

GROUNDWATER MONITORING PLAN

PLANT MCINTOSH CCR LANDFILL NO. 4
EFFINGHAM COUNTY, GEORGIA

FOR



Georgia
Power

November 2018



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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. 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 EPD Rules of Solid Waste Management, Chapter 391-3-4.10(6).

Signature: _____

Christie J. Battenhouse

Date: _____

11/19/18



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 Coal Combustion Residuals (CCR) Landfill No. 4 (Landfill No. 4) (Site) at Georgia Power Company's (GPC's) Plant McIntosh. This plan meets the requirements of EPD rules and uses EPD's *Manual for Groundwater Monitoring* dated September 1991 as a guide (EPD, 1991). Groundwater sampling locations are presented in Appendix A, Figure A-1 Compliance Monitoring Network Map.

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. In accordance with the United States Environmental Protection Agency (EPA) Coal Combustion Rule (§257.90), which is incorporated in the Georgia State CCR Rule by reference, a detection monitoring well network for Landfill No. 4 has been installed and certified by a qualified professional engineer. This certification has been placed in the Site's operating record, per EPA Rule requirements, and is included in Part B of the permit application. 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.

2. GEOLOGIC AND HYDROGEOLOGIC CONDITIONS

Plant McIntosh is in southeast Effingham County, Georgia, on the west bank of the Savannah River at Big Kiffer Point. The plant is located within the Coastal Plain Province of Georgia. Coastal Plain sediments are composed of stratified clay, silt, sand, and limestone, resting on much older igneous and metamorphic basement rocks (Cooke, 1943). These older, crystalline rocks dip to the south and east causing the overlying sediments to form a wedge-shaped deposit, which is thickest to the east and the south. The Coastal Plain deposits crop out at the land surface in bands, from the oldest to the most recent, from the Fall Line to the coast. Pleistocene-aged deposits are at the surface in this region. Recharge to the major aquifers in the area is to the northeast of Plant McIntosh, where these formations outcrop (Southern Company Services Earth Science & Environmental Engineering [SCS ES&EE], 2002).

The uppermost aquifer at Plant McIntosh is the surficial aquifer, characterized by silty, sandy clays, clayey silts, silty sands, and fine to medium grained sands. Groundwater at Landfill No. 4 flows from the south-southwest to the north-northeast across the Site (Appendix A, Figure A-2, Potentiometric Surface Contour Map). Based on slug test data collected in a subset of wells in March 2002, hydraulic conductivity measurements were calculated, and the average hydraulic conductivity was determined to be 0.859 ft/day.

3. SELECTION OF WELL LOCATIONS

Groundwater monitoring wells are installed to monitor the uppermost occurrence of groundwater beneath the site. Locations are selected based on disposal cell layouts and site geologic and hydrogeologic considerations. GPC follows the recommendation as stated in Chapter 2 of the *Manual for Groundwater Monitoring* (EPD, 1991) to determine well spacing based on site-specific conditions. Locations are chosen to serve as upgradient (GWA), sidegradient (GWB), or downgradient (GWC) based on groundwater flow direction determined by potentiometric evaluation. The well naming nomenclature is based on EPD's *Industrial Waste Disposal Site Design and Operations Plan – Supplemental Data for Solid Waste Handling Permit* (EPD, undated). Monitoring wells will generally be located outside of areas with frequent auto traffic; however, wells may be installed in heavily trafficked areas when necessary to meet the groundwater monitoring objectives of the EPD rules.

A map depicting monitoring well locations is included in Appendix A, Figure A-1 Compliance Monitoring Network Map. Appendix A Table A-1 includes a tabulated list of individual monitoring wells with well construction details such as location coordinates, top-of-casing elevation, well depths and screened intervals. Any change to the groundwater monitoring network will be made by a minor modification to the permit pursuant to Georgia Rules of Solid Waste Management, Chapter 391-3-4-.02(4)(b)7.

4. MONITORING WELL DRILLING, CONSTRUCTION, ABANDONMENT, AND REPORTING

4.1 Drilling

A variety of well drilling methods are available for installing groundwater wells. Drilling methodology may include, but not be limited to: hollow stem augers, direct push, air rotary, mud rotary, or 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 site-specific geology. Drilling equipment shall be decontaminated before use and between borehole locations using the procedures described in the latest version of the Region 4 EPA Science and Ecosystem Support Division (SESD) *Operating Procedure for Field Equipment Cleaning and Decontamination* (EPA, SESDGUID-205-R3) as a general guide for best practices.

Sampling and/or coring may be used to help determine the stratigraphy and geology. Samples will be logged by a qualified groundwater scientist. Screen depths will be chosen based on the depth of the uppermost aquifer.

All drilling for any subsurface hydrologic investigation, installation or abandonment of groundwater monitoring wells will be performed by a driller that has, at the time of installation, a performance bond on file with the Water Well Standards Advisory Council. Monitoring wells shall be installed using the latest version of the Region 4 EPA SESD *Operating Procedure for Design and Installation of Monitoring Wells* (EPA, SESDGUID-205-R1) as a general guide for best practices.

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.

4.2.1 Well Casings and Screens

American Society for Testing and Materials International (ASTM), National Science Foundation (NSF) rated, Schedule 40, 2-inch 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 Site.

4.2.2 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 steps

prove ineffective for developing a well with sufficient yield or acceptable turbidity, further steps will be taken to assure 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 dual-wall 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 dual-wall well screens will be installed following general industry standards and using the latest version of the Region 4 EPA SESD *Operating Procedure for Design and Installation of Monitoring Wells* (EPA, SESDGUID-205-R1) as a general guide for best practices.

4.2.3 Filter Pack and Annular Seal

The materials used to construct the filter pack will be clean quartz sand of a size that is appropriate for the screened formation. Fabric filters will not be 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 1 to 2 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 2 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.

4.2.4 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 B, Groundwater Monitoring Well Detail, illustrates the general design and construction details for a monitoring well.

4.2.5 Well Development

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 10 nephelometric turbidity units (NTUs); however, formation-specific conditions may not allow this target to be accomplished. Additionally, the stabilization criteria contained in Appendix C 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.

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 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, the latest version of the Region 4 EPA SEDS *Operating Procedure for Design and Installation of Monitoring Wells* (EPA, SEDSGUID-205-R1) and using the *Manual for Groundwater Monitoring* (EPD, 1991), and Georgia Water Well Standards Act (EPD, 1985) as guides. The wells will be abandoned under the direction of a qualified groundwater scientist. Neat Portland cement or bentonite will be used as appropriate to complete abandonment and seal the well borehole. If appropriate, piezometers or groundwater wells located within the footprint of a future expansion to Landfill No. 4 will be over-drilled prior to abandonment.

4.4 Documentation

The following information documenting the construction and development of each well will be submitted to EPD by a qualified groundwater scientist after completing all planned well installations.

- Name of drilling contractor and type of drill rig
- Documentation that the driller, at the time the monitoring wells were installed, had a bond on file with the Water Well Advisory Council
- Dates of drilling and initial well emplacement
- Drilling method and drilling fluid if used

- Well location (± 0.5 ft.)
- Borehole diameter and well casing diameter
- Well depth (± 0.1 ft.)
- Lithologic logs
- Well casing materials
- Screen materials and design
- Screen length
- Screen slot size
- Filter pack material/size and volume
- Sealant materials and volume
- Documentation of ground surface elevation (± 0.01 feet)
- Documentation of top of casing elevation (± 0.01 feet)
- 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. Eight independent samples from each groundwater well were 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 will be at least semiannual during the active life of the Site and the post-closure care period. If required, assessment monitoring will be performed per Georgia Chapter 391-3-4-.10, 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 (EPD, 2015).

As shown on Table 2, Analytical Methods, the groundwater samples will be analyzed using methods specified in EPA Manual SW-846, EPA 600/4-79-020, Standard Methods for the Examination of Water and Wastewater (SM18-20), EPA 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 practical quantification limit to detect natural background conditions at the Site. 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 0.2 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
	ORP	X	X
	Turbidity	X	X
	Specific Conductance	X	X
	Dissolved Oxygen	X	X
Appendix III (Detection)	Boron	X	X
	Calcium	X	X
	Chloride	X	X
	Fluoride	X	X
	pH	X	X
	Sulfate	X	X
	Total Dissolved Solids	X	X
Appendix IV (Assessment)	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	6010B/6020
Calcium	6010B/6020
Chloride	300.0/300.1/9250/9251/9253/9056A
Fluoride	300.0/300.1/9214/9056A
pH	150.1field/90405C
Sulfate	9035/9036/9038300.0/300.1/9056A
Total Dissolved Solids (TDS)	160/2540C
Antimony	EPA 7040/7041/6010B/6020
Arsenic	EPA 7060A/7061A/6010B/6020
Barium	EPA 7080A/7081/6010B/6020
Beryllium	EPA 7090/7091/6010B/6020
Cadmium	EPA 7130/7131A/6020
Chromium	EPA 7190/7191/6010B/6020
Cobalt	EPA 7200/7201/6010B/6020
Fluoride	300.0/300.1/9214/9056A
Lead	EPA 7420/7421/6010B/6020
Lithium	6010/6020B
Mercury	7470
Molybdenum	6010/6020B
Selenium	EPA 7740/7741A/6010B/6020
Thallium	EPA 7840/7841/6010/6020
Radium 226 and 228 combined	EPA 903/9320/9315

If any parameters contained in Appendix I or II of 40 CFR 258, Subpart E, as amended, 56 Fed. Reg. 51032 - 51039 (EPA, 1991) have been detected previously at statistically significant levels above background concentrations, these parameters will continue to be monitored.

6. SAMPLE COLLECTION

During each sampling event, samples will be collected and handled in accordance with the procedures specified in Appendix C, Groundwater Sampling Procedures. Sampling procedures were developed using standard industry practice and EPA Region 4 Field Branches Quality System and Technical Procedures. 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 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. Groundwater wells that are determined to be dry for two consecutive sampling events will be replaced unless an alternate schedule has been approved by EPD.

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
- 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 regarding 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.

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

9. REPORTING RESULTS

A semiannual groundwater report that documents the results of sampling and analysis will be submitted to EPD. At a minimum, semiannual 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. Chain-of custody (COC) documentation.
14. Field sampling logs including field instrument calibration, indicator parameters, and parameter stabilization data.
15. Documentation of non-functioning wells.
16. Table of current analytical results for each well, highlighting statistically significant increases, and concentrations above maximum contaminant level (MCL).

17. Statistical analyses.
18. 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.

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. (§257.93(f)(3)).
2. A control chart approach that gives control limits for each constituent. (§257.93(f)(4)).
3. Another statistical test method (such as prediction limits or control charts) that meets the performance standards of §257.93(g) (§257.93(f)(5)). 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 §257.93(g).

Based on site-specific conditions, statistical methods may be intra-well, inter-well, or a 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

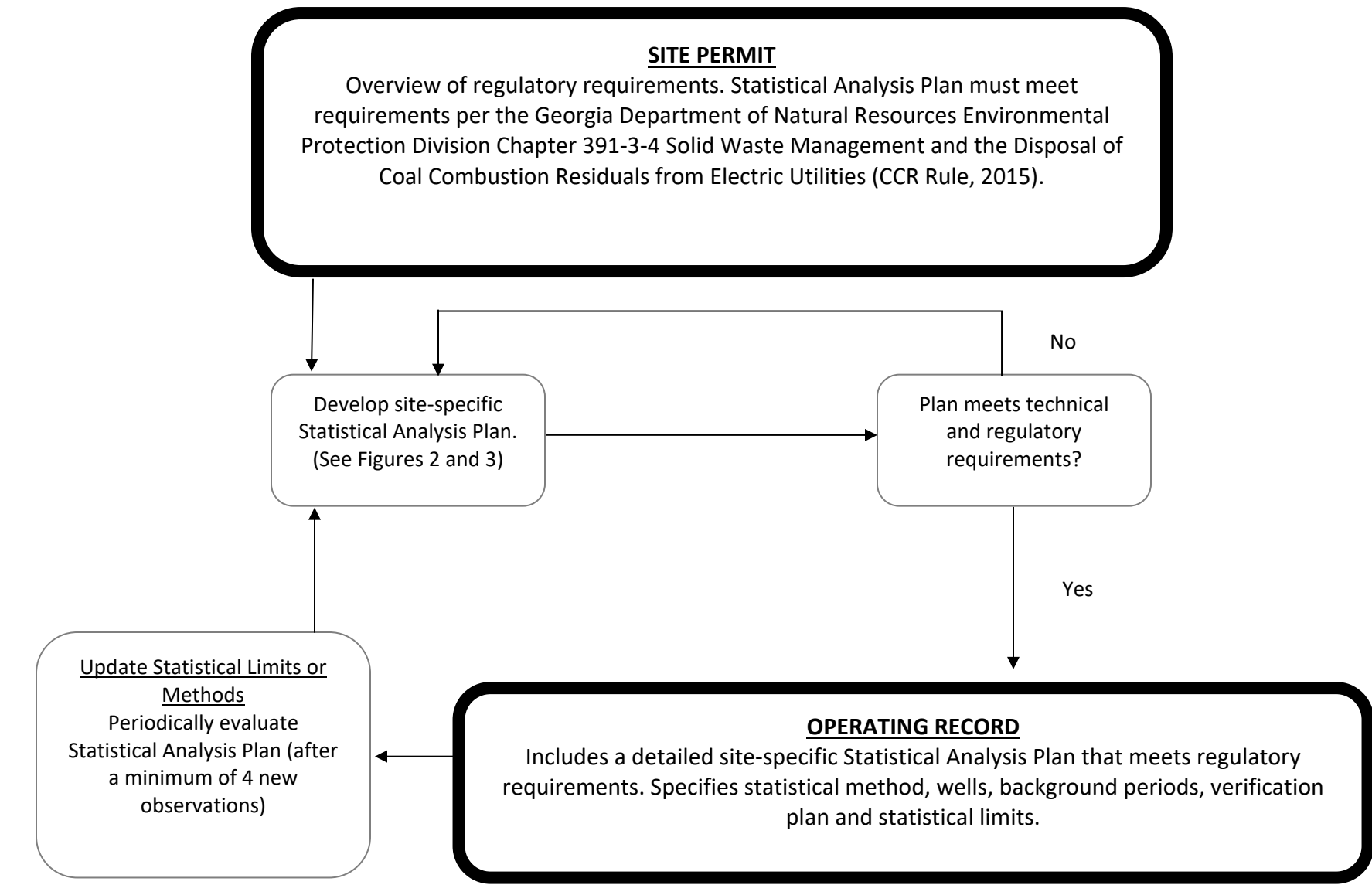
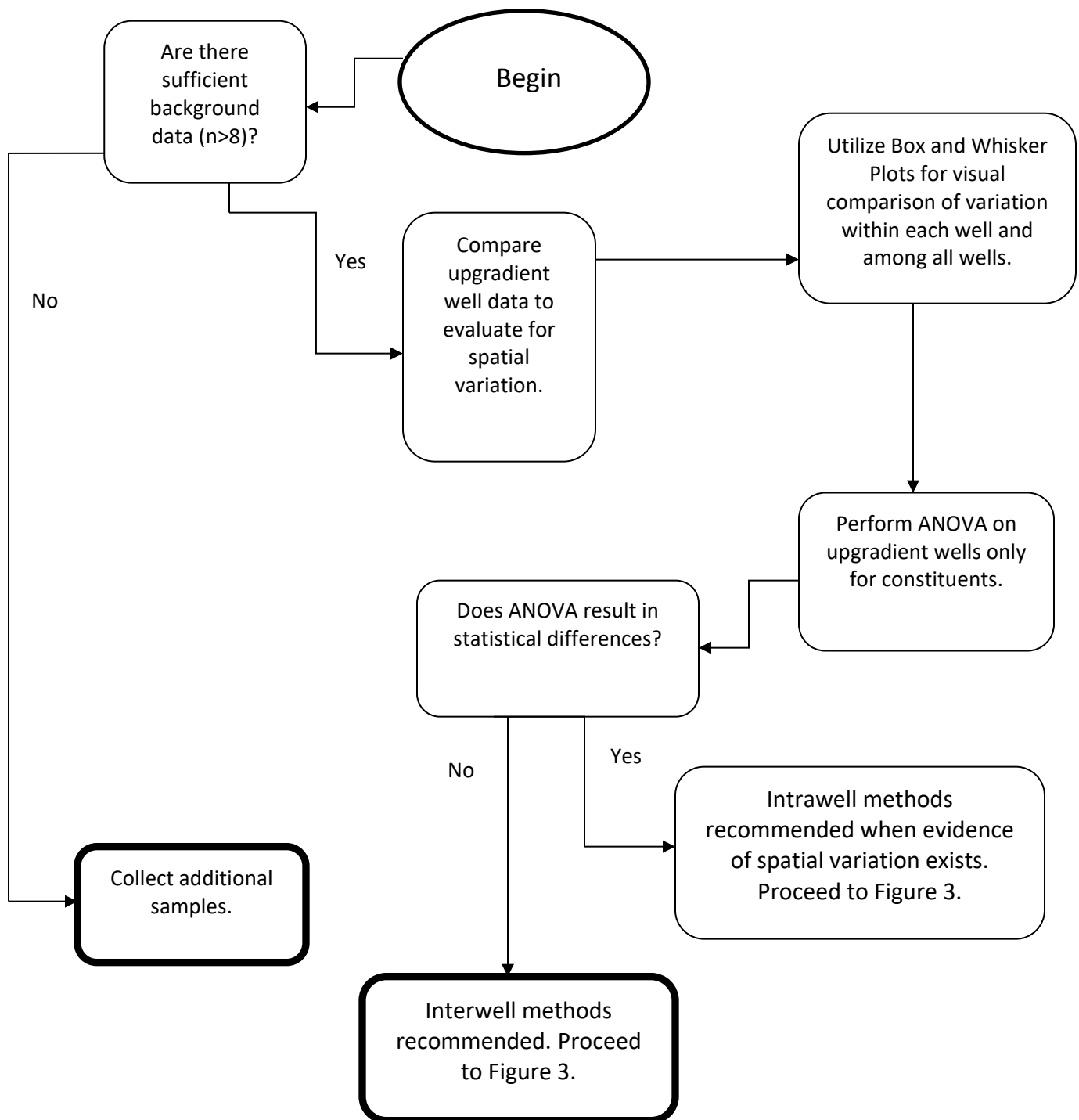
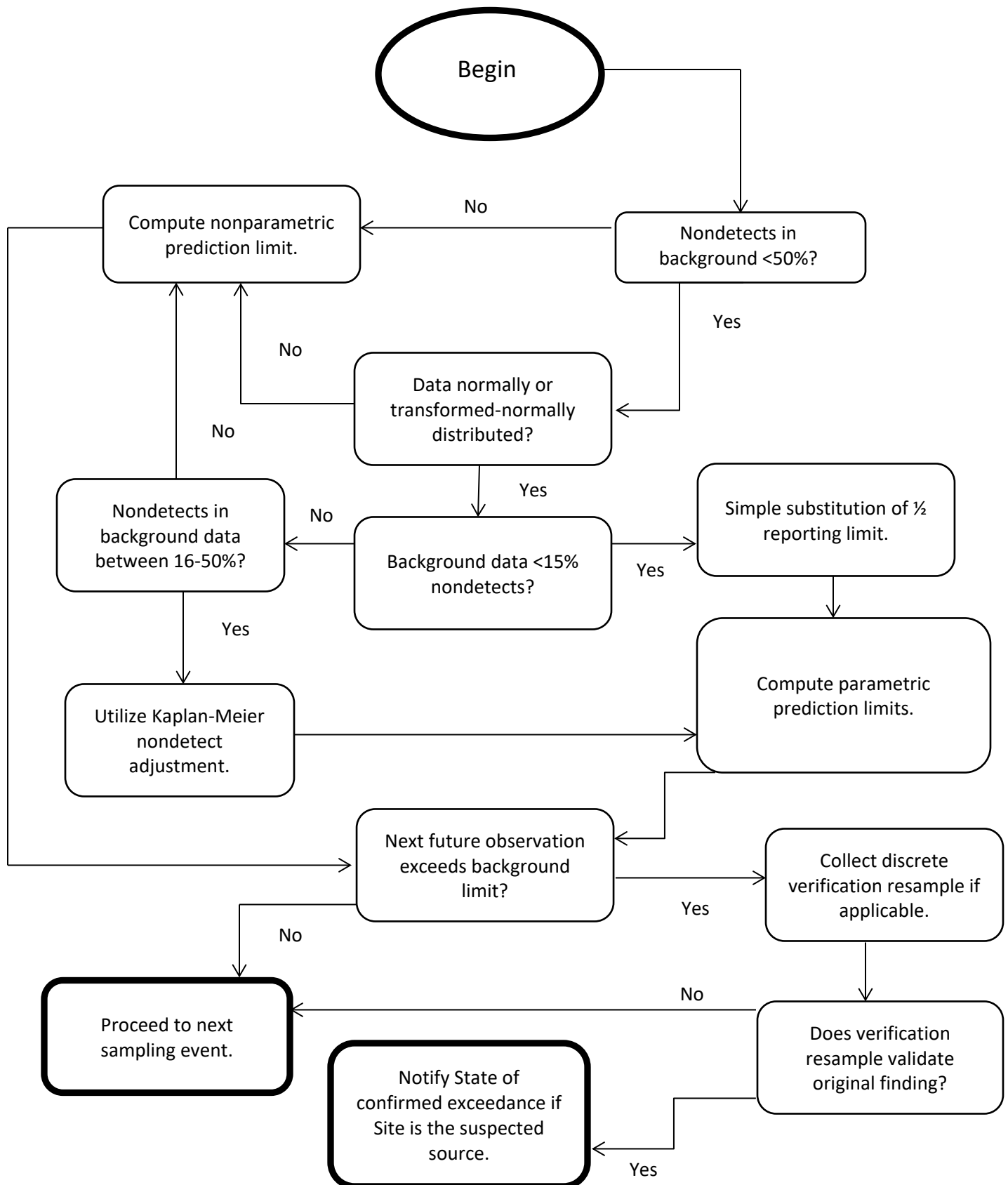


FIGURE 2. DECISION LOGIC FOR DETERMINING APPROPRIATE STATISTICAL METHOD



n = Number of sampling events
ANOVA = Analysis of Variance Test

FIGURE 3. DECISION LOGIC FOR COMPUTING PREDICTION LIMITS



11. REFERENCES

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APPENDIX

- A. MONITORING SYSTEM DETAILS
 - FIGURE A-1 - COMPLIANCE MONITORING NETWORK MAP
 - FIGURE A-2 - POTENTIOMETRIC SURFACE CONTOUR MAP
 - TABLE A-1 - MONITORING NETWORK WELL DETAILS
 - TABLE A-2 - WATER LEVEL MONITORING PIEZOMETER DETAILS
 - BORING AND WELL CONSTRUCTION LOGS
- B. GROUNDWATER MONITORING WELL DETAIL
- C. GROUNDWATER SAMPLING PROCEDURE

Appendix A – Monitoring System Details

FIGURE A-1 COMPLIANCE MONITORING NETWORK MAP

FIGURE A-2 POTENTIOMETRIC SURFACE CONTOUR MAP

TABLE A-1 MONITORING NETWORK WELL DETAILS

TABLE A-2 WATER LEVEL MONITORING NETWORK PIEZOMETER DETAILS

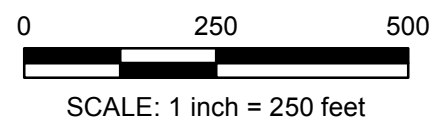
BORING AND WELL CONSTRUCTION LOGS



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

LEGEND

- ⊕ Downgradient Monitoring Wells (GWC)
- ⊕ Sidegradient Monitoring Wells (GWB)
- ⊕ Upgradient Monitoring Wells (GWA)
- Approximate Property Boundary
- Cell 1 Approximate Boundary
- Cell 2A Approximate Boundary
- Cell 2B Approximate Boundary (Not Yet Constructed)



Groundwater Monitoring Plan
Plant McIntosh Landfill No. 4
Effingham County, Georgia

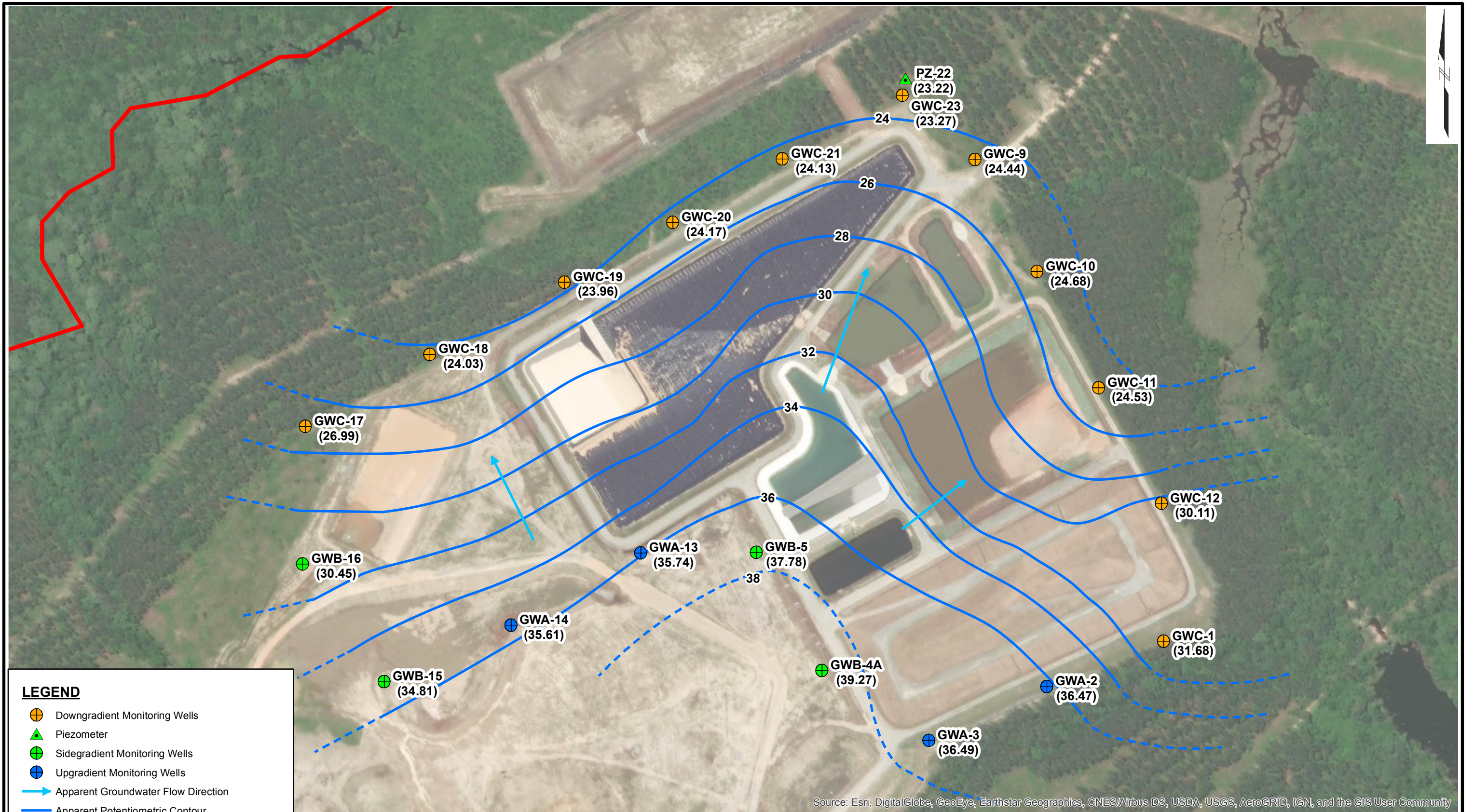
Georgia Power Company
Atlanta, Georgia



Project No. 1800205

LANDFILL NO. 4
COMPLIANCE MONITORING
NETWORK MAP

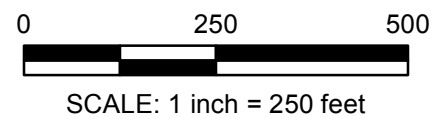
Prepared November 2018 Fig. A-1



LEGEND

- Downgradient Monitoring Wells
- Piezometer
- Sidegradient Monitoring Wells
- Upgradient Monitoring Wells
- Apparent Groundwater Flow Direction
- Apparent Potentiometric Contour
- Inferred Potentiometric Contour
- Approximate Property Boundary

(31.68) = Groundwater elevation measured 07/09/18
Elevations are in feet relative to North American Vertical Datum (NAVD)88



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Groundwater Monitoring Plan
Plant McIntosh Landfill No. 4
Effingham County, Georgia

Georgia Power Company
Atlanta, Georgia



Project No. 1800205

LANDFILL NO. 4
POTENTIOMETRIC SURFACE
CONTOUR MAP

Prepared November 2018 Fig. A-2

Table A-1 Monitoring Network Well Details
Groundwater Monitoring Plan
Georgia Power Company
Landfill No. 4
Plant McIntosh
Effingham County, Georgia

Well ID	Northing	Easting	Ground Surface Elevation (ft)	Top of Casing Elevation (ft)	Total Depth (ft bTOC)	Bottom of Well Elevation (ft)	Depth to Top of Screen (ft bTOC)	Depth to Bottom of Screen (ft bTOC)	Top of Screen Elevation (ft)	Bottom of Screen Elevation (ft)	Screen Length (ft)	Purpose	Installation Date
GWC-1	855431.30	958419.36	44.06	47.06	28.50	18.56	18.00	28.00	29.06	19.06	10.00	Downgradient Monitoring	08/17/2004
GWA-2	855308.90	958103.93	50.64	53.64	28.50	25.14	18.00	28.00	35.64	25.64	10.00	Upgradient Monitoring	08/17/2004
GWA-3	855163.12	957786.21	54.93	57.93	38.50	19.43	28.00	38.00	29.93	19.93	10.00	Upgradient Monitoring	08/17/2004
GWB-4A	855352.55	957496.51	62.20	64.98	39.00	25.98	28.60	38.60	36.38	26.38	10.00	Sidegradient Monitoring	08/4/2016
GWB-5	855671.33	957319.99	59.29	62.29	41.50	20.79	31.00	41.00	31.29	21.29	10.00	Sidegradient Monitoring	08/18/2004
GWC-9	856732.82	957909.70	50.56	53.56	38.50	15.06	28.00	38.00	25.56	15.56	10.00	Downgradient Monitoring	08/16/2004
GWC-10	856429.88	958077.92	46.55	49.55	33.50	16.05	23.00	33.00	26.55	16.55	10.00	Downgradient Monitoring	08/19/2004
GWC-11	856116.10	958244.61	54.97	57.97	43.50	14.47	33.00	43.00	24.97	14.97	10.00	Downgradient Monitoring	08/18/2004
GWC-12	855803.80	958413.62	54.26	57.26	41.50	15.76	31.00	41.00	26.26	16.26	10.00	Downgradient Monitoring	08/18/2004
GWA-13	855669.87	957006.97	57.74	60.85	40.11	20.74	29.81	39.81	31.04	21.04	10.00	Upgradient Monitoring	10/23/2015
GWA-14	855474.41	956656.96	58.50	61.40	49.90	11.50	39.60	49.60	21.80	11.80	10.00	Upgradient Monitoring	10/27/2015
GWB-15	855322.23	956314.50	53.42	56.72	40.30	16.42	30.00	40.00	26.72	16.72	10.00	Sidegradient Monitoring	10/27/2015
GWB-16	855640.15	956094.66	51.33	54.60	40.27	14.33	29.97	39.97	24.63	14.63	10.00	Sidegradient Monitoring	10/27/2015
GWC-17	856011.50	956102.41	51.14	54.19	40.05	14.14	29.75	39.75	24.44	14.44	10.00	Downgradient Monitoring	10/28/2015
GWC-18	856205.99	956438.21	56.48	59.68	42.20	17.48	31.90	41.90	27.78	17.78	10.00	Downgradient Monitoring	10/29/2015
GWC-19	856400.89	956801.55	50.67	53.62	36.95	16.67	26.65	36.65	26.97	16.97	10.00	Downgradient Monitoring	10/29/2015
GWC-20	856562.11	957093.85	44.10	47.23	30.13	17.10	19.83	29.83	27.40	17.40	10.00	Downgradient Monitoring	10/30/2015
GWC-21	856734.08	957390.27	42.00	45.16	27.16	18.00	16.70	26.70	28.46	18.46	10.00	Downgradient Monitoring	11/4/2015
GWC-23	856905.66	957714.42	NA	52.16	33.70	18.46	23.40	33.40	28.76	18.76	10.00	Downgradient Monitoring	05/26/2016

Notes:

bTOC = below top of casing

ft = feet

NA = Not available

Northing and easting are in feet NAD83, State Plane Georgia East Zone

Elevations are in feet relative to NAVD88

Well construction information taken from the October 2017 Landfill No. 4 Well Design, Installation, Development, and Decommissioning Report

All wells installed by Southern Company Services (SCS)

Table A-2 Water Level Monitoring Piezometer Details
Groundwater Monitoring Plan
 Georgia Power Company
 Landfill No. 4
 Plant McIntosh
 Effingham County, Georgia

Well ID	Northing	Easting	Ground Surface Elevation (ft)	Top of Casing Elevation (ft)	Total Depth (ft bTOC)	Bottom of Well Elevation (ft)	Depth to Top of Screen (ft bTOC)	Depth to Bottom of Screen (ft bTOC)	Top of Screen Elevation (ft)	Bottom of Screen Elevation (ft)	Screen Length (ft)	Purpose	Installation Date
PZ-22	856950.77	957722.65	47.42	51.07	31.65	19.42	21.35	31.35	29.72	19.72	10.00	Water Level	11/4/2015

Notes:

bTOC = below top of casing

ft = feet

Northing and easting are in feet NAD83, State Plane Georgia East Zone

Elevations are in feet relative to NAVD88

Monitoring well GWC-23 was installed as a replacement for PZ-22

Well construction information taken from the October 2017 Landfill No. 4 Well Design, Installation, Development, and Decommissioning Report

Well installed by Southern Company Services (SCS)

SOUTHERN COMPANY SERVICES

WELL CONSTRUCTION LOG

SITE Cell #1

PROJECT

McIntosh Monofill

WELL NO.

LOCATION

Rincon, GA

GWC-1

DATE STARTED 8/17/2004

ENDED

8/17/2004

PREPARED

JDP

	DEPTH	ELEVATION
TOP OF CASING		47.06
TOP OF CONCRETE		44.32
GROUND SURFACE	0	44.06
PROTECTIVE CASING DIAMETER: TYPE: 4"x4"x5' Standpipe and Protector Cap BOTTOM OF PROTECTIVE CASING	2	42.06
BACKFILL MATERIAL TYPE: 3/8" Bentonite Chips		
RISER CASING DIAMETER: 2" TYPE: 480 Thread Flush Joint SCH 40 PVC		
TOP OF SEAL	10.9	33.16
ANNULAR SEAL TYPE: 1/4" Bentonite Pellets TOP OF FILTER PACK	12.9	31.16
FILTER PACK TYPE: DSI #2 Filter Sand BOTTOM OF RISER/ TOP OF SCREEN	15	29.06
SCREEN DIAMETER: 2" TYPE: PVC PrePac OPENING WIDTH: 0.010" OPENING TYPE: Slotted BOTTOM OF SCREEN	25	19.06
BOTTOM OF CASING	25.5	18.56
BOTTOM OF HOLE	25.5	18.56
HOLE DIA: 7 5/8"		

**DRILLING LOG
GEOLOGICAL SERVICES**

Hole No. **GWC-1**

Sheet 1 of 2

SITE McIntosh Monofill		HOLE DEPTH 25.5 ft.	SURF.ELEV. 44.06
LOCATION Rincon, GA		COORDINATES N 855431.295	E 958419.36
ANGLE NA	BEARING NA	CONTRACTOR SCS	DRILL NO.
DRILLING METHOD Hollow Stem Auger		NO. SAMPLES 1	NO. U.D. SAMPLES N/A
CASING SIZE 	LENGTH 	CORE SIZE 	TOTAL % REC. N/A
WATER TABLE DEPTH 		ELEV. 	TIME AFTER COMP.
TYPE GROUT 		QUANTITY 	MIX
DRILLER B. Filipovich		RECORDER John Pugh	APPROVED
		DRILLING START DATE 8/17/2004	DRILLING COMP. DATE 8/17/2004

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD
				From	To	Blows			
0	44.06								
1	43.06	brownish-yellow silty fine-grained SAND							
2	42.06								
3	41.06								
4	40.06	yellowish-brown sandy CLAY							
5	39.06	clayey SAND							
6	38.06								
7	37.06								
8	36.06	brownish-yellow sandy CLAY							
9	35.06								
10	34.06								
11	33.06	brownish-yellow silty SAND, moist					Water Depth at 24 hours: 11.2 ft		
12	32.06								
13	31.06								
14	30.06								
15	29.06								
16	28.06								
17	27.06	brownish-yellow sandy clayey SILT, wet					Water Depth at time of boring: 17 ft		
18	26.06								
19	25.06								
20	24.06	brownish-yellow silty clayey very fine-grained SAND, wet							
21	23.06								
22	22.06								
23	21.06								
24	20.06								

**DRILLING LOG
GEOLOGICAL SERVICES**

Hole No. GWC-1

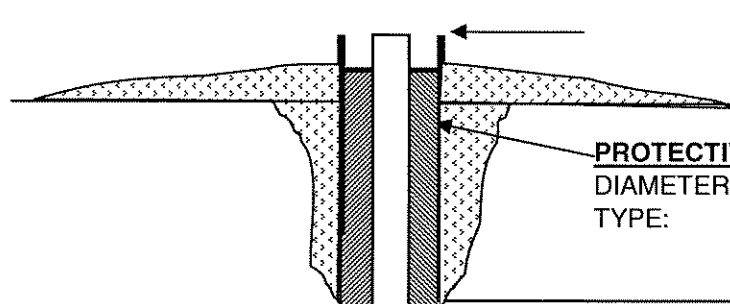
Sheet 2 of 2

SITE		McIntosh Monofill		TOTAL DEPTH		25.5 ft.		SURF.ELEV.		44.06	
Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD		
				From	To	Blows					
25	19.06	brownish-yellow silty clayey very fine-grained SAND									
26											
27											
28											
29											
30											
31											
32											
33											
34											
35											
36											
37											
38											
39											
40											
41											
42											
43											
44											
45											
46											
47											
48											
49											
50											
51											
52											
53											
54											
55											
56											

SOUTHERN COMPANY SERVICES

WELL CONSTRUCTION LOG

WELL CONSTRUCTION LOG			PROJECT		McIntosh Monofill		WELL NO.
SITE			Cell #1		LOCATION		Rincon, GA
DATE STARTED			8/17/2004		ENDED		8/17/2004
PREPARED			JDP				

**PROTECTIVE CASING**

DIAMETER:

TYPE:

TOP OF CASING

DEPTH

ELEVATION

TOP OF CONCRETE

GROUND SURFACE

4"x4"x5' Standpipe and
Protector Cap

BOTTOM OF PROTECTIVE CASING

2

48.64

BACKFILL MATERIAL

TYPE:

3/8" Bentonite Chips

RISER CASING

DIAMETER:

2"

TYPE:

480 Thread Flush Joint
SCH 40 PVC

TOP OF SEAL

10.5

40.14

ANNULAR SEAL

TYPE:

1/4" Bentonite Pellets

TOP OF FILTER PACK

12.5

38.14

FILTER PACK

TYPE:

DSI #2 Filter Sand

BOTTOM OF RISER/
TOP OF SCREEN

15

35.64

SCREEN

DIAMETER:

2"

TYPE:

PVC PrePac

OPENING WIDTH:

0.010"

OPENING TYPE:

Slotted

BOTTOM OF SCREEN

25

25.64

BOTTOM OF CASING

25.5

25.14

BOTTOM OF HOLE

25.5

25.14

HOLE DIA: 7 5/8"

DRILLING LOG
GEOLOGICAL SERVICES

Hole No. **GWA-2**

Sheet 1 of 2

SITE McIntosh Monofill		HOLE DEPTH 25.5 ft.	SURF.ELEV. 50.64
LOCATION Rincon, GA		COORDINATES N 855308.895	E 958103.93
ANGLE _____	BEARING _____	CONTRACTOR SCS	DRILL NO. _____
DRILLING METHOD Hollow Stem Auger	NO. SAMPLES 1	NO. U.D. SAMPLES _____	N/A
CASING SIZE _____	LENGTH _____	CORE SIZE _____	TOTAL % REC. N/A
WATER TABLE DEPTH _____	ELEV. _____	TIME AFTER COMP. _____	DATE TAKEN _____
TYPE GROUT _____	QUANTITY _____	MIX _____	DRILLING START DATE 8/17/2004
DRILLER Brad Filipovich	RECORDER John Pugh	APPROVED _____	DRILLING COMP. DATE 8/17/2004

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD
				From To	Blows	N			
0	50.64								
1	49.64	brown silty fine-grained SAND							
2	48.64								
3	47.64	brownish-yellow clayey silty SAND							
4	46.64								
5	45.64								
6	44.64	purplish-brown clayey silty SAND							
7	43.64								
8	42.64								
9	41.64								
10	40.64	tan/brown clayey SAND							
11	39.64								
12	38.64	brownish-yellow sandy CLAY							
13	37.64						Water Depth at 24 hours: 12.97 ft		
14	36.64	brownish-yellow sandy silty CLAY, moist							
15	35.64								
16	34.64								
17	33.64								
18	32.64								
19	31.64								
20	30.64	tan/orange clayey silty fine-grained SAND, moist							
21	29.64								
22	28.64						Water Depth at time of boring: 22 ft		
23	27.64								
24	26.64	brownish-yellow silty clayey fine-grained SAND, wet							

**DRILLING LOG
GEOLOGICAL SERVICES**

Hole No. GWA-2

Sheet 2 of 2

SITE **McIntosh Monofill** TOTAL DEPTH **25.5 ft.** SURF. ELEV. **50.64**

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD
				From To	Blows	N			
25	25.64	brownish-yellow silty clayey fine-grained SAND, wet							
26	24.64								
27									
28									
29									
30									
31									
32									
33									
34									
35									
36									
37									
38									
39									
40									
41									
42									
43									
44									
45									
46									
47									
48									
49									
50									
51									
52									
53									
54									
55									
56									

SOUTHERN COMPANY SERVICES

WELL CONSTRUCTION LOG

SITE Cell #1

PROJECT

McIntosh Monofill

WELL NO.

LOCATION

Rincon, GA

GWA-3

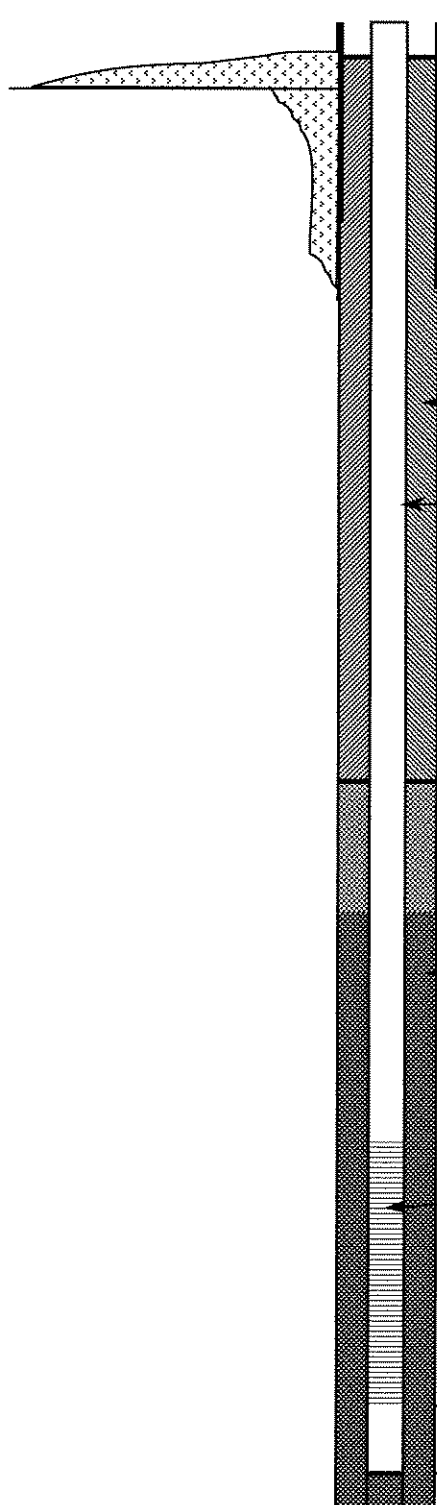
DATE STARTED 8/17/2004

ENDED

8/17/2004

PREPARED

JDP

	DEPTH	ELEVATION
TOP OF CASING		57.93
TOP OF CONCRETE		55.15
GROUND SURFACE	0	54.93
 <p>PROTECTIVE CASING DIAMETER: TYPE: 4"x4"x5' Standpipe and Protector Cap BOTTOM OF PROTECTIVE CASING</p>	2	52.93
<p>BACKFILL MATERIAL TYPE: 3/8" Bentonite Chips</p> <p>RISER CASING DIAMETER: 2" TYPE: 480 Thread Flush Joint SCH 40 PVC</p>		
TOP OF SEAL	19.9	35.03
<p>ANNULAR SEAL TYPE: 1/4" Bentonite Pellets TOP OF FILTER PACK</p>	21.9	33.03
<p>FILTER PACK TYPE: DSI #2 Filter Sand BOTTOM OF RISER/ TOP OF SCREEN</p>	25	29.93
<p>SCREEN DIAMETER: 2" TYPE: PVC PrePac OPENING WIDTH: 0.010" OPENING TYPE: Slotted BOTTOM OF SCREEN</p>	35	19.93
BOTTOM OF CASING	35.5	19.43
BOTTOM OF HOLE	35.5	19.43
HOLE DIA: 7 5/8"		

**DRILLING LOG
GEOLOGICAL SERVICES**

Hole No. **GWA-3**

Sheet 1 of 2

SITE **McIntosh Monofill** HOLE DEPTH **35.5 ft.** SURF.ELEV. **54.93**
 LOCATION **Rincon, GA** COORDINATES N **855163.123** E **957786.21**
 ANGLE _____ BEARING _____ CONTRACTOR **SCS** DRILL NO. _____
 DRILLING METHOD **Hollow Stem Auger** NO. SAMPLES **1** NO. U.D. SAMPLES **N/A**
 CASING SIZE _____ LENGTH _____ CORE SIZE _____ TOTAL % REC. **N/A**
 WATER TABLE DEPTH _____ ELEV. _____ TIME AFTER COMP. _____ DATE TAKEN _____
 TYPE GROUT _____ QUANTITY _____ MIX _____ DRILLING START DATE **8/17/2004**
 DRILLER **Brad Filipovich** RECORDER **John Pugh** APPROVED _____ DRILLING COMP. DATE **8/17/2004**

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	ROD
				From To	Blows	N			
0	54.93								
1	53.93	light brown silty fine-grained SAND							
2	52.93								
3	51.93								
4	50.93								
5	49.93	yellowish-brown clayey fine-grained SAND							
6	48.93								
7	47.93								
8	46.93	yellowish-brown silty sandy CLAY							
9	45.93								
10	44.93	reddish-orange silty CLAY							
11	43.93								
12	42.93								
13	41.93	reddish-yellow silty sandy CLAY							
14	40.93								
15	39.93								
16	38.93								
17	37.93								
18	36.93	purplish-red silty clayey very fine-grained SAND							
19	35.93								
20	34.93						Water Depth at 24 hours: 20.1 ft		
21	33.93								
22	32.93								
23	31.93								
24	30.93	reddish-yellow silty CLAY							

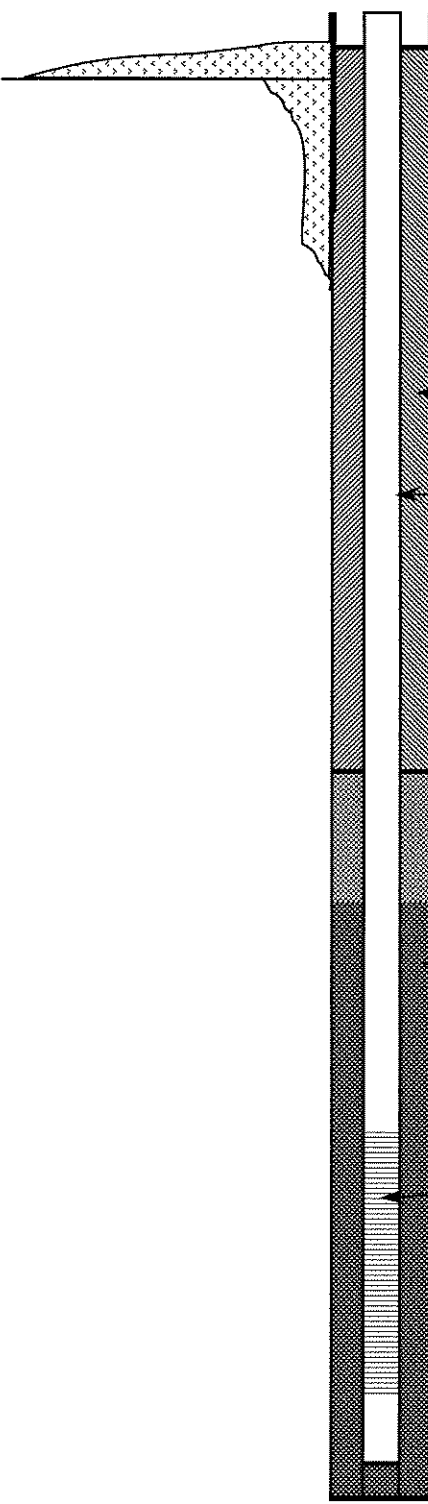
**DRILLING LOG
GEOLOGICAL SERVICES**

Hole No. GWA-3

Sheet 2 of 2

SITE **McIntosh Monofill** TOTAL DEPTH **35.5 ft.** SURF.ELEV. **54.93**

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD					
				From To	Blows	N								
25	29.93	purplish-red clayey silty fine-grained SAND, wet					Water Depth at time of boring: 27 ft							
26	28.93													
27	27.93													
28	26.93						wet light orange/tan clayey silty fine-grained SAND							
29	25.93													
30	24.93													
31	23.93													
32	22.93	gray CLAY												
33	21.93													
34	20.93													
35	19.93													
36														
37														
38														
39														
40														
41														
42														
43														
44														
45														
46														
47														
48														
49														
50														
51														
52														
53														
54														
55														
56														

SOUTHERN COMPANY SERVICES			
WELL CONSTRUCTION LOG		PROJECT	McIntosh Monofill
SITE	Cell #1	LOCATION	Rincon, GA
DATE STARTED	8/17/2004	ENDED	8/17/2004
		PREPARED	JDP
		WELL NO. GWC-4	
			DEPTH
			ELEVATION
TOP OF CASING			65.14
TOP OF CONCRETE			62.41
GROUND SURFACE			0
			
PROTECTIVE CASING DIAMETER: 4"x4"x5' TYPE: Protector Pipe			
BOTTOM OF PROTECTIVE CASING			2
			60.14
BACKFILL MATERIAL TYPE: 3/8" Bentonite Chips			
RISER CASING DIAMETER: 2" TYPE: 480 Thread Flush Joint SCH 40 PVC			
TOP OF SEAL			24.5
			37.64
ANNULAR SEAL TYPE: 1/4" Bentonite Pellets			
TOP OF FILTER PACK			26.5
			35.64
FILTER PACK TYPE: DSI #2 Filter Sand			
BOTTOM OF RISER/ TOP OF SCREEN			30
			32.14
SCREEN DIAMETER: 2" TYPE: PVC PrePac OPENING WIDTH: 0.010" OPENING TYPE: Slotted			
BOTTOM OF SCREEN			40
			22.14
BOTTOM OF CASING			40.5
			21.64
BOTTOM OF HOLE			40.5
			21.64
HOLE DIA: 7 5/8"			

**DRILLING LOG
GEOLOGICAL SERVICES**

Hole No. **GWC-4**

Sheet 1 of 2

SITE **McIntosh Monofill** HOLE DEPTH **40.5 ft.** SURF.ELEV. **62.14**
 LOCATION **Rincon, GA** COORDINATES N **855369.714** E **957498.828**
 ANGLE _____ BEARING _____ CONTRACTOR **SCS** DRILL NO. _____
 DRILLING METHOD **Hollow Stem Auger** NO. SAMPLES **1** NO. U.D. SAMPLES **N/A**
 CASING SIZE _____ LENGTH _____ CORE SIZE _____ TOTAL % REC. **N/A**
 WATER TABLE DEPTH _____ ELEV. _____ TIME AFTER COMP. _____ DATE TAKEN _____
 TYPE GROUT _____ QUANTITY _____ MIX _____ DRILLING START DATE **8/17/2004**
 DRILLER **Brad Filipovich** RECORDER **John Pugh** APPROVED _____ DRILLING COMP. DATE **8/17/2004**

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD
				From To	Blows	N			
0	62.14								
1	61.14	light brown silty fine-grained SAND							
2	60.14								
3	59.14								
4	58.14	reddish-yellow silty clayey SAND							
5	57.14								
6	56.14	yellowish-red sandy CLAY							
7	55.14								
8	54.14	reddish-yellow silty SAND							
9	53.14								
10	52.14	reddish-yellow silty sandy CLAY							
11	51.14								
12	50.14								
13	49.14	purplish-brown silty CLAY							
14	48.14								
15	47.14	reddish-brown silty CLAY							
16	46.14								
17	45.14								
18	44.14								
19	43.14								
20	42.14	yellowish-brown sandy CLAY							
21	41.14								
22	40.14								
23	39.14								
24	38.14						Water Depth at 24 hours: 24 ft		

**DRILLING LOG
GEOLOGICAL SERVICES**

Hole No. GWC-4

Sheet 2 of 2

SITE **McIntosh Monofill** TOTAL DEPTH **40.5 ft.** SURF. ELEV. **62.14**

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD
				From To	Blows	N			
25	37.14	light brown sandy clayey SILT, very moist							
26	36.14								
27	35.14								
28	34.14								
29	33.14								
30	32.14								
31	31.14								
32	30.14								
33	29.14								
34	28.14								
35	27.14								
36	26.14	yellowish-brown silty sandy CLAY, slightly moist							
37	25.14								
38	24.14	clayey silty very fine-grained SAND, wet					Water Depth at time of boring: 38 ft		
39	23.14								
40	22.14								
41									
42									
43									
44									
45									
46									
47									
48									
49									
50									
51									
52									
53									
54									
55									
56									



LOG OF TEST BORING

BORING GWC-04A1

PAGE 1 OF 1

GPC294369

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT PLANT MCINTOSH WELL REPLACEMENT

LOCATION RINCON, GEORGIA

DATE STARTED 8/3/2016 COMPLETED 8/4/2016 SURF. ELEV. Not Surveyed COORDINATES:

CONTRACTOR Cascade Drilling LLC EQUIPMENT BL Mini METHOD Rotasonic

DRILLED BY Ray Whitt LOGGED BY S. Baxter CHECKED BY B. Coates ANGLE BEARING

BORING DEPTH 40 ft. GROUND WATER DEPTH: DURING 10 ft. COMP. 17.5 ft. DELAYED 21.22 ft. after 24 hrs.

NOTES Well installed. Refer to well data sheet.

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	HCL REACTION Weak Moderate Strong	GROUNDWATER OBSERVATIONS	WELL DATA
					Completion: Protective aluminum cover with bollards; 4-foot square concrete pad
		Well-graded Sand (SW) - brown (10YR 4/3) fill moist, fine to coarse grained, subrounded			Surface Seal: concrete
5					
		Silty Clay (CL-ML) - mottled brown (10YR 4/3) and red / moderate reddish brown (10R 4/6) fill moist, with sand			Annular Fill: 1 - Batch Cement - Bentonite Grout (Batch = 6 bags Holcim Type I/II Portland Cement, 4 cups WyoBen High Yield Bentonite Powder, 35 Gal Potable Water, 18 PPG)
10					
		Well-graded Sand (SW) - brown (10YR 4/3) fill wet, fine to coarse grained, subangular			
15					
		Silt (ML) - mottled dark reddish gray (10R 4/1) and light gray (10R 7/1) alluvium wet, with sand			Annular Seal: 1 Bucket PelPlug 3/8" Non-Coated Bentonite Pellets, 50 lbs each
20					
		Silt (ML) - dark red (2.5YR 3/6) alluvium wet, with yellow streaking, trace sand			Filter: 6 Bags Filter Media GP#1 (20/40) Silica Sand, 50 lbs each, 1 Bag Quikcrete Fine Play Sand (Upper Filter), 50 lbs each
25					
		Silt (ML) - pink (10R 8/3) alluvium wet, trace coarse grained sand			
30					
		Well-graded Sand (SW) - brown (10YR 4/3) alluvium wet, fine to coarse grained, rounded, trace silt			Standpipe: 2" OD PVC (SCH 40) Screen: 10 ft; pre-pack
35					
		- coarsens downward			Sump:0.3999999999999999 ft.
40					Backfill:1 Bag WyoBen Hole Plug 3/8" Chip Bentonite, 50 lbs each
		Fat Clay (CH) - very dark bluish gray (10B 3/1) and brownish yellow / dark yellowish orange (10YR 6/6) alluvium wet, trace sand			

Bottom of borehole at 40.0 feet.

**DRILLING LOG
GEOLOGICAL SERVICES**

Hole No. **GWC-5**

Sheet 1 of 2

SITE McIntosh Monofill		HOLE DEPTH 38.5 ft.	SURF.ELEV. 59.29
LOCATION Rincon, GA	COORDINATES N 855671.327	E 957319.987	
ANGLE _____	BEARING _____	CONTRACTOR SCS	DRILL NO. _____
DRILLING METHOD Hollow Stem Auger	NO. SAMPLES 1	NO. U.D. SAMPLES _____	N/A
CASING SIZE _____	LENGTH _____	CORE SIZE _____	TOTAL % REC. N/A
WATER TABLE DEPTH _____	ELEV. _____	TIME AFTER COMP. _____	DATE TAKEN _____
TYPE GROUT _____	QUANTITY _____	MIX _____	DRILLING START DATE 8/18/2004
DRILLER Brad Filipovich	RECORDER John Pugh	APPROVED _____	DRILLING COMP. DATE 8/18/2004

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD
				From To	Blows	N			
0	59.29								
1	58.29	brown silty fine-grained SAND							
2	57.29								
3	56.29								
4	55.29	greenish-brown silty fine-grained SAND							
5	54.29								
6	53.29								
7	52.29	reddish-brown sandy CLAY							
8	51.29								
9	50.29								
10	49.29								
11	48.29								
12	47.29								
13	46.29								
14	45.29								
15	44.29								
16	43.29								
17	42.29	reddish-yellow sandy silty CLAY							
18	41.29								
19	40.29								
20	39.29								
21	38.29								
22	37.29								
23	36.29								
24	35.29								

Water Depth at
24 hours: 23.6 ft

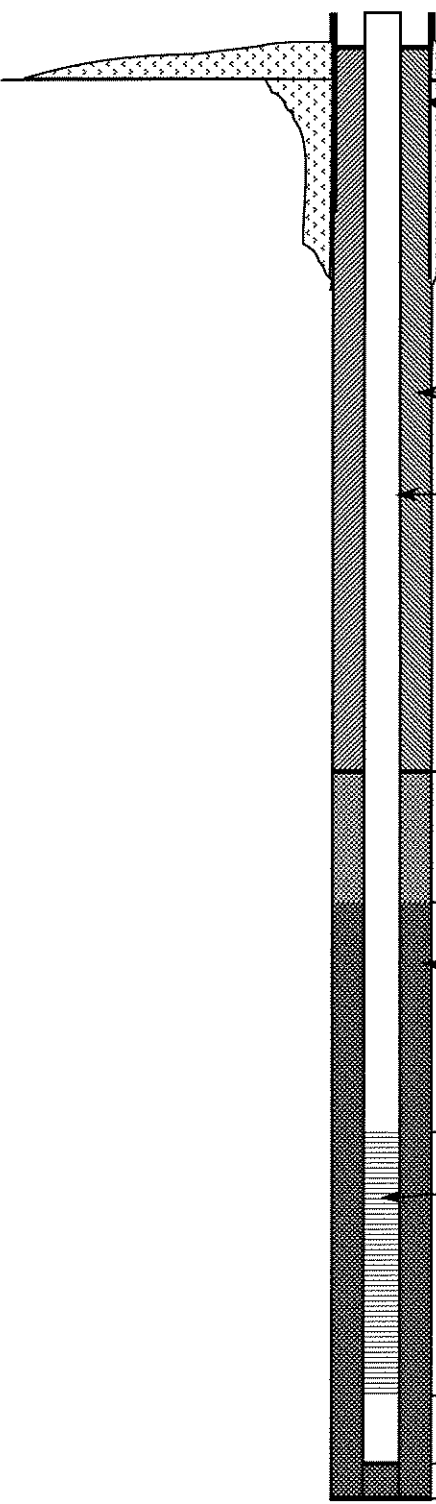
**DRILLING LOG
GEOLOGICAL SERVICES**

Hole No. GWC-5

Sheet 2 of 2

SITE **McIntosh Monofill** TOTAL DEPTH **38.5 ft.** SURF.ELEV. **59.29**

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec.	ROD
				From To	Blows	N			
25	34.29	purplish-brown sandy clayey SILT, moist							
26	33.29								
27	32.29								
28	31.29								
29	30.29								
30	29.29								
31	28.29								
32	27.29								
33	26.29	clayey silty fine-grained SAND, wet							
34	25.29						Water Depth at time of boring: 34 ft		
35	24.29								
36	23.29								
37	22.29								
38	21.29								
39									
40									
41									
42									
43									
44									
45									
46									
47									
48									
49									
50									
51									
52									
53									
54									
55									
56									

SOUTHERN COMPANY SERVICES			
WELL CONSTRUCTION LOG		PROJECT	McIntosh Monofill
SITE	Cell #1	LOCATION	Rincon, GA
DATE STARTED	8/10/2004	ENDED	8/10/2004
		PREPARED	JDP
			WELL NO. GWC-6
			DEPTH
			ELEVATION
TOP OF CASING			57.01
TOP OF CONCRETE			54.02
GROUND SURFACE			0
			54.01
 <p>PROTECTIVE CASING DIAMETER: TYPE: 4"x4"x5' Standpipe and Protector Cap</p> <p>BACKFILL MATERIAL TYPE: 3/8" Bentonite Chips</p> <p>RISER CASING DIAMETER: 2" TYPE: 480 Thread Flush Joint SCH 40 PVC</p> <p>ANNULAR SEAL TYPE: 1/4" Bentonite Pellets</p> <p>FILTER PACK TYPE: DSI #2 Filter Sand</p> <p>SCREEN DIAMETER: 2" TYPE: PVC PrePac OPENING WIDTH: 0.010" OPENING TYPE: Slotted</p>			2
BOTTOM OF PROTECTIVE CASING			52.01
TOP OF SEAL			19
			35.01
TOP OF FILTER PACK			21
			33.01
BOTTOM OF RISER/ TOP OF SCREEN			25
			29.01
BOTTOM OF SCREEN			35
			19.01
BOTTOM OF CASING			35.5
			18.51
BOTTOM OF HOLE			35.5
			18.51
HOLE DIA: 7 5/8"			

DRILLING LOG
GEOLOGICAL SERVICES

Hole No. **GWC-6**

Sheet 1 of 2

SITE **McIntosh Monofill** HOLE DEPTH **35.5 ft** SURF. ELEV. **54.01**
 LOCATION **Rincon, GA** COORDINATES N **856012.692** E **957377.382**
 ANGLE _____ BEARING _____ CONTRACTOR **SCS** DRILL NO. _____
 DRILLING METHOD **Hollow Stem Auger** NO. SAMPLES **one (1)** NO. U.D. SAMPLES **N/A**
 CASING SIZE _____ LENGTH _____ CORE SIZE _____ TOTAL % REC. **N/A**
 WATER TABLE DEPTH _____ ELEV. _____ TIME AFTER COMP. _____ DATE TAKEN _____
 TYPE GROUT _____ QUANTITY _____ MIX _____ DRILLING START DATE **8/10/2004**
 DRILLER **Brad Filipovich** RECORDER **Richard Esposito** APPROVED _____ DRILLING COMP. DATE **8/10/2004**

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD
				From To	Blows	N			
0	54.01	white SAND							
1	53.01	tan/yellow silty SAND							
2	52.01								
3	51.01								
4	50.01								
5	49.01	red silty SAND							
6	48.01								
7	47.01								
8	46.01								
9	45.01	brown/yellow clayey SAND							
10	44.01								
11	43.01								
12	42.01								
13	41.01								
14	40.01								
15	39.01								
16	38.01								
17	37.01								
18	36.01								
19	35.01								
20	34.01								
21	33.01								
22	32.01								
23	31.01						Water Depth at 24 hours: 23.6 ft		
24	30.01								

**DRILLING LOG
GEOLOGICAL SERVICES**

Hole No. GWC-6

Sheet 2 of 2

SITE **McIntosh Monofill** TOTAL DEPTH **35.5 ft** SURF.ELEV. **54.01**

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD
				From To	Blows	N			
25		yellow silty sandy CLAY							
26							Water Depth at time of boring: 26 ft		
27									
28									
29									
30									
31									
32									
33									
34									
35		silty sandy CLAY							
36									
37									
38									
39									
40									
41									
42									
43									
44									
45									
46									
47									
48									
49									
50									
51									
52									
53									
54									
55									
56									

WELL CONSTRUCTION LOG

WELL NO.

GWC-7

PREPARED



**DRILLING LOG
GEOLOGICAL SERVICES**

Hole No. **GWC-7**

Sheet 1 of 2

SITE **McIntosh Monofill** HOLE DEPTH **35.5 ft.** SURF.ELEV. **50.42**
 LOCATION **Rincon, GA** COORDINATES N **856266.637** E **957433.222**
 ANGLE _____ BEARING _____ CONTRACTOR **SCS** DRILL NO. _____
 DRILLING METHOD **Hollow Stem Auger** NO. SAMPLES **one (1)** NO. U.D. SAMPLES **N/A**
 CASING SIZE _____ LENGTH _____ CORE SIZE _____ TOTAL % REC. **N/A**
 WATER TABLE DEPTH _____ ELEV. _____ TIME AFTER COMP. _____ DATE TAKEN _____
 TYPE GROUT _____ QUANTITY _____ MIX _____ DRILLING START DATE **8/10/2004**
 DRILLER **Brad Filipovich** RECORDER **Richard Esposito** APPROVED _____ DRILLING COMP. DATE **8/10/2004**

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD
				From To	Blows	N			
0	50.42								
1	49.42	yellow/tan sandy SILT							
2	48.42								
3	47.42								
4	46.42								
5	45.42								
6	44.42	red clayey SAND							
7	43.42								
8	42.42								
9	41.42								
10	40.42								
11	39.42								
12	38.42								
13	37.42								
14	36.42	yellow silty sandy CLAY							
15	35.42								
16	34.42	yellow silty SAND							
17	33.42								
18	32.42	yellow silty CLAY, moist							
19	31.42								
20	30.42								
21	29.42								
22	28.42								
23	27.42								
24	26.42								

**DRILLING LOG
GEOLOGICAL SERVICES**

Hole No. GWC-7

Sheet 2 of 2

SITE **McIntosh Monofill** TOTAL DEPTH **35.5 ft.** SURF.ELEV. **50.42**

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD
				From To	Blows	N			
25	25.42	yellow silty CLAY, moist							
26	24.42						Water Depth at 24 hours: 26 ft		
27	23.42								
28	22.42								
29	21.42								
30	20.42	silty sandy CLAY							
31	19.42								
32	18.42								
33	17.42	silty SAND							
34	16.42						Water Depth at time of boring: 34 ft		
35	15.42								
36									
37									
38									
39									
40									
41									
42									
43									
44									
45									
46									
47									
48									
49									
50									
51									
52									
53									
54									
55									
56									

SOUTHERN COMPANY SERVICES

WELL CONSTRUCTION LOG

SITE		Cell #1		LOCATION		Rincon, GA		GWC-8
DATE STARTED		8/10/2004		ENDED		8/10/2004		
				PREPARED		JDP		

	DEPTH	ELEVATION
TOP OF CASING		54.19
TOP OF CONCRETE		51.35
GROUND SURFACE	0	51.19
PROTECTIVE CASING DIAMETER: TYPE: 4"x4"x5' Standpipe and Protector Cap		
BOTTOM OF PROTECTIVE CASING	2	49.19
BACKFILL MATERIAL TYPE: 3/8" Bentonite Chips		
RISER CASING DIAMETER: 2" TYPE: 480 Thread Flush Joint SCH 40 PVC		
TOP OF SEAL	20	31.19
ANNULAR SEAL TYPE: 1/4" Bentonite Pellets		
TOP OF FILTER PACK	22.2	28.99
FILTER PACK TYPE: DSI #2 Filter Sand		
BOTTOM OF RISER/ TOP OF SCREEN	24	27.19
SCREEN DIAMETER: 2" TYPE: PVC PrePac OPENING WIDTH: 0.010" OPENING TYPE: Slotted		
BOTTOM OF SCREEN	34	17.19
BOTTOM OF CASING	34.5	16.69
BOTTOM OF HOLE	34.5	16.69
HOLE DIA: 7 5/8"		

**DRILLING LOG
GEOLOGICAL SERVICES**

Hole No. **GWC-8**

Sheet 1 of 2

SITE McIntosh Monofill		HOLE DEPTH 34.3 ft.	SURF. ELEV. 51.19
LOCATION Rincon, GA		COORDINATES N 856517.818	E 957648.715
ANGLE _____	BEARING _____	CONTRACTOR SCS	DRILL NO. _____
DRILLING METHOD Hollow Stem Auger	NO. SAMPLES one (1)	NO. U.D. SAMPLES _____	N/A
CASING SIZE _____	LENGTH _____	CORE SIZE _____	TOTAL % REC. N/A
WATER TABLE DEPTH _____	ELEV. _____	TIME AFTER COMP. _____	DATE TAKEN _____
TYPE GROUT _____	QUANTITY _____	MIX _____	DRILLING START DATE 8/10/2004
DRILLER Brad Filipovich	RECORDER Richard Esposito	APPROVED _____	DRILLING COMP. DATE 8/10/2004

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD
				From To	Blows	N			
0	51.19								
1	50.19	brown/yellow silty SAND							
2	49.19								
3	48.19								
4	47.19								
5	46.19								
6	45.19	red silty SAND							
7	44.19								
8	43.19								
9	42.19								
10	41.19	red silty CLAY							
11	40.19								
12	39.19								
13	38.19								
14	37.19								
15	36.19	red silty CLAY							
16	35.19								
17	34.19								
18	33.19	yellow silty CLAY							
19	32.19								
20	31.19	tan silty CLAY, moist							
21	30.19								
22	29.19								
23	28.19								
24	27.19								

**DRILLING LOG
GEOLOGICAL SERVICES**

Hole No. GWC-8

Sheet 2 of 2

SITE **McIntosh Monofill** TOTAL DEPTH **34.3 ft.** SURF.ELEV. **51.19**

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD
				From To	Blows	N			
25	26.19	yellow silty CLAY silty SAND, moist							
26	25.19								
27	24.19								
28	23.19						Water Depth at 24 hours: 28.2 ft		
29	22.19								
30	21.19						Water Depth at time of boring: 30 ft		
31	20.19								
32	19.19								
33	18.19								
34	17.19								
35									
36									
37									
38									
39									
40									
41									
42									
43									
44									
45									
46									
47									
48									
49									
50									
51									
52									
53									
54									
55									
56									

SOUTHERN COMPANY SERVICES

WELL CONSTRUCTION LOG

SITE Cell #1		PROJECT McIntosh Monofill	WELL NO. GWC-9
LOCATION Rincon, GA		DATE STARTED 8/16/2004	ENDED 8/16/2004
PREPARED JDP			

	DEPTH	ELEVATION
TOP OF CASING		53.56
TOP OF CONCRETE		51.05
GROUND SURFACE	0	50.56
PROTECTIVE CASING DIAMETER: TYPE: 4"x4"x5' Standpipe and Protector Cap BOTTOM OF PROTECTIVE CASING	2	48.56
BACKFILL MATERIAL TYPE: 3/8" Bentonite Chips		
RISER CASING DIAMETER: 2" TYPE: 480 Thread Flush Joint SCH 40 PVC		
TOP OF SEAL	20	30.56
ANNULAR SEAL TYPE: 1/4" Bentonite Pellets TOP OF FILTER PACK	22	28.56
FILTER PACK TYPE: DSI #2 Filter Sand BOTTOM OF RISER/ TOP OF SCREEN	25	25.56
SCREEN DIAMETER: 2" TYPE: PVC PrePac OPENING WIDTH: 0.010" OPENING TYPE: Slotted BOTTOM OF SCREEN	35	15.56
BOTTOM OF CASING	35.5	15.06
BOTTOM OF HOLE	35.5	15.06
HOLE DIA: 7 5/8"		

DRILLING LOG
GEOLOGICAL SERVICES

Hole No. **GWC-9**

Sheet 1 of 2

SITE **McIntosh Monofill** HOLE DEPTH **35.5 ft.** SURF.ELEV. **50.56**
LOCATION **Rincon, GA** COORDINATES N **856732.82** E **957909.7**
ANGLE _____ BEARING _____ CONTRACTOR **SCS** DRILL NO. _____
DRILLING METHOD **Hollow Stem Auger** NO. SAMPLES **one (1)** NO. U.D. SAMPLES **N/A**
CASING SIZE _____ LENGTH _____ CORE SIZE _____ TOTAL % REC. **N/A**
WATER TABLE DEPTH _____ ELEV. _____ TIME AFTER COMP. _____ DATE TAKEN _____
TYPE GROUT _____ QUANTITY _____ MIX _____ DRILLING START DATE **8/16/2004**
DRILLER **Brad Filipovich** RECORDER **John Pugh** APPROVED _____ DRILLING COMP. DATE **8/16/2004**

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD
				From To	Blows	N			
0	50.56								
1	49.56	yellowish-brown silty fine-grained SAND							
2	48.56								
3	47.56	yellowish-orange silty fine-grained SAND							
4	46.56								
5	45.56	reddish-yellow clayey fine-grained SAND							
6	44.56								
7	43.56	brownish-red silty CLAY							
8	42.56								
9	41.56								
10	40.56	reddish-orange silty fine-grained SAND							
11	39.56								
12	38.56								
13	37.56	yellowish-orange silty fine-grained SAND							
14	36.56								
15	35.56								
16	34.56								
17	33.56								
18	32.56								
19	31.56								
20	30.56	orangish-yellow silty fine-to medium-grained SAND							
21	29.56								
22	28.56								
23	27.56	brownish-yellow silty fine-grained SAND							
24	26.56								

**DRILLING LOG
GEOLOGICAL SERVICES**

Hole No. GWC-9

Sheet 2 of 2

SITE **McIntosh Monofill** TOTAL DEPTH **35.5 ft.** SURF.ELEV. **50.56**

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD						
				From To	Blows	N									
25	25.56	brownish-yellow silty clayey SAND, very moist													
26	24.56														
27	23.56														
28	22.56														
29	21.56														
30	20.56														
31	19.56														
32	18.56						Water Depth at time of boring: 32.5 ft								
33	17.56														
34	16.56														
35	15.56														
36															
37															
38															
39															
40															
41															
42															
43															
44															
45															
46															
47															
48															
49															
50															
51															
52															
53															
54															
55															
56															

SOUTHERN COMPANY SERVICES			
WELL CONSTRUCTION LOG		PROJECT	McIntosh Monofill
SITE	Cell #1	LOCATION	Rincon, GA
DATE STARTED	8/19/2004	ENDED	8/19/2004
		PREPARED	JDP
		WELL NO. GWC-10	
		DEPTH	ELEVATION
		TOP OF CASING	49.55
		TOP OF CONCRETE	46.99
		GROUND SURFACE	0 46.55
		PROTECTIVE CASING	
		DIAMETER:	
		TYPE:	4"x4"x5' Standpipe and Protector Cap
		BOTTOM OF PROTECTIVE CASING	2 44.55
		BACKFILL MATERIAL	
		TYPE:	3/8" Bentonite Chips
		RISER CASING	
		DIAMETER:	2"
		TYPE:	480 Thread Flush Joint SCH 40 PVC
		TOP OF SEAL	15.8 30.75
		ANNULAR SEAL	
		TYPE:	1/4" Bentonite Pellets
		TOP OF FILTER PACK	17.8 28.75
		FILTER PACK	
		TYPE:	DSI #2 Filter Sand
		BOTTOM OF RISER/ TOP OF SCREEN	20 26.55
		SCREEN	
		DIAMETER:	2"
		TYPE:	PVC PrePac
		OPENING WIDTH:	0.010"
		OPENING TYPE:	Slotted
		BOTTOM OF SCREEN	30 16.55
		BOTTOM OF CASING	30.5 16.05
		BOTTOM OF HOLE	30.5 16.05
		HOLE DIA: 7 5/8"	

**DRILLING LOG
GEOLOGICAL SERVICES**

Hole No. **GWC-10**

Sheet 1 of 2

SITE McIntosh Monofill		HOLE DEPTH 30.5 ft.	SURF.ELEV. 46.55
LOCATION Rincon, GA	COORDINATES N 856429.875	E 958077.922	
ANGLE _____	BEARING _____	CONTRACTOR SCS	DRILL NO. _____
DRILLING METHOD Hollow Stem Auger	NO. SAMPLES _____	NO. U.D. SAMPLES _____	N/A
CASING SIZE _____	LENGTH _____	CORE SIZE _____	TOTAL % REC. N/A
WATER TABLE DEPTH _____	ELEV. _____	TIME AFTER COMP. _____	DATE TAKEN _____
TYPE GROUT _____	QUANTITY _____	MIX _____	DRILLING START DATE 8/19/2004
DRILLER Brad Filipovich	RECORDER John Pugh	APPROVED _____	DRILLING COMP. DATE 8/19/2004

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD
				From To	Blows	N			
0	46.55								
1	45.55	light brown silty SAND							
2	44.55	reddish-yellow clayey SAND							
3	43.55								
4	42.55								
5	41.55								
6	40.55	reddish-yellow sandy CLAY							
7	39.55								
8	38.55	yellowish-red sandy CLAY							
9	37.55								
10	36.55								
11	35.55								
12	34.55	brownish-yellow silty CLAY, moist							
13	33.55								
14	32.55								
15	31.55	orange-green silty CLAY							
16	30.55								
17	29.55								
18	28.55	greenish-brown clayey sandy SILT							
19	27.55								
20	26.55	greenish-brown clayey sandy SILT, moist							
21	25.55								
22	24.55	greenish-brown clayey sandy SILT, wet							
23	23.55								
24	22.55								

Water Depth at time
of boring: 22 ft
Water Depth at
24 hours: 22.8 ft

**DRILLING LOG
GEOLOGICAL SERVICES**

Hole No. GWC-10

Sheet 2 of 2

SITE **McIntosh Monofill** TOTAL DEPTH **30.5 ft.** SURF.ELEV. **46.55**

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD
				From To	Blows	N			
25	21.55								
26	20.55								
27	19.55								
28	18.55	tan/gray silty medium- to coarse-grained SAND, wet							
29	17.55								
30	16.55								
31									
32									
33									
34									
35									
36									
37									
38									
39									
40									
41									
42									
43									
44									
45									
46									
47									
48									
49									
50									
51									
52									
53									
54									
55									
56									

**DRILLING LOG
GEOLOGICAL SERVICES**

Hole No. **GWC-11**

Sheet 1 of 2

SITE McIntosh Monofill		HOLE DEPTH 40.5 ft.	SURF. ELEV. 54.97
LOCATION Rincon, GA	COORDINATES N 856116.096	E 958244.613	
ANGLE _____	BEARING _____	CONTRACTOR SCS	DRILL NO. _____
DRILLING METHOD Hollow Stem Auger	NO. SAMPLES one (1)	NO. U.D. SAMPLES _____	N/A
CASING SIZE _____	LENGTH _____	CORE SIZE _____	TOTAL % REC. N/A
WATER TABLE DEPTH _____	ELEV. _____	TIME AFTER COMP. _____	DATE TAKEN _____
TYPE GROUT _____	QUANTITY _____	MIX _____	DRILLING START DATE 8/18/2004
DRILLER Brad Filipovich	RECORDER John Pugh	APPROVED _____	DRILLING COMP. DATE 8/18/2004

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD
				From To	Blows	N			
0									
1		light brown silty SAND							
2									
3									
4		brownish-yellow silty clayey SAND							
5									
6									
7									
8									
9		reddish-brown silty sandy CLAY							
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									
23									
24		clayey sandy SILT, moist							

**DRILLING LOG
GEOLOGICAL SERVICES**

Hole No. GWC-11

Sheet 2 of 2

SITE **McIntosh Monofill** TOTAL DEPTH **40.5 ft.** SURF. ELEV. **54.97**

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	ROD
				From To	Blows	N			
25	29.97	greenish-brown sandy clayey SILT, moist							
26	28.97								
27	27.97								
28	26.97								
29	25.97								
30	24.97								
31	23.97	reddish-brown sandy silty CLAY, moist					Water Depth at 24 hours: 31.3 ft		
32	22.97								
33	21.97								
34	20.97								
35	19.97	greenish-gray clayey silty fine-grained SAND, wet					Water Depth at time of boring: 35 ft		
36	18.97								
37	17.97								
38	16.97								
39	15.97								
40	14.97								
41		grayish-green clayey silty fine-grained SAND							
42									
43									
44									
45									
46									
47									
48									
49									
50									
51									
52									
53									
54									
55									
56									

SOUTHERN COMPANY SERVICES

WELL CONSTRUCTION LOG

SITE		Cell #1		LOCATION		Rincon, GA		GWC-12	
DATE STARTED		8/18/2004		ENDED		8/18/2004			PREPARED

	DEPTH	ELEVATION
TOP OF CASING		57.26
TOP OF CONCRETE		54.65
GROUND SURFACE	0	54.26
PROTECTIVE CASING DIAMETER: TYPE: 4"x4"x5' Standpipe and Protector Cap BOTTOM OF PROTECTIVE CASING	2	52.26
BACKFILL MATERIAL TYPE: 3/8" Bentonite Chips		
RISER CASING DIAMETER: 2" TYPE: 480 Thread Flush Joint SCH 40 PVC		
TOP OF SEAL	23	31.26
ANNULAR SEAL TYPE: 1/4" Bentonite Pellets TOP OF FILTER PACK	25	29.26
FILTER PACK TYPE: DSI #2 Filter Sand BOTTOM OF RISER/ TOP OF SCREEN	28	26.26
SCREEN DIAMETER: 2" TYPE: PVC PrePac OPENING WIDTH: 0.010" OPENING TYPE: Slotted BOTTOM OF SCREEN	38	16.26
BOTTOM OF CASING	38.5	15.76
BOTTOM OF HOLE	38.5	15.76
HOLE DIA: 7 5/8"		

**DRILLING LOG
GEOLOGICAL SERVICES**

Hole No. **GWC-12**

Sheet 1 of 2

SITE McIntosh Monofill		HOLE DEPTH 38.5 ft.	SURF.ELEV. 54.26
LOCATION Rincon, GA	COORDINATES N 855803.795	E 958413.662	
ANGLE _____	BEARING _____	CONTRACTOR SCS	DRILL NO. _____
DRILLING METHOD Hollow Stem Auger	NO. SAMPLES one (1)	NO. U.D. SAMPLES _____	N/A
CASING SIZE _____	LENGTH _____	CORE SIZE _____	TOTAL % REC. N/A
WATER TABLE DEPTH _____	ELEV. _____	TIME AFTER COMP. _____	DATE TAKEN _____
TYPE GROUT _____	QUANTITY _____	MIX _____	DRILLING START DATE 8/18/2004
DRILLER Brad Filipovich	RECORDER John Pugh	APPROVED _____	DRILLING COMP. DATE 8/18/2004

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD
				From To	Blows	N			
0	54.26								
1	53.26	light brown silty fine- to medium-grained SAND							
2	52.26								
3	51.26								
4	50.26								
5	49.26	brownish-yellow clayey fine-to medium-grained SAND							
6	48.26	reddish-yellow silty clayey fine-to medium-grained SAND							
7	47.26								
8	46.26								
9	45.26	purplish-red silty clayey SAND							
10	44.26								
11	43.26								
12	42.26								
13	41.26	brownish-purple silty sandy CLAY							
14	40.26								
15	39.26								
16	38.26								
17	37.26								
18	36.26								
19	35.26								
20	34.26								
21	33.26								
22	32.26								
23	31.26						Water Depth at 24 hours: 23 ft		
24	30.26								

DRILLING LOG
GEOLOGICAL SERVICES

Hole No. GWC-12

Sheet 2 of 2

SITE **McIntosh Monofill** TOTAL DEPTH **38.5 ft.** SURF.ELEV. **54.26**

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD
				From To	Blows	N			
25	29.26	yellowish-brown sandy clayey SILT, moist							
26	28.26								
27	27.26								
28	26.26								
29	25.26								
30	24.26								
31	23.26								
32	22.26	tan clayey silty very fine-grained SAND, wet							
33	21.26						Water Depth at time of boring: 33 ft		
34	20.26								
35	19.26								
36	18.26								
37	17.26	grayish-green clayey SILT							
38	16.26								
39									
40									
41									
42									
43									
44									
45									
46									
47									
48									
49									
50									
51									
52									
53									
54									
55									
56									



LOG OF TEST BORING

BORING GWA-13
PAGE 1 OF 2
GPC568939

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Plant McIntosh Landfill 4 Expansion Wells
LOCATION Rincon, GA

DATE STARTED 10/22/2015 **COMPLETED** 10/23/2015 **SURF. ELEV.** 57.7 **COORDINATES:** N:32.348802 E:-81.192482

CONTRACTOR Cascade **EQUIPMENT** Prosonic **METHOD** Rotosonic

DRILLED BY F. Kraus **LOGGED BY** W. Shaughnessy **CHECKED BY** B. Smelser **ANGLE** **BEARING**

BORING DEPTH 37 ft. **GROUND WATER DEPTH DURING** 25 ft. **COMP.** **DELAYED** 22.1 ft. after 100 hrs.

NOTES

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	HCL REACTION Weak Moderate Strong	GROUNDWATER OBSERVATIONS	WELL DATA
		Low Plastic Organic Silt or Clay (OL) - black (2.5Y 2.5/1) topsoil topsoil				Completion: protective aluminum cover with bollards; 4-foot square concrete pad
		Poorly-graded Sand with Silt (SP-SM) - mottled light yellowish brown (2.5Y 6/3) and yellow (2.5Y 7/6) damp, loose, fine-grained				Surface Seal: concrete
5		Poorly-graded Sand with Clay (SP-SC) - mottled light brownish gray (2.5Y 6/2), yellowish brown (10YR 5/8) and yellowish red / light brown (5YR 5/6) damp, cohesive, fine-grained - increase sand content with depth				
10		Silty Clay (CL-ML) - mottled light gray (2.5Y 7/2), dark reddish brown (2.5YR 3/3) and yellowish brown / moderate yellowish brown (10YR 5/4) dry, very stiff, low to medium - increased plasticity with depth				
15		Sandy Fat Clay (CH) - mottled light gray (2.5Y 7/2), dark reddish brown (2.5YR 3/3) and yellowish brown (10YR 5/8) damp, medium stiff, medium to high - mottled light gray (2.5Y 7/2) and yellowish brown (10YR 5/8) high - brownish yellow / dark yellowish orange (10YR 6/6) soft, high				Annular Fill: Cement-Bentonite Grout (30 gal.)
20		Fat Clay (CH) - light olive gray (5Y 6/2) damp, medium stiff, medium to high, some fine sand lenses				
25		Sandy Lean Clay (CL) - mottled pale olive (5Y 6/3) and brownish yellow / dark yellowish orange (10YR 6/6) damp, high				Annular Seal: Pel Plug 3/8 coated pellets (1 - 5gal. bucket)
		Poorly-graded Sand with Clay (SP-SC) - yellow (2.5Y 7/6) wet, medium grained, interbedded with clay seams				Filter: Filter Media 1A Silica Sand (4 - 50 lbs bags)
30		Poorly-graded Sand (SP) - mottled brownish yellow (10YR 6/8), yellow (2.5Y 7/6) and strong brown (7.5YR 5/8) wet, medium grained, interbedded with few thin clay seams				Standpipe: 2" OD PVC (SCH 40) Screen: 10 ft; 10' - 0.010" Slot Prepack

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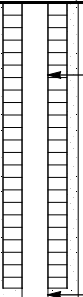
LOG OF TEST BORING

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SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Plant McIntosh Landfill 4 Expansion Wells

LOCATION Rincon, GA

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	HCL REACTION <small>Weak Moderate Strong</small>	GROUNDWATER OBSERVATIONS	WELL DATA
		Poorly-graded Sand (SP) <i>(Con't)</i>				Completion: protective aluminum cover with bollards; 4-foot square concrete pad
		Well-graded Sand with Clay (SW-SC) - mottled brownish yellow (10YR 6/8) and light gray (10YR 7/1) cohesive				<div>CONTINUED</div> <div></div> <div>Standpipe: 2" OD PVC (SCH 40) Screen: 10 ft; 10' - 0.010" Slot Prepack</div> <div>Sump: 0.29999999999999997 ft. Cave-in to 37 ft.</div>
35		Fat Clay (CH) - mottled light gray (2.5Y 7/1) and yellow (2.5Y 7/6) high				
		Well-graded Gravelly Sand (SW-SC) - mottled yellow (2.5Y 8/6) and light gray (5Y 7/1) wet, fine to coarse-grained, trace of fine gravel				
		Bottom of borehole at 37.0 feet.				
40						
45						
50						
55						
60						
65						



LOG OF TEST BORING

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SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Plant McIntosh Landfill 4 Expansion Wells

LOCATION Rincon, GA

DATE STARTED 10/23/2015 **COMPLETED** 10/27/2015 **SURF. ELEV.** 58.5 **COORDINATES:** N:32.348273 E:-81.193621

CONTRACTOR Cascade **EQUIPMENT** Prosonic **METHOD** Rotosonic

DRILLED BY F. Kraus **LOGGED BY** W. Shaughnessy **CHECKED BY** B. Smelser **ANGLE** **BEARING**

BORING DEPTH 47 ft. **GROUND WATER DEPTH DURING** 19.2 ft. **COMP.** **DELAYED** 23 ft. after 24 hrs.

NOTES

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DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	HCL REACTION Weak Moderate Strong	GROUNDWATER OBSERVATIONS	WELL DATA
						Completion: protective aluminum cover with bollards; 4-foot square concrete pad
5		Low Plastic Organic Silt or Clay (OL) - dark olive brown (2.5Y 3/3) damp, topsoil, fine-grained sand Poorly-graded Sand (SP) - light olive brown (2.5Y 5/3) damp, fine-grained Clayey Sand (SC) - mottled gray (10YR 6/1), gray / light brownish gray (5YR 6/1) and red (2.5YR 4/8) dry, cohesive, fine-grained, mica				Surface Seal: concrete
10		Sandy Lean Clay (CL) - mottled white / yellowish gray (5Y 8/1) and red (2.5YR 5/8) dry, very stiff, thin fine-sand lenses Lean Clay (CL) - mottled light greenish gray (5GY 8/1) and light reddish brown (2.5YR 6/3) dry, very stiff, low to medium, mica Silty Clay (CL-ML) - mottled light gray (5Y 7/1), red (2.5YR 4/8) and brownish yellow (10YR 6/8) dry, very stiff, low to medium, thin fine-sand lenses				
15		Silt (ML) - mottled light gray (5Y 7/1), red (2.5YR 4/8) and brownish yellow (10YR 6/8) damp, stiff, medium, with clay - strong brown (7.5YR 5/8) damp, soft, medium, with clay - red (2.5YR 5/8) with clay and fine-sand				Annular Fill: Cement-Bentonite Grout (45 gal.)
20		Lean Clay (CL) - light gray (5Y 7/1), light reddish brown (2.5YR 6/3) and red (2.5YR 4/8) damp, stiff, medium Silt (ML) - brownish yellow (10YR 6/8) dry, some fine-sand - yellowish red (5YR 5/8) - brownish yellow / dark yellowish orange (10YR 6/6) and light reddish brown (2.5YR 6/3) Poorly-graded Sand with Silt (SP-SM) - brownish yellow / dark yellowish orange (10YR 6/6) and strong brown (7.5YR 5/8) wet				
25						
30						

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SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Plant McIntosh Landfill 4 Expansion Wells

LOCATION Rincon, GA

DATE STARTED 10/27/2015 **COMPLETED** 10/27/2015 **SURF. ELEV.** 53.4 **COORDINATES:** N:32.347863 E:-81.194734

CONTRACTOR Cascade **EQUIPMENT** Prosonic **METHOD** Rotosonic

DRILLED BY F. Kraus **LOGGED BY** W. Shaughnessy **CHECKED BY** B. Smelser **ANGLE** **BEARING**

BORING DEPTH 37 ft. **GROUND WATER DEPTH DURING** 19 ft. **COMP.** **DELAYED** 18.6 ft. after 24 hrs.

NOTES

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	HCL REACTION Weak Moderate Strong	GROUNDWATER OBSERVATIONS	WELL DATA
		Silty Sand (SM) - grayish brown (2.5Y 5/2) topsoil				Completion: protective aluminum cover with bollards; 4-foot square concrete pad
		Poorly-graded Sand (SP) - light yellowish brown (2.5Y 6/3) damp, fine-grained				
5		Sandy Lean Clay (CL) - mottled gray / light olive gray (5Y 6/1) and red (2.5YR 4/8) damp, very stiff, medium - mottled gray (2.5Y 5/1) and reddish yellow (7.5YR 6/6)				Surface Seal: concrete
10		Lean Clay (CL) - mottled light gray / yellowish gray (5Y 7/2) and red (2.5YR 4/6) damp, stiff, medium				
15		Clayey Sand (SC) - reddish gray (2.5YR 5/1) damp, cohesive				Annular Fill: Cement-Bentonite Grout (30 gal.)
		Lean Clay (CL) - mottled gray / light olive gray (5Y 6/1) and red (10R 5/8) dry				
		Poorly-graded Sand with Silt (SP-SM) - yellow (10YR 7/8) dry, fine-grained				
		Clayey Sand (SC) - yellowish red / light brown (5YR 5/6) fine-grained				
20		Poorly-graded Sand (SP) - mottled brownish yellow (10YR 6/8), pinkish gray (7.5YR 6/2) and red (10R 4/8) wet, fine-grained - brownish yellow (10YR 6/8) and pale yellow (2.5Y 7/4) - strong brown (7.5YR 5/6) and light gray (5Y 7/1)				Annular Seal: Pel Plug 3/8 coated pellets (1 - 5gal. bucket)
25		Sandy Lean Clay (CL) - light gray / yellowish gray (5Y 7/2) damp, low				Filter: Filter Media 1A Silica Sand (4 - 50 lbs bags)
		Sandy Fat Clay (CH) - mottled light gray / yellowish gray (5Y 7/2) and strong brown (7.5YR 5/6) dry, medium stiff, medium to high				
		Poorly-graded Sand with Silt (SP-SM) - mottled yellow (5Y 7/8) and strong brown (7.5YR 5/6) wet, fine-grained				Standpipe: 2" OD PVC (SCH 40) Screen: 10 ft; 10' - 0.010" Slot Prepack
30						

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LOG OF TEST BORING

BORING GWC-15
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SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Plant McIntosh Landfill 4 Expansion Wells

LOCATION Rincon, GA

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	HCL REACTION <small>Weak Moderate Strong</small>	GROUNDWATER OBSERVATIONS	WELL DATA
		Poorly-graded Sand with Silt (SP-SM) <i>(Con't)</i>				Completion: protective aluminum cover with bollards; 4-foot square concrete pad
35		- with fine well-rounded gravel				(CONTINUED)
		Well-graded Sand with Clay (SW-SC) - yellowish red (5YR 5/8) fine to coarse-grained				Standpipe: 2" OD PVC (SCH 40) Screen: 10 ft; 10' - 0.010" Slot Prepack
		Bottom of borehole at 37.0 feet.				Sump: 0.299999999999997 ft. Cave-in to 37 ft.
40						
45						
50						
55						
60						
65						

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LOG OF TEST BORING

BORING GWA-16
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SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Plant McIntosh Landfill 4 Expansion Wells

LOCATION Rincon, GA

DATE STARTED 10/27/2015 **COMPLETED** 10/27/2015 **SURF. ELEV.** 51.3 **COORDINATES:** N:32.348743 E:-81.195437

CONTRACTOR Cascade **EQUIPMENT** Prosonic **METHOD** Rotosonic

DRILLED BY F. Kraus **LOGGED BY** W. Shaughnessy **CHECKED BY** B. Smelser **ANGLE** **BEARING**

BORING DEPTH 37 ft. **GROUND WATER DEPTH DURING** 18 ft. **COMP.** **DELAYED** 20.5 ft. after 48 hrs.

NOTES

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	HCL REACTION Weak Moderate Strong	GROUNDWATER OBSERVATIONS	WELL DATA
5		Poorly-graded Sand (SP) - light olive brown (2.5Y 5/6) fine-grained				Completion: protective aluminum cover with bollards; 4-foot square concrete pad
		Sandy Lean Clay (CL) - strong brown (7.5YR 5/8) and red (2.5YR 5/8)				
		Fat Clay (CH) - mottled brownish yellow / dark yellowish orange (10YR 6/6) and red / moderate reddish brown (10R 4/6) damp, soft, medium to high - very pale brown (10YR 7/3) and yellowish brown (10YR 5/6)				
10		- mottled red (2.5YR 5/8), yellowish brown (10YR 5/6) and light gray (2.5Y 7/2)				
		- mottled red (2.5YR 5/6) and light gray (2.5Y 7/2) wet				
15		- mottled light gray (2.5Y 7/2) and dark red (2.5YR 3/6) some sand				
		- light gray / yellowish gray (5Y 7/2) sticky				
20		Poorly-graded Sand with Clay (SP-SC) - pale brown (10YR 6/3) and brownish yellow / dark yellowish orange (10YR 6/6) wet, cohesive, fine to coarse grained				Surface Seal: concrete
		Fat Clay (CH) - mottled pale olive (5Y 6/3) and reddish yellow (7.5YR 6/6) wet, high				
25		Poorly-graded Sand with Clay (SP-SC) - mottled pale olive (5Y 6/3) and reddish yellow (7.5YR 6/6) wet				Annular Fill: Cement-Bentonite Grout (30 gal.)
		Poorly-graded Sand (SP) - mottled brownish yellow (10YR 6/8) and light gray (2.5Y 7/2) wet, fine-grained				Annular Seal: Pel Plug 3/8 coated pellets (1 - 5gal. bucket)
30						Filter: Filter Media 1A Silica Sand (4 - 50 lbs bags)
						Standpipe: 2" OD PVC (SCH 40) Screen: 10 ft; 10' - 0.010" Slot Prepack

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LOG OF TEST BORING

BORING GWA-16

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SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Plant McIntosh Landfill 4 Expansion Wells

LOCATION Rincon, GA

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	HCL REACTION <small>Weak Moderate Strong</small>	GROUNDWATER OBSERVATIONS	WELL DATA
		Poorly-graded Sand (SP)(Con't)				Completion: protective aluminum cover with bollards; 4-foot square concrete pad
35		Well-graded Sand with Silt (SW-SM) - pale yellow (2.5Y 7/3) with fine to coarse well-rounded gravel - yellow (2.5Y 7/6) some clay				(CONTINUED)
		Bottom of borehole at 37.0 feet.				Standpipe: 2" OD PVC (SCH 40) Screen: 10 ft; 10' - 0.010" Slot Prepack Sump:0.299999999999997 ft. Cave-in to 37 ft.
40						
45						
50						
55						
60						
65						

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SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Plant McIntosh Landfill 4 Expansion Wells

LOCATION Rincon, GA

DATE STARTED 10/28/2015 **COMPLETED** 10/28/2015 **SURF. ELEV.** 51.1 **COORDINATES:** N:32.349763 E:-81.195401

CONTRACTOR Cascade **EQUIPMENT** Prosonic **METHOD** Rotosonic

DRILLED BY F. Kraus **LOGGED BY** W. Shaughnessy **CHECKED BY** B. Smelser **ANGLE** **BEARING**

BORING DEPTH 37 ft. **GROUND WATER DEPTH DURING** 18 ft. **COMP.** **DELAYED** 23.9 ft. after 48 hrs.

NOTES

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	HCL REACTION Weak Moderate Strong	GROUNDWATER OBSERVATIONS	WELL DATA
		Poorly-graded Sand with Clay (SP-SC) - light yellowish brown (2.5Y 6/3) damp, topsoil - olive yellow (2.5Y 6/6) increase clay content with depth				Completion: protective aluminum cover with bollards; 4-foot square concrete pad
5		Sandy Lean Clay (CL) - light gray (2.5Y 7/1) and red (2.5YR 4/8) dry, medium stiff, low - reddish yellow (7.5YR 6/6) interbedded clayey sand lenses (2" thick)				
10		Fat Clay (CH) - mottled light gray (2.5Y 7/1), red (2.5YR 5/6) and dark yellowish brown (10YR 4/6) damp, soft to medium stiff, low to medium, with sand				Surface Seal: concrete
		Sandy Lean Clay (CL) - mottled light gray (2.5Y 7/1) and red (2.5YR 5/6) dry, medium stiff, low				
15		Well-graded Sand with Clay (SW-SC) - red (10R 4/8) dry, cohesive, fine to coarse-grained - mottled weak red (10R 4/3) and strong brown (7.5YR 5/8)				Annular Fill: Cement-Bentonite Grout (30 gal.)
		Lean Clay (CL) - light gray (2.5Y 7/1) stiff, low				
		Poorly-graded Sand (SP) - yellow (2.5Y 7/6) very moist, fine to medium-grained, with mica				
20		Well-graded Sand (SW) - pale yellow (2.5Y 7/3) and brownish yellow / dark yellowish orange (10YR 6/6) wet, fine to coarse-grained				
		Fat Clay (CH) - mottled light gray (2.5Y 7/2) and yellowish brown (10YR 5/6) damp, high, sandy mottles - increasing sand content with depth				Annular Seal: Pel Plug 3/8 coated pellets (1 - 5gal. bucket)
25		Poorly-graded Sand with Clay (SP-SC) - mottled light brownish gray (2.5Y 6/2) and brownish yellow / dark yellowish orange (10YR 6/6) wet, fine-grained - decreasing clay content with depth - olive yellow (2.5Y 6/6) trace of fine well-rounded gravel				Filter: Filter Media 1A Silica Sand (4 - 50 lbs bags)
30		Well-graded Sand with Silt (SW-SM) - light gray (2.5Y 7/2) fine to coarse-grained, with fine to coarse well-				Standpipe: 2" OD PVC (SCH 40) Screen: 10 ft; 10' - 0.010" Slot Prepack

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SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Plant McIntosh Landfill 4 Expansion Wells

LOCATION Rincon, GA

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	HCL REACTION <small>Weak Moderate Strong</small>	GROUNDWATER OBSERVATIONS	WELL DATA
		rounded gravel Well-graded Sand with Silt (SW-SM) <i>(Con't)</i>				Completion: protective aluminum cover with bollards; 4-foot square concrete pad
35		- mottled olive yellow (2.5Y 6/6), very dark gray (2.5Y 3/1) and light yellowish brown (2.5Y 6/3)				(CONTINUED)
		Poorly-graded Sand with Clay (SP-SC) - dark greenish gray (5GY 4/1) damp, cohesive, fine grained, trace coarse sand, with mica				Standpipe: 2" OD PVC (SCH 40) Screen: 10 ft; 10' - 0.010" Slot Prepack
		Bottom of borehole at 37.0 feet.				Sump: 0.299999999999997 ft. Cave-in to 37 ft.
40						
45						
50						
55						
60						
65						

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SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Plant McIntosh Landfill 4 Expansion Wells

LOCATION Rincon, GA

DATE STARTED 10/28/2015 **COMPLETED** 10/29/2015 **SURF. ELEV.** 56.5 **COORDINATES:** N:32.350289 E:-81.194308

CONTRACTOR Cascade **EQUIPMENT** Prosonic **METHOD** Rotosonic

DRILLED BY F. Kraus **LOGGED BY** W. Shaughnessy **CHECKED BY** B. Smelser **ANGLE** **BEARING**

BORING DEPTH 47 ft. **GROUND WATER DEPTH DURING** 28 ft. **COMP.** **DELAYED** 32.2 ft. after 24 hrs.

NOTES

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	HCL REACTION Weak Moderate Strong	GROUNDWATER OBSERVATIONS	WELL DATA
						Completion: protective aluminum cover with bollards; 4-foot square concrete pad
5		Poorly-graded Sand with Clay (SP-SC) - dark grayish brown (2.5Y 4/2) and light yellowish brown (2.5Y 6/3) dry, topsoil, fine-grained - mottled brownish yellow (10YR 6/8) and red (2.5YR 5/8) increasing clay content with depth				Surface Seal: concrete
		Sandy Lean Clay (CL) - mottled light gray (2.5Y 7/2), brownish yellow (10YR 6/8) and red (2.5YR 4/6) damp, medium stiff, low, increasing sand content with depth, with mica				
10		Fat Clay (CH) - mottled light gray (5Y 7/1), brownish yellow (10YR 6/8) and red (2.5YR 4/6) very damp, medium stiff, high				
		Well-graded Sand with Clay (SW-SC) - mottled red / moderate reddish brown (10R 4/6) and yellowish brown (10YR 5/6) damp, cohesive, fine to coarse-grained				
		Fat Clay (CH) - mottled pale yellow (2.5Y 8/2) and light reddish brown (2.5YR 6/3) damp, medium stiff, high, with sand				Annular Fill: Cement-Bentonite Grout (30 gal.)
15		Poorly-graded Sand (SP) - mottled pale yellow (2.5Y 8/4) and light reddish brown (2.5YR 6/3) damp, fine-grained				
		Fat Clay (CH) - mottled light gray (2.5Y 7/2) and yellow (2.5Y 8/6) very damp, medium stiff, high, with silt - mottled light gray / yellowish gray (5Y 7/2) and very pale brown / grayish orange (10YR 7/4)				
20						
25		- with sand				Annular Seal: Pel Plug 3/8 coated pellets (1 - 5gal. bucket)
						Filter: Filter Media 1A Silica Sand (4 - 50 lbs bags)
30		Poorly-graded Sand with Clay (SP-SC) - light yellowish brown (2.5Y 6/4) and pink (5YR 7/3) moist, fine-grained				

(Continued Next Page)



LOG OF TEST BORING

BORING GWC-18
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GPC568939

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Plant McIntosh Landfill 4 Expansion Wells

LOCATION Rincon, GA

S:\PROJECTS\BENTLEY\GINT\PROJECTS\PLANT MCINTOSH LANDFILL 4 EXPANSION.GPJ

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	HCL REACTION <small>Weak Moderate Strong</small>	GROUNDWATER OBSERVATIONS	WELL DATA
		Poorly-graded Sand with Clay (SP-SC) <i>Con't</i> - brownish yellow / dark yellowish orange (10YR 6/6) and pale yellow (2.5Y 7/3) fine to medium-grained - yellowish brown (10YR 5/8)				Completion: protective aluminum cover with bollards; 4-foot square concrete pad
		Well-graded Sand (SW) - grayish brown (2.5Y 5/2) wet, fine to coarse-grained				(CONTINUED)
35		Poorly-graded Sand with Silt (SP-SM) - light brownish gray (2.5Y 6/2) wet, fine-grained, with mica				Standpipe: 2" OD PVC (SCH 40) Screen: 10 ft; 10' - 0.010" Slot Prepack
40		Sandy Silt (ML) - dark greenish gray (10GY 4/1) very damp, with mica				Sump: 0.299999999999997 ft.
45						Backfill: Haliburton Baroid 3/8 chips
		Bottom of borehole at 47.0 feet.				Cave-in to 47 ft.
50						
55						
60						
65						



LOG OF TEST BORING

BORING GWC-19
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GPC568939

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Plant McIntosh Landfill 4 Expansion Wells
LOCATION Rincon, GA

DATE STARTED 10/29/2015 **COMPLETED** 10/29/2015 **SURF. ELEV.** 50.7 **COORDINATES:** N:32.350816 E:-81.193126

CONTRACTOR Cascade **EQUIPMENT** Prosonic **METHOD** Rotosonic

DRILLED BY F. Kraus **LOGGED BY** W. Shaughnessy **CHECKED BY** B. Smelser **ANGLE** **BEARING**

BORING DEPTH 37 ft. **GROUND WATER DEPTH DURING** 28 ft. **COMP.** **DELAYED** 26.6 ft. after 72 hrs.

NOTES

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	HCL REACTION Weak Moderate Strong	GROUNDWATER OBSERVATIONS	WELL DATA
		Poorly-graded Sand with Silt (SP-SM) - grayish brown (10YR 5/2) moist, topsoil, fine-grained				Completion: protective aluminum cover with bollards; 4-foot square concrete pad
		Sandy Lean Clay (CL) - mottled light gray (10YR 7/1), brownish yellow (10YR 6/8) and red (2.5YR 4/6) dry, very stiff, low to medium				
5		Well-graded Sand with Clay (SW-SC) - mottled gray (2.5Y 6/1) and light olive brown (2.5Y 5/6) dry, fine to coarse-grained				
		Silty Clay (CL-ML) - mottled light gray (2.5Y 7/1) and red (2.5YR 5/8) moist, very stiff				
		- light gray (2.5Y 7/2) and red (2.5YR 4/8) dry, hard, low				
10		Fat Clay (CH) - light gray / yellowish gray (5Y 7/2) damp, medium stiff, medium to high - interbedded with thin lenses of fine sand (white 5Y 8/1)				Surface Seal: concrete
15						Annular Fill: Cement-Bentonite Grout (30 gal.)
20						Annular Seal: Pel Plug 3/8 coated pellets (1 - 5gal. bucket)
		- increasing sand content				Filter: Filter Media 1A Silica Sand (4 - 50 lbs bags)
25		Well-graded Sand with Clay (SW-SC) - mottled yellowish brown (10YR 5/6) and very dark gray (10YR 3/1) damp, fine to coarse-grained				Standpipe: 2" OD PVC (SCH 40) Screen: 10 ft; 10' - 0.010" Slot Prepack
		Well-graded Sand (SW) - pale brown (10YR 6/3) and light gray (2.5Y 7/2) dry, fine to coarse-grained				
		- olive yellow (2.5Y 6/6) interbedded with clayey sand lenses				
		- light yellowish brown (2.5Y 6/3) wet				
30						

(Continued Next Page)



LOG OF TEST BORING

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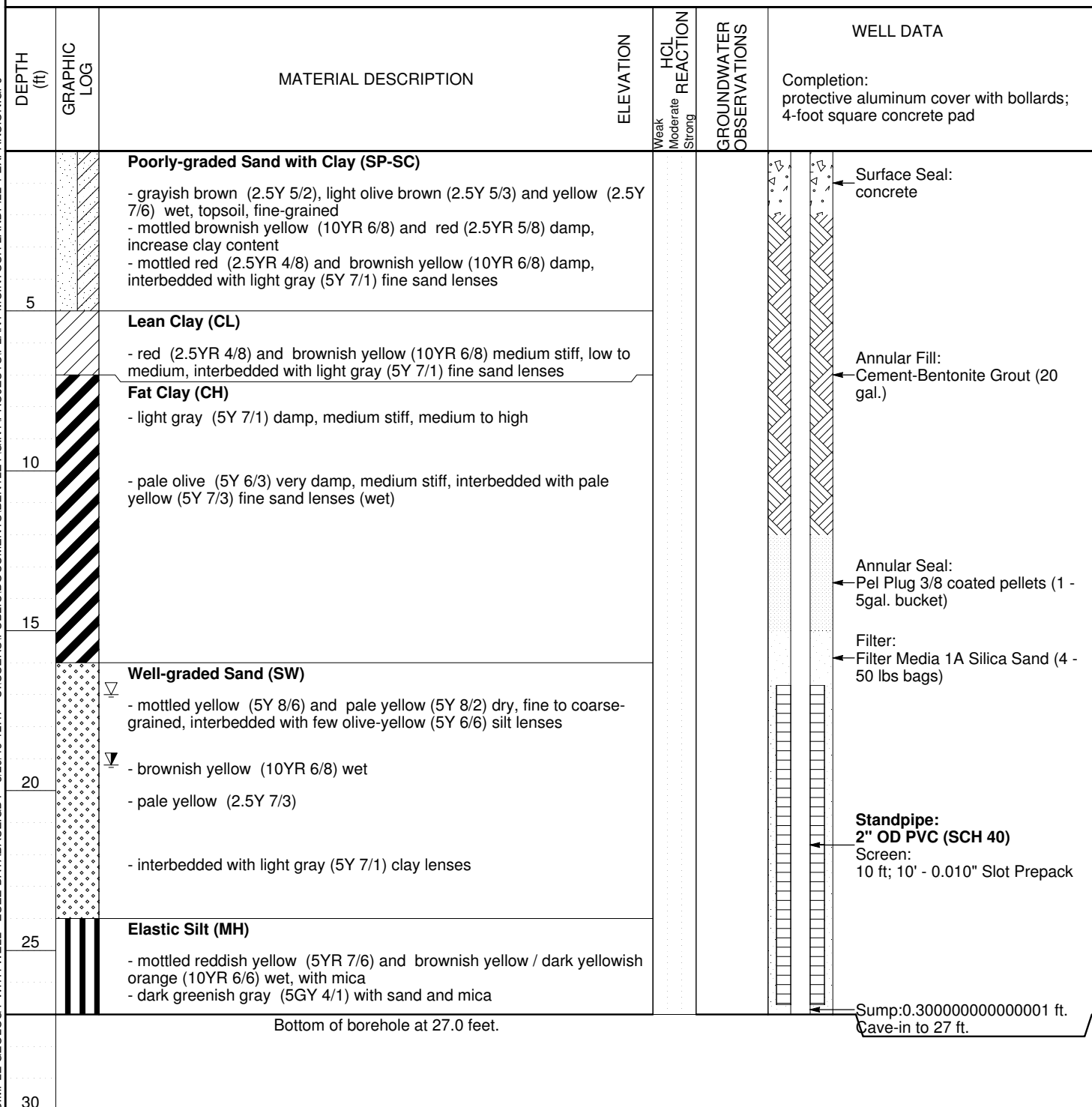
SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Plant McIntosh Landfill 4 Expansion Wells

LOCATION Rincon, GA

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	HCL REACTION <small>Weak Moderate Strong</small>	GROUNDWATER OBSERVATIONS	WELL DATA
		Well-graded Sand (SW) (<i>Con't</i>) - yellowish brown / moderate yellowish brown (10YR 5/4) - brown (10YR 4/3)				Completion: protective aluminum cover with bollards; 4-foot square concrete pad
		Poorly-graded Sand with Silt (SP-SM) - light olive brown (2.5Y 5/6) wet, fine to medium-grained, with mica				(CONTINUED)
35		Silt (ML) - dark greenish gray (5GY 4/1) damp, with mica				Standpipe: 2" OD PVC (SCH 40) Screen: 10 ft; 10' - 0.010" Slot Prepack Sump:0.299999999999997 ft.
		Bottom of borehole at 37.0 feet.				Backfill:Haliburton Baroid 3/8 chips Cave-in to 37 ft.
40						
45						
50						
55						
60						
65						

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LOG OF TEST BORING

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SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Plant McIntosh Landfill 4 Expansion Wells

LOCATION Rincon, GA

DATE STARTED 11/4/2015 **COMPLETED** 11/4/2015 **SURF. ELEV.** 42.0 **COORDINATES:** N:32.351717 E:-81.191210

CONTRACTOR Cascade **EQUIPMENT** Prosonic **METHOD** Rotosonic

DRILLED BY F. Kraus **LOGGED BY** W. Shaughnessy **CHECKED BY** B. Smelser **ANGLE** **BEARING**

BORING DEPTH 32 ft. **GROUND WATER DEPTH DURING** 17 ft. **COMP.** **DELAYED** 17.5 ft. after 24 hrs.

NOTES

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	HCL REACTION Weak Moderate Strong	GROUNDWATER OBSERVATIONS	WELL DATA
		Poorly-graded Sand with Silt (SP-SM) - yellowish brown / moderate yellowish brown (10YR 5/4) fine-grained				Completion: protective aluminum cover with bollards; 4-foot square concrete pad
5		Clayey Sand (SC) - mottled yellowish brown (10YR 5/6) and red (2.5YR 4/8) wet, cohesive - yellowish red (5YR 5/8)				Surface Seal: concrete
10		Lean Clay (CL) - mottled light gray (5Y 7/1) and red (2.5YR 5/8) damp, medium stiff, low to medium - dry, stiff - mottled light gray (5Y 7/1) and yellow (10YR 7/8) interbedded with thin fine sand lenses				Annular Fill: Cement-Bentonite Grout (20 gal.)
15		Well-graded Sand (SW) - strong brown (7.5YR 5/8) dry, fine to coarse-grained - yellow (10YR 7/8) - brownish yellow (10YR 6/8) wet				Annular Seal: Pel Plug 3/8 coated pellets (1 - 5gal. bucket) Filter: Filter Media 1A Silica Sand (4 - 50 lbs bags)
20		Well-graded Sand with Clay (SW-SC) - pale yellow (2.5Y 7/3) wet, fine to coarse-grained, with mica - brownish yellow (10YR 6/8)				Standpipe: 2" OD PVC (SCH 40) Screen: 10 ft; 10' - 0.010" Slot Prepack
25		Poorly-graded Sand with Silt (SP-SM) - mottled yellowish brown (10YR 5/6), black (10YR 2/1) and light gray (10YR 7/1) wet Elastic Silt (MH) - brownish yellow (10YR 6/8) wet, with mica - mottled light brownish gray (2.5Y 6/2) and brownish yellow (10YR 6/8) damp Silt (ML) - dark greenish gray (10BG 4/1) damp, with mica				Sump: 0.3000000000000001 ft.
30						Backfill: Haliburton Baroid 3/8 chips

(Continued Next Page)



LOG OF TEST BORING

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SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Plant McIntosh Landfill 4 Expansion Wells

LOCATION Rincon, GA

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	HCL REACTION <small>Weak Moderate Strong</small>	GROUNDWATER OBSERVATIONS	WELL DATA Completion: protective aluminum cover with bollards; 4-foot square concrete pad
		Silt (ML) (Con't)				(CONTINUED)
						Backfill:Haliburton Baroid 3/8 chips Cave-in to 32 ft.
		Bottom of borehole at 32.0 feet.				
35						
40						
45						
50						
55						
60						
65						

S:\PUBLIC\PROJECTS\BENTLEY\GINT\PROJECTS\PLANT MCINTOSH LANDFILL 4 EXPANSION.GPJ
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LOG OF TEST BORING

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GPC568939

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Plant McIntosh Landfill 4 Expansion Wells
LOCATION Rincon, GA

DATE STARTED 11/3/2015 **COMPLETED** 11/4/2015 **SURF. ELEV.** 47.4 **COORDINATES:** N:32.352304 E:-81.190127

CONTRACTOR Cascade **EQUIPMENT** Prosonic **METHOD** Rotosonic

DRILLED BY F. Kraus **LOGGED BY** W. Shaughnessy **CHECKED BY** B. Smelser **ANGLE** **BEARING**

BORING DEPTH 37 ft. **GROUND WATER DEPTH DURING** 23 ft. **COMP.** **DELAYED** 24.3 ft. after 24 hrs.

NOTES

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	HCL REACTION Weak Moderate Strong	GROUNDWATER OBSERVATIONS	WELL DATA
		Silty Sand (SM) - dark olive gray / olive gray (5Y 3/2) and light olive gray (5Y 6/2) wet, topsoil				Completion: protective aluminum cover with bollards; 4-foot square concrete pad
5		Clayey Sand (SC) - mottled light olive brown (2.5Y 5/3), red (2.5YR 5/8) and brownish yellow (10YR 6/8) very damp, cohesive - decrease sand content with depth				Surface Seal: concrete
		Poorly-graded Sand (SP) - mottled pale yellow (2.5Y 7/3) and brownish yellow (10YR 6/8) damp				
		Lean Clay (CL) - mottled light yellowish brown (2.5Y 6/3) and yellowish red / light brown (5YR 5/6) damp				Annular Fill: Cement-Bentonite Grout (20 gal.)
10		Fat Clay (CH) - light olive gray (5Y 6/2) and reddish yellow (7.5YR 6/6) damp, medium to high, with silt - white (2.5Y 8/1) interbedded with thin white (2.5Y 8/1) fine sand lenses				
15		- increase silt content				Annular Seal: Pel Plug 3/8 coated pellets (1 - 5gal. bucket)
		Well-graded Sand (SW) - pale yellow (2.5Y 7/4) and brownish yellow / dark yellowish orange (10YR 6/6) dry, fine to coarse-grained				Filter: Filter Media 1A Silica Sand (4 - 50 lbs bags)
20		Poorly-graded Sand (SP) - mottled pale brown (10YR 6/3) and brownish yellow (10YR 6/8) dry, fine to medium-grained				
25		- olive yellow (2.5Y 6/6) wet				Standpipe: 2" OD PVC (SCH 40) Screen: 10 ft; 10' - 0.010" Slot Prepack
		Poorly-graded Sand with Silt (SM) - pale yellow (5Y 7/4) wet, cohesive				Sump: 0.300000000000001 ft.
30		Sandy Silt (ML)				Backfill: Haliburton Baroid 3/8 chips

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LOG OF TEST BORING

BORING GWC-22
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SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Plant McIntosh Landfill 4 Expasion Wells

LOCATION Rincon, GA

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	HCL REACTION <small>Weak Moderate Strong</small>	GROUNDWATER OBSERVATIONS	WELL DATA
						Completion: protective aluminum cover with bollards; 4-foot square concrete pad
						(CONTINUED)
35		Sandy Silt (ML) (<i>Con't</i>) - light yellowish brown (2.5Y 6/3) damp, with mica - strong brown (7.5YR 5/8) and light yellowish brown (10YR 6/4) - dark greenish gray (5G 4/1) damp				Backfill:Haliburton Baroid 3/8 chips
						Cave-in to 37 ft.
40						
45						
50						
55						
60						
65						

S:\PROJECTS\BENTLEY\GINT\PROJECTS\PLANT MCINTOSH LANDFILL 4 EXPANSION.GPJ

WELL CONSTRUCTION LOG - ES&E DATABASE.GDT - 7/6/16 12:34 - S:\WORKGROUPS\APC GENERAL SERVICE COMPLEX\CIVIL TECH SUPPORT\DRILLING\PROJECTS\GA-MCINTOSH\MCINTOSH REPLACEMENT AND ABANDONMENT (2016)\BORING LOGS\MCINTOSH



LOG OF WELL CONSTRUCTION

WELL: GWC-23
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ECS38075

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT McIntosh CCR PZ Install (2016)

LOCATION Plant McIntosh

DATE STARTED 5/25/2016 COMPLETED 5/26/2016 SURF. ELEV. 52.2 COORDINATES: N:32.352180 E:-81.190155

CONTRACTOR Cascade Drilling EQUIPMENT Sonic METHOD Rotosonic

DRILLED BY T. Ardito LOGGED BY A. Henry CHECKED BY B. Smelser ANGLE BEARING

BORING DEPTH 37 ft. GROUND WATER DEPTH DURING COMP. 18.05 ft. DELAYED

NOTES

DEPTH (ft)	GROUNDWATER OBSERVATIONS	ELEVATION	WELL DATA Completion: protective aluminum cover with bollards; 4-foot square concrete pad	NOTES
5		52.2 50.2	Surface Seal: concrete	
10			Annular Fill: Portland Cement-Bentonite Grout (2 - 94lbs bags PC, 0.25 - 50lbs bags Gel, 20 gal. Water)	
15		39.7	Annular Seal: Pel-Plug 3/8 Bentonite Non-Coated Pellets (0.5 - 5gal buckets)	
20		34.1 32.4	Filter: Filter Media 20/40 Silica Sand (4 - 50 lbs bags)	
25			Standpipe: 2" OD PVC (SCH 40) Screen: 10 ft; 0.010" Slot Prepack	
30		22.4 22.2	Sump: 0.20 ft.	
35		18.2	Backfill: Baroid 3/8 Hole Plug Chips (1 - 50lbs bags (37.0'-34.0')) and Filter Media 20/40 Silica Sand (1 - 50lbs bags (30.0'-34.0'))	
		15.2	Cave-in to 37 ft.	



LOG OF TEST BORING

BORING GWC-23

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ECS38075

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT McIntosh CCR PZ Install (2016)

LOCATION Plant McIntosh

DATE STARTED 5/25/2016 COMPLETED 5/26/2016 SURF. ELEV. 52.2 COORDINATES: N:32.352180 E:-81.190155

CONTRACTOR Cascade Drilling EQUIPMENT Sonic METHOD Rotosonic

DRILLED BY T. Ardito LOGGED BY A. Henry CHECKED BY B. Smelser ANGLE BEARING

BORING DEPTH 37 ft. GROUND WATER DEPTH DURING COMP. 18.05 ft. DELAYED

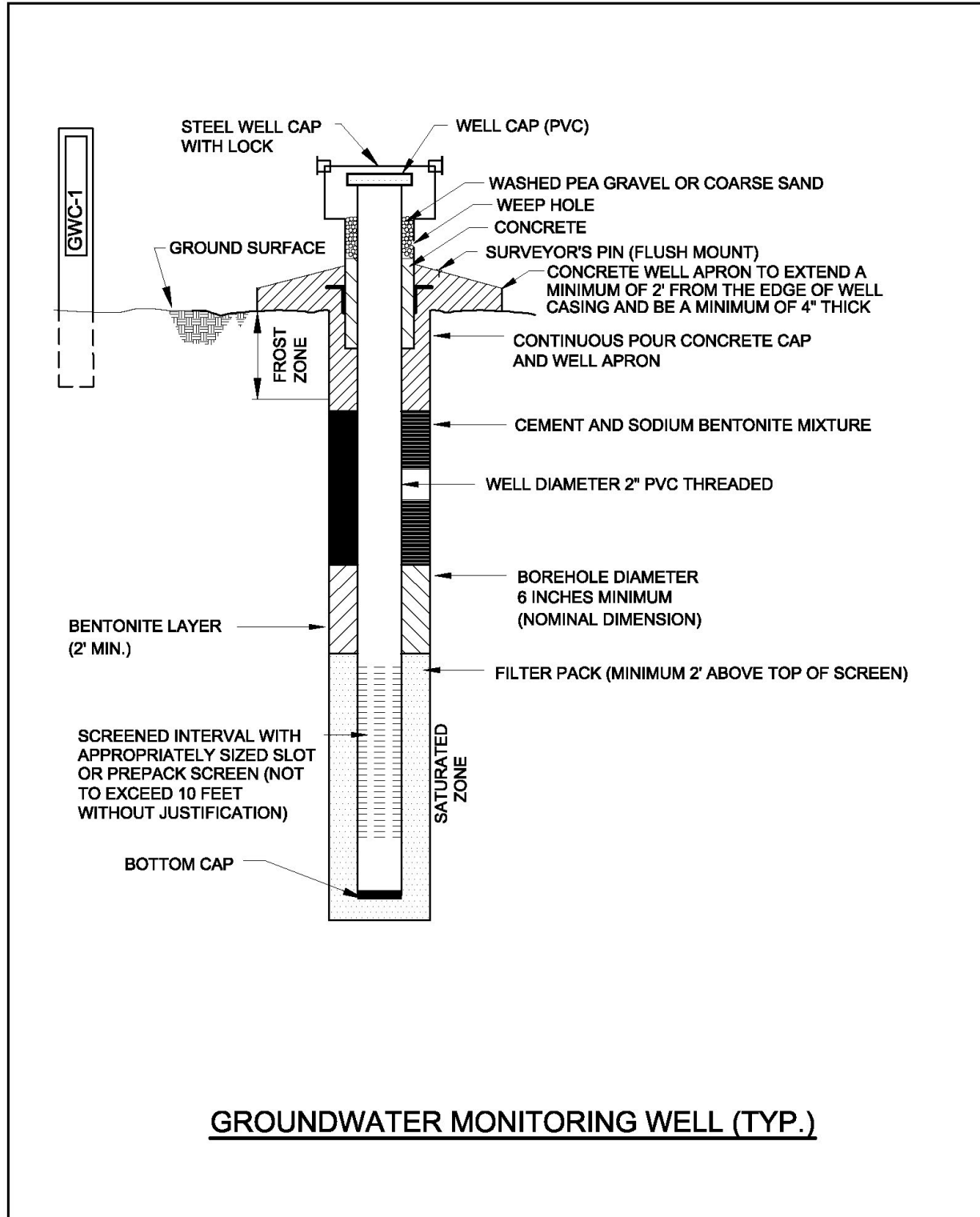
NOTES No Gamma Data Recorded (Gamma tool not functioning)

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	HCL REACTION Weak Moderate Strong	COMMENTS	Natural Gamma		
						55	110	165
5		- topsoil Lean Clay (CL) - mottled very light gray (N8) and red / moderate reddish brown (10R 4/6) damp, stiff, low, micaceous; fine grained						
10		Lean Clay (CL) - light gray (2.5Y 7/2) damp, stiff, to medium, very fine grained						
15								
20								
25		(SP-SC) - white (10YR 8/1) moist, loose, no, fine grained with lt. brownish gray clay lenses, approx, 1/16" in thickness or less						
30		Silty Sand (SM) - brownish yellow / dark yellowish orange (10YR 6/6) very moist, medium dense, no, fine grained Silty Sand (SM) - light gray (10YR 7/2) moist, loose, no, fine grained; micaceous Silt (ML) - dark greenish gray (5GY 4/1) moist, medium stiff, low, micaceous						
35		Silt (ML) - dark greenish gray (10Y 4/1) damp, medium stiff, low, micaceous micaceous micaceous						

Bottom of borehole at 37.0 feet.

GEOLOGY LOG COLOR GAMMA - ESEE DATABASE.GDT - 7/6/16 12:39 - S:\WORKGROUPS\APC GENERAL SERVICE COMPLEX\CIVIL TECH SUPPORT\DRILLING\PROJECTS\GA-MCINTOSH\MCINTOSH REPLACEMENT AND ABANDONMENT (2016)\BORING LOGS\MCMCINTOSH

Appendix B - Groundwater Monitoring Well Detail



Appendix C - Groundwater Sampling Procedure

Groundwater sampling will be conducted using the latest United States Environmental Protection Agency (EPA) 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.

GPC 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 GPC 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. 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 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 EPA 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 feet 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 dissolved oxygen [DO]) approximately every 3 to 5 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
 - $\pm 5\%$ for specific conductance (conductivity)
 - $\pm 10\%$ or ± 0.2 mg/L (whichever is greater) for DO where $DO > 0.5$ mg/L. If $DO < 0.5$ mg/L no stabilization criteria apply
 - Temperature – Record only, not used for stabilization criteria

- ORP – Record only, not used for stabilization criteria.
- ≤10 for turbidity (see additional details below)

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 5 NTU and all other stabilization criteria have been met, samplers will continue purging for 1 additional hour in order to reduce the turbidity to 5 NTU or less.

- If turbidity remains above 5 NTU but is less than 10 NTU after the additional hour of purging, 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 COC form.
7. Collect samples at a flow rate between 50 and 250 mL/min 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 a cooler containing ice 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 Site
 - 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 chain-of-custody (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 donned prior to filling sample bottles. Gloves will be discarded after sampling each well and before sampling the next well.