1548	1.10	7.09	275.6	47.1			4.4
37.38	1040	19.3	1545	0.99	7.09	274.3	48.7			4.6
37.30	1045	19.1	1560	1.08	7.10	271.7	29.3			4.8
37.24	1050	19.1	1558	1.09	7.10	271.4	26.1			5.0
37.15	1055	19.2	1498	0.81	7.09	268.7	17.4			5.2
37.10	1100	19.2	1493	0.95	7.09	265.4	10.37			5.4
37.12	1105	19.2	1494	0.77	7.09	266.4	9.56			5.6
	1110									
	1115									
				Sample @ 1105						
37.63	1130	19.1	1447	0.99	7.10	262.9	44.5			5.8
39.67	1140	19.3	1459	0.59	7.08	256.4	18.3			6.4
37.90	1145	19.3	1474	0.56	7.06	256.3	—			6.5
37.51	1155	19.2	1452	0.49	7.08	251.1	19.01			6.7
37.46	1200	19.3	1448	0.46	7.08	249.7	18.42			6.8
37.40	1205	19.4	1446	0.45	7.08	247.4	13.4			7.0
37.33	1210	19.4	1446	0.45	7.08	245.7	13.8			7.2
37.55	1215	19.4	1450	0.44	7.07	245.2	21.6			7.4
37.56	1220	19.3	1430	0.58	7.08	244.6	18.8			7.6
37.58	1225	19.3	1448	0.43	7.08	242.8	15.7			7.8

SMITH GARDNER

Ground Water Sample Collection Record

Client:
Project Name/Number: Charah Brickhaven - Chatham-20-4
Site Location: Charah Brickhaven, Moncure-Flatwood Road
Weather Conditions:
Collector(s): Smith + Gardner, HDR

Well/Peizometer ID: MW-8

WATER LEVEL DATA: (measured from Top of Casing)

Total Well Depth (ft.): 46.00
Depth to Water (ft.): 35.79
Casing Diameter (in.): 2
Casing Material: PVC

Water Column Length (ft.):
Multiplication Factor:
One Well Volume (gals.):
Three Well Volumes (gals.):

ACCEPTANCE CRITERIA:

Min.required vols.purged: 3 Vols.
Max. allowable turbidity: 5 NTUs
Conductivity stabilize within: 3 %
Temperature stabilize within: 5 % or: 0.2 °C
DO stabilize within: 10 % or: <0.5 mg/L
pH stabilize within: 0.1 pH units

WELL PURGING DATA:

Date Purged: 11/16 Time Start: 0915 Time Finish:
Purge Method/Equipmen: Low Flow
Field Testing Equipment Used: Make Model Serial Number

DTW
37.57
37.60
37.59

Time	Temp. (°C)	Spec. Cond. (mS)	DO (mg/L)	pH (s.u.)	ORP (mV)	Turbidity (NTUs)	Color	Odor	Volume Removed (gal)
1230	19.3	1493	0.42	7.08	241.6	12.8	clear	none	7.9
1235	19.4	1441	0.41	7.08	240.4	11.0	↓	↓	8.2
1240	19.4	1440	0.41	7.08	239.4	10.1			8.4
1245	19.4	1440	0.42	7.08	240.0	9.36			8.6

Sample @ 1245

SMITH GARDNER

Ground Water Sample Collection Record

Client:
Project Name/Number: Charah Brickhaven - Chatham-20-4
Site Location: Charah Brickhaven, Moncure-Flatwood Road
Weather Conditions:
Collector(s): Smith + Gardner, HDR

Well/Peizometer ID: MW-19

WATER LEVEL DATA: (measured from Top of Casing)

Total Well Depth (ft.): 47.09
Depth to Water (ft.): 35.96
Casing Diameter (in.): 2
Casing Material: PVC
Water Column Length (ft.):
Multiplication Factor:
One Well Volume (gals.):
Three Well Volumes (gals.):

ACCEPTANCE CRITERIA:

Min.required vols.purged: 3 Vols.
Max. allowable turbidity: 5 NTUs
Conductivity stabilize within: 3 %
Temperature stabilize within: 5 % or: 0.2 °C
DO stabilize within: 10 % or: <0.5 mg/L
pH stabilize within: 0.1 pH units

WELL PURGING DATA:

Date Purged: 11/15 Time Start: 1115 Time Finish: 1155
Purge Method/Equipmen: Low Flow
Field Testing Equipment Used: Make Model Serial Number

DTW
35.96
37.73
38.06
38.60
38.90
39.52
40.00
40.87 40.43

Time	Temp. (°C)	Spec. Cond. (mS)	DO (mg/L)	pH (s.u.)	ORP (mV)	Turbidity (NTUs)	Color	Odor	Volume Removed (gal)
1115	17.7	582	~~1.48~~ 1.18	7.87	148.1	92.47	clear	none	.1
1120	17.5	581	1.46	7.79	140.3	86.10			.3
1125	17.6	583	1.47	7.76	138.8	78.31			.3
1130	17.8	582	1.56	7.76	143.9	87.14			.4
1135	18.0	581	1.85	7.77	155.5	81.2			.5
1140	18.2	583	2.36	7.77	176.4	80.5			.6
1145	18.4	584	2.47	7.78	185.5	62.7			.7
1150	18.4	581	2.89	7.79	203.5	59.8			
1155									
1200									

Sample at 1155

- Started sampling early due to water level continuing to drop.
- Did not get to do at 1200

SMITH GARDNER

Ground Water Sample Collection Record

Client:
Project Name/Number: Charah Brickhaven - Chatham-20-4
Site Location: Charah Brickhaven, Moncure-Flatwood Road
Weather Conditions:
Collector(s): Smith + Gardner, HDR

Well/Peizometer ID: MW-11

WATER LEVEL DATA: (measured from Top of Casing)

Total Well Depth (ft.): 40.00
Depth to Water (ft.): 11.90
Casing Diameter (in.): 2
Casing Material: PVC
Water Column Length (ft.):
Multiplication Factor:
One Well Volume (gals.):
Three Well Volumes (gals.):

ACCEPTANCE CRITERIA:

Min.required vols.purged: 3 Vols.
Max. allowable turbidity: 5 NTUs
Conductivity stabilize within: 3 %
Temperature stabilize within: 5 % or: 0.2 °C
DO stabilize within: 10 % or: <0.5 mg/L
pH stabilize within: 0.1 pH units

WELL PURGING DATA:

Date Purged: 11/17 Time Start: 0725 Time Finish:
Purge Method/Equipmen: Low Flow
Field Testing Equipment Used: Make Model Serial Number

DTW
11.90
15.38
16.06
16.67
16.80
16.88
17.06
17.15
17.28
17.33
17.49
17.64
17.70
17.85
17.91
18.00
18.10
18.05

Time	Temp. (°C)	Spec. Cond. (mS)	DO (mg/L)	pH (s.u.)	ORP (mV)	Turbidity (NTUs)	Color	Odor	Volume Removed (gal)
0725	15.2	768	3.81	7.09	301.4	220	Cloudy	none	.1
0730	16.6	770	1.28	6.70	306.4	260	cloudy		.3
0735	17.1	765	1.03	6.69	297.8	171	cloudy		.5
0740	17.2	759	0.78	6.68	288.4	123	cloudy		.7
0745	17.3	758	0.74	6.68	285.7	101	cloudy		.8
0750	17.3	756	0.66	6.68	283.1	71.5	cloudy		1.0
0755	17.4	754	0.57	6.67	274.8	43.1	Clear		1.2
0800	17.4	751	0.54	6.67	267.3	31.0			1.4
0805	17.4	748	0.50	6.66	259.2	29.2			1.6
0810	17.4	746	0.48	6.66	253.8	25.4			1.8
0815	17.5	766	0.37	6.65	246.5	20.1			2.0
0820	17.6	763	0.27	6.63	233.7	169			2.2
0825	17.6	760	0.25	6.62	225.4	16.5			2.4
0830	17.6	757	0.24	6.62	219.6	16.3			2.6
0835	17.6	753	0.23	6.62	212.9	12.9			2.8
0840	17.6	752	0.22	6.61	205.4	~~12.7~~ 11.1			3.0
0845	17.7	751	0.22	6.62	~~203~~ 203.5	10.4			3.2
0850	17.7	752	0.22	6.61	201.9	8.40			3.5

Sample @ 0850

SMITH GARDNER

Ground Water Sample Collection Record

Client:
Project Name/Number: Charah Brickhaven - Chatham-20-4
Site Location: Charah Brickhaven, Moncure-Flatwood Road
Weather Conditions:
Collector(s): Smith + Gardner, HDR

Well/Peizometer ID: MW-11D

WATER LEVEL DATA: (measured from Top of Casing)

Total Well Depth (ft.): 65.00
Depth to Water (ft.): 7.60
Casing Diameter (in.): 2
Casing Material: PVC
Water Column Length (ft.):
Multiplication Factor:
One Well Volume (gals.):
Three Well Volumes (gals.):

ACCEPTANCE CRITERIA:

Min. required vols. purged: 3 Vols.
Max. allowable turbidity: 5 NTUs
Conductivity stabilize within: 3 %
Temperature stabilize within: 5 % or: 0.2 °C
DO stabilize within: 10 % or: <0.5 mg/L
pH stabilize within: 0.1 pH units

WELL PURGING DATA:

Date Purged: 11/17 Time Start: 0920 Time Finish: 1050
Purge Method/Equipmen: Low Flow
Field Testing Equipment Used: Make Model Serial Number

DTW	Time	Temp. (°C)	Spec. Cond. (mS)	DO (mg/L)	pH (s.u.)	ORP (mV)	Turbidity (NTUs)	Color	Odor	Volume Removed (gal)
7.60	0920	16.2	825	4.10	8.08	266.7	450	cloudy	none	.1
10.00	0925	16.0	832	2.64	8.24	257.3	500	cloudy		.3
13.38	0930	16.9	882	0.63	8.51	241.0	360	cloudy		1.2
13.11	0935	16.9	971	0.35	8.55	229.6	61.3	cloudy		1.5
14.98	0940	17.3	996	0.26	8.59	216.2	47.5	clear		1.8
15.16	0945	17.2	1032	0.23	8.59	209.4	18.4			2.5
15.35	0950	17.2	1026	0.22	8.60	203.4	14.9			2.8
14.70	0955	17.1	1019	0.21	8.60	198.7	12.8			3.5
14.18	1000	17.2	1032	0.20	8.60	193.0	13.1			3.8
14.17	1005	17.3	1063	0.21	8.62	187.4	13.2			4.2
14.22	1010	17.4	1033	0.20	8.63	180.6	11.8			4.5
14.20	1015	17.3	1024	0.19	8.62	178.2	14.0			5.0
14.18	1020	17.4	964	0.18	8.61	171.8	12.7			5.3
14.20	1025	17.4	963	0.20	8.60	170.5	10.4			5.7
14.17	1030	17.4	962	0.23	8.60	168.7	10.4			6.0
14.18	1035	17.5	910	0.20	8.59	165.4	11.5			6.2
14.20	1040	17.5	908	0.17	8.59	160.1	12.6			6.4
14.18	1045	17.5	907	0.17	8.59	159.7	10.2			6.8
14.16	1050	17.5	904	0.17	8.59	159.6	9.8			7.0

Sample @ 1050

SMITH GARDNER

Ground Water Sample Collection Record

Client:
Project Name/Number: Charah Brickhaven - Chatham-20-4
Site Location: Charah Brickhaven, Moncure-Flatwood Road
Weather Conditions:
Collector(s): Smith + Gardner, HDR

Well/Peizometer ID: Leachate

WATER LEVEL DATA: (measured from Top of Casing)

Total Well Depth (ft.): _____ Water Column Length (ft.): _____

Depth to Water (ft.): _____ Multiplication Factor: _____

Casing Diameter (in.): 2 One Well Volume (gals.): _____

Casing Material: PVC Three Well Volumes (gals.): _____

ACCEPTANCE CRITERIA:

Min.required vols.purged: 3 Vols.

Max. allowable turbidity: 5 NTUs

Conductivity stabilize within: 3 %

Temperature stabilize within: 5 %
or: 0.2 °C

DO stabilize within: 10 %
or: <0.5 mg/L

pH stabilize within: 0.1 pH units

WELL PURGING DATA:

Date Purged: 11/15 Time Start: _____ Time Finish: _____

Purge Method/Equipmen Low Flow

Field Testing Equipment Used: Make Model Serial Number

Time	Temp (°C)	Spec. Cond. (mS)	DO (mg/L)	pH (s.u.)	ORP (mV)	Turbidity (NTUs)	Color	Odor	Volume Removed (gal)
1530	14.7	1882	10.06	7.84	297.3	2.88	clear	none	—

SMITH GARDNER

Ground Water Sample Collection Record

Client:
Project Name/Number: Charah Brickhaven - Chatham-20-4
Site Location: Charah Brickhaven, Moncure-Flatwood Road
Weather Conditions:
Collector(s): Smith + Gardner, HDR

Well/Peizometer ID: Surface Waters

WATER LEVEL DATA: (measured from Top of Casing)

Total Well Depth (ft.): 145
Depth to Water (ft.): 135.92
Casing Diameter (in.): 2
Casing Material: PVC
Water Column Length (ft.):
Multiplication Factor:
One Well Volume (gals.):
Three Well Volumes (gals.):

ACCEPTANCE CRITERIA:

Min. required vols. purged: 3 Vols.
Max. allowable turbidity: 5 NTUs
Conductivity stabilize within: 3 %
Temperature stabilize within: 5 % or: 0.2 °C
DO stabilize within: 10 % or: <0.5 mg/L
pH stabilize within: 0.1 pH units

WELL PURGING DATA:

Date Purged: 11/18 Time Start: Time Finish:
Purge Method/Equipmen: Low Flow
Field Testing Equipment Used: Make Model Serial Number

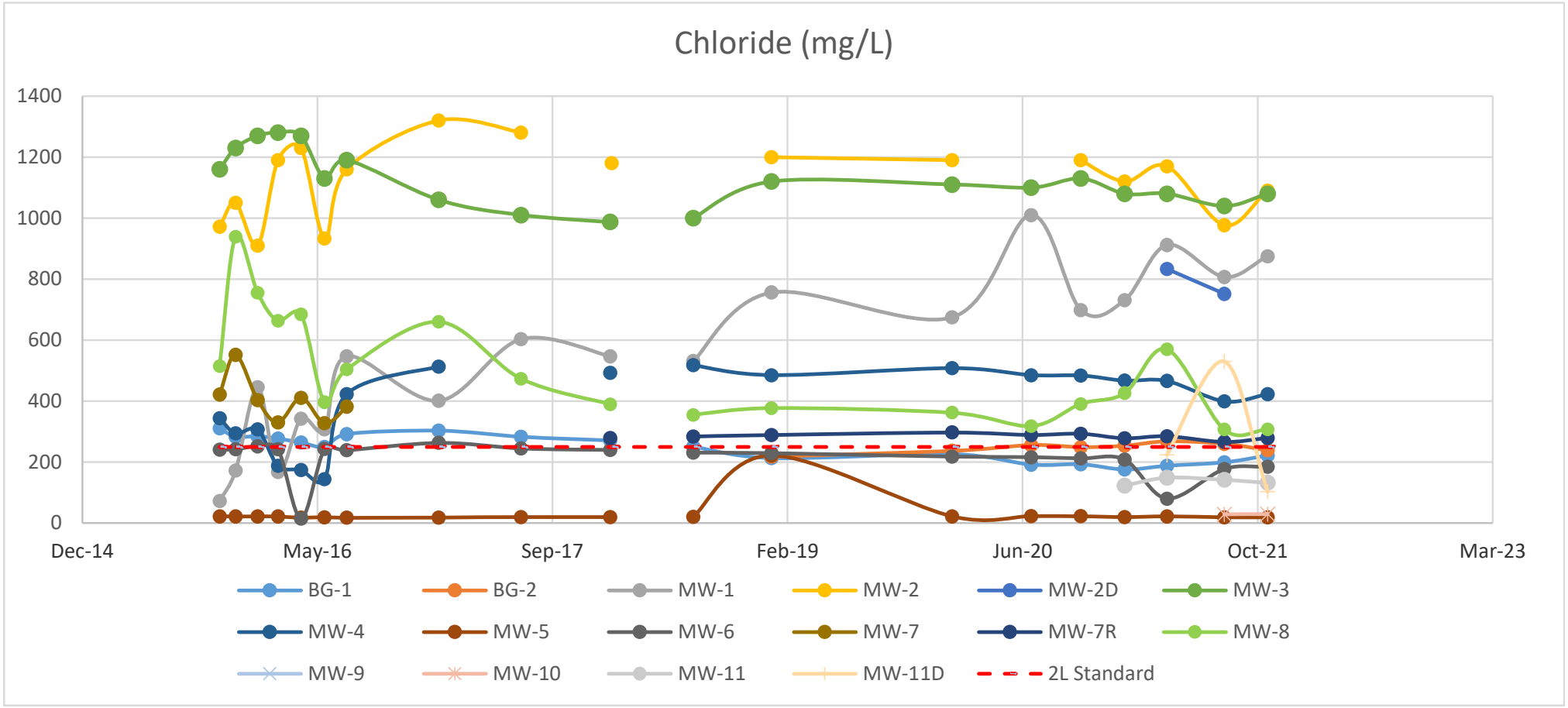
DTW 135.92

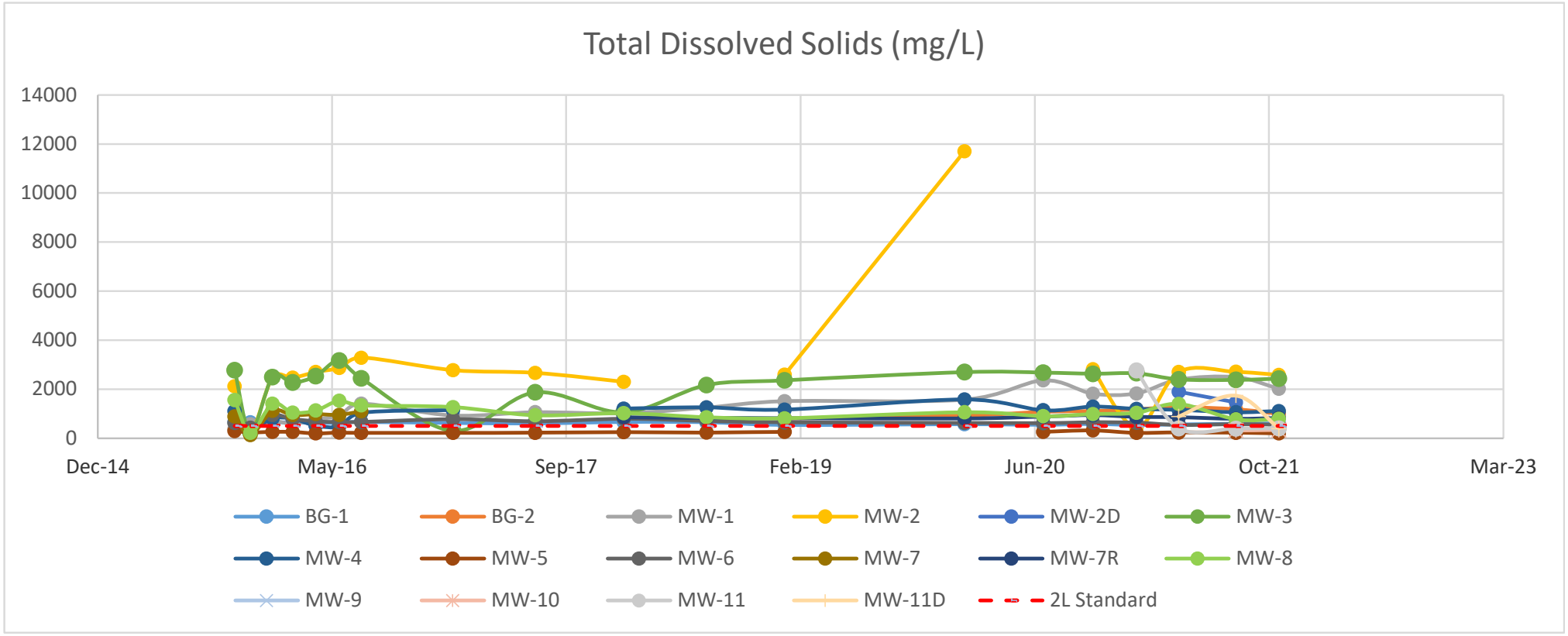
Time	Temp (°C)	Spec. Cond. (mS)	DO (mg/L)	pH (s.u.)	ORP (mV)	Turbidity (NTUs)	Color	Odor	Volume Removed (gal)
				SW-1					
1440	15.9	126.9	2.75	6.49	265.7	1712	Brown	none	—
				SW-2					
1540	14.2	318.1	5.65	6.59	296.4	24.17	clear	none	—
				SW-3					
1550	DRY								
				SW-4					
1500	15.0	99.1	7.39	6.47	284.7	56.8	Brown	none	—
				SW-5					
1615	13.9	64.2	7.41	6.69	310.7	808	Brown	none	—

B

Appendix B – Concentration vs. Time Plots

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Chloride (mg/L)
1400
1200
1000
800
600
400
200
0
Dec-14
May-16
Sep-17
Feb-19
Jun-20
Oct-21
Mar-23
BG-1
BG-2
MW-1
MW-2
MW-2D
MW-3
MW-4
MW-5
MW-6
MW-7
MW-7R
MW-8
MW-9
MW-10
MW-11
MW-11D
2L Standard


Total Dissolved Solids (mg/L)
14000
12000
10000
8000
6000
4000
2000
0
Dec-14
May-16
Sep-17
Feb-19
Jun-20
Oct-21
Mar-23
BG-1
BG-2
MW-1
MW-2
MW-2D
MW-3
MW-4
MW-5
MW-6
MW-7
MW-7R
MW-8
MW-9
MW-10
MW-11
MW-11D
2L Standard

C

Appendix C – Laboratory Reports, Chains of Custody, and Quality Control Data

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Pace Analytical Services, LLC
9800 Kincey Ave. Suite 100
Huntersville, NC 28078
(704)875-9092

September 24, 2021

Mark Filardi
HDR
440 S. Church St
Suite 900
Charlotte, NC 28202

RE: Project: Charah Q3 GW
Pace Project No.: 92555499

Dear Mark Filardi:

Enclosed are the analytical results for sample(s) received by the laboratory on August 13, 2021. The results relate only to the samples included in this report. Results reported herein conform to the applicable TNI/NELAC Standards and the laboratory's Quality Manual, where applicable, unless otherwise noted in the body of the report.

The test results provided in this final report were generated by each of the following laboratories within the Pace Network:

- Pace Analytical Services - Asheville
- Pace Analytical Services - Greensburg

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Tyler Forney
tyler.forney@pacelabs.com
(704)875-9092
Project Manager

Enclosures

cc: Charles Gruenberg
Mike Plummer, HDR
Jacob Ruffing

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CERTIFICATIONS

Project: Charah Q3 GW
Pace Project No.: 92555499

Pace Analytical Services Pennsylvania

1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601
ANAB DOD-ELAP Rad Accreditation #: L2417
Alabama Certification #: 41590
Arizona Certification #: AZ0734
Arkansas Certification
California Certification #: 04222CA
Colorado Certification #: PA01547
Connecticut Certification #: PH-0694
Delaware Certification
EPA Region 4 DW Rad
Florida/TNI Certification #: E87683
Georgia Certification #: C040
Guam Certification
Florida: Cert E871149 SEKS WET
Hawaii Certification
Idaho Certification
Illinois Certification
Indiana Certification
Iowa Certification #: 391
Kansas/TNI Certification #: E-10358
Kentucky Certification #: KY90133
KY WW Permit #: KY0098221
KY WW Permit #: KY0000221
Louisiana DHH/TNI Certification #: LA180012
Louisiana DEQ/TNI Certification #: 4086
Maine Certification #: 2017020
Maryland Certification #: 308
Massachusetts Certification #: M-PA1457
Michigan/PADEP Certification #: 9991
Missouri Certification #: 235
Montana Certification #: Cert0082
Nebraska Certification #: NE-OS-29-14
Nevada Certification #: PA014572018-1
New Hampshire/TNI Certification #: 297617
New Jersey/TNI Certification #: PA051
New Mexico Certification #: PA01457
New York/TNI Certification #: 10888
North Carolina Certification #: 42706
North Dakota Certification #: R-190
Ohio EPA Rad Approval: #41249
Oregon/TNI Certification #: PA200002-010
Pennsylvania/TNI Certification #: 65-00282
Puerto Rico Certification #: PA01457
Rhode Island Certification #: 65-00282
South Dakota Certification
Tennessee Certification #: 02867
Texas/TNI Certification #: T104704188-17-3
Utah/TNI Certification #: PA014572017-9
USDA Soil Permit #: P330-17-00091
Vermont Dept. of Health: ID# VT-0282
Virgin Island/PADEP Certification
Virginia/VELAP Certification #: 9526
Washington Certification #: C868
West Virginia DEP Certification #: 143
West Virginia DHHR Certification #: 9964C
Wisconsin Approve List for Rad
Wyoming Certification #: 8TMS-L

Pace Analytical Services Asheville

2225 Riverside Drive, Asheville, NC 28804
Florida/NELAP Certification #: E87648
North Carolina Drinking Water Certification #: 37712
North Carolina Wastewater Certification #: 40
South Carolina Certification #: 99030001
Virginia/VELAP Certification #: 460222

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SAMPLE SUMMARY

Project: Charah Q3 GW
Pace Project No.: 92555499

Lab ID	Sample ID	Matrix	Date Collected	Date Received
92555499001	**BG-1**	Water	08/10/21 19:00	08/13/21 15:48
92555499002	**BG-2**	Water	08/12/21 18:15	08/13/21 15:48
92555499003	**MW-1**	Water	08/10/21 09:05	08/13/21 15:48
92555499004	**MW-2**	Water	08/10/21 15:02	08/13/21 15:48
92555499005	**MW-3**	Water	08/12/21 15:50	08/13/21 15:48
92555499006	**MW-4**	Water	08/12/21 14:05	08/13/21 15:48
92555499007	**MW-5**	Water	08/09/21 17:05	08/13/21 15:48
92555499008	**MW-6**	Water	08/11/21 17:20	08/13/21 15:48
92555499009	**MW-7R**	Water	08/11/21 13:45	08/13/21 15:48
92555499010	**MW-8**	Water	08/11/21 09:55	08/13/21 15:48
92555499011	**MW-10**	Water	08/09/21 13:20	08/13/21 15:48
92555499012	**MW-11**	Water	08/12/21 09:20	08/13/21 15:48
92555499013	**MW-11D**	Water	08/12/21 11:20	08/13/21 15:48
92555499014	**SW-1**	Water	08/13/21 08:59	08/13/21 15:48
92555499015	**SW-2**	Water	08/13/21 07:25	08/13/21 15:48
92555499016	**SW-4**	Water	08/13/21 08:30	08/13/21 15:48
92555499017	**SW-5**	Water	08/13/21 13:00	08/13/21 15:48
92555499018	**LEACHATE**	Water	08/13/21 08:08	08/13/21 15:48
92555499019	**DUP**	Water	08/11/21 17:30	08/13/21 15:48
92555499020	**EQBL**	Water	08/13/21 12:40	08/13/21 15:48
92555499021	**SW-6**	Water	08/13/21 09:15	08/13/21 15:48

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SAMPLE ANALYTE COUNT

Project: Charah Q3 GW
Pace Project No.: 92555499

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
92555499001	**BG-1**	EPA 6010D	DS	16	PASI-A
		EPA 6020B	CRW, JOR	3	PASI-A
		EPA 7470A	RDT	1	PASI-A
		EPA 903.1	SLC	1	PASI-PA
		EPA 904.0	JC2	1	PASI-PA
		Total Radium Calculation	RMK	1	PASI-PA
		SM 2540C-2011	ZMC	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	3	PASI-A
92555499002	**BG-2**	EPA 6010D	DS	16	PASI-A
		EPA 6020B	CRW, JOR	3	PASI-A
		EPA 7470A	RDT	1	PASI-A
		EPA 903.1	SLC	1	PASI-PA
		EPA 904.0	JC2	1	PASI-PA
		Total Radium Calculation	RMK	1	PASI-PA
		SM 2540C-2011	MJP	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	3	PASI-A
92555499003	**MW-1**	EPA 6010D	CBV, DS	16	PASI-A
		EPA 6020B	CRW, JOR	3	PASI-A
		EPA 7470A	RDT	1	PASI-A
		EPA 903.1	SLC	1	PASI-PA
		EPA 904.0	JC2	1	PASI-PA
		Total Radium Calculation	RMK	1	PASI-PA
		SM 2540C-2011	ZMC	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	3	PASI-A
92555499004	**MW-2**	EPA 6010D	CBV, DS	16	PASI-A
		EPA 6020B	CRW, JOR	3	PASI-A
		EPA 7470A	RDT	1	PASI-A
		EPA 903.1	SLC	1	PASI-PA
		EPA 904.0	JC2	1	PASI-PA
		Total Radium Calculation	RMK	1	PASI-PA
		SM 2540C-2011	ZMC	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	3	PASI-A
92555499005	**MW-3**	EPA 6010D	CBV, DS	16	PASI-A
		EPA 6020B	JOR	3	PASI-A
		EPA 7470A	RDT	1	PASI-A
		EPA 903.1	SLC	1	PASI-PA
		EPA 904.0	JC2	1	PASI-PA

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SAMPLE ANALYTE COUNT

Project: Charah Q3 GW
Pace Project No.: 92555499

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		Total Radium Calculation	RMK	1	PASI-PA
		SM 2540C-2011	MJP	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	3	PASI-A
92555499006	**MW-4**	EPA 6010D	CBV, DS	16	PASI-A
		EPA 6020B	CRW, JOR	3	PASI-A
		EPA 7470A	RDT	1	PASI-A
		EPA 903.1	SLC	1	PASI-PA
		EPA 904.0	JC2	1	PASI-PA
		Total Radium Calculation	RMK	1	PASI-PA
		SM 2540C-2011	MJP	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	3	PASI-A
92555499007	**MW-5**	EPA 6010D	CBV, DS	16	PASI-A
		EPA 6020B	CRW, JOR	3	PASI-A
		EPA 7470A	RDT	1	PASI-A
		EPA 903.1	SLC	1	PASI-PA
		EPA 904.0	JC2	1	PASI-PA
		Total Radium Calculation	RMK	1	PASI-PA
		SM 2540C-2011	ZMC	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	3	PASI-A
92555499008	**MW-6**	EPA 6010D	CBV, DS	16	PASI-A
		EPA 6020B	CRW, JOR	3	PASI-A
		EPA 7470A	RDT	1	PASI-A
		EPA 903.1	SLC	1	PASI-PA
		EPA 904.0	JC2	1	PASI-PA
		Total Radium Calculation	RMK	1	PASI-PA
		SM 2540C-2011	ZMC	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	3	PASI-A
92555499009	**MW-7R**	EPA 6010D	CBV, DS	16	PASI-A
		EPA 6020B	CRW, JOR	3	PASI-A
		EPA 7470A	RDT	1	PASI-A
		EPA 903.1	SLC	1	PASI-PA
		EPA 904.0	JC2	1	PASI-PA
		Total Radium Calculation	RMK	1	PASI-PA
		SM 2540C-2011	ZMC	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	3	PASI-A
92555499010	**MW-8**	EPA 6010D	CBV, DS	16	PASI-A
		EPA 6020B	CRW, JOR	3	PASI-A

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SAMPLE ANALYTE COUNT

Project: Charah Q3 GW
Pace Project No.: 92555499

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		EPA 7470A	RDT	1	PASI-A
		EPA 903.1	SLC	1	PASI-PA
		EPA 904.0	JC2	1	PASI-PA
		Total Radium Calculation	RMK	1	PASI-PA
		SM 2540C-2011	ZMC	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	3	PASI-A
92555499011	**MW-10**	EPA 6010D	CBV, DS	16	PASI-A
		EPA 6020B	CRW, JOR	3	PASI-A
		EPA 7470A	RDT	1	PASI-A
		EPA 903.1	SLC	1	PASI-PA
		EPA 904.0	JC2	1	PASI-PA
		Total Radium Calculation	RMK	1	PASI-PA
		SM 2540C-2011	ZMC	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	3	PASI-A
92555499012	**MW-11**	EPA 6010D	CBV, DS	16	PASI-A
		EPA 6020B	CRW, JOR	3	PASI-A
		EPA 7470A	RDT	1	PASI-A
		EPA 903.1	SLC	1	PASI-PA
		EPA 904.0	JC2	1	PASI-PA
		Total Radium Calculation	RMK	1	PASI-PA
		SM 2540C-2011	MJP	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	3	PASI-A
92555499013	**MW-11D**	EPA 6010D	CBV, DS	16	PASI-A
		EPA 6020B	CRW, JOR	3	PASI-A
		EPA 7470A	RDT	1	PASI-A
		EPA 903.1	SLC	1	PASI-PA
		EPA 904.0	JC2	1	PASI-PA
		Total Radium Calculation	RMK	1	PASI-PA
		SM 2540C-2011	MJP	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	3	PASI-A
92555499014	**SW-1**	EPA 6010D	CBV, DS	16	PASI-A
		EPA 6020B	CRW, JOR	3	PASI-A
		EPA 7470A	RDT	1	PASI-A
		EPA 903.1	SLC	1	PASI-PA
		EPA 904.0	JC2	1	PASI-PA
		Total Radium Calculation	RMK	1	PASI-PA
		SM 2540C-2011	MJP	1	PASI-A

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SAMPLE ANALYTE COUNT

Project: Charah Q3 GW
Pace Project No.: 92555499

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		EPA 300.0 Rev 2.1 1993	CDC	3	PASI-A
92555499015	**SW-2**	EPA 6010D	CBV	16	PASI-A
		EPA 6020B	CRW, JOR	3	PASI-A
		EPA 7470A	RDT	1	PASI-A
		EPA 903.1	SLC	1	PASI-PA
		EPA 904.0	JC2	1	PASI-PA
		Total Radium Calculation	RMK	1	PASI-PA
		SM 2540C-2011	MJP	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	3	PASI-A
92555499016	**SW-4**	EPA 6010D	CBV	16	PASI-A
		EPA 6020B	JOR	3	PASI-A
		EPA 7470A	RDT	1	PASI-A
		EPA 903.1	SLC	1	PASI-PA
		EPA 904.0	JC2	1	PASI-PA
		Total Radium Calculation	RMK	1	PASI-PA
		SM 2540C-2011	ZMC	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	3	PASI-A
92555499017	**SW-5**	EPA 6010D	CBV	16	PASI-A
		EPA 6020B	JOR	3	PASI-A
		EPA 7470A	RDT	1	PASI-A
		EPA 903.1	SLC	1	PASI-PA
		EPA 904.0	JC2	1	PASI-PA
		Total Radium Calculation	RMK	1	PASI-PA
		SM 2540C-2011	ZMC	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	3	PASI-A
92555499018	**LEACHATE**	EPA 6010D	CBV, DS	16	PASI-A
		EPA 6020B	CRW, JOR	3	PASI-A
		EPA 7470A	RDT	1	PASI-A
		EPA 903.1	SLC	1	PASI-PA
		EPA 904.0	JC2	1	PASI-PA
		Total Radium Calculation	RMK	1	PASI-PA
		SM 2540C-2011	ZMC	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	3	PASI-A
92555499019	**DUP**	EPA 6010D	CBV	16	PASI-A
		EPA 6020B	JOR	3	PASI-A
		EPA 7470A	RDT	1	PASI-A
		EPA 903.1	SLC	1	PASI-PA

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SAMPLE ANALYTE COUNT

Project: Charah Q3 GW
Pace Project No.: 92555499

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		EPA 904.0	JC2	1	PASI-PA
		Total Radium Calculation	RMK	1	PASI-PA
		SM 2540C-2011	ZMC	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	3	PASI-A
92555499020	**EQBL**	EPA 6010D	CBV	16	PASI-A
		EPA 6020B	JOR	3	PASI-A
		EPA 7470A	RDT	1	PASI-A
		EPA 903.1	SLC	1	PASI-PA
		EPA 904.0	JC2	1	PASI-PA
		Total Radium Calculation	RMK	1	PASI-PA
		SM 2540C-2011	ZMC	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	3	PASI-A
92555499021	**SW-6**	EPA 6010D	CBV	16	PASI-A
		EPA 6020B	CRW	3	PASI-A
		EPA 7470A	RDT	1	PASI-A
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JC2	1	PASI-PA
		Total Radium Calculation	RMK	1	PASI-PA
		SM 2540C-2011	ZMC	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	3	PASI-A

PASI-A = Pace Analytical Services - Asheville
PASI-PA = Pace Analytical Services - Greensburg

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SUMMARY OF DETECTION

Project: Charah Q3 GW
Pace Project No.: 92555499

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92555499001	**BG-1**					
EPA 6010D	Barium	295	ug/L	5.0	08/18/21 20:50	
EPA 6010D	Calcium	24100	ug/L	100	08/18/21 20:50	
EPA 6020B	Lithium	19.7	ug/L	2.5	08/26/21 20:07	
EPA 7470A	Mercury	0.14J	ug/L	0.20	08/25/21 11:15	
EPA 903.1	Radium-226	-0.276 ± 0.364 (0.828) C:NA T:89%	pCi/L		09/07/21 12:34	
EPA 904.0	Radium-228	0.229 ± 0.317 (0.678) C:63% T:95%	pCi/L		09/02/21 11:18	
Total Radium Calculation	Total Radium	0.229 ± 0.681 (1.51)	pCi/L		09/08/21 15:13	
SM 2540C-2011	Total Dissolved Solids	590	mg/L	25.0	08/17/21 18:04	
EPA 300.0 Rev 2.1 1993	Chloride	199	mg/L	4.0	08/18/21 22:00	M1
EPA 300.0 Rev 2.1 1993	Fluoride	0.15	mg/L	0.10	08/18/21 11:36	
EPA 300.0 Rev 2.1 1993	Sulfate	18.3	mg/L	1.0	08/18/21 11:36	
92555499002	**BG-2**					
EPA 6010D	Barium	53.3	ug/L	5.0	08/18/21 21:03	
EPA 6010D	Calcium	123000	ug/L	500	08/19/21 15:42	
EPA 6020B	Boron	12.0J	ug/L	50.0	08/27/21 13:00	
EPA 6020B	Lithium	19.0	ug/L	2.5	08/27/21 13:00	
EPA 903.1	Radium-226	0.265 ± 0.493 (0.839) C:NA T:90%	pCi/L		09/07/21 12:34	
EPA 904.0	Radium-228	0.632 ± 0.422 (0.791) C:56% T:85%	pCi/L		09/02/21 11:18	
Total Radium Calculation	Total Radium	0.897 ± 0.915 (1.63)	pCi/L		09/08/21 15:13	
SM 2540C-2011	Total Dissolved Solids	1180	mg/L	125	08/19/21 12:31	
EPA 300.0 Rev 2.1 1993	Chloride	260	mg/L	6.0	08/18/21 23:16	
EPA 300.0 Rev 2.1 1993	Fluoride	0.23	mg/L	0.10	08/18/21 12:23	
EPA 300.0 Rev 2.1 1993	Sulfate	181	mg/L	6.0	08/18/21 23:16	
92555499003	**MW-1**					
EPA 6010D	Barium	294	ug/L	5.0	08/18/21 21:19	
EPA 6010D	Calcium	227000	ug/L	1000	08/19/21 15:46	
EPA 6020B	Lithium	34.9	ug/L	2.5	08/27/21 13:05	
EPA 903.1	Radium-226	0.0594 ± 0.333 (0.638) C:NA T:101%	pCi/L		09/07/21 12:34	

REPORT OF LABORATORY ANALYSIS

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SUMMARY OF DETECTION

Project: Charah Q3 GW
Pace Project No.: 92555499

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92555499003	**MW-1**					
EPA 904.0	Radium-228	0.761 ± 0.412 (0.733) C:65% T:88%	pCi/L		09/02/21 11:18	
Total Radium Calculation	Total Radium	0.820 ± 0.745 (1.37)	pCi/L		09/08/21 15:13	
SM 2540C-2011	Total Dissolved Solids	2490	mg/L	250	08/17/21 18:04	
EPA 300.0 Rev 2.1 1993	Chloride	807	mg/L	18.0	08/18/21 23:31	
EPA 300.0 Rev 2.1 1993	Fluoride	0.15	mg/L	0.10	08/18/21 12:38	
EPA 300.0 Rev 2.1 1993	Sulfate	5.4	mg/L	1.0	08/18/21 12:38	
92555499004	**MW-2**					
EPA 6010D	Antimony	4.6J	ug/L	5.0	08/18/21 21:22	
EPA 6010D	Arsenic	4.8J	ug/L	10.0	08/18/21 21:22	
EPA 6010D	Barium	342	ug/L	5.0	08/18/21 21:22	
EPA 6010D	Calcium	156000	ug/L	1000	08/19/21 16:02	
EPA 6010D	Chromium	9.7	ug/L	5.0	08/19/21 16:05	
EPA 6010D	Molybdenum	4.8J	ug/L	5.0	08/18/21 21:22	
EPA 6010D	Nickel	8.6	ug/L	5.0	08/18/21 21:22	
EPA 6020B	Boron	42.7J	ug/L	250	08/27/21 14:04	
EPA 6020B	Lithium	512	ug/L	12.5	08/27/21 14:04	
EPA 903.1	Radium-226	1.02 ± 0.554 (0.609) C:NA T:89%	pCi/L		09/07/21 12:34	
EPA 904.0	Radium-228	1.83 ± 0.610 (0.836) C:60% T:90%	pCi/L		09/02/21 11:18	
Total Radium Calculation	Total Radium	2.85 ± 1.16 (1.45)	pCi/L		09/08/21 15:13	
SM 2540C-2011	Total Dissolved Solids	2710	mg/L	278	08/17/21 18:05	
EPA 300.0 Rev 2.1 1993	Chloride	977	mg/L	21.0	08/18/21 23:47	
EPA 300.0 Rev 2.1 1993	Fluoride	0.22	mg/L	0.10	08/18/21 12:53	
EPA 300.0 Rev 2.1 1993	Sulfate	75.8	mg/L	1.0	08/18/21 12:53	
92555499005	**MW-3**					
EPA 6010D	Barium	666	ug/L	5.0	08/18/21 21:26	
EPA 6010D	Calcium	166000	ug/L	1000	08/19/21 16:09	
EPA 6010D	Molybdenum	6.3	ug/L	5.0	08/18/21 21:26	
EPA 6020B	Boron	28.5J	ug/L	50.0	08/26/21 15:05	
EPA 6020B	Lithium	87.5	ug/L	2.5	08/26/21 15:05	
EPA 903.1	Radium-226	0.848 ± 0.690 (1.00) C:NA T:91%	pCi/L		09/07/21 12:34	

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Pace Analytical Services, LLC
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(704)875-9092

SUMMARY OF DETECTION

Project: Charah Q3 GW
Pace Project No.: 92555499

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92555499005	**MW-3**					
EPA 904.0	Radium-228	0.326 ± 0.396 (0.838) C:65% T:91%	pCi/L		09/02/21 11:19	
Total Radium Calculation	Total Radium	1.17 ± 1.09 (1.84)	pCi/L		09/08/21 15:13	
SM 2540C-2011	Total Dissolved Solids	2380	mg/L	500	08/19/21 12:31	
EPA 300.0 Rev 2.1 1993	Chloride	1040	mg/L	20.0	08/19/21 00:02	
EPA 300.0 Rev 2.1 1993	Fluoride	0.31	mg/L	0.10	08/18/21 13:09	
EPA 300.0 Rev 2.1 1993	Sulfate	20.9	mg/L	1.0	08/18/21 13:09	
92555499006	**MW-4**					
EPA 6010D	Barium	279	ug/L	5.0	08/18/21 21:29	
EPA 6010D	Calcium	58900	ug/L	100	08/18/21 21:29	
EPA 6010D	Nickel	4.3J	ug/L	5.0	08/18/21 21:29	
EPA 6020B	Lithium	98.0	ug/L	12.5	08/27/21 14:08	
EPA 903.1	Radium-226	0.291 ± 0.544 (0.922) C:NA T:88%	pCi/L		09/07/21 12:34	
EPA 904.0	Radium-228	0.143 ± 0.432 (0.969) C:61% T:84%	pCi/L		09/02/21 11:19	
Total Radium Calculation	Total Radium	0.434 ± 0.976 (1.89)	pCi/L		09/08/21 15:13	
SM 2540C-2011	Total Dissolved Solids	1060	mg/L	125	08/19/21 12:31	
EPA 300.0 Rev 2.1 1993	Chloride	399	mg/L	9.0	08/19/21 00:17	
EPA 300.0 Rev 2.1 1993	Fluoride	0.27	mg/L	0.10	08/18/21 13:24	
EPA 300.0 Rev 2.1 1993	Sulfate	9.9	mg/L	1.0	08/18/21 13:24	
92555499007	**MW-5**					
EPA 6010D	Barium	120	ug/L	5.0	08/18/21 21:32	
EPA 6010D	Calcium	10100	ug/L	100	08/18/21 21:32	
EPA 6010D	Zinc	9.6J	ug/L	10.0	08/18/21 21:32	
EPA 6020B	Lithium	28.6	ug/L	2.5	08/27/21 14:31	
EPA 903.1	Radium-226	-0.205 ± 0.472 (0.969) C:NA T:93%	pCi/L		09/07/21 12:34	
EPA 904.0	Radium-228	0.574 ± 0.420 (0.824) C:64% T:88%	pCi/L		09/02/21 11:19	
Total Radium Calculation	Total Radium	0.574 ± 0.892 (1.79)	pCi/L		09/08/21 15:13	
SM 2540C-2011	Total Dissolved Solids	224	mg/L	25.0	08/16/21 22:15	
EPA 300.0 Rev 2.1 1993	Chloride	19.1	mg/L	1.0	08/18/21 14:11	

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Project: Charah Q3 GW
Pace Project No.: 92555499

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92555499007	**MW-5**					
EPA 300.0 Rev 2.1 1993	Fluoride	0.46	mg/L	0.10	08/18/21 14:11	
EPA 300.0 Rev 2.1 1993	Sulfate	3.6	mg/L	1.0	08/18/21 14:11	
92555499008	**MW-6**					
EPA 6010D	Barium	49.0	ug/L	5.0	08/18/21 21:36	
EPA 6010D	Calcium	34200	ug/L	100	08/18/21 21:36	
EPA 6010D	Selenium	4.9J	ug/L	10.0	08/18/21 21:36	
EPA 6020B	Lithium	10.1	ug/L	2.5	08/27/21 14:36	
EPA 903.1	Radium-226	0.0323 ± 0.257 (0.533) C:NA T:93%	pCi/L		09/07/21 12:52	
EPA 904.0	Radium-228	0.400 ± 0.531 (1.13) C:65% T:68%	pCi/L		09/02/21 11:19	
Total Radium Calculation	Total Radium	0.432 ± 0.788 (1.66)	pCi/L		09/08/21 15:13	
SM 2540C-2011	Total Dissolved Solids	575	mg/L	25.0	08/17/21 18:12	MW
EPA 300.0 Rev 2.1 1993	Chloride	177	mg/L	4.0	08/19/21 00:32	
EPA 300.0 Rev 2.1 1993	Fluoride	0.30	mg/L	0.10	08/18/21 14:26	
EPA 300.0 Rev 2.1 1993	Sulfate	25.1	mg/L	1.0	08/18/21 14:26	
92555499009	**MW-7R**					
EPA 6010D	Barium	308	ug/L	5.0	08/18/21 21:39	
EPA 6010D	Calcium	91600	ug/L	100	08/18/21 21:39	
EPA 6020B	Lithium	23.8	ug/L	2.5	08/27/21 14:40	
EPA 903.1	Radium-226	0.214 ± 0.336 (0.561) C:NA T:96%	pCi/L		09/07/21 12:52	
EPA 904.0	Radium-228	0.173 ± 0.376 (0.831) C:65% T:90%	pCi/L		09/02/21 11:19	
Total Radium Calculation	Total Radium	0.387 ± 0.712 (1.39)	pCi/L		09/08/21 15:13	
SM 2540C-2011	Total Dissolved Solids	790	mg/L	50.0	08/17/21 18:12	MW
EPA 300.0 Rev 2.1 1993	Chloride	266	mg/L	6.0	08/19/21 00:47	
EPA 300.0 Rev 2.1 1993	Fluoride	0.11	mg/L	0.10	08/18/21 14:42	
EPA 300.0 Rev 2.1 1993	Sulfate	14.2	mg/L	1.0	08/18/21 14:42	
92555499010	**MW-8**					
EPA 6010D	Barium	1040	ug/L	5.0	08/18/21 21:42	
EPA 6010D	Calcium	95700	ug/L	100	08/18/21 21:42	
EPA 6020B	Lithium	25.3	ug/L	2.5	08/27/21 14:45	

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Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92555499010	**MW-8**					
EPA 903.1	Radium-226	0.311 ± 0.413 (0.664) C:NA T:89%	pCi/L		09/07/21 12:52	
EPA 904.0	Radium-228	1.04 ± 0.498 (0.867) C:65% T:87%	pCi/L		09/02/21 11:19	
Total Radium Calculation	Total Radium	1.35 ± 0.911 (1.53)	pCi/L		09/08/21 15:13	
SM 2540C-2011	Total Dissolved Solids	770	mg/L	50.0	08/17/21 18:12	MW
EPA 300.0 Rev 2.1 1993	Chloride	307	mg/L	7.0	08/19/21 01:03	
EPA 300.0 Rev 2.1 1993	Fluoride	0.067J	mg/L	0.10	08/18/21 14:57	
EPA 300.0 Rev 2.1 1993	Sulfate	6.6	mg/L	1.0	08/18/21 14:57	
92555499011	**MW-10**					
EPA 6010D	Barium	43.2	ug/L	5.0	08/18/21 21:45	
EPA 6010D	Calcium	17700	ug/L	100	08/18/21 21:45	
EPA 6010D	Molybdenum	32.5	ug/L	5.0	08/18/21 21:45	
EPA 6020B	Boron	20.4J	ug/L	50.0	08/27/21 14:49	
EPA 6020B	Lithium	1.7J	ug/L	2.5	08/27/21 14:49	
EPA 903.1	Radium-226	0.0695 ± 0.297 (0.573) C:NA T:97%	pCi/L		09/07/21 12:52	
EPA 904.0	Radium-228	1.67 ± 0.608 (0.927) C:63% T:90%	pCi/L		09/02/21 11:19	
Total Radium Calculation	Total Radium	1.74 ± 0.905 (1.50)	pCi/L		09/08/21 15:13	
SM 2540C-2011	Total Dissolved Solids	318	mg/L	25.0	08/16/21 22:15	
EPA 300.0 Rev 2.1 1993	Chloride	29.0	mg/L	1.0	08/18/21 15:13	
EPA 300.0 Rev 2.1 1993	Fluoride	0.46	mg/L	0.10	08/18/21 15:13	
EPA 300.0 Rev 2.1 1993	Sulfate	5.7	mg/L	1.0	08/18/21 15:13	M1, R1
92555499012	**MW-11**					
EPA 6010D	Barium	34.3	ug/L	5.0	08/18/21 21:48	
EPA 6010D	Calcium	23200	ug/L	100	08/18/21 21:48	
EPA 6020B	Boron	12.8J	ug/L	50.0	08/27/21 14:54	
EPA 6020B	Lithium	12.3	ug/L	2.5	08/27/21 14:54	
EPA 903.1	Radium-226	0.124 ± 0.393 (0.724) C:NA T:98%	pCi/L		09/07/21 12:52	

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SUMMARY OF DETECTION

Project: Charah Q3 GW
Pace Project No.: 92555499

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92555499012	**MW-11**					
EPA 904.0	Radium-228	-0.135 ± 0.388 (0.922) C:63% T:92%	pCi/L		09/02/21 11:19	
Total Radium Calculation	Total Radium	0.124 ± 0.781 (1.65)	pCi/L		09/08/21 15:13	
SM 2540C-2011	Total Dissolved Solids	398	mg/L	50.0	08/19/21 12:31	
EPA 300.0 Rev 2.1 1993	Chloride	142	mg/L	3.0	08/19/21 01:49	
EPA 300.0 Rev 2.1 1993	Fluoride	0.14	mg/L	0.10	08/18/21 16:52	
EPA 300.0 Rev 2.1 1993	Sulfate	1.8	mg/L	1.0	08/18/21 16:52	
92555499013	**MW-11D**					
EPA 6010D	Antimony	5.6	ug/L	5.0	08/18/21 22:14	
EPA 6010D	Arsenic	16.5	ug/L	10.0	08/18/21 22:14	
EPA 6010D	Barium	69.3	ug/L	5.0	08/18/21 22:14	
EPA 6010D	Calcium	94400	ug/L	100	08/18/21 22:14	M1
EPA 6010D	Molybdenum	127	ug/L	5.0	08/18/21 22:14	
EPA 6020B	Boron	109	ug/L	100	08/27/21 14:58	
EPA 6020B	Lithium	80.7	ug/L	5.0	08/27/21 14:58	
EPA 903.1	Radium-226	0.483 ± 0.460 (0.676) C:NA T:95%	pCi/L		09/07/21 12:52	
EPA 904.0	Radium-228	0.751 ± 0.456 (0.855) C:63% T:90%	pCi/L		09/02/21 11:19	
Total Radium Calculation	Total Radium	1.23 ± 0.916 (1.53)	pCi/L		09/08/21 15:13	
SM 2540C-2011	Total Dissolved Solids	1740	mg/L	500	08/19/21 12:31	
EPA 300.0 Rev 2.1 1993	Chloride	530	mg/L	12.0	08/19/21 02:04	
EPA 300.0 Rev 2.1 1993	Fluoride	0.49	mg/L	0.10	08/18/21 17:07	
EPA 300.0 Rev 2.1 1993	Sulfate	523	mg/L	12.0	08/19/21 02:04	
92555499014	**SW-1**					
EPA 6010D	Arsenic	12.0	ug/L	10.0	08/18/21 22:28	
EPA 6010D	Barium	753	ug/L	5.0	08/18/21 22:28	
EPA 6010D	Beryllium	3.3	ug/L	1.0	08/18/21 22:28	
EPA 6010D	Calcium	6360	ug/L	100	08/18/21 22:28	
EPA 6010D	Chromium	17.0	ug/L	5.0	08/19/21 17:41	
EPA 6010D	Cobalt	28.5	ug/L	5.0	08/18/21 22:28	
EPA 6010D	Copper	16.1	ug/L	5.0	08/18/21 22:28	
EPA 6010D	Lead	55.0	ug/L	5.0	08/18/21 22:28	
EPA 6010D	Nickel	10.6	ug/L	5.0	08/18/21 22:28	
EPA 6010D	Vanadium	75.8	ug/L	5.0	08/18/21 22:28	
EPA 6010D	Zinc	76.5	ug/L	10.0	08/18/21 22:28	
EPA 6020B	Lithium	7.5	ug/L	2.5	08/27/21 15:03	

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SUMMARY OF DETECTION

Project: Charah Q3 GW
Pace Project No.: 92555499

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92555499014	**SW-1**					
EPA 6020B	Thallium	0.14J	ug/L	0.47	08/26/21 21:28	
EPA 903.1	Radium-226	0.743 ± 0.767 (1.16) C:NA T:58%	pCi/L		09/07/21 12:52	
EPA 904.0	Radium-228	2.00 ± 1.34 (2.57) C:61% T:28%	pCi/L		09/02/21 11:19	
Total Radium Calculation	Total Radium	2.74 ± 2.11 (3.73)	pCi/L		09/08/21 15:13	
SM 2540C-2011	Total Dissolved Solids	1540	mg/L	62.5	08/19/21 12:31	
92555499015	**SW-2**					
EPA 6010D	Barium	94.7	ug/L	5.0	08/18/21 22:38	
EPA 6010D	Calcium	20700	ug/L	100	08/18/21 22:38	
EPA 6020B	Boron	16.5J	ug/L	50.0	08/27/21 15:21	
EPA 6020B	Lithium	0.81J	ug/L	2.5	08/27/21 15:21	
EPA 903.1	Radium-226	0.804 ± 0.659 (0.956) C:NA T:92%	pCi/L		09/07/21 12:52	
EPA 904.0	Radium-228	-0.0160 ± 0.415 (0.967) C:64% T:78%	pCi/L		09/02/21 11:19	
Total Radium Calculation	Total Radium	0.804 ± 1.07 (1.92)	pCi/L		09/08/21 15:13	
SM 2540C-2011	Total Dissolved Solids	134	mg/L	25.0	08/19/21 12:31	
EPA 300.0 Rev 2.1 1993	Chloride	15.8	mg/L	1.0	08/18/21 17:38	
EPA 300.0 Rev 2.1 1993	Fluoride	0.19	mg/L	0.10	08/18/21 17:38	
EPA 300.0 Rev 2.1 1993	Sulfate	7.8	mg/L	1.0	08/18/21 17:38	
92555499016	**SW-4**					
EPA 6010D	Barium	30.6	ug/L	5.0	08/18/21 22:41	
EPA 6010D	Calcium	6790	ug/L	100	08/18/21 22:41	
EPA 6020B	Boron	16.9J	ug/L	50.0	08/26/21 15:24	
EPA 903.1	Radium-226	0.290 ± 0.487 (0.819) C:NA T:96%	pCi/L		09/07/21 13:09	
EPA 904.0	Radium-228	0.510 ± 0.525 (1.09) C:63% T:76%	pCi/L		09/02/21 11:19	
Total Radium Calculation	Total Radium	0.800 ± 1.01 (1.91)	pCi/L		09/08/21 15:13	
SM 2540C-2011	Total Dissolved Solids	66.0	mg/L	25.0	08/19/21 19:02	
EPA 300.0 Rev 2.1 1993	Chloride	3.5	mg/L	1.0	08/18/21 17:53	
EPA 300.0 Rev 2.1 1993	Fluoride	0.12	mg/L	0.10	08/18/21 17:53	
EPA 300.0 Rev 2.1 1993	Sulfate	6.6	mg/L	1.0	08/18/21 17:53	

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Pace Project No.: 92555499

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92555499017	**SW-5**					
EPA 6010D	Arsenic	7.7J	ug/L	10.0	08/18/21 22:44	
EPA 6010D	Barium	447	ug/L	5.0	08/18/21 22:44	
EPA 6010D	Beryllium	2.0	ug/L	1.0	08/18/21 22:44	
EPA 6010D	Calcium	5480	ug/L	100	08/18/21 22:44	
EPA 6010D	Chromium	10.3	ug/L	5.0	08/18/21 22:44	
EPA 6010D	Cobalt	8.5	ug/L	5.0	08/18/21 22:44	
EPA 6010D	Copper	10.2	ug/L	5.0	08/18/21 22:44	
EPA 6010D	Lead	37.1	ug/L	5.0	08/18/21 22:44	
EPA 6010D	Nickel	6.8	ug/L	5.0	08/18/21 22:44	
EPA 6010D	Vanadium	45.0	ug/L	5.0	08/18/21 22:44	
EPA 6010D	Zinc	41.8	ug/L	10.0	08/18/21 22:44	
EPA 6020B	Boron	10.3J	ug/L	50.0	08/26/21 15:28	
EPA 6020B	Lithium	8.0	ug/L	2.5	08/26/21 15:28	
EPA 6020B	Thallium	0.15J	ug/L	0.47	08/26/21 15:28	
EPA 903.1	Radium-226	0.267 ± 0.448 (0.753) C:NA T:96%	pCi/L		09/07/21 13:09	
EPA 904.0	Radium-228	1.07 ± 0.481 (0.805) C:62% T:91%	pCi/L		09/02/21 11:20	
Total Radium Calculation	Total Radium	1.34 ± 0.929 (1.56)	pCi/L		09/08/21 15:13	
SM 2540C-2011	Total Dissolved Solids	984	mg/L	25.0	08/19/21 19:02	
92555499018	**LEACHATE**					
EPA 6010D	Arsenic	7.8J	ug/L	10.0	08/18/21 22:47	
EPA 6010D	Barium	48.7	ug/L	5.0	08/18/21 22:47	
EPA 6010D	Calcium	264000	ug/L	1000	08/19/21 17:44	
EPA 6010D	Molybdenum	205	ug/L	5.0	08/18/21 22:47	
EPA 6010D	Zinc	27.8	ug/L	10.0	08/18/21 22:47	
EPA 6020B	Boron	3390	ug/L	1000	08/27/21 11:49	
EPA 6020B	Lithium	61.1	ug/L	2.5	08/26/21 15:33	
EPA 6020B	Thallium	0.13J	ug/L	0.47	08/26/21 15:33	
EPA 903.1	Radium-226	-0.129 ± 0.419 (0.849) C:NA T:96%	pCi/L		09/07/21 13:09	
EPA 904.0	Radium-228	0.345 ± 0.405 (0.854) C:65% T:85%	pCi/L		09/02/21 11:20	
Total Radium Calculation	Total Radium	0.345 ± 0.824 (1.70)	pCi/L		09/08/21 15:13	
SM 2540C-2011	Total Dissolved Solids	1320	mg/L	50.0	08/19/21 19:02	
EPA 300.0 Rev 2.1 1993	Chloride	18.3	mg/L	1.0	08/18/21 18:24	

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Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92555499018	**LEACHATE**					
EPA 300.0 Rev 2.1 1993	Fluoride	0.18	mg/L	0.10	08/18/21 18:24	
EPA 300.0 Rev 2.1 1993	Sulfate	502	mg/L	12.0	08/19/21 02:19	
92555499019	**DUP**					
EPA 6010D	Barium	48.6	ug/L	5.0	08/18/21 22:50	
EPA 6010D	Calcium	32900	ug/L	100	08/18/21 22:50	
EPA 6020B	Boron	58.7	ug/L	50.0	08/26/21 15:37	
EPA 6020B	Lithium	27.4	ug/L	2.5	08/26/21 15:37	
EPA 903.1	Radium-226	-0.00966 ± 0.374 (0.734) C:NA T:95%	pCi/L		09/07/21 13:09	
EPA 904.0	Radium-228	0.928 ± 0.474 (0.835) C:63% T:87%	pCi/L		09/02/21 11:20	
Total Radium Calculation	Total Radium	0.928 ± 0.848 (1.57)	pCi/L		09/08/21 15:13	
SM 2540C-2011	Total Dissolved Solids	567	mg/L	25.0	08/17/21 18:12	MW
EPA 300.0 Rev 2.1 1993	Chloride	177	mg/L	4.0	08/19/21 02:34	
EPA 300.0 Rev 2.1 1993	Fluoride	0.32	mg/L	0.10	08/18/21 18:39	
EPA 300.0 Rev 2.1 1993	Sulfate	25.1	mg/L	1.0	08/18/21 18:39	
92555499020	**EQBL**					
EPA 6020B	Boron	12.5J	ug/L	50.0	08/26/21 15:46	
EPA 903.1	Radium-226	0.195 ± 0.443 (0.785) C:NA T:93%	pCi/L		09/07/21 13:09	
EPA 904.0	Radium-228	0.431 ± 0.379 (0.762) C:63% T:85%	pCi/L		09/02/21 11:18	
Total Radium Calculation	Total Radium	0.626 ± 0.822 (1.55)	pCi/L		09/08/21 15:13	
92555499021	**SW-6**					
EPA 6010D	Arsenic	12.2	ug/L	10.0	08/18/21 22:57	
EPA 6010D	Barium	767	ug/L	5.0	08/18/21 22:57	
EPA 6010D	Beryllium	3.3	ug/L	1.0	08/18/21 22:57	
EPA 6010D	Calcium	6560	ug/L	100	08/18/21 22:57	
EPA 6010D	Chromium	12.6	ug/L	5.0	08/18/21 22:57	
EPA 6010D	Cobalt	26.3	ug/L	5.0	08/18/21 22:57	
EPA 6010D	Copper	15.1	ug/L	5.0	08/18/21 22:57	
EPA 6010D	Lead	56.3	ug/L	5.0	08/18/21 22:57	
EPA 6010D	Nickel	9.2	ug/L	5.0	08/18/21 22:57	
EPA 6010D	Vanadium	66.7	ug/L	5.0	08/18/21 22:57	
EPA 6010D	Zinc	94.8	ug/L	10.0	08/18/21 22:57	

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SUMMARY OF DETECTION

Project: Charah Q3 GW
Pace Project No.: 92555499

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92555499021	**SW-6**					
EPA 6020B	Boron	10.3J	ug/L	50.0	08/27/21 11:53	
EPA 6020B	Lithium	10.6	ug/L	2.5	08/27/21 11:53	
EPA 6020B	Thallium	0.21J	ug/L	0.47	08/27/21 11:53	
EPA 903.1	Radium-226	0.324 ± 0.486 (0.691) C:NA T:97%	pCi/L		09/20/21 12:24	
EPA 904.0	Radium-228	0.520 ± 0.677 (1.44) C:71% T:51%	pCi/L		09/02/21 14:09	
Total Radium Calculation	Total Radium	0.844 ± 1.16 (2.13)	pCi/L		09/21/21 16:13	
SM 2540C-2011	Total Dissolved Solids	1550	mg/L	25.0	08/19/21 19:02	
EPA 300.0 Rev 2.1 1993	Fluoride	0.52J	mg/L	1.0	08/18/21 20:12	D3,M1

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ANALYTICAL RESULTS

Project: Charah Q3 GW
Pace Project No.: 92555499

Sample: BG-1 **Lab ID: 92555499001** Collected: 08/10/21 19:00 Received: 08/13/21 15:48 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Antimony	ND	ug/L	5.0	3.0	1	08/18/21 04:36	08/18/21 20:50	7440-36-0	
Arsenic	ND	ug/L	10.0	4.7	1	08/18/21 04:36	08/18/21 20:50	7440-38-2	
Barium	**295**	ug/L	5.0	3.5	1	08/18/21 04:36	08/18/21 20:50	7440-39-3	
Beryllium	ND	ug/L	1.0	0.70	1	08/18/21 04:36	08/18/21 20:50	7440-41-7	
Cadmium	ND	ug/L	1.0	0.40	1	08/18/21 04:36	08/18/21 20:50	7440-43-9	
Calcium	**24100**	ug/L	100	94.2	1	08/18/21 04:36	08/18/21 20:50	7440-70-2	
Chromium	ND	ug/L	5.0	3.7	1	08/18/21 04:36	08/18/21 20:50	7440-47-3	
Cobalt	ND	ug/L	5.0	3.6	1	08/18/21 04:36	08/18/21 20:50	7440-48-4	
Copper	ND	ug/L	5.0	4.3	1	08/18/21 04:36	08/18/21 20:50	7440-50-8	
Lead	ND	ug/L	5.0	4.5	1	08/18/21 04:36	08/18/21 20:50	7439-92-1	
Molybdenum	ND	ug/L	5.0	3.9	1	08/18/21 04:36	08/18/21 20:50	7439-98-7	
Nickel	ND	ug/L	5.0	3.5	1	08/18/21 04:36	08/18/21 20:50	7440-02-0	
Selenium	ND	ug/L	10.0	4.7	1	08/18/21 04:36	08/18/21 20:50	7782-49-2	
Silver	ND	ug/L	5.0	2.5	1	08/18/21 04:36	08/18/21 20:50	7440-22-4	
Vanadium	ND	ug/L	5.0	3.9	1	08/18/21 04:36	08/18/21 20:50	7440-62-2	
Zinc	ND	ug/L	10.0	9.5	1	08/18/21 04:36	08/18/21 20:50	7440-66-6	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Boron	ND	ug/L	50.0	8.5	1	08/20/21 11:00	08/27/21 12:56	7440-42-8	
Lithium	**19.7**	ug/L	2.5	0.50	1	08/20/21 11:00	08/26/21 20:07	7439-93-2	
Thallium	ND	ug/L	0.47	0.050	1	08/20/21 11:00	08/26/21 20:07	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	**0.14J**	ug/L	0.20	0.12	1	08/24/21 14:30	08/25/21 11:15	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**590**	mg/L	25.0	25.0	1		08/17/21 18:04		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**199**	mg/L	4.0	2.4	4		08/18/21 22:00	16887-00-6	M1
Fluoride	**0.15**	mg/L	0.10	0.050	1		08/18/21 11:36	16984-48-8	
Sulfate	**18.3**	mg/L	1.0	0.50	1		08/18/21 11:36	14808-79-8	

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ANALYTICAL RESULTS

Project: Charah Q3 GW
Pace Project No.: 92555499

Sample: BG-2 **Lab ID: 92555499002** Collected: 08/12/21 18:15 Received: 08/13/21 15:48 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Antimony	ND	ug/L	5.0	3.0	1	08/18/21 04:36	08/18/21 21:03	7440-36-0	
Arsenic	ND	ug/L	10.0	4.7	1	08/18/21 04:36	08/18/21 21:03	7440-38-2	
Barium	**53.3**	ug/L	5.0	3.5	1	08/18/21 04:36	08/18/21 21:03	7440-39-3	
Beryllium	ND	ug/L	1.0	0.70	1	08/18/21 04:36	08/18/21 21:03	7440-41-7	
Cadmium	ND	ug/L	1.0	0.40	1	08/18/21 04:36	08/18/21 21:03	7440-43-9	
Calcium	**123000**	ug/L	500	471	5	08/18/21 04:36	08/19/21 15:42	7440-70-2	
Chromium	ND	ug/L	5.0	3.7	1	08/18/21 04:36	08/18/21 21:03	7440-47-3	
Cobalt	ND	ug/L	5.0	3.6	1	08/18/21 04:36	08/18/21 21:03	7440-48-4	
Copper	ND	ug/L	5.0	4.3	1	08/18/21 04:36	08/18/21 21:03	7440-50-8	
Lead	ND	ug/L	5.0	4.5	1	08/18/21 04:36	08/18/21 21:03	7439-92-1	
Molybdenum	ND	ug/L	5.0	3.9	1	08/18/21 04:36	08/18/21 21:03	7439-98-7	
Nickel	ND	ug/L	5.0	3.5	1	08/18/21 04:36	08/18/21 21:03	7440-02-0	
Selenium	ND	ug/L	10.0	4.7	1	08/18/21 04:36	08/18/21 21:03	7782-49-2	
Silver	ND	ug/L	5.0	2.5	1	08/18/21 04:36	08/18/21 21:03	7440-22-4	
Vanadium	ND	ug/L	5.0	3.9	1	08/18/21 04:36	08/18/21 21:03	7440-62-2	
Zinc	ND	ug/L	10.0	9.5	1	08/18/21 04:36	08/18/21 21:03	7440-66-6	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Boron	**12.0J**	ug/L	50.0	8.5	1	08/20/21 11:00	08/27/21 13:00	7440-42-8	
Lithium	**19.0**	ug/L	2.5	0.50	1	08/20/21 11:00	08/27/21 13:00	7439-93-2	
Thallium	ND	ug/L	0.47	0.050	1	08/20/21 11:00	08/26/21 20:20	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	ND	ug/L	0.20	0.12	1	08/24/21 14:30	08/25/21 11:18	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**1180**	mg/L	125	125	1		08/19/21 12:31		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**260**	mg/L	6.0	3.6	6		08/18/21 23:16	16887-00-6	
Fluoride	**0.23**	mg/L	0.10	0.050	1		08/18/21 12:23	16984-48-8	
Sulfate	**181**	mg/L	6.0	3.0	6		08/18/21 23:16	14808-79-8	

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ANALYTICAL RESULTS

Project: Charah Q3 GW
Pace Project No.: 92555499

Sample: MW-1 **Lab ID: 92555499003** Collected: 08/10/21 09:05 Received: 08/13/21 15:48 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Antimony	ND	ug/L	5.0	3.0	1	08/18/21 04:36	08/18/21 21:19	7440-36-0	
Arsenic	ND	ug/L	10.0	4.7	1	08/18/21 04:36	08/18/21 21:19	7440-38-2	
Barium	**294**	ug/L	5.0	3.5	1	08/18/21 04:36	08/18/21 21:19	7440-39-3	
Beryllium	ND	ug/L	1.0	0.70	1	08/18/21 04:36	08/18/21 21:19	7440-41-7	
Cadmium	ND	ug/L	1.0	0.40	1	08/18/21 04:36	08/18/21 21:19	7440-43-9	
Calcium	**227000**	ug/L	1000	942	10	08/18/21 04:36	08/19/21 15:46	7440-70-2	
Chromium	ND	ug/L	5.0	3.7	1	08/18/21 04:36	08/19/21 15:49	7440-47-3	
Cobalt	ND	ug/L	5.0	3.6	1	08/18/21 04:36	08/18/21 21:19	7440-48-4	
Copper	ND	ug/L	5.0	4.3	1	08/18/21 04:36	08/18/21 21:19	7440-50-8	
Lead	ND	ug/L	5.0	4.5	1	08/18/21 04:36	08/18/21 21:19	7439-92-1	
Molybdenum	ND	ug/L	5.0	3.9	1	08/18/21 04:36	08/18/21 21:19	7439-98-7	
Nickel	ND	ug/L	5.0	3.5	1	08/18/21 04:36	08/18/21 21:19	7440-02-0	
Selenium	ND	ug/L	10.0	4.7	1	08/18/21 04:36	08/18/21 21:19	7782-49-2	
Silver	ND	ug/L	5.0	2.5	1	08/18/21 04:36	08/18/21 21:19	7440-22-4	
Vanadium	ND	ug/L	5.0	3.9	1	08/18/21 04:36	08/18/21 21:19	7440-62-2	
Zinc	ND	ug/L	10.0	9.5	1	08/18/21 04:36	08/18/21 21:19	7440-66-6	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Boron	ND	ug/L	50.0	8.5	1	08/20/21 11:00	08/27/21 13:05	7440-42-8	
Lithium	**34.9**	ug/L	2.5	0.50	1	08/20/21 11:00	08/27/21 13:05	7439-93-2	
Thallium	ND	ug/L	0.47	0.050	1	08/20/21 11:00	08/26/21 20:25	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	ND	ug/L	0.20	0.12	1	08/24/21 14:30	08/25/21 11:20	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**2490**	mg/L	250	250	1		08/17/21 18:04		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**807**	mg/L	18.0	10.8	18		08/18/21 23:31	16887-00-6	
Fluoride	**0.15**	mg/L	0.10	0.050	1		08/18/21 12:38	16984-48-8	
Sulfate	**5.4**	mg/L	1.0	0.50	1		08/18/21 12:38	14808-79-8	

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ANALYTICAL RESULTS

Project: Charah Q3 GW
Pace Project No.: 92555499

Sample: MW-2 **Lab ID: 92555499004** Collected: 08/10/21 15:02 Received: 08/13/21 15:48 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Antimony	**4.6J**	ug/L	5.0	3.0	1	08/18/21 04:36	08/18/21 21:22	7440-36-0	
Arsenic	**4.8J**	ug/L	10.0	4.7	1	08/18/21 04:36	08/18/21 21:22	7440-38-2	
Barium	**342**	ug/L	5.0	3.5	1	08/18/21 04:36	08/18/21 21:22	7440-39-3	
Beryllium	ND	ug/L	1.0	0.70	1	08/18/21 04:36	08/18/21 21:22	7440-41-7	
Cadmium	ND	ug/L	1.0	0.40	1	08/18/21 04:36	08/18/21 21:22	7440-43-9	
Calcium	**156000**	ug/L	1000	942	10	08/18/21 04:36	08/19/21 16:02	7440-70-2	
Chromium	**9.7**	ug/L	5.0	3.7	1	08/18/21 04:36	08/19/21 16:05	7440-47-3	
Cobalt	ND	ug/L	5.0	3.6	1	08/18/21 04:36	08/18/21 21:22	7440-48-4	
Copper	ND	ug/L	5.0	4.3	1	08/18/21 04:36	08/18/21 21:22	7440-50-8	
Lead	ND	ug/L	5.0	4.5	1	08/18/21 04:36	08/18/21 21:22	7439-92-1	
Molybdenum	**4.8J**	ug/L	5.0	3.9	1	08/18/21 04:36	08/18/21 21:22	7439-98-7	
Nickel	**8.6**	ug/L	5.0	3.5	1	08/18/21 04:36	08/18/21 21:22	7440-02-0	
Selenium	ND	ug/L	10.0	4.7	1	08/18/21 04:36	08/18/21 21:22	7782-49-2	
Silver	ND	ug/L	5.0	2.5	1	08/18/21 04:36	08/18/21 21:22	7440-22-4	
Vanadium	ND	ug/L	5.0	3.9	1	08/18/21 04:36	08/18/21 21:22	7440-62-2	
Zinc	ND	ug/L	10.0	9.5	1	08/18/21 04:36	08/18/21 21:22	7440-66-6	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Boron	**42.7J**	ug/L	250	42.5	5	08/20/21 11:00	08/27/21 14:04	7440-42-8	
Lithium	**512**	ug/L	12.5	2.5	5	08/20/21 11:00	08/27/21 14:04	7439-93-2	
Thallium	ND	ug/L	0.47	0.050	1	08/20/21 11:00	08/26/21 20:29	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	ND	ug/L	0.20	0.12	1	08/24/21 14:30	08/25/21 11:22	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**2710**	mg/L	278	278	1		08/17/21 18:05		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**977**	mg/L	21.0	12.6	21		08/18/21 23:47	16887-00-6	
Fluoride	**0.22**	mg/L	0.10	0.050	1		08/18/21 12:53	16984-48-8	
Sulfate	**75.8**	mg/L	1.0	0.50	1		08/18/21 12:53	14808-79-8	

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ANALYTICAL RESULTS

Project: Charah Q3 GW
Pace Project No.: 92555499

Sample: MW-3 **Lab ID: 92555499005** Collected: 08/12/21 15:50 Received: 08/13/21 15:48 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Antimony	ND	ug/L	5.0	3.0	1	08/18/21 04:36	08/18/21 21:26	7440-36-0	
Arsenic	ND	ug/L	10.0	4.7	1	08/18/21 04:36	08/18/21 21:26	7440-38-2	
Barium	**666**	ug/L	5.0	3.5	1	08/18/21 04:36	08/18/21 21:26	7440-39-3	
Beryllium	ND	ug/L	1.0	0.70	1	08/18/21 04:36	08/18/21 21:26	7440-41-7	
Cadmium	ND	ug/L	1.0	0.40	1	08/18/21 04:36	08/18/21 21:26	7440-43-9	
Calcium	**166000**	ug/L	1000	942	10	08/18/21 04:36	08/19/21 16:09	7440-70-2	
Chromium	ND	ug/L	5.0	3.7	1	08/18/21 04:36	08/19/21 16:12	7440-47-3	
Cobalt	ND	ug/L	5.0	3.6	1	08/18/21 04:36	08/18/21 21:26	7440-48-4	
Copper	ND	ug/L	5.0	4.3	1	08/18/21 04:36	08/18/21 21:26	7440-50-8	
Lead	ND	ug/L	5.0	4.5	1	08/18/21 04:36	08/18/21 21:26	7439-92-1	
Molybdenum	**6.3**	ug/L	5.0	3.9	1	08/18/21 04:36	08/18/21 21:26	7439-98-7	
Nickel	ND	ug/L	5.0	3.5	1	08/18/21 04:36	08/18/21 21:26	7440-02-0	
Selenium	ND	ug/L	10.0	4.7	1	08/18/21 04:36	08/18/21 21:26	7782-49-2	
Silver	ND	ug/L	5.0	2.5	1	08/18/21 04:36	08/18/21 21:26	7440-22-4	
Vanadium	ND	ug/L	5.0	3.9	1	08/18/21 04:36	08/18/21 21:26	7440-62-2	
Zinc	ND	ug/L	10.0	9.5	1	08/18/21 04:36	08/18/21 21:26	7440-66-6	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Boron	**28.5J**	ug/L	50.0	8.5	1	08/24/21 10:47	08/26/21 15:05	7440-42-8	
Lithium	**87.5**	ug/L	2.5	0.50	1	08/24/21 10:47	08/26/21 15:05	7439-93-2	
Thallium	ND	ug/L	0.47	0.050	1	08/24/21 10:47	08/26/21 15:05	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	ND	ug/L	0.20	0.12	1	08/24/21 14:30	08/25/21 11:25	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**2380**	mg/L	500	500	1		08/19/21 12:31		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**1040**	mg/L	20.0	12.0	20		08/19/21 00:02	16887-00-6	
Fluoride	**0.31**	mg/L	0.10	0.050	1		08/18/21 13:09	16984-48-8	
Sulfate	**20.9**	mg/L	1.0	0.50	1		08/18/21 13:09	14808-79-8	

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ANALYTICAL RESULTS

Project: Charah Q3 GW
Pace Project No.: 92555499

Sample: MW-4 **Lab ID: 92555499006** Collected: 08/12/21 14:05 Received: 08/13/21 15:48 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Antimony	ND	ug/L	5.0	3.0	1	08/18/21 04:36	08/18/21 21:29	7440-36-0	
Arsenic	ND	ug/L	10.0	4.7	1	08/18/21 04:36	08/18/21 21:29	7440-38-2	
Barium	**279**	ug/L	5.0	3.5	1	08/18/21 04:36	08/18/21 21:29	7440-39-3	
Beryllium	ND	ug/L	1.0	0.70	1	08/18/21 04:36	08/18/21 21:29	7440-41-7	
Cadmium	ND	ug/L	1.0	0.40	1	08/18/21 04:36	08/18/21 21:29	7440-43-9	
Calcium	**58900**	ug/L	100	94.2	1	08/18/21 04:36	08/18/21 21:29	7440-70-2	
Chromium	ND	ug/L	5.0	3.7	1	08/18/21 04:36	08/19/21 16:15	7440-47-3	
Cobalt	ND	ug/L	5.0	3.6	1	08/18/21 04:36	08/18/21 21:29	7440-48-4	
Copper	ND	ug/L	5.0	4.3	1	08/18/21 04:36	08/18/21 21:29	7440-50-8	
Lead	ND	ug/L	5.0	4.5	1	08/18/21 04:36	08/18/21 21:29	7439-92-1	
Molybdenum	ND	ug/L	5.0	3.9	1	08/18/21 04:36	08/18/21 21:29	7439-98-7	
Nickel	**4.3J**	ug/L	5.0	3.5	1	08/18/21 04:36	08/18/21 21:29	7440-02-0	
Selenium	ND	ug/L	10.0	4.7	1	08/18/21 04:36	08/18/21 21:29	7782-49-2	
Silver	ND	ug/L	5.0	2.5	1	08/18/21 04:36	08/18/21 21:29	7440-22-4	
Vanadium	ND	ug/L	5.0	3.9	1	08/18/21 04:36	08/18/21 21:29	7440-62-2	
Zinc	ND	ug/L	10.0	9.5	1	08/18/21 04:36	08/18/21 21:29	7440-66-6	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Boron	ND	ug/L	250	42.5	5	08/20/21 11:00	08/27/21 14:08	7440-42-8	
Lithium	**98.0**	ug/L	12.5	2.5	5	08/20/21 11:00	08/27/21 14:08	7439-93-2	
Thallium	ND	ug/L	0.47	0.050	1	08/20/21 11:00	08/26/21 20:34	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	ND	ug/L	0.20	0.12	1	08/24/21 14:30	08/25/21 11:27	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**1060**	mg/L	125	125	1		08/19/21 12:31		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**399**	mg/L	9.0	5.4	9		08/19/21 00:17	16887-00-6	
Fluoride	**0.27**	mg/L	0.10	0.050	1		08/18/21 13:24	16984-48-8	
Sulfate	**9.9**	mg/L	1.0	0.50	1		08/18/21 13:24	14808-79-8	

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ANALYTICAL RESULTS

Project: Charah Q3 GW
Pace Project No.: 92555499

Sample: MW-5 **Lab ID: 92555499007** Collected: 08/09/21 17:05 Received: 08/13/21 15:48 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Antimony	ND	ug/L	5.0	3.0	1	08/18/21 04:36	08/18/21 21:32	7440-36-0	
Arsenic	ND	ug/L	10.0	4.7	1	08/18/21 04:36	08/18/21 21:32	7440-38-2	
Barium	**120**	ug/L	5.0	3.5	1	08/18/21 04:36	08/18/21 21:32	7440-39-3	
Beryllium	ND	ug/L	1.0	0.70	1	08/18/21 04:36	08/18/21 21:32	7440-41-7	
Cadmium	ND	ug/L	1.0	0.40	1	08/18/21 04:36	08/18/21 21:32	7440-43-9	
Calcium	**10100**	ug/L	100	94.2	1	08/18/21 04:36	08/18/21 21:32	7440-70-2	
Chromium	ND	ug/L	5.0	3.7	1	08/18/21 04:36	08/19/21 16:19	7440-47-3	
Cobalt	ND	ug/L	5.0	3.6	1	08/18/21 04:36	08/18/21 21:32	7440-48-4	
Copper	ND	ug/L	5.0	4.3	1	08/18/21 04:36	08/18/21 21:32	7440-50-8	
Lead	ND	ug/L	5.0	4.5	1	08/18/21 04:36	08/18/21 21:32	7439-92-1	
Molybdenum	ND	ug/L	5.0	3.9	1	08/18/21 04:36	08/18/21 21:32	7439-98-7	
Nickel	ND	ug/L	5.0	3.5	1	08/18/21 04:36	08/18/21 21:32	7440-02-0	
Selenium	ND	ug/L	10.0	4.7	1	08/18/21 04:36	08/18/21 21:32	7782-49-2	
Silver	ND	ug/L	5.0	2.5	1	08/18/21 04:36	08/18/21 21:32	7440-22-4	
Vanadium	ND	ug/L	5.0	3.9	1	08/18/21 04:36	08/18/21 21:32	7440-62-2	
Zinc	**9.6J**	ug/L	10.0	9.5	1	08/18/21 04:36	08/18/21 21:32	7440-66-6	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Boron	ND	ug/L	50.0	8.5	1	08/20/21 11:00	08/27/21 14:31	7440-42-8	
Lithium	**28.6**	ug/L	2.5	0.50	1	08/20/21 11:00	08/27/21 14:31	7439-93-2	
Thallium	ND	ug/L	0.47	0.050	1	08/20/21 11:00	08/26/21 20:38	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	ND	ug/L	0.20	0.12	1	08/24/21 14:30	08/25/21 11:29	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**224**	mg/L	25.0	25.0	1		08/16/21 22:15		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**19.1**	mg/L	1.0	0.60	1		08/18/21 14:11	16887-00-6	
Fluoride	**0.46**	mg/L	0.10	0.050	1		08/18/21 14:11	16984-48-8	
Sulfate	**3.6**	mg/L	1.0	0.50	1		08/18/21 14:11	14808-79-8	

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ANALYTICAL RESULTS

Project: Charah Q3 GW
Pace Project No.: 92555499

Sample: MW-6 **Lab ID: 92555499008** Collected: 08/11/21 17:20 Received: 08/13/21 15:48 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Antimony	ND	ug/L	5.0	3.0	1	08/18/21 04:36	08/18/21 21:36	7440-36-0	
Arsenic	ND	ug/L	10.0	4.7	1	08/18/21 04:36	08/18/21 21:36	7440-38-2	
Barium	**49.0**	ug/L	5.0	3.5	1	08/18/21 04:36	08/18/21 21:36	7440-39-3	
Beryllium	ND	ug/L	1.0	0.70	1	08/18/21 04:36	08/18/21 21:36	7440-41-7	
Cadmium	ND	ug/L	1.0	0.40	1	08/18/21 04:36	08/18/21 21:36	7440-43-9	
Calcium	**34200**	ug/L	100	94.2	1	08/18/21 04:36	08/18/21 21:36	7440-70-2	
Chromium	ND	ug/L	5.0	3.7	1	08/18/21 04:36	08/19/21 16:22	7440-47-3	
Cobalt	ND	ug/L	5.0	3.6	1	08/18/21 04:36	08/18/21 21:36	7440-48-4	
Copper	ND	ug/L	5.0	4.3	1	08/18/21 04:36	08/18/21 21:36	7440-50-8	
Lead	ND	ug/L	5.0	4.5	1	08/18/21 04:36	08/18/21 21:36	7439-92-1	
Molybdenum	ND	ug/L	5.0	3.9	1	08/18/21 04:36	08/18/21 21:36	7439-98-7	
Nickel	ND	ug/L	5.0	3.5	1	08/18/21 04:36	08/18/21 21:36	7440-02-0	
Selenium	**4.9J**	ug/L	10.0	4.7	1	08/18/21 04:36	08/18/21 21:36	7782-49-2	
Silver	ND	ug/L	5.0	2.5	1	08/18/21 04:36	08/18/21 21:36	7440-22-4	
Vanadium	ND	ug/L	5.0	3.9	1	08/18/21 04:36	08/18/21 21:36	7440-62-2	
Zinc	ND	ug/L	10.0	9.5	1	08/18/21 04:36	08/18/21 21:36	7440-66-6	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Boron	ND	ug/L	50.0	8.5	1	08/20/21 11:00	08/27/21 14:36	7440-42-8	
Lithium	**10.1**	ug/L	2.5	0.50	1	08/20/21 11:00	08/27/21 14:36	7439-93-2	
Thallium	ND	ug/L	0.47	0.050	1	08/20/21 11:00	08/26/21 20:43	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	ND	ug/L	0.20	0.12	1	08/24/21 14:30	08/25/21 11:32	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**575**	mg/L	25.0	25.0	1		08/17/21 18:12		MW
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**177**	mg/L	4.0	2.4	4		08/19/21 00:32	16887-00-6	
Fluoride	**0.30**	mg/L	0.10	0.050	1		08/18/21 14:26	16984-48-8	
Sulfate	**25.1**	mg/L	1.0	0.50	1		08/18/21 14:26	14808-79-8	

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ANALYTICAL RESULTS

Project: Charah Q3 GW
Pace Project No.: 92555499

Sample: MW-7R **Lab ID: 92555499009** Collected: 08/11/21 13:45 Received: 08/13/21 15:48 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Antimony	ND	ug/L	5.0	3.0	1	08/18/21 04:36	08/18/21 21:39	7440-36-0	
Arsenic	ND	ug/L	10.0	4.7	1	08/18/21 04:36	08/18/21 21:39	7440-38-2	
Barium	**308**	ug/L	5.0	3.5	1	08/18/21 04:36	08/18/21 21:39	7440-39-3	
Beryllium	ND	ug/L	1.0	0.70	1	08/18/21 04:36	08/18/21 21:39	7440-41-7	
Cadmium	ND	ug/L	1.0	0.40	1	08/18/21 04:36	08/18/21 21:39	7440-43-9	
Calcium	**91600**	ug/L	100	94.2	1	08/18/21 04:36	08/18/21 21:39	7440-70-2	
Chromium	ND	ug/L	5.0	3.7	1	08/18/21 04:36	08/19/21 16:25	7440-47-3	
Cobalt	ND	ug/L	5.0	3.6	1	08/18/21 04:36	08/18/21 21:39	7440-48-4	
Copper	ND	ug/L	5.0	4.3	1	08/18/21 04:36	08/18/21 21:39	7440-50-8	
Lead	ND	ug/L	5.0	4.5	1	08/18/21 04:36	08/18/21 21:39	7439-92-1	
Molybdenum	ND	ug/L	5.0	3.9	1	08/18/21 04:36	08/18/21 21:39	7439-98-7	
Nickel	ND	ug/L	5.0	3.5	1	08/18/21 04:36	08/18/21 21:39	7440-02-0	
Selenium	ND	ug/L	10.0	4.7	1	08/18/21 04:36	08/18/21 21:39	7782-49-2	
Silver	ND	ug/L	5.0	2.5	1	08/18/21 04:36	08/18/21 21:39	7440-22-4	
Vanadium	ND	ug/L	5.0	3.9	1	08/18/21 04:36	08/18/21 21:39	7440-62-2	
Zinc	ND	ug/L	10.0	9.5	1	08/18/21 04:36	08/18/21 21:39	7440-66-6	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Boron	ND	ug/L	50.0	8.5	1	08/20/21 11:00	08/27/21 14:40	7440-42-8	
Lithium	**23.8**	ug/L	2.5	0.50	1	08/20/21 11:00	08/27/21 14:40	7439-93-2	
Thallium	ND	ug/L	0.47	0.050	1	08/20/21 11:00	08/26/21 20:47	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	ND	ug/L	0.20	0.12	1	08/24/21 14:30	08/25/21 11:34	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**790**	mg/L	50.0	50.0	1		08/17/21 18:12		MW
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**266**	mg/L	6.0	3.6	6		08/19/21 00:47	16887-00-6	
Fluoride	**0.11**	mg/L	0.10	0.050	1		08/18/21 14:42	16984-48-8	
Sulfate	**14.2**	mg/L	1.0	0.50	1		08/18/21 14:42	14808-79-8	

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ANALYTICAL RESULTS

Project: Charah Q3 GW
Pace Project No.: 92555499

Sample: MW-8 **Lab ID: 92555499010** Collected: 08/11/21 09:55 Received: 08/13/21 15:48 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Antimony	ND	ug/L	5.0	3.0	1	08/18/21 04:36	08/18/21 21:42	7440-36-0	
Arsenic	ND	ug/L	10.0	4.7	1	08/18/21 04:36	08/18/21 21:42	7440-38-2	
Barium	**1040**	ug/L	5.0	3.5	1	08/18/21 04:36	08/18/21 21:42	7440-39-3	
Beryllium	ND	ug/L	1.0	0.70	1	08/18/21 04:36	08/18/21 21:42	7440-41-7	
Cadmium	ND	ug/L	1.0	0.40	1	08/18/21 04:36	08/18/21 21:42	7440-43-9	
Calcium	**95700**	ug/L	100	94.2	1	08/18/21 04:36	08/18/21 21:42	7440-70-2	
Chromium	ND	ug/L	5.0	3.7	1	08/18/21 04:36	08/19/21 16:28	7440-47-3	
Cobalt	ND	ug/L	5.0	3.6	1	08/18/21 04:36	08/18/21 21:42	7440-48-4	
Copper	ND	ug/L	5.0	4.3	1	08/18/21 04:36	08/18/21 21:42	7440-50-8	
Lead	ND	ug/L	5.0	4.5	1	08/18/21 04:36	08/18/21 21:42	7439-92-1	
Molybdenum	ND	ug/L	5.0	3.9	1	08/18/21 04:36	08/18/21 21:42	7439-98-7	
Nickel	ND	ug/L	5.0	3.5	1	08/18/21 04:36	08/18/21 21:42	7440-02-0	
Selenium	ND	ug/L	10.0	4.7	1	08/18/21 04:36	08/18/21 21:42	7782-49-2	
Silver	ND	ug/L	5.0	2.5	1	08/18/21 04:36	08/18/21 21:42	7440-22-4	
Vanadium	ND	ug/L	5.0	3.9	1	08/18/21 04:36	08/18/21 21:42	7440-62-2	
Zinc	ND	ug/L	10.0	9.5	1	08/18/21 04:36	08/18/21 21:42	7440-66-6	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Boron	ND	ug/L	50.0	8.5	1	08/20/21 11:00	08/27/21 14:45	7440-42-8	
Lithium	**25.3**	ug/L	2.5	0.50	1	08/20/21 11:00	08/27/21 14:45	7439-93-2	
Thallium	ND	ug/L	0.47	0.050	1	08/20/21 11:00	08/26/21 20:52	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	ND	ug/L	0.20	0.12	1	08/24/21 14:30	08/25/21 11:37	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**770**	mg/L	50.0	50.0	1		08/17/21 18:12		MW
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**307**	mg/L	7.0	4.2	7		08/19/21 01:03	16887-00-6	
Fluoride	**0.067J**	mg/L	0.10	0.050	1		08/18/21 14:57	16984-48-8	
Sulfate	**6.6**	mg/L	1.0	0.50	1		08/18/21 14:57	14808-79-8	

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ANALYTICAL RESULTS

Project: Charah Q3 GW
Pace Project No.: 92555499

Sample: MW-10 **Lab ID: 92555499011** Collected: 08/09/21 13:20 Received: 08/13/21 15:48 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Antimony	ND	ug/L	5.0	3.0	1	08/18/21 04:36	08/18/21 21:45	7440-36-0	
Arsenic	ND	ug/L	10.0	4.7	1	08/18/21 04:36	08/18/21 21:45	7440-38-2	
Barium	**43.2**	ug/L	5.0	3.5	1	08/18/21 04:36	08/18/21 21:45	7440-39-3	
Beryllium	ND	ug/L	1.0	0.70	1	08/18/21 04:36	08/18/21 21:45	7440-41-7	
Cadmium	ND	ug/L	1.0	0.40	1	08/18/21 04:36	08/18/21 21:45	7440-43-9	
Calcium	**17700**	ug/L	100	94.2	1	08/18/21 04:36	08/18/21 21:45	7440-70-2	
Chromium	ND	ug/L	5.0	3.7	1	08/18/21 04:36	08/19/21 16:38	7440-47-3	
Cobalt	ND	ug/L	5.0	3.6	1	08/18/21 04:36	08/18/21 21:45	7440-48-4	
Copper	ND	ug/L	5.0	4.3	1	08/18/21 04:36	08/18/21 21:45	7440-50-8	
Lead	ND	ug/L	5.0	4.5	1	08/18/21 04:36	08/18/21 21:45	7439-92-1	
Molybdenum	**32.5**	ug/L	5.0	3.9	1	08/18/21 04:36	08/18/21 21:45	7439-98-7	
Nickel	ND	ug/L	5.0	3.5	1	08/18/21 04:36	08/18/21 21:45	7440-02-0	
Selenium	ND	ug/L	10.0	4.7	1	08/18/21 04:36	08/18/21 21:45	7782-49-2	
Silver	ND	ug/L	5.0	2.5	1	08/18/21 04:36	08/18/21 21:45	7440-22-4	
Vanadium	ND	ug/L	5.0	3.9	1	08/18/21 04:36	08/18/21 21:45	7440-62-2	
Zinc	ND	ug/L	10.0	9.5	1	08/18/21 04:36	08/18/21 21:45	7440-66-6	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Boron	**20.4J**	ug/L	50.0	8.5	1	08/20/21 11:00	08/27/21 14:49	7440-42-8	
Lithium	**1.7J**	ug/L	2.5	0.50	1	08/20/21 11:00	08/27/21 14:49	7439-93-2	
Thallium	ND	ug/L	0.47	0.050	1	08/20/21 11:00	08/26/21 20:56	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	ND	ug/L	0.20	0.12	1	08/24/21 14:30	08/25/21 11:58	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**318**	mg/L	25.0	25.0	1		08/16/21 22:15		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**29.0**	mg/L	1.0	0.60	1		08/18/21 15:13	16887-00-6	
Fluoride	**0.46**	mg/L	0.10	0.050	1		08/18/21 15:13	16984-48-8	
Sulfate	**5.7**	mg/L	1.0	0.50	1		08/18/21 15:13	14808-79-8	M1,R1

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ANALYTICAL RESULTS

Project: Charah Q3 GW
Pace Project No.: 92555499

Sample: MW-11 **Lab ID: 92555499012** Collected: 08/12/21 09:20 Received: 08/13/21 15:48 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Antimony	ND	ug/L	5.0	3.0	1	08/18/21 04:36	08/18/21 21:48	7440-36-0	
Arsenic	ND	ug/L	10.0	4.7	1	08/18/21 04:36	08/18/21 21:48	7440-38-2	
Barium	**34.3**	ug/L	5.0	3.5	1	08/18/21 04:36	08/18/21 21:48	7440-39-3	
Beryllium	ND	ug/L	1.0	0.70	1	08/18/21 04:36	08/18/21 21:48	7440-41-7	
Cadmium	ND	ug/L	1.0	0.40	1	08/18/21 04:36	08/18/21 21:48	7440-43-9	
Calcium	**23200**	ug/L	100	94.2	1	08/18/21 04:36	08/18/21 21:48	7440-70-2	
Chromium	ND	ug/L	5.0	3.7	1	08/18/21 04:36	08/19/21 16:41	7440-47-3	
Cobalt	ND	ug/L	5.0	3.6	1	08/18/21 04:36	08/18/21 21:48	7440-48-4	
Copper	ND	ug/L	5.0	4.3	1	08/18/21 04:36	08/18/21 21:48	7440-50-8	
Lead	ND	ug/L	5.0	4.5	1	08/18/21 04:36	08/18/21 21:48	7439-92-1	
Molybdenum	ND	ug/L	5.0	3.9	1	08/18/21 04:36	08/18/21 21:48	7439-98-7	
Nickel	ND	ug/L	5.0	3.5	1	08/18/21 04:36	08/18/21 21:48	7440-02-0	
Selenium	ND	ug/L	10.0	4.7	1	08/18/21 04:36	08/18/21 21:48	7782-49-2	
Silver	ND	ug/L	5.0	2.5	1	08/18/21 04:36	08/18/21 21:48	7440-22-4	
Vanadium	ND	ug/L	5.0	3.9	1	08/18/21 04:36	08/18/21 21:48	7440-62-2	
Zinc	ND	ug/L	10.0	9.5	1	08/18/21 04:36	08/18/21 21:48	7440-66-6	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Boron	**12.8J**	ug/L	50.0	8.5	1	08/20/21 11:00	08/27/21 14:54	7440-42-8	
Lithium	**12.3**	ug/L	2.5	0.50	1	08/20/21 11:00	08/27/21 14:54	7439-93-2	
Thallium	ND	ug/L	0.47	0.050	1	08/20/21 11:00	08/26/21 21:01	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	ND	ug/L	0.20	0.12	1	08/24/21 14:30	08/25/21 12:00	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**398**	mg/L	50.0	50.0	1		08/19/21 12:31		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**142**	mg/L	3.0	1.8	3		08/19/21 01:49	16887-00-6	
Fluoride	**0.14**	mg/L	0.10	0.050	1		08/18/21 16:52	16984-48-8	
Sulfate	**1.8**	mg/L	1.0	0.50	1		08/18/21 16:52	14808-79-8	

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ANALYTICAL RESULTS

Project: Charah Q3 GW
Pace Project No.: 92555499

Sample: MW-11D **Lab ID: 92555499013** Collected: 08/12/21 11:20 Received: 08/13/21 15:48 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Antimony	**5.6**	ug/L	5.0	3.0	1	08/18/21 04:36	08/18/21 22:14	7440-36-0	
Arsenic	**16.5**	ug/L	10.0	4.7	1	08/18/21 04:36	08/18/21 22:14	7440-38-2	
Barium	**69.3**	ug/L	5.0	3.5	1	08/18/21 04:36	08/18/21 22:14	7440-39-3	
Beryllium	ND	ug/L	1.0	0.70	1	08/18/21 04:36	08/18/21 22:14	7440-41-7	
Cadmium	ND	ug/L	1.0	0.40	1	08/18/21 04:36	08/18/21 22:14	7440-43-9	
Calcium	**94400**	ug/L	100	94.2	1	08/18/21 04:36	08/18/21 22:14	7440-70-2	M1
Chromium	ND	ug/L	5.0	3.7	1	08/18/21 04:36	08/19/21 17:21	7440-47-3	
Cobalt	ND	ug/L	5.0	3.6	1	08/18/21 04:36	08/18/21 22:14	7440-48-4	
Copper	ND	ug/L	5.0	4.3	1	08/18/21 04:36	08/18/21 22:14	7440-50-8	
Lead	ND	ug/L	5.0	4.5	1	08/18/21 04:36	08/18/21 22:14	7439-92-1	
Molybdenum	**127**	ug/L	5.0	3.9	1	08/18/21 04:36	08/18/21 22:14	7439-98-7	
Nickel	ND	ug/L	5.0	3.5	1	08/18/21 04:36	08/18/21 22:14	7440-02-0	
Selenium	ND	ug/L	10.0	4.7	1	08/18/21 04:36	08/18/21 22:14	7782-49-2	
Silver	ND	ug/L	5.0	2.5	1	08/18/21 04:36	08/18/21 22:14	7440-22-4	
Vanadium	ND	ug/L	5.0	3.9	1	08/18/21 04:36	08/18/21 22:14	7440-62-2	
Zinc	ND	ug/L	10.0	9.5	1	08/18/21 04:36	08/18/21 22:14	7440-66-6	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Boron	**109**	ug/L	100	17.0	2	08/20/21 11:00	08/27/21 14:58	7440-42-8	
Lithium	**80.7**	ug/L	5.0	1.0	2	08/20/21 11:00	08/27/21 14:58	7439-93-2	
Thallium	ND	ug/L	0.47	0.050	1	08/20/21 11:00	08/26/21 21:23	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	ND	ug/L	0.20	0.12	1	08/26/21 17:00	08/30/21 13:38	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**1740**	mg/L	500	500	1		08/19/21 12:31		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**530**	mg/L	12.0	7.2	12		08/19/21 02:04	16887-00-6	
Fluoride	**0.49**	mg/L	0.10	0.050	1		08/18/21 17:07	16984-48-8	
Sulfate	**523**	mg/L	12.0	6.0	12		08/19/21 02:04	14808-79-8	

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ANALYTICAL RESULTS

Project: Charah Q3 GW
Pace Project No.: 92555499

Sample: SW-1 **Lab ID: 92555499014** Collected: 08/13/21 08:59 Received: 08/13/21 15:48 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Antimony	ND	ug/L	5.0	3.0	1	08/18/21 04:36	08/18/21 22:28	7440-36-0	
Arsenic	**12.0**	ug/L	10.0	4.7	1	08/18/21 04:36	08/18/21 22:28	7440-38-2	
Barium	**753**	ug/L	5.0	3.5	1	08/18/21 04:36	08/18/21 22:28	7440-39-3	
Beryllium	**3.3**	ug/L	1.0	0.70	1	08/18/21 04:36	08/18/21 22:28	7440-41-7	
Cadmium	ND	ug/L	1.0	0.40	1	08/18/21 04:36	08/18/21 22:28	7440-43-9	
Calcium	**6360**	ug/L	100	94.2	1	08/18/21 04:36	08/18/21 22:28	7440-70-2	
Chromium	**17.0**	ug/L	5.0	3.7	1	08/18/21 04:36	08/19/21 17:41	7440-47-3	
Cobalt	**28.5**	ug/L	5.0	3.6	1	08/18/21 04:36	08/18/21 22:28	7440-48-4	
Copper	**16.1**	ug/L	5.0	4.3	1	08/18/21 04:36	08/18/21 22:28	7440-50-8	
Lead	**55.0**	ug/L	5.0	4.5	1	08/18/21 04:36	08/18/21 22:28	7439-92-1	
Molybdenum	ND	ug/L	5.0	3.9	1	08/18/21 04:36	08/18/21 22:28	7439-98-7	
Nickel	**10.6**	ug/L	5.0	3.5	1	08/18/21 04:36	08/18/21 22:28	7440-02-0	
Selenium	ND	ug/L	10.0	4.7	1	08/18/21 04:36	08/18/21 22:28	7782-49-2	
Silver	ND	ug/L	5.0	2.5	1	08/18/21 04:36	08/18/21 22:28	7440-22-4	
Vanadium	**75.8**	ug/L	5.0	3.9	1	08/18/21 04:36	08/18/21 22:28	7440-62-2	
Zinc	**76.5**	ug/L	10.0	9.5	1	08/18/21 04:36	08/18/21 22:28	7440-66-6	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Boron	ND	ug/L	50.0	8.5	1	08/20/21 11:00	08/27/21 15:03	7440-42-8	
Lithium	**7.5**	ug/L	2.5	0.50	1	08/20/21 11:00	08/27/21 15:03	7439-93-2	
Thallium	**0.14J**	ug/L	0.47	0.050	1	08/20/21 11:00	08/26/21 21:28	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	ND	ug/L	0.20	0.12	1	08/26/21 17:00	08/30/21 13:45	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**1540**	mg/L	62.5	62.5	1		08/19/21 12:31		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	ND	mg/L	10.0	6.0	10		08/18/21 17:23	16887-00-6	D3
Fluoride	ND	mg/L	1.0	0.50	10		08/18/21 17:23	16984-48-8	D3
Sulfate	ND	mg/L	10.0	5.0	10		08/18/21 17:23	14808-79-8	D3

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ANALYTICAL RESULTS

Project: Charah Q3 GW
Pace Project No.: 92555499

Sample: SW-2 **Lab ID: 92555499015** Collected: 08/13/21 07:25 Received: 08/13/21 15:48 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Antimony	ND	ug/L	5.0	3.0	1	08/18/21 04:36	08/18/21 22:38	7440-36-0	
Arsenic	ND	ug/L	10.0	4.7	1	08/18/21 04:36	08/18/21 22:38	7440-38-2	
Barium	**94.7**	ug/L	5.0	3.5	1	08/18/21 04:36	08/18/21 22:38	7440-39-3	
Beryllium	ND	ug/L	1.0	0.70	1	08/18/21 04:36	08/18/21 22:38	7440-41-7	
Cadmium	ND	ug/L	1.0	0.40	1	08/18/21 04:36	08/18/21 22:38	7440-43-9	
Calcium	**20700**	ug/L	100	94.2	1	08/18/21 04:36	08/18/21 22:38	7440-70-2	
Chromium	ND	ug/L	5.0	3.7	1	08/18/21 04:36	08/18/21 22:38	7440-47-3	
Cobalt	ND	ug/L	5.0	3.6	1	08/18/21 04:36	08/18/21 22:38	7440-48-4	
Copper	ND	ug/L	5.0	4.3	1	08/18/21 04:36	08/18/21 22:38	7440-50-8	
Lead	ND	ug/L	5.0	4.5	1	08/18/21 04:36	08/18/21 22:38	7439-92-1	
Molybdenum	ND	ug/L	5.0	3.9	1	08/18/21 04:36	08/18/21 22:38	7439-98-7	
Nickel	ND	ug/L	5.0	3.5	1	08/18/21 04:36	08/18/21 22:38	7440-02-0	
Selenium	ND	ug/L	10.0	4.7	1	08/18/21 04:36	08/18/21 22:38	7782-49-2	
Silver	ND	ug/L	5.0	2.5	1	08/18/21 04:36	08/18/21 22:38	7440-22-4	
Vanadium	ND	ug/L	5.0	3.9	1	08/18/21 04:36	08/18/21 22:38	7440-62-2	
Zinc	ND	ug/L	10.0	9.5	1	08/18/21 04:36	08/18/21 22:38	7440-66-6	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Boron	**16.5J**	ug/L	50.0	8.5	1	08/20/21 11:00	08/27/21 15:21	7440-42-8	
Lithium	**0.81J**	ug/L	2.5	0.50	1	08/20/21 11:00	08/27/21 15:21	7439-93-2	
Thallium	ND	ug/L	0.47	0.050	1	08/20/21 11:00	08/26/21 21:32	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	ND	ug/L	0.20	0.12	1	08/26/21 17:00	08/30/21 13:47	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**134**	mg/L	25.0	25.0	1		08/19/21 12:31		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**15.8**	mg/L	1.0	0.60	1		08/18/21 17:38	16887-00-6	
Fluoride	**0.19**	mg/L	0.10	0.050	1		08/18/21 17:38	16984-48-8	
Sulfate	**7.8**	mg/L	1.0	0.50	1		08/18/21 17:38	14808-79-8	

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ANALYTICAL RESULTS

Project: Charah Q3 GW
Pace Project No.: 92555499

Sample: SW-4 **Lab ID: 92555499016** Collected: 08/13/21 08:30 Received: 08/13/21 15:48 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Antimony	ND	ug/L	5.0	3.0	1	08/18/21 04:36	08/18/21 22:41	7440-36-0	
Arsenic	ND	ug/L	10.0	4.7	1	08/18/21 04:36	08/18/21 22:41	7440-38-2	
Barium	**30.6**	ug/L	5.0	3.5	1	08/18/21 04:36	08/18/21 22:41	7440-39-3	
Beryllium	ND	ug/L	1.0	0.70	1	08/18/21 04:36	08/18/21 22:41	7440-41-7	
Cadmium	ND	ug/L	1.0	0.40	1	08/18/21 04:36	08/18/21 22:41	7440-43-9	
Calcium	**6790**	ug/L	100	94.2	1	08/18/21 04:36	08/18/21 22:41	7440-70-2	
Chromium	ND	ug/L	5.0	3.7	1	08/18/21 04:36	08/18/21 22:41	7440-47-3	
Cobalt	ND	ug/L	5.0	3.6	1	08/18/21 04:36	08/18/21 22:41	7440-48-4	
Copper	ND	ug/L	5.0	4.3	1	08/18/21 04:36	08/18/21 22:41	7440-50-8	
Lead	ND	ug/L	5.0	4.5	1	08/18/21 04:36	08/18/21 22:41	7439-92-1	
Molybdenum	ND	ug/L	5.0	3.9	1	08/18/21 04:36	08/18/21 22:41	7439-98-7	
Nickel	ND	ug/L	5.0	3.5	1	08/18/21 04:36	08/18/21 22:41	7440-02-0	
Selenium	ND	ug/L	10.0	4.7	1	08/18/21 04:36	08/18/21 22:41	7782-49-2	
Silver	ND	ug/L	5.0	2.5	1	08/18/21 04:36	08/18/21 22:41	7440-22-4	
Vanadium	ND	ug/L	5.0	3.9	1	08/18/21 04:36	08/18/21 22:41	7440-62-2	
Zinc	ND	ug/L	10.0	9.5	1	08/18/21 04:36	08/18/21 22:41	7440-66-6	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Boron	**16.9J**	ug/L	50.0	8.5	1	08/24/21 10:47	08/26/21 15:24	7440-42-8	
Lithium	ND	ug/L	2.5	0.50	1	08/24/21 10:47	08/26/21 15:24	7439-93-2	
Thallium	ND	ug/L	0.47	0.050	1	08/24/21 10:47	08/26/21 15:24	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	ND	ug/L	0.20	0.12	1	08/26/21 17:00	08/30/21 13:50	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**66.0**	mg/L	25.0	25.0	1		08/19/21 19:02		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**3.5**	mg/L	1.0	0.60	1		08/18/21 17:53	16887-00-6	
Fluoride	**0.12**	mg/L	0.10	0.050	1		08/18/21 17:53	16984-48-8	
Sulfate	**6.6**	mg/L	1.0	0.50	1		08/18/21 17:53	14808-79-8	

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ANALYTICAL RESULTS

Project: Charah Q3 GW
Pace Project No.: 92555499

Sample: SW-5 **Lab ID: 92555499017** Collected: 08/13/21 13:00 Received: 08/13/21 15:48 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Antimony	ND	ug/L	5.0	3.0	1	08/18/21 04:36	08/18/21 22:44	7440-36-0	
Arsenic	**7.7J**	ug/L	10.0	4.7	1	08/18/21 04:36	08/18/21 22:44	7440-38-2	
Barium	**447**	ug/L	5.0	3.5	1	08/18/21 04:36	08/18/21 22:44	7440-39-3	
Beryllium	**2.0**	ug/L	1.0	0.70	1	08/18/21 04:36	08/18/21 22:44	7440-41-7	
Cadmium	ND	ug/L	1.0	0.40	1	08/18/21 04:36	08/18/21 22:44	7440-43-9	
Calcium	**5480**	ug/L	100	94.2	1	08/18/21 04:36	08/18/21 22:44	7440-70-2	
Chromium	**10.3**	ug/L	5.0	3.7	1	08/18/21 04:36	08/18/21 22:44	7440-47-3	
Cobalt	**8.5**	ug/L	5.0	3.6	1	08/18/21 04:36	08/18/21 22:44	7440-48-4	
Copper	**10.2**	ug/L	5.0	4.3	1	08/18/21 04:36	08/18/21 22:44	7440-50-8	
Lead	**37.1**	ug/L	5.0	4.5	1	08/18/21 04:36	08/18/21 22:44	7439-92-1	
Molybdenum	ND	ug/L	5.0	3.9	1	08/18/21 04:36	08/18/21 22:44	7439-98-7	
Nickel	**6.8**	ug/L	5.0	3.5	1	08/18/21 04:36	08/18/21 22:44	7440-02-0	
Selenium	ND	ug/L	10.0	4.7	1	08/18/21 04:36	08/18/21 22:44	7782-49-2	
Silver	ND	ug/L	5.0	2.5	1	08/18/21 04:36	08/18/21 22:44	7440-22-4	
Vanadium	**45.0**	ug/L	5.0	3.9	1	08/18/21 04:36	08/18/21 22:44	7440-62-2	
Zinc	**41.8**	ug/L	10.0	9.5	1	08/18/21 04:36	08/18/21 22:44	7440-66-6	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Boron	**10.3J**	ug/L	50.0	8.5	1	08/24/21 10:47	08/26/21 15:28	7440-42-8	
Lithium	**8.0**	ug/L	2.5	0.50	1	08/24/21 10:47	08/26/21 15:28	7439-93-2	
Thallium	**0.15J**	ug/L	0.47	0.050	1	08/24/21 10:47	08/26/21 15:28	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	ND	ug/L	0.20	0.12	1	08/26/21 17:00	08/30/21 13:52	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**984**	mg/L	25.0	25.0	1		08/19/21 19:02		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	ND	mg/L	10.0	6.0	10		08/18/21 18:09	16887-00-6	D3
Fluoride	ND	mg/L	1.0	0.50	10		08/18/21 18:09	16984-48-8	D3
Sulfate	ND	mg/L	10.0	5.0	10		08/18/21 18:09	14808-79-8	D3

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ANALYTICAL RESULTS

Project: Charah Q3 GW
Pace Project No.: 92555499

Sample: LEACHATE **Lab ID: 92555499018** Collected: 08/13/21 08:08 Received: 08/13/21 15:48 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Antimony	ND	ug/L	5.0	3.0	1	08/18/21 04:36	08/18/21 22:47	7440-36-0	
Arsenic	**7.8J**	ug/L	10.0	4.7	1	08/18/21 04:36	08/18/21 22:47	7440-38-2	
Barium	**48.7**	ug/L	5.0	3.5	1	08/18/21 04:36	08/18/21 22:47	7440-39-3	
Beryllium	ND	ug/L	1.0	0.70	1	08/18/21 04:36	08/18/21 22:47	7440-41-7	
Cadmium	ND	ug/L	1.0	0.40	1	08/18/21 04:36	08/18/21 22:47	7440-43-9	
Calcium	**264000**	ug/L	1000	942	10	08/18/21 04:36	08/19/21 17:44	7440-70-2	
Chromium	ND	ug/L	5.0	3.7	1	08/18/21 04:36	08/18/21 22:47	7440-47-3	
Cobalt	ND	ug/L	5.0	3.6	1	08/18/21 04:36	08/18/21 22:47	7440-48-4	
Copper	ND	ug/L	5.0	4.3	1	08/18/21 04:36	08/18/21 22:47	7440-50-8	
Lead	ND	ug/L	5.0	4.5	1	08/18/21 04:36	08/18/21 22:47	7439-92-1	
Molybdenum	**205**	ug/L	5.0	3.9	1	08/18/21 04:36	08/18/21 22:47	7439-98-7	
Nickel	ND	ug/L	5.0	3.5	1	08/18/21 04:36	08/18/21 22:47	7440-02-0	
Selenium	ND	ug/L	10.0	4.7	1	08/18/21 04:36	08/18/21 22:47	7782-49-2	
Silver	ND	ug/L	50.0	25.0	10	08/18/21 04:36	08/19/21 17:44	7440-22-4	
Vanadium	ND	ug/L	5.0	3.9	1	08/18/21 04:36	08/18/21 22:47	7440-62-2	
Zinc	**27.8**	ug/L	10.0	9.5	1	08/18/21 04:36	08/18/21 22:47	7440-66-6	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Boron	**3390**	ug/L	1000	170	20	08/24/21 10:47	08/27/21 11:49	7440-42-8	
Lithium	**61.1**	ug/L	2.5	0.50	1	08/24/21 10:47	08/26/21 15:33	7439-93-2	
Thallium	**0.13J**	ug/L	0.47	0.050	1	08/24/21 10:47	08/26/21 15:33	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	ND	ug/L	0.20	0.12	1	08/26/21 17:00	08/30/21 13:54	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**1320**	mg/L	50.0	50.0	1		08/19/21 19:02		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**18.3**	mg/L	1.0	0.60	1		08/18/21 18:24	16887-00-6	
Fluoride	**0.18**	mg/L	0.10	0.050	1		08/18/21 18:24	16984-48-8	
Sulfate	**502**	mg/L	12.0	6.0	12		08/19/21 02:19	14808-79-8	

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ANALYTICAL RESULTS

Project: Charah Q3 GW
Pace Project No.: 92555499

Sample: DUP **Lab ID: 92555499019** Collected: 08/11/21 17:30 Received: 08/13/21 15:48 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Antimony	ND	ug/L	5.0	3.0	1	08/18/21 04:36	08/18/21 22:50	7440-36-0	
Arsenic	ND	ug/L	10.0	4.7	1	08/18/21 04:36	08/18/21 22:50	7440-38-2	
Barium	**48.6**	ug/L	5.0	3.5	1	08/18/21 04:36	08/18/21 22:50	7440-39-3	
Beryllium	ND	ug/L	1.0	0.70	1	08/18/21 04:36	08/18/21 22:50	7440-41-7	
Cadmium	ND	ug/L	1.0	0.40	1	08/18/21 04:36	08/18/21 22:50	7440-43-9	
Calcium	**32900**	ug/L	100	94.2	1	08/18/21 04:36	08/18/21 22:50	7440-70-2	
Chromium	ND	ug/L	5.0	3.7	1	08/18/21 04:36	08/18/21 22:50	7440-47-3	
Cobalt	ND	ug/L	5.0	3.6	1	08/18/21 04:36	08/18/21 22:50	7440-48-4	
Copper	ND	ug/L	5.0	4.3	1	08/18/21 04:36	08/18/21 22:50	7440-50-8	
Lead	ND	ug/L	5.0	4.5	1	08/18/21 04:36	08/18/21 22:50	7439-92-1	
Molybdenum	ND	ug/L	5.0	3.9	1	08/18/21 04:36	08/18/21 22:50	7439-98-7	
Nickel	ND	ug/L	5.0	3.5	1	08/18/21 04:36	08/18/21 22:50	7440-02-0	
Selenium	ND	ug/L	10.0	4.7	1	08/18/21 04:36	08/18/21 22:50	7782-49-2	
Silver	ND	ug/L	5.0	2.5	1	08/18/21 04:36	08/18/21 22:50	7440-22-4	
Vanadium	ND	ug/L	5.0	3.9	1	08/18/21 04:36	08/18/21 22:50	7440-62-2	
Zinc	ND	ug/L	10.0	9.5	1	08/18/21 04:36	08/18/21 22:50	7440-66-6	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Boron	**58.7**	ug/L	50.0	8.5	1	08/24/21 10:47	08/26/21 15:37	7440-42-8	
Lithium	**27.4**	ug/L	2.5	0.50	1	08/24/21 10:47	08/26/21 15:37	7439-93-2	
Thallium	ND	ug/L	0.47	0.050	1	08/24/21 10:47	08/26/21 15:37	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	ND	ug/L	0.20	0.12	1	08/26/21 17:00	08/30/21 14:15	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**567**	mg/L	25.0	25.0	1		08/17/21 18:12		MW
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**177**	mg/L	4.0	2.4	4		08/19/21 02:34	16887-00-6	
Fluoride	**0.32**	mg/L	0.10	0.050	1		08/18/21 18:39	16984-48-8	
Sulfate	**25.1**	mg/L	1.0	0.50	1		08/18/21 18:39	14808-79-8	

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ANALYTICAL RESULTS

Project: Charah Q3 GW
Pace Project No.: 92555499

Sample: EQBL **Lab ID: 92555499020** Collected: 08/13/21 12:40 Received: 08/13/21 15:48 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Antimony	ND	ug/L	5.0	3.0	1	08/18/21 04:36	08/18/21 22:54	7440-36-0	
Arsenic	ND	ug/L	10.0	4.7	1	08/18/21 04:36	08/18/21 22:54	7440-38-2	
Barium	ND	ug/L	5.0	3.5	1	08/18/21 04:36	08/18/21 22:54	7440-39-3	
Beryllium	ND	ug/L	1.0	0.70	1	08/18/21 04:36	08/18/21 22:54	7440-41-7	
Cadmium	ND	ug/L	1.0	0.40	1	08/18/21 04:36	08/18/21 22:54	7440-43-9	
Calcium	ND	ug/L	100	94.2	1	08/18/21 04:36	08/18/21 22:54	7440-70-2	
Chromium	ND	ug/L	5.0	3.7	1	08/18/21 04:36	08/18/21 22:54	7440-47-3	
Cobalt	ND	ug/L	5.0	3.6	1	08/18/21 04:36	08/18/21 22:54	7440-48-4	
Copper	ND	ug/L	5.0	4.3	1	08/18/21 04:36	08/18/21 22:54	7440-50-8	
Lead	ND	ug/L	5.0	4.5	1	08/18/21 04:36	08/18/21 22:54	7439-92-1	
Molybdenum	ND	ug/L	5.0	3.9	1	08/18/21 04:36	08/18/21 22:54	7439-98-7	
Nickel	ND	ug/L	5.0	3.5	1	08/18/21 04:36	08/18/21 22:54	7440-02-0	
Selenium	ND	ug/L	10.0	4.7	1	08/18/21 04:36	08/18/21 22:54	7782-49-2	
Silver	ND	ug/L	5.0	2.5	1	08/18/21 04:36	08/18/21 22:54	7440-22-4	
Vanadium	ND	ug/L	5.0	3.9	1	08/18/21 04:36	08/18/21 22:54	7440-62-2	
Zinc	ND	ug/L	10.0	9.5	1	08/18/21 04:36	08/18/21 22:54	7440-66-6	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Boron	**12.5J**	ug/L	50.0	8.5	1	08/24/21 10:47	08/26/21 15:46	7440-42-8	
Lithium	ND	ug/L	2.5	0.50	1	08/24/21 10:47	08/26/21 15:46	7439-93-2	
Thallium	ND	ug/L	0.47	0.050	1	08/24/21 10:47	08/26/21 15:46	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	ND	ug/L	0.20	0.12	1	08/26/21 17:00	08/30/21 14:18	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	ND	mg/L	25.0	25.0	1		08/19/21 19:02		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	ND	mg/L	1.0	0.60	1		08/18/21 18:55	16887-00-6	
Fluoride	ND	mg/L	0.10	0.050	1		08/18/21 18:55	16984-48-8	
Sulfate	ND	mg/L	1.0	0.50	1		08/18/21 18:55	14808-79-8	

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ANALYTICAL RESULTS

Project: Charah Q3 GW
Pace Project No.: 92555499

Sample: SW-6 **Lab ID: 92555499021** Collected: 08/13/21 09:15 Received: 08/13/21 15:48 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Antimony	ND	ug/L	5.0	3.0	1	08/18/21 04:36	08/18/21 22:57	7440-36-0	
Arsenic	**12.2**	ug/L	10.0	4.7	1	08/18/21 04:36	08/18/21 22:57	7440-38-2	
Barium	**767**	ug/L	5.0	3.5	1	08/18/21 04:36	08/18/21 22:57	7440-39-3	
Beryllium	**3.3**	ug/L	1.0	0.70	1	08/18/21 04:36	08/18/21 22:57	7440-41-7	
Cadmium	ND	ug/L	1.0	0.40	1	08/18/21 04:36	08/18/21 22:57	7440-43-9	
Calcium	**6560**	ug/L	100	94.2	1	08/18/21 04:36	08/18/21 22:57	7440-70-2	
Chromium	**12.6**	ug/L	5.0	3.7	1	08/18/21 04:36	08/18/21 22:57	7440-47-3	
Cobalt	**26.3**	ug/L	5.0	3.6	1	08/18/21 04:36	08/18/21 22:57	7440-48-4	
Copper	**15.1**	ug/L	5.0	4.3	1	08/18/21 04:36	08/18/21 22:57	7440-50-8	
Lead	**56.3**	ug/L	5.0	4.5	1	08/18/21 04:36	08/18/21 22:57	7439-92-1	
Molybdenum	ND	ug/L	5.0	3.9	1	08/18/21 04:36	08/18/21 22:57	7439-98-7	
Nickel	**9.2**	ug/L	5.0	3.5	1	08/18/21 04:36	08/18/21 22:57	7440-02-0	
Selenium	ND	ug/L	10.0	4.7	1	08/18/21 04:36	08/18/21 22:57	7782-49-2	
Silver	ND	ug/L	5.0	2.5	1	08/18/21 04:36	08/18/21 22:57	7440-22-4	
Vanadium	**66.7**	ug/L	5.0	3.9	1	08/18/21 04:36	08/18/21 22:57	7440-62-2	
Zinc	**94.8**	ug/L	10.0	9.5	1	08/18/21 04:36	08/18/21 22:57	7440-66-6	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Boron	**10.3J**	ug/L	50.0	8.5	1	08/24/21 10:47	08/27/21 11:53	7440-42-8	
Lithium	**10.6**	ug/L	2.5	0.50	1	08/24/21 10:47	08/27/21 11:53	7439-93-2	
Thallium	**0.21J**	ug/L	0.47	0.050	1	08/24/21 10:47	08/27/21 11:53	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	ND	ug/L	0.20	0.12	1	08/26/21 17:00	08/30/21 14:20	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**1550**	mg/L	25.0	25.0	1		08/19/21 19:02		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	ND	mg/L	10.0	6.0	10		08/18/21 20:12	16887-00-6	D3,M1
Fluoride	**0.52J**	mg/L	1.0	0.50	10		08/18/21 20:12	16984-48-8	D3,M1
Sulfate	ND	mg/L	10.0	5.0	10		08/18/21 20:12	14808-79-8	D3,M1

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QUALITY CONTROL DATA

Project: Charah Q3 GW
Pace Project No.: 92555499

QC Batch: 641399 — Analysis Method: EPA 7470A
QC Batch Method: EPA 7470A — Analysis Description: 7470 Mercury
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92555499001, 92555499002, 92555499003, 92555499004, 92555499005, 92555499006, 92555499007, 92555499008, 92555499009, 92555499010, 92555499011, 92555499012

METHOD BLANK: 3366808 — Matrix: Water
Associated Lab Samples: 92555499001, 92555499002, 92555499003, 92555499004, 92555499005, 92555499006, 92555499007, 92555499008, 92555499009, 92555499010, 92555499011, 92555499012

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury	ug/L	ND	0.20	0.12	08/25/21 10:42	

LABORATORY CONTROL SAMPLE: 3366809

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	2.5	2.5	100	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3366810 3366811

Parameter	Units	92555437002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ug/L	ND	2.5	2.5	2.5	2.4	97	93	75-125	4	25	

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QUALITY CONTROL DATA

Project: Charah Q3 GW
Pace Project No.: 92555499

QC Batch: 642996
QC Batch Method: EPA 7470A
Analysis Method: EPA 7470A
Analysis Description: 7470 Mercury
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92555499013, 92555499014, 92555499015, 92555499016, 92555499017, 92555499018, 92555499019, 92555499020, 92555499021

METHOD BLANK: 3374076 Matrix: Water
Associated Lab Samples: 92555499013, 92555499014, 92555499015, 92555499016, 92555499017, 92555499018, 92555499019, 92555499020, 92555499021

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury	ug/L	ND	0.20	0.12	08/30/21 13:33	

LABORATORY CONTROL SAMPLE: 3374077

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	2.5	2.4	98	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3374078 3374079

Parameter	Units	92555499013 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ug/L	ND	2.5	2.5	2.5	2.3	99	91	75-125	8	25	

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QUALITY CONTROL DATA

Project: Charah Q3 GW
Pace Project No.: 92555499

QC Batch: 641125
QC Batch Method: EPA 3010A
Analysis Method: EPA 6010D
Analysis Description: 6010 MET
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92555499001, 92555499002, 92555499003, 92555499004, 92555499005, 92555499006, 92555499007, 92555499008, 92555499009, 92555499010, 92555499011, 92555499012

METHOD BLANK: 3365082 Matrix: Water
Associated Lab Samples: 92555499001, 92555499002, 92555499003, 92555499004, 92555499005, 92555499006, 92555499007, 92555499008, 92555499009, 92555499010, 92555499011, 92555499012

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Antimony	ug/L	ND	5.0	3.0	08/18/21 20:43	
Arsenic	ug/L	ND	10.0	4.7	08/18/21 20:43	
Barium	ug/L	ND	5.0	3.5	08/18/21 20:43	
Beryllium	ug/L	ND	1.0	0.70	08/18/21 20:43	
Cadmium	ug/L	ND	1.0	0.40	08/18/21 20:43	
Calcium	ug/L	ND	100	94.2	08/18/21 20:43	
Chromium	ug/L	ND	5.0	3.7	08/18/21 20:43	
Cobalt	ug/L	ND	5.0	3.6	08/18/21 20:43	
Copper	ug/L	ND	5.0	4.3	08/18/21 20:43	
Lead	ug/L	ND	5.0	4.5	08/18/21 20:43	
Molybdenum	ug/L	ND	5.0	3.9	08/18/21 20:43	
Nickel	ug/L	ND	5.0	3.5	08/18/21 20:43	
Selenium	ug/L	ND	10.0	4.7	08/18/21 20:43	
Silver	ug/L	ND	5.0	2.5	08/18/21 20:43	
Vanadium	ug/L	ND	5.0	3.9	08/18/21 20:43	
Zinc	ug/L	ND	10.0	9.5	08/18/21 20:43	

LABORATORY CONTROL SAMPLE: 3365083

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	500	480	96	80-120	
Arsenic	ug/L	500	437	87	80-120	
Barium	ug/L	500	460	92	80-120	
Beryllium	ug/L	500	456	91	80-120	
Cadmium	ug/L	500	442	88	80-120	
Calcium	ug/L	5000	4530	91	80-120	
Chromium	ug/L	500	415	83	80-120	
Cobalt	ug/L	500	443	89	80-120	
Copper	ug/L	500	451	90	80-120	
Lead	ug/L	500	458	92	80-120	
Molybdenum	ug/L	500	484	97	80-120	
Nickel	ug/L	500	445	89	80-120	
Selenium	ug/L	500	455	91	80-120	
Silver	ug/L	250	223	89	80-120	
Vanadium	ug/L	500	432	86	80-120	
Zinc	ug/L	500	435	87	80-120	

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QUALITY CONTROL DATA

Project: Charah Q3 GW
Pace Project No.: 92555499

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3365084 3365085

Parameter	Units	92555499001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Antimony	ug/L	ND	500	500	506	491	101	98	75-125	3	20	
Arsenic	ug/L	ND	500	500	478	464	95	93	75-125	3	20	
Barium	ug/L	295	500	500	795	777	100	97	75-125	2	20	
Beryllium	ug/L	ND	500	500	488	474	98	95	75-125	3	20	
Cadmium	ug/L	ND	500	500	475	461	95	92	75-125	3	20	
Calcium	ug/L	24100	5000	5000	29600	29200	109	101	75-125	1	20	
Chromium	ug/L	ND	500	500	444	429	89	86	75-125	4	20	
Cobalt	ug/L	ND	500	500	459	444	92	89	75-125	3	20	
Copper	ug/L	ND	500	500	485	469	97	94	75-125	3	20	
Lead	ug/L	ND	500	500	470	455	94	91	75-125	3	20	
Molybdenum	ug/L	ND	500	500	497	482	99	96	75-125	3	20	
Nickel	ug/L	ND	500	500	460	446	92	89	75-125	3	20	
Selenium	ug/L	ND	500	500	504	489	100	97	75-125	3	20	
Silver	ug/L	ND	250	250	233	225	93	90	75-125	3	20	
Vanadium	ug/L	ND	500	500	476	461	94	92	75-125	3	20	
Zinc	ug/L	ND	500	500	475	457	95	91	75-125	4	20	

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QUALITY CONTROL DATA

Project: Charah Q3 GW
Pace Project No.: 92555499

QC Batch: 641126
QC Batch Method: EPA 3010A
Analysis Method: EPA 6010D
Analysis Description: 6010 MET
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92555499013, 92555499014, 92555499015, 92555499016, 92555499017, 92555499018, 92555499019, 92555499020, 92555499021

METHOD BLANK: 3365086 Matrix: Water
Associated Lab Samples: 92555499013, 92555499014, 92555499015, 92555499016, 92555499017, 92555499018, 92555499019, 92555499020, 92555499021

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Antimony	ug/L	ND	5.0	3.0	08/19/21 17:02	
Arsenic	ug/L	ND	10.0	4.7	08/19/21 17:02	
Barium	ug/L	ND	5.0	3.5	08/19/21 17:02	
Beryllium	ug/L	ND	1.0	0.70	08/19/21 17:02	
Cadmium	ug/L	ND	1.0	0.40	08/19/21 17:02	
Calcium	ug/L	ND	100	94.2	08/19/21 17:02	
Chromium	ug/L	ND	5.0	3.7	08/19/21 17:02	
Cobalt	ug/L	ND	5.0	3.6	08/19/21 17:02	
Copper	ug/L	ND	5.0	4.3	08/19/21 17:02	
Lead	ug/L	ND	5.0	4.5	08/19/21 17:02	
Molybdenum	ug/L	ND	5.0	3.9	08/19/21 17:02	
Nickel	ug/L	ND	5.0	3.5	08/19/21 17:02	
Selenium	ug/L	ND	10.0	4.7	08/19/21 17:02	
Silver	ug/L	ND	5.0	2.5	08/19/21 17:02	
Vanadium	ug/L	ND	5.0	3.9	08/19/21 17:02	
Zinc	ug/L	ND	10.0	9.5	08/19/21 17:02	

LABORATORY CONTROL SAMPLE: 3365087

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	500	481	96	80-120	
Arsenic	ug/L	500	470	94	80-120	
Barium	ug/L	500	476	95	80-120	
Beryllium	ug/L	500	482	96	80-120	
Cadmium	ug/L	500	466	93	80-120	
Calcium	ug/L	5000	4840	97	80-120	
Chromium	ug/L	500	475	95	80-120	
Cobalt	ug/L	500	455	91	80-120	
Copper	ug/L	500	489	98	80-120	
Lead	ug/L	500	470	94	80-120	
Molybdenum	ug/L	500	508	102	80-120	
Nickel	ug/L	500	474	95	80-120	
Selenium	ug/L	500	441	88	80-120	
Silver	ug/L	250	242	97	80-120	
Vanadium	ug/L	500	472	94	80-120	
Zinc	ug/L	500	449	90	80-120	

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QUALITY CONTROL DATA

Project: Charah Q3 GW
Pace Project No.: 92555499

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3365088 3365089

Parameter	Units	92555499013 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Antimony	ug/L	5.6	500	500	507	515	100	102	75-125	1	20	
Arsenic	ug/L	16.5	500	500	489	499	95	97	75-125	2	20	
Barium	ug/L	69.3	500	500	553	559	97	98	75-125	1	20	
Beryllium	ug/L	ND	500	500	476	478	95	96	75-125	1	20	
Cadmium	ug/L	ND	500	500	469	474	94	95	75-125	1	20	
Calcium	ug/L	94400	5000	5000	107000	112000	257	346	75-125	4	20	M1
Chromium	ug/L	ND	500	500	464	469	93	94	75-125	1	20	
Cobalt	ug/L	ND	500	500	445	449	89	90	75-125	1	20	
Copper	ug/L	ND	500	500	478	484	95	97	75-125	1	20	
Lead	ug/L	ND	500	500	449	454	89	90	75-125	1	20	
Molybdenum	ug/L	127	500	500	621	631	99	101	75-125	2	20	
Nickel	ug/L	ND	500	500	442	448	88	89	75-125	1	20	
Selenium	ug/L	ND	500	500	499	509	99	101	75-125	2	20	
Silver	ug/L	ND	250	250	229	231	92	92	75-125	1	20	
Vanadium	ug/L	ND	500	500	468	472	94	94	75-125	1	20	
Zinc	ug/L	ND	500	500	457	461	91	92	75-125	1	20	

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QUALITY CONTROL DATA

Project: Charah Q3 GW
Pace Project No.: 92555499

QC Batch: 641860
QC Batch Method: EPA 3010A
Analysis Method: EPA 6020B
Analysis Description: 6020 MET
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92555499001, 92555499002, 92555499003, 92555499004, 92555499006, 92555499007, 92555499008, 92555499009, 92555499010, 92555499011, 92555499012, 92555499013, 92555499014, 92555499015

METHOD BLANK: 3368594 Matrix: Water
Associated Lab Samples: 92555499001, 92555499002, 92555499003, 92555499004, 92555499006, 92555499007, 92555499008, 92555499009, 92555499010, 92555499011, 92555499012, 92555499013, 92555499014, 92555499015

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Boron	ug/L	ND	50.0	8.5	08/26/21 16:10	
Lithium	ug/L	ND	2.5	0.50	08/26/21 16:10	
Thallium	ug/L	ND	0.47	0.050	08/26/21 16:10	

LABORATORY CONTROL SAMPLE: 3368595

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Boron	ug/L	50	43.2J	86	80-120	
Lithium	ug/L	50	56.6	113	80-120	
Thallium	ug/L	25	24.2	97	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3368596 3368597

Parameter	Units	92552558003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Boron	ug/L	ND	50	50	42.1J	41.0J	82	79	75-125		20	
Lithium	ug/L	ND	50	50	58.3	58.5	117	117	75-125	0	20	
Thallium	ug/L	ND	25	25	24.6	24.8	98	99	75-125	1	20	

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QUALITY CONTROL DATA

Project: Charah Q3 GW
Pace Project No.: 92555499

QC Batch: 642159
QC Batch Method: EPA 3010A
Analysis Method: EPA 6020B
Analysis Description: 6020 MET
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92555499005, 92555499016, 92555499017, 92555499018, 92555499019, 92555499020, 92555499021

METHOD BLANK: 3370242 Matrix: Water
Associated Lab Samples: 92555499005, 92555499016, 92555499017, 92555499018, 92555499019, 92555499020, 92555499021

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Boron	ug/L	ND	50.0	8.5	08/26/21 14:00	
Lithium	ug/L	ND	2.5	0.50	08/26/21 14:00	
Thallium	ug/L	ND	0.47	0.050	08/26/21 14:00	

LABORATORY CONTROL SAMPLE: 3370243

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Boron	ug/L	50	46.8J	94	80-120	
Lithium	ug/L	50	51.2	102	80-120	
Thallium	ug/L	25	23.9	96	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3370244 3370245

Parameter	Units	92552921015 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Boron	ug/L	ND	50	50	48.5J	52.4	89	97	75-125		20	
Lithium	ug/L	19.9	50	50	71.3	72.9	103	106	75-125	2	20	
Thallium	ug/L	ND	25	25	24.6	24.8	98	99	75-125	0	20	

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QUALITY CONTROL DATA

Project: Charah Q3 GW
Pace Project No.: 92555499

QC Batch: 640792
QC Batch Method: SM 2540C-2011
Analysis Method: SM 2540C-2011
Analysis Description: 2540C Total Dissolved Solids
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92555499007, 92555499011

METHOD BLANK: 3363234 Matrix: Water
Associated Lab Samples: 92555499007, 92555499011

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	ND	25.0	25.0	08/16/21 22:15	

LABORATORY CONTROL SAMPLE: 3363235

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	250	248	99	90-110	

SAMPLE DUPLICATE: 3363236

Parameter	Units	92555477002 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	353	349	1	25	

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QUALITY CONTROL DATA

Project: Charah Q3 GW
Pace Project No.: 92555499

QC Batch: 640967
QC Batch Method: SM 2540C-2011
Analysis Method: SM 2540C-2011
Analysis Description: 2540C Total Dissolved Solids
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92555499001, 92555499003, 92555499004

METHOD BLANK: 3364000 Matrix: Water
Associated Lab Samples: 92555499001, 92555499003, 92555499004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	ND	25.0	25.0	08/17/21 18:04	

LABORATORY CONTROL SAMPLE: 3364001

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	250	244	98	90-110	

SAMPLE DUPLICATE: 3364002

Parameter	Units	92555499001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	590	580	2	25	

SAMPLE DUPLICATE: 3364003

Parameter	Units	92555499003 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	2490	2500	0	25	

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QUALITY CONTROL DATA

Project: Charah Q3 GW
Pace Project No.: 92555499

QC Batch: 641019 | Analysis Method: SM 2540C-2011
QC Batch Method: SM 2540C-2011 | Analysis Description: 2540C Total Dissolved Solids
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92555499008, 92555499009, 92555499010, 92555499019

METHOD BLANK: 3364449 Matrix: Water
Associated Lab Samples: 92555499008, 92555499009, 92555499010, 92555499019

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	ND	25.0	25.0	08/17/21 18:10	

LABORATORY CONTROL SAMPLE: 3364450

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	250	258	103	90-110	

SAMPLE DUPLICATE: 3364451

Parameter	Units	92555337010 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	87.0	91.0	4	25	

SAMPLE DUPLICATE: 3364452

Parameter	Units	92555487012 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	75.0	82.0	9	25	

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QUALITY CONTROL DATA

Project: Charah Q3 GW
Pace Project No.: 92555499

QC Batch: 641521 | Analysis Method: SM 2540C-2011
QC Batch Method: SM 2540C-2011 | Analysis Description: 2540C Total Dissolved Solids
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92555499002, 92555499005, 92555499006, 92555499012, 92555499013, 92555499014, 92555499015

METHOD BLANK: 3367049 Matrix: Water
Associated Lab Samples: 92555499002, 92555499005, 92555499006, 92555499012, 92555499013, 92555499014, 92555499015

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	ND	25.0	25.0	08/19/21 12:29	

LABORATORY CONTROL SAMPLE: 3367050

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	250	242	97	90-110	

SAMPLE DUPLICATE: 3367051

Parameter	Units	92555258033 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	151	151	0	25	

SAMPLE DUPLICATE: 3367052

Parameter	Units	92555487008 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	ND	ND		25	

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QUALITY CONTROL DATA

Project: Charah Q3 GW
Pace Project No.: 92555499

QC Batch: 641707 | Analysis Method: SM 2540C-2011
QC Batch Method: SM 2540C-2011 | Analysis Description: 2540C Total Dissolved Solids
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92555499016, 92555499017, 92555499018, 92555499020, 92555499021

METHOD BLANK: 3368042 Matrix: Water
Associated Lab Samples: 92555499016, 92555499017, 92555499018, 92555499020, 92555499021

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	ND	25.0	25.0	08/19/21 19:01	

LABORATORY CONTROL SAMPLE: 3368043

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	250	242	97	90-110	

SAMPLE DUPLICATE: 3368044

Parameter	Units	92555597001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	214	214	0	25	H1

SAMPLE DUPLICATE: 3368045

Parameter	Units	92555499021 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	1550	1650	6	25	

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QUALITY CONTROL DATA

Project: Charah Q3 GW
Pace Project No.: 92555499

QC Batch: 641058
QC Batch Method: EPA 300.0 Rev 2.1 1993
Analysis Method: EPA 300.0 Rev 2.1 1993
Analysis Description: 300.0 IC Anions
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92555499001, 92555499002, 92555499003, 92555499004, 92555499005, 92555499006, 92555499007, 92555499008, 92555499009, 92555499010, 92555499011, 92555499012, 92555499013, 92555499014, 92555499015, 92555499016, 92555499017, 92555499018, 92555499019, 92555499020

METHOD BLANK: 3364705 Matrix: Water
Associated Lab Samples: 92555499001, 92555499002, 92555499003, 92555499004, 92555499005, 92555499006, 92555499007, 92555499008, 92555499009, 92555499010, 92555499011, 92555499012, 92555499013, 92555499014, 92555499015, 92555499016, 92555499017, 92555499018, 92555499019, 92555499020

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	ND	1.0	0.60	08/18/21 11:05	
Fluoride	mg/L	ND	0.10	0.050	08/18/21 11:05	
Sulfate	mg/L	ND	1.0	0.50	08/18/21 11:05	

LABORATORY CONTROL SAMPLE: 3364706

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	50	49.4	99	90-110	
Fluoride	mg/L	2.5	2.5	101	90-110	
Sulfate	mg/L	50	49.2	98	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3364707 3364708

Parameter	Units	92555499001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	199	50	50	246	243	93	87	90-110	1	10	M1
Fluoride	mg/L	0.15	2.5	2.5	2.5	2.5	95	96	90-110	1	10	
Sulfate	mg/L	18.3	50	50	67.2	67.0	98	97	90-110	0	10	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3364709 3364710

Parameter	Units	92555499011 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	29.0	50	50	76.4	77.5	95	97	90-110	1	10	
Fluoride	mg/L	0.46	2.5	2.5	3.0	3.0	101	102	90-110	1	10	
Sulfate	mg/L	5.7	50	50	88.8	54.9	166	98	90-110	47	10	M1,R1

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QUALITY CONTROL DATA

Project: Charah Q3 GW
Pace Project No.: 92555499

QC Batch: 641060
QC Batch Method: EPA 300.0 Rev 2.1 1993
Analysis Method: EPA 300.0 Rev 2.1 1993
Analysis Description: 300.0 IC Anions
Laboratory: Pace Analytical Services - Asheville

Associated Lab Samples: 92555499021

METHOD BLANK: 3364714 Matrix: Water
Associated Lab Samples: 92555499021

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	ND	1.0	0.60	08/18/21 19:41	
Fluoride	mg/L	ND	0.10	0.050	08/18/21 19:41	
Sulfate	mg/L	ND	1.0	0.50	08/18/21 19:41	

LABORATORY CONTROL SAMPLE: 3364715

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	50	49.6	99	90-110	
Fluoride	mg/L	2.5	2.5	101	90-110	
Sulfate	mg/L	50	48.4	97	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3364716 3364717

Parameter	Units	92555499021 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	ND	50	50	44.5	44.2	82	82	90-110	1	10	M1
Fluoride	mg/L	0.52J	2.5	2.5	2.0	2.1	58	62	90-110	5	10	M1
Sulfate	mg/L	ND	50	50	37.6	35.2	74	69	90-110	7	10	M1

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: Charah Q3 GW
Pace Project No.: 92555499

Sample: BG-1 **Lab ID: 92555499001** Collected: 08/10/21 19:00 Received: 08/13/21 15:48 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**-0.276 ± 0.364 (0.828) C:NA T:89%**	pCi/L	09/07/21 12:34	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.229 ± 0.317 (0.678) C:63% T:95%**	pCi/L	09/02/21 11:18	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**0.229 ± 0.681 (1.51)**	pCi/L	09/08/21 15:13	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: Charah Q3 GW
Pace Project No.: 92555499

Sample: BG-2 **Lab ID: 92555499002** Collected: 08/12/21 18:15 Received: 08/13/21 15:48 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.265 ± 0.493 (0.839) C:NA T:90%**	pCi/L	09/07/21 12:34	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.632 ± 0.422 (0.791) C:56% T:85%**	pCi/L	09/02/21 11:18	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**0.897 ± 0.915 (1.63)**	pCi/L	09/08/21 15:13	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: Charah Q3 GW
Pace Project No.: 92555499

Sample: MW-1 **Lab ID: 92555499003** Collected: 08/10/21 09:05 Received: 08/13/21 15:48 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.0594 ± 0.333 (0.638) C:NA T:101%**	pCi/L	09/07/21 12:34	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.761 ± 0.412 (0.733) C:65% T:88%**	pCi/L	09/02/21 11:18	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**0.820 ± 0.745 (1.37)**	pCi/L	09/08/21 15:13	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: Charah Q3 GW
Pace Project No.: 92555499

Sample: MW-2 **Lab ID: 92555499004** Collected: 08/10/21 15:02 Received: 08/13/21 15:48 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**1.02 ± 0.554 (0.609) C:NA T:89%**	pCi/L	09/07/21 12:34	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**1.83 ± 0.610 (0.836) C:60% T:90%**	pCi/L	09/02/21 11:18	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**2.85 ± 1.16 (1.45)**	pCi/L	09/08/21 15:13	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: Charah Q3 GW
Pace Project No.: 92555499

Sample: MW-3 **Lab ID: 92555499005** Collected: 08/12/21 15:50 Received: 08/13/21 15:48 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.848 ± 0.690 (1.00) C:NA T:91%**	pCi/L	09/07/21 12:34	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.326 ± 0.396 (0.838) C:65% T:91%**	pCi/L	09/02/21 11:19	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**1.17 ± 1.09 (1.84)**	pCi/L	09/08/21 15:13	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: Charah Q3 GW
Pace Project No.: 92555499

Sample: MW-4 **Lab ID: 92555499006** Collected: 08/12/21 14:05 Received: 08/13/21 15:48 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.291 ± 0.544 (0.922) C:NA T:88%**	pCi/L	09/07/21 12:34	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.143 ± 0.432 (0.969) C:61% T:84%**	pCi/L	09/02/21 11:19	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**0.434 ± 0.976 (1.89)**	pCi/L	09/08/21 15:13	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: Charah Q3 GW
Pace Project No.: 92555499

Sample: MW-5 **Lab ID: 92555499007** Collected: 08/09/21 17:05 Received: 08/13/21 15:48 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**-0.205 ± 0.472 (0.969) C:NA T:93%**	pCi/L	09/07/21 12:34	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.574 ± 0.420 (0.824) C:64% T:88%**	pCi/L	09/02/21 11:19	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**0.574 ± 0.892 (1.79)**	pCi/L	09/08/21 15:13	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: Charah Q3 GW
Pace Project No.: 92555499

Sample: MW-6 **Lab ID: 92555499008** Collected: 08/11/21 17:20 Received: 08/13/21 15:48 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.0323 ± 0.257 (0.533) C:NA T:93%**	pCi/L	09/07/21 12:52	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.400 ± 0.531 (1.13) C:65% T:68%**	pCi/L	09/02/21 11:19	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**0.432 ± 0.788 (1.66)**	pCi/L	09/08/21 15:13	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: Charah Q3 GW
Pace Project No.: 92555499

Sample: MW-7R **Lab ID: 92555499009** Collected: 08/11/21 13:45 Received: 08/13/21 15:48 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.214 ± 0.336 (0.561) C:NA T:96%**	pCi/L	09/07/21 12:52	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.173 ± 0.376 (0.831) C:65% T:90%**	pCi/L	09/02/21 11:19	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**0.387 ± 0.712 (1.39)**	pCi/L	09/08/21 15:13	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: Charah Q3 GW
Pace Project No.: 92555499

Sample: MW-8 **Lab ID: 92555499010** Collected: 08/11/21 09:55 Received: 08/13/21 15:48 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.311 ± 0.413 (0.664) C:NA T:89%**	pCi/L	09/07/21 12:52	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**1.04 ± 0.498 (0.867) C:65% T:87%**	pCi/L	09/02/21 11:19	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**1.35 ± 0.911 (1.53)**	pCi/L	09/08/21 15:13	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: Charah Q3 GW
Pace Project No.: 92555499

Sample: MW-10 **Lab ID: 92555499011** Collected: 08/09/21 13:20 Received: 08/13/21 15:48 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.0695 ± 0.297 (0.573) C:NA T:97%**	pCi/L	09/07/21 12:52	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**1.67 ± 0.608 (0.927) C:63% T:90%**	pCi/L	09/02/21 11:19	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**1.74 ± 0.905 (1.50)**	pCi/L	09/08/21 15:13	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: Charah Q3 GW
Pace Project No.: 92555499

Sample: MW-11 **Lab ID: 92555499012** Collected: 08/12/21 09:20 Received: 08/13/21 15:48 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.124 ± 0.393 (0.724) C:NA T:98%**	pCi/L	09/07/21 12:52	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**-0.135 ± 0.388 (0.922) C:63% T:92%**	pCi/L	09/02/21 11:19	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**0.124 ± 0.781 (1.65)**	pCi/L	09/08/21 15:13	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: Charah Q3 GW
Pace Project No.: 92555499

Sample: MW-11D **Lab ID: 92555499013** Collected: 08/12/21 11:20 Received: 08/13/21 15:48 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.483 ± 0.460 (0.676) C:NA T:95%**	pCi/L	09/07/21 12:52	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.751 ± 0.456 (0.855) C:63% T:90%**	pCi/L	09/02/21 11:19	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**1.23 ± 0.916 (1.53)**	pCi/L	09/08/21 15:13	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: Charah Q3 GW
Pace Project No.: 92555499

Sample: SW-1 **Lab ID: 92555499014** Collected: 08/13/21 08:59 Received: 08/13/21 15:48 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.743 ± 0.767 (1.16) C:NA T:58%**	pCi/L	09/07/21 12:52	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**2.00 ± 1.34 (2.57) C:61% T:28%**	pCi/L	09/02/21 11:19	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**2.74 ± 2.11 (3.73)**	pCi/L	09/08/21 15:13	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: Charah Q3 GW
Pace Project No.: 92555499

Sample: SW-2 **Lab ID: 92555499015** Collected: 08/13/21 07:25 Received: 08/13/21 15:48 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.804 ± 0.659 (0.956) C:NA T:92%**	pCi/L	09/07/21 12:52	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**-0.0160 ± 0.415 (0.967) C:64% T:78%**	pCi/L	09/02/21 11:19	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**0.804 ± 1.07 (1.92)**	pCi/L	09/08/21 15:13	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: Charah Q3 GW
Pace Project No.: 92555499

Sample: SW-4 **Lab ID: 92555499016** Collected: 08/13/21 08:30 Received: 08/13/21 15:48 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.290 ± 0.487 (0.819) C:NA T:96%**	pCi/L	09/07/21 13:09	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.510 ± 0.525 (1.09) C:63% T:76%**	pCi/L	09/02/21 11:19	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**0.800 ± 1.01 (1.91)**	pCi/L	09/08/21 15:13	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: Charah Q3 GW
Pace Project No.: 92555499

Sample: SW-5 **Lab ID: 92555499017** Collected: 08/13/21 13:00 Received: 08/13/21 15:48 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.267 ± 0.448 (0.753) C:NA T:96%**	pCi/L	09/07/21 13:09	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**1.07 ± 0.481 (0.805) C:62% T:91%**	pCi/L	09/02/21 11:20	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**1.34 ± 0.929 (1.56)**	pCi/L	09/08/21 15:13	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: Charah Q3 GW
Pace Project No.: 92555499

Sample: LEACHATE **Lab ID: 92555499018** Collected: 08/13/21 08:08 Received: 08/13/21 15:48 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**-0.129 ± 0.419 (0.849) C:NA T:96%**	pCi/L	09/07/21 13:09	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.345 ± 0.405 (0.854) C:65% T:85%**	pCi/L	09/02/21 11:20	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**0.345 ± 0.824 (1.70)**	pCi/L	09/08/21 15:13	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: Charah Q3 GW
Pace Project No.: 92555499

Sample: DUP **Lab ID: 92555499019** Collected: 08/11/21 17:30 Received: 08/13/21 15:48 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**-0.00966 ± 0.374 (0.734) C:NA T:95%**	pCi/L	09/07/21 13:09	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.928 ± 0.474 (0.835) C:63% T:87%**	pCi/L	09/02/21 11:20	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**0.928 ± 0.848 (1.57)**	pCi/L	09/08/21 15:13	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: Charah Q3 GW
Pace Project No.: 92555499

Sample: EQBL **Lab ID: 92555499020** Collected: 08/13/21 12:40 Received: 08/13/21 15:48 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.195 ± 0.443 (0.785) C:NA T:93%**	pCi/L	09/07/21 13:09	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.431 ± 0.379 (0.762) C:63% T:85%**	pCi/L	09/02/21 11:18	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**0.626 ± 0.822 (1.55)**	pCi/L	09/08/21 15:13	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: Charah Q3 GW
Pace Project No.: 92555499

Sample: SW-6 **Lab ID: 92555499021** Collected: 08/13/21 09:15 Received: 08/13/21 15:48 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.324 ± 0.486 (0.691) C:NA T:97%**	pCi/L	09/20/21 12:24	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.520 ± 0.677 (1.44) C:71% T:51%**	pCi/L	09/02/21 14:09	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**0.844 ± 1.16 (2.13)**	pCi/L	09/21/21 16:13	7440-14-4	

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QUALITY CONTROL - RADIOCHEMISTRY

Project: Charah Q3 GW
Pace Project No.: 92555499

QC Batch: 460961
QC Batch Method: EPA 903.1
Analysis Method: EPA 903.1
Analysis Description: 903.1 Radium-226
Laboratory: Pace Analytical Services - Greensburg
Associated Lab Samples: 92555499021

METHOD BLANK: 2225543 Matrix: Water
Associated Lab Samples: 92555499021

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	-0.177 ± 0.270 (0.708) C:NA T:91%	pCi/L	09/20/21 12:24	

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QUALITY CONTROL - RADIOCHEMISTRY

Project: Charah Q3 GW
Pace Project No.: 92555499

QC Batch: 460952 | Analysis Method: EPA 903.1
QC Batch Method: EPA 903.1 | Analysis Description: 903.1 Radium-226
Laboratory: Pace Analytical Services - Greensburg

Associated Lab Samples: 92555499001, 92555499002, 92555499003, 92555499004, 92555499005, 92555499006, 92555499007, 92555499008, 92555499009, 92555499010, 92555499011, 92555499012, 92555499013, 92555499014, 92555499015, 92555499016, 92555499017, 92555499018, 92555499019, 92555499020

METHOD BLANK: 2225531 Matrix: Water

Associated Lab Samples: 92555499001, 92555499002, 92555499003, 92555499004, 92555499005, 92555499006, 92555499007, 92555499008, 92555499009, 92555499010, 92555499011, 92555499012, 92555499013, 92555499014, 92555499015, 92555499016, 92555499017, 92555499018, 92555499019, 92555499020

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	-0.0538 ± 0.184 (0.381) C:NA T:94%	pCi/L	09/07/21 12:34	

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QUALITY CONTROL - RADIOCHEMISTRY

Project: Charah Q3 GW
Pace Project No.: 92555499

QC Batch: 460953 Analysis Method: EPA 904.0
QC Batch Method: EPA 904.0 Analysis Description: 904.0 Radium 228
Laboratory: Pace Analytical Services - Greensburg
Associated Lab Samples: 92555499001, 92555499002, 92555499003, 92555499004, 92555499005, 92555499006, 92555499007, 92555499008, 92555499009, 92555499010, 92555499011, 92555499012, 92555499013, 92555499014, 92555499015, 92555499016, 92555499017, 92555499018, 92555499019, 92555499020

METHOD BLANK: 2225532 Matrix: Water
Associated Lab Samples: 92555499001, 92555499002, 92555499003, 92555499004, 92555499005, 92555499006, 92555499007, 92555499008, 92555499009, 92555499010, 92555499011, 92555499012, 92555499013, 92555499014, 92555499015, 92555499016, 92555499017, 92555499018, 92555499019, 92555499020

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	0.315 ± 0.328 (0.677) C:64% T:89%	pCi/L	09/02/21 11:20	

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QUALITY CONTROL - RADIOCHEMISTRY

Project: Charah Q3 GW
Pace Project No.: 92555499

QC Batch: 460962
QC Batch Method: EPA 904.0
Analysis Method: EPA 904.0
Analysis Description: 904.0 Radium 228
Laboratory: Pace Analytical Services - Greensburg
Associated Lab Samples: 92555499021

METHOD BLANK: 2225544 Matrix: Water
Associated Lab Samples: 92555499021

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	-0.204 ± 0.245 (0.631) C:77% T:94%	pCi/L	09/02/21 14:11	

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QUALIFIERS

Project: Charah Q3 GW
Pace Project No.: 92555499

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

Acid preservation may not be appropriate for 2 Chloroethylvinyl ether.

A separate vial preserved to a pH of 4-5 is recommended in SW846 Chapter 4 for the analysis of Acrolein and Acrylonitrile by EPA Method 8260.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Reported results are not rounded until the final step prior to reporting. Therefore, calculated parameters that are typically reported as "Total" may vary slightly from the sum of the reported component parameters.

Act - Activity

Unc - Uncertainty: SDWA = 1.96 sigma count uncertainty, all other matrices = Expanded Uncertainty (95% confidence interval). Gamma Spec = Expanded Uncertainty (95.4% Confidence Interval)

(MDC) - Minimum Detectable Concentration

Trac - Tracer Recovery (%)

Carr - Carrier Recovery (%)

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

ANALYTE QUALIFIERS

D3	Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference.
H1	Analysis conducted outside the EPA method holding time.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
MW	Due to matrix interference, achieving a constant weight is not possible.
R1	RPD value was outside control limits.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: Charah Q3 GW
Pace Project No.: 92555499

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
92555499001	**BG-1**	EPA 3010A	641125	EPA 6010D	641139
92555499002	**BG-2**	EPA 3010A	641125	EPA 6010D	641139
92555499003	**MW-1**	EPA 3010A	641125	EPA 6010D	641139
92555499004	**MW-2**	EPA 3010A	641125	EPA 6010D	641139
92555499005	**MW-3**	EPA 3010A	641125	EPA 6010D	641139
92555499006	**MW-4**	EPA 3010A	641125	EPA 6010D	641139
92555499007	**MW-5**	EPA 3010A	641125	EPA 6010D	641139
92555499008	**MW-6**	EPA 3010A	641125	EPA 6010D	641139
92555499009	**MW-7R**	EPA 3010A	641125	EPA 6010D	641139
92555499010	**MW-8**	EPA 3010A	641125	EPA 6010D	641139
92555499011	**MW-10**	EPA 3010A	641125	EPA 6010D	641139
92555499012	**MW-11**	EPA 3010A	641125	EPA 6010D	641139
92555499013	**MW-11D**	EPA 3010A	641126	EPA 6010D	641137
92555499014	**SW-1**	EPA 3010A	641126	EPA 6010D	641137
92555499015	**SW-2**	EPA 3010A	641126	EPA 6010D	641137
92555499016	**SW-4**	EPA 3010A	641126	EPA 6010D	641137
92555499017	**SW-5**	EPA 3010A	641126	EPA 6010D	641137
92555499018	**LEACHATE**	EPA 3010A	641126	EPA 6010D	641137
92555499019	**DUP**	EPA 3010A	641126	EPA 6010D	641137
92555499020	**EQBL**	EPA 3010A	641126	EPA 6010D	641137
92555499021	**SW-6**	EPA 3010A	641126	EPA 6010D	641137
92555499001	**BG-1**	EPA 3010A	641860	EPA 6020B	641980
92555499002	**BG-2**	EPA 3010A	641860	EPA 6020B	641980
92555499003	**MW-1**	EPA 3010A	641860	EPA 6020B	641980
92555499004	**MW-2**	EPA 3010A	641860	EPA 6020B	641980
92555499005	**MW-3**	EPA 3010A	642159	EPA 6020B	642644
92555499006	**MW-4**	EPA 3010A	641860	EPA 6020B	641980
92555499007	**MW-5**	EPA 3010A	641860	EPA 6020B	641980
92555499008	**MW-6**	EPA 3010A	641860	EPA 6020B	641980
92555499009	**MW-7R**	EPA 3010A	641860	EPA 6020B	641980
92555499010	**MW-8**	EPA 3010A	641860	EPA 6020B	641980
92555499011	**MW-10**	EPA 3010A	641860	EPA 6020B	641980
92555499012	**MW-11**	EPA 3010A	641860	EPA 6020B	641980
92555499013	**MW-11D**	EPA 3010A	641860	EPA 6020B	641980
92555499014	**SW-1**	EPA 3010A	641860	EPA 6020B	641980
92555499015	**SW-2**	EPA 3010A	641860	EPA 6020B	641980
92555499016	**SW-4**	EPA 3010A	642159	EPA 6020B	642644
92555499017	**SW-5**	EPA 3010A	642159	EPA 6020B	642644
92555499018	**LEACHATE**	EPA 3010A	642159	EPA 6020B	642644
92555499019	**DUP**	EPA 3010A	642159	EPA 6020B	642644
92555499020	**EQBL**	EPA 3010A	642159	EPA 6020B	642644
92555499021	**SW-6**	EPA 3010A	642159	EPA 6020B	642644
92555499001	**BG-1**	EPA 7470A	641399	EPA 7470A	642642
92555499002	**BG-2**	EPA 7470A	641399	EPA 7470A	642642
92555499003	**MW-1**	EPA 7470A	641399	EPA 7470A	642642
92555499004	**MW-2**	EPA 7470A	641399	EPA 7470A	642642

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: Charah Q3 GW
Pace Project No.: 92555499

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
92555499005	**MW-3**	EPA 7470A	641399	EPA 7470A	642642
92555499006	**MW-4**	EPA 7470A	641399	EPA 7470A	642642
92555499007	**MW-5**	EPA 7470A	641399	EPA 7470A	642642
92555499008	**MW-6**	EPA 7470A	641399	EPA 7470A	642642
92555499009	**MW-7R**	EPA 7470A	641399	EPA 7470A	642642
92555499010	**MW-8**	EPA 7470A	641399	EPA 7470A	642642
92555499011	**MW-10**	EPA 7470A	641399	EPA 7470A	642642
92555499012	**MW-11**	EPA 7470A	641399	EPA 7470A	642642
92555499013	**MW-11D**	EPA 7470A	642996	EPA 7470A	643592
92555499014	**SW-1**	EPA 7470A	642996	EPA 7470A	643592
92555499015	**SW-2**	EPA 7470A	642996	EPA 7470A	643592
92555499016	**SW-4**	EPA 7470A	642996	EPA 7470A	643592
92555499017	**SW-5**	EPA 7470A	642996	EPA 7470A	643592
92555499018	**LEACHATE**	EPA 7470A	642996	EPA 7470A	643592
92555499019	**DUP**	EPA 7470A	642996	EPA 7470A	643592
92555499020	**EQBL**	EPA 7470A	642996	EPA 7470A	643592
92555499021	**SW-6**	EPA 7470A	642996	EPA 7470A	643592
92555499001	**BG-1**	EPA 903.1	460952		
92555499002	**BG-2**	EPA 903.1	460952		
92555499003	**MW-1**	EPA 903.1	460952		
92555499004	**MW-2**	EPA 903.1	460952		
92555499005	**MW-3**	EPA 903.1	460952		
92555499006	**MW-4**	EPA 903.1	460952		
92555499007	**MW-5**	EPA 903.1	460952		
92555499008	**MW-6**	EPA 903.1	460952		
92555499009	**MW-7R**	EPA 903.1	460952		
92555499010	**MW-8**	EPA 903.1	460952		
92555499011	**MW-10**	EPA 903.1	460952		
92555499012	**MW-11**	EPA 903.1	460952		
92555499013	**MW-11D**	EPA 903.1	460952		
92555499014	**SW-1**	EPA 903.1	460952		
92555499015	**SW-2**	EPA 903.1	460952		
92555499016	**SW-4**	EPA 903.1	460952		
92555499017	**SW-5**	EPA 903.1	460952		
92555499018	**LEACHATE**	EPA 903.1	460952		
92555499019	**DUP**	EPA 903.1	460952		
92555499020	**EQBL**	EPA 903.1	460952		
92555499021	**SW-6**	EPA 903.1	460961		
92555499001	**BG-1**	EPA 904.0	460953		
92555499002	**BG-2**	EPA 904.0	460953		
92555499003	**MW-1**	EPA 904.0	460953		
92555499004	**MW-2**	EPA 904.0	460953		
92555499005	**MW-3**	EPA 904.0	460953		
92555499006	**MW-4**	EPA 904.0	460953		
92555499007	**MW-5**	EPA 904.0	460953		
92555499008	**MW-6**	EPA 904.0	460953		
92555499009	**MW-7R**	EPA 904.0	460953		

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: Charah Q3 GW
Pace Project No.: 92555499

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
92555499010	MW-8	EPA 904.0	460953		
92555499011	MW-10	EPA 904.0	460953		
92555499012	MW-11	EPA 904.0	460953		
92555499013	MW-11D	EPA 904.0	460953		
92555499014	SW-1	EPA 904.0	460953		
92555499015	SW-2	EPA 904.0	460953		
92555499016	SW-4	EPA 904.0	460953		
92555499017	SW-5	EPA 904.0	460953		
92555499018	LEACHATE	EPA 904.0	460953		
92555499019	DUP	EPA 904.0	460953		
92555499020	EQBL	EPA 904.0	460953		
92555499021	SW-6	EPA 904.0	460962		
92555499001	BG-1	Total Radium Calculation	463277		
92555499002	BG-2	Total Radium Calculation	463277		
92555499003	MW-1	Total Radium Calculation	463277		
92555499004	MW-2	Total Radium Calculation	463277		
92555499005	MW-3	Total Radium Calculation	463277		
92555499006	MW-4	Total Radium Calculation	463277		
92555499007	MW-5	Total Radium Calculation	463277		
92555499008	MW-6	Total Radium Calculation	463277		
92555499009	MW-7R	Total Radium Calculation	463277		
92555499010	MW-8	Total Radium Calculation	463277		
92555499011	MW-10	Total Radium Calculation	463277		
92555499012	MW-11	Total Radium Calculation	463277		
92555499013	MW-11D	Total Radium Calculation	463277		
92555499014	SW-1	Total Radium Calculation	463277		
92555499015	SW-2	Total Radium Calculation	463277		
92555499016	SW-4	Total Radium Calculation	463277		
92555499017	SW-5	Total Radium Calculation	463277		
92555499018	LEACHATE	Total Radium Calculation	463277		
92555499019	DUP	Total Radium Calculation	463277		
92555499020	EQBL	Total Radium Calculation	463277		
92555499021	SW-6	Total Radium Calculation	464961		
92555499001	BG-1	SM 2540C-2011	640967		
92555499002	BG-2	SM 2540C-2011	641521		
92555499003	MW-1	SM 2540C-2011	640967		
92555499004	MW-2	SM 2540C-2011	640967		
92555499005	MW-3	SM 2540C-2011	641521		
92555499006	MW-4	SM 2540C-2011	641521		
92555499007	MW-5	SM 2540C-2011	640792		
92555499008	MW-6	SM 2540C-2011	641019		
92555499009	MW-7R	SM 2540C-2011	641019		
92555499010	MW-8	SM 2540C-2011	641019		
92555499011	MW-10	SM 2540C-2011	640792		

REPORT OF LABORATORY ANALYSIS

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Pace Analytical Services, LLC
9800 Kincey Ave. Suite 100
Huntersville, NC 28078
(704)875-9092

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: Charah Q3 GW
Pace Project No.: 92555499

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
92555499012	**MW-11**	SM 2540C-2011	641521		
92555499013	**MW-11D**	SM 2540C-2011	641521		
92555499014	**SW-1**	SM 2540C-2011	641521		
92555499015	**SW-2**	SM 2540C-2011	641521		
92555499016	**SW-4**	SM 2540C-2011	641707		
92555499017	**SW-5**	SM 2540C-2011	641707		
92555499018	**LEACHATE**	SM 2540C-2011	641707		
92555499019	**DUP**	SM 2540C-2011	641019		
92555499020	**EQBL**	SM 2540C-2011	641707		
92555499021	**SW-6**	SM 2540C-2011	641707		
92555499001	**BG-1**	EPA 300.0 Rev 2.1 1993	641058		
92555499002	**BG-2**	EPA 300.0 Rev 2.1 1993	641058		
92555499003	**MW-1**	EPA 300.0 Rev 2.1 1993	641058		
92555499004	**MW-2**	EPA 300.0 Rev 2.1 1993	641058		
92555499005	**MW-3**	EPA 300.0 Rev 2.1 1993	641058		
92555499006	**MW-4**	EPA 300.0 Rev 2.1 1993	641058		
92555499007	**MW-5**	EPA 300.0 Rev 2.1 1993	641058		
92555499008	**MW-6**	EPA 300.0 Rev 2.1 1993	641058		
92555499009	**MW-7R**	EPA 300.0 Rev 2.1 1993	641058		
92555499010	**MW-8**	EPA 300.0 Rev 2.1 1993	641058		
92555499011	**MW-10**	EPA 300.0 Rev 2.1 1993	641058		
92555499012	**MW-11**	EPA 300.0 Rev 2.1 1993	641058		
92555499013	**MW-11D**	EPA 300.0 Rev 2.1 1993	641058		
92555499014	**SW-1**	EPA 300.0 Rev 2.1 1993	641058		
92555499015	**SW-2**	EPA 300.0 Rev 2.1 1993	641058		
92555499016	**SW-4**	EPA 300.0 Rev 2.1 1993	641058		
92555499017	**SW-5**	EPA 300.0 Rev 2.1 1993	641058		
92555499018	**LEACHATE**	EPA 300.0 Rev 2.1 1993	641058		
92555499019	**DUP**	EPA 300.0 Rev 2.1 1993	641058		
92555499020	**EQBL**	EPA 300.0 Rev 2.1 1993	641058		
92555499021	**SW-6**	EPA 300.0 Rev 2.1 1993	641060		

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Pace Analytical®	Document Name: Sample Condition Upon Receipt(SCUR)	Document Revised: October 28, 2020 Page 1 of 2
	Document No.: F-CAR-CS-033-Rev.07	Issuing Authority: Pace Carolinas Quality Office

Laboratory receiving samples:

Asheville ☐ Eden ☐ Greenwood ☐ Huntersville ☒ Raleigh ☐ Mechanicsville ☐ Atlanta ☐ Kernersville ☐

Sample Condition Upon Receipt

Client Name: HDR **Proje**

WO# : 92555499

92555499

Courier: ☐ Commercial ☐ Fed Ex ☐ Pace ☐ UPS ☐ USPS ☐ Other:____ ☒ Client

Custody Seal Present? ☐ Yes ☒ No **Seals Intact?** ☐ Yes ☒ No

Date/Initials Person Examining Contents: 8-16-21

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☒ None ☐ Other

Biological Tissue Frozen? ☐ Yes ☐ No ☒ N/A

Thermometer: ☒ IR Gun ID: 92T064 ☐ Wet ☐ Blue ☐ None **Type of Ice:**

Cooler Temp: 3.8 **Correction Factor:** Add/Subtract (°C) -0.1

Cooler Temp Corrected (°C): 3.7

Temp should be above freezing to 6°C

☐ Samples out of temp criteria. Samples on ice, cooling process has begun

USDA Regulated Soil (☒ N/A, water sample)

Did samples originate in a quarantine zone within the United States: CA, NY, or SC (check maps)? ☐ Yes ☐ No

Did samples originate from a foreign source (Internationally, including Hawaii and Puerto Rico)? ☐ Yes ☐ No

				Comments/Discrepancy:
Chain of Custody Present?	☒ Yes	☐ No	☐ N/A	1.
Samples Arrived within Hold Time?	☒ Yes	☐ No	☐ N/A	2.
Short Hold Time Analysis (<72 hr.)?	☐ Yes	☒ No	☐ N/A	3.
Rush Turn Around Time Requested?	☐ Yes	☒ No	☐ N/A	4.
Sufficient Volume?	☒ Yes	☐ No	☐ N/A	5.
Correct Containers Used?	☒ Yes	☐ No	☐ N/A	6.
-Pace Containers Used?	☒ Yes	☐ No	☐ N/A	
Containers Intact?	☒ Yes	☐ No	☐ N/A	7.
Dissolved analysis: Samples Field Filtered?	☐ Yes	☒ No	☐ N/A	8.
Sample Labels Match COC?	☒ Yes	☐ No	☐ N/A	9.
-Includes Date/Time/ID/Analysis Matrix: WT				
Headspace in VOA Vials (>5-6mm)?	☐ Yes	☐ No	☒ N/A	10.
Trip Blank Present?	☐ Yes	☐ No	☒ N/A	11.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☒ N/A	

COMMENTS/SAMPLE DISCREPANCY

Field Data Required? ☐ Yes ☐ No

Lot ID of split containers:

CLIENT NOTIFICATION/RESOLUTION

Person contacted: _____ Date/Time: _____

Project Manager SCURF Review: _____ **Date:** _____

Project Manager SRF Review: _____ **Date:** _____

WO# : 92555499
PM: ATF Due Date: 08/20/21
CLIENT: 92-HDR

***Check mark top half of box if pH and/or dechlorination is verified and within the acceptance range for preservation samples.**

Proje

Exceptions: VOA, Coliform, TOC, Oil and Grease, DRO/8015 (water) DOC, LLHg

****Bottom half of box is to list number of bottles**

Item#	BP4U-125 mL Plastic Unpreserved (N/A) (Cl-)	BP3U-250 mL Plastic Unpreserved (N/A)	BP2U-500 mL Plastic Unpreserved (N/A)	BP1U-1 liter Plastic Unpreserved (N/A)	BP4S-125 mL Plastic H2SO4 (pH < 2) (Cl-)	BP3N-250 mL plastic HNO3 (pH < 2)	BP4Z-125 mL Plastic ZN Acetate & NaOH (>9)	BP4C-125 mL Plastic NaOH (pH > 12) (Cl-)	WGFU-Wide-mouthed Glass jar Unpreserved	AG1U-1 liter Amber Unpreserved (N/A) (Cl-)	AG1H-1 liter Amber HCl (pH < 2)	AG3U-250 mL Amber Unpreserved (N/A) (Cl-)	AG1S-1 liter Amber H2SO4 (pH < 2)	AG3S-250 mL Amber H2SO4 (pH < 2)	AG3A(DG3A)-250 mL Amber NH4Cl (N/A)(Cl-)	DG9H-40 mL VOA HCl (N/A)	VG9T-40 mL VOA Na2S2O3 (N/A)	VG9U-40 mL VOA Unp (N/A)	DG9P-40 mL VOA H3PO4 (N/A)	VOAK (6 vials per kit)-5035 kit (N/A)	V/GK (3 vials per kit)-VPH/Gas kit (N/A)	SP5T-125 mL Sterile Plastic (N/A – lab)	SP2T-250 mL Sterile Plastic (N/A – lab)	BIN	BP3A-250 mL Plastic (NH2)2SO4 (9.3-9.7)	AG0U-100 mL Amber Unpreserved vials (N/A)	VSGU-20 mL Scintillation vials (N/A)	DG9U-40 mL Amber Unpreserved vials (N/A)
1		1	1			1																		2				
2		1	1			1																		2				
3		1	1			1																		2				
4		1	1			1																		2				
5		1	1			1																		2				
6		1	1			1																		2				
7		1	1			1																		2				
8		1	1			1																		2				
9		1	1			1																		2				
10		1	1			1																		2				
11		1	1			1																		2				
12		1	1			1																		2				

pH Adjustment Log for Preserved Samples

Sample ID	Type of Preservative	pH upon receipt	Date preservation adjusted	Time preservation adjusted	Amount of Preservative added	Lot #

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. Out of hold, Incorrect preservative, out of temp, incorrect containers.

***Check mark top half of box if pH and/or dechlorination is verified and within the acceptance range for preservation samples.**

Exceptions: VOA, Coliform, TOC, Oil and Grease, DRO/8015 (water) DOC, LLHg

****Bottom half of box is to list number of bottles**

Project #

Item#	BP4U-125 mL Plastic Unpreserved (N/A) (Cl-)	BP3U-250 mL Plastic Unpreserved (N/A)	BP2U-500 mL Plastic Unpreserved (N/A)	BP1U-1 liter Plastic Unpreserved (N/A)	BP4S-125 mL Plastic H2SO4 (pH < 2) (Cl-)	BP3N-250 mL plastic HNO3 (pH < 2)	BP4Z-125 mL Plastic ZN Acetate & NaOH (>9)	BP4C-125 mL Plastic NaOH (pH > 12) (Cl-)	WGFU-Wide-mouthed Glass jar Unpreserved	AG1U-1 liter Amber Unpreserved (N/A) (Cl-)	AG1H-1 liter Amber HCl (pH < 2)	AG3U-250 mL Amber Unpreserved (N/A) (Cl-)	AG1S-1 liter Amber H2SO4 (pH < 2)	AG3S-250 mL Amber H2SO4 (pH < 2)	AG3A(DG3A)-250 mL Amber NH4Cl (N/A)(Cl-)	DG9H-40 mL VOA HCl (N/A)	VG9T-40 mL VOA Na2S2O3 (N/A)	VG9U-40 mL VOA Unp (N/A)	DG9P-40 mL VOA H3PO4 (N/A)	VOAK (6 vials per kit)-5035 kit (N/A)	V/GK (3 vials per kit)-VPH/Gas kit (N/A)	SP5T-125 mL Sterile Plastic (N/A – lab)	SP2T-250 mL Sterile Plastic (N/A – lab)	BP	BP3A-250 mL Plastic (NH2)2SO4 (9.3-9.7)	AG0U-100 mL Amber Unpreserved vials (N/A)	VSGU-20 mL Scintillation vials (N/A)	DG9U-40 mL Amber Unpreserved vials (N/A)
1	\	|	|		\	|	\	\			\		\	\	\									2	\	\		
2	\	|	|		\	|	\	\			\		\	\	\									2	\	\		
3	\	|	|		\	|	\	\			\		\	\	\									2	\	\		
4	\	|	|		\	|	\	\			\		\	\	\									2	\	\		
5	\	|	|		\	|	\	\			\		\	\	\									2	\	\		
6	\	|	|		\	|	\	\			\		\	\	\									2	\	\		
7	\	|	|		\	|	\	\			\		\	\	\									2	\	\		
8	\	|	|		\	|	\	\			\		\	\	\									2	\	\		
9	\	|	|		\	|	\	\			\		\	\	\									2	\	\		
10	\				\	\	\	\			\		\	\	\									\	\				
11	\				\	\	\	\			\		\	\	\									\	\				
12	\				\	\	\	\			\		\	\	\									\	\				

pH Adjustment Log for Preserved Samples

Sample ID	Type of Preservative	pH upon receipt	Date preservation adjusted	Time preservation adjusted	Amount of Preservative added	Lot #

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. Out of hold, incorrect preservative, out of temp, incorrect containers.

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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Submitting a sample via this chain of custody constitutes acknowledgment and acceptance of the Pace Terms and Conditions found at https://info.pacelabs.com/hubfs/pas-standard-terms.pdf.

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company:	HDR	Report To:	Mark Filardi / Charles Gruenberg	Attention:	
Address:	440 S. Church St	Copy To:		Company Name:	
	Suite 900, Charlotte, NC 28202			Address:	
Email:	mark.filardi@hdrinc.com	Purchase Order #:		Pace Quote:	
Phone:	(704)338-6787 Fax	Project Name:	Charah Q3 GW	Pace Project Manager:	tyler.forney@pacelabs.com,
Requested Due Date:		Project #:		Pace Profile #:	7672-1

Regulatory Agency: | State / Location: NC

MATRIX CODE: Drinking Water DW; Water WT; Waste Water WW; Product P; Soil/Solid SL; Oil OL; Wipe WP; Air AR; Other OT; Tissue TS

ITEM #	SAMPLE ID (One Character per box. (A-Z, 0-9 / , -) Sample Ids must be unique)	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED START DATE	COLLECTED START TIME	COLLECTED END DATE	COLLECTED END TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H2SO4	HNO3	HCl	NaOH	Na2S2O3	Methanol	Other	Analyses Test Y/N	6010/6020/7470	Cl, F, SO4	TDS	903.1/904.0 + Total Rad	Residual Chlorine (Y/N)	92555499
1	BG-1	WT	G	8/10/21	1900				5	2		3						X	X	X	X			001
2	BG-2	WT	G	8/12/21	1815													X	X	X	X			002
3	MW-1	WT	G	8/10/21	0905				5	2		3						X	X	X	X			003
4	MW-2	WT	G	8/10/21	1502				5	2		3						X	X	X	X			004
5	MW-2D	WT																X	X	X	X			
6	MW-3	WT	G	8/11/21	1550				5	2		3						X	X	X	X			005
7	MW-4	WT	G	8/12/21	1405				5	2		3						X	X	X	X			006
8	MW-5	WT	G	8/9/21	1705				5	2		3						X	X	X	X			007
9	MW-6	WT	G	8/11/21	1720				5	2		3						X	X	X	X			008
10	MW-7R	WT	G	8/11/21	1345				5	2		3						X	X	X	X			009
11	MW-8	WT	G	8/11/21	0955				5	2		3						X	X	X	X			010
12	MW-9	WT																X	X	X	X			

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
	HDR	8/13/21	1548	Pace Huntersville	8-13-21	15.48	3.7	Y	N	Y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Charles Gruenberg

SIGNATURE of SAMPLER: [signature] DATE Signed: 08/13/21

TEMP in C | Received on Ice (Y/N) | Custody Sealed Cooler (Y/N) | Samples Intact (Y/N)

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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Submitting a sample via this chain of custody constitutes acknowledgment and acceptance of the Pace Terms and Conditions found at https://info.pacelabs.com/hubfs/pas-standard-terms.pdf.

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company:	HDR	Report To:	Mark Filardi / Charles Gruenberg	Attention:	
Address:	440 S. Church St	Copy To:		Company Name:	
Suite 900, Charlotte, NC 28202				Address:	
Email:	mark.filardi@hdrinc.com	Purchase Order #:		Pace Quote:	
Phone:	(704)338-6787 Fax	Project Name:	Charah Q3 GW	Pace Project Manager:	tyler.forney@pacelabs.com,
Requested Due Date:		Project #:		Pace Profile #:	7672-1

Regulatory Agency	
State / Location	NC

MATRIX CODE: Drinking Water DW; Water WT; Waste Water WW; Product P; Soil/Solid SL; Oil OL; Wipe WP; Air AR; Other OT; Tissue TS

ITEM #	SAMPLE ID (One Character per box. (A-Z, 0-9 / , -) Sample Ids must be unique)	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED START DATE	COLLECTED START TIME	COLLECTED END DATE	COLLECTED END TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H2SO4	HNO3	HCl	NaOH	Na2S2O3	Methanol	Other	Analyses Test Y/N	6010/6020/7470	Cl, F, SO4	TDS	903.1/904.0 + Total Rad	Residual Chlorine (Y/N)	
13	MW-10	WT	G	8/10/21	1320				5	2		3						X	X	X	X			011
14	MW-11	WT	G	8/12/21	0920				5	2		3						X	X	X	X			012
15	MW-11D	WT	G	8/12/21	1120				5	2		3						X	X	X	X			013
16	SW-1	WT	G	8/13/21	0859				5	2		3						X	X	X	X			014
17	SW-2	WT	G	8/13/21	0725				5	2		3						X	X	X	X			015
18	SW-3	WT																X	X	X	X			—
19	SW-4	WT	G	8/13/21	0830				5	2		3						X	X	X	X			016
20	SW-5	WT	G	8/13/21	1300				5	2		3						X	X	X	X			017
21	LEACHATE	WT	G	8/13/21	0808				5	2		3						X	X	X	X			018
22	DUP	WT	G	8/11/21	1730				5	2		3						X	X	X	X			019
23	EQBL	WT	G	8/13/21	1240				5	2		3						X	X	X	X			020
24	SW-6	WT	G	8/13/21	0915				5	2		3						X	X	X	X			021

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
	CMGR / HDR	8/13/21	1548	Pace Mathews Labs	8-13-21	1548	3.7	Y	U	Y

SAMPLER NAME AND SIGNATURE					
PRINT Name of SAMPLER:	Charles Gruenberg				
SIGNATURE of SAMPLER:		DATE Signed:	08/13/21		

TEMP in C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)

Pace Analytical Services, LLC
9800 Kincey Ave. Suite 100
Huntersville, NC 28078
(704)875-9092

August 30, 2021

Mark Filardi
HDR
440 S. Church St
Suite 900
Charlotte, NC 28202

RE: Project: Charah Q3 GW
Pace Project No.: 92555580

Dear Mark Filardi:

Enclosed are the analytical results for sample(s) received by the laboratory on August 16, 2021. The results relate only to the samples included in this report. Results reported herein conform to the applicable TNI/NELAC Standards and the laboratory's Quality Manual, where applicable, unless otherwise noted in the body of the report.

The test results provided in this final report were generated by each of the following laboratories within the Pace Network:

- Pace Analytical Services - Asheville
- Pace Analytical Services - Greensburg

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Tyler Forney
tyler.forney@pacelabs.com
(704)875-9092
Project Manager

Enclosures

cc: Charles Gruenberg
Mike Plummer, HDR
Jacob Ruffing

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Pace Analytical Services, LLC
9800 Kincey Ave. Suite 100
Huntersville, NC 28078
(704)875-9092

CERTIFICATIONS

Project: Charah Q3 GW
Pace Project No.: 92555580

Pace Analytical Services Pennsylvania

1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601
ANAB DOD-ELAP Rad Accreditation #: L2417
Alabama Certification #: 41590
Arizona Certification #: AZ0734
Arkansas Certification
California Certification #: 04222CA
Colorado Certification #: PA01547
Connecticut Certification #: PH-0694
Delaware Certification
EPA Region 4 DW Rad
Florida/TNI Certification #: E87683
Georgia Certification #: C040
Guam Certification
Florida: Cert E871149 SEKS WET
Hawaii Certification
Idaho Certification
Illinois Certification
Indiana Certification
Iowa Certification #: 391
Kansas/TNI Certification #: E-10358
Kentucky Certification #: KY90133
KY WW Permit #: KY0098221
KY WW Permit #: KY0000221
Louisiana DHH/TNI Certification #: LA180012
Louisiana DEQ/TNI Certification #: 4086
Maine Certification #: 2017020
Maryland Certification #: 308
Massachusetts Certification #: M-PA1457
Michigan/PADEP Certification #: 9991
Missouri Certification #: 235
Montana Certification #: Cert0082
Nebraska Certification #: NE-OS-29-14
Nevada Certification #: PA014572018-1
New Hampshire/TNI Certification #: 297617
New Jersey/TNI Certification #: PA051
New Mexico Certification #: PA01457
New York/TNI Certification #: 10888
North Carolina Certification #: 42706
North Dakota Certification #: R-190
Ohio EPA Rad Approval: #41249
Oregon/TNI Certification #: PA200002-010
Pennsylvania/TNI Certification #: 65-00282
Puerto Rico Certification #: PA01457
Rhode Island Certification #: 65-00282
South Dakota Certification
Tennessee Certification #: 02867
Texas/TNI Certification #: T104704188-17-3
Utah/TNI Certification #: PA014572017-9
USDA Soil Permit #: P330-17-00091
Vermont Dept. of Health: ID# VT-0282
Virgin Island/PADEP Certification
Virginia/VELAP Certification #: 9526
Washington Certification #: C868
West Virginia DEP Certification #: 143
West Virginia DHHR Certification #: 9964C
Wisconsin Approve List for Rad
Wyoming Certification #: 8TMS-L

Pace Analytical Services Asheville

2225 Riverside Drive, Asheville, NC 28804
Florida/NELAP Certification #: E87648
North Carolina Drinking Water Certification #: 37712
North Carolina Wastewater Certification #: 40
South Carolina Certification #: 99030001
Virginia/VELAP Certification #: 460222

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Huntersville, NC 28078
(704)875-9092

SAMPLE SUMMARY

Project: Charah Q3 GW
Pace Project No.: 92555580

Lab ID	Sample ID	Matrix	Date Collected	Date Received
92555580001	**MW-2D**	Water	08/16/21 09:30	08/16/21 13:05

REPORT OF LABORATORY ANALYSIS

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Pace Analytical Services, LLC
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Huntersville, NC 28078
(704)875-9092

SAMPLE ANALYTE COUNT

Project: Charah Q3 GW
Pace Project No.: 92555580

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
92555580001	**MW-2D**	EPA 6010D	CBV, SH1	16	PASI-A
		EPA 6020B	CRW	3	PASI-A
		EPA 7470A	RDT	1	PASI-A
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	RMK	1	PASI-PA
		SM 2540C-2011	ZMC	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	3	PASI-A

PASI-A = Pace Analytical Services - Asheville
PASI-PA = Pace Analytical Services - Greensburg

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SUMMARY OF DETECTION

Project: Charah Q3 GW
Pace Project No.: 92555580

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92555580001	**MW-2D**					
EPA 6010D	Antimony	3.0J	ug/L	5.0	08/20/21 04:11	
EPA 6010D	Arsenic	5.4J	ug/L	10.0	08/20/21 04:11	
EPA 6010D	Barium	1240	ug/L	5.0	08/20/21 04:11	
EPA 6010D	Calcium	96800	ug/L	100	08/20/21 04:11	
EPA 6010D	Molybdenum	14.8	ug/L	5.0	08/20/21 04:11	
EPA 6010D	Nickel	7.1	ug/L	5.0	08/20/21 04:11	
EPA 903.1	Radium-226	0.244 ± 0.415 (0.732) C:NA T:99%	pCi/L		08/25/21 13:02	
EPA 904.0	Radium-228	1.40 ± 0.477 (0.654) C:82% T:83%	pCi/L		08/24/21 11:15	
Total Radium Calculation	Total Radium	1.64 ± 0.892 (1.39)	pCi/L		08/26/21 09:01	
SM 2540C-2011	Total Dissolved Solids	1460	mg/L	125	08/19/21 19:03	
EPA 300.0 Rev 2.1 1993	Chloride	752	mg/L	16.0	08/19/21 05:24	
EPA 300.0 Rev 2.1 1993	Sulfate	1.0	mg/L	1.0	08/18/21 20:58	

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ANALYTICAL RESULTS

Project: Charah Q3 GW
Pace Project No.: 92555580

Sample: MW-2D **Lab ID: 92555580001** Collected: 08/16/21 09:30 Received: 08/16/21 13:05 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Antimony	**3.0J**	ug/L	5.0	3.0	1	08/19/21 14:20	08/20/21 04:11	7440-36-0	
Arsenic	**5.4J**	ug/L	10.0	4.7	1	08/19/21 14:20	08/20/21 04:11	7440-38-2	
Barium	**1240**	ug/L	5.0	3.5	1	08/19/21 14:20	08/20/21 04:11	7440-39-3	
Beryllium	ND	ug/L	1.0	0.70	1	08/19/21 14:20	08/20/21 04:11	7440-41-7	
Cadmium	ND	ug/L	1.0	0.40	1	08/19/21 14:20	08/20/21 04:11	7440-43-9	
Calcium	**96800**	ug/L	100	94.2	1	08/19/21 14:20	08/20/21 04:11	7440-70-2	
Chromium	ND	ug/L	5.0	3.7	1	08/19/21 14:20	08/20/21 04:11	7440-47-3	
Cobalt	ND	ug/L	5.0	3.6	1	08/19/21 14:20	08/20/21 04:11	7440-48-4	
Copper	ND	ug/L	5.0	4.3	1	08/19/21 14:20	08/20/21 04:11	7440-50-8	
Lead	ND	ug/L	5.0	4.5	1	08/19/21 14:20	08/20/21 04:11	7439-92-1	
Molybdenum	**14.8**	ug/L	5.0	3.9	1	08/19/21 14:20	08/20/21 04:11	7439-98-7	
Nickel	**7.1**	ug/L	5.0	3.5	1	08/19/21 14:20	08/20/21 04:11	7440-02-0	
Selenium	ND	ug/L	10.0	4.7	1	08/19/21 14:20	08/20/21 04:11	7782-49-2	
Silver	ND	ug/L	5.0	2.5	1	08/19/21 14:20	08/20/21 04:11	7440-22-4	
Vanadium	ND	ug/L	5.0	3.9	1	08/19/21 14:20	08/20/21 04:11	7440-62-2	
Zinc	ND	ug/L	10.0	9.5	1	08/19/21 14:20	08/20/21 15:27	7440-66-6	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Boron	ND	ug/L	50.0	8.5	1	08/24/21 10:47	08/27/21 11:58	7440-42-8	
Lithium	ND	ug/L	2.5	0.50	1	08/24/21 10:47	08/27/21 11:58	7439-93-2	
Thallium	ND	ug/L	0.47	0.050	1	08/24/21 10:47	08/27/21 11:58	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	ND	ug/L	0.20	0.12	1	08/26/21 17:00	08/30/21 14:22	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**1460**	mg/L	125	125	1		08/19/21 19:03		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**752**	mg/L	16.0	9.6	16		08/19/21 05:24	16887-00-6	
Fluoride	ND	mg/L	0.10	0.050	1		08/18/21 20:58	16984-48-8	
Sulfate	**1.0**	mg/L	1.0	0.50	1		08/18/21 20:58	14808-79-8	

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QUALITY CONTROL DATA

Project: Charah Q3 GW
Pace Project No.: 92555580

QC Batch: 642996
QC Batch Method: EPA 7470A
Analysis Method: EPA 7470A
Analysis Description: 7470 Mercury
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92555580001

METHOD BLANK: 3374076 Matrix: Water
Associated Lab Samples: 92555580001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury	ug/L	ND	0.20	0.12	08/30/21 13:33	

LABORATORY CONTROL SAMPLE: 3374077

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	2.5	2.4	98	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3374078 3374079

Parameter	Units	92555499013 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ug/L	ND	2.5	2.5	2.5	2.3	99	91	75-125	8	25	

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QUALITY CONTROL DATA

Project: Charah Q3 GW
Pace Project No.: 92555580

QC Batch: 641551
QC Batch Method: EPA 3010A
Analysis Method: EPA 6010D
Analysis Description: 6010 MET
Laboratory: Pace Analytical Services - Asheville

Associated Lab Samples: 92555580001

METHOD BLANK: 3367164 Matrix: Water
Associated Lab Samples: 92555580001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Antimony	ug/L	ND	5.0	3.0	08/20/21 03:34	
Arsenic	ug/L	ND	10.0	4.7	08/20/21 03:34	
Barium	ug/L	ND	5.0	3.5	08/20/21 03:34	
Beryllium	ug/L	ND	1.0	0.70	08/20/21 03:34	
Cadmium	ug/L	ND	1.0	0.40	08/20/21 03:34	
Calcium	ug/L	ND	100	94.2	08/20/21 03:34	
Chromium	ug/L	ND	5.0	3.7	08/20/21 03:34	
Cobalt	ug/L	ND	5.0	3.6	08/20/21 03:34	
Copper	ug/L	ND	5.0	4.3	08/20/21 03:34	
Lead	ug/L	ND	5.0	4.5	08/20/21 03:34	
Molybdenum	ug/L	ND	5.0	3.9	08/20/21 03:34	
Nickel	ug/L	ND	5.0	3.5	08/20/21 03:34	
Selenium	ug/L	ND	10.0	4.7	08/20/21 03:34	
Silver	ug/L	ND	5.0	2.5	08/20/21 03:34	
Vanadium	ug/L	ND	5.0	3.9	08/20/21 03:34	
Zinc	ug/L	ND	10.0	9.5	08/20/21 15:21	

LABORATORY CONTROL SAMPLE: 3367165

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	500	465	93	80-120	
Arsenic	ug/L	500	486	97	80-120	
Barium	ug/L	500	478	96	80-120	
Beryllium	ug/L	500	475	95	80-120	
Cadmium	ug/L	500	468	94	80-120	
Calcium	ug/L	5000	4600	92	80-120	
Chromium	ug/L	500	500	100	80-120	
Cobalt	ug/L	500	443	89	80-120	
Copper	ug/L	500	504	101	80-120	
Lead	ug/L	500	461	92	80-120	
Molybdenum	ug/L	500	499	100	80-120	
Nickel	ug/L	500	477	95	80-120	
Selenium	ug/L	500	426	85	80-120	
Silver	ug/L	250	239	95	80-120	
Vanadium	ug/L	500	486	97	80-120	
Zinc	ug/L	500	475	95	80-120	

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QUALITY CONTROL DATA

Project: Charah Q3 GW
Pace Project No.: 92555580

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3367166 3367167

Parameter	Units	92555236001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Antimony	ug/L	24.9	500	500	471	470	89	89	75-125	0	20	
Arsenic	ug/L	ND	500	500	536	544	107	108	75-125	2	20	
Barium	ug/L	39.4	500	500	508	512	94	95	75-125	1	20	
Beryllium	ug/L	ND	500	500	455	457	91	91	75-125	0	20	
Cadmium	ug/L	ND	500	500	485	488	97	98	75-125	1	20	
Calcium	ug/L	52600	5000	5000	56600	56900	80	85	75-125	0	20	
Chromium	ug/L	18.4	500	500	507	511	98	98	75-125	1	20	
Cobalt	ug/L	26.4	500	500	414	417	77	78	75-125	1	20	
Copper	ug/L	10.9	500	500	518	518	101	101	75-125	0	20	
Lead	ug/L	ND	500	500	387	387	77	77	75-125	0	20	
Molybdenum	ug/L	138	500	500	601	606	93	94	75-125	1	20	
Nickel	ug/L	16.0	500	500	431	436	83	84	75-125	1	20	
Selenium	ug/L	ND	500	500	481	484	96	96	75-125	0	20	
Silver	ug/L	ND	250	250	264	266	106	106	75-125	1	20	
Vanadium	ug/L	ND	500	500	501	503	99	100	75-125	0	20	
Zinc	ug/L	ND	500	500	419	423	82	83	75-125	1	20	

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QUALITY CONTROL DATA

Project: Charah Q3 GW
Pace Project No.: 92555580

QC Batch: 642159
QC Batch Method: EPA 3010A
Analysis Method: EPA 6020B
Analysis Description: 6020 MET
Laboratory: Pace Analytical Services - Asheville

Associated Lab Samples: 92555580001

METHOD BLANK: 3370242 Matrix: Water
Associated Lab Samples: 92555580001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Boron	ug/L	ND	50.0	8.5	08/26/21 14:00	
Lithium	ug/L	ND	2.5	0.50	08/26/21 14:00	
Thallium	ug/L	ND	0.47	0.050	08/26/21 14:00	

LABORATORY CONTROL SAMPLE: 3370243

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Boron	ug/L	50	46.8J	94	80-120	
Lithium	ug/L	50	51.2	102	80-120	
Thallium	ug/L	25	23.9	96	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3370244 3370245

Parameter	Units	92552921015 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Boron	ug/L	ND	50	50	48.5J	52.4	89	97	75-125		20	
Lithium	ug/L	19.9	50	50	71.3	72.9	103	106	75-125	2	20	
Thallium	ug/L	ND	25	25	24.6	24.8	98	99	75-125	0	20	

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QUALITY CONTROL DATA

Project: Charah Q3 GW
Pace Project No.: 92555580

QC Batch: 641707
QC Batch Method: SM 2540C-2011
Analysis Method: SM 2540C-2011
Analysis Description: 2540C Total Dissolved Solids
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92555580001

METHOD BLANK: 3368042 Matrix: Water
Associated Lab Samples: 92555580001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	ND	25.0	25.0	08/19/21 19:01	

LABORATORY CONTROL SAMPLE: 3368043

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	250	242	97	90-110	

SAMPLE DUPLICATE: 3368044

Parameter	Units	92555597001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	214	214	0	25	H1

SAMPLE DUPLICATE: 3368045

Parameter	Units	92555499021 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	1550	1650	6	25	

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QUALITY CONTROL DATA

Project: Charah Q3 GW
Pace Project No.: 92555580

QC Batch: 641060
QC Batch Method: EPA 300.0 Rev 2.1 1993
Analysis Method: EPA 300.0 Rev 2.1 1993
Analysis Description: 300.0 IC Anions
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92555580001

METHOD BLANK: 3364714 Matrix: Water
Associated Lab Samples: 92555580001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	ND	1.0	0.60	08/18/21 19:41	
Fluoride	mg/L	ND	0.10	0.050	08/18/21 19:41	
Sulfate	mg/L	ND	1.0	0.50	08/18/21 19:41	

LABORATORY CONTROL SAMPLE: 3364715

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	50	49.6	99	90-110	
Fluoride	mg/L	2.5	2.5	101	90-110	
Sulfate	mg/L	50	48.4	97	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3364716 3364717

Parameter	Units	92555499021 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	ND	50	50	44.5	44.2	82	82	90-110	1	10	M1
Fluoride	mg/L	0.52J	2.5	2.5	2.0	2.1	58	62	90-110	5	10	M1
Sulfate	mg/L	ND	50	50	37.6	35.2	74	69	90-110	7	10	M1

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: Charah Q3 GW
Pace Project No.: 92555580

Sample: MW-2D **Lab ID: 92555580001** Collected: 08/16/21 09:30 Received: 08/16/21 13:05 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.244 ± 0.415 (0.732) C:NA T:99%**	pCi/L	08/25/21 13:02	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**1.40 ± 0.477 (0.654) C:82% T:83%**	pCi/L	08/24/21 11:15	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**1.64 ± 0.892 (1.39)**	pCi/L	08/26/21 09:01	7440-14-4	

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QUALITY CONTROL - RADIOCHEMISTRY

Project: Charah Q3 GW
Pace Project No.: 92555580

QC Batch: 460742
QC Batch Method: EPA 903.1
Analysis Method: EPA 903.1
Analysis Description: 903.1 Radium-226
Laboratory: Pace Analytical Services - Greensburg
Associated Lab Samples: 92555580001

METHOD BLANK: 2224773
Matrix: Water
Associated Lab Samples: 92555580001

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	0.0498 ± 0.293 (0.598) C:NA T:94%	pCi/L	08/25/21 13:02	

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QUALITY CONTROL - RADIOCHEMISTRY

Project: Charah Q3 GW
Pace Project No.: 92555580

QC Batch: 460744
QC Batch Method: EPA 904.0
Analysis Method: EPA 904.0
Analysis Description: 904.0 Radium 228
Laboratory: Pace Analytical Services - Greensburg
Associated Lab Samples: 92555580001

METHOD BLANK: 2224778
Matrix: Water
Associated Lab Samples: 92555580001

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	0.929 ± 0.398 (0.638) C:78% T:86%	pCi/L	08/24/21 11:15	

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QUALIFIERS

Project: Charah Q3 GW
Pace Project No.: 92555580

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

Acid preservation may not be appropriate for 2 Chloroethylvinyl ether.

A separate vial preserved to a pH of 4-5 is recommended in SW846 Chapter 4 for the analysis of Acrolein and Acrylonitrile by EPA Method 8260.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Act - Activity

Unc - Uncertainty: SDWA = 1.96 sigma count uncertainty, all other matrices = Expanded Uncertainty (95% confidence interval). Gamma Spec = Expanded Uncertainty (95.4% Confidence Interval)

(MDC) - Minimum Detectable Concentration

Trac - Tracer Recovery (%)

Carr - Carrier Recovery (%)

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TNI - The NELAC Institute.

ANALYTE QUALIFIERS

H1	Analysis conducted outside the EPA method holding time.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: Charah Q3 GW
Pace Project No.: 92555580

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
92555580001	**MW-2D**	EPA 3010A	641551	EPA 6010D	641720
92555580001	**MW-2D**	EPA 3010A	642159	EPA 6020B	642644
92555580001	**MW-2D**	EPA 7470A	642996	EPA 7470A	643592
92555580001	**MW-2D**	EPA 903.1	460742		
92555580001	**MW-2D**	EPA 904.0	460744		
92555580001	**MW-2D**	Total Radium Calculation	461739		
92555580001	**MW-2D**	SM 2540C-2011	641707		
92555580001	**MW-2D**	EPA 300.0 Rev 2.1 1993	641060		

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CHAIN-OF-CUSTODY Analytical Request Document

Pace Analytical

Chain-of-Custody is a LEGAL DOCUMENT - Complete all relevent fields

LAB USE ONLY- Affix Wo

WO# : 92555580

92555580

ALL SHA

Company: HDR	Billing Information: HDR 440 S. Church Street Suite 900 Charlotte, NC 28202
Address: 440 S. Church St, Suite 900, Charlotte, NC 28202	
Report To: Mark Filardi	Email To: mark.filardi@hdrinc.com
Copy To: Charles Greenberg	Site Collection Info/Address: Charah
Customer Project Name/Number: Charah Q3 GW	State: NC / County/City: Moncure / Time Zone Collected: [ ] PT [ ] MT [ ] CT [ ] ET
Phone: 704 338 6767 Email: mark.filardi@hdrinc.com	Site/Facility ID #: Charah / Compliance Monitoring? [ ] Yes [ ] No
Collected By (print): Charles Greenberg	Purchase Order #: / Quote #: / DW PWS ID #: / DW Location Code:
Collected By (signature):	Turnaround Date Required: / Immediately Packed on Ice: [X] Yes [ ] No
Sample Disposal: [ ] Dispose as appropriate [ ] Return [ ] Archive: [ ] Hold:	Rush: [ ] Same Day [ ] Next Day [ ] 2 Day [ ] 3 Day [ ] 4 Day [ ] 5 Day (Expedite Charges Apply) / Field Filtered (if applicable): [ ] Yes [X] No / Analysis:

* Matrix Codes (Insert in Matrix box below): Drinking Water (DW), Ground Water (GW), Wastewater (WW), Product (P), Soil/Solid (SL), Oil (OL), Wipe (WP), Air (AR), Tissue (TS), Bioassay (B), Vapor (V), Other (OT)

Customer Sample ID	Matrix *	Comp / Grab	Collected (or Composite Start) Date	Collected (or Composite Start) Time	Composite End Date	Composite End Time	Res Cl	# of Ctns	Analyses: 6010/6020/7470	Cl, F, SO4	TDS	903.1/904.0 + Total Rad
MW-20	WT	G	8/16/21	0930				5	X	X	X	X

Container Preservative Type: 1 U U 1

** Preservative Types: (1) nitric acid, (2) sulfuric acid, (3) hydrochloric acid, (4) sodium hydroxide, (5) zinc acetate, (6) methanol, (7) sodium bisulfate, (8) sodium thiosulfate, (9) hexane, (A) ascorbic acid, (B) ammonium sulfate, (C) ammonium hydroxide, (D) TSP, (U) Unpreserved, (O) Other _____

Lab Profile/Line:

Lab Sample Receipt Checklist:

Custody Seals Present/Intact	Y (N) NA
Custody Signatures Present	Y N (NA)
Collector Signature Present	(Y) N NA
Bottles Intact	(Y) N NA
Correct Bottles	(Y) N NA
Sufficient Volume	(Y) N NA
Samples Received on Ice	(Y) N NA
VOA - Headspace Acceptable	Y N (NA)
USDA Regulated Soils	Y N (NA)
Samples in Holding Time	(Y) N NA
Residual Chlorine Present	Y N (NA)
Cl Strips:	
Sample pH Acceptable	(Y) N NA
pH Strips: 223819AV	
Sulfide Present	Y N (NA)
Lead Acetate Strips:	

LAB USE ONLY:
Lab Sample # / Comments:
92555580
001

Customer Remarks / Special Conditions / Possible Hazards:

Type of Ice Used: (Wet) Blue Dry None

Packing Material Used: None

Radchem sample(s) screened (<500 cpm): Y N (NA)

SHORT HOLDS PRESENT (<72 hours): Y (N) N/A

Lab Tracking #: 2546326

Samples received via: FEDEX UPS (Client) Courier Pace Courier

Lab Sample Temperature Info:
Temp Blank Received: Y (N) NA
Therm ID#: 211064
Cooler 1 Temp Upon Receipt: 3.7 oC
Cooler 1 Therm Corr. Factor: -.1 oC
Cooler 1 Corrected Temp: 3.6 oC
Comments:

Relinquished by/Company: (Signature) (HDR)	Date/Time: 8/16/21 1305	Received by/Company: (Signature) PACE HVL
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)

Date/Time: 8/16/21 13:05	MTJL LAB USE ONLY
Date/Time:	Table #:
Date/Time:	Acctnum:
	Template:
	Prelogin:
	PM:
	PB:

Trip Blank Received: Y (N) NA
HCL MeOH TSP Other

Non Conformance(s): YES / (NO)

Page: _____ of: _____

Pace Analytical

CHAIN-OF-CUSTODY Analytical Request Document

Chain-of-Custody is a LEGAL DOCUMENT - Complete all relevent fields

LAB USE ONLY- Affix Workorder/Login Label Here or List Pace Workorder Number or MTJL Log-in Number Here

ALL SHADED AREAS are for LAB USE ONLY

Company: HDR		Billing Information: HDR 4440 S. Church Street Suite 900 Charlotte, NC 28202	
Address: 4440 S. Church St, Suite 900, Charlotte, NC 28201			
Report To: Mark Filardi		Email To: mark.filardi@hdrinc.com	
Copy To: Charles Greenberg		Site Collection Info/Address: Cherah	
Customer Project Name/Number: Cherah Q3 GW		State: NC / County/City: Marcus	Time Zone Collected: [ ] PT [ ] MT [ ] CT [ ] ET
Phone: 704 338 6787 Email: mark.filardi@hdrinc.com	Site/Facility ID #: Cherah		Compliance Monitoring? [ ] Yes [ ] No
Collected By (print): Charles Greenberg	Purchase Order #: Quote #:		DW PWS ID #: DW Location Code:
Collected By (signature):	Turnaround Date Required:		Immediately Packed on Ice: [X] Yes [ ] No
Sample Disposal: [ ] Dispose as appropriate [ ] Return [ ] Archive: _____ [ ] Hold: _____	Rush: [ ] Same Day [ ] Next Day [ ] 2 Day [ ] 3 Day [ ] 4 Day [ ] 5 Day (Expedite Charges Apply)		Field Filtered (if applicable): [ ] Yes [X] No Analysis: _____

* Matrix Codes (Insert in Matrix box below): Drinking Water (DW), Ground Water (GW), Wastewater (WW), Product (P), Soil/Solid (SL), Oil (OL), Wipe (WP), Air (AR), Tissue (TS), Bioassay (B), Vapor (V), Other (OT)

Container Preservative Type **: V U V I

** Preservative Types: (1) nitric acid, (2) sulfuric acid, (3) hydrochloric acid, (4) sodium hydroxide, (5) zinc acetate, (6) methanol, (7) sodium bisulfate, (8) sodium thiosulfate, (9) hexane, (A) ascorbic acid, (B) ammonium sulfate, (C) ammonium hydroxide, (D) TSP, (U) Unpreserved, (O) Other _____

Lab Project Manager:

Customer Sample ID	Matrix *	Comp / Grab	Collected (or Composite Start) Date	Collected (or Composite Start) Time	Composite End Date	Composite End Time	Res Cl	# of Ctns	Analyses: 6010/6020/7470	Cl, F, SO4	TDS	903.1/904.0 + Total Rad
MW-20	WT	G	8/16/21	0930				5	X	X	X	X

Lab Profile/Line:

Lab Sample Receipt Checklist:

Custody Seals Present/Intact	Y N NA
Custody Signatures Present	Y N NA
Collector Signature Present	Y N NA
Bottles Intact	Y N NA
Correct Bottles	Y N NA
Sufficient Volume	Y N NA
Samples Received on Ice	Y N NA
VOA - Headspace Acceptable	Y N NA
USDA Regulated Soils	Y N NA
Samples in Holding Time	Y N NA
Residual Chlorine Present	Y N NA
Cl Strips: _____	
Sample pH Acceptable	Y N NA
pH Strips: _____	
Sulfide Present	Y N NA
Lead Acetate Strips: _____	

LAB USE ONLY:
Lab Sample # / Comments:
92555580
001

Customer Remarks / Special Conditions / Possible Hazards:

Type of Ice Used: Wet Blue Dry None

Packing Material Used: None

Radchem sample(s) screened (<500 cpm): Y N NA

SHORT HOLDS PRESENT (<72 hours): Y N N/A

Lab Tracking #: 2546326

Samples received via: FEDEX UPS Client Courier Pace Courier

Lab Sample Temperature Info:
Temp Blank Received: Y N NA
Therm ID#: 211064
Cooler 1 Temp Upon Receipt: 2.7 oC
Cooler 1 Therm Corr. Factor: 0.0 oC
Cooler 1 Corrected Temp: 2.7 oC
Comments:

Relinquished by/Company: (Signature) (HDR)	Date/Time: 8/16/21 1305	Received by/Company: (Signature) PACE HVL	Date/Time: 8/16/21 13:05
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:

MTJL LAB USE ONLY
Table #:
Acctnum:
Template:
Prelogin:
PM:
PB:

Trip Blank Received: Y N NA
HCL MeOH TSP Other

Non Conformance(s): YES / NO

Page: _____ of: _____

***Check mark top half of box if pH and/or dechlorination is verified and within the acceptance range for preservation samples.**

Exceptions: VOA, Coliform, TOC, Oil and Grease, DRO/8015 (water) DOC, LLHg

****Bottom half of box is to list number of bottles**

Item#	BP4U-125 mL Plastic Unpreserved (N/A) (Cl-)	BP3U-250 mL Plastic Unpreserved (N/A)	BP2U-500 mL Plastic Unpreserved (N/A)	BP1U-1 liter Plastic Unpreserved (N/A)	BP4S-125 mL Plastic H2SO4 (pH < 2) (Cl-)	BP3N-250 mL plastic HNO3 (pH < 2)	BP4Z-125 mL Plastic ZN Acetate & NaOH (>9)	BP4C-125 mL Plastic NaOH (pH > 12) (Cl-)	WGFU-Wide-mouthed Glass jar Unpreserved	AG1U-1 liter Amber Unpreserved (N/A) (Cl-)	AG1H-1 liter Amber HCl (pH < 2)	AG3U-250 mL Amber Unpreserved (N/A) (Cl-)	AG1S-1 liter Amber H2SO4 (pH < 2)	AG3S-250 mL Amber H2SO4 (pH < 2)	AG3A(DG3A)-250 mL Amber NH4Cl (N/A)(Cl-)	DG9H-40 mL VOA HCl (N/A)	VG9T-40 mL VOA Na2S2O3 (N/A)	VG9U-40 mL VOA Unp (N/A)	DG9P-40 mL VOA H3PO4 (N/A)	VOAK (6 vials per kit)-5035 kit (N/A)	V/GK (3 vials per kit)-VPH/Gas kit (N/A)	SP5T-125 mL Sterile Plastic (N/A – lab)	SP2T-250 mL Sterile Plastic (N/A – lab)	BP1N	BP3A-250 mL Plastic (NH2)2SO4 (9.3-9.7)	AG0U-100 mL Amber Unpreserved vials (N/A)	VSGU-20 mL Scintillation vials (N/A)	DG9U-40 mL Amber Unpreserved vials (N/A)
1		1	1			1																			X				
2																													
3																													
4																													
5																													
6																													
7																													
8																													
9																													
10																													
11																													
12																													

pH Adjustment Log for Preserved Samples

Sample ID	Type of Preservative	pH upon receipt	Date preservation adjusted	Time preservation adjusted	Amount of Preservative added	Lot #

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. Out of hold, Incorrect preservative, out of temp, incorrect containers.

Pace Analytical Services, LLC
9800 Kincey Ave. Suite 100
Huntersville, NC 28078
(704)875-9092

January 17, 2022

Mark Filardi
HDR
440 S. Church St
Suite 900
Charlotte, NC 28202

RE: Project: CHARAH Q4 GW
Pace Project No.: 92573625

Dear Mark Filardi:

Enclosed are the analytical results for sample(s) received by the laboratory on November 19, 2021. The results relate only to the samples included in this report. Results reported herein conform to the applicable TNI/NELAC Standards and the laboratory's Quality Manual, where applicable, unless otherwise noted in the body of the report.

The test results provided in this final report were generated by each of the following laboratories within the Pace Network:

- Pace Analytical Services - Asheville
- Pace Analytical Services - Greensburg

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Tyler Forney
tyler.forney@pacelabs.com
(704)875-9092
Project Manager

Enclosures

cc: Charles Gruenberg
Mike Plummer, HDR
Jacob Ruffing

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Pace Analytical Services, LLC
9800 Kincey Ave. Suite 100
Huntersville, NC 28078
(704)875-9092

CERTIFICATIONS

Project: CHARAH Q4 GW
Pace Project No.: 92573625

Pace Analytical Services Pennsylvania

1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601
ANAB DOD-ELAP Rad Accreditation #: L2417
Alabama Certification #: 41590
Arizona Certification #: AZ0734
Arkansas Certification
California Certification #: 04222CA
Colorado Certification #: PA01547
Connecticut Certification #: PH-0694
Delaware Certification
EPA Region 4 DW Rad
Florida/TNI Certification #: E87683
Georgia Certification #: C040
Florida: Cert E871149 SEKS WET
Guam Certification
Hawaii Certification
Idaho Certification
Illinois Certification
Indiana Certification
Iowa Certification #: 391
Kansas/TNI Certification #: E-10358
Kentucky Certification #: KY90133
KY WW Permit #: KY0098221
KY WW Permit #: KY0000221
Louisiana DHH/TNI Certification #: LA180012
Louisiana DEQ/TNI Certification #: 4086
Maine Certification #: 2017020
Maryland Certification #: 308
Massachusetts Certification #: M-PA1457
Michigan/PADEP Certification #: 9991
Missouri Certification #: 235
Montana Certification #: Cert0082
Nebraska Certification #: NE-OS-29-14
Nevada Certification #: PA014572018-1
New Hampshire/TNI Certification #: 297617
New Jersey/TNI Certification #: PA051
New Mexico Certification #: PA01457
New York/TNI Certification #: 10888
North Carolina Certification #: 42706
North Dakota Certification #: R-190
Ohio EPA Rad Approval: #41249
Oregon/TNI Certification #: PA200002-010
Pennsylvania/TNI Certification #: 65-00282
Puerto Rico Certification #: PA01457
Rhode Island Certification #: 65-00282
South Dakota Certification
Tennessee Certification #: 02867
Texas/TNI Certification #: T104704188-17-3
Utah/TNI Certification #: PA014572017-9
USDA Soil Permit #: P330-17-00091
Vermont Dept. of Health: ID# VT-0282
Virgin Island/PADEP Certification
Virginia/VELAP Certification #: 9526
Washington Certification #: C868
West Virginia DEP Certification #: 143
West Virginia DHHR Certification #: 9964C
Wisconsin Approve List for Rad
Wyoming Certification #: 8TMS-L

Pace Analytical Services Asheville

2225 Riverside Drive, Asheville, NC 28804
Florida/NELAP Certification #: E87648
North Carolina Drinking Water Certification #: 37712
North Carolina Wastewater Certification #: 40
South Carolina Laboratory ID: 99030
South Carolina Certification #: 99030001
Virginia/VELAP Certification #: 460222

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Huntersville, NC 28078
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SAMPLE SUMMARY

Project: CHARAH Q4 GW
Pace Project No.: 92573625

Lab ID	Sample ID	Matrix	Date Collected	Date Received
92573625001	**BG-1**	Water	11/16/21 16:10	11/19/21 14:00
92573625002	**BG-2**	Water	11/17/21 17:10	11/19/21 14:00
92573625003	**MW-1**	Water	11/16/21 08:45	11/19/21 14:00
92573625004	**MW-2**	Water	11/18/21 11:55	11/19/21 14:00
92573625005	**MW-3**	Water	11/18/21 08:35	11/19/21 14:00
92573625006	**MW-4**	Water	11/17/21 15:30	11/19/21 14:00
92573625007	**MW-5**	Water	11/16/21 14:45	11/19/21 14:00
92573625008	**MW-6**	Water	11/17/21 12:40	11/19/21 14:00
92573625009	**MW-7R**	Water	11/15/21 15:00	11/19/21 14:00
92573625010	**MW-8**	Water	11/16/21 12:55	11/19/21 14:00
92573625011	**MW-10**	Water	11/15/21 12:20	11/19/21 14:00
92573625012	**MW-11**	Water	11/17/21 09:00	11/19/21 14:00
92573625013	**MW-11D**	Water	11/17/21 11:00	11/19/21 14:00
92573625014	**SW-1**	Water	11/18/21 14:35	11/19/21 14:00
92573625015	**SW-2**	Water	11/18/21 15:40	11/19/21 14:00
92573625016	**SW-4**	Water	11/18/21 15:00	11/19/21 14:00
92573625017	**SW-5**	Water	11/18/21 16:10	11/19/21 14:00
92573625018	**SW-6**	Water	11/18/21 14:20	11/19/21 14:00
92573625019	**LEACHATE**	Water	11/15/21 15:25	11/19/21 14:00
92573625020	**DUP**	Water	11/17/21 12:50	11/19/21 14:00
92573625021	**EQBL**	Water	11/18/21 14:00	11/19/21 14:00

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Huntersville, NC 28078
(704)875-9092

SAMPLE ANALYTE COUNT

Project: CHARAH Q4 GW
Pace Project No.: 92573625

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
92573625001	**BG-1**	EPA 6010D	RDT	16	PASI-A
		EPA 6020B	CRW, JOR	3	PASI-A
		EPA 7470A	RDT	1	PASI-A
		EPA 903.1	SLC	1	PASI-PA
		EPA 904.0	JC2	1	PASI-PA
		Total Radium Calculation	JAL	1	PASI-PA
		SM 2540C-2015	MJP	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	3	PASI-A
92573625002	**BG-2**	EPA 6010D	RDT	16	PASI-A
		EPA 6020B	CRW, JOR	3	PASI-A
		EPA 7470A	RDT	1	PASI-A
		EPA 903.1	SLC	1	PASI-PA
		EPA 904.0	JC2	1	PASI-PA
		Total Radium Calculation	JAL	1	PASI-PA
		SM 2540C-2015	ZMC	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	3	PASI-A
92573625003	**MW-1**	EPA 6010D	DS, RDT	16	PASI-A
		EPA 6020B	CRW, JOR	3	PASI-A
		EPA 7470A	RDT	1	PASI-A
		EPA 903.1	SLC	1	PASI-PA
		EPA 904.0	JC2	1	PASI-PA
		Total Radium Calculation	JAL	1	PASI-PA
		SM 2540C-2015	MJP	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	3	PASI-A
92573625004	**MW-2**	EPA 6010D	RDT	16	PASI-A
		EPA 6020B	CRW	3	PASI-A
		EPA 7470A	RDT	1	PASI-A
		EPA 903.1	SLC	1	PASI-PA
		EPA 904.0	JC2	1	PASI-PA
		Total Radium Calculation	JAL	1	PASI-PA
		SM 2540C-2015	MJP	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	3	PASI-A
92573625005	**MW-3**	EPA 6010D	RDT	16	PASI-A
		EPA 6020B	CRW	3	PASI-A
		EPA 7470A	RDT	1	PASI-A
		EPA 903.1	SLC	1	PASI-PA
		EPA 904.0	JC2	1	PASI-PA

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9800 Kincey Ave. Suite 100
Huntersville, NC 28078
(704)875-9092

SAMPLE ANALYTE COUNT

Project: CHARAH Q4 GW
Pace Project No.: 92573625

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		Total Radium Calculation	JAL	1	PASI-PA
		SM 2540C-2015	MJP	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	3	PASI-A
92573625006	**MW-4**	EPA 6010D	RDT	16	PASI-A
		EPA 6020B	CRW, JOR	3	PASI-A
		EPA 7470A	RDT	1	PASI-A
		EPA 903.1	SLC	1	PASI-PA
		EPA 904.0	JC2	1	PASI-PA
		Total Radium Calculation	JAL	1	PASI-PA
		SM 2540C-2015	ZMC	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	3	PASI-A
92573625007	**MW-5**	EPA 6010D	RDT	16	PASI-A
		EPA 6020B	CRW, JOR	3	PASI-A
		EPA 7470A	RDT	1	PASI-A
		EPA 903.1	SLC	1	PASI-PA
		EPA 904.0	JC2	1	PASI-PA
		Total Radium Calculation	JAL	1	PASI-PA
		SM 2540C-2015	MJP	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	3	PASI-A
92573625008	**MW-6**	EPA 6010D	RDT	16	PASI-A
		EPA 6020B	CRW, JOR	3	PASI-A
		EPA 7470A	RDT	1	PASI-A
		EPA 903.1	SLC	1	PASI-PA
		EPA 904.0	JC2	1	PASI-PA
		Total Radium Calculation	JAL	1	PASI-PA
		SM 2540C-2015	ZMC	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	3	PASI-A
92573625009	**MW-7R**	EPA 6010D	RDT	16	PASI-A
		EPA 6020B	CRW, JOR	3	PASI-A
		EPA 7470A	RDT	1	PASI-A
		EPA 903.1	SLC	1	PASI-PA
		EPA 904.0	JC2	1	PASI-PA
		Total Radium Calculation	JAL	1	PASI-PA
		SM 2540C-2015	MJP	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	3	PASI-A
92573625010	**MW-8**	EPA 6010D	DS, RDT	16	PASI-A
		EPA 6020B	CRW, JOR	3	PASI-A

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Pace Analytical Services, LLC
9800 Kincey Ave. Suite 100
Huntersville, NC 28078
(704)875-9092

SAMPLE ANALYTE COUNT

Project: CHARAH Q4 GW
Pace Project No.: 92573625

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		EPA 7470A	RDT	1	PASI-A
		EPA 903.1	SLC	1	PASI-PA
		EPA 904.0	JC2	1	PASI-PA
		Total Radium Calculation	JAL	1	PASI-PA
		SM 2540C-2015	MJP	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	3	PASI-A
92573625011	**MW-10**	EPA 6010D	RDT	16	PASI-A
		EPA 6020B	CRW, JOR	3	PASI-A
		EPA 7470A	RDT	1	PASI-A
		EPA 903.1	SLC	1	PASI-PA
		EPA 904.0	JC2	1	PASI-PA
		Total Radium Calculation	JAL	1	PASI-PA
		SM 2540C-2015	MJP	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	3	PASI-A
92573625012	**MW-11**	EPA 6010D	RDT	16	PASI-A
		EPA 6020B	CRW, JOR	3	PASI-A
		EPA 7470A	RDT	1	PASI-A
		EPA 903.1	SLC	1	PASI-PA
		EPA 904.0	JC2	1	PASI-PA
		Total Radium Calculation	JAL	1	PASI-PA
		SM 2540C-2015	ZMC	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	3	PASI-A
92573625013	**MW-11D**	EPA 6010D	RDT	16	PASI-A
		EPA 6020B	CRW, JOR	3	PASI-A
		EPA 7470A	RDT	1	PASI-A
		EPA 903.1	SLC	1	PASI-PA
		EPA 904.0	JC2	1	PASI-PA
		Total Radium Calculation	JAL	1	PASI-PA
		SM 2540C-2015	ZMC	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	3	PASI-A
92573625014	**SW-1**	EPA 6010D	RDT	16	PASI-A
		EPA 6020B	CRW	3	PASI-A
		EPA 7470A	RDT	1	PASI-A
		EPA 903.1	SLC	1	PASI-PA
		EPA 904.0	JC2	1	PASI-PA
		Total Radium Calculation	JAL	1	PASI-PA
		SM 2540C-2015	MJP	1	PASI-A

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SAMPLE ANALYTE COUNT

Project: CHARAH Q4 GW
Pace Project No.: 92573625

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		EPA 300.0 Rev 2.1 1993	CDC	3	PASI-A
92573625015	**SW-2**	EPA 6010D	RDT	16	PASI-A
		EPA 6020B	CRW	3	PASI-A
		EPA 7470A	RDT	1	PASI-A
		EPA 903.1	SLC	1	PASI-PA
		EPA 904.0	JC2	1	PASI-PA
		Total Radium Calculation	JAL	1	PASI-PA
		SM 2540C-2015	MJP	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	3	PASI-A
92573625016	**SW-4**	EPA 6010D	RDT	16	PASI-A
		EPA 6020B	CRW	3	PASI-A
		EPA 7470A	RDT	1	PASI-A
		EPA 903.1	SLC	1	PASI-PA
		EPA 904.0	JC2	1	PASI-PA
		Total Radium Calculation	JAL	1	PASI-PA
		SM 2540C-2015	MJP	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	3	PASI-A
92573625017	**SW-5**	EPA 6010D	RDT	16	PASI-A
		EPA 6020B	CRW	3	PASI-A
		EPA 7470A	RDT	1	PASI-A
		EPA 903.1	SLC	1	PASI-PA
		EPA 904.0	JC2	1	PASI-PA
		Total Radium Calculation	JAL	1	PASI-PA
		SM 2540C-2015	MJP	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	3	PASI-A
92573625018	**SW-6**	EPA 6010D	RDT	16	PASI-A
		EPA 6020B	CRW	3	PASI-A
		EPA 7470A	RDT	1	PASI-A
		EPA 903.1	SLC	1	PASI-PA
		EPA 904.0	JC2	1	PASI-PA
		Total Radium Calculation	JAL	1	PASI-PA
		SM 2540C-2015	MJP	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	3	PASI-A
92573625019	**LEACHATE**	EPA 6010D	RDT	16	PASI-A
		EPA 6020B	CRW	3	PASI-A
		EPA 7470A	RDT	1	PASI-A
		EPA 903.1	SLC	1	PASI-PA

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SAMPLE ANALYTE COUNT

Project: CHARAH Q4 GW
Pace Project No.: 92573625

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		EPA 904.0	JC2	1	PASI-PA
		Total Radium Calculation	JAL	1	PASI-PA
		SM 2540C-2015	MJP	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	3	PASI-A
92573625020	**DUP**	EPA 6010D	RDT	16	PASI-A
		EPA 6020B	CRW	3	PASI-A
		EPA 7470A	RDT	1	PASI-A
		EPA 903.1	SLC	1	PASI-PA
		EPA 904.0	JC2	1	PASI-PA
		Total Radium Calculation	JAL	1	PASI-PA
		SM 2540C-2015	ZMC	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	3	PASI-A
92573625021	**EQBL**	EPA 6010D	RDT	16	PASI-A
		EPA 6020B	CRW	3	PASI-A
		EPA 7470A	RDT	1	PASI-A
		EPA 903.1	SLC	1	PASI-PA
		EPA 904.0	JC2	1	PASI-PA
		Total Radium Calculation	JAL	1	PASI-PA
		SM 2540C-2015	MJP	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	3	PASI-A

PASI-A = Pace Analytical Services - Asheville
PASI-PA = Pace Analytical Services - Greensburg

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SUMMARY OF DETECTION

Project: CHARAH Q4 GW
Pace Project No.: 92573625

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92573625001	**BG-1**					
EPA 6010D	Barium	335	ug/L	5.0	12/01/21 19:07	
EPA 6010D	Calcium	27500	ug/L	100	12/01/21 19:07	
EPA 6010D	Copper	7.1	ug/L	5.0	12/01/21 19:07	
EPA 6010D	Vanadium	5.5	ug/L	5.0	12/01/21 19:07	
EPA 6020B	Lithium	17.5	ug/L	2.5	11/28/21 17:12	
EPA 7470A	Mercury	0.17J	ug/L	0.20	12/08/21 10:39	
EPA 903.1	Radium-226	0.532 ± 0.347 (0.356) C:NA T:96%	pCi/L		01/10/22 14:19	
EPA 904.0	Radium-228	0.534 ± 0.328 (0.601) C:75% T:97%	pCi/L		01/06/22 14:56	
Total Radium Calculation	Total Radium	1.07 ± 0.675 (0.957)	pCi/L		01/16/22 21:34	
SM 2540C-2015	Total Dissolved Solids	604	mg/L	25.0	11/22/21 11:30	
EPA 300.0 Rev 2.1 1993	Chloride	222	mg/L	5.0	11/22/21 14:31	M1
EPA 300.0 Rev 2.1 1993	Fluoride	0.18	mg/L	0.10	11/22/21 00:03	
EPA 300.0 Rev 2.1 1993	Sulfate	18.8	mg/L	1.0	11/22/21 00:03	
92573625002	**BG-2**					
EPA 6010D	Barium	78.5	ug/L	5.0	12/29/21 21:22	
EPA 6010D	Calcium	119000	ug/L	500	12/29/21 22:56	M1
EPA 6010D	Copper	6.9	ug/L	5.0	12/29/21 21:22	
EPA 6020B	Boron	15.6J	ug/L	50.0	11/29/21 15:48	
EPA 6020B	Lithium	15.2	ug/L	2.5	11/28/21 17:16	
EPA 903.1	Radium-226	0.192 ± 0.453 (0.840) C:NA T:95%	pCi/L		01/10/22 14:19	
EPA 904.0	Radium-228	0.649 ± 0.505 (1.00) C:67% T:94%	pCi/L		01/06/22 14:56	
Total Radium Calculation	Total Radium	0.841 ± 0.958 (1.84)	pCi/L		01/16/22 21:34	
SM 2540C-2015	Total Dissolved Solids	998	mg/L	50.0	11/23/21 16:43	
EPA 300.0 Rev 2.1 1993	Chloride	239	mg/L	5.0	11/22/21 15:15	
EPA 300.0 Rev 2.1 1993	Fluoride	0.19	mg/L	0.10	11/22/21 00:48	
EPA 300.0 Rev 2.1 1993	Sulfate	122	mg/L	5.0	11/22/21 15:15	
92573625003	**MW-1**					
EPA 6010D	Barium	310	ug/L	5.0	12/29/21 21:35	
EPA 6010D	Calcium	247000	ug/L	500	01/05/22 11:19	
EPA 6010D	Zinc	28.9	ug/L	10.0	12/29/21 21:35	
EPA 6020B	Lithium	37.5	ug/L	2.5	11/28/21 17:19	

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SUMMARY OF DETECTION

Project: CHARAH Q4 GW
Pace Project No.: 92573625

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92573625003	**MW-1**					
EPA 903.1	Radium-226	-0.0643 ± 0.334 (0.773) C:NA T:93%	pCi/L		01/10/22 14:19	
EPA 904.0	Radium-228	0.552 ± 0.353 (0.660) C:68% T:98%	pCi/L		01/06/22 14:56	
Total Radium Calculation	Total Radium	0.552 ± 0.687 (1.43)	pCi/L		01/16/22 21:34	
SM 2540C-2015	Total Dissolved Solids	2020	mg/L	250	11/22/21 11:30	
EPA 300.0 Rev 2.1 1993	Chloride	875	mg/L	18.0	11/22/21 15:29	
EPA 300.0 Rev 2.1 1993	Fluoride	0.17	mg/L	0.10	11/22/21 01:03	
EPA 300.0 Rev 2.1 1993	Sulfate	6.0	mg/L	1.0	11/22/21 01:03	
92573625004	**MW-2**					
EPA 6010D	Barium	347	ug/L	5.0	12/29/21 21:38	
EPA 6010D	Calcium	185000	ug/L	500	12/29/21 23:29	
EPA 6010D	Chromium	5.9	ug/L	5.0	12/29/21 21:38	
EPA 6010D	Copper	294	ug/L	5.0	12/29/21 21:38	
EPA 6010D	Molybdenum	4.9J	ug/L	5.0	12/29/21 21:38	
EPA 6010D	Nickel	4.7J	ug/L	5.0	12/29/21 21:38	
EPA 6020B	Boron	39.7J	ug/L	100	11/29/21 15:55	
EPA 6020B	Lithium	212	ug/L	5.0	11/29/21 15:55	
EPA 903.1	Radium-226	1.25 ± 0.830 (1.16) C:NA T:94%	pCi/L		01/10/22 14:19	
EPA 904.0	Radium-228	1.56 ± 0.495 (0.616) C:75% T:95%	pCi/L		01/06/22 14:56	
Total Radium Calculation	Total Radium	2.81 ± 1.33 (1.78)	pCi/L		01/16/22 21:34	
SM 2540C-2015	Total Dissolved Solids	2580	mg/L	250	11/24/21 13:25	
EPA 300.0 Rev 2.1 1993	Chloride	1090	mg/L	23.0	11/22/21 16:38	
EPA 300.0 Rev 2.1 1993	Sulfate	75.1	mg/L	1.0	11/22/21 01:18	
92573625005	**MW-3**					
EPA 6010D	Arsenic	6.1J	ug/L	10.0	12/29/21 21:42	
EPA 6010D	Barium	717	ug/L	5.0	12/29/21 21:42	
EPA 6010D	Calcium	183000	ug/L	500	12/29/21 23:32	
EPA 6010D	Copper	52.5	ug/L	5.0	12/29/21 21:42	
EPA 6010D	Molybdenum	7.4	ug/L	5.0	12/29/21 21:42	
EPA 6020B	Boron	27.2J	ug/L	100	11/29/21 15:59	
EPA 6020B	Lithium	88.4	ug/L	5.0	11/29/21 15:59	

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SUMMARY OF DETECTION

Project: CHARAH Q4 GW
Pace Project No.: 92573625

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92573625005	**MW-3**					
EPA 903.1	Radium-226	1.26 ± 0.686 (0.751) C:NA T:97%	pCi/L		01/10/22 14:19	
EPA 904.0	Radium-228	1.18 ± 0.466 (0.711) C:64% T:99%	pCi/L		01/06/22 14:56	
Total Radium Calculation	Total Radium	2.44 ± 1.15 (1.46)	pCi/L		01/16/22 21:34	
SM 2540C-2015	Total Dissolved Solids	2430	mg/L	250	11/24/21 13:25	
EPA 300.0 Rev 2.1 1993	Chloride	1080	mg/L	22.0	11/23/21 04:33	
EPA 300.0 Rev 2.1 1993	Fluoride	0.39	mg/L	0.10	11/22/21 02:03	
EPA 300.0 Rev 2.1 1993	Sulfate	20.7	mg/L	1.0	11/22/21 02:03	
92573625006	**MW-4**					
EPA 6010D	Barium	285	ug/L	5.0	12/29/21 21:45	
EPA 6010D	Calcium	62000	ug/L	100	12/29/21 21:45	
EPA 6010D	Copper	170	ug/L	5.0	12/29/21 21:45	
EPA 6010D	Nickel	4.5J	ug/L	5.0	12/29/21 21:45	
EPA 6010D	Selenium	5.9J	ug/L	10.0	12/29/21 21:45	
EPA 6020B	Lithium	30.6	ug/L	2.5	11/28/21 17:30	
EPA 903.1	Radium-226	0.230 ± 0.452 (0.826) C:NA T:90%	pCi/L		01/10/22 14:19	
EPA 904.0	Radium-228	0.770 ± 0.408 (0.714) C:65% T:95%	pCi/L		01/06/22 14:57	
Total Radium Calculation	Total Radium	1.000 ± 0.860 (1.54)	pCi/L		01/16/22 21:34	
SM 2540C-2015	Total Dissolved Solids	1110	mg/L	50.0	11/23/21 16:43	
EPA 300.0 Rev 2.1 1993	Chloride	423	mg/L	9.0	11/23/21 04:48	
EPA 300.0 Rev 2.1 1993	Fluoride	0.34	mg/L	0.10	11/22/21 02:18	
EPA 300.0 Rev 2.1 1993	Sulfate	10.3	mg/L	1.0	11/22/21 02:18	
92573625007	**MW-5**					
EPA 6010D	Barium	97.3	ug/L	5.0	12/29/21 21:48	
EPA 6010D	Calcium	9280	ug/L	100	12/29/21 21:48	
EPA 6010D	Copper	5.4	ug/L	5.0	12/29/21 21:48	
EPA 6020B	Lithium	10.0	ug/L	2.5	11/28/21 17:50	
EPA 903.1	Radium-226	0.121 ± 0.412 (0.794) C:NA T:98%	pCi/L		01/10/22 14:19	

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SUMMARY OF DETECTION

Project: CHARAH Q4 GW
Pace Project No.: 92573625

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92573625007	**MW-5**					
EPA 904.0	Radium-228	0.576 ± 0.365 (0.682) C:63% T:106%	pCi/L		01/06/22 14:56	
Total Radium Calculation	Total Radium	0.697 ± 0.777 (1.48)	pCi/L		01/16/22 21:34	
SM 2540C-2015	Total Dissolved Solids	202	mg/L	25.0	11/22/21 11:30	
EPA 300.0 Rev 2.1 1993	Chloride	19.0	mg/L	1.0	11/22/21 02:33	
EPA 300.0 Rev 2.1 1993	Fluoride	0.58	mg/L	0.10	11/22/21 02:33	
EPA 300.0 Rev 2.1 1993	Sulfate	3.6	mg/L	1.0	11/22/21 02:33	
92573625008	**MW-6**					
EPA 6010D	Barium	61.5	ug/L	5.0	12/29/21 21:58	
EPA 6010D	Calcium	33900	ug/L	100	12/29/21 21:58	
EPA 6010D	Copper	19.8	ug/L	5.0	12/29/21 21:58	
EPA 6010D	Zinc	14.3	ug/L	10.0	12/29/21 21:58	
EPA 6020B	Lithium	26.7	ug/L	2.5	11/28/21 17:53	
EPA 903.1	Radium-226	-0.252 ± 0.304 (0.827) C:NA T:94%	pCi/L		01/10/22 14:38	
EPA 904.0	Radium-228	1.12 ± 0.648 (1.17) C:63% T:90%	pCi/L		01/06/22 17:31	
Total Radium Calculation	Total Radium	1.12 ± 0.952 (2.00)	pCi/L		01/16/22 21:34	
SM 2540C-2015	Total Dissolved Solids	556	mg/L	25.0	11/23/21 16:43	
EPA 300.0 Rev 2.1 1993	Chloride	185	mg/L	4.0	11/23/21 05:03	
EPA 300.0 Rev 2.1 1993	Fluoride	0.37	mg/L	0.10	11/22/21 02:48	
EPA 300.0 Rev 2.1 1993	Sulfate	26.1	mg/L	1.0	11/22/21 02:48	
92573625009	**MW-7R**					
EPA 6010D	Barium	304	ug/L	5.0	12/29/21 22:01	
EPA 6010D	Calcium	91100	ug/L	100	12/29/21 22:01	
EPA 6010D	Copper	5.5	ug/L	5.0	12/29/21 22:01	
EPA 6020B	Lithium	28.5	ug/L	2.5	11/28/21 17:57	
EPA 903.1	Radium-226	0.128 ± 0.559 (1.06) C:NA T:96%	pCi/L		01/10/22 14:38	
EPA 904.0	Radium-228	0.726 ± 0.543 (1.06) C:66% T:96%	pCi/L		01/06/22 17:31	
Total Radium Calculation	Total Radium	0.854 ± 1.10 (2.12)	pCi/L		01/16/22 21:34	
SM 2540C-2015	Total Dissolved Solids	828	mg/L	50.0	11/22/21 11:28	

REPORT OF LABORATORY ANALYSIS

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SUMMARY OF DETECTION

Project: CHARAH Q4 GW
Pace Project No.: 92573625

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92573625009	**MW-7R**					
EPA 300.0 Rev 2.1 1993	Chloride	279	mg/L	6.0	11/23/21 05:18	M1
EPA 300.0 Rev 2.1 1993	Fluoride	0.13	mg/L	0.10	11/22/21 03:03	
EPA 300.0 Rev 2.1 1993	Sulfate	14.5	mg/L	1.0	11/22/21 03:03	
92573625010	**MW-8**					
EPA 6010D	Arsenic	5.2J	ug/L	10.0	12/29/21 22:04	
EPA 6010D	Barium	1080	ug/L	5.0	12/29/21 22:04	
EPA 6010D	Calcium	101000	ug/L	500	01/05/22 11:22	
EPA 6020B	Boron	8.6J	ug/L	50.0	11/29/21 16:24	
EPA 6020B	Lithium	23.5	ug/L	2.5	11/28/21 18:00	
EPA 903.1	Radium-226	0.269 ± 0.458 (0.808) C:NA T:95%	pCi/L		01/10/22 14:38	
EPA 904.0	Radium-228	0.650 ± 0.541 (1.09) C:69% T:95%	pCi/L		01/06/22 17:31	
Total Radium Calculation	Total Radium	0.919 ± 0.999 (1.90)	pCi/L		01/16/22 21:34	
SM 2540C-2015	Total Dissolved Solids	788	mg/L	50.0	11/22/21 11:30	
EPA 300.0 Rev 2.1 1993	Chloride	307	mg/L	6.0	11/23/21 05:32	
EPA 300.0 Rev 2.1 1993	Fluoride	0.075J	mg/L	0.10	11/22/21 03:48	
EPA 300.0 Rev 2.1 1993	Sulfate	6.9	mg/L	1.0	11/22/21 03:48	
92573625011	**MW-10**					
EPA 6010D	Barium	54.7	ug/L	5.0	12/29/21 22:08	
EPA 6010D	Calcium	21500	ug/L	100	12/29/21 22:08	
EPA 6010D	Chromium	5.9	ug/L	5.0	12/29/21 22:08	
EPA 6010D	Copper	11.4	ug/L	5.0	12/29/21 22:08	
EPA 6010D	Molybdenum	36.2	ug/L	5.0	12/29/21 22:08	
EPA 6010D	Selenium	5.2J	ug/L	10.0	12/29/21 22:08	
EPA 6020B	Boron	20.8J	ug/L	50.0	11/29/21 16:28	
EPA 6020B	Lithium	1.2J	ug/L	2.5	11/28/21 18:04	
EPA 903.1	Radium-226	0.537 ± 0.530 (0.807) C:NA T:97%	pCi/L		01/10/22 14:38	
EPA 904.0	Radium-228	0.389 ± 0.458 (0.964) C:67% T:100%	pCi/L		01/06/22 17:32	
Total Radium Calculation	Total Radium	0.926 ± 0.988 (1.77)	pCi/L		01/16/22 21:34	
SM 2540C-2015	Total Dissolved Solids	335	mg/L	25.0	11/22/21 11:28	
EPA 300.0 Rev 2.1 1993	Chloride	29.4	mg/L	1.0	11/22/21 04:03	
EPA 300.0 Rev 2.1 1993	Fluoride	0.54	mg/L	0.10	11/22/21 04:03	
EPA 300.0 Rev 2.1 1993	Sulfate	8.0	mg/L	1.0	11/22/21 04:03	

REPORT OF LABORATORY ANALYSIS

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SUMMARY OF DETECTION

Project: CHARAH Q4 GW
Pace Project No.: 92573625

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92573625012	**MW-11**					
EPA 6010D	Barium	38.7	ug/L	5.0	12/29/21 22:11	
EPA 6010D	Calcium	25400	ug/L	100	12/29/21 22:11	
EPA 6010D	Copper	20.1	ug/L	5.0	12/29/21 22:11	
EPA 6020B	Boron	15.1J	ug/L	50.0	11/29/21 16:31	
EPA 6020B	Lithium	9.3	ug/L	2.5	11/28/21 18:07	
EPA 903.1	Radium-226	-0.0605 ± 0.393 (0.853) C:NA T:101%	pCi/L		01/10/22 14:38	
EPA 904.0	Radium-228	0.129 ± 0.425 (0.961) C:67% T:95%	pCi/L		01/06/22 17:32	
Total Radium Calculation	Total Radium	0.129 ± 0.818 (1.81)	pCi/L		01/16/22 21:34	
SM 2540C-2015	Total Dissolved Solids	403	mg/L	25.0	11/23/21 16:43	
EPA 300.0 Rev 2.1 1993	Chloride	132	mg/L	3.0	11/23/21 07:07	
EPA 300.0 Rev 2.1 1993	Fluoride	0.18	mg/L	0.10	11/22/21 04:18	
EPA 300.0 Rev 2.1 1993	Sulfate	2.1	mg/L	1.0	11/22/21 04:18	
92573625013	**MW-11D**					
EPA 6010D	Arsenic	7.0J	ug/L	10.0	12/29/21 22:14	
EPA 6010D	Barium	100	ug/L	5.0	12/29/21 22:14	
EPA 6010D	Calcium	19100	ug/L	100	12/29/21 22:14	
EPA 6010D	Copper	15.4	ug/L	5.0	12/29/21 22:14	
EPA 6010D	Molybdenum	17.0	ug/L	5.0	12/29/21 22:14	
EPA 6020B	Boron	50.9	ug/L	50.0	11/29/21 16:35	
EPA 6020B	Lithium	30.2	ug/L	2.5	11/28/21 18:11	
EPA 903.1	Radium-226	0.431 ± 0.448 (0.667) C:NA T:95%	pCi/L		01/10/22 14:38	
EPA 904.0	Radium-228	0.283 ± 0.453 (0.983) C:66% T:91%	pCi/L		01/06/22 17:32	
Total Radium Calculation	Total Radium	0.714 ± 0.901 (1.65)	pCi/L		01/16/22 21:34	
SM 2540C-2015	Total Dissolved Solids	396	mg/L	25.0	11/23/21 16:43	
EPA 300.0 Rev 2.1 1993	Chloride	103	mg/L	2.0	11/23/21 07:24	
EPA 300.0 Rev 2.1 1993	Fluoride	0.52	mg/L	0.10	11/22/21 05:03	
92573625014	**SW-1**					
EPA 6010D	Arsenic	25.9	ug/L	10.0	12/29/21 22:17	
EPA 6010D	Barium	805	ug/L	5.0	12/29/21 22:17	
EPA 6010D	Beryllium	4.0	ug/L	1.0	12/29/21 22:17	
EPA 6010D	Calcium	12200	ug/L	100	12/29/21 22:17	

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SUMMARY OF DETECTION

Project: CHARAH Q4 GW
Pace Project No.: 92573625

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92573625014	**SW-1**					
EPA 6010D	Chromium	23.2	ug/L	5.0	12/29/21 22:17	
EPA 6010D	Cobalt	60.2	ug/L	5.0	12/29/21 22:17	
EPA 6010D	Copper	29.5	ug/L	5.0	12/29/21 22:17	
EPA 6010D	Lead	68.1	ug/L	5.0	12/29/21 22:17	
EPA 6010D	Molybdenum	17.2	ug/L	5.0	12/29/21 22:17	
EPA 6010D	Nickel	19.5	ug/L	5.0	12/29/21 22:17	
EPA 6010D	Vanadium	92.0	ug/L	5.0	12/29/21 22:17	
EPA 6010D	Zinc	114	ug/L	10.0	12/29/21 22:17	
EPA 6020B	Boron	16.2J	ug/L	50.0	12/07/21 18:22	
EPA 6020B	Lithium	11.3	ug/L	2.5	12/07/21 18:22	
EPA 6020B	Thallium	0.20J	ug/L	0.47	12/07/21 18:22	
EPA 903.1	Radium-226	0.939 ± 0.694 (0.939) C:NA T:74%	pCi/L		01/10/22 14:38	
EPA 904.0	Radium-228	2.33 ± 1.19 (2.05) C:61% T:49%	pCi/L		01/06/22 17:32	
Total Radium Calculation	Total Radium	3.27 ± 1.88 (2.99)	pCi/L		01/16/22 21:34	
SM 2540C-2015	Total Dissolved Solids	495	mg/L	25.0	11/24/21 13:25	
EPA 300.0 Rev 2.1 1993	Chloride	6.5	mg/L	1.0	11/22/21 19:22	
EPA 300.0 Rev 2.1 1993	Fluoride	0.15	mg/L	0.10	11/22/21 19:22	
92573625015	**SW-2**					
EPA 6010D	Barium	69.3	ug/L	5.0	12/29/21 22:20	
EPA 6010D	Cadmium	0.50J	ug/L	1.0	12/29/21 22:20	
EPA 6010D	Calcium	22900	ug/L	100	12/29/21 22:20	
EPA 6020B	Boron	11.0J	ug/L	50.0	12/07/21 18:25	
EPA 903.1	Radium-226	0.382 ± 0.398 (0.592) C:NA T:92%	pCi/L		01/10/22 14:38	
EPA 904.0	Radium-228	0.110 ± 0.451 (1.03) C:60% T:95%	pCi/L		01/06/22 17:58	
Total Radium Calculation	Total Radium	0.492 ± 0.849 (1.62)	pCi/L		01/16/22 21:34	
SM 2540C-2015	Total Dissolved Solids	171	mg/L	25.0	11/24/21 13:25	
EPA 300.0 Rev 2.1 1993	Chloride	37.8	mg/L	1.0	11/22/21 05:32	
EPA 300.0 Rev 2.1 1993	Fluoride	0.12	mg/L	0.10	11/22/21 05:32	
EPA 300.0 Rev 2.1 1993	Sulfate	10.3	mg/L	1.0	11/22/21 05:32	
92573625016	**SW-4**					
EPA 6010D	Arsenic	5.5J	ug/L	10.0	12/29/21 22:24	
EPA 6010D	Barium	69.9	ug/L	5.0	12/29/21 22:24	
EPA 6010D	Calcium	7870	ug/L	100	12/29/21 22:24	

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SUMMARY OF DETECTION

Project: CHARAH Q4 GW
Pace Project No.: 92573625

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92573625016	**SW-4**					
EPA 6010D	Cobalt	9.0	ug/L	5.0	12/29/21 22:24	
EPA 6010D	Copper	5.4	ug/L	5.0	12/29/21 22:24	
EPA 6010D	Lead	8.1	ug/L	5.0	12/29/21 22:24	
EPA 6010D	Vanadium	5.6	ug/L	5.0	12/29/21 22:24	
EPA 6010D	Zinc	19.1	ug/L	10.0	12/29/21 22:24	
EPA 6020B	Boron	8.6J	ug/L	50.0	12/07/21 18:52	
EPA 6020B	Lithium	1.7J	ug/L	2.5	12/07/21 18:52	
EPA 903.1	Radium-226	0.426 ± 0.559 (0.932) C:NA T:94%	pCi/L		01/10/22 14:54	
EPA 904.0	Radium-228	0.729 ± 0.971 (2.06) C:59% T:47%	pCi/L		01/06/22 17:58	
Total Radium Calculation	Total Radium	1.16 ± 1.53 (2.99)	pCi/L		01/16/22 21:34	
SM 2540C-2015	Total Dissolved Solids	62.0	mg/L	25.0	11/24/21 13:25	
EPA 300.0 Rev 2.1 1993	Chloride	4.8	mg/L	1.0	11/22/21 05:47	
EPA 300.0 Rev 2.1 1993	Fluoride	0.057J	mg/L	0.10	11/22/21 05:47	
EPA 300.0 Rev 2.1 1993	Sulfate	17.0	mg/L	1.0	11/22/21 05:47	
92573625017	**SW-5**					
EPA 6010D	Arsenic	9.0J	ug/L	10.0	12/29/21 22:27	
EPA 6010D	Barium	394	ug/L	5.0	12/29/21 22:27	
EPA 6010D	Beryllium	1.7	ug/L	1.0	12/29/21 22:27	
EPA 6010D	Calcium	5560	ug/L	100	12/29/21 22:27	
EPA 6010D	Chromium	12.8	ug/L	5.0	12/29/21 22:27	
EPA 6010D	Cobalt	5.0	ug/L	5.0	12/29/21 22:27	
EPA 6010D	Copper	11.8	ug/L	5.0	12/29/21 22:27	
EPA 6010D	Lead	33.4	ug/L	5.0	12/29/21 22:27	
EPA 6010D	Nickel	6.6	ug/L	5.0	12/29/21 22:27	
EPA 6010D	Vanadium	48.6	ug/L	5.0	12/29/21 22:27	
EPA 6010D	Zinc	55.0	ug/L	10.0	12/29/21 22:27	
EPA 6020B	Lithium	3.7	ug/L	2.5	12/07/21 18:56	
EPA 6020B	Thallium	0.072J	ug/L	0.47	12/07/21 18:56	
EPA 903.1	Radium-226	0.108 ± 0.562 (1.17) C:NA T:52%	pCi/L		01/10/22 14:54	
EPA 904.0	Radium-228	1.27 ± 0.598 (1.02) C:67% T:101%	pCi/L		01/06/22 17:58	
Total Radium Calculation	Total Radium	1.38 ± 1.16 (2.19)	pCi/L		01/16/22 21:34	
SM 2540C-2015	Total Dissolved Solids	265	mg/L	25.0	11/24/21 13:25	
EPA 300.0 Rev 2.1 1993	Chloride	5.9	mg/L	1.0	11/22/21 19:37	
EPA 300.0 Rev 2.1 1993	Fluoride	0.14	mg/L	0.10	11/22/21 19:37	

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SUMMARY OF DETECTION

Project: CHARAH Q4 GW
Pace Project No.: 92573625

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92573625017	**SW-5**					
EPA 300.0 Rev 2.1 1993	Sulfate	4.3	mg/L	1.0	11/22/21 19:37	
92573625018	**SW-6**					
EPA 6010D	Arsenic	15.0	ug/L	10.0	12/29/21 22:43	
EPA 6010D	Barium	1130	ug/L	5.0	12/29/21 22:43	
EPA 6010D	Beryllium	4.9	ug/L	1.0	12/29/21 22:43	
EPA 6010D	Calcium	9860	ug/L	100	12/29/21 22:43	
EPA 6010D	Chromium	22.0	ug/L	5.0	12/29/21 22:43	
EPA 6010D	Cobalt	21.8	ug/L	5.0	12/29/21 22:43	
EPA 6010D	Copper	24.7	ug/L	5.0	12/29/21 22:43	
EPA 6010D	Lead	73.4	ug/L	5.0	12/29/21 22:43	
EPA 6010D	Molybdenum	5.6	ug/L	5.0	12/29/21 22:43	
EPA 6010D	Nickel	14.2	ug/L	5.0	12/29/21 22:43	
EPA 6010D	Vanadium	102	ug/L	5.0	12/29/21 22:43	
EPA 6010D	Zinc	160	ug/L	10.0	12/29/21 22:43	
EPA 6020B	Lithium	12.6	ug/L	12.5	12/07/21 19:20	
EPA 903.1	Radium-226	2.09 ± 1.37 (1.57) C:NA T:25%	pCi/L		01/10/22 14:54	
EPA 904.0	Radium-228	2.48 ± 0.861 (1.20) C:61% T:86%	pCi/L		01/06/22 17:58	
Total Radium Calculation	Total Radium	4.57 ± 2.23 (2.77)	pCi/L		01/16/22 21:34	
SM 2540C-2015	Total Dissolved Solids	683	mg/L	25.0	11/24/21 13:25	
EPA 300.0 Rev 2.1 1993	Chloride	4.6	mg/L	1.0	11/22/21 20:22	
EPA 300.0 Rev 2.1 1993	Fluoride	0.34	mg/L	0.10	11/22/21 20:22	
EPA 300.0 Rev 2.1 1993	Sulfate	1.2	mg/L	1.0	11/22/21 20:22	
92573625019	**LEACHATE**					
EPA 6010D	Arsenic	19.3	ug/L	10.0	12/29/21 22:46	
EPA 6010D	Barium	52.7	ug/L	5.0	12/29/21 22:46	
EPA 6010D	Cadmium	0.49J	ug/L	1.0	12/29/21 22:46	
EPA 6010D	Copper	6.6	ug/L	5.0	12/29/21 22:46	
EPA 6010D	Molybdenum	254	ug/L	5.0	12/29/21 22:46	
EPA 6010D	Nickel	3.9J	ug/L	5.0	12/29/21 22:46	
EPA 6010D	Zinc	14.7	ug/L	10.0	12/29/21 22:46	
EPA 6020B	Boron	3190	ug/L	1000	12/07/21 19:03	
EPA 6020B	Lithium	59.6	ug/L	50.0	12/07/21 19:03	
EPA 903.1	Radium-226	0.195 ± 0.383 (0.700) C:NA T:92%	pCi/L		01/10/22 14:54	
EPA 904.0	Radium-228	0.722 ± 0.462 (0.855) C:68% T:103%	pCi/L		01/06/22 17:58	

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SUMMARY OF DETECTION

Project: CHARAH Q4 GW
Pace Project No.: 92573625

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92573625019	**LEACHATE**					
Total Radium Calculation	Total Radium	0.917 ± 0.845 (1.56)	pCi/L		01/16/22 21:34	
SM 2540C-2015	Total Dissolved Solids	1500	mg/L	50.0	11/22/21 11:28	
EPA 300.0 Rev 2.1 1993	Chloride	18.6	mg/L	1.0	11/22/21 07:02	
EPA 300.0 Rev 2.1 1993	Fluoride	0.27	mg/L	0.10	11/22/21 07:02	
EPA 300.0 Rev 2.1 1993	Sulfate	530	mg/L	11.0	11/23/21 07:38	
92573625020	**DUP**					
EPA 6010D	Arsenic	5.8J	ug/L	10.0	12/29/21 22:50	
EPA 6010D	Barium	52.7	ug/L	5.0	12/29/21 22:50	
EPA 6010D	Cadmium	0.59J	ug/L	1.0	12/29/21 22:50	
EPA 6010D	Calcium	34400	ug/L	100	12/29/21 22:50	
EPA 6010D	Copper	29.3	ug/L	5.0	12/29/21 22:50	
EPA 6010D	Zinc	10.2	ug/L	10.0	12/29/21 22:50	
EPA 6020B	Boron	11.0J	ug/L	50.0	12/07/21 19:10	
EPA 6020B	Lithium	23.8	ug/L	2.5	12/07/21 19:10	
EPA 903.1	Radium-226	0.326 ± 0.340 (0.479) C:NA T:94%	pCi/L		01/10/22 14:54	
EPA 904.0	Radium-228	0.0506 ± 0.431 (0.998) C:69% T:92%	pCi/L		01/06/22 17:58	
Total Radium Calculation	Total Radium	0.377 ± 0.771 (1.48)	pCi/L		01/16/22 21:34	
SM 2540C-2015	Total Dissolved Solids	574	mg/L	25.0	11/23/21 16:45	
EPA 300.0 Rev 2.1 1993	Chloride	186	mg/L	4.0	11/23/21 07:53	
EPA 300.0 Rev 2.1 1993	Fluoride	0.38	mg/L	0.10	11/22/21 07:17	
EPA 300.0 Rev 2.1 1993	Sulfate	26.4	mg/L	1.0	11/22/21 07:17	
92573625021	**EQBL**					
EPA 6010D	Barium	52.7	ug/L	5.0	12/29/21 22:53	
EPA 6010D	Calcium	8140	ug/L	100	12/29/21 22:53	
EPA 6010D	Zinc	330	ug/L	10.0	12/29/21 22:53	
EPA 6020B	Boron	165	ug/L	50.0	12/07/21 19:06	
EPA 6020B	Lithium	0.50J	ug/L	2.5	12/07/21 19:06	
EPA 903.1	Radium-226	0.108 ± 0.246 (0.396) C:NA T:104%	pCi/L		01/10/22 15:47	
EPA 904.0	Radium-228	0.461 ± 0.480 (0.999) C:76% T:94%	pCi/L		01/06/22 14:07	

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SUMMARY OF DETECTION

Project: CHARAH Q4 GW
Pace Project No.: 92573625

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92573625021	**EQBL**					
Total Radium Calculation	Total Radium	0.569 ± 0.726 (1.40)	pCi/L		01/17/22 12:08	
SM 2540C-2015	Total Dissolved Solids	56.0	mg/L	25.0	11/24/21 13:25	
EPA 300.0 Rev 2.1 1993	Chloride	5.0	mg/L	1.0	11/22/21 08:02	
EPA 300.0 Rev 2.1 1993	Fluoride	0.33	mg/L	0.10	11/22/21 08:02	
EPA 300.0 Rev 2.1 1993	Sulfate	3.0	mg/L	1.0	11/22/21 08:02	

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ANALYTICAL RESULTS

Project: CHARAH Q4 GW
Pace Project No.: 92573625

Sample: BG-1 **Lab ID: 92573625001** Collected: 11/16/21 16:10 Received: 11/19/21 14:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Antimony	ND	ug/L	5.0	3.0	1	11/29/21 10:03	12/01/21 19:07	7440-36-0	
Arsenic	ND	ug/L	10.0	4.7	1	11/29/21 10:03	12/01/21 19:07	7440-38-2	
Barium	**335**	ug/L	5.0	3.5	1	11/29/21 10:03	12/01/21 19:07	7440-39-3	
Beryllium	ND	ug/L	1.0	0.70	1	11/29/21 10:03	12/01/21 19:07	7440-41-7	
Cadmium	ND	ug/L	1.0	0.40	1	11/29/21 10:03	12/01/21 19:07	7440-43-9	
Calcium	**27500**	ug/L	100	94.2	1	11/29/21 10:03	12/01/21 19:07	7440-70-2	
Chromium	ND	ug/L	5.0	3.7	1	11/29/21 10:03	12/01/21 19:07	7440-47-3	
Cobalt	ND	ug/L	5.0	3.6	1	11/29/21 10:03	12/01/21 19:07	7440-48-4	
Copper	**7.1**	ug/L	5.0	4.3	1	11/29/21 10:03	12/01/21 19:07	7440-50-8	
Lead	ND	ug/L	5.0	4.5	1	11/29/21 10:03	12/01/21 19:07	7439-92-1	
Molybdenum	ND	ug/L	5.0	3.9	1	11/29/21 10:03	12/01/21 19:07	7439-98-7	
Nickel	ND	ug/L	5.0	3.5	1	11/29/21 10:03	12/01/21 19:07	7440-02-0	
Selenium	ND	ug/L	10.0	4.7	1	11/29/21 10:03	12/01/21 19:07	7782-49-2	
Silver	ND	ug/L	5.0	2.5	1	11/29/21 10:03	12/01/21 19:07	7440-22-4	
Vanadium	**5.5**	ug/L	5.0	3.9	1	11/29/21 10:03	12/01/21 19:07	7440-62-2	
Zinc	ND	ug/L	10.0	9.5	1	11/29/21 10:03	12/01/21 19:07	7440-66-6	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Boron	ND	ug/L	50.0	8.5	1	11/27/21 15:52	11/29/21 15:45	7440-42-8	
Lithium	**17.5**	ug/L	2.5	0.50	1	11/27/21 15:52	11/28/21 17:12	7439-93-2	
Thallium	ND	ug/L	0.47	0.050	1	11/27/21 15:52	11/28/21 17:12	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	**0.17J**	ug/L	0.20	0.12	1	12/04/21 21:45	12/08/21 10:39	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2015 Pace Analytical Services - Asheville								
Total Dissolved Solids	**604**	mg/L	25.0	25.0	1		11/22/21 11:30		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**222**	mg/L	5.0	3.0	5		11/22/21 14:31	16887-00-6	M1
Fluoride	**0.18**	mg/L	0.10	0.050	1		11/22/21 00:03	16984-48-8	
Sulfate	**18.8**	mg/L	1.0	0.50	1		11/22/21 00:03	14808-79-8	

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ANALYTICAL RESULTS

Project: CHARAH Q4 GW
Pace Project No.: 92573625

Sample: BG-2 **Lab ID: 92573625002** Collected: 11/17/21 17:10 Received: 11/19/21 14:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Antimony	ND	ug/L	5.0	3.0	1	11/29/21 10:03	12/29/21 21:22	7440-36-0	
Arsenic	ND	ug/L	10.0	4.7	1	11/29/21 10:03	12/29/21 21:22	7440-38-2	
Barium	**78.5**	ug/L	5.0	3.5	1	11/29/21 10:03	12/29/21 21:22	7440-39-3	
Beryllium	ND	ug/L	1.0	0.70	1	11/29/21 10:03	12/29/21 21:22	7440-41-7	
Cadmium	ND	ug/L	1.0	0.40	1	11/29/21 10:03	12/29/21 21:22	7440-43-9	
Calcium	**119000**	ug/L	500	471	5	11/29/21 10:03	12/29/21 22:56	7440-70-2	M1
Chromium	ND	ug/L	5.0	3.7	1	11/29/21 10:03	12/29/21 21:22	7440-47-3	
Cobalt	ND	ug/L	5.0	3.6	1	11/29/21 10:03	12/29/21 21:22	7440-48-4	
Copper	**6.9**	ug/L	5.0	4.3	1	11/29/21 10:03	12/29/21 21:22	7440-50-8	
Lead	ND	ug/L	5.0	4.5	1	11/29/21 10:03	12/29/21 21:22	7439-92-1	
Molybdenum	ND	ug/L	5.0	3.9	1	11/29/21 10:03	12/29/21 21:22	7439-98-7	
Nickel	ND	ug/L	5.0	3.5	1	11/29/21 10:03	12/29/21 21:22	7440-02-0	
Selenium	ND	ug/L	10.0	4.7	1	11/29/21 10:03	12/29/21 21:22	7782-49-2	
Silver	ND	ug/L	5.0	2.5	1	11/29/21 10:03	12/29/21 21:22	7440-22-4	
Vanadium	ND	ug/L	5.0	3.9	1	11/29/21 10:03	12/29/21 21:22	7440-62-2	
Zinc	ND	ug/L	10.0	9.5	1	11/29/21 10:03	12/29/21 21:22	7440-66-6	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Boron	**15.6J**	ug/L	50.0	8.5	1	11/27/21 15:52	11/29/21 15:48	7440-42-8	
Lithium	**15.2**	ug/L	2.5	0.50	1	11/27/21 15:52	11/28/21 17:16	7439-93-2	
Thallium	ND	ug/L	0.47	0.050	1	11/27/21 15:52	11/28/21 17:16	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	ND	ug/L	0.20	0.12	1	12/04/21 21:45	12/08/21 10:41	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2015 Pace Analytical Services - Asheville								
Total Dissolved Solids	**998**	mg/L	50.0	50.0	1		11/23/21 16:43		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**239**	mg/L	5.0	3.0	5		11/22/21 15:15	16887-00-6	
Fluoride	**0.19**	mg/L	0.10	0.050	1		11/22/21 00:48	16984-48-8	
Sulfate	**122**	mg/L	5.0	2.5	5		11/22/21 15:15	14808-79-8	

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ANALYTICAL RESULTS

Project: CHARAH Q4 GW
Pace Project No.: 92573625

Sample: MW-1 **Lab ID: 92573625003** Collected: 11/16/21 08:45 Received: 11/19/21 14:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Antimony	ND	ug/L	5.0	3.0	1	11/29/21 10:03	12/29/21 21:35	7440-36-0	
Arsenic	ND	ug/L	10.0	4.7	1	11/29/21 10:03	12/29/21 21:35	7440-38-2	
Barium	**310**	ug/L	5.0	3.5	1	11/29/21 10:03	12/29/21 21:35	7440-39-3	
Beryllium	ND	ug/L	1.0	0.70	1	11/29/21 10:03	12/29/21 21:35	7440-41-7	
Cadmium	ND	ug/L	1.0	0.40	1	11/29/21 10:03	12/29/21 21:35	7440-43-9	
Calcium	**247000**	ug/L	500	471	5	11/29/21 10:03	01/05/22 11:19	7440-70-2	
Chromium	ND	ug/L	5.0	3.7	1	11/29/21 10:03	12/29/21 21:35	7440-47-3	
Cobalt	ND	ug/L	5.0	3.6	1	11/29/21 10:03	12/29/21 21:35	7440-48-4	
Copper	ND	ug/L	5.0	4.3	1	11/29/21 10:03	12/29/21 21:35	7440-50-8	
Lead	ND	ug/L	5.0	4.5	1	11/29/21 10:03	12/29/21 21:35	7439-92-1	
Molybdenum	ND	ug/L	5.0	3.9	1	11/29/21 10:03	12/29/21 21:35	7439-98-7	
Nickel	ND	ug/L	5.0	3.5	1	11/29/21 10:03	12/29/21 21:35	7440-02-0	
Selenium	ND	ug/L	10.0	4.7	1	11/29/21 10:03	12/29/21 21:35	7782-49-2	
Silver	ND	ug/L	5.0	2.5	1	11/29/21 10:03	12/29/21 21:35	7440-22-4	
Vanadium	ND	ug/L	5.0	3.9	1	11/29/21 10:03	12/29/21 21:35	7440-62-2	
Zinc	**28.9**	ug/L	10.0	9.5	1	11/29/21 10:03	12/29/21 21:35	7440-66-6	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Boron	ND	ug/L	50.0	8.5	1	11/27/21 15:52	11/29/21 15:52	7440-42-8	
Lithium	**37.5**	ug/L	2.5	0.50	1	11/27/21 15:52	11/28/21 17:19	7439-93-2	
Thallium	ND	ug/L	0.47	0.050	1	11/27/21 15:52	11/28/21 17:19	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	ND	ug/L	0.20	0.12	1	12/04/21 21:45	12/08/21 10:48	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2015 Pace Analytical Services - Asheville								
Total Dissolved Solids	**2020**	mg/L	250	250	1		11/22/21 11:30		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**875**	mg/L	18.0	10.8	18		11/22/21 15:29	16887-00-6	
Fluoride	**0.17**	mg/L	0.10	0.050	1		11/22/21 01:03	16984-48-8	
Sulfate	**6.0**	mg/L	1.0	0.50	1		11/22/21 01:03	14808-79-8	

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ANALYTICAL RESULTS

Project: CHARAH Q4 GW
Pace Project No.: 92573625

Sample: MW-2 **Lab ID: 92573625004** Collected: 11/18/21 11:55 Received: 11/19/21 14:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Antimony	ND	ug/L	5.0	3.0	1	11/29/21 10:03	12/29/21 21:38	7440-36-0	
Arsenic	ND	ug/L	10.0	4.7	1	11/29/21 10:03	12/29/21 21:38	7440-38-2	
Barium	**347**	ug/L	5.0	3.5	1	11/29/21 10:03	12/29/21 21:38	7440-39-3	
Beryllium	ND	ug/L	1.0	0.70	1	11/29/21 10:03	12/29/21 21:38	7440-41-7	
Cadmium	ND	ug/L	1.0	0.40	1	11/29/21 10:03	12/29/21 21:38	7440-43-9	
Calcium	**185000**	ug/L	500	471	5	11/29/21 10:03	12/29/21 23:29	7440-70-2	
Chromium	**5.9**	ug/L	5.0	3.7	1	11/29/21 10:03	12/29/21 21:38	7440-47-3	
Cobalt	ND	ug/L	25.0	18.2	5	11/29/21 10:03	12/29/21 23:29	7440-48-4	
Copper	**294**	ug/L	5.0	4.3	1	11/29/21 10:03	12/29/21 21:38	7440-50-8	
Lead	ND	ug/L	5.0	4.5	1	11/29/21 10:03	12/29/21 21:38	7439-92-1	
Molybdenum	**4.9J**	ug/L	5.0	3.9	1	11/29/21 10:03	12/29/21 21:38	7439-98-7	
Nickel	**4.7J**	ug/L	5.0	3.5	1	11/29/21 10:03	12/29/21 21:38	7440-02-0	
Selenium	ND	ug/L	10.0	4.7	1	11/29/21 10:03	12/29/21 21:38	7782-49-2	
Silver	ND	ug/L	5.0	2.5	1	11/29/21 10:03	12/29/21 21:38	7440-22-4	
Vanadium	ND	ug/L	5.0	3.9	1	11/29/21 10:03	12/29/21 21:38	7440-62-2	
Zinc	ND	ug/L	10.0	9.5	1	11/29/21 10:03	12/29/21 21:38	7440-66-6	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Boron	**39.7J**	ug/L	100	17.0	2	11/27/21 15:52	11/29/21 15:55	7440-42-8	
Lithium	**212**	ug/L	5.0	1.0	2	11/27/21 15:52	11/29/21 15:55	7439-93-2	
Thallium	ND	ug/L	0.94	0.10	2	11/27/21 15:52	11/29/21 15:55	7440-28-0	D3
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	ND	ug/L	0.20	0.12	1	12/04/21 21:45	12/08/21 10:51	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2015 Pace Analytical Services - Asheville								
Total Dissolved Solids	**2580**	mg/L	250	250	1		11/24/21 13:25		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**1090**	mg/L	23.0	13.8	23		11/22/21 16:38	16887-00-6	
Fluoride	ND	mg/L	0.10	0.050	1		11/22/21 01:18	16984-48-8	
Sulfate	**75.1**	mg/L	1.0	0.50	1		11/22/21 01:18	14808-79-8	

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ANALYTICAL RESULTS

Project: CHARAH Q4 GW
Pace Project No.: 92573625

Sample: MW-3 **Lab ID: 92573625005** Collected: 11/18/21 08:35 Received: 11/19/21 14:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Antimony	ND	ug/L	5.0	3.0	1	11/29/21 10:03	12/29/21 21:42	7440-36-0	
Arsenic	**6.1J**	ug/L	10.0	4.7	1	11/29/21 10:03	12/29/21 21:42	7440-38-2	
Barium	**717**	ug/L	5.0	3.5	1	11/29/21 10:03	12/29/21 21:42	7440-39-3	
Beryllium	ND	ug/L	1.0	0.70	1	11/29/21 10:03	12/29/21 21:42	7440-41-7	
Cadmium	ND	ug/L	1.0	0.40	1	11/29/21 10:03	12/29/21 21:42	7440-43-9	
Calcium	**183000**	ug/L	500	471	5	11/29/21 10:03	12/29/21 23:32	7440-70-2	
Chromium	ND	ug/L	5.0	3.7	1	11/29/21 10:03	12/29/21 21:42	7440-47-3	
Cobalt	ND	ug/L	25.0	18.2	5	11/29/21 10:03	12/29/21 23:32	7440-48-4	
Copper	**52.5**	ug/L	5.0	4.3	1	11/29/21 10:03	12/29/21 21:42	7440-50-8	
Lead	ND	ug/L	5.0	4.5	1	11/29/21 10:03	12/29/21 21:42	7439-92-1	
Molybdenum	**7.4**	ug/L	5.0	3.9	1	11/29/21 10:03	12/29/21 21:42	7439-98-7	
Nickel	ND	ug/L	5.0	3.5	1	11/29/21 10:03	12/29/21 21:42	7440-02-0	
Selenium	ND	ug/L	10.0	4.7	1	11/29/21 10:03	12/29/21 21:42	7782-49-2	
Silver	ND	ug/L	5.0	2.5	1	11/29/21 10:03	12/29/21 21:42	7440-22-4	
Vanadium	ND	ug/L	5.0	3.9	1	11/29/21 10:03	12/29/21 21:42	7440-62-2	
Zinc	ND	ug/L	10.0	9.5	1	11/29/21 10:03	12/29/21 21:42	7440-66-6	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Boron	**27.2J**	ug/L	100	17.0	2	11/27/21 15:52	11/29/21 15:59	7440-42-8	
Lithium	**88.4**	ug/L	5.0	1.0	2	11/27/21 15:52	11/29/21 15:59	7439-93-2	
Thallium	ND	ug/L	0.94	0.10	2	11/27/21 15:52	11/29/21 15:59	7440-28-0	D3
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	ND	ug/L	0.20	0.12	1	12/04/21 21:45	12/08/21 10:53	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2015 Pace Analytical Services - Asheville								
Total Dissolved Solids	**2430**	mg/L	250	250	1		11/24/21 13:25		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**1080**	mg/L	22.0	13.2	22		11/23/21 04:33	16887-00-6	
Fluoride	**0.39**	mg/L	0.10	0.050	1		11/22/21 02:03	16984-48-8	
Sulfate	**20.7**	mg/L	1.0	0.50	1		11/22/21 02:03	14808-79-8	

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ANALYTICAL RESULTS

Project: CHARAH Q4 GW
Pace Project No.: 92573625

Sample: MW-4 **Lab ID: 92573625006** Collected: 11/17/21 15:30 Received: 11/19/21 14:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Antimony	ND	ug/L	5.0	3.0	1	11/29/21 10:03	12/29/21 21:45	7440-36-0	
Arsenic	ND	ug/L	10.0	4.7	1	11/29/21 10:03	12/29/21 21:45	7440-38-2	
Barium	**285**	ug/L	5.0	3.5	1	11/29/21 10:03	12/29/21 21:45	7440-39-3	
Beryllium	ND	ug/L	1.0	0.70	1	11/29/21 10:03	12/29/21 21:45	7440-41-7	
Cadmium	ND	ug/L	1.0	0.40	1	11/29/21 10:03	12/29/21 21:45	7440-43-9	
Calcium	**62000**	ug/L	100	94.2	1	11/29/21 10:03	12/29/21 21:45	7440-70-2	
Chromium	ND	ug/L	5.0	3.7	1	11/29/21 10:03	12/29/21 21:45	7440-47-3	
Cobalt	ND	ug/L	5.0	3.6	1	11/29/21 10:03	12/29/21 21:45	7440-48-4	
Copper	**170**	ug/L	5.0	4.3	1	11/29/21 10:03	12/29/21 21:45	7440-50-8	
Lead	ND	ug/L	5.0	4.5	1	11/29/21 10:03	12/29/21 21:45	7439-92-1	
Molybdenum	ND	ug/L	5.0	3.9	1	11/29/21 10:03	12/29/21 21:45	7439-98-7	
Nickel	**4.5J**	ug/L	5.0	3.5	1	11/29/21 10:03	12/29/21 21:45	7440-02-0	
Selenium	**5.9J**	ug/L	10.0	4.7	1	11/29/21 10:03	12/29/21 21:45	7782-49-2	
Silver	ND	ug/L	5.0	2.5	1	11/29/21 10:03	12/29/21 21:45	7440-22-4	
Vanadium	ND	ug/L	5.0	3.9	1	11/29/21 10:03	12/29/21 21:45	7440-62-2	
Zinc	ND	ug/L	10.0	9.5	1	11/29/21 10:03	12/29/21 21:45	7440-66-6	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Boron	ND	ug/L	50.0	8.5	1	11/27/21 15:52	11/29/21 16:02	7440-42-8	
Lithium	**30.6**	ug/L	2.5	0.50	1	11/27/21 15:52	11/28/21 17:30	7439-93-2	
Thallium	ND	ug/L	0.47	0.050	1	11/27/21 15:52	11/28/21 17:30	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	ND	ug/L	0.20	0.12	1	12/04/21 21:45	12/08/21 10:55	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2015 Pace Analytical Services - Asheville								
Total Dissolved Solids	**1110**	mg/L	50.0	50.0	1		11/23/21 16:43		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**423**	mg/L	9.0	5.4	9		11/23/21 04:48	16887-00-6	
Fluoride	**0.34**	mg/L	0.10	0.050	1		11/22/21 02:18	16984-48-8	
Sulfate	**10.3**	mg/L	1.0	0.50	1		11/22/21 02:18	14808-79-8	

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ANALYTICAL RESULTS

Project: CHARAH Q4 GW
Pace Project No.: 92573625

Sample: MW-5 **Lab ID: 92573625007** Collected: 11/16/21 14:45 Received: 11/19/21 14:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Antimony	ND	ug/L	5.0	3.0	1	11/29/21 10:03	12/29/21 21:48	7440-36-0	
Arsenic	ND	ug/L	10.0	4.7	1	11/29/21 10:03	12/29/21 21:48	7440-38-2	
Barium	**97.3**	ug/L	5.0	3.5	1	11/29/21 10:03	12/29/21 21:48	7440-39-3	
Beryllium	ND	ug/L	1.0	0.70	1	11/29/21 10:03	12/29/21 21:48	7440-41-7	
Cadmium	ND	ug/L	1.0	0.40	1	11/29/21 10:03	12/29/21 21:48	7440-43-9	
Calcium	**9280**	ug/L	100	94.2	1	11/29/21 10:03	12/29/21 21:48	7440-70-2	
Chromium	ND	ug/L	5.0	3.7	1	11/29/21 10:03	12/29/21 21:48	7440-47-3	
Cobalt	ND	ug/L	5.0	3.6	1	11/29/21 10:03	12/29/21 21:48	7440-48-4	
Copper	**5.4**	ug/L	5.0	4.3	1	11/29/21 10:03	12/29/21 21:48	7440-50-8	
Lead	ND	ug/L	5.0	4.5	1	11/29/21 10:03	12/29/21 21:48	7439-92-1	
Molybdenum	ND	ug/L	5.0	3.9	1	11/29/21 10:03	12/29/21 21:48	7439-98-7	
Nickel	ND	ug/L	5.0	3.5	1	11/29/21 10:03	12/29/21 21:48	7440-02-0	
Selenium	ND	ug/L	10.0	4.7	1	11/29/21 10:03	12/29/21 21:48	7782-49-2	
Silver	ND	ug/L	5.0	2.5	1	11/29/21 10:03	12/29/21 21:48	7440-22-4	
Vanadium	ND	ug/L	5.0	3.9	1	11/29/21 10:03	12/29/21 21:48	7440-62-2	
Zinc	ND	ug/L	10.0	9.5	1	11/29/21 10:03	12/29/21 21:48	7440-66-6	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Boron	ND	ug/L	50.0	8.5	1	11/27/21 15:52	11/29/21 16:13	7440-42-8	
Lithium	**10.0**	ug/L	2.5	0.50	1	11/27/21 15:52	11/28/21 17:50	7439-93-2	
Thallium	ND	ug/L	0.47	0.050	1	11/27/21 15:52	11/28/21 17:50	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	ND	ug/L	0.20	0.12	1	12/04/21 21:45	12/08/21 10:58	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2015 Pace Analytical Services - Asheville								
Total Dissolved Solids	**202**	mg/L	25.0	25.0	1		11/22/21 11:30		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**19.0**	mg/L	1.0	0.60	1		11/22/21 02:33	16887-00-6	
Fluoride	**0.58**	mg/L	0.10	0.050	1		11/22/21 02:33	16984-48-8	
Sulfate	**3.6**	mg/L	1.0	0.50	1		11/22/21 02:33	14808-79-8	

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ANALYTICAL RESULTS

Project: CHARAH Q4 GW
Pace Project No.: 92573625

Sample: MW-6 **Lab ID: 92573625008** Collected: 11/17/21 12:40 Received: 11/19/21 14:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Antimony	ND	ug/L	5.0	3.0	1	11/29/21 10:03	12/29/21 21:58	7440-36-0	
Arsenic	ND	ug/L	10.0	4.7	1	11/29/21 10:03	12/29/21 21:58	7440-38-2	
Barium	**61.5**	ug/L	5.0	3.5	1	11/29/21 10:03	12/29/21 21:58	7440-39-3	
Beryllium	ND	ug/L	1.0	0.70	1	11/29/21 10:03	12/29/21 21:58	7440-41-7	
Cadmium	ND	ug/L	1.0	0.40	1	11/29/21 10:03	12/29/21 21:58	7440-43-9	
Calcium	**33900**	ug/L	100	94.2	1	11/29/21 10:03	12/29/21 21:58	7440-70-2	
Chromium	ND	ug/L	5.0	3.7	1	11/29/21 10:03	12/29/21 21:58	7440-47-3	
Cobalt	ND	ug/L	5.0	3.6	1	11/29/21 10:03	12/29/21 21:58	7440-48-4	
Copper	**19.8**	ug/L	5.0	4.3	1	11/29/21 10:03	12/29/21 21:58	7440-50-8	
Lead	ND	ug/L	5.0	4.5	1	11/29/21 10:03	12/29/21 21:58	7439-92-1	
Molybdenum	ND	ug/L	5.0	3.9	1	11/29/21 10:03	12/29/21 21:58	7439-98-7	
Nickel	ND	ug/L	5.0	3.5	1	11/29/21 10:03	12/29/21 21:58	7440-02-0	
Selenium	ND	ug/L	10.0	4.7	1	11/29/21 10:03	12/29/21 21:58	7782-49-2	
Silver	ND	ug/L	5.0	2.5	1	11/29/21 10:03	12/29/21 21:58	7440-22-4	
Vanadium	ND	ug/L	5.0	3.9	1	11/29/21 10:03	12/29/21 21:58	7440-62-2	
Zinc	**14.3**	ug/L	10.0	9.5	1	11/29/21 10:03	12/29/21 21:58	7440-66-6	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Boron	ND	ug/L	50.0	8.5	1	11/27/21 15:52	11/29/21 16:17	7440-42-8	
Lithium	**26.7**	ug/L	2.5	0.50	1	11/27/21 15:52	11/28/21 17:53	7439-93-2	
Thallium	ND	ug/L	0.47	0.050	1	11/27/21 15:52	11/28/21 17:53	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	ND	ug/L	0.20	0.12	1	12/04/21 21:45	12/08/21 11:00	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2015 Pace Analytical Services - Asheville								
Total Dissolved Solids	**556**	mg/L	25.0	25.0	1		11/23/21 16:43		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**185**	mg/L	4.0	2.4	4		11/23/21 05:03	16887-00-6	
Fluoride	**0.37**	mg/L	0.10	0.050	1		11/22/21 02:48	16984-48-8	
Sulfate	**26.1**	mg/L	1.0	0.50	1		11/22/21 02:48	14808-79-8	

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ANALYTICAL RESULTS

Project: CHARAH Q4 GW
Pace Project No.: 92573625

Sample: MW-7R **Lab ID: 92573625009** Collected: 11/15/21 15:00 Received: 11/19/21 14:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Antimony	ND	ug/L	5.0	3.0	1	11/29/21 10:03	12/29/21 22:01	7440-36-0	
Arsenic	ND	ug/L	10.0	4.7	1	11/29/21 10:03	12/29/21 22:01	7440-38-2	
Barium	**304**	ug/L	5.0	3.5	1	11/29/21 10:03	12/29/21 22:01	7440-39-3	
Beryllium	ND	ug/L	1.0	0.70	1	11/29/21 10:03	12/29/21 22:01	7440-41-7	
Cadmium	ND	ug/L	1.0	0.40	1	11/29/21 10:03	12/29/21 22:01	7440-43-9	
Calcium	**91100**	ug/L	100	94.2	1	11/29/21 10:03	12/29/21 22:01	7440-70-2	
Chromium	ND	ug/L	5.0	3.7	1	11/29/21 10:03	12/29/21 22:01	7440-47-3	
Cobalt	ND	ug/L	5.0	3.6	1	11/29/21 10:03	12/29/21 22:01	7440-48-4	
Copper	**5.5**	ug/L	5.0	4.3	1	11/29/21 10:03	12/29/21 22:01	7440-50-8	
Lead	ND	ug/L	5.0	4.5	1	11/29/21 10:03	12/29/21 22:01	7439-92-1	
Molybdenum	ND	ug/L	5.0	3.9	1	11/29/21 10:03	12/29/21 22:01	7439-98-7	
Nickel	ND	ug/L	5.0	3.5	1	11/29/21 10:03	12/29/21 22:01	7440-02-0	
Selenium	ND	ug/L	10.0	4.7	1	11/29/21 10:03	12/29/21 22:01	7782-49-2	
Silver	ND	ug/L	5.0	2.5	1	11/29/21 10:03	12/29/21 22:01	7440-22-4	
Vanadium	ND	ug/L	5.0	3.9	1	11/29/21 10:03	12/29/21 22:01	7440-62-2	
Zinc	ND	ug/L	10.0	9.5	1	11/29/21 10:03	12/29/21 22:01	7440-66-6	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Boron	ND	ug/L	50.0	8.5	1	11/27/21 15:52	11/29/21 16:20	7440-42-8	
Lithium	**28.5**	ug/L	2.5	0.50	1	11/27/21 15:52	11/28/21 17:57	7439-93-2	
Thallium	ND	ug/L	0.47	0.050	1	11/27/21 15:52	11/28/21 17:57	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	ND	ug/L	0.20	0.12	1	12/04/21 21:45	12/08/21 11:02	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2015 Pace Analytical Services - Asheville								
Total Dissolved Solids	**828**	mg/L	50.0	50.0	1		11/22/21 11:28		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**279**	mg/L	6.0	3.6	6		11/23/21 05:18	16887-00-6	M1
Fluoride	**0.13**	mg/L	0.10	0.050	1		11/22/21 03:03	16984-48-8	
Sulfate	**14.5**	mg/L	1.0	0.50	1		11/22/21 03:03	14808-79-8	

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ANALYTICAL RESULTS

Project: CHARAH Q4 GW
Pace Project No.: 92573625

Sample: MW-8 **Lab ID: 92573625010** Collected: 11/16/21 12:55 Received: 11/19/21 14:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Antimony	ND	ug/L	5.0	3.0	1	11/29/21 10:03	12/29/21 22:04	7440-36-0	
Arsenic	**5.2J**	ug/L	10.0	4.7	1	11/29/21 10:03	12/29/21 22:04	7440-38-2	
Barium	**1080**	ug/L	5.0	3.5	1	11/29/21 10:03	12/29/21 22:04	7440-39-3	
Beryllium	ND	ug/L	1.0	0.70	1	11/29/21 10:03	12/29/21 22:04	7440-41-7	
Cadmium	ND	ug/L	1.0	0.40	1	11/29/21 10:03	12/29/21 22:04	7440-43-9	
Calcium	**101000**	ug/L	500	471	5	11/29/21 10:03	01/05/22 11:22	7440-70-2	
Chromium	ND	ug/L	5.0	3.7	1	11/29/21 10:03	12/29/21 22:04	7440-47-3	
Cobalt	ND	ug/L	5.0	3.6	1	11/29/21 10:03	12/29/21 22:04	7440-48-4	
Copper	ND	ug/L	5.0	4.3	1	11/29/21 10:03	12/29/21 22:04	7440-50-8	
Lead	ND	ug/L	5.0	4.5	1	11/29/21 10:03	12/29/21 22:04	7439-92-1	
Molybdenum	ND	ug/L	5.0	3.9	1	11/29/21 10:03	12/29/21 22:04	7439-98-7	
Nickel	ND	ug/L	5.0	3.5	1	11/29/21 10:03	12/29/21 22:04	7440-02-0	
Selenium	ND	ug/L	10.0	4.7	1	11/29/21 10:03	12/29/21 22:04	7782-49-2	
Silver	ND	ug/L	5.0	2.5	1	11/29/21 10:03	12/29/21 22:04	7440-22-4	
Vanadium	ND	ug/L	5.0	3.9	1	11/29/21 10:03	12/29/21 22:04	7440-62-2	
Zinc	ND	ug/L	10.0	9.5	1	11/29/21 10:03	12/29/21 22:04	7440-66-6	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Boron	**8.6J**	ug/L	50.0	8.5	1	11/27/21 15:52	11/29/21 16:24	7440-42-8	
Lithium	**23.5**	ug/L	2.5	0.50	1	11/27/21 15:52	11/28/21 18:00	7439-93-2	
Thallium	ND	ug/L	0.47	0.050	1	11/27/21 15:52	11/28/21 18:00	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	ND	ug/L	0.20	0.12	1	12/04/21 21:45	12/08/21 11:05	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2015 Pace Analytical Services - Asheville								
Total Dissolved Solids	**788**	mg/L	50.0	50.0	1		11/22/21 11:30		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**307**	mg/L	6.0	3.6	6		11/23/21 05:32	16887-00-6	
Fluoride	**0.075J**	mg/L	0.10	0.050	1		11/22/21 03:48	16984-48-8	
Sulfate	**6.9**	mg/L	1.0	0.50	1		11/22/21 03:48	14808-79-8	

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ANALYTICAL RESULTS

Project: CHARAH Q4 GW
Pace Project No.: 92573625

Sample: MW-10 **Lab ID: 92573625011** Collected: 11/15/21 12:20 Received: 11/19/21 14:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Antimony	ND	ug/L	5.0	3.0	1	11/29/21 10:03	12/29/21 22:08	7440-36-0	
Arsenic	ND	ug/L	10.0	4.7	1	11/29/21 10:03	12/29/21 22:08	7440-38-2	
Barium	**54.7**	ug/L	5.0	3.5	1	11/29/21 10:03	12/29/21 22:08	7440-39-3	
Beryllium	ND	ug/L	1.0	0.70	1	11/29/21 10:03	12/29/21 22:08	7440-41-7	
Cadmium	ND	ug/L	1.0	0.40	1	11/29/21 10:03	12/29/21 22:08	7440-43-9	
Calcium	**21500**	ug/L	100	94.2	1	11/29/21 10:03	12/29/21 22:08	7440-70-2	
Chromium	**5.9**	ug/L	5.0	3.7	1	11/29/21 10:03	12/29/21 22:08	7440-47-3	
Cobalt	ND	ug/L	5.0	3.6	1	11/29/21 10:03	12/29/21 22:08	7440-48-4	
Copper	**11.4**	ug/L	5.0	4.3	1	11/29/21 10:03	12/29/21 22:08	7440-50-8	
Lead	ND	ug/L	5.0	4.5	1	11/29/21 10:03	12/29/21 22:08	7439-92-1	
Molybdenum	**36.2**	ug/L	5.0	3.9	1	11/29/21 10:03	12/29/21 22:08	7439-98-7	
Nickel	ND	ug/L	5.0	3.5	1	11/29/21 10:03	12/29/21 22:08	7440-02-0	
Selenium	**5.2J**	ug/L	10.0	4.7	1	11/29/21 10:03	12/29/21 22:08	7782-49-2	
Silver	ND	ug/L	5.0	2.5	1	11/29/21 10:03	12/29/21 22:08	7440-22-4	
Vanadium	ND	ug/L	5.0	3.9	1	11/29/21 10:03	12/29/21 22:08	7440-62-2	
Zinc	ND	ug/L	10.0	9.5	1	11/29/21 10:03	12/29/21 22:08	7440-66-6	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Boron	**20.8J**	ug/L	50.0	8.5	1	11/27/21 15:52	11/29/21 16:28	7440-42-8	
Lithium	**1.2J**	ug/L	2.5	0.50	1	11/27/21 15:52	11/28/21 18:04	7439-93-2	
Thallium	ND	ug/L	0.47	0.050	1	11/27/21 15:52	11/28/21 18:04	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	ND	ug/L	0.20	0.12	1	12/04/21 21:45	12/08/21 11:07	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2015 Pace Analytical Services - Asheville								
Total Dissolved Solids	**335**	mg/L	25.0	25.0	1		11/22/21 11:28		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**29.4**	mg/L	1.0	0.60	1		11/22/21 04:03	16887-00-6	
Fluoride	**0.54**	mg/L	0.10	0.050	1		11/22/21 04:03	16984-48-8	
Sulfate	**8.0**	mg/L	1.0	0.50	1		11/22/21 04:03	14808-79-8	

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ANALYTICAL RESULTS

Project: CHARAH Q4 GW
Pace Project No.: 92573625

Sample: MW-11 **Lab ID: 92573625012** Collected: 11/17/21 09:00 Received: 11/19/21 14:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Antimony	ND	ug/L	5.0	3.0	1	11/29/21 10:03	12/29/21 22:11	7440-36-0	
Arsenic	ND	ug/L	10.0	4.7	1	11/29/21 10:03	12/29/21 22:11	7440-38-2	
Barium	**38.7**	ug/L	5.0	3.5	1	11/29/21 10:03	12/29/21 22:11	7440-39-3	
Beryllium	ND	ug/L	1.0	0.70	1	11/29/21 10:03	12/29/21 22:11	7440-41-7	
Cadmium	ND	ug/L	1.0	0.40	1	11/29/21 10:03	12/29/21 22:11	7440-43-9	
Calcium	**25400**	ug/L	100	94.2	1	11/29/21 10:03	12/29/21 22:11	7440-70-2	
Chromium	ND	ug/L	5.0	3.7	1	11/29/21 10:03	12/29/21 22:11	7440-47-3	
Cobalt	ND	ug/L	5.0	3.6	1	11/29/21 10:03	12/29/21 22:11	7440-48-4	
Copper	**20.1**	ug/L	5.0	4.3	1	11/29/21 10:03	12/29/21 22:11	7440-50-8	
Lead	ND	ug/L	5.0	4.5	1	11/29/21 10:03	12/29/21 22:11	7439-92-1	
Molybdenum	ND	ug/L	5.0	3.9	1	11/29/21 10:03	12/29/21 22:11	7439-98-7	
Nickel	ND	ug/L	5.0	3.5	1	11/29/21 10:03	12/29/21 22:11	7440-02-0	
Selenium	ND	ug/L	10.0	4.7	1	11/29/21 10:03	12/29/21 22:11	7782-49-2	
Silver	ND	ug/L	5.0	2.5	1	11/29/21 10:03	12/29/21 22:11	7440-22-4	
Vanadium	ND	ug/L	5.0	3.9	1	11/29/21 10:03	12/29/21 22:11	7440-62-2	
Zinc	ND	ug/L	10.0	9.5	1	11/29/21 10:03	12/29/21 22:11	7440-66-6	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Boron	**15.1J**	ug/L	50.0	8.5	1	11/27/21 15:52	11/29/21 16:31	7440-42-8	
Lithium	**9.3**	ug/L	2.5	0.50	1	11/27/21 15:52	11/28/21 18:07	7439-93-2	
Thallium	ND	ug/L	0.47	0.050	1	11/27/21 15:52	11/28/21 18:07	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	ND	ug/L	0.20	0.12	1	12/04/21 21:45	12/08/21 11:10	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2015 Pace Analytical Services - Asheville								
Total Dissolved Solids	**403**	mg/L	25.0	25.0	1		11/23/21 16:43		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**132**	mg/L	3.0	1.8	3		11/23/21 07:07	16887-00-6	
Fluoride	**0.18**	mg/L	0.10	0.050	1		11/22/21 04:18	16984-48-8	
Sulfate	**2.1**	mg/L	1.0	0.50	1		11/22/21 04:18	14808-79-8	

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ANALYTICAL RESULTS

Project: CHARAH Q4 GW
Pace Project No.: 92573625

Sample: MW-11D **Lab ID: 92573625013** Collected: 11/17/21 11:00 Received: 11/19/21 14:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Antimony	ND	ug/L	5.0	3.0	1	11/29/21 10:03	12/29/21 22:14	7440-36-0	
Arsenic	**7.0J**	ug/L	10.0	4.7	1	11/29/21 10:03	12/29/21 22:14	7440-38-2	
Barium	**100**	ug/L	5.0	3.5	1	11/29/21 10:03	12/29/21 22:14	7440-39-3	
Beryllium	ND	ug/L	1.0	0.70	1	11/29/21 10:03	12/29/21 22:14	7440-41-7	
Cadmium	ND	ug/L	1.0	0.40	1	11/29/21 10:03	12/29/21 22:14	7440-43-9	
Calcium	**19100**	ug/L	100	94.2	1	11/29/21 10:03	12/29/21 22:14	7440-70-2	
Chromium	ND	ug/L	5.0	3.7	1	11/29/21 10:03	12/29/21 22:14	7440-47-3	
Cobalt	ND	ug/L	5.0	3.6	1	11/29/21 10:03	12/29/21 22:14	7440-48-4	
Copper	**15.4**	ug/L	5.0	4.3	1	11/29/21 10:03	12/29/21 22:14	7440-50-8	
Lead	ND	ug/L	5.0	4.5	1	11/29/21 10:03	12/29/21 22:14	7439-92-1	
Molybdenum	**17.0**	ug/L	5.0	3.9	1	11/29/21 10:03	12/29/21 22:14	7439-98-7	
Nickel	ND	ug/L	5.0	3.5	1	11/29/21 10:03	12/29/21 22:14	7440-02-0	
Selenium	ND	ug/L	10.0	4.7	1	11/29/21 10:03	12/29/21 22:14	7782-49-2	
Silver	ND	ug/L	5.0	2.5	1	11/29/21 10:03	12/29/21 22:14	7440-22-4	
Vanadium	ND	ug/L	5.0	3.9	1	11/29/21 10:03	12/29/21 22:14	7440-62-2	
Zinc	ND	ug/L	10.0	9.5	1	11/29/21 10:03	12/29/21 22:14	7440-66-6	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Boron	**50.9**	ug/L	50.0	8.5	1	11/27/21 15:52	11/29/21 16:35	7440-42-8	
Lithium	**30.2**	ug/L	2.5	0.50	1	11/27/21 15:52	11/28/21 18:11	7439-93-2	
Thallium	ND	ug/L	0.47	0.050	1	11/27/21 15:52	11/28/21 18:11	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	ND	ug/L	0.20	0.12	1	12/04/21 21:45	12/08/21 11:17	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2015 Pace Analytical Services - Asheville								
Total Dissolved Solids	**396**	mg/L	25.0	25.0	1		11/23/21 16:43		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**103**	mg/L	2.0	1.2	2		11/23/21 07:24	16887-00-6	
Fluoride	**0.52**	mg/L	0.10	0.050	1		11/22/21 05:03	16984-48-8	
Sulfate	ND	mg/L	1.0	0.50	1		11/22/21 05:03	14808-79-8	

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ANALYTICAL RESULTS

Project: CHARAH Q4 GW
Pace Project No.: 92573625

Sample: SW-1 **Lab ID: 92573625014** Collected: 11/18/21 14:35 Received: 11/19/21 14:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Antimony	ND	ug/L	5.0	3.0	1	11/29/21 10:03	12/29/21 22:17	7440-36-0	
Arsenic	**25.9**	ug/L	10.0	4.7	1	11/29/21 10:03	12/29/21 22:17	7440-38-2	
Barium	**805**	ug/L	5.0	3.5	1	11/29/21 10:03	12/29/21 22:17	7440-39-3	
Beryllium	**4.0**	ug/L	1.0	0.70	1	11/29/21 10:03	12/29/21 22:17	7440-41-7	
Cadmium	ND	ug/L	1.0	0.40	1	11/29/21 10:03	12/29/21 22:17	7440-43-9	
Calcium	**12200**	ug/L	100	94.2	1	11/29/21 10:03	12/29/21 22:17	7440-70-2	
Chromium	**23.2**	ug/L	5.0	3.7	1	11/29/21 10:03	12/29/21 22:17	7440-47-3	
Cobalt	**60.2**	ug/L	5.0	3.6	1	11/29/21 10:03	12/29/21 22:17	7440-48-4	
Copper	**29.5**	ug/L	5.0	4.3	1	11/29/21 10:03	12/29/21 22:17	7440-50-8	
Lead	**68.1**	ug/L	5.0	4.5	1	11/29/21 10:03	12/29/21 22:17	7439-92-1	
Molybdenum	**17.2**	ug/L	5.0	3.9	1	11/29/21 10:03	12/29/21 22:17	7439-98-7	
Nickel	**19.5**	ug/L	5.0	3.5	1	11/29/21 10:03	12/29/21 22:17	7440-02-0	
Selenium	ND	ug/L	10.0	4.7	1	11/29/21 10:03	12/29/21 22:17	7782-49-2	
Silver	ND	ug/L	5.0	2.5	1	11/29/21 10:03	12/29/21 22:17	7440-22-4	
Vanadium	**92.0**	ug/L	5.0	3.9	1	11/29/21 10:03	12/29/21 22:17	7440-62-2	
Zinc	**114**	ug/L	10.0	9.5	1	11/29/21 10:03	12/29/21 22:17	7440-66-6	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Boron	**16.2J**	ug/L	50.0	8.5	1	12/07/21 11:50	12/07/21 18:22	7440-42-8	
Lithium	**11.3**	ug/L	2.5	0.50	1	12/07/21 11:50	12/07/21 18:22	7439-93-2	
Thallium	**0.20J**	ug/L	0.47	0.050	1	12/07/21 11:50	12/07/21 18:22	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	ND	ug/L	0.20	0.12	1	12/04/21 21:45	12/08/21 11:19	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2015 Pace Analytical Services - Asheville								
Total Dissolved Solids	**495**	mg/L	25.0	25.0	1		11/24/21 13:25		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**6.5**	mg/L	1.0	0.60	1		11/22/21 19:22	16887-00-6	
Fluoride	**0.15**	mg/L	0.10	0.050	1		11/22/21 19:22	16984-48-8	
Sulfate	ND	mg/L	1.0	0.50	1		11/22/21 19:22	14808-79-8	

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ANALYTICAL RESULTS

Project: CHARAH Q4 GW
Pace Project No.: 92573625

Sample: SW-2 **Lab ID: 92573625015** Collected: 11/18/21 15:40 Received: 11/19/21 14:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Antimony	ND	ug/L	5.0	3.0	1	11/29/21 10:03	12/29/21 22:20	7440-36-0	
Arsenic	ND	ug/L	10.0	4.7	1	11/29/21 10:03	12/29/21 22:20	7440-38-2	
Barium	**69.3**	ug/L	5.0	3.5	1	11/29/21 10:03	12/29/21 22:20	7440-39-3	
Beryllium	ND	ug/L	1.0	0.70	1	11/29/21 10:03	12/29/21 22:20	7440-41-7	
Cadmium	**0.50J**	ug/L	1.0	0.40	1	11/29/21 10:03	12/29/21 22:20	7440-43-9	
Calcium	**22900**	ug/L	100	94.2	1	11/29/21 10:03	12/29/21 22:20	7440-70-2	
Chromium	ND	ug/L	5.0	3.7	1	11/29/21 10:03	12/29/21 22:20	7440-47-3	
Cobalt	ND	ug/L	5.0	3.6	1	11/29/21 10:03	12/29/21 22:20	7440-48-4	
Copper	ND	ug/L	5.0	4.3	1	11/29/21 10:03	12/29/21 22:20	7440-50-8	
Lead	ND	ug/L	5.0	4.5	1	11/29/21 10:03	12/29/21 22:20	7439-92-1	
Molybdenum	ND	ug/L	5.0	3.9	1	11/29/21 10:03	12/29/21 22:20	7439-98-7	
Nickel	ND	ug/L	5.0	3.5	1	11/29/21 10:03	12/29/21 22:20	7440-02-0	
Selenium	ND	ug/L	10.0	4.7	1	11/29/21 10:03	12/29/21 22:20	7782-49-2	
Silver	ND	ug/L	5.0	2.5	1	11/29/21 10:03	12/29/21 22:20	7440-22-4	
Vanadium	ND	ug/L	5.0	3.9	1	11/29/21 10:03	12/29/21 22:20	7440-62-2	
Zinc	ND	ug/L	10.0	9.5	1	11/29/21 10:03	12/29/21 22:20	7440-66-6	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Boron	**11.0J**	ug/L	50.0	8.5	1	12/07/21 11:50	12/07/21 18:25	7440-42-8	
Lithium	ND	ug/L	2.5	0.50	1	12/07/21 11:50	12/07/21 18:25	7439-93-2	
Thallium	ND	ug/L	0.47	0.050	1	12/07/21 11:50	12/07/21 18:25	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	ND	ug/L	0.20	0.12	1	12/04/21 21:45	12/08/21 11:21	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2015 Pace Analytical Services - Asheville								
Total Dissolved Solids	**171**	mg/L	25.0	25.0	1		11/24/21 13:25		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**37.8**	mg/L	1.0	0.60	1		11/22/21 05:32	16887-00-6	
Fluoride	**0.12**	mg/L	0.10	0.050	1		11/22/21 05:32	16984-48-8	
Sulfate	**10.3**	mg/L	1.0	0.50	1		11/22/21 05:32	14808-79-8	

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ANALYTICAL RESULTS

Project: CHARAH Q4 GW
Pace Project No.: 92573625

Sample: SW-4 **Lab ID: 92573625016** Collected: 11/18/21 15:00 Received: 11/19/21 14:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Antimony	ND	ug/L	5.0	3.0	1	11/29/21 10:03	12/29/21 22:24	7440-36-0	
Arsenic	**5.5J**	ug/L	10.0	4.7	1	11/29/21 10:03	12/29/21 22:24	7440-38-2	
Barium	**69.9**	ug/L	5.0	3.5	1	11/29/21 10:03	12/29/21 22:24	7440-39-3	
Beryllium	ND	ug/L	1.0	0.70	1	11/29/21 10:03	12/29/21 22:24	7440-41-7	
Cadmium	ND	ug/L	1.0	0.40	1	11/29/21 10:03	12/29/21 22:24	7440-43-9	
Calcium	**7870**	ug/L	100	94.2	1	11/29/21 10:03	12/29/21 22:24	7440-70-2	
Chromium	ND	ug/L	5.0	3.7	1	11/29/21 10:03	12/29/21 22:24	7440-47-3	
Cobalt	**9.0**	ug/L	5.0	3.6	1	11/29/21 10:03	12/29/21 22:24	7440-48-4	
Copper	**5.4**	ug/L	5.0	4.3	1	11/29/21 10:03	12/29/21 22:24	7440-50-8	
Lead	**8.1**	ug/L	5.0	4.5	1	11/29/21 10:03	12/29/21 22:24	7439-92-1	
Molybdenum	ND	ug/L	5.0	3.9	1	11/29/21 10:03	12/29/21 22:24	7439-98-7	
Nickel	ND	ug/L	5.0	3.5	1	11/29/21 10:03	12/29/21 22:24	7440-02-0	
Selenium	ND	ug/L	10.0	4.7	1	11/29/21 10:03	12/29/21 22:24	7782-49-2	
Silver	ND	ug/L	5.0	2.5	1	11/29/21 10:03	12/29/21 22:24	7440-22-4	
Vanadium	**5.6**	ug/L	5.0	3.9	1	11/29/21 10:03	12/29/21 22:24	7440-62-2	
Zinc	**19.1**	ug/L	10.0	9.5	1	11/29/21 10:03	12/29/21 22:24	7440-66-6	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Boron	**8.6J**	ug/L	50.0	8.5	1	12/07/21 11:50	12/07/21 18:52	7440-42-8	
Lithium	**1.7J**	ug/L	2.5	0.50	1	12/07/21 11:50	12/07/21 18:52	7439-93-2	
Thallium	ND	ug/L	0.47	0.050	1	12/07/21 11:50	12/07/21 18:52	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	ND	ug/L	0.20	0.12	1	12/04/21 21:45	12/08/21 11:24	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2015 Pace Analytical Services - Asheville								
Total Dissolved Solids	**62.0**	mg/L	25.0	25.0	1		11/24/21 13:25		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**4.8**	mg/L	1.0	0.60	1		11/22/21 05:47	16887-00-6	
Fluoride	**0.057J**	mg/L	0.10	0.050	1		11/22/21 05:47	16984-48-8	
Sulfate	**17.0**	mg/L	1.0	0.50	1		11/22/21 05:47	14808-79-8	

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ANALYTICAL RESULTS

Project: CHARAH Q4 GW
Pace Project No.: 92573625

Sample: SW-5 **Lab ID: 92573625017** Collected: 11/18/21 16:10 Received: 11/19/21 14:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Antimony	ND	ug/L	5.0	3.0	1	11/29/21 10:03	12/29/21 22:27	7440-36-0	
Arsenic	**9.0J**	ug/L	10.0	4.7	1	11/29/21 10:03	12/29/21 22:27	7440-38-2	
Barium	**394**	ug/L	5.0	3.5	1	11/29/21 10:03	12/29/21 22:27	7440-39-3	
Beryllium	**1.7**	ug/L	1.0	0.70	1	11/29/21 10:03	12/29/21 22:27	7440-41-7	
Cadmium	ND	ug/L	1.0	0.40	1	11/29/21 10:03	12/29/21 22:27	7440-43-9	
Calcium	**5560**	ug/L	100	94.2	1	11/29/21 10:03	12/29/21 22:27	7440-70-2	
Chromium	**12.8**	ug/L	5.0	3.7	1	11/29/21 10:03	12/29/21 22:27	7440-47-3	
Cobalt	**5.0**	ug/L	5.0	3.6	1	11/29/21 10:03	12/29/21 22:27	7440-48-4	
Copper	**11.8**	ug/L	5.0	4.3	1	11/29/21 10:03	12/29/21 22:27	7440-50-8	
Lead	**33.4**	ug/L	5.0	4.5	1	11/29/21 10:03	12/29/21 22:27	7439-92-1	
Molybdenum	ND	ug/L	5.0	3.9	1	11/29/21 10:03	12/29/21 22:27	7439-98-7	
Nickel	**6.6**	ug/L	5.0	3.5	1	11/29/21 10:03	12/29/21 22:27	7440-02-0	
Selenium	ND	ug/L	10.0	4.7	1	11/29/21 10:03	12/29/21 22:27	7782-49-2	
Silver	ND	ug/L	5.0	2.5	1	11/29/21 10:03	12/29/21 22:27	7440-22-4	
Vanadium	**48.6**	ug/L	5.0	3.9	1	11/29/21 10:03	12/29/21 22:27	7440-62-2	
Zinc	**55.0**	ug/L	10.0	9.5	1	11/29/21 10:03	12/29/21 22:27	7440-66-6	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Boron	ND	ug/L	50.0	8.5	1	12/07/21 11:50	12/07/21 18:56	7440-42-8	
Lithium	**3.7**	ug/L	2.5	0.50	1	12/07/21 11:50	12/07/21 18:56	7439-93-2	
Thallium	**0.072J**	ug/L	0.47	0.050	1	12/07/21 11:50	12/07/21 18:56	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	ND	ug/L	0.20	0.12	1	12/07/21 20:20	12/08/21 18:23	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2015 Pace Analytical Services - Asheville								
Total Dissolved Solids	**265**	mg/L	25.0	25.0	1		11/24/21 13:25		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**5.9**	mg/L	1.0	0.60	1		11/22/21 19:37	16887-00-6	
Fluoride	**0.14**	mg/L	0.10	0.050	1		11/22/21 19:37	16984-48-8	
Sulfate	**4.3**	mg/L	1.0	0.50	1		11/22/21 19:37	14808-79-8	

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ANALYTICAL RESULTS

Project: CHARAH Q4 GW
Pace Project No.: 92573625

Sample: SW-6 **Lab ID: 92573625018** Collected: 11/18/21 14:20 Received: 11/19/21 14:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Antimony	ND	ug/L	5.0	3.0	1	11/29/21 10:03	12/29/21 22:43	7440-36-0	
Arsenic	**15.0**	ug/L	10.0	4.7	1	11/29/21 10:03	12/29/21 22:43	7440-38-2	
Barium	**1130**	ug/L	5.0	3.5	1	11/29/21 10:03	12/29/21 22:43	7440-39-3	
Beryllium	**4.9**	ug/L	1.0	0.70	1	11/29/21 10:03	12/29/21 22:43	7440-41-7	
Cadmium	ND	ug/L	1.0	0.40	1	11/29/21 10:03	12/29/21 22:43	7440-43-9	
Calcium	**9860**	ug/L	100	94.2	1	11/29/21 10:03	12/29/21 22:43	7440-70-2	
Chromium	**22.0**	ug/L	5.0	3.7	1	11/29/21 10:03	12/29/21 22:43	7440-47-3	
Cobalt	**21.8**	ug/L	5.0	3.6	1	11/29/21 10:03	12/29/21 22:43	7440-48-4	
Copper	**24.7**	ug/L	5.0	4.3	1	11/29/21 10:03	12/29/21 22:43	7440-50-8	
Lead	**73.4**	ug/L	5.0	4.5	1	11/29/21 10:03	12/29/21 22:43	7439-92-1	
Molybdenum	**5.6**	ug/L	5.0	3.9	1	11/29/21 10:03	12/29/21 22:43	7439-98-7	
Nickel	**14.2**	ug/L	5.0	3.5	1	11/29/21 10:03	12/29/21 22:43	7440-02-0	
Selenium	ND	ug/L	10.0	4.7	1	11/29/21 10:03	12/29/21 22:43	7782-49-2	
Silver	ND	ug/L	5.0	2.5	1	11/29/21 10:03	12/29/21 22:43	7440-22-4	
Vanadium	**102**	ug/L	5.0	3.9	1	11/29/21 10:03	12/29/21 22:43	7440-62-2	
Zinc	**160**	ug/L	10.0	9.5	1	11/29/21 10:03	12/29/21 22:43	7440-66-6	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Boron	ND	ug/L	250	42.5	5	12/07/21 11:50	12/07/21 19:20	7440-42-8	D3
Lithium	**12.6**	ug/L	12.5	2.5	5	12/07/21 11:50	12/07/21 19:20	7439-93-2	
Thallium	ND	ug/L	2.4	0.25	5	12/07/21 11:50	12/07/21 19:20	7440-28-0	D3
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	ND	ug/L	0.20	0.12	1	12/07/21 20:20	12/08/21 18:25	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2015 Pace Analytical Services - Asheville								
Total Dissolved Solids	**683**	mg/L	25.0	25.0	1		11/24/21 13:25		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**4.6**	mg/L	1.0	0.60	1		11/22/21 20:22	16887-00-6	
Fluoride	**0.34**	mg/L	0.10	0.050	1		11/22/21 20:22	16984-48-8	
Sulfate	**1.2**	mg/L	1.0	0.50	1		11/22/21 20:22	14808-79-8	

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ANALYTICAL RESULTS

Project: CHARAH Q4 GW
Pace Project No.: 92573625

Sample: LEACHATE **Lab ID: 92573625019** Collected: 11/15/21 15:25 Received: 11/19/21 14:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Antimony	ND	ug/L	5.0	3.0	1	11/29/21 10:03	12/29/21 22:46	7440-36-0	
Arsenic	**19.3**	ug/L	10.0	4.7	1	11/29/21 10:03	12/29/21 22:46	7440-38-2	
Barium	**52.7**	ug/L	5.0	3.5	1	11/29/21 10:03	12/29/21 22:46	7440-39-3	
Beryllium	ND	ug/L	1.0	0.70	1	11/29/21 10:03	12/29/21 22:46	7440-41-7	
Cadmium	**0.49J**	ug/L	1.0	0.40	1	11/29/21 10:03	12/29/21 22:46	7440-43-9	
Calcium	ND	ug/L	500	471	5	11/29/21 10:03	12/29/21 23:36	7440-70-2	
Chromium	ND	ug/L	5.0	3.7	1	11/29/21 10:03	12/29/21 22:46	7440-47-3	
Cobalt	ND	ug/L	5.0	3.6	1	11/29/21 10:03	12/29/21 22:46	7440-48-4	
Copper	**6.6**	ug/L	5.0	4.3	1	11/29/21 10:03	12/29/21 22:46	7440-50-8	
Lead	ND	ug/L	5.0	4.5	1	11/29/21 10:03	12/29/21 22:46	7439-92-1	
Molybdenum	**254**	ug/L	5.0	3.9	1	11/29/21 10:03	12/29/21 22:46	7439-98-7	
Nickel	**3.9J**	ug/L	5.0	3.5	1	11/29/21 10:03	12/29/21 22:46	7440-02-0	
Selenium	ND	ug/L	10.0	4.7	1	11/29/21 10:03	12/29/21 22:46	7782-49-2	
Silver	ND	ug/L	5.0	2.5	1	11/29/21 10:03	12/29/21 22:46	7440-22-4	
Vanadium	ND	ug/L	5.0	3.9	1	11/29/21 10:03	12/29/21 22:46	7440-62-2	
Zinc	**14.7**	ug/L	10.0	9.5	1	11/29/21 10:03	12/29/21 22:46	7440-66-6	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Boron	**3190**	ug/L	1000	170	20	12/07/21 11:50	12/07/21 19:03	7440-42-8	
Lithium	**59.6**	ug/L	50.0	10.0	20	12/07/21 11:50	12/07/21 19:03	7439-93-2	
Thallium	ND	ug/L	9.4	1.0	20	12/07/21 11:50	12/07/21 19:03	7440-28-0	D3
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	ND	ug/L	0.20	0.12	1	12/07/21 20:20	12/08/21 18:27	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2015 Pace Analytical Services - Asheville								
Total Dissolved Solids	**1500**	mg/L	50.0	50.0	1		11/22/21 11:28		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**18.6**	mg/L	1.0	0.60	1		11/22/21 07:02	16887-00-6	
Fluoride	**0.27**	mg/L	0.10	0.050	1		11/22/21 07:02	16984-48-8	
Sulfate	**530**	mg/L	11.0	5.5	11		11/23/21 07:38	14808-79-8	

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ANALYTICAL RESULTS

Project: CHARAH Q4 GW
Pace Project No.: 92573625

Sample: DUP **Lab ID: 92573625020** Collected: 11/17/21 12:50 Received: 11/19/21 14:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Antimony	ND	ug/L	5.0	3.0	1	11/29/21 10:03	12/29/21 22:50	7440-36-0	
Arsenic	**5.8J**	ug/L	10.0	4.7	1	11/29/21 10:03	12/29/21 22:50	7440-38-2	
Barium	**52.7**	ug/L	5.0	3.5	1	11/29/21 10:03	12/29/21 22:50	7440-39-3	
Beryllium	ND	ug/L	1.0	0.70	1	11/29/21 10:03	12/29/21 22:50	7440-41-7	
Cadmium	**0.59J**	ug/L	1.0	0.40	1	11/29/21 10:03	12/29/21 22:50	7440-43-9	
Calcium	**34400**	ug/L	100	94.2	1	11/29/21 10:03	12/29/21 22:50	7440-70-2	
Chromium	ND	ug/L	5.0	3.7	1	11/29/21 10:03	12/29/21 22:50	7440-47-3	
Cobalt	ND	ug/L	5.0	3.6	1	11/29/21 10:03	12/29/21 22:50	7440-48-4	
Copper	**29.3**	ug/L	5.0	4.3	1	11/29/21 10:03	12/29/21 22:50	7440-50-8	
Lead	ND	ug/L	5.0	4.5	1	11/29/21 10:03	12/29/21 22:50	7439-92-1	
Molybdenum	ND	ug/L	5.0	3.9	1	11/29/21 10:03	12/29/21 22:50	7439-98-7	
Nickel	ND	ug/L	5.0	3.5	1	11/29/21 10:03	12/29/21 22:50	7440-02-0	
Selenium	ND	ug/L	10.0	4.7	1	11/29/21 10:03	12/29/21 22:50	7782-49-2	
Silver	ND	ug/L	5.0	2.5	1	11/29/21 10:03	12/29/21 22:50	7440-22-4	
Vanadium	ND	ug/L	5.0	3.9	1	11/29/21 10:03	12/29/21 22:50	7440-62-2	
Zinc	**10.2**	ug/L	10.0	9.5	1	11/29/21 10:03	12/29/21 22:50	7440-66-6	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Boron	**11.0J**	ug/L	50.0	8.5	1	12/07/21 11:50	12/07/21 19:10	7440-42-8	
Lithium	**23.8**	ug/L	2.5	0.50	1	12/07/21 11:50	12/07/21 19:10	7439-93-2	
Thallium	ND	ug/L	0.47	0.050	1	12/07/21 11:50	12/07/21 19:10	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	ND	ug/L	0.20	0.12	1	12/07/21 20:20	12/08/21 18:30	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2015 Pace Analytical Services - Asheville								
Total Dissolved Solids	**574**	mg/L	25.0	25.0	1		11/23/21 16:45		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**186**	mg/L	4.0	2.4	4		11/23/21 07:53	16887-00-6	
Fluoride	**0.38**	mg/L	0.10	0.050	1		11/22/21 07:17	16984-48-8	
Sulfate	**26.4**	mg/L	1.0	0.50	1		11/22/21 07:17	14808-79-8	

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ANALYTICAL RESULTS

Project: CHARAH Q4 GW
Pace Project No.: 92573625

Sample: EQBL **Lab ID: 92573625021** Collected: 11/18/21 14:00 Received: 11/19/21 14:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Antimony	ND	ug/L	5.0	3.0	1	11/29/21 10:03	12/29/21 22:53	7440-36-0	
Arsenic	ND	ug/L	10.0	4.7	1	11/29/21 10:03	12/29/21 22:53	7440-38-2	
Barium	**52.7**	ug/L	5.0	3.5	1	11/29/21 10:03	12/29/21 22:53	7440-39-3	
Beryllium	ND	ug/L	1.0	0.70	1	11/29/21 10:03	12/29/21 22:53	7440-41-7	
Cadmium	ND	ug/L	1.0	0.40	1	11/29/21 10:03	12/29/21 22:53	7440-43-9	
Calcium	**8140**	ug/L	100	94.2	1	11/29/21 10:03	12/29/21 22:53	7440-70-2	
Chromium	ND	ug/L	5.0	3.7	1	11/29/21 10:03	12/29/21 22:53	7440-47-3	
Cobalt	ND	ug/L	5.0	3.6	1	11/29/21 10:03	12/29/21 22:53	7440-48-4	
Copper	ND	ug/L	5.0	4.3	1	11/29/21 10:03	12/29/21 22:53	7440-50-8	
Lead	ND	ug/L	5.0	4.5	1	11/29/21 10:03	12/29/21 22:53	7439-92-1	
Molybdenum	ND	ug/L	5.0	3.9	1	11/29/21 10:03	12/29/21 22:53	7439-98-7	
Nickel	ND	ug/L	5.0	3.5	1	11/29/21 10:03	12/29/21 22:53	7440-02-0	
Selenium	ND	ug/L	10.0	4.7	1	11/29/21 10:03	12/29/21 22:53	7782-49-2	
Silver	ND	ug/L	5.0	2.5	1	11/29/21 10:03	12/29/21 22:53	7440-22-4	
Vanadium	ND	ug/L	5.0	3.9	1	11/29/21 10:03	12/29/21 22:53	7440-62-2	
Zinc	**330**	ug/L	10.0	9.5	1	11/29/21 10:03	12/29/21 22:53	7440-66-6	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Boron	**165**	ug/L	50.0	8.5	1	12/07/21 11:50	12/07/21 19:06	7440-42-8	
Lithium	**0.50J**	ug/L	2.5	0.50	1	12/07/21 11:50	12/07/21 19:06	7439-93-2	
Thallium	ND	ug/L	0.47	0.050	1	12/07/21 11:50	12/07/21 19:06	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	ND	ug/L	0.20	0.12	1	12/07/21 20:20	12/08/21 18:37	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2015 Pace Analytical Services - Asheville								
Total Dissolved Solids	**56.0**	mg/L	25.0	25.0	1		11/24/21 13:25		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**5.0**	mg/L	1.0	0.60	1		11/22/21 08:02	16887-00-6	
Fluoride	**0.33**	mg/L	0.10	0.050	1		11/22/21 08:02	16984-48-8	
Sulfate	**3.0**	mg/L	1.0	0.50	1		11/22/21 08:02	14808-79-8	

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QUALITY CONTROL DATA

Project: CHARAH Q4 GW
Pace Project No.: 92573625

QC Batch: 663987
QC Batch Method: EPA 7470A
Analysis Method: EPA 7470A
Analysis Description: 7470 Mercury
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92573625001, 92573625002, 92573625003, 92573625004, 92573625005, 92573625006, 92573625007, 92573625008, 92573625009, 92573625010, 92573625011, 92573625012, 92573625013, 92573625014, 92573625015, 92573625016

METHOD BLANK: 3478151
Matrix: Water
Associated Lab Samples: 92573625001, 92573625002, 92573625003, 92573625004, 92573625005, 92573625006, 92573625007, 92573625008, 92573625009, 92573625010, 92573625011, 92573625012, 92573625013, 92573625014, 92573625015, 92573625016

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury	ug/L	ND	0.20	0.12	12/08/21 10:20	

LABORATORY CONTROL SAMPLE: 3478152

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	2.5	2.8	112	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3478153 3478154

Parameter	Units	92574891001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ug/L	ND	2.5	2.5	2.3	2.4	91	95	75-125	4	25	

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QUALITY CONTROL DATA

Project: CHARAH Q4 GW
Pace Project No.: 92573625

QC Batch: 664359
QC Batch Method: EPA 7470A
Analysis Method: EPA 7470A
Analysis Description: 7470 Mercury
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92573625017, 92573625018, 92573625019, 92573625020, 92573625021

METHOD BLANK: 3479827 Matrix: Water
Associated Lab Samples: 92573625017, 92573625018, 92573625019, 92573625020, 92573625021

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury	ug/L	ND	0.20	0.12	12/08/21 18:08	

LABORATORY CONTROL SAMPLE: 3479828

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	2.5	2.6	103	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3479829 3479830

Parameter	Units	92574642001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ug/L	ND	2.5	2.5	2.9	2.8	115	114	75-125	1	25	

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QUALITY CONTROL DATA

Project: CHARAH Q4 GW
Pace Project No.: 92573625

QC Batch: 662375
QC Batch Method: EPA 3010A
Analysis Method: EPA 6010D
Analysis Description: 6010 MET
Laboratory: Pace Analytical Services - Asheville

Associated Lab Samples: 92573625001

METHOD BLANK: 3470340 Matrix: Water
Associated Lab Samples: 92573625001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Antimony	ug/L	ND	5.0	3.0	12/01/21 17:39	
Arsenic	ug/L	ND	10.0	4.7	12/01/21 17:39	
Barium	ug/L	ND	5.0	3.5	12/01/21 17:39	
Beryllium	ug/L	ND	1.0	0.70	12/01/21 17:39	
Cadmium	ug/L	ND	1.0	0.40	12/01/21 17:39	
Calcium	ug/L	ND	100	94.2	12/01/21 17:39	
Chromium	ug/L	ND	5.0	3.7	12/01/21 17:39	
Cobalt	ug/L	ND	5.0	3.6	12/01/21 17:39	
Copper	ug/L	ND	5.0	4.3	12/01/21 17:39	
Lead	ug/L	ND	5.0	4.5	12/01/21 17:39	
Molybdenum	ug/L	ND	5.0	3.9	12/01/21 17:39	
Nickel	ug/L	ND	5.0	3.5	12/01/21 17:39	
Selenium	ug/L	ND	10.0	4.7	12/01/21 17:39	
Silver	ug/L	ND	5.0	2.5	12/01/21 17:39	
Vanadium	ug/L	ND	5.0	3.9	12/01/21 17:39	
Zinc	ug/L	ND	10.0	9.5	12/01/21 17:39	

LABORATORY CONTROL SAMPLE: 3470341

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	500	542	108	80-120	
Arsenic	ug/L	500	517	103	80-120	
Barium	ug/L	500	524	105	80-120	
Beryllium	ug/L	500	526	105	80-120	
Cadmium	ug/L	500	519	104	80-120	
Calcium	ug/L	5000	5180	104	80-120	
Chromium	ug/L	500	524	105	80-120	
Cobalt	ug/L	500	498	100	80-120	
Copper	ug/L	500	528	106	80-120	
Lead	ug/L	500	520	104	80-120	
Molybdenum	ug/L	500	560	112	80-120	
Nickel	ug/L	500	515	103	80-120	
Selenium	ug/L	500	512	102	80-120	
Silver	ug/L	250	264	105	80-120	
Vanadium	ug/L	500	524	105	80-120	
Zinc	ug/L	500	508	102	80-120	

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QUALITY CONTROL DATA

Project: CHARAH Q4 GW
Pace Project No.: 92573625

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3470342 3470343

Parameter	Units	92574206001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Antimony	ug/L	ND	500	500	553	544	110	108	75-125	2	20	
Arsenic	ug/L	ND	500	500	536	532	107	106	75-125	1	20	
Barium	ug/L	62.7	500	500	595	593	107	106	75-125	0	20	
Beryllium	ug/L	ND	500	500	553	546	111	109	75-125	1	20	
Cadmium	ug/L	0.41J	500	500	534	527	107	105	75-125	1	20	
Calcium	ug/L	21600	5000	5000	26900	27500	105	117	75-125	2	20	
Chromium	ug/L	ND	500	500	539	531	108	106	75-125	1	20	
Cobalt	ug/L	ND	500	500	504	497	101	99	75-125	2	20	
Copper	ug/L	64.8	500	500	602	599	107	107	75-125	0	20	
Lead	ug/L	12.5	500	500	540	532	106	104	75-125	1	20	
Molybdenum	ug/L	ND	500	500	563	555	113	111	75-125	1	20	
Nickel	ug/L	ND	500	500	521	515	104	103	75-125	1	20	
Selenium	ug/L	ND	500	500	559	551	111	110	75-125	2	20	
Silver	ug/L	ND	250	250	266	265	107	106	75-125	1	20	
Vanadium	ug/L	4.2J	500	500	544	537	108	107	75-125	1	20	
Zinc	ug/L	423	500	500	942	943	104	104	75-125	0	20	

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QUALITY CONTROL DATA

Project: CHARAH Q4 GW
Pace Project No.: 92573625

QC Batch: 662376
QC Batch Method: EPA 3010A
Analysis Method: EPA 6010D
Analysis Description: 6010 MET
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92573625002, 92573625003, 92573625004, 92573625005, 92573625006, 92573625007, 92573625008, 92573625009, 92573625010, 92573625011, 92573625012, 92573625013, 92573625014, 92573625015, 92573625016, 92573625017, 92573625018, 92573625019, 92573625020, 92573625021

METHOD BLANK: 3470344
Matrix: Water
Associated Lab Samples: 92573625002, 92573625003, 92573625004, 92573625005, 92573625006, 92573625007, 92573625008, 92573625009, 92573625010, 92573625011, 92573625012, 92573625013, 92573625014, 92573625015, 92573625016, 92573625017, 92573625018, 92573625019, 92573625020, 92573625021

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Antimony	ug/L	ND	5.0	3.0	12/29/21 21:09	
Arsenic	ug/L	ND	10.0	4.7	12/29/21 21:09	
Barium	ug/L	ND	5.0	3.5	12/29/21 21:09	
Beryllium	ug/L	ND	1.0	0.70	12/29/21 21:09	
Cadmium	ug/L	ND	1.0	0.40	12/29/21 21:09	
Calcium	ug/L	ND	100	94.2	12/29/21 21:09	
Chromium	ug/L	ND	5.0	3.7	12/29/21 21:09	
Cobalt	ug/L	ND	5.0	3.6	12/29/21 21:09	
Copper	ug/L	ND	5.0	4.3	12/29/21 21:09	
Lead	ug/L	ND	5.0	4.5	12/29/21 21:09	
Molybdenum	ug/L	ND	5.0	3.9	12/29/21 21:09	
Nickel	ug/L	ND	5.0	3.5	12/29/21 21:09	
Selenium	ug/L	ND	10.0	4.7	12/29/21 21:09	
Silver	ug/L	ND	5.0	2.5	12/29/21 21:09	
Vanadium	ug/L	ND	5.0	3.9	12/29/21 21:09	
Zinc	ug/L	ND	10.0	9.5	12/29/21 21:09	

LABORATORY CONTROL SAMPLE: 3470345

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	500	470	94	80-120	
Arsenic	ug/L	500	453	91	80-120	
Barium	ug/L	500	466	93	80-120	
Beryllium	ug/L	500	468	94	80-120	
Cadmium	ug/L	500	461	92	80-120	
Calcium	ug/L	5000	4680	94	80-120	
Chromium	ug/L	500	456	91	80-120	
Cobalt	ug/L	500	444	89	80-120	
Copper	ug/L	500	472	94	80-120	
Lead	ug/L	500	470	94	80-120	
Molybdenum	ug/L	500	491	98	80-120	
Nickel	ug/L	500	461	92	80-120	
Selenium	ug/L	500	439	88	80-120	
Silver	ug/L	250	236	94	80-120	
Vanadium	ug/L	500	458	92	80-120	

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QUALITY CONTROL DATA

Project: CHARAH Q4 GW
Pace Project No.: 92573625

LABORATORY CONTROL SAMPLE: 3470345

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Zinc	ug/L	500	452	90	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3470346 3470347

Parameter	Units	92573625002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Antimony	ug/L	ND	500	500	501	492	100	98	75-125	2	20	
Arsenic	ug/L	ND	500	500	508	498	102	100	75-125	2	20	
Barium	ug/L	78.5	500	500	580	572	100	99	75-125	1	20	
Beryllium	ug/L	ND	500	500	511	504	102	101	75-125	1	20	
Cadmium	ug/L	ND	500	500	501	493	100	99	75-125	2	20	
Calcium	ug/L	119000	5000	5000	123000	124000	74	103	75-125	1	20	M1
Chromium	ug/L	ND	500	500	492	484	98	97	75-125	2	20	
Cobalt	ug/L	ND	500	500	458	453	92	91	75-125	1	20	
Copper	ug/L	6.9	500	500	522	511	103	101	75-125	2	20	
Lead	ug/L	ND	500	500	488	485	97	97	75-125	1	20	
Molybdenum	ug/L	ND	500	500	520	513	104	102	75-125	1	20	
Nickel	ug/L	ND	500	500	476	471	95	94	75-125	1	20	
Selenium	ug/L	ND	500	500	492	484	98	96	75-125	2	20	
Silver	ug/L	ND	250	250	247	271	99	108	75-125	9	20	
Vanadium	ug/L	ND	500	500	504	495	101	99	75-125	2	20	
Zinc	ug/L	ND	500	500	486	478	96	95	75-125	1	20	

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QUALITY CONTROL DATA

Project: CHARAH Q4 GW
Pace Project No.: 92573625

QC Batch: 662386
QC Batch Method: EPA 3010A
Analysis Method: EPA 6020B
Analysis Description: 6020 MET
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92573625001, 92573625002, 92573625003, 92573625004, 92573625005, 92573625006, 92573625007, 92573625008, 92573625009, 92573625010, 92573625011, 92573625012, 92573625013

METHOD BLANK: 3470388 Matrix: Water
Associated Lab Samples: 92573625001, 92573625002, 92573625003, 92573625004, 92573625005, 92573625006, 92573625007, 92573625008, 92573625009, 92573625010, 92573625011, 92573625012, 92573625013

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Boron	ug/L	ND	50.0	8.5	11/29/21 15:38	
Lithium	ug/L	ND	2.5	0.50	11/28/21 17:05	
Thallium	ug/L	ND	0.47	0.050	11/28/21 17:05	

LABORATORY CONTROL SAMPLE: 3470389

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Boron	ug/L	50	45.4J	91	80-120	
Lithium	ug/L	50	49.7	99	80-120	
Thallium	ug/L	25	25.2	101	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3470390 3470391

Parameter	Units	92573847008 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Boron	ug/L	346	50	50	269	250	-155	-193	75-125	7	20	E,M1
Lithium	ug/L	35.1	50	50	83.4	81.8	97	93	75-125	2	20	
Thallium	ug/L	ND	25	25	24.7	24.5	98	97	75-125	1	20	

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QUALITY CONTROL DATA

Project: CHARAH Q4 GW
Pace Project No.: 92573625

QC Batch: 664324
QC Batch Method: EPA 3010A
Analysis Method: EPA 6020B
Analysis Description: 6020 MET
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92573625014, 92573625015, 92573625016, 92573625017, 92573625018, 92573625019, 92573625020, 92573625021

METHOD BLANK: 3479628 Matrix: Water
Associated Lab Samples: 92573625014, 92573625015, 92573625016, 92573625017, 92573625018, 92573625019, 92573625020, 92573625021

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Boron	ug/L	ND	50.0	8.5	12/07/21 18:15	
Lithium	ug/L	ND	2.5	0.50	12/07/21 18:15	
Thallium	ug/L	ND	0.47	0.050	12/07/21 18:15	

LABORATORY CONTROL SAMPLE: 3479629

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Boron	ug/L	50	42.1J	84	80-120	
Lithium	ug/L	50	48.8	98	80-120	
Thallium	ug/L	25	23.9	95	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3480738 3480739

Parameter	Units	92573625015 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Boron	ug/L	11.0J	50	50	53.6	54.9	85	88	75-125	2	20	
Lithium	ug/L	ND	50	50	49.4	49.9	98	100	75-125	1	20	
Thallium	ug/L	ND	25	25	24.5	24.9	98	100	75-125	2	20	

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QUALITY CONTROL DATA

Project: CHARAH Q4 GW
Pace Project No.: 92573625

QC Batch: 661511 | Analysis Method: SM 2540C-2015
QC Batch Method: SM 2540C-2015 | Analysis Description: 2540C Total Dissolved Solids
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92573625001, 92573625003, 92573625007, 92573625009, 92573625010, 92573625011, 92573625019

METHOD BLANK: 3465858 Matrix: Water
Associated Lab Samples: 92573625001, 92573625003, 92573625007, 92573625009, 92573625010, 92573625011, 92573625019

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	ND	25.0	25.0	11/22/21 11:28	

LABORATORY CONTROL SAMPLE: 3465859

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	250	250	100	90-110	

SAMPLE DUPLICATE: 3465860

Parameter	Units	92573625009 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	828	844	2	25	

SAMPLE DUPLICATE: 3465861

Parameter	Units	92573372002 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	85.0	85.0	0	25	

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QUALITY CONTROL DATA

Project: CHARAH Q4 GW
Pace Project No.: 92573625

QC Batch: 661926 | Analysis Method: SM 2540C-2015
QC Batch Method: SM 2540C-2015 | Analysis Description: 2540C Total Dissolved Solids
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92573625002, 92573625006, 92573625008, 92573625012, 92573625013, 92573625020

METHOD BLANK: 3468164 Matrix: Water
Associated Lab Samples: 92573625002, 92573625006, 92573625008, 92573625012, 92573625013, 92573625020

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	ND	25.0	25.0	11/23/21 16:42	

LABORATORY CONTROL SAMPLE: 3468165

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	250	258	103	90-110	

SAMPLE DUPLICATE: 3468166

Parameter	Units	92573078008 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	2770	2730	1	25	

SAMPLE DUPLICATE: 3468167

Parameter	Units	92573628001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	136000	136000	0	25	

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QUALITY CONTROL DATA

Project: CHARAH Q4 GW
Pace Project No.: 92573625

QC Batch: 662115 — Analysis Method: SM 2540C-2015
QC Batch Method: SM 2540C-2015 — Analysis Description: 2540C Total Dissolved Solids
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92573625004, 92573625005, 92573625014, 92573625015, 92573625016, 92573625017, 92573625018, 92573625021

METHOD BLANK: 3469005 — Matrix: Water
Associated Lab Samples: 92573625004, 92573625005, 92573625014, 92573625015, 92573625016, 92573625017, 92573625018, 92573625021

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	ND	25.0	25.0	11/24/21 13:25	

LABORATORY CONTROL SAMPLE: 3469006

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	250	250	100	90-110	

SAMPLE DUPLICATE: 3469007

Parameter	Units	92573625004 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	2580	2550	1	25	

SAMPLE DUPLICATE: 3469008

Parameter	Units	92573908003 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	458	461	1	25	

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QUALITY CONTROL DATA

Project: CHARAH Q4 GW
Pace Project No.: 92573625

QC Batch: 661444
QC Batch Method: EPA 300.0 Rev 2.1 1993
Analysis Method: EPA 300.0 Rev 2.1 1993
Analysis Description: 300.0 IC Anions
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92573625001, 92573625002, 92573625003, 92573625004, 92573625005, 92573625006, 92573625007, 92573625008, 92573625009, 92573625010, 92573625011, 92573625012, 92573625013, 92573625014, 92573625015, 92573625016, 92573625017, 92573625018

METHOD BLANK: 3465604
Matrix: Water
Associated Lab Samples: 92573625001, 92573625002, 92573625003, 92573625004, 92573625005, 92573625006, 92573625007, 92573625008, 92573625009, 92573625010, 92573625011, 92573625012, 92573625013, 92573625014, 92573625015, 92573625016, 92573625017, 92573625018

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	ND	1.0	0.60	11/21/21 23:04	
Fluoride	mg/L	ND	0.10	0.050	11/21/21 23:04	
Sulfate	mg/L	ND	1.0	0.50	11/21/21 23:04	

LABORATORY CONTROL SAMPLE: 3465605

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	50	48.8	98	90-110	
Fluoride	mg/L	2.5	2.7	106	90-110	
Sulfate	mg/L	50	48.4	97	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3465606 3465607

Parameter	Units	92573625001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	222	50	50	221	221	-1	-2	90-110	0	10	M1
Fluoride	mg/L	0.18	2.5	2.5	2.9	2.9	107	108	90-110	1	10	
Sulfate	mg/L	18.8	50	50	65.4	65.8	93	94	90-110	1	10	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3465608 3465609

Parameter	Units	92573625009 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	279	50	50	318	318	78	78	90-110	0	10	M1
Fluoride	mg/L	0.13	2.5	2.5	2.8	2.8	105	105	90-110	0	10	
Sulfate	mg/L	14.5	50	50	61.1	61.4	93	94	90-110	0	10	

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QUALITY CONTROL DATA

Project: CHARAH Q4 GW
Pace Project No.: 92573625

QC Batch: 661445
QC Batch Method: EPA 300.0 Rev 2.1 1993
Analysis Method: EPA 300.0 Rev 2.1 1993
Analysis Description: 300.0 IC Anions
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92573625019, 92573625020, 92573625021

METHOD BLANK: 3465610 Matrix: Water
Associated Lab Samples: 92573625019, 92573625020, 92573625021

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	ND	1.0	0.60	11/22/21 17:23	
Fluoride	mg/L	ND	0.10	0.050	11/22/21 17:23	
Sulfate	mg/L	ND	1.0	0.50	11/22/21 17:23	

LABORATORY CONTROL SAMPLE: 3465611

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	50	49.1	98	90-110	
Fluoride	mg/L	2.5	2.7	107	90-110	
Sulfate	mg/L	50	48.6	97	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3465612 3465613

Parameter	Units	92573625021 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	5.0	50	50	52.5	52.6	95	95	90-110	0	10	
Fluoride	mg/L	0.33	2.5	2.5	2.9	2.9	103	104	90-110	1	10	
Sulfate	mg/L	3.0	50	50	50.2	50.4	94	95	90-110	0	10	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3465614 3465615

Parameter	Units	92573222010 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	2.0	50	50	49.4	49.0	95	94	90-110	1	10	
Fluoride	mg/L	ND	2.5	2.5	2.7	2.6	105	104	90-110	1	10	
Sulfate	mg/L	110	50	50	85.3	167	-49	116	90-110	65	10	M1,R1

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: CHARAH Q4 GW
Pace Project No.: 92573625

Sample: BG-1 **Lab ID: 92573625001** Collected: 11/16/21 16:10 Received: 11/19/21 14:00 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.532 ± 0.347 (0.356) C:NA T:96%**	pCi/L	01/10/22 14:19	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.534 ± 0.328 (0.601) C:75% T:97%**	pCi/L	01/06/22 14:56	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**1.07 ± 0.675 (0.957)**	pCi/L	01/16/22 21:34	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: CHARAH Q4 GW
Pace Project No.: 92573625

Sample: BG-2 **Lab ID: 92573625002** Collected: 11/17/21 17:10 Received: 11/19/21 14:00 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.192 ± 0.453 (0.840) C:NA T:95%**	pCi/L	01/10/22 14:19	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.649 ± 0.505 (1.00) C:67% T:94%**	pCi/L	01/06/22 14:56	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**0.841 ± 0.958 (1.84)**	pCi/L	01/16/22 21:34	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: CHARAH Q4 GW
Pace Project No.: 92573625

Sample: MW-1 **Lab ID: 92573625003** Collected: 11/16/21 08:45 Received: 11/19/21 14:00 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**-0.0643 ± 0.334 (0.773) C:NA T:93%**	pCi/L	01/10/22 14:19	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.552 ± 0.353 (0.660) C:68% T:98%**	pCi/L	01/06/22 14:56	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**0.552 ± 0.687 (1.43)**	pCi/L	01/16/22 21:34	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: CHARAH Q4 GW
Pace Project No.: 92573625

Sample: MW-2 **Lab ID: 92573625004** Collected: 11/18/21 11:55 Received: 11/19/21 14:00 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**1.25 ± 0.830 (1.16) C:NA T:94%**	pCi/L	01/10/22 14:19	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**1.56 ± 0.495 (0.616) C:75% T:95%**	pCi/L	01/06/22 14:56	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**2.81 ± 1.33 (1.78)**	pCi/L	01/16/22 21:34	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: CHARAH Q4 GW
Pace Project No.: 92573625

Sample: MW-3 **Lab ID: 92573625005** Collected: 11/18/21 08:35 Received: 11/19/21 14:00 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**1.26 ± 0.686 (0.751) C:NA T:97%**	pCi/L	01/10/22 14:19	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**1.18 ± 0.466 (0.711) C:64% T:99%**	pCi/L	01/06/22 14:56	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**2.44 ± 1.15 (1.46)**	pCi/L	01/16/22 21:34	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: CHARAH Q4 GW
Pace Project No.: 92573625

Sample: MW-4 **Lab ID: 92573625006** Collected: 11/17/21 15:30 Received: 11/19/21 14:00 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.230 ± 0.452 (0.826) C:NA T:90%**	pCi/L	01/10/22 14:19	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.770 ± 0.408 (0.714) C:65% T:95%**	pCi/L	01/06/22 14:57	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**1.000 ± 0.860 (1.54)**	pCi/L	01/16/22 21:34	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: CHARAH Q4 GW
Pace Project No.: 92573625

Sample: MW-5 **Lab ID: 92573625007** Collected: 11/16/21 14:45 Received: 11/19/21 14:00 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.121 ± 0.412 (0.794) C:NA T:98%**	pCi/L	01/10/22 14:19	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.576 ± 0.365 (0.682) C:63% T:106%**	pCi/L	01/06/22 14:56	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**0.697 ± 0.777 (1.48)**	pCi/L	01/16/22 21:34	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: CHARAH Q4 GW
Pace Project No.: 92573625

Sample: MW-6 **Lab ID: 92573625008** Collected: 11/17/21 12:40 Received: 11/19/21 14:00 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**-0.252 ± 0.304 (0.827) C:NA T:94%**	pCi/L	01/10/22 14:38	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**1.12 ± 0.648 (1.17) C:63% T:90%**	pCi/L	01/06/22 17:31	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**1.12 ± 0.952 (2.00)**	pCi/L	01/16/22 21:34	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: CHARAH Q4 GW
Pace Project No.: 92573625

Sample: MW-7R **Lab ID: 92573625009** Collected: 11/15/21 15:00 Received: 11/19/21 14:00 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.128 ± 0.559 (1.06) C:NA T:96%**	pCi/L	01/10/22 14:38	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.726 ± 0.543 (1.06) C:66% T:96%**	pCi/L	01/06/22 17:31	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**0.854 ± 1.10 (2.12)**	pCi/L	01/16/22 21:34	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: CHARAH Q4 GW
Pace Project No.: 92573625

Sample: MW-8 **Lab ID: 92573625010** Collected: 11/16/21 12:55 Received: 11/19/21 14:00 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.269 ± 0.458 (0.808) C:NA T:95%**	pCi/L	01/10/22 14:38	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.650 ± 0.541 (1.09) C:69% T:95%**	pCi/L	01/06/22 17:31	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**0.919 ± 0.999 (1.90)**	pCi/L	01/16/22 21:34	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: CHARAH Q4 GW
Pace Project No.: 92573625

Sample: MW-10 **Lab ID: 92573625011** Collected: 11/15/21 12:20 Received: 11/19/21 14:00 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.537 ± 0.530 (0.807) C:NA T:97%**	pCi/L	01/10/22 14:38	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.389 ± 0.458 (0.964) C:67% T:100%**	pCi/L	01/06/22 17:32	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**0.926 ± 0.988 (1.77)**	pCi/L	01/16/22 21:34	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: CHARAH Q4 GW
Pace Project No.: 92573625

Sample: MW-11 **Lab ID: 92573625012** Collected: 11/17/21 09:00 Received: 11/19/21 14:00 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**-0.0605 ± 0.393 (0.853) C:NA T:101%**	pCi/L	01/10/22 14:38	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.129 ± 0.425 (0.961) C:67% T:95%**	pCi/L	01/06/22 17:32	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**0.129 ± 0.818 (1.81)**	pCi/L	01/16/22 21:34	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: CHARAH Q4 GW
Pace Project No.: 92573625

Sample: MW-11D **Lab ID: 92573625013** Collected: 11/17/21 11:00 Received: 11/19/21 14:00 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.431 ± 0.448 (0.667) C:NA T:95%**	pCi/L	01/10/22 14:38	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.283 ± 0.453 (0.983) C:66% T:91%**	pCi/L	01/06/22 17:32	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**0.714 ± 0.901 (1.65)**	pCi/L	01/16/22 21:34	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: CHARAH Q4 GW
Pace Project No.: 92573625

Sample: SW-1 **Lab ID: 92573625014** Collected: 11/18/21 14:35 Received: 11/19/21 14:00 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.939 ± 0.694 (0.939) C:NA T:74%**	pCi/L	01/10/22 14:38	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**2.33 ± 1.19 (2.05) C:61% T:49%**	pCi/L	01/06/22 17:32	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**3.27 ± 1.88 (2.99)**	pCi/L	01/16/22 21:34	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: CHARAH Q4 GW
Pace Project No.: 92573625

Sample: SW-2 **Lab ID: 92573625015** Collected: 11/18/21 15:40 Received: 11/19/21 14:00 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.382 ± 0.398 (0.592) C:NA T:92%**	pCi/L	01/10/22 14:38	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.110 ± 0.451 (1.03) C:60% T:95%**	pCi/L	01/06/22 17:58	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**0.492 ± 0.849 (1.62)**	pCi/L	01/16/22 21:34	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: CHARAH Q4 GW
Pace Project No.: 92573625

Sample: SW-4 **Lab ID: 92573625016** Collected: 11/18/21 15:00 Received: 11/19/21 14:00 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.426 ± 0.559 (0.932) C:NA T:94%**	pCi/L	01/10/22 14:54	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.729 ± 0.971 (2.06) C:59% T:47%**	pCi/L	01/06/22 17:58	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**1.16 ± 1.53 (2.99)**	pCi/L	01/16/22 21:34	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: CHARAH Q4 GW
Pace Project No.: 92573625

Sample: SW-5 **Lab ID: 92573625017** Collected: 11/18/21 16:10 Received: 11/19/21 14:00 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.108 ± 0.562 (1.17) C:NA T:52%**	pCi/L	01/10/22 14:54	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**1.27 ± 0.598 (1.02) C:67% T:101%**	pCi/L	01/06/22 17:58	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**1.38 ± 1.16 (2.19)**	pCi/L	01/16/22 21:34	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: CHARAH Q4 GW
Pace Project No.: 92573625

Sample: SW-6 **Lab ID: 92573625018** Collected: 11/18/21 14:20 Received: 11/19/21 14:00 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**2.09 ± 1.37 (1.57) C:NA T:25%**	pCi/L	01/10/22 14:54	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**2.48 ± 0.861 (1.20) C:61% T:86%**	pCi/L	01/06/22 17:58	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**4.57 ± 2.23 (2.77)**	pCi/L	01/16/22 21:34	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: CHARAH Q4 GW
Pace Project No.: 92573625

Sample: LEACHATE **Lab ID: 92573625019** Collected: 11/15/21 15:25 Received: 11/19/21 14:00 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.195 ± 0.383 (0.700) C:NA T:92%**	pCi/L	01/10/22 14:54	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.722 ± 0.462 (0.855) C:68% T:103%**	pCi/L	01/06/22 17:58	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**0.917 ± 0.845 (1.56)**	pCi/L	01/16/22 21:34	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: CHARAH Q4 GW
Pace Project No.: 92573625

Sample: DUP **Lab ID: 92573625020** Collected: 11/17/21 12:50 Received: 11/19/21 14:00 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.326 ± 0.340 (0.479) C:NA T:94%**	pCi/L	01/10/22 14:54	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.0506 ± 0.431 (0.998) C:69% T:92%**	pCi/L	01/06/22 17:58	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**0.377 ± 0.771 (1.48)**	pCi/L	01/16/22 21:34	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: CHARAH Q4 GW
Pace Project No.: 92573625

Sample: EQBL **Lab ID: 92573625021** Collected: 11/18/21 14:00 Received: 11/19/21 14:00 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.108 ± 0.246 (0.396) C:NA T:104%**	pCi/L	01/10/22 15:47	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.461 ± 0.480 (0.999) C:76% T:94%**	pCi/L	01/06/22 14:07	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**0.569 ± 0.726 (1.40)**	pCi/L	01/17/22 12:08	7440-14-4	

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QUALITY CONTROL - RADIOCHEMISTRY

Project: CHARAH Q4 GW
Pace Project No.: 92573625

QC Batch: 475988
QC Batch Method: EPA 903.1
Analysis Method: EPA 903.1
Analysis Description: 903.1 Radium-226
Laboratory: Pace Analytical Services - Greensburg
Associated Lab Samples: 92573625021

METHOD BLANK: 2299164 Matrix: Water
Associated Lab Samples: 92573625021

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	0.313 ± 0.363 (0.586) C:NA T:98%	pCi/L	01/10/22 15:47	

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QUALITY CONTROL - RADIOCHEMISTRY

Project: CHARAH Q4 GW
Pace Project No.: 92573625

QC Batch: 475989
QC Batch Method: EPA 904.0
Analysis Method: EPA 904.0
Analysis Description: 904.0 Radium 228
Laboratory: Pace Analytical Services - Greensburg
Associated Lab Samples: 92573625021

METHOD BLANK: 2299165 Matrix: Water
Associated Lab Samples: 92573625021

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	0.460 ± 0.355 (0.695) C:65% T:98%	pCi/L	01/06/22 10:55	

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QUALITY CONTROL - RADIOCHEMISTRY

Project: CHARAH Q4 GW
Pace Project No.: 92573625

QC Batch: 475987 Analysis Method: EPA 904.0
QC Batch Method: EPA 904.0 Analysis Description: 904.0 Radium 228
Laboratory: Pace Analytical Services - Greensburg
Associated Lab Samples: 92573625001, 92573625002, 92573625003, 92573625004, 92573625005, 92573625006, 92573625007, 92573625008, 92573625009, 92573625010, 92573625011, 92573625012, 92573625013, 92573625014, 92573625015, 92573625016, 92573625017, 92573625018, 92573625019, 92573625020

METHOD BLANK: 2299163 Matrix: Water
Associated Lab Samples: 92573625001, 92573625002, 92573625003, 92573625004, 92573625005, 92573625006, 92573625007, 92573625008, 92573625009, 92573625010, 92573625011, 92573625012, 92573625013, 92573625014, 92573625015, 92573625016, 92573625017, 92573625018, 92573625019, 92573625020

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	0.871 ± 0.392 (0.634) C:74% T:92%	pCi/L	01/06/22 14:57	

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QUALITY CONTROL - RADIOCHEMISTRY

Project: CHARAH Q4 GW
Pace Project No.: 92573625

QC Batch: 475986 Analysis Method: EPA 903.1
QC Batch Method: EPA 903.1 Analysis Description: 903.1 Radium-226
Laboratory: Pace Analytical Services - Greensburg
Associated Lab Samples: 92573625001, 92573625002, 92573625003, 92573625004, 92573625005, 92573625006, 92573625007, 92573625008, 92573625009, 92573625010, 92573625011, 92573625012, 92573625013, 92573625014, 92573625015, 92573625016, 92573625017, 92573625018, 92573625019, 92573625020

METHOD BLANK: 2299162 Matrix: Water
Associated Lab Samples: 92573625001, 92573625002, 92573625003, 92573625004, 92573625005, 92573625006, 92573625007, 92573625008, 92573625009, 92573625010, 92573625011, 92573625012, 92573625013, 92573625014, 92573625015, 92573625016, 92573625017, 92573625018, 92573625019, 92573625020

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	0.181 ± 0.308 (0.543) C:NA T:97%	pCi/L	01/10/22 14:19	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

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Pace Analytical Services, LLC
9800 Kincey Ave. Suite 100
Huntersville, NC 28078
(704)875-9092

QUALIFIERS

Project: CHARAH Q4 GW
Pace Project No.: 92573625

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

Acid preservation may not be appropriate for 2 Chloroethylvinyl ether.

A separate vial preserved to a pH of 4-5 is recommended in SW846 Chapter 4 for the analysis of Acrolein and Acrylonitrile by EPA Method 8260.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Reported results are not rounded until the final step prior to reporting. Therefore, calculated parameters that are typically reported as "Total" may vary slightly from the sum of the reported component parameters.

Act - Activity

Unc - Uncertainty: SDWA = 1.96 sigma count uncertainty, all other matrices = Expanded Uncertainty (95% confidence interval). Gamma Spec = Expanded Uncertainty (95.4% Confidence Interval)

(MDC) - Minimum Detectable Concentration

Trac - Tracer Recovery (%)

Carr - Carrier Recovery (%)

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

ANALYTE QUALIFIERS

D3	Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference.
E	Analyte concentration exceeded the calibration range. The reported result is estimated.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
R1	RPD value was outside control limits.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: CHARAH Q4 GW
Pace Project No.: 92573625

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
92573625001	**BG-1**	EPA 3010A	662375	EPA 6010D	662525
92573625002	**BG-2**	EPA 3010A	662376	EPA 6010D	662527
92573625003	**MW-1**	EPA 3010A	662376	EPA 6010D	662527
92573625004	**MW-2**	EPA 3010A	662376	EPA 6010D	662527
92573625005	**MW-3**	EPA 3010A	662376	EPA 6010D	662527
92573625006	**MW-4**	EPA 3010A	662376	EPA 6010D	662527
92573625007	**MW-5**	EPA 3010A	662376	EPA 6010D	662527
92573625008	**MW-6**	EPA 3010A	662376	EPA 6010D	662527
92573625009	**MW-7R**	EPA 3010A	662376	EPA 6010D	662527
92573625010	**MW-8**	EPA 3010A	662376	EPA 6010D	662527
92573625011	**MW-10**	EPA 3010A	662376	EPA 6010D	662527
92573625012	**MW-11**	EPA 3010A	662376	EPA 6010D	662527
92573625013	**MW-11D**	EPA 3010A	662376	EPA 6010D	662527
92573625014	**SW-1**	EPA 3010A	662376	EPA 6010D	662527
92573625015	**SW-2**	EPA 3010A	662376	EPA 6010D	662527
92573625016	**SW-4**	EPA 3010A	662376	EPA 6010D	662527
92573625017	**SW-5**	EPA 3010A	662376	EPA 6010D	662527
92573625018	**SW-6**	EPA 3010A	662376	EPA 6010D	662527
92573625019	**LEACHATE**	EPA 3010A	662376	EPA 6010D	662527
92573625020	**DUP**	EPA 3010A	662376	EPA 6010D	662527
92573625021	**EQBL**	EPA 3010A	662376	EPA 6010D	662527
92573625001	**BG-1**	EPA 3010A	662386	EPA 6020B	662394
92573625002	**BG-2**	EPA 3010A	662386	EPA 6020B	662394
92573625003	**MW-1**	EPA 3010A	662386	EPA 6020B	662394
92573625004	**MW-2**	EPA 3010A	662386	EPA 6020B	662394
92573625005	**MW-3**	EPA 3010A	662386	EPA 6020B	662394
92573625006	**MW-4**	EPA 3010A	662386	EPA 6020B	662394
92573625007	**MW-5**	EPA 3010A	662386	EPA 6020B	662394
92573625008	**MW-6**	EPA 3010A	662386	EPA 6020B	662394
92573625009	**MW-7R**	EPA 3010A	662386	EPA 6020B	662394
92573625010	**MW-8**	EPA 3010A	662386	EPA 6020B	662394
92573625011	**MW-10**	EPA 3010A	662386	EPA 6020B	662394
92573625012	**MW-11**	EPA 3010A	662386	EPA 6020B	662394
92573625013	**MW-11D**	EPA 3010A	662386	EPA 6020B	662394
92573625014	**SW-1**	EPA 3010A	664324	EPA 6020B	664495
92573625015	**SW-2**	EPA 3010A	664324	EPA 6020B	664495
92573625016	**SW-4**	EPA 3010A	664324	EPA 6020B	664495
92573625017	**SW-5**	EPA 3010A	664324	EPA 6020B	664495
92573625018	**SW-6**	EPA 3010A	664324	EPA 6020B	664495
92573625019	**LEACHATE**	EPA 3010A	664324	EPA 6020B	664495
92573625020	**DUP**	EPA 3010A	664324	EPA 6020B	664495
92573625021	**EQBL**	EPA 3010A	664324	EPA 6020B	664495
92573625001	**BG-1**	EPA 7470A	663987	EPA 7470A	663999
92573625002	**BG-2**	EPA 7470A	663987	EPA 7470A	663999
92573625003	**MW-1**	EPA 7470A	663987	EPA 7470A	663999
92573625004	**MW-2**	EPA 7470A	663987	EPA 7470A	663999
92573625005	**MW-3**	EPA 7470A	663987	EPA 7470A	663999

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: CHARAH Q4 GW
Pace Project No.: 92573625

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
92573625006	MW-4	EPA 7470A	663987	EPA 7470A	663999
92573625007	MW-5	EPA 7470A	663987	EPA 7470A	663999
92573625008	MW-6	EPA 7470A	663987	EPA 7470A	663999
92573625009	MW-7R	EPA 7470A	663987	EPA 7470A	663999
92573625010	MW-8	EPA 7470A	663987	EPA 7470A	663999
92573625011	MW-10	EPA 7470A	663987	EPA 7470A	663999
92573625012	MW-11	EPA 7470A	663987	EPA 7470A	663999
92573625013	MW-11D	EPA 7470A	663987	EPA 7470A	663999
92573625014	SW-1	EPA 7470A	663987	EPA 7470A	663999
92573625015	SW-2	EPA 7470A	663987	EPA 7470A	663999
92573625016	SW-4	EPA 7470A	663987	EPA 7470A	663999
92573625017	SW-5	EPA 7470A	664359	EPA 7470A	664534
92573625018	SW-6	EPA 7470A	664359	EPA 7470A	664534
92573625019	LEACHATE	EPA 7470A	664359	EPA 7470A	664534
92573625020	DUP	EPA 7470A	664359	EPA 7470A	664534
92573625021	EQBL	EPA 7470A	664359	EPA 7470A	664534
92573625001	BG-1	EPA 903.1	475986		
92573625002	BG-2	EPA 903.1	475986		
92573625003	MW-1	EPA 903.1	475986		
92573625004	MW-2	EPA 903.1	475986		
92573625005	MW-3	EPA 903.1	475986		
92573625006	MW-4	EPA 903.1	475986		
92573625007	MW-5	EPA 903.1	475986		
92573625008	MW-6	EPA 903.1	475986		
92573625009	MW-7R	EPA 903.1	475986		
92573625010	MW-8	EPA 903.1	475986		
92573625011	MW-10	EPA 903.1	475986		
92573625012	MW-11	EPA 903.1	475986		
92573625013	MW-11D	EPA 903.1	475986		
92573625014	SW-1	EPA 903.1	475986		
92573625015	SW-2	EPA 903.1	475986		
92573625016	SW-4	EPA 903.1	475986		
92573625017	SW-5	EPA 903.1	475986		
92573625018	SW-6	EPA 903.1	475986		
92573625019	LEACHATE	EPA 903.1	475986		
92573625020	DUP	EPA 903.1	475986		
92573625021	EQBL	EPA 903.1	475988		
92573625001	BG-1	EPA 904.0	475987		
92573625002	BG-2	EPA 904.0	475987		
92573625003	MW-1	EPA 904.0	475987		
92573625004	MW-2	EPA 904.0	475987		
92573625005	MW-3	EPA 904.0	475987		
92573625006	MW-4	EPA 904.0	475987		
92573625007	MW-5	EPA 904.0	475987		
92573625008	MW-6	EPA 904.0	475987		
92573625009	MW-7R	EPA 904.0	475987		
92573625010	MW-8	EPA 904.0	475987		

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: CHARAH Q4 GW
Pace Project No.: 92573625

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
92573625011	**MW-10**	EPA 904.0	475987		
92573625012	**MW-11**	EPA 904.0	475987		
92573625013	**MW-11D**	EPA 904.0	475987		
92573625014	**SW-1**	EPA 904.0	475987		
92573625015	**SW-2**	EPA 904.0	475987		
92573625016	**SW-4**	EPA 904.0	475987		
92573625017	**SW-5**	EPA 904.0	475987		
92573625018	**SW-6**	EPA 904.0	475987		
92573625019	**LEACHATE**	EPA 904.0	475987		
92573625020	**DUP**	EPA 904.0	475987		
92573625021	**EQBL**	EPA 904.0	475989		
92573625001	**BG-1**	Total Radium Calculation	479706		
92573625002	**BG-2**	Total Radium Calculation	479706		
92573625003	**MW-1**	Total Radium Calculation	479706		
92573625004	**MW-2**	Total Radium Calculation	479706		
92573625005	**MW-3**	Total Radium Calculation	479706		
92573625006	**MW-4**	Total Radium Calculation	479706		
92573625007	**MW-5**	Total Radium Calculation	479706		
92573625008	**MW-6**	Total Radium Calculation	479706		
92573625009	**MW-7R**	Total Radium Calculation	479706		
92573625010	**MW-8**	Total Radium Calculation	479706		
92573625011	**MW-10**	Total Radium Calculation	479706		
92573625012	**MW-11**	Total Radium Calculation	479706		
92573625013	**MW-11D**	Total Radium Calculation	479706		
92573625014	**SW-1**	Total Radium Calculation	479706		
92573625015	**SW-2**	Total Radium Calculation	479706		
92573625016	**SW-4**	Total Radium Calculation	479706		
92573625017	**SW-5**	Total Radium Calculation	479706		
92573625018	**SW-6**	Total Radium Calculation	479706		
92573625019	**LEACHATE**	Total Radium Calculation	479706		
92573625020	**DUP**	Total Radium Calculation	479706		
92573625021	**EQBL**	Total Radium Calculation	479723		
92573625001	**BG-1**	SM 2540C-2015	661511		
92573625002	**BG-2**	SM 2540C-2015	661926		
92573625003	**MW-1**	SM 2540C-2015	661511		
92573625004	**MW-2**	SM 2540C-2015	662115		
92573625005	**MW-3**	SM 2540C-2015	662115		
92573625006	**MW-4**	SM 2540C-2015	661926		
92573625007	**MW-5**	SM 2540C-2015	661511		
92573625008	**MW-6**	SM 2540C-2015	661926		
92573625009	**MW-7R**	SM 2540C-2015	661511		
92573625010	**MW-8**	SM 2540C-2015	661511		
92573625011	**MW-10**	SM 2540C-2015	661511		

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: CHARAH Q4 GW
Pace Project No.: 92573625

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
92573625012	**MW-11**	SM 2540C-2015	661926		
92573625013	**MW-11D**	SM 2540C-2015	661926		
92573625014	**SW-1**	SM 2540C-2015	662115		
92573625015	**SW-2**	SM 2540C-2015	662115		
92573625016	**SW-4**	SM 2540C-2015	662115		
92573625017	**SW-5**	SM 2540C-2015	662115		
92573625018	**SW-6**	SM 2540C-2015	662115		
92573625019	**LEACHATE**	SM 2540C-2015	661511		
92573625020	**DUP**	SM 2540C-2015	661926		
92573625021	**EQBL**	SM 2540C-2015	662115		
92573625001	**BG-1**	EPA 300.0 Rev 2.1 1993	661444		
92573625002	**BG-2**	EPA 300.0 Rev 2.1 1993	661444		
92573625003	**MW-1**	EPA 300.0 Rev 2.1 1993	661444		
92573625004	**MW-2**	EPA 300.0 Rev 2.1 1993	661444		
92573625005	**MW-3**	EPA 300.0 Rev 2.1 1993	661444		
92573625006	**MW-4**	EPA 300.0 Rev 2.1 1993	661444		
92573625007	**MW-5**	EPA 300.0 Rev 2.1 1993	661444		
92573625008	**MW-6**	EPA 300.0 Rev 2.1 1993	661444		
92573625009	**MW-7R**	EPA 300.0 Rev 2.1 1993	661444		
92573625010	**MW-8**	EPA 300.0 Rev 2.1 1993	661444		
92573625011	**MW-10**	EPA 300.0 Rev 2.1 1993	661444		
92573625012	**MW-11**	EPA 300.0 Rev 2.1 1993	661444		
92573625013	**MW-11D**	EPA 300.0 Rev 2.1 1993	661444		
92573625014	**SW-1**	EPA 300.0 Rev 2.1 1993	661444		
92573625015	**SW-2**	EPA 300.0 Rev 2.1 1993	661444		
92573625016	**SW-4**	EPA 300.0 Rev 2.1 1993	661444		
92573625017	**SW-5**	EPA 300.0 Rev 2.1 1993	661444		
92573625018	**SW-6**	EPA 300.0 Rev 2.1 1993	661444		
92573625019	**LEACHATE**	EPA 300.0 Rev 2.1 1993	661445		
92573625020	**DUP**	EPA 300.0 Rev 2.1 1993	661445		
92573625021	**EQBL**	EPA 300.0 Rev 2.1 1993	661445		

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Pace Analytical®	Document Name: Sample Condition Upon Receipt (SCUR)	Document Revised: November 15, 2021 Page 1 of 2
	Document No.: F-CAR-CS-033-Rev.08	Issuing Authority: Pace Carolinas Quality Office

Laboratory receiving samples:
Asheville ☐ Eden ☐ Greenwood ☐ Huntersville ☑ Raleigh ☐ Mechanicsville ☐ Atlanta ☐ Kernersville ☐

Sample Condition Upon Receipt

Client Name: HDR

Project # WO# : 92573625

92573625

Courier: ☐ Commercial ☐ Fed Ex ☐ Pace ☐ UPS ☐ USPS ☐ Other:____ ☑ Client

Custody Seal Present? ☐ Yes ☑ No **Seals Intact?** ☐ Yes ☑ No

Date/Initials Person Examining Contents: 06/17/21

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☑ None ☐ Other

Biological Tissue Frozen? ☐ Yes ☐ No ☐ N/A

Thermometer: ☐ IR Gun ID: 92704 1.1, 3.1, 4.4 6/17/21

Type of Ice: ☑ Wet ☐ Blue ☐ None

Correction Factor:

Cooler Temp: _____ Add/Subtract (°C) 0

Temp should be above freezing to 6°C
☐ Samples out of temp criteria. Samples on ice, cooling process has begun

Cooler Temp Corrected (°C): 1.1, 3.1, 4.4

USDA Regulated Soil (☑ N/A, water sample) 6, 3.2, 8

Did samples originate in a quarantine zone within the United States: CA, NY, or SC (check maps)? ☐ Yes ☐ No

Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)? ☐ Yes ☐ No

				Comments/Discrepancy:
Chain of Custody Present?	☑ Yes	☐ No	☐ N/A	1.
Samples Arrived within Hold Time?	☐ Yes	☐ No	☐ N/A	2.
Short Hold Time Analysis (<72 hr.)?	☐ Yes	☑ No	☐ N/A	3.
Rush Turn Around Time Requested?	☐ Yes	☑ No	☐ N/A	4.
Sufficient Volume?	☑ Yes	☐ No	☐ N/A	5.
Correct Containers Used?	☑ Yes	☐ No	☐ N/A	6.
-Pace Containers Used?	☐ Yes	☐ No	☐ N/A	
Containers Intact?	☑ Yes	☐ No	☐ N/A	7.
Dissolved analysis: Samples Field Filtered?	☐ Yes	☐ No	☑ N/A	8.
Sample Labels Match COC?	☑ Yes	☐ No	☐ N/A	9.
-Includes Date/Time/ID/Analysis Matrix: WT				
Headspace in VOA Vials (>5-6mm)?	☐ Yes	☐ No	☑ N/A	10.
Trip Blank Present?	☐ Yes	☐ No	☐ N/A	11.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☑ N/A	

COMMENTS/SAMPLE DISCREPANCY

Field Data Required? ☐ Yes ☐ No

Lot ID of split containers:

CLIENT NOTIFICATION/RESOLUTION

Person contacted: _____ Date/Time: _____

Project Manager SCURF Review: _____ **Date:** _____

Project Manager SRF Review: _____ **Date:** _____

***Check mark top half of box if pH and/or dechlorination is verified and within the acceptance range for preservation samples.**

Exceptions: VOA, Coliform, TOC, Oil and Grease, DRO/8015 (water) DOC, LLHg

****Bottom half of box is to list number of bottles**

Project # WO# : 92573625

PM: ATF Due Date: 11/30/21

CLIENT: 92-HDR

Item#	BP4U-125 mL Plastic Unpreserved (N/A) (Cl-)	BP3U-250 mL Plastic Unpreserved (N/A)	BP2U-500 mL Plastic Unpreserved (N/A)	BP1U-1 liter Plastic Unpreserved (N/A)	BP4S-125 mL Plastic H2SO4 (pH < 2) (Cl-)	BP3N-250 mL plastic HNO3 (pH < 2)	BP4Z-125 mL Plastic ZN Acetate & NaOH (>9)	BP4B-125 mL Plastic NaOH (pH > 12) (Cl-)	WGFU-Wide-mouthed Glass jar Unpreserved	AG1U-1 liter Amber Unpreserved (N/A) (Cl-)	AG1H-1 liter Amber HCl (pH < 2)	AG3U-250 mL Amber Unpreserved (N/A) (Cl-)	AG1S-1 liter Amber H2SO4 (pH < 2)	AG3S-250 mL Amber H2SO4 (pH < 2)	AG3A(DG3A)-250 mL Amber NH4Cl (N/A)(Cl-)	DG9H-40 mL VOA HCl (N/A)	VG9T-40 mL VOA Na2S2O3 (N/A)	VG9U-40 mL VOA Unpreserved (N/A)	DG9P-40 mL VOA H3PO4 (N/A)	VOAK (3 vials per kit)-5035 kit (N/A)	V/GK (3 vials per kit)-VPH/Gas kit (N/A)	SP5T-125 mL Sterile Plastic (N/A – lab)	SP2T-250 mL Sterile Plastic (N/A – lab)	B P N	BP3A-250 mL Plastic (NH2)2SO4 (9.3-9.7)	AG0U-100 mL Amber Unpreserved vials (N/A)	VSGU-20 mL Scintillation vials (N/A)	DG9U-40 mL Amber Unpreserved vials (N/A)
1		1	1			1																		2					
2		1	1			1																		2					
3		1	1			1																		2					
4		1	1			1																		2					
5																													
6		1	1			1																		2					
7		1	1			1																		2					
8		1	1			1																		2					
9		1	1			1																		2					
10		1	1			1																		2					
11		1	1			1																		2					
12																													

pH Adjustment Log for Preserved Samples

Sample ID	Type of Preservative	pH upon receipt	Date preservation adjusted	Time preservation adjusted	Amount of Preservative added	Lot #

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. Out of hold, incorrect preservative, out of temp, incorrect containers.

***Check mark top half of box if pH and/or dechlorination is verified and within the acceptance range for preservation samples.**

Exceptions: VOA, Coliform, TOC, Oil and Grease, DRO/8015 (water) DOC, LLHg

****Bottom half of box is to list number of bottles**

Project # WO# : 92573625

PM: ATF Due Date: 11/30/21

CLIENT: 92-HDR

2

Item#	BP4U-125 mL Plastic Unpreserved (N/A) (Cl-)	BP3U-250 mL Plastic Unpreserved (N/A)	BP2U-500 mL Plastic Unpreserved (N/A)	BP1U-1 liter Plastic Unpreserved (N/A)	BP4S-125 mL Plastic H2SO4 (pH < 2) (Cl-)	BP3N-250 mL plastic HNO3 (pH < 2)	BP4Z-125 mL Plastic ZN Acetate & NaOH (>9)	BP4B-125 mL Plastic NaOH (pH > 12) (Cl-)	WGFU-Wide-mouthed Glass jar Unpreserved	AG1U-1 liter Amber Unpreserved (N/A) (Cl-)	AG1H-1 liter Amber HCl (pH < 2)	AG3U-250 mL Amber Unpreserved (N/A) (Cl-)	AG1S-1 liter Amber H2SO4 (pH < 2)	AG3S-250 mL Amber H2SO4 (pH < 2)	AG3A(DG3A)-250 mL Amber NH4Cl (N/A)(Cl-)	DG9H-40 mL VOA HCl (N/A)	VG9T-40 mL VOA Na2S2O3 (N/A)	VG9U-40 mL VOA Unpreserved (N/A)	DG9P-40 mL VOA H3PO4 (N/A)	VOAK (3 vials per kit)-5035 kit (N/A)	V/GK (3 vials per kit)-VPH/Gas kit (N/A)	SP5T-125 mL Sterile Plastic (N/A – lab)	SP2T-250 mL Sterile Plastic (N/A – lab)		BP3A-250 mL Plastic (NH2)2SO4 (9.3-9.7)	AG0U-100 mL Amber Unpreserved vials (N/A)	VSGU-20 mL Scintillation vials (N/A)	DG9U-40 mL Amber Unpreserved vials (N/A)
1		1	1			1																		2				
2		1	1			1																		2				
3		1	1			1																		2				
4		1	1			1																		2				
5		1	1			1																		2				
6																												
7		1	1			1																		2				
8		1	1			1																		2				
9		1	1			1																		2				
10		1	1			1																		2				
11		1	1			1																		2				
12		1	1			1																		2				

pH Adjustment Log for Preserved Samples

Sample ID	Type of Preservative	pH upon receipt	Date preservation adjusted	Time preservation adjusted	Amount of Preservative added	Lot #

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. Out of hold, incorrect preservative, out of temp, incorrect containers.

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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Submitting a sample via this chain of custody constitutes acknowledgment and acceptance of the Pace Terms and Conditions found at https://info.pacelabs.com/hubfs/pas-standard-terms.pdf.

Page : 2 Of 2

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company:	HDR	Report To:	Mark Filardi / Charles Gruenberg	Attention:	
Address:	440 S. Church St	Copy To:		Company Name:	
Suite 900, Charlotte, NC 28202				Address:	
Email:	mark.filardi@hdrinc.com	Purchase Order #:		Pace Quote:	
Phone:	(704)338-6787 Fax	Project Name:	Charah Q4 GW	Pace Project Manager:	tyler.forney@pacelabs.com,
Requested Due Date:		Project #:		Pace Profile #:	7672-1

Regulatory Agency	State / Location
	NC

MATRIX CODE: Drinking Water DW; Water WT; Waste Water WW; Product P; Soil/Solid SL; Oil OL; Wipe WP; Air AR; Other OT; Tissue TS

ITEM #	SAMPLE ID (One Character per box. (A-Z, 0-9 / , -) Sample Ids must be unique)	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED START DATE	COLLECTED START TIME	COLLECTED END DATE	COLLECTED END TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H2SO4	HNO3	HCl	NaOH	Na2S2O3	Methanol	Other	Analyses Test: Y/N	6010/6020/7470	Cl, F, SO4	TDS	903.1/904.0 + Total Rad	Residual Chlorine (Y/N)	9873625
13	MW-10	WT	G	11/15/21	1220				5	2		3						X	X	X	X			01
14	MW-11	WT	G	11/17/21	0900				5	2		3						X	X	X	X			02
15	MW-11D	WT	G	11/17/21	1100				5	2		3						X	X	X	X			03
16	SW-1	WT	G	11/18/21	1435				5	2		3						X	X	X	X			04
17	SW-2	WT	G	11/18/21	1540				5	2		3						X	X	X	X			05
18	~~SW-3~~	WT																X	X	X	X			
19	SW-4	WT	G	11/16/21	1500				5	2		3						X	X	X	X			06
20	SW-5	WT	G	11/16/21	1610				5	2		3						X	X	X	X			07
21	SW-6	WT	G	11/18/21	1420				5	2		3						X	X	X	X			08
22	LEACHATE	WT	G	11/15/21	1525				5	2		3						X	X	X	X			09
23	DUP	WT	G	11/17/21	1250				5	2		3						X	X	X	X			20
24	EQBL	WT	G	11/18/21	1400				5	2		3						X	X	X	X			21

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS: TEMP in C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
	Charles Gruenberg / HDR	11/19/21	1400	Pace MVL	11-19-21	1400	4	Y	N	Y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Charles Gruenberg

SIGNATURE of SAMPLER: [signature] DATE Signed: 11/19/21

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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

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Page : 1 Of 1

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company:	HDR	Report To:	Mark Filardi / Charles Gruenberg	Attention:	
Address:	440 S. Church St	Copy To:		Company Name:	
Suite 900, Charlotte, NC 28202				Address:	
Email:	mark.filardi@hdrinc.com	Purchase Order #:		Pace Quote:	
Phone:	(704)338-6787 Fax	Project Name:	Charah Q4 GW	Pace Project Manager:	tyler.forney@pacelabs.com,
Requested Due Date:		Project #:		Pace Profile #:	7672-1

Regulatory Agency

State / Location: NC

ITEM #	SAMPLE ID (One Character per box. (A-Z, 0-9 / , -) Sample Ids must be unique)	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED START DATE	COLLECTED START TIME	COLLECTED END DATE	COLLECTED END TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H2SO4	HNO3	HCl	NaOH	Na2S2O3	Methanol	Other	Analyses Test Y/N	6010/6020/7470	Cl, F, SO4	TDS	903.1/904.0 + Total Rad	Residual Chlorine (Y/N)	
																									2557362S
1	BG-1	WT	G	11/16/21	1610				5	2		3							x	x	x	x			04
2	BG-2	WT	G	11/17/21	1710				5	2		3							x	x	x	x			07
3	MW-1	WT	G	11/16/21	0845				5	2		3							x	x	x	x			03
4	MW-2	WT	G	11/18/21	1155				5	2		3							x	x	x	x			04
5	MW-2D	WT																	x	x	x	x			
6	MW-3	WT	G	11/18/21	0835				5	2		3							x	x	x	x			08
7	MW-4	WT	G	11/17/21	1530				5	2		3							x	x	x	x			06
8	MW-5	WT	G	11/16/21	1445				5	2		3							x	x	x	x			07
9	MW-6	WT	G	11/17/21	1240				5	2		3							x	x	x	x			02
10	MW-7R	WT	G	11/15/21	1300				5	2		3							x	x	x	x			05
11	MW-8	WT	G	11/16/21	1255				5	2		3							x	x	x	x			09
12	MW-9	WT																	x	x	x	x			

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
	Charles Gruenberg / HDR	11/19/21	1400	Pace HDR	11-19-21	1400	Ice	Y	N	Y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Charles Gruenberg

SIGNATURE of SAMPLER: DATE Signed: 11/19/21

TEMP in C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)

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D

Appendix D – Electronic Data Deliverables (electronic only)

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E

Appendix E – Statistical Analysis Memo

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Summary of Statistical Analysis and Evaluation for SSIs for 2021 Second Semi-Annual Report

Background and Downgradient Wells

Charah, LLC

Moncure, Chatham County, North Carolina
January 26, 2022

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1 Introduction

This report summarizes the statistical analysis of background and downgradient groundwater quality for the Charah, LLC Brickhaven No. Mine Tract 'A' Site (Brickhaven Mine) and operating under the Facility Permit #1910-STRUC-2015 as a municipal solid waste land fill (MSWLF). Background groundwater quality was evaluated such that statistically-derived background concentrations could be established for the site. Groundwater quality in downgradient wells was then compared to background concentrations to determine if a statistically significant increase (SSI) over background has occurred, as required by Section .1600 rules of the North Carolina Solid Waste Management Rules 15A NCAC 13B .1600. Sampling results used to establish background threshold values (BTVs) were obtained during twenty-five monitoring events performed between October 2015 and April 2021. Downgradient sampling results from the detection monitoring round in November 2021 were used to evaluate for SSIs. The current Brickhaven Mine groundwater monitoring network is presented in **Table 1**.

Software packages ProUCL [1], NCSS [2], R [3], and SPSS [4] were used in the production of the statistics. ProUCL is offered by the USEPA, R is a free software environment, NCSS and SPSS are licensed software packages.

Table 1: Brickhaven Mine Monitoring Well Network

Background	Downgradient
BG-1	MW-1
BG-2	MW-2
	MW-3
	MW-4
	MW-5
	MW-6
	MW-7R
	MW-8
	MW-11

Groundwater samples collected as part of the 15A NCAC 13B .1600 monitoring program were analyzed for EPA Appendix III and Appendix IV constituents, and Appendix I metals. Only non-filtered sample results were utilized for the statistical analysis of monitored constituents. A summary of constituents included in the data analysis is provided in **Table 2**.

Table 2: Brickhaven Mine Monitored Constituents

Appendix I Metals	Appendix III Constituents	Appendix IV Constituents
Copper	Boron	Antimony
Nickel	Calcium	Arsenic
Silver	Chloride	Barium
Vanadium	Fluoride	Beryllium
Zinc	pH (Field)	Cadmium
	Sulfate	Chromium
	Total Dissolved Solids	Cobalt
		Fluoride
		Lead
		Lithium
		Mercury
		Molybdenum
		Radium-226
		Radium-228
		Selenium
		Thallium
		Total Radium

2 Statistical Analysis

The background sample size (i.e., quantity of qualifying samples) was evaluated per constituent. Descriptive statistics were calculated for the background data set including non-detect (ND) values and excluding ND values. When NDs were included in the data set, the method detection limit (MDL) was substituted as the ND value for simple descriptive statistics. The analysis was performed with NDs removed to better understand the central tendency and range of the detected values. A summary of the descriptive statistics for the background data set is provided in **Table 3**. Note that for the trend analyses in Section 2.3 and for the establishment of statistically-derived background concentration levels in Section 4, imputation methods using the maximum likelihood method (MLE) for NDs, regression on order statistics (ROS) or Kaplan-Meier (KM) methods, where appropriate, were used.

Following the calculation of descriptive statistics, the statistical analysis for the background data set was performed to evaluate for outliers, data distributions, trends, and spatial variability between the background wells for Appendix I metals, Appendix III and IV constituents, where data quantity and quality permit. Spatial variability between the background wells was evaluated for each constituent to assess whether the data can be pooled for establishing background concentrations. A total of thirty-five samples (twenty-five monitoring events from well BG-1 and ten monitoring events from well BG-2) were included for the descriptive analysis of the background monitoring well results for the monitored constituents. The first monitoring round sampled in August 2015 was not included in the analysis as it was deemed not representative of the other monitoring events as the samples were tested at a different lab. The sample collected April 3rd, 2017 for total dissolved solid in well BG-1 is considered an outlier and removed from the analysis. The January 2020 samples for boron were removed from the analysis as they were diluted and could not be properly detected.

For downgradient monitoring results, the data analysis included the calculation of descriptive statistics for Appendix I metals, Appendix III and IV constituents (for the data sets including and excluding ND values), followed by an evaluation of outliers and trends. A total of twenty-six monitoring events performed between November 2015 and November 2021 were included for the descriptive analysis of the downgradient monitoring well results for the monitored constituents. A summary of the descriptive statistics for each downgradient well is provided in **Appendix E.A**.

Table 3: Summary of Background Data Set Descriptive Statistics (BG-1 and BG-2)

Constituent	Unit	Sample Size	No. of NDs	With NDs=MDLs Included				With NDs Removed			
				Minimum	Maximum	Mean	Median	Minimum	Maximum	Mean	Median
Appendix I Metals											
Copper	ug/L	35	33	2.10	11.4	3.09	2.50	4.30	11.4	7.85	7.85
Nickel	ug/L	35	35	0.900	3.50	2.36	2.50	--	--	--	--
Silver	ug/L	35	35	2.50	2.50	2.50	2.50	--	--	--	--
Vanadium	ug/L	35	22	1.30	8.30	3.83	2.50	5.10	8.30	6.02	5.60
Zinc	ug/L	35	31	3.90	34.2	7.23	5.00	10.0	34.2	18.6	15.0
Appendix III Constituents											
Boron	ug/L	34	18	0.570	56.5	7.41	5.30	5.50	56.5	13.1	6.90
Calcium	ug/L	35	0	20,300	124,000	50,937	29,500	20,300	124,000	50,937	29,500
Chloride	mg/L	35	0	176	311	246	250	176	311	246	250
Fluoride	mg/L	35	0	0.100	0.230	0.158	0.150	0.100	0.230	0.158	0.150
pH (Field)	S.U.	33	0	6.10	7.01	6.55	6.52	6.10	7.01	6.55	6.52
Sulfate	mg/L	35	0	15.1	182	49.0	22.2	15.1	182	49.0	22.2
Total Dissolved Solids	mg/L	34	0	544	1,270	737	647	544	1,270	737	647
Appendix IV Constituents											
Antimony	ug/L	35	35	3.00	3.90	3.47	3.80	--	--	--	--
Arsenic	ug/L	35	34	2.50	5.00	4.37	4.70	4.80	4.80	4.80	4.80
Barium	ug/L	35	0	59.1	443	258	302	59.1	443	258	302
Beryllium	ug/L	35	35	0.200	0.700	0.477	0.500	--	--	--	--
Cadmium	ug/L	35	33	0.400	0.500	0.457	0.500	0.400	0.500	0.450	0.450
Chromium	ug/L	35	35	1.00	3.70	2.43	2.50	--	--	--	--
Cobalt	ug/L	35	35	1.10	3.60	2.43	2.50	--	--	--	--
Fluoride	mg/L	35	0	0.100	0.230	0.158	0.150	0.100	0.230	0.158	0.150
Lead	ug/L	35	34	1.60	14.1	3.11	2.50	14.1	14.1	14.1	14.1
Lithium	ug/L	35	3	0.390	36.8	17.0	16.5	11.9	36.8	18.5	17.1
Mercury	ug/L	35	32	0.100	0.200	0.107	0.100	0.120	0.200	0.153	0.140
Molybdenum	ug/L	35	29	0.900	13.6	3.98	2.50	6.80	13.6	10.1	10.4
Radium-226	pCi/L	32	0	-0.206	1.22	0.290	0.238	-0.206	1.22	0.290	0.238
Radium-228	pCi/L	32	0	0.0108	1.29	0.601	0.588	0.0108	1.29	0.601	0.588
Selenium	ug/L	35	35	4.70	5.00	4.86	5.00	--	--	--	--
Thallium	ug/L	35	34	0.0200	13.7	1.29	0.0600	13.7	13.7	13.7	13.7
Total Radium	pCi/L	32	0	0.271	2.09	0.900	0.857	0.271	2.09	0.900	0.857

Notes:
1. ND = not detected above the laboratory method detection limit.
2. MDL = method detection limit.
3. "--" indicates all results for the respective constituent were NDs, or with the case of total radium, NDs were flagged but the laboratory did not provide a value for the MDL.
4. Numbers are displayed using the same number of significant figures as reported by the laboratory.
5. If a constituent had 100% detections the descriptive statistics provided above are identical for the data including NDs and excluding NDs

2.1 Outliers

Outliers are values that are not representative of the population from which they are sampled. The background and downgradient data sets were screened for outliers using Dixon's and Rosner's outlier tests. Dixon's outlier test is suitable for data sets containing less than twenty-five samples, while Rosner's test is suitable for data sets with twenty-five or more samples. The outlier test was conducted using a significance of one percent. For constituents that had NDs, the NDs were removed prior to testing for outliers.

2.1.1 Background

The statistical outliers identified in the background data set are listed in **Table 4**. Two concentrations from background well BG-1, Appendix III constituent boron and Appendix IV constituent lithium, were identified as statistical outliers. The concentrations identified as statistical outliers for Appendix III constituents calcium, sulfate and total dissolved solids were sampled from the background well BG-2.

Table 4: Statistical Outlier Test Results – Background

Well	Constituent Type	Constituent	Potential Outlier Value	Units	Sampling Event	Sample Date
BG-1	Appendix III	Boron	56.5	ug/L	R26	4/12/2021
	Appendix IV	Lithium	36.8	ug/L	R06	4/5/2016
BG-2	Appendix III	Calcium	119,000	ug/L	R18	4/16/2019
			111,000	ug/L	R19	7/11/2019
			109,000	ug/L	R20	10/14/2019
			106,000	ug/L	R21	1/15/2020
			114,000	ug/L	R22	4/14/2020
			117,000	ug/L	R23	7/8/2020
			124,000	ug/L	R24	10/12/2020
			101,000	ug/L	R25	1/26/2021
			105,000	ug/L	R26	4/12/2021
		Sulfate	79.8	mg/L	R18	4/16/2019
			102	mg/L	R19	7/11/2019
			135	mg/L	R20	10/14/2019
			102	mg/L	R21	1/15/2020
			136	mg/L	R22	4/14/2020
			135	mg/L	R23	7/8/2020
			115	mg/L	R24	10/12/2020
			162	mg/L	R25	1/26/2021
			182	mg/L	R26	4/12/2021
		Total Dissolved Solids	810	mg/L	R17	1/22/2019
			952	mg/L	R19	7/11/2019
			1,120	mg/L	R20	10/14/2019

Well	Constituent Type	Constituent	Potential Outlier Value	Units	Sampling Event	Sample Date
			922	mg/L	R21	1/15/2020
			1,050	mg/L	R22	4/14/2020
			1,080	mg/L	R23	7/8/2020
			1,110	mg/L	R24	10/12/2020
			1,180	mg/L	R25	1/26/2021
			1,270	mg/L	R26	4/12/2021

A visual inspection of concentration vs. time scatter plots for boron (**Figure 1**), calcium (**Figure 2**), lithium (**Figure 3**), sulfate (**Figure 4**), and total dissolved solids (**Figure 5**) reveal the presence of the potential outliers. The statistical outliers were investigated as possible data entry or measurement errors. The remaining values were all within one order of magnitude of other observations and deemed correct. Although the elevated values appear as statistical outliers, it is within a reasonable range of the remaining concentrations throughout the monitoring period and should not be removed from the data set at this time for purposes of determining background concentrations. Given the variable nature of groundwater samples, the small sample sizes and that it is common for groundwater quality samples to have very low or very high concentrations over time, statistical outliers are expected but do not necessarily signify that the outliers are from different distributions. As additional background samples are collected over time, the variability in concentrations will be better understood. Outlier test results may change, and earlier observations thought to be outliers may no longer be outliers.

Figure 1: Boron Concentrations (mg/L) vs. Time

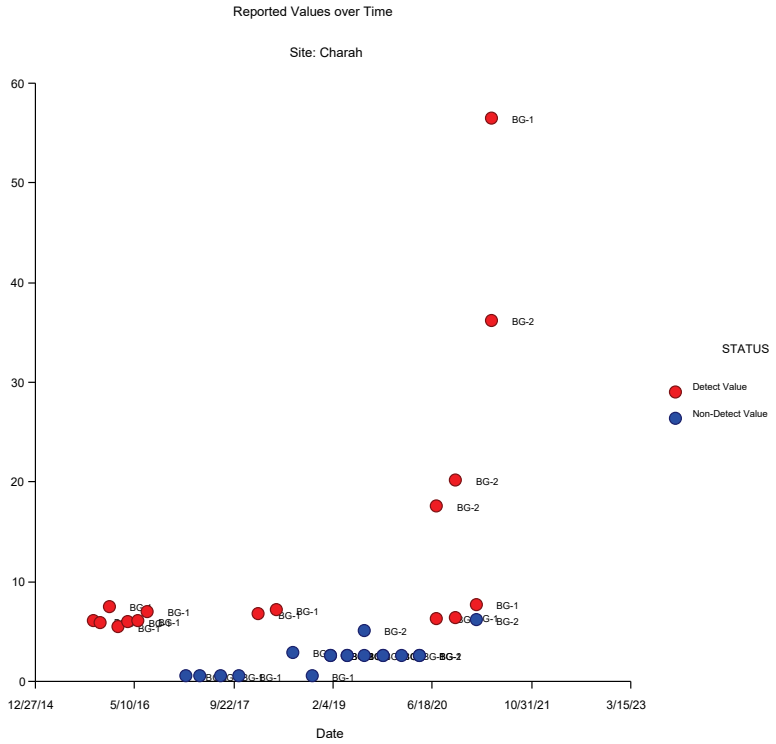


Figure 2: Calcium Concentrations (ug/L) vs. Time

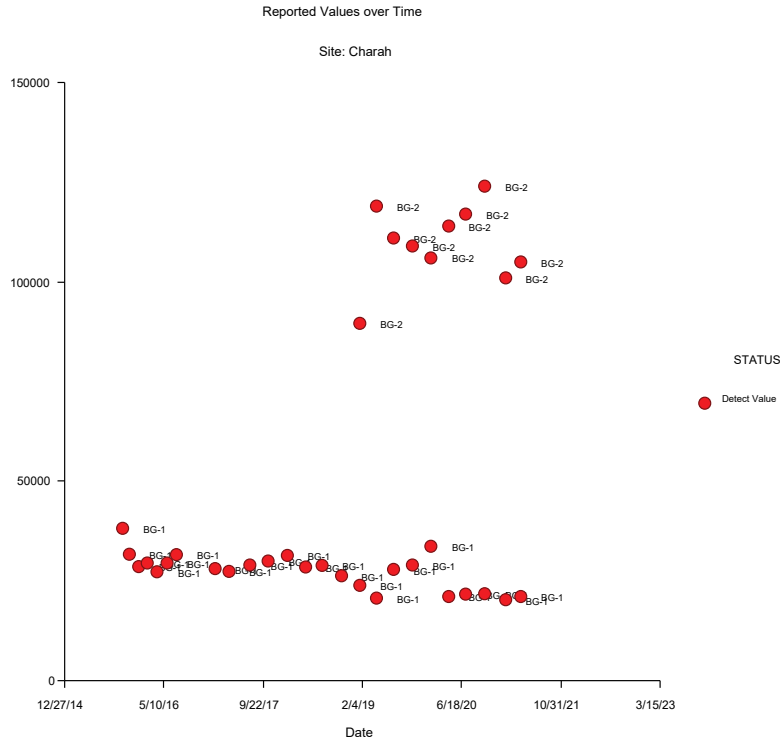


Figure 3: Lithium Concentrations (mg/L) vs. Time

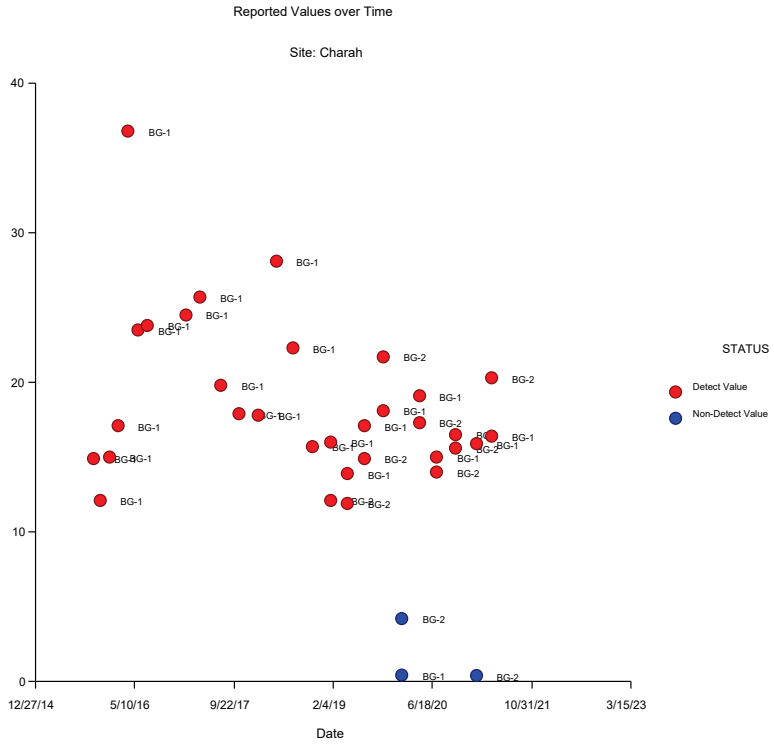


Figure 4: Sulfate Concentrations (ug/L) vs. Time

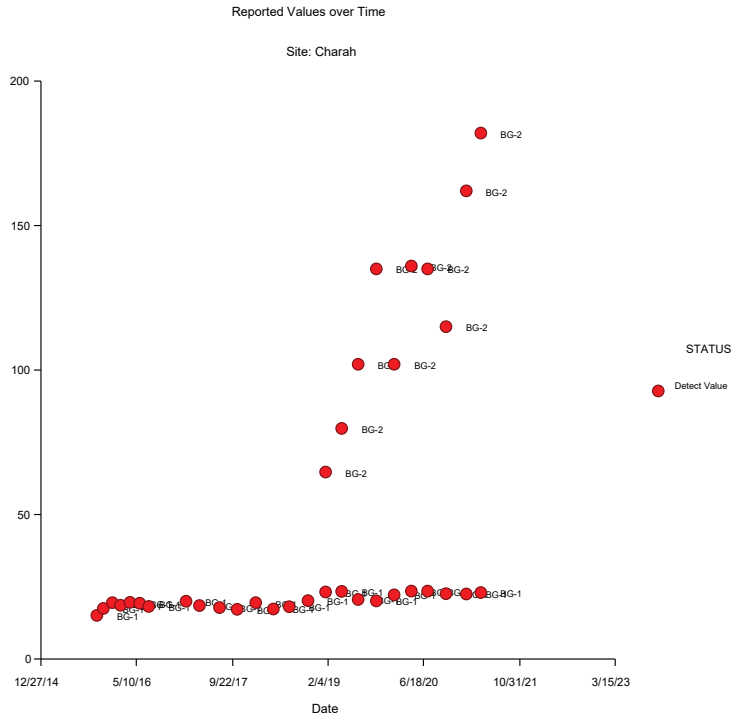
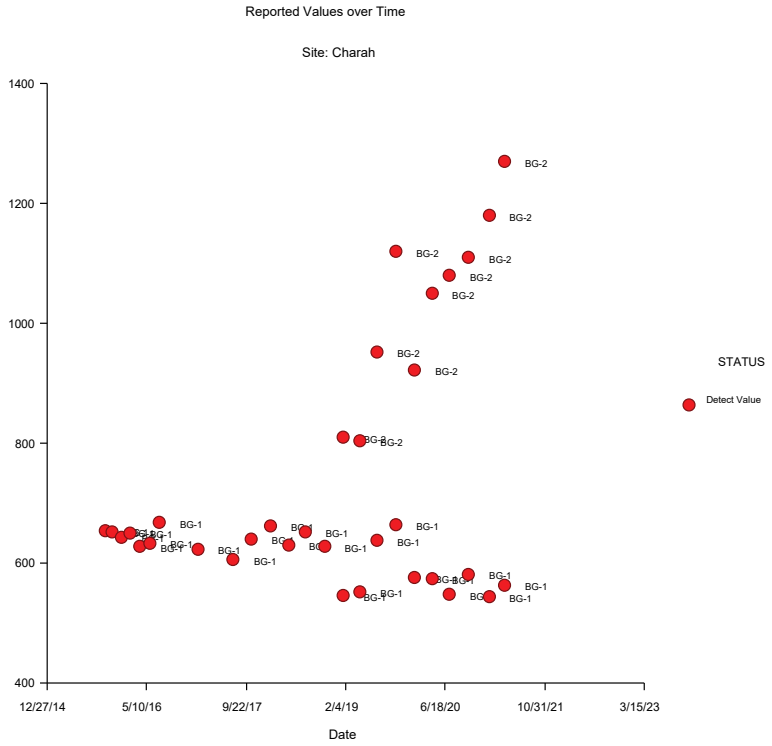


Figure 5: Total Dissolved Solids Concentrations (ug/L) vs. Time



2.1.2 Downgradient

Statistical outliers were identified for Appendix I metals, Appendix III and Appendix IV constituents in the data sets evaluated for downgradient monitoring wells throughout the monitoring period and are listed in **Table 5**.

Table 5: Statistical Outlier Test Results – Downgradient

Well	Constituent Type	Constituent	Potential Outlier Value	Units	Sampling Event	Sample Date
MW-1	Appendix IV	Cadmium	0.670	ug/L	R24	10/14/2020
		Radium-228	1.45	pCi/L	R19	7/10/2019
MW-2	Appendix I Metals	Zinc	113	ug/L	R06	4/6/2016
		Copper	294	ug/L	R28	11/18/2021
	Appendix III	Total Dissolved Solids	257	mg/L	R03	11/19/2015
		Total Dissolved Solids	11,700	mg/L	R21	1/17/2020
	Appendix IV	Molybdenum	41.0	ug/L	R21	1/17/2020
MW-3	Appendix III	Lithium	236	ug/L	R12	10/18/2017
		pH (Field)	6.18	S.U.	R23	7/7/2020
	Appendix IV	Chromium	179	ug/L	R17	1/25/2019
		Molybdenum	35.7	ug/L	R21	1/16/2020

Well	Constituent Type	Constituent	Potential Outlier Value	Units	Sampling Event	Sample Date
MW-4	Appendix III	Boron	165	ug/L	R12	10/17/2017
		Calcium	39200	ug/L	R03	11/19/2015
		Calcium	35200	ug/L	R04	1/4/2016
		Calcium	35200	ug/L	R05	2/16/2016
		Calcium	17900	ug/L	R06	4/7/2016
		Calcium	18600	ug/L	R07	5/25/2016
		Chloride	294	mg/L	R03	11/19/2015
		Chloride	307	mg/L	R04	1/4/2016
		Chloride	188	mg/L	R05	2/16/2016
		Chloride	174	mg/L	R06	4/7/2016
		Chloride	144	mg/L	R07	5/25/2016
		Sulfate	5.90	mg/L	R03	11/19/2015
		Sulfate	6.30	mg/L	R04	1/4/2016
		Sulfate	5.60	mg/L	R05	2/16/2016
		Sulfate	3.90	mg/L	R06	4/7/2016
		Sulfate	3.40	mg/L	R07	5/25/2016
		Total Dissolved Solids	395	mg/L	R03	11/19/2015
		Total Dissolved Solids	806	mg/L	R04	1/4/2016
		Total Dissolved Solids	800	mg/L	R05	2/16/2016
		Total Dissolved Solids	513	mg/L	R06	4/7/2016
		Total Dissolved Solids	486	mg/L	R07	5/25/2016
		Total Dissolved Solids	1580	mg/L	R21	1/16/2020
	Appendix IV	Barium	191	ug/L	R03	11/19/2015
		Barium	176	ug/L	R04	1/4/2016
		Barium	157	ug/L	R05	2/16/2016
		Barium	85.9	ug/L	R06	4/7/2016
		Barium	90.5	ug/L	R07	5/25/2016
		Barium	431	ug/L	R22	4/17/2020
		Cobalt	21.8	ug/L	R22	4/17/2020
		Lithium	98.0	ug/L	R27	8/12/2021
MW-5	Appendix III	Boron	39.3	ug/L	R09	1/23/2017
		pH (Field)	8.54	S.U.	R22	4/15/2020
		Total Dissolved Solids	1160	mg/L	R12	10/17/2017
	Appendix IV	Lithium	28.6	ug/L	R27	8/9/2021
MW-6	Appendix III	Chloride	15.3	mg/L	R06	4/5/2016
		Chloride	80.3	mg/L	R26	4/15/2021
MW-7R	Appendix I Metals	Nickel	880	ug/L	R19	7/10/2019

Well	Constituent Type	Constituent	Potential Outlier Value	Units	Sampling Event	Sample Date
	Appendix III	Fluoride	0.320	mg/L	R11	7/20/2017
		pH (Field)	9.60	S.U.	R11	7/20/2017
		Sulfate	51.2	mg/L	R11	7/20/2017
	Appendix IV	Barium	50.1	ug/L	R11	7/20/2017
		Chromium	1940	ug/L	R19	7/10/2019
		Fluoride	0.320	mg/L	R11	7/20/2017
		Radium-228	-0.454	pCi/L	R15	7/18/2018
		Radium-228	2.13	pCi/L	R26	4/14/2021
MW-8	Appendix III	Calcium	4170	ug/L	R25	1/27/2021
MW-11	Appendix III	Fluoride	0.180	mg/L	R28	11/17/2021
		pH (Field)	18.1	S.U.	R28	11/17/2021
		Total Dissolved Solids	2760	mg/L	R25	1/29/2021
	Appendix IV	Fluoride	0.180	mg/L	R28	11/17/2021
		Total Radium	2.39	pCi/L	R26	4/13/2021

A visual inspection of concentration vs. time scatter plots for constituents included in the outliers listed in **Table 5** reveal the presence of the potential outliers.[1] Following review of the sampling protocols and field sampling records, there were no obvious reasons for the outliers noted on the sampling dates. The value for each statistical outlier listed above is within a reasonable range of the remaining concentrations for each constituent throughout the monitoring period. The variability in concentrations will be better understood as additional samples are obtained.

2.2 Data Distribution

Groundwater data was fitted to known distribution models using Goodness-of-Fit (GOF) tests incorporated into ProUCL. For data sets comprised of 50 or fewer samples, ProUCL's GOF module incorporates the Shapiro-Wilk GOF test to determine normal or lognormal distribution and Anderson-Darling to determine gamma distribution. Normal, lognormal and gamma distributions are parametric distributions. If a data set could not be fit with any of these three parametric distributions, it was considered to follow a nonparametric distribution. Note that ProUCL does not provide GOF results for data sets with less than three detected values due to insufficient data. For purposes of estimating background concentrations, these data sets were treated under non-parametric distribution assumptions with the maximum detected value chosen to represent the background concentrations. In addition, the data for total radium is set to nonparametric as the MDL values were not provided by the laboratory. Data distributions are listed in **Table 6**.

[1] See **Appendix E.B** for scatter plots of constituents with downgradient statistically-derived outliers.

Table 6: Data Distributions – Background

Constituent	Sample Size	No. of NDs	Distribution Fit[1]
Appendix I Metals			
Copper	35	33	Nonparametric
Nickel	35	35	Nonparametric
Silver	35	35	Nonparametric
Vanadium	35	22	Nonparametric
Zinc	35	31	Nonparametric
Appendix III Constituents			
Boron	34	18	Nonparametric
Calcium	35	0	Nonparametric
Chloride	35	0	Parametric
Fluoride	35	0	Parametric
pH (Field)	33	0	Parametric
Sulfate	35	0	Nonparametric
Total Dissolved Solids	34	0	Nonparametric
Appendix IV Constituents			
Antimony	35	35	Nonparametric
Arsenic	35	34	Nonparametric
Barium	35	0	Nonparametric
Beryllium	35	35	Nonparametric
Cadmium	35	33	Nonparametric
Chromium	35	35	Nonparametric
Cobalt	35	35	Nonparametric
Fluoride	35	0	Parametric
Lead	35	34	Nonparametric
Lithium	35	3	Parametric
Mercury	35	32	Nonparametric
Molybdenum	35	29	Nonparametric
Radium-226	32	0	Nonparametric
Radium-228	32	0	Nonparametric
Selenium	35	35	Nonparametric
Thallium	35	34	Nonparametric
Total Radium	32	0	Nonparametric

[1]Best fit is based on detected data.

2.3 Trends

2.3.1 Background

Background constituent concentrations in groundwater should demonstrate stationary conditions through time, free of trends. Constituents were analyzed for trends within the data set using a maximum likelihood estimate (MLE) regression for constituents which followed parametric distributions and Mann-Kendall tests for those that were treated under nonparametric distributional assumptions. The MLE regression can be applied to data sets that can be fitted to a specific distribution model and that contain NDs with multiple MDLs. The Mann-Kendall test is suitable for data series with no discernable distributions and only one MDL value for NDs.

Constituents treated under nonparametric data assumptions (either tested as nonparametric or having more than 50 percent NDs) and with multiple MDLs or with less than three detected values were not assessed for trends. A summary of the trend analysis results for constituents with sufficient detected values in the background data set is provided in **Table 7**.

The background well regression analysis showed a potential increasing trend for fluoride (an Appendix III and Appendix IV constituent) and sulfate (Appendix III), and a potential decreasing trend for chloride (Appendix III) and three Appendix IV constituents (barium, lithium, and radium-226). There were no increasing or decreasing trends identified for other monitoring constituents with sufficient data quantity and quality for testing with the MLE analysis or Mann-Kendall test.

Table 7: Summary of Trend Analysis Results – Background

Constituent	Trend
Appendix III Constituents	
Chloride	↓
Fluoride	↑
Sulfate	↑
Appendix IV Constituents	
Lithium	↓
Barium	↓
Radium-226	↓

2.3.2 Downgradient

Trends were also evaluated for constituents in each downgradient well using the same methods as described above for the background data set. Trends identified for select constituents at select monitoring well locations should be monitored as additional downgradient groundwater data are collected at the site. A summary of the statistical trends identified within the downgradient data set is provided in **Table 8**.

Table 8: Summary of Trend Analysis Results – Downgradient

Constituent	Downgradient Well with Increasing or Decreasing Trend							
	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7R	MW-8
Appendix I Metals								
Nickel				↑				
Appendix III Constituents								
Calcium	↑			↑				↓
Chloride	↑				↑	↓	↓	↓
Fluoride				↓				
pH (Field)		↓				↓	↓	↑
Sulfate	↓	↓		↑		↓	↓	↑
Total Dissolved Solids	↑		↑	↑			↑	
Appendix IV Constituents								
Antimony		↓						
Barium	↑	↑		↑		↓	↑	↓
Fluoride				↓				
Lithium	↑	↑	↓	↑	↑	↓	↑	↓
Molybdenum		↓						

2.4 Spatial Variability

Spatial variability refers to identifying whether or not there are statistically identifiable differences in mean concentrations or variance levels across the well field (i.e., the pooled background data). Parametric and nonparametric analysis of variance (ANOVA) tests and visual aids (i.e., side-by-side box plots and scatter plots), as needed, were used to evaluate for spatial variability within the background data set to confirm that results from background wells BG-1 and BG-2 were appropriate for pooling and calculating background concentrations for constituents.

Statistical tests indicated that five Appendix III constituents (calcium, fluoride, pH, sulfate, and total dissolved solids) exhibited spatial variability. Statistical spatial variability was also identified for one Appendix IV constituent (barium). Review of side-by-side box plots for the constituents listed above indicated that the statistically identified variability in concentrations are reasonable and the mean concentrations calculated for the monitoring wells are generally within one order of magnitude of the other. Therefore, the concentration distribution across the background wells should be considered reflective of the hydrogeological regime at the site and the background results are appropriate for pooling and calculating background concentrations at this time.

3 Summary of Statistical Analysis

A summary of the statistical analysis results is provided in **Table 9** and discussed below.

- The statistical outliers identified for total dissolved solids, barium, calcium, and sulfate should not be removed from the data set to be used for developing background concentrations for the site at this time.
- For the background data set, all of the five Appendix I metals exhibited high percentages of NDs and will be treated under nonparametric distribution assumptions with the maximum detected value chosen to represent the background concentrations, until additional results can be included in the data sets.
- For the background data set, there are currently sufficient data to fit the Appendix III constituents to known parametric distribution models (e.g., gamma, lognormal, or normal) using GOF tests, except for boron, calcium, sulfate, and total dissolved solids, which are nonparametric. Statistical tests conducted under parametric distribution assumptions have more power to detect an SSI when compared to tests conducted under nonparametric distribution assumptions.
- For the background data set, eleven of the seventeen Appendix IV constituents exhibited high percentages of NDs and will be treated under nonparametric distribution assumptions with the maximum detected value chosen to represent background, until additional results can be included in the data sets. The data for radium-226, radium-228 and total radium is set to a nonparametric distribution as the MDL values were not provided by the laboratory. Currently, the background data sets for fluoride and lithium can be fitted to known parametric distribution models using GOF tests.
- At this time, for the purpose of calculating background concentrations and testing for SSIs over background for Appendix I metals and Appendix III and Appendix IV constituents, results from twenty-five monitoring events taken during October 2015 to April 2021 from BG-1 and ten monitoring events taken January 2019 to April 2021 from BG-2 were used. The statistically-derived background concentrations and the evaluation for SSIs over background for Appendix I metals and Appendix III and Appendix IV constituents are included in **Section 4**.

Table 9: Summary of Background Preliminary Data Analysis

Constituent	Statistical Outlier	Nonparametric Data Distribution	Trend
Appendix I Metals			
Copper		✓	
Nickel		✓	
Silver		✓	
Vanadium		✓	
Zinc		✓	
Appendix III Constituents			
Boron	✓	✓	
Calcium	✓	✓	
Chloride			✓
Fluoride			✓
Sulfate	✓	✓	✓
Total Dissolved Solids	✓	✓	
Appendix IV Constituents			
Antimony		✓	
Arsenic		✓	
Barium		✓	✓
Beryllium		✓	
Cadmium		✓	
Chromium		✓	
Cobalt		✓	
Fluoride			✓
Lead		✓	
Lithium	✓		✓
Mercury		✓	
Molybdenum		✓	
Radium-226		✓	✓
Radium-228		✓	
Selenium		✓	
Thallium		✓	
Total Radium		✓	

✓Constituent was flagged during the statistical analysis

4 Evaluation for SSIs over Background

Based on the statistical evaluations performed, background threshold values (BTVs) were determined for the detection monitoring program at the site for Appendix I metals, Appendix III and Appendix IV constituents. For constituents that have all ND background values, the maximum MDL is chosen to represent background and the double quantification rule (DQR) is used to evaluate whether or not there is an SSI. The BTV provided for detection monitoring constituents is the statistically derived background concentration (i.e., upper prediction limit [UPL]), the maximum detected value or the maximum MDL depending on the level of censorship in each of the background samples. For pH (field), both the UPL and the lower prediction limit (LPL) were computed as pH values above or below the prediction limits at the downgradient wells can be considered statistically significant. The test significance level per constituent has been estimated such that the cumulative false positive rate over all constituent/well pair comparisons is approximately ten percent. The number of verification samples per constituent has been selected to provide sufficient statistical power to detect an SSI when an SSI has occurred conditional on the background sample size, its distributional properties, and the total number of statistical test comparisons. The calculated background concentrations, or BTVs, for each detection monitoring constituent is provided below in **Table 10**.

Table 10: Background Concentrations for Detection Monitoring Constituents

Constituent	Unit	No. of Verification Samples	BTV (UPL)
Appendix I Metals			
Copper	ug/L	**2**	**11.4**
Nickel	ug/L	**na**	***3.50***
Silver	ug/L	**na**	***2.50***
Vanadium	ug/L	**2**	**8.30**
Zinc	ug/L	**2**	**34.2**
Appendix III Constituents			
Boron	ug/L	**2**	**56.5**
Calcium	ug/L	**2**	**124,000**
Chloride	mg/L	**1**	**344**
Fluoride	mg/L	**1**	**0.254**
pH (Field)*	S.U.	**1**	**5.88 - 7.26**
Sulfate	mg/L	**2**	**182**
Total Dissolved Solids	mg/L	**2**	**1,270**
Appendix IV Constituents			
Antimony	ug/L	**na**	***3.90***
Arsenic	ug/L	**2**	**4.80**
Barium	ug/L	**2**	**443**

Constituent	Unit	No. of Verification Samples	BTV (UPL)
Appendix I Metals			
Beryllium	ug/L	**na**	***0.700***
Cadmium	ug/L	**2**	**0.500**
Chromium	ug/L	**na**	***3.70***
Cobalt	ug/L	**na**	***3.60***
Fluoride	mg/L	**1**	**0.250**
Lead	ug/L	**2**	**14.1**
Lithium	ug/L	**1**	**48.1**
Mercury	ug/L	**2**	**0.200**
Molybdenum	ug/L	**2**	**13.6**
Radium-226	pCi/L	**2**	**1.22**
Radium-228	pCi/L	**2**	**1.29**
Selenium	ug/L	**na**	***5.00***
Thallium	ug/L	**2**	**13.7**
Total Radium	pCi/L	**2**	**2.09**

Note:
* indicates the lower bound of the pH range is the lower prediction limit (LPL). The upper bound is the UPL.
Italic concentration indicates a non-detect value and that the DQR is recommended for statistical evaluation.

Downgradient sampling results from the second detection monitoring round in November 2021 were used to test for SSIs. For constituents that have all ND background values, the DQR is applied; that is, an SSI is registered for the well-constituent pair if the downgradient concentrations exhibit detects in two consecutive sampling events. Downgradient sampling results from the August 2021 and November 2021 sampling events were used to test for SSIs for constituents that have all ND background values. Downgradient concentrations were compared to the BTVs and are summarized below in **Table 11** through **Table 13**. Eight monitoring wells (MW-1 through MW-8) were installed and sampled (October 2015) prior to ash placement, thus representing pre-ash conditions at the site. The range of the concentrations of the pre-ash conditions are included in the tables below as a relative comparison to the current downgradient conditions.

Table 11: Summary of Evaluation for SSIs over Background for Appendix I Metals (Detection Monitoring)

	Copper	Nickel	Silver	Vanadium	Zinc
Unit	ug/L	ug/L	ug/L	ug/L	ug/L
BTV (UPL)	11.4	*3.50*	*2.50*	8.30	34.2
Pre-Ash Range	2.50 - 16.4	2.50 - 18.2	2.50 - 2.50	2.50 - 9.90	5.00 - 106
Well	*Second Detection Monitoring Round Results*				
MW-1	*4.30*	*3.50*	*2.50*	*3.90*	28.9
MW-11	***20.1***	*3.50*	*2.50*	*3.90*	*9.50*

	Copper	Nickel	Silver	Vanadium	Zinc
Unit	ug/L	ug/L	ug/L	ug/L	ug/L
BTV (UPL)	11.4	*3.50*	*2.50*	8.30	34.2
Pre-Ash Range	2.50 - 16.4	2.50 - 18.2	2.50 - 2.50	2.50 - 9.90	5.00 - 106
MW-2	**294**	**4.70**	*2.50*	*3.90*	*9.50*
MW-3	**52.5**	*3.50*	*2.50*	*3.90*	*9.50*
MW-4	**170**	***4.50***	*2.50*	*3.90*	*9.50*
MW-5	5.40	*3.50*	*2.50*	*3.90*	*9.50*
MW-6	**19.8**	*3.50*	*2.50*	*3.90*	14.3
MW-7R	5.50	*3.50*	*2.50*	*3.90*	*9.50*
MW-8	*4.30*	*3.50*	*2.50*	*3.90*	*9.50*

Notes:
Italic concentration for a BTV indicates background was 100 percent non-detects. *Italic concentration* for a sample observation indicates a non-detect value/
Underlined concentration indicates a detect value for constituents with 100 percent background non-detects, and the DQR is the recommended for statistical evaluation.
Bold and underlined concentration indicates an SSI over background.

Table 12: Summary of Evaluation for SSIs over Background for Appendix III Constituents (Detection Monitoring)

	Appendix III Constituents						
	Boron	Calcium	Chloride	Fluoride	pH (Field)*	Sulfate	TDS
Unit	ug/L	ug/L	mg/L	mg/L	S.U.	mg/L	mg/L
BTV (UPL)	56.5	124,000	344	0.254	5.88 - 7.26	182	1,270
Pre-Ash Range	6.20 - 53.1	16,900 - 185,000	22.2 - 1,160	0.0200 - 0.590	6.17 - 7.70	3.70 - 199	296 - 2,770
Well	*Second Detection Monitoring Round Results*						
MW-1	*8.50*	**124,000**	**875**	0.170	6.66	6.00	**2,020**
MW-11	15.1	25,400	132	0.180	**18.1**	2.10	403
MW-2	39.7	**185,000**	**1,090**	*0.0500*	**7.56**	75.1	**2,580**
MW-3	27.2	**183,000**	**1,080**	**0.390**	**7.37**	20.7	**2,430**
MW-4	*8.50*	62,000	**423**	**0.340**	6.21	10.3	1,110
MW-5	*8.50*	9,280	19.0	**0.580**	6.70	3.60	1,270
MW-6	*8.50*	33,900	185	**0.370**	6.28	26.1	556
MW-7R	*8.50*	91,100	279	0.130	**7.31**	14.5	828
MW-8	8.60	101,000	307	0.0750	7.09	6.90	788

Notes:
Italic concentration for a BTV indicates background was 100 percent non-detects. *Italic concentration* for a sample observation indicates a non-detect value/
Underlined concentration indicates a detect value for constituents with 100 percent background non-detects, and the DQR is the recommended for statistical evaluation.
Bold and underlined concentration indicates an SSI over background.
* indicates the lower bound of the pH range is the LPL. The upper bound is the UPL.

Table 13: Summary of Evaluation for SSIs over Background for Appendix IV Constituents (Detection Monitoring)

	Appendix IV Constituents																
	Anti-mony	Ars-enic	Barium	Bery-llium	Cadmium	Chromium	Cobalt	Fluoride	Lead	Lithium	Mercury	Moly-bdenum	Radium-226	Radium-228	Selenium	Thallium	Total Radium
Unit	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	mg/L	ug/L	ug/L	ug/L	ug/L	pCi/L	pCi/L	ug/L	ug/L	pCi/L
BTV (UPL)	*3.90*	*4.80*	443	0.700	0.500	*3.70*	*3.60*	0.253	14.1	48.1	0.200	13.6	1.22	1.29	*5.00*	13.7	2.09
Pre-Ash Range	3.80 - 12.0	2.50 - 2.50	117 - 1,240	0.500 - 0.500	0.500 - 0.500	2.50 - 33.9	2.50 - 7.00	0.0200 - 0.590	2.50 - 6.30	7.50 - 70.4	0.100 - 0.100	2.50 - 20.6	0.0774 - 0.820	0.0230 - 1.56	5.00 - 5.00	5.00 - 5.00	0.304 - 2.93
Well	*Second Detection Monitoring Round Results*																
MW-1	*3.00*	*4.70*	310	*0.700*	*0.400*	*3.70*	*3.60*	0.170	*4.50*	35.5	*0.120*	*3.90*	-0.0643	0.552	*4.70*	*0.0500*	0.552
MW-11	*3.00*	*4.70*	38.7	*0.700*	*0.400*	*3.70*	*3.60*	0.180	*4.50*	9.30	*0.120*	*3.90*	-0.0605	0.129	*4.70*	*0.0500*	0.129
MW-2	*3.00*	*4.70*	347	*0.700*	0.400	**5.90**	*18.2*	0.0500	*4.50*	**212**	*0.120*	4.90	1.25	**1.56**	*4.70*	*0.100*	**2.81**
MW-3	*3.00*	**6.10**	**717**	*0.700*	*0.400*	*3.70*	*18.2*	**0.390**	*4.50*	**88.4**	*0.120*	7.40	**1.26**	1.18	*4.70*	*0.100*	**2.44**
MW-4	3.10	*4.70*	316	*0.700*	*0.400*	*3.70*	*3.60*	**0.260**	*4.50*	28.9	*0.120*	*3.90*	0.0618	0.465	5.90	*0.0500*	0.527
MW-5	3.00	*4.70*	97.3	*0.700*	*0.400*	*3.70*	*3.60*	**0.580**	*4.50*	10.0	*0.120*	*3.90*	0.121	0.576	*4.70*	*0.0500*	0.697
MW-6	*3.00*	*4.70*	61.5	*0.700*	*0.400*	*3.70*	*3.60*	**0.370**	*4.50*	26.7	*0.120*	*3.90*	-0.252	1.12	*4.70*	*0.0500*	1.12
MW-7R	*3.00*	*4.70*	304	*0.700*	*0.400*	*3.70*	*3.60*	0.130	*4.50*	28.5	*0.120*	*3.90*	0.128	0.726	*4.70*	*0.0500*	0.854
MW-8	*3.00*	**5.20**	**1,080**	*0.700*	*0.400*	*3.70*	*3.60*	0.0750	*4.50*	23.5	*0.120*	*3.90*	0.269	0.650	*4.70*	*0.0500*	0.919

Notes:
Italic concentration for a BTV indicates background was 100 percent non-detects. *Italic concentration* for a sample observation indicates a non-detect value/
Underlined concentration indicates a detect value for constituents with 100 percent background non-detects, and the DQR is the recommended for statistical evaluation.
Bold and underlined concentration indicates an SSI over background.

SSIs were found for two Appendix I metals (copper, nickel), five Appendix III constituents (calcium, chloride, fluoride, pH (field), and TDS), and eight Appendix IV constituents (arsenic, barium, chromium, fluoride, lithium, radium-226, radium-228 and total radium).

When the November 2021 sampling event results are compared to the pre-ash sampling results from those eight wells, current downgradient groundwater constituent concentrations are generally similar to concentrations reported prior to ash placement with the exception of calcium, pH (field), copper, radium-226, and lithium.

Depending on the data distribution of the constituent, the BTVs have been computed to allow for one to two verification samples. With verification sampling, the validity of the SSIs can be confirmed

.

5 Appendix E.A: Downgradient Well Descriptive Statistics

Table 14: Summary of Well MW-1 Data Set Descriptive Statistics

Constituent	Unit	Sample Size	No. of NDs	With NDs=MDLs Included				With NDs Removed			
				Minimum	Maximum	Mean	Median	Minimum	Maximum	Mean	Median
Appendix I Metals											
Copper	ug/L	26	25	2.10	7.20	3.03	2.50	7.20	7.20	7.20	7.20
Nickel	ug/L	26	22	0.900	13.3	3.28	2.50	4.90	13.3	7.93	6.75
Silver	ug/L	26	26	2.50	2.50	2.50	2.50	--	--	--	--
Vanadium	ug/L	26	21	1.30	7.80	3.24	2.50	4.90	7.80	5.90	5.60
Zinc	ug/L	26	17	3.90	28.9	10.0	9.50	10.2	28.9	17.4	14.7
Appendix III Constituents											
Boron	ug/L	26	0	0.570	14.5	5.83	6.20	6.20	14.5	9.44	9.60
Calcium	ug/L	26	0	43,100	256,000	156,123	151,500	43,100	256,000	156,123	151,500
Chloride	mg/L	26	1	167	1,010	602	610	167	1,010	602	610
Fluoride	mg/L	24	0	0.0200	0.170	0.138	0.140	0.110	0.170	0.142	0.140
pH (Field)	S.U.	26	0	6.41	7.30	6.70	6.70	6.41	7.30	6.70	6.70
Sulfate	mg/L	26	0	5.40	11.2	7.64	7.00	5.40	11.2	7.64	7.00
Total Dissolved Solids	mg/L	26	0	569	2,490	1,403	1,265	569	2,490	1,403	1,265
Appendix IV Constituents											
Antimony	ug/L	26	25	3.00	6.10	3.62	3.80	6.10	6.10	6.10	6.10
Arsenic	ug/L	26	25	2.50	5.20	4.33	4.70	5.20	5.20	5.20	5.20
Barium	ug/L	26	0	61.9	363	207	214	61.9	363	207	214
Beryllium	ug/L	26	26	0.200	0.700	0.500	0.500	--	--	--	--
Cadmium	ug/L	26	23	0.400	0.670	0.485	0.500	0.570	0.670	0.603	0.570
Chromium	ug/L	26	20	1.00	18.4	4.04	2.50	5.00	18.4	9.18	7.10
Cobalt	ug/L	26	26	1.10	3.60	2.54	2.50	--	--	--	--
Fluoride	mg/L	26	1	0.0200	0.170	0.138	0.140	0.110	0.170	0.142	0.140
Lead	ug/L	26	26	1.60	4.50	2.82	2.50	--	--	--	--
Lithium	ug/L	26	0	19.2	42.8	32.4	32.4	19.2	42.8	32.4	32.4
Mercury	ug/L	26	26	0.100	0.120	0.105	0.100	--	--	--	--
Molybdenum	ug/L	26	23	0.900	15.1	3.96	2.50	9.00	15.1	12.9	14.5
Radium-226	pCi/L	24	0	-0.188	1.03	0.331	0.265	-0.188	1.03	0.331	0.265
Radium-228	pCi/L	24	0	-0.0467	1.45	0.556	0.524	-0.0467	1.45	0.556	0.524
Selenium	ug/L	26	26	4.70	5.00	4.88	5.00	--	--	--	--
Thallium	ug/L	26	26	0.0200	5.00	1.21	0.0500	--	--	--	--
Total Radium	pCi/L	24	0	0.237	2.48	0.907	0.791	0.237	2.48	0.907	0.791

Notes:

1. ND = not detected above the method detection limit.
2. MDL = method detection limit.
3. "--" indicates all results for the respective constituent were NDs, or with the case of total radium, NDs were flagged but the laboratory did not provide a value for the MDL.
4. Numbers are displayed using the same number of significant figures as reported by the laboratory.
5. If a constituent had 100% detections the descriptive statistics provided above are identical for the data including NDs and excluding NDs.

Table 15: Summary of Well MW-2 Data Set Descriptive Statistics

Constituent	Unit	Sample Size	No. of NDs	With NDs=MDLs Included				With NDs Removed			
				Minimum	Maximum	Mean	Median	Minimum	Maximum	Mean	Median
Appendix I Metals											
Copper	ug/L	21	13	2.10	294	18.6	2.50	4.90	294	44.3	7.20
Nickel	ug/L	21	10	0.900	54.4	10.0	4.50	4.50	54.4	16.9	10.2
Silver	ug/L	21	21	2.50	2.50	2.50	2.50	--	--	--	--
Vanadium	ug/L	21	18	1.30	7.60	3.13	2.50	4.20	7.60	5.90	5.90
Zinc	ug/L	21	11	5.00	113	19.6	9.50	10.7	113	34.2	27.5
Appendix III Constituents											
Boron	ug/L	20	0	37.4	63.9	45.1	44.1	37.4	63.9	45.1	44.1
Calcium	ug/L	21	0	130,000	221,000	191,429	192,000	130,000	221,000	191,429	192,000
Chloride	mg/L	21	0	910	1,360	1,155	1,180	910	1,360	1,155	1,180
Fluoride	mg/L	21	2	0.0200	0.400	0.205	0.220	0.130	0.400	0.223	0.220
pH (Field)	S.U.	17	0	7.50	8.50	7.72	7.60	7.50	8.50	7.72	7.60
Sulfate	mg/L	21	0	53.3	338	160	130	53.3	338	160	130
Total Dissolved Solids	mg/L	21	0	257	11,700	2,781	2,580	257	11,700	2,781	2,580
Appendix IV Constituents											
Antimony	ug/L	21	10	3.00	12.3	5.96	4.60	4.60	12.3	8.08	8.70
Arsenic	ug/L	21	19	2.50	5.40	4.24	4.80	4.80	5.40	5.10	5.10
Barium	ug/L	21	0	177	481	284	275	177	481	284	275
Beryllium	ug/L	21	21	0.200	0.700	0.533	0.500	--	--	--	--
Cadmium	ug/L	21	20	0.400	0.500	0.475	0.500	0.480	0.480	0.480	0.480
Chromium	ug/L	21	5	1.00	84.0	16.5	7.20	4.60	84.0	20.8	9.95
Cobalt	ug/L	21	21	1.10	18.2	3.39	2.50	--	--	--	--
Fluoride	mg/L	21	2	0.0200	0.400	0.205	0.220	0.130	0.400	0.223	0.220
Lead	ug/L	21	20	1.60	4.80	2.95	2.50	4.80	4.80	4.80	4.80
Lithium	ug/L	21	0	53.1	512	167	129	53.1	512	167	129
Mercury	ug/L	21	21	0.100	0.120	0.105	0.100	--	--	--	--
Molybdenum	ug/L	21	1	3.90	41.0	11.3	9.30	4.80	41.0	11.6	9.40
Radium-226	pCi/L	20	0	0.410	1.94	0.949	0.965	0.410	1.94	0.949	0.965
Radium-228	pCi/L	20	0	0.433	2.16	1.34	1.40	0.433	2.16	1.34	1.40
Selenium	ug/L	21	21	4.70	5.00	4.91	5.00	--	--	--	--
Thallium	ug/L	21	19	0.0200	10.3	1.74	0.0600	0.0680	10.3	5.18	5.18
Total Radium	pCi/L	20	0	1.12	3.09	2.29	2.37	1.12	3.09	2.29	2.37

Notes:

1. ND = not detected above the method detection limit.
2. MDL = method detection limit.
3. "--" indicates all results for the respective constituent were NDs, or with the case of total radium, NDs were flagged but the laboratory did not provide a value for the MDL.
4. Numbers are displayed using the same number of significant figures as reported by the laboratory.
5. If a constituent had 100% detections the descriptive statistics provided above are identical for the data including NDs and excluding NDs.

Table 16: Summary of Well MW-3 Data Set Descriptive Statistics

Constituent	Unit	Sample Size	No. of NDs	With NDs=MDLs Included				With NDs Removed			
				Minimum	Maximum	Mean	Median	Minimum	Maximum	Mean	Median
Appendix I Metals											
Copper	ug/L	24	17	2.10	52.5	7.56	2.50	5.30	52.5	18.9	9.20
Nickel	ug/L	24	16	0.900	86.0	8.83	2.50	3.70	86.0	21.3	6.55
Silver	ug/L	24	24	2.50	2.50	2.50	2.50	--	--	--	--
Vanadium	ug/L	24	19	1.30	13.9	3.79	2.50	4.10	13.9	7.82	6.90
Zinc	ug/L	24	19	3.90	42.7	9.25	5.00	11.8	42.7	21.1	13.5
Appendix III Constituents											
Boron	ug/L	23	9	0.570	49.4	20.7	22.8	9.70	49.4	32.5	32.2
Calcium	ug/L	24	0	117,000	201,000	168,125	171,500	117,000	201,000	168,125	171,500
Chloride	mg/L	24	0	893	1,280	1,088	1,080	893	1,280	1,088	1,080
Fluoride	mg/L	24	1	0.0200	0.610	0.370	0.390	0.210	0.610	0.386	0.390
pH (Field)	S.U.	20	0	6.18	7.77	7.30	7.30	6.18	7.77	7.30	7.30
Sulfate	mg/L	24	0	9.10	174	64.6	53.3	9.10	174	64.6	53.3
Total Dissolved Solids	mg/L	24	0	256	3,180	2,121	2,315	256	3,180	2,121	2,315
Appendix IV Constituents											
Antimony	ug/L	24	15	3.00	15.0	5.83	3.90	3.80	11.4	8.31	9.20
Arsenic	ug/L	24	20	2.50	9.60	4.65	5.00	5.10	9.60	6.95	6.55
Barium	ug/L	24	0	353	855	621	619	353	855	621	619
Beryllium	ug/L	24	24	0.200	0.700	0.525	0.500	--	--	--	--
Cadmium	ug/L	24	23	0.400	0.500	0.467	0.500	0.410	0.410	0.410	0.410
Chromium	ug/L	24	13	1.00	179	15.3	3.70	4.40	179	30.2	9.30
Cobalt	ug/L	24	23.0	1.10	18.2	3.42	2.50	6.20	6.20	6.20	6.20
Fluoride	mg/L	24	1	0.0200	0.610	0.370	0.390	0.210	0.610	0.386	0.390
Lead	ug/L	24	23	1.60	7.30	3.13	2.50	7.30	7.30	7.30	7.30
Lithium	ug/L	24	1	0.390	236	93.5	87.7	36.7	236	97.5	87.8
Mercury	ug/L	24	24	0.100	0.120	0.105	0.100	--	--	--	--
Molybdenum	ug/L	24	0	5.10	35.7	9.53	7.80	5.10	35.7	9.53	7.80
Radium-226	pCi/L	23	0	0.213	1.92	0.947	1.02	0.213	1.92	0.947	1.02
Radium-228	pCi/L	23	0	0.326	2.86	1.42	1.35	0.326	2.86	1.42	1.35
Selenium	ug/L	24	24	4.70	5.00	4.90	5.00	--	--	--	--
Thallium	ug/L	24	24	0.0200	5.00	1.31	0.0500	--	--	--	--
Total Radium	pCi/L	23	0	0.857	3.92	2.37	2.41	0.857	3.92	2.37	2.41

Notes:

1. ND = not detected above the method detection limit.
2. MDL = method detection limit.
3. "--" indicates all results for the respective constituent were NDs, or with the case of total radium, NDs were flagged but the laboratory did not provide a value for the MDL.
4. Numbers are displayed using the same number of significant figures as reported by the laboratory.
5. If a constituent had 100% detections the descriptive statistics provided above are identical for the data including NDs and excluding NDs.

Table 17: Summary of Well MW-4 Data Set Descriptive Statistics

Constituent	Unit	Sample Size	No. of NDs	With NDs=MDLs Included				With NDs Removed			
				Minimum	Maximum	Mean	Median	Minimum	Maximum	Mean	Median
Appendix I Metals											
Copper	ug/L	25	23	2.10	170	9.72	2.50	7.60	170	88.8	88.8
Nickel	ug/L	25	11	0.900	11.5	4.92	4.50	4.30	11.5	6.93	6.55
Silver	ug/L	25	25	2.50	2.50	2.50	2.50	--	--	--	--
Vanadium	ug/L	25	24	1.30	10.7	3.02	2.50	10.7	10.7	10.7	10.7
Zinc	ug/L	25	21	3.90	47.2	9.04	5.00	9.50	47.2	25.2	22.0
Appendix III Constituents											
Boron	ug/L	24	13	0.570	165	12.9	6.00	5.70	165	21.2	6.80
Calcium	ug/L	25	0	17,900	71,600	56,192	62,100	17,900	71,600	56,192	62,100
Chloride	mg/L	25	0	144	567	431	475	144	567	431	475
Fluoride	mg/L	25	0	0.210	0.420	0.310	0.300	0.210	0.420	0.310	0.300
pH (Field)	S.U.	23	0	6.10	6.56	6.31	6.30	6.10	6.56	6.31	6.30
Sulfate	mg/L	25	0	3.40	12.3	9.66	10.5	3.40	12.3	9.66	10.5
Total Dissolved Solids	mg/L	25	0	395	1,580	1,073	1,150	395	1,580	1,073	1,150
Appendix IV Constituents											
Antimony	ug/L	25	20	3.00	7.00	3.75	3.80	3.10	7.00	4.32	3.40
Arsenic	ug/L	25	25	2.50	5.00	4.28	4.70	--	--	--	--
Barium	ug/L	25	0	85.9	431	278	306	85.9	431	278	306
Beryllium	ug/L	25	25	0.200	0.700	0.500	0.500	--	--	--	--
Cadmium	ug/L	25	24	0.400	0.500	0.463	0.500	0.470	0.470	0.470	0.470
Chromium	ug/L	25	22	1.00	8.60	3.00	2.50	4.10	8.60	6.13	5.70
Cobalt	ug/L	25	18	1.10	21.8	4.52	2.50	5.30	21.8	9.31	8.10
Fluoride	mg/L	25	0	0.210	0.420	0.310	0.300	0.210	0.420	0.310	0.300
Lead	ug/L	25	25	1.60	4.50	2.84	2.50	--	--	--	--
Lithium	ug/L	25	0	15.8	98.0	29.0	27.6	15.8	98.0	29.0	27.6
Mercury	ug/L	25	25	0.100	0.120	0.105	0.100	--	--	--	--
Molybdenum	ug/L	25	21	0.900	20.9	5.10	2.50	8.90	20.9	17.1	19.2
Radium-226	pCi/L	23	0	-0.120	0.913	0.385	0.406	-0.120	0.913	0.385	0.406
Radium-228	pCi/L	23	0	0.0190	1.35	0.525	0.481	0.0190	1.35	0.525	0.481
Selenium	ug/L	25	24	4.70	5.90	4.93	5.00	5.90	5.90	5.90	5.90
Thallium	ug/L	25	25	0.0200	5.00	1.26	0.0500	--	--	--	--
Total Radium	pCi/L	23	0	0.240	2.26	0.915	0.760	0.240	2.26	0.915	0.760

Notes:

1. ND = not detected above the method detection limit.
2. MDL = method detection limit.
3. "--" indicates all results for the respective constituent were NDs, or with the case of total radium, NDs were flagged but the laboratory did not provide a value for the MDL.
4. Numbers are displayed using the same number of significant figures as reported by the laboratory.
5. If a constituent had 100% detections the descriptive statistics provided above are identical for the data including NDs and excluding NDs.

Table 18: Summary of Well MW-5 Data Set Descriptive Statistics

Constituent	Unit	Sample Size	No. of NDs	With NDs=MDLs Included				With NDs Removed			
				Minimum	Maximum	Mean	Median	Minimum	Maximum	Mean	Median
Appendix I Metals											
Copper	ug/L	26	22	2.10	8.00	3.43	2.50	5.40	8.00	6.48	6.25
Nickel	ug/L	26	24	0.900	9.00	2.95	2.50	8.10	9.00	8.55	8.55
Silver	ug/L	26	26	2.50	2.50	2.50	2.50	--	--	--	--
Vanadium	ug/L	26	26	1.30	3.90	2.64	2.50	--	--	--	--
Zinc	ug/L	26	19	3.90	36.1	9.11	5.00	9.60	36.1	17.4	13.5
Appendix III Constituents											
Boron	ug/L	25	11	0.570	39.3	8.93	10.1	9.80	39.3	12.9	11.0
Calcium	ug/L	26	0	9,040	16,900	11,956	12,050	9,040	16,900	11,956	12,050
Chloride	mg/L	26	0	17.6	23.1	20.4	20.2	17.6	23.1	20.4	20.2
Fluoride	mg/L	26	0	0.410	0.680	0.538	0.555	0.410	0.680	0.538	0.555
pH (Field)	S.U.	23	0	5.50	8.54	6.92	7.00	5.50	8.54	6.92	7.00
Sulfate	mg/L	26	0	2.60	5.60	3.63	3.55	2.60	5.60	3.63	3.55
Total Dissolved Solids	mg/L	26	0	194	1,160	275	241	194	1,160	275	241
Appendix IV Constituents											
Antimony	ug/L	26	25	3.00	3.90	3.57	3.80	3.90	3.90	3.90	3.90
Arsenic	ug/L	26	26	2.50	5.00	4.31	4.70	--	--	--	--
Barium	ug/L	26	0	89.2	153	108	107	89.2	153	108	107
Beryllium	ug/L	26	26	0.200	0.700	0.500	0.500	--	--	--	--
Cadmium	ug/L	26	26	0.400	0.500	0.462	0.500	--	--	--	--
Chromium	ug/L	26	22	1.00	16.8	3.80	2.50	5.10	16.8	10.6	10.3
Cobalt	ug/L	26	26	1.10	3.60	2.54	2.50	--	--	--	--
Fluoride	mg/L	26	0	0.410	0.680	0.538	0.555	0.410	0.680	0.538	0.555
Lead	ug/L	26	26	1.60	4.50	2.82	2.50	--	--	--	--
Lithium	ug/L	26	1	4.20	28.6	9.42	8.90	6.30	28.6	9.63	8.90
Mercury	ug/L	26	26	0.100	0.120	0.105	0.100	--	--	--	--
Molybdenum	ug/L	26	26	0.900	3.90	2.58	2.50	--	--	--	--
Radium-226	pCi/L	24	0	-0.205	0.778	0.112	0.0923	-0.205	0.778	0.112	0.0923
Radium-228	pCi/L	24	0	-0.0922	1.08	0.404	0.364	-0.0922	1.08	0.404	0.364
Selenium	ug/L	26	26	4.70	5.00	4.88	5.00	--	--	--	--
Thallium	ug/L	26	25	0.0200	14.8	1.58	0.0500	14.8	14.8	14.8	14.8
Total Radium	pCi/L	24	0	0.0262	1.15	0.557	0.566	0.0262	1.15	0.557	0.566

Notes:

1. ND = not detected above the method detection limit.
2. MDL = method detection limit.
3. "--" indicates all results for the respective constituent were NDs, or with the case of total radium, NDs were flagged but the laboratory did not provide a value for the MDL.
4. Numbers are displayed using the same number of significant figures as reported by the laboratory.
5. If a constituent had 100% detections the descriptive statistics provided above are identical for the data including NDs and excluding NDs.

Table 19: Summary of Well MW-6 Data Set Descriptive Statistics

Constituent	Unit	Sample Size	No. of NDs	With NDs=MDLs Included				With NDs Removed			
				Minimum	Maximum	Mean	Median	Minimum	Maximum	Mean	Median
Appendix I Metals											
Copper	ug/L	26	24	2.10	19.8	3.58	2.50	5.50	19.8	12.7	12.7
Nickel	ug/L	26	24	0.900	8.20	2.68	2.50	3.90	8.20	6.05	6.05
Silver	ug/L	26	26	2.50	2.50	2.50	2.50	--	--	--	--
Vanadium	ug/L	26	26	1.30	3.90	2.64	2.50	--	--	--	--
Zinc	ug/L	26	21	3.90	17.7	7.34	5.00	11.3	17.7	13.5	12.6
Appendix III Constituents											
Boron	ug/L	25	14	0.570	10.8	5.33	6.60	6.10	10.8	8.09	7.70
Calcium	ug/L	26	0	31,300	40,200	34,977	34,450	31,300	40,200	34,977	34,450
Chloride	mg/L	26	0	15.3	279	216	231	15.3	279	216	231
Fluoride	mg/L	26	0	0.180	0.520	0.375	0.375	0.180	0.520	0.375	0.375
pH (Field)	S.U.	23	0	6.15	7.00	6.44	6.40	6.15	7.00	6.44	6.40
Sulfate	mg/L	26	0	25.1	214	74.4	52.7	25.1	214	74.4	52.7
Total Dissolved Solids	mg/L	26	0	371	946	655	656	371	946	655	656
Appendix IV Constituents											
Antimony	ug/L	26	26	3.00	3.90	3.53	3.80	--	--	--	--
Arsenic	ug/L	26	26	2.50	5.00	4.31	4.70	--	--	--	--
Barium	ug/L	26	0	46.9	142	87.6	90.2	46.9	142	87.6	90.2
Beryllium	ug/L	26	26	0.200	0.700	0.500	0.500	--	--	--	--
Cadmium	ug/L	26	26	0.400	0.500	0.462	0.500	--	--	--	--
Chromium	ug/L	26	22	1.00	14.0	3.22	2.50	4.70	14.0	7.50	5.65
Cobalt	ug/L	26	26	1.10	3.60	2.54	2.50	--	--	--	--
Fluoride	mg/L	26	0	0.180	0.520	0.375	0.375	0.180	0.520	0.375	0.375
Lead	ug/L	26	26	1.60	4.50	2.82	2.50	--	--	--	--
Lithium	ug/L	26	0	10.1	60.5	35.7	31.9	10.1	60.5	35.7	31.9
Mercury	ug/L	26	25	0.100	0.320	0.113	0.100	0.320	0.320	0.320	0.320
Molybdenum	ug/L	26	22	0.900	8.30	3.43	2.50	5.40	8.30	6.83	6.80
Radium-226	pCi/L	24	0	-0.252	0.910	0.196	0.218	-0.252	0.910	0.196	0.218
Radium-228	pCi/L	24	0	0.00147	1.12	0.570	0.540	0.00147	1.12	0.570	0.540
Selenium	ug/L	26	25	4.70	5.00	4.89	5.00	4.90	4.90	4.90	4.90
Thallium	ug/L	26	25	0.0200	6.20	1.23	0.0500	6.20	6.20	6.20	6.20
Total Radium	pCi/L	24	0	0.148	1.47	0.801	0.881	0.148	1.47	0.801	0.881

Notes:

1. ND = not detected above the method detection limit.
2. MDL = method detection limit.
3. "--" indicates all results for the respective constituent were NDs, or with the case of total radium, NDs were flagged but the laboratory did not provide a value for the MDL.
4. Numbers are displayed using the same number of significant figures as reported by the laboratory.
5. If a constituent had 100% detections the descriptive statistics provided above are identical for the data including NDs and excluding NDs.

Table 20: Summary of Well MW-7R Data Set Descriptive Statistics

Constituent	Unit	Sample Size	No. of NDs	With NDs=MDLs Included				With NDs Removed			
				Minimum	Maximum	Mean	Median	Minimum	Maximum	Mean	Median
Appendix I Metals											
Copper	ug/L	17	13	2.10	79.3	8.82	4.30	5.50	79.3	27.3	12.3
Nickel	ug/L	17	10	0.900	880	58.4	3.50	4.70	880	138	17.4
Silver	ug/L	17	17	2.50	2.50	2.50	2.50	--	--	--	--
Vanadium	ug/L	17	13	1.30	18.8	5.54	3.90	4.50	18.8	14.3	16.9
Zinc	ug/L	17	14	3.90	53.4	12.5	9.50	10.7	53.4	39.0	52.8
Appendix III Constituents											
Boron	ug/L	16	8	0.570	25.3	9.94	10.8	10.2	25.3	14.8	13.3
Calcium	ug/L	17	0	74,000	104,000	89,735	89,700	74,000	104,000	89,735	89,700
Chloride	mg/L	17	0	266	312	287	285	266	312	287	285
Fluoride	mg/L	17	1	0.0500	0.320	0.126	0.110	0.100	0.320	0.131	0.115
pH (Field)	S.U.	16	0	7.13	9.60	7.54	7.37	7.13	9.60	7.54	7.37
Sulfate	mg/L	17	0	14.2	51.2	19.2	17.3	14.2	51.2	19.2	17.3
Total Dissolved Solids	mg/L	17	0	740	990	837	828	740	990	837	828
Appendix IV Constituents											
Antimony	ug/L	17	16	3.00	13.6	3.99	3.00	13.6	13.6	13.6	13.6
Arsenic	ug/L	17	17	4.70	5.00	4.82	4.70	--	--	--	--
Barium	ug/L	17	0	50.1	423	276	292	50.1	423	276	292
Beryllium	ug/L	17	17	0.200	0.700	0.500	0.500	--	--	--	--
Cadmium	ug/L	17	17	0.400	0.500	0.441	0.400	--	--	--	--
Chromium	ug/L	17	6	1.00	1,940	126	6.50	5.10	1,940	193	15.7
Cobalt	ug/L	17	15	1.10	20.4	4.02	2.50	6.70	20.4	13.6	13.6
Fluoride	mg/L	17	1	0.0500	0.320	0.126	0.110	0.100	0.320	0.131	0.115
Lead	ug/L	17	15	1.60	6.80	3.60	2.50	6.70	6.80	6.75	6.75
Lithium	ug/L	17	0	5.60	33.8	25.6	27.6	5.60	33.8	25.6	27.6
Mercury	ug/L	17	17	0.100	0.120	0.107	0.100	--	--	--	--
Molybdenum	ug/L	17	14	0.900	49.5	7.05	3.90	10.7	49.5	26.6	19.5
Radium-226	pCi/L	15	0	-0.194	1.05	0.270	0.128	-0.194	1.05	0.270	0.128
Radium-228	pCi/L	15	0	-0.454	2.13	0.604	0.585	-0.454	2.13	0.604	0.585
Selenium	ug/L	17	17	4.70	5.00	4.82	4.70	--	--	--	--
Thallium	ug/L	17	14	0.0200	0.480	0.0799	0.0500	0.110	0.480	0.237	0.120
Total Radium	pCi/L	15	0	0.0741	2.31	0.926	0.845	0.0741	2.31	0.926	0.845

Notes:

1. ND = not detected above the method detection limit.
2. MDL = method detection limit.
3. "--" indicates all results for the respective constituent were NDs, or with the case of total radium, NDs were flagged but the laboratory did not provide a value for the MDL.
4. Numbers are displayed using the same number of significant figures as reported by the laboratory.
5. If a constituent had 100% detections the descriptive statistics provided above are identical for the data including NDs and excluding NDs.

Table 21: Summary of Well MW-8 Data Set Descriptive Statistics

Constituent	Unit	Sample Size	No. of NDs	With NDs=MDLs Included				With NDs Removed			
				Minimum	Maximum	Mean	Median	Minimum	Maximum	Mean	Median
Appendix I Metals											
Copper	ug/L	26	24	2.10	10.2	3.32	2.50	6.40	10.2	8.30	8.30
Nickel	ug/L	26	19	0.900	42.1	6.41	2.50	3.50	42.1	17.5	13.8
Silver	ug/L	26	26	2.50	2.50	2.50	2.50	--	--	--	--
Vanadium	ug/L	26	26	1.30	3.90	2.64	2.50	--	--	--	--
Zinc	ug/L	26	17	3.90	50.7	12.9	9.50	11.4	50.7	25.1	18.7
Appendix III Constituents											
Boron	ug/L	25	11	0.570	14.0	7.19	8.90	8.60	14.0	10.4	9.85
Calcium	ug/L	26	0	4,170	194,000	115,257	108,000	4,170	194,000	115,257	108,000
Chloride	mg/L	26	0	271	939	450	391	271	939	450	391
Fluoride	mg/L	26	20	0.0200	0.0750	0.0451	0.0500	0.0610	0.0750	0.0687	0.0680
pH (Field)	S.U.	24	0	6.70	7.29	7.01	7.01	6.70	7.29	7.01	7.01
Sulfate	mg/L	26	0	4.40	8.00	6.72	6.70	4.40	8.00	6.72	6.70
Total Dissolved Solids	mg/L	26	0	224	1,530	970	917	224	1,530	970	917
Appendix IV Constituents											
Antimony	ug/L	26	19	3.00	10.1	4.55	3.90	5.20	10.1	7.46	7.50
Arsenic	ug/L	26	25	2.50	5.20	4.33	4.70	5.20	5.20	5.20	5.20
Barium	ug/L	26	0	976	1,550	1,161	1,095	976	1,550	1,161	1,095
Beryllium	ug/L	26	26	0.200	0.700	0.500	0.500	--	--	--	--
Cadmium	ug/L	26	26	0.400	0.500	0.462	0.500	--	--	--	--
Chromium	ug/L	26	18	1.00	82.0	10.7	2.50	5.70	82.0	29.3	25.5
Cobalt	ug/L	26	26	1.10	3.60	2.54	2.50	--	--	--	--
Fluoride	mg/L	26	20	0.0200	0.0750	0.0451	0.0500	0.0610	0.0750	0.0687	0.0680
Lead	ug/L	26	26	1.60	4.50	2.82	2.50	--	--	--	--
Lithium	ug/L	26	1	4.20	50.1	27.8	26.1	18.7	50.1	28.7	26.8
Mercury	ug/L	26	25	0.100	0.370	0.115	0.100	0.370	0.370	0.370	0.370
Molybdenum	ug/L	26	24	0.900	5.60	2.86	2.50	5.20	5.60	5.40	5.40
Radium-226	pCi/L	24	0	0.00	1.16	0.490	0.457	0.00	1.16	0.490	0.457
Radium-228	pCi/L	24	0	0.239	1.74	0.774	0.622	0.239	1.74	0.774	0.622
Selenium	ug/L	26	26	4.70	5.00	4.88	5.00	--	--	--	--
Thallium	ug/L	26	25	0.0200	8.80	1.33	0.0500	8.80	8.80	8.80	8.80
Total Radium	pCi/L	24	0	0.454	1.94	1.26	1.25	0.454	1.94	1.26	1.25

Notes:

1. ND = not detected above the method detection limit.
2. MDL = method detection limit.
3. "--" indicates all results for the respective constituent were NDs, or with the case of total radium, NDs were flagged but the laboratory did not provide a value for the MDL.
4. Numbers are displayed using the same number of significant figures as reported by the laboratory.
5. If a constituent had 100% detections the descriptive statistics provided above are identical for the data including NDs and excluding NDs.

Table 22: Summary of Well MW-11 Data Set Descriptive Statistics

Constituent	Unit	Sample Size	No. of NDs	With NDs=MDLs Included				With NDs Removed			
				Minimum	Maximum	Mean	Median	Minimum	Maximum	Mean	Median
Appendix I Metals											
Copper	ug/L	5	3	4.30	20.1	7.78	4.30	5.90	20.1	13.0	13.0
Nickel	ug/L	5	5	3.50	3.50	3.50	3.50	--	--	--	--
Silver	ug/L	5	5	2.50	2.50	2.50	2.50	--	--	--	--
Vanadium	ug/L	5	5	3.90	3.90	3.90	3.90	--	--	--	--
Zinc	ug/L	5	5	9.50	9.50	9.50	9.50	--	--	--	--
Appendix III Constituents											
Boron	ug/L	5	0	11.5	16.5	14.5	15.1	11.5	16.5	14.5	15.1
Calcium	ug/L	5	0	23,200	38,900	30,440	26,500	23,200	38,900	30,440	26,500
Chloride	mg/L	5	0	123	149	139	142	123	149	139	142
Fluoride	mg/L	5	0	0.140	0.180	0.148	0.140	0.140	0.180	0.148	0.140
pH (Field)	S.U.	4	0	6.64	18.1	9.67	7.00	6.64	18.1	9.67	7.00
Sulfate	mg/L	5	0	1.80	3.00	2.20	2.10	1.80	3.00	2.20	2.10
Total Dissolved Solids	mg/L	5	0	398	2,760	898	410	398	2,760	898	410
Appendix IV Constituents											
Antimony	ug/L	5	5	3.00	3.00	3.00	3.00	--	--	--	--
Arsenic	ug/L	5	5	4.70	4.70	4.70	4.70	--	--	--	--
Barium	ug/L	5	0	34.3	66.0	51.2	57.4	34.3	66.0	51.2	57.4
Beryllium	ug/L	5	5	0.700	0.700	0.700	0.700	--	--	--	--
Cadmium	ug/L	5	5	0.400	0.400	0.400	0.400	--	--	--	--
Chromium	ug/L	5	5	3.70	3.70	3.70	3.70	--	--	--	--
Cobalt	ug/L	5	5	3.60	3.60	3.60	3.60	--	--	--	--
Fluoride	mg/L	5	0	0.140	0.180	0.148	0.140	0.140	0.180	0.148	0.140
Lead	ug/L	5	5	4.50	4.50	4.50	4.50	--	--	--	--
Lithium	ug/L	5	0	9.30	12.6	11.1	10.7	9.30	12.6	11.1	10.7
Mercury	ug/L	5	5	0.120	0.120	0.120	0.120	--	--	--	--
Molybdenum	ug/L	5	5	3.90	3.90	3.90	3.90	--	--	--	--
Radium-226	pCi/L	5	0	-0.0605	0.399	0.133	0.124	-0.0605	0.399	0.133	0.124
Radium-228	pCi/L	5	0	-0.135	2.13	0.545	0.129	-0.135	2.13	0.545	0.129
Selenium	ug/L	5	5	4.70	4.70	4.70	4.70	--	--	--	--
Thallium	ug/L	5	5	0.0500	0.0500	0.0500	0.0500	--	--	--	--
Total Radium	pCi/L	5	0	0.124	2.39	0.728	0.499	0.124	2.39	0.728	0.499

Notes:

6. ND = not detected above the method detection limit.
7. MDL = method detection limit.
8. "--" indicates all results for the respective constituent were NDs, or with the case of total radium, NDs were flagged but the laboratory did not provide a value for the MDL.
9. Numbers are displayed using the same number of significant figures as reported by the laboratory.
10. If a constituent had 100% detections the descriptive statistics provided above are identical for the data including NDs and excluding NDs.

6 Appendix E.B: Scatter Plots for Constituents with Downgradient Statistical Outliers

Figure 6: Cadmium Concentrations (ug/L) vs. Time (MW-1)

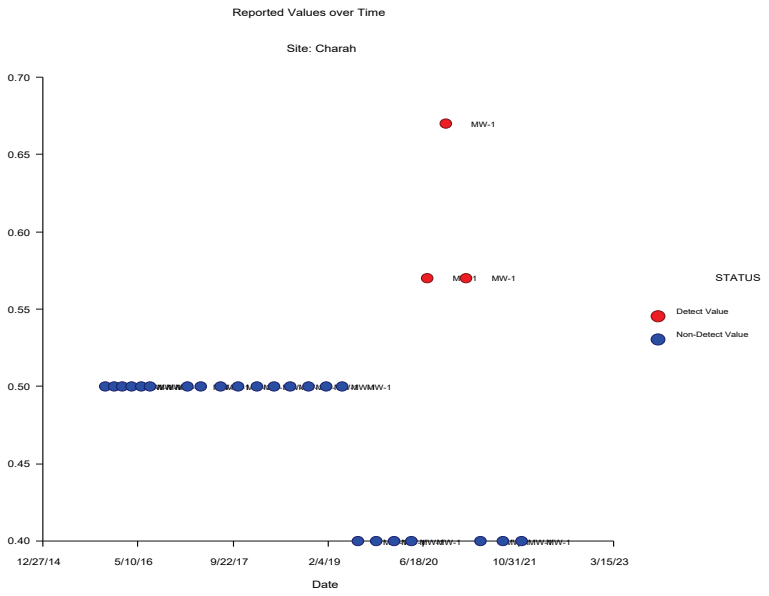


Figure 7: Radium-28 (pCi/L) vs. Time (MW-1)



Figure 8: Copper (ug/L) vs. Time (MW-2)

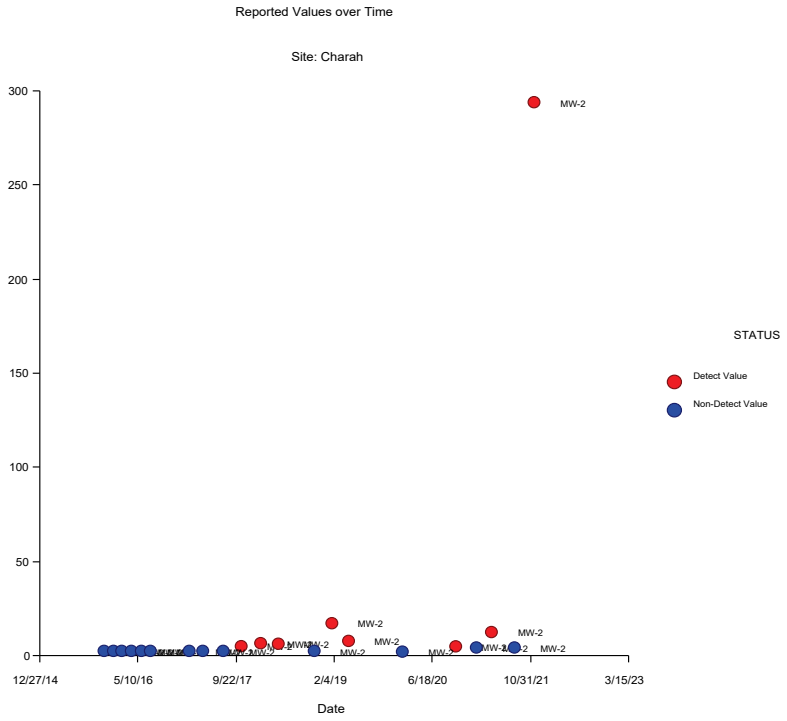


Figure 9: Zinc Concentrations (ug/L) vs. Time (MW-2)

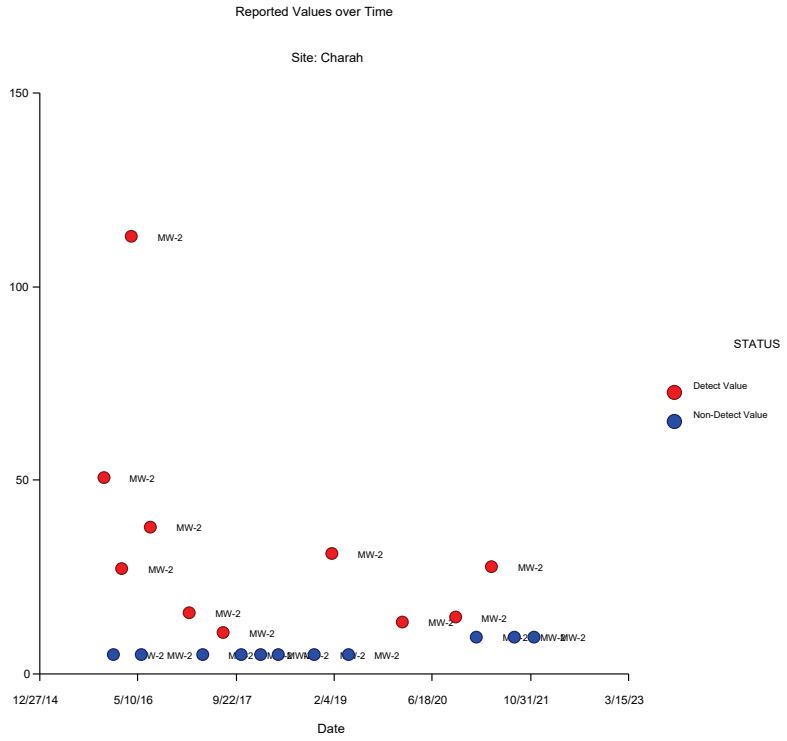


Figure 10: Total Dissolved Solids (mg/L) vs. Time (MW-2)

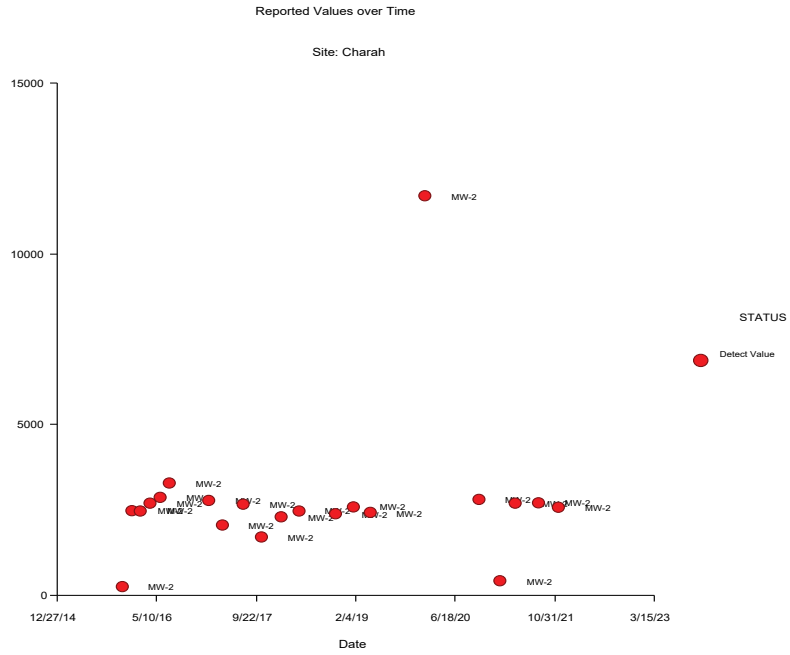


Figure 11: Molybdenum Concentrations (ug/L) vs. Time (MW-2)

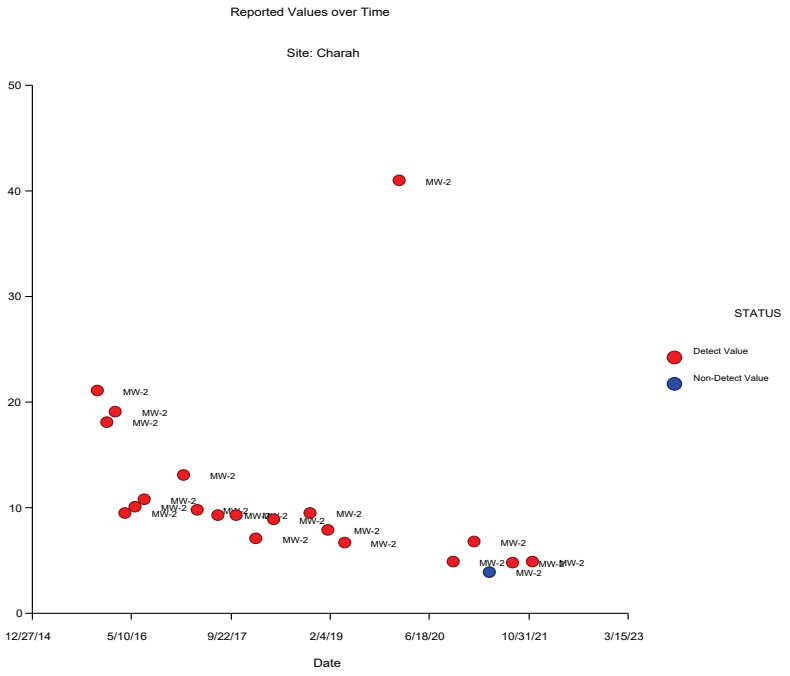


Figure 12: pH (Field) (S.U.) vs. Time (MW-3)

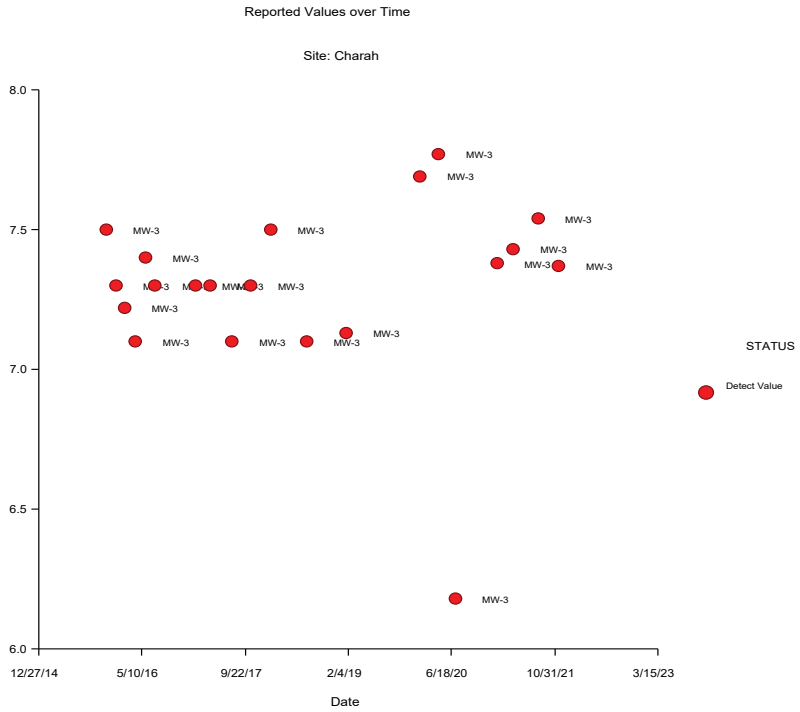


Figure 13: Chromium (ug/L) vs. Time (MW-3)

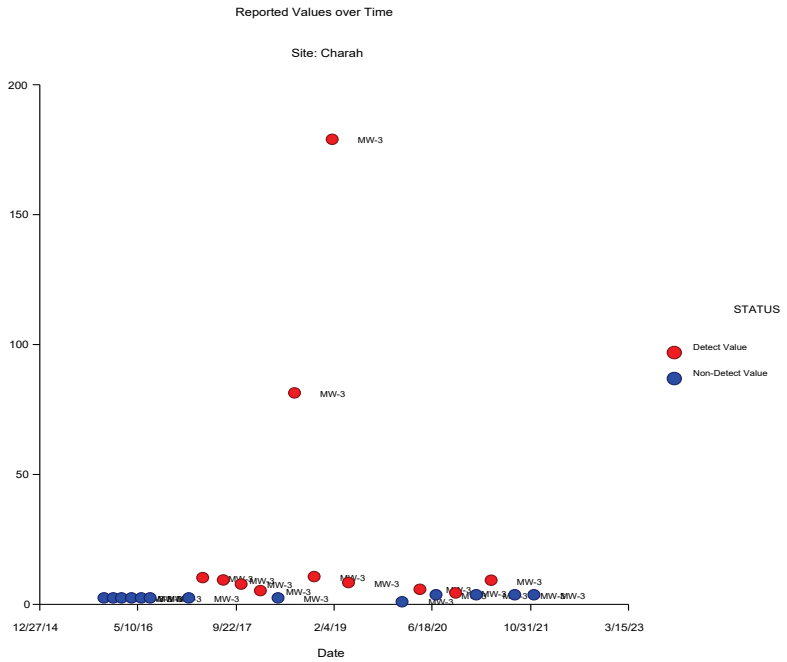


Figure 14: Lithium Concentrations (ug/L) vs. Time (MW-3)

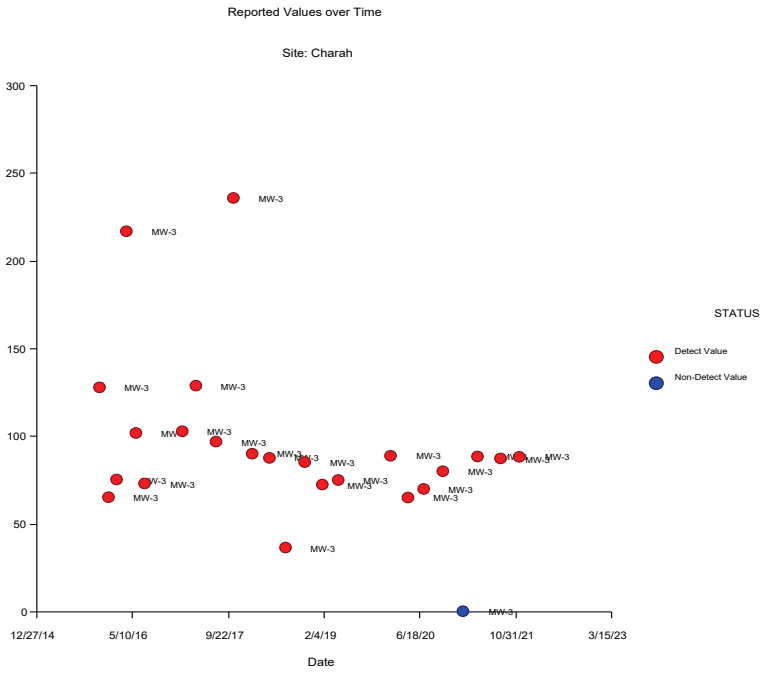


Figure 15: Molybdenum Concentrations (ug/L) vs. Time (MW-3)

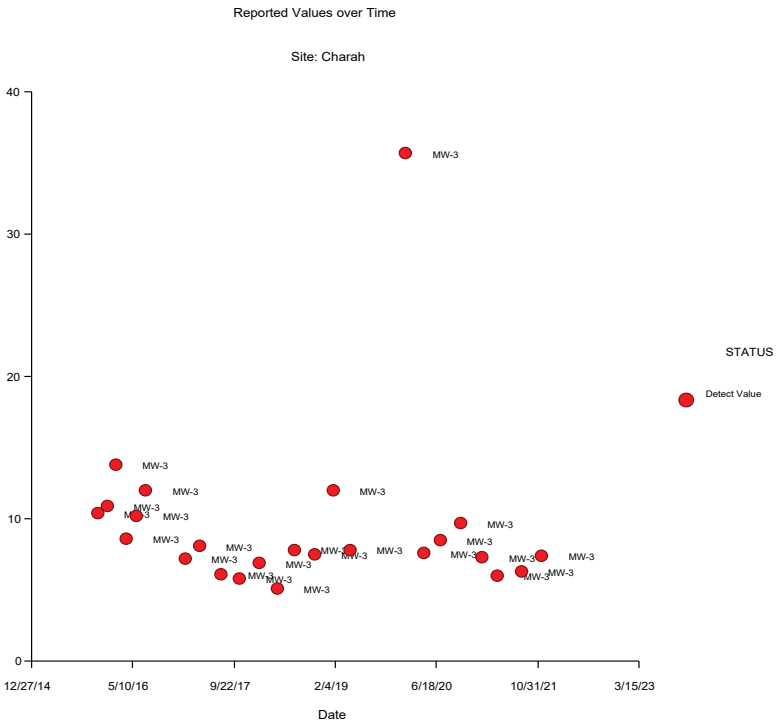


Figure 16: Boron Concentrations (ug/L) vs. Time (MW-4)

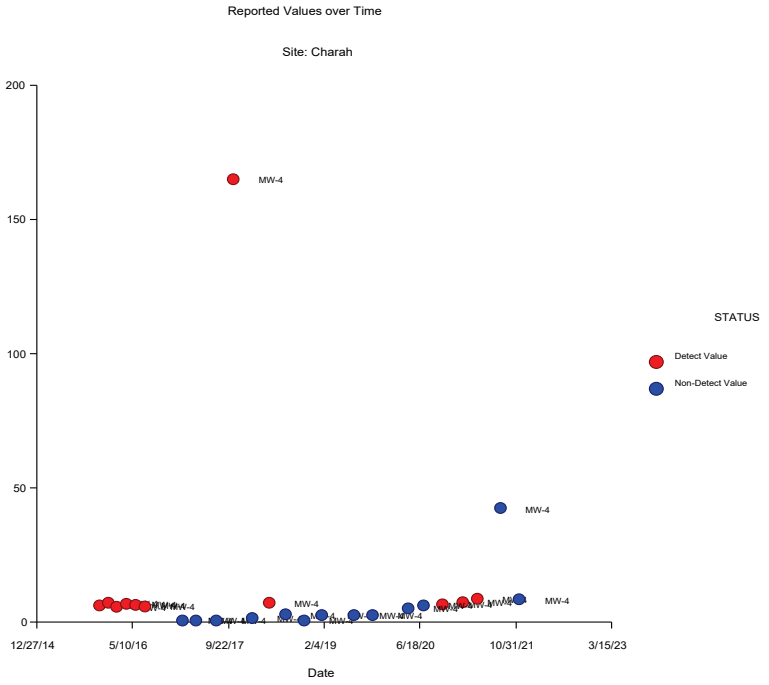


Figure 17: Calcium Concentrations (ug/L) vs. Time (MW-4)

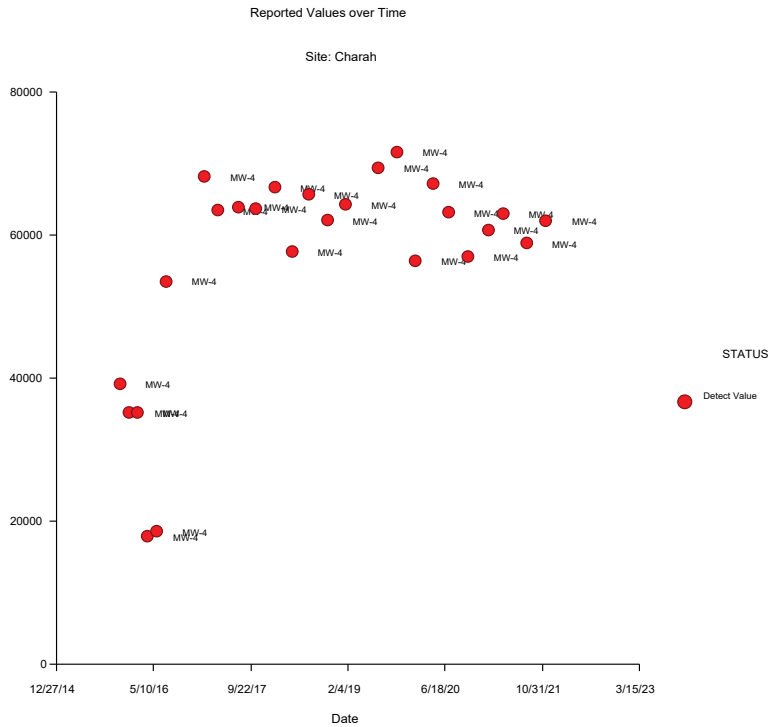


Figure 18: Chloride (mg/L) vs. Time (MW-4)

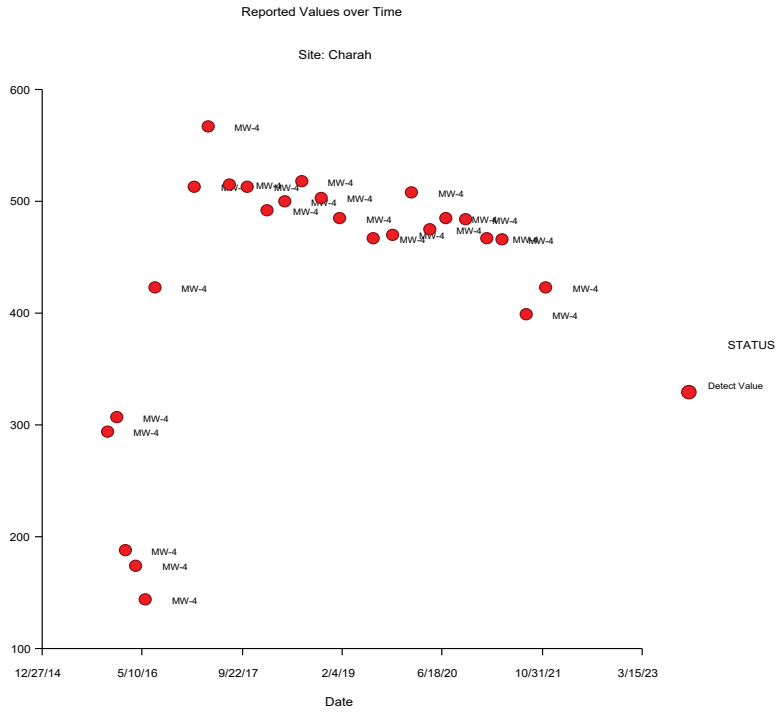


Figure 19: Sulfate (mg/L) vs. Time (MW-4)

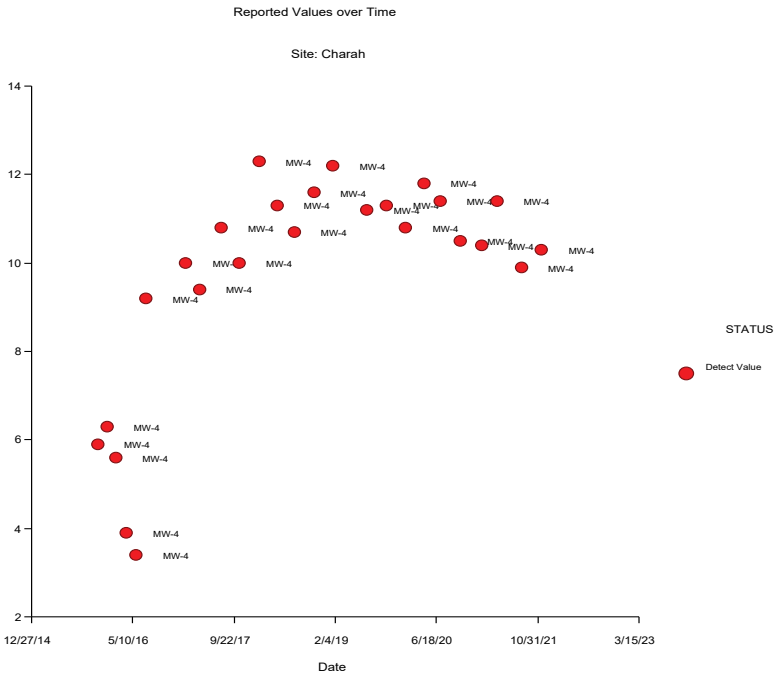


Figure 20: Total Dissolved Solids (mg/L) vs. Time (MW-4)

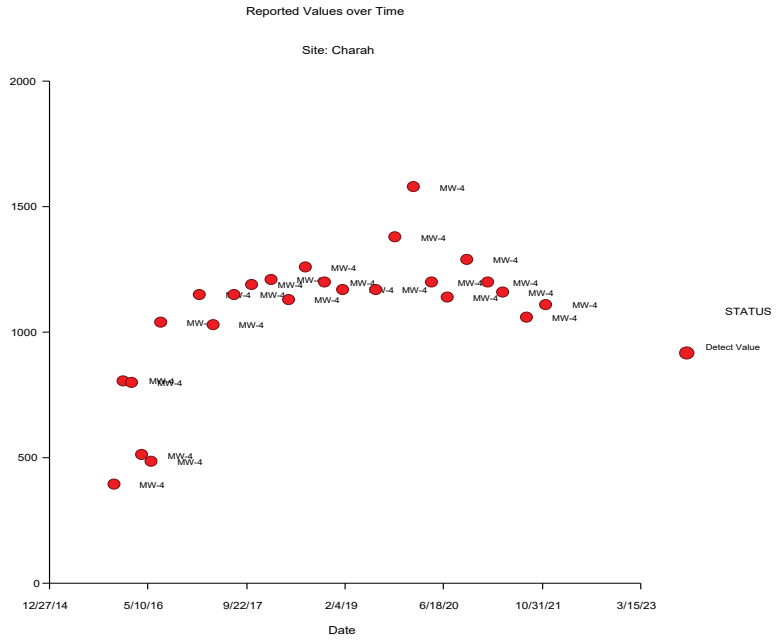


Figure 21: Barium (ug/L) vs. Time (MW-4)

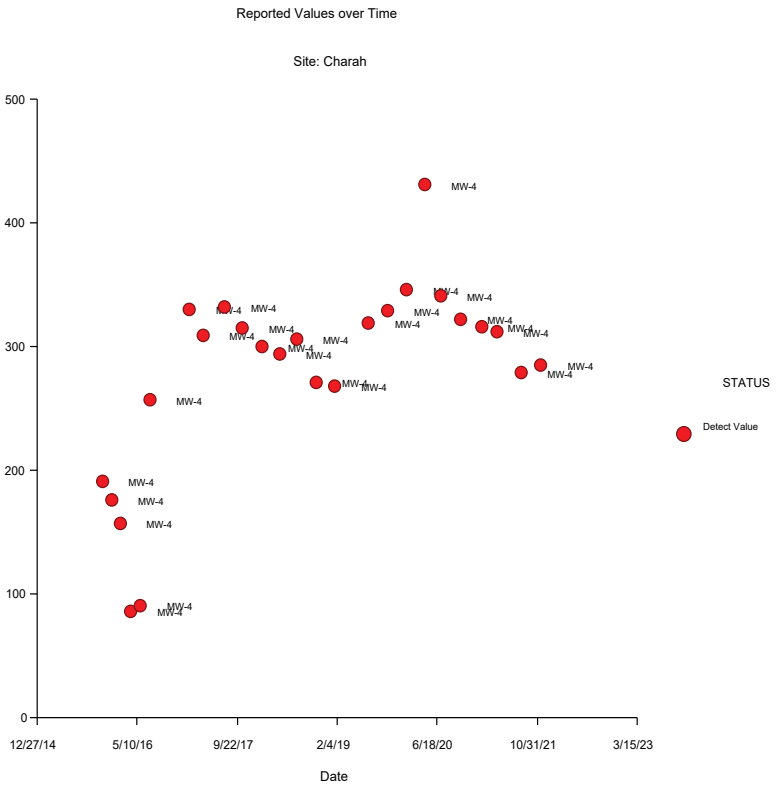


Figure 22: Cobalt (ug/L) vs. Time (MW-4)

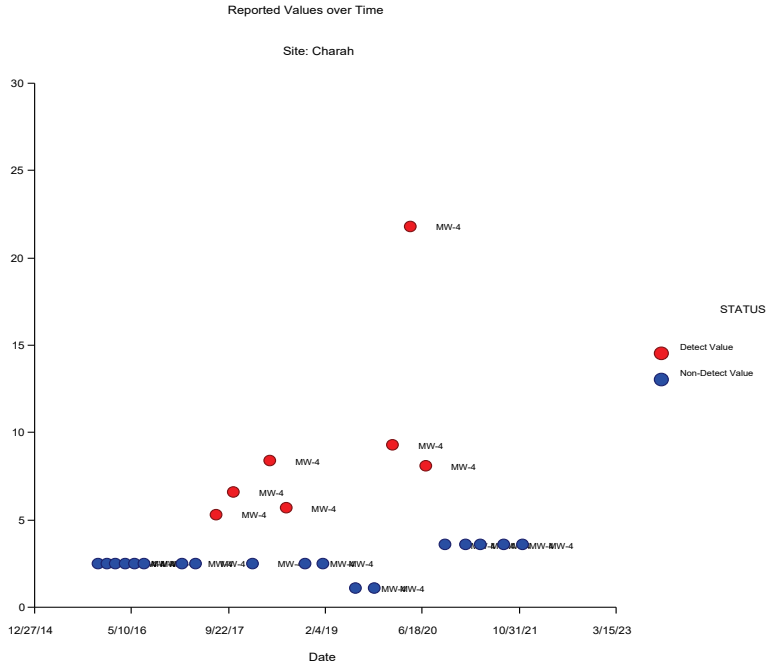


Figure 23: Lithium (ug/L) vs. Time (MW-4)

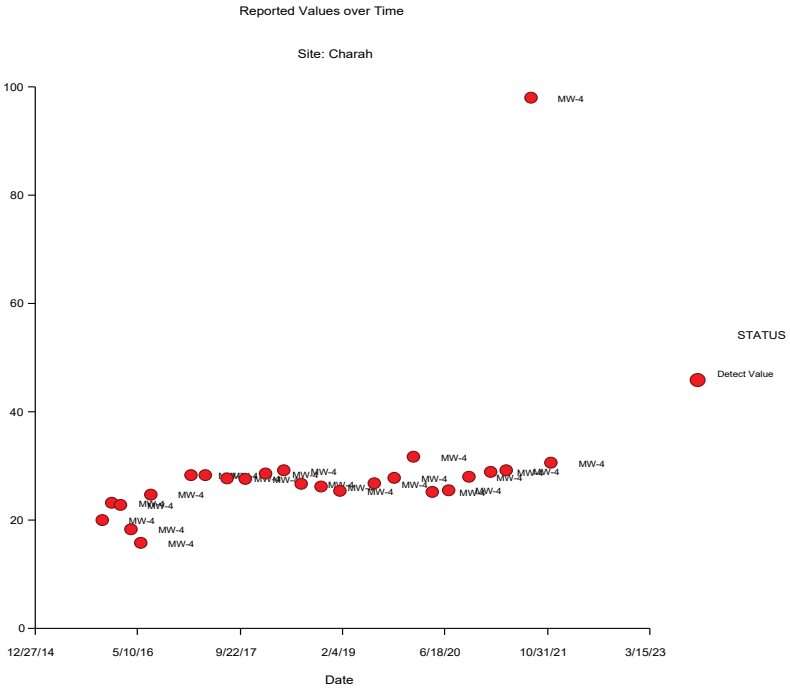


Figure 24: Boron Concentrations (ug/L) vs. Time (MW-5)

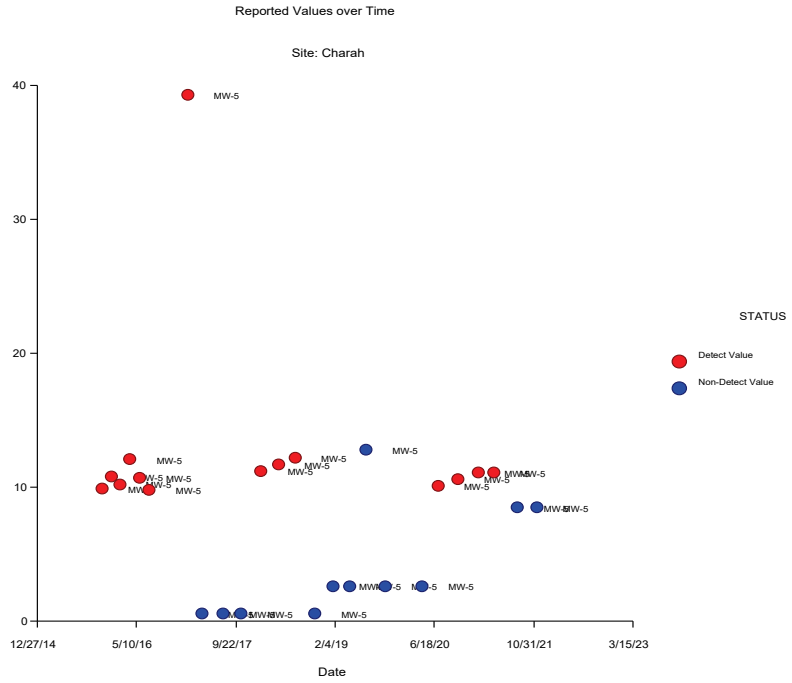


Figure 25: pH (Field) (S.U.) vs. Time (MW-5)

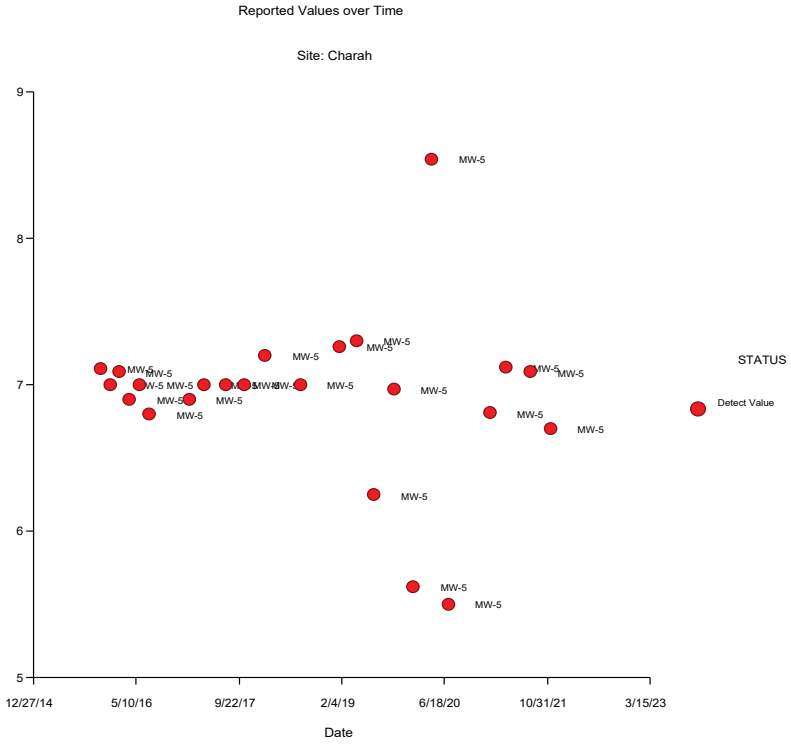


Figure 26: Total Dissolved Solids Concentrations (mg/L) vs. Time (MW-5)

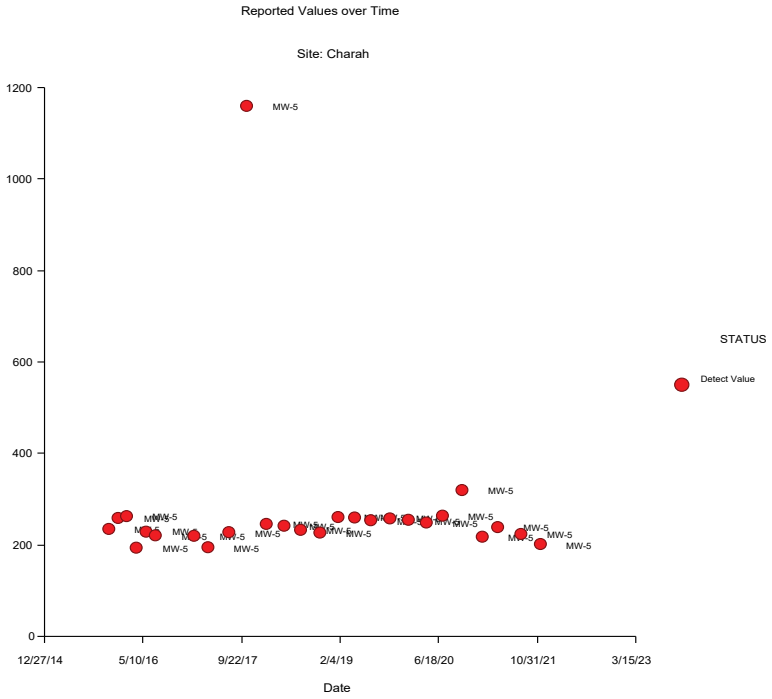


Figure 27: Lithium (ug/L) vs. Time (MW-5)

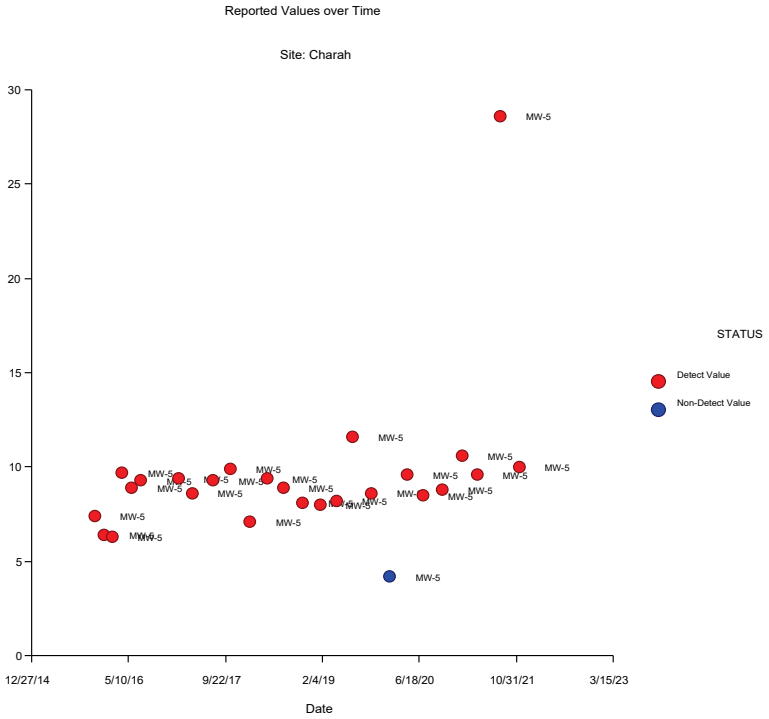


Figure 28: Chloride Concentrations (mg/L) vs. Time (MW-6)

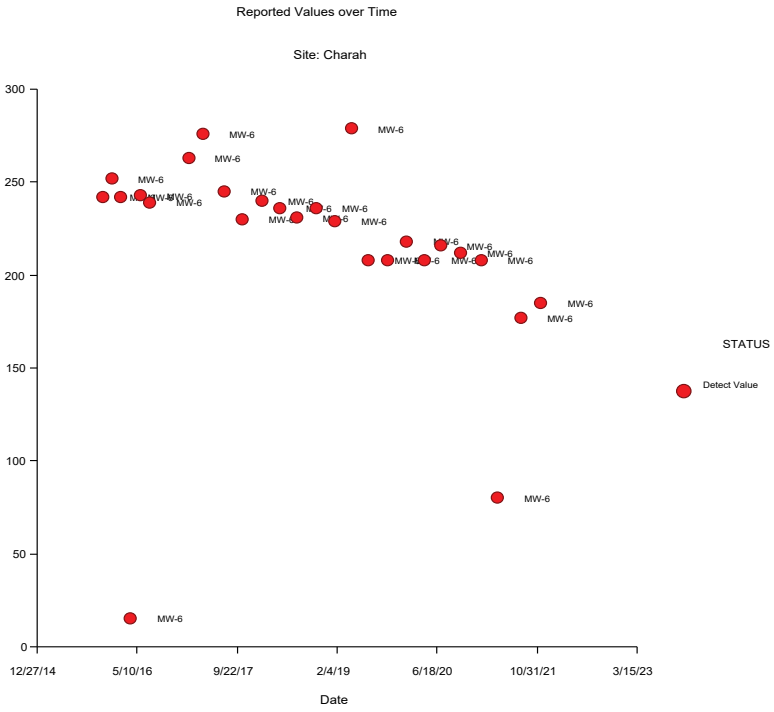


Figure 29: Nickel (ug/L) vs. Time (MW-7R)

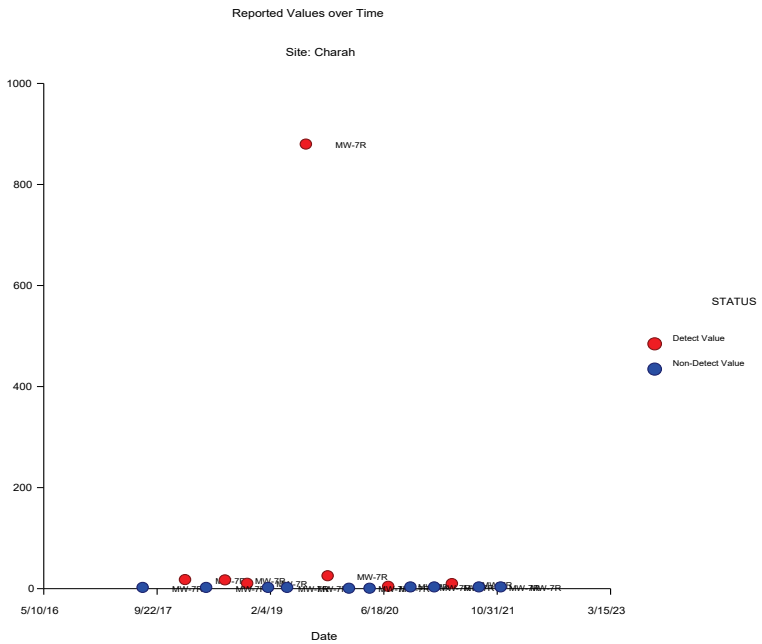


Figure 30: Fluoride Concentrations (mg/L) vs. Time (MW-7R)

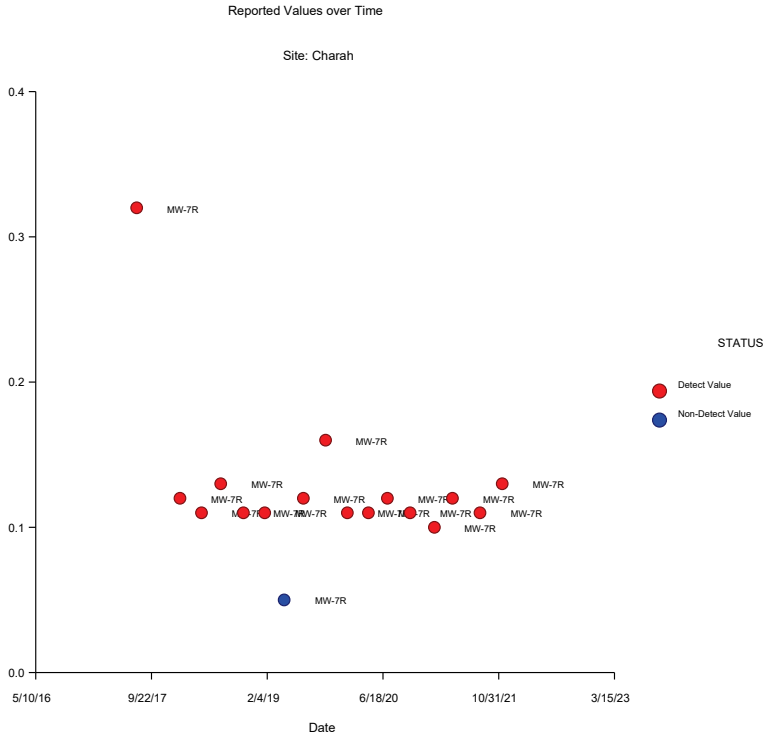


Figure 31: pH (Field) Concentrations (S.U.) vs. Time (MW-7R)

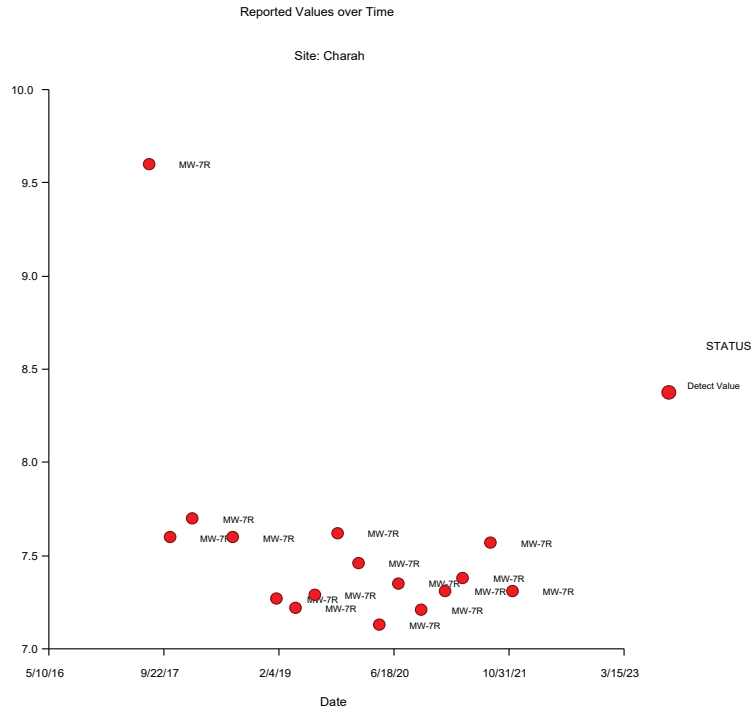


Figure 32: Sulfate Concentrations (mg/L) vs. Time (MW-7R)

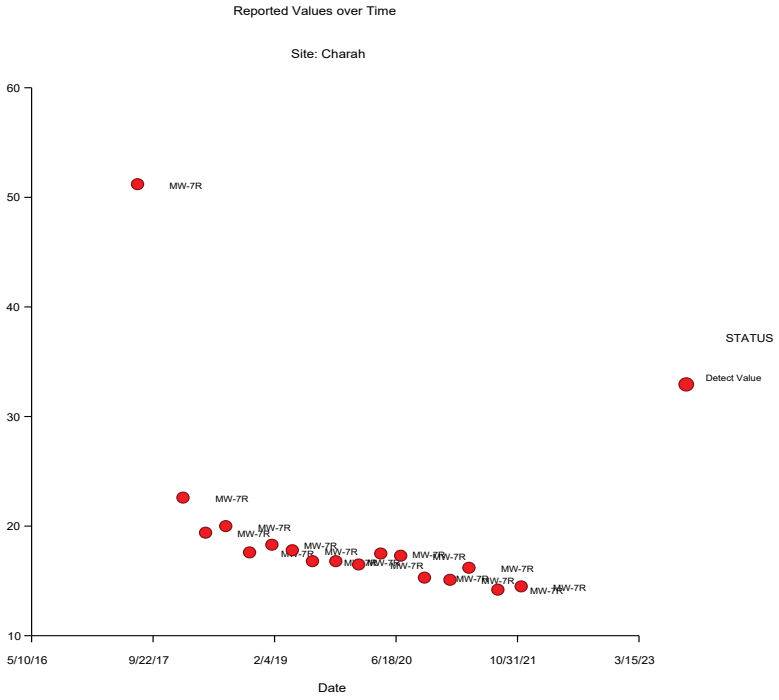


Figure 33: Barium Concentrations (ug/L) vs. Time (MW-7R)

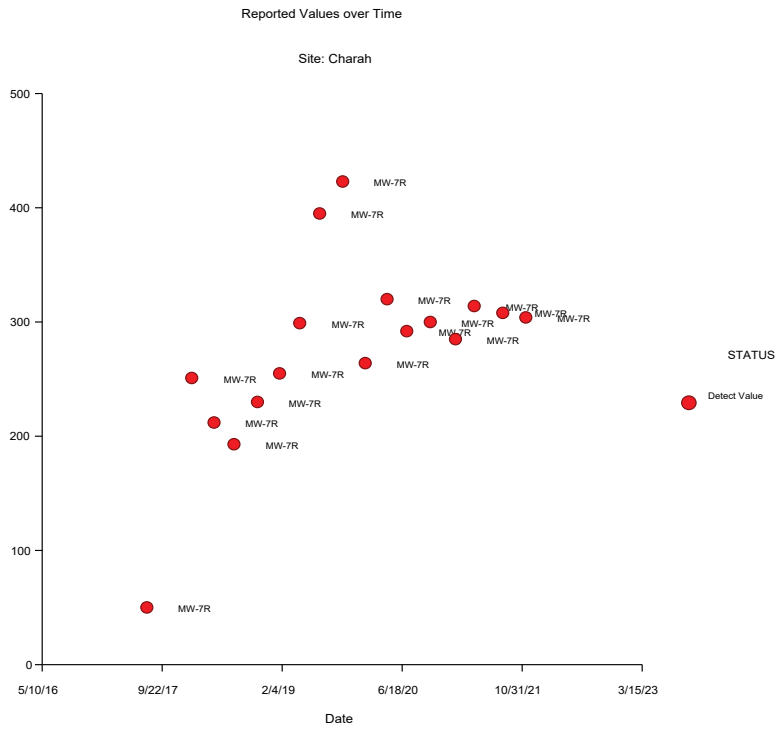


Figure 34: Chromium Concentrations (ug/L) vs. Time (MW-7R)

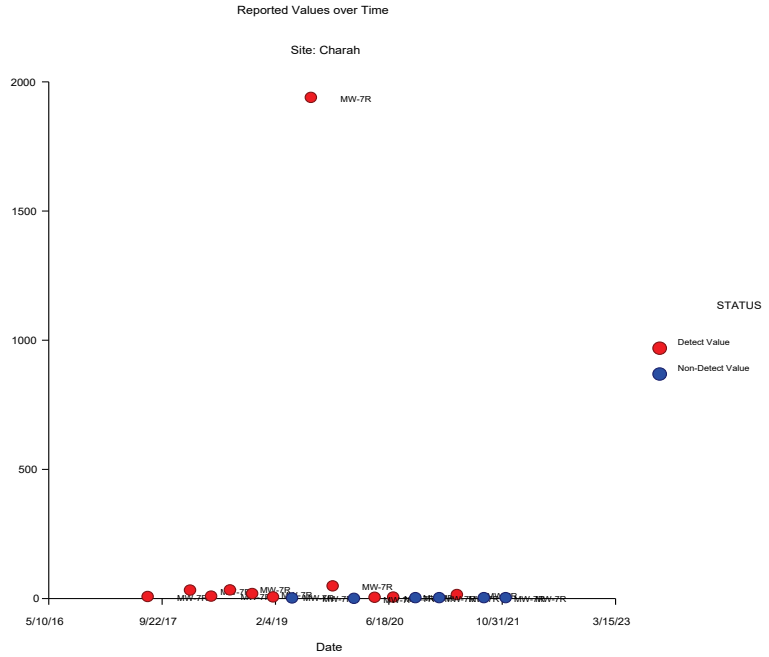


Figure 35: Radium-228 (pCi/L) vs. Time (MW-7R)

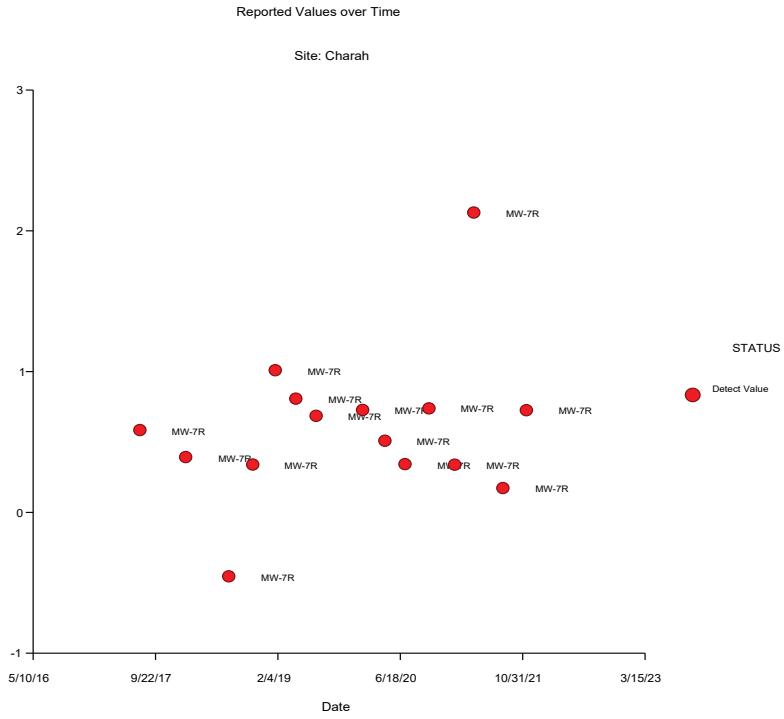


Figure 36: Calcium Concentrations (ug/L) vs. Time (MW-8)

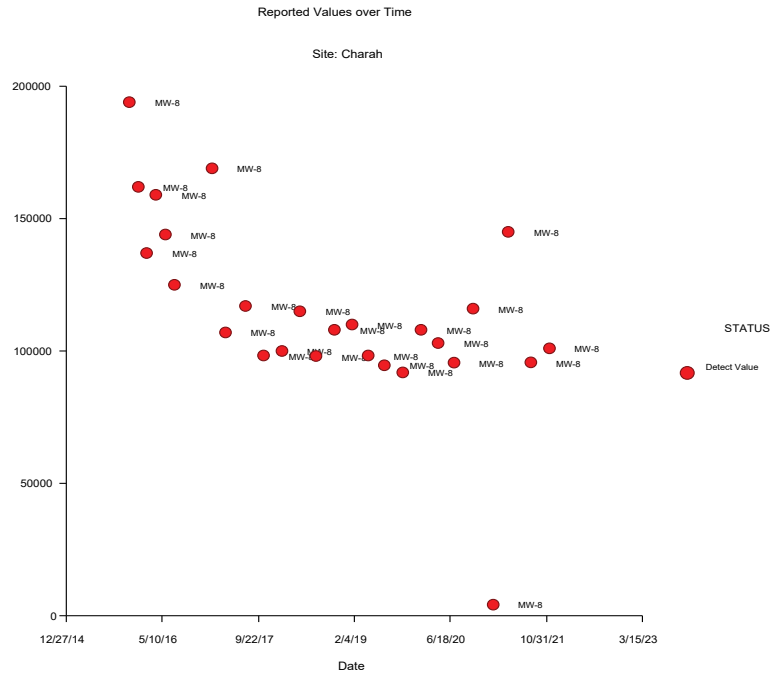


Figure 37: Fluoride Concentrations (mg/L) vs. Time (MW-11)

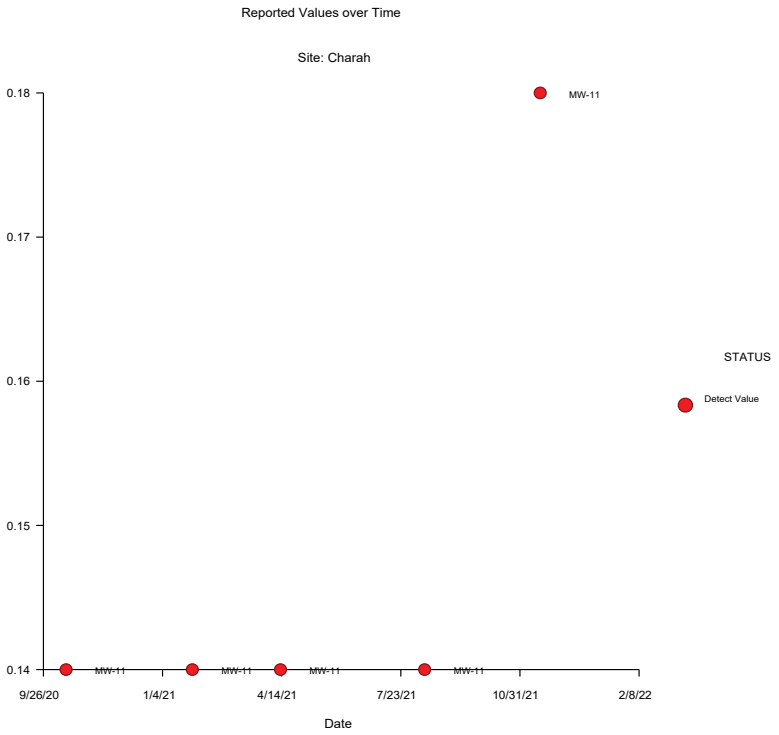


Figure 38: pH (Field) (S.U.) vs. Time (MW-11)

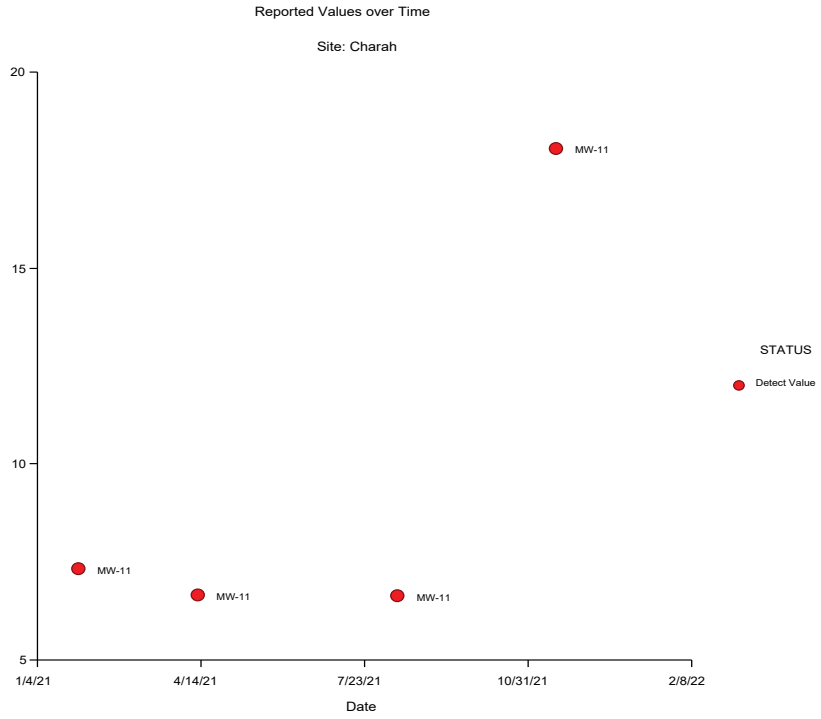


Figure 39: Total Dissolved Solids (mg/L) vs. Time (MW-11)

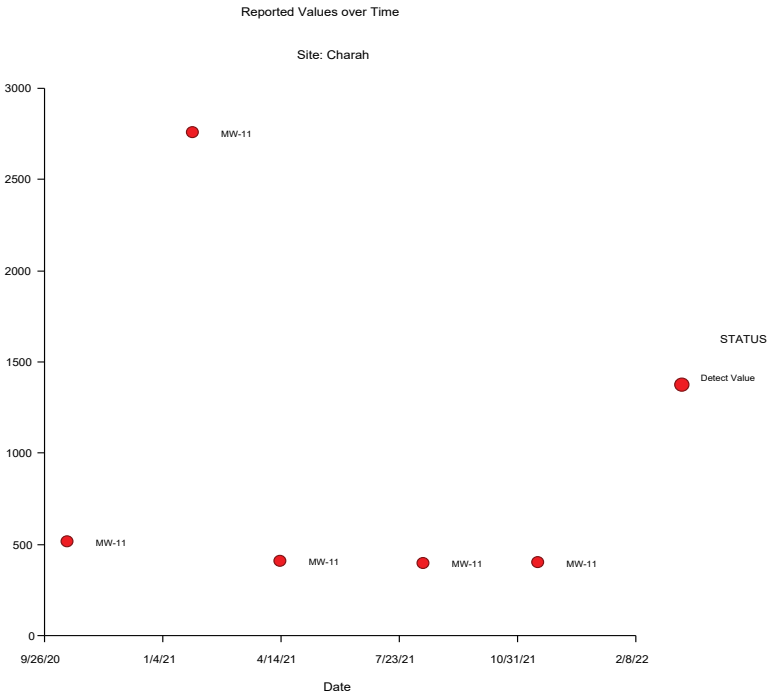
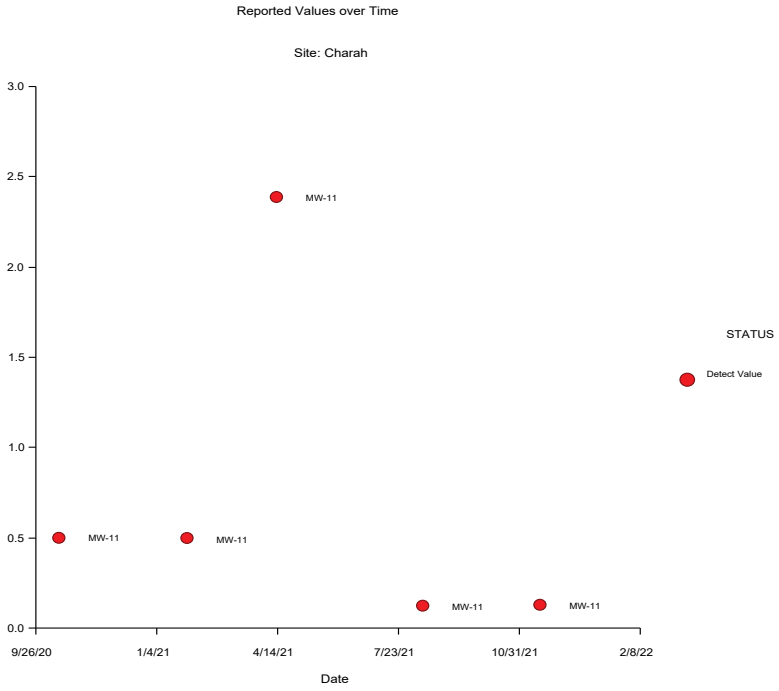


Figure 40: Total Radium (pCi/L) vs. Time (MW-11)



7 References

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