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Corrective Measures Implementation/Remedial Action Implementation Plan for the G-Area Oil Seepage Basin (761-13G) Operable Unit (U)

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DISCLAIMER

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U.S. Department of Energy
and
Savannah River Nuclear Solutions, LLC
Aiken, South Carolina

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LIST OF ABBREVIATIONS AND ACRONYMS

~	approximately
ac	acre
ARAR	applicable or relevant and appropriate requirement
ARF	Administrative Record File
bgs	below ground surface
BRA	Baseline Risk Assessment
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
cm	centimeter
CMI/RAIP	Corrective Measures Implementation/Remedial Action Implementation Plan
CMIR	Corrective Measures Implementation Report
CMS/FS	Corrective Measures Study/Feasibility Study
COC	constituent of concern
DDD	dichlorodiphenyldichloroethane
DDE	dichlorodiphenyldichloroethylene
FFA	Federal Facility Agreement
ft	feet/foot
gal	gallon
GOSB	G-Area Oil Seepage Basin
ha	hectare
HQ	Hazard Quotient
in.	inch
km	kilometer
km^2	square kilometer
L	liter
LUC	land use control
m	meter
mi	mile
mi^2	square mile
NPDES	National Pollutant Discharge Elimination System
OU	Operable Unit
PCR	Post-Construction Report
POC	Point-of-contact
QA	quality assurance
QC	quality control
RA	remedial action
RACR	Remedial Action Completion Report
RAO	remedial action objective
RCRA	Resource Conservation and Recovery Act
RFI/RI	RCRA Facility Investigation/Remedial Investigation
RG	remedial goal
RGO	remedial goal objective
ROD	Record of Decision

LIST OF ABBREVIATIONS AND ACRONYMS *(Continued/End)*

SB/PP	Statement of Basis/Proposed Plan
SCDHEC	South Carolina Department of Health and Environmental Control
SEMS	Superfund Enterprise Management System
SOW	Statement of Work
SRNS	Savannah River Nuclear Solutions
SRS	Savannah River Site
STR	subcontract technical representative
SVOC	semi-volatile organic compound
USDA	U.S. Department of Agriculture
USDOE	United States Department of Energy
USEPA	United States Environmental Protection Agency
VOC	volatile organic compound
WSRC	Washington Savannah River Company, LLC
WWTP	Waste Water Treatment Plant

1.0 GENERAL DESCRIPTION

1.1 Purpose and Scope

This post-Record of Decision (ROD) document provides the following items for the implementation of the selected remedial action (RA) established in the ROD (SRNS 2019) for the G-Area Oil Seepage Basin (GOSB) (761-13G) Operable Unit (OU):

- A general description of the location and history of the site, description of the constituents of concern (COC) to be remedied and an overview of the selected RA;
- A summary of any associated study (if applicable) and the application of its results in the remedial design;
- An outline of the necessary design tasks;
- A design summary highlighting the results of each of the design tasks performed to accomplish the objectives of the selected RA;
- A summary of the construction strategy addressing critical components of construction activities required to implement the remedial design;
- Requirements for health and safety, waste management, contamination control, decontamination, quality assurance (QA)/quality control (QC) inspections, performance verifications (sampling, testing/analysis, when applicable), post-construction operations, maintenance and land use controls (LUCs), project closeout, post-construction monitoring and a forecast schedule for implementation of the RA; and
- A forecast schedule and brief discussion of the contents of the upcoming post-ROD documents required by the Federal Facility Agreement (FFA) for the Savannah River Site (SRS).

1.2 General Description and History of the Unit

SRS occupies approximately (~) 802.9 square kilometers (km^2) (310 square miles [mi^2]) of land adjacent to the Savannah River, principally in Aiken and Barnwell counties of South Carolina (Figure 1). SRS is located ~40.2-kilometers (km) (25-miles [mi]) southeast of Augusta, Georgia, and ~32.1-km (20-mi) south of Aiken, South Carolina.

The GOSB OU is located southeast of N-Area (Central Shops) in relatively flat terrain, ~54-meters (m) (180-feet [ft]) south of the railroad tracks, which run adjacent to Central Shops (Figure 1).

The area surrounding the GOSB OU is wooded with heavy underbrush and contains no stressed vegetation or other visual indications of contamination (Figure 2).

The basin is ~45-m (150-ft) long and ~28.5-m (95-ft) wide. The basin has steep side slopes that extend ~3-m (10-ft) deep around the edges of the basin with berms on the northern and southern sides (0.9-m [3-ft] and 0.6-m [2-ft] high, respectively). The top edge of the basin on the east and west sides is roughly even with the surrounding grade. The deepest part of the basin, near the center, is ~4.8-m (16-ft) below ground surface (bgs). Depth to groundwater is ~9- to 12-m (30- to 40-ft) bgs and ~6- to 7.5-m (20- to 25-ft) below the basin bottom. Approximately 57-m (190-ft) of buried 30-centimeter (cm) (12-inch [in.]) vitrified clay pipe (previously plugged and abandoned in place) runs to the inlet side of the basin. On the outlet side of the basin, ~153-m (510-ft) of buried 30-cm (12-in.) vitrified clay pipe discharges southeast of the basin into an intermittent stream. Both inlet and outlet pipes are buried to a depth of ~1.8- to 2.4-m (6- to 8-ft) bgs. The basin and surrounding area cover ~0.27-hectare (ha) (0.67-acres [ac]). A schematic of the GOSB OU is provided in Figure 3.

The GOSB OU received various unknown liquid wastes since SRS plant construction (1951-1956) until the early 1960s. However, there are no records indicating the disposal of radioactive or hazardous materials at the GOSB OU. After the 1960s, the basin received sanitary wastewater treatment facility effluent. The basin was isolated from the active system in the early 1990s. As part of the isolation, the basin was drained, and the influent sewer line (Figure 4) was plugged. Since the isolation, rainwater continues to accumulate and be retained in the basin with volume varying up to a maximum of 1,567,160 liters (L) (414,000 gallons [gal]). Currently, sediment in the basin is covered with ~20 cm (8 in.) of leaf debris and decayed organic material. Sandy clay underlies the decayed organic material.

For evaluation purposes, the GOSB OU is comprised of four subunits that represent geographically distinct locations within the GOSB OU (Figure 4). The subunits (and environmental samples associated with each subunit) include the following:

- GOSB Interior Subunit (sediment and surface water)
- GOSB Berm Subunit (soil)
- Pipeline Subunit (soil)
- Effluent Discharge Subunit (soil)

Characterization of the GOSB OU was conducted in 2009 and 2016-2017. Results of the characterization efforts are documented in the *Resource Conservation and Recovery Act Facility Investigation/Remedial Investigation Report with Baseline Risk Assessment and Corrective Measures Study/Feasibility Study for the G-Area Oil Seepage Basin (GOSB) (U)* (SRNS 2018a). The Resource Conservation and Recovery Act (RCRA) Facility Investigation/Remedial Investigation (RFI/RI)/Baseline Risk Assessment (BRA) portion of the document summarizes the data associated with the unit, describes the nature and extent of the contaminants in affected media, and evaluates potential risk to human and ecological receptors. The Corrective Measures Study/Feasibility Study (CMS/FS) portion outlines potential remedial alternatives and screens remedial technologies. The CMS/FS also includes a detailed alternative analysis that was used to support the selection of a final RA.

The extent of the contamination is limited to the sediment and surface water within the GOSB Interior Subunit. Contaminants were not found in the GOSB Berm Subunit, Pipeline Subunit, and the Effluent Discharge Subunit at levels that require a RA. Based on the results of the RFI/RI/BRA report, a RA is needed for the GOSB Interior Subunit due to pesticides/fungicides that are present in sediment and surface water at levels that potentially pose a threat to human health and the environment. The United States Environmental Protection Agency (USEPA), South Carolina Department of Health and Environmental Control (SCDHEC), and United States Department of Energy (USDOE) have agreed on the preferred RA for the GOSB Interior Subunit as identified in the *Statement of Basis/Proposed Plan for the G-Area Oil Seepage Basin (GOSB) (761-13G) Operable Unit (OU) (U)* (SRNS 2018b). The RA selected in the ROD contained no significant changes from the preferred RA presented in the Statement of Basis/Proposed Plan (SB/PP).

The selected RA includes dewatering and backfilling the basin to the natural grade with clean common fill and berm soil. Controlled compaction, including compaction testing, will be performed to mitigate subsidence followed by grading, and construction of a soil and vegetative cover over the basin footprint. Water removed from the basin will be used to irrigate a section of nearby forest (Figure 5). The RA to backfill the basin and manage the surface water is protective of human health and the environment, and the future land use of the GOSB OU will be unrestricted.

1.3 Nature and Extent of Contamination

Sampling events conducted in 2009, 2016, and 2017 were used to assess the contamination within the GOSB OU. For this RA, samples of interest include ten composite basin floor/wall sediment samples collected from the 0- to 0.3-m (0- to 1-ft) and 0.3- to 1.2-m (1- to 4-ft) depth intervals (2009), five surface water samples (unfiltered) collected from within the basin (2009), and six surface water samples (filtered and unfiltered) collected from within the basin (2016) (Figure 4). The 15 samples collected in 2009 were analyzed for inorganics (metals), pesticides, polychlorinated biphenyls, volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs) and radiological indicators (gross alpha/nonvolatile beta). The six surface water samples collected in 2016 were analyzed for inorganics (metals), VOCs, SVOCs, and radiological indicators.

The characterization data was used to perform a human health risk assessment and ecological risk assessment, a principal threat source material evaluation, and contaminant migration to groundwater analysis (SRNS 2018a). Sediment and surface water within the GOSB Interior Subunit contain contaminants that may potentially pose a threat to human health and the environment. There were no contaminant migration problems warranting action identified for the GOSB Interior Subunit. Table 1 identifies the refined constituents of concern for the GOSB Interior Subunit and the calculated remedial goals (RGs). There were no human health, ecological, or contaminant migration problems warranting action identified for the GOSB Berm, Pipeline, or Effluent Discharge subunits.

1.4 Document Format

The format of this Corrective Measures Implementation/Remedial Action Implementation Plan (CMI/RAIP) is consistent with the FFA protocol format approved by the USEPA and SCDHEC in March 2003.

1.5 Remedial Action

As stated in the ROD, the selected RA for the GOSB Interior Subunit entails dewatering of the basin, clearing ~0.27-ha (0.67-ac), excavation of the berms, backfilling the basin with ~4,460 cubic meters (5,834-cubic yards) of clean common fill and berm soil, compacting fill

material (including compaction testing) to mitigate subsidence followed by grading and construction of a soil and vegetative cover over the basin footprint. The thickness of the required fill material, a minimum of 3.1 m (10 ft) in the shallow end of the basin and a minimum of 4.9 m (16 ft) in the deeper end of the basin, prevents exposure to pesticides buried at depth. There is ample forested area adjacent to the basin to receive irrigation from the dewatering effort.

Controlled compaction is expected to be adequate to mitigate settlement and erosion; however, an aggregate bridging material layer will also be used because the sediment is likely to be unstable. Clean common fill will be verified in accordance with the approved SRS protocol for verification of fill and cover material. There is no debris from the interior of the basin anticipated based on observations of the basin when it was drained in a dewatering effort in the early 1990s. However, any debris encountered will be managed as Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) waste and disposed of at an approved waste disposal facility. Trees cleared to gain access to the basin will be pushed aside and left near the site. Perimeter site fencing, signs, orange ball waste site markers, and posts will be disposed of as common construction debris during implementation of the RA. Disturbance of the fill material and vegetative cover at the GOSB OU will not occur as long as administrative site use procedures that prohibit unauthorized excavations at SRS are in place. Following implementation of the RA, the GOSB OU will not require LUCs or a five-year remedy review and the area will be available for unrestricted land use.

This remedy was selected because it meets the remedial action objectives (RAOs) (Section 1.6), provides overall protection of human health and the environment, complies with Applicable or Relevant and Appropriate Requirements (ARARs) (listed in Table 2), and is cost-effective.

There are no COCs for the GOSB Berm Subunit, Pipeline Subunit, and Effluent Discharge Subunit. Therefore, No Action is the appropriate response and the subunits are available for unrestricted land use.

A conceptual site model (Figure 6) illustrates how implementation of the RA breaks the exposure pathways.

1.6 Remedial Action Objectives

As stated in the ROD (SRNS 2019), the RAOs for the GOSB Interior Subunit sediment are as follows:

- Protect the future resident receptor from exposure to alpha-chlordane, gamma-chlordane, dichlorodiphenyldichloroethylene (DDE), dieldrin, and heptachlor epoxide in sediment within the 0- to 0.3-m (0- to 1-ft) depth interval that exceeds 10^{-6} risk-based threshold level. Also, protect the future industrial worker receptor from exposure to the pesticides gamma-chlordane, dieldrin, and heptachlor epoxide in sediment within the 0- to 0.3-m (0- to 1-ft) depth interval that exceeds 10^{-6} risk-based threshold level. The primary route of exposure for both scenarios is the incidental ingestion pathway.
- Protect ecological receptors from exposure to alpha-chlordane, gamma-chlordane, dichlorodiphenyldichloroethane (DDD), DDE, dieldrin, heptachlor epoxide and silver in sediment that exceed a Hazard Quotient (HQ) = 1. The primary route of exposure is the direct contact pathway.

Based on the problem warranting action, the following RAO applies for GOSB Interior Subunit surface water:

- Protect ecological receptors from exposure to alpha-chlordane, gamma-chlordane, and silver in surface water that exceed an HQ = 1. The primary route of exposure is the direct contact pathway.

1.7 Remedial Action Implementation Schedule

A summary of the key deliverables and submittal dates for the GOSB OU is shown in Figure 7 and is summarized below:

Submit Rev. 0, Record of Decision	January 28, 2019
Submit Rev. 0, Corrective Measures Implementation/Remedial Action Implementation Plan	September 5, 2019
Issuance of the Record of Decision	September 30, 2019
Remedial Action Start	September 30, 2020
Submit Rev.0, Post Construction Report/Corrective Measures Implementation Report/Remedial Action Completion Report	June 22, 2021

1.8 Community Relations

The *Statement of Basis/Proposed Plan for the G-Area Oil Seepage Basin (GOSB) (761-13G) Operable Unit (OU) (U)* (SRNS 2018b), a part of the Administrative Record File (ARF), highlights key aspects of the investigation and identifies the preferred action for addressing the GOSB OU. The FFA ARF and the RCRA ARF for SCDHEC were made available for public review.

The public was notified of the public comment period through mailings of the *SRS Environmental Bulletin*, a newsletter sent to interested citizens in South Carolina and Georgia, and through notices in the *Aiken Standard*, *The Augusta Chronicle*, *The People-Sentinel*, and *The State* newspapers. The public comment period was also announced on local radio stations.

The SB/PP 45-day public comment period began on November 28, 2018, and ended on January 11, 2019. A fact sheet on the RA is attached as Appendix A to inform interested parties about activities related to the RA and that an opportunity for a public briefing will be held before initiation of the RA.

2.0 REMEDIAL DESIGN

2.1 Design Strategy

The design for remediation of the GOSB OU was produced by Design Engineering at Savannah River Nuclear Solutions (SRNS). The design strategy is based on information gathered during formal site investigations and walk downs by engineering personnel. A Statement of Work (SOW), along with the design drawings (Attachment 1), will allow for a definitive execution by SRS construction forces or a subcontractor. The RA design consists of dewatering the basin, clearing vegetation from the remediation area, excavating the berms, backfilling the basin with controlled compaction, and development of a vegetative cover over the GOSB OU footprint.

2.2 Design Activities

The following is a list of design tasks that are required to implement the selected RA:

1. Development of the RA design;
2. Development of a SOW for the selected RA;

3. Definitive survey of RA area and other areas to support design activities;
4. Development and approval of the Site Use/Site Clearance Permit; and
5. Development and approval of the specifications for construction activities for contract procurement.

2.3 Design Deliverables

Design deliverables include construction drawings and the specifications for construction.

2.4 Results of Data Acquisition

2.4.1 Evaluation of Studies

No treatability study was required for the implementation of the RA. Soil sampling as summarized in the *Resource Conservation and Recovery Act Facility Investigation/Remedial Investigation Report with Baseline Risk Assessment and Corrective Measures Study/Feasibility Study for the G-Area Oil Seepage Basin (GOSB) (U)* (SRNS 2018a) was used to determine the limits of disturbance.

2.5 Design Criteria

The design criteria include basin dewatering, backfilling of the basin with clean fill by controlled compaction, and compaction testing to ensure a minimum of 85% compaction. The RGs for the project are summarized in Table 1. Results of the compaction testing will be presented in the Post Construction Report (PCR)/Corrective Measures Implementation Report (CMIR)/Remedial Action Completion Report (RACR). Construction activities associated with this RA have been designed to meet the ARARs for the GOSB OU as shown in Table 2.

2.6 Drawings

Attachment 1 provides sketches of the basin backfill design. Dewatering and management of the basin water will be performed by subcontract or with SRS construction workforce. Details for basin dewatering are provided in a SOW.

2.7 Design Technical Information

Design technical information for backfilling the basin is provided on the construction drawings shown in Attachment 1. The drawings and a SOW will be issued to the performing entity to provide details of the existing conditions and construction requirements.

Technical information regarding dewatering of the GOSB is summarized in the following:

- Amount of accumulated rainwater in the GOSB is less than 1,567,160 L (414,000 gal).
- A Spray Irrigation to Land Surface Risk Evaluation, (SRNS 2018b) concluded that there is no human health, ecological or contaminant migration risk from applying all water within the GOSB to the spray field.
- Accumulated rainwater will be dewatered by pumping from the basin and irrigating an area/spray field of ~2.2 ha (5.5 ac) which is ~94.5-m (310-ft) east of the GOSB as shown in Figure 5 and Table 3.
- Spray irrigation will be by mobile gun and/or spray head(s). Other dewatering equipment includes portable pumps, hose, and rigid pipe for application to the designated spray field.
- The slope of the spray field is ~2.1% based on local topography.
- An unnamed tributary to Pen Branch is the nearest surface water body and is ~94.5 m (310 ft) from the southern edge of the spray field.
- The spray field is heavily vegetated with a stand of pine trees and light underbrush.
- Soil type within the spay field is classified as Dothan per the Soil Survey of the Savannah River Plant (U.S. Department of Agriculture [USDA] 1990). Dothan series consists of well drained, moderately permeable soils consisting of sand and sandy loam.
- Depth to groundwater is ~12- to 15-m (40- to 50-ft) bgs.
- The dewatering equipment and spray field will be used only until the GOSB water has been removed. Dewatering will be monitored to ensure that the application rate does not result in runoff that could reach waters of the State.

3.0 PERMITTING REQUIREMENTS

A grading permit will be prepared to address stormwater management and sediment reduction via the use of best management practices during land disturbing activities. The area of disturbance is less than one acre and does not require a formal Stormwater Pollution Prevention Plan. In addition to the grading permit, a SRS Site Use and Site Clearance Permit will be required.

4.0 CONSTRUCTION

4.1 Construction Strategy

The construction sequencing requirements have been established for GOSB OU remediation area (Figure 5). Construction details for backfilling the basin are shown in the sketches provided in Attachment 1. Prior to backfilling, the GOSB will be dewatered, and surface water will be used to irrigate a nearby section of forest. Figure 5 provides the irrigation area for dewatering.

Clearing of the vegetation within the basin and area immediately adjacent to the basin will be conducted prior to backfilling. Following adequate clearing of the GOSB OU Interior Subunit, the basin will be backfilled with bridging material, followed by clean fill. The bridging material will be considered clean fill for purposes of meeting the minimum fill thickness.

Backfilling of the GOSB OU will be completed using the controlled compaction technique. Compaction testing will be completed as required to ensure a minimum of 85% of the maximum density is reached per American Society for Testing and Materials (ASTM) D1557 (ASTM 2012). Once the fill reaches the required compaction, grading and stabilization activities will be completed to return the area to natural grade.

4.2 Construction Activities

Construction activities will be executed by the constructor per the design drawings and SOW. The general construction activities include, but are not limited to the following:

- Preparing construction laydown areas and vehicular ingress and egress areas;
- Developing an accepted traffic safety plan and placement of traffic control signs;
- Clearing and disposal of vegetation as required within limits of disturbance;
- Disposal of fence posts and metal at on-site solid waste landfill (if applicable);

- Emplacement of bridging material;
- Backfilling of basin with clean soil;
- Grading and shaping of the excavated areas to allow for stormwater drainage;
- Stabilizing disturbed areas by placement of vegetative cover; and
- Performing as-built surveys.

4.3 Remedial Design Change Control

A Subcontract Technical Representative (STR) and/or point-of-contact (POC) will be assigned by SRNS to interface with the RA constructor and the SRNS project engineers and other project team members. The constructor is required to promptly notify the STR/POC of observed irregularities or nonconformance of work or products. The SRNS project engineers will review and approve of any necessary design change documents.

The USDOE will notify the USEPA and SCDHEC, within a reasonable time frame, if significant problems arise regarding any aspect of the Remedial Design/RA process. In particular, scheduling, budget and implementability/technical issues that compromises the successful execution of the project will be brought to the attention of the regulators as soon as they are identified. Notifications will follow established protocols for major and minor changes during construction. If the change is considered major, National Oil and Hazardous Substances Pollution Contingency Plan §300.435(c)(2)(i) or (ii) will be followed for public participation requirements. Section 300.435(c)(2)(i) applies to Explanation of Significant Difference for RODs and (ii) applies to ROD amendments.

All changes will be documented on the as-built drawings. As-built drawings will be included in the PCR/CMIR/RACR.

4.4 Waste Disposal and Transport

Excess clean soil that originates from the GOSB OU berms during the clearing of vegetation and that is not used as a fill material within the basin can be utilized as a grading material around the perimeter of the basin as necessary to level the immediate areas. Debris (including excess residual soils) located within the construction area (gates, fencing, etc.) will be managed as construction waste and transported to an approved solid waste facility on-site. The SRS 632-G Class Two

Construction and Demolition Landfill (Permit #065800-1901) is permitted to receive these materials.

4.5 Quality Assurance (QA)

QA for the RA is provided through implementation of the performance requirements specified in the design documents to ensure compliance with the approved ROD (SRNS 2019). Design documents are developed in accordance with the SRS Manuel E7, *Conduct of Engineering and Technical Support*, to ensure quality work and conformance with the requirements of the SRS Manual 1Q, *Quality Assurance Manual*. The constructor's team including any sub tier contractors will be required to have the necessary qualifications and experience to perform the required tasks.

Soil compaction testing will be performed by a qualified testing facility. QC inspections of all critical construction and testing activities related to implementation of the RA will be performed by SRNS engineers. The inspections will ensure conformance to the specified requirements and acceptance criteria. The PCR/CMIR/RACR will contain a summary of the results of the quality control test and inspections.

4.6 Non-Conformances

All non-conformances will be evaluated, resolved, or rectified as described in the pertinent sections of this document and per the subcontract documents. Design changes from the resolution of non-conforming conditions will be processed per Section 4.3, Remedial Design Change Control.

4.7 Health and Safety Plan

Due to low concentration of contaminants, the RA of filling the basin with clean fill poses insignificant risk of exposure to workers. Procedures will be used to address industrial hazards associated with the earth moving equipment. A hazards analysis will be performed, and necessary controls will be identified in the Work Package/Work Instructions. A copy of the Work Package/Work Instructions will be available at the job site at all times. At a minimum, the Work Package/Work Instructions will describe the following:

- Required actions by the facility personnel in case of fires, explosions, or any unplanned releases of hazardous waste;

- Arrangements with onsite security, fire department, medical facility, and emergency response teams to coordinate emergency services;
- Names, addresses, and phone numbers (office and home) of all persons qualified to act as emergency coordinators;
- Emergency equipment available at the facility; and
- Evacuation plan for facility personnel.

5.0 POST CONSTRUCTION

5.1 Post-Construction Monitoring

No post-construction monitoring is required for this remediation.

5.2 Contingency Plan Implementation Strategy

Field construction activities for the RA completed by the constructor will be overseen by the SRNS STR/POC. The STR/POC is responsible for ensuring backfilling is performed in accordance with the contract and the contract requirements and for interfacing with the constructor and other SRNS project team members. If visual examination or testing results indicate that additional filling and/or compaction, is required, the STR may direct the constructor to perform additional work. This additional work will be handled as a design change as described in Section 4.3 of this document.

5.3 Operations, Maintenance, and Institutional Control

There are no operations, maintenance, or institutional controls required by this RA. The selected RA does not require LUCs.

5.4 Requirements for Project Closeout

Completion of construction will be verified by the SRNS project team. The SRNS project team will perform periodic surveillance of construction activities and will compile the results of the compaction testing in the PCR/CMIR/RACR. An as-built survey of the filled, compacted, and stabilized area will be prepared to document the final condition of the remediated area.

5.5 Schedule for Federal Facility Agreement Deliverables

A schedule of the FFA milestones is provided in Figure 7. The GOSB OU PCR/CMIR/RACR will be submitted in accordance with the requirements for submittal of regulatory documents as identified in the FFA. The PCR/CMIR/RACR is scheduled to be prepared and submitted to USEPA and SCDHEC in June 2021, within 160 calendar days of completion of the RA. The PCR/CMIR/RACR will include items such as a chronology of events, performance standards and construction QC information, a description of the construction activities, final inspections, project as-built drawings, a summary of project costs, and the results of the compaction testing.

6.0 REFERENCES

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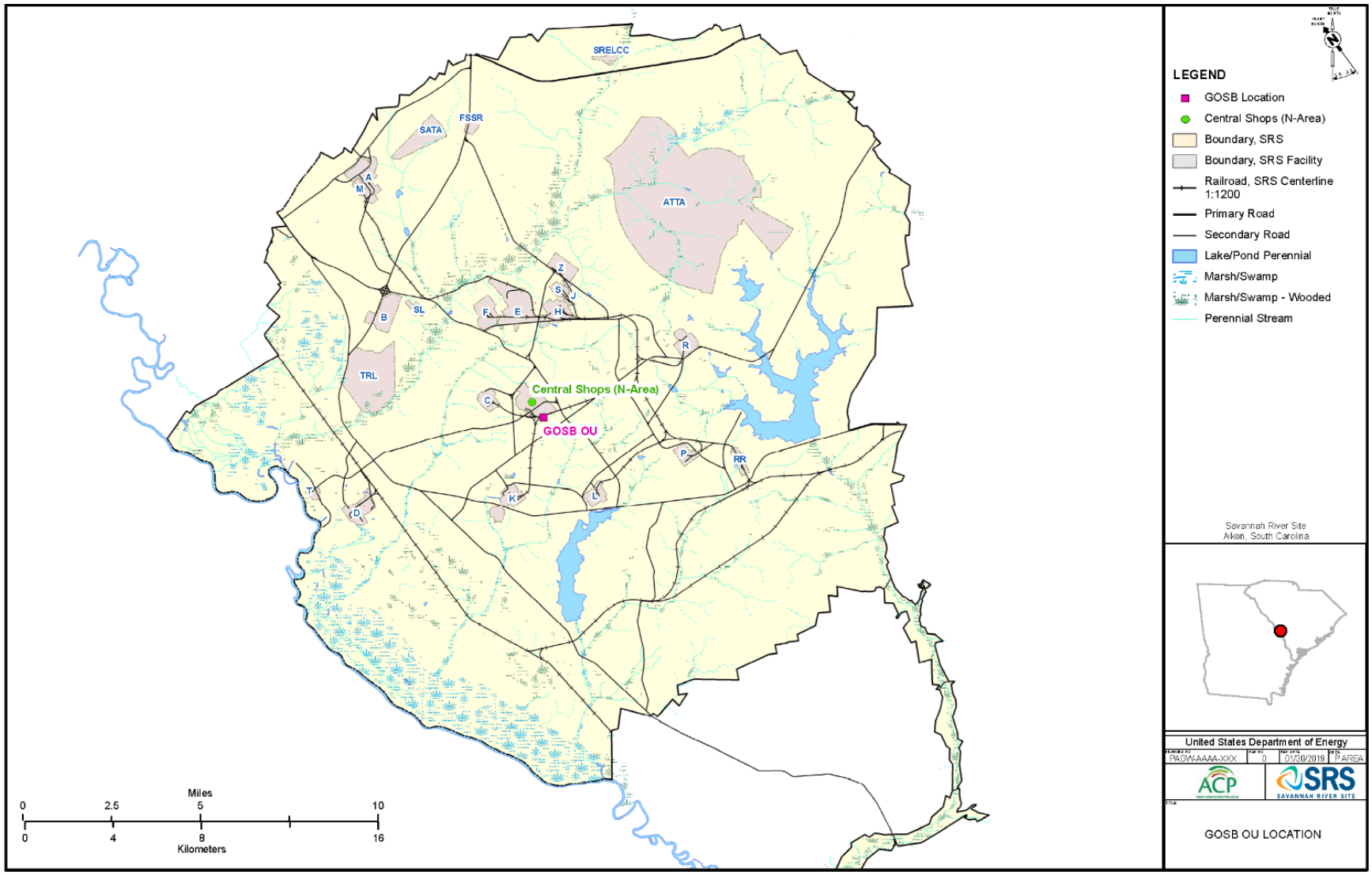


Figure 1. GOSB OU Location

Figure 2. Photograph of the GOSB OU (February 2017)

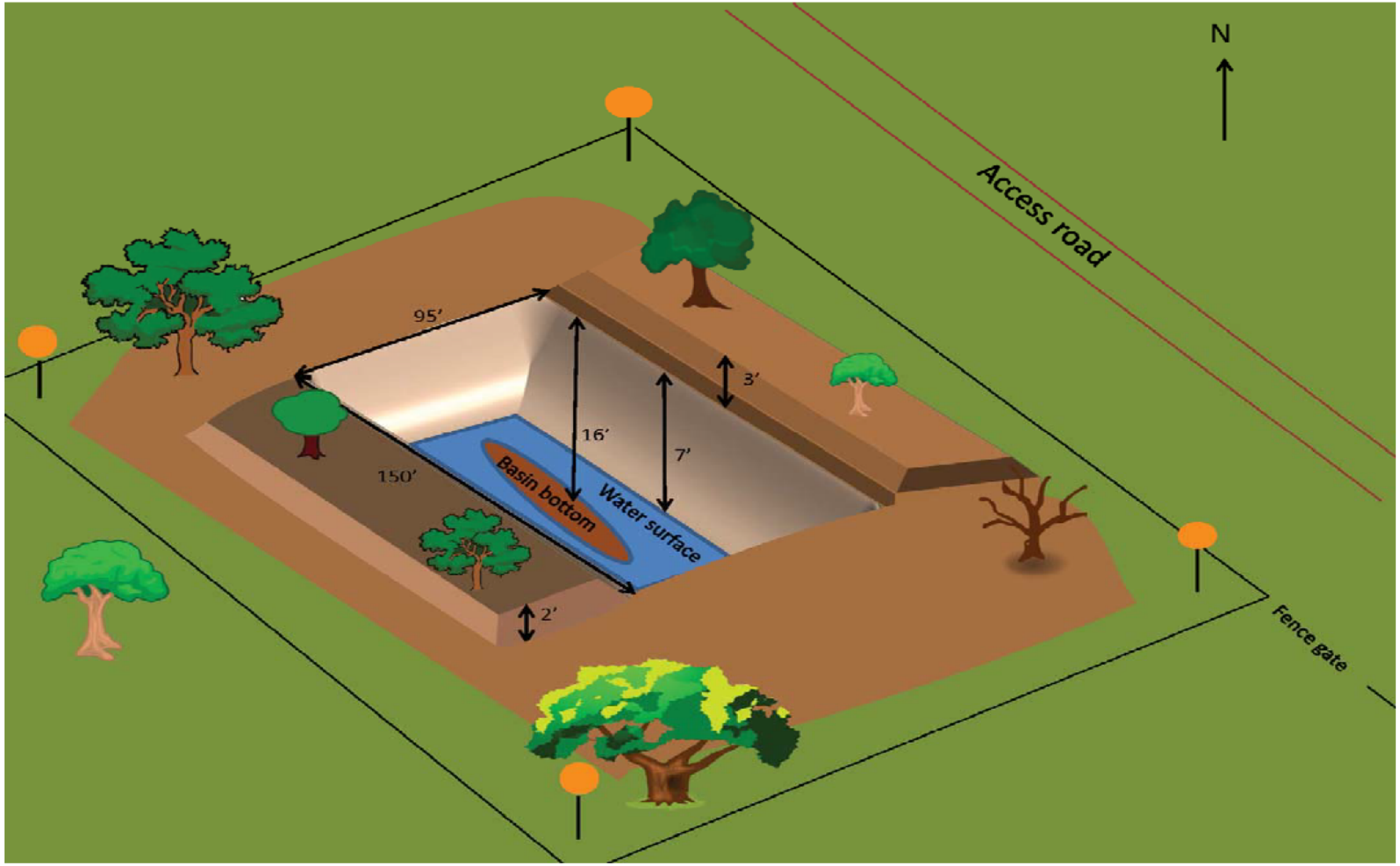


Figure 3. Schematic of the GOSB OU

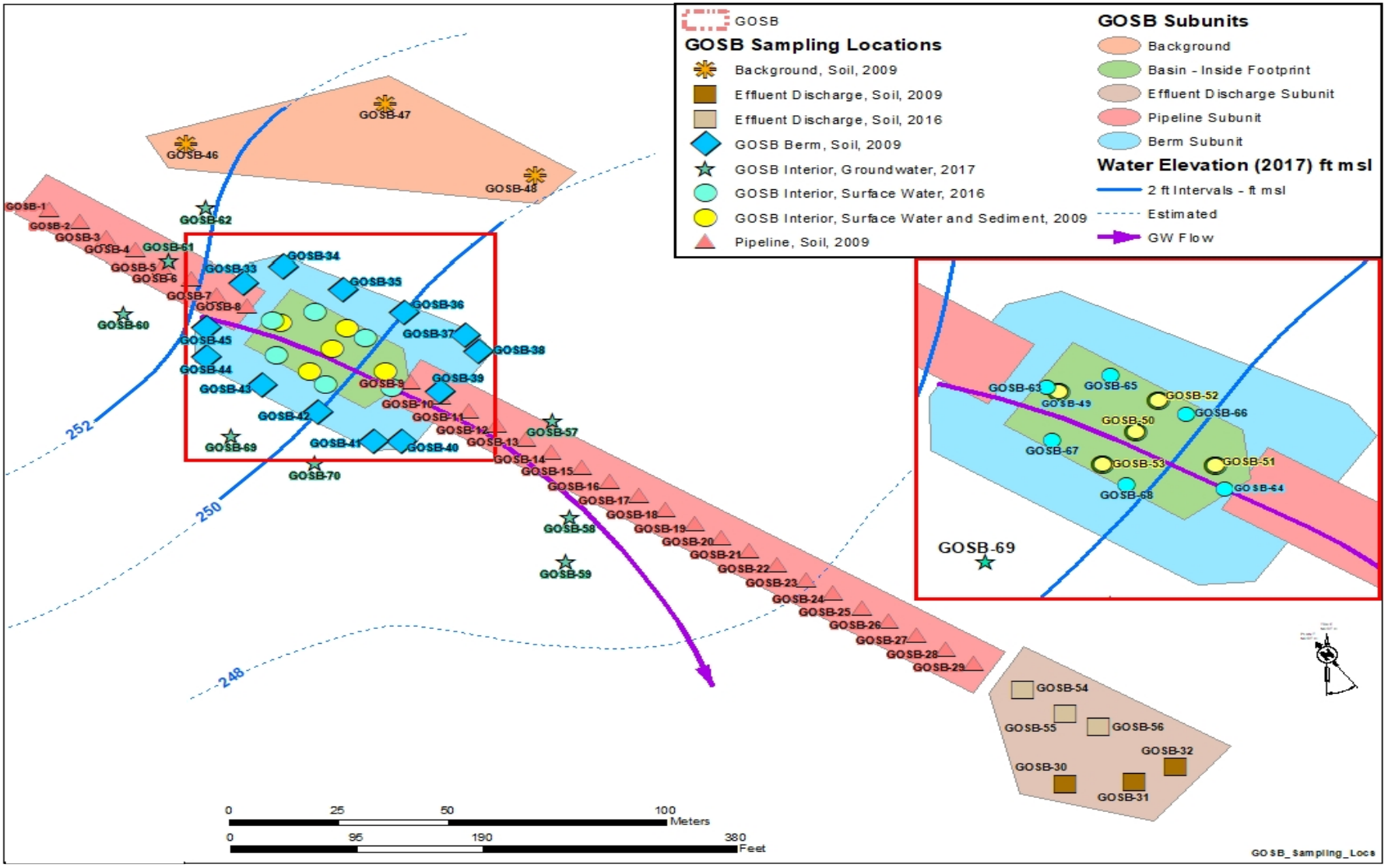


Figure 4. GOSB Subunit Identification and Sample Locations

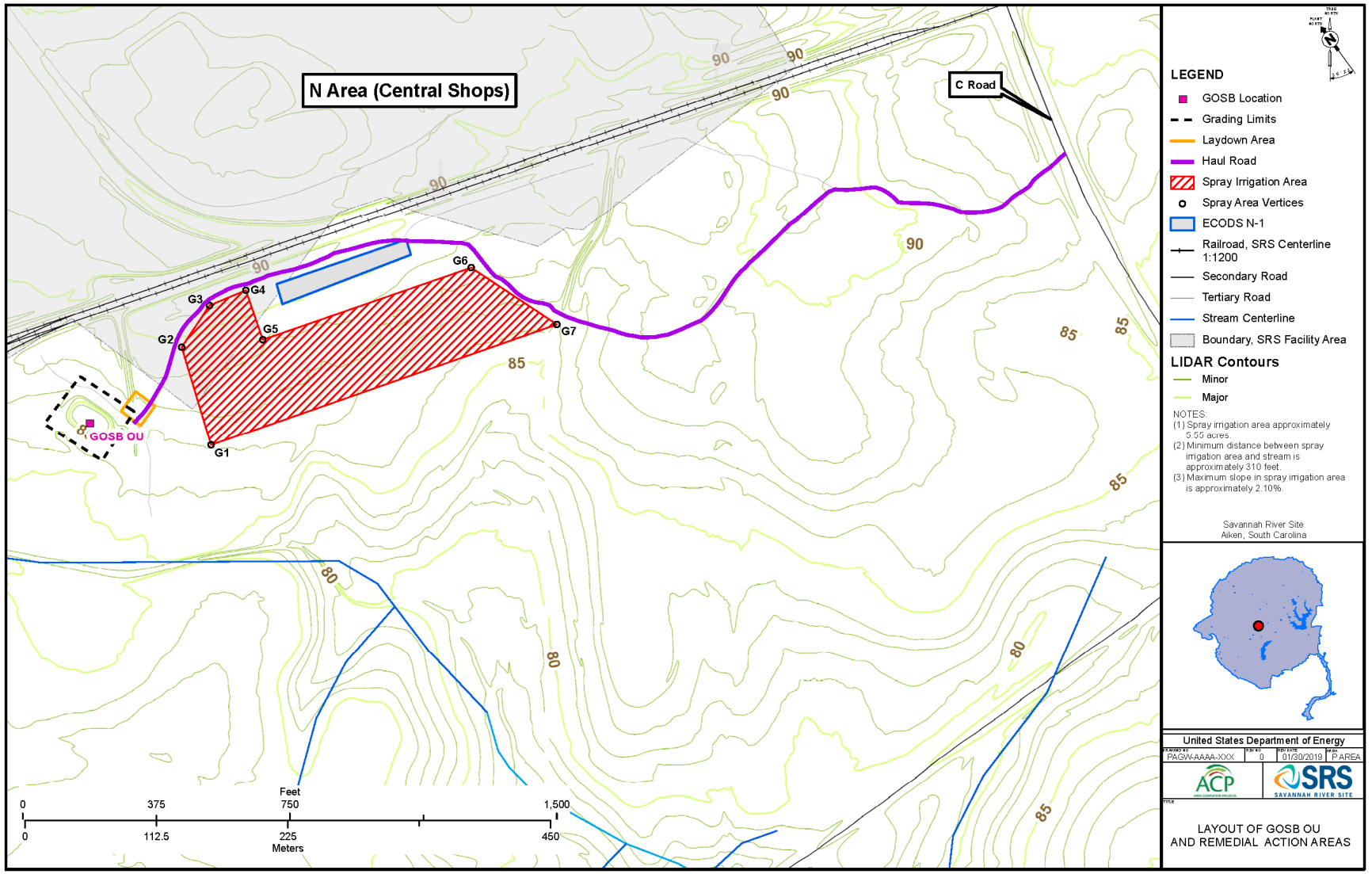


Figure 5. Layout of GOSB OU and Remedial Action Areas

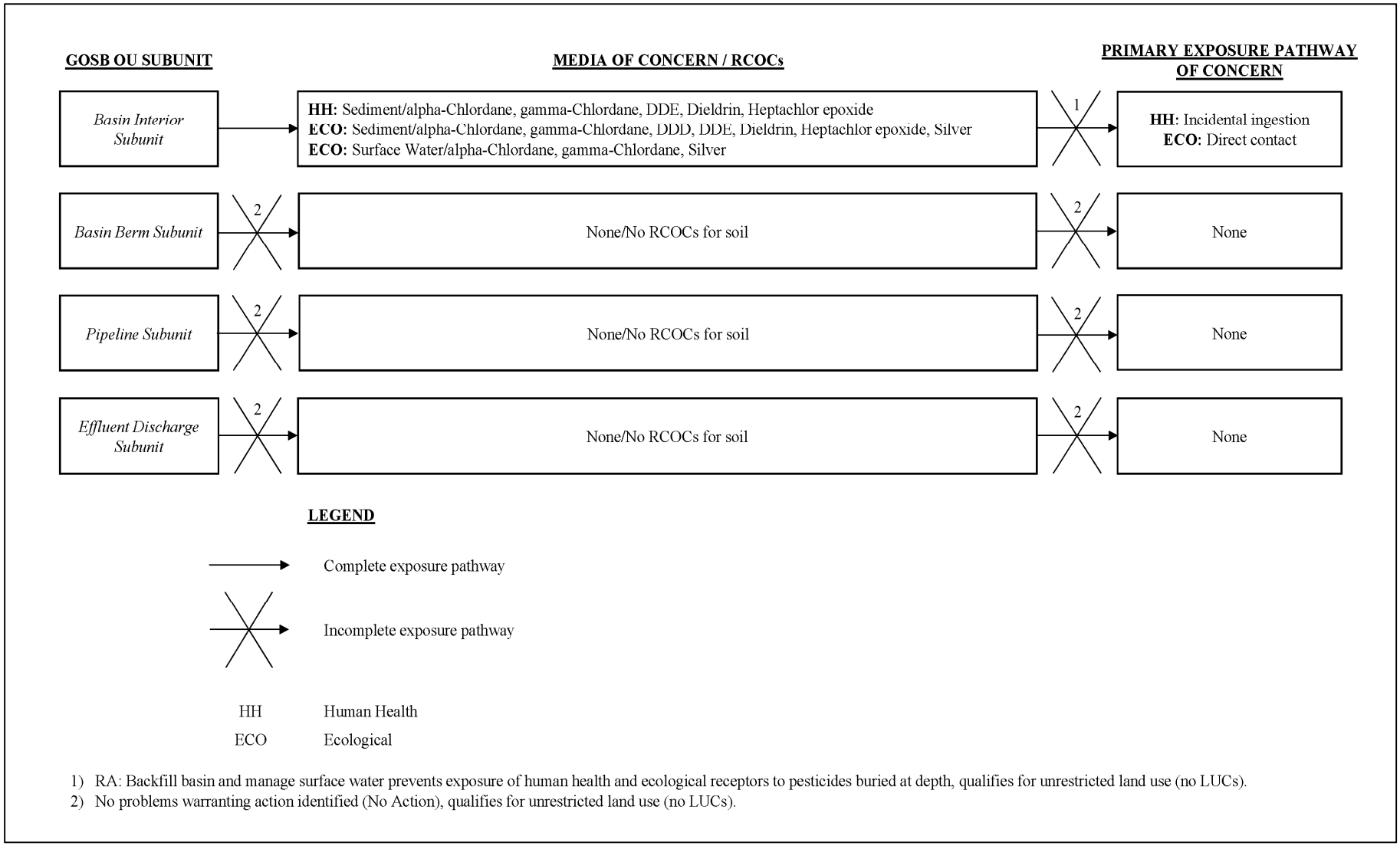
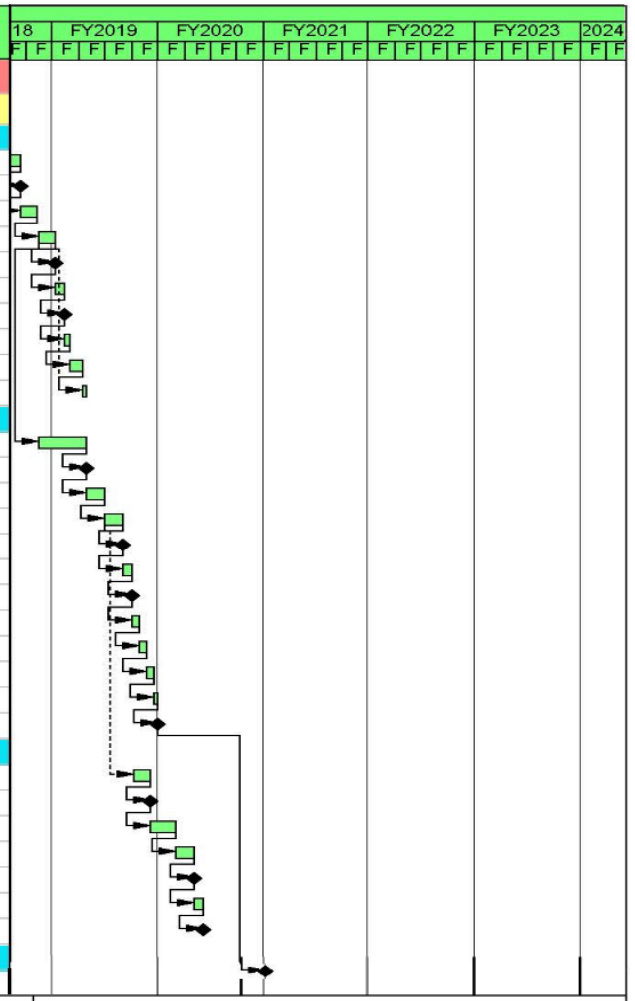


Figure 6. GOSB OU Generic Conceptual Site Model

Activity Name	Original Duration	Start	Finish
Four Mile Branch WS	1353	05-Apr-18	17-Dec-21
G-Area Oil Seepage Basin Implementation Sche	1353	05-Apr-18	17-Dec-21
Statement of Basis/Proposed Plan (SB/PP)	299	05-Apr-18	28-Jan-19
SRS Prepare SB/PP (Rev.0)	68	05-Apr-18	11-Jun-18
SRS Submit SB/PP (Rev.0) to EPA/SCDHEC	0		11-Jun-18
EPA/SCDHEC Review of SB/PP (Rev.0)	60	12-Jun-18	10-Aug-18
SRS Incorporate EPA/SCDHEC Comments	60	13-Aug-18	11-Oct-18
SRS Submit SB/PP (Rev.1) to EPA/SCDHEC	0		11-Oct-18
EPA/SCDHEC Final Review/Approval	33	12-Oct-18	13-Nov-18
Approval of SB/PP	0		13-Nov-18
Notification of SB/PP Public Comment	14	14-Nov-18	27-Nov-18
Public Comment Period	45	28-Nov-18	11-Jan-19
Develop Responsiveness Summary	15	14-Jan-19	28-Jan-19
ROD	414	13-Aug-18	30-Sep-19
SRS Develop ROD (Rev.0)	169	13-Aug-18	28-Jan-19
SRS Submit ROD (Rev.0) to EPA/SCDHEC	0		28-Jan-19
EPA/SCDHEC Review of ROD (Rev.0)	60	29-Jan-19	29-Mar-19
SRS Incorporate EPA/SCDHEC Comments	60	01-Apr-19	30-May-19
Submit ROD (Rev.1) to EPA/SCDHEC	0		30-May-19
EPA/SCDHEC Final Review/Approval	32	31-May-19	01-Jul-19
Approval of ROD	0		01-Jul-19
DOE Obtain Signature on ROD	25	02-Jul-19	26-Jul-19
SCDHEC Obtain Signature on ROD	25	29-Jul-19	22-Aug-19
EPA Obtain Signature on ROD	25	23-Aug-19	16-Sep-19
Prepare Public Notice	14	17-Sep-19	30-Sep-19
Issue ROD	0		30-Sep-19
CMI/RAIP	241	08-Jul-19	04-Mar-20
SRS Develop CMI/RAIP (Rev.0)	60	08-Jul-19*	05-Sep-19
SRS Submit CMI/RAIP (Rev.0) to EPA/SCDHEC	0		05-Sep-19
EPA/SCDHEC Review of (CMI/RAIP Rev.0)	90	06-Sep-19	04-Dec-19
SRS Incorporate EPA/SCDHEC Comments	61	05-Dec-19	03-Feb-20
SRS Submit CMI/RAIP (Rev.1) to EPA/SCDHEC	0		03-Feb-20
EPA/SCDHEC Final Review/Approval	30	04-Feb-20	04-Mar-20
Approval of CMI/RAIP	0		04-Mar-20
RA Start	0	30-Sep-20	30-Sep-20
RA Start	0	30-Sep-20	

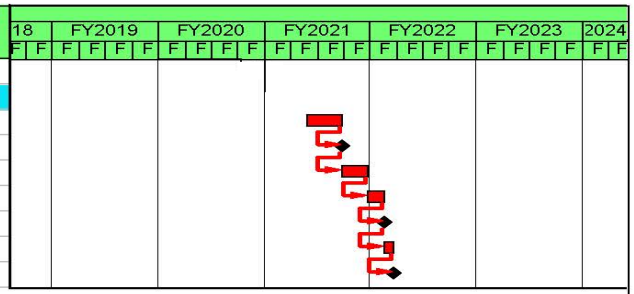


GOSB Implementation Schedule

Page 1 of 2

Figure 7. GOSB OU Implementation Schedule

Activity Name	Original Duration	Start	Finish
PCR/CMIR/RACR	298	23-Feb-21	17-Dec-21
SRS Develop PCR/CMIR/RACR (Rev.0)	120	23-Feb-21*	22-Jun-21
SRS Submit PCR/CMIR/RACR (Rev.0) to EPA/SCDHEC	0		22-Jun-21
EPA/SCDHEC Review of PCR/CMIR/RACR (Rev.0)	90	23-Jun-21	20-Sep-21
SRS Incorporate EPA/SCDHEC Comments	60	21-Sep-21	19-Nov-21
SRS Submit PCR/CMIR/ACR (Rev.1) to EPA/SCDHEC	0		19-Nov-21
EPA/SCDHEC Final Review/Approval	28	20-Nov-21	17-Dec-21
Approval of PCR/CMIR/RACR	0		17-Dec-21



GOSB Implementation Schedule

Page 2 of 2

Figure 7. GOSB OU Implementation Schedule *(Continued/End)*

Table 1. Remedial Goals for the GOSB Remedial Action

Medium	Constituent	Receptor	Human Health RGO[1] *(mg/kg)*	Ecological RGO[2] *(mg/kg or µg/L)*	Background[3] *(mg/kg)*	RG[4]
Sediment	alpha-Chlordane	Resident	1.7	-	N/A	0.017
		Benthic Organism	-	0.017		
	DDD	Benthic Organism	-	0.00781	N/A	0.00781
	DDE	Resident	2	-	N/A	0.00374
		Benthic Organism	-	0.00374		
	Dieldrin	Resident	0.034	-	N/A	0.009
		Industrial Worker	0.14	-		
		Benthic Organism	-	0.009		
	gamma-Chlordane	Resident	1.7	-	N/A	0.017
		Industrial Worker	7.7	-		
		Benthic Organism	-	0.017		
	Heptachlor epoxide	Resident	0.07	-	N/A	0.016
		Industrial Worker	0.33	-		
		Benthic Organism	-	0.016		
	Silver	Benthic Organism	-	2.2	0.24 - 1.96	2.2
Surface Water	alpha-Chlordane	Aquatic Organism	-	0.0043	N/A	0.0043
	gamma-Chlordane	Aquatic Organism	-	0.0043	N/A	0.0043
	Silver	Aquatic Organism	-	0.06	N/A	0.06

[1] Human Health RGO– concentration set at risk = 1E-06
[2] Ecological RGO – concentration set at HQ = 1
[3] Background – range from minimum detect to maximum detect from Background Soils Statistical Summary Report for the Savannah River Site, Appendix B-2 (all depths interval) (WSRC 2006)
[4] RG – remedial goal is the lesser of the human health or ecological RGOs
N/A – not available

Table 2. Applicable or Relevant and Appropriate Requirements for the GOSB Remedial Action

Action	Requirements	Prerequisite	Citation
General Construction Standards - All Land-Disturbing Activities (e.g. excavation, clearing, grading, etc.)			
Managing storm water runoff from land-disturbing activities	Must comply with the substantive requirements for stormwater management and sediment control of *NPDES General Permit No. SCR100000.*	Large and small construction activities (as defined in R. 61-9) of more than 0.40 hectare (ha [1 acre {ac}]) of land – **applicable**	S.C. R. 61-9.122.26(c) NPDES General Permit No. SCR100000
	The requirements of R.72-305 and R.72-307 will apply.	For land disturbing activities involving 0.80 ha (2 ac) or less of actual land disturbance – **applicable**	S.C. R. 72-305.B.(1)
	The stormwater management and sediment control plan shall contain at a minimum a sketched plan to accompany the narrative which shall include: a) A site location drawing of the proposed project, indicating the location of the proposed project in relation to roadways, jurisdictional boundaries, streams and rivers; b) The boundary lines of the site on which the work is to be performed; c) The location of temporary & permanent vegetative & structural stormwater management and sediment control measures.	Land disturbance activities involving 0.80 ha (2 ac) or less which are not part of a larger common plan of development or sale – **applicable**	S.C. R. 72-307 H – *South Carolina Storm Water Management and Sediment Reduction Regulations* S.C. R. 72-307 H.(5)(a) S.C. R. 72-307 H.(5)(b) S.C. R. 72-307 H.(5)(d)
Managing fugitive dust emissions from land disturbing activities	Emissions of fugitive particulate matter shall be controlled in such a manner and to the degree that it does not create an undesirable level of air pollution.	Activities that will generate fugitive particulate matter (Statewide) – **applicable**	S.C. R. 61-62.6 Section III(a)- *Control of Fugitive Particulate Matter Statewide*
Disposal of Wastes (e.g. trees, bushes, etc.)			
Disposal of *solid waste* off-SRS	Disposal of solid waste at facilities and/or sites permitted or registered by the Department for processing or disposal of that waste stream. Waste must meet state classification system for the permitted facilities NOTE: All waste generated from this remedial action will be managed as non-hazardous, due to the known characteristics of the operable unit.	Generation of solid waste intended for off-SRS disposal – **applicable**	SCDHEC R. 61-107.15

Table 2. Applicable or Relevant and Appropriate Requirements for the GOSB Remedial Action *(Continued)*

Action	Requirements	Prerequisite	Citation
Dewatering/Irrigation of G-Area Oil Seepage Basin Contained Stormwater			
On-site Land Application	The regulatory provisions contained in R.61-9 122 and 124 implement the National Pollutant Discharge Elimination System (NPDES) Program under sections 318, 402, and 405 of the Clean Water Act (CWA) (Public Law 92- 500, as amended by Pub. L. 95-217, Pub. L. 95-576, Pub. L. 96-483, Pub. L. 97-117, and Pub. L. 100-4; 33 U.S.C. 1251 et seq.) and the South Carolina Pollution Control Act, S.C. Code Ann. 48-1-10, et seq.	Land application of pollutants (including toxic substances) in the State of South Carolina – **relevant and appropriate**	S.C. R. 61-9 122.1(a)(1)
	Information Requirements: 1) Provide location of the Waste Water Treatment Plant (WWTP) and land disposal sites: Provide a map or maps showing the location of the WWTP and land disposal site(s). 2) Provide description of waste to be land applied: Provide a description of the wastewater or sludge to be land applied. State whether the waste is domestic and/or industrial wastewater. If the wastewater is not strictly domestic, give a detailed characterization of the wastewater. 3) Provide volume and quantity of waste to be land applied: Provide the volume in gallons per day and the quantity in pounds per day of the waste to be land applied to each disposal site. 4) Provide frequency of application: Provide the proposed frequency application in times per day, week or other period for each disposal site. 5) Provide site application rate(s): Provide the proposed application rate in inches per week, pounds per acre per day (use annual rates for crop uptake) for sludge disposal, or other units as appropriate for each disposal site, whichever is the limiting factor. 6) Provide hazardous substances: Identify whether or not the discharge contains a substance that could be considered hazardous as defined under section 101(14) of CERCLA. Provide the substance name, concentration and source.	Same as above	S.C. R. 61-9 505.21(f)(9) S.C. R. 61-9 505.21(f)(10) S.C. R. 61-9 505.21(f)(11) S.C. R. 61-9 505.21(f)(12) S.C. R. 61-9 505.21(f)(13) S.C. R. 61-9 505.21(f)(16)

Table 2. Applicable or Relevant and Appropriate Requirements for the GOSB Remedial Action *(Continued/End)*

Action	Requirements	Prerequisite	Citation
	Irrigation of treated wastewater including methods of surface application, including but not limited to, fixed gun application, travelling or mobile gun application, or center pivot application.	Additional conditions applicable to specified categories of Land Application permits and State permits for irrigation of treated wastewater - **relevant and appropriate**	S.C. R. 61-9 505.42(b)
	Spray field slopes shall not exceed 10 percent unless approved by the Department. The Department may require that slopes be less than 10% based on site conditions.	Same as above	S.C. R. 61-9 505.42(b)(1)
	The new or expanding spray field shall be at least 61.0 m (200 ft) from surface waters of the State, occupied buildings and potable water wells. The new or expanding spray field shall be at least 30.5 m (100 ft) from the property boundary.	Same as above	S.C. R. 61-9 505.42(b)(8)
Protection of Migratory Birds	No person may take, possess, import, export, transport, sell, purchaser, barter or offer for sale, purchase or barter, any migratory bird, or the parts, nests, or eggs of such bird except as under the terms of a valid permit.	Migratory bird populations may be present in the vicinity – **applicable**	16 USC 703-704 – *Migratory Bird Treaty Act*

CWA – Clean Water Act of 1972
NPDES – National Pollutant Discharge Elimination System

Table 3. Spray Irrigation Area Coordinates

Point	X UTM NAD27	Y UTM NAD27
G1	439,695.96	3,678,239.83
G2	439,670.80	3,678,323.45
G3	439,694.61	3,678,358.83
G4	439,725.70	3,678,371.73
G5	439,740.25	3,678,329.73
G6	439,918.65	3,678,391.04
G7	439,991.92	3,678,342.75

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APPENDIX A

FACT SHEET

Remedial Action G-Area Oil Seepage Basin

Location

The G-Area Oil Seepage Basin Operable Unit (761-13G) is listed as a Resource Conservation and Recovery Act (RCRA) 3004(u) Solid Waste Management Unit/Comprehensive Environmental Response, Compensation, and Liability Act unit in Appendix C of the Federal Facility Agreement for the Savannah River Site. The GOSB OU is located southeast of N-Area (Central Shops) in relatively flat terrain, approximately (~) 54-meters (m [180-feet {ft}]) south of the railroad tracks, which run adjacent to Central Shops. The basin is ~45-m (150-ft) long and ~28.5-m (95-ft) wide. The deepest part of the basin, near the center, is ~4.8-m (16-ft) bgs.

History

The GOSB OU received various unknown liquid wastes since Savannah River Site plant construction (1951-1956) until the early 1960s. After the 1960s, the basin received sanitary wastewater treatment facility effluent. The basin was isolated from the active system in the early 1990s and has since collected rainwater with a maximum volume of 1,567,160-liters (414,000-gallons). The extent of the contamination is primarily in the sediments of the GOSB OU and contaminants of concern include alpha-chlordane, gamma-chlordane, dichlorodiphenyldichloroethane, dichlorodiphenyldichloroethylene, dieldrin, heptachlor epoxide, and silver.

Remedial Action

The sediments and surface water in the basin contain unacceptable levels of contaminants that require remediation to meet the RCRA cleanup requirements. The remedial action (RA) for the basin includes dewatering and backfilling with clean common fill and berm soil. Controlled compaction will be performed to mitigate subsidence followed by compaction testing, grading, and construction of a soil and vegetative cover over the basin footprint. Water removed from the basin will be used to irrigate a section of nearby forest. The RA does not require land use controls or a five-year remedy review, and the area will be available for unrestricted land use.

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ATTACHMENT 1

LIST OF DRAWINGS

SK-EC&ACP-GOSB-00001
G-Area Oil Seepage Basin Closure Grading Plan
(2 Sheets)

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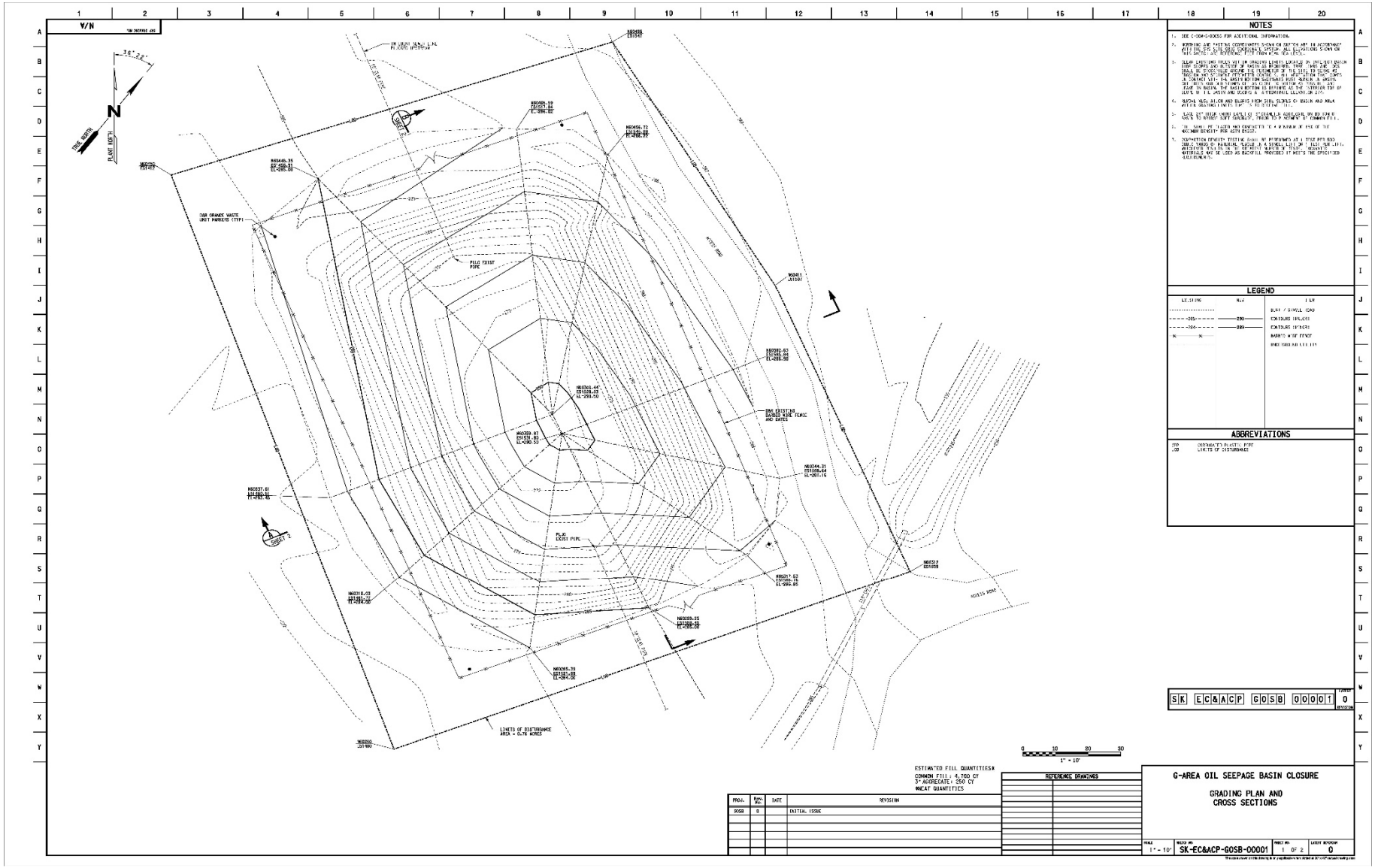
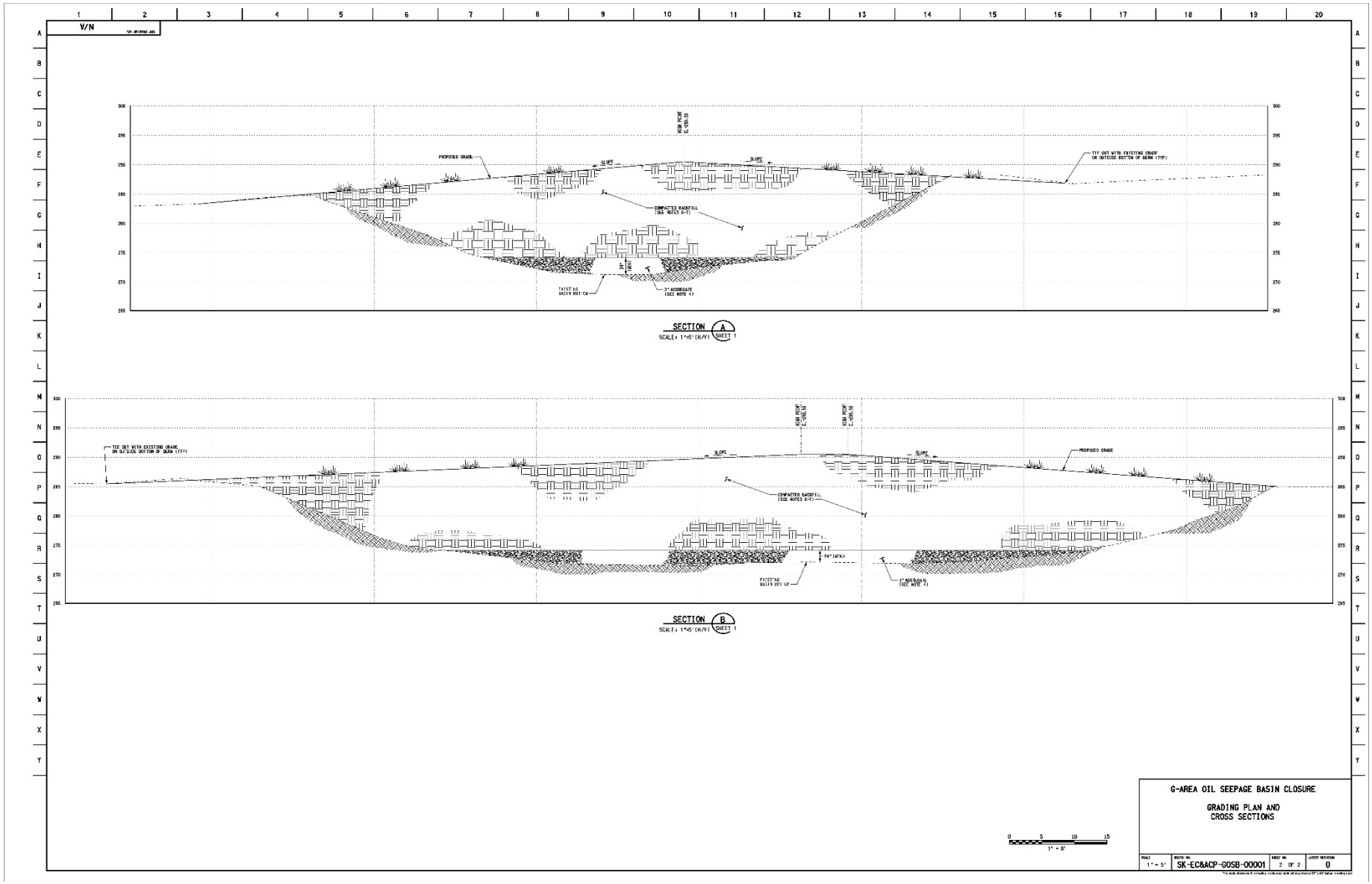

NOTES
LEGEND
ABBREVIATIONS
G-AREA OIL SEEPAGE BASIN CLOSURE
GRADING PLAN AND
CROSS SECTIONS
SK-EC&ACP-GOSB-00001
ESTIMATED FILL QUANTITIES*
COMMON FILL: 4,700 CY
3" AGGREGATE: 250 CY
*NEAT QUANTITIES
REFERENCE DRAWINGS
LIMITS OF DISTURBANCE
AREA = 0.76 ACRES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SHEET 1
SECTION B
SCALE: 1"=5' (H/V)
SHEET 1
G-AREA OIL SEEPAGE BASIN CLOSURE
GRADING PLAN AND
CROSS SECTIONS
SK-EC&ACP-GOSB-00001
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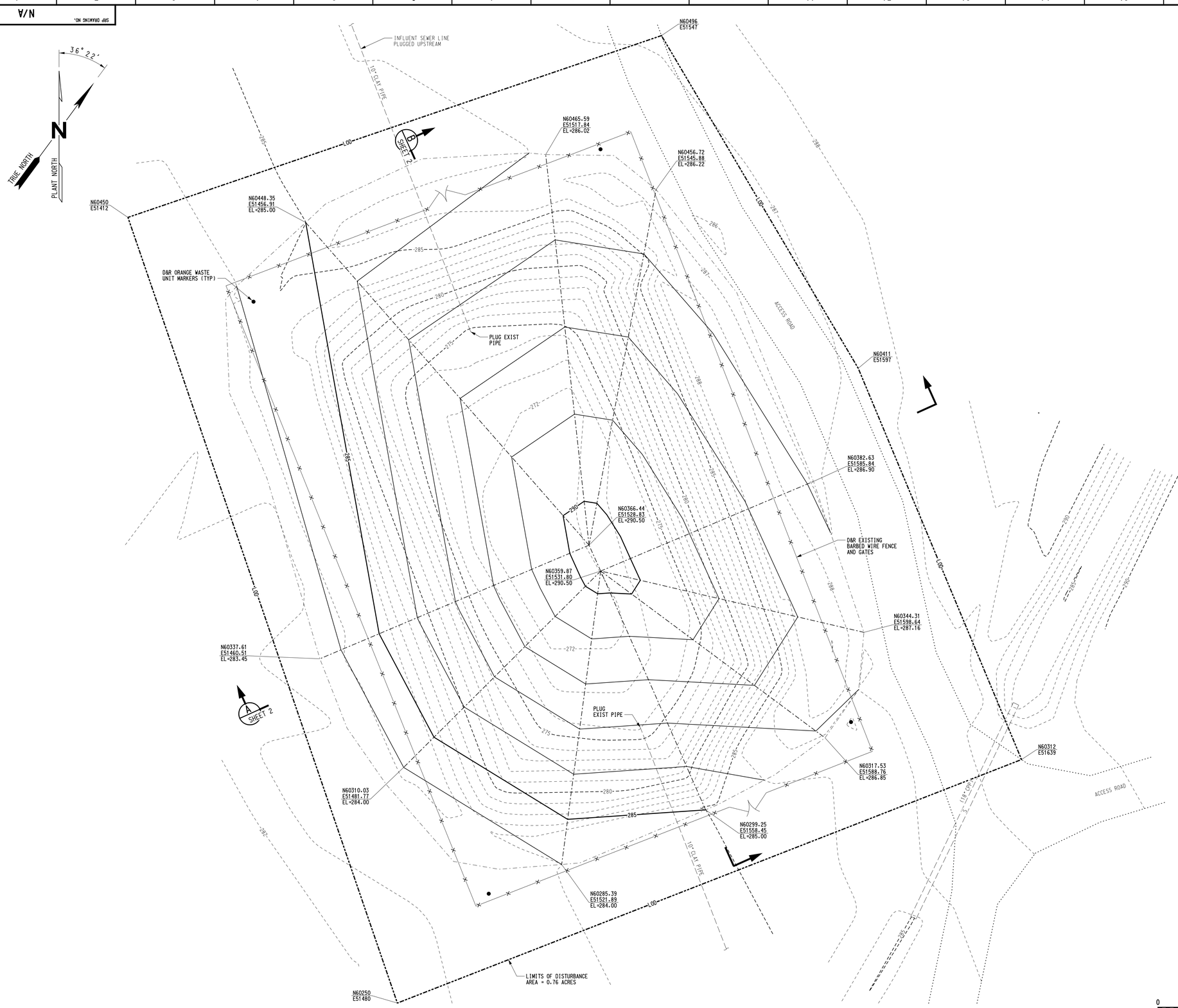

NOTES

1. SEE C-SOW-G-00055 FOR ADDITIONAL INFORMATION.
2. NORTHING AND EASTING COORDINATES SHOWN ON SKETCH ARE IN ACCORDANCE WITH THE SRS SITE GRID COORDINATE SYSTEM. ALL ELEVATIONS SHOWN ON THIS SKETCH ARE REFERENCE FEET FROM MEAN SEA LEVEL.
3. CLEAR EXISTING TREES WITHIN GRADING LIMITS LOCATED ON INTERIOR BASIN SIDE SLOPES AND OUTSIDE OF BASIN AS REQUIRED. TREE LIMBS AND LOGS SHALL BE STOCKPILED AROUND THE PERIMETER OF THE SITE TO SERVE AS EROSION AND SEDIMENT PERIMETER CONTROLS. ALL VEGETATION THAT COMES IN CONTACT WITH THE BASIN BOTTOM SEDIMENTS MUST REMAIN IN BASIN. CUT TREES AND OLD STUMPS OFF AS CLOSE TO BOTTOM AS POSSIBLE AND LEAVE IN BASIN. THE BASIN BOTTOM IS DEFINED AS THE INTERIOR TOE OF SLOPE OF THE BASIN AND OCCURS AT APPROXIMATE ELEVATION 274.
4. REMOVE VEGETATION AND DEBRIS FROM SIDE SLOPES OF BASIN AND AREA WITHIN GRADING LIMITS THAT IS TO RECEIVE FILL.
5. PLACE 24" THICK (MIN) LAYER OF 3" DIAMETER AGGREGATE ON BOTTOM OF BASIN TO BRIDGE SOFT SUBGRADE. PRIOR TO PLACEMENT OF COMMON FILL.
6. FILL SHALL BE PLACED AND COMPACTED TO A MINIMUM OF 85% OF THE MAXIMUM DENSITY PER ASTM D1557.
7. COMPACTION DENSITY TESTING SHALL BE PERFORMED AT 1 TEST PER 500 CUBIC YARDS OF MATERIAL PLACED IN A SINGLE LIFT OR 1 TEST PER LIFT, WHICHEVER RESULTS IN THE GREATEST NUMBER OF TESTS. EXCAVATED MATERIALS MAY BE USED AS BACKFILL PROVIDED IT MEETS THE SPECIFIED REQUIREMENTS.

LEGEND

EXISTING	NEW	ITEM
.....		DIRT / GRAVEL ROAD
---285---	290	CONTOURS (MAJOR)
---284---	289	CONTOURS (MINOR)
-x-x-		BARBED WIRE FENCE
- - - - -		UNDERGROUND UTILITY

ABBREVIATIONS

CPP	CORRUGATED PLASTIC PIPE
LOD	LIMITS OF DISTURBANCE

ESTIMATED FILL QUANTITIES*

COMMON FILL: 4,700 CY
3" AGGREGATE: 250 CY
*NEAT QUANTITIES

PROJ.	Rev. No.	DATE	REVISION
GOSB	0		INITIAL ISSUE

REFERENCE DRAWINGS

G-AREA OIL SEEPAGE BASIN CLOSURE

GRADING PLAN AND CROSS SECTIONS

SCALE	SKETCH NO.	SHEET NO.	LATEST REVISION
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SK EC&ACP GOSB 00001 — LATEST REVISION 0

The scale shown on this drawing is only applicable when plotted at 30" x 42" (actual drawing size)

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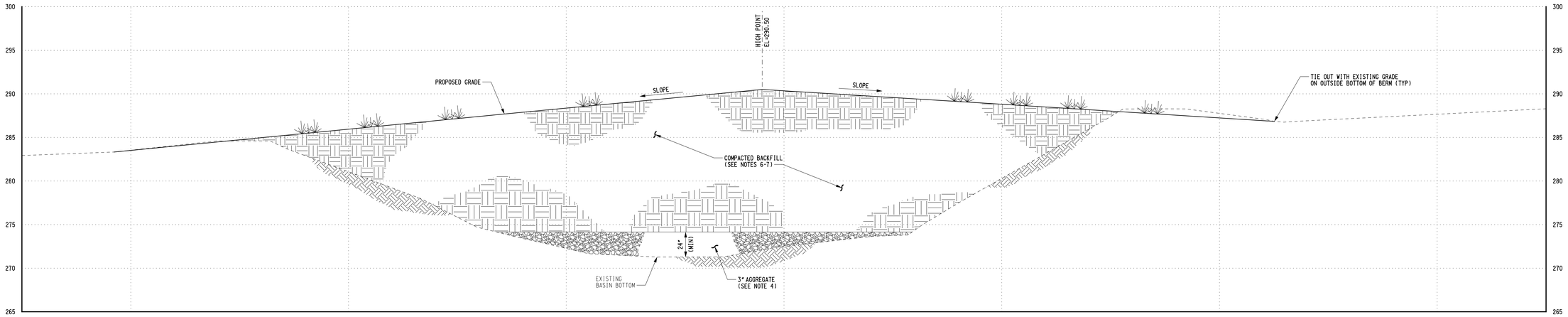

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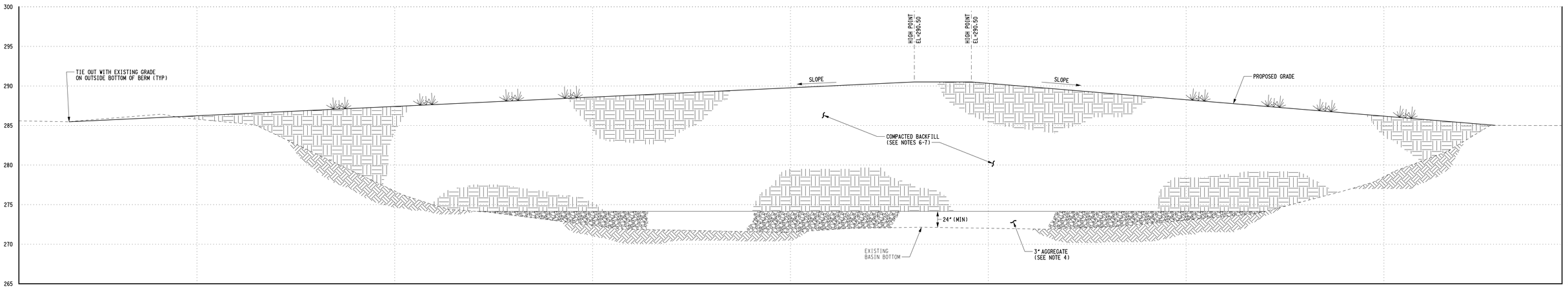

SECTION B
SCALE: 1"=5'(H/V) SHEET 1

0 5 10 15
1" - 5'

G-AREA OIL SEEPAGE BASIN CLOSURE

GRADING PLAN AND CROSS SECTIONS

SCALE	SKETCH NO.	SHEET NO.	LATEST REVISION
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