September 2021
Plant Greene County

Groundwater Remedy Selection Report

Prepared for Alabama Power Company

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Prepared for
Alabama Power Company
600 18th Street North
Birmingham, Alabama 35203

Prepared by
Anchor QEA, LLC
9797 Timber Circle
Daphne, Alabama 36527

Engineer's Certification

This *Groundwater Remedy Selection Report* has been prepared in accordance with the U.S. Environmental Protection Agency's coal combustion residuals rule (40 Code of Federal Regulations Part 257, Subpart D) and the Alabama Department of Environmental Management Administrative Code Ch. 335-13-15. This report was prepared under the supervision and direction of the undersigned, whose seal as a registered professional engineer is affixed below. The undersigned is practicing through Anchor QEA, LLC, which is an authorized engineering business in the State of Alabama (Certificate of Authorization license number 5073; a copy of this license is provided in Appendix A).

ALABAMA LICENSED
No. 36733
PROFESSIONAL
ENGINEER
KRISTI A. MITCHELL

Kristi A. Mitchell 9/29/21

Kristi A. Mitchell, Senior Engineer
Alabama Professional Engineer No. 36733

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ABBREVIATIONS

ACM	*Assessment of Corrective Measures*
ADEM	Alabama Department of Environmental Management
Admin. Code	Administrative Code
APC	Alabama Power Company
ASM	adaptive site management
CAS	corrective action system
CCR	coal combustion residuals
CFR	Code of Federal Regulations
cm/sec	centimeters per second
COI	constituent of interest
EPRI	Electric Power Research Institute
Facility Plan	*Facility Plan for Groundwater Investigation*
GWPS	groundwater protection standard
MNA	monitored natural attenuation
Plant Greene County	Greene County Electric Generating Plant
PRB	permeable reactive barrier
RCRA	Resource Conservation and Recovery Act
Site	Greene County ash pond
SSE	selective sequential extraction
SSI	statistically significant increases
SSLs	statistically significant level
UIC	Underground Injection Control
USEPA	U.S. Environmental Protection Agency

Executive Summary

Since submittal of the *Assessment of Corrective Measures* (ACM) in June 2019 (Anchor QEA 2019a), extensive investigations have been performed to select effective corrective measures for arsenic, cobalt, and lithium (constituents of interest [COIs]) in groundwater at the Greene County ash pond (Site). The following corrective measures were selected:

- Source control to include dewatering, consolidation, capping of the Site, and the installation of a subsurface barrier (slurry) wall completely around the consolidated perimeter keyed into the relatively impermeable chalk aquitard
- Geochemical manipulation via injections in areas of relatively high concentrations of COIs to remove them from groundwater and immobilize them in situ
- Monitored natural attenuation (MNA) over the entire Site.

Closure of the Site—including dewatering, consolidation, capping, and the perimeter barrier wall—will effectively eliminate source contributions to groundwater. Geochemical manipulation was selected because of its effectiveness, ease of implementation, versatility (ability to treat more than one COI with the same treatment solution), ability to implement in areas with limited working space, and no byproducts that would require further treatment or disposal. MNA was selected because substantial evidence indicates that it is currently occurring at the Site.

Effective injection treatment has been performed for arsenic in groundwater under variable geochemical conditions using iron-based treatment solutions (Anchor QEA 2017, 2018, 2019b, 2019c). In laboratory treatability studies conducted for the Electric Power Research Institute and large utility companies, mixed oxides of iron, manganese, and magnesium in solution were proven effective for arsenic, cobalt, lithium, and other constituents (EPRI 2021). Site-specific laboratory treatability studies using Site aquifer media and impacted groundwater will be performed prior to field implementation of injection treatment. These studies will evaluate multiple viable treatment solutions and a range of doses.

After selection of the optimum treatment reagents and doses, areas with the highest concentrations of arsenic, lithium, and/or cobalt will be treated with a line of injection points. Existing monitoring wells will be used to monitor the effectiveness of the injection treatment, and additional remedial-effectiveness monitoring wells will be installed at variable distances to demonstrate the benefits of injection. Monitoring parameters will include COIs and other indicator parameters based on the composition of the treatment solutions. Monitoring frequency will be based on the hydraulics of the aquifer in the areas of interest and distance of the monitoring wells from the line of injection.

Extensive site-specific geochemical studies performed in 2020 and 2021 demonstrate that MNA is a viable corrective action for COIs in groundwater at the Site (Anchor QEA 2020a, 2020b, 2021). The preponderance of evidence indicates that Site conditions meet the U.S. Environmental Protection

Agency's evaluation criteria for the use of MNA, specifically: area of impacts stable or shrinking, identified mechanisms for attenuation, stability of the attenuating mechanisms, sufficient aquifer capacity for attenuation, and time to achieve groundwater protection standards (GWPSs) considered reasonable when compared to other corrective action alternatives. The ACM identified other corrective measures that could be used in conjunction with MNA should MNA not perform as expected.

Investigations performed to support MNA included preparation of concentration versus time and concentration versus distance graphs for COIs in groundwater; groundwater, well solids (precipitates), and soil sampling; laboratory analysis of solid samples for bulk chemistry (X-ray diffraction), mineralogy (X-ray diffraction and scanning electron microscopy), and cation exchange capacity; geochemical modeling; selective sequential extraction (SSE) to determine associations of COIs with attenuating solids; and column studies to assess aquifer capacity for attenuation.

Several concentration versus time graphs indicate that arsenic, lithium, and/or cobalt concentrations are stable or are decreasing with time in some areas, even without source control. Decreasing trends were extrapolated to estimate time to achieve GWPSs. Also, concentration versus distance graphs along downgradient transects indicate that arsenic, cobalt, and lithium are decreasing with distance from the Site, even without source control. The 2020 and 2021 isoconcentration maps for all three COIs are similar, further demonstrating that the area of impacts are not expanding with time.

Based on the geochemical investigations, multiple lines of evidence support multiple attenuating mechanisms, depending upon the COIs. The major attenuating mechanisms include sorption on (or coprecipitation with) iron oxides and, possibly, precipitation of barium arsenate for arsenic; cobalt attenuation by incorporation into a cobalt-iron oxide; and lithium attenuation by ion exchange on oxides and clay minerals. All COIs are subject to physical attenuation mechanisms such as dispersion and flushing, which will contribute to decreased concentrations with time and distance from the Site.

Column studies were performed to assess the ability for the aquifer media (soil) to take up COIs. Cobalt and lithium showed limited ability to sorb to the aquifer media based on column studies. However, these constituents are still subject to other attenuating mechanisms, such as physical attenuation (dispersion and flushing) and coprecipitation as indicated by the concentration versus time and distance graphs and geochemical studies.

Column studies indicate that arsenic is significantly attenuated by aquifer media, as arsenic in column effluent remained much less than the influent concentrations. This attenuation capacity was extrapolated to the entire mass of the aquifer downgradient of the consolidated Site but within the property boundary. The extrapolation showed that the aquifer has an attenuating capacity of many more times needed based on the mass of arsenic requiring attenuation. SSE studies indicate that most of the mass of all 3 COIs occurs in the oxidizable and residual fractions, which are very stable attenuation phases.

Source control, geochemical manipulation via injections in areas of relatively high concentrations of COIs to remove them from groundwater and immobilize them in situ, and MNA over the entire Site are expected to achieve GWPSs within 2 to 40 years post-closure (depending upon area and associated wells), which is a reasonable time frame as compared to the other, more aggressive, methods investigated as part of the remedy selection process. More aggressive methods are not expected to achieve GWPSs sooner than 2 to 40 years.

Extensive sitewide monitoring will be performed to evaluate the remedial effectiveness of individual corrective actions such as injection treatment, as well as the cumulative effects of closure (source control), injections, and MNA. Additional monitoring wells will be installed relatively close to injection wells and monitored for specific parameters and at a frequency sufficient to determine the benefits of injection.

The certified compliance monitoring network will be supplemented to establish a comprehensive groundwater remedy plan meeting the requirements of 40 CFR § 257.98(a) and ADEM Administrative Code r. 335-13-15-.06(9)(a). The groundwater remedy monitoring plan will be submitted within 90 days and include: 1) the certified coal combustion residuals compliance monitoring that meets the assessment monitoring requirements of § 257.95 and 335-13-15-.06(6); 2) additional wells that document the effectiveness of the remedy; and 3) sample locations and data evaluation that demonstrate compliance with the GWPS and protection of potential human and ecological receptors.

Alabama Power Company will employ an adaptive site management approach to perform ongoing remedy system evaluation, consider adjustments to the remedy, and ensure achieving corrective action objectives at the Site. Adaptive triggers will be developed, and additional actions (monitoring, analysis, and/or supplemental corrective action measures) will be implemented as needed. Details on the sitewide remedial-effectiveness monitoring program, including adaptive triggers, will be provided in a detailed monitoring plan to be submitted within 90 days of this *Groundwater Remedy Selection Report*.

1 Introduction

1.1 Purpose

This *Groundwater Remedy Selection Report* was prepared to meet the requirements of the U.S. Environmental Protection Agency's (USEPA's) coal combustion residuals (CCR) Rule 40 Code of Federal Regulations (CFR) § 257.97, the Alabama Department of Environmental Management's (ADEM's) Administrative Code (Admin. Code) r. 335-13-15-.06(8), and Part C of Administrative Order No. 18-097-GW at Alabama Power Company's (APC's) Greene County Electric Generating Plant (Plant Greene County) ash pond (Site). Specifically, this report has been prepared to present a groundwater corrective action plan to address the occurrence of arsenic, cobalt, and lithium in groundwater at the Site.

Prior to preparing this final *Groundwater Remedy Selection Report*, semiannual progress reports were prepared to describe the progress made in evaluating the selected remedy and alternative remedies and designing a remedy plan (Anchor QEA 2019d, 2020a, 2020b, 2021).

1.2 Site Location and Description

Plant Greene County is located in southeastern Greene County, Alabama. The physical address is 801 Steam Plant Road, Forkland, Alabama 36740. The Greene County plant lies in portions of Sections 21 and 28, Township 19 North, Range 3 East (USGS 2018). The Site is located south of the main plant along the Black Warrior River to the south and the barge canal to the east. Figure 1 depicts the location of the Site with respect to the surrounding area. The Site went into service in 1964 and is approximately 489 acres.

1.3 Site Closure and Source Control Measures

The Site is underlain by low-permeability clay soils that separate CCR from groundwater. The proposed corrective action strategy incorporates the closure of the Site, which will effectively control the source of CCR constituents to groundwater by removing free liquid from the CCR, reducing the area of the Site footprint, encircling the Site with a subsurface barrier wall, and capping the CCR in place to prevent further infiltration. Specifically, the design for the Site closure calls for dewatering and consolidating the CCR material within the northern portion of the existing Site, which will occupy approximately 221 acres within a diked area, bounded on the northern end by the northern portion of the existing exterior dike, and to the east, west, and south by a new interior dike constructed as part of the Site closure. A barrier wall keyed into the existing underlying chalk layer will be constructed around the perimeter of the consolidated CCR material, along with a final cover consisting of an engineered synthetic turf and geomembrane.

Site closure activities began in 2019. As presented in the *Amended Closure Plan* (APC 2020), closure of the Site will be accomplished by the following:

1. Dewatering and consolidating the CCR footprint from approximately 489 acres to approximately 221 acres
2. Constructing a vertical barrier wall around the consolidated footprint and extending below the uppermost aquifer at the Site
3. Installing a low-permeability geosynthetic final cover system over the consolidated CCR

Figure 2 provides an overview of the closure methods described in the following sections.

1.3.1 Dewatering and Consolidation

(Consolidation of the horizontal footprint by about 55%, from 489 acres to 221 acres (APC 2020), will greatly reduce the CCR surface area potentially exposed to groundwater, thereby reducing the leaching potential of constituents of interest (COIs) to groundwater.

CCR removed from outside of the consolidated footprint will be sufficiently dewatered and compacted within the consolidated footprint. The remaining approximately 268 acres will be converted to a stormwater runoff pond for the cover system and consolidated footprint. Details regarding consolidation are provided in the previously submitted *Amended Closure Plan* (APC 2020).

As discussed in Section 2, the CCR deposits at the Site (including the consolidated CCR footprint) are separated from the uppermost aquifer and groundwater by a low-permeability clay deposit. This serves to isolate the CCR from groundwater at the Site.

1.3.2 Vertical Barrier Wall

To isolate groundwater beneath the Site, a vertical subsurface barrier wall is being constructed around the consolidated CCR and keyed into the low-permeability chalk deposit. The vertical barrier wall will extend from ground surface and penetrate the uppermost aquifer overlying the chalk deposit. Coupled with the low-permeability clay and soil underlying the consolidated CCR deposits, the barrier wall will further isolate the Site from contact with groundwater outside the barrier wall. Figures 3 and 4 depict the conceptual site closure model and show the configuration of the vertical barrier wall relative to the consolidated CCR, surrounding geology, and uppermost aquifer.

Construction of a segment of the barrier wall is complete within a portion of the northern dike where CCR material is being consolidated. Figure 2 shows the approximate extent of the portion of the barrier wall that has already been constructed. The barrier wall will be constructed using a low-permeability bentonite slurry designed to achieve a permeability of 10^{-7} centimeters per second (cm/sec) or less. The bentonite slurry will be installed extending from the underlying chalk surface to the top of the portion of the containment dike to the cover system (APC 2020). The chalk is thick (estimated 250 feet at the Site), with a reported permeability of 10^{-7} to 10^{-8} cm/sec (Sadler et al. 1992) and is widely recognized as a regional confining layer. As described in Section 2.1, measured site-specific permeability values are on the order of 10^{-8} cm/sec. The barrier wall sides, chalk bottom, and cover system will effectively isolate CCR from groundwater (Figure 5), thereby preventing additional releases to groundwater.

1.3.3 Final Cover System (Cap)

The final cover will be constructed to "control, minimize or eliminate, to the maximum extent feasible, post-closure infiltration" of stormwater into the closed CCR unit, which will mitigate potential releases of COIs to groundwater. The cover will consist of the following (described from the final CCR surface upward): 3 to 6 inches of protective soil, a linear low-density polyethylene geomembrane, an engineered synthetic turf product, and sand infill material. The final cover system will have a permeability of 10^{-7} cm/sec or less (APC 2020).

Infiltration will also be prevented by providing sufficient grades and slopes to: 1) preclude the probability of future impoundment of water or sediment on the cover system; 2) ensure slope and cover system stability; 3) minimize the need for further maintenance; and 4) be completed in the shortest amount of time consistent with recognized and generally accepted good engineering practices (APC 2020).

1.3.4 Closure Schedule

The current closure plan estimates that dewatering, consolidation, and capping will be completed in 2026. The current closure timeline is shown in Figure 6. The northernmost section of the barrier wall was completed in early 2021.

1.4 Corrective Action Objectives

Pursuant to 40 CFR 257.97(b) and ADEM Admin. Code r. 335-13-15-.06(8)(b), groundwater remedies must:

(1) Be protective of human health and the environment.
(2) Attain applicable groundwater protection standards (GWPSs) as specified in the CCR rule.
(3) Control the source(s) of the release so as to reduce or eliminate, to the extent feasible, further releases of Appendix IV to 40 CFR Part 257 constituents into the environment.
(4) Remove from the environment as much of the contaminated material that was released from the CCR unit as is feasible, taking into account factors such as avoiding inappropriate disturbances of sensitive ecosystems.[1]

[1] 40 CFR § 257.97(b)(4) requires a remedy to "remove from the environment as much of the contaminated material that was released from the CCR unit as is feasible, taking into account factors such as avoiding inappropriate disturbance of sensitive ecosystems."

(5) Comply with any relevant standards (i.e., all applicable Resource Conservation and Recovery Act [RCRA] requirements) for management of wastes generated by the remedial actions.

As presented in this report, the selected remedy plan satisfies the above performance criteria.

The preamble to the CCR rule explains that this requirement is "more directly related to remediation of contamination associated with a release, such as from a collapse or structural failure of a CCR unit," not a release to groundwater (80 Federal Register 21302, 21407 [April 17, 2015]). The § 257.97(b)(4) remedial objective is not applicable to the groundwater corrective action for the Site, but it is included here for completeness when referencing the rule requirements.

2 Site Geology and Hydrogeology

2.1 Geology, Hydrogeology, and Surface Water Hydrology

At the Site, the geology consists of alluvium deposits overlying a low-permeability chalk formation. The major components of the hydrogeological conceptual site model include the components described in previous reports (SCS 2018a) and are summarized as follows:

- Geologic Unit 1: predominantly low-permeability clays with a general thickness between 5 and 15 feet; vertical hydraulic conductivities ranging from 8.0×10^{-8} to 7.8×10^{-6} cm/sec with an average of 1.7×10^{-6} cm/sec; provides upper confining to semi-confining conditions between CCR and the uppermost aquifer
- Geologic Unit 2 (Uppermost Aquifer): fine- to medium-grained sand with clay lenses in upper sections and fine gravel toward the base, generally located 5 to 15 feet beneath the top of the dike, 10 to 30 feet thick, with horizontal hydraulic conductivities ranging from 1.68×10^{-3} to 8.29×10^{-2} cm/sec with an average of 1.83×10^{-2} cm/sec
- Geologic Unit 3: low-permeability chalk and marl with a general thickness of 250 feet; vertical hydraulic conductivities ranging from 1.4×10^{-8} to 5.0×10^{-8} cm/sec; provides lower confining conditions for the uppermost aquifer
- Groundwater flow occurs within the sand and gravel deposit (Unit 2) overlying the Unit 3 chalk. Characteristics of groundwater flow are as follows:
  - Vertical groundwater flow in upper strata is impeded by low-permeability clays of Unit 1 and beneath Unit 2 by the underlying Unit 3 chalk deposit.
  - Sources of recharge are largely from the infiltration of precipitation and estimated to be 5 to 6 inches per year; infiltration will be eliminated over the consolidated CCR footprint after closure.
  - Groundwater flow reflects the topography at the Site and flows radially from higher elevations toward the Black Warrior River and barge canal.
  - Groundwater flow velocity within Unit 2 is generally between 1 and 3 feet per day.

Geologic cross sections with constituents of interest (COIs) isoconcentration lines are included in Appendix B.

Historical potentiometric data from the Site indicate that groundwater flow directions have been consistent at the Site during the monitoring period. Groundwater flow at the Site reflects the natural topography, where gravity is the dominant force driving flow. Groundwater flows from higher topographic elevations near the northernmost edge of the Site toward the north, east, and south-southeast. However, the construction of the northern section of the barrier wall has apparently caused groundwater to flow to the north on the northern side of the barrier wall and to the south on the southern side of the barrier wall (Appendix C). The installation of the barrier wall has created a physical groundwater divide impeding groundwater flow toward the surface water body (river) to the north. Groundwater elevations measured on either side of the barrier wall indicate that groundwater flow within the Site footprint is now toward the south and southeast. This change in direction will be confirmed in subsequent monitoring events. A topographic high southwest of the pond provides a localized mound where groundwater elevations are higher than those of neighboring monitoring wells.

Groundwater elevations fluctuate in response to rainfall. Seasonal variations of 1.7 to 10 feet are typical at the Site. These fluctuations are consistent in response in monitoring wells across the Site but vary in magnitude. Groundwater flow direction is consistent despite seasonal fluctuations. Groundwater elevation data indicate that water levels tend to be higher in the spring and early summer and lower during the fall and winter. A typical potentiometric surface map before barrier wall construction and the most recent potentiometric surface map are presented in Appendix C.

2.2 Nature and Extent of Groundwater Exceedances

Based on groundwater monitoring performed pursuant to the federal CCR rule and ADEM's rules, the following constituents have been identified in Site groundwater at concentrations exceeding the GWPS:

- Arsenic
- Cobalt
- Lithium

Several phases of investigation have been completed at the Site to delineate the extent of Appendix IV constituents exceeding GWPSs (SCS 2019, 2020, 2021).

Background groundwater sampling at the Site occurred between February 2016 and June 2017. Compliance detection sampling began in August 2017. Statistically significant increases (SSI) of Appendix III to 40 CFR Part 257 constituents were noted during the September 2017 compliance detection sampling event as described in the *2017 Annual Groundwater Monitoring and Corrective Action Report* (SCS 2018a). The Appendix III SSIs triggered assessment sampling for Appendix IV constituents, with the first assessment sampling event occurring in January 2018.

A *Facility Plan for Groundwater Investigation* (Facility Plan; SCS 2018b) at the Site was completed to meet the requirements of Order No. 18-097-GW issued to APC by ADEM on August 15, 2018. Part B of the order required completion of a Facility Plan by November 13, 2018. The Facility Plan included the following elements:

- Installing additional wells as necessary to define the extent of groundwater impacts, defined as Appendix IV constituents that statistically exceed GWPSs
- Collecting data on the nature and estimated quantity of material released

- Installing at least one additional well at the facility boundary
- Establishing an Assessment Monitoring Program
- If necessary, scheduling the notification of persons who own or reside on land that overlies areas where Appendix IV constituents statistically exceed GWPSs.

The Facility Plan summarized the proposed approach for completing the tasks necessary to satisfy Part B of the order.

Horizontal delineation of arsenic, cobalt, and lithium GWPS exceedances utilized a stepping-out approach based on groundwater flow direction relative to monitoring wells exhibiting exceedances. Vertical delineation wells were not required at the Site, as the uppermost aquifer is relatively thin and is confined at its base by an estimated 250-foot-thick low-permeability chalk (10^{-8} cm/sec) that defines the base of the uppermost aquifer.

Three phases of delineation field activities, beginning in December 2018, were performed at the Site. Compliance (assessment) monitoring and delineation sampling events have shown exceedances of arsenic, cobalt, and lithium in the alluvial and low terrace deposits in which groundwater occurs in the coarser sand and gravel intervals of Unit 2.

Details on groundwater data evaluation and monitoring well abandonments and installations (including wells installed for delineation) are provided in annual groundwater monitoring and corrective action reports (SCS 2018a, 2019, 2020, 2021). During the most recent reporting period, the Appendix IV constituents arsenic, lithium, and cobalt were noted at statistically significant levels (SSLs) above the GWPS as follows:

- Arsenic at monitoring wells GC-AP-MW-1, GC-AP-MW-5, GC-AP-MW-10, GC-AP-MW-14, GC-AP-MW-16, GC-AP-MW-17, and GC-AP-MW-18
- Cobalt at monitoring wells GC-AP-MW-1 and GC-AP-MW-11
- Lithium at monitoring wells GC-AP-MW-5, GC-AP-MW-10, GC-AP-MW-11, GC-AP-MW-12, GC-AP-MW-13, GC-AP-MW-14, GC-AP-MW-15, GC-AP-MW-16, GC-AP-MW-17, GC-AP-MW-18, and GC-AP-MW-21

Figure 2 depicts the extent of arsenic, cobalt, and lithium GWPS exceedances based on recent delineation data.

Delineation field activities included the installation and sampling of 11 wells located on 3 off-site properties adjacent to the Site. Assessment monitoring and delineation sampling events have shown exceedances of cobalt in 1 off-site delineation well and lithium in 4 off-site delineation wells.

3 Groundwater Remedy Selection

Groundwater remedy selection has occurred in two stages: completing an assessment of corrective measures to identify potentially feasible remedies for the Site after the initial determination that GWPSs have been exceeded, followed by a comprehensive evaluation of potential remedies to develop this specific remedy plan.

3.1 Assessment of Corrective Measures

In June 2019, the *Assessment of Corrective Measures* (ACM) was prepared pursuant to USEPA's CCR rule (40 CFR Part 257 Subpart D), ADEM's Admin. Code r. 335-13-15, and an Administrative Order issued by ADEM (AO 18-097-GW) to evaluate potential groundwater corrective measures for the occurrence of arsenic, cobalt, and lithium in groundwater at SSLs at the Site (Anchor QEA 2019a). This ACM was the first step in developing a long-term corrective action plan to address GWPS exceedances identified at the Site.

As described in the ACM, the following remedies were considered as potential groundwater corrective measures for the Site:

- Geochemical manipulation via injection of treatment solutions
- Monitored natural attenuation (MNA)
- Hydraulic containment (pump-and-treat)
- Permeable reactive barrier (PRB) walls
- Vertical barrier walls

3.2 Remedy Selection Criteria

The ACM was only the first step in the process for developing a groundwater remedy. The CCR rule contemplated that multiple potential remedies would be identified as potentially effective at achieving the corrective action objectives outlined in 40 CFR § 257.97(b) and ADEM Admin. Code r. 335-13-15-.06(8)(b). Thus, following the ACM, the Site must evaluate the remedial options using the following four factors in § 257.97(b)[2] and ADEM Admin. Code r. 335-13-15-.06(8)(b):

(1) Be protective of human health and the environment.
(2) Attain applicable GWPSs as specified in the rules.
(3) Control the source(s) of the release so as to reduce or eliminate, to the maximum extent feasible, further releases of Appendix IV constituents into the environment.

[2] As explained in Footnote 1 (Section 1.4), the 40 CFR § 257.97(b)(4) requirement to "remove from the environment as much of the contaminated material that was released from the CCR unit as is feasible" is not applicable to the Site because there was no release of material as contemplated by the rule. Additionally, it is not evaluated as a performance standard for the proposed remedy.

(4) Comply with any relevant standards (i.e., all applicable RCRA requirements) for management of wastes generated by the remedial actions.

In selecting a remedy plan to meet the above performance criteria, consideration factors are set forth in 40 CFR § 257.97(c) and ADEM Admin. Code r. 335-13-15-.06(8)(c) to weigh which option(s) are most appropriate based on site-specific conditions. These factors include the following:

(1) The long- and short-term effectiveness and protectiveness of the potential remedy(s), along with the degree of certainty that the remedy will prove successful based on consideration of the following
  (i) Magnitude of reduction of existing risks
  (ii) Magnitude of residual risks in terms of likelihood of further releases due to CCR remaining following implementation of a remedy
  (iii) The type and degree of long-term management required, including monitoring, operation, and maintenance
  (iv) Short-term risks that might be posed to the community or the environment during implementation of such a remedy, including potential threats to human health and the environment associated with excavation, transportation, and redisposal of contaminant
  (v) Time until full protection is achieved
  (vi) Potential for exposure of humans and environmental receptors to remaining wastes, considering the potential threat to human health and the environment associated with excavation, transportation, redisposal, or containment
  (vii) Long-term reliability of the engineering and institutional controls
  (viii) Potential need for replacement of the remedy
(2) The effectiveness of the remedy in controlling the source to reduce further releases based on consideration of the following factors:
  (i) The extent to which containment practices will reduce further releases
  (ii) The extent to which treatment technologies may be used
(3) The ease or difficulty of implementing a potential remedy(s) based on consideration of the following types of factors
  (i) Degree of difficulty associated with constructing the technology
  (ii) Expected operational reliability of the technologies
  (iii) Need to coordinate with and obtain necessary approvals and permits from other agencies
  (iv) Availability of necessary equipment and specialists
  (v) Available capacity and location of needed treatment, storage, and disposal services
(4) The degree to which community concerns are addressed by a potential remedy(s)

None of the factors identified in 40 CFR § 257.97(c) and 335-13-15-.06(8)(c) are given greater weight over others. After balancing the various factors, the rules provide facilities with discretion in selecting the final remedy plan, so long as it will achieve the remedial objectives in § 257.97(b) and 335-13-15-.06(8)(b). Therefore, faster and/or more aggressive technologies may not always make up the most suitable option for a Site.

The CCR rules do not establish a set time frame for a facility to evaluate potential remedies and develop a final remedy plan. 40 CFR § 257.97(a) and 335-13-15-.06(a) require an owner or operator to select a remedy "as soon as feasible," and 80 Federal Register 21407 explains USEPA declined to set a specific time frame for selecting a remedy. As described previously, the Site has had to secure off-site property access to complete delineation, performed multiple phases of investigation, and completed sampling and analysis to complete remedy evaluation.

3.3 Remedy Evaluation

As part of the ACM, some potential remedies were eliminated from consideration because they were technically infeasible. The ACM identified the following potentially feasible remedies for groundwater corrective measures for the Site:

- Geochemical manipulation via injection of treatment solutions
- MNA
- Hydraulic containment (pump-and-treat)
- PRB walls
- Vertical barrier walls

Since submittal of the ACM, desktop studies, field work, and laboratory studies have been performed to evaluate potential corrective measures for the Site. Results of these studies are summarized in the semiannual remedy selection progress reports (Anchor QEA 2019d, 2020a, 2020b, 2021).

The following provides details regarding the evaluation of each remedy relative to the considerations listed in 40 CFR § 257.97(c) and 335-13-15-.06(c).

3.3.1 Geochemical Manipulation via Injection of Treatment Solutions

Geochemical manipulation is retained as part of the planned remedy for the following reasons:

- Proven effectiveness for arsenic in field applications and effective for cobalt and lithium in laboratory treatability studies on CCR-impacted groundwater
- Suitable for spot (isolated area) treatment or creation of a linear treatment zone perpendicular to groundwater flow
- Compatible with and can enhance natural attenuation processes

Typical steps in a geochemical manipulation treatment include the following:

- Laboratory treatability studies to determine the optimum reagents, concentration, and dose
- Design, including spacing and depth of injection points, injection rates, travel time, and radius of influence, considerations of which are largely based on site hydrogeological characteristics and injection logistics
- Additional fine-scale delineation of the impacted area in the field
- Implementation of a field pilot test and remedial-effectiveness monitoring

Arsenic has been successfully treated in field applications under a broad range of site geochemical conditions, including adsorption to iron oxyhydroxides under oxidizing conditions (with and without pH adjustment) and sequestration in and on iron sulfide minerals created by injection. Both technologies are ferrous-sulfate-based, though sequestration in sulfide minerals includes the addition of a carbon source (e.g., molasses) as the sulfide process is mediated by naturally occurring iron-reducing bacteria. Mixed metal oxides containing iron, manganese, and magnesium have been successful for arsenic, lithium, and cobalt treatment in laboratory studies.

Especially for spot treatment, the area of impacts is typically better defined (delineated) prior to injection. The delineation may include collection of numerous groundwater samples through direct-push technology on a grid. Groundwater samples are screened with field test kits, with a subset of samples sent to an analytical laboratory for confirmation analyses.

3.3.2 Monitored Natural Attenuation

Extensive geochemical and related studies demonstrate that MNA is a viable corrective action for groundwater impacts associated with the Site. The preponderance of evidence indicates that Site conditions meet USEPA's requirements for MNA, specifically: area of impacts stable or shrinking, identified mechanisms for attenuation, stability of the attenuating mechanisms, sufficient aquifer capacity for attenuation, and time to achieve GWPSs reasonable as compared to other corrective action alternatives. The ACM identified alternative corrective measures, which is the last requirement should MNA not perform as expected. Injection treatments will be performed in areas with higher concentrations of COIs in groundwater; therefore, MNA is one component of corrective action, rather than a standalone remedy. The *Monitored Natural Attenuation Demonstration* report is included as Appendix D.

3.3.3 Hydraulic Containment (Pump-and-Treat)

Hydraulic containment is not recommended for the following reasons:

- Inefficiency due to groundwater not requiring treatment being drawn to the pumping wells
- High operation and maintenance requirements

- Long time required to achieve GWPS, likely beyond the post-closure period of 30 years (based on pore volume calculations)
- Low sustainability (excessive use of resources)

The Site has surface water bodies on three sides: the Black Warrior River to the north and south, and the barge canal connecting to the Black Warrior River to the east. An effective hydraulic containment (pump-and-treat) system would likely pull water from the surface water bodies into pumping wells and, ultimately, into the water treatment system. Treating large volumes of unimpacted groundwater would be inefficient and time-consuming.

Many pumping wells, extensive piping, and a water treatment system would be required to implement pump-and-treat at the Site. Pump-and-treat systems typically have high operation and maintenance requirements (USEPA 2002). These include keeping the wells, pumps, piping, and water treatment system in working order and replacing components as needed. Fouling of well screens and piping is not uncommon in Southeastern Coastal Plain settings such as the Site location. The Site often requires well cleaning and rehabilitation, and, under the most adverse conditions, replacement of the wells. Pumps and components of the water treatment system will need to be replaced periodically. In addition, water treatment for the three COIs at the Site will require an ongoing supply of water treatment chemicals such as ferric chloride and sodium hydroxide (for pH adjustment) and will produce a sludge that will need to be dewatered and disposed of properly. Water treatment systems usually require a full- or part-time operator.

Hydraulic containment (pump-and-treat) will likely not offer any time advantage to achieving GWPSs over geochemical manipulation and MNA due to the slow release of COIs from the aquifer solids. To be effective, many pore volumes of water would need to be passed over the aquifer solids to release the COIs. As part of feasibility studies for pump-and-treat for the Site, estimates of numbers of pore volumes to be pumped and treated range from 20 to 522, depending upon the COI. Natural attenuation is occurring at the Site, and pump-and-treat would operate against (essentially try to reverse) the natural processes already occurring. Pump-and-treat systems for inorganic constituents such as the COIs at the Site typically operate for decades.

Pump-and-treat is also one of the least sustainable groundwater corrective actions, as it requires extensive resources to implement and operate. These resources are expended for decades and include raw materials for the infrastructure, ongoing electricity use, water treatment chemicals, water treatment system operation, pump replacement, well redevelopment and maintenance, equipment maintenance, and laborers for monitoring and maintenance. Geochemical manipulation and MNA, however, are among the most sustainable groundwater corrective actions due to minimal infrastructure and relatively low operation and maintenance requirements.

3.3.4 PRB Walls

A PRB wall is a feasible corrective action for the site. However, it is not recommended for the following reasons:

- It is redundant with the vertical barrier (slurry) wall installed around the consolidated footprint of the CCR for source control.
- It would delay implementation of the groundwater remedy until groundwater flow directions are reestablished after closure activities.
- It does not address the impacted groundwater that has previously moved beyond the consolidated footprint of the CCR.
- It is more difficult to implement and has greater maintenance requirements than the selected remedies (geochemical manipulation via injections and MNA).
- Would require extensive and time-consuming replacement/reinstallation as treatment media were expended.
  - This would potentially create geochemical disruption or disequilibrium that could mobilize COIs and set back remedy progress.

As discussed in the ACM, a PRB wall treats groundwater as it flows through permeable reactive material in the wall or a portion of the wall (reactive gate). A vertical barrier wall is being installed at the Site around the consolidated CCR perimeter to impede further migration of impacted groundwater away from the source. Therefore, a PRB wall is not needed to prevent migration of COIs from the source.

A PRB wall relies on groundwater flow through the wall for treatment. Site closure activities, particularly construction of the vertical barrier wall and runoff pond, will alter groundwater flow magnitude and direction. Therefore, the optimum location and configuration of the PRB wall will not be known until groundwater flow direction stabilizes after construction is complete in 2026. Design and implementation of a PRB wall, therefore, would be delayed until at least 2026 (and probably longer). The selected remedies, geochemical manipulation and MNA, could be implemented prior to 2026.

Over the 57-year history of the Site, groundwater impacted with one particular COI (lithium) has migrated appreciable distances beyond the boundary of the consolidated footprint of the CCR. Though a PRB wall could prevent impacted groundwater from migrating off site, it would not treat existing impacted areas as effectively as the selected remedies, geochemical manipulation and MNA.

A PRB wall is more difficult to implement than the selected remedies and would require periodic maintenance. PRB walls typically require trenching and emplacement of reactive media in the trench through a slurry of some sort. At the Site, trenching would be required to depths up to 70 feet (possibly more), with the wall keyed into the chalk.

The reactive media in the PRB wall would be complex due to the different chemical properties of the three COIs. Laboratory treatability studies would need to be performed to determine the optimum media composition and life of the media. The media loses effectiveness with time (sorption properties diminish as COIs are captured) and would likely become fouled and less permeable, even before its reactivity was diminished. Therefore, reactive media must be replaced periodically based on laboratory studies and groundwater monitoring near the PRB wall.

3.3.5 Vertical Barrier Walls

As discussed in Section 1.3.2, the Site closure plan already incorporates a vertical barrier wall, and that will further source control objectives; therefore, developing a wall as part of a remedy plan was not necessary, although the presence and function of the wall are included in the overall remedy strategy.

4 Selected Groundwater Remedy

Since submittal of the ACM in June 2019 (Anchor QEA 2019a), extensive investigations have been performed to select effective corrective measures for COIs in groundwater at the Site. Semiannual status reports regarding investigation and evaluation have been submitted to ADEM and posted to the Site's CCR compliance webpage. Based on investigation and evaluation, the following combination of corrective measures are proposed to address GWPS exceedances at the site:

- Source control
  - Dewatering and consolidating the Site footprint by approximately 55%
  - Installing a low-permeability geosynthetic cover system over the consolidated footprint
  - Constructing a vertical subsurface cement-bentonite barrier wall around the consolidated Site footprint and extending it through the uppermost aquifer (Unit 2) and keying into the relatively impermeable chalk aquitard
- Geochemical manipulation
  - Injecting treatment solutions into areas exhibiting highest concentrations of arsenic, lithium, and cobalt to remove them from groundwater and immobilize them in situ
  - Monitoring treatment performance
- MNA
  - Establish no-exceedance boundary monitoring
  - Monitor concentration reduction and natural attenuation mechanisms
- Adaptive site management (ASM)
  - Routinely evaluate remedy system performance
  - Measure performance against interim performance standards (adaptive triggers)
  - Systematically reevaluate remedy system performance against adaptive triggers

As explained in the following subsections, the selected remedy plan meets the four performance standards of 40 CFR § 257.97(b) and ADEM Admin. Code r. 335-13-15-.06(8)(b) and will achieve the following:

- Be protective of human health and the environment.
- Attain the GWPS specified in the rules.
- Control the source of release to reduce or eliminate, to the extent feasible, further releases to the environment.
- Comply with any relevant standards (i.e., all applicable RCRA requirements) for management of wastes generated by the remedial actions.

As required by 40 CFR § 257.97(a) and ADEM Admin. Code r. 335-13-15-.06(8)(a), the following subsections describe the selected remedy.

4.1 Source Control

As discussed previously, a key component of the groundwater remedy plan for the Site is source control to prevent future releases to groundwater from the disposal unit. Figure 5 provides a generalized overview of the closure and source control measures. Closure/source control measures began in 2019 and are anticipated to continue through 2026. Figure 6 presents a general timeline depicting the closure schedule relative to implementation of the groundwater remedy. Source control will be accomplished by:

1. Dewatering and consolidating the CCR material to the northern portion of the existing Site and reducing the footprint from approximately 489 acres to approximately 221 acres and contained within dikes. Slopes will be graded to provide stability, promote drainage, and prevent ponding in the disposal area. As shown in Figure 6, dewatering and consolidation are anticipated to proceed into 2025.
2. Installing a low-permeability cement-bentonite vertical barrier wall extending through the uppermost aquifer and keyed into the existing underlying chalk layer. The vertical barrier wall will prevent the horizontal migration of impacted water from the Site area and virtually eliminate future releases to groundwater outside the barrier wall. Construction of the northern portion of the barrier wall was completed in 2021. The remainder of the barrier wall is scheduled for completion in 2026.
3. Placing final cover, consisting of an engineered synthetic turf and geomembrane, over the disposal area. The low-permeability cover system will promote and control runoff from the disposal area and prevent infiltration. Eliminating infiltration will prevent the mobilization of constituents within the disposal unit and further reduce the potential for future releases from the Site. The final cover will be installed after consolidation is complete and the slurry wall is installed. The planned installation of the final cover system is scheduled for 2026.

As shown in Figure 6, closure/source control measures will proceed for several years following implementation of the groundwater remedy at the Site. Closure activities are, in themselves, anticipated to change and improve groundwater quality by isolating the source area, preventing further releases, and changing groundwater flow conditions. These changes may result in short-term variability in groundwater quality as construction proceeds. These anticipated changes will be accommodated by the groundwater remedy strategy.

The closure and source control measures meet the requirements of 40 CFR § 257.97(b)(3) and 335-13-15-.06(8)(b)3 and will control the source of release to reduce or eliminate, to the extent feasible, further releases to the environment.

4.2 Geochemical Manipulation via Injections

Geochemical manipulation via subsurface injections is an in situ remediation technology for inorganic constituents in groundwater. In this technology, treatment solutions are injected to create solid precipitates, which remove COIs from groundwater during their formation and continue to sorb COIs on their surfaces over time. Geochemical manipulation for arsenic is well established and, due to geochemical similarities, should also be effective for cobalt. Geochemical manipulation is an emerging technology for lithium and has had significant technological development over the last 2 years (EPRI 2021).

Geochemical manipulation will be implemented at the Site in two phases as follows:

- Phase 1 (Pilot)
  - Identify four areas for treatment.
  - Complete bench-scale studies and identify optimum treatment solutions and doses.
  - Plan and install the injection and monitoring points.
  - Perform injections and monitor performance.
  - Evaluate injection results.
  - Adjust injectate, injection frequency, or locations as necessary.
  - Expand and adjust the system to meet objectives based on monitoring results.
- Phase 2
  - Identify additional areas for treatment (if needed).
  - Plan and install the injection and monitoring points based on Phase 1 (Pilot) results.
  - Perform injections and monitor performance.
  - Evaluate injection results.
  - Adjust injectate, injection frequency, or locations as necessary.
  - Expand and adjust the system to meet objectives based on monitoring results.

4.2.1 Injection Treatment Overview

Geochemical manipulation was selected because of its effectiveness, ease of implementation versatility (ability to treat more than one COI with the same treatment solution), ability to implement in areas with limited working space, and lack of byproducts that would require further treatment or disposal.

Effective injection treatment has been performed for arsenic in groundwater under variable geochemical conditions using iron-based treatment solutions (Anchor QEA 2017, 2018, 2019c, 2019e). In laboratory treatability studies conducted for the Electric Power Research Institute (EPRI) and large utility companies, mixed oxides of iron, manganese, and magnesium in solution were proven effective for arsenic, cobalt, lithium, and other constituents (EPRI 2021). Site-specific laboratory treatability studies using Site aquifer media and impacted groundwater will be performed prior to field implementation of injection treatment. These studies will evaluate multiple viable treatment solutions and a range of doses.

After selection of the optimum treatment reagents and doses, injections will be performed in two phases: a field pilot phase and follow-up treatments as needed based on the results of the pilot injections and ongoing groundwater monitoring data. Areas with the highest concentrations of arsenic, lithium, and/or cobalt will be selected for field pilot studies (Figure 7). A requisite monitoring period (anticipated to be approximately 1 year) will follow the field pilot injections. This approach to injection treatment is consistent with ASM for corrective action.

As described in Section 1.3, site closure (source control) measures are expected to reduce concentrations of COIs in groundwater. Other areas with SSLs will be treated as needed in a second phase of injection based on groundwater monitoring data from the field pilots and ongoing sitewide monitoring. Depending upon the effectiveness of treatment, injections may need to be repeated periodically, though required time between injection treatments is expected to be years (based on other injection treatment precedents).

4.2.2 Site-Specific Injection Treatment Plan

Phase 1 (Pilot) injections will be performed through permanent injection wells. Phase 2 injections will be performed through permanent injection wells and/or direct-push technology, depending upon the results of the pilot program.

Existing monitoring wells will be used to monitor the effectiveness of the injection treatment. In addition, based on the hydraulics of the aquifer in the injection area, additional remedial-effectiveness monitoring wells will be installed at variable distances to demonstrate injection effectiveness. Monitoring parameters will include COIs and other indicator parameters based on the composition of the treatment solutions. Monitoring frequency will be based on the hydraulics of the aquifer in the areas of interest, distance of the monitoring wells from the line of injection, and associated travel time from the points of injection to monitoring wells.

A two-phase injection program will be implemented at the Site targeting areas with the greatest observed arsenic, cobalt, and lithium concentrations:

- Phase 1 (Pilot) will serve as the pilot testing to determine the optimum spacing for injection locations and evaluate the field performance of the treatment solutions. Based on observed results, adaptations will be made to injection location spacing and treatment solutions (if necessary) to optimize performance and attain desired reduction in constituent concentrations.
- Phase 2 will follow Phase 1 (Pilot) as needed and incorporate site-specific information as determined during Phase 1 (Pilot).

For Phase 1 (Pilot), four areas exhibiting the greatest concentrations of arsenic, cobalt, and lithium are targeted to evaluate the effectiveness of in situ injection treatment. Figure 7 identifies the four general areas at the Site where Phase 1 (Pilot) injections will be performed. Tentative anticipated Phase 2 injection areas are identified based on current site conditions and may be adjusted based on changes in groundwater chemistry that may occur because of closure activities, natural attenuation, and Phase 1 (Pilot) injection effectiveness.

Figures 8 through 15 provide details regarding the planned injection program in each Phase 1 (Pilot) area. The first figure for each injection area provides a plan view of the area identifying the existing monitoring well exhibiting elevated concentrations, locations of planned injection wells spaced approximately 15 feet apart and parallel to groundwater flow direction, and performance monitoring points installed approximately 10 feet downgradient of each injection point. The second figure for each injection area provides a cross-sectional depiction of the area and shows well configuration relative to location-specific geology.

Prior to installing Phase 1 (Pilot) injection wells, treatability studies and supplemental data collection must be performed to complete the formulation of the injection media. Supplementary data collection and evaluation activities planned to be completed as part of Phase 1 (Pilot) include the following:

- Collection of Site soils for batch and column studies from proposed Phase 1 (Pilot) injection areas
- Performance of laboratory treatability studies (batch and/or column tests) for geochemical manipulation
- Higher-resolution delineation of COIs in Phase 1 (Pilot) injection areas.

Laboratory treatability studies will be performed to formulate the treatment solution composition, dose, and sequencing (if sequencing is needed). Specifically, the following tasks are anticipated as part of Phase 1 (Pilot):

- Batch tests for reagent selection and sequencing
  - Combinations of iron, manganese, and/or magnesium salts at different concentrations mixed with impacted groundwater from the Site
    - Formulations are based on previous successful treatability studies.
    - Multiple formulations have been proven successful for arsenic in field applications and for lithium and cobalt in laboratory treatability studies.
  - Expected to take approximately 4 to 6 weeks, including post-batch data analysis
- Column tests
  - Apply treatment solution to Site soils based on batch tests.
  - Simulate injection and subsequent precipitation of reactive solids on the sand aquifer.

- Pump impacted groundwater through columns and measure arsenic, lithium, and cobalt in the effluent.
- After column tests, perform SSE on soil to determine the treated form of constituents and stability of treatment.
- Pump ambient groundwater through treated soils in columns to test for stability (remobilization).
- Column tests are expected to take approximately 12 weeks, including post-column data analysis.

Prior to implementing geochemical manipulation, the COIs in the injection areas will be further delineated with greater resolution and may include the following procedures:

- Collect groundwater samples through direct-push technology.
  - Sampling grid from impacted wells; holes on 10-foot spacings
  - Two or three depths within the Unit 2 aquifer, based on thickness
- Field filter as needed, based on visual observation.
- Screen samples with field test kits for arsenic, lithium, and cobalt; adjust sampling locations as needed.
- Geophysical techniques such as electrical resistivity may be performed over the anticipated treatment area. The geophysical survey would be performed again shortly after treatment. Due to the anticipated conductivity contrast between the treatment solution (higher conductivity) and ambient groundwater, geophysics may be useful in mapping the travel distance of the treatment solution and areal extent of the treatment zone (Halihan et al. 2009).
- Once delineation is refined, and wells are installed in each injection area, injections will be performed.

The monitoring program for each injection area is expected to include the following components:

- Pre-injection sampling from injection and monitoring wells to establish background
- Post-injection monitoring in select wells at intervals to determine treatment solution behavior, such as 2 days, 1 week, 1 month, 6 months, and annually thereafter (Frequency may be adjusted as needed based on data generated.)
- Sampling for the following constituents during each monitoring event:
  - Field parameters (temperature, pH, oxidation-reduction potential, and specific conductance)
  - Appendix IV constituents and treatment solution indicators such as iron, magnesium, and manganese (Combined radium-226 and -228 will be excluded from monitoring because it is not observed at elevated concentrations at the Site; thus, the burden of additional sample volume, specialized analysis, and additional analysis turnaround time is not warranted.)

Data loggers may be installed in select monitoring wells prior to injection to observe changes in groundwater chemistry for indicator parameters (e.g., pH, oxidation-reduction potential, and specific conductance) before, during, and after treatment. Due to the expected conductivity contrast between the treatment solution and groundwater, geophysical methods such as electrical resistivity imaging will be investigated to map the extent of the treatment zone.

4.3 Monitored Natural Attenuation

MNA has been a component of corrective action at RCRA and Comprehensive Environmental Response, Compensation, and Liability Act (Superfund) sites since the 1990s. MNA describes a range of physical, chemical, and biological processes in the environment that reduce the concentration, toxicity, or mobility of constituents in groundwater. For inorganic constituents, the mechanisms of natural attenuation include sorption, dispersion, precipitation, and ion exchange (USEPA 1999, 2007a, 2007b). MNA as a remedial alternative is dependent on a good understanding of localized hydrogeologic and geochemical conditions and may require considerable information and monitoring over an extended period of time.

4.3.1 MNA Overview

USEPA defines MNA as the "reliance on natural attenuation processes (within the context of a carefully controlled and monitored site cleanup approach) to achieve site-specific remediation objectives within a time frame that is reasonable compared to that offered by other more active methods" (USEPA 1999, 2015). An MNA evaluation consists of the following steps or tiers (USEPA 2015):

1. Demonstrate that the area of impacts (plume) is stable or shrinking.
2. Determine the mechanisms and rates of attenuation.
3. Determine that the capacity of the aquifer is sufficient to attenuate the mass of constituents in groundwater and that the immobilized constituents are stable and will not remobilize.
4. Design a performance monitoring program based on the mechanisms of attenuation and establish contingency remedies (tailored to site-specific conditions) should MNA not perform as expected.

Where site conditions are conducive to MNA, it has the potential to provide a more sustainable, lower-cost alternative to aggressive remediation technologies such as pump-and-treat. EPRI has prepared a document describing implementation of MNA for 24 inorganic constituents, which include most Appendix III and IV constituents (EPRI 2015).

Attenuation mechanisms can be placed in two broad categories, physical and chemical. Physical mechanisms include dilution, dispersion, flushing, and related processes. All constituents are subject to physical attenuation mechanisms, so physical processes should be considered in MNA evaluations.

When properly implemented, MNA removes constituents from groundwater and immobilizes them onto aquifer solids. Decisions to utilize MNA as a remedy or remedy component should be thoroughly supported by site-specific data and analysis (USEPA 1999, 2015). In addition, though not an MNA tier per se, source control is presumed to precede MNA implementation. Extensive MNA investigations were performed for the Site in 2020 and 2021 and are documented in the MNA demonstration report provided in Appendix D.

Site closure (dewatering, consolidation, and capping) and the associated barrier (slurry) wall will meet the MNA criteria for source control. As described in Section 1.3, the Site will be closed by consolidating the Site footprint from approximately 489 acres to approximately 221 acres. CCR removed from outside the consolidated footprint will be dewatered, excavated, and compacted within the consolidated footprint. All visible CCR and a portion of the subgrade soils will be excavated outside the consolidated footprint. A barrier wall will be constructed completely around the footprint of the consolidated CCR and tied into the relatively impermeable underlying chalk such that CCR will be encapsulated and isolated from contact with groundwater outside the barrier wall (Figures 2 and 3). The final cover of the consolidated footprint will have a permeability of 10^{-7} cm/sec or less and will be constructed to control and minimize or eliminate (to the extent possible) post-closure infiltration of precipitation into the waste and potential releases of CCR from the unit. Site closure and the associated barrier wall will effectively eliminate any future discharges to groundwater.

4.3.2 Site-Specific MNA Evaluation Summary

As described in greater detail in Appendix D, the trends observed in concentration versus time and concentration versus distance graphs provide evidence that natural attenuation is occurring at the Site. Several concentration versus time graphs indicate that arsenic, lithium, and/or cobalt concentrations are stable or are decreasing with time in some areas, even without source control. Also, concentration versus distance graphs along downgradient transects indicate these COIs are decreasing with distance from the Site. Isoconcentration maps for COIs from 2020 and 2021 were compared and show plume stability.

Based on the geochemical investigations, several lines of evidence support multiple attenuating mechanisms, depending upon the COIs. The major attenuating mechanisms include:

- Arsenic attenuation by sorption on and coprecipitation with iron oxides and, possibly, precipitation of barium arsenate
- Cobalt attenuation by incorporation into a cobalt-iron oxide
- Lithium attenuation by ion exchange on oxides and clay minerals

Rates of attenuation were determined by results of reactive transport modeling and by extrapolating decreasing trends on the concentration versus time graphs to the GWPS for areas where decreasing trends were observed. Depending on the COIs and well/location, the estimated time to achieve natural attenuation ranges from 2 to 40 years, which is reasonable compared to durations of other corrective action technologies. Based on MNA case histories for inorganic constituents, MNA time frames typically range from a few years to decades (EPRI 2015). Because pond closure activities (consolidation and capping) at the Site are projected to take approximately 5 additional years, the time frame for MNA is compatible with the closure period.

Column studies were performed to assess the ability for the aquifer (soil) to chemically attenuate COIs and to help determine the stability of the attenuated COIs. Cobalt and lithium showed limited ability to sorb to the aquifer media based on column studies. However, these constituents are still subject to other attenuating mechanisms, such as physical attenuation (dispersion and flushing) and coprecipitation, as indicated by the concentration versus time graphs, concentration versus distance graphs, and geochemical studies.

Column studies indicate that arsenic is significantly attenuated by aquifer media, as arsenic in column effluent remained less than 13% of the influent concentrations. Arsenic attenuation capacity was extrapolated to the entire mass of the aquifer downgradient of the consolidated Site but within the property boundary. The extrapolation showed that the aquifer has an attenuating capacity of many more times the mass of arsenic requiring attenuation. SSE studies indicate that most of the mass of all three COIs occurs in the oxidizable and residual fractions, which are very stable attenuation phases.

Corrective action performance monitoring consists of two major components: 1) monitoring for sitewide corrective action, which would include MNA and the positive benefits of source control and geochemical manipulation (injections) at the Site scale; and 2) remedial-effectiveness monitoring for geochemical manipulation in the areas of injections. Sitewide monitoring applies to MNA because MNA will be implemented over the entire Site. Sitewide monitoring is described in Section 4.3.1.

4.3.3 Site-Specific MNA Plan

Implementation of MNA at the Site will be relatively easy. Most of the wells for MNA are already in place, though some additional wells will need to be installed to monitor progress in critical areas. The site-specific MNA plan will be composed of the following:

- A network of sentinel or clean-line monitoring points beyond the extent of GWPS exceedances. The clean-line network will consist of monitoring wells and surface water sampling locations and will be monitored to verify that GWPS exceedances do not occur at or beyond the locations.
- Monitoring wells located within the areas exhibiting GWPS exceedances. These wells will be monitored to verify attenuation mechanisms, document decreasing concentrations, calculate plume mass or mass flux, and provide monitoring data to demonstrate MNA effectiveness.

- A comprehensive data analysis and reporting plan identifying specific wells, performance standards and reporting procedures.
- Components of an ASM plan.

A key component of MNA is a detailed monitoring and reporting plan. Pursuant to 40 CFR § 257.98(a) and ADEM Admin. Code r. 335-13-15-.06(9)(a), a remedy and monitoring program must be implemented within 90 days of selecting a remedy. As documented in Appendix D, natural attenuation is already occurring at the Site. A comprehensive and specific MNA monitoring plan document will be developed within 90 days of this report. A conceptual summary of the anticipated MNA monitoring network is included in Figure 16.

MNA monitoring will primarily be accomplished by sampling MNA monitoring wells for the following list of constituents on a semiannual basis:

- Appendix IV constituents
- General parameters that influence geochemistry such as pH, temperature, oxidation-reduction potential, dissolved oxygen, and specific conductivity
- Natural attenuation indicator parameters specific to the identified attenuation mechanisms such as ferrous and ferric iron

Because MNA does not require design and construction of infrastructure other than new monitoring wells, the monitoring can be initiated within 6 months to a year. At least 1 year of groundwater monitoring data are recommended to establish baseline conditions and trends. The following provides a summary of the MNA implementation plan:

- Install additional monitoring wells
- Begin MNA-specific sampling and analysis
- Provide first MNA evaluation monitoring report describing initial conditions

4.4 Adaptive Site Management Plan

Changes in Site conditions are inevitable with the long-term performance of groundwater remedies. 40 CFR § 257.98(b) and ADEM Admin. Code r. 335-13-15-.06(9)(b) require an owner or operator to implement other methods or techniques if it is determined that compliance is not being achieved by the existing remedy. Remedy system performance will be proactively and systematically monitored against interim performance standards in accordance with the ASM plan to ensure compliance with 40 CFR § 257.98(b) and ADEM Admin. Code r. 335-13-15-.06(9)(b) requirements and provide a process for proactively responding to changing conditions. Details regarding implementation of the ASM will be included in the comprehensive *Corrective Action Groundwater Monitoring Plan*.

The ASM for the Site will include the following items:

- Implementing interim/short-term goals to measure system performance and progress toward long-term goals
- Evaluating remedy system performance against interim goals (adaptive triggers)
- Adapting when performance metrics are satisfied or interim goals are not met
- Updating Site conceptual model as new data become available
- Reevaluating and updating interim goals (adaptive triggers)
- Adapting the corrective action system, if necessary

The performance of the groundwater corrective action system at the Site will be subject to routine evaluation and, if necessary, adjustment as part of the ASM. Figure 17 presents the process that will be used to evaluate monitoring data, determine if performance objectives are met, and determine if adaptation of the corrective action system (CAS) is needed. Performance monitoring is an integral component of the ASM. Details regarding the performance monitoring systems, performance criteria, adaptive triggers, and evaluation criteria will be provided in the comprehensive *Corrective Action Groundwater Monitoring Plan* developed for the Site within 90 days pursuant to 40 CFR § 257.98(a) and ADEM Admin. Code r. 335-13-15-.06(9)(a).

The purpose of the ASM plan is to identify objective data targets that may be used to evaluate the effectiveness of the CAS. The ASM process is applicable at all stages of corrective action as follows (Figure 17):

- The CAS described herein will be implemented to address current conditions.
- Monitoring will occur and system performance will be evaluated with respect to interim and long-term performance standards (adaptive triggers) that signal a reevaluation of performance standards or adjustment to the CAS may be warranted.
- If monitoring indicates interim standards (adaptive triggers) have not been met, those performance standards will be reevaluated and a determination made regarding their continued suitability, if they need to be adjusted, or if the CAS needs to be adapted.
- Adjustments will be made to the adaptive triggers or CAS, as needed, to ensure that long-term (final) performance criteria and remedial goals are met.
- The conceptual site model will be updated as additional data are obtained.
- Implementation of the CAS, monitoring, and ASM plan will continue until the final long-term objectives are met.

4.4.1 Interim Performance Standards and Monitoring

The long-term performance standards for the CAS are defined in 40 CFR § 257.98(c) and ADEM Admin. Code r. 335-13-15-.06(9)(c): demonstrate compliance with the GWPS at all points that lie beyond the groundwater monitoring system established under § 257.91 and 335-13-15-.06(2) for three consecutive years based on semiannual monitoring.

Interim performance standards and adaptive triggers are developed to evaluate the effectiveness of the CAS in furtherance to meeting the long-term performance standards. As described in Section 4, in addition to closure and source control, the CAS is composed of injection treatment and MNA. Monitoring frequency of CAS components will vary as described in the *Corrective Action Groundwater Monitoring Plan*. Performance monitoring reporting will occur at least semiannually.

Sections 4.4.1.1 and 4.4.1.2 provide details regarding interim and long-term performance standards incorporated into the performance monitoring plan.

4.4.1.1 Injection Treatment

Injection treatment is designed to remove constituents from groundwater by precipitation or sorption via a treatment solution injected into the area of impact.

The interim performance goal of the injection treatment system is to document a reduction in constituent concentrations in groundwater and distribution of the treatment solution within the Unit 2 aquifer. The long-term performance objective is to demonstrate sustained constituent concentration reductions after injection of treatment solution has ceased. As will be described in the *Corrective Action Groundwater Monitoring Plan,* a series of monitoring wells will be installed within the injection zones and will be monitored to demonstrate the performance of the injection system. The performance monitoring system will account for potential variability created during ongoing closure activities such as excavation and slurry wall construction.

4.4.1.2 Monitored Natural Attenuation

The long-term goal of MNA is to document that, in conjunction with source control and injection treatment, natural attenuation of the constituents is occurring. The MNA performance monitoring network and adaptive triggers will be described in detail within the *Corrective Action Groundwater Monitoring Plan.* As described by USEPA (2015), the four tiers of MNA can be summarized as:

- Tier 1: plume size/stability
- Tier 2: attenuation mechanisms and rates
- Tier 3: attenuation mechanism capacity and reversibility
- Tier 4: performance monitoring plan

The suitability of MNA has been demonstrated as described in Section 4.3.2 and Appendix D. The performance of the MNA (Tiers 1 through 3) will be monitored by evaluating the following:

- Source control mechanisms

    - Section 1.3 describes how source control at the Site will be complete by way of consolidating the former Site footprint, installing a vertical barrier wall, and constructing the final cover system.
- Plume size and stability
    - The size and stability will be monitored by a network of groundwater monitoring wells within and around the perimeter of the area of groundwater exceedances (i.e., the plume). From a practical implementation standpoint, plume stability refers to an area of groundwater impacts that is not substantially expanding or adversely changing (by exhibiting new constituents or increasing mass). The interim performance standard for plume stability may be monitoring wells installed around the areas of groundwater impacts to exhibit trends that are statistically steady or decreasing and for no new SSLs to occur within the plume area. The long-term performance objective is for statistically decreasing trends, continual reduction in the number or SSLs in the MNA performance monitoring network, a reduction in size of the plume, and/or a reduction in magnitude of COIs within the plume.
- Plume mass and mass reduction
    - MNA performance relative to Tier 2 criteria for attenuation mechanisms and rates and Tier 3 criteria for attenuation capacity and reversibility may be demonstrated by monitoring the mass of each COI within the plume area and documenting changes in mass over time. Steady or decreasing mass indicates that attenuation mechanisms continue to be effective, attenuation capacity remains, and attenuation mechanisms have not reversed. The interim performance standard for mass reduction is for monitoring wells installed in and around the areas of groundwater impacts, in aggregate, to exhibit statistically steady or decreasing mass. Per USEPA guidance, mass flux across transects (cross sections) located in meaningful areas will also be calculated. The long-term performance objective is to demonstrate COI concentration decline to below GWPS and reduce COI mass.

Adjustments to the MNA performance monitoring network will be made as MNA proceeds.

4.4.2 Adaptive Triggers

Detailed performance monitoring requirements for each component of the CAS will be included in the *Corrective Action Groundwater Monitoring Plan*. Included in the performance monitoring plan will be the objective performance standards that serve as adaptive triggers. Should the performance standard not be met, the adaptive trigger will signify that reevaluation of the performance standards and CAS are warranted.

4.4.3 Corrective Action System Adaptation

If it is determined that the performance objectives are appropriate and that the CAS is not achieving the interim or long-term goals, then the CAS may be adapted, optimized, or changed. Within a reasonable time, depending on complexity and need, changes to the CAS and associated workplan or implementation schedule will be provided. A semiannual report describing the progress made adapting the CAS will be completed and placed in the operating record as required by 40 CFR § 257.105(h)(12) and 335-13-15-.08(1)(h)(12). Amendments to this *Groundwater Remedy Selection Report* and the *Corrective Action Groundwater Monitoring Plan* will also be completed and placed in the operating record as described in § 257.105(h)(12) and 335-13-15-.08(1)(h)12.

5 Remedy Performance Requirement Demonstration

As previously discussed, as required in 40 CFR § 257.97(b) and ADEM Admin. Code r. 335-13-15-.06(8)(b), the groundwater remedy for the Site must meet the following performance standards:

(1) Be protective of human health and the environment.
(2) Attain applicable GWPSs as specified in the rules.
(3) Control the source of release to reduce or eliminate, to the extent feasible, further releases to the environment.
(4) Comply with any relevant standards (i.e., all applicable RCRA requirements) for management of wastes generated by the remedial actions).

The following describes how the selected remedy plan meets the performance requirements of 40 CFR § 257.97(b) and 335-13-15-.06(8)(b).

5.1 Protection of Human Health and the Environment

A remedy is protective of human health and the environment when a quantitative risk assessment, conducted according to well-supported scientific principles, demonstrates that chemicals in relevant environmental media are at or below regulatory and/or health-based benchmarks for human health and the environment. Quantitative risk assessment approaches and the derivation of health-based benchmarks may vary by the competent authority or regulatory application. The State of Alabama has several reports that provide specific guidance on risk assessment approaches and the selection/derivation of appropriate health-based benchmarks for chemicals in groundwater and in surface water that will be protective of human health and the environment

Current conditions are protective of human health and the environment. The proposed remedy plan will improve groundwater quality and result in a reduction in concentrations; therefore, the proposed remedy will be protective of human health and the environment as required by 40 CFR § 257.97(b)(1) and 335-13-15-.06(8)(b)(1).

5.2 Attain Groundwater Protection Standard Requirements

As stated in 40 CFR § 257.97(b)(2) and 335-13-15-.06(8)(b)(2), a groundwater remedy plan must be able to attain the GWPS specified in the rules. As described in this report, a three-pronged approach will be used to achieve the GWPS. A significant component of the groundwater remedy plan is the closure and source control measures being implemented at the Site. The combination of CCR consolidation dewatering, construction of a vertical barrier wall, and installation of a low-permeability geosynthetic cover system will prevent further release to the environment.

Injection treatment of areas with significantly elevated concentrations of constituents will reduce concentrations by creating precipitates (solids) that remove COI from the groundwater. Injection treatment was based on successful field treatments for arsenic and successful laboratory treatability studies from other sites for cobalt and lithium (Anchor QEA 2017, 2018, 2019b, 2019c; EPRI 2021). Effectiveness of injection treatments will be evaluated in the context of decreasing trends from source control and natural attenuation. If warranted, injection treatments will be repeated on a frequency determined to be necessary based on remedial-effectiveness monitoring data.

Finally, as discussed in Section 4.3.2 and Appendix D, the plume area is currently being attenuated, and concentrations are declining as a result of natural attenuation processes. In concert with closure/source control and treatment injections, MNA will continue until constituent concentrations are below the GWPS. Closure activities and injection treatments will serve to enhance the already-occurring natural attenuation.

Remedy evaluation has demonstrated that actions proposed for the Site result in decreasing concentrations in groundwater (Appendix D). Decreasing concentrations will ultimately result in constituents occurring at concentrations below the GWPS. Therefore, as required by 40 CFR § 257.97(b)(2) and 335-13-15-.06(8)(b)(2), the groundwater remedy plan will be able to attain the GWPS specified in the rules.

Depending on constituent and well (location), the estimated time to achieve GWPSs from natural attenuation ranges from 2 to 40 years, which is reasonable compared to durations of other corrective action technologies. Pump-and-treat for inorganic constituents, for example, typically takes decades because that process must reverse the natural attenuation processes already operating by desorbing constituents from aquifer solids by passing many pore volumes (sometimes hundreds) through the aquifer. Supporting information for time to attain GWPSs, including concentration versus time and concentration versus distance graphs, is included in Appendix D. Source control and geochemical manipulation (injections) are expected to accelerate this time frame, particularly in areas where little attenuation is currently observed.

5.3 Control Sources of Releases

As discussed in Section 4.1, Site closure will eliminate potential discharges to groundwater as required by 40 CFR § 257.97(b) (3) and ADEM Admin. Code r. 335-13-15-.06(8)(b) (3). Review of Site hydrogeologic data demonstrates that the Site is separated from the uppermost aquifer by a low-permeability clay soil. Source control will be accomplished by:

1. Dewatering and consolidating the CCR material to the northern portion of the existing Site and reducing the footprint from approximately 489 acres to approximately 221 acres and contained within dikes. Slopes will be graded to provide stability, promote drainage, and prevent ponding in the disposal area. As shown in Figure 6, dewatering and consolidation are anticipated to proceed into 2025.

2. Installing a low-permeability cement-bentonite vertical barrier wall extending through the uppermost aquifer and keyed into the existing underlying chalk layer. The vertical barrier wall will prevent the horizontal migration of impacted water from the Site area and virtually eliminate future releases to groundwater outside the barrier wall. Construction of the northern portion of the barrier wall was completed in 2021. The remainder of the barrier wall is scheduled for completion in 2026.
3. Placing final cover, consisting of an engineered synthetic turf and geomembrane over the disposal area. The low-permeability cover system will promote and control runoff from the disposal area and prevent infiltration. Eliminating infiltration will prevent the mobilization of constituents within the disposal unit and further reduce the potential for future releases from the Site. The final cover will be installed after consolidation is complete and the slurry wall is installed. The planned installation of the final cover system is scheduled for 2026.

The closure activities are, in themselves, anticipated to improve groundwater quality by isolating the source area, preventing infiltration of water, minimizing the mobilization of constituents, and impeding release to the environment. The closure and source control measures meet the requirements of 40 CFR § 257.97(b)(3) and ADEM Admin. Code r. 335-13-15-.06(8)(b)(3) and will control the source of release to reduce or eliminate, to the extent feasible, further releases to the environment.

5.4 Standards for Waste Management

As specified in requirements of 40 CFR § 257.97(b)(5) and ADEM Admin Code r. 335-13-15-.06(8)(b)(5), any waste must be handled and disposed according to all applicable requirements under RCRA. Specifically, any liquid or solid waste generated must be handled and disposed according to applicable regulations in 40 CFR parts 239 through 282 and ADEM Admin. Code chapters 335-13-1 through 335-13-16.

Based on the technologies selected, very little waste will be generated. Waste may be generated by additional well installations, completing injections, and monitoring. All waste generated during completion of the remedy will be handled and disposed according to RCRA requirements for the type of waste. Therefore, the remedy plan meets the requirements of 40 CFR § 257.97(b)(5) and ADEM Admin. Code r. 335-13-15-.06(8)(b)(5) for managing waste generated by the remedy.

As demonstrated here, the groundwater remedy plan meets the performance criteria of 40 CFR § 257.97(b) and ADEM Admin. Code r. 335-13-15-.06(8)(b).

6 Corrective Action Groundwater Monitoring Program

As required by 40 CFR § 257.98(a) and ADEM Admin. Code r. 335-13-15-.06(9)(a), the owner/operator must implement the groundwater remedy within 90 days of selecting a remedy, including establishing a corrective action groundwater monitoring program that 1) meets the assessment monitoring requirements of § 257.95 and 335-13-15-.06(6); 2) documents the effectiveness of the remedy; and 3) demonstrates compliance with the GWPS. A conceptual groundwater monitoring network is shown in Figure 16.

Assessment monitoring of the certified groundwater monitoring network must continue pursuant to 40 CFR § 257.96(b) and ADEM Admin. Code r. 335-13-15-.06(7)(b). The corrective action groundwater monitoring program will include groundwater monitoring requirements for:

- Assessment monitoring of the certified CCR compliance groundwater monitoring network
- An injection treatment system
  - Injection performance
  - ASM
- MNA
  - Attenuation mechanisms, plume reduction, and mass/concentration reduction
  - ASM
  - Sentinel/clean-line boundary monitoring

Within 90 days of selecting a remedy, a corrective action groundwater monitoring program will be developed that describes the following in detail:

- Sample locations
- Monitoring schedule
- Monitoring parameters
- Data analysis methods
- Interim adaptive standards (for ASM)
- Reporting and notification requirements

Following implementation of the ACM, several wells were installed to complete delineation and have been monitored semiannually pursuant to 40 CFR § 257.95(g)(1) and ADEM Admin. Code r. 335-13-15-.06(6)(g)(2). Ongoing monitoring of certain delineation monitoring wells may be discontinued when the final corrective action groundwater monitoring program is developed.

Sentinel/clean-line boundary monitoring points will be located between known GWPS exceedances and the property boundary or potential receptors. These wells will be sampled at the same frequency as the CCR compliance monitoring wells. Conceptual sentinel/clean-line monitoring points are shown in Figure 18. Adaptive triggers could include statistically increasing trends for multiple events and verified GWPS exceedances at clean-line boundary monitoring points.

Remedy performance monitoring wells will be used to evaluate the combined effects of source control (Site closure), injection treatment, and MNA. Conceptual remedy performance monitoring wells are shown in Figure 19. Adaptive triggers could include statistically increasing trends above the GWPS for multiple events after barrier wall construction is complete.

APC will take an ASM approach to MNA and other corrective action at the Site. Adaptive triggers will be developed, and additional actions (monitoring, analysis, and/or corrective action) will be implemented as needed. These details will be provided in the Site *Corrective Action Groundwater Monitoring Plan* to be submitted 90 days after submission of this *Groundwater Remedy Selection Report*.

During closure and dewatering, the pond-groundwater system will be in a state of geochemical disequilibrium, leading to potential temporary increases in COI concentrations at some locations. Additionally, temporary increases could occur as the subsurface is disturbed by barrier wall construction, injections, and possible localized changes in groundwater flow direction.

7 Schedule

The following factors were considered when determining the schedule for remedial activities as required by 40 CFR § 257.97(d)(1 through 5) and ADEM Admin. Code r. 335-13-15-.06(8)(d)(1 through 5):

- Extent and nature of exceedances
- Reasonable probabilities of remedial technologies in achieving compliance with CCR rule GWPSs and other objectives of the remedy
- Availability of treatment or disposal capacity for CCR managed during implementation of the remedy (not applicate for the Site)
- Potential risks to human health and the environment from exposure to contamination prior to completion of the remedy
- Resource value of the aquifer

In accordance with 40 CFR § 257.97(d) and ADEM Admin. Code r. 335-13-15-.06(8)(d), the following schedules are provided for implementing and completing remedial activities at the Site.

7.1 Site Closure and Source Control

Site closure and source control activities are currently being implemented and are expected to be completed as shown in the timeline in Figure 6. Anticipated project milestones are as follows:

- May 2025: CCR consolidation complete
- February 2026: barrier wall installation complete
- April 2026: final cover installation complete
- November 2026: Site closure certification complete

7.2 Injection Treatment

The anticipated injection treatment implementation schedule is included below and summarized in Figure 20.

For treatability studies and the Underground Injection Control (UIC) permit, the following schedule is anticipated:

- Collect soil and groundwater samples for treatability studies: 2 months
- Conduct batch studies for reagents and doses: 4 to 6 weeks
- Conduct column studies for effectiveness: 3 months
- Prepare Class V UIC permit: 3 months

After securing the proper ADEM UIC permit, the following schedule is anticipated:

- Design field implementation of injection treatment: 3 months

- Refine delineation in the field: 1 month
- Phase 1 (Pilot): field implementation (well installation and injections): 4 months
- Phase 1 (Pilot): collect and analyze remedial-effectiveness monitoring data: 15 months
- Phase 2 injections: field implementation: 4 months
- Phase 2 injections: collect and analyze remedial-effectiveness monitoring data: 15 months

7.3 Monitored Natural Attenuation

Strictly speaking, the MNA process is currently being implemented at the site, although a formalized process to evaluate and document the process has not been established. MNA will be implemented by establishing the detailed MNA sampling, analysis, and evaluation plan in 90 days as part of the groundwater remedy monitoring plan. Implementation of the MNA program is anticipated to include the following:

- Install additional no-exceedance and remedial-effectiveness monitoring wells (at an estimated 17 locations, to take 3 to 4 weeks)
- Coordinate MNA sampling with the first semiannual compliance sampling event after new well installation
- Collect and analyze baseline data: 1 year
- Remedy complete: depending on area, 2 to 40 years after Site closure is complete

8 References

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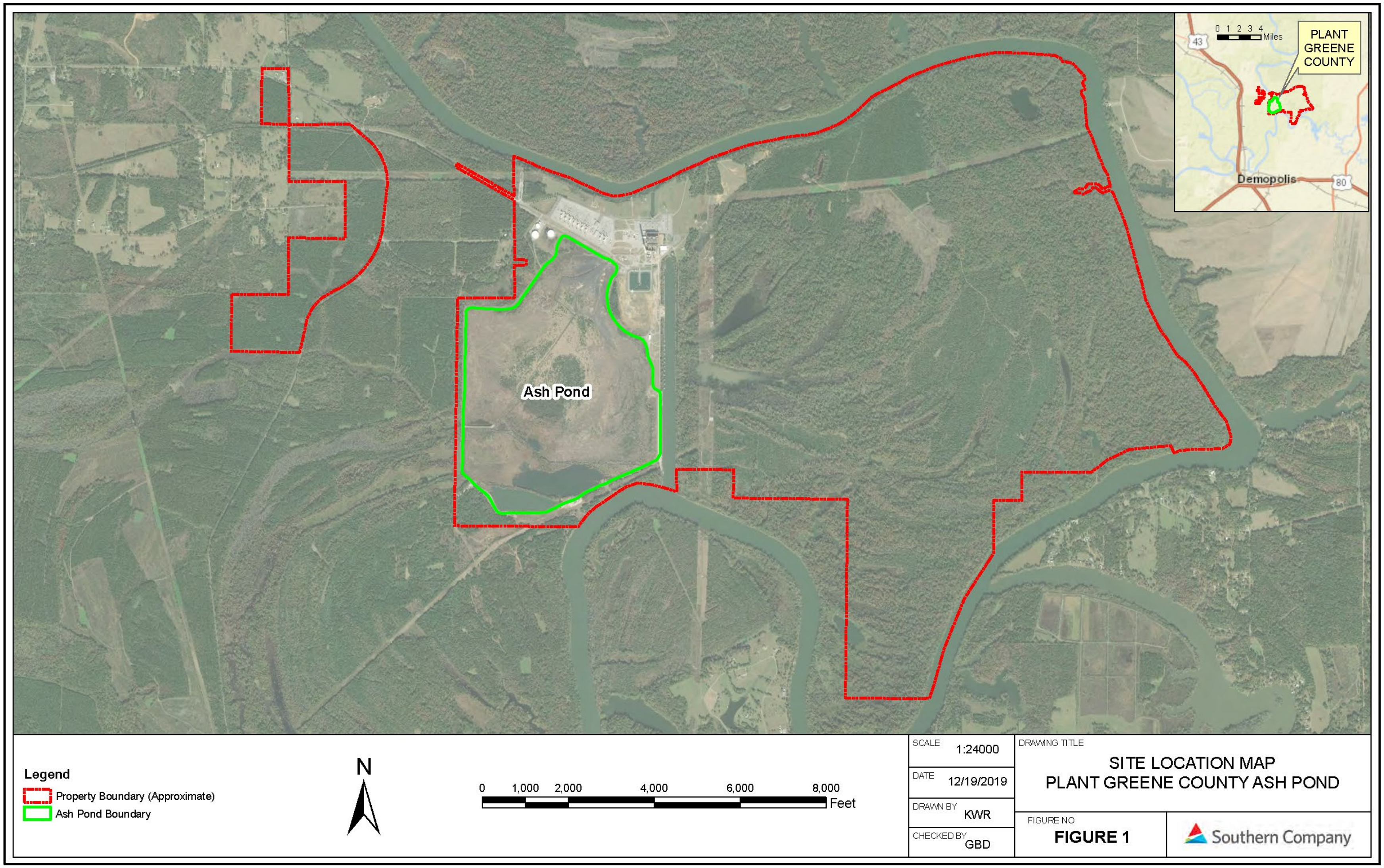
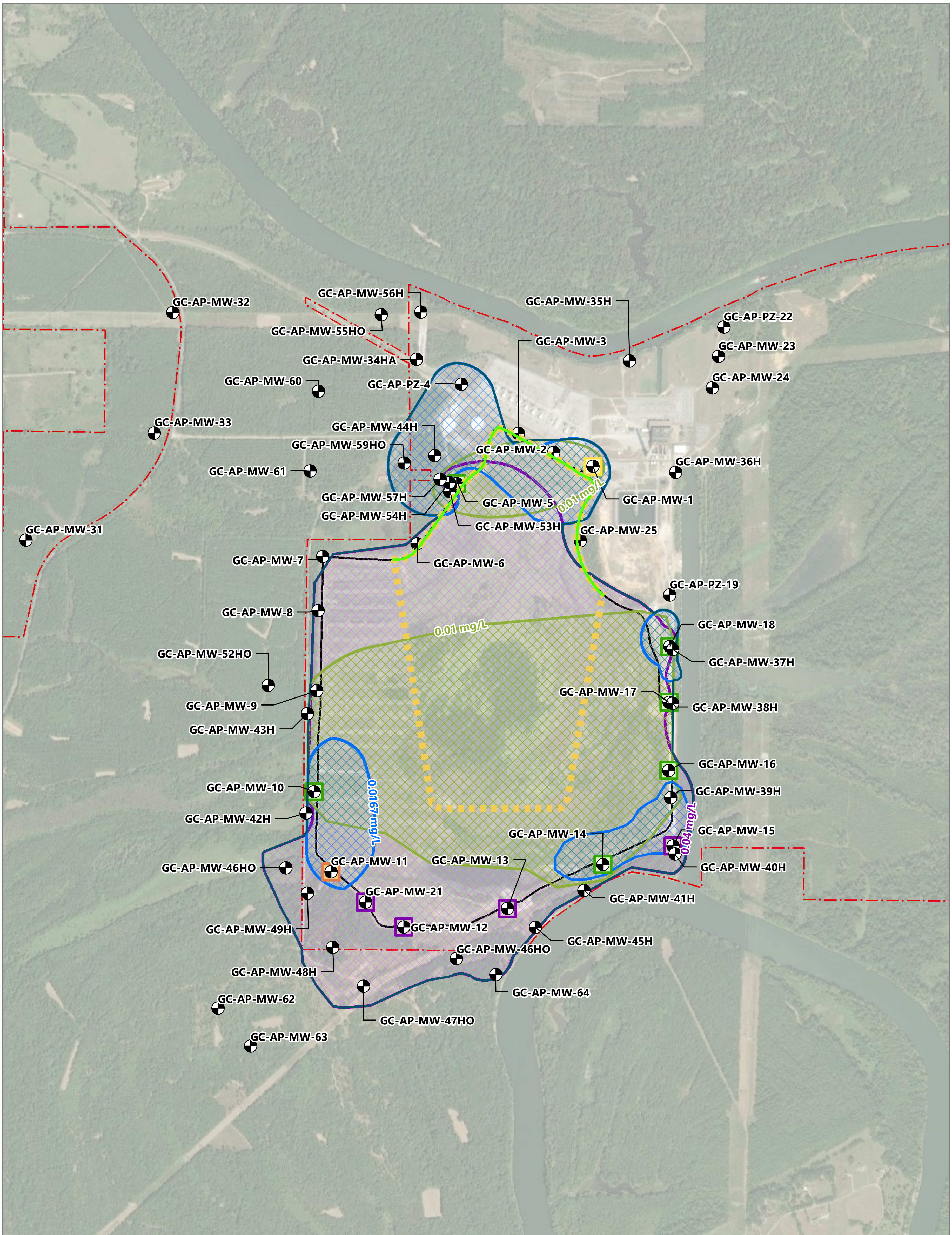


Source: Southern Company Services, Inc., 2020. *2019 Annual Groundwater Monitoring and Corrective Action Report.* Plant Greene County Ash Pond. Prepared for Alabama Power Company. January 31, 2020.



LEGEND:

- Property Boundary
- Greene County Ash Pond Boundary
- As-Built Barrier Wall Alignment
- Approximate Barrier Wall/ Post-Closure Limits of CCR
- Monitoring Well
- Maximum Extent of GWPS Exceedences for Arsenic, Lithium, and Cobalt
- Lithium SSLs
- Arsenic + Cobalt SSLs
- Arsenic + Lithium SSLs
- Cobalt + Lithium SSLs
- Cobalt GWPS Isconcentration (0.0167 mg/L)
- Arsenic GWPS Isconcentration (0.01 mg/L)
- Lithium GWPS Isoconcentration (0.04 mg/L)

NOTES:
CCR: coal combustion residuals
GWPS: groundwater protection standard
mg/L: milligrams per liter
SSL: statistically significant level

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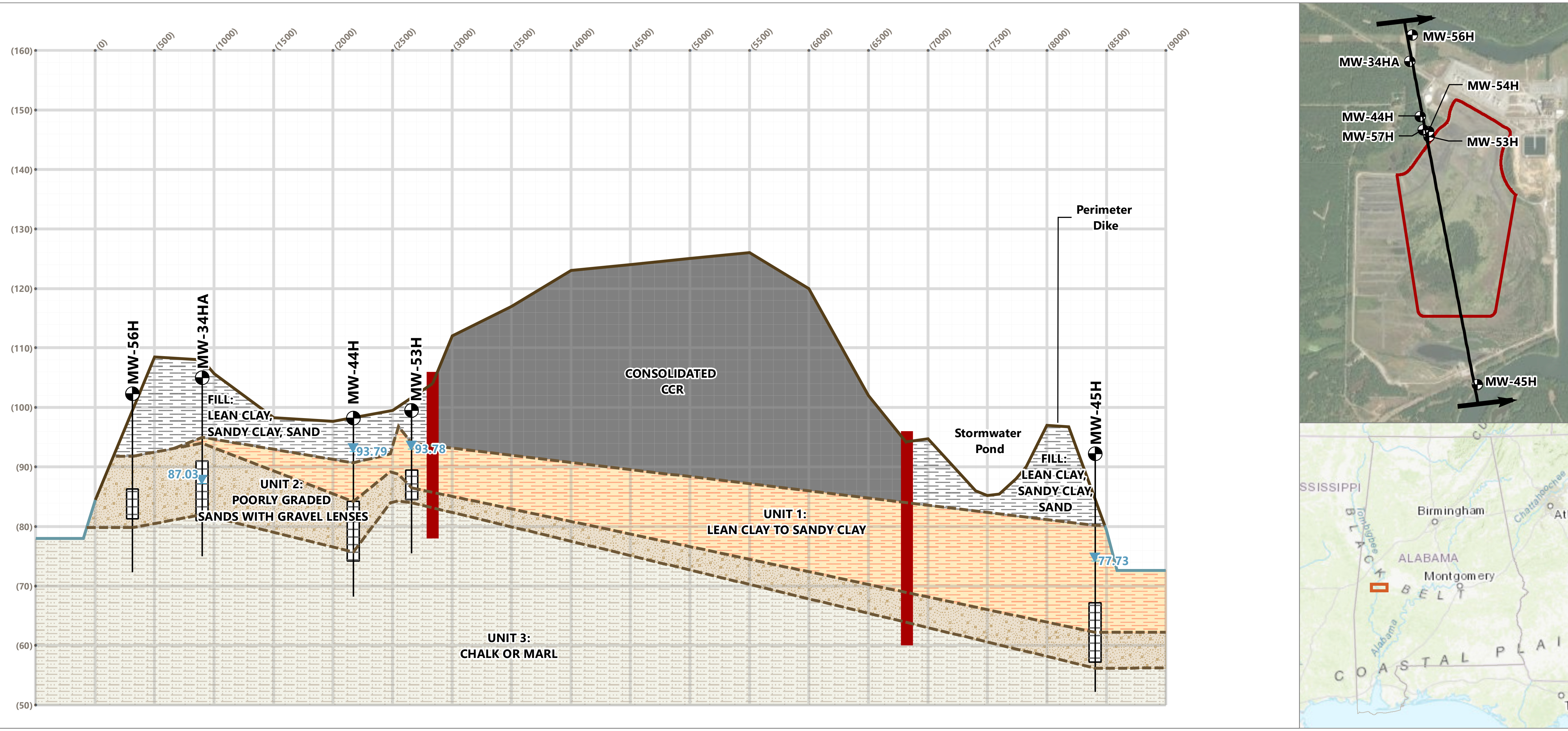
Figure 2
Site Layout Map
Groundwater Remedy Selection Report
Plant Greene County



LEGEND:

- Cross Section Orientation
- Monitoring Well Location
- Monitoring Well Depth Below Ground Surface
- Groundwater Elevation
- Screened Interval
- Slurry Wall
- Black Warrior River
- Generalized Ground Surface Elevation
- Geologic Contact
- Consolidated CCR
- Fill: Lean Clay, Sandy Clay, Sand
- Unit 1: Lean Clay to Sandy Clay
- Unit 2: Poorly Graded Sands with Gravel Lenses
- Unit 3: Chalk or Marle

NOTES:
1. Source of ground surface elevation data: U.S. Geological Survey 3D Elevation Program, collected between December 2, 2016, and March 15, 2017
2. Stratigraphic layers were correlated using boring data.
3. The ground surface shown on the cross section was derived from a digital elevation model raster along the cross-section line drawn as shown in the inset map. In addition to boring data from wells located directly on the cross-section line, boring data from wells located near but not directly on the cross-section line were also utilized for lithologic correlation. These wells' boring data are projected onto the cross-section line, and, as such, the ground surface shown in the cross section is higher in elevation than the actual ground surface at these locations.
4. Groundwater elevation values are from the 2020 gauging event.
5. Groundwater elevation data are not available for MW-56H.

CCR: Coal Combustion Residuals

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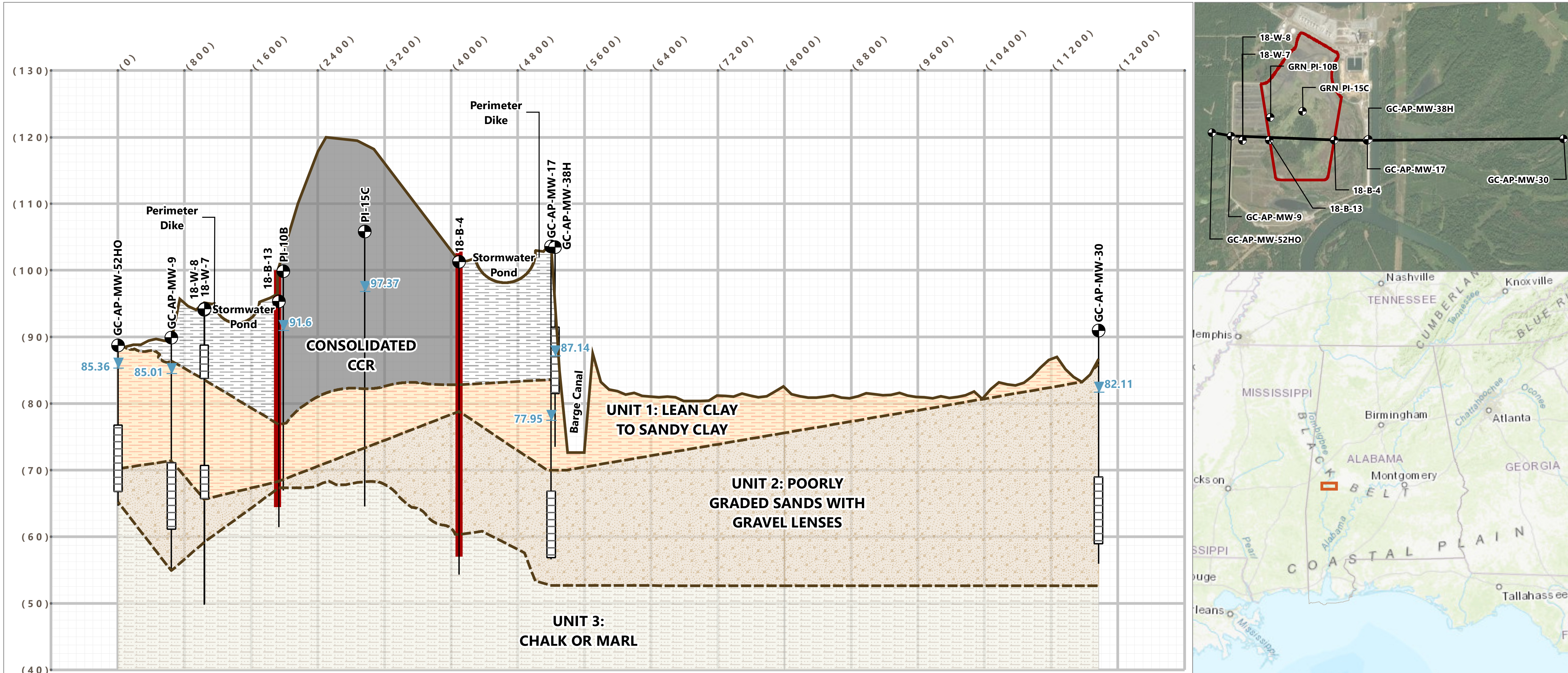
Figure 3
Conceptual Cross Section (North-South)
Groundwater Remedy Selection Report
Plant Greene County



LEGEND:

- Monitoring Well Location
- Monitoring Well Depth Below Ground Surface
- Groundwater Elevation
- Screen Interval
- Ground Surface Elevation
- Geologic Contact
- Slurry Wall
- Consolidated CCR
- Fill: Lean clay, sandy clay, sand
- Unit 1: Lean clay, to sandy clay
- Unit 2: Poorly-graded sands with gravel lenses
- Unit 3: Chalk or Marle

NOTES:

1. Source of ground surface elevation data: 2016 Light Detection and Ranging.
2. Groundwater elevation data were measured on March 8, 2021.
3. The ground surface shown on the cross-section was derived from a digital elevation model raster along the cross-section line drawn as shown in the inset map. In addition to boring data from wells located directly on the cross-section line, boring data from wells located near but not directly on the cross-section line were also utilized for lithologic correlation. These wells' boring data are projected onto the cross-section line, and, as such, the ground surface shown in the cross-section is higher in elevation than what the ground surface actually is at those locations.
4. Vertical exaggeration: 80.
5. Boring data from Vibrating Wire Piezometers (VWPs) PI-10B and PI-15C were recorded on May 20 and May 14, 2020, respectively, and the VWPs were installed on September 24 and July 31, 2020, respectively.

CCR: Coal Combustion Residuals

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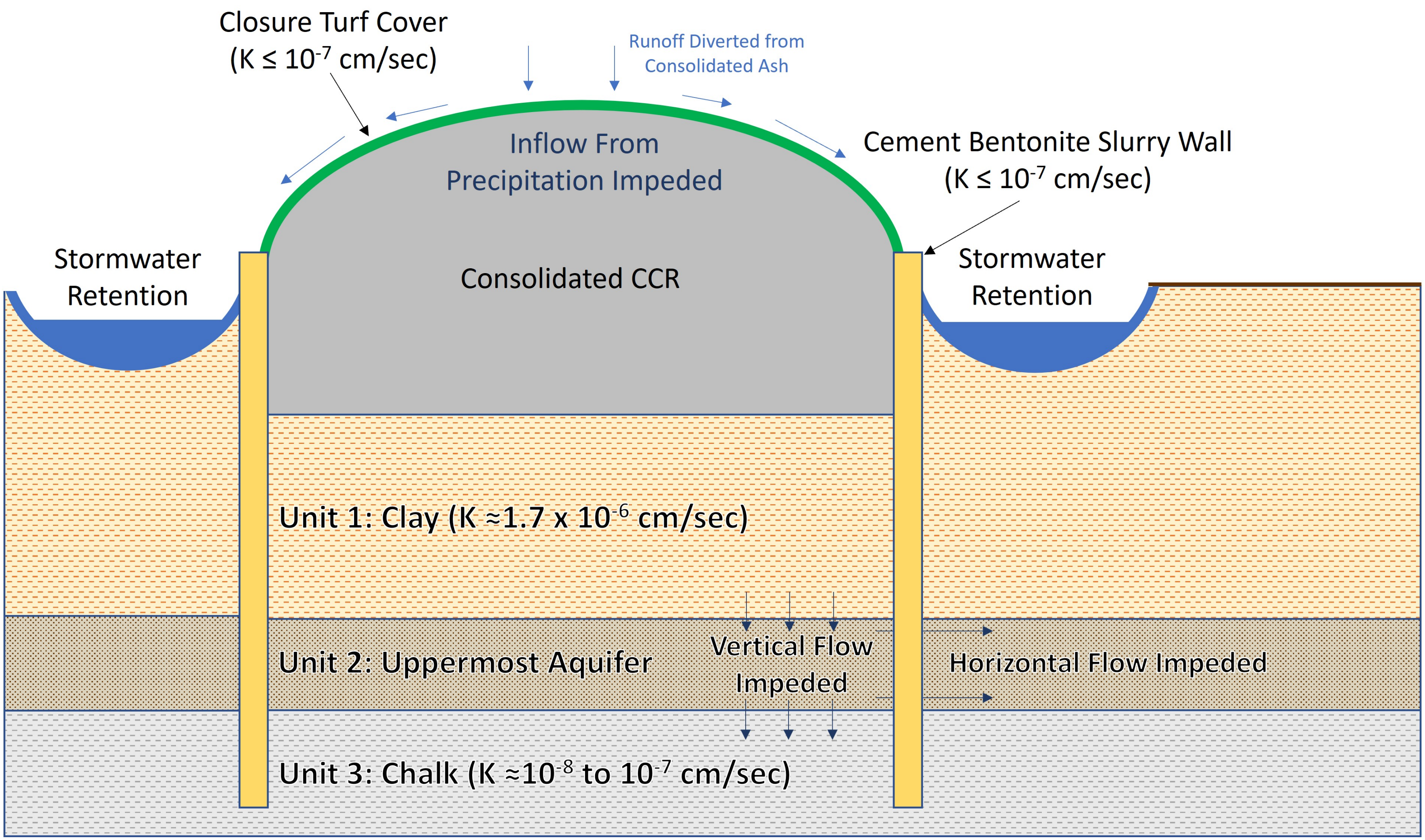
Figure 4
Conceptual Cross Section (East-West)
Groundwater Remedy Selection Report
Plant Greene County



Notes:
CCR: coal combustion residuals
cm/sec: centimeters per second
K: permeability

Figure 5
Generalized Cross Section
Groundwater Remedy Selection Report
Plant Greene County

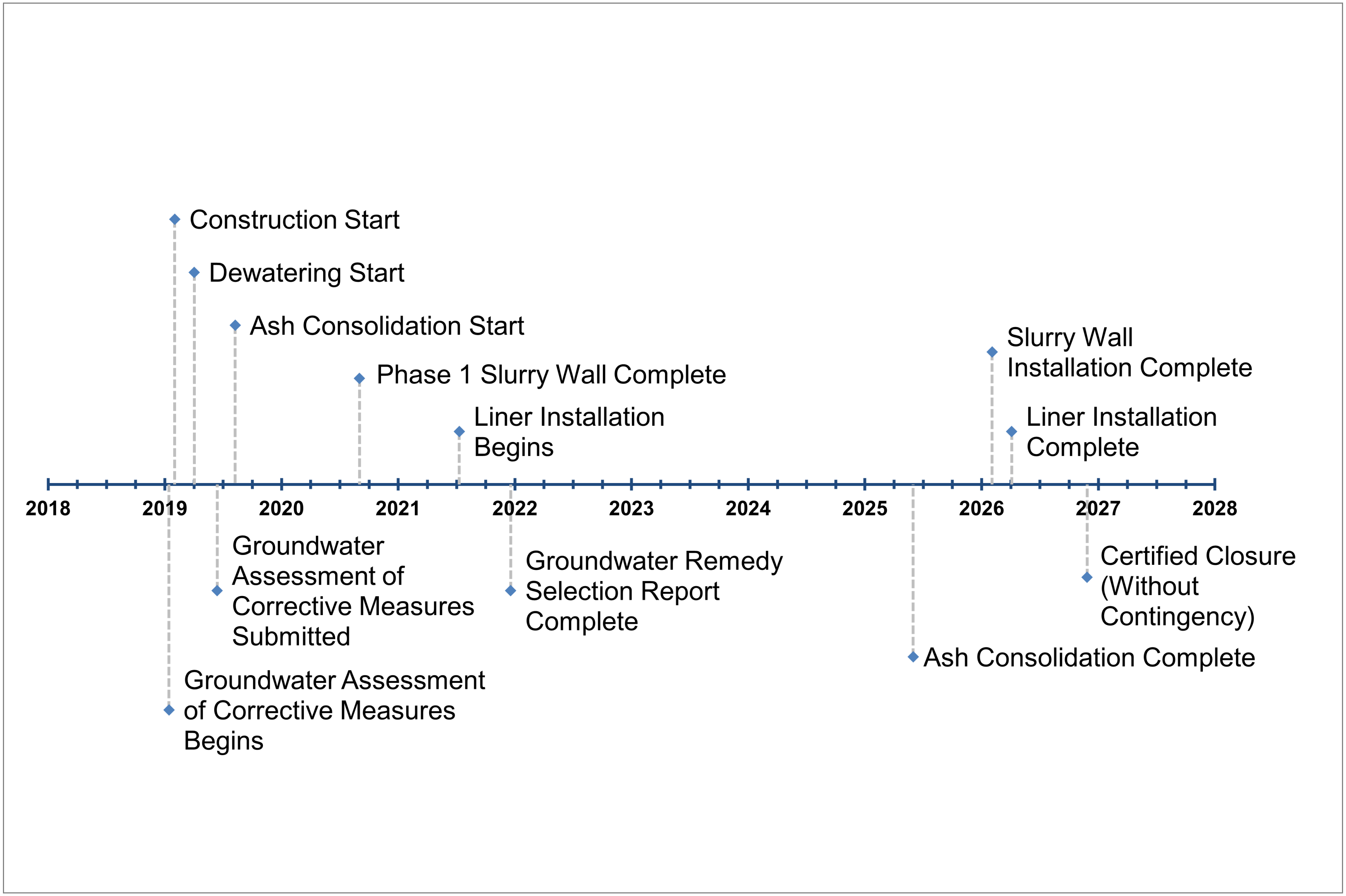
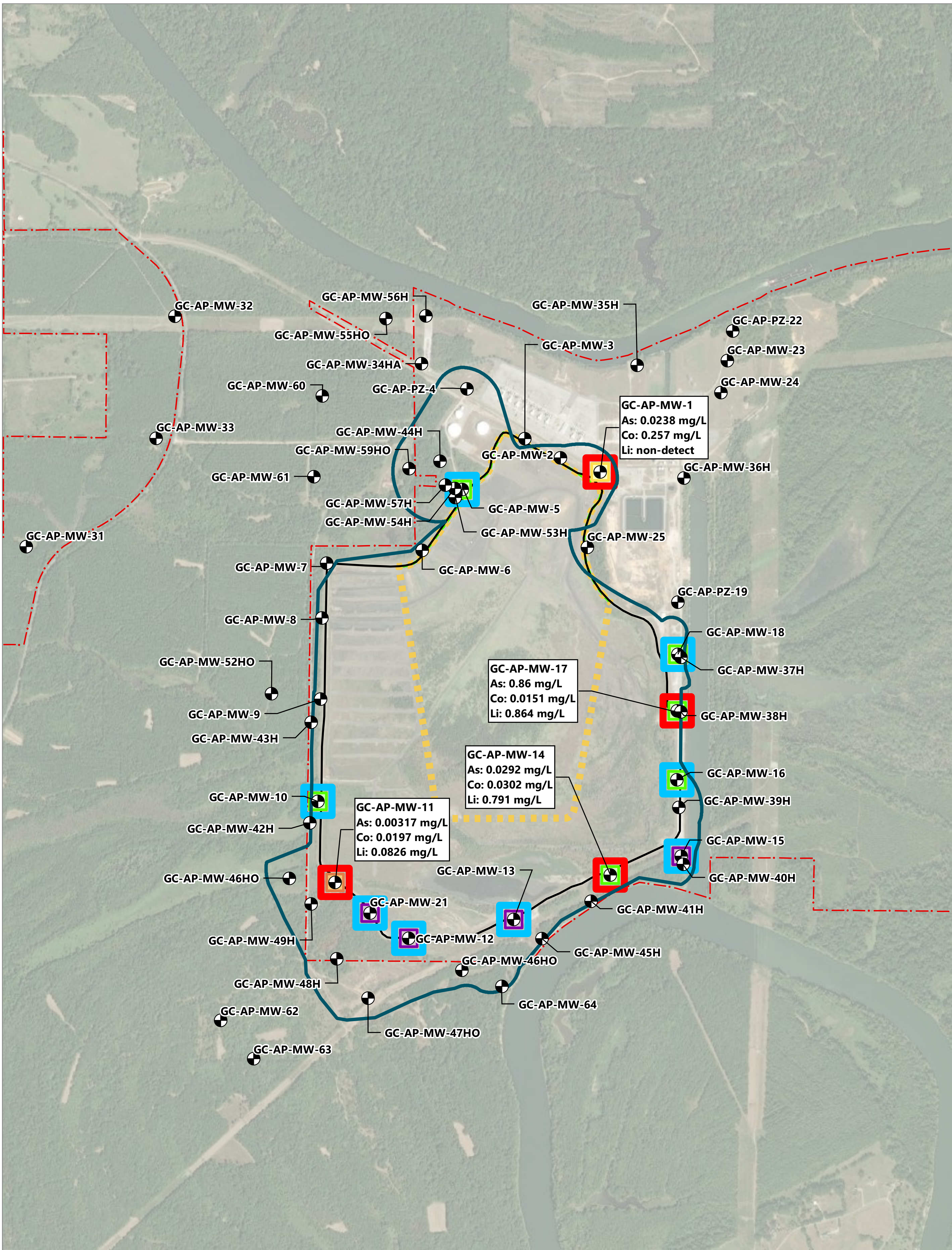


Figure 6
Closure Timeline
Groundwater Remedy Selection Report
Plant Greene County



LEGEND:

- Property Boundary
- Greene County Ash Pond Boundary
- As-Built Barrier Wall Alignment
- Approximate Barrier Wall/ Post-Closure Limits of CCR
- Monitoring Well
- Maximum Extent of GWPS Exceedences for Arsenic,Lithium, and Cobalt
- Lithium SSLs
- Arsenic + Cobalt SSLs
- Arsenic + Lithium SSLs
- Cobalt + Lithium SSLs
- Phase 1: Pilot Injection Area
- Phase 2 Injection Area if Needed

NOTES:
As: arsenic
CCR: coal combustion residuals
Co: cobalt
GWPS: groundwater protection standard
Li: lithium
mg/L: milligrams per liter
SSL: statistically significant level

Groundwater concentrations are from March 2021 sampling event.

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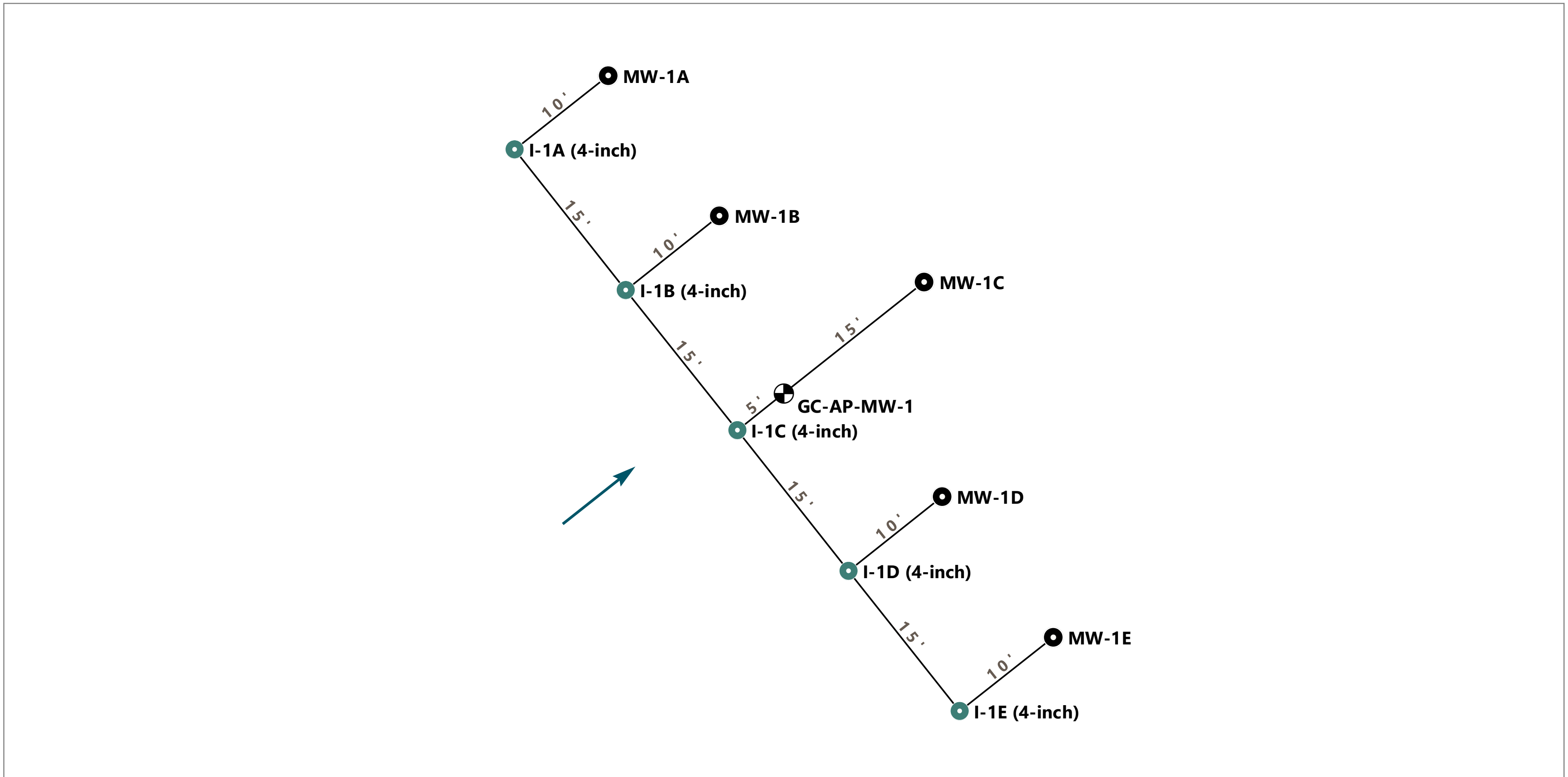
Figure 7
Injection Treatment Areas
Groundwater Remedy Selection Report
Plant Greene County



LEGEND:

- Proposed Injection Well
- Proposed Monitoring Well
- Coal Combustion Residuals Compliance Monitoring Well (Existing)
- General Groundwater Flow Direction

NOTE:
Proposed injection and monitoring well locations are to be considered conceptual. Locations to be refined during design phase.

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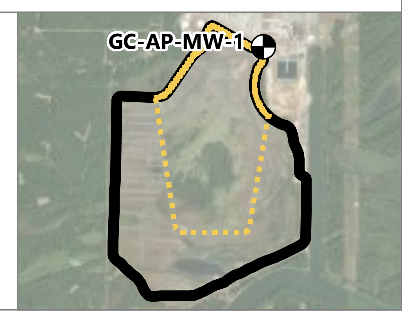

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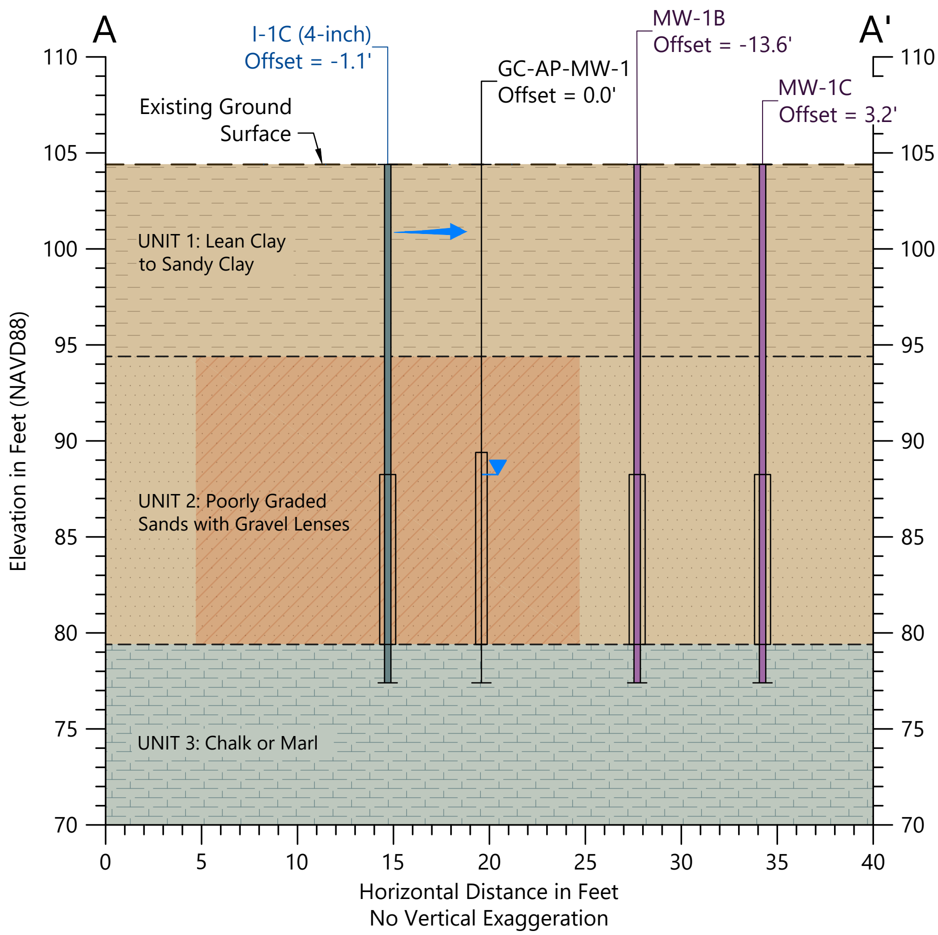
Figure 8
Pilot Test Injection and Monitoring (Plan View): GC-AP-MW-1
Groundwater Remedy Selection Report
Plant Greene County



LEGEND:

Groundwater Flow Direction

Geologic Contact

Anticipated Radius of Influence

Proposed Monitoring Well

Screened Interval

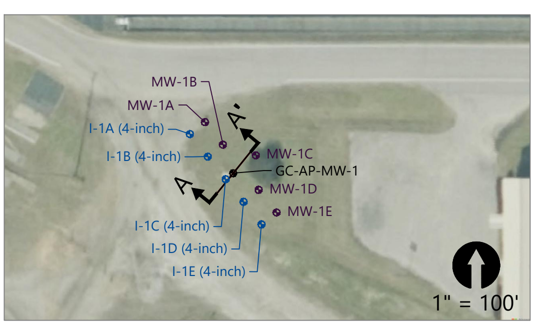
Proposed Monitoring Well

Screened Interval

Existing Monitoring Well

Water Elevation

Screened Interval



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NOTE: Proposed injection and monitoring well locations are to be considered conceptual. Locations to be refined during design phase.
HORIZONTAL DATUM: Alabama State Plane West Zone, NAD83, U.S. Survey Feet
VERTICAL DATUM: NAVD88

Publish Date: 2021/09/28 10:10 AM | User: hmerrick
Filepath: K:\Projects\1114-Southern Company\Greene County\Groundwater Remedy Selection Report\1114-RP-001 (Greene Inj Well Sections).dwg Figure 9

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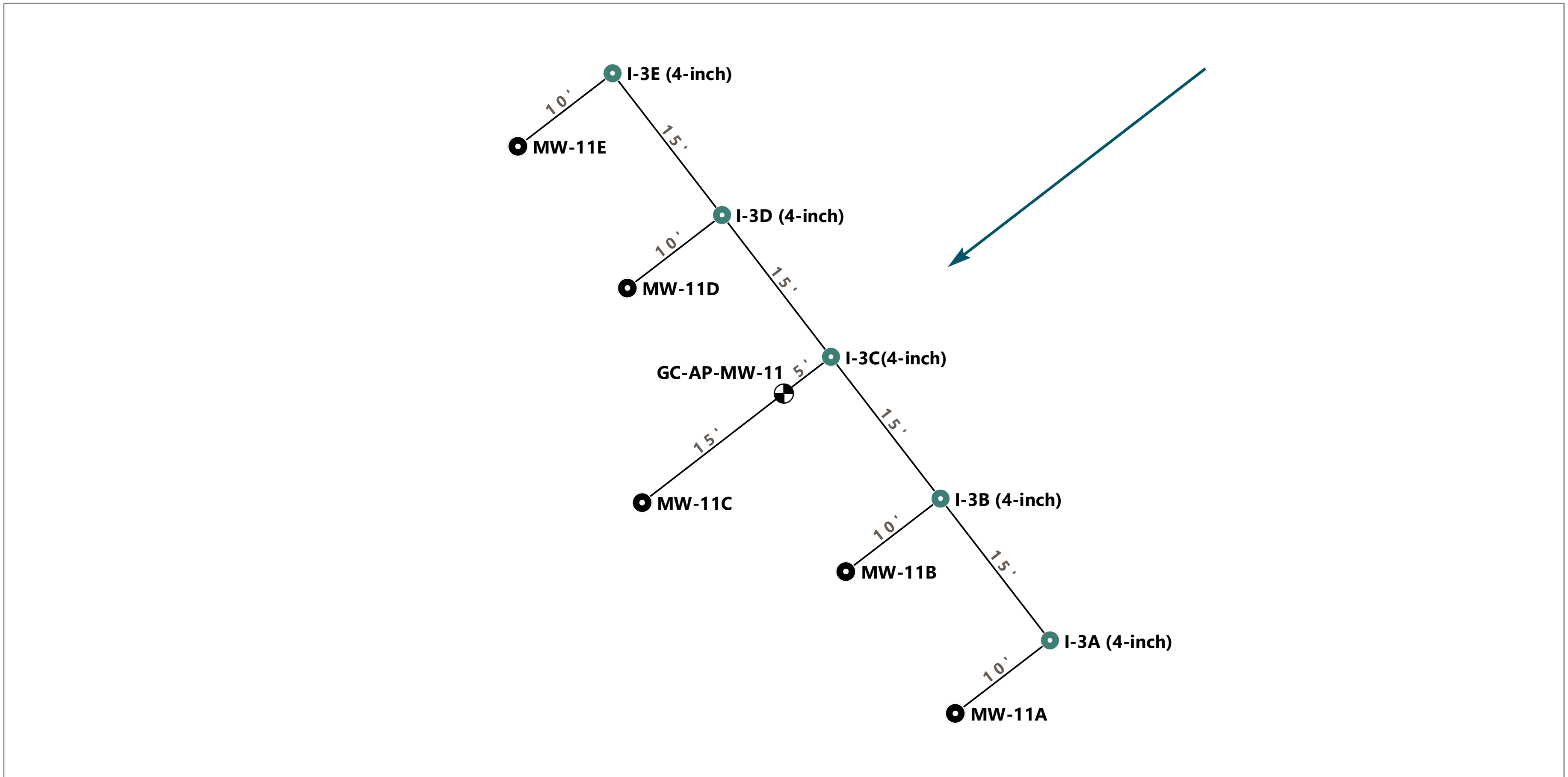
Figure 9
Phase 1 (Pilot) Injection and Monitoring (Cross Section): GC-AP-MW-1

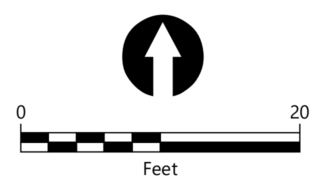
Groundwater Remedy Selection Report
Plant Greene County

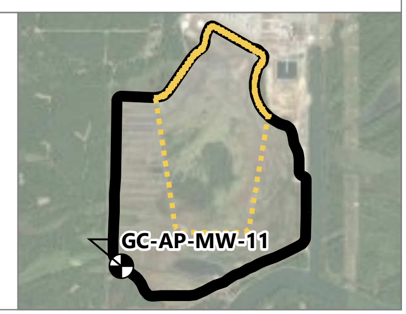


LEGEND:

- Proposed Injection Well
- Proposed Monitoring Well
- Coal Combustion Residuals Compliance Monitoring Well (Existing)
- General Groundwater Flow Direction

NOTE:
Proposed injection and monitoring well locations are to be considered conceptual. Locations to be refined during design phase.





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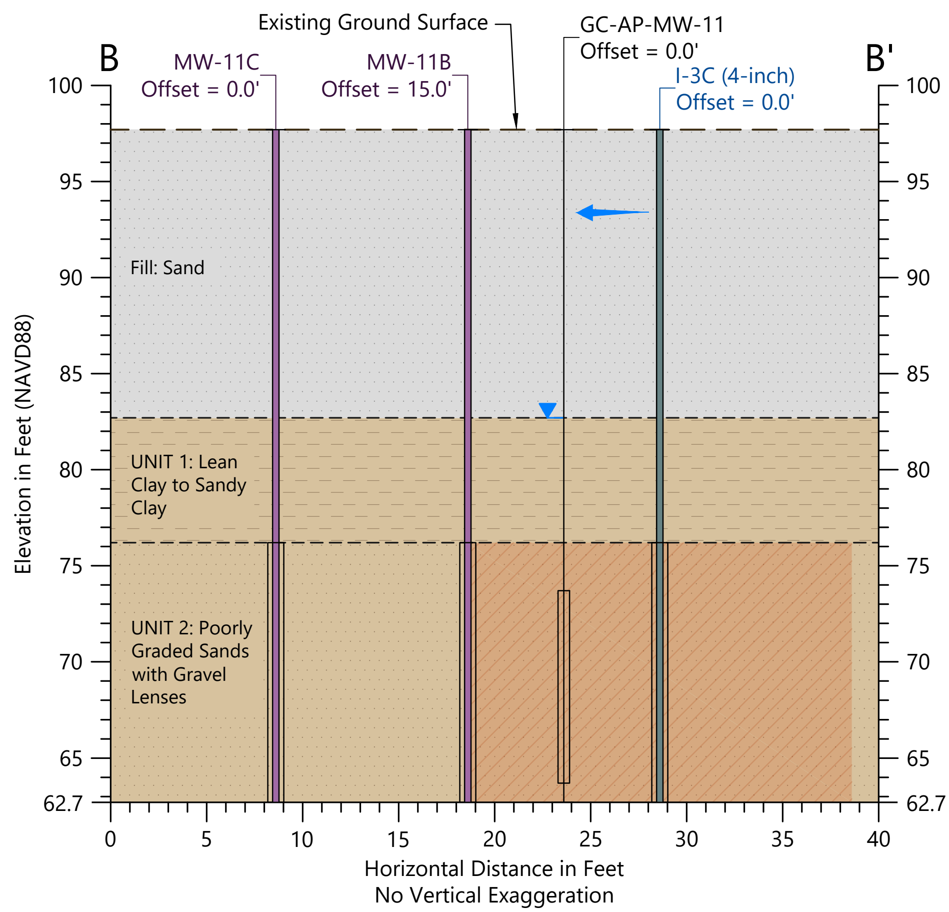
ANCHOR QEA

Figure 10
Pilot Test Injection and Monitoring (Plan View): GC-AP-MW-11
Groundwater Remedy Selection Report
Plant Greene County



LEGEND:

Groundwater Flow Direction

Geologic Contact

Anticipated Radius of Influence

Proposed Monitoring Well

Screened Interval

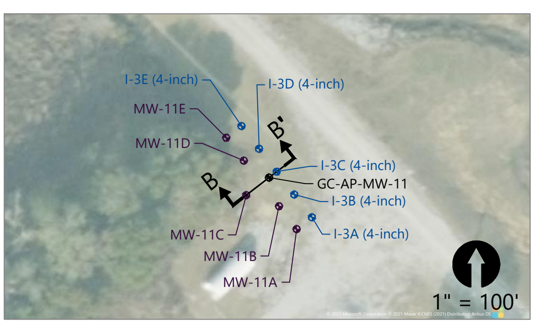
Proposed Monitoring Well

Screened Interval

Existing Monitoring Well

Water Elevation

Screened Interval



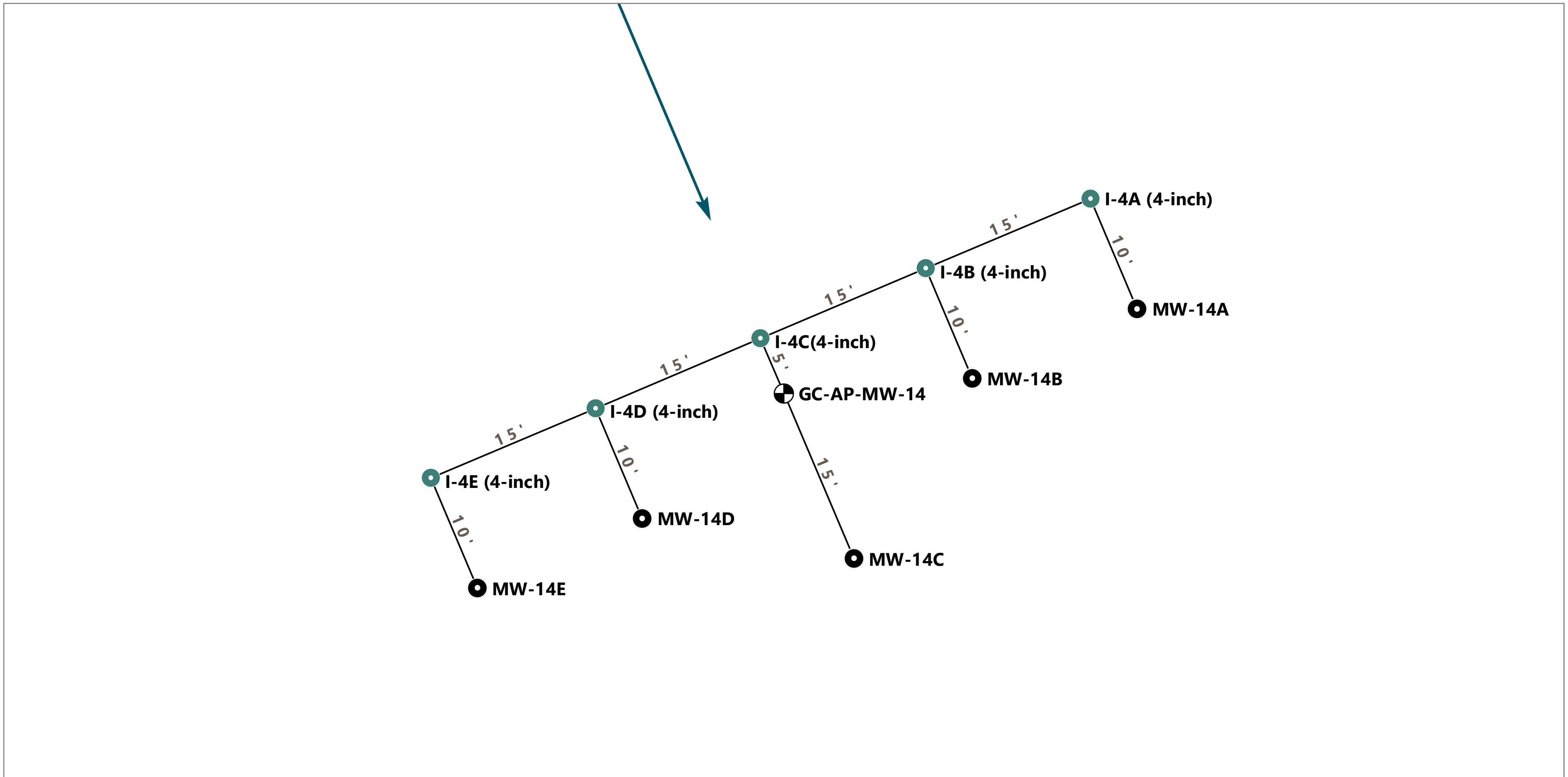
0 10
Feet

NOTE: Proposed injection and monitoring well locations are to be considered conceptual. Locations to be refined during design phase.
HORIZONTAL DATUM: Alabama State Plane West Zone, NAD83, U.S. Survey Feet
VERTICAL DATUM: NAVD88

Publish Date: 2021/09/28 10:11 AM | User: hmerrick
Filepath: K:\Projects\1114-Southern Company\Greene County\Groundwater Remedy Selection Report\1114-RP-001 (Greene Inj Well Sections).dwg Figure 11

ANCHOR QEA

Figure 11
Phase 1 (Pilot) Injection and Monitoring (Cross Section): GC-AP-MW-11

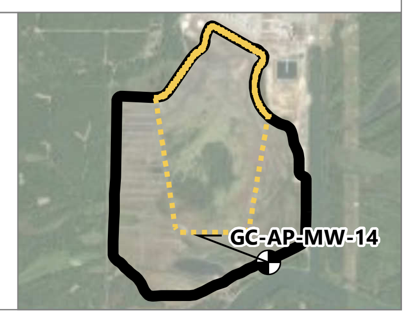


LEGEND:

- Proposed Injection Well
- Proposed Monitoring Well
- Coal Combustion Residuals Compliance Monitoring Well (Existing)
- General Groundwater Flow Direction

NOTE:
Proposed injection and monitoring well locations are to be considered conceptual. Locations to be refined during design phase.

0 20
Feet



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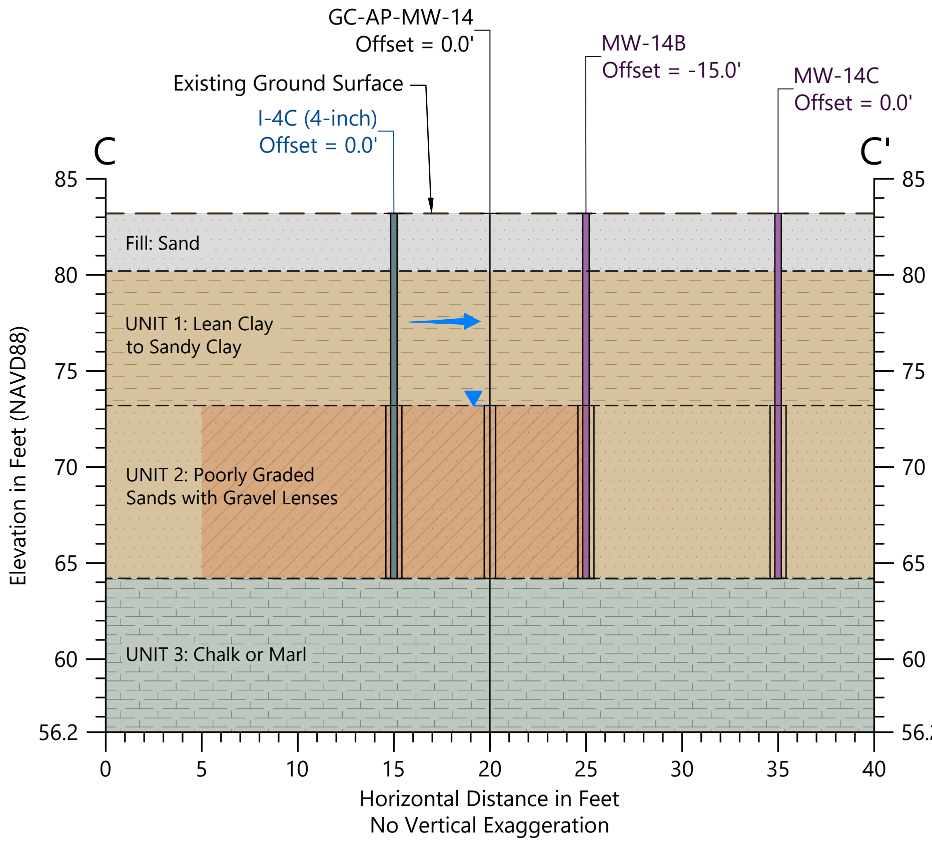
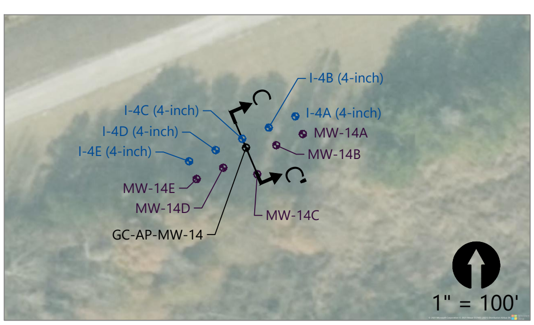
ANCHOR QEA

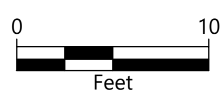
Figure 12
Pilot Test Injection and Monitoring (Plan View): GC-AP-MW-14
Groundwater Remedy Selection Report
Plant Greene County



LEGEND:

- Groundwater Flow Direction
- Geologic Contact
- Anticipated Radius of Influence
- Proposed Monitoring Well — Screened Interval
- Proposed Monitoring Well — Screened Interval
- Existing Monitoring Well — Water Elevation — Screened Interval





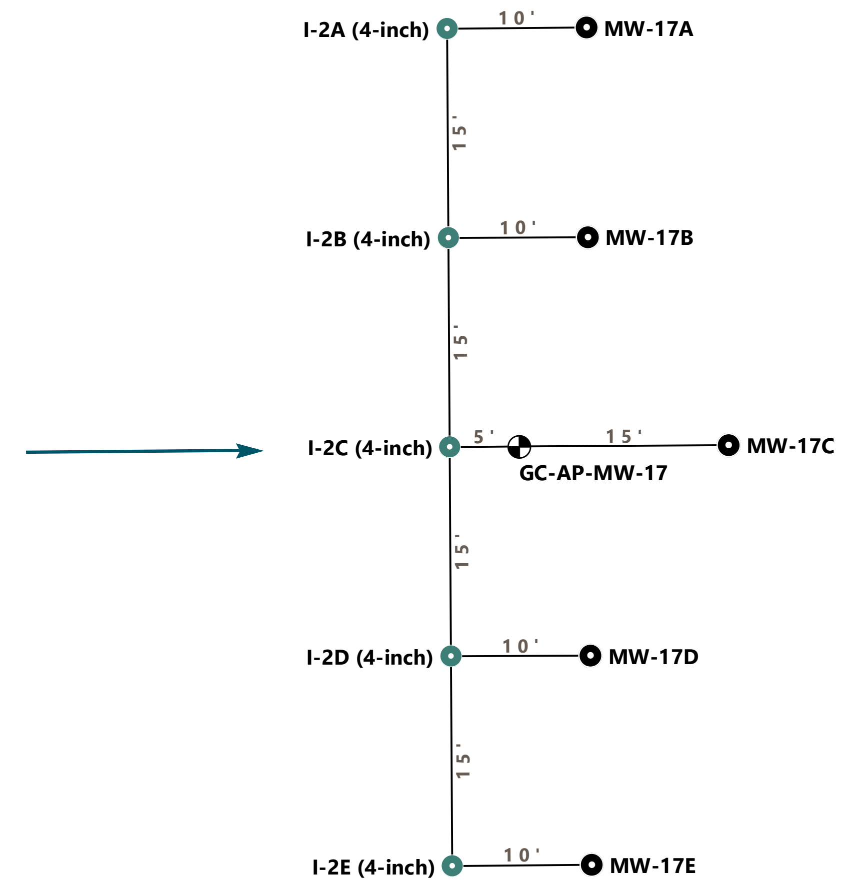
NOTE: Proposed injection and monitoring well locations are to be considered conceptual. Locations to be refined during design phase.
HORIZONTAL DATUM: Alabama State Plane West Zone, NAD83, U.S. Survey Feet
VERTICAL DATUM: NAVD88

Publish Date: 2021/09/28 10:11 AM | User: hmerrick
Filepath: K:\Projects\1114-Southern Company\Greene County\Groundwater Remedy Selection Report\1114-RP-001 (Greene Inj Well Sections).dwg Figure 13

ANCHOR QEA

Figure 13
Phase 1 (Pilot) Injection and Monitoring (Cross Section): GC-AP-MW-14

Groundwater Remedy Selection Report
Plant Greene County

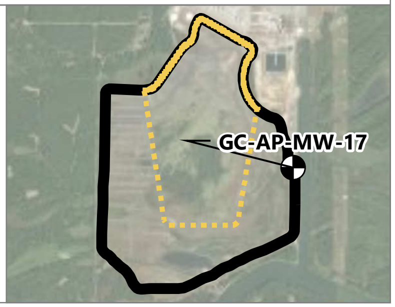


LEGEND:

- Proposed Injection Well
- Proposed Monitoring Well
- Coal Combustion Residuals Compliance Monitoring Well (Existing)
- General Groundwater Flow Direction

NOTE:
Proposed injection and monitoring well locations are to be considered conceptual. Locations to be refined during design phase.

0 20
Feet



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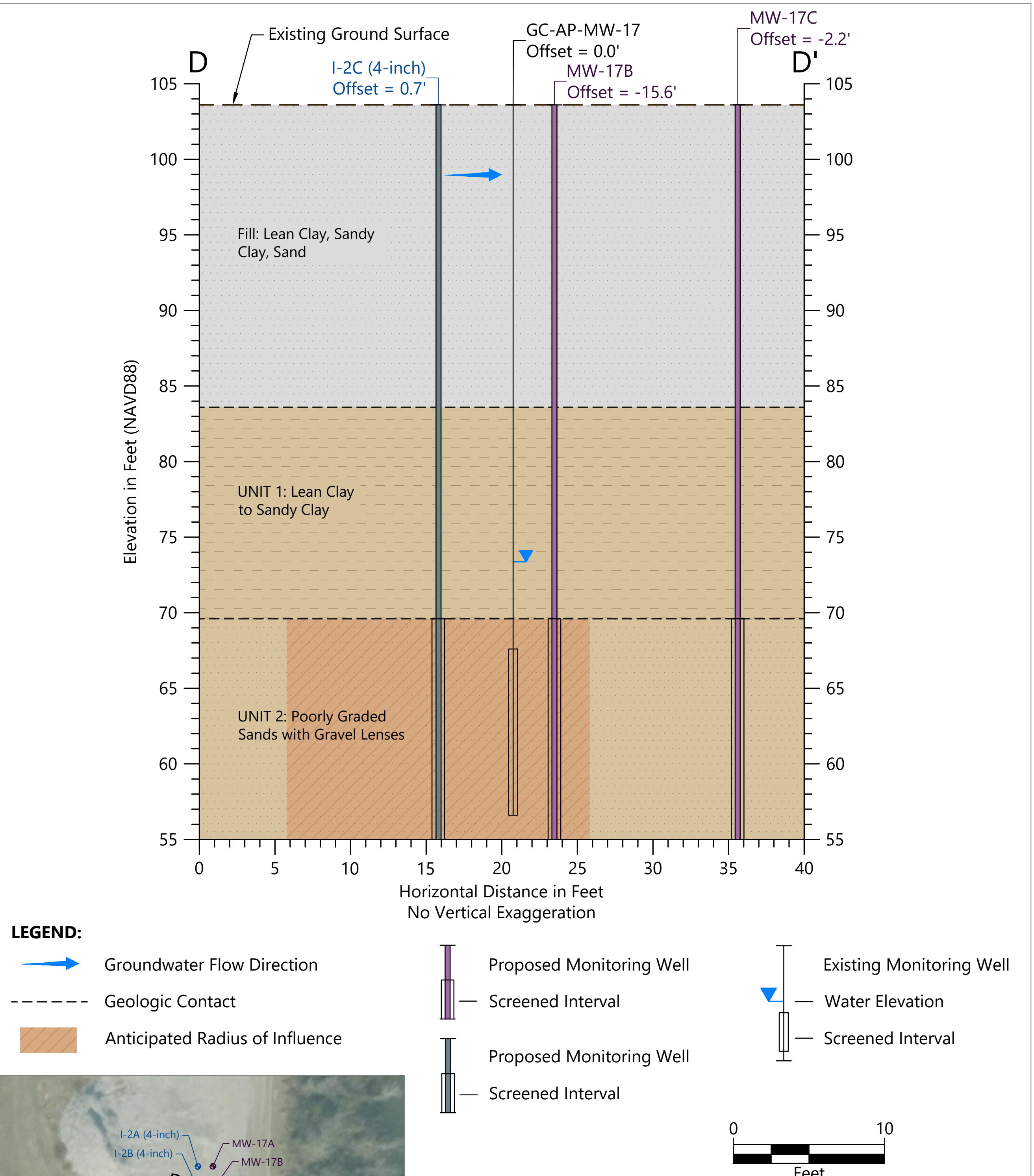
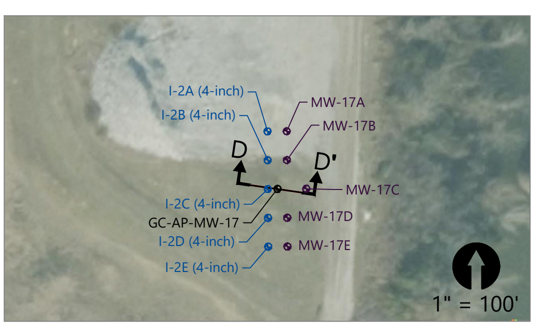
Filepath: Q:\Jobs\SouthernCompany_1114\GreeneCounty\Maps\2021_Groundwater_Remedy_Selection_Report\08_GC_CMP_Prop_Injection_DDP.mxd

ANCHOR QEA

Figure 14
Pilot Test Injection and Monitoring (Plan View): GC-AP-MW-17
Groundwater Remedy Selection Report
Plant Greene County

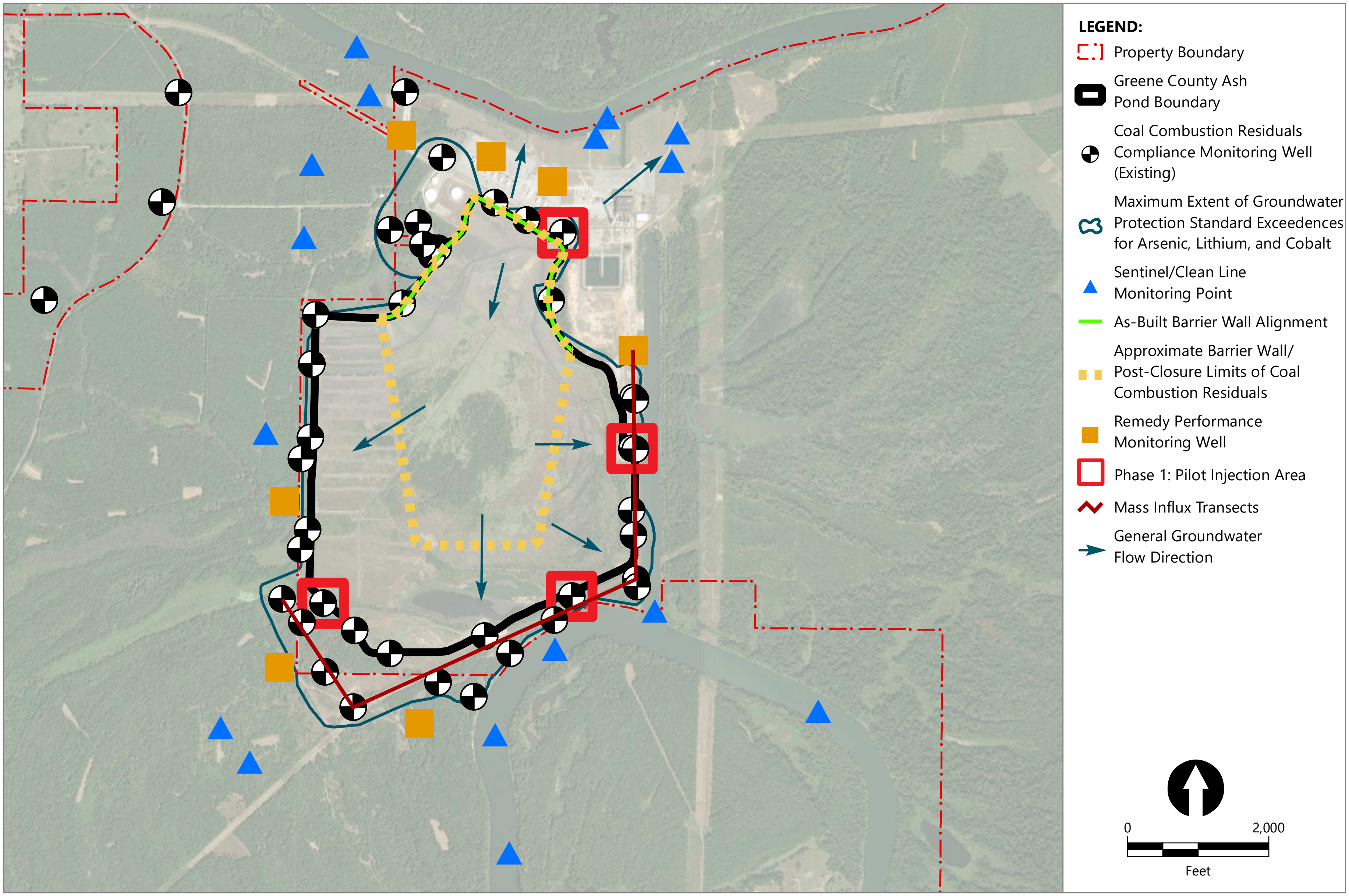




NOTE: Proposed injection and monitoring well locations are to be considered conceptual. Locations to be refined during design phase.
HORIZONTAL DATUM: Alabama State Plane West Zone, NAD83, U.S. Survey Feet
VERTICAL DATUM: NAVD88

Publish Date: 2021/09/28 10:11 AM | User: hmerrick
Filepath: K:\Projects\1114-Southern Company\Greene County\Groundwater Remedy Selection Report\1114-RP-001 (Greene Inj Well Sections).dwg Figure 15

Figure 15
Phase 1 (Pilot) Injection and Monitoring (Cross Section): GC-AP-MW-17



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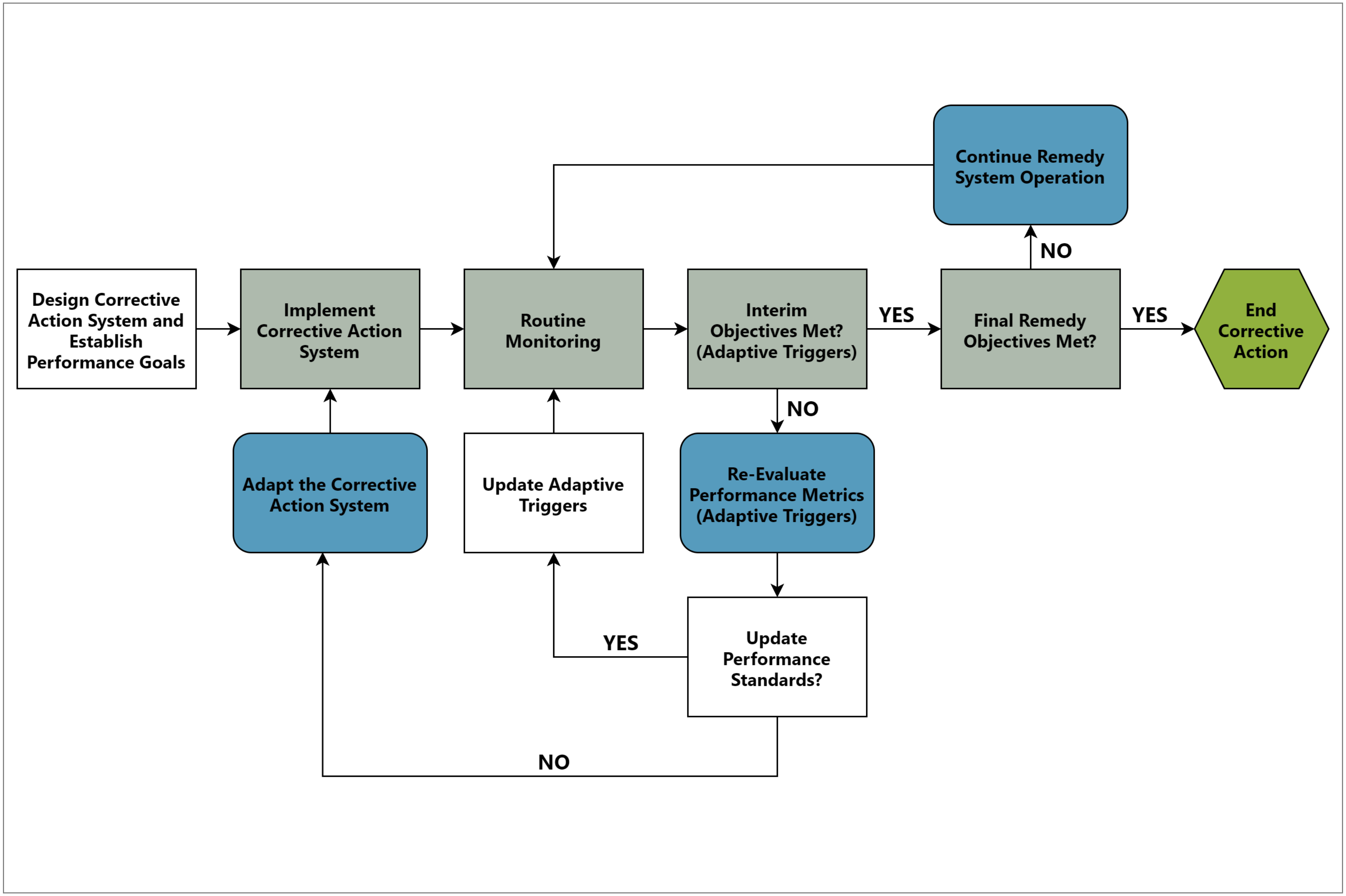
ANCHOR QEA

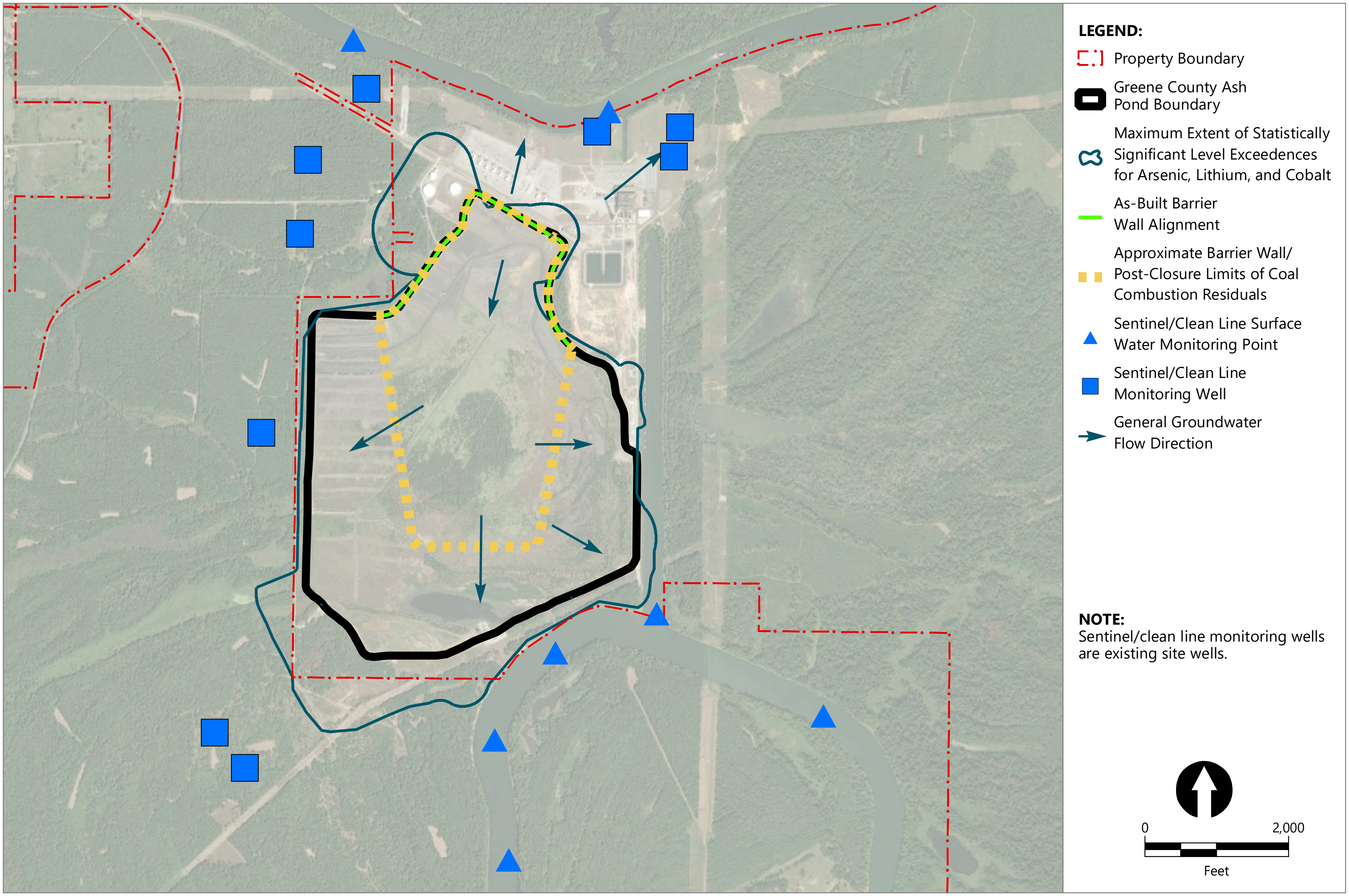
Figure 16
Conceptual Corrective Action Monitoring Plan
Groundwater Remedy Selection Report
Plant Greene County



Filepath: \\Athena\Mobile\Projects\Southern Company\Alabama Power ACMs - PRIVILEGED & CONFIDENTIAL\Remedy Selection Reports\Greene\Figures\Figure 17 - Site Management Framework.docx

ANCHOR QEA

Figure 17
Adaptive Site Management Framework
Groundwater Remedy Selection Report
Plant Greene County



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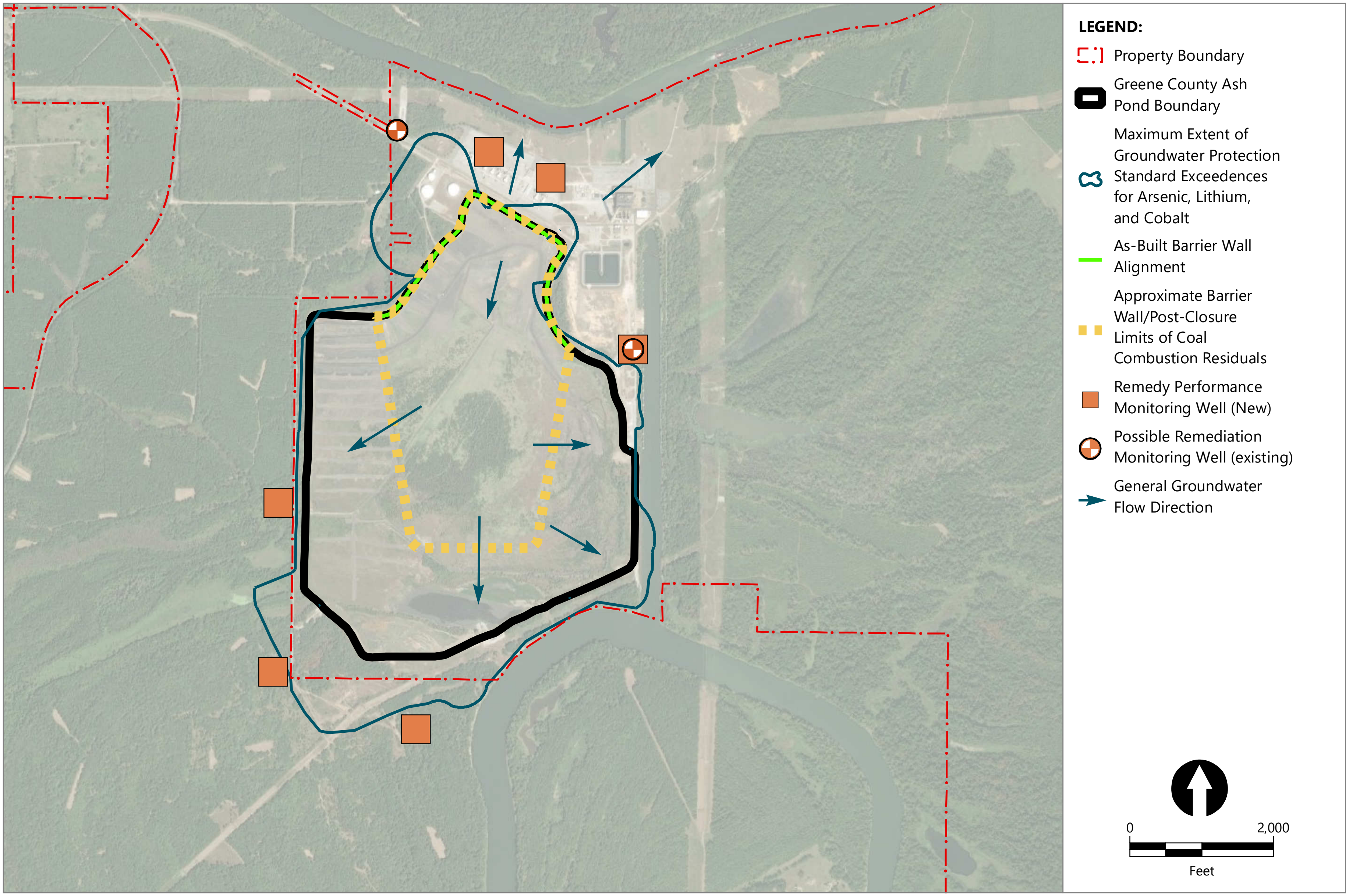
Filepath: Q:\Jobs\SouthernCompany_1114\GreeneCounty\Maps\2021_Groundwater_Remedy_Selection_Report\18_GC_CMP_Sentinel.mxd

ANCHOR QEA

Figure 18
Conceptual Corrective Action Monitoring Plan: Sentinel/Clean Line Monitoring Points
Groundwater Remedy Selection Report
Plant Greene County



Publish Date: 2021/09/28, 2:35 PM | User: epipkin
Filepath: Q:\Jobs\SouthernCompany_1114\GreeneCounty\Maps\2021_Groundwater_Remedy_Selection_Report\19_GC_CMP_RemedyPerformanceWells.mxd

ANCHOR QEA

Figure 19
Conceptual Corrective Action Monitoring Plan: Remedy Performance Wells
Groundwater Remedy Selection Report
Plant Greene County

Before UIC Permit Submittal	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10
Collect soil and groundwater samples for treatability studies	■	■								
Conduct batch studies for reagents and doses			■	■						
Conduct column studies for effectiveness					■	■	■			
Prepare Class V UIC Permit								■	■	■

After Class V UIC Permit Approval	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	Y2	Y3	Y4
Design field implementation of injection treatment	■	■	■												
Refine delineation in the field		■													
Phase 1 (Pilot): field implementation (well installation and injections)				■	■	■	■								
Phase 1 (Pilot): collect and analyze remedial effectiveness monitoring data								■	■	■	■	■	■		
Phase 2 injections: field implementation														■	
Phase 2 injections: collect and analyze remedial effectiveness monitoring data														■	■

Notes:
M: month
UIC: Underground Injection Control
Y: year

Figure 20
Anticipated Injection Treatment Schedule

Groundwater Remedy Selection Report
Plant Greene County

Appendix A
Certificate of Authorization

State of Alabama

Board of Licensure for Professional Engineers and Land Surveyors

This is to certify that

ANCHOR QEA LLC

Having given satisfactory evidence of the necessary qualifications required by law has been duly certificated and is hereby issued Certificate of Authorization

CA- 5073 -E

authorizing the firm to provide or offer to provide

Engineering

services in the State of Alabama through individual licensed professional licensees as agents, employees, officers or partners.

This certificate requires the firm to operate in the State of Alabama as

ANCHOR QEA LLC

This certificate will lapse January 31, 2022 unless renewed.

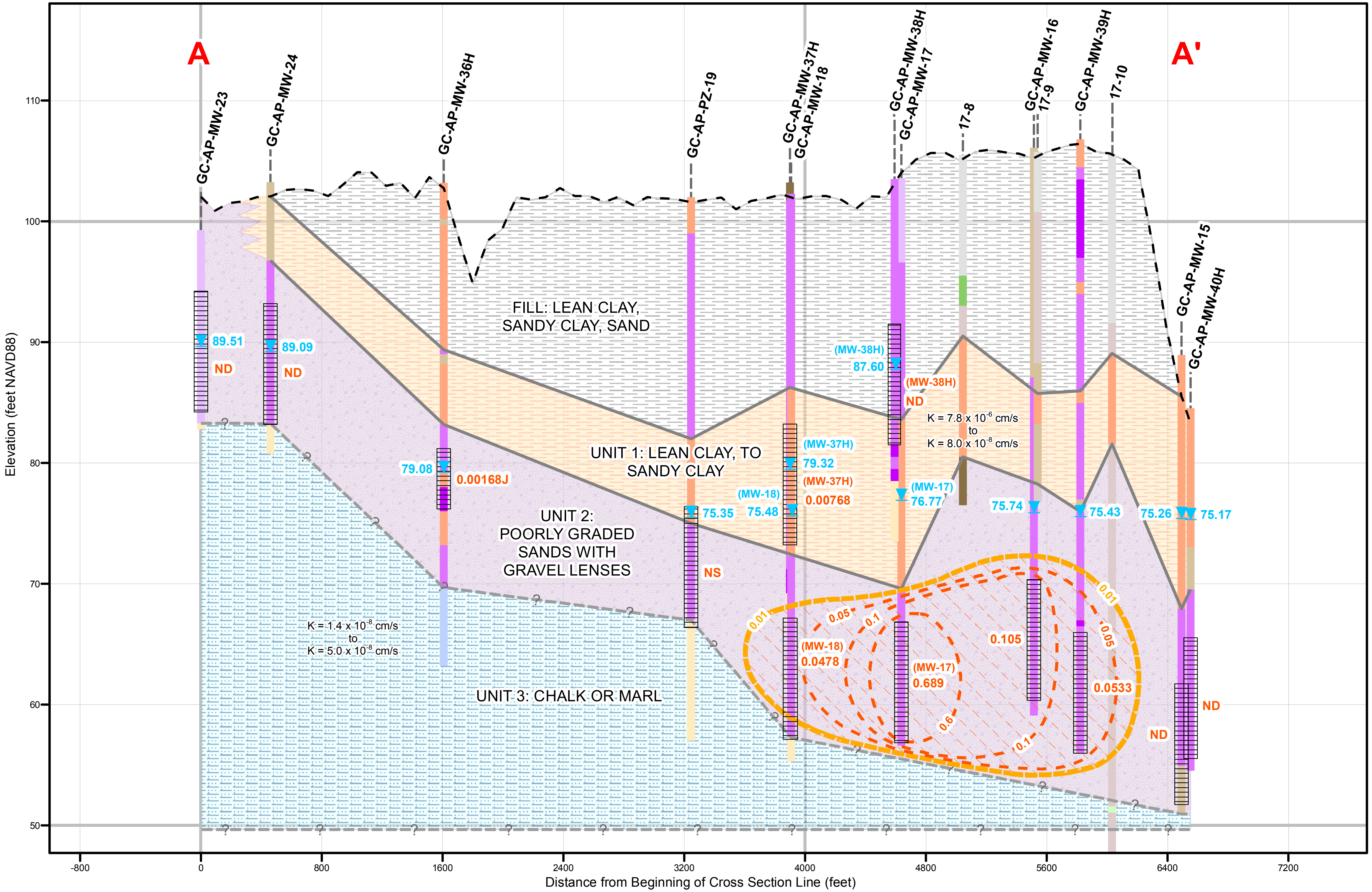
In Testimony whereof, witness the signature of the Executive Director under seal of the Board on November 02, 2020

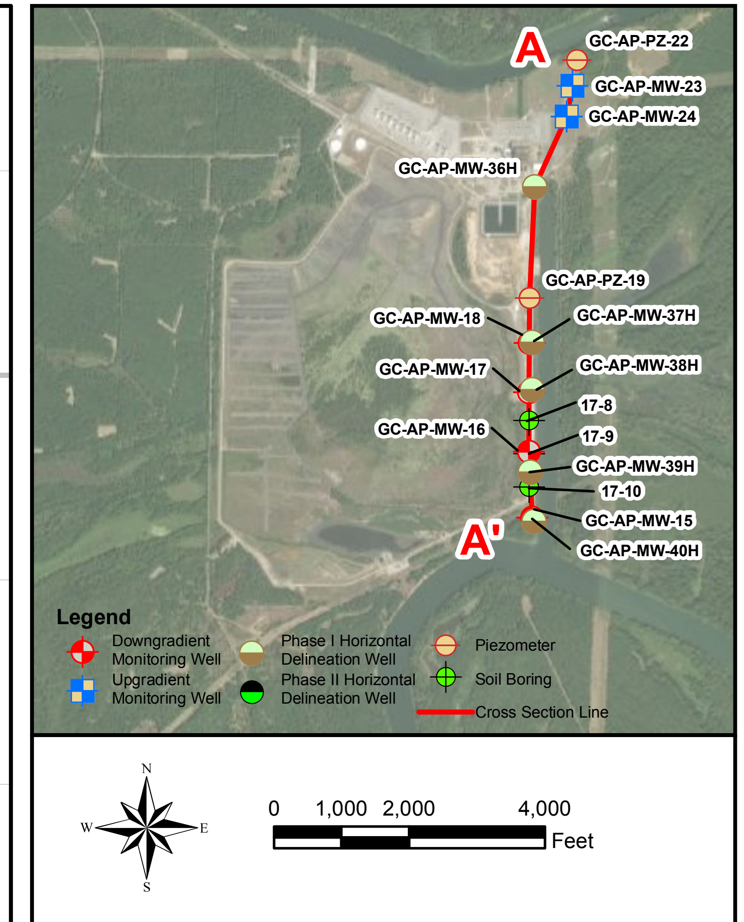
William R. Huett

Executive Director

RECEIPT NO.
20201102000023800

Appendix B
Geologic Cross Sections





Notes:
1. Source of ground surface elevation data: June 2020 Lidar and 2019 USGS 3DEP.
2. NAVD88 indicates North American Vertical Datum of 1988.
3. Groundwater elevation data were measured on June 30, 2020.
4. K = Hydraulic Conductivity.
5. Water samples were collected between April 20 and 22, 2020.
6. mg/L indicates milligrams per liter.
7. J indicates a laboratory estimated concentration between the analytical method detection limit and the laboratory reporting limit.
8. ND indicates not detected above the laboratory method detection limit.
9. GWPS indicates Groundwater Protection Standard.
10. Vertical exaggeration = 80.
11. Soil borings 17-8, 17-9, and 17-10 are utilized for soil characterization and were drilled on July 18, 2017 (17-10) and July 20, 2017 (17-8 and 17-9).

Legend

- Groundwater Elevation
- Ground Surface Elevation
- Screen Interval
- Unit Boundary (inferred)
- Unit Boundary
- Well Location
- Arsenic Concentration (mg/L)
- Arsenic GWPS (mg/L)
- Area Exceeding GWPS for Arsenic
- 0.105 Arsenic concentration (mg/L)
- 0.01 Arsenic GWPS (mg/L)

Borehole Description

- Fill
- Fat Clay
- Lean Clay
- Silt
- Sandy Silt
- Clayey Sand
- Silty Sand
- Sand
- Well-graded Sand
- Poorly-graded Sand
- Poorly-graded Sand with Clay
- Chalk

Geologic Units

- Fill: Lean Clay, Sandy Clay, Sand
- Unit 1: Lean Clay to Sandy Clay
- Unit 2: Poorly-Graded Sands with Gravel Lenses
- Unit 3: Chalk or Marl

SCALE	As Shown
DATE	9/10/2020
DRAWN BY	KWR
CHECKED BY	GBD

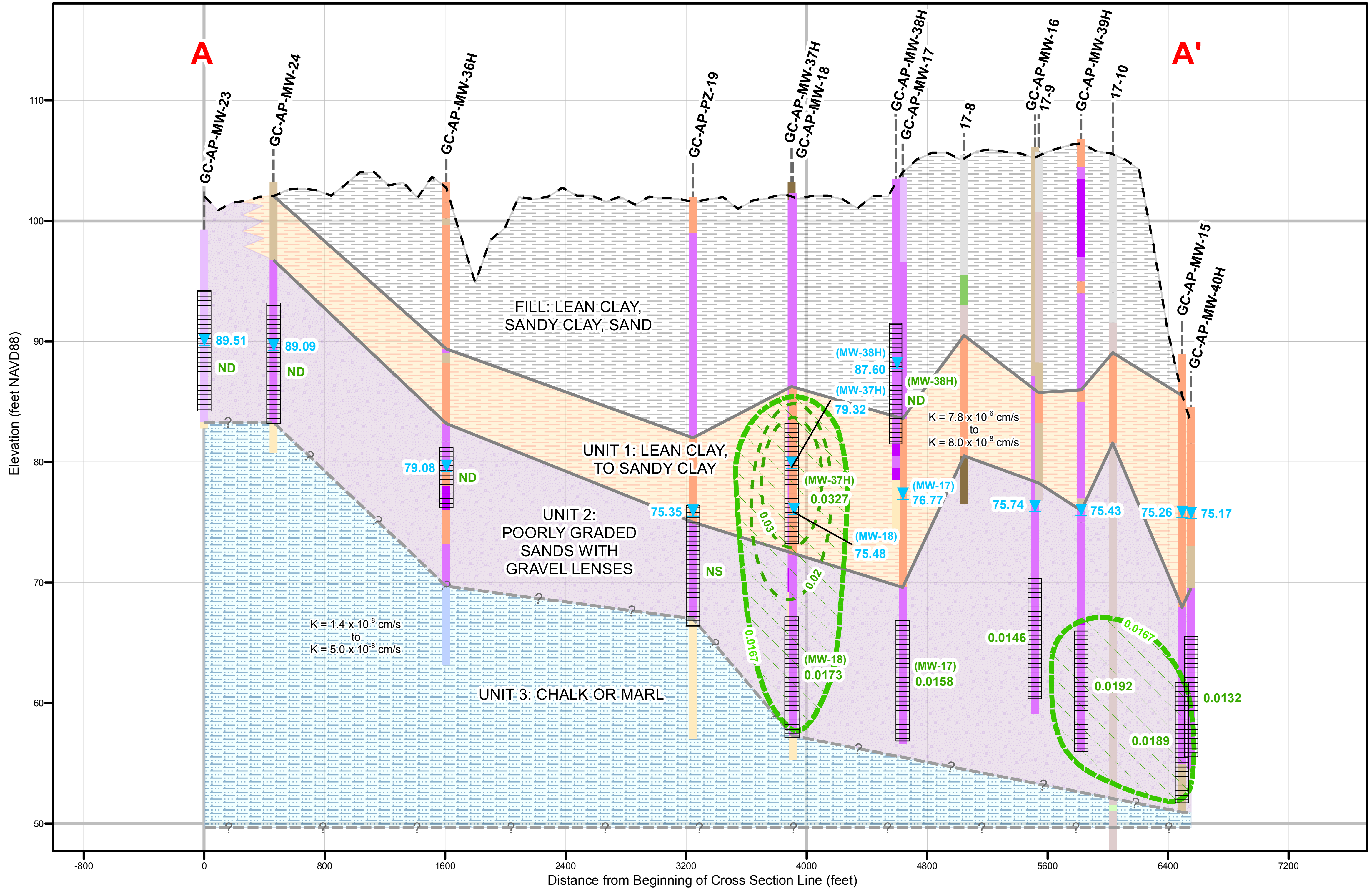
DRAWING TITLE

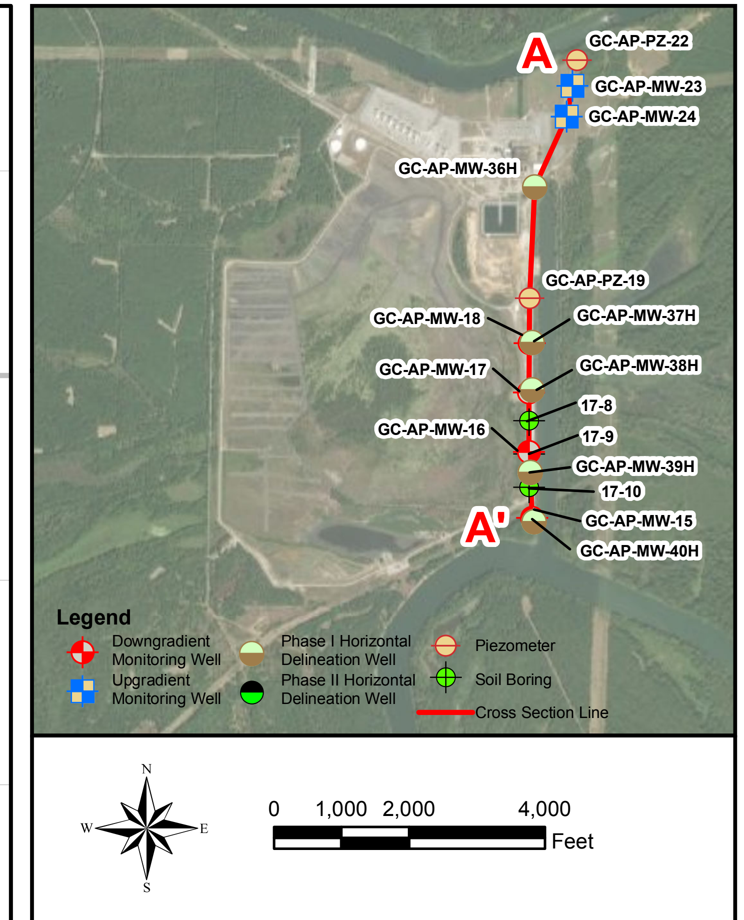
ARSENIC CONCENTRATIONS ON GEOLOGIC CROSS SECTION A - A' PLANT GREENE COUNTY ASH POND

FIGURE NO

FIGURE 9A

Southern Company





Notes:
1. Source of ground surface elevation data: June 2020 Lidar and 2019 USGS 3DEP.
2. NAVD88 indicates North American Vertical Datum of 1988.
3. Groundwater elevation data were measured on June 30, 2020.
4. K = Hydraulic Conductivity.
5. Water samples were collected between April 20 and 22, 2020.
6. mg/L indicates milligrams per liter.
7. J indicates a laboratory estimated concentration between the analytical method detection limit and the laboratory reporting limit.
8. ND indicates not detected above the laboratory method detection limit.
9. GWPS indicates Groundwater Protection Standard.
10. Vertical exaggeration = 80.
11. Soil borings 17-8, 17-9, and 17-10 are utilized for soil characterization and were drilled on July 18, 2017 (17-10) and July 20, 2017 (17-8 and 17-9).

Legend

- Groundwater Elevation
- Ground Surface Elevation
- Screen Interval
- Unit Boundary (inferred)
- Unit Boundary
- Well Location
- Cobalt Concentration (mg/L)
- Cobalt GWPS (mg/L)
- Area Exceeding GWPS for Cobalt
- 0.0173 Cobalt concentration (mg/L)
- 0.0167 Cobalt GWPS (mg/L)

Borehole Description

- Fill
- Fat Clay
- Lean Clay
- Silt
- Sandy Silt
- Clayey Sand
- Silty Sand
- Sand
- Well-graded Sand
- Poorly-graded Sand
- Poorly-graded Sand with Clay
- Chalk

Geologic Units

- Fill: Lean Clay, Sandy Clay, Sand
- Unit 1: Lean Clay to Sandy Clay
- Unit 2: Poorly-Graded Sands with Gravel Lenses
- Unit 3: Chalk or Marl

SCALE	As Shown
DATE	9/10/2020
DRAWN BY	KWR
CHECKED BY	GBD

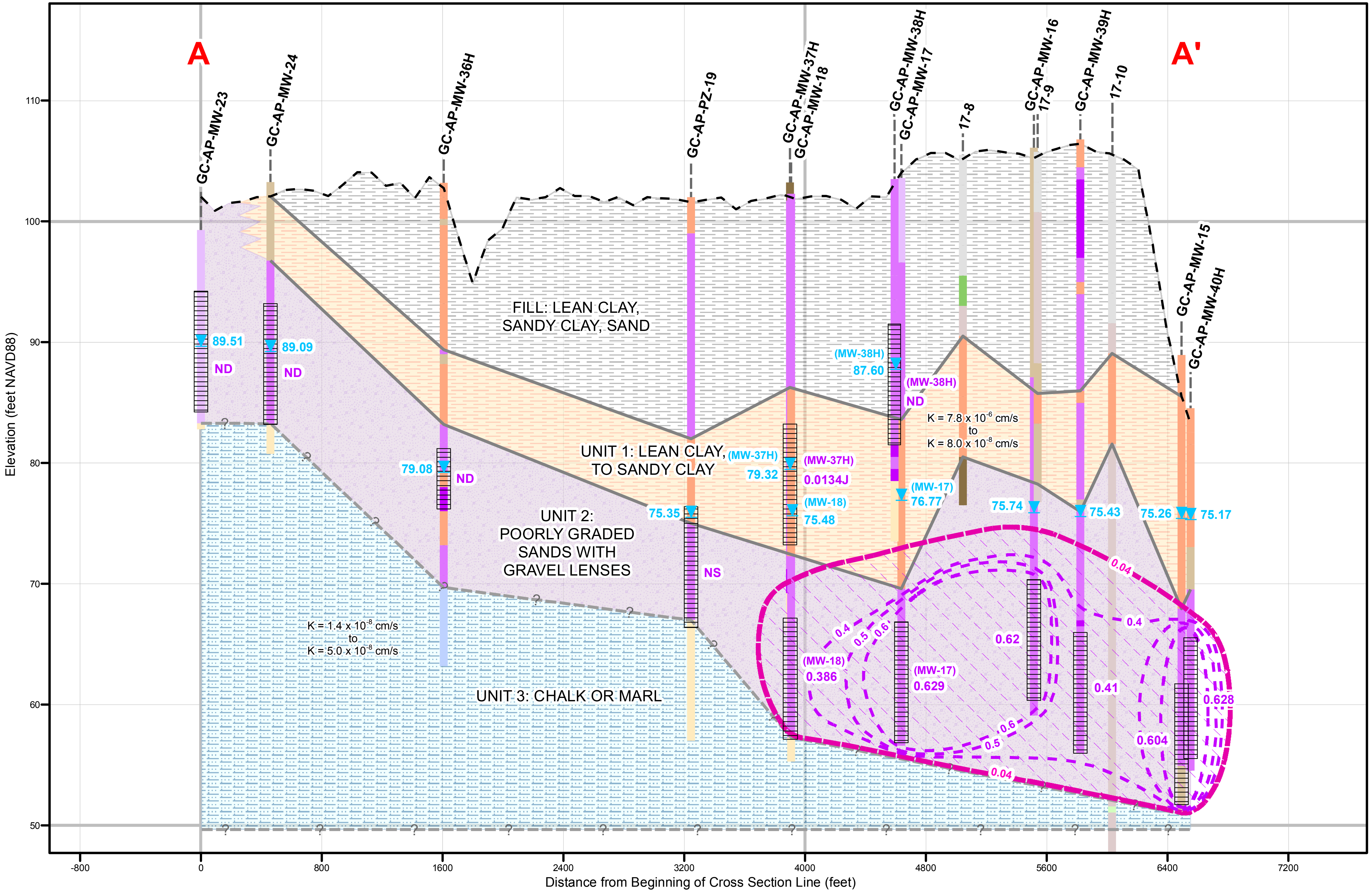
DRAWING TITLE

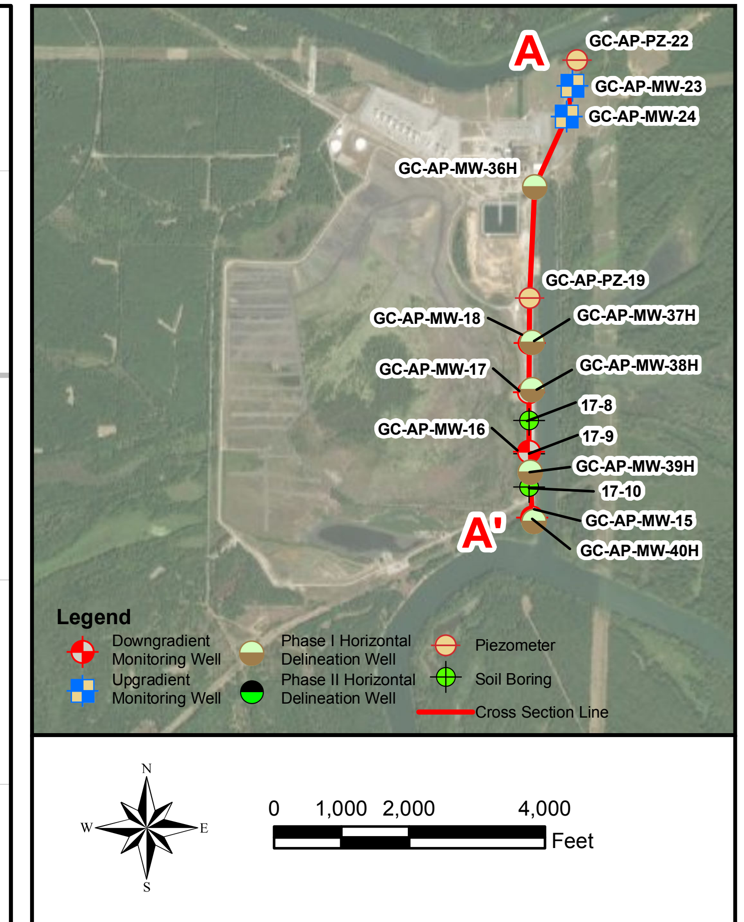
COBALT CONCENTRATIONS ON GEOLOGIC CROSS SECTION A - A' PLANT GREENE COUNTY ASH POND

FIGURE NO

FIGURE 9B

Southern Company





Notes:
1. Source of ground surface elevation data: June 2020 Lidar and 2019 USGS 3DEP.
2. NAVD88 indicates North American Vertical Datum of 1988.
3. Groundwater elevation data were measured on June 30, 2020.
4. K = Hydraulic Conductivity.
5. Water samples were collected between April 20 and 22, 2020.
6. mg/L indicates milligrams per liter.
7. J indicates a laboratory estimated concentration between the analytical method detection limit and the laboratory reporting limit.
8. ND indicates not detected above the laboratory method detection limit.
9. GWPS indicates Groundwater Protection Standard.
10. Vertical exaggeration = 80.
11. Soil borings 17-8, 17-9, and 17-10 are utilized for soil characterization and were drilled on July 18, 2017 (17-10) and July 20, 2017 (17-8 and 17-9).

Legend

- Groundwater Elevation
- Ground Surface Elevation
- Screen Interval
- Unit Boundary (inferred)
- Unit Boundary
- Well Location
- Lithium Concentration (mg/L)
- Lithium GWPS (mg/L)
- Area Exceeding GWPS for Lithium
- 0.41 Lithium concentration (mg/L)
- 0.04 Lithium GWPS (mg/L)

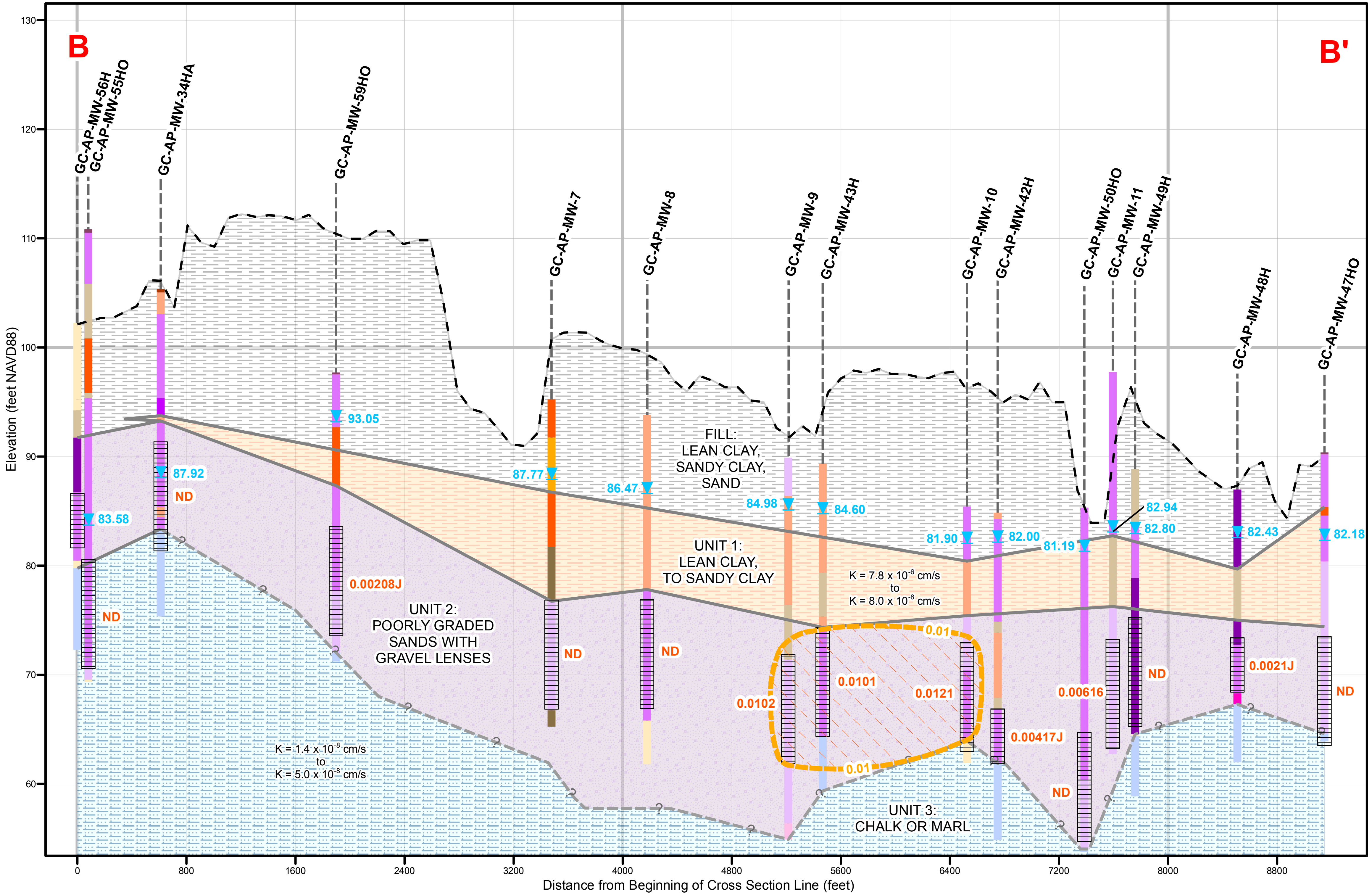
Borehole Description

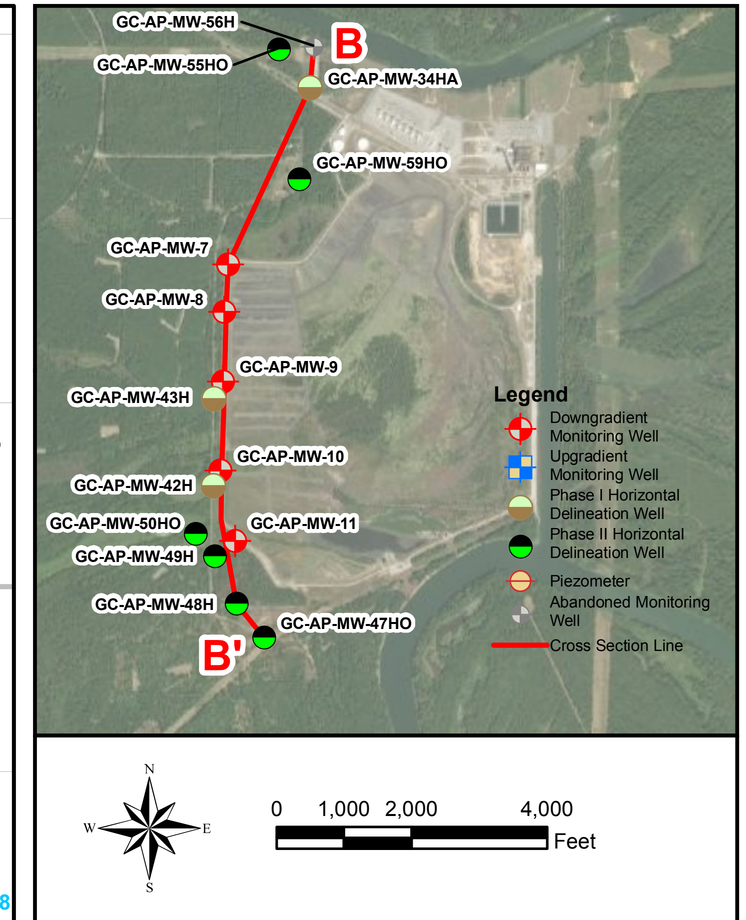
- Fill
- Fat Clay
- Lean Clay
- Silt
- Sandy Silt
- Clayey Sand
- Silty Sand
- Sand
- Well-graded Sand
- Poorly-graded Sand
- Poorly-graded Sand with Clay
- Chalk

Geologic Units

- Fill: Lean Clay, Sandy Clay, Sand
- Unit 1: Lean Clay to Sandy Clay
- Unit 2: Poorly-Graded Sands with Gravel Lenses
- Unit 3: Chalk or Marl

SCALE: As Shown	DRAWING TITLE: LITHIUM CONCENTRATIONS ON GEOLOGIC CROSS SECTION A - A' PLANT GREENE COUNTY ASH POND
DATE: 9/10/2020	
DRAWN BY: KWR	FIGURE NO: FIGURE 9C
CHECKED BY: GBD	Southern Company





Notes:
1. Source of ground surface elevation data: June 2020 Lidar and 2019 USGS 3DEP.
2. NAVD88 indicates North American Vertical Datum of 1988.
3. Groundwater elevation data were measured on June 30, 2020.
4. K = Hydraulic Conductivity.
5. Water samples were collected between April 21 and 22, 2020 except MW-47HO, MW-50HO, MW-55HO, and MW-59HO that were sampled on May 28, 2020.
6. mg/L indicates milligrams per liter.
7. J indicates a laboratory estimated concentration between the analytical method detection limit and the laboratory reporting limit.
8. ND indicates not detected above the laboratory method detection limit.
9. GWPS indicates Groundwater Protection Standard.
10. MW-56H was abandoned on May 16, 2020.
11. Vertical exaggeration = 80.

Legend

- Groundwater Elevation
- Ground Surface Elevation
- Screen Interval
- Unit Boundary (Inferred)
- Unit Boundary
- Well Location
- Arsenic GWPS (mg/L)
- Area Exceeding GWPS for Arsenic
- 0.0102 Arsenic concentration (mg/L)
- 0.01 Arsenic GWPS (mg/L)

Borehole Description

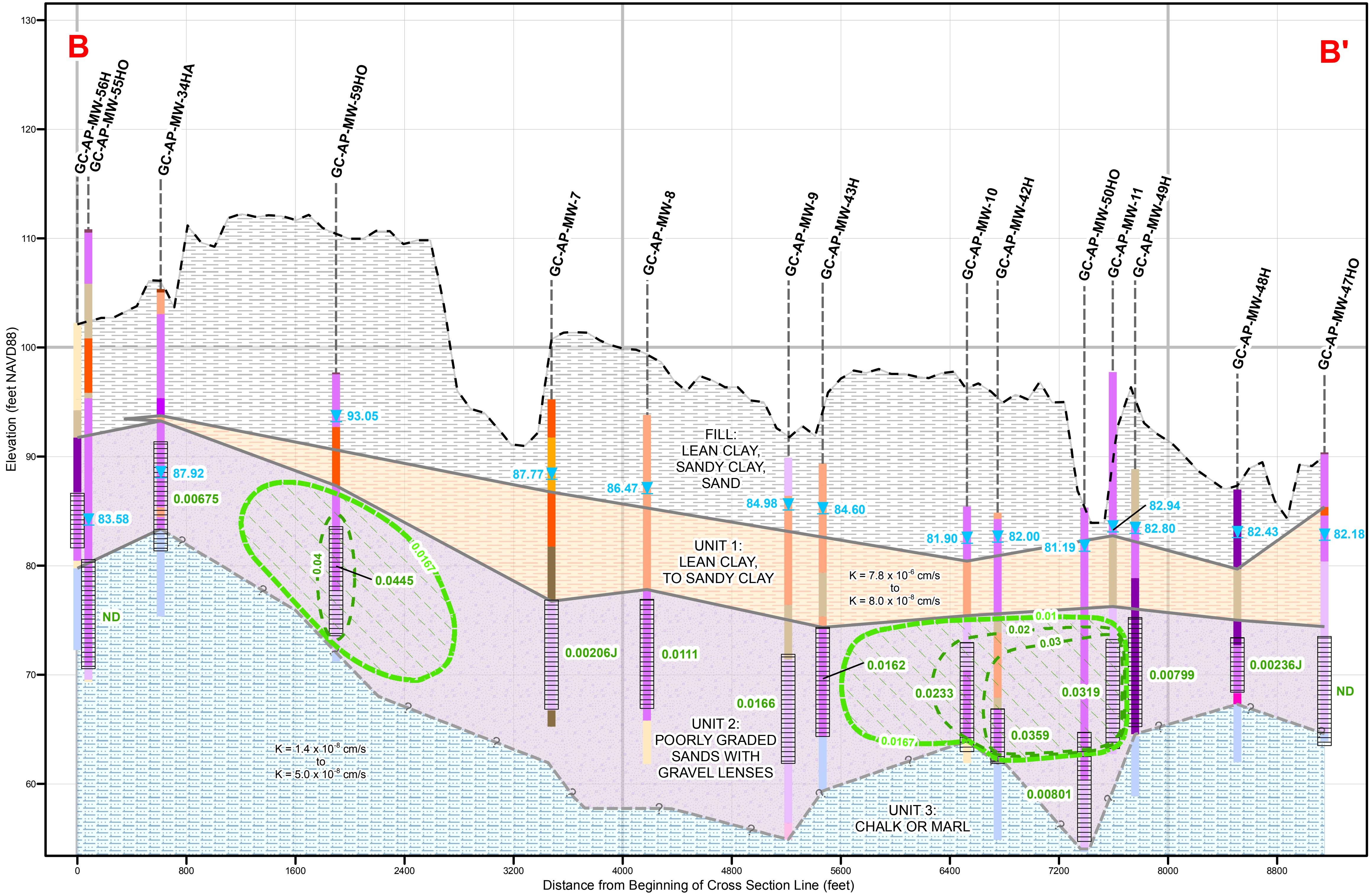
- Topsoi
- Fat Clay
- Lean Clay
- Silty Clay
- Sandy Lean Clay
- Sandy Silt
- Clayey Sand
- Silty Sand
- Well-graded Sand
- Poorly-graded Sand
- Poorly-graded Sand with Clay
- Poorly-graded Sand with Silt
- Well-graded Gravel
- Poorly-graded Gravel
- Chalk

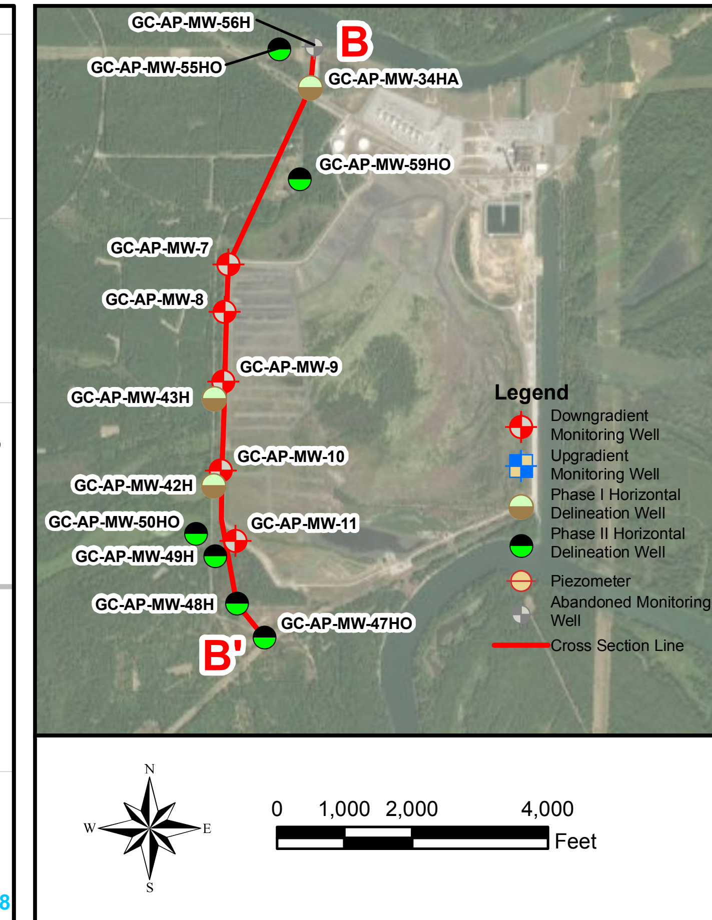
Geologic Units

- Fill: Lean Clay, Sandy Clay, Sand
- Unit 1: Lean Clay to Sandy Clay
- Unit 2: Poorly-Graded Sands with Gravel Lenses
- Unit 3: Chalk or Marl

SCALE	As Shown
DATE	9/10/2020
DRAWN BY	KWR
CHECKED BY	GFB
DRAWING TITLE	ARSENIC CONCENTRATIONS ALONG GEOLOGIC CROSS SECTION B - B' PLANT GREENE COUNTY ASH POND
FIGURE NO	FIGURE 10A

Southern Company





Notes:
1. Source of ground surface elevation data: June 2020 Lidar and 2019 USGS 3DEP.
2. NAVD88 indicates North American Vertical Datum of 1988.
3. Groundwater elevation data were measured on June 30, 2020.
4. K = Hydraulic Conductivity.
5. Water samples were collected between April 21 and 22, 2020 except MW-47HO, MW-50HO, MW-55HO, and MW-59HO that were sampled on May 28, 2020.
6. mg/L indicates milligrams per liter.
7. J indicates a laboratory estimated concentration between the analytical method detection limit and the laboratory reporting limit.
8. ND indicates not detected above the laboratory method detection limit.
9. GWPS indicates Groundwater Protection Standard.
10. MW-56H was abandoned on May 16, 2020.
11. Vertical exaggeration = 80.

Legend

- Groundwater Elevation
- Ground Surface Elevation
- Screen Interval
- Unit Boundary (Inferred)
- Unit Boundary
- Well Location
- Cobalt concentration (mg/L)
- Cobalt GWPS (mg/L)
- Area Exceeding GWPS for Cobalt
- 0.0111 Cobalt concentration (mg/L)
- 0.0167 Cobalt GWPS (mg/L)

Borehole Description

- Topsoi
- Fat Clay
- Lean Clay
- Silty Clay
- Sandy Lean Clay
- Sandy Silt
- Clayey Sand
- Silty Sand
- Well-graded Sand
- Poorly-graded Sand
- Poorly-graded Sand with Clay
- Poorly-graded Sand with Silt
- Well-graded Gravel
- Poorly-graded Gravel
- Chalk

Geologic Units

- Fill: Lean Clay, Sandy Clay, Sand
- Unit 1: Lean Clay to Sandy Clay
- Unit 2: Poorly-Graded Sands with Gravel Lenses
- Unit 3: Chalk or Marl

SCALE	As Shown
DATE	9/15/2020
DRAWN BY	KWR
CHECKED BY	GFB

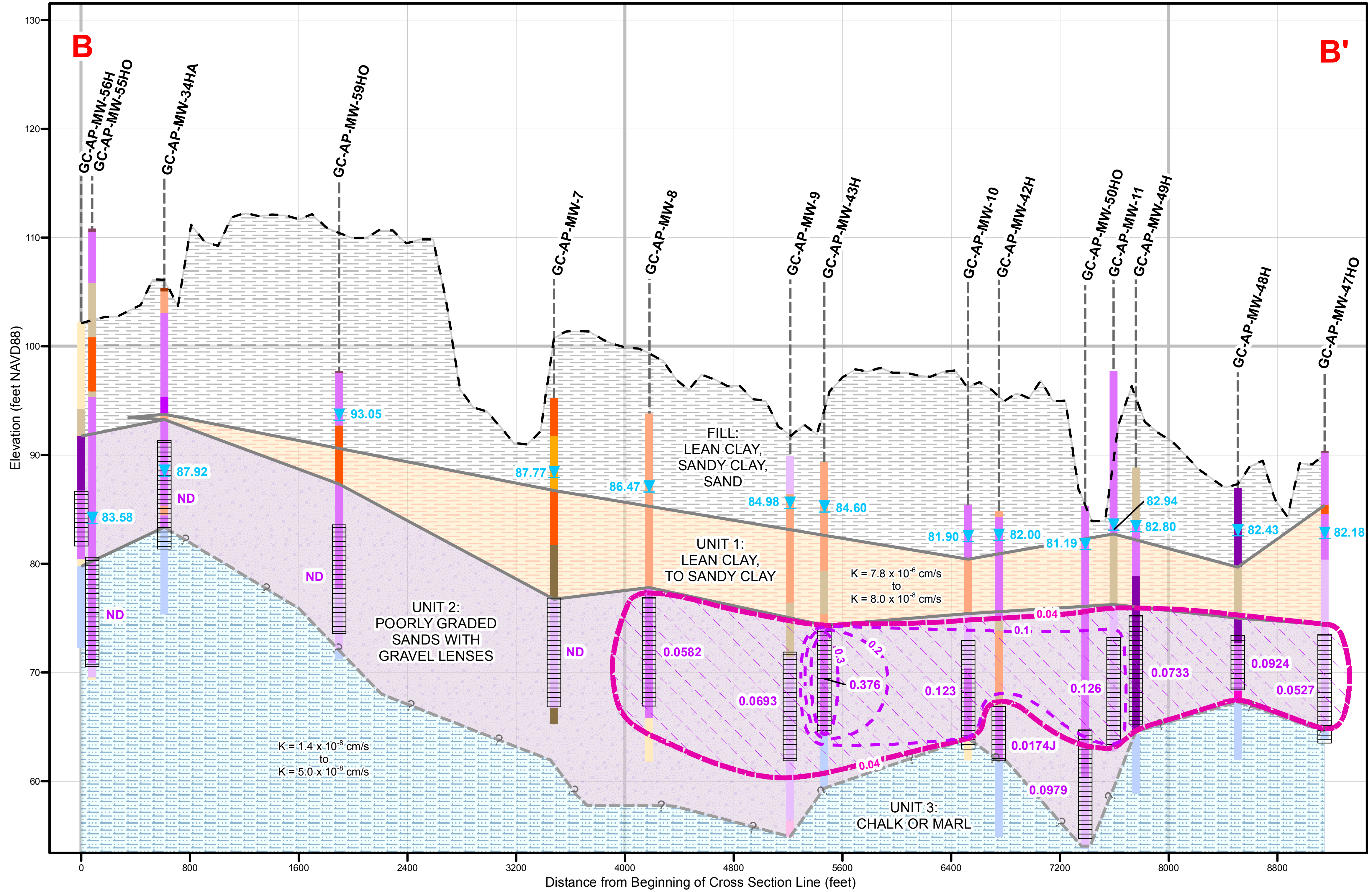
DRAWING TITLE

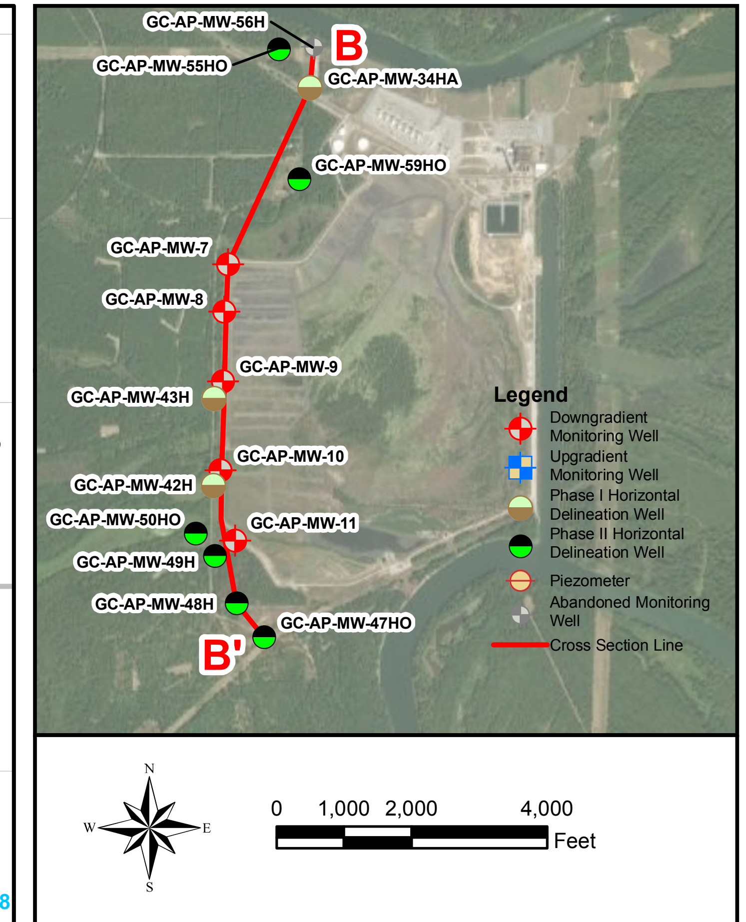
COBALT CONCENTRATIONS ALONG GEOLOGIC CROSS SECTION B - B' PLANT GREENE COUNTY ASH POND

FIGURE NO

FIGURE 10B

Southern Company





Notes:
1. Source of ground surface elevation data: June 2020 Lidar and 2019 USGS 3DEP.
2. NAVD88 indicates North American Vertical Datum of 1988.
3. Groundwater elevation data were measured on June 30, 2020.
4. K = Hydraulic Conductivity.
5. Water samples were collected between April 21 and 22, 2020 except MW-47HO, MW-50HO, MW-55HO, and MW-59HO that were sampled on May 28, 2020.
6. mg/L indicates milligrams per liter.
7. J indicates a laboratory estimated concentration between the analytical method detection limit and the laboratory reporting limit.
8. ND indicates not detected above the laboratory method detection limit.
9. GWPS indicates Groundwater Protection Standard.
10. MW-56H was abandoned on May 16, 2020.
11. Vertical exaggeration = 80.

Legend

- Groundwater Elevation
- Ground Surface Elevation
- Screen Interval
- Unit Boundary (Inferred)
- Unit Boundary
- Well Location
- Lithium concentration (mg/L)
- Lithium GWPS (mg/L)
- Area Exceeding GWPS for Lithium
- 0.123 Lithium concentration (mg/L)
- 0.04 Lithium GWPS (mg/L)

Borehole Description

- Topsoi
- Fat Clay
- Lean Clay
- Silty Clay
- Sandy Lean Clay
- Sandy Silt
- Clayey Sand
- Silty Sand
- Well-graded Sand
- Poorly-graded Sand
- Poorly-graded Sand with Clay
- Poorly-graded Sand with Silt
- Well-graded Gravel
- Poorly-graded Gravel
- Chalk

Geologic Units

- Fill: Lean Clay, Sandy Clay, Sand
- Unit 1: Lean Clay to Sandy Clay
- Unit 2: Poorly-Graded Sands with Gravel Lenses
- Unit 3: Chalk or Marl

SCALE	As Shown
DATE	9/15/2020
DRAWN BY	KWR
CHECKED BY	GFB

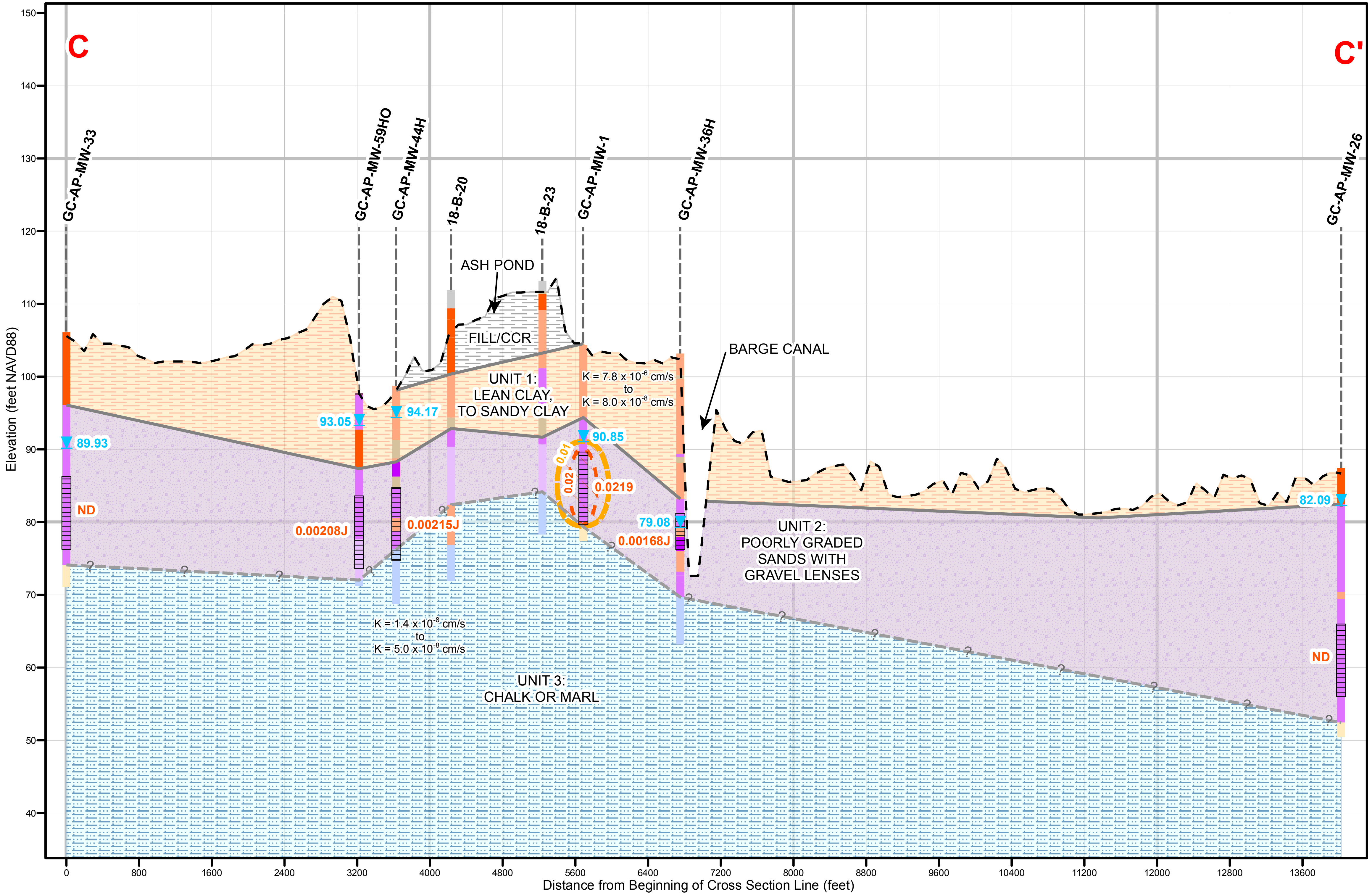
DRAWING TITLE

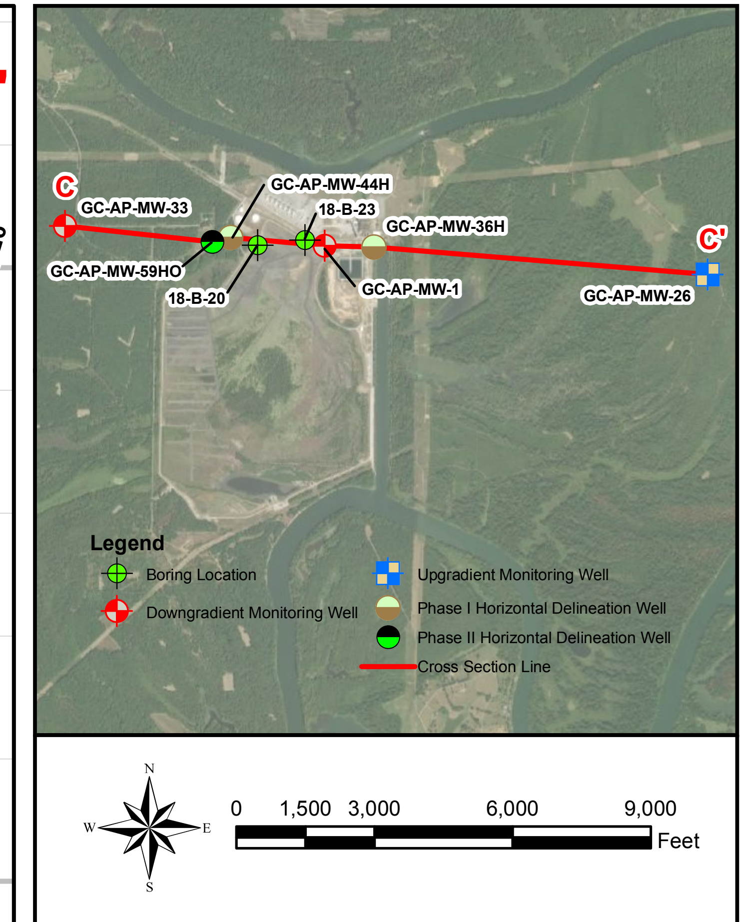
LITHIUM CONCENTRATIONS ALONG GEOLOGIC CROSS SECTION B - B' PLANT GREENE COUNTY ASH POND

FIGURE NO

FIGURE 10C

Southern Company





Notes:
1. Source of ground surface elevation data: June 2020 Lidar and 2019 USGS 3DEP.
2. NAVD88 indicates North American Vertical Datum of 1988.
3. Groundwater elevation data were measured on June 30, 2020.
4. K = Hydraulic Conductivity.
5. Water samples were collected between April 20 and 23, 2020 except MW-59HO that was collected on May 28, 2020.
6. mg/L indicates milligrams per liter.
7. J indicates a laboratory estimated concentration between the analytical method detection limit and the laboratory reporting limit.
8. ND indicates not detected above the laboratory method detection limit.
9. GWPS indicates Groundwater Protection Standard.
10. Vertical exaggeration = 80.

Legend

- Groundwater Elevation
- Ground Elevation
- Screen Interval
- Unit Boundary (Inferred)
- Unit Boundary
- Boring or Well Location
- Arsenic concentration (mg/L)
- Arsenic GWPS (mg/L)
- Area Exceeding GWPS for Arsenic
- 0.0219 Arsenic concentration (mg/L)
- 0.01 Arsenic GWPS (mg/L)

Borehole Description

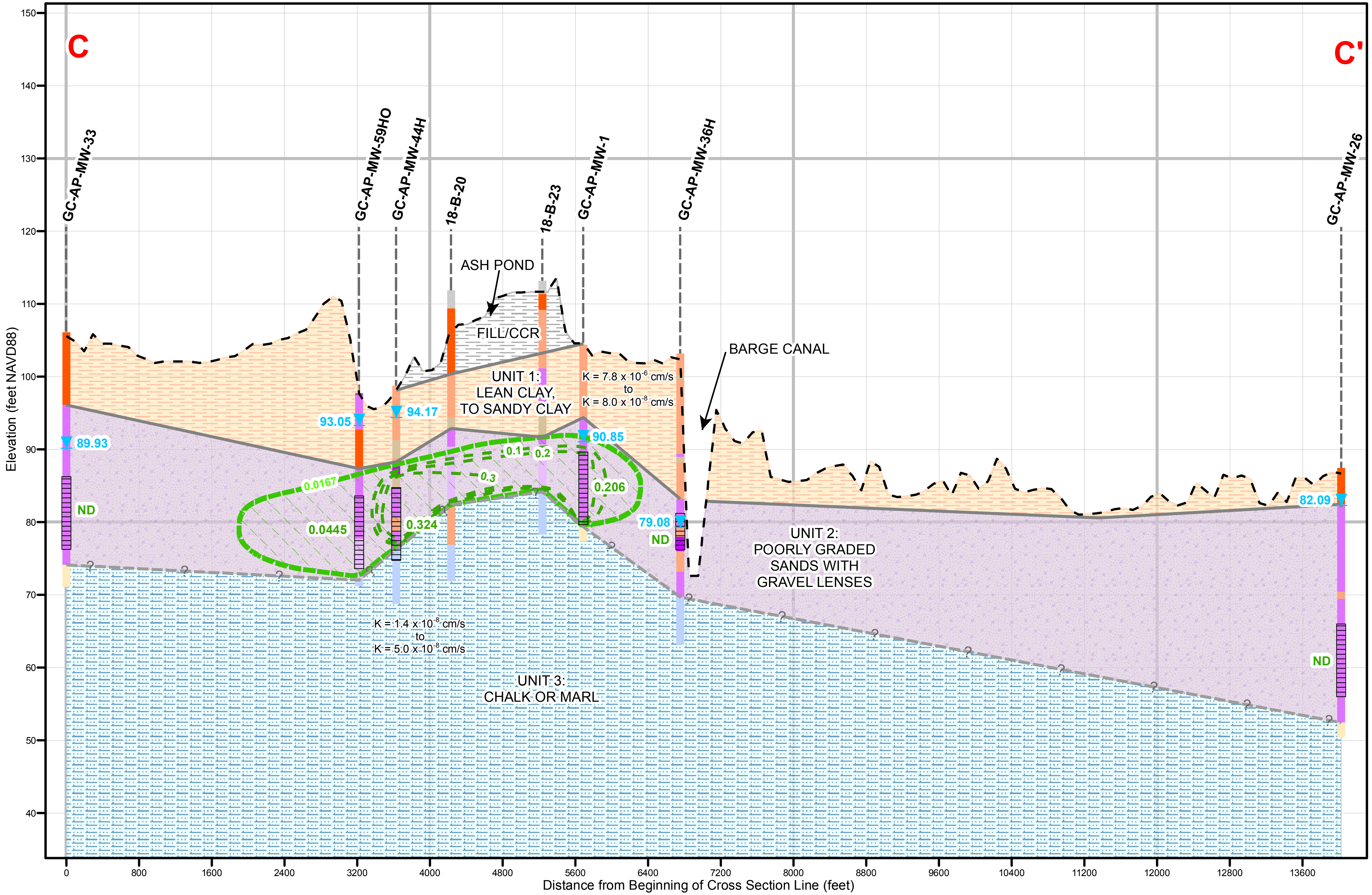
- Fill/CCR
- Topsoil
- Fat Clay
- Lean Clay
- Silty Clay
- Sandy Lean Clay
- Sandy Silt
- Clayey Sand
- Silty Sand
- Well-graded Sand
- Poorly-graded Sand
- Poorly-graded Sand with Clay
- Poorly-graded Sand with Silt
- Well-graded Gravel
- Poorly-graded Gravel
- Chalk

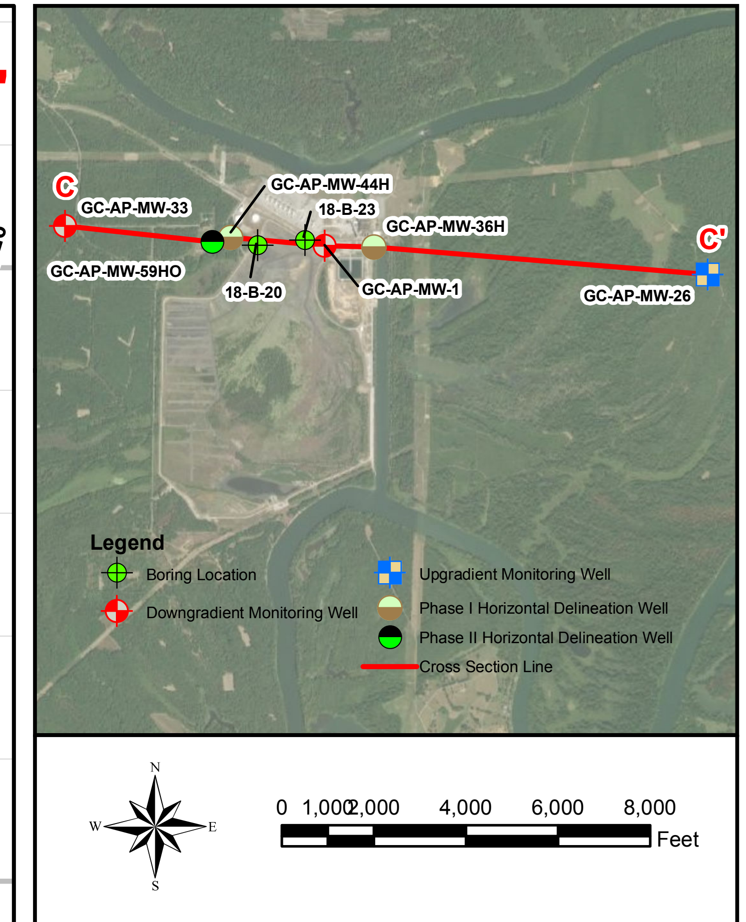
Geologic Units

- Fill/CCR
- Unit 1: Lean Clay to Sandy Clay
- Unit 2: Poorly-Graded Sands with Gravel Lenses
- Unit 3: Chalk or Marl

SCALE	As Shown
DATE	9/15/2020
DRAWN BY	KWR
CHECKED BY	GFB
DRAWING TITLE	ARSENIC CONCENTRATIONS ALONG GEOLOGIC CROSS SECTION C - C' PLANT GREENE COUNTY ASH POND
FIGURE NO	FIGURE 11A

Southern Company





Notes:
1. Source of ground surface elevation data: June 2020 Lidar and 2019 USGS 3DEP.
2. NAVD88 indicates North American Vertical Datum of 1988.
3. Groundwater elevation data were measured on June 30, 2020.
4. K = Hydraulic Conductivity.
5. Water samples were collected between April 20 and 23, 2020 except MW-59HO that was collected on May 28, 2020.
6. mg/L indicates milligrams per liter.
7. J indicates a laboratory estimated concentration between the analytical method detection limit and the laboratory reporting limit.
8. ND indicates not detected above the laboratory method detection limit.
9. GWPS indicates Groundwater Protection Standard.
10. Vertical exaggeration = 80.

Legend

- Groundwater Elevation
- Ground Elevation
- Screen Interval
- Unit Boundary (Inferred)
- Unit Boundary
- Well Location
- Cobalt concentration (mg/L)
- Cobalt GWPS (mg/L)
- Area Exceeding GWPS for Cobalt
- 0.324 Cobalt concentration (mg/L)
- 0.0167 Cobalt GWPS (mg/L)

Borehole Description

- Fill/CCR
- Topsoil
- Fat Clay
- Lean Clay
- Silty Clay
- Sandy Lean Clay
- Sandy Silt
- Clayey Sand
- Silty Sand
- Well-graded Sand
- Poorly-graded Sand
- Poorly-graded Sand with Clay
- Poorly-graded Sand with Silt
- Well-graded Gravel
- Poorly-graded Gravel
- Chalk

Geologic Units

- Fill/CCR
- Unit 1: Lean Clay to Sandy Clay
- Unit 2: Poorly-Graded Sands with Gravel Lenses
- Unit 3: Chalk or Marl

SCALE	As Shown
DATE	9/15/2020
DRAWN BY	KWR
CHECKED BY	GFB

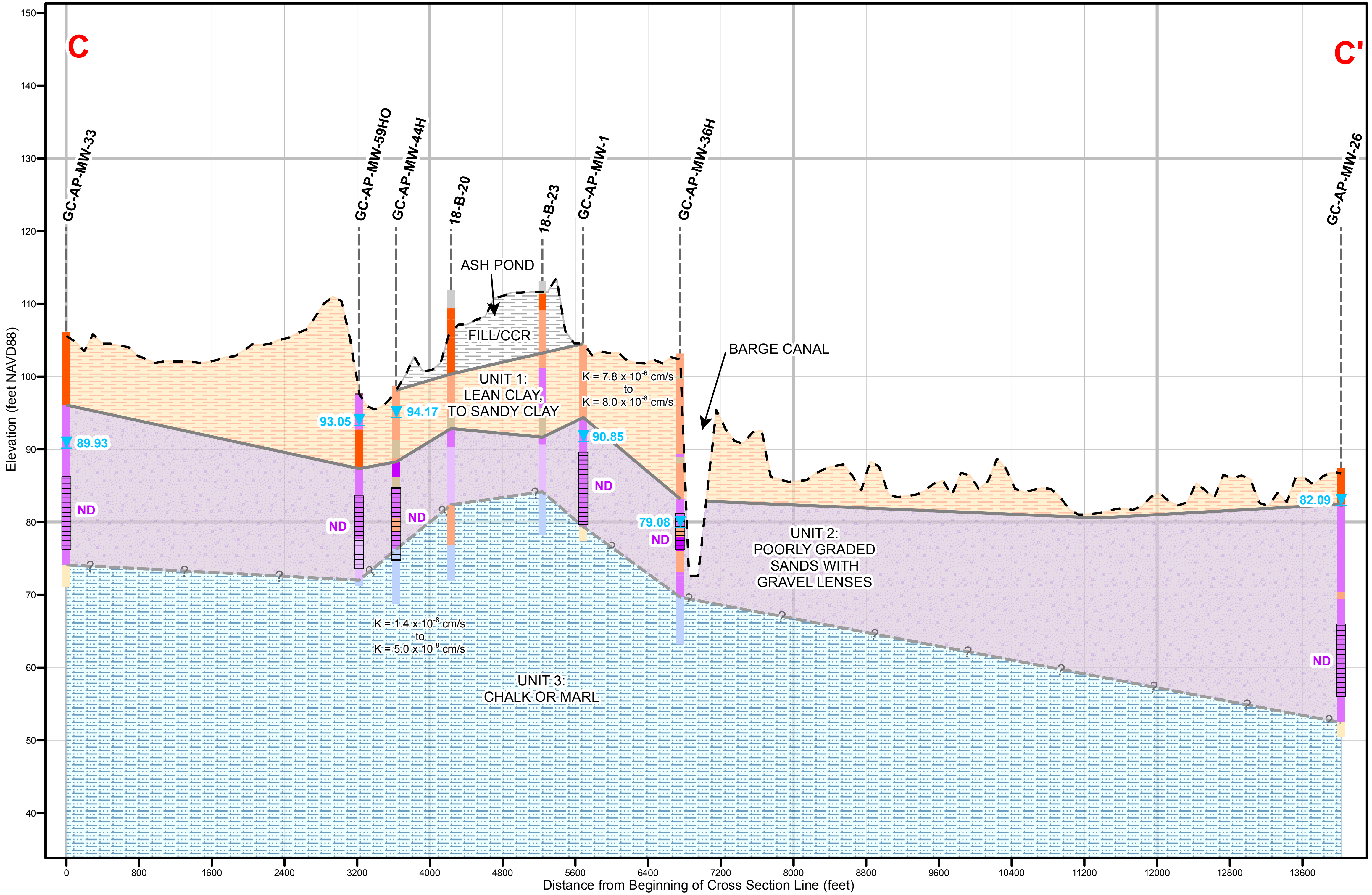
DRAWING TITLE

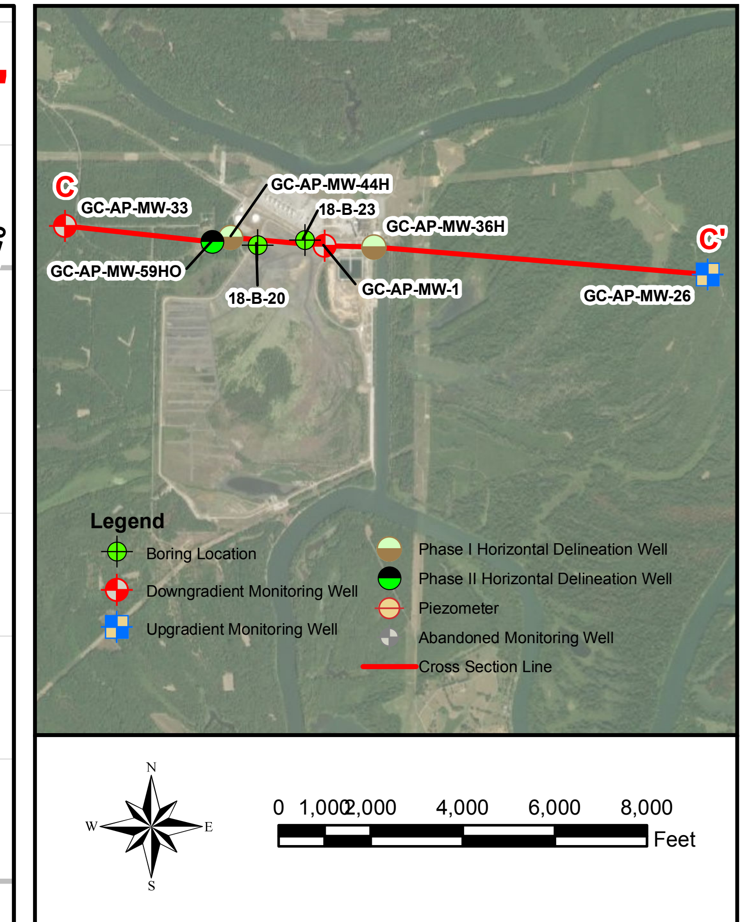
COBALT CONCENTRATIONS ALONG GEOLOGIC CROSS SECTION C - C' PLANT GREENE COUNTY ASH POND

FIGURE NO

FIGURE 11B

Southern Company





Notes:
1. Source of ground surface elevation data: June 2020 Lidar and 2019 USGS 3DEP.
2. NAVD88 indicates North American Vertical Datum of 1988.
3. Groundwater elevation data were measured on June 30, 2020.
4. K = Hydraulic Conductivity.
5. Water samples were collected between April 20 and 23, 2020 except MW-59HO that was collected on May 28, 2020.
6. mg/L indicates milligrams per liter.
7. J indicates a laboratory estimated concentration between the analytical method detection limit and the laboratory reporting limit.
8. ND indicates not detected above the laboratory method detection limit.
9. GWPS indicates Groundwater Protection Standard.
10. Vertical exaggeration = 80.

Legend

- Groundwater Elevation
- Ground Elevation
- Screen Interval
- Unit Boundary (Inferred)
- Unit Boundary
- Well Location
- Lithium concentration (mg/L)
- Lithium GWPS (mg/L)
- Area Exceeding GWPS for Lithium

Borehole Description

- Fill/CCR
- Topsoil
- Fat Clay
- Lean Clay
- Silty Clay
- Sandy Lean Clay
- Sandy Silt
- Clayey Sand
- Silty Sand
- Well-graded Sand
- Poorly-graded Sand
- Poorly-graded Sand with Clay
- Poorly-graded Sand with Silt
- Well-graded Gravel
- Poorly-graded Gravel
- Chalk

Geologic Units

- Fill/CCR
- Unit 1: Lean Clay to Sandy Clay
- Unit 2: Poorly-Graded Sands with Gravel Lenses
- Unit 3: Chalk or Marl

SCALE	As Shown
DATE	9/15/2020
DRAWN BY	KWR
CHECKED BY	GFB

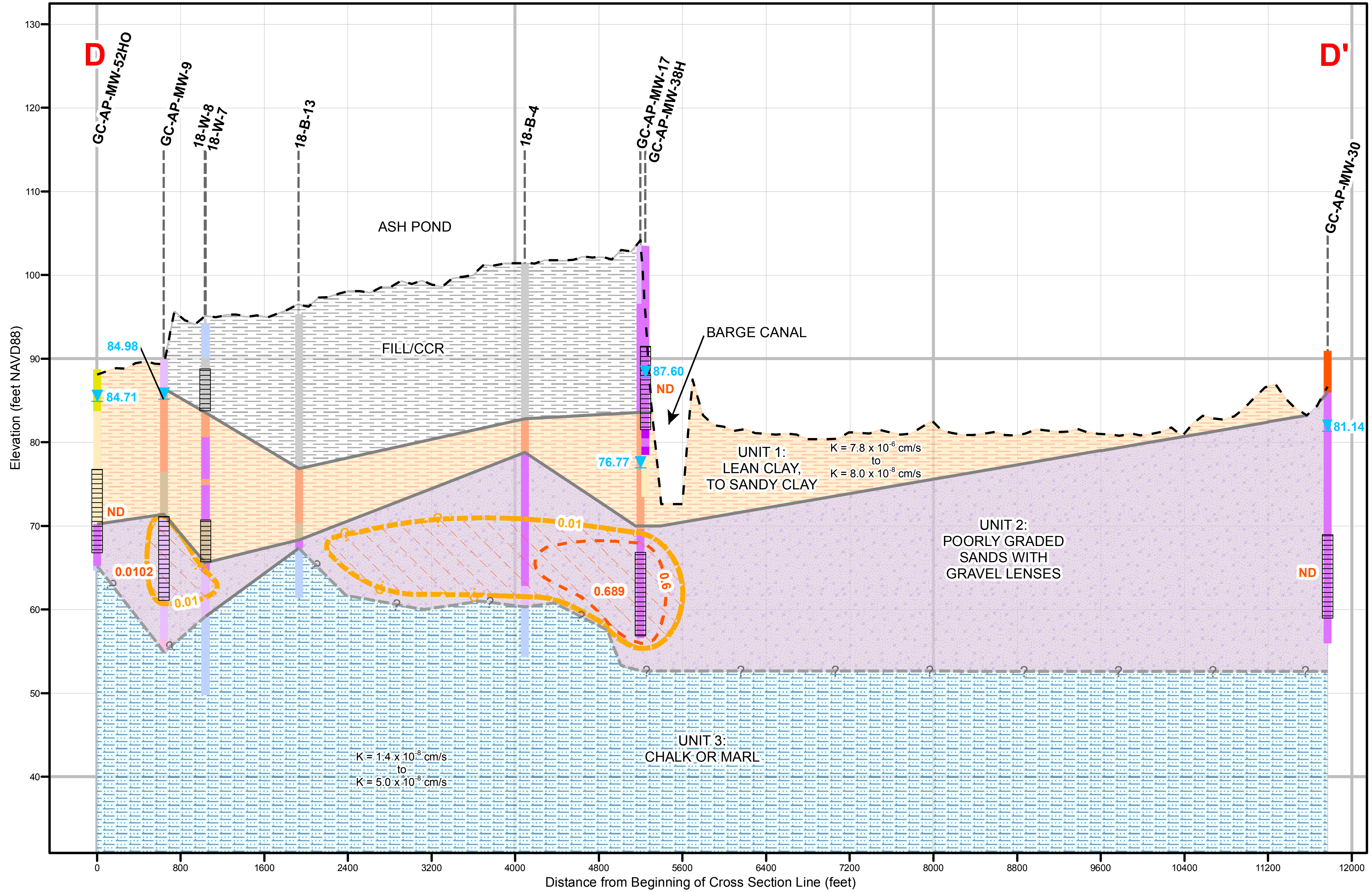
DRAWING TITLE

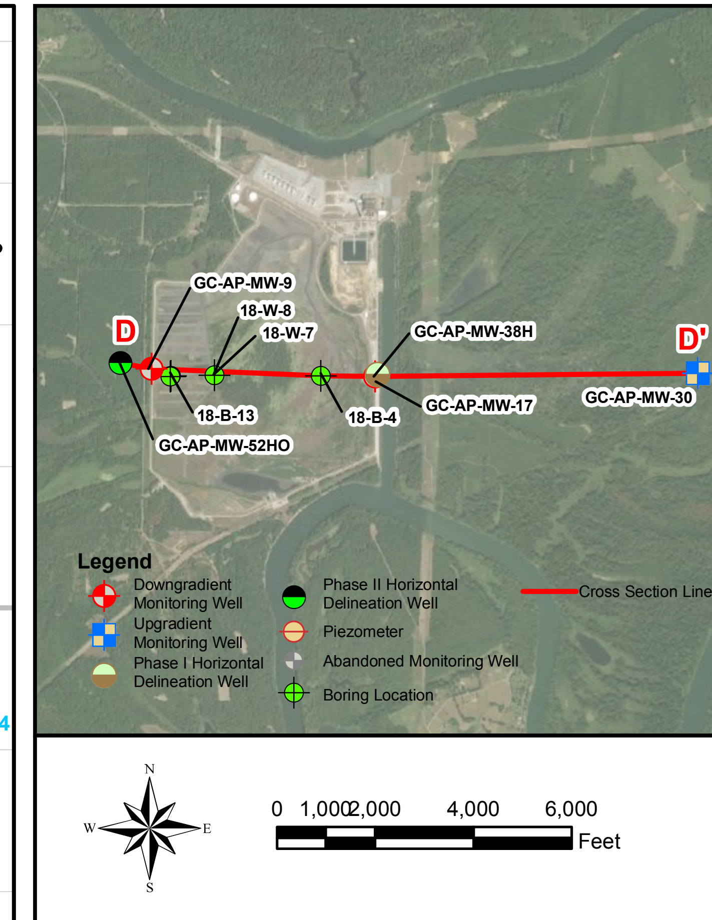
LITHIUM CONCENTRATIONS ALONG GEOLOGIC CROSS SECTION C - C' PLANT GREENE COUNTY ASH POND

FIGURE NO

FIGURE 11C

Southern Company





Notes:
1. Source of ground surface elevation data: June 2020 Lidar and 2019 USGS 3DEP.
2. NAVD88 indicates North American Vertical Datum of 1988.
3. Groundwater elevation data were measured on June 30, 2020.
4. K = Hydraulic Conductivity.
5. Water samples were collected on April 21, 2020 except MW-52HO that was collected on July 2, 2020.
6. mg/L indicates milligrams per liter.
7. J indicates a laboratory estimated concentration between the analytical method detection limit and the laboratory reporting limit.
8. ND indicates not detected above the laboratory method detection limit.
9. GWPS indicates Groundwater Protection Standard.
10. Vertical exaggeration = 80.

Legend

- Groundwater Elevation
- Ground Elevation
- Screen Interval
- Unit Boundary (Inferred)
- Unit Boundary
- Well Location
- Arsenic concentration (mg/L)
- Inferred Arsenic GWPS (mg/L)
- Arsenic GWPS (mg/L)
- Area Exceeding GWPS for Arsenic
- 0.0102 Arsenic concentration (mg/L)
- 0.01 Arsenic GWPS (mg/L)

Borehole Description

- Auger
- CCR Fill
- Topsoil
- Fat Clay
- Lean Clay
- Silty Clay
- Sandy Lean Clay
- Sandy Silt
- Clayey Silt
- Clayey Sand
- Silty Sand
- Well-graded Sand
- Poorly-graded Sand
- Poorly-graded Sand with Clay
- Poorly-graded Sand with Silt
- Well-graded Gravel
- Poorly-graded Gravel
- Chalk

Geologic Units

- Fill/CCR
- Unit 1: Lean Clay to Sandy Clay
- Unit 2: Poorly-Graded Sands with Gravel Lenses
- Unit 3: Chalk or Marl

SCALE	As Shown
DATE	9/17/2020
DRAWN BY	KWR
CHECKED BY	GFB

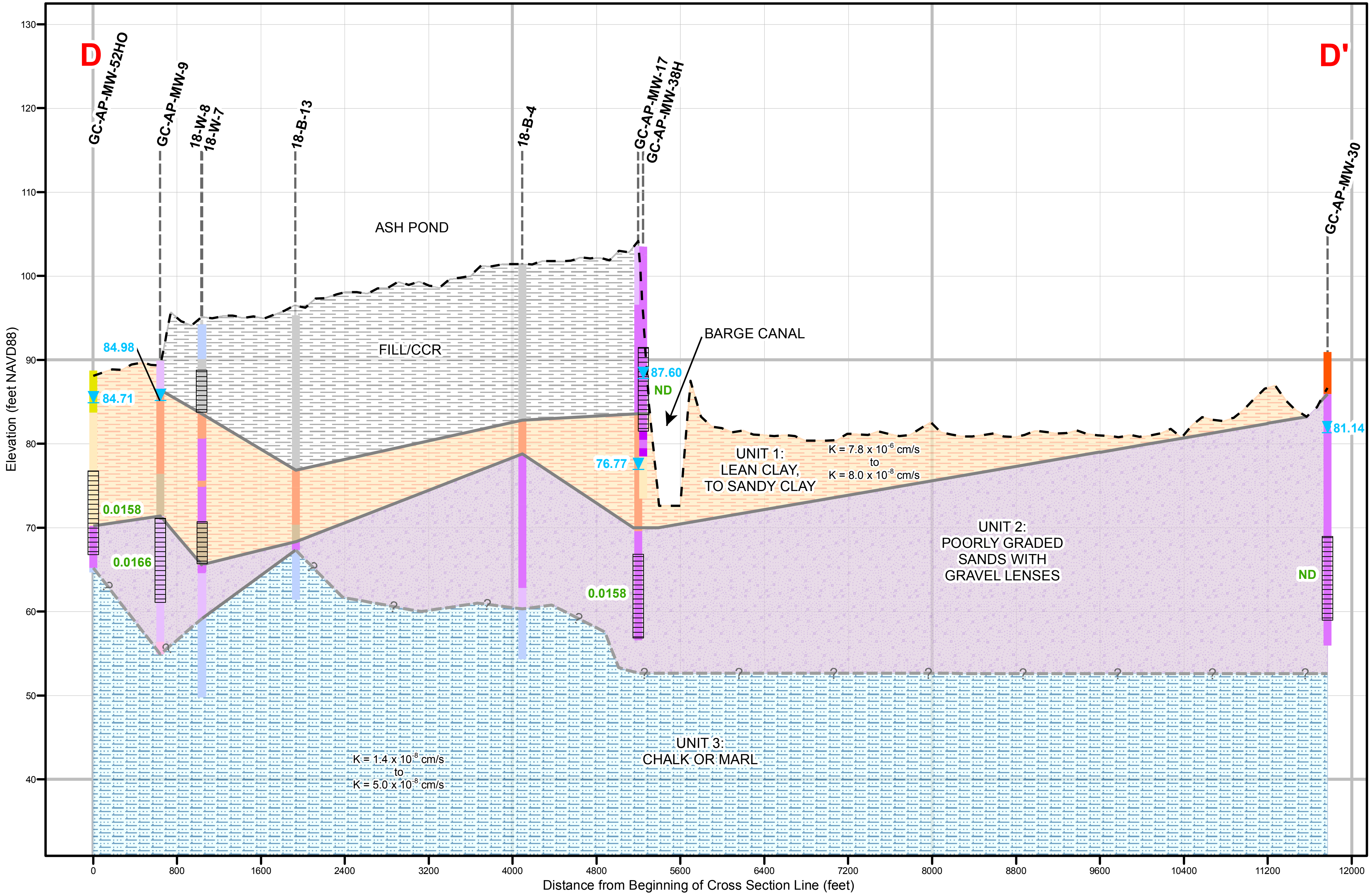
DRAWING TITLE

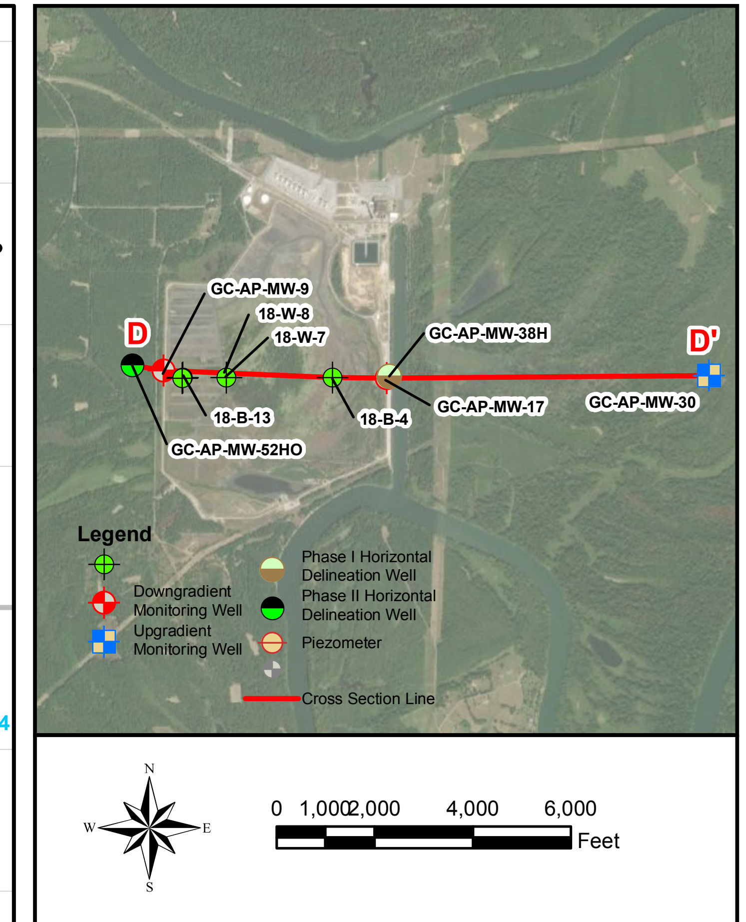
ARSENIC CONCENTRATIONS ALONG GEOLOGIC CROSS SECTION D - D' PLANT GREENE COUNTY ASH POND

FIGURE NO

FIGURE 12A

Southern Company





Notes:
1. Source of ground surface elevation data: June 2020 Lidar and 2019 USGS 3DEP.
2. NAVD88 indicates North American Vertical Datum of 1988.
3. Groundwater elevation data were measured on June 30, 2020.
4. K = Hydraulic Conductivity.
5. Water samples were collected on April 21, 2020 except MW-52HO that was collected on July 2, 2020.
6. mg/L indicates milligrams per liter.
7. J indicates a laboratory estimated concentration between the analytical method detection limit and the laboratory reporting limit.
8. ND indicates not detected above the laboratory method detection limit.
9. GWPS indicates Groundwater Protection Standard.
10. Vertical exaggeration = 80.

Legend

- Groundwater Elevation
- Ground Elevation
- Screen Interval
- Unit Boundary (Inferred)
- Unit Boundary
- Well Location
- 0.0166 Cobalt concentration (mg/L)

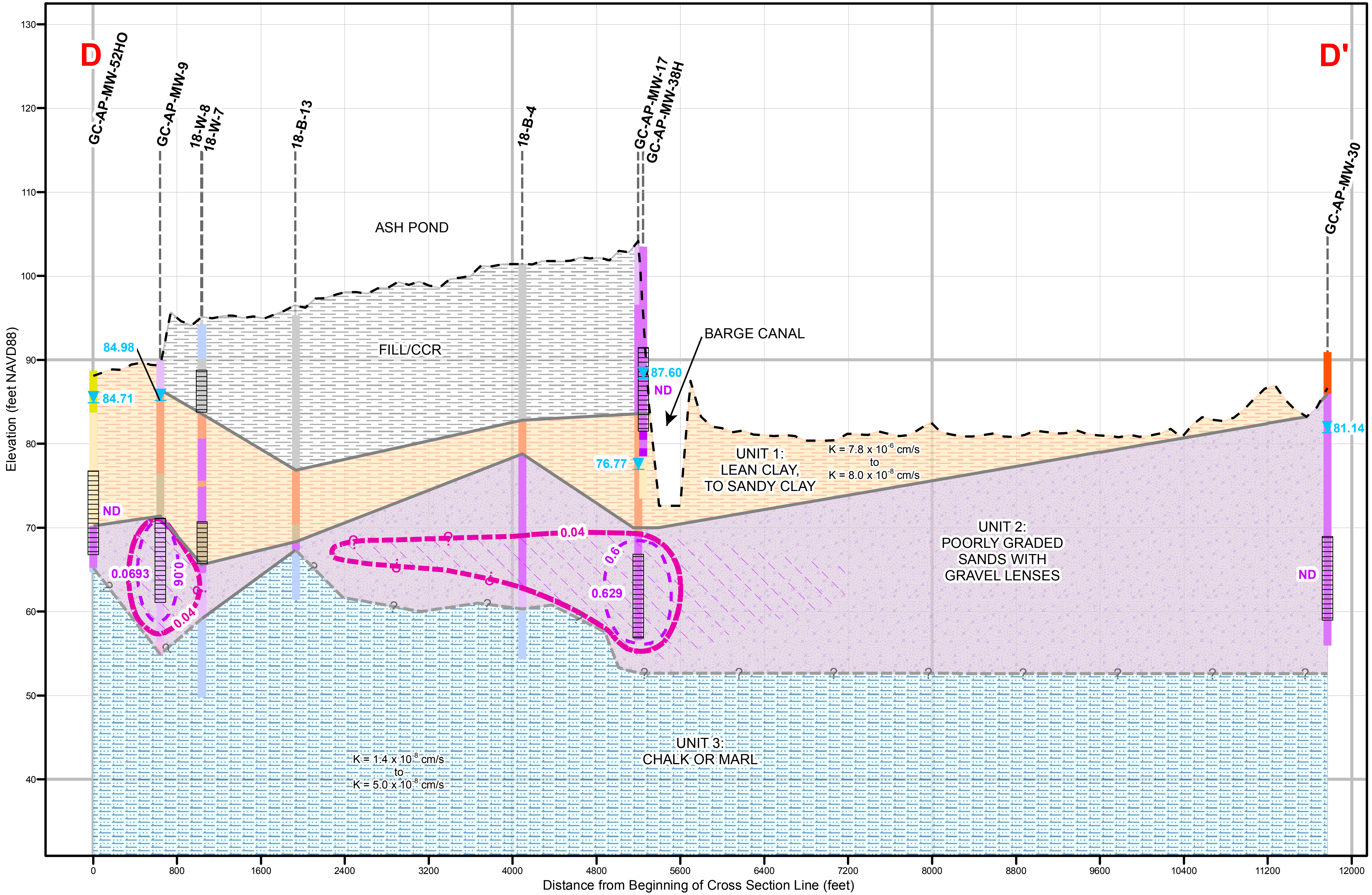
Borehole Description

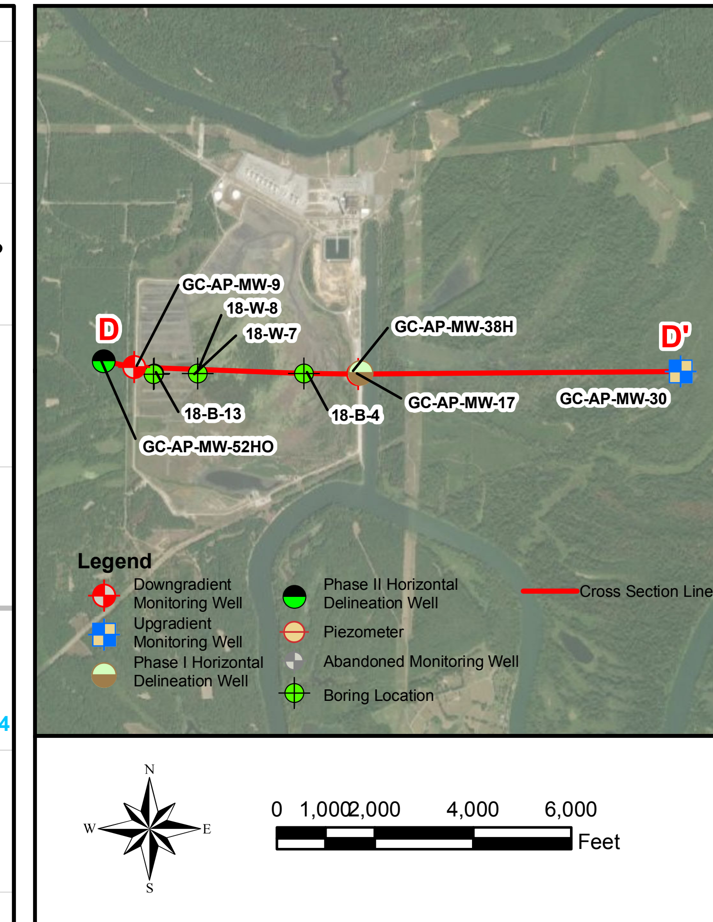
- Auger
- CCR Fill
- Topsoil
- Fat Clay
- Lean Clay
- Silty Clay
- Sandy Lean Clay
- Sandy Silt
- Clayey Silt
- Clayey Sand
- Silty Sand
- Well-graded Sand
- Poorly-graded Sand
- Poorly-graded Sand with Clay
- Poorly-graded Sand with Silt
- Well-graded Gravel
- Poorly-graded Gravel
- Chalk

Geologic Units

- Fill/CCR
- Unit 1: Lean Clay to Sandy Clay
- Unit 2: Poorly-Graded Sands with Gravel Lenses
- Unit 3: Chalk or Marl

SCALE	DRAWING TITLE
As Shown	COBALT CONCENTRATIONS ALONG GEOLOGIC CROSS SECTION D - D' PLANT GREENE COUNTY ASH POND
DATE 9/17/2020	
DRAWN BY KWR	FIGURE NO **FIGURE 12B**
CHECKED BY GFB	Southern Company





Notes:
1. Source of ground surface elevation data: June 2020 Lidar and 2019 USGS 3DEP.
2. NAVD88 indicates North American Vertical Datum of 1988.
3. Groundwater elevation data were measured on June 30, 2020.
4. K = Hydraulic Conductivity.
5. Water samples were collected on April 21, 2020 except MW-52HO that was collected on July 2, 2020.
6. mg/L indicates milligrams per liter.
7. J indicates a laboratory estimated concentration between the analytical method detection limit and the laboratory reporting limit.
8. ND indicates not detected above the laboratory method detection limit.
9. GWPS indicates Groundwater Protection Standard.
10. Vertical exaggeration = 80.

Legend

- Groundwater Elevation
- Ground Elevation
- Screen Interval
- Unit Boundary (Inferred)
- Unit Boundary
- Well Location
- Lithium concentration (mg/L)
- Inferred Lithium GWPS (mg/L)
- Lithium GWPS (mg/L)
- Area Exceeding GWPS for Lithium
- 0.629 Lithium concentration (mg/L)
- 0.04 Lithium GWPS (mg/L)

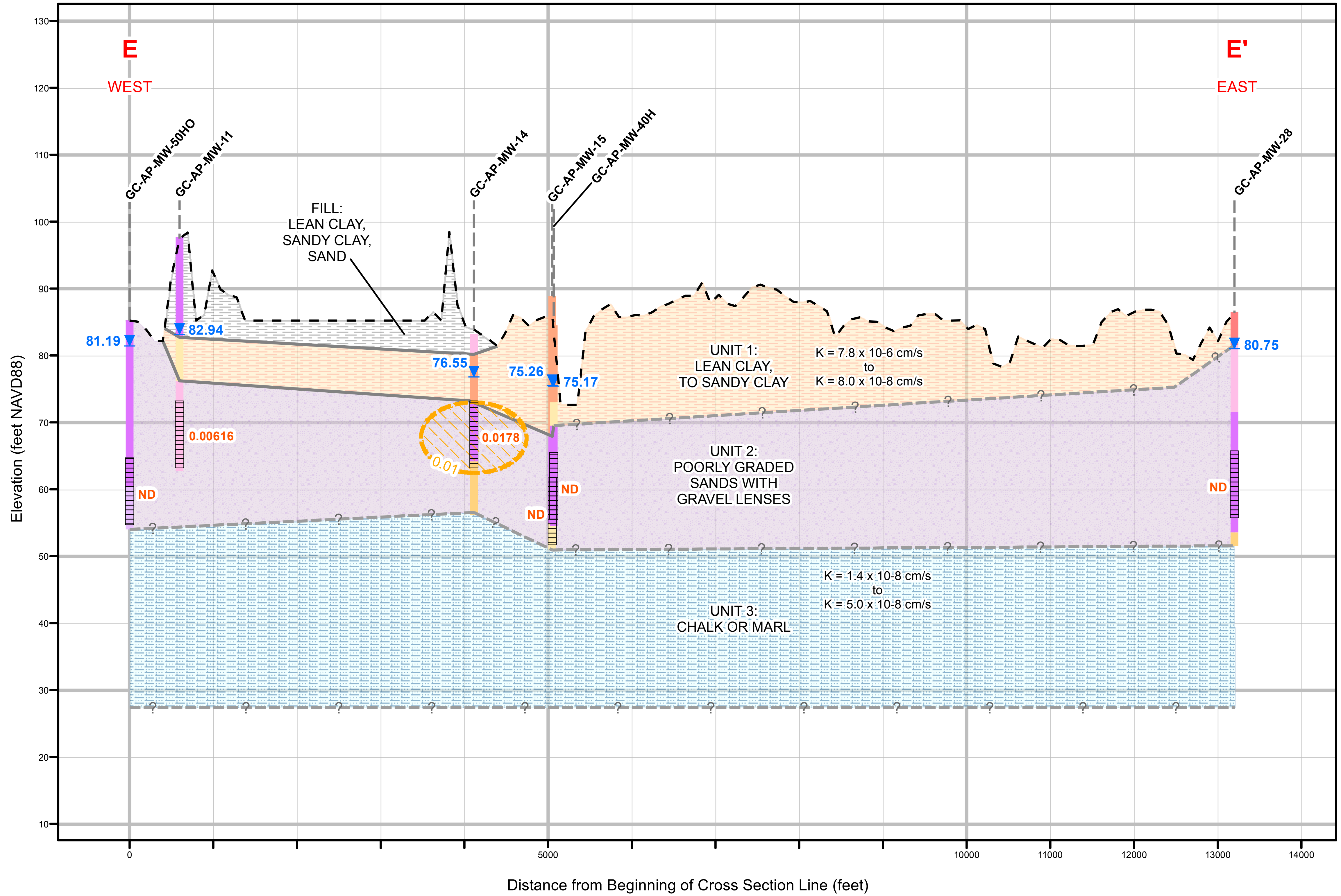
Borehole Description

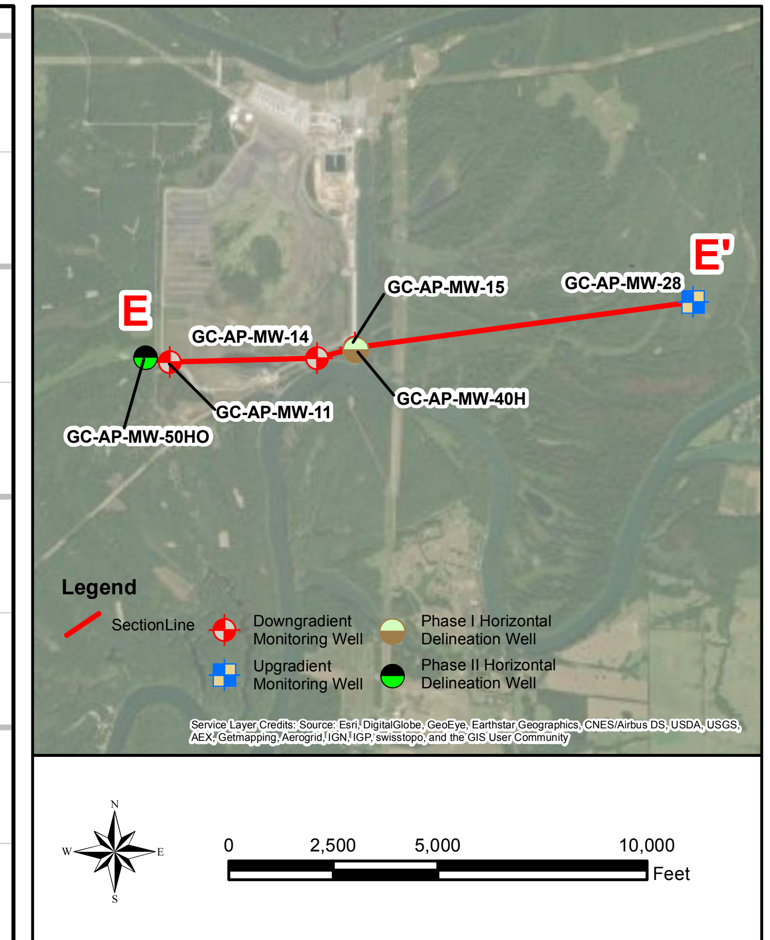
- Auger
- CCR Fill
- Topsoil
- Fat Clay
- Lean Clay
- Silty Clay
- Sandy Lean Clay
- Sandy Silt
- Clayey Silt
- Clayey Sand
- Silty Sand
- Well-graded Sand
- Poorly-graded Sand
- Poorly-graded Sand with Clay
- Poorly-graded Sand with Silt
- Well-graded Gravel
- Poorly-graded Gravel
- Chalk

Geologic Units

- Fill/CCR
- Unit 1: Lean Clay to Sandy Clay
- Unit 2: Poorly-Graded Sands with Gravel Lenses
- Unit 3: Chalk or Marl

SCALE: As Shown	DRAWING TITLE: LITHIUM CONCENTRATIONS ALONG GEOLOGIC CROSS SECTION D - D' PLANT GREENE COUNTY ASH POND
DATE: 9/17/2020	
DRAWN BY: KWR	FIGURE NO: FIGURE 12C
CHECKED BY: GFB	Southern Company





Notes:
1. Source of ground surface elevation data: 2020 Lidar and 2019 USGS 3DEP.
2. NAVD88 indicates North American Vertical Datum of 1988
3. Groundwater elevations measured on June 30, 2020.
4. Vertical exaggeration = 80.
5. Water samples were collected between April 20 and 22, 2020 except MW-50HO that was collected on May 28, 2020.
6. K = Hydraulic Conductivity.
7. mg/L indicates milligrams per liter.
8. ND indicates not detected above the laboratory method detection limit.
9. GWPS indicates Groundwater Protection Standard.

Legend

- Ground Surface Elevation
- Unit Boundary (Inferred)
- Unit Boundary
- Groundwater Elevation
- Screen Interval
- Arsenic GWPS Isoconcentration Contour (0.01 mg/L)
- Area Exceeding GWPS for Arsenic
- 0.0178 Arsenic Concentration (mg/L)

Borehole Description

- Top Soil
- Poorly Graded Sand
- Well Graded Sand
- Poorly Graded Sand with Clay
- Poorly Graded Sand with Silt
- Well graded sand
- Poorly-graded Gravel
- Fat Clay
- Lean Clay
- Clayey Sand
- Sandy Lean Clay
- Chalk with Traces of Fat Clay
- Chalk

Geologic Units

- Fill: Lean Clay, Sandy Clay, Sand
- Unit 1: Lean Clay to Sandy Clay
- Unit 2: Poorly Graded Sands with Gravel Lenses
- Unit 3: Chalk or Marl

SCALE	As Shown
DATE	8/19/2020
DRAWN BY	KAR
CHECKED BY	GBD

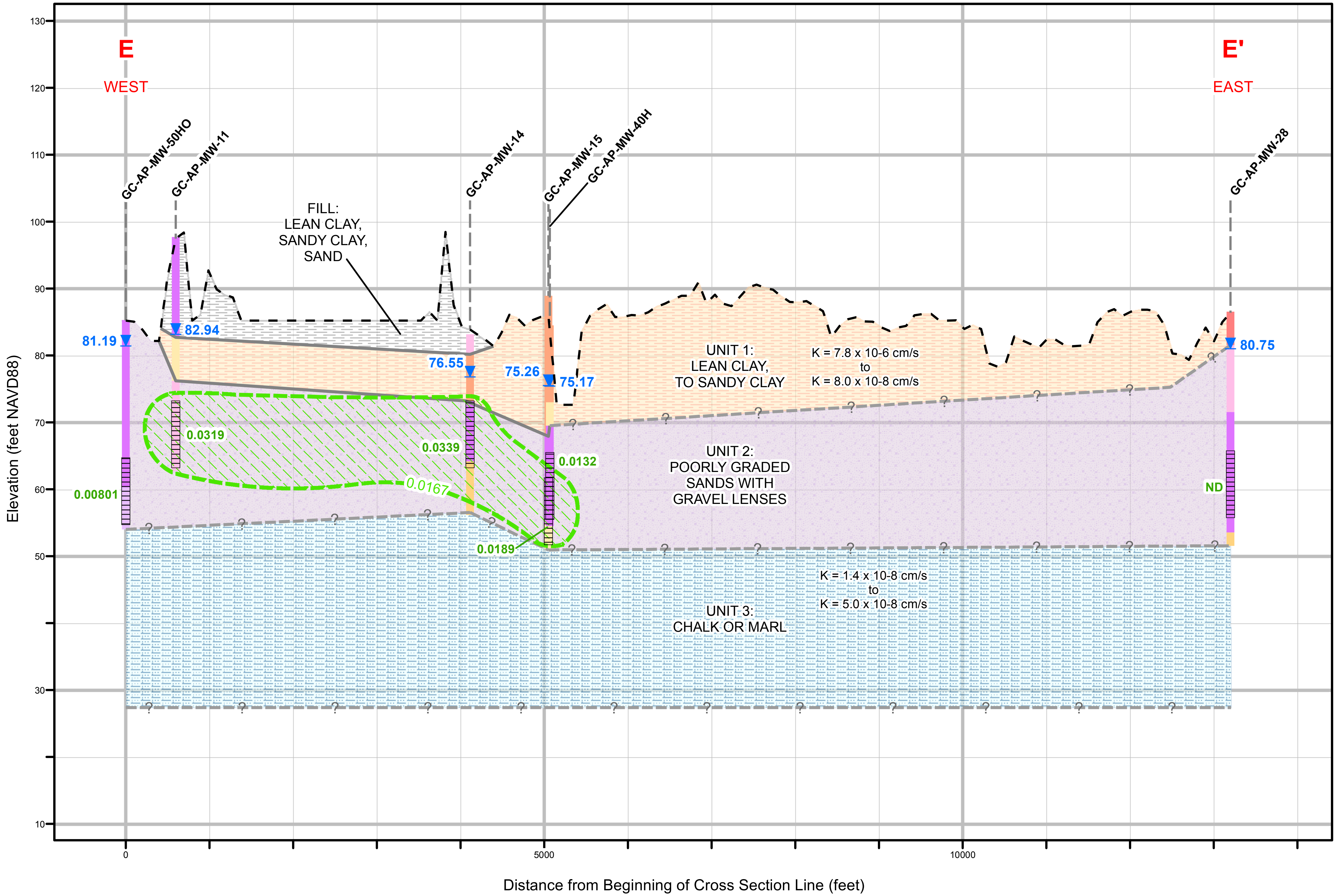
DRAWING TITLE

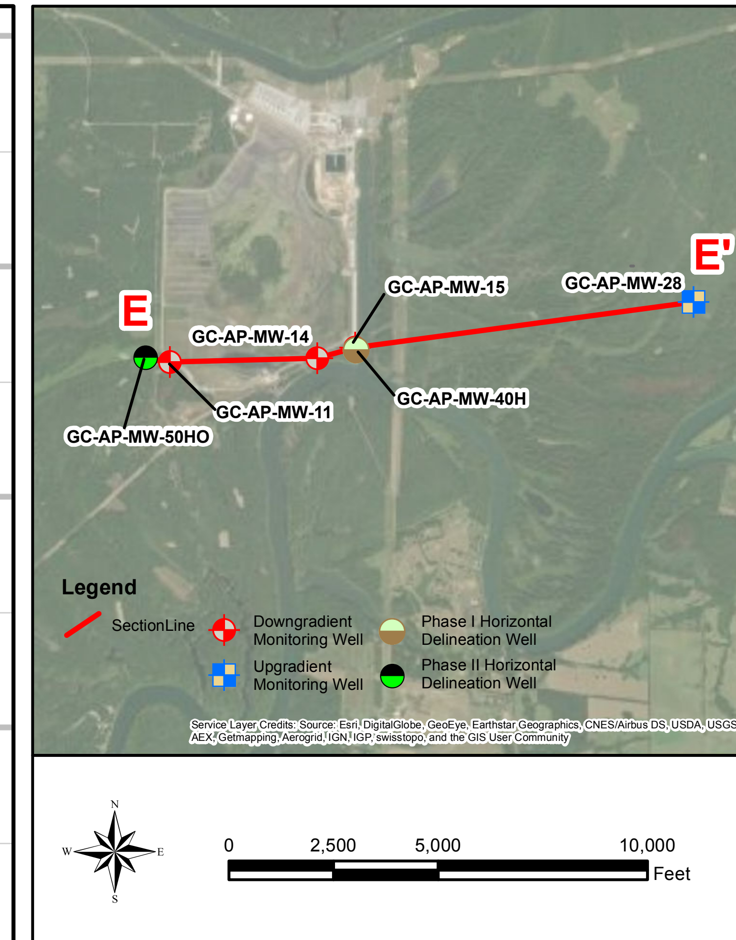
ARSENIC CONCENTRATIONS ON GEOLOGIC CROSS SECTION E - E' PLANT GREENE COUNTY ASH POND

FIGURE NO

FIGURE 13A

Southern Company





Notes:
1. Source of ground surface elevation data: 2020 Lidar and 2019 USGS 3DEP.
2. NAVD88 indicates North American Vertical Datum of 1988
3. Groundwater elevations measured on June 30, 2020.
4. Vertical exaggeration = 80.
5. Water samples were collected between April 20 and 22, 2020 except MW-50HO that was collected on May 28, 2020.
6. K = Hydraulic Conductivity.
7. mg/L indicates milligrams per liter.
8. ND indicates not detected above the laboratory method detection limit.
9. GWPS indicates Groundwater Protection Standard.

Legend

- Ground Surface Elevation
- Unit Boundary (Inferred)
- Unit Boundary
- Groundwater Elevation
- Screen Interval
- Cobalt GWPS Isoconcentration Contour (0.0167 mg/L)
- Area Exceeding GWPS for Cobalt
- 0.0132 Cobalt Concentration (mg/L)

Borehole Description

- Top Soil
- Poorly Graded Sand
- Well Graded Sand
- Poorly Graded Sand with Clay
- Poorly Graded Sand with Silt
- Well graded sand
- Poorly-graded Gravel
- Fat Clay
- Lean Clay
- Clayey Sand
- Sandy Lean Clay
- Chalk with Traces of Fat Clay
- Chalk

Geologic Units

- Fill: Lean Clay, Sandy Clay, Sand
- Unit 1: Lean Clay to Sandy Clay
- Unit 2: Poorly Graded Sands with Gravel Lenses
- Unit 3: Chalk or Marl

SCALE	As Shown
DATE	8/19/2020
DRAWN BY	KAR
CHECKED BY	GBD

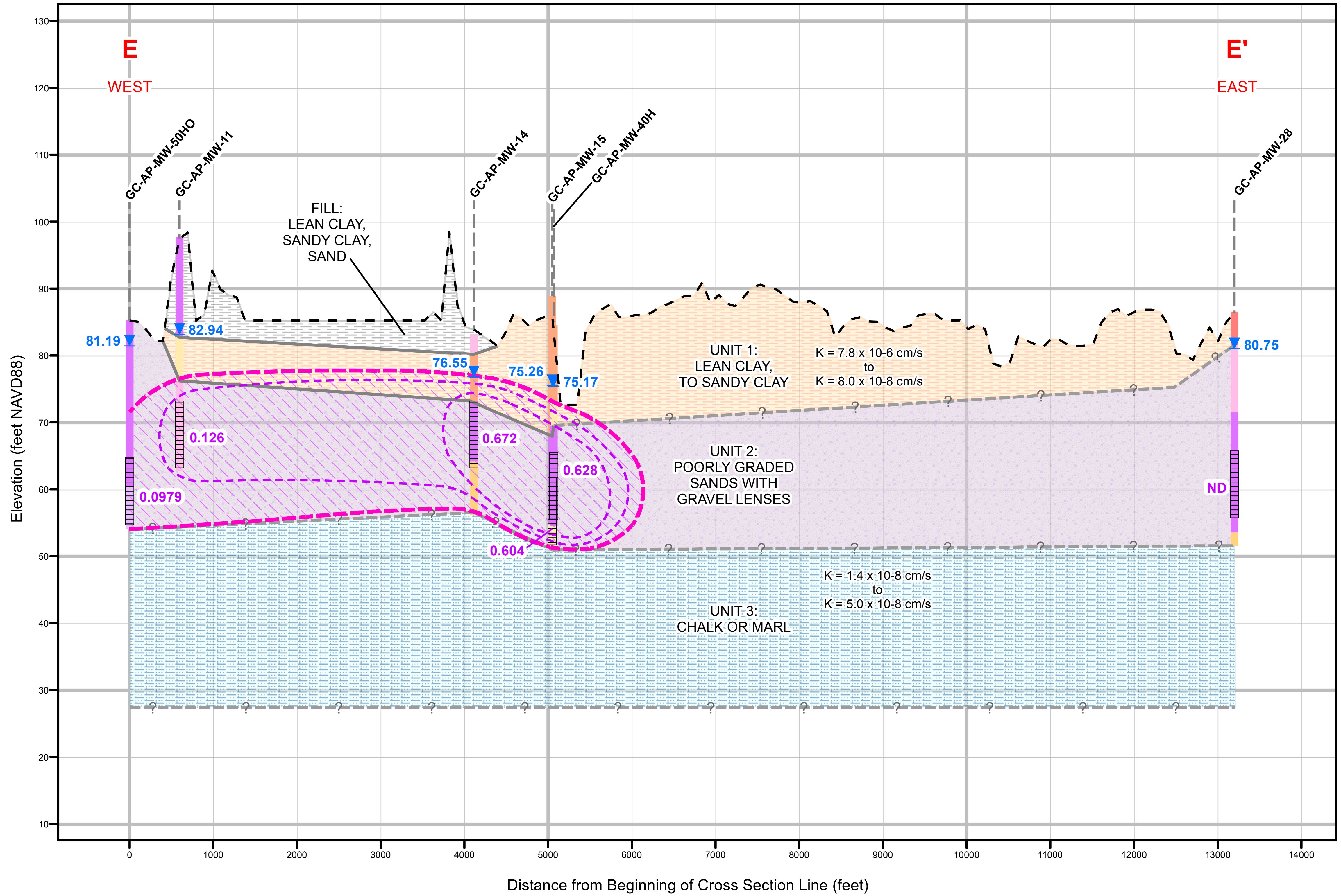
DRAWING TITLE

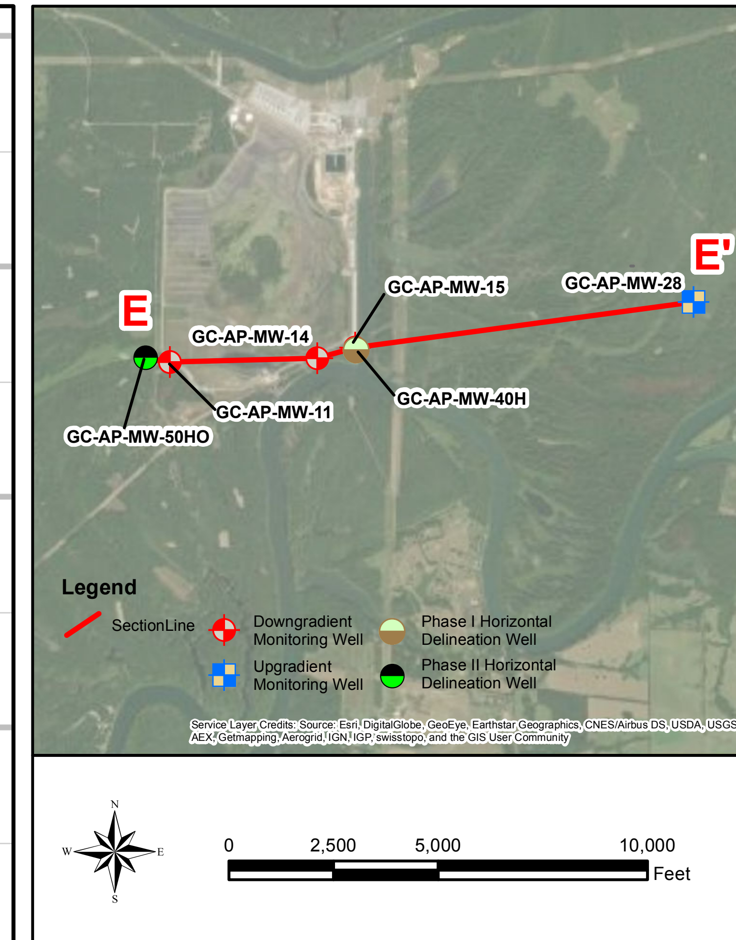
COBALT CONCENTRATIONS ON GEOLOGIC CROSS SECTION E - E' PLANT GREENE COUNTY ASH POND

FIGURE NO

FIGURE 13B

Southern Company





Notes:
1. Source of ground surface elevation data: 2020 Lidar and 2019 USGS 3DEP.
2. NAVD88 indicates North American Vertical Datum of 1988
3. Groundwater elevations measured on June 30, 2020.
4. Vertical exaggeration = 80.
5. Water samples were collected between April 20 and 22, 2020 except MW-50HO that was collected on May 28, 2020.
6. K = Hydraulic Conductivity.
7. mg/L indicates milligrams per liter.
8. ND indicates not detected above the laboratory method detection limit.
9. GWPS indicates Groundwater Protection Standard.

Legend

- Ground Surface Elevation
- Unit Boundary (Inferred)
- Unit Boundary
- Groundwater Elevation
- Screen Interval
- Lithium Isoconcentration Contour (mg/L)
- Lithium GWPS Isoconcentration Contour (0.04 mg/L)
- Area Exceeding GWPS for Lithium
- 0.126 Lithium concentration (mg/L)

Borehole Description

- Top Soil
- Poorly Graded Sand
- Well Graded Sand
- Poorly Graded Sand with Clay
- Poorly Graded Sand with Silt
- Well graded sand
- Poorly-graded Gravel
- Fat Clay
- Lean Clay
- Clayey Sand
- Sandy Lean Clay
- Chalk with Traces of Fat Clay
- Chalk

Geologic Units

- Fill: Lean Clay, Sandy Clay, Sand
- Unit 1: Lean Clay to Sandy Clay
- Unit 2: Poorly Graded Sands with Gravel Lenses
- Unit 3: Chalk or Marl

SCALE	As Shown
DATE	8/19/2020
DRAWN BY	KAR
CHECKED BY	GBD

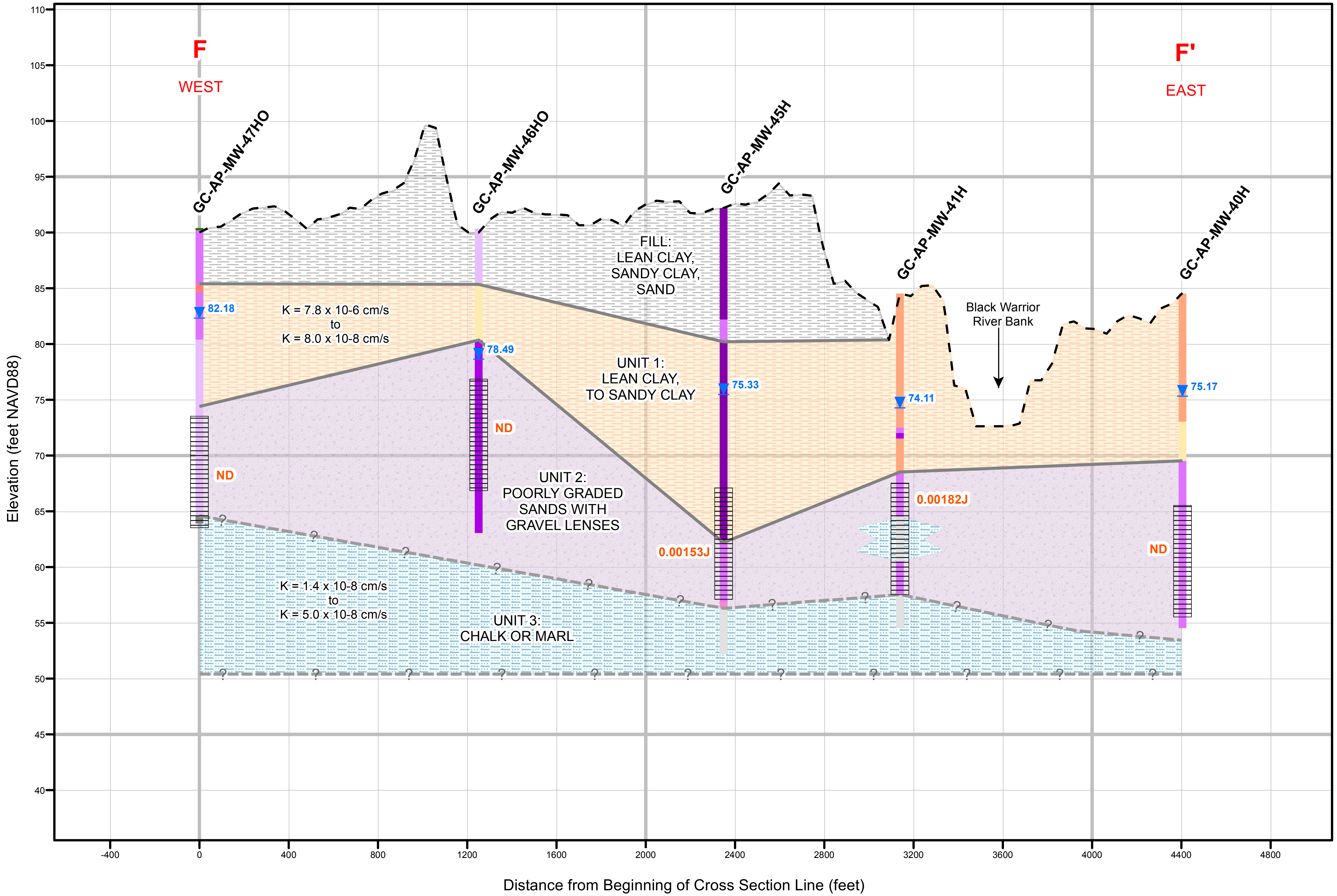
DRAWING TITLE

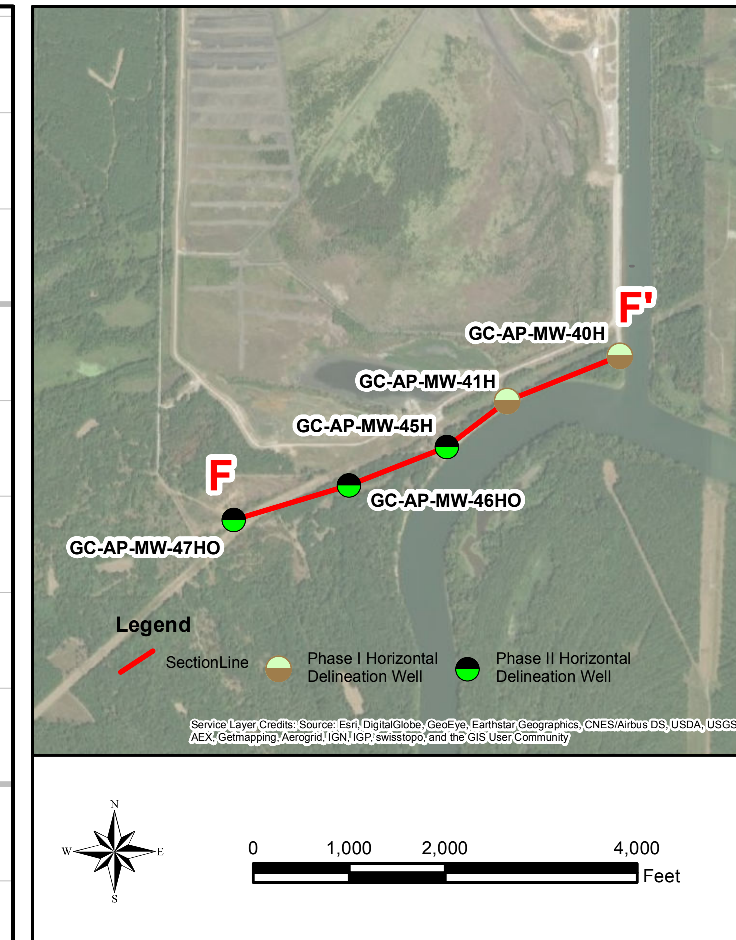
LITHIUM CONCENTRATIONS ON GEOLOGIC CROSS SECTION E - E' PLANT GREENE COUNTY ASH POND

FIGURE NO

FIGURE 13C

Southern Company





Notes:
1. Source of ground surface elevation data: 2020 Lidar and 2019 USGS 3DEP.
2. NAVD88 indicates North American Vertical Datum of 1988
3. Groundwater elevations measured on June 30, 2020.
4. Vertical exaggeration = 80.
5. Water samples were collected between April 20 and April 29 except MW-47HO (collected on May 28, 2020) and MW-46HO (collected on July 6, 2020).
6. K = Hydraulic Conductivity.
7. mg/L indicates milligrams per liter.
8. ND indicates not detected above the laboratory method detection limit.
9. J indicates a laboratory estimated concentration between the analytical method detection limit and the laboratory reporting limit.
10. GWPS indicates Groundwater Protection Standard.
11. The GWPS for Arsenic (0.01 mg/L) was not exceeded in any wells on this cross section.

Legend

Ground Surface Elevation
Groundwater Elevation
Screen Interval
Unit Boundary (Inferred)
Unit Boundary
0.00153J Arsenic Concentration (mg/L)

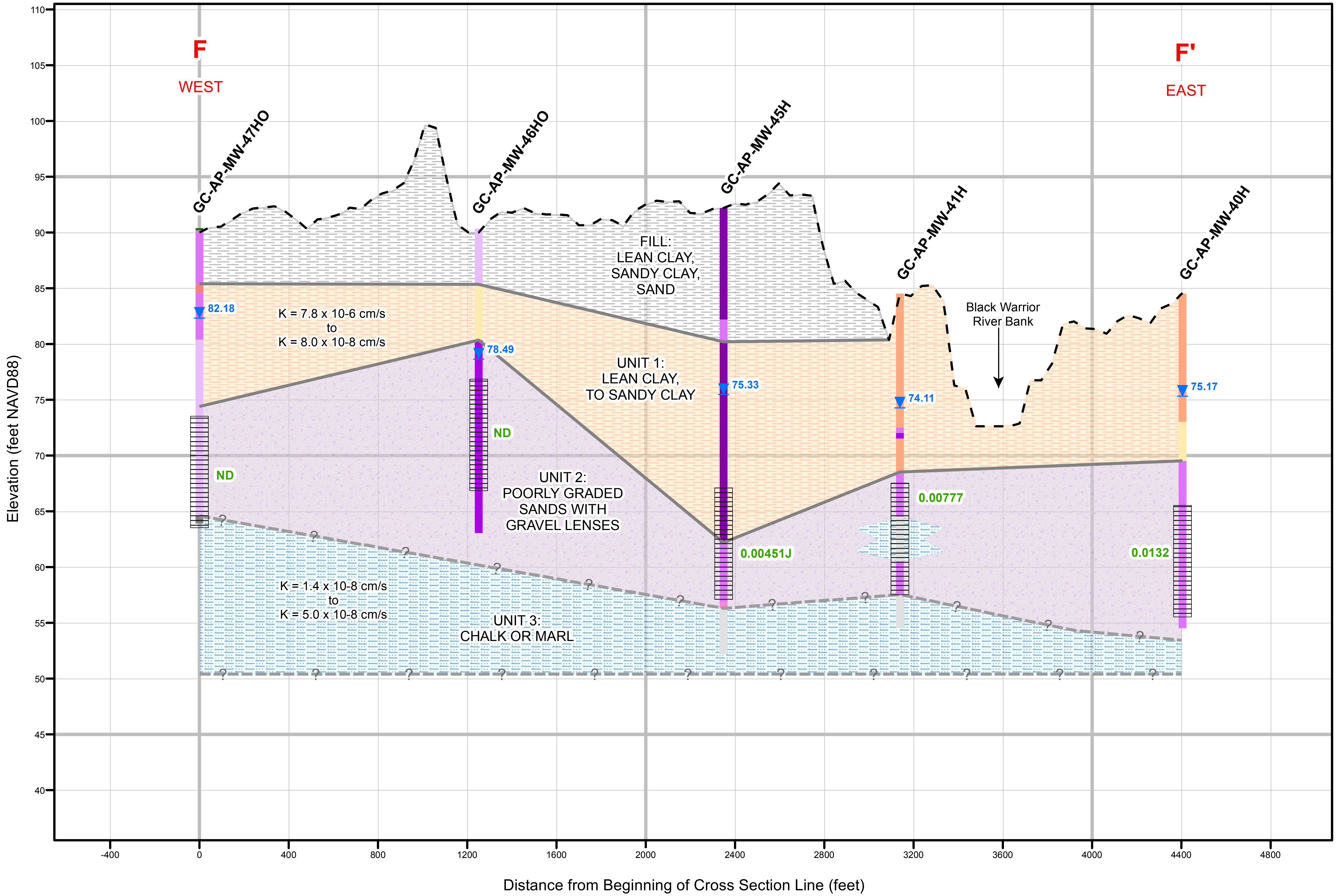
Borehole Description

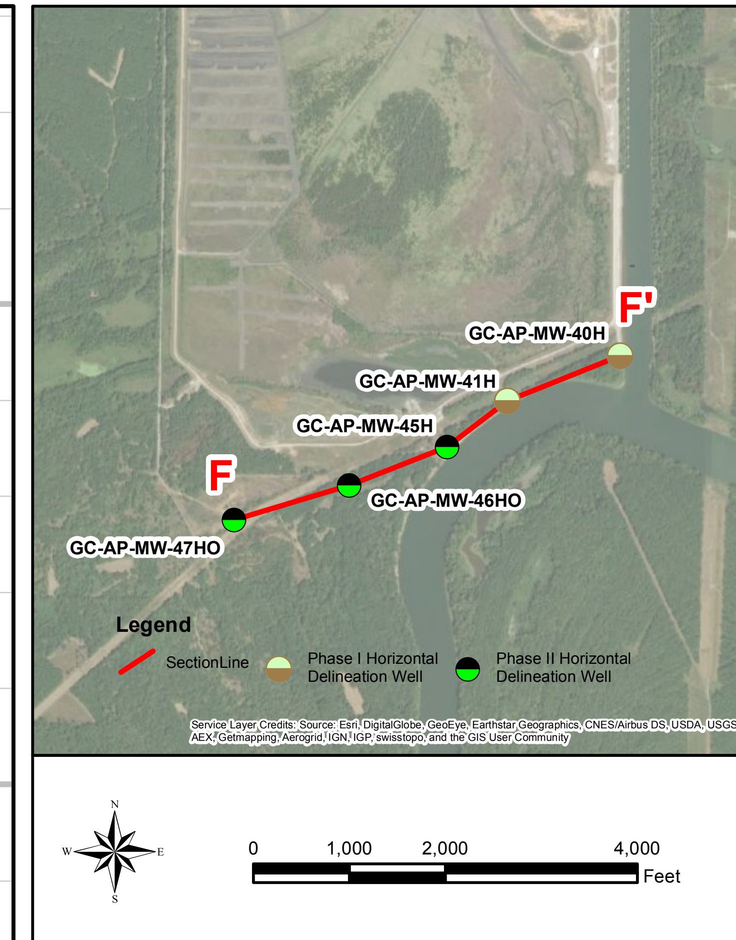
Top Soil
Poorly Graded Sand
Well Graded Sand
Poorly Graded Sand with Clay
Poorly Graded Sand with Silt
Well graded sand
Poorly-graded Gravel
Fat Clay
Lean Clay
Clayey Sand
Sandy Lean Clay
Chalk with Traces of Fat CClay
Chalk

Geologic Units

Fill: Lean Clay, Sandy Clay, Sand
Unit 1: Lean Clay to Sandy Clay
Unit 2: Poorly Graded Sands with Gravel Lenses
Unit 3: Chalk or Marl

SCALE: As Shown	DRAWING TITLE: ARSENIC CONCENTRATIONS ON GEOLOGIC CROSS SECTION F - F' PLANT GREENE COUNTY ASH POND
DATE: 8/20/2020	
DRAWN BY: KAR	FIGURE NO: FIGURE 14A
CHECKED BY: GBD	Southern Company





Notes:

1. Source of ground surface elevation data: 2020 Lidar and 2019 USGS 3DEP.
2. NAVD88 indicates North American Vertical Datum of 1988
3. Groundwater elevations measured on June 30, 2020.
4. Vertical exaggeration = 80.
5. Water samples were collected between April 20 and April 29 except MW-47HO (collected on May 28, 2020) and MW-46HO (collected on July 6, 2020).
6. K = Hydraulic Conductivity.
7. mg/L indicates milligrams per liter.
8. ND indicates not detected above the laboratory method detection limit.
9. J indicates a laboratory estimated concentration between the analytical method detection limit and the laboratory reporting limit.
10. GWPS indicates Groundwater Protection Standard.
11. The GWPS for Cobalt (0.0167 mg/L) was not exceeded in any wells on this cross section.

Legend

- Ground Surface Elevation
- Groundwater Elevation
- Screen Interval
- Unit Boundary (Inferred)
- Unit Boundary
- 0.0132 Cobalt Concentration (mg/L)

Borehole Description

- Top Soil
- Poorly Graded Sand
- Well Graded Sand
- Poorly Graded Sand with Clay
- Poorly Graded Sand with Silt
- Well graded sand
- Poorly-graded Gravel
- Fat Clay
- Lean Clay
- Clayey Sand
- Sandy Lean Clay
- Chalk with Traces of Fat CClay
- Chalk

Geologic Units

- Fill: Lean Clay, Sandy Clay, Sand
- Unit 1: Lean Clay to Sandy Clay
- Unit 2: Poorly Graded Sands with Gravel Lenses
- Unit 3: Chalk or Marl

SCALE: As Shown

DATE: 8/20/2020

DRAWN BY: KAR

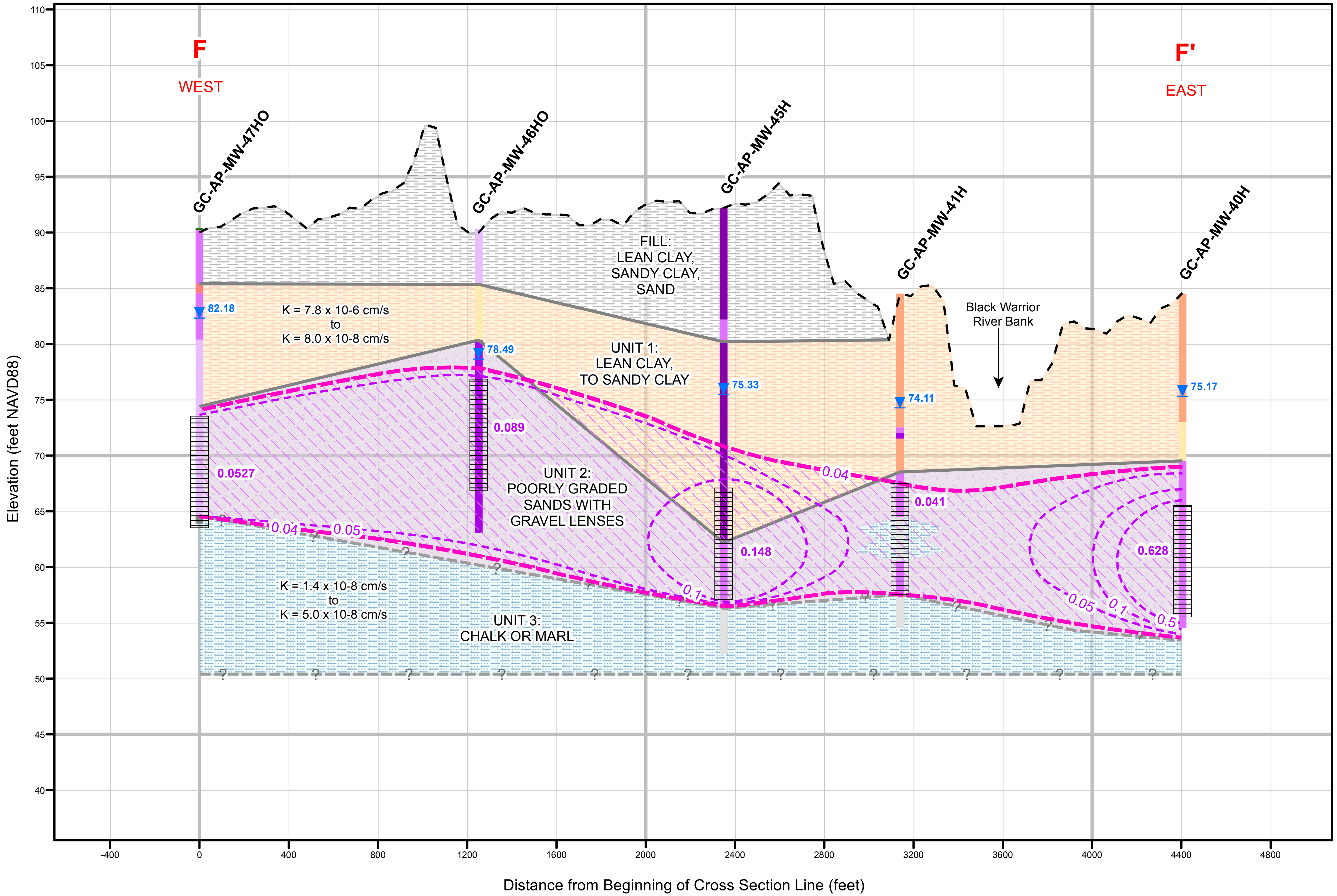
CHECKED BY: GBD

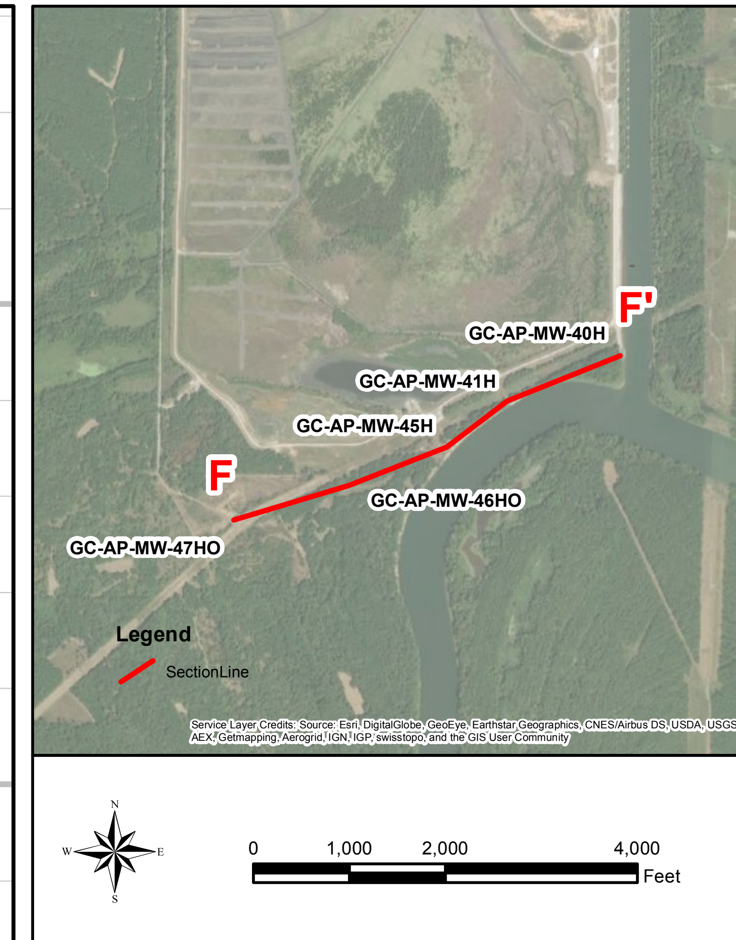
DRAWING TITLE:

COBALT CONCENTRATIONS ON GEOLOGIC CROSS SECTION F - F' PLANT GREENE COUNTY ASH POND

FIGURE NO: **FIGURE 14B**

Southern Company





Notes:
1. Source of ground surface elevation data: 2020 Lidar and 2019 USGS 3DEP.
2. NAVD88 indicates North American Vertical Datum of 1988
3. Groundwater elevations measured on June 30, 2020.
4. Vertical exaggeration = 80.
5. Water samples were collected between April 20 and April 29 except MW-47HO (collected on May 28, 2020) and MW-46HO (collected on July 6, 2020).
6. K = Hydraulic Conductivity.
7. mg/L indicates milligrams per liter.
8. ND indicates not detected above the laboratory method detection limit.
9. J indicates a laboratory estimated concentration between the analytical method detection limit and the laboratory reporting limit.
10. GWPS indicates Groundwater Protection Standard.

Legend

- Ground Surface Elevation
- Groundwater Elevation
- Screen Interval
- Unit Boundary (Inferred)
- Unit Boundary
- Lithium Isoconcentration Contour (mg/L)
- Lithium GWPS Isoconcentration Contour (0.04 mg/L)
- Area Exceeding GWPS for Lithium
- 0.089 Lithium Concentration (mg/L)

Borehole Description

- Top Soil
- Poorly Graded Sand
- Well Graded Sand
- Poorly Graded Sand with Clay
- Poorly Graded Sand with Silt
- Well graded sand
- Poorly-graded Gravel
- Fat Clay
- Lean Clay
- Clayey Sand
- Sandy Lean Clay
- Chalk with Traces of Fat CClay
- Chalk

Geologic Units

- Fill: Lean Clay, Sandy Clay, Sand
- Unit 1: Lean Clay to Sandy Clay
- Unit 2: Poorly Graded Sands with Gravel Lenses
- Unit 3: Chalk or Marl

SCALE	As Shown
DATE	8/20/2020
DRAWN BY	KAR
CHECKED BY	GBD

DRAWING TITLE

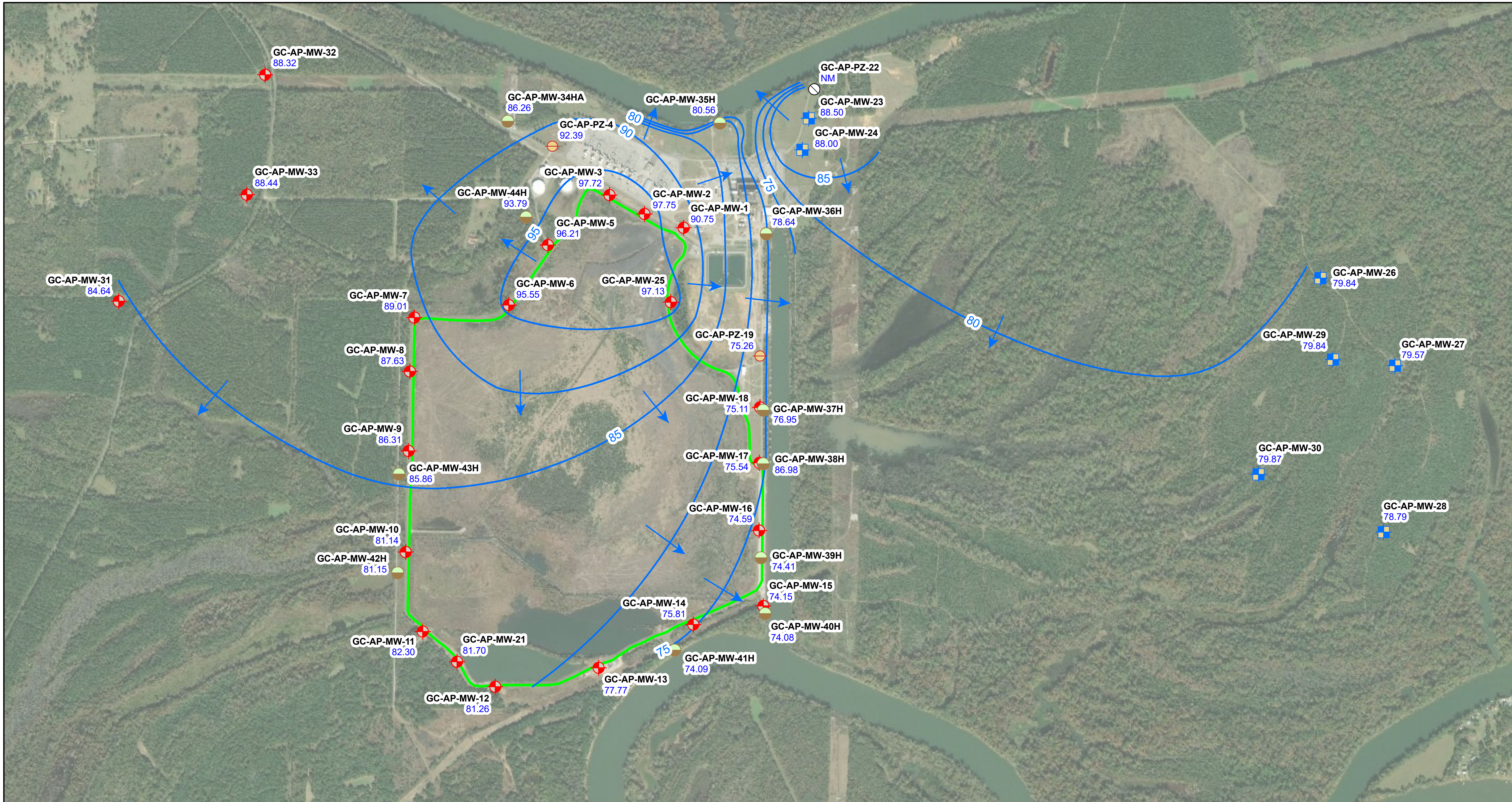
LITHIUM CONCENTRATIONS ON GEOLOGIC CROSS SECTION F - F' PLANT GREENE COUNTY ASH POND

FIGURE NO

FIGURE 14C

Southern Company

Appendix C
Potentiometric Maps



Legend

- Downgradient Monitoring Well
- Upgradient Monitoring Well
- Horizontal Delineation Well
- Piezometer
- Piezometer to be Abandoned
- Potentiometric Surface Contour (ft NAVD88)
- Approximate Groundwater Flow Direction
- Ash Pond Boundary

GN-AP-MW-1 Well ID
90.75 Groundwater Elevation

N

0 1,000 2,000 4,000 Feet

NOTES:
1. NAVD88 indicates North American Vertical Datum of 1988.
2. NM indicates not measured.
2. GC-AP-MW-38H* was excluded from potentiometric surface calculation due to possible perched-water-table condition.

SCALE	1:15000
DATE	1/13/2020
DRAWN BY	KWR/KAR
CHECKED BY	GBD

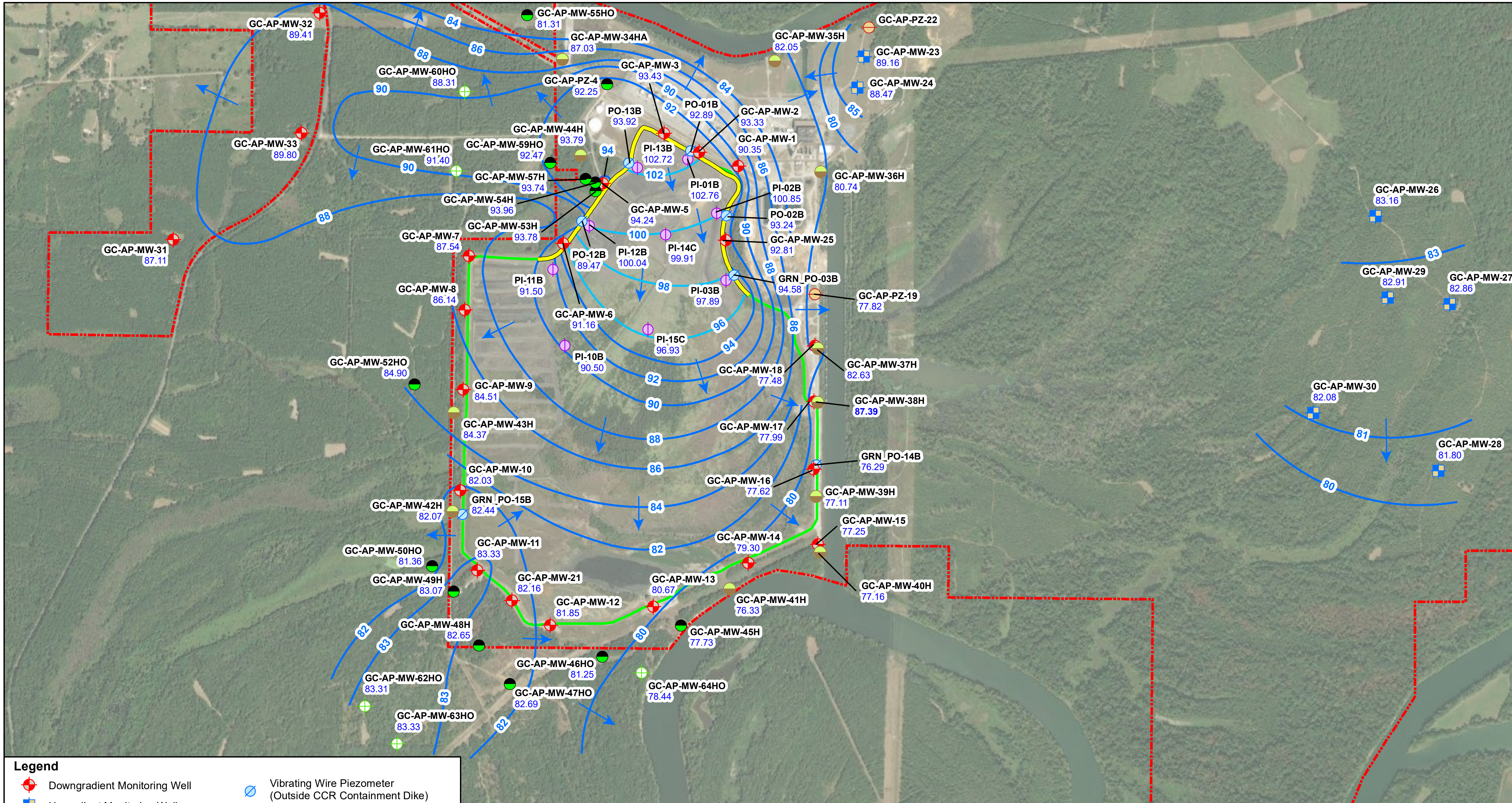
DRAWING TITLE

POTENTIOMETRIC SURFACE CONTOUR MAP
SEPTEMBER 9, 2019
PLANT GREENE COUNTY ASH POND

FIGURE NO

FIGURE 7A

Southern Company



Legend

- Downgradient Monitoring Well
- Upgradient Monitoring Well
- Piezometer
- Phase I Horizontal Delineation Well
- Phase II Horizontal Delineation Well
- Phase III Horizontal Delineation Well
- Abandoned Monitoring Well
- Vibrating Wire Piezometer (Inside CCR Containment Dike)
- Vibrating Wire Piezometer (Outside CCR Containment Dike)
- Slurry Wall Alignment
- Approximate Potentiometric Surface Contour (ft NAVD88) (Outside Barrier Wall)
- Approximate Potentiometric Surface Contour (ft NAVD88) (Inside Barrier Wall)
- Approximate Groundwater Flow Direction
- Ash Pond Boundary
- Property Boundary

0 1,000 2,000 4,000 Feet

N

NOTES:
1. ft NAVD88 indicates feet above North American Vertical Datum of 1988.
2. *GC-AP-MW-38H was excluded from potentiometric surface calculation due to possible perched-water-table condition.
3. Construction on the barrier wall shown on map was completed in September 2020, resulting in south/southeastward flow of groundwater within the confines of the barrier wall.

SCALE	1:15000
DATE	8/1/2021
DRAWN BY	KWR
CHECKED BY	GFB

DRAWING TITLE
POTENTIOMETRIC SURFACE CONTOUR MAP
JUNE 28, 2021
PLANT GREENE COUNTY ASH POND

FIGURE NO
FIGURE 7B

Southern Company

Appendix D
Monitored Natural Attenuation Demonstration

September 2021
Plant Greene County

Monitored Natural Attenuation Demonstration

Prepared for Alabama Power Company

September 2021
Plant Greene County

Monitored Natural Attenuation Demonstration

Prepared for
Alabama Power Company
600 18th Street North
Birmingham, Alabama 35203

Prepared by
Anchor QEA, LLC
9797 Timber Circle, Suite B
Daphne, Alabama 36527

Project Number: 201114-01.05
\\Athena\Mobile\Projects\Southern Company\Alabama Power ACMs - PRIVILEGED & CONFIDENTIAL\MNA Demonstration Reports\Greene County\Text\Greene County MNA Demonstration Report.docx

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ABBREVIATIONS

µg	microgram
ADEM	Alabama Department of Environmental Management
APC	Alabama Power Company
CCR	coal combustion residuals
CEC	cation exchange capacity
cm	centimeter
COI	constituent of interest
EGL	Anchor QEA Environmental Geochemistry Laboratory
GWPS	groundwater protection standard
kg	kilogram
meq	milliequivalents
mg	milligram
MNA	monitored natural attenuation
Plant Greene County	Greene County Electric Generating Plant
PV	pore volume
SEM	scanning electron microscopy
Site	Greene County Electric Generating Plant ash pond
SSE	selective sequential extraction
SSL	statistically significant level
USEPA	U.S. Environmental Protection Agency
wt%	weight percent
XRD	X-ray diffraction
XRF	X-ray fluorescence

Executive Summary

Extensive geochemical and related studies demonstrate that monitored natural attenuation (MNA) is a viable corrective action for groundwater impacts associated with the Greene County Electric Generating Plant (Plant Greene County) ash pond (Site). The preponderance of evidence indicates that conditions at the Site meet U.S. Environmental Protection Agency's evaluation criteria for the use of MNA, specifically: area of impacts stable or shrinking, identified mechanisms for attenuation, stability of the attenuating mechanisms, sufficient aquifer capacity for attenuation, and time to achieve groundwater protection standards (GWPSs) are reasonable compared to other corrective-action alternatives. However, MNA is one component of the Site's corrective action remedy. As noted in the *Groundwater Remedy Selection Report*, the following corrective measures were selected for the Site: source control to include dewatering, consolidation, capping of the Site, and the installation of a barrier (slurry) wall completely around the consolidated perimeter keyed into the relatively impermeable chalk aquitard; geochemical manipulation via injections in areas of relatively high concentrations of constituents of interest (COIs) to remove them from groundwater and immobilize them in situ; and MNA over the entire Site.

Investigations performed to support the use of MNA at the Site included preparation of concentration versus time and concentration versus distance graphs for COIs in groundwater; groundwater, well solids (precipitates), and soil sampling; laboratory analyses of well solids samples for bulk chemistry (X-ray fluorescence), mineralogy (X-ray diffraction and scanning electron microscopy), and cation exchange capacity; geochemical modeling; selective sequential extraction (SSE) to determine associations of COIs with attenuating solids; and column studies to assess the aquifer (soil) capacity for attenuation.

The trends observed in concentration versus time and concentration versus distance graphs provide evidence that natural attenuation is occurring at the Site, even without source control. Several concentration versus time graphs indicate that arsenic, lithium, and/or cobalt concentrations are stable or are decreasing with time in some areas. Decreasing trends were extrapolated to estimate time to achieve the GWPS. Also, concentration versus distance graphs along downgradient transects indicate that arsenic, cobalt, and lithium are decreasing with distance from the Site. Isoconcentration maps for COIs from 2020 and 2021 were compared and show plume stability.

Based on the geochemical investigations, multiple lines of evidence support multiple attenuating mechanisms, depending upon the COIs. The major attenuating mechanisms include sorption on (or coprecipitation with) iron oxides and possibly precipitation of barium arsenate for arsenic, cobalt attenuation by incorporation into a cobalt-iron oxide, and lithium attenuation by ion exchange on oxides and clay minerals. All COIs are subject to physical attenuation mechanisms such as dispersion and flushing, which will contribute to decreased concentrations with time and distance from the Site.

Column studies were performed to assess the ability for the aquifer media (soil) to take up COIs. Cobalt and lithium showed limited ability to sorb to the aquifer media based on column studies. However, these constituents are still subject to other attenuating mechanisms, such as physical attenuation (dispersion and flushing) and coprecipitation, as indicated by the concentration versus time and distance graphs, and geochemical studies.

Column studies indicate that arsenic is significantly attenuated by aquifer media, as arsenic in column effluent remained below 13% of the influent concentrations. This attenuation capacity was extrapolated to the entire mass of the aquifer downgradient of the consolidated Site (outside the barrier wall), but within the property boundary. The extrapolation showed that the aquifer has an attenuating capacity of many more times the mass of arsenic requiring attenuation.

SSE studies indicate that most of the mass of all three COIs occurs in the oxidizable and residual fractions, which are very stable attenuation phases.

The slope of trend lines through recent data on concentration versus time graphs and results from reactive transport modeling were used to estimate time to achieve the applicable GWPS. Depending on the COI and well (area), the estimated time to achieve natural attenuation ranges from 2 to 40 years not considering source control, which is very reasonable compared to durations of other corrective action technologies. Source control and geochemical manipulation (injections) will reduce the time to achieve natural attenuation.

1 Introduction

The Greene County Electric Generating Plant (Plant Greene County) ash pond (Site), located in Greene County, Alabama, is owned and operated by Alabama Power Company (APC). As of April 15, 2019, the Site ceased receipt of all coal combustion residuals (CCR) and non-CCR waste streams.

APC has been monitoring groundwater at the Site in accordance with the U.S. Environmental Protection Agency (USEPA) CCR Rule and the Alabama Department of Environmental Management (ADEM) rule since 2016. Constituents of interest (COIs) for the Site include arsenic, cobalt, and lithium.

Though substantial evidence for natural attenuation exists for the Site, natural attenuation is expected to increase as source control measures are implemented (i.e., dewatering, consolidation, barrier wall installation, and capping).

USEPA defines MNA as the "reliance on natural attenuation processes (within the context of a carefully controlled and monitored site cleanup approach) to achieve site-specific remediation objectives within a time frame that is reasonable compared to that offered by other more active methods" (USEPA 1999, 2015). An MNA evaluation consists of the following steps or tiers (USEPA 2015):

1. Demonstrate that the area of impacts (plume) is stable or shrinking.
2. Determine the mechanisms and rates of attenuation.
3. Determine that the capacity of the aquifer is sufficient to attenuate the mass of constituents in groundwater and that the immobilized constituents are stable and will not remobilize.
4. Design a performance monitoring program based on the mechanisms of attenuation and establish contingency remedies (tailored to site-specific conditions) should MNA not perform as expected.

As shown in Table 1, the field and laboratory investigations completed for this evaluation support Tiers 1 through 3. Tier 4 is addressed in the accompanying *Groundwater Remedy Selection Report*. A detailed sitewide corrective action monitoring plan will be submitted by December 29, 2021.

2 Stability of Areas of Impacts

Existing groundwater data were used to generate concentration versus time and concentration versus distance graphs to determine if attenuation is occurring over time and/or space and to assess natural attenuation occurrence and rates. COIs were plotted on the y-axis. For the concentration versus time plots, the time between sampling events (in days from 2016 through 2021) was plotted on the x-axis. For the concentration versus distance graphs, the distance between the pond boundary and the monitoring well was plotted on the x-axis. Concentration versus distance graphs were made for all COIs along the upgradient-downgradient flowpaths. Specifically, concentration versus distance graphs were made for the following wells:

- GC-AP-MW-2 to GC-AP-MW-35H (arsenic)
- GC-AP-MW-5 to GC-AP-MW-54H to GC-AP-MW-57H to GC-AP-MW-59HO (arsenic and lithium)
- GC-AP-MW-13 to GC-AP-MW-45H (lithium)
- GC-AP-MW-12 to GC-AP-MW-47HO (lithium)
- GC-AP-MW-21 to GC-AP-MW-48H to GC-AP-MW-63HO (lithium and cobalt)
- GC-AP-MW-11 to GC-AP-MW-49H to GC-AP-MW-62HO (lithium)

The trends observed in recent data provide evidence that natural attenuation is occurring at the Site. Recent trends in wells that have statistically significant levels (SSLs) of at least one COI are generally either stable or are decreasing, which supports USEPA's Tier I for an MNA evaluation. Similar evidence from other wells is expected after closure, as closure activities cut off the source of COIs to groundwater. A selection of concentration versus time graphs is included in Figure 1. All concentration versus time graphs are included in Appendix A. For concentration versus distance, all transects showed COI concentrations decreasing with distance away from the Site, indicating spatial attenuation (as shown in Figure 2).

A demonstration that the areas of impacts are stable or shrinking (Tier I) is further supported by comparing isoconcentration maps from 2020 and 2021 for all COIs (Appendix B). These isoconcentration maps show a close correlation in isoconcentration contours between the two dates, indicating that impacts are not expanding.

3 Groundwater Sampling and Analysis

Groundwater samples were collected by RDH Environmental, Inc., on March 30 through 31, 2020. The samples were submitted to the Alabama Power General Test Laboratory to evaluate MNA and enable groundwater geochemical modeling. This groundwater data could also be used to support geochemically based corrective action such as geochemical manipulation (injections). Groundwater samples were collected from monitoring wells as listed in Table 2. The samples were analyzed for major cations, anions, and parameters influencing the chemical behavior of the COI. The analyzed constituents and associated laboratory analytical methods are summarized in Table 3.

Groundwater samples were collected from monitoring wells included in Table 2 using the dedicated pump installed in each well. Wells were purged at a low flow rate to minimize drawdown and sampled using low-flow sampling techniques in accordance with 40 CFR § 257.93(a) and ADEM Admin. Code r. 335-13-15-.06(4)(a). Prior to sampling, each monitoring well was purged until field parameters (pH, temperature, specific conductance, dissolved oxygen, and oxidation-reduction potential) stabilized. Turbidity was measured during sampling but was not used as a stabilization criterion.

4 Groundwater Geochemical Modeling

4.1 Geochemical Stability and Speciation Calculations

Geochemical equilibrium modeling was performed to help determine which phases may be controlling the dissolved concentrations, mobility, and attenuation of arsenic, cobalt, and lithium as well as the behavior of other species (such as iron, manganese, and aluminum) that influence the behavior of the COI.

The Geochemist's Workbench software (Bethke and Yeakel 2013) was used to construct Pourbaix (Eh-pH) diagrams for the COI, iron, and manganese based on Site groundwater chemistry to assess the geochemical stability of phases potentially controlling COI concentrations under Site conditions (Figures 3 through 6). Blue fields indicate dissolved/mobile species, and yellow fields indicate solid/attenuated species. Eh-pH data from the March 2020 groundwater sampling event are also plotted to determine the most stable species under Site conditions. The Pourbaix stability diagrams indicate the following associations and attenuating mechanisms:

- Site Eh-pH data generally fall along the equilibrium line between amorphous iron hydroxide [$Fe(OH)_3(a)$] and dissolved ferrous iron [Fe^{2+}], from which the presence of iron oxides in the aquifer can be inferred as a major control on Eh-pH conditions (Figure 3). Iron oxides are strong sorbents for many metals and metalloids including arsenic and cobalt.
- Site Eh-pH data also indicate that a barium arsenate mineral phase is stable under Site conditions and may control dissolved arsenic concentrations (Figure 4).
- A cobalt-iron oxide phase [$CoFe_2O_4$] is also predicted to be stable under Site conditions (Figure 5). This phase has a similar structure to the iron oxide mineral magnetite [Fe_3O_4], suggesting incorporation/co-precipitation of cobalt in iron oxides as an attenuation mechanism.
- Lithium is often associated with manganese oxides, and specifically with the mineral lithiophorite [$(Li,Al)Mn_2O_2(OH)_2$]. The thermodynamic properties of lithiophorite and other lithium-bearing manganese oxides are not well known, and its stability field shown in Figure 6 is approximate. According to the Eh-pH diagram for manganese, Site groundwater conditions appear to be too reducing (lower Eh) for lithiophorite to be stable; therefore, manganese oxides are not likely important attenuating phases for lithium at the Site.

Geochemical speciation-solubility calculations were also performed using the U.S. Geological Survey computer program PHREEQC (Parkhurst and Appelo 2013) with the WATEQ4F thermodynamic database (augmented with data for lithiophorite [Parc et al. 1989] and cobalt species from the MINTEQv4 database) to calculate aqueous speciation and determine the saturation state of groundwater samples with respect to possible mineral phases. Saturation index calculations can be useful in inferring potential solid phases present in an aquifer and controls on water chemistry and reactivity of an aqueous solution toward specific mineral phases. If a groundwater solution is saturated or supersaturated with a solid mineral phase, then that phase could be precipitating and attenuating COIs as it precipitates. Saturation indices for groundwater samples collected in March 2020 are presented in Table 4, and geochemical speciation modeling results indicate the following:

- Groundwater samples in downgradient wells are slightly supersaturated and/or close to equilibrium with respect to amorphous iron hydroxide [$Fe(OH)_3(a)$] and iron carbonate (siderite) and supersaturated with respect to the more crystalline iron oxides (goethite, hematite, and magnetite).
- Groundwater samples with detectable arsenic are generally supersaturated with respect to a barium arsenate mineral phase.
- Groundwater samples with detectable cobalt concentrations are generally supersaturated with respect to a cobalt-iron oxide phase.
- Groundwater samples with both detectable aluminum and manganese are supersaturated with respect to lithiophorite (lithium aluminum manganese oxide), suggesting lithiophorite as a potential attenuating phase for lithium at the Site. However, groundwater samples in all wells are generally undersaturated with respect to manganese oxides, and downgradient samples are close to equilibrium with respect to rhodochrosite [$MnCO_3$], indicating that redox conditions are generally more reducing than required to stabilize manganese oxides. The role of lithiophorite as an attenuation mechanism for lithium at the Site is, therefore, somewhat uncertain.

5 Solids Sampling and Analysis

Precipitation and coprecipitation may be major mechanisms for natural attenuation. Soil and aquifer media can also sorb COIs, and their geochemistry can indicate if natural attenuation is occurring or has the potential to occur. If well solids (precipitates) are forming and incorporating COIs, then natural attenuation is occurring. Similarly, if well solids (precipitates) are forming and incorporating COIs, this suggests attenuation mechanisms that can be enhanced by geochemical manipulation under existing Site conditions.

5.1 Sample Collection

To evaluate these mechanisms (precipitation and coprecipitation), solid particles were collected from the bottom of select monitoring wells and analyzed, as summarized in Table 2. The solids may be well solids (precipitates) forming in the aquifer or part of the mineralogy of the aquifer that has migrated into the well through the well screen. Regardless, depending upon their chemistry and mineralogy, the solids may have the ability to attenuate COIs.

Well solids samples were collected as follows:

- Well solids were pumped from the bottom of the well via polyethylene tubing and the applicable pump.
- Groundwater and well solids (precipitates) were pumped through an inline filter holder and stand (for example, those manufactured by Geotech Environmental Equipment, Inc.) with a 0.45-micron filter membrane until the filter clogged or the water ran clear. Up to five filters containing well solids were collected at each well (with the objective to collect as much solid material as possible from the bottom of each well).
- All filters from each well were placed in a single plastic petri dish, and the petri dish lid was secured with duct tape.
- Each wrapped petri dish was placed in a Mylar bag with oxygen-absorbent packets.
- The Mylar bags were sealed with no headspace and placed in a secured iced cooler.
- Samples were stored on ice and shipped to the Anchor QEA Environmental Geochemistry Laboratory (EGL) in Portland, Oregon, for analysis.

Aquifer solids (soil) samples were also collected from borings and analyzed to conduct column laboratory experiments to determine capacity, rates, and stability of MNA. Soil samples were collected on March 29 through April 2, 2021, from the soil boring locations shown in Figure 7. Soil samples were collected using sonic drilling technology at four locations (11 borings) at the Site along potential groundwater flow paths (downgradient) from the CCR unit. One composite soil sample was collected per boring from Unit 2 (poorly graded sands with gravel lenses). Photographs of representative soil samples are shown in Figure 8. Samples were selected in the field, packaged to preserve field redox conditions (airtight containers packed in Mylar bags with oxygen-scavenging packets), and shipped on ice to the EGL for column study experiments.

Each soil sample collected for laboratory analyses was assigned a unique alphanumeric identifier. Analytical sample identification was based on the following designations:

- 1 through 4 (transect number "1")
- A through C (location identifier where "A" is closest to the Site, and "C" is farthest downgradient)

5.2 Sample Analysis

Upon arrival at the EGL, well solids (precipitates) and soil samples were inspected and checked against the chain of custody. Samples were then stored under refrigeration until processing. To maintain in situ geochemical conditions, well solids (precipitates) were removed from the filters under a nitrogen atmosphere in an aerobic glove box for analysis and geochemical characterization. Solids retained on the sample filters was scraped and rinsed into centrifuge tubes. This mixture was then centrifuged, and the solids were transferred into a pre-weighed glass jar. The solids were then placed into the incubator portion of the glove box at 38°C for 24 to 72 hours until dry.

The well solids and soil samples were analyzed by the following methods:

- X-ray fluorescence (XRF) to determine the chemical composition of the matrix (e.g., iron compounds) and presence of COIs
- X-ray diffraction (XRD) to determine mineral phases
- SSE to determine association of COIs with attenuating phases, determine relative strength of attenuation, and provide a sense of permanence
- Cation exchange capacity (CEC) to assess ion exchange as a mechanism for attenuation
- Scanning electron microscopy (SEM) to directly observe attenuating phases (well solids only)

Additional detail (including the relevance of each analysis to the MNA evaluation) is included in Table 5.

All samples with sufficient volume were analyzed by XRF to determine the chemical composition. After drying, processed samples were loaded and sealed in plastic sample containers for elemental analysis by XRF. XRF testing was performed by EGL staff using a Niton XL3t GOLDD+ XRF Analyzer rented from Thermo Fisher Scientific. Individual samples were analyzed by XRF using the "Test All Geo" method under the "Mining" profile, which includes most elements heavier than sodium.

Powder XRD analysis was performed on selected well solids and aquifer soil samples to determine mineralogy. Samples were selected based on several factors, including well location, groundwater chemistry, bulk chemical composition data (XRF), and, for well solids samples, available sample mass.

Samples for XRD were delivered to RC Imaging and Analysis in Portland under chain of custody for analysis.

After XRF analysis, samples for SSE analysis were selected using the criteria above and the results of the XRF analysis. SSE targets a series of operationally defined mineral fractions. In SSE, samples are leached with increasingly aggressive solutions to determine the chemical associations. Generally, each successive step represents stronger attenuation and greater permanence than the previous step. The fractions, from most to least environmentally available, are as follows:

- F1: Water soluble
- F2: Exchangeable (e.g., clay minerals)
- F3: Reducible (e.g., poorly crystalline metal oxides such as iron oxides)
- F4: Oxidizable (e.g., crystalline oxide and crystalline sulfide minerals)
- F5: Residual (e.g., silicate phases)

The F3, F4, and F5 fractions represent relatively stable (permanent) attenuating mechanisms, provided Site geochemical conditions do not change drastically.

Ion exchange is a common attenuation mechanism for some COIs, such as lithium and cobalt. After XRF analysis, samples for CEC analysis were selected using the criteria above and the results of the XRF analysis. Exchange capacity is calculated after adding ammonium acetate to samples and leaching for 16 hours, then analyzing the leachate for released exchangeable cations.

Select well solids samples were submitted for examination by SEM to confirm attenuating mineral phases and compositions and to identify amorphous coatings on mineral grains (documented by elemental mapping) that can attenuate COIs. Samples for SEM were delivered to RC Imaging and Analysis in Portland under chain of custody for analysis.

5.3 Well Solids Results

The XRF chemical analysis of the well solids (Table 6) showed a relationship with at least one COI and elements associated with natural attenuation (iron, calcium, and/or manganese) detected in samples from 12 monitoring wells. The relationship of arsenic and iron is shown in Figure 9. Solids from upgradient wells were used to define the geogenic (natural) relationship of arsenic to iron (open circles and orange dashed line in Figure 9). Arsenic values above the line represent arsenic enrichment in iron compounds, which demonstrates arsenic attenuation in downgradient wells. XRD identified goethite, an attenuating iron oxide, in solids from one well (Table 7). Figure 10 shows the results of SSE for four samples from the Site. Interpretation by COI includes the following:

- Arsenic: Bound primarily in the F4 (oxidizable) and F5 (residual) fractions, though some samples also show an association with the F2 (exchangeable) fraction. This is consistent with the identification of crystalline iron oxides from the other investigations and possibly barium arsenate (predicted by geochemical modeling).

- Cobalt: Bound primarily in the F4 (oxidizable) fraction, though some cobalt is associated with all fractions. This is consistent with the identification of crystalline iron oxides from the other investigations.
- Lithium: Bound primarily in the F2 (exchangeable/clay), and in some samples F4 (oxidizable) and F5 (residual) fractions. This is consistent with the other investigations identifying cation exchange (F2) as the main attenuating mechanism.

Select samples with suspected clay content were submitted for CEC testing. CEC was variable in the samples, ranging from 15 to 432 milliequivalents per kilogram (meq/kg; Table 8), which is sufficient to provide significant attenuating capacity. Exchangeable lithium was detected in solids from two downgradient wells, indicating attenuation of lithium by clay minerals.

SEM and associated elemental mapping were conducted on select samples to confirm mineral phases and attenuating mechanisms. SEM results indicate that the solids collected from both GC-AP-MW-1 and GC-AP-MW-11 are a mix of quartz, iron-rich, and feldspar grains. In GC-AP-MW-1, extensive alteration with coatings of aluminum and iron material were observed on many quartz grains, and much of the iron material appears to be well solids (precipitates). In GC-AP-MW-11, extensive alteration, with heavy coatings of aluminum, iron, and (rare) calcium materials were observed (Figure 11). The colors on Figure 11 are not natural but are added to show the locations of the various elements analyzed.

5.4 Aquifer Solids (Soil) Results

XRF analysis of soil samples show total iron content in the range of 0.08 to 1.5 weight percent (wt%), which likely reflects iron oxide content and provides substantial attenuating capacity (Table 9). The mineralogy of the soil samples (as determined by XRD) consists mostly of quartz, with lesser amounts of feldspar, mica, and clay minerals (Table 10). The clay minerals include bentonite, montmorillonite, kaolinite, and vermiculite, all of which have attenuating capacity (the bentonite could be naturally occurring or possibly an artifact from use in well construction).

CEC for the soil samples was in the same range as well solids samples (3.6 and 16 meq/kg) and reflects differences in the clay mineral content of the two samples (Table 11).

Analytical results are included in Appendix C.

6 Mechanisms for Natural Attenuation

To support MNA, the following laboratory analyses of groundwater and well solids (precipitates) (attenuating solids) were conducted:

- Performed geochemical modeling using PHREEQC with WATEQ4F
- Analyzed samples of well solids (precipitates) by XRF and XRD
- Directly observed attenuating mineral phases by SEM
- Determined association of COI with attenuating phases, determined relative strength of attenuation, and provided a sense of permanence by SSE
- Assessed ion exchange as an attenuation mechanism by CEC

As discussed in Section 5, results from groundwater data analysis, geochemical modeling, and well solids analyses provide multiple lines of evidence for multiple attenuation mechanisms for COI, as summarized in Table 12. The attenuating mechanisms include sorption-coprecipitation with iron oxides and ion exchange on clay minerals. Precipitation of barium arsenate for arsenic was predicted by geochemical modeling but not identified in solid samples.

As discussed in Section 5, results from groundwater data analysis, geochemical modeling, and well solids analyses provide multiple lines of evidence for multiple attenuation mechanisms for COIs, as summarized in Table 12. The attenuating mechanisms include sorption-coprecipitation with iron oxides and ion exchange on clay minerals. Precipitation of barium arsenate for arsenic was predicted by geochemical modeling but not identified in solid samples. XRF detected at least one COI and elements associated with natural attenuation (iron, calcium, manganese, magnesium, and/or barium). The XRF bulk chemical analysis show relatively high concentrations of iron (an attenuating species) ranging between 15,000 and 260,000 milligrams per kilogram (mg/kg) at 1.5 to 26.3 wt%. The positive correlation between iron and arsenic and cobalt, respectively, indicates that iron compounds are attenuating these two COIs.

XRD identified at least one of six potentially attenuating clay minerals (montmorillonite, kaolinite, vermiculite, clinochlore, greenalite, and muscovite/illite) in six soil samples. CEC, SSE and SEM were performed on select samples to verify the results of the XRD work. The well solids samples exhibit moderate but variable CEC, which ranges from 15.3 to 432 meq/kg. Exchangeable lithium and cobalt concentrations show a positive relationship to CEC, which supports a conclusion that cation exchange on clays is a significant attenuation mechanism for lithium and cobalt.

SEM identified iron oxide coatings on sand grains and abundant aluminosilicate clays such as muscovite-illite, which supports other investigations that indicated these species as attenuating compounds.

As discussed in greater detail in Section 5.3, SSE indicated an association of COIs with multiple attenuation mechanisms as follows:

- Arsenic: Primarily in the oxidizable (crystalline oxide) and residual fractions, with some arsenic associated with the exchangeable fraction. This is consistent with attenuation in, and sorption on iron oxides.
- Cobalt: Primarily in the oxidizable (crystalline oxide) fraction, which is consistent with incorporation into a cobalt-iron oxide. Some cobalt associated with all fractions.
- Lithium: Occurs in the water soluble, exchangeable (e.g., on clay minerals), oxidizable, and residual fractions. Lithium in the exchangeable fraction is consistent with the CEC data, i.e., attenuation as ion exchange on clays.

All three COIs occur in the oxidizable and residual fractions, which indicate very stable attenuation phases. The residual fraction, however, likely represents residual mineral phases (grains) that are part of the aquifer matrix.

7 Reactive Transport Modeling

Reactive transport modeling was performed to assess the post-closure fate and transport of COIs (arsenic, cobalt, and lithium) along select groundwater flow paths at the Site. The objective of the modeling was to quantitatively assess the effectiveness and estimate the timeframes for natural attenuation to reduce COI concentrations in groundwater outside the Site boundary to below groundwater protection standard (GWPS) following source removal.

Four 1-dimensional transects, extending along groundwater flow paths from the boundary of the Site to downgradient surface water features, were modeled using PHREEQC (Figure 7). Following source removal and installation of a barrier wall, groundwater currently present along these transects will be progressively replaced by upgradient groundwater with COI concentrations less than the GWPS. In addition, COI concentrations will be attenuated along the flow path due to reactions with the aquifer matrix. Specific attenuating mechanisms for the three COIs included in the models are as follows:

- Arsenic: Sorption to iron and aluminum oxide binding sites in aquifer soil, as well as precipitation of a barium arsenate mineral phase
- Cobalt: Sorption to iron and aluminum oxide binding sites in aquifer soil
- Lithium: Cation exchange on clay minerals in aquifer soil

Selection of these attenuation mechanisms was based on observed attenuation mechanisms, geochemical modeling, and laboratory studies described previously, including data on extractable iron and aluminum oxides and CEC of aquifer solids samples collected in the vicinity of the model transects (Table 13).

Sorption reactions of COI were simulated using the surface complexation models for iron and aluminum oxide binding sites based on Dzombak and Morel (1990) and Karamalidis and Dzombak (2010), respectively. Transect-specific data, including groundwater chemistry, as well as CEC and extractable iron and aluminum oxide concentration data for aquifer solids were used to define initial groundwater and aquifer matrix geochemistry.

Groundwater chemistry along each transect was based on data for samples collected in 2020 for which complete chemical analyses (major ions and COIs) were available. Initial chemistry was defined by data from at least two wells along each transect and background[1] groundwater chemistry defined by data from a nearby well with no SSLs. Along each flowpath, groundwater chemistry was assigned in segments, extending to the midpoints between adjacent wells. The groundwater chemistry data used in the models are presented in Table 14. CEC and extractable iron and aluminum oxide data

[1] "Background" indicates chemical background.

(Table 15) for aquifer soil samples collected along each transect were used to assign cation exchange and sorption capacity (concentrations of iron and aluminum binding sites) parameters in the models.

Model simulations were run for a total time representing five pore volumes of flow along each transect. Simulation times ranged from 2 to 40 years depending on the groundwater flow velocity and length of each transect. Groundwater velocities were calculated from hydraulic conductivity, hydraulic gradients, and effective porosity. The average horizontal hydraulic conductivity (30 feet per day) was taken from the *Groundwater Modeling Report, Rev. 0* (Wood 2019) for fine to medium sand, and a value of 0.25 was assumed for effective porosity. The hydraulic gradients were calculated from April 2020 groundwater elevation data for wells along transects 1 and 2 and from May 2020 groundwater elevation data for wells along transects 3 and 4. Reactive transport models for the four transects, including model results, are described in more detail as follows:

- Transect 1, Arsenic and Lithium at SSLs
  - Transect length = 2,570 feet; hydraulic gradient = 0.0061; linear groundwater velocity = 0.73 feet per day; one pore volume = 9.6 years
  - Transect wells for chemistry: Background: MW-6; Downgradient: MW-5 (0-60 feet), MW-54H (60-170 feet), MW-57H (170-360 feet), MW-44H (360-950 feet), PZ-4 (950-1,500 feet), and MW-34HA (1,500-2,570 feet)
  - Arsenic concentrations are predicted to be attenuated over time along this transect but remain above the GWPS along the upgradient portion of the transect for at least 40 years. The downgradient extent of GWPS exceedances is predicted to slowly increase as the maximum concentration decreases (Figure 12).
  - Lithium concentrations are predicted to be attenuated over time and decrease below the GWPS along this transect within 8 years (Figure 12).
- Transect 2, Arsenic and Cobalt at SSLs
  - Transect length = 1,360 feet; hydraulic gradient = 0.0059; linear groundwater velocity = 0.71 feet per day; one pore volume = 5.2 years
  - Transect wells for chemistry: Background: MW-25; Downgradient: MW-1 (0-680 feet) and MW-35H (680-1,360 feet)
  - Arsenic concentrations are predicted to be attenuated over time along this transect and will decrease to less than a factor of 2 above the GWPS within approximately 10 years. Small exceedances for arsenic (less than 2 times the GWPS) are predicted to persist downgradient for at least 26 years (Figure 13).
  - Cobalt concentrations are predicted to be attenuated over time along this transect and will decrease below the GWPS along this transect within approximately 10 years (Figure 13).
- Transect 3, Arsenic and Lithium at SSLs

- Transect length = 370 feet; hydraulic gradient = 0.0081; linear groundwater velocity = 0.97 feet per day; one pore volume = 0.51 years
- Transect wells for chemistry: Background: MW-25; Downgradient: MW-17 (0-40 feet) and MW-38H (40-180 feet); although transect 2 soils are located adjacent to MW-18, MW-17 data were selected to define groundwater chemistry in this area for modeling because the COI concentrations are higher at MW-17.
- Arsenic concentrations are predicted to be attenuated over time along this transect but remain above the GWPS for at least 5 years. The downgradient extent of GWPS exceedances is predicted to increase as the maximum concentration decreases (Figure 14).
- Lithium concentrations are predicted to be attenuated over time and decrease below the GWPS along this transect within 2 years (Figure 14).

- Transect 4, Lithium at SSL
  - Transect length = 530 feet; hydraulic gradient = 0.0052; linear groundwater velocity = 0.63 feet per day; one pore volume = 2.3 years
  - Transect wells for chemistry: Background: MW-41H; Downgradient: MW-13 (0-210 feet) and MW-45H (210-530 feet)
  - Lithium concentrations are predicted to be attenuated over time and decrease below the GWPS along this transect within 10 years (Figure 15).

The reactive transport model results presented here indicate that, following completion of source control measures that will reduce COI concentrations in groundwater (including consolidation, capping, and barrier wall placement that will occur in and around the Site), natural attenuation processes will play an important role in achieving GWPS. For cobalt and lithium, model predictions indicate that GWPS could be achieved within 10 years after source control measures are implemented. The timeframes for achieving GWPS for arsenic by natural attenuation alone, however, are significantly longer (e.g., more than 26 to 40 years along the northern portion of the Site). The modeling results indicate that natural attenuation is occurring and demonstrate that it can be a component of the final remedy; however, attenuation capacity will likely need to be enhanced in some areas (e.g., via injection treatment) to reduce the timeframe for achieving GWPS for all COIs sitewide.

8 Column Studies

8.1 Methodology (Setup)

Column tests were performed using Site aquifer media (soil) and impacted groundwater to evaluate effectiveness of removal of COIs under flow conditions and provide a basis for estimating the natural attenuation capacity of the aquifer matrix (part of USEPA's Tier 3).

Two groundwater samples were collected on April 15, 2021, from monitoring wells GC-AP-MW-1 and GC-AP-MW-17. Upon receipt, groundwater samples were submitted to ALS Environmental in Kelso, Washington, for chemical analysis prior to beginning the column testing. Analytical results are summarized in Table 16 and included in Appendix C. Four column tests were prepared with four Site soils (GC-1A-UNIT2-20-25, GC-2A-UNIT2-15-25, GC-3A-UNIT2-40-45, and GC-4A-UNIT2-30-35). Two different Site groundwaters (from GC-AP-MW-1 and GC-AP-MW-17) were pumped through the columns (Table 17). The laboratory column setup is shown in Figure 16, and a detailed schematic is provided in Figure 17.

Column tests were carried out in 12.8-centimeter (cm)-long, 2.6-cm-diameter polypropylene columns. The Site soils were packed into the columns to achieve a total depth of 12.8 cm. Site groundwater was pumped in an up-flow direction through the columns at a flow rate of approximately 0.4 milliliters per minute for 14 days using a peristatic pump with a multichannel pump head. Flow rates were regularly checked and adjusted as needed to maintain a constant flow rate. Table 18 provides a summary of the column test operating conditions.

The initial arsenic concentration in GC-AP-MW-1 and GC-AP-MW-17 groundwater were lower than expected based on historical data (0.01 micrograms per liter [µg/L] versus historical concentrations of approximately 20 µg/L in GC-AP-MW-1 and 300 µg/L in GC-AP-MW-17). For the column tests, GC-AP-MW-1 and GC-AP-MW-17 groundwater were, therefore, spiked with arsenic. An arsenic stock solution was prepared from sodium arsenate heptahydrate and added to the influent reservoir of MW-1 to produce an influent concentration of approximately 400 µg/L.

Column influents and effluents were sampled periodically over the duration of the test. The samples were tested for pH at the time of sampling and filtered using 0.45-micron nylon syringe filters and preserved with nitric acid. Flow rates and cumulative flow volumes were also recorded for each column at the time of sampling to calculate the total number of pore volumes (PVs) treated. The column influent and effluent samples were analyzed for dissolved COIs by USEPA method 200.8 (inductively coupled plasma mass spectrometry) at ALS Environmental.

The laboratory column tests were operated at a higher linear velocity (102 cm per day) than the groundwater flow conditions in the vicinity of the Site, which ranges from 24.7 to 74.4 cm per day (SCS 2021). As a result, the hydraulic residence time in the columns was also much shorter than the hydraulic residence time at the Site. The attenuation measured in the columns, therefore, provides a conservative estimate of the attenuation in the field.

8.2 Column Test Results

Column test results for arsenic, cobalt, and lithium are shown in Figures 18 through 21, respectively. Analytical summary reports are included in Appendix C. For Columns 1 and 2, arsenic in the effluents was significantly attenuated by the Site soils up to approximately 150 PVs and remained at less than 13% of the influent level (Figure 18). Slightly higher arsenic concentrations from 0-50 PVs could be attributed to desorption of arsenic from the Site soils. After 150 PVs, arsenic concentrations were gradually elevated. In Columns 3 and 4, arsenic concentrations in the effluents gradually increased from the start of the test but were reduced by the Site soils to some extent and did not reach to the influent level throughout the tests (Figure 19). As mentioned above, the hydraulic residence time in the columns was shorter than the hydraulic residence time at the Site. The hydraulic residence time in the column could be short for the kinetics of arsenic attenuation mechanisms such as adsorption, which might result in incomplete arsenic attenuation.

In contrast, cobalt and lithium were not attenuated to the extent of arsenic by the Site soils (Figures 20 and 21, respectively). Cobalt was not effectively attenuated by the Site soils due to elevated cobalt concentrations in the soils. The Site soil GC-1A-UNIT2 20’-25’ released cobalt up to approximately 20 PVs. This is likely due to desorption of cobalt from the native soil. The Site soil GC-2A-UNIT2-15-25 feet also did not remove cobalt well due to cobalt present in the soil. After 20 PVs, the effluent cobalt concentrations from the column packed with GC-2A-UNIT2-15-25 reached to the influent level. Lithium concentrations in the column effluents rose from 1 PV and reached to the influent concentration in less than 5 PVs.

9 Aquifer Capacity for Attenuation

Geospatial methods were used to calculate the estimated saturated volume of the aquifer, and the estimated mass of COIs in the aquifer. The volume of aquifer within the footprint of the barrier wall was excluded from these calculations because it will be physically isolated (encapsulated) and will neither contribute mass of COIs nor be available for attenuation. ArcGIS software (Esri 2021a) was used to perform all geospatial operations. Saturated aquifer thickness data (interpreted from boring and well construction logs), groundwater chemistry data (collected from Site monitoring wells), and previously reported Site porosity values (SCS 2021) were used to create interpolated (Thiessens) saturated aquifer thickness and COI concentration polygons for the entire Site (Esri 2021b).

Vector and raster geospatial data, in combination with results from the column tests, were used as inputs for calculations to estimate the aquifer capacity for attenuating COIs. Vector data consist of points, lines, and polygons and are used to spatially represent precise locations or discrete boundaries in real-world space. Raster data are matrices of cells organized into rows and columns (i.e., a grid) where each cell carries a data value. Thiessen polygons delineate area around each input point such that any location within the polygon is closer to that point than any of the other input points—effectively allocating area to each point based on the way the points are distributed across a site. A value encoded in the point, such as aquifer thickness, is applied across the entire area of the Thiessen polygon surrounding the point.

The primary geospatial data sources used in this analysis are as follows:

- Aquifer extent (the estimated maximum lateral extent of the aquifer available for attenuating COIs; based on parcel boundaries in the downgradient flow direction)
- Barrier wall alignment
- Isoconcentration boundaries (the estimated extent of COIs at concentrations greater than the GWPS)
- Sitewide estimates for the saturated aquifer thickness and COI concentrations

A workflow was developed using the ArcGIS Model Builder application to calculate estimated saturated aquifer volumes and the mass of COIs in the aquifer. The workflow was divided into modular steps, with separate models created to execute one or more steps. A summary of each step in the workflow is as follows:

1. Interpolate Saturated Aquifer Thickness using Thiessen Polygons: The saturated aquifer thickness across the Site was determined by interpolating saturated aquifer thickness values from boring and well construction logs. Thiessen polygons were generated from the aquifer thickness points. Because data within the Site footprint is limited, Thiessen polygons were used because they are an interpolation method that estimates data values across large distances

between data points without reducing the magnitude of the values, allowing for the estimate of aquifer thickness in the interior portion of the Site where no data points were available.

2. Convert Saturated Aquifer Thickness Thiessen Polygons into Saturated Aquifer Thickness Raster: Saturated aquifer thickness Thiessen polygons were then converted into a saturated aquifer thickness raster surface with a grid cell resolution of 50 feet by 50 feet, where each cell is encoded with the interpolated saturated aquifer thickness at that location. A 50-foot by 50-foot grid captures adequate detail given that the Site is hundreds of acres in size.
3. Create Saturated Aquifer Volume Raster: The saturated aquifer thickness raster was used to create a saturated aquifer volume raster by multiplying all thickness cells by their respective area (i.e., 50 feet by 50 feet equals 2,500 square feet). The saturated aquifer volume could then be estimated by taking the summation of all the grid cell values in the saturated aquifer volume raster. Any portion of the aquifer volume within the slurry wall boundary was not included in the volume summation.
4. Create Plume Volume Raster: For a given COI, a plume volume raster was created by taking the summation of all the grid cell values from the Saturated Aquifer Volume Raster within the isoconcentration boundary.
5. Interpolate COI Concentrations Using Thiessen Polygons: Thiessen polygons were created from the groundwater chemistry data for each COI following the same methods used to create the saturated aquifer thickness polygons by applying groundwater chemistry data to the areas surrounding each point instead of aquifer thickness values.
6. Convert COI Concentrations Thiessen Polygons into COI Concentrations Raster Surfaces: COI concentration Thiessen polygons were then converted into COI concentration raster surfaces using the same 50-foot by 50-foot cell size.
7. Estimate COI Mass within Plumes: For each COI, mass within the plume was estimated using Equation 1.
8. Extrapolate Column Test Results to Entire Aquifer: Aquifer capacity for attenuation was determined by multiplying the mass of COIs attenuated in the column studies by the total volume of saturated aquifer calculated in Step 3.

Equation 1

$$M_C = \sum_{i=1}^{n} (V_i \times C_i) \times A \times B \times p$$

where:

M_c	=	estimated mass of COIs within the plume
n	=	number of grid cells in raster
V	=	volume of grid cell
C	=	COI concentration at grid cell
A	=	conversion factor for cubic feet to liters
B	=	conversion factor for either µg or mg to kg
p	=	porosity

The aquifer has far more potential for attenuation than the mass of arsenic requiring attenuation. Specifically, the aquifer has an attenuating capacity 890 times greater than the mass of arsenic in groundwater. As discussed in Section 8.2, lithium and cobalt were poorly chemically attenuated (sorbed).

10 Time to Achieve Groundwater Protection Standards (Rates) and Stability of Attenuated COIs

The slope of trend lines through recent monitoring data on concentration versus time graphs and results from reactive transport modeling were used to estimate time to achieve the applicable GWPS. Constituents that are already less than their applicable GWPSs were not included in this analysis. Depending on constituent and well, the estimated time to achieve natural attenuation ranges from 2 to 40 years, which is very reasonable compared to durations of other corrective-action technologies. Figure 1 shows typical concentration versus time graphs that served as the basis for the rate analysis, and Appendix A contains all time versus concentration graphs.

SSE performed on soils used in the column studies provides a measure of relative stability of the attenuated COIs and their hosts, such as iron oxides. The SSE fractions, from least stable to most stable, are as follows:

- F1: Water soluble
- F2: Exchangeable (e.g., clay minerals)
- F3: Reducible (e.g., poorly crystalline metal oxides such as iron oxides)
- F4: Oxidizable (e.g., crystalline oxide and crystalline sulfide minerals)
- F5: Residual (e.g., silicate phases)

The F5 fraction is likely not related to attenuation processes occurring at the Site; rather, this phase likely reflects the composition of residual silicate minerals, such as micas or amphiboles, from the aquifer. However, for completeness, the F5 fraction is shown in Table 19, which provides a summary of post-column-testing SSE results. Because relatively small amounts of COI were taken up by column soils, the results of the SSE analysis were all less than the laboratory method detection limits.

11 Conclusions and Interpretation

Extensive geochemical and related studies demonstrate that MNA is a viable corrective action for groundwater impacts associated with the Site. The preponderance of evidence indicates that Site conditions meet USEPA’s evaluation criteria for the use of MNA, specifically: area of impacts stable or shrinking, identified mechanisms for attenuation, stability of the attenuating mechanisms, sufficient aquifer capacity for attenuation, and time to achieve GWPSs reasonable as compared to other corrective-action alternatives. However, MNA is one component of the Site’s corrective action remedy. As noted in the *Groundwater Remedy Selection Report*, the following corrective measures were selected for the Site: source control to include dewatering, consolidation, capping of the Site, and installation of a barrier (slurry) wall completely around the consolidated perimeter keyed into the relatively impermeable chalk aquitard; geochemical manipulation via injections in areas of relatively high concentrations of COIs to remove them from groundwater and immobilize them in situ; and MNA over the entire Site.

Investigations performed to support the use of MNA at the Site included the following:

- Preparation of concentration versus time and concentration versus distance graphs for COIs in groundwater
- Groundwater, well solids (precipitates), and soil sampling and analysis
- Laboratory analysis of well solids samples for bulk chemistry (XRF), mineralogy (XRD and SEM), and CEC
- Geochemical modeling
- SSE to determine associations of COIs with attenuating solids
- Column studies to assess the attenuation capacity of the aquifer and to determine the stability of the attenuating phases
- Calculation of the time to achieve natural attenuation

Graphs of concentration versus time for COIs at the Site indicate a reduction of some COIs in groundwater through time in some areas, specifically the following:

- Arsenic is decreasing or stable over time at GC-AP-MW-10, GC-AP-MW-14, GC-AP-MW-16, and GC-AP-MW-18.
- Cobalt is decreasing over time in GC-AP-MW-11.
- Lithium is decreasing or stable over time in GC-AP-MW-10, GC-AP-MW-12, GC-AP-MW-15, GC-AP-MW-16, GC-AP-MW-17, GC-AP-MW-18, and GC-AP-MW-21.

Concentration versus distance graphs along four downgradient transects indicate that arsenic, cobalt, and lithium are decreasing with distance from the Site. Isoconcentration maps from 2020 and 2021 were also compared and show plume stability for all COIs.

Results from existing groundwater data analysis, geochemical modeling, and well solids (precipitates) analyses provide multiple lines of evidence for attenuation mechanisms for COIs operating at the Site. The major attenuation mechanisms operating at the Site include the following:

- Sorption on (or coprecipitation with) iron oxides and possibly precipitation of barium arsenate for arsenic
- Cobalt attenuation by incorporation into a cobalt-iron oxide
- Lithium attenuation by ion exchange on oxides and clay minerals

All COIs are subject to physical attenuation mechanisms such as dispersion and flushing, which will contribute to decreased concentrations with time and distance from the Site.

Column studies were performed to assess the ability for the aquifer media (soil) to take up COIs. Laboratory results were then extrapolated to the entire saturated mass of aquifer (downgradient of the consolidated pond footprint) using quantitative GIS-based techniques. Based on the column studies and saturated volume of the downgradient aquifer, the aquifer has much more capability to attenuate (sorb) arsenic than the mass currently in groundwater. Specifically, the aquifer has an attenuating capacity 890 times greater than the mass of arsenic in groundwater.

Cobalt and lithium showed limited ability to sorb to the aquifer media based on column studies. However, these constituents are still subject to other attenuating mechanisms, such as physical attenuation (dispersion and flushing) and coprecipitation, as indicated by the concentration versus time and distance graphs, and geochemical studies.

SSE was performed on samples of well solids (precipitates) and soils used in the column studies to assess the stability of the attenuated COIs and their host minerals. Because relatively small amounts of COI were taken up by column soils, the results of the SSE analysis were all less than the laboratory method detection limits. Specific results for the three COIs in well solids samples are as follows:

- Arsenic: Bound primarily in the F4 (oxidizable) and F5 (residual) fractions, though some samples also show an association with the F2 (exchangeable) fraction. This is consistent with the identification of crystalline iron oxides from the other investigations and possibly barium arsenate (predicted by geochemical modeling).
- Cobalt: Bound primarily in the F4 (oxidizable) fraction, though some cobalt is associated with all fractions. This is consistent with the identification of crystalline iron oxides from the other investigations.
- Lithium: Bound primarily in the F2 (exchangeable/clay) and in some samples F4 (oxidizable) and F5 (residual) fractions. This is consistent with the other investigations identifying cation exchange (F2) as the main attenuating mechanism.

Based on the SSE results for well solids, attenuated arsenic and cobalt are very stable under ambient groundwater conditions, as they are bound primarily in the oxidizable fraction. Lithium is somewhat less stable, as it is bound primarily in the exchangeable fraction.

Trend lines through recent groundwater data and results from reactive transport modeling were used to estimate time to achieve the applicable GWPS. Depending on the COI and well, the estimated time to achieve GWPSs ranges from 2 to 40 years following completion of source control measures. The estimated time to achieve natural attenuation is very reasonable compared to durations of other corrective action technologies. Source control and geochemical manipulation (injections) will reduce the time to achieve natural attenuation.

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Tables

Table 1
Monitored Natural Attenuation Demonstration Status

Tier	Approach	Status of MNA Demonstration
Tier 1: Area of Impacts Stable or Shrinking	Concentration vs. time and/or distance graphs, statistics, isoconcentrations in plan and/or section view, Ricker Method (part of ongoing monitoring)	Satisfied
Tier 2a: Determine Mechanisms of Attenuation	Analysis of well solids: XRF, XRD, SEM, CEC, SSE; complete analysis of groundwater (major cations and anions); geochemical modeling	Satisfied
Tier 2b: Determine Rates of Attenuation	Derived from concentration vs. time graphs, batch and/or column tests, geochemical modeling	Satisfied
Tier 3a: Determine System (Aquifer) Capacity for Attenuation	Batch and/or column tests, geochemical modeling	Satisfied
Tier 3b: Determine Stability of the Attenuating Mechanisms (Solids) and COI	SSE on tested materials from batch and column tests, geochemical modeling, inference from mechanisms	Satisfied
Tier 4a: Design a Performance Monitoring Program	Additional wells, repeat well solids and/or complete groundwater analysis, triggers	Satisfied
Tier 4b: Identify Alternative Remedies Should MNA Not Perform as Expected	Completed as part of the ACM; some technologies may need further testing and/or development (bench and pilot)	Satisfied

Notes:
ACM: Assessment of Corrective Measures
CEC: cation exchange capacity
COI: constituent of interest
MNA: monitored natural attenuation
SEM: scanning electron microscopy
SSE: selective sequential extraction
XRD: X-ray diffraction
XRF: X-ray fluorescence

Table 2
Sampling Locations

Groundwater Sampling Locations			
GC-AP-MW-1	GC-AP-MW-14	GC-AP-MW-18	GC-AP-MW-27
GC-AP-MW-5	GC-AP-MW-15	GC-AP-MW-23	GC-AP-MW-28
GC-AP-MW-10	GC-AP-MW-16	GC-AP-MW-24	GC-AP-MW-29
GC-AP-MW-11	GC-AP-MW-17	GC-AP-MW-26	GC-AP-MW-30
Well Solids Sampling Locations			
GC-AP-MW-1	GC-AP-MW-5	GC-AP-MW-10	GC-AP-MW-11
GC-AP-MW-14	GC-AP-MW-15	GC-AP-MW-16	GC-AP-MW-17
GC-AC-MW-18	GC-AP-MW-23	GC-AP-MW-24	GC-AP-MW-29

Table 3
Analyzed Constituents and Laboratory Analytical Methods

Constituent	Analytical Method	Constituent	Analytical Method
Alkalinity (Total as $CaCO_3$)	SM 2320 B	Lead (Dissolved)	EPA 200.8
Aluminum (Dissolved)	EPA 200.8	Iron (Total)	EPA 200.7
Aluminum (Total)	EPA 200.8	Lead (Total)	EPA 200.8
Antimony (Dissolved)	EPA 200.8	Lithium (Total)	EPA 200.7
Antimony (Total)	EPA 200.8	Magnesium (Total)	EPA 200.7
Arsenic (Dissolved)	EPA 200.8	Manganese (Dissolved)	EPA 200.8
Arsenic (Total)	EPA 200.8	Manganese (Total)	EPA 200.8
Barium (Total)	EPA 200.8	Molybdenum (Dissolved)	EPA 200.8
Beryllium (Dissolved)	EPA 200.8	Molybdenum (Total)	EPA 200.8
Beryllium (Total)	EPA 200.8	Nitrogen Nitrate (Calculated)	EPA 353.2
Bicarbonate Alkalinity (Calculated)	SM 4500CO2 D	Nitrogen Nitrate/Nitrite	EPA 353.2
Boron (Total)	EPA 200.7	Nitrogen Nitrite	EPA 353.2
Cadmium (Dissolved)	EPA 200.8	Ortho Phosphate	SM 4500PF-OP
Cadmium (Total)	EPA 200.8	Potassium (Total)	EPA 200.8
Calcium (Total)	EPA 200.7	Selenium (Dissolved)	EPA 200.8
Carbonate Alkalinity (Calculated)	SM 4500CO2 D	Selenium (Total)	EPA 200.8
Chloride	SM4500Cl E	Silica (Total; Calculated)	EPA 200.7
Chromium (Dissolved)	EPA 200.8	Silicon (Total)	EPA 200.7
Chromium (Total)	EPA 200.8	Sodium (Total)	EPA 200.7
Cobalt (Dissolved)	EPA 200.8	Sulfate	SM 4500SO4 E 2011
Cobalt (Total)	EPA 200.8	Thallium (Dissolved)	EPA 200.8
Fluoride	SM 4500F G 2017	Thallium (Total)	EPA 200.8
Iron (Dissolved)	EPA 200.7	Total Organic Carbon	SM 5310 B

Notes:

$CaCO_3$: calcium carbonate

EPA: Environmental Protection Agency

SM: Standard Method

Table 4
Saturation Indices for Groundwater Samples

Sample ID	Well Designation	Gibbsite	$Fe(OH)_3(a)$	Goethite	Hematite	Magnetite	Siderite	$CoFe_2O_4$	$Ba_3(AsO_4)_2$	Pyrolusite	Bixbyite	Birnessite	Hausmannite	Manganite	Pyrochroite	Lithiophorite	Rhodochrosite
GC-AP-MW-1	downgradient	**0.72**	**0.53**	**6.24**	**14.5**	**15.1**	**0.14**	**19.4**	-0.29	-15.0	-16.8	-16.4	-20.5	-8.11	-7.91	**17.8**	-0.94
GC-AP-MW-5	downgradient	--	**0.18**	**5.89**	**13.8**	**15.3**	**1.02**	**19.0**	**8.99**	-16.5	-17.3	-18.0	-20.0	-8.36	-6.89	--	**0.04**
GC-AP-MW-10	downgradient	**1.97**	**0.23**	**5.99**	**14.0**	**15.0**	**0.62**	**19.5**	**5.82**	-15.2	-15.8	-16.8	-18.4	-7.74	-6.84	**22.5**	**0.24**
GC-AP-MW-11	downgradient	**1.96**	**0.42**	**6.19**	**14.4**	**14.8**	-0.35	**20.2**	**4.75**	-13.1	-13.6	-14.8	-15.9	-6.65	-6.61	**23.8**	**0.18**
GC-AP-MW-14	downgradient	**1.78**	**0.64**	**6.36**	**14.7**	**16.4**	**1.26**	**20.6**	**5.62**	-15.5	-16.0	-16.9	-18.4	-7.7	-6.60	**22.9**	**0.47**
GC-AP-MW-15	downgradient	--	**0.57**	**6.25**	**14.5**	**14.0**	-0.83	**19.5**	--	-12.5	-13.9	-13.8	-17.3	-6.60	-7.53	--	-0.45
GC-AP-MW-16	downgradient	--	**0.31**	**6.00**	**14.0**	**14.9**	**0.72**	**19.3**	**6.46**	-15.2	-16.1	-16.5	-19.0	-7.74	-7.06	--	**0.23**
GC-AP-MW-17	downgradient	--	**0.10**	**5.81**	**13.6**	**15.0**	**1.15**	**19.2**	**10.4**	-16.5	-17.2	-17.9	-20.0	-8.32	-6.90	--	**0.30**
GC-AP-MW-18	downgradient	--	**0.18**	**5.89**	**13.8**	**14.5**	**0.59**	**19.1**	**6.18**	-15.1	-16.0	-16.5	-19.0	-7.72	-7.10	--	**0.25**
GC-AP-MW-23	upgradient	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
GC-AP-MW-24	upgradient	**0.75**	--	--	--	--	--	--	--	-15.1	-19.9	-16.4	-26.8	-9.6	-11.0	**9.84**	-3.96
GC-AP-MW-26	upgradient	**1.96**	--	--	--	--	--	--	--	-15.5	-18.9	-16.7	-24.4	-9.06	-9.54	**16.8**	-3.89
GC-AP-MW-27	upgradient	--	--	--	--	--	--	--	--	-17.9	-23.6	-19.1	-31.3	-11.4	-11.8	--	-5.40
GC-AP-MW-28	upgradient	-0.09	--	--	--	--	--	--	--	-17.7	-22.9	-18.8	-30.2	-11.0	-11.3	**7.56**	-5.21
GC-AP-MW-29	upgradient	**0.46**	--	--	--	--	--	--	--	-13.8	-18.9	-14.8	-26.3	-9.00	-11.3	**8.78**	-4.72
GC-AP-MW-30	upgradient	--	--	--	--	--	--	--	--	-13.7	-19.2	-14.8	-26.9	-9.15	-11.6	--	-4.98

Notes:

SI for Greene County groundwater samples collected in March 2020.

Bold indicates positive SI values (i.e., groundwater supersaturated with respect to mineral phase).

--: No SI calculated because one or more constituent(s) in phase was not detected in groundwater sample.

SI: saturation indices

Table 5
Geochemical Analysis of Monitoring Well and Aquifer Solids

Analysis	Description	Relevance to MNA Demonstration
CEC	Determines if cation exchange on clays is an attenuating mechanism.	Supports Tier 2 (mechanisms) and Tier 3 (stability) for cation exchange.
SEM	Allows direct visual observation of attenuating phases, such as framboidal pyrite and iron oxide coatings on sand grains.	Supports Tier 2 (mechanisms) and Tier 3 (stability) of attenuating phases.
SSE	Determines which attenuating solid phases are associated with arsenic and lithium.	Supports Tier 2 (mechanisms) and Tier 3 (stability) of attenuating phases.
XRD	Identifies and provides mineralogy of crystalline attenuating phases.	Supports Tier 2 (mechanisms) and Tier 3 (stability) of attenuation involving crystalline mineral phases.
XRF	Provides bulk chemistry and presence of arsenic. (Lithium is too light to be detected by XRF.)	Relationships are determined among elements in attenuating phases (e.g., iron and manganese) and arsenic. Supports Tier 2 (mechanisms) and Tier 3 (stability).

Notes:
CEC: cation exchange capacity
MNA: monitored natural attenuation
SEM: scanning electron microscopy
SSE: selective sequential extraction
XRD: X-ray diffraction
XRF: X-ray fluorescence

Table 6
Bulk Chemistry by XRF (Well Solids)

Well ID	Arsenic	Cobalt	Iron	Manganese	Aluminum	Calcium	Magnesium	Potassium	Silicon
GC-AP-MW-1	336	ND	263,630	ND	19,150	760	ND	4,350	190,000
GC-AP-MW-10	517	ND	234,930	ND	11,460	15,350	ND	3,910	160,000
GC-AP-MW-11	644	ND	231,160	ND	18,090	2,480	ND	5,410	133,000
GC-AP-MW-16	5,128	ND	212,580	ND	3,240	245,920	ND	820	37,000
GC-AP-MW-23	3	ND	15,220	ND	16,130	1,430	ND	4,330	370,000
GC-AP-MW-29	ND	ND	14,960	ND	13,960	360	ND	4,780	375,000

Notes:

Elements lighter than magnesium (including lithium) can not be determined by portable XRF.

Units are in parts per million

ND: below limit of detection

XRF: X-ray fluorescence

Table 7

Minerals Identified in Well Solids Samples by XRD[1]

Well ID	Quartz	Calcite	Goethite
GC-AP-MW-1	X	--	X
GC-AP-MW-10	97	3	--
GC-AP-MW-11	100	--	--
GC-AP-MW-16	17	83	--
GC-AP-MW-17	100	--	--
GC-AP-MW-23	100	--	--
GC-AP-MW-29	100	--	--

Notes:

1. Estimated concentration (weight %) reported where available

--: not detected

X: Positive identification, not quantified

XRD: X-ray diffraction

Table 8
Cation Exchange Capacity of Well Solids Samples

Well ID	Aluminum	Boron	Calcium	Lithium	Magnesium	Potassium	Sodium	Sum
GC-AP-MW-29	<0.003	<0.003	8.0	<0.005	3.5	0.34	3.5	15.3
GC-AP-MW-1	0.10 J	<0.05	120	0.072 J	30	3.5	53	207
GC-AP-MW-11	<0.03	<0.03	250	0.43	61	6.5	115	432

Notes:

Units are in milliequivalents per kilogram

<: Indicates the compound was analyzed for but not detected

J: Detected but results below method reporting limit

Table 9
Bulk Chemistry by XRF (Aquifer Solids)

Boring Location	Depth Interval (ft bgs)	Units	Antimony	Arsenic	Barium	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Manganese	Mercury	Molybdenum	Nickel	Potassium	Rubidium	Strontium	Sulfur	Titanium	Zinc	Zirconium
GC1A	20-25	ppm	<LOD	<LOD	154	<LOD	511	36	<LOD	22	5,819	<LOD	155	<LOD	2	47	7,022	11	17	222	2,101	17	468
GC1B	15-20	ppm	<LOD	3	156	<LOD	615	13	<LOD	17	6,229	<LOD	154	<LOD	<LOD	52	10,107	16	16	<LOD	2,711	14	583
GC1C	15-20	ppm	<LOD	<LOD	96	<LOD	694	<LOD	<LOD	15	915	<LOD	110	4	<LOD	38	1,540	3	8	<LOD	898	7	230
GC2A	15-25	ppm	<LOD	<LOD	114	<LOD	378	9	<LOD	16	5,971	<LOD	128	<LOD	<LOD	44	2,672	7	8	<LOD	885	14	104
GC2B	15-20	ppm	<LOD	<LOD	111	<LOD	474	<LOD	<LOD	12	4,080	<LOD	167	<LOD	<LOD	38	2,284	4	6	<LOD	1,233	9	99
GC2C	15-20	ppm	<LOD	<LOD	83	<LOD	131	<LOD	19	<LOD	906	<LOD	91	<LOD	<LOD	27	882	2	4	<LOD	317	4	42
GC2C[1]	15-20	ppm	<LOD	<LOD	75	<LOD	152	<LOD	<LOD	8	811	<LOD	100	<LOD	<LOD	31	859	1	4	<LOD	283	<LOD	41
GC3A	40-45	ppm	<LOD	<LOD	122	<LOD	191	8	21	12	1,419	<LOD	114	<LOD	<LOD	39	2,361	4	9	<LOD	1,367	7	145
GC3B	40-45	ppm	<LOD	<LOD	114	<LOD	331	<LOD	20	9	1,500	<LOD	119	<LOD	<LOD	37	4,879	6	8	<LOD	952	9	63
GC4A	30-35	ppm	<LOD	7	136	<LOD	575	11	<LOD	9	15,470	<LOD	430	<LOD	<LOD	47	2,170	3	6	<LOD	469	10	34
GC4B	15-31	ppm	<LOD	5	140	<LOD	161	<LOD	<LOD	9	3,043	<LOD	165	<LOD	4	43	2,369	4	8	<LOD	959	9	252
GC4C	15-35	ppm	<LOD	<LOD	133	<LOD	250	<LOD	<LOD	13	4,284	<LOD	159	<LOD	2	39	5,354	9	16	<LOD	2,105	13	225

Notes:
1. Duplicate
Samples were analyzed on April 20, 2021.
ft bgs: feet below ground surface
ppm: parts per million
XRF: X-ray fluorescence
<LOD: Less than limit of detection

Table 10
Minerals Identified in Aquifer Soil Samples by XRD

Boring Location	Depth Interval (ft bgs)	Quartz	Feldspars				Micas			Clay Minerals			
			Albite	Anorthite	Anorthoclase	Orthoclase	Biotite	Muscovite	Other	Bentonite	Kaolinite	Montmorillonite	Vermiculite
GC1A	20-25	95	3.8				1					0.1	
GC1B	15-20	94		2.5				2.5			1	0.1	
GC1C	15-20	99								0.4		0.1	
GC2B	15-20	99								0.4		0.1	
GC3A	40-45	95			4					1			0.01
GC3B	40-45	99.8					0.1					0.1	
GC4A	30-35	99.7								0.2		0.1	
GC4C	15-30	98				0.3			1.5			0.1	

Notes:

Results are presented as weight percentage

ft bgs: feet below ground surface

XRD: X-Ray Diffraction Analysis

Table 11
Cation Exchange Capacity of Aquifer Solids Samples

Boring Location	Depth Interval (ft bgs)	Exchangeable Cations (meq/kg soil)							CEC (meq/kg soil)
		Aluminum	Calcium	Cobalt	Magnesium	Potassium	Sodium	Lithium	
GC1A	20-25	0.0695 U	**7.81**	**0.00612**	**3.86**	**2.59**	**0.489**	**0.0156 J**	**14.8**
GC1B	15-20	0.0695 U	**10.8**	**0.000462 J**	**2.81**	**1.04**	**0.363**	0.00901 U	**15.0**
GC1C	15-20	0.0695 U	**12.6**	**0.00157**	**1.27**	**1.5**	**0.33**	**0.0215**	**15.7**
GC2A	15-25	0.0694 U	**5.98**	0.000424 U	**2.36**	**1.24**	**0.486**	0.00899 U	**10.1**
GC2B	15-20	0.0694 U	**6.6**	**0.000513 J**	**0.891**	**1.39**	**0.18**	0.00899 U	**9.1**
GC2C	15-20	0.0694 U	**2.49**	**0.000517 J**	**0.324**	**0.499**	**0.187**	0.00899 U	**3.5**
GC3A	40-45	0.0694 U	**3.31**	**0.000635 J**	**0.949**	**1.13**	**0.682**	**0.0413**	**6.1**
GC3A[1]	40-45	0.0694 U	**2.77**	**0.000588 J**	**0.863**	**0.945**	**0.595**	**0.037**	**5.2**
GC3B	40-45	0.0694 U	**4.83**	**0.000571 J**	**1.96**	**1**	**0.506**	**0.0265**	**8.3**
GC4A	30-35	0.0694 U	**7.1**	**0.000881**	**2.47**	**0.893**	**0.395**	**0.0347**	**10.9**
GC4B	15-31	0.0695 U	**3.69**	**0.000711 J**	**1.65**	**1.62**	**0.365**	**0.0828**	**7.4**
GC4C	15-35	0.0694 U	**4.41**	**0.00127**	**2.45**	**1.01**	**0.317**	**0.0439**	**8.2**

Notes:
Bold indicates detected values.
1. Duplicate
CEC: cation exchange capacity
ft bgs: feet below ground surface
J: Estimated value
meq/kg: milliequivalents per kilogram
ND: non detect
U: Compound analyzed but not detected above detection limit

Table 12
Lines of Evidence for Attenuation Mechanisms

Mechanism	Geochemical Modeling	XRF	XRD	SSE	CEC
Sorption on iron oxides (arsenic and cobalt)	X	X	X	X	
Cation exchange on clays (cobalt, lithium)		X		X	X
Coprecipitation in iron oxides (cobalt)	X			X	
Precipitation in barium arsenate (arsenic)	X				

Notes:

CEC: cation exchange capacity

SSE: selective sequential extraction

XRD: X-ray diffraction

XRF: X-ray fluorescence

Table 13
Extractable Aluminum, Manganese, and Iron Oxides in Aquifer Soils

Boring Location	Depth Interval (ft bgs)	Aluminum (mg/kg)	Iron (mg/kg)	Manganese (mg/kg)
GC1A	20-25	**923**	**1190**	**14.6**
GC1B	15-20	**435**	**866**	**18.8**
GC1C	15-20	**440**	**879**	**18.7**
GC2A	15-25	**929**	**384**	**4.39**
GC2B	15-20	**453**	**300**	**4.92**
GC2C	15-20	**626**	**528**	**40.4**
GC3A	40-45	**245**	**91.5**	**2.95**
GC3A[1]	40-45	**297**	**168**	**3.21**
GC3B	40-45	**289**	**159**	**3.1**
GC4A	30-35	**247**	**794**	**148**
GC4B	15-31	**420**	**374**	**27.7**
GC4C	15-35	**313**	**302**	**19.7**

Notes:
1. Duplicate
Extractable oxides determined by acid ammonium oxalate method.
Bold indicates detected values.
ft bgs: feet below ground surface
mg/kg: milligrams per kilogram

Table 14
Groundwater Chemistry Data Used in the 1D Reactive Transport Models

		Transect 1							Transect 2			Transect 3			Transect 4		
Sample Location ID		MW-6	MW-5	MW-54H	MW-57H	MW-44H	PZ-4	MW-34HA	MW-25	MW-1	MW-35H	MW-25	MW-17	MW-38H	MW-41H	MW-13	MW-45H
Analyte	Units	Background	Downgradient	Downgradient	Downgradient	Downgradient	Downgradient	Downgradient	Background	Downgradient	Downgradient	Background	Downgradient	Downgradient	Background	Downgradient	Downgradient
Eh	V	0.249	0.145	0.097	0.133	0.252	0.233	0.459	0.432	0.234	0.316	0.432	0.126	0.271	0.222	0.332	0.164
pe	s.u.	4.28	2.49	1.67	2.27	4.34	3.97	7.82	7.40	4.00	5.41	7.40	2.17	4.62	3.81	5.64	2.80
pH	s.u.	6.49	6.36	6.67	6.48	6.27	5.94	4.78	4.81	5.54	6.03	4.81	6.71	6.57	5.93	6.76	6.94
DO	mg/L	0.72	0.70	0.27	0.21	0.26	0.28	3.53	0.58	0.63	7.47	0.58	0.23	2.65	0.22	1.38	0.76
Alkalinity	mg/L	483	205	205	84.8	98.8	93.6	21.6	29.0	75.7	31.3	29.0	402	183	160	117	104
Arsenic	mg/L	0.005 U	0.415	0.467	0.047	0.002	0.002	0.005 U	0.005 U	0.027	0.005 U	0.005 U	0.581	0.005 U	0.002	0.002	0.005 U
Barium	mg/L	0.078	0.134	0.221	0.080	0.059	0.072	0.047	0.111	0.022	0.033	0.111	0.290	0.068	0.088	0.199	0.063
Calcium	mg/L	162	92.2	101	79.1	173	153	9.68	10.7	81.5	22.9	10.7	73.0	96.0	66.7	95.3	57.2
Chloride	mg/L	39.6	13.0	10.8	6.30	10.8	9.78	2.07	16.7	23.2	1.12	16.7	15.4	3.40	15.9	8.24	8.99
Cobalt	mg/L	0.003	0.007	0.027	0.086	0.273	0.148	0.002	0.013	0.195	0.005 U	0.013	0.012	0.005 U	0.008	0.005 U	0.005
Iron (dissolved)	mg/L	0.256	30.5	45.0	62.7	3.26	30.0	0.05 U	0.749	298	0.05 U	0.749	26.4	0.054	4.36	0.05 U	0.501
Lithium	mg/L	0.020	0.132	0.105	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.552	0.02 U	0.0390	0.420	0.212
Magnesium	mg/L	35.9	17.4	21.4	22.6	19.8	30.7	1.82	9.68	38.5	2.96	9.68	22.4	7.43	6.47	19.2	17.7
Manganese (dissolved)	mg/L	1.07	1.70	1.88	3.38	12.1	6.00	0.008	0.273	13.9	0.005 U	0.273	1.84	0.089	1.65	0.074	3.37
Potassium	mg/L	1.34	6.74	6.72	6.15	2.67	5.96	1.19	0.772	3.56	1.31	0.772	12.5	2.02	4.63	7.87	4.05
Sodium	mg/L	85.8	24.6	24.7	21.0	28.7	25.9	5.72	33.2	64.1	1.24	33.2	70.3	3.26	27.5	18.4	17.9
Sulfate	mg/L	163	132	180	274	415	493	13.5	79.5	919	28.8	79.5	46.7	70.0	76.6	203	128

Notes:

Groundwater chemistry data from August 2020

Thick border indicates Transect COI at a statistically significant level.

DO: dissolved oxygen

mg/L: milligrams per liter

s.u.: standard units

U: non-detect

V: volts

Table 15
Cation Exchange and Sorption Capacity for the 1D Model Transects

Constituent	Units	Transect 1	Transect 2	Transect 3	Transect 4
Average cation exchange capacity	meq/kg	16	8.0	7.0	9.0
X	meq/L	0.127	0.064	0.056	0.072
Average extractable iron oxides	mg/kg	979	404	140	490
≡FeOH (weak)	mol/L	0.028	0.012	0.004	0.014
≡FeOH (strong)	mol/L	0.0007	0.0003	0.0001	0.00035
Average extractable aluminum oxides	mg/kg	322	670	277	327
≡AlOH	mol/L	0.00315	0.0065	0.0027	0.0032

Notes:

X: ion exchange site

≡FeOH (weak): weak surface binding site on $Fe(OH)_3$

≡FeOH (strong): strong surface binding site on $Fe(OH)_3$

≡AlOH: surface binding site on $Al(OH)_3$

meq/kg: milliequivalents per kilogram

meq/L: milliequivalents per liter

mg/kg: milligrams per kilogram

mol/L: moles per liter

Table 16
Initial Groundwater Characterization Results

Parameter	Result		Units
	MW-1	MW-17	
Alkalinity	7 J	446	mg/L as $CaCO_3$
Ammonia as N	1.90	0.388	mg/L
Total organic carbon	2.40	1.60	mg/L
Chloride	24.3	--	mg/L
Fluoride	0.01 U	0.94	mg/L
Nitrate as N[1]	0.02 U	0.04 J	mg/L
Nitrite as N	0.006 U	0.006 U	mg/L
Orthophosphate	0.020 U	0.020 U	mg/L
Sulfate	1,240	83.7	mg/L
Aluminum, dissolved	1.90	1.3 J	µg/L
Aluminum, total	7.60	1.2 J	µg/L
Antimony, dissolved	0.020 U	0.020 U	µg/L
Arsenic, dissolved	4.19	343	µg/L
Barium, dissolved	22.4	299	µg/L
Beryllium	0.05 U	0.10 U	µg/L
Boron, dissolved	156	2,350	µg/L
Cadmium, dissolved	0.035	0.008 U	µg/L
Calcium, dissolved	112	117	mg/L
Chromium, dissolved	0.13 J	0.06 J	µg/L
Cobalt, dissolved	284	12.6	µg/L
Iron, dissolved	214,000	19,300	µg/L
Iron, total	213,000	25,100	µg/L
Lead, dissolved	0.006 U	0.006 U	µg/L
Lithium, dissolved	2.6	685	µg/L
Magnesium, dissolved	43.6	30.9	mg/L
Manganese, dissolved	14,100	2,280	µg/L
Manganese, total	14,400	2,350	µg/L
Molybdenum, dissolved	0.04 J	65.1	µg/L
Nickel, dissolved	58.9	7.46	µg/L
Potassium, dissolved	3.57	13,800	mg/L
Selenium, dissolved	0.2 U	0.2 U	µg/L
Silicon, dissolved	6.35	9.24	mg/L
Silver, dissolved	0.009 U	0.009 U	µg/L
Sodium, dissolved	64.0	58.1	mg/L
Thallium, dissolved	0.127	0.009 U	µg/L
Zinc, dissolved	58.1	2.7	µg/L
pH	6.28	7.19	--

Notes:

Samples were field filtered with a 0.45-micron filter at the time of collection and filtered again prior to analysis for dissolved constituents.

1. Calculated as: (nitrogen, nitrate + nitrite) – (nitrogen, nitrite)

--: not applicable

µg/L: micrograms per liter

$CaCO_3$: calcium carbonate

J: Indicates that the result is an estimated value.

mg/L: milligrams per liter

mV: millivolts

N: nitrogen

ORP: oxidation-reduction potential

U: Indicates that the compound was analyzed for but not detected.

Table 17
Site Soils and Groundwater Used in Column Tests

Column Number	Soil ID	Groundwater ID	COI(s) in Groundwater
1	GC-1A-UNIT2-20-25	MW-1	Arsenic, Cobalt
2	GC-2A-UNIT2-15-25	MW-1	Arsenic, Cobalt
3	GC-3A-UNIT2-40-45	MW-17	Arsenic, Lithium
4	GC-4A-UNIT2-30-35	MW-17	Arsenic, Lithium

Note:

COI: constituent of interest

Table 18
Column Test Operating Conditions

Parameter	Value	Unit
Soil/sand mixture depth	12.8	cm
Column Inside diameter	2.68	cm
Flow rate	0.4	mL per minute
Empty bed contact time	3.01	hours
Porosity	32-38	%
Dry mass of soil in column	104-111	gram
Hydraulic residence time	0.96-1.18	hours
Darcy flux	32.6-38.8	cm per day
Linear velocity	102	cm per day
Column test duration	14	days

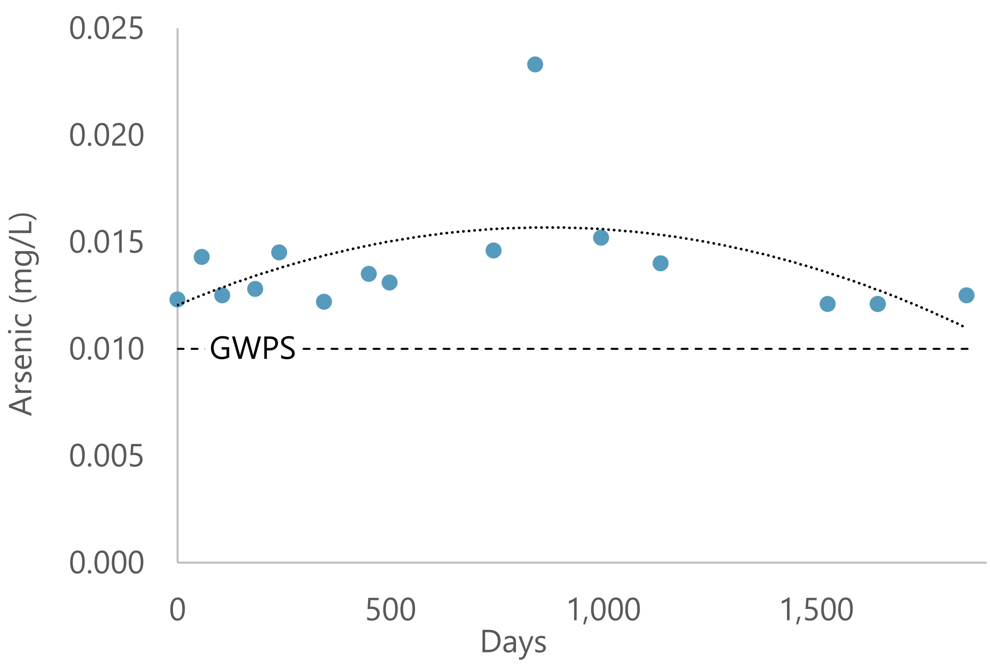
Notes:
cm: centimeter
mL: milliliter

Table 19
Post-Column Test Soil SSE Results

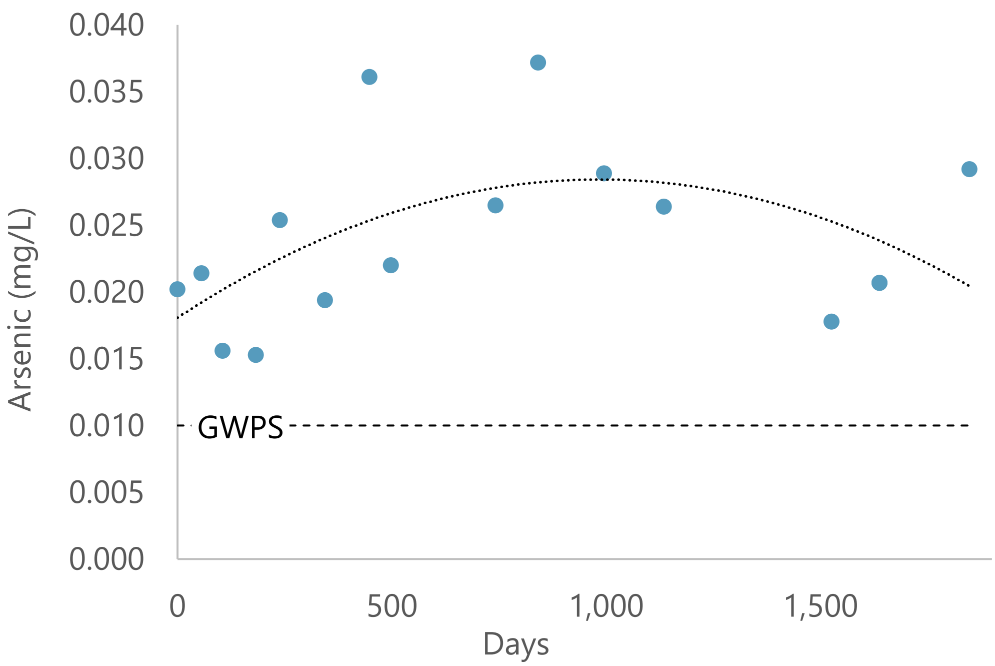
Sample ID	Arsenic (mg/kg)					Cobalt (mg/kg)					Lithium (mg/kg)					Iron (mg/kg)					Manganese (mg/kg)				
	F1	F2	F3	F4	F5	F1	F2	F3	F4	F5	F1	F2	F3	F4	F5	F1	F2	F3	F4	F5	F1	F2	F3	F4	F5
GC-1A-UNIT2-15-25	2.03 U	2.03 U	2.03 U	2.03 U	2.65 U	2.03 U	2.03 U	2.03 U	2.03 U	2.65 U	--	--	--	--	--	--	102 U	**121 J**	**2250**	**1810**	--	2.03 U	**4.69**	2.03 U	**4.27**
GC-1A-UNIT2-15-25[1]	1.95 U	1.95 U	1.95 U	**2.39 J**	2.60 U	1.95 U	1.95 U	1.95 U	1.95 U	2.60 U	--	--	--	--	--	--	97.7 U	**148 J**	**2520**	**1290**	--	1.95 U	**4.66**	1.95 U	**3.73**
GC-1A-UNIT2-20-25	1.97 U	1.97 U	1.97 U	1.97 U	2.65 U	1.97 U	1.97 U	1.97 U	1.97 U	2.65 U	--	--	--	--	--	--	98.4 U	**132 J**	**2230**	**1070**	--	1.97 U	**5.03**	1.97 U	2.65 U
GC-1A-UNIT2-30-35	1.91 U	1.91 U	1.91 U	1.91 U	2.65 U	--	--	--	--	--	9.54 U	9.54 U	9.54 U	9.54 U	13.2 U	--	**114 J**	95.4 U	**1210**	**4100**	--	**14.5**	**160**	**6.06**	**13.4**
GC-1A-UNIT2-40-45	1.91 U	1.91 U	1.91 U	1.91 U	2.66 U	--	--	--	--	--	9.54 U	9.54 U	9.54 U	9.54 U	13.3 U	--	95.4 U	95.4 U	95.4 U	**471**	--	**5.96**	**6.43**	1.91 U	2.66 U

Notes:
Bold indicates detected values.
1. Duplicate
F1: Soluble
F2: Exchangeable
F3: Reducible (Fe/Mn oxide bound)
F4: Oxidizable (Sulfide/organic/crystalline oxide bound)
F5: Residual
--: not measured
J: Estimated value
mg/kg: milligrams per kilogram
SSE: selective sequential extraction
U: Compound analyzed but not detected above detection limit

Figures



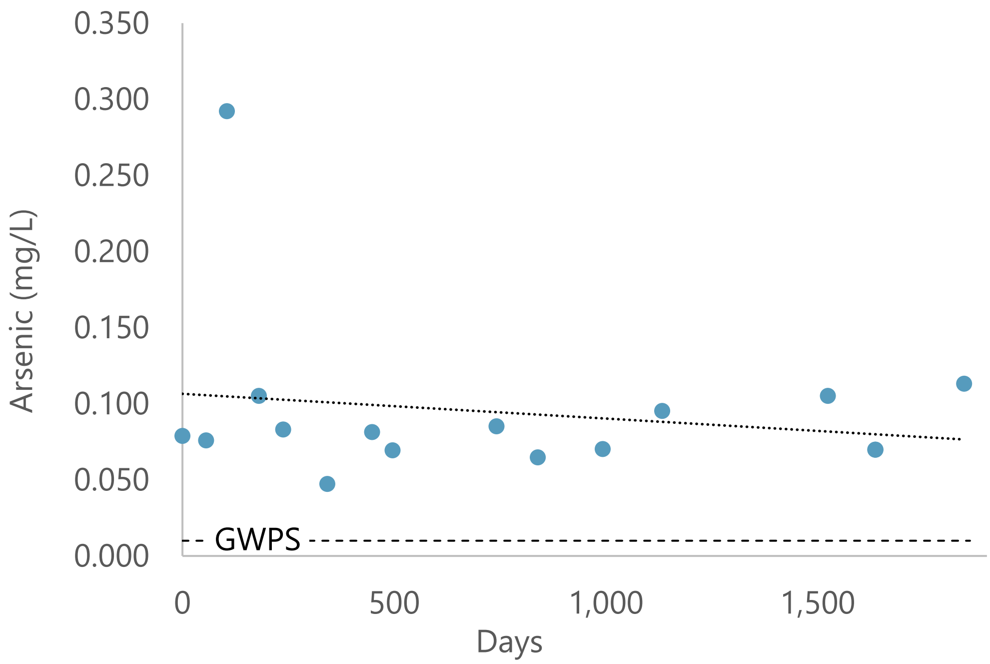
GC-AP-MW-10



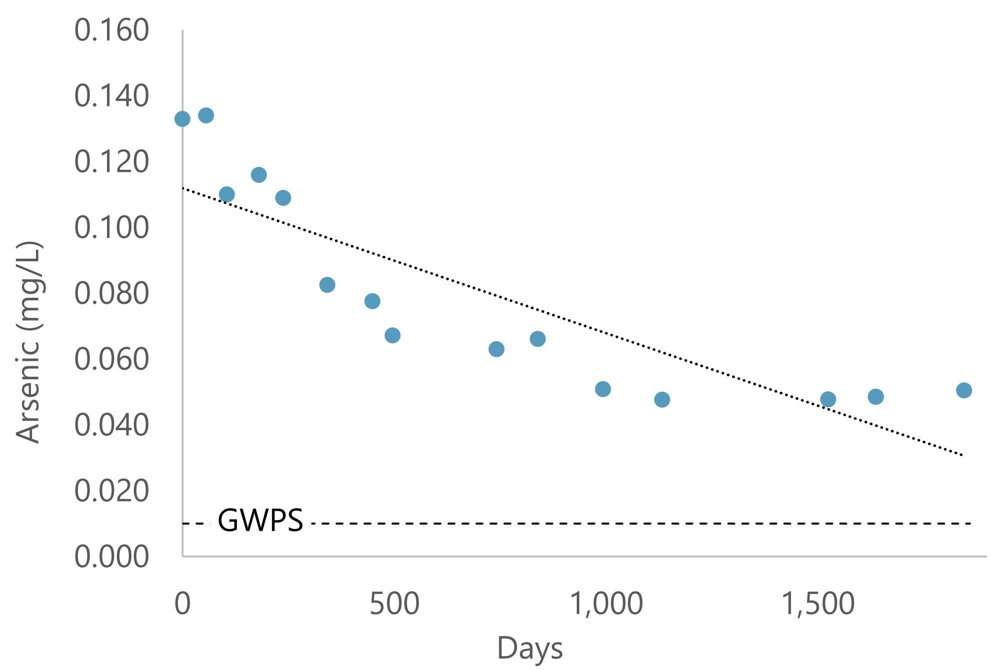
GC-AP-MW-14

Notes:
GWPS: groundwater protection standards
mg/L: milligrams per liter

Figure 1a
Concentration Versus Time Graphs
Monitored Natural Attenuation Demonstration
Plant Greene County

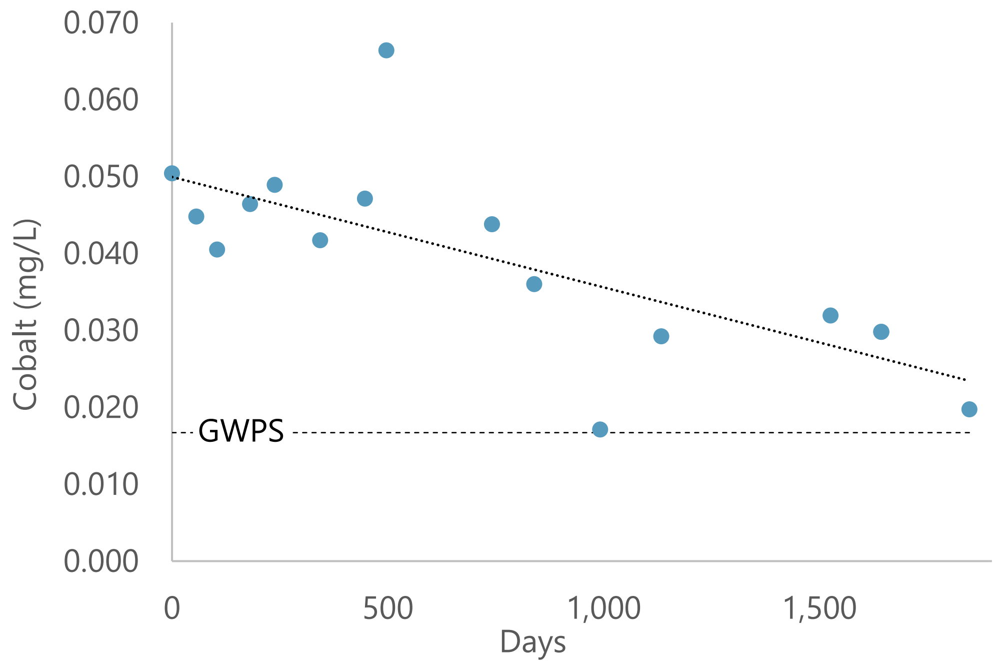


GC-AP-MW-16

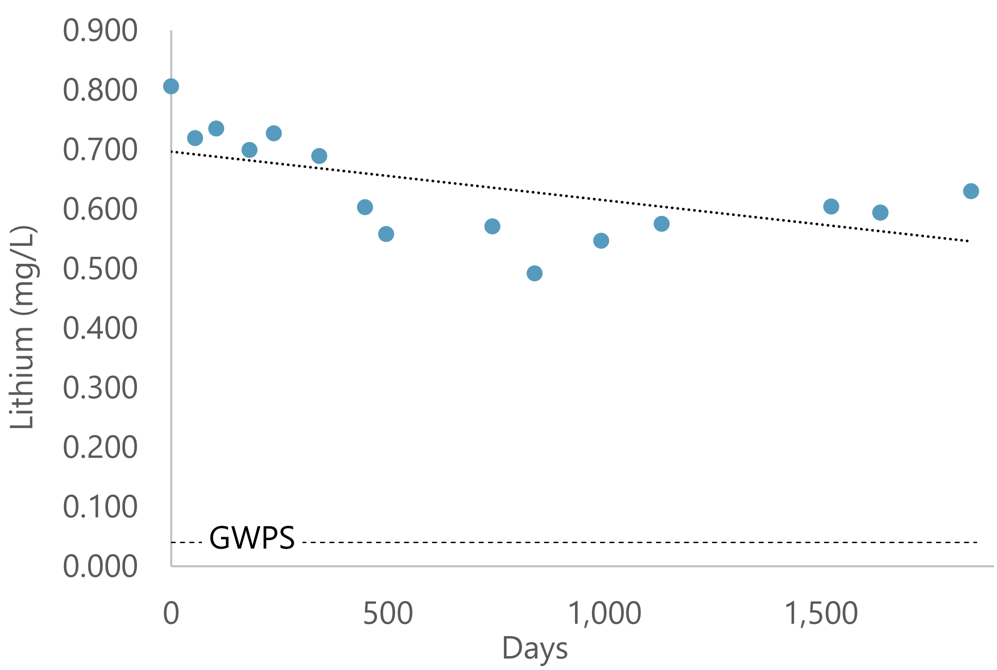


GC-AP-MW-18

Notes:
GWPS: groundwater protection standards
mg/L: milligrams per liter

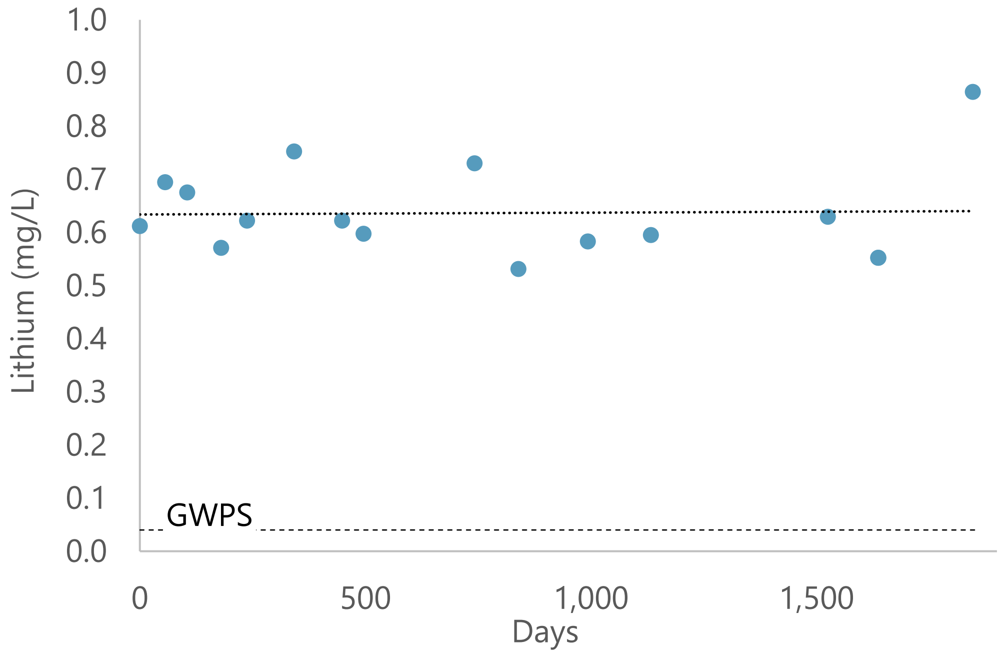


GC-AP-MW-11

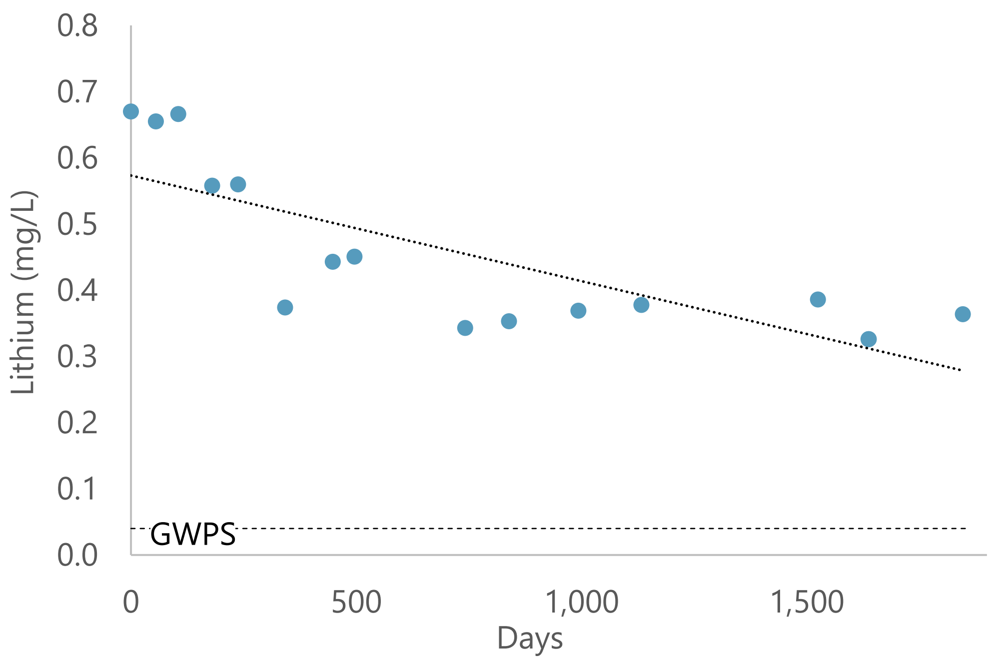


GC-AP-MW-15

Notes:
GWPS: groundwater protection standards
mg/L: milligrams per liter

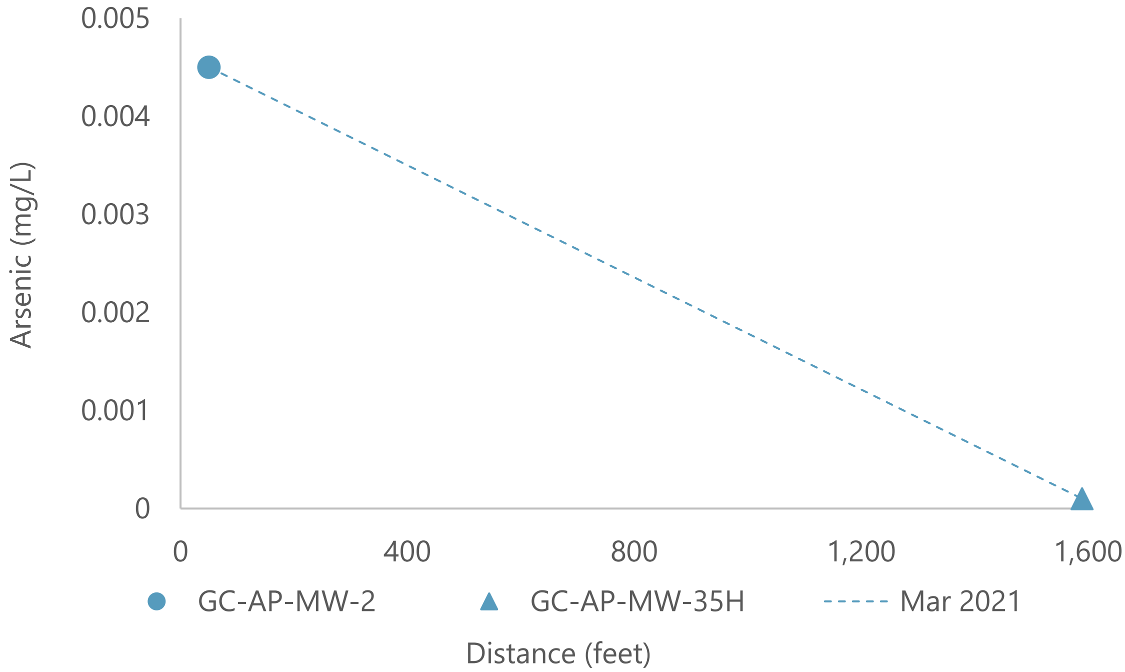


GC-AP-MW-17

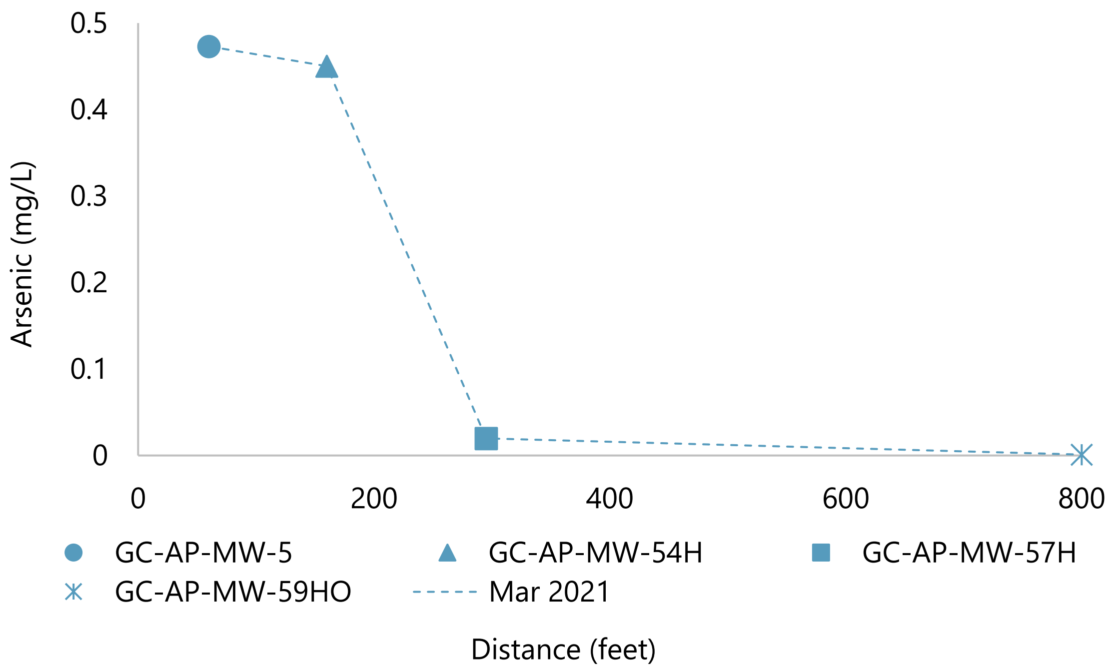


GC-AP-MW-18

Notes:
GWPS: groundwater protection standards
mg/L: milligrams per liter

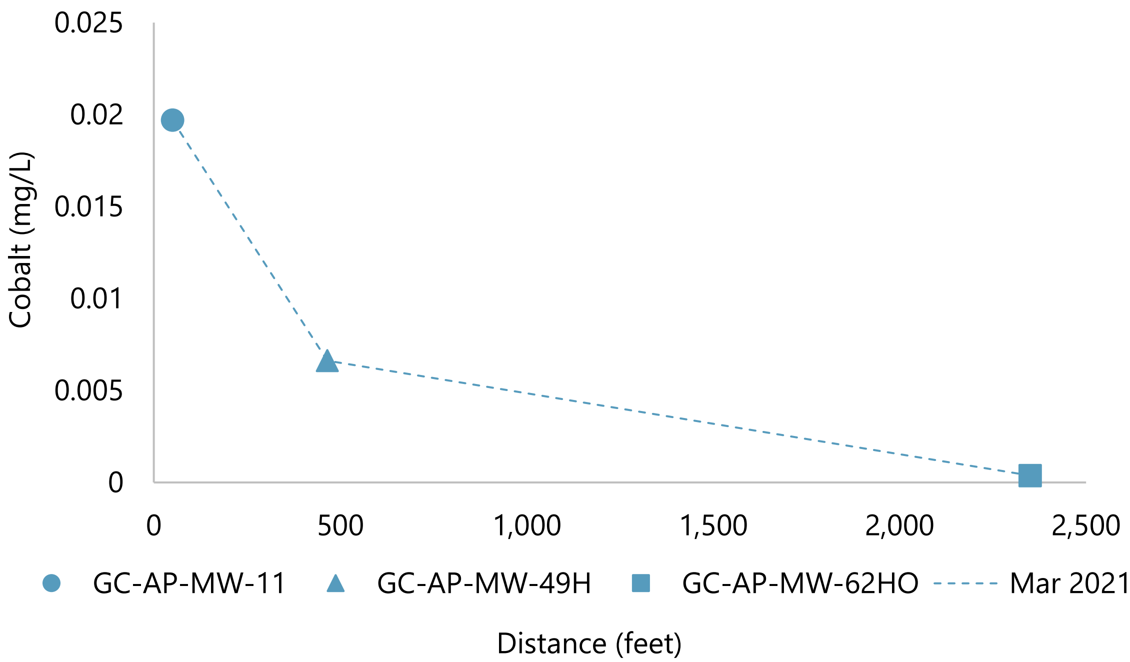


GC-AP-MW-2 (Arsenic)

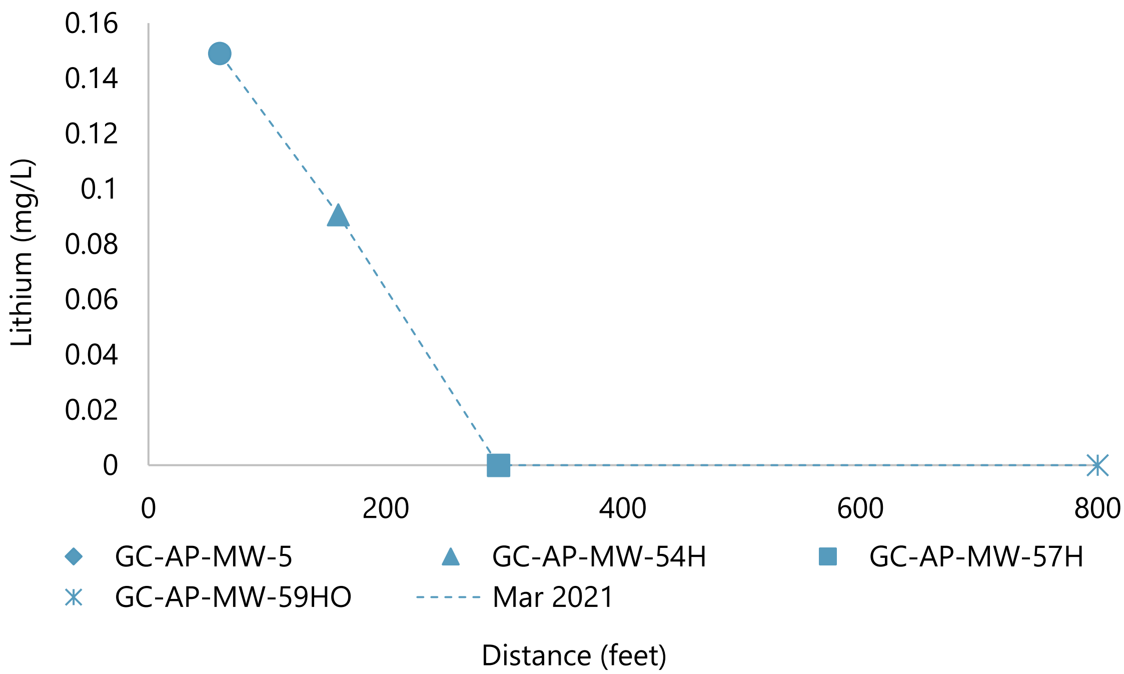


GC-AP-MW-5 (Arsenic)

Note:
mg/L: milligrams per liter

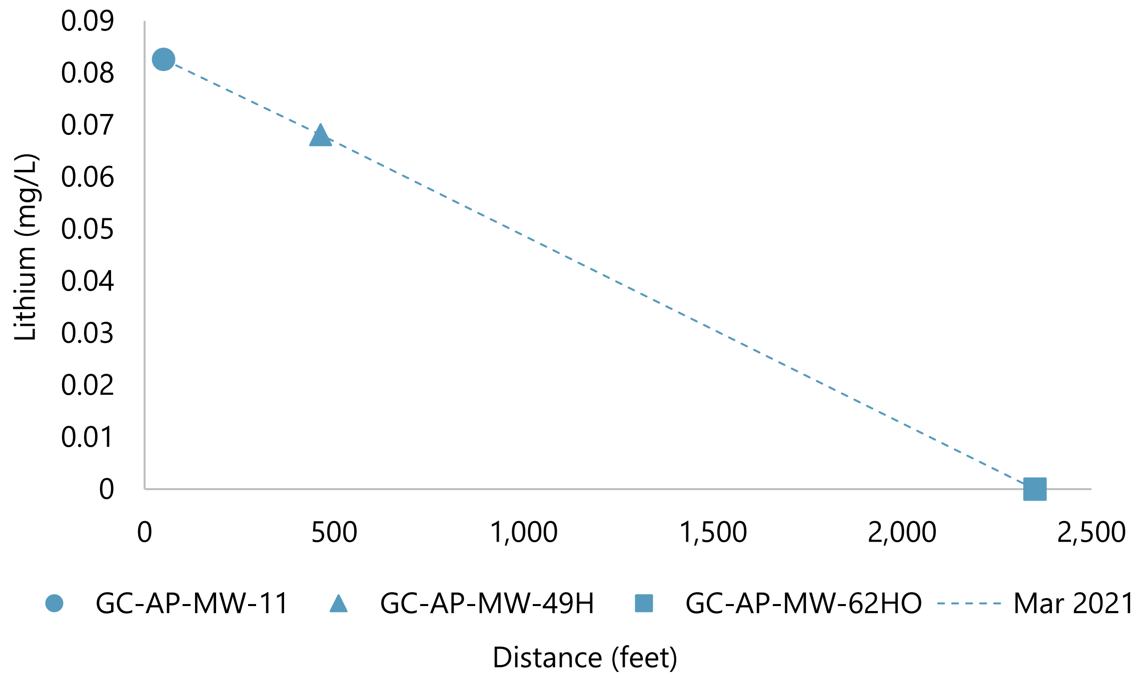


GC-AP-MW-11 (Cobalt)

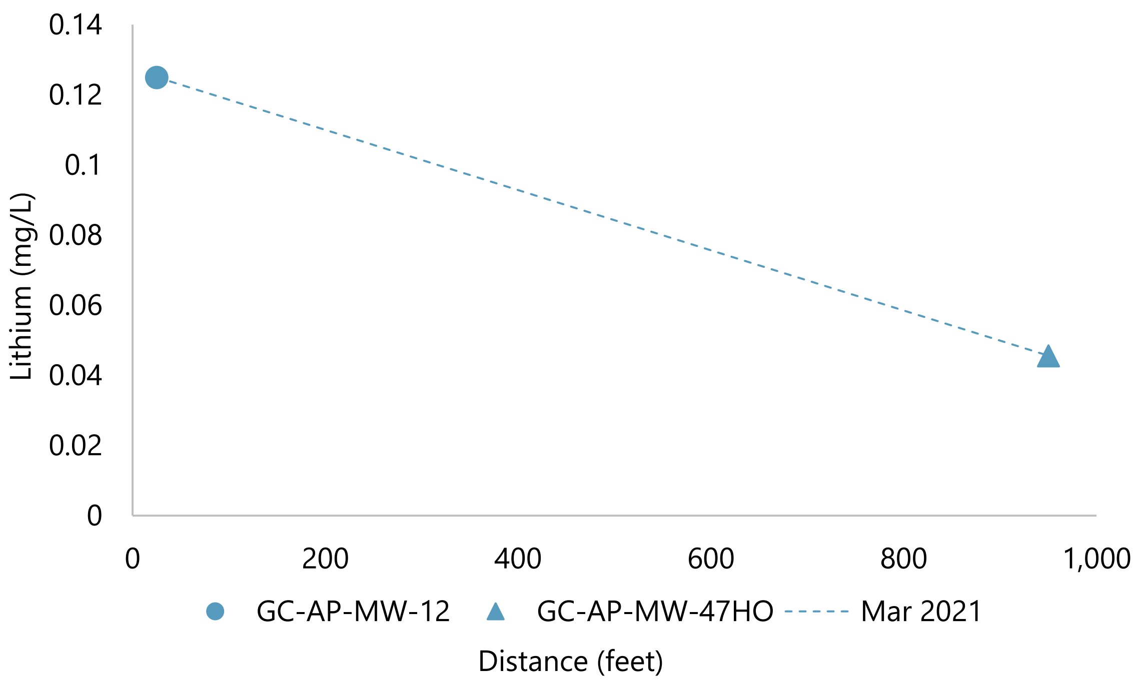


GC-AP-MW-5 (Lithium)

Note:
mg/L: milligrams per liter

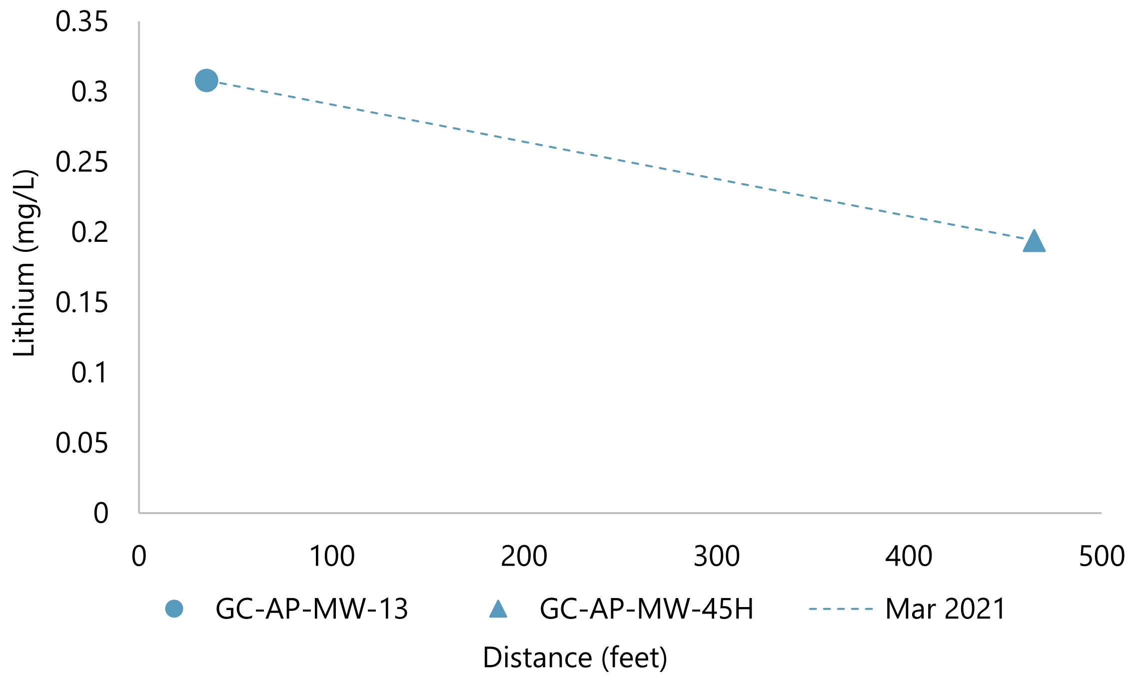


GC-AP-MW-11 (Lithium)

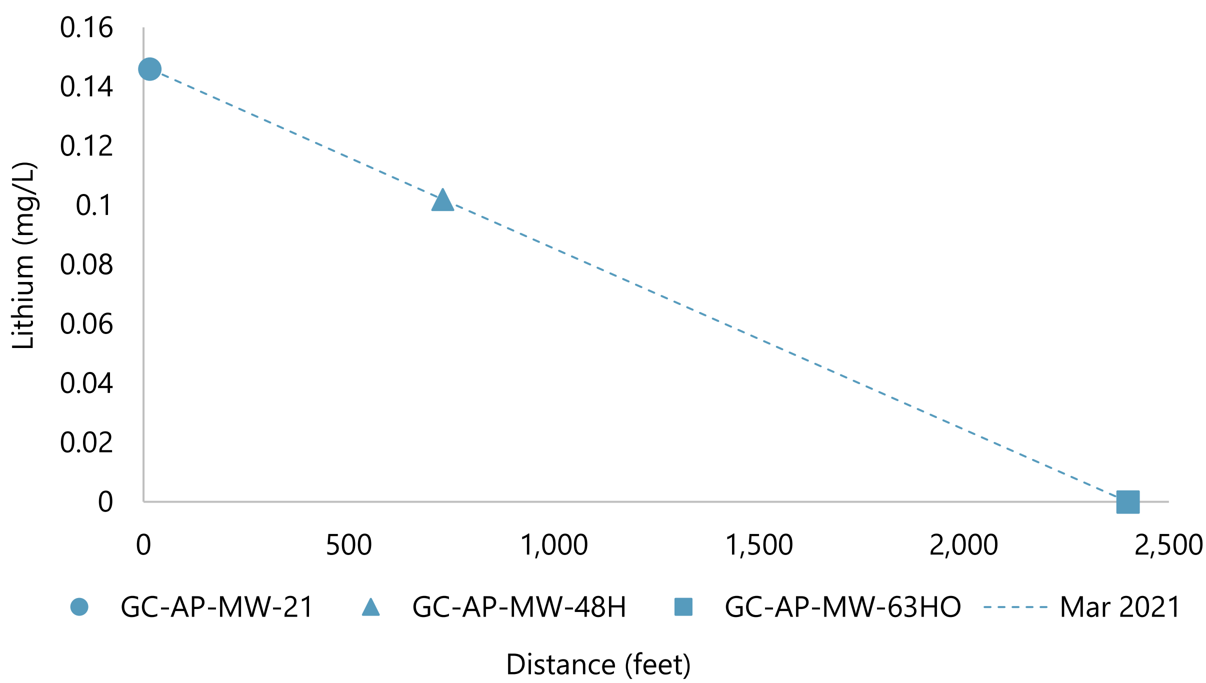


GC-AP-MW-12 (Lithium)

Note:
mg/L: milligrams per liter

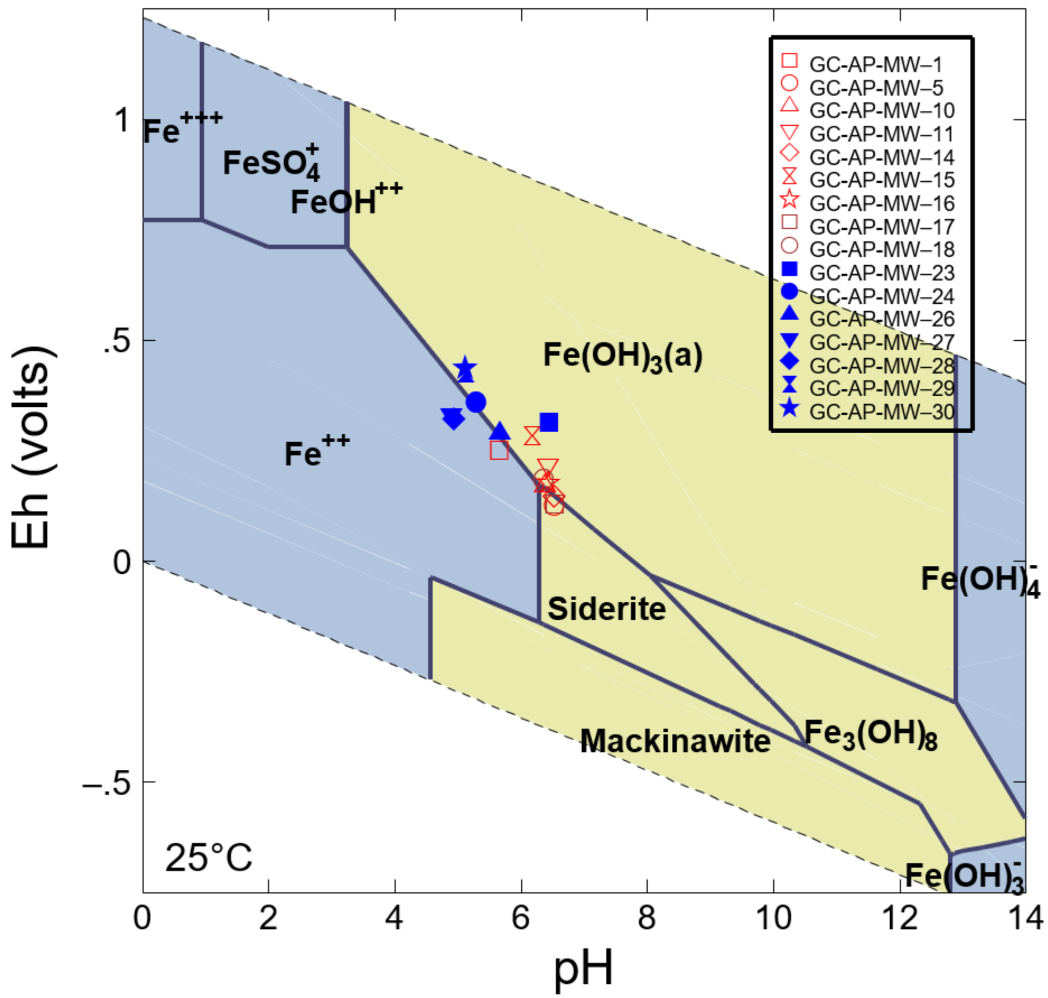


GC-AP-MW-13 (Lithium)



GC-AP-MW-21 (Lithium)

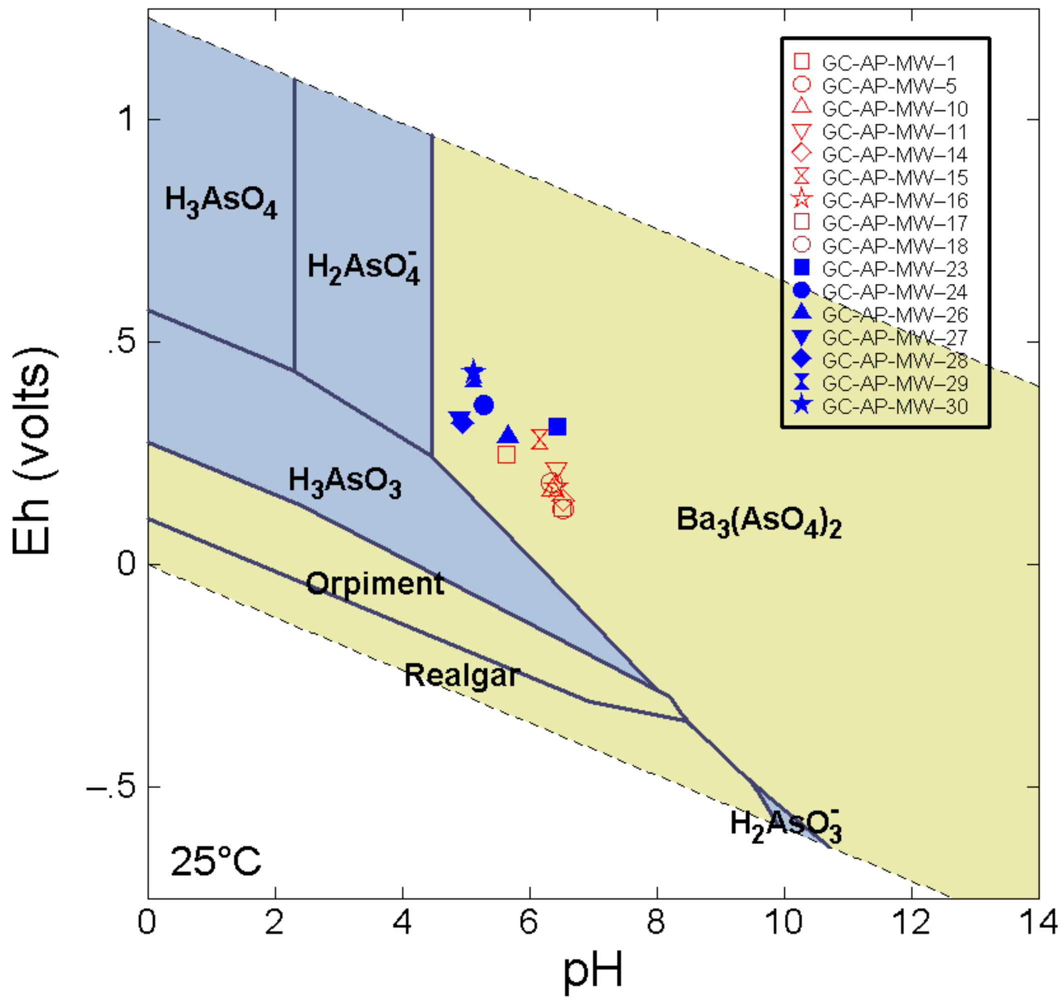
Note:
mg/L: milligrams per liter



Note:
Blue fields indicate dissolved/mobile species. Yellow fields indicate solid/attenuated species.

Filepath: \\Athena\Mobile\Projects\Southern Company\Alabama Power ACMs - PRIVILEGED & CONFIDENTIAL\MNA Demonstration Reports\Greene County\Figures\Figure 3 - GreeneCounty - Fe.docx

Figure 3
Eh-pH Stability Diagram for Dissolved and Solid Iron Phases
Monitored Natural Attenuation Demonstration
Plant Greene County



Note:
Blue fields indicate dissolved/mobile species. Yellow fields indicate solid/attenuated species.

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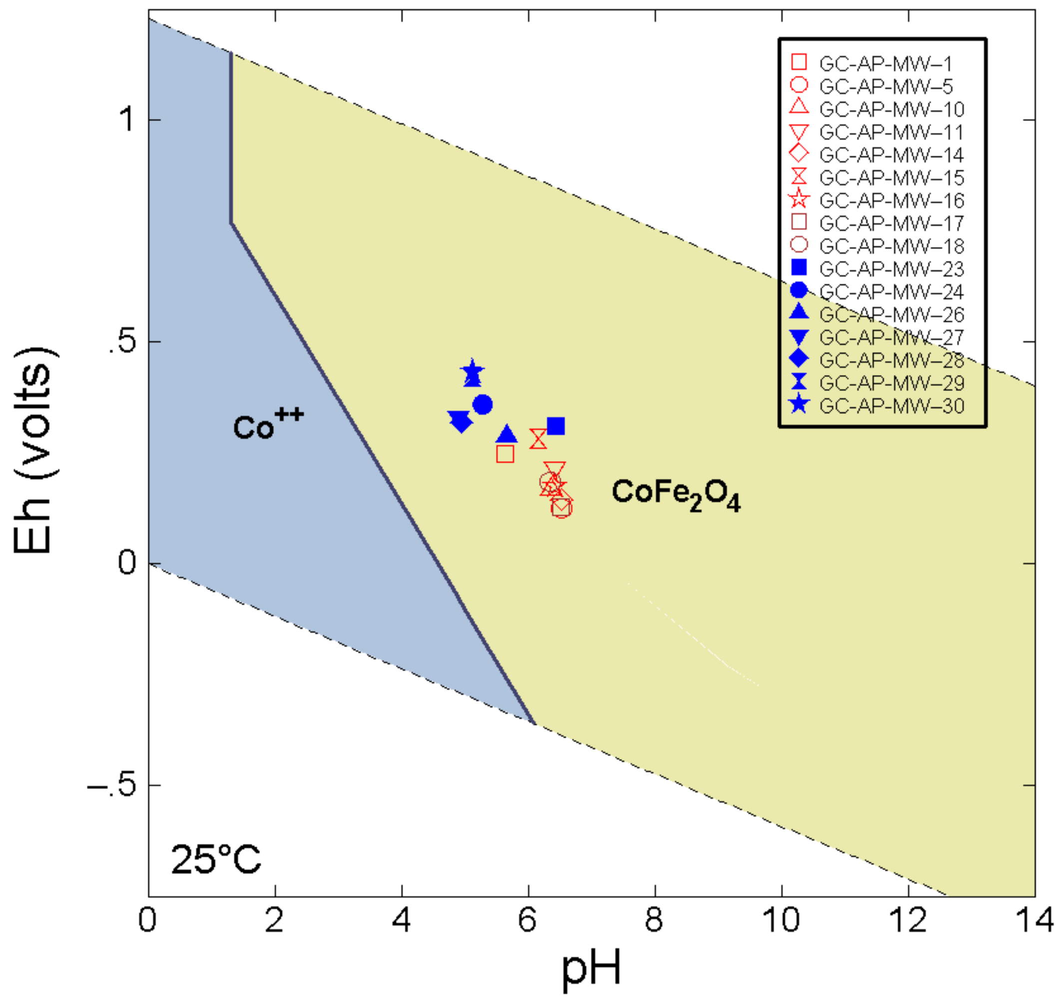
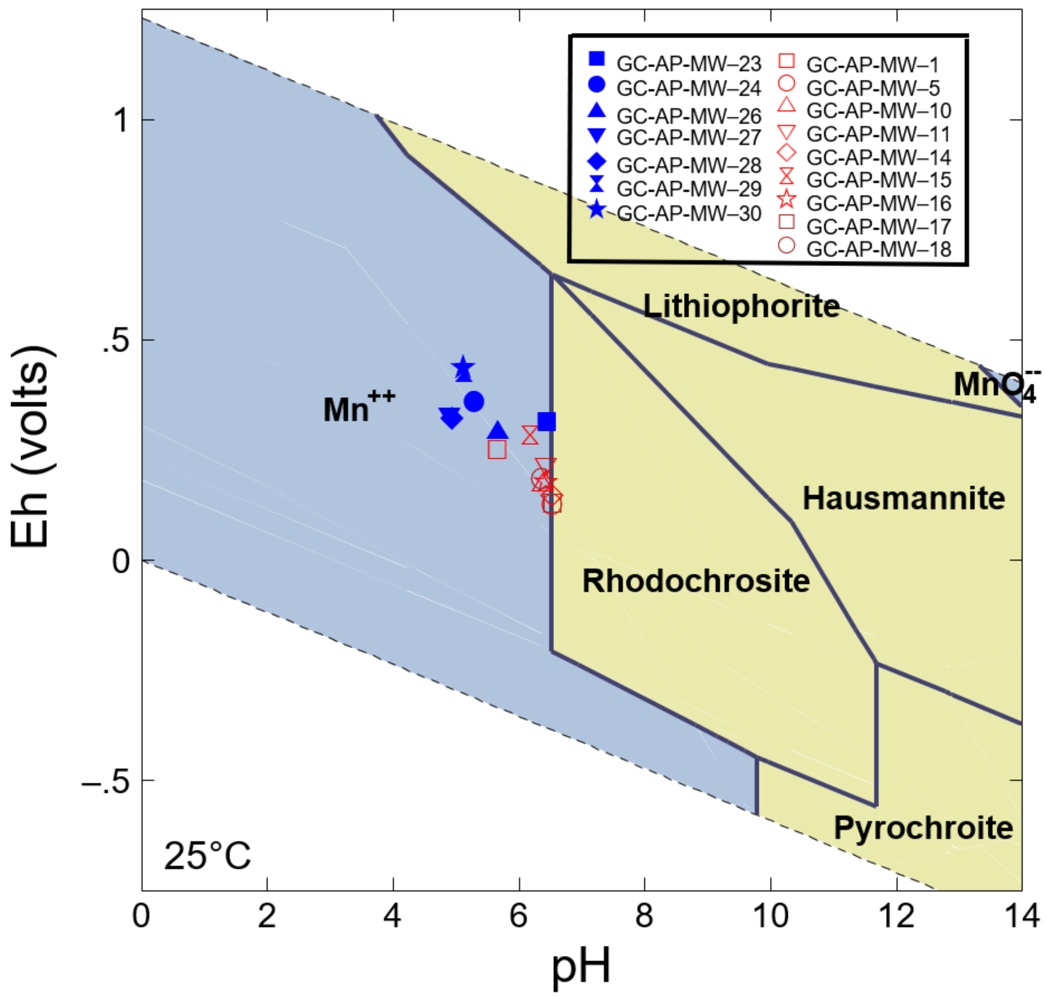
Figure 4
Eh-pH Stability Diagram for Dissolved and Solid Arsenic Phases
Monitored Natural Attenuation Demonstration
Plant Greene County



Note:
Blue fields indicate dissolved/mobile species. Yellow fields indicate solid/attenuated species.

Figure 5
Eh-pH Stability Diagram for Dissolved and Solid Cobalt Phases
Monitored Natural Attenuation Demonstration
Plant Greene County



Note:
Blue fields indicate dissolved/mobile species. Yellow fields indicate solid/attenuated species.

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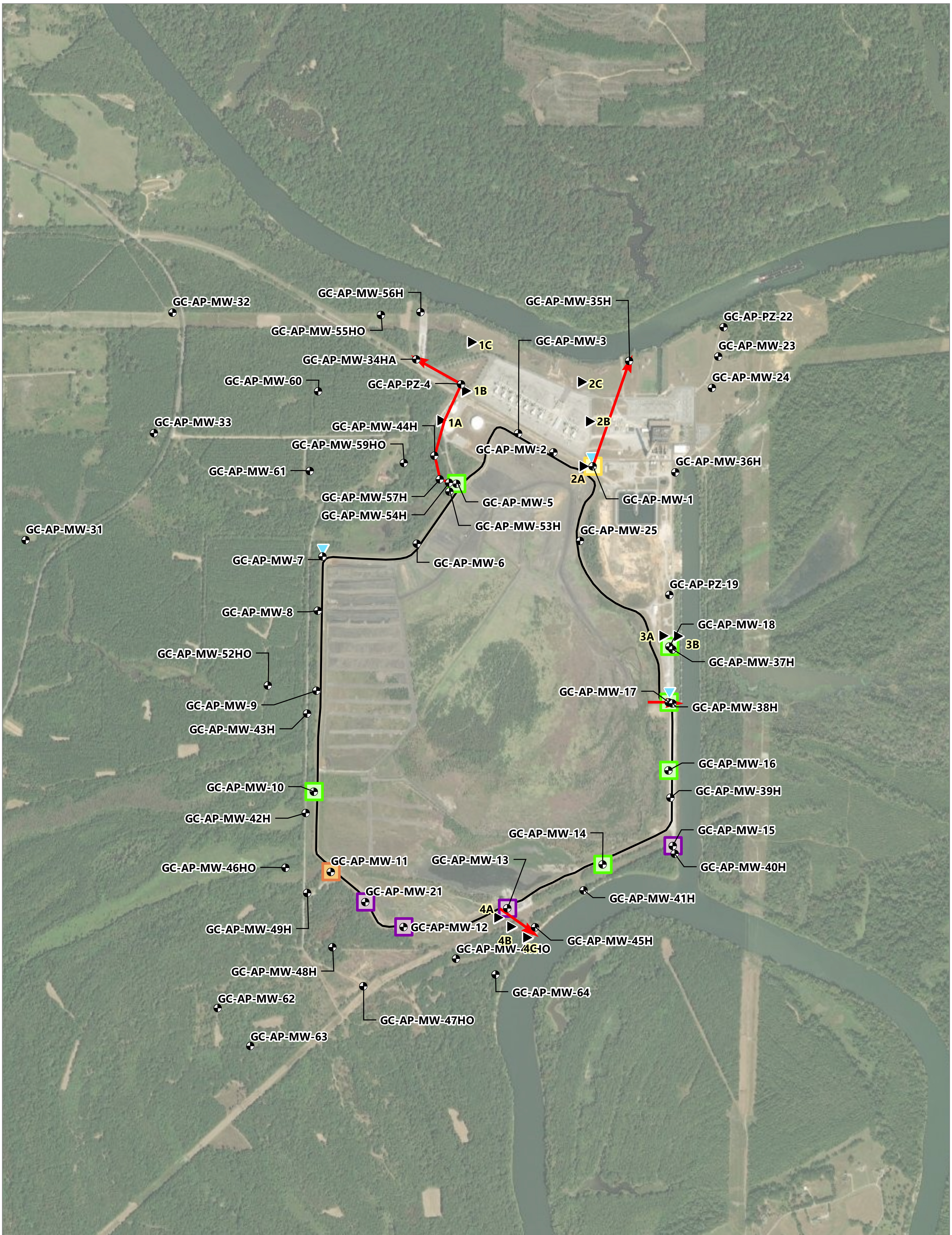
Figure 6
Eh-pH Stability Diagram for Dissolved and Solid Manganese Phases
Monitored Natural Attenuation Demonstration
Plant Greene County



LEGEND:

- Greene County Ash Pond Boundary
- Monitoring Well
- 1D Model Transect
- Groundwater Sample
- Soil Sample
- Lithium SSL
- Arsenic + Cobalt SSLs
- Arsenic + Lithium SSLs
- Cobalt + Lithium SSLs

NOTE:
SSL: statistically significant level

Groundwater Samples:
- GC-AP-MW-1
- GC-AP-MW-7
- GC-AP-MW-17

0 2,000
Feet

Publish Date: 2021/09/29, 1:39 PM | User: jquinley
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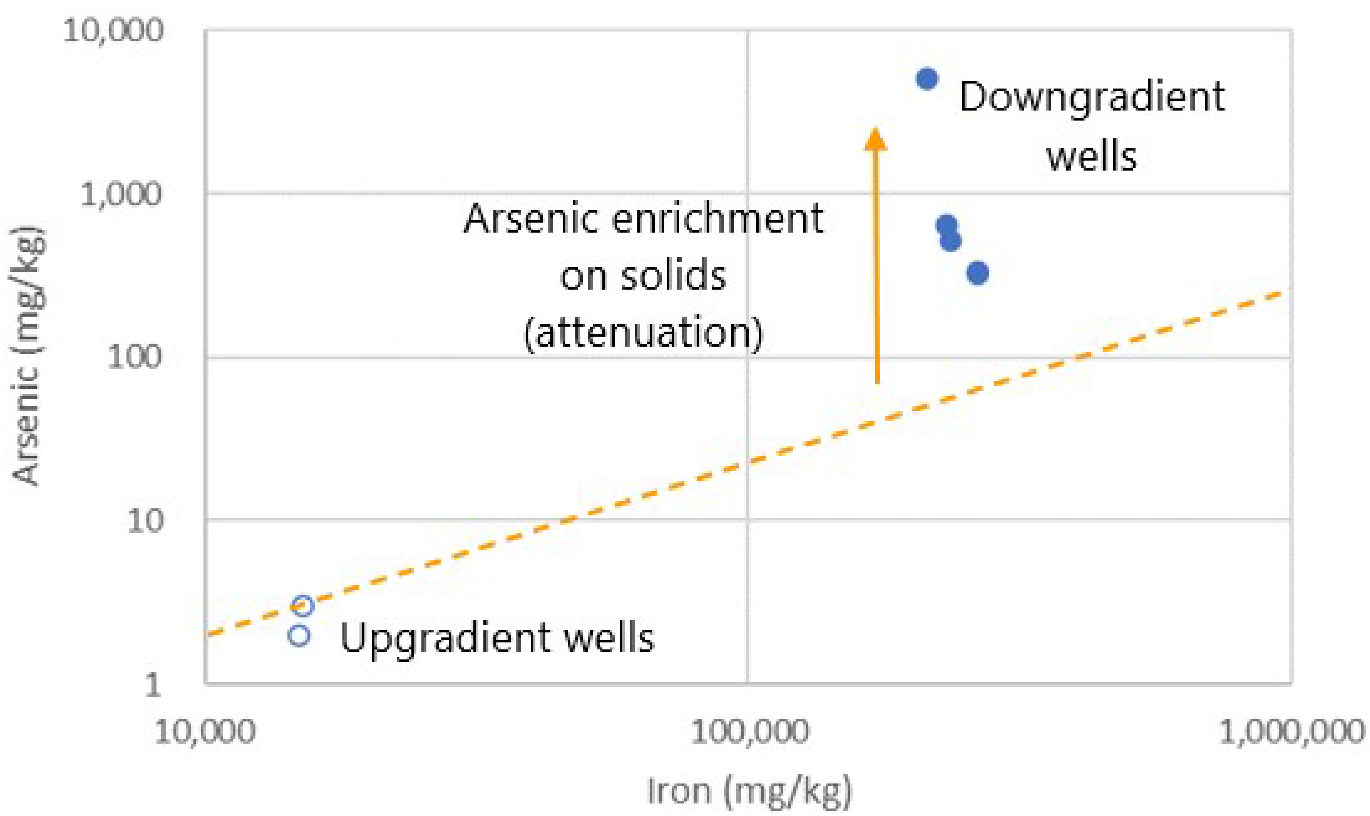
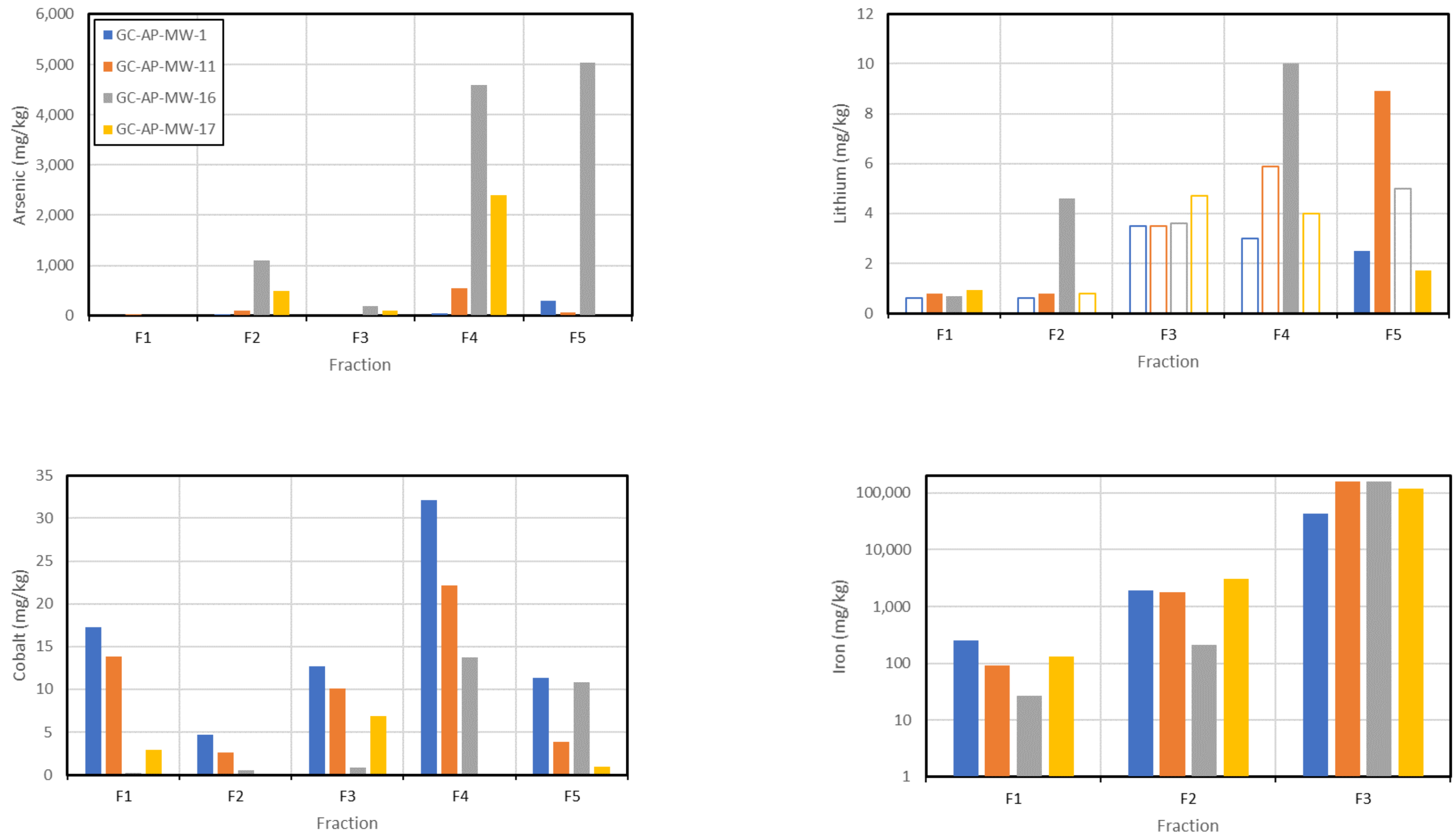
Figure 7
1D Model Transects
Monitored Natural Attenuation Demonstration
Plant Greene County

Figure 8
Representative Soil Samples
Monitored Natural Attenuation Demonstration
Plant Greene County



Note:
mg/kg: milligrams per kilogram

Figure 9
Bulk Chemistry Relationship Between Arsenic and Iron
Monitored Natural Attenuation Demonstration
Plant Greene County



Notes:
Non-detect results shown as unfilled bars plotted at detection limit.
mg/kg: milligrams per kilogram
F1 – Water soluble
F2 – Exchangeable (e.g., clay minerals)
F3 – Reducible (e.g., poorly crystalline metal oxides such as iron oxides)
F4 – Oxidizable (e.g., crystalline oxide and crystalline sulfide minerals)
F5 – Residual (e.g., silicate phases)

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Figure 10
SSE Results for Well Solids
Monitored Natural Attenuation Demonstration
Plant Greene County

Note:
µm: micron

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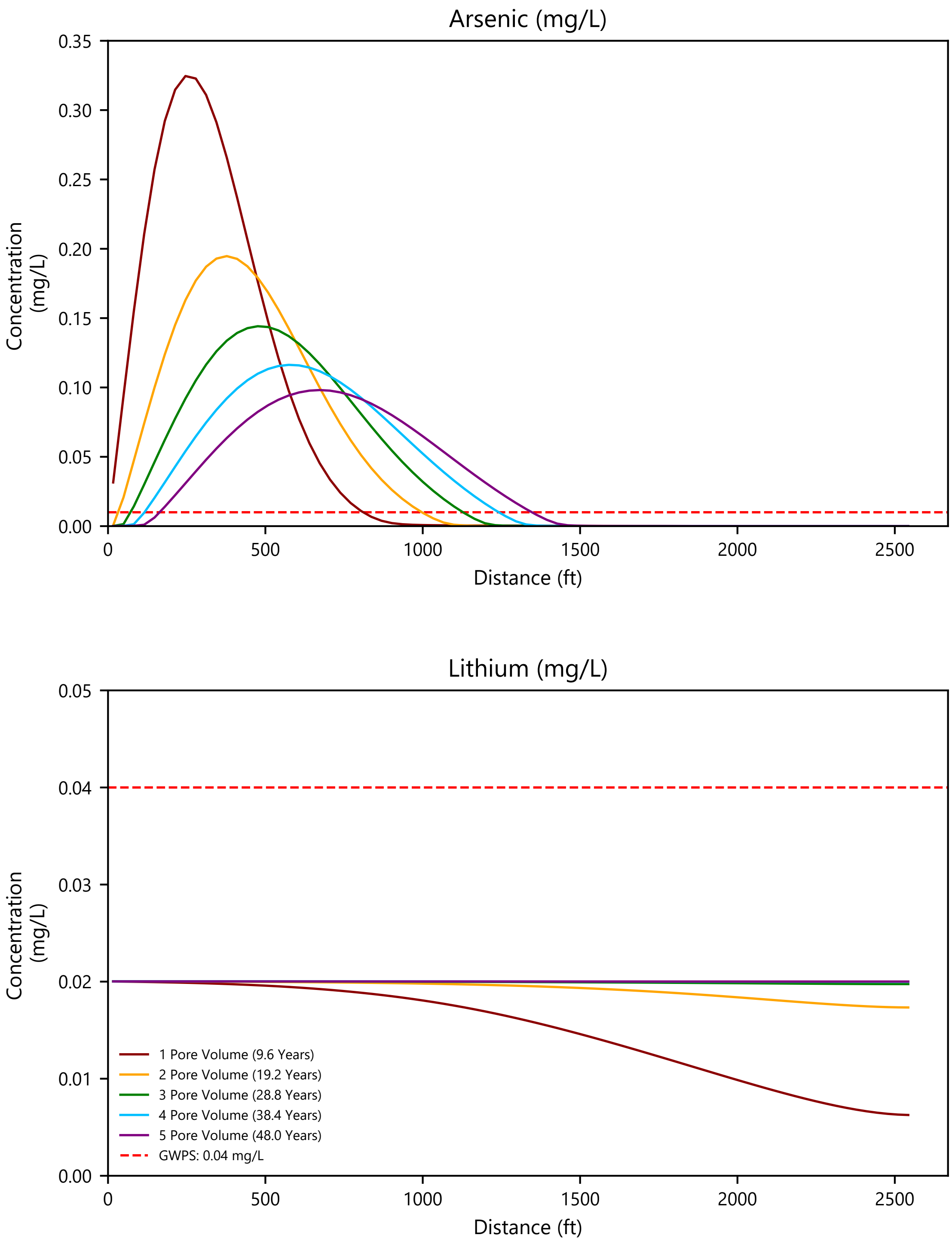
Figure 11
SEM Results for GC-AP-MW-11
Monitored Natural Attenuation Demonstration
Plant Greene County



Note:
Model reactions include surface complexation, cation exchange, and mineral precipitation.
Abbreviations:
GWPS: Groundwater Protection Standard
mg/L: milligrams per liter

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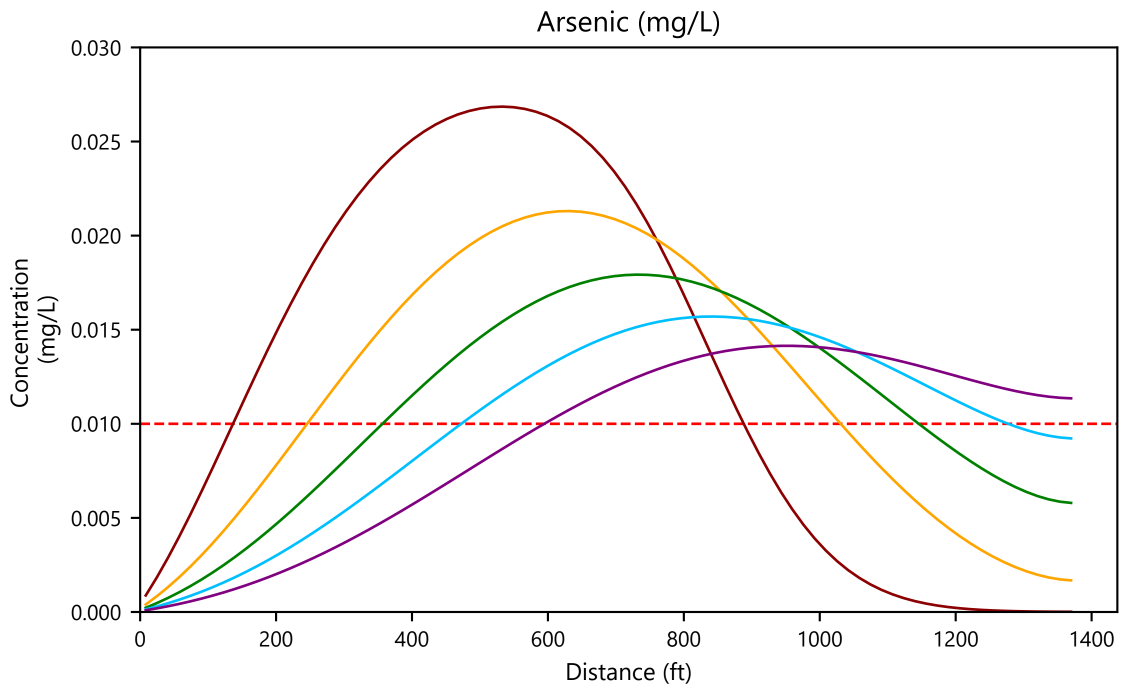
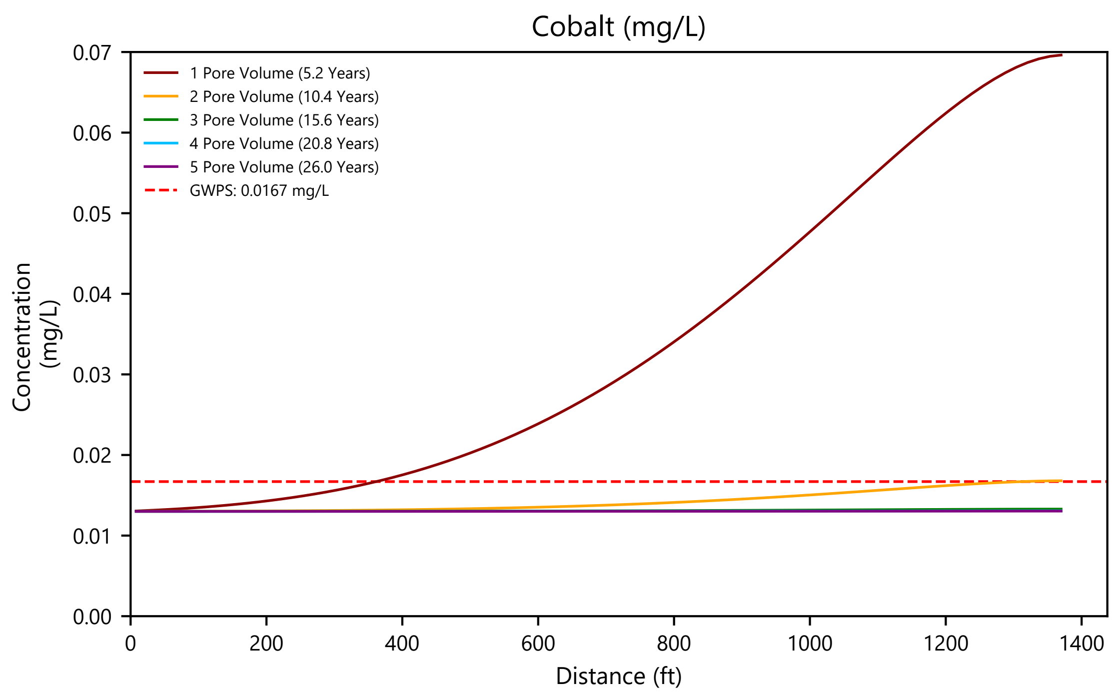
Figure 12
Simulated Arsenic and Lithium Concentrations Along Model Transect 1
Monitored Natural Attenuation Demonstration
Plant Greene County





Note:
Model reactions include surface complexation, cation exchange, and mineral precipitation.
Abbreviations:
GWPS: Groundwater Protection Standard
mg/L: milligrams per liter

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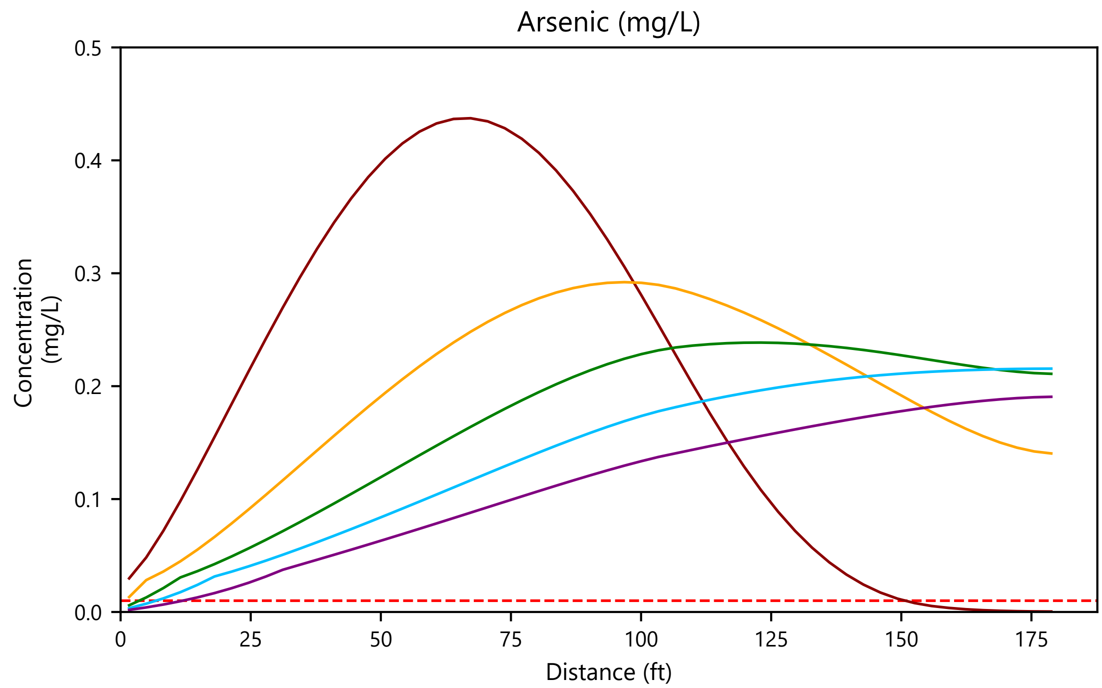
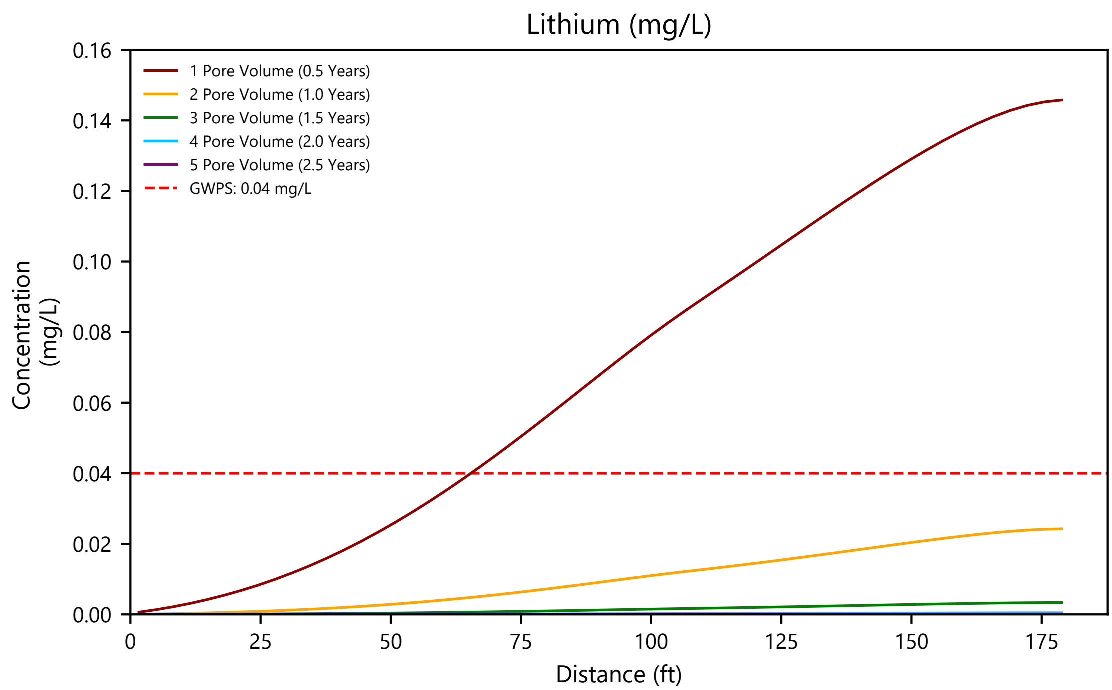
Figure 13
Simulated Arsenic and Cobalt Concentrations Along Model Transect 2
Monitored Natural Attenuation Demonstration
Plant Greene County





Note:
Model reactions include surface complexation, cation exchange, and mineral precipitation.
Abbreviations:
GWPS: Groundwater Protection Standard
mg/L: milligrams per liter

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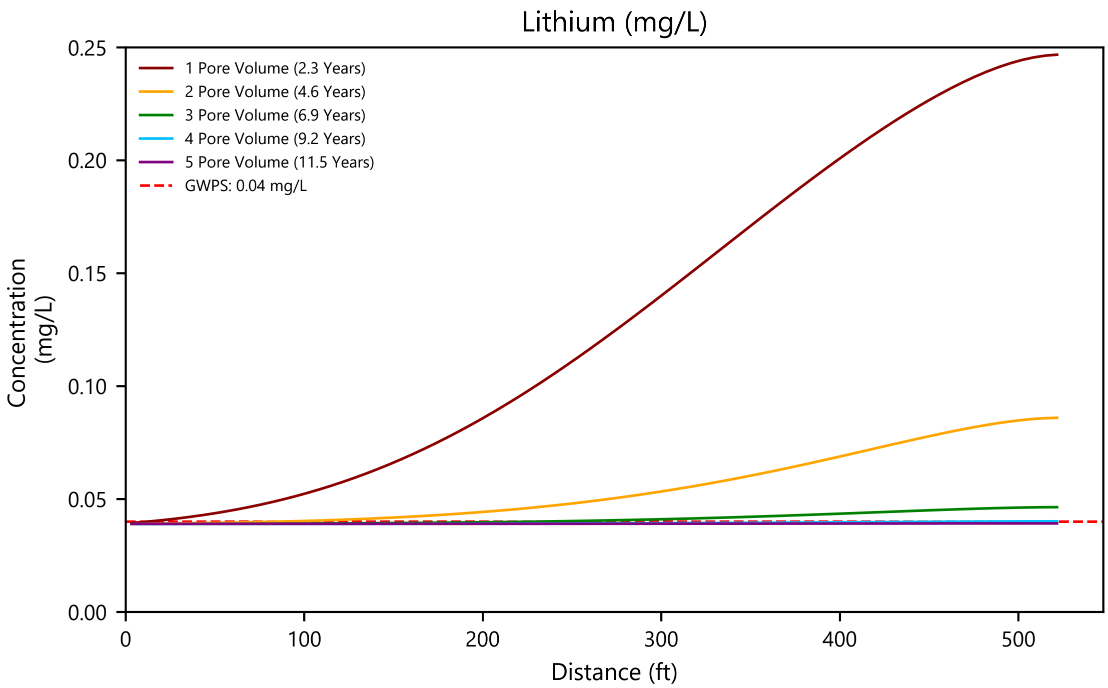
Figure 14
Simulated Arsenic and Lithium Concentrations Along Model Transect 3
Monitored Natural Attenuation Demonstration
Plant Greene County



Note:
Model reactions include surface complexation, cation exchange, and mineral precipitation.
Abbreviations:
GWPS: Groundwater Protection Standard
mg/L: milligrams per liter

Publish Date: 09/28/2021 12:23 PM | User: pspina
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Figure 15
Simulated Lithium Concentrations Along Model Transect 4
Monitored Natural Attenuation Demonstration
Plant Greene County

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Figure 16
Column Test Equipment Setup
Monitored Natural Attenuation Demonstration
Plant Greene County

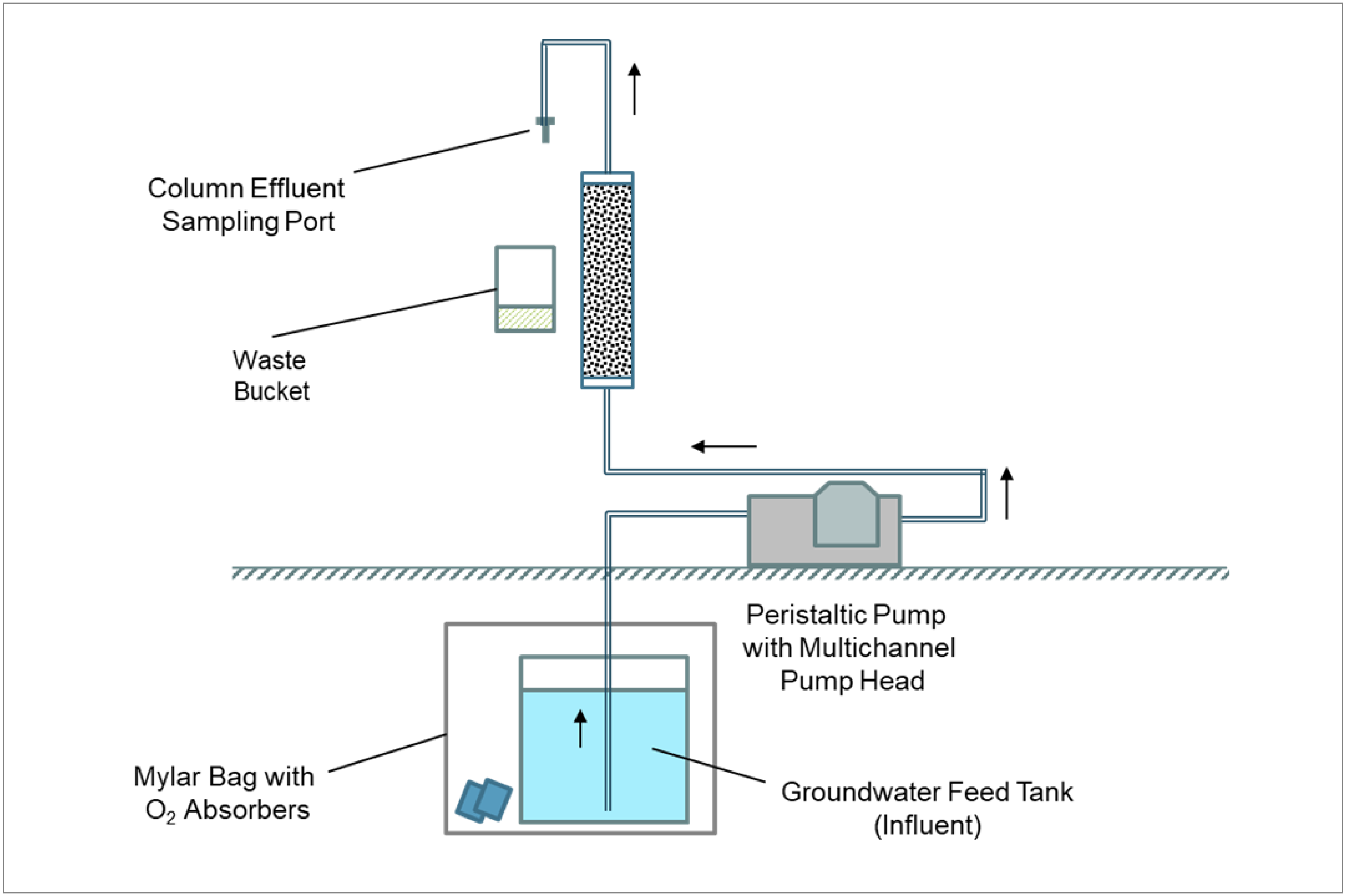
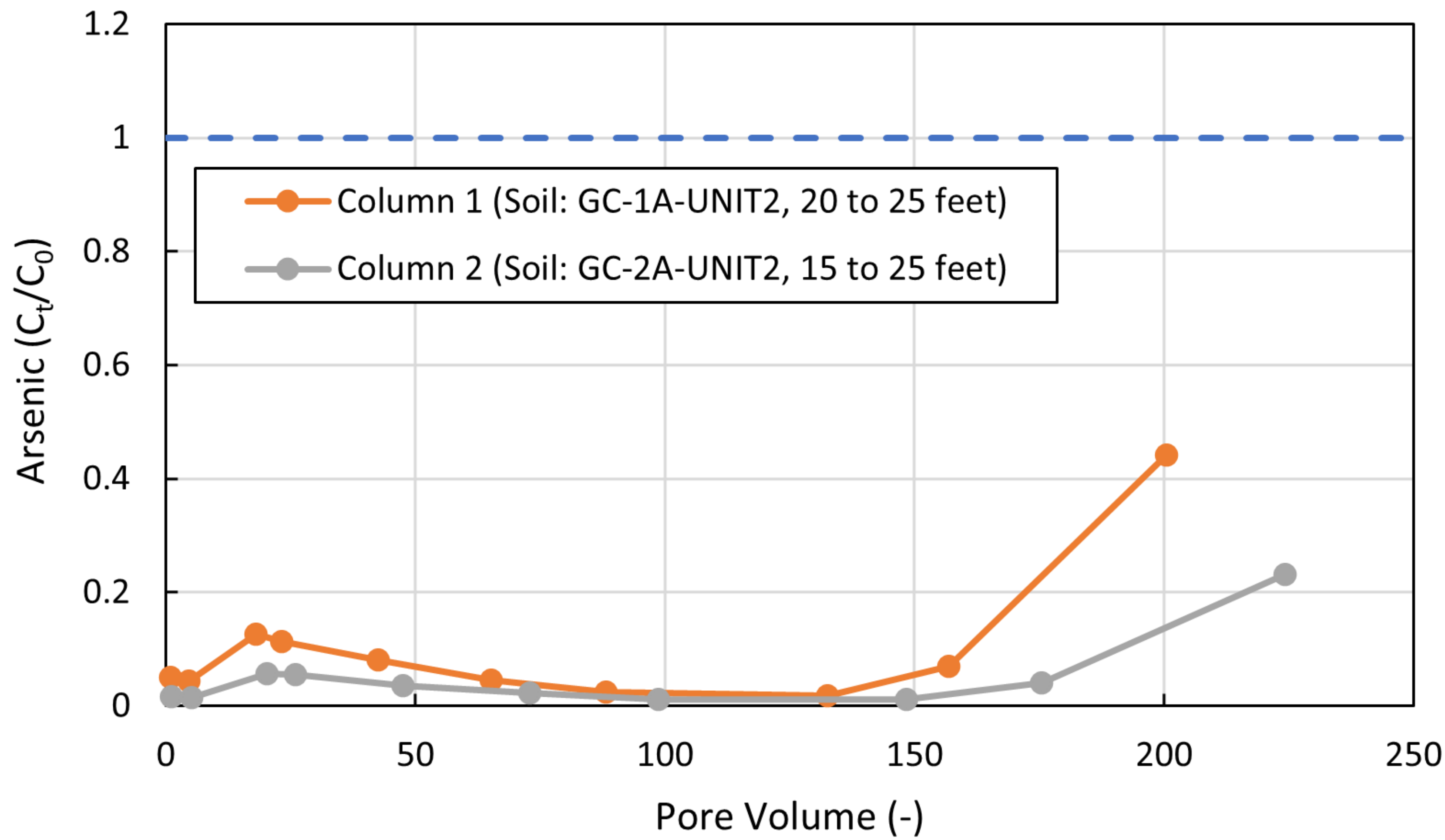
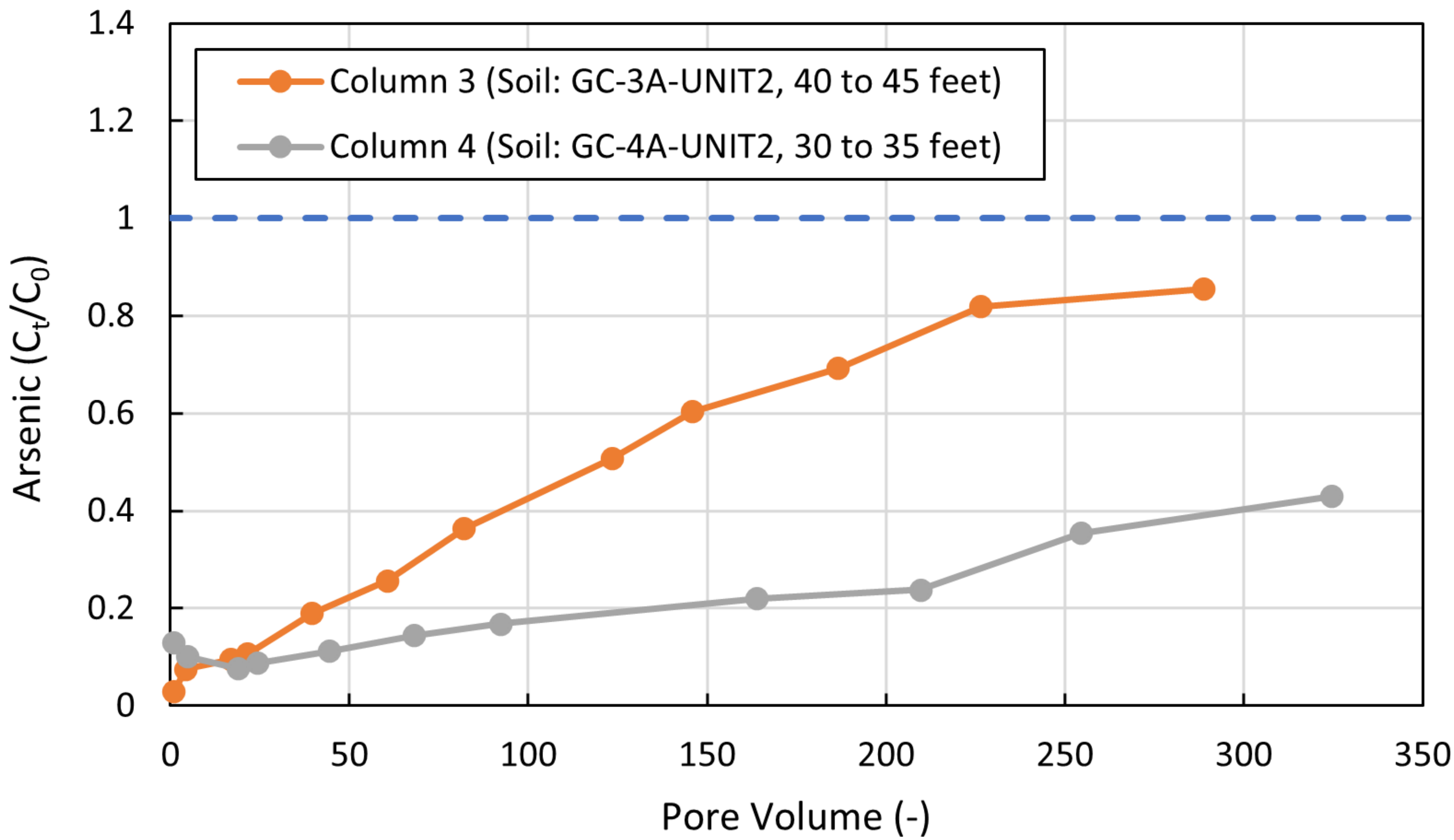


Figure 17
Schematic of Column Test Setup
Monitored Natural Attenuation Demonstration
Plant Greene County



Note:
Blue dashed line indicates that effluent concentrations equal influent concentrations (i.e., capacity for attenuation has been consumed).

Figure 18
Dissolved Arsenic Breakthrough Curves: Columns 1 and 2
Monitored Natural Attenuation Demonstration
Plant Greene County



Note:
Blue dashed line indicates that effluent concentrations equal influent concentrations (i.e., capacity for attenuation has been consumed).

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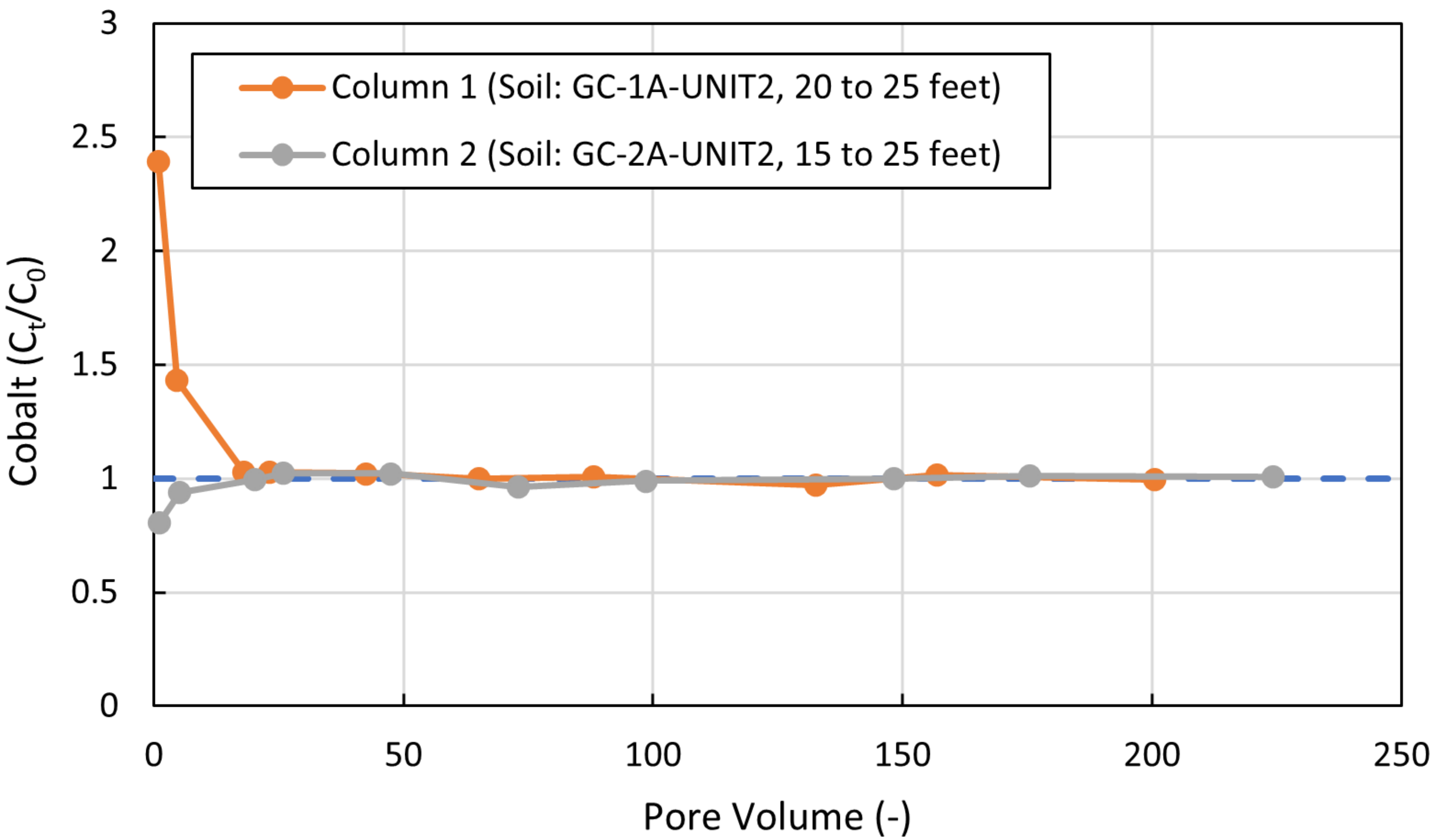
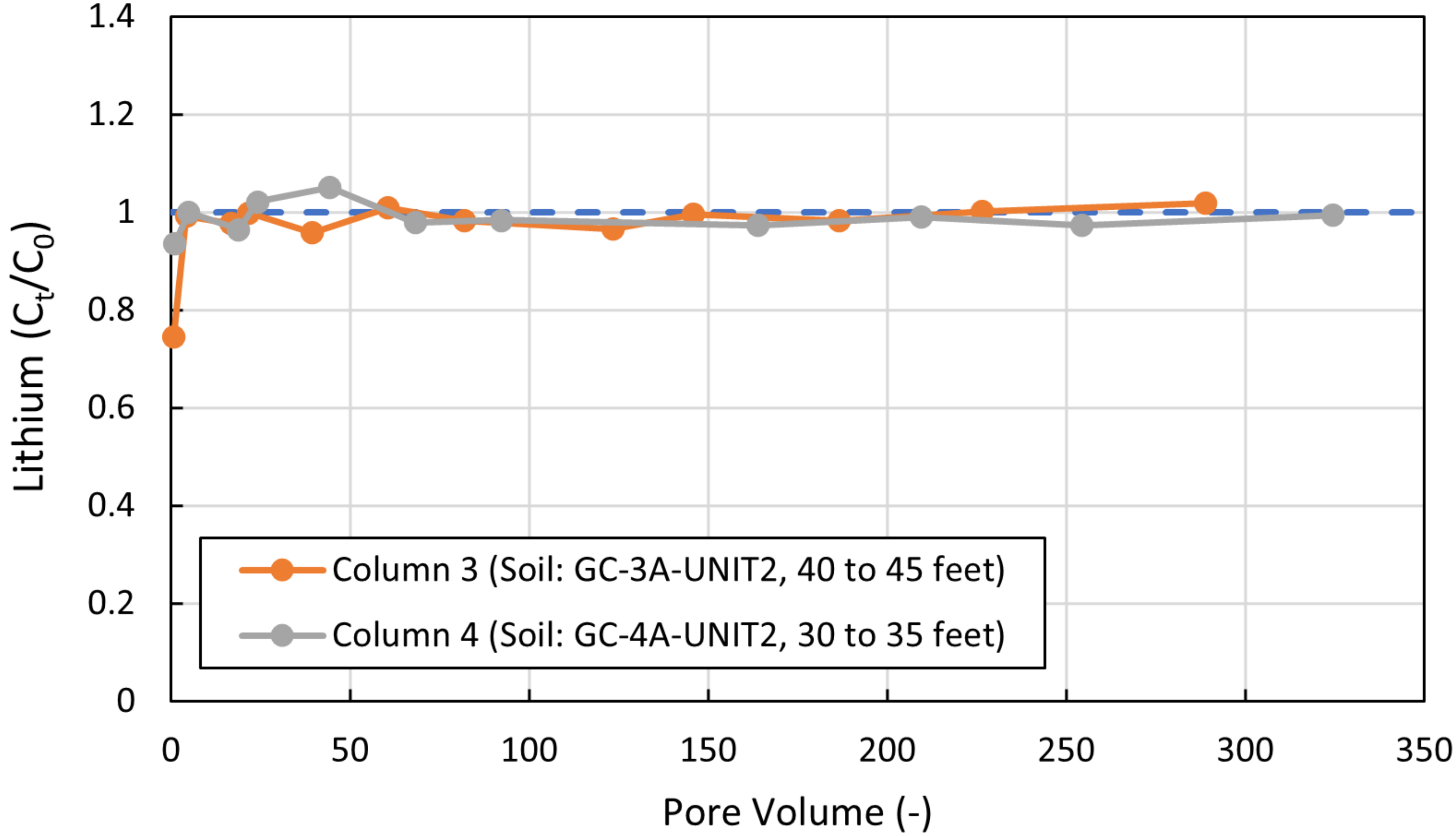
Figure 19
Dissolved Arsenic Breakthrough Curves: Columns 3 and 4
Monitored Natural Attenuation Demonstration
Plant Greene County



Note:
Blue dashed line indicates that effluent concentrations equal influent concentrations (i.e., capacity for attenuation has been consumed).

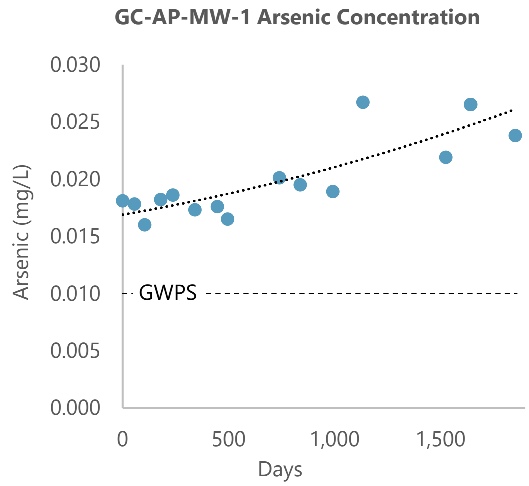
Figure 20
Dissolved Cobalt Breakthrough Curves
Monitored Natural Attenuation Demonstration
Plant Greene County

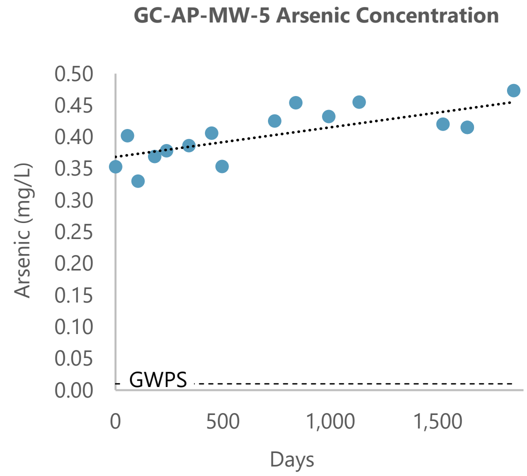


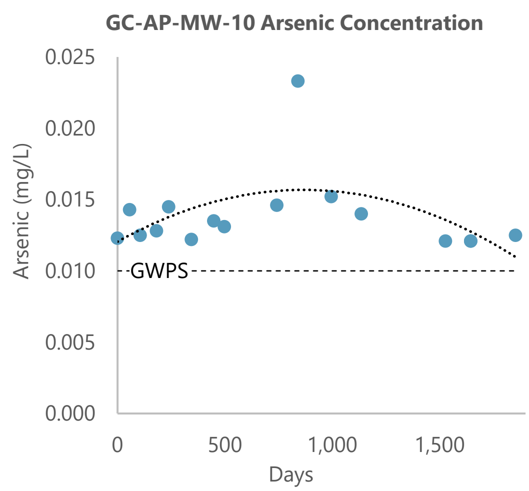
Note:
Blue dashed line indicates that effluent concentrations equal influent concentrations (i.e., capacity for attenuation has been consumed).

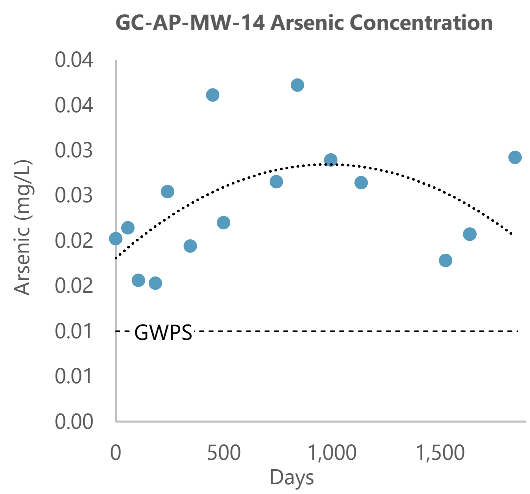
Figure 21
Dissolved Lithium Breakthrough Curves
Monitored Natural Attenuation Demonstration
Plant Greene County

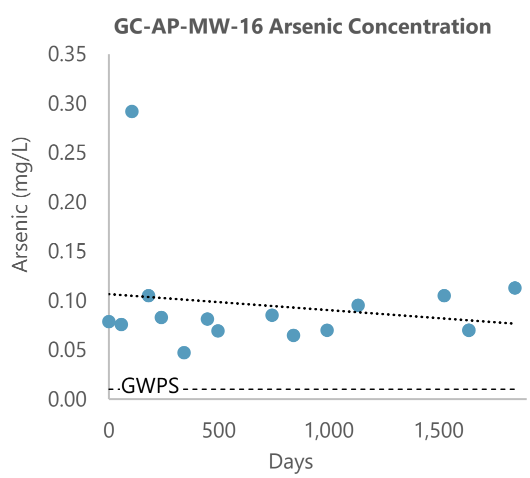
Appendix A
Concentration Versus Time Graphs

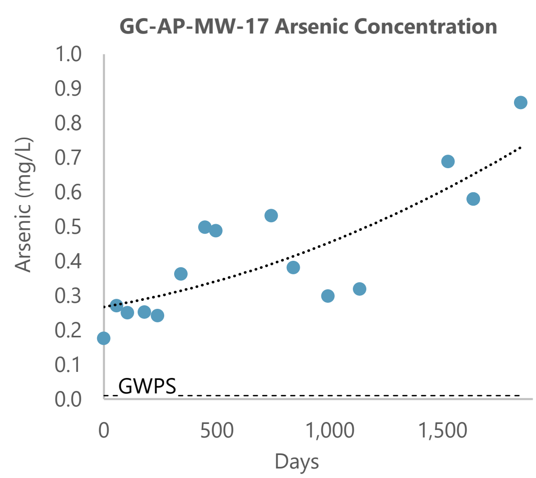






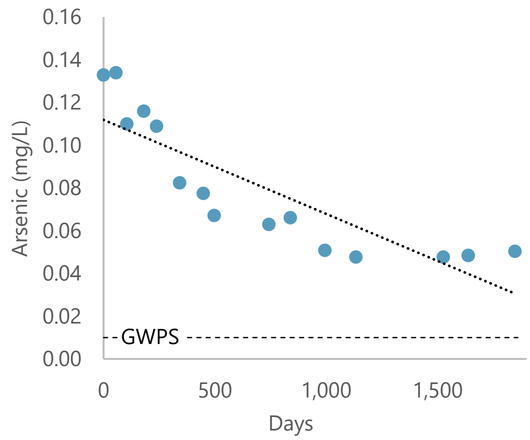




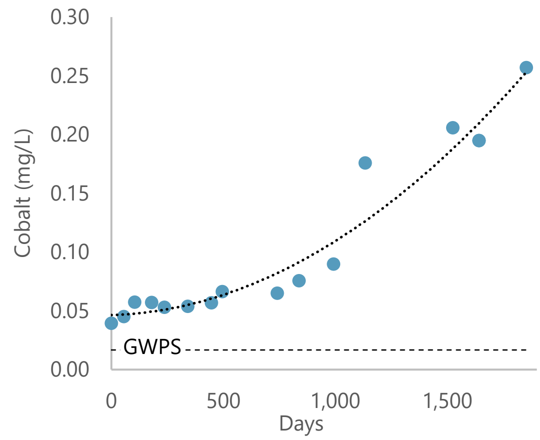


Notes:
GWPS: groundwater protection standards
mg/L: milligrams per liter

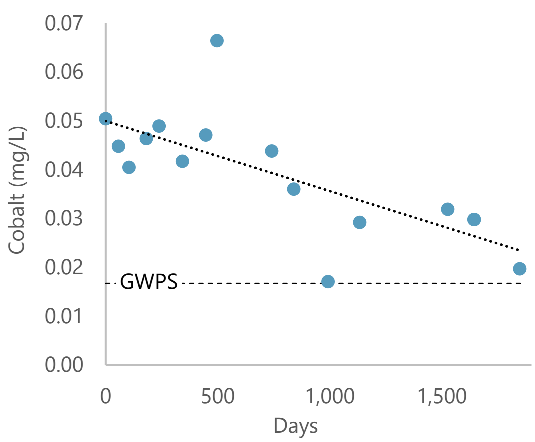
GC-AP-MW-18 Arsenic Concentration



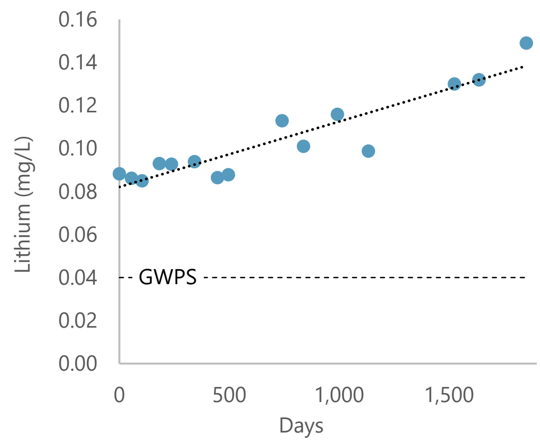
GC-AP-MW-1 Cobalt Concentration



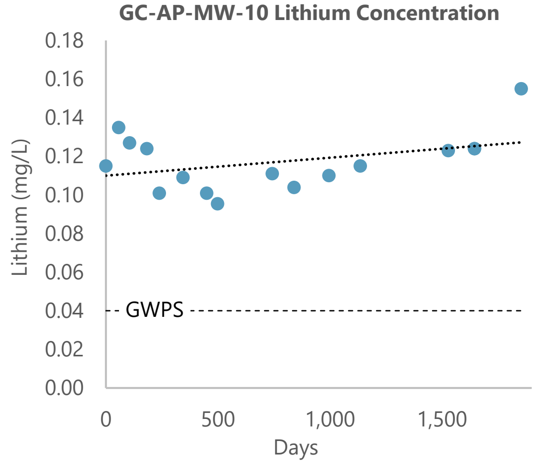
GC-AP-MW-11 Cobalt Concentration



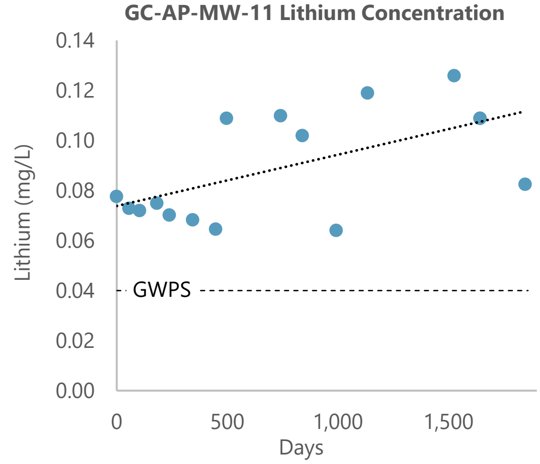
GC-AP-MW-5 Lithium Concentration



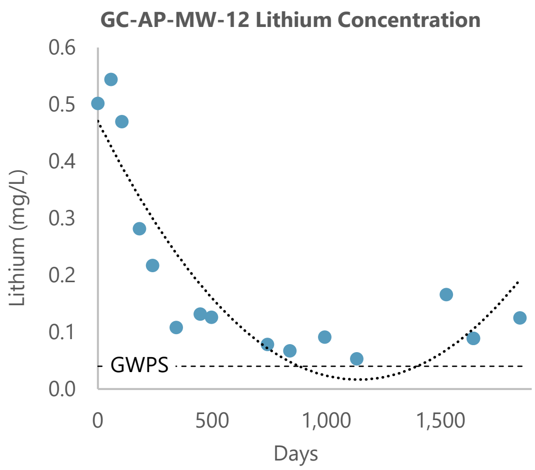
GC-AP-MW-10 Lithium Concentration

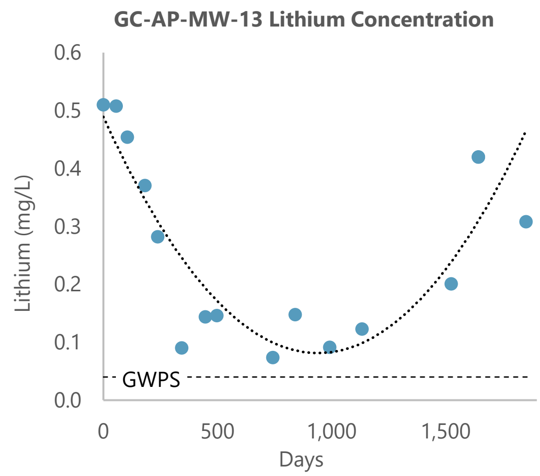


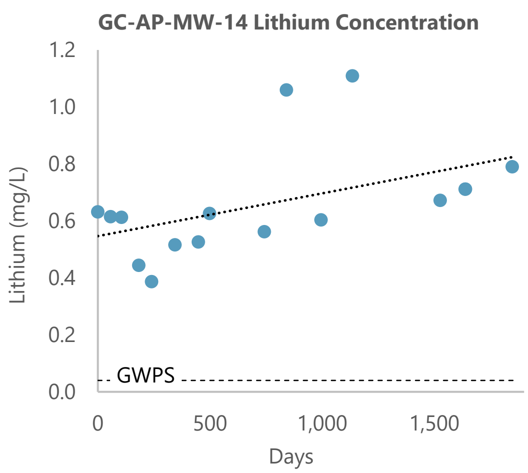
GC-AP-MW-11 Lithium Concentration

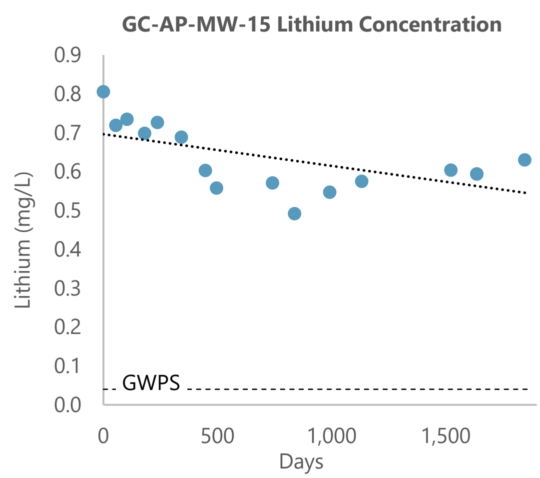


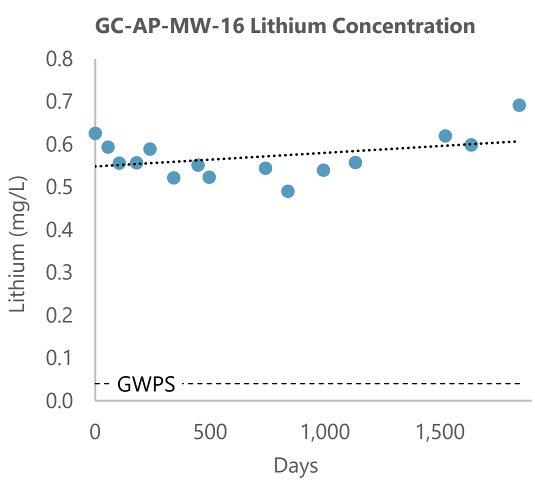
Notes:
GWPS: groundwater protection standards
mg/L: milligrams per liter

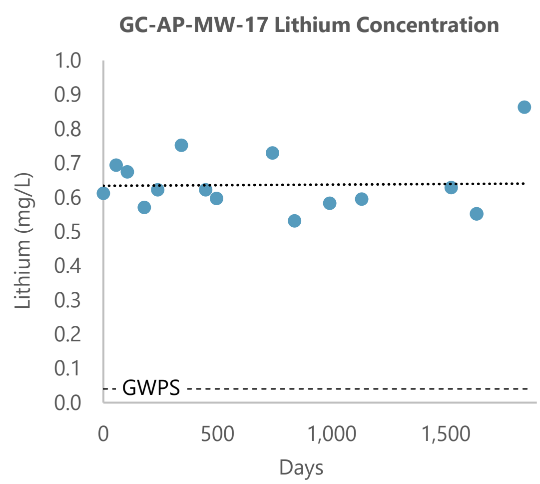




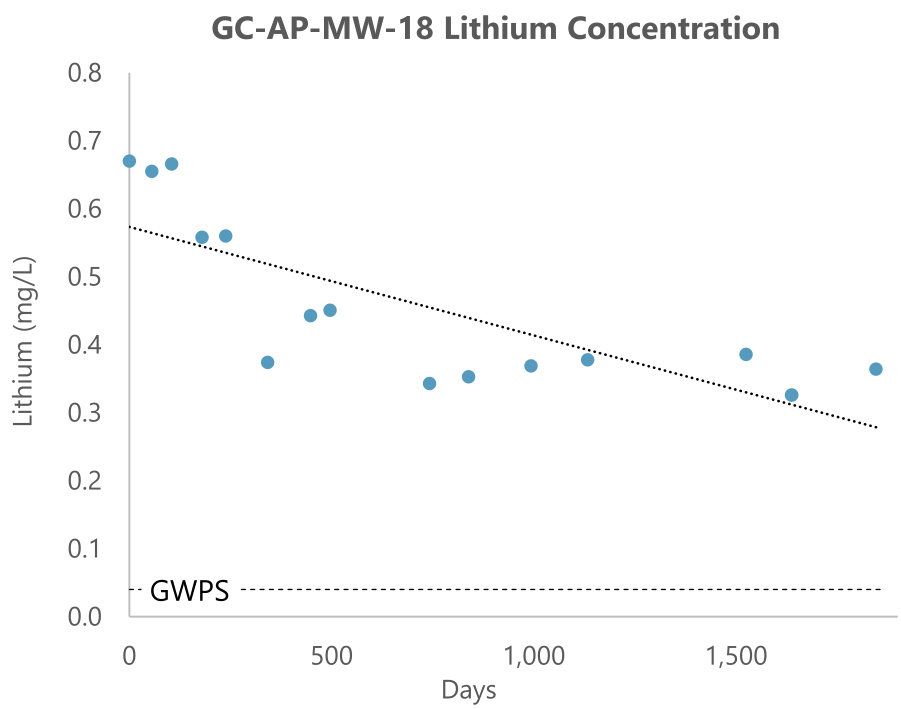


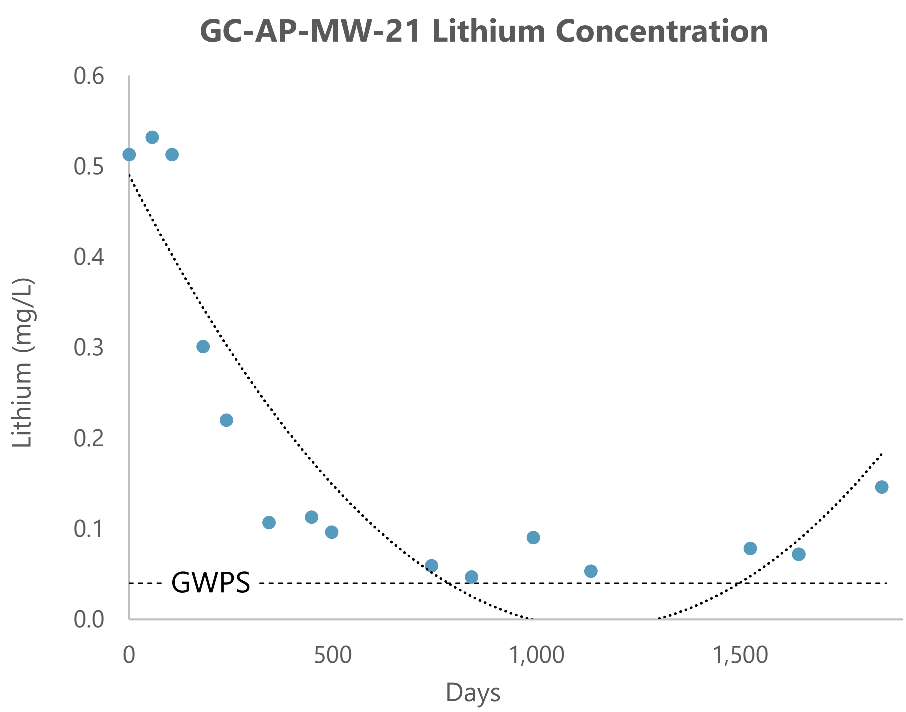






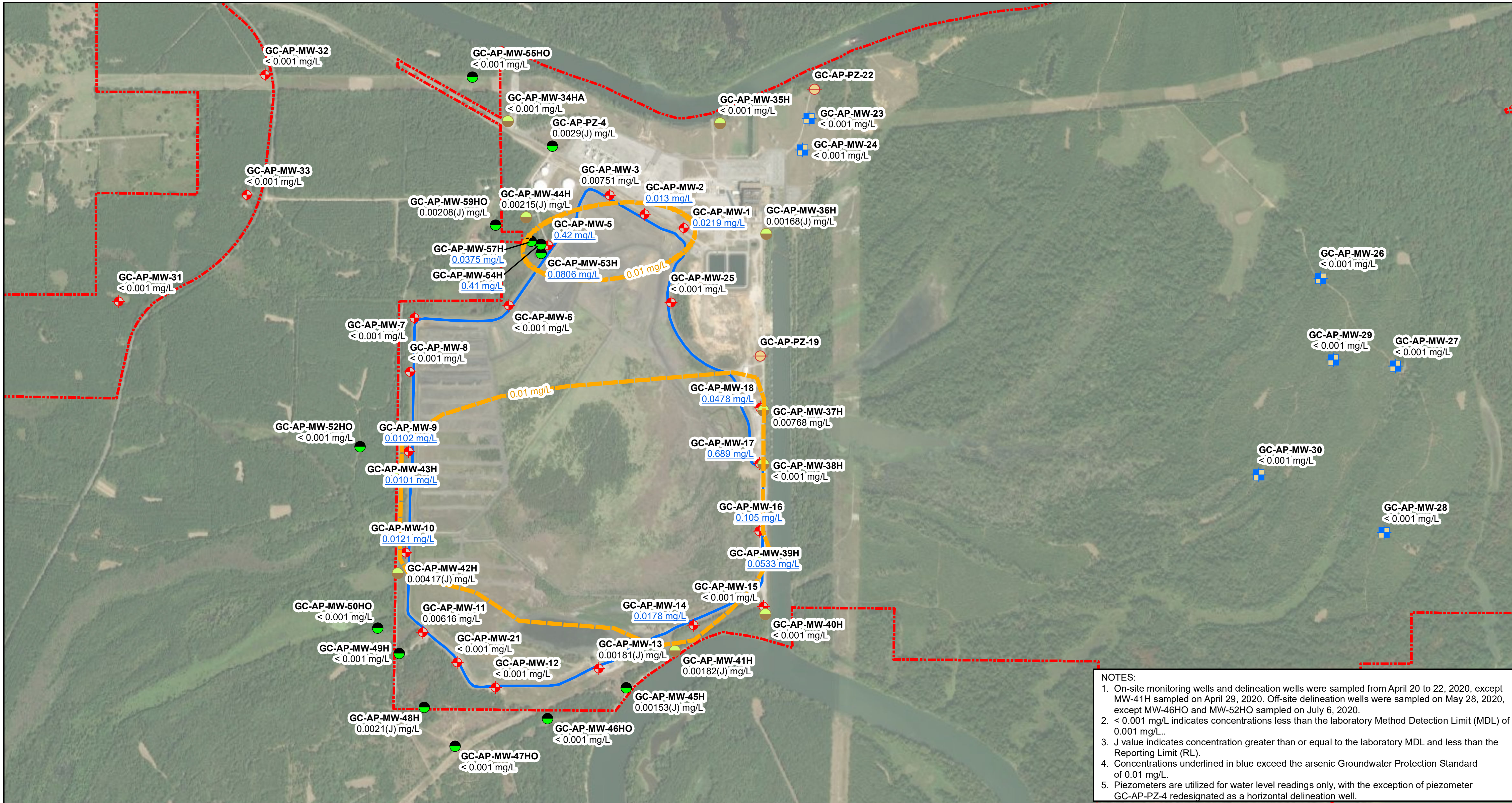
Notes:
GWPS: groundwater protection standards
mg/L: milligrams per liter





Notes:
GWPS: groundwater protection standards
mg/L: milligrams per liter

Appendix B
Isoconcentration Maps



NOTES:

1. On-site monitoring wells and delineation wells were sampled from April 20 to 22, 2020, except MW-41H sampled on April 29, 2020. Off-site delineation wells were sampled on May 28, 2020, except MW-46HO and MW-52HO sampled on July 6, 2020.
2. < 0.001 mg/L indicates concentrations less than the laboratory Method Detection Limit (MDL) of 0.001 mg/L..
3. J value indicates concentration greater than or equal to the laboratory MDL and less than the Reporting Limit (RL).
4. Concentrations underlined in blue exceed the arsenic Groundwater Protection Standard of 0.01 mg/L.
5. Piezometers are utilized for water level readings only, with the exception of piezometer GC-AP-PZ-4 redesignated as a horizontal delineation well.

Legend

- Arsenic GWPS Isoconcentration Contour (mg/L)
- Downgradient Monitoring Well
- Upgradient Monitoring Well
- Piezometer
- Phase I Horizontal Delineation Well
- Phase II Horizontal Delineation Well
- Ash Pond Boundary
- Property Boundary

N

0 1,000 2,000 4,000 Feet

SCALE	1:15000
DATE	9/25/2020
DRAWN BY	KAR
CHECKED BY	GBD

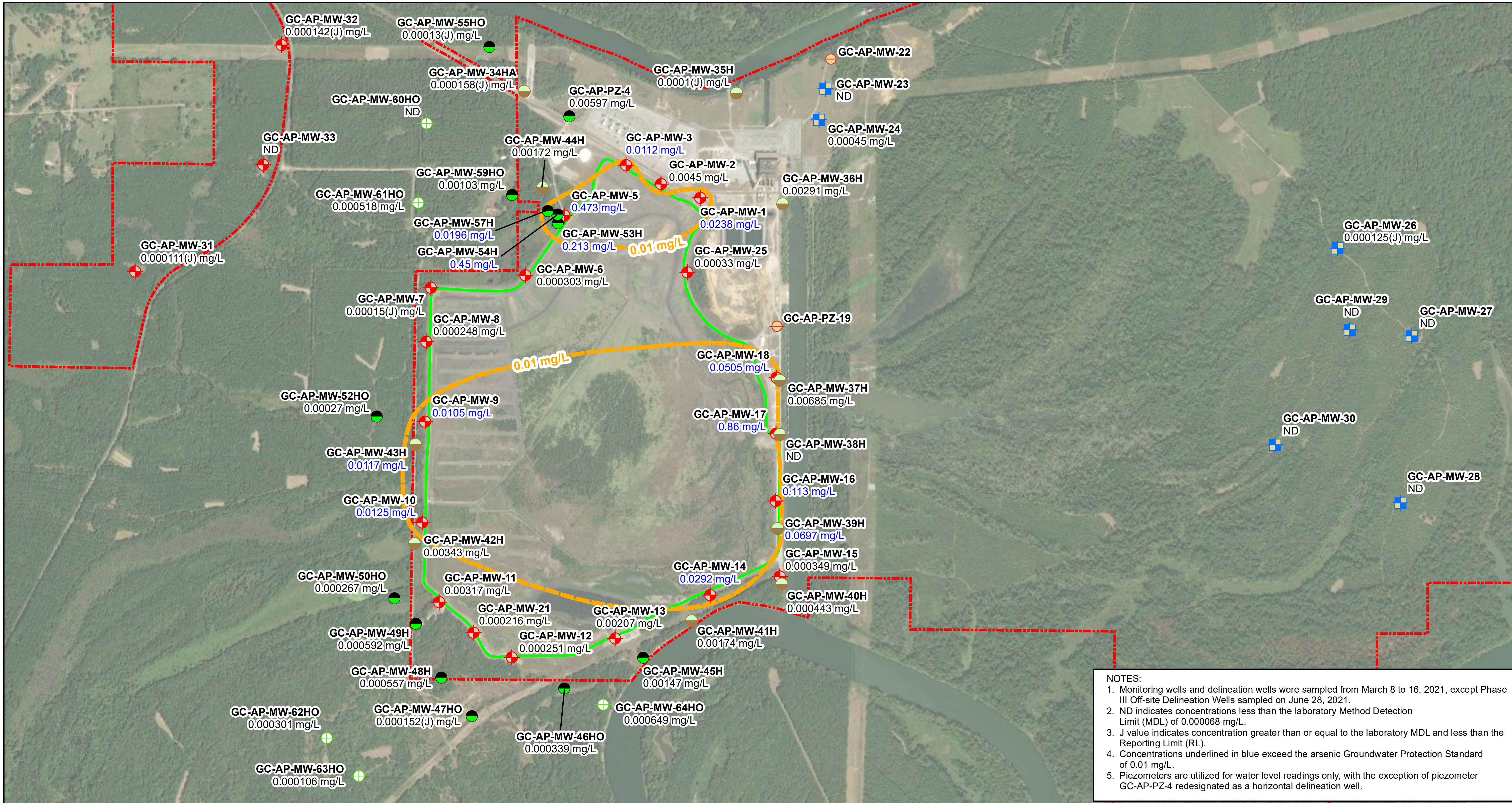
DRAWING TITLE

ARSENIC ISOCONCENTRATION CONTOUR MAP
PLANT GREENE COUNTY ASH POND

FIGURE NO

FIGURE 8A

Southern Company



NOTES:
1. Monitoring wells and delineation wells were sampled from March 8 to 16, 2021, except Phase III Off-site Delineation Wells sampled on June 28, 2021.
2. ND indicates concentrations less than the laboratory Method Detection Limit (MDL) of 0.000068 mg/L.
3. J value indicates concentration greater than or equal to the laboratory MDL and less than the Reporting Limit (RL).
4. Concentrations underlined in blue exceed the arsenic Groundwater Protection Standard of 0.01 mg/L.
5. Piezometers are utilized for water level readings only, with the exception of piezometer GC-AP-PZ-4 redesignated as a horizontal delineation well.

Legend

- Downgradient Monitoring Well
- Upgradient Monitoring Well
- Piezometer
- Phase I Horizontal Delineation Well
- Phase II Horizontal Delineation Well
- Phase III Horizontal Delineation
- Arsenic GWPS Isoconcentration Contour (mg/L)
- Ash Pond Boundary
- Property Boundary

N

0 1,000 2,000 4,000 Feet

SCALE	1:15000
DATE	7/16/2021
DRAWN BY	KWR
CHECKED BY	GFB

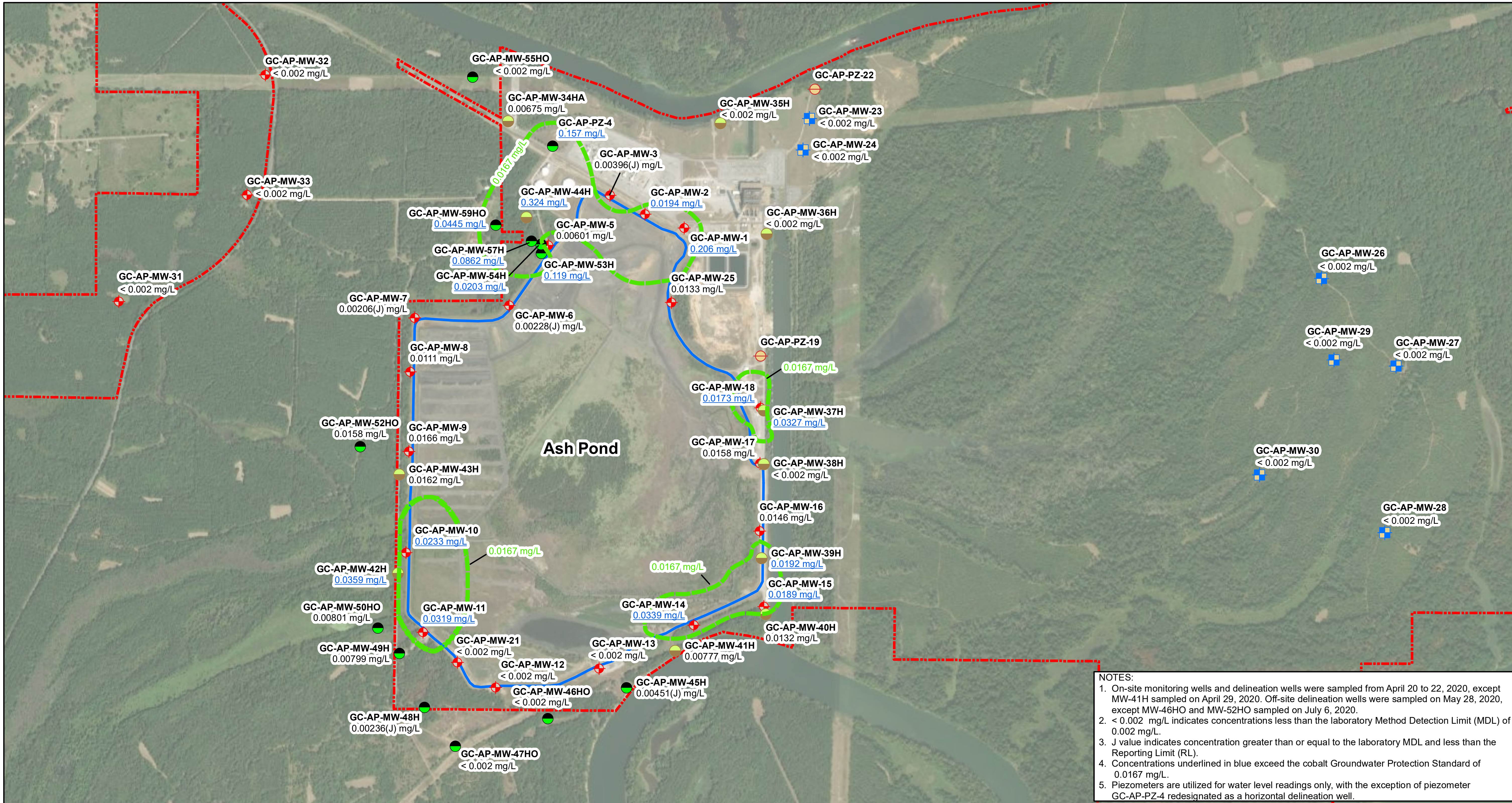
DRAWING TITLE

ARSENIC ISOCONCENTRATION MAP PLANT GREENE COUNTY ASH POND

FIGURE NO

FIGURE 8A

Southern Company



NOTES:
1. On-site monitoring wells and delineation wells were sampled from April 20 to 22, 2020, except MW-41H sampled on April 29, 2020. Off-site delineation wells were sampled on May 28, 2020, except MW-46HO and MW-52HO sampled on July 6, 2020.
2. < 0.002 mg/L indicates concentrations less than the laboratory Method Detection Limit (MDL) of 0.002 mg/L.
3. J value indicates concentration greater than or equal to the laboratory MDL and less than the Reporting Limit (RL).
4. Concentrations underlined in blue exceed the cobalt Groundwater Protection Standard of 0.0167 mg/L.
5. Piezometers are utilized for water level readings only, with the exception of piezometer GC-AP-PZ-4 redesignated as a horizontal delineation well.

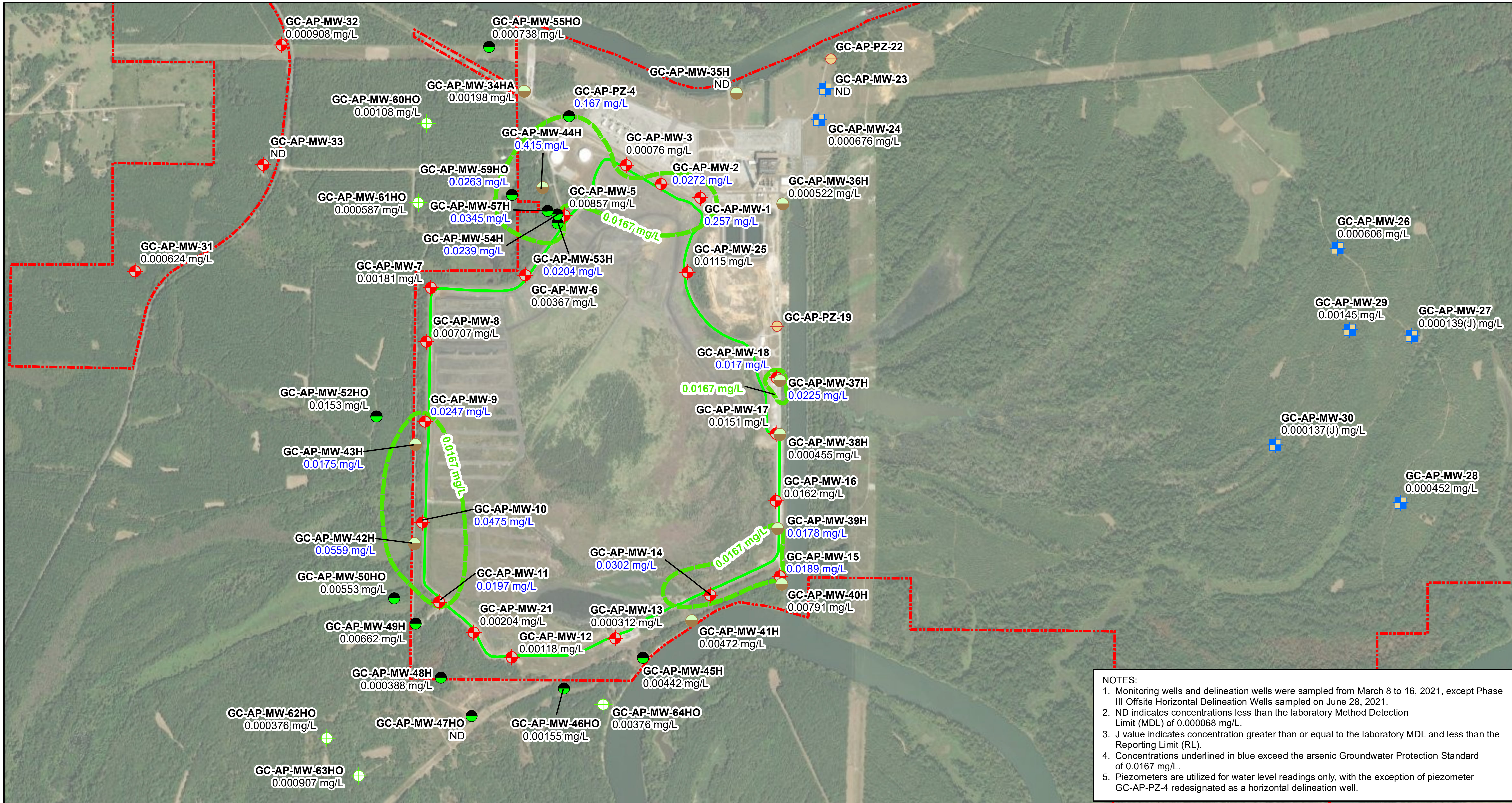
Legend

- Cobalt GWPS Isoconcentration Contour (mg/L)
- Downgradient Monitoring Well
- Upgradient Monitoring Well
- Piezometer
- Phase I Horizontal Delineation Well
- Phase II Horizontal Delineation Well
- Ash Pond Boundary
- Property Boundary

N

0 1,000 2,000 4,000 Feet

SCALE 1:15000	DRAWING TITLE COBALT ISOCONCENTRATION CONTOUR MAP PLANT GREENE COUNTY ASH POND
DATE 9/25/2020	
DRAWN BY KAR	FIGURE NO **FIGURE 8B**
CHECKED BY GBD	Southern Company



NOTES:
1. Monitoring wells and delineation wells were sampled from March 8 to 16, 2021, except Phase III Offsite Horizontal Delineation Wells sampled on June 28, 2021.
2. ND indicates concentrations less than the laboratory Method Detection Limit (MDL) of 0.000068 mg/L.
3. J value indicates concentration greater than or equal to the laboratory MDL and less than the Reporting Limit (RL).
4. Concentrations underlined in blue exceed the arsenic Groundwater Protection Standard of 0.0167 mg/L.
5. Piezometers are utilized for water level readings only, with the exception of piezometer GC-AP-PZ-4 redesignated as a horizontal delineation well.

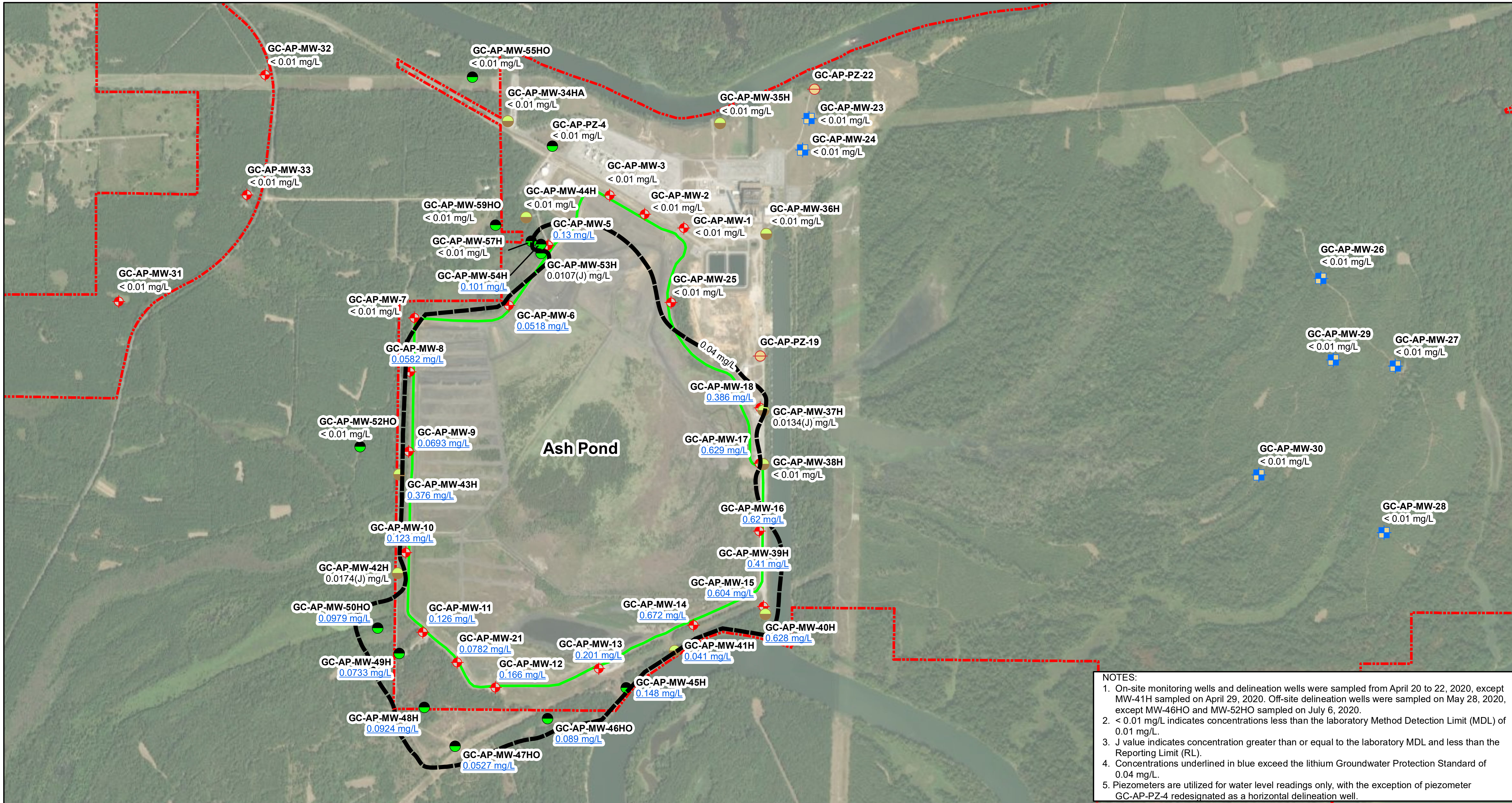
Legend

- Downgradient Monitoring Well
- Upgradient Monitoring Well
- Piezometer
- Phase I Horizontal Delineation Well
- Phase II Horizontal Delineation Well
- Phase III Horizontal Delineation Well
- Cobalt GWPS Isoconcentration Contour (mg/L)
- Ash Pond Boundary
- Property Boundary

N

0 1,000 2,000 4,000 Feet

SCALE 1:15000	DRAWING TITLE COBALT ISOCONCENTRATION MAP PLANT GREENE COUNTY ASH POND
DATE 8/1/2021	
DRAWN BY KWR	FIGURE NO **FIGURE 8B**
CHECKED BY GFB	Southern Company

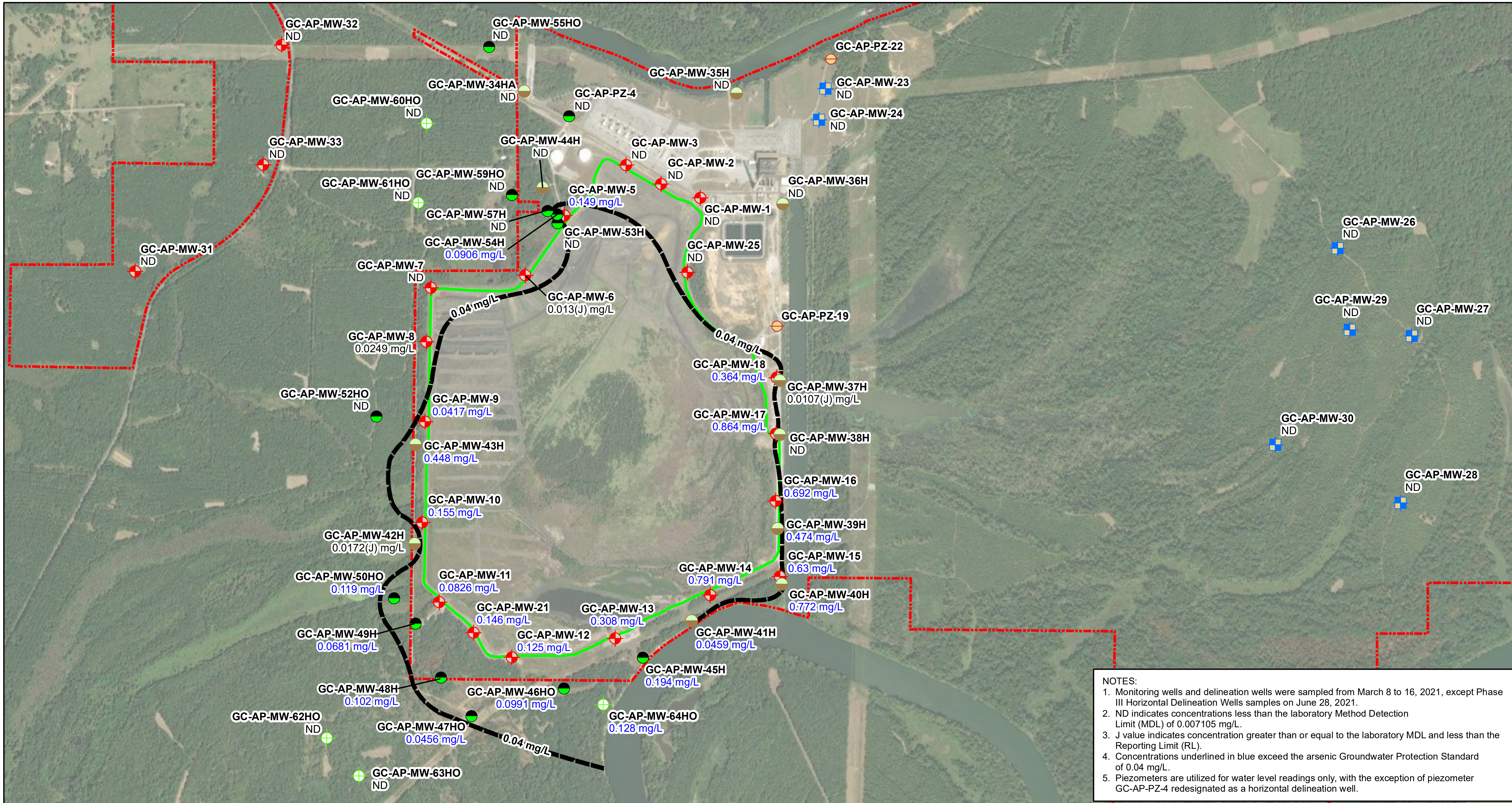


NOTES:
1. On-site monitoring wells and delineation wells were sampled from April 20 to 22, 2020, except MW-41H sampled on April 29, 2020. Off-site delineation wells were sampled on May 28, 2020, except MW-46HO and MW-52HO sampled on July 6, 2020.
2. < 0.01 mg/L indicates concentrations less than the laboratory Method Detection Limit (MDL) of 0.01 mg/L.
3. J value indicates concentration greater than or equal to the laboratory MDL and less than the Reporting Limit (RL).
4. Concentrations underlined in blue exceed the lithium Groundwater Protection Standard of 0.04 mg/L.
5. Piezometers are utilized for water level readings only, with the exception of piezometer GC-AP-PZ-4 redesignated as a horizontal delineation well.

Legend

- Lithium GWPS Isoconcentration Contour (mg/L)
- Downgradient Monitoring Well
- Upgradient Monitoring Well
- Piezometer
- Phase I Horizontal Delineation Well
- Phase II Horizontal Delineation Well
- Ash Pond Boundary
- Property Boundary

SCALE 1:15000	DRAWING TITLE LITHIUM ISOCONCENTRATION CONTOUR MAP PLANT GREENE COUNTY ASH POND
DATE 9/25/2020	
DRAWN BY KAR	FIGURE NO **FIGURE 8C**
CHECKED BY GBD	Southern Company



NOTES:
1. Monitoring wells and delineation wells were sampled from March 8 to 16, 2021, except Phase III Horizontal Delineation Wells samples on June 28, 2021.
2. ND indicates concentrations less than the laboratory Method Detection Limit (MDL) of 0.007105 mg/L.
3. J value indicates concentration greater than or equal to the laboratory MDL and less than the Reporting Limit (RL).
4. Concentrations underlined in blue exceed the arsenic Groundwater Protection Standard of 0.04 mg/L.
5. Piezometers are utilized for water level readings only, with the exception of piezometer GC-AP-PZ-4 redesignated as a horizontal delineation well.

Legend

- Downgradient Monitoring Well
- Upgradient Monitoring Well
- Piezometer
- Phase I Horizontal Delineation Well
- Phase II Horizontal Delineation Well
- Phase III Horizontal Delineation Well
- Lithium GWPS Isoconcentration Contour (mg/L)
- Ash Pond Boundary
- Property Boundary

N

0 1,000 2,000 4,000 Feet

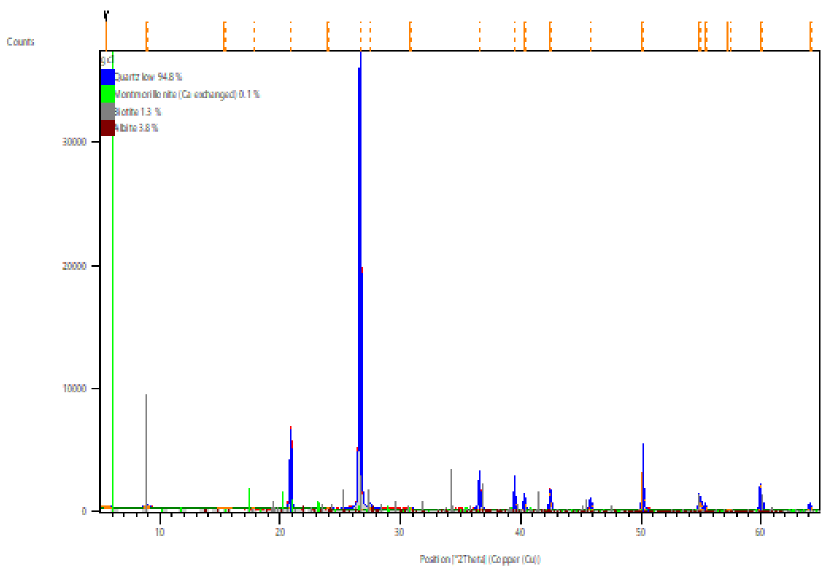
SCALE 1:15000	DRAWING TITLE LITHIUM ISOCONCENTRATION MAP PLANT GREENE COUNTY ASH POND
DATE 8/1/2021	
DRAWN BY KWR	FIGURE NO **FIGURE 8C**
CHECKED BY GFB	Southern Company

Appendix C
Analytical Data

Pattern List

Ref.Code	Score	Compound Name	Chem. Formula
98-008-3849	81	Quartz low	O2 Si1
98-005-1636	1	Montmorillonite (C..	H8.2 Al4 Ca1.2 O27..
96-900-1584	20	Biotite	Si11.14 Al4.86 Fe4..
98-009-0142	9	Albite	Al1.02 Ca0.02 Na0...

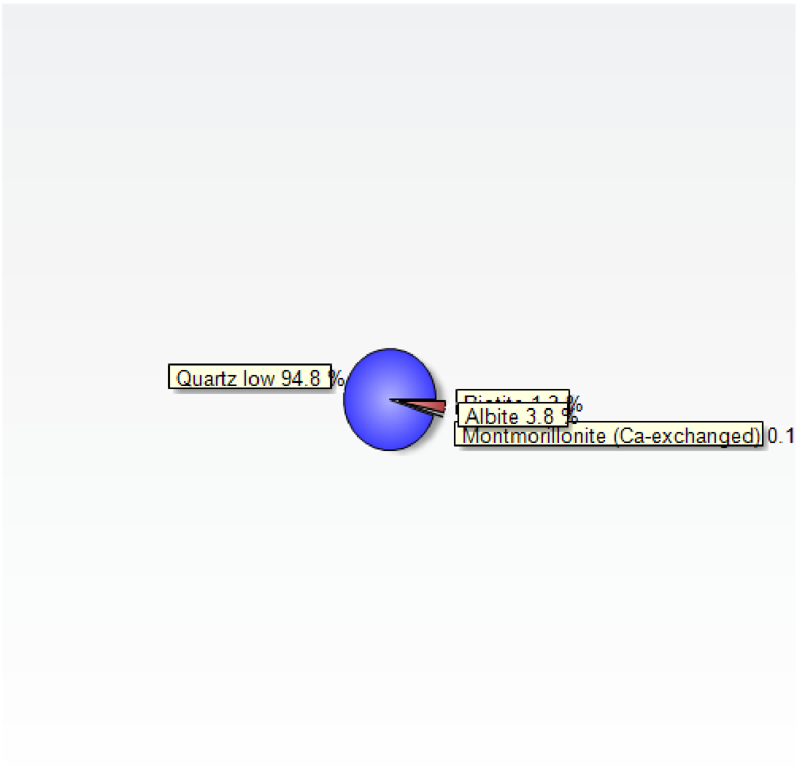
Graphics



Peak List

Pos.[°2Th.]	d-spacing [Å]	Rel. Int. [%]	Matched by
5.51(2)	16.03765	0.44	
8.900(7)	9.92815	0.81	96-900-1584
15.35(4)	5.76634	0.15	98-005-1636;98..
17.78(2)	4.98507	0.16	98-005-1636;96..
20.8584(6)	4.25531	16.69	98-008-3849;96..
23.991(7)	3.70625	0.39	98-009-0142
26.6283(2)	3.34491	100.00	98-008-3849;98..
27.467(5)	3.24469	0.96	98-005-1636;96..
30.82(1)	2.89868	0.24	98-005-1636;96..
36.546(1)	2.45673	7.51	98-008-3849;98..
39.459(1)	2.28185	4.94	98-008-3849;98..
40.286(2)	2.23685	3.56	98-008-3849;96..
42.446(1)	2.12791	5.22	98-008-3849;98..
45.784(2)	1.98022	3.22	98-008-3849;98..
50.1287(8)	1.81830	10.78	98-008-3849;98..
54.863(1)	1.67205	4.36	98-008-3849;98..
55.314(2)	1.65949	1.72	98-008-3849;96..
57.27(3)	1.60736	0.11	98-008-3849;98..
59.9488(9)	1.54179	7.44	98-008-3849;98..
64.027(2)	1.45307	1.76	98-008-3849;98..

Quantitative Results



Phase Quartz low:	Weight fraction/ %:	95
Phase Montmorillonite (Ca-exchanged):	Weight fraction/ %:	0.1
Phase Biotite:	Weight fraction/ %:	1
Phase Albite:	Weight fraction/ %:	4

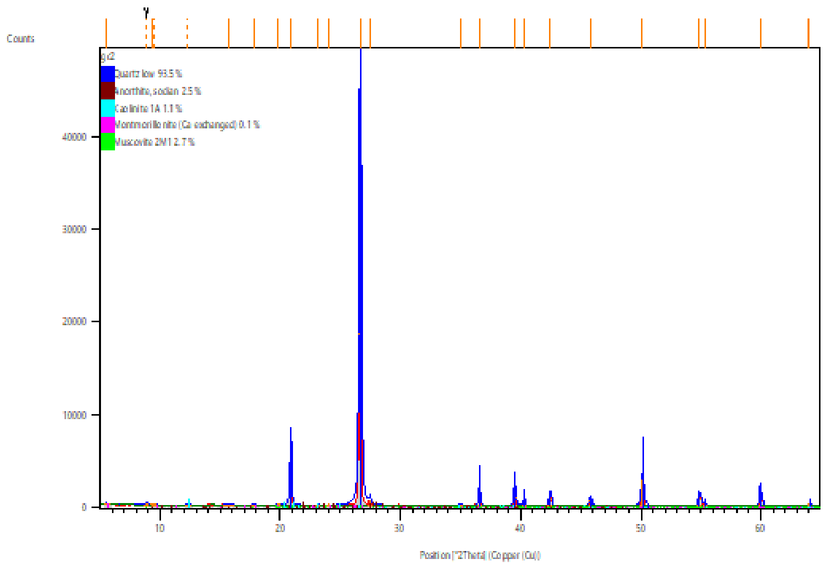
Anchor Scan Parameters

Dataset Name:	gc1
File name:	C:\Users\Rick\Documents\RCIA_Win10\AnchorQEA\AnchorQEA-2021July26\GreeneCounty\gc1.rd
Sample Identification:	GC1-GC1A-Unit2_20-25
Comment:	Exported by X'Pert SW Generated by hugo in project AnchorQEA-2
Measurement Date / Time:	8/10/2021 8:06:00 AM
Raw Data Origin:	PHILIPS-binary (scan) (.RD)
Scan Axis:	Gonio
Start Position [°2Th.]:	5.0200
End Position [°2Th.]:	64.9400
Step Size [°2Th.]:	0.0400
Scan Step Time [s]:	4.5000
Scan Type:	Continuous
Offset [°2Th.]:	0.0000
Divergence Slit Type:	Fixed
Divergence Slit Size [°]:	0.5000
Specimen Length [mm]:	10.00
Receiving Slit Size [mm]:	0.1000
Measurement Temperature [°C]:	0.00
Anode Material:	Cu
K-Alpha1 [Å]:	1.54060
K-Alpha2 [Å]:	1.54443
K-Beta [Å]:	1.39225
K-A2 / K-A1 Ratio:	0.50000
Generator Settings:	30 mA, 40 kV
Diffractometer Type:	XPert MPD
Diffractometer Number:	1
Goniometer Radius [mm]:	200.00
Dist. Focus-Diverg. Slit [mm]:	91.00
Incident Beam Monochromator:	No
Spinning:	No

Pattern List

Ref.Code	Score	Compound Name	Chem. Formula
98-008-3849	79	Quartz low	O2 Si1
98-020-1648	4	Anorthite, sodian	Al1.66 Ca0.66 Na0...
98-008-0082	20	Kaolinite 1A	H4 Al2 O9 Si2
98-005-1636	17	Montmorillonite (C..	H8.2 Al4 Ca1.2 O27..
98-002-5803	0	Muscovite 2M1	H2 Al3 K1 O12 Si3

Graphics

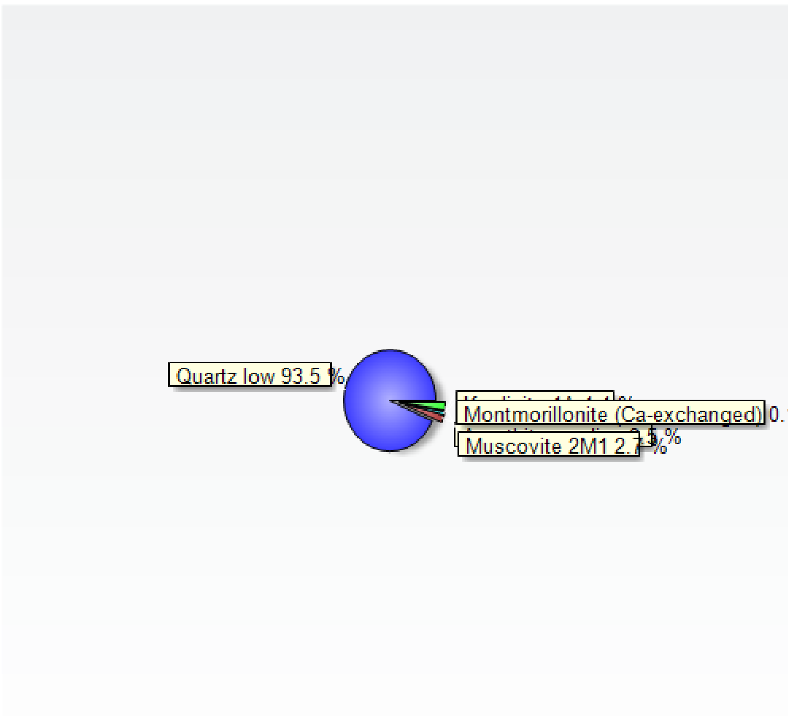


Peak List

Pos.[°2Th.]	d-spacing [Å]	Rel. Int. [%]	Matched by
5.5197	16.01117	0.30	98-005-1636
8.878(6)	9.95284	0.70	
9.45(2)	9.34714	0.24	98-020-1648
12.30(1)	7.18972	0.22	98-008-0082
15.7259	5.63533	0.06	98-020-1648
17.7993	4.98329	0.21	98-020-1648;98..
19.8471	4.47351	0.48	98-008-0082;98..
20.8685	4.25681	17.24	98-008-3849;98..
23.1628	3.84009	0.31	98-020-1648;98..
24.0375	3.70230	0.31	98-020-1648;98..
26.6467	3.34540	100.00	98-008-3849;98..
27.4357	3.25096	1.59	98-020-1648
34.9636	2.56634	0.42	98-020-1648;98..
36.5527	2.45834	4.76	98-008-3849;98..
39.4796	2.28257	5.17	98-008-3849;98..
40.2868	2.23868	2.30	98-008-3849;98..
42.4500	2.12947	3.71	98-008-3849;98..
45.7863	1.98177	2.61	98-008-3849;98..
50.1188	1.82015	7.80	98-008-3849;98..

54.8558	1.67365	3.64	98-008-3849;98..
55.3191	1.66073	1.01	98-008-3849;98..
59.9374	1.54333	5.94	98-008-3849;98..
64.0113	1.45459	0.96	98-008-3849;98..

Quantitative Results



Phase Quartz low:	Weight fraction/ %:	94
Phase Anorthite, sodian:	Weight fraction/ %:	2.5
Phase Kaolinite 1A:	Weight fraction/ %:	1
Phase Montmorillonite (Ca-exchanged):	Weight fraction/ %:	0.1
Phase Muscovite 2M1:	Weight fraction/ %:	2.5

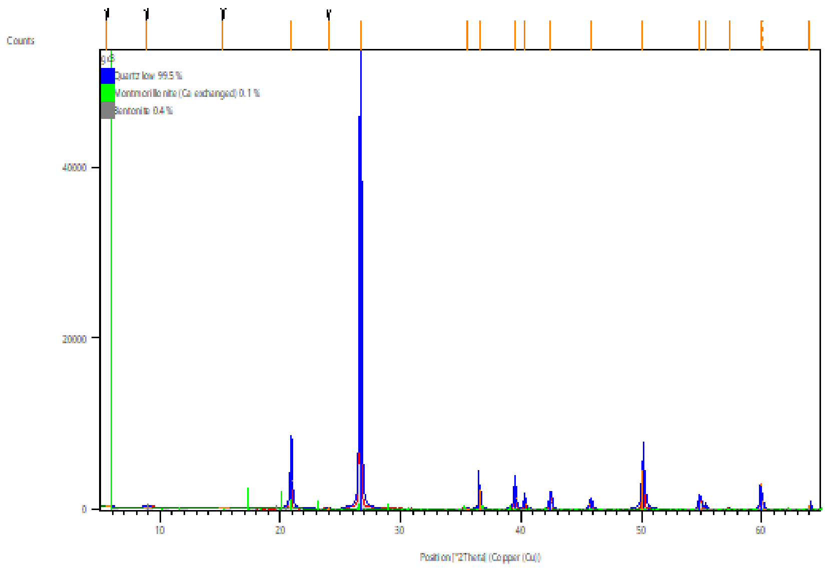
Anchor Scan Parameters

Dataset Name:	gc2
File name:	C:\Users\Rick\Documents\RCIA_Win10\AnchorQEA\AnchorQEA-2021July26\GreeneCounty\gc2.rd
Sample Identification:	GC2-1B-Unit2_15-20
Comment:	Exported by X'Pert SW Generated by hugo in project AnchorQEA-2
Measurement Date / Time:	8/9/2021 2:02:00 PM
Raw Data Origin:	PHILIPS-binary (scan) (.RD)
Scan Axis:	Gonio
Start Position [°2Th.]:	5.0200
End Position [°2Th.]:	64.9400
Step Size [°2Th.]:	0.0400
Scan Step Time [s]:	4.5000
Scan Type:	Continuous
Offset [°2Th.]:	0.0000
Divergence Slit Type:	Fixed
Divergence Slit Size [°]:	0.5000
Specimen Length [mm]:	10.00
Receiving Slit Size [mm]:	0.1000
Measurement Temperature [°C]:	0.00
Anode Material:	Cu
K-Alpha1 [Å]:	1.54060
K-Alpha2 [Å]:	1.54443
K-Beta [Å]:	1.39225
K-A2 / K-A1 Ratio:	0.50000
Generator Settings:	30 mA, 40 kV
Diffractometer Type:	XPert MPD
Diffractometer Number:	1
Goniometer Radius [mm]:	200.00
Dist. Focus-Diverg. Slit [mm]:	91.00
Incident Beam Monochromator:	No
Spinning:	No

Pattern List

Ref.Code	Score	Compound Name	Chem. Formula
98-008-3849	84	Quartz low	O2 Si1
98-005-1636	3	Montmorillonite (C..	H8.2 Al4 Ca1.2 O27..
98-016-0437	6	Bentonite	H2 Al1.93 Ca0.06 F..

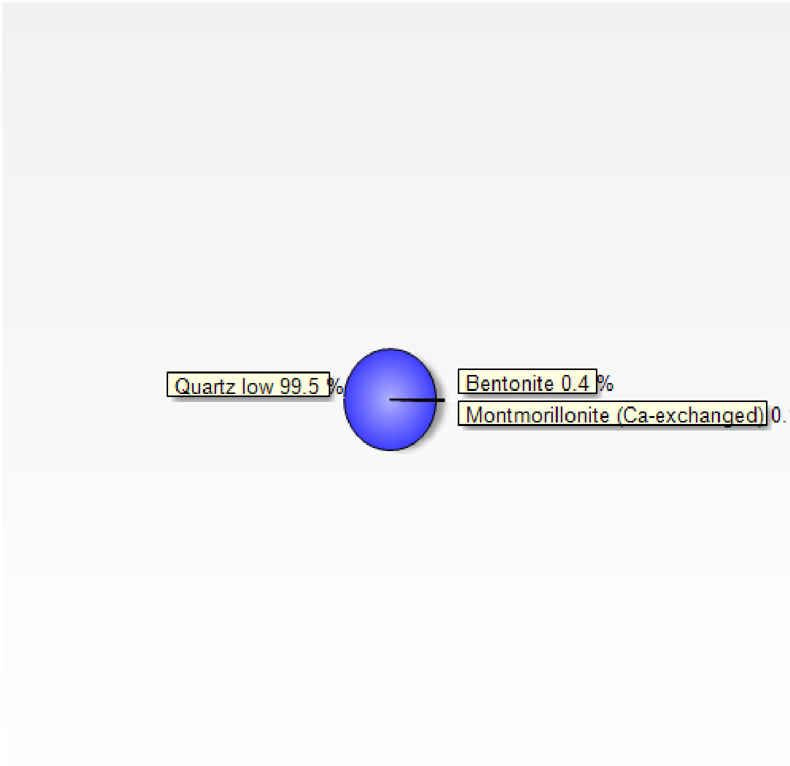
Graphics



Peak List

Pos.[°2Th.]	d-spacing [Å]	Rel. Int. [%]	Matched by
5.6004	15.78066	0.27	
8.8878	9.94978	0.26	
15.2302	5.81761	0.17	
20.8936	4.25175	14.66	98-008-3849;98..
24.0253	3.70415	0.24	
26.6527	3.34466	100.00	98-008-3849;98..
35.5343	2.52643	0.12	98-005-1636;98..
36.5607	2.45782	5.45	98-008-3849;98..
39.4753	2.28281	5.85	98-008-3849;98..
40.2964	2.23817	2.55	98-008-3849;98..
42.4622	2.12889	4.11	98-008-3849;98..
45.7921	1.98153	2.58	98-008-3849;98..
50.1301	1.81976	10.66	98-008-3849;98..
54.8580	1.67359	3.31	98-008-3849;98..
55.3123	1.66091	0.96	98-008-3849;98..
57.3017	1.60789	0.13	98-008-3849;98..
59.9423	1.54194	6.99	98-008-3849;98..
64.0189	1.45323	1.17	98-008-3849;98..

Quantitative Results



Phase Quartz low:	Weight fraction/ %:	99
Phase Montmorillonite (Ca-exchanged):	Weight fraction/ %:	0.1
Phase Bentonite:	Weight fraction/ %:	0.4

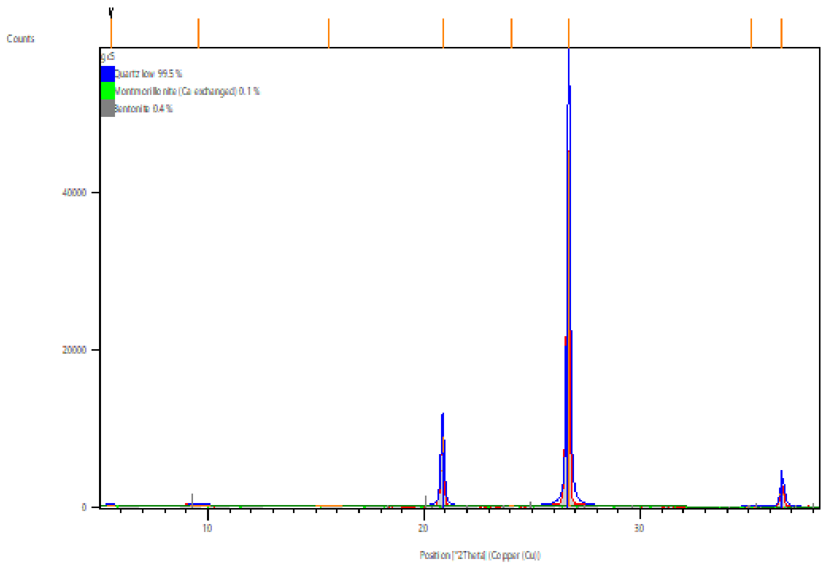
Anchor Scan Parameters

Dataset Name:	gc3
File name:	C:\Users\Rick\Documents\RCIA_Win10\AnchorQEA\AnchorQEA-2021July26\GreeneCounty\gc3.rd
Sample Identification:	GC3-GC1C-Unit2-15-20
Comment:	Exported by X'Pert SW Generated by hugo in project AnchorQEA-2
Measurement Date / Time:	8/9/2021 3:59:00 PM
Raw Data Origin:	PHILIPS-binary (scan) (.RD)
Scan Axis:	Gonio
Start Position [°2Th.]:	5.0200
End Position [°2Th.]:	64.9400
Step Size [°2Th.]:	0.0400
Scan Step Time [s]:	4.5000
Scan Type:	Continuous
Offset [°2Th.]:	0.0000
Divergence Slit Type:	Fixed
Divergence Slit Size [°]:	0.5000
Specimen Length [mm]:	10.00
Receiving Slit Size [mm]:	0.1000
Measurement Temperature [°C]:	0.00
Anode Material:	Cu
K-Alpha1 [Å]:	1.54060
K-Alpha2 [Å]:	1.54443
K-Beta [Å]:	1.39225
K-A2 / K-A1 Ratio:	0.50000
Generator Settings:	30 mA, 40 kV
Diffractometer Type:	XPert MPD
Diffractometer Number:	1
Goniometer Radius [mm]:	200.00
Dist. Focus-Diverg. Slit [mm]:	91.00
Incident Beam Monochromator:	No
Spinning:	No

Pattern List

Ref.Code	Score	Compound Name	Chem. Formula
98-006-2405	59	Quartz low	O2 Si1
98-005-1636	0	Montmorillonite (C..	H8.2 Al4 Ca1.2 O27..
98-016-0437	8	Bentonite	H2 Al1.93 Ca0.06 F..

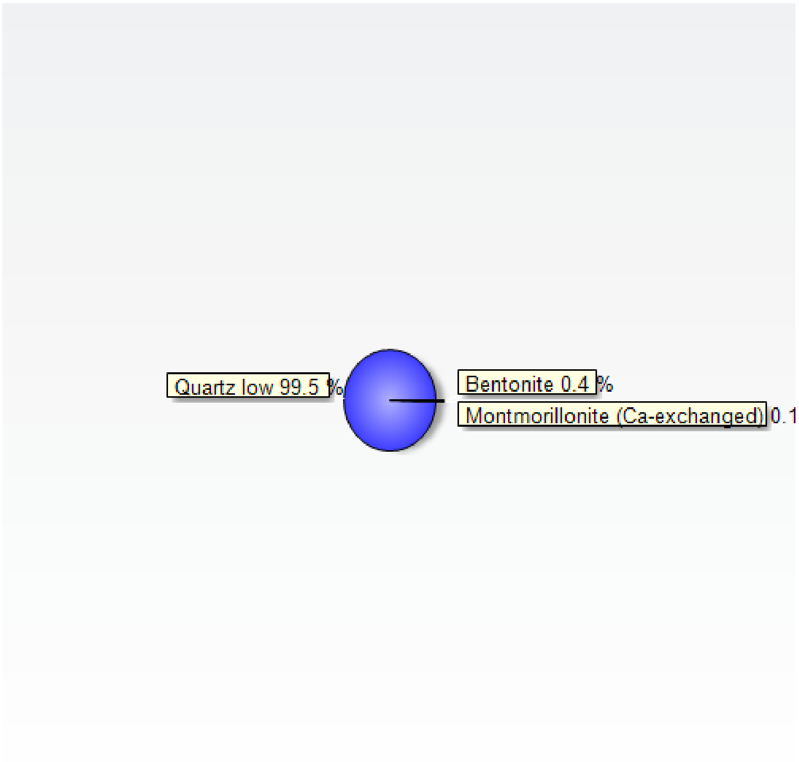
Graphics



Peak List

Pos.[°2Th.]	d-spacing [Å]	Rel. Int. [%]	Matched by
5.5167	16.01978	0.29	
9.5964	9.21663	0.32	98-016-0437
15.5945	5.68254	0.14	98-005-1636
20.8507	4.26039	19.73	98-006-2405;98..
24.0463	3.70097	0.21	98-016-0437
26.6678	3.34281	100.00	98-006-2405;98..
35.1275	2.55474	0.08	98-005-1636;98..
36.5620	2.45774	6.24	98-006-2405;98..

Quantitative Results



Phase Quartz low:	Weight fraction/ %:	99
Phase Montmorillonite (Ca-exchanged):	Weight fraction/ %:	0.1
Phase Bentonite:	Weight fraction/ %:	0.4

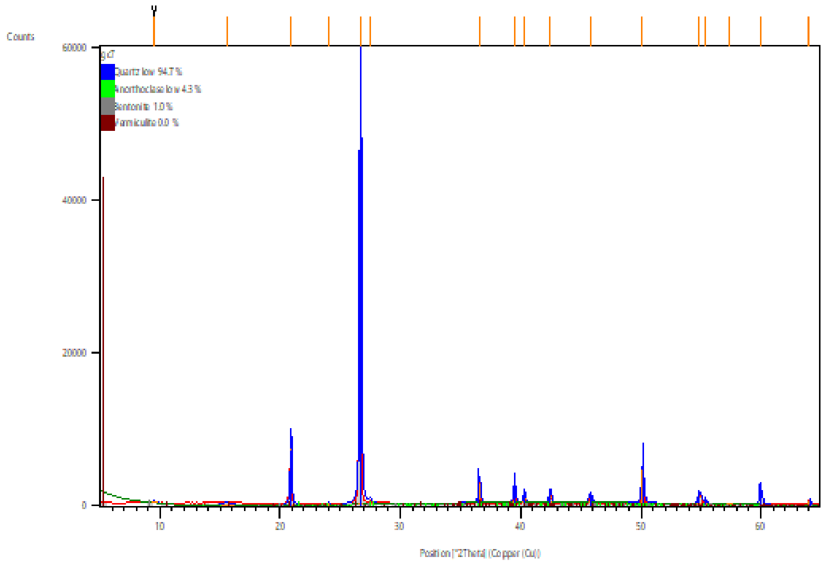
Anchor Scan Parameters

Dataset Name:	gc5
File name:	C:\Users\Rick\Documents\RCIA_Win10\AnchorQEA\AnchorQEA-2021July26\GreeneCounty\gc5.rd
Sample Identification:	GC5-GC2B-Unit2_15-20
Comment:	Exported by X'Pert SW Generated by hugo in project AnchorQEA-2
Measurement Date / Time:	8/11/2021 3:05:00 PM
Raw Data Origin:	PHILIPS-binary (scan) (.RD)
Scan Axis:	Gonio
Start Position [°2Th.]:	5.0200
End Position [°2Th.]:	38.3400
Step Size [°2Th.]:	0.0400
Scan Step Time [s]:	4.5000
Scan Type:	Continuous
Offset [°2Th.]:	0.0000
Divergence Slit Type:	Fixed
Divergence Slit Size [°]:	0.5000
Specimen Length [mm]:	10.00
Receiving Slit Size [mm]:	0.1000
Measurement Temperature [°C]:	0.00
Anode Material:	Cu
K-Alpha1 [Å]:	1.54060
K-Alpha2 [Å]:	1.54443
K-Beta [Å]:	1.39225
K-A2 / K-A1 Ratio:	0.50000
Generator Settings:	30 mA, 40 kV
Diffractometer Type:	XPert MPD
Diffractometer Number:	1
Goniometer Radius [mm]:	200.00
Dist. Focus-Diverg. Slit [mm]:	91.00
Incident Beam Monochromator:	No
Spinning:	No

Pattern List

Ref.Code	Score	Compound Name	Chem. Formula
98-008-3849	80	Quartz low	O2 Si1
98-003-1180	9	Anorthoclase low	Al1 K0.333 Na0.667..
98-016-0437	9	Bentonite	H2 Al1.93 Ca0.06 F..
98-015-9357	1	Vermiculite	C3 H10.5 Al1.28 Mg..

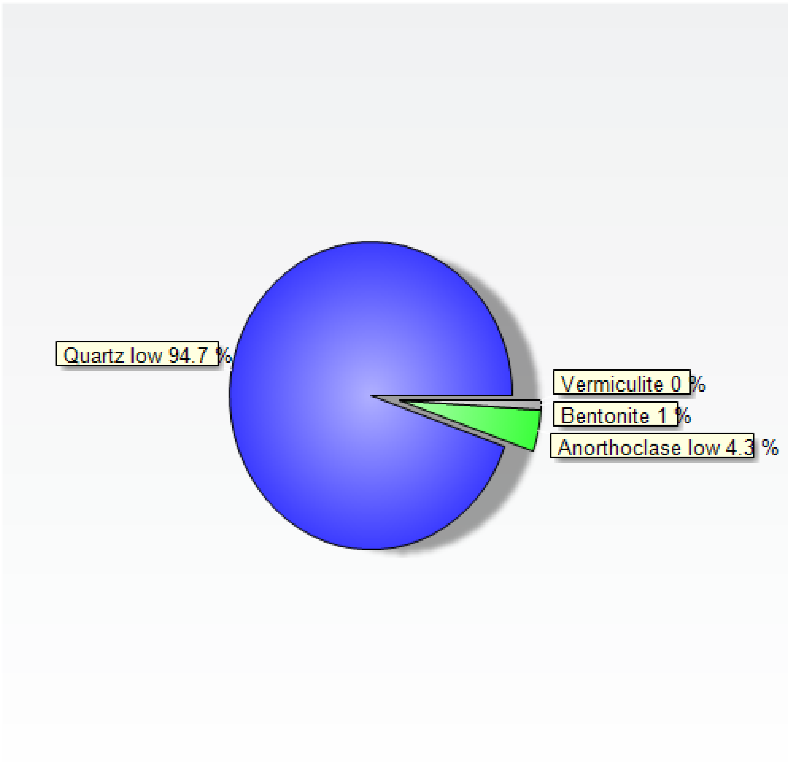
Graphics



Peak List

Pos.[°2Th.]	d-spacing [Å]	Rel. Int. [%]	Matched by
9.5230	9.28750	0.29	
15.5972	5.68156	0.50	98-015-9357
20.8862	4.25324	15.99	98-008-3849;98..
24.0241	3.70434	0.53	98-003-1180
26.6659	3.34304	100.00	98-008-3849
27.4797	3.24587	1.17	98-003-1180;98..
36.5630	2.45767	5.68	98-008-3849;98..
39.4743	2.28287	4.50	98-008-3849;98..
40.2916	2.23842	2.47	98-008-3849;98..
42.4483	2.12956	3.07	98-008-3849;98..
45.7848	1.98184	2.50	98-008-3849;98..
50.1278	1.81984	9.37	98-008-3849;98..
54.8579	1.67359	3.15	98-008-3849;98..
55.3079	1.66104	0.90	98-008-3849;98..
57.3828	1.60581	0.15	98-008-3849;98..
59.9383	1.54331	5.91	98-008-3849;98..
64.0106	1.45460	1.15	98-008-3849;98..

Quantitative Results



Phase Quartz low:	Weight fraction/ %:	95
Phase Anorthoclase low:	Weight fraction/ %:	4
Phase Bentonite:	Weight fraction/ %:	1
Phase Vermiculite:	Weight fraction/ %:	0.01

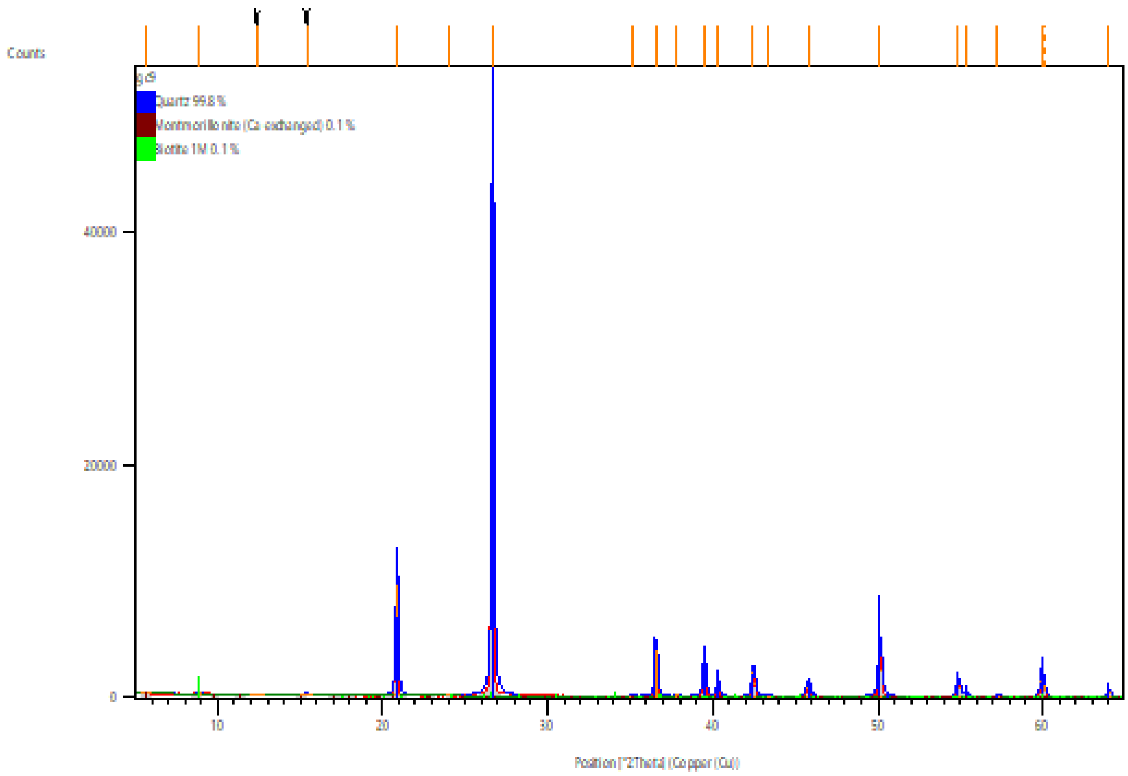
Anchor Scan Parameters

Dataset Name:	gc7
File name:	C:\Users\Rick\Documents\RCIA_Win10\AnchorQEA\AnchorQEA-2021July26\GreeneCounty\gc7.rd
Sample Identification:	GC7-GC3A-Unit2_40-45
Comment:	Exported by X'Pert SW Generated by hugo in project AnchorQEA-2
Measurement Date / Time:	8/10/2021 10:03:00 AM
Raw Data Origin:	PHILIPS-binary (scan) (.RD)
Scan Axis:	Gonio
Start Position [°2Th.]:	5.0200
End Position [°2Th.]:	64.9400
Step Size [°2Th.]:	0.0400
Scan Step Time [s]:	4.5000
Scan Type:	Continuous
Offset [°2Th.]:	0.0000
Divergence Slit Type:	Fixed
Divergence Slit Size [°]:	0.5000
Specimen Length [mm]:	10.00
Receiving Slit Size [mm]:	0.1000
Measurement Temperature [°C]:	0.00
Anode Material:	Cu
K-Alpha1 [Å]:	1.54060
K-Alpha2 [Å]:	1.54443
K-Beta [Å]:	1.39225
K-A2 / K-A1 Ratio:	0.50000
Generator Settings:	30 mA, 40 kV
Diffractometer Type:	XPert MPD
Diffractometer Number:	1
Goniometer Radius [mm]:	200.00
Dist. Focus-Diverg. Slit [mm]:	91.00
Incident Beam Monochromator:	No
Spinning:	No

Pattern List

Ref.Code	Score	Compound Name	Chem. Formula
98-015-4289	81	Quartz	O2 Si1
98-005-1636	25	Montmorillonite (C..	H8.2 Al4 Ca1.2 O27..
98-016-1225	10	Biotite 1M	H1.68 Al1.83 F0.07..

Graphics

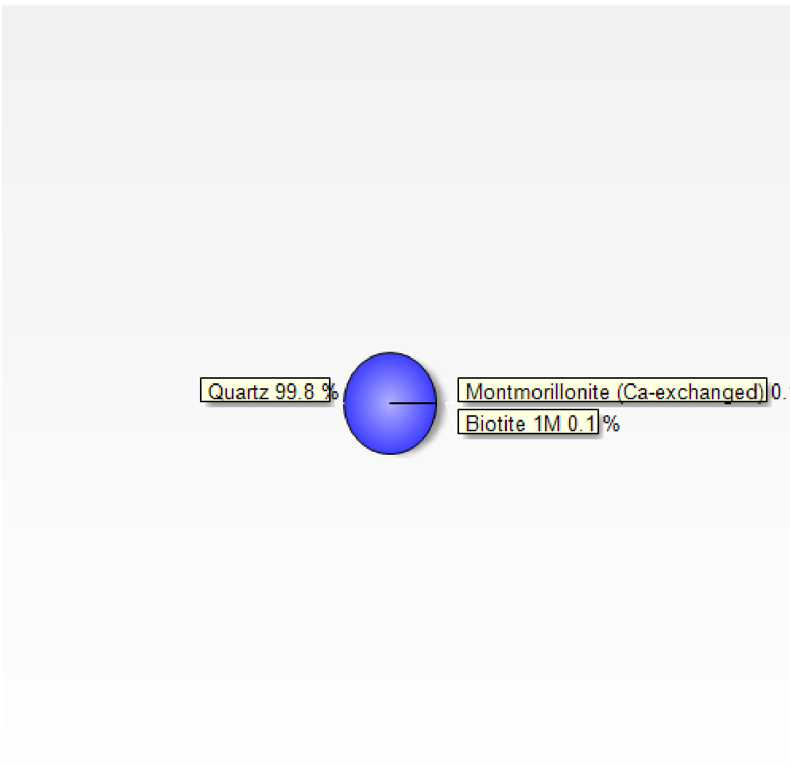


Peak List

Pos.[°2Th.]	d-spacing [Å]	Rel. Int. [%]	Matched by
5.6195	15.72720	0.23	98-005-1636
8.8836	9.95449	0.44	98-016-1225
12.3605	7.16109	0.01	
15.3870	5.75869	0.17	
20.8638	4.25775	22.69	98-015-4289;98..
24.0309	3.70330	0.24	98-005-1636;98..
26.6613	3.34361	100.00	98-015-4289;98..
35.1059	2.55627	0.19	98-005-1636
36.5566	2.45809	9.34	98-015-4289;98..
37.8171	2.37900	0.25	98-005-1636;98..
39.4759	2.28278	5.94	98-015-4289;98..
40.3053	2.23770	2.66	98-015-4289;98..
42.4568	2.12915	5.08	98-015-4289
43.3680	2.08650	0.17	98-005-1636;98..

45.7826	1.98193	2.76	98-015-4289;98..
50.1164	1.82023	9.69	98-015-4289;98..
54.8495	1.67383	3.23	98-015-4289;98..
55.3050	1.66112	0.83	98-015-4289;98..
57.2515	1.60918	0.15	98-015-4289;98..
59.9270	1.54230	5.43	98-015-4289;98..
64.0047	1.45352	1.36	98-015-4289;98..

Quantitative Results



Phase Quartz:	Weight fraction/ %:	100
Phase Montmorillonite (Ca-exchanged):	Weight fraction/ %:	0.1
Phase Biotite 1M:	Weight fraction/ %:	0.1

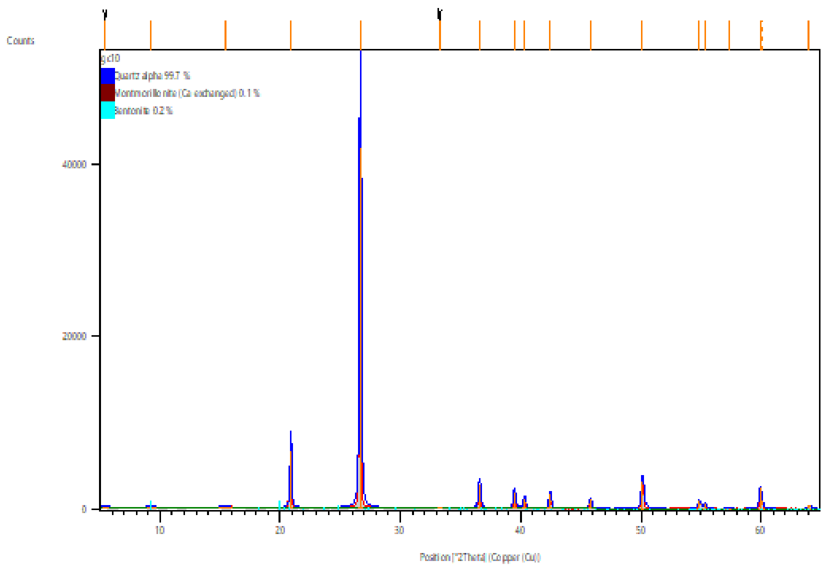
Anchor Scan Parameters

Dataset Name:	gc9
File name:	C:\Users\Rick\Documents\RCIA_Win10\AnchorQEA\AnchorQEA-2021July26\GreeneCounty\gc9.rd
Sample Identification:	GC9-GC3B-Unit2_40-45
Comment:	Exported by X'Pert SW Generated by hugo in project AnchorQEA-2
Measurement Date / Time:	8/11/2021 1:10:00 PM
Raw Data Origin:	PHILIPS-binary (scan) (.RD)
Scan Axis:	Gonio
Start Position [°2Th.]:	5.0200
End Position [°2Th.]:	64.9400
Step Size [°2Th.]:	0.0400
Scan Step Time [s]:	4.5000
Scan Type:	Continuous
Offset [°2Th.]:	0.0000
Divergence Slit Type:	Fixed
Divergence Slit Size [°]:	0.5000
Specimen Length [mm]:	10.00
Receiving Slit Size [mm]:	0.1000
Measurement Temperature [°C]:	0.00
Anode Material:	Cu
K-Alpha1 [Å]:	1.54060
K-Alpha2 [Å]:	1.54443
K-Beta [Å]:	1.39225
K-A2 / K-A1 Ratio:	0.50000
Generator Settings:	30 mA, 40 kV
Diffractometer Type:	XPert MPD
Diffractometer Number:	1
Goniometer Radius [mm]:	200.00
Dist. Focus-Diverg. Slit [mm]:	91.00
Incident Beam Monochromator:	No
Spinning:	No

Pattern List

Ref.Code	Score	Compound Name	Chem. Formula
98-017-3226	73	Quartz alpha	O2 Si1
98-005-1636	0	Montmorillonite (C..	H8.2 Al4 Ca1.2 O27..
98-016-0437	7	Bentonite	H2 Al1.93 Ca0.06 F..

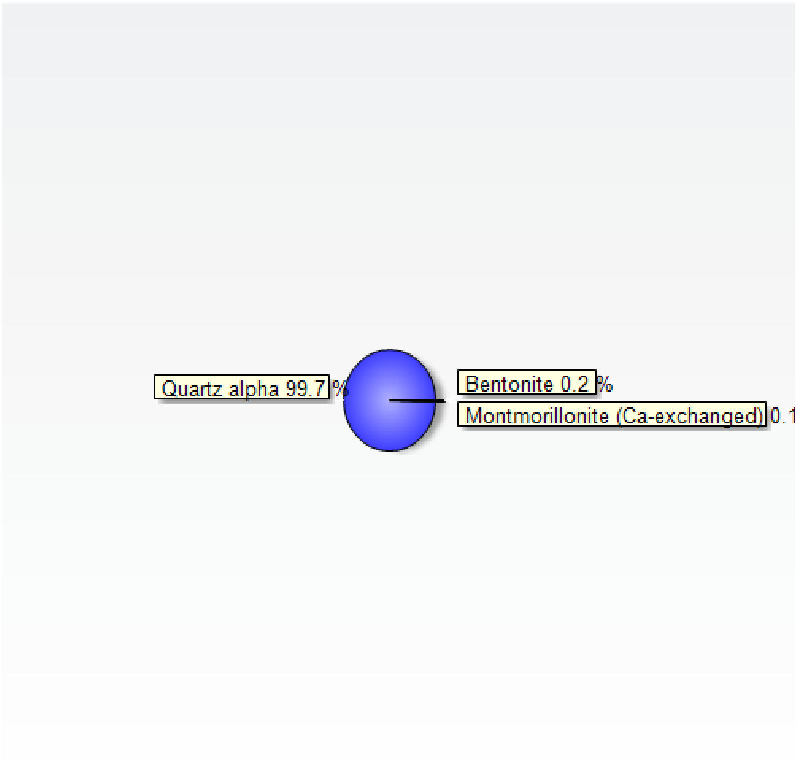
Graphics



Peak List

Pos.[°2Th.]	d-spacing [Å]	Rel. Int. [%]	Matched by
5.43(6)	16.24777	0.30	
9.29(2)	9.51302	0.30	98-016-0437
15.4410	5.73866	0.15	98-005-1636
20.8706	4.25637	15.89	98-017-3226;98..
26.6534	3.34458	100.00	98-017-3226;98..
33.2587	2.69390	0.03	
36.5650	2.45754	6.42	98-017-3226;98..
39.4637	2.28345	4.48	98-017-3226;98..
40.3000	2.23798	2.87	98-017-3226;98..
42.4331	2.13028	3.79	98-017-3226;98..
45.7818	1.98196	2.47	98-017-3226;98..
50.1194	1.82013	7.43	98-017-3226;98..
54.8522	1.67375	2.08	98-017-3226;98..
55.3050	1.66112	1.45	98-017-3226;98..
57.3008	1.60791	0.13	98-017-3226;98..
59.9227	1.54240	5.60	98-017-3226;98..
64.0098	1.45342	0.99	98-017-3226;98..

Quantitative Results



Phase Quartz alpha:	Weight fraction/ %:	100
Phase Montmorillonite (Ca-exchanged):	Weight fraction/ %:	0.1
Phase Bentonite:	Weight fraction/ %:	0.2

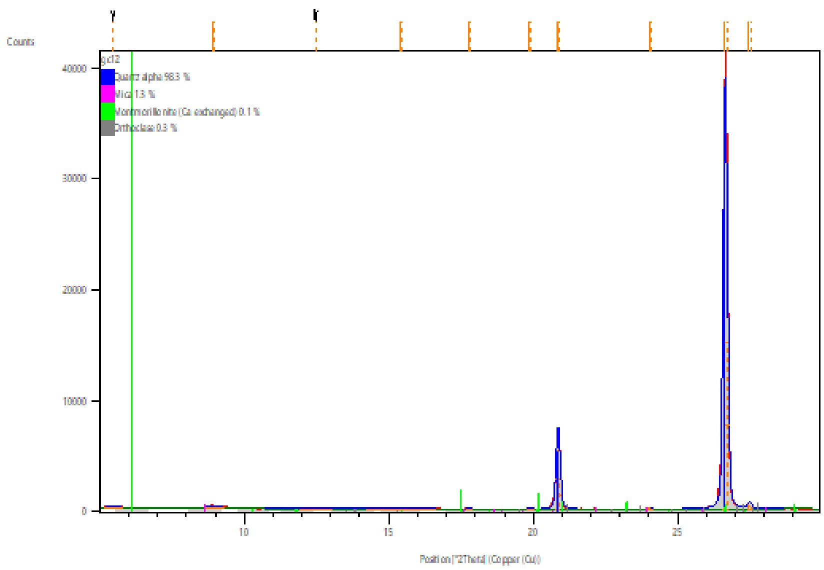
Anchor Scan Parameters

Dataset Name:	gc10
File name:	C:\Users\Rick\Documents\RCIA_Win10\AnchorQEA\AnchorQEA-2021July26\GreeneCounty\gc10.rd
Sample Identification:	GC10-GC4A-Unit2_30-3
Comment:	Exported by X'Pert SW Generated by hugo in project AnchorQEA-2
Measurement Date / Time:	8/11/2021 11:12:00 AM
Raw Data Origin:	PHILIPS-binary (scan) (.RD)
Scan Axis:	Gonio
Start Position [°2Th.]:	5.0200
End Position [°2Th.]:	64.9400
Step Size [°2Th.]:	0.0400
Scan Step Time [s]:	4.5000
Scan Type:	Continuous
Offset [°2Th.]:	0.0000
Divergence Slit Type:	Fixed
Divergence Slit Size [°]:	0.5000
Specimen Length [mm]:	10.00
Receiving Slit Size [mm]:	0.1000
Measurement Temperature [°C]:	0.00
Anode Material:	Cu
K-Alpha1 [Å]:	1.54060
K-Alpha2 [Å]:	1.54443
K-Beta [Å]:	1.39225
K-A2 / K-A1 Ratio:	0.50000
Generator Settings:	30 mA, 40 kV
Diffractometer Type:	XPert MPD
Diffractometer Number:	1
Goniometer Radius [mm]:	200.00
Dist. Focus-Diverg. Slit [mm]:	91.00
Incident Beam Monochromator:	No
Spinning:	No

Pattern List

Ref.Code	Score	Compound Name	Chem. Formula
98-017-3226	44	Quartz alpha	O2 Si1
98-017-2273	17	Mica	H2 Fe4.07 O12 Rb0...
98-005-1636	1	Montmorillonite (C..	H8.2 Al4 Ca1.2 O27..
98-003-4782	35	Orthoclase	Al1 K0.94 Na0.06 O..

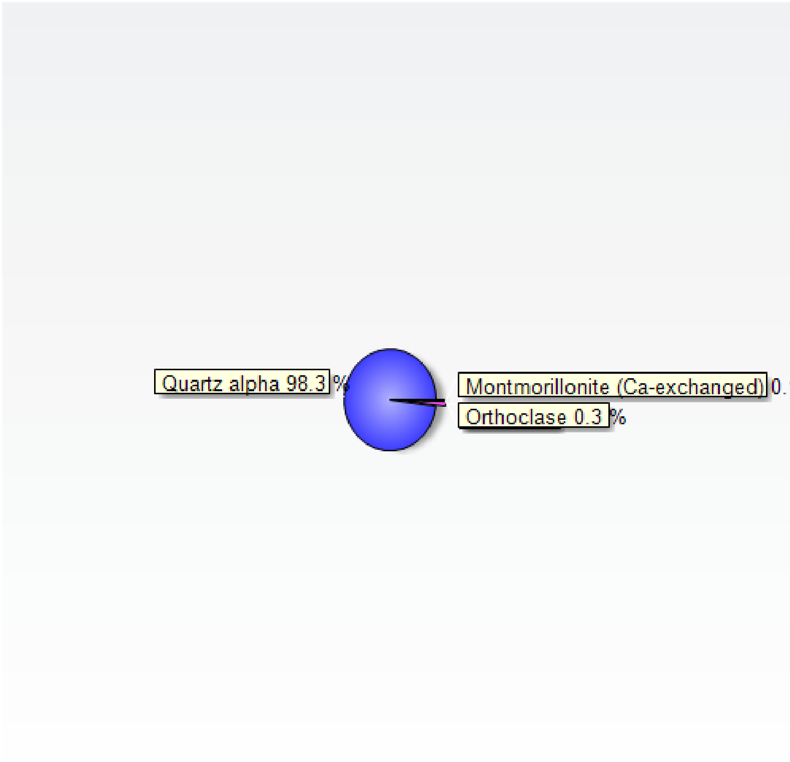
Graphics



Peak List

Pos.[°2Th.]	d-spacing [Å]	Rel. Int. [%]	Matched by
5.47(3)	16.14686	0.37	
8.949(9)	9.87335	0.60	98-017-2273
12.47(6)	7.09239	0.12	
15.40(4)	5.74801	0.25	98-005-1636;98..
17.78(1)	4.98520	0.22	98-017-2273;98..
19.86(1)	4.46753	0.18	98-017-2273;98..
20.8500(5)	4.25700	17.83	98-017-3226;98..
24.016(8)	3.70252	0.31	98-017-2273;98..
26.6282(2)	3.34492	100.00	98-017-3226;98..
27.472(3)	3.24408	1.53	98-017-2273;98..

Quantitative Results



Phase Quartz alpha:	Weight fraction/ %:	98
Phase Mica:	Weight fraction/ %:	1.5
Phase Montmorillonite (Ca-exchanged):	Weight fraction/ %:	0.1
Phase Orthoclase:	Weight fraction/ %:	0.3

Anchor Scan Parameters

Dataset Name:	gc12
File name:	C:\Users\Rick\Documents\RCIA_Win10\AnchorQEA\AnchorQEA-2021July26\GreeneCounty\gc12.rd
Sample Identification:	GC12-GC4C-Unit2_15-3
Comment:	Exported by X'Pert SW Generated by hugo in project AnchorQEA-2
Measurement Date / Time:	8/10/2021 12:01:00 PM
Raw Data Origin:	PHILIPS-binary (scan) (.RD)
Scan Axis:	Gonio
Start Position [°2Th.]:	5.0200
End Position [°2Th.]:	29.9400
Step Size [°2Th.]:	0.0400
Scan Step Time [s]:	4.5000
Scan Type:	Continuous
Offset [°2Th.]:	0.0000
Divergence Slit Type:	Fixed
Divergence Slit Size [°]:	0.5000
Specimen Length [mm]:	10.00
Receiving Slit Size [mm]:	0.1000
Measurement Temperature [°C]:	0.00
Anode Material:	Cu
K-Alpha1 [Å]:	1.54060
K-Alpha2 [Å]:	1.54443
K-Beta [Å]:	1.39225
K-A2 / K-A1 Ratio:	0.50000
Generator Settings:	30 mA, 40 kV
Diffractometer Type:	XPert MPD
Diffractometer Number:	1
Goniometer Radius [mm]:	200.00
Dist. Focus-Diverg. Slit [mm]:	91.00
Incident Beam Monochromator:	No
Spinning:	No

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

Wednesday, August 4, 2021

Anthony Dalton-Atha
Anchor QEA, LLC
6720 SW Macadam Ave. Suite 125
Portland, OR 97219

RE: A1G0829 - Alabama Power-Greene County - 201114-01.05

Thank you for using Apex Laboratories. We greatly appreciate your business and strive to provide the highest quality services to the environmental industry.

Enclosed are the results of analyses for work order A1G0829, which was received by the laboratory on 7/29/2021 at 9:55:00AM.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: dthomas@apex-labs.com, or by phone at 503-718-2323.

Please note: All samples will be disposed of within 30 days of sample receipt, unless prior arrangements have been made.

Cooler Receipt Information

(See Cooler Receipt Form for details)

Cooler #1	2.6 degC

The results provided in this report are PRELIMINARY and are subject to change based on subsequent analysis, QC validation or final data review. Please use these results with the understanding that they may have not been finalized by the laboratory.

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

Anchor QEA, LLC	Project: **Alabama Power-Greene County**	
6720 SW Macadam Ave. Suite 125	Project Number: 201114-01.05	**Report ID:**
Portland, OR 97219	Project Manager: Anthony Dalton-Atha	A1G0829 - 08 04 21 1710

ANALYTICAL REPORT FOR SAMPLES

SAMPLE INFORMATION

Client Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
GC-AP-CEC-1-20210728	A1G0829-01	Water	07/28/21 15:25	07/29/21 09:55
GC-AP-CEC-2-20210728	A1G0829-02	Water	07/28/21 15:30	07/29/21 09:55
GC-AP-CEC-3-20210728	A1G0829-03	Water	07/28/21 15:35	07/29/21 09:55
GC-AP-CEC-4-20210728	A1G0829-04	Water	07/28/21 15:40	07/29/21 09:55
GC-AP-CEC-5-20210728	A1G0829-05	Water	07/28/21 15:45	07/29/21 09:55
GC-AP-CEC-6-20210728	A1G0829-06	Water	07/28/21 15:50	07/29/21 09:55
GC-AP-CEC-7-20210728	A1G0829-07	Water	07/28/21 15:55	07/29/21 09:55
GC-AP-CEC-8-20210728	A1G0829-08	Water	07/28/21 16:00	07/29/21 09:55
GC-AP-CEC-9-20210728	A1G0829-09	Water	07/28/21 16:05	07/29/21 09:55
GC-AP-CEC-10-20210728	A1G0829-10	Water	07/28/21 16:10	07/29/21 09:55
GC-AP-CEC-11-20210728	A1G0829-11	Water	07/28/21 16:15	07/29/21 09:55
GC-AP-CEC-12-20210728	A1G0829-12	Water	07/28/21 16:20	07/29/21 09:55
GC-AP-CEC-MB-20210728	A1G0829-13	Water	07/28/21 16:25	07/29/21 09:55

DRAFT REPORT

The results provided in this report are PRELIMINARY and are subject to change based on subsequent analysis, QC validation or final data review. Please use these results with the understanding that they may have not been finalized by the laboratory.

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

Anchor QEA, LLC	Project: **Alabama Power-Greene County**	
6720 SW Macadam Ave. Suite 125	Project Number: **201114-01.05**	**Report ID:**
Portland, OR 97219	Project Manager: **Anthony Dalton-Atha**	**A1G0829 - 08 04 21 1710**

ANALYTICAL SAMPLE RESULTS

Total Metals by EPA 6020B (ICPMS)

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
GC-AP-CEC-1-20210728 (A1G0829-01)				**Matrix: Water**				
Batch: 1071000								
Aluminum	ND	125	250	ug/L	5	08/02/21 20:54	EPA 6020B	R-04
Arsenic	**38.3**	2.50	5.00	ug/L	5	08/02/21 20:54	EPA 6020B	
Calcium	**31300**	1500	3000	ug/L	5	08/02/21 20:54	EPA 6020B	
Cobalt	**36.1**	2.50	5.00	ug/L	5	08/02/21 20:54	EPA 6020B	
Magnesium	**9380**	375	750	ug/L	5	08/02/21 20:54	EPA 6020B	
Potassium	**20300**	250	500	ug/L	5	08/02/21 20:54	EPA 6020B	
Sodium	**2250**	250	500	ug/L	5	08/02/21 20:54	EPA 6020B	
Lithium	**21.6**	12.5	25.0	ug/L	5	08/02/21 20:54	EPA 6020B	**R-04, J**
GC-AP-CEC-2-20210728 (A1G0829-02)				**Matrix: Water**				
Batch: 1071000								
Aluminum	ND	125	250	ug/L	5	08/02/21 20:59	EPA 6020B	R-04
Arsenic	**11.9**	2.50	5.00	ug/L	5	08/02/21 20:59	EPA 6020B	
Calcium	**43100**	1500	3000	ug/L	5	08/02/21 20:59	EPA 6020B	
Cobalt	**2.72**	2.50	5.00	ug/L	5	08/02/21 20:59	EPA 6020B	**R-04, J**
Magnesium	**6830**	375	750	ug/L	5	08/02/21 20:59	EPA 6020B	
Potassium	**8120**	250	500	ug/L	5	08/02/21 20:59	EPA 6020B	
Sodium	**1670**	250	500	ug/L	5	08/02/21 20:59	EPA 6020B	
Lithium	ND	12.5	25.0	ug/L	5	08/02/21 20:59	EPA 6020B	R-04
GC-AP-CEC-3-20210728 (A1G0829-03)				**Matrix: Water**				
Batch: 1071000								
Aluminum	ND	125	250	ug/L	5	08/02/21 21:05	EPA 6020B	R-04
Arsenic	**3.50**	2.50	5.00	ug/L	5	08/02/21 21:05	EPA 6020B	**R-04, J**
Calcium	**50500**	1500	3000	ug/L	5	08/02/21 21:05	EPA 6020B	
Cobalt	**9.24**	2.50	5.00	ug/L	5	08/02/21 21:05	EPA 6020B	
Magnesium	**3090**	375	750	ug/L	5	08/02/21 21:05	EPA 6020B	
Potassium	**11700**	250	500	ug/L	5	08/02/21 21:05	EPA 6020B	
Sodium	**1520**	250	500	ug/L	5	08/02/21 21:05	EPA 6020B	
Lithium	**29.9**	12.5	25.0	ug/L	5	08/02/21 21:05	EPA 6020B	
GC-AP-CEC-4-20210728 (A1G0829-04)				**Matrix: Water**				
Batch: 1071000								

DRAFT REPORT

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ANALYTICAL REPORT

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

Anchor QEA, LLC
6720 SW Macadam Ave. Suite 125
Portland, OR 97219

Project: **Alabama Power-Greene County**
Project Number: **201114-01.05**
Project Manager: **Anthony Dalton-Atha**

Report ID:
A1G0829 - 08 04 21 1710

ANALYTICAL SAMPLE RESULTS

Total Metals by EPA 6020B (ICPMS)

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
GC-AP-CEC-4-20210728 (A1G0829-04)				**Matrix: Water**				
Aluminum	ND	125	250	ug/L	5	08/02/21 21:10	EPA 6020B	R-04
Arsenic	**8.34**	2.50	5.00	ug/L	5	08/02/21 21:10	EPA 6020B	
Calcium	**24000**	1500	3000	ug/L	5	08/02/21 21:10	EPA 6020B	
Cobalt	ND	2.50	5.00	ug/L	5	08/02/21 21:10	EPA 6020B	R-04
Magnesium	**5740**	375	750	ug/L	5	08/02/21 21:10	EPA 6020B	
Potassium	**9720**	250	500	ug/L	5	08/02/21 21:10	EPA 6020B	
Sodium	**2240**	250	500	ug/L	5	08/02/21 21:10	EPA 6020B	
Lithium	ND	12.5	25.0	ug/L	5	08/02/21 21:10	EPA 6020B	R-04
GC-AP-CEC-5-20210728 (A1G0829-05)				**Matrix: Water**				
Batch: 1071000								
Aluminum	ND	125	250	ug/L	5	08/02/21 21:26	EPA 6020B	R-04
Arsenic	ND	2.50	5.00	ug/L	5	08/02/21 21:26	EPA 6020B	R-04
Cobalt	**3.03**	2.50	5.00	ug/L	5	08/02/21 21:26	EPA 6020B	**R-04, J**
Potassium	**10900**	250	500	ug/L	5	08/02/21 21:26	EPA 6020B	
Sodium	**829**	250	500	ug/L	5	08/02/21 21:26	EPA 6020B	
Lithium	ND	12.5	25.0	ug/L	5	08/02/21 21:26	EPA 6020B	R-04
GC-AP-CEC-5-20210728 (A1G0829-05RE1)				**Matrix: Water**				
Batch: 1071000								
Calcium	**26500**	1500	3000	ug/L	5	08/03/21 14:50	EPA 6020B	
Magnesium	**2170**	375	750	ug/L	5	08/03/21 14:50	EPA 6020B	
GC-AP-CEC-6-20210728 (A1G0829-06)				**Matrix: Water**				
Batch: 1071000								
Aluminum	ND	125	250	ug/L	5	08/02/21 21:31	EPA 6020B	R-04
Arsenic	ND	2.50	5.00	ug/L	5	08/02/21 21:31	EPA 6020B	R-04
Calcium	**10000**	1500	3000	ug/L	5	08/02/21 21:31	EPA 6020B	
Cobalt	**3.05**	2.50	5.00	ug/L	5	08/02/21 21:31	EPA 6020B	**J, R-04**
Potassium	**3910**	250	500	ug/L	5	08/02/21 21:31	EPA 6020B	
Sodium	**861**	250	500	ug/L	5	08/02/21 21:31	EPA 6020B	
Lithium	ND	12.5	25.0	ug/L	5	08/02/21 21:31	EPA 6020B	R-04
GC-AP-CEC-6-20210728 (A1G0829-06RE1)				**Matrix: Water**				
Batch: 1071000								

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ANALYTICAL REPORT

Anchor QEA, LLC	Project:	**Alabama Power-Greene County**	
6720 SW Macadam Ave. Suite 125	Project Number:	201114-01.05	**Report ID:**
Portland, OR 97219	Project Manager:	Anthony Dalton-Atha	A1G0829 - 08 04 21 1710

ANALYTICAL SAMPLE RESULTS

Total Metals by EPA 6020B (ICPMS)

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
GC-AP-CEC-6-20210728 (A1G0829-06RE1)				Matrix: Water				
Magnesium	**789**	375	750	ug/L	5	08/03/21 14:55	EPA 6020B	
GC-AP-CEC-7-20210728 (A1G0829-07)				Matrix: Water				
Batch: 1071000								
Aluminum	ND	125	250	ug/L	5	08/02/21 21:36	EPA 6020B	R-04
Arsenic	ND	2.50	5.00	ug/L	5	08/02/21 21:36	EPA 6020B	R-04
Calcium	**13300**	1500	3000	ug/L	5	08/02/21 21:36	EPA 6020B	
Cobalt	**3.75**	2.50	5.00	ug/L	5	08/02/21 21:36	EPA 6020B	**R-04, J**
Potassium	**8860**	250	500	ug/L	5	08/02/21 21:36	EPA 6020B	
Sodium	**3140**	250	500	ug/L	5	08/02/21 21:36	EPA 6020B	
Lithium	**57.4**	12.5	25.0	ug/L	5	08/02/21 21:36	EPA 6020B	
GC-AP-CEC-7-20210728 (A1G0829-07RE1)				Matrix: Water				
Batch: 1071000								
Magnesium	**2310**	375	750	ug/L	5	08/03/21 15:03	EPA 6020B	
GC-AP-CEC-8-20210728 (A1G0829-08)				Matrix: Water				
Batch: 1071000								
Aluminum	ND	125	250	ug/L	5	08/02/21 21:41	EPA 6020B	R-04
Arsenic	ND	2.50	5.00	ug/L	5	08/02/21 21:41	EPA 6020B	R-04
Calcium	**11100**	1500	3000	ug/L	5	08/02/21 21:41	EPA 6020B	
Cobalt	**3.47**	2.50	5.00	ug/L	5	08/02/21 21:41	EPA 6020B	**R-04, J**
Potassium	**7400**	250	500	ug/L	5	08/02/21 21:41	EPA 6020B	
Sodium	**2740**	250	500	ug/L	5	08/02/21 21:41	EPA 6020B	
Lithium	**51.4**	12.5	25.0	ug/L	5	08/02/21 21:41	EPA 6020B	
GC-AP-CEC-8-20210728 (A1G0829-08RE2)				Matrix: Water				
Batch: 1071000								
Magnesium	**2100**	375	750	ug/L	5	08/03/21 21:34	EPA 6020B	
GC-AP-CEC-9-20210728 (A1G0829-09)				Matrix: Water				
Batch: 1071000								
Aluminum	ND	125	250	ug/L	5	08/02/21 21:46	EPA 6020B	R-04
Arsenic	**3.43**	2.50	5.00	ug/L	5	08/02/21 21:46	EPA 6020B	**R-04, J**
Calcium	**19400**	1500	3000	ug/L	5	08/02/21 21:46	EPA 6020B	

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Project: **Alabama Power-Greene County**
Project Number: **201114-01.05**
Project Manager: **Anthony Dalton-Atha**

Report ID:
A1G0829 - 08 04 21 1710

ANALYTICAL SAMPLE RESULTS

Total Metals by EPA 6020B (ICPMS)

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
GC-AP-CEC-9-20210728 (A1G0829-09)				**Matrix: Water**				
Cobalt	**3.37**	2.50	5.00	ug/L	5	08/02/21 21:46	EPA 6020B	**R-04, J**
Potassium	**7870**	250	500	ug/L	5	08/02/21 21:46	EPA 6020B	
Sodium	**2330**	250	500	ug/L	5	08/02/21 21:46	EPA 6020B	
Lithium	**36.9**	12.5	25.0	ug/L	5	08/02/21 21:46	EPA 6020B	
GC-AP-CEC-9-20210728 (A1G0829-09RE2)				**Matrix: Water**				
Batch: 1071000								
Magnesium	**4760**	375	750	ug/L	5	08/03/21 21:49	EPA 6020B	
GC-AP-CEC-10-20210728 (A1G0829-10)				**Matrix: Water**				
Batch: 1071000								
Aluminum	ND	125	250	ug/L	5	08/02/21 21:52	EPA 6020B	R-04
Arsenic	ND	2.50	5.00	ug/L	5	08/02/21 21:52	EPA 6020B	R-04
Calcium	**28500**	1500	3000	ug/L	5	08/02/21 21:52	EPA 6020B	
Cobalt	**5.20**	2.50	5.00	ug/L	5	08/02/21 21:52	EPA 6020B	
Potassium	**6990**	250	500	ug/L	5	08/02/21 21:52	EPA 6020B	
Sodium	**1820**	250	500	ug/L	5	08/02/21 21:52	EPA 6020B	
Lithium	**48.3**	12.5	25.0	ug/L	5	08/02/21 21:52	EPA 6020B	
GC-AP-CEC-10-20210728 (A1G0829-10RE1)				**Matrix: Water**				
Batch: 1071000								
Magnesium	**6020**	375	750	ug/L	5	08/03/21 21:59	EPA 6020B	
GC-AP-CEC-11-20210728 (A1G0829-11)				**Matrix: Water**				
Batch: 1071000								
Aluminum	ND	125	250	ug/L	5	08/02/21 21:57	EPA 6020B	R-04
Arsenic	**7.17**	2.50	5.00	ug/L	5	08/02/21 21:57	EPA 6020B	
Calcium	**14800**	1500	3000	ug/L	5	08/02/21 21:57	EPA 6020B	
Cobalt	**4.19**	2.50	5.00	ug/L	5	08/02/21 21:57	EPA 6020B	**R-04, J**
Potassium	**12700**	250	500	ug/L	5	08/02/21 21:57	EPA 6020B	
Sodium	**1680**	250	500	ug/L	5	08/02/21 21:57	EPA 6020B	
Lithium	**115**	12.5	25.0	ug/L	5	08/02/21 21:57	EPA 6020B	
GC-AP-CEC-11-20210728 (A1G0829-11RE1)				**Matrix: Water**				
Batch: 1071000								

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Portland, OR 97219	Project Manager: **Anthony Dalton-Atha**	**A1G0829 - 08 04 21 1710**

ANALYTICAL SAMPLE RESULTS

Total Metals by EPA 6020B (ICPMS)

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
GC-AP-CEC-11-20210728 (A1G0829-11RE1)				**Matrix: Water**				
Magnesium	**4010**	375	750	ug/L	5	08/03/21 22:04	EPA 6020B	
GC-AP-CEC-12-20210728 (A1G0829-12)				**Matrix: Water**				
Batch: 1071000								
Aluminum	ND	125	250	ug/L	5	08/02/21 22:02	EPA 6020B	R-04
Arsenic	ND	2.50	5.00	ug/L	5	08/02/21 22:02	EPA 6020B	R-04
Calcium	**17700**	1500	3000	ug/L	5	08/02/21 22:02	EPA 6020B	
Cobalt	**7.50**	2.50	5.00	ug/L	5	08/02/21 22:02	EPA 6020B	
Potassium	**7910**	250	500	ug/L	5	08/02/21 22:02	EPA 6020B	
Sodium	**1460**	250	500	ug/L	5	08/02/21 22:02	EPA 6020B	
Lithium	**61.0**	12.5	25.0	ug/L	5	08/02/21 22:02	EPA 6020B	
GC-AP-CEC-12-20210728 (A1G0829-12RE1)				**Matrix: Water**				
Batch: 1071000								
Magnesium	**5960**	375	750	ug/L	5	08/03/21 22:08	EPA 6020B	
GC-AP-CEC-MB-20210728 (A1G0829-13)				**Matrix: Water**				
Batch: 1071000								
Aluminum	ND	125	250	ug/L	5	08/02/21 22:07	EPA 6020B	R-04
Arsenic	ND	2.50	5.00	ug/L	5	08/02/21 22:07	EPA 6020B	R-04
Calcium	ND	1500	3000	ug/L	5	08/02/21 22:07	EPA 6020B	R-04
Cobalt	ND	2.50	5.00	ug/L	5	08/02/21 22:07	EPA 6020B	R-04
Magnesium	ND	375	750	ug/L	5	08/02/21 22:07	EPA 6020B	R-04
Potassium	ND	250	500	ug/L	5	08/02/21 22:07	EPA 6020B	R-04
Sodium	ND	250	500	ug/L	5	08/02/21 22:07	EPA 6020B	R-04
Lithium	ND	12.5	25.0	ug/L	5	08/02/21 22:07	EPA 6020B	R-04

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QUALITY CONTROL (QC) SAMPLE RESULTS

Total Metals by EPA 6020B (ICPMS)

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 1071000 - EPA 3015A							**Water**					
Blank (1071000-BLK1)			Prepared: 07/30/21 14:15			Analyzed: 08/02/21 20:28						
EPA 6020B												
Aluminum	ND	25.0	50.0	ug/L	1	---	---	---	---	---	---	
Arsenic	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Calcium	ND	300	600	ug/L	1	---	---	---	---	---	---	
Cobalt	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Magnesium	ND	75.0	150	ug/L	1	---	---	---	---	---	---	
Potassium	ND	50.0	100	ug/L	1	---	---	---	---	---	---	
Sodium	ND	50.0	100	ug/L	1	---	---	---	---	---	---	
Lithium	ND	2.50	5.00	ug/L	1	---	---	---	---	---	---	
LCS (1071000-BS1)			Prepared: 07/30/21 14:15			Analyzed: 08/02/21 20:44						
EPA 6020B												
Aluminum	2760	25.0	50.0	ug/L	1	2780	---	99	80-120%	---	---	
Arsenic	56.6	0.500	1.00	ug/L	1	55.6	---	102	80-120%	---	---	
Calcium	2840	300	600	ug/L	1	2780	---	102	80-120%	---	---	
Cobalt	58.0	0.500	1.00	ug/L	1	55.6	---	104	80-120%	---	---	
Magnesium	2840	75.0	150	ug/L	1	2780	---	102	80-120%	---	---	
Potassium	2820	50.0	100	ug/L	1	2780	---	102	80-120%	---	---	
Sodium	2970	50.0	100	ug/L	1	2780	---	107	80-120%	---	---	
LCS (1071000-BS2)			Prepared: 07/30/21 14:15			Analyzed: 08/02/21 20:49						
EPA 6020B												
Lithium	44.4	2.50	5.00	ug/L	1	44.4	---	100	80-120%	---	---	
LCS Dup (1071000-BSD1)			Prepared: 07/30/21 14:15			Analyzed: 08/02/21 20:33						
EPA 6020B												
Aluminum	2750	25.0	50.0	ug/L	1	2780	---	99	80-120%	0.1	20%	
Arsenic	56.5	0.500	1.00	ug/L	1	55.6	---	102	80-120%	0.2	20%	
Calcium	2830	300	600	ug/L	1	2780	---	102	80-120%	0.3	20%	
Cobalt	57.8	0.500	1.00	ug/L	1	55.6	---	104	80-120%	0.3	20%	
Magnesium	2850	75.0	150	ug/L	1	2780	---	103	80-120%	0.3	20%	
Potassium	2820	50.0	100	ug/L	1	2780	---	101	80-120%	0.3	20%	
Sodium	2990	50.0	100	ug/L	1	2780	---	108	80-120%	0.8	20%	

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Portland, OR 97219	Project Manager: **Anthony Dalton-Atha**	**A1G0829 - 08 04 21 1710**

QUALITY CONTROL (QC) SAMPLE RESULTS

Total Metals by EPA 6020B (ICPMS)

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 1071000 - EPA 3015A							**Water**					
LCS Dup (1071000-BSD2)			Prepared: 07/30/21 14:15		Analyzed: 08/02/21 20:39							
EPA 6020B												
Lithium	46.0	2.50	5.00	ug/L	1	44.4	---	103	80-120%	3	20%	

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SAMPLE PREPARATION INFORMATION

Total Metals by EPA 6020B (ICPMS)

Prep: EPA 3015A

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 1071000							
A1G0829-01	Water	EPA 6020B	07/28/21 15:25	07/30/21 14:15	45mL/50mL	45mL/50mL	1.00
A1G0829-02	Water	EPA 6020B	07/28/21 15:30	07/30/21 14:15	45mL/50mL	45mL/50mL	1.00
A1G0829-03	Water	EPA 6020B	07/28/21 15:35	07/30/21 14:15	45mL/50mL	45mL/50mL	1.00
A1G0829-04	Water	EPA 6020B	07/28/21 15:40	07/30/21 14:15	45mL/50mL	45mL/50mL	1.00
A1G0829-05	Water	EPA 6020B	07/28/21 15:45	07/30/21 14:15	45mL/50mL	45mL/50mL	1.00
A1G0829-05RE1	Water	EPA 6020B	07/28/21 15:45	07/30/21 14:15	45mL/50mL	45mL/50mL	1.00
A1G0829-06	Water	EPA 6020B	07/28/21 15:50	07/30/21 14:15	45mL/50mL	45mL/50mL	1.00
A1G0829-06RE1	Water	EPA 6020B	07/28/21 15:50	07/30/21 14:15	45mL/50mL	45mL/50mL	1.00
A1G0829-07	Water	EPA 6020B	07/28/21 15:55	07/30/21 14:15	45mL/50mL	45mL/50mL	1.00
A1G0829-07RE1	Water	EPA 6020B	07/28/21 15:55	07/30/21 14:15	45mL/50mL	45mL/50mL	1.00
A1G0829-08	Water	EPA 6020B	07/28/21 16:00	07/30/21 14:15	45mL/50mL	45mL/50mL	1.00
A1G0829-08RE2	Water	EPA 6020B	07/28/21 16:00	07/30/21 14:15	45mL/50mL	45mL/50mL	1.00
A1G0829-09	Water	EPA 6020B	07/28/21 16:05	07/30/21 14:15	45mL/50mL	45mL/50mL	1.00
A1G0829-09RE2	Water	EPA 6020B	07/28/21 16:05	07/30/21 14:15	45mL/50mL	45mL/50mL	1.00
A1G0829-10	Water	EPA 6020B	07/28/21 16:10	07/30/21 14:15	45mL/50mL	45mL/50mL	1.00
A1G0829-10RE1	Water	EPA 6020B	07/28/21 16:10	07/30/21 14:15	45mL/50mL	45mL/50mL	1.00
A1G0829-11	Water	EPA 6020B	07/28/21 16:15	07/30/21 14:15	45mL/50mL	45mL/50mL	1.00
A1G0829-11RE1	Water	EPA 6020B	07/28/21 16:15	07/30/21 14:15	45mL/50mL	45mL/50mL	1.00
A1G0829-12	Water	EPA 6020B	07/28/21 16:20	07/30/21 14:15	45mL/50mL	45mL/50mL	1.00
A1G0829-12RE1	Water	EPA 6020B	07/28/21 16:20	07/30/21 14:15	45mL/50mL	45mL/50mL	1.00
A1G0829-13	Water	EPA 6020B	07/28/21 16:25	07/30/21 14:15	45mL/50mL	45mL/50mL	1.00

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QUALIFIER DEFINITIONS

Client Sample and Quality Control (QC) Sample Qualifier Definitions:

Apex Laboratories

J	Estimated Result. Result detected below the lowest point of the calibration curve, but above the specified MDL.
R-04	Reporting levels elevated due to preparation and/or analytical dilution necessary for analysis.

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Anchor QEA, LLC	Project: **Alabama Power-Greene County**	
6720 SW Macadam Ave. Suite 125	Project Number: **201114-01.05**	**Report ID:**
Portland, OR 97219	Project Manager: **Anthony Dalton-Atha**	**A1G0829 - 08 04 21 1710**

REPORTING NOTES AND CONVENTIONS:

Abbreviations:

DET Analyte DETECTED at or above the detection or reporting limit.

ND Analyte NOT DETECTED at or above the detection or reporting limit.

NR Result Not Reported

RPD Relative Percent Difference. RPDs for Matrix Spikes and Matrix Spike Duplicates are based on concentration, not recovery.

Detection Limits: Limit of Detection (LOD)

Limits of Detection (LODs) are normally set at a level of one half the validated Limit of Quantitation (LOQ).
If no value is listed ('-----'), then the data has not been evaluated below the Reporting Limit.

Reporting Limits: Limit of Quantitation (LOQ)

Validated Limits of Quantitation (LOQs) are reported as the Reporting Limits for all analyses where the LOQ, MRL, PQL or CRL are requested. The LOQ represents a level at or above the low point of the calibration curve, that has been validated according to Apex Laboratories' comprehensive LOQ policies and procedures.

Reporting Conventions:

Basis: Results for soil samples are generally reported on a 100% dry weight basis.
The Result Basis is listed following the units as " dry", " wet", or " " (blank) designation.

" dry" Sample results and Reporting Limits are reported on a dry weight basis. (i.e. "ug/kg dry")
See Percent Solids section for details of dry weight analysis.

" wet" Sample results and Reporting Limits for this analysis are normally dry weight corrected, but have not been modified in this case.

" " Results without 'wet' or 'dry' designation are not normally dry weight corrected. These results are considered 'As Received'.

QC Source:

In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) may be analyzed to demonstrate accuracy and precision of the extraction batch.

Non-Client Batch QC Samples (Duplicates and Matrix Spike/Duplicates) may not be included in this report. Please request a Full QC report if this data is required.

Miscellaneous Notes:

" --- " QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.

" *** " Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).

Blanks:

Standard practice is to evaluate the results from Blank QC Samples down to a level equal to ½ the Reporting Limit (RL).
-For Blank hits falling between ½ the RL and the RL (J flagged hits), the associated sample and QC data will receive a ‘B-02’ qualifier.
-For Blank hits above the RL, the associated sample and QC data will receive a ‘B’ qualifier, per Apex Laboratories' Blank Policy.
For further details, please request a copy of this document.

REPORTING NOTES AND CONVENTIONS (Cont.):

Blanks (Cont.):

Sample results flagged with a 'B' or 'B-02' qualifier are potentially biased high if the sample results are less than ten times the level found in the blank for inorganic analyses, or less than five times the level found in the blank for organic analyses.

'B' and 'B-02' qualifications are only applied to sample results detected above the Reporting Level.

Preparation Notes:

Mixed Matrix Samples:

Water Samples:

Water samples containing significant amounts of sediment are decanted or separated prior to extraction, and only the water portion analyzed, unless otherwise directed by the client.

Soil and Sediment Samples:

Soil and Sediment samples containing significant amounts of water are decanted prior to extraction, and only the solid portion analyzed, unless otherwise directed by the client.

Sampling and Preservation Notes:

Certain regulatory programs, such as National Pollutant Discharge Elimination System (NPDES), require that activities such as sample filtration (for dissolved metals, orthophosphate, hexavalent chromium, etc.) and testing of short hold analytes (pH, Dissolved Oxygen, etc.) be performed in the field (on-site) within a short time window. In addition, sample matrix spikes are required for some analyses, and sufficient volume must be provided, and billable site specific QC requested, if this is required. All regulatory permits should be reviewed to ensure that these requirements are being met.

Data users should be aware of which regulations pertain to the samples they submit for testing. If related sample collection activities are not approved for a particular regulatory program, results should be considered estimates. Apex Laboratories will qualify these analytes according to the most stringent requirements, however results for samples that are for non-regulatory purposes may be acceptable.

Samples that have been filtered and preserved at Apex Laboratories per client request are listed in the preparation section of the report with the date and time of filtration listed.

Apex Laboratories maintains detailed records on sample receipt, including client label verification, cooler temperature, sample preservation, hold time compliance and field filtration. Data is qualified as necessary, and the lack of qualification indicates compliance with required parameters.

Apex Laboratories, LLC

6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

Anchor QEA, LLC	Project: **Alabama Power-Greene County**	
6720 SW Macadam Ave. Suite 125	Project Number: **201114-01.05**	**Report ID:**
Portland, OR 97219	Project Manager: **Anthony Dalton-Atha**	**A1G0829 - 08 04 21 1710**

LABORATORY ACCREDITATION INFORMATION

ORELAP Certification ID: OR100062 (Primary Accreditation) - EPA ID: OR01039

All methods and analytes reported from work performed at Apex Laboratories are included on Apex Laboratories' ORELAP Scope of Certification, with the exception of any analyte(s) listed below:

Apex Laboratories

Matrix	Analysis	TNI_ID	Analyte	TNI_ID	Accreditation

All reported analytes are included in Apex Laboratories' current ORELAP scope.

Secondary Accreditations

Apex Laboratories also maintains reciprocal accreditation with non-TNI states (Washington DOE), as well as other state specific accreditations not listed here.

Subcontract Laboratory Accreditations

Subcontracted data falls outside of Apex Laboratories' Scope of Accreditation.
Please see the Subcontract Laboratory report for full details, or contact your Project Manager for more information.

Field Testing Parameters

Results for Field Tested data are provded by the client or sampler, and fall outside of Apex Laboratories' Scope of Accreditation.

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ANALYTICAL REPORT

Anchor QEA, LLC	Project: **Alabama Power-Greene County**	
6720 SW Macadam Ave. Suite 125	Project Number: **201114-01.05**	**Report ID:**
Portland, OR 97219	Project Manager: **Anthony Dalton-Atha**	**A1G0829 - 08 04 21 1710**

A1G0829

Chain of Custody Record & Laboratory Analysis Request

ANCHOR QEA

Company: Anchor QEA
Date: 7/28/2021
Project Name: Alabama Power - Greene County
Project Number: 201114-01.05
Project Manager: Anthony Dalton-Atha adalton-atha@anchorqea.com
Phone Number: 201114-01.02
Shipment Method: Pick-up
Samplers: Paloma Spina

Line	Field Sample ID	Collection Date/Time	Matrix	No. of Containers	As, Co, Li, Ca, Mg, K, Na, Al	Comments/Preservation
1	GC-AP-CEC-1-20210728	7/28/2021 15:25	Water	1	x	1 Molar (M) ammonium acetate, pH 7
2	GC-AP-CEC-2-20210728	7/28/2021 15:30	Water	1	x	1 Molar (M) ammonium acetate, pH 7
3	GC-AP-CEC-3-20210728	7/28/2021 15:35	Water	1	x	1 Molar (M) ammonium acetate, pH 7
4	GC-AP-CEC-4-20210728	7/28/2021 15:40	Water	1	x	1 Molar (M) ammonium acetate, pH 7
5	GC-AP-CEC-5-20210728	7/28/2021 15:45	Water	1	x	1 Molar (M) ammonium acetate, pH 7
6	GC-AP-CEC-6-20210728	7/28/2021 15:50	Water	1	x	1 Molar (M) ammonium acetate, pH 7
7	GC-AP-CEC-7-20210728	7/28/2021 15:55	Water	1	x	1 Molar (M) ammonium acetate, pH 7
8	GC-AP-CEC-8-20210728	7/28/2021 16:00	Water	1	x	1 Molar (M) ammonium acetate, pH 7
9	GC-AP-CEC-9-20210728	7/28/2021 16:05	Water	1	x	1 Molar (M) ammonium acetate, pH 7
10	GC-AP-CEC-10-20210728	7/28/2021 16:10	Water	1	x	1 Molar (M) ammonium acetate, pH 7
11	GC-AP-CEC-11-20210728	7/28/2021 16:15	Water	1	x	1 Molar (M) ammonium acetate, pH 7
12	GC-AP-CEC-12-20210728	7/28/2021 16:20	Water	1	x	1 Molar (M) ammonium acetate, pH 7
13	GC-AP-CEC-MB-20210728	7/28/2021 16:25	Water	1	x	1 Molar (M) ammonium acetate, pH 7
14						
15						
16						

Comments: samples are filtered but not preserved.

Relinquished By: Anthony Dalton Atha	Company: AQEA	Received By: Eric Jone	Company: APEX LABS
Signature/Printed Name	Date/Time 7/29/2021 0955	Signature/Printed Name	Date/Time 7/29/21 955
Relinquished By:	Company:	Received By:	Company:
Signature/Printed Name	Date/Time	Signature/Printed Name	Date/Time

Page 1 of 1

DRAFT REPORT

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6720 SW Macadam Ave. Suite 125	Project Number: **201114-01.05**	**Report ID:**
Portland, OR 97219	Project Manager: **Anthony Dalton-Atha**	**A1G0829 - 08 04 21 1710**

APEX LABS COOLER RECEIPT FORM

Client: Anchor QEA Element WO#: A1 G0829

Project/Project #: Alabama Power - Greene County 201114-01.02

Delivery Info:

Date/time received: 7/29/21 @ 955 By: ET

Delivered by: Apex X Client___ ESS___ FedEx___ UPS___ Swift___ Senvoy___ SDS___ Other___

Cooler Inspection Date/time inspected: 7/29/21 @ 1030 By: ET

Chain of Custody included? Yes X No ___ Custody seals? Yes___ No X

Signed/dated by client? Yes X No ___

Signed/dated by Apex? Yes X No ___

	Cooler #1	Cooler #2	Cooler #3	Cooler #4	Cooler #5	Cooler #6	Cooler #7
Temperature (°C)	2.6						
Received on ice? (Y/N)	Y						
Temp. blanks? (Y/N)	N						
Ice type: (Gel/Real/Other)	Real						
Condition:	Good						

Cooler out of temp? (Y/N) Possible reason why:___

Green dots applied to out of temperature samples? Yes/No

Out of temperature samples form initiated? Yes/No

Sample Inspection: Date/time inspected: 7/29/21 @ 1600 By: 8

All samples intact? Yes Y No ___ Comments:___

Bottle labels/COCs agree? Yes X No ___ Comments:___

COC/container discrepancies form initiated? Yes ___ No Y

Containers/volumes received appropriate for analysis? Yes Y No ___ Comments: Limited volume

Do VOA vials have visible headspace? Yes ___ No ___ NA Y

Comments___

Water samples: pH checked: Yes___ No___ NA X pH appropriate? Yes___ No___ NA X

Comments:___

Additional information:___

Labeled by: JS 7/29/21 Witness: JS Cooler Inspected by: 8

DRAFT REPORT

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Apex Laboratories, LLC

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ORELAP ID: **OR100062**

ANALYTICAL REPORT

Tuesday, August 10, 2021

Anthony Dalton-Atha
Anchor QEA, LLC
6720 SW Macadam Ave. Suite 125
Portland, OR 97219

RE: A1H0073 - Alabama Power-Greene County - 201114-01.05

Thank you for using Apex Laboratories. We greatly appreciate your business and strive to provide the highest quality services to the environmental industry.

Enclosed are the results of analyses for work order A1H0073, which was received by the laboratory on 8/3/2021 at 12:35:00PM.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: dthomas@apex-labs.com, or by phone at 503-718-2323.

Please note: All samples will be disposed of within 30 days of sample receipt, unless prior arrangements have been made.

Cooler Receipt Information

(See Cooler Receipt Form for details)

Cooler #1 2.4 degC

Apex Laboratories, LLC
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ANALYTICAL REPORT

Anchor QEA, LLC	Project: **Alabama Power-Greene County**	
6720 SW Macadam Ave. Suite 125	Project Number: **201114-01.05**	**Report ID:**
Portland, OR 97219	Project Manager: **Anthony Dalton-Atha**	**A1H0073 - 08 10 21 1205**

ANALYTICAL REPORT FOR SAMPLES

SAMPLE INFORMATION

Client Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
GC-AP-AAO-1-20210731	A1H0073-01	Water	07/31/21 14:25	08/03/21 12:35
GC-AP-AAO-2-20210731	A1H0073-02	Water	07/31/21 14:30	08/03/21 12:35
GC-AP-AAO-3-20210731	A1H0073-03	Water	07/31/21 14:35	08/03/21 12:35
GC-AP-AAO-4-20210731	A1H0073-04	Water	07/31/21 14:40	08/03/21 12:35
GC-AP-AAO-5-20210731	A1H0073-05	Water	07/31/21 14:45	08/03/21 12:35
GC-AP-AAO-6-20210731	A1H0073-06	Water	07/31/21 14:50	08/03/21 12:35
GC-AP-AAO-7-20210731	A1H0073-07	Water	07/31/21 14:55	08/03/21 12:35
GC-AP-AAO-8-20210731	A1H0073-08	Water	07/31/21 15:00	08/03/21 12:35
GC-AP-AAO-9-20210731	A1H0073-09	Water	07/31/21 15:05	08/03/21 12:35
GC-AP-AAO-10-20210731	A1H0073-10	Water	07/31/21 15:10	08/03/21 12:35
GC-AP-AAO-11-20210731	A1H0073-11	Water	07/31/21 15:15	08/03/21 12:35
GC-AP-AAO-12-20210731	A1H0073-12	Water	07/31/21 15:20	08/03/21 12:35
GC-AP-AAO-MB-20210731	A1H0073-13	Water	07/31/21 15:25	08/03/21 12:35

APEX LABORATORIES

ANALYTICAL REPORT

Apex Laboratories, LLC
6700 S.W. Sandburg Street
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503-718-2323
ORELAP ID: **OR100062**

Anchor QEA, LLC	Project: **Alabama Power-Greene County**	
6720 SW Macadam Ave. Suite 125	Project Number: **201114-01.05**	**Report ID:**
Portland, OR 97219	Project Manager: **Anthony Dalton-Atha**	**A1H0073 - 08 10 21 1205**

ANALYTICAL SAMPLE RESULTS

Total Metals by EPA 6020B (ICPMS)

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
GC-AP-AAO-1-20210731 (A1H0073-01)				Matrix: Water				
Batch: 1080090								
Aluminum	**15000**	150	300	ug/L	5	08/07/21 04:01	EPA 6020B	
Arsenic	**19.5**	3.00	6.00	ug/L	5	08/07/21 04:01	EPA 6020B	
Cobalt	**31.5**	3.00	6.00	ug/L	5	08/07/21 04:01	EPA 6020B	
Iron	**19400**	150	300	ug/L	5	08/07/21 04:01	EPA 6020B	**A-01, Q-41**
Manganese	**238**	3.00	6.00	ug/L	5	08/07/21 04:01	EPA 6020B	**B**
Lithium	ND	15.0	30.0	ug/L	5	08/07/21 04:01	EPA 6020B	R-04
GC-AP-AAO-2-20210731 (A1H0073-02)				Matrix: Water				
Batch: 1080090								
Aluminum	**7280**	150	300	ug/L	5	08/07/21 04:05	EPA 6020B	
Arsenic	**15.1**	3.00	6.00	ug/L	5	08/07/21 04:05	EPA 6020B	
Cobalt	**12.3**	3.00	6.00	ug/L	5	08/07/21 04:05	EPA 6020B	
Iron	**14500**	150	300	ug/L	5	08/07/21 04:05	EPA 6020B	**A-01, Q-41**
Manganese	**315**	3.00	6.00	ug/L	5	08/07/21 04:05	EPA 6020B	**B**
Lithium	ND	15.0	30.0	ug/L	5	08/07/21 04:05	EPA 6020B	R-04
GC-AP-AAO-3-20210731 (A1H0073-03)				Matrix: Water				
Batch: 1080090								
Aluminum	**7260**	150	300	ug/L	5	08/07/21 04:10	EPA 6020B	
Arsenic	**14.7**	3.00	6.00	ug/L	5	08/07/21 04:10	EPA 6020B	
Cobalt	**12.0**	3.00	6.00	ug/L	5	08/07/21 04:10	EPA 6020B	
Iron	**14500**	150	300	ug/L	5	08/07/21 04:10	EPA 6020B	**A-01, Q-41**
Manganese	**308**	3.00	6.00	ug/L	5	08/07/21 04:10	EPA 6020B	**B**
Lithium	ND	15.0	30.0	ug/L	5	08/07/21 04:10	EPA 6020B	R-04
GC-AP-AAO-4-20210731 (A1H0073-04)				Matrix: Water				
Batch: 1080090								
Aluminum	**15800**	150	300	ug/L	5	08/07/21 04:15	EPA 6020B	
Arsenic	**3.96**	3.00	6.00	ug/L	5	08/07/21 04:15	EPA 6020B	**R-04, J**
Cobalt	**9.28**	3.00	6.00	ug/L	5	08/07/21 04:15	EPA 6020B	
Iron	**6520**	150	300	ug/L	5	08/07/21 04:15	EPA 6020B	**A-01, Q-41**
Manganese	**74.7**	3.00	6.00	ug/L	5	08/07/21 04:15	EPA 6020B	**B**
Lithium	ND	15.0	30.0	ug/L	5	08/07/21 04:15	EPA 6020B	R-04

DRAFT REPORT

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6700 S.W. Sandburg Street
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ORELAP ID: OR100062

ANALYTICAL REPORT

Anchor QEA, LLC	Project: **Alabama Power-Greene County**	
6720 SW Macadam Ave. Suite 125	Project Number: **201114-01.05**	**Report ID:**
Portland, OR 97219	Project Manager: **Anthony Dalton-Atha**	A1H0073 - 08 10 21 1205

ANALYTICAL SAMPLE RESULTS

Total Metals by EPA 6020B (ICPMS)

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
GC-AP-AAO-5-20210731 (A1H0073-05)				Matrix: Water				
Batch: 1080090								
Aluminum	**7820**	150	300	ug/L	5	08/07/21 04:20	EPA 6020B	
Arsenic	**6.92**	3.00	6.00	ug/L	5	08/07/21 04:20	EPA 6020B	
Cobalt	ND	3.00	6.00	ug/L	5	08/07/21 04:20	EPA 6020B	R-04
Iron	**5180**	150	300	ug/L	5	08/07/21 04:20	EPA 6020B	**A-01, Q-41**
Manganese	**84.9**	3.00	6.00	ug/L	5	08/07/21 04:20	EPA 6020B	**B**
Lithium	ND	15.0	30.0	ug/L	5	08/07/21 04:20	EPA 6020B	R-04
GC-AP-AAO-6-20210731 (A1H0073-06)				Matrix: Water				
Batch: 1080090								
Aluminum	**10800**	150	300	ug/L	5	08/07/21 04:25	EPA 6020B	
Arsenic	**13.6**	3.00	6.00	ug/L	5	08/07/21 04:25	EPA 6020B	
Cobalt	**33.6**	3.00	6.00	ug/L	5	08/07/21 04:25	EPA 6020B	
Iron	**9100**	150	300	ug/L	5	08/07/21 04:25	EPA 6020B	**A-01, Q-41**
Manganese	**697**	3.00	6.00	ug/L	5	08/07/21 04:25	EPA 6020B	**B**
Lithium	ND	15.0	30.0	ug/L	5	08/07/21 04:25	EPA 6020B	R-04
GC-AP-AAO-7-20210731 (A1H0073-07)				Matrix: Water				
Batch: 1080090								
Aluminum	**4040**	150	300	ug/L	5	08/07/21 04:40	EPA 6020B	
Arsenic	ND	3.00	6.00	ug/L	5	08/07/21 04:40	EPA 6020B	R-04
Cobalt	**4.15**	3.00	6.00	ug/L	5	08/07/21 04:40	EPA 6020B	**R-04, J**
Iron	**1510**	150	300	ug/L	5	08/07/21 04:40	EPA 6020B	**A-01, Q-41**
Manganese	**48.7**	3.00	6.00	ug/L	5	08/07/21 04:40	EPA 6020B	**B**
Lithium	ND	15.0	30.0	ug/L	5	08/07/21 04:40	EPA 6020B	R-04
GC-AP-AAO-8-20210731 (A1H0073-08)				Matrix: Water				
Batch: 1080090								
Aluminum	**5130**	150	300	ug/L	5	08/07/21 04:45	EPA 6020B	
Arsenic	ND	3.00	6.00	ug/L	5	08/07/21 04:45	EPA 6020B	R-04
Cobalt	**4.03**	3.00	6.00	ug/L	5	08/07/21 04:45	EPA 6020B	**R-04, J**
Iron	**2900**	150	300	ug/L	5	08/07/21 04:45	EPA 6020B	**A-01, Q-41**
Manganese	**55.3**	3.00	6.00	ug/L	5	08/07/21 04:45	EPA 6020B	**B**

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ANALYTICAL REPORT

Anchor QEA, LLC	Project: **Alabama Power-Greene County**	
6720 SW Macadam Ave. Suite 125	Project Number: **201114-01.05**	**Report ID:**
Portland, OR 97219	Project Manager: **Anthony Dalton-Atha**	**A1H0073 - 08 10 21 1205**

ANALYTICAL SAMPLE RESULTS

Total Metals by EPA 6020B (ICPMS)

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
GC-AP-AAO-8-20210731 (A1H0073-08)				Matrix: Water				
Lithium	ND	15.0	30.0	ug/L	5	08/07/21 04:45	EPA 6020B	R-04
GC-AP-AAO-9-20210731 (A1H0073-09)				Matrix: Water				
Batch: 1080090								
Aluminum	**4840**	150	300	ug/L	5	08/07/21 04:50	EPA 6020B	
Arsenic	**4.29**	3.00	6.00	ug/L	5	08/07/21 04:50	EPA 6020B	**R-04, J**
Cobalt	ND	3.00	6.00	ug/L	5	08/07/21 04:50	EPA 6020B	R-04
Iron	**2670**	150	300	ug/L	5	08/07/21 04:50	EPA 6020B	**A-01, Q-41**
Manganese	**52.0**	3.00	6.00	ug/L	5	08/07/21 04:50	EPA 6020B	**B**
Lithium	ND	15.0	30.0	ug/L	5	08/07/21 04:50	EPA 6020B	R-04
GC-AP-AAO-10-20210731 (A1H0073-10)				Matrix: Water				
Batch: 1080090								
Aluminum	**4070**	150	300	ug/L	5	08/07/21 04:55	EPA 6020B	
Arsenic	**22.4**	3.00	6.00	ug/L	5	08/07/21 04:55	EPA 6020B	
Cobalt	**33.7**	3.00	6.00	ug/L	5	08/07/21 04:55	EPA 6020B	
Iron	**13100**	150	300	ug/L	5	08/07/21 04:55	EPA 6020B	**A-01, Q-41**
Manganese	**2440**	3.00	6.00	ug/L	5	08/07/21 04:55	EPA 6020B	**B**
Lithium	ND	15.0	30.0	ug/L	5	08/07/21 04:55	EPA 6020B	R-04
GC-AP-AAO-11-20210731 (A1H0073-11)				Matrix: Water				
Batch: 1080090								
Aluminum	**7250**	150	300	ug/L	5	08/07/21 05:00	EPA 6020B	
Arsenic	**38.0**	3.00	6.00	ug/L	5	08/07/21 05:00	EPA 6020B	
Cobalt	**13.9**	3.00	6.00	ug/L	5	08/07/21 05:00	EPA 6020B	
Iron	**6450**	150	300	ug/L	5	08/07/21 05:00	EPA 6020B	**A-01, Q-41**
Manganese	**478**	3.00	6.00	ug/L	5	08/07/21 05:00	EPA 6020B	**B**
Lithium	**19.5**	15.0	30.0	ug/L	5	08/07/21 05:00	EPA 6020B	**R-04, J**
GC-AP-AAO-12-20210731 (A1H0073-12)				Matrix: Water				
Batch: 1080090								
Aluminum	**5240**	150	300	ug/L	5	08/07/21 05:05	EPA 6020B	
Arsenic	**5.76**	3.00	6.00	ug/L	5	08/07/21 05:05	EPA 6020B	**R-04, J**
Cobalt	**8.85**	3.00	6.00	ug/L	5	08/07/21 05:05	EPA 6020B	

DRAFT REPORT

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APEX LABORATORIES

ANALYTICAL REPORT

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

Anchor QEA, LLC	Project: **Alabama Power-Greene County**	
6720 SW Macadam Ave. Suite 125	Project Number: **201114-01.05**	**Report ID:**
Portland, OR 97219	Project Manager: **Anthony Dalton-Atha**	**A1H0073 - 08 10 21 1205**

ANALYTICAL SAMPLE RESULTS

Total Metals by EPA 6020B (ICPMS)

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
GC-AP-AAO-12-20210731 (A1H0073-12)				**Matrix: Water**				
Iron	**5060**	150	300	ug/L	5	08/07/21 05:05	EPA 6020B	**A-01, Q-41**
Manganese	**330**	3.00	6.00	ug/L	5	08/07/21 05:05	EPA 6020B	**B**
Lithium	ND	15.0	30.0	ug/L	5	08/07/21 05:05	EPA 6020B	R-04
GC-AP-AAO-MB-20210731 (A1H0073-13)				**Matrix: Water**				
Batch: 1080090								
Aluminum	ND	150	300	ug/L	5	08/07/21 05:09	EPA 6020B	R-04
Arsenic	ND	3.00	6.00	ug/L	5	08/07/21 05:09	EPA 6020B	R-04
Cobalt	ND	3.00	6.00	ug/L	5	08/07/21 05:09	EPA 6020B	R-04
Iron	ND	150	300	ug/L	5	08/07/21 05:09	EPA 6020B	Q-41, R-04
Manganese	**3.40**	3.00	6.00	ug/L	5	08/07/21 05:09	EPA 6020B	**R-04, J, B**
Lithium	ND	15.0	30.0	ug/L	5	08/07/21 05:09	EPA 6020B	R-04

Highlighted results have not undergone full secondary data review at the time of reporting.
Results are subject to change upon final review and reporting.

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6720 SW Macadam Ave. Suite 125
Portland, OR 97219

Project: **Alabama Power-Greene County**
Project Number: **201114-01.05**
Project Manager: **Anthony Dalton-Atha**

Report ID:
A1H0073 - 08 10 21 1205

QUALITY CONTROL (QC) SAMPLE RESULTS

Total Metals by EPA 6020B (ICPMS)

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 1080090 - EPA 3015A							Water					
Blank (1080090-BLK1)			Prepared: 08/04/21 08:58 Analyzed: 08/07/21 02:57									
EPA 6020B												
Aluminum	ND	25.0	50.0	ug/L	1	---	---	---	---	---	---	
Arsenic	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Cobalt	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Iron	ND	25.0	50.0	ug/L	1	---	---	---	---	---	---	
Manganese	**2.31**	0.500	1.00	ug/L	1	---	---	---	---	---	---	B
Lithium	ND	2.50	5.00	ug/L	1	---	---	---	---	---	---	
LCS (1080090-BS1)			Prepared: 08/04/21 08:58 Analyzed: 08/07/21 03:11									
EPA 6020B												
Aluminum	3050	25.0	50.0	ug/L	1	2780	---	110	80-120%	---	---	
Arsenic	56.3	0.500	1.00	ug/L	1	55.6	---	101	80-120%	---	---	
Cobalt	57.7	0.500	1.00	ug/L	1	55.6	---	104	80-120%	---	---	
Iron	2950	25.0	50.0	ug/L	1	2780	---	106	80-120%	---	---	A-01, Q-41
Manganese	59.2	0.500	1.00	ug/L	1	55.6	---	106	80-120%	---	---	B
LCS (1080090-BS2)			Prepared: 08/04/21 08:58 Analyzed: 08/07/21 03:16									
EPA 6020B												
Lithium	46.8	2.50	5.00	ug/L	1	44.4	---	105	80-120%	---	---	
LCS Dup (1080090-BSD1)			Prepared: 08/04/21 08:58 Analyzed: 08/07/21 03:02									
EPA 6020B												
Aluminum	2860	25.0	50.0	ug/L	1	2780	---	103	80-120%	6	20%	
Arsenic	55.3	0.500	1.00	ug/L	1	55.6	---	100	80-120%	2	20%	
Cobalt	56.7	0.500	1.00	ug/L	1	55.6	---	102	80-120%	2	20%	
Iron	3210	25.0	50.0	ug/L	1	2780	---	116	80-120%	9	20%	A-01, Q-41
Manganese	58.7	0.500	1.00	ug/L	1	55.6	---	106	80-120%	0.8	20%	B
LCS Dup (1080090-BSD2)			Prepared: 08/04/21 08:58 Analyzed: 08/07/21 03:06									
EPA 6020B												
Lithium	44.4	2.50	5.00	ug/L	1	44.4	---	100	80-120%	5	20%	

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Portland, OR 97219	Project Manager: **Anthony Dalton-Atha**	**A1H0073 - 08 10 21 1205**

SAMPLE PREPARATION INFORMATION

Total Metals by EPA 6020B (ICPMS)

Prep: EPA 3015A

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 1080090							
A1H0073-01	Water	EPA 6020B	07/31/21 14:25	08/04/21 08:58	37.5mL/50mL	45mL/50mL	1.20
A1H0073-02	Water	EPA 6020B	07/31/21 14:30	08/04/21 08:58	37.5mL/50mL	45mL/50mL	1.20
A1H0073-03	Water	EPA 6020B	07/31/21 14:35	08/04/21 08:58	37.5mL/50mL	45mL/50mL	1.20
A1H0073-04	Water	EPA 6020B	07/31/21 14:40	08/04/21 08:58	37.5mL/50mL	45mL/50mL	1.20
A1H0073-05	Water	EPA 6020B	07/31/21 14:45	08/04/21 08:58	37.5mL/50mL	45mL/50mL	1.20
A1H0073-06	Water	EPA 6020B	07/31/21 14:50	08/04/21 08:58	37.5mL/50mL	45mL/50mL	1.20
A1H0073-07	Water	EPA 6020B	07/31/21 14:55	08/04/21 08:58	37.5mL/50mL	45mL/50mL	1.20
A1H0073-08	Water	EPA 6020B	07/31/21 15:00	08/04/21 08:58	37.5mL/50mL	45mL/50mL	1.20
A1H0073-09	Water	EPA 6020B	07/31/21 15:05	08/04/21 08:58	37.5mL/50mL	45mL/50mL	1.20
A1H0073-10	Water	EPA 6020B	07/31/21 15:10	08/04/21 08:58	37.5mL/50mL	45mL/50mL	1.20
A1H0073-11	Water	EPA 6020B	07/31/21 15:15	08/04/21 08:58	37.5mL/50mL	45mL/50mL	1.20
A1H0073-12	Water	EPA 6020B	07/31/21 15:20	08/04/21 08:58	37.5mL/50mL	45mL/50mL	1.20
A1H0073-13	Water	EPA 6020B	07/31/21 15:25	08/04/21 08:58	37.5mL/50mL	45mL/50mL	1.20

DRAFT REPORT

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QUALIFIER DEFINITIONS

Client Sample and Quality Control (QC) Sample Qualifier Definitions:

Apex Laboratories

A-01	Results do not meet EPA 6020B and/or Apex SOP criteria. Results reported for research per client request.
B	Analyte detected in an associated blank at a level above the MRL. (See Notes and Conventions below.)
J	Estimated Result. Result detected below the lowest point of the calibration curve, but above the specified MDL.
Q-41	Estimated Results. Recovery of Continuing Calibration Verification sample above upper control limit for this analyte. Results are likely biased high.
R-04	Reporting levels elevated due to preparation and/or analytical dilution necessary for analysis.

Apex Laboratories, LLC

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Portland, OR 97219	Project Manager: **Anthony Dalton-Atha**	**A1H0073 - 08 10 21 1205**

REPORTING NOTES AND CONVENTIONS:

Abbreviations:

DET Analyte DETECTED at or above the detection or reporting limit.

ND Analyte NOT DETECTED at or above the detection or reporting limit.

NR Result Not Reported

RPD Relative Percent Difference. RPDs for Matrix Spikes and Matrix Spike Duplicates are based on concentration, not recovery.

Detection Limits: Limit of Detection (LOD)

Limits of Detection (LODs) are normally set at a level of one half the validated Limit of Quantitation (LOQ).
If no value is listed ('-----'), then the data has not been evaluated below the Reporting Limit.

Reporting Limits: Limit of Quantitation (LOQ)

Validated Limits of Quantitation (LOQs) are reported as the Reporting Limits for all analyses where the LOQ, MRL, PQL or CRL are requested. The LOQ represents a level at or above the low point of the calibration curve, that has been validated according to Apex Laboratories' comprehensive LOQ policies and procedures.

Reporting Conventions:

Basis: Results for soil samples are generally reported on a 100% dry weight basis.
The Result Basis is listed following the units as " dry", " wet", or " " (blank) designation.

" dry" Sample results and Reporting Limits are reported on a dry weight basis. (i.e. "ug/kg dry")
See Percent Solids section for details of dry weight analysis.

" wet" Sample results and Reporting Limits for this analysis are normally dry weight corrected, but have not been modified in this case.

"   " Results without 'wet' or 'dry' designation are not normally dry weight corrected. These results are considered 'As Received'.

QC Source:

In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) may be analyzed to demonstrate accuracy and precision of the extraction batch.

Non-Client Batch QC Samples (Duplicates and Matrix Spike/Duplicates) may not be included in this report. Please request a Full QC report if this data is required.

Miscellaneous Notes:

" --- " QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.

" *** " Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).

Blanks:

Standard practice is to evaluate the results from Blank QC Samples down to a level equal to ½ the Reporting Limit (RL).
-For Blank hits falling between ½ the RL and the RL (J flagged hits), the associated sample and QC data will receive a 'B-02' qualifier.
-For Blank hits above the RL, the associated sample and QC data will receive a 'B' qualifier, per Apex Laboratories' Blank Policy.
For further details, please request a copy of this document.

DRAFT REPORT

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Portland, OR 97219	Project Manager: **Anthony Dalton-Atha**	**A1H0073 - 08 10 21 1205**

REPORTING NOTES AND CONVENTIONS (Cont.):

Blanks (Cont.):

Sample results flagged with a 'B' or 'B-02' qualifier are potentially biased high if the sample results are less than ten times the level found in the blank for inorganic analyses, or less than five times the level found in the blank for organic analyses.

'B' and 'B-02' qualifications are only applied to sample results detected above the Reporting Level.

Preparation Notes:

Mixed Matrix Samples:

Water Samples:

Water samples containing significant amounts of sediment are decanted or separated prior to extraction, and only the water portion analyzed, unless otherwise directed by the client.

Soil and Sediment Samples:

Soil and Sediment samples containing significant amounts of water are decanted prior to extraction, and only the solid portion analyzed, unless otherwise directed by the client.

Sampling and Preservation Notes:

Certain regulatory programs, such as National Pollutant Discharge Elimination System (NPDES), require that activities such as sample filtration (for dissolved metals, orthophosphate, hexavalent chromium, etc.) and testing of short hold analytes (pH, Dissolved Oxygen, etc.) be performed in the field (on-site) within a short time window. In addition, sample matrix spikes are required for some analyses, and sufficient volume must be provided, and billable site specific QC requested, if this is required. All regulatory permits should be reviewed to ensure that these requirements are being met.

Data users should be aware of which regulations pertain to the samples they submit for testing. If related sample collection activities are not approved for a particular regulatory program, results should be considered estimates. Apex Laboratories will qualify these analytes according to the most stringent requirements, however results for samples that are for non-regulatory purposes may be acceptable.

Samples that have been filtered and preserved at Apex Laboratories per client request are listed in the preparation section of the report with the date and time of filtration listed.

Apex Laboratories maintains detailed records on sample receipt, including client label verification, cooler temperature, sample preservation, hold time compliance and field filtration. Data is qualified as necessary, and the lack of qualification indicates compliance with required parameters.

Apex Laboratories, LLC

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6720 SW Macadam Ave. Suite 125	Project Number: **201114-01.05**	**Report ID:**
Portland, OR 97219	Project Manager: **Anthony Dalton-Atha**	**A1H0073 - 08 10 21 1205**

LABORATORY ACCREDITATION INFORMATION

ORELAP Certification ID: OR100062 (Primary Accreditation) -
EPA ID: OR01039

All methods and analytes reported from work performed at Apex Laboratories are included on Apex Laboratories' ORELAP Scope of Certification, with the exception of any analyte(s) listed below:

Apex Laboratories

Matrix	Analysis	TNI_ID	Analyte	TNI_ID	Accreditation

All reported analytes are included in Apex Laboratories' current ORELAP scope.

Secondary Accreditations

Apex Laboratories also maintains reciprocal accreditation with non-TNI states (Washington DOE), as well as other state specific accreditations not listed here.

Subcontract Laboratory Accreditations

Subcontracted data falls outside of Apex Laboratories' Scope of Accreditation.
Please see the Subcontract Laboratory report for full details, or contact your Project Manager for more information.

Field Testing Parameters

Results for Field Tested data are provded by the client or sampler, and fall outside of Apex Laboratories' Scope of Accreditation.

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ANALYTICAL REPORT

Anchor QEA, LLC
6720 SW Macadam Ave. Suite 125
Portland, OR 97219

Project: Alabama Power-Greene County
Project Number: 201114-01.05
Project Manager: Anthony Dalton-Atha

Report ID:
A1H0073 - 08 10 21 1205

A1H0073

Chain of Custody Record & Laboratory Analysis Request

ANCHOR QEA

Company: Anchor QEA
Date: 7/31/2021
Project Name: Alabama Power - Greene County
Project Number: 201114-01.05
Project Manager: Anthony Dalton-Atha adalton-atha@anchorqea.com
Phone Number: 201114-01.02
Shipment Method: Pick-up
Samplers: Paloma Spina

Test Parameters

Line	Field Sample ID	Collection Date/Time		Matrix	No. of Containers	As, Co, Li, Fe, Al	Comments/Preservation
1	GC-AP-AAO-1-20210731	7/31/2021	14:25	Water	1	x	0.2 M ammonium oxalate in 0.1 M oxalic acid
2	GC-AP-AAO-2-20210731	7/31/2021	14:30	Water	1	x	0.2 M ammonium oxalate in 0.1 M oxalic acid
3	GC-AP-AAO-3-20210731	7/31/2021	14:35	Water	1	x	0.2 M ammonium oxalate in 0.1 M oxalic acid
4	GC-AP-AAO-4-20210731	7/31/2021	14:40	Water	1	x	0.2 M ammonium oxalate in 0.1 M oxalic acid
5	GC-AP-AAO-5-20210731	7/31/2021	14:45	Water	1	x	0.2 M ammonium oxalate in 0.1 M oxalic acid
6	GC-AP-AAO-6-20210731	7/31/2021	14:50	Water	1	x	0.2 M ammonium oxalate in 0.1 M oxalic acid
7	GC-AP-AAO-7-20210731	7/31/2021	14:55	Water	1	x	0.2 M ammonium oxalate in 0.1 M oxalic acid
8	GC-AP-AAO-8-20210731	7/31/2021	15:00	Water	1	x	0.2 M ammonium oxalate in 0.1 M oxalic acid
9	GC-AP-AAO-9-20210731	7/31/2021	15:05	Water	1	x	0.2 M ammonium oxalate in 0.1 M oxalic acid
10	GC-AP-AAO-10-20210731	7/31/2021	15:10	Water	1	x	0.2 M ammonium oxalate in 0.1 M oxalic acid
11	GC-AP-AAO-11-20210731	7/31/2021	15:15	Water	1	x	0.2 M ammonium oxalate in 0.1 M oxalic acid
12	GC-AP-AAO-12-20210731	7/31/2021	15:20	Water	1	x	0.2 M ammonium oxalate in 0.1 M oxalic acid
13	GC-AP-AAO-MB-20210731	7/31/2021	15:25	Water	1	x	0.2 M ammonium oxalate in 0.1 M oxalic acid
14							
15							
16							

Comments: samples are filtered and preserved with nitric acid.

Relinquished By: Anthony Dalton-Atha	Company: AQEA	Received By: Eli Joyner	Company: APEX LABS
Signature/Printed Name	Date/Time 8/3/2021 0945	Signature/Printed Name	Date/Time 8/3/21 1235
Relinquished By:	Company:	Received By:	Company:
Signature/Printed Name	Date/Time	Signature/Printed Name	Date/Time

Page 1 of 1

DRAFT REPORT

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Anchor QEA, LLC	Project: **Alabama Power-Greene County**	
6720 SW Macadam Ave. Suite 125	Project Number: **201114-01.05**	**Report ID:**
Portland, OR 97219	Project Manager: **Anthony Dalton-Atha**	**A1H0073 - 08 10 21 1205**

APEX LABS COOLER RECEIPT FORM

Client: Anchor QEA Element WO#: A1 H0073

Project/Project #: Alabama Power - Greene County 201114-01.02

Delivery Info:

Date/time received: 8/3/21 @ 1235 By: EJ

Delivered by: Apex X Client___ ESS___ FedEx___ UPS___ Swift___ Senvoy___ SDS___ Other___

Cooler Inspection Date/time inspected: 8/3/21 @ 1403 By: EJ

Chain of Custody included? Yes X No ___ Custody seals? Yes X No ___

Signed/dated by client? Yes X No ___

Signed/dated by Apex? Yes X No ___

	Cooler #1	Cooler #2	Cooler #3	Cooler #4	Cooler #5	Cooler #6	Cooler #7
Temperature (°C)	2.4						
Received on ice? (Y/N)	Y						
Temp. blanks? (Y/N)	N						
Ice type: (Gel/Real/Other)	Gel						
Condition:	Good						

Cooler out of temp? (Y/N) Possible reason why: ___

Green dots applied to out of temperature samples? Yes/No

Out of temperature samples form initiated? Yes/No

Sample Inspection: Date/time inspected: 8/3/21 @ 2000 By: HAS

All samples intact? Yes X No ___ Comments: ___

Bottle labels/COCs agree? Yes ___ No X Comments: Times vary on all containers.

COC/container discrepancies form initiated? Yes ___ No X

Containers/volumes received appropriate for analysis? Yes X No ___ Comments: ___

Do VOA vials have visible headspace? Yes ___ No ___ NA X

Comments ___

Water samples: pH checked: Yes ~~X~~ No ___ NA X pH appropriate? Yes ~~X~~ No ___ NA X

Comments: HAS 8/3/21 HAS 8/3/21

Additional information: ___

Labeled by: HAS Witness: [illegible] Cooler Inspected by: TAG

Apex Laboratories, LLC

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ANALYTICAL REPORT

Friday, July 16, 2021

Anthony Dalton-Atha
Anchor QEA, LLC
6720 SW Macadam Ave. Suite 125
Portland, OR 97219

RE: A1G0350 - Alabama Power-Greene County - 201114-01.05

Thank you for using Apex Laboratories. We greatly appreciate your business and strive to provide the highest quality services to the environmental industry.

Enclosed are the results of analyses for work order A1G0350, which was received by the laboratory on 7/13/2021 at 2:08:00PM.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: dthomas@apex-labs.com, or by phone at 503-718-2323.

Please note: All samples will be disposed of within 30 days of sample receipt, unless prior arrangements have been made.

Cooler Receipt Information

(See Cooler Receipt Form for details)

Cooler #1	5.7 degC

Apex Laboratories, LLC
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ANALYTICAL REPORT

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6720 SW Macadam Ave. Suite 125	Project Number: **201114-01.05**	**Report ID:**
Portland, OR 97219	Project Manager: **Anthony Dalton-Atha**	**A1G0350 - 07 16 21 1537**

ANALYTICAL REPORT FOR SAMPLES

SAMPLE INFORMATION

Client Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
AP-SSE-F1-GC1	A1G0350-01	Water	07/07/21 10:40	07/13/21 14:08
AP-SSE-F1-GC2	A1G0350-02	Water	07/07/21 10:45	07/13/21 14:08
AP-SSE-F1-GC3	A1G0350-03	Water	07/07/21 10:50	07/13/21 14:08
AP-SSE-F1-GC4	A1G0350-04	Water	07/07/21 10:55	07/13/21 14:08
AP-SSE-F1-GC5	A1G0350-05	Water	07/07/21 11:00	07/13/21 14:08
MB-SSE-F1-GC6	A1G0350-06	Water	07/07/21 11:05	07/13/21 14:08
AP-SSE-F2-GC1	A1G0350-07	Water	07/08/21 10:40	07/13/21 14:08
AP-SSE-F2-GC2	A1G0350-08	Water	07/08/21 10:45	07/13/21 14:08
AP-SSE-F2-GC3	A1G0350-09	Water	07/08/21 10:50	07/13/21 14:08
AP-SSE-F2-GC4	A1G0350-10	Water	07/08/21 10:55	07/13/21 14:08
AP-SSE-F2-GC5	A1G0350-11	Water	07/08/21 11:00	07/13/21 14:08
MB-SSE-F2-GC6	A1G0350-12	Water	07/08/21 11:05	07/13/21 14:08
AP-SSE-F3-GC1	A1G0350-13	Water	07/09/21 10:40	07/13/21 14:08
AP-SSE-F3-GC2	A1G0350-14	Water	07/09/21 10:45	07/13/21 14:08
AP-SSE-F3-GC3	A1G0350-15	Water	07/09/21 10:50	07/13/21 14:08
AP-SSE-F3-GC4	A1G0350-16	Water	07/09/21 10:55	07/13/21 14:08
AP-SSE-F3-GC5	A1G0350-17	Water	07/09/21 11:00	07/13/21 14:08
MB-SSE-F3-GC6	A1G0350-18	Water	07/09/21 11:05	07/13/21 14:08
AP-SSE-F4-GC1	A1G0350-19	Water	07/12/21 10:40	07/13/21 14:08
AP-SSE-F4-GC2	A1G0350-20	Water	07/12/21 10:45	07/13/21 14:08
AP-SSE-F4-GC3	A1G0350-21	Water	07/12/21 10:50	07/13/21 14:08
AP-SSE-F4-GC4	A1G0350-22	Water	07/12/21 10:55	07/13/21 14:08
AP-SSE-F4-GC5	A1G0350-23	Water	07/12/21 11:00	07/13/21 14:08
MB-SSE-F4-GC6	A1G0350-24	Water	07/12/21 11:05	07/13/21 14:08
AP-SSE-F5-GC1	A1G0350-25	Solid	07/13/21 10:40	07/13/21 14:08
AP-SSE-F5-GC2	A1G0350-26	Solid	07/13/21 10:45	07/13/21 14:08
AP-SSE-F5-GC3	A1G0350-27	Solid	07/13/21 10:50	07/13/21 14:08
AP-SSE-F5-GC4	A1G0350-28	Solid	07/13/21 10:55	07/13/21 14:08
AP-SSE-F5-GC5	A1G0350-29	Solid	07/13/21 11:00	07/13/21 14:08

DRAFT REPORT

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Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

Anchor QEA, LLC	Project: **Alabama Power-Greene County**	
6720 SW Macadam Ave. Suite 125	Project Number: 201114-01.05	**Report ID:**
Portland, OR 97219	Project Manager: Anthony Dalton-Atha	A1G0350 - 07 16 21 1537

ANALYTICAL SAMPLE RESULTS

Total Metals by EPA 6020B (ICPMS)

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
AP-SSE-F1-GC1 (A1G0350-01)				**Matrix: Water**				
Batch: 1070415								
Arsenic	ND	25.0	50.0	ug/L	50	07/15/21 23:51	EPA 6020B	R-04
Cobalt	ND	25.0	50.0	ug/L	50	07/15/21 23:51	EPA 6020B	R-04
AP-SSE-F1-GC2 (A1G0350-02)				**Matrix: Water**				
Batch: 1070415								
Arsenic	ND	25.0	50.0	ug/L	50	07/15/21 23:56	EPA 6020B	R-04
Cobalt	ND	25.0	50.0	ug/L	50	07/15/21 23:56	EPA 6020B	R-04
AP-SSE-F1-GC3 (A1G0350-03)				**Matrix: Water**				
Batch: 1070415								
Arsenic	ND	25.0	50.0	ug/L	50	07/16/21 00:00	EPA 6020B	R-04
Lithium	ND	125	250	ug/L	50	07/15/21 13:05	EPA 6020B	R-04
AP-SSE-F1-GC4 (A1G0350-04)				**Matrix: Water**				
Batch: 1070415								
Arsenic	ND	25.0	50.0	ug/L	50	07/16/21 00:05	EPA 6020B	R-04
Lithium	ND	125	250	ug/L	50	07/15/21 13:12	EPA 6020B	R-04
AP-SSE-F1-GC5 (A1G0350-05)				**Matrix: Water**				
Batch: 1070415								
Arsenic	ND	25.0	50.0	ug/L	50	07/16/21 00:10	EPA 6020B	R-04
Cobalt	ND	25.0	50.0	ug/L	50	07/16/21 00:10	EPA 6020B	R-04
MB-SSE-F1-GC6 (A1G0350-06)				**Matrix: Water**				
Batch: 1070415								
Arsenic	ND	25.0	50.0	ug/L	50	07/16/21 00:24	EPA 6020B	R-04
Cobalt	ND	25.0	50.0	ug/L	50	07/16/21 00:24	EPA 6020B	R-04
Lithium	ND	125	250	ug/L	50	07/15/21 13:17	EPA 6020B	R-04
AP-SSE-F2-GC1 (A1G0350-07)				**Matrix: Water**				
Batch: 1070415								
Arsenic	ND	25.0	50.0	ug/L	50	07/16/21 00:29	EPA 6020B	R-04
Cobalt	ND	25.0	50.0	ug/L	50	07/16/21 00:29	EPA 6020B	R-04
Iron	ND	1250	2500	ug/L	50	07/16/21 00:29	EPA 6020B	R-04

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6720 SW Macadam Ave. Suite 125	Project Number: **201114-01.05**	**Report ID:**
Portland, OR 97219	Project Manager: **Anthony Dalton-Atha**	**A1G0350 - 07 16 21 1537**

ANALYTICAL SAMPLE RESULTS

Total Metals by EPA 6020B (ICPMS)

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
AP-SSE-F2-GC1 (A1G0350-07)				**Matrix: Water**				
Manganese	ND	25.0	50.0	ug/L	50	07/16/21 00:29	EPA 6020B	R-04
AP-SSE-F2-GC2 (A1G0350-08)				**Matrix: Water**				
Batch: 1070415								
Arsenic	ND	25.0	50.0	ug/L	50	07/16/21 00:34	EPA 6020B	R-04
Cobalt	ND	25.0	50.0	ug/L	50	07/16/21 00:34	EPA 6020B	R-04
Iron	ND	1250	2500	ug/L	50	07/16/21 00:34	EPA 6020B	R-04
Manganese	ND	25.0	50.0	ug/L	50	07/16/21 00:34	EPA 6020B	R-04
AP-SSE-F2-GC3 (A1G0350-09)				**Matrix: Water**				
Batch: 1070415								
Arsenic	ND	25.0	50.0	ug/L	50	07/16/21 00:39	EPA 6020B	R-04
Iron	ND	1250	2500	ug/L	50	07/16/21 00:39	EPA 6020B	R-04
Manganese	**78.1**	25.0	50.0	ug/L	50	07/16/21 00:39	EPA 6020B	
Lithium	ND	125	250	ug/L	50	07/15/21 13:23	EPA 6020B	R-04
AP-SSE-F2-GC4 (A1G0350-10)				**Matrix: Water**				
Batch: 1070415								
Arsenic	ND	25.0	50.0	ug/L	50	07/16/21 00:43	EPA 6020B	R-04
Iron	**1490**	1250	2500	ug/L	50	07/16/21 00:43	EPA 6020B	**J, R-04**
Manganese	**190**	25.0	50.0	ug/L	50	07/16/21 00:43	EPA 6020B	
Lithium	ND	125	250	ug/L	50	07/15/21 13:29	EPA 6020B	A-01, Q-06, R-04
AP-SSE-F2-GC5 (A1G0350-11)				**Matrix: Water**				
Batch: 1070415								
Arsenic	ND	25.0	50.0	ug/L	50	07/16/21 00:48	EPA 6020B	R-04
Cobalt	ND	25.0	50.0	ug/L	50	07/16/21 00:48	EPA 6020B	R-04
Iron	ND	1250	2500	ug/L	50	07/16/21 00:48	EPA 6020B	R-04
Manganese	ND	25.0	50.0	ug/L	50	07/16/21 00:48	EPA 6020B	R-04
MB-SSE-F2-GC6 (A1G0350-12)				**Matrix: Water**				
Batch: 1070415								
Arsenic	ND	25.0	50.0	ug/L	50	07/16/21 00:53	EPA 6020B	R-04
Cobalt	ND	25.0	50.0	ug/L	50	07/16/21 00:53	EPA 6020B	R-04

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ANALYTICAL REPORT

Anchor QEA, LLC	Project: **Alabama Power-Greene County**	
6720 SW Macadam Ave. Suite 125	Project Number: **201114-01.05**	**Report ID:**
Portland, OR 97219	Project Manager: **Anthony Dalton-Atha**	**A1G0350 - 07 16 21 1537**

ANALYTICAL SAMPLE RESULTS

Total Metals by EPA 6020B (ICPMS)

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MB-SSE-F2-GC6 (A1G0350-12)				**Matrix: Water**				
Iron	ND	1250	2500	ug/L	50	07/16/21 00:53	EPA 6020B	R-04
Manganese	ND	25.0	50.0	ug/L	50	07/16/21 00:53	EPA 6020B	R-04
Lithium	ND	125	250	ug/L	50	07/15/21 13:51	EPA 6020B	R-04
AP-SSE-F3-GC1 (A1G0350-13)				**Matrix: Water**				
Batch: 1070415								
Arsenic	ND	25.0	50.0	ug/L	50	07/16/21 00:58	EPA 6020B	R-04
Cobalt	ND	25.0	50.0	ug/L	50	07/16/21 00:58	EPA 6020B	R-04
Iron	**1680**	1250	2500	ug/L	50	07/16/21 00:58	EPA 6020B	**J, R-04**
Manganese	**63.9**	25.0	50.0	ug/L	50	07/16/21 00:58	EPA 6020B	
AP-SSE-F3-GC2 (A1G0350-14)				**Matrix: Water**				
Batch: 1070415								
Arsenic	ND	25.0	50.0	ug/L	50	07/16/21 01:02	EPA 6020B	R-04
Cobalt	ND	25.0	50.0	ug/L	50	07/16/21 01:02	EPA 6020B	R-04
Iron	**1490**	1250	2500	ug/L	50	07/16/21 01:02	EPA 6020B	**J, R-04**
Manganese	**57.7**	25.0	50.0	ug/L	50	07/16/21 01:02	EPA 6020B	
AP-SSE-F3-GC3 (A1G0350-15)				**Matrix: Water**				
Batch: 1070415								
Arsenic	ND	25.0	50.0	ug/L	50	07/16/21 01:07	EPA 6020B	R-04
Iron	ND	1250	2500	ug/L	50	07/16/21 01:07	EPA 6020B	R-04
Manganese	**84.2**	25.0	50.0	ug/L	50	07/16/21 01:07	EPA 6020B	
Lithium	ND	125	250	ug/L	50	07/15/21 13:56	EPA 6020B	R-04
AP-SSE-F3-GC4 (A1G0350-16)				**Matrix: Water**				
Batch: 1070415								
Arsenic	ND	25.0	50.0	ug/L	50	07/16/21 01:22	EPA 6020B	R-04
Iron	ND	1250	2500	ug/L	50	07/16/21 01:22	EPA 6020B	R-04
Manganese	**2100**	25.0	50.0	ug/L	50	07/16/21 01:22	EPA 6020B	
Lithium	ND	125	250	ug/L	50	07/15/21 14:02	EPA 6020B	R-04
AP-SSE-F3-GC5 (A1G0350-17)				**Matrix: Water**				
Batch: 1070415								
Arsenic	ND	25.0	50.0	ug/L	50	07/16/21 01:26	EPA 6020B	R-04

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6720 SW Macadam Ave. Suite 125	Project Number: **201114-01.05**	**Report ID:**
Portland, OR 97219	Project Manager: **Anthony Dalton-Atha**	**A1G0350 - 07 16 21 1537**

ANALYTICAL SAMPLE RESULTS

Total Metals by EPA 6020B (ICPMS)

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
AP-SSE-F3-GC5 (A1G0350-17)				**Matrix: Water**				
Cobalt	ND	25.0	50.0	ug/L	50	07/16/21 01:26	EPA 6020B	R-04
Iron	**1890**	1250	2500	ug/L	50	07/16/21 01:26	EPA 6020B	**J, R-04**
Manganese	**59.7**	25.0	50.0	ug/L	50	07/16/21 01:26	EPA 6020B	
MB-SSE-F3-GC6 (A1G0350-18)				**Matrix: Water**				
Batch: 1070420								
Arsenic	ND	25.0	50.0	ug/L	50	07/16/21 01:50	EPA 6020B	R-04
Cobalt	ND	25.0	50.0	ug/L	50	07/16/21 01:50	EPA 6020B	R-04
Iron	ND	1250	2500	ug/L	50	07/16/21 01:50	EPA 6020B	R-04
Manganese	**59.7**	25.0	50.0	ug/L	50	07/16/21 01:50	EPA 6020B	
Lithium	ND	125	250	ug/L	50	07/15/21 14:31	EPA 6020B	R-04
AP-SSE-F4-GC1 (A1G0350-19)				**Matrix: Water**				
Batch: 1070420								
Arsenic	ND	25.0	50.0	ug/L	50	07/16/21 01:55	EPA 6020B	R-04
Cobalt	ND	25.0	50.0	ug/L	50	07/16/21 01:55	EPA 6020B	R-04
Iron	**28300**	1250	2500	ug/L	50	07/16/21 01:55	EPA 6020B	
Manganese	ND	25.0	50.0	ug/L	50	07/16/21 01:55	EPA 6020B	R-04
AP-SSE-F4-GC2 (A1G0350-20)				**Matrix: Water**				
Batch: 1070420								
Arsenic	ND	25.0	50.0	ug/L	50	07/16/21 02:00	EPA 6020B	R-04
Cobalt	ND	25.0	50.0	ug/L	50	07/16/21 02:00	EPA 6020B	R-04
Iron	**27700**	1250	2500	ug/L	50	07/16/21 02:00	EPA 6020B	
Manganese	ND	25.0	50.0	ug/L	50	07/16/21 02:00	EPA 6020B	R-04
AP-SSE-F4-GC3 (A1G0350-21)				**Matrix: Water**				
Batch: 1070420								
Arsenic	ND	25.0	50.0	ug/L	50	07/16/21 02:05	EPA 6020B	R-04
Iron	ND	1250	2500	ug/L	50	07/16/21 02:05	EPA 6020B	R-04
Manganese	ND	25.0	50.0	ug/L	50	07/16/21 02:05	EPA 6020B	R-04
Lithium	ND	125	250	ug/L	50	07/15/21 14:36	EPA 6020B	R-04
AP-SSE-F4-GC4 (A1G0350-22)				**Matrix: Water**				
Batch: 1070420								

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ANALYTICAL REPORT

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6720 SW Macadam Ave. Suite 125	Project Number: **201114-01.05**	**Report ID:**
Portland, OR 97219	Project Manager: **Anthony Dalton-Atha**	**A1G0350 - 07 16 21 1537**

ANALYTICAL SAMPLE RESULTS

Total Metals by EPA 6020B (ICPMS)

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
AP-SSE-F4-GC4 (A1G0350-22)				**Matrix: Water**				
Arsenic	ND	25.0	50.0	ug/L	50	07/16/21 02:19	EPA 6020B	R-04
Iron	**15900**	1250	2500	ug/L	50	07/16/21 02:19	EPA 6020B	
Manganese	**79.4**	25.0	50.0	ug/L	50	07/16/21 02:19	EPA 6020B	
Lithium	ND	125	250	ug/L	50	07/15/21 14:53	EPA 6020B	R-04
AP-SSE-F4-GC5 (A1G0350-23)				**Matrix: Water**				
Batch: 1070420								
Arsenic	**30.6**	25.0	50.0	ug/L	50	07/16/21 02:24	EPA 6020B	**J, R-04**
Cobalt	ND	25.0	50.0	ug/L	50	07/16/21 02:24	EPA 6020B	R-04
Iron	**32300**	1250	2500	ug/L	50	07/16/21 02:24	EPA 6020B	
Manganese	ND	25.0	50.0	ug/L	50	07/16/21 02:24	EPA 6020B	R-04
MB-SSE-F4-GC6 (A1G0350-24)				**Matrix: Water**				
Batch: 1070420								
Arsenic	ND	25.0	50.0	ug/L	50	07/16/21 02:28	EPA 6020B	R-04
Cobalt	ND	25.0	50.0	ug/L	50	07/16/21 02:28	EPA 6020B	R-04
Iron	ND	1250	2500	ug/L	50	07/16/21 02:28	EPA 6020B	R-04
Manganese	ND	25.0	50.0	ug/L	50	07/16/21 02:28	EPA 6020B	R-04
Lithium	ND	125	250	ug/L	50	07/15/21 14:59	EPA 6020B	R-04
AP-SSE-F5-GC1 (A1G0350-25)				**Matrix: Solid**				
Batch: 1070436								
Arsenic	ND	2.65	5.31	mg/kg	50	07/16/21 04:23	EPA 6020B	R-04
Cobalt	ND	2.65	5.31	mg/kg	50	07/16/21 04:23	EPA 6020B	R-04
Iron	**1070**	133	265	mg/kg	50	07/16/21 04:23	EPA 6020B	
Manganese	ND	2.65	5.31	mg/kg	50	07/16/21 04:23	EPA 6020B	R-04
AP-SSE-F5-GC2 (A1G0350-26)				**Matrix: Solid**				
Batch: 1070436								
Arsenic	ND	2.65	5.30	mg/kg	50	07/16/21 04:28	EPA 6020B	R-04
Cobalt	ND	2.65	5.30	mg/kg	50	07/16/21 04:28	EPA 6020B	R-04
Iron	**1810**	132	265	mg/kg	50	07/16/21 04:28	EPA 6020B	
Manganese	**4.27**	2.65	5.30	mg/kg	50	07/16/21 04:28	EPA 6020B	**J**

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Project: **Alabama Power-Greene County**
Project Number: **201114-01.05**
Project Manager: **Anthony Dalton-Atha**

Report ID:
A1G0350 - 07 16 21 1537

ANALYTICAL SAMPLE RESULTS

Total Metals by EPA 6020B (ICPMS)

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
AP-SSE-F5-GC3 (A1G0350-27)				Matrix: Solid				
Batch: 1070436								
Arsenic	ND	2.66	5.32	mg/kg	50	07/16/21 04:32	EPA 6020B	R-04
Iron	**471**	133	266	mg/kg	50	07/16/21 04:32	EPA 6020B	
Manganese	ND	2.66	5.32	mg/kg	50	07/16/21 04:32	EPA 6020B	R-04
Lithium	ND	13.3	26.6	mg/kg	50	07/15/21 16:52	EPA 6020B	R-04
AP-SSE-F5-GC4 (A1G0350-28)				Matrix: Solid				
Batch: 1070436								
Arsenic	ND	2.65	5.30	mg/kg	50	07/16/21 04:37	EPA 6020B	R-04
Iron	**4100**	132	265	mg/kg	50	07/16/21 04:37	EPA 6020B	
Manganese	**13.4**	2.65	5.30	mg/kg	50	07/16/21 04:37	EPA 6020B	
Lithium	ND	13.2	26.5	mg/kg	50	07/15/21 17:09	EPA 6020B	R-04
AP-SSE-F5-GC5 (A1G0350-29)				Matrix: Solid				
Batch: 1070436								
Arsenic	ND	2.60	5.21	mg/kg	50	07/16/21 04:42	EPA 6020B	R-04
Cobalt	ND	2.60	5.21	mg/kg	50	07/16/21 04:42	EPA 6020B	R-04
Iron	**1290**	130	260	mg/kg	50	07/16/21 04:42	EPA 6020B	
Manganese	**3.73**	2.60	5.21	mg/kg	50	07/16/21 04:42	EPA 6020B	J

Highlighted results have not undergone full secondary data review at the time of reporting.
Results are subject to change upon final review and reporting.

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ANALYTICAL REPORT

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Portland, OR 97219	Project Manager: **Anthony Dalton-Atha**	**A1G0350 - 07 16 21 1537**

QUALITY CONTROL (QC) SAMPLE RESULTS

Total Metals by EPA 6020B (ICPMS)

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 1070415 - EPA 3015A							Water					
Blank (1070415-BLK1)			Prepared: 07/14/21 09:08 Analyzed: 07/15/21 23:27									
EPA 6020B												
Arsenic	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Cobalt	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Iron	ND	25.0	50.0	ug/L	1	---	---	---	---	---	---	
Manganese	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Blank (1070415-BLK2)			Prepared: 07/14/21 09:08 Analyzed: 07/15/21 12:36									
EPA 6020B												
Lithium	ND	2.50	5.00	ug/L	1	---	---	---	---	---	---	
LCS (1070415-BS1)			Prepared: 07/14/21 09:08 Analyzed: 07/15/21 23:32									
EPA 6020B												
Arsenic	54.2	0.500	1.00	ug/L	1	55.6	---	98	80-120%	---	---	
Cobalt	54.8	0.500	1.00	ug/L	1	55.6	---	99	80-120%	---	---	
Iron	2800	25.0	50.0	ug/L	1	2780	---	101	80-120%	---	---	
Manganese	55.3	0.500	1.00	ug/L	1	55.6	---	100	80-120%	---	---	
LCS (1070415-BS2)			Prepared: 07/14/21 09:08 Analyzed: 07/15/21 12:42									
EPA 6020B												
Lithium	42.9	2.50	5.00	ug/L	1	44.4	---	97	80-120%	---	---	
Duplicate (1070415-DUP1)			Prepared: 07/14/21 09:08 Analyzed: 07/15/21 23:41									
QC Source Sample: Non-SDG (A1G0339-01)												
Arsenic	**6.32**	5.00	10.0	ug/L	10	---	6.74	---	---	6	20%	J
Cobalt	**9.42**	5.00	10.0	ug/L	10	---	9.22	---	---	2	20%	J
Iron	**5910**	250	500	ug/L	10	---	5980	---	---	1	20%	
Manganese	**277**	5.00	10.0	ug/L	10	---	274	---	---	1	20%	
Duplicate (1070415-DUP2)			Prepared: 07/14/21 09:08 Analyzed: 07/15/21 12:53									
QC Source Sample: Non-SDG (A1G0339-01)												
Lithium	ND	25.0	50.0	ug/L	10	---	ND	---	---	---	20%	R-04
Matrix Spike (1070415-MS1)			Prepared: 07/14/21 09:08 Analyzed: 07/15/21 23:46									

DRAFT REPORT

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Apex Laboratories, LLC

6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

Anchor QEA, LLC
6720 SW Macadam Ave. Suite 125
Portland, OR 97219

Project: **Alabama Power-Greene County**
Project Number: **201114-01.05**
Project Manager: **Anthony Dalton-Atha**

Report ID:
A1G0350 - 07 16 21 1537

QUALITY CONTROL (QC) SAMPLE RESULTS

Total Metals by EPA 6020B (ICPMS)

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 1070415 - EPA 3015A							**Water**					
Matrix Spike (1070415-MS1)			Prepared: 07/14/21 09:08 Analyzed: 07/15/21 23:46									
QC Source Sample: Non-SDG (A1G0339-01)												
EPA 6020B												
Arsenic	63.6	5.00	10.0	ug/L	10	55.6	6.74	102	75-125%	---	---	
Cobalt	65.3	5.00	10.0	ug/L	10	55.6	9.22	101	75-125%	---	---	
Iron	8710	250	500	ug/L	10	2780	5980	98	75-125%	---	---	
Manganese	342	5.00	10.0	ug/L	10	55.6	274	121	75-125%	---	---	
Matrix Spike (1070415-MS2)			Prepared: 07/14/21 09:08 Analyzed: 07/15/21 12:59									
QC Source Sample: Non-SDG (A1G0339-01)												
EPA 6020B												
Lithium	57.4	25.0	50.0	ug/L	10	44.4	ND	**129**	**75-125%**	---	---	Q-11, R-04

DRAFT REPORT

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Anchor QEA, LLC	Project: **Alabama Power-Greene County**	
6720 SW Macadam Ave. Suite 125	Project Number: **201114-01.05**	**Report ID:**
Portland, OR 97219	Project Manager: **Anthony Dalton-Atha**	A1G0350 - 07 16 21 1537

QUALITY CONTROL (QC) SAMPLE RESULTS

Total Metals by EPA 6020B (ICPMS)

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 1070420 - EPA 3015A							**Water**					
Blank (1070420-BLK1)			Prepared: 07/14/21 10:48	Analyzed: 07/16/21 01:36								
EPA 6020B												
Arsenic	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Cobalt	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Iron	ND	25.0	50.0	ug/L	1	---	---	---	---	---	---	
Manganese	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Blank (1070420-BLK2)			Prepared: 07/14/21 10:48	Analyzed: 07/15/21 14:14								
EPA 6020B												
Lithium	ND	2.50	5.00	ug/L	1	---	---	---	---	---	---	
LCS (1070420-BS1)			Prepared: 07/14/21 10:48	Analyzed: 07/16/21 01:45								
EPA 6020B												
Arsenic	54.4	0.500	1.00	ug/L	1	55.6	---	98	80-120%	---	---	
Cobalt	54.2	0.500	1.00	ug/L	1	55.6	---	97	80-120%	---	---	
Iron	2750	25.0	50.0	ug/L	1	2780	---	99	80-120%	---	---	
Manganese	54.8	0.500	1.00	ug/L	1	55.6	---	99	80-120%	---	---	
LCS (1070420-BS2)			Prepared: 07/14/21 10:48	Analyzed: 07/15/21 14:25								
EPA 6020B												
Lithium	42.6	2.50	5.00	ug/L	1	44.4	---	96	80-120%	---	---	
LCS Dup (1070420-BSD1)			Prepared: 07/14/21 10:48	Analyzed: 07/16/21 01:41								
EPA 6020B												
Arsenic	55.0	0.500	1.00	ug/L	1	55.6	---	99	80-120%	0.9	20%	
Cobalt	54.4	0.500	1.00	ug/L	1	55.6	---	98	80-120%	0.4	20%	
Iron	2780	25.0	50.0	ug/L	1	2780	---	100	80-120%	1	20%	
Manganese	56.0	0.500	1.00	ug/L	1	55.6	---	101	80-120%	2	20%	
LCS Dup (1070420-BSD2)			Prepared: 07/14/21 10:48	Analyzed: 07/15/21 14:19								
EPA 6020B												
Lithium	42.7	2.50	5.00	ug/L	1	44.4	---	96	80-120%	0.1	20%	

DRAFT REPORT

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Anchor QEA, LLC **6720 SW Macadam Ave. Suite 125** **Portland, OR 97219**	Project: **Alabama Power-Greene County** Project Number: **201114-01.05** Project Manager: **Anthony Dalton-Atha**	**Report ID:** **A1G0350 - 07 16 21 1537**

QUALITY CONTROL (QC) SAMPLE RESULTS

Total Metals by EPA 6020B (ICPMS)

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 1070436 - EPA 3051A							**Solid**					
Blank (1070436-BLK1)			Prepared: 07/14/21 13:30	Analyzed: 07/16/21 03:40								
EPA 6020B												
Arsenic	ND	0.500	1.00	mg/kg	10	---	---	---	---	---	---	
Cobalt	ND	0.500	1.00	mg/kg	10	---	---	---	---	---	---	
Iron	ND	25.0	50.0	mg/kg	10	---	---	---	---	---	---	
Manganese	ND	0.500	1.00	mg/kg	10	---	---	---	---	---	---	
Blank (1070436-BLK2)			Prepared: 07/14/21 13:30	Analyzed: 07/15/21 16:23								
EPA 6020B												
Lithium	ND	2.50	5.00	mg/kg	10	---	---	---	---	---	---	
LCS (1070436-BS1)			Prepared: 07/14/21 13:30	Analyzed: 07/16/21 03:45								
EPA 6020B												
Arsenic	50.5	0.500	1.00	mg/kg	10	50.0	---	101	80-120%	---	---	
Cobalt	49.8	0.500	1.00	mg/kg	10	50.0	---	100	80-120%	---	---	
Iron	2560	25.0	50.0	mg/kg	10	2500	---	102	80-120%	---	---	
Manganese	50.0	0.500	1.00	mg/kg	10	50.0	---	100	80-120%	---	---	
LCS (1070436-BS2)			Prepared: 07/14/21 13:30	Analyzed: 07/15/21 16:29								
EPA 6020B												
Lithium	41.7	2.50	5.00	mg/kg	10	40.0	---	104	80-120%	---	---	
Duplicate (1070436-DUP1)			Prepared: 07/14/21 13:30	Analyzed: 07/16/21 03:54								
QC Source Sample: Non-SDG (A1G0245-01)												
Arsenic	ND	25.3	50.5	mg/kg	100	---	ND	---	---	---	20%	
Cobalt	ND	25.3	50.5	mg/kg	100	---	ND	---	---	---	20%	
Iron	**116000**	1260	2530	mg/kg	100	---	113000	---	---	2	20%	
Manganese	**1260**	25.3	50.5	mg/kg	100	---	1250	---	---	0.5	20%	
Duplicate (1070436-DUP2)			Prepared: 07/14/21 13:30	Analyzed: 07/15/21 16:41								
QC Source Sample: Non-SDG (A1G0245-01)												
Lithium	ND	126	253	mg/kg	100	---	ND	---	---	---	20%	R-04
Matrix Spike (1070436-MS1)			Prepared: 07/14/21 13:30	Analyzed: 07/16/21 03:59								

DRAFT REPORT

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Project: **Alabama Power-Greene County**
Project Number: **201114-01.05**
Project Manager: **Anthony Dalton-Atha**

Report ID:
A1G0350 - 07 16 21 1537

QUALITY CONTROL (QC) SAMPLE RESULTS

Total Metals by EPA 6020B (ICPMS)

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 1070436 - EPA 3051A							**Solid**					
Matrix Spike (1070436-MS1)			Prepared: 07/14/21 13:30	Analyzed: 07/16/21 03:59								
QC Source Sample: Non-SDG (A1G0245-01)												
EPA 6020B												
Arsenic	267	25.5	51.0	mg/kg	100	255	ND	105	75-125%	---	---	
Cobalt	272	25.5	51.0	mg/kg	100	255	ND	107	75-125%	---	---	
Iron	139000	1280	2550	mg/kg	100	12800	113000	**201**	**75-125%**	---	---	Q-03
Manganese	1680	25.5	51.0	mg/kg	100	255	1250	**167**	**75-125%**	---	---	Q-03
Matrix Spike (1070436-MS2)			Prepared: 07/14/21 13:30	Analyzed: 07/15/21 16:46								
QC Source Sample: Non-SDG (A1G0245-01)												
EPA 6020B												
Lithium	207	124	248	mg/kg	100	198	ND	105	75-125%	---	---	R-04, J

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ANALYTICAL REPORT

Anchor QEA, LLC	Project:	**Alabama Power-Greene County**	
6720 SW Macadam Ave. Suite 125	Project Number:	**201114-01.05**	**Report ID:**
Portland, OR 97219	Project Manager:	**Anthony Dalton-Atha**	**A1G0350 - 07 16 21 1537**

SAMPLE PREPARATION INFORMATION

Total Metals by EPA 6020B (ICPMS)

Prep: EPA 3015A

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 1070415							
A1G0350-01	Water	EPA 6020B	07/07/21 10:40	07/14/21 09:08	45mL/50mL	45mL/50mL	1.00
A1G0350-02	Water	EPA 6020B	07/07/21 10:45	07/14/21 09:08	45mL/50mL	45mL/50mL	1.00
A1G0350-03	Water	EPA 6020B	07/07/21 10:50	07/14/21 09:08	45mL/50mL	45mL/50mL	1.00
A1G0350-04	Water	EPA 6020B	07/07/21 10:55	07/14/21 09:08	45mL/50mL	45mL/50mL	1.00
A1G0350-05	Water	EPA 6020B	07/07/21 11:00	07/14/21 09:08	45mL/50mL	45mL/50mL	1.00
A1G0350-06	Water	EPA 6020B	07/07/21 11:05	07/14/21 09:08	45mL/50mL	45mL/50mL	1.00
A1G0350-07	Water	EPA 6020B	07/08/21 10:40	07/14/21 09:08	45mL/50mL	45mL/50mL	1.00
A1G0350-08	Water	EPA 6020B	07/08/21 10:45	07/14/21 09:08	45mL/50mL	45mL/50mL	1.00
A1G0350-09	Water	EPA 6020B	07/08/21 10:50	07/14/21 09:08	45mL/50mL	45mL/50mL	1.00
A1G0350-10	Water	EPA 6020B	07/08/21 10:55	07/14/21 09:08	45mL/50mL	45mL/50mL	1.00
A1G0350-11	Water	EPA 6020B	07/08/21 11:00	07/14/21 09:08	45mL/50mL	45mL/50mL	1.00
A1G0350-12	Water	EPA 6020B	07/08/21 11:05	07/14/21 09:08	45mL/50mL	45mL/50mL	1.00
A1G0350-13	Water	EPA 6020B	07/09/21 10:40	07/14/21 09:08	45mL/50mL	45mL/50mL	1.00
A1G0350-14	Water	EPA 6020B	07/09/21 10:45	07/14/21 09:08	45mL/50mL	45mL/50mL	1.00
A1G0350-15	Water	EPA 6020B	07/09/21 10:50	07/14/21 09:08	45mL/50mL	45mL/50mL	1.00
A1G0350-16	Water	EPA 6020B	07/09/21 10:55	07/14/21 09:08	45mL/50mL	45mL/50mL	1.00
A1G0350-17	Water	EPA 6020B	07/09/21 11:00	07/14/21 09:08	45mL/50mL	45mL/50mL	1.00
Batch: 1070420							
A1G0350-18	Water	EPA 6020B	07/09/21 11:05	07/14/21 10:48	45mL/50mL	45mL/50mL	1.00
A1G0350-19	Water	EPA 6020B	07/12/21 10:40	07/14/21 10:48	45mL/50mL	45mL/50mL	1.00
A1G0350-20	Water	EPA 6020B	07/12/21 10:45	07/14/21 10:48	45mL/50mL	45mL/50mL	1.00
A1G0350-21	Water	EPA 6020B	07/12/21 10:50	07/14/21 10:48	45mL/50mL	45mL/50mL	1.00
A1G0350-22	Water	EPA 6020B	07/12/21 10:55	07/14/21 10:48	45mL/50mL	45mL/50mL	1.00
A1G0350-23	Water	EPA 6020B	07/12/21 11:00	07/14/21 10:48	45mL/50mL	45mL/50mL	1.00
A1G0350-24	Water	EPA 6020B	07/12/21 11:05	07/14/21 10:48	45mL/50mL	45mL/50mL	1.00

Prep: EPA 3051A

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 1070436							
A1G0350-25	Solid	EPA 6020B	07/13/21 10:40	07/14/21 13:30	0.471g/50mL	0.5g/50mL	1.06
A1G0350-26	Solid	EPA 6020B	07/13/21 10:45	07/14/21 13:30	0.472g/50mL	0.5g/50mL	1.06
A1G0350-27	Solid	EPA 6020B	07/13/21 10:50	07/14/21 13:30	0.47g/50mL	0.5g/50mL	1.06
A1G0350-28	Solid	EPA 6020B	07/13/21 10:55	07/14/21 13:30	0.472g/50mL	0.5g/50mL	1.06
A1G0350-29	Solid	EPA 6020B	07/13/21 11:00	07/14/21 13:30	0.48g/50mL	0.5g/50mL	1.04

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Project: **Alabama Power-Greene County**
Project Number: **201114-01.05**
Project Manager: **Anthony Dalton-Atha**

Report ID:
A1G0350 - 07 16 21 1537

QUALIFIER DEFINITIONS

Client Sample and Quality Control (QC) Sample Qualifier Definitions:

Apex Laboratories

A-01	Results do not meet EPA 6020B criteria. Results reportes for research and development and client information.
J	Estimated Result. Result detected below the lowest point of the calibration curve, but above the specified MDL.
Q-03	Spike recovery and/or RPD is outside control limits due to the high concentration of analyte present in the sample.
Q-06	Internal Standard area outside of method specified limits. Data is Not Reported. See previous or subsequent runs for reportable sample data.
Q-11	Spike recovery cannot be accurately quantified due to sample dilution required for high analyte concentration and/or matrix interference.
R-04	Reporting levels elevated due to preparation and/or analytical dilution necessary for analysis.

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REPORTING NOTES AND CONVENTIONS:

Abbreviations:

DET Analyte DETECTED at or above the detection or reporting limit.

ND Analyte NOT DETECTED at or above the detection or reporting limit.

NR Result Not Reported

RPD Relative Percent Difference. RPDs for Matrix Spikes and Matrix Spike Duplicates are based on concentration, not recovery.

Detection Limits: Limit of Detection (LOD)

Limits of Detection (LODs) are normally set at a level of one half the validated Limit of Quantitation (LOQ).
If no value is listed ('-----'), then the data has not been evaluated below the Reporting Limit.

Reporting Limits: Limit of Quantitation (LOQ)

Validated Limits of Quantitation (LOQs) are reported as the Reporting Limits for all analyses where the LOQ, MRL, PQL or CRL are requested. The LOQ represents a level at or above the low point of the calibration curve, that has been validated according to Apex Laboratories' comprehensive LOQ policies and procedures.

Reporting Conventions:

Basis: Results for soil samples are generally reported on a 100% dry weight basis.
The Result Basis is listed following the units as " dry", " wet", or " " (blank) designation.

" dry" Sample results and Reporting Limits are reported on a dry weight basis. (i.e. "ug/kg dry")
See Percent Solids section for details of dry weight analysis.

" wet" Sample results and Reporting Limits for this analysis are normally dry weight corrected, but have not been modified in this case.

" " Results without 'wet' or 'dry' designation are not normally dry weight corrected. These results are considered 'As Received'.

QC Source:

In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) may be analyzed to demonstrate accuracy and precision of the extraction batch.

Non-Client Batch QC Samples (Duplicates and Matrix Spike/Duplicates) may not be included in this report. Please request a Full QC report if this data is required.

Miscellaneous Notes:

" --- " QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.

" *** " Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).

Blanks:

Standard practice is to evaluate the results from Blank QC Samples down to a level equal to ½ the Reporting Limit (RL).
-For Blank hits falling between ½ the RL and the RL (J flagged hits), the associated sample and QC data will receive a 'B-02' qualifier.
-For Blank hits above the RL, the associated sample and QC data will receive a 'B' qualifier, per Apex Laboratories' Blank Policy.
For further details, please request a copy of this document.

REPORTING NOTES AND CONVENTIONS (Cont.):

Blanks (Cont.):

Sample results flagged with a 'B' or 'B-02' qualifier are potentially biased high if the sample results are less than ten times the level found in the blank for inorganic analyses, or less than five times the level found in the blank for organic analyses.

'B' and 'B-02' qualifications are only applied to sample results detected above the Reporting Level.

Preparation Notes:

Mixed Matrix Samples:

Water Samples:

Water samples containing significant amounts of sediment are decanted or separated prior to extraction, and only the water portion analyzed, unless otherwise directed by the client.

Soil and Sediment Samples:

Soil and Sediment samples containing significant amounts of water are decanted prior to extraction, and only the solid portion analyzed, unless otherwise directed by the client.

Sampling and Preservation Notes:

Certain regulatory programs, such as National Pollutant Discharge Elimination System (NPDES), require that activities such as sample filtration (for dissolved metals, orthophosphate, hexavalent chromium, etc.) and testing of short hold analytes (pH, Dissolved Oxygen, etc.) be performed in the field (on-site) within a short time window. In addition, sample matrix spikes are required for some analyses, and sufficient volume must be provided, and billable site specific QC requested, if this is required. All regulatory permits should be reviewed to ensure that these requirements are being met.

Data users should be aware of which regulations pertain to the samples they submit for testing. If related sample collection activities are not approved for a particular regulatory program, results should be considered estimates. Apex Laboratories will qualify these analytes according to the most stringent requirements, however results for samples that are for non-regulatory purposes may be acceptable.

Samples that have been filtered and preserved at Apex Laboratories per client request are listed in the preparation section of the report with the date and time of filtration listed.

Apex Laboratories maintains detailed records on sample receipt, including client label verification, cooler temperature, sample preservation, hold time compliance and field filtration. Data is qualified as necessary, and the lack of qualification indicates compliance with required parameters.

Apex Laboratories, LLC

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6720 SW Macadam Ave. Suite 125	Project Number: **201114-01.05**	**Report ID:**
Portland, OR 97219	Project Manager: **Anthony Dalton-Atha**	**A1G0350 - 07 16 21 1537**

LABORATORY ACCREDITATION INFORMATION

ORELAP Certification ID: OR100062 (Primary Accreditation) -
EPA ID: OR01039

All methods and analytes reported from work performed at Apex Laboratories are included on Apex Laboratories' ORELAP Scope of Certification, with the exception of any analyte(s) listed below:

Apex Laboratories

Matrix	Analysis	TNI_ID	Analyte	TNI_ID	Accreditation
		All reported analytes are included in Apex Laboratories' current ORELAP scope.			

Secondary Accreditations

Apex Laboratories also maintains reciprocal accreditation with non-TNI states (Washington DOE), as well as other state specific accreditations not listed here.

Subcontract Laboratory Accreditations

Subcontracted data falls outside of Apex Laboratories' Scope of Accreditation.
Please see the Subcontract Laboratory report for full details, or contact your Project Manager for more information.

Field Testing Parameters

Results for Field Tested data are provded by the client or sampler, and fall outside of Apex Laboratories' Scope of Accreditation.

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A1G0350

Chain of Custody Record & Laboratory Analysis Request

ANCHOR QEA

Company: Anchor QEA
Date: 7/13/2021
Project Name: Alabama Power - Greene County
Project Number: 201114-01.05
Project Manager: Anthony Dalton-Atha adalton-atha@anchorqea.com
Phone Number: 503-924-6186
Shipment Method: Pick-up
Samplers: Modi Raduma &Paloma Spina

Test Parameters

Line	Field Sample ID	Collection Date	Time	Matrix	No. of Containers	As, Co	As, Li	As, Co, Li	As, Co, Fe, Mn	As, Li, Fe, Mn	As, Co, Li, Fe, Mn	Comments/Preservation
1	AP-SSE-F1-GC1	7/7/2021	10:40	Water	1	x						1M MgCl2 sol'n
2	AP-SSE-F1-GC2	7/7/2021	10:45	Water	1	x						
3	AP-SSE-F1-GC3	7/7/2021	10:50	Water	1		x					
4	AP-SSE-F1-GC4	7/7/2021	10:55	Water	1		x					
5	AP-SSE-F1-GC5	7/7/2021	11:00	Water	1	x						
6	MB-SSE-F1-GC6	7/7/2021	11:05	Water	1			x				
7	AP-SSE-F2-GC1	7/8/2021	10:40	Water	1				x			1M monosodium phosphate sol'n
8	AP-SSE-F2-GC2	7/8/2021	10:45	Water	1				x			
9	AP-SSE-F2-GC3	7/8/2021	10:50	Water	1					x		
10	AP-SSE-F2-GC4	7/8/2021	10:55	Water	1					x		
11	AP-SSE-F2-GC5	7/8/2021	11:00	Water	1				x			
12	MB-SSE-F2-GC6	7/8/2021	11:05	Water	1						x	

Comments: Samples may contain elevated Mg and Ca levels. Please analyze with minimal dilution to achieve best DLs. Samples have been preserved with nitric acid.

Relinquished By: Paloma Spina	Company: AnchorQEA	Received By: [signature]	Company: Apex Labs
Signature/Printed Name: [signature]	Date/Time:	Signature/Printed Name: Michael Kachnik	Date/Time: 7-13-21/1408
Relinquished By:	Company:	Received By:	Company:
Signature/Printed Name	Date/Time	Signature/Printed Name	Date/Time

Page 1 of 3

DRAFT REPORT

The results provided in this report are PRELIMINARY and are subject to change based on subsequent analysis, QC validation or final data review. Please use these results with the understanding that they may have not been finalized by the laboratory.

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

Anchor QEA, LLC
6720 SW Macadam Ave. Suite 125
Portland, OR 97219

Project: **Alabama Power-Greene County**
Project Number: **201114-01.05**
Project Manager: **Anthony Dalton-Atha**

Report ID:
A1G0350 - 07 16 21 1537

A1G0350

Chain of Custody Record & Laboratory Analysis Request

ANCHOR QEA

Company: Anchor QEA
Date: 7/13/2021
Project Name: Alabama Power - Greene County
Project Number: 201114-01.05
Project Manager: Anthony Dalton-Atha adalton-atha@anchorqea.com
Phone Number: 503-924-6186
Shipment Method: Pick-up
Samplers: Modi Raduma &Paloma Spina

Test Parameters

Line	Field Sample ID	Collection Date/Time		Matrix	No. of Containers	As, Co, Fe, Mn	As, Li, Fe, Mn	As, Co, Li, Fe, Mn	Comments/Preservation
1	AP-SSE-F3-GC1	7/9/2021	10:40	Water	1	x			0.1m hydroxylamine HCl
2	AP-SSE-F3-GC2	7/9/2021	10:45	Water	1	x			
3	AP-SSE-F3-GC3	7/9/2021	10:50	Water	1		x		
4	AP-SSE-F3-GC4	7/9/2021	10:55	Water	1		x		
5	AP-SSE-F3-GC5	7/9/2021	11:00	Water	1	x			
6	MB-SSE-F3-GC6	7/9/2021	11:05	Water	1			x	
7	AP-SSE-F4-GC1	7/12/2021	10:40	Water	1	x			Caution! Conc. Nitric acid.
8	AP-SSE-F4-GC2	7/12/2021	10:45	Water	1	x			Caution! Conc. Nitric acid.
9	AP-SSE-F4-GC3	7/12/2021	10:50	Water	1		x		Caution! Conc. Nitric acid.
10	AP-SSE-F4-GC4	7/12/2021	10:55	Water	1		x		Caution! Conc. Nitric acid.
11	AP-SSE-F4-GC5	7/12/2021	11:00	Water	1	x			Caution! Conc. Nitric acid.
12	MB-SSE-F4-GC6	7/12/2021	11:05	Water	1			x	Caution! Conc. Nitric acid.

Comments: Samples may contain elevated Mg and Ca levels. Please analyze with minimal dilution to achieve best DLs. Samples have been preserved with nitric acid.

Relinquished By: Paloma Spina Company: Anchor QEA
Signature/Printed Name Date/Time

Received By: Company: Apex Labs
Signature/Printed Name M. Rachnth Date/Time 7-13-21/1408

Relinquished By: Company:
Signature/Printed Name Date/Time

Received By: Company:
Signature/Printed Name Date/Time

Page 2 of 3

DRAFT REPORT

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Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

Anchor QEA, LLC	Project: **Alabama Power-Greene County**	
6720 SW Macadam Ave. Suite 125	Project Number: **201114-01.05**	**Report ID:**
Portland, OR 97219	Project Manager: **Anthony Dalton-Atha**	**A1G0350 - 07 16 21 1537**

A1G0350

Chain of Custody Record & Laboratory Analysis Request

ANCHOR QEA

Company: Anchor QEA
Date: 7/13/2021
Project Name: Alabama Power - Greene County
Project Number: 201114-01.05
Project Manager: Anthony Dalton-Atha adalton-atha@anchorqea.com
Phone Number: 503-924-6186
Shipment Method: Pick-up
Samplers: Modi Raduma &Paloma Spina

Line	Field Sample ID	Collection Date/Time		Matrix	No. of Containers	As, Co, Fe, Mn	As, Li, Fe, Mn	Comments/Preservation
1	AP-SSE-F5-GC1	7/13/2021	10:40	Soil	1	x		
2	AP-SSE-F5-GC2	7/13/2021	10:45	Soil	1	x		
3	AP-SSE-F5-GC3	7/13/2021	10:50	Soil	1		x	
4	AP-SSE-F5-GC4	7/13/2021	10:55	Soil	1		x	
5	AP-SSE-F5-GC5	7/13/2021	11:00	Soil	1	x		
6								
7								
8								
9								
10								
11								
12								

Test Parameters

Comments: Samples may contain elevated Mg and Ca levels. Please analyze with minimal dilution to achieve best DLs. Samples have been preserved with nitric acid.

Relinquished By: Paloma Spina Company: AQ
Signature/Printed Name: Paloma Spina Date/Time:

Received By: Company: Apex Labs
Signature/Printed Name: M. Kuchnik Date/Time: 7-13-21/1408

Relinquished By: Company:
Signature/Printed Name Date/Time

Received By: Company:
Signature/Printed Name Date/Time

Page 3 of 3

DRAFT REPORT

The results provided in this report are PRELIMINARY and are subject to change based on subsequent analysis, QC validation or final data review. Please use these results with the understanding that they may have not been finalized by the laboratory.

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

Anchor QEA, LLC	Project: **Alabama Power-Greene County**	
6720 SW Macadam Ave. Suite 125	Project Number: **201114-01.05**	**Report ID:**
Portland, OR 97219	Project Manager: **Anthony Dalton-Atha**	**A1G0350 - 07 16 21 1537**

APEX LABS COOLER RECEIPT FORM

Client: Anchor QEA Element WO#: A1 G0350

Project/Project #: Alabama Power - Greene County / 201114-01.05

Delivery Info:

Date/time received: 7-13-21 @ 1408 By: MK

Delivered by: Apex X Client ___ ESS ___ FedEx ___ UPS ___ Swift ___ Senvoy ___ SDS ___ Other ___

Cooler Inspection Date/time inspected: 7-13-21 @ 1500 By: MK

Chain of Custody included? Yes X No ___ Custody seals? Yes ___ No X

Signed/dated by client? Yes X No ___

Signed/dated by Apex? Yes X No ___

	Cooler #1	Cooler #2	Cooler #3	Cooler #4	Cooler #5	Cooler #6	Cooler #7
Temperature (°C)	5.7						
Received on ice? (Y/N)	Y						
Temp. blanks? (Y/N)	Y						
Ice type: (Gel/Real/Other)	Gel						
Condition:	good						

Cooler out of temp? (Y/N) Possible reason why: ___
Green dots applied to out of temperature samples? Yes/No
Out of temperature samples form initiated? Yes/No

Sample Inspection: Date/time inspected: 7/13/21 @ 16:30 By: KB

All samples intact? Yes X No ___ Comments: ___

Bottle labels/COCs agree? Yes X No ___ Comments: ___

COC/container discrepancies form initiated? Yes ___ No X

Containers/volumes received appropriate for analysis? Yes X No ___ Comments: ___

Do VOA vials have visible headspace? Yes ___ No ___ NA X

Comments ___

Water samples: pH checked: Yes X No ___ NA ___ pH appropriate? Yes X No ___ NA ___

Comments: ___

Additional information: ___

Labeled by: KB Witness: MK Cooler Inspected by: KB

May 07, 2021

Service Request No:K2104839

Masa Kanematsu
Anchor QEA, LLC
6720 SW Macadam Avenue
Suite 125
Portland, OR 97219

Laboratory Results for: CCR-GC

Dear Masa,

Enclosed are the results of the sample(s) submitted to our laboratory May 04, 2021
For your reference, these analyses have been assigned our service request number **K2104839.**

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please contact me if you have any questions. My extension is 3376. You may also contact me via email at Mark.Harris@alsglobal.com.

Respectfully submitted,

ALS Group USA, Corp. dba ALS Environmental

Mark Harris
Project Manager

ADDRESS 1317 S. 13th Avenue, Kelso, WA 98626
PHONE +1 360 577 7222 | FAX +1 360 636 1068
ALS Group USA, Corp.
dba ALS Environmental

Narrative Documents

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360) 577-7222 Fax (360) 425-9096
www.alsglobal.com

Client: Anchor QEA, LLC **Service Request:** K2104839
Project: CCR-GC **Date Received:** 05/04/2021
Sample Matrix: Water

CASE NARRATIVE

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples for the Tier II level requested by the client.

Sample Receipt:

Two water samples were received for analysis at ALS Environmental on 05/04/2021. Any discrepancies upon initial sample inspection are annotated on the sample receipt and preservation form included within this report. The samples were stored at minimum in accordance with the analytical method requirements.

Metals:

No significant anomalies were noted with this analysis.

Approved by ____________________ Date 05/07/2021

SAMPLE DETECTION SUMMARY

CLIENT ID: GC-MW-1-20210503	Lab ID: K2104839-001					
Analyte	**Results**	**Flag**	**MDL**	**MRL**	**Units**	**Method**
Cobalt, Dissolved	290		0.7	2.1	ug/L	6010C

CLIENT ID: GC-MW-17-20210503	Lab ID: K2104839-002					
Analyte	**Results**	**Flag**	**MDL**	**MRL**	**Units**	**Method**
Arsenic, Dissolved	348		5	21	ug/L	6010C
Lithium, Dissolved	677		6	21	ug/L	6010C

Sample Receipt Information

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360) 577-7222 Fax (360) 425-9096
www.alsglobal.com

SAMPLE CROSS-REFERENCE

SAMPLE #	CLIENT SAMPLE ID	DATE	TIME
K2104839-001	GC-MW-1-20210503	5/3/2021	1230
K2104839-002	GC-MW-17-20210503	5/3/2021	1300

K2104839

Chain of Custody Record & Laboratory Analysis Request

Laboratory Number: 503-972-5019	
Date:	5/3/2021
Project Name:	CCR-GC
Project Number:	201114-01.05 Task 02
Project Manager:	Masa Kanematsu
Phone Number:	503-972-5001 (Masa Kanematsu)
Shipment Method:	Fedex Overnight

ANCHOR QEA
Jessica Goin
6720 SW Macadam Ave
Suite 125
Portland OR 97219

Line	Field Sample ID	Collection Date	Collection Time	Matrix	No. of Containers	Arsenic, Cobalt (diss.) 3d TAT	Arsenic, Lithium(diss.) 3d TAT	Dissolved metals	Total Metals (Al, Fe, Mn)	Anions	Ortho-Phosphate	Alkalinity	Total Organic Carbon	Ammonia as N								Comments/Preservation
1	GC-MW-1-20210503	5/3/3021	12:30	Water	6	X		X	X	X	X	X	X	X								HNO_3 preserved, filtered
2	GC-MW-17-20210503	5/3/3021	13:00	Water	6		X	X	X	X	X	X	X	X								HNO_3 preserved, filtered
3																						
4																						
5																						
6																						
7																						
8																						
9																						
10																						
11																						
12																						
13																						
14																						
15																						

Notes: **Please analyze all analytes with Standard TAT on this page otherwise noted.** For specific dissolved metals, please analyze with 3 day TAT if possible.
Dissolved metals: Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Fe, Pb, Li, Mg, Mn, Mo, Ni, K, Se, Si, Ag, Na, Tl, Zn), Anions (Cl, F, nitrate, nitrite, Sulfate)

Relinquished by:	Company:
Masa Kanematsu	Anchor QEA
Signature/Print Name:	Date/Time:
[signature]	5/3/2020 16:40

Received by:	Company:
[signature] Swolf	AS 5/4/21 0950
Signature/Print Name:	Date/Time:

Relinquished by:	Company:
Signature/Print Name:	Date/Time:

Received by:	Company:
Signature/Print Name:	Date/Time:

Distribution: A copy will be made for the laboratory and client. The Project file will retain the original.

Page 1 of 1

PM MH

Cooler Receipt and Preservation Form

Client Anchor QEA Service Request K21 04839

Received: 5/4/21 Opened: 5/4/21 By: [signature] Unloaded: 5/4/21 By: [signature]

1. Samples were received via? *USPS* *Fed Ex* *UPS* *DHL* *PDX* *Courier* *Hand Delivered*
2. Samples were received in: (circle) *Cooler* *Box* *Envelope* *Other* ______ *NA*
3. Were custody seals on coolers? NA Y N If yes, how many and where? ______
   If present, were custody seals intact? Y N If present, were they signed and dated? Y N
4. Was a Temperature Blank present in cooler? NA Y N If yes, notate the temperature in the appropriate column below:
   If no, take the temperature of a representative sample bottle contained within the cooler; notate in the column "Sample Temp":
5. Were samples received within the method specified temperature ranges? NA Y N
   If no, were they received on ice and same day as collected? If not, notate the cooler # below and notify the PM. NA Y N

If applicable, tissue samples were received: *Frozen* *Partially Thawed* *Thawed*

Temp Blank	Sample Temp	IR Gun	Cooler #/COC ID NA	Out of temp indicate with "X"	PM Notified If out of temp	Tracking Number NA	Filed
5.4	—	IR01				7736 1943 0275	

6. Packing material: *Inserts* *Baggies* *Bubble Wrap* *Gel Packs* *Wet Ice* *Dry Ice* *Sleeves* ______
7. Were custody papers properly filled out (ink, signed, etc.)? NA Y N
8. Were samples received in good condition (unbroken) NA Y N
9. Were all sample labels complete (ie, analysis, preservation, etc.)? NA Y N
10. Did all sample labels and tags agree with custody papers? NA Y N
11. Were appropriate bottles/containers and volumes received for the tests indicated? NA Y N
12. Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? *Indicate in the table below* NA Y N
13. Were VOA vials received without headspace? *Indicate in the table below.* NA Y N
14. Was C12/Res negative? NA Y N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count Bottle Type	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, Resolutions: RUSH

Miscellaneous Forms

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360) 577-7222 Fax (360) 425-9096
www.alsglobal.com

Inorganic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
E	The result is an estimate amount because the value exceeded the instrument calibration range.
J	The result is an estimated value.
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
i	The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
X	See case narrative.
Q	See case narrative. One or more quality control criteria was outside the limits.
H	The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

Metals Data Qualifiers

#	The control limit criteria is not applicable. See case narrative.
J	The result is an estimated value.
E	The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
M	The duplicate injection precision was not met.
N	The Matrix Spike sample recovery is not within control limits. See case narrative.
S	The reported value was determined by the Method of Standard Additions (MSA).
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
W	The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
i	The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
X	See case narrative.
+	The correlation coefficient for the MSA is less than 0.995.
Q	See case narrative. One or more quality control criteria was outside the limits.

Organic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
A	A tentatively identified compound, a suspected aldol-condensation product.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
C	The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
D	The reported result is from a dilution.
E	The result is an estimated value.
J	The result is an estimated value.
N	The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
P	The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
i	The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
X	See case narrative.
Q	See case narrative. One or more quality control criteria was outside the limits.

Additional Petroleum Hydrocarbon Specific Qualifiers

F	The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
L	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
H	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
O	The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
Y	The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
Z	The chromatographic fingerprint does not resemble a petroleum product.

ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso
State Certifications, Accreditations, and Licenses

Agency	Web Site	Number
Alaska DEH	http://dec.alaska.gov/eh/lab/cs/csapproval.htm	UST-040
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0339
Arkansas - DEQ	http://www.adeq.state.ar.us/techsvs/labcert.htm	88-0637
California DHS (ELAP)	http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx	2795
DOD ELAP	http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm	L16-58-R4
Florida DOH	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E87412
Hawaii DOH	http://health.hawaii.gov/	-
ISO 17025	http://www.pjlabs.com/	L16-57
Louisiana DEQ	http://www.deq.louisiana.gov/page/la-lab-accreditation	03016
Maine DHS	http://www.maine.gov/dhhs/	WA01276
Minnesota DOH	http://www.health.state.mn.us/accreditation	053-999-457
Nevada DEP	http://ndep.nv.gov/bsdw/labservice.htm	WA01276
New Jersey DEP	http://www.nj.gov/dep/enforcement/oqa.html	WA005
New York - DOH	https://www.wadsworth.org/regulatory/elap	12060
North Carolina DEQ	https://deq.nc.gov/about/divisions/water-resources/water-resources-data/water-sciences-home-page/laboratory-certification-branch/non-field-lab-certification	605
Oklahoma DEQ	http://www.deq.state.ok.us/CSDnew/labcert.htm	9801
Oregon – DEQ (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	WA100010
South Carolina DHEC	http://www.scdhec.gov/environment/EnvironmentalLabCertification/	61002
Texas CEQ	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	T104704427
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C544
Wyoming (EPA Region 8)	https://www.epa.gov/region8-waterops/epa-region-8-certified-drinking-water-	-
Kelso Laboratory Website	www.alsglobal.com	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at www.ALSGlobal.com or at the accreditation bodies web site.

Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/anlayte is offered by that state.

Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

ALS Group USA, Corp.
dba ALS Environmental

Analyst Summary report

Client:	Anchor QEA, LLC	**Service Request:**	K2104839
Project:	CCR-GC/201114-01.05 Task 02		

Sample Name:	GC-MW-1-20210503	**Date Collected:**	05/3/21
Lab Code:	K2104839-001	**Date Received:**	05/4/21
Sample Matrix:	Water		

Analysis Method	Extracted/Digested By	Analyzed By
6010C	ABOYER	RMOORE

Sample Name:	GC-MW-17-20210503	**Date Collected:**	05/3/21
Lab Code:	K2104839-002	**Date Received:**	05/4/21
Sample Matrix:	Water		

Analysis Method	Extracted/Digested By	Analyzed By
6010C	ABOYER	RMOORE

Sample Results

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360) 577-7222 Fax (360) 425-9096
www.alsglobal.com

Metals

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360) 577-7222 Fax (360) 425-9096
www.alsglobal.com

Client:	Anchor QEA, LLC		**Service Request:**	K2104839
Project:	CCR-GC/201114-01.05 Task 02		**Date Collected:**	05/03/21 12:30
Sample Matrix:	Water		**Date Received:**	05/04/21 09:50
Sample Name:	GC-MW-1-20210503		**Basis:**	NA
Lab Code:	K2104839-001			

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	6010C	ND U	ug/L	21	5	1	05/06/21 14:28	05/05/21	
Cobalt	6010C	**290**	ug/L	2.1	0.7	1	05/06/21 14:28	05/05/21	

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client:	Anchor QEA, LLC	**Service Request:**	K2104839
Project:	CCR-GC/201114-01.05 Task 02	**Date Collected:**	05/03/21 13:00
Sample Matrix:	Water	**Date Received:**	05/04/21 09:50
Sample Name:	GC-MW-17-20210503	**Basis:**	NA
Lab Code:	K2104839-002		

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	6010C	**348**	ug/L	21	5	1	05/06/21 14:30	05/05/21	
Lithium	6010C	**677**	ug/L	21	6	1	05/06/21 14:30	05/05/21	

QC Summary Forms

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Metals

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Client:	Anchor QEA, LLC		**Service Request:**	K2104839
Project:	CCR-GC/201114-01.05 Task 02		**Date Collected:**	NA
Sample Matrix:	Water		**Date Received:**	NA
Sample Name:	Method Blank		**Basis:**	NA
Lab Code:	KQ2107366-02			

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	6010C	ND U	ug/L	21	5	1	05/06/21 13:47	05/05/21	
Cobalt	6010C	ND U	ug/L	2.1	0.7	1	05/06/21 13:47	05/05/21	
Lithium	6010C	ND U	ug/L	21	6	1	05/06/21 13:47	05/05/21	

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client:	Anchor QEA, LLC	**Service Request:**	K2104839
Project:	CCR-GC/201114-01.05 Task 02	**Date Analyzed:**	05/06/21
Sample Matrix:	Water		

Lab Control Sample Summary
Dissolved Metals

Units:ug/L
Basis:NA

Lab Control Sample
KQ2107366-01

Analyte Name	Analytical Method	Result	Spike Amount	% Rec	% Rec Limits
Arsenic	6010C	2390	2500	96	80-120
Cobalt	6010C	1220	1250	98	80-120
Lithium	6010C	9310	10000	93	80-120

June 11, 2021 Service Request No:K2104840

Masa Kanematsu
Anchor QEA, LLC
6720 SW Macadam Avenue
Suite 125
Portland, OR 97219

Laboratory Results for: CCR-GC

Dear Masa,

Enclosed are the results of the sample(s) submitted to our laboratory May 04, 2021
For your reference, these analyses have been assigned our service request number **K2104840.**

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please contact me if you have any questions. My extension is 3376. You may also contact me via email at Mark.Harris@alsglobal.com.

Respectfully submitted,

ALS Group USA, Corp. dba ALS Environmental

Mark Harris
Project Manager

ADDRESS 1317 S. 13th Avenue, Kelso, WA 98626
PHONE +1 360 577 7222 | FAX +1 360 636 1068
ALS Group USA, Corp.
dba ALS Environmental

Narrative Documents

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360) 577-7222 Fax (360) 425-9096
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ALS Environmental

Client: Anchor QEA, LLC
Project: CCR-GC
Sample Matrix: Water

Service Request: K2104840
Date Received: 05/04/2021

CASE NARRATIVE

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples for the Tier II level requested by the client.

Sample Receipt:

Two water samples were received for analysis at ALS Environmental on 05/04/2021. Any discrepancies upon initial sample inspection are annotated on the sample receipt and preservation form included within this report. The samples were stored at minimum in accordance with the analytical method requirements.

Metals:

No significant anomalies were noted with this analysis.

General Chemistry:

Method 300.0, 05/05/2021: The duplicate matrix spike recovery of Sulfate for sample GC-MW-17-20210503 was outside control criteria. Recovery in the Laboratory Control Sample (LCS) was acceptable, which indicated the analytical batch was in control. The matrix spike outlier suggested a potential low bias in this matrix. No further corrective action was appropriate.

Approved by ______________________ Date 06/11/2021

ALS Environmental

SAMPLE DETECTION SUMMARY

CLIENT ID: GC-MW-1-20210503			Lab ID: K2104840-001			
Analyte	**Results**	**Flag**	**MDL**	**MRL**	**Units**	**Method**
Alkalinity as CaCO3, Total	7	J	3	15	mg/L	SM 2320 B
Ammonia as Nitrogen	1.90		0.020	0.050	mg/L	350.1
Carbon, Total Organic	2.40		0.07	0.50	mg/L	SM 5310 C
Chloride	24.3		0.04	0.50	mg/L	300.0
Sulfate	1240		0.1	1.0	mg/L	300.0
Aluminum, Dissolved	1.9	J	0.5	4.0	ug/L	200.8
Arsenic, Dissolved	4.19		0.09	0.50	ug/L	200.8
Barium, Dissolved	22.4		0.020	0.050	ug/L	200.8
Boron, Dissolved	156		5	20	ug/L	200.8
Cadmium, Dissolved	0.035		0.008	0.020	ug/L	200.8
Calcium, Dissolved	112000		3	21	ug/L	6010C
Chromium, Dissolved	0.13	J	0.03	0.20	ug/L	200.8
Cobalt, Dissolved	284		0.009	0.020	ug/L	200.8
Iron, Dissolved	214000		3	20	ug/L	200.8
Lithium, Dissolved	2.6		1.0	1.0	ug/L	200.8
Magnesium, Dissolved	43600		0.4	5.3	ug/L	6010C
Manganese, Dissolved	14100		0.4	2.0	ug/L	200.8
Molybdenum, Dissolved	0.04	J	0.03	0.10	ug/L	200.8
Nickel, Dissolved	58.9		0.04	0.20	ug/L	200.8
Potassium, Dissolved	3570		60	420	ug/L	6010C
Silicon, Dissolved	6350		30	210	ug/L	6010C
Sodium, Dissolved	64000		30	210	ug/L	6010C
Thallium, Dissolved	0.127		0.009	0.020	ug/L	200.8
Zinc, Dissolved	58.1		0.5	2.0	ug/L	200.8
Aluminum	7.6		0.5	4.0	ug/L	200.8
Iron	213000		3	20	ug/L	200.8
Manganese	14400		0.4	2.0	ug/L	200.8

CLIENT ID: GC-MW-17-20210503			Lab ID: K2104840-002			
Analyte	**Results**	**Flag**	**MDL**	**MRL**	**Units**	**Method**
Alkalinity as CaCO3, Total	446		3	15	mg/L	SM 2320 B
Ammonia as Nitrogen	0.388		0.020	0.050	mg/L	350.1
Carbon, Total Organic	1.60		0.07	0.50	mg/L	SM 5310 C
Fluoride	0.94		0.01	0.20	mg/L	300.0
Nitrate as Nitrogen	0.04	J	0.02	0.10	mg/L	300.0
Sulfate	83.7		0.4	4.0	mg/L	300.0
Aluminum, Dissolved	1.3	J	0.5	4.0	ug/L	200.8
Arsenic, Dissolved	343		0.09	0.50	ug/L	200.8
Barium, Dissolved	299		0.020	0.050	ug/L	200.8
Boron, Dissolved	2350		10	40	ug/L	200.8
Calcium, Dissolved	117000		3	21	ug/L	6010C
Chromium, Dissolved	0.06	J	0.03	0.20	ug/L	200.8

SAMPLE DETECTION SUMMARY

CLIENT ID: GC-MW-17-20210503			Lab ID: K2104840-002			
Analyte	**Results**	**Flag**	**MDL**	**MRL**	**Units**	**Method**
Cobalt, Dissolved	12.6		0.009	0.020	ug/L	200.8
Iron, Dissolved	19300		6	40	ug/L	200.8
Lithium, Dissolved	685		2.0	2.0	ug/L	200.8
Magnesium, Dissolved	30900		0.4	5.3	ug/L	6010C
Manganese, Dissolved	2280		0.8	4.0	ug/L	200.8
Molybdenum, Dissolved	65.1		0.03	0.10	ug/L	200.8
Nickel, Dissolved	7.46		0.04	0.20	ug/L	200.8
Potassium, Dissolved	13800		60	420	ug/L	6010C
Silicon, Dissolved	9240		30	210	ug/L	6010C
Sodium, Dissolved	58100		30	210	ug/L	6010C
Zinc, Dissolved	2.7		0.5	2.0	ug/L	200.8
Aluminum	1.2	J	0.5	4.0	ug/L	200.8
Iron	25100		6	40	ug/L	200.8
Manganese	2350		0.8	4.0	ug/L	200.8

Sample Receipt Information

ALS Environmental—Kelso Laboratory
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Phone (360) 577-7222 Fax (360) 425-9096
www.alsglobal.com

Client: Anchor QEA, LLC **Service Request:** K2104840
Project: CCR-GC/201114-01.05 Task 02

SAMPLE CROSS-REFERENCE

SAMPLE #	CLIENT SAMPLE ID	DATE	TIME
K2104840-001	GC-MW-1-20210503	5/3/2021	1230
K2104840-002	GC-MW-17-20210503	5/3/2021	1300

K2104840

Chain of Custody Record & Laboratory Analysis Request

Laboratory Number:	503-972-5019
Date:	5/3/2021
Project Name:	CCR-GC
Project Number:	201114-01.05 Task 02
Project Manager:	Masa Kanematsu
Phone Number:	503-972-5001 (Masa Kanematsu)
Shipment Method:	Fedex Overnight

ANCHOR QEA
Jessica Goin
6720 SW Macadam Ave
Suite 125
Portland OR 97219

Line	Field Sample ID	Collection Date	Collection Time	Matrix	No. of Containers	Arsenic, Cobalt (diss.) 3d TAT	Arsenic, Lithium(diss.) 3d TAT	Dissolved metals	Total Metals (Al, Fe, Mn)	Anions	Ortho-Phosphate	Alkalinity	Total Organic Carbon	Ammonia as N								Comments/Preservation
1	GC-MW-1-20210503	5/3/3021	12:30	Water	6	X		X	X	X	X	X	X	X								HNO_3 preserved, filtered
2	GC-MW-17-20210503	5/3/3021	13:00	Water	6		X	X	X	X	X	X	X	X								HNO_3 preserved, filtered
3																						
4																						
5																						
6																						
7																						
8																						
9																						
10																						
11																						
12																						
13																						
14																						
15																						

Notes: **Please analyze all analytes with Standard TAT on this page otherwise noted.** For specific dissolved metals, please analyze with 3 day TAT if possible.
Dissolved metals: Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Fe, Pb, Li, Mg, Mn, Mo, Ni, K, Se, Si, Ag, Na, Tl, Zn), Anions (Cl, F, nitrate, nitrite, Sulfate)

Relinquished by:	Company:
Masa Kanematsu	Anchor QEA
Signature/Print Name:	Date/Time:
	5/3/2020 16:40

Received by:	Company:
Swolf	ALS 5/4/21 0950
Signature/Print Name:	Date/Time:

Relinquished by:	Company:
Signature/Print Name:	Date/Time:

Received by:	Company:
Signature/Print Name:	Date/Time:

Distribution: A copy will be made for the laboratory and client. The Project file will retain the original.

Page 1 of 1

PM MH

Cooler Receipt and Preservation Form

Client Anchor QEA Service Request K21 04840

Received: 5/4/21 Opened: 5/4/21 By: [signature] Unloaded: 5/4/21 By: [signature]

1. Samples were received via? USPS **Fed Ex** UPS DHL PDX Courier Hand Delivered
2. Samples were received in: (circle) **Cooler** Box Envelope Other ______ NA
3. Were custody seals on coolers? NA Y **N** If yes, how many and where? ______
   If present, were custody seals intact? Y N If present, were they signed and dated? Y N
4. Was a Temperature Blank present in cooler? NA **Y** N If yes, notate the temperature in the appropriate column below:
   If no, take the temperature of a representative sample bottle contained within the cooler; notate in the column "Sample Temp":
5. Were samples received within the method specified temperature ranges? NA **Y** N
   If no, were they received on ice and same day as collected? If not, notate the cooler # below and notify the PM. **NA** Y N

If applicable, tissue samples were received: Frozen Partially Thawed Thawed

Temp Blank	Sample Temp	IR Gun	Cooler #/COC ID NA	Out of temp indicate with "X"	PM Notified If out of temp	Tracking Number NA	Filed
5.4	—	IR01				7736 1943 0275	

6. Packing material: Inserts **Baggies** **Bubble Wrap** Gel Packs **Wet Ice** Dry Ice Sleeves ______
7. Were custody papers properly filled out (ink, signed, etc.)? NA **Y** N
8. Were samples received in good condition (unbroken) NA **Y** N
9. Were all sample labels complete (ie, analysis, preservation, etc.)? NA **Y** N
10. Did all sample labels and tags agree with custody papers? NA **Y** N
11. Were appropriate bottles/containers and volumes received for the tests indicated? NA **Y** N
12. Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? *Indicate in the table below* NA ~~Y~~ CG 5/4 **N**
13. Were VOA vials received without headspace? *Indicate in the table below.* **NA** Y N
14. Was C12/Res negative? **NA** Y N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count Bottle Type	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time
All	1-250mL P			X	H_2SO_4	0.5ml	19-GEN-07-19A	CG	1345

Notes, Discrepancies, Resolutions:

RUSH

Miscellaneous Forms

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Inorganic Data Qualifiers

- * The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- E The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated value.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
  DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.
- H The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

Metals Data Qualifiers

- # The control limit criteria is not applicable. See case narrative.
- J The result is an estimated value.
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- M The duplicate injection precision was not met.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- S The reported value was determined by the Method of Standard Additions (MSA).
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
  DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- + The correlation coefficient for the MSA is less than 0.995.
- Q See case narrative. One or more quality control criteria was outside the limits.

Organic Data Qualifiers

- * The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- A A tentatively identified compound, a suspected aldol-condensation product.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- C The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
- D The reported result is from a dilution.
- E The result is an estimated value.
- J The result is an estimated value.
- N The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
- P The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
  DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.

Additional Petroleum Hydrocarbon Specific Qualifiers

- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- Y The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
- Z The chromatographic fingerprint does not resemble a petroleum product.

ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso
State Certifications, Accreditations, and Licenses

Agency	Web Site	Number
Alaska DEH	http://dec.alaska.gov/eh/lab/cs/csapproval.htm	UST-040
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0339
Arkansas - DEQ	http://www.adeq.state.ar.us/techsvs/labcert.htm	88-0637
California DHS (ELAP)	http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx	2795
DOD ELAP	http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm	L16-58-R4
Florida DOH	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E87412
Hawaii DOH	http://health.hawaii.gov/	-
ISO 17025	http://www.pjlabs.com/	L16-57
Louisiana DEQ	http://www.deq.louisiana.gov/page/la-lab-accreditation	03016
Maine DHS	http://www.maine.gov/dhhs/	WA01276
Minnesota DOH	http://www.health.state.mn.us/accreditation	053-999-457
Nevada DEP	http://ndep.nv.gov/bsdw/labservice.htm	WA01276
New Jersey DEP	http://www.nj.gov/dep/enforcement/oqa.html	WA005
New York - DOH	https://www.wadsworth.org/regulatory/elap	12060
North Carolina DEQ	https://deq.nc.gov/about/divisions/water-resources/water-resources-data/water-sciences-home-page/laboratory-certification-branch/non-field-lab-certification	605
Oklahoma DEQ	http://www.deq.state.ok.us/CSDnew/labcert.htm	9801
Oregon – DEQ (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	WA100010
South Carolina DHEC	http://www.scdhec.gov/environment/EnvironmentalLabCertification/	61002
Texas CEQ	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	T104704427
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C544
Wyoming (EPA Region 8)	https://www.epa.gov/region8-waterops/epa-region-8-certified-drinking-water-	-
Kelso Laboratory Website	www.alsglobal.com	NA

Analyses were performed according to our laboratory’s NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at www.ALSGlobal.com or at the accreditation bodies web site.
Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/anlayte is offered by that state.

Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

Analyst Summary report

Client: Anchor QEA, LLC **Service Request:** K2104840
Project: CCR-GC/201114-01.05 Task 02

Sample Name: GC-MW-1-20210503 **Date Collected:** 05/3/21
Lab Code: K2104840-001 **Date Received:** 05/4/21
Sample Matrix: Water

Analysis Method	Extracted/Digested By	Analyzed By
200.8	ABOYER	RMOORE
300.0		KABROWN
350.1	ESCHLOSS	ESCHLOSS
6010C	ABOYER	RMOORE
SM 2320 B		GOLSON
SM 4500-P E		BNETLING
SM 5310 C		MSPECHT

Sample Name: GC-MW-1-20210503 **Date Collected:** 05/3/21
Lab Code: K2104840-001.R01 **Date Received:** 05/4/21
Sample Matrix: Water

Analysis Method	Extracted/Digested By	Analyzed By
300.0		KABROWN

Sample Name: GC-MW-17-20210503 **Date Collected:** 05/3/21
Lab Code: K2104840-002 **Date Received:** 05/4/21
Sample Matrix: Water

Analysis Method	Extracted/Digested By	Analyzed By
200.8	ABOYER	RMOORE
300.0		KABROWN
350.1	ESCHLOSS	ESCHLOSS
6010C	ABOYER	RMOORE
SM 2320 B		GOLSON
SM 4500-P E		BNETLING
SM 5310 C		MSPECHT

ALS Group USA, Corp.
dba ALS Environmental

Analyst Summary report

Client:	Anchor QEA, LLC	**Service Request:**	K2104840
Project:	CCR-GC/201114-01.05 Task 02		

Sample Name:	GC-MW-17-20210503	**Date Collected:**	05/3/21
Lab Code:	K2104840-002.R01	**Date Received:**	05/4/21
Sample Matrix:	Water		

Analysis Method	Extracted/Digested By	Analyzed By
300.0		KABROWN

Printed 6/11/2021 5:13:09 PM

Superset Reference:21-0000588570 rev 00

Sample Results

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ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client:	Anchor QEA, LLC	**Service Request:**	K2104840
Project:	CCR-GC/201114-01.05 Task 02	**Date Collected:**	05/03/21 12:30
Sample Matrix:	Water	**Date Received:**	05/04/21 09:50
Sample Name:	GC-MW-1-20210503	**Basis:**	NA
Lab Code:	K2104840-001		

Dissolved Metals

Analyte Name	Analysis Method	Result		Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Aluminum	200.8	**1.9**	**J**	ug/L	4.0	0.5	1	06/10/21 14:48	05/28/21	
Antimony	200.8	ND	U	ug/L	0.050	0.020	1	06/10/21 14:48	05/28/21	
Arsenic	200.8	**4.19**		ug/L	0.50	0.09	1	06/10/21 14:48	05/28/21	
Barium	200.8	**22.4**		ug/L	0.050	0.020	1	06/10/21 14:48	05/28/21	
Beryllium	200.8	ND	U	ug/L	0.20	0.05	10	06/10/21 12:44	05/28/21	
Boron	200.8	**156**		ug/L	20	5	10	06/10/21 12:44	05/28/21	
Cadmium	200.8	**0.035**		ug/L	0.020	0.008	1	06/10/21 14:48	05/28/21	
Calcium	6010C	**112000**		ug/L	21	3	1	05/25/21 18:26	05/07/21	
Chromium	200.8	**0.13**	**J**	ug/L	0.20	0.03	1	06/10/21 14:48	05/28/21	
Cobalt	200.8	**284**		ug/L	0.020	0.009	1	06/10/21 14:48	05/28/21	
Iron	200.8	**214000**		ug/L	20	3	10	06/10/21 12:44	05/28/21	
Lead	200.8	ND	U	ug/L	0.020	0.006	1	06/10/21 14:48	05/28/21	
Lithium	200.8	**2.6**		ug/L	1.0	1.0	10	06/10/21 12:44	05/28/21	
Magnesium	6010C	**43600**		ug/L	5.3	0.4	1	05/25/21 18:26	05/07/21	
Manganese	200.8	**14100**		ug/L	2.0	0.4	10	06/10/21 12:44	05/28/21	
Molybdenum	200.8	**0.04**	**J**	ug/L	0.10	0.03	1	06/10/21 14:48	05/28/21	
Nickel	200.8	**58.9**		ug/L	0.20	0.04	1	06/10/21 14:48	05/28/21	
Potassium	6010C	**3570**		ug/L	420	60	1	05/25/21 18:26	05/07/21	
Selenium	200.8	ND	U	ug/L	1.0	0.2	1	06/10/21 14:48	05/28/21	
Silicon	6010C	**6350**		ug/L	210	30	1	05/25/21 18:26	05/07/21	
Silver	200.8	ND	U	ug/L	0.020	0.009	1	06/10/21 14:48	05/28/21	
Sodium	6010C	**64000**		ug/L	210	30	1	05/25/21 18:26	05/07/21	
Thallium	200.8	**0.127**		ug/L	0.020	0.009	1	06/10/21 14:48	05/28/21	
Zinc	200.8	**58.1**		ug/L	2.0	0.5	1	06/10/21 14:48	05/28/21	

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Analytical Report

Client:	Anchor QEA, LLC	**Service Request:**	K2104840
Project:	CCR-GC/201114-01.05 Task 02	**Date Collected:**	05/03/21 12:30
Sample Matrix:	Water	**Date Received:**	05/04/21 09:50
Sample Name:	GC-MW-1-20210503	**Basis:**	NA
Lab Code:	K2104840-001		

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Aluminum	200.8	**7.6**	ug/L	4.0	0.5	1	06/10/21 14:36	05/28/21	
Iron	200.8	**213000**	ug/L	20	3	10	06/10/21 12:34	05/28/21	
Manganese	200.8	**14400**	ug/L	2.0	0.4	10	06/10/21 12:34	05/28/21	

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Superset Reference:21-0000588570 rev 00

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Analytical Report

Client:	Anchor QEA, LLC	**Service Request:**	K2104840
Project:	CCR-GC/201114-01.05 Task 02	**Date Collected:**	05/03/21 13:00
Sample Matrix:	Water	**Date Received:**	05/04/21 09:50
Sample Name:	GC-MW-17-20210503	**Basis:**	NA
Lab Code:	K2104840-002		

Dissolved Metals

Analyte Name	Analysis Method	Result		Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Aluminum	200.8	**1.3**	**J**	ug/L	4.0	0.5	1	06/10/21 14:50	05/28/21	
Antimony	200.8	ND	U	ug/L	0.050	0.020	1	06/10/21 14:50	05/28/21	
Arsenic	200.8	**343**		ug/L	0.50	0.09	1	06/10/21 14:50	05/28/21	
Barium	200.8	**299**		ug/L	0.050	0.020	1	06/10/21 14:50	05/28/21	
Beryllium	200.8	ND	U	ug/L	0.40	0.10	20	06/10/21 12:46	05/28/21	
Boron	200.8	**2350**		ug/L	40	10	20	06/10/21 12:46	05/28/21	
Cadmium	200.8	ND	U	ug/L	0.020	0.008	1	06/10/21 14:50	05/28/21	
Calcium	6010C	**117000**		ug/L	21	3	1	05/25/21 18:29	05/07/21	
Chromium	200.8	**0.06**	**J**	ug/L	0.20	0.03	1	06/10/21 14:50	05/28/21	
Cobalt	200.8	**12.6**		ug/L	0.020	0.009	1	06/10/21 14:50	05/28/21	
Iron	200.8	**19300**		ug/L	40	6	20	06/10/21 12:46	05/28/21	
Lead	200.8	ND	U	ug/L	0.020	0.006	1	06/10/21 14:50	05/28/21	
Lithium	200.8	**685**		ug/L	2.0	2.0	20	06/10/21 12:46	05/28/21	
Magnesium	6010C	**30900**		ug/L	5.3	0.4	1	05/25/21 18:29	05/07/21	
Manganese	200.8	**2280**		ug/L	4.0	0.8	20	06/10/21 12:46	05/28/21	
Molybdenum	200.8	**65.1**		ug/L	0.10	0.03	1	06/10/21 14:50	05/28/21	
Nickel	200.8	**7.46**		ug/L	0.20	0.04	1	06/10/21 14:50	05/28/21	
Potassium	6010C	**13800**		ug/L	420	60	1	05/25/21 18:29	05/07/21	
Selenium	200.8	ND	U	ug/L	1.0	0.2	1	06/10/21 14:50	05/28/21	
Silicon	6010C	**9240**		ug/L	210	30	1	05/25/21 18:29	05/07/21	
Silver	200.8	ND	U	ug/L	0.020	0.009	1	06/10/21 14:50	05/28/21	
Sodium	6010C	**58100**		ug/L	210	30	1	05/25/21 18:29	05/07/21	
Thallium	200.8	ND	U	ug/L	0.020	0.009	1	06/10/21 14:50	05/28/21	
Zinc	200.8	**2.7**		ug/L	2.0	0.5	1	06/10/21 14:50	05/28/21	

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Analytical Report

Client:	Anchor QEA, LLC	**Service Request:**	K2104840
Project:	CCR-GC/201114-01.05 Task 02	**Date Collected:**	05/03/21 13:00
Sample Matrix:	Water	**Date Received:**	05/04/21 09:50
Sample Name:	GC-MW-17-20210503	**Basis:**	NA
Lab Code:	K2104840-002		

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Aluminum	200.8	**1.2 J**	ug/L	4.0	0.5	1	06/10/21 14:45	05/28/21	
Iron	200.8	**25100**	ug/L	40	6	20	06/10/21 12:41	05/28/21	
Manganese	200.8	**2350**	ug/L	4.0	0.8	20	06/10/21 12:41	05/28/21	

General Chemistry

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Analytical Report

Client:	Anchor QEA, LLC		**Service Request:**	K2104840
Project:	CCR-GC/201114-01.05 Task 02		**Date Collected:**	05/03/21 12:30
Sample Matrix:	Water		**Date Received:**	05/04/21 09:50
Sample Name:	GC-MW-1-20210503		**Basis:**	NA
Lab Code:	K2104840-001			

General Chemistry Parameters

Analyte Name	Analysis Method	Result		Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Alkalinity as CaCO3, Total	SM 2320 B	**7**	**J**	mg/L	15	3	1	05/05/21 18:30	NA	
Ammonia as Nitrogen	350.1	**1.90**		mg/L	0.050	0.020	1	05/06/21 11:48	05/06/21	
Carbon, Total Organic	SM 5310 C	**2.40**		mg/L	0.50	0.07	1	05/17/21 14:51	NA	
Chloride	300.0	**24.3**		mg/L	0.50	0.04	5	05/05/21 19:50	NA	
Fluoride	300.0	ND	U	mg/L	0.20	0.01	2	05/04/21 20:31	NA	
Nitrate as Nitrogen	300.0	ND	U	mg/L	0.10	0.02	2	05/04/21 20:31	NA	
Nitrite as Nitrogen	300.0	ND	U	mg/L	0.10	0.006	2	05/04/21 20:31	NA	
Orthophosphate as Phosphorus	SM 4500-P E	ND	U	mg/L	0.050	0.020	1	05/04/21 15:20	NA	
Sulfate	300.0	**1240**		mg/L	1.0	0.1	5	05/05/21 19:50	NA	

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Analytical Report

Client:	Anchor QEA, LLC	**Service Request:**	K2104840
Project:	CCR-GC/201114-01.05 Task 02	**Date Collected:**	05/03/21 13:00
Sample Matrix:	Water	**Date Received:**	05/04/21 09:50
Sample Name:	GC-MW-17-20210503	**Basis:**	NA
Lab Code:	K2104840-002		

General Chemistry Parameters

Analyte Name	Analysis Method	Result		Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Alkalinity as CaCO3, Total	SM 2320 B	**446**		mg/L	15	3	1	05/05/21 18:30	NA	
Ammonia as Nitrogen	350.1	**0.388**		mg/L	0.050	0.020	1	05/06/21 11:48	05/06/21	
Carbon, Total Organic	SM 5310 C	**1.60**		mg/L	0.50	0.07	1	05/17/21 14:51	NA	
Fluoride	300.0	**0.94**		mg/L	0.20	0.01	2	05/04/21 21:17	NA	
Nitrate as Nitrogen	300.0	**0.04**	**J**	mg/L	0.10	0.02	2	05/04/21 21:17	NA	
Nitrite as Nitrogen	300.0	ND	U	mg/L	0.10	0.006	2	05/04/21 21:17	NA	
Orthophosphate as Phosphorus	SM 4500-P E	ND	U	mg/L	0.050	0.020	1	05/04/21 15:20	NA	
Sulfate	300.0	**83.7**		mg/L	4.0	0.4	20	05/05/21 19:59	NA	

QC Summary Forms

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Metals

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Client: Anchor QEA, LLC
Project: CCR-GC/201114-01.05 Task 02
Sample Matrix: Water

Service Request: K2104840
Date Collected: NA
Date Received: NA

Sample Name: Method Blank
Lab Code: KQ2107495-02

Basis: NA

Dissolved Metals

Analyte Name	Analysis Method	Result		Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Calcium	6010C	ND	U	ug/L	21	3	1	05/25/21 16:48	05/07/21	
Magnesium	6010C	ND	U	ug/L	5.3	0.4	1	05/25/21 16:48	05/07/21	
Potassium	6010C	ND	U	ug/L	420	60	1	05/25/21 16:48	05/07/21	
Silicon	6010C	**40**	**J**	ug/L	210	30	1	05/25/21 16:48	05/07/21	
Sodium	6010C	ND	U	ug/L	210	30	1	05/25/21 16:48	05/07/21	

Analytical Report

Client: Anchor QEA, LLC
Project: CCR-GC/201114-01.05 Task 02
Sample Matrix: Water

Service Request: K2104840
Date Collected: NA
Date Received: NA

Sample Name: Method Blank
Lab Code: KQ2108788-01

Basis: NA

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Aluminum	200.8	**1.1 J**	ug/L	4.0	0.5	1	06/10/21 12:29	05/28/21	
Antimony	200.8	ND U	ug/L	0.050	0.020	1	06/10/21 12:29	05/28/21	
Arsenic	200.8	ND U	ug/L	0.50	0.09	1	06/10/21 12:29	05/28/21	
Barium	200.8	ND U	ug/L	0.050	0.020	1	06/10/21 12:29	05/28/21	
Beryllium	200.8	ND U	ug/L	0.020	0.005	1	06/10/21 12:29	05/28/21	
Boron	200.8	ND U	ug/L	2.0	0.5	1	06/10/21 12:29	05/28/21	
Cadmium	200.8	ND U	ug/L	0.020	0.008	1	06/10/21 12:29	05/28/21	
Chromium	200.8	ND U	ug/L	0.20	0.03	1	06/10/21 12:29	05/28/21	
Cobalt	200.8	ND U	ug/L	0.020	0.009	1	06/10/21 12:29	05/28/21	
Iron	200.8	ND U	ug/L	2.0	0.3	1	06/10/21 12:29	05/28/21	
Lead	200.8	ND U	ug/L	0.020	0.006	1	06/10/21 12:29	05/28/21	
Lithium	200.8	ND U	ug/L	0.10	0.10	1	06/10/21 12:29	05/28/21	
Manganese	200.8	ND U	ug/L	0.20	0.04	1	06/10/21 12:29	05/28/21	
Molybdenum	200.8	ND U	ug/L	0.10	0.03	1	06/10/21 12:29	05/28/21	
Nickel	200.8	ND U	ug/L	0.20	0.04	1	06/10/21 12:29	05/28/21	
Selenium	200.8	ND U	ug/L	1.0	0.2	1	06/10/21 12:29	05/28/21	
Silver	200.8	ND U	ug/L	0.020	0.009	1	06/10/21 12:29	05/28/21	
Thallium	200.8	ND U	ug/L	0.020	0.009	1	06/10/21 12:29	05/28/21	
Zinc	200.8	ND U	ug/L	2.0	0.5	1	06/10/21 12:29	05/28/21	

Client: Anchor QEA, LLC
Project: CCR-GC/201114-01.05 Task 02
Sample Matrix: Water

Service Request: K2104840
Date Analyzed: 05/25/21

Lab Control Sample Summary
Dissolved Metals

Units: ug/L
Basis: NA

Lab Control Sample
KQ2107495-01

Analyte Name	Analytical Method	Result	Spike Amount	% Rec	% Rec Limits
Calcium	6010C	12600	12500	101	80-120
Magnesium	6010C	12700	12500	102	80-120
Potassium	6010C	12600	12500	101	80-120
Sodium	6010C	12600	12500	101	80-120

Client: Anchor QEA, LLC
Project: CCR-GC/201114-01.05 Task 02
Sample Matrix: Water

Service Request: K2104840
Date Analyzed: 05/25/21

Lab Control Sample Summary
Dissolved Metals

Units:ug/L
Basis:NA

Lab Control Sample
KQ2107495-03

Analyte Name	Analytical Method	Result	Spike Amount	% Rec	% Rec Limits
Silicon	6010C	10100	10000	101	80-120

Client: Anchor QEA, LLC
Project: CCR-GC/201114-01.05 Task 02
Sample Matrix: Water

Service Request: K2104840
Date Analyzed: 06/10/21

Lab Control Sample Summary
Total Metals

Units:ug/L
Basis:NA

Lab Control Sample
KQ2108788-02

Analyte Name	Analytical Method	Result	Spike Amount	% Rec	% Rec Limits
Aluminum	200.8	109	100	109	85-115
Iron	200.8	51.7	50.0	103	85-115
Manganese	200.8	25.6	25.0	103	85-115

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QA/QC Report

Client:	Anchor QEA, LLC	**Service Request:**	K2104840
Project:	CCR-GC/201114-01.05 Task 02	**Date Analyzed:**	06/10/21
Sample Matrix:	Water		

Lab Control Sample Summary
Total Metals

Units:ug/L
Basis:NA

Lab Control Sample
KQ2108788-02

Analyte Name	Analytical Method	Result	Spike Amount	% Rec	% Rec Limits
Antimony	200.8	10.1	10.0	101	85-115
Arsenic	200.8	52.0	50.0	104	85-115
Barium	200.8	102	100	102	85-115
Beryllium	200.8	2.59	2.50	104	85-115
Boron	200.8	24.8	25.0	99	85-115
Cadmium	200.8	25.9	25.0	104	85-115
Chromium	200.8	10.4	10.0	104	85-115
Cobalt	200.8	25.6	25.0	102	85-115
Lead	200.8	50.6	50.0	101	85-115
Lithium	200.8	51.9	50.0	104	85-115
Molybdenum	200.8	26.5	25.0	106	85-115
Nickel	200.8	25.9	25.0	104	85-115
Selenium	200.8	53.6	50.0	107	85-115
Silver	200.8	12.6	12.5	101	85-115
Thallium	200.8	52.3	50.0	105	85-115
Zinc	200.8	26.4	25.0	106	85-115

General Chemistry

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Client: Anchor QEA, LLC
Project: CCR-GC/201114-01.05 Task 02
Sample Matrix: Water

Service Request: K2104840
Date Collected: NA
Date Received: NA

Sample Name: Method Blank
Lab Code: K2104840-MB1

Basis: NA

General Chemistry Parameters

Analyte Name	Analysis Method	Result		Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Alkalinity as CaCO3, Total	SM 2320 B	**5**	**J**	mg/L	15	3	1	05/05/21 18:30	NA	
Ammonia as Nitrogen	350.1	ND	U	mg/L	0.050	0.020	1	05/06/21 11:48	05/06/21	
Carbon, Total Organic	SM 5310 C	ND	U	mg/L	0.50	0.07	1	05/17/21 14:51	NA	
Chloride	300.0	ND	U	mg/L	0.10	0.007	1	05/05/21 15:45	NA	
Fluoride	300.0	ND	U	mg/L	0.10	0.005	1	05/04/21 10:32	NA	
Nitrate as Nitrogen	300.0	ND	U	mg/L	0.050	0.007	1	05/04/21 10:32	NA	
Nitrite as Nitrogen	300.0	ND	U	mg/L	0.050	0.003	1	05/04/21 10:32	NA	
Orthophosphate as Phosphorus	SM 4500-P E	ND	U	mg/L	0.050	0.020	1	05/04/21 15:20	NA	
Sulfate	300.0	**0.05**	**J**	mg/L	0.20	0.02	1	05/05/21 15:45	NA	

Client: Anchor QEA, LLC
Project: CCR-GC/201114-01.05 Task 02
Sample Matrix: Water

Service Request: K2104840
Date Collected: NA
Date Received: NA

Sample Name: Method Blank
Lab Code: K2104840-MB2

Basis: NA

General Chemistry Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Q
Fluoride	300.0	ND U	mg/L	0.10	0.005	1	05/04/21 19:09	
Nitrate as Nitrogen	300.0	ND U	mg/L	0.050	0.007	1	05/04/21 19:09	
Nitrite as Nitrogen	300.0	ND U	mg/L	0.050	0.003	1	05/04/21 19:09	

Client: Anchor QEA, LLC
Project: CCR-GC/201114-01.05 Task 02
Sample Matrix: Water

Service Request: K2104840
Date Collected: 05/03/21
Date Received: 05/04/21
Date Analyzed: 5/4/21

Duplicate Matrix Spike Summary
General Chemistry Parameters

Sample Name: GC-MW-1-20210503
Lab Code: K2104840-001

Units: mg/L
Basis: NA

			Matrix Spike K2104840-001MS			Duplicate Matrix Spike K2104840-001DMS					
Analyte Name	**Method**	**Sample Result**	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
Fluoride	300.0	ND U	8.08	8.00	101	8.23	8.00	103	90-110	2	20
Nitrate as Nitrogen	300.0	ND U	7.70	8.00	96	7.76	8.00	97	90-110	<1	20
Nitrite as Nitrogen	300.0	ND U	7.71	8.00	96	7.77	8.00	97	90-110	<1	20

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

Client:	Anchor QEA, LLC	**Service Request:**	K2104840
Project:	CCR-GC/201114-01.05 Task 02	**Date Collected:**	05/03/21
Sample Matrix:	Water	**Date Received:**	05/04/21
		Date Analyzed:	05/5/21
		Date Extracted:	NA

Duplicate Matrix Spike Summary
Sulfate

Sample Name:	GC-MW-17-20210503	**Units:**	mg/L
Lab Code:	K2104840-002	**Basis:**	NA
Analysis Method:	300.0		
Prep Method:	None		

		Matrix Spike K2104840-002MS			Duplicate Matrix Spike K2104840-002DMS					
Analyte Name	**Sample Result**	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
Sulfate	83.7	161	80.0	97	154	80.0	88 *	90-110	5	20

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

Matrix Spike and Matrix Spike Duplicate Data is presented for information purposes only. The matrix may or may not be relevant to samples reported in this report. The laboratory evaluates system performance based on the LCS and LCSD control limits.

QA/QC Report

Client:	Anchor QEA, LLC	**Service Request:**	K2104840
Project	CCR-GC/201114-01.05 Task 02	**Date Collected:**	05/03/21
Sample Matrix:	Water	**Date Received:**	05/04/21
		Date Analyzed:	05/04/21

Replicate Sample Summary
General Chemistry Parameters

Sample Name:	GC-MW-1-20210503	**Units:**	mg/L
Lab Code:	K2104840-001	**Basis:**	NA

Analyte Name	Analysis Method	MRL	MDL	Sample Result	Duplicate Sample K2104840-001DUP Result	Average	RPD	RPD Limit
Fluoride	300.0	0.20	0.01	ND U	ND U	NC	NC	20
Nitrate as Nitrogen	300.0	0.10	0.02	ND U	ND U	NC	NC	20
Nitrite as Nitrogen	300.0	0.10	0.006	ND U	ND U	NC	NC	20

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

Client:	Anchor QEA, LLC		**Service Request:**	K2104840
Project	CCR-GC/201114-01.05 Task 02		**Date Collected:**	05/03/21
Sample Matrix:	Water		**Date Received:**	05/04/21
			Date Analyzed:	05/05/21

Replicate Sample Summary
General Chemistry Parameters

Sample Name:	GC-MW-17-20210503		**Units:**	mg/L
Lab Code:	K2104840-002		**Basis:**	NA

Analyte Name	Analysis Method	MRL	MDL	Sample Result	Duplicate Sample K2104840-002DUP Result	Average	RPD	RPD Limit
Sulfate	300.0	4.0	0.4	83.7	78.5	81.1	6	20
Alkalinity as CaCO3, Total	SM 2320 B	15	3	446	451	449	1	20

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

Client: Anchor QEA, LLC
Project: CCR-GC/201114-01.05 Task 02
Sample Matrix: Water

Service Request: K2104840
Date Analyzed: 05/04/21 - 05/17/21

Lab Control Sample Summary
General Chemistry Parameters

Units:mg/L
Basis:NA

Lab Control Sample
K2104840-LCS1

Analyte Name	Analytical Method	Result	Spike Amount	% Rec	% Rec Limits
Alkalinity as CaCO3, Total	SM 2320 B	182	180	101	90-110
Ammonia as Nitrogen	350.1	5.50	5.36	103	86-114
Carbon, Total Organic	SM 5310 C	26.3	25.0	105	83-117
Chloride	300.0	4.68	5.00	94	90-110
Fluoride	300.0	4.76	5.00	95	90-110
Nitrate as Nitrogen	300.0	2.38	2.50	95	90-110
Nitrite as Nitrogen	300.0	2.37	2.50	95	90-110
Orthophosphate as Phosphorus	SM 4500-P E	1.54	1.57	98	85-115
Sulfate	300.0	4.86	5.00	97	90-110

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client:	Anchor QEA, LLC	**Service Request:**	K2104840
Project:	CCR-GC/201114-01.05 Task 02	**Date Analyzed:**	05/04/21 - 05/05/21
Sample Matrix:	Water		

Lab Control Sample Summary
General Chemistry Parameters

Units:mg/L
Basis:NA

Lab Control Sample
K2104840-LCS2

Analyte Name	Analytical Method	Result	Spike Amount	% Rec	% Rec Limits
Alkalinity as CaCO3, Total	SM 2320 B	195	180	108	90-110
Fluoride	300.0	5.04	5.00	101	90-110
Nitrate as Nitrogen	300.0	2.43	2.50	97	90-110
Nitrite as Nitrogen	300.0	2.41	2.50	97	90-110

June 09, 2021 Service Request No:K2105586

Masa Kanematsu
Anchor QEA, LLC
6720 SW Macadam Avenue
Suite 125
Portland, OR 97219

Laboratory Results for: CCR-GC

Dear Masa,

Enclosed are the results of the sample(s) submitted to our laboratory May 04, 2021
For your reference, these analyses have been assigned our service request number **K2105586.**

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please contact me if you have any questions. My extension is 3376. You may also contact me via email at Mark.Harris@alsglobal.com.

Respectfully submitted,

ALS Group USA, Corp. dba ALS Environmental

Mark Harris
Project Manager

ADDRESS 1317 S. 13th Avenue, Kelso, WA 98626
PHONE +1 360 577 7222 | FAX +1 360 636 1068
ALS Group USA, Corp.
dba ALS Environmental

Narrative Documents

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360) 577-7222 Fax (360) 425-9096
www.alsglobal.com

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ALS Environmental

Client:	Anchor QEA, LLC	**Service Request:**	K2105586
Project:	CCR-GC	**Date Received:**	05/04/2021
Sample Matrix:	Water		

CASE NARRATIVE

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples for the Tier II level requested by the client.

Sample Receipt:

Two water samples were received for analysis at ALS Environmental on 05/04/2021. Any discrepancies upon initial sample inspection are annotated on the sample receipt and preservation form included within this report. The samples were stored at minimum in accordance with the analytical method requirements.

Metals:

Method 200.8, 06/08/2021:The laboratory does not maintain a Method Detection Limit (MDL) study for Lithium by ICPMS. Lithium is a non-standard target analyte for this methodology at the Kelso lab. Results are reported to the Method Reporting Limit (MRL) for this analyte.

Approved by ______________________ Date 06/09/2021

ALS Environmental

SAMPLE DETECTION SUMMARY

CLIENT ID: GC-MW-1-20210503	Lab ID: K2105586-001					
Analyte	**Results**	**Flag**	**MDL**	**MRL**	**Units**	**Method**
Arsenic, Dissolved	4.1		0.2	1.3	ug/L	200.8
Cobalt, Dissolved	283		0.023	0.050	ug/L	200.8

CLIENT ID: GC-MW-17-20210503	Lab ID: K2105586-002					
Analyte	**Results**	**Flag**	**MDL**	**MRL**	**Units**	**Method**
Arsenic, Dissolved	358		1.1	6.3	ug/L	200.8
Lithium, Dissolved	657		1.3	1.3	ug/L	200.8

Sample Receipt Information

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360) 577-7222 Fax (360) 425-9096
www.alsglobal.com

Client: Anchor QEA, LLC **Service Request:** K2105586
Project: CCR-GC/201114-01.05 Task 02

SAMPLE CROSS-REFERENCE

SAMPLE #	CLIENT SAMPLE ID	DATE	TIME
K2105586-001	GC-MW-1-20210503	5/3/2021	1230
K2105586-002	GC-MW-17-20210503	5/3/2021	1300

K2105586
~~K2104839~~ 5/19

Chain of Custody Record & Laboratory Analysis Request

Laboratory Number: 503-972-5019	
Date:	5/3/2021
Project Name:	CCR-GC
Project Number:	201114-01.05 Task 02
Project Manager:	Masa Kanematsu
Phone Number:	503-972-5001 (Masa Kanematsu)
Shipment Method:	Fedex Overnight

ANCHOR QEA
Jessica Goin
6720 SW Macadam Ave
Suite 125
Portland OR 97219

Line	Field Sample ID	Collection Date	Collection Time	Matrix	No. of Containers	Arsenic, Cobalt (diss.) 3d TAT	Arsenic, Lithium(diss.) 3d TAT	Dissolved metals	Total Metals (Al, Fe, Mn)	Anions	Ortho-Phosphate	Alkalinity	Total Organic Carbon	Ammonia as N								Comments/Preservation
1	GC-MW-1-20210503	5/3/3021	12:30	Water	6	X		X	X	X	X	X	X	X								HNO_3 preserved, filtered
2	GC-MW-17-20210503	5/3/3021	13:00	Water	6		X	X	X	X	X	X	X	X								HNO_3 preserved, filtered
3																						
4																						
5																						
6																						
7																						
8																						
9																						
10																						
11																						
12																						
13																						
14																						
15																						

Notes: **Please analyze all analytes with Standard TAT on this page otherwise noted.** For specific dissolved metals, please analyze with 3 day TAT if possible.
Dissolved metals: Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Fe, Pb, Li, Mg, Mn, Mo, Ni, K, Se, Si, Ag, Na, Tl, Zn), Anions (Cl, F, nitrate, nitrite, Sulfate)

Relinquished by:	Company:
Masa Kanematsu	Anchor QEA
Signature/Print Name:	Date/Time:
	5/3/2020 16:40

Received by:	Company:
Swolf	ALS 5/4/21 0950
Signature/Print Name:	Date/Time:

Relinquished by:	Company:
Signature/Print Name:	Date/Time:

Received by:	Company:
Signature/Print Name:	Date/Time:

Distribution: A copy will be made for the laboratory and client. The Project file will retain the original.

Page 1 of 1

Cooler Receipt and Preservation Form

K2105586 PM MH

Client Anchor QEA Service Request K21 04839

Received: 5/4/21 Opened: 5/4/21 By: [signature] Unloaded: 5/4/21 By: [signature]

1. Samples were received via? *USPS* *Fed Ex* *UPS* *DHL* *PDX* *Courier* *Hand Delivered*
2. Samples were received in: (circle) *Cooler* *Box* *Envelope* *Other* ______ *NA*
3. Were custody seals on coolers? NA Y N If yes, how many and where? ______
   If present, were custody seals intact? Y N If present, were they signed and dated? Y N
4. Was a Temperature Blank present in cooler? NA Y N If yes, notate the temperature in the appropriate column below:
   If no, take the temperature of a representative sample bottle contained within the cooler; notate in the column "Sample Temp":
5. Were samples received within the method specified temperature ranges? NA Y N
   If no, were they received on ice and same day as collected? If not, notate the cooler # below and notify the PM. NA Y N

If applicable, tissue samples were received: *Frozen* *Partially Thawed* *Thawed*

Temp Blank	Sample Temp	IR Gun	Cooler #/COC ID NA	Out of temp indicate with "X"	PM Notified if out of temp	Tracking Number NA	Filed
5.4	—	IR01				7736 1943 0275	

6. Packing material: *Inserts* *Baggies* *Bubble Wrap* *Gel Packs* *Wet Ice* *Dry Ice* *Sleeves* ______
7. Were custody papers properly filled out (ink, signed, etc.)? NA Y N
8. Were samples received in good condition (unbroken) NA Y N
9. Were all sample labels complete (ie, analysis, preservation, etc.)? NA Y N
10. Did all sample labels and tags agree with custody papers? NA Y N
11. Were appropriate bottles/containers and volumes received for the tests indicated? NA Y N
12. Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? *Indicate in the table below* NA Y N
13. Were VOA vials received without headspace? *Indicate in the table below.* NA Y N
14. Was C12/Res negative? NA Y N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count Bottle Type	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, Resolutions:

RUSH

Miscellaneous Forms

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1317 South 13th Avenue, Kelso, WA 98626
Phone (360) 577-7222 Fax (360) 425-9096
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Inorganic Data Qualifiers

- * The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- E The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated value.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
  DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.
- H The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

Metals Data Qualifiers

- # The control limit criteria is not applicable. See case narrative.
- J The result is an estimated value.
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- M The duplicate injection precision was not met.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- S The reported value was determined by the Method of Standard Additions (MSA).
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
  DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- \+ The correlation coefficient for the MSA is less than 0.995.
- Q See case narrative. One or more quality control criteria was outside the limits.

Organic Data Qualifiers

- * The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- A A tentatively identified compound, a suspected aldol-condensation product.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- C The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
- D The reported result is from a dilution.
- E The result is an estimated value.
- J The result is an estimated value.
- N The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
- P The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
  DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.

Additional Petroleum Hydrocarbon Specific Qualifiers

- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- Y The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
- Z The chromatographic fingerprint does not resemble a petroleum product.

ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso
State Certifications, Accreditations, and Licenses

Agency	Web Site	Number
Alaska DEH	http://dec.alaska.gov/eh/lab/cs/csapproval.htm	UST-040
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0339
Arkansas - DEQ	http://www.adeq.state.ar.us/techsvs/labcert.htm	88-0637
California DHS (ELAP)	http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx	2795
DOD ELAP	http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm	L16-58-R4
Florida DOH	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E87412
Hawaii DOH	http://health.hawaii.gov/	-
ISO 17025	http://www.pjlabs.com/	L16-57
Louisiana DEQ	http://www.deq.louisiana.gov/page/la-lab-accreditation	03016
Maine DHS	http://www.maine.gov/dhhs/	WA01276
Minnesota DOH	http://www.health.state.mn.us/accreditation	053-999-457
Nevada DEP	http://ndep.nv.gov/bsdw/labservice.htm	WA01276
New Jersey DEP	http://www.nj.gov/dep/enforcement/oqa.html	WA005
New York - DOH	https://www.wadsworth.org/regulatory/elap	12060
North Carolina DEQ	https://deq.nc.gov/about/divisions/water-resources/water-resources-data/water-sciences-home-page/laboratory-certification-branch/non-field-lab-certification	605
Oklahoma DEQ	http://www.deq.state.ok.us/CSDnew/labcert.htm	9801
Oregon – DEQ (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	WA100010
South Carolina DHEC	http://www.scdhec.gov/environment/EnvironmentalLabCertification/	61002
Texas CEQ	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	T104704427
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C544
Wyoming (EPA Region 8)	https://www.epa.gov/region8-waterops/epa-region-8-certified-drinking-water-	-
Kelso Laboratory Website	www.alsglobal.com	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at www.ALSGlobal.com or at the accreditation bodies web site.
Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/anlayte is offered by that state.

Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

Analyst Summary report

Client:	Anchor QEA, LLC	**Service Request:**	K2105586
Project:	CCR-GC/201114-01.05 Task 02		

Sample Name:	GC-MW-1-20210503	**Date Collected:**	05/3/21
Lab Code:	K2105586-001	**Date Received:**	05/4/21
Sample Matrix:	Water		

Analysis Method	Extracted/Digested By	Analyzed By
200.8	ABOYER	RMOORE

Sample Name:	GC-MW-17-20210503	**Date Collected:**	05/3/21
Lab Code:	K2105586-002	**Date Received:**	05/4/21
Sample Matrix:	Water		

Analysis Method	Extracted/Digested By	Analyzed By
200.8	ABOYER	RMOORE

Sample Results

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360) 577-7222 Fax (360) 425-9096
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Metals

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1317 South 13th Avenue, Kelso, WA 98626
Phone (360) 577-7222 Fax (360) 425-9096
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ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client:	Anchor QEA, LLC	**Service Request:**	K2105586
Project:	CCR-GC/201114-01.05 Task 02	**Date Collected:**	05/03/21 12:30
Sample Matrix:	Water	**Date Received:**	05/04/21 09:50
Sample Name:	GC-MW-1-20210503	**Basis:**	NA
Lab Code:	K2105586-001		

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	**4.1**	ug/L	1.3	0.2	1	06/08/21 16:45	05/26/21	
Cobalt	200.8	**283**	ug/L	0.050	0.023	1	06/08/21 16:45	05/26/21	

Analytical Report

Client:	Anchor QEA, LLC	**Service Request:**	K2105586
Project:	CCR-GC/201114-01.05 Task 02	**Date Collected:**	05/03/21 13:00
Sample Matrix:	Water	**Date Received:**	05/04/21 09:50
Sample Name:	GC-MW-17-20210503	**Basis:**	NA
Lab Code:	K2105586-002		

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	**358**	ug/L	6.3	1.1	5	06/08/21 16:47	05/26/21	
Lithium	200.8	**657**	ug/L	1.3	1.3	5	06/08/21 16:47	05/26/21	

QC Summary Forms

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1317 South 13th Avenue, Kelso, WA 98626
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Metals

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Phone (360) 577-7222 Fax (360) 425-9096
www.alsglobal.com

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client:	Anchor QEA, LLC	**Service Request:**	K2105586
Project:	CCR-GC/201114-01.05 Task 02	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA
Sample Name:	Method Blank	**Basis:**	NA
Lab Code:	KQ2108793-01		

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	ND U	ug/L	0.50	0.09	1	06/08/21 16:01	05/26/21	
Cobalt	200.8	ND U	ug/L	0.020	0.009	1	06/08/21 16:01	05/26/21	
Lithium	200.8	ND U	ug/L	0.10	0.10	1	06/08/21 16:01	05/26/21	

Client:	Anchor QEA, LLC	**Service Request:**	K2105586
Project:	CCR-GC/201114-01.05 Task 02	**Date Analyzed:**	06/08/21
Sample Matrix:	Water		

Lab Control Sample Summary
Dissolved Metals

Units:ug/L
Basis:NA

Lab Control Sample
KQ2108793-02

Analyte Name	Analytical Method	Result	Spike Amount	% Rec	% Rec Limits
Arsenic	200.8	49.8	50.0	100	85-115
Cobalt	200.8	24.8	25.0	99	85-115
Lithium	200.8	48.3	50.0	97	85-115

July 21, 2021 Service Request No:K2107111

Masa Kanematsu
Anchor QEA, LLC
6720 SW Macadam Avenue
Suite 125
Portland, OR 97219

Laboratory Results for: Green Country

Dear Masa,

Enclosed are the results of the sample(s) submitted to our laboratory June 18, 2021
For your reference, these analyses have been assigned our service request number **K2107111.**

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please contact me if you have any questions. My extension is 3376. You may also contact me via email at Mark.Harris@alsglobal.com.

Respectfully submitted,

ALS Group USA, Corp. dba ALS Environmental

Mark Harris
Project Manager

ADDRESS 1317 S. 13th Avenue, Kelso, WA 98626
PHONE +1 360 577 7222 | FAX +1 360 636 1068
ALS Group USA, Corp.
dba ALS Environmental

Narrative Documents

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360) 577-7222 Fax (360) 425-9096
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Client: Anchor QEA, LLC
Project: Green Country
Sample Matrix: Water

Service Request: K2107111
Date Received: 06/18/2021

CASE NARRATIVE

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples for the Tier II level requested by the client.

Sample Receipt:

Thirteen water samples were received for analysis at ALS Environmental on 06/18/2021. Any discrepancies upon initial sample inspection are annotated on the sample receipt and preservation form included within this report. The samples were stored at minimum in accordance with the analytical method requirements.

Metals:

No significant anomalies were noted with this analysis.

Approved by ____________________ Date 07/21/2021

ALS Environmental

SAMPLE DETECTION SUMMARY

CLIENT ID: GRC-COL-2-6 — **Lab ID: K2107111-001**

Analyte	Results	Flag	MDL	MRL	Units	Method
Arsenic, Dissolved	2.1	J	0.5	2.5	ug/L	200.8
Cobalt, Dissolved	182		0.05	0.10	ug/L	200.8

CLIENT ID: GRC-COL-INF-MW-1-7 — **Lab ID: K2107111-002**

Analyte	Results	Flag	MDL	MRL	Units	Method
Arsenic, Dissolved	122		0.5	2.5	ug/L	200.8
Cobalt, Dissolved	185		0.05	0.10	ug/L	200.8

CLIENT ID: GRC-COL-1-7 — **Lab ID: K2107111-003**

Analyte	Results	Flag	MDL	MRL	Units	Method
Arsenic, Dissolved	2.9		0.5	2.5	ug/L	200.8
Cobalt, Dissolved	186		0.05	0.10	ug/L	200.8

CLIENT ID: GRC-COL-2-7 — **Lab ID: K2107111-004**

Analyte	Results	Flag	MDL	MRL	Units	Method
Arsenic, Dissolved	1.4	J	0.5	2.5	ug/L	200.8
Cobalt, Dissolved	183		0.05	0.10	ug/L	200.8

CLIENT ID: GRC-COL-INF-MW-1-8 — **Lab ID: K2107111-005**

Analyte	Results	Flag	MDL	MRL	Units	Method
Arsenic, Dissolved	119		0.5	2.5	ug/L	200.8
Cobalt, Dissolved	180		0.05	0.10	ug/L	200.8

CLIENT ID: GRC-COL-1-8 — **Lab ID: K2107111-006**

Analyte	Results	Flag	MDL	MRL	Units	Method
Arsenic, Dissolved	2.2	J	0.5	2.5	ug/L	200.8
Cobalt, Dissolved	175		0.05	0.10	ug/L	200.8

CLIENT ID: GRC-COL-2-8 — **Lab ID: K2107111-007**

Analyte	Results	Flag	MDL	MRL	Units	Method
Arsenic, Dissolved	1.4	J	0.5	2.5	ug/L	200.8
Cobalt, Dissolved	180		0.05	0.10	ug/L	200.8

CLIENT ID: GRC-COL-INF-MW-1-9 — **Lab ID: K2107111-008**

Analyte	Results	Flag	MDL	MRL	Units	Method
Arsenic, Dissolved	31.4		0.5	2.5	ug/L	200.8
Cobalt, Dissolved	178		0.05	0.10	ug/L	200.8

CLIENT ID: GRC-COL-1-9 — **Lab ID: K2107111-009**

Analyte	Results	Flag	MDL	MRL	Units	Method
Arsenic, Dissolved	2.2	J	0.5	2.5	ug/L	200.8
Cobalt, Dissolved	181		0.05	0.10	ug/L	200.8

CLIENT ID: GRC-COL-2-9 — **Lab ID: K2107111-010**

Analyte	Results	Flag	MDL	MRL	Units	Method
Arsenic, Dissolved	1.3	J	0.5	2.5	ug/L	200.8

SAMPLE DETECTION SUMMARY

CLIENT ID: GRC-COL-2-9	Lab ID: K2107111-010					
Analyte	**Results**	**Flag**	**MDL**	**MRL**	**Units**	**Method**
Cobalt, Dissolved	180		0.05	0.10	ug/L	200.8

CLIENT ID: GRC-COL-INF-MW-1-10	Lab ID: K2107111-011					
Analyte	**Results**	**Flag**	**MDL**	**MRL**	**Units**	**Method**
Arsenic, Dissolved	5.2		0.5	2.5	ug/L	200.8
Cobalt, Dissolved	182		0.05	0.10	ug/L	200.8

CLIENT ID: GRC-COL-1-10	Lab ID: K2107111-012					
Analyte	**Results**	**Flag**	**MDL**	**MRL**	**Units**	**Method**
Arsenic, Dissolved	2.3	J	0.5	2.5	ug/L	200.8
Cobalt, Dissolved	181		0.05	0.10	ug/L	200.8

CLIENT ID: GRC-COL-2-10	Lab ID: K2107111-013					
Analyte	**Results**	**Flag**	**MDL**	**MRL**	**Units**	**Method**
Arsenic, Dissolved	1.2	J	0.5	2.5	ug/L	200.8
Cobalt, Dissolved	183		0.05	0.10	ug/L	200.8

Sample Receipt Information

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360) 577-7222 Fax (360) 425-9096
www.alsglobal.com

Client: Anchor QEA, LLC **Service Request:** K2107111
Project: Green Country/201114-01.05 Task 02

SAMPLE CROSS-REFERENCE

SAMPLE #	CLIENT SAMPLE ID	DATE	TIME
K2107111-001	GRC-COL-2-6	6/10/2021	1315
K2107111-002	GRC-COL-INF-MW-1-7	6/11/2021	1400
K2107111-003	GRC-COL-1-7	6/11/2021	1400
K2107111-004	GRC-COL-2-7	6/11/2021	1400
K2107111-005	GRC-COL-INF-MW-1-8	6/13/2021	1350
K2107111-006	GRC-COL-1-8	6/13/2021	1350
K2107111-007	GRC-COL-2-8	6/13/2021	1350
K2107111-008	GRC-COL-INF-MW-1-9	6/8/2021	1600
K2107111-009	GRC-COL-1-9	6/8/2021	1600
K2107111-010	GRC-COL-2-9	6/8/2021	1600
K2107111-011	GRC-COL-INF-MW-1-10	6/9/2021	1500
K2107111-012	GRC-COL-1-10	6/9/2021	1500
K2107111-013	GRC-COL-2-10	6/9/2021	1500

K2107111

Chain of Custody Record & Laboratory Analysis Request

Laboratory Number: 503-972-5019

Date:	6/18/2021
Project Name:	Green County
Project Number:	201114-01.05 Task 02
Project Manager:	Masa Kanematsu
Phone Number:	503-972-5001 (Masa Kanematsu)
Shipment Method:	ALS Carrier

ANCHOR QEA

Jessica Goin
6720 SW Macadam Ave
Suite 125
Portland OR 97219

Line	Field Sample ID	Collection Date	Collection Time	Matrix	No. of Containers	Arsenic, Cobalt (dissolved, Method 200.8)																Comments/Preservation
1	GRC-COL-2-6	6/10/2021	13:15	Water	1	X																HNO_3 preserved, filtered
2	GRC-COL-INF-MW-1-7	6/11/2021	14:00	Water	1	X																HNO_3 preserved, filtered
3	GRC-COL-1-7	6/11/2021	14:00	Water	1	X																HNO_3 preserved, filtered
4	GRC-COL-2-7	6/11/2021	14:00	Water	1	X																HNO_3 preserved, filtered
5	GRC-COL-INF-MW-1-8	6/13/2021	13:50	Water	1	X																HNO_3 preserved, filtered
6	GRC-COL-1-8	6/13/2021	13:50	Water	1	X																HNO_3 preserved, filtered
7	GRC-COL-2-8	6/13/2021	13:50	Water	1	X																HNO_3 preserved, filtered
8	GRC-COL-INF-MW-1-9	6/8/2021	16:00	Water	1	X																HNO_3 preserved, filtered
9	GRC-COL-1-9	6/8/2021	16:00	Water	1	X																HNO_3 preserved, filtered
10	GRC-COL-2-9	6/8/2021	16:00	Water	1	X																HNO_3 preserved, filtered
11	GRC-COL-INF-MW-1-10	6/9/2021	15:00	Water	1	X																HNO_3 preserved, filtered
12	GRC-COL-1-10	6/9/2021	15:00	Water	1	X																HNO_3 preserved, filtered
13	GRC-COL-2-10	6/9/2021	15:00	Water	1	X																HNO_3 preserved, filtered
14																						
15																						

Notes: **Please analyze all analytes with** standard TAT **on this page. Please analyze with Method 200.8 (ICP-MS) for better detection limit.**
Desired reporting limits : As (<2 ug/L), Co (<1 ug/L). For Lithium, please use Method 200.8 for better detection limit if possible. Report requirement: Type II (PDF & csv files)

Relinquished by:	Company:	Received by:	Company:
Masa Kanematsu	Anchor QEA	Perry Jones	ALS 6/18/21 1220
Signature/Print Name:	Date/Time:	Signature/Print Name:	Date/Time:
[signature]	6/18/2021 9:00		
Relinquished by:	Company:	Received by:	Company:
Signature/Print Name:	Date/Time:	Signature/Print Name:	Date/Time:

Distribution: A copy will be made for the laboratory and client. The Project file will retain the original.

Page 2 of 2

PM MH

Cooler Receipt and Preservation Form

Client Anchor Service Request K21 07111

Received: 6/18/21 Opened: 6/18/21 By: PJ Unloaded: 6/18/21 By: PJ

1. Samples were received via? *USPS* *Fed Ex* *UPS* *DHL* *PDX* *Courier* *Hand Delivered*
2. Samples were received in: (circle) *Cooler* *Box* *Envelope* *Other* NA
3. Were custody seals on coolers? NA Y N If yes, how many and where?
   If present, were custody seals intact? Y N If present, were they signed and dated? Y N
4. Was a Temperature Blank present in cooler? NA Y N If yes, notate the temperature in the appropriate column below:
   If no, take the temperature of a representative sample bottle contained within the cooler; notate in the column "Sample Temp":
5. Were samples received within the method specified temperature ranges? NA Y N
   If no, were they received on ice and same day as collected? If not, notate the cooler # below and notify the PM. NA Y N

If applicable, tissue samples were received: *Frozen* *Partially Thawed* *Thawed*

Temp Blank	Sample Temp	IR Gun	Cooler #/COC ID / NA	Out of temp indicate with "X"	PM Notified If out of temp	Tracking Number NA	Filed
	5.7	IR02					

6. Packing material: *Inserts* *Baggies* *Bubble Wrap* *Gel Packs* *Wet Ice* *Dry Ice* *Sleeves*
7. Were custody papers properly filled out (ink, signed, etc.)? NA Y N
8. Were samples received in good condition (unbroken) NA Y N
9. Were all sample labels complete (ie, analysis, preservation, etc.)? NA Y N
10. Did all sample labels and tags agree with custody papers? NA Y N
11. Were appropriate bottles/containers and volumes received for the tests indicated? NA Y N
12. Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? *Indicate in the table below* NA Y N
13. Were VOA vials received without headspace? *Indicate in the table below.* NA Y N
14. Was C12/Res negative? NA Y N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count Bottle Type	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, Resolutions:

Miscellaneous Forms

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360) 577-7222 Fax (360) 425-9096
www.alsglobal.com

Inorganic Data Qualifiers

- * The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- E The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated value.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
  DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.
- H The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

Metals Data Qualifiers

- # The control limit criteria is not applicable. See case narrative.
- J The result is an estimated value.
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- M The duplicate injection precision was not met.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- S The reported value was determined by the Method of Standard Additions (MSA).
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
  DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- + The correlation coefficient for the MSA is less than 0.995.
- Q See case narrative. One or more quality control criteria was outside the limits.

Organic Data Qualifiers

- * The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- A A tentatively identified compound, a suspected aldol-condensation product.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- C The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
- D The reported result is from a dilution.
- E The result is an estimated value.
- J The result is an estimated value.
- N The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
- P The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
  DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.

Additional Petroleum Hydrocarbon Specific Qualifiers

- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- Y The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
- Z The chromatographic fingerprint does not resemble a petroleum product.

ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso
State Certifications, Accreditations, and Licenses

Agency	Web Site	Number
Alaska DEH	http://dec.alaska.gov/eh/lab/cs/csapproval.htm	UST-040
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0339
Arkansas - DEQ	http://www.adeq.state.ar.us/techsvs/labcert.htm	88-0637
California DHS (ELAP)	http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx	2795
DOD ELAP	http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm	L16-58-R4
Florida DOH	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E87412
Hawaii DOH	http://health.hawaii.gov/	-
ISO 17025	http://www.pjlabs.com/	L16-57
Louisiana DEQ	http://www.deq.louisiana.gov/page/la-lab-accreditation	03016
Maine DHS	http://www.maine.gov/dhhs/	WA01276
Minnesota DOH	http://www.health.state.mn.us/accreditation	053-999-457
Nevada DEP	http://ndep.nv.gov/bsdw/labservice.htm	WA01276
New Jersey DEP	http://www.nj.gov/dep/enforcement/oqa.html	WA005
New York - DOH	https://www.wadsworth.org/regulatory/elap	12060
North Carolina DEQ	https://deq.nc.gov/about/divisions/water-resources/water-resources-data/water-sciences-home-page/laboratory-certification-branch/non-field-lab-certification	605
Oklahoma DEQ	http://www.deq.state.ok.us/CSDnew/labcert.htm	9801
Oregon – DEQ (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	WA100010
South Carolina DHEC	http://www.scdhec.gov/environment/EnvironmentalLabCertification/	61002
Texas CEQ	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	T104704427
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C544
Wyoming (EPA Region 8)	https://www.epa.gov/region8-waterops/epa-region-8-certified-drinking-water-	-
Kelso Laboratory Website	www.alsglobal.com	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at www.ALSGlobal.com or at the accreditation bodies web site.
Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/anlayte is offered by that state.

Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

Analyst Summary report

Client: Anchor QEA, LLC **Service Request:** K2107111
Project: Green Country/201114-01.05 Task 02

Sample Name: GRC-COL-2-6 **Date Collected:** 06/10/21
Lab Code: K2107111-001 **Date Received:** 06/18/21
Sample Matrix: Water

Analysis Method	Extracted/Digested By	Analyzed By
200.8	ABOYER	RMOORE

Sample Name: GRC-COL-INF-MW-1-7 **Date Collected:** 06/11/21
Lab Code: K2107111-002 **Date Received:** 06/18/21
Sample Matrix: Water

Analysis Method	Extracted/Digested By	Analyzed By
200.8	ABOYER	RMOORE

Sample Name: GRC-COL-1-7 **Date Collected:** 06/11/21
Lab Code: K2107111-003 **Date Received:** 06/18/21
Sample Matrix: Water

Analysis Method	Extracted/Digested By	Analyzed By
200.8	ABOYER	RMOORE

Sample Name: GRC-COL-2-7 **Date Collected:** 06/11/21
Lab Code: K2107111-004 **Date Received:** 06/18/21
Sample Matrix: Water

Analysis Method	Extracted/Digested By	Analyzed By
200.8	ABOYER	RMOORE

Sample Name: GRC-COL-INF-MW-1-8 **Date Collected:** 06/13/21
Lab Code: K2107111-005 **Date Received:** 06/18/21
Sample Matrix: Water

Analysis Method	Extracted/Digested By	Analyzed By
200.8	ABOYER	RMOORE

Client: Anchor QEA, LLC | **Service Request:** K2107111
Project: Green Country/201114-01.05 Task 02

Sample Name: GRC-COL-1-8 | **Date Collected:** 06/13/21
Lab Code: K2107111-006 | **Date Received:** 06/18/21
Sample Matrix: Water

Analysis Method	Extracted/Digested By	Analyzed By
200.8	ABOYER	RMOORE

Sample Name: GRC-COL-2-8 | **Date Collected:** 06/13/21
Lab Code: K2107111-007 | **Date Received:** 06/18/21
Sample Matrix: Water

Analysis Method	Extracted/Digested By	Analyzed By
200.8	ABOYER	RMOORE

Sample Name: GRC-COL-INF-MW-1-9 | **Date Collected:** 06/8/21
Lab Code: K2107111-008 | **Date Received:** 06/18/21
Sample Matrix: Water

Analysis Method	Extracted/Digested By	Analyzed By
200.8	ABOYER	RMOORE

Sample Name: GRC-COL-1-9 | **Date Collected:** 06/8/21
Lab Code: K2107111-009 | **Date Received:** 06/18/21
Sample Matrix: Water

Analysis Method	Extracted/Digested By	Analyzed By
200.8	ABOYER	RMOORE

Sample Name: GRC-COL-2-9 | **Date Collected:** 06/8/21
Lab Code: K2107111-010 | **Date Received:** 06/18/21
Sample Matrix: Water

Analysis Method	Extracted/Digested By	Analyzed By
200.8	ABOYER	RMOORE

Client: Anchor QEA, LLC **Service Request:** K2107111
Project: Green Country/201114-01.05 Task 02

Sample Name: GRC-COL-INF-MW-1-10 **Date Collected:** 06/9/21
Lab Code: K2107111-011 **Date Received:** 06/18/21
Sample Matrix: Water

Analysis Method	Extracted/Digested By	Analyzed By
200.8	ABOYER	RMOORE

Sample Name: GRC-COL-1-10 **Date Collected:** 06/9/21
Lab Code: K2107111-012 **Date Received:** 06/18/21
Sample Matrix: Water

Analysis Method	Extracted/Digested By	Analyzed By
200.8	ABOYER	RMOORE

Sample Name: GRC-COL-2-10 **Date Collected:** 06/9/21
Lab Code: K2107111-013 **Date Received:** 06/18/21
Sample Matrix: Water

Analysis Method	Extracted/Digested By	Analyzed By
200.8	ABOYER	RMOORE

Sample Results

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360) 577-7222 Fax (360) 425-9096
www.alsglobal.com

Metals

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360) 577-7222 Fax (360) 425-9096
www.alsglobal.com

Client: Anchor QEA, LLC
Project: Green Country/201114-01.05 Task 02
Sample Matrix: Water

Service Request: K2107111
Date Collected: 06/10/21 13:15
Date Received: 06/18/21 12:30

Sample Name: GRC-COL-2-6
Lab Code: K2107111-001

Basis: NA

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	**2.1 J**	ug/L	2.5	0.5	5	07/19/21 13:00	06/24/21	
Cobalt	200.8	**182**	ug/L	0.10	0.05	5	07/19/21 13:00	06/24/21	

Client:	Anchor QEA, LLC	**Service Request:**	K2107111
Project:	Green Country/201114-01.05 Task 02	**Date Collected:**	06/11/21 14:00
Sample Matrix:	Water	**Date Received:**	06/18/21 12:30
Sample Name:	GRC-COL-INF-MW-1-7	**Basis:**	NA
Lab Code:	K2107111-002		

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	**122**	ug/L	2.5	0.5	5	07/19/21 13:05	06/24/21	
Cobalt	200.8	**185**	ug/L	0.10	0.05	5	07/19/21 13:05	06/24/21	

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client:	Anchor QEA, LLC	**Service Request:**	K2107111
Project:	Green Country/201114-01.05 Task 02	**Date Collected:**	06/11/21 14:00
Sample Matrix:	Water	**Date Received:**	06/18/21 12:30
Sample Name:	GRC-COL-1-7	**Basis:**	NA
Lab Code:	K2107111-003		

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	**2.9**	ug/L	2.5	0.5	5	07/19/21 13:09	06/24/21	
Cobalt	200.8	**186**	ug/L	0.10	0.05	5	07/19/21 13:09	06/24/21	

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client:	Anchor QEA, LLC	**Service Request:**	K2107111
Project:	Green Country/201114-01.05 Task 02	**Date Collected:**	06/11/21 14:00
Sample Matrix:	Water	**Date Received:**	06/18/21 12:30
Sample Name:	GRC-COL-2-7	**Basis:**	NA
Lab Code:	K2107111-004		

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	**1.4 J**	ug/L	2.5	0.5	5	07/19/21 13:11	06/24/21	
Cobalt	200.8	**183**	ug/L	0.10	0.05	5	07/19/21 13:11	06/24/21	

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client:	Anchor QEA, LLC	**Service Request:**	K2107111
Project:	Green Country/201114-01.05 Task 02	**Date Collected:**	06/13/21 13:50
Sample Matrix:	Water	**Date Received:**	06/18/21 12:30
Sample Name:	GRC-COL-INF-MW-1-8	**Basis:**	NA
Lab Code:	K2107111-005		

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	**119**	ug/L	2.5	0.5	5	07/19/21 13:16	06/24/21	
Cobalt	200.8	**180**	ug/L	0.10	0.05	5	07/19/21 13:16	06/24/21	

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client:	Anchor QEA, LLC	**Service Request:**	K2107111
Project:	Green Country/201114-01.05 Task 02	**Date Collected:**	06/13/21 13:50
Sample Matrix:	Water	**Date Received:**	06/18/21 12:30
Sample Name:	GRC-COL-1-8	**Basis:**	NA
Lab Code:	K2107111-006		

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	**2.2 J**	ug/L	2.5	0.5	5	07/19/21 13:17	06/24/21	
Cobalt	200.8	**175**	ug/L	0.10	0.05	5	07/19/21 13:17	06/24/21	

Client:	Anchor QEA, LLC		**Service Request:**	K2107111
Project:	Green Country/201114-01.05 Task 02		**Date Collected:**	06/13/21 13:50
Sample Matrix:	Water		**Date Received:**	06/18/21 12:30
Sample Name:	GRC-COL-2-8		**Basis:**	NA
Lab Code:	K2107111-007			

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	**1.4 J**	ug/L	2.5	0.5	5	07/19/21 13:19	06/24/21	
Cobalt	200.8	**180**	ug/L	0.10	0.05	5	07/19/21 13:19	06/24/21	

Client:	Anchor QEA, LLC	**Service Request:**	K2107111
Project:	Green Country/201114-01.05 Task 02	**Date Collected:**	06/08/21 16:00
Sample Matrix:	Water	**Date Received:**	06/18/21 12:30
Sample Name:	GRC-COL-INF-MW-1-9	**Basis:**	NA
Lab Code:	K2107111-008		

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	**31.4**	ug/L	2.5	0.5	5	07/19/21 13:29	06/24/21	
Cobalt	200.8	**178**	ug/L	0.10	0.05	5	07/19/21 13:29	06/24/21	

Client:	Anchor QEA, LLC		**Service Request:**	K2107111
Project:	Green Country/201114-01.05 Task 02		**Date Collected:**	06/08/21 16:00
Sample Matrix:	Water		**Date Received:**	06/18/21 12:30
Sample Name:	GRC-COL-1-9		**Basis:**	NA
Lab Code:	K2107111-009			

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	**2.2 J**	ug/L	2.5	0.5	5	07/19/21 13:31	06/24/21	
Cobalt	200.8	**181**	ug/L	0.10	0.05	5	07/19/21 13:31	06/24/21	

Client:	Anchor QEA, LLC		**Service Request:**	K2107111
Project:	Green Country/201114-01.05 Task 02		**Date Collected:**	06/08/21 16:00
Sample Matrix:	Water		**Date Received:**	06/18/21 12:30
Sample Name:	GRC-COL-2-9		**Basis:**	NA
Lab Code:	K2107111-010			

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	**1.3 J**	ug/L	2.5	0.5	5	07/19/21 13:33	06/24/21	
Cobalt	200.8	**180**	ug/L	0.10	0.05	5	07/19/21 13:33	06/24/21	

Client: Anchor QEA, LLC
Project: Green Country/201114-01.05 Task 02
Sample Matrix: Water

Service Request: K2107111
Date Collected: 06/09/21 15:00
Date Received: 06/18/21 12:30

Sample Name: GRC-COL-INF-MW-1-10
Lab Code: K2107111-011

Basis: NA

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	**5.2**	ug/L	2.5	0.5	5	07/19/21 13:37	06/24/21	
Cobalt	200.8	**182**	ug/L	0.10	0.05	5	07/19/21 13:37	06/24/21	

Client:	Anchor QEA, LLC		**Service Request:**	K2107111
Project:	Green Country/201114-01.05 Task 02		**Date Collected:**	06/09/21 15:00
Sample Matrix:	Water		**Date Received:**	06/18/21 12:30
Sample Name:	GRC-COL-1-10		**Basis:**	NA
Lab Code:	K2107111-012			

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	**2.3 J**	ug/L	2.5	0.5	5	07/19/21 13:39	06/24/21	
Cobalt	200.8	**181**	ug/L	0.10	0.05	5	07/19/21 13:39	06/24/21	

Client:	Anchor QEA, LLC	**Service Request:**	K2107111
Project:	Green Country/201114-01.05 Task 02	**Date Collected:**	06/09/21 15:00
Sample Matrix:	Water	**Date Received:**	06/18/21 12:30
Sample Name:	GRC-COL-2-10	**Basis:**	NA
Lab Code:	K2107111-013		

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	**1.2 J**	ug/L	2.5	0.5	5	07/19/21 13:41	06/24/21	
Cobalt	200.8	**183**	ug/L	0.10	0.05	5	07/19/21 13:41	06/24/21	

QC Summary Forms

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360) 577-7222 Fax (360) 425-9096
www.alsglobal.com

Metals

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1317 South 13th Avenue, Kelso, WA 98626
Phone (360) 577-7222 Fax (360) 425-9096
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Analytical Report

Client: Anchor QEA, LLC
Project: Green Country/201114-01.05 Task 02
Sample Matrix: Water

Service Request: K2107111
Date Collected: NA
Date Received: NA

Sample Name: Method Blank
Lab Code: KQ2111386-01

Basis: NA

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	ND U	ug/L	0.50	0.09	1	07/19/21 12:57	06/24/21	
Cobalt	200.8	ND U	ug/L	0.020	0.009	1	07/19/21 12:57	06/24/21	

Client:	Anchor QEA, LLC	**Service Request:**	K2107111
Project:	Green Country/201114-01.05 Task 02	**Date Collected:**	06/10/21
Sample Matrix:	Water	**Date Received:**	06/18/21
		Date Analyzed:	07/19/21
		Date Extracted:	06/24/21

Matrix Spike Summary
Dissolved Metals

Sample Name:	GRC-COL-2-6	**Units:**	ug/L
Lab Code:	K2107111-001	**Basis:**	NA
Analysis Method:	200.8		
Prep Method:	EPA CLP ILM04.0		

Matrix Spike
KQ2111386-04

Analyte Name	Sample Result	Result	Spike Amount	% Rec	% Rec Limits
Arsenic	2.1 J	53.0	50.0	102	70-130
Cobalt	182	211	25.0	116 #	70-130

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

Matrix Spike and Matrix Spike Duplicate Data is presented for information purposes only. The matrix may or may not be relevant to samples reported in this report. The laboratory evaluates system performance based on the LCS and LCSD control limits.

Client:	Anchor QEA, LLC	**Service Request:**	K2107111
Project:	Green Country/201114-01.05 Task 02	**Date Collected:**	06/11/21
Sample Matrix:	Water	**Date Received:**	06/18/21
		Date Analyzed:	07/19/21
		Date Extracted:	06/24/21

Matrix Spike Summary
Dissolved Metals

Sample Name:	GRC-COL-INF-MW-1-7	**Units:**	ug/L
Lab Code:	K2107111-002	**Basis:**	NA
Analysis Method:	200.8		
Prep Method:	EPA CLP ILM04.0		

Matrix Spike
KQ2111386-06

Analyte Name	Sample Result	Result	Spike Amount	% Rec	% Rec Limits
Arsenic	122	171	50.0	99	70-130
Cobalt	185	206	25.0	83 #	70-130

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

Matrix Spike and Matrix Spike Duplicate Data is presented for information purposes only. The matrix may or may not be relevant to samples reported in this report. The laboratory evaluates system performance based on the LCS and LCSD control limits.

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client:	Anchor QEA, LLC	**Service Request:**	K2107111
Project	Green Country/201114-01.05 Task 02	**Date Collected:**	06/10/21
Sample Matrix:	Water	**Date Received:**	06/18/21
		Date Analyzed:	07/19/21

Replicate Sample Summary
Dissolved Metals

Sample Name:	GRC-COL-2-6	**Units:**	ug/L
Lab Code:	K2107111-001	**Basis:**	NA

Analyte Name	Analysis Method	MRL	MDL	Sample Result	Duplicate Sample KQ2111386-03 Result	Average	RPD	RPD Limit
Arsenic	200.8	2.5	0.5	2.1 J	1.9 J	2.0	10	20
Cobalt	200.8	0.10	0.05	182	185	184	2	20

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

Printed 7/21/2021 8:59:08 AM Superset Reference:21-0000597266 rev 00

ALS Group USA, Corp.

dba ALS Environmental

QA/QC Report

Client:	Anchor QEA, LLC	**Service Request:**	K2107111
Project	Green Country/201114-01.05 Task 02	**Date Collected:**	06/11/21
Sample Matrix:	Water	**Date Received:**	06/18/21
		Date Analyzed:	07/19/21

Replicate Sample Summary
Dissolved Metals

Sample Name:	GRC-COL-INF-MW-1-7	**Units:**	ug/L
Lab Code:	K2107111-002	**Basis:**	NA

Analyte Name	Analysis Method	MRL	MDL	Sample Result	Duplicate Sample KQ2111386-05 Result	Average	RPD	RPD Limit
Arsenic	200.8	2.5	0.5	122	120	121	2	20
Cobalt	200.8	0.10	0.05	185	186	186	<1	20

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

Printed 7/21/2021 8:59:08 AM

Superset Reference:21-0000597266 rev 00

Client: Anchor QEA, LLC
Project: Green Country/201114-01.05 Task 02
Sample Matrix: Water

Service Request: K2107111
Date Analyzed: 07/19/21

Lab Control Sample Summary
Dissolved Metals

Units:ug/L
Basis:NA

Lab Control Sample
KQ2111386-02

Analyte Name	Analytical Method	Result	Spike Amount	% Rec	% Rec Limits
Arsenic	200.8	50.0	50.0	100	85-115
Cobalt	200.8	24.6	25.0	98	85-115

ALS Environmental
ALS Group USA, Corp
1317 South 13th Avenue
Kelso, WA 98626
T : +1 360 577 7222
F : +1 360 636 1068
www.alsglobal.com

July 21, 2021

Analytical Report for Service Request No: K2107113

Masa Kanematsu
Anchor QEA, LLC
6720 SW Macadam Avenue
Suite 125
Portland, OR 97219

RE: Green County / 201114-01.05 Task 02

Dear Masa,

Enclosed are the results of the sample(s) submitted to our laboratory June 18, 2021
For your reference, these analyses have been assigned our service request number **K2107113.**

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please contact me if you have any questions. My extension is 3376. You may also contact me via email at Mark.Harris@alsglobal.com.

Respectfully submitted,

ALS Group USA, Corp. dba ALS Environmental

Mark Harris
Project Manager

ALS Environmental
ALS Group USA, Corp
1317 South 13th Avenue
Kelso, WA 98626
T : +1 360 577 7222
F : +1 360 636 1068
www.alsglobal.com

Table of Contents

Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

Inorganic Data Qualifiers

- `*` The result is an outlier. See case narrative.
- `#` The control limit criteria is not applicable. See case narrative.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- E The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated value.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.
- H The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

Metals Data Qualifiers

- `#` The control limit criteria is not applicable. See case narrative.
- J The result is an estimated value.
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- M The duplicate injection precision was not met.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- S The reported value was determined by the Method of Standard Additions (MSA).
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- `+` The correlation coefficient for the MSA is less than 0.995.
- Q See case narrative. One or more quality control criteria was outside the limits.

Organic Data Qualifiers

- `*` The result is an outlier. See case narrative.
- `#` The control limit criteria is not applicable. See case narrative.
- A A tentatively identified compound, a suspected aldol-condensation product.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- C The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
- D The reported result is from a dilution.
- E The result is an estimated value.
- J The result is an estimated value.
- N The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
- P The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.

Additional Petroleum Hydrocarbon Specific Qualifiers

- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- Y The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
- Z The chromatographic fingerprint does not resemble a petroleum product.

ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso
State Certifications, Accreditations, and Licenses

Agency	Web Site	Number
Alaska DEH	http://dec.alaska.gov/eh/lab/cs/csapproval.htm	UST-040
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0339
Arkansas - DEQ	http://www.adeq.state.ar.us/techsvs/labcert.htm	88-0637
California DHS (ELAP)	http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx	2795
DOD ELAP	http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm	L16-58-R4
Florida DOH	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E87412
Hawaii DOH	http://health.hawaii.gov/	-
ISO 17025	http://www.pjlabs.com/	L16-57
Louisiana DEQ	http://www.deq.louisiana.gov/page/la-lab-accreditation	03016
Maine DHS	http://www.maine.gov/dhhs/	WA01276
Minnesota DOH	http://www.health.state.mn.us/accreditation	053-999-457
Nevada DEP	http://ndep.nv.gov/bsdw/labservice.htm	WA01276
New Jersey DEP	http://www.nj.gov/dep/enforcement/oqa.html	WA005
New York - DOH	https://www.wadsworth.org/regulatory/elap	12060
North Carolina DEQ	https://deq.nc.gov/about/divisions/water-resources/water-resources-data/water-sciences-home-page/laboratory-certification-branch/non-field-lab-certification	605
Oklahoma DEQ	http://www.deq.state.ok.us/CSDnew/labcert.htm	9801
Oregon – DEQ (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	WA100010
South Carolina DHEC	http://www.scdhec.gov/environment/EnvironmentalLabCertification/	61002
Texas CEQ	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	T104704427
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C544
Wyoming (EPA Region 8)	https://www.epa.gov/region8-waterops/epa-region-8-certified-drinking-water-	-
Kelso Laboratory Website	www.alsglobal.com	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at www.ALSGlobal.com or at the accreditation bodies web site.
Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/anlayte is offered by that state.

Case Narrative

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360)577-7222 Fax (360)636-1068
www.alsglobal.com

Client:	Anchor QEA, LLC	**Service Request:**	K2107113
Project:	Green County	**Date Received:**	06/18/2021
Sample Matrix:	Water		

CASE NARRATIVE

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples for the Tier level II requested by the client.

Sample Receipt:

Fifteen water samples were received for analysis at ALS Environmental on 06/18/2021. Any discrepancies upon initial sample inspection are annotated on the sample receipt and preservation form included within this report. The samples were stored at minimum in accordance with the analytical method requirements.

Metals:

No significant anomalies were noted with this analysis.

Approved by ______________________ Date 07/21/2021

Chain of Custody

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360)577-7222 Fax (360)636-1068
www.alsglobal.com

K2107113

Chain of Custody Record & Laboratory Analysis Request

ANCHOR QEA

Jessica Goin
6720 SW Macadam Ave
Suite 125
Portland OR 97219

Laboratory Number:	503-972-5019
Date:	6/18/2021
Project Name:	Green County
Project Number:	201114-01.05 Task 02
Project Manager:	Masa Kanematsu
Phone Number:	503-972-5001 (Masa Kanematsu)
Shipment Method:	ALS Carrier

Line	Field Sample ID	Collection Date	Collection Time	Matrix	No. of Containers	Arsenic, Cobalt (dissolved, Method 200.8)	Comments/Preservation
1	GRC-COL-INF-MW-1-1	6/7/2021	16:00	Water	1	X	HNO_3 preserved, filtered
2	GRC-COL-1-1	6/7/2021	16:00	Water	1	X	HNO_3 preserved, filtered
3	GRC-COL-2-1	6/7/2021	16:00	Water	1	X	HNO_3 preserved, filtered
4	GRC-COL-1-2	6/7/2021	20:00	Water	1	X	HNO_3 preserved, filtered
5	GRC-COL-2-2	6/7/2021	20:00	Water	1	X	HNO_3 preserved, filtered
6	GRC-COL-INF-MW-1-3	6/8/2021	10:30	Water	1	X	HNO_3 preserved, filtered
7	GRC-COL-1-3	6/8/2021	10:30	Water	1	X	HNO_3 preserved, filtered
8	GRC-COL-2-3	6/8/2021	10:30	Water	1	X	HNO_3 preserved, filtered
9	GRC-COL-1-4	6/8/2021	16:00	Water	1	X	HNO_3 preserved, filtered
10	GRC-COL-2-4	6/8/2021	16:00	Water	1	X	HNO_3 preserved, filtered
11	GRC-COL-INF-MW-1-5	6/9/2021	12:45	Water	1	X	HNO_3 preserved, filtered
12	GRC-COL-1-5	6/9/2021	12:45	Water	1	X	HNO_3 preserved, filtered
13	GRC-COL-2-5	6/9/2021	12:45	Water	1	X	HNO_3 preserved, filtered
14	GRC-COL-INF-MW-1-6	6/10/2021	13:15	Water	1	X	HNO_3 preserved, filtered
15	GRC-COL-1-6	6/10/2021	13:15	Water	1	X	HNO_3 preserved, filtered

Notes: **Please analyze all analytes with** standard TAT **on this page. Please analyze with Method 200.8 (ICP-MS) for better detection limit.**
Desired reporting limits : As (<2 ug/L), Co (<1 ug/L). For Lithium, please use Method 200.8 for better detection limit if possible. Report requirement: Type II (PDF & csv files)

Relinquished by:	Company:	Received by:	Company:
Masa Kanematsu	Anchor QEA	Perry Jones	ALS
Signature/Print Name:	Date/Time:	Signature/Print Name:	Date/Time:
[signature]	6/18/2021 9:00		6/18/21 1230

Relinquished by:	Company:	Received by:	Company:
Signature/Print Name:	Date/Time:	Signature/Print Name:	Date/Time:

Distribution: A copy will be made for the laboratory and client. The Project file will retain the original.

Page 1 of 2

PM MH

Cooler Receipt and Preservation Form

Client Anchor Service Request **K21** 07113

Received: 6/18/21 Opened: 6/18/21 By: PJ Unloaded: 6/18/21 By: PJ

1. Samples were received via? *USPS* *Fed Ex* *UPS* *DHL* *PDX* *Courier* *Hand Delivered*
2. Samples were received in: (circle) *Cooler* *Box* *Envelope* *Other*_____ *NA*
3. Were custody seals on coolers? NA Y N If yes, how many and where? _____
   If present, were custody seals intact? Y N If present, were they signed and dated? Y N
4. Was a Temperature Blank present in cooler? NA Y N If yes, notate the temperature in the appropriate column below:
   If no, take the temperature of a representative sample bottle contained within the cooler; notate in the column "Sample Temp":
5. Were samples received within the method specified temperature ranges? NA Y N
   If no, were they received on ice and same day as collected? If not, notate the cooler # below and notify the PM. NA Y N

If applicable, tissue samples were received: *Frozen* *Partially Thawed* *Thawed*

Temp Blank	Sample Temp	IR Gun	Cooler #/COC ID / NA	Out of temp indicate with "X"	PM Notified If out of temp	Tracking Number NA	Filed
	4.7	FR02					

6. Packing material: *Inserts* *Baggies* *Bubble Wrap* *Gel Packs* *Wet Ice* *Dry Ice* *Sleeves* _____
7. Were custody papers properly filled out (ink, signed, etc.)? NA Y N
8. Were samples received in good condition (unbroken) NA Y N
9. Were all sample labels complete (ie, analysis, preservation, etc.)? NA Y N
10. Did all sample labels and tags agree with custody papers? NA Y N
11. Were appropriate bottles/containers and volumes received for the tests indicated? NA Y N
12. Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? *Indicate in the table below* NA Y N
13. Were VOA vials received without headspace? *Indicate in the table below.* NA Y N
14. Was C12/Res negative? NA Y N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count Bottle Type	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, Resolutions:_____

Metals

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360)577-7222 Fax (360)636-1068
www.alsglobal.com

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client:	Anchor QEA, LLC	**Service Request:**	K2107113
Project:	Green County/201114-01.05 Task 02	**Date Collected:**	06/07/21 16:00
Sample Matrix:	Water	**Date Received:**	06/18/21 12:30
Sample Name:	GRC-COL-INF-MW-1-1	**Basis:**	NA
Lab Code:	K2107113-001		

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	**290**	ug/L	2.5	0.5	5	07/19/21 12:17	06/24/21	
Cobalt	200.8	**190**	ug/L	0.10	0.05	5	07/19/21 12:17	06/24/21	

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Superset Reference:

Client:	Anchor QEA, LLC		**Service Request:**	K2107113
Project:	Green County/201114-01.05 Task 02		**Date Collected:**	06/07/21 16:00
Sample Matrix:	Water		**Date Received:**	06/18/21 12:30
Sample Name:	GRC-COL-1-1		**Basis:**	NA
Lab Code:	K2107113-002			

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	**14.5**	ug/L	2.5	0.5	5	07/19/21 12:21	06/24/21	
Cobalt	200.8	**455**	ug/L	0.10	0.05	5	07/19/21 12:21	06/24/21	

Client:	Anchor QEA, LLC	**Service Request:**	K2107113
Project:	Green County/201114-01.05 Task 02	**Date Collected:**	06/07/21 16:00
Sample Matrix:	Water	**Date Received:**	06/18/21 12:30
Sample Name:	GRC-COL-2-1	**Basis:**	NA
Lab Code:	K2107113-003		

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	**4.6**	ug/L	2.5	0.5	5	07/19/21 12:26	06/24/21	
Cobalt	200.8	**153**	ug/L	0.10	0.05	5	07/19/21 12:26	06/24/21	

Client:	Anchor QEA, LLC		**Service Request:**	K2107113
Project:	Green County/201114-01.05 Task 02		**Date Collected:**	06/07/21 20:00
Sample Matrix:	Water		**Date Received:**	06/18/21 12:30
Sample Name:	GRC-COL-1-2		**Basis:**	NA
Lab Code:	K2107113-004			

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	**12.6**	ug/L	2.5	0.5	5	07/19/21 12:28	06/24/21	
Cobalt	200.8	**272**	ug/L	0.10	0.05	5	07/19/21 12:28	06/24/21	

Client:	Anchor QEA, LLC	**Service Request:**	K2107113
Project:	Green County/201114-01.05 Task 02	**Date Collected:**	06/07/21 20:00
Sample Matrix:	Water	**Date Received:**	06/18/21 12:30
Sample Name:	GRC-COL-2-2	**Basis:**	NA
Lab Code:	K2107113-005		

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	**4.2**	ug/L	2.5	0.5	5	07/19/21 12:33	06/24/21	
Cobalt	200.8	**178**	ug/L	0.10	0.05	5	07/19/21 12:33	06/24/21	

Client:	Anchor QEA, LLC		**Service Request:**	K2107113
Project:	Green County/201114-01.05 Task 02		**Date Collected:**	06/08/21 10:30
Sample Matrix:	Water		**Date Received:**	06/18/21 12:30
Sample Name:	GRC-COL-INF-MW-1-3		**Basis:**	NA
Lab Code:	K2107113-006			

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	**52.7**	ug/L	2.5	0.5	5	07/19/21 12:34	06/24/21	
Cobalt	200.8	**184**	ug/L	0.10	0.05	5	07/19/21 12:34	06/24/21	

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Analytical Report

Client:	Anchor QEA, LLC	**Service Request:**	K2107113
Project:	Green County/201114-01.05 Task 02	**Date Collected:**	06/08/21 10:30
Sample Matrix:	Water	**Date Received:**	06/18/21 12:30
Sample Name:	GRC-COL-1-3	**Basis:**	NA
Lab Code:	K2107113-007		

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	**6.7**	ug/L	2.5	0.5	5	07/19/21 12:36	06/24/21	
Cobalt	200.8	**189**	ug/L	0.10	0.05	5	07/19/21 12:36	06/24/21	

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Superset Reference:

Client:	Anchor QEA, LLC		**Service Request:**	K2107113
Project:	Green County/201114-01.05 Task 02		**Date Collected:**	06/08/21 10:30
Sample Matrix:	Water		**Date Received:**	06/18/21 12:30
Sample Name:	GRC-COL-2-3		**Basis:**	NA
Lab Code:	K2107113-008			

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	**3.0**	ug/L	2.5	0.5	5	07/19/21 12:37	06/24/21	
Cobalt	200.8	**183**	ug/L	0.10	0.05	5	07/19/21 12:37	06/24/21	

Client:	Anchor QEA, LLC		**Service Request:**	K2107113
Project:	Green County/201114-01.05 Task 02		**Date Collected:**	06/08/21 16:00
Sample Matrix:	Water		**Date Received:**	06/18/21 12:30
Sample Name:	GRC-COL-1-4		**Basis:**	NA
Lab Code:	K2107113-009			

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	**6.0**	ug/L	2.5	0.5	5	07/19/21 12:39	06/24/21	
Cobalt	200.8	**189**	ug/L	0.10	0.05	5	07/19/21 12:39	06/24/21	

Analytical Report

Client:	Anchor QEA, LLC	**Service Request:**	K2107113
Project:	Green County/201114-01.05 Task 02	**Date Collected:**	06/08/21 16:00
Sample Matrix:	Water	**Date Received:**	06/18/21 12:30
Sample Name:	GRC-COL-2-4	**Basis:**	NA
Lab Code:	K2107113-010		

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	**2.9**	ug/L	2.5	0.5	5	07/19/21 12:41	06/24/21	
Cobalt	200.8	**188**	ug/L	0.10	0.05	5	07/19/21 12:41	06/24/21	

Analytical Report

Client:	Anchor QEA, LLC		**Service Request:**	K2107113
Project:	Green County/201114-01.05 Task 02		**Date Collected:**	06/09/21 12:45
Sample Matrix:	Water		**Date Received:**	06/18/21 12:30
Sample Name:	GRC-COL-INF-MW-1-5		**Basis:**	NA
Lab Code:	K2107113-011			

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	**55.5**	ug/L	2.5	0.5	5	07/19/21 12:42	06/24/21	
Cobalt	200.8	**186**	ug/L	0.10	0.05	5	07/19/21 12:42	06/24/21	

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Analytical Report

Client:	Anchor QEA, LLC	**Service Request:**	K2107113
Project:	Green County/201114-01.05 Task 02	**Date Collected:**	06/09/21 12:45
Sample Matrix:	Water	**Date Received:**	06/18/21 12:30
Sample Name:	GRC-COL-1-5	**Basis:**	NA
Lab Code:	K2107113-012		

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	**4.5**	ug/L	2.5	0.5	5	07/19/21 12:44	06/24/21	
Cobalt	200.8	**190**	ug/L	0.10	0.05	5	07/19/21 12:44	06/24/21	

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ALS Group USA, Corp.
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Analytical Report

Client:	Anchor QEA, LLC	**Service Request:**	K2107113
Project:	Green County/201114-01.05 Task 02	**Date Collected:**	06/09/21 12:45
Sample Matrix:	Water	**Date Received:**	06/18/21 12:30
Sample Name:	GRC-COL-2-5	**Basis:**	NA
Lab Code:	K2107113-013		

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	**2.0 J**	ug/L	2.5	0.5	5	07/19/21 12:45	06/24/21	
Cobalt	200.8	**190**	ug/L	0.10	0.05	5	07/19/21 12:45	06/24/21	

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Superset Reference:

Client:	Anchor QEA, LLC	**Service Request:**	K2107113
Project:	Green County/201114-01.05 Task 02	**Date Collected:**	06/10/21 13:15
Sample Matrix:	Water	**Date Received:**	06/18/21 12:30
Sample Name:	GRC-COL-INF-MW-1-6	**Basis:**	NA
Lab Code:	K2107113-014		

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	**88.9**	ug/L	2.5	0.5	5	07/19/21 12:47	06/24/21	
Cobalt	200.8	**189**	ug/L	0.10	0.05	5	07/19/21 12:47	06/24/21	

Client:	Anchor QEA, LLC		**Service Request:**	K2107113
Project:	Green County/201114-01.05 Task 02		**Date Collected:**	06/10/21 13:15
Sample Matrix:	Water		**Date Received:**	06/18/21 12:30
Sample Name:	GRC-COL-1-6		**Basis:**	NA
Lab Code:	K2107113-015			

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	**4.0**	ug/L	2.5	0.5	5	07/19/21 12:52	06/24/21	
Cobalt	200.8	**189**	ug/L	0.10	0.05	5	07/19/21 12:52	06/24/21	

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Analytical Report

Client:	Anchor QEA, LLC	**Service Request:**	K2107113
Project:	Green County/201114-01.05 Task 02	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA
Sample Name:	Method Blank	**Basis:**	NA
Lab Code:	KQ2111454-01		

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	ND U	ug/L	0.50	0.09	1	07/19/21 12:13	06/24/21	
Cobalt	200.8	ND U	ug/L	0.020	0.009	1	07/19/21 12:13	06/24/21	

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client:	Anchor QEA, LLC	**Service Request:**	K2107113
Project	Green County/201114-01.05 Task 02	**Date Collected:**	06/07/21
Sample Matrix:	Water	**Date Received:**	06/18/21
		Date Analyzed:	07/19/21

Replicate Sample Summary
Dissolved Metals

Sample Name:	GRC-COL-INF-MW-1-1	**Units:**	ug/L
Lab Code:	K2107113-001	**Basis:**	NA

Analyte Name	Analysis Method	MRL	MDL	Sample Result	Duplicate Sample KQ2111454-03 Result	Average	RPD	RPD Limit
Arsenic	200.8	2.5	0.5	290	290	290	<1	20
Cobalt	200.8	0.10	0.05	190	191	191	<1	20

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

Printed 7/20/2021 2:29:10 PM   Superset Reference:

Client:	Anchor QEA, LLC	**Service Request:**	K2107113
Project	Green County/201114-01.05 Task 02	**Date Collected:**	06/07/21
Sample Matrix:	Water	**Date Received:**	06/18/21
		Date Analyzed:	07/19/21

Replicate Sample Summary
Dissolved Metals

Sample Name:	GRC-COL-1-1	**Units:**	ug/L
Lab Code:	K2107113-002	**Basis:**	NA

Analyte Name	Analysis Method	MRL	MDL	Sample Result	Duplicate Sample KQ2111454-05 Result	Average	RPD	RPD Limit
Arsenic	200.8	2.5	0.5	14.5	14.2	14.4	2	20
Cobalt	200.8	0.10	0.05	455	451	453	<1	20

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

Client:	Anchor QEA, LLC	**Service Request:**	K2107113
Project:	Green County/201114-01.05 Task 02	**Date Collected:**	06/07/21
Sample Matrix:	Water	**Date Received:**	06/18/21
		Date Analyzed:	07/19/21
		Date Extracted:	06/24/21

Matrix Spike Summary
Dissolved Metals

Sample Name:	GRC-COL-INF-MW-1-1	**Units:**	ug/L
Lab Code:	K2107113-001	**Basis:**	NA
Analysis Method:	200.8		
Prep Method:	EPA CLP ILM04.0		

Matrix Spike
KQ2111454-04

Analyte Name	Sample Result	Result	Spike Amount	% Rec	% Rec Limits
Arsenic	290	330	50.0	81 #	70-130
Cobalt	190	211	25.0	87 #	70-130

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

Matrix Spike and Matrix Spike Duplicate Data is presented for information purposes only. The matrix may or may not be relevant to samples reported in this report. The laboratory evaluates system performance based on the LCS and LCSD control limits.

Client:	Anchor QEA, LLC	**Service Request:**	K2107113
Project:	Green County/201114-01.05 Task 02	**Date Collected:**	06/07/21
Sample Matrix:	Water	**Date Received:**	06/18/21
		Date Analyzed:	07/19/21
		Date Extracted:	06/24/21

Matrix Spike Summary
Dissolved Metals

Sample Name:	GRC-COL-1-1	**Units:**	ug/L
Lab Code:	K2107113-002	**Basis:**	NA
Analysis Method:	200.8		
Prep Method:	EPA CLP ILM04.0		

Matrix Spike
KQ2111454-06

Analyte Name	Sample Result	Result	Spike Amount	% Rec	% Rec Limits
Arsenic	14.5	63.1	50.0	97	70-130
Cobalt	455	475	25.0	82 #	70-130

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

Matrix Spike and Matrix Spike Duplicate Data is presented for information purposes only. The matrix may or may not be relevant to samples reported in this report. The laboratory evaluates system performance based on the LCS and LCSD control limits.

Client: Anchor QEA, LLC
Project: Green County/201114-01.05 Task 02
Sample Matrix: Water

Service Request: K2107113
Date Analyzed: 07/19/21

Lab Control Sample Summary
Dissolved Metals

Units: ug/L
Basis: NA

Lab Control Sample
KQ2111454-02

Analyte Name	Analytical Method	Result	Spike Amount	% Rec	% Rec Limits
Arsenic	200.8	51.6	50.0	103	85-115
Cobalt	200.8	25.7	25.0	103	85-115

ALS Environmental
ALS Group USA, Corp
1317 South 13th Avenue
Kelso, WA 98626
T : +1 360 577 7222
F : +1 360 636 1068
www.alsglobal.com

July 21, 2021

Analytical Report for Service Request No: K2107116

Masa Kanematsu
Anchor QEA, LLC
6720 SW Macadam Avenue
Suite 125
Portland, OR 97219

RE: Green County / 201114-01.05 Task 02

Dear Masa,

Enclosed are the results of the sample(s) submitted to our laboratory June 18, 2021
For your reference, these analyses have been assigned our service request number **K2107116.**

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please contact me if you have any questions. My extension is 3376. You may also contact me via email at Mark.Harris@alsglobal.com.

Respectfully submitted,

ALS Group USA, Corp. dba ALS Environmental

Mark Harris
Project Manager

ALS Environmental
ALS Group USA, Corp
1317 South 13th Avenue
Kelso, WA 98626
T : +1 360 577 7222
F : +1 360 636 1068
www.alsglobal.com

Table of Contents

Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

Inorganic Data Qualifiers

- * The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- E The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated value.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
  DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.
- H The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

Metals Data Qualifiers

- # The control limit criteria is not applicable. See case narrative.
- J The result is an estimated value.
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- M The duplicate injection precision was not met.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- S The reported value was determined by the Method of Standard Additions (MSA).
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
  DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- + The correlation coefficient for the MSA is less than 0.995.
- Q See case narrative. One or more quality control criteria was outside the limits.

Organic Data Qualifiers

- * The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- A A tentatively identified compound, a suspected aldol-condensation product.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- C The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
- D The reported result is from a dilution.
- E The result is an estimated value.
- J The result is an estimated value.
- N The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
- P The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
  DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.

Additional Petroleum Hydrocarbon Specific Qualifiers

- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- Y The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
- Z The chromatographic fingerprint does not resemble a petroleum product.

ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso
State Certifications, Accreditations, and Licenses

Agency	Web Site	Number
Alaska DEH	http://dec.alaska.gov/eh/lab/cs/csapproval.htm	UST-040
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0339
Arkansas - DEQ	http://www.adeq.state.ar.us/techsvs/labcert.htm	88-0637
California DHS (ELAP)	http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx	2795
DOD ELAP	http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm	L16-58-R4
Florida DOH	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E87412
Hawaii DOH	http://health.hawaii.gov/	-
ISO 17025	http://www.pjlabs.com/	L16-57
Louisiana DEQ	http://www.deq.louisiana.gov/page/la-lab-accreditation	03016
Maine DHS	http://www.maine.gov/dhhs/	WA01276
Minnesota DOH	http://www.health.state.mn.us/accreditation	053-999-457
Nevada DEP	http://ndep.nv.gov/bsdw/labservice.htm	WA01276
New Jersey DEP	http://www.nj.gov/dep/enforcement/oqa.html	WA005
New York - DOH	https://www.wadsworth.org/regulatory/elap	12060
North Carolina DEQ	https://deq.nc.gov/about/divisions/water-resources/water-resources-data/water-sciences-home-page/laboratory-certification-branch/non-field-lab-certification	605
Oklahoma DEQ	http://www.deq.state.ok.us/CSDnew/labcert.htm	9801
Oregon – DEQ (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	WA100010
South Carolina DHEC	http://www.scdhec.gov/environment/EnvironmentalLabCertification/	61002
Texas CEQ	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	T104704427
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C544
Wyoming (EPA Region 8)	https://www.epa.gov/region8-waterops/epa-region-8-certified-drinking-water-	-
Kelso Laboratory Website	www.alsglobal.com	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at www.ALSGlobal.com or at the accreditation bodies web site.
Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/anlayte is offered by that state.

Case Narrative

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360)577-7222 Fax (360)636-1068
www.alsglobal.com

1317 South 13th Ave, Kelso, WA 98626 | 1-360-577-7222 | www.alsglobal.com

ALS Environmental

Client: Anchor QEA, LLC
Project: Green County
Sample Matrix: Water

Service Request: K2107116
Date Received: 06/18/2021

CASE NARRATIVE

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples for the Tier level II requested by the client.

Sample Receipt:

Fifteen water samples were received for analysis at ALS Environmental on 06/18/2021. Any discrepancies upon initial sample inspection are annotated on the sample receipt and preservation form included within this report. The samples were stored at minimum in accordance with the analytical method requirements.

Metals:

No significant anomalies were noted with this analysis.

Approved by ____________________ Date 07/21/2021

Chain of Custody

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360)577-7222 Fax (360)636-1068
www.alsglobal.com

K2107116

Chain of Custody Record & Laboratory Analysis Request

Laboratory Number:	503-972-5019
Date:	6/18/2021
Project Name:	Green County
Project Number:	201114-01.05 Task 02
Project Manager:	Masa Kanematsu
Phone Number:	503-972-5001 (Masa Kanematsu)
Shipment Method:	ALS Carrier

ANCHOR QEA

Jessica Goin
6720 SW Macadam Ave
Suite 125
Portland OR 97219

Line	Field Sample ID	Collection Date	Collection Time	Matrix	No. of Containers	Arsenic, Lithium (dissolved, Method 200.8)	Comments/Preservation
1	GRC-COL-INF-MW-17-1	6/7/2021	16:00	Water	1	X	HNO_3 preserved, filtered
2	GRC-COL-3-1	6/7/2021	16:00	Water	1	X	HNO_3 preserved, filtered
3	GRC-COL-4-1	6/7/2021	16:00	Water	1	X	HNO_3 preserved, filtered
4	GRC-COL-3-2	6/7/2021	20:00	Water	1	X	HNO_3 preserved, filtered
5	GRC-COL-4-2	6/7/2021	20:00	Water	1	X	HNO_3 preserved, filtered
6	GRC-COL-INF-MW-17-3	6/8/2021	10:30	Water	1	X	HNO_3 preserved, filtered
7	GRC-COL-3-3	6/8/2021	10:30	Water	1	X	HNO_3 preserved, filtered
8	GRC-COL-4-3	6/8/2021	10:30	Water	1	X	HNO_3 preserved, filtered
9	GRC-COL-3-4	6/8/2021	16:00	Water	1	X	HNO_3 preserved, filtered
10	GRC-COL-4-4	6/8/2021	16:00	Water	1	X	HNO_3 preserved, filtered
11	GRC-COL-INF-MW-17-5	6/9/2021	12:45	Water	1	X	HNO_3 preserved, filtered
12	GRC-COL-3-5	6/9/2021	12:45	Water	1	X	HNO_3 preserved, filtered
13	GRC-COL-4-5	6/9/2021	12:45	Water	1	X	HNO_3 preserved, filtered
14	GRC-COL-INF-MW-17-6	6/10/2021	13:15	Water	1	X	HNO_3 preserved, filtered
15	GRC-COL-3-6	6/10/2021	13:15	Water	1	X	HNO_3 preserved, filtered

Notes: **Please analyze all analytes with** standard TAT **on this page. Please analyze with Method 200.8 (ICP-MS) for better detection limit.**

Desired reporting limits : As (<2 ug/L). For Lithium, please use Method 200.8 for better detection limit if possible. Report requirement: Type II (PDF & csv files)

Relinquished by:	Company:	Received by:	Company:
Masa Kanematsu	Anchor QEA		
Signature/Print Name:	Date/Time:	Signature/Print Name:	Date/Time:
	6/18/2021 9:00		

Relinquished by:	Company:	Received by:	Company:
Signature/Print Name:	Date/Time:	Signature/Print Name:	Date/Time:
Perry Jones	6/18/21 1230		

Distribution: A copy will be made for the laboratory and client. The Project file will retain the original.

Page 1 of 2

PM MH

Cooler Receipt and Preservation Form

Client Anchor Service Request K21 07116

Received: 6/18/21 Opened: 6/18/21 By: PJ Unloaded: 6/18/21 By: PJ

1. Samples were received via? *USPS* *Fed Ex* *UPS* *DHL* *PDX* *Courier* *Hand Delivered*
2. Samples were received in: (circle) *Cooler* *Box* *Envelope* *Other* ______ *NA*
3. Were custody seals on coolers? NA Y N If yes, how many and where? ______
   If present, were custody seals intact? Y N If present, were they signed and dated? Y N
4. Was a Temperature Blank present in cooler? NA Y N If yes, notate the temperature in the appropriate column below:
   If no, take the temperature of a representative sample bottle contained within the cooler; notate in the column "Sample Temp":
5. Were samples received within the method specified temperature ranges? NA Y N
   If no, were they received on ice and same day as collected? If not, notate the cooler # below and notify the PM. NA Y N

If applicable, tissue samples were received: *Frozen* *Partially Thawed* *Thawed*

Temp Blank	Sample Temp	IR Gun	Cooler #/COC ID / NA	Out of temp indicate with "X"	PM Notified If out of temp	Tracking Number NA	Filed
	5.7	IR02					

6. Packing material: *Inserts* *Baggies* *Bubble Wrap* *Gel Packs* *Wet Ice* *Dry Ice* *Sleeves* ______
7. Were custody papers properly filled out (ink, signed, etc.)? NA Y N
8. Were samples received in good condition (unbroken) NA Y N
9. Were all sample labels complete (ie, analysis, preservation, etc.)? NA Y N
10. Did all sample labels and tags agree with custody papers? NA Y N
11. Were appropriate bottles/containers and volumes received for the tests indicated? NA Y N
12. Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? *Indicate in the table below* NA Y N
13. Were VOA vials received without headspace? *Indicate in the table below.* NA Y N
14. Was C12/Res negative? NA Y N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count Bottle Type	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, Resolutions: ______

Metals

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360)577-7222 Fax (360)636-1068
www.alsglobal.com

Client:	Anchor QEA, LLC	**Service Request:**	K2107116
Project:	Green County/201114-01.05 Task 02	**Date Collected:**	06/07/21 16:00
Sample Matrix:	Water	**Date Received:**	06/18/21 12:30
Sample Name:	GRC-COL-INF-MW-17-1	**Basis:**	NA
Lab Code:	K2107116-001		

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	**105**	ug/L	2.5	0.5	5	07/19/21 13:49	06/24/21	
Lithium	200.8	**695**	ug/L	0.50	0.50	5	07/19/21 13:49	06/24/21	

Client: Anchor QEA, LLC
Project: Green County/201114-01.05 Task 02
Sample Matrix: Water

Service Request: K2107116
Date Collected: 06/07/21 16:00
Date Received: 06/18/21 12:30

Sample Name: GRC-COL-3-1
Lab Code: K2107116-002

Basis: NA

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	**3.0**	ug/L	2.5	0.5	5	07/19/21 13:53	06/24/21	
Lithium	200.8	**518**	ug/L	0.50	0.50	5	07/19/21 13:53	06/24/21	

Client:	Anchor QEA, LLC		**Service Request:**	K2107116
Project:	Green County/201114-01.05 Task 02		**Date Collected:**	06/07/21 16:00
Sample Matrix:	Water		**Date Received:**	06/18/21 12:30
Sample Name:	GRC-COL-4-1		**Basis:**	NA
Lab Code:	K2107116-003			

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	**13.6**	ug/L	2.5	0.5	5	07/19/21 13:58	06/24/21	
Lithium	200.8	**650**	ug/L	0.50	0.50	5	07/19/21 13:58	06/24/21	

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client:	Anchor QEA, LLC		**Service Request:**	K2107116
Project:	Green County/201114-01.05 Task 02		**Date Collected:**	06/07/21 20:00
Sample Matrix:	Water		**Date Received:**	06/18/21 12:30
Sample Name:	GRC-COL-3-2		**Basis:**	NA
Lab Code:	K2107116-004			

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	**7.9**	ug/L	2.5	0.5	5	07/19/21 14:00	06/24/21	
Lithium	200.8	**689**	ug/L	0.50	0.50	5	07/19/21 14:00	06/24/21	

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Superset Reference:

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client:	Anchor QEA, LLC	**Service Request:**	K2107116
Project:	Green County/201114-01.05 Task 02	**Date Collected:**	06/07/21 20:00
Sample Matrix:	Water	**Date Received:**	06/18/21 12:30
Sample Name:	GRC-COL-4-2	**Basis:**	NA
Lab Code:	K2107116-005		

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	**10.6**	ug/L	2.5	0.5	5	07/19/21 14:05	06/24/21	
Lithium	200.8	**695**	ug/L	0.50	0.50	5	07/19/21 14:05	06/24/21	

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Superset Reference:

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client:	Anchor QEA, LLC	**Service Request:**	K2107116
Project:	Green County/201114-01.05 Task 02	**Date Collected:**	06/08/21 10:30
Sample Matrix:	Water	**Date Received:**	06/18/21 12:30
Sample Name:	GRC-COL-INF-MW-17-3	**Basis:**	NA
Lab Code:	K2107116-006		

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	**73.8**	ug/L	2.5	0.5	5	07/19/21 14:06	06/24/21	
Lithium	200.8	**708**	ug/L	0.50	0.50	5	07/19/21 14:06	06/24/21	

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Superset Reference:

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client:	Anchor QEA, LLC	**Service Request:**	K2107116
Project:	Green County/201114-01.05 Task 02	**Date Collected:**	06/08/21 10:30
Sample Matrix:	Water	**Date Received:**	06/18/21 12:30
Sample Name:	GRC-COL-3-3	**Basis:**	NA
Lab Code:	K2107116-007		

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	**7.0**	ug/L	2.5	0.5	5	07/19/21 14:08	06/24/21	
Lithium	200.8	**692**	ug/L	0.50	0.50	5	07/19/21 14:08	06/24/21	

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Superset Reference:

Client:	Anchor QEA, LLC		**Service Request:**	K2107116
Project:	Green County/201114-01.05 Task 02		**Date Collected:**	06/08/21 10:30
Sample Matrix:	Water		**Date Received:**	06/18/21 12:30
Sample Name:	GRC-COL-4-3		**Basis:**	NA
Lab Code:	K2107116-008			

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	**5.6**	ug/L	2.5	0.5	5	07/19/21 14:09	06/24/21	
Lithium	200.8	**683**	ug/L	0.50	0.50	5	07/19/21 14:09	06/24/21	

Analytical Report

Client: Anchor QEA, LLC
Project: Green County/201114-01.05 Task 02
Sample Matrix: Water
Service Request: K2107116
Date Collected: 06/08/21 16:00
Date Received: 06/18/21 12:30

Sample Name: GRC-COL-3-4
Lab Code: K2107116-009
Basis: NA

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	**7.9**	ug/L	2.5	0.5	5	07/19/21 14:11	06/24/21	
Lithium	200.8	**707**	ug/L	0.50	0.50	5	07/19/21 14:11	06/24/21	

Client: Anchor QEA, LLC
Service Request: K2107116
Project: Green County/201114-01.05 Task 02
Date Collected: 06/08/21 16:00
Sample Matrix: Water
Date Received: 06/18/21 12:30

Sample Name: GRC-COL-4-4
Basis: NA
Lab Code: K2107116-010

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	**6.5**	ug/L	2.5	0.5	5	07/19/21 14:13	06/24/21	
Lithium	200.8	**723**	ug/L	0.50	0.50	5	07/19/21 14:13	06/24/21	

Client: Anchor QEA, LLC
Project: Green County/201114-01.05 Task 02
Sample Matrix: Water

Service Request: K2107116
Date Collected: 06/09/21 12:45
Date Received: 06/18/21 12:30

Sample Name: GRC-COL-INF-MW-17-5
Lab Code: K2107116-011

Basis: NA

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	**61.6**	ug/L	2.5	0.5	5	07/19/21 14:14	06/24/21	
Lithium	200.8	**734**	ug/L	0.50	0.50	5	07/19/21 14:14	06/24/21	

Analytical Report

Client:	Anchor QEA, LLC	**Service Request:**	K2107116
Project:	Green County/201114-01.05 Task 02	**Date Collected:**	06/09/21 12:45
Sample Matrix:	Water	**Date Received:**	06/18/21 12:30
Sample Name:	GRC-COL-3-5	**Basis:**	NA
Lab Code:	K2107116-012		

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	**11.7**	ug/L	2.5	0.5	5	07/19/21 14:16	06/24/21	
Lithium	200.8	**703**	ug/L	0.50	0.50	5	07/19/21 14:16	06/24/21	

Analytical Report

Client:	Anchor QEA, LLC	**Service Request:**	K2107116
Project:	Green County/201114-01.05 Task 02	**Date Collected:**	06/09/21 12:45
Sample Matrix:	Water	**Date Received:**	06/18/21 12:30
Sample Name:	GRC-COL-4-5	**Basis:**	NA
Lab Code:	K2107116-013		

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	**6.9**	ug/L	2.5	0.5	5	07/19/21 14:17	06/24/21	
Lithium	200.8	**771**	ug/L	0.50	0.50	5	07/19/21 14:17	06/24/21	

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client:	Anchor QEA, LLC	**Service Request:**	K2107116
Project:	Green County/201114-01.05 Task 02	**Date Collected:**	06/10/21 13:15
Sample Matrix:	Water	**Date Received:**	06/18/21 12:30
Sample Name:	GRC-COL-INF-MW-17-6	**Basis:**	NA
Lab Code:	K2107116-014		

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	**49.1**	ug/L	2.5	0.5	5	07/19/21 14:19	06/24/21	
Lithium	200.8	**717**	ug/L	0.50	0.50	5	07/19/21 14:19	06/24/21	

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Superset Reference:

Client:	Anchor QEA, LLC	**Service Request:**	K2107116
Project:	Green County/201114-01.05 Task 02	**Date Collected:**	06/10/21 13:15
Sample Matrix:	Water	**Date Received:**	06/18/21 12:30
Sample Name:	GRC-COL-3-6	**Basis:**	NA
Lab Code:	K2107116-015		

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	**12.6**	ug/L	2.5	0.5	5	07/19/21 14:24	06/24/21	
Lithium	200.8	**723**	ug/L	0.50	0.50	5	07/19/21 14:24	06/24/21	

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client:	Anchor QEA, LLC	**Service Request:**	K2107116
Project:	Green County/201114-01.05 Task 02	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA
Sample Name:	Method Blank	**Basis:**	NA
Lab Code:	KQ2111389-01		

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	ND U	ug/L	0.50	0.09	1	07/19/21 13:46	06/24/21	
Lithium	200.8	ND U	ug/L	0.10	0.10	1	07/19/21 13:46	06/24/21	

ALS Group USA, Corp.

dba ALS Environmental

QA/QC Report

Client:	Anchor QEA, LLC	**Service Request:**	K2107116
Project	Green County/201114-01.05 Task 02	**Date Collected:**	06/07/21
Sample Matrix:	Water	**Date Received:**	06/18/21
		Date Analyzed:	07/19/21

Replicate Sample Summary
Dissolved Metals

Sample Name:	GRC-COL-INF-MW-17-1	**Units:**	ug/L
Lab Code:	K2107116-001	**Basis:**	NA

Analyte Name	Analysis Method	MRL	MDL	Sample Result	Duplicate Sample KQ2111389-03 Result	Average	RPD	RPD Limit
Arsenic	200.8	2.5	0.5	105	103	104	2	20
Lithium	200.8	0.50	0.50	695	688	692	1	20

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

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Client:	Anchor QEA, LLC	**Service Request:**	K2107116
Project	Green County/201114-01.05 Task 02	**Date Collected:**	06/07/21
Sample Matrix:	Water	**Date Received:**	06/18/21
		Date Analyzed:	07/19/21

Replicate Sample Summary
Dissolved Metals

Sample Name:	GRC-COL-3-1	**Units:**	ug/L
Lab Code:	K2107116-002	**Basis:**	NA

Analyte Name	Analysis Method	MRL	MDL	Sample Result	Duplicate Sample KQ2111389-05 Result	Average	RPD	RPD Limit
Arsenic	200.8	2.5	0.5	3.0	2.8	2.9	7	20
Lithium	200.8	0.50	0.50	518	533	526	3	20

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

Client:	Anchor QEA, LLC	**Service Request:**	K2107116
Project:	Green County/201114-01.05 Task 02	**Date Collected:**	06/07/21
Sample Matrix:	Water	**Date Received:**	06/18/21
		Date Analyzed:	07/19/21
		Date Extracted:	06/24/21

Matrix Spike Summary
Dissolved Metals

Sample Name:	GRC-COL-INF-MW-17-1	**Units:**	ug/L
Lab Code:	K2107116-001	**Basis:**	NA
Analysis Method:	200.8		
Prep Method:	EPA CLP ILM04.0		

Matrix Spike
KQ2111389-04

Analyte Name	Sample Result	Result	Spike Amount	% Rec	% Rec Limits
Arsenic	105	155	50.0	100	70-130
Lithium	695	756	50.0	122 #	70-130

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

Matrix Spike and Matrix Spike Duplicate Data is presented for information purposes only. The matrix may or may not be relevant to samples reported in this report. The laboratory evaluates system performance based on the LCS and LCSD control limits.

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client:	Anchor QEA, LLC	**Service Request:**	K2107116
Project:	Green County/201114-01.05 Task 02	**Date Collected:**	06/07/21
Sample Matrix:	Water	**Date Received:**	06/18/21
		Date Analyzed:	07/19/21
		Date Extracted:	06/24/21

Matrix Spike Summary
Dissolved Metals

Sample Name:	GRC-COL-3-1	**Units:**	ug/L
Lab Code:	K2107116-002	**Basis:**	NA
Analysis Method:	200.8		
Prep Method:	EPA CLP ILM04.0		

Matrix Spike
KQ2111389-06

Analyte Name	Sample Result	Result	Spike Amount	% Rec	% Rec Limits
Arsenic	3.0	57.6	50.0	109	70-130
Lithium	518	570	50.0	103 #	70-130

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

Matrix Spike and Matrix Spike Duplicate Data is presented for information purposes only. The matrix may or may not be relevant to samples reported in this report. The laboratory evaluates system performance based on the LCS and LCSD control limits.

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Client:	Anchor QEA, LLC	**Service Request:**	K2107116
Project:	Green County/201114-01.05 Task 02	**Date Analyzed:**	07/19/21
Sample Matrix:	Water		

Lab Control Sample Summary
Dissolved Metals

Units:ug/L
Basis:NA

Lab Control Sample
KQ2111389-02

Analyte Name	Analytical Method	Result	Spike Amount	% Rec	% Rec Limits
Arsenic	200.8	51.3	50.0	103	85-115
Lithium	200.8	48.4	50.0	97	85-115

ALS Environmental
ALS Group USA, Corp
1317 South 13th Avenue
Kelso, WA 98626
T : +1 360 577 7222
F : +1 360 636 1068
www.alsglobal.com

July 21, 2021

Analytical Report for Service Request No: K2107117

Masa Kanematsu
Anchor QEA, LLC
6720 SW Macadam Avenue
Suite 125
Portland, OR 97219

RE: Green County / 201114-01.05 Task 02

Dear Masa,

Enclosed are the results of the sample(s) submitted to our laboratory June 18, 2021
For your reference, these analyses have been assigned our service request number **K2107117.**

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please contact me if you have any questions. My extension is 3376. You may also contact me via email at Mark.Harris@alsglobal.com.

Respectfully submitted,

ALS Group USA, Corp. dba ALS Environmental

Mark Harris
Project Manager

ALS Environmental
ALS Group USA, Corp
1317 South 13th Avenue
Kelso, WA 98626
T : +1 360 577 7222
F : +1 360 636 1068
www.alsglobal.com

Table of Contents

Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

Inorganic Data Qualifiers

- `*` The result is an outlier. See case narrative.
- `#` The control limit criteria is not applicable. See case narrative.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- E The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated value.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.
- H The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

Metals Data Qualifiers

- `#` The control limit criteria is not applicable. See case narrative.
- J The result is an estimated value.
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- M The duplicate injection precision was not met.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- S The reported value was determined by the Method of Standard Additions (MSA).
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- `+` The correlation coefficient for the MSA is less than 0.995.
- Q See case narrative. One or more quality control criteria was outside the limits.

Organic Data Qualifiers

- `*` The result is an outlier. See case narrative.
- `#` The control limit criteria is not applicable. See case narrative.
- A A tentatively identified compound, a suspected aldol-condensation product.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- C The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
- D The reported result is from a dilution.
- E The result is an estimated value.
- J The result is an estimated value.
- N The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
- P The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.

Additional Petroleum Hydrocarbon Specific Qualifiers

- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- Y The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
- Z The chromatographic fingerprint does not resemble a petroleum product.

ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso
State Certifications, Accreditations, and Licenses

Agency	Web Site	Number
Alaska DEH	http://dec.alaska.gov/eh/lab/cs/csapproval.htm	UST-040
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0339
Arkansas - DEQ	http://www.adeq.state.ar.us/techsvs/labcert.htm	88-0637
California DHS (ELAP)	http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx	2795
DOD ELAP	http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm	L16-58-R4
Florida DOH	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E87412
Hawaii DOH	http://health.hawaii.gov/	-
ISO 17025	http://www.pjlabs.com/	L16-57
Louisiana DEQ	http://www.deq.louisiana.gov/page/la-lab-accreditation	03016
Maine DHS	http://www.maine.gov/dhhs/	WA01276
Minnesota DOH	http://www.health.state.mn.us/accreditation	053-999-457
Nevada DEP	http://ndep.nv.gov/bsdw/labservice.htm	WA01276
New Jersey DEP	http://www.nj.gov/dep/enforcement/oqa.html	WA005
New York - DOH	https://www.wadsworth.org/regulatory/elap	12060
North Carolina DEQ	https://deq.nc.gov/about/divisions/water-resources/water-resources-data/water-sciences-home-page/laboratory-certification-branch/non-field-lab-certification	605
Oklahoma DEQ	http://www.deq.state.ok.us/CSDnew/labcert.htm	9801
Oregon – DEQ (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	WA100010
South Carolina DHEC	http://www.scdhec.gov/environment/EnvironmentalLabCertification/	61002
Texas CEQ	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	T104704427
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C544
Wyoming (EPA Region 8)	https://www.epa.gov/region8-waterops/epa-region-8-certified-drinking-water-	-
Kelso Laboratory Website	www.alsglobal.com	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at www.ALSGlobal.com or at the accreditation bodies web site.
Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/anlayte is offered by that state.

Case Narrative

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360)577-7222 Fax (360)636-1068
www.alsglobal.com

1317 South 13th Ave, Kelso, WA 98626 | 1-360-577-7222 | www.alsglobal.com

Client:	Anchor QEA, LLC	**Service Request:**	K2107117
Project:	Green County	**Date Received:**	06/18/2021
Sample Matrix:	Water		

CASE NARRATIVE

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples for the Tier level II requested by the client.

Sample Receipt:

Thirteen water samples were received for analysis at ALS Environmental on 06/18/2021. Any discrepancies upon initial sample inspection are annotated on the sample receipt and preservation form included within this report. The samples were stored at minimum in accordance with the analytical method requirements.

Metals:

No significant anomalies were noted with this analysis.

Approved by Mae D. Oar Date 07/21/2021

Chain of Custody

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360)577-7222 Fax (360)636-1068
www.alsglobal.com

K2107117

Chain of Custody Record & Laboratory Analysis Request

Laboratory Number:	503-972-5019
Date:	6/18/2021
Project Name:	Green County
Project Number:	201114-01.05 Task 02
Project Manager:	Masa Kanematsu
Phone Number:	503-972-5001 (Masa Kanematsu)
Shipment Method:	ALS Carrier

ANCHOR QEA

Jessica Goin
6720 SW Macadam Ave
Suite 125
Portland OR 97219

Line	Field Sample ID	Collection Date	Collection Time	Matrix	No. of Containers	Parameters: Arsenic, Lithium (dissolved, Method 200.8)	Comments/Preservation
1	GRC-COL-4-6	6/10/2021	13:15	Water	1	X	HNO_3 preserved, filtered
2	GRC-COL-INF-MW-17-7	6/11/2021	14:00	Water	1	X	HNO_3 preserved, filtered
3	GRC-COL-3-7	6/11/2021	14:00	Water	1	X	HNO_3 preserved, filtered
4	GRC-COL-4-7	6/11/2021	14:00	Water	1	X	HNO_3 preserved, filtered
5	GRC-COL-INF-MW-17-8	6/13/2021	13:50	Water	1	X	HNO_3 preserved, filtered
6	GRC-COL-3-8	6/13/2021	13:50	Water	1	X	HNO_3 preserved, filtered
7	GRC-COL-4-8	6/13/2021	13:50	Water	1	X	HNO_3 preserved, filtered
8	GRC-COL-INF-MW-17-9	6/8/2021	16:00	Water	1	X	HNO_3 preserved, filtered
9	GRC-COL-3-9	6/8/2021	16:00	Water	1	X	HNO_3 preserved, filtered
10	GRC-COL-4-9	6/8/2021	16:00	Water	1	X	HNO_3 preserved, filtered
11	GRC-COL-INF-MW-17-10	6/9/2021	15:00	Water	1	X	HNO_3 preserved, filtered
12	GRC-COL-3-10	6/9/2021	15:00	Water	1	X	HNO_3 preserved, filtered
13	GRC-COL-4-10	6/9/2021	15:00	Water	1	X	HNO_3 preserved, filtered
14							
15							

Notes: **Please analyze all analytes with** standard TAT **on this page. Please analyze with Method 200.8 (ICP-MS) for better detection limit.**
Desired reporting limits : As (<2 ug/L). For Lithium, please use Method 200.8 for better detection limit if possible. Report requirement: Type II (PDF & csv files)

Relinquished by:	Company:	Received by:	Company:
Masa Kanematsu	Anchor QEA		
Signature/Print Name:	Date/Time:	Signature/Print Name:	Date/Time:
[signature]	6/18/2021 9:00		

Relinquished by:	Company:	Received by:	Company:
Signature/Print Name:	Date/Time:	Signature/Print Name:	Date/Time:
Perry Jones	6/18/21 1230		

Distribution: A copy will be made for the laboratory and client. The Project file will retain the original.

Page 2 of 2

PM MH

Cooler Receipt and Preservation Form

Client Anchor Service Request **K21** 07117

Received: 6/18/21 Opened: 6/18/21 By: PJ Unloaded: 6/18/21 By: PJ

1. Samples were received via? *USPS* *Fed Ex* *UPS* *DHL* *PDX* *Courier* *Hand Delivered*
2. Samples were received in: (circle) *Cooler* *Box* *Envelope* *Other* ______ *NA*
3. Were custody seals on coolers? NA Y N If yes, how many and where? ______
   If present, were custody seals intact? Y N If present, were they signed and dated? Y N
4. Was a Temperature Blank present in cooler? NA Y N If yes, notate the temperature in the appropriate column below:
   If no, take the temperature of a representative sample bottle contained within the cooler; notate in the column "Sample Temp":
5. Were samples received within the method specified temperature ranges? NA Y N
   If no, were they received on ice and same day as collected? If not, notate the cooler # below and notify the PM. NA Y N

If applicable, tissue samples were received: *Frozen* *Partially Thawed* *Thawed*

Temp Blank	Sample Temp	IR Gun	Cooler #/COC ID / NA	Out of temp indicate with "X"	PM Notified If out of temp	Tracking Number NA	Filed
	5.2	IR02					

6. Packing material: *Inserts* *Baggies* *Bubble Wrap* *Gel Packs* *Wet Ice* *Dry Ice* *Sleeves* ______
7. Were custody papers properly filled out (ink, signed, etc.)? NA Y N
8. Were samples received in good condition (unbroken) NA Y N
9. Were all sample labels complete (ie, analysis, preservation, etc.)? NA Y N
10. Did all sample labels and tags agree with custody papers? NA Y N
11. Were appropriate bottles/containers and volumes received for the tests indicated? NA Y N
12. Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? *Indicate in the table below* NA Y N
13. Were VOA vials received without headspace? *Indicate in the table below.* NA Y N
14. Was Cl2/Res negative? NA Y N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count Bottle Type	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, Resolutions: ______

Metals

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Phone (360)577-7222 Fax (360)636-1068
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ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client:	Anchor QEA, LLC	**Service Request:**	K2107117
Project:	Green County/201114-01.05 Task 02	**Date Collected:**	06/10/21 13:15
Sample Matrix:	Water	**Date Received:**	06/18/21 12:30
Sample Name:	GRC-COL-4-6	**Basis:**	NA
Lab Code:	K2107117-001		

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	**7.1**	ug/L	2.5	0.5	5	07/19/21 14:32	06/24/21	
Lithium	200.8	**702**	ug/L	0.50	0.50	5	07/19/21 14:32	06/24/21	

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Superset Reference:

Client:	Anchor QEA, LLC	**Service Request:**	K2107117
Project:	Green County/201114-01.05 Task 02	**Date Collected:**	06/11/21 14:00
Sample Matrix:	Water	**Date Received:**	06/18/21 12:30
Sample Name:	GRC-COL-INF-MW-17-7	**Basis:**	NA
Lab Code:	K2107117-002		

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	**44.1**	ug/L	2.5	0.5	5	07/19/21 14:37	06/24/21	
Lithium	200.8	**730**	ug/L	0.50	0.50	5	07/19/21 14:37	06/24/21	

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Analytical Report

Client:	Anchor QEA, LLC	**Service Request:**	K2107117
Project:	Green County/201114-01.05 Task 02	**Date Collected:**	06/11/21 14:00
Sample Matrix:	Water	**Date Received:**	06/18/21 12:30
Sample Name:	GRC-COL-3-7	**Basis:**	NA
Lab Code:	K2107117-003		

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	**16.0**	ug/L	2.5	0.5	5	07/19/21 14:41	06/24/21	
Lithium	200.8	**717**	ug/L	0.50	0.50	5	07/19/21 14:41	06/24/21	

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client:	Anchor QEA, LLC	**Service Request:**	K2107117
Project:	Green County/201114-01.05 Task 02	**Date Collected:**	06/11/21 14:00
Sample Matrix:	Water	**Date Received:**	06/18/21 12:30
Sample Name:	GRC-COL-4-7	**Basis:**	NA
Lab Code:	K2107117-004		

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	**7.4**	ug/L	2.5	0.5	5	07/19/21 14:43	06/24/21	
Lithium	200.8	**718**	ug/L	0.50	0.50	5	07/19/21 14:43	06/24/21	

Client:	Anchor QEA, LLC	**Service Request:**	K2107117
Project:	Green County/201114-01.05 Task 02	**Date Collected:**	06/13/21 13:50
Sample Matrix:	Water	**Date Received:**	06/18/21 12:30
Sample Name:	GRC-COL-INF-MW-17-8	**Basis:**	NA
Lab Code:	K2107117-005		

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	**39.6**	ug/L	2.5	0.5	5	07/19/21 14:52	06/24/21	
Lithium	200.8	**732**	ug/L	0.50	0.50	5	07/19/21 14:52	06/24/21	

Client:	Anchor QEA, LLC		**Service Request:**	K2107117
Project:	Green County/201114-01.05 Task 02		**Date Collected:**	06/13/21 13:50
Sample Matrix:	Water		**Date Received:**	06/18/21 12:30
Sample Name:	GRC-COL-3-8		**Basis:**	NA
Lab Code:	K2107117-006			

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	**20.1**	ug/L	2.5	0.5	5	07/19/21 14:54	06/24/21	
Lithium	200.8	**707**	ug/L	0.50	0.50	5	07/19/21 14:54	06/24/21	

Analytical Report

Client:	Anchor QEA, LLC	**Service Request:**	K2107117
Project:	Green County/201114-01.05 Task 02	**Date Collected:**	06/13/21 13:50
Sample Matrix:	Water	**Date Received:**	06/18/21 12:30
Sample Name:	GRC-COL-4-8	**Basis:**	NA
Lab Code:	K2107117-007		

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	**38.7**	ug/L	2.5	0.5	5	07/19/21 14:56	06/24/21	
Lithium	200.8	**742**	ug/L	0.50	0.50	5	07/19/21 14:56	06/24/21	

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Analytical Report

Client:	Anchor QEA, LLC	**Service Request:**	K2107117
Project:	Green County/201114-01.05 Task 02	**Date Collected:**	06/08/21 16:00
Sample Matrix:	Water	**Date Received:**	06/18/21 12:30
Sample Name:	GRC-COL-INF-MW-17-9	**Basis:**	NA
Lab Code:	K2107117-008		

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	**36.8**	ug/L	2.5	0.5	5	07/19/21 14:57	06/24/21	
Lithium	200.8	**727**	ug/L	0.50	0.50	5	07/19/21 14:57	06/24/21	

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Superset Reference:

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client:	Anchor QEA, LLC	**Service Request:**	K2107117
Project:	Green County/201114-01.05 Task 02	**Date Collected:**	06/08/21 16:00
Sample Matrix:	Water	**Date Received:**	06/18/21 12:30
Sample Name:	GRC-COL-3-9	**Basis:**	NA
Lab Code:	K2107117-009		

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	**22.2**	ug/L	2.5	0.5	5	07/19/21 14:59	06/24/21	
Lithium	200.8	**724**	ug/L	0.50	0.50	5	07/19/21 14:59	06/24/21	

Client:	Anchor QEA, LLC	**Service Request:**	K2107117
Project:	Green County/201114-01.05 Task 02	**Date Collected:**	06/08/21 16:00
Sample Matrix:	Water	**Date Received:**	06/18/21 12:30
Sample Name:	GRC-COL-4-9	**Basis:**	NA
Lab Code:	K2107117-010		

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	**8.1**	ug/L	2.5	0.5	5	07/19/21 15:00	06/24/21	
Lithium	200.8	**707**	ug/L	0.50	0.50	5	07/19/21 15:00	06/24/21	

Client:	Anchor QEA, LLC		**Service Request:**	K2107117
Project:	Green County/201114-01.05 Task 02		**Date Collected:**	06/09/21 15:00
Sample Matrix:	Water		**Date Received:**	06/18/21 12:30
Sample Name:	GRC-COL-INF-MW-17-10		**Basis:**	NA
Lab Code:	K2107117-011			

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	**33.2**	ug/L	2.5	0.5	5	07/19/21 15:02	06/24/21	
Lithium	200.8	**731**	ug/L	0.50	0.50	5	07/19/21 15:02	06/24/21	

Client:	Anchor QEA, LLC	**Service Request:**	K2107117
Project:	Green County/201114-01.05 Task 02	**Date Collected:**	06/09/21 15:00
Sample Matrix:	Water	**Date Received:**	06/18/21 12:30
Sample Name:	GRC-COL-3-10	**Basis:**	NA
Lab Code:	K2107117-012		

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	**23.0**	ug/L	2.5	0.5	5	07/19/21 15:04	06/24/21	
Lithium	200.8	**718**	ug/L	0.50	0.50	5	07/19/21 15:04	06/24/21	

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client:	Anchor QEA, LLC	**Service Request:**	K2107117
Project:	Green County/201114-01.05 Task 02	**Date Collected:**	06/09/21 15:00
Sample Matrix:	Water	**Date Received:**	06/18/21 12:30
Sample Name:	GRC-COL-4-10	**Basis:**	NA
Lab Code:	K2107117-013		

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	**7.9**	ug/L	2.5	0.5	5	07/19/21 15:05	06/24/21	
Lithium	200.8	**724**	ug/L	0.50	0.50	5	07/19/21 15:05	06/24/21	

Printed 7/20/2021 2:34:07 PM Superset Reference:

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client:	Anchor QEA, LLC	**Service Request:**	K2107117
Project:	Green County/201114-01.05 Task 02	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA
Sample Name:	Method Blank	**Basis:**	NA
Lab Code:	KQ2111390-01		

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	ND U	ug/L	0.50	0.09	1	07/19/21 14:29	06/24/21	
Lithium	200.8	ND U	ug/L	0.10	0.10	1	07/19/21 14:29	06/24/21	

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Superset Reference:

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client:	Anchor QEA, LLC	**Service Request:**	K2107117
Project	Green County/201114-01.05 Task 02	**Date Collected:**	06/10/21
Sample Matrix:	Water	**Date Received:**	06/18/21
		Date Analyzed:	07/19/21

Replicate Sample Summary
Dissolved Metals

Sample Name:	GRC-COL-4-6	**Units:**	ug/L
Lab Code:	K2107117-001	**Basis:**	NA

Analyte Name	Analysis Method	MRL	MDL	Sample Result	Duplicate Sample KQ2111390-03 Result	Average	RPD	RPD Limit
Arsenic	200.8	2.5	0.5	7.1	7.5	7.3	5	20
Lithium	200.8	0.50	0.50	702	717	710	2	20

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

Printed 7/20/2021 2:34:07 PM Superset Reference:

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client:	Anchor QEA, LLC	**Service Request:**	K2107117
Project	Green County/201114-01.05 Task 02	**Date Collected:**	06/11/21
Sample Matrix:	Water	**Date Received:**	06/18/21
		Date Analyzed:	07/19/21

Replicate Sample Summary
Dissolved Metals

Sample Name:	GRC-COL-INF-MW-17-7	**Units:**	ug/L
Lab Code:	K2107117-002	**Basis:**	NA

Analyte Name	Analysis Method	MRL	MDL	Sample Result	Duplicate Sample KQ2111390-05 Result	Average	RPD	RPD Limit
Arsenic	200.8	2.5	0.5	44.1	43.6	43.9	1	20
Lithium	200.8	0.50	0.50	730	728	729	<1	20

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

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Superset Reference:

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client:	Anchor QEA, LLC	**Service Request:**	K2107117
Project:	Green County/201114-01.05 Task 02	**Date Collected:**	06/10/21
Sample Matrix:	Water	**Date Received:**	06/18/21
		Date Analyzed:	07/19/21
		Date Extracted:	06/24/21

Matrix Spike Summary
Dissolved Metals

Sample Name:	GRC-COL-4-6	**Units:**	ug/L
Lab Code:	K2107117-001	**Basis:**	NA
Analysis Method:	200.8		
Prep Method:	EPA CLP ILM04.0		

Matrix Spike
KQ2111390-04

Analyte Name	Sample Result	Result	Spike Amount	% Rec	% Rec Limits
Arsenic	7.1	60.6	50.0	107	70-130
Lithium	702	749	50.0	92 #	70-130

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

Matrix Spike and Matrix Spike Duplicate Data is presented for information purposes only. The matrix may or may not be relevant to samples reported in this report. The laboratory evaluates system performance based on the LCS and LCSD control limits.

Printed 7/20/2021 2:34:07 PM Superset Reference:

Client:	Anchor QEA, LLC	**Service Request:**	K2107117
Project:	Green County/201114-01.05 Task 02	**Date Collected:**	06/11/21
Sample Matrix:	Water	**Date Received:**	06/18/21
		Date Analyzed:	07/19/21
		Date Extracted:	06/24/21

Matrix Spike Summary
Dissolved Metals

Sample Name:	GRC-COL-INF-MW-17-7	**Units:**	ug/L
Lab Code:	K2107117-002	**Basis:**	NA
Analysis Method:	200.8		
Prep Method:	EPA CLP ILM04.0		

Matrix Spike
KQ2111390-06

Analyte Name	Sample Result	Result	Spike Amount	% Rec	% Rec Limits
Arsenic	44.1	95.6	50.0	103	70-130
Lithium	730	810	50.0	160 #	70-130

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

Matrix Spike and Matrix Spike Duplicate Data is presented for information purposes only. The matrix may or may not be relevant to samples reported in this report. The laboratory evaluates system performance based on the LCS and LCSD control limits.

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client:	Anchor QEA, LLC	**Service Request:**	K2107117
Project:	Green County/201114-01.05 Task 02	**Date Analyzed:**	07/19/21
Sample Matrix:	Water		

Lab Control Sample Summary
Dissolved Metals

Units: ug/L
Basis: NA

Lab Control Sample
KQ2111390-02

Analyte Name	Analytical Method	Result	Spike Amount	% Rec	% Rec Limits
Arsenic	200.8	52.6	50.0	105	85-115
Lithium	200.8	52.7	50.0	105	85-115

Printed 7/20/2021 2:34:07 PM

Superset Reference:

July 21, 2021 Service Request No:K2107406

Masa Kanematsu
Anchor QEA, LLC
6720 SW Macadam Avenue
Suite 125
Portland, OR 97219

Laboratory Results for: Green County

Dear Masa,

Enclosed are the results of the sample(s) submitted to our laboratory June 25, 2021
For your reference, these analyses have been assigned our service request number **K2107406.**

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please contact me if you have any questions. My extension is 3376. You may also contact me via email at Mark.Harris@alsglobal.com.

Respectfully submitted,

ALS Group USA, Corp. dba ALS Environmental

Mark Harris
Project Manager

ADDRESS 1317 S. 13th Avenue, Kelso, WA 98626
PHONE +1 360 577 7222 | FAX +1 360 636 1068
ALS Group USA, Corp.
dba ALS Environmental

Narrative Documents

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360) 577-7222 Fax (360) 425-9096
www.alsglobal.com

1317 South 13th Ave, Kelso, WA 98626 | 1-360-577-7222 | www.alsglobal.com

ALS Environmental

Client: Anchor QEA, LLC
Project: Green County
Sample Matrix: Water

Service Request: K2107406
Date Received: 06/25/2021

CASE NARRATIVE

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples for the Tier II level requested by the client.

Sample Receipt:

Six water samples were received for analysis at ALS Environmental on 06/25/2021. Any discrepancies upon initial sample inspection are annotated on the sample receipt and preservation form included within this report. The samples were stored at minimum in accordance with the analytical method requirements.

Metals:

No significant anomalies were noted with this analysis.

Approved by ____________________ Date 07/21/2021

SAMPLE DETECTION SUMMARY

CLIENT ID: GRC-COL-INF-MW-17-11			Lab ID: K2107406-001			
Analyte	**Results**	**Flag**	**MDL**	**MRL**	**Units**	**Method**
Arsenic, Dissolved	31.4		0.5	2.5	ug/L	200.8
Lithium, Dissolved	674		0.50	0.50	ug/L	200.8

CLIENT ID: GRC-COL-3-11			Lab ID: K2107406-002			
Analyte	**Results**	**Flag**	**MDL**	**MRL**	**Units**	**Method**
Arsenic, Dissolved	25.7		0.5	2.5	ug/L	200.8
Lithium, Dissolved	675		0.50	0.50	ug/L	200.8

CLIENT ID: GRC-COL-4-11			Lab ID: K2107406-003			
Analyte	**Results**	**Flag**	**MDL**	**MRL**	**Units**	**Method**
Arsenic, Dissolved	11.1		0.5	2.5	ug/L	200.8
Lithium, Dissolved	656		0.50	0.50	ug/L	200.8

CLIENT ID: GRC-COL-INF-MW-17-12			Lab ID: K2107406-004			
Analyte	**Results**	**Flag**	**MDL**	**MRL**	**Units**	**Method**
Arsenic, Dissolved	39.5		0.5	2.5	ug/L	200.8
Lithium, Dissolved	671		0.50	0.50	ug/L	200.8

CLIENT ID: GRC-COL-3-12			Lab ID: K2107406-005			
Analyte	**Results**	**Flag**	**MDL**	**MRL**	**Units**	**Method**
Arsenic, Dissolved	33.8		0.5	2.5	ug/L	200.8
Lithium, Dissolved	683		0.50	0.50	ug/L	200.8

CLIENT ID: GRC-COL-4-12			Lab ID: K2107406-006			
Analyte	**Results**	**Flag**	**MDL**	**MRL**	**Units**	**Method**
Arsenic, Dissolved	17.0		0.5	2.5	ug/L	200.8
Lithium, Dissolved	667		0.50	0.50	ug/L	200.8

Sample Receipt Information

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360) 577-7222 Fax (360) 425-9096
www.alsglobal.com

Client: Anchor QEA, LLC **Service Request:** K2107406
Project: Green County/201114-01.05 Task 02

SAMPLE CROSS-REFERENCE

SAMPLE #	CLIENT SAMPLE ID	DATE	TIME
K2107406-001	GRC-COL-INF-MW-17-11	6/18/2021	1310
K2107406-002	GRC-COL-3-11	6/18/2021	1310
K2107406-003	GRC-COL-4-11	6/18/2021	1310
K2107406-004	GRC-COL-INF-MW-17-12	6/21/2021	1320
K2107406-005	GRC-COL-3-12	6/21/2021	1320
K2107406-006	GRC-COL-4-12	6/21/2021	1320

K2107406

Chain of Custody Record & Laboratory Analysis Request

Laboratory Number:	503-972-5019
Date:	6/25/2021
Project Name:	Green County
Project Number:	201114-01.05 Task 02
Project Manager:	Masa Kanematsu
Phone Number:	503-972-5001 (Masa Kanematsu)
Shipment Method:	ALS Carrier

ANCHOR QEA

Jessica Goin
6720 SW Macadam Ave
Suite 125
Portland OR 97219

Line	Field Sample ID	Collection Date	Collection Time	Matrix	No. of Containers	Arsenic, Lithium (dissolved, Method 200.8)															Comments/Preservation
1	GRC-COL-INF-MW-17-11	6/18/2021	13:10	Water	1	X															HNO_3 preserved, filtered
2	GRC-COL-3-11	6/18/2021	13:10	Water	1	X															HNO_3 preserved, filtered
3	GRC-COL-4-11	6/18/2021	13:10	Water	1	X															HNO_3 preserved, filtered
4	GRC-COL-INF-MW-17-12	6/21/2021	13:20	Water	1	X															HNO_3 preserved, filtered
5	GRC-COL-3-12	6/21/2021	13:20	Water	1	X															HNO_3 preserved, filtered
6	GRC-COL-4-12	6/21/2021	13:20	Water	1	X															HNO_3 preserved, filtered
7																					
8																					
9																					
10																					
11																					
12																					
13																					
14																					
15																					

Notes: **Please analyze all analytes with** standard TAT **on this page. Please analyze with Method 200.8 (ICP-MS) for better detection limit.**
Desired reporting limits : As (<2 ug/L). For Lithium, please use Method 200.8 for better detection limit if possible. Report requirement: Type II (PDF & csv files)

Relinquished by:	Company:	Received by:	Company:
Masa Kanematsu	Anchor QEA	Perry Jones	ALS
Signature/Print Name:	Date/Time:	Signature/Print Name:	Date/Time:
[signature]	6/25/2021 9:00	Perry Jones	6/25/21 1335
Relinquished by:	Company:	Received by:	Company:
Signature/Print Name:	Date/Time:	Signature/Print Name:	Date/Time:

Distribution: A copy will be made for the laboratory and client. The Project file will retain the original.

Page 1 of 1

PM M H

Cooler Receipt and Preservation Form

Client Anchor Service Request **K21** 07406

Received: 6/25/21 Opened: 6/25/21 By: PJ Unloaded: 6-25-21 By: PJ

1. Samples were received via? *USPS* *Fed Ex* *UPS* *DHL* *PDX* *Courier* *Hand Delivered*
2. Samples were received in: (circle) *Cooler* *Box* *Envelope* *Other* ______ *NA*
3. Were custody seals on coolers? NA Y N If yes, how many and where? ______
   If present, were custody seals intact? Y N If present, were they signed and dated? Y N
4. Was a Temperature Blank present in cooler? NA Y N If yes, notate the temperature in the appropriate column below:
   If no, take the temperature of a representative sample bottle contained within the cooler; notate in the column "Sample Temp":
5. Were samples received within the method specified temperature ranges? NA Y N
   If no, were they received on ice and same day as collected? If not, notate the cooler # below and notify the PM. NA Y N

If applicable, tissue samples were received: *Frozen* *Partially Thawed* *Thawed*

Temp Blank	Sample Temp	IR Gun	Cooler #/COC ID / NA	Out of temp indicate with "X"	PM Notified If out of temp	Tracking Number NA	Filed
4.7		IR01					

6. Packing material: *Inserts* *Baggies* *Bubble Wrap* *Gel Packs* *Wet Ice* *Dry Ice* *Sleeves* ______
7. Were custody papers properly filled out (ink, signed, etc.)? NA Y N
8. Were samples received in good condition (unbroken) NA Y N
9. Were all sample labels complete (ie, analysis, preservation, etc.)? NA Y N
10. Did all sample labels and tags agree with custody papers? NA Y N
11. Were appropriate bottles/containers and volumes received for the tests indicated? NA Y N
12. Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? *Indicate in the table below* NA Y N
13. Were VOA vials received without headspace? *Indicate in the table below.* NA Y N
14. Was C12/Res negative? NA Y N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count Bottle Type	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, Resolutions: ______

Miscellaneous Forms

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360) 577-7222 Fax (360) 425-9096
www.alsglobal.com

Inorganic Data Qualifiers

- * The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- E The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated value.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
  DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.
- H The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

Metals Data Qualifiers

- # The control limit criteria is not applicable. See case narrative.
- J The result is an estimated value.
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- M The duplicate injection precision was not met.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- S The reported value was determined by the Method of Standard Additions (MSA).
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
  DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- + The correlation coefficient for the MSA is less than 0.995.
- Q See case narrative. One or more quality control criteria was outside the limits.

Organic Data Qualifiers

- * The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- A A tentatively identified compound, a suspected aldol-condensation product.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- C The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
- D The reported result is from a dilution.
- E The result is an estimated value.
- J The result is an estimated value.
- N The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
- P The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
  DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.

Additional Petroleum Hydrocarbon Specific Qualifiers

- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- Y The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
- Z The chromatographic fingerprint does not resemble a petroleum product.

ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso
State Certifications, Accreditations, and Licenses

Agency	Web Site	Number
Alaska DEH	http://dec.alaska.gov/eh/lab/cs/csapproval.htm	UST-040
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0339
Arkansas - DEQ	http://www.adeq.state.ar.us/techsvs/labcert.htm	88-0637
California DHS (ELAP)	http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx	2795
DOD ELAP	http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm	L16-58-R4
Florida DOH	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E87412
Hawaii DOH	http://health.hawaii.gov/	-
ISO 17025	http://www.pjlabs.com/	L16-57
Louisiana DEQ	http://www.deq.louisiana.gov/page/la-lab-accreditation	03016
Maine DHS	http://www.maine.gov/dhhs/	WA01276
Minnesota DOH	http://www.health.state.mn.us/accreditation	053-999-457
Nevada DEP	http://ndep.nv.gov/bsdw/labservice.htm	WA01276
New Jersey DEP	http://www.nj.gov/dep/enforcement/oqa.html	WA005
New York - DOH	https://www.wadsworth.org/regulatory/elap	12060
North Carolina DEQ	https://deq.nc.gov/about/divisions/water-resources/water-resources-data/water-sciences-home-page/laboratory-certification-branch/non-field-lab-certification	605
Oklahoma DEQ	http://www.deq.state.ok.us/CSDnew/labcert.htm	9801
Oregon – DEQ (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	WA100010
South Carolina DHEC	http://www.scdhec.gov/environment/EnvironmentalLabCertification/	61002
Texas CEQ	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	T104704427
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C544
Wyoming (EPA Region 8)	https://www.epa.gov/region8-waterops/epa-region-8-certified-drinking-water-	-
Kelso Laboratory Website	www.alsglobal.com	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at www.ALSGlobal.com or at the accreditation bodies web site.
Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/anlayte is offered by that state.

Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

Client: Anchor QEA, LLC
Project: Green County/201114-01.05 Task 02
Service Request: K2107406

Sample Name: GRC-COL-INF-MW-17-11
Lab Code: K2107406-001
Sample Matrix: Water
Date Collected: 06/18/21
Date Received: 06/25/21

Analysis Method	Extracted/Digested By	Analyzed By
200.8	ABOYER	RMOORE

Sample Name: GRC-COL-3-11
Lab Code: K2107406-002
Sample Matrix: Water
Date Collected: 06/18/21
Date Received: 06/25/21

Analysis Method	Extracted/Digested By	Analyzed By
200.8	ABOYER	RMOORE

Sample Name: GRC-COL-4-11
Lab Code: K2107406-003
Sample Matrix: Water
Date Collected: 06/18/21
Date Received: 06/25/21

Analysis Method	Extracted/Digested By	Analyzed By
200.8	ABOYER	RMOORE

Sample Name: GRC-COL-INF-MW-17-12
Lab Code: K2107406-004
Sample Matrix: Water
Date Collected: 06/21/21
Date Received: 06/25/21

Analysis Method	Extracted/Digested By	Analyzed By
200.8	ABOYER	RMOORE

Sample Name: GRC-COL-3-12
Lab Code: K2107406-005
Sample Matrix: Water
Date Collected: 06/21/21
Date Received: 06/25/21

Analysis Method	Extracted/Digested By	Analyzed By
200.8	ABOYER	RMOORE

Analyst Summary report

Client:	Anchor QEA, LLC	**Service Request:**	K2107406
Project:	Green County/201114-01.05 Task 02		

Sample Name:	GRC-COL-4-12	**Date Collected:**	06/21/21
Lab Code:	K2107406-006	**Date Received:**	06/25/21
Sample Matrix:	Water		

Analysis Method	**Extracted/Digested By**	**Analyzed By**
200.8	ABOYER	RMOORE

Sample Results

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360) 577-7222 Fax (360) 425-9096
www.alsglobal.com

Metals

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360) 577-7222 Fax (360) 425-9096
www.alsglobal.com

Analytical Report

Client:	Anchor QEA, LLC	**Service Request:**	K2107406
Project:	Green County/201114-01.05 Task 02	**Date Collected:**	06/18/21 13:10
Sample Matrix:	Water	**Date Received:**	06/25/21 13:35
Sample Name:	GRC-COL-INF-MW-17-11	**Basis:**	NA
Lab Code:	K2107406-001		

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	**31.4**	ug/L	2.5	0.5	5	07/19/21 16:19	07/01/21	
Lithium	200.8	**674**	ug/L	0.50	0.50	5	07/19/21 16:19	07/01/21	

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client:	Anchor QEA, LLC	**Service Request:**	K2107406
Project:	Green County/201114-01.05 Task 02	**Date Collected:**	06/18/21 13:10
Sample Matrix:	Water	**Date Received:**	06/25/21 13:35
Sample Name:	GRC-COL-3-11	**Basis:**	NA
Lab Code:	K2107406-002		

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	**25.7**	ug/L	2.5	0.5	5	07/19/21 16:24	07/01/21	
Lithium	200.8	**675**	ug/L	0.50	0.50	5	07/19/21 16:24	07/01/21	

Client:	Anchor QEA, LLC	**Service Request:**	K2107406
Project:	Green County/201114-01.05 Task 02	**Date Collected:**	06/18/21 13:10
Sample Matrix:	Water	**Date Received:**	06/25/21 13:35
Sample Name:	GRC-COL-4-11	**Basis:**	NA
Lab Code:	K2107406-003		

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	**11.1**	ug/L	2.5	0.5	5	07/19/21 16:26	07/01/21	
Lithium	200.8	**656**	ug/L	0.50	0.50	5	07/19/21 16:26	07/01/21	

Analytical Report

Client:	Anchor QEA, LLC	**Service Request:**	K2107406
Project:	Green County/201114-01.05 Task 02	**Date Collected:**	06/21/21 13:20
Sample Matrix:	Water	**Date Received:**	06/25/21 13:35
Sample Name:	GRC-COL-INF-MW-17-12	**Basis:**	NA
Lab Code:	K2107406-004		

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	**39.5**	ug/L	2.5	0.5	5	07/19/21 16:30	07/01/21	
Lithium	200.8	**671**	ug/L	0.50	0.50	5	07/19/21 16:30	07/01/21	

Analytical Report

Client:	Anchor QEA, LLC		**Service Request:**	K2107406
Project:	Green County/201114-01.05 Task 02		**Date Collected:**	06/21/21 13:20
Sample Matrix:	Water		**Date Received:**	06/25/21 13:35
Sample Name:	GRC-COL-3-12		**Basis:**	NA
Lab Code:	K2107406-005			

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	**33.8**	ug/L	2.5	0.5	5	07/19/21 16:32	07/01/21	
Lithium	200.8	**683**	ug/L	0.50	0.50	5	07/19/21 16:32	07/01/21	

Client: Anchor QEA, LLC
Service Request: K2107406
Project: Green County/201114-01.05 Task 02
Date Collected: 06/21/21 13:20
Sample Matrix: Water
Date Received: 06/25/21 13:35

Sample Name: GRC-COL-4-12
Basis: NA
Lab Code: K2107406-006

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	**17.0**	ug/L	2.5	0.5	5	07/19/21 16:34	07/01/21	
Lithium	200.8	**667**	ug/L	0.50	0.50	5	07/19/21 16:34	07/01/21	

QC Summary Forms

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Metals

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ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client:	Anchor QEA, LLC	**Service Request:**	K2107406
Project:	Green County/201114-01.05 Task 02	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA
Sample Name:	Method Blank	**Basis:**	NA
Lab Code:	KQ2111981-01		

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	ND U	ug/L	0.50	0.09	1	07/19/21 15:54	07/01/21	
Lithium	200.8	ND U	ug/L	0.10	0.10	1	07/19/21 15:54	07/01/21	

Client:	Anchor QEA, LLC	**Service Request:**	K2107406
Project:	Green County/201114-01.05 Task 02	**Date Collected:**	06/18/21
Sample Matrix:	Water	**Date Received:**	06/25/21
		Date Analyzed:	07/19/21
		Date Extracted:	07/1/21

Matrix Spike Summary
Dissolved Metals

Sample Name:	GRC-COL-INF-MW-17-11	**Units:**	ug/L
Lab Code:	K2107406-001	**Basis:**	NA
Analysis Method:	200.8		
Prep Method:	EPA CLP ILM04.0		

Matrix Spike
KQ2111981-06

Analyte Name	Sample Result	Result	Spike Amount	% Rec	% Rec Limits
Arsenic	31.4	85.1	50.0	107	70-130
Lithium	674	725	50.0	101 #	70-130

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

Matrix Spike and Matrix Spike Duplicate Data is presented for information purposes only. The matrix may or may not be relevant to samples reported in this report. The laboratory evaluates system performance based on the LCS and LCSD control limits.

QA/QC Report

Client: Anchor QEA, LLC
Project Green County/201114-01.05 Task 02
Sample Matrix: Water

Service Request: K2107406
Date Collected: 06/18/21
Date Received: 06/25/21
Date Analyzed: 07/19/21

Replicate Sample Summary
Dissolved Metals

Sample Name: GRC-COL-INF-MW-17-11
Lab Code: K2107406-001

Units: ug/L
Basis: NA

Analyte Name	Analysis Method	MRL	MDL	Sample Result	Duplicate Sample KQ2111981-05 Result	Average	RPD	RPD Limit
Arsenic	200.8	2.5	0.5	31.4	31.3	31.4	<1	20
Lithium	200.8	0.50	0.50	674	677	676	<1	20

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client:	Anchor QEA, LLC	**Service Request:**	K2107406
Project:	Green County/201114-01.05 Task 02	**Date Analyzed:**	07/19/21
Sample Matrix:	Water		

Lab Control Sample Summary
Dissolved Metals

Units: ug/L
Basis: NA

Lab Control Sample
KQ2111981-02

Analyte Name	Analytical Method	Result	Spike Amount	% Rec	% Rec Limits
Arsenic	200.8	51.8	50.0	104	85-115
Lithium	200.8	49.7	50.0	99	85-115

July 21, 2021

Service Request No:K2107408

Masa Kanematsu
Anchor QEA, LLC
6720 SW Macadam Avenue
Suite 125
Portland, OR 97219

Laboratory Results for: Green County

Dear Masa,

Enclosed are the results of the sample(s) submitted to our laboratory June 25, 2021
For your reference, these analyses have been assigned our service request number **K2107408.**

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please contact me if you have any questions. My extension is 3376. You may also contact me via email at Mark.Harris@alsglobal.com.

Respectfully submitted,

ALS Group USA, Corp. dba ALS Environmental

Mark Harris
Project Manager

ADDRESS 1317 S. 13th Avenue, Kelso, WA 98626
PHONE +1 360 577 7222 | FAX +1 360 636 1068
ALS Group USA, Corp.
dba ALS Environmental

Narrative Documents

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1317 South 13th Avenue, Kelso, WA 98626
Phone (360) 577-7222 Fax (360) 425-9096
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ALS Environmental

Client: Anchor QEA, LLC
Project: Green County
Sample Matrix: Water

Service Request: K2107408
Date Received: 06/25/2021

CASE NARRATIVE

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples for the Tier II level requested by the client.

Sample Receipt:

Six water samples were received for analysis at ALS Environmental on 06/25/2021. Any discrepancies upon initial sample inspection are annotated on the sample receipt and preservation form included within this report. The samples were stored at minimum in accordance with the analytical method requirements.

Metals:

No significant anomalies were noted with this analysis.

Approved by ____________________ Date 07/21/2021

SAMPLE DETECTION SUMMARY

CLIENT ID: GRC-COL-INF-MW-1-11	Lab ID: K2107408-001					
Analyte	**Results**	**Flag**	**MDL**	**MRL**	**Units**	**Method**
Arsenic, Dissolved	1.6	J	0.5	2.5	ug/L	200.8
Cobalt, Dissolved	184		0.05	0.10	ug/L	200.8

CLIENT ID: GRC-COL-1-11	Lab ID: K2107408-002					
Analyte	**Results**	**Flag**	**MDL**	**MRL**	**Units**	**Method**
Arsenic, Dissolved	1.5	J	0.5	2.5	ug/L	200.8
Cobalt, Dissolved	181		0.05	0.10	ug/L	200.8

CLIENT ID: GRC-COL-2-11	Lab ID: K2107408-003					
Analyte	**Results**	**Flag**	**MDL**	**MRL**	**Units**	**Method**
Arsenic, Dissolved	1.0	J	0.5	2.5	ug/L	200.8
Cobalt, Dissolved	181		0.05	0.10	ug/L	200.8

CLIENT ID: GRC-COL-INF-MW-1-12	Lab ID: K2107408-004					
Analyte	**Results**	**Flag**	**MDL**	**MRL**	**Units**	**Method**
Arsenic, Dissolved	1.1	J	0.5	2.5	ug/L	200.8
Cobalt, Dissolved	222		0.05	0.10	ug/L	200.8

CLIENT ID: GRC-COL-1-12	Lab ID: K2107408-005					
Analyte	**Results**	**Flag**	**MDL**	**MRL**	**Units**	**Method**
Arsenic, Dissolved	0.8	J	0.5	2.5	ug/L	200.8
Cobalt, Dissolved	185		0.05	0.10	ug/L	200.8

CLIENT ID: GRC-COL-2-12	Lab ID: K2107408-006					
Analyte	**Results**	**Flag**	**MDL**	**MRL**	**Units**	**Method**
Cobalt, Dissolved	188		0.05	0.10	ug/L	200.8

Sample Receipt Information

ALS Environmental—Kelso Laboratory
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Phone (360) 577-7222 Fax (360) 425-9096
www.alsglobal.com

Client: Anchor QEA, LLC **Service Request:** K2107408
Project: Green County/201114-01.05 Task 02

SAMPLE CROSS-REFERENCE

SAMPLE #	CLIENT SAMPLE ID	DATE	TIME
K2107408-001	GRC-COL-INF-MW-1-11	6/18/2021	1310
K2107408-002	GRC-COL-1-11	6/18/2021	1310
K2107408-003	GRC-COL-2-11	6/18/2021	1310
K2107408-004	GRC-COL-INF-MW-1-12	6/21/2021	1320
K2107408-005	GRC-COL-1-12	6/21/2021	1320
K2107408-006	GRC-COL-2-12	6/21/2021	1320

K2107408

Chain of Custody Record & Laboratory Analysis Request

Laboratory Number: 503-972-5019

Date:	6/25/2021
Project Name:	Green County
Project Number:	201114-01.05 Task 02
Project Manager:	Masa Kanematsu
Phone Number:	503-972-5001 (Masa Kanematsu)
Shipment Method:	ALS Carrier

ANCHOR QEA

Jessica Goin
6720 SW Macadam Ave
Suite 125
Portland OR 97219

Line	Field Sample ID	Collection Date	Collection Time	Matrix	No. of Containers	Arsenic, Cobalt (dissolved, Method 200.8)																Comments/Preservation
1	GRC-COL-INF-MW-1-11	6/18/2021	13:10	Water	1	X																HNO_3 preserved, filtered
2	GRC-COL-1-11	6/18/2021	13:10	Water	1	X																HNO_3 preserved, filtered
3	GRC-COL-2-11	6/18/2021	13:10	Water	1	X																HNO_3 preserved, filtered
4	GRC-COL-INF-MW-1-12	6/21/2021	13:20	Water	1	X																HNO_3 preserved, filtered
5	GRC-COL-1-12	6/21/2021	13:20	Water	1	X																HNO_3 preserved, filtered
6	GRC-COL-2-12	6/21/2021	13:20	Water	1	X																HNO_3 preserved, filtered
7																						
8																						
9																						
10																						
11																						
12																						
13																						
14																						
15																						

Notes: **Please analyze all analytes with** standard TAT **on this page. Please analyze with Method 200.8 (ICP-MS) for better detection limit.**
Desired reporting limits : As (<2 ug/L), Co (<1 ug/L). For Lithium, please use Method 200.8 for better detection limit if possible. Report requirement: Type II (PDF & csv files)

Relinquished by:	Company:	Received by:	Company:
Masa Kanematsu	Anchor QEA	Perry Jones	ALS
Signature/Print Name:	Date/Time:	Signature/Print Name:	Date/Time:
[signature]	6/25/2021 9:00	Perry Jones	6/25/21 1335

Relinquished by:	Company:	Received by:	Company:
Signature/Print Name:	Date/Time:	Signature/Print Name:	Date/Time:

Distribution: A copy will be made for the laboratory and client. The Project file will retain the original.

Page 1 of 1

PM MH

Cooler Receipt and Preservation Form

Client Anchore Service Request K21 07408

Received: 6/25/21 Opened: 6/25/21 By: PJ Unloaded: 6-25-21 By: PJ

1. Samples were received via? *USPS* *Fed Ex* *UPS* *DHL* *PDX* ***Courier*** *Hand Delivered*
2. Samples were received in: (circle) ***Cooler*** *Box* *Envelope* *Other* ________ NA
3. Were custody seals on coolers? NA Y N If yes, how many and where? ________
   If present, were custody seals intact? Y N If present, were they signed and dated? Y N
4. Was a Temperature Blank present in cooler? NA Y N If yes, notate the temperature in the appropriate column below:
   If no, take the temperature of a representative sample bottle contained within the cooler; notate in the column "Sample Temp":
5. Were samples received within the method specified temperature ranges? NA Y N
   If no, were they received on ice and same day as collected? If not, notate the cooler # below and notify the PM. NA Y N

If applicable, tissue samples were received: *Frozen* *Partially Thawed* *Thawed*

Temp Blank	Sample Temp	IR Gun	Cooler #/COC ID / NA	Out of temp indicate with "X"	PM Notified If out of temp	Tracking Number NA	Filed
4.7		IR01					

6. Packing material: *Inserts* ***Baggies*** *Bubble Wrap* *Gel Packs* ***Wet Ice*** *Dry Ice* *Sleeves* ________
7. Were custody papers properly filled out (ink, signed, etc.)? NA Y N
8. Were samples received in good condition (unbroken) NA Y N
9. Were all sample labels complete (ie, analysis, preservation, etc.)? NA Y N
10. Did all sample labels and tags agree with custody papers? NA Y N
11. Were appropriate bottles/containers and volumes received for the tests indicated? NA Y N
12. Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? *Indicate in the table below* NA Y N
13. Were VOA vials received without headspace? *Indicate in the table below.* NA Y N
14. Was C12/Res negative? NA Y N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count Bottle Type	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, Resolutions: ________

Miscellaneous Forms

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Inorganic Data Qualifiers

- * The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- E The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated value.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.
- H The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

Metals Data Qualifiers

- # The control limit criteria is not applicable. See case narrative.
- J The result is an estimated value.
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- M The duplicate injection precision was not met.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- S The reported value was determined by the Method of Standard Additions (MSA).
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- \+ The correlation coefficient for the MSA is less than 0.995.
- Q See case narrative. One or more quality control criteria was outside the limits.

Organic Data Qualifiers

- * The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- A A tentatively identified compound, a suspected aldol-condensation product.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- C The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
- D The reported result is from a dilution.
- E The result is an estimated value.
- J The result is an estimated value.
- N The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
- P The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.

Additional Petroleum Hydrocarbon Specific Qualifiers

- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- Y The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
- Z The chromatographic fingerprint does not resemble a petroleum product.

ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso
State Certifications, Accreditations, and Licenses

Agency	Web Site	Number
Alaska DEH	http://dec.alaska.gov/eh/lab/cs/csapproval.htm	UST-040
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0339
Arkansas - DEQ	http://www.adeq.state.ar.us/techsvs/labcert.htm	88-0637
California DHS (ELAP)	http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx	2795
DOD ELAP	http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm	L16-58-R4
Florida DOH	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E87412
Hawaii DOH	http://health.hawaii.gov/	-
ISO 17025	http://www.pjlabs.com/	L16-57
Louisiana DEQ	http://www.deq.louisiana.gov/page/la-lab-accreditation	03016
Maine DHS	http://www.maine.gov/dhhs/	WA01276
Minnesota DOH	http://www.health.state.mn.us/accreditation	053-999-457
Nevada DEP	http://ndep.nv.gov/bsdw/labservice.htm	WA01276
New Jersey DEP	http://www.nj.gov/dep/enforcement/oqa.html	WA005
New York - DOH	https://www.wadsworth.org/regulatory/elap	12060
North Carolina DEQ	https://deq.nc.gov/about/divisions/water-resources/water-resources-data/water-sciences-home-page/laboratory-certification-branch/non-field-lab-certification	605
Oklahoma DEQ	http://www.deq.state.ok.us/CSDnew/labcert.htm	9801
Oregon – DEQ (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	WA100010
South Carolina DHEC	http://www.scdhec.gov/environment/EnvironmentalLabCertification/	61002
Texas CEQ	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	T104704427
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C544
Wyoming (EPA Region 8)	https://www.epa.gov/region8-waterops/epa-region-8-certified-drinking-water-	-
Kelso Laboratory Website	www.alsglobal.com	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at www.ALSGlobal.com or at the accreditation bodies web site.
Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/anlayte is offered by that state.

Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

Client:	Anchor QEA, LLC	**Service Request:**	K2107408
Project:	Green County/201114-01.05 Task 02		

Sample Name:	GRC-COL-INF-MW-1-11	**Date Collected:**	06/18/21
Lab Code:	K2107408-001	**Date Received:**	06/25/21
Sample Matrix:	Water		

Analysis Method	Extracted/Digested By	Analyzed By
200.8	ABOYER	RMOORE

Sample Name:	GRC-COL-1-11	**Date Collected:**	06/18/21
Lab Code:	K2107408-002	**Date Received:**	06/25/21
Sample Matrix:	Water		

Analysis Method	Extracted/Digested By	Analyzed By
200.8	ABOYER	RMOORE

Sample Name:	GRC-COL-2-11	**Date Collected:**	06/18/21
Lab Code:	K2107408-003	**Date Received:**	06/25/21
Sample Matrix:	Water		

Analysis Method	Extracted/Digested By	Analyzed By
200.8	ABOYER	RMOORE

Sample Name:	GRC-COL-INF-MW-1-12	**Date Collected:**	06/21/21
Lab Code:	K2107408-004	**Date Received:**	06/25/21
Sample Matrix:	Water		

Analysis Method	Extracted/Digested By	Analyzed By
200.8	ABOYER	RMOORE

Sample Name:	GRC-COL-1-12	**Date Collected:**	06/21/21
Lab Code:	K2107408-005	**Date Received:**	06/25/21
Sample Matrix:	Water		

Analysis Method	Extracted/Digested By	Analyzed By
200.8	ABOYER	RMOORE

Client:	Anchor QEA, LLC	**Service Request:**	K2107408
Project:	Green County/201114-01.05 Task 02		

Sample Name:	GRC-COL-2-12	**Date Collected:**	06/21/21
Lab Code:	K2107408-006	**Date Received:**	06/25/21
Sample Matrix:	Water		

Analysis Method	Extracted/Digested By	Analyzed By
200.8	ABOYER	RMOORE

Sample Results

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Phone (360) 577-7222 Fax (360) 425-9096
www.alsglobal.com

Analytical Report

Client:	Anchor QEA, LLC	**Service Request:**	K2107408
Project:	Green County/201114-01.05 Task 02	**Date Collected:**	06/18/21 13:10
Sample Matrix:	Water	**Date Received:**	06/25/21 13:35
Sample Name:	GRC-COL-INF-MW-1-11	**Basis:**	NA
Lab Code:	K2107408-001		

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	**1.6 J**	ug/L	2.5	0.5	5	07/19/21 16:38	07/02/21	
Cobalt	200.8	**184**	ug/L	0.10	0.05	5	07/19/21 16:38	07/02/21	

Analytical Report

Client:	Anchor QEA, LLC		**Service Request:**	K2107408
Project:	Green County/201114-01.05 Task 02		**Date Collected:**	06/18/21 13:10
Sample Matrix:	Water		**Date Received:**	06/25/21 13:35
Sample Name:	GRC-COL-1-11		**Basis:**	NA
Lab Code:	K2107408-002			

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	**1.5 J**	ug/L	2.5	0.5	5	07/19/21 16:43	07/02/21	
Cobalt	200.8	**181**	ug/L	0.10	0.05	5	07/19/21 16:43	07/02/21	

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Analytical Report

Client:	Anchor QEA, LLC		**Service Request:**	K2107408
Project:	Green County/201114-01.05 Task 02		**Date Collected:**	06/18/21 13:10
Sample Matrix:	Water		**Date Received:**	06/25/21 13:35
Sample Name:	GRC-COL-2-11		**Basis:**	NA
Lab Code:	K2107408-003			

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	**1.0 J**	ug/L	2.5	0.5	5	07/19/21 16:45	07/02/21	
Cobalt	200.8	**181**	ug/L	0.10	0.05	5	07/19/21 16:45	07/02/21	

Client:	Anchor QEA, LLC		**Service Request:**	K2107408
Project:	Green County/201114-01.05 Task 02		**Date Collected:**	06/21/21 13:20
Sample Matrix:	Water		**Date Received:**	06/25/21 13:35
Sample Name:	GRC-COL-INF-MW-1-12		**Basis:**	NA
Lab Code:	K2107408-004			

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	**1.1 J**	ug/L	2.5	0.5	5	07/19/21 16:50	07/02/21	
Cobalt	200.8	**222**	ug/L	0.10	0.05	5	07/19/21 16:50	07/02/21	

Client:	Anchor QEA, LLC		**Service Request:**	K2107408
Project:	Green County/201114-01.05 Task 02		**Date Collected:**	06/21/21 13:20
Sample Matrix:	Water		**Date Received:**	06/25/21 13:35
Sample Name:	GRC-COL-1-12		**Basis:**	NA
Lab Code:	K2107408-005			

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	**0.8 J**	ug/L	2.5	0.5	5	07/19/21 16:51	07/02/21	
Cobalt	200.8	**185**	ug/L	0.10	0.05	5	07/19/21 16:51	07/02/21	

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Analytical Report

Client:	Anchor QEA, LLC	**Service Request:**	K2107408
Project:	Green County/201114-01.05 Task 02	**Date Collected:**	06/21/21 13:20
Sample Matrix:	Water	**Date Received:**	06/25/21 13:35
Sample Name:	GRC-COL-2-12	**Basis:**	NA
Lab Code:	K2107408-006		

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	ND U	ug/L	2.5	0.5	5	07/19/21 16:53	07/02/21	
Cobalt	200.8	**188**	ug/L	0.10	0.05	5	07/19/21 16:53	07/02/21	

QC Summary Forms

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360) 577-7222 Fax (360) 425-9096
www.alsglobal.com

Metals

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1317 South 13th Avenue, Kelso, WA 98626
Phone (360) 577-7222 Fax (360) 425-9096
www.alsglobal.com

Analytical Report

Client:	Anchor QEA, LLC		**Service Request:**	K2107408
Project:	Green County/201114-01.05 Task 02		**Date Collected:**	NA
Sample Matrix:	Water		**Date Received:**	NA
Sample Name:	Method Blank		**Basis:**	NA
Lab Code:	KQ2111986-01			

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	ND U	ug/L	0.50	0.09	1	07/19/21 16:35	07/02/21	
Cobalt	200.8	ND U	ug/L	0.020	0.009	1	07/19/21 16:35	07/02/21	

Client:	Anchor QEA, LLC	**Service Request:**	K2107408
Project:	Green County/201114-01.05 Task 02	**Date Collected:**	06/18/21
Sample Matrix:	Water	**Date Received:**	06/25/21
		Date Analyzed:	07/19/21
		Date Extracted:	07/2/21

Matrix Spike Summary
Dissolved Metals

Sample Name:	GRC-COL-INF-MW-1-11	**Units:**	ug/L
Lab Code:	K2107408-001	**Basis:**	NA
Analysis Method:	200.8		
Prep Method:	EPA CLP ILM04.0		

Matrix Spike
KQ2111986-04

Analyte Name	Sample Result	Result	Spike Amount	% Rec	% Rec Limits
Arsenic	1.6 J	52.7	50.0	102	70-130
Cobalt	184	212	25.0	112 #	70-130

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

Matrix Spike and Matrix Spike Duplicate Data is presented for information purposes only. The matrix may or may not be relevant to samples reported in this report. The laboratory evaluates system performance based on the LCS and LCSD control limits.

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QA/QC Report

Client:	Anchor QEA, LLC	**Service Request:**	K2107408
Project	Green County/201114-01.05 Task 02	**Date Collected:**	06/18/21
Sample Matrix:	Water	**Date Received:**	06/25/21
		Date Analyzed:	07/19/21

Replicate Sample Summary
Dissolved Metals

Sample Name:	GRC-COL-INF-MW-1-11	**Units:**	ug/L
Lab Code:	K2107408-001	**Basis:**	NA

Analyte Name	Analysis Method	MRL	MDL	Sample Result	Duplicate Sample KQ2111986-03 Result	Average	RPD	RPD Limit
Arsenic	200.8	2.5	0.5	1.6 J	1.5 J	1.6	6	20
Cobalt	200.8	0.10	0.05	184	181	183	2	20

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

Client: Anchor QEA, LLC
Project: Green County/201114-01.05 Task 02
Sample Matrix: Water

Service Request: K2107408
Date Analyzed: 07/19/21

Lab Control Sample Summary
Dissolved Metals

Units: ug/L
Basis: NA

Lab Control Sample
KQ2111986-02

Analyte Name	Analytical Method	Result	Spike Amount	% Rec	% Rec Limits
Arsenic	200.8	51.6	50.0	103	85-115
Cobalt	200.8	25.6	25.0	103	85-115