



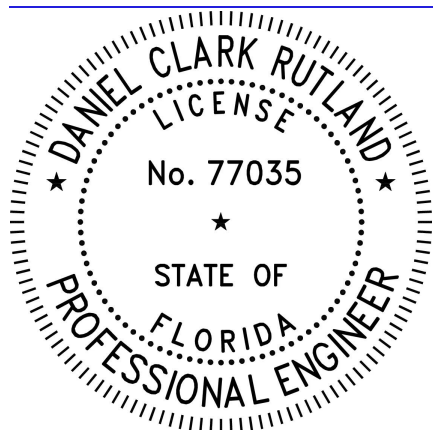
2024 Annual Groundwater Monitoring and Corrective Action Report

Orlando Utility Commission – Stanton Energy Center

January 28, 2025

Date: January 28, 2025
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1. Purpose

On April 17, 2015, the United States Environmental Protection Agency (EPA) published the final rule for the Coal Combustion Residuals (CCR) Rule, Subtitle D of 40 Code of Federal Regulations (CFR) 257. The CCR Rule established national minimum criteria for CCR disposal and became effective October 19, 2015. The Orlando Utilities Commission (OUC) must comply with this rule when managing the disposal of CCR material generated at Stanton Energy Center (SEC). This technical memorandum fulfills the reporting requirements associated with the annual groundwater monitoring and corrective action report, Section 257.90 (2)(e), CFR.

The CCR Rule includes: deadlines for the establishment of a groundwater monitoring system, sampling and analysis of groundwater requirements, the statistical analysis of the groundwater quality data, and specifying corrective actions (if necessary) for facilities disposing of CCR. The CCR Groundwater Monitoring and Corrective Action program is described in Sections 257.90 through 257.98 of the CCR Rule:

- Applicability (§257.90)
- Groundwater Monitoring Systems (§257.91)
- Groundwater Sampling and Analysis Requirements (§257.93)
- Detection Monitoring Program (§257.94)
- Assessment Monitoring Program (§257.95)
- Assessment of Corrective Measures (§257.96)
- Selection of Remedy (§257.97)
- Implementation of Corrective Action Program (§257.98)

Monitoring requirements for compliance are included in §257 sub-sections. How OUC met the requirements of the CCR program is described in the first annual report (CH2M 2018). The 2017 annual report contained the results of the Groundwater Monitoring and Corrective Action program from July 2015 through December 2017. Subsequent OUC SEC annual reports were intended to only describe the status of the program for the given year in accordance with §257.90(e) (Table 1). This technical memorandum provides the required 2024 documentation to demonstrate the OUC SEC's compliance with the CCR Rule annual groundwater monitoring and corrective action report.

Table 1. Annual Groundwater Monitoring and Corrective Action Report (§257.90(e))

Requirement	Response
A map, aerial image, or diagram showing the CCR unit and the background (or up-gradient) and downgradient monitoring wells, to include the well identification numbers, that are part of the groundwater monitoring program for the CCR unit.	These are shown in Figures 2 and 3 in the background section
Identification of any monitoring wells that were installed or decommissioned during the preceding year, along with a narrative description of why those actions were taken.	One additional well added. Description in Section 7.

Requirement	Response
In addition to the monitoring data obtained under §257.90 through §257.98, a summary including the number of groundwater samples that were collected for analysis for each background and downgradient well, the dates the samples were collected, and whether the sample was required by the detection monitoring or assessment monitoring programs.	See results section
A narrative discussion of any transition between monitoring programs (e.g., the date and circumstances for transitioning from detection monitoring to assessment monitoring in addition to identifying the constituent(s) detected at a statistically significant increase [SSI] over background levels).	See discussion section
Other information required to be included in the annual report as specified in §257.90 through §257.98.	Part of discussion and conclusions

2. Background and Setting

SEC is located 12 miles southeast of Orlando, Florida. OUC has been operating SEC since 1987 and dry-managing CCRs in landfills on the west side of the property. The original, now closed, landfill received CCR from July 1987 through August 28, 2015. From the period of May 28 through August 15, 2015, the CCR directed to the closed landfill was used to form part of the landfill cap. The cap was completed with 2 feet of soil and then sodded to stabilize the soil. The old landfill is closed (hereinafter “closed landfill”) and is undergoing post-closure monitoring under OUC’s Conditions of Certification with the Florida Department of Environmental Protection (FDEP). The closed landfill has a 6.42-megawatt solar power generation farm installed over its top. The closed landfill is exempt from the CCR Rule because it ceased operations prior to the rule’s implementation.

The new landfill (hereinafter “active landfill”) began receiving CCR on May 28, 2015 as a monofill that receives CCR produced by the SEC coal-fired power generating process. The active landfill is positioned immediately west of and adjacent to the closed landfill and immediately east of the road Innovation Way, which is the approximate SEC western property boundary (Figure 1). The Orange County Landfill for municipal solid waste is immediately west of SEC. The design standards for the active landfill are compliant with Florida’s municipal solid waste landfill requirements under Chapter 62-701, Florida Administrative Code. The active landfill is fully double-lined and does not discharge into the surficial groundwater.

Groundwater conditions at SEC are regulated under two separate programs: the FDEP Power Plant Siting Act and the U.S. Environmental Protection Agency (EPA) CCR Rule. The FDEP monitoring program has been active since August 1986, while the CCR monitoring program began in October 2015. OUC has made a conscious effort to keep these programs separate because different regulatory requirements, different groundwater quality standards, and different monitored constituents. However, the groundwater under the two adjacent landfills is common.

CCR monitoring well locations were selected based on the groundwater gradient characteristics, the positions of the active and closed landfills, and were also constrained by the western site boundary. The physical constraints, the history of FDEP’s groundwater monitoring and other investigation results were used to locate the monitoring wells for the CCR program. The western property boundary is the regional

groundwater up-gradient edge at the SEC site (Figures 2 and 3). The surficial aquifer groundwater near the SEC CCR active landfill is generally flowing outward from an apparent local groundwater level high under the adjacent closed coal residual landfill (this is especially evident at the end of the wet season in Figure 3). Even though the surficial groundwater gradient is toward the southwest initially from this local high, the overall groundwater gradient is still toward the east and northeast. Consequently, the groundwater quality conditions near the active landfill that are monitored for the CCR program do not represent unaffected background conditions. The CCR Rule groundwater data represent conditions since the beginning of the CCR monitoring program.

Key program activities for 2024 were to continue with CCR detection monitoring, in accordance with the outcomes of the alternative source demonstration in the vicinity of MW-D (Appendix A), complete the installation of a new monitoring well (Appendix B), and prepare an annual report by January 31, 2025. This document will be uploaded to the OUC CCR website within 30 days of placing this information in the operating record.



Figure 1: General Vicinity Map of OUC SEC and Landfills

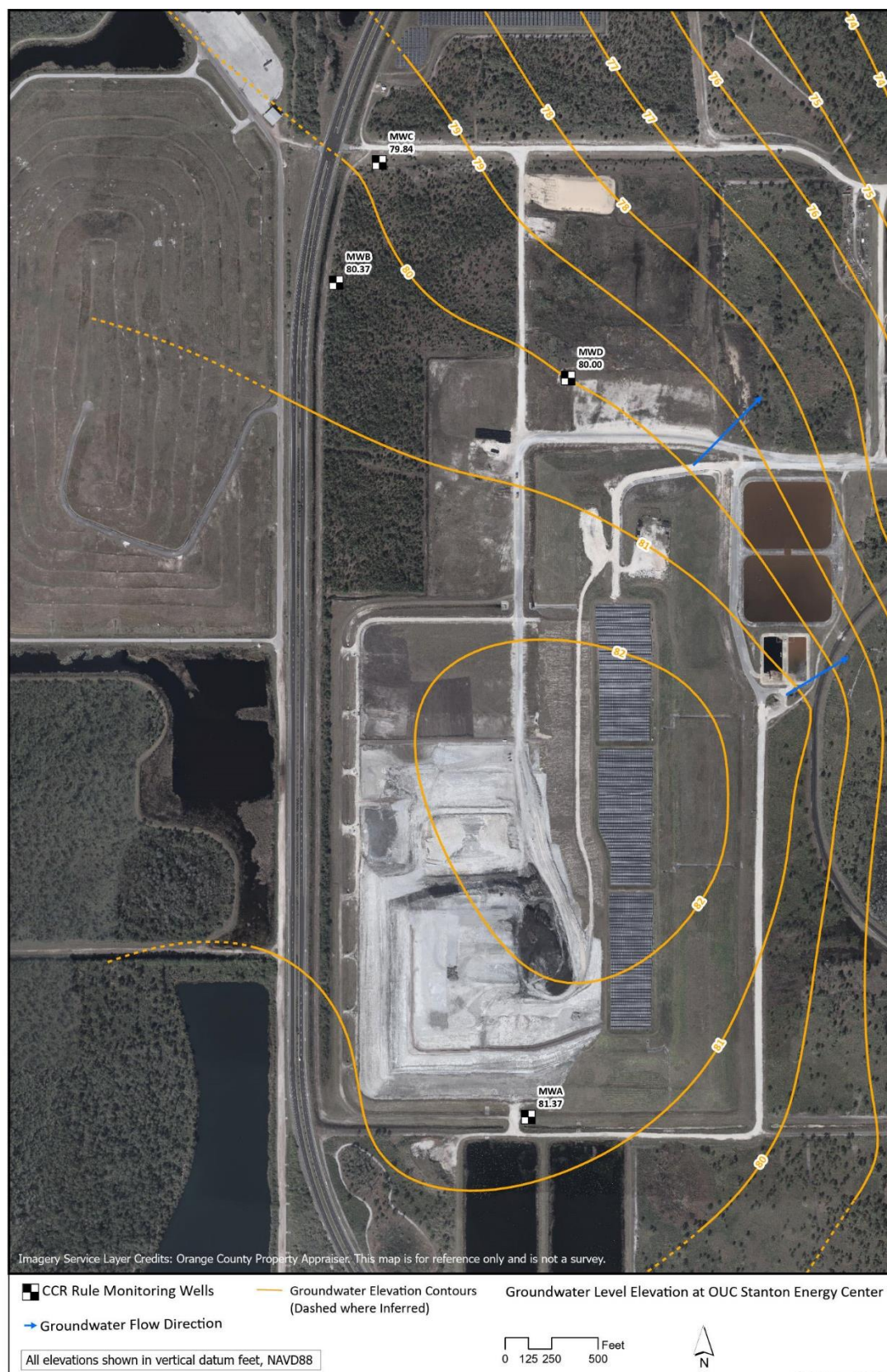


Figure 2: April 2024 First Semi-Annual Event Groundwater Levels



Figure 3: October 2024 Second Semi-Annual Event Groundwater Levels

3. CCR Groundwater Data Screening and Decision Process through the Assessment Monitoring Program

The groundwater data and screening and decision process was derived from §257.90 through §257.98 of the CCR Rule. A summary of the monitoring process is:

1. Collect CCR period background water quality data, Appendix III and IV constituents. This step occurred between September 9, 2015 and July 20, 2017 at SEC and is completed.
2. Identify method(s) to evaluate the data for statistically significant trend changes for each well and constituent for Appendix III and IV constituents by well. This step was completed and documented in an October 2017 report (CH2M 2017a).
3. Quantify criteria that define the limits for statistically significant change from background for each Appendix III and IV constituent by well. This was completed and documented in the 2017 annual report and was updated for the 2022 monitoring year.
4. Establish a groundwater protection standard for each Appendix IV constituent [§257.95(h)] detected in groundwater. Note that the CCR Rule does not list Appendix III constituents to establish groundwater protection standards. This was completed and documented in the 2017 annual report.
5. Collect detection program water quality data, Appendix III constituents (§257.94). The previous detection monitoring program sampling results are presented in the 2017 through 2023 annual reports.
6. Assess groundwater flow direction and rate. The previous detection monitoring program sampling results are presented in the 2017 through 2023 annual reports.
7. Compare detection program water quality data to the statistical trend criteria to evaluate for no significant trend change, or a significant trend change, from the background water quality data.
 - a. If the result is no significant trend change then continue with detection program monitoring
 - b. If the result is a significant trend change may be indicated, then resample within 90 days
 - i. Compare data to the statistical criteria for no significant trend change or significant trend change
 1. If the result is no significant trend change then continue with detection program monitoring
 2. If the result is significant trend change of one or more constituents at the waste boundary [§257.94(e)]
 - a. Establish an assessment monitoring program and post a notification on the CCR Web site that an assessment monitoring program has been established, or
 - b. Demonstrate that a source other than the CCR unit caused the significant increase within 90 days. Continue with the detection monitoring program.
 - c. After approximately 3 years of detection program monitoring reassess the statistical analyses of the groundwater water quality trends against the background data to identify if changes are needed. The 2015 through 2021 dataset was statistically reanalyzed to

update baseline conditions and more accurately represent groundwater quality trends for each constituent.

8. Assessment monitoring program (§257.95)

- a. Within 90 days of establishing an assessment monitoring program sample the groundwater for Appendix IV constituents, and then sample annually thereafter.
- b. The number of samples, N, needs to be sufficient to support the statistical evaluation of the data [§257.93(e)]. The owner may demonstrate that an alternative sampling frequency is necessary during the active life and post-closure of the CCR unit based on site conditions; however, sample no less frequently than annually.
- c. After obtaining the results from the above, within 90 days sample all wells for Appendix III and IV constituents, at least semi-annually. The number of samples, N, needs to be sufficient to support the statistical evaluation of the data [§257.93(e)].
 - i. Establish groundwater protection standards consistent with [§257.95(h)] as described in Item 4, above.
 - ii. If the sampling results for the Appendix III and IV constituents are below the established groundwater protection standards for two consecutive sampling events, the monitoring program may return to detection monitoring (Appendix III constituents). Notification that the detection monitoring program is resuming must be posted on the CCR Web site.
 - iii. If concentrations of one or more constituents are above background but below the groundwater protection standard continue with the assessment monitoring program.
 - iv. If concentrations of one or more constituents are statistically significant concentrations above the groundwater protection standard, post a notification on the CCR Web site [§257.95(g)] and characterize the nature of the release [§257.95(g)(1)].

4. Results of the Detection Monitoring Program - 2024

4.1 Monitoring Wells

The SEC CCR active landfill groundwater monitoring system consists of four surficial aquifer monitoring wells. These wells are named MW-A, MW-B, MW-C, and MW-D. The monitoring wells are about 20 to 25 feet deep into the surficial aquifer. MW-A has an approximate 10-foot deeper installation depth because the land surface elevation at its location is approximately 10 feet higher than at the other wells. The horizon for the monitoring interval for MW-A is the same as the interval for MW-B, MW-C, and MW-D. MW-A is considered the regional up-gradient well and the other wells are downgradient based on local groundwater levels.

4.2 Groundwater Levels and Flow

Groundwater levels in the monitoring wells were collected with each sampling event and groundwater level elevation maps were prepared. Table 2 presents the well location and water level data. Figure 4 shows a chart of the semi-annual groundwater elevations. The semi-annual groundwater level maps are provided in Figures 2 and 3. In general, there are no major changes in groundwater levels and flow patterns across the site since 2015. The 2018 values were like those measured in 2016, while 2017

showed some larger variations. The 2019 levels were about 0.3- to 0.7-foot higher than 2018 levels for the dry and wet seasons, respectively. Water levels in October 2021 were the highest recorded to date after a very wet summer. These levels were similar to the fall 2017 and fall 2020 levels and within the range monitored during the entire program, since 2015 (Figure 4). Water levels in April of 2022 were elevated due to increased rainfall in the antecedent months prior to the 2022 sampling event. Water levels in April 2024 were similar to spring of 2021 and within the range monitored for the entire program. Overall, there is no substantial trend in groundwater levels as the 2024 levels were similar to the 2021 levels (approximately less than 0.17-foot difference).

Table 2. Background and Operations Period Groundwater Levels – MW-A, MW-B, MW-C, and MW-D, OUC Stanton Energy Center

DATE	Well	Florida State Plane East Zone (901)		Elevation TOC ¹ (feet, NAVD88)	Depth to Water (feet)	Water Level Elevation (feet, NAVD88 ²)
		Northing (feet)	Easting (feet)			
10/30/2015	MW-A	1504260.1	597643.8	95.77	13.6	82.17
4/29/2016					13.96	81.81
10/31/2016					13.53	82.24
4/25/2017					15.64	80.13
10/31/2017					13.31	82.46
4/27/2018					15.16	80.61
10/30/2018					14.20	81.57
4/29/2019					14.82	80.95
10/31/2019					13.94	81.83
4/29/2020					15.28	80.49
10/29/2020					13.35	82.42
3/17/2021					14.47	81.30
10/13/2021					13.39	82.38
4/19/2022					13.32	82.45
10/25/2022					13.45	82.32
4/18/2023					14.87	80.90
10/17/2023					13.56	82.21
4/23/2024					14.40	81.37
10/29/2024					13.78	81.99
10/30/2015	MW-B	1508750.3	596609.8	86.05	4.86	81.19
4/29/2016					5.20	80.85
10/31/2016					4.90	81.15
4/25/2017					7.25	78.80
10/31/2017					4.41	81.64
4/27/2018					6.17	79.88
10/30/2018					5.59	80.46
4/29/2019					5.74	80.31
10/31/2019					4.72	81.33

Table 2. Background and Operations Period Groundwater Levels – MW-A, MW-B, MW-C, and MW-D, OUC Stanton Energy Center

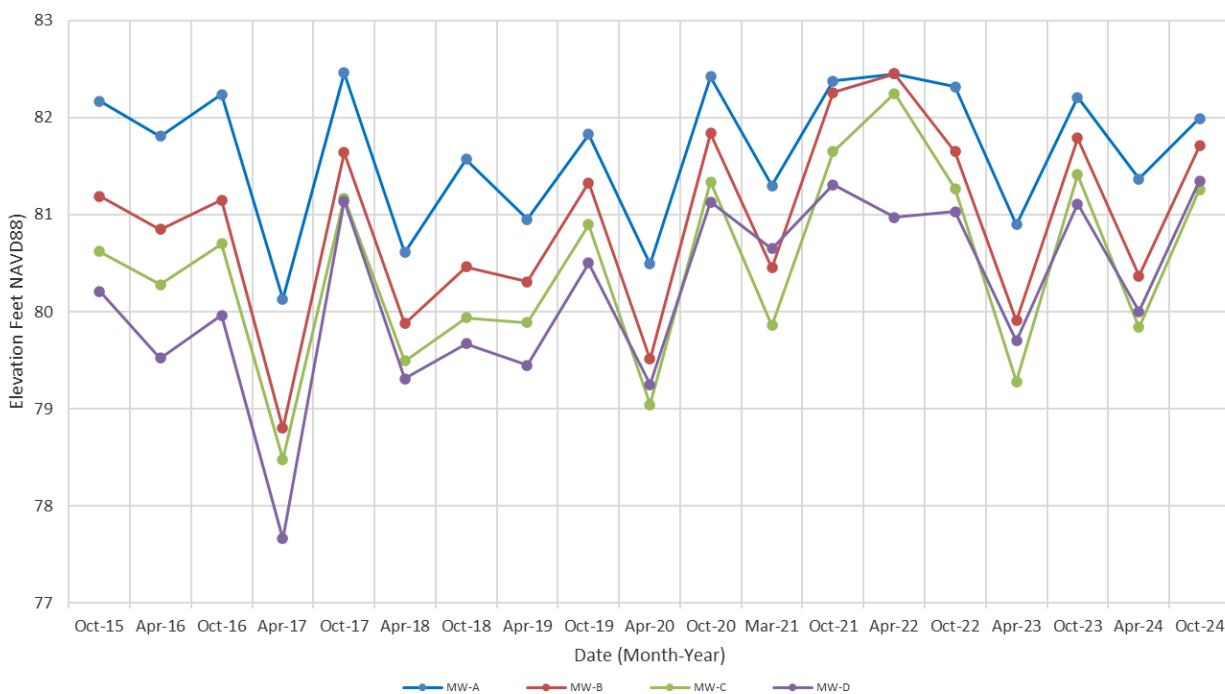
DATE	Well	Florida State Plane East Zone (901)		Elevation TOC ¹ (feet, NAVD88)	Depth to Water (feet)	Water Level Elevation (feet, NAVD88 ²)
4/29/2020	MW-B	1508750.3	596609.8	86.05	6.54	79.51
10/31/2020					4.21	81.84
3/17/2021					5.60	80.45
10/13/2021					3.79	82.26
4/19/2022					13.32	82.45
10/25/2022					4.40	81.65
4/18/2023					6.14	79.91
10/17/2023					4.26	81.79
4/23/2024					5.65	80.37
10/29/2024					4.34	81.71
10/30/2015	MW-C	1509397.7	596841.6	86.84	6.22	80.62
4/29/2016					6.56	80.28
10/31/2016					6.14	80.70
4/25/2017					8.36	78.48
10/31/2017					5.67	81.17
4/27/2018					7.35	79.49
10/30/2018					6.90	79.94
4/29/2019					6.95	79.89
10/31/2019					5.94	80.90
4/29/2020					7.80	79.04
10/31/2020					5.50	81.34
3/17/2021					6.98	79.86
10/13/2021					5.19	81.65
4/19/2022					4.59	82.25
10/25/2022					5.57	81.27
4/18/2023					7.56	79.28
10/17/2023					5.43	81.41
4/23/2024					7.00	79.84
10/29/2024					5.58	81.26
10/30/2015	MW-D	1508237.4	597858.3	85.10	4.89	80.21
4/29/2016					5.58	79.52
10/31/2016					5.14	79.96
4/25/2017					7.44	77.66
10/31/2017					3.96	81.14
4/27/2018					5.79	79.31

Table 2. Background and Operations Period Groundwater Levels – MW-A, MW-B, MW-C, and MW-D, OUC Stanton Energy Center

DATE	Well	Florida State Plane East Zone (901)		Elevation TOC ¹ (feet, NAVD88)	Depth to Water (feet)	Water Level Elevation (feet, NAVD88 ²)
		Northing (feet)	Easting (feet)			
10/30/2018	MW-D	1508237.4	597858.3	85.10	5.43	79.67
4/29/2019					5.65	79.45
10/31/2019					4.60	80.50
4/29/2020					5.85	79.25
10/29/2020					3.97	81.13
3/17/2021					4.45	80.65
10/13/2021					3.79	81.31
4/19/2022					4.13	80.97
10/25/2022					4.07	81.03
4/18/2023					5.40	79.70
10/17/2023					3.99	81.11
4/23/2024					5.10	80.00
10/29/2024					3.75	81.35

1 TOC - Top of casing

2 NAVD88 - North American Vertical Datum of 1988

**Figure 4: Semi-Annual Groundwater Levels**

4.3 Groundwater Sampling and Laboratory Analysis

The detection monitoring program began with establishing background groundwater quality conditions that consisted of collecting and analyzing quarterly samples between September 2015 and July 2017 for Appendix III and IV constituents. Sampling events to establish background water quality conditions were completed by October 17, 2017 in accordance with §257.94(b). MW-A is the background well and MW-B, MW-C, and MW-D are the three wells to monitor for compliance with the CCR.

Several parameters being monitored had trends noted during the CCR background period. In the past, the upper probability limits (UPL, and lower probability limit [LPL] for pH) were tested by modifying the baseline UPL/LPL with the trend parameter. This made the limits slope with time, and in some instances the limits approached zero - which is not feasible. Because it was difficult to see the change over time when both the observed data and probability limits vary, starting with the 2019 annual report the UPL/LPL were held constant and the observed data were adjusted by the trend parameters (that is, "detrended" by applying the slope parameter to the observed data as shown by example on the bottom of Table 3). Time series plots were created to show the change in the observations over time against a constant limit. These plots are discussed further in the next section.

The 2024 semi-annual sampling results are shown in Table 4 (and Appendix C). The following results are noted:

- The March 11, 2024 CCR monitoring sampling event resulted in the identification of potential SSIs for constituents at 2 wells. For constituents that resulted in potential SSIs relative to detrended UPL, resampling was completed on July 16, 2024 and constituents with the following results:
 - Well MW-C was retested for sulfate. The sulfate concentration of the retest was above the UPL and resulted in a confirmed SSI. Note that the statistical analysis for sulfate at MW-C is based on historical measurements at the lowest result that can be routinely quantified and reported by the laboratory. As a result, minor fluctuations in sulfate concentration about this limit will indicate a potential SSI.
 - Well MW-D for boron, calcium, chloride, sulfate, and total dissolved solids (TDS). Well MW-D was retested for all noted parameters. The detrended parameter retest values were outside of their respective probability limits.
- The September 11, 2024 CCR monitoring sampling event resulted in the identification of potential SSIs for constituents at 1 well. For constituents that resulted in potential SSIs relative to detrended UPL, resampling was completed on October 29, 2024 for the following wells and constituents:
 - Well MW-D for boron, calcium, chloride, fluoride, sulfate, and TDS. The boron, calcium, chloride, sulfate, and TDS observed values were higher in the spring sampling event. The retest values for the fall sampling event were higher than originally collected.

Table 3. Detection Monitoring Parameters Tolerance Limits and Trend Parameters

Well	Constituent	UPL ¹	LPL ²	Unit	Limit Trend Slope	Detrended ⁴
MW-B	Boron	69		µg/L ³	0.02	Y
	Calcium	25,800		µg/L		
	Chloride	101,000		µg/L	-7.74	Y
	pH	4.80	4.14	pH Units		
	Fluoride	211		µg/L		
	Sulfate	66,200		µg/L	-3.72	Y
	TDS	280,000		µg/L	-17.54	Y
MW-C	Boron	21		µg/L		
	Calcium	8,200		µg/L	0.58	Y
	Chloride	11,100		µg/L	3.76	Y
	pH	5.59	4.76	pH Units		
	Fluoride	110		µg/L		
	Sulfate	3,350		µg/L		
	TDS	58,200		µg/L	9.92	Y
MW-D	Boron	31		µg/L		
	Calcium	56,800		µg/L		
	Chloride	85,200		µg/L	13.71	Y
	pH	5.63	4.41	pH Units	-0.13	Y
	Fluoride	440		µg/L		
	Sulfate	13,500		µg/L		
	TDS	320,00		µg/L	16.76	Y

1 UPL - upper probability limit/tolerance level

2 LPL - lower probability limits/tolerance levels.

3 µg/L = micrograms per liter

4 Detrended means that the data need to be adjusted for the trend. The trend is applied to the days since the baseline period began (9/9/2015) to the observed data.

Table 4. Summary of the 2024 Annual Data Detection Monitoring Results

Well	Constituents	Units	LPL ³	UPL ²	Trend	First Semi-Annual Sampling Event on 3/14/2021 & Retesting on 5/12/2023						Second Semi-Annual Sampling Event on 9/19/2023 & associated Retesting on 11/7/2023							
						Observed Value	Detrended / Observed Value	Within Probability Limits	Is Retesting Required?	Retest Values	Detrended Retest Value	SSI ⁴	Observed Value	Detrended / Observed Value	Within Probability Limits	Is Retesting Required?	Retest Values	Detrended Retest Value	SSI ⁴ Confirmed
MW-B	Boron	µg/L ¹		69.0	Y	97.0	-78.0	Yes	No				105.0	-80.0	Yes	No			
	Calcium	µg/L		25,800		5,020	5,020	Yes	No				4,610	4,610	Yes	No			
	Chloride	µg/L		101,000	Y	13,800	79,623	Yes	No				9,810	79,488	Yes	No			
	pH	pH Units	4.14	4.80		4.76	4.76	Yes	No				4.51	4.51	Yes	No			
	Fluoride	µg/L		211		48	48	Yes	No				60 l	60	Yes	No			
	Sulfate	µg/L		66,200	Y	25,700	57,326	Yes	No				32,300	65,768	Yes	No			
	TDS	µg/L		280,000	Y	104,000	253,342	Yes	No				106,000	264,036	Yes	No			
MW-C	Boron	µg/L		21.0		12.0	12.0	Yes	No				14.0	14.0	Yes	No			
	Calcium	µg/L		8,200	Y	9,470	4,502	Yes	No				7,850	2,591	Yes	No			
	Chloride	µg/L		11,100	Y	23,600	-8,409	Yes	No				21,000	-12,883	Yes	No			
	pH	pH Units	4.76	5.59		5.25	5.25	Yes	No				5.10	5.10	Yes	No			
	Fluoride	µg/L		110		78	78	Yes	No				80 l	80	Yes	No			
	Sulfate	µg/L		3,350		5,330	5,330	No	Yes	7,910	7,910	Yes	4,920	4,920	No	Yes	7,170	7,170	Yes
	TDS	µg/L		58,200	Y	123,000	38,594	Yes	No				81,000	-8,319	Yes	No			
MW-D	Boron	µg/L		31.0		124.0	124.0	No	Yes	105.0	105.0	Yes	112.0	112.0	No	Yes	134.0	134.0	Yes
	Calcium	µg/L		56,800		1,870,000	1,870,000	No	Yes	1,910,000	1,910,000	Yes	2,120,000	2,120,000	No	Yes	2,240,000	2,240,000	Yes
	Chloride	µg/L		85,200	Y	7,990,000	7,873,008	No	Yes	7,870,000	7,748,614	Yes	8,180,000	8,056,474	No	Yes	12,000,000	11,874,672	Yes
	pH	pH Units	4.41	5.63	Y	4.05	5.15	Yes	No				4.09	5.25	Yes	No			
	Fluoride	µg/L		440		44	44	No	No				4,820	4,820	No	Yes	5,080	5,080	Yes
	Sulfate	µg/L		13,500		700,000	700,000	No	Yes	786,000	786,000	Yes	828,000	828,000	No	Yes	1,170,000	844,000	Yes
	TDS	µg/L		320,000	Y	21,800,000	21,657,355	No	Yes	18,000,000	17,851,666	Yes	18,600,000	18,449,051	No	Yes	23,300,000	23,146,849	Yes

1 µg/L = micrograms per liter
2 UPL - upper probability limit/tolerance level
3 LPL - lower probability limits/tolerance levels.
4 SSI – Statistically Significant Increase Requiring Alternate Source Demonstration

4.4 Data Discussion

Sample results from the first semi-annual sampling event conducted on March 11, 2024 required retesting for identified potential SSIs at well MW-C for sulfate and MW-D for boron, calcium, chloride, sulfate, and total dissolved solids. After checking the results with the lab and retesting on July 16, 2024, the potential SSIs were confirmed at MW-C for sulfate and at MW-D for boron, calcium, chloride, sulfate, and TDS. Detrended concentrations for these parameters were orders of magnitude different from the baseline data.

The results of second semi-annual sampling event conducted on September 11, 2024 indicated potential SSIs for sulfate at MW-C and boron, calcium, chloride, fluoride, sulfate, and TDS at MW-D. Retesting results collected on October 29, 2024 identified potential SSIs at MW-C for sulfate and at MW-D for boron, calcium, chloride, fluoride, sulfate, and TDS. It was determined that the elevated concentrations at MW-C for sulfate and at MW-D for boron, calcium, chloride, sulfate, and TDS could not be explained by statistical analysis alone. Detrended concentrations for these parameters were orders of magnitude different from the baseline data.

The sulfate concentration at MW-C was higher than the statistical upper limit for samples collected during 2024. It should be noted that the statistical analysis for sulfate at MW-C is based on historical measurements at the lowest result that can be routinely quantified and reported by the laboratory. As a result, minor fluctuations in sulfate concentration about this limit will indicate a potential SSI. An alternative source demonstration completed in October of 2021 concluded that it would be highly unlikely that the groundwater at MW-C would be from the active cell of the CCR landfill (CH2M 2021b).

The fluoride concentration at MW-D was higher than the statistical upper limit for samples collected in 2022 and the spring of 2023, but lower than the UPL in the retest and the fall 2023 sample. Fluoride remained below the UPL in the spring of 2024 and increased above the upper limit in the fall of 2024. Because of high dissolved solids, it is possible that fluoride may not be accurately represented by laboratory analysis when measured in low concentrations.

Considering the original baseline and the 2017 through 2021 data, the original trends/non-trends estimated on the smaller background dataset seemed to be inaccurate for some constituents, especially at MW-B for boron, pH, and sulfate. The 2015 through 2021 dataset was statistically reanalyzed for all wells for each constituent to update baseline limits and to improve accuracy in representing groundwater quality trends. Figure 5 shows the detrended data over time using the newer trend analysis. Accurate time series plots of the detrended data should be relatively flat, like it is for MW-C pH. A few parameters had trends during the original baseline period but now have better consistency over the entire period (including boron, chloride, and TDS in MW-B). Similarly, pH and calcium now have no trend adjustment required but sulfate now does. It is probable that the original baseline trend analysis over a shorter time was not representative and the newer 2022 baseline will be used until further notice.

For some data, the time series plots indicated that there could have been a change occurring around 2017 at MW-D. The chloride, calcium, sulfate, and TDS concentrations started to rise greatly in MW-D by 2018 (Figure 5). However, during 2020 there was a significant increase in these four parameters which indicated that there is a potential new source or introduction of inorganic minerals in the shallow groundwater. An alternative source evaluation demonstrated a likely alternative source and concluded that detection monitoring should continue.

5. Potential Alternative Sources Review

The 2017 and 2018 results and analysis indicated that calcium, chloride, pH (low) and TDS from MW-B, and calcium and chloride from MW-D fell outside the statistical confidence intervals. This did not mean that there was a problem, but continued scrutiny was needed to assess site conditions. Continued detection monitoring proceeded. SSIs for chlorides, calcium, sulfate, and TDS were observed in MW-B, MW-C, and MW-D in the 2019 and 2020, and 2021 results. In accordance with the CCR rule requirements, a closer review of the potential alternative sources was conducted during 2020 and 2021 (CH2M 2020b and CH2M 2021b). These reviews indicated that the source was not from the CCR-regulated landfill and detection monitoring could continue.

Additionally, the statistical baseline and trend analysis was updated in 2022 to replace the original trend estimates that were made with the limited initial data set, as required by the CCR Rule, and in accordance with EPA recommendations (EPA 2009b). The results of this 2022 analysis provided updated UPL and LPL (for pH) that characterize each well over a longer period (September 2015 to September 2021). The updated baseline trend analysis resulted in revised thresholds for UPLs that would have eliminated SSI categorization for previous sampling data for calcium, chloride, pH, and TDS in MW-B and MW-C. The same analysis eliminated SSIs at MW-D for pH and most fluoride tests. The statistical analysis completed for the 2024 data shows similar concentrations as in recent years but with identified SSIs at MW-C for sulfate and at MW-D for boron, calcium, chloride, fluoride, sulfate, and TDS.

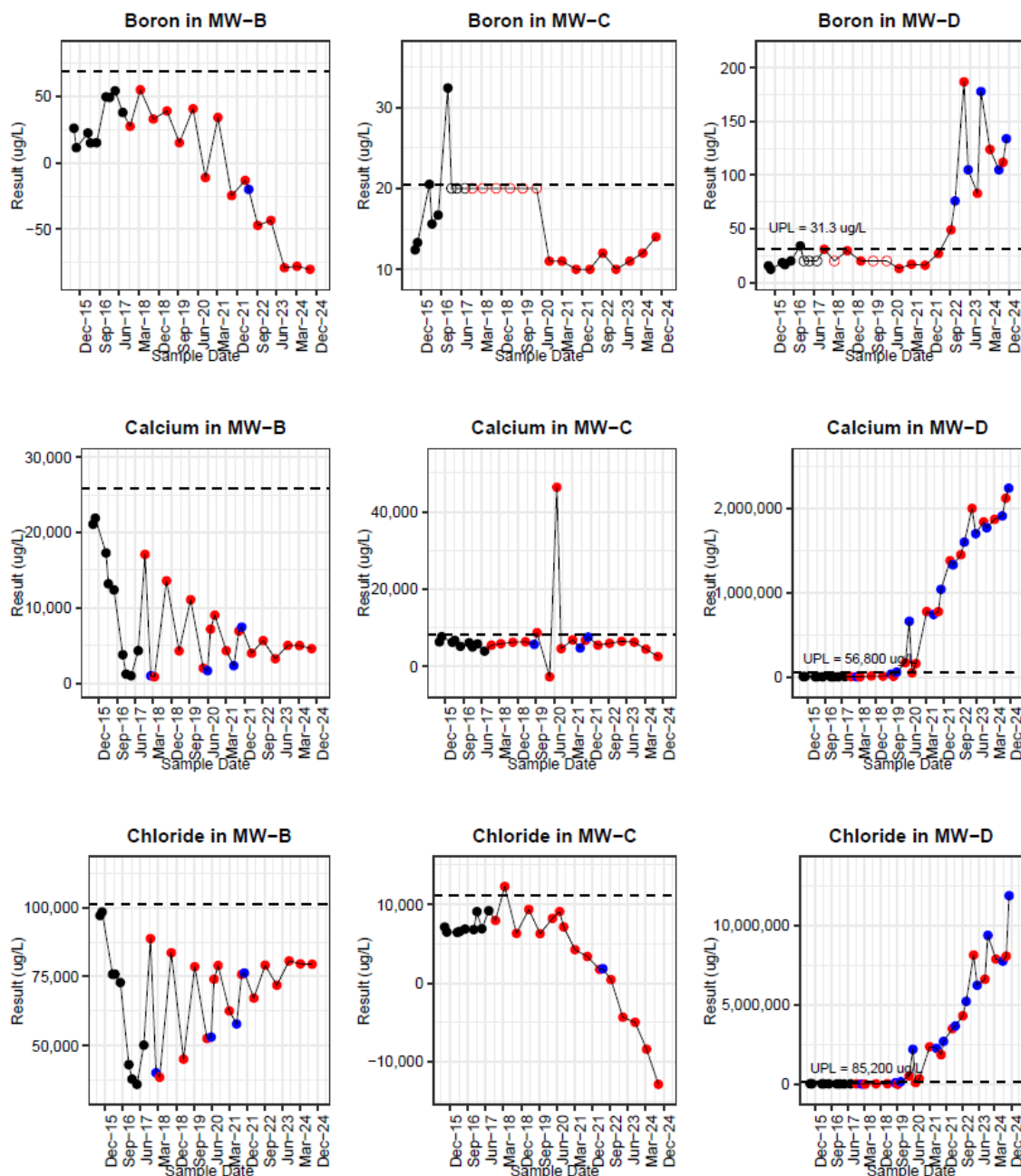
As a result of the updated statistical baseline analysis that better characterizes the historical data and trends at each well in the CCR monitoring program, MW-B and MW-C seem to have no consistent SSIs except for sulfate at MW-C. MW-B and MW-D are not close to the new, double-lined CCR landfill subject to this regulation. MW-B is approximately 3,125 linear feet and MW-D is approximately 2,600 linear feet from the CCR regulated landfill. MW-C is even further north. MW-B is closer to the western boundary of the property than MW-D and the water level elevation in MW-B is consistently about 0.2- to 1.0-foot higher than the elevation in MW-D (Table 2 and Figure 4). Consequently, the high concentrations in MW-D do not appear to be coming from the west or northwest.

The sulfate concentration at MW-C was higher than the statistical upper limit for samples collected during 2024. It should be noted that the statistical analysis for sulfate at MW-C is based on historical measurements at the lowest result that can be routinely quantified and reported by the laboratory. As a result, minor fluctuations in sulfate concentration about this limit will indicate a potential SSI. An alternative source demonstration completed in October of 2021 concluded that it would be highly unlikely that the groundwater at MW-C would be from the active cell of the CCR landfill (CH2M 2021b). The findings in the October 2021 ASD have not changed, and conditions for groundwater flow remain similar across the site (Appendix D).

The rise in calcium, chloride, sulfate, and TDS concentrations measured in MW-D started in mid-2017, approximately 780 days from the initiation of storing CCR material in the active landfill. The calculated groundwater flow rate in the western part of the site is between 0.105 and 0.405 feet per day under the typical groundwater gradient measured on site. The groundwater travel time from the northern edge of active cell of the active landfill to any compliance monitoring well is expected to be greater than 17 years (CH2M 2021b). In accordance with the recommendations outlined in the alternative source demonstration conducted in 2021, additional field investigations to identify the source influencing water quality at MW-D were initiated in 2022 and completed in 2023 as part of an alternative source demonstration (Appendix A).

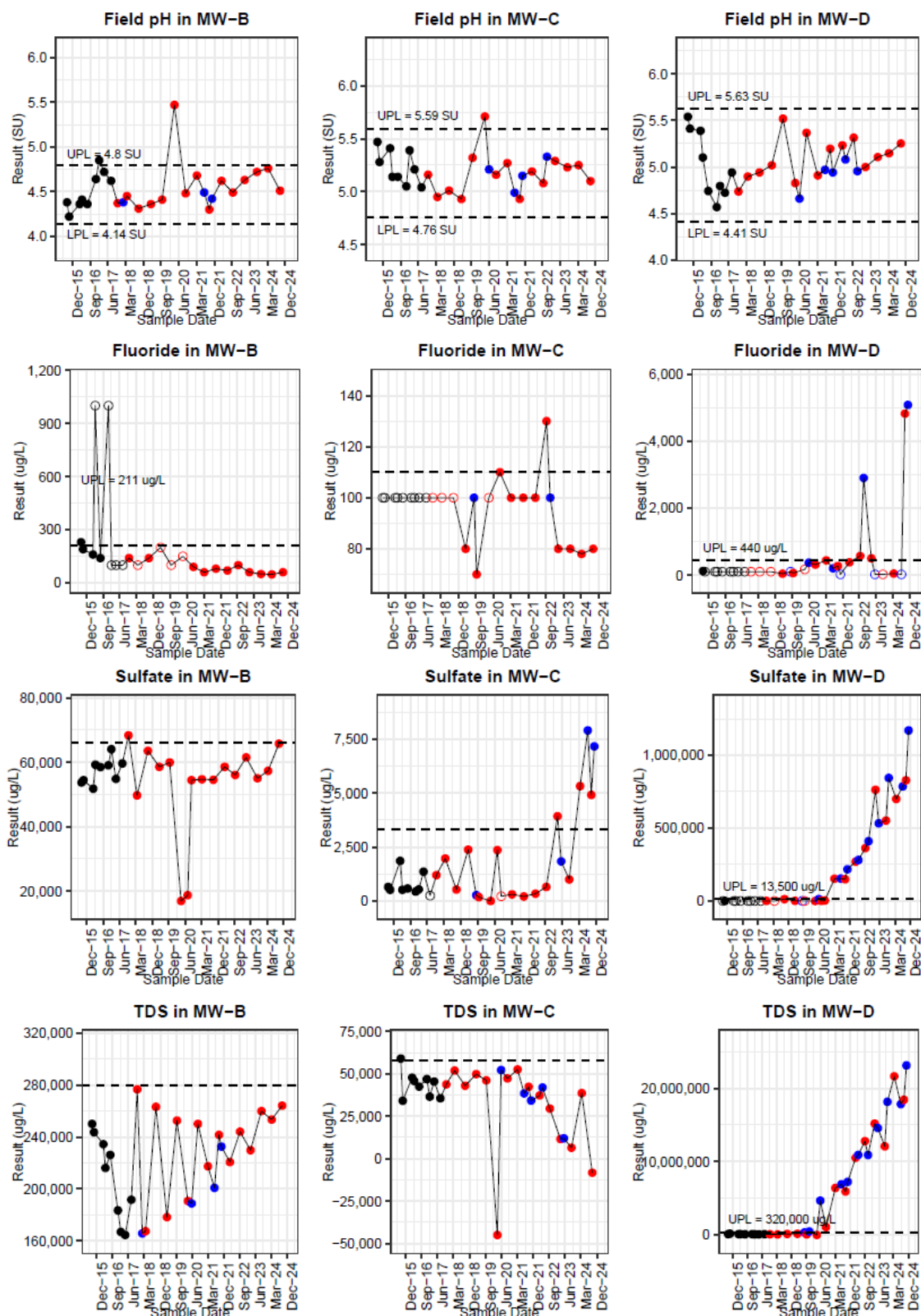
As part of this alternate source demonstration, additional groundwater, surface water, and soils data were collected in November and December of 2022 to evaluate groundwater quality in the surficial aquifer and determine a potential alternate source of impacted groundwater at MW-D.

An alternative source was not identified from surface water quality and soil sampling. However, the results of groundwater investigations indicate that specific conductance decreases with distance from the closed landfill, generally returning to values below 770 $\mu\text{S}/\text{cm}$ (500 mg/L TDS) when greater than 500 feet from the landfill. Statistical analysis confirms that specific conductance (and TDS) decreases with distance from the closed landfill. As a result, highly mineralized water appears to be emanating from the closed landfill and appears to be the alternate source of impacted groundwater sampled at MW-D. As a result of the changing water quality at MW-D, it was recommended to update the groundwater monitoring plan to incorporate an additional well that is not impacted by the identified alternative source.



Black dots are background data; red dots are detection data; blue dots are resampled data

Figure 5: Well-Constituent Results



Black dots are background data; red dots are detection data; blue dots are resampled data

Figure 5: (Continued) Well-Constituent Results

6. Geochemical Pattern Analysis

During sampling events starting in July 2020, OUC has sampled the four CCR MWs for a suite of major ions for geochemical pattern analysis using the method described by Piper (1944) to identify if the groundwaters at the MWs are from different sources. These parameters for geochemical pattern analysis included: bicarbonate/carbonate (HCO_3/CO_3), chloride (Cl), sulfate (SO_4), calcium (Ca), magnesium (Mg), potassium (K), and sodium (Na). The results of the first semi-annual sampling event are presented in Table 5. The results from the second semi-annual sampling event are provided in Table 6. The low percent difference between the total cations and anions indicate that the basic geochemistry constituents are in balance at each MW and suitable to use for the pattern analysis.

Piper's graphical method plots the equivalent concentration results (milliequivalents per liter, meq/L) of the sampled common water ions over a diamond grid. Sample results that plot close to one another are geochemically similar indicating a possible common source; sample results that do not plot close to one another are geochemically dissimilar indicating different sources.

The equivalent ion concentrations were plotted (percent meq/L) and aligned to a geochemical facies pattern. The overlay of the OUC CCR results and the facies pattern are presented in Figures 6 through 9 for MW-A, MW-B, MW-C, and MW-D, respectively. The data were very similar between sampling events, except for MW-D. The results of the procedure show that the position of the MW-D groundwater (as indicated by the triangles in Figures 6 through 9) have slowly migrated toward similar cation and anion distributions as MW-A. The results indicate that groundwater at MW-D is similar to the groundwater at MW-A.

Table 5. March 14, 2024 Geochemical Sampling Results with Ion Balances

Well	Anions			Cations			
	HCo3	So4	Cl	Na	Ca	Mg	K
	Concentration (mg/L)						
MW-A	1	1,040	22,200	6,170	5,730	3.12	1,720
MW-B	2.6	25.7	13.8	13.1	5.02	1.68	2.48
MW-C	15	5.33	23.6	10.5	9.47	0.92	1.3
MW-D	1	700	7,990	2,600	1,870	14.1	605
Well	Concentration (mEq/L)						
MW-A	0.02	21.6	626.0	268.4	285.9	0.3	44.0
MW-B	0.05	0.53	0.39	0.57	0.25	0.14	0.06
MW-C	0.30	0.11	0.67	0.46	0.47	0.08	0.03
MW-D	0.02	14.6	225.3	113.1	93.3	1.2	15.5
Well	Concentration Percentage of mEq						
MW-A	0%	3%	97%	45%	48%	0%	7%
MW-B	5%	55%	40%	56%	25%	14%	6%
MW-C	28%	10%	62%	44%	46%	7%	3%
MW-D	0%	6%	94%	51%	42%	1%	7%
Well	Ion Balance						
Well	Sum Anion	Sum Cations	Ion Balance				
AW-A	647.7	598.6	-3.94%				
MW-B	0.98	1.02	2.31%				
MW-C	1.08	1.04	-1.81%				
MW-D	239.9	223.1	-3.64%				

Notes:Bicarbonate (HCO₃), carbonate (CO₃), chloride (Cl), sulfate (SO₄), calcium (Ca), magnesium (Mg), potassium (K), and sodium (Na)

mg/L= milligram per liter; meq/L = milliequivalents per liter

Percentage meq is the percent of the sum of the four anions/cations listed

The ion balance was calculated (in meq/L) as the total dissolved-anions concentration minus the total dissolved-cation concentration divided by the total concentration of ions

Table 6. September 11, 2024 Geochemical Sampling Results with Ion Balances*2024 Coal Combustion Residuals Annual Groundwater Monitoring and Corrective Action Report*

Well	Anions			Cations			
	HCo3	So4	Cl	Na	Ca	Mg	K
	Concentration (mg/L)						
MW-A	1.0	1,130.0	22,200.0	6,070.0	6,630.0	3.4	1,820.0
MW-B	1.00	32.30	9.81	8.19	4.61	2.27	7.66
MW-C	15.00	4.92	21.00	10.80	7.85	1.02	1.49
MW-D	1.0	828.0	8,180.0	2,820.0	2,120.0	18.3	623.0
Well	Concentration (mEq/L)						
MW-A	0.02	23.5	626.0	264.0	330.8	0.3	46.6
MW-B	0.02	0.67	0.28	0.36	0.23	0.19	0.20
MW-C	0.30	0.10	0.59	0.47	0.39	0.08	0.04
MW-D	0.02	17.2	230.7	122.7	105.8	1.5	15.9
Well	Concentration Percentage of mEq						
MW-A	0%	4%	96%	41%	52%	0%	7%
MW-B	2%	69%	29%	37%	24%	19%	20%
MW-C	30%	10%	60%	48%	40%	9%	4%
MW-D	0%	7%	93%	50%	43%	1%	6%
Well	Ion Balance						
Well	Sum Anion	Sum Cations	Ion Balance				
AW-A	649.6	641.8	-0.60%				
MW-B	0.97	0.97	0.03%				
MW-C	0.99	0.98	-0.56%				
MW-D	247.9	245.9	-0.41%				

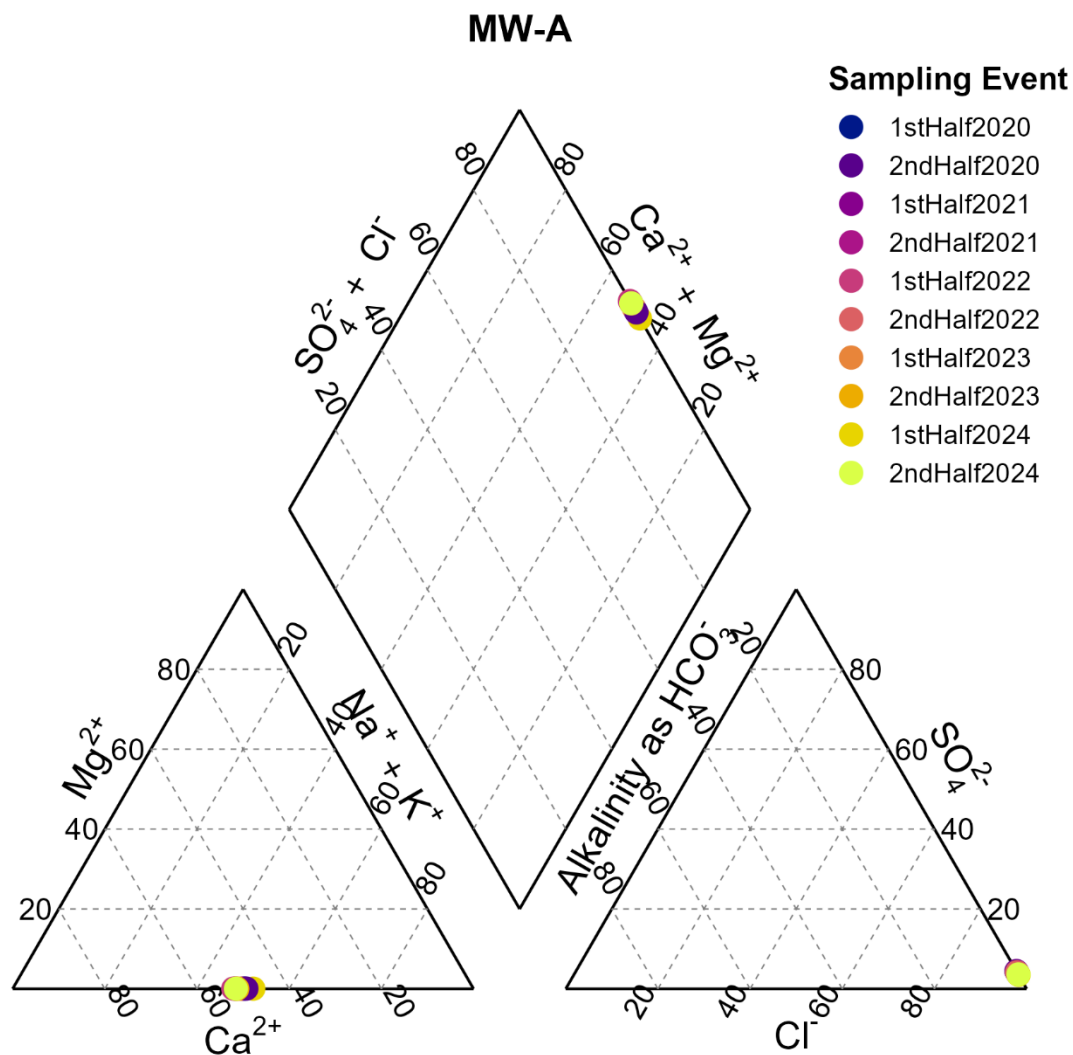
Notes:

Bicarbonate (HCO₃), carbonate (CO₃), chloride (Cl), sulfate (SO₄), calcium (Ca), magnesium (Mg), potassium (K), and sodium (Na)

mg/L= milligram per liter; meq/L = milliequivalents per liter

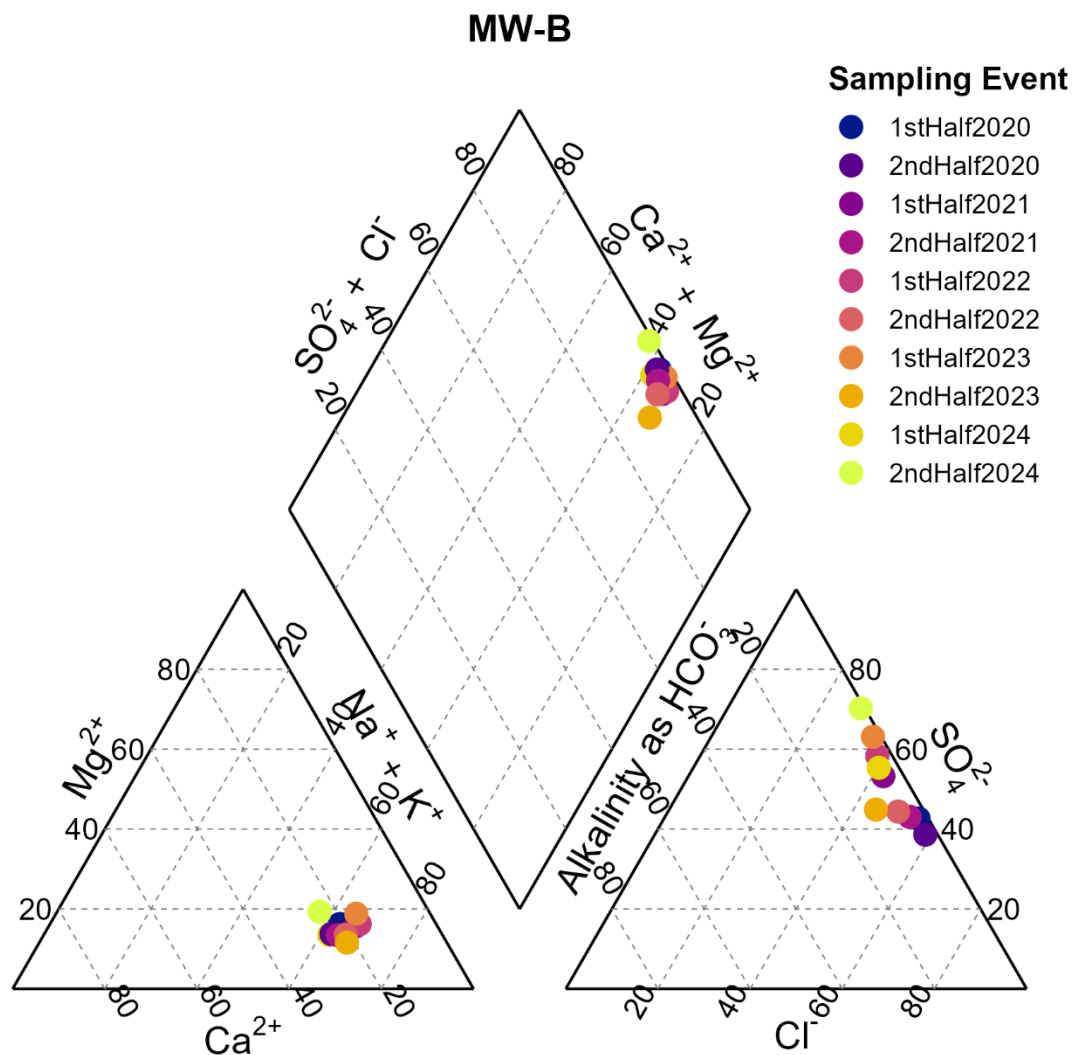
Percentage meq is the percent of the sum of the four anions/cations listed

The ion balance was calculated (in meq/L) as the total dissolved-anions concentration minus the total dissolved-cation concentration divided by the total concentration of ions



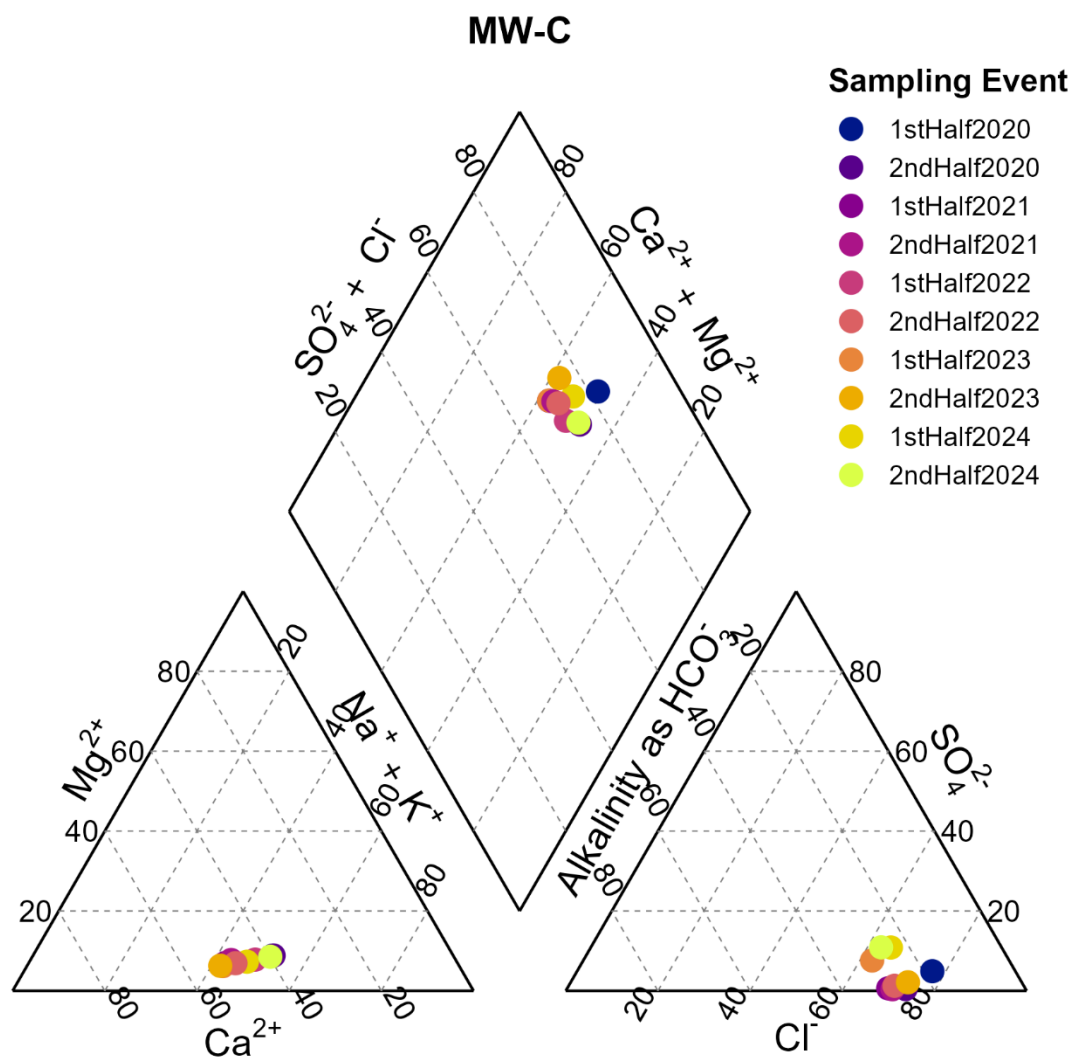
Note that data points overlap and may not be seen.

Figure 6: MW-A Results of Geochemical Facies Pattern and Analysis Results



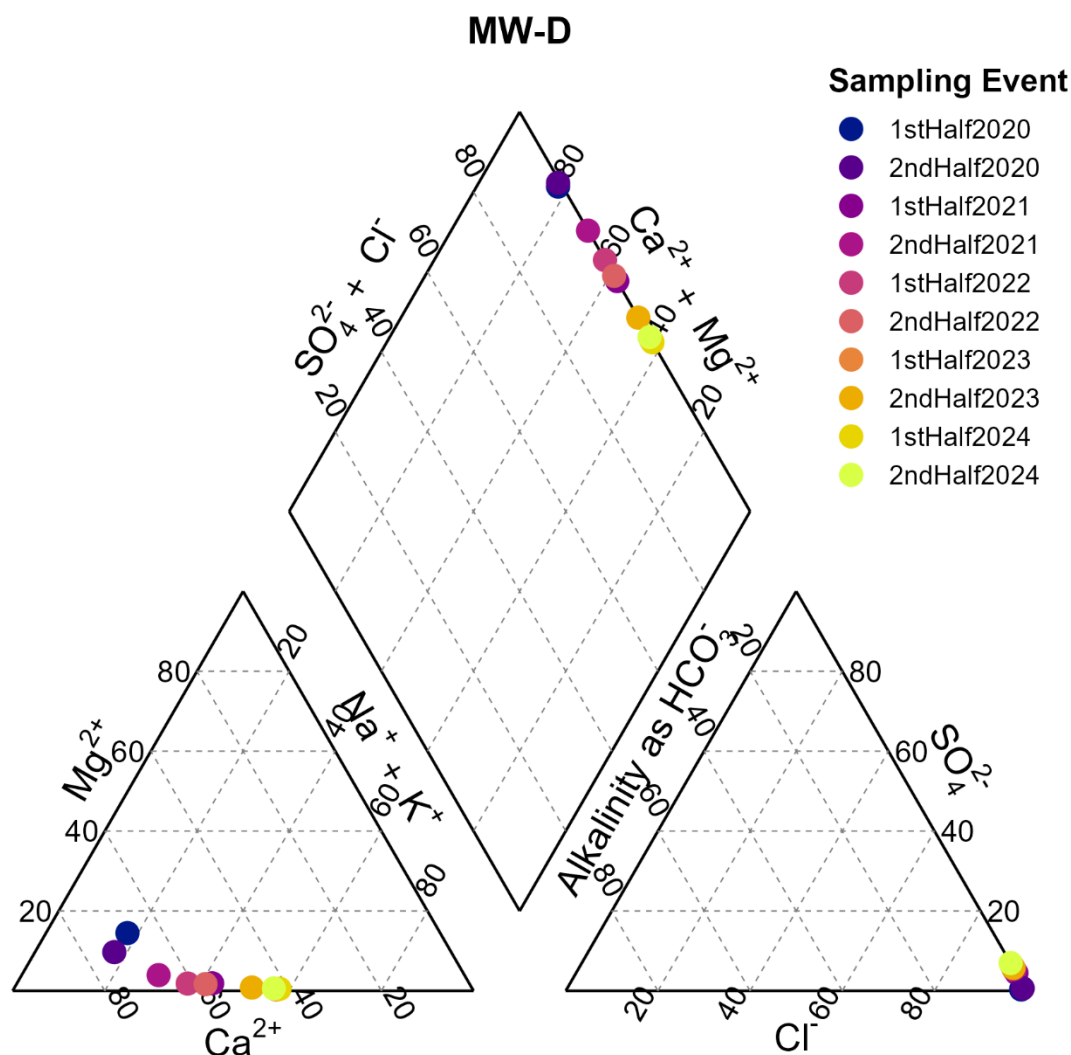
Note that data points overlap and may not be seen.

Figure 7: MW-B Results of Geochemical Facies Pattern and Analysis Results



Note that data points overlap and may not be seen.

Figure 8: MW-C Results of Geochemical Facies Pattern and Analysis Results



Note that data points overlap and may not be seen.

Figure 9: MW-D Results of Geochemical Facies Pattern and Analysis Results

7. General Site Conditions

The 2021 Annual Groundwater Monitoring and Corrective Action Report detailed the location and history of a nearby stockpile of material, including crushed limestone (also called limerock) and sand. This stockpile area was removed in 2022 and the area has been returned to normal ground.

During Hurricane Ian travel over Central Florida on September 28th and September 29th, 2022, approximately 13.1 inches of rain was recorded at the nearby Orlando International Airport rainfall station (NOAA Station Number USW00012815). Antecedent conditions indicate that approximately 7 inches of rainfall fell in the two weeks prior Hurricane Ian. During the hurricane, the northwest berm of Cell 2 was compromised, ultimately discharging water into the adjacent stormwater ditch. The berm was immediately

repaired, and the FDEP was notified. No apparent rapid changes in groundwater were observed after this event, other than the recent trends discussed previously.

The findings of the 2023 alternative source demonstration indicated that groundwater quality was influenced by an alternate source at MW-D. As such, it was recommended that an additional monitoring well be installed outside of the documented impacted area to better monitor potential groundwater changes from the active landfill subject to the CCR well. In May of 2024, an additional well was installed approximately 500 feet north and 175 west of MW-D and within the down gradient groundwater flow path of the regulated CCR landfill. This well was installed to monitor the surficial groundwater quality in the same horizon as the existing monitoring wells in the program, and as such was drilled to a depth of approximately 30 feet and is screened from 20 to 30 feet (Appendix B). Prior to installation a soil boring was completed in the immediate vicinity of the proposed well to document the hydrogeologic conditions present at the site. As identified in other borings completed across the site, a competent clay layer starts at approximately 30 feet in depth and approximately 8 feet thick. Background sampling of Appendix III and Appendix IV parameters for this well began on July 16, 2024 and will continue for eight quarterly sampling events (2 years) in accordance with requirements of 40 CFR §257.94(b). After background data has been collected, statistical baselining will be completed, and the new monitoring well (MW-E) will be included in the monitoring program as a replacement for MW-D.

8. Conclusions

The general purpose of the 2024 annual report is to document the results of the CCR detection monitoring conducted at OUC SEC. The results indicated that analyses of several parameter fell outside the expected statistical prediction limit based on the original background analysis of the CCR data. The SSIs observed in early annual reports were derived from a comparison of the results to a statistical analysis of a limited number of background readings.

The statistical baseline and trend analysis was repeated in 2022 to update the original trend estimates that were made with the initial limited-sized dataset. The results of this analysis provided updated UPL and LPL (for pH) that characterize each well over a longer period (September 2015 to September 2021). As a result, the updated statistical baseline analysis better characterizes the historical data and trends at each well in the CCR monitoring program. The updated baseline trend analysis resulted in revised thresholds for UPLs that eliminated SSI categorization for previous sampling data for calcium, chloride, pH, and TDS at the MW-B and MW-C locations. The same analysis has eliminated SSIs at MW-D for pH and fluoride. SSIs remain at MW-D for boron, calcium, chloride, sulfate, and TDS.

If a potential SSI is verified using the detection monitoring program, the site assessment monitoring program must be initiated for all monitoring wells within 90 days and continue at semiannual frequency. Alternately, the owner of the facility must demonstrate that a source other than the CCR unit is responsible for the increase. The CCR landfill is relatively new (8 years old) and located away from downgradient CCR monitoring wells. Groundwater does not move very quickly along the low gradient landscape at OUC SEC. Additional site investigations were completed as part of an Alternative Source Analysis in 2021 (CH2M 2021b). This analysis focused on the hydrogeologic conditions on the western portion of the site between MW-D and the active landfill and found that groundwater travel time from the northern edge of the active landfill cell to MW-C and MW-D is expected to be greater than 24 and 17 years, respectively. Results of this analysis indicated that the groundwater quality at MW-C and MW-D cannot yet be influenced by the new CCR landfill and that an alternate source is responsible for the water quality at MW-C and MW-D.

As part of additional groundwater investigations and alternative source demonstration, groundwater, surface water, and soils data were collected in November and December of 2022 to evaluate groundwater quality in the surficial aquifer and determine a potential alternate source of impacted groundwater at MW-

D (Appendix A). An alternative source was not identified from surface water quality and soil sampling. However, the results of groundwater investigations indicate that specific conductance decreases with distance from the closed landfill, generally returning to values below 770 $\mu\text{S}/\text{cm}$ (500 mg/L TDS) when greater than 500 feet from the landfill. Statistical analysis confirms that specific conductance (and TDS) decreases with distance from the closed landfill. As a result, highly mineralized water appears to be emanating from the closed landfill and appears to be the alternate source of impacted groundwater sampled at MW-D.

Based on the review of the data against projected trends in the vicinity of MW-D and analysis of groundwater flow potential at the site, it is concluded that SSIs of constituents at both MW-C and MW-D are not verified to be from the regulated CCR landfill and it is not appropriate to proceed to assessment monitoring. There is reasonable documentation that the high concentration of dissolved ions is from an alternative source and that continued Detection Monitoring is appropriate.

A new well has been installed to replace MW-D in the monitoring program (Appendix B). This well will be sampled for quarterly for Appendix III and Appendix IV parameters for 2 years (8 samples) in accordance with requirements of 40 CFR §257.94(b) before replacing MW-D in the monitoring program. After background data has been collected, static baselining will be completed, and the new monitoring well (MW-E) will be included in the monitoring program as a replacement for MW-D.

9. References

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Appendix A. 2023 Alternative Source Demonstration in the Vicinity of CCR Monitoring Well MW-D: OUC Stanton Energy Center

2023 Alternative Source Demonstration in the Vicinity of CCR Monitoring Well MW-D: OUC Stanton Energy Center

PREPARED FOR: Orlando Utility Commission
PREPARED BY: CH2M HILL Engineers, Inc.
DATE: September 22, 2023
PROJECT NUMBER: D3292400

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Executive Summary

The Orlando Utilities Commission (OUC) has been conducting groundwater monitoring associated with the active coal combustion residuals (CCR) landfill consistent with the United States Environmental Protection Agency's (EPA's) CCR Rule¹ since September 2015. Activities and results prior to 2023 have been documented and posted on OUC's CCR website, as required by the CCR Rule. The OUC CCR groundwater monitoring system consists of one background monitoring well (MW), MW-A, and three compliance MWs, MW-B, MW-C, and MW-D. Sampling for the first 2023 semi-annual sampling event was conducted on March 14, 2023. Laboratory and statistical analysis completed on April 30, 2023 indicated that retesting was required for identified statistically significant increases (SSIs) at wells MW-C and MW-D for Boron (B), fluoride (F), sulfate (SO₄), calcium (Ca), chloride (Cl), and total dissolved solids (TDS) (parameters varied per well). Sampling for retesting was conducted on May 12, 2023. Laboratory and statistical analysis completed on June 25, 2023 indicated that the data at MW-D for B, SO₄, Ca, Cl, and TDS were confirmed as SSIs that could not be explained by statistical analysis alone. MW-C retests were not confirmed as SSIs.

The groundwater sampling and statistical analyses of the groundwater quality data sets from the four MWs will be presented in the 2023 annual groundwater monitoring and corrective action report for the OUC Stanton Energy Center. This document presents a demonstration that the confirmed SSIs identified at MW-D is from an alternate source; thus, meeting the requirement of the CCR Rule to continue in the Detection Monitoring program. Since the concentrations in MW-D have been higher than at the other MWs, and the constituents of concern are B, Ca, Cl, SO₄, and TDS, the discussion focuses primarily on these five analytes at this location.

¹ <https://www.epa.gov/coalash/coal-ash-rule>, accessed September 5, 2023.

The alternate source demonstration completed in 2021 (CH2M, 2021) determined that the lined active CCR landfill was an improbable source of identified SSIs because groundwater does not travel quickly enough across the site to have reached MW-D since it was installed. The recommendation from the 2021 alternative source demonstration was to complete additional groundwater investigations to ascertain the source of groundwater quality impacts at MW-D.

As part of this updated alternate source demonstration, additional groundwater, surface water, and soils data were collected in November and December of 2022 to evaluate groundwater quality in the surficial aquifer and determine a potential alternate source of impacted groundwater at MW-D.

An alternative source was not identified from surface water quality and soil sampling. However, the results of groundwater investigations indicate that specific conductance decreases with distance from the closed landfill, generally returning to values below 770 $\mu\text{S}/\text{cm}$ (500 mg/L TDS) when greater than 500 feet from the landfill. Statistical analysis confirms that specific conductance (and TDS) decreases with distance from the closed landfill. As a result, highly mineralized water appears to be emanating from the closed landfill and appears to be the alternate source of impacted groundwater sampled at MW-D.

The updated demonstration work and analysis is documented in this memorandum. Subsequently, continued Detection Monitoring is recommended while the groundwater monitoring plan is updated to incorporate an additional well that is not impacted by the identified alternative source.

This report is organized into the following sections.

1. Background
2. Groundwater Quality Data
3. Groundwater Monitoring Infrastructure and Field Data Collection
4. Groundwater and Collected Data Analysis
5. Conclusions
6. Recommendations
7. References
8. Appendices

Background

The Stanton Energy Center (SEC) is located 12 miles southeast of Orlando, Florida. OUC has been operating SEC since 1987 and dry-managing CCRs in landfills on the west side of the property. The original, now closed, landfill received CCR from July 1987 through August 28, 2015. From the period of May 28 through August 15, 2015, the CCR directed to the closed landfill was used to form part of the landfill cap. The cap was completed with 2 feet of soil and then sodded to stabilize the soil. The old landfill is exempt from the CCR Rule because it ceased operations prior the prescribed date of the CCR Rule, October 17, 2017. The old landfill has been closed (hereinafter “closed landfill”) and is undergoing post-closure monitoring under OUC’s Conditions of Certification with the Florida Department of Environmental Protection (FDEP). The closed landfill has a 6.42-megawatt solar power generation farm installed over its top.

Construction of the first cell (Cell 1) of the new landfill (hereinafter “active landfill”) was completed in 2012. The active landfill began receiving CCR on May 28, 2015 in Cell 1 as a monofill that receives CCR produced by the SEC coal-fired power generating process. The active landfill is positioned immediately west of and adjacent to the closed landfill and immediately east of Innovation Way, which is the approximate SEC western property boundary. The design standards for Cell 1 of the active landfill complied with Florida’s municipal solid waste landfill requirements under Chapter 62-701, Florida Administrative Code. Before the start of construction for Cell 2, the original design for Cells 2 and 3 were

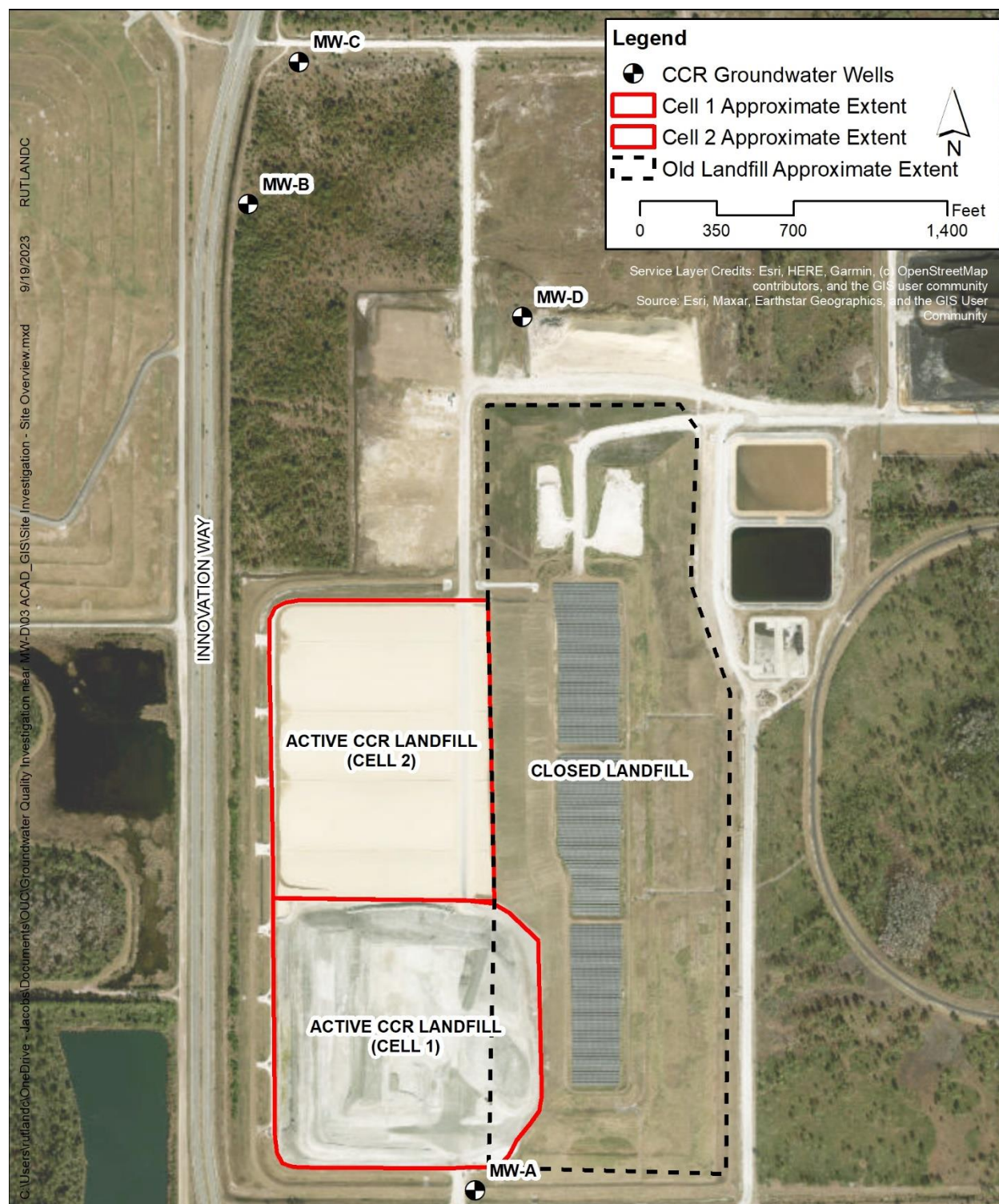
updated to meet the requirements with the applicable provisions of the CCR Rule (40 CFR 257 Subpart D). The active landfill is fully double-lined and does not discharge into the surficial groundwater.

Groundwater conditions at SEC are regulated under two separate programs: the FDEP Power Plant Siting Act and the U.S. Environmental Protection Agency (EPA) CCR Rule. The FDEP monitoring program has been active since August 1986, while the CCR monitoring program began in October 2015. OUC has made a conscious effort to keep these programs separate because of different regulatory requirements, different groundwater quality standards, and different monitored constituents. However, the groundwater conditions at the two adjacent landfills are common.

The CCR groundwater monitoring network was installed in August 2015 and consisted of 4 MWs. MW-A is the background MW and MW-B, MW-C, and MW-D are compliance MWs (Figure 1). Background period groundwater quality sampling was performed from September 2015 through July 2017. Operational monitoring has been performed semi-annually beginning October 2017 to the present under the Detection Monitoring program of the CCR Rule. Data from the background monitoring period were used to establish statistically based evaluation criteria consistent with the CCR Rule. These baseline data established potential trends, when present, and statistical upper limits (and lower limit for pH) that are typically set at 95 percent confidence interval.

Sampling for the first 2023 semi-annual sampling event was conducted on March 14, 2023. Laboratory and statistical analysis completed on April 30, 2023 indicated that retesting was required for identified statistically significant increases (SSIs) at wells MW-C and MW-D for Boron (B), fluoride (F), sulfate (SO_4), calcium (Ca), chloride (Cl), and total dissolved solids (TDS) (parameters varied per well). Sampling for retesting was conducted on May 12, 2023. Laboratory and statistical analysis completed on June 25, 2023 indicated that the data collected at MW-C for SO_4 was not a confirmed SSI while data collected at MW-D for B, SO_4 , Ca, Cl, and TDS were confirmed as SSIs that could not be explained by statistical analysis alone. When an SSI is determined from analysis of the data, the CCR Rule requires that the Detection Monitoring program convert to an Assessment Monitoring program unless the owner or operator demonstrates that the SSI resulted from an error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality, or was caused by a source other than the CCR unit. This analysis assessed the potential of an alternative source of contaminants in the groundwater.

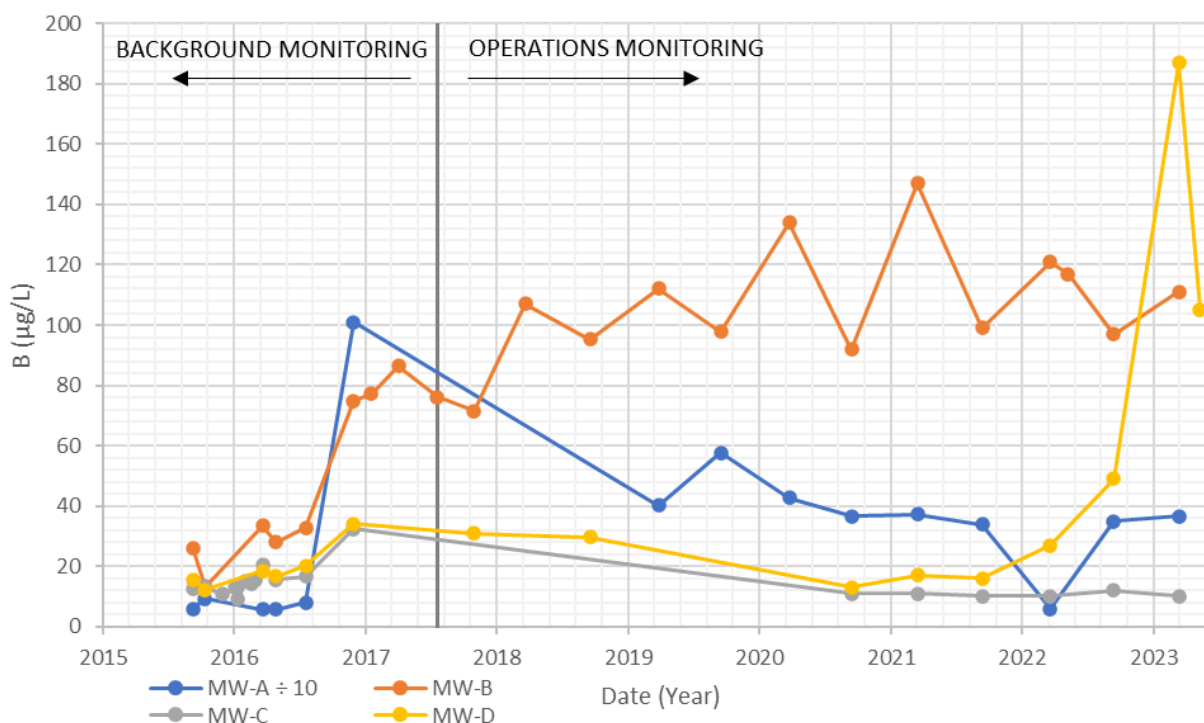
Figure 1. OUC's CCR Groundwater Monitoring Network for the Regulated CCR Landfill



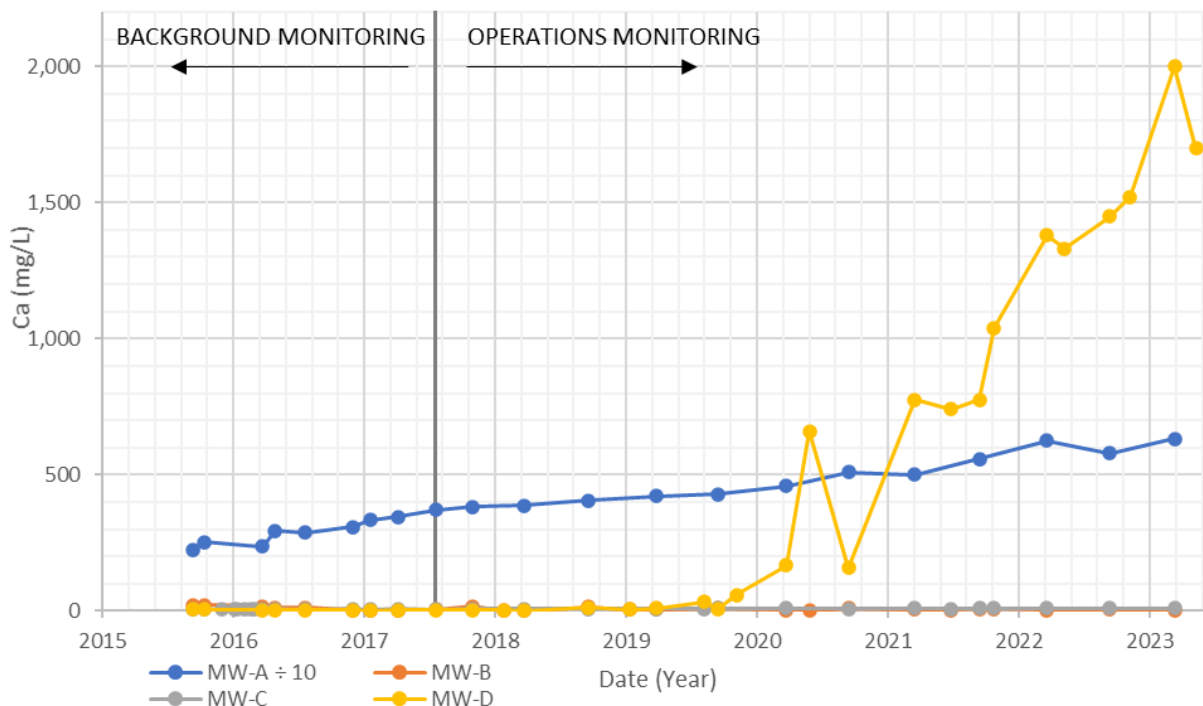
Groundwater Quality Data

Groundwater quality data for B, Ca, Cl, SO_4 , and TDS are presented to show patterns among the MWs in Figures 2a through 2e. The background monitoring period is identified on the charts. Of interest are the concentrations of Ca and Cl at MW-D that began to increase on September 17, 2019 and continued through the May 29, 2020 confirmatory selective resampling. The September 14, 2020 sampling results in Figures 2a, 2b, and 2c, respectively, had a decrease of B, Ca, and Cl concentrations. The March 17, 2021 sampling event showed elevated Ca and Cl concentrations, with confirmation sampling completed on June 28, 2021. A decrease in Cl concentration is noted on September 14, 2021 followed by a period of increase until March 14, 2023. The May 13, 2023 sampling results show an overall decrease in all parameters with the most decrease observed in B, Ca, Cl, and SO_4 . It was determined that the data at MW-D for B, SO_4 , Ca, Cl, and TDS represented SSIs that could not be explained by statistical analysis alone. The concentrations of these parameters were up to orders of magnitude different from the baseline data, approximately 3.4 to 74 times the statistical upper prediction limits (UPL).

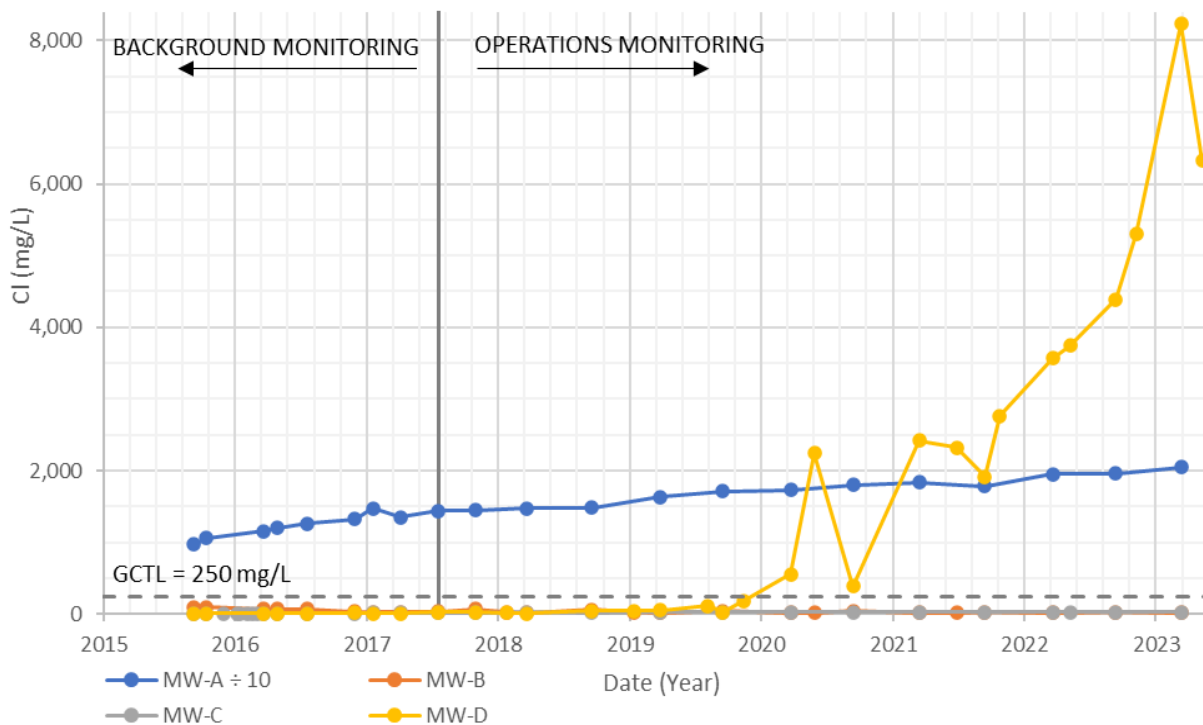
Figures 2a through 2e. Raw Groundwater Quality at the CCR Monitoring Wells



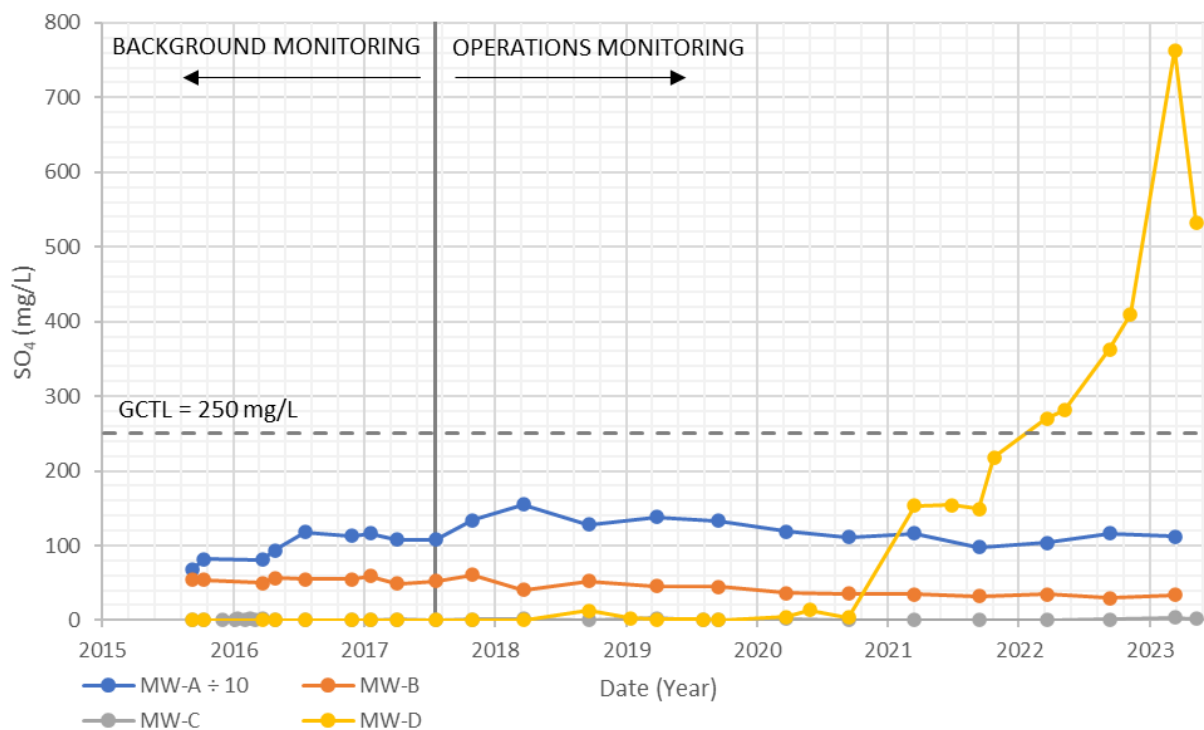
2a. Boron



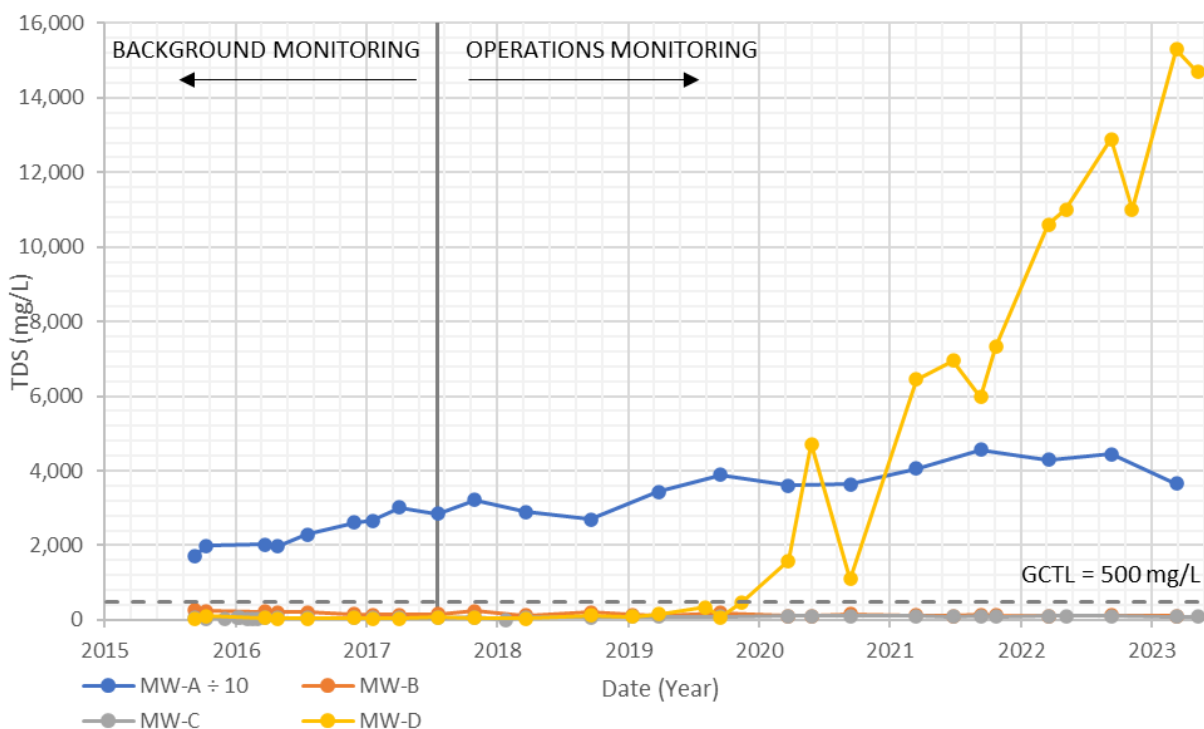
2b. Calcium



2c. Chloride



2d. Sulfate



2e. Total Dissolved Solids

Groundwater Monitoring Infrastructure and Field Data Collection

OUC has finished the construction of a new CCR landfill Cell 2 adjacent to and north of Cell 1 (Figure 1). The original design standards for the horizontal expansion were compliant with Florida's municipal solid waste landfill requirements under Chapter 62-701, Florida Administrative Code. Before the start of construction for Cell 2, the original design for Cells 2 and 3 were updated to meet the requirements with the applicable provisions of the CCR Rule (40 CFR 257 Subpart D). Cell 2 is fully double lined with a leachate collection system that pumps to the lined Combustion Waste Storage Area (CWSA) Runoff Ponds and does not discharge into the surficial groundwater.

The groundwater table north of the newly constructed cell is approximately 3.3 feet below land surface (bls) and the MWs are 30 feet bls with the screened intervals between 20 to 30 feet bls (screens fully submersed in the groundwater). MW-D is over 2,600 feet from the north side of the Cell 1 and 1,200 feet from the north side of the Cell 2. MW-B is about 3,200 feet from the active landfill cell and 1,700 feet from the new cell. MW-C is the furthest north and away from the active landfill cell (about 3,800 feet) and disturbed soils.

Field Investigation

Subsurface data collection was completed to identify a potential source for impacted groundwater sampled at MW-D. This was accomplished by conducting a screening level investigation to estimate the horizontal and vertical extent of impacted groundwater by measuring specific conductance of sampled groundwater in the vicinity of MW-D. OUC contracted Custom Drilling Services Inc (CDS) to complete soil boring in the area surrounding the MW-D. CDS mobilized a direct push drilling rig and completed the scheduled sampling in two phases. Phase 1 was completed between November 7, 2022 and November 11, 2022. Phase 1 included fourteen temporary borings located at B-01 to B-14, five surface soil samples located at S-01 to S-05, three subsurface samples located at B-01, and two surface water grab samples located at SW-01 & SW-02. Phase 2 was completed from December 12, 2022 to December 14, 2022 and included thirteen temporary borings located at B-15 to B-27 and groundwater samples at three existing piezometers. A combined total of thirty-eight locations were sampled for groundwater, surface water, and soil samples during the field investigation. Figure 3 identifies locations of each boring while Figure 4 shows the locations of soil and surface water sampling points. Boring details are documented in Table 1.

Site selection for boring investigations was based on proximity to MW-D. The testing plan created an initial set of borings around MW-D at approximately 200 to 300 feet in distance. Subsequent borings were completed in greater distance from MW-D, generally extending beyond the previous borings by approximately 200 to 300-foot increments as permitted by the terrain. Measured specific conductivity was used in the field to rapidly assess water quality, identify concentration gradients between boring locations, and identify the spatial extent of future boring locations. The spatial extent of the expanding investigation area was bounded where low specific conductance values were encountered and terrain or infrastructure limited further exploration.

The soil lithology was continuously sampled to approximately 35 feet bls at boring B-01. Soil sampling shows that approximately 32 feet of deep fine sands overlay a dense clay layer that has a thickness of greater than 5 feet. This clay layer provides an apparent shallow confining layer in the vicinity of the tested area. The localized lithology from B-01 agrees with previous lithologic sampling observed during MW and piezometer installations (CH2M, 2021). A detailed lithologic log of B-01 is included in Appendix A.

Groundwater Quality Data Collection

Twenty-seven direct push borings were sampled during the Phase 1 and Phase 2 characterizations at the locations shown on Figure 4. The borings were advanced with a Geoprobe 7822DT drill rig using a single tube core (MC5) as the push tool and sampled using a Screen Point (SP16) Groundwater Sampler, which is a direct push device consisting of a stainless-steel screen. The SP16 is driven to depth within a sealed, steel sheath and then deployed for the collection of representative groundwater samples. Upon deployment, up to 41 inches of screen can be exposed to the formation.

Fourteen borings were sampled (B-01 to B-14) at three discrete intervals with the bottom of the SP16 groundwater sampler placed at 10, 20, and 30 feet bls. During Phase 2, borings B-15 to B-27 were sampled with bottom of the sampler placed at 20 and 30 feet bls. Phase 2 data collection did not include sampling in the 10 ft interval because field results from Phase 1 indicated that groundwater in the 10 ft bls interval was not impacted.

Testing procedures generally included the following steps:

- The contractor utilized a hand auger to clear individual boring locations to a depth of at least 5 feet bls.
- Using 5-foot long MC5 rods, the boring was advanced to 10 feet bls.
- With the MC5 acting as casing, the contractor set the SP16 Groundwater Sampler to 10 feet bls.
- The contractor removed a single MC5 rod exposing the bottommost 3.5 feet of the SP16 Groundwater Sampler to the formation.
- Each well was developed using a peristaltic pump with new disposable tubing set inside the SP16 Groundwater Sampler. Development continued until relatively clear, sediment-free formation water was produced and specific conductance and temperature measurements stabilized. Field samples were recorded approximately every five minutes during development.
- After field parameter stabilization, if determined by the onsite representative, samples for the list of analytes were collected with the pump used to purge the well.
- After sampling was completed, the contractor removed all equipment from the borehole and moved the rig horizontally by approximately 1-foot to start over and advance the boring to the next interval, repeating the previous steps to the desire depth.
- After the drill rig was demobilized, a stake was labeled and placed at each boring location for site surveying.
- Post investigation vertical and horizontal survey data was collected at each site.

Figure 3. Boring Locations for Groundwater Sampling

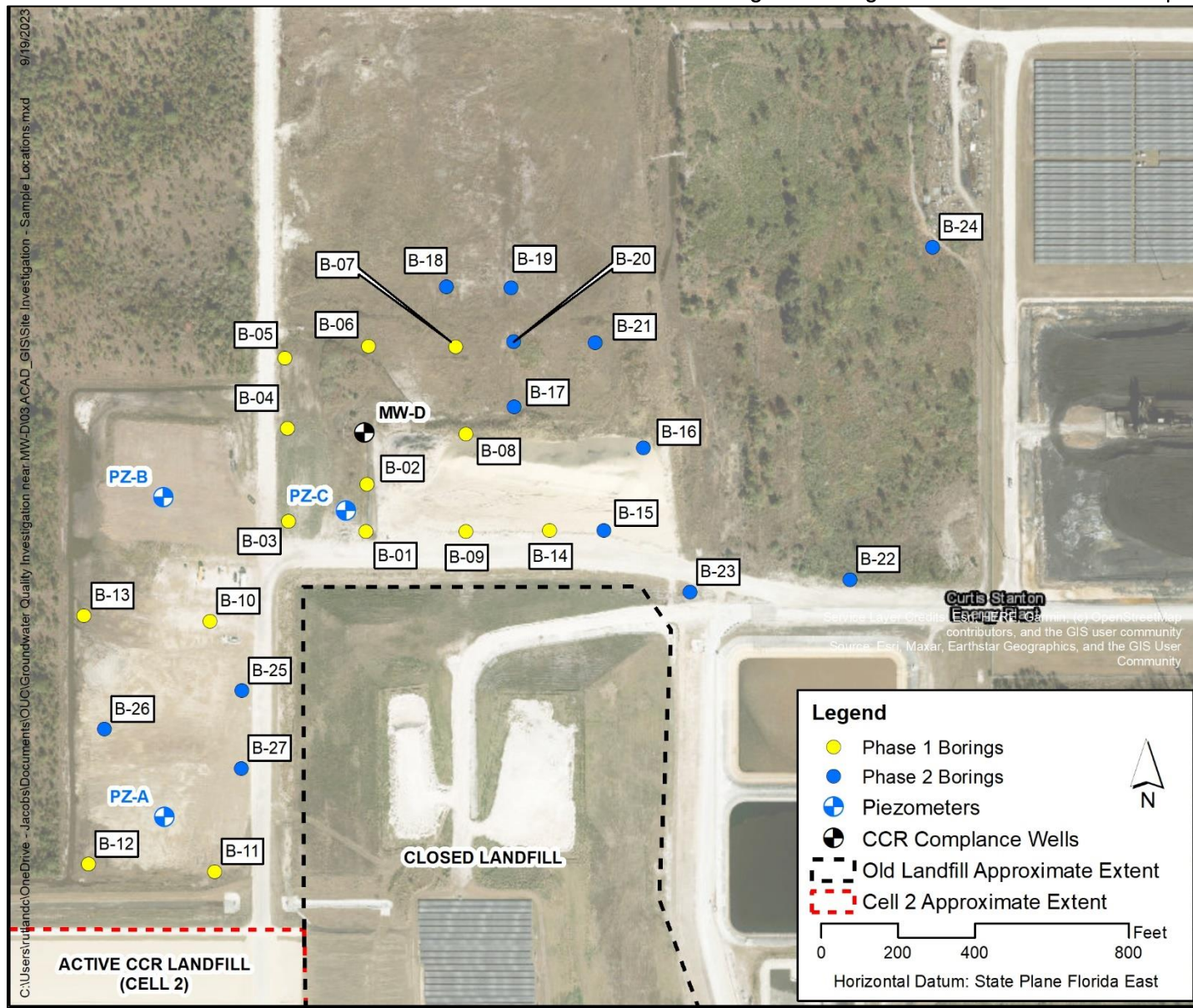


Figure 4. Boring Locations for Soil and Surface Water Sampling

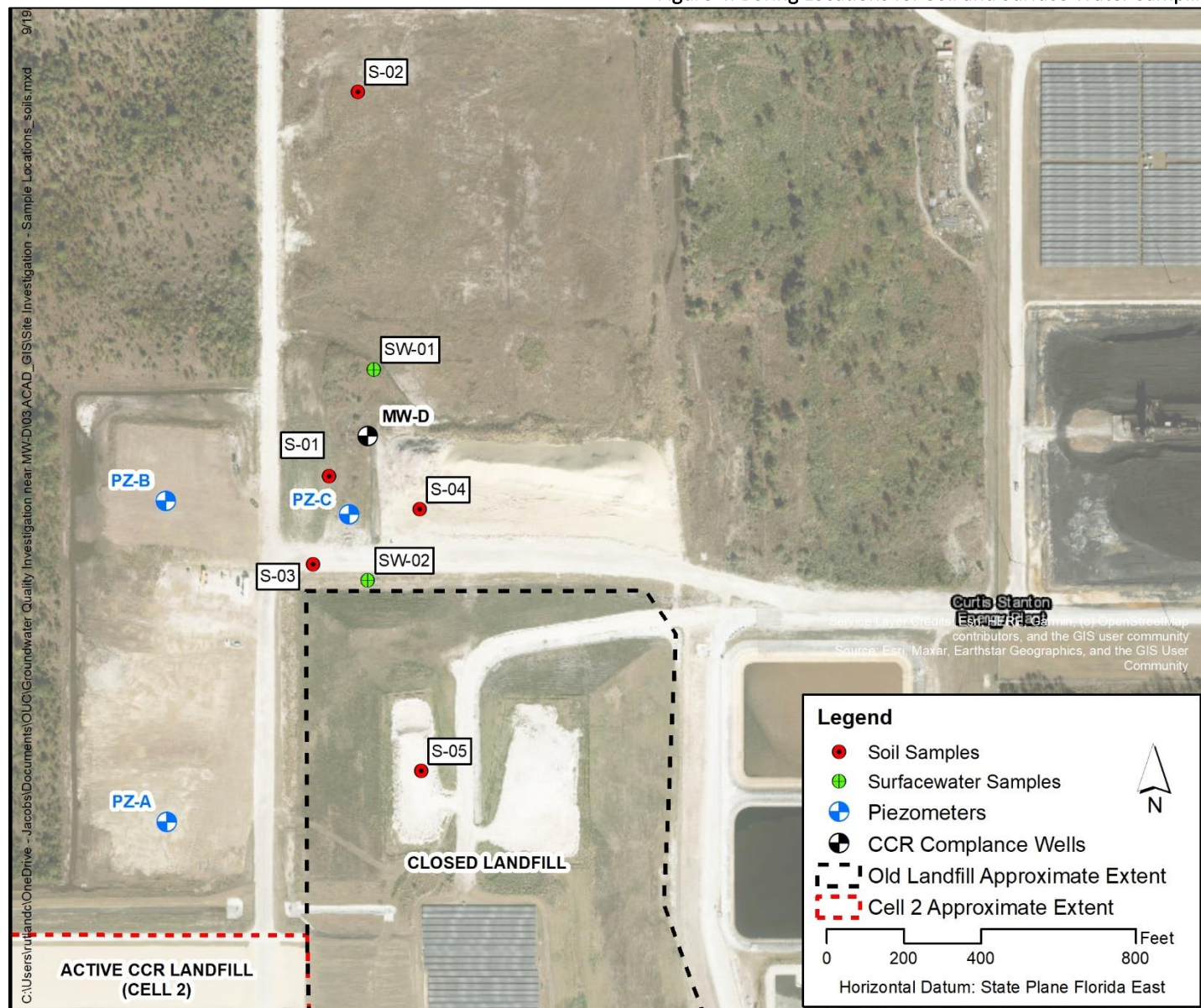


Table 1. Test Boring Details

Well ID	Type	Northing (feet)	Easting (feet)	LSE (feet NAVD88)	Depth (feet bls)
B-01	Test Boring	597862.4	1507980	84.7	10, 20, 30
B-02	Test Boring	597865.5	1508103	81.9	10, 20, 30
B-03	Test Boring	597661.7	1508006	82.8	10, 20, 30
B-04	Test Boring	597658	1508247	81.4	10, 20, 30
B-05	Test Boring	597651.7	1508431	81.4	10, 20, 30
B-06	Test Boring	597869.6	1508461	80.6	10, 20, 30
B-07	Test Boring	598096.3	1508459	80.8	10, 20, 30
B-08	Test Boring	598123.1	1508233	81.6	10, 20, 30
B-09	Test Boring	598122.4	1507979	86.5	10, 20, 30
B-10	Test Boring	597456.9	1507746	85.6	10, 20, 30
B-11	Test Boring	597469.7	1507096	83.2	10, 20, 30
B-12	Test Boring	597140.9	1507115	82.3	10, 20, 30
B-13	Test Boring	597129.6	1507761	82.6	10, 20, 30
B-14	Test Boring	598340.4	1507982	86.0	10, 20
B-15	Test Boring	598480.8	1507982	86.0	20 ,30
B-16	Test Boring	598584.3	1508196	81.2	20 ,30
B-17	Test Boring	598247.3	1508303	81.3	20 ,30
B-18	Test Boring	598071.6	1508616	80.7	30
B-19	Test Boring	598239.6	1508613	80.3	20 ,30
B-20	Test Boring	598246.3	1508473	80.4	20 ,30
B-21	Test Boring	598458.4	1508471	80.1	20 ,30
B-22	Test Boring	599121.5	1507855	83.1	20 ,30
B-23	Test Boring	598705.6	1507822	88.4	20 ,30
B-24	Test Boring	599336.2	1508718	81.2	20 ,30
B-25	Test Boring	597539.2	1507566	87.9	20 ,30
B-26	Test Boring	597182.1	1507466	82.7	20 ,30
B-27	Test Boring	597538.9	1507364	87.6	20 ,30

ID = identification

LSE = land surface elevation

NAVD88 = North American Vertical Datum of 1988

Surface Water Quality Data Collection

There were two locations of surface water near MW-D during the first phase of sampling. Surface water samples were collected to determine if surface water was a potential alternative source. All surface water samples were collected by using a dip sampler to obtain an unfiltered sample.

Piezometer Water Quality Data Collection

Each piezometer was developed by using a peristaltic pump with new disposable tubing set inside the well casing within the 20 to 30 feet bls screened interval. Development continued until relatively clear, sediment-free formation water was produced and pH, specific conductance, and temperature measurements were stabilized. Field samples were recorded every 5 minutes.

Soil Sampling Data Collection

In-situ soil sampling included samples from the surface and subsurface. Sampling of surface soils in the vicinity of MW-D were collected to determine if nearby soils were a potential alternative source. Sampling locations include the topsoil in the vicinity of MW-D (S-01), a sand stockpile north of MW-D (S-02), the haul road south of MW-D (S-03), the pad location east of MW-D (S-04), and the limestone pile located on the northern portion of the closed landfill (S-05). Subsurface soil sampling was limited to subsurface investigations completed at B-01. Subsurface sampling was generally accomplished by installing soil borings with a drill rig to recover soil cores at specific depths. Sampling of surface soils was conducted using hand tools.

The following procedures were used to harvest the surface soil samples from sites S-01 to S-05:

- Identified location for soil sampling.
- Using a trowel, a grab sample was collected.
- Placed and spread sample on a clean work surface (clean plastic sheet).
- Prepared samples for laboratory analyses by placing each sample into separate labeled plastic bags and placed in cooler until all samples were ready for shipment.
- Samples were sent to an analytical laboratory for analyses that included the following:
 - Metals (Calcium, Magnesium, Potassium, and Sodium).
 - Percent moisture.
 - Wet chemistry (Chloride and Sulfate).

At boring site B-01 CDS collected tube samples from specific intervals using the direct push method. A lithologic log was developed by the on-site hydrogeologist and representative samples were gathered for analysis.

Care was taken to limit contamination between samples by using the following steps:

- Rinsed tools between collection of different samples.
- Rinsed hands or change gloves between samples.
- Did not prepare samples on the same piece of plastic used to prepare an earlier sample without cleaning the plastic.
- Kept samples in Ziploc bags, or screw-top sample containers. Always kept sample containers sealed.

Groundwater Analysis and Results

In natural systems, water is conductive because ions dissolved in the water can carry electrical charge. High TDS concentrations are a result of high concentrations of ionic solutes and subsequently high conductivities. As a result, concentrations of TDS can be estimated by measuring the ability of water to conduct electricity, also called specific conductance. Based on groundwater sampling laboratory results and collected field information the correlation of specific conductivity to TDS is $1:0.65 \pm 0.03$. As a result, a specific conductance value of $770 \mu\text{S}/\text{cm}$ is approximately equal to $500 \text{ mg}/\text{L}$ of TDS.

Geospatial Results

Spatial analysis of specific conductivity concentrations was completed using hydrogeological modeling software with spheroidal numerical approximations to develop a 3D model of concentrations. A series of cross sections were developed using the results of the 3D model to spatially delineate specific

conductivity with distance and depth from the closed landfill. The estimated distribution of specific conductance at both 20 feet bls and 30 ft bls are shown in Figures 5a and 5b, respectively.

North of the of the closed landfill, two areas with a radius of approximately 175 feet 75 feet exhibit high specific conductivity concentrations (values greater than 16,000 $\mu\text{S}/\text{cm}$), at a depth of 20 feet bls. At a depth of 30 feet bls these high concentration areas expand to an approximate radius of 230 feet and 125 feet, respectively. Groundwater samples collected east of the closed landfill show high concentrations of specific conductivity at 20 feet and 30 feet bls. Figures 5c and 5d show the vertical extent of modelled specific conductivity as the specific conductivity gradient extends to the east and north from the perimeter of the closed landfill.

Analytical Results

Water quality samples were collected at the end of each developing period at selected surface water features and on selected borings at 10, 20, and 30 feet bls. These samples were submitted to Advanced Environmental Laboratories, Inc. (AEL) for analysis of major ions and sulfides. A copy of the analytical laboratory reports provided by AEL is included in Appendix B. Field samples were collected and analyzed for temperature and specific conductivity to demonstrate stable water quality conditions before collecting the laboratory samples. Table 2 summarizes the results of the laboratory analyses of the primary and duplicate samples and the field parameters collected at the time of sampling.

The surface water quality sampling results did not indicate the presence of a source that would contribute toward groundwater quality impacts in the vicinity of MW-D (Table 3). Soil sampling results indicated elevated levels of calcium in S-01, S-03, S-04, and S-05 (Table 4). Higher levels of calcium were anticipated in samples collected from the haul road south of MW-D (S-03) where limerock is used as a roadbase, the pad location east of MW-D (S-04) where limerock was stored during 2019, and the limerock pile located on the northern portion of the closed landfill (S-05). Calcium concentrations were also elevated in the topsoil west of MW-D (S-01), which is also not unexpected considering the potential sources of calcium in the immediate vicinity. Because elevated concentrations of calcium are located at depth in the groundwater (not near the surface), soil sampling results did not indicate the presence of a source that would contribute toward groundwater quality impacts in the vicinity of MW-D. As a result, the focus of the analysis in this report is related to groundwater.

Groundwater samples collected within the investigation site have higher concentrations of Ca, Cl, SO_4 , and TDS compared to the background groundwater. In the samples tested at 20 and 30 ft bls the values of chloride in groundwater ranged from 18 mg/L to 13,000 mg/L. The lowest values of chloride are observed at borings B-06 and B-04, located north and east of MW-D, while the remaining samples in this interval exhibit values greater than 1,000 mg/L. Calcium and magnesium levels in the studied samples ranged from 1.2 mg/L to 3,400 mg/L and 0.5 mg/L to 38 mg/L, respectively. The values for calcium below 50 mg/L and those for magnesium below 2mg/L are similarly observed north and east of MW-D. The lowest concentration of sodium is also observed in sites north and east of MW-D, exhibiting values below 7 mg/L. The rest of the sodium concentrations tested within the investigation site at 20 feet bls and 30 feet bls range from 460 mg/L to 4,200 mg/L. Sulfate concentrations greater than 250 mg/L are observed in groundwater samples collected from borings within 400 feet of the closed landfill perimeter. Conversely, sulfate concentrations obtained from borings which are located more than 400 feet from the landfill perimeter were lower (<140 mg/L).

Figures 5a through 5b. Distribution of Specific Conductivity with Depth

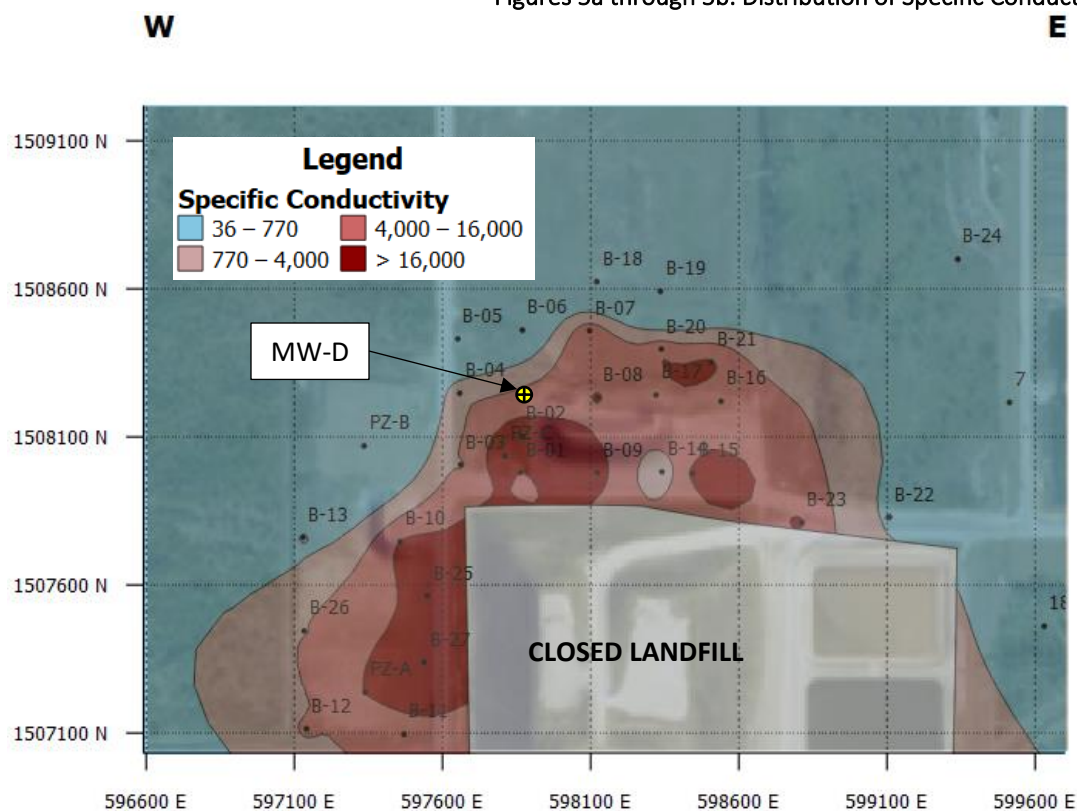


Figure 5a. 20 feet in Depth (~64 FT NAVD88)

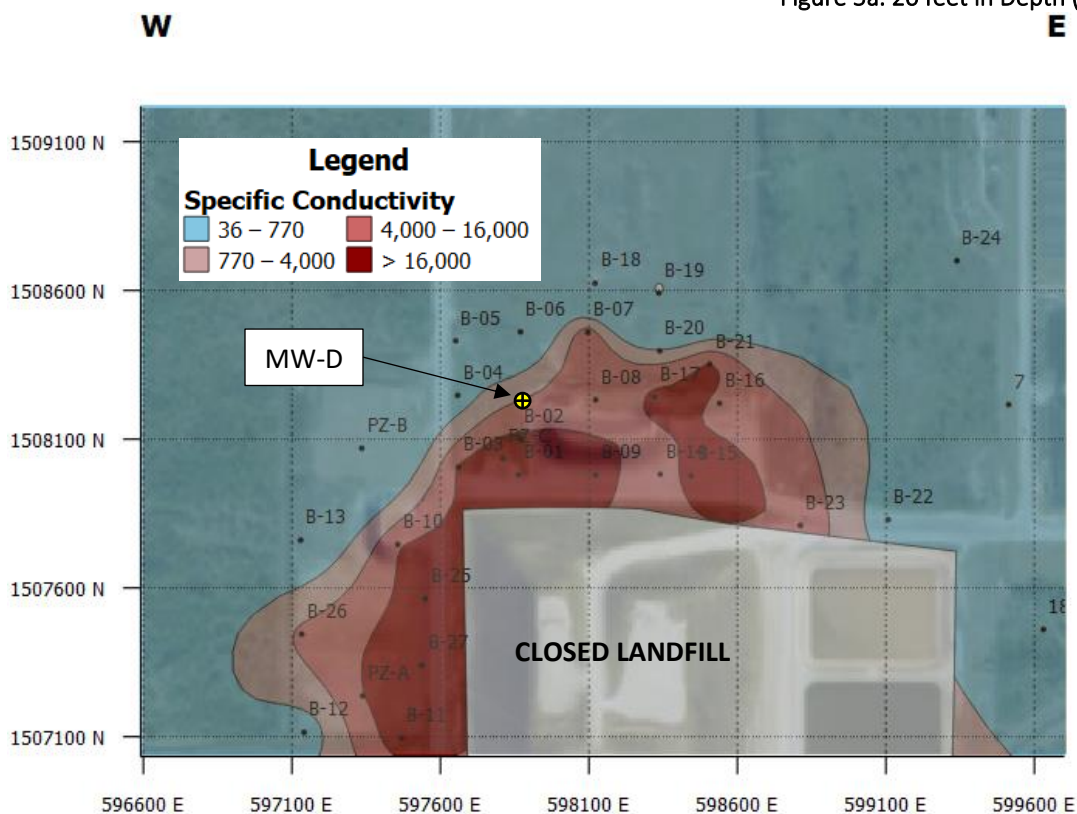
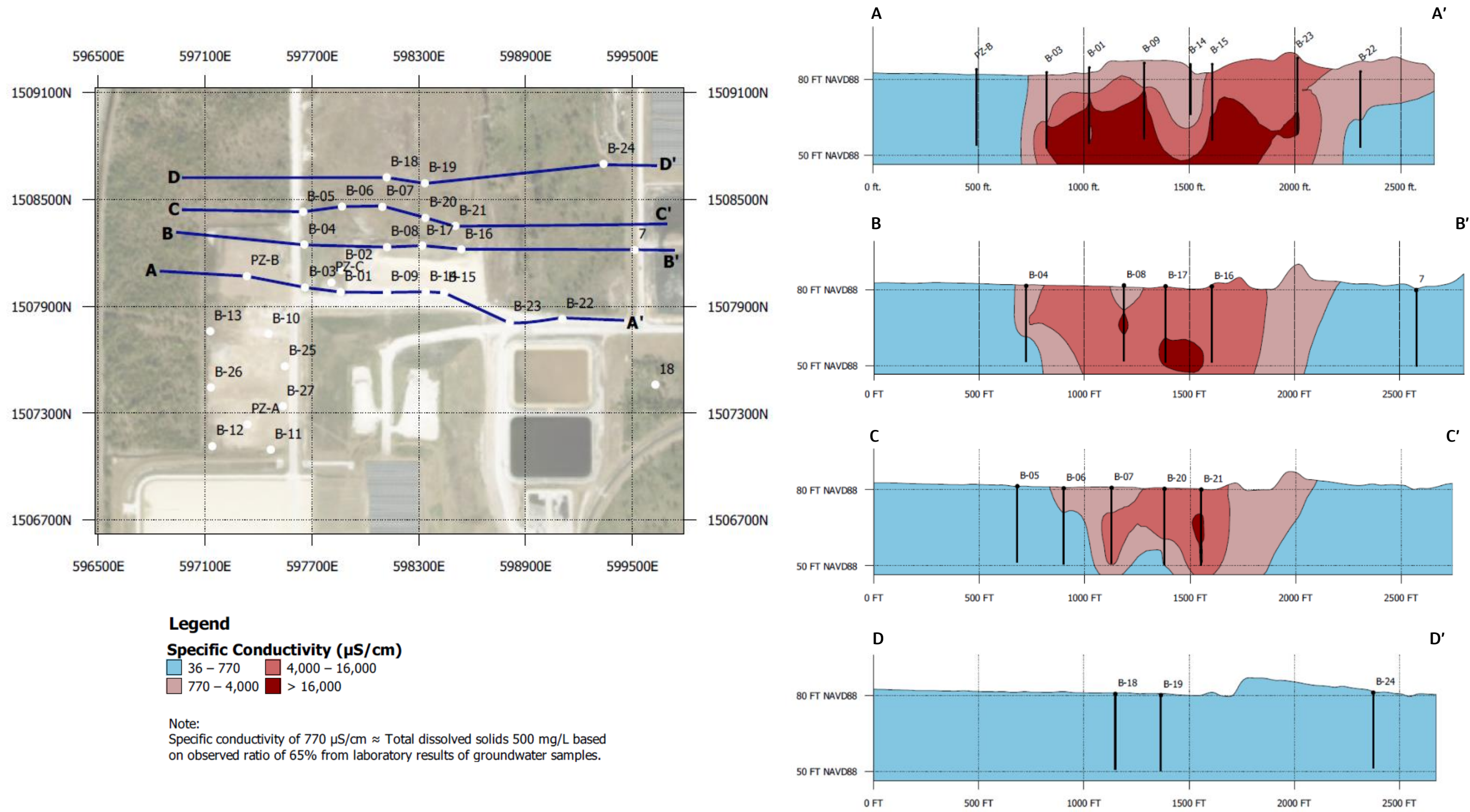
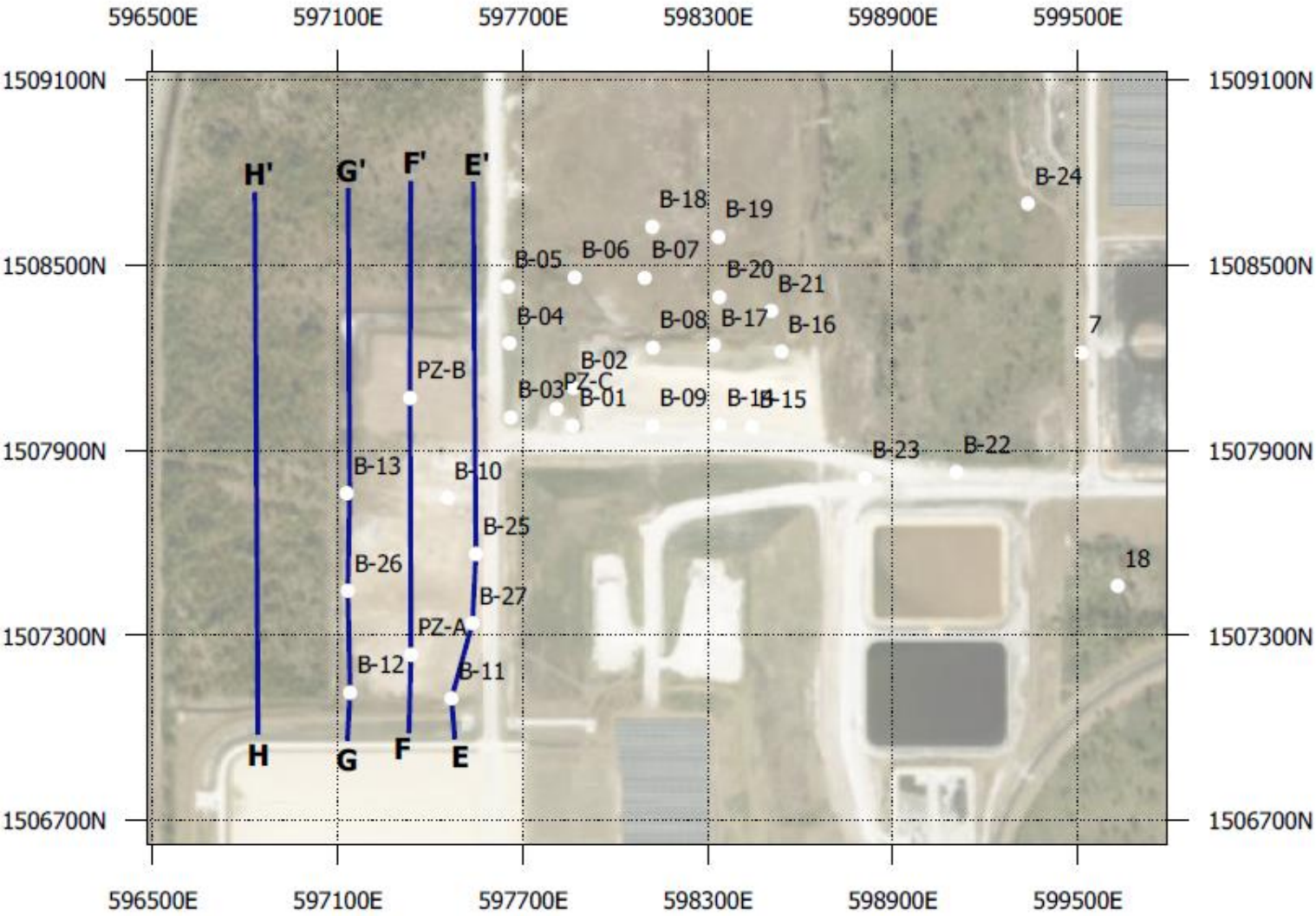


Figure 5b. 30 feet in Depth (~54 FT NAVD88)





Legend

Specific Conductivity ($\mu\text{S}/\text{cm}$)



Note:
Specific conductivity of 770 $\mu\text{S}/\text{cm}$ $\approx$ Total dissolved solids 500 mg/L based
on observed ratio of 65% from laboratory results of groundwater samples.

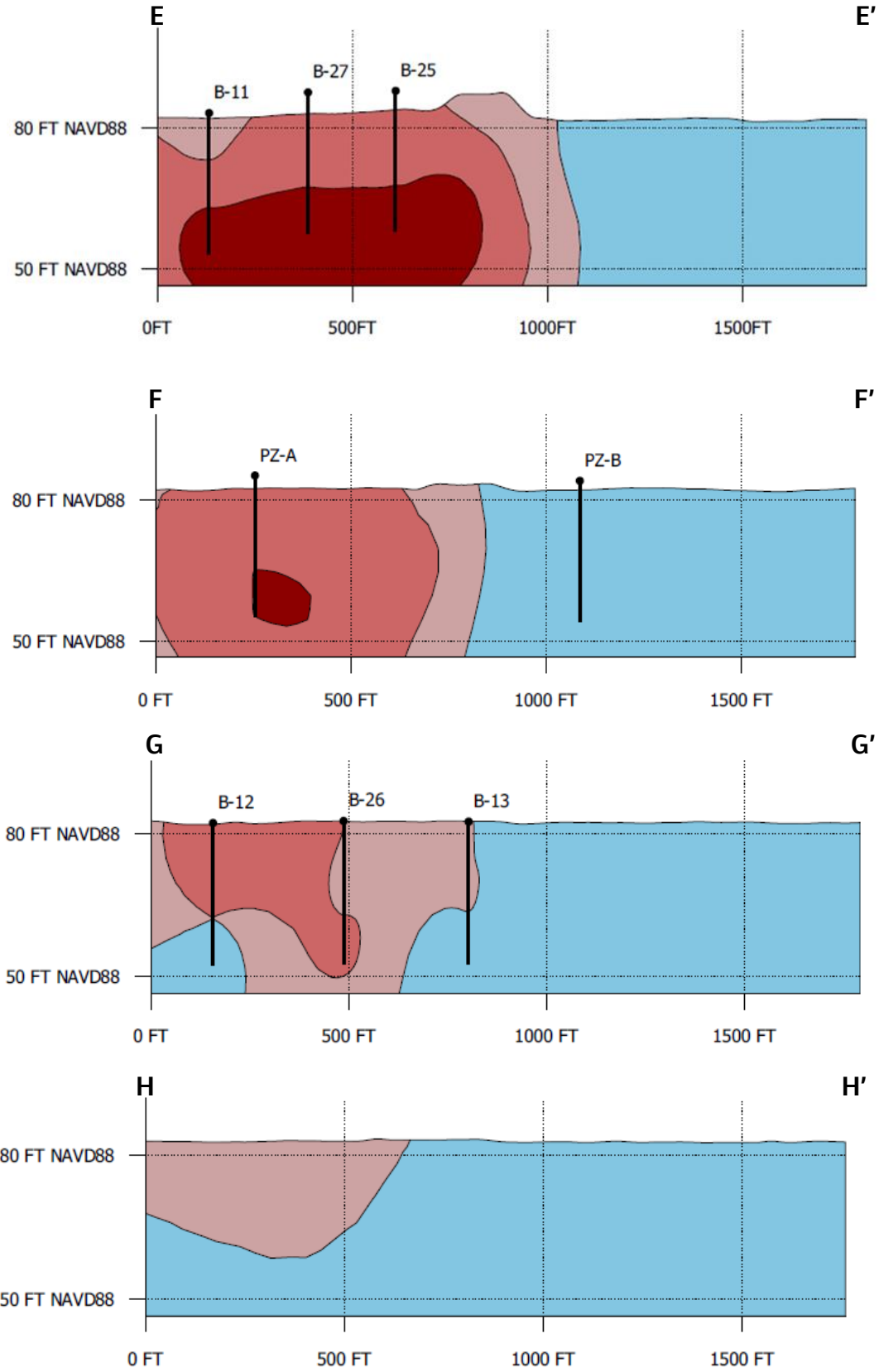


Figure 5d Western Cross Sections of Specific Conductivity with Depth

Table 2. Water Quality Laboratory Results Details

Sample ID	Depth	Matrix	Ca (mg/L)	Mg (mg/L)	K (mg/L)	Na (mg/L)	Cl (mg/L)	SO ₄ (mg/L)	HCO ₃ (mg/L)	CO ₃ (mg/L)	TA (mg/L)	TDS (mg/L)
B-01-10	10	GW	98	11	24	37	230	310	5	5	5	780
B-01-20	20	GW	1,300	5.3	590	2,800	6,800	1,400	5	5	5	11,000
B-01-30	30	GW	1,400	8.4	470	1,900	7,500	570	5	5	5	10,000
B-10-20	20	GW	1,700	8.5	480	1,500	6,600	1,400	5	5	5	9,500
B-10-30	30	GW	1,700	12	480	1,300	6,200	500	5	5	5	8,600
B-02-10	10	GW	720	9.9	370	990	3,100	990	5	5	5	6,000
B-02-20	20	GW	2,100	7.4	980	3,600	12,000	1,200	5	5	5	19,000
B-02-30	30	GW	1,800	20	350	2,000	11,000	1,000	14	5	14	12,000
B-09-10	10	GW	370	23	29	45	220	660	410	5	410	1,700
B-09-20	20	GW	1,500	26	910	1,800	6,400	1,100	5	5	5	12,000
B-09-30	30	GW	2,100	11	1,400	2,900	13,000	1,300	5	5	5	17,000
B-04-10	10	GW	410	13	17	30	490	900	5	5	5	2,000
B-04-20	20	GW	930	13	150	700	3,200	300	5	5	5	5,700
B-04-30	30	GW	47	1.3	1.3	5.2	42	2.2	73	5	73	290
B-08-10	10	GW	200	13	120	180	660	390	5	5	5	1,700
B-08-20	20	GW	1,400	19	870	1,600	6,300	660	5	5	5	11,000
B-08-30	30	GW	600	38	86	460	2,500	140	5	5	5	3,700
B-06-20	20	GW	1.2	1.1	0.58	6.8	18	1.7	12	5	12	71
B-06-30	30	GW	3.3	0.5	0.75	3.6	23	8.1	11	5	11	57
B-11-10	10	GW	460	22	90	160	440	1,000	21	5	21	2,300
B-11-20	20	GW	660	17	240	470	1,500	1,200	5	5	5	4,200
B-11-30	30	GW	3,400	19	1,700	4,200	12,000	940	5	5	5	21,000
B-07-10	10	GW	29	30	2	160	590	12	5	5	5	780
B-07-20	20	GW	740	16	270	900	2,900	60	5	5	5	5,100
B-07-30	30	GW	550	8	97	600	2,300	34	5	5	5	3,700
B-12-10	10	GW	450	25	160	970	3,000	95	5	5	5	4,300
B-12-20	20	GW	620	22	250	1,800	4,100	75	5	5	5	6,700

Sample ID	Depth	Matrix	Ca (mg/L)	Mg (mg/L)	K (mg/L)	Na (mg/L)	Cl (mg/L)	SO ₄ (mg/L)	HCO ₃ (mg/L)	CO ₃ (mg/L)	TA (mg/L)	TDS (mg/L)
SW-01		GW	220	8.3	51	210	620	120	5	5	5	2,300
SW-02		GW	290	4.2	12	32	76	590	130	5	130	1,200

Contaminant	GCTL	(units)
Chloride	250	mg/L
Sodium	160	mg/L
Sulfate	250	mg/L
TDS	500	mg/L

GCTL = groundwater cleanup target levels

GW = groundwater

mg/L = milligram(s) per liter

Table 3. Surface Water Sampling Results

Sample ID	Depth	Matrix	Ca (mg/L)	Mg (mg/L)	K (mg/L)	Na (mg/L)	Cl (mg/L)	SO ₄ (mg/L)	HCO ₃ (mg/L)	CO ₃ (mg/L)	TA (mg/L)	TDS (mg/L)
SW-01	surface	GW	220	8.3	51	210	620	120	5	5	5	2,300
SW-02	surface	GW	290	4.2	12	32	76	590	130	5	130	1,200

Contaminant	GCTL	(units)
Chloride	250	mg/L
Sodium	160	mg/L
Sulfate	250	mg/L
TDS	500	mg/L

GCTL = groundwater cleanup target levels

GW = groundwater

mg/L = milligram(s) per liter

Table 4. Soil Sampling Results

Sample ID	Depth	Matrix	Ca (mg/L)	Mg (mg/L)	K (mg/L)	Na (mg/L)	Cl (mg/L)	SO ₄ (mg/L)
B-01-10	10	S	220	24	28	140	210	130
B-01-20	20	S	260	14	53	120	530	370
B-01-30	30	S	580	13	280	1,000	2,900	300
S-01	surficial	S	23,000	130	53	220	210	590
S-02	surficial	S	1,300	32	21	110	22	5
S-03	surficial	S	190,000	1,100	50	170	95	1,800
S-04	surficial	S	49,000	530	47	110	88	130
S-05	surficial	S	280,000	3,200	31	160	33	190

Contaminant	GCTL	(units)
Chloride	250	mg/L
Sodium	160	mg/L
Sulfate	250	mg/L
TDS	500	mg/L

GCTL = groundwater cleanup target levels

S = soil

mg/L = milligram(s) per liter

Results of Statistical Analysis of Groundwater Data

Groundwater that has not been impacted by anthropogenic activities should have the same mean and variance in cross sectional data. To investigate these characteristics in the data collected as part of the groundwater investigation, the one-way ANOVA analysis is conducted. Two statistical tests, namely the classical and nonparametric ANOVA, are used to conduct the one-way ANOVA analysis.

The classical one-way ANOVA assumes the normality and homoscedasticity of all data groups collected from the various transects being compared (see Figures 5c and 5d). As the number of observations for various groups ranges from 3 to 13, it is hard to verify the normality and homoscedasticity assumptions. An alternative to the classical ANOVA test, the nonparametric Kruskal-Wallis (K-W) can be used which does not require the normality of the data sets collected from the various groups. However, for each group, the distribution of the characteristic of interest should have comparable shapes and variabilities. Figure 6 presents the Box-Whisker plot comparing specific conductance of various data groups providing an estimation about shapes and variabilities of various data groups.

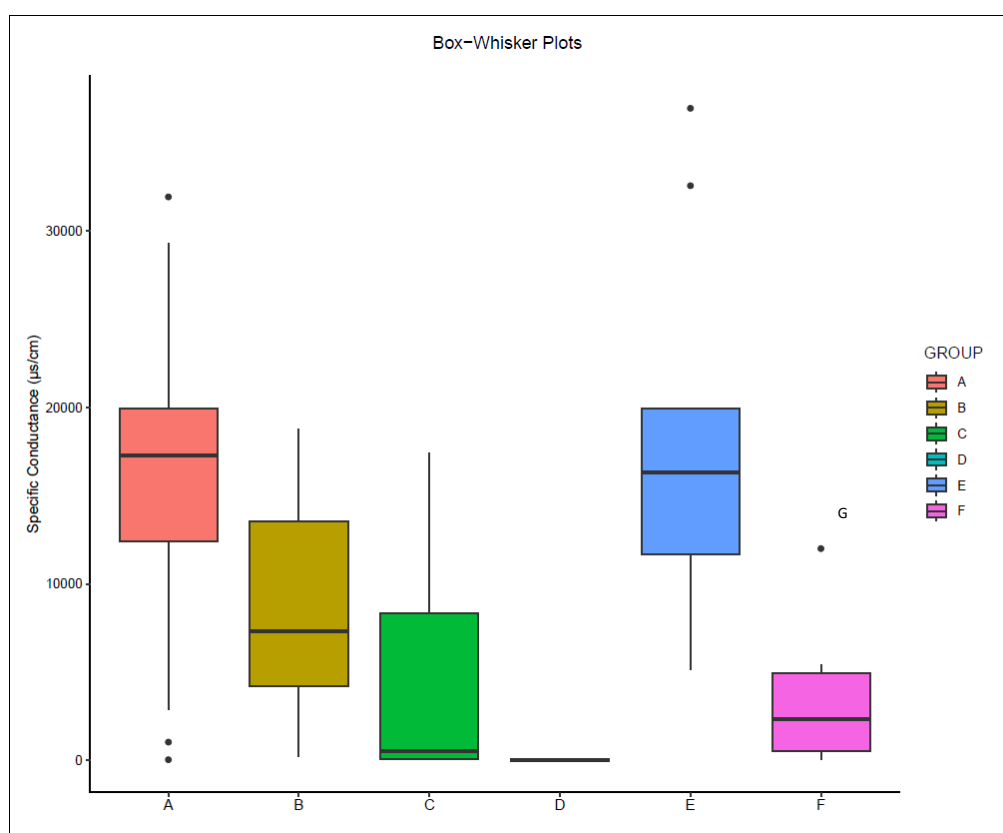


Figure 6: Box-Whisker Plot comparing specific conductance of various data groups

It is important to note that the Kruskal-Wallis test is robust to violations of the assumption of homogeneity of variance, but it may not be appropriate to use if the distributions of the dependent variable in each group have very different shapes. To assess whether the variances of various data groups are equal, the Levene's test is used. The null hypothesis of Levene's test is that the variances of the various groups are equal. The alternative hypothesis is that the variances are not equal. The obtained p-value for the Levene's test is 0.13 which indicates that one can assume the variances of various data groups are similar. Thus, the use of the Kruskal-Wallis test may be appropriate. Table 3 presents the results of the Kruskal-Wallis test.

Table 3: Results of the Kruskal Wallis Test

Group	Obs.	Median	Ave Rank	Z
A	13	17275	33.15	2.4
B	8	7309	25.75	0.162
C	10	533	15.9	-2.257
D	3	39	4.667	-2.544
E	9	16330	34.78	2.272
G	6	2324	17	-1.464
Overall	49	8050	25	

K-W (H-Stat)	DOF	P-Value	(Approx. Chi-square)
20.48	5	0.001	
20.48	5	0.001	(Adjusted for Ties)

Based on the results of the Kruskal-Wallis test, the calculated p-value is 0.001. A p-value ≤ 0.05 suggests that there are significant differences in mean/median characteristics of the various groups at the 5% level of significance. However, Group D has only three observations which does not provide an acceptable understanding of its variability and distribution shape. To address uncertainty about assumptions of homogeneity of variance and shapes of various groups, the Welch F test is used because it is useful in situations where the equal variance assumption is violated. The obtained Welch F Test p-value is 1.316e-05 which is less than the critical p-value of 0.05. This indicates that there is a significant difference between at least one pair of groups.

While the Welch F Test confirms that there is a significant difference between at least one pair of groups, it doesn't identify which pair of groups are significantly different. To determine differences between the median values of group pairs, pairwise comparisons using Dunn's all-pairs test (also known as post-hoc tests) was conducted. Table 4 presents the results (in terms of p-values) using the Dunn's all-pairs nonparametric test.

Table 4: Pairwise Comparisons using Dunn's all-pairs Test

GROUPS	A (100')	B (350')	C (500')	D (730')	E (100')
B (350')	0.2489	-	-	-	-
C (500')	0.0041	0.1461	-	-	-
D (730')	0.0019	0.0293	0.2324	-	-
E (100')	0.7932	0.1935	0.004	0.0016	-
G (520')	0.022	0.2568	0.8815	0.2222	0.0182

Note: Red: Significant difference between groups; Black: No significant difference between groups

Comparing the p-values of pairs with the critical p-value of 0.05 indicates which group pairs have median values that are significantly different. While there are some similarities between adjacent cross sections to the north (A, B, C, and D), there were significant differences between every other section which supports the gradient away from the closed landfill (including toward the west with Groups E and G).

- Cross sections A and C are significantly different ($p = 0.0041$)
- Cross sections B and D are significantly different ($p = 0.0293$)
- Cross sections E and G are significantly different ($p = 0.022$)

Furthermore, this analysis indicates the following:

- Cross sections A and E are similar ($p = 0.7932$) – 100 feet from the closed landfill
- Cross sections C and G are similar ($p = 0.8815$) – 500 feet from the closed landfill

The result of this statistical analysis confirmed that the concentration of specific conductance decreases with distance from the closed landfill and is the similar where cross sections are the same distance from the closed landfill. The weaker similarity between Group G to the west and some groups to the north was considered a coincidental result of the magnitudes measured and variance.

Conclusion

The alternate source demonstration completed in 2021 (CH2M, 2021) determined that the lined active CCR landfill was an improbable source of identified SSIs because groundwater does not travel quickly enough across the site to have reached MW-D since it was installed. The recommendation from the 2021 alternative source demonstration was to complete additional groundwater investigations to ascertain the source of groundwater quality impacts at MW-D.

The results of the groundwater investigations indicate that specific conductance decrease with distance from the closed landfill, generally returning to levels below $770 \mu\text{S}/\text{cm}$ (500 mg/L TDS) when greater than 500 feet from the landfill. Statistical analysis confirms that the concentration of specific conductance (and TDS) decreases with distance from the closed landfill.

Additionally, surface water quality and soil sampling results did not indicate the presence of any other alternative source. As a result, highly mineralized water appears to be emanating from the closed CCR landfill and appears to be the alternate source of impacted groundwater sampled at MW-D.

Recommendations

1. OUC's CCR groundwater monitoring program should remain in the Detection Monitoring program.
2. Because the groundwater quality at MW-D is influenced by an alternate source and the CCR groundwater monitoring program requires a minimum of four wells per 40 CFR 257.91(c)(1), the CCR groundwater monitoring program should be updated to include an additional monitoring well located outside of the documented impacted area to better monitor potential groundwater changes from the active landfill subject to the CCR rule.

References

CH2M Hill, Inc. 2021. Alternate Source Demonstration for CCR Monitoring Wells: OUC Stanton Energy Center CCR. Orlando Utilities Commission, Stanton Energy Center, Orange County, Florida.

U.S. Environmental Protection Agency (EPA). 2020. Disposal of Coal Combustion Residuals from Electric Utilities Rulemakings. Website with history and linking rule and updates.

<https://www.epa.gov/coalash/coal-ash-rule>, Accessed September 2, 2020.

APPENDIX A Soil Boring Log

		PROJECT NUMBER D3292400	BORING NUMBER PZ-A
		SOIL BORING LOG	
PROJECT : OUC Stanton Energy Center			
LOCATION : OUC Stanton Energy Center, Orange County, Fl			
ELEVATION : N/A		DRILLING CONTRACTOR : Custom Drilling Services	
DRILLING METHOD AND EQUIPMENT USED : Sonic			
WATER LEVELS N/A		START : 9/29/21 @ 1715	END : 9/29/21 @ 1800 LOGGER : D. Vanegas
DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.
	RECOVERY (FT) #/TYPE		COMMENTS DRILLER COMMENTS
5			TOP SOIL
10	10		FINE SAND, trace organics, well sorted, Dark Reddish Brown (5YR 2.5/2), loose to very densely packed.
15			
20	10		FINE SAND, well sorted, Dark Brown (10YR 7/4), densely packed.
25			
30	5		VERY FINE SAND, well sorted, Pale Brown (10YR 7/2), densely packed.
	5		SANDY CLAY, Greenish Gray (5G 4/1), very dense, medium plasticity.
35			CLAY, Dark Greenish Gray (5G 4/1), very dense, high plasticity.

APPENDIX B Laboratory Report



Advanced Environmental Laboratories, Inc
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FINAL

Workorder: OUC SEC (A2209849)

December 16, 2022

Daniel Rutland
Jacobs
200 South Orange Ave
Suite 900
Orlando, FL 32801

RE: Workorder: A2209849 OUC SEC

Dear Daniel Rutland:

Enclosed are the analytical results for sample(s) received by the laboratory on Wednesday November 9, 2022. Results reported herein conform to the most current NELAC standards, where applicable, unless otherwise narrated in the body of the report. The analytical results for the samples contained in this report were submitted for analysis as outlined by the Chain of Custody and results pertain only to these samples.

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

Sincerely,

Brandon O'Hara, Laboratory Manager
BOhara@AELLab.com

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FINAL

Workorder: OUC SEC (A2209849)

Sample Summary

Lab ID	Sample ID	Matrix	Method	Date Collected	Date Received	Analytes Reported	Basis
A2209849001	B-07-10	WA	EPA 300.0	11/08/2022 15:35	11/09/2022 15:44	2	NA
A2209849001	B-07-10	WA	SM 2320B	11/08/2022 15:35	11/09/2022 15:44	3	NA
A2209849001	B-07-10	WA	SM 2540 C	11/08/2022 15:35	11/09/2022 15:44	1	NA
A2209849001	B-07-10	WA	SW-846 6010	11/08/2022 15:35	11/09/2022 15:44	4	NA
A2209849002	B-07-20	WA	EPA 300.0	11/08/2022 16:15	11/09/2022 15:44	2	NA
A2209849002	B-07-20	WA	SM 2320B	11/08/2022 16:15	11/09/2022 15:44	3	NA
A2209849002	B-07-20	WA	SM 2540 C	11/08/2022 16:15	11/09/2022 15:44	1	NA
A2209849002	B-07-20	WA	SW-846 6010	11/08/2022 16:15	11/09/2022 15:44	4	NA
A2209849003	B-07-30	WA	EPA 300.0	11/08/2022 17:00	11/09/2022 15:44	2	NA
A2209849003	B-07-30	WA	SM 2320B	11/08/2022 17:00	11/09/2022 15:44	3	NA
A2209849003	B-07-30	WA	SM 2540 C	11/08/2022 17:00	11/09/2022 15:44	1	NA
A2209849003	B-07-30	WA	SW-846 6010	11/08/2022 17:00	11/09/2022 15:44	4	NA
A2209849004	B-08-10	WA	EPA 300.0	11/09/2022 08:00	11/09/2022 15:44	2	NA
A2209849004	B-08-10	WA	SM 2320B	11/09/2022 08:00	11/09/2022 15:44	3	NA
A2209849004	B-08-10	WA	SM 2540 C	11/09/2022 08:00	11/09/2022 15:44	1	NA
A2209849004	B-08-10	WA	SW-846 6010	11/09/2022 08:00	11/09/2022 15:44	4	NA
A2209849005	B-08-20	WA	EPA 300.0	11/09/2022 08:40	11/09/2022 15:44	2	NA
A2209849005	B-08-20	WA	SM 2320B	11/09/2022 08:40	11/09/2022 15:44	3	NA
A2209849005	B-08-20	WA	SM 2540 C	11/09/2022 08:40	11/09/2022 15:44	1	NA
A2209849005	B-08-20	WA	SW-846 6010	11/09/2022 08:40	11/09/2022 15:44	4	NA
A2209849006	B-08-30	WA	EPA 300.0	11/09/2022 09:15	11/09/2022 15:44	2	NA
A2209849006	B-08-30	WA	SM 2320B	11/09/2022 09:15	11/09/2022 15:44	3	NA
A2209849006	B-08-30	WA	SM 2540 C	11/09/2022 09:15	11/09/2022 15:44	1	NA
A2209849006	B-08-30	WA	SW-846 6010	11/09/2022 09:15	11/09/2022 15:44	4	NA
A2209849007	B-09-10	WA	EPA 300.0	11/09/2022 10:00	11/09/2022 15:44	2	NA
A2209849007	B-09-10	WA	SM 2320B	11/09/2022 10:00	11/09/2022 15:44	3	NA
A2209849007	B-09-10	WA	SM 2540 C	11/09/2022 10:00	11/09/2022 15:44	1	NA
A2209849007	B-09-10	WA	SW-846 6010	11/09/2022 10:00	11/09/2022 15:44	4	NA
A2209849008	B-09-20	WA	EPA 300.0	11/09/2022 10:30	11/09/2022 15:44	2	NA
A2209849008	B-09-20	WA	SM 2320B	11/09/2022 10:30	11/09/2022 15:44	3	NA
A2209849008	B-09-20	WA	SM 2540 C	11/09/2022 10:30	11/09/2022 15:44	1	NA
A2209849008	B-09-20	WA	SW-846 6010	11/09/2022 10:30	11/09/2022 15:44	4	NA
A2209849009	B-09-30	WA	EPA 300.0	11/09/2022 11:20	11/09/2022 15:44	2	NA
A2209849009	B-09-30	WA	SM 2320B	11/09/2022 11:20	11/09/2022 15:44	3	NA
A2209849009	B-09-30	WA	SM 2540 C	11/09/2022 11:20	11/09/2022 15:44	1	NA

Friday, December 16, 2022 6:08:38 PM
Dates and times are displayed using (-05:00)
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FINAL

Workorder: OUC SEC (A2209849)

Sample Summary

Lab ID	Sample ID	Matrix	Method	Date Collected	Date Received	Analytes Reported	Basis
A2209849009	B-09-30	WA	SW-846 6010	11/09/2022 11:20	11/09/2022 15:44	4	NA

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FINAL

Workorder: OUC SEC (A2209849)

Workorder Summary

Batch Comments

ICPm/2985 - ICP 6010B Analysis

The matrix spike recoveries of Calcium, Magnesium, Sodium and Potassium for A2209849004 were outside control criteria due to the presence of target analytes in the sample. Recovery in the Laboratory Control Sample (LCS) was acceptable, which indicates the analytical batch was in control. The matrix spike outlier suggests an inconsistency in this matrix. The affected sample is qualified to indicate matrix interference.

WCAa/3793 - IC,E300.0,Water

The matrix spike and matrix spike duplicate percent recoveries applying to parent sample A220909849001 for CL were (88%, 88%) and for SO4 were (89%, 89%); respectively. The recoveries for both analytes in the Laboratory Control Sample were within the method required 90-110% range, indicating the batch was in control. The sample results have been qualified to indicate any matrix interference.

WCAt/16107 - Alkalinity,SM2320B,Water

Negative/zero alkalinity results are due to samples initial pH falling below endpoint of titration of 4.5 in the following; A2209849001, A2209849002, A2209849003, A2209849004, A2209849005, A2209849006, A2209849008, G2209856003, A2209849009, A2209850009

Analysis Results Comments

A2209849001 (B-07-10) - Alkalinity, Total

See Case Narration

A2209849001 (B-07-10) - Chloride

J4|Estimated Result

A2209849001 (B-07-10) - Sulfate

J4|Estimated Result

A2209849002 (B-07-20) - Alkalinity, Total

See Case Narration

A2209849003 (B-07-30) - Alkalinity, Total

See Case Narration

A2209849004 (B-08-10) - Alkalinity, Total

See Case Narration

A2209849005 (B-08-20) - Alkalinity, Total

See Case Narration

A2209849006 (B-08-30) - Alkalinity, Total

See Case Narration

A2209849008 (B-09-20) - Alkalinity, Total

See Case Narration

A2209849009 (B-09-30) - Alkalinity, Total

See Case Narration

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FINAL

Workorder: OUC SEC (A2209849)

Analytical Results Qualifiers

Parameter Qualifiers

U	The compound was analyzed for but not detected.
I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
J4	Estimated Result
CN	See Case Narration

Lab Qualifiers

A	DOH Certification #E53076 (FL NELAC) AEL-Altamonte Springs
M	DOH Certification #E82535 (FL NELAC) AEL-Miami
T	DOH Certification #E84589 (FL NELAC) AEL-Tampa

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FINAL

Workorder: OUC SEC (A2209849)

Analytical Results

Lab ID: A2209849001
Sample ID: B-07-10

Date Collected: 11/08/2022 15:35
Date Received: 11/09/2022 15:44

Matrix: Water

Parameter	Results	Units	PQL	MDL	DF	Prepared	Analyzed	Lab
METALS (SW-846 3010A/SW-846 6010)								
Calcium	29	mg/L	1.0	0.20	1	11/15/2022 00:00	11/18/2022 18:53	M
Magnesium	30	mg/L	0.20	0.080	1	11/15/2022 00:00	11/18/2022 18:53	M
Potassium	1.6	mg/L	1.0	0.50	1	11/15/2022 00:00	11/18/2022 18:53	M
Sodium	160	mg/L	4.0	3.2	4	11/15/2022 00:00	11/21/2022 11:09	M
WET CHEMISTRY (EPA 300.0)								
Chloride	590	mg/L	50	0.39	10	11/21/2022 19:51	11/21/2022 19:51	A
Sulfate	121	mg/L	50	0.34	10	11/21/2022 19:51	11/21/2022 19:51	A
WET CHEMISTRY (SM 2320B)								
Alkalinity, Bicarbonate	5.0 U	mg/L	20	5.0	1	11/15/2022 15:46	11/15/2022 15:46	T
Alkalinity, Carbonate	5.0 U	mg/L	20	5.0	1	11/15/2022 15:46	11/15/2022 15:46	T
Alkalinity, Total	5.0 U	mg/L	20	5.0	1	11/15/2022 15:46	11/15/2022 15:46	T
WET CHEMISTRY (SM 2540 C)								
Total Dissolved Solids	780	mg/L	5.0	5.0	.5	11/14/2022 09:20	11/14/2022 09:20	A

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Workorder: OUC SEC (A2209849)

Analytical Results

Lab ID: A2209849002
Sample ID: B-07-20

Date Collected: 11/08/2022 16:15
Date Received: 11/09/2022 15:44

Matrix: Water

Parameter	Results	Units	PQL	MDL	DF	Prepared	Analyzed	Lab
METALS (SW-846 3010A/SW-846 6010)								
Calcium	740	mg/L	1.0	0.20	1	11/15/2022 00:00	11/18/2022 18:57	M
Magnesium	16	mg/L	0.20	0.080	1	11/15/2022 00:00	11/18/2022 18:57	M
Potassium	270	mg/L	1.0	0.50	1	11/15/2022 00:00	11/18/2022 18:57	M
Sodium	900	mg/L	10	8.0	10	11/15/2022 00:00	11/21/2022 14:33	M
WET CHEMISTRY (EPA 300.0)								
Chloride	2900	mg/L	120	0.96	25	11/21/2022 20:30	11/21/2022 20:30	A
Sulfate	60 I	mg/L	120	0.85	25	11/21/2022 20:30	11/21/2022 20:30	A
WET CHEMISTRY (SM 2320B)								
Alkalinity, Bicarbonate	5.0 U	mg/L	20	5.0	1	11/15/2022 15:53	11/15/2022 15:53	T
Alkalinity, Carbonate	5.0 U	mg/L	20	5.0	1	11/15/2022 15:53	11/15/2022 15:53	T
Alkalinity, Total	5.0 U	mg/L	20	5.0	1	11/15/2022 15:53	11/15/2022 15:53	T
WET CHEMISTRY (SM 2540 C)								
Total Dissolved Solids	5100	mg/L	5.0	5.0	.5	11/14/2022 09:20	11/14/2022 09:20	A

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FINAL

Workorder: OUC SEC (A2209849)

Analytical Results

Lab ID: A2209849003
Sample ID: B-07-30

Date Collected: 11/08/2022 17:00
Date Received: 11/09/2022 15:44

Matrix: Water

Parameter	Results	Units	PQL	MDL	DF	Prepared	Analyzed	Lab
METALS (SW-846 3010A/SW-846 6010)								
Calcium	550	mg/L	1.0	0.20	1	11/15/2022 00:00	11/18/2022 19:00	M
Magnesium	8.0	mg/L	0.20	0.080	1	11/15/2022 00:00	11/18/2022 19:00	M
Potassium	97	mg/L	1.0	0.50	1	11/15/2022 00:00	11/18/2022 19:00	M
Sodium	600	mg/L	4.0	3.2	4	11/15/2022 00:00	11/21/2022 11:16	M
WET CHEMISTRY (EPA 300.0)								
Chloride	2300	mg/L	120	0.96	25	11/21/2022 20:43	11/21/2022 20:43	A
Sulfate	34 I	mg/L	120	0.85	25	11/21/2022 20:43	11/21/2022 20:43	A
WET CHEMISTRY (SM 2320B)								
Alkalinity, Bicarbonate	5.0 U	mg/L	20	5.0	1	11/15/2022 15:56	11/15/2022 15:56	T
Alkalinity, Carbonate	5.0 U	mg/L	20	5.0	1	11/15/2022 15:56	11/15/2022 15:56	T
Alkalinity, Total	5.0 U	mg/L	20	5.0	1	11/15/2022 15:56	11/15/2022 15:56	T
WET CHEMISTRY (SM 2540 C)								
Total Dissolved Solids	3700	mg/L	5.0	5.0	.5	11/14/2022 09:20	11/14/2022 09:20	A

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FINAL

Workorder: OUC SEC (A2209849)

Analytical Results

Lab ID:	A2209849004	Date Collected:	11/09/2022 08:00			Matrix:	Water		
Sample ID:	B-08-10	Date Received:	11/09/2022 15:44						
Parameter	Results	Units	PQL	MDL	DF	Prepared	Analyzed	Lab	
METALS (SW-846 3010A/SW-846 6010)									
Calcium	200	mg/L	1.0	0.20	1	11/15/2022 00:00	11/15/2022 11:36	M	
Magnesium	13	mg/L	0.20	0.080	1	11/15/2022 00:00	11/15/2022 11:36	M	
Potassium	120	mg/L	1.0	0.50	1	11/15/2022 00:00	11/15/2022 11:36	M	
Sodium	180	mg/L	4.0	3.2	4	11/15/2022 00:00	12/16/2022 13:24	M	
WET CHEMISTRY (EPA 300.0)									
Chloride	660	mg/L	120	0.96	25	11/21/2022 20:56	11/21/2022 20:56	A	
Sulfate	390	mg/L	120	0.85	25	11/21/2022 20:56	11/21/2022 20:56	A	
WET CHEMISTRY (SM 2320B)									
Alkalinity, Bicarbonate	5.0 U	mg/L	20	5.0	1	11/15/2022 16:00	11/15/2022 16:00	T	
Alkalinity, Carbonate	5.0 U	mg/L	20	5.0	1	11/15/2022 16:00	11/15/2022 16:00	T	
Alkalinity, Total	5.0 U	mg/L	20	5.0	1	11/15/2022 16:00	11/15/2022 16:00	T	
WET CHEMISTRY (SM 2540 C)									
Total Dissolved Solids	1700	mg/L	5.0	5.0	.5	11/14/2022 09:20	11/14/2022 09:20	A	

Analysis Results Comments

Calcium

J4|Estimated Result

Magnesium

J4|Estimated Result

Potassium

J4|Estimated Result

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FINAL

Workorder: OUC SEC (A2209849)

Analytical Results

Lab ID: A2209849005
Sample ID: B-08-20

Date Collected: 11/09/2022 08:40
Date Received: 11/09/2022 15:44

Matrix: Water

Parameter	Results	Units	PQL	MDL	DF	Prepared	Analyzed	Lab
METALS (SW-846 3010A/SW-846 6010)								
Calcium	1400	mg/L	10	2.0	10	11/15/2022 00:00	12/16/2022 13:34	M
Magnesium	19	mg/L	0.20	0.080	1	11/15/2022 00:00	11/15/2022 14:13	M
Potassium	870	mg/L	10	5.0	10	11/15/2022 00:00	12/16/2022 13:34	M
Sodium	1600	mg/L	10	8.0	10	11/15/2022 00:00	12/16/2022 13:34	M
WET CHEMISTRY (EPA 300.0)								
Chloride	6300	mg/L	250	1.9	50	11/21/2022 21:09	11/21/2022 21:09	A
Sulfate	660	mg/L	250	1.7	50	11/21/2022 21:09	11/21/2022 21:09	A
WET CHEMISTRY (SM 2320B)								
Alkalinity, Bicarbonate	5.0 U	mg/L	20	5.0	1	11/15/2022 16:11	11/15/2022 16:11	T
Alkalinity, Carbonate	5.0 U	mg/L	20	5.0	1	11/15/2022 16:11	11/15/2022 16:11	T
Alkalinity, Total	5.0 U	mg/L	20	5.0	1	11/15/2022 16:11	11/15/2022 16:11	T
WET CHEMISTRY (SM 2540 C)								
Total Dissolved Solids	11000	mg/L	5.0	5.0	.5	11/14/2022 09:20	11/14/2022 09:20	A

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FINAL

Workorder: OUC SEC (A2209849)

Analytical Results

Lab ID: A2209849006
Sample ID: B-08-30

Date Collected: 11/09/2022 09:15
Date Received: 11/09/2022 15:44

Matrix: Water

Parameter	Results	Units	PQL	MDL	DF	Prepared	Analyzed	Lab
METALS (SW-846 3010A/SW-846 6010)								
Calcium	600	mg/L	4.0	0.80	4	11/15/2022 00:00	12/16/2022 13:37	M
Magnesium	38	mg/L	0.80	0.32	4	11/15/2022 00:00	12/16/2022 13:37	M
Potassium	86	mg/L	4.0	2.0	4	11/15/2022 00:00	12/16/2022 13:37	M
Sodium	460	mg/L	4.0	3.2	4	11/15/2022 00:00	12/16/2022 13:37	M
WET CHEMISTRY (EPA 300.0)								
Chloride	2500	mg/L	120	0.96	25	11/21/2022 21:21	11/21/2022 21:21	A
Sulfate	140	mg/L	120	0.85	25	11/21/2022 21:21	11/21/2022 21:21	A
WET CHEMISTRY (SM 2320B)								
Alkalinity, Bicarbonate	5.0 U	mg/L	20	5.0	1	11/15/2022 16:15	11/15/2022 16:15	T
Alkalinity, Carbonate	5.0 U	mg/L	20	5.0	1	11/15/2022 16:15	11/15/2022 16:15	T
Alkalinity, Total	5.0 U	mg/L	20	5.0	1	11/15/2022 16:15	11/15/2022 16:15	T
WET CHEMISTRY (SM 2540 C)								
Total Dissolved Solids	3700	mg/L	5.0	5.0	.5	11/14/2022 09:20	11/14/2022 09:20	A

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FINAL

Workorder: OUC SEC (A2209849)

Analytical Results

Lab ID: A2209849007
Sample ID: B-09-10

Date Collected: 11/09/2022 10:00
Date Received: 11/09/2022 15:44

Matrix: Water

Parameter	Results	Units	PQL	MDL	DF	Prepared	Analyzed	Lab
METALS (SW-846 3010A/SW-846 6010)								
Calcium	370	mg/L	1.0	0.20	1	11/15/2022 00:00	11/15/2022 14:20	M
Magnesium	23	mg/L	0.20	0.080	1	11/15/2022 00:00	11/15/2022 14:20	M
Potassium	29	mg/L	1.0	0.50	1	11/15/2022 00:00	12/16/2022 13:41	M
Sodium	45	mg/L	1.0	0.80	1	11/15/2022 00:00	11/15/2022 14:20	M
WET CHEMISTRY (EPA 300.0)								
Chloride	220	mg/L	50	0.39	10	11/21/2022 21:34	11/21/2022 21:34	A
Sulfate	660	mg/L	50	0.34	10	11/21/2022 21:34	11/21/2022 21:34	A
WET CHEMISTRY (SM 2320B)								
Alkalinity, Bicarbonate	410	mg/L	20	5.0	1	11/15/2022 16:44	11/15/2022 16:44	T
Alkalinity, Carbonate	5.0 U	mg/L	20	5.0	1	11/15/2022 16:44	11/15/2022 16:44	T
Alkalinity, Total	410	mg/L	20	5.0	1	11/15/2022 16:44	11/15/2022 16:44	T
WET CHEMISTRY (SM 2540 C)								
Total Dissolved Solids	1700	mg/L	5.0	5.0	.5	11/14/2022 09:20	11/14/2022 09:20	A

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FINAL

Workorder: OUC SEC (A2209849)

Analytical Results

Lab ID: A2209849008
Sample ID: B-09-20

Date Collected: 11/09/2022 10:30
Date Received: 11/09/2022 15:44

Matrix: Water

Parameter	Results	Units	PQL	MDL	DF	Prepared	Analyzed	Lab
METALS (SW-846 3010A/SW-846 6010)								
Calcium	1500	mg/L	10	2.0	10	11/15/2022 00:00	12/16/2022 13:51	M
Magnesium	26	mg/L	0.20	0.080	1	11/15/2022 00:00	11/15/2022 14:24	M
Potassium	910	mg/L	10	5.0	10	11/15/2022 00:00	12/16/2022 13:51	M
Sodium	1800	mg/L	10	8.0	10	11/15/2022 00:00	12/16/2022 13:51	M
WET CHEMISTRY (EPA 300.0)								
Chloride	6400	mg/L	500	3.9	100	11/22/2022 08:45	11/22/2022 08:45	A
Sulfate	1100	mg/L	500	3.4	100	11/22/2022 08:45	11/22/2022 08:45	A
WET CHEMISTRY (SM 2320B)								
Alkalinity, Bicarbonate	5.0 U	mg/L	20	5.0	1	11/15/2022 16:51	11/15/2022 16:51	T
Alkalinity, Carbonate	5.0 U	mg/L	20	5.0	1	11/15/2022 16:51	11/15/2022 16:51	T
Alkalinity, Total	5.0 U	mg/L	20	5.0	1	11/15/2022 16:51	11/15/2022 16:51	T
WET CHEMISTRY (SM 2540 C)								
Total Dissolved Solids	12000	mg/L	5.0	5.0	.5	11/14/2022 09:20	11/14/2022 09:20	A

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FINAL

Workorder: OUC SEC (A2209849)

Analytical Results

Lab ID: A2209849009
Sample ID: B-09-30

Date Collected: 11/09/2022 11:20
Date Received: 11/09/2022 15:44

Matrix: Water

Parameter	Results	Units	PQL	MDL	DF	Prepared	Analyzed	Lab
METALS (SW-846 3010A/SW-846 6010)								
Calcium	2100	mg/L	10	2.0	10	11/15/2022 00:00	12/16/2022 13:54	M
Magnesium	11	mg/L	0.20	0.080	1	11/15/2022 00:00	11/15/2022 14:28	M
Potassium	1400	mg/L	10	5.0	10	11/15/2022 00:00	12/16/2022 13:54	M
Sodium	2900	mg/L	10	8.0	10	11/15/2022 00:00	12/16/2022 13:54	M
WET CHEMISTRY (EPA 300.0)								
Chloride	13000	mg/L	500	3.9	100	11/22/2022 08:58	11/22/2022 08:58	A
Sulfate	1300	mg/L	500	3.4	100	11/22/2022 08:58	11/22/2022 08:58	A
WET CHEMISTRY (SM 2320B)								
Alkalinity, Bicarbonate	5.0 U	mg/L	20	5.0	1	11/15/2022 16:57	11/15/2022 16:57	T
Alkalinity, Carbonate	5.0 U	mg/L	20	5.0	1	11/15/2022 16:57	11/15/2022 16:57	T
Alkalinity, Total	5.0 U	mg/L	20	5.0	1	11/15/2022 16:57	11/15/2022 16:57	T
WET CHEMISTRY (SM 2540 C)								
Total Dissolved Solids	17000	mg/L	5.0	5.0	.5	11/14/2022 09:20	11/14/2022 09:20	A

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Workorder: OUC SEC (A2209849)

QC Results

QC Batch: ICPm/2984
Preparation Method: SW-846 3010A
Associated Lab IDs: A2209849001, A2209849002, A2209849003

Analysis Method: SW-846 6010

Method Blank(4545534)

Parameter	Results	Units	PQL	MDL	Lab
Calcium	0.20 U	mg/L	1.0	0.20	M
Potassium	0.50 U	mg/L	1.0	0.50	M
Magnesium	0.080 U	mg/L	0.20	0.080	M
Sodium	0.80 U	mg/L	1.0	0.80	M

Lab Control Sample (4545535)

Parameter	Units	Spiked Amount	Spike Result	Spike Recovery	Control Limits	Lab
Calcium	mg/L	4	4.3	107	80 - 120	M
Potassium	mg/L	10	11	105	80 - 120	M
Magnesium	mg/L	2	2	99	80 - 120	M
Sodium	mg/L	16	17	108	80 - 120	M

Matrix Spike (4545536); Matrix Spike Duplicate (4545537); Parent Lab Sample (S2202875001)

Parameter	Units	Spiked Amount	Spike Result	Spike Recovery	Control Limits	Dup Result	Dup Recovery	RPD	RPD Limit	Lab
Calcium	mg/L	4	6.7	93	75 - 125	6.8	97	2	20	M
Potassium	mg/L	10	13	95	75 - 125	13	99	3	20	M
Magnesium	mg/L	2	2.5	91	75 - 125	2.6	94	2	20	M
Sodium	mg/L	16	29	94	75 - 125	30	99	3	20	M

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FINAL

Workorder: OUC SEC (A2209849)

QC Results

QC Batch: ICPm/2985 Analysis Method: SW-846 6010
Preparation Method: SW-846 3010A
Associated Lab IDs: A2209849004, A2209849005, A2209849006, A2209849007, A2209849008, A2209849009

Method Blank(4545559)

Parameter	Results	Units	PQL	MDL	Lab
Calcium	0.20 U	mg/L	1.0	0.20	M
Potassium	0.50 U	mg/L	1.0	0.50	M
Magnesium	0.080 U	mg/L	0.20	0.080	M
Sodium	0.80 U	mg/L	1.0	0.80	M

Lab Control Sample (4545560)

Parameter	Units	Spiked Amount	Spike Result	Spike Recovery	Control Limits	Lab
Calcium	mg/L	4	4.1	103	80 - 120	M
Potassium	mg/L	10	10	102	80 - 120	M
Magnesium	mg/L	2	2.1	104	80 - 120	M
Sodium	mg/L	16	16	103	80 - 120	M

Matrix Spike (4545561); Matrix Spike Duplicate (4545562); Parent Lab Sample (A2209849004)

Parameter	Units	Spiked Amount	Spike Result	Spike Recovery	Control Limits	Dup Result	Dup Recovery	RPD	RPD Limit	Lab
Calcium	mg/L	4	200	-115	75 - 125	210	288	8	20	M
Potassium	mg/L	10	120	46	75 - 125	130	157	9	20	M
Magnesium	mg/L	2	15	63	75 - 125	16	126	8	20	M
Sodium	mg/L	16	190	96	75 - 125	170	-22	10	20	M

Matrix Spike (4545561); Matrix Spike Duplicate (4545562); Parent Lab Sample (A2209849004)

Parameter	Units	Spiked Amount	Spike Result	Spike Recovery	Control Limits	Dup Result	Dup Recovery	RPD	RPD Limit	Lab
Calcium	mg/L	4	200	-115	75 - 125	210	288	8	20	M
Potassium	mg/L	10	120	46	75 - 125	130	157	9	20	M
Magnesium	mg/L	2	15	63	75 - 125	16	126	8	20	M
Sodium	mg/L	16	190	96	75 - 125	170	-22	10	20	M

QC Result Comments

Matrix Spike - 4545561 - Calcium

J4|Estimated Result

Matrix Spike - 4545561 - Magnesium

J4|Estimated Result





FINAL

Workorder: OUC SEC (A2209849)

QC Result Comments

Matrix Spike - 4545561 - Potassium

J4|Estimated Result

Matrix Spike - 4545561 - Sodium

J4|Estimated Result

Matrix Spike Duplicate - 4545562 - Calcium

J4|Estimated Result

Matrix Spike Duplicate - 4545562 - Magnesium

J4|Estimated Result

Matrix Spike Duplicate - 4545562 - Potassium

J4|Estimated Result

Matrix Spike Duplicate - 4545562 - Sodium

J4|Estimated Result

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FINAL

Workorder: OUC SEC (A2209849)

QC Results

QC Batch: WCAa/3715 Analysis Method: SM 2540 C
Preparation Method: SM 2540 C
Associated Lab IDs: A2209849001, A2209849002, A2209849003, A2209849004, A2209849005, A2209849006

Method Blank(4543887)

Parameter	Results	Units	PQL	MDL	Lab
Total Dissolved Solids	10 U	mg/L	10	10	A

Lab Control Sample (4543888)

Parameter	Units	Spiked Amount	Spike Result	Spike Recovery	Control Limits	Lab
Total Dissolved Solids	mg/L	660	650	98	85 - 115	A

Sample Duplicate (4543889); Parent Lab Sample (A2209849001, A2209849002, A2209849003, A2209849004, A2209849005, A2209849006)

Parameter	Original	Duplicate	Units	RPD	RPD Limit	Lab
Total Dissolved Solids	1029	1059	mg/L	3	10	A

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FINAL

Workorder: OUC SEC (A2209849)

QC Results

QC Batch: WCAa/3725 Analysis Method: SM 2540 C
Preparation Method: SM 2540 C
Associated Lab IDs: A2209849007, A2209849008, A2209849009

Method Blank(4545463)

Parameter	Results	Units	PQL	MDL	Lab
Total Dissolved Solids	10 U	mg/L	10	10	A

Lab Control Sample (4545464)

Parameter	Units	Spiked Amount	Spike Result	Spike Recovery	Control Limits	Lab
Total Dissolved Solids	mg/L	660	650	99	85 - 115	A

Sample Duplicate (4545465); Parent Lab Sample (A2209849007, A2209849008, A2209849009)

Parameter	Original	Duplicate	Units	RPD	RPD Limit	Lab
Total Dissolved Solids	1722	1656	mg/L	4	10	A

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FINAL

Workorder: OUC SEC (A2209849)

QC Results

QC Batch: WCAa/3793

Analysis Method: EPA 300.0

Preparation Method: EPA 300.0

Associated Lab IDs: A2209849001, A2209849002, A2209849003, A2209849004, A2209849005, A2209849006, A2209849007, A2209849008, A2209849009

Lab Control Sample (4561826)

Parameter	Units	Spiked Amount	Spike Result	Spike Recovery	Control Limits	Lab
Chloride	mg/L	50	50	99	90 - 110	A
Sulfate	mg/L	50	50	100	90 - 110	A

Method Blank(4561828)

Parameter	Results	Units	PQL	MDL	Lab
Chloride	0.039 U	mg/L	5.0	0.039	A
Sulfate	0.034 U	mg/L	5.0	0.034	A

Matrix Spike (4561829); Matrix Spike Duplicate (4561830); Parent Lab Sample (A2209849001)

Parameter	Units	Spiked Amount	Spike Result	Spike Recovery	Control Limits	Dup Result	Dup Recovery	RPD	RPD Limit	Lab
Chloride	mg/L	200	770	350	90 - 110	770	350	0.0180	10	A
Sulfate	mg/L	200	190	94	90 - 110	190	94	0.0320	10	A

Method Blank(4561832)

Parameter	Results	Units	PQL	MDL	Lab
Chloride	0.039 U	mg/L	5.0	0.039	A
Sulfate	0.034 U	mg/L	5.0	0.034	A

QC Result Comments

Matrix Spike - 4561829 - Chloride

J4|Estimated Result

Matrix Spike - 4561829 - Sulfate

J4|Estimated Result

Matrix Spike Duplicate - 4561830 - Chloride

J4|Estimated Result

Matrix Spike Duplicate - 4561830 - Sulfate

J4|Estimated Result

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FINAL

Workorder: OUC SEC (A2209849)

QC Results

QC Batch: WCAa/3793

Analysis Method: EPA 300.0

Preparation Method: EPA 300.0

Associated Lab IDs: A2209849002, A2209849003, A2209849004, A2209849005, A2209849006, A2209849007, A2209849008, A2209849009

Matrix Spike (4561833); Matrix Spike Duplicate (4561834); Parent Lab Sample (A2209850007)

Parameter	Units	Spiked Amount	Spike Result	Spike Recovery	Control Limits	Dup Result	Dup Recovery	RPD	RPD Limit	Lab
Chloride	mg/L	20	37	98	90 - 110	37	98	0.21	10	A
Sulfate	mg/L	20	20	90	90 - 110	20	90	0.44	10	A

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Workorder: OUC SEC (A2209849)

QC Results

QC Batch: WCA/16107

Analysis Method: SM 2320B

Preparation Method: SM 2320B

Associated Lab IDs: A2209849001, A2209849002, A2209849003, A2209849004, A2209849005, A2209849006

Sample Duplicate (4545540); Parent Lab Sample (A2209849001, A2209849002, A2209849003, A2209849004, A2209849005, A2209849006)

Parameter	Original	Duplicate	Units	RPD	RPD Limit	Lab
Alkalinity, Total	147.68	150.67	mg/L	2	20	T

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Workorder: OUC SEC (A2209849)

QC Results

QC Batch: WCA/16107

Analysis Method: SM 2320B

Preparation Method: SM 2320B

Associated Lab IDs: A2209849001, A2209849002, A2209849003, A2209849004, A2209849005, A2209849006, A2209849007, A2209849008, A2209849009

Method Blank(4545538)

Parameter	Results	Units	PQL	MDL	Lab
Alkalinity, Total	5.0 U	mg/L	20	5.0	T

Lab Control Sample (4545539)

Parameter	Units	Spiked Amount	Spike Result	Spike Recovery	Control Limits	Lab
Alkalinity, Total	mg/L	100	110	106	75 - 125	T

Sample Duplicate (4545541); Parent Lab Sample (A2209849001, A2209849002, A2209849003, A2209849004, A2209849005, A2209849006, A2209849007, A2209849008, A2209849009)

Parameter	Original	Duplicate	Units	RPD	RPD Limit	Lab
Alkalinity, Total	309	313.42	mg/L	1	20	T

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Workorder: OUC SEC (A2209849)

QC Cross Reference

Lab ID	Sample ID	Prep Batch	Prep Method
ICPm/2984 - SW-846 6010			
A2209849001	B-07-10	DGMm/3096	SW-846 3010A
A2209849002	B-07-20	DGMm/3096	SW-846 3010A
A2209849003	B-07-30	DGMm/3096	SW-846 3010A
ICPm/2985 - SW-846 6010			
A2209849004	B-08-10	DGMm/3097	SW-846 3010A
A2209849005	B-08-20	DGMm/3097	SW-846 3010A
A2209849006	B-08-30	DGMm/3097	SW-846 3010A
A2209849007	B-09-10	DGMm/3097	SW-846 3010A
A2209849008	B-09-20	DGMm/3097	SW-846 3010A
A2209849009	B-09-30	DGMm/3097	SW-846 3010A
WCAa/3715 - SM 2540 C			
A2209849001	B-07-10		
A2209849002	B-07-20		
A2209849003	B-07-30		
A2209849004	B-08-10		
A2209849005	B-08-20		
A2209849006	B-08-30		
WCAa/3725 - SM 2540 C			
A2209849007	B-09-10		
A2209849008	B-09-20		
A2209849009	B-09-30		
WCAa/3793 - EPA 300.0			
A2209849001	B-07-10		
A2209849002	B-07-20		
A2209849003	B-07-30		
A2209849004	B-08-10		
A2209849005	B-08-20		
A2209849006	B-08-30		
A2209849007	B-09-10		
A2209849008	B-09-20		
A2209849009	B-09-30		

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FINAL

Workorder: OUC SEC (A2209849)

QC Cross Reference

Lab ID	Sample ID	Prep Batch	Prep Method
WCA1/16107 - SM 2320B			
A2209849001	B-07-10		
A2209849002	B-07-20		
A2209849003	B-07-30		
A2209849004	B-08-10		
A2209849005	B-08-20		
A2209849006	B-08-30		
A2209849007	B-09-10		
A2209849008	B-09-20		
A2209849009	B-09-30		

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FINAL

Workorder: OUC SEC (A2209849)

Client Name: Jacobs Project Name: Altamonte Springs, 380 Northlake Blvd, Ste. 1048, FL 32701 - 407/9

Address: Altamonte Springs, 380 Northlake Blvd, Ste. 1048, FL 32701 - 407/9

Phone: 407-881-9330 PO Number:

FAX: FDEP Facility No:

Contact: Daniel Rutland FDEP Facility Addr:

Sample By: David Venegas Special Instructions:

Standard: Rush

ADAPT:

AEI Profile #: 71947

SAMPLE ID	SAMPLE DESCRIPTION	Grab Comp	SAMPLING		MATRIX	NO. COUNT	PRESERVATION	ANALYSIS REQUIRED	BOTTLE SIZE & TYPE	LABORATORY I.D. NUMBER
			DATE	TIME						
B-07-10	Sample from 0-10'		11/8	15:35	GUW			TDS		
B-07-20	" 10-20'		11/8	16:15	GUW			Ca, Mg, Na, K		
B-07-30	" 20-30'		11/8	17:00	GUW			Alkalinity		
B-08-10	" 0-10'		11/9	09:00	GUW			Cl, SO ₄		
B-08-20	" 10-20'		11/9	08:40	GUW					
B-08-30	" 20-30'		11/9	09:15	GUW					
B-09-10	" 0-10'		11/9	10:20	GUW					
B-09-20	" 10-20'		11/9	10:30	GUW					
B-09-30	" 20-30'		11/9	11:20	GUW					

Matrix Code: WW=wastewater, SW=surface water, GW=ground water, DW=drinking water, MW=marine water,

O=oil, A=air, SO=soil, SL=sediment

Received on Ice: ☒ Yes ☐ No Temp taken from sample: ☐ Temp from blank: ☐ Where required, pH checked: ☐

DCN-AD-005 (web) Form last revised: 07/26/2022 Device used for measuring Temp by unique identifier (circle IR temp gun used): 4 °C Temp when received (observed): 4 °C Temp when received (corrected): °C

Relinquished By: [Signature] Date: 11/9 Time: 15:44 Received By: [Signature] Date: 11/9 Time: 15:44

FOR DRINKING WATER USE:

(When PWS information not otherwise supplied) PWS ID:

Contact Person:

Supplier of Water:

Site Address:

Page 2 of 2

Barcode: A2209849

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FINAL

Workorder: OUC SEC (A2209850)

December 16, 2022

Daniel Rutland
Jacobs
200 South Orange Ave
Suite 900
Orlando, FL 32801

RE: Workorder: A2209850 OUC SEC

Dear Daniel Rutland:

Enclosed are the analytical results for sample(s) received by the laboratory on Wednesday November 9, 2022. Results reported herein conform to the most current NELAC standards, where applicable, unless otherwise narrated in the body of the report. The analytical results for the samples contained in this report were submitted for analysis as outlined by the Chain of Custody and results pertain only to these samples.

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

Sincerely,

Brandon O'Hara, Laboratory Manager
BOhara@AELLab.com

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FINAL

Workorder: OUC SEC (A2209850)

Sample Summary

Lab ID	Sample ID	Matrix	Method	Date Collected	Date Received	Analytes Reported	Basis
A2209850001	B-02-10	WA	EPA 300.0	11/07/2022 14:35	11/09/2022 15:44	2	NA
A2209850001	B-02-10	WA	SM 2320B	11/07/2022 14:35	11/09/2022 15:44	3	NA
A2209850001	B-02-10	WA	SM 2540 C	11/07/2022 14:35	11/09/2022 15:44	1	NA
A2209850001	B-02-10	WA	SW-846 6010	11/07/2022 14:35	11/09/2022 15:44	4	NA
A2209850002	B-02-20	WA	EPA 300.0	11/07/2022 15:20	11/09/2022 15:44	2	NA
A2209850002	B-02-20	WA	SM 2320B	11/07/2022 15:20	11/09/2022 15:44	3	NA
A2209850002	B-02-20	WA	SM 2540 C	11/07/2022 15:20	11/09/2022 15:44	1	NA
A2209850002	B-02-20	WA	SW-846 6010	11/07/2022 15:20	11/09/2022 15:44	4	NA
A2209850003	B-02-30	WA	EPA 300.0	11/07/2022 16:20	11/09/2022 15:44	2	NA
A2209850003	B-02-30	WA	SM 2320B	11/07/2022 16:20	11/09/2022 15:44	3	NA
A2209850003	B-02-30	WA	SM 2540 C	11/07/2022 16:20	11/09/2022 15:44	1	NA
A2209850003	B-02-30	WA	SW-846 6010	11/07/2022 16:20	11/09/2022 15:44	4	NA
A2209850004	B-04-10	WA	EPA 300.0	11/08/2022 08:45	11/09/2022 15:44	2	NA
A2209850004	B-04-10	WA	SM 2320B	11/08/2022 08:45	11/09/2022 15:44	3	NA
A2209850004	B-04-10	WA	SM 2540 C	11/08/2022 08:45	11/09/2022 15:44	1	NA
A2209850004	B-04-10	WA	SW-846 6010	11/08/2022 08:45	11/09/2022 15:44	4	NA
A2209850005	B-04-20	WA	EPA 300.0	11/08/2022 09:26	11/09/2022 15:44	2	NA
A2209850005	B-04-20	WA	SM 2320B	11/08/2022 09:26	11/09/2022 15:44	3	NA
A2209850005	B-04-20	WA	SM 2540 C	11/08/2022 09:26	11/09/2022 15:44	1	NA
A2209850005	B-04-20	WA	SW-846 6010	11/08/2022 09:26	11/09/2022 15:44	4	NA
A2209850006	B-04-30	WA	EPA 300.0	11/08/2022 10:10	11/09/2022 15:44	2	NA
A2209850006	B-04-30	WA	SM 2320B	11/08/2022 10:10	11/09/2022 15:44	3	NA
A2209850006	B-04-30	WA	SM 2540 C	11/08/2022 10:10	11/09/2022 15:44	1	NA
A2209850006	B-04-30	WA	SW-846 6010	11/08/2022 10:10	11/09/2022 15:44	4	NA
A2209850007	B-06-20	WA	EPA 300.0	11/08/2022 14:00	11/09/2022 15:44	2	NA
A2209850007	B-06-20	WA	SM 2320B	11/08/2022 14:00	11/09/2022 15:44	3	NA
A2209850007	B-06-20	WA	SM 2540 C	11/08/2022 14:00	11/09/2022 15:44	1	NA
A2209850007	B-06-20	WA	SW-846 6010	11/08/2022 14:00	11/09/2022 15:44	4	NA
A2209850008	B-06-30	WA	EPA 300.0	11/08/2022 14:45	11/09/2022 15:44	2	NA
A2209850008	B-06-30	WA	SM 2320B	11/08/2022 14:45	11/09/2022 15:44	3	NA
A2209850008	B-06-30	WA	SM 2540 C	11/08/2022 14:45	11/09/2022 15:44	1	NA
A2209850008	B-06-30	WA	SW-846 6010	11/08/2022 14:45	11/09/2022 15:44	4	NA
A2209850009	B-10-20	WA	EPA 300.0	11/09/2022 13:00	11/09/2022 15:44	2	NA
A2209850009	B-10-20	WA	SM 2320B	11/09/2022 13:00	11/09/2022 15:44	3	NA
A2209850009	B-10-20	WA	SM 2540 C	11/09/2022 13:00	11/09/2022 15:44	1	NA

Friday, December 16, 2022 6:09:01 PM
Dates and times are displayed using (-05:00)
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FINAL

Workorder: OUC SEC (A2209850)

Sample Summary

Lab ID	Sample ID	Matrix	Method	Date Collected	Date Received	Analytes Reported	Basis
A2209850009	B-10-20	WA	SW-846 6010	11/09/2022 13:00	11/09/2022 15:44	4	NA
A2209850010	B-10-30	WA	EPA 300.0	11/09/2022 13:45	11/09/2022 15:44	2	NA
A2209850010	B-10-30	WA	SM 2320B	11/09/2022 13:45	11/09/2022 15:44	3	NA
A2209850010	B-10-30	WA	SM 2540 C	11/09/2022 13:45	11/09/2022 15:44	1	NA
A2209850010	B-10-30	WA	SW-846 6010	11/09/2022 13:45	11/09/2022 15:44	4	NA

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FINAL

Workorder: OUC SEC (A2209850)

Workorder Summary

Batch Comments

ICPm/2985 - ICP 6010B Analysis

The matrix spike recoveries of Calcium, Magnesium, Sodium and Potassium for A2209849004 were outside control criteria due to the presence of target analytes in the sample. Recovery in the Laboratory Control Sample (LCS) was acceptable, which indicates the analytical batch was in control. The matrix spike outlier suggests an inconsistency in this matrix. The affected sample is qualified to indicate matrix interference.

WCAa/3793 - IC,E300.0,Water

The matrix spike and matrix spike duplicate percent recoveries applying to parent sample A220909849001 for CL were (88%, 88%) and for SO4 were (89%, 89%); respectively. The recoveries for both analytes in the Laboratory Control Sample were within the method required 90-110% range, indicating the batch was in control. The sample results have been qualified to indicate any matrix interference.

WCA/16106 - Alkalinity,SM2320B,Water

The relative percent difference (RPD) for the following analyte in the duplicate quality control sample for A2209852001 was outside control criteria. Failing RPD indicates inconsistency in the parent sample matrix. The associated LCS was within acceptable limits, indicating the analytical batch was in control. The data were qualified accordingly to indicate sample matrix interference.

Negative/zero alkalinity results are due to samples initial pH falling below titration endpoint of 4.5 in the following; A2209852001, A2209852002, A2209852003, A2209850001, A2209850002 & A2209850005

WCA/16107 - Alkalinity,SM2320B,Water

Negative/zero alkalinity results are due to samples initial pH falling below endpoint of titration of 4.5 in the following; A2209849001, A2209849002, A2209849003, A2209849004, A2209849005, A2209849006, A2209849008, G2209856003, A2209849009, A2209850009

WCA/16108 - Alkalinity,SM2320B,Water

Negative/zero alkalinity results are due to samples falling below a pH of 4.5 in the following; A2209850010

Analysis Results Comments

A2209850001 (B-02-10) - Alkalinity, Total

See Case Narration

A2209850002 (B-02-20) - Alkalinity, Total

See Case Narration

A2209850005 (B-04-20) - Alkalinity, Total

See Case Narration

A2209850009 (B-10-20) - Alkalinity, Total

See Case Narration

A2209850010 (B-10-30) - Alkalinity, Total

See Case Narration

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FINAL

Workorder: OUC SEC (A2209850)

Analytical Results Qualifiers

Parameter Qualifiers

U	The compound was analyzed for but not detected.
I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
CN	See Case Narration

Lab Qualifiers

A	DOH Certification #E53076 (FL NELAC) AEL-Altamonte Springs
M	DOH Certification #E82535 (FL NELAC) AEL-Miami
T	DOH Certification #E84589 (FL NELAC) AEL-Tampa

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FINAL

Workorder: OUC SEC (A2209850)

Analytical Results

Lab ID: A2209850001
Sample ID: B-02-10

Date Collected: 11/07/2022 14:35
Date Received: 11/09/2022 15:44

Matrix: Water

Parameter	Results	Units	PQL	MDL	DF	Prepared	Analyzed	Lab
METALS (SW-846 3010A/SW-846 6010)								
Calcium	720	mg/L	1.0	0.20	1	11/15/2022 00:00	11/15/2022 14:31	M
Magnesium	9.9	mg/L	0.20	0.080	1	11/15/2022 00:00	11/15/2022 14:31	M
Potassium	370	mg/L	10	5.0	10	11/15/2022 00:00	12/16/2022 13:58	M
Sodium	990	mg/L	10	8.0	10	11/15/2022 00:00	12/16/2022 13:58	M
WET CHEMISTRY (EPA 300.0)								
Chloride	3100	mg/L	120	0.96	25	11/21/2022 22:13	11/21/2022 22:13	A
Sulfate	990	mg/L	120	0.85	25	11/21/2022 22:13	11/21/2022 22:13	A
WET CHEMISTRY (SM 2320B)								
Alkalinity, Bicarbonate	5.0 U	mg/L	20	5.0	1	11/15/2022 13:59	11/15/2022 13:59	T
Alkalinity, Carbonate	5.0 U	mg/L	20	5.0	1	11/15/2022 13:59	11/15/2022 13:59	T
Alkalinity, Total	5.0 U	mg/L	20	5.0	1	11/15/2022 13:59	11/15/2022 13:59	T
WET CHEMISTRY (SM 2540 C)								
Total Dissolved Solids	6000	mg/L	5.0	5.0	.5	11/14/2022 09:20	11/14/2022 09:20	A

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FINAL

Workorder: OUC SEC (A2209850)

Analytical Results

Lab ID: A2209850002
Sample ID: B-02-20

Date Collected: 11/07/2022 15:20
Date Received: 11/09/2022 15:44

Matrix: Water

Parameter	Results	Units	PQL	MDL	DF	Prepared	Analyzed	Lab
METALS (SW-846 3010A/SW-846 6010)								
Calcium	2100	mg/L	10	2.0	10	11/15/2022 00:00	12/16/2022 14:02	M
Magnesium	7.4	mg/L	0.20	0.080	1	11/15/2022 00:00	11/15/2022 14:35	M
Potassium	980	mg/L	10	5.0	10	11/15/2022 00:00	12/16/2022 14:02	M
Sodium	3600	mg/L	10	8.0	10	11/15/2022 00:00	12/16/2022 14:02	M
WET CHEMISTRY (EPA 300.0)								
Chloride	12000	mg/L	500	3.9	100	11/22/2022 09:11	11/22/2022 09:11	A
Sulfate	1200	mg/L	500	3.4	100	11/22/2022 09:11	11/22/2022 09:11	A
WET CHEMISTRY (SM 2320B)								
Alkalinity, Bicarbonate	5.0 U	mg/L	20	5.0	1	11/15/2022 14:02	11/15/2022 14:02	T
Alkalinity, Carbonate	5.0 U	mg/L	20	5.0	1	11/15/2022 14:02	11/15/2022 14:02	T
Alkalinity, Total	5.0 U	mg/L	20	5.0	1	11/15/2022 14:02	11/15/2022 14:02	T
WET CHEMISTRY (SM 2540 C)								
Total Dissolved Solids	19000	mg/L	5.0	5.0	.5	11/14/2022 09:20	11/14/2022 09:20	A

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FINAL

Workorder: OUC SEC (A2209850)

Analytical Results

Lab ID: A2209850003
Sample ID: B-02-30

Date Collected: 11/07/2022 16:20
Date Received: 11/09/2022 15:44

Matrix: Water

Parameter	Results	Units	PQL	MDL	DF	Prepared	Analyzed	Lab
METALS (SW-846 3010A/SW-846 6010)								
Calcium	1800	mg/L	10	2.0	10	11/15/2022 00:00	12/16/2022 14:05	M
Magnesium	20	mg/L	0.20	0.080	1	11/15/2022 00:00	11/15/2022 14:39	M
Potassium	350	mg/L	10	5.0	10	11/15/2022 00:00	12/16/2022 14:05	M
Sodium	2000	mg/L	10	8.0	10	11/15/2022 00:00	12/16/2022 14:05	M
WET CHEMISTRY (EPA 300.0)								
Chloride	11000	mg/L	500	3.9	100	11/22/2022 09:24	11/22/2022 09:24	A
Sulfate	1000	mg/L	500	3.4	100	11/22/2022 09:24	11/22/2022 09:24	A
WET CHEMISTRY (SM 2320B)								
Alkalinity, Bicarbonate	14 I	mg/L	20	5.0	1	11/15/2022 14:06	11/15/2022 14:06	T
Alkalinity, Carbonate	5.0 U	mg/L	20	5.0	1	11/15/2022 14:06	11/15/2022 14:06	T
Alkalinity, Total	14 I	mg/L	20	5.0	1	11/15/2022 14:06	11/15/2022 14:06	T
WET CHEMISTRY (SM 2540 C)								
Total Dissolved Solids	12000	mg/L	5.0	5.0	.5	11/14/2022 09:20	11/14/2022 09:20	A

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FINAL

Workorder: OUC SEC (A2209850)

Analytical Results

Lab ID:	A2209850004	Date Collected:	11/08/2022 08:45			Matrix:	Water		
Sample ID:	B-04-10	Date Received:	11/09/2022 15:44						
Parameter	Results	Units	PQL	MDL	DF	Prepared	Analyzed	Lab	
METALS (SW-846 3010A/SW-846 6010)									
Calcium	410	mg/L	1.0	0.20	1	11/15/2022 00:00	11/15/2022 14:42	M	
Magnesium	13	mg/L	0.20	0.080	1	11/15/2022 00:00	11/15/2022 14:42	M	
Potassium	17	mg/L	1.0	0.50	1	11/15/2022 00:00	12/16/2022 14:09	M	
Sodium	30	mg/L	1.0	0.80	1	11/15/2022 00:00	11/15/2022 14:42	M	
WET CHEMISTRY (EPA 300.0)									
Chloride	490	mg/L	120	0.96	25	11/21/2022 23:18	11/21/2022 23:18	A	
Sulfate	900	mg/L	120	0.85	25	11/21/2022 23:18	11/21/2022 23:18	A	
WET CHEMISTRY (SM 2320B)									
Alkalinity, Bicarbonate	5.0 U	mg/L	20	5.0	1	11/15/2022 14:09	11/15/2022 14:09	T	
Alkalinity, Carbonate	5.0 U	mg/L	20	5.0	1	11/15/2022 14:09	11/15/2022 14:09	T	
Alkalinity, Total	5.0 U	mg/L	20	5.0	1	11/15/2022 14:09	11/15/2022 14:09	T	
WET CHEMISTRY (SM 2540 C)									
Total Dissolved Solids	2000	mg/L	5.0	5.0	.5	11/14/2022 09:20	11/14/2022 09:20	A	

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FINAL

Workorder: OUC SEC (A2209850)

Analytical Results

Lab ID:	A2209850005	Date Collected:	11/08/2022 09:26			Matrix:	Water	
Sample ID:	B-04-20	Date Received:	11/09/2022 15:44					
Parameter	Results	Units	PQL	MDL	DF	Prepared	Analyzed	Lab
METALS (SW-846 3010A/SW-846 6010)								
Calcium	930	mg/L	1.0	0.20	1	11/15/2022 00:00	11/15/2022 14:55	M
Magnesium	13	mg/L	0.20	0.080	1	11/15/2022 00:00	11/15/2022 14:55	M
Potassium	150	mg/L	10	5.0	10	11/15/2022 00:00	12/16/2022 14:12	M
Sodium	700	mg/L	10	8.0	10	11/15/2022 00:00	12/16/2022 14:12	M
WET CHEMISTRY (EPA 300.0)								
Chloride	3200	mg/L	120	0.96	25	11/21/2022 23:30	11/21/2022 23:30	A
Sulfate	300	mg/L	120	0.85	25	11/21/2022 23:30	11/21/2022 23:30	A
WET CHEMISTRY (SM 2320B)								
Alkalinity, Bicarbonate	5.0 U	mg/L	20	5.0	1	11/15/2022 14:12	11/15/2022 14:12	T
Alkalinity, Carbonate	5.0 U	mg/L	20	5.0	1	11/15/2022 14:12	11/15/2022 14:12	T
Alkalinity, Total	5.0 U	mg/L	20	5.0	1	11/15/2022 14:12	11/15/2022 14:12	T
WET CHEMISTRY (SM 2540 C)								
Total Dissolved Solids	5700	mg/L	5.0	5.0	.5	11/14/2022 09:20	11/14/2022 09:20	A

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FINAL

Workorder: OUC SEC (A2209850)

Analytical Results

Lab ID: A2209850006
Sample ID: B-04-30

Date Collected: 11/08/2022 10:10
Date Received: 11/09/2022 15:44

Matrix: Water

Parameter	Results	Units	PQL	MDL	DF	Prepared	Analyzed	Lab
METALS (SW-846 3010A/SW-846 6010)								
Calcium	47	mg/L	1.0	0.20	1	11/15/2022 00:00	11/15/2022 14:58	M
Magnesium	1.3	mg/L	0.20	0.080	1	11/15/2022 00:00	11/15/2022 14:58	M
Potassium	1.3	mg/L	1.0	0.50	1	11/15/2022 00:00	12/16/2022 14:16	M
Sodium	5.2	mg/L	1.0	0.80	1	11/15/2022 00:00	11/15/2022 14:58	M
WET CHEMISTRY (EPA 300.0)								
Chloride	42	mg/L	5.0	0.039	1	11/21/2022 23:43	11/21/2022 23:43	A
Sulfate	2.2 I	mg/L	5.0	0.034	1	11/21/2022 23:43	11/21/2022 23:43	A
WET CHEMISTRY (SM 2320B)								
Alkalinity, Bicarbonate	73	mg/L	20	5.0	1	11/15/2022 14:21	11/15/2022 14:21	T
Alkalinity, Carbonate	5.0 U	mg/L	20	5.0	1	11/15/2022 14:21	11/15/2022 14:21	T
Alkalinity, Total	73	mg/L	20	5.0	1	11/15/2022 14:21	11/15/2022 14:21	T
WET CHEMISTRY (SM 2540 C)								
Total Dissolved Solids	290	mg/L	5.0	5.0	.5	11/14/2022 09:20	11/14/2022 09:20	A

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FINAL

Workorder: OUC SEC (A2209850)

Analytical Results

Lab ID: A2209850007
Sample ID: B-06-20

Date Collected: 11/08/2022 14:00
Date Received: 11/09/2022 15:44

Matrix: Water

Parameter	Results	Units	PQL	MDL	DF	Prepared	Analyzed	Lab
METALS (SW-846 3010A/SW-846 6010)								
Calcium	1.2	mg/L	1.0	0.20	1	11/15/2022 00:00	11/15/2022 15:02	M
Magnesium	1.1	mg/L	0.20	0.080	1	11/15/2022 00:00	11/15/2022 15:02	M
Potassium	0.58 I	mg/L	1.0	0.50	1	11/15/2022 00:00	12/16/2022 14:19	M
Sodium	6.8	mg/L	1.0	0.80	1	11/15/2022 00:00	11/15/2022 15:02	M
WET CHEMISTRY (EPA 300.0)								
Chloride	18	mg/L	5.0	0.039	1	11/21/2022 23:56	11/21/2022 23:56	A
Sulfate	1.7 I	mg/L	5.0	0.034	1	11/21/2022 23:56	11/21/2022 23:56	A
WET CHEMISTRY (SM 2320B)								
Alkalinity, Bicarbonate	12 I	mg/L	20	5.0	1	11/15/2022 15:01	11/15/2022 15:01	T
Alkalinity, Carbonate	5.0 U	mg/L	20	5.0	1	11/15/2022 15:01	11/15/2022 15:01	T
Alkalinity, Total	12 I	mg/L	20	5.0	1	11/15/2022 15:01	11/15/2022 15:01	T
WET CHEMISTRY (SM 2540 C)								
Total Dissolved Solids	71	mg/L	5.0	5.0	.5	11/14/2022 09:20	11/14/2022 09:20	A

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FINAL

Workorder: OUC SEC (A2209850)

Analytical Results

Lab ID: A2209850008	Date Collected: 11/08/2022 14:45					Matrix: Water		
Sample ID: B-06-30	Date Received: 11/09/2022 15:44							
Parameter	Results	Units	PQL	MDL	DF	Prepared	Analyzed	Lab
METALS (SW-846 3010A/SW-846 6010)								
Calcium	3.3	mg/L	1.0	0.20	1	11/15/2022 00:00	11/15/2022 15:05	M
Magnesium	0.50	mg/L	0.20	0.080	1	11/15/2022 00:00	11/15/2022 15:05	M
Potassium	0.75 I	mg/L	1.0	0.50	1	11/15/2022 00:00	12/16/2022 14:23	M
Sodium	3.6	mg/L	1.0	0.80	1	11/15/2022 00:00	11/15/2022 15:05	M
WET CHEMISTRY (EPA 300.0)								
Chloride	23 I	mg/L	25	0.19	5	11/22/2022 09:37	11/22/2022 09:37	A
Sulfate	8.1 I	mg/L	25	0.17	5	11/22/2022 09:37	11/22/2022 09:37	A
WET CHEMISTRY (SM 2320B)								
Alkalinity, Bicarbonate	11 I	mg/L	20	5.0	1	11/15/2022 15:06	11/15/2022 15:06	T
Alkalinity, Carbonate	5.0 U	mg/L	20	5.0	1	11/15/2022 15:06	11/15/2022 15:06	T
Alkalinity, Total	11 I	mg/L	20	5.0	1	11/15/2022 15:06	11/15/2022 15:06	T
WET CHEMISTRY (SM 2540 C)								
Total Dissolved Solids	57	mg/L	5.0	5.0	.5	11/14/2022 09:20	11/14/2022 09:20	A

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FINAL

Workorder: OUC SEC (A2209850)

Analytical Results

Lab ID: A2209850009
Sample ID: B-10-20

Date Collected: 11/09/2022 13:00
Date Received: 11/09/2022 15:44

Matrix: Water

Parameter	Results	Units	PQL	MDL	DF	Prepared	Analyzed	Lab
METALS (SW-846 3010A/SW-846 6010)								
Calcium	1700	mg/L	4.0	0.80	4	11/15/2022 00:00	11/21/2022 14:37	M
Magnesium	8.5	mg/L	0.20	0.080	1	11/15/2022 00:00	11/15/2022 15:08	M
Potassium	480	mg/L	4.0	2.0	4	11/15/2022 00:00	11/21/2022 14:37	M
Sodium	1500	mg/L	200	160	200	11/15/2022 00:00	11/21/2022 14:55	M
WET CHEMISTRY (EPA 300.0)								
Chloride	6600	mg/L	500	3.9	100	11/22/2022 09:49	11/22/2022 09:49	A
Sulfate	1400	mg/L	500	3.4	100	11/22/2022 09:49	11/22/2022 09:49	A
WET CHEMISTRY (SM 2320B)								
Alkalinity, Bicarbonate	5.0 U	mg/L	20	5.0	1	11/15/2022 16:59	11/15/2022 16:59	T
Alkalinity, Carbonate	5.0 U	mg/L	20	5.0	1	11/15/2022 16:59	11/15/2022 16:59	T
Alkalinity, Total	5.0 U	mg/L	20	5.0	1	11/15/2022 16:59	11/15/2022 16:59	T
WET CHEMISTRY (SM 2540 C)								
Total Dissolved Solids	9500	mg/L	5.0	5.0	.5	11/14/2022 09:20	11/14/2022 09:20	A

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FINAL

Workorder: OUC SEC (A2209850)

Analytical Results

Lab ID: A2209850010
Sample ID: B-10-30

Date Collected: 11/09/2022 13:45
Date Received: 11/09/2022 15:44

Matrix: Water

Parameter	Results	Units	PQL	MDL	DF	Prepared	Analyzed	Lab
METALS (SW-846 3010A/SW-846 6010)								
Calcium	1700	mg/L	4.0	0.80	4	11/15/2022 00:00	11/21/2022 14:40	M
Magnesium	12	mg/L	0.20	0.080	1	11/15/2022 00:00	11/15/2022 15:12	M
Potassium	480	mg/L	4.0	2.0	4	11/15/2022 00:00	11/21/2022 14:40	M
Sodium	1300	mg/L	200	160	200	11/15/2022 00:00	11/21/2022 14:58	M
WET CHEMISTRY (EPA 300.0)								
Chloride	6200	mg/L	250	1.9	50	11/22/2022 10:02	11/22/2022 10:02	A
Sulfate	500	mg/L	250	1.7	50	11/22/2022 10:02	11/22/2022 10:02	A
WET CHEMISTRY (SM 2320B)								
Alkalinity, Bicarbonate	5.0 U	mg/L	20	5.0	1	11/15/2022 17:36	11/15/2022 17:36	T
Alkalinity, Carbonate	5.0 U	mg/L	20	5.0	1	11/15/2022 17:36	11/15/2022 17:36	T
Alkalinity, Total	5.0 U	mg/L	20	5.0	1	11/15/2022 17:36	11/15/2022 17:36	T
WET CHEMISTRY (SM 2540 C)								
Total Dissolved Solids	8600	mg/L	5.0	5.0	.5	11/14/2022 09:20	11/14/2022 09:20	A

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FINAL

Workorder: OUC SEC (A2209850)

QC Results

QC Batch: ICPm/2985
Preparation Method: SW-846 3010A
Analysis Method: SW-846 6010
Associated Lab IDs: A2209850001, A2209850002, A2209850003, A2209850004, A2209850005, A2209850006, A2209850007, A2209850008, A2209850009, A2209850010

Method Blank(4545559)

Parameter	Results	Units	PQL	MDL	Lab
Calcium	0.20 U	mg/L	1.0	0.20	M
Potassium	0.50 U	mg/L	1.0	0.50	M
Magnesium	0.080 U	mg/L	0.20	0.080	M
Sodium	0.80 U	mg/L	1.0	0.80	M

Lab Control Sample (4545560)

Parameter	Units	Spiked Amount	Spike Result	Spike Recovery	Control Limits	Lab
Calcium	mg/L	4	4.1	103	80 - 120	M
Potassium	mg/L	10	10	102	80 - 120	M
Magnesium	mg/L	2	2.1	104	80 - 120	M
Sodium	mg/L	16	16	103	80 - 120	M

Matrix Spike (4545561); Matrix Spike Duplicate (4545562); Parent Lab Sample (A2209849004)

Parameter	Units	Spiked Amount	Spike Result	Spike Recovery	Control Limits	Dup Result	Dup Recovery	RPD	RPD Limit	Lab
Calcium	mg/L	4	200	-115	75 - 125	210	288	8	20	M
Potassium	mg/L	10	120	46	75 - 125	130	157	9	20	M
Magnesium	mg/L	2	15	63	75 - 125	16	126	8	20	M
Sodium	mg/L	16	190	96	75 - 125	170	-22	10	20	M

Matrix Spike (4545561); Matrix Spike Duplicate (4545562); Parent Lab Sample (A2209849004)

Parameter	Units	Spiked Amount	Spike Result	Spike Recovery	Control Limits	Dup Result	Dup Recovery	RPD	RPD Limit	Lab
Calcium	mg/L	4	200	-115	75 - 125	210	288	8	20	M
Potassium	mg/L	10	120	46	75 - 125	130	157	9	20	M
Magnesium	mg/L	2	15	63	75 - 125	16	126	8	20	M
Sodium	mg/L	16	190	96	75 - 125	170	-22	10	20	M

QC Result Comments

Matrix Spike - 4545561 - Calcium

J4|Estimated Result





FINAL

Workorder: OUC SEC (A2209850)

QC Result Comments

Matrix Spike - 4545561 - Magnesium

J4|Estimated Result

Matrix Spike - 4545561 - Potassium

J4|Estimated Result

Matrix Spike - 4545561 - Sodium

J4|Estimated Result

Matrix Spike Duplicate - 4545562 - Calcium

J4|Estimated Result

Matrix Spike Duplicate - 4545562 - Magnesium

J4|Estimated Result

Matrix Spike Duplicate - 4545562 - Potassium

J4|Estimated Result

Matrix Spike Duplicate - 4545562 - Sodium

J4|Estimated Result

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Workorder: OUC SEC (A2209850)

QC Results

QC Batch: WCAa/3715

Analysis Method: SM 2540 C

Preparation Method: SM 2540 C

Associated Lab IDs: A2209850001, A2209850002, A2209850003, A2209850004, A2209850005, A2209850006, A2209850007, A2209850008

Method Blank(4543887)

Parameter	Results	Units	PQL	MDL	Lab
Total Dissolved Solids	10 U	mg/L	10	10	A

Lab Control Sample (4543888)

Parameter	Units	Spiked Amount	Spike Result	Spike Recovery	Control Limits	Lab
Total Dissolved Solids	mg/L	660	650	98	85 - 115	A

Sample Duplicate (4543889); Parent Lab Sample (A2209850001, A2209850002, A2209850003, A2209850004, A2209850005, A2209850006, A2209850007, A2209850008)

Parameter	Original	Duplicate	Units	RPD	RPD Limit	Lab
Total Dissolved Solids	1029	1059	mg/L	3	10	A

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Workorder: OUC SEC (A2209850)

QC Results

QC Batch: WCAa/3725
Preparation Method: SM 2540 C
Associated Lab IDs: A2209850009, A2209850010

Analysis Method: SM 2540 C

Method Blank(4545463)

Parameter	Results	Units	PQL	MDL	Lab
Total Dissolved Solids	10 U	mg/L	10	10	A

Lab Control Sample (4545464)

Parameter	Units	Spiked Amount	Spike Result	Spike Recovery	Control Limits	Lab
Total Dissolved Solids	mg/L	660	650	99	85 - 115	A

Sample Duplicate (4545465); Parent Lab Sample (A2209850009, A2209850010)

Parameter	Original	Duplicate	Units	RPD	RPD Limit	Lab
Total Dissolved Solids	1722	1656	mg/L	4	10	A

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FINAL

Workorder: OUC SEC (A2209850)

QC Results

QC Batch: WCAa/3793
Preparation Method: EPA 300.0
Associated Lab IDs: A2209850001

Analysis Method: EPA 300.0

Method Blank(4561828)

Parameter	Results	Units	PQL	MDL	Lab
Chloride	0.039 U	mg/L	5.0	0.039	A
Sulfate	0.034 U	mg/L	5.0	0.034	A

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FINAL

Workorder: OUC SEC (A2209850)

QC Results

QC Batch: WCAa/3793 Analysis Method: EPA 300.0
Preparation Method: EPA 300.0
Associated Lab IDs: A2209850001, A2209850002, A2209850003, A2209850004, A2209850005, A2209850006, A2209850007

Matrix Spike (4561829); Matrix Spike Duplicate (4561830); Parent Lab Sample (A2209849001)

Parameter	Units	Spiked Amount	Spike Result	Spike Recovery	Control Limits	Dup Result	Dup Recovery	RPD	RPD Limit	Lab
Chloride	mg/L	200	770	350	90 - 110	770	350	0.0180	10	A
Sulfate	mg/L	200	190	94	90 - 110	190	94	0.0320	10	A

QC Result Comments

Matrix Spike - 4561829 - Chloride

J4|Estimated Result

Matrix Spike - 4561829 - Sulfate

J4|Estimated Result

Matrix Spike Duplicate - 4561830 - Chloride

J4|Estimated Result

Matrix Spike Duplicate - 4561830 - Sulfate

J4|Estimated Result

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FINAL

Workorder: OUC SEC (A2209850)

QC Results

QC Batch: WCAa/3793

Analysis Method: EPA 300.0

Preparation Method: EPA 300.0

Associated Lab IDs: A2209850001, A2209850002, A2209850003, A2209850004, A2209850005, A2209850006, A2209850007, A2209850008, A2209850009, A2209850010

Lab Control Sample (4561826)

Parameter	Units	Spiked Amount	Spike Result	Spike Recovery	Control Limits	Lab
Chloride	mg/L	50	50	99	90 - 110	A
Sulfate	mg/L	50	50	100	90 - 110	A

Method Blank(4561832)

Parameter	Results	Units	PQL	MDL	Lab
Chloride	0.039 U	mg/L	5.0	0.039	A
Sulfate	0.034 U	mg/L	5.0	0.034	A

Matrix Spike (4561833); Matrix Spike Duplicate (4561834); Parent Lab Sample (A2209850007)

Parameter	Units	Spiked Amount	Spike Result	Spike Recovery	Control Limits	Dup Result	Dup Recovery	RPD	RPD Limit	Lab
Chloride	mg/L	20	37	98	90 - 110	37	98	0.21	10	A
Sulfate	mg/L	20	20	90	90 - 110	20	90	0.44	10	A

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FINAL

Workorder: OUC SEC (A2209850)

QC Results

QC Batch: WCAa/3793 **Analysis Method:** EPA 300.0
Preparation Method: EPA 300.0
Associated Lab IDs: A2209850002, A2209850003, A2209850004, A2209850005, A2209850006, A2209850007, A2209850008, A2209850009, A2209850010

Method Blank(4561836)

Parameter	Results	Units	PQL	MDL	Lab
Chloride	0.039 U	mg/L	5.0	0.039	A
Sulfate	0.034 U	mg/L	5.0	0.034	A

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FINAL

Workorder: OUC SEC (A2209850)

QC Results

QC Batch: WCA/16106 Analysis Method: SM 2320B
Preparation Method: SM 2320B
Associated Lab IDs: A2209850001, A2209850002, A2209850003, A2209850004, A2209850005, A2209850006

Sample Duplicate (4545527); Parent Lab Sample (A2209850001, A2209850002, A2209850003, A2209850004, A2209850005, A2209850006)

Parameter	Original	Duplicate	Units	RPD	RPD Limit	Lab
Alkalinity, Total	-.27	-1.36	mg/L	-134	20	T

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FINAL

Workorder: OUC SEC (A2209850)

QC Results

QC Batch: WCA/16106 Analysis Method: SM 2320B
Preparation Method: SM 2320B
Associated Lab IDs: A2209850001, A2209850002, A2209850003, A2209850004, A2209850005, A2209850006, A2209850007, A2209850008

Method Blank(4545525)

Parameter	Results	Units	PQL	MDL	Lab
Alkalinity, Total	5.0 U	mg/L	20	5.0	T

Lab Control Sample (4545526)

Parameter	Units	Spiked Amount	Spike Result	Spike Recovery	Control Limits	Lab
Alkalinity, Total	mg/L	100	110	106	75 - 125	T

Sample Duplicate (4545528); Parent Lab Sample (A2209850001, A2209850002, A2209850003, A2209850004, A2209850005, A2209850006, A2209850007, A2209850008)

Parameter	Original	Duplicate	Units	RPD	RPD Limit	Lab
Alkalinity, Total	21.9	21.33	mg/L	3	20	T

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Workorder: OUC SEC (A2209850)

QC Results

QC Batch: WCA/16107
Preparation Method: SM 2320B
Associated Lab IDs: A2209850009

Analysis Method: SM 2320B

Method Blank(4545538)

Parameter	Results	Units	PQL	MDL	Lab
Alkalinity, Total	5.0 U	mg/L	20	5.0	T

Lab Control Sample (4545539)

Parameter	Units	Spiked Amount	Spike Result	Spike Recovery	Control Limits	Lab
Alkalinity, Total	mg/L	100	110	106	75 - 125	T

Sample Duplicate (4545541); Parent Lab Sample (A2209850009)

Parameter	Original	Duplicate	Units	RPD	RPD Limit	Lab
Alkalinity, Total	309	313.42	mg/L	1	20	T

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Workorder: OUC SEC (A2209850)

QC Results

QC Batch: WCA/16108
Preparation Method: SM 2320B
Associated Lab IDs: A2209850010

Analysis Method: SM 2320B

Method Blank(4545555)

Parameter	Results	Units	PQL	MDL	Lab
Alkalinity, Total	5.0 U	mg/L	20	5.0	T

Lab Control Sample (4545556)

Parameter	Units	Spiked Amount	Spike Result	Spike Recovery	Control Limits	Lab
Alkalinity, Total	mg/L	100	110	106	75 - 125	T

Sample Duplicate (4545557); Parent Lab Sample (A2209850010)

Parameter	Original	Duplicate	Units	RPD	RPD Limit	Lab
Alkalinity, Total	169.77	172.43	mg/L	2	20	T

Sample Duplicate (4545558); Parent Lab Sample (A2209850010)

Parameter	Original	Duplicate	Units	RPD	RPD Limit	Lab
Alkalinity, Total	287.83	292.94	mg/L	2	20	T

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Workorder: OUC SEC (A2209850)

QC Cross Reference

Lab ID	Sample ID	Prep Batch	Prep Method
ICPm/2985 - SW-846 6010			
A2209850001	B-02-10	DGMm/3097	SW-846 3010A
A2209850002	B-02-20	DGMm/3097	SW-846 3010A
A2209850003	B-02-30	DGMm/3097	SW-846 3010A
A2209850004	B-04-10	DGMm/3097	SW-846 3010A
A2209850005	B-04-20	DGMm/3097	SW-846 3010A
A2209850006	B-04-30	DGMm/3097	SW-846 3010A
A2209850007	B-06-20	DGMm/3097	SW-846 3010A
A2209850008	B-06-30	DGMm/3097	SW-846 3010A
A2209850009	B-10-20	DGMm/3097	SW-846 3010A
A2209850010	B-10-30	DGMm/3097	SW-846 3010A
WCAa/3715 - SM 2540 C			
A2209850001	B-02-10		
A2209850002	B-02-20		
A2209850003	B-02-30		
A2209850004	B-04-10		
A2209850005	B-04-20		
A2209850006	B-04-30		
A2209850007	B-06-20		
A2209850008	B-06-30		
WCAa/3725 - SM 2540 C			
A2209850009	B-10-20		
A2209850010	B-10-30		
WCAa/3793 - EPA 300.0			
A2209850001	B-02-10		
A2209850002	B-02-20		
A2209850003	B-02-30		
A2209850004	B-04-10		
A2209850005	B-04-20		
A2209850006	B-04-30		
A2209850007	B-06-20		
A2209850008	B-06-30		
A2209850009	B-10-20		
A2209850010	B-10-30		

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Workorder: OUC SEC (A2209850)

QC Cross Reference

Lab ID	Sample ID	Prep Batch	Prep Method
WCAI/16106 - SM 2320B			
A2209850001	B-02-10		
A2209850002	B-02-20		
A2209850003	B-02-30		
A2209850004	B-04-10		
A2209850005	B-04-20		
A2209850006	B-04-30		
A2209850007	B-06-20		
A2209850008	B-06-30		
WCAI/16107 - SM 2320B			
A2209850009	B-10-20		
WCAI/16108 - SM 2320B			
A2209850010	B-10-30		

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Workorder: OUC SEC (A2209850)

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Tallahassee: 2639 North Monroe St., Suite D, FL 32303 • (904) 219-8274 • Lab ID: E54559

Client Name: Nicola Project Name: ADAPT
Address: Standard Project Number: 71946
Phone: 904-881-9730 PO Number: 1
FAX: Denise Rutland FDEP Facility No.: 1
Contact: Denise Rutland FDEP Facility Addr.: 1
Sampled By: Standard Special Instructions: Rush

ADAPT EQUIS Other
SAMPLE ID SAMPLE DESCRIPTION Grab Comp DATE TIME MATRIX NO. COUNT

B-02-10	Sample from 0-10'	11/7	14:35	GW		
B-02-20	" 10-20'	11/7	15:20	GW		
B-02-30	" 20-30'	11/7	16:20	GW		
B-04-10	" 0-10'	11/8	08:45	GW		
B-04-20	" 10-20'	11/8	09:26	GW		
B-04-30	" 20-30'	11/8	10:10	GW		
B-06-20	" 10-20'	11/8	14:00	GW		
B-06-30	" 20-30'	11/8	14:45	GW		
B-10-20	" 10-20'	11/9	13:00	GW		
B-10-30	" 20-30'	11/9	13:47	GW		

Matrix Code: WW=wastewater, SW=surface water, GW=ground water, DW=drinking water, MW=marine water,
O=oil, A=air, SO=soil, SL=sludge

Received on Ice ☒ Yes ☐ No Temp taken from sample ☐ Temp from blank ☐ Where required, pH checked ☐
DON: AP-D05 (web Form last revised 07/28/2022) Device used for measuring Temp by unique identifier (circle in temp gun used) J: 9A G: LT-1 LT-2 T: 10A (30) M: 3A S: IV F: 1A
Temp. when received (observed) 4 °C Temp. when received (corrected) 30 °C

Received by: [Signature] Date: 11/9/22 Time: 15:44

FOR DRINKING WATER USE:
(When PWS information not otherwise supplied) PWS ID: _____
Contact Person: _____
Supplier of Water: _____
Site Address: _____

ANALYSIS REQUIRED
TDS
Ca, Mg, Na, K
Alkalinity
CL, SO₄

LABORATORY I.D. NUMBER

Page 2 of 2

14, FL 32009 • 352.377.2349 • Lab ID: E52001
19, FL 32025 • 954.889.2288 • Lab ID: E52535
16, FL 33619 • 813.830.9916 • Lab ID: E54559





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FINAL

Workorder: OUC SEC (A2209851)

December 02, 2022

Daniel Rutland
Jacobs
200 South Orange Ave
Suite 900
Orlando, FL 32801

RE: Workorder: A2209851 OUC SEC

Dear Daniel Rutland:

Enclosed are the analytical results for sample(s) received by the laboratory on Wednesday November 9, 2022. Results reported herein conform to the most current NELAC standards, where applicable, unless otherwise narrated in the body of the report. The analytical results for the samples contained in this report were submitted for analysis as outlined by the Chain of Custody and results pertain only to these samples.

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

Sincerely,

Brandon O'Hara, Laboratory Manager
BOhara@AELLab.com

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FINAL

Workorder: OUC SEC (A2209851)

Sample Summary

Lab ID	Sample ID	Matrix	Method	Date Collected	Date Received	Analytes Reported	Basis
A2209851001	B-01-10	SO	EPA 9056	11/07/2022 10:30	11/09/2022 15:44	2	Wet
A2209851001	B-01-10	SO	SM 2540G	11/07/2022 10:30	11/09/2022 15:44	1	Wet
A2209851001	B-01-10	SO	SW-846 6010	11/07/2022 10:30	11/09/2022 15:44	4	Wet
A2209851002	B-01-20	SO	EPA 9056	11/07/2022 11:00	11/09/2022 15:44	2	Wet
A2209851002	B-01-20	SO	SM 2540G	11/07/2022 11:00	11/09/2022 15:44	1	Wet
A2209851002	B-01-20	SO	SW-846 6010	11/07/2022 11:00	11/09/2022 15:44	4	Wet
A2209851003	B-01-30	SO	EPA 9056	11/07/2022 11:00	11/09/2022 15:44	2	Wet
A2209851003	B-01-30	SO	SM 2540G	11/07/2022 11:00	11/09/2022 15:44	1	Wet
A2209851003	B-01-30	SO	SW-846 6010	11/07/2022 11:00	11/09/2022 15:44	4	Wet
A2209851004	S-01	SO	EPA 9056	11/07/2022 15:50	11/09/2022 15:44	2	Wet
A2209851004	S-01	SO	SM 2540G	11/07/2022 15:50	11/09/2022 15:44	1	Wet
A2209851004	S-01	SO	SW-846 6010	11/07/2022 15:50	11/09/2022 15:44	4	Wet
A2209851005	S-02	SO	EPA 9056	11/08/2022 10:35	11/09/2022 15:44	2	Wet
A2209851005	S-02	SO	SM 2540G	11/08/2022 10:35	11/09/2022 15:44	1	Wet
A2209851005	S-02	SO	SW-846 6010	11/08/2022 10:35	11/09/2022 15:44	4	Wet
A2209851006	S-03	SO	EPA 9056	11/08/2022 11:20	11/09/2022 15:44	2	Wet
A2209851006	S-03	SO	SM 2540G	11/08/2022 11:20	11/09/2022 15:44	1	Wet
A2209851006	S-03	SO	SW-846 6010	11/08/2022 11:20	11/09/2022 15:44	4	Wet
A2209851007	S-04	SO	EPA 9056	11/09/2022 10:00	11/09/2022 15:44	2	Wet
A2209851007	S-04	SO	SM 2540G	11/09/2022 10:00	11/09/2022 15:44	1	Wet
A2209851007	S-04	SO	SW-846 6010	11/09/2022 10:00	11/09/2022 15:44	4	Wet
A2209851008	S-05	SO	EPA 9056	11/09/2022 11:30	11/09/2022 15:44	2	Wet
A2209851008	S-05	SO	SM 2540G	11/09/2022 11:30	11/09/2022 15:44	1	Wet
A2209851008	S-05	SO	SW-846 6010	11/09/2022 11:30	11/09/2022 15:44	4	Wet

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FINAL

Workorder: OUC SEC (A2209851)

Workorder Summary

Batch Comments

ICPm/2986 - ICP 6010B Analysis

The matrix spike recoveries of Chromium for S2202870001 were outside control criteria due to the presence of target analytes in the sample. Recovery in the Laboratory Control Sample (LCS) was acceptable, which indicates the analytical batch was in control. The matrix spike outlier suggests a potential high bias in this matrix. The affected sample is qualified to indicate matrix interference.

WCA/16187 - 9056, Soil

The matrix spike recovery of Chloride and Sulfate for A2209851005 was outside control criteria. Recoveries in the Laboratory Control Sample (LCS), and %RPD were acceptable, which indicates the analytical batch was in control. No further corrective action was required.

Sample S2202865003 was ran out of hold for Nitrate.

Analysis Results Comments

A2209851005 (S-02) - Chloride

J4|Estimated Result

A2209851005 (S-02) - Sulfate

J4|Estimated Result

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FINAL

Workorder: OUC SEC (A2209851)

Analytical Results Qualifiers

Parameter Qualifiers

U	The compound was analyzed for but not detected.
I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
J4	Estimated Result

Lab Qualifiers

M	DOH Certification #E82535 (FL NELAC) AEL-Miami
T	DOH Certification #E84589 (FL NELAC) AEL-Tampa

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FINAL

Workorder: OUC SEC (A2209851)

Analytical Results

Lab ID: A2209851001	Date Collected: 11/07/2022 10:30					Matrix: Soil		
Sample ID: B-01-10	Date Received: 11/09/2022 15:44							
Parameter	Results	Units	PQL	MDL	DF	Prepared	Analyzed	Lab
METALS (SW-846 3050B/SW-846 6010)								
Calcium	220	mg/Kg	110	28	1	11/15/2022 08:11	11/17/2022 14:53	M
Magnesium	24 I	mg/Kg	55	14	1	11/15/2022 08:11	11/17/2022 14:53	M
Potassium	28 U	mg/Kg	110	28	1	11/15/2022 08:11	11/17/2022 14:53	M
Sodium	140 U	mg/Kg	550	140	1	11/15/2022 08:11	11/17/2022 14:53	M
(SM 2540G)								
Percent Moisture	27	%	0.0010	0.0010	1	11/14/2022 09:30	11/14/2022 09:30	T
WET CHEMISTRY (EPA 9056)								
Chloride	210	mg/Kg	170	19	5	11/15/2022 21:16	11/15/2022 21:16	T
Sulfate	130 I	mg/Kg	170	32	5	11/15/2022 21:16	11/15/2022 21:16	T

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Workorder: OUC SEC (A2209851)

Analytical Results

Lab ID: A2209851002	Date Collected: 11/07/2022 11:00					Matrix: Soil		
Sample ID: B-01-20	Date Received: 11/09/2022 15:44							
Parameter	Results	Units	PQL	MDL	DF	Prepared	Analyzed	Lab
METALS (SW-846 3050B/SW-846 6010)								
Calcium	260	mg/Kg	99	25	1	11/15/2022 08:11	11/17/2022 14:57	M
Magnesium	14 I	mg/Kg	49	12	1	11/15/2022 08:11	11/17/2022 14:57	M
Potassium	53 I	mg/Kg	99	25	1	11/15/2022 08:11	11/17/2022 14:57	M
Sodium	120 U	mg/Kg	490	120	1	11/15/2022 08:11	11/17/2022 14:57	M
(SM 2540G)								
Percent Moisture	20	%	0.0010	0.0010	1	11/14/2022 09:30	11/14/2022 09:30	T
WET CHEMISTRY (EPA 9056)								
Chloride	530	mg/Kg	31	3.5	1	11/15/2022 21:32	11/15/2022 21:32	T
Sulfate	370	mg/Kg	31	5.8	1	11/15/2022 21:32	11/15/2022 21:32	T

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FINAL

Workorder: OUC SEC (A2209851)

Analytical Results

Lab ID: A2209851003
Sample ID: B-01-30

Date Collected: 11/07/2022 11:00
Date Received: 11/09/2022 15:44

Matrix: Soil

Parameter	Results	Units	PQL	MDL	DF	Prepared	Analyzed	Lab
METALS (SW-846 3050B/SW-846 6010)								
Calcium	580	mg/Kg	99	25	1	11/15/2022 08:11	11/17/2022 15:00	M
Magnesium	131	mg/Kg	49	12	1	11/15/2022 08:11	11/17/2022 15:00	M
Potassium	280	mg/Kg	99	25	1	11/15/2022 08:11	11/17/2022 15:00	M
Sodium	1000	mg/Kg	490	120	1	11/15/2022 08:11	11/17/2022 15:00	M
(SM 2540G)								
Percent Moisture	19	%	0.0010	0.0010	1	11/14/2022 09:30	11/14/2022 09:30	T
WET CHEMISTRY (EPA 9056)								
Chloride	2900	mg/Kg	31	3.4	1	11/15/2022 21:48	11/15/2022 21:48	T
Sulfate	300	mg/Kg	31	5.7	1	11/15/2022 21:48	11/15/2022 21:48	T

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FINAL

Workorder: OUC SEC (A2209851)

Analytical Results

Lab ID: A2209851004
Sample ID: S-01

Date Collected: 11/07/2022 15:50
Date Received: 11/09/2022 15:44

Matrix: Soil

Parameter	Results	Units	PQL	MDL	DF	Prepared	Analyzed	Lab
METALS (SW-846 3050B/SW-846 6010)								
Calcium	23000	mg/Kg	110	27	1	11/15/2022 08:11	11/17/2022 15:10	M
Magnesium	130	mg/Kg	54	13	1	11/15/2022 08:11	11/17/2022 15:10	M
Potassium	53 I	mg/Kg	110	27	1	11/15/2022 08:11	11/17/2022 15:10	M
Sodium	220 I	mg/Kg	540	130	1	11/15/2022 08:11	11/17/2022 15:10	M
(SM 2540G)								
Percent Moisture	28	%	0.0010	0.0010	1	11/14/2022 09:30	11/14/2022 09:30	T
WET CHEMISTRY (EPA 9056)								
Chloride	210	mg/Kg	35	3.8	1	11/15/2022 22:04	11/15/2022 22:04	T
Sulfate	590	mg/Kg	35	6.4	1	11/15/2022 22:04	11/15/2022 22:04	T

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FINAL

Workorder: OUC SEC (A2209851)

Analytical Results

Lab ID: A2209851005
Sample ID: S-02

Date Collected: 11/08/2022 10:35
Date Received: 11/09/2022 15:44

Matrix: Soil

Parameter	Results	Units	PQL	MDL	DF	Prepared	Analyzed	Lab
METALS (SW-846 3050B/SW-846 6010)								
Calcium	1300	mg/Kg	84	21	1	11/15/2022 08:11	11/17/2022 15:14	M
Magnesium	32 I	mg/Kg	42	11	1	11/15/2022 08:11	11/17/2022 15:14	M
Potassium	21 U	mg/Kg	84	21	1	11/15/2022 08:11	11/17/2022 15:14	M
Sodium	110 U	mg/Kg	420	110	1	11/15/2022 08:11	11/17/2022 15:14	M
(SM 2540G)								
Percent Moisture	2.3	%	0.0010	0.0010	1	11/14/2022 09:30	11/14/2022 09:30	T
WET CHEMISTRY (EPA 9056)								
Chloride	22 I	mg/Kg	26	2.8	1	11/15/2022 22:20	11/15/2022 22:20	T
Sulfate	5.0 I	mg/Kg	26	4.7	1	11/15/2022 22:20	11/15/2022 22:20	T

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Workorder: OUC SEC (A2209851)

Analytical Results

Lab ID: A2209851006	Date Collected: 11/08/2022 11:20					Matrix: Soil		
Sample ID: S-03	Date Received: 11/09/2022 15:44							
Parameter	Results	Units	PQL	MDL	DF	Prepared	Analyzed	Lab
METALS (SW-846 3050B/SW-846 6010)								
Calcium	190000	mg/Kg	840	210	10	11/15/2022 08:11	11/22/2022 10:34	M
Magnesium	1100	mg/Kg	42	11	1	11/15/2022 08:11	11/17/2022 15:17	M
Potassium	50 l	mg/Kg	84	21	1	11/15/2022 08:11	11/17/2022 15:17	M
Sodium	170 l	mg/Kg	420	110	1	11/15/2022 08:11	11/17/2022 15:17	M
(SM 2540G)								
Percent Moisture	6.2	%	0.0010	0.0010	1	11/14/2022 09:30	11/14/2022 09:30	T
WET CHEMISTRY (EPA 9056)								
Chloride	95	mg/Kg	27	2.9	1	11/15/2022 23:08	11/15/2022 23:08	T
Sulfate	1800	mg/Kg	27	4.9	1	11/15/2022 23:08	11/15/2022 23:08	T

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FINAL

Workorder: OUC SEC (A2209851)

Analytical Results

Lab ID: A2209851007	Date Collected: 11/09/2022 10:00					Matrix: Soil		
Sample ID: S-04	Date Received: 11/09/2022 15:44							
Parameter	Results	Units	PQL	MDL	DF	Prepared	Analyzed	Lab
METALS (SW-846 3050B/SW-846 6010)								
Calcium	49000	mg/Kg	450	110	5	11/16/2022 08:50	11/30/2022 17:22	M
Magnesium	530	mg/Kg	220	56	5	11/16/2022 08:50	11/30/2022 17:22	M
Potassium	47 I	mg/Kg	90	22	1	11/16/2022 08:50	11/28/2022 16:14	M
Sodium	110 U	mg/Kg	450	110	1	11/16/2022 08:50	11/28/2022 16:14	M
(SM 2540G)								
Percent Moisture	11	%	0.0010	0.0010	1	11/14/2022 09:30	11/14/2022 09:30	T
WET CHEMISTRY (EPA 9056)								
Chloride	88	mg/Kg	28	3.1	1	11/15/2022 23:24	11/15/2022 23:24	T
Sulfate	130	mg/Kg	28	5.2	1	11/15/2022 23:24	11/15/2022 23:24	T

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FINAL

Workorder: OUC SEC (A2209851)

Analytical Results

Lab ID: A2209851008
Sample ID: S-05

Date Collected: 11/09/2022 11:30
Date Received: 11/09/2022 15:44

Matrix: Soil

Parameter	Results	Units	PQL	MDL	DF	Prepared	Analyzed	Lab
METALS (SW-846 3050B/SW-846 6010)								
Calcium	280000	mg/Kg	1800	450	20	11/16/2022 08:50	12/01/2022 16:00	M
Magnesium	3200	mg/Kg	230	56	5	11/16/2022 08:50	11/30/2022 17:26	M
Potassium	31 I	mg/Kg	90	23	1	11/16/2022 08:50	11/28/2022 16:17	M
Sodium	160 I	mg/Kg	450	110	1	11/16/2022 08:50	11/28/2022 16:17	M
(SM 2540G)								
Percent Moisture	11	%	0.0010	0.0010	1	11/14/2022 09:30	11/14/2022 09:30	T
WET CHEMISTRY (EPA 9056)								
Chloride	33	mg/Kg	28	3.1	1	11/15/2022 23:40	11/15/2022 23:40	T
Sulfate	190	mg/Kg	28	5.2	1	11/15/2022 23:40	11/15/2022 23:40	T

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FINAL

Workorder: OUC SEC (A2209851)

QC Results

QC Batch: ICPm/2986
Preparation Method: SW-846 3050B
Associated Lab IDs: A2209851001, A2209851002, A2209851003, A2209851004, A2209851005, A2209851006

Analysis Method: SW-846 6010

Method Blank(4545649)

Parameter	Results	Units	PQL	MDL	Lab
Calcium	20 U	mg/Kg	80	20	M
Potassium	20 U	mg/Kg	80	20	M
Magnesium	10 U	mg/Kg	40	10	M
Sodium	100 U	mg/Kg	400	100	M

Lab Control Sample (4545650)

Parameter	Units	Spiked Amount	Spike Result	Spike Recovery	Control Limits	Lab
Calcium	mg/Kg	400	420	106	80 - 120	M
Potassium	mg/Kg	400	400	100	80 - 120	M
Magnesium	mg/Kg	200	200	99	80 - 120	M
Sodium	mg/Kg	2000	2000	100	80 - 120	M

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FINAL

Workorder: OUC SEC (A2209851)

QC Results

QC Batch: ICPm/2989
Preparation Method: SW-846 3050B
Associated Lab IDs: A2209851007, A2209851008

Analysis Method: SW-846 6010

Method Blank(4547903)

Parameter	Results	Units	PQL	MDL	Lab
Calcium	20 U	mg/Kg	80	20	M
Potassium	20 U	mg/Kg	80	20	M
Magnesium	10 U	mg/Kg	40	10	M
Sodium	100 U	mg/Kg	400	100	M

Lab Control Sample (4547904)

Parameter	Units	Spiked Amount	Spike Result	Spike Recovery	Control Limits	Lab
Calcium	mg/Kg	400	440	111	80 - 120	M
Potassium	mg/Kg	400	410	103	80 - 120	M
Magnesium	mg/Kg	200	200	99	80 - 120	M
Sodium	mg/Kg	2000	2100	106	80 - 120	M

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FINAL

Workorder: OUC SEC (A2209851)

QC Results

QC Batch: WCA1/16187

Analysis Method: EPA 9056

Preparation Method: EPA 9056

Associated Lab IDs: A2209851001, A2209851002, A2209851003, A2209851004, A2209851005, A2209851006, A2209851007, A2209851008

Method Blank(4549762)

Parameter	Results	Units	PQL	MDL	Lab
Chloride	2.8 U	mg/Kg	25	2.8	T
Sulfate	4.6 U	mg/Kg	25	4.6	T

Lab Control Sample (4549763); Lab Control Sample Duplicate (4550474); Parent Lab Sample (A2209851001, A2209851002, A2209851003, A2209851004, A2209851005, A2209851006, A2209851007, A2209851008)

Parameter	Units	Spiked Amount	Spike Result	Spike Recovery	Control Limits	Dup Result	Dup Recovery	RPD	RPD Limit	Lab
Chloride	mg/Kg	500	510	101	90 - 110	480	96	6	10	T
Sulfate	mg/Kg	500	500	101	90 - 110	470	93	8	10	T

Matrix Spike (4549764); Matrix Spike Duplicate (4549765); Parent Lab Sample (A2209851005)

Parameter	Units	Spiked Amount	Spike Result	Spike Recovery	Control Limits	Dup Result	Dup Recovery	RPD	RPD Limit	Lab
Chloride	mg/Kg	500	180	33	90 - 110	140	24	27	10	T
Sulfate	mg/Kg	500	170	33	90 - 110	110	22	39	10	T

QC Result Comments

Matrix Spike - 4549764 - Chloride

J4|Estimated Result

Matrix Spike - 4549764 - Sulfate

J4|Estimated Result

Matrix Spike Duplicate - 4549765 - Chloride

J4|Estimated Result

Matrix Spike Duplicate - 4549765 - Sulfate

J4|Estimated Result

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FINAL

Workorder: OUC SEC (A2209851)

QC Cross Reference

Lab ID	Sample ID	Prep Batch	Prep Method
ICPm/2986 - SW-846 6010			
A2209851001	B-01-10	DGMm/3098	SW-846 3050B
A2209851002	B-01-20	DGMm/3098	SW-846 3050B
A2209851003	B-01-30	DGMm/3098	SW-846 3050B
A2209851004	S-01	DGMm/3098	SW-846 3050B
A2209851005	S-02	DGMm/3098	SW-846 3050B
A2209851006	S-03	DGMm/3098	SW-846 3050B
ICPm/2989 - SW-846 6010			
A2209851007	S-04	DGMm/3104	SW-846 3050B
A2209851008	S-05	DGMm/3104	SW-846 3050B
WCAI/16084 - SM 2540G			
A2209851001	B-01-10		
A2209851002	B-01-20		
A2209851003	B-01-30		
A2209851004	S-01		
A2209851005	S-02		
A2209851006	S-03		
A2209851007	S-04		
A2209851008	S-05		
WCAI/16187 - EPA 9056			
A2209851001	B-01-10		
A2209851002	B-01-20		
A2209851003	B-01-30		
A2209851004	S-01		
A2209851005	S-02		
A2209851006	S-03		
A2209851007	S-04		
A2209851008	S-05		

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Fax: (407) 937-1597

FINAL

Workorder: OUC SEC (A2209851)

		☐ Altamonte Springs, 380 North Lake Blvd., Suite 1048, Altamonte Springs, FL 32255-1580 ☐ Fort Myers, 13100 Westlark Lane, Fort Myers, FL 33907 ☐ Jacksonville, 6601 Southpark Park, Jacksonville, FL 32256 ☐ Tallahassee, 2330 North Monroe St., Tallahassee, FL 32309					
Client Name: <u>Jacobs</u>		Project Name: _____					
Address: _____		Project Number: _____					
Phone: <u>(904) 981-9230</u>		FDEP Facility No: _____					
FAX: _____		FDEP Facility Addr: _____					
Contact: <u>David P. Howard</u>		Special Instructions: _____					
Sampled By: <u>LI</u>		Special Instructions: _____					
Standard		Rush					
AEL Profile #: <u>71944</u>		ADAPT					
SAMPLE ID	SAMPLE DESCRIPTION	Grab Comp	EQUIS	Other	NO. COUNT	ANALYSIS REQUIRED	BOTTLE SI & TYPE
B-01-10	Sample from 0-10 feet		11/7	1030	50		
B-01-20	" from 10-20 feet		11/7	1100	50		
B-01-30	" from 20-30 feet		11/7	1100	50		
S-01	Sample Top Soil - 6"		11/8	1035	50		
S-02	Sample Sand FILL - 6"		11/8	1120	50		
S-03	Sample Sand FILL - 6"		11/9	1000	50		
S-04	Sample Top Soil - 6"		11/9	1130	50		
S-05	Sample Top Soil - 6"						
Matrix Code: WW=wastewater, SW=surface water, GW=ground water, DW=drinking water, MW=marine water, O=oil, A=air, SO=soil, SL=sediment		Preservation Code: I=ice, H=HCl, S=H2SO4, N=HNO3, T=Sodium Thiosulfate, AA=Ascorbic/HCl, AB=Ascorbic/NaoH		Temp. when received (observed) <u>4</u> °C Temp. when received (corrected) _____ °C		Temp. when received (observed) _____ °C Temp. when received (corrected) _____ °C	
Received on ice ☒ Yes ☐ No ☐ Temp taken from sample ☐ Temp from blank ☐ Where required, pH checked _____		Device used for measuring Temp by unique identifier (circle IR temp gun used) _____		Temp. when received (observed) _____ °C Temp. when received (corrected) _____ °C		Temp. when received (observed) _____ °C Temp. when received (corrected) _____ °C	
DCN: AC-D051web Form last revised 07/26/2022		Device used for measuring Temp by unique identifier (circle IR temp gun used) _____		Temp. when received (observed) _____ °C Temp. when received (corrected) _____ °C		Temp. when received (observed) _____ °C Temp. when received (corrected) _____ °C	
Relinquished by: <u>[Signature]</u> Date: <u>11/9 15:44</u>		Received by: <u>[Signature]</u> Date: <u>11/9/22 15:44</u>		FOR DRINKING WATER USE: (When PWS information not otherwise supplied) PWS ID: _____		Supplier of Water: _____	
1		2		3		4	
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12		13		14		15	
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888		889					



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FINAL

Workorder: OUC SEC (A2209852)

November 29, 2022

DeAnna Simmons
Jacobs - Villages
2085 Buena Vista Blvd
The Villages, FL 32162

RE: Workorder: A2209852 OUC SEC

Dear DeAnna Simmons:

Enclosed are the analytical results for sample(s) received by the laboratory on Wednesday November 9, 2022. Results reported herein conform to the most current NELAC standards, where applicable, unless otherwise narrated in the body of the report. The analytical results for the samples contained in this report were submitted for analysis as outlined by the Chain of Custody and results pertain only to these samples.

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

Sincerely,

Brandon O'Hara, Laboratory Manager
BOhara@AELLab.com

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Workorder: OUC SEC (A2209852)

Sample Summary

Lab ID	Sample ID	Matrix	Method	Date Collected	Date Received	Analytes Reported	Basis
A2209852001	B-01-10	WA	EPA 300.0	11/07/2022 11:50	11/09/2022 15:44	2	NA
A2209852001	B-01-10	WA	SM 2320B	11/07/2022 11:50	11/09/2022 15:44	3	NA
A2209852001	B-01-10	WA	SM 2540 C	11/07/2022 11:50	11/09/2022 15:44	1	NA
A2209852001	B-01-10	WA	SW-846 6010	11/07/2022 11:50	11/09/2022 15:44	4	NA
A2209852002	B-01-20	WA	EPA 300.0	11/07/2022 12:30	11/09/2022 15:44	2	NA
A2209852002	B-01-20	WA	SM 2320B	11/07/2022 12:30	11/09/2022 15:44	3	NA
A2209852002	B-01-20	WA	SM 2540 C	11/07/2022 12:30	11/09/2022 15:44	1	NA
A2209852002	B-01-20	WA	SW-846 6010	11/07/2022 12:30	11/09/2022 15:44	4	NA
A2209852003	B-01-30	WA	EPA 300.0	11/07/2022 13:45	11/09/2022 15:44	2	NA
A2209852003	B-01-30	WA	SM 2320B	11/07/2022 13:45	11/09/2022 15:44	3	NA
A2209852003	B-01-30	WA	SM 2540 C	11/07/2022 13:45	11/09/2022 15:44	1	NA
A2209852003	B-01-30	WA	SW-846 6010	11/07/2022 13:45	11/09/2022 15:44	4	NA
A2209852004	SW-01	WA	EPA 300.0	11/08/2022 14:55	11/09/2022 15:44	2	NA
A2209852004	SW-01	WA	SM 2320B	11/08/2022 14:55	11/09/2022 15:44	3	NA
A2209852004	SW-01	WA	SM 2540 C	11/08/2022 14:55	11/09/2022 15:44	1	NA
A2209852004	SW-01	WA	SW-846 6010	11/08/2022 14:55	11/09/2022 15:44	4	NA
A2209852005	SW-02	WA	EPA 300.0	11/09/2022 14:20	11/09/2022 15:44	2	NA
A2209852005	SW-02	WA	SM 2320B	11/09/2022 14:20	11/09/2022 15:44	3	NA
A2209852005	SW-02	WA	SM 2540 C	11/09/2022 14:20	11/09/2022 15:44	1	NA
A2209852005	SW-02	WA	SW-846 6010	11/09/2022 14:20	11/09/2022 15:44	4	NA

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Workorder: OUC SEC (A2209852)

Workorder Summary

Batch Comments

ICPm/2985 - ICP 6010B Analysis

The matrix spike recoveries of Calcium, Magnesium, Sodium and Potassium for A2209849004 were outside control criteria due to the presence of target analytes in the sample. Recovery in the Laboratory Control Sample (LCS) was acceptable, which indicates the analytical batch was in control. The matrix spike outlier suggests an inconsistency in this matrix. The affected sample is qualified to indicate matrix interference.

WCAa/3793 - IC,E300.0,Water

The matrix spike and matrix spike duplicate percent recoveries applying to parent sample A220909849001 for CL were (88%, 88%) and for SO4 were (89%, 89%); respectively. The recoveries for both analytes in the Laboratory Control Sample were within the method required 90-110% range, indicating the batch was in control. The sample results have been qualified to indicate any matrix interference.

WCAa/3794 - IC,E300.0,Water

The matrix spike and matrix spike duplicate percent recoveries applying to parent sample A2209852004 for CL were (88%, 88%); respectively. The recoveries for THE analytes in the Laboratory Control Sample were within the method required 90-110% range, indicating the batch was in control. The sample results have been qualified to indicate any matrix interference.

WCAI/16106 - Alkalinity,SM2320B,Water

The relative percent difference (RPD) for the following analyte in the duplicate quality control sample for A2209852001 was outside control criteria. Failing RPD indicates inconsistency in the parent sample matrix. The associated LCS was within acceptable limits, indicating the analytical batch was in control. The data were qualified accordingly to indicate sample matrix interference.

Negative/zero alkalinity results are due to samples initial pH falling below titration endpoint of 4.5 in the following; A2209852001, A2209852002, A2209852003, A2209850001, A2209850002 & A2209850005

WCAI/16108 - Alkalinity,SM2320B,Water

Negative/zero alkalinity results are due to samples falling below a pH of 4.5 in the following; A2209850010

Analysis Results Comments

A2209852001 (B-01-10) - Alkalinity, Total

J4|Estimated Result

See Case Narration

A2209852002 (B-01-20) - Alkalinity, Total

See Case Narration

A2209852003 (B-01-30) - Alkalinity, Total

See Case Narration

A2209852004 (SW-01) - Chloride

J4|Estimated Result

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FINAL

Workorder: OUC SEC (A2209852)

Analytical Results Qualifiers

Parameter Qualifiers

U	The compound was analyzed for but not detected.
I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
J4	Estimated Result
CN	See Case Narration

Lab Qualifiers

A	DOH Certification #E53076 (FL NELAC) AEL-Altamonte Springs
M	DOH Certification #E82535 (FL NELAC) AEL-Miami
T	DOH Certification #E84589 (FL NELAC) AEL-Tampa

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FINAL

Workorder: OUC SEC (A2209852)

Analytical Results

Lab ID:	A2209852001	Date Collected:	11/07/2022 11:50	Matrix:	Water			
Sample ID:	B-01-10	Date Received:	11/09/2022 15:44					
Parameter	Results	Units	PQL	MDL	DF	Prepared	Analyzed	Lab
METALS (SW-846 3010A/SW-846 6010)								
Calcium	98	mg/L	1.0	0.20	1	11/15/2022 00:00	11/15/2022 15:16	M
Magnesium	11	mg/L	0.20	0.080	1	11/15/2022 00:00	11/15/2022 15:16	M
Potassium	24	mg/L	4.0	2.0	4	11/15/2022 00:00	11/21/2022 14:44	M
Sodium	37	mg/L	1.0	0.80	1	11/15/2022 00:00	11/15/2022 15:16	M
WET CHEMISTRY (EPA 300.0)								
Chloride	230	mg/L	25	0.19	5	11/22/2022 01:14	11/22/2022 01:14	A
Sulfate	310	mg/L	25	0.17	5	11/22/2022 01:14	11/22/2022 01:14	A
WET CHEMISTRY (SM 2320B)								
Alkalinity, Bicarbonate	5.0 U	mg/L	20	5.0	1	11/15/2022 13:48	11/15/2022 13:48	T
Alkalinity, Carbonate	5.0 U	mg/L	20	5.0	1	11/15/2022 13:48	11/15/2022 13:48	T
Alkalinity, Total	5.0 U	mg/L	20	5.0	1	11/15/2022 13:48	11/15/2022 13:48	T
WET CHEMISTRY (SM 2540 C)								
Total Dissolved Solids	780	mg/L	5.0	5.0	.5	11/14/2022 09:20	11/14/2022 09:20	A

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FINAL

Workorder: OUC SEC (A2209852)

Analytical Results

Lab ID: A2209852002
Sample ID: B-01-20

Date Collected: 11/07/2022 12:30
Date Received: 11/09/2022 15:44

Matrix: Water

Parameter	Results	Units	PQL	MDL	DF	Prepared	Analyzed	Lab
METALS (SW-846 3010A/SW-846 6010)								
Calcium	1300	mg/L	4.0	0.80	4	11/15/2022 00:00	11/21/2022 14:47	M
Magnesium	5.3	mg/L	0.20	0.080	1	11/15/2022 00:00	11/15/2022 15:23	M
Potassium	590	mg/L	4.0	2.0	4	11/15/2022 00:00	11/21/2022 14:47	M
Sodium	2800	mg/L	200	160	200	11/15/2022 00:00	11/21/2022 15:05	M
WET CHEMISTRY (EPA 300.0)								
Chloride	6800	mg/L	250	1.9	50	11/22/2022 10:15	11/22/2022 10:15	A
Sulfate	1400	mg/L	250	1.7	50	11/22/2022 10:15	11/22/2022 10:15	A
WET CHEMISTRY (SM 2320B)								
Alkalinity, Bicarbonate	5.0 U	mg/L	20	5.0	1	11/15/2022 13:54	11/15/2022 13:54	T
Alkalinity, Carbonate	5.0 U	mg/L	20	5.0	1	11/15/2022 13:54	11/15/2022 13:54	T
Alkalinity, Total	5.0 U	mg/L	20	5.0	1	11/15/2022 13:54	11/15/2022 13:54	T
WET CHEMISTRY (SM 2540 C)								
Total Dissolved Solids	11000	mg/L	5.0	5.0	.5	11/14/2022 09:20	11/14/2022 09:20	A

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FINAL

Workorder: OUC SEC (A2209852)

Analytical Results

Lab ID: A2209852003
Sample ID: B-01-30

Date Collected: 11/07/2022 13:45
Date Received: 11/09/2022 15:44

Matrix: Water

Parameter	Results	Units	PQL	MDL	DF	Prepared	Analyzed	Lab
METALS (SW-846 3010A/SW-846 6010)								
Calcium	1400	mg/L	4.0	0.80	4	11/15/2022 00:00	11/21/2022 14:51	M
Magnesium	8.4	mg/L	0.20	0.080	1	11/15/2022 00:00	11/15/2022 15:27	M
Potassium	470	mg/L	4.0	2.0	4	11/15/2022 00:00	11/21/2022 14:51	M
Sodium	1900	mg/L	200	160	200	11/15/2022 00:00	11/21/2022 15:16	M
WET CHEMISTRY (EPA 300.0)								
Chloride	7500	mg/L	500	3.9	100	11/22/2022 11:50	11/22/2022 11:50	A
Sulfate	570	mg/L	500	3.4	100	11/22/2022 11:50	11/22/2022 11:50	A
WET CHEMISTRY (SM 2320B)								
Alkalinity, Bicarbonate	5.0 U	mg/L	20	5.0	1	11/15/2022 13:57	11/15/2022 13:57	T
Alkalinity, Carbonate	5.0 U	mg/L	20	5.0	1	11/15/2022 13:57	11/15/2022 13:57	T
Alkalinity, Total	5.0 U	mg/L	20	5.0	1	11/15/2022 13:57	11/15/2022 13:57	T
WET CHEMISTRY (SM 2540 C)								
Total Dissolved Solids	10000	mg/L	5.0	5.0	.5	11/14/2022 09:20	11/14/2022 09:20	A

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FINAL

Workorder: OUC SEC (A2209852)

Analytical Results

Lab ID: A2209852004
Sample ID: SW-01

Date Collected: 11/08/2022 14:55
Date Received: 11/09/2022 15:44

Matrix: Water

Parameter	Results	Units	PQL	MDL	DF	Prepared	Analyzed	Lab
METALS (SW-846 3010A/SW-846 6010)								
Calcium	220	mg/L	1.0	0.20	1	11/18/2022 00:00	11/21/2022 15:33	M
Magnesium	8.3	mg/L	0.20	0.080	1	11/18/2022 00:00	11/21/2022 15:33	M
Potassium	51	mg/L	1.0	0.50	1	11/18/2022 00:00	11/21/2022 15:33	M
Sodium	210	mg/L	4.0	3.2	4	11/18/2022 00:00	11/23/2022 15:33	M
WET CHEMISTRY (EPA 300.0)								
Chloride	620	mg/L	50	0.39	10	11/22/2022 02:32	11/22/2022 02:32	A
Sulfate	120	mg/L	50	0.34	10	11/22/2022 02:32	11/22/2022 02:32	A
WET CHEMISTRY (SM 2320B)								
Alkalinity, Bicarbonate	5.0 U	mg/L	20	5.0	1	11/15/2022 15:09	11/15/2022 15:09	T
Alkalinity, Carbonate	5.0 U	mg/L	20	5.0	1	11/15/2022 15:09	11/15/2022 15:09	T
Alkalinity, Total	5.0 U	mg/L	20	5.0	1	11/15/2022 15:09	11/15/2022 15:09	T
WET CHEMISTRY (SM 2540 C)								
Total Dissolved Solids	2300	mg/L	5.0	5.0	.5	11/14/2022 09:20	11/14/2022 09:20	A

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FINAL

Workorder: OUC SEC (A2209852)

Analytical Results

Lab ID: A2209852005
Sample ID: SW-02

Date Collected: 11/09/2022 14:20
Date Received: 11/09/2022 15:44

Matrix: Water

Parameter	Results	Units	PQL	MDL	DF	Prepared	Analyzed	Lab
METALS (SW-846 3010A/SW-846 6010)								
Calcium	290	mg/L	1.0	0.20	1	11/18/2022 00:00	11/21/2022 15:36	M
Magnesium	4.2	mg/L	0.20	0.080	1	11/18/2022 00:00	11/21/2022 15:36	M
Potassium	12	mg/L	1.0	0.50	1	11/18/2022 00:00	11/21/2022 15:36	M
Sodium	32	mg/L	1.0	0.80	1	11/18/2022 00:00	11/21/2022 15:36	M
WET CHEMISTRY (EPA 300.0)								
Chloride	76	mg/L	50	0.39	10	11/22/2022 03:10	11/22/2022 03:10	A
Sulfate	590	mg/L	50	0.34	10	11/22/2022 03:10	11/22/2022 03:10	A
WET CHEMISTRY (SM 2320B)								
Alkalinity, Bicarbonate	130	mg/L	20	5.0	1	11/15/2022 17:49	11/15/2022 17:49	T
Alkalinity, Carbonate	5.0 U	mg/L	20	5.0	1	11/15/2022 17:49	11/15/2022 17:49	T
Alkalinity, Total	130	mg/L	20	5.0	1	11/15/2022 17:49	11/15/2022 17:49	T
WET CHEMISTRY (SM 2540 C)								
Total Dissolved Solids	1200	mg/L	5.0	5.0	.5	11/14/2022 09:20	11/14/2022 09:20	A

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FINAL

Workorder: OUC SEC (A2209852)

QC Results

QC Batch: ICPm/2985
Preparation Method: SW-846 3010A
Associated Lab IDs: A2209852001, A2209852002, A2209852003

Analysis Method: SW-846 6010

Method Blank(4545559)

Parameter	Results	Units	PQL	MDL	Lab
Calcium	0.20 U	mg/L	1.0	0.20	M
Potassium	0.50 U	mg/L	1.0	0.50	M
Magnesium	0.080 U	mg/L	0.20	0.080	M
Sodium	0.80 U	mg/L	1.0	0.80	M

Lab Control Sample (4545560)

Parameter	Units	Spiked Amount	Spike Result	Spike Recovery	Control Limits	Lab
Calcium	mg/L	4	4.1	103	80 - 120	M
Potassium	mg/L	10	10	102	80 - 120	M
Magnesium	mg/L	2	2.1	104	80 - 120	M
Sodium	mg/L	16	16	103	80 - 120	M

Matrix Spike (4545561); Matrix Spike Duplicate (4545562); Parent Lab Sample (A2209849004)

Parameter	Units	Spiked Amount	Spike Result	Spike Recovery	Control Limits	Dup Result	Dup Recovery	RPD	RPD Limit	Lab
Calcium	mg/L	4	200	-115	75 - 125	210	288	8	20	M
Potassium	mg/L	10	120	46	75 - 125	130	157	9	20	M
Magnesium	mg/L	2	15	63	75 - 125	16	126	8	20	M

QC Result Comments

Matrix Spike - 4545561 - Calcium

J4|Estimated Result

Matrix Spike - 4545561 - Magnesium

J4|Estimated Result

Matrix Spike - 4545561 - Potassium

J4|Estimated Result

Matrix Spike Duplicate - 4545562 - Calcium

J4|Estimated Result

Matrix Spike Duplicate - 4545562 - Magnesium

J4|Estimated Result





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FINAL

Workorder: OUC SEC (A2209852)

QC Result Comments

Matrix Spike Duplicate - 4545562 - Potassium

J4|Estimated Result

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FINAL

Workorder: OUC SEC (A2209852)

QC Results

QC Batch: ICPm/2996
Preparation Method: SW-846 3010A
Associated Lab IDs: A2209852004, A2209852005

Analysis Method: SW-846 6010

Method Blank(4552149)

Parameter	Results	Units	PQL	MDL	Lab
Calcium	0.20 U	mg/L	1.0	0.20	M
Potassium	0.50 U	mg/L	1.0	0.50	M
Magnesium	0.080 U	mg/L	0.20	0.080	M
Sodium	0.80 U	mg/L	1.0	0.80	M

Lab Control Sample (4552150)

Parameter	Units	Spiked Amount	Spike Result	Spike Recovery	Control Limits	Lab
Calcium	mg/L	4	4.1	102	80 - 120	M
Potassium	mg/L	10	9.9	99	80 - 120	M
Magnesium	mg/L	2	2	99	80 - 120	M
Sodium	mg/L	16	16	101	80 - 120	M

Matrix Spike (4552151); Matrix Spike Duplicate (4552152); Parent Lab Sample (M2206357001)

Parameter	Units	Spiked Amount	Spike Result	Spike Recovery	Control Limits	Dup Result	Dup Recovery	RPD	RPD Limit	Lab
Calcium	mg/L	4	65	-52	75 - 125	76	234	16	20	M
Potassium	mg/L	10	53	56	75 - 125	62	146	16	20	M
Magnesium	mg/L	2	7	68	75 - 125	8.2	128	16	20	M
Sodium	mg/L	16	250	-29	75 - 125	280	205	14	20	M

QC Result Comments

Matrix Spike - 4552151 - Calcium

J4|Estimated Result

Matrix Spike - 4552151 - Magnesium

J4|Estimated Result

Matrix Spike - 4552151 - Potassium

J4|Estimated Result

Matrix Spike - 4552151 - Sodium

J4|Estimated Result

Matrix Spike Duplicate - 4552152 - Calcium

J4|Estimated Result

Matrix Spike Duplicate - 4552152 - Magnesium

J4|Estimated Result

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FINAL

Workorder: OUC SEC (A2209852)

QC Result Comments

Matrix Spike Duplicate - 4552152 - Potassium

J4|Estimated Result

Matrix Spike Duplicate - 4552152 - Sodium

J4|Estimated Result

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FINAL

Workorder: OUC SEC (A2209852)

QC Results

QC Batch: WCAa/3715 Analysis Method: SM 2540 C
Preparation Method: SM 2540 C
Associated Lab IDs: A2209852001, A2209852002, A2209852003, A2209852004

Method Blank(4543887)

Parameter	Results	Units	PQL	MDL	Lab
Total Dissolved Solids	10 U	mg/L	10	10	A

Lab Control Sample (4543888)

Parameter	Units	Spiked Amount	Spike Result	Spike Recovery	Control Limits	Lab
Total Dissolved Solids	mg/L	660	650	98	85 - 115	A

Sample Duplicate (4543889); Parent Lab Sample (A2209852001, A2209852002, A2209852003, A2209852004)

Parameter	Original	Duplicate	Units	RPD	RPD Limit	Lab
Total Dissolved Solids	1029	1059	mg/L	3	10	A

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FINAL

Workorder: OUC SEC (A2209852)

QC Results

QC Batch: WCAa/3725
Preparation Method: SM 2540 C
Associated Lab IDs: A2209852005

Analysis Method: SM 2540 C

Method Blank(4545463)

Parameter	Results	Units	PQL	MDL	Lab
Total Dissolved Solids	10 U	mg/L	10	10	A

Lab Control Sample (4545464)

Parameter	Units	Spiked Amount	Spike Result	Spike Recovery	Control Limits	Lab
Total Dissolved Solids	mg/L	660	650	99	85 - 115	A

Sample Duplicate (4545465); Parent Lab Sample (A2209852005)

Parameter	Original	Duplicate	Units	RPD	RPD Limit	Lab
Total Dissolved Solids	1722	1656	mg/L	4	10	A

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Workorder: OUC SEC (A2209852)

QC Results

QC Batch: WCAa/3793
Preparation Method: EPA 300.0
Associated Lab IDs: A2209852001

Analysis Method: EPA 300.0

Lab Control Sample (4561826)

Parameter	Units	Spiked Amount	Spike Result	Spike Recovery	Control Limits	Lab
Chloride	mg/L	50	50	99	90 - 110	A
Sulfate	mg/L	50	50	100	90 - 110	A

Method Blank(4561832)

Parameter	Results	Units	PQL	MDL	Lab
Chloride	0.039 U	mg/L	5.0	0.039	A
Sulfate	0.034 U	mg/L	5.0	0.034	A

Matrix Spike (4561833); Matrix Spike Duplicate (4561834); Parent Lab Sample (A2209850007)

Parameter	Units	Spiked Amount	Spike Result	Spike Recovery	Control Limits	Dup Result	Dup Recovery	RPD	RPD Limit	Lab
Chloride	mg/L	20	37	98	90 - 110	37	98	0.21	10	A
Sulfate	mg/L	20	20	90	90 - 110	20	90	0.44	10	A

Method Blank(4561836)

Parameter	Results	Units	PQL	MDL	Lab
Chloride	0.039 U	mg/L	5.0	0.039	A
Sulfate	0.034 U	mg/L	5.0	0.034	A

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Workorder: OUC SEC (A2209852)

QC Results

QC Batch: WCAa/3794

Analysis Method: EPA 300.0

Preparation Method: EPA 300.0

Associated Lab IDs: A2209852002, A2209852003, A2209852004, A2209852005

Lab Control Sample (4562129)

Parameter	Units	Spiked Amount	Spike Result	Spike Recovery	Control Limits	Lab
Chloride	mg/L	50	50	100	90 - 110	A
Sulfate	mg/L	50	50	100	90 - 110	A

Method Blank(4562131)

Parameter	Results	Units	PQL	MDL	Lab
Chloride	0.039 U	mg/L	5.0	0.039	A
Sulfate	0.034 U	mg/L	5.0	0.034	A

Matrix Spike (4562132); Matrix Spike Duplicate (4562133); Parent Lab Sample (A2209852004)

Parameter	Units	Spiked Amount	Spike Result	Spike Recovery	Control Limits	Dup Result	Dup Recovery	RPD	RPD Limit	Lab
Chloride	mg/L	200	800	370	90 - 110	800	370	0.0075	10	A
Sulfate	mg/L	200	310	150	90 - 110	310	150	0.0680	10	A

Method Blank(4562135)

Parameter	Results	Units	PQL	MDL	Lab
Chloride	0.039 U	mg/L	5.0	0.039	A
Sulfate	0.034 U	mg/L	5.0	0.034	A

QC Result Comments

Matrix Spike - 4562132 - Chloride

J4|Estimated Result

Matrix Spike - 4562132 - Sulfate

J4|Estimated Result

Matrix Spike Duplicate - 4562133 - Chloride

J4|Estimated Result

Matrix Spike Duplicate - 4562133 - Sulfate

J4|Estimated Result

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FINAL

Workorder: OUC SEC (A2209852)

QC Results

QC Batch: WCA/16106 Analysis Method: SM 2320B
Preparation Method: SM 2320B
Associated Lab IDs: A2209852001, A2209852002, A2209852003

Sample Duplicate (4545527); Parent Lab Sample (A2209852001, A2209852002, A2209852003)

Parameter	Original	Duplicate	Units	RPD	RPD Limit	Lab
Alkalinity, Total	-.27	-1.36	mg/L	-134	20	T

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Workorder: OUC SEC (A2209852)

QC Results

QC Batch: WCA/16106 Analysis Method: SM 2320B
Preparation Method: SM 2320B
Associated Lab IDs: A2209852001, A2209852002, A2209852003, A2209852004

Method Blank(4545525)

Parameter	Results	Units	PQL	MDL	Lab
Alkalinity, Total	5.0 U	mg/L	20	5.0	T

Lab Control Sample (4545526)

Parameter	Units	Spiked Amount	Spike Result	Spike Recovery	Control Limits	Lab
Alkalinity, Total	mg/L	100	110	106	75 - 125	T

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Workorder: OUC SEC (A2209852)

QC Results

QC Batch: WCA/16106 Analysis Method: SM 2320B
Preparation Method: SM 2320B
Associated Lab IDs: A2209852002, A2209852003, A2209852004

Sample Duplicate (4545528); Parent Lab Sample (A2209852002, A2209852003, A2209852004)

Parameter	Original	Duplicate	Units	RPD	RPD Limit	Lab
Alkalinity, Total	21.9	21.33	mg/L	3	20	T

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FINAL

Workorder: OUC SEC (A2209852)

QC Results

QC Batch: WCA/16108
Preparation Method: SM 2320B
Associated Lab IDs: A2209852005

Analysis Method: SM 2320B

Method Blank(4545555)

Parameter	Results	Units	PQL	MDL	Lab
Alkalinity, Total	5.0 U	mg/L	20	5.0	T

Lab Control Sample (4545556)

Parameter	Units	Spiked Amount	Spike Result	Spike Recovery	Control Limits	Lab
Alkalinity, Total	mg/L	100	110	106	75 - 125	T

Sample Duplicate (4545557); Parent Lab Sample (A2209852005)

Parameter	Original	Duplicate	Units	RPD	RPD Limit	Lab
Alkalinity, Total	169.77	172.43	mg/L	2	20	T

Sample Duplicate (4545558); Parent Lab Sample (A2209852005)

Parameter	Original	Duplicate	Units	RPD	RPD Limit	Lab
Alkalinity, Total	287.83	292.94	mg/L	2	20	T

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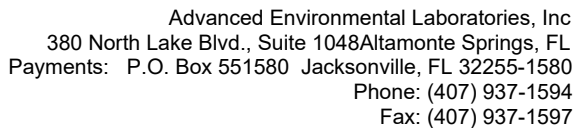
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Workorder: OUC SEC (A2209852)

QC Cross Reference

Lab ID	Sample ID	Prep Batch	Prep Method
ICPm/2985 - SW-846 6010			
A2209852001	B-01-10	DGMm/3097	SW-846 3010A
A2209852002	B-01-20	DGMm/3097	SW-846 3010A
A2209852003	B-01-30	DGMm/3097	SW-846 3010A
ICPm/2996 - SW-846 6010			
A2209852004	SW-01	DGMm/3112	SW-846 3010A
A2209852005	SW-02	DGMm/3112	SW-846 3010A
WCAa/3715 - SM 2540 C			
A2209852001	B-01-10		
A2209852002	B-01-20		
A2209852003	B-01-30		
A2209852004	SW-01		
WCAa/3725 - SM 2540 C			
A2209852005	SW-02		
WCAa/3793 - EPA 300.0			
A2209852001	B-01-10		
WCAa/3794 - EPA 300.0			
A2209852002	B-01-20		
A2209852003	B-01-30		
A2209852004	SW-01		
A2209852005	SW-02		
WCAI/16106 - SM 2320B			
A2209852001	B-01-10		
A2209852002	B-01-20		
A2209852003	B-01-30		
A2209852004	SW-01		
WCAI/16108 - SM 2320B			
A2209852005	SW-02		





Workorder: OUC SEC (A2209852)

Tuesday, November 29, 2022 6:57:03 PM
Dates and times are displayed using (-05:00)
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Workorder: OUC SEC (A2209888)

November 30, 2022

DeAnna Simmons
Jacobs - Villages
2085 Buena Vista Blvd
The Villages, FL 32162

RE: Workorder: A2209888 OUC SEC

Dear DeAnna Simmons:

Enclosed are the analytical results for sample(s) received by the laboratory on Friday November 11, 2022. Results reported herein conform to the most current NELAC standards, where applicable, unless otherwise narrated in the body of the report. The analytical results for the samples contained in this report were submitted for analysis as outlined by the Chain of Custody and results pertain only to these samples.

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

Sincerely,

Brandon O'Hara, Laboratory Manager
BOhara@AELLab.com

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FINAL

Workorder: OUC SEC (A2209888)

Sample Summary

Lab ID	Sample ID	Matrix	Method	Date Collected	Date Received	Analytes Reported	Basis
A2209888001	B11-10	WA	EPA 300.0	11/11/2022 07:45	11/11/2022 16:00	2	NA
A2209888001	B11-10	WA	SM 2320B	11/11/2022 07:45	11/11/2022 16:00	3	NA
A2209888001	B11-10	WA	SM 2540 C	11/11/2022 07:45	11/11/2022 16:00	1	NA
A2209888001	B11-10	WA	SW-846 6010	11/11/2022 07:45	11/11/2022 16:00	4	NA
A2209888002	B11-20	WA	EPA 300.0	11/11/2022 08:20	11/11/2022 16:00	2	NA
A2209888002	B11-20	WA	SM 2320B	11/11/2022 08:20	11/11/2022 16:00	3	NA
A2209888002	B11-20	WA	SM 2540 C	11/11/2022 08:20	11/11/2022 16:00	1	NA
A2209888002	B11-20	WA	SW-846 6010	11/11/2022 08:20	11/11/2022 16:00	4	NA
A2209888003	B11-30	WA	EPA 300.0	11/11/2022 09:15	11/11/2022 16:00	2	NA
A2209888003	B11-30	WA	SM 2320B	11/11/2022 09:15	11/11/2022 16:00	3	NA
A2209888003	B11-30	WA	SM 2540 C	11/11/2022 09:15	11/11/2022 16:00	1	NA
A2209888003	B11-30	WA	SW-846 6010	11/11/2022 09:15	11/11/2022 16:00	4	NA
A2209888004	B12-10	WA	EPA 300.0	11/11/2022 09:55	11/11/2022 16:00	2	NA
A2209888004	B12-10	WA	SM 2320B	11/11/2022 09:55	11/11/2022 16:00	3	NA
A2209888004	B12-10	WA	SM 2540 C	11/11/2022 09:55	11/11/2022 16:00	1	NA
A2209888004	B12-10	WA	SW-846 6010	11/11/2022 09:55	11/11/2022 16:00	4	NA
A2209888005	B12-20	WA	EPA 300.0	11/11/2022 10:30	11/11/2022 16:00	2	NA
A2209888005	B12-20	WA	SM 2320B	11/11/2022 10:30	11/11/2022 16:00	3	NA
A2209888005	B12-20	WA	SM 2540 C	11/11/2022 10:30	11/11/2022 16:00	1	NA
A2209888005	B12-20	WA	SW-846 6010	11/11/2022 10:30	11/11/2022 16:00	4	NA

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FINAL

Workorder: OUC SEC (A2209888)

Workorder Summary

Batch Comments

WCAa/3794 - IC,E300.0,Water

The matrix spike and matrix spike duplicate percent recoveries applying to parent sample A2209852004 for CL were (88%, 88%); respectively. The recoveries for THE analytes in the Laboratory Control Sample were within the method required 90-110% range, indicating the batch was in control. The sample results have been qualified to indicate any matrix interference.

WCAI/16163 - Alkalinity,SM2320B,Water

Negative/zero alkalinity results are due to samples initial pH falling below endpoint of titration of 4.5 in the following; A2209888005, A2209888004

WCAI/16164 - Alkalinity,SM2320B,Water

Negative/zero alkalinity results are due to samples initial pH falling below endpoint of titration of 4.5 in the following; A2209888003, A2209888003, G2209948009, G2209948004

Analysis Results Comments

A2209888002 (B11-20) - Alkalinity, Total

See Case Narration

A2209888003 (B11-30) - Alkalinity, Total

See Case Narration

A2209888004 (B12-10) - Alkalinity, Total

See Case Narration

A2209888005 (B12-20) - Alkalinity, Total

See Case Narration

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FINAL

Workorder: OUC SEC (A2209888)

Analytical Results Qualifiers

Parameter Qualifiers

U	The compound was analyzed for but not detected.
I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
CN	See Case Narration

Lab Qualifiers

A	DOH Certification #E53076 (FL NELAC) AEL-Altamonte Springs
M	DOH Certification #E82535 (FL NELAC) AEL-Miami
T	DOH Certification #E84589 (FL NELAC) AEL-Tampa

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FINAL

Workorder: OUC SEC (A2209888)

Analytical Results

Lab ID: A2209888001
Sample ID: B11-10

Date Collected: 11/11/2022 07:45
Date Received: 11/11/2022 16:00

Matrix: Water

Parameter	Results	Units	PQL	MDL	DF	Prepared	Analyzed	Lab
METALS (SW-846 3010A/SW-846 6010)								
Calcium	460	mg/L	1.0	0.20	1	11/18/2022 00:00	11/21/2022 15:47	M
Magnesium	22	mg/L	0.20	0.080	1	11/18/2022 00:00	11/21/2022 15:47	M
Potassium	90	mg/L	1.0	0.50	1	11/18/2022 00:00	11/21/2022 15:47	M
Sodium	160	mg/L	4.0	3.2	4	11/18/2022 00:00	11/23/2022 15:44	M
WET CHEMISTRY (EPA 300.0)								
Chloride	440	mg/L	120	0.96	25	11/22/2022 03:23	11/22/2022 03:23	A
Sulfate	1000	mg/L	120	0.85	25	11/22/2022 03:23	11/22/2022 03:23	A
WET CHEMISTRY (SM 2320B)								
Alkalinity, Bicarbonate	21	mg/L	20	5.0	1	11/16/2022 18:30	11/16/2022 18:30	T
Alkalinity, Carbonate	5.0 U	mg/L	20	5.0	1	11/16/2022 18:30	11/16/2022 18:30	T
Alkalinity, Total	21	mg/L	20	5.0	1	11/16/2022 18:30	11/16/2022 18:30	T
WET CHEMISTRY (SM 2540 C)								
Total Dissolved Solids	2300	mg/L	5.0	5.0	.5	11/14/2022 09:20	11/14/2022 09:20	A

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FINAL

Workorder: OUC SEC (A2209888)

Analytical Results

Lab ID: A2209888002
Sample ID: B11-20

Date Collected: 11/11/2022 08:20
Date Received: 11/11/2022 16:00

Matrix: Water

Parameter	Results	Units	PQL	MDL	DF	Prepared	Analyzed	Lab
METALS (SW-846 3010A/SW-846 6010)								
Calcium	660	mg/L	1.0	0.20	1	11/18/2022 00:00	11/21/2022 15:57	M
Magnesium	17	mg/L	0.20	0.080	1	11/18/2022 00:00	11/21/2022 15:57	M
Potassium	240	mg/L	1.0	0.50	1	11/18/2022 00:00	11/21/2022 15:57	M
Sodium	470	mg/L	4.0	3.2	4	11/18/2022 00:00	11/23/2022 15:47	M
WET CHEMISTRY (EPA 300.0)								
Chloride	1500	mg/L	120	0.96	25	11/22/2022 03:36	11/22/2022 03:36	A
Sulfate	1200	mg/L	120	0.85	25	11/22/2022 03:36	11/22/2022 03:36	A
WET CHEMISTRY (SM 2320B)								
Alkalinity, Bicarbonate	5.0 U	mg/L	20	5.0	1	11/16/2022 18:58	11/16/2022 18:58	T
Alkalinity, Carbonate	5.0 U	mg/L	20	5.0	1	11/16/2022 18:58	11/16/2022 18:58	T
Alkalinity, Total	5.0 U	mg/L	20	5.0	1	11/16/2022 18:58	11/16/2022 18:58	T
WET CHEMISTRY (SM 2540 C)								
Total Dissolved Solids	4200	mg/L	5.0	5.0	.5	11/14/2022 09:20	11/14/2022 09:20	A

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FINAL

Workorder: OUC SEC (A2209888)

Analytical Results

Lab ID: A2209888003
Sample ID: B11-30

Date Collected: 11/11/2022 09:15
Date Received: 11/11/2022 16:00

Matrix: Water

Parameter	Results	Units	PQL	MDL	DF	Prepared	Analyzed	Lab
METALS (SW-846 3010A/SW-846 6010)								
Calcium	3400	mg/L	200	40	200	11/18/2022 00:00	11/23/2022 15:51	M
Magnesium	19	mg/L	0.20	0.080	1	11/18/2022 00:00	11/21/2022 16:01	M
Potassium	1700	mg/L	200	100	200	11/18/2022 00:00	11/23/2022 15:51	M
Sodium	4200	mg/L	200	160	200	11/18/2022 00:00	11/23/2022 15:51	M
WET CHEMISTRY (EPA 300.0)								
Chloride	12000	mg/L	1000	7.7	200	11/22/2022 12:03	11/22/2022 12:03	A
Sulfate	940 I	mg/L	1000	6.8	200	11/22/2022 12:03	11/22/2022 12:03	A
WET CHEMISTRY (SM 2320B)								
Alkalinity, Bicarbonate	5.0 U	mg/L	20	5.0	1	11/16/2022 18:52	11/16/2022 18:52	T
Alkalinity, Carbonate	5.0 U	mg/L	20	5.0	1	11/16/2022 18:52	11/16/2022 18:52	T
Alkalinity, Total	5.0 U	mg/L	20	5.0	1	11/16/2022 18:52	11/16/2022 18:52	T
WET CHEMISTRY (SM 2540 C)								
Total Dissolved Solids	21000	mg/L	5.0	5.0	.5	11/14/2022 09:20	11/14/2022 09:20	A

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FINAL

Workorder: OUC SEC (A2209888)

Analytical Results

Lab ID: A2209888004
Sample ID: B12-10

Date Collected: 11/11/2022 09:55
Date Received: 11/11/2022 16:00

Matrix: Water

Parameter	Results	Units	PQL	MDL	DF	Prepared	Analyzed	Lab
METALS (SW-846 3010A/SW-846 6010)								
Calcium	450	mg/L	1.0	0.20	1	11/18/2022 00:00	11/21/2022 16:05	M
Magnesium	25	mg/L	0.20	0.080	1	11/18/2022 00:00	11/21/2022 16:05	M
Potassium	160	mg/L	1.0	0.50	1	11/18/2022 00:00	11/21/2022 16:05	M
Sodium	970	mg/L	200	160	200	11/18/2022 00:00	11/30/2022 15:43	M
WET CHEMISTRY (EPA 300.0)								
Chloride	3000	mg/L	250	1.9	50	11/22/2022 04:02	11/22/2022 04:02	A
Sulfate	95 I	mg/L	250	1.7	50	11/22/2022 04:02	11/22/2022 04:02	A
WET CHEMISTRY (SM 2320B)								
Alkalinity, Bicarbonate	5.0 U	mg/L	20	5.0	1	11/16/2022 18:35	11/16/2022 18:35	T
Alkalinity, Carbonate	5.0 U	mg/L	20	5.0	1	11/16/2022 18:35	11/16/2022 18:35	T
Alkalinity, Total	5.0 U	mg/L	20	5.0	1	11/16/2022 18:35	11/16/2022 18:35	T
WET CHEMISTRY (SM 2540 C)								
Total Dissolved Solids	4300	mg/L	5.0	5.0	.5	11/14/2022 09:20	11/14/2022 09:20	A

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FINAL

Workorder: OUC SEC (A2209888)

Analytical Results

Lab ID: A2209888005
Sample ID: B12-20

Date Collected: 11/11/2022 10:30
Date Received: 11/11/2022 16:00

Matrix: Water

Parameter	Results	Units	PQL	MDL	DF	Prepared	Analyzed	Lab
METALS (SW-846 3010A/SW-846 6010)								
Calcium	620	mg/L	1.0	0.20	1	11/18/2022 00:00	11/21/2022 16:08	M
Magnesium	22	mg/L	0.20	0.080	1	11/18/2022 00:00	11/21/2022 16:08	M
Potassium	250	mg/L	1.0	0.50	1	11/18/2022 00:00	11/21/2022 16:08	M
Sodium	1800	mg/L	200	160	200	11/18/2022 00:00	11/23/2022 15:58	M
WET CHEMISTRY (EPA 300.0)								
Chloride	4100	mg/L	250	1.9	50	11/22/2022 10:54	11/22/2022 10:54	A
Sulfate	75 I	mg/L	250	1.7	50	11/22/2022 10:54	11/22/2022 10:54	A
WET CHEMISTRY (SM 2320B)								
Alkalinity, Bicarbonate	5.0 U	mg/L	20	5.0	1	11/16/2022 18:32	11/16/2022 18:32	T
Alkalinity, Carbonate	5.0 U	mg/L	20	5.0	1	11/16/2022 18:32	11/16/2022 18:32	T
Alkalinity, Total	5.0 U	mg/L	20	5.0	1	11/16/2022 18:32	11/16/2022 18:32	T
WET CHEMISTRY (SM 2540 C)								
Total Dissolved Solids	6700	mg/L	5.0	5.0	.5	11/14/2022 09:20	11/14/2022 09:20	A

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FINAL

Workorder: OUC SEC (A2209888)

QC Results

QC Batch: ICPm/2996
Preparation Method: SW-846 3010A
Analysis Method: SW-846 6010
Associated Lab IDs: A2209888001, A2209888002, A2209888003, A2209888004, A2209888005

Method Blank(4552149)

Parameter	Results	Units	PQL	MDL	Lab
Calcium	0.20 U	mg/L	1.0	0.20	M
Potassium	0.50 U	mg/L	1.0	0.50	M
Magnesium	0.080 U	mg/L	0.20	0.080	M
Sodium	0.80 U	mg/L	1.0	0.80	M

Lab Control Sample (4552150)

Parameter	Units	Spiked Amount	Spike Result	Spike Recovery	Control Limits	Lab
Calcium	mg/L	4	4.1	102	80 - 120	M
Potassium	mg/L	10	9.9	99	80 - 120	M
Magnesium	mg/L	2	2	99	80 - 120	M
Sodium	mg/L	16	16	101	80 - 120	M

Matrix Spike (4552151); Matrix Spike Duplicate (4552152); Parent Lab Sample (M2206357001)

Parameter	Units	Spiked Amount	Spike Result	Spike Recovery	Control Limits	Dup Result	Dup Recovery	RPD	RPD Limit	Lab
Calcium	mg/L	4	65	-52	75 - 125	76	234	16	20	M
Potassium	mg/L	10	53	56	75 - 125	62	146	16	20	M
Magnesium	mg/L	2	7	68	75 - 125	8.2	128	16	20	M
Sodium	mg/L	16	250	-29	75 - 125	280	205	14	20	M

QC Result Comments

Matrix Spike - 4552151 - Calcium

J4|Estimated Result

Matrix Spike - 4552151 - Magnesium

J4|Estimated Result

Matrix Spike - 4552151 - Potassium

J4|Estimated Result

Matrix Spike - 4552151 - Sodium

J4|Estimated Result

Matrix Spike Duplicate - 4552152 - Calcium

J4|Estimated Result





FINAL

Workorder: OUC SEC (A2209888)

QC Result Comments

Matrix Spike Duplicate - 4552152 - Magnesium

J4|Estimated Result

Matrix Spike Duplicate - 4552152 - Potassium

J4|Estimated Result

Matrix Spike Duplicate - 4552152 - Sodium

J4|Estimated Result

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FINAL

Workorder: OUC SEC (A2209888)

QC Results

QC Batch: WCAa/3725

Analysis Method: SM 2540 C

Preparation Method: SM 2540 C

Associated Lab IDs: A2209888001, A2209888002, A2209888003, A2209888004, A2209888005

Method Blank(4545463)

Parameter	Results	Units	PQL	MDL	Lab
Total Dissolved Solids	10 U	mg/L	10	10	A

Lab Control Sample (4545464)

Parameter	Units	Spiked Amount	Spike Result	Spike Recovery	Control Limits	Lab
Total Dissolved Solids	mg/L	660	650	99	85 - 115	A

Sample Duplicate (4545465); Parent Lab Sample (A2209888001, A2209888002, A2209888003, A2209888004, A2209888005)

Parameter	Original	Duplicate	Units	RPD	RPD Limit	Lab
Total Dissolved Solids	1722	1656	mg/L	4	10	A

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FINAL

Workorder: OUC SEC (A2209888)

QC Results

QC Batch: WCAa/3794

Analysis Method: EPA 300.0

Preparation Method: EPA 300.0

Associated Lab IDs: A2209888001, A2209888002, A2209888003, A2209888004, A2209888005

Lab Control Sample (4562129)

Parameter	Units	Spiked Amount	Spike Result	Spike Recovery	Control Limits	Lab
Chloride	mg/L	50	50	100	90 - 110	A
Sulfate	mg/L	50	50	100	90 - 110	A

Method Blank(4562131)

Parameter	Results	Units	PQL	MDL	Lab
Chloride	0.039 U	mg/L	5.0	0.039	A
Sulfate	0.034 U	mg/L	5.0	0.034	A

Matrix Spike (4562132); Matrix Spike Duplicate (4562133); Parent Lab Sample (A2209852004)

Parameter	Units	Spiked Amount	Spike Result	Spike Recovery	Control Limits	Dup Result	Dup Recovery	RPD	RPD Limit	Lab
Chloride	mg/L	200	800	370	90 - 110	800	370	0.0075	10	A
Sulfate	mg/L	200	310	150	90 - 110	310	150	0.0680	10	A

Method Blank(4562135)

Parameter	Results	Units	PQL	MDL	Lab
Chloride	0.039 U	mg/L	5.0	0.039	A
Sulfate	0.034 U	mg/L	5.0	0.034	A

QC Result Comments

Matrix Spike - 4562132 - Chloride

J4|Estimated Result

Matrix Spike - 4562132 - Sulfate

J4|Estimated Result

Matrix Spike Duplicate - 4562133 - Chloride

J4|Estimated Result

Matrix Spike Duplicate - 4562133 - Sulfate

J4|Estimated Result

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FINAL

Workorder: OUC SEC (A2209888)

QC Results

QC Batch: WCA/16163 Analysis Method: SM 2320B
Preparation Method: SM 2320B
Associated Lab IDs: A2209888001, A2209888004, A2209888005

Method Blank(4548941)

Parameter	Results	Units	PQL	MDL	Lab
Alkalinity, Total	5.0 U	mg/L	20	5.0	T

Lab Control Sample (4548942)

Parameter	Units	Spiked Amount	Spike Result	Spike Recovery	Control Limits	Lab
Alkalinity, Total	mg/L	100	97	97	75 - 125	T

Sample Duplicate (4548944); Parent Lab Sample (A2209888001, A2209888004, A2209888005)

Parameter	Original	Duplicate	Units	RPD	RPD Limit	Lab
Alkalinity, Total	74.21	76.69	mg/L	3	20	T

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FINAL

Workorder: OUC SEC (A2209888)

QC Results

QC Batch: WCA/16164
Preparation Method: SM 2320B
Associated Lab IDs: A2209888002

Analysis Method: SM 2320B

Sample Duplicate (4548982); Parent Lab Sample (A2209888002)

Parameter	Original	Duplicate	Units	RPD	RPD Limit	Lab
Alkalinity, Total	7.48	7.36	mg/L	2	20	T

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FINAL

Workorder: OUC SEC (A2209888)

QC Results

QC Batch: WCA/16164
Preparation Method: SM 2320B
Associated Lab IDs: A2209888002, A2209888003

Analysis Method: SM 2320B

Method Blank(4548979)

Parameter	Results	Units	PQL	MDL	Lab
Alkalinity, Total	5.0 U	mg/L	20	5.0	T

Lab Control Sample (4548980)

Parameter	Units	Spiked Amount	Spike Result	Spike Recovery	Control Limits	Lab
Alkalinity, Total	mg/L	100	92	92	75 - 125	T

Sample Duplicate (4548981); Parent Lab Sample (A2209888002, A2209888003)

Parameter	Original	Duplicate	Units	RPD	RPD Limit	Lab
Alkalinity, Total	0	0	mg/L	0	20	T

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Workorder: OUC SEC (A2209888)

QC Cross Reference

Lab ID	Sample ID	Prep Batch	Prep Method
ICPm/2996 - SW-846 6010			
A2209888001	B11-10	DGMm/3112	SW-846 3010A
A2209888002	B11-20	DGMm/3112	SW-846 3010A
A2209888003	B11-30	DGMm/3112	SW-846 3010A
A2209888004	B12-10	DGMm/3112	SW-846 3010A
A2209888005	B12-20	DGMm/3112	SW-846 3010A
WCAa/3725 - SM 2540 C			
A2209888001	B11-10		
A2209888002	B11-20		
A2209888003	B11-30		
A2209888004	B12-10		
A2209888005	B12-20		
WCAa/3794 - EPA 300.0			
A2209888001	B11-10		
A2209888002	B11-20		
A2209888003	B11-30		
A2209888004	B12-10		
A2209888005	B12-20		
WCAI/16163 - SM 2320B			
A2209888001	B11-10		
A2209888004	B12-10		
A2209888005	B12-20		
WCAI/16164 - SM 2320B			
A2209888002	B11-20		
A2209888003	B11-30		

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Workorder: OUC SEC (A2209888)

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Fort Myers: 13100 Westline Terrace, Ste. 10, FL 33913 • 239.674.8130 • Lab ID: E54492
Jacksonville: 6661 Southport Pkwy., FL 32216 • 904.363.9350 • Lab ID: E52574
Tallahassee: 2303 North Monroe St., Suite D, FL 32303 • 904.219.6274 • Lab ID: E51105

Gainesville: 4665 NW 44th Blvd., FL 32609 • 352.399.8811 • Lab ID: E53076
Miramar: 10200
Tampa: 9810 PH

Client Name: Jacobs Project Name: _____
Address: _____ Project Number: _____
Phone: 904-881-9230 FDEP Facility No: _____
FAX: _____ FDEP Facility Addr: _____
Contact: David Rutland Special Instructions: _____
Sampled By: David Rutland
Standard Rush

ADAPT EQUIS Other

SAMPLE ID	SAMPLE DESCRIPTION	Grab Comp	SAMPLING		MATRIX	NO. COUNT	ANALYSIS REQUIRED	BOTTLE SIZE & TYPE
			DATE	TIME				
B10-10	Sample from 0-10'		11/11	7:45	GW		TDS	
B11-20	" 10-20'		11/11	8:20	GW		Ca, Mg, Na, K	
B11-30	" 20-30'		11/11	9:15	GW		Alkalinity	
B12-10	" 0-10'		11/11	9:55	GW		Cl, SO ₄	
B12-20	" 10-20'		11/11	10:30	GW			

Matrix Code: WW=wastewater, SW=surface water, GW=ground water, DW=drinking water, MW=marine water,
O=oil, A=air, SO=soil, SL=sediment

Received on Ice ☐ Yes ☐ No Temp taken from sample ☐ Temp from blank ☐ Where required, pH checked _____
DCN-AD-0051web Form last revised 07/26/2022 Device used for measuring Temp by unique identifier (circle in temp gun used) J: 9A G: LT-1 LT-2 I: 10A A: 3A M: 3A S: IV F: 1A

Relinquished by: [Signature] Date: 11/11 Time: 4:00 Received by: [Signature] Date: 11-22 Time: 16:00

FOR DRINKING WATER USE:
(When PWS information not otherwise supplied) PWS ID: _____
Contact Person: _____
Supplier of Water: _____
Site Address: _____

Preservation Code: I=Ice, H=HCl, S=H₂SO₄, N=HNO₃, T=Sodium Thiosulfate,
AA=AscorbicHCl, AB=AscorbicNaOH
Temp. when received (observed) 9 °C Temp. when received (corrected) _____ °C
J: 9A G: LT-1 LT-2 I: 10A A: 3A M: 3A S: IV F: 1A

LABORATORY I.D. NUMBER

* A 2 2 0 9 8 8 8 *



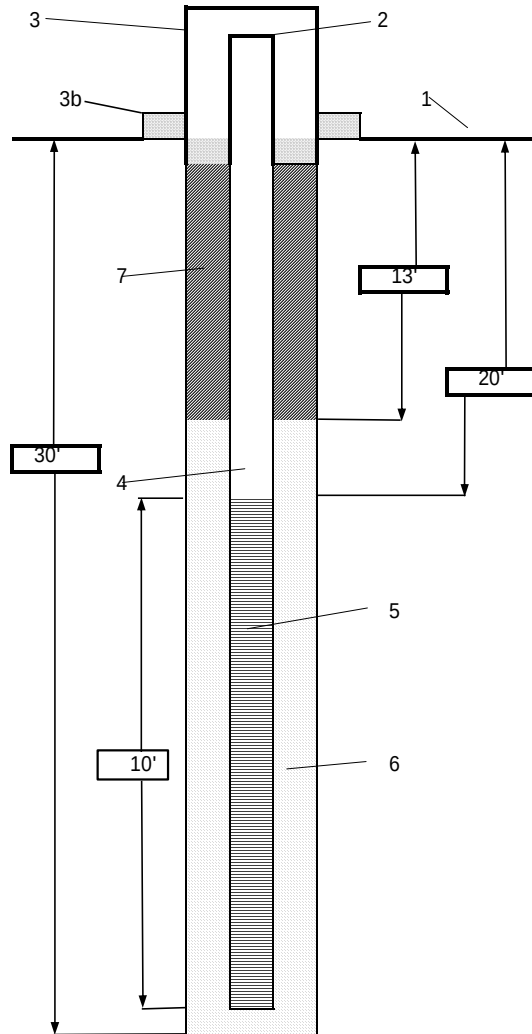
Appendix B. New Monitoring Well Installation Details

	PROJECT NUMBER D3292400		BORING NUMBER MW-E		
	SOIL BORING LOG				
PROJECT : OUC STANTON ENERGY CENTER LOCATION : OUC STANTON ENERGY CENTER, ORANGE COUNTY, FLORIDA					
ELEVATION : N/A DRILLING CONTRACTOR : CUSTOM DRILLING SERVICES					
DRILLING METHOD AND EQUIPMENT USED : HOLLOW STEM AUGER / GEOPROBE 7822 DT					
WATER LEVELS : N/A START : 5/2/24 @0900 END : 5/2/24 @ 1015 LOGGER : D. VANEGAS & N. SALAZAR					
DEPTH BELOW SURFACE (FT)	INTERVAL (FT)		STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION	COMMENTS
	RECOVERY (FT)	#/TYPE		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	DRILLER COMMENTS
5 10 15 20 25	0-3	3		TOP SOIL	
	3-4			TRACE ORGANICS	
	4-5			FINE SAND	
	5-10	5		FINE SAND, TRACE ORGANICS, WELL SORTED, DARK REDDISH BROWN (5YR 2.5/2), LOOSE TO VERY DENSELY PACKED, SATURATED SANDS STARTING @ 6 FT BLS.	
	10-22	5		FINE SAND, TRACE ORGANICS, WELL SORTED, DARK BROWN (10YR 7/4), DENSELY PACKED.	
	22-24	5		FINE SAND, LESS TRACE ORGANICS, WELL SORTED, DARK BROWN (10YR 7/4), DENSELY PACKED.	
	24-25			VERY FINE SANDY CLAY, LESS TRACE ORGANICS, WELL SORTED, DARK BROWN (10YR 7/4), DENSELY PACKED.	
	25-30	5		VERY FINE SAND, WELL SORTED, PALE BROWN (10YR 7/2), DENSELY PACKED.	

Jacobs				PROJECT NUMBER D3292400		BORING NUMBER MW-E		
				SOIL BORING LOG				
30		5						
	30-34							SANDY CLAY, GREENISH GRAY (5G 4/1), VERY DENSE, MEDIUM PLASTICITY.
35		5						
	34-38							CLAY, DARK GREENISH GRAY (5G 4/1), VERY DENSE, HIGH PLASTICITY.
	38-40				CLAYEY SAND, DARK GREENISH GRAY (5G 4/1), VERY DENSE, HIGH PLASTICITY.			
40								

PROJECT NUMBER D3292400	WELL NUMBER MW-E	SHEET 1	OF 1
WELL COMPLETION DIAGRAM			

PROJECT : OUC STANTON ENERGY CENTER	LOCATION : OUC STANTON ENERGY CENTER - ORANGE COUNTY, FLORIDA
DRILLING CONTRACTOR : CUSTOM DRILLING SERVICES	
DRILLING METHOD AND EQUIPMENT USED : HOLLOW STEM AUGER / GEOPROBE 7822DT	
WATER LEVELS : N/A	START : 5/02/2024 @0910 END : 5/02/24 @1551 LOGGER : D. VANEGAS & N. SALAZAR



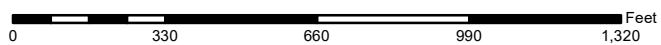
1- Ground elevation at well	N/A
2- Top of casing	3.0 FT ALS
3- Wellhead protection cover	ALUM ABOVE GND ENCLOSURE W/LOCKING CAP
a) drain tube?	N/A
b) concrete pad dimensions	2' X 2' X 0.5'
4- Dia./type of well casing	2" SCH 40 PVC
5- Type/slot size of screen	0.01"
	MACHINED
6- Type screen filter	20-30 SILICA SAND
a) Quantity used	5 BAGS
7- Type of seal	30-65 SILICA SAND
a) Quantity used	2 BAGS
8- Grout	
a) Grout mix used	NEAT PORTLAND CEMENT
b) Method of placement	GRAVITY
c) Vol. of well casing grout	0.35 ft³
Development method	SUBMERSIBLE PUMP (@1.2GPM)/SURGE
Development time	2.14 HOURS
Estimated purge volume	154.1 GALLONS
Comments	



Legend

-  Proposed Monitoring Well

Service Layer Credits: Source: Esri, Maxar, GeoEye,



VICINITY MAP

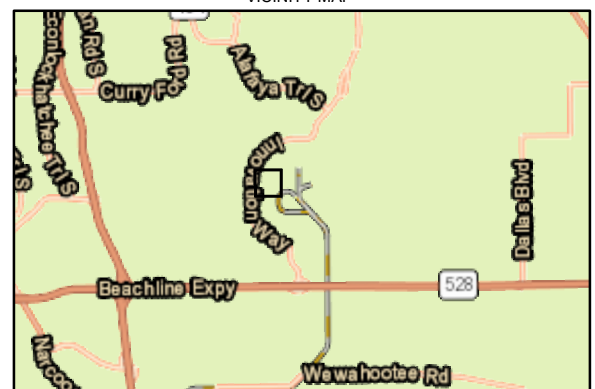


FIGURE
Proposed Monitor Well Site
OUC Stanton Energy Center

Appendix C. Laboratory Analysis Results

OUC Stanton CCR Monitoring Well Results, 2024								
Location ID	Sample Date	Parameter Name	MCL	Final Result Text	Final Result Units	Final Reporting Limit	Final Detection Limit	Qualifier Flag
MW-B	3/11/2024	Boron		97	µg/L	6	2	
MW-B	3/11/2024	Calcium		5,020	µg/L	500	80	
MW-B	3/11/2024	Chloride	250,000	13,800	µg/L	1,000	110	
MW-B	3/11/2024	Fluoride	4,000	48	µg/L	100	25	I
MW-B	3/11/2024	pH	6.5 to 8.5	4.76	pH Units			
MW-B	3/11/2024	Sulfate	250,000	25,700	µg/L	1,520	500	
MW-B	3/11/2024	TDS	500,000	104,000	µg/L	5,000	5,000	
MW-B	9/11/2024	Boron		105	µg/L	6	2	
MW-B	9/11/2024	Calcium		4,610	µg/L	500	80	
MW-B	9/11/2024	Chloride	250,000	9,810	µg/L	1,000	110	
MW-B	9/11/2024	Fluoride	4,000	60	µg/L	100	20	I
MW-B	9/11/2024	pH	6.5 to 8.5	4.51	pH Units			
MW-B	9/11/2024	Sulfate	250,000	32,300	µg/L	1,520	500	
MW-B	9/11/2024	TDS	500,000	106,000	µg/L	5,000	5,000	
MW-C	3/11/2024	Boron		12	µg/L	6	2	
MW-C	3/11/2024	Calcium		9,470	µg/L	500	80	
MW-C	3/11/2024	Chloride	250,000	23,600	µg/L	1,000	110	
MW-C	3/11/2024	Fluoride	4,000	78	µg/L	100	25	I
MW-C	3/11/2024	pH	6.5 to 8.5	5.25	pH Units			
MW-C	3/11/2024	Sulfate	250,000	5,330	µg/L	1,520	500	
MW-C	3/11/2024	TDS	500,000	123,000	µg/L	5,000	5,000	
MW-C	7/16/2024	Sulfate	250,000	7,910	µg/L	300	100	
MW-C	9/11/2024	Boron		14	µg/L	6	2	
MW-C	9/11/2024	Calcium		7,850	µg/L	500	80	
MW-C	9/11/2024	Chloride	250,000	21,000	µg/L	1,000	110	
MW-C	9/11/2024	Fluoride	4,000	80	µg/L	100	20	I
MW-C	9/11/2024	pH	6.5 to 8.5	5.1	pH Units			
MW-C	9/11/2024	Sulfate	250,000	4,920	µg/L	300	100	
MW-C	9/11/2024	TDS	500,000	81,000	µg/L	5,000	5,000	
MW-C	10/29/2024	Sulfate	250,000	7,170	µg/L	300	100	
MW-D	3/11/2024	Boron		124	µg/L	6	2	
MW-D	3/11/2024	Calcium		1,870,000	µg/L	50,000	8,000	
MW-D	3/11/2024	Chloride	250,000	7,990,000	µg/L	200,000	22,000	
MW-D	3/11/2024	Fluoride	4,000	44	µg/L	100	25	I

OUC Stanton CCR Monitoring Well Results, 2024								
Location ID	Sample Date	Parameter Name	MCL	Final Result Text	Final Result Units	Final Reporting Limit	Final Detection Limit	Qualifier Flag
MW-D	3/11/2024	pH	6.5 to 8.5	4.05	pH Units			
MW-D	3/11/2024	Sulfate	250,000	700,000	µg/L	60,600	20,200	
MW-D	3/11/2024	TDS	500,000	21,800,000	µg/L	5,000	5,000	
MW-D	7/16/2024	Boron		105	µg/L	6	2	
MW-D	7/16/2024	Calcium		1,910,000	µg/L	50,000	5,000	
MW-D	7/16/2024	Chloride	250,000	7,870,000	µg/L	250,000	27,500	
MW-D	7/16/2024	Fluoride	4,000	-	µg/L	100	20	ND
MW-D	7/16/2024	Sulfate	250,000	786,000	µg/L	75,800	25,200	
MW-D	7/16/2024	TDS	500,000	18,000,000	µg/L	5,000	5,000	
MW-D	9/11/2024	Boron		112	µg/L	6	2	
MW-D	9/11/2024	Calcium		2,120,000	µg/L	50,000	8,000	
MW-D	9/11/2024	Chloride	250,000	8,180,000	µg/L	250,000	27,500	
MW-D	9/11/2024	Fluoride	4,000	4,820	µg/L	2,000	500	
MW-D	9/11/2024	pH	6.5 to 8.5	4.09	pH Units			
MW-D	9/11/2024	Sulfate	250,000	828,000	µg/L	75,800	25,200	
MW-D	9/11/2024	TDS	500,000	18,600,000	µg/L	5,000	5,000	
MW-D	10/29/2024	Boron		134	µg/L	6	2	
MW-D	10/29/2024	Calcium		2,240,000	µg/L	50,000	8,000	
MW-D	10/29/2024	Chloride	250,000	12,000,000	µg/L	250,000	27,500	
MW-D	10/29/2024	Fluoride	4,000	5,080	µg/L	2,000	500	
MW-D	10/29/2024	Sulfate	250,000	828,000	µg/L	75,800	25,200	
MW-D	10/29/2024	TDS	500,000	18,600,000	µg/L	5,000	5,000	

Flags: U = Results below method detection limit; I = The reported value is greater than or equal to the laboratory method detection limit but less than the laboratory practical quantitation limit.

Appendix D. Alternative Source Demonstration – OUC Stanton Energy Center Monitoring Well MW-C

Alternative Source Demonstration – OUC Stanton Energy Center Monitoring Well MW-C

Date: January 28, 2025

Project no: D3292401

Client: Orlando Utilities Commission

Prepared by: Jacobs

Jacobs Engineering Group Inc.

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Daniel C. Rutland, P.E.
Florida P.E. No. 77035

The sulfate concentration at MW-C was higher than the statistical upper limit for samples collected during 2024. It should be noted that the statistical analysis for sulfate at MW-C is based on historical measurements at the lowest result that can be routinely quantified and reported by the laboratory. As a result, minor fluctuations in sulfate concentration about this limit will indicate a potential SSI.

Additionally, an alternative source demonstration completed in October of 2021 concluded that it would be highly unlikely that the groundwater at MW-C would be from the active cell of the CCR landfill (Appendix A). The soil properties and groundwater conditions controlling groundwater flow remain similar across the site. The results of the 2021 alternative source demonstration remain applicable. Because of the distance from MW-C to the active landfill it would take approximately 27 years for groundwater under the active landfill to reach MW-C. As such, it is concluded that the recorded SSI is not verified to be from the regulated CCR landfill and OUC's CCR groundwater monitoring program should remain in the Detection Monitoring program.

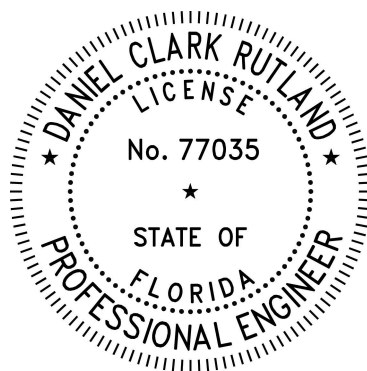
Appendix A. 2021 Alternate Source Demonstration for CCR Monitoring Wells OUC Stanton Energy Center CCR

2021 Alternate Source Demonstration for CCR Monitoring Wells: OUC Stanton Energy Center CCR

PREPARED FOR: Orlando Utility Commission
PREPARED BY: CH2M HILL Engineers, Inc.
DATE: October 18, 2021
PROJECT NUMBER: D3292400

Daniel C. Rutland, P.E.
Florida P.E. No. 77035

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Executive Summary

The Orlando Utilities Commission (OUC) has been conducting groundwater monitoring associated with the new coal combustion residuals (CCR) landfill consistent with the United States Environmental Protection Agency's (EPA's) CCR Rule¹ since September 2015. Activities and results prior to 2021 have been documented and posted on OUC's CCR website, as required by the CCR Rule. The OUC CCR groundwater monitoring system consists of one background monitoring well (MW), MW-A, and three compliance MWs, MW-B, MW-C, and MW-D. Sample results from the first semi-annual sampling event conducted on March 17, 2021 required retesting for identified statistically significant increases (SSIs) at wells MW-B, MW-C, and MW-D for pH, fluoride (F), sulfate (SO₄), calcium (Ca), chloride (Cl), and total dissolved solids (TDS) (parameters varied per well).

After checking the results with the lab and retesting on June 28, 2021, it was determined that the data at MW-D for pH, F, SO₄, Ca, Cl, and TDS were confirmed as SSIs that could not be explained by statistical analysis alone. The SSIs at MW-B and MW-C were not as high as those at MW-D, but had similar parameters with high Cl, Ca, pH, and/or TDS levels.

The groundwater sampling and statistical analyses of the groundwater quality data sets from the four MWs will be presented in the 2021 annual groundwater monitoring and corrective action report for the OUC Stanton Energy Center. This document presents a demonstration that the confirmed SSIs identified at the MWs are from an alternate source; thus, meeting the requirement of the CCR Rule to continue in the Detection Monitoring program. Since the concentrations in MW-D have been higher than at the other MWs, and the constituents of concern are Ca, Cl, SO₄, and TDS, the discussion focuses primarily on these four analytes.

As part of this alternate source demonstration, additional groundwater data were collected in September 2021 to evaluate hydrogeologic conditions in the surficial aquifer and determine the

¹ <https://www.epa.gov/coalash/coal-ash-rule>, accessed October 6, 2021.

expected travel time of groundwater from the new CCR landfill to MW-D. The results of this analysis indicate that the groundwater velocity in the surficial aquifer is too low to have traveled from the new CCR landfill to MW-D since the beginning of the new CCR landfill operation approximately 6 years ago. Results of this analysis indicated that the groundwater quality at MW-D cannot yet be influenced by the new CCR landfill and indicates that an alternate source is responsible for the water quality at MW-D. This demonstration is documented in this memorandum. Subsequently, continued Detection Monitoring is recommended so this situation can continue to be evaluated.

Background

The Stanton Energy Center (SEC) is located 12 miles southeast of Orlando, Florida. OUC has been operating SEC since 1987 and dry-managing CCRs in landfills on the west side of the property. The original, now closed, landfill received CCR from July 1987 through August 28, 2015. From the period of May 28 through August 15, 2015, the CCR directed to the closed landfill was used to form part of the landfill cap. The cap was completed with 2 feet of soil and then sodded to stabilize the soil. The old landfill is exempt from the CCR Rule because it ceased operations prior the prescribed date of the CCR Rule, October 17, 2017. The old landfill has been closed (hereinafter “closed landfill”) and is undergoing post-closure monitoring under OUC’s Conditions of Certification with the Florida Department of Environmental Protection (FDEP). The closed landfill has a 6.42-megawatt solar power generation farm installed over its top.

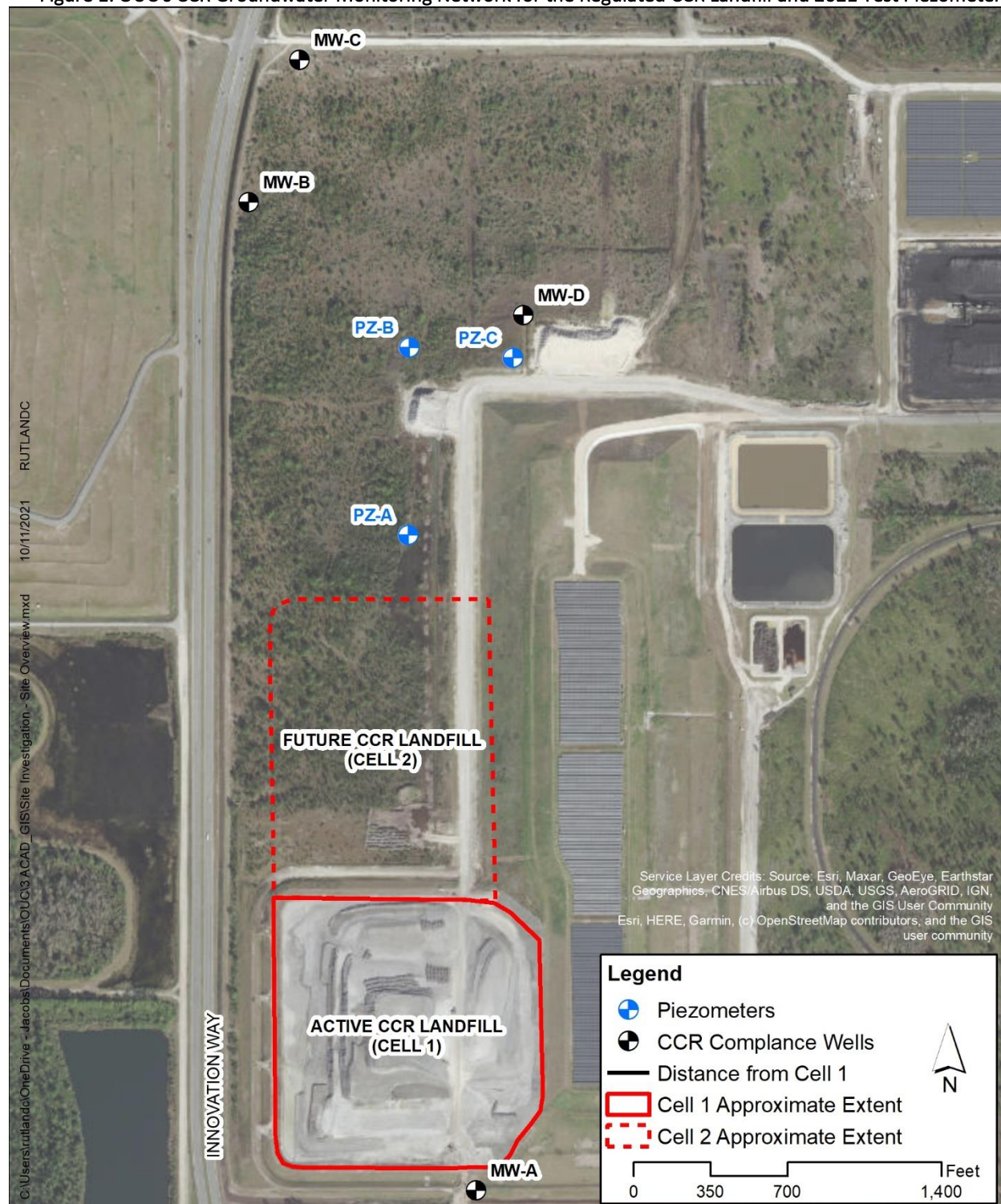
The new landfill (hereinafter “active landfill”) began receiving CCR on May 28, 2015 as a monofill that receives CCR produced by the SEC coal-fired power generating process. The new landfill is positioned immediately west of and adjacent to the closed landfill and immediately east of Innovation Way, which is the approximate SEC western property boundary. The design standards for the active landfill were compliant with Florida’s municipal solid waste landfill requirements under Chapter 62-701, Florida Administrative Code. The active landfill is fully double-lined and does not discharge into the surficial groundwater.

Groundwater conditions at SEC are regulated under two separate programs: the FDEP Power Plant Siting Act and the U.S. Environmental Protection Agency (EPA) CCR Rule. The FDEP monitoring program has been active since August 1986, while the CCR monitoring program began in October 2015. OUC has made a conscious effort to keep these programs separate because different regulatory requirements, different groundwater quality standards, and different monitored constituents. However, the groundwater conditions at the two adjacent landfills are common.

The CCR well monitoring network was installed in August 2015 and consisted of 4 MWs. MW-A is the background MW and MW-B, MW-C, and MW-D are compliance MWs (Figure 1). Background period groundwater quality sampling was performed from September 2015 through July 2017. Operational monitoring has been performed semi-annually beginning October 2017 to the present under the Detection Monitoring program of the CCR Rule. Data from the background monitoring period were used to establish statistically based evaluation criteria consistent with the CCR Rule. These baseline data established potential trends, when present, and statistical upper limits (and lower limit for pH) that are typically set at 95 percent confidence interval.

The March 17, 2021 semi-annual sampling and selective retest resampling on June 28, 2021 to confirm groundwater quality, determined that SSIs at the MWs associated with the active CCR unit were potentially present. When an SSI is determined from analysis of the data, the CCR Rule requires that the Detection Monitoring program convert to an Assessment Monitoring program unless the owner or operator demonstrates that the SSI resulted from an error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality, or was caused by a source other than the CCR unit. This analysis assessed the potential of an alternative source of contaminants in the groundwater.

Figure 1. OUC's CCR Groundwater Monitoring Network for the Regulated CCR Landfill and 2021 Test Piezometers



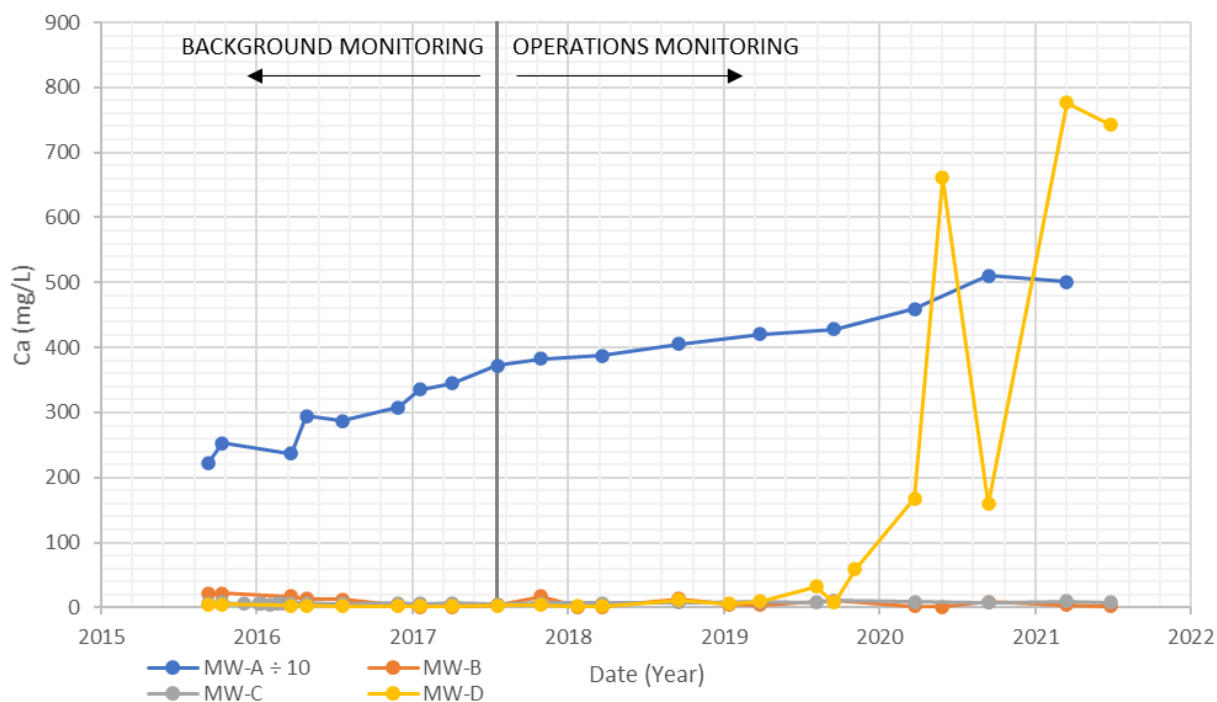
Groundwater Quality Data

Groundwater quality data for Ca, Cl, SO₄, and TDS are presented to show patterns among the MWs in Figures 2a through 2d. The background monitoring period is identified on the charts. Of interest are the concentrations of Ca and Cl at MW-D that began to increase on September 17, 2019 continued through the May 29, 2020 confirmatory selective resampling. The patterns show a sharp increase of concentrations in May. The September 14, 2020 sampling results in Figures 2a and 2b, respectively, had a sharp decrease of Ca and Cl concentrations. The March 17, 2021 sampling event showed elevated concentrations again, with confirmation sampling completed on June 28, 2021.

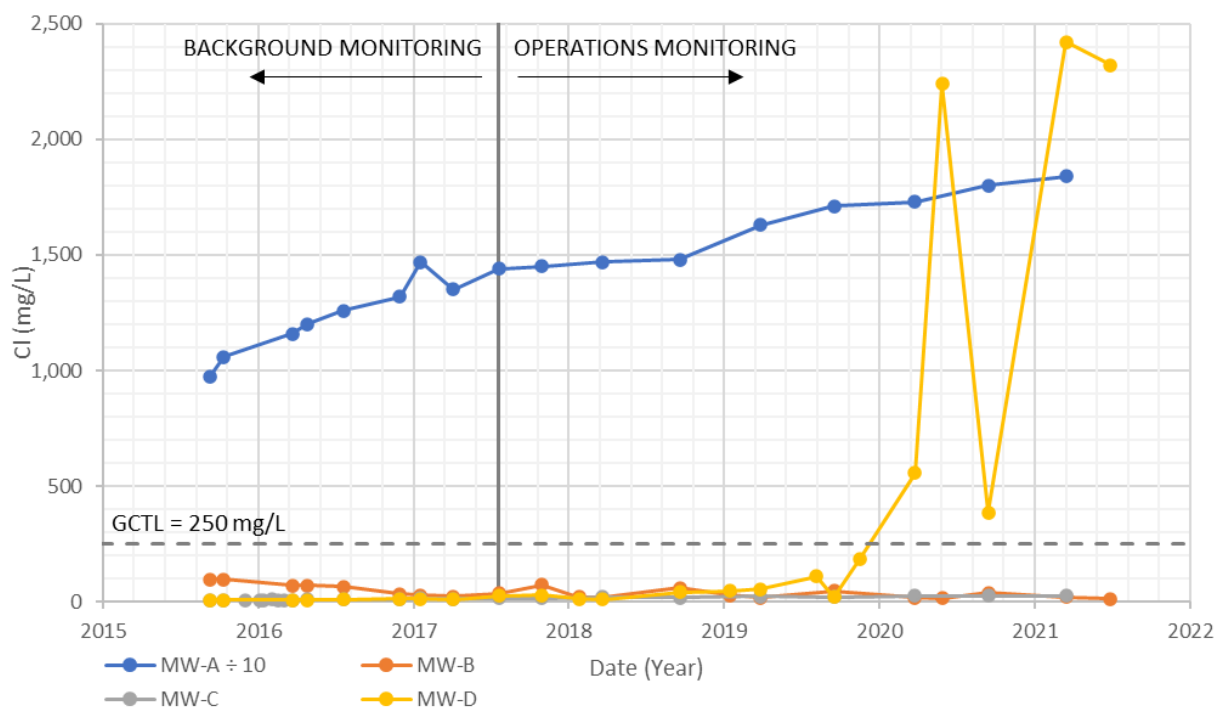
It was determined that the data at MW-D for pH, F, SO₄, Ca, Cl, and TDS were confirmed as SSIs that could not be explained by statistical analysis alone. The concentrations for these parameters were orders of magnitude different from the baseline data, approximately 1.3 to 470 times the statistical upper prediction limits (UPL). The pH was greater than the UPL when the baseline trend was applied, but the value of 4.22 standard units is not a water quality issue. The F and SO₄ concentrations at MW-D were greater than the UPL, but still below the primary and secondary maximum contaminant limits (MCL) of 4 mg/L and 250 mg/L, respectively.

The SSIs at MW-B and MW-C were not as high as those at MW-D, but had similar parameters with high Cl, Ca, pH, and/or TDS levels. The Cl and TDS analytes were approximately two times greater than the UPL at MW-B in the retest results. However, sampled values of Cl and TDS were below the secondary MCLs of 250 mg/L and 500 mg/L, respectively. At MW-C pH, Ca, and TDS were retested, but only pH and TDS were above the UPL. The pH retest value was 5.2 standard units and while that was high compared to baseline, it is not a water quality issue. While the TDS retest value was above the UPL, it was significantly below the secondary MCL.

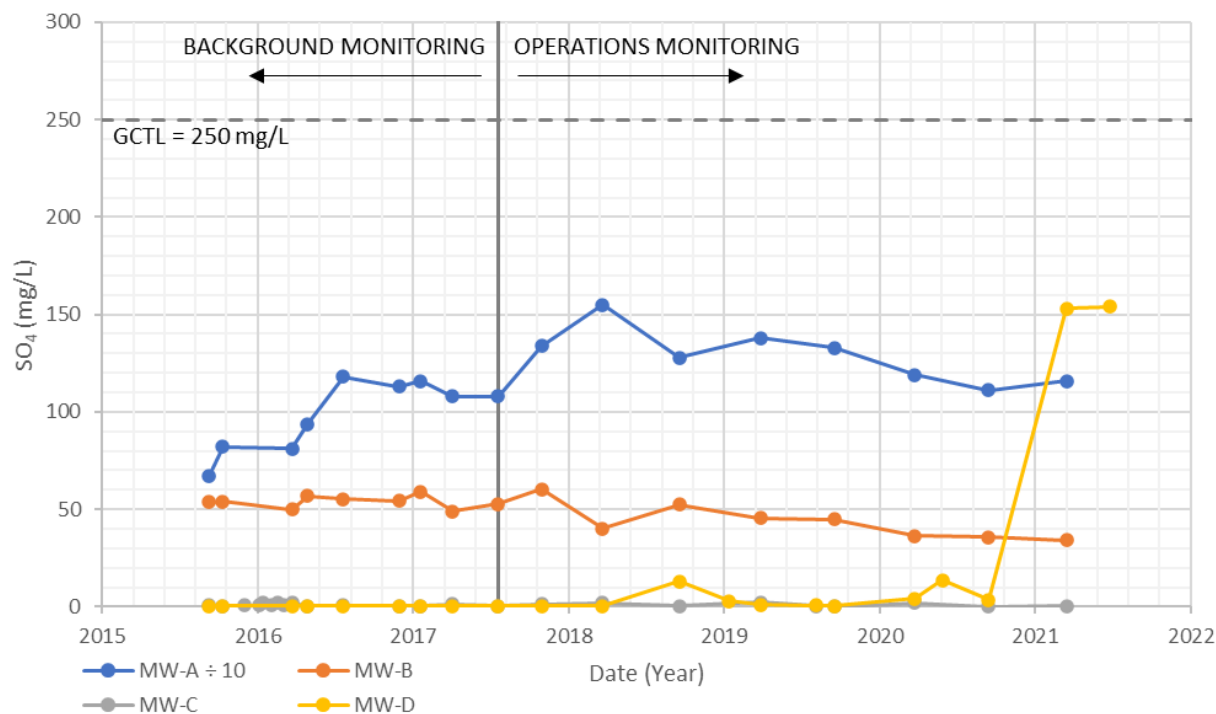
Figures 2a through 2d. Raw Groundwater Quality at the CCR Monitoring Wells



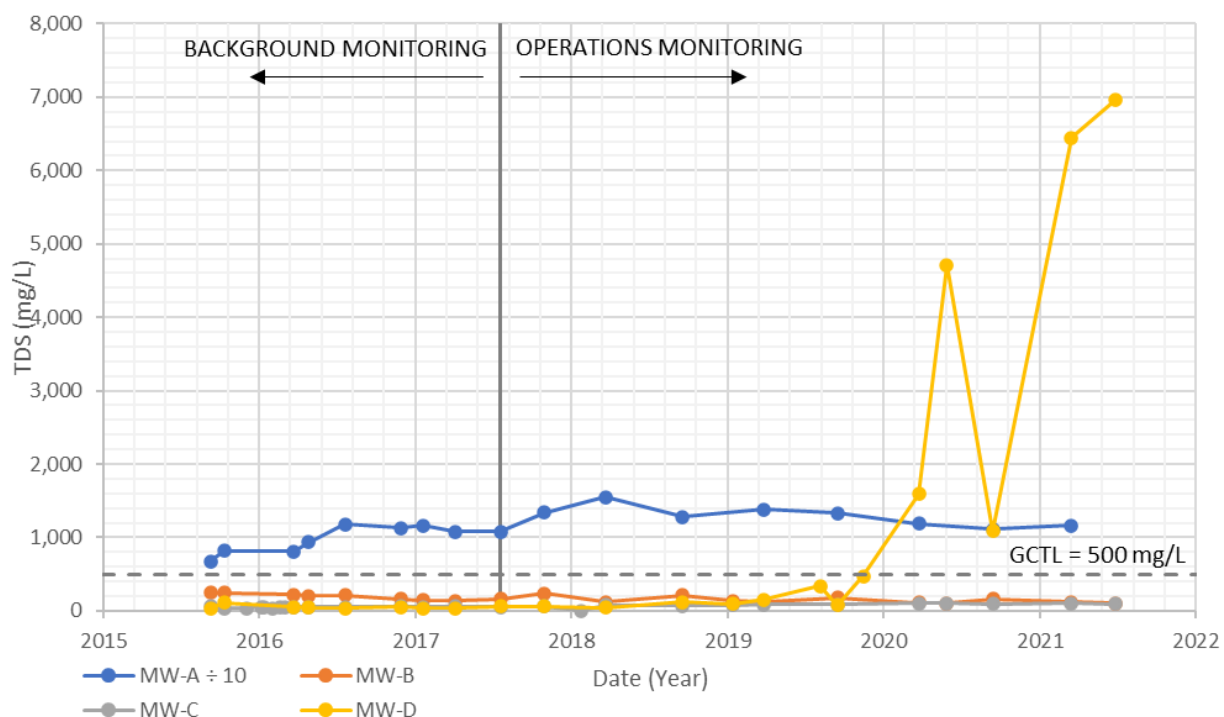
2a. Calcium



2b. Chloride



2c. Sulfate



2d. Total Dissolved Solids

Groundwater Monitoring Infrastructure and Testing

OUC has finished the construction of a new CCR landfill Cell 2 adjacent to and north of Cell 1 (Figure 1). The design standards for the horizontal expansion were compliant with Florida's municipal solid waste landfill requirements under Chapter 62-701, Florida Administrative Code. Cell 2 is fully double lined with a leachate collection system that pumps to the lined Combustion Waste Storage area (CWSA) Runoff Ponds and does not discharge into the surficial groundwater. It has not started receiving CCR materials.

The groundwater table north of the newly constructed cell is about 2.5 feet below land surface (bls) and the MWs are 30 feet bls with the screened intervals between 20 to 30 feet bls (screens fully submersed in the groundwater). MW-D is over 2,600 feet from the north side of the active landfill cell (Cell 1) and 1,200 feet from the north side of the new cell (Cell 2). MW-B is about 3,200 feet from the active landfill cell and 1,700 feet from the new cell. MW-C is the furthest north and away from the active landfill cell (about 3,800 feet) and disturbed soils.

Three new piezometers were installed on September 29, 2021 to measure the surficial aquifer properties in the area between the active landfill cell and MW-D (Figure 1). PZ-A is located approximately 320 feet north of the newly constructed landfill cell, over 1,600 feet north the active landfill cell, and approximately 1,100 feet southwest of MW-D. PZ-B is located over 1,110 feet north of the newly constructed landfill cell, over 2,500 feet north of the active landfill cell, and approximately 530 feet west of MW-D. PZ-C is located approximately 1,700 feet north of the newly constructed landfill cell, over 2,400 feet from the active landfill cell, and approximately 190 feet south of MW-D.

The soil lithology was continuously sampled to approximately 35 feet bls at each piezometer location prior to the casing installation. Soil sampling generally shows that approximately 30 to 35 feet of deep fine sands overlay a dense clay layer that has a thickness of greater than 5 feet. This clay layer provides an apparent shallow confining layer in the vicinity of the tested area. Detailed lithology results are included in Appendix A.

Each piezometer was installed above the clay layer to a depth of 30 feet bls utilizing a hollow stem auger. Piezometers were installed utilizing 2-inch schedule 40 PVC with a 10-foot screen interval (screened between 20 to 30 feet bls). A typical clean sand (20-40 silica sand) was used for the filter pack in the screen interval with approximately 1 to 2 feet of fine sand above the top of screen. All three wells were completed to the surface with neat cement grout and finished with a 2 ft by 2 ft by 4-inch concrete pad. Detailed well completion diagrams are included in Appendix B. Piezometer development was completed using a 2-inch submersible pump and surging.

After piezometer installation and development, slug tests were completed at each well to characterize the surficial aquifer hydraulic conductivity. Prior to slug testing, static water level data was collected from the new piezometers and existing monitoring wells in the vicinity of the active and newly constructed landfill cell. A summary of water levels and hydraulic gradient can be seen in Figure 3.

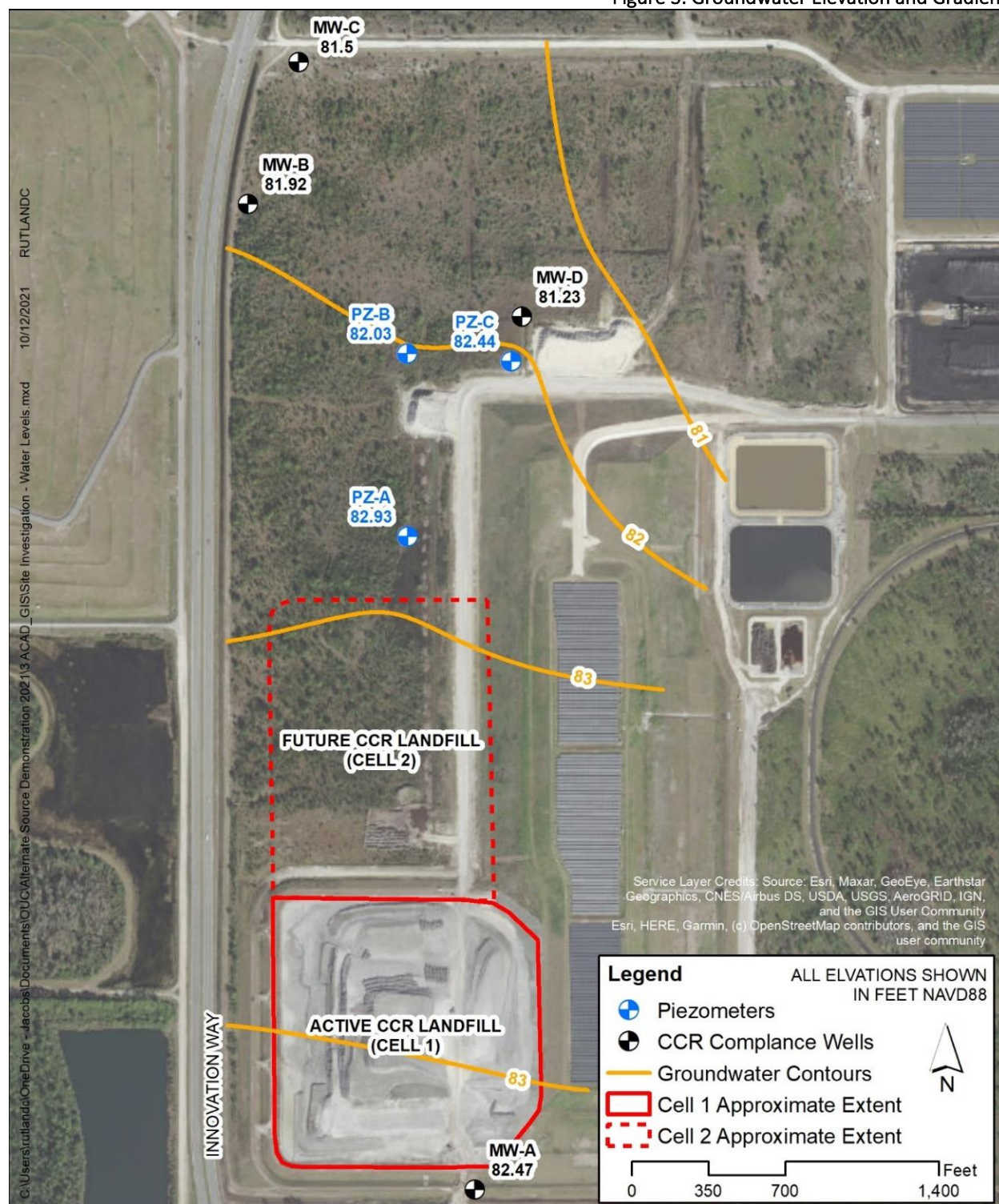
Slug tests were conducted using a vented pressure transducer and a 5-foot long 1.5-inch diameter positive displacement rod. Slug testing was conducted utilizing both rising head (slug-in) and falling head (slug-out) tests. The pressure transducer recorded depth every 250 milliseconds, allowing for the collection of detailed water level data within each piezometer during testing. Results were analyzed using the AQTESOLV program and the KGS Model solution and are summarized in Table 1 and Appendix C. Results at the new piezometers ranged from 7.1 to 20.9 feet/day.

These results are consistent with previously documented hydraulic conductivity testing completed on site. Previous testing found hydraulic conductivity of the surficial aquifer to range between 8.5 and 22.0 feet/day (Ardaman & Associates, Inc., 2011).

Table 1. Summary of Slug Test Results

Piezometer ID	Hydraulic Conductivity (ft/day)	
	Rising Head Test (slug-in)	Falling Head Test (slug-out)
PZ-A	7.2	7.2
PZ-B	20.9	19.7
PZ-C	11.8	12.0

Figure 3. Groundwater Elevation and Gradient



Groundwater Flow Analysis

The new information collected as part of the site investigative activities was used to calculate velocity and flow rate of the surficial aquifer in the area between the active landfill cell and MW-D. Utilizing Darcy's equation for flow through a porous medium (Equation 1), solving for specific discharge (Equation 2), and calculating soil pore space velocity (Equation 3), the velocity and travel times for groundwater originating from the edge of the active landfill cell can be estimated.

$$Q = KA(h_0 - h_1)/L \quad \text{Equation 1}$$

$$q = K(h_0 - h_1)/L \quad \text{Equation 2}$$

$$v = K(h_0 - h_1)/(nL) \quad \text{Equation 3}$$

Where:

Q = Flow (ft³/day)

q = Specific Discharge (ft/day)

v = Groundwater Velocity (ft/day)

K = Hydraulic Conductivity (ft/day)

h_0 = Upgradient Hydraulic Head (ft)

h_1 = Downgradient Hydraulic Head (ft)

L = Distance in Direction of Flow (ft)

n = Soil Porosity (dimensionless)

Based on the soil borings completed prior to piezometer installation, an estimated value for soil porosity for fine sand of 30 percent was utilized in Equation 3. The hydraulic gradient between the active landfill Cell 1 and MW-D was measured to be 0.0015 ft/ft. A more inclined gradient between PZ-C and MW-D was measured to be 0.0058 ft/ft. Using the range of hydraulic gradients relative to MW-D (0.0015 to 0.0058 ft/ft) and the highest measured hydraulic conductivity of 20.9 ft/day, it is estimated that groundwater travels at velocity between 0.105 and 0.405 ft/day. Based on these results, it will take between 7 and 26 years for groundwater to travel 1,000 feet, depending on groundwater gradient conditions. Therefore, the fastest conservative calculated travel time from the edge of the active landfill cell to MW-D would be greater than 16.9 years, as shown in Figure 4.

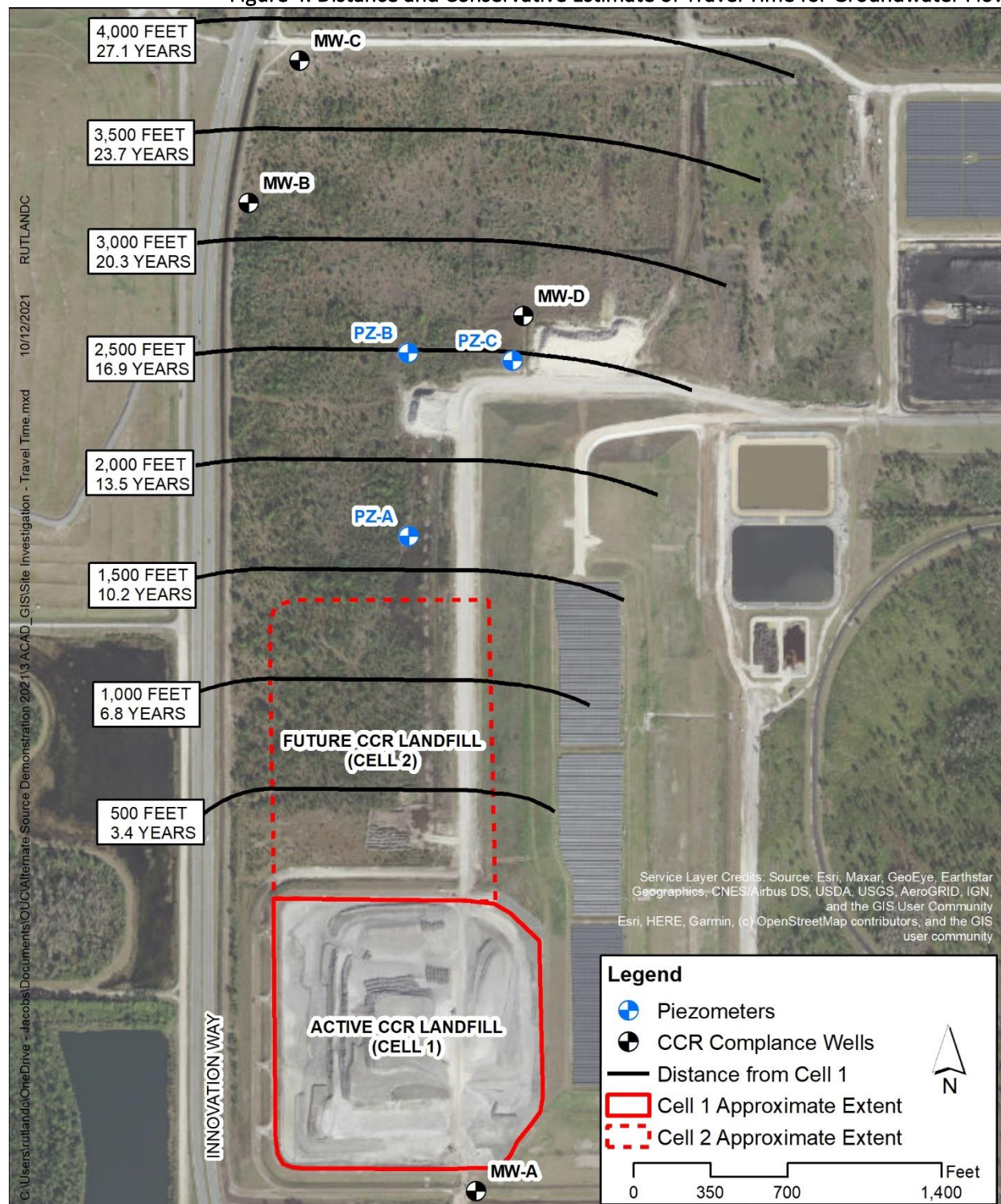
Conclusion

The CCR landfill active cell is relatively new (6 years old) and located far away from the compliance MWs. Groundwater does not move very quickly along the low gradient landscape at OUC Stanton Energy Center. From this analysis, utilizing new site-specific data, it is concluded to be highly unlikely that the groundwater at MW-B, MW-C, and MW-D is from the active cell of the CCR landfill. It is improbable that the lined CCR landfill would be a source of identified SSIs. Based on this new information, the changes in groundwater quality observed at MW-B, MW-C, and MW-D cannot yet be influenced by active CCR landfill activities. Therefore, an alternate source is likely influencing the groundwater quality at these wells.

Recommendations

1. OUC's CCR groundwater monitoring program should remain in the Detection Monitoring program.
2. Conduct additional field investigations to identify the source influencing water quality at MW-D.

Figure 4. Distance and Conservative Estimate of Travel Time for Groundwater Flow



References

Ardaman & Associates, Inc. 2021. Hydrogeological Report Proposed Horizontal Expansion of Combustion Waste Storage Area. Orlando Utilities Commission, Stanton Energy Center, Orange County Florida.

U.S. Environmental Protection Agency (EPA). 2020. Disposal of Coal Combustion Residuals from Electric Utilities Rulemakings. Website with history and linking rule and updates.

<https://www.epa.gov/coalash/coal-ash-rule>, Accessed September 2, 2020.

APPENDIX A Soil Boring Logs



PROJECT NUMBER
D3292400

BORING NUMBER
PZ-A

SOIL BORING LOG

PROJECT : OUC STANTON ENERGY CENTER LOCATION : OUC STANTON ENERGY CENTER, ORANGE COUNTY, FLORIDA
ELEVATION : N/A DRILLING CONTRACTOR : CUSTOM DRILLING SERVICES
DRILLING METHOD AND EQUIPMENT USED : SONIC
WATER LEVELS : N/A START : 9/29/21 @ 1715 END : 9/29/21 @ 1800 LOGGER : D. VANEGAS

DEPTH BELOW SURFACE (FT)		STANDARD PENETRATION TEST RESULTS		SOIL DESCRIPTION	COMMENTS
	INTERVAL (FT)	RECOVERY (FT)	6"-6"-6"-6" (N)	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	DRILLER COMMENTS
		#/TYPE			
				TOP SOIL	
5					
10	10			FINE SAND, TRACE ORGANICS, WELL SORTED, DARK REDDISH BROWN (5YR 2.5/2), LOOSE TO VERY DENSELY PACKED.	
15					
20	10			FINE SAND, WELL SORTED, DARK BROWN (10YR 7/4), DENSELY PACKED.	
25					
	5			VERY FINE SAND, WELL SORTED, PALE BROWN (10YR 7/2), DENSELY PACKED.	



PROJECT NUMBER
D3292400

BORING NUMBER
PZ-A

SOIL BORING LOG

30

5

SANDY CLAY, GREENISH GRAY (5G 4/1), VERY
DENSE, MEDIUM PLASTICITY.

35

CLAY, DARK GREENISH GRAY (5G 4/1), VERY
DENSE, HIGH PLASTICITY.



PROJECT NUMBER
D3292400

BORING NUMBER
PZ-B

SOIL BORING LOG

PROJECT : OUC STANTON ENERGY CENTER LOCATION : OUC STANTON ENERGY CENTER, ORANGE COUNTY, FLORIDA

ELEVATION : N/A DRILLING CONTRACTOR : CUSTOM DRILLING SERVICES

DRILLING METHOD AND EQUIPMENT USED : SONIC

WATER LEVELS N/A START : 9/29/21 @ 0945 END : 9/29/21 @ 1115 LOGGER : D. VANEGAS

DEPTH BELOW SURFACE (FT)				STANDARD	SOIL DESCRIPTION	COMMENTS
	INTERVAL (FT)	RECOVERY (FT)		PENETRATION	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	DRILLER COMMENTS
		#/TYPE		TEST RESULTS		
				6"-6"-6"-6" (N)		
5					TOP SOIL	
10	10				FINE SAND, TRACE ORGANICS, WELL SORTED, DARK REDDISH BROWN (5YR 2.5/2), LOOSE TO VERY DENSELY PACKED.	
15						
20	10				FINE SAND, WELL SORTED, VERY PALE BROWN (10YR 7/4), DENSELY PACKED.	
25						
	5				VERY FINE SAND, WELL SORTED, VERY PALE BROWN (10YR 7/4), DENSELY PACKED.	

Jacobs					PROJECT NUMBER D3292400		BORING NUMBER PZ-B	
					SOIL BORING LOG			
30					SILT SAND, WELL SORTED, VERY PALE ORANGE (10YR 5/8), DENSELY PACKED.			
35		5			CLAY, DARK GREENISH GRAY (5G 4/1), VERY DENSE, HIGH PLASTICITY.			



PROJECT NUMBER
D3292400

BORING NUMBER
PZ-C

SOIL BORING LOG

PROJECT : OUC STANTON ENERGY CENTER LOCATION : OUC STANTON ENERGY CENTER, ORANGE COUNTY, FLORIDA
ELEVATION : N/A DRILLING CONTRACTOR : CUSTOM DRILLING SERVICES
DRILLING METHOD AND EQUIPMENT USED : SONIC
WATER LEVELS : N/A START : 9/29/21 @ 1355 END : 9/29/21 @ 1450 LOGGER : D. VANEGAS

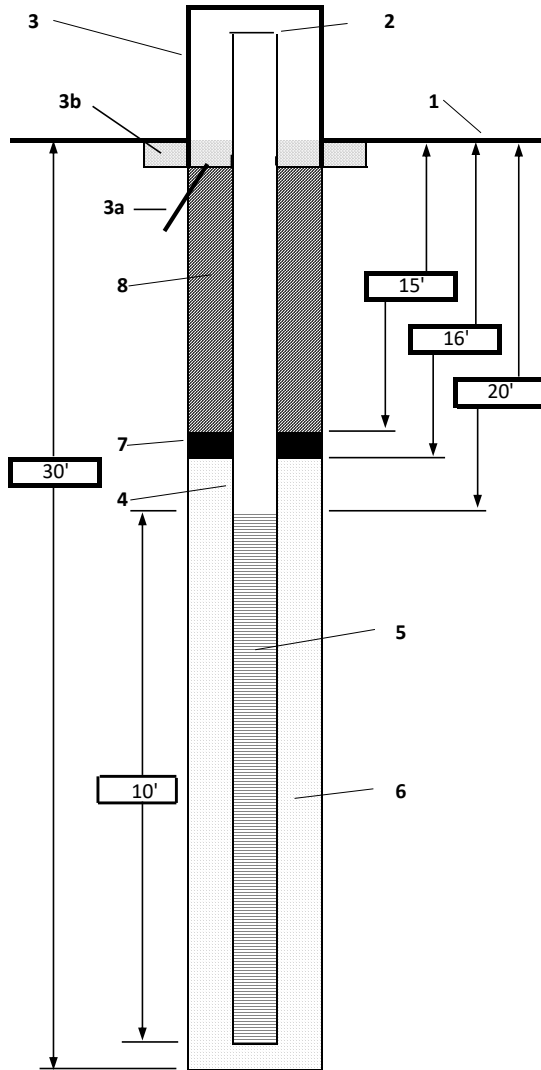
DEPTH BELOW SURFACE (FT)	INTERVAL (FT)		STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION	COMMENTS
	RECOVERY (FT)	#/TYPE		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	DRILLER COMMENTS
				TOP SOIL	
5		10		FINE SAND, TRACE ORGANICS, WELL SORTED, DARK REDDISH BROWN (5YR 2.5/2), LOOSE TO VERY DENSELY PACKED.	
10		10		VERY FINE SAND, WELL SORTED, VERY PALE BROWN (10YR 7/4), DENSELY PACKED.	
15				VERY FINE SAND, WELL SORTED, PALE BROWN (10YR 7/2), MODERATELY PACKED.	
20		5		SILT SAND, WELL SORTED, VERY PALE ORANGE (10YR 5/8), DENSELY PACKED, TRACE CLAY	
25				VERY FINE SAND, WELL SORTED, PALE BROWN (10YR 7/2). MODERATELY PACKED.	

Jacobs				PROJECT NUMBER D3292400		BORING NUMBER PZ-C	
				SOIL BORING LOG			
30					SANDY CLAY, GREENISH GRAY (5G 4/1), VERY DENSE, MEDIUM PLASTICITY.		
		5			CLAY, DARK GREENISH GRAY (5G 4/1), VERY DENSE, HIGH PLASTICITY.		
35							

APPENDIX B Well Completion Diagrams

PROJECT NUMBER D3292400	WELL NUMBER PZ-A
SHEET 1 OF 1	
WELL COMPLETION DIAGRAM	

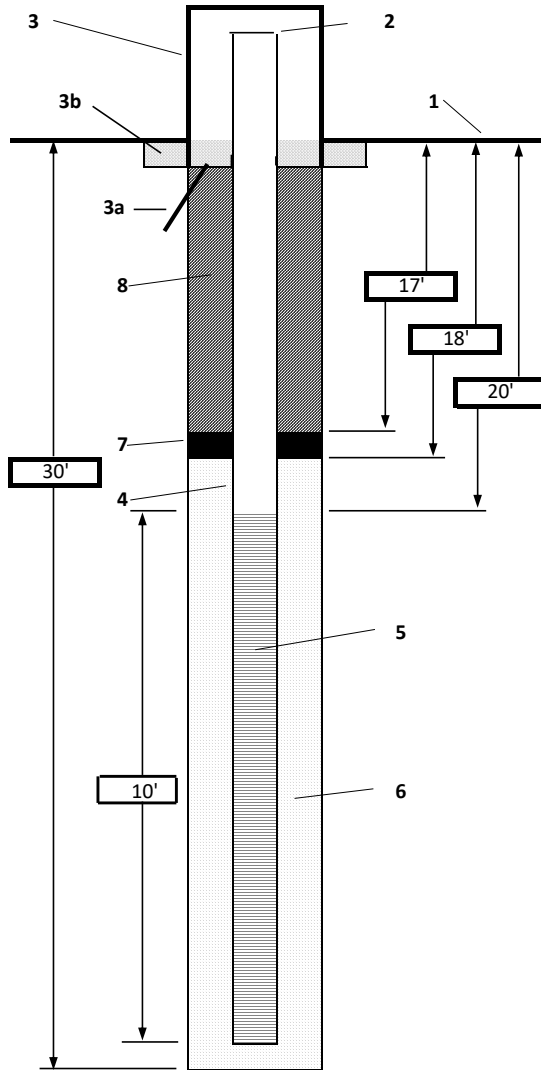
PROJECT : OUC STANTON ENERGY CENTER	LOCATION : OUC STANTON ENERGY CENTER - ORANGE COUNTY, FLORIDA
DRILLING CONTRACTOR : CUSTOM DRILLING SERVICES	
DRILLING METHOD AND EQUIPMENT USED : HOLLOW STEM AUGER	
WATER LEVELS : N/A	START : 9/30/2021 @0845 END : 9/30/21 @0955 LOGGER : D. VANEGAS



1- Ground elevation at well	N/A
2- Top of casing	3.4 FT ALS
3- Wellhead protection cover	ALUM ABOVE GND ENCLOSURE W/LOCKING CAP
a) drain tube?	NO
b) concrete pad dimensions	2' X 2' X 0.5'
4- Dia./type of well casing	2" SCH 40 PVC
5- Type/slot size of screen	0.01"
	MACHINED
6- Type screen filter	20-40 SILICA SAND
a) Quantity used	7 BAGS
7- Type of seal	FINE SAND
a) Quantity used	1 BAG
8- Grout	
a) Grout mix used	NEAT PORTLAND CEMENT
b) Method of placement	GRAVITY
c) Vol. of well casing grout	
Development method	SUBMERSIBLE PUMP (@2GPM)/SURGE
Development time	2.5 HOURS
Estimated purge volume	264 GALLONS
Comments	

PROJECT NUMBER D3292400	WELL NUMBER PZ-B
SHEET 1 OF 1	
WELL COMPLETION DIAGRAM	

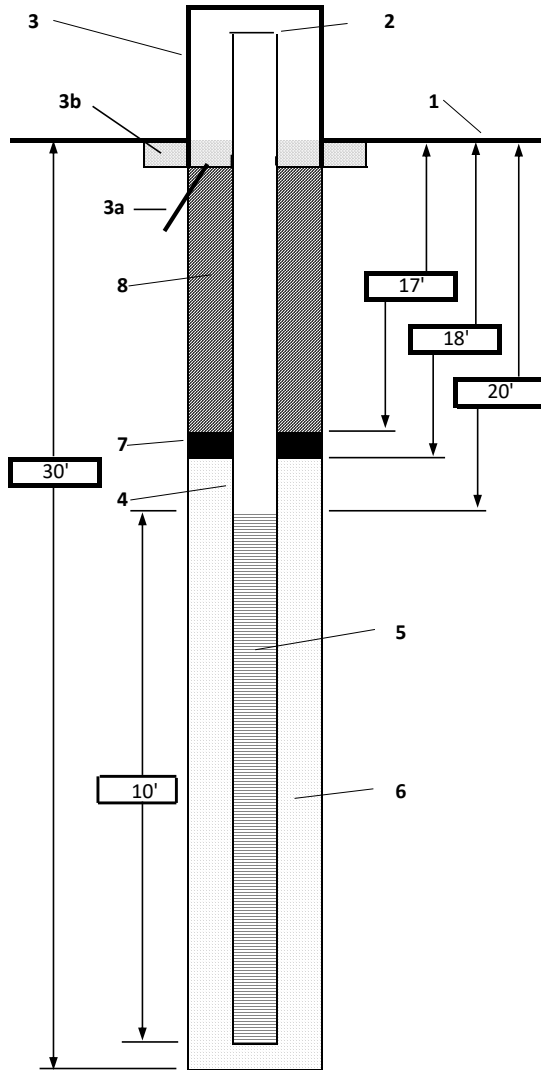
PROJECT : OUC STANTON ENERGY CENTER	LOCATION : OUC STANTON ENERGY CENTER - ORANGE COUNTY, FLORIDA
DRILLING CONTRACTOR : CUSTOM DRILLING SERVICES	
DRILLING METHOD AND EQUIPMENT USED : HOLLOW STEM AUGER	
WATER LEVELS : N/A	START : 9/29/2021 END : 9/29/21 LOGGER : D. VANEGAS



1- Ground elevation at well	N/A
2- Top of casing	3.7 FT ALS
3- Wellhead protection cover	ALUM ABOVE GND ENCLOSURE W/LOCKING CAP
a) drain tube?	NO
b) concrete pad dimensions	2' X 2' X 0.5'
4- Dia./type of well casing	2" SCH 40 PVC
5- Type/slot size of screen	0.01"
	MACHINED
6- Type screen filter	20-40 SILICA SAND
a) Quantity used	5 BAGS
7- Type of seal	FINE SAND
a) Quantity used	1 BAG
8- Grout	
a) Grout mix used	NEAT PORTLAND CEMENT
b) Method of placement	GRAVITY
c) Vol. of well casing grout	
Development method	SUBMERSIBLE PUMP (@2GPM)/SURGE
Development time	6 HOURS
Estimated purge volume	286 GALLONS
Comments	

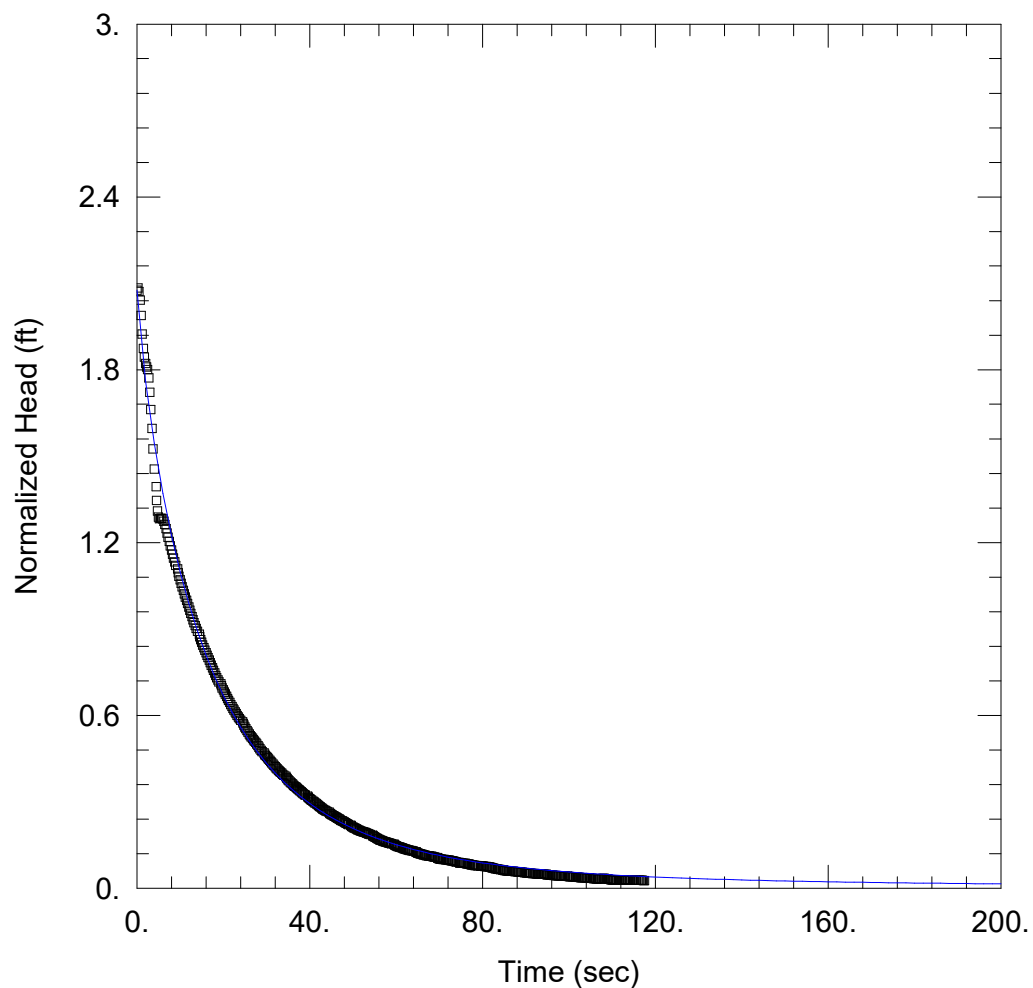
PROJECT NUMBER D3292400	WELL NUMBER PZ-C
SHEET 1 OF 1	
WELL COMPLETION DIAGRAM	

PROJECT : OUC STANTON ENERGY CENTER	LOCATION : OUC STANTON ENERGY CENTER - ORANGE COUNTY, FLORIDA
DRILLING CONTRACTOR : CUSTOM DRILLING SERVICES	
DRILLING METHOD AND EQUIPMENT USED : HOLLOW STEM AUGER	
WATER LEVELS : N/A	START : 9/29/2021 END : 9/29/21 LOGGER : D. VANEGAS



1- Ground elevation at well	N/A
2- Top of casing	3.3 FT ALS
3- Wellhead protection cover	ALUM ABOVE GND ENCLOSURE W/LOCKING CAP
a) drain tube?	NO
b) concrete pad dimensions	2' X 2' X 0.5'
4- Dia./type of well casing	2" SCH 40 PVC
5- Type/slot size of screen	0.01"
	MACHINED
6- Type screen filter	20-40 SILICA SAND
a) Quantity used	5 BAGS
7- Type of seal	FINE SAND
a) Quantity used	1 BAG
8- Grout	
a) Grout mix used	NEAT PORTLAND CEMENT
b) Method of placement	GRAVITY
c) Vol. of well casing grout	
Development method	SUBMERSIBLE PUMP (@2GPM)/SURGE
Development time	2 HOURS
Estimated purge volume	220 GALLONS
Comments	

APPENDIX C Slug Test Analysis and Results



WELL TEST ANALYSIS

Data Set: C:\Users\DV052933\Documents\OUC SEC MW - Dan\Slug Tests\PZ-A SlugIN.aqt
 Date: 10/11/21 Time: 13:52:15

PROJECT INFORMATION

Company: Jacobs
 Client: OUC
 Location: OUC SEC
 Test Well: PZ-A
 Test Date: 10/1/2021

AQUIFER DATA

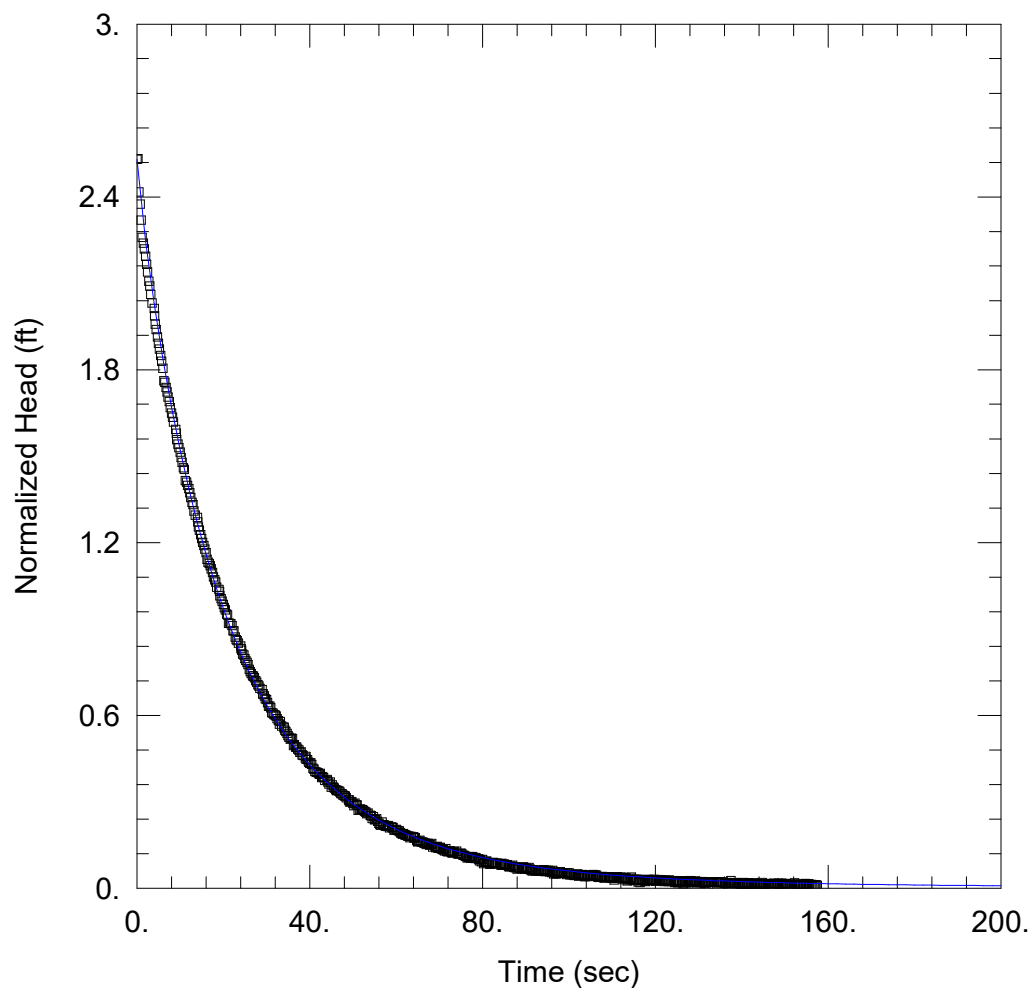
Saturated Thickness: 35. ft

WELL DATA (PZ-A)

Initial Displacement: <u>2.076 ft</u>	Static Water Column Height: <u>26.47 ft</u>
Total Well Penetration Depth: <u>30. ft</u>	Screen Length: <u>10. ft</u>
Casing Radius: <u>0.083 ft</u>	Well Radius: <u>0.083 ft</u>

SOLUTION

Aquifer Model: <u>Unconfined</u>	Solution Method: <u>KGS Model</u>
Kr = <u>7.149 ft/day</u>	Ss = <u>7.05E-5 ft⁻¹</u>
Kz/Kr = <u>0.1059</u>	



WELL TEST ANALYSIS

Data Set: C:\Users\DV052933\Documents\OUC SEC MW - Dan\Slug Tests\PZ-A SlugOUT.aqt
 Date: 10/11/21 Time: 13:55:17

PROJECT INFORMATION

Company: Jacobs
 Client: OUC
 Location: OUC SEC
 Test Well: PZ-A
 Test Date: 10/1/2021

AQUIFER DATA

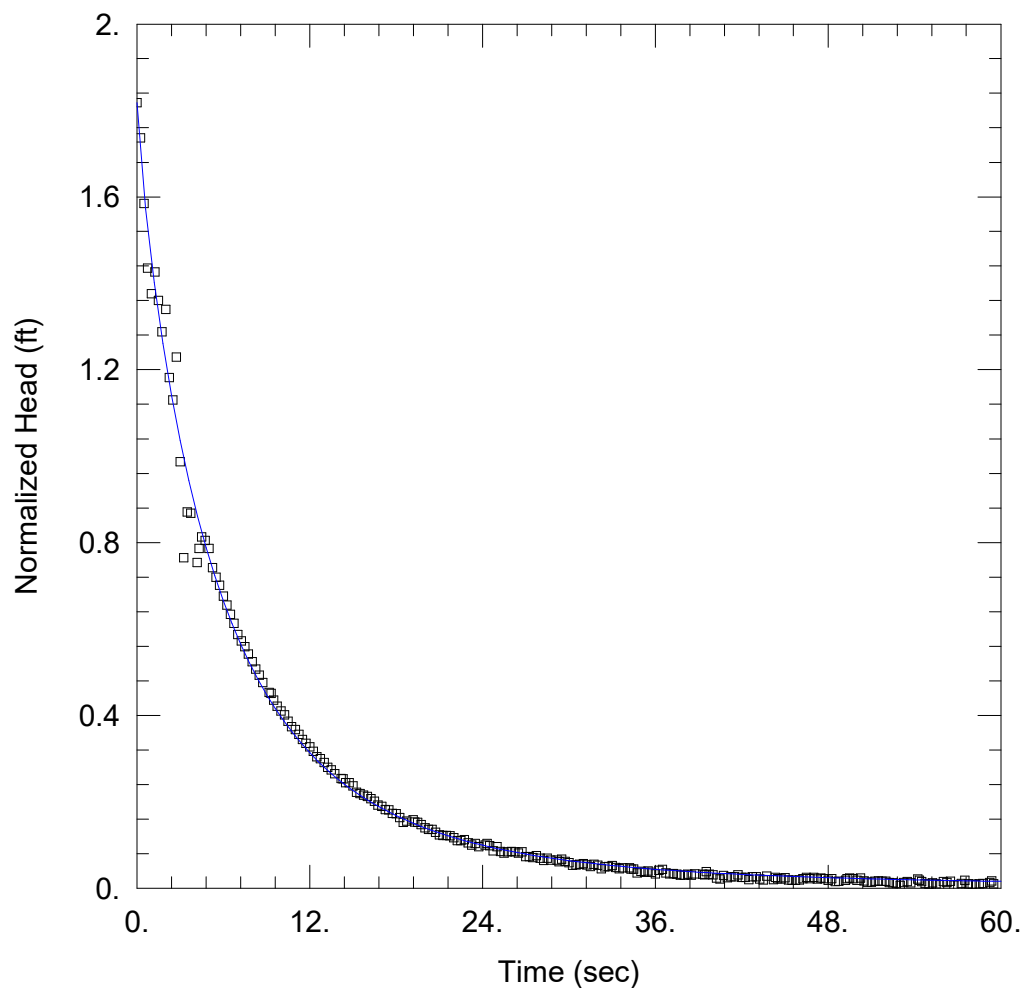
Saturated Thickness: 35. ft

WELL DATA (PZ-A)

Initial Displacement: <u>2.531 ft</u>	Static Water Column Height: <u>26.47 ft</u>
Total Well Penetration Depth: <u>30. ft</u>	Screen Length: <u>10. ft</u>
Casing Radius: <u>0.083 ft</u>	Well Radius: <u>0.083 ft</u>

SOLUTION

Aquifer Model: <u>Unconfined</u>	Solution Method: <u>KGS Model</u>
Kr = <u>7.216 ft/day</u>	Ss = <u>5.035E-6 ft⁻¹</u>
Kz/Kr = <u>0.1059</u>	



WELL TEST ANALYSIS

Data Set: C:\Users\DV052933\Documents\OUC SEC MW - Dan\Slug Tests\PZ-B SlugIN.aqt
 Date: 10/11/21 Time: 13:55:48

PROJECT INFORMATION

Company: Jacobs
 Client: OUC
 Location: OUC SEC
 Test Well: PZ-B
 Test Date: 10/1/2021

AQUIFER DATA

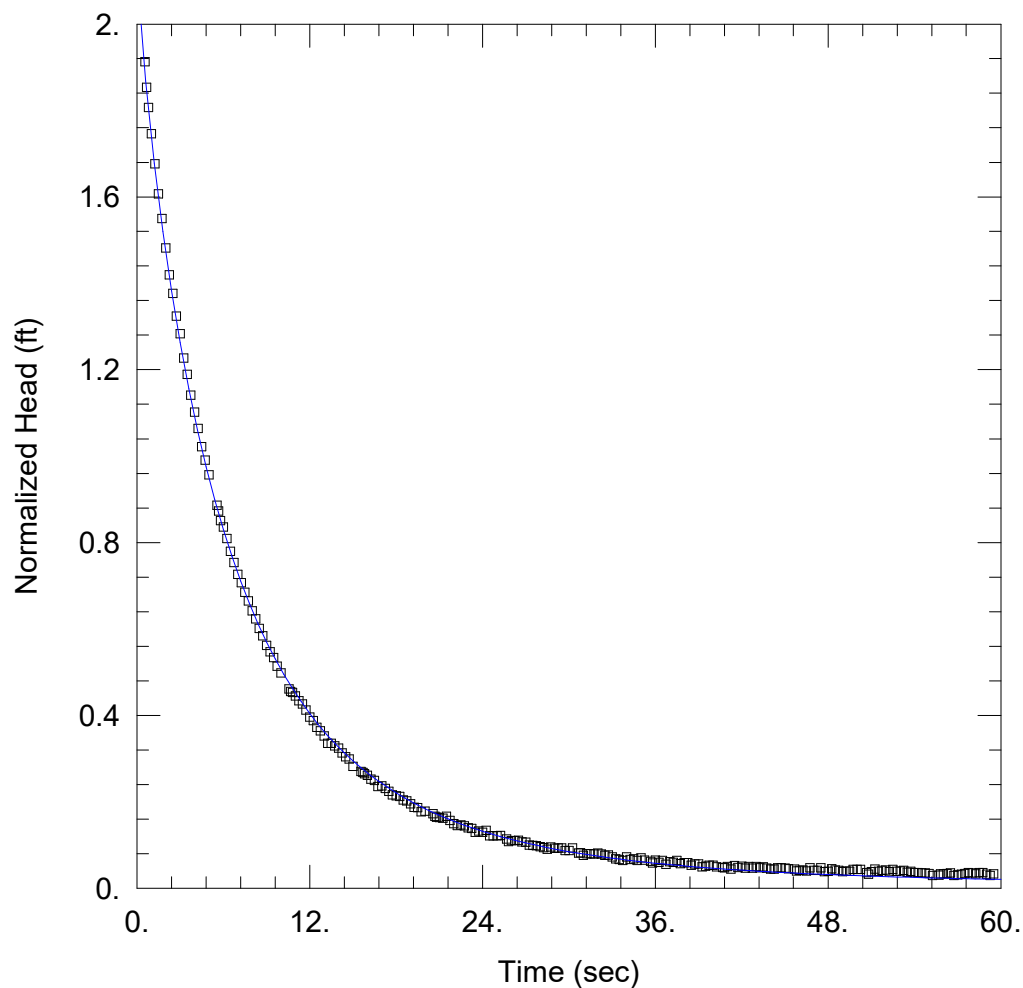
Saturated Thickness: 35. ft

WELL DATA (PZ-B)

Initial Displacement: <u>1.818 ft</u>	Static Water Column Height: <u>28.49 ft</u>
Total Well Penetration Depth: <u>30. ft</u>	Screen Length: <u>10. ft</u>
Casing Radius: <u>0.083 ft</u>	Well Radius: <u>0.083 ft</u>

SOLUTION

Aquifer Model: <u>Unconfined</u>	Solution Method: <u>KGS Model</u>
Kr = <u>20.93 ft/day</u>	Ss = <u>6.113E-5 ft⁻¹</u>
Kz/Kr = <u>0.1059</u>	



WELL TEST ANALYSIS

Data Set: C:\Users\DV052933\Documents\OUC SEC MW - Dan\Slug Tests\PZ-B SlugOUT.aqt
 Date: 10/11/21 Time: 13:56:31

PROJECT INFORMATION

Company: Jacobs
 Client: OUC
 Location: OUC SEC
 Test Well: PZ-B
 Test Date: 10/1/2021

AQUIFER DATA

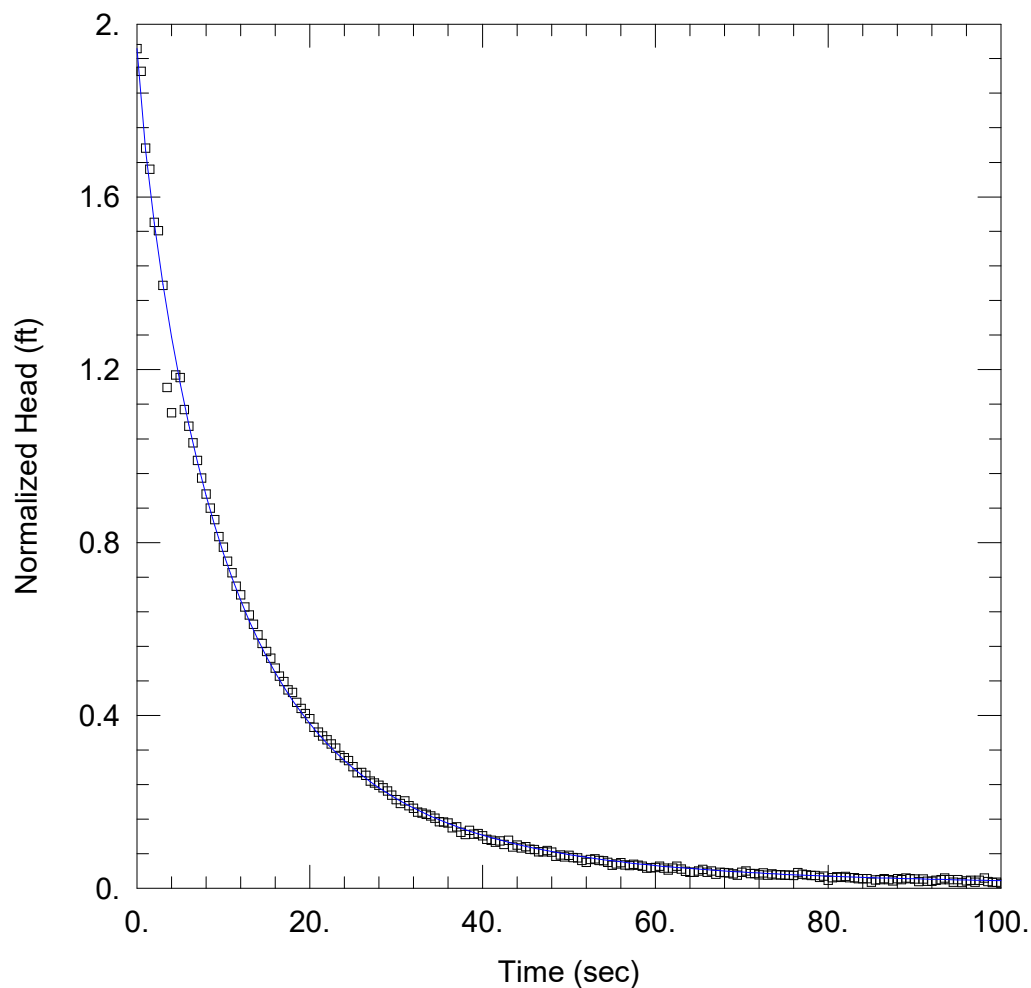
Saturated Thickness: 35. ft

WELL DATA (PZ-B)

Initial Displacement: <u>2.141</u> ft	Static Water Column Height: <u>28.49</u> ft
Total Well Penetration Depth: <u>30</u> . ft	Screen Length: <u>10</u> . ft
Casing Radius: <u>0.083</u> ft	Well Radius: <u>0.083</u> ft

SOLUTION

Aquifer Model: <u>Unconfined</u>	Solution Method: <u>KGS Model</u>
Kr = <u>19.74</u> ft/day	Ss = <u>5.407E-5</u> ft ⁻¹
Kz/Kr = <u>0.1059</u>	



WELL TEST ANALYSIS

Data Set: C:\Users\DV052933\Documents\OUC SEC MW - Dan\Slug Tests\PZ-C SlugIN.aqt
 Date: 10/11/21 Time: 13:57:29

PROJECT INFORMATION

Company: Jacobs
 Client: OUC
 Location: OUC SEC
 Test Well: PZ-A
 Test Date: 10/1/2021

AQUIFER DATA

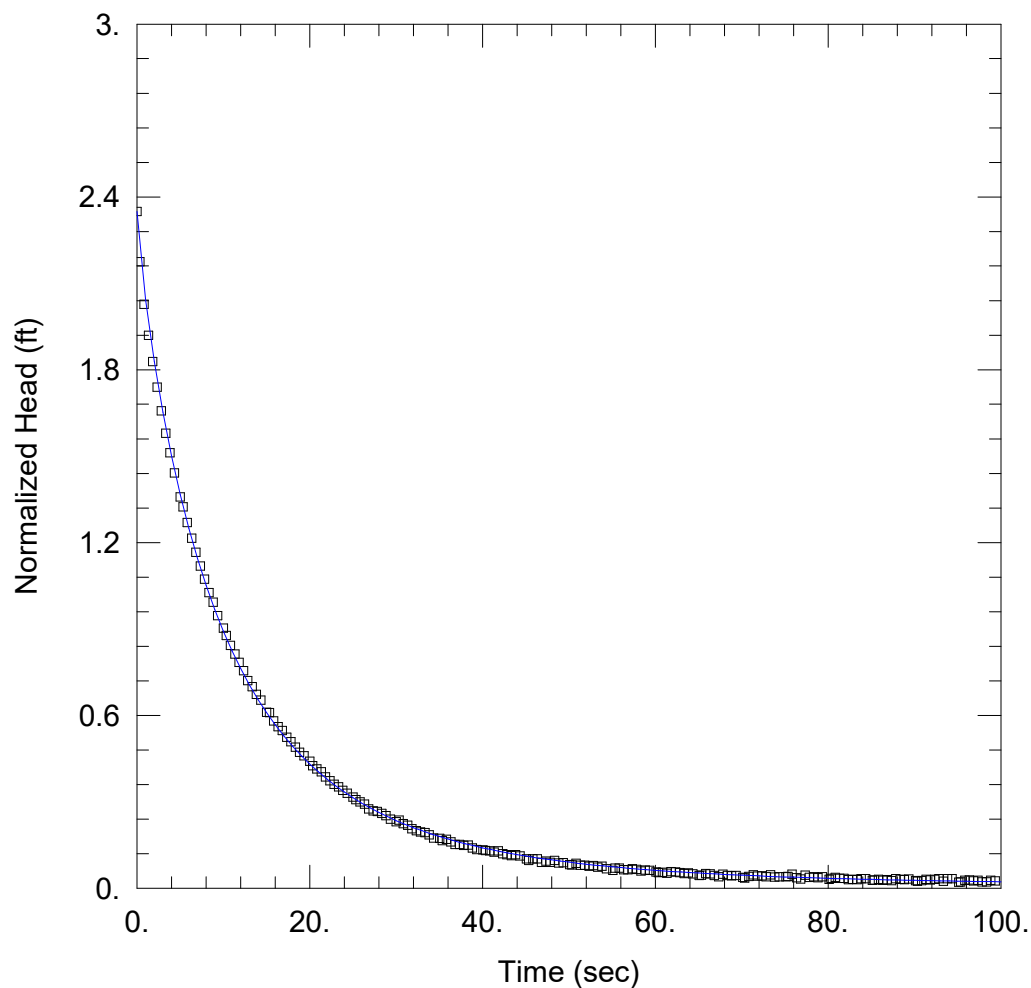
Saturated Thickness: 35. ft

WELL DATA (PZ-C)

Initial Displacement: <u>1.943 ft</u>	Static Water Column Height: <u>30. ft</u>
Total Well Penetration Depth: <u>30. ft</u>	Screen Length: <u>10. ft</u>
Casing Radius: <u>0.083 ft</u>	Well Radius: <u>0.083 ft</u>

SOLUTION

Aquifer Model: <u>Unconfined</u>	Solution Method: <u>KGS Model</u>
Kr = <u>11.77 ft/day</u>	Ss = <u>4.011E-5 ft⁻¹</u>
Kz/Kr = <u>0.1059</u>	



WELL TEST ANALYSIS

Data Set: C:\Users\DV052933\Documents\OUC SEC MW - Dan\Slug Tests\PZ-C SlugOUT.aqt
 Date: 10/11/21 Time: 13:58:07

PROJECT INFORMATION

Company: Jacobs
 Client: OUC
 Location: OUC SEC
 Test Well: PZ-A
 Test Date: 10/1/2021

AQUIFER DATA

Saturated Thickness: 35. ft

WELL DATA (PZ-C)

Initial Displacement: <u>2.349 ft</u>	Static Water Column Height: <u>30. ft</u>
Total Well Penetration Depth: <u>30. ft</u>	Screen Length: <u>10. ft</u>
Casing Radius: <u>0.083 ft</u>	Well Radius: <u>0.083 ft</u>

SOLUTION

Aquifer Model: <u>Unconfined</u>	Solution Method: <u>KGS Model</u>
Kr = <u>12.01 ft/day</u>	Ss = <u>6.022E-5 ft⁻¹</u>
Kz/Kr = <u>0.1059</u>	

Table C-1 Slug Test Raw Data Summary

Time (s)	PZ-A		PZ-B		PZ-C	
	Rising Head	Falling Head	Rising Head	Falling Head	Rising Head	Falling Head
	Displacement (ft)	Displacement (ft)	Displacement (ft)	Displacement (ft)	Displacement (ft)	Displacement (ft)
0	2.08	2.53	1.82	2.14	1.82	2.35
0.25	2.08	2.53	1.74	1.91	1.74	--
0.5	2.07	2.42	1.59	1.85	1.59	2.18
0.75	2.04	2.38	1.44	1.81	1.44	--
1	1.99	2.32	1.38	1.75	1.38	2.03
2	1.82	2.19	1.34	1.48	1.34	1.83
3	1.72	2.09	0.99	1.28	0.99	1.66
4	1.45	1.99	0.75	1.10	0.75	1.51
5	1.29	1.89	0.79	0.96	0.79	1.36
6	1.28	1.81	0.68	0.84	0.68	1.27
7	1.23	1.72	0.59	0.73	0.59	1.17
8	1.17	1.65	0.52	0.64	0.52	1.07
9	1.12	1.58	0.45	0.56	0.45	0.99
10	1.07	1.51	0.41	0.50	0.41	0.90
20	0.69	0.99	0.14	0.18	0.14	0.44
30	0.46	0.66	0.06	0.09	0.06	0.23
40	0.31	0.43	0.03	0.05	0.03	0.13
50	0.21	0.29	0.02	0.04	0.02	0.08
60	0.15	0.20	--	--	--	0.06
70	0.10	0.14	--	--	--	0.04
80	0.08	0.10	--	--	--	0.03
90	0.05	0.07	--	--	--	0.03
100	0.04	0.05	--	--	--	0.02
110	0.03	0.04	--	--	--	--
120	0.03	0.02	--	--	--	--

1 Data was collected in 0.25 second increments and has been summarized for formatting purposes

2 Data collected on October 1, 2021 by David Varegas and Daniel Rutland, PE

3 Data was collected using a Insitu Level TROLL 700

C-2 Analysis of Travel Times with Gradient Conditions Between PZ-A and MW-D

h ₀	h ₁	L ₁	L ₂	thickness	width	Porosity
ft	ft	ft	ft	ft	ft	%
82.93	81.23	0	1,127	1	1	30

Delta H	1.7	ft
Delta L	1127	ft
A	1	ft ²
Gradient	0.0015	ft/ft

Test ID	k	Q	q	v	Travel Time (1,127 Feet)		Travel Time (500 feet)		Travel Time (1,000 feet)		Travel Time (1,500 feet)		Travel Time (2,000 feet)		Travel Time (2,500 feet)		Travel Time (2,600 feet)		Travel Time (3,000 feet)		Travel Time (3,500 feet)		Travel Time (4,000 feet)	
	ft/day	ft ³ /day	ft/day	ft/day	Days	Years	Days	Years	Days	Years	Days	Years	Days	Years	Days	Years	Days	Years	Days	Years	Days	Years	Days	Years
PZ-A	7.149	0.011	0.011	0.036	31,353	85.9	13,910	38.1	27,820	76.2	41,729	114.3	55,639	152.4	69,549	190.5	72,331	198.2	83,459	228.7	97,369	266.8	111,278	304.9
PZ-A Recovery	7.216	0.011	0.011	0.036	31,062	85.1	13,781	37.8	27,561	75.5	41,342	113.3	55,123	151.0	68,903	188.8	71,659	196.3	82,684	226.5	96,465	264.3	110,245	302.0
PZ-B	20.93	0.032	0.032	0.105	10,709	29.3	4,751	13.0	9,502	26.0	14,253	39.1	19,005	52.1	23,756	65.1	24,706	67.7	28,507	78.1	33,258	91.1	38,009	104.1
PZ-B Recovery	19.74	0.030	0.030	0.099	11,355	31.1	5,038	13.8	10,075	27.6	15,113	41.4	20,150	55.2	25,188	69.0	26,195	71.8	30,225	82.8	35,263	96.6	40,300	110.4
PZ-C	11.77	0.018	0.018	0.059	19,043	52.2	8,449	23.1	16,897	46.3	25,346	69.4	33,795	92.6	42,243	115.7	43,933	120.4	50,692	138.9	59,141	162.0	67,590	185.2
PZ-C Recovery	12.01	0.018	0.018	0.060	18,663	51.1	8,280	22.7	16,560	45.4	24,840	68.1	33,119	90.7	41,399	113.4	43,055	118.0	49,679	136.1	57,959	158.8	66,239	181.5

C-3 Analysis of Travel Times with Gradient Conditions Between PZ-C and MW-D

h ₀	h ₁	L ₁	L ₂	thickness	width	Porosity
ft	ft	ft	ft	ft	ft	%
82.44	81.23	0	208.57	1	1	30

Delta H	1.21	ft
Delta L	208.57	ft
A	1	ft ²
Gradient	0.0058	ft/ft

Test ID	k	Q	q	v	Travel Time (208.57 feet)		Travel Time (500 feet)		Travel Time (1,000 feet)		Travel Time (1,500 feet)		Travel Time (2,000 feet)		Travel Time (2,500 feet)		Travel Time (2,600 feet)		Travel Time (3,000 feet)		Travel Time (3,500 feet)		Travel Time (4,000 feet)	
	ft/day	ft ³ /day	ft/day	ft/day	Days	Years	Days	Years	Days	Years	Days	Years	Days	Years	Days	Years	Days	Years	Days	Years	Days	Years	Days	Years
PZ-A	7.149	0.041	0.041	0.138	1,509	4.1	3,617	9.9	7,233	19.8	10,850	29.7	14,467	39.6	18,083	49.5	18,807	51.5	21,700	59.5	25,317	69.4	28,934	79.3
PZ-A Recovery	7.216	0.042	0.042	0.140	1,495	4.1	3,583	9.8	7,166	19.6	10,749	29.5	14,332	39.3	17,916	49.1	18,632	51.0	21,499	58.9	25,082	68.7	28,665	78.5
PZ-B	20.93	0.121	0.121	0.405	515	1.4	1,235	3.4	2,471	6.8	3,706	10.2	4,941	13.5	6,177	16.9	6,424	17.6	7,412	20.3	8,647	23.7	9,883	27.1
PZ-B Recovery	19.74	0.115	0.115	0.382	546	1.5	1,310	3.6	2,620	7.2	3,929	10.8	5,239	14.4	6,549	17.9	6,811	18.7	7,859	21.5	9,169	25.1	10,479	28.7
PZ-C	11.77	0.068	0.068	0.228	916	2.5	2,197	6.0	4,394	12.0	6,590	18.1	8,787	24.1	10,984	30.1	11,423	31.3	13,181	36.1	15,377	42.1	17,574	48.1
PZ-C Recovery	12.01	0.070	0.070	0.232	898	2.5	2,153	5.9	4,306	11.8	6,459	17.7	8,611	23.6	10,764	29.5	11,195	30.7	12,917	35.4	15,070	41.3	17,223	47.2