GROUNDWATER MONITORING PLAN

PLANT MCINTOSH INACTIVE COAL COMBUSTION INACTIVE CCR LANDFILL NO. 3 EFFINGHAM COUNTY, GEORGIA

FOR

Georgia Power

November 2018

GEI Consultants

GEI Consultants, Inc., 1375 Peachtree Street NE, Suite A15, Atlanta, GA, 404.592.0050

TABLE OF CONTENTS

Tables

Figures

Appendices

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: _____

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 Inactive Coal Combustion Residuals (CCR) Landfill No. 3 (Inactive CCR Landfill No. 3) (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 EPD 391-3-4.10(6), a detection monitoring well network for Inactive Landfill No. 3 has been installed and certified by a qualified professional engineer. This certification has been placed in the Site's operating record 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 (Appendix A, Figure A-1, Compliance Monitoring Network Map). 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], 1998).

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 Inactive CCR Landfill No. 3 flows from the southwest to the 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 1997, hydraulic conductivity measurements were calculated, and the average hydraulic conductivity was determined to be 2.23 ft/day (SCS ES&EE, 1998).

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) 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 rotosonic 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, 2015) 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, 2013) 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, 2013) 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 SESD *Operating Procedure for Design and Installation of Monitoring Wells* 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 the Site 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. A minimum of eight independent samples from each groundwater well will be 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 LABORATYR 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. Semiannual groundwater monitoring reports will be submitted to the EPD within 90 days of receipt of the groundwater analytical data from the laboratory. At a minimum, 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 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

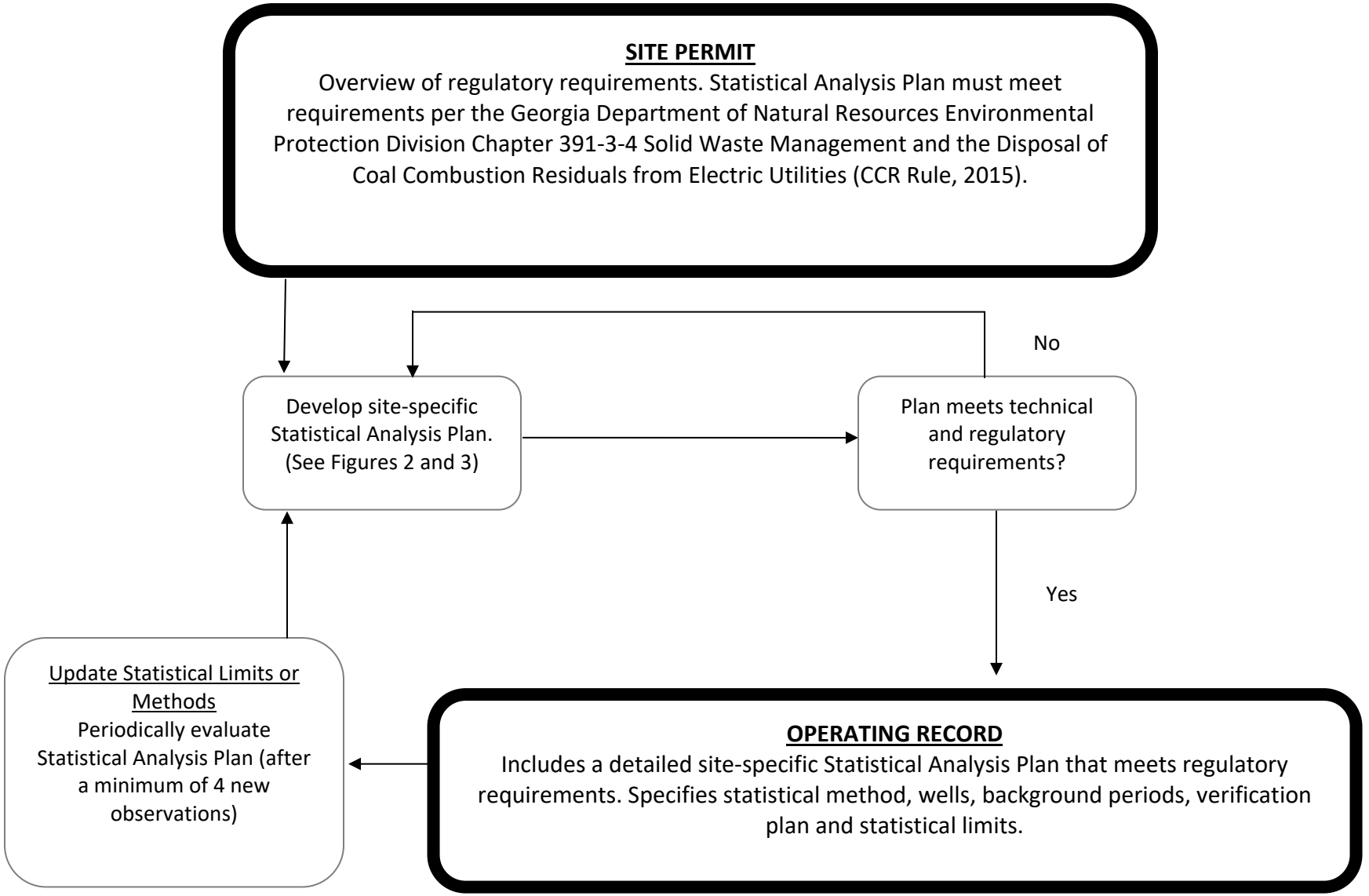
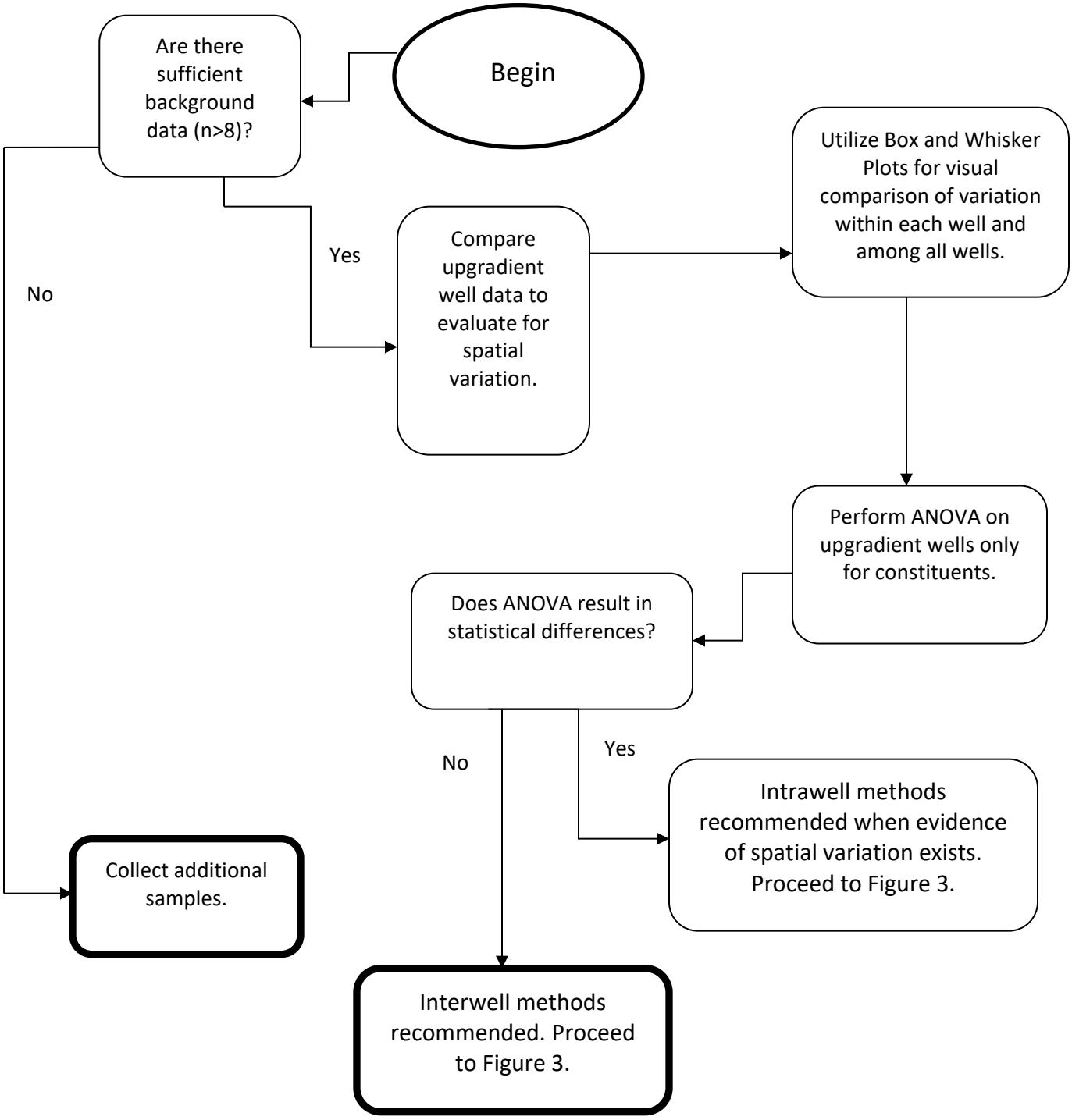
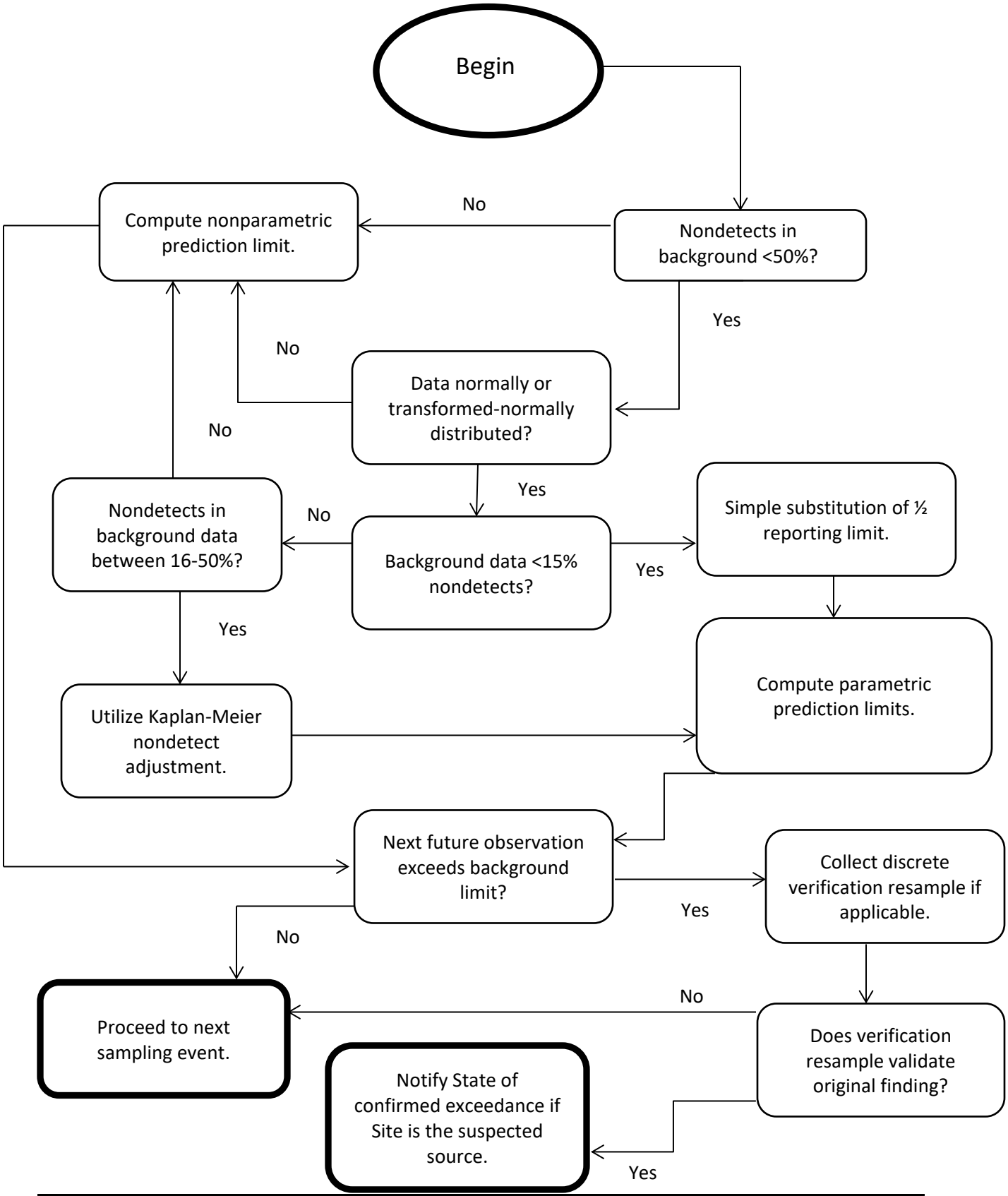


FIGURE 2. DECISION LOGIC FOR DETERMINING APPROPRIATE STATISTICAL METHOD



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

FIGURE 3. DECISION LOGIC FOR COMPUTING PREDICTION LIMITS



11. REFERENCES

Cooke, 1943. Cooke, Charles W., 1943, Geology of the Coastal Plain of Georgia, United States Geologic Survey Bulletin 941.

EPA, 2015. 40 CFR Parts 257 and 261. *Hazardous and Solid Waste Management System, Disposal of Coal Combustion Residuals from Electric Utilities, Final Rule*.

EPA, SESDGUID-205-R1, 2013. EPA, Region 4 SESD *Operating Procedure for Design and Installation of Monitoring Wells*. SESDGUID-205-R1, Published January 29, 2013.

EPA, SESDGUID-205-R3, 2015. EPA, Region 4 SESD *Operating Procedure for Field Equipment Cleaning and Decontamination*. SESDPROC-205-R3. Published February 5, 2007, revised December 18, 2015.

EPD, 1985. Official Code of Georgia Annotated (O.C.G.A.). O.C.G.A. § 12-5-120. Water Well Standards Act of 1985.

EPD, 1991. Georgia Environmental Protection Division, 1991. Manual for Groundwater Monitoring. (PP. 38).

GA EPD, undated. Industrial Waste Disposal Site Design and Operations Plan – Supplemental Data for Solid Waste Handling Permit. Georgia Department of Natural Resources.

EPD, 2018. Georgia EPD Rules and Regulations, 2018. Rule Subject 391-3-4, Solid Waste Management. Revised March 28, 2018.

SCS ES&EE, 1998. *Groundwater Monitoring Plan, Plant McIntosh Ash Disposal Site No. 3*, prepared by Southern Company, August 5, 1998.

APPENDIX

Appendix A – Monitoring System Details

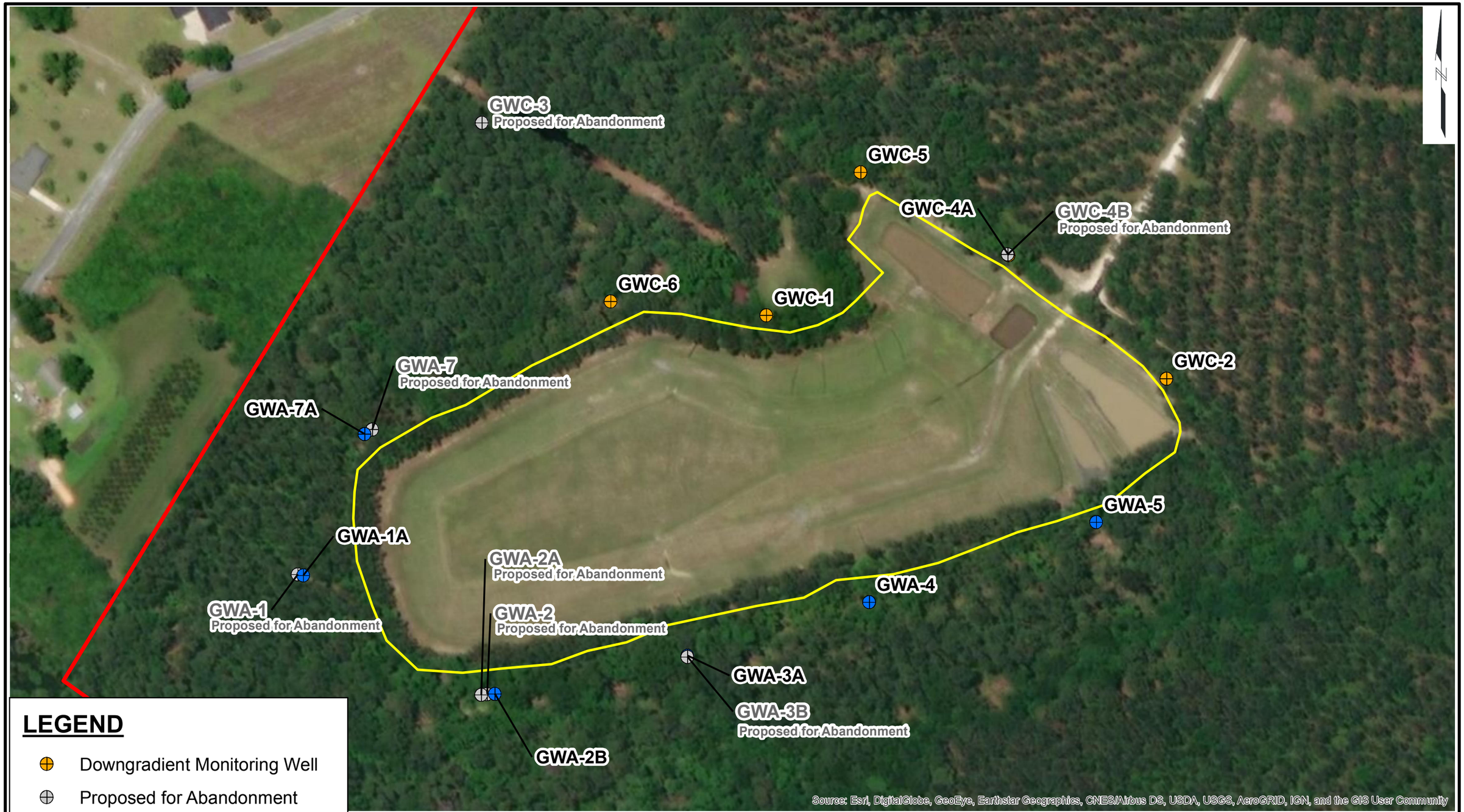
FIGURE A-1 COMPLIANCE MONITORING NETWORK MAP

FIGURE A-2 POTENTIOMETRIC SURFACE CONTOUR MAP – OCTOBER 2018

TABLE A-1 MONITORING NETWORK WELL DETAILS

TABLE A-2 WATER LEVEL MONITORING NETWORK PIEZOMETER DETAILS

BORING AND WELL CONSTRUCTION LOGS



LEGEND

- Downgradient Monitoring Well
- Proposed for Abandonment
- Upgradient Monitoring Well
- Inactive CCR Landfill No. 3
- Approximate Property Boundary

GWA-1, GWA-2, GWA-2A, GWA-3B, GWA-7, GWC-3, and GWC-4B are proposed for abandonment

0 150 300

SCALE: 1 inch = 150 feet

Groundwater Monitoring Plan
Plant McIntosh Inactive CCR Landfill No. 3
Effingham County, Georgia

Georgia Power Company
Atlanta, Georgia

GEI Consultants

INACTIVE CCR LANDFILL NO. 3
COMPLIANCE MONITORING
NETWORK MAP

Project No. 1800205

Prepared November 2018 Fig. A-1

LEGEND

- Downgradient Monitoring Well
- Piezometer
- Upgradient Monitoring Well
- Apparent Groundwater Flow Direction
- Apparent Potentiometric Surface Contour
- Inferred Potentiometric Surface Contour
- Approximate Property Boundary

(52.16) = Groundwater Elevation measured 10/09/18

N

45
47
46
48
49
50
51
52

GWC-5 (48.97 *)
PZ-2 (46.40)
GWC-4A (46.08)
GWC-6 (47.11)
PZ-1 (46.08)
GWC-1 (46.58)
GWC-2 (45.78)
GWA-7A (45.99)
GWA-5 (47.14)
PZ-3 (46.49)
GWA-1A (52.16)
GWA-4 (46.89)
GWA-3A (47.53)
GWA-2B (47.23)

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

NOTES

* GWC-5 not used in contouring.

Elevations are in feet relative to North American Vertical Datum (NAVD) 88

0 150 300

SCALE: 1 inch = 150 feet

Groundwater Monitoring Plan
Plant McIntosh Inactive CCR Landfill No. 3
Effingham County, Georgia

Georgia Power Company
Atlanta, Georgia

GEI Consultants

INACTIVE CCR LANDFILL NO. 3
POTENTIOMETRIC SURFACE
CONTOUR MAP - OCTOBER 2018

Project No. 1800205

Prepared November 2018 Fig. A-2

Table A-1 Monitoring Network Well Details
Groundwater Monitoring Plan
Georgia Power Company
Inactive CCR Landfill No. 3
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)	Top of Screen Elevation (ft)	Bottom of Screen Elevation (ft)	Screen Length (ft)	Purpose	Installation Date
GWA-1A	852024.525	954555.644	63.91	66.78	37.30	29.48	27.3	39.48	29.48	10	Upgradient Monitoring	1/5/2017
GWA-2B	851832.1056	954866.6934	63.4	66.18	51.78	14.4	41.48	24.7	14.7	10	Upgradient Monitoring	8/29/2018
GWA-3A	851893.795	955179.816	59.69	62.79	33.88	28.91	23.88	38.91	28.91	10	Upgradient Monitoring	5/16/1998
GWA-4	851980.953	955475.643	58.85	62.01	29.16	32.85	24.16	37.85	32.85	5	Upgradient Monitoring	5/7/1998
GWA-5	852110.879	955844.722	57.31	60.43	33.00	27.43	18.44	41.99	31.99	10	Upgradient Monitoring	5/7/1998
GWA-7A	852253.9256	954655.5624	65.64	68.18	46.94	21.24	36.64	31.54	21.54	10	Upgradient Monitoring	8/29/2018
GWC-1	852446.977	955308.283	63.28	66.08	35.96	30.12	26.16	39.92	30.62	9.3	Downgradient Monitoring	1/22/1996
GWC-2	852344.004	955958.339	60.56	64.21	36.78	27.43	26.98	37.23	27.93	9.3	Downgradient Monitoring	1/23/1996
GWC-4A	852544.54	955702.085	63.6	66.62	36.96	29.66	26.96	39.66	29.66	10	Downgradient Monitoring	5/16/1998
GWC-5	852679.451	955461.524	64.62	68.08	30.56	37.52	20.56	47.52	37.52	10	Downgradient Monitoring	5/5/1998
GWC-6	852469.762	955055.452	65.34	68.51	32.64	35.87	27.14	41.37	36.37	5	Downgradient Monitoring	5/6/1998

Notes:
bTOC = below top of casing
ft = feet
NA = Not Available
Horizontal Datum: NAD1983 Georgia State Plane East Zone. Vertical Datum: NAVD1988
Northing, Easting, Ground Surface Elevation, and TOC Elevation taken from the March 2017 survey by Donaldson & Garrett on 3/21-22/2017 and revised on 4/18/17.
Total depth and screen depths taken from available installation logs.
GWA-1A, GWA-2B, and GWA-7A were installed as replacement wells for GWA-1, GWA-2, and GWA-7, respectively.

Table A-2 Water Level Monitoring Piezometer Details
Groundwater Monitoring Plan
Georgia Power Company
Inactive CCR Landfill No. 3
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)	Top of Screen Elevation (ft)	Bottom of Screen Elevation (ft)	Screen Length (ft)	Purpose	Installation Date
PZ-1	852399.5177	954905.4851	64.96	67.64	52.68	14.96	42.38	25.26	15.26	10	Water Level	8/29/2018
PZ-2	852550.2241	955305.0957	65.24	67.5	42.26	25.24	31.96	35.54	25.54	10	Water Level	8/28/2018
PZ-3	852031.8053	955677.8109	58.73	61.3	41.57	19.73	31.27	30.03	20.03	10	Water Level	8/30/2018

Notes:
bTOC = below top of casing
ft = feet
NA = Not Available
Horizontal Datum: NAD1983 Georgia State Plane East Zone. Vertical Datum: NAVD1988
Northing, Easting, Ground Surface Elevation, and TOC Elevation for 2018 wells surveyed by Thomas & Hutton on 9/24/18.
Additional well construction information taken from installation logs.

SITE: SEPCO Plant McIntosh, Rincon, GA WELL NO. G.W.A.-1

"AS-BUILT" DIAGRAM OF EACH WELL: attached

NAME OF DRILLER(S): Ron Wilkerson
Tim Wainwright
Joseph Whitaker
Carroll Crowther

TYPE OF DRILL RIG(S): Cannonball B-53

DRILLING METHOD: 6.25" I. D. hollow stem augers

WELL LOCATION: See the attached well schematic

BOREHOLE DIAMETER: 12.25 inches

WELL CASING DIAMETER: 2.0" I. D.

WELL DEPTH: 33'

DRILLING AND LITHOLOGIC LOGS: attached

CASING MATERIALS: 2.0" dia. ASTM, NSF rated, Schedule 40 PVC

SCREEN MATERIALS AND DESIGN: 2" to 4" dia. PVC with 0.01" slots ("Pre-Pac Dual-Wall Well Screen").

SCREENING AND CASING JOINT TYPE: flush threaded

SCREEN SLOT SIZE: 0.01" slots - 1.5" long (4 slots per diameter) (8 slots per vertical inch)

SCREEN LENGTH: 10'

FILTER PACK MATERIAL/SIZE: 20/30 quartz (silica) sand

FILTER PACK VOLUME: 8.90 cu. ft.

FILTER PACK PLACEMENT METHOD: Tremie pipe

SEALANT MATERIALS: Course grit sodium benonite

SEALANT VOLUME: 1.53 cu. ft.

SEALANT PLACEMENT METHOD: Tremie pipe

SURFACE SEAL DESIGN/CONSTRUCTION: See the attached well schematic

WELL DEVELOPMENT PROCEDURE: Pumping/surging

TYPE OF PROTECTIVE WELL CAP: 4" x 4" x 4' locking steel cover

GROUND SURFACE ELEVATION: See the attached individual well schematic

WELL CAP ELEVATION: See the attached individual well schematic

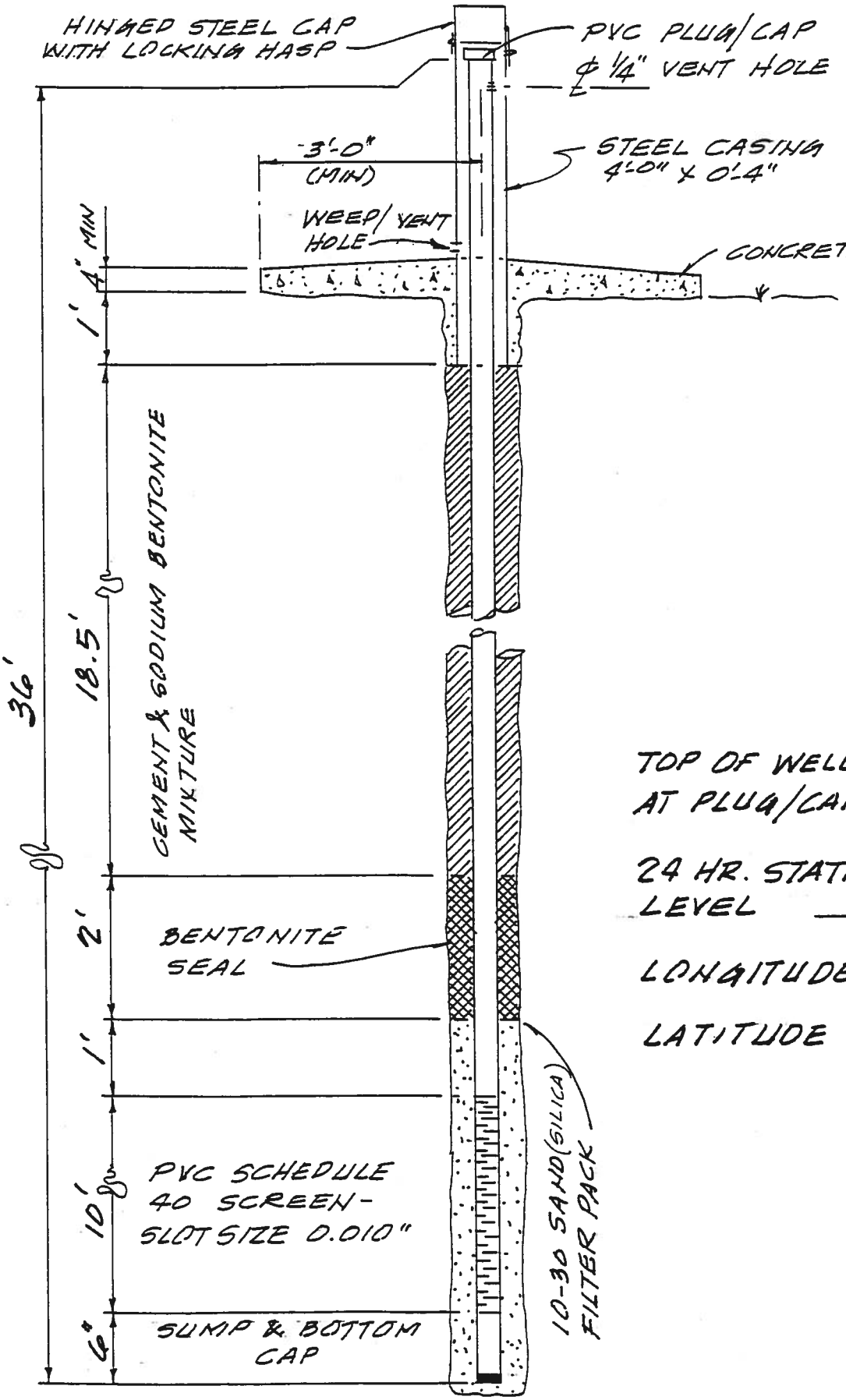
DETAILED DRAWING OF WELL: See the attached individual well schematic

GENERAL WELL INSTALLATION PROCEDURES

Prior to drilling the first well, all equipment was steam cleaned. This process was repeated after installation of each well.

All monitoring wells were installed using hollow-stem augers to advance the holes.

WELL Nº GWA-1



TOP OF WELL ELEVATION AT PLUG/CAP _____

24 HR. STATIC WATER LEVEL 13.05'

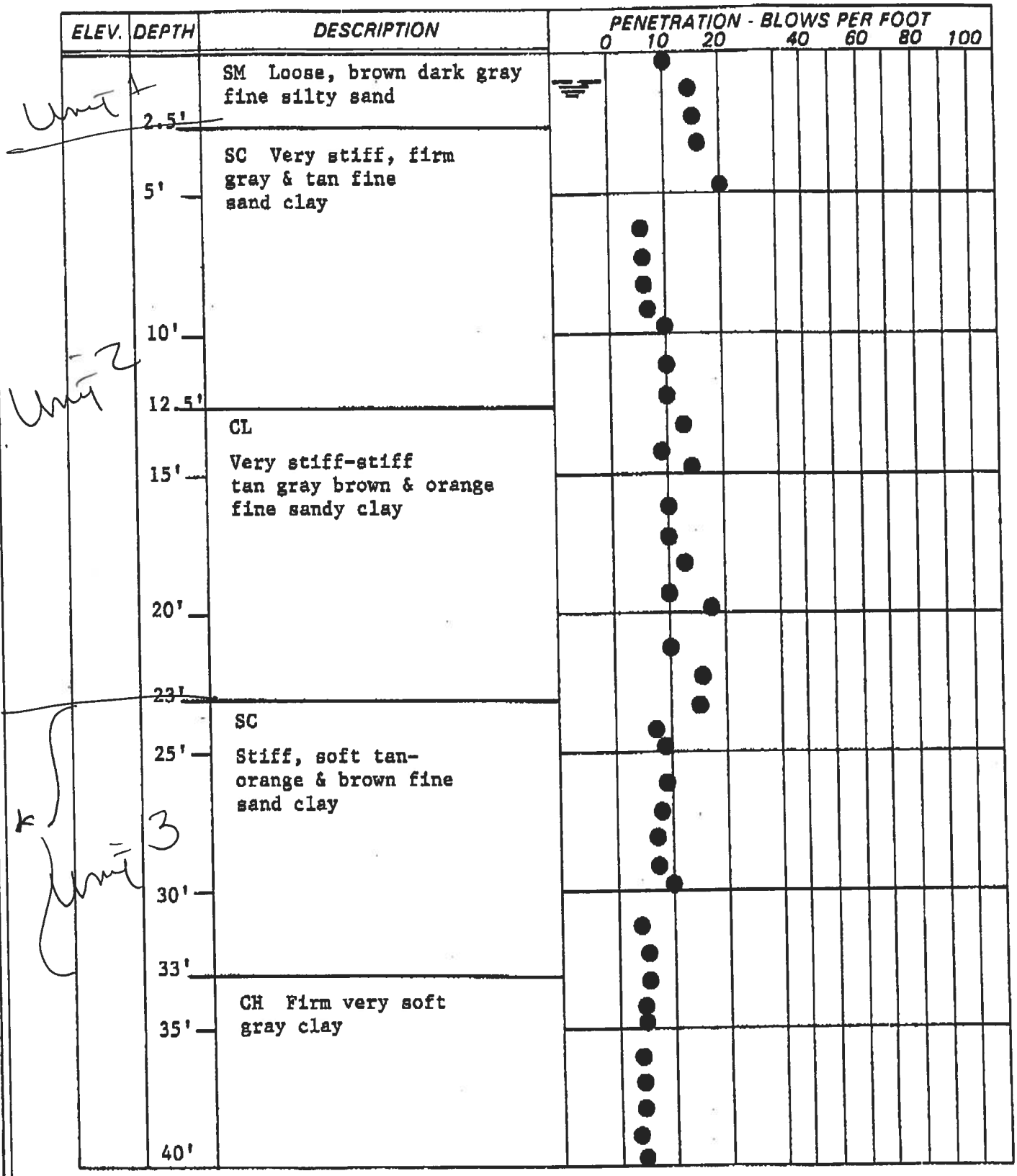
LONGITUDE _____

LATITUDE _____

SCALE: 1/2" = 1'-0" VERT.
1" = 1'-0" HORZ

TEST BORING RECORD

FIELD CLASSIFIED



Boring Terminated

Penetration is number of blows of 140 lb. hammer falling 30 in. required to drive 2.0 in. O.D. sampler one foot.

BORING NO. G.W.A.-1

WHITAKER LABORATORY, INC.

JOB SEPCO Plant McIntosh

DATE 5/6/98

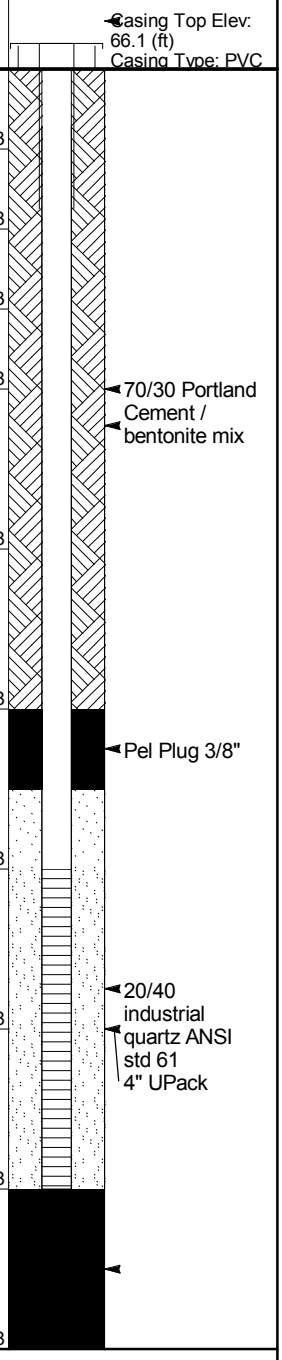
ERM
3200 Windy Hill Rd Ste 1500W
Atlanta, GA 30339
Telephone: 678-486-2700

WELL NUMBER GWA-1A

CLIENT Southern Company Services, Inc.
PROJECT NAME Plant McIntosh
PROJECT NUMBER 0372382
PROJECT LOCATION Ash Disposal Site #3
DATE STARTED 1/4/17 **COMPLETED** 1/5/17
GROUND ELEVATION 63.8 ft **HOLE SIZE** 8 inches
DRILLING CONTRACTOR Southern Comparny Services, Inc
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger 2"
AT TIME OF DRILLING ---
LOGGED BY NGV **CHECKED BY** ALR
AT END OF DRILLING ---
NOTES
AFTER DRILLING 6.17 ft / Elev 57.63 ft

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	U.S.C.S.	GRAPHIC LOG		MATERIAL DESCRIPTION	
0								
	SS	100	3-3-4 (7)	SP		2.5	(SP) loose light gray, fine grained SAND, loose, poorly graded, subrounded, dry	61.3
5	SS	100	7-5-11 (16)	SP-SC		5.0	(SP-SC) light gray, fine grained SAND with Clay, medium dense, poorly graded, subrounded, moist	58.8
	SS	100	3-2-4 (6)	SP-SC		7.5	(SP-SC) light gray, fine grained SAND with Clay, medium dense, poorly graded, subrounded, wet	56.3
10	SS	100	5-8-6 (14)	SC		10.0	(SC) light gray, fine grained Clayey SAND, medium dense, poorly graded, subrounded, wet	53.8
15	SS	100	1-2-2 (4)	SC		15.0	(SC) light gray, fine grained Clayey SAND, medium dense, poorly graded, subrounded, wet, trace clay nodules	48.8
20	SS	100	3-3-5 (8)	CL		20.0	(CL) light gray, Sandy CLAY, very stiff, moderate plasticity, wet	43.8
25	SS	100	3-3-2 (5)	SC		25.0	(SC) light gray and tan, fine grained Clayey SAND, dense, poorly graded, subrounded, wet	38.8
30	SS	100		SC		30.0	(SC) light gray and tan, more tan than above, fine grained Clayey SAND, dense, poorly graded, subrounded, wet	33.8
35	SS	100	1-2-1 (3)	CL		35.0	(CL) light gray, Sandy CLAY, medium stiff, moderate plasticity, wet	28.8
40	SS	100	5-5-5 (10)	CL		40.0	(CL) light gray, Sandy CLAY, medium stiff, moderate plasticity, wet	23.8

Bottom of borehole at 40.0 feet.



SITE: SEPCO Plant McIntosh, Rincon, GA WELL NO. G.W.A.-2

"AS-BUILT" DIAGRAM OF EACH WELL: attached

NAME OF DRILLER(S): Ron Wilkerson
Tim Wainwright
Joseph Whitaker
Carroll Crowther

TYPE OF DRILL RIG(S): Cannonball B-53

DRILLING METHOD: 6.25" I. D. hollow stem augers

WELL LOCATION: See the attached well schematic

BOREHOLE DIAMETER: 12.25 inches

WELL CASING DIAMETER: 2.0" I. D.

WELL DEPTH: 30'

DRILLING AND LITHOLOGIC LOGS: attached

CASING MATERIALS: 2.0" dia. ASTM, NSF rated, Schedule 40 PVC

SCREEN MATERIALS AND DESIGN: 2" to 4" dia. PVC with 0.01" slots ("Pre-Pac Dual-Wall Well Screen")

SCREENING AND CASING JOINT TYPE: flush threaded

SCREEN SLOT SIZE: 0.01" slots - 1.5" long (4 slots per diameter) (8 slots per vertical inch)

SCREEN LENGTH: 5'

FILTER PACK MATERIAL/SIZE: 20/30 quartz (silica) sand

FILTER PACK VOLUME: 4.99 cu. ft.

FILTER PACK PLACEMENT METHOD: Tremie pipe

SEALANT MATERIALS: Course grit sodium benonite

SEALANT VOLUME: 1.57 cu. ft.

SEALANT PLACEMENT METHOD: Tremie pipe

SURFACE SEAL DESIGN/CONSTRUCTION: See the attached well schematic

WELL DEVELOPMENT PROCEDURE: Pumping/surging

TYPE OF PROTECTIVE WELL CAP: 4" x 4" x 4' locking steel cover

GROUND SURFACE ELEVATION: See the attached individual well schematic

WELL CAP ELEVATION: See the attached individual well schematic

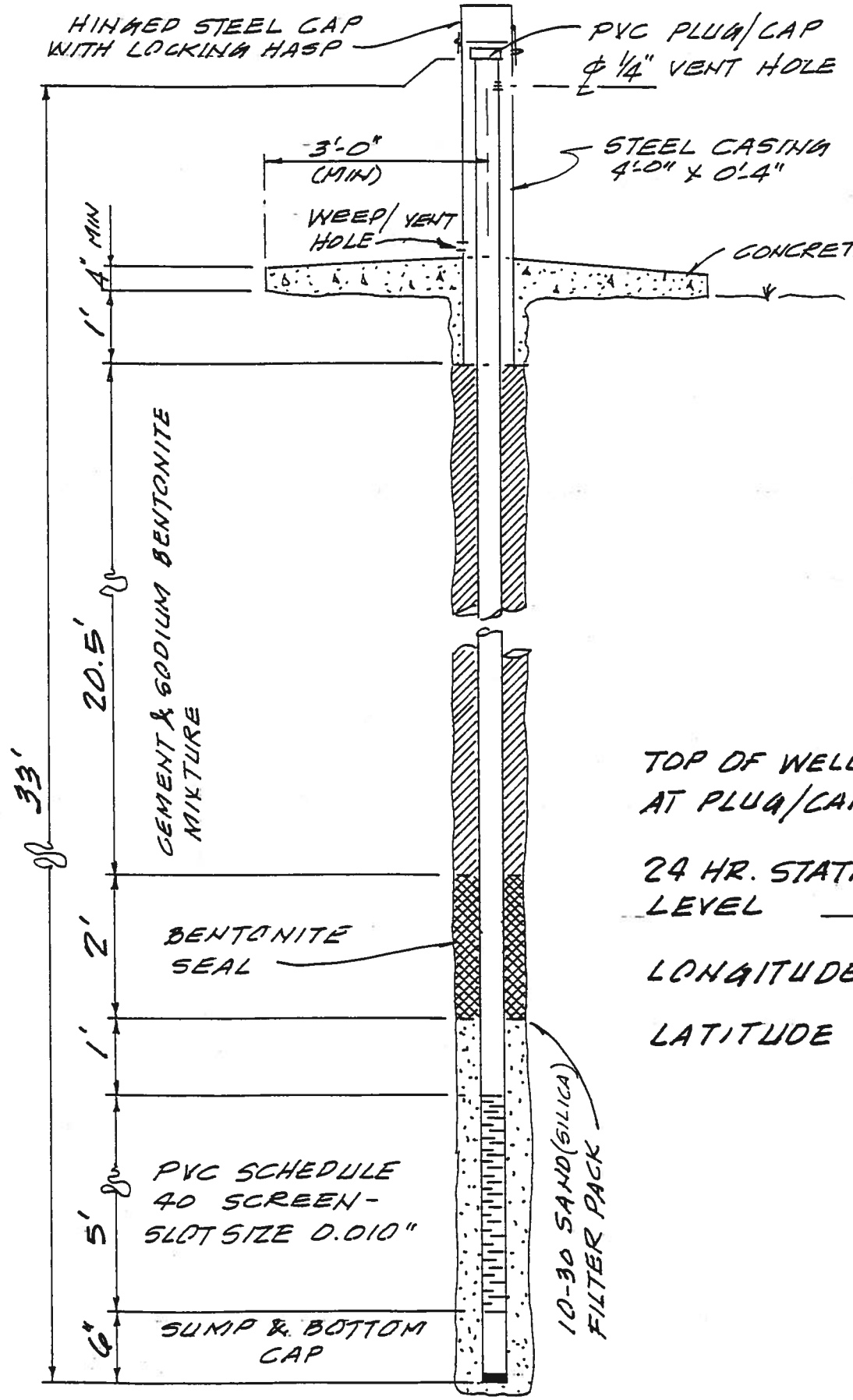
DETAILED DRAWING OF WELL: See the attached individual well schematic

GENERAL WELL INSTALLATION PROCEDURES

Prior to drilling the first well, all equipment was steam cleaned. This process was repeated after installation of each well.

All monitoring wells were installed using hollow-stem augers to advance the holes.

WELL Nº GWA-2



TOP OF WELL ELEVATION AT PLUG/CAP _____

24 HR. STATIC WATER LEVEL 16.55

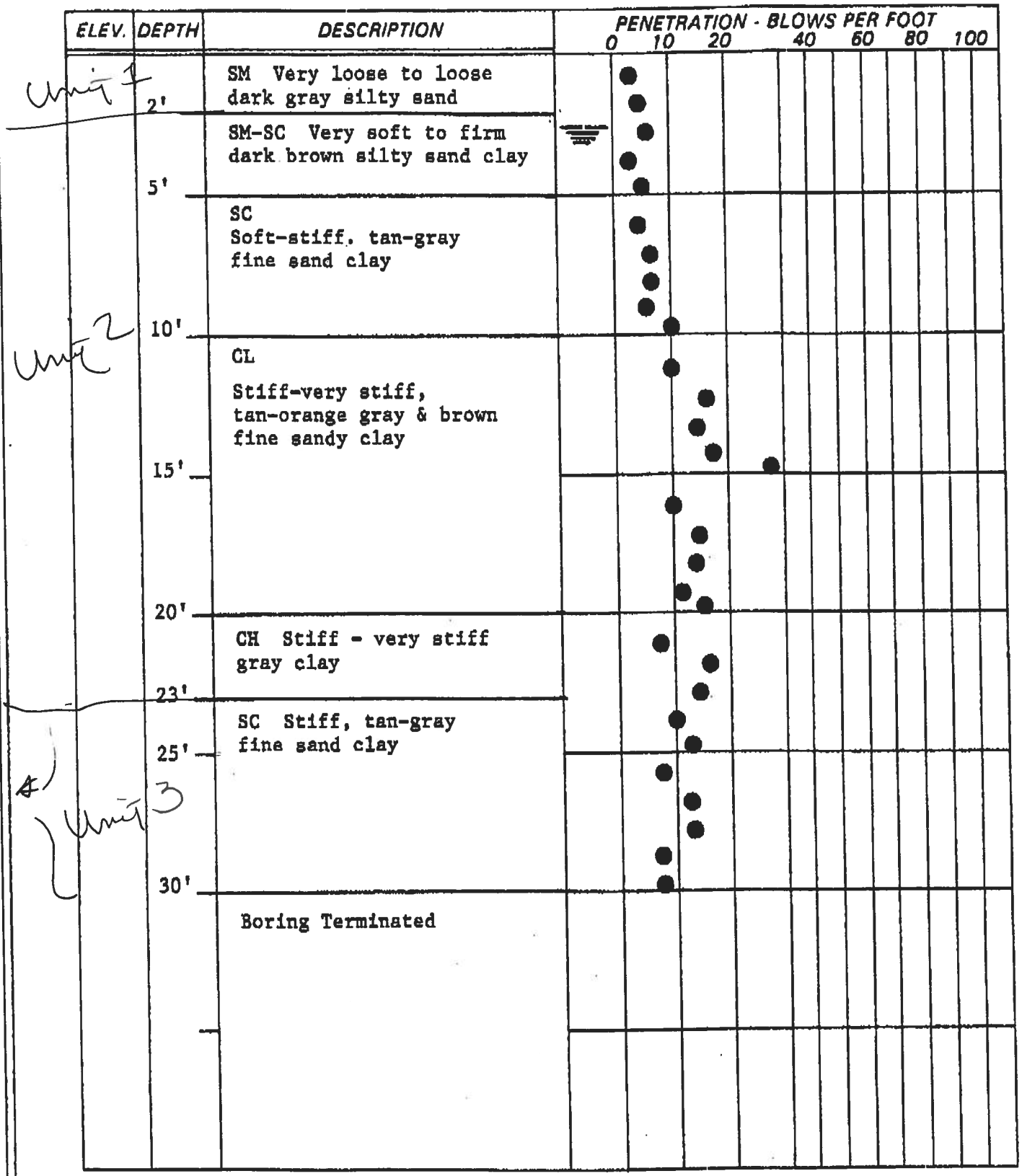
LONGITUDE _____

LATITUDE _____

SCALE: 1/2" = 1'-0" VERT.
1" = 1'-0" HORZ

TEST BORING RECORD

FIELD CLASSIFIED



Penetration is number of blows of 140 lb. hammer falling 30 in. required to drive 2.0 in. O.D. sampler one foot.

BORING NO. G.W.A.-2

WHITAKER LABORATORY, INC.

JOB SEPCO Plant McIntosh

DATE 5/7/98

1023

ERM
3200 Windy Hill Rd Ste 1500W
Atlanta, GA 30339
Telephone: 678-486-2700

WELL NUMBER GWA-2A

CLIENT Southern Company Services, Inc.
PROJECT NAME Plant McIntosh
PROJECT NUMBER 0372382
PROJECT LOCATION Ash Disposal Site #3
DATE STARTED 1/10/17 **COMPLETED** 1/10/17
GROUND ELEVATION 63.3 ft **HOLE SIZE** 8 inches
DRILLING CONTRACTOR Southern Comparny Services, Inc
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger 2"
AT TIME OF DRILLING ---
LOGGED BY GEJ **CHECKED BY** ALR
AT END OF DRILLING ---
NOTES
AFTER DRILLING 11.01 ft / Elev 52.29 ft

DEPTH (ft)	SAMPLE TYPE NUMBER	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION		WELL DIAGRAM
0						Casing Top Elev: 66.48 (ft) Casing Type: PVC
		SM		(SM) Reddish brown Silty SAND		
6.0					57.3	
		SC		(SC) Brownish orange Clayey SAND		
9.0					54.3	
		ML		(ML) Light gray and orange mottled Sandy Silt, fine grained, stiff, moist		70/30 Portland Cement / bentonite mix
14.0					49.3	
		CL-ML		(CL-ML) Light gray Silty CLAY, stiff, moderate plasticity, wet		
17.5					45.8	
18.0		SP		(SP) SAND, loose, wet	45.3	
19.0		ML		(ML) Light gray with orange mottling, fine grained, Sandy SILT, some clay, stiff, wet	44.3	
		CL-ML		(CL-ML) Light gray, Silty CLAY, very stiff, wet		
22.0					41.3	
		ML		(ML) Light gray with orange and tan mottling, Sandy SILT, some clay, stiff, wet		Pel Plug 3/8"
33.5					29.8	
		CL		(CL) Dark gray CLAY, very stiff, low plasticity		20/40 industrial quartz ANSI std 61 4" UPack
35.0					28.3	
		SW		(SW) Light and dark gray, fine - medium grained SAND, loose, wet		
39.8					23.5	
40.0		CH		(CH) Dark gray CLAY, soft, high plasticity	23.3	

Bottom of borehole at 40.0 feet.

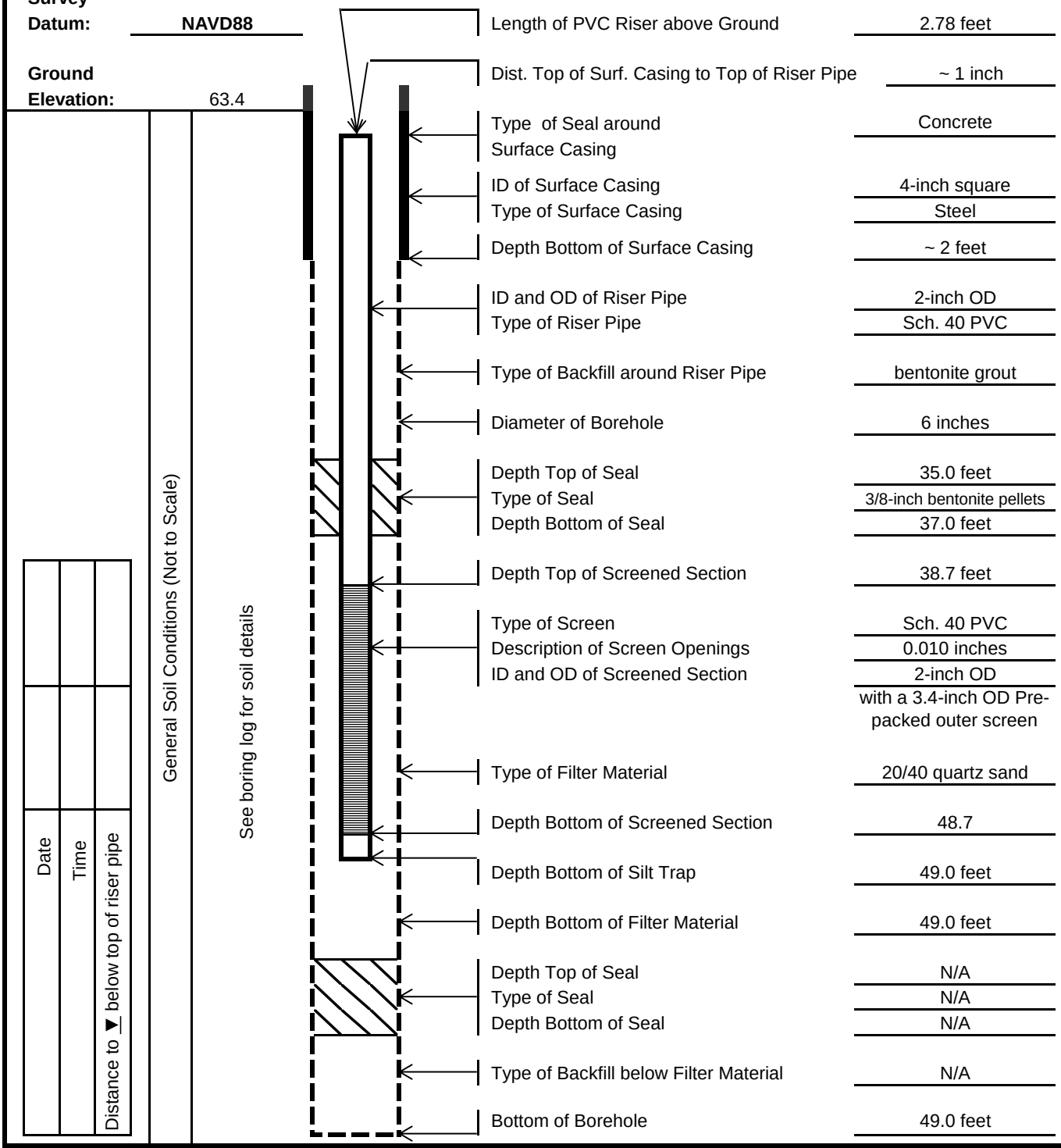
Groundwater Well Installation Log

GWA-2B

Project	Plant McIntosh	**GEI Proj. No.**	1800205
City / Town	Effingham County, GA	**Location**	Inactive CCR Landfill No. 3
Client	Georgia Power Company		Replacement for GWA-2 and GWA-2A
Contractor	Cascade Drilling		
Driller	Ray Whitt **GEI Rep.** Peter Adams	**Install Date**	8/29/2018

Survey Datum: NAVD88

Ground Elevation: 63.4



Length of PVC Riser above Ground	2.78 feet
Dist. Top of Surf. Casing to Top of Riser Pipe	~ 1 inch
Type of Seal around Surface Casing	Concrete
ID of Surface Casing	4-inch square
Type of Surface Casing	Steel
Depth Bottom of Surface Casing	~ 2 feet
ID and OD of Riser Pipe	2-inch OD
Type of Riser Pipe	Sch. 40 PVC
Type of Backfill around Riser Pipe	bentonite grout
Diameter of Borehole	6 inches
Depth Top of Seal	35.0 feet
Type of Seal	3/8-inch bentonite pellets
Depth Bottom of Seal	37.0 feet
Depth Top of Screened Section	38.7 feet
Type of Screen	Sch. 40 PVC
Description of Screen Openings	0.010 inches
ID and OD of Screened Section	2-inch OD with a 3.4-inch OD Pre-packed outer screen
Type of Filter Material	20/40 quartz sand
Depth Bottom of Screened Section	48.7
Depth Bottom of Silt Trap	49.0 feet
Depth Bottom of Filter Material	49.0 feet
Depth Top of Seal	N/A
Type of Seal	N/A
Depth Bottom of Seal	N/A
Type of Backfill below Filter Material	N/A
Bottom of Borehole	49.0 feet

Notes:

All depths are measured below ground surface (bgs).

Soil details recorded during the exploratory soil boring (soil boring ID: GWA-2R) completed 6/30/18, drilled approximately 10 ft adjacent to well installation location.

GEI Consultants

BORING INFORMATION

LOCATION: Landfill No. 3
GROUND SURFACE EL. (ft): NM
VERTICAL DATUM:
TOTAL DEPTH (ft): 45.0
LOGGED BY: P. Adams
DATE START/END: 6/30/2018 - 6/30/2018
DRILLING COMPANY: Cascade
DRILLER NAME: Richard Mooney
RIG TYPE: Geoprobe 7720DT

BORING

GWA-2B

DRILLING INFORMATION

HAMMER TYPE: NA
AUGER I.D/O.D.: NA / NA
DRILLING METHOD: Direct Push
WATER LEVEL DEPTHS (ft): Not measured
CASING I.D./O.D.: 2 inch/ NA
DRILL ROD O.D.: NM
CORE BARREL TYPE:
CORE BARREL I.D./O.D.: NA / NA

ABBREVIATIONS:
Pen. = Penetration Length
Rec. = Recovery Length
RQD = Rock Quality Designation = Length of Sound Cores>4 in / Pen.,%
WOR = Weight of Rods
WOH = Weight of Hammer
S = Split Spoon Sample
C = Core Sample
U = Undisturbed Sample
SC = Sonic Core
DP = Direct Push Sample
HSA = Hollow-Stem Auger
Qp = Pocket Penetrometer Strength
Sv = Pocket Torvane Shear Strength
LL = Liquid Limit
PI = Plasticity Index
PID = Photoionization Detector
I.D./O.D. = Inside Diameter/Outside Diameter
NA, NM = Not Applicable, Not Measured
Blows per 6 in.: 140 lb hammer falling 30 inches to drive a 2-inch-O.D. split spoon sampler.

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
		DP1	0 to 5	60/42				(0-0.3'): TOPSOIL (0.3-6'): SILTY SAND (SM); ~70% fine sand, ~30% nonplastic to low plasticity fines. Medium dense. Moist. Grey-brown.
	5	DP2	5 to 10	60/48				(6-15'): SANDY LEAN CLAY (CL); ~70% medium plasticity fines, ~30% fine sand. Stiff. Moist. Grey-brown with red mottling.
	10	DP3	10 to 15	60/60				
	15	DP4	15 to 20	60/48				(15-25'): FAT CLAY (CH); ~85% medium to high plasticity fines,~15% fine to coarse sand. Hard. Moist. Grey.
	20	DP5	20 to 25	60/60				

NOTES: Exploratory boring for proposed well installation. No well installed in this boring.

PROJECT NAME: Georgia Power Company - Plant McIntosh
CITY/STATE: Effingham County, GA
GEI PROJECT NUMBER: 1800205

GEI Consultants

LOCATION: Landfill No. 3
GROUND SURFACE EL. (ft): NM
VERTICAL DATUM:
DATE START/END: 6/30/2018 - 6/30/2018
DRILLING COMPANY: Cascade

BORING GWA-2B

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
	30	DP6	25 to 30	60/60				(25-35'): SANDY LEAN CLAY (CL); ~65% medium plasticity fines, ~35% fine to coarse sand. Stiff. Very moist. Grey-brown.
	35	DP7	30 to 35	60/60				
	40	DP8	35 to 40	60/60				(35-36'): SILTY SAND (SM); ~60% fine to coarse sand, ~40% nonplastic to low plasticity fines. Loose. Wet. Brown. (36-38'): FAT CLAY (CH); ~85% high plasticity fines, ~15% fine to coarse sand. Hard. Moist. Grey. (38-40'): WIDELY GRADED SAND WITH CLAY (SW-SC); ~84.9% fine to coarse sand, ~14.7% medium plasticity fines, ~0.4% fine gravel. Dense. Wet. Dark grey.
	45	DP9	40 to 45	60/60		Recommended screen interval: 38-48'		(40-45'): WIDELY GRADED SAND WITH SILT (SW-SM); ~88.7% fine to coarse sand, ~11.1% nonplastic fines, ~0.2% fine gravel. Dense. Wet. Brown with red and yellow mottling.
	50							Bottom of boring at depth 45 ft. Backfilled with bentonite chips and hydrated
	55							

NOTES: Exploratory boring for proposed well installation. No well installed in this boring.

PROJECT NAME: Georgia Power Company - Plant McIntosh
CITY/STATE: Effingham County, GA
GEI PROJECT NUMBER: 1800205

GEI Consultants

WHITAKER LABORATORY INC.
P.O. BOX 7081
SAVANNAH, GEORGIA 31418
FAX 912/233-5061
2500 TREMONT RD.
912/234-0696

AUGER BORING RECORD

PROJECT: SEPCO Plant McIntosh, Rincon Ga.

DATE: May 16, 1998

BORING NUMBER: GWA 3

DEPTH - ft	DESCRIPTION	MOISTURE
0-1	fine brown sand	moist
1-2	fine tan sand	moist
2-3	fine tan sand	moist
3-4	fine orange & tan sand	moist
4-5	orange & tan sand clay	moist
5-6	orange & tan sand clay	moist
6-7	orange & tan sand clay	wet
7-8	none retained - hole collapsed	

NOTE: 24 hr. ground water table @ 2 feet

SITE: SEPCO Plant McIntosh, Rincon, GA WELL NO. G.W.A-3 (Deep)

"AS-BUILT" DIAGRAM OF EACH WELL: attached

NAME OF DRILLER(S): Ron Wilkerson
Tim Wainwright
Joseph Whitaker
Carroll Crowther

TYPE OF DRILL RIG(S): Cannonball B-53

DRILLING METHOD: 6.25" I. D. hollow stem augers

WELL LOCATION: See the attached well schematic

BOREHOLE DIAMETER: 12.25 inches

WELL CASING DIAMETER: 2.0" I. D.

WELL DEPTH: 30'

DRILLING AND LITHOLOGIC LOGS: attached

CASING MATERIALS: 2.0" dia. ASTM, NSF rated, Schedule 40 PVC

SCREEN MATERIALS AND DESIGN: 2" to 4" dia. PVC with 0.01" slots ("Pre-Pac Dual-Wall Well Screen")

SCREENING AND CASING JOINT TYPE: flush threaded

SCREEN SLOT SIZE: 0.01" slots - 1.5" long (4 slots per diameter) (8 slots per vertical inch)

SCREEN LENGTH: 10'

FILTER PACK MATERIAL/SIZE: 20/30 quartz (silica) sand

FILTER PACK VOLUME: 8.78 cu. ft.

FILTER PACK PLACEMENT METHOD: Tremie pipe

SEALANT MATERIALS: Course grit sodium benonite

SEALANT VOLUME: 1.57 cu. ft.

SEALANT PLACEMENT METHOD: Tremie pipe

SURFACE SEAL DESIGN/CONSTRUCTION: See the attached well schematic

WELL DEVELOPMENT PROCEDURE: Pumping/surging

TYPE OF PROTECTIVE WELL CAP: 4" x 4" x 4' locking steel cover

GROUND SURFACE ELEVATION: See the attached individual well schematic

WELL CAP ELEVATION: See the attached individual well schematic

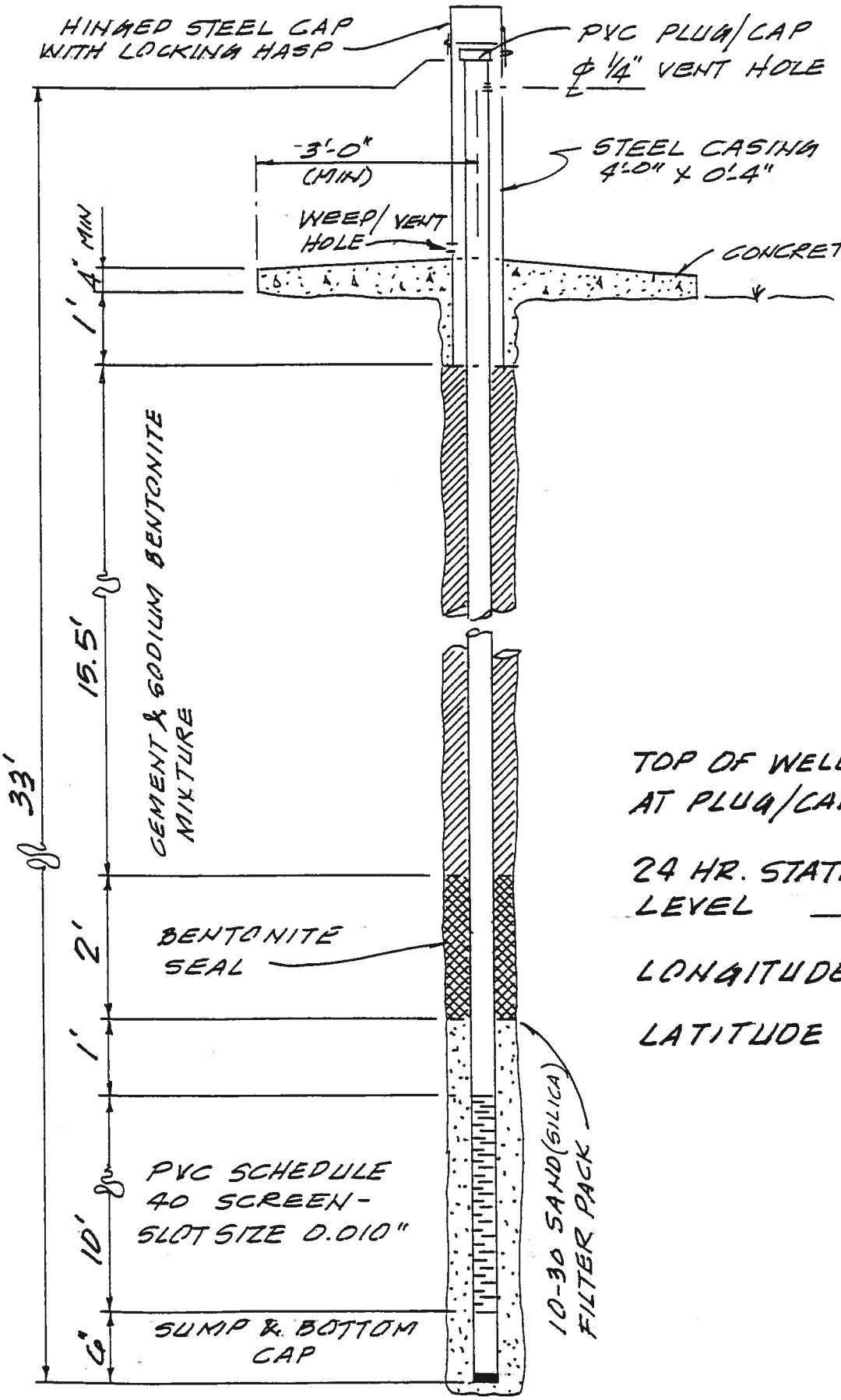
DETAILED DRAWING OF WELL: See the attached individual well schematic

GENERAL WELL INSTALLATION PROCEDURES

Prior to drilling the first well, all equipment was steam cleaned. This process was repeated after installation of each well.

All monitoring wells were installed using hollow-stem augers to advance the holes.

WELL Nº GWA-3A
(DEEP)



TOP OF WELL ELEVATION AT PLUG/CAP _____

24 HR. STATIC WATER LEVEL 9.92'

LONGITUDE _____

LATITUDE _____

SCALE: 1/2" = 1'-0" VERT.
1" = 1'-0" HORZ

SITE: SEPCO Plant McIntosh, Rincon, GA WELL NO. G.W.A-35(Shallow)

"AS-BUILT" DIAGRAM OF EACH WELL: attached

NAME OF DRILLER(S): Ron Wilkerson
Tim Wainwright
Joseph Whitaker
Carroll Crowther

TYPE OF DRILL RIG(S): Cannonball B-53

DRILLING METHOD: 6.25" I. D. hollow stem augers

WELL LOCATION: See the attached well schematic

BOREHOLE DIAMETER: 12.25 inches

WELL CASING DIAMETER: 2.0" I. D.

WELL DEPTH: 15'

DRILLING AND LITHOLOGIC LOGS: attached

CASING MATERIALS: 2.0" dia. ASTM, NSF rated, Schedule 40 PVC

SCREEN MATERIALS AND DESIGN: 2" to 4" dia. PVC with 0.01" slots ("Pre-Pac Dual-Wall Well Screen")

SCREENING AND CASING JOINT TYPE: flush threaded

SCREEN SLOT SIZE: 0.01" slots - 1.5" long (4 slots per diameter) (8 slots per vertical inch)

SCREEN LENGTH: 10'

FILTER PACK MATERIAL/SIZE: 20/30 quartz (silica) sand

FILTER PACK VOLUME: 8.51 cu. ft.

FILTER PACK PLACEMENT METHOD: Tremie pipe

SEALANT MATERIALS: Course grit sodium benonite

SEALANT VOLUME: 1.66 cu. ft.

SEALANT PLACEMENT METHOD: Tremie pipe

SURFACE SEAL DESIGN/CONSTRUCTION: See the attached well schematic

WELL DEVELOPMENT PROCEDURE: Pumping/surging

TYPE OF PROTECTIVE WELL CAP: 4" x 4" x 4' locking steel cover

GROUND SURFACE ELEVATION: See the attached individual well schematic

WELL CAP ELEVATION: See the attached individual well schematic

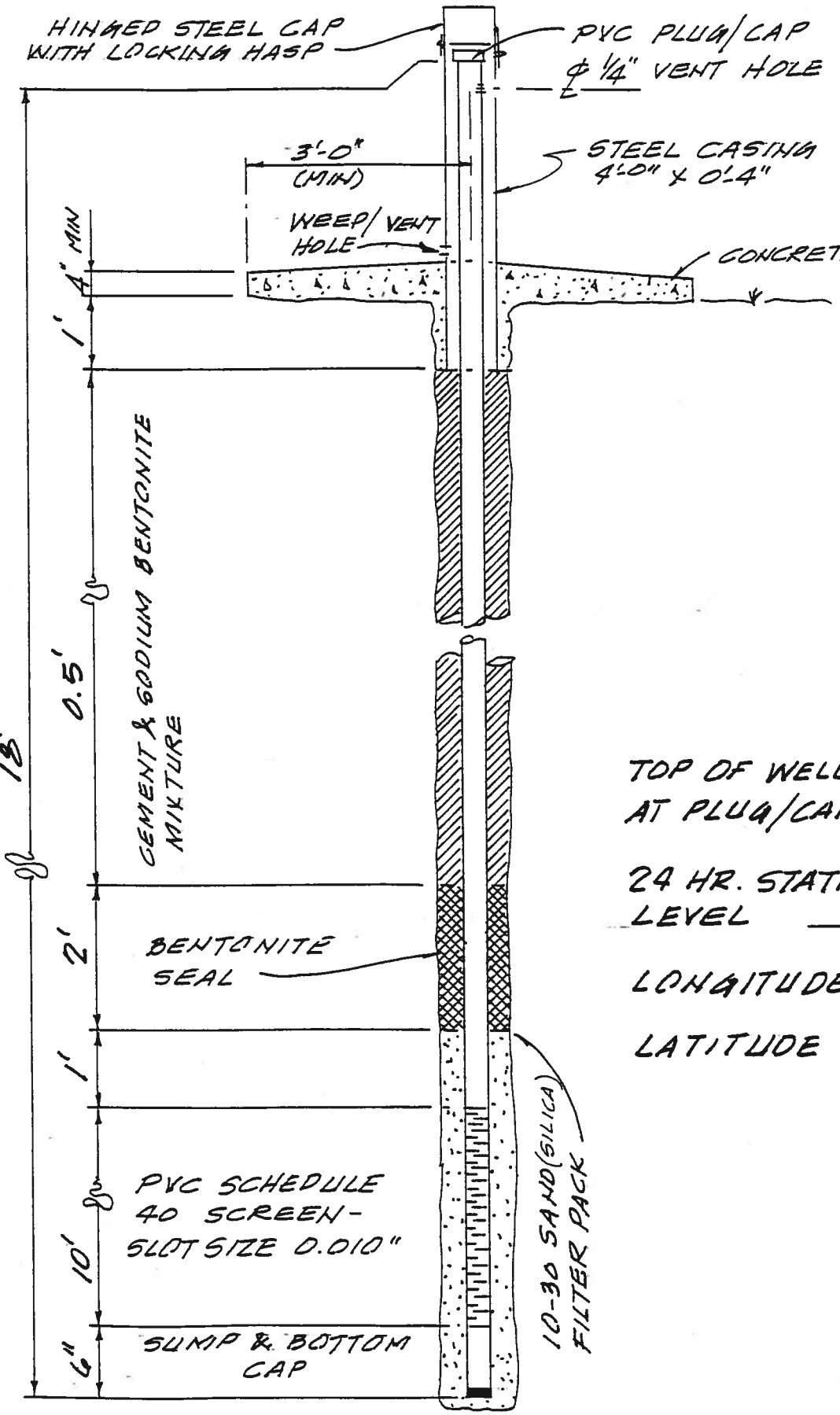
DETAILED DRAWING OF WELL: See the attached individual well schematic

GENERAL WELL INSTALLATION PROCEDURES

Prior to drilling the first well, all equipment was steam cleaned. This process was repeated after installation of each well.

All monitoring wells were installed using hollow-stem augers to advance the holes.

WELL Nº GWA-3B
(SHALLOW)



TOP OF WELL ELEVATION AT PLUG/CAP _____

24 HR. STATIC WATER LEVEL 8.89

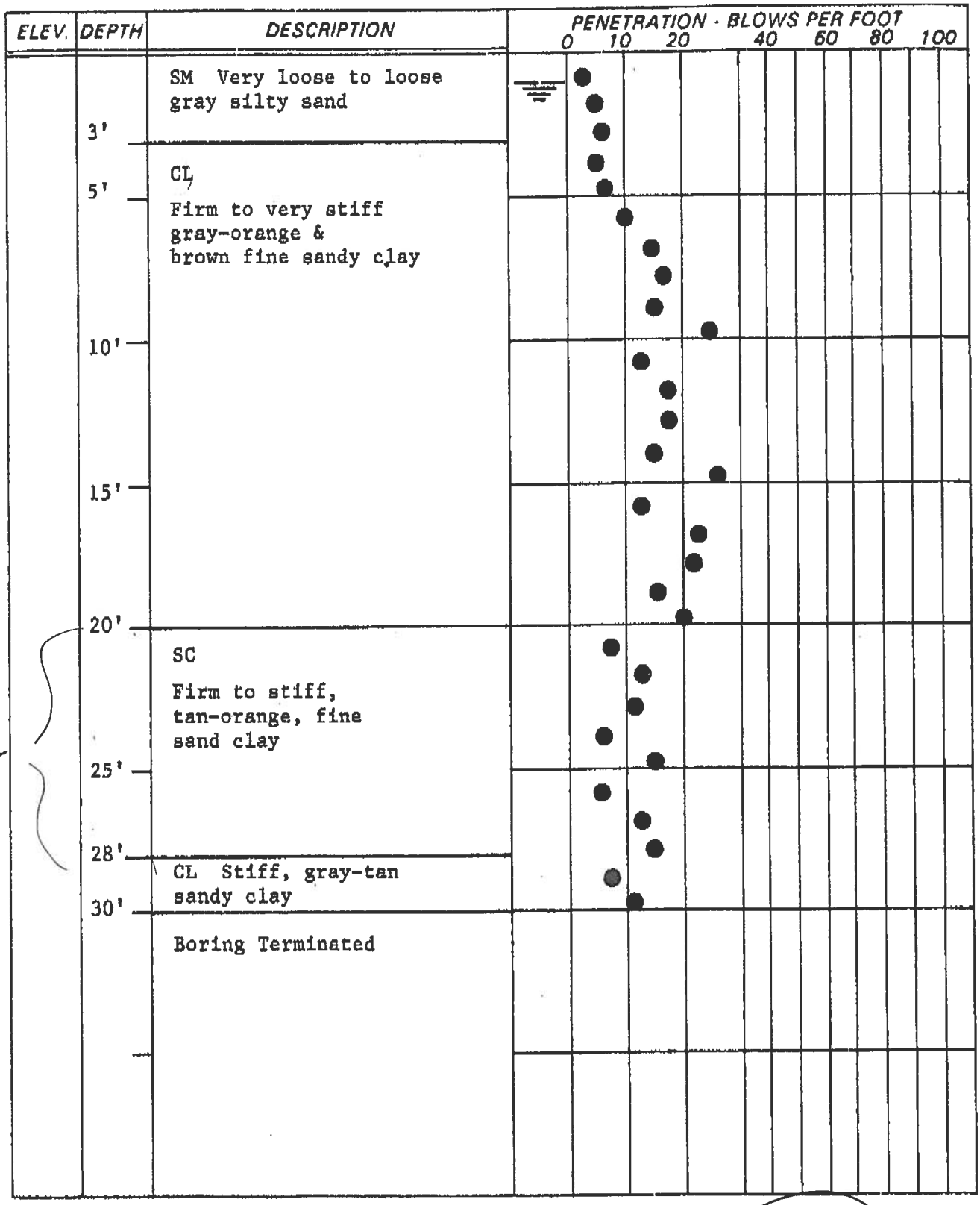
LONGITUDE _____

LATITUDE _____

SCALE: 1/2" = 1'-0" VERT.
1" = 1'-0" HORZ

TEST BORING RECORD

FIELD CLASSIFIED



Penetration is number of blows of 140 lb. hammer falling 30 in. required to drive 2.0 in. O.D. sampler one foot.

JOB SEPCO Plant McIntosh

DATE 5/7/98

BORING NO. G.W.A.-3

WHITAKER LABORATORY, INC.

1023

SITE: SEPCO Plant McIntosh, Rincon, GA WELL NO. G.W.A.-4

"AS-BUILT" DIAGRAM OF EACH WELL: attached

NAME OF DRILLER(S): Ron Wilkerson
Tim Wainwright
Joseph Whitaker
Carroll Crowther

TYPE OF DRILL RIG(S): Cannonball B-53

DRILLING METHOD: 6.25" I. D. hollow stem augers

WELL LOCATION: See the attached well schematic

BOREHOLE DIAMETER: 12.25 inches

WELL CASING DIAMETER: 2.0" I. D.

WELL DEPTH: 26'

DRILLING AND LITHOLOGIC LOGS: attached

CASING MATERIALS: 2.0" dia. ASTM, NSF rated, Schedule 40 PVC

SCREEN MATERIALS AND DESIGN: 2" to 4" dia. PVC with 0.01" slots ("Pre-Pac Dual-Wall Well Screen")

SCREENING AND CASING JOINT TYPE: flush threaded

SCREEN SLOT SIZE: 0.01" slots - 1.5" long (4 slots per diameter) (8 slots per vertical inch)

SCREEN LENGTH: 5'

FILTER PACK MATERIAL/SIZE: 20/30 quartz (silica) sand

FILTER PACK VOLUME: 4.75 cu. ft.

FILTER PACK PLACEMENT METHOD: Tremie pipe

SEALANT MATERIALS: Course grit sodium benonite

SEALANT VOLUME: 1.60 cu. ft.

SEALANT PLACEMENT METHOD: Tremie pipe

SURFACE SEAL DESIGN/CONSTRUCTION: See the attached well schematic

WELL DEVELOPMENT PROCEDURE: Pumping/surging

TYPE OF PROTECTIVE WELL CAP: 4" x 4" x 4' locking steel cover

GROUND SURFACE ELEVATION: See the attached individual well schematic

WELL CAP ELEVATION: See the attached individual well schematic

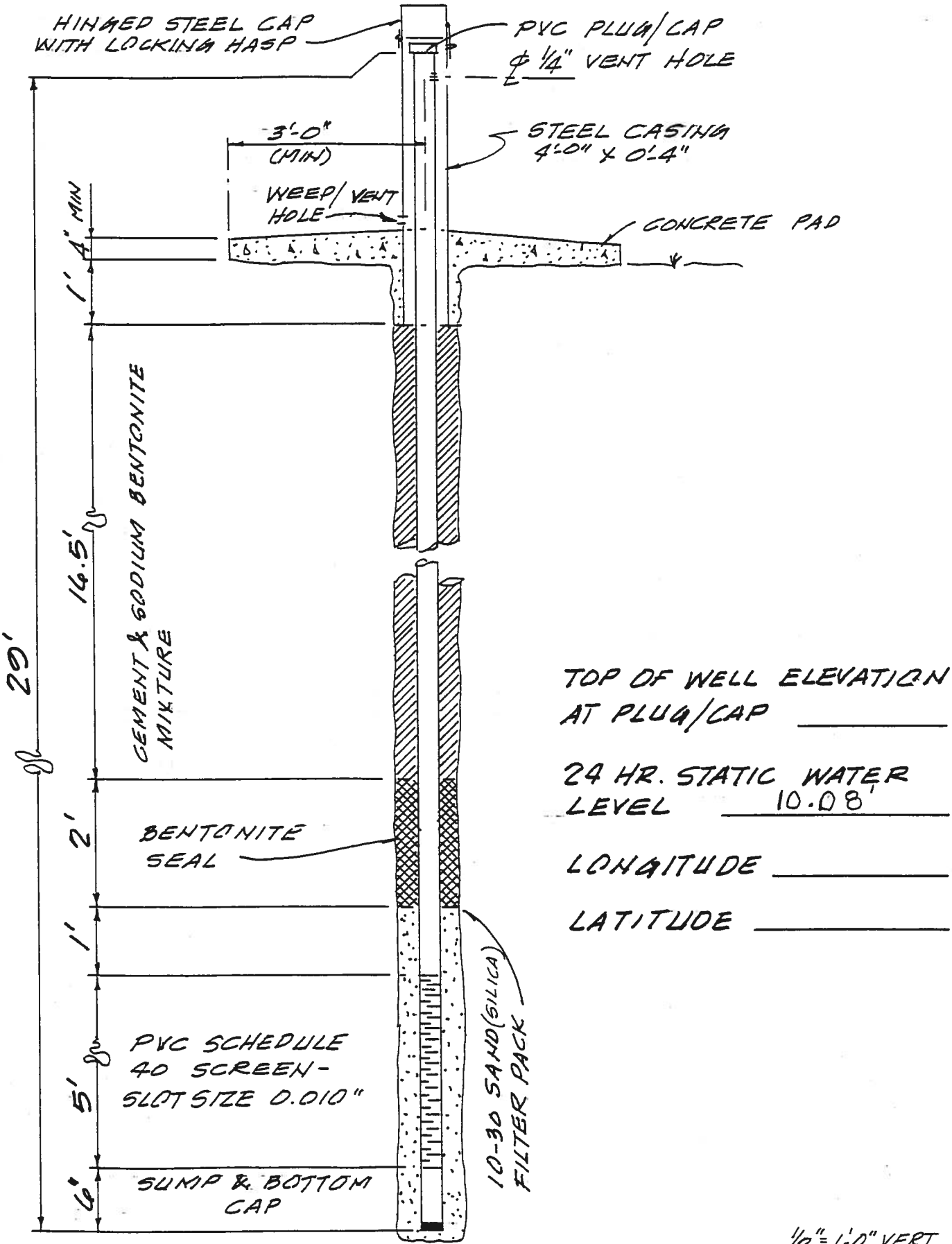
DETAILED DRAWING OF WELL: See the attached individual well schematic

GENERAL WELL INSTALLATION PROCEDURES

Prior to drilling the first well, all equipment was steam cleaned. This process was repeated after installation of each well.

All monitoring wells were installed using hollow-stem augers to advance the holes.

WELL Nº GWA-4



TOP OF WELL ELEVATION AT PLUG/CAP _____

24 HR. STATIC WATER LEVEL 10.08'

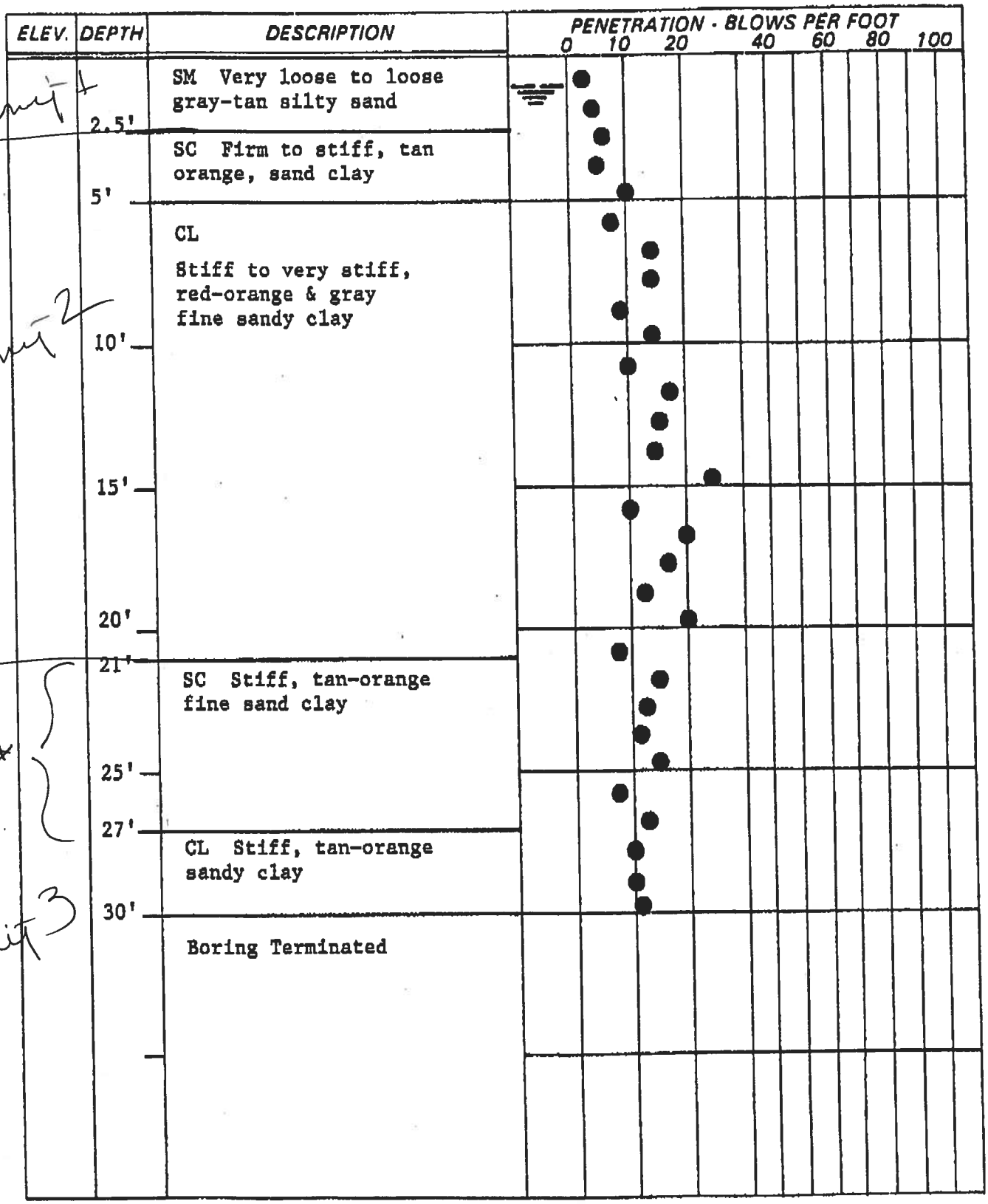
LONGITUDE _____

LATITUDE _____

SCALE: 1/2" = 1'-0" VERT.
1" = 1'-0" HORZ

TEST BORING RECORD

FIELD CLASSIFIED



Penetration is number of blows of 140 lb. hammer falling 30 in. required to drive 2.0 in. O.D. sampler one foot.

BORING NO. G.W.A-4

WHITAKER LABORATORY, INC.

JOB SEPCO Plant McInTosh

DATE 5/7/98

SITE: SEPCO Plant McIntosh, Rincon, GA WELL NO. G.W.A.-5

"AS-BUILT" DIAGRAM OF EACH WELL: attached

NAME OF DRILLER(S): Ron Wilkerson
Tim Wainwright
Joseph Whitaker
Carroll Crowther

TYPE OF DRILL RIG(S): Cannonball B-53

DRILLING METHOD: 6.25" I. D. hollow stem augers

WELL LOCATION: See the attached well schematic

BOREHOLE DIAMETER: 12.25 inches

WELL CASING DIAMETER: 2.0" I. D.

WELL DEPTH: 30'

DRILLING AND LITHOLOGIC LOGS: attached

CASING MATERIALS: 2.0" dia. ASTM, NSF rated, Schedule 40 PVC

SCREEN MATERIALS AND DESIGN: 2" to 4" dia. PVC with 0.01" slots ("Pre-Pac Dual-Wall Well Screen")

SCREENING AND CASING JOINT TYPE: flush threaded

SCREEN SLOT SIZE: 0.01" slots - 1.5" long (4 slots per diameter) (8 slots per vertical inch)

SCREEN LENGTH: 10'

FILTER PACK MATERIAL/SIZE: 20/30 quartz (silica) sand

FILTER PACK VOLUME: 8.50 cu. ft.

FILTER PACK PLACEMENT METHOD: Tremie pipe

SEALANT MATERIALS: Course grit sodium benonite

SEALANT VOLUME: 1.45 cu. ft.

SEALANT PLACEMENT METHOD: Tremie pipe

SURFACE SEAL DESIGN/CONSTRUCTION: See the attached well schematic

WELL DEVELOPMENT PROCEDURE: Pumping/surging

TYPE OF PROTECTIVE WELL CAP: 4" x 4" x 4' locking steel cover

GROUND SURFACE ELEVATION: See the attached individual well schematic

WELL CAP ELEVATION: See the attached individual well schematic

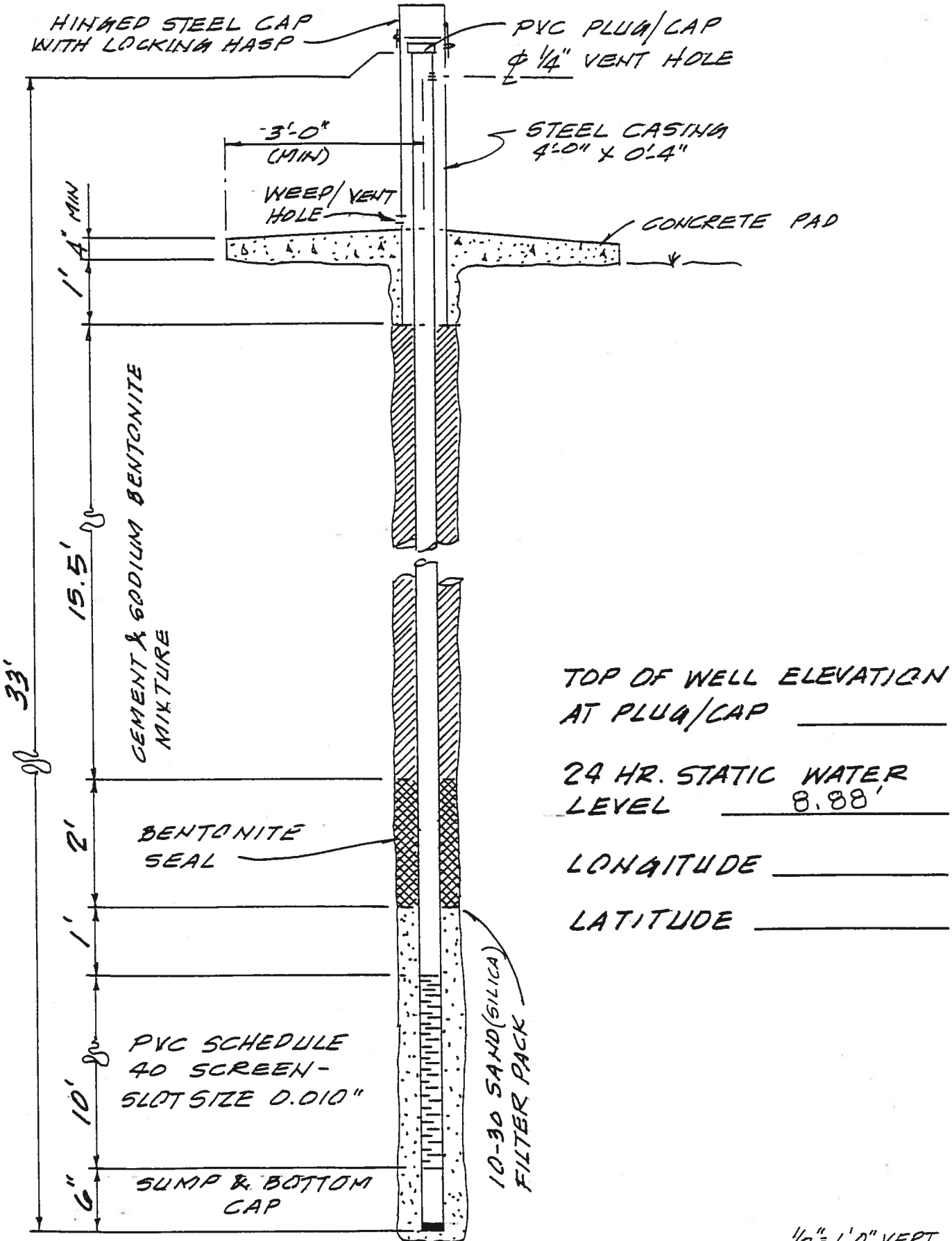
DETAILED DRAWING OF WELL: See the attached individual well schematic

GENERAL WELL INSTALLATION PROCEDURES

Prior to drilling the first well, all equipment was steam cleaned. This process was repeated after installation of each well.

All monitoring wells were installed using hollow-stem augers to advance the holes.

WELL Nº GWA-5



TOP OF WELL ELEVATION AT PLUG/CAP _____

24 HR. STATIC WATER LEVEL 8.88'

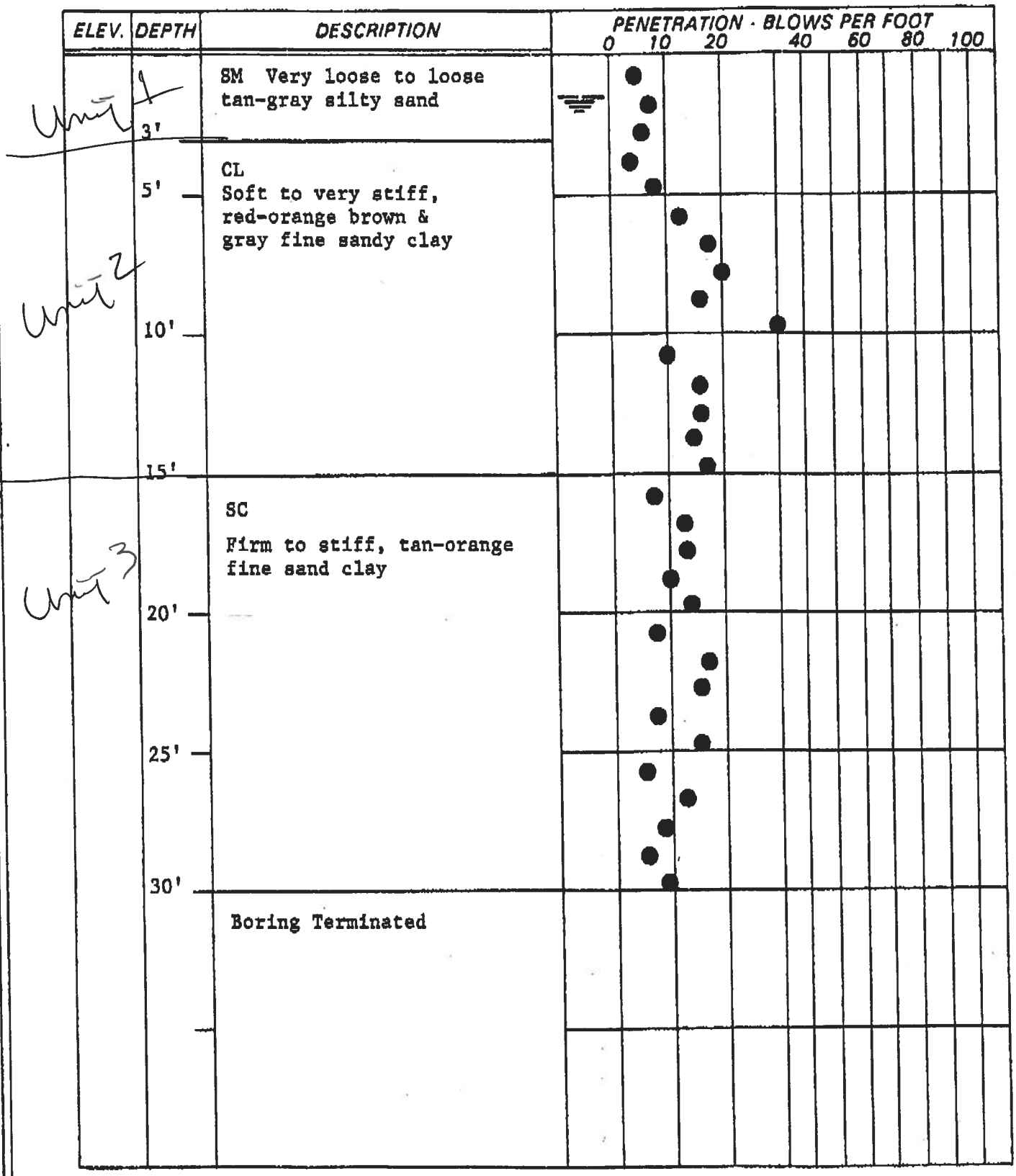
LONGITUDE _____

LATITUDE _____

SCALE: 1/2" = 1'-0" VERT.
1" = 1'-0" HORZ

TEST BORING RECORD

FIELD CLASSIFIED



Penetration is number of blows of 140 lb. hammer falling 30 in. required to drive 2.0 in. O.D. sampler one foot.

BORING NO. G.W.A.-5

WHITAKER LABORATORY, INC.

JOB SEPCO Plant McIntosh

DATE 5/7/98

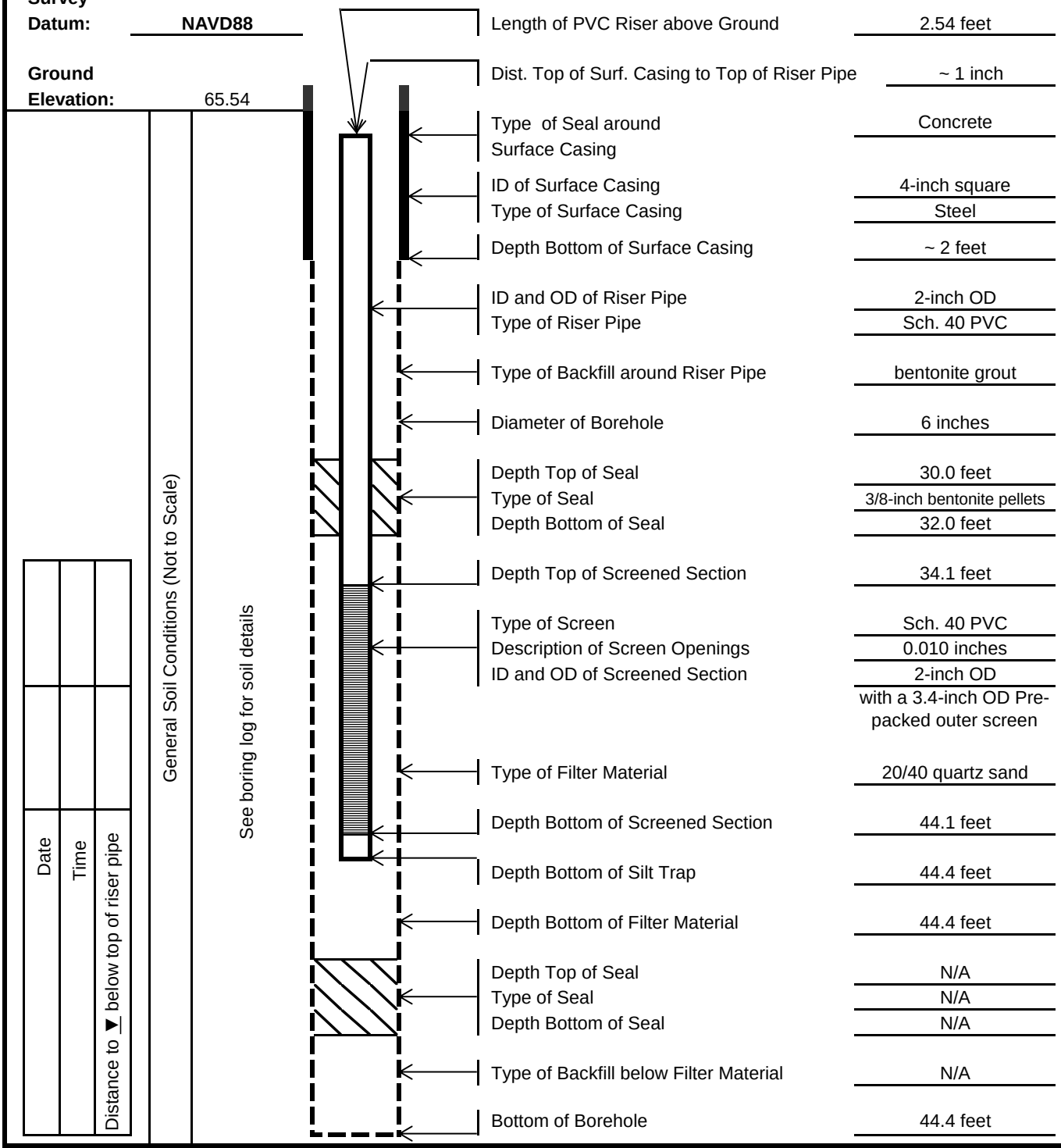
Groundwater Well Installation Log

GWA-7A

Project	Plant McIntosh	**GEI Proj. No.**	1800205
City / Town	Effingham County, GA	**Location**	Inactive CCR Landfill No. 3
Client	Georgia Power Company		Replacement for GWA-7
Contractor	Cascade Drilling		
Driller	Ray Whitt **GEI Rep.** Peter Adams	**Install Date**	8/29/2018

Survey Datum: NAVD88

Ground Elevation: 65.54



Length of PVC Riser above Ground	2.54 feet
Dist. Top of Surf. Casing to Top of Riser Pipe	~ 1 inch
Type of Seal around Surface Casing	Concrete
ID of Surface Casing	4-inch square
Type of Surface Casing	Steel
Depth Bottom of Surface Casing	~ 2 feet
ID and OD of Riser Pipe	2-inch OD
Type of Riser Pipe	Sch. 40 PVC
Type of Backfill around Riser Pipe	bentonite grout
Diameter of Borehole	6 inches
Depth Top of Seal	30.0 feet
Type of Seal	3/8-inch bentonite pellets
Depth Bottom of Seal	32.0 feet
Depth Top of Screened Section	34.1 feet
Type of Screen	Sch. 40 PVC
Description of Screen Openings	0.010 inches
ID and OD of Screened Section	2-inch OD with a 3.4-inch OD Pre-packed outer screen
Type of Filter Material	20/40 quartz sand
Depth Bottom of Screened Section	44.1 feet
Depth Bottom of Silt Trap	44.4 feet
Depth Bottom of Filter Material	44.4 feet
Depth Top of Seal	N/A
Type of Seal	N/A
Depth Bottom of Seal	N/A
Type of Backfill below Filter Material	N/A
Bottom of Borehole	44.4 feet

Notes:

All depths are measured below ground surface (bgs).

Soil details recorded during the exploratory soil boring (soil boring ID: GWA-7R) completed 6/30/18, drilled approximately 10 ft adjacent to well installation location.

GEI Consultants

BORING INFORMATION

LOCATION: Landfill No. 3
GROUND SURFACE EL. (ft): NM
VERTICAL DATUM:
TOTAL DEPTH (ft): 45.0
LOGGED BY: P. Adams
DATE START/END: 6/30/2018 - 6/30/2018
DRILLING COMPANY: Cascade
DRILLER NAME: Richard Mooney
RIG TYPE: Geoprobe 7720DT

BORING

GWA-7A

DRILLING INFORMATION

HAMMER TYPE: NA
AUGER I.D/O.D.: NA / NA
DRILLING METHOD: Direct Push
WATER LEVEL DEPTHS (ft): Not measured
CASING I.D./O.D.: 2 inch/ NA
DRILL ROD O.D.: NM
CORE BARREL TYPE:
CORE BARREL I.D./O.D.: NA / NA

ABBREVIATIONS:
Pen. = Penetration Length
Rec. = Recovery Length
RQD = Rock Quality Designation = Length of Sound Cores>4 in / Pen.,%
WOR = Weight of Rods
WOH = Weight of Hammer
S = Split Spoon Sample
C = Core Sample
U = Undisturbed Sample
SC = Sonic Core
DP = Direct Push Sample
HSA = Hollow-Stem Auger
Qp = Pocket Penetrometer Strength
Sv = Pocket Torvane Shear Strength
LL = Liquid Limit
PI = Plasticity Index
PID = Photoionization Detector
I.D./O.D. = Inside Diameter/Outside Diameter
NA, NM = Not Applicable, Not Measured
Blows per 6 in.: 140 lb hammer falling 30 inches to drive a 2-inch-O.D. split spoon sampler.

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
		DP1	0 to 5	60/48				(0-0.3'): TOPSOIL (0.3-5'): SILTY SAND (SM); ~70% fine sand, ~30% nonplastic to low plasticity fines. Organics throughout. Medium dense. Moist. Grey.
	5	DP2	5 to 10	60/42				(5-10.5'): SANDY LEAN CLAY (CL); ~60% low to medium plasticity fines, ~40% fine sand. Stiff. Moist. Grey.
	10	DP3	10 to 15	60/60				(10.5-13'): LEAN CLAY WITH SAND (CL); ~75% medium plasticity fines, ~25% fine sand. Very stiff. Moist. Grey with red mottling.
								(13-13.3'): SILTY SAND (SM); ~80% fine to coarse sand, ~20% nonplastic fines. Very loose. Wet. Brown.
								(13.3-15'): LEAN CLAY WITH SAND (CL); ~75% medium plasticity fines, ~25% fine sand. Stiff. Moist. Grey with red mottling.
	15	DP4	15 to 20	60/48				(15-15.5'): SILTY SAND (SM); ~80% fine to coarse sand, ~20% nonplastic fines. Loose. Wet. Brown.
								(15.5-17'): LEAN CLAY WITH SAND (CL); ~75% medium plasticity fines, ~25% fine sand. Stiff. Moist. Grey with red mottling.
								(17-20'): FAT CLAY (CH); ~85% high plasticity fines, ~15% fine sand. Very hard. Moist. Grey.
	20	DP5	20 to 25	60/60				(20-21.5'): CLAYEY SAND (SC); ~60% fine to coarse sand, ~40% medium to high plasticity fines. Medium dense. Wet. Brown.
								(21.5-23'): FAT CLAY (CH); ~85% high plasticity fines, ~15% fine sand. Very hard. Moist. Grey.
								(23-25'): CLAYEY SAND (SC); ~70% fine to coarse sand, ~30% low plasticity fines. medium dense. Very moist. Brown.

NOTES: Exploratory boring for proposed well installation. No well installed in this boring.

PROJECT NAME: Georgia Power Company - Plant McIntosh
CITY/STATE: Effingham County, GA
GEI PROJECT NUMBER: 1800205

GEI Consultants

LOCATION: Landfill No. 3
GROUND SURFACE EL. (ft): NM
VERTICAL DATUM:
DATE START/END: 6/30/2018 - 6/30/2018
DRILLING COMPANY: Cascade

BORING GWA-7A

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
		DP6	25 to 30	60/60				(25-27'): FAT CLAY (CH); ~85% high plasticity fines, ~15% fine sand. Very hard. Moist. Grey. (27-30'): SANDY FAT CLAY (CH); ~60% medium to high plasticity fines, ~40% fine sand. Hard. Very moist. Brown.
	30	DP7	30 to 35	60/60				(30-30.5'): WIDELY GRADED SAND (SW); ~90% fine to coarse sand, ~10% nonplastic fines. Medium dense. Wet. Light brown. (30.5-35'): FAT CLAY WITH SAND (CH); ~80% medium to high plasticity fines, ~20% coarse sand. Hard. Very moist. Brown.
	35	DP8	35 to 40	60/60		Recommended screen interval: 35-45'		(35-38'): CLAYEY SAND (SC); ~77.4% fine to coarse sand, ~22.6% low to medium plasticity fines. Loose. Wet. Light brown. (38-38.5'): SANDY LEAN CLAY (CL); ~60% medium plasticity fines, ~40% fine sand. Very stiff. Very moist. Grey. (38.5-42'): SILTY SAND (SM); ~84.3% fine to coarse sand, ~15.7% nonplastic fines. Dense. Wet. Light brown.
	40	DP9	40 to 45	60/60				(42-43'): CLAYEY SAND (SC); ~60% fine to coarse sand, ~40% medium plasticity fines. Medium dense. Wet. Brown-grey. (43-44'): WIDELY GRADED SAND (SW); ~90% fine to coarse sand, ~10% nonplastic fines. Dense. Wet. Light brown. (44-45'): CLAYEY SAND (SC); ~60% fine to coarse sand, ~40% medium plasticity fines. Medium dense. Wet. Brown-grey.
	45							Bottom of boring at depth 45 ft. Backfilled with bentonite chips and hydrated
	50							
	55							

NOTES: Exploratory boring for proposed well installation. No well installed in this boring.

PROJECT NAME: Georgia Power Company - Plant McIntosh
CITY/STATE: Effingham County, GA
GEI PROJECT NUMBER: 1800205

GEI Consultants

GEI WOBURN STD 2-LOCATION-GRAPHIC LOG MCINTOSH_BORING_LOGS_JUNE2018.GPJ 7/30/18

Southern Company Services, Inc.
Soil Boring Log

Project:	Plant McIntosh Groundwater Monitoring Plan		**HOLE No. GWC-1**
Location:	Ash Disposal Site No. 3		
Purpose:	Install 2" Monitoring Well		SHEET 1 OF 1
Position:	E 799,095.5 N 852,349.0	Surface Elevation: 64.90	
Rig Type:	CME 75	Contractor: SCS Atlanta	Driller: Jeff Gilreath
Drilling Method:	Hollow Stem Auger	Boring Depth: 33.5	No. SPT: 7 — No. UD Samples: 0
Date Started:	1/22/96	Date Completed: 1/22/96	Logged By: Terri Hartsfield — Date Logged: 1/22/96
Hole Closure:	2" Monitoring Well		

WATER TABLE	DEPTH AND ELEVN. (FT)	SYMBOLIC LOG	SOIL DESCRIPTION	SAMPLE NUMBER	SAMPLE LEGEND	SAMPLE RECOVERY (%)	SAMPLE SPT VALUES BLOWS/6" (N)	COMMENTS	TEST RESULTS MOISTURE CONTENT (%)	TEST RESULTS LIQUID LIMIT (%)	TEST RESULTS PLASTIC LIMIT (%)	TEST RESULTS K (cm/s)
	0 64.90		3" Dark Gray TOPSOIL	SS-1		100		Auger w/ Continuous Sampler				
	64.60		Light Gray Slightly Silty Fine SAND									
	63.90		Organgish Brown and Gray Silty Fine SAND									
	60.90 5		Orange and Gray, Stiff, Silty Fine SAND to Fine Sandy SILT	SS-2		100						
	10			SS-3		100						
	50.90 15		Grades to Dark Red, Stiff, Plastic CLAY/SILT interlayered with Gray and Tan Silty Sand to Fine Sandy Silt	SS-4		100						
	46.40 20		Mottled Pink and Gray, Fine, Clayey, Silty SAND w/Layers of Gray and Orange Interlayered Clayey Sand	SS-5		100						
	41.90 25		Orangish Brown and Gray Silty SAND Interlayered w/Stiff, Pink Sandy CLAY	SS-6		30						
	30			SS-7		100						
			^Boring Terminated @ 33.5'									

SS = Split Spoon; ST = Shelby Tube;
D = Dennison; P = Pitcher; O = Other

▽ while drilling
▼ after drilling

☑ 11.09 after 24 hours

Hole No. GWC-1

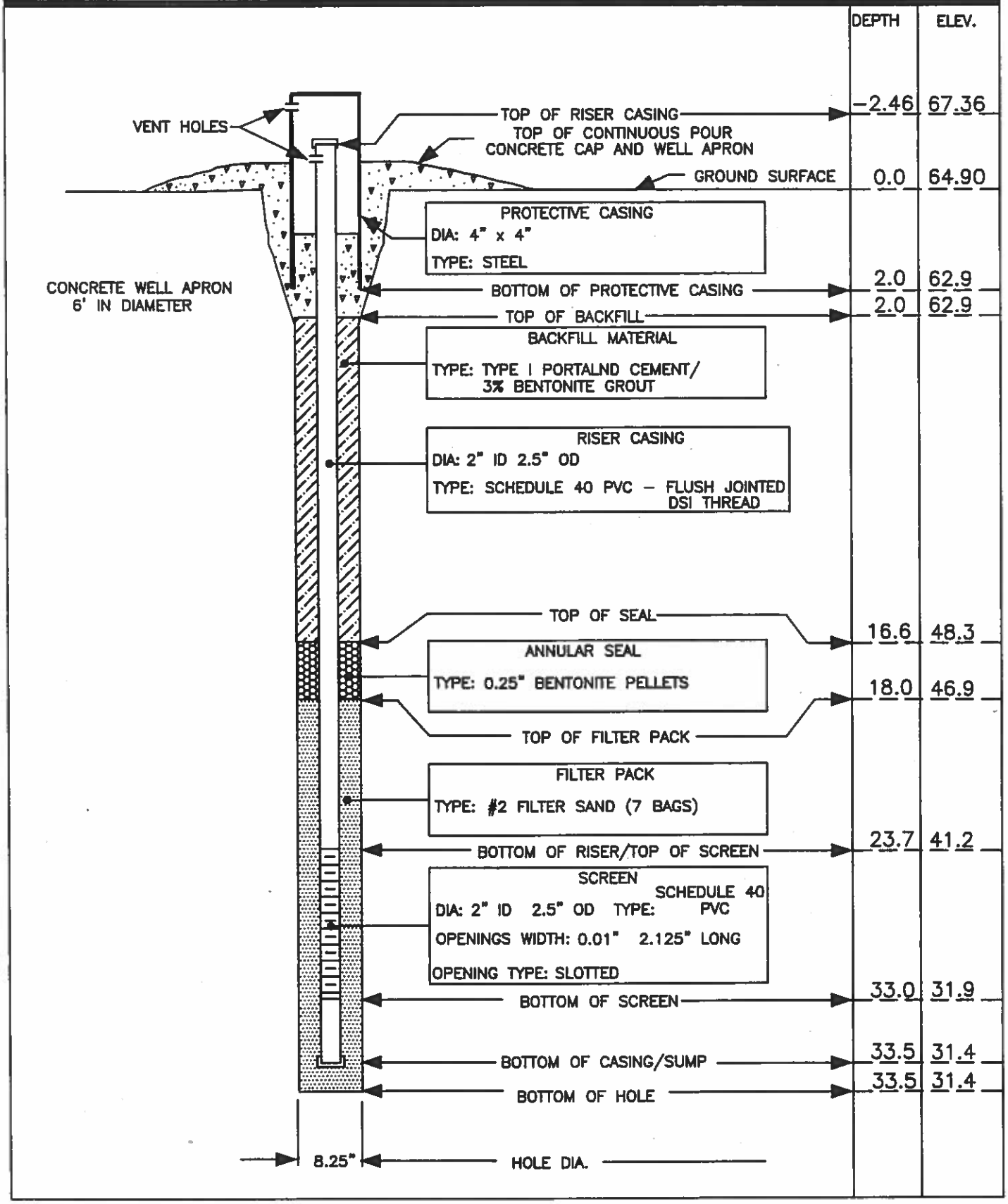
Southern Company Services

WELL CONSTRUCTION LOG

PROJECT	WELL NO.
Plant McIntosh Groundwater Monitoring Plan	GWC-1

SITE	LOCATION
Hunt Club–Ash Disposal Area #3	N 852348.950 E 799095.545

BEGUN	COMPLETED	PREPARED BY	WATER LEVEL	CONTRACTOR
1/22/96	1/22/96	Terri Hartsfield	EL. 53.81	SCS – Atlanta



Well Identification	GWC-1
Name of Drillers	Jeff Gilreath David Ivey Melvin Hughes
Identification of Drill Rig	CME 75 Serial # 242227
Drilling Method	Hollow Stem Auger w/ Continuous Sampler
Well Location	N 852348.950 E 799095.545
Borehole Diameter	8.25"
Well Casing Diameter	2" I. D.
Well Depth	33.5'
Casing Materials	Schedule 40 PVC
Screen Materials	Schedule 40 PVC
Screen Design	Slotted
Casing and Screen Joint Type	Flush Jointed
Screen Slot Size	0.01"
Screen Slot Length	2 1/8"
Filter Pack Material and Size	#2 filter sand
Filter Pack Volume	7 bags (~ 3.5 cu. ft.)
Filter Pack Placement Method	tremie
Sealant Materials	0.25" bentonite pellets
Sealant Volume	0.47 cu. ft.
Sealant Placement Method	tremie
Well Development Procedures	Grunfos Rediflo
Type of Protective Well Cap	locking, compression ring

Southern Company Services, Inc.
Soil Boring Log

Project:	Plant McIntosh Groundwater Monitoring Plan		**HOLE No. GWC-2**
Location:	Ash Disposal Site No. 3		
Purpose:	Install 2" Monitoring Well		SHEET 1 OF 1
Position:	E 799,745.3 N 852,246.2	Surface Elevation: 62.07	
Rig Type:	CME 75	Contractor: SCS Atlanta	Driller: Jeff Gilreath
Drilling Method:	Hollow Stem Auger	Boring Depth: 33.5	No. SPT: 7 No. UD Samples: 1
Date Started:	1/23/96	Date Completed: 1/23/96	Logged By: Terri Hartsfield Date Logged: 1/23/96
Hole Closure:	2" Monitoring Well		

WATER TABLE	DEPTH AND ELEVN. (FT)	SYMBOLIC LOG	SOIL DESCRIPTION	SAMPLE NUMBER	SAMPLE LEGEND	SAMPLE RECOVERY (%)	SAMPLE SPT VALUES BLOWS/6" (N)	COMMENTS	TEST RESULTS MOISTURE CONTENT (%)	TEST RESULTS LIQUID LIMIT (%)	TEST RESULTS PLASTIC LIMIT (%)	TEST RESULTS K (cm/s)
	0 62.07		4" Dark Gray, Silty Sand TOPSOIL	SS-1		100		Auger w/ Continuous Sampler				
	61.77		Light Gray, Silty, Fine-Grained SAND									
	58.07 5		Grades to a Gray and Brown and Red Mottled Clayey Silty Fine-Grained SAND. By 6' Becomes Gray, Tan and Red Fine-Grained Sandy CLAY w/ Muscovite	SS-2		100						
	10			SS-3		100						
	15		Grades to a Gray, Tan and Orange Very Stiff SILT w/Fine-Grained SAND	SS-4		100		U.D. Sample from 13.5 - 15.5'				
	45.57		Tan, Very Silty Clayey, Fine- to Medium-Grained Quartz SAND									
	44.07 20		Olive Gray and Orange, Fractured Silty CLAY (Water Fractures?)	SS-5		100						
	39.07 25		Orange, Fine- to Medium-Grained Silty SAND. Very Wet	SS-6		70						
	30			SS-7		70						
			Boring Terminated @ 33.5'									

SS = Split Spoon; ST = Shelby Tube;
D = Dennison; P = Pitcher; O = Other

▽ while drilling
▼ after drilling

☑ 8.86 after 24 hours

Hole No. **GWC-2**

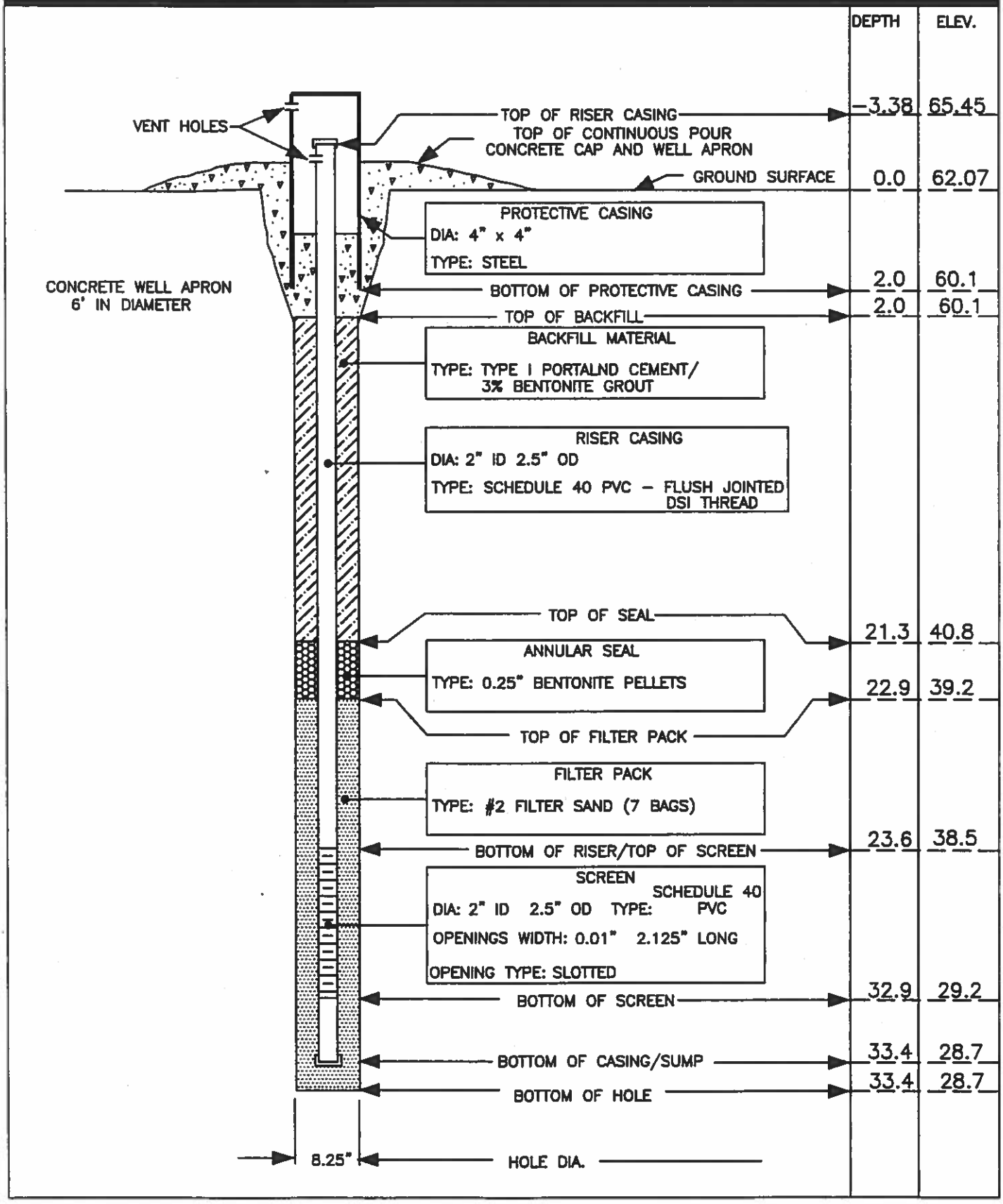
Southern Company Services

WELL CONSTRUCTION LOG

PROJECT	WELL NO.
Plant McIntosh Groundwater Monitoring Plan	GWC-2

SITE	LOCATION
East Side of Ash Disposal Area #3	N 852246.190 E 799745.269

BEGUN	COMPLETED	PREPARED BY	WATER LEVEL	CONTRACTOR
1/22/96	1/22/96	Terri Hartsfield	EL. 53.21	SCS – Atlanta



Well Identification	GWC-2
Name of Drillers	Jeff Gilreath David Ivey Melvin Hughes
Identification of Drill Rig	CME 75 Serial # 242227
Drilling Method	Hollow Stem Auger w/ Continuous Sampler
Well Location	N852246.190 E 799745.269
Borehole Diameter	8.25"
Well Casing Diameter	2" I. D.
Well Depth	33.4'
Casing Materials	Schedule 40 PVC
Screen Materials	Schedule 40 PVC
Screen Design	Slotted
Casing and Screen Joint Type	Flush Jointed
Screen Slot Size	0.01"
Screen Slot Length	2 1/8"
Filter Pack Material and Size	#2 filter sand
Filter Pack Volume	7 bags (~ 3.5 cu. ft.)
Filter Pack Placement Method	tremie
Sealant Materials	0.25" bentonite pellets
Sealant Volume	0.54 cu. ft.
Sealant Placement Method	tremie
Well Development Procedures	Grunfos Rediflo
Type of Protective Well Cap	locking, compression ring

Southern Company Services, Inc.
Soil Boring Log

Project:	Plant McIntosh Groundwater Monitoring Plan		**HOLE No. GWC-3**
Location:	Ash Disposal Site No. 3		
Purpose:	Install 2" Monitoring Well		SHEET 1 OF 1
Position:	E 798,632.9 N 852,662.6	Surface Elevation: 65.54	
Rig Type:	CME 75	Contractor: SCS Atlanta	Driller: Jeff Gilreath
Drilling Method:	Hollow Stem Auger	Boring Depth: 33.5	No. SPT: 7 No. UD Samples: 0
Date Started:	1/25/96	Date Completed: 1/25/96	Logged By: Terri Hartsfield Date Logged: 1/25/96
Hole Closure:	2" Monitoring Well		

WATER TABLE	DEPTH AND ELEVN. (FT)	SYMBOLIC LOG	SOIL DESCRIPTION	SAMPLE NUMBER	SAMPLE LEGEND	SAMPLE RECOVERY (%)	SAMPLE SPT VALUES BLOWS/6" (N)	COMMENTS	TEST RESULTS MOISTURE CONTENT (%)	TEST RESULTS LIQUID LIMIT (%)	TEST RESULTS PLASTIC LIMIT (%)	TEST RESULTS K (cm/s)
	0 65.54		6" Dark Brown Silty Sandy TOPSOIL	SS-1		50		Auger w/ Continuous Sampler				
	65.04		Dark Gray Fine Sandy Silt. Very Stiff. Organics From 6" to 7'									
	5			SS-2		30		Wood @ ~6'				
	58.54		Contact Uncertain									
			Light Gray Very Fine Sandy Silt to Very Silty Fine-Grained SAND. Contains Muscovite Grains	SS-3		100						
	10											
				SS-4		100						
	15											
			Contains Thin (1/8") Layers of Orange Fine- to Medium-Grained Slightly Silty SAND from 17-18'. Grades to Light Gray Silty SAND by 19'.	SS-5		100						
	20											
	42.54		Light Tannish Gray, Slightly Silty, Fine- to Medium-Grained SAND	SS-6		70						
	25											
	37.04		Light Gray Sandy SILT to Silty Sand	SS-7		70						
	36.04 30		Light Tannish Gray, Slightly Silty, Fine- to Medium-Grained SAND									
	32.54		Light Gray Sandy SILT to Silty Sand									
			Boring Terminated @ 33.5'									

SS = Split Spoon; ST = Shelby Tube;
D = Dennison; P = Pitcher; O = Other

▽ while drilling
▼ after drilling

☑ 14.67 after 24 hours

Hole No. GWC-3

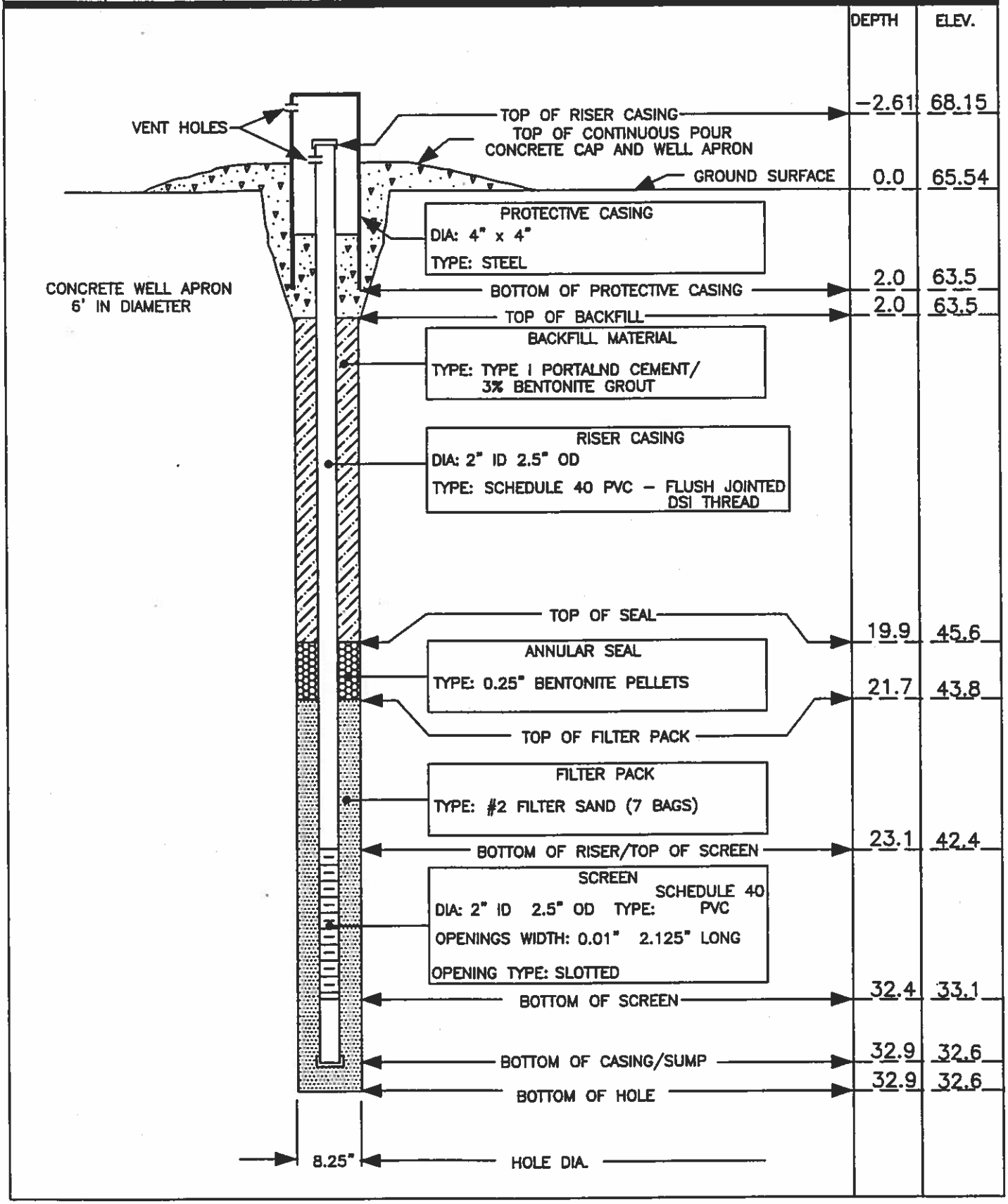
Southern Company Services

WELL CONSTRUCTION LOG

PROJECT	WELL NO.
Plant McIntosh Groundwater Monitoring Plan	GWC-3

SITE	LOCATION
Northwest Side of Ash Disposal Area	N 852662.552 E 798632.926

BEGUN	COMPLETED	PREPARED BY	WATER LEVEL	CONTRACTOR
1/25/96	1/25/96	Terri Hartsfield	EL. 50.87	SCS – Atlanta



Well Identification	GWC-3
Name of Drillers	Jeff Gilreath David Ivey Melvin Hughes
Identification of Drill Rig	CME 75 Serial # 242227
Drilling Method	Hollow Stem Auger w/ Continuous Sampler
Well Location	N 852662.552 E 798632.926
Borehole Diameter	8.25"
Well Casing Diameter	2" I. D.
Well Depth	32.9'
Casing Materials	Schedule 40 PVC
Screen Materials	Schedule 40 PVC
Screen Design	Slotted
Casing and Screen Joint Type	Flush Jointed
Screen Slot Size	0.01"
Screen Slot Length	2 1/8"
Filter Pack Material and Size	#2 filter sand
Filter Pack Volume	7 bags (~ 3.5 cu. ft.)
Filter Pack Placement Method	tremie
Sealant Materials	0.25" bentonite pellets
Sealant Volume	0.61 cu. ft.
Sealant Placement Method	tremie
Well Development Procedures	Grunfos Rediflo
Type of Protective Well Cap	locking, compression ring

WHITAKER LABORATORY INC.
P.O. BOX 7081
SAVANNAH, GEORGIA 31418
2500 TREMONT RD. FAX 912/233-5061 912/234-0696

AUGER BORING RECORD

PROJECT: SEPCO Plant McIntosh, Rincon Ga.

DATE: May 16, 1998

BORING NUMBER: GWC 4

DEPTH - ft	DESCRIPTION	MOISTURE
0-1	fine brown & tan sand	dry
1-2	fine tan sand	wet
2-3	fine orange & tan sand	wet
3-4	fine orange & tan sand clay	moist
4-5	fine orange & tan sand clay	moist
5-6	fine orange & tan silty sand	wet
6-7	fine orange & tan silty sand	wet
7-8	orange & tan clay	moist
8-9	orange & tan silty sand	wet
9-10	orange & tan clay	wet
10-11	orange & tan silty sand clay	wet
11-12	orange & tan silty sand	wet

NOTE: 24 hr ground water table @ 3.5 feet

SITE: SEPCO Plant McIntosh, Rincon, GA WELL NO. G.W.C-4A(Deep)

"AS-BUILT" DIAGRAM OF EACH WELL: attached

NAME OF DRILLER(S): Ron Wilkerson
Tim Wainwright
Joseph Whitaker
Carroll Crowther

TYPE OF DRILL RIG(S): Cannonball B-53

DRILLING METHOD: 6.25" I. D. hollow stem augers

WELL LOCATION: See the attached well schematic

BOREHOLE DIAMETER: 12.25 inches

WELL CASING DIAMETER: 2.0" I. D.

WELL DEPTH: 33'

DRILLING AND LITHOLOGIC LOGS: attached

CASING MATERIALS: 2.0" dia. ASTM, NSF rated, Schedule 40 PVC

SCREEN MATERIALS AND DESIGN: 2" to 4" dia. PVC with 0.01" slots ("Pre-Pac Dual-Wall Well Screen")

SCREENING AND CASING JOINT TYPE: flush threaded

SCREEN SLOT SIZE: 0.01" slots - 1.5" long (4 slots per diameter) (8 slots per vertical inch)

SCREEN LENGTH: 10'

FILTER PACK MATERIAL/SIZE: 20/30 quartz (silica) sand

FILTER PACK VOLUME: 8.67 cu. ft.

FILTER PACK PLACEMENT METHOD: Tremie pipe

SEALANT MATERIALS: Course grit sodium benonite

SEALANT VOLUME: 1.60 cu. ft.

SEALANT PLACEMENT METHOD: Tremie pipe

SURFACE SEAL DESIGN/CONSTRUCTION: See the attached well schematic

WELL DEVELOPMENT PROCEDURE: Pumping/surging

TYPE OF PROTECTIVE WELL CAP: 4" x 4" x 4' locking steel cover

GROUND SURFACE ELEVATION: See the attached individual well schematic

WELL CAP ELEVATION: See the attached individual well schematic

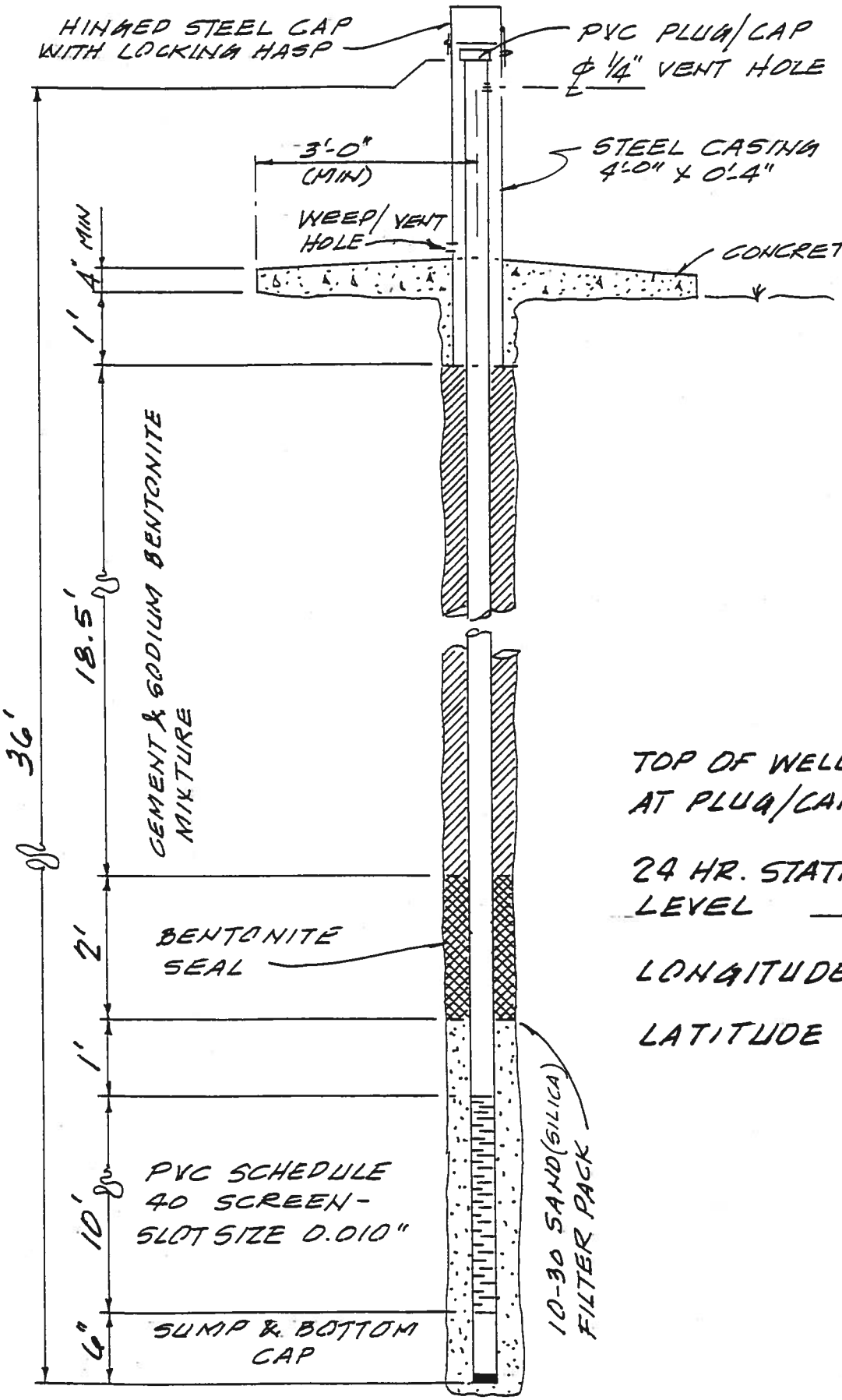
DETAILED DRAWING OF WELL: See the attached individual well schematic

GENERAL WELL INSTALLATION PROCEDURES

Prior to drilling the first well, all equipment was steam cleaned. This process was repeated after installation of each well.

All monitoring wells were installed using hollow-stem augers to advance the holes.

WELL Nº GWC-4A
(DEEP)



TOP OF WELL ELEVATION AT PLUG/CAP _____

24 HR. STATIC WATER LEVEL 12.38'

LONGITUDE _____

LATITUDE _____

SCALE: 1/2" = 1'-0" VERT.
1" = 1'-0" HORZ

SITE: SEPCO Plant McIntosh, Rincon, GA WELL NO. G.W.C-4B(Shallow)

"AS-BUILT" DIAGRAM OF EACH WELL: attached

NAME OF DRILLER(S): Ron Wilkerson
Tim Wainwright
Joseph Whitaker
Carroll Crowther

TYPE OF DRILL RIG(S): Cannonball B-53

DRILLING METHOD: 6.25" I. D. hollow stem augers

WELL LOCATION: See the attached well schematic

BOREHOLE DIAMETER: 12.25 inches

WELL CASING DIAMETER: 2.0" I. D.

WELL DEPTH: 15'

DRILLING AND LITHOLOGIC LOGS: attached

CASING MATERIALS: 2.0" dia. ASTM, NSF rated, Schedule 40 PVC

SCREEN MATERIALS AND DESIGN: 2" to 4" dia. PVC with 0.01" slots ("Pre-Pac Dual-Wall Well Screen")

SCREENING AND CASING JOINT TYPE: flush threaded

SCREEN SLOT SIZE: 0.01" slots - 1.5" long (4 slots per diameter) (8 slots per vertical inch)

SCREEN LENGTH: 10'

FILTER PACK MATERIAL/SIZE: 20/30 quartz (silica) sand

FILTER PACK VOLUME: 8.40 cu. ft.

FILTER PACK PLACEMENT METHOD: Tremie pipe

SEALANT MATERIALS: Course grit sodium benonite

SEALANT VOLUME: 1.50 cu. ft.

SEALANT PLACEMENT METHOD: Tremie pipe

SURFACE SEAL DESIGN/CONSTRUCTION: See the attached well schematic

WELL DEVELOPMENT PROCEDURE: Pumping/surging

TYPE OF PROTECTIVE WELL CAP: 4" x 4" x 4' locking steel cover

GROUND SURFACE ELEVATION: See the attached individual well schematic

WELL CAP ELEVATION: See the attached individual well schematic

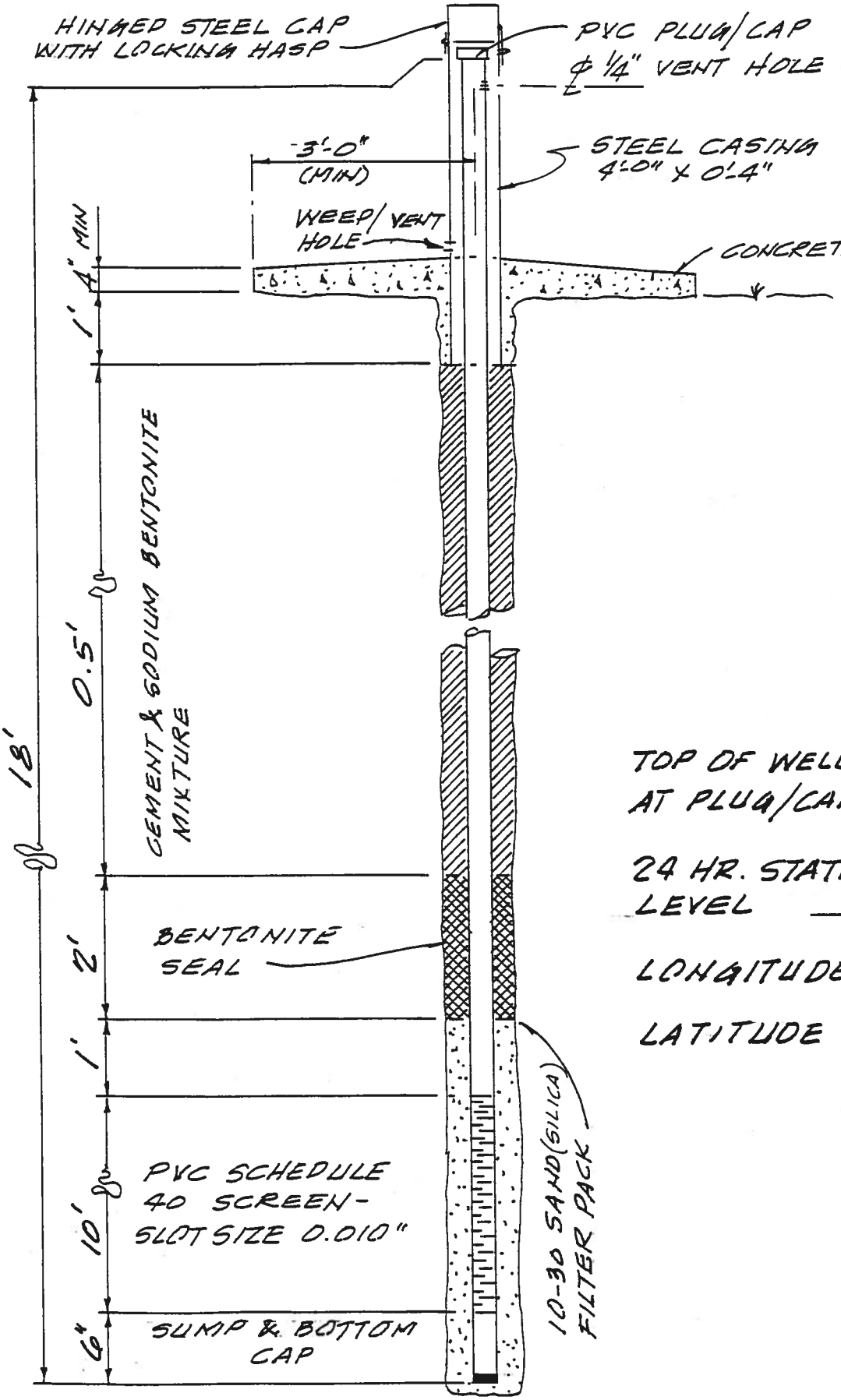
DETAILED DRAWING OF WELL: See the attached individual well schematic

GENERAL WELL INSTALLATION PROCEDURES

Prior to drilling the first well, all equipment was steam cleaned. This process was repeated after installation of each well.

All monitoring wells were installed using hollow-stem augers to advance the holes.

WELL Nº GWC-4B
(SHALLOW)



TOP OF WELL ELEVATION AT PLUG/CAP _____

24 HR. STATIC WATER LEVEL 11.40'

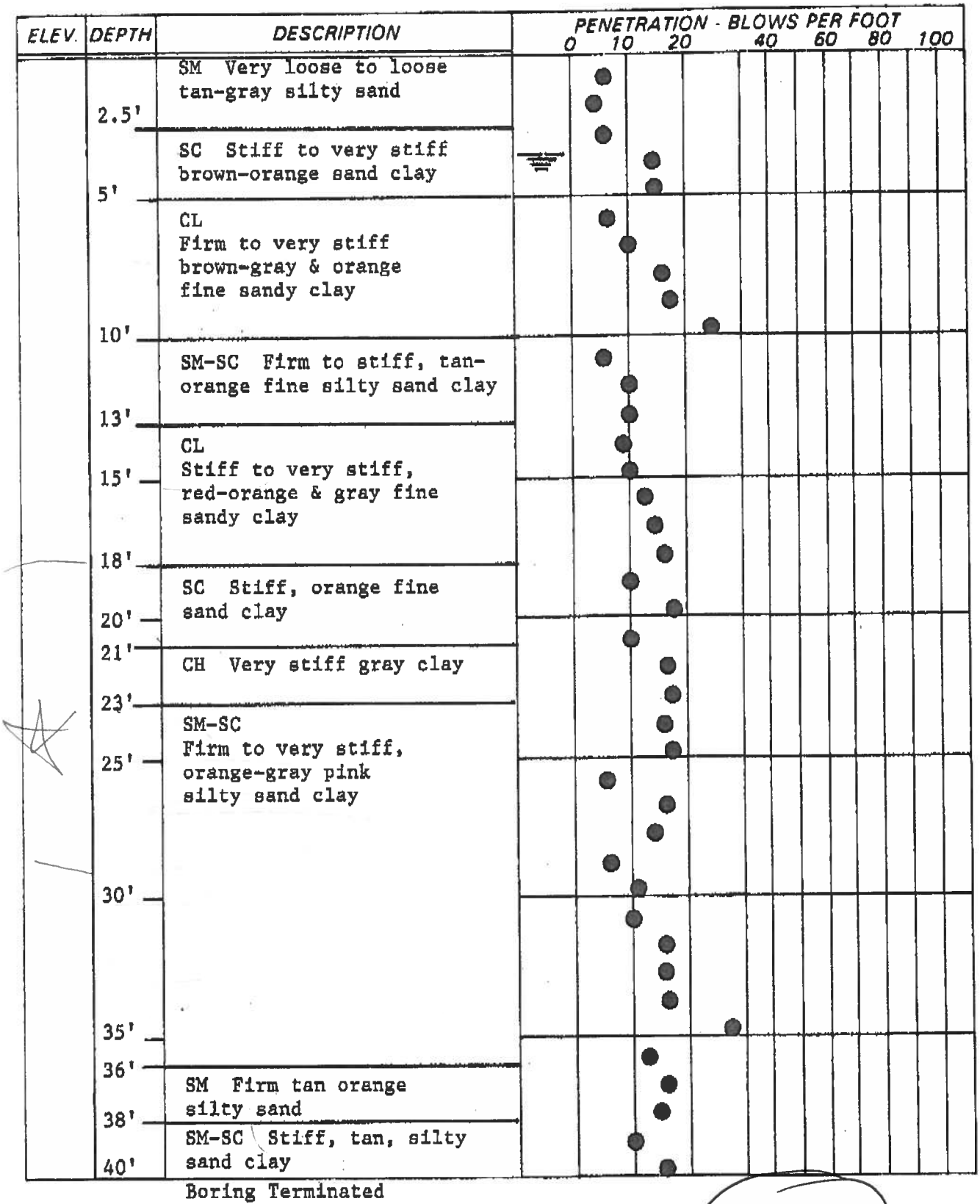
LONGITUDE _____

LATITUDE _____

SCALE: 1/2" = 1'-0" VERT.
1" = 1'-0" HORZ

TEST BORING RECORD

FIELD CLASSIFIED



Penetration is number of blows of 140 lb. hammer falling 30 in. required to drive 2.0 in. O.D. sampler one foot.

BORING NO. G.W.C-4

WHITAKER LABORATORY, INC.

JOB SEPCO Plant McIntosh

DATE 5/5/98

1023

SITE: SEPCO Plant McIntosh, Rincon, GA WELL NO. G.W.C.-5

"AS-BUILT" DIAGRAM OF EACH WELL: attached

NAME OF DRILLER(S): Ron Wilkerson
Tim Wainwright
Joseph Whitaker
Carroll Crowther

TYPE OF DRILL RIG(S): Cannonball B-53

DRILLING METHOD: 6.25" I. D. hollow stem augers

WELL LOCATION: See the attached well schematic

BOREHOLE DIAMETER: 12.25 inches

WELL CASING DIAMETER: 2.0" I. D.

WELL DEPTH: 28'

DRILLING AND LITHOLOGIC LOGS: attached

CASING MATERIALS: 2.0" dia. ASTM, NSF rated, Schedule 40 PVC

SCREEN MATERIALS AND DESIGN: 2" to 4" dia. PVC with 0.01" slots ("Pre-Pac Dual-Wall Well Screen")

SCREENING AND CASING JOINT TYPE: flush threaded

SCREEN SLOT SIZE: 0.01" slots - 1.5" long (4 slots per diameter) (8 slots per vertical inch)

SCREEN LENGTH: 10'

FILTER PACK MATERIAL/SIZE: 20/30 quartz (silica) sand

FILTER PACK VOLUME: 8.75 cu. ft.

FILTER PACK PLACEMENT METHOD: Tremie pipe

SEALANT MATERIALS: Course grit sodium benonite

SEALANT VOLUME: 1.57 cu. ft.

SEALANT PLACEMENT METHOD: Tremie pipe

SURFACE SEAL DESIGN/CONSTRUCTION: See the attached well schematic

WELL DEVELOPMENT PROCEDURE: Pumping/surging

TYPE OF PROTECTIVE WELL CAP: 4" x 4" x 4' locking steel cover

GROUND SURFACE ELEVATION: See the attached individual well schematic

WELL CAP ELEVATION: See the attached individual well schematic

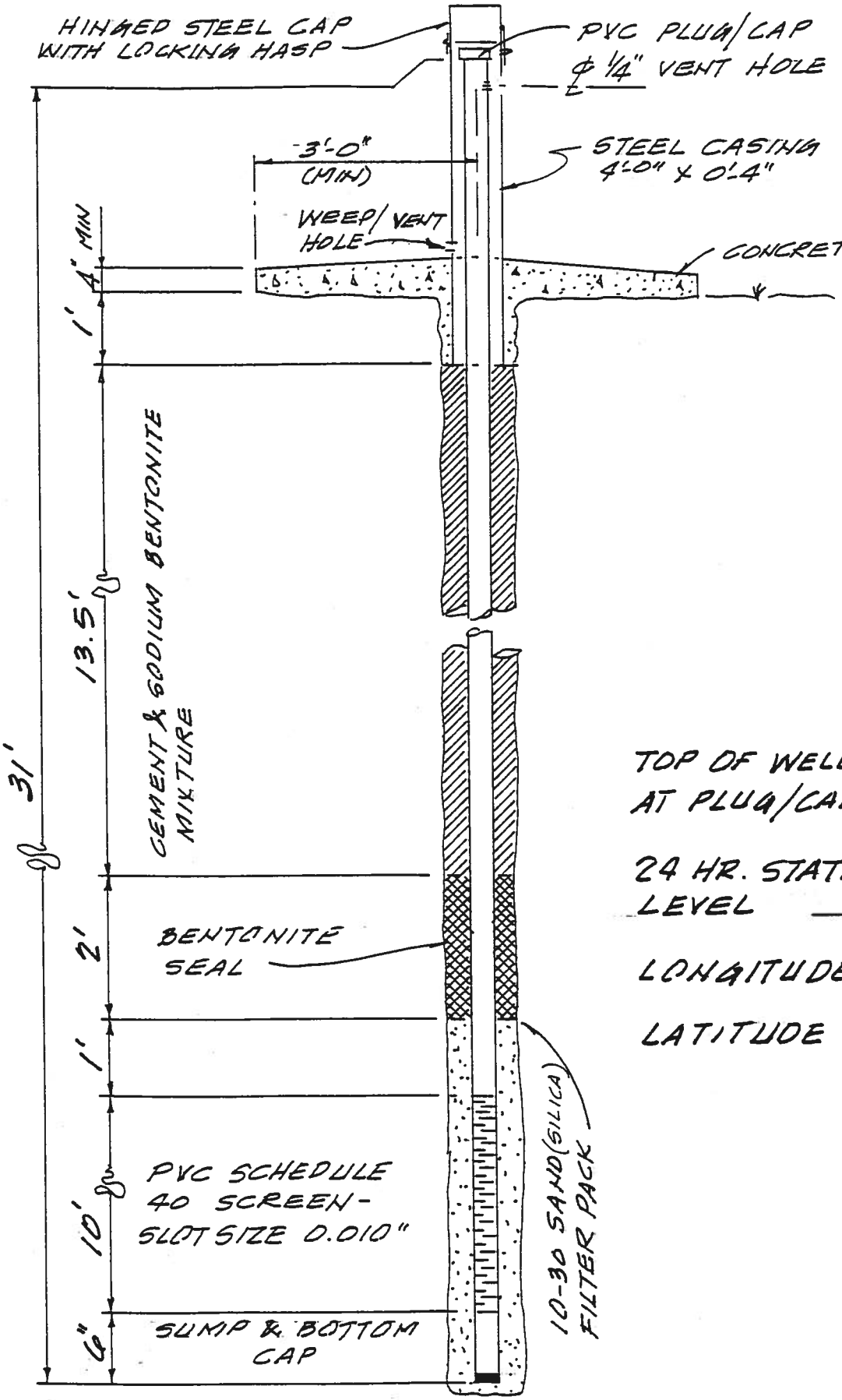
DETAILED DRAWING OF WELL: See the attached individual well schematic

GENERAL WELL INSTALLATION PROCEDURES

Prior to drilling the first well, all equipment was steam cleaned. This process was repeated after installation of each well.

All monitoring wells were installed using hollow-stem augers to advance the holes.

WELL Nº GWC-5



TOP OF WELL ELEVATION AT PLUG/CAP _____

24 HR. STATIC WATER LEVEL 21.49

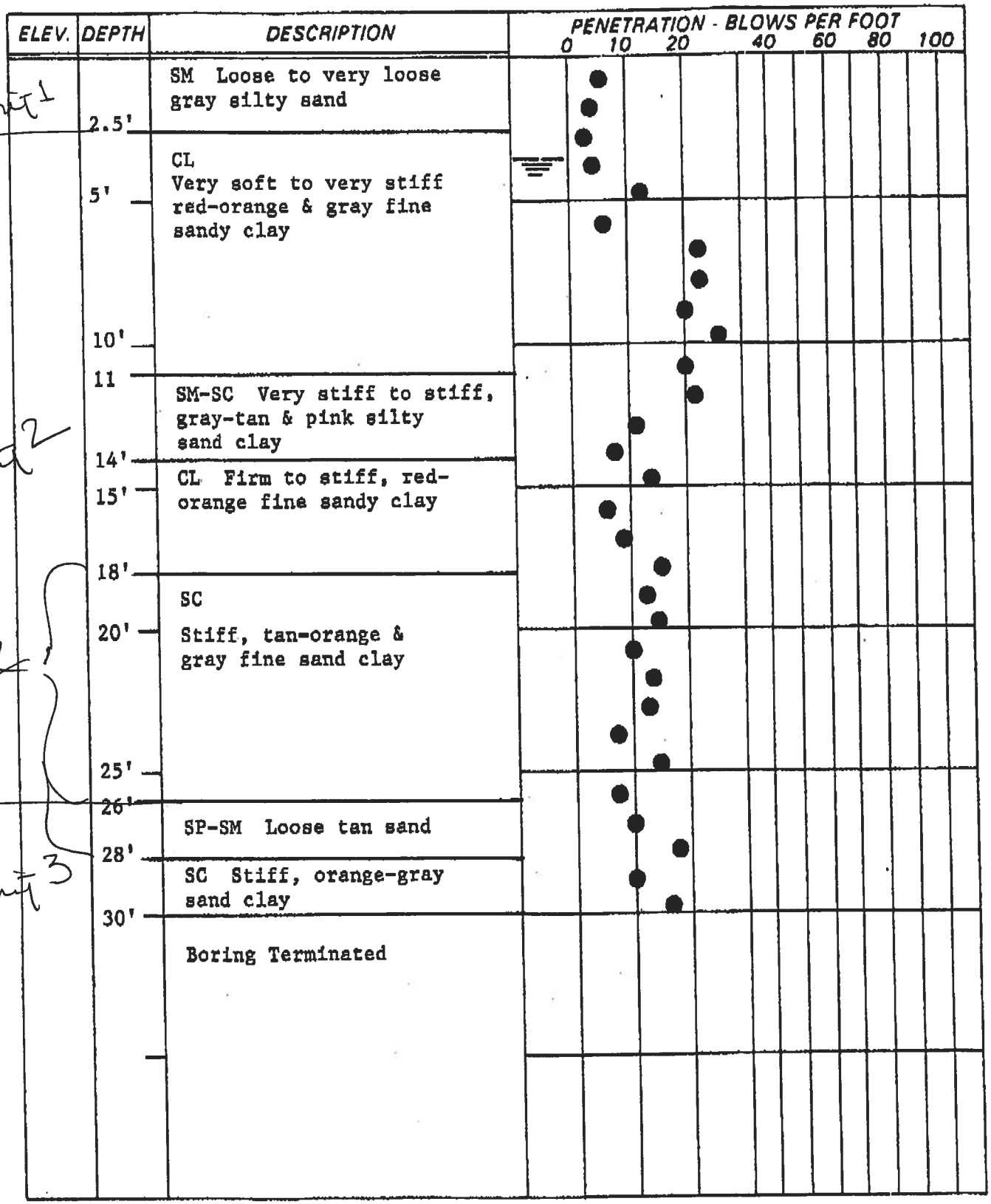
LONGITUDE _____

LATITUDE _____

SCALE: 1/2" = 1'-0" VERT.
1" = 1'-0" HORZ

TEST BORING RECORD

FIELD CLASSIFIED



Penetration is number of blows of 140 lb. hammer falling 30 in. required to drive 2.0 in. O.D. sampler one foot.

BORING NO. G.W.C.-5

WHITAKER LABORATORY, INC.

JOB SEPCO Plant McIntosh

DATE 5/5/98

SITE: SEPCO Plant McIntosh, Rincon, GA WELL NO. G.W.C.-6

"AS-BUILT" DIAGRAM OF EACH WELL: attached

NAME OF DRILLER(S): Ron Wilkerson
Tim Wainwright
Joseph Whitaker
Carroll Crowther

TYPE OF DRILL RIG(S): Cannonball B-53

DRILLING METHOD: 6.25" I. D. hollow stem augers

WELL LOCATION: See the attached well schematic

BOREHOLE DIAMETER: 12.25 inches

WELL CASING DIAMETER: 2.0" I. D.

WELL DEPTH: 29'

DRILLING AND LITHOLOGIC LOGS: attached

CASING MATERIALS: 2.0" dia. ASTM, NSF rated, Schedule 40 PVC

SCREEN MATERIALS AND DESIGN: 2" to 4" dia. PVC with 0.01" slots ("Pre-Pac Dual-Wall Well Screen")

SCREENING AND CASING JOINT TYPE: flush threaded

SCREEN SLOT SIZE: 0.01" slots - 1.5" long (4 slots per diameter) (8 slots per vertical inch)

SCREEN LENGTH: 5'

FILTER PACK MATERIAL/SIZE: 20/30 quartz (silica) sand

FILTER PACK VOLUME: 4.35 cu. ft.

FILTER PACK PLACEMENT METHOD: Tremie pipe

SEALANT MATERIALS: Course grit sodium benonite

SEALANT VOLUME: 1.55 cu. ft.

SEALANT PLACEMENT METHOD: Tremie pipe

SURFACE SEAL DESIGN/CONSTRUCTION: See the attached well schematic

WELL DEVELOPMENT PROCEDURE: Pumping/surging

TYPE OF PROTECTIVE WELL CAP: 4" x 4" x 4' locking steel cover

GROUND SURFACE ELEVATION: See the attached individual well schematic

WELL CAP ELEVATION: See the attached individual well schematic

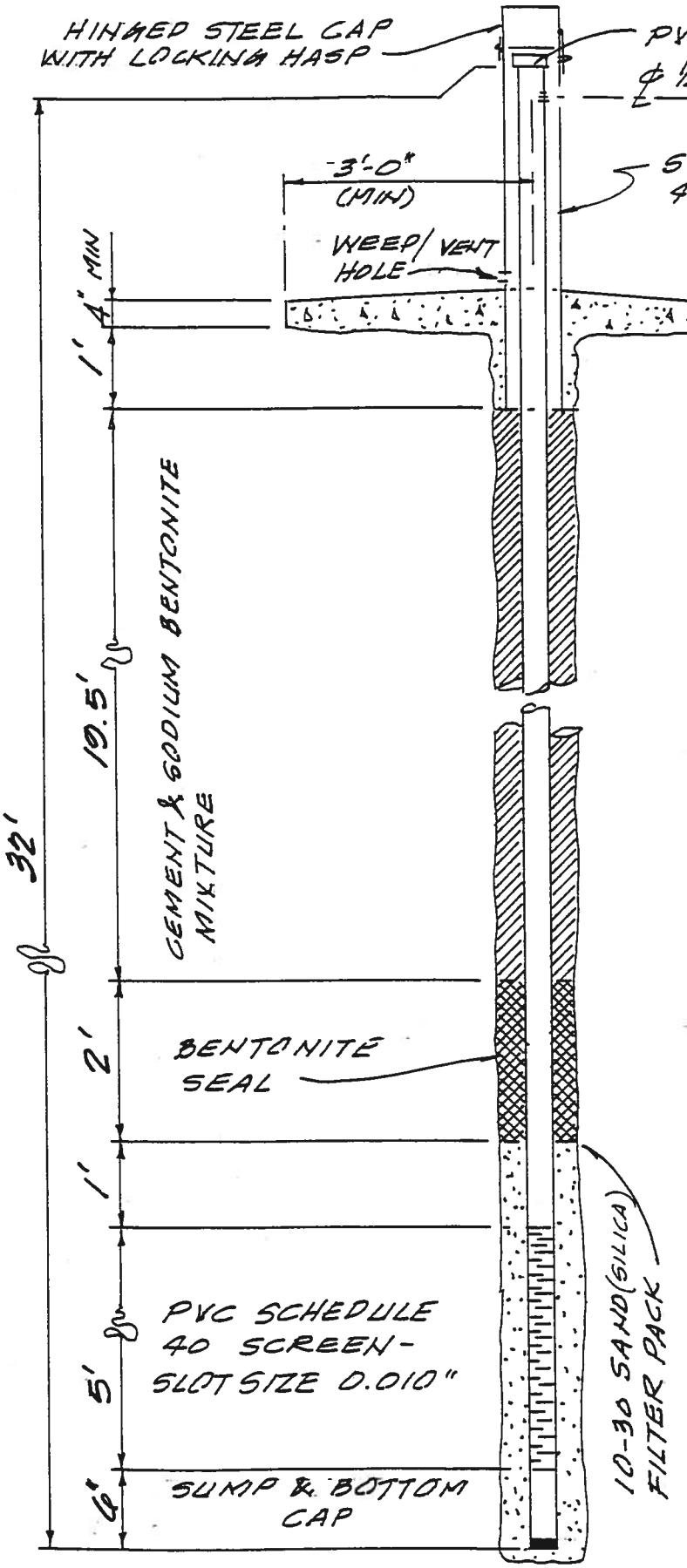
DETAILED DRAWING OF WELL: See the attached individual well schematic

GENERAL WELL INSTALLATION PROCEDURES

Prior to drilling the first well, all equipment was steam cleaned. This process was repeated after installation of each well.

All monitoring wells were installed using hollow-stem augers to advance the holes.

WELL Nº GWC-6



TOP OF WELL ELEVATION AT PLUG/CAP _____

24 HR. STATIC WATER LEVEL 16.48

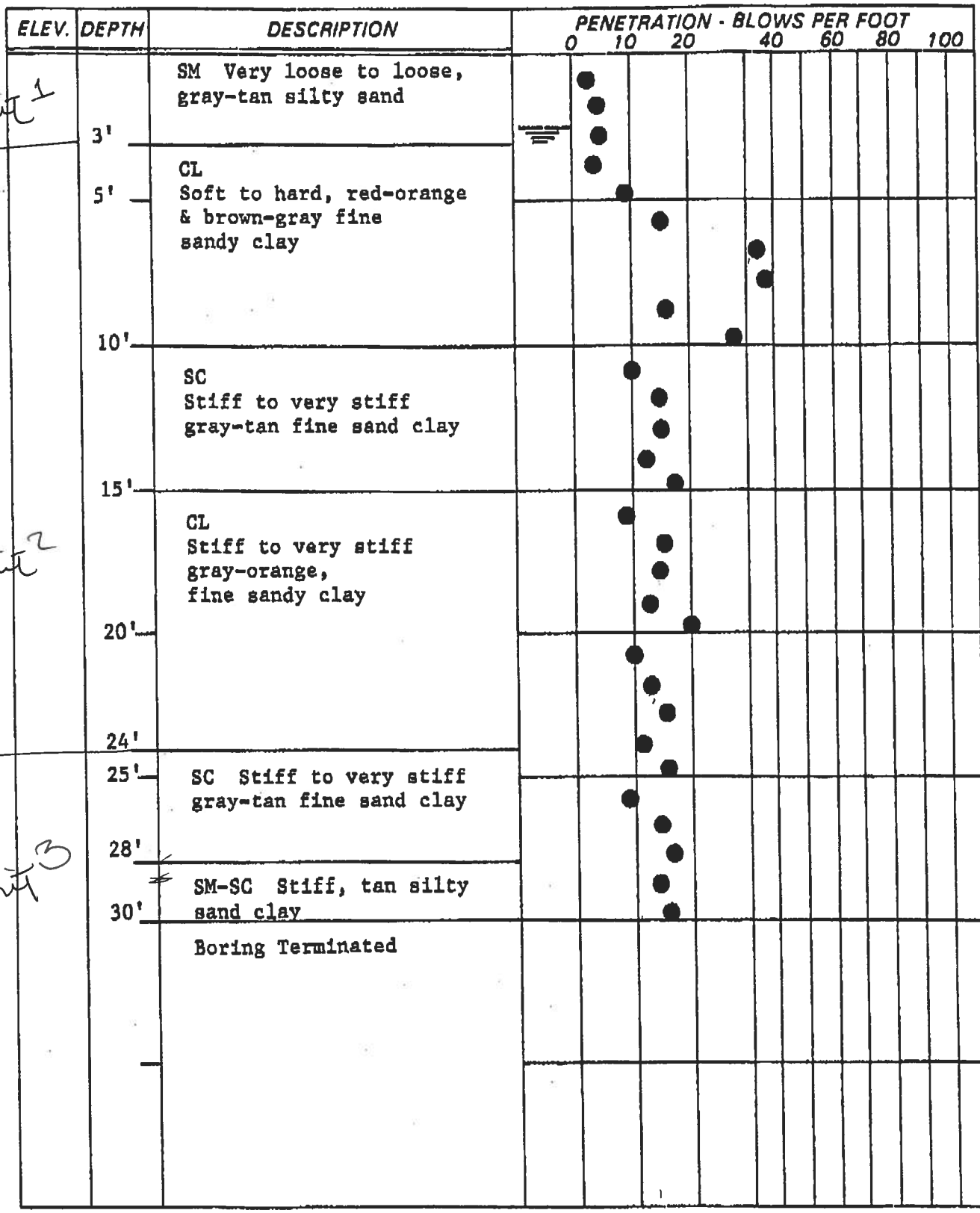
LONGITUDE _____

LATITUDE _____

SCALE: 1/2" = 1'-0" VERT.
1" = 1'-0" HORZ

TEST BORING RECORD

FIELD CLASSIFIED



Penetration is number of blows of 140 lb. hammer falling 30 in. required to drive 2.0 in. O.D. sampler one foot.

BORING NO. G.W.C-6

WHITAKER LABORATORY, INC.

JOB SEPCO - Plant McIntosh

DATE 5/6/98

SITE: SEPCO Plant McIntosh, Rincon, GA WELL NO. G.W.C.-7

"AS-BUILT" DIAGRAM OF EACH WELL: attached

NAME OF DRILLER(S): Ron Wilkerson
Tim Wainwright
Joseph Whitaker
Carroll Crowther

TYPE OF DRILL RIG(S): Cannonball B-53

DRILLING METHOD: 6.25" I. D. hollow stem augers

WELL LOCATION: See the attached well schematic

BOREHOLE DIAMETER: 12.25 inches

WELL CASING DIAMETER: 2.0" I. D.

WELL DEPTH: 33'

DRILLING AND LITHOLOGIC LOGS: attached

CASING MATERIALS: 2.0" dia. ASTM, NSF rated, Schedule 40 PVC

SCREEN MATERIALS AND DESIGN: 2" to 4" dia. PVC with 0.01" slots ("Pre-Pac Dual-Wall Well Screen")

SCREENING AND CASING JOINT TYPE: flush threaded

SCREEN SLOT SIZE: 0.01" slots - 1.5" long (4 slots per diameter) (8 slots per vertical inch)

SCREEN LENGTH: 10'

FILTER PACK MATERIAL/SIZE: 20/30 quartz (silica) sand

FILTER PACK VOLUME: 8.80 cu. ft.

FILTER PACK PLACEMENT METHOD: Tremie pipe

SEALANT MATERIALS: Course grit sodium benonite

SEALANT VOLUME: 1.57 cu. ft.

SEALANT PLACEMENT METHOD: Tremie pipe

SURFACE SEAL DESIGN/CONSTRUCTION: See the attached well schematic

WELL DEVELOPMENT PROCEDURE: Pumping/surging

TYPE OF PROTECTIVE WELL CAP: 4" x 4" x 4' locking steel cover

GROUND SURFACE ELEVATION: See the attached individual well schematic

WELL CAP ELEVATION: See the attached individual well schematic

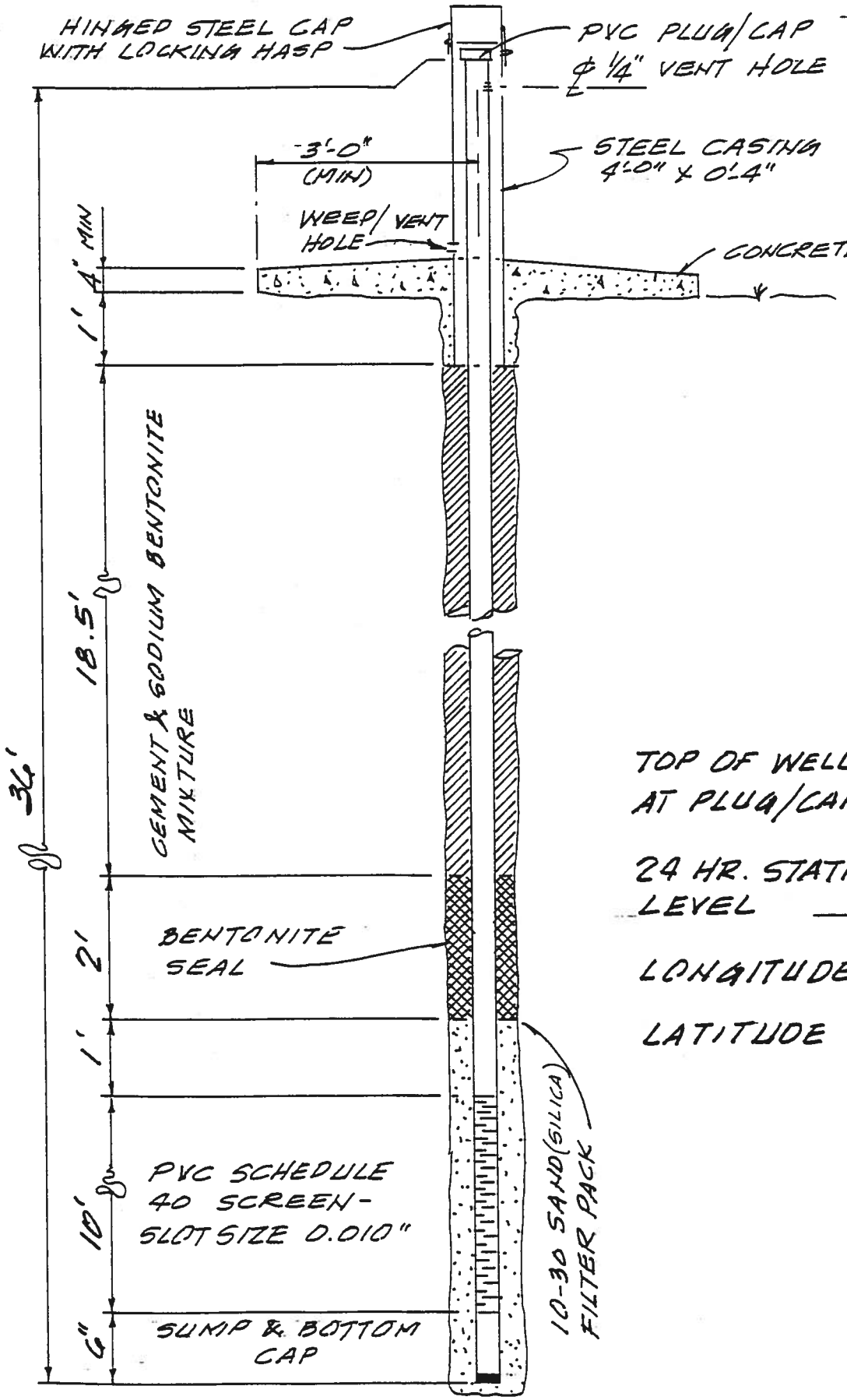
DETAILED DRAWING OF WELL: See the attached individual well schematic

GENERAL WELL INSTALLATION PROCEDURES

Prior to drilling the first well, all equipment was steam cleaned. This process was repeated after installation of each well.

All monitoring wells were installed using hollow-stem augers to advance the holes.

WELL Nº GWC-7



TOP OF WELL ELEVATION AT PLUG/CAP _____

24 HR. STATIC WATER LEVEL 14.86'

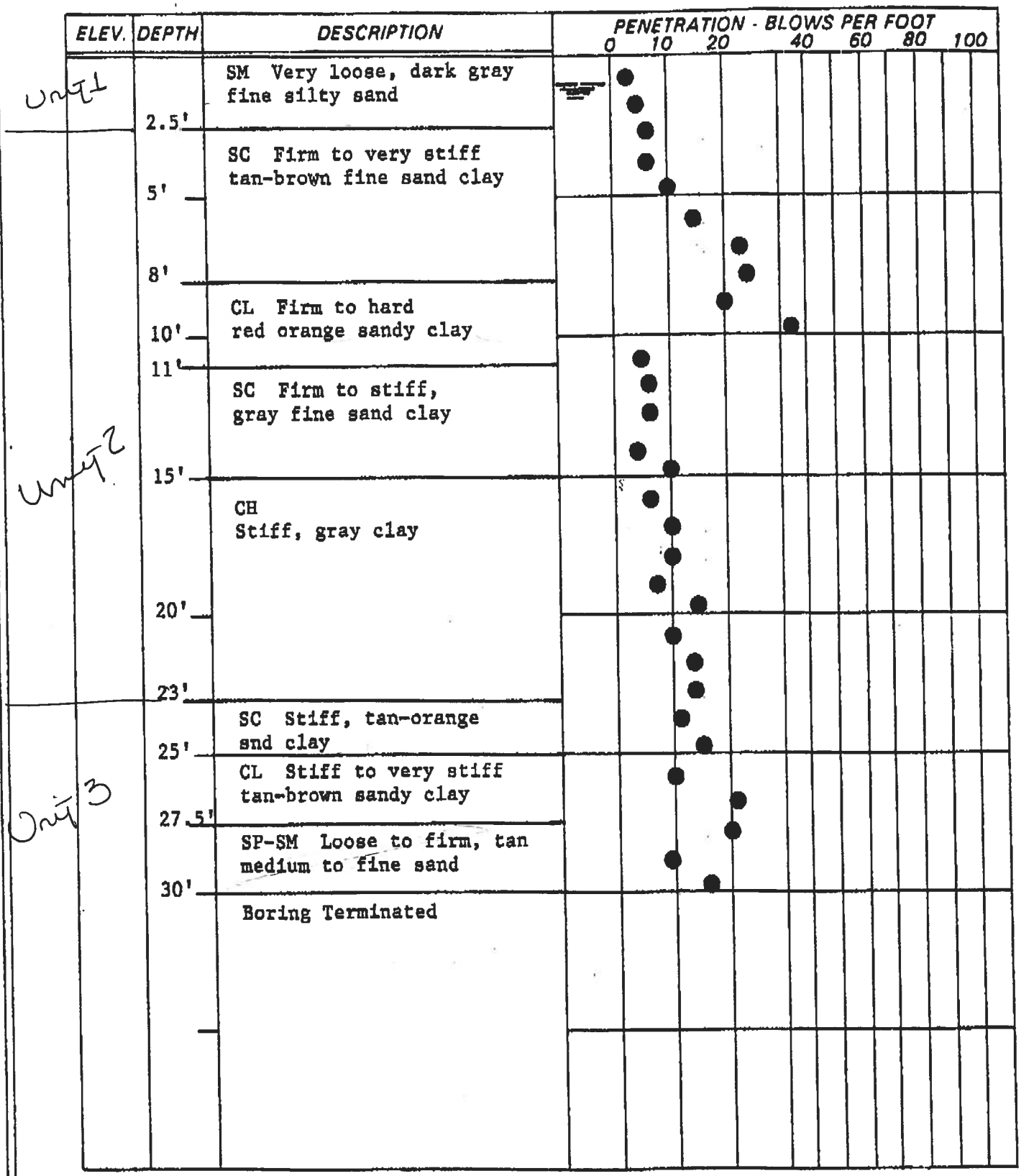
LONGITUDE _____

LATITUDE _____

SCALE: 1/2" = 1'-0" VERT.
1" = 1'-0" HORZ

TEST BORING RECORD

FIELD CLASSIFIED



Penetration is number of blows of 140 lb. hammer falling 30 in. required to drive 2.0 in. O.D. sampler one foot.

BORING NO. G.W.C-7

WHITAKER LABORATORY, INC.

JOB SEPCO Plant McIntosh

DATE 5/6/98

COMPLETION REPORT OF WELL No. GWC-7

PROJECT: **SEPCO Plant McIntosh Landfill**
PROJECT NO: **1144-00-323**
PROJECT LOCATION: **Georgia**

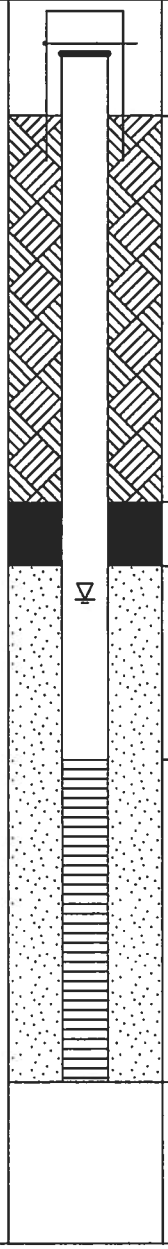
WATER LEVEL: **15.04 BTOC@TOB**

LATITUDE:
LONGITUDE:
TOP OF CASING ELEVATION:
DATUM:

DRILLING CONTRACTOR: **Cypress Bay**
DRILLING METHOD: **6-5/8" H.S.A.**
DATE DRILLED: **11/07/00**

LOGGED BY: **PG**

STRATA DESCRIPTION	SYMBOL	DEPTH (ft.)
SILTY SAND (SM) Brown, fine		0
		5
CLAYEY SAND (SC) Brown with layers of orange and dark gray silt		
SANDY CLAY (SC) Light gray, hard		10
Tan, soft to very soft		15
CLAY (CL/CH) Tan, soft to very stiff		20
Becoming sandy.		25
		30



DEPTH (ft.)	LEGEND	ELEVATION (ft.)
0.00	GS	
12.00	CG	
14.00	BS	
20.00	FP	
30.00	TD	

WELL CONSTRUCTION DETAILS

PROTECTIVE CASING
Diameter: **4" X 4" X 5'**
Type: **STEEL STAND-UP COVER**
Interval: **-3.5 - 1.5**

RISER CASING
Diameter: **2.067"**
Type: **PVC**
Interval: **-3.0-20.0**

GROUT
Type: **Cement**
Interval: **0-12**

SEAL
Type: **DSI Shur-Plug 3/8" Bentonite Chips**
Interval: **12-14**

FILTERPACK
Type: **DSI#2 Filter Sand**
Interval: **14-30**

SCREEN
Diameter: **4" X 2" X 10'**
Type: **PVC U-Pack Screen (0.01" slots)**
Interval: **20-30**

LEGEND

FILTER PACK
BENTONITE
CEMENT GROUT
CUTTINGS / BACKFILL
STATIC WATER LEVEL

TOC	TOP OF CASING
GS	GROUND SURFACE
BS	BENTONITE SEAL
FP	FILTER PACK
TSC	TOP OF SCREEN
BSC	BOTTOM OF SCREEN
TD	TOTAL DEPTH
CG	CEMENT GROUT

MONITORING WELL 00-323.GPJ S&ME.GDT 12/04/00

S&ME
ENGINEERING • TESTING
ENVIRONMENTAL SERVICES

905 E. 69th Street
Savannah, Georgia 31405

COMPLETION REPORT OF WELL No. GWC-7

Plant McIntosh Ash Disposal Site No. 3
Rincon, Georgia

Well ID	GWC-7
Location of well	
Names of drillers	Jim Peurifoy and Bill Kinard of Cypress Bay Geological Services
ID of drill rig	Foremost Mobile B-3300
Date/time of construction	11/7/00; 12pm - 5pm
Drilling method and drilling fluid	6-5/8" ID Hollow stem auger; no drilling mud
Borehole diameter	9.5 in.
Well casing diameter	2.067 in. ID
Well depth	30.0 ft.
Casing materials	ASTM rated Schedule 40 PVC
Screen material and design	Slotted, ASTM rate Schedule 40 PVC
Casing and screen joint type	Flush jointed; ASTM 480
Casing length	23.0 ft.
Screen slot size	0.01 in.
Screen slot length	0.15 ft.
Screen length	10 ft.
Filter pack material	DSI #2 Filter Sand
Filter pack volume	7.4 cu. ft.
Filter pack placement	Tremmied down augers
Sealant materials	DSI Shur-Plug 3/8 in. bentonite chips
Sealant volume	1 cu. ft.
Sealant placement method	Tremmied down augers
Grout volume	5.5 cu. ft.
Surface seal design/construction	4.5 ft. X 5 ft. X 6 in. thick concrete pad in ground
Well development procedure	Geotech centrifugal pump; surged with bailer and pumped 44 gallons at rate of 0.5 gpm
Type of protective cap	Hinged cover standpipe; push-on cap on well

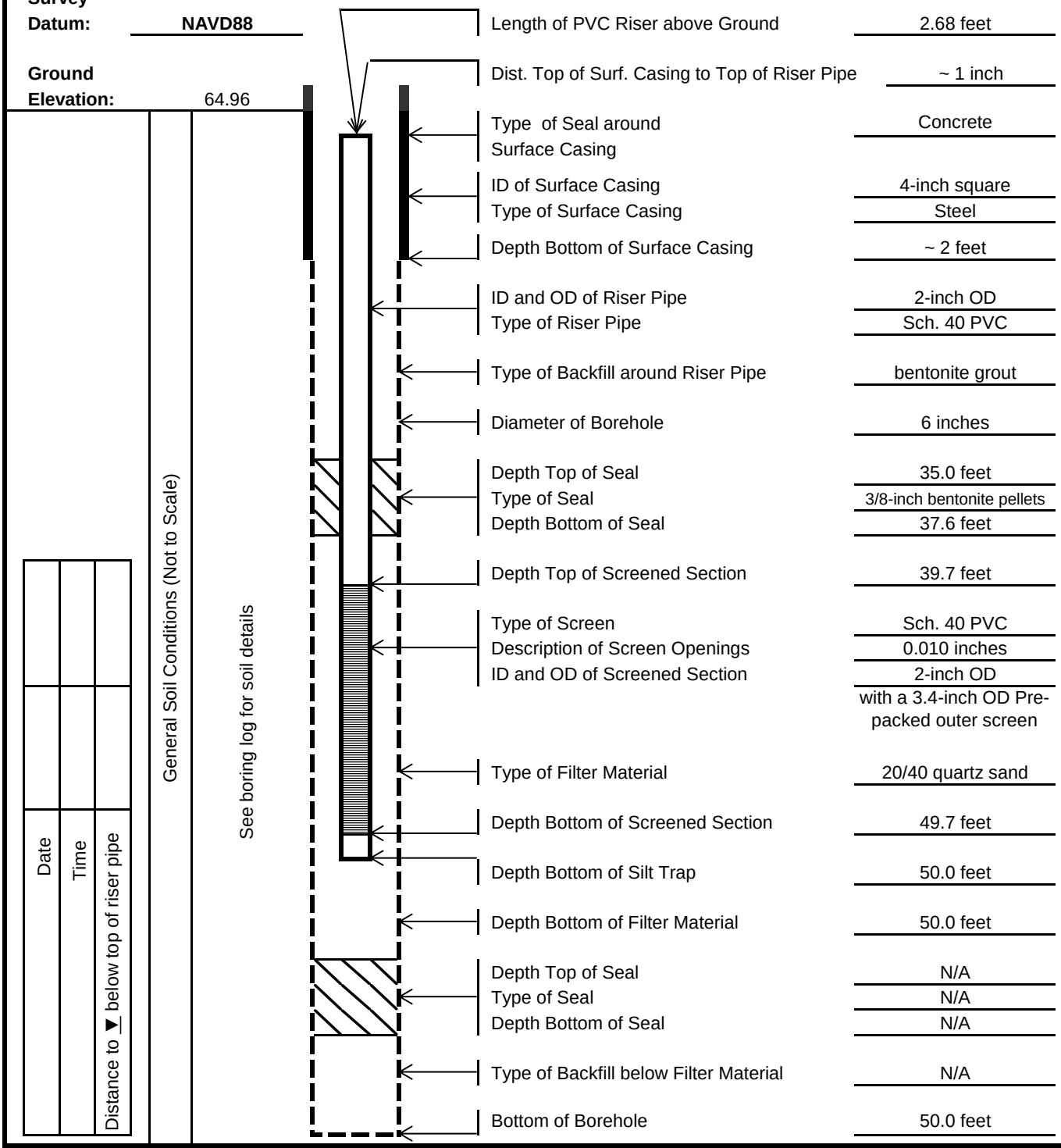
Groundwater Well Installation Log

PZ-1

Project	Plant McIntosh	**GEI Proj. No.**	1800205
City / Town	Effingham County, GA	**Location**	Inactive CCR Landfill No. 3
Client	Georgia Power Company		Between GWA-7 and GWC-6
Contractor	Cascade Drilling		
Driller	Ray Whitt **GEI Rep.** Peter Adams	**Install Date**	8/29/2018

Survey Datum: **NAVD88**

Ground Elevation: 64.96



Length of PVC Riser above Ground	2.68 feet
Dist. Top of Surf. Casing to Top of Riser Pipe	~ 1 inch
Type of Seal around Surface Casing	Concrete
ID of Surface Casing	4-inch square
Type of Surface Casing	Steel
Depth Bottom of Surface Casing	~ 2 feet
ID and OD of Riser Pipe	2-inch OD
Type of Riser Pipe	Sch. 40 PVC
Type of Backfill around Riser Pipe	bentonite grout
Diameter of Borehole	6 inches
Depth Top of Seal	35.0 feet
Type of Seal	3/8-inch bentonite pellets
Depth Bottom of Seal	37.6 feet
Depth Top of Screened Section	39.7 feet
Type of Screen	Sch. 40 PVC
Description of Screen Openings	0.010 inches
ID and OD of Screened Section	2-inch OD with a 3.4-inch OD Pre-packed outer screen
Type of Filter Material	20/40 quartz sand
Depth Bottom of Screened Section	49.7 feet
Depth Bottom of Silt Trap	50.0 feet
Depth Bottom of Filter Material	50.0 feet
Depth Top of Seal	N/A
Type of Seal	N/A
Depth Bottom of Seal	N/A
Type of Backfill below Filter Material	N/A
Bottom of Borehole	50.0 feet

Notes:

All depths are measured below ground surface (bgs).

Soil details recorded during the exploratory soil boring (soil boring ID: PZ-1) completed 6/29/18, drilled approximately 10 ft adjacent to well installation location.

GEI Consultants

BORING INFORMATION

LOCATION: Landfill No. 3, between GWA-7 and GWC-6

GROUND SURFACE EL. (ft): NM | **DATE START/END:** 6/29/2018 - 6/29/2018

VERTICAL DATUM: | **DRILLING COMPANY:** Cascade

TOTAL DEPTH (ft): 50.0 | **DRILLER NAME:** Richard Mooney

LOGGED BY: P. Adams | **RIG TYPE:** Geoprobe 7720DT

BORING

PZ-1

DRILLING INFORMATION

HAMMER TYPE: NA | **CASING I.D./O.D.:** 2 inch/ NA | **CORE BARREL TYPE:**

AUGER I.D/O.D.: NA / NA | **DRILL ROD O.D.:** NM | **CORE BARREL I.D./O.D.:** NA / NA

DRILLING METHOD: Direct Push

WATER LEVEL DEPTHS (ft): Not measured

ABBREVIATIONS:

Pen. = Penetration Length
Rec. = Recovery Length
RQD = Rock Quality Designation = Length of Sound Cores>4 in / Pen.,%
WOR = Weight of Rods
WOH = Weight of Hammer

S = Split Spoon Sample
C = Core Sample
U = Undisturbed Sample
SC = Sonic Core
DP = Direct Push Sample
HSA = Hollow-Stem Auger

Qp = Pocket Penetrometer Strength
Sv = Pocket Torvane Shear Strength
LL = Liquid Limit
PI = Plasticity Index
PID = Photoionization Detector
I.D./O.D. = Inside Diameter/Outside Diameter

NA, NM = Not Applicable, Not Measured
Blows per 6 in.: 140 lb hammer falling 30 inches to drive a 2-inch-O.D. split spoon sampler.

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
		DP1	0 to 5	60/48				(0-0.3'): TOPSOIL (0.3-2.5'): SILTY SAND (SM); ~70% fine sand, ~30% nonplastic to low plasticity fines. Medium dense. Moist. Grey.
	5	DP2	5 to 10	60/60				(2.5-10'): SANDY LEAN CLAY (CL); ~60% medium plasticity fines, ~40% fine sand. Very stiff. Moist. Grey.
	10	DP3	10 to 15	60/60				(10-12'): SILTY SAND (SM); ~70% fine to coarse sand, ~30% nonplastic to low plasticity fines. Loose. Wet. Grey. (12-15'): SANDY LEAN CLAY (CL); ~60% medium plasticity fines, ~40% fine sand. Medium stiff. Moist. Grey.
	15	DP4	15 to 20	60/60				(15-17'): SILTY SAND (SM); ~80% fine to coarse sand, ~20% nonplastic to low plasticity fines. Loose. Wet. Brown. (17-20'): FAT CLAY WITH SAND (CH); ~80% medium to high plasticity fines, ~20% fine sand. Hard. Moist. Grey.
	20	DP5	20 to 25	60/48				(20-28'): FAT CLAY (CH); ~90% high plasticity fines, ~10% fine sand. Very hard. Moist. Grey.

NOTES: Exploratory boring for proposed well installation. No well installed in this boring.

PROJECT NAME: Georgia Power Company - Plant McIntosh

CITY/STATE: Effingham County, GA

GEI PROJECT NUMBER: 1800205

GEI Consultants

LOCATION: Landfill No. 3, between GWA-7 and GWC-6
GROUND SURFACE EL. (ft): NM
VERTICAL DATUM:
DATE START/END: 6/29/2018 - 6/29/2018
DRILLING COMPANY: Cascade

BORING PZ-1

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
		DP6	25 to 30	60/60				
								(28-30'): SANDY LEAN CLAY (CL); ~70% medium plasticity fines, ~30% fine sand. Medium stiff. Moist. Grey-brown.
	30	DP7	30 to 35	60/60				(30-33'): WIDELY GRADED SAND (SW); ~90% fine to coarse sand, ~10% nonplastic fines. Dense. Wet. Light brown.
								(33-40'): CLAYEY SAND (SC); ~75.2% fine sand, ~24.8% medium plasticity fines. Medium dense. Wet. Brown.
	35	DP8	35 to 40	60/60				
	40	DP9	40 to 45	60/60		Recommended screen interval: 40-50'		(40-43'): WIDELY GRADED SAND WITH SILT (SW-SM); ~91.2% fine to coarse sand, ~8.8% nonplastic fines. Dense. Wet. Light brown.
								(43-45'): CLAYEY SAND (SC); ~60% fine sand, ~40% medium plasticity fines. Medium dense. Wet. Brown.
	45	DP10	45 to 50	60/60				(45-47'): WIDELY GRADED SAND (SW); ~90% fine to coarse sand, ~10% nonplastic fines. Loose. Wet. Light brown.
								(47-50'): SILTY SAND (SM); ~80% fine sand, ~20% nonplastic fines. Dense. Wet. Brown-orange and dark grey.
	50							Bottom of boring at depth 50 ft. Backfilled with bentonite chips and hydrated
	55							

NOTES: Exploratory boring for proposed well installation. No well installed in this boring.

PROJECT NAME: Georgia Power Company - Plant McIntosh
CITY/STATE: Effingham County, GA
GEI PROJECT NUMBER: 1800205

GEI Consultants

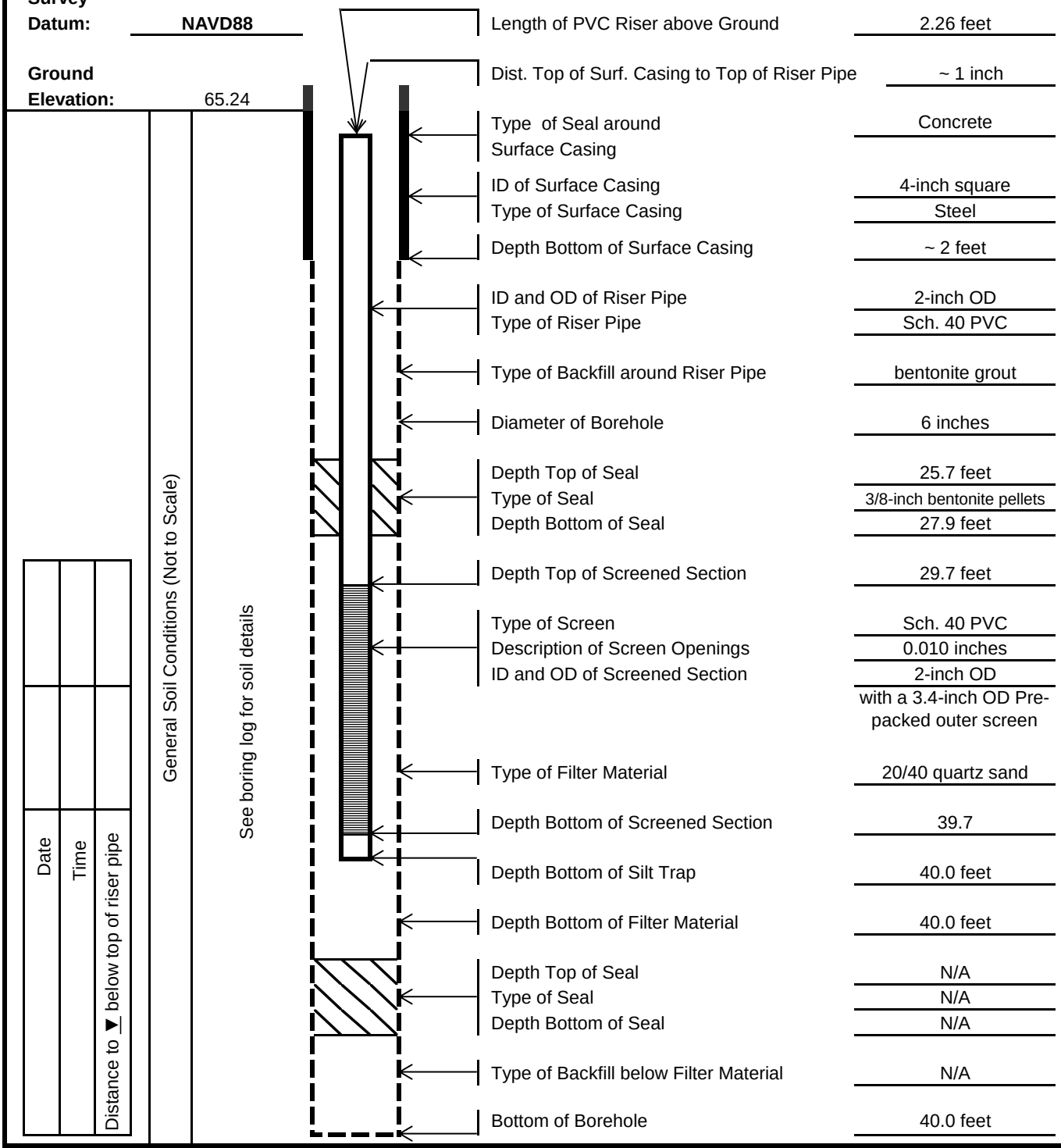
Groundwater Well Installation Log

PZ-2

Project	Plant McIntosh	**GEI Proj. No.**	1800205
City / Town	Effingham County, GA	**Location**	Inactive CCR Landfill No. 3
Client	Georgia Power Company		North of GWC-1
Contractor	Cascade Drilling		
Driller	Ray Whitt	**GEI Rep.** Peter Adams	**Install Date** 8/28/2018

Survey Datum: NAVD88

Ground Elevation: 65.24



Length of PVC Riser above Ground	2.26 feet
Dist. Top of Surf. Casing to Top of Riser Pipe	~ 1 inch
Type of Seal around Surface Casing	Concrete
ID of Surface Casing	4-inch square
Type of Surface Casing	Steel
Depth Bottom of Surface Casing	~ 2 feet
ID and OD of Riser Pipe	2-inch OD
Type of Riser Pipe	Sch. 40 PVC
Type of Backfill around Riser Pipe	bentonite grout
Diameter of Borehole	6 inches
Depth Top of Seal	25.7 feet
Type of Seal	3/8-inch bentonite pellets
Depth Bottom of Seal	27.9 feet
Depth Top of Screened Section	29.7 feet
Type of Screen	Sch. 40 PVC
Description of Screen Openings	0.010 inches
ID and OD of Screened Section	2-inch OD with a 3.4-inch OD Pre-packed outer screen
Type of Filter Material	20/40 quartz sand
Depth Bottom of Screened Section	39.7
Depth Bottom of Silt Trap	40.0 feet
Depth Bottom of Filter Material	40.0 feet
Depth Top of Seal	N/A
Type of Seal	N/A
Depth Bottom of Seal	N/A
Type of Backfill below Filter Material	N/A
Bottom of Borehole	40.0 feet

Notes:

All depths are measured below ground surface (bgs).

Soil details recorded during the exploratory soil boring (soil boring ID: PZ-2) completed 6/29/18, drilled approximately 5 ft adjacent to well installation location.

GEI Consultants

BORING INFORMATION

LOCATION: Landfill No. 3, north of GWC-1
GROUND SURFACE EL. (ft): NM
VERTICAL DATUM:
TOTAL DEPTH (ft): 50.0
LOGGED BY: P. Adams
DATE START/END: 6/29/2018 - 6/29/2018
DRILLING COMPANY: Cascade
DRILLER NAME: Richard Mooney
RIG TYPE: Geoprobe 7720DT

BORING

PZ-2

DRILLING INFORMATION

HAMMER TYPE: NA
AUGER I.D/O.D.: NA / NA
DRILLING METHOD: Direct Push
WATER LEVEL DEPTHS (ft): Not measured
CASING I.D./O.D.: 2 inch/ NA
DRILL ROD O.D.: NM
CORE BARREL TYPE:
CORE BARREL I.D./O.D.: NA / NA

ABBREVIATIONS:
Pen. = Penetration Length
Rec. = Recovery Length
RQD = Rock Quality Designation = Length of Sound Cores>4 in / Pen.,%
WOR = Weight of Rods
WOH = Weight of Hammer
S = Split Spoon Sample
C = Core Sample
U = Undisturbed Sample
SC = Sonic Core
DP = Direct Push Sample
HSA = Hollow-Stem Auger
Qp = Pocket Penetrometer Strength
Sv = Pocket Torvane Shear Strength
LL = Liquid Limit
PI = Plasticity Index
PID = Photoionization Detector
I.D./O.D. = Inside Diameter/Outside Diameter
NA, NM = Not Applicable, Not Measured
Blows per 6 in.: 140 lb hammer falling 30 inches to drive a 2-inch-O.D. split spoon sampler.

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
		DP1	0 to 5	60/48				(0-0.3'): TOPSOIL (0.3-7'): CLAYEY SAND (SC); ~70% fine sand, ~30% low to medium plasticity fines. Medium dense. Moist. Brown.
	5	DP2	5 to 10	60/60				(7-14'): SANDY LEAN CLAY (CL); ~60% low to medium plasticity fines, ~40% fine sand. Stiff. Moist. Grey with red mottling.
	10	DP3	10 to 15	60/60				(14-16'): CLAYEY SAND (SC); ~70% fine sand, ~30% low to medium plasticity fines. Medium dense. Wet. Light brown.
	15	DP4	15 to 20	60/60				(16-20'): SANDY LEAN CLAY (CL); ~70% low to medium plasticity fines. ~30% fine to coarse sand. Very stiff. Moist. Red-grey.
	20	DP5	20 to 25	60/60				(20-26.5'): FAT CLAY (CH); ~90% medium to high plasticity fines, ~10% fine sand. Very hard. Moist. Grey.

NOTES: Exploratory boring for proposed well installation. No well installed in this boring.

PROJECT NAME: Georgia Power Company - Plant McIntosh
CITY/STATE: Effingham County, GA
GEI PROJECT NUMBER: 1800205

GEI Consultants

LOCATION: Landfill No. 3, north of GWC-1
GROUND SURFACE EL. (ft): NM
VERTICAL DATUM:
DATE START/END: 6/29/2018 - 6/29/2018
DRILLING COMPANY: Cascade

BORING PZ-2

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
		DP6	25 to 30	60/60				
								(26.5-30'): SILTY SAND (SM); ~70% fine to coarse sand, ~30% nonplastic to low plasticity fines. Medium dense. Very moist. Grey.
	30	DP7	30 to 35	60/60		Recommended screen interval: 30-40'		(30-36'): WIDELY GRADED SAND WITH SILT (SW-SM); ~89.4% fine to coarse sand, ~10.6% nonplastic fines. Medium dense. Wet. Brown.
	35	DP8	35 to 40	60/60				
								(36.38.5'): CLAYEY SAND (SC); ~65.4% fine to coarse sand, ~34.6% low to medium plasticity fines. Dense. Wet. Brown-red.
								(38.5-41'): SILTY SAND (SM); ~80% fine to coarse sand, ~20% nonplastic fines. Dense. Wet. Grey with brown mottling.
	40	DP9	40 to 45	60/60				
								(41-45'): CLAYEY SAND (SC); ~70% fine to coarse sand, ~40% low to medium plasticity fines. Medium dense. Wet. Grey.
	45	DP10	45 to 50	60/60				(45-50'): SILTY SAND (SM); ~80% fine to coarse sand, ~20% nonplastic fines. Medium dense. Wet. Brown.
	50							Bottom of boring at depth 50 ft. Backfilled with bentonite chips and hydrated
	55							

NOTES: Exploratory boring for proposed well installation. No well installed in this boring.

PROJECT NAME: Georgia Power Company - Plant McIntosh
CITY/STATE: Effingham County, GA
GEI PROJECT NUMBER: 1800205

GEI Consultants

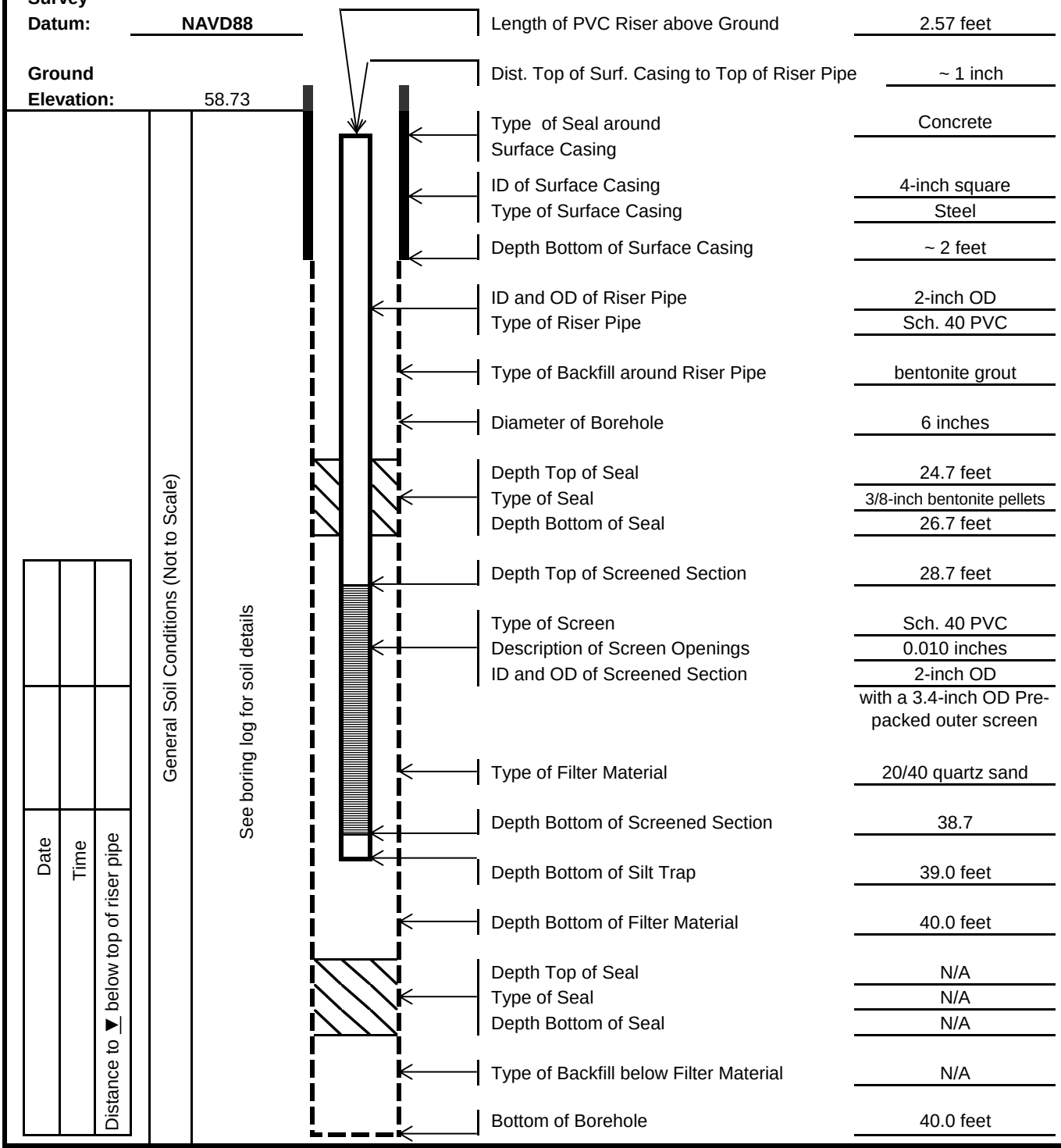
Groundwater Well Installation Log

PZ-3

Project	Plant McIntosh	**GEI Proj. No.**	1800205
City / Town	Effingham County, GA	**Location**	Inactive CCR Landfill No. 3
Client	Georgia Power Company		Between GWA-4 and GWA-5
Contractor	Cascade Drilling		
Driller	Ray Whitt **GEI Rep.** Peter Adams	**Install Date**	8/30/2018

Survey Datum: **NAVD88**

Ground Elevation: 58.73



Length of PVC Riser above Ground	2.57 feet
Dist. Top of Surf. Casing to Top of Riser Pipe	~ 1 inch
Type of Seal around Surface Casing	Concrete
ID of Surface Casing	4-inch square
Type of Surface Casing	Steel
Depth Bottom of Surface Casing	~ 2 feet
ID and OD of Riser Pipe	2-inch OD
Type of Riser Pipe	Sch. 40 PVC
Type of Backfill around Riser Pipe	bentonite grout
Diameter of Borehole	6 inches
Depth Top of Seal	24.7 feet
Type of Seal	3/8-inch bentonite pellets
Depth Bottom of Seal	26.7 feet
Depth Top of Screened Section	28.7 feet
Type of Screen	Sch. 40 PVC
Description of Screen Openings	0.010 inches
ID and OD of Screened Section	2-inch OD with a 3.4-inch OD Pre-packed outer screen
Type of Filter Material	20/40 quartz sand
Depth Bottom of Screened Section	38.7
Depth Bottom of Silt Trap	39.0 feet
Depth Bottom of Filter Material	40.0 feet
Depth Top of Seal	N/A
Type of Seal	N/A
Depth Bottom of Seal	N/A
Type of Backfill below Filter Material	N/A
Bottom of Borehole	40.0 feet

Notes:

All depths are measured below ground surface (bgs).

Soil details recorded during the exploratory soil boring (soil boring ID: PZ-3) completed 6/30/18, drilled approximately 10 ft adjacent to well installation location.

GEI Consultants

BORING INFORMATION

LOCATION: Landfill No. 3, between GWA-4 and GWA-5
GROUND SURFACE EL. (ft): NM
VERTICAL DATUM:
TOTAL DEPTH (ft): 40.0
LOGGED BY: P. Adams
DATE START/END: 6/30/2018 - 6/30/2018
DRILLING COMPANY: Cascade
DRILLER NAME: Richard Mooney
RIG TYPE: Geoprobe 7720DT

BORING

PZ-3

DRILLING INFORMATION

HAMMER TYPE: NA
AUGER I.D/O.D.: NA / NA
DRILLING METHOD: Direct Push
WATER LEVEL DEPTHS (ft): Not measured
CASING I.D./O.D.: 2 inch/ NA
DRILL ROD O.D.: NM
CORE BARREL TYPE:
CORE BARREL I.D./O.D.: NA / NA

ABBREVIATIONS:
Pen. = Penetration Length
Rec. = Recovery Length
RQD = Rock Quality Designation = Length of Sound Cores>4 in / Pen.,%
WOR = Weight of Rods
WOH = Weight of Hammer
S = Split Spoon Sample
C = Core Sample
U = Undisturbed Sample
SC = Sonic Core
DP = Direct Push Sample
HSA = Hollow-Stem Auger
Qp = Pocket Penetrometer Strength
Sv = Pocket Torvane Shear Strength
LL = Liquid Limit
PI = Plasticity Index
PID = Photoionization Detector
I.D./O.D. = Inside Diameter/Outside Diameter
NA, NM = Not Applicable, Not Measured
Blows per 6 in.: 140 lb hammer falling 30 inches to drive a 2-inch-O.D. split spoon sampler.

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
		DP1	0 to 5	60/48				(0-0.3'): TOPSOIL (0.3-6'): SILTY SAND (SM); ~80% fine sand, ~20% nonplastic to low plasticity fines. Medium density. Moist. Grey.
	5	DP2	5 to 10	60/60				(6-10'): SANDY LEAN CLAY (CL); ~70% medium plasticity fines, ~30% fine sand. Stiff. Moist. Grey-red.
	10	DP3	10 to 15	60/60				(10-16'): FAT CLAY (CH); ~85% high plasticity fines, ~15% fine sand. Hard. Moist. Grey.
	15	DP4	15 to 20	60/60				(16-25'): CLAYEY SAND (SC); ~70% fine to coarse sand, ~30% medium plasticity fines. Medium dense. Moist. Grey-brown.
	20	DP5	20 to 25	60/60				

NOTES: Exploratory boring for proposed well installation. No well installed in this boring.

PROJECT NAME: Georgia Power Company - Plant McIntosh
CITY/STATE: Effingham County, GA
GEI PROJECT NUMBER: 1800205

GEI Consultants

LOCATION: Landfill No. 3, between GWA-4 and GWA-5
GROUND SURFACE EL. (ft): NM **DATE START/END:** 6/30/2018 - 6/30/2018
VERTICAL DATUM: **DRILLING COMPANY:** Cascade

BORING PZ-3

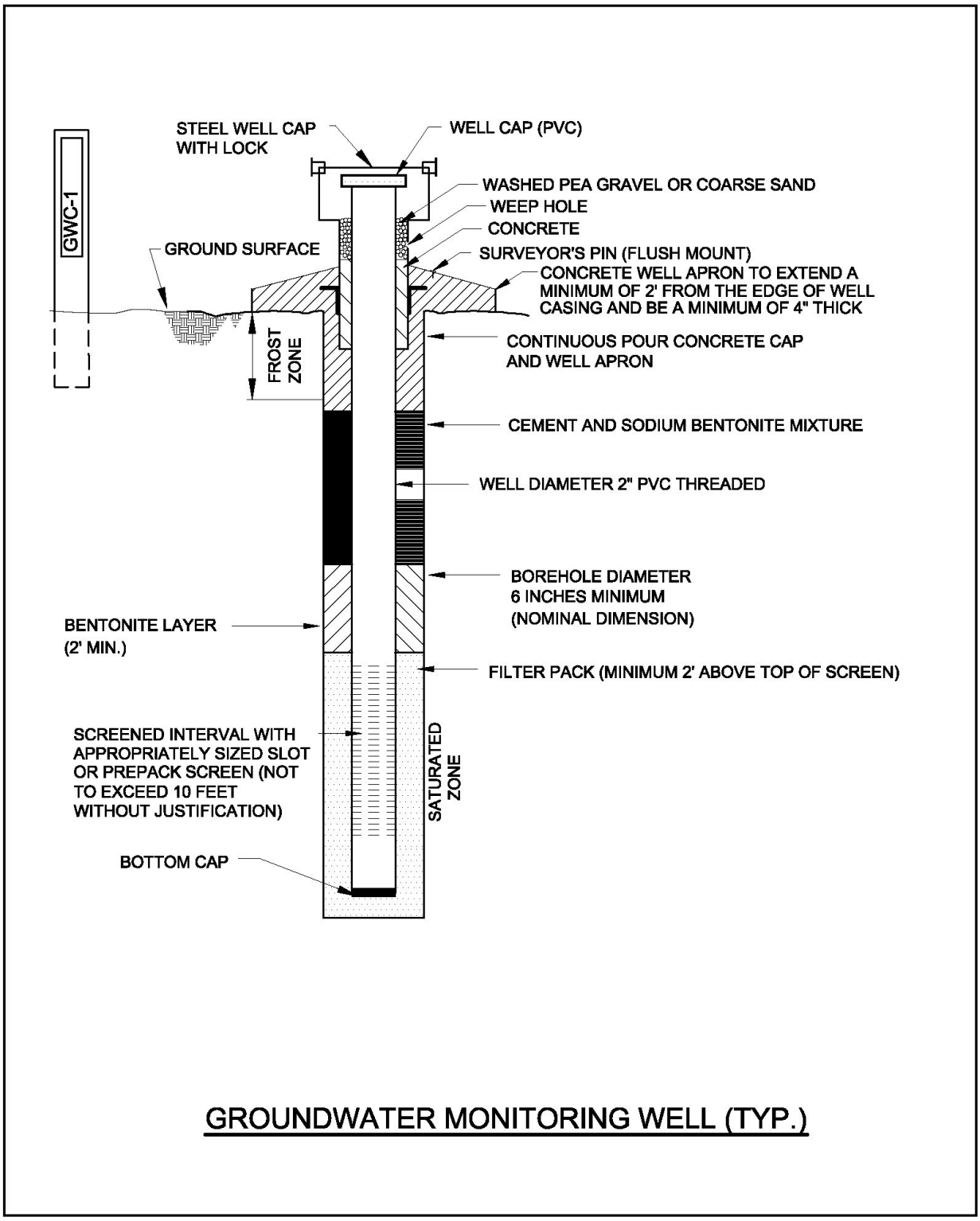
Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
	30	DP6	25 to 30	60/60				(25-30'): SILTY SAND (SM); ~70% fine to coarse sand, ~30% nonplastic fines. Medium dense. Wet. Brown.
	35	DP7	30 to 35	60/60		Recommended screen interval: 30-40'		(30-35'): CLAYEY SAND (SC); ~81.8% fine to coarse sand, ~18.2% nonplastic to low plasticity fines. Medium dense. Wet. Brown.
	40	DP8	35 to 40	60/60				(35-40'): WIDELY GRADED SAND WITH SILT (SW-SM); ~89.8% fine to coarse sand, ~10.2% nonplastic fines. Medium dense. Wet. Brown.
	45							Bottom of boring at depth 40 ft. Backfilled with bentonite chips and hydrated
	50							
	55							

NOTES: Exploratory boring for proposed well installation. No well installed in this boring.

PROJECT NAME: Georgia Power Company - Plant McIntosh
CITY/STATE: Effingham County, GA
GEI PROJECT NUMBER: 1800205

GEI Consultants

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
    - ± 5% for specific conductance (conductivity)
    - ±10% or ±0.2 mg/L (whichever is greater) for DO where DO>0.5mg/L. If DO<0.5mg/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.