

GROUNDWATER MONITORING PLAN

PLANT YATES INACTIVE CCR LANDFILL – GYPSUM STACK

COWETA COUNTY, GEORGIA

FOR



Georgia
Power

SEPTEMBER 2021



Approved
Solid Waste Management Program
Beverly
Approved By: Tipton

Digitally signed by Beverly Tipton
Date: 2021.11.09 12:04:42 -05'00'

TABLE OF CONTENTS

I.	CERTIFICATION	1
1.	INTRODUCTION	2
2.	GEOLOGIC AND HYDROGEOLOGIC CONDITIONS.....	3
3.	WELL LOCATIONS	5
4.	MONITORING WELL DRILLING, CONSTRUCTION, ABANDONMENT & REPORTING	6
4.1	DRILLING.....	6
4.2	DESIGN AND CONSTRUCTION	6
4.3	ABANDONMENT	8
4.4	DOCUMENTATION	9
5.	GROUNDWATER MONITORING PARAMETERS AND FREQUENCY.....	10
6.	SAMPLE COLLECTION	14
7.	CHAIN-OF-CUSTODY.....	15
8.	FIELD AND LABORATORY QUALITY ASSURANCE / QUALITY CONTROL	16
9.	REPORTING RESULTS.....	17
10.	STATISTICAL ANALYSIS	19

TABLES

TABLE 1	GROUNDWATER MONITORING PARAMETERS & FREQUENCY
TABLE 2	ANALYTICAL METHODS AND REPORTING LIMITS

FIGURES

FIGURE 1	STATISTICAL ANALYSIS PLAN OVERVIEW
FIGURE 2	DECISION LOGIC FOR DETERMINING APPROPRIATE STATISTICAL METHOD
FIGURE 3	DECISION LOGIC FOR COMPUTING PREDICTION LIMITS

APPENDICES

APPENDIX A.	MONITORING SYSTEM DETAILS
APPENDIX B.	HYDRAULIC CONDUCTIVITY TESTING RESULTS
APPENDIX C.	BORING LOGS, WELL CONSTRUCTION DIAGRAMS, EPD BOND CONTINUATION CERTIFICATES AND SURVEY DATA
APPENDIX D.	GROUNDWATER MONITORING WELL DETAIL
APPENDIX E.	GROUNDWATER SAMPLING PROCEDURES

I. CERTIFICATION

I hereby certify that this Groundwater Monitoring Plan was prepared by, or under the direct supervision of, a “Qualified Groundwater Scientist,” in accordance with the Georgia Environmental Protection Division (EPD) Rules of Solid Waste Management, Chapter 391-3-3.10(6). According to 391-3-4-.01(57), a Qualified Groundwater Scientist is “a professional engineer or geologist registered to practice in Georgia who has received a baccalaureate or post-graduate degree in the natural sciences or engineering and has sufficient training and experience in groundwater hydrology and related fields that enable individuals to make sound professional judgments regarding groundwater monitoring, contaminant fate and transport, and corrective action.” The design of the groundwater monitoring system was developed in compliance with the Georgia Environmental Protection Division (GA EPD) Rules of Solid Waste Management, Chapter 391-3-4.10(6).

Signature: _____

Date: 2021-09-30



1. INTRODUCTION

Groundwater monitoring is required by the Georgia Environmental Protection Division (EPD) to detect and quantify potential changes in groundwater chemistry. This Groundwater Monitoring Plan (plan) describes the groundwater monitoring program for the Gypsum Stack Landfill (Gypsum Stack). This plan meets the requirements of EPD rules and uses EPD's Manual for Ground Water Monitoring dated September 1991 as a guide. Groundwater monitoring well locations are presented on Figure 1 of Appendix A and well construction details presented in Table 1 of Appendix A.

Monitoring will occur in accordance with 391-3-4-.10 of the Georgia Solid Waste Management Rules. If the monitoring requirements specified in this plan conflict with EPD rules (391-3-4), the EPD rules will take precedent.

The Gypsum Stack was permitted by Georgia EPD on February 14, 1992. The facility-initiated closure activities in 2015 that included removal of all coal combustion residuals (CCR). A Georgia EPD-approved detection monitoring well network for the Gypsum Stack was installed and certified by a qualified groundwater scientist as required for issuance of EPD Solid Waste Handling Permit No. 038-014D(I). This detection monitoring well network complies with United States Environmental Protection Agency (USEPA) Coal Combustion Rule (§257.90), which is incorporated in the Georgia State CCR Rule by reference. The existing monitoring wells were installed following the guidelines presented herein. Additionally, this plan documents the methods for future monitoring well installation and/or replacement, and procedures for well abandonment. As required by 391-3-4.10(6)(g), a minor modification will be submitted to the EPD prior to the unscheduled installation or abandonment of monitoring wells. Well installation and/or abandonment must be directed by a qualified groundwater scientist. Currently, routine assessment monitoring is completed as required by 391-3-4.10(6)(a) and §257.95.

2. GEOLOGIC AND HYDROGEOLOGIC CONDITIONS

A detailed overview of site geology and hydrogeology was provided in *The Geology and Hydrogeology of the Plant Yates CT-121 Project Stacking Area*. This document was prepared by Southern Company Services, Inc. during permitting of the former gypsum landfill in the early 1990s. The former landfill was located within Plant Yates property approximately 0.5 miles north of the CCR pond area. The Hydrogeological Assessment report provides a comprehensive review of the site's geology and hydrogeology.

Plant Yates lies within the Inner Piedmont of western Georgia, immediately southeast of the Brevard Fault Zone, an inactive fault which forms the northern boundary of the Inner Piedmont and the Dadeville Complex lithologies. The rocks in the area have been subjected to several episodes of metamorphism and intrusion by igneous bodies, creating a complex geologic picture. Surface expressions of the joints are observed on topographic maps and aerial photos of the Plant Yates area.

Granitic gneiss and schist units have been identified in the Plant Yates area. Both units are covered by a thick layer of saprolite. The schist unit is a sequence of amphibolites interlayered with chlorite schists and other metasedimentary rocks. Amphibolites are well foliated and may be retrograded to chlorite. The granitic gneiss is metamorphosed light-gray granitic pluton of medium- to coarse-grained texture. The unit is exposed in outcrops that trend northeast.

A thin layer soil from one to two feet thick overlies a thick layer of saprolite. The saprolite, which extends to typical depths of 20-40 feet below ground surface, was formed from the weathering of the underlying metamorphic rocks. There is typically a zone of variable thickness (approximately 5-20 feet) of weathered rock between the saprolite and competent bedrock.

Shallow groundwater is typically encountered near the saprolite/weathered rock interface. Bedrock becomes increasing competent with depth and movement of groundwater occurs only in fractures (i.e., secondary porosity). Recharge to the water-bearing zones in fractured bedrock takes place by seepage through the overlying mantle of soil/saprolite, or by direct entrance through openings in outcrops. A recent water table elevation contour map showing overall flow directions is provided in Appendix A, Figure 2. Average depth of the water table at Plant Yates varies with topography (range of approximately 5 to 50 feet below ground surface).

At the site, groundwater in the saturated overburden represents the uppermost aquifer. This uppermost aquifer is comprised of both residual soils, saprolite, and partially weathered rock, and is generally unconfined. It is recharged by precipitation stored in residual soils and typically discharges to streams. Groundwater stored in the overburden also recharges the underlying bedrock through preferentially weathered discontinuities in the bedrock and discharges to streams through inter-connected bedrock fractures. Hydraulic conductivity (K) is defined as the rate at which water can move through a permeable medium. In situ rising head and falling slug tests were performed at multiple locations at the Gypsum Stack to determine horizontal K values. Vertical K values for locations throughout Plant Yates were determined by laboratory testing of undisturbed overburden samples (Shelby Tubes) collected at multiple Plant Yates locations. The range in K values at these locations was small, indicating a fairly uniform hydrogeologic layers across the saprolite and weathered rock horizon (typically range from 10^{-3} cm/sec to 10^{-4} cm/sec). Appendix A, Table 1, Monitoring System Details, presents summaries of the K testing values from Plant Yates monitoring wells and piezometers laboratory test results for locations throughout Plant Yates. The values from the field and laboratory tests fall within the standard range of hydraulic conductivity values associated with a silty sand. Supporting data for the K testing values are provided in Appendix B, Hydraulic Conductivity Testing Results.

The horizontal hydraulic gradient across the former Gypsum Stack was measured during the March 2021 groundwater monitoring event from GWA-2 to GWC-4R with an average estimated horizontal gradient of 0.031 ft/ft.

Average groundwater flow velocity in the Gypsum Stack area is based on hydraulic conductivity (K), lateral gradient (i) and effective porosity (P_e). The average K for the site is 1054 feet/year, and the gradient across Gypsum Stack (March 2021) was 0.031 ft/ft, and the effective porosity (n_e) was estimated at 0.20. The average groundwater velocity is calculated as:

$$V_{gw} = (K)(i)/n_e = ((1054 \text{ ft/year}) (0.031 \text{ ft/ft})/0.20 \text{ ft/ft}) = 163 \text{ feet/year.}$$

3. WELL LOCATIONS

Groundwater monitoring wells are installed to monitor the uppermost occurrence of groundwater beneath the site. Locations were selected based on the former waste unit layout and site geologic and hydrogeologic considerations. Locations were chosen to serve as upgradient (GWA designation) or downgradient (GWC designation) based on groundwater flow direction determined by potentiometric evaluation. The well naming nomenclature is based on Georgia EPD's Industrial Waste Disposal Site Design and Operations Plan – Supplemental Data for Solid Waste Handling Permit (undated).

A map depicting monitoring well locations is included in Appendix A (Figure 1, Groundwater Monitoring Plan). A tabulated list of individual monitoring wells with well construction details such as top-of-casing elevations, well depths, and screened intervals is included in Table 1 of Appendix A. A March 2021 potentiometric map was prepared for the uppermost aquifer in the area of the Gypsum Stack and is illustrated on Figure 2, Appendix A. Any change to the groundwater monitoring network must be made by a minor modification to the permit pursuant to 391-3-4.10(6)(g)7.

Upgradient monitoring well GWA-2 is utilized as part of the monitoring network system. This monitoring well is located to the east of the former Gypsum Stack. There are 18 additional site-wide upgradient wells located within Plant Yates that are included in the overall upgradient monitoring network system. All 19 upgradient wells are included in Table 1 of Appendix A.

The following six downgradient monitoring wells are utilized as part of the monitoring network system: GWC-1R, GWC-2R, GWC-3R, GWC-4R, GWC-5R and GWC-6R. The monitoring well locations are shown in Appendix A, Figure 1. Boring logs and well construction diagrams for the existing monitoring wells are provided In Appendix C, Boring Logs and Well Construction Diagrams. Copies of the driller's EPD bond continuation certificates from the period of well installation (2007 – 2012) and June 2020 well re-survey data certified by Georgia Registered Land Surveyor are also included in Appendix C.

4. MONITORING WELL DRILLING, CONSTRUCTION, ABANDONMENT & REPORTING

The existing monitoring well network at the Gypsum Stack is in place. Existing monitoring wells were installed following the latest version of the Region 4 USEPA Science and Ecosystem Support Division Operating Procedure for Design and Installation of Monitoring Wells as a general guide for best practices. Monitoring well construction data are provided on Table 1 of Appendix A.

4.1 DRILLING

A variety of well drilling methods are available for the purpose of installing groundwater wells. Drilling methodology options include, but are not limited to hollow stem augers, direct push, air rotary, mud rotary, and roto sonic techniques. The drilling method shall minimize the disturbance of subsurface materials and shall not cause impact to the groundwater. Borings will be advanced using an appropriate drilling technology capable of drilling and installing a well in the site-specific geology. Monitoring wells will be installed using the most current version of the USEPA SEDD SEDDGUID-101-R1 as a general guide for best practices. Drilling equipment shall be decontaminated before use and between borehole locations using the procedures described in the latest version of the Region 4 USEPA Science and Ecosystem Support Division Operating Procedure for Field Equipment Cleaning and Decontamination as a guide.

Sampling and/or coring may be used to help determine the stratigraphy and geology. Samples will be logged by trained personnel working under the direction of a Professional Geologist/Engineer registered in the State of Georgia. Screen depths will be chosen based on the depth of the uppermost aquifer.

Drilling and well installation activities will be directed by a qualified groundwater scientist. All drilling for any subsurface hydrologic investigation, installation, or abandonment of groundwater monitoring wells must be performed by a driller that has, at the time of installation, a performance bond on file with the Water Well Standards Advisory Council.

4.2 DESIGN AND CONSTRUCTION

Well construction materials will be sufficiently durable to resist chemical and physical degradation and will not interfere with the quality of groundwater samples.

WELL CASINGS AND SCREENS

American Society for Testing and Materials International (ASTM), National Science Foundation (NSF) rated, Schedule 40, 2-inch diameter polyvinyl chloride (PVC) pipe with flush threaded connections will be used for the well riser and screens. Compounds that can cause PVC to deteriorate (e.g., organic compounds) are not expected at this facility. If conditions warrant, other appropriate materials may be used for construction with prior written approval from the EPD.

WELL INTAKE DESIGN

The design and construction of the intake of the groundwater wells shall: (1) allow sufficient groundwater flow to the well for sampling; (2) minimize the passage of formation materials (turbidity) into the well; and (3) ensure sufficient structural integrity to prevent the collapse of the intake structure.

Each groundwater monitoring well will include a well screen designed to limit the amount of formation material passing into the well when it is purged and sampled. Screens with 0.010-inch slots have proven effective for the earth materials at the site and will be used unless geologic conditions discovered at the time of installation dictate a different size. Screen length shall not exceed 10 feet without justification as to why a longer screen is necessary (e.g., significant variation in groundwater level). If the above prove ineffective for developing a well with sufficient yield or acceptable turbidity, further steps will be taken to ensure that the well screen is appropriately sized for the formation material. This may include performing sieve analysis of the formation material and determining well screen slot size based on the grain size distribution.

Pre-packed dual-wall well screens may be used for well construction. Pre-packed well screens combine a centralized inner well screen, a developed filter sand pack, and an outer conductor screen in one integrated unit composed of inert materials. Pre-packed well screens will be installed following general industry standards and using the latest version of the Region 4 U.S. Environmental Protection Agency Science and Ecosystem Support Division Operating Procedure for Design and Installation of Monitoring Wells as a general guide.

FILTER PACK AND ANNULAR SEAL

The materials used to construct the filter pack were clean quartz sand of a size that is appropriate for the screened formation. Fabric filters were not used as filter pack material. Sufficient filter material will be placed in the hole and measurements taken to ensure that no bridging occurs. Upon placement of the filter pack, the well may be pumped to assure settlement of the pack. If pumping is performed, the top of filter pack depth will be measured, and additional sand added if necessary. The filter pack will extend approximately one to two feet above the top of the well screen.

The materials used to seal the annular space must prevent hydraulic communication between strata and prevent migration from overlying areas into the well screen interval. A minimum of two feet of bentonite (chips, pellets, or slurry) will be placed immediately above the filter pack. The bentonite seal will extend up to the base of any overlying confining zone or the top of the water-bearing zone to prevent cementitious grout from entering the water-bearing or screened zone. If dry bentonite is used, the bentonite must be hydrated with potable water prior to grouting the remaining annulus.

The annulus above the bentonite seal will be grouted with a cement and bentonite mixture (approximately 94 pounds cement / 3 to 5 pounds bentonite / 6.5 gallons of potable water) placed via tremie pipe from the top of the bentonite seal. During grouting, care will be taken to assure that the bentonite seal is not disturbed by locating the base of the tremie pipe approximately 2 feet above the bentonite seal and injecting grout at low pressure/velocity.

PROTECTIVE CASING AND WELL COMPLETION

After allowing the grout to settle, the well will be finished by installing a flush-mount or above-ground protective casing as appropriate, and building a surface cap. The use of flush-mount wells will generally be limited to paved surfaces unless site operations warrant otherwise. The surface cap will extend from the top of the cementitious grout to ground surface, where it will become a concrete apron extending outward with a radius of at least 2 feet from the edge of the well casing and sloped to drain water away from the well.

Each well will be fitted with a cap that contains a hole or opening to allow the pressure in the well to equalize with atmospheric pressure. In wells with above-ground protection, the space between the well casing and the protective casing will be filled with coarse sand or pea-gravel to within approximately 6 inches of the top of the well casing. A small weep hole will be drilled at the base of the metal casing for the drainage of moisture from the casing. Above ground protective covers will be locked.

Protective bollards will be installed around each above-grade groundwater monitoring well. Well construction in high traffic areas will generally be limited unless site conditions warrant otherwise.

The groundwater monitoring well detail attached in Appendix D, Groundwater Monitoring Well Detail, illustrates the general design and construction details for a monitoring well.

WELL DEVELOPMENT

Well development will be conducted under supervision of a certified groundwater professional. After well construction is completed, wells will be developed by alternately purging and surging until relatively clear discharge water with little turbidity is observed. The goal will be to achieve a turbidity of less than 5 nephelometric turbidity units (NTUs); however, formation-specific conditions may not allow this target to be accomplished. Development can be discontinued once a maximum turbidity of 10 NTU is achieved. Additionally, the stabilization criteria contained in Appendix E, Groundwater Sampling Procedures, should be met. A variety of techniques may be used to develop site groundwater monitoring wells. The method used must create reversals or surges in flow to eliminate bridging by particles around the well screen. These reversals or surges can be created by using surge blocks, bailers, or pumps. The wells will be developed using a pump capable of inducing the stress necessary to achieve the development goals. All development equipment will be decontaminated prior to first use and between wells. Well development data will be included in installation documentation reports.

In low yielding wells, potable water may be added to the well to facilitate surging of the well screen interval and removal of fine-grained sediment. If water is added, the volume will be documented and at a minimum, an equal volume purged from the well.

Many geologic formations contain clay and silt particles that are small enough to work their way through the wells' filter packs over time. Therefore, the turbidity of the groundwater from the monitoring wells may gradually increase over time after initial well development. As a result, the monitoring wells may have to be redeveloped periodically to remove the silt and clay that has worked its way into the filter pack of the monitoring wells. Each monitoring well should be redeveloped when sample turbidity values have significantly increased since initial development or since prior redevelopment. The redevelopment should be performed as described above.

4.3 ABANDONMENT

Monitoring wells will be abandoned using industry-accepted practices and using the EPD Manual for Groundwater Monitoring (1991) and Georgia's Well Water Standards Act of 1985 [Official Code of Georgia Annotated (O.C.G.A.) § 12-5-120, 1985] as guides. Neat Portland cement or bentonite will be used as appropriate to complete abandonment and seal the well borehole. Monitoring wells will be abandoned under the direction of a qualified groundwater scientist registered in Georgia.

Per Georgia Rule 391-3-4-.10(6)(g): Monitoring wells require abandonment and replacement after two consecutive dry sampling events, unless an alternate schedule is approved by the Georgia EPD. Well abandonment will be directed by a qualified groundwater scientist.

4.4 DOCUMENTATION

Within 60 days of the construction, development, and survey of each new groundwater monitoring well, or the abandonment of an existing monitoring well, completed under the direction of a qualified groundwater scientist or engineer, a well installation/abandonment report will be submitted to the EPD. The following information will be documented in this report.

- Well identification,
- Name of drilling contractor and type of drill rig,
- Documentation stating that a Georgia-registered professional surveyor shall certify that the horizontal accuracy for the installed monitoring wells is 0.5 feet, and vertical accuracy for top of casing elevations to 0.01 feet using a known datum,
- Documentation that the driller, at the time the monitoring wells were installed, had a bond on file with the Water Well Standards Advisory Council,
- Type of protective well cap and sump dimensions for each well,
- Dates of drilling and initial well emplacement,
- Drilling method and drilling fluid if used,
- Borehole diameter and well casing diameter,
- Well depth (± 0.1 feet),
- Lithologic logs,
- Well casing materials,
- Screen materials and design (i.e., interval in feet below ground surface and elevation),
- Screen length,
- Screen slot size,
- Filter pack material/size and volume (placement narrative),
- Seal emplacement method and type/volume of sealant,
- Surface seal and volumes/mix of annular seal material,
- Well development date,
- Sealant materials and volume,
- Well turbidity following development,
- Narrative of well development method - specific well development,
- Documentation of ground surface elevation (± 0.01 feet),
- Documentation of top of casing elevation (± 0.01 feet), and
- Schematic of the well with dimensions

5. GROUNDWATER MONITORING PARAMETERS AND FREQUENCY

The following describes groundwater sampling requirements with respect to parameters for analysis, sampling frequency, sample preservation and shipment, and analytical methods. Groundwater samples used to provide compliance monitoring data will not be filtered prior to collection.

Table 1, Groundwater Monitoring Parameters and Frequency, presents the groundwater monitoring parameters and sampling frequency. A minimum of eight independent samples from each groundwater are collected and analyzed for 40 CFR 257, Subpart D, Appendix III and Appendix IV test parameters to establish a background statistical dataset. Subsequently, in accordance with 391-3-4-.10(6), the monitoring frequency for the Appendix III parameters is at least semi-annual during the post-CCR removal monitoring period. Assessment monitoring was initiated on November 13, 2019 per Chapter 391-3-4-.10, Georgia Rules for Solid Waste Management.

When referenced throughout this plan, Appendix III and Appendix IV parameters refer to the parameters contained in Appendix III and Appendix IV of 40 CFR 257, Subpart D, 80 Fed. Reg. 21468 (April 17, 2015).

If any parameters contained in Appendix I or II of 40 CFR 258, Subpart E, as amended, 56 Fed. Reg. 51032 - 51039 (October 9, 1991) are detected at statistically significant levels above background concentrations, these parameters will continue to be monitored. Appendix I or II analytes for the approved monitoring wells have been historically monitored in accordance with the requirements of Chapter 391-3-4-.14, Rules for Solid Waste Management.

As shown on Table 2, Analytical Methods, groundwater samples will be analyzed using methods specified in USEPA Manual SW-846, EPA 600/4-79-020, Standard Methods for the Examination of Water and Wastewater (SM18-20), USEPA Methods for the Chemical Analysis of Water and Wastes (MCAWW), ASTM, or other suitable analytical methods approved by the Georgia EPD. The method used will be able to reach a suitable practical quantification limit to detect natural background conditions at the facility. The groundwater samples will be analyzed by licensed and accredited laboratories through the National Environmental Laboratory Accreditation Program (NELAP). Field instruments used to measure pH must be accurate and reproducible to within 0.1 Standard Units (S.U.).

**TABLE 1
 GROUNDWATER MONITORING PARAMETERS & FREQUENCY**

MONITORING PARAMETER		GROUNDWATER MONITORING	
		Background	Semiannual Events
Field Parameters	Temperature	X	X
	pH	X	X
	Specific Conductance	X	X
	Turbidity	X	X
	Dissolved Oxygen	X	X
Appendix I and II Metals (State Permit)	Antimony	X	X
	Arsenic	X	X
	Barium	X	X
	Beryllium	X	X
	Cadmium	X	X
	Chromium	X	X
	Cobalt	X	X
	Copper	X	X
	Lead	X	X
	Mercury	X	X
	Nickel	X	X
	Selenium	X	X
	Silver	X	X
	Thallium	X	X
Vanadium	X	X	
Zinc	X	X	
Appendix III (40 CFR 257)	Boron	X	X
	Calcium	X	X
	Chloride	X	X
	Fluoride	X	X
	pH	X	X
	Sulfate	X	X
	Total Dissolved Solids	X	X

**TABLE 1
 GROUNDWATER MONITORING PARAMETERS & FREQUENCY**

MONITORING PARAMETER		GROUNDWATER MONITORING	
		Background	Semiannual Events
Appendix IV (40CFR 257)	Antimony	X	Assessment sampling frequency and parameter list determined in accordance with Georgia Chapter 391-3-4.10(6).
	Arsenic	X	
	Barium	X	
	Beryllium	X	
	Cadmium	X	
	Chromium	X	
	Cobalt	X	
	Fluoride	X	
	Lead	X	
	Lithium	X	
	Mercury	X	
	Molybdenum	X	
	Selenium	X	
	Thallium	X	
	Radium 226 & 228	X	

**TABLE 2
 ANALYTICAL METHODS**

Parameters	EPA Method Number
Boron	6010D/6020B
Calcium	7140/6010D/6020B
Chloride	300.0/300.1/9250/9251/9253/9056A
Fluoride	300.0/300.1/9214/9056A
pH	150.1field/9040C
Sulfate	9035/9036/9038300.0/300.1/9056A
Total Dissolved Solids (TDS)	160/2540C
Antimony	7040/7041/6010D/6020B
Arsenic	7060A/7061A/6010D/6020B
Barium	7080A/7081/6010D/6020B
Beryllium	7090/7091/6010D/6020B

**TABLE 2
 ANALYTICAL METHODS**

Parameters	EPA Method Number
Cadmium	7130/7131A/6020B
Chromium	7190/7191/6010D/6020B
Cobalt	7200/7201/6010D/6020B
Copper	7210/7211/6010D/6020B
Fluoride	300.0/300.1/9214/9056A
Lead	7420/7421/6010D/6020B
Lithium	6010D/6020B
Mercury	7470A/7471B
Molybdenum	6010D/6020B
Nickel	7520/7521/6010D/6020B
Selenium	7740/7741A/6010D/6020B
Silver	7760A/7761/6010D/6020B
Thallium	7840/7841/6010D/6020B
Vanadium	7910/7911/6010D/6020B
Zinc	7950/7951/6010D/6020B
Radium 226 and 228 combined	903/9320/9315

6. SAMPLE COLLECTION

During each sampling event, samples will be collected and handled in accordance with the procedures specified in Appendix E, Groundwater Sampling Procedures. Sampling procedures were developed using standard industry practice and USEPA Region 4 Field Branches Quality System and Technical Procedures as a guide. Low-flow sampling methodology will be utilized for sample collection. Alternative industry accepted sampling techniques may be used when appropriate with prior EPD approval.

For groundwater sampling, positive gas displacement PVC, Teflon™ or stainless steel bladder pumps will be used for purging. If dedicated bladder pumps are not used, portable bladder pumps or peristaltic pumps (with dedicated or disposable tubing) may be used. When non-dedicated equipment is used, it will be decontaminated prior to use and between wells. The applied groundwater purging, and sampling methodologies are discussed in the groundwater semi-annual monitoring reports submitted to EPD.

Per Georgia Rule 391-3-4-.10(6)(g) monitoring wells require replacement after two consecutive dry sampling events. Well installation must be directed by a qualified groundwater scientist. A minor modification shall be submitted in accordance with Rule 391-3-4-.02(3)(b)(6) prior to the installation or decommissioning of monitoring wells.

7. CHAIN-OF-CUSTODY

All samples will be handled under chain-of-custody (COC) procedures beginning in the field. The COC record will contain the following information:

- Sample identification numbers
- Signature of collector
- Date and time of collection
- Sample type
- Sample point identification
- Number of sample containers
- Notated date(s) and time(s) of sample transfer between individuals
- Signature of person(s) involved in the chain of possession
- Dates of possession by each individual

The samples will remain in the custody of assigned personnel, an assigned agent, or the laboratory. If the samples are transferred to other employees for delivery or transport, the sampler or possessor must relinquish possession and the samples must be received by the new owner.

If the samples are being shipped, a hard copy COC will be signed and enclosed within the shipping container.

Samplers must use COC forms provided by the analytical laboratory or use a COC form similarly formatted and containing the information listed above.

8. FIELD AND LABORATORY QUALITY ASSURANCE / QUALITY CONTROL

All field quality control samples will be prepared the same as compliance samples with regard to sample volume, containers, and preservation. The following quality control samples will be collected during each sampling event:

- Field Equipment Rinsate Blanks - Where sampling equipment is not new or dedicated, an equipment rinsate blank will be collected at a rate of one blank per 10 samples using non-dedicated equipment.
- Field Duplicates - Field duplicates will be collected by filling additional containers at the same location, and the field duplicate is assigned a unique sample identification number. One blind field duplicate will be collected for every 20 samples.
- Field Blanks - Field blanks will be collected in the field using the same water source that is used for decontamination. The water will be poured directly into the supplied sample containers in the field and submitted to the laboratory for analysis of target constituents. One field blank will be collected for every 20 samples.

Calibration of field instruments will occur daily and follow the recommended (specific) instrument calibration procedures provided by the manufacturer and/or equipment manual specific to each instrument. Daily calibration will be documented on field forms and these field forms will be included in all groundwater monitoring reports. Instruments will be recalibrated as necessary (e.g., when calibration checks indicate significant variability), and all checks and recalibration steps will also be documented on field calibration forms. Calibration of the instruments will also be checked if any readings during sampling activities are suspect. Replacement probes and meters will be obtained as a corrective action in the event that recalibration does not improve instrument function. Calibration field forms will be provided as part of each groundwater report's quality control documentation.

The groundwater samples will be analyzed by licensed and accredited laboratories through the NELAP.

9. REPORTING RESULTS

A semi-annual groundwater report that documents the results of sampling and analysis will be submitted to EPD. Semiannual groundwater monitoring reports will be submitted to the EPD within 90 days of receipt of the groundwater analytical data from the laboratory. At a minimum, semi-annual reports will include:

1. A narrative describing sampling activities and findings including a summary of the number of samples collected, the dates the samples were collected and whether the samples were required by the detection or assessment monitoring programs.
2. A brief overview of purging/sampling methodologies.
3. Discussion of results.
4. Recommendations for the future monitoring consistent with the Rules.
5. Potentiometric surface contour map for the aquifer(s) being monitored, signed and sealed by a Georgia-registered P.G. or P.E.
6. Table of as-built information for groundwater monitoring wells including top of casing elevations, ground elevations, screened elevations, current groundwater elevations and depth to water measurements.
7. Groundwater flow rate and direction calculations.
8. Identification of any groundwater wells that were installed or decommissioned during the preceding year, along with a narrative description of why these actions were taken.
9. A narrative discussion of any transition between monitoring programs (e.g., the date and circumstances for transitioning from detection monitoring to assessment monitoring in addition to identifying the constituent(s) detected at a statistically significant increase over background levels.
10. If applicable, semiannual assessment monitoring results.
11. Any alternate source demonstration completed during the previous monitoring period, if applicable.
12. Laboratory Reports.
13. COC documentation.
14. Field sampling logs including field instrument calibration, indicator parameters and parameter stabilization data.
15. Field logs and forms for each sampling event to include, but not limited to, well signage, well access, sampling and purging equipment condition, and any site conditions that may affect sampling.

16. Documentation of non-functioning wells.
17. Table of current analytical results for each well, highlighting statistically significant increases and concentrations above maximum contaminant level (MCL).
18. Statistical analyses.
19. Certification by a qualified groundwater scientist.

10. STATISTICAL ANALYSIS

Groundwater quality data from each sampling event will be statistically evaluated to determine if there has been a statistically significant change in groundwater chemistry. Historical background data will be used to determine statistical limits. All 19 upgradient wells at Plant Yates are included in site background. Statistical analysis techniques will be consistent with the USEPA document Statistical Analysis of Groundwater Data at RCRA Facilities Unified Guidance (Unified Guidance) (USEPA, 2009).

According to EPD rules (391-3-4-.10(6)(a)) the site must specify in the operating record the statistical methods to be used in evaluating groundwater monitoring data for each hazardous constituent. The statistical test chosen shall be conducted separately for each hazardous constituent in each well. As authorized by the rule, statistical tests that will be used include:

1. A prediction interval procedure in which an interval for each constituent is established from the distribution of the background data, and the level of each constituent in each compliance well is compared to the upper prediction limit. (391-3-4-.14(18)(c)).
2. A control chart approach that gives control limits for each constituent. (391-3-4-.14(18)(d)).
3. Another statistical test method (such as prediction limits or control charts) that meets the performance standards of paragraph 391-3-4-.14(19) of the rule (391-3-4-.14(18)(e)). A justification for an alternative method will be placed in the operating record and the Director notified of the use of an alternative test. The justification will demonstrate that the alternative method meets the performance standards of 391-3-4-.14(19).

Based on site-specific conditions, statistical methods may be intrawell, interwell, or combination of both.

A site-specific statistical analysis plan that provides details regarding the statistical methods to be used will be placed in the site's operating record pursuant to 391-3-4-.10(6). Figure 1, Statistical Analysis Plan Overview, includes a flowchart that depicts the process that will be followed to develop the site-specific plan. Figure 2, Decision Logic for Determining Appropriate Statistical Methods, depicts the decision logic that will be used to determine the appropriate method as required by 391-3-4-.10(6). Figure 3, Decision Logic for Computing Prediction Limits, presents the logic that will be used to calculate site-specific statistical limits and test compliance results against those limits.

FIGURE 1. STATISTICAL ANALYSIS PLAN OVERVIEW

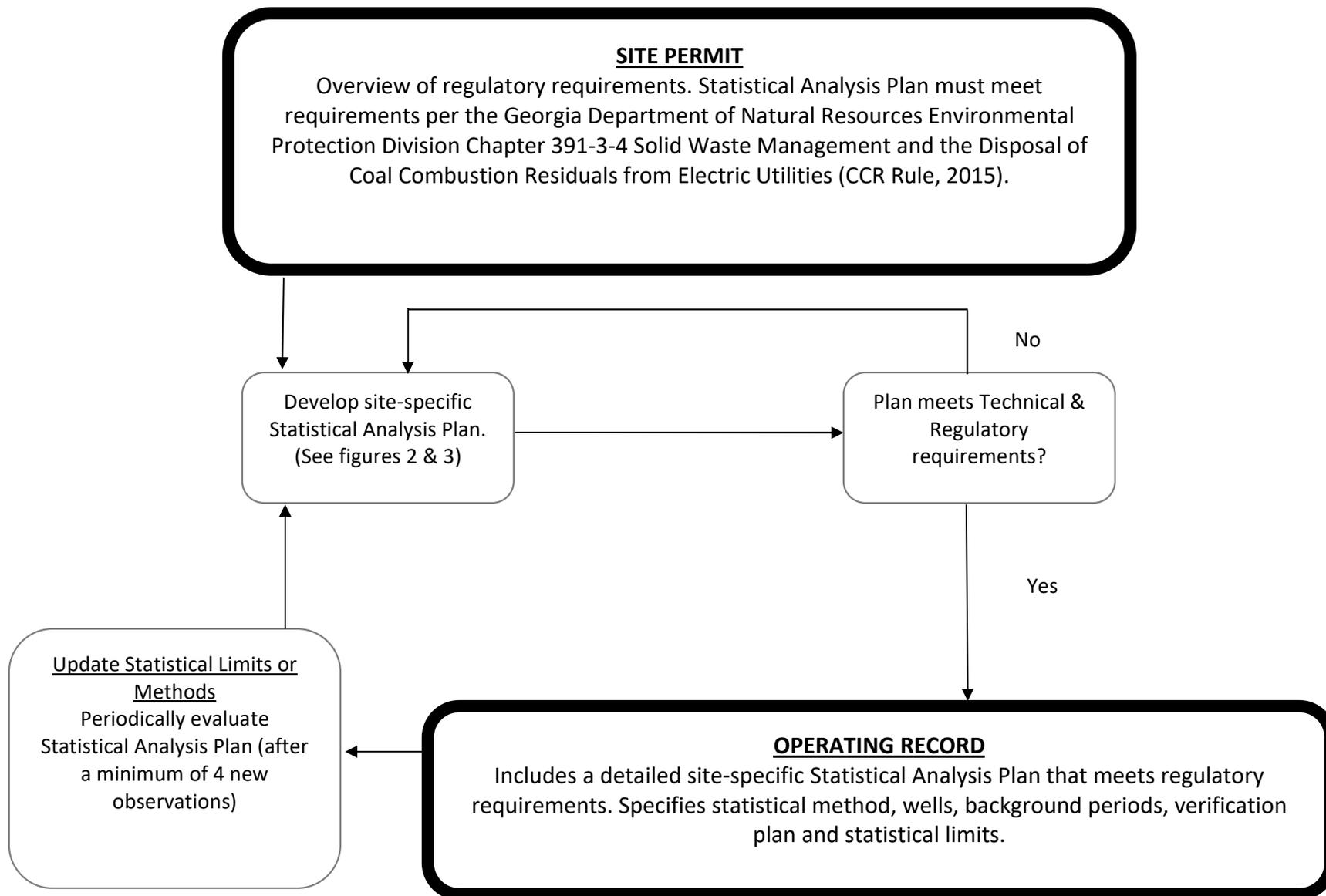


FIGURE 2. DECISION LOGIC FOR DETERMINING APPROPRIATE STATISTICAL METHOD

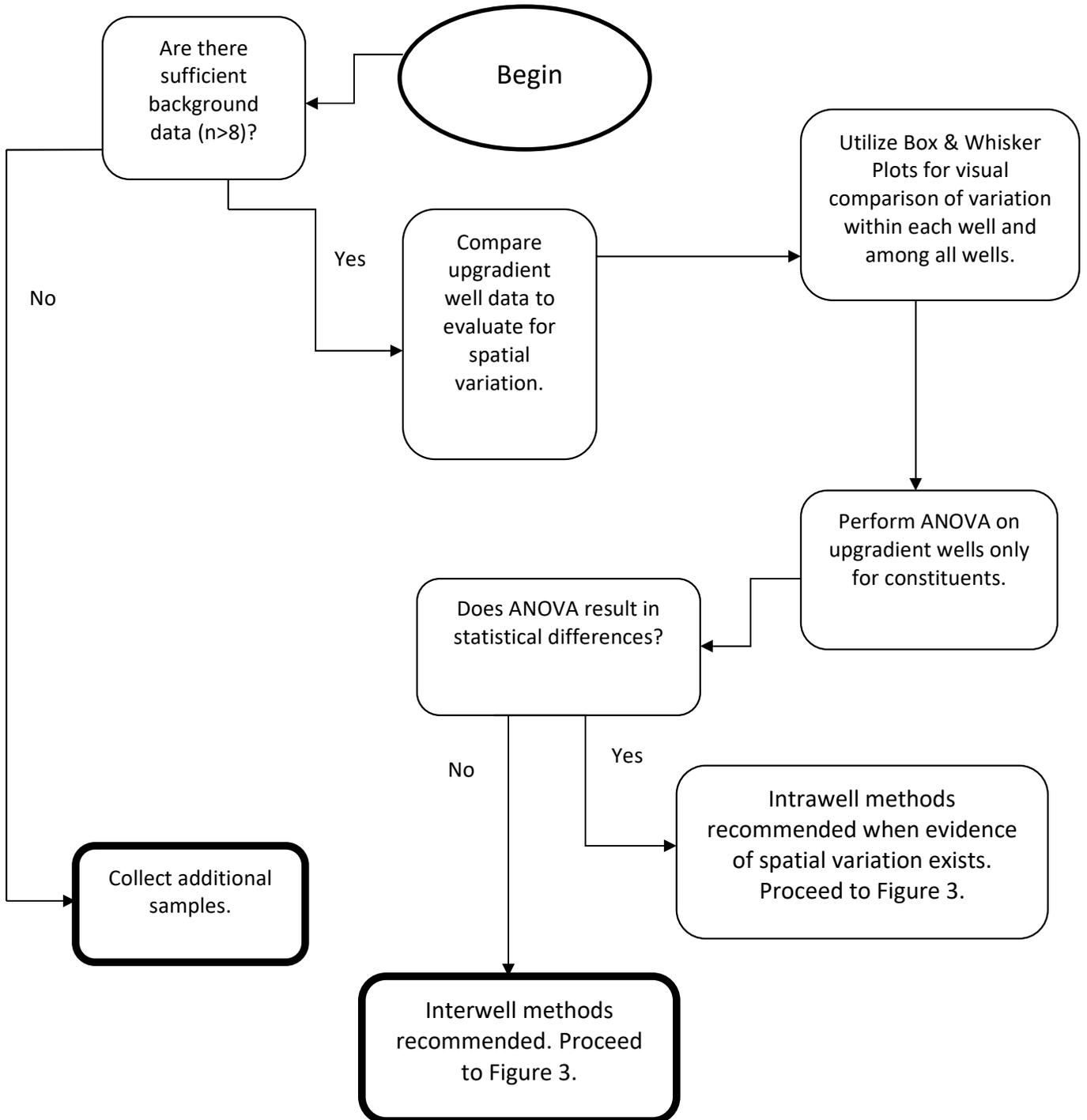
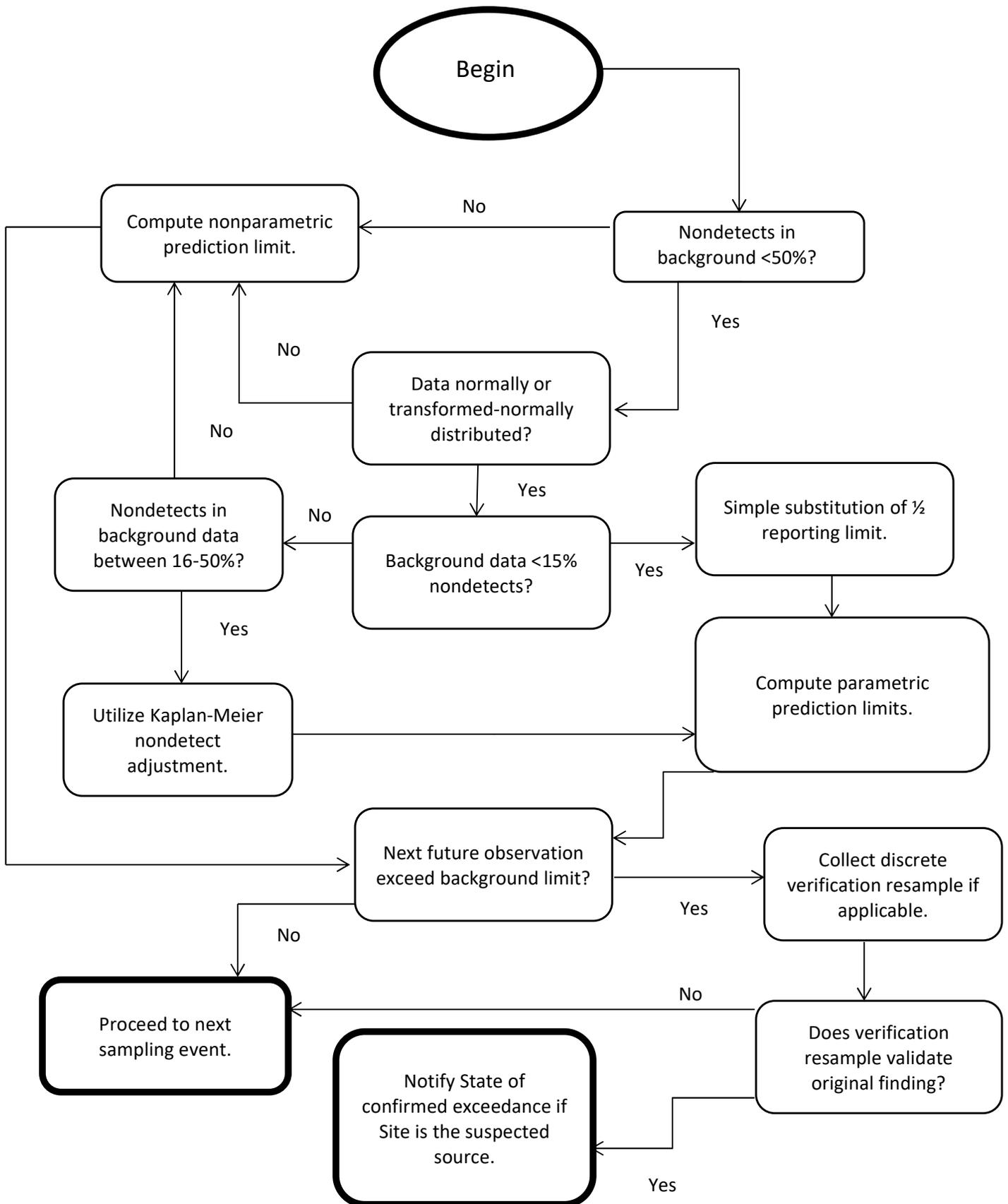


FIGURE 3. DECISION LOGIC FOR COMPUTING PREDICTION LIMITS



APPENDICES

APPENDIX A. MONITORING SYSTEM DETAILS

APPENDIX B. HYDRAULIC CONDUCTIVITY TESTING RESULTS

**APPENDIX C. BORING LOGS, WELL CONSTRUCTION DIAGRAMS, EPD BOND CONTINUATION
CERTIFICATES AND SURVEY DATA**

APPENDIX D. GROUNDWATER MONITORING WELL DETAIL

APPENDIX E. GROUNDWATER SAMPLING PROCEDURE

APPENDIX A. MONITORING SYSTEM DETAILS



ATLANTIC COAST CONSULTING, INC.
 1150 Northmeadow Pkwy, Suite 100
 Roswell, Ga 30076
 770-594-5998
 www.atlcc.net

PROJECT:
PLANT YATES GYPSUM STACK
 708 Dyer Road
 Newnan, Georgia



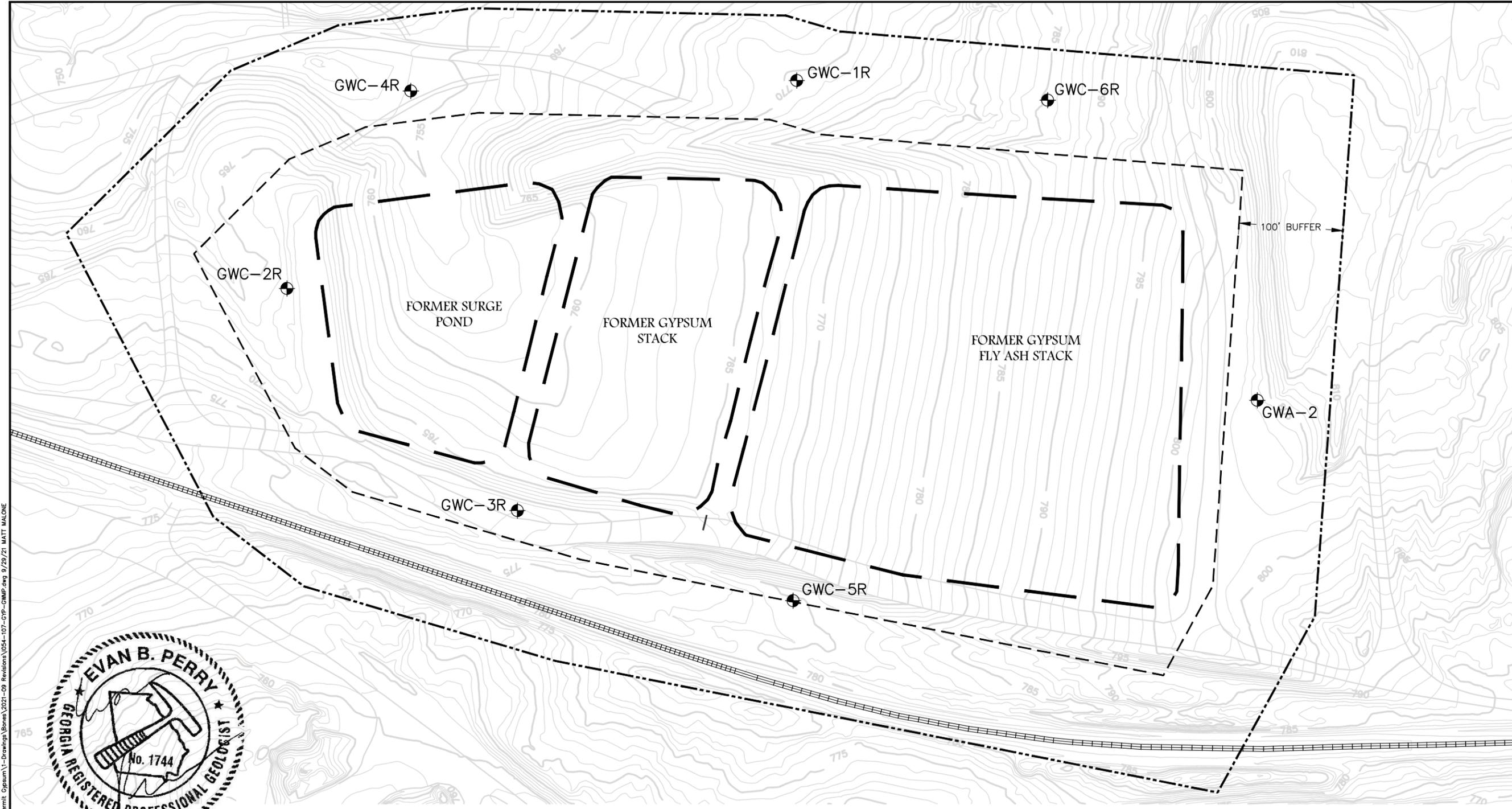
REVISIONS

Drawn by: MM	Checked by: EP	QC by: MJ
-----------------	-------------------	--------------

PROJECT NUMBER:
 I054-107
 September 2021

MONITORING WELL NETWORK

Figure 1



P:\Industrial\I054-Southern Company\107-Plant Yates CDR Permiting\1 - CDR Permiting\Drawings\Bones\2021-09 Revisions\I054-107-CDF-CWMP.dwg 9/29/21 MATT MALONE

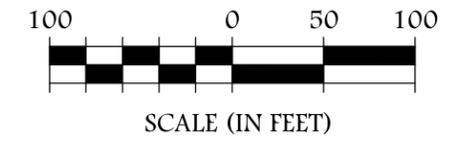
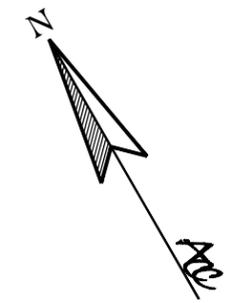
GROUNDWATER MONITORING WELLS							
WELL NAME	NORTHING	EASTING	WELL DEPTH (FT BTOC)	TOP OF CASING ELEVATION	WELL SCREEN ELEVATION	DEPTH TO GROUND-WATER (FT BTOC)	GROUND-WATER ELEVATION
GWA-2	1261383.11	2073509.98	52.02	805.62	763.80 - 753.80	35.74	769.88
GWC-1R	1261869.77	2073279.85	36.37	773.27	747.20 - 737.20	24.39	748.88
GWC-2R	1261942.15	2072755.92	44.00	769.76	736.06 - 726.06	27.35	742.41
GWC-3R	1261647.10	2072841.28	38.35	775.25	747.10 - 737.10	26.64	748.61
GWC-4R	1262046.56	2072953.68	30.20	757.48	737.58 - 727.58	14.66	742.82
GWC-5R	1261439.91	2073027.56	42.35	782.45	750.40 - 740.40	27.32	755.13
GWC-6R	1261732.91	2073479.40	55.25	788.98	747.04 - 737.04	33.67	755.31

FT BTOC = FEET BELOW TOP OF CASING. ELEVATION DATA ARE RELATIVE TO NAVD88. NORTHINGS AND EASTINGS ARE GEORGIA STATE PLANE WEST (NAD83). DEPTHS TO GROUNDWATER MEASURED MARCH 2021.

NOTES:
 1. TOPOGRAPHIC SURVEY DATED MAY 26, 2017.
 2. REMOVAL OF WASTE MATERIAL AND LINER COMPLETED IN SEPTEMBER 2016.
 3. FINAL COVER SYSTEM AND SITE RESTORATION COMPLETED IN LATE 2016.

LEGEND:

	10	PROMINENT CONTOUR		GWC-5R	GROUNDWATER WELL
	2	INTERMEDIATE CONTOUR			100' BUFFER BOUNDARY
		RAILROAD TRACK			FORMER LIMITS OF WASTE DISPOSAL
		ROAD			FORMER WASTE DISPOSAL UNITS





ATLANTIC COAST CONSULTING, INC.
 1150 Northmeadow Pkwy,
 Suite 100
 Roswell, Ga 30076
 770-594-5998
 www.atlcc.net

PROJECT:

PLANT YATES
 GYPSUM STACK

708 Dyer Road
 Newnan, Georgia



Georgia
 Power

REVISIONS

Drawn by:	Checked by:	QC by:
MM	EP	MJ

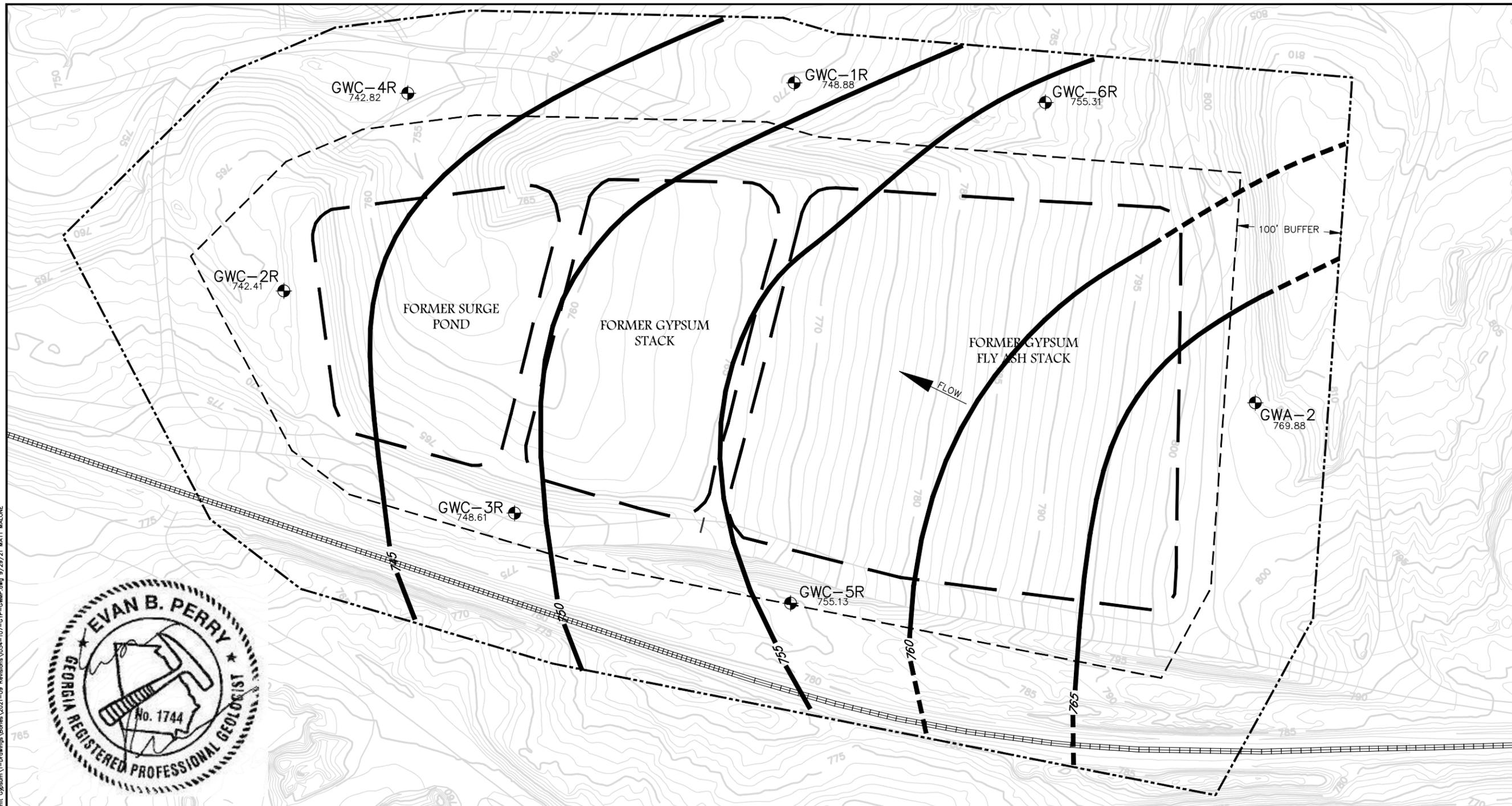
PROJECT NUMBER:

1054-107

September 2021

MARCH 2021
 POTENTIOMETRIC
 SURFACE CONTOUR
 MAP

Figure 2



P:\Industrial\1054-Southern Company\107-Plant Yates CDR Permit\Opsum\Drawings\Bones\2021-09 Revisions\1054-107-GPW-GWMP.dwg 9/29/21 MATT MALONE

GROUNDWATER MONITORING WELLS							
WELL NAME	NORTHING	EASTING	WELL DEPTH (FT BTOC)	TOP OF CASING ELEVATION	WELL SCREEN ELEVATION	DEPTH TO GROUND-WATER (FT BTOC)	GROUND-WATER ELEVATION
GWA-2	1261383.11	2073509.98	52.02	805.62	763.80 - 753.80	35.74	769.88
GWC-1R	1261869.77	2073279.85	36.37	773.27	747.20 - 737.20	24.39	748.88
GWC-2R	1261942.15	2072755.92	44.00	769.76	736.06 - 726.06	27.35	742.41
GWC-3R	1261647.10	2072841.28	38.35	775.25	747.10 - 737.10	26.64	748.61
GWC-4R	1262046.56	2072953.68	30.20	757.48	737.58 - 727.58	14.66	742.82
GWC-5R	1261439.91	2073027.56	42.35	782.45	750.40 - 740.40	27.32	755.13
GWC-6R	1261732.91	2073479.40	55.25	788.98	747.04 - 737.04	33.67	755.31

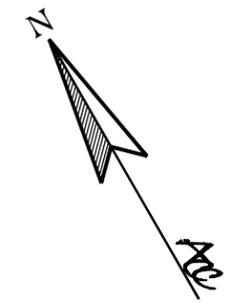
FT BTOC = FEET BELOW TOP OF CASING. ELEVATION DATA ARE RELATIVE TO NAVD88. NORTHINGS AND EASTINGS ARE GEORGIA STATE PLANE WEST (NAD83). DEPTHS TO GROUNDWATER MEASURED MARCH 2021.

NOTES:

- TOPOGRAPHIC SURVEY DATED MAY 26, 2017.
- REMOVAL OF WASTE MATERIAL AND LINER COMPLETED IN SEPTEMBER 2016.
- FINAL COVER SYSTEM AND SITE RESTORATION COMPLETED IN LATE 2016.

LEGEND:

- 10 - PROMINENT CONTOUR
- 2 - INTERMEDIATE CONTOUR
- 750 - GROUNDWATER CONTOUR
- RAILROAD TRACK
- ROAD
- GWC-5R 748.90 - GROUNDWATER WELL GROUNDWATER ELEVATION
- 100' BUFFER BOUNDARY
- FORMER LIMITS OF WASTE DISPOSAL
- FORMER WASTE DISPOSAL UNITS



SCALE (IN FEET)

**TABLE 1
GROUNDWATER MONITORING WELL CONSTRUCTION DETAILS**

Upgradient Monitoring Well ID	Hydraulic Location	Total Depth (ft BTOC)	Top of Casing (ft)	Screened Interval Elevation (ft)	Depth to Groundwater (ft BTOC)	March 2021 Groundwater Elevation (ft)	Screened Lithology	Horizontal Hydraulic Conductivity (cm/sec)	Vertical Hydraulic Conductivity (cm/sec)
YGWA-1I	Upgradient	53.60	836.60	793.3 - 783.3	37.25	799.35	PWR	1.80E-04	n/a
YGWA-1D	Upgradient	128.85	837.25	759.2 - 709.2	47.88	789.37	Bedrock	6.17E-05	n/a
GWA-2	Upgradient	52.02	805.62	763.8 - 753.8	35.74	769.88	PWR	1.46E-03	n/a
YGWA-2I	Upgradient	63.75	866.25	812.8 - 802.8	44.50	821.75	PWR	3.53E-06	n/a
YGWA-3I	Upgradient	59.05	796.55	747.7 - 737.7	52.36	744.19	PWR	1.16E-04	n/a
YGWA-3D	Upgradient	134.18	796.78	712.9 - 662.9	29.30	767.48	Bedrock	4.90E-04	n/a
YGWA-4I	Upgradient	48.81	784.21	745.7 - 735.7	22.12	762.09	PWR	8.55E-05	n/a
YGWA-5I	Upgradient	58.94	784.54	735.9 - 725.9	18.19	766.35	PWR	2.90E-04	n/a
YGWA-5D	Upgradient	129.13	784.53	706.0 - 656.0	21.88	762.65	Bedrock	1.11E-04	n/a
YGWA-14S	Upgradient	34.96	748.76	724.1 - 714.1	16.70	732.06	Saprolite	4.94E-04	n/a
YGWA-17S	Upgradient	39.85	783.05	753.2 - 743.2	11.38	771.67	Saprolite	3.46E-04	6.91E-04
YGWA-18S	Upgradient	39.97	790.57	760.9 - 750.9	18.94	771.63	Saprolite	1.06E-04	n/a
YGWA-18I	Upgradient	79.97	790.57	720.9 - 710.9	22.41	768.16	PWR	6.42E-04	n/a
YGWA-20S	Upgradient	29.52	767.12	747.9 - 737.9	11.28	755.84	Saprolite	2.93E-04	9.72E-05
YGWA-21I	Upgradient	79.90	783.70	714.1 - 704.1	31.10	752.60	PWR	2.20E-05	n/a
YGWA-30I	Upgradient	59.48	762.58	713.4 - 703.4	43.88	718.70	PWR	2.27E-03	n/a
YGWA-39	Upgradient	68.59	818.19	760.1 - 750.1	16.66	801.53	PWR	1.85E-03	n/a
YGWA-40	Upgradient	48.23	815.73	778.0 - 768.0	22.39	793.34	PWR	6.50E-04	n/a
YGWA-47	Upgradient	59.19	758.22	709.6 - 699.6	34.47	723.75	PWR	8.04E-04	n/a
GWC-1R	Downgradient	36.37	773.27	747.20 - 737.20	24.39	748.88	Saprolite	8.10E-04	n/a
GWC-2R	Downgradient	44.00	769.76	736.06 - 726.06	27.35	742.41	Saprolite	2.18E-03	n/a
GWC-3R	Downgradient	38.45	775.25	747.10 - 737.10	26.64	748.61	Saprolite	1.06E-03	n/a
GWC-4R	Downgradient	30.20	757.48	737.58 - 727.58	14.66	742.82	Saprolite	1.67E-03	n/a
GWC-5R	Downgradient	42.35	782.45	750.40 - 740.40	27.32	755.13	Saprolite	4.38E-04	n/a
GWC-6R	Downgradient	55.25	788.98	747.04 - 737.40	33.67	755.31	PWR	5.96E-04	n/a

Notes:

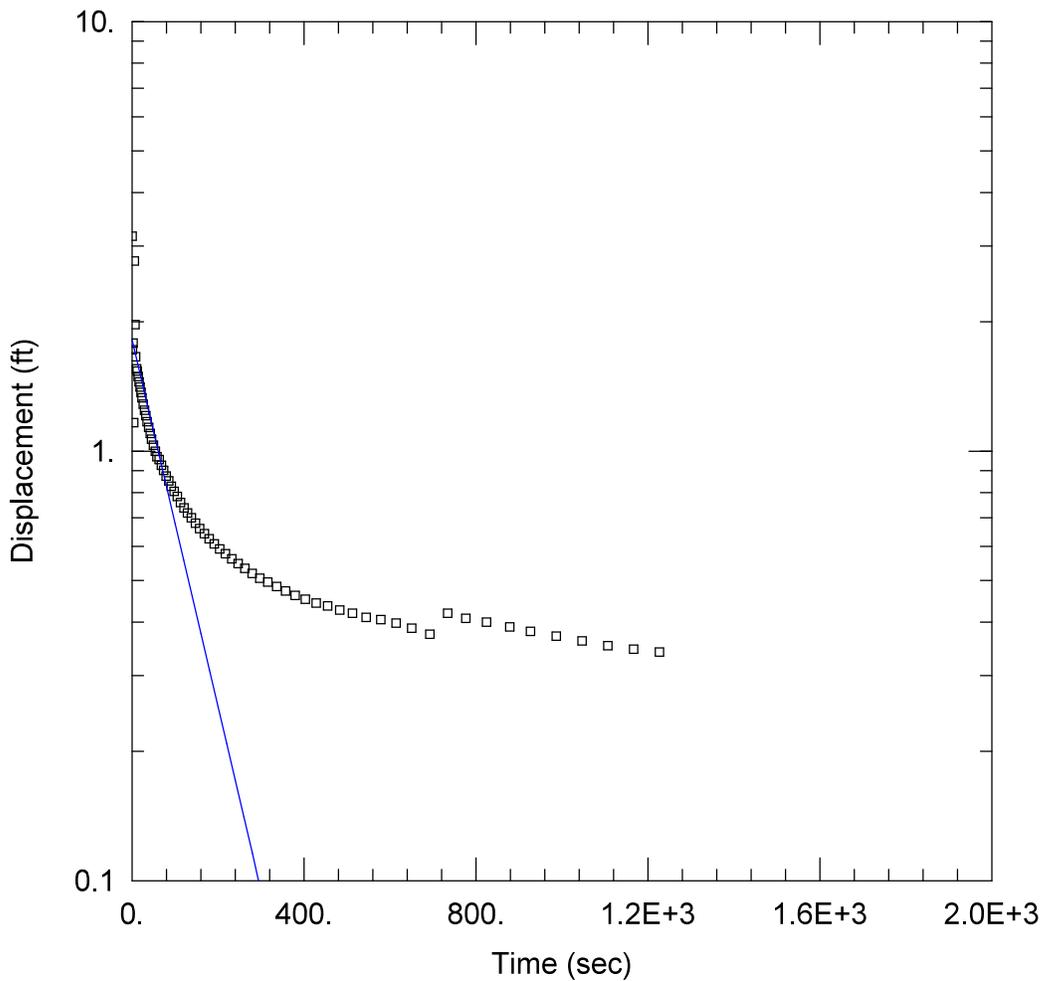
ft BTOC = feet below top of casing; cm/sec = centimeters per second

Elevation in U.S. Survey Feet (NAVD88) based on June 2020 survey.

PWR = Partially Weathered Rock

n/a = not applicable

APPENDIX B. HYDRAULIC CONDUCTIVITY TESTING RESULTS



WELL TEST ANALYSIS

Data Set: C:\...\GWA-2 IN.aqt

Date: 04/09/21

Time: 13:31:09

PROJECT INFORMATION

Company: Atlantic Coast Consulting

Project: I054-107

Location: Plant Yates Gypsum Landfill

Test Well: GWA-2 IN

Test Date: 4/6/2021

AQUIFER DATA

Saturated Thickness: 16.34 ft

Anisotropy Ratio (K_z/K_r): 1

WELL DATA (GWA-2)

Initial Displacement: 3.162 ft

Total Well Penetration Depth: 16.34 ft

Casing Radius: 0.0833 ft

Static Water Column Height: 16.34 ft

Screen Length: 10 ft

Well Radius: 0.25 ft

Gravel Pack Porosity: 0.3

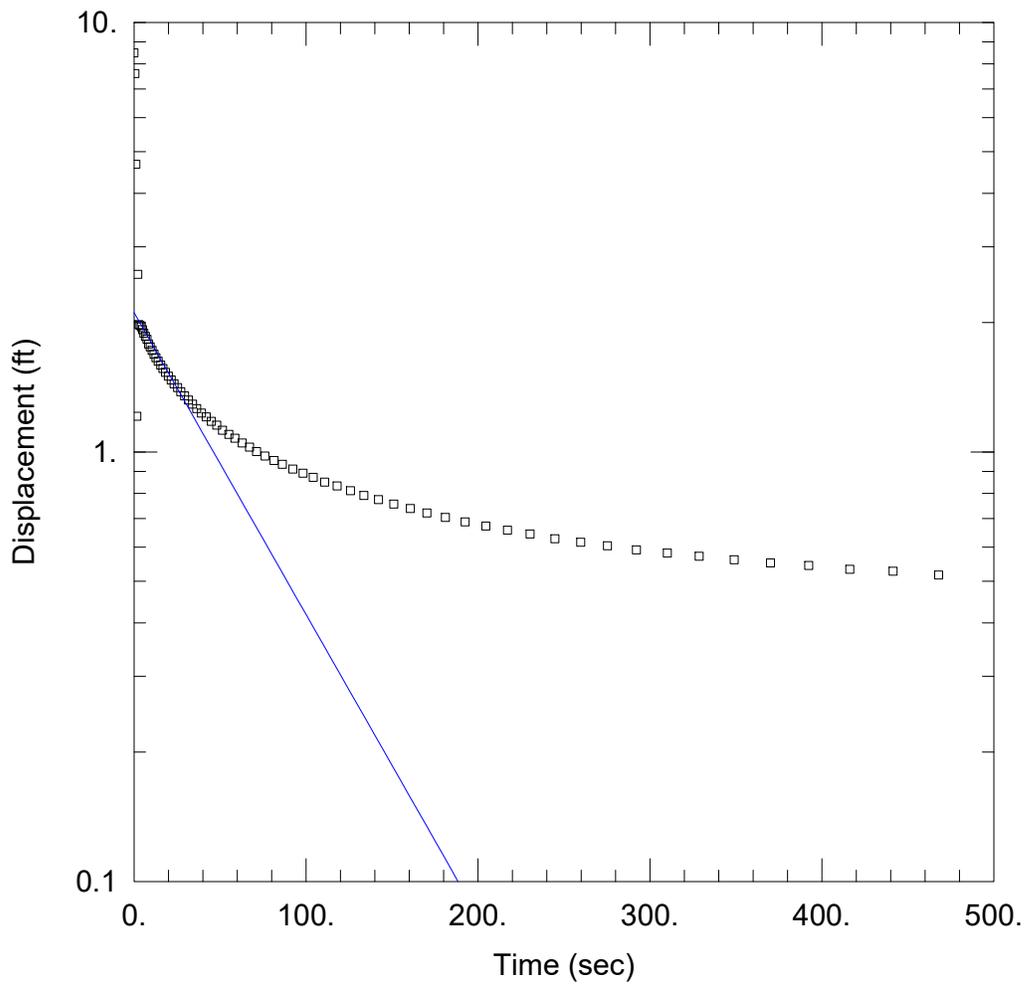
SOLUTION

Aquifer Model: Unconfined

$K = 0.001098$ cm/sec

Solution Method: Bouwer-Rice

$y_0 = 1.815$ ft



WELL TEST ANALYSIS

Data Set: \\...\GWA-2 OUT.aqt
 Date: 04/14/21

Time: 09:17:30

PROJECT INFORMATION

Company: Atlantic Coast Consulting
 Client: Plant Yates
 Project: I054-107
 Location: Plant Yates Gypsum Landfill
 Test Well: GWA-2 OUT
 Test Date: 4/6/2021

AQUIFER DATA

Saturated Thickness: 16.74 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (GWA-2)

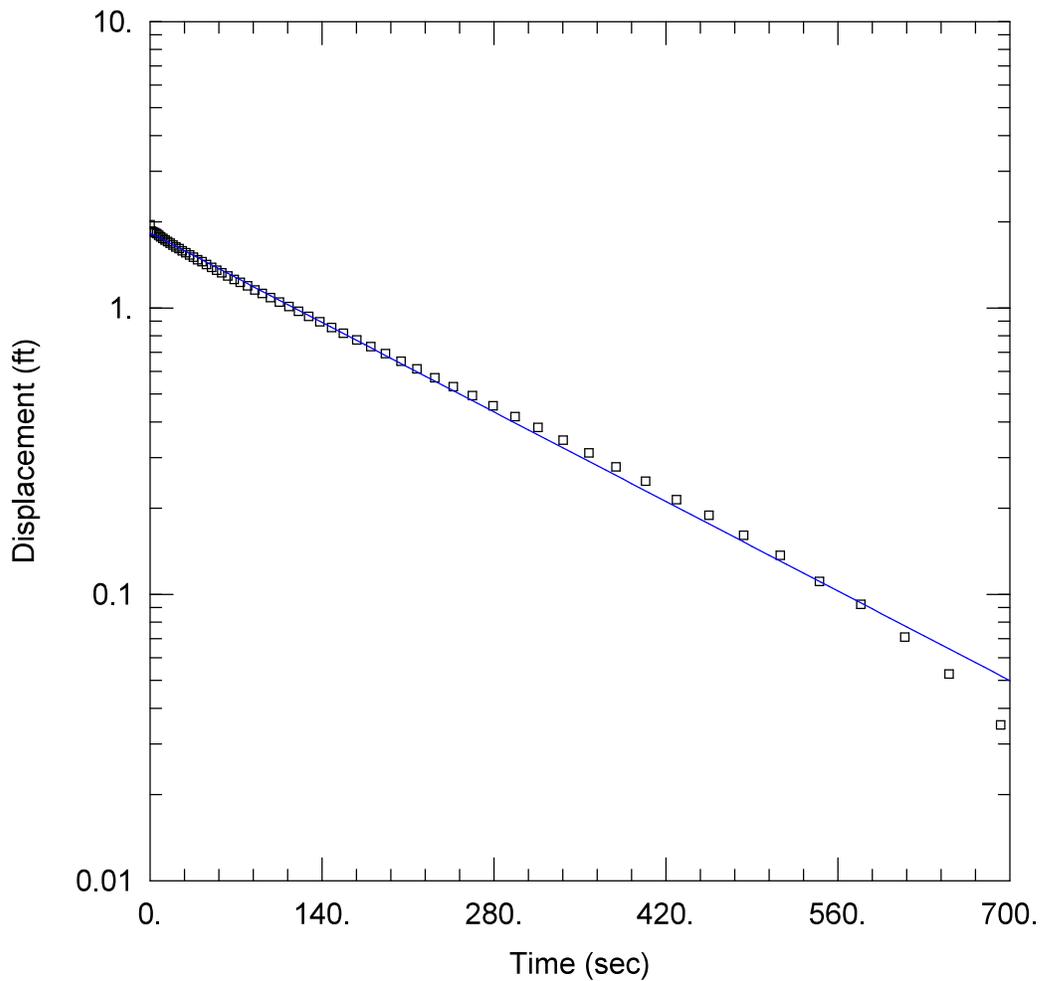
Initial Displacement: 8.487 ft
 Total Well Penetration Depth: 16.74 ft
 Casing Radius: 0.0833 ft

Static Water Column Height: 16.74 ft
 Screen Length: 10. ft
 Well Radius: 0.25 ft
 Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined
 K = 0.001816 cm/sec

Solution Method: Bouwer-Rice
 y0 = 2.109 ft



WELL TEST ANALYSIS

Data Set: C:\...\GWC-1R IN.aqt

Date: 04/09/21

Time: 13:32:54

PROJECT INFORMATION

Company: Atlantic Coast Consulting

Project: I054-107

Location: Plant Yates Gypsum Landfill

Test Well: GWC-1R IN

Test Date: 4/6/2021

AQUIFER DATA

Saturated Thickness: 16.04 ft

Anisotropy Ratio (K_z/K_r): 1

WELL DATA (GWC-1R)

Initial Displacement: 1.95 ft

Static Water Column Height: 16.04 ft

Total Well Penetration Depth: 16.04 ft

Screen Length: 10. ft

Casing Radius: 0.0833 ft

Well Radius: 0.33 ft

Gravel Pack Porosity: 0.3

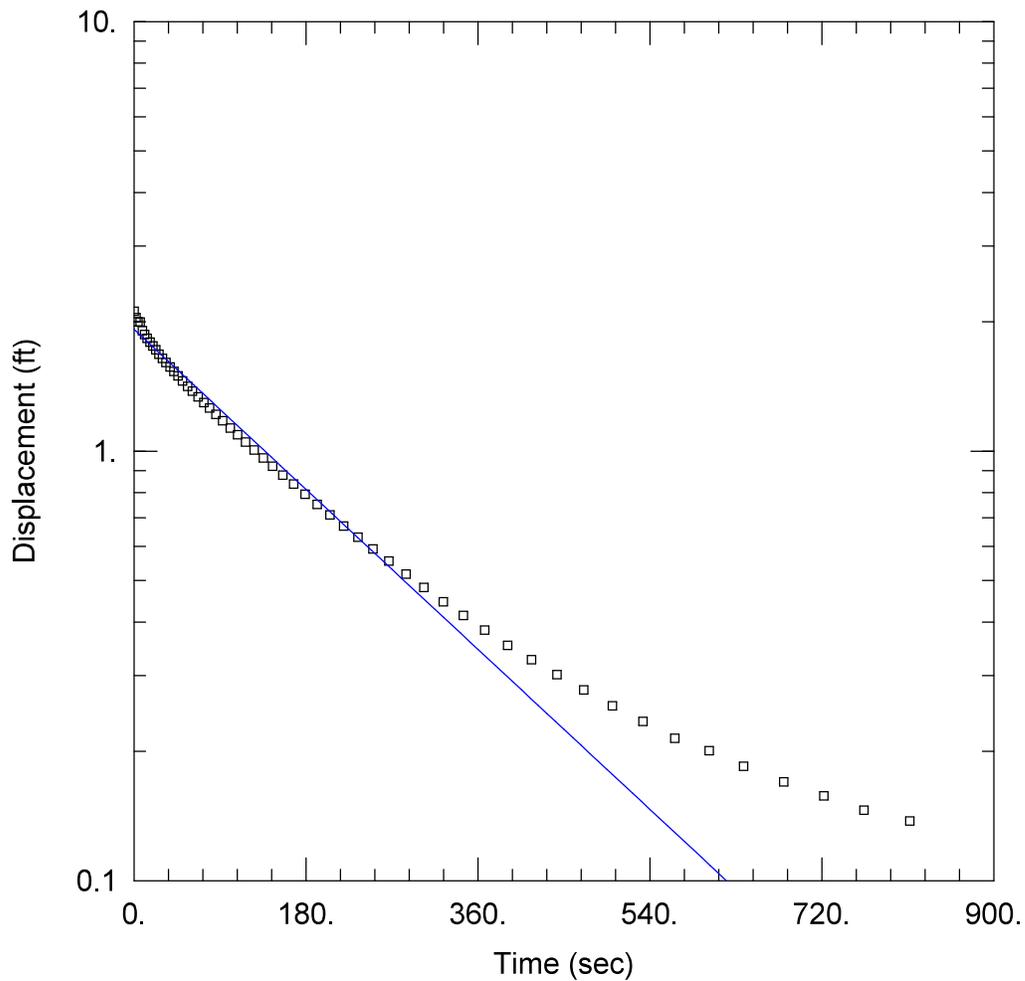
SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

$K = 0.0008413$ cm/sec

$y_0 = 1.828$ ft



WELL TEST ANALYSIS

Data Set: C:\...\GWC-1R OUT.aqt

Date: 04/09/21

Time: 13:34:44

PROJECT INFORMATION

Company: Atlantic Coast Consulting

Project: I054-107

Location: Plant Yates Gypsum Landfill

Test Well: GWC-1R OUT

Test Date: 4/6/2021

AQUIFER DATA

Saturated Thickness: 16. ft

Anisotropy Ratio (K_z/K_r): 1.

WELL DATA (GWC-1R)

Initial Displacement: 2.117 ft

Total Well Penetration Depth: 16. ft

Casing Radius: 0.0833 ft

Static Water Column Height: 16. ft

Screen Length: 10. ft

Well Radius: 0.33 ft

Gravel Pack Porosity: 0.3

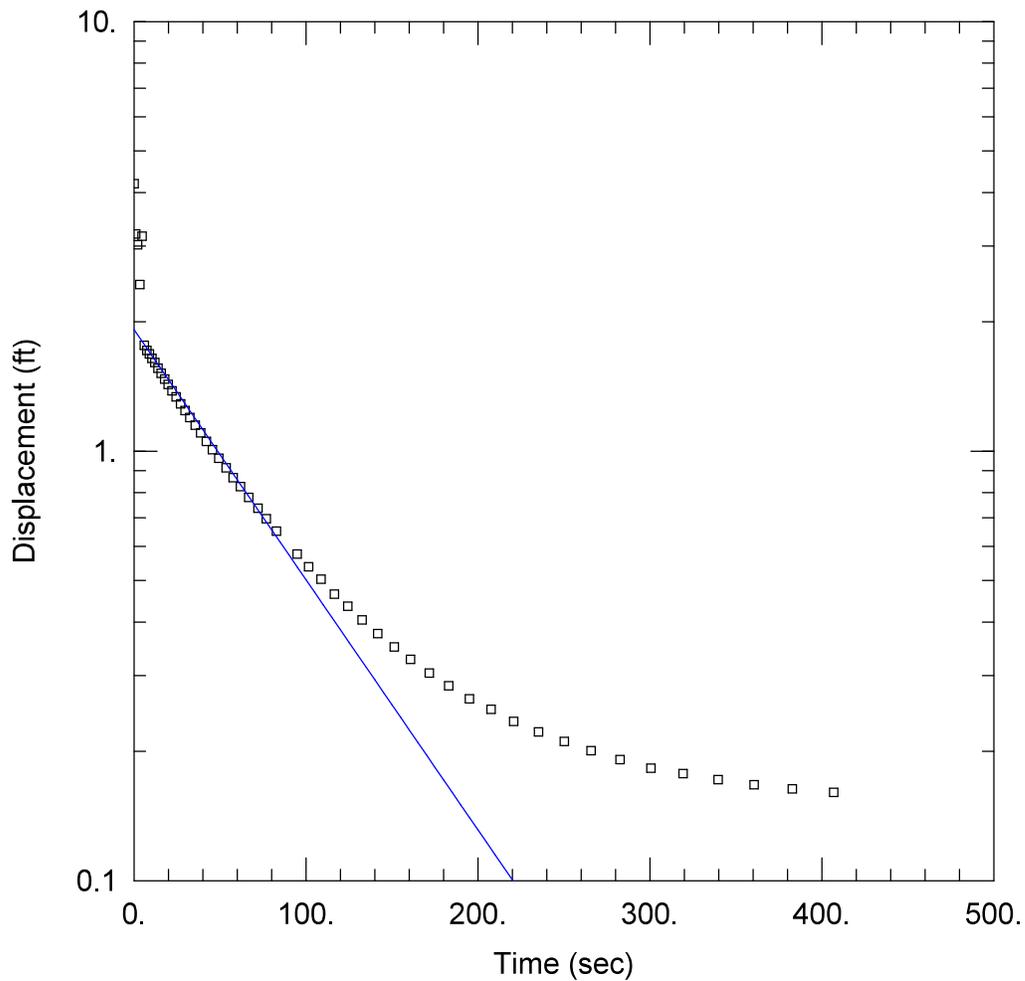
SOLUTION

Aquifer Model: Unconfined

$K = 0.0007792$ cm/sec

Solution Method: Bouwer-Rice

$y_0 = 1.92$ ft



WELL TEST ANALYSIS

Data Set: C:\...\GWC-2R IN.aqt

Date: 04/09/21

Time: 13:34:28

PROJECT INFORMATION

Company: Atlantic Coast Consulting

Project: I054-107

Location: Plant Yates Gypsum Landfill

Test Well: GWC-2R IN

Test Date: 4/6/2021

AQUIFER DATA

Saturated Thickness: 16.7 ft

Anisotropy Ratio (K_z/K_r): 1

WELL DATA (GWC-2R)

Initial Displacement: 4.195 ft

Static Water Column Height: 16.7 ft

Total Well Penetration Depth: 16.7 ft

Screen Length: 10. ft

Casing Radius: 0.0833 ft

Well Radius: 0.33 ft

Gravel Pack Porosity: 0.3

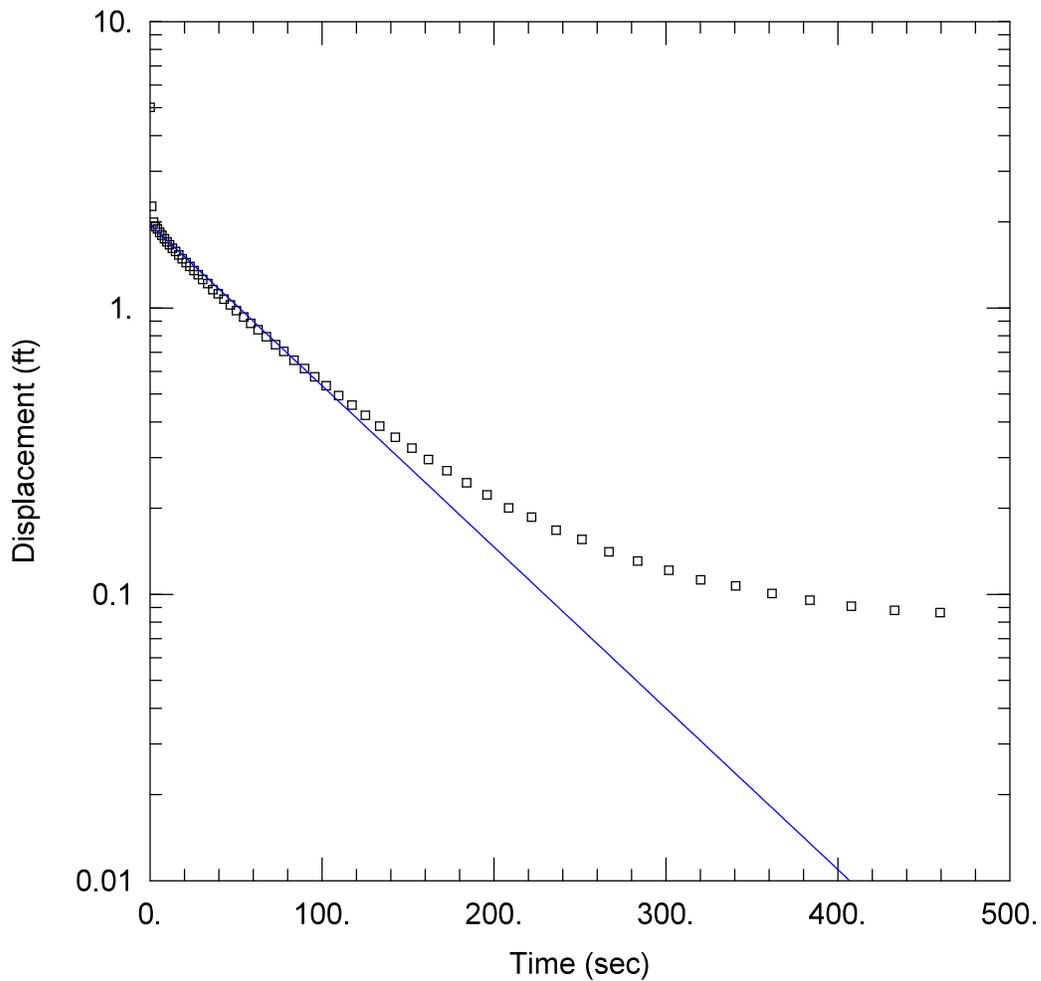
SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

$K = 0.002212$ cm/sec

$y_0 = 1.917$ ft



WELL TEST ANALYSIS

Data Set: C:\...\GWC-2R OUT.aqt

Date: 04/09/21

Time: 13:34:09

PROJECT INFORMATION

Company: Atlantic Coast Consulting

Project: I054-107

Location: Plant Yates Gypsum Landfill

Test Well: GWC-2R OUT

Test Date: 4/6/2021

AQUIFER DATA

Saturated Thickness: 16.62 ft

Anisotropy Ratio (K_z/K_r): 1

WELL DATA (GWC-2R)

Initial Displacement: 5.02 ft

Total Well Penetration Depth: 16.62 ft

Casing Radius: 0.0833 ft

Static Water Column Height: 16.62 ft

Screen Length: 10. ft

Well Radius: 0.33 ft

Gravel Pack Porosity: 0.3

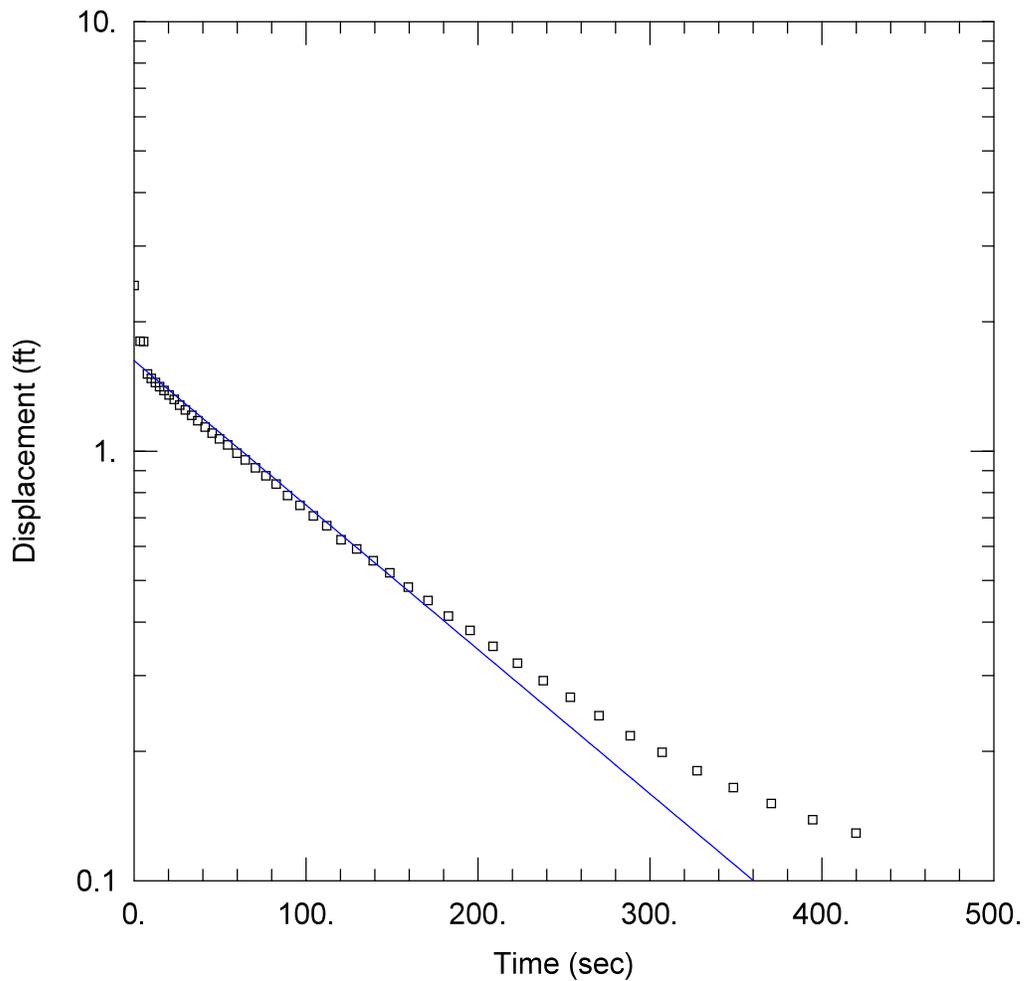
SOLUTION

Aquifer Model: Unconfined

$K = 0.002138$ cm/sec

Solution Method: Bouwer-Rice

$y_0 = 1.957$ ft



WELL TEST ANALYSIS

Data Set: C:\...\GWC-3R IN.aqt

Date: 04/09/21

Time: 13:35:12

PROJECT INFORMATION

Company: Atlantic Coast Consulting

Project: I054-107

Location: Plant Yates Gypsum Landfill

Test Well: GWC-3R IN

Test Date: 4/5/2021

AQUIFER DATA

Saturated Thickness: 11.86 ft

Anisotropy Ratio (K_z/K_r): 1

WELL DATA (GWC-3R)

Initial Displacement: 2.43 ft

Static Water Column Height: 11.86 ft

Total Well Penetration Depth: 11.86 ft

Screen Length: 10. ft

Casing Radius: 0.0833 ft

Well Radius: 0.33 ft

Gravel Pack Porosity: 0.3

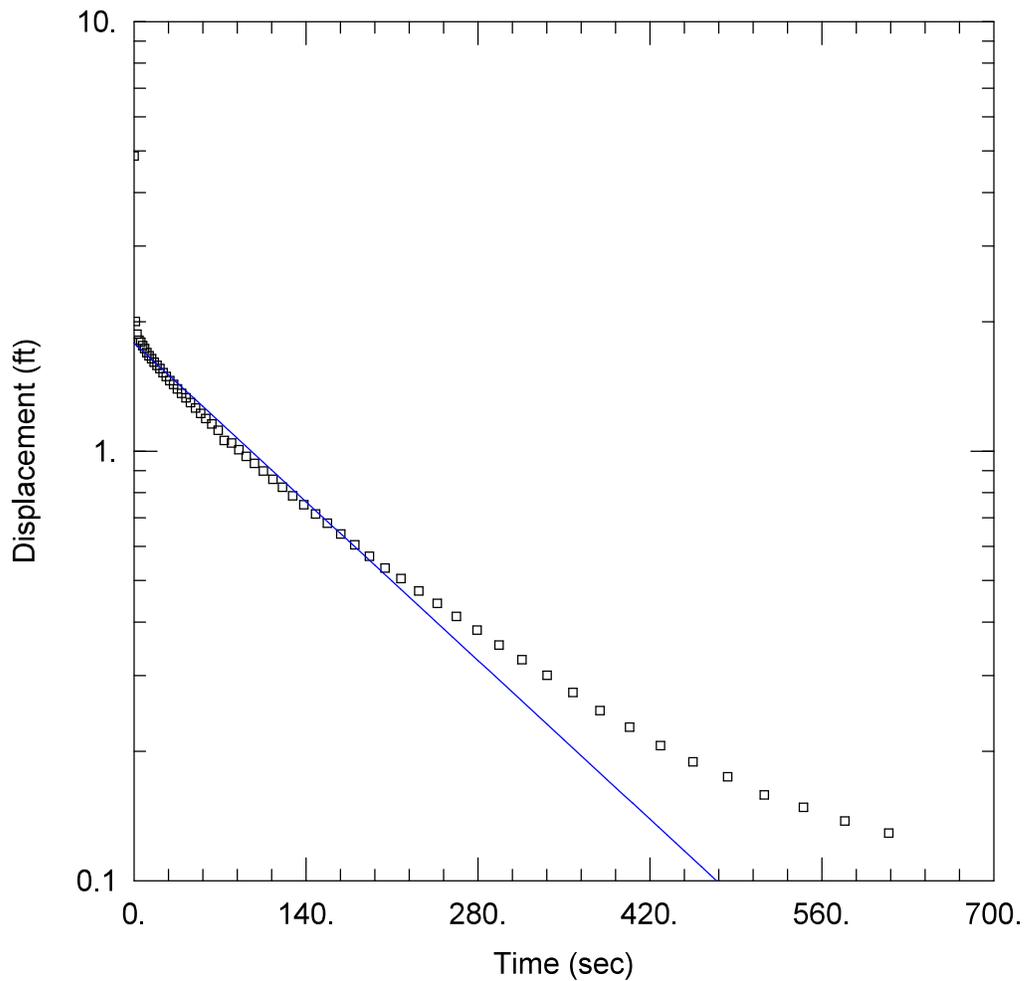
SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

$K = 0.001185$ cm/sec

$y_0 = 1.623$ ft



WELL TEST ANALYSIS

Data Set: C:\...\GWC-3R OUT.aqt

Date: 04/09/21

Time: 13:35:42

PROJECT INFORMATION

Company: Atlantic Coast Consulting

Project: I054-107

Location: Plant Yates Gypsum Landfill

Test Well: GWC-3R OUT

Test Date: 4/5/2021

AQUIFER DATA

Saturated Thickness: 11.85 ft

Anisotropy Ratio (K_z/K_r): 1

WELL DATA (GWC-3R)

Initial Displacement: 4.86 ft

Total Well Penetration Depth: 11.85 ft

Casing Radius: 0.0833 ft

Static Water Column Height: 11.85 ft

Screen Length: 10. ft

Well Radius: 0.33 ft

Gravel Pack Porosity: 0.3

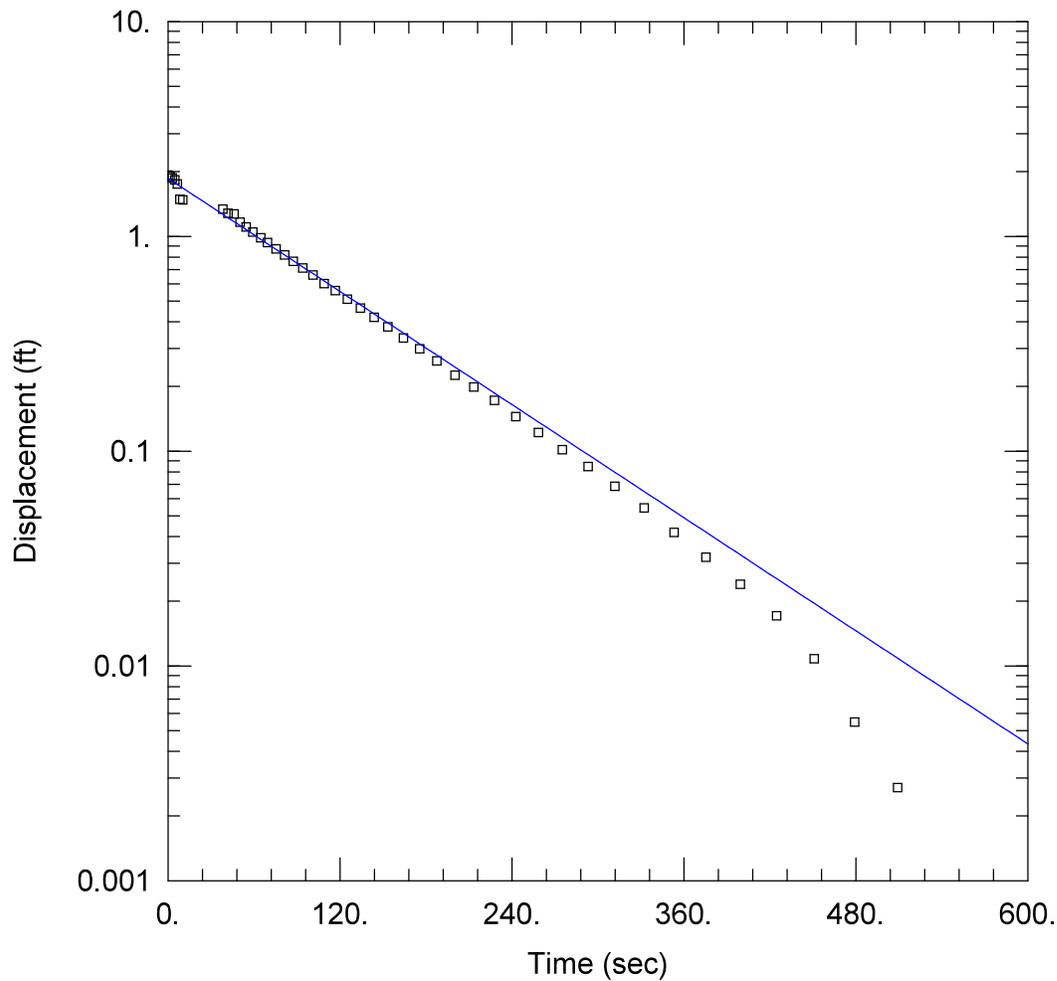
SOLUTION

Aquifer Model: Unconfined

$K = 0.0009304$ cm/sec

Solution Method: Bouwer-Rice

$y_0 = 1.785$ ft



WELL TEST ANALYSIS

Data Set: C:\...\GWC-4R IN.aqt

Date: 04/09/21

Time: 13:36:25

PROJECT INFORMATION

Company: Atlantic Coast Consulting

Project: I054-107

Location: Plant Yates Gypsum Landfill

Test Well: GWC-4R IN

Test Date: 4/6/2021

AQUIFER DATA

Saturated Thickness: 16.33 ft

Anisotropy Ratio (K_z/K_r): 1

WELL DATA (GWC-4R)

Initial Displacement: 1.928 ft

Static Water Column Height: 16.33 ft

Total Well Penetration Depth: 16.33 ft

Screen Length: 10. ft

Casing Radius: 0.0833 ft

Well Radius: 0.33 ft

Gravel Pack Porosity: 0.3

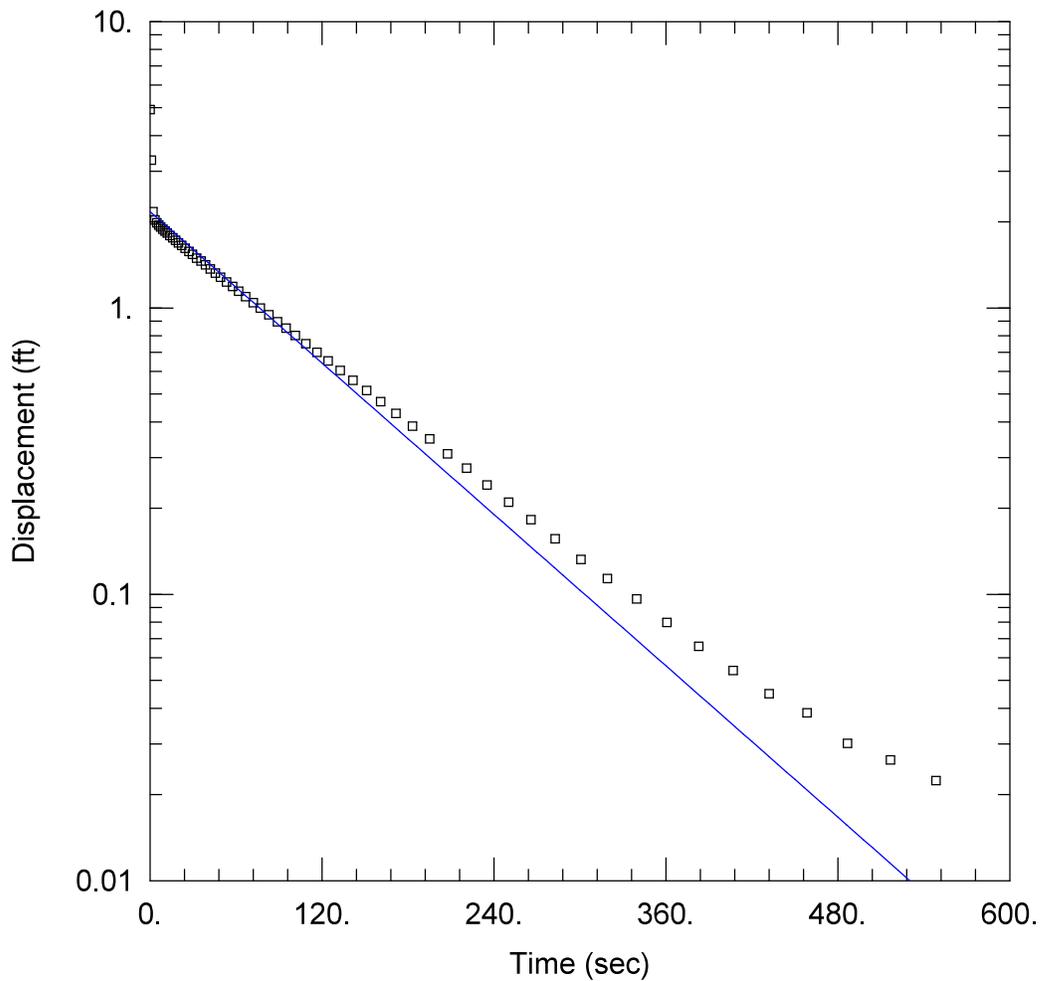
SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

$K = 0.00166$ cm/sec

$y_0 = 1.862$ ft



WELL TEST ANALYSIS

Data Set: C:\...\GWC-4R OUT.aqt

Date: 04/09/21

Time: 13:37:02

PROJECT INFORMATION

Company: Atlantic Coast Consulting

Project: I054-107

Location: Plant Yates Gypsum Landfill

Test Well: GWC-4R OUT

Test Date: 4/6/2021

AQUIFER DATA

Saturated Thickness: 16.46 ft

Anisotropy Ratio (K_z/K_r): 1

WELL DATA (GWC-4R)

Initial Displacement: 4.927 ft

Static Water Column Height: 16.49 ft

Total Well Penetration Depth: 16.49 ft

Screen Length: 10. ft

Casing Radius: 0.0833 ft

Well Radius: 0.33 ft

Gravel Pack Porosity: 0.3

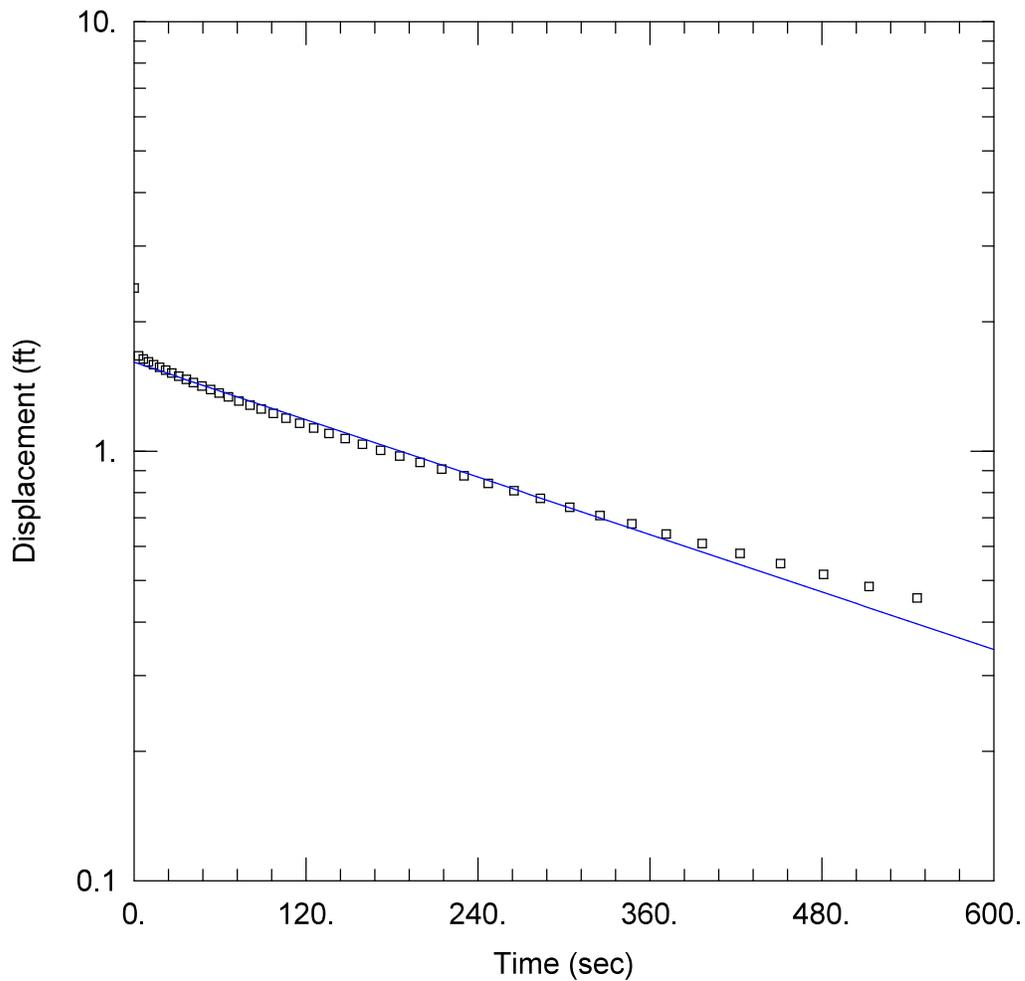
SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

$K = 0.00167$ cm/sec

$y_0 = 2.169$ ft



WELL TEST ANALYSIS

Data Set: C:\...\GWC-5R IN.aqt

Date: 04/09/21

Time: 13:37:31

PROJECT INFORMATION

Company: Atlantic Coast Consulting

Project: I054-107

Location: Plant Yates Gypsum Landfill

Test Well: GWC-5R IN

Test Date: 4/5/2021

AQUIFER DATA

Saturated Thickness: 15.6 ft

Anisotropy Ratio (K_z/K_r): 1

WELL DATA (GWC-5R)

Initial Displacement: 2.397 ft

Static Water Column Height: 15.6 ft

Total Well Penetration Depth: 15.6 ft

Screen Length: 10. ft

Casing Radius: 0.0833 ft

Well Radius: 0.33 ft

Gravel Pack Porosity: 0.3

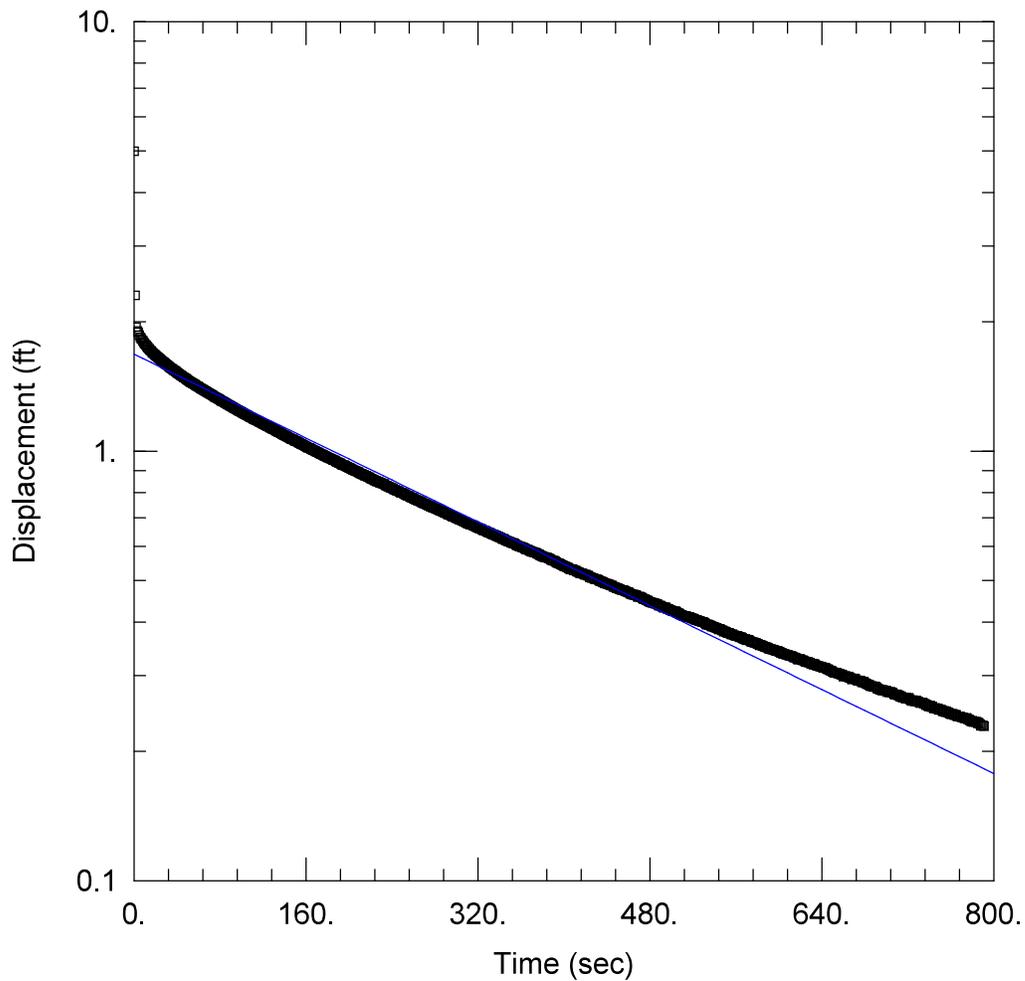
SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

$K = 0.0004174$ cm/sec

$y_0 = 1.61$ ft



WELL TEST ANALYSIS

Data Set: C:\...\GWC-5R OUT.aqt

Date: 04/09/21

Time: 13:38:22

PROJECT INFORMATION

Company: Atlantic Coast Consulting

Project: I054-107

Location: Plant Yates Gypsum Landfill

Test Well: GWC-5R OUT

Test Date: 4/5/2021

AQUIFER DATA

Saturated Thickness: 15.71 ft

Anisotropy Ratio (K_z/K_r): 1

WELL DATA (GWC-5R)

Initial Displacement: 4.994 ft

Total Well Penetration Depth: 15.71 ft

Casing Radius: 0.0833 ft

Static Water Column Height: 15.71 ft

Screen Length: 10. ft

Well Radius: 0.33 ft

Gravel Pack Porosity: 0.3

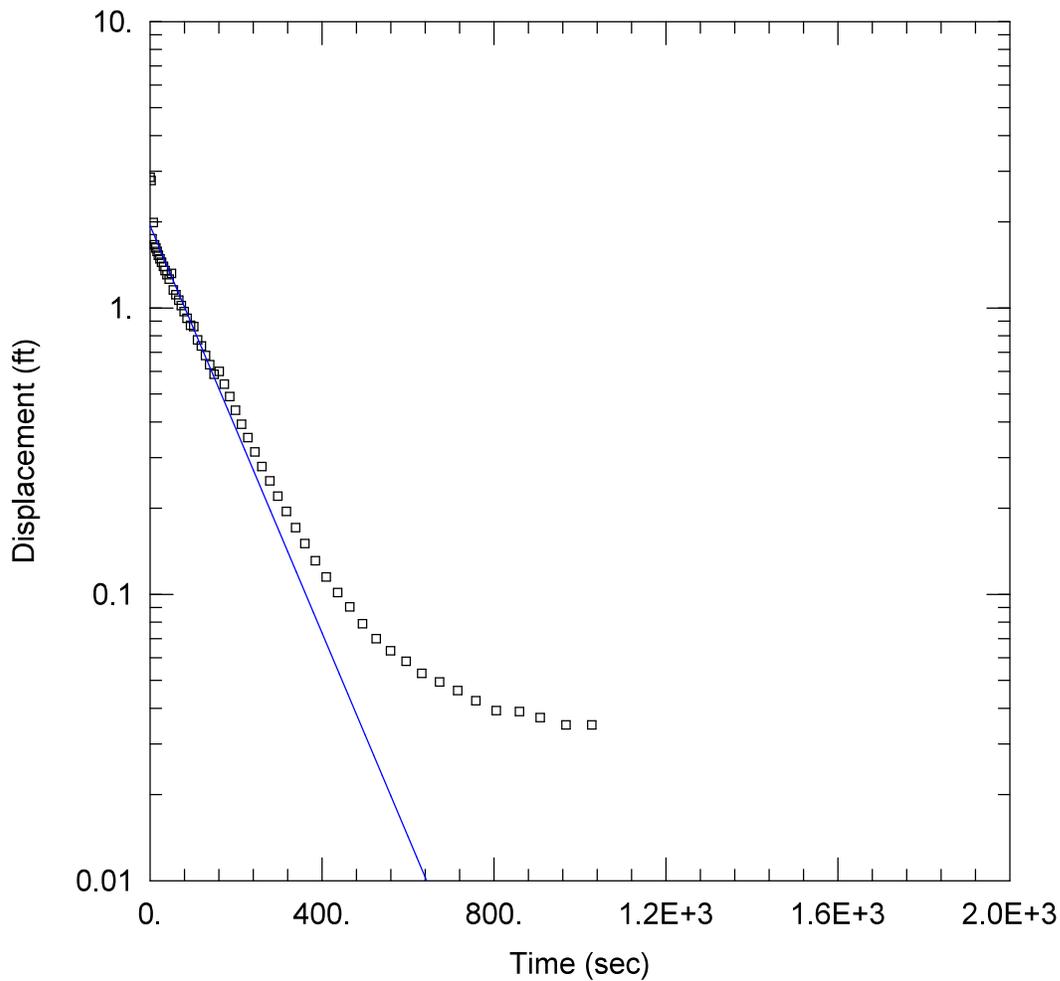
SOLUTION

Aquifer Model: Unconfined

$K = 0.0004577$ cm/sec

Solution Method: Bouwer-Rice

$y_0 = 1.681$ ft



WELL TEST ANALYSIS

Data Set: C:\...\GWC-6R IN.aqt

Date: 04/09/21

Time: 13:38:53

PROJECT INFORMATION

Company: Atlantic Coast Consulting

Project: I054-107

Location: Plant Yates Gypsum Landfill

Test Well: GWC-6R IN

Test Date: 4/6/2021

AQUIFER DATA

Saturated Thickness: 18.66 ft

Anisotropy Ratio (K_z/K_r): 1

WELL DATA (GWC-6R)

Initial Displacement: 2.861 ft

Static Water Column Height: 18.66 ft

Total Well Penetration Depth: 18.66 ft

Screen Length: 10 ft

Casing Radius: 0.0833 ft

Well Radius: 0.1667 ft

Gravel Pack Porosity: 0.3

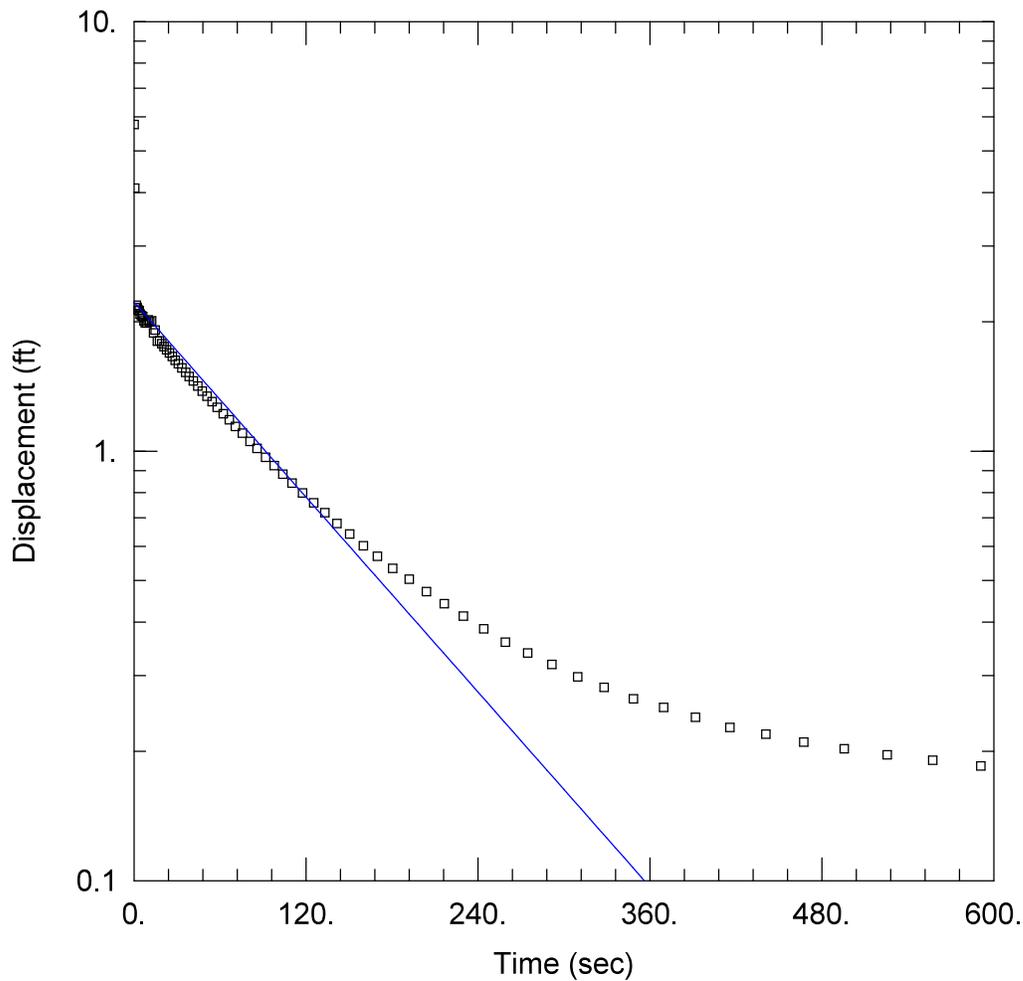
SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

$K = 0.0005771$ cm/sec

$y_0 = 1.938$ ft



WELL TEST ANALYSIS

Data Set: C:\...\GWC-6R OUT.aqt

Date: 04/09/21

Time: 13:39:22

PROJECT INFORMATION

Company: Atlantic Coast Consulting

Project: I054-107

Location: Plant Yates Gypsum Landfill

Test Well: GWC-6R OUT

Test Date: 4/6/2021

AQUIFER DATA

Saturated Thickness: 18.68 ft

Anisotropy Ratio (K_z/K_r): 1

WELL DATA (GWC-6R)

Initial Displacement: 5.761 ft

Static Water Column Height: 18.68 ft

Total Well Penetration Depth: 18.68 ft

Screen Length: 10 ft

Casing Radius: 0.0833 ft

Well Radius: 0.1667 ft

Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

$K = 0.0006137$ cm/sec

$y_0 = 2.221$ ft

October 27, 2015

Bart Smelser
Southern Company Services, Inc.
299 Logan Martin Village Road
Vincent, AL 35178
205-438-5893 direct

Subject: Laboratory Testing Results
Plant Yates Piezometers Geotechnical Investigation
Cardno Project Number Z003000203

Cardno ATC

200 Wellington Manor Court
Suite 100
Birmingham, AL 35007

Phone +1 205 733 8775
Fax +1 205 733 8954
www.cardno.com

www.cardnoatc.com

Mr. Smelser:

Cardno ATC has completed the soils testing for the Shelby Tube samples collected from the Plant Yates Piezometers location. These samples were collected by Southern Company Services, Inc. and delivered to the Cardno ATC laboratory in Alabaster, AL by members of Cardno staff. This work was conducted in accordance with the master agreement between Cardno ATC and Southern Company Affiliates, dated February 28, 2014, and detailed in the Work Authorization dated September 23, 2015.

The purpose of this letter is to report the results of the laboratory testing which are detailed in the following pages.

Cardno ATC sincerely appreciates the opportunity to work with you on this project. If you have any questions or if we may be of further service to you, please contact us.

Respectfully Submitted,

Cardno ATC



Brian A. White, CET
Laboratory Supervisor
Cardno ATC
Direct Line +1 205 624 1870
Email: gauen.alexander@cardno.com



Fred R. DeLeon, Jr., P.E., P.G.
Principal Engineer
Cardno ATC
Direct Line +1 205 624 1876
Email: fred.deleon@cardno.com

Enclosures: laboratory report

Table of Contents

Summary of Laboratory Results	1
PZ-17s Laboratory Results	2
PZ-19s Laboratory Results	5
PZ-20s Laboratory Results	8
PZ-22s Laboratory Results	11
PZ-24s Laboratory Results	15
PZ-25s Laboratory Results	19
PZ-26s Laboratory Results	23
PZ-27s Laboratory Results	27
PZ-28s Laboratory Results	31
PZ-30s Laboratory Results	34
PZ-31s Laboratory Results	37



200 Wellington Court, Suite 100
 Alabaster, Alabama 35007
 Office: 205-738-8775
 Fax: 205-733-8954

SUMMARY OF LABORATORY RESULTS

CLIENT Southern Company Services

PROJECT NAME Plant Yates Piezometers

PROJECT NUMBER Z003000203

PROJECT LOCATION Newnan, GA

Borehole	Depth	Liquid Limit	Plastic Limit	Plasticity Index	Maximum Size (mm)	%<#200 Sieve	Classification	Water Content (%)	Dry Density (pcf)	Specific Gravity	Void Ratio
PZ-17s	17.0	NP	NP	NP	4.75	21.2	SM-SC			2.665	
PZ-19s	17.0	NP	NP	NP	9.5	42.0	SM-SC			2.681	
PZ-20s	17.0	NP	NP	NP	4.75	28.9	SM-SC			2.665	
PZ-22s	7.0	NP	NP	NP	9.5	20.3	SM-SC			2.731	
PZ-22s	17.0	NP	NP	NP	9.5	28.0	SM-SC			2.717	
PZ-24s	17.0	NP	NP	NP	19	15.3	SM-SC			2.693	
PZ-24s	37.0	NP	NP	NP	4.75	22.0	SM-SC			2.701	
PZ-25s	33.0	NP	NP	NP	9.5	23.4	SM-SC			2.678	
PZ-25s	44.0	NP	NP	NP	19	22.3	SM-SC			2.682	
PZ-26s	17.0	37	27	10	4.75	57.9	ML			2.741	
PZ-26s	27.0	NP	NP	NP	4.75	33.7	SM-SC			2.720	
PZ-27s	17.0	39	30	9	4.75	73.5	ML			2.661	
PZ-27s	27.0	NP	NP	NP	2	45.0	SM-SC			2.673	
PZ-28s	17.0	NP	NP	NP	19	18.9	SM-SC			2.578	
PZ-30s	27.0	NP	NP	NP	4.75	16.6	SM-SC			2.710	
PZ-31s	7.0	NP	NP	NP	4.75	16.7	SM-SC			2.653	

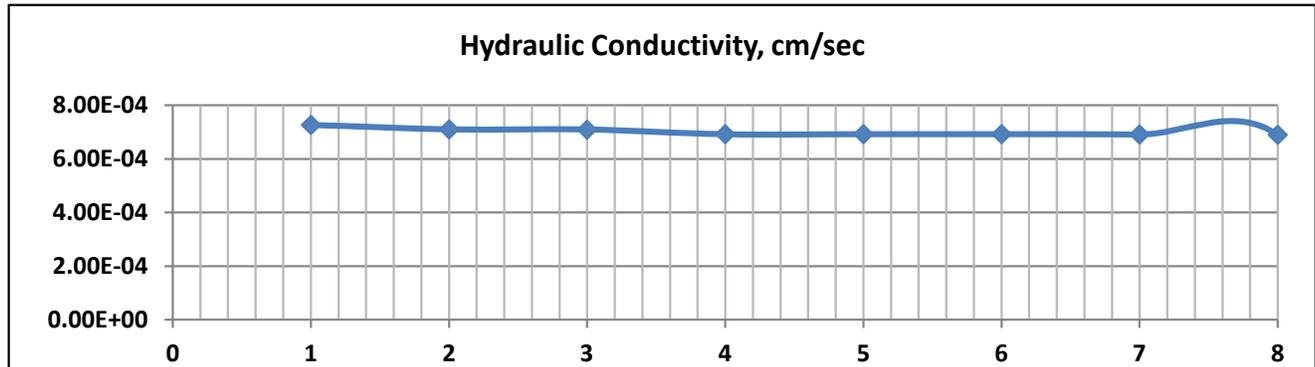
LAB SUMMARY - GINT STD US LAB.GDT - 10/27/15 11:25 - S:\TRADITIONAL\BIRMINGHAM LAB\SOUTHERN COMPANY\PLANT YATES PIEZOMETERS\GINT\PLANT YATES PIEZOMETERS.GPJ

Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter

ASTM D 5084-10

Project :	Plant Yates Piezometers	Project Number:	Z003000203
Client :	Southern Company Services, INC	Sample Number :	PZ-17s (17'-19')
Sample Location :	PZ-17S (17'-19') UD-01	Date Sampled:	09/10/15
Northing: --	Easting: --	Elevation:	--
Sample Preparation:	Shelby Tube Pushed	Permeant Liquid :	De-Aired Tap Water

Initial Sample Conditions		Initial Working Pressures, psi		Final Sample Conditions	
Wet Density, pcf	119.8	Chamber	92	Wet Density, pcf	119.6
Dry Density, pcf	98.0	Head	79	Dry Density, pcf	98.1
Moisture Content, %	22.2	Tail	77	Moisture Content, %	22.0
Void ratio, e	0.697	Conso.	14	Void ratio, e	0.695
Porosity, n	0.411	Soil Specific Gravity		Porosity, n	0.410
Saturation, Percent	84.9	Gs	2.665	Saturation, Percent	84.2
Hydraulic Gradient, i	9.8	Proctor Referenced		Hydraulic Gradient, i	7.1
Sample Length, Inches	5.668	--		Sample Length, Inches	5.650
Sample Volume, cc	584.4856	--		Sample Volume, cc	583.5545
B-value :	97.0%	Sample Consolidated During Saturation, %		0.32%	



Start Test @ t=0	Cum. Time Δ t, min.	Head Loss, Δh2 psi	Hydraulic Conductivity, k (Permeability)	
0	0.00	2.0000	cm/sec	°C
1	0.08	1.9180	7.27E-04	20
2	0.17	1.8429	7.10E-04	20
3	0.25	1.7692	7.10E-04	20
4	0.33	1.7053	6.92E-04	20
5	0.42	1.6385	6.92E-04	20
6	0.50	1.5746	6.92E-04	20
7	0.58	1.5134	6.92E-04	20
8	0.67	1.4550	6.91E-04	20
9	0.00			20

Hydraulic Conductivity, cm/sec

6.91E-04



200 Wellington Court, Suite 100
 Alabaster, Alabama 35007
 Office: 205-738-8775
 Fax: 205-733-8954

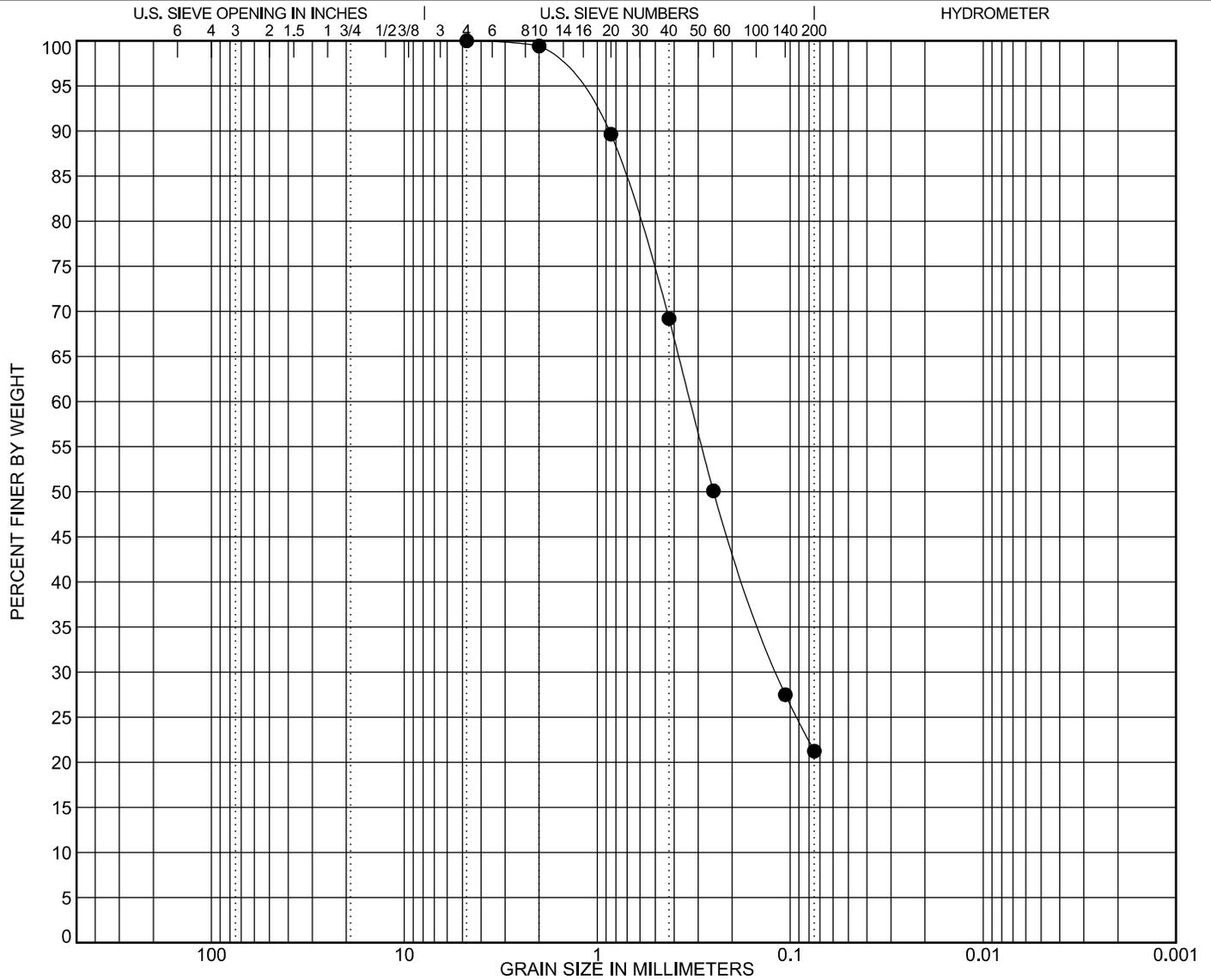
GRAIN SIZE DISTRIBUTION

CLIENT Southern Company Services

PROJECT NAME Plant Yates Piezometers

PROJECT NUMBER Z003000203

PROJECT LOCATION Newnan, GA



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
● PZ-17S	17	SILTY SAND (SM-SC)	NP	NP	NP		

BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● PZ-17S	17	4.75	0.329	0.117		0.0	78.8	21.2	

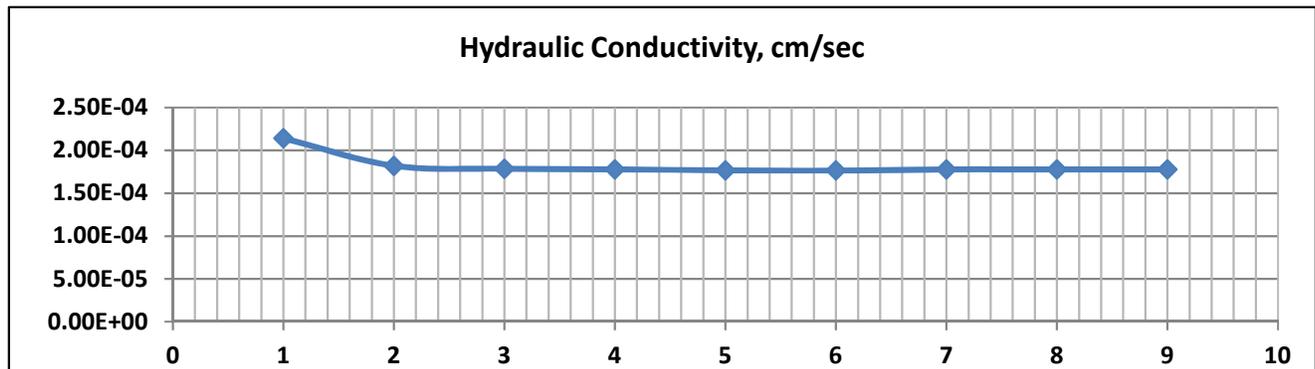
GRAIN SIZE - GINT STD US LAB.GDT - 10/27/15 11:25 - S:\TRADITIONAL\BIRMINGHAM LAB\SOUTHERN COMPANY\PLANT YATES PIEZOMETERS\GINT\PLANT YATES PIEZOMETERS.GPJ

Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter

ASTM D 5084-10

Project : Plant Yates Piezometers	Project Number: Z003000203
Client : Southern Company Services, INC	Sample Number : PZ-19S (17'-19')
Sample Location : PZ-19S (17'-19') UD-01	Date Sampled: 09/21/15
Northing: -- Easting: --	Elevation: --
Sample Preparation: Shelby Tube Pushed	Permeant Liquid : De-Aired Tap Water

Initial Sample Conditions		Initial Working Pressures, psi		Final Sample Conditions	
Wet Density, pcf	112.9	Chamber	87	Wet Density, pcf	110.9
Dry Density, pcf	85.5	Head	78	Dry Density, pcf	85.5
Moisture Content, %	32.1	Tail	76	Moisture Content, %	29.7
Void ratio, e	0.956	Conso.	10	Void ratio, e	0.956
Porosity, n	0.489	Soil Specific Gravity		Porosity, n	0.489
Saturation, Percent	89.9	Gs	2.681	Saturation, Percent	83.3
Hydraulic Gradient, i	9.9	Proctor Referenced		Hydraulic Gradient, i	8.4
Sample Length, Inches	5.613	--		Sample Length, Inches	5.613
Sample Volume, cc	582.1245	--		Sample Volume, cc	582.1245
B-value :	98.0%	Sample Consolidated During Saturation, %		0.00%	



Start Test @ t=0	Cum. Time Δ t, min.	Head Loss, Δh2 psi	Hydraulic Conductivity, k (Permeability)	
0	0.00	2.0000	cm/sec	°C
1	0.17	1.9513	2.14E-04	20
2	0.33	1.9180	1.82E-04	20
3	0.50	1.8804	1.79E-04	20
4	0.67	1.8429	1.78E-04	20
5	0.83	1.8068	1.77E-04	20
6	1.00	1.7706	1.77E-04	20
7	1.00	1.7692	1.78E-04	20
8	1.17	1.7331	1.78E-04	20
9	1.33	1.6983	1.78E-04	20

Hydraulic Conductivity, cm/sec

1.78E-04



200 Wellington Court, Suite 100
 Alabaster, Alabama 35007
 Office: 205-738-8775
 Fax: 205-733-8954

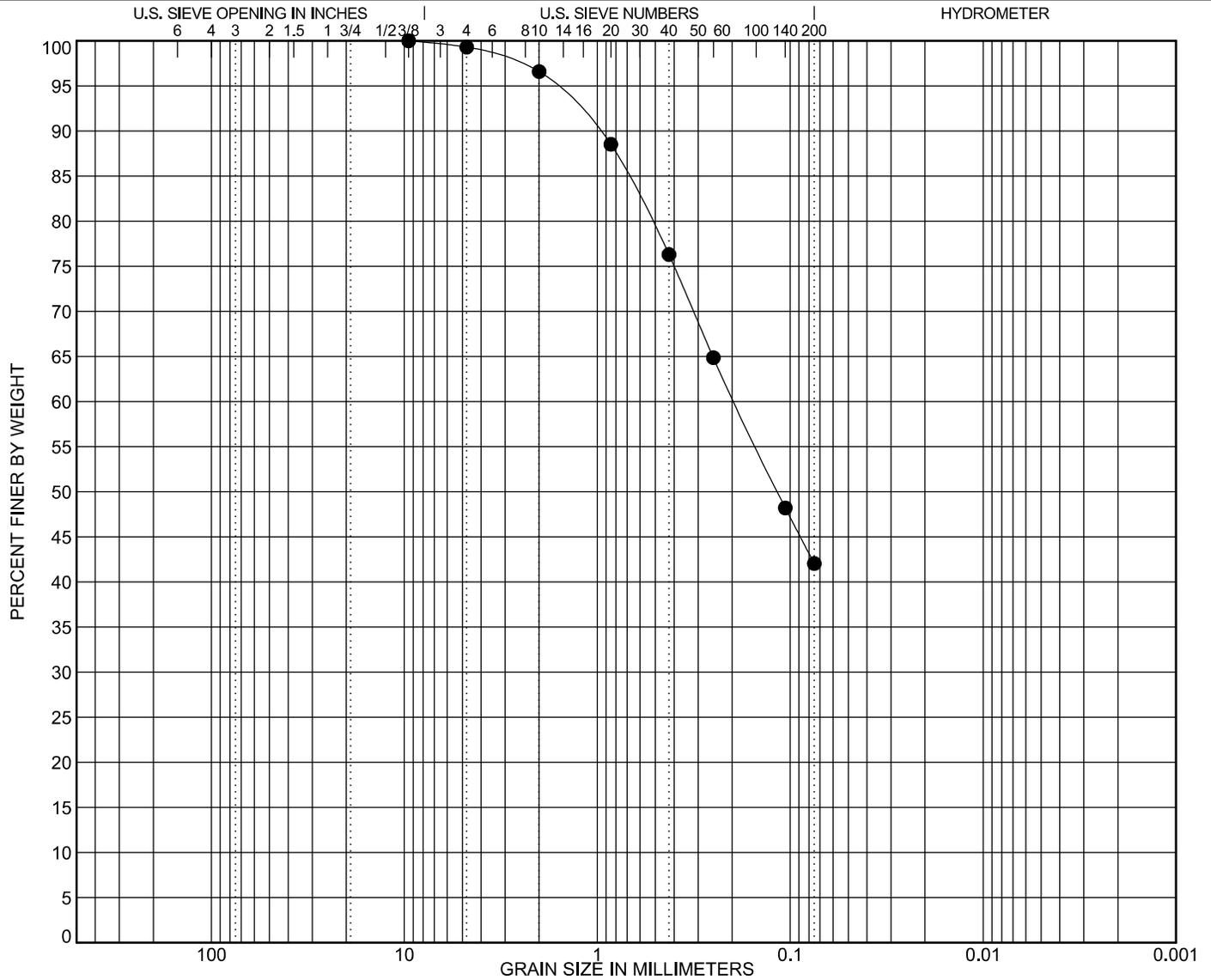
GRAIN SIZE DISTRIBUTION

CLIENT Southern Company Services

PROJECT NAME Plant Yates Piezometers

PROJECT NUMBER Z003000203

PROJECT LOCATION Newnan, GA



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
● PZ-19S	17	SILTY SAND (SM-SC)	NP	NP	NP		

BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● PZ-19S	17	9.5	0.195			0.7	57.3	42.0	

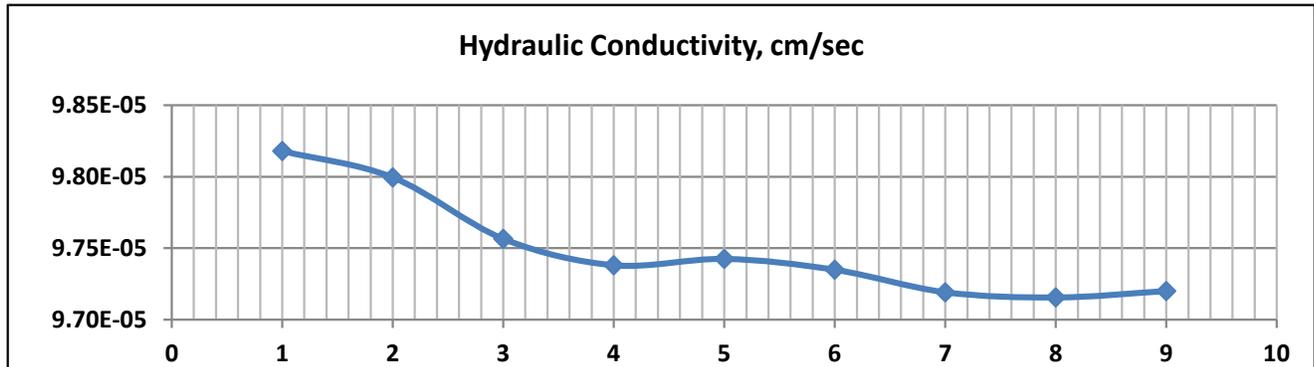
GRAIN SIZE - GINT STD US LAB.GDT - 10/27/15 11:26 - S:\TRADITIONAL\BIRMINGHAM LAB\SOUTHERN COMPANY\PLANT YATES PIEZOMETERS\GINT\PLANT YATES PIEZOMETERS.GPJ

Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter

ASTM D 5084-10

Project :	Plant Yates Piezometers	Project Number:	Z003000203
Client :	Southern Company Services, INC	Sample Number :	PZ-20s (17'-19')
Sample Location :	PZ-20s (17'-19') UD-01	Date Sampled:	09/03/15
Northing: --	Easting: --	Elevation:	--
Sample Preparation:	Shelby Tube Pushed	Permeant Liquid :	De-Aired Tap Water

Initial Sample Conditions		Initial Working Pressures, psi		Final Sample Conditions	
Wet Density, pcf	126.8	Chamber	93	Wet Density, pcf	120.2
Dry Density, pcf	98.4	Head	79	Dry Density, pcf	98.8
Moisture Content, %	28.9	Tail	77	Moisture Content, %	21.7
Void ratio, e	0.690	Conso.	15	Void ratio, e	0.683
Porosity, n	0.408	Soil Specific Gravity		Porosity, n	0.406
Saturation, Percent	111.5	Gs	2.665	Saturation, Percent	84.5
Hydraulic Gradient, i	9.9	Proctor Referenced		Hydraulic Gradient, i	8.2
Sample Length, Inches	5.585	--		Sample Length, Inches	5.535
Sample Volume, cc	569.1641	--		Sample Volume, cc	566.5934
B-value :	100.0%	Sample Consolidated During Saturation, %		0.90%	



Start Test @ t=0	Cum. Time Δ t, min.	Head Loss, Δh2 psi	Hydraulic Conductivity, k (Permeability)	
0	0.00	2.0000	cm/sec	°C
1	0.33	1.9563	9.82E-05	20
2	0.67	1.9138	9.80E-05	20
3	1.00	1.8727	9.76E-05	20
4	1.33	1.8323	9.74E-05	20
5	1.67	1.7926	9.74E-05	20
6	2.00	1.7539	9.73E-05	20
7	2.33	1.7164	9.72E-05	20
8	2.67	1.6794	9.72E-05	20
9	3.00	1.6430	9.72E-05	20

Hydraulic Conductivity, cm/sec

9.72E-05



200 Wellington Manor Court Suite 100
Alabaster, Alabama 35007



200 Wellington Court, Suite 100
 Alabaster, Alabama 35007
 Office: 205-738-8775
 Fax: 205-733-8954

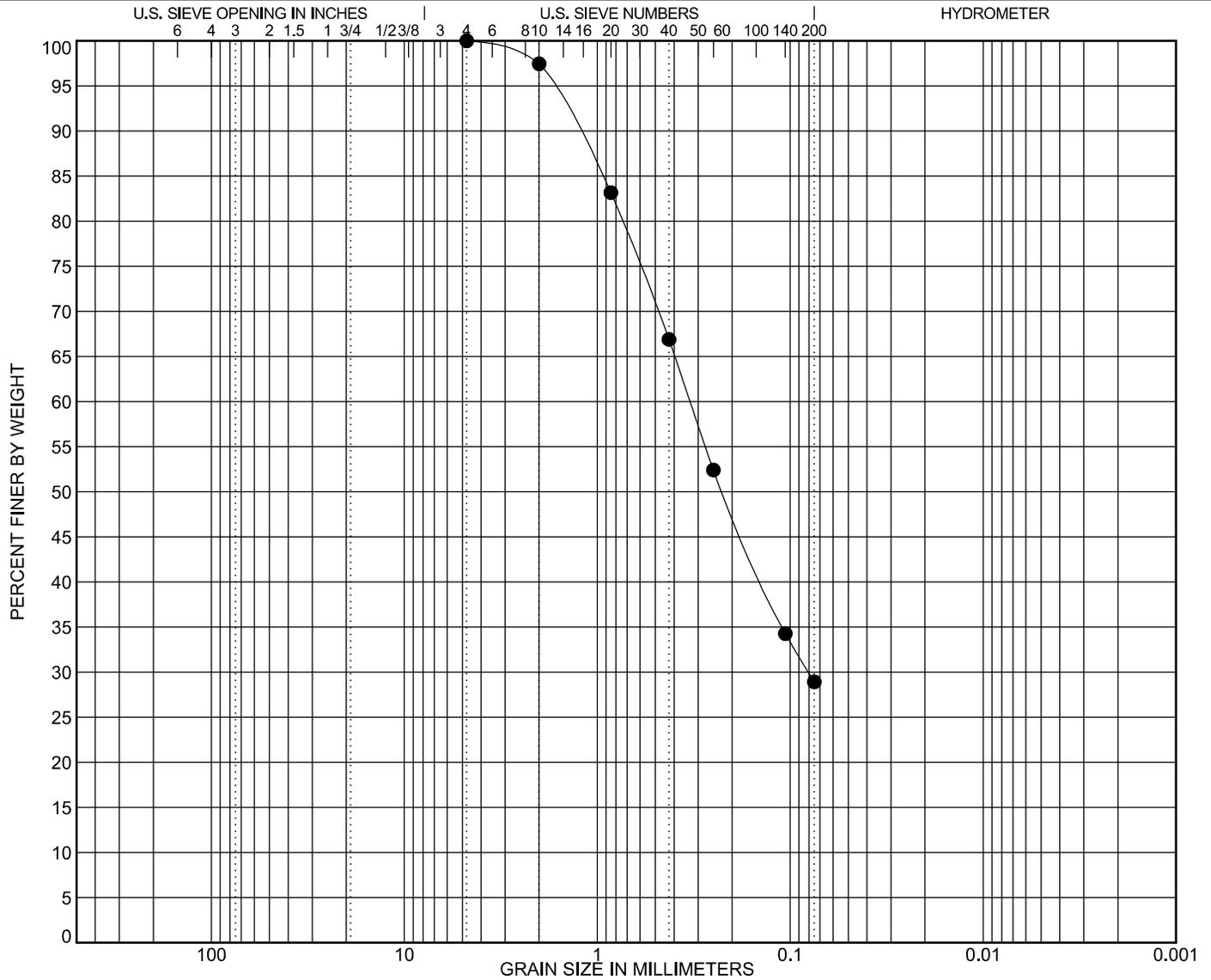
GRAIN SIZE DISTRIBUTION

CLIENT Southern Company Services

PROJECT NAME Plant Yates Piezometers

PROJECT NUMBER Z003000203

PROJECT LOCATION Newnan, GA



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
● PZ-20s	17	SILTY SAND (SM-SC)	NP	NP	NP		

BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● PZ-20s	17	4.75	0.33	0.08		0.0	71.1	28.9	

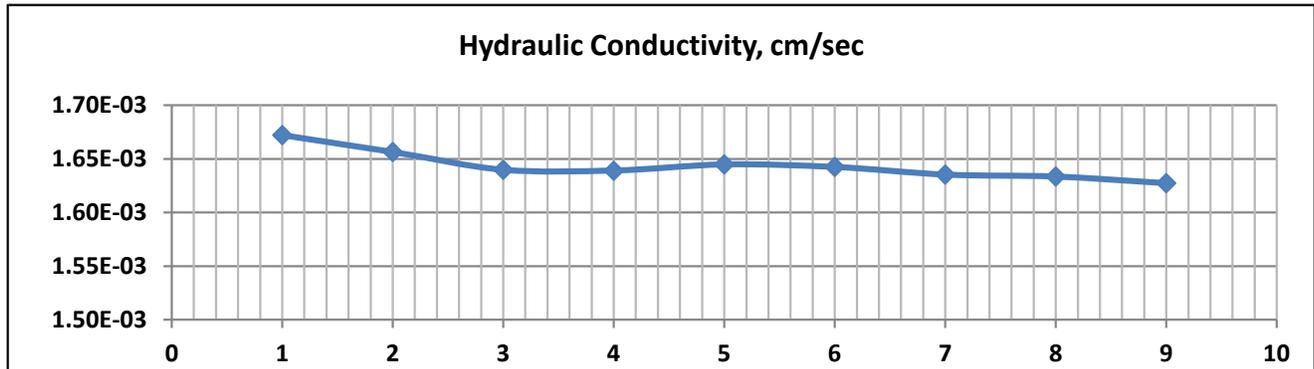
GRAIN SIZE - GINT STD US LAB.GDT - 10/27/15 11:27 - S:\TRADITIONAL\BIRMINGHAM LAB\SOUTHERN COMPANY\PLANT YATES PIEZOMETERS\GINT\PLANT YATES PIEZOMETERS.GPJ

Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter

ASTM D 5084-10

Project :	Plant Yates Piezometers	Project Number:	Z003000203
Client :	Southern Company Services, INC	Sample Number :	PZ-22S (7'-9')
Sample Location :	PZ-22S (7'-9') UD-01	Date Sampled:	09/17/15
Northing: --	Easting: --	Elevation:	--
Sample Preparation:	Shelby Tube Pushed	Permeant Liquid :	De-Aired Tap Water

Initial Sample Conditions		Initial Working Pressures, psi		Final Sample Conditions	
Wet Density, pcf	110.9	Chamber	83	Wet Density, pcf	110.3
Dry Density, pcf	83.5	Head	78	Dry Density, pcf	83.6
Moisture Content, %	32.8	Tail	76	Moisture Content, %	31.9
Void ratio, e	1.040	Conso.	6	Void ratio, e	1.038
Porosity, n	0.510	Soil Specific Gravity		Porosity, n	0.509
Saturation, Percent	86.2	Gs	2.731	Saturation, Percent	84.0
Hydraulic Gradient, i	9.9	Proctor Referenced		Hydraulic Gradient, i	8.4
Sample Length, Inches	5.618	--		Sample Length, Inches	5.600
Sample Volume, cc	571.7477	--		Sample Volume, cc	570.8288
B-value :	96.0%	Sample Consolidated During Saturation, %		0.32%	



Start Test @ t=0	Cum. Time Δ t, min.	Head Loss, Δh2 psi	Hydraulic Conductivity, k (Permeability)	
0	0.00	2.0000	cm/sec	°C
1	0.02	1.9625	1.67E-03	20
2	0.03	1.9263	1.66E-03	20
3	0.05	1.8916	1.64E-03	20
4	0.07	1.8568	1.64E-03	20
5	0.08	1.8220	1.64E-03	20
6	0.10	1.7887	1.64E-03	20
7	0.12	1.7567	1.64E-03	20
8	0.13	1.7247	1.63E-03	20
9	0.15	1.6941	1.63E-03	20

Hydraulic Conductivity, cm/sec

1.63E-03



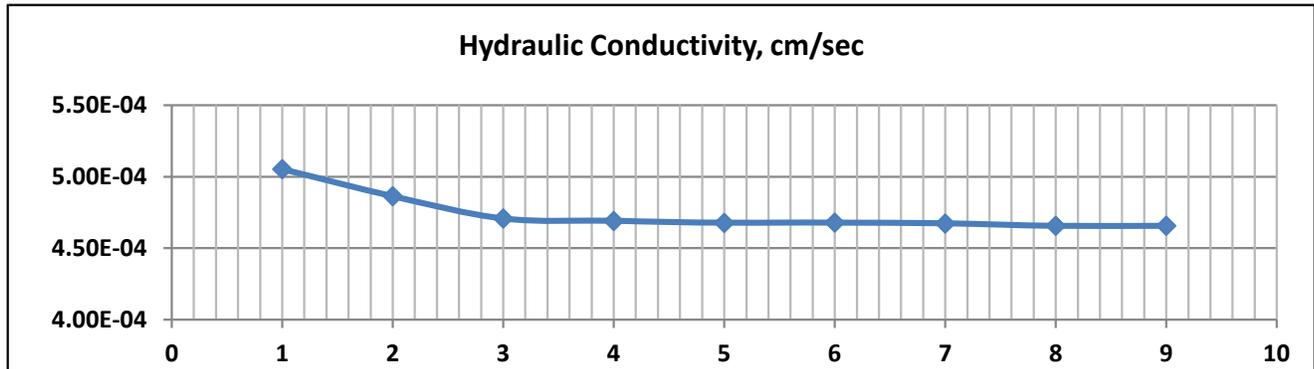
200 Wellington Manor Court Suite 100
Alabaster, Alabama 35007

Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter

ASTM D 5084-10

Project :	Plant Yates Piezometers	Project Number:	Z003000203
Client :	Southern Company Services, INC	Sample Number :	PZ-22s (17'-19')
Sample Location :	PZ-22s (17'-19') UD-02	Date Sampled:	09/17/15
Northing: --	Easting: --	Elevation:	--
Sample Preparation:	Shelby Tube Pushed	Permeant Liquid :	De-Aired Tap Water

Initial Sample Conditions		Initial Working Pressures, psi		Final Sample Conditions	
Wet Density, pcf	111.1	Chamber	88	Wet Density, pcf	110.3
Dry Density, pcf	82.5	Head	78	Dry Density, pcf	82.4
Moisture Content, %	34.7	Tail	76	Moisture Content, %	33.8
Void ratio, e	1.056	Conso.	11	Void ratio, e	1.057
Porosity, n	0.514	Soil Specific Gravity		Porosity, n	0.514
Saturation, Percent	89.4	Gs	2.717	Saturation, Percent	86.9
Hydraulic Gradient, i	9.8	Proctor Referenced		Hydraulic Gradient, i	7.8
Sample Length, Inches	5.645	--		Sample Length, Inches	5.648
Sample Volume, cc	572.9644	--		Sample Volume, cc	573.1166
B-value :	99.0%	Sample Swelled During Saturation, %		0.05%	



Start Test @ t=0	Cum. Time Δ t, min.	Head Loss, Δh2 psi	Hydraulic Conductivity, k (Permeability)	
0	0.00	2.0000	cm/sec	°C
1	0.08	1.9444	5.05E-04	20
2	0.17	1.8943	4.86E-04	20
3	0.25	1.8485	4.71E-04	20
4	0.33	1.8012	4.69E-04	20
5	0.42	1.7553	4.68E-04	20
6	0.50	1.7100	4.68E-04	20
7	0.58	1.6663	4.67E-04	20
8	0.67	1.6246	4.66E-04	20
9	0.75	1.5829	4.66E-04	20

Hydraulic Conductivity, cm/sec

4.66E-04



200 Wellington Manor Court Suite 100
Alabaster, Alabama 35007



200 Wellington Court, Suite 100
 Alabaster, Alabama 35007
 Office: 205-738-8775
 Fax: 205-733-8954

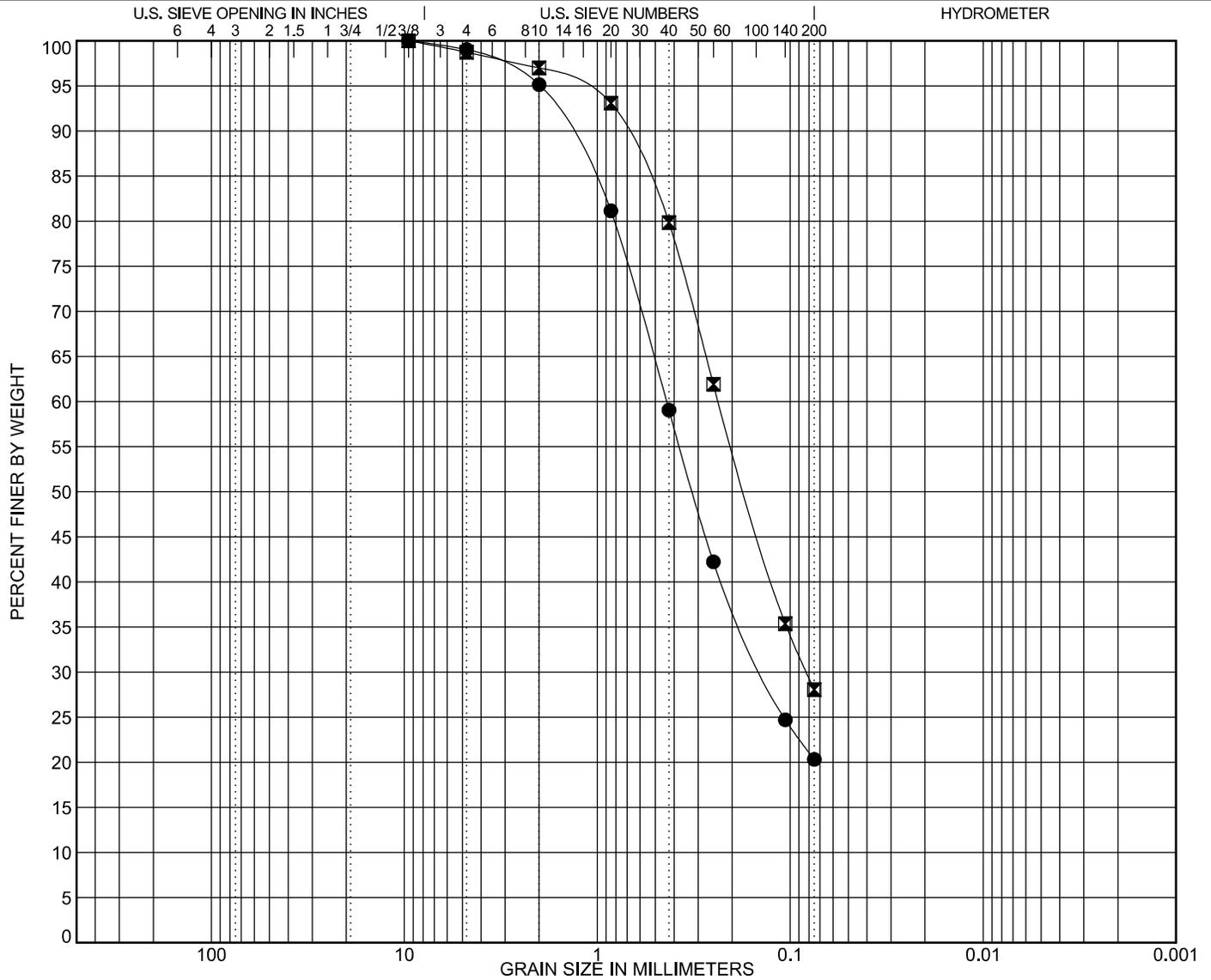
GRAIN SIZE DISTRIBUTION

CLIENT Southern Company Services

PROJECT NAME Plant Yates Piezometers

PROJECT NUMBER Z003000203

PROJECT LOCATION Newnan, GA



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
● PZ-22S	7	SILTY SAND (SM-SC)	NP	NP	NP		
☒ PZ-22S	17	SILTY SAND (SM-SC)	NP	NP	NP		

BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● PZ-22S	7	9.5	0.438	0.137		1.0	78.7	20.3	
☒ PZ-22S	17	9.5	0.235	0.082		1.3	70.7	28.0	

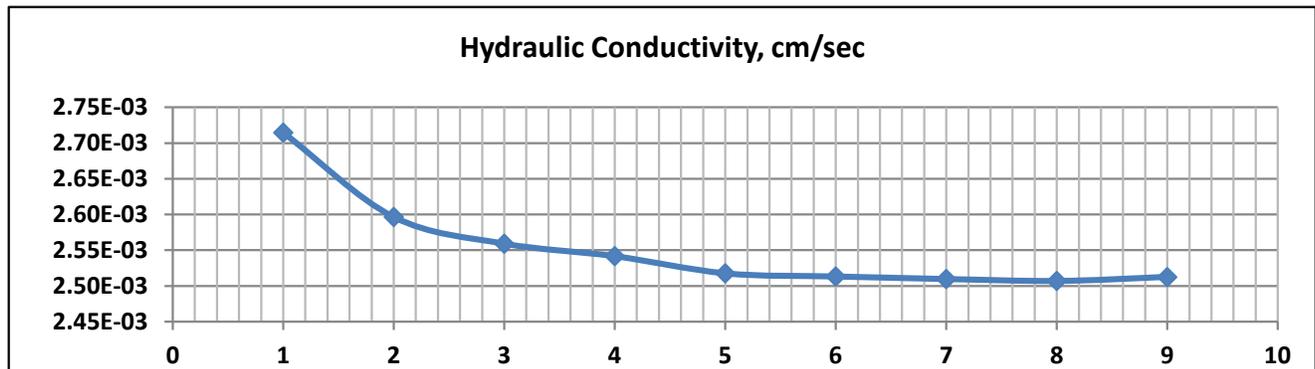
GRAIN SIZE - GINT STD US LAB.GDT - 10/27/15 11:27 - S:\TRADITIONAL\BIRMINGHAM LAB\SOUTHERN COMPANY\PLANT YATES PIEZOMETERS\GINT\PLANT YATES PIEZOMETERS.GPJ

Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter

ASTM D 5084-10

Project :	Plant Yates Piezometers	Project Number:	Z003000203
Client :	Southern Company Services, INC	Sample Number :	PZ-24S (17'-19')
Sample Location :	PZ-24S (17'-19') UD-01	Date Sampled:	09/17/15
Northing: --	Easting: --	Elevation:	--
Sample Preparation:	Shelby Tube Pushed	Permeant Liquid :	De-Aired Tap Water

Initial Sample Conditions		Initial Working Pressures, psi		Final Sample Conditions	
Wet Density, pcf	103.0	Chamber	90	Wet Density, pcf	111.1
Dry Density, pcf	83.4	Head	79	Dry Density, pcf	83.4
Moisture Content, %	23.5	Tail	77	Moisture Content, %	33.3
Void ratio, e	1.015	Conso.	12	Void ratio, e	1.015
Porosity, n	0.504	Soil Specific Gravity		Porosity, n	0.504
Saturation, Percent	62.2	Gs	2.693	Saturation, Percent	88.2
Hydraulic Gradient, i	9.9	Proctor Referenced		Hydraulic Gradient, i	7.7
Sample Length, Inches	5.587	--		Sample Length, Inches	5.583
Sample Volume, cc	566.4718	--		Sample Volume, cc	566.2689
B-value :	96.0%	Sample Consolidated During Saturation, %		0.07%	



Start Test @ t=0	Cum. Time Δ t, min.	Head Loss, Δh2, psi	Hydraulic Conductivity, k (Permeability)	
0	0.00	2.0000	cm/sec	°C
1	0.02	1.9388	2.71E-03	20
2	0.03	1.8846	2.60E-03	20
3	0.05	1.8318	2.56E-03	20
4	0.07	1.7803	2.54E-03	20
5	0.08	1.7317	2.52E-03	20
6	0.10	1.6830	2.51E-03	20
7	0.12	1.6357	2.51E-03	20
8	0.13	1.5899	2.51E-03	20
9	0.15	1.5440	2.51E-03	20

Hydraulic Conductivity, cm/sec

2.51E-03



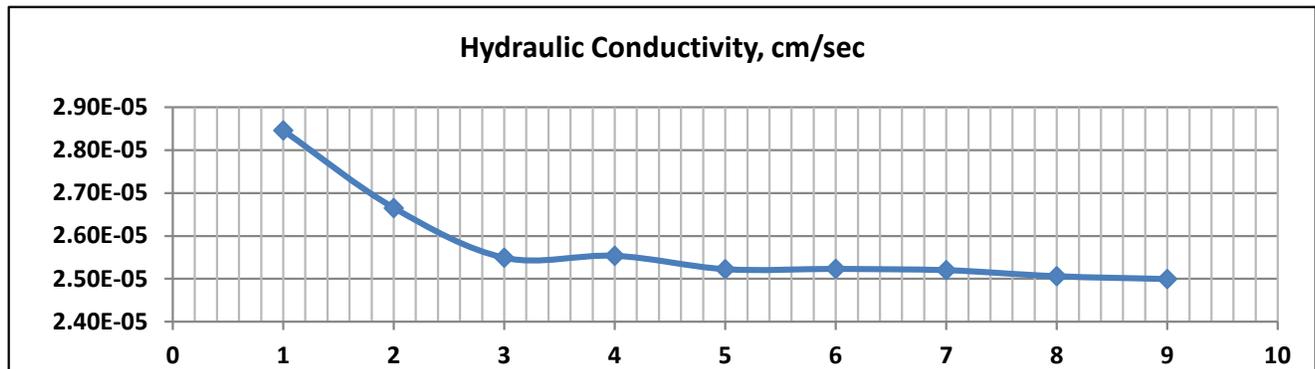
200 Wellington Manor Court Suite 100
Alabaster, Alabama 35007

Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter

ASTM D 5084-10

Project : Plant Yates Piezometers	Project Number: Z003000203
Client : Southern Company Services, INC	Sample Number : PZ-24S (37'-39')
Sample Location : PZ-24S (37'-39') UD-02	Date Sampled: 09/16/15
Northing: -- Easting: --	Elevation: --
Sample Preparation: Shelby Tube Pushed	Permeant Liquid : De-Aired Tap Water

Initial Sample Conditions		Initial Working Pressures, psi		Final Sample Conditions	
Wet Density, pcf	109.6	Chamber	101	Wet Density, pcf	112.3
Dry Density, pcf	90.6	Head	79	Dry Density, pcf	91.0
Moisture Content, %	21.0	Tail	77	Moisture Content, %	23.3
Void ratio, e	0.860	Conso.	23	Void ratio, e	0.851
Porosity, n	0.462	Soil Specific Gravity		Porosity, n	0.460
Saturation, Percent	66.0	Gs	2.701	Saturation, Percent	74.0
Hydraulic Gradient, i	9.6	Proctor Referenced		Hydraulic Gradient, i	8.3
Sample Length, Inches	5.745	--		Sample Length, Inches	5.687
Sample Volume, cc	594.031	--		Sample Volume, cc	591.0023
B-value :	100.0%	Sample Consolidated During Saturation, %		1.01%	



Start Test @ t=0	Cum. Time Δ t, min.	Head Loss, Δh2, psi	Hydraulic Conductivity, k (Permeability)	
0	0.00	2.0000	cm/sec	°C
1	1.00	1.9611	2.85E-05	20
2	2.00	1.9277	2.67E-05	20
3	3.00	1.8971	2.55E-05	20
4	4.00	1.8638	2.55E-05	20
5	5.00	1.8332	2.52E-05	20
6	6.00	1.8015	2.52E-05	20
7	7.00	1.7706	2.52E-05	20
8	8.00	1.7414	2.51E-05	20
9	9.00	1.7122	2.50E-05	20

Hydraulic Conductivity, cm/sec

2.50E-05



200 Wellington Manor Court Suite 100
Alabaster, Alabama 35007



200 Wellington Court, Suite 100
 Alabaster, Alabama 35007
 Office: 205-738-8775
 Fax: 205-733-8954

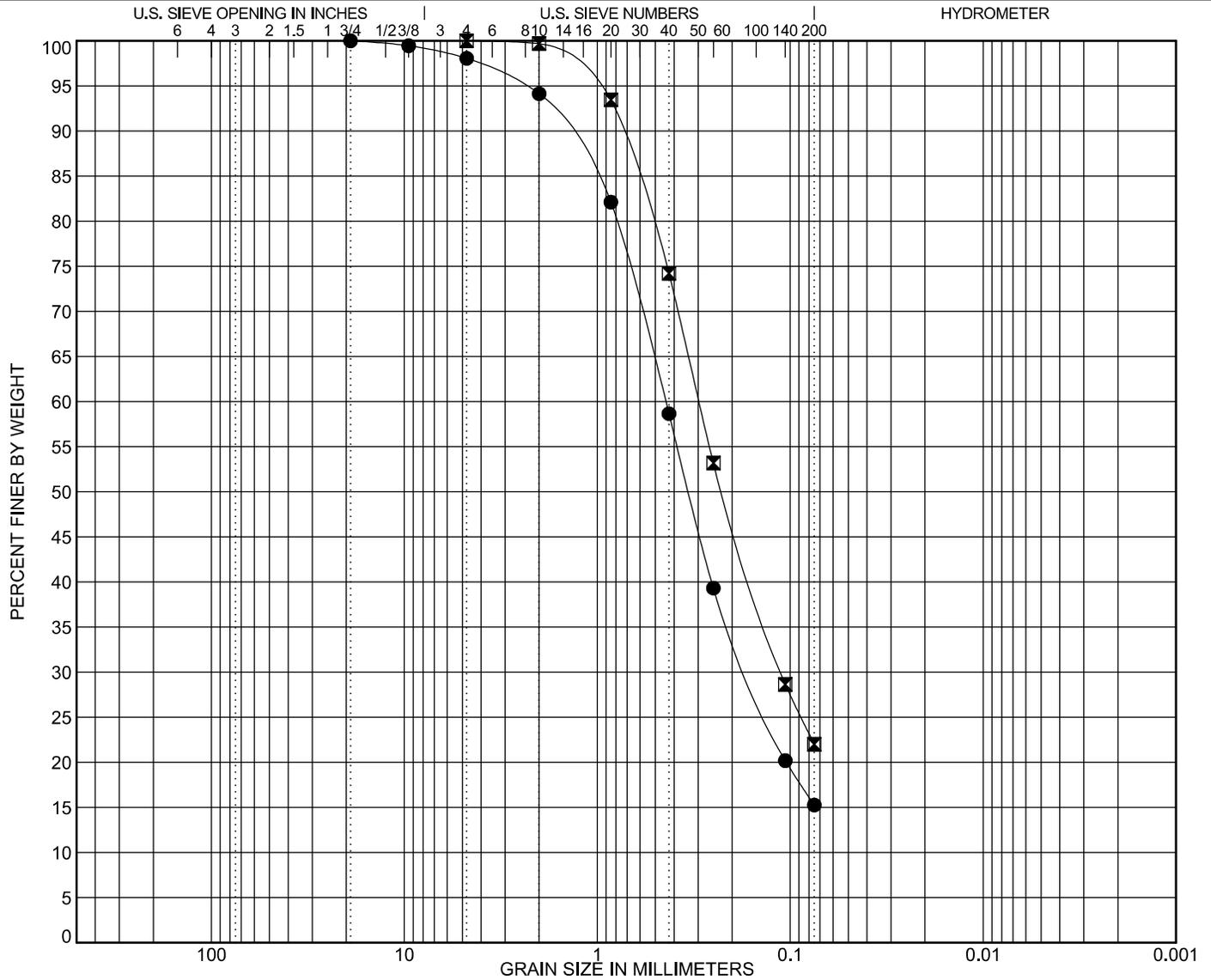
GRAIN SIZE DISTRIBUTION

CLIENT Southern Company Services

PROJECT NAME Plant Yates Piezometers

PROJECT NUMBER Z003000203

PROJECT LOCATION Newnan, GA



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
● PZ-24S	17	SILTY SAND (SM-SC)	NP	NP	NP		
⊠ PZ-24S	37	SILTY SAND (SM-SC)	NP	NP	NP		

BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● PZ-24S	17	19	0.442	0.165		1.9	82.8	15.3	
⊠ PZ-24S	37	4.75	0.297	0.111		0.0	78.0	22.0	

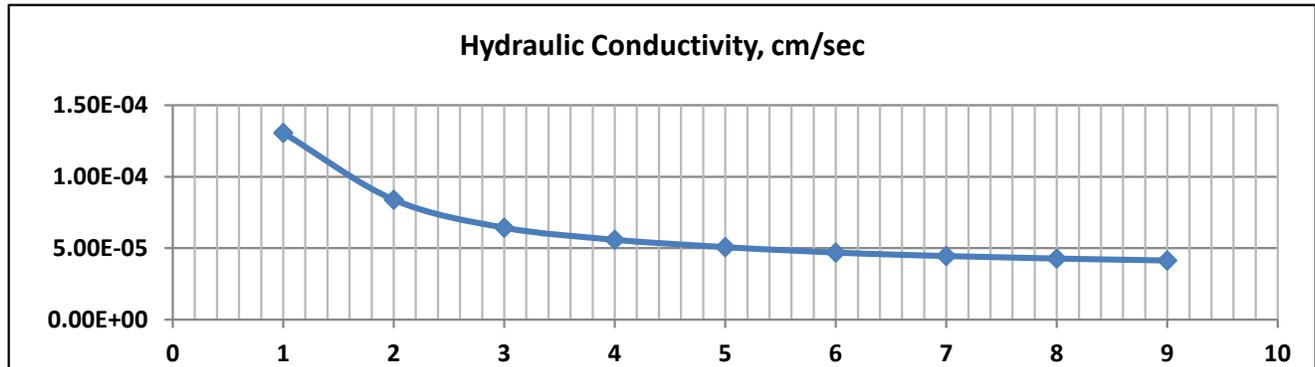
GRAIN SIZE - GINT STD US LAB.GDT - 10/27/15 11:28 - S:\TRADITIONAL\BIRMINGHAM LAB\SOUTHERN COMPANY\PLANT YATES PIEZOMETERS\GINT\PLANT YATES PIEZOMETERS.GPJ

Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter

ASTM D 5084-10

Project : Plant Yates Piezometers	Project Number: Z003000203
Client : Southern Company Services, INC	Sample Number : PZ-25S (33'-35')
Sample Location : PZ-25S (33'-35') UD-01	Date Sampled: 09/03/15
Northing: -- Easting: --	Elevation: --
Sample Preparation: Shelby Tube Pushed	Permeant Liquid : De-Aired Tap Water

Initial Sample Conditions		Initial Working Pressures, psi		Final Sample Conditions	
Wet Density, pcf	110.9	Chamber	98	Wet Density, pcf	112.1
Dry Density, pcf	85.8	Head	79	Dry Density, pcf	86.1
Moisture Content, %	29.2	Tail	77	Moisture Content, %	30.3
Void ratio, e	0.947	Conso.	20	Void ratio, e	0.942
Porosity, n	0.486	Soil Specific Gravity		Porosity, n	0.485
Saturation, Percent	82.7	Gs	2.678	Saturation, Percent	86.1
Hydraulic Gradient, i	9.8	Proctor Referenced		Hydraulic Gradient, i	7.7
Sample Length, Inches	5.635	--		Sample Length, Inches	5.600
Sample Volume, cc	575.4849	--		Sample Volume, cc	573.6865
B-value :	97.0%	Sample Consolidated During Saturation, %		0.62%	



Start Test @ t=0	Cum. Time Δ t, min.	Head Loss, Δh2 psi	Hydraulic Conductivity, k (Permeability)	
0	0.00	2.0000	cm/sec	°C
1	1.00	1.8290	1.31E-04	20
2	2.00	1.7831	8.40E-05	20
3	3.00	1.7525	6.44E-05	20
4	4.00	1.7164	5.59E-05	20
5	5.00	1.6816	5.07E-05	20
6	6.00	1.6497	4.70E-05	20
7	7.00	1.6163	4.45E-05	20
8	8.00	1.5829	4.28E-05	20
9	9.00	1.5509	4.13E-05	20

Hydraulic Conductivity, cm/sec

4.13E-05



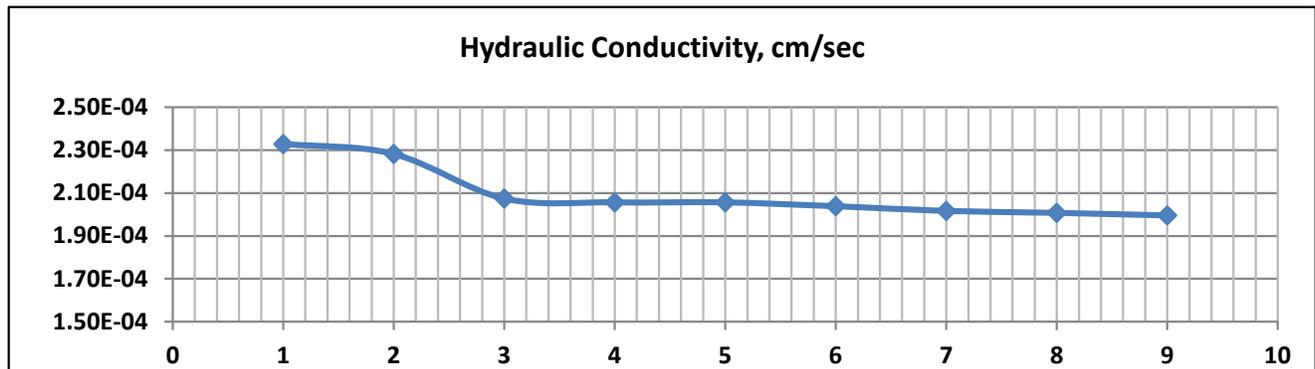
200 Wellington Manor Court Suite 100
Alabaster, Alabama 35007

Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter

ASTM D 5084-10

Project :	Plant Yates Piezometers	Project Number:	Z003000203
Client :	Southern Company Services, INC	Sample Number :	PZ-25S (44'-46')
Sample Location :	PZ-25S (44'-46') UD-02	Date Sampled:	09/03/15
Northing: --	Easting: --	Elevation:	--
Sample Preparation:	Shelby Tube Pushed	Permeant Liquid :	De-Aired Tap Water

Initial Sample Conditions		Initial Working Pressures, psi		Final Sample Conditions	
Wet Density, pcf	118.4	Chamber	104	Wet Density, pcf	119.4
Dry Density, pcf	97.9	Head	78	Dry Density, pcf	98.1
Moisture Content, %	21.0	Tail	76	Moisture Content, %	21.7
Void ratio, e	0.710	Conso.	27	Void ratio, e	0.706
Porosity, n	0.415	Soil Specific Gravity		Porosity, n	0.414
Saturation, Percent	79.2	Gs	2.682	Saturation, Percent	82.4
Hydraulic Gradient, i	9.9	Proctor Referenced		Hydraulic Gradient, i	9.0
Sample Length, Inches	5.610	--		Sample Length, Inches	5.577
Sample Volume, cc	572.1864	--		Sample Volume, cc	570.4937
B-value :	97.0%	Sample Consolidated During Saturation, %		0.59%	



Start Test @ t=0	Cum. Time Δ t, min.	Head Loss, Δh2, psi	Hydraulic Conductivity, k (Permeability)	
0	0.00	2.0000	cm/sec	°C
1	0.08	1.9736	2.33E-04	20
2	0.17	1.9486	2.28E-04	20
3	0.25	1.9302	2.07E-04	20
4	0.33	1.9082	2.06E-04	20
5	0.42	1.8860	2.06E-04	20
6	0.50	1.8651	2.04E-04	20
7	0.58	1.8451	2.02E-04	20
8	0.67	1.8248	2.01E-04	20
9	0.75	1.8051	2.00E-04	20

Hydraulic Conductivity, cm/sec

2.00E-04



200 Wellington Manor Court Suite 100
Alabaster, Alabama 35007



200 Wellington Court, Suite 100
 Alabaster, Alabama 35007
 Office: 205-738-8775
 Fax: 205-733-8954

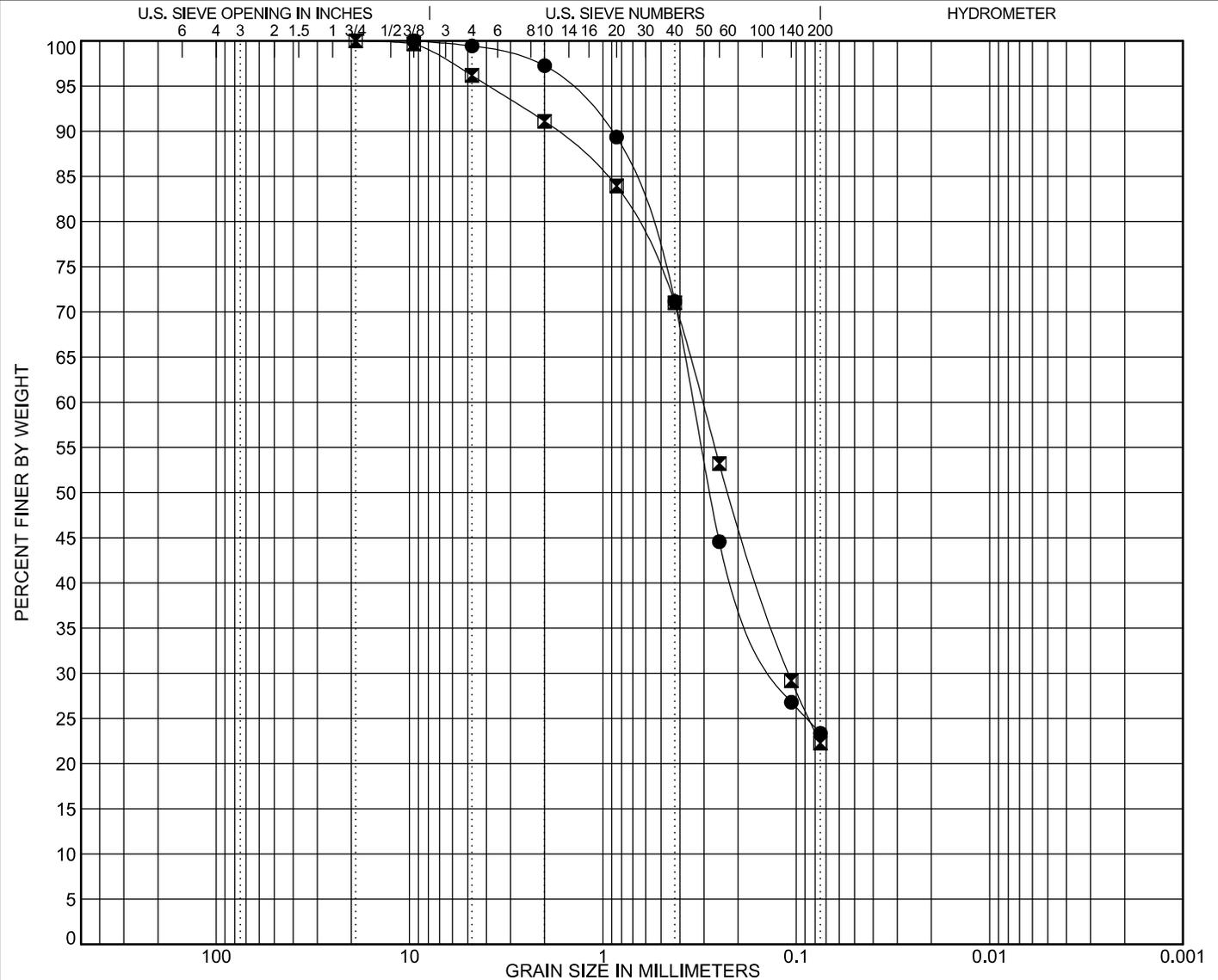
GRAIN SIZE DISTRIBUTION

CLIENT Southern Company Services

PROJECT NAME Plant Yates Piezometers

PROJECT NUMBER Z003000203

PROJECT LOCATION Newnan, GA



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
● PZ-25S	33	SILTY SAND (SM-SC)	NP	NP	NP		
◻ PZ-25S	44	SILTY SAND (SM-SC)	NP	NP	NP		

BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● PZ-25S	33	9.5	0.34	0.124		0.6	76.1	23.4	
◻ PZ-25S	44	19	0.306	0.109		3.8	73.9	22.3	

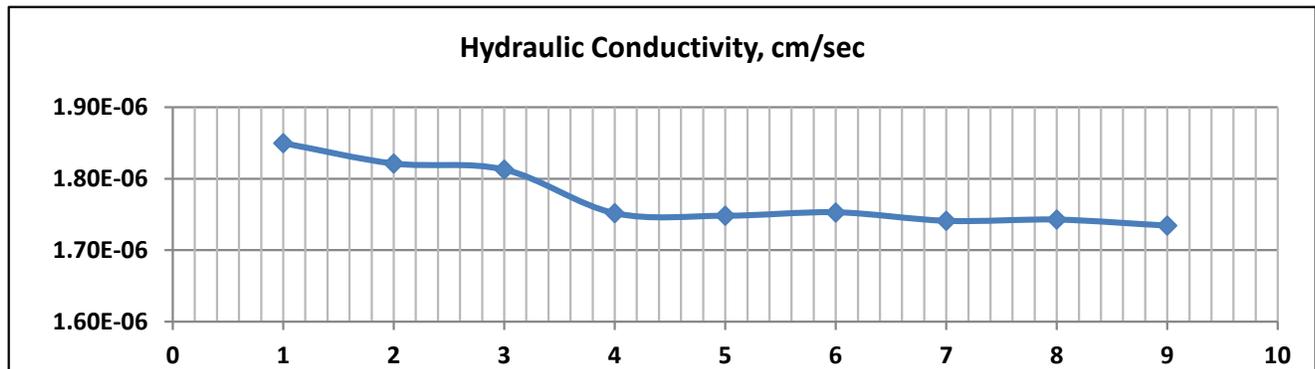
GRAIN SIZE - GINT STD US LAB.GDT - 10/27/15 11:29 - S:\TRADITIONAL\BIRMINGHAM LAB\SOUTHERN COMPANY\PLANT YATES PIEZOMETERS\GINT\PLANT YATES PIEZOMETERS.GPJ

Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter

ASTM D 5084-10

Project :	Plant Yates Piezometers	Project Number:	Z003000203
Client :	Southern Company Services, INC	Sample Number :	PZ-26S (17'-19')
Sample Location :	PZ-26S (17'-19') UD-01	Date Sampled:	9/31/2015
Northing: --	Easting: --	Elevation:	--
Sample Preparation:	Shelby Tube Pushed	Permeant Liquid :	De-Aired Tap Water

Initial Sample Conditions		Initial Working Pressures, psi		Final Sample Conditions	
Wet Density, pcf	122.6	Chamber	92	Wet Density, pcf	115.8
Dry Density, pcf	94.9	Head	79	Dry Density, pcf	95.2
Moisture Content, %	29.3	Tail	77	Moisture Content, %	21.7
Void ratio, e	0.803	Conso.	14	Void ratio, e	0.797
Porosity, n	0.445	Soil Specific Gravity		Porosity, n	0.443
Saturation, Percent	99.9	Gs	2.741	Saturation, Percent	74.5
Hydraulic Gradient, i	9.8	Proctor Referenced		Hydraulic Gradient, i	8.9
Sample Length, Inches	5.645	--		Sample Length, Inches	5.601
Sample Volume, cc	590.4383	--		Sample Volume, cc	588.1194
B-value :	100.0%	Sample Consolidated During Saturation, %		0.78%	



Start Test @ t=0	Cum. Time Δ t, min.	Head Loss, Δh2, psi	Hydraulic Conductivity, k (Permeability)	
0	0.00	2.0000	cm/sec	°C
1	10.00	1.9741	1.85E-06	20
2	20.00	1.9494	1.82E-06	20
3	30.00	1.9249	1.81E-06	20
4	40.00	1.9038	1.75E-06	20
5	50.00	1.8807	1.75E-06	20
6	60.00	1.8574	1.75E-06	20
7	70.00	1.8357	1.74E-06	20
8	80.00	1.8131	1.74E-06	20
9	90.00	1.7920	1.73E-06	20

Hydraulic Conductivity, cm/sec

1.73E-06



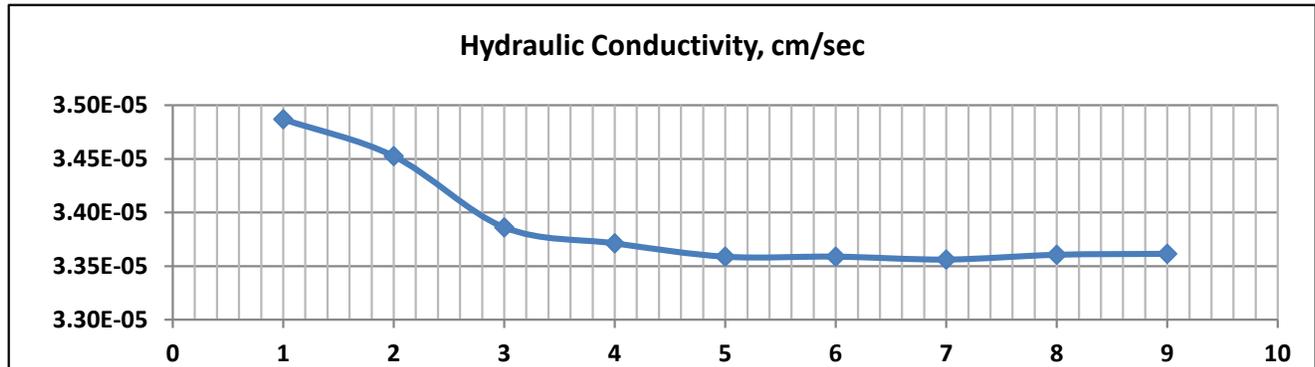
200 Wellington Manor Court Suite 100
Alabaster, Alabama 35007

Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter

ASTM D 5084-10

Project :	Plant Yates Piezometers	Project Number:	Z003000203
Client :	Southern Company Services, INC	Sample Number :	PZ-26S (27'-29')
Sample Location :	PZ-26S (27'-29') UD-02	Date Sampled:	9/31/15
Northing: --	Easting: --	Elevation:	--
Sample Preparation:	Shelby Tube Pushed	Permeant Liquid :	De-Aired Tap Water

Initial Sample Conditions		Initial Working Pressures, psi		Final Sample Conditions	
Wet Density, pcf	120.1	Chamber	101	Wet Density, pcf	119.2
Dry Density, pcf	92.5	Head	79	Dry Density, pcf	92.5
Moisture Content, %	29.8	Tail	77	Moisture Content, %	28.8
Void ratio, e	0.834	Conso.	23	Void ratio, e	0.834
Porosity, n	0.455	Soil Specific Gravity		Porosity, n	0.455
Saturation, Percent	97.1	Gs	2.720	Saturation, Percent	94.1
Hydraulic Gradient, i	9.8	Proctor Referenced		Hydraulic Gradient, i	8.0
Sample Length, Inches	5.623	--		Sample Length, Inches	5.619
Sample Volume, cc	570.3925	--		Sample Volume, cc	570.1895
B-value :	100.0%	Sample Consolidated During Saturation, %		0.07%	



Start Test @ t=0	Cum. Time Δ t, min.	Head Loss, Δh2 psi	Hydraulic Conductivity, k (Permeability)	
0	0.00	2.0000	cm/sec	°C
1	1.00	1.9538	3.49E-05	20
2	2.00	1.9096	3.45E-05	20
3	3.00	1.8685	3.39E-05	20
4	4.00	1.8273	3.37E-05	20
5	5.00	1.7873	3.36E-05	20
6	6.00	1.7475	3.36E-05	20
7	7.00	1.7089	3.36E-05	20
8	8.00	1.6705	3.36E-05	20
9	9.00	1.6332	3.36E-05	20

Hydraulic Conductivity, cm/sec

3.36E-05



200 Wellington Manor Court Suite 100
Alabaster, Alabama 35007



200 Wellington Court, Suite 100
 Alabaster, Alabama 35007
 Office: 205-738-8775
 Fax: 205-733-8954

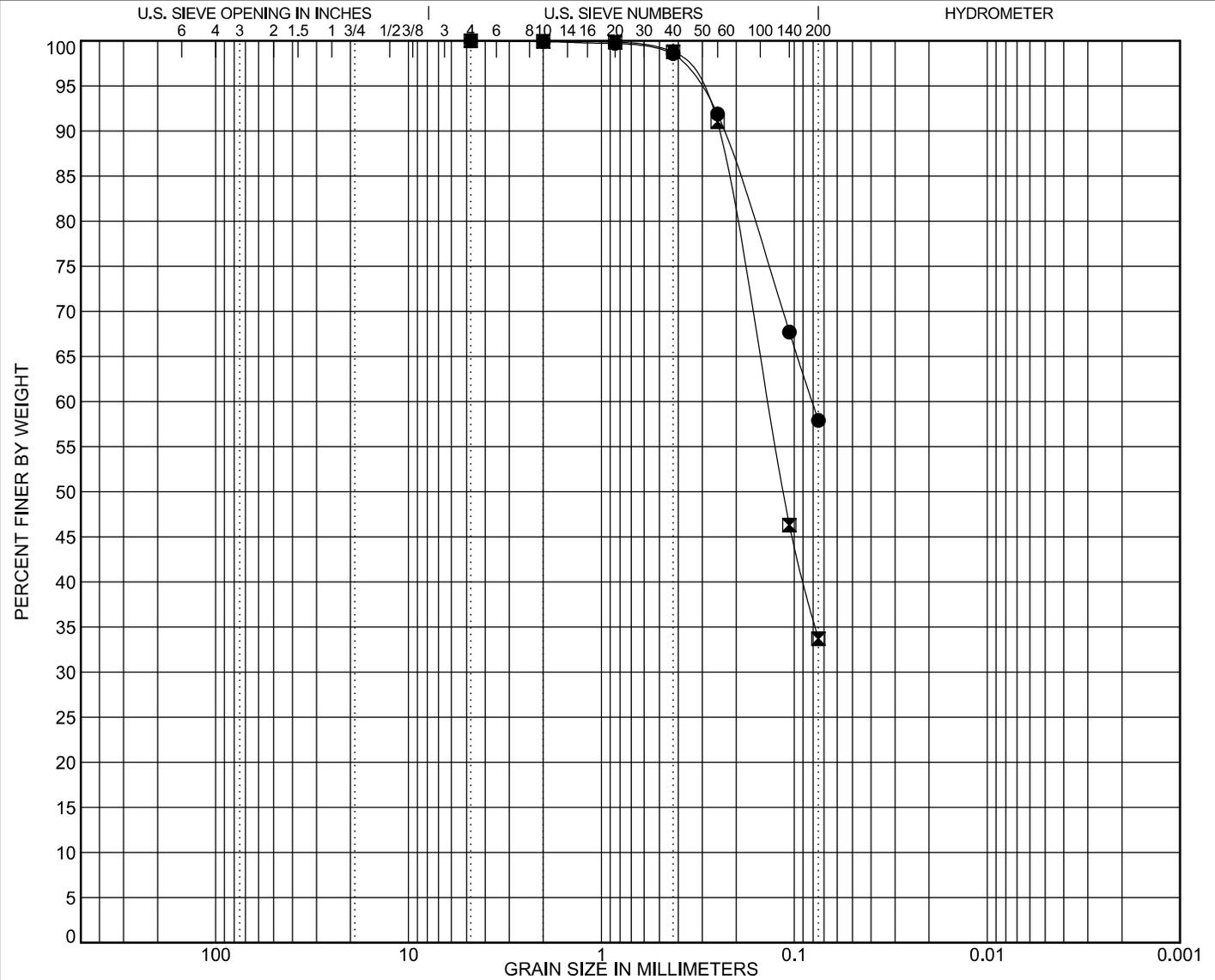
GRAIN SIZE DISTRIBUTION

CLIENT Southern Company Services

PROJECT NAME Plant Yates Piezometers

PROJECT NUMBER Z003000203

PROJECT LOCATION Newnan, GA



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
● PZ-26s	17	SANDY SILT (ML)	37	27	10		
☒ PZ-26s	27	SILTY SAND (SM-SC)	NP	NP	NP		

BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● PZ-26s	17	4.75	0.081			0.0	42.1		57.9
☒ PZ-26s	27	4.75	0.138			0.0	66.3		33.7

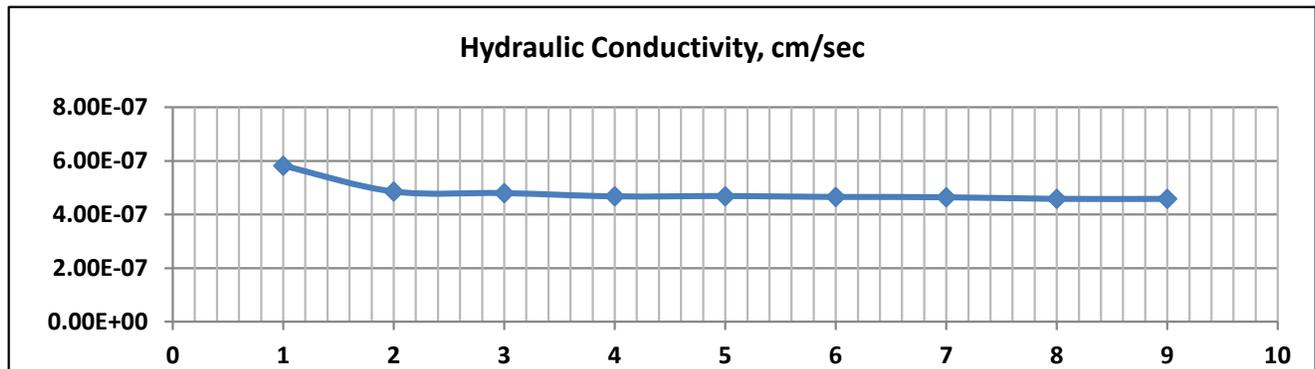
GRAIN SIZE - GINT STD US LAB.GDT - 10/27/15 11:29 - S:\TRADITIONAL\BIRMINGHAM LAB\SOUTHERN COMPANY\PLANT YATES PIEZOMETERS\GINT\PLANT YATES PIEZOMETERS.GPJ

Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter

ASTM D 5084-10

Project :	Plant Yates Piezometers	Project Number:	Z003000203
Client :	Southern Company Services, INC	Sample Number :	PZ-27S (17'-19')
Sample Location :	PZ-27S (17'-19') UD-01	Date Sampled:	10/07/15
Northing:	--	Easting:	--
Sample Preparation:	Shelby Tube Pushed	Permeant Liquid :	De-Aired Tap Water

Initial Sample Conditions		Initial Working Pressures, psi		Final Sample Conditions	
Wet Density, pcf	126.5	Chamber	93	Wet Density, pcf	126.1
Dry Density, pcf	99.6	Head	79	Dry Density, pcf	99.8
Moisture Content, %	27.0	Tail	77	Moisture Content, %	26.3
Void ratio, e	0.667	Conso.	15	Void ratio, e	0.663
Porosity, n	0.400	Soil Specific Gravity		Porosity, n	0.399
Saturation, Percent	107.7	Gs	2.661	Saturation, Percent	105.7
Hydraulic Gradient, i	9.8	Proctor Referenced		Hydraulic Gradient, i	9.6
Sample Length, Inches	5.635	--		Sample Length, Inches	5.603
Sample Volume, cc	578.7582	--		Sample Volume, cc	577.1055
B-value :	97.0%	Sample Consolidated During Saturation, %		0.57%	



Start Test @ t=0	Cum. Time Δ t, min.	Head Loss, Δh2 psi	Hydraulic Conductivity, k (Permeability)	
0	0.00	2.0000	cm/sec	°C
1	10.00	1.9917	5.82E-07	20
2	20.00	1.9861	4.86E-07	20
3	30.00	1.9794	4.80E-07	20
4	40.00	1.9733	4.68E-07	20
5	50.00	1.9666	4.68E-07	20
6	60.00	1.9602	4.66E-07	20
7	70.00	1.9538	4.64E-07	20
8	80.00	1.9480	4.58E-07	20
9	90.00	1.9416	4.58E-07	20

Hydraulic Conductivity, cm/sec

4.58E-07



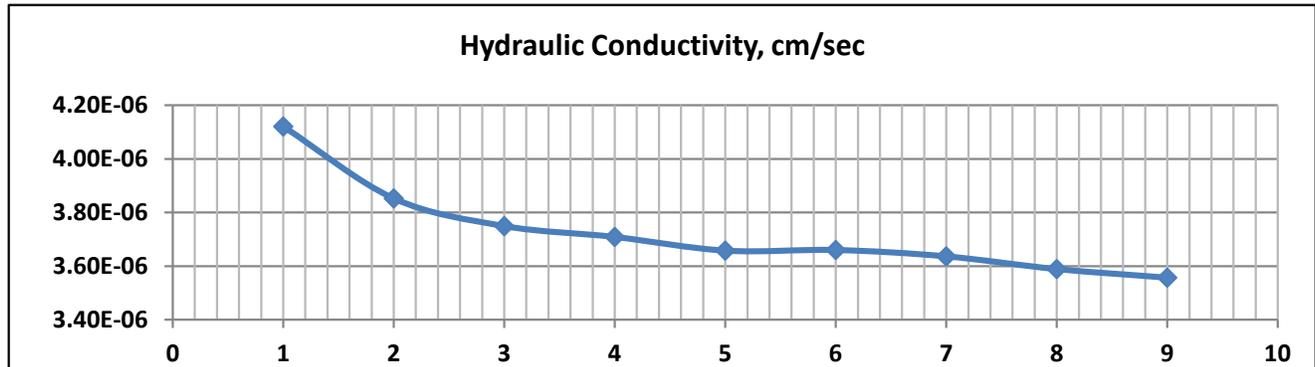
200 Wellington Manor Court Suite 100
Alabaster, Alabama 35007

Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter

ASTM D 5084-10

Project :	Plant Yates Piezometers	Project Number:	Z003000203
Client :	Southern Company Services, INC	Sample Number :	PZ-27S (27'-29')
Sample Location :	PZ-27S (27'-29') UD-02	Date Sampled:	10/07/15
Northing:	--	Easting:	--
Sample Preparation:	Shelby Tube Pushed	Permeant Liquid :	De-Aired Tap Water

Initial Sample Conditions		Initial Working Pressures, psi		Final Sample Conditions	
Wet Density, pcf	120.0	Chamber	98	Wet Density, pcf	119.6
Dry Density, pcf	91.1	Head	79	Dry Density, pcf	91.3
Moisture Content, %	31.7	Tail	77	Moisture Content, %	31.0
Void ratio, e	0.831	Conso.	20	Void ratio, e	0.827
Porosity, n	0.454	Soil Specific Gravity		Porosity, n	0.453
Saturation, Percent	101.9	Gs	2.673	Saturation, Percent	100.2
Hydraulic Gradient, i	9.8	Proctor Referenced		Hydraulic Gradient, i	8.8
Sample Length, Inches	5.657	--		Sample Length, Inches	5.629
Sample Volume, cc	576.1263	--		Sample Volume, cc	574.6934
B-value :	99.0%	Sample Consolidated During Saturation, %		0.49%	



Start Test @ t=0	Cum. Time Δ t, min.	Head Loss, Δh2 psi	Hydraulic Conductivity, k (Permeability)	
0	0.00	2.0000	cm/sec	°C
1	5.00	1.9725	4.12E-06	20
2	10.00	1.9488	3.85E-06	20
3	15.00	1.9258	3.75E-06	20
4	20.00	1.9027	3.71E-06	20
5	25.00	1.8807	3.66E-06	20
6	30.00	1.8576	3.66E-06	20
7	35.00	1.8359	3.64E-06	20
8	40.00	1.8159	3.59E-06	20
9	45.00	1.7959	3.56E-06	20

Hydraulic Conductivity, cm/sec

3.56E-06



200 Wellington Manor Court Suite 100
Alabaster, Alabama 35007



200 Wellington Court, Suite 100
 Alabaster, Alabama 35007
 Office: 205-738-8775
 Fax: 205-733-8954

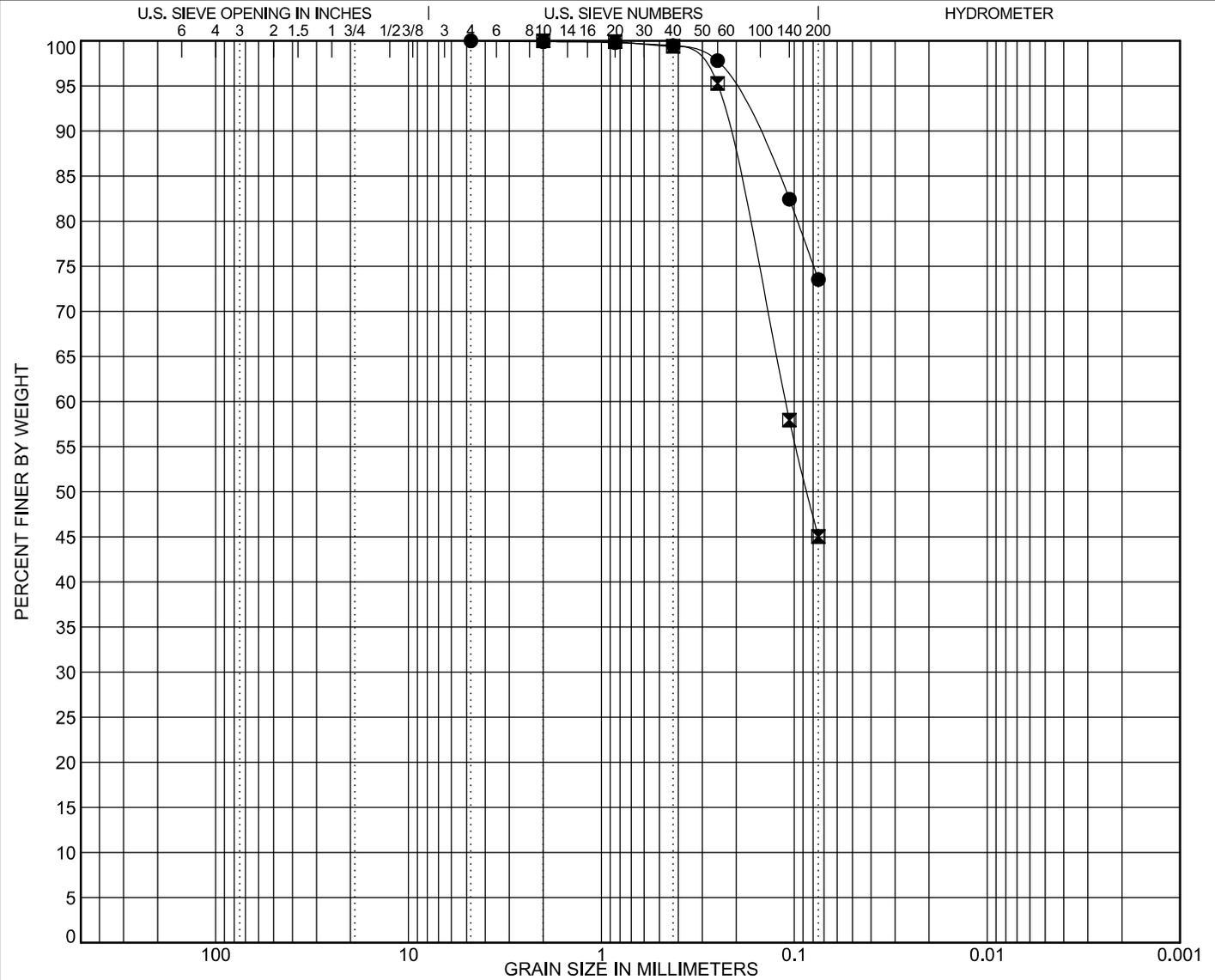
GRAIN SIZE DISTRIBUTION

CLIENT Southern Company Services

PROJECT NAME Plant Yates Piezometers

PROJECT NUMBER Z003000203

PROJECT LOCATION Newnan, GA



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
● PZ-27s	17	SILT with SAND (ML)	39	30	9		
☒ PZ-27s	27	SILTY SAND(SM-SC)	NP	NP	NP		

BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● PZ-27s	17	4.75				0.0	26.5	73.5	
☒ PZ-27s	27	2	0.111			0.0	55.0	45.0	

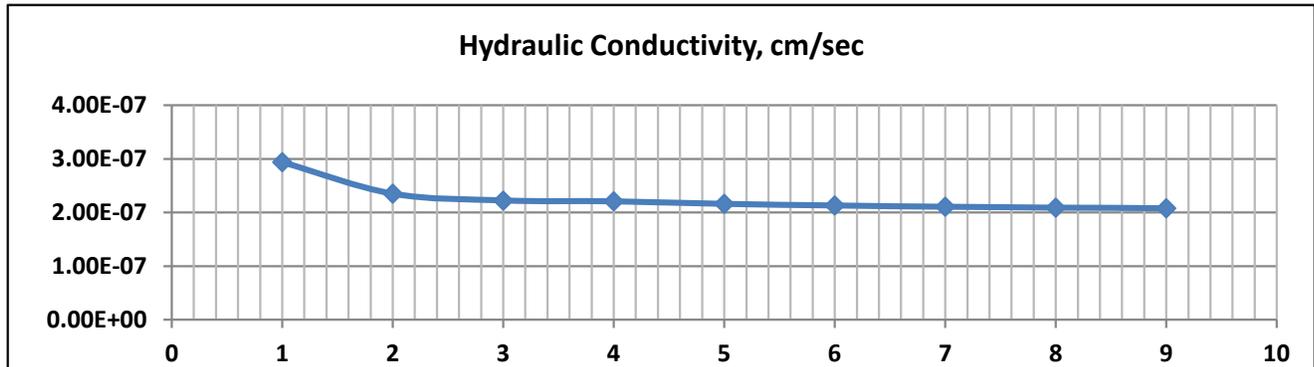
GRAIN SIZE - GINT STD US LAB.GDT - 10/27/15 11:29 - S:\TRADITIONAL\BIRMINGHAM LAB\SOUTHERN COMPANY\PLANT YATES PIEZOMETERS\GINT\PLANT YATES PIEZOMETERS.GPJ

Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter

ASTM D 5084-10

Project :	Plant Yates Piezometers	Project Number:	Z003000203
Client :	Southern Company Services, INC	Sample Number :	PZ-28S (17'-19')
Sample Location :	PZ-28S (17'-19') UD-01	Date Sampled:	No Date
Northing:	--	Easting:	--
Sample Preparation:	Shelby Tube Pushed	Permeant Liquid :	De-Aired Tap Water

Initial Sample Conditions		Initial Working Pressures, psi		Final Sample Conditions	
Wet Density, pcf	124.6	Chamber	93	Wet Density, pcf	126.0
Dry Density, pcf	100.8	Head	79	Dry Density, pcf	100.9
Moisture Content, %	23.6	Tail	77	Moisture Content, %	24.9
Void ratio, e	0.597	Conso.	15	Void ratio, e	0.594
Porosity, n	0.374	Soil Specific Gravity		Porosity, n	0.373
Saturation, Percent	102.2	Gs	2.578	Saturation, Percent	108.0
Hydraulic Gradient, i	9.9	Proctor Referenced		Hydraulic Gradient, i	9.8
Sample Length, Inches	5.606	--		Sample Length, Inches	5.584
Sample Volume, cc	568.1281	--		Sample Volume, cc	567.0091
B-value :	99.0%	Sample Consolidated During Saturation, %		0.39%	



Start Test @ t=0	Cum. Time Δ t, min.	Head Loss, Δh2 psi	Hydraulic Conductivity, k (Permeability)	
0	0.00	2.0000	cm/sec	°C
1	10.00	1.9958	2.94E-07	20
2	20.00	1.9933	2.35E-07	20
3	30.00	1.9905	2.22E-07	20
4	40.00	1.9875	2.21E-07	20
5	50.00	1.9847	2.16E-07	20
6	60.00	1.9819	2.13E-07	20
7	70.00	1.9791	2.11E-07	20
8	80.00	1.9764	2.09E-07	20
9	90.00	1.9736	2.08E-07	20

Hydraulic Conductivity, cm/sec

2.08E-07



200 Wellington Manor Court Suite 100
Alabaster, Alabama 35007



200 Wellington Court, Suite 100
 Alabaster, Alabama 35007
 Office: 205-738-8775
 Fax: 205-733-8954

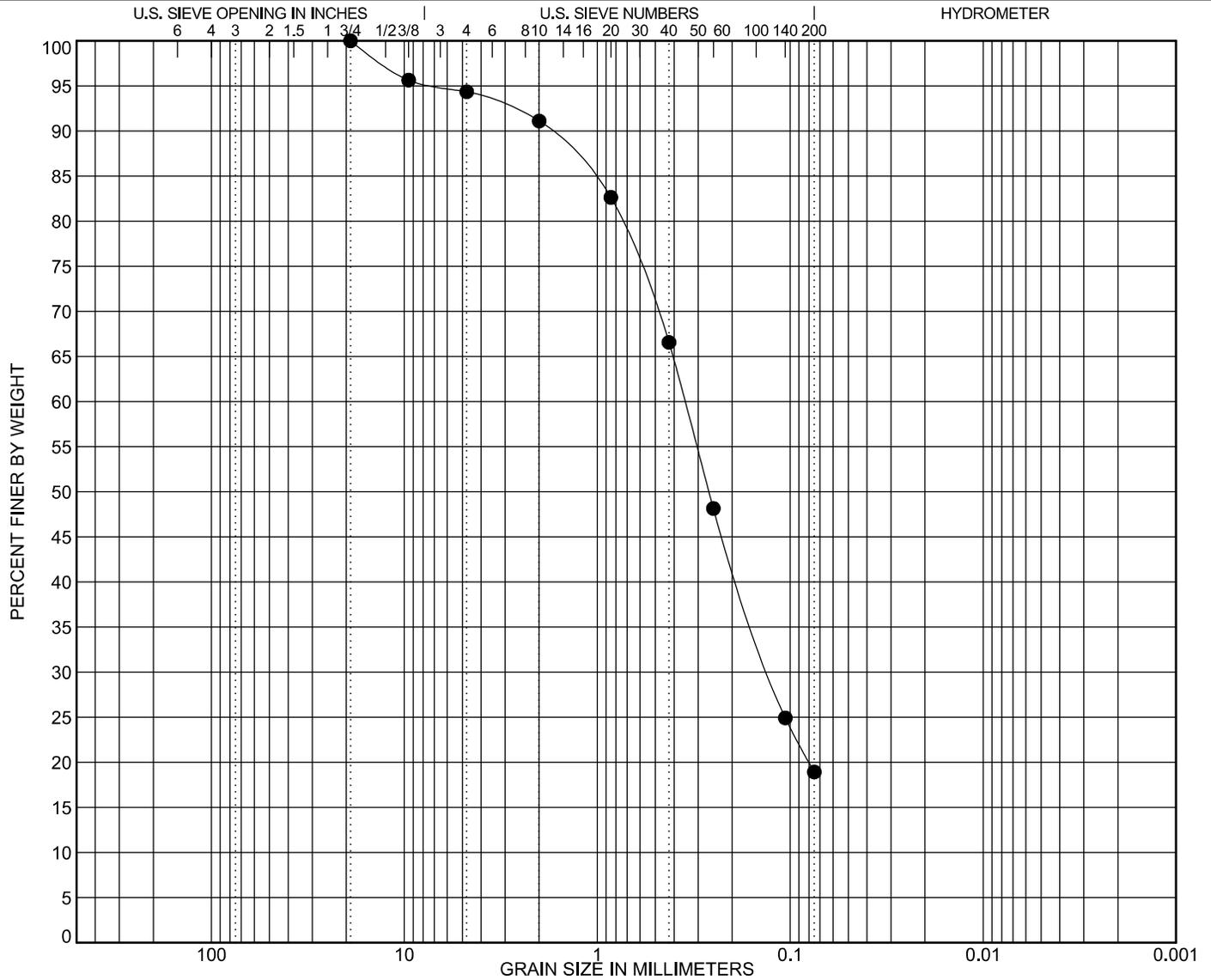
GRAIN SIZE DISTRIBUTION

CLIENT Southern Company Services

PROJECT NAME Plant Yates Piezometers

PROJECT NUMBER Z003000203

PROJECT LOCATION Newnan, GA



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
● PZ-28s	17	SILTY SAND (SM-SC)	NP	NP	NP		

BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● PZ-28s	17	19	0.352	0.128		5.7	75.4	18.9	

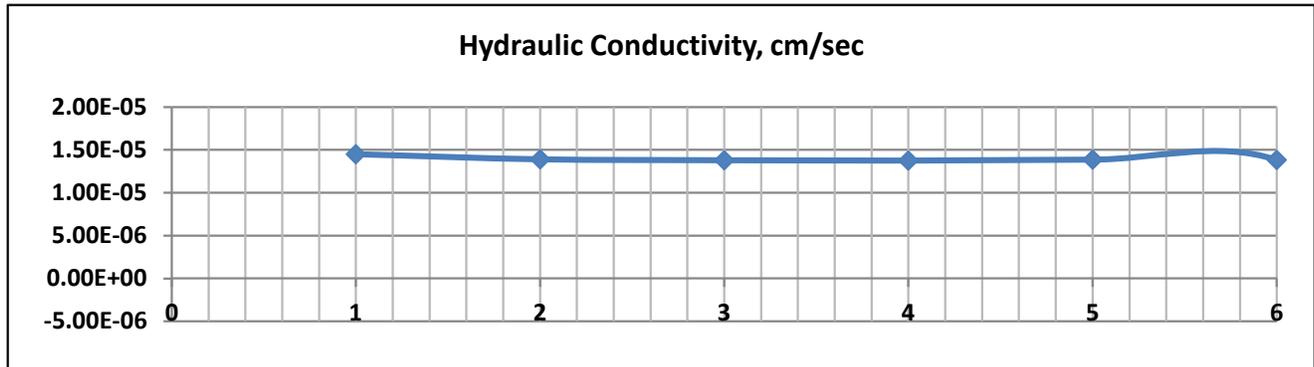
GRAIN SIZE - GINT STD US LAB.GDT - 10/27/15 11:30 - S:\TRADITIONAL\BIRMINGHAM LAB\SOUTHERN COMPANY\PLANT YATES PIEZOMETERS\GINT\PLANT YATES PIEZOMETERS.GPJ

Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter

ASTM D 5084-10

Project :	Plant Yates Piezometers	Project Number:	Z003000203
Client :	Southern Company Services, INC	Sample Number :	PZ-30S (27'-29')
Sample Location :	PZ-30S (27'-29') UD-01	Date Sampled:	09/23/15
Northing:	--	Easting:	--
Sample Preparation:	Shelby Tube Pushed	Permeant Liquid :	De-Aired Tap Water

Initial Sample Conditions		Initial Working Pressures, psi		Final Sample Conditions	
Wet Density, pcf	122.4	Chamber	101	Wet Density, pcf	124.0
Dry Density, pcf	99.7	Head	79	Dry Density, pcf	100.5
Moisture Content, %	22.7	Tail	77	Moisture Content, %	23.5
Void ratio, e	0.696	Conso.	23	Void ratio, e	0.683
Porosity, n	0.410	Soil Specific Gravity		Porosity, n	0.406
Saturation, Percent	88.5	Gs	2.710	Saturation, Percent	93.1
Hydraulic Gradient, i	10.0	Proctor Referenced		Hydraulic Gradient, i	7.5
Sample Length, Inches	5.538	--		Sample Length, Inches	5.450
Sample Volume, cc	580.1959	--		Sample Volume, cc	575.5133
B-value :	100.0%	Sample Consolidated During Saturation, %		1.59%	



Start Test @ t=0	Cum. Time Δ t, min.	Head Loss, Δh2 psi	Hydraulic Conductivity, k (Permeability)	
0	0.00	2.0000	cm/sec	°C
1	5.00	1.8985	1.45E-05	20
2	10.00	1.8098	1.39E-05	20
3	15.00	1.7236	1.38E-05	20
4	20.00	1.6410	1.38E-05	20
5	25.00	1.5596	1.38E-05	20
6	30.00	1.4842	1.38E-05	20
7	0.00			20
8	0.00			20
9	0.00			20

Hydraulic Conductivity, cm/sec

1.38E-05



200 Wellington Manor Court Suite 100
Alabaster, Alabama 35007



200 Wellington Court, Suite 100
 Alabaster, Alabama 35007
 Office: 205-738-8775
 Fax: 205-733-8954

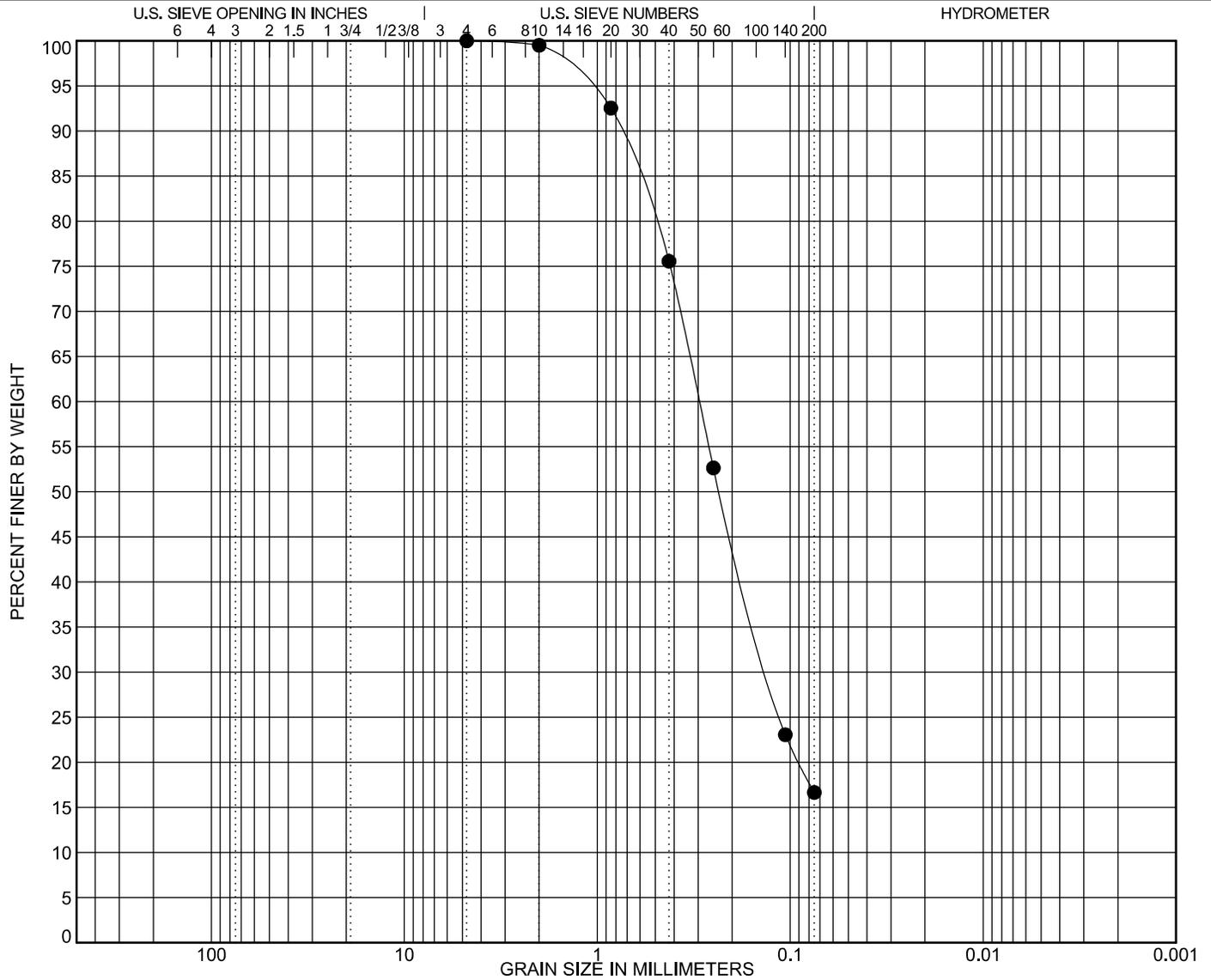
GRAIN SIZE DISTRIBUTION

CLIENT Southern Company Services

PROJECT NAME Plant Yates Piezometers

PROJECT NUMBER Z003000203

PROJECT LOCATION Newnan, GA



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
● PZ-30s	27	SILTY SAND (SM-SC)	NP	NP	NP		

BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● PZ-30s	27	4.75	0.296	0.13		0.0	83.4		16.6

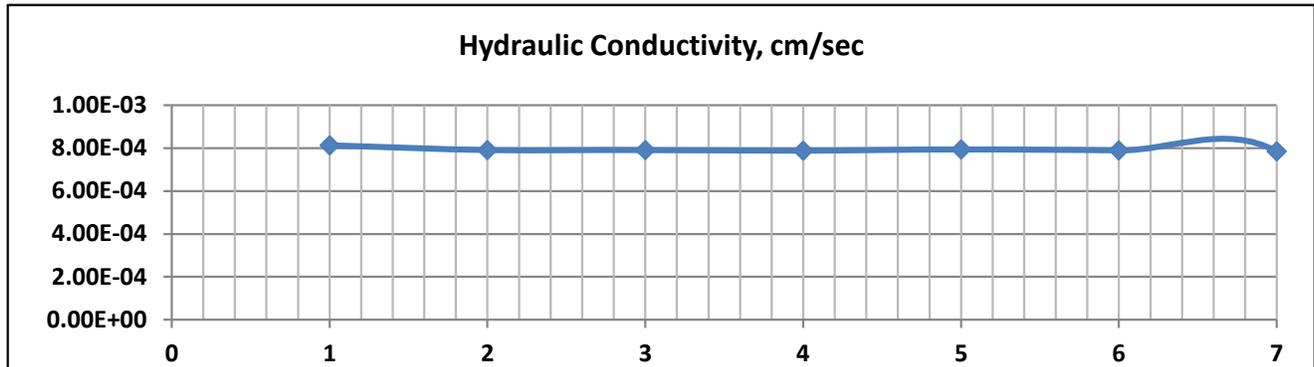
GRAIN SIZE - GINT STD US LAB.GDT - 10/27/15 11:30 - S:\TRADITIONAL\BIRMINGHAM LAB\SOUTHERN COMPANY\PLANT YATES PIEZOMETERS\GINT\PLANT YATES PIEZOMETERS.GPJ

Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter

ASTM D 5084-10

Project :	Plant Yates Piezometers	Project Number:	Z003000203
Client :	Southern Company Services, INC	Sample Number :	PZ-31S (44'-46')
Sample Location :	PZ-31S (44'-46')	Date Sampled:	09/03/15
Northing:	--	Easting:	--
Sample Preparation:	Shelby Tube Pushed	Permeant Liquid :	De-Aired Tap Water

Initial Sample Conditions		Initial Working Pressures, psi		Final Sample Conditions	
Wet Density, pcf	99.9	Chamber	83	Wet Density, pcf	108.3
Dry Density, pcf	79.1	Head	79	Dry Density, pcf	79.2
Moisture Content, %	26.3	Tail	77	Moisture Content, %	36.7
Void ratio, e	1.092	Conso.	5	Void ratio, e	1.089
Porosity, n	0.522	Soil Specific Gravity		Porosity, n	0.521
Saturation, Percent	63.8	Gs	2.653	Saturation, Percent	89.3
Hydraulic Gradient, i	9.9	Proctor Referenced		Hydraulic Gradient, i	7.2
Sample Length, Inches	5.617	--		Sample Length, Inches	5.598
Sample Volume, cc	583.669	--		Sample Volume, cc	582.6785
B-value :	98.0%	Sample Consolidated During Saturation, %		0.34%	



Start Test @ t=0	Cum. Time Δ t, min.	Head Loss, Δh2, psi	Hydraulic Conductivity, k (Permeability)	
0	0.00	2.0000	cm/sec	°C
1	0.08	1.9099	8.14E-04	20
2	0.17	1.8284	7.92E-04	20
3	0.25	1.7484	7.92E-04	20
4	0.33	1.6727	7.89E-04	20
5	0.42	1.5971	7.95E-04	20
6	0.50	1.5290	7.90E-04	20
7	0.58	1.4653	7.85E-04	20
8	0.67			20
9	0.75			20

Hydraulic Conductivity, cm/sec

7.85E-04



200 Wellington Manor Court Suite 100
Alabaster, Alabama 35007



200 Wellington Court, Suite 100
 Alabaster, Alabama 35007
 Office: 205-738-8775
 Fax: 205-733-8954

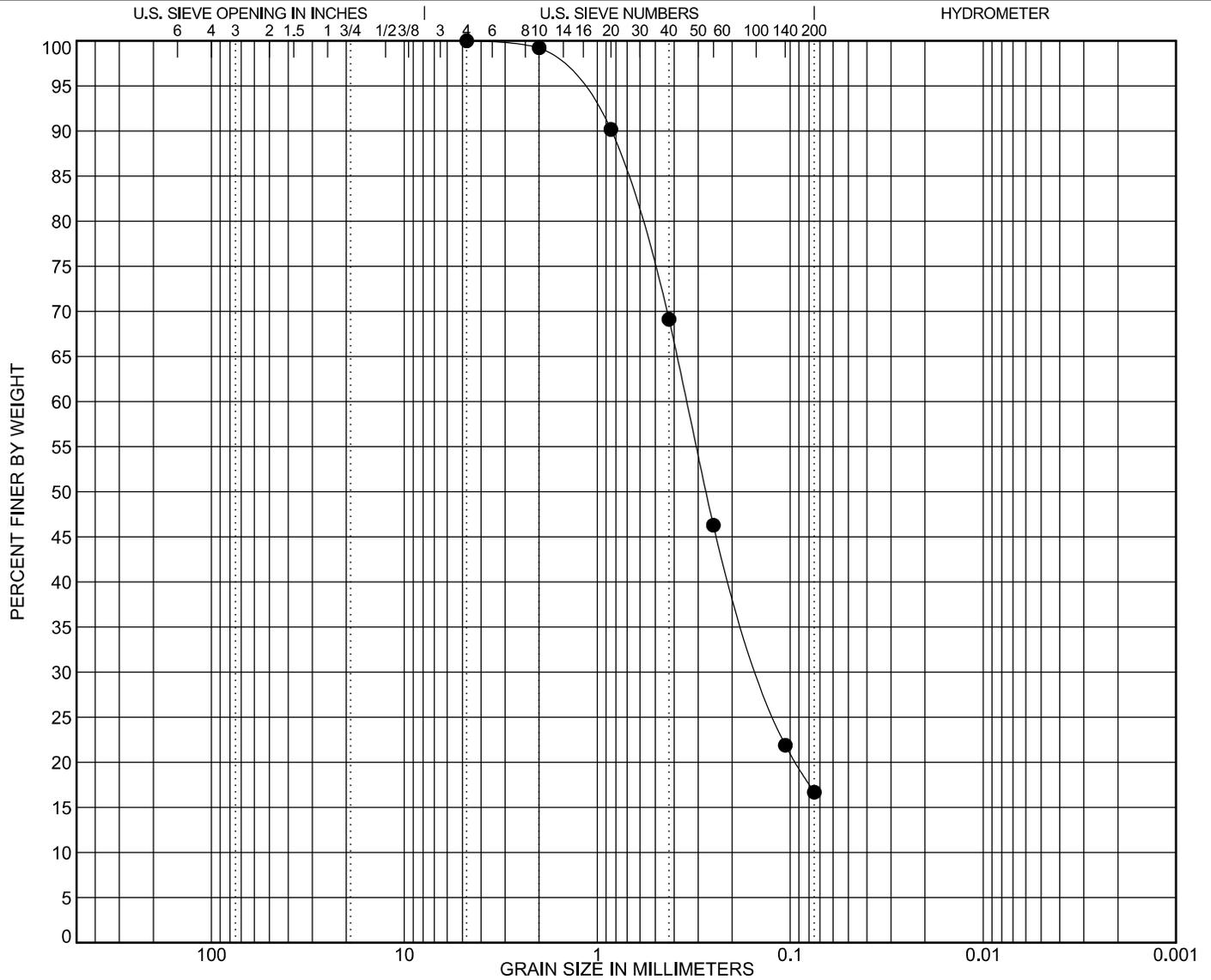
GRAIN SIZE DISTRIBUTION

CLIENT Southern Company Services

PROJECT NAME Plant Yates Piezometers

PROJECT NUMBER Z003000203

PROJECT LOCATION Newnan, GA



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
● PZ-31s	7	SILTY SAND (SM-SC)	NP	NP	NP		

BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● PZ-31s	7	4.75	0.344	0.141		0.0	83.3	16.7	

GRAIN SIZE - GINT STD US LAB.GDT - 10/27/15 11:30 - S:\TRADITIONAL\BIRMINGHAM LAB\SOUTHERN COMPANY\PLANT YATES PIEZOMETERS\GINT\PLANT YATES PIEZOMETERS.GPJ

**APPENDIX C. BORING LOGS, WELL CONSTRUCTION DIAGRAMS, EPD
BOND CONTINUATION CERTIFICATES, AND SURVEY
DATA**

The well coordinates and elevation data were revised based on a June 2020 survey (Arcadis, June 29, 2020).

SOUTHERN COMPANY Energy to Serve Your World™		DRILLING LOG GEOLOGICAL SERVICE			Hole No.	GWA-2			
Sheet 1 of 2									
SITE Plant Yates				HOLE DEPTH	49.5	SURF.ELEV.	803.1		
LOCATION Gypsum Stacking Area				COORDINATES N	1,261,383.11	E	2,073,509.98		
ANGLE	0	BEARING	0	CONTRACTOR	SCS, Inc.	DRILL NO.			
DRILLING METHOD		HAS/SS -31' Rock core-49.5'		NO. SAMPLES	6	NO. U.D. SAMPLES	0		
CASING SIZE	6"	LENGTH		CORE SIZE	2"	TOTAL % REC.			
WATER TABLE DEPTH		37.6	ELEV.	767.71	TIME AFTER COMP.	0	DATE TAKEN	4/17/2007	
TYPE GROUT		Portland Type I/II		QUANTITY	18 gallons	MIX	6 gal:94 lbs	DRILLING START DATE	4/16/2007
DRILLER	Shawn Milan	RECORDER	Lea Millet	APPROVED		DRILLING COMP. DATE	4/17/2007		
Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Penetration Test			Sample No.	Comments	
				From To	Blows	N			
	0	803.1							
	1	802.1							
	2	801.1							
	3	800.1							
	4	799.1							
	5	798.1	Orange and tan silty CLAY, dry, black mottling, high mica content	4.5-6.0	2/5/6	11		50%	
	6	797.1							
	7	796.1							
	8	795.1							
	9	794.1							
	10	793.1	As above	9.5-11.0	4/4/5	9		40%	
	11	792.1							
	12	791.1							
	13	790.1							
	14	789.1							
	15	788.1	As above - last 3" starting into saprolite	14.5-16.0	3/5/7	12		50%	
	16	787.1							
	17	786.1							
	18	785.1							
	19	784.1							
	20	783.1	Orange gneissic saprolite with mica, dry, weathered feldspar pebbles	19.5-21.0	4/3/8	11		50%	
	21	782.1							
	22	781.1							
	23	780.1							
	24	779.1							

SITE **Plant Yates** TOTAL DEPTH **49.5** SURF. ELEV. **805.31**

Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Penetration Test			Sample No.	Comments					
				From To	Blows	N							
	25	778.1	As above, no pebbles	24.5-26.0	4/4/50-3	R							
	26	777.1											
	27	776.1											
	28	775.1											
	29	774.1											
	30	773.1	Granular gneissic saprolite	29.5-31.0	50-3	R		20					
	31	772.1	32' - Top of Rock										
	32	771.1	Black & white schist, verging on gneiss - chlorite, biotite, white minerals	32-40 7.9/8									
	33	770.1	Fracture with iron staining, chlorite/biotite schist										
	34	769.1	33.7-Fracture with iron staining Fracture with pyrite										
	35	768.1	Schist verging on gneiss, iron staining, small amount pyrite										
	36	767.1	Chlorite/biotite schist, iron staining, light clay rind										
	37	766.1	36.9-Iron staining in fracture Fracture with clay rind										
	38	765.1	37.1-Clay rind with minimal pyrite Visible amphibole										
	39	764.1	Pyrite crystal, high chlorite content										
	40	763.1	Abundant pyrite						40-45 4.8/5				
	41	762.1	Thin clay rind										
	42	761.1											
	43	760.1	42.7-High chlorite content, heavier clay rind Gneissic with visible biotite books, chlorite, pyrite, thin clay rind	45-50 4/5									
	44	759.1											
	45	758.1	Chlorite/biotite schist, pyrite, thin clay rind										
	46	757.1	Visible amphibole										
	47	756.1	Gneissic, visible biotite, pyrite										
	48	755.1	Schistic, visible amphibole, clay rind										
	49	754.1	48.1-Heavy clay rind										
	50	753.1	49.5- Bottom of Boring										
	51												
	52												
	53												
	54												
	55												
	56												

SOUTHERN COMPANY SERVICES, INC.

WELL CONSTRUCTION LOG

PROJECT Background well installation

WELL NO.

SITE Plant Yates

LOCATION Gypsum Stacking Area

DATE STARTED 4/17/2007

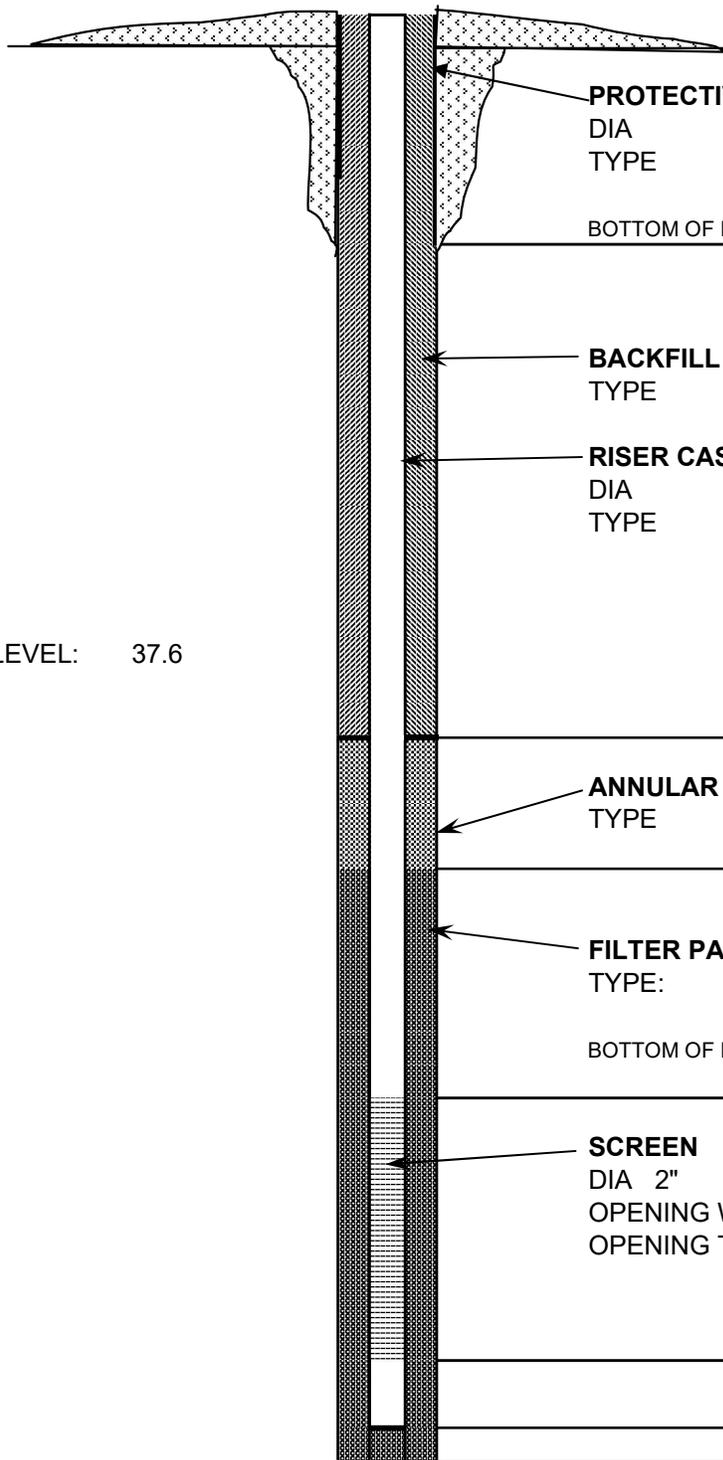
ENDED 4/17/2007

PREPARED L. Millet

GWA-2

		DEPTH	ELEVATION
GROUND SURFACE		0	803.1
PROTECTIVE CASING DIA 4" TYPE Sch 40 PVC			
BOTTOM OF PROTECTIVE CASING		2	801.1
BACKFILL MATERIAL TYPE Portland Type I/II			
RISER CASING DIA 2" TYPE Sch 40 PVC			
TOP OF SEAL		35.3	767.8
ANNULAR SEAL TYPE Bentonite TOP OF FILTER PACK		37.3	765.8
FILTER PACK TYPE: Grade 1A Filter Sand BOTTOM OF RISER/ TOP OF SCREEN		39.3	763.8
SCREEN DIA 2" TYPE Sch 40 PVC OPENING WIDTH 0.01 OPENING TYPE Slot BOTTOM OF SCREEN		49.3	753.8
BOTTOM OF CASING		49.3	753.8
BOTTOM OF HOLE		49.5	753.6
HOLE DIA: 6"			

WATER LEVEL: 37.6



The well coordinates and elevation data were revised based on a June 2020 survey (Arcadis, June 29, 2020).

		DRILLING LOG			Hole No. GWC-1R				
		GEOLOGICAL SERVICES			Sheet 1 of 2				
SITE Georgia Power Company Plant Yates				HOLE DEPTH 33.6	SURF.ELEV. 770.50				
LOCATION Gypsum Facility		COORDINATES N 1261869.77 E 2073279.85							
ANGLE 0	BEARING 0	CONTRACTOR SCS, Inc.	DRILL NO. CME 550						
DRILLING METHOD HSA		NO. SAMPLES 6	NO. U.D. SAMPLES 0						
WATER TABLE DEPTH 24' bgs		ELEV. 746.47	TIME AFTER COMP. 1 hour	DATE TAKEN 5/12/2011					
TYPE GROUT NA		QUANTITY NA	MIX NA	DRILLING START DATE 5/12/2011					
DRILLER S. Milam	RECORDER C. Sellars	APPROVED D. Brooks	DRILLING COMP. DATE 5/12/2011						
Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD
				From To	Blows	N			
0	770.50								
1	769.50								
2	768.50								
3	767.50								
4	766.50								
5	765.50	SILT, Clayey; reddish brown; dry	1	4.5-6	4-7-6	13			
6	764.50								
7	763.50								
8	762.50								
9	761.50								
10	760.50	CLAY, Silty; red; micaceous; damp	2	9.5-11	3-3-3	6			
11	759.50								
12	758.50								
13	757.50								
14	756.50								
15	755.50	SAA	3	14.5-16	2-3-4	7			
16	754.50								
17	753.50								
18	752.50								
19	751.50								
20	750.50	SAND, Clayey; light brown; moist; micaceous; medium grained sand with feldspar and quartz pebbles	4	19.5-21	15-39-50/3	50+			
21	749.50								
22	748.50								
23	747.50								
24	746.50								



DRILLING LOG
GEOLOGICAL SERVICES

Hole No. GWC-1R

Sheet 2 of 2

SITE Georgia Power Company Plant Yates TOTAL DEPTH 33.6 SURF.ELEV. 770.5

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD
				From To	Blows	N			
25	745.50	SAND, Clayey; light brown; wet; micaceous; medium grained sand with feldspar and quartz pebbles	5	24.5-26	25-50/3	50+			
26	744.50								
27	743.50								
28	742.50								
29	741.50								
30	740.50	SAA	6	29.5-31	16-50/4	50+			
31	739.50								
32	738.50								
33	737.50								
34	736.50								
35	735.50	BOH @ 33.6' bgs							
36	734.50								
37	733.50								
38	732.50								
39	731.50								
40	730.50								
41	729.50								
42	728.50								
43	727.50								
44	726.50								
45	725.50								
46	724.50								
47	723.50								
48	722.50								
49	721.50								
50	720.50								
51	719.50								
52	718.50								
53	717.50								
54	716.50								
55	715.50								

WELL CONSTRUCTION LOG

Southern Company Generation

PROJECT: Plant Yates	DRILLING CO.: SCS, Inc.	WELL NAME
	DRILLER: S. Milam	
LOCATION: Gypsum Stack	RIG TYPE: CME550	
LOGGER: C. Sellers	DRILLING METHODS: HSA	GWC-1R
DATE CONSTRUCTED: 5/12/2011		

	DEPTH FEET	ELEVATION FT, MSL
Locking Hinged Top 1/4-inch Vent 1/4-inch Weep Hole 4-ft x 4-ft x 4" concrete pad 2" Threaded Riser Cap Pea Gravel in annular space TOP OF RISER	2.77	773.27
GROUND SURFACE 0.00 770.5	0.00	770.5
PROTECTIVE CASING SIZE: 4-inch round TYPE: PVC BOTTOM OF PROTECTIVE CASING		
BACKFILL MATERIAL TYPE: Portland Cement Grout AMOUNT: 50 gal RISER CASING DIA: 2-inch TYPE: Schedule 40 PVC JOINT TYPE: Flush Threaded TOP OF SEAL	18.90	751.6
ANNULAR SEAL TYPE: 3/8-inch bentonite pellets Sur-plug 5 gal buckets AMOUNT: 1 bucket PLACEMENT: Tremie TOP OF FILTER PACK	22.00	748.5
FILTER PACK TYPE: DSI Sand - #1A Drillers Services, Inc. 0.5 cubic foot bags AMOUNT: 8.5 bags PLACEMENT: Tremie; wash with water BOTTOM OF RISER / TOP OF SCREEN	23.30	747.2
SCREEN DIA: 3.75" outer, 2" inner TYPE: ASTM-NSF Schedule 40 PVC Pre-Pac OPENING WIDTH: 0.01-inch OPENING TYPE: Slotted SLOT SPACING: 0.25-inch SLOT LENGTH: 1.5-inch BOTTOM OF SCREEN	33.30	737.2
BOTTOM OF CASING	33.60	736.9
HOLE DIA: 8"		

▼ El. 746.47
5/12/2011 at time of completion

The well coordinates and elevation data were revised based on a June 2020 survey (Arcadis, June 29, 2020).

	DRILLING LOG				Hole No. GWC-2R
	GEOLOGICAL SERVICES				Sheet 1 of 2
SITE Georgia Power Company Plant Yates		HOLE DEPTH 42.2	SURF.ELEV. 766.80		
LOCATION Gypsum Facility		COORDINATES N 1261942.15	E 2072755.92		
ANGLE 0	BEARING 0	CONTRACTOR SCS, Inc.	DRILL NO. CME500		
DRILLING METHOD HSA		NO. SAMPLES 4	NO. U.D. SAMPLES 0		
WATER TABLE DEPTH _____		ELEV. _____	TIME AFTER COMP. _____		DATE TAKEN _____
TYPE GROUT _____		QUANTITY _____	MIX _____	DRILLING START DATE 10/19/2010	
DRILLER S. Milam		RECORDER L. Millet	APPROVED _____	DRILLING COMP. DATE 10/19/2010	

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD
				From	To	Blows			
0	766.80	Reddish orange silty SAND, dry, loose, very fine grained					Logged from auger cuttings to 25' bgs		
1	765.80								
2	764.80								
3	763.80								
4	762.80								
5	761.80								
6	760.80								
7	759.80								
8	758.80								
9	757.80								
10	756.80	Light orange clayey SILT, dry, loose, white nodules							
11	755.80								
12	754.80								
13	753.80								
14	752.80	Light brown clayey SILT, dry, loose, with pebbles							
15	751.80								
16	750.80								
17	749.80								
18	748.80								
19	747.80								
20	746.80								
21	745.80								
22	744.80	As above, with trace mica							
23	743.80								
24	742.80								

DRILLING LOG
GEOLOGICAL SERVICES

Hole No. GWC-2R

Sheet 2 of 2

SITE **Georgia Power Company Plant Yates** TOTAL DEPTH **42.2** SURF.ELEV. **766.8**

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD
				From	To	Blows			
25	741.80	Light tan silty SAND, moist, occasional black speckling, trace mica		25-26.5					
26	740.80								
27	739.80								
28	738.80								
29	737.80								
30	736.80	Tan and white silty SAND, as above		30-31.5					
31	735.80								
32	734.80								
33	733.80								
34	732.80								
35	731.80	Brown and white silty SAND, moist, occasional dark brown mottling		35-36.5					
36	730.80								
37	729.80								
38	728.80								
39	727.80								
40	726.80	Light tan SAND, moist, occasional brown mottling, pieces of heavily weathered schist		40-41.5					
41	725.80								
42	724.80								
43	723.80								
44	722.80								
45	721.80								
46	720.80								
47	719.80								
48	718.80								
49	717.80								
50	716.80								
51	715.80								
52	714.80								
53	713.80								
54	712.80								
55	711.80								

WELL CONSTRUCTION LOG

Southern Company Generation

PROJECT: Plant Yates	DRILLING CO.: SCS, Inc.	WELL NAME
LOCATION: Gypsum Stack	DRILLER: S. Milam	
LOGGER: L. Millet	RIG TYPE: CME550	
DATE CONSTRUCTED: 10/19/2010	DRILLING METHODS: HSA	GWC-2R

	DEPTH FEET	ELEVATION FT, MSL
Locking Hinged Top 1/4-inch Vent 1/4-inch Weep Hole 6-ft x 6-ft x 4" concrete pad 2" Threaded Riser Cap Pea Gravel in annular space TOP OF RISER	-2.96	769.76
GROUND SURFACE PROTECTIVE CASING SIZE: 4-inch round TYPE: PVC BOTTOM OF PROTECTIVE CASING	0.00	766.80
BACKFILL MATERIAL TYPE: Portland Cement Grout AMOUNT: 30 gal RISER CASING DIA: 2-inch TYPE: Schedule 40 PVC JOINT TYPE: Flush Threaded TOP OF SEAL	26.74	740.06
ANNULAR SEAL TYPE: 3/8-inch bentonite pellets Sur-plug 5 gal buckets AMOUNT: 3/4 bucket PLACEMENT: Tremie TOP OF FILTER PACK	28.74	738.06
FILTER PACK TYPE: DSI Sand - #1A Drillers Services, Inc. 0.5 cubic foot bags AMOUNT: 8 bags PLACEMENT: Tremie; wash with water BOTTOM OF RISER / TOP OF SCREEN	30.74	736.06
SCREEN DIA: 2-inch TYPE: ASTM-NSF Schedule 40 PVC OPENING WIDTH: 0.01-inch OPENING TYPE: Slotted SLOT SPACING: 0.25-inch SLOT LENGTH: 1.5-inch BOTTOM OF SCREEN	40.74	726.06
BOTTOM OF CASING	41.04	725.76

▼ El. 740.31
10/29/2010

HOLE DIA: 8"

The well coordinates and elevation data were revised based on a June 2020 survey (Arcadis, June 29, 2020).

	DRILLING LOG				Hole No. GWC-3R
	GEOLOGICAL SERVICES				Sheet 1 of 2
SITE Georgia Power Company Plant Yates		HOLE DEPTH 35.4	SURF.ELEV. 772.20		
LOCATION Gypsum Facility		COORDINATES N 1261647.1	E 2072841.28		
ANGLE 0	BEARING 0	CONTRACTOR SCS, Inc.	DRILL NO. CME 550		
DRILLING METHOD HSA		NO. SAMPLES 7	NO. U.D. SAMPLES 0		
WATER TABLE DEPTH 26.45' bgs		ELEV. 745.88	TIME AFTER COMP. 24 hours	DATE TAKEN 5/12/2011	
TYPE GROUT NA		QUANTITY NA	MIX NA	DRILLING START DATE 5/11/2011	
DRILLER S. Milam	RECORDER C. Sellars	APPROVED D. Brooks	DRILLING COMP. DATE 5/11/2011		

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD
				From To	Blows	N			
0	772.20								
1	771.20								
2	770.20								
3	769.20								
4	768.20								
5	767.20	SAND, Clayey; red; dry; micaceous; fine to medium grained	1	4.5-6	2-3-2	5			
6	766.20								
7	765.20								
8	764.20								
9	763.20								
10	762.20	CLAY, Sandy; yellowish red; micaceous; damp	2	9.5-11	3-3-4	7			
11	761.20								
12	760.20								
13	759.20								
14	758.20								
15	757.20	SAA	3	14.5-16	5-4-4	8			
16	756.20								
17	755.20								
18	754.20								
19	753.20								
20	752.20	SAND, Silty; tan; moist; micaceous; fine grained sand with feldspar and quartz pebbles	4	19.5-21	3-3-5	8			
21	751.20								
22	750.20								
23	749.20								
24	748.20								



DRILLING LOG
GEOLOGICAL SERVICES

Hole No. GWC-3R

Sheet 2 of 2

SITE Georgia Power Company Plant Yates TOTAL DEPTH 35.4 SURF.ELEV. 772.2

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD
				From To	Blows	N			
25	747.20	SAND, Clayey; light brown; wet; micaceous; medium grained sand with feldspar and quartz pebbles	5	24.5-26	4-5-7	12			
26	746.20								
27	745.20								
28	744.20								
29	743.20								
30	742.20	SAA	6	29.5-31	21-50/4	50+			
31	741.20								
32	740.20								
33	739.20								
34	738.20								
35	737.20	SAA BOH at 35.40' bgs	7	34.5-36	50/2	50+			
36	736.20								
37	735.20								
38	734.20								
39	733.20								
40	732.20								
41	731.20								
42	730.20								
43	729.20								
44	728.20								
45	727.20								
46	726.20								
47	725.20								
48	724.20								
49	723.20								
50	722.20								
51	721.20								
52	720.20								
53	719.20								
54	718.20								
55	717.20								

WELL CONSTRUCTION LOG

Southern Company Generation

PROJECT: Plant Yates	DRILLING CO.: SCS, Inc.	WELL NAME
	DRILLER: S. Milam	
LOCATION: Gypsum Stack	RIG TYPE: CME550	
LOGGER: C. Sellers	DRILLING METHODS: HSA	GWC-3R
DATE CONSTRUCTED: 5/11/2011		

	DEPTH FEET	ELEVATION FT, MSL
<p>Locking Hinged Top</p> <p>1/4-inch Vent</p> <p>1/4-inch Weep Hole</p> <p>4-ft x 4-ft x 4" concrete pad</p> <p>2" Threaded Riser Cap</p> <p>Pea Gravel in annular space</p> <p>PROTECTIVE CASING SIZE: 4-inch round TYPE: PVC</p> <p>BACKFILL MATERIAL TYPE: Portland Cement Grout AMOUNT: 50 gal</p> <p>RISER CASING DIA: 2-inch TYPE: Schedule 40 PVC JOINT TYPE: Flush Threaded</p> <p>ANNULAR SEAL TYPE: 3/8-inch bentonite pellets Sur-plug 5 gal buckets AMOUNT: 1 bucket PLACEMENT: Tremie</p> <p>FILTER PACK TYPE: DSI Sand - #1A Drillers Services, Inc. 0.5 cubic foot bags AMOUNT: 8 bags PLACEMENT: Tremie; wash with water</p> <p>SCREEN DIA: 3.75" outer, 2" inner TYPE: ASTM-NSF Schedule 40 PVC Pre-Pac OPENING WIDTH: 0.01-inch OPENING TYPE: Slotted SLOT SPACING: 0.25-inch SLOT LENGTH: 1.5-inch</p> <p>HOLE DIA: 8"</p>	<p>TOP OF RISER</p> <p>GROUND SURFACE</p> <p>BOTTOM OF PROTECTIVE CASING</p> <p>TOP OF SEAL</p> <p>TOP OF FILTER PACK</p> <p>BOTTOM OF RISER / TOP OF SCREEN</p> <p>BOTTOM OF SCREEN</p> <p>BOTTOM OF CASING</p>	<p>2.95</p> <p>0.00</p> <p>772.25</p> <p>772.2</p> <p>20.00</p> <p>752.20</p> <p>23.20</p> <p>749.0</p> <p>25.10</p> <p>747.10</p> <p>35.10</p> <p>737.10</p> <p>35.40</p> <p>736.80</p>

▼ El. 745.88
5/12/2011 24 hours after construction

The well coordinates and elevation data were revised based on a June 2020 survey (Arcadis, June 29, 2020).

SOUTHERN COMPANY Energy to Serve Your World™		DRILLING LOG GEOLOGICAL SERVICES				Hole No.	GWC-4R		
						Sheet	1	of	2
SITE		Georgia Power Company Plant Yates			HOLE DEPTH	29	SURF.ELEV.	754.6	
LOCATION		Gypsum Facility		COORDINATES	N 1262046.56	E	2072841.28		
ANGLE	0	BEARING	0	CONTRACTOR	SCS, Inc.		DRILL NO.	CME500	
DRILLING METHOD	HSA		NO. SAMPLES	3	NO. U.D. SAMPLES	0			
WATER TABLE DEPTH		ELEV.	TIME AFTER COMP.	DATE TAKEN					
TYPE GROUT		QUANTITY	MIX	DRILLING START DATE		10/20/2010			
DRILLER	S. Milam	RECORDER	L. Millet	APPROVED	DRILLING COMP. DATE		10/20/2010		
Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD
				From	To	Blows			
0	754.6	Dark brown silty CLAY, moist, plastic, trace mica					Logged from auger cuttings to 15' bgs		
1	753.6								
2	752.6								
3	751.6								
4	750.6								
5	749.6								
6	748.6								
7	747.6								
8	746.6								
9	745.6								
10	744.6	As above							
11	743.6								
12	742.46								
13	741.6								
14	740.6								
15	739.6	Orange and white clayey SILT, moist, black mottling, with mica, trace sand		15-16.5					
16	738.6								
17	737.6								
18	736.6								
19	735.6								
20	734.6	As above		20-21.5					
21	733.6								
22	732.6								
23	731.6								
24	730.6								



DRILLING LOG

GEOLOGICAL SERVICES

Hole No. GWC-4R

Sheet 2 of 2

SITE Georgia Power Company Plant Yates TOTAL DEPTH 29 SURF.ELEV. 754.6

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD
				From	To	Blows			
25	729.6	Light brown and white silty SAND, moist, very fine to fine grained, with mica, brown mottling		25	26.5				
26	728.6								
27	727.6								
28	726.6								
29	725.6		Top of rock						
30	724.6	29' - Bottom of boring							
31	723.6								
32	722.6								
33	721.6								
34	720.6								
35	719.6								
36	718.6								
37	717.6								
38	716.6								
39	715.6								
40	714.6								
41	713.6								
42	712.6								
43	711.6								
44	710.6								
45	709.6								
46	708.6								
47	707.6								
48	706.6								
49	705.6								
50	704.6								
51	703.6								
52	702.6								
53	701.6								
54	700.6								
55	699.6								

WELL CONSTRUCTION LOG

Southern Company Generation

PROJECT: Plant Yates	DRILLING CO.: SCS, Inc.	WELL NAME
LOCATION: Gypsum Stack	DRILLER: S. Milam	
LOGGER: L. Millet	RIG TYPE: CME550	
DATE CONSTRUCTED: 10/20/2010	DRILLING METHODS: HSA	GWC-4R

	DEPTH FEET	ELEVATION FT, MSL
Locking Hinged Top 1/4-inch Vent 1/4-inch Weep Hole 4-ft x 4-ft x 4" concrete pad 2" Threaded Riser Cap Pea Gravel in annular space TOP OF RISER	-2.88	757.48
GROUND SURFACE PROTECTIVE CASING SIZE: 4-inch round TYPE: Anodized Aluminum BOTTOM OF PROTECTIVE CASING	0.00	754.60
BACKFILL MATERIAL TYPE: Portland Cement Grout AMOUNT: 12.5 gal RISER CASING DIA: 2-inch TYPE: Schedule 40 PVC JOINT TYPE: Flush Threaded TOP OF SEAL	13.02	741.58
ANNULAR SEAL TYPE: 3/8-inch bentonite pellets Sur-plug 5 gal buckets AMOUNT: 3/4 bucket PLACEMENT: Tremie TOP OF FILTER PACK	15.02	739.58
FILTER PACK TYPE: DSI Sand - #1A Drillers Services, Inc. 0.5 cubic foot bags AMOUNT: 8 bags PLACEMENT: Tremie; wash with water BOTTOM OF RISER / TOP OF SCREEN	17.02	737.58
SCREEN DIA: 2-inch TYPE: ASTM-NSF Schedule 40 PVC OPENING WIDTH: 0.01-inch OPENING TYPE: Slotted SLOT SPACING: 0.25-inch SLOT LENGTH: 1.5-inch BOTTOM OF SCREEN	27.02	727.58
BOTTOM OF CASING	27.32	727.28

▼ El. 739.81
7/16/2010

HOLE DIA: 8"

The well coordinates and elevation data were revised based on a June 2020 survey (Arcadis, June 29, 2020).

	DRILLING LOG				Hole No. GWC-5R
	GEOLOGICAL SERVICES				Sheet 1 of 2
SITE Georgia Power Company Plant Yates		HOLE DEPTH 39.9	SURF.ELEV. 780.00		
LOCATION Gypsum Facility		COORDINATES N 1261439.91	E 2073027.56		
ANGLE 0	BEARING 0	CONTRACTOR SCS, Inc.	DRILL NO. CME 550		
DRILLING METHOD HSA		NO. SAMPLES 7	NO. U.D. SAMPLES 0		
WATER TABLE DEPTH 29.2' bgs		ELEV. 750.47	TIME AFTER COMP. 24 hours	DATE TAKEN 5/12/2011	
TYPE GROUT NA		QUANTITY NA	MIX NA	DRILLING START DATE 5/11/2011	
DRILLER S. Milam	RECORDER C. Sellars	APPROVED D. Brooks	DRILLING COMP. DATE 5/11/2011		

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD
				From To	Blows	N			
0	780.00								
1	779.00								
2	778.00								
3	777.00								
4	776.00								
5	775.00	SAND, Clayey; red; dry; micaceous; fine to medium grained	1	4.5-6	2-2-3	5			
6	774.00								
7	773.00								
8	772.00								
9	771.00								
10	770.00	SAND, Silty; tan; damp; micaceous; fine grained	2	9.5-11	6-12-10	22			
11	769.00								
12	768.00								
13	767.00								
14	766.00								
15	765.00	SAA	3	14.5-16	7-22-25	47			
16	764.00								
17	763.00								
18	762.00								
19	761.00								
20	760.00	SAA	4	19.5-21	6-9-11	20			
21	759.00								
22	758.00								
23	757.00								
24	756.00								



DRILLING LOG
GEOLOGICAL SERVICES

Hole No. GWC-5R

Sheet 2 of 2

SITE Georgia Power Company Plant Yates TOTAL DEPTH 39.9 SURF.ELEV. 780

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD
				From To	Blows	N			
25	755.00	SAND, Clayey; tan; moist; micaceous; medium grained sand with feldspar and quartz pebbles	5	24.5-26	7-8-9	17			
26	754.00								
27	753.00								
28	752.00								
29	751.00								
30	750.00	SAA except wet	6	29.5-31	8-12-24	36			
31	749.00								
32	748.00								
33	747.00								
34	746.00								
35	745.00								
36	744.00								
37	743.00	SAA	7	34.5-36	22-34-50/2	50+			
38	742.00								
39	741.00								
40	740.00								
41	739.00								
42	738.00								
43	737.00								
44	736.00								
45	735.00								
46	734.00								
47	733.00								
48	732.00								
49	731.00								
50	730.00								
51	729.00								
52	728.00								
53	727.00								
54	726.00								
55	725.00								
		BOH at 39.90' bgs							

WELL CONSTRUCTION LOG

Southern Company Generation

PROJECT: Plant Yates	DRILLING CO.: SCS, Inc.	WELL NAME
	DRILLER: S. Milam	
LOCATION: Gypsum Stack	RIG TYPE: CME550	
LOGGER: C. Sellers	DRILLING METHODS: HSA	GWC-5R
DATE CONSTRUCTED: 5/11/2011		

	DEPTH FEET	ELEVATION FT, MSL
Locking Hinged Top 1/4-inch Vent 1/4-inch Weep Hole 4-ft x 4-ft x 4" concrete pad 2" Threaded Riser Cap Pea Gravel in annular space TOP OF RISER	2.87	782.45
GROUND SURFACE PROTECTIVE CASING SIZE: 4-inch round TYPE: PVC BOTTOM OF PROTECTIVE CASING	0.00	778.0
BACKFILL MATERIAL TYPE: Portland Cement Grout AMOUNT: 65 gal RISER CASING DIA: 2-inch TYPE: Schedule 40 PVC JOINT TYPE: Flush Threaded TOP OF SEAL	24.20	755.50
ANNULAR SEAL TYPE: 3/8-inch bentonite pellets Sur-plug 5 gal buckets AMOUNT: 1 bucket PLACEMENT: Tremie TOP OF FILTER PACK	28.00	751.70
FILTER PACK TYPE: DSI Sand - #1A Drillers Services, Inc. 0.5 cubic foot bags AMOUNT: 8.5 bags PLACEMENT: Tremie; wash with water BOTTOM OF RISER / TOP OF SCREEN	29.60	750.40
SCREEN DIA: 3.75" outer, 2" inner TYPE: ASTM-NSF Schedule 40 PVC Pre-Pac OPENING WIDTH: 0.01-inch OPENING TYPE: Slotted SLOT SPACING: 0.25-inch SLOT LENGTH: 1.5-inch BOTTOM OF SCREEN	39.60	740.40
BOTTOM OF CASING	39.90	740.10

▼ El. 750.47
5/12/2011 24 hours after construction

HOLE DIA: 8"

The well coordinates and elevation data were revised based on a June 2020 survey (Arcadis, June 29, 2020).

 <p>SOUTHERN COMPANY Energy to Serve Your World™</p>	DRILLING LOG			Hole No. <u>GWC-6R</u>
	GEOLOGICAL SERVICES			Sheet <u>1</u> of <u>2</u>
SITE <u>Plant Yates</u>		HOLE DEPTH <u>48.1</u>	SURF. ELEV. <u>785.60</u>	
LOCATION <u>Gypsum Stacking Area</u>		COORDINATES N <u>1261732.91</u>	E <u>2073479.40</u>	
ANGLE <u>0</u>	BEARING <u>0</u>	CONTRACTOR <u>SCS, Inc.</u>	DRILL NO. <u>CME550</u>	
DRILLING METHOD <u>HSA/HQ Rock core with water</u>		NO. SAMPLES <u>7</u>	NO. U.D. SAMPLES <u>0</u>	
CASING SIZE _____	LENGTH _____	CORE SIZE _____	TOTAL % REC. _____	
WATER TABLE DEPTH <u>31.50</u>	ELEV. <u>754.10</u>	TIME AFTER COMP. <u>15 hours</u>	DATE TAKEN <u>8/12/2009</u>	
TYPE GROUT _____	QUANTITY _____	MIX _____	DRILLING START DATE <u>8/11/2009</u>	
DRILLER <u>S. Milam</u>	RECORDER <u>L. Millet</u>	APPROVED _____	DRILLING COMP. DATE <u>8/11/2009</u>	

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD
				From To	Blows	N			
0	785.60								
1	784.60								
2	783.60								
3	782.60								
4	781.60								
5	780.60	Red clayey SILT, dry, soft, with mica, black mottling, relict schist	1	4.5-6	5-3-4	7		100	
6	779.60								
7	778.60								
8	777.60								
9	776.60								
10	775.60	Red and white silty SAND, dry, soft, with mica, black mottling, relict gneiss	2	9.5-11	10-12-8	20		100	
11	774.60								
12	773.60								
13	772.60								
14	771.60								
15	770.60	Red, black and white granular saprolite, dry, firm, trace mica, relict gneiss	3	14.5-16	9-8-10	18		100	
16	769.60								
17	768.60								
18	767.60								
19	766.60								
20	765.60	Orange, black, and white saprolitic gneiss, dry, soft, with amphibolite and mica	4	19.5-21	6-8-9	17		100	
21	764.60								
22	763.60								
23	762.60								
24	761.60								



DRILLING LOG GEOLOGICAL SERVICES

Hole No. GWC-6R

Sheet 2 of 2

SITE **Plant Yates** TOTAL DEPTH **48.1** SURF.ELEV. **785.6**

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD
				From To	Blows	N			
25	760.60	Orange, black, and white saprolitic gneiss, dry, soft	5	24.5-26	6-8-10	18		100	
26	759.60								
27	758.60								
28	757.60								
29	756.60								
30	755.60	Orange and white clayey SILT, dry, soft, with mica, black mottling, relict schist	6	29.5-31	5-4-4	8		100	
31	754.60								
32	753.60								
33	752.60								
34	751.60	Black, white, and orange weathered gneiss, moist, firm	7	34.5-39	10-19-50/3	R		100	
35	750.60								
36	749.60								
37	748.60								
38	747.60	38.1- Auger refusal							
39	746.60	38'-39' - Black and white GNEISS							
40	745.60	39'-39.5' - weathered black and white GNEISS							
41	744.60	41' - Light gray GNEISS with multiple iron-stained fractures and pyrite		38.1-43.1			5.0/4.15	83	
42	743.60								
43	742.60								
44	741.60	Light gray chlorite and muscovite SCHIST, with pyrite		43.1-48.1			5.0/5.0	100	
45	740.60								44'-44.5' - Iron-stained fractures
46	739.60	46' - Fracture							
47	738.60								
48	737.60								
49	736.60	48.1' - Bottom of boring							
50	735.60								
51	734.60								
52	733.60								
53	732.60								
54	731.60								
55	730.60								
56	729.60								

WELL CONSTRUCTION LOG

Southern Company Generation

PROJECT: Plant Yates	DRILLING CO.: SCS, Inc.	WELL NAME
LOCATION: Gypsum Stacking Area	DRILLER: S. Denty	
LOGGER: L. Millet	RIG TYPE: CME 550	
DATE CONSTRUCTED: 8/11/2009	DRILLING METHODS: HSA, HQ Rock Core	GWC-6R

		DEPTH FEET	ELEVATION FT, MSL
Locking Top	TOP OF RISER		788.98
1/4-inch Vent			
1/4-inch Weep Hole			
2" Threaded Riser Cap			
Pea Gravel in annular space			
4-ft x 4-ft x 4" concrete pad	GROUND SURFACE	0.00	785.60
PROTECTIVE CASING SIZE: 6-inch round TYPE: PVC			
BOTTOM OF PROTECTIVE CASING			
BACKFILL MATERIAL TYPE: Portland Cement Grout AMOUNT: 7 bags @ 1.3 cf/bag = 9.1 cf			
RISER CASING DIA: 2-inch TYPE: Schedule 40 PVC JOINT TYPE: Flush Threaded			
TOP OF SEAL		34.56	751.04
ANNULAR SEAL TYPE: 1/4-inch bentonite pellets 5-gal buckets AMOUNT: 0.5 bucket PLACEMENT: Tremie			
TOP OF FILTER PACK		36.56	749.04
FILTER PACK TYPE: DSI Sand - 1A (20/30) Drillers Services, Inc. AMOUNT: 1.25 bags; 50 lbs/bag PLACEMENT: Tremie; wash with water			
BOTTOM OF RISER / TOP OF SCREEN		38.56	747.04
SCREEN DIA: 2-inch TYPE: Schedule 40 ASTM-NSF PVC OPENING WIDTH: 0.01-inch OPENING TYPE: Slotted SLOT SPACING: 0.25-inch SLOT LENGTH: 1.5-inch			
BOTTOM OF SCREEN		48.56	737.04
Sump	BOTTOM OF CASING	51.87	733.73
HOLE DIA: 8" in soil 4" in rock			



CONTINUATION
CERTIFICATE

SAFECO INSURANCE COMPANY OF AMERICA

, Surety upon

a certain Bond No. 4993104

dated effective June 30 2005
(MONTH-DAY-YEAR)

on behalf of Southern Company Services, Inc.
(PRINCIPAL)

and in favor of Georgia - Dept. of Natural Resources
(OBLIGEE)

does hereby continue said bond in force for the further period

beginning on June 30 2007
(MONTH-DAY-YEAR)

and ending on June 30 2008
(MONTH-DAY-YEAR)

Amount of bond \$10,000

Description of bond License Bond - Water Well Contractors and Drillers

Premium:

PROVIDED: That this continuation certificate does not create a new obligation and is executed upon the express condition and provision that the Surety's liability under said bond and this and all Continuation Certificates issued in connection therewith shall not be cumulative and that the said Surety's aggregate liability under said bond and this and all such Continuation Certificates on account of all defaults committed during the period (regardless of the number of years) said bond had been and shall be in force, shall not in any event exceed the amount of said bond as hereinbefore set forth.

Signed and dated on June 30 2007
(MONTH-DAY-YEAR)
SAFECO INSURANCE COMPANY OF AMERICA

By Laurel D. Huss
ATTORNEY-IN-FACT Laurel D. Huss

Marsh USA, Inc.
Agent
3475 Piedmont Road NE, Suite 1200, Atlanta, GA 30305
Address of Agent
(404) 995-3702
Telephone Number of Agent





POWER OF ATTORNEY

Safeco Insurance Company of America
General Insurance Company of America
Safeco Plaza
Seattle, WA 98185

No. 6724

KNOW ALL BY THESE PRESENTS:

That SAFECO INSURANCE COMPANY OF AMERICA and GENERAL INSURANCE COMPANY OF AMERICA, each a Washington corporation, does each hereby appoint

SANDRA S. CARTER; GARY D. EKLUND; JUDY S. FLEMING; LAUREL D. HUSS; BARBARA S. MACARTHUR; VIRGINIA B. MCMANUS; EDWARD L. MITCHELL; NANCY NIX; CHAUN M. WILSON; Atlanta, Georgia

its true and lawful attorney(s)-in-fact, with full authority to execute on its behalf fidelity and surety bonds or undertakings and other documents of a similar character issued in the course of its business, and to bind the respective company thereby.

IN WITNESS WHEREOF, SAFECO INSURANCE COMPANY OF AMERICA and GENERAL INSURANCE COMPANY OF AMERICA have each executed and attested these presents

this 17th day of August 2006

Handwritten signature of Stephanie Daley-Watson

Handwritten signature of Tim Mikolajewski

STEPHANIE DALEY-WATSON, SECRETARY

TIM MIKOLAJEWSKI, SENIOR VICE-PRESIDENT, SURETY

CERTIFICATE

Extract from the By-Laws of SAFECO INSURANCE COMPANY OF AMERICA and of GENERAL INSURANCE COMPANY OF AMERICA:

Article V, Section 13. - FIDELITY AND SURETY BONDS ... the President, any Vice President, the Secretary, and any Assistant Vice President appointed for that purpose by the officer in charge of surety operations, shall each have authority to appoint individuals as attorneys-in-fact or under other appropriate titles with authority to execute on behalf of the company fidelity and surety bonds and other documents of similar character issued by the company in the course of its business...

Extract from a Resolution of the Board of Directors of SAFECO INSURANCE COMPANY OF AMERICA and of GENERAL INSURANCE COMPANY OF AMERICA adopted July 28, 1970.

On any certificate executed by the Secretary or an assistant secretary of the Company setting out,

- (i) The provisions of Article V, Section 13 of the By-Laws, and
(ii) A copy of the power-of-attorney appointment, executed pursuant thereto, and
(iii) Certifying that said power-of-attorney appointment is in full force and effect,

the signature of the certifying officer may be by facsimile, and the seal of the Company may be a facsimile thereof.

I, Stephanie Daley-Watson, Secretary of SAFECO INSURANCE COMPANY OF AMERICA and of GENERAL INSURANCE COMPANY OF AMERICA, do hereby certify that the foregoing extracts of the By-Laws and of a Resolution of the Board of Directors of these corporations, and of a Power of Attorney issued pursuant thereto, are true and correct, and that both the By-Laws, the Resolution and the Power of Attorney are still in full force and effect.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the facsimile seal of said corporation

this 30th day of June 2007



Handwritten signature of Stephanie Daley-Watson

STEPHANIE DALEY-WATSON, SECRETARY

Safeco and the Safeco logo are registered trademarks of Safeco Corporation.

SAFECO Insurance Company of America

, Surety upon

a certain Bond No. **4993104**

dated effective **June 30, 2005**
(MONTH-DAY-YEAR)

on behalf of **Southern Company Services, Inc.**
(PRINCIPAL)

and in favor of **State of Georgia - Dept. of Natural Resources**
(OBLIGEE)

does hereby continue said bond in force for the further period

beginning on **June 30, 2009**
(MONTH-DAY-YEAR)

and ending on **June 30, 2010**
(MONTH-DAY-YEAR)

Amount of bond **\$10,000.00**

Description of bond **License Bond - Water Well Contractors & Drillers**

Premium: **\$100.00**

PROVIDED: That this continuation certificate does not create a new obligation and is executed upon the express condition and provision that the Surety's liability under said bond and this and all Continuation Certificates issued in connection therewith shall not be cumulative and that the said Surety's aggregate liability under said bond and this and all such Continuation Certificates on account of all defaults committed during the period (regardless of the number of years) said bond had been and shall be in force, shall not in any event exceed the amount of said bond as hereinbefore set forth.

Signed and dated on **April 24, 2009**
(MONTH-DAY-YEAR)

SAFECO Insurance Company of America

By

Barbara S. MacArthur
Barbara S. MacArthur, Attorney-In-Fact



POWER OF ATTORNEY

Safeco Insurance Company of America
General Insurance Company of America
1001 4th Avenue
Suite 1700
Seattle, WA 98154

KNOW ALL BY THESE PRESENTS:

No. 6724

That SAFECO INSURANCE COMPANY OF AMERICA and GENERAL INSURANCE COMPANY OF AMERICA, each a Washington corporation, does each hereby appoint

SANDRA S. CARTER; GARY D. EKLUND; BARBARA S. MACARTHUR; VIRGINIA B. MCMANUS; EDWARD L. MITCHELL; NANCY G. NIX; CHAUN M. WILSON; Atlanta, Georgia

its true and lawful attorney(s)-in-fact, with full authority to execute on its behalf fidelity and surety bonds or undertakings and other documents of a similar character issued in the course of its business, and to bind the respective company thereby.

IN WITNESS WHEREOF, SAFECO INSURANCE COMPANY OF AMERICA and GENERAL INSURANCE COMPANY OF AMERICA have each executed and attested these presents

this 21st day of March, 2009

Dexter R. Legg

T. Mikolajewski

Dexter R. Legg, Secretary

Timothy A. Mikolajewski, Vice President

CERTIFICATE

Extract from the By-Laws of SAFECO INSURANCE COMPANY OF AMERICA and of GENERAL INSURANCE COMPANY OF AMERICA:

"Article V, Section 13. - FIDELITY AND SURETY BONDS ... the President, any Vice President, the Secretary, and any Assistant Vice President appointed for that purpose by the officer in charge of surety operations, shall each have authority to appoint individuals as attorneys-in-fact or under other appropriate titles with authority to execute on behalf of the company fidelity and surety bonds and other documents of similar character issued by the company in the course of its business...

Extract from a Resolution of the Board of Directors of SAFECO INSURANCE COMPANY OF AMERICA and of GENERAL INSURANCE COMPANY OF AMERICA adopted July 28, 1970.

"On any certificate executed by the Secretary or an assistant secretary of the Company setting out,

- (i) The provisions of Article V, Section 13 of the By-Laws, and
(ii) A copy of the power-of-attorney appointment, executed pursuant thereto, and
(iii) Certifying that said power-of-attorney appointment is in full force and effect,

the signature of the certifying officer may be by facsimile, and the seal of the Company may be a facsimile thereof."

I, Dexter R. Legg, Secretary of SAFECO INSURANCE COMPANY OF AMERICA and of GENERAL INSURANCE COMPANY OF AMERICA, do hereby certify that the foregoing extracts of the By-Laws and of a Resolution of the Board of Directors of these corporations, and of a Power of Attorney issued pursuant thereto, are true and correct, and that both the By-Laws, the Resolution and the Power of Attorney are still in full force and effect.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the facsimile seal of said corporation

this 24th day of April, 2009



Dexter R. Legg

Dexter R. Legg, Secretary



SAFECO Insurance Company of America

, Surety upon

a certain Bond No. **4993104**

dated effective **June 30, 2005**
(MONTH-DAY-YEAR)

on behalf of **Southern Company Services, Inc.**
(PRINCIPAL)

and in favor of **State of Georgia - Dept. of Natural Resources**
(OBLIGEE)

does hereby continue said bond in force for the further period

beginning on **June 30, 2010**
(MONTH-DAY-YEAR)

and ending on **June 30, 2011**
(MONTH-DAY-YEAR)

Amount of bond **\$10,000.00**

Description of bond **License Bond - Water Well Contractors & Drillers**

Premium: **\$100.00**

PROVIDED: That this continuation certificate does not create a new obligation and is executed upon the express condition and provision that the Surety's liability under said bond and this and all Continuation Certificates issued in connection therewith shall not be cumulative and that the said Surety's aggregate liability under said bond and this and all such Continuation Certificates on account of all defaults committed during the period (regardless of the number of years) said bond had been and shall be in force, shall not in any event exceed the amount of said bond as hereinbefore set forth.

Signed and dated on **April 15, 2010**
(MONTH-DAY-YEAR)

SAFECO Insurance Company of America

By 

Barbara S. MacArthur, Attorney-In-Fact

POWER OF ATTORNEY

No. 6724

KNOW ALL BY THESE PRESENTS:

That SAFECO INSURANCE COMPANY OF AMERICA and GENERAL INSURANCE COMPANY OF AMERICA, each a Washington corporation, does each hereby appoint

*****GARY D. EKLUND; BARBARA S. MACARTHUR; VIRGINIA B. MCMANUS; CHAUN M. WILSON; MICHAEL F. YADACH; Atlanta, Georgia*****

its true and lawful attorney(s)-in-fact, with full authority to execute on its behalf fidelity and surety bonds or undertakings and other documents of a similar character issued in the course of its business, and to bind the respective company thereby.

IN WITNESS WHEREOF, SAFECO INSURANCE COMPANY OF AMERICA and GENERAL INSURANCE COMPANY OF AMERICA have each executed and attested these presents

this 2nd day of February 2010

Dexter R. Legg

TAMIKOLAJEWSKI

Dexter R. Legg, Secretary

Timothy A. Mikolajewski, Vice President

CERTIFICATE

Extract from the By-Laws of SAFECO INSURANCE COMPANY OF AMERICA and of GENERAL INSURANCE COMPANY OF AMERICA:

"Article V, Section 13. - FIDELITY AND SURETY BONDS ... the President, any Vice President, the Secretary, and any Assistant Vice President appointed for that purpose by the officer in charge of surety operations, shall each have authority to appoint individuals as attorneys-in-fact or under other appropriate titles with authority to execute on behalf of the company fidelity and surety bonds and other documents of similar character issued by the company in the course of its business... On any instrument making or evidencing such appointment, the signatures may be affixed by facsimile. On any instrument conferring such authority or on any bond or undertaking of the company, the seal, or a facsimile thereof, may be impressed or affixed or in any other manner reproduced; provided, however, that the seal shall not be necessary to the validity of any such instrument or undertaking."

Extract from a Resolution of the Board of Directors of SAFECO INSURANCE COMPANY OF AMERICA and of GENERAL INSURANCE COMPANY OF AMERICA adopted July 28, 1970.

"On any certificate executed by the Secretary or an assistant secretary of the Company setting out,

- (i) The provisions of Article V, Section 13 of the By-Laws, and
(ii) A copy of the power-of-attorney appointment, executed pursuant thereto, and
(iii) Certifying that said power-of-attorney appointment is in full force and effect,

the signature of the certifying officer may be by facsimile, and the seal of the Company may be a facsimile thereof."

I, Dexter R. Legg, Secretary of SAFECO INSURANCE COMPANY OF AMERICA and of GENERAL INSURANCE COMPANY OF AMERICA, do hereby certify that the foregoing extracts of the By-Laws and of a Resolution of the Board of Directors of these corporations, and of a Power of Attorney issued pursuant thereto, are true and correct, and that both the By-Laws, the Resolution and the Power of Attorney are still in full force and effect.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the facsimile seal of said corporation

this 15th day of April 2010



Dexter R. Legg

Dexter R. Legg, Secretary



CONTINUATION
CERTIFICATE

SAFECO Insurance Company of America

, Surety upon

a certain Bond No. 4993104

dated effective June 30, 2005
(MONTH-DAY-YEAR)

on behalf of Southern Company Services, Inc.
(PRINCIPAL)

and in favor of State of Georgia - Dept. of Natural Resources
(OBLIGEE)

does hereby continue said bond in force for the further period

beginning on June 30, 2011
(MONTH-DAY-YEAR)

and ending on June 30, 2012
(MONTH-DAY-YEAR)

Amount of bond \$10,000.00

Description of bond License Bond - Water Well Contractors & Drillers

Premium: \$100.00

PROVIDED: That this continuation certificate does not create a new obligation and is executed upon the express condition and provision that the Surety's liability under said bond and this and all Continuation Certificates issued in connection therewith shall not be cumulative and that the said Surety's aggregate liability under said bond and this and all such Continuation Certificates on account of all defaults committed during the period (regardless of the number of years) said bond had been and shall be in force, shall not in any event exceed the amount of said bond as hereinbefore set forth.

Signed and dated on April 21, 2011
(MONTH-DAY-YEAR)

SAFECO Insurance Company of America

By Barbara S. MacArthur
Barbara S. MacArthur, Attorney-In-Fact

THIS POWER OF ATTORNEY IS NOT VALID UNLESS IT IS PRINTED ON RED BACKGROUND.

4178633

This Power of Attorney limits the acts of those named herein, and they have no authority to bind the Company except in the manner and to the extent herein stated.

SAFECO INSURANCE COMPANY OF AMERICA
SEATTLE, WASHINGTON
POWER OF ATTORNEY

KNOW ALL PERSONS BY THESE PRESENTS: That Safeco Insurance Company of America (the "Company"), a Washington stock insurance company, pursuant to and by authority of the By-law and Authorization hereinafter set forth, does hereby name, constitute and appoint **VIRGINIA B. MCMANUS, GARY D. EKLUND, BARBARA S. MACARTHUR, CHAUN M. WILSON, MICHAEL F. YADACH, ALL OF THE CITY OF ATLANTA, STATE OF GEORGIA**

each individually if there be more than one named, its true and lawful attorney-in-fact to make, execute, seal, acknowledge and deliver, for and on its behalf as surety and as its act and deed, any and all undertakings, bonds, recognizances and other surety obligations in the penal sum not exceeding **ONE HUNDRED MILLION AND 00/100 DOLLARS (\$ 100,000,000.00)** each, and the execution of such undertakings, bonds, recognizances and other surety obligations, in pursuance of these presents, shall be as binding upon the Company as if they had been duly signed by the president and attested by the secretary of the Company in their own proper persons.

That this power is made and executed pursuant to and by authority of the following By-law and Authorization:

ARTICLE IV - Execution of Contracts: Section 12. Surety Bonds and Undertakings.

Any officer or other official of the Corporation authorized for that purpose in writing by the Chairman or the President, and subject to such limitations as the Chairman or the President may prescribe, shall appoint such attorneys-in-fact, as may be necessary to act in behalf of the Corporation to make, execute, seal, acknowledge and deliver as surety any and all undertakings, bonds, recognizances and other surety obligations. Such attorneys-in-fact, subject to the limitations set forth in their respective powers of attorney, shall have full power to bind the Corporation by their signature and executed, such instruments shall be as binding as if signed by the president and attested by the secretary.

By the following instrument the chairman or the president has authorized the officer or other official named therein to appoint attorneys-in-fact:

Pursuant to Article IV, Section 12 of the By-laws, Garnet W. Elliott, Assistant Secretary of Safeco Insurance Company of America, is authorized to appoint such attorneys-in-fact as may be necessary to act in behalf of the Corporation to make, execute, seal, acknowledge and deliver as surety any and all undertakings, bonds, recognizances and other surety obligations.

That the By-law and the Authorization set forth above are true copies thereof and are now in full force and effect.

IN WITNESS WHEREOF, this Power of Attorney has been subscribed by an authorized officer or official of the Company and the corporate seal of Safeco Insurance Company of America has been affixed thereto in Plymouth Meeting, Pennsylvania this 14th day of October, 2010.



SAFECO INSURANCE COMPANY OF AMERICA

By Garnet W. Elliott
Garnet W. Elliott, Assistant Secretary

COMMONWEALTH OF PENNSYLVANIA ss
COUNTY OF MONTGOMERY

On this 14th day of October, 2010, before me, a Notary Public, personally came Garnet W. Elliott, to me known, and acknowledged that he is an Assistant Secretary of Safeco Insurance Company of America; that he knows the seal of said corporation; and that he executed the above Power of Attorney and affixed the corporate seal of Safeco Insurance Company of America thereto with the authority and at the direction of said corporation.

IN TESTIMONY WHEREOF, I have hereunto subscribed my name and affixed my notarial seal at Plymouth Meeting, Pennsylvania, on the day and year first above written.



Notarial Seal
Teresa Pastella, Notary Public
Plymouth Twp., Montgomery County
My Commission Expires Mar. 28, 2013
Member, Pennsylvania Association of Notaries

By Teresa Pastella
Teresa Pastella, Notary Public

CERTIFICATE

I, the undersigned, Assistant Secretary of Safeco Insurance Company of America, do hereby certify that the original power of attorney of which the foregoing is a full, true and correct copy, is in full force and effect on the date of this certificate; and I do further certify that the officer or official who executed the said power of attorney is an Assistant Secretary specially authorized by the chairman or the president to appoint attorneys-in-fact as provided in Article IV, Section 12 of the By-laws of Safeco Insurance Company of America.

This certificate and the above power of attorney may be signed by facsimile or mechanically reproduced signatures under and by authority of the following vote of the board of directors of Safeco Insurance Company of America at a meeting duly called and held on the 18th day of September, 2009.

VOTED that the facsimile or mechanically reproduced signature of any assistant secretary of the company, wherever appearing upon a certified copy of any power of attorney issued by the company in connection with surety bonds, shall be valid and binding upon the company with the same force and effect as though manually affixed.

IN TESTIMONY WHEREOF, I have hereunto subscribed my name and affixed the corporate seal of the said company, this 21st day of April, 2011.



By David M. Carey
David M. Carey, Assistant Secretary

Not valid for mortgage, note, letter of credit, bank deposit, currency rate, interest rate or residual value guarantees.

To confirm the validity of this Power of Attorney call 1-610-832-8240 between 9:00 am and 4:30 pm EST on any business day.

Mr. Joju Abraham
Southern Company
Environmental Solutions
241 Ralph McGill Blvd, NE
Atlanta, Georgia 30308

Arcadis U.S., Inc.
1210 Premier Drive
Suite 200
Chattanooga
Tennessee 37421
Tel 423 756 7193
Fax 423 756 7197
www.arcadis-us.com

Subject:
Monitoring Well and Piezometer Surveys
Plant Yates, 708 Dyer Road, Newnan, Georgia

Date:
June 29, 2020

Dear Mr. Abraham:

Contact:
Cory Williams, PLS

Attached is a copy of the reports for the Monitoring Well and Piezometer Surveys for the Phase I and Phase II Sites at Plant Yates. The Phase I and Phase II sites surveyed include the following specific areas:

Phone:
919.415.2348

- AMA, Ash Management Area
- AP-1, Former Ash Pond 1
- AP-2, Ash Pond 2
- Gypsum Landfill

Email:
cory.williams@arcadis.com

We appreciate the opportunity to work with Georgia Power and look forward to working with you in the future. If you need additional information, please feel free to contact me.

Our ref:
30054533

Sincerely,

Arcadis U.S., Inc.



A. Cory Williams, PLS
Survey Department Manager

Attachments

Copies:
Geoffrey Gay, PE
Rick Helmadollar, PE
A. Lee Robertson IV, PLS

DESCRIPTION AND SCOPE

The task included performing horizontal and vertical field survey locations of the existing well networks (including all monitoring wells and piezometers). The Arcadis field survey team obtained horizontal and vertical locations for the top of the well casing (TOC) and surveyed the nail located on the concrete pad around the well. Where no nail was present, the field crew surveyed the top of the concrete well pad. The Arcadis field team utilized a combination of Leica GS16 Global Positioning System (GPS) with traditional Leica MS60 Robotic Total Station field survey equipment and methods to obtain horizontal locations of the TOC and/or nail or top of the concrete well pad. All horizontal field survey locations are relative to the Georgia State Plane Coordinate System, West Zone, NAD1983, US Survey Feet. All horizontal locations meet or exceed an accuracy level of 0.50 foot. All vertical field survey locations were obtained from a level loop, performed with the Leica DNA03 digital level. Next, we began from a benchmark set, by utilizing GPS Static Session with an OPUS solution and subsequently verified via the eGPS RTN Network and ran through all well and piezometer locations to close on the beginning benchmark to confirm accuracy. All vertical elevations are referenced to NAVD1988, US Survey Feet and meet an accuracy standard of 0.01 foot.

See the attached exhibits detailing the Monitoring Well and Piezometer surveyed locations for each Phase I and Phase II site.

SUMMARY

The field survey crew performed the survey in June 2020 with the findings or observations summarized below:

- The ground elevation survey location was taken adjacent to the concrete base point (PK, Disk or Chiseled X). Note that at some locations, the concrete base was buried under soil; consequently, the ground elevation is higher than the concrete base point location.
- The horizontal location for monitoring well GWC-6R at the Gypsum Landfill is approximately +/- 51 feet southeasterly of the provided coordinate location as detailed in “Georgia Power Company Plant Yates, Private Industrial Landfill, Permit No. 038-014D (I), Replacement Monitoring Well GWC-6R Certification, ES1703”, dated July 2010. See attached Photograph Log.

Monitoring Well Summary

Site	Monitoring Wells	Piezometers
AMA = Ash Management Area	25	8
AP-1 = Former Ash Pond 1	5	5
AP-2 = Ash Pond 2	14	8
Gypsum Landfill	7	0

CERTIFICATION

I, A. Lee Robertson IV, being a Georgia Licensed Professional Land Surveyor, in accordance with the Georgia Board of Professional Engineers and Land Surveyors do hereby certify that the information contained herein is true and correct and has been prepared in accordance with generally accepted good land survey practices under my supervision, and the data is reliable to a horizontal accuracy of 0.5 foot and an elevational accuracy of 0.01 foot for each surveyed point.

FINAL REVIEW:

A. Lee Robertson IV

DATE: June 29, 2020


Digitally signed by A Lee
Robertson IV
Reason: Revised Yates
Date: 2020.08.06 09:22:42
-04'00'

A. Lee Robertson IV, ARM, PLS, PSM
1301 Riverplace Blvd., Suite 700
Jacksonville, FL 32207
904.493.8589



EXHIBIT 1



Plant Yates – AMA Monitoring Well and Piezometer Surveys

Monument	Concrete Base Point	NAVD88 Elevation	Georgia State Plane Grid (NAD83), West Zone		WGS84 Latitude	Longitude
			Northing	Easting		
YGWA-4I	Casing	784.21	1254436.68	2075455.62	33° 26' 47.432" N	84° 53' 29.831" W
	Disk	782.00	1254436.75	2075456.65		
	Ground	781.9				
YGWA-5I	Casing	784.54	1254399.95	2076218.86	33° 26' 47.122" N	84° 53' 20.821" W
	Disk	782.21	1254400.71	2076219.39		
	Ground	782.1				
YGWA-5D	Casing	784.53	1254396.67	2076223.63	33° 26' 47.089" N	84° 53' 20.764" W
	Disk	782.16	1254397.45	2076224.30		
	Ground	781.9				
YGWA-17S	Casing	783.05	1257602.79	2076758.31	33° 27' 18.846" N	84° 53' 14.717" W
	PK Nail	780.14	1257603.70	2076758.38		
	Ground	780.2				
YGWA-18S	Casing	790.57	1257116.05	2077015.25	33° 27' 14.048" N	84° 53' 11.644" W
	PK Nail	787.69	1257116.98	2077015.60		
	Ground	787.6				
YGWA-18I	Casing	790.57	1257090.05	2077015.82	33° 27' 13.791" N	84° 53' 11.635" W
	PK Nail	787.90	1257094.38	2077023.55		
	Ground	787.9				
YGWA-20S	Casing	767.12	1255531.55	2077410.37	33° 26' 58.399" N	84° 53' 06.851" W
	PK Nail	764.41	1255531.12	2077409.22		
	Ground	764.6				
YGWA-21I	Casing	783.70	1255538.27	2076768.14	33° 26' 58.421" N	84° 53' 14.432" W
	PK Nail	780.62	1255537.44	2076768.81		
	Ground	780.8				
YGWC-23S	Casing	764.91	1256366.93	2074734.07	33° 27' 06.479" N	84° 53' 38.506" W
	PK Nail	761.74	1256367.40	2074734.44		
	Ground	762.0				
YGWC-24SA	Casing	765.00	1258907.98	2073924.81	33° 27' 31.563" N	84° 53' 48.268" W
	PK Nail	762.08	1258909.02	2073924.05		
	Ground	762.0				
YGWC-36	Casing	739.61	1258514.02	2073770.14	33° 27' 27.654" N	84° 53' 50.061" W
	PK Nail	737.04	1258513.74	2073771.01		
	Ground	736.9				
YGWC-49	Casing	782.73	1259375.23	2074337.51	33° 27' 36.214" N	84° 53' 43.435" W
	PK Nail	780.11	1259375.91	2074337.14		
	Ground	780.1				

EXHIBIT 1



Plant Yates – AMA Monitoring Well and Piezometer Surveys

Monument	Concrete Base Point	NAVD88 Elevation	Georgia State Plane Grid (NAD83), West Zone		WGS84 Latitude	Longitude
			Northing	Easting		
YGWA-6S	Casing	782.47	1260484.87	2074786.49	33° 27' 47.223" N	84° 53' 38.227" W
	Disk	780.06	1260485.50	2074785.70		
	Ground	779.8				
YGWA-6I	Casing	782.73	1260490.02	2074790.49	33° 27' 47.275" N	84° 53' 38.181" W
	Disk	780.36	1260490.74	2074789.66		
	Ground	780.2				
YAMW-1	Casing	743.83	1258602.12	2073814.55	33° 27' 28.529" N	84° 53' 49.543" W
	PK Nail	741.11	1258602.93	2073815.29		
	Ground	740.9				
PZ-04S	Casing	784.25	1254442.86	2075454.20	33° 26' 47.493" N	84° 53' 29.848" W
	Disk	781.94	1254443.16	2075455.15		
	Ground	781.8				
PZ-05S	Casing	784.64	1254404.42	2076211.43	33° 26' 47.165" N	84° 53' 20.909" W
	Disk	782.31	1254405.12	2076212.12		
	Ground	782.2				
PZ-06D	Casing	782.02	1260480.15	2074782.68	33° 27' 47.176" N	84° 53' 38.272" W
	Disk	779.65	1260480.84	2074782.04		
	Ground	779.5				
PZ-24IA	Casing	764.65	1258910.76	2073930.07	33° 27' 31.591" N	84° 53' 48.206" W
	PK Nail	761.89	1258911.68	2073929.64		
	Ground	761.8				
PZ-35	Casing	743.81	1258593.16	2073805.60	33° 27' 28.440" N	84° 53' 49.649" W
	PK Nail	741.09	1258593.85	2073806.06		
	Ground	740.9				
PZ-48	Casing	779.83	1259868.04	2074528.00	33° 27' 41.103" N	84° 53' 41.228" W
	PK Nail	777.29	1259868.75	2074527.27		
	Ground	777.2				
YGWA-39	Casing	818.19	1255717.13	2073865.58	33° 26' 59.990" N	84° 53' 48.702" W
	PK Nail	815.58	1255717.96	2073865.39		
	Ground	815.6				
YGWA-40	Casing	815.73	1255791.95	2073431.34	33° 27' 00.700" N	84° 53' 53.833" W
	PK Nail	813.45	1255792.83	2073431.58		
	Ground	813.5				

EXHIBIT 1



Plant Yates – AMA Monitoring Well and Piezometer Surveys

Monument	Concrete Base Point	NAVD88 Elevation	Georgia State Plane Grid (NAD83), West Zone		WGS84 Latitude	Longitude
			Northing	Easting		
YGWC-38	Casing	799.69	1256108.38	2074446.80	33° 27' 03.901" N	84° 53' 41.875" W
	PK Nail	797.24	1256108.41	2074446.02		
	Ground	797.1				
YGWC-41	Casing	803.92	1256510.62	2073274.41	33° 27' 07.799" N	84° 53' 55.745" W
	PK Nail	801.23	1256509.74	2073274.29		
	Ground	801.1				
YGWC-42	Casing	797.86	1256882.87	2073326.52	33° 27' 11.486" N	84° 53' 55.161" W
	PK Nail	795.34	1256881.68	2073326.58		
	Ground	795.1				
YGWC-43	Casing	744.96	1257547.41	2073199.65	33° 27' 18.052" N	84° 53' 56.714" W
	PK Nail	742.50	1257546.78	2073200.55		
	Ground	742.3				
PZ-37	Casing	760.78	1256471.14	2074699.59	33° 27' 07.508" N	84° 53' 38.922" W
	PK Nail	758.10	1256471.89	2074700.06		
	Ground	758.0				
PZ-51	Casing	744.30	1257595.80	2073182.55	33° 27' 18.529" N	84° 53' 56.920" W
	PK Nail	741.23	1257595.53	2073181.53		
	Ground	741.3				
YAMW-2	Casing	781.04	1256780.59	2072924.89	33° 27' 10.446" N	84° 53' 59.893" W
	PK Nail	777.81	1256781.38	2072926.79		
	Ground	777.9				
YAMW-3	Casing	796.05	1256915.25	2073345.21	33° 27' 11.808" N	84° 53' 54.943" W
	PK Nail	792.98	1256914.96	2073344.24		
	Ground	793.2				
YAMW-4	Casing	805.59	1256532.64	2073280.71	33° 27' 08.018" N	84° 53' 55.673" W
	PK Nail	802.60	1256532.72	2073281.78		
	Ground	802.6				
YAMW-5	Casing	788.90	1256140.21	2074486.69	33° 27' 04.219" N	84° 53' 41.407" W
	PK Nail	785.87	1256139.54	2074487.44		
	Ground	785.9				

Notes:

NAD83(2011) coordinates established by utilizing eGPS VRS & OPUS Solutions

Elevations derived from Arcadis BM#1 (El. 758.24)

Elevations & coordinates are U.S. Survey feet

EXHIBIT 2



Plant Yates – AP-1 Monitoring Well and Piezometer Surveys

Monument	Concrete Base Point	NAVD88 Elevation	Georgia State Plane Grid (NAD83), West Zone		WGS84 Latitude	Longitude
			Northing	Easting		
YGWA-47	Casing	758.22	1262411.84	2071818.05	33° 28' 06.081" N	84° 54' 13.428" W
	PK Nail	755.73	1262410.74	2071817.99		
	Ground	755.6				
YGWC-44	Casing	758.35	1261874.34	2071219.39	33° 28' 00.721" N	84° 54' 20.449" W
	PK Nail	755.7	1261874.44	2071218.47		
	Ground	755.5				
YGWC-45	Casing	719.36	1261668.95	2070912.60	33° 27' 58.667" N	84° 54' 24.053" W
	PK Nail	716.72	1261668.87	2070911.87		
	Ground	716.5				
YGWC-52	Casing	755.86	1262145.22	2071464.36	33° 28' 03.418" N	84° 54' 17.580" W
	PK Nail	752.99	1262144.65	2071465.21		
	Ground	752.9				
YGWC-46A	Casing	733.04	1260994.59	2070970.30	33° 27' 52.000" N	84° 54' 23.316" W
	PK Nail	730.16	1260994.40	2070971.40		
	Ground	730.1				
PZ-09S	Casing	712.08	1262003.49	2070720.43	33° 28' 01.963" N	84° 54' 26.350" W
	Disk	709.90	1262003.23	2070721.54		
	Ground	709.8				
PZ-09I	Casing	712.13	1261995.81	2070720.09	33° 28' 01.887" N	84° 54' 26.353" W
	Disk	709.92	1261995.51	2070721.11		
	Ground	709.8				
PZ-10S	Casing	700.43	1260802.29	2070552.32	33° 27' 50.068" N	84° 54' 28.233" W
	Disk	698.02	1260802.21	2070553.31		
	Ground	698.1				
PZ-10I	Casing	700.25	1260809.64	2070551.98	33° 27' 50.068" N	84° 54' 28.233" W
	Disk	697.96	1260809.55	2070552.97		
	Ground	697.8				
PZ-53	Casing	732.90	1260964.50	2070920.38	33° 27' 51.698" N	84° 54' 23.902" W
	PK Nail	729.99	1260964.35	2070921.22		
	Ground	729.9				

Notes:

NAD83(2011) coordinates established by utilizing eGPS VRS & OPUS Solutions

Elevations derived from Arcadis BM#1 (El. 758.24)

Elevations & coordinates are U.S. Survey feet

EXHIBIT 3



Plant Yates – AP-2 Monitoring Well and Piezometer Surveys

Monument	Concrete Base Point	NAVD88 Elevation	Georgia State Plane Grid (NAD83), West Zone		WGS84 Latitude	Longitude
			Northing	Easting		
YGWA-1I	Casing	836.60	1256876.13	2070097.91	33° 27' 11.193" N	84° 54' 33.266" W
	Disk	834.33	1256876.76	2070098.84		
	Ground	834.3				
YGWA-1D	Casing	837.25	1256867.34	2070104.61	33° 27' 11.106" N	84° 54' 33.186" W
	Disk	835.04	1256868.01	2070105.52		
	Ground	834.9				
YGWA-2I	Casing	866.25	1256144.08	2070790.49	33° 27' 03.999" N	84° 54' 25.030" W
	Disk	864.2	1256144.35	2070791.29		
	Ground	864.0				
YGWA-3I	Casing	796.55	1256405.20	2072024.20	33° 27' 06.669" N	84° 54' 10.492" W
	Disk	794.34	1256405.65	2072025.23		
	Ground	794.0				
YGWA-3D	Casing	796.78	1256399.94	2072026.21	33° 27' 06.617" N	84° 54' 10.468" W
	Disk	794.39	1256400.26	2072027.12		
	Ground	794.1				
YGWA-14S	Casing	748.76	1257828.64	2072537.24	33° 27' 20.788" N	84° 54' 04.555" W
	Disk	746.58	1257829.68	2072537.61		
	Ground	746.8				
YGWA-30I	Casing	762.58	1258421.86	2071107.11	33° 27' 26.556" N	84° 54' 21.485" W
	PK Nail	759.95	1258421.69	2071106.13		
	Ground	760.1				
YGWC-26S	Casing	716.28	1259734.66	2070615.87	33° 27' 39.510" N	84° 54' 27.393" W
	PK Nail	713.17	1259734.57	2070614.87		
	Ground	713.1				
YGWC-26I	Casing	715.91	1259725.79	2070613.56	33° 27' 39.422" N	84° 54' 27.420" W
	PK Nail	713.21	1259725.80	2070612.71		
	Ground	713.1				
YGWC-27S	Casing	716.52	1259417.12	2070454.17	33° 27' 36.357" N	84° 54' 29.275" W
	PK Nail	713.27	1259416.33	2070454.96		
	Ground	713.0				
YGWC-27I	Casing	716.19	1259423.73	2070460.89	33° 27' 36.423" N	84° 54' 29.196" W
	PK Nail	713.35	1259423.32	2070461.64		
	Ground	713.2				
YGWC-28S	Casing	717.95	1259218.37	2070322.23	33° 27' 34.381" N	84° 54' 30.816" W
	PK Nail	715.09	1259217.72	2070323.07		
	Ground	715.0				

EXHIBIT 3



Plant Yates – AP-2 Monitoring Well and Piezometer Surveys

Monument	Concrete Base Point	NAVD88 Elevation	Georgia State Plane Grid (NAD83), West Zone		WGS84 Latitude	Longitude
			Northing	Easting		
YGWC-28I	Casing	717.93	1259226.47	2070328.27	33° 27' 34.462" N	84° 54' 30.745" W
	PK Nail	715.06	1259225.93	2070329.06		
	Ground	715.0				
YGWC-29I	Casing	717.39	1258974.06	2070203.26	33° 27' 31.956" N	84° 54' 32.199" W
	PK Nail	714.94	1258973.51	2070203.93		
	Ground	714.8				
PZ-01S	Casing	836.84	1256871.97	2070101.24	33° 27' 11.152" N	84° 54' 33.226" W
	Disk	834.73	1256874.29	2070101.35		
	Ground	834.5				
PZ-03S	Casing	796.39	1256410.86	2072021.63	33° 27' 06.725" N	84° 54' 10.523" W
	Disk	794.31	1256411.38	2072022.63		
	Ground	794.0				
PZ-13S	Casing	807.79	1257849.98	2069810.25	33° 27' 20.807" N	84° 54' 36.743" W
	Disk	805.59	1257848.97	2069810.38		
	Ground	805.5				
PZ-13I	Casing	807.62	1257850.30	2069817.10	33° 27' 20.811" N	84° 54' 36.662" W
	Disk	805.42	1257849.17	2069817.19		
	Ground	805.4				
PZ-14I	Casing	749.06	1257826.16	2072542.59	33° 27' 20.764" N	84° 54' 04.492" W
	Disk	746.84	1257827.25	2072543.09		
	Ground	747.2				
PZ-25S	Casing	766.60	1258856.99	2073497.99	33° 27' 31.029" N	84° 53' 53.301" W
	PK Nail	763.77	1258857.85	2073498.45		
	Ground	763.8				
PZ-25I	Casing	766.38	1258860.75	2073491.10	33° 27' 31.065" N	84° 53' 53.383" W
	PK Nail	763.69	1258861.69	2073491.62		
	Ground	763.8				
PZ-31S	Casing	738.62	1258313.70	2072820.25	33° 27' 25.606" N	84° 54' 01.256" W
	PK Nail	736.04	1258312.79	2072820.01		
	Ground	735.9				

Notes:

NAD83(2011) coordinates established by utilizing eGPS VRS & OPUS Solutions

Elevations derived from Arcadis BM#1 (El. 758.24)

Elevations & coordinates are U.S. Survey feet

EXHIBIT 4



Plant Yates – Gypsum Landfill Monitoring Well and Piezometer Surveys

Monument	Concrete Base Point	NAVD88 Elevation	Georgia State Plane Grid (NAD83), West Zone		WGS84 Latitude	Longitude
			Northing	Easting		
GWA-2	Casing	805.62	1261383.11	2073509.98	33° 27' 56.021" N	84° 53' 53.370" W
	Bolt	803.25	1261383.21	2073507.93		
	Ground	803.1				
GWC-1R	Casing	773.27	1261869.77	2073279.85	33° 28' 00.820" N	84° 53' 56.127" W
	Bolt	770.69	1261868.10	2073281.57		
	Ground	770.5				
GWC-2R	Casing	769.76	1261942.15	2072755.92	33° 28' 01.499" N	84° 54' 02.317" W
	Bolt	767.13	1261944.58	2072756.60		
	Ground	766.8				
GWC-3R	Casing	775.25	1261647.10	2072841.28	33° 27' 58.586" N	84° 54' 01.285" W
	Bolt	772.32	1261646.62	2072843.63		
	Ground	772.2				
GWC-4R	Casing	757.48	1262046.56	2072953.68	33° 28' 02.546" N	84° 53' 59.992" W
	Bolt	754.88	1262044.70	2072955.00		
	Ground	754.6				
GWC-5R	Casing	782.45	1261439.91	2073027.56	33° 27' 56.550" N	84° 53' 59.069" W
	Bolt	779.69	1261441.13	2073029.78		
	Ground	780.0				
GWC-6R	Casing	788.98	1261732.91	2073479.40	33° 27' 59.480" N	84° 53' 53.760" W
	Bolt	785.95	1261730.98	2073478.53		
	Ground	785.6				

Notes:

NAD83(2011) coordinates established by utilizing eGPS VRS & OPUS Solutions
 Elevations derived from Arcadis BM#1 (El. 758.24)
 Elevations & coordinates are U.S. Survey feet

PHOTOGRAPH LOG

Plant Yates – Monitoring Well and Piezometer Survey
June 2020



Photograph: 1

Description:
Staked Coordinate
Location for GWC-6R



Photograph: 2

Description:
From Staked Location
of GWC-6R to Found
Location of GWC-6R

PHOTOGRAPH LOG

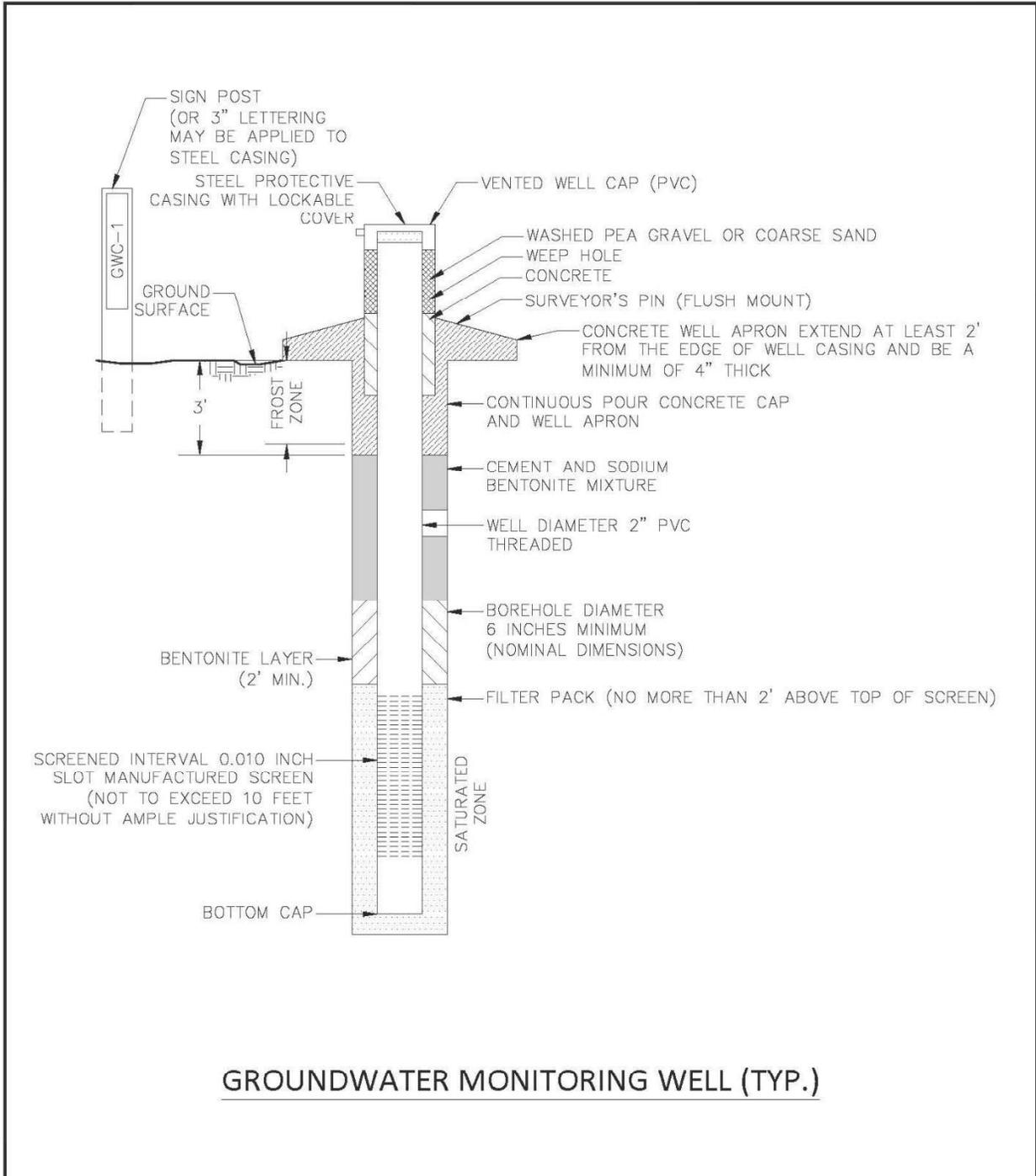
Plant Yates – Monitoring Well and Piezometer Survey
June 2020



Photograph: 3

Description:
Existing Location of
GWC-6R

APPENDIX D. GROUNDWATER MONITORING WELL DETAIL



APPENDIX E. GROUNDWATER SAMPLING PROCEDURES

Groundwater sampling will be conducted using most current USEPA Region 4 Field Quality and Technical Procedures as a guide. The following procedures describe the general methods associated with groundwater sampling at the site. Prior to sampling, the well must be evacuated (purged) to ensure that representative groundwater is obtained. Any item coming in contact with the inside of the well casing or the well water will be kept in a clean container and handled only with gloved hands.

Sample personnel will follow the procedures below at each well to ensure that a representative sample is collected:

1. Check the well, the lock, and the locking cap for damage or evidence of tampering. Record observations and notify Georgia Power if it appears that the well has been compromised.
2. Measure and record the depth to water in all wells to be sampled prior to purging using a water measuring device consisting of probe and measuring tape capable of measuring water levels with accuracy to 0.01 foot. Static water levels will be measured from each well, within a 24-hour period. The water level measuring device will be decontaminated prior to lowering in each well.
3. Install Pump: If a dedicated pump is not present, slowly lower the pump into the well to the midpoint of the well screen or a depth otherwise approved by the hydrogeologist or project scientist. The pump intake must be kept at least two (2) feet above the bottom of the well to prevent disturbance and suspension of any sediment present in the bottom of the well. Record the depth to which the pump is lowered. All non-dedicated pumps and wiring will be decontaminated before use and between well locations using procedures described in the latest version of the Region 4 U.S. Environmental Protection Agency Science and Ecosystem Support Division (SESD) Operating Procedure for Field Equipment Cleaning and Decontamination as a guide.
4. Measure Water Level: Immediately prior to purging, measure the water level again with the pump in the well. Leave the water level measuring device in the well.
5. Purge Well: Begin pumping the well at approximately 100 to 500 milliliters per minute (mL/min). Monitor the water level continually. Maintain a steady flow rate that results in a stabilized water level with 0.3 foot or less of variability. Avoid entraining air in the tubing. Record each adjustment made to the pumping rate and the water level measured immediately after each adjustment.
6. Monitor Indicator Parameters: Monitor and record the field indicator parameters (turbidity, temperature, specific conductance, pH, oxidation reduction potential (ORP), and DO) approximately every three to five minutes. The well is considered stabilized and ready for sample collection when the indicator parameters have stabilized for three consecutive readings at a minimum:

±0.1 for pH

±5% for specific conductance (conductivity)

±10% for DO where DO > 0.5 mg/L (milligrams per liter). If DO < 0.5 mg/L, no stabilization criteria applies

≤5 NTUs for turbidity

Temperature – Record only, not used for stabilization criteria

ORP – Record only, not used for stabilization criteria.

7. Collect samples at a low flow rate and such that drawdown of the water level within the well is stable. Flow rate must be reduced if excessive drawdown is observed during sampling. All sample containers should be filled with minimal turbulence by allowing the groundwater to flow from the tubing gently down the inside of the container.
8. Compliance samples will be unfiltered; however, to determine if turbidity is affecting sample results, duplicate samples may be filtered in the field prior to being placed in a sample container, clearly marked as filtered and preserved. Filtering will be accomplished by the use of 0.45 micron filters on the sampling line. At least two filter volumes of sample will pass through before filling sample containers. Filtered samples are not considered compliance samples and are only used to evaluate the effects of turbidity.
9. All sample bottles will be filled, capped, and placed in an ice containing cooler immediately after sampling where temperature control is required. Samples that do not require temperature control will be placed in a clean and secure container.
10. Sample containers and preservative will be appropriate for the analytical method being used.
11. Information contained on sample container labels will include:
 - a. Name of facility
 - b. Date and time of sampling
 - c. Sample description (well number)
 - d. Sampler's initials
 - e. Preservatives
 - f. Analytical method(s)
12. After samples are collected, samplers will remove all non-dedicated equipment. Upon completion of all activity the well will be closed and locked.
13. Samples will be delivered to the laboratory following appropriate COC and temperature control requirements. The goal for sample delivery will be within 48 hours of collection; however, at no time will samples be analyzed after the method-prescribed hold time.

Throughout the sampling process, new latex or nitrile gloves will be worn by the sampling personnel. A clean pair of new, disposable gloves will be worn each time a different location is sampled, and new gloves will be donned prior to filling sample bottles. Gloves will be discarded after sampling each well and before sampling the next well.

The goal when sampling is to attain a turbidity of less than 5 NTU; however, samples may be collected where turbidity is less than 10 NTU and the stabilization criteria described above are met.

If sample turbidity is greater than 10 NTU and all other stabilization criteria have been met, samplers will continue purging for up to 3 additional hours in order to reduce the turbidity to 10 NTU or less, as follows:

- If turbidity remains above 5 NTU but is less than 10 NTU, and all other parameters are stabilized, the well can be sampled.
- Where turbidity remains above 10 NTU, an unfiltered sample will be collected followed by a filtered sample that has passed through an in-line 0.45-micron filter attached to the discharge (sample collection) tube. Data from filtered samples will only be used to quantify the effects of turbidity on sample results.

Samplers will identify the sample bottle as containing a filtered sample on the sample bottle label and on the COC form.