Contract No:

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Installation of Lysimeters Near Engineered Trench 3, Slit Trench 8, and Slit Trench 9

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May 2023

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ACKNOWLEDGEMENTS

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EXECUTIVE SUMMARY

Nine new lysimeter stations were installed at the E-Area Low Level Waste Facility (ELLWF). Six lysimeter stations were installed near Engineered Trench 3 (ET3), one installed near Slit Trench 8 (ST8), and two installed near Slit Trench 9 (ST9) as shown in Figure ES-1. Two lysimeters were installed at each station at the depths shown in Table ES-1. Lysimeter placements were based on borehole lithology and were comparable to existing nearby lysimeter stations. The deepest lysimeter at each of the new lysimeter stations was designated as the action-level lysimeter.

Following installation, the lysimeters were purged and placed under vacuum for sampling. Sampling occurred in April 2023. Analytical results from the sampling will be provided in the Spring 2023 Lysimeter Tritium Data technical memo and the 2023 Annual Summary Report.

With the addition of the new lysimeters at ET3, ST8, and ST9, the vadose zone monitoring system is now comprised of 327 active lysimeters at 111 lysimeter stations. There are 102 action-level lysimeters at 111 stations.

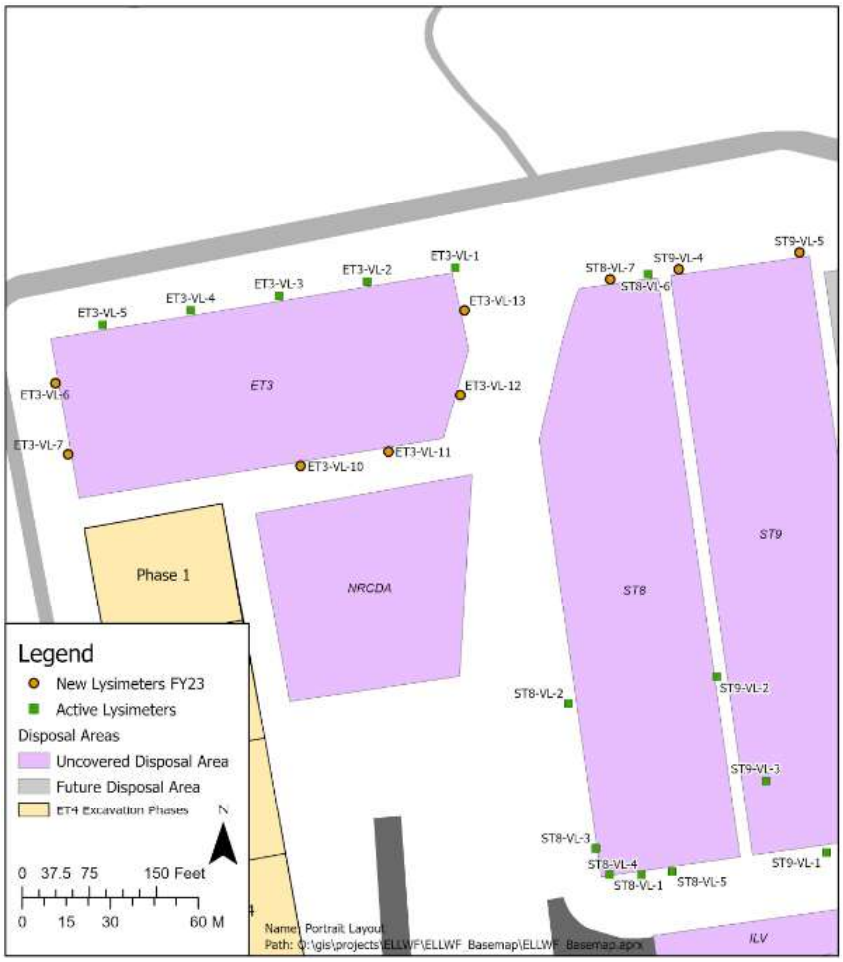

Figure ES-1. Layout of Lysimeter Stations Installed in FY23.

Table ES-1. Construction Details for FY23 Lysimeter Stations.

Station Name	SRS North (ft)	SRS East (ft)	Ground Elevation (ft msl)	Lysimeter Elevation (ft msl)	Lysimeter Depth (ft bgs)	Action Level (pCi/ml)
ET3-VL-6 (238)	78685.32	57503.89	276.22	238	38	-
ET3-VL-6 (219)[1]	78685.32	57503.89	276.22	219	57	43.7
ET3-VL-7 (240)	78613.77	57465.83	278.08	240	38	-
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ST9-VL-5 (237)	78313.77	58261.45	276.12	237	39	-
ST9-VL-5 (220)[1]	78313.77	58261.45	276.12	220	56	46.9

[1]Action-Level Lysimeter

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

AL	Action Level
bgs	Below ground surface
CIG	Component-In-Grout
CPT	Cone Penetrometer Technology
DOE	Department of Energy
ELLWF	E-Area Low Level Waste Facility
ET	Engineered Trench
ft	Feet
GSA	General Separations Area
ILV	Intermediate Level Vault
LAWV	Low Activity Waste Vault
msl	Mean sea level
MWMF	Mixed Waste Management Facility
NRCDA	Naval Reactor Component Disposal Area
PA	Performance Assessment
pCi/ml	Picocurie per milliliter
PVC	Polyvinyl chloride
SRNL	Savannah River National Laboratory
SRNS	Savannah River Nuclear Solutions
SRS	Savannah River Site
ST	Slit Trench
SWM	Solid Waste Management
WSRC	Westinghouse Savannah River Company

1.0 Introduction

The E-Area Low-Level Waste Facility (ELLWF) is a radioactive waste disposal facility at the Savannah River Site (Figure 1). It is approximately 200 acres in size with a 100m buffer zone that extends out to the point of compliance. Disposal units within the footprint of the low-level waste facilities include the Slit Trenches (ST), Engineered Trenches (ET), Component-in-Grout Trenches (CIG), the Low-Activity Waste Vault (LAWV), the Intermediate-Level Vault (ILV), and the Naval Reactor Component Disposal Area (NRCDA) (WSRC, 2007). The facility provides disposal capacity for solid, low-level, non-hazardous radioactive waste and has been accepting waste since 1994 (WSRC, 2007). The ELLWF is situated within the General Separations Area (GSA) of the Savannah River Site (SRS) immediately north of the Mixed Waste Management Facility (MWMF).

The ELLWF is regulated under Department of Energy (DOE) Order 435.1 (DOE 1999) and is operated in accordance with a DOE approved Performance Assessment (PA) (WSRC, 2007). The E-Area Performance Monitoring Program provides assurance that the facility is operating as expected and predicted by the PA. As part of the Performance Monitoring Program, SRS operates a vadose zone monitoring system comprised of suction lysimeters to monitor the release of tritium from the disposal trenches. At most of the lysimeter stations, the deepest or second deepest lysimeter is designated as the Action-Level (AL) lysimeter.

In 2016 two lysimeter stations were installed on the north rim of ET3 amid ongoing waste disposal operations. In 2020, three additional lysimeter stations were added to the north rim of ET3. In 2022, the remaining disposal capacity of ET3 was filled and the trench was closed.

The closure of ET3 provided access to install six lysimeter stations along the remaining perimeter of ET3 as shown in Figure 2. A portion of ET3 is located north of ET4 and was not accessible for lysimeter installations in FY2023 due to ongoing waste disposal activities in ET4. Two lysimeter stations (ET3-VL-8 and ET3-VL-9) will be installed in this area in the future. In addition to the ET3 lysimeter stations, one lysimeter station was installed on the north end of Slit Trench 8 (ST8) and two lysimeter stations were installed on the north end of Slit Trench 9 (ST9).

The objective of this project was to install a total of nine vertical lysimeter stations along the perimeters of ET3, ST8, and ST9. This report provides the construction details and layout for the new lysimeters.

2.0 Summary of Field Activities

Drilling and lysimeter installation occurred during February and March 2023. Drilling services were provided by Cascade Environmental, LLC. Technical oversight of the drilling activities was provided by SRNL and SRNS personnel. Nine new lysimeter stations were installed including six stations along the perimeter of ET3, one station on the north end of ST8, and two stations on the north end of ST9. Figure 2 provides the layout of the lysimeter stations. Table 1 provides the construction details of the lysimeter stations.

2.1 Coring and Lithologic Logging

Prior to the start of drilling, a CPT push for lithology was conducted at seven of nine locations to assist with the placement of lysimeters. It was originally planned to conduct a CPT push at all lysimeter stations; however, excessive rainfall made ET3-VL-7 and ST9-VL-5 inaccessible to the CPT truck. The lithologic data obtained from the CPT pushes are plotted in Figure 3 through Figure 9. The vendor supplied CPT logs and CPT Field Reports are presented in Appendix A.

Vertical borings were completed at each lysimeter location using sonic drilling technology (Figure 10). Sonic drilling involves using a dual cased setup and high frequency mechanical vibration to collect continuous core. At each location, four-inch diameter steel casing was used to collect core through six-inch diameter steel override casing. All boreholes were dry drilled meaning no drilling mud or water was used to advance the casing or to remove cuttings from the borehole. Prior to drilling, each borehole was hand augured to a depth of 6 ft bgs. Then, each borehole was continuously cored from ground surface to total depth (~70 ft bgs). The resulting core was visually described, and detailed logs were documented for each borehole (Appendix B).

2.2 Lysimeter Installation

The lysimeters installed at the new stations were SoilMoisture® Equipment Corporation Model Number 1920F1 vacuum soil water samplers (Figure 11). The model 1920F1 suction lysimeter is constructed from 1.5" diameter polyvinyl chloride (PVC) and is supplied by the vendor completely assembled. The lysimeter is fitted with a 2-bar porous ceramic cup on one end and two 1/4" service ports on the other end. Polyethylene access tubes are used to apply pressure/vacuum (black tubing) and to collect water samples (green tubing). These tubes connect to the service ports on the lysimeter and extend from the lysimeter to above ground surface through 1-inch diameter PVC riser pipe. The riser pipe connects to the body of the lysimeter with a standard PVC reducing coupling.

The lysimeter assemblies (lysimeter, tubing, and riser pipe) were completely assembled at the ground surface prior to installation. The porous ceramic cup on each lysimeter was soaked in water for a minimum of two hours to saturate the ceramic cup (Figure 12). Once saturated, the lysimeters and connections were leak checked by applying pressure to the pressure/vacuum port. After the integrity of the lysimeter, tubing, and fittings were verified by leak check, the first section of 1-inch PVC riser pipe was connected to the lysimeter body using a reducing coupling. The lysimeter assembly was then lowered in the borehole and riser pipe was added as needed to reach the target depth.

Figure 13 presents a schematic diagram of lysimeter completion for the ET3, ST8, and ST9 lysimeter stations. Installation reports for all lysimeters are presented in Appendix C. At each lysimeter station, both the shallow and deep lysimeters were installed within the same borehole (Figure 13). Each borehole was drilled to a total depth of approximately 70 ft bgs and backfilled with bentonite hole plug and pellets to target depth. A slurry of silica flour was then added to ensure good contact between the ceramic cup of the lysimeter and surrounding soil (Figure 14). The lysimeter was placed into the borehole and firmly seated into the silica flour. Filter sand was

backfilled to cover the lysimeter in the borehole. The shallow lysimeter was installed in a similar manner as shown in Figure 13. A protective casing (6-inch PVC) was installed at the ground surface along with a concrete surface seal and pad. The final layout of the lysimeter stations is provided in Appendix D.

2.3 Lysimeter Placement

The conceptual model for placement of the new lysimeters at ET3 was to maintain consistency with the existing nearby lysimeter stations while honoring the local lithology observed in each new borehole. The existing nearby lysimeter stations each have two lysimeters with the deeper of the two lysimeters being designated the action level lysimeter. The strategy for placement was to locate the new lysimeters in sandy zones above silt/clay layers while maintaining consistency with the elevations of the existing lysimeters. This may improve the odds of collecting samples due to perched water at this interface. Lysimeters were not placed near the water table and capillary fringe due to the possibility they could be influenced by contaminants in the water table aquifer. The water table near ET3/ST8/ST9 was approximately 75 ft bgs surface at the time of installation.

The CPT logs (Appendix A) and core description (Appendix B) were all used to select the depth of installation for each lysimeter. More weight was given to the core description for lysimeter placement in cases where the logging results and the core description differed. The placement of the new lysimeters at each lysimeter station is shown in Figure 3 through Figure 9. CPT data were not obtained for ET3-VL-7 and ST9-VL-5. As a result, lysimeter placement for ET3-VL-7 is shown with ET3-VL-6 (Figure 3) and lysimeter placement for ST9-VL-5 is shown with ST9-VL-4 (Figure 9). Construction details for all lysimeters are presented in Table 1. Lysimeter depths were chosen to target intervals of likely water bearing sands underlain by less permeable silts or clays.

For ET3-VL-6, lysimeters were installed at 38 ft bgs (238 ft msl) and 57 ft bgs (219 ft msl) as shown in Figure 3. For ET3-VL-7, lysimeters were installed at 38 ft bgs (240 ft msl) and 58 ft bgs (220 ft msl) as shown in Figure 3. Each shallow lysimeter was placed based on the CPT log and field observation of soil cores. Good agreement is noted between the core description logs and the CPT log for ET3-VL-6. The shallow lysimeters were placed at 38 ft bgs for ET3-VL-6 and ET3-VL-7 and located above a competent silt layer observed on both in the field and CPT logs. The deep lysimeters for ET3-VL-6 and ET3-VL-7 were placed at 57 ft bgs and 58 ft bgs respectively and located above a clay layer observed from 58 to 67 ft bgs (Figure 3). This layer is noted in the core description at 57 ft bgs (Appendix B, Page B-9).

For ET3-VL-10, lysimeters were installed at 38 ft bgs (242 ft msl) and 58 ft bgs (222 ft msl) as shown in Figure 4. For ET3-VL-10, the CPT log is inconsistent with the core description (Appendix B). The CPT log shows shallow intervals of sand with little evidence of a confining layer to approximately 50 ft bgs. The shallow lysimeter at ET3-VL-10 was placed at 38 ft bgs according to field coring observation above a layer of firm silt and within a loose sand layer that is noted in the core description (Appendix B, Page B-11).

The deep lysimeter at ET3-VL-10 was placed at 58 ft bgs based primarily on the core description (Appendix B, Page B-12) though the CPT log for this location, shown in Figure 4, generally corresponds to field observations. From the core description, the sediments in this interval are

comprised of highly stratified sand and silt/clay. The lysimeter was placed in a sandier zone as indicated in the core description (Appendix B, Page B-12).

The ET3-VL-11, lysimeters were installed at 39 ft bgs (241 ft msl) and 59 ft bgs (221 ft msl) as shown in Figure 5. For ET3-VL-11, the CPT log and core description (Appendix B) are broadly consistent. The shallow lysimeter at ET3-VL-11 was placed at 39 ft bgs according to field coring observation above a layer of consolidated silt and within a loose sand layer that is noted in the core description (Appendix B, Page B-14).

The deep lysimeter at ET3-VL-11 was placed at 59 ft bgs based primarily on the core description (Appendix B, Page B-17). The lysimeter was placed in a sandier zone underlain by clay rich silt. This placement depth is in line with the other lysimeters installed during this event.

For ET3-VL-12, lysimeters were installed at 45 ft bgs (235 ft msl) and 57 ft bgs (223 ft msl) as shown in Figure 6. For ET3-VL-12, the CPT log is generally consistent with the core description (Appendix B). The shallow lysimeter at ET3-VL-12 was placed at 45 ft bgs according to field coring observation, above a layer of firm silt and within a loose sand layer that is noted in the core description (Appendix B, Page B18).

The deep lysimeter at ET3-VL-12 was placed at 58 ft bgs based primarily on the core description (Appendix B, Page 20). The CPT log for this location, shown in Figure 6, corresponds well to field observations. The deep lysimeter at ET3-VL-12 was placed in a loose sand layer just above a dense clay layer beginning at 59 ft bgs, as indicated in the core description (Appendix B, Page B-20).

For ET3-VL-13, lysimeters were installed at 45 ft bgs (232 ft msl) and 59 ft bgs (218 ft msl) as shown in Figure 7. For ET3-VL-13, the CPT log is consistent with the core description (Appendix B). The CPT log shows alternating layers of density that indicate interbedded layers of sand and silt/clay to depth. The shallow lysimeter at ET3-VL-13 was placed at 45 ft bgs according to field coring observation, above a layer of silt and within a sand layer that is noted in the core description (Appendix B, Page B-22).

The deep lysimeter at ET3-VL-13 was placed at 59 ft bgs based on the CPT log (Figure 7) and the core description (Appendix B, Page B-24). The lysimeter was placed in a sandier zone as indicated in the core description (Appendix B, Page B-24) above a denser layer of plastic clay.

Lysimeters at location ST8-VL-7 were installed at 39 ft bgs and 56 ft bgs as shown in Figure 8. The shallow lysimeter depth of 39 ft bgs was primarily informed by field core description above a small layer of hard silt layer seen at 40 ft bgs as noted in core logs (Appendix B, Page B-26). CPT logging for ST8-VL-8 also show evidence of this silt layer's presence.

The deep lysimeter at ST8-VL-7 was placed at 56 ft bgs. Both core description and CPT logging agree that a dense clay layer starting at approximately 61 ft bgs is overlain by loose sands from approximately 54 ft to 61 ft bgs. The interval of 56 ft bgs was chosen to target this sand layer.

For ST9-VL-4, lysimeters were installed at 38 ft bgs (238 ft msl) and 60 ft bgs (216 ft msl) as shown in Figure 9. For ST9-VL-5, lysimeters were installed at 39 ft bgs (237 ft msl) and 56 ft bgs

(220 ft msl) as shown in Figure 9. The shallow lysimeter was placed based on the CPT log and field observation of soil cores. Good agreement is noted between the core description logs and the CPT log for ST9-VL-4 and the descriptions for ST9-VL-4 and ST9-VL-5. Shallow lysimeters were placed at 38 ft bgs for ST9-VL-4 and 39 ft bgs at ST9-VL-5. Each shallow lysimeter was located above a competent silt layer observed on both the core description and CPT logs. The deep lysimeters for ST9-VL-4 and ST9-VL-5 were placed at 60 ft bgs and 56 ft bgs respectively and located above a clay layer observed in each core log (Appendix B, Pages B-30 and B-34).

3.0 Summary

Nine new lysimeter stations were installed at the E-Area Low Level Waste Facility (ELLWF). Six lysimeter stations were installed near Engineered Trench 3 (ET3), one installed near Slit Trench 8 (ST8), and two installed near Slit Trench 9 (ST9). Two lysimeters were installed at each station at the depths shown in Table ES-1. Lysimeter placements were based on borehole lithology and were comparable to existing nearby lysimeter stations. The deepest lysimeter at each of the new lysimeter stations was designated as the action-level lysimeter.

Following installation, the lysimeters were purged and placed under vacuum for sampling. Sampling occurred in April 2023. Analytical results from the sampling will be provided in the Spring 2023 Lysimeter Tritium Data technical memo and the 2023 Annual Summary Report.

With the addition of the new lysimeters at ET3, ST8, and ST9, the vadose zone monitoring system is now comprised of 327 active lysimeters at 111 lysimeter stations. There are 102 action-level lysimeters at 111 stations.

4.0 References

DOE, 1999. USDOE Order 435.1 Radioactive Waste Management Manual, U. S. Department of Energy, U.S. Department of Energy, Washington D.C., January 11, 2021.

WSRC, 2007. E-Area Low-Level Waste Facility DOE 435.1 Performance Assessment, WSRC-STI-2007-00306, Revision 0, Washington Savannah River Company, Aiken, SC, July 2008.

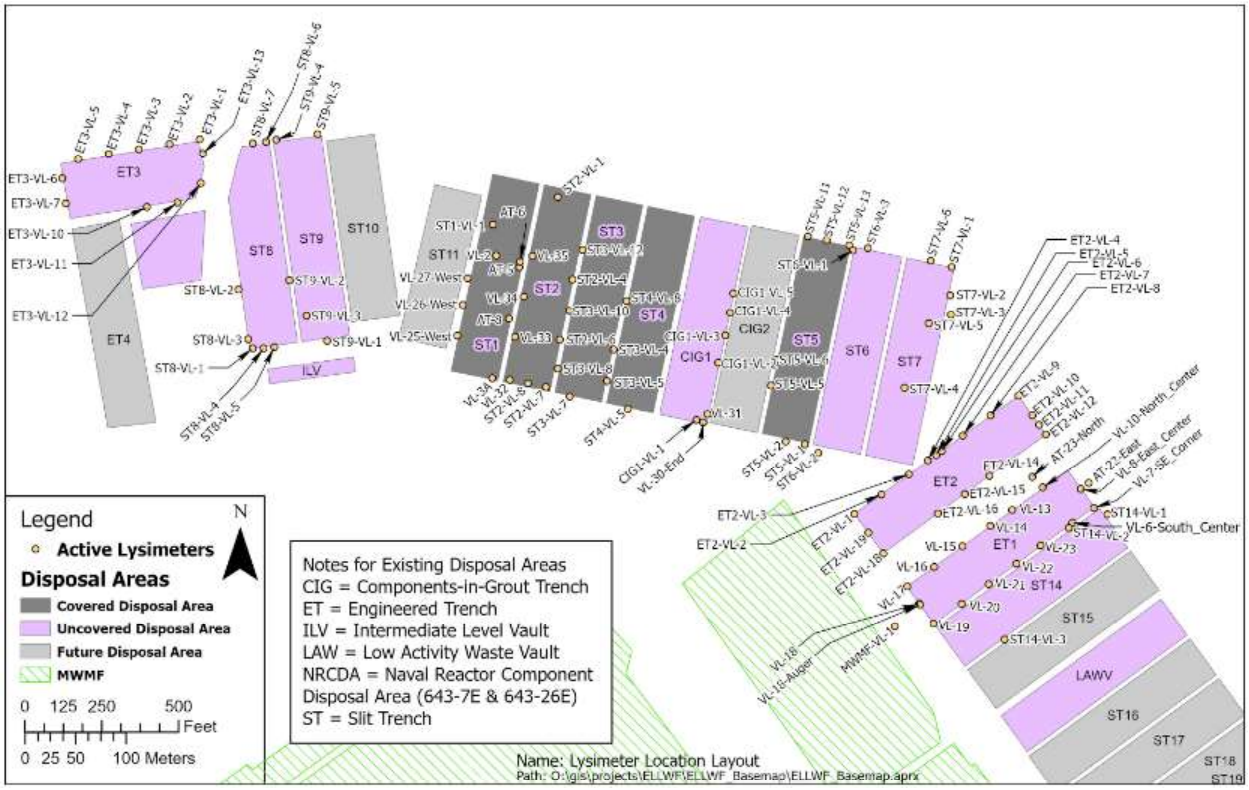

Figure 1. E-Area Low-Level Waste Facility.

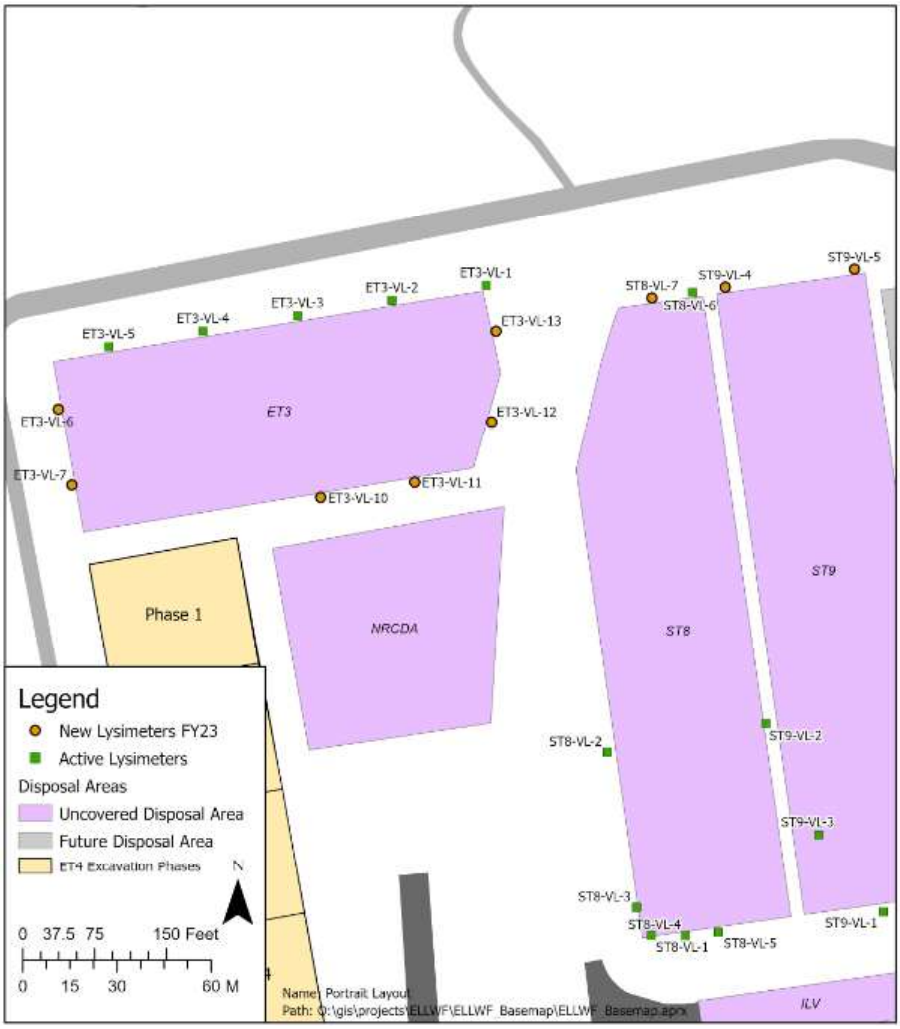

Figure 2. Layout of Lysimeter Stations Installed in FY23.

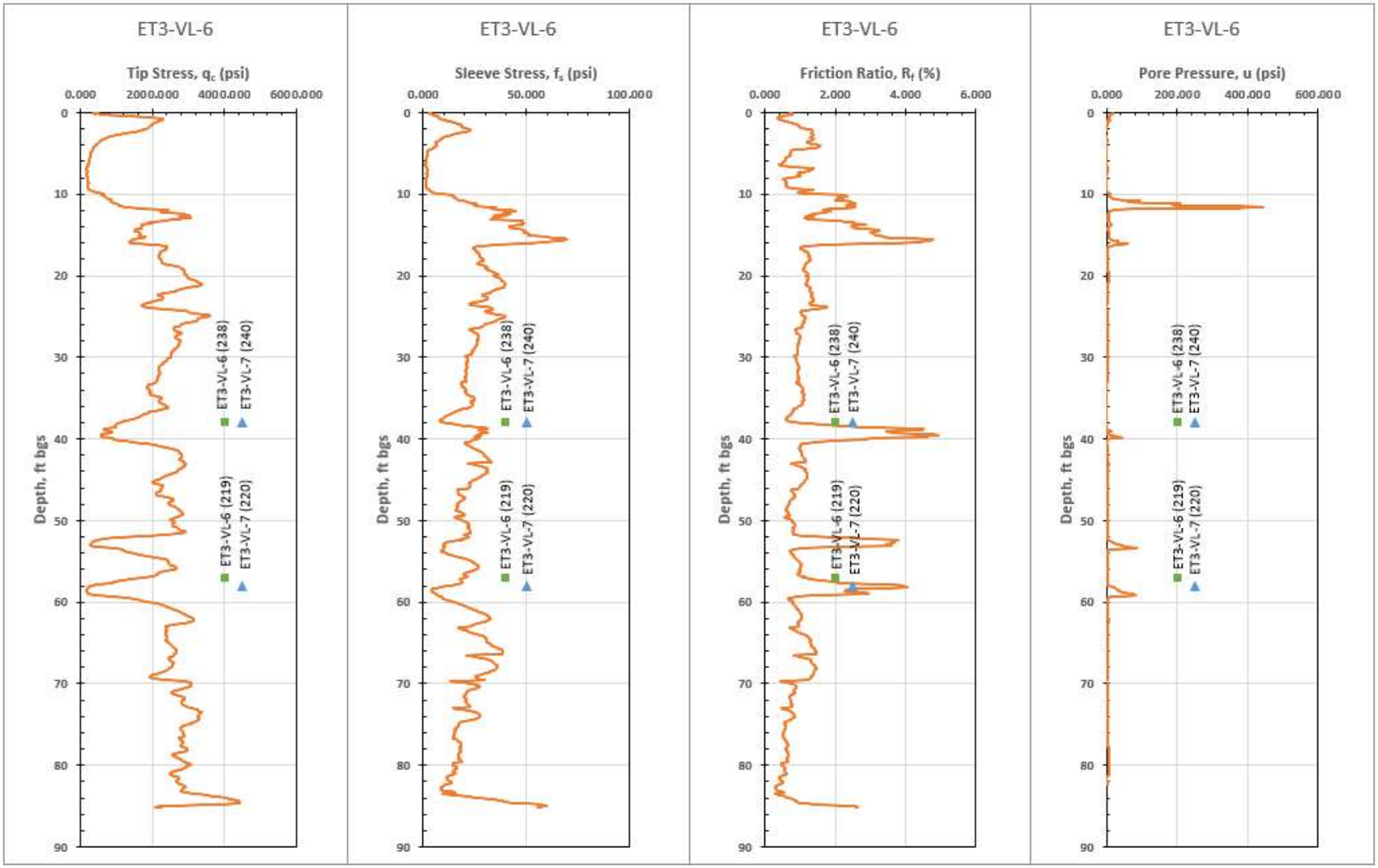

Figure 3. Lithologic Logs and Lysimeter Placement for ET3-VL-6 and ET3-VL-7

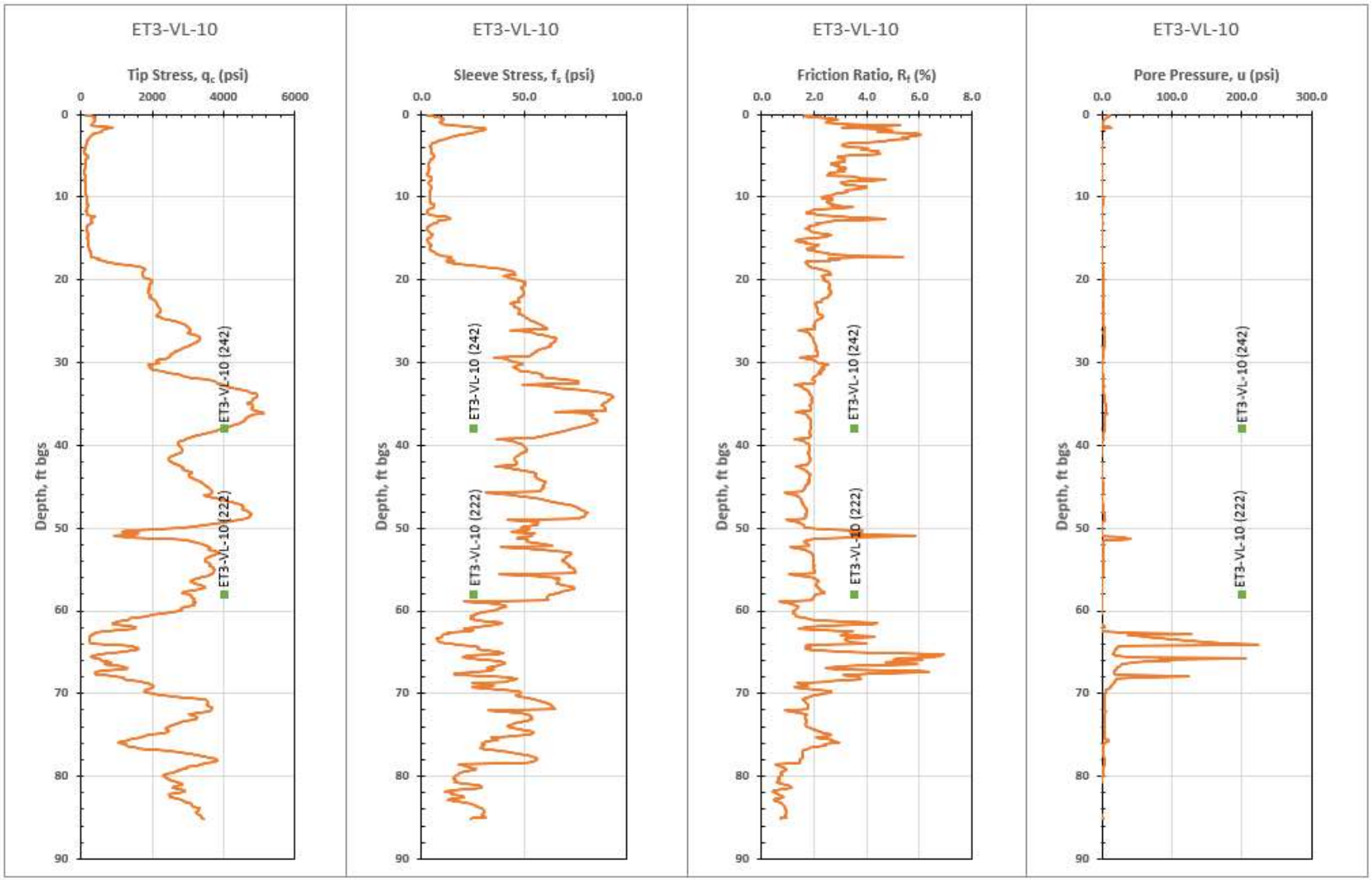

Figure 4. Lithologic Logs and Lysimeter Placement for ET3-VL-10

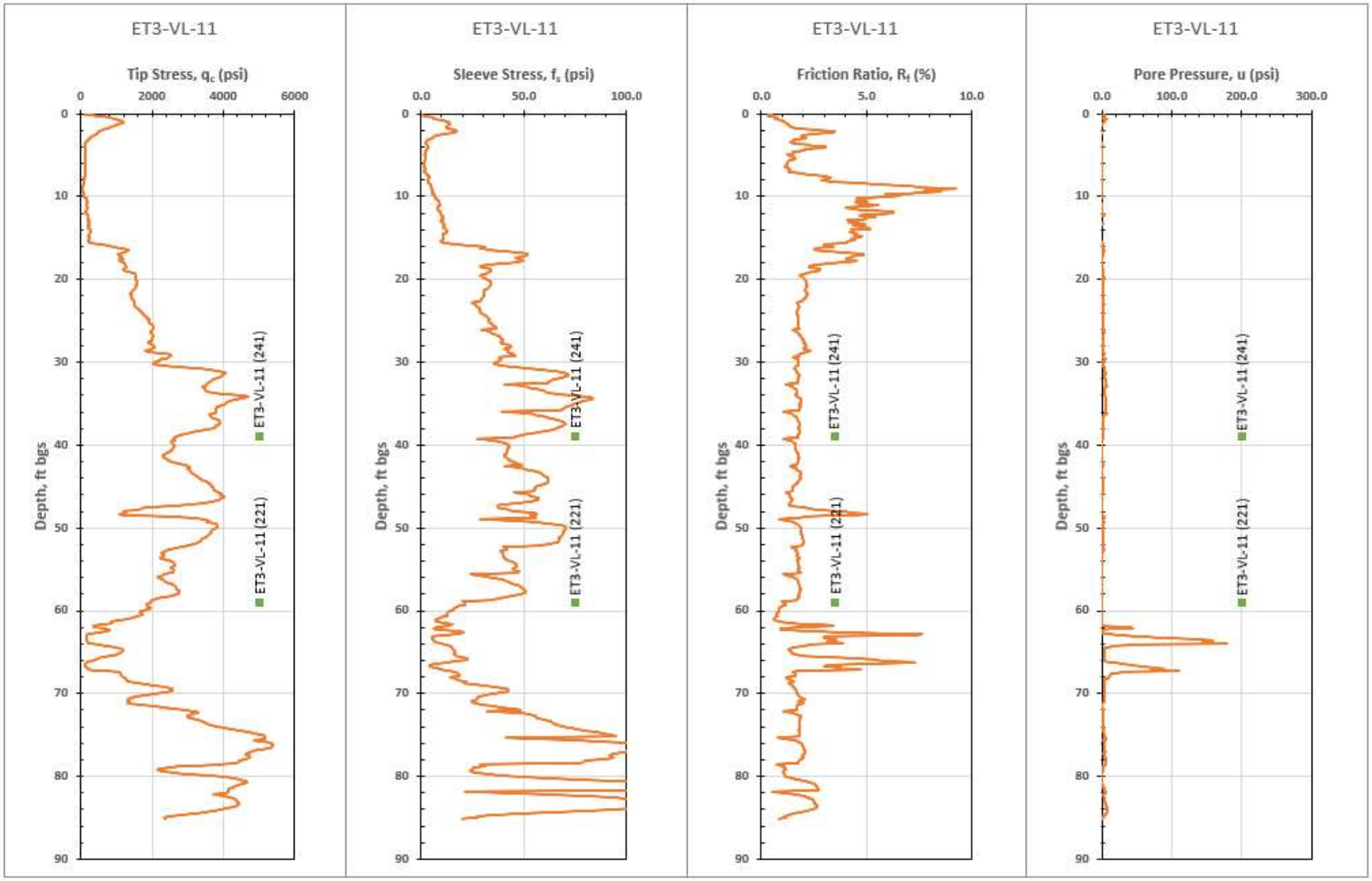

Figure 5. Lithologic Logs and Lysimeter Placement for ET3-VL-11

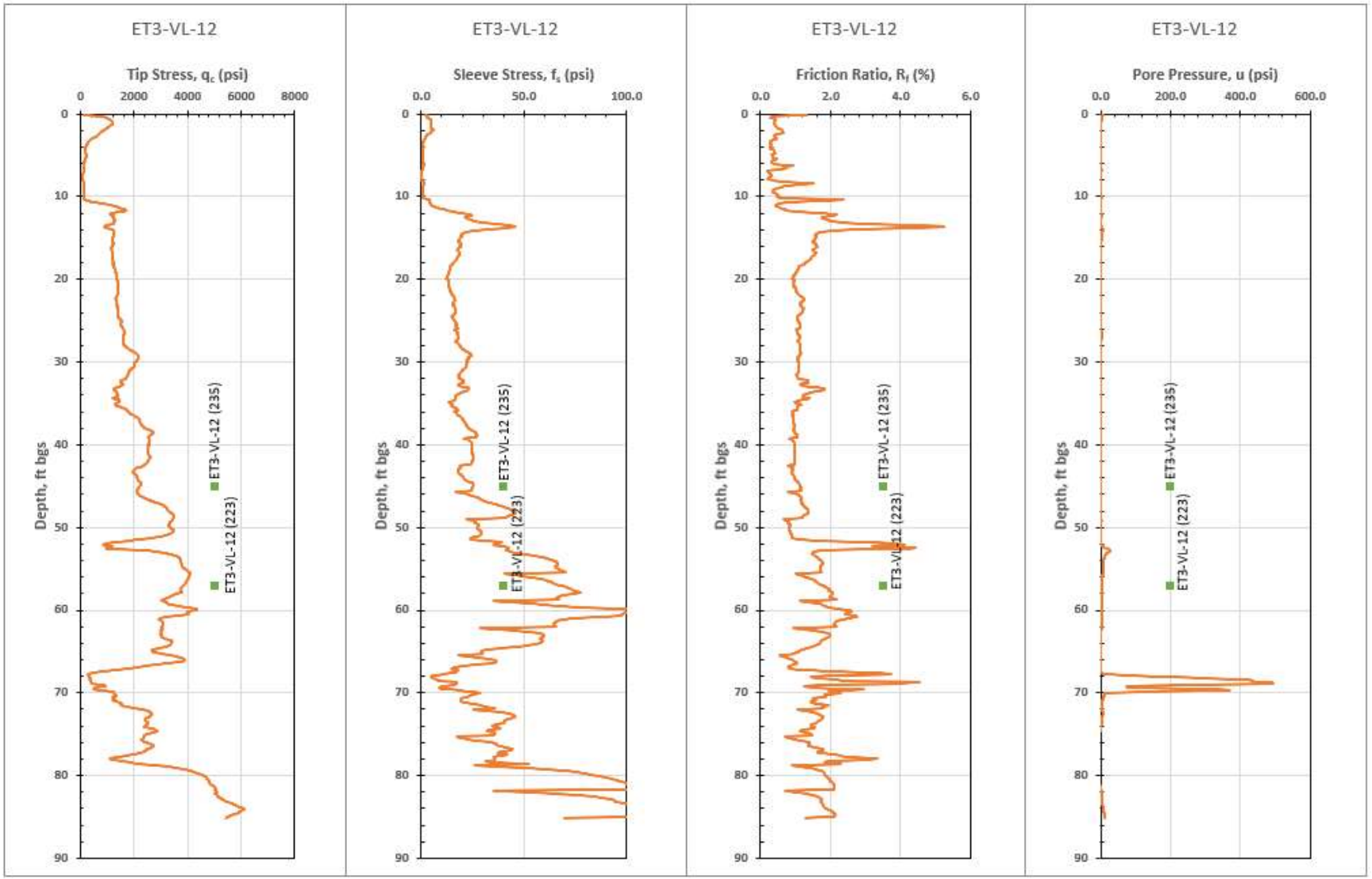

Figure 6. Lithologic Logs and Lysimeter Placement for ET3-VL-12

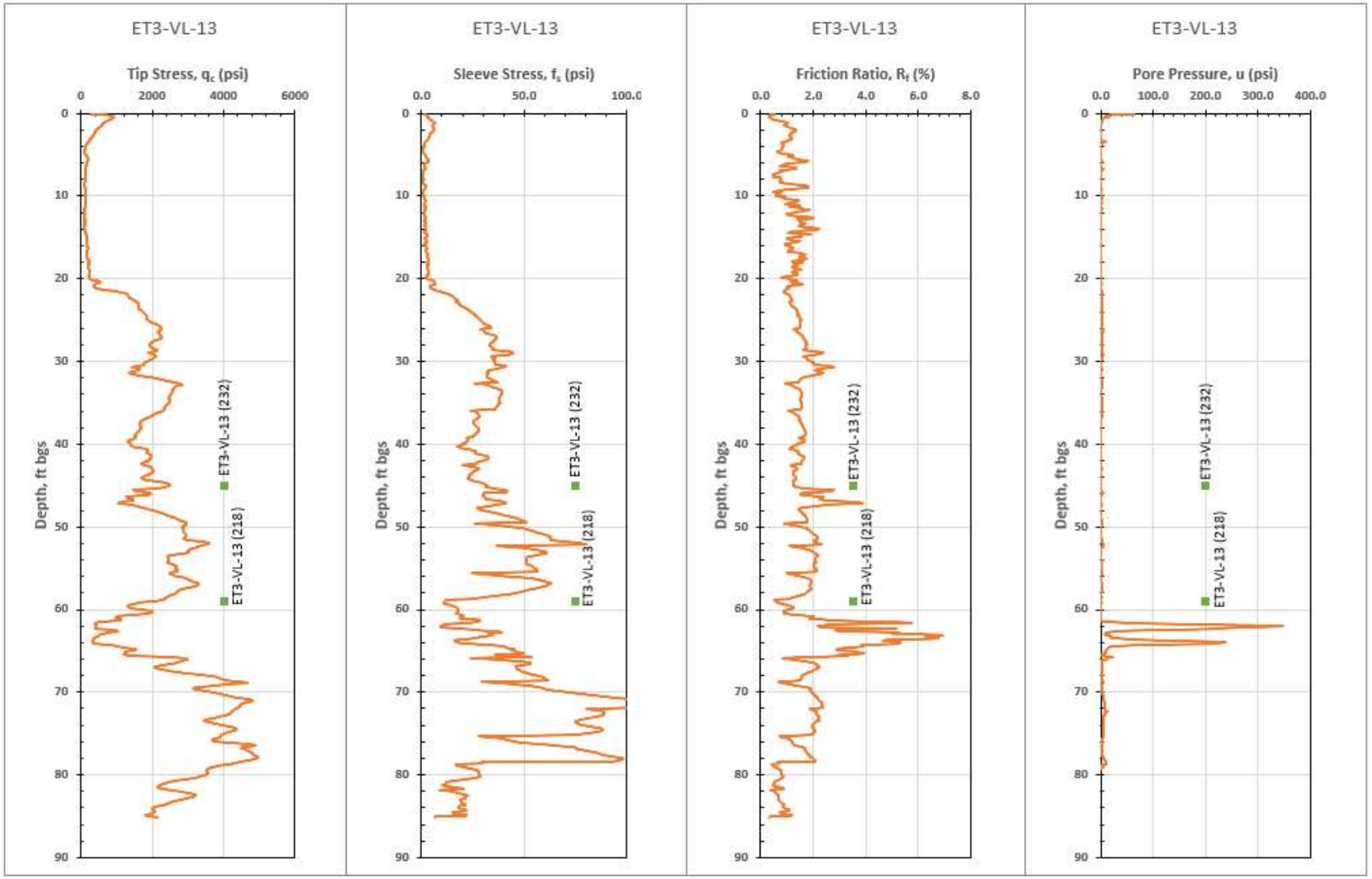

Figure 7. Lithologic Logs and Lysimeter Placement for ET3-VL-13

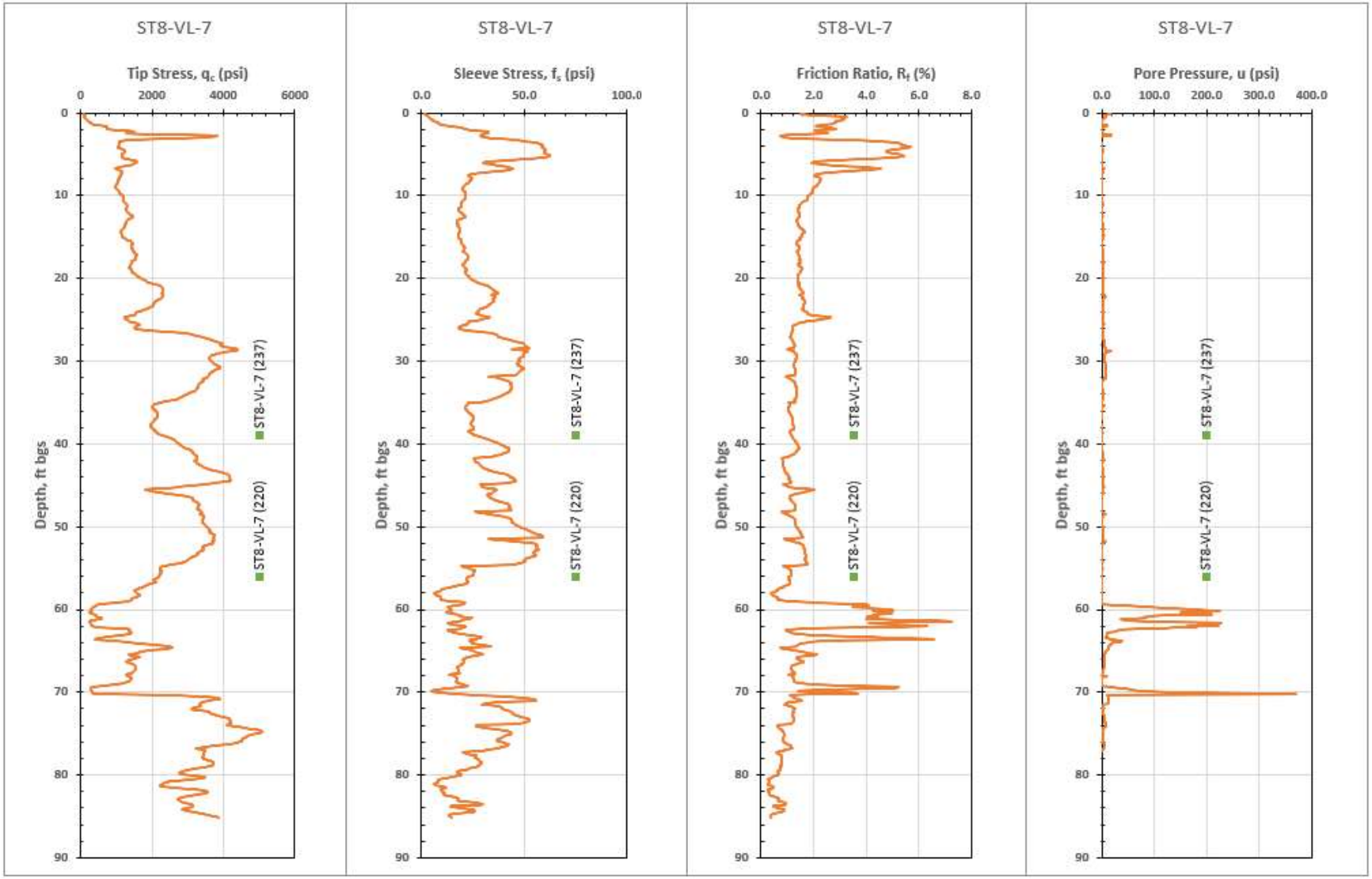

Figure 8. Lithologic Logs and Lysimeter Placement for ST8-VL-7

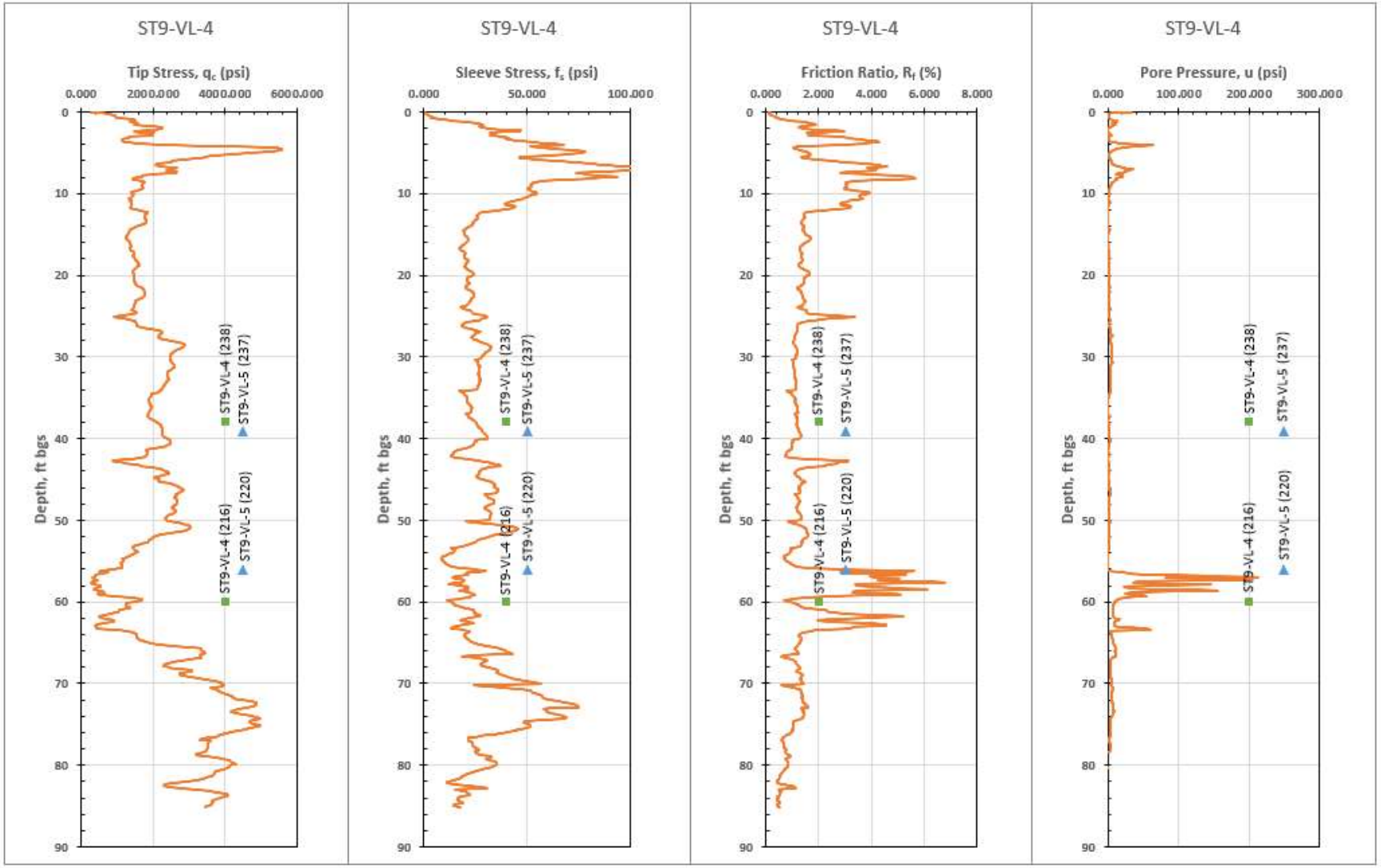

Figure 9. Lithologic Logs and Lysimeter Placement for ST9-VL-4 and ST9-VL-5

Figure 10. Sonic Drill Rig Used to Install New Lysimeters at ET3.

Figure 11. Model 1920F1 (SoilMoisture® Equipment Corp) Suction Lysimeter

Figure 12. Lysimeters were Saturated with Water Prior To Installation.

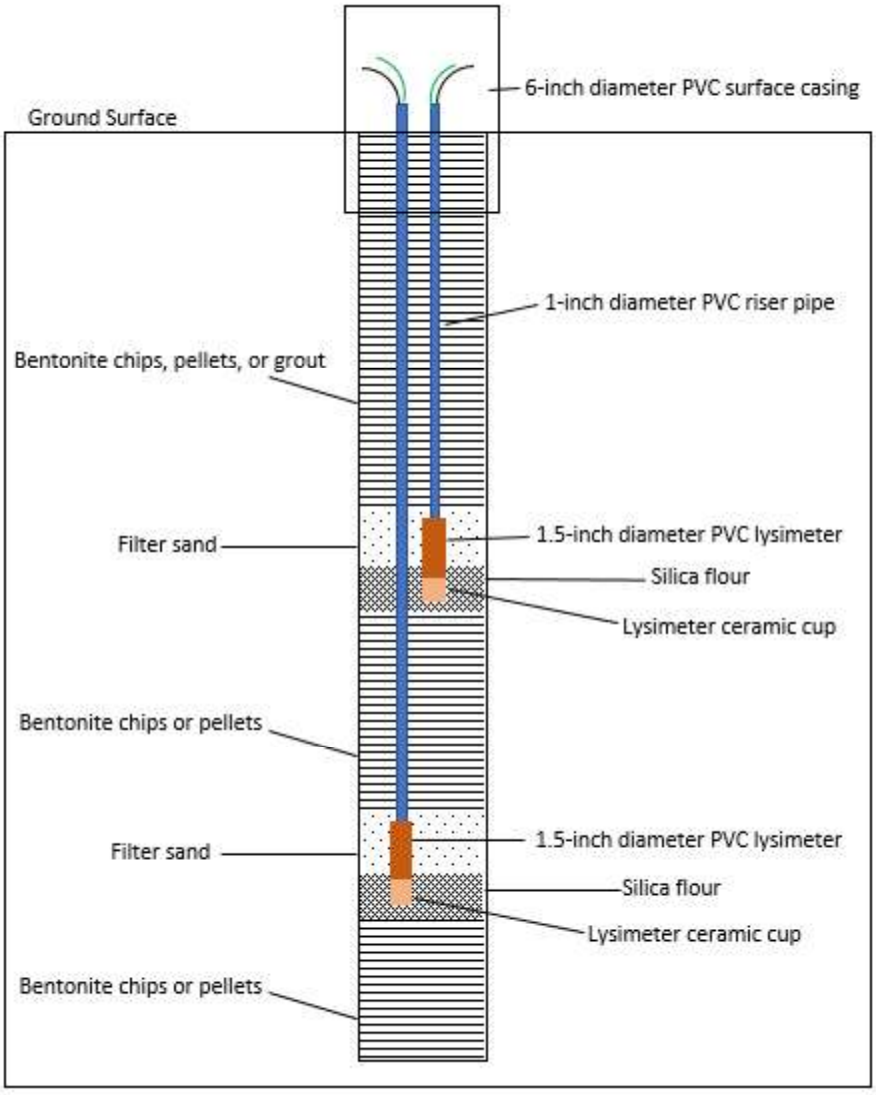

Figure 13. Generalized Schematic of Lysimeter Installation (not to scale).

Figure 14. Silica Flour Placed Around Annulus of Lysimeter Ceramic Cup.

Table 1 Construction Details for FY23 Lysimeter Stations.

Station Name	Date Installed	SRS North (ft)	SRS East (ft)	Ground Elevation (ft msl)	Lysimeter Elevation (ft msl)	Lysimeter Depth (ft bgs)	Action Level Lysimeter	Action Level (pCi/ml)
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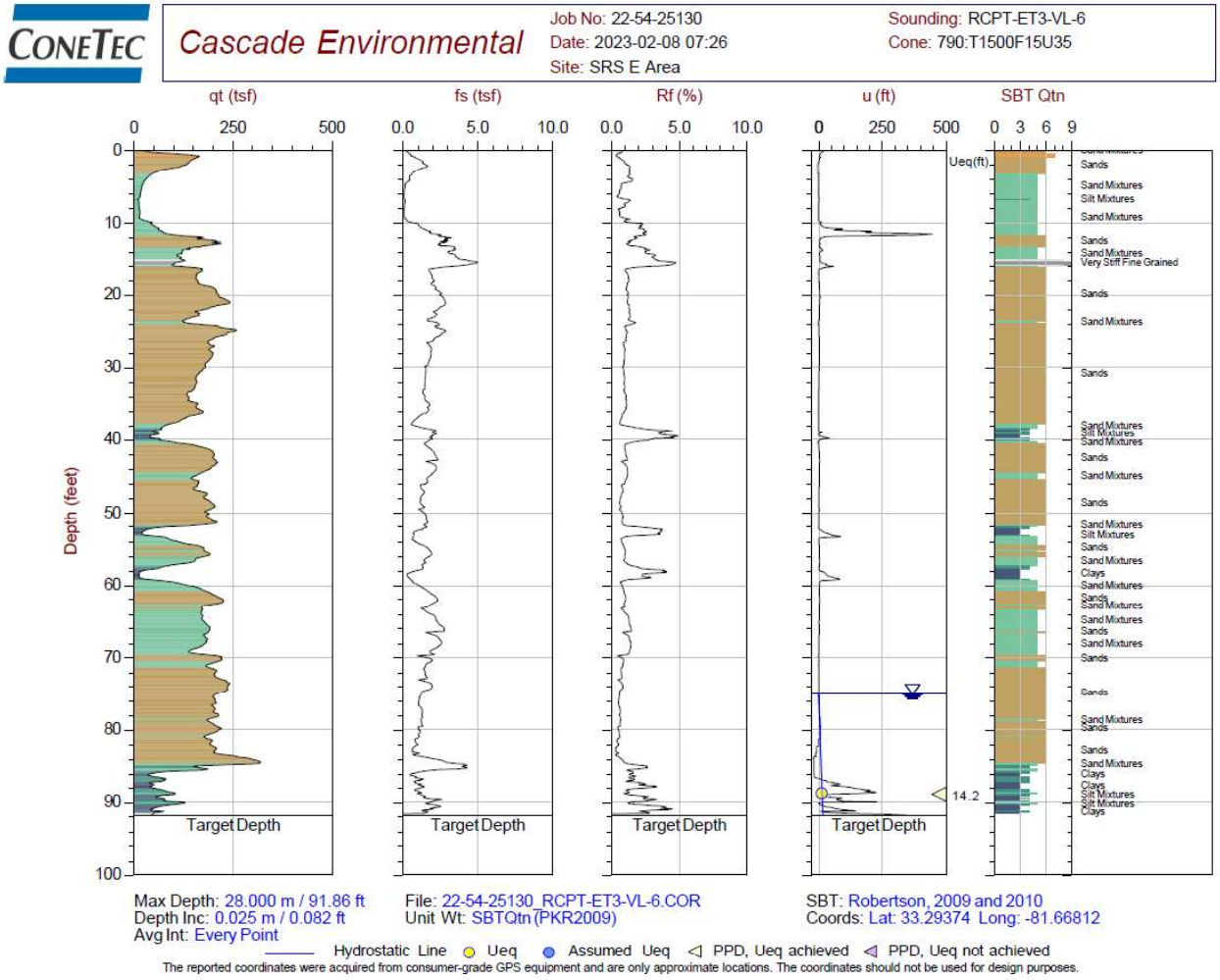
Appendix A. CPT Logs and Field Reports for FY23 ET3, ST8, and ST9 Lysimeter Installations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Cascade Environmental
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qt (tsf)
fs (tsf)
Rf (%)
u (ft)
SBT Qtn
Depth (feet)
Target Depth
Ueq(ft)
14.2
Sands
Sand Mixtures
Silt Mixtures
Clays
Very Stiff Fine Grained
Max Depth: 28.000 m / 91.86 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point
File: 22-54-25130_RCPT-ET3-VL-6.COR
Unit Wt: SBTQtn (PKR2009)
SBT: Robertson, 2009 and 2010
Coords: Lat: 33.29374 Long: -81.66812
Hydrostatic Line
Ueq
Assumed Ueq
PPD, Ueq achieved
PPD, Ueq not achieved
The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

OSR 30-13 (Rev. 07-30-2019)
Page 1 of 1

Cone Penetrometer Field Report

Test Hole Number (AAA,NNN,AA)		
ET3	VL	6

General

Project Name				
E-Area Lysimeter Install 1-2/2023				
Project Manager (last name, first initial)			Department	
Dixon, K.			Environmental Sciences and Dosimetery	
Type of Cone Penetrometer Test		County	Location Description	
RCPT Resist Cone Penetration Test		Aiken	North West edge of cleared area	
SRS North Grid Coordinate	SRS East Grid Coordinate	Ground Elevation	Latitude (degrees, minutes, seconds)	Longitude (degrees, minutes, seconds)
78685.32	57503.89	276.43	33° / 17' / 37.06"	-81° / 40' / 5.61"

Testing and Sampling

Test Start Date	Test Complete Date	Total Penetration Depth	Interpreted Water Table Level	Ground Water Samples?	Soil Samples?
02/08/2023	02/08/2023	90ft bls	71ft bls	○ Yes ◉ No	○ Yes ◉ No

Cone Penetrometer Test Type	Depth to Sample	Cone Penetrometer Test Type	Depth to Sample	Cone Penetrometer Test Type	Depth to Sample
Dissipation	76ft bls and 88ft bls				

Cone Penetrometer Company	Cone Operator	Oversight Company	Oversight (last name, first initial)
Cone Tech	Josh Hauck	Cascade Drilling	Wilcox, D.

Drilling and Sampling Comments (e.g.,drilling muds used, source of water, lost circulation zones, etc.)

Logging

Log Type

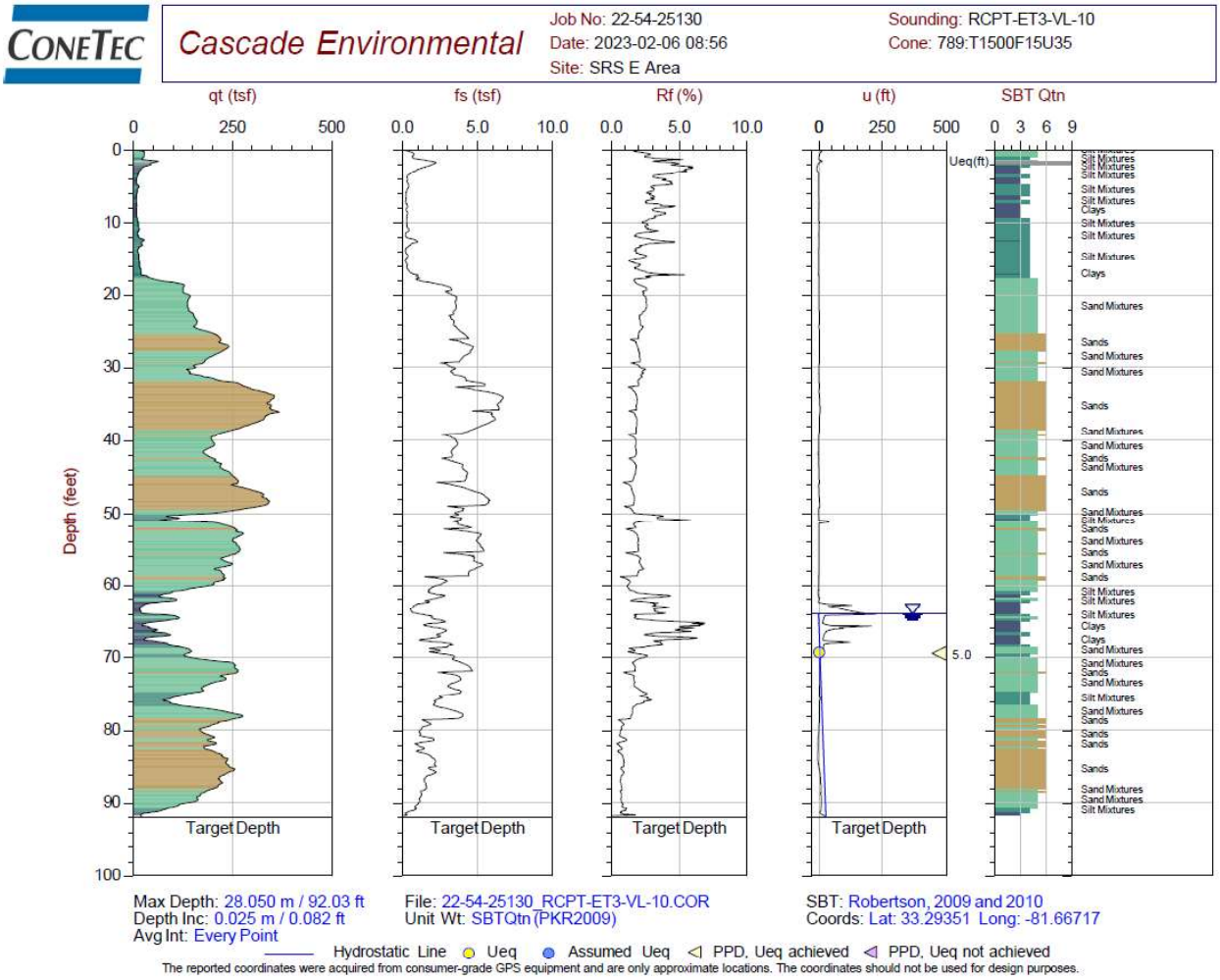
☒ Sleeve (psi) ☒ Tip (psi) ☒ Ratio (%) ☒ Pressure (psi) ☒ Resistivity

Other Logs (list)

Abandonment

Date Abandoned	Method of Abandonment	Theoretical Grout Volume	Actual Grout Volume
02/08/2023	☐ Tremie Pipe ☒ CP Rod-Grouting Method	10,4 gal	15 gal

Report Prepared by	Date Report Prepared
Evan Koelker	03/03/2023


CONETEC
Cascade Environmental
Job No: 22-54-25130
Date: 2023-02-06 08:56
Site: SRS E Area
Sounding: RCPT-ET3-VL-10
Cone: 789:T1500F15U35
qt (tsf)
fs (tsf)
Rf (%)
u (ft)
SBT Qtn
Depth (feet)
Ueq(ft)
5.0
Target Depth
Max Depth: 28.050 m / 92.03 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point
File: 22-54-25130_RCPT-ET3-VL-10.COR
Unit Wt: SBTQtn (PKR2009)
SBT: Robertson, 2009 and 2010
Coords: Lat: 33.29351 Long: -81.66717
Hydrostatic Line
Ueq
Assumed Ueq
PPD, Ueq achieved
PPD, Ueq not achieved
The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

OSR 30-13 (Rev. 07-30-2019)
Page 1 of 1

Cone Penetrometer Field Report

Test Hole Number (AAA,NNN,AA)		
ET3	VL	10

General

Project Name					
E-Area Lysimeter Install 1-2/2023					
Project Manager (last name, first initial)			Department		
Dixon, K.			Environmental Sciences and Dosimetery		
Type of Cone Penetrometer Test		County	Location Description		
RCPT Resist Cone Penetration Test		Aiken	South Edge of cleared area		
SRS North Grid Coordinate	SRS East Grid Coordinate	Ground Elevation	Latitude (degrees, minutes, seconds)	Longitude (degrees, minutes, seconds)	
78448.06	57671.99	280.01	33°/17'/36.15"	-81°/40'/2.36"	

Testing and Sampling

Test Start Date	Test Complete Date	Total Penetration Depth	Interpreted Water Table Level	Ground Water Samples?	Soil Samples?
02/06/2023	02/06/2023	90ft	64ft bls	○ Yes ◉ No	○ Yes ◉ No

Cone Penetrometer Test Type	Depth to Sample	Cone Penetrometer Test Type	Depth to Sample	Cone Penetrometer Test Type	Depth to Sample
Dissipation	69ft bls				

Cone Penetrometer Company	Cone Operator	Oversight Company	Oversight (last name, first initial)
Cone Tech	Josh Hauck	Cascade Drilling	Wilcox, D.

Drilling and Sampling Comments (e.g.,drilling muds used, source of water, lost circulation zones, etc.)

Logging

Log Type

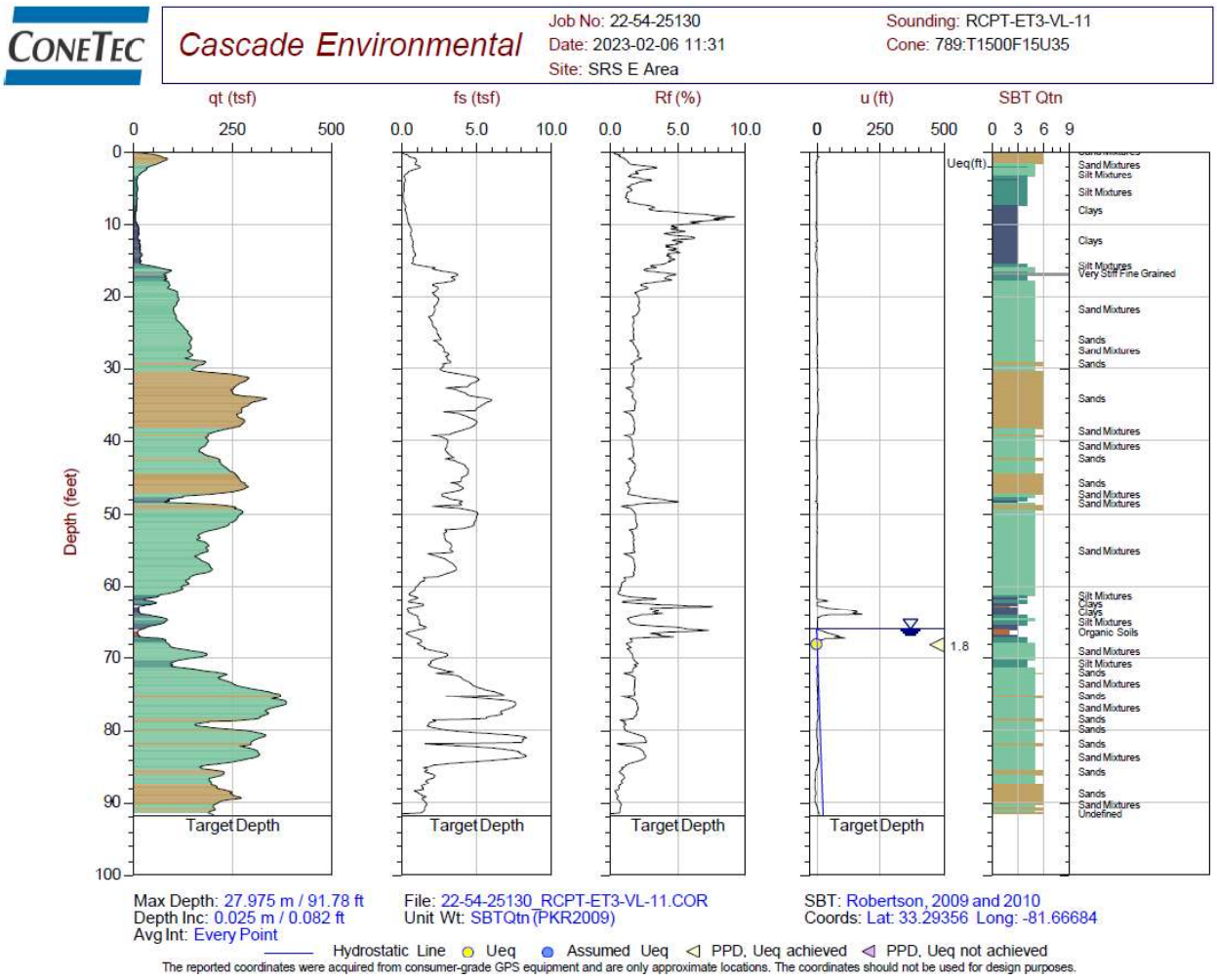
☒ Sleeve (psi) ☒ Tip (psi) ☒ Ratio (%) ☒ Pressure (psi) ☒ Resistivity

Other Logs (list)

Abandonment

Date Abandoned	Method of Abandonment	Theoretical Grout Volume	Actual Grout Volume
	☐ Tremie Pipe ☒ CP Rod-Grouting Method	10,58 gal	45 gal

Report Prepared by	Date Report Prepared
Evan Koelker	02/06/2023


CONETEC
Cascade Environmental
Job No: 22-54-25130
Date: 2023-02-06 11:31
Site: SRS E Area
Sounding: RCPT-ET3-VL-11
Cone: 789:T1500F15U35
qt (tsf)
fs (tsf)
Rf (%)
u (ft)
SBT Qtn
Ueq(ft)
Depth (feet)
Target Depth
1.8
Max Depth: 27.975 m / 91.78 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point
File: 22-54-25130_RCPT-ET3-VL-11.COR
Unit Wt: SBTQtn (PKR2009)
SBT: Robertson, 2009 and 2010
Coords: Lat: 33.29356 Long: -81.66684
Hydrostatic Line
Ueq
Assumed Ueq
PPD, Ueq achieved
PPD, Ueq not achieved
The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

OSR 30-13 (Rev. 07-30-2019)
Page 1 of 1

Cone Penetrometer Field Report

Test Hole Number (AAA,NNN,AA)		
ET3	VL	11

General

Project Name: E-Area Lysimeter Install 1-2/2023				
Project Manager (last name, first initial): Dixon, K.			Department: Environmental Sciences and Dosimetery	
Type of Cone Penetrometer Test: RCPT Resist Cone Penetration Test		County: Aiken	Location Description: East edge of cleared area	
SRS North Grid Coordinate: 78401.64	SRS East Grid Coordinate: 57760.57	Ground Elevation: 280.62	Latitude (degrees, minutes, seconds): 33°/17'/36.30"	Longitude (degrees, minutes, seconds): -81°/40'/1.20"

Testing and Sampling

Test Start Date	Test Complete Date	Total Penetration Depth	Interpreted Water Table Level	Ground Water Samples?	Soil Samples?
02/06/2023	02/07/2023	90ft bls	66ft bls	○ Yes ◉ No	○ Yes ◉ No

Cone Penetrometer Test Type	Depth to Sample	Cone Penetrometer Test Type	Depth to Sample	Cone Penetrometer Test Type	Depth to Sample
Dissipation	68ft bls				

Cone Penetrometer Company	Cone Operator	Oversight Company	Oversight (last name, first initial)
Cone Tech	Josh Hauck	Cascade Drilling	Wilcox, D.

Drilling and Sampling Comments (e.g.,drilling muds used, source of water, lost circulation zones, etc.)

Logging

Log Type

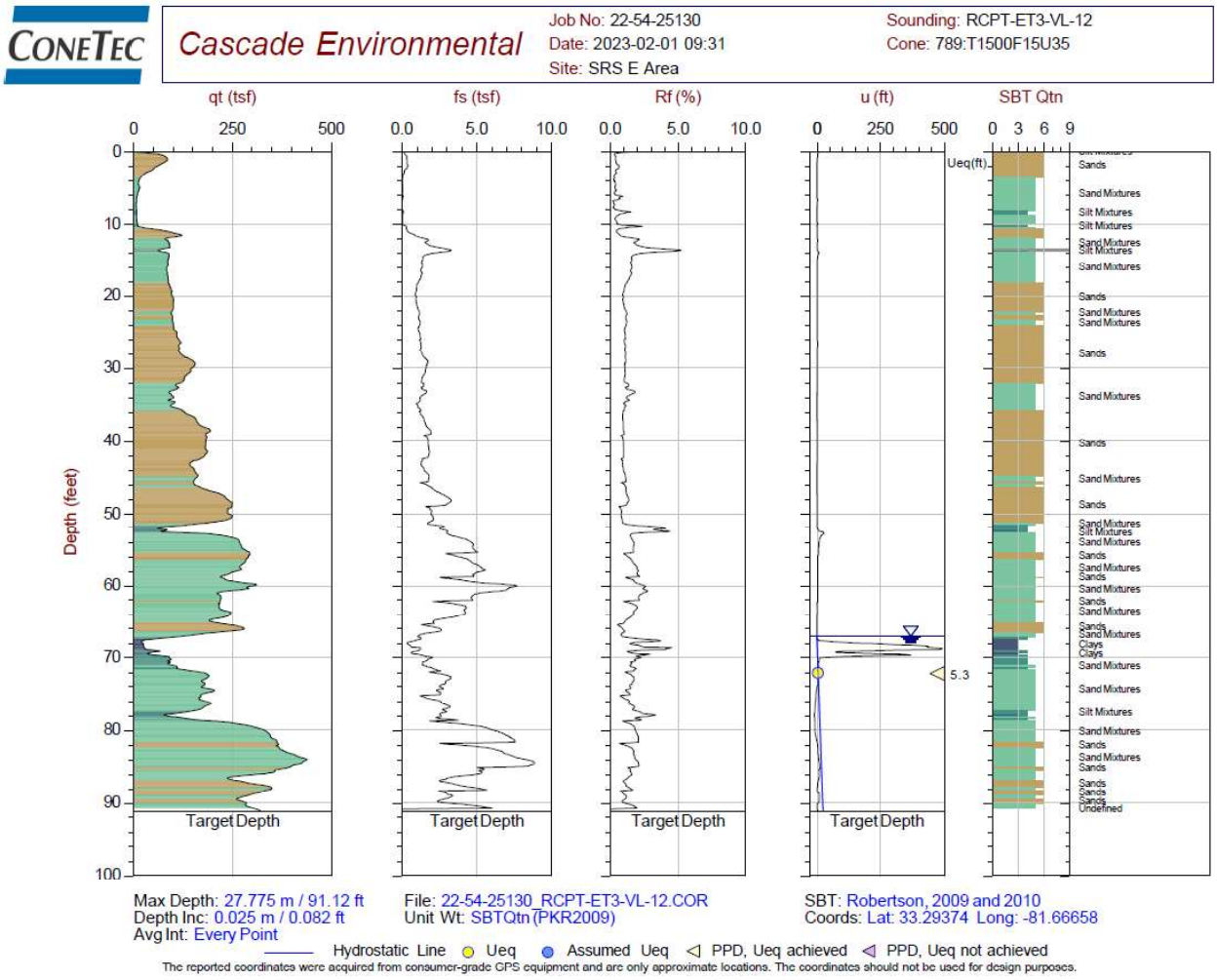
☒ Sleeve (psi) ☒ Tip (psi) ☒ Ratio (%) ☒ Pressure (psi) ☒ Resistivity

Other Logs (list)

Abandonment

Date Abandoned	Method of Abandonment	Theoretical Grout Volume	Actual Grout Volume
02/07/2023	☐ Tremie Pipe ☒ CP Rod-Grouting Method	10,6 gal	15 gal

Report Prepared by	Date Report Prepared
Evan Koelker	02/07/2023


CONETEC
Cascade Environmental
Job No: 22-54-25130
Date: 2023-02-01 09:31
Site: SRS E Area
Sounding: RCPT-ET3-VL-12
Cone: 789:T1500F15U35
qt (tsf)
fs (tsf)
Rf (%)
u (ft)
SBT Qtn
Depth (feet)
Ueq(ft)
5.3
Target Depth
Sands
Sand Mixtures
Silt Mixtures
Clays
Undefined
Max Depth: 27.775 m / 91.12 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point
File: 22-54-25130_RCPT-ET3-VL-12.COR
Unit Wt: SBTQtn (PKR2009)
SBT: Robertson, 2009 and 2010
Coords: Lat: 33.29374 Long: -81.66658
Hydrostatic Line
Ueq
Assumed Ueq
PPD, Ueq achieved
PPD, Ueq not achieved
The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

OSR 30-13 (Rev. 07-30-2019)
Page 1 of 1

Cone Penetrometer Field Report

Test Hole Number (AAA,NNN,AA)		
ET3	VL	12

General

Project Name: E-Area Lysimeter Install 1-2/2023				
Project Manager (last name, first initial): Dixon, K.			Department: Environmental Sciences and Dosimetery	
Type of Cone Penetrometer Test: RCPT Resist Cone Penetration Test		County: Aiken	Location Description: ET3 - East edge of of cleared area,	
SRS North Grid Coordinate: 78407.9	SRS East Grid Coordinate: 57860.51	Ground Elevation: 279.86	Latitude (degrees, minutes, seconds): '33° / 17' / 36.94"	Longitude (degrees, minutes, seconds): -81° / 40' / 0.29"

Testing and Sampling

Test Start Date	Test Complete Date	Total Penetration Depth	Interpreted Water Table Level	Ground Water Samples?	Soil Samples?
02/01/2023	02/01/2023	90 ft bls	66 ft bls	○ Yes ◉ No	○ Yes ◉ No

Cone Penetrometer Test Type	Depth to Sample	Cone Penetrometer Test Type	Depth to Sample	Cone Penetrometer Test Type	Depth to Sample
Dissipation	72.2 ft bls				

Cone Penetrometer Company	Cone Operator	Oversight Company	Oversight (last name, first initial)
Conetech	Josh Hauck	Cascade Drilling	Wilcox, D.

Drilling and Sampling Comments (e.g.,drilling muds used, source of water, lost circulation zones, etc.)

Logging

Log Type

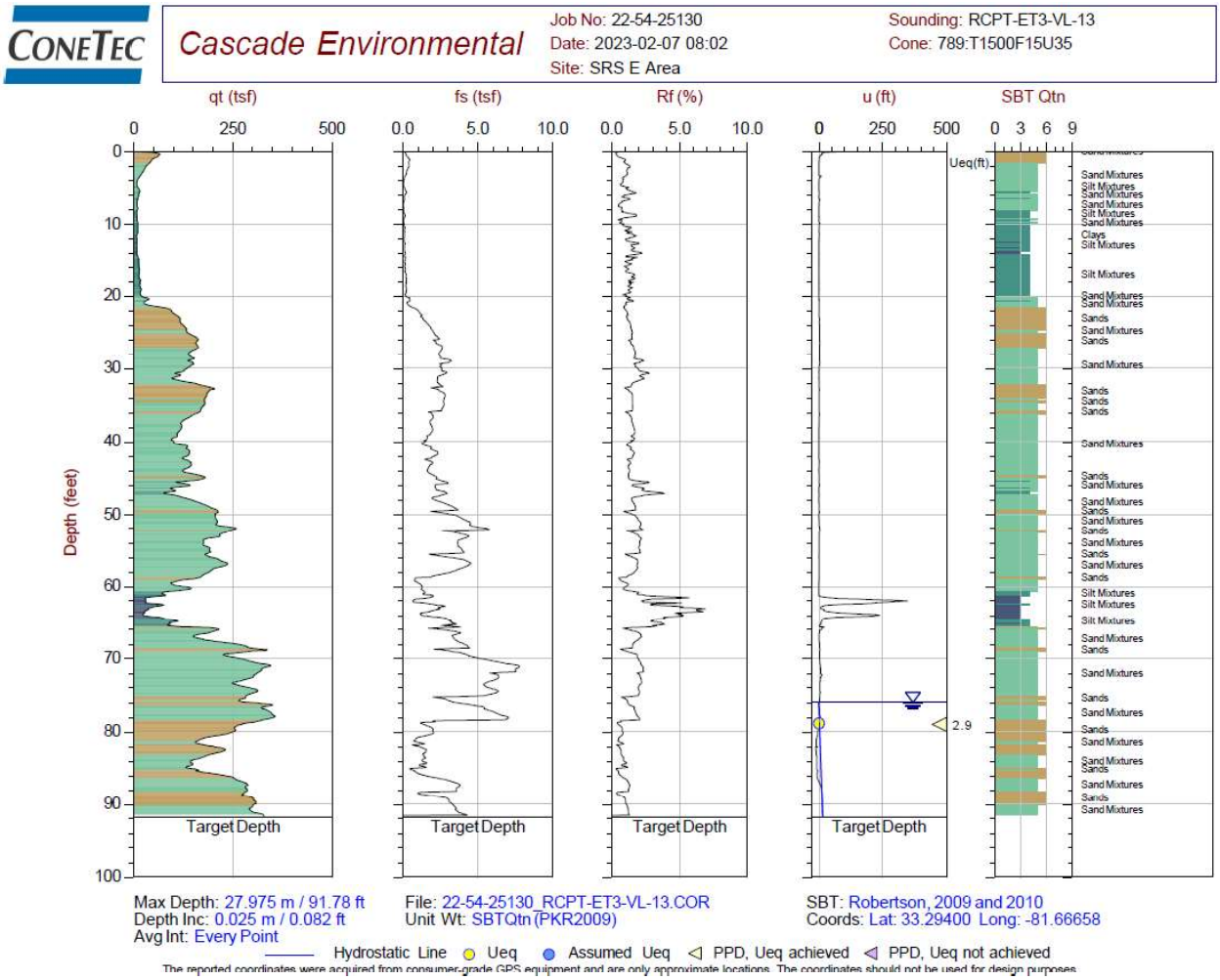
☒ Sleeve (psi) ☒ Tip (psi) ☒ Ratio (%) ☒ Pressure (psi) ☒ Resistivity

Other Logs (list)

Abandonment

Date Abandoned	Method of Abandonment	Theoretical Grout Volume	Actual Grout Volume
02/02/2023	☐ Tremie Pipe ☒ CP Rod-Grouting Method	10,32	25

Report Prepared by	Date Report Prepared
Evan Koelker	02/02/2023


CONETEC
Cascade Environmental
Job No: 22-54-25130
Date: 2023-02-07 08:02
Site: SRS E Area
Sounding: RCPT-ET3-VL-13
Cone: 789:T1500F15U35
qt (tsf)
fs (tsf)
Rf (%)
u (ft)
SBT Qtn
Depth (feet)
Ueq(ft)
2.9
Target Depth
Max Depth: 27.975 m / 91.78 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point
File: 22-54-25130_RCPT-ET3-VL-13.COR
Unit Wt: SBTQtn (PKR2009)
SBT: Robertson, 2009 and 2010
Coords: Lat: 33.29400 Long: -81.66658
Hydrostatic Line
Ueq
Assumed Ueq
PPD, Ueq achieved
PPD, Ueq not achieved
The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

OSR 30-13 (Rev. 07-30-2019)
Page 1 of 1

Cone Penetrometer Field Report

Test Hole Number (AAA,NNN,AA)		
ET3	VL	13

General

Project Name: E-Area Lysimeter Install 1-2/2023				
Project Manager (last name, first initial): Dixon, K.			Department: Environmental Sciences and Dosimetery	
Type of Cone Penetrometer Test: RCPT Resist Cone Penetration Test		County: Aiken	Location Description: South East edge of cleared area	
SRS North Grid Coordinate: 78482.5	SRS East Grid Coordinate: 57922.75	Ground Elevation: 277.37	Latitude (degrees, minutes, seconds): 33° / 17' / 37.90"	Longitude (degrees, minutes, seconds): -81° / 40' / 0.22"

Testing and Sampling

Test Start Date	Test Complete Date	Total Penetration Depth	Interpreted Water Table Level	Ground Water Samples?	Soil Samples?
02/07/2023	02/07/2023	90ft bls	76ft bls	○ Yes ◉ No	○ Yes ◉ No

Cone Penetrometer Test Type	Depth to Sample	Cone Penetrometer Test Type	Depth to Sample	Cone Penetrometer Test Type	Depth to Sample
Dissipation	79ft bls				

Cone Penetrometer Company	Cone Operator	Oversight Company	Oversight (last name, first initial)
Cone Tech	Josh Hauck	Cascade Drilling	Wilcox, D.

Drilling and Sampling Comments (e.g.,drilling muds used, source of water, lost circulation zones, etc.)

Logging

Log Type

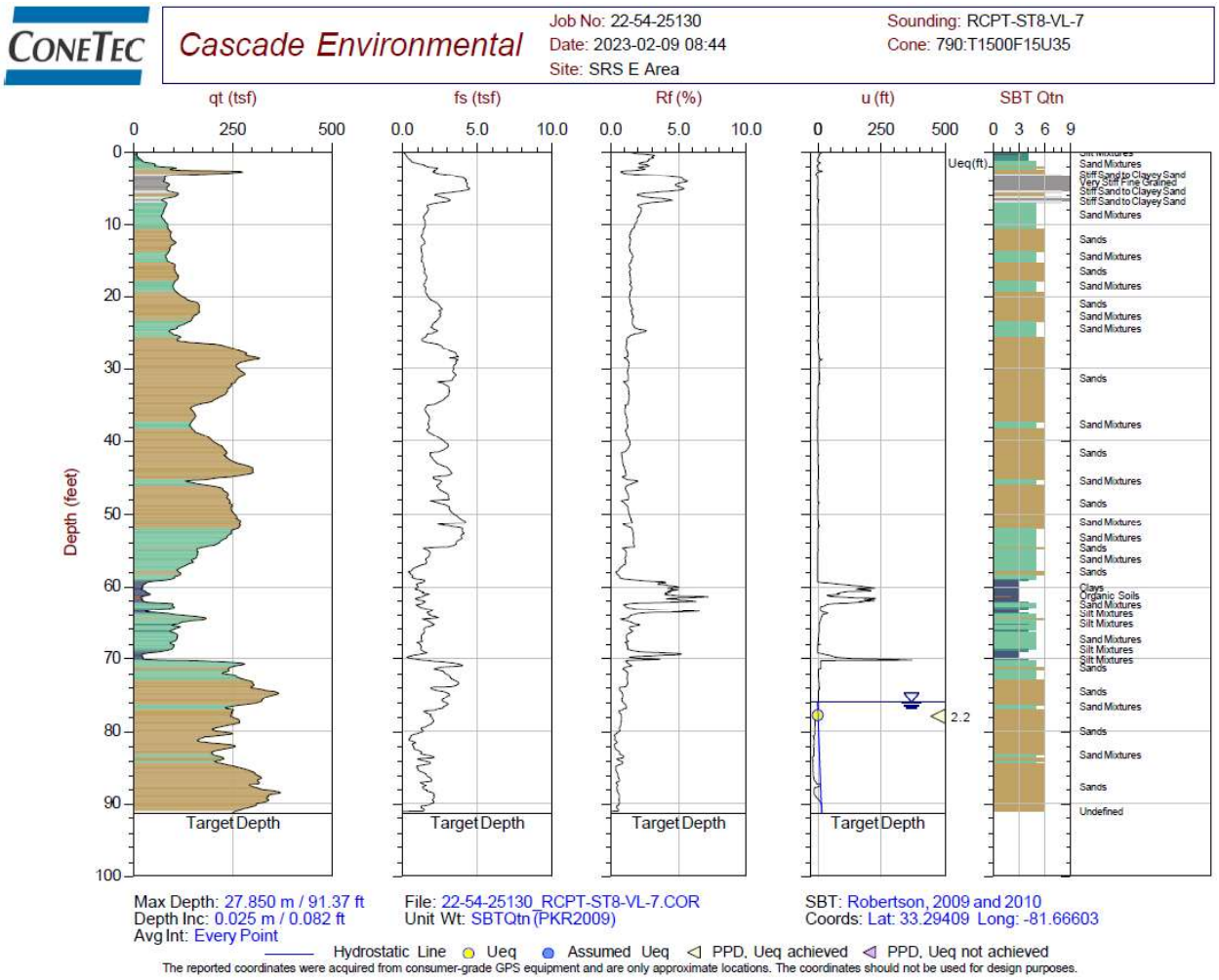
☒ Sleeve (psi) ☒ Tip (psi) ☒ Ratio (%) ☒ Pressure (psi) ☒ Resistivity

Other Logs (list)

Abandonment

Date Abandoned	Method of Abandonment	Theoretical Grout Volume	Actual Grout Volume
02/07/2023	☐ Tremie Pipe ☒ CP Rod-Grouting Method	10,5 gal	15 gal

Report Prepared by	Date Report Prepared
Evan Koelker	03/03/2023


CONETEC
Cascade Environmental
Job No: 22-54-25130
Date: 2023-02-09 08:44
Site: SRS E Area
Sounding: RCPT-ST8-VL-7
Cone: 790:T1500F15U35
qt (tsf)
fs (tsf)
Rf (%)
u (ft)
SBT Qtn
Depth (feet)
Ueq(ft)
Target Depth
2.2
Max Depth: 27.850 m / 91.37 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point
File: 22-54-25130_RCPT-ST8-VL-7.COR
Unit Wt: SBTQtn (PKR2009)
SBT: Robertson, 2009 and 2010
Coords: Lat: 33.29409 Long: -81.66603
Hydrostatic Line
Ueq
Assumed Ueq
PPD, Ueq achieved
PPD, Ueq not achieved
The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

OSR 30-13 (Rev. 07-30-2019)
Page 1 of 1

Cone Penetrometer Field Report

Test Hole Number (AAA,NNN,AA)		
ST8	VL	7

General

Project Name: E-Area Lysimeter Install 1-2/2023				
Project Manager (last name, first initial): Dixon, K.			Department: Environmental Sciences and Dosimetery	
Type of Cone Penetrometer Test: RCPT Resist Cone Penetration Test		County: Aiken	Location Description: East edge of cleared area	
SRS North Grid Coordinate: 78413.31	SRS East Grid Coordinate: 58073.94	Ground Elevation: 276.26	Latitude (degrees, minutes, seconds): 33° / 17' / 38.24"	Longitude (degrees, minutes, seconds): -81° / 39' / 58.31"

Testing and Sampling

Test Start Date	Test Complete Date	Total Penetration Depth	Interpreted Water Table Level	Ground Water Samples?	Soil Samples?
02/09/2023	02/09/2023	91.9ft bls	76ft bls	○ Yes ◉ No	○ Yes ◉ No

Cone Penetrometer Test Type	Depth to Sample	Cone Penetrometer Test Type	Depth to Sample	Cone Penetrometer Test Type	Depth to Sample
Dissipation	78ft bls				

Cone Penetrometer Company	Cone Operator	Oversight Company	Oversight (last name, first initial)
Cone Tech	Josh Hauck	Cascade Drilling	Wilcox, D.

Drilling and Sampling Comments (e.g.,drilling muds used, source of water, lost circulation zones, etc.)

Logging

Log Type

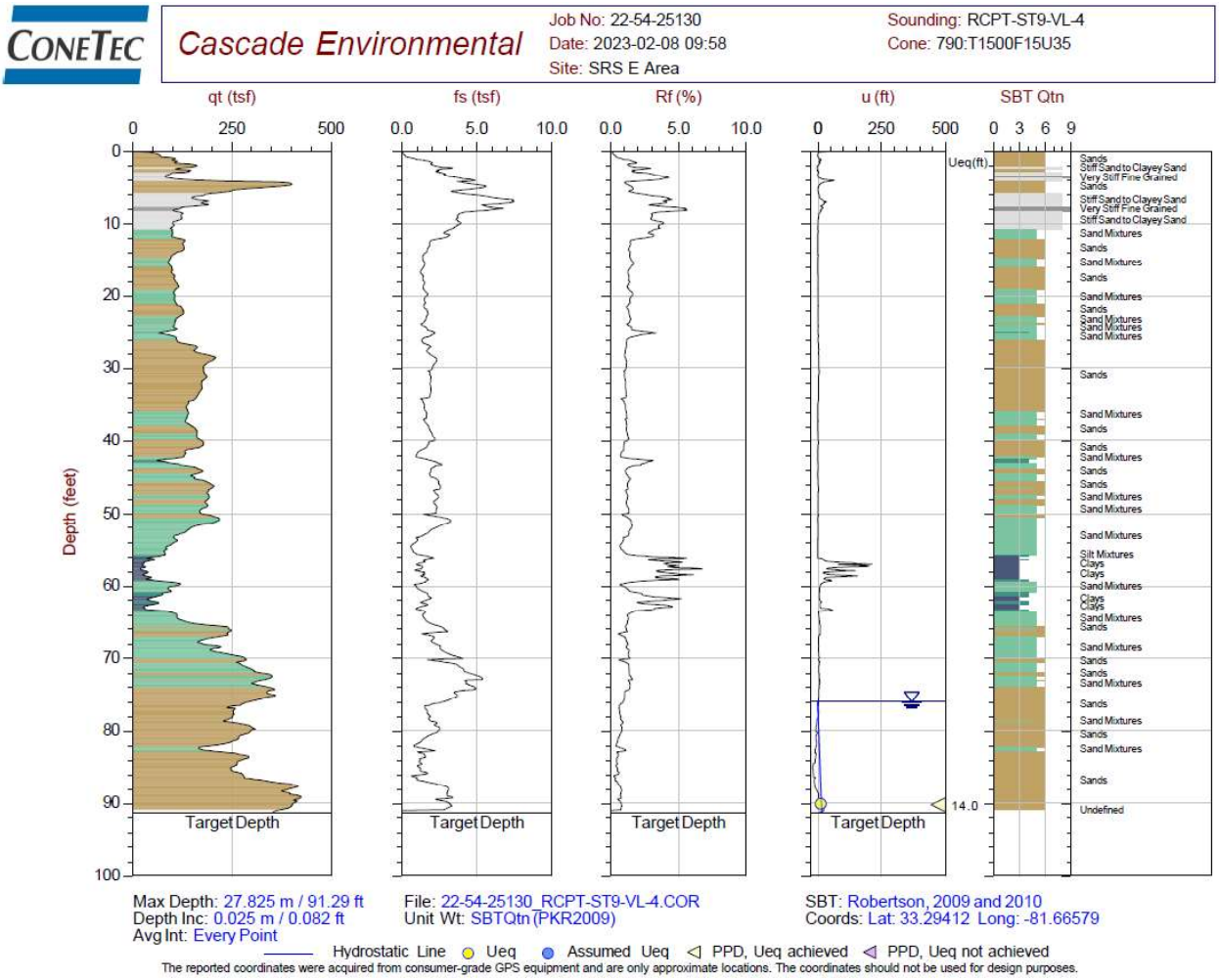
☒ Sleeve (psi) ☒ Tip (psi) ☒ Ratio (%) ☒ Pressure (psi) ☒ Resistivity

Other Logs (list)

Abandonment

Date Abandoned	Method of Abandonment	Theoretical Grout Volume	Actual Grout Volume
02/09/2023	☐ Tremie Pipe ☒ CP Rod-Grouting Method	10,5 gal	20 gal

Report Prepared by	Date Report Prepared
Evan Koelker	03/03/2023


CONETEC
Cascade Environmental
Job No: 22-54-25130
Date: 2023-02-08 09:58
Site: SRS E Area
Sounding: RCPT-ST9-VL-4
Cone: 790:T1500F15U35
qt (tsf)
fs (tsf)
Rf (%)
u (ft)
SBT Qtn
Ueq(ft)
Depth (feet)
Target Depth
14.0
Undefined
Max Depth: 27.825 m / 91.29 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point
File: 22-54-25130_RCPT-ST9-VL-4.COR
Unit Wt: SBTQtn (PKR2009)
SBT: Robertson, 2009 and 2010
Coords: Lat: 33.29412 Long: -81.66579
Hydrostatic Line
Ueq
Assumed Ueq
PPD, Ueq achieved
PPD, Ueq not achieved
The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

OSR 30-13 (Rev. 07-30-2019)
Page 1 of 1

Cone Penetrometer Field Report

Test Hole Number (AAA,NNN,AA)		
ST9	VL	4

General

Project Name: E-Area Lysimeter Install 1-2/2023				
Project Manager (last name, first initial): Dixon, K.			Department: Environmental Sciences and Dosimetery	
Type of Cone Penetrometer Test: RCPT Resist Cone Penetration Test		County: Aiken	Location Description: North East portion of cleared area	
SRS North Grid Coordinate: 78377.51	SRS East Grid Coordinate: 58142.24	Ground Elevation: 276.67	Latitude (degrees, minutes, seconds): 33° / 17' / 38.35"	Longitude (degrees, minutes, seconds): -81° / 39' / 57.41"

Testing and Sampling

Test Start Date	Test Complete Date	Total Penetration Depth	Interpreted Water Table Level	Ground Water Samples?	Soil Samples?
02/08/2023	02/08/2023	90ft bls	76ft bls	○ Yes ◉ No	○ Yes ◉ No

Cone Penetrometer Test Type	Depth to Sample	Cone Penetrometer Test Type	Depth to Sample	Cone Penetrometer Test Type	Depth to Sample
Dissipation	70ft bls				

Cone Penetrometer Company	Cone Operator	Oversight Company	Oversight (last name, first initial)
Cone Tech	Josh Hauck	Cascade Drilling	Wilcox, D.

Drilling and Sampling Comments (e.g.,drilling muds used, source of water, lost circulation zones, etc.)

Logging

Log Type

☒ Sleeve (psi) ☒ Tip (psi) ☒ Ratio (%) ☒ Pressure (psi) ☒ Resistivity

Other Logs (list)

Abandonment

Date Abandoned	Method of Abandonment	Theoretical Grout Volume	Actual Grout Volume
	☐ Tremie Pipe ☒ CP Rod-Grouting Method	10,5	15 gal

Report Prepared by	Date Report Prepared
Evan Koelker	03/03/2023

Appendix B. Field Geologic Logs for FY23 ET3, ST8, and ST9 Lysimeter Installations

OSR 30-27 (Rev. 08-01-2019)
Page 1 of 4

Field Geologic Log

Proc. Ref. 3Q1-9004, 9006

Project			Date
E-Area Lysimeter Installations 2-3/2023			02/21/2023
Well Number	Location	Drilling Subcontractor	
ET3-VL-6	E-Area	Cascade Drilling	
Logs Prepared By		Driller	
Evan Koelker		Branden Griffis	
Company		Drilling Method	
SRNL		Rotosonic	

Run Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
	0				
				0' - 10'	
	1			Med. stiff, moist, 5YR5/6 yellow-red, sandy SILT	
	2				
	3				
1	4		50		
	5	SM			
	6				
	7				
	8				
	9				
	0 10				
				10' - 12'	
	1			Firm, dry, 10YR4/6 red, sandy SILT; trace c. sand, trace	
				subangular to rounded gravel up to ~3" diam. (fill)	
	2				
	3				
2			100		
	4				
	5			12' - 27'	
		ML		Firm, dry, 5YR 6/8 red-yellow, nonplastic SILT;	
	6			some f. sand, occasional white clay parting at 17'	
	7				
	8				
	9				
	0 20				

OSR 30-27 (Rev. 08-01-2019)
Page 2 of 4

Field Geologic Log (Continued)

Proc. Ref. 3Q1-9004, 9006

Run Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
	20				
	1				
	2				
	3	ML			
3	4		90		
	5				
	6				
	7			27' - 30'	
	8			Loose, dry, 7.5YR7/6 yellow red with 7.5YR8/1 white color	
		SP		layering ~1/16in in thicknesses, poorly graded f. SAND;	
	9			trace m. sand	
	30			30' - 32'	
	1	ML		Firm, dry 2.5YR6/8 light red, nonplastic SILT;	
				some f. sand, with 31' - 32' section very dry and	
	2			powderlike	
	3			32' - 37'	
				Low dense, dry to moist, 10R4/6 red, silty f. SAND;	
				occasional white clay parting	
4	4		100		
		SM			
	5				
	6				
	7				
	8	SW		37' - 39'	
				Loose, moist, 5YR6/8 red-yellow, well graded f. SAND;	
				some silt, trace c. sand	
	9				
		CL		39' - 40'	
	0			Soft, moist, 5YR6/6 red-yellow, silty plastic CLAY	

OSR 30-27 (Rev. 08-01-2019)
Page 3 of 4

Field Geologic Log (Continued)

Proc. Ref. 3Q1-9004, 9006

Run Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
	40				
				40' - 45'	
	1			Loose, dry, 5YR5/3 red-brown, sandy nonplastic SILT;	
	2	SM			
	3				
	4				
5			100		
	5				
				45' - 49'	
	6			Loose, dry to moist, well graded, f. SAND;	
				trace m. sand, trace silt	
	7	SW			
	8				
	9				
				49' - 50'	
	0 50	ML		Firm/Friable, dry, 7.5YR red-yellow, nonplastic SILT;	
				some f. sand	
	1			50' - 51'	
				Loose, v. dry, 5YR 6/1 gray, nonplastic SILT; powderlike	
	2				
		SM		51' - 54'	
	3			Loose, moist, 10YR 6/8 brown-yellow, silty well sorted	
6			100	f. SAND; trace m. sand	
	4				
	5				
				54' - 58'	
	6	SW		Loose, moist, 7.5YR6/8 red-yellow, well graded m-f ;	
				SAND; trace silt	
	7			-becoming 10R4/8 red at 57'	
	8				
	9				
		CL			
	0 60				

OSR 30-27 (Rev. 08-01-2019)
Page 4 of 4

Field Geologic Log (Continued)

Proc. Ref. 3Q1-9004, 9006

Run Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
	0 60				
				58' - 63'	
	1			Soft, moist to wet, 10YR7/8 yellow, silty/sandy	
		CL		plastic CLAY; trace m. sand	
	2			-becoming 10R3/6 dark red at 59' wiht purple mottling	
	3				
	4			63' - 70'	
7			100	Loost, wet, 10YR7/8 yellow, well graded SAND;	
	5			trace m. sand	
	6				
	7				
	8				
	9				
	0 70	TotalDepth			
	1				
	2				
	3				
	4				
	5				
	6				
	7				
	8				
	9				
	0				

OSR 30-27 (Rev. 08-01-2019)
Page 1 of 4

Field Geologic Log

Proc. Ref. 3Q1-9004, 9006

Project			Date
E-Area Lysimeter Installations 2-3/2023			02/21/2023
Well Number	Location	Drilling Subcontractor	
ET3-VL-7	E-Area	Cascade Drilling	
Logs Prepared By		Driller	
Evan Koelker		Branden Griffis	
Company		Drilling Method	
SRNL		Rotosonic	

Run Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
	0			0' - 8'	
				Med stiff, moist, 2.5YR 4/8 red, sandy low-plastic SILT;	
	1			trace m. sand, trace gravel at 8ft	
	2				
	3				
	4	SM			
1			100		
	5				
	6				
	7				
	8				
	9				
	0 10				
				8' - 20'	
	1			Firm, moist 5YR6/8 red-yellow, silty low-plastic CLAY;	
				occasional white clay (kaolin) parting at 10' to 13'	
	2			- color changing to 10R 4/8 red at 10' and purple mottling	
				at 19'	
	3				
		CL			
2	4		100		
	5				
	6				
	7				
	8				
	9				
	0 20				

OSR 30-27 (Rev. 08-01-2019)
Page 2 of 4

Field Geologic Log (Continued)

Proc. Ref. 3Q1-9004, 9006

Run Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
	20				
				20' - 26'	
				Loose, moist, 10R6/8 light red, silty well graded m-f SAND	
		SW			
3			100		
				26' to 34'	
				Loose, moist, 7.5YR6/8 red-yellow, poorly graded	
				f. SAND	
		SP			
	30				
4			90		
				34' - 37'	
		SM		Loose, dry, 10R4/6 red, silty, poorly graded f. SAND	
				37' - 38'	
		SM		Firm/Friable, dry, 10R7/4 pale red and 10YR8/4 yellow	
				color parting/seams, sandy SILT;	
		SM		occasional low cementation	
				38' - 39'	
	40	CL		Loose, moist, 10R4/8 red, silty m-f SAND	

OSR 30-27 (Rev. 08-01-2019)
Page 3 of 4

Field Geologic Log (Continued)

Proc. Ref. 3Q1-9004, 9006

Run Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
	40				
				39' - 43'	
	1			Fimr, dry, 10R4/8red with brown mottling, silty CLAY;	
		CL		trace f. sand	
	2				
	3				
5	4		100	43' - 47'	
				M. stiff to hard (Friable), dry, 7.5YR6/8 and 10R4/6 red	
	5			layers, sandy SILT	
		ML			
	6				
	7			47' - 48'	
				Loose, v. dry, 7.5YR 7/1 gray, sandy SILT; powder-like	
	8				
				47' - 52'	
	9			M. stiff, moist, 2.5YR5/8 red, sandy SILT;	
		ML		trace c. subangular sand	
	50				
	1				
	2	xxxNRxxx			
		xxxNRxxx			52' - 55' sample not recovered
	3	xxxNRxxx			
6		xxxNRxxx	70		
	4	xxxNRxxx			
		xxxNRxxx			
	5	xxxNRxxx			
				55' - 58'	
	6			Loose, moist, 10YR 8/8 yellow, m-f SAND;	
		SW		trace c. sand	
	7			- becoming 2.5YR4/6 red at 57'	
	8				
	9				
		CL			
	60				

OSR 30-27 (Rev. 08-01-2019)
Page 4 of 4

Field Geologic Log (Continued)

Proc. Ref. 3Q1-9004, 9006

Run Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
	60				
				58' - 67'	
	1			Soft, moist, 10R 3/6 dark red, sandy low-plastic CLAY;	
				- increasing sand % to depth.	
	2	CL			
	3				
	4				
7			80		
	5				
	6				
	7				
				67' - 70'	
	8			Loose, moist to wet, 10R4/6 red, well graded m-f SAND;	
		SW		trace silt	
	9				
	0	70			
	1				
	2				
	3				
	4				
	5				
	6				
	7				
	8				
	9				
	0				

OSR 30-27 (Rev. 08-01-2019)
Page 1 of 4

Field Geologic Log

Proc. Ref. 3Q1-9004, 9006

Project			Date
E-Area Lysimeter Installations 2-3/2023			02/22/2023
Well Number	Location	Drilling Subcontractor	
ET3-VL-10	E-Area	Cascade Drilling	
Logs Prepared By		Driller	
Evan Koelker		Branden Griffis	
Company		Drilling Method	
SRNL		Rotosonic	

Run Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
	0				
	1				
	2			0' - 18'	
	3			Soft, moist, 10R 5/8 red, sandy low-plastic CLAY	
1	4		60		
	5				
	6	CL			
	7				
	8				
	9				
	10				
	1				
	2				
	3				
2	4		100		
	5	CL			
	6				
	7				
	8				
	9			18' - 22'	
	20	SM		Soft, moist, 7.5YR6/8 red-yellow, sandy SILT gradual increasing sand % to depth of 22'	

OSR 30-27 (Rev. 08-01-2019)
Page 2 of 4

Field Geologic Log (Continued)

Proc. Ref. 3Q1-9004, 9006

Run Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
	0				
	1	SM			
	2				
	3				
				22' - 29'	
3	4		100	Loose, dry, 7.5YR6/8 red-yellow, silty well graded	
	5	SW		f. SAND	
	6				
	7				
	8				
	9				
	0 30				
		SM		29' - 32'	
	1			Firm/Friable, dry, 10R5/6 red, sandy SILT;	
	2			trace c. sand	
				32' - 34'	
	3			Dense, dry, 10YR 8/8 yellow, silty f. SAND	
4			100	color change to 10R 5/8 red at 34' - 36'	
	4	SM			
	5				
	6				
				36' - 39'	
	7			Loose, moist, 5YR6/8 yellow-red, m-f well graded SAND;	
		SW		some silt	
	8				
	9				
	0 40	SM			

Field Geologic Log (Continued)

Proc. Ref. 3Q1-9004, 9006

Run Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
	40				
				39' - 46'	
	1			Firm, dry, 5YR5/6 yellow-red, sandy non-plastic SILT	
	2				
5		SM	80		
	3				
	4				
					46' - 49' sample dropped from rods,
	5				and second run from 46' to 49' added
					to recover that interval.
	6				
				46' - 50'	
	7			Dry, loose, 7.5YR5/8 pale brown, well-graded m-f SAND	
6			100	some silt, trace c. sand	
	8	SW			
	9				
	50			50' - 51'	
		CL		Stiff, dry, 5YR5/4 red-brown, sandy low plastic CLAY	
	1				
	2			51' - 55'	
				Loose, moist, 5YR6/8 red-yellow, well graded m-f SAND;	
	3	SW		some silt, trace c. sand and small pebbles, occasional	
7			100	low cementation	
	4				
	5				
				55' - 58'	
	6			Loose, moist, 7.5YR 7/8 red-yellow poorly graded	
		SP		f. SAND; some silt	
	7				
	8				
				58' - 63'	
	9			Soft, moist to wet, 7.5YR7/8 red-yellow with 10YR5/8red	
		SM		mottling, sandy nonplastic SILT; occasional white clay	
	60			parting	

OSR 30-27 (Rev. 08-01-2019)
Page 4 of 4

Field Geologic Log (Continued)

Proc. Ref. 3Q1-9004, 9006

Run Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
	0 60				
	1	SM			
	2				
	3			63' - 65'	
				Firm to hard, dry, 7.5YR6/6 brown, sandy SILT	
	4				
8	5		100		
	6			65' - 70'	
				Soft, wet, 5YR4/6 yellow-red, sandy CLAY	
	7	SC			
	8				
	9				
	0 70	TotalDepth			
	1				
	2				
	3				
	4				
	5				
	6				
	7				
	8				
	9				
	0				

DSR 30-27 (Rev. 08-01-2019)
Page 1 of 4

Field Geologic Log

Proc. Ref. 3Q1-9004, 9006

Project		Date
E-Area Lysimeter Installations 2-3/2023		02/23/2023
Well Number: ET3-VL-11	Location: E-Area	Drilling Subcontractor: Cascade Drilling
Logs Prepared By: Evan Koelker/Terry Killeen		Driller: Branden Griffis
Company: SRNL/SRNS		Drilling Method: Rotosonic

Run Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
	0				
				0' - 15'	
	1			Soft, moist, 2.5YR 5/8 red, sandy CLAY	
	2				
	3				
1	4		80		
	5				
	6				
	7				
		CL			
	8				
----------	9		----------		
	0 10				
	1				
	2				
	3				
2			100		
	4				
	5	----------			
				15' - 26'	
	6			Stiff, moist, 5YR 7/8 red-yellow, sandy low plastic SILT;	
				sparse white mottling color	
	7				
		SM			
	8				
----------	9		----------		
	0 20				

DSR 30-27 (Rev. 08-01-2019)
Page 2 of 4

Field Geologic Log (Continued)

Proc. Ref. 3Q1-9004, 9006

Run Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
	0 20				
	1				
	2				
	3				
3		SM	100		
	4				
	5				
	6	----------			
				26' - 29'	
	7			Loose, dry, 10YR 8/8 yellow, f-grain SAND;	
		SW		well graded with trace m-sand	
	8				
----------	9	----------	----------		
	0 30				
				26' - 34'	
	1			M-stiff, dry, 10YR 7/8 yellow, sandy SILT;	
		SM		some low cementation	
	2				
	3				
4			100		
	4	----------			
	5				
	6			34' - 39'	
		SW		Loose, dry, 7.5YR 6/8 red-yellow, m-f grain SAND;	
	7			trace silt	
	8				
----------	9	----------	----------	39' - 40': 10R 5/6 Reddish Brown Sandy-Silty-Clay,	
		ML		~ 10% fine to med. grained sand, ~ 20-30% silt;	
	0 40	----------		Dry & partially consolidated.	

DSR 30-27 (Rev. 08-01-2019)
Page 3 of 4

Field Geologic Log (Continued)

Proc. Ref. 3Q1-9004, 9006

Run Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
	0 40				
				40' - 41.5': 10R 5/6 Reddish Brown Clayey-Silty-Sand.	
	1				
				41.5' - 42.5': 2.5YR 4/4 Lt Brown Clayey-Silty-Sand;	
	2			Very fine to med. grained sand.	
		SM		42.5' - 46.0': 10R 5/6 Reddish Brown Clayey-Silty-Sand	
	3				
5	4		100		
	5				
	6	----------			
	7			46' - 49': 10YR 6/8 Yellow Brown Sand, fine to coarse	
		SP		grain sand; 20-25% silt & clay.	
	8				
----------	9	----------	----------		
	0 50				
				49' - 54': 10YR 8/6 Yellow Clayey-Silty-Sand;	
	1			Very fine to med. grain sand; grades to Clayey-Sandy-Silt	
		SC		towards 54'.	
	2				
	3				
6			100		
	4	----------		54' - 54.5': 10YR 5/4 Brown Sandy-Clayey-Silt,	
		SM		30-40% Vry fine to med. grain sand, more clay at 44.5'.	
	5	----------			
	6			54.5' - 59': 10YR 8/8 Light Yellow Clayey-Silty-Sand,	
				20-25% fines (silt & clay); Vry fine to med. grain sand;	
	7	SC		white clayey-sand lenses 58' to 59'.	
	8				
----------	9	----------	----------		
	0 60	SM			

DSR 30-27 (Rev. 08-01-2019)
Page 4 of 4

Field Geologic Log (Continued)

Proc. Ref. 3Q1-9004, 9006

Run Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
	0 60				
				59' - 65.5': Lt Yellow Brown Silty-Sand, Very fine to med.	
	1			grain sand, 30-4-% silt.	
	2	SM			
	3				
7	4		100		
	5	----------		65.5' - 66.5': 10YR 8/4 Lt Brown Clayey-Sandy-Silt;	
		SM		Very fine to fine grained sand (30-40%).	
	6				
		----------		66.5 - 68': 10YR 7/6 Lt Yellow Brown Clay (Tan Clay?)	
	7	CL		grades to dark brown (10YR 3/6) sandy-silty-clay near 68'	
				thin (2") black (10YR 2/1) sandy-clay layer at 68', fine	
	8	----------		to very coarse grained sand.	
				68' - 69': 10YR 6/8 Yelowish Brown Silty-Clayey-Sand,	
----------	9	SC	----------	very fine to fine grained sand (50-60%).	
----------		TotalDepth	----------	----------	----------
	0 70				
	1				
	2				
	3				
	4				
	5				
	6				
	7				
	8				
	9				
	0				

OSR 30-27 (Rev. 08-01-2019)
Page 1 of 4

Field Geologic Log

Proc. Ref. 3Q1-9004, 9006

Project			Date
E-Area Lysimeter Installations 2-3/2023			02/14/2023
Well Number	Location	Drilling Subcontractor	
ET3-VL-12	E-Area	Cascade Drilling	
Logs Prepared By		Driller	
Evan Koelker		Branden Griffis	
Company		Drilling Method	
SRNL		Rotosonic	

Run Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
	0				
				0' - 9'	
	1			Loose, dry, 5YR5/8 orange, silty f. SAND	
	2				
	3				
1	4	SW	60		
	5				
	6				
	7				
	8				
	9				
	10				
	1				
	2			9' - 35'	
	3			Firm, dry, 10YR8/8 yellow-red, sandy SILT; occasional	
2	4	SM	100	white clay parting at 23' - 35'	
	5				
	6				
	7				
	8				
	9				
	20				

OSR 30-27 (Rev. 08-01-2019)
Page 2 of 4

Field Geologic Log (Continued)

Proc. Ref. 3Q1-9004, 9006

Run Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
	0				
	20				
	1	SM			
	2				
	3				
3	4		100		
	5				
	6				
	7				
		SM			
	8				
	9				
	0				
	30				
	1				
	2				
	3				
4	4		80		
	5				
	6			35' - 40'	
				Med. dense, dry, 2.5YR4/8 red, silty f. SAND	
	7	SW			
	8				
	9				
	0				
	40				

Field Geologic Log (Continued)

Proc. Ref. 3Q1-9004, 9006

Run Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
	40			40' - 41'	
		ML		Loose, dry, 10YR7/6 yellow-red, SILT; some f. sand	
	41			-dry and powderlike	
	42				
	43			41' - 46'	
	44			Loose, moist, 7.5YR7/8 yellow-red, well graded m-f SAND	
		SW		trace silt	
5	45		90		
	46				
	47				
	48				
	49			46' - 55'	
	50			Stiff, dry, 7.5YR6/8 red-yellow, sandy SILT	
	51			- becoming 10YR6/6 brown-yellow at 49' with silt %	
	52			increasing to depth	
	53				
	54				
	55				
		SM			
	56				
	57				
	58				
	59				
6	60		60		
	61				
	62				
	63				
	64			55' - 59'	
	65			Loose, moist, 10R5/8 red, well graded m-f SAND;	
	66			trace silt, trace subangular c. sand	
	67	SW			
	68				
	69				
	70				
	71			59' - 59.5'	
	72			Soft, moist, 10R8/1 white, plstic CLAY varved with	
	73			soft, moist, 5YR6/8 red-yellow, nonplastic SILT	

OSR 30-27 (Rev. 08-01-2019)
Page 4 of 4

Field Geologic Log (Continued)

Proc. Ref. 3Q1-9004, 9006

Run Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
	0 60			59.5' - 63'	
				Firm/ dry, 10YR6/6 brown-yellow, sandy SILT;	
	1			-becoming 10YR5/6red at 62'	
		SM			
	2				
	3				
7	4		100	63' - 71'	
				Loose, moist, 5YR6/8 red-yellow, well graded f. SAND;	
	5			some silt, trace c. sand	
				-becoming wet at 68'	
	6				
	7	SW			
	8				
	9				
	0 70				
	1			71' - 72'	
		CL		Soft, moist, 7.5YR6/8 red-yellow, sandy plastic CLAY;	
8	2		100	trace c. sand, occasional white clay parting	
	3			72' - 75'	
				Soft, wet, 10R5/8 red, sandy nonplastic SILT	
	4				
	5 75	TotalDepth			
	6				
	7				
	8				
	9				
	0				

OSR 30-27 (Rev. 08-01-2019)
Page 1 of 4

Field Geologic Log

Proc. Ref. 3Q1-9004, 9006

Project			Date
E-Area Lysimeter Installations 2-3/2023			02/15/2023
Well Number	Location	Drilling Subcontractor	
ET3-VL-13	E-Area	Cascade Drilling	
Logs Prepared By		Driller	
Evan Koelker		Branden Griffis	
Company		Drilling Method	
SRNL		Rotosonic	

Run Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
	0				
	1				
	2			0' - 22'	
				Soft, moist,10YR6/8 light red, sandy nonplastic SILT	
	3				
	4	SM			
1			100		
	5				
	6				
	7				
	8				
	9				
----------	0	10	----------		
	1				
	2				
	3				
	4				
2			80		
	5				
	6				
		SM			
	7				
	8				
	9				
----------	0	20	----------		

OSR 30-27 (Rev. 08-01-2019)
Page 2 of 4

Field Geologic Log (Continued)

Proc. Ref. 3Q1-9004, 9006

Run Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
	0 20				
	1	SM			
	2				
	3			22' - 31'	
	4			Loose, dry, 10YR7/8 yellow, well graded f. SAND;	
				some silt, occasional white clay parting increasing in	
				frequency to 31' maximum	
3	5		100		
	6				
		SW			
	7				
	8				
	9				
	0 30				
	1				
				31' - 39.5'	
	2			Loose, moist, 10R5/8 red, well graded m-f SAND;	
				some silt, trace c. sand and increasing in grain size	
	3			to depth	
				- lenticular white clay parting at 39' - 39.5'	
	4				
4			80		
	5	SW			
	6				
	7				
	8				
	9				
	0 40	SM			

Field Geologic Log (Continued)

Proc. Ref. 3Q1-9004, 9006

Run Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
	40				
				39.5' - 45'	
	1			Loose, moist, 7.5YR7/8 red-yellow, silty m-f SAND	
	2	SM			
	3				
	4				
5			90		
	5			45' - 46'	
		ML		Hard, dry, 2.5YR 8/1 white, sandy nonplastic SILT	
	6				
	7				
	8			46' = 60'	
				Loose, moist, 7.5YR7/8 red-yellow, m-f SAND	
	9				
	0 50				
	1				
	2				50' - 60' sample dropped from rods
					during extraction. Sample recovered
	3				in 2nd run, and appeared consistent
					with 39.5' - 45' interval.
	4				
6			80		
	5				
	6				
	7				
	8				
	9				
	0 60				

OSR 30-27 (Rev. 08-01-2019)
Page 4 of 4

Field Geologic Log (Continued)

Proc. Ref. 3Q1-9004, 9006

Run Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
	60				
				60' - 62'	
	1	CL		Soft, moist, 2.5YR6/8 light red, plastic CLAY;	
				some m-f sand, trace c. sand and rounded gravel up to	
	2			1/4" in diameter	
	3			62' - 65'	
		SM		Loose, moist, 7.5YR6/8 red-yellow, silty m-f SAND	
	4				
7			80		
	5			65'	
				Small lens (1/2") of black staining, no odor	
	6				
				65' - 70'	
	7	SW		Loose, wet, 7.5YR6/3 light brown, well graded m-f SAND;	
				trace c. sand	
	8				
	9				
	70	Total depth			
	1				
	2				
	3				
	4				
	5				
	6				
	7				
	8				
	9				
	0				

OSR 30-27 (Rev. 08-01-2019)
Page 1 of 4

Field Geologic Log

Proc. Ref. 3Q1-9004, 9006

Project	Date
E-Area Lysimeter Installations 2-3/2023	03/02/2023

Well Number	Location	Drilling Subcontractor
ST8-VL-7	E-Area	Cascade Drilling

Logs Prepared By	Driller
Evan Koelker	Branden Griffis

Company	Drilling Method
SRNL	Rotosonic

Run Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
	0			0' - 9'	
				Firm, moist, 2.5YR 5/8 red, sandy plastic CLAY	
	1			trace gravel (Fill)	
	2				
	3				
1	4	SC	100		
	5				
	6				
	7				
	8				
	9				
	10				
	1				
	2				
				9' - 20'	
	3			Soft, moist, 7.5 6/8 red-yellow, sandy SILT	
				Trace med-sand, white clay parting seen at 7ft	
2	4	SM	100		
	5				
	6				
	7				
	8				
	9				
	20				

Field Geologic Log (Continued)

Proc. Ref. 3Q1-9004, 9006

Run Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
	0			20' - 24'	
				Firm, dry, 2.5YR 5/8 red, sandy, non-plastic SILT	
	1			~30% f. sand, trace gravel	
	2				
	3				
3	4	SM	100		
				24' - 28'	
	5			Friable/firm, moist, 7.5YR 6/8 red-yellow, sandy, SILT;	
				some f. sand, trace c.-m. sand.	
	6			Some white mottling in color	
	7				
	8				
				28' - 34'	
	9			Loose, moist, 10R 5/8 red, m.-f. well graded SAND;	
				trace silt, trace white plastic clay pockets 1/4-1/2 in diam.	
	0 30				
	1	SW			
	2				
	3				
4			90		
	4				
	5			34' - 40'	
				Loose, moist, 7.5YR 6/6 red yellow, silty, m-f SAND;	
	6			occasional white clay parting (~1/16in thickness seams)	
		SM			
	7				
	8				
	9				
	0 40				

OSR 30-27 (Rev. 08-01-2019)
Page 3 of 4

Field Geologic Log (Continued)

Proc. Ref. 3Q1-9004, 9006

Run Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
	0	ML		40' - 41' Firm/Friable, dry 10YR 4/4 dk. yellow brown,	
				SILT; trace f. sand	
	1			41' - 42' Loose, moist, 7.5YR 6/8 red yellow, silty, SAND;	
		SM		some black staining, no odor	
	2				
				42' - 45'	
	3			Firm/Friable, v. dry, 7.5YR 7/2 pink gray, nonplastic SILT;	
		ML		-powderlike when broken apart	
5	4		100		
	5				
				45' - 48'	
	6			Loose, moist, 7.5YR7/8 redyellow, well graded m-f	
		SM		SAND; some (~20%) silt/fines	
	7				
	8				
				48' - 50'	
	9			Soft, moist, 5YR 3/1 dark gray, sandy, low-plastic CLAY	
				m to f sand	
	0	50			
	1	ML		50' - 54'	
				Firm/Friable, dry, 7.5YR5/6 strong brown, SILT	
	2			some fine sand.	
	3				
6			80		
	4				
	5				
	6				
				54' - 61'	
	7			Loose, moist to wet, 2.5YR 5/8 red layered with 7.5YR6/8	
		SW		red yellow, m. to f. SAND, some silt, trace c. sand	
	8			and gravel	
	9				
	0	60			

OSR 30-27 (Rev. 08-01-2019)
Page 4 of 4

Field Geologic Log (Continued)

Proc. Ref. 3Q1-9004, 9006

Run Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
	0				
	1			61' - 64'	
	2			Friable/Firm, dry, 5YR 4/3 red brown, SILT	
		ML		some trace f. sand	
	3			-color 5YR 6/1 gray from 63'-64'	
7	4				
	5	CL		64' - 70'	
	6			Soft, moist to wet, 10R 4/6 red, sandy/silty, plastic CLAY	
	7				
	8				
	9	TotalDepth			
	0 70				
	1				
	2				
	3				
	4				
	5				
	6				
	7				
	8				
	9				
	0				

OSR 30-27 (Rev. 08-01-2019)
Page 1 of 4

Field Geologic Log

Proc. Ref. 3Q1-9004, 9006

Project			Date
E-Area Lysimeter Installations 2-3/2023			02/28/2023
Well Number	Location	Drilling Subcontractor	
ST9-VL-4	E-Area	Cascade Drilling	
Logs Prepared By		Driller	
Evan Koelker		Branden Griffis	
Company		Drilling Method	
SRNL		Rotosonic	

Run Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
	0			0' - 17'	
				Firm, dry, 7.5YR 7/6 red-yellow, sandy SILT;	
	1	ML		trace m. sand	
	2				
	3				
1	4		90		
	5				
	6				
	7				
	8				
	9	ML			
	0 10				
	1				
	2				
	3				
2			100		
	4				
	5				
	6				
	7	ML			
				17' - 20'	
	8			Fribale, dry, 7.5YR8/6 red-yellow, nonplastic SILT	
				occasional white clay parting	
	9				
	0 20				

OSR 30-27 (Rev. 08-01-2019)
Page 2 of 4

Field Geologic Log (Continued)

Proc. Ref. 3Q1-9004, 9006

Run Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
	20				
				20' - 27'	
	1			Med. dense, moist, 7.5YR6/8 red-yellow, silty f. well	
				graded SAND; trace m. sand	
	2				
	3	SM			
3	4		80		
	5				
	6				
	7				
	8				
	9			27' - 39'	
				Loose, dry, 10R 5/8 red, m-f well graded SAND;	
	30			some silt, becoming 5YR5/8 yellow-red at 35ft	
	1				
	2	SW			
	3				
4	4		60		
	5				
	6				
	7				
	8				
	9				
	40				

OSR 30-27 (Rev. 08-01-2019)
Page 3 of 4

Field Geologic Log (Continued)

Proc. Ref. 3Q1-9004, 9006

Run Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
	40			39' - 47'	
				Friable, dry, 5YR5/8 yellow-red with gray parting, sandy	
	1			nonplastic SILT; trace m. sand	
	2				
		ML			
	3				
	4				
5			80		
	5				
	6				
	7				
	8			47' - 50ft	
		SW		Loose, moist, 7.5YR6/8 red-yellow, well graded	
	9			m-f SAND; occasional white plastic clay seams	
	0 50				
	1				
				50' - 56'	
	2			Soft/loose, dry, 5YR5-3 red-brown, sandy SILT	
	3	ML			
6	4		70		
	5				
	6				
				56' - 59'	
	7			Loose, moist, 7.5YR 6/8 red-yellow, f. well graded SAND;	
		SW		trace silt, with occasional white clay parting	
	8				
	9				
		CL		59' - 59.5'	
	0 60			Soft, moist, 7.5YR7/2 pink-gray, sandy CLAY	

OSR 30-27 (Rev. 08-01-2019)
Page 4 of 4

Field Geologic Log (Continued)

Proc. Ref. 3Q1-9004, 9006

Run Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
	60			59.5' - 61'	
		SW		Loose, moist, 5YR5/8 yellow-red, m-f well graded SAND;	
	1			trace c. sand, trace silt	
	2			61' - 70'	
				Soft, moist, 7.5YR 6/8 red-yellow, sandy lowplastic CLAY	
	3				
	4				
7			90		
	5				
		CL			
	6				
	7				
	8				
	9				
	70	TotalDepth			
	1				
	2				
	3				
	4				
	5				
	6				
	7				
	8				
	9				
	0				

OSR 30-27 (Rev. 08-01-2019)
Page 1 of 4

Field Geologic Log

Proc. Ref. 3Q1-9004, 9006

Project			Date
E-Area Lysimeter Installations 2-3/2023			03/01/2023
Well Number	Location	Drilling Subcontractor	
ST9-VL-5	E-Area	Cascade Drilling	
Logs Prepared By		Driller	
Evan Koelker		Branden Griffis	
Company		Drilling Method	
SRNL		Rotosonic	

Run Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
	0			0' - 3'	
				Firm, moist, 2.5YR 5/8 red, low-plastic CLAY	
	1			trace f. sand.	
		CL			
	2				
	3				
				3' - 10'	
1	4		100	Soft/Loose, moist to wet, 5YR 6/8 red-yellow, sandy SILT	
	5				
	6				
		ML			
	7				
	8				
	9				
	0 10				
	1				
	2				
	3				
2	4		100	10' - 24'	
				Soft, moist, 7.5YR 6/8 red yellow and 10R 4/6 red color	
	5			stratum, sandy SILT; with occasional white clay parting.	
		ML			
	6				
	7				
	8				
	9				
	0 20				

Field Geologic Log (Continued)

Proc. Ref. 3Q1-9004, 9006

Run Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
	0				
	20				
	1				
	2	ML			
	3				
3	4		100		
	5			24' - 30'	
	6			Loose, dry, 7.5YR 6/8 red yellow with 10R 4/6 red layering, well graded m-f SAND; some silt	
	7	SW			
	8				
	9				
	0				
	30			30'- 32'	
	1	SM		Loose, dry, 5YR 6/3 light red-brown, silty f. SAND; ~40% silt, very dry/powder-like	
	2				
	3				
4	4		90	34' - 37'	
		SM/ML		Friable, dry to moist, 7.5YR 6/6 red-yellow, silty f. SAND with parting of firm, dry, 7.5YR7/1 light gray, SILT	
	5				
	6				
	7				
	8			37' - 40'	
		SW		Loose moist, 7.5YR 6/8 red-yellow, m-f well graded SAND	
	9			some silt, trace c. sand	
	0				
	40				

OSR 30-27 (Rev. 08-01-2019)
Page 3 of 4

Field Geologic Log (Continued)

Proc. Ref. 3Q1-9004, 9006

Run Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
	40			40' - 42'	
				Firm/Friable, dry, 5YR 6/8 red-yellow, nonplastic SILT;	
	1	ML		trace f. sand	
	2				
				42' - 44'	
	3	SM		Friable, dry, 5YR6/3 light red-brown, sandy SILT;	
	4	xxxNRxxx			
5		xxxNRxxx	80		44' to 45' interval not recovered
	5	xxxNRxxx		44' - 52'	
	6			Loose, moist, 7.5 6/6 red-yellow, silty well-graded SAND	
				trace c. sand with1ft lens of soft, 10R 3/6 red, sandy	
	7			plastic CLAY	
	8	SW			
	9				
	50				
	1				
	2				
				52' - 54'	
	3	ML		Friable, dry, 5YR5/6 yellow-red, sandy nonplastic SILT	
6			90	trace m. sand	
	4			54' - 54.5'	
				Loose, v. dry, 5YR 6/1 gray, nonplastic SILT (powder like)	
	5			54.5' - 56'	
		SW		Loose, moist to wet, 7.5YR 5/8 strong brown, m-f well	
	6			graded SAND; trace silt	
	7			56' - 59'	
		CL		Soft, wet, 7.5YR 4/6 strong brown, sandy plastic CLAY;	
	8				
	9				
	60				

OSR 30-27 (Rev. 08-01-2019)
Page 4 of 4

Field Geologic Log (Continued)

Proc. Ref. 3Q1-9004, 9006

Run Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
	60				
	1			59' - 69'	
	2			Loose, moist to wet, 5YR5/8 yellow red, clayey m-f well graded SAND	
	3				
	4	SC			
7	5		70		
	6				
	7				
	8				
	9 69	TotalDepth			
	0				
	1				
	2				
	3				
	4				
	5				
	6				
	7				
	8				
	9				
	0				

Appendix C. Soil Boring Reports for FY23 ET3, ST8, and ST9 Lysimeter Installations

OSR 30-10 (Rev 6-14-2016)

Soil Boring Installation Report

Boring Number (AAA,NNN,AA)		
ET3	VL	6

GENERAL INFORMATION

Project Name				
E-Area LLWF ET3, ST8 & ST9 Lysimeters				
Project Manager			Department	
Ken Dixon			SRNS, Solid Waste Programs	
Boring Purpose		County	Location Description	
Install Lysimeters at ET3 for vadose zone sampling.		Aiken, SC	E-Area at SRS	
SRS North Grid Coordinate	SRS East Grid Coordinate	Latitude (degrees, minutes, seconds) (NAD 27)	Longitude (degrees, minutes, seconds) (NAD 27)	Ground Elevation
78685.32	57503.89	33° / 17' / 37.06"	-81° / 40' / 5.61"	276.43 ft-msl

DRILLING AND SAMPLING INFORMATION

Total Drilled Depth	Static Water Level	Drilling Start Date	Drilling Completion Date	Drilling Method
70 ft-bgs	75 ft-bgs	2/16/2023	2/21/2023	RotoSonic

Sample Type	Sampling Interval	Sample Type	Sampling Interval
RadCon Composite	0 - 70 ft-bgs		

Drilling and Sampling Comments (Include drilling muds used, source of water, lost circulation zones, etc.)

1) Borehole drilled dry to 70 ft-bgs, with 4" diameter continuous coring and 6" diameter over-ride casing.
2) Bentonite pellets backfill to elev. 219.43 ft-msl for lysimeter ET3-VL-6-219. Silica flour (~3 lbs) installed under lysimeter ceramic cup and around it to cover top of ceramic cup, then silica sand installed to top of the lysimeter.
3) Bentonite pellets installed from top of sand to elevation 238.43 ft-msl for lysimeter ET3-VL-6-238. Silica flour (~3 lbs) installed under lysimeter ceramic cup and around it to cover top of ceramic cup, then silica sand installed to top of the lysimeter.
4) Bentonite pellets installed from top of sand to 2.5 ft-bgs.
5) Surface completion is 5-ft PVC protective casing (6-in diam.) driven 2-ft into ground, and 1 bag (60lb) Sakrete to cement in place at ground surface.
6) Two lysimeters (Soilmoisture Corp., model 1920F1, 1.5" diameter) are installed in the borehole, which are connected to 1" risers with an PVC adapter. Lysimeter 1/4" vaccum/pressure air tubing and 1/4" water discharge tubing runs from lysimeter through 1" PVC riser pipe to surface for sampling.

Drilling Company	Driller (Last Name, First Initial)	Oversight Company	Oversight (Last Name, First Initial)
Cascade Drilling Co	Hall, James Jr.	SRNS	Killeen, Terry

Disposition of Samples

Composite samples collected and analyzed by SRNS Radiological Controls (RadCon). All samples below detection. Drill cuttings disposed on unit.

ABANDONMENT

Method of Abandonment	Materials Used in Abandonment
NA	NA

APPROVALS

Abandonment Verified By	Date	Boring Installation Report Prepared By	Date
NA	NA	Terry Killeen	3/15/2023

OSR 30-10 (Rev 6-14-2016)

Soil Boring Installation Report

Boring Number (AAA,NNN,AA)		
ET3	VL	7

GENERAL INFORMATION

Project Name				
E-Area LLWF ET3, ST8 & ST9 Lysimeters				
Project Manager			Department	
Ken Dixon			SRNS, Solid Waste Programs	
Boring Purpose		County	Location Description	
Install Lysimeters at ET3 for vadose zone sampling.		Aiken, SC	E-Area at SRS	
SRS North Grid Coordinate	SRS East Grid Coordinate	Latitude (degrees, minutes, seconds) (NAD 27)	Longitude (degrees, minutes, seconds) (NAD 27)	Ground Elevation
78613.77	57465.83	33° / 17' / 36.26"	-81° / 40' / 5.47"	278.48 ft-msl

DRILLING AND SAMPLING INFORMATION

Total Drilled Depth	Static Water Level	Drilling Start Date	Drilling Completion Date	Drilling Method
70 ft-bgs	77 ft-bgs	2/21/2023	2/22/2023	RotoSonic

Sample Type	Sampling Interval	Sample Type	Sampling Interval
RadCon Composite	0 - 70 ft-bgs		

Drilling and Sampling Comments (Include drilling muds used, source of water, lost circulation zones, etc.)

1) Borehole drilled dry to 70 ft-bgs, with 4" diameter continuous coring and 6" diameter over-ride casing.
2) Bentonite pellets backfill to elev. 220.48 ft-msl for lysimeter ET3-VL-7-220. Silica flour (~3 lbs) installed under lysimeter ceramic cup and around it to cover top of ceramic cup, then silica sand installed to top of the lysimeter.
3) Bentonite pellets installed from top of sand to elevation 240.48 ft-msl for lysimeter ET3-VL-7-240. Silica flour (~3 lbs) installed under lysimeter ceramic cup and around it to cover top of ceramic cup, then silica sand installed to top of the lysimeter.
4) Bentonite pellets installed from top of sand to 2.5 ft-bgs.
5) Surface completion is 5-ft PVC protective casing (6-in diam.) driven 2-ft into ground, and 1 bag (60lb) Sakrete to cement in place at ground surface.
6) Two lysimeters (Soilmoisture Corp., model 1920F1, 1.5" diameter) are installed in the borehole, which are connected to 1" risers with an PVC adapter. Lysimeter 1/4" vaccum/pressure air tubing and 1/4" water discharge tubing runs from lysimeter through 1" PVC riser pipe to surface for sampling.

Drilling Company	Driller (Last Name, First Initial)	Oversight Company	Oversight (Last Name, First Initial)
Cascade Drilling Co	Hall, James Jr.	SRNS	Killeen, Terry

Disposition of Samples

Composite samples collected and analyzed by SRNS Radiological Controls (RadCon). All samples below detection. Drill cuttings disposed on unit.

ABANDONMENT

Method of Abandonment	Materials Used in Abandonment
NA	NA

APPROVALS

Abandonment Verified By	Date	Boring Installation Report Prepared By	Date
NA	NA	Terry Killeen	3/15/2023

OSR 30-10 (Rev 6-14-2016)

Soil Boring Installation Report

Boring Number (AAA,NNN,AA)		
ET3	VL	10

GENERAL INFORMATION

Project Name				
E-Area LLWF ET3, ST8 & ST9 Lysimeters				
Project Manager			Department	
Ken Dixon			SRNS, Solid Waste Programs	
Boring Purpose		County	Location Description	
Install Lysimeters at ET3 for vadose zone sampling.		Aiken, SC	E-Area at SRS	
SRS North Grid Coordinate	SRS East Grid Coordinate	Latitude (degrees, minutes, seconds) (NAD 27)	Longitude (degrees, minutes, seconds) (NAD 27)	Ground Elevation
78448.06	57671.99	33°/17'/36.15"	-81°/40'/2.36"	280.01 ft-msl

DRILLING AND SAMPLING INFORMATION

Total Drilled Depth	Static Water Level	Drilling Start Date	Drilling Completion Date	Drilling Method
70 ft-bgs	65 ft-bgs	2/22/2023	2/23/2023	RotoSonic

Sample Type	Sampling Interval	Sample Type	Sampling Interval
RadCon Composite	0 - 70 ft-bgs		

Drilling and Sampling Comments (Include drilling muds used, source of water, lost circulation zones, etc.)

1) Borehole drilled dry to 70 ft-bgs, with 4" diameter continuous coring and 6" diameter over-ride casing.
2) Bentonite pellets backfill to elevation 222 ft-msl for lysimeter ET3-VL-10-222. Silica flour (~3 lbs) installed under lysimeter ceramic cup and around it to cover top of ceramic cup, then silica sand installed to top of the lysimeter.
3) Bentonite pellets installed from top of sand to elevation 242 ft-msl for lysimeter ET3-VL-10-242. Silica flour (~3 lbs) installed under lysimeter ceramic cup and around it to cover top of ceramic cup, then silica sand installed to top of the lysimeter.
4) Bentonite pellets installed from top of sand to 2.5 ft-bgs.
5) Surface completion is 5-ft PVC protective casing (6-in diam.) driven 2-ft into ground, and 1 bag (60lb) Sakrete to cement in place at ground surface.
6) Two lysimeters (Soilmoisture Corp., model 1920F1, 1.5" diameter) are installed in the borehole, which are connected to 1" risers with an PVC adapter. Lysimeter 1/4" vaccum/pressure air tubing and 1/4" water discharge tubing runs from lysimeter through 1" PVC riser pipe to surface for sampling.

Drilling Company	Driller (Last Name, First Initial)	Oversight Company	Oversight (Last Name, First Initial)
Cascade Drilling Co	Hall, James, Jr	SRNS	Killeen, Terry

Disposition of Samples

Composite samples collected and analyzed by SRNS Radiological Controls (RadCon). All samples below detection. Drill cuttings disposed on unit.

ABANDONMENT

Method of Abandonment	Materials Used in Abandonment
NA	NA

APPROVALS

Abandonment Verified By	Date	Boring Installation Report Prepared By	Date
NA	NA	Terry Killeen	3/15/2023

OSR 30-10 (Rev 6-14-2016)

Soil Boring Installation Report

Boring Number (AAA,NNN,AA)		
ET3	VL	11

GENERAL INFORMATION

Project Name				
E-Area LLWF ET3, ST8 & ST9 Lysimeters				
Project Manager			Department	
Ken Dixon			SRNS, Solid Waste Programs	
Boring Purpose		County	Location Description	
Install Lysimeters at ET3 for vadose zone sampling.		Aiken, SC	E-Area at SRS	
SRS North Grid Coordinate	SRS East Grid Coordinate	Latitude (degrees, minutes, seconds) (NAD 27)	Longitude (degrees, minutes, seconds) (NAD 27)	Ground Elevation
78401.64	57760.57	33°/17'/36.30"	-81°/40'/1.20"	280.62 ft-msl

DRILLING AND SAMPLING INFORMATION

Total Drilled Depth	Static Water Level	Drilling Start Date	Drilling Completion Date	Drilling Method
70 ft-bgs	66 ft-bgs	2/23/2023	2/27/2023	RotoSonic

Sample Type	Sampling Interval	Sample Type	Sampling Interval
RadCon Composite	0 - 70 ft-bgs		

Drilling and Sampling Comments (Include drilling muds used, source of water, lost circulation zones, etc.)

1) Borehole drilled dry to 70 ft-bgs, with 4" diameter continuous coring and 6" diameter over-ride casing.
2) Bentonite pellets backfill to elev. 221.6 ft-msl for lysimeter ET3-VL-11-222. Silica flour (~3 lbs) installed under lysimeter ceramic cup and around it to cover top of ceramic cup, then silica sand installed to top of the lysimeter.
3) Bentonite pellets installed from top of sand to elevation 241.6 ft-msl for lysimeter ET3-VL-11-242. Silica flour (~3 lbs) installed under lysimeter ceramic cup and around it to cover top of ceramic cup, then silica sand installed to top of the lysimeter.
4) Bentonite pellets installed from top of sand to 2.5 ft-bgs.
5) Surface completion is 5-ft PVC protective casing (6-in diam.) driven 2-ft into ground, and 1 bag (60lb) Sakrete to cement in place at ground surface.
6) Two lysimeters (Soilmoisture Corp., model 1920F1, 1.5" diameter) are installed in the borehole, which are connected to 1" risers with an PVC adapter. Lysimeter 1/4" vaccum/pressure air tubing and 1/4" water discharge tubing runs from lysimeter through 1" PVC riser pipe to surface for sampling.

Drilling Company	Driller (Last Name, First Initial)	Oversight Company	Oversight (Last Name, First Initial)
Cascade Drilling Co	Hall, James Jr.	SRNS	Killeen, Terry

Disposition of Samples

Composite samples collected and analyzed by SRNS Radiological Controls (RadCon). All samples below detection. Drill cuttings disposed on unit.

ABANDONMENT

Method of Abandonment	Materials Used in Abandonment
NA	NA

APPROVALS

Abandonment Verified By	Date	Boring Installation Report Prepared By	Date
NA	NA	Terry Killeen	3/15/2023

OSR 30-10 (Rev 6-14-2016)

Soil Boring Installation Report

Boring Number (AAA,NNN,AA)		
ET3	VL	12

GENERAL INFORMATION

Project Name				
E-Area LLWF ET3, ST8 & ST9 Lysimeters				
Project Manager			Department	
Ken Dixon			SRNS, Solid Waste Programs	
Boring Purpose		County	Location Description	
Install Lysimeters at ET3 for vadose zone sampling.		Aiken, SC	E-Area at SRS	
SRS North Grid Coordinate	SRS East Grid Coordinate	Latitude (degrees, minutes, seconds) (NAD 27)	Longitude (degrees, minutes, seconds) (NAD 27)	Ground Elevation
78407.90	57860.51	'33° / 17' / 36.94"	-81° / 40' / 0.29"	279.86 ft-msl

DRILLING AND SAMPLING INFORMATION

Total Drilled Depth	Static Water Level	Drilling Start Date	Drilling Completion Date	Drilling Method
75 ft-bgs	67 ft-bgs	2/14/2023	2/15/2023	RotoSonic

Sample Type	Sampling Interval	Sample Type	Sampling Interval
RadCon Composite	0 - 75 ft-bgs		

Drilling and Sampling Comments (Include drilling muds used, source of water, lost circulation zones, etc.)

1) Borehole drilled dry to 75 ft-bgs, with 4" diameter continuous coring and 6" diameter over-ride casing.
2) Bentonite pellets backfill to elev. 222.86 ft-msl for lysimeter ET3-VL-12-223. Silica flour (~3 lbs) installed under lysimeter ceramic cup and around it to cover top of ceramic cup, then silica sand installed to top of the lysimeter.
3) Bentonite pellets installed from top of sand to elevation 234.86 ft-msl for lysimeter ET3-VL-12-235. Silica flour (~3 lbs) installed under lysimeter ceramic cup and around it to cover top of ceramic cup, then silica sand installed to top of the lysimeter.
4) Bentonite pellets installed from top of sand to 2.5 ft-bgs.
5) Surface completion is 5-ft PVC protective casing (6-in diam.) driven 2-ft into ground, and 1 bag (60lb) Sakrete to cement in place at ground surface.
6) Two lysimeters (Soilmoisture Corp., model 1920F1, 1.5" diameter) are installed in the borehole, which are connected to 1" risers with an PVC adapter. Lysimeter 1/4" vaccum/pressure air tubing and 1/4" water discharge tubing runs from lysimeter through 1" PVC riser pipe to surface for sampling.

Drilling Company	Driller (Last Name, First Initial)	Oversight Company	Oversight (Last Name, First Initial)
Cascade Drilling Co	Hall, James Jr.	SRNS	Killeen, Terry

Disposition of Samples

Composite samples collected and analyzed by SRNS Radiological Controls (RadCon). All samples below detection. Drill cuttings disposed on unit.

ABANDONMENT

Method of Abandonment	Materials Used in Abandonment
NA	NA

APPROVALS

Abandonment Verified By	Date	Boring Installation Report Prepared By	Date
NA	NA	Terry Killeen	3/15/2023

OSR 30-10 (Rev 6-14-2016)

Soil Boring Installation Report

Boring Number (AAA,NNN,AA)		
ET3	VL	13

GENERAL INFORMATION

Project Name				
E-Area LLWF ET3, ST8 & ST9 Lysimeters				
Project Manager			Department	
Ken Dixon			SRNS, Solid Waste Programs	
Boring Purpose		County	Location Description	
Install Lysimeters at ET3 for vadose zone sampling.		Aiken, SC	E-Area at SRS	
SRS North Grid Coordinate	SRS East Grid Coordinate	Latitude (degrees, minutes, seconds) (NAD 27)	Longitude (degrees, minutes, seconds) (NAD 27)	Ground Elevation
78482.50	57922.75	33° / 17' / 37.90"	-81° / 40' / 0.22"	277.37 ft-msl

DRILLING AND SAMPLING INFORMATION

Total Drilled Depth	Static Water Level	Drilling Start Date	Drilling Completion Date	Drilling Method
70 ft-bgs	76 ft-bgs	2/15/2023	2/16/2023	RotoSonic

Sample Type	Sampling Interval	Sample Type	Sampling Interval
RadCon Composite	0 - 70 ft-bgs		

Drilling and Sampling Comments (Include drilling muds used, source of water, lost circulation zones, etc.)

1) Borehole drilled dry to 70 ft-bgs, with 4" diameter continuous coring and 6" diameter over-ride casing.
2) Bentonite pellets backfill to elev. 218.37 ft-msl for lysimeter ET3-VL-13-218. Silica flour (~3 lbs) installed under lysimeter ceramic cup and around it to cover top of ceramic cup, then silica sand installed to top of the lysimeter.
3) Bentonite pellets installed from top of sand to elevation 232.37 ft-msl for lysimeter ET3-VL-13-232. Silica flour (~3 lbs) installed under lysimeter ceramic cup and around it to cover top of ceramic cup, then silica sand installed to top of the lysimeter.
4) Bentonite pellets installed from top of sand to 2.5 ft-bgs.
5) Surface completion is 5-ft PVC protective casing (6-in diam.) driven 2-ft into ground, and 1 bag (60lb) Sakrete to cement in place at ground surface.
6) Two lysimeters (Soilmoisture Corp., model 1920F1, 1.5" diameter) are installed in the borehole, which are connected to 1" risers with an PVC adapter. Lysimeter 1/4" vaccum/pressure air tubing and 1/4" water discharge tubing runs from lysimeter through 1" PVC riser pipe to surface for sampling.

Drilling Company	Driller (Last Name, First Initial)	Oversight Company	Oversight (Last Name, First Initial)
Cascade Drilling Co	Hall, James Jr.	SRNS	Killeen, Terry

Disposition of Samples

Composite samples collected and analyzed by SRNS Radiological Controls (RadCon). All samples below detection. Drill cuttings disposed on unit.

ABANDONMENT

Method of Abandonment	Materials Used in Abandonment
NA	NA

APPROVALS

Abandonment Verified By	Date	Boring Installation Report Prepared By	Date
NA	NA	Terry Killeen	3/15/2023

OSR 30-10 (Rev 6-14-2016)

Soil Boring Installation Report

Boring Number (AAA,NNN,AA)		
ST8	VL	7

GENERAL INFORMATION

Project Name				
E-Area LLWF ET3, ST8 & ST9 Lysimeters				
Project Manager			Department	
Ken Dixon			SRNS, Solid Waste Programs	
Boring Purpose		County	Location Description	
Install Lysimeters at ST8 for vadose zone sampling.		Aiken, SC	E-Area at SRS	
SRS North Grid Coordinate	SRS East Grid Coordinate	Latitude (degrees, minutes, seconds) (NAD 27)	Longitude (degrees, minutes, seconds) (NAD 27)	Ground Elevation
78413.31	58073.94	33° / 17' / 38.24"	-81° / 39' / 58.31"	276.26 ft-msl

DRILLING AND SAMPLING INFORMATION

Total Drilled Depth	Static Water Level	Drilling Start Date	Drilling Completion Date	Drilling Method
70 ft-bgs	76 ft-bgs	3/2/2023	3/2/2023	RotoSonic

Sample Type	Sampling Interval	Sample Type	Sampling Interval
RadCon Composite	0 - 70 ft-bgs		

Drilling and Sampling Comments (Include drilling muds used, source of water, lost circulation zones, etc.)

1) Borehole drilled dry to 70 ft-bgs, with 4" diameter continuous coring and 6" diameter over-ride casing.
2) Bentonite pellets backfill to elev. 220.26 ft-msl for lysimeter ST8-VL-7-220. Silica flour (~3 lbs) installed under lysimeter ceramic cup and around it to cover top of ceramic cup, then silica sand installed to top of the lysimeter.
3) Bentonite pellets installed from top of sand to elevation 237.26 ft-msl for lysimeter ST8-VL-7-237. Silica flour (~3 lbs) installed under lysimeter ceramic cup and around it to cover top of ceramic cup, then silica sand installed to top of the lysimeter.
4) Bentonite pellets installed from top of sand to 2.5 ft-bgs.
5) Surface completion is 5-ft PVC protective casing (6-in diam.) driven 2-ft into ground, and 1 bag (60lb) Sakrete to cement in place at ground surface.
6) Two lysimeters (Soilmoisture Corp., model 1920F1, 1.5" diameter) are installed in the borehole, which are connected to 1" risers with an PVC adapter. Lysimeter 1/4" vaccum/pressure air tubing and 1/4" water discharge tubing runs from lysimeter through 1" PVC riser pipe to surface for sampling.

Drilling Company	Driller (Last Name, First Initial)	Oversight Company	Oversight (Last Name, First Initial)
Cascade Drilling Co	Hall, James Jr.	SRNS	Killeen, Terry

Disposition of Samples

Composite samples collected and analyzed by SRNS Radiological Controls (RadCon). All samples below detection. Drill cuttings disposed on unit.

ABANDONMENT

Method of Abandonment	Materials Used in Abandonment
NA	NA

APPROVALS

Abandonment Verified By	Date	Boring Installation Report Prepared By	Date
NA	NA	Terry Killeen	3/15/2023

OSR 30-10 (Rev 6-14-2016)

Soil Boring Installation Report

Boring Number (AAA,NNN,AA)		
ST9	VL	4

GENERAL INFORMATION

Project Name				
E-Area LLWF ET3, ST8 & ST9 Lysimeters				
Project Manager			Department	
Ken Dixon			SRNS, Solid Waste Programs	
Boring Purpose		County	Location Description	
Install Lysimeters at ST9 for vadose zone sampling.		Aiken, SC	E-Area at SRS	
SRS North Grid Coordinate	SRS East Grid Coordinate	Latitude (degrees, minutes, seconds) (NAD 27)	Longitude (degrees, minutes, seconds) (NAD 27)	Ground Elevation
78377.51	58142.24	33°/ 17' / 38.35"	-81° / 39' / 57.41"	276.67ft-msl

DRILLING AND SAMPLING INFORMATION

Total Drilled Depth	Static Water Level	Drilling Start Date	Drilling Completion Date	Drilling Method
70 ft-bgs	76 ft-bgs	2/27/2023	2/28/2023	RotoSonic

Sample Type	Sampling Interval	Sample Type	Sampling Interval
RadCon Composite	0 - 70 ft-bgs		

Drilling and Sampling Comments (Include drilling muds used, source of water, lost circulation zones, etc.)

1) Borehole drilled dry to 70 ft-bgs, with 4" diameter continuous coring and 6" diameter over-ride casing.
2) Bentonite pellets backfill to elev. 216.67 ft-msl for lysimeter ST9-VL-11-217. Silica flour (~3 lbs) installed under lysimeter ceramic cup and around it to cover top of ceramic cup, then silica sand installed to top of the lysimeter.
3) Bentonite pellets installed from top of sand to elevation 238.67 ft-msl for lysimeter ST9-VL-11-239. Silica flour (~3 lbs) installed under lysimeter ceramic cup and around it to cover top of ceramic cup, then silica sand installed to top of the lysimeter.
4) Bentonite pellets installed from top of sand to 2.5 ft-bgs.
5) Surface completion is 5-ft PVC protective casing (6-in diam.) driven 2-ft into ground, and 1 bag (60lb) Sakrete to cement in place at ground surface.
6) Two lysimeters (Soilmoisture Corp., model 1920F1, 1.5" diameter) are installed in the borehole, which are connected to 1" risers with an PVC adapter. Lysimeter 1/4" vaccum/pressure air tubing and 1/4" water discharge tubing runs from lysimeter through 1" PVC riser pipe to surface for sampling.

Drilling Company	Driller (Last Name, First Initial)	Oversight Company	Oversight (Last Name, First Initial)
Cascade Drilling Co	Hall, James Jr.	SRNS	Killeen, Terry

Disposition of Samples

Composite samples collected and analyzed by SRNS Radiological Controls (RadCon). All samples below detection. Drill cuttings disposed on unit.

ABANDONMENT

Method of Abandonment	Materials Used in Abandonment
NA	NA

APPROVALS

Abandonment Verified By	Date	Boring Installation Report Prepared By	Date
NA	NA	Terry Killeen	3/15/2023

OSR 30-10 (Rev 6-14-2016)

Soil Boring Installation Report

Boring Number (AAA,NNN,AA)		
ST9	VL	5

GENERAL INFORMATION

Project Name				
E-Area LLWF ET3, ST8 & ST9 Lysimeters				
Project Manager			Department	
Ken Dixon			SRNS, Solid Waste Programs	
Boring Purpose		County	Location Description	
Install Lysimeters at ST9 for vadose zone sampling.		Aiken, SC	E-Area at SRS	
SRS North Grid Coordinate	SRS East Grid Coordinate	Latitude (degrees, minutes, seconds) (NAD 27)	Longitude (degrees, minutes, seconds) (NAD 27)	Ground Elevation
78313.77	58261.45	33° / 17' / 38.55"	-81° / 39' / 55.83"	276.48 ft-msl

DRILLING AND SAMPLING INFORMATION

Total Drilled Depth	Static Water Level	Drilling Start Date	Drilling Completion Date	Drilling Method
70 ft-bgs	76 ft-bgs	3/1/2023	3/1/2023	RotoSonic

Sample Type	Sampling Interval	Sample Type	Sampling Interval
RadCon Composite	0 - 70 ft-bgs		

Drilling and Sampling Comments (Include drilling muds used, source of water, lost circulation zones, etc.)

1) Borehole drilled dry to 70 ft-bgs, with 4" diameter continuous coring and 6" diameter over-ride casing.
2) Bentonite pellets backfill to elev. 220.48 ft-msl for lysimeter ST9-VL-5-220. Silica flour (~3 lbs) installed under lysimeter ceramic cup and around it to cover top of ceramic cup, then silica sand installed to top of the lysimeter.
3) Bentonite pellets installed from top of sand to elevation 237.48 ft-msl for lysimeter ST9-VL-5-237. Silica flour (~3 lbs) installed under lysimeter ceramic cup and around it to cover top of ceramic cup, then silica sand installed to top of the lysimeter.
4) Bentonite pellets installed from top of sand to 2.5 ft-bgs.
5) Surface completion is 5-ft PVC protective casing (6-in diam.) driven 2-ft into ground, and 1 bag (60lb) Sakrete to cement in place at ground surface.
6) Two lysimeters (Soilmoisture Corp., model 1920F1, 1.5" diameter) are installed in the borehole, which are connected to 1" risers with an PVC adapter. Lysimeter 1/4" vaccum/pressure air tubing and 1/4" water discharge tubing runs from lysimeter through 1" PVC riser pipe to surface for sampling.

Drilling Company	Driller (Last Name, First Initial)	Oversight Company	Oversight (Last Name, First Initial)
Cascade Drilling Co	Hall, James Jr.	SRNS	Killeen, Terry

Disposition of Samples

Composite samples collected and analyzed by SRNS Radiological Controls (RadCon). All samples below detection. Drill cuttings disposed on unit.

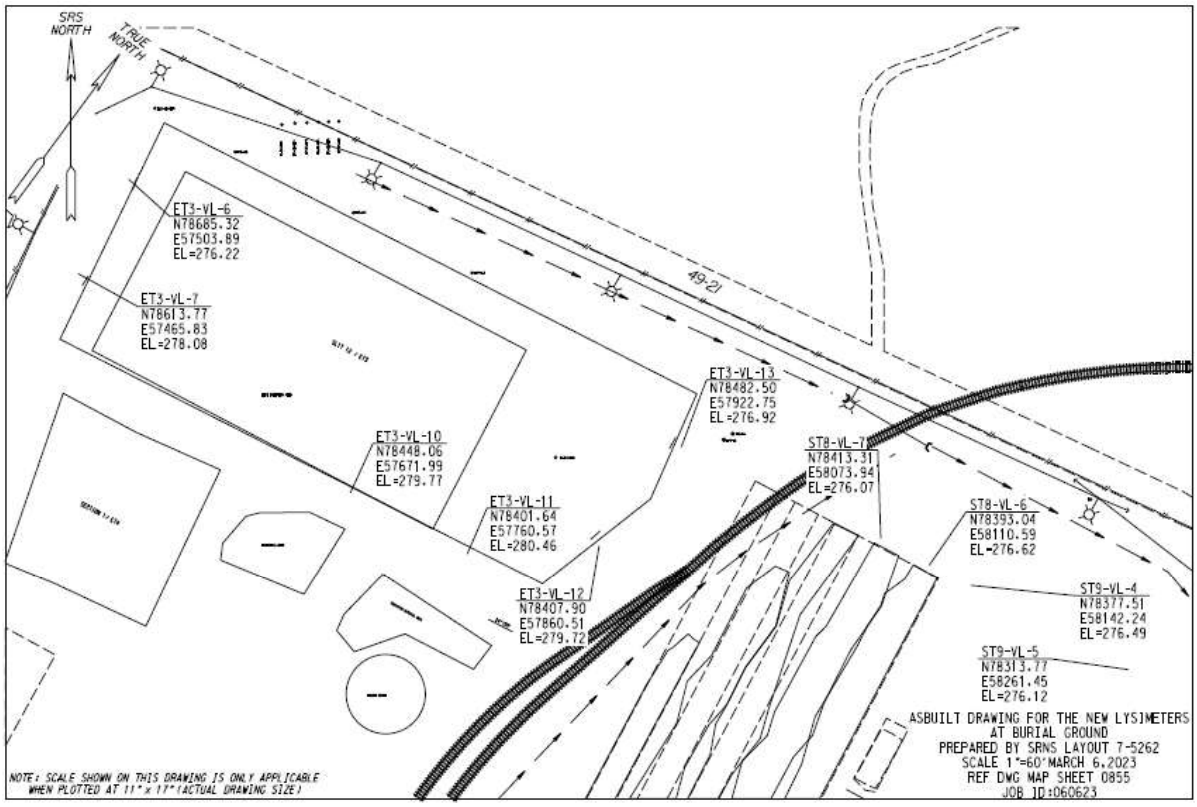
ABANDONMENT

Method of Abandonment	Materials Used in Abandonment
NA	NA

APPROVALS

Abandonment Verified By	Date	Boring Installation Report Prepared By	Date
NA	NA	Terry Killeen	3/15/2023

Appendix D. Final Layout for FY23 ET3, ST8, and ST9 Lysimeter Installations


SRS NORTH
TRUE NORTH
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E57503.89
EL=276.22
ET3-VL-7
N78613.77
E57465.83
EL=278.08
ET3-VL-10
N78448.06
E57671.99
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ET3-VL-11
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E57760.57
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ET3-VL-12
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ET3-VL-13
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E58073.94
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ST9-VL-4
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E58142.24
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ST9-VL-5
N78313.77
E58261.45
EL=276.12
49-21
ASBUILT DRAWING FOR THE NEW LYSIMETERS
AT BURIAL GROUND
PREPARED BY SRNS LAYOUT 7-5262
SCALE 1"=60' MARCH 6,2023
REF DWG MAP SHEET 0855
JOB ID:060623
NOTE: SCALE SHOWN ON THIS DRAWING IS ONLY APPLICABLE WHEN PLOTTED AT 11" x 17" (ACTUAL DRAWING SIZE)

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