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## **Scoping Summary for the G-Area Oil Seepage Basin (GOSB) (761-13G) Operable Unit (OU) (U)**

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## 1.0 PROJECT PHASE AND STATUS

This scoping summary provides the current status of the G-Area Oil Seepage Basin (GOSB) Operable Unit (OU), and was prepared to support a scoping meeting on May 2, 2018, for the Statement of Basis/Proposed Plan (SB/PP) document. The Resource Conservation and Recovery Act (RCRA) Facility Investigation/Remedial Investigation/Baseline Risk Assessment/Corrective Measures Study/Feasibility Study (RFI/RI/BRA/CMS/FS) was scoped with the Core Team consisting of representatives from the United States Department of Energy (USDOE), United States Environmental Protection Agency (USEPA), and the South Carolina Department of Health and Environmental Control (SCDHEC) in July 2017. All comments on the Revision 0, RFI/RI/BRA/CMS/FS, were resolved with the Core Team and the Revision 1 document was submitted for final review and approval in April 2018.

This scoping meeting supports Core Team agreement on the preferred response action for the GOSB OU and rationale to be presented in the SB/PP. A remedial action is needed at the GOSB because pesticides exist in the Basin Interior Subunit that may pose a threat to human health and the environment. A comparative analysis has been performed, and the USDOE proposes to backfill the basin and manage the surface water as the preferred remedial alternative for the GOSB OU. The SB/PP, Revision 0, is due for submittal on June 11, 2018.

## 2.0 OPERABLE UNIT HISTORY AND BACKGROUND

The GOSB 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 (Figure 1). The area surrounding the GOSB is wooded with heavy underbrush. It contains no stressed vegetation or other visual indications of contamination. It is ~45-m (150-ft) long and ~28.5-m (95-ft) wide (Figure 2). The basin is ~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 deepest part of the basin, near the center, is ~4.8-m (16-ft) below ground surface (bgs) (Figure 3). 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-centimeters (cm [12-inches {in.}]) vitrified clay pipe (previously 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 (Figure 4). Both inlet and outlet pipes are buried to a depth of ~1.8- to 2.4-m (6- to 8-ft) bgs.

The GOSB was initially used for liquid waste disposal during Savannah River Site (SRS) plant construction (1951-1956) and later for receipt of effluent from sanitary wastewater treatment plants in Central Shops. The basin may have received unknown liquid waste from the time of plant construction until the early 1960s. However, there are no records indicating that disposal of radioactive or hazardous materials at the GOSB occurred. The basin also received effluent from the Central Shops sanitary wastewater treatment plant from 1983 until 1992. Prior to 1983 the basin received effluent from a smaller sanitary wastewater treatment facility. The designation of the basin as an oil seepage basin may be a misnomer, as there is no information available to support the specific use of the basin for management and disposal of waste oils. The basin is currently inactive; however, rainwater is typically retained in the basin.

Characterization of the GOSB was conducted in 2009 and 2016-2017. The sampling locations are shown in Figure 4. Results of the characterization efforts are documented in the RFI/RI/BRA/CMS/FS (Rev. 1), March 2018. This document has been submitted to the USEPA and SCDHEC for review and approval.

### **3.0 LAND USE**

The GOSB is located ~300-m (1,000-ft) southeast of N Area (Central Shops) in an area currently designated for industrial use. No current or projected future development of the basin unit is planned. In order to support risk management decision-making, both the residential (unrestricted) and industrial land use scenarios were evaluated. Groundwater is not part of the GOSB OU and will be addressed as part of the Central Shops Groundwater OU.

#### 4.0 GOSB OU SUBUNITS

The GOSB OU is comprised of four subunits: GOSB Interior, GOSB Berm, Pipeline, and Effluent Discharge (Figure 4). Data collected in 2009 and 2016-2017 for each subunit has been subjected to the RI/BRA protocols to support problems warranting action determinations. The human health and ecological risk assessments, the principle threat source material (PTSM) evaluation, and the contaminant migration analysis have been completed per SRS protocols. A summary of the risk assessment results for each subunit is provided in Attachment A. The CMS/FS alternative screening and comparative analysis of alternatives is provided in Attachment B.

#### 4.1 GOSB Interior Subunit

Although the basin no longer receives discharge from any industrial activity, rainwater continues to accumulate within the basin. 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.

Pesticides have been identified as the contaminants in the Basin Interior Subunit. A group of pesticides including alpha-Chlordane, gamma-Chlordane, dichlorodiphenyldichloroethane (DDD), dichlorodiphenyldichloroethylene (DDE), dieldrin, and heptachlor epoxide have been identified as potential risks to human health and the environment in the sediment in the basin interior. Silver present in the basin sediments is likely associated with a silver-containing pesticide. The horizontal and vertical extent of contamination at the GOSB OU is represented by two cross-sections (Figures 5 and 6). The contaminants are generally co-located. Two pesticides, dieldrin and gamma-Chlordane, have been selected to represent the extent of contamination because they are the most laterally and vertically extensive contaminants and pose some of the higher risks to human health and the environment. The highest concentrations of contaminants are located in the shallowest depth interval at the deepest portion of the basin (Figures 5 and 6).

Based on the RFI/RI/BRA evaluation, no human health refined constituents of concern (RCOCs) were identified for surface water. Alpha-Chlordane, gamma-Chlordane, and silver were identified as ecological RCOCs for aquatic organisms (Figure 7).

Groundwater is not part of the GOSB OU and will be addressed as part of the Central Shops Groundwater OU. However, the Core Team determined that groundwater samples were needed upgradient, sidegradient, and downgradient of the GOSB to confirm that there had not been a past release of contaminants from the basin. In 2017, groundwater samples (filtered and unfiltered) were collected from temporary piezometers at eight locations (Figure 4). Based on the RFI/RI/BRA evaluation, no problems warranting action are identified for groundwater.

**GOSB Interior Subunit (Sediment/Surface Water)**

<b>Problem(s) Warranting Action</b>	<b>Remedial Action Objectives</b>	<b>Scope of Problem(s)</b>	<b>Likely Response Actions</b>
<ul style="list-style-type: none"> <li>Alpha-chlordane, gamma chlordane, DDE, dieldrin, heptachlor epoxide, are present in sediment (from 0- to 1-ft bgs) at levels that exceed 1E-06 risk for the resident (total cumulative risk [TCR] = 3.0E-05) and industrial worker (TCR = 5.7E-06).</li> </ul>	<ul style="list-style-type: none"> <li>Prevent exposure of human receptors to sediment contaminants (0- to 1-ft bgs) that exceed a risk of 1E-06 for resident and industrial worker scenarios.</li> </ul>	<ul style="list-style-type: none"> <li>Interior basin footprint is ~0.24 acres.</li> </ul>	<ul style="list-style-type: none"> <li>No Action</li> <li>Land use Controls (LUCs)</li> <li>Place 2-Foot Clean-Fill, Manage Surface Water, LUCs</li> <li>Backfill Basin and Manage Surface Water</li> <li>Excavate and Manage Surface Water</li> </ul>
<ul style="list-style-type: none"> <li>Alpha-chlordane (hazard quotient [HQ] = 100), gamma-chlordane (HQ = 148), DDD (HQ = 50), DDE (HQ = 278), dieldrin (HQ = 12), heptachlor epoxide (HQ = 12), and silver (HQ = 40) are present in sediment (from 0- to 1-ft bgs) at levels that exceed an HQ = 1 to ecological receptors for benthic organisms.</li> </ul>	<ul style="list-style-type: none"> <li>Prevent exposure of ecological receptors to sediment contaminants (0- to 1-ft bgs) that exceed an HQ = 1</li> </ul>		
<ul style="list-style-type: none"> <li>Alpha-chlordane (HQ = 9), gamma chlordane (HQ = 9), and silver (HQ = 30) are present in surface water at levels that exceed an HQ = 1 to ecological receptors for aquatic organisms.</li> </ul>	<ul style="list-style-type: none"> <li>Prevent exposure of ecological receptors to surface water contaminants that exceed an HQ = 1</li> </ul>	<ul style="list-style-type: none"> <li>Approximately 414,000 gallons</li> </ul>	
<b>Uncertainties</b>			
<ul style="list-style-type: none"> <li>None</li> </ul>			

In support of the CMS/FS, response actions for sediment and surface water in the basin were further evaluated in an alternative screening and comparative analysis as shown in more detail in Attachment B.

#### 4.2 Basin Berm Subunit

The Basin Berm is highest on the north side at ~0.9-m (3-ft) high; the southern side is ~0.6-m (2-ft) high. The remaining two sides are even with the surrounding grade. Based on the RFI/RI/BRA evaluation, there are no problems warranting action are identified for this subunit.

##### Basin Berm Subunit (Soil)

Problem(s) Warranting Action	Remedial Action Objectives	Scope of Problem(s)	Likely Response Actions
• No RCOCs were identified for the Basin Berm subunit.	• None	• None	• None
<b>Uncertainties</b>			
• None.			

#### 4.3 Pipeline Subunit

The Pipeline subunit includes ~57 m (190 ft) of abandoned pipeline at the northeast (inlet) end of the basin and ~153 m (510 ft) of pipeline at the southeast (outlet) end of the basin. Both inlet and outlet pipes are buried to a depth of ~1.8- to 2.4-m (6- to 8-ft) bgs. Based on the RFI/RI/BRA evaluation, no problems warranting action are identified for this subunit.

##### Pipeline Subunit (Soil)

Problem(s) Warranting Action	Remedial Action Objectives	Scope of Problem(s)	Likely Response Actions
• No RCOCs were identified for the Pipeline subunit.	• None	• None	• None
<b>Uncertainties</b>			
• None			

#### 4.4 Effluent Discharge Subunit

The effluent discharge subunit lies southeast of the basin ~30 m (100 ft) from the outlet pipe (Figure 4). An intermittent stream conveys drainage from the surrounding topography, including basin discharge, to an unnamed tributary of Pen Branch ~900-m (3,000-ft) southeast of the GOSB (Figure 1). Based on the RFI/RI/BRA evaluation, no problems warranting action are identified for this subunit.

#### Effluent Discharge Subunit (Soil)

Problem(s) Warranting Action	Remedial Action Objectives	Scope of Problem(s)	Likely Response Actions
<ul style="list-style-type: none"> <li>No RCOCs were identified for the Effluent Discharge subunit.</li> </ul>	<ul style="list-style-type: none"> <li>None</li> </ul>	<ul style="list-style-type: none"> <li>None</li> </ul>	<ul style="list-style-type: none"> <li>None</li> </ul>
<b>Uncertainties</b>			
<ul style="list-style-type: none"> <li>None.</li> </ul>			

#### 5.0 OPERABLE UNIT STRATEGY

The project team proposes to develop a SB/PP for the GOSB OU that summarizes the remedial alternatives evaluated in the RI/BRA/CMS/FS document and identifies Alternative A-4, backfilling the basin and managing surface water, as the preferred alternative for the GOSB OU Interior Subunit (Figure 8). Backfilling the basin is the preferred alternative because the remedy is effective in reducing exposure of contaminated media to human and ecological receptors, and does not require LUCs or a five-year remedy review. The SB/PP will be submitted to the USEPA and SCDHEC June 11, 2018.

<b>Deliverable</b>	<b>Submittal Date</b>
Submit Rev. 0, Statement of Basis/Proposed Plan	June 11, 2018
Submit Rev. 0, Record of Decision	January 28, 2019
Issuance of the Record of Decision	September 30, 2019
Submit Rev. 0, Corrective Measures Implementation/Remedial Action Implementation Plan	September 5, 2019
Submit Rev. 0, Land Use Control Implementation Plan	September 5, 2019
Remedial Action Start	September 30, 2020

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**Table 1. Record of Core Team Agreements**

<b>RECORD OF CORE TEAM AGREEMENTS</b>	
<b>Date</b>	<b>Description of Agreement</b>
5/5/10	Because of the lengthy time period between the characterization scoping and the GOSB milestone dates, the Core Team concurred that the agreements in this scoping summary will be reevaluated at the Problem ID Scoping Meeting to assess any changes to cleanup criteria (i.e., protocol revisions, regulatory changes, etc.) prior to development of any decision document.
5/5/10	The Core Team agreed that additional sampling is needed in the effluent discharge area and for groundwater to support the problem ID scoping.
12/9/15	The Core Team agreed to the following actions: <ul style="list-style-type: none"> <li>• Add excavation as an alternative Response Action.</li> <li>• Survey berm volume and the depth of the top of the basin sediments (if contamination exists greater than or equal to 10 ft from surface elevation LUCs could be eliminated with no excavation and a backfill-only scenario).                             <ul style="list-style-type: none"> <li>• Direct push water sampling upgradient and downgradient of the basin (2 transects); target analyte list (TAL), target compound list (TCL), pesticides, filtered and unfiltered.</li> <li>• Additional surface water sampling; TAL, TCL, pesticides, gross alpha, nonvolatile beta, filtered and unfiltered.</li> </ul> </li> <li>• Sample documentation will be included in the Sampling Analysis Plan.</li> </ul>
3/8/17	The Core Team agrees that the data gaps have been addressed and development of the RFI/RI/BRA/CMS/FS can proceed.
7/19/17	The Core Team agreed to the following actions: <ul style="list-style-type: none"> <li>• Polycyclic Aromatic Hydrocarbons: (benzo(a)pyrene, benzo(a)anthracene, and benzo(b)fluoranthene) in sediment (0 to 1 ft) should not be retained as RCOCs for the residential scenario.</li> <li>• Pesticides alpha- and beta-benzene hexachloride should not be identified as human health RCOCs for surface water.</li> <li>• Benzo(a)pyrene and benzo(b)fluoranthene should not be identified as an RCOCs for the residential scenario.</li> <li>• Benzo(a)pyrene should not be identified as an RCOC for the residential scenario.</li> </ul>

**Table 2. Key Changes to the Scoping Summary**

<b>CHANGES TO SCOPING SUMMARY</b>			
<b>Date</b>	<b>Section</b>	<b>Description of Change</b>	<b>Rationale for Change</b>
May 2018	1.0	Revised to support development of the SB/PP.	Updated to reflect current project phase.
	2.0	Revised to summarize characterization data.	Updated to remove details of characterization data previously needed to support development of the RFI/RI/BRA/CMS/FS document.
	4.0 – 4.4	Revised to summarize risk assessment and likely response actions and remove uncertainties addressed by the RFI/RI/BRA/CMS/FS document.	Updated to support development of the SB/PP.
	5.0	Revised to identify the preferred remedial alternative.	Updated to reflect the current OU strategy for development of the SB/PP.
	Figures	Included updated figures for the Basin Interior subunit.	Removed figures for subunits that do not have a problem warranting action.
	Appendix B	Added cost numbers for each alternative from the RFI/RI/BRA/CMS/FS	Updated to support Core Team agreement on the preferred alternative.

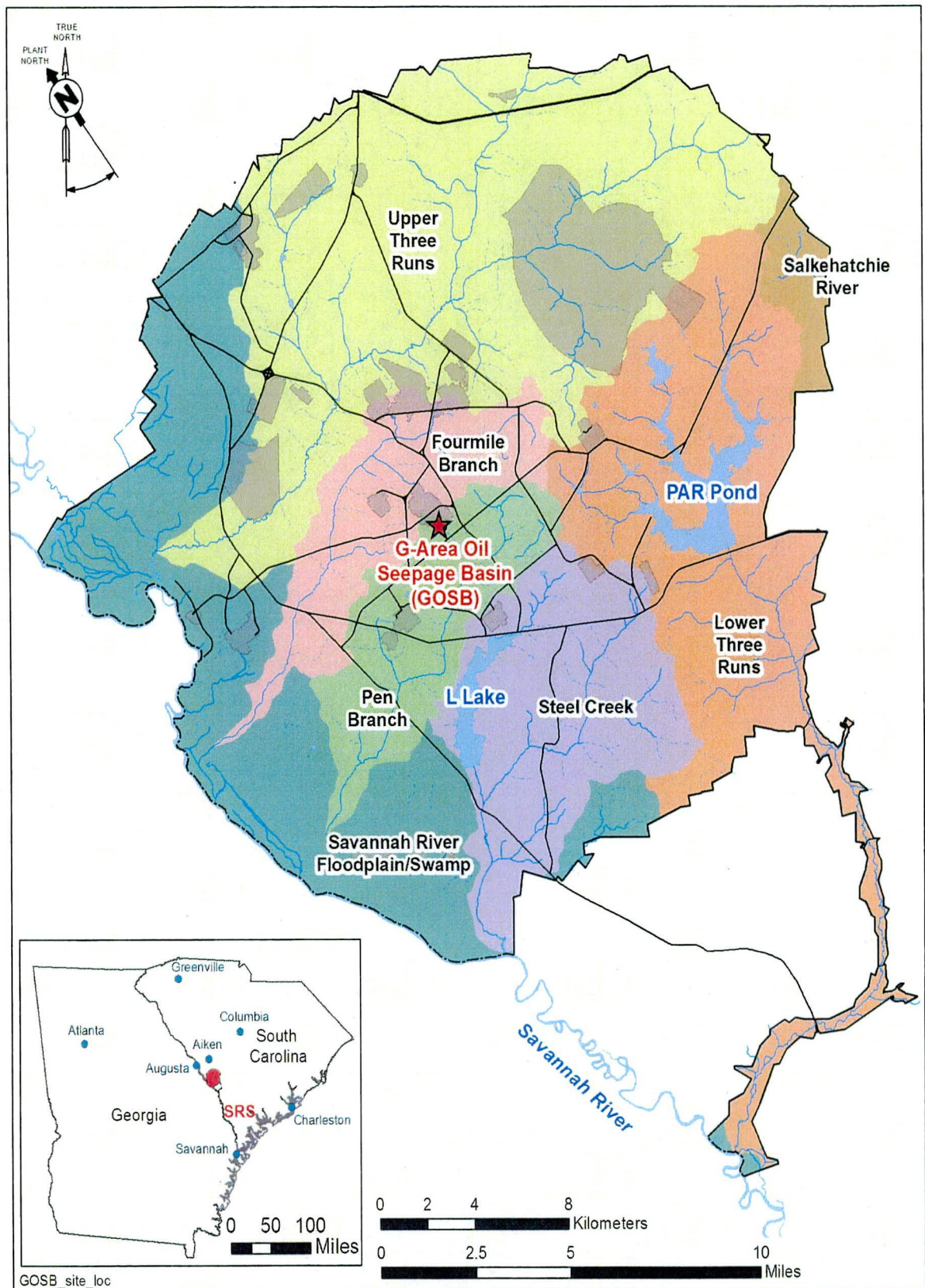


Figure 1. Location of GOSB at the Savannah River Site



**Figure 2. Photograph of GOSB (February 2017)**

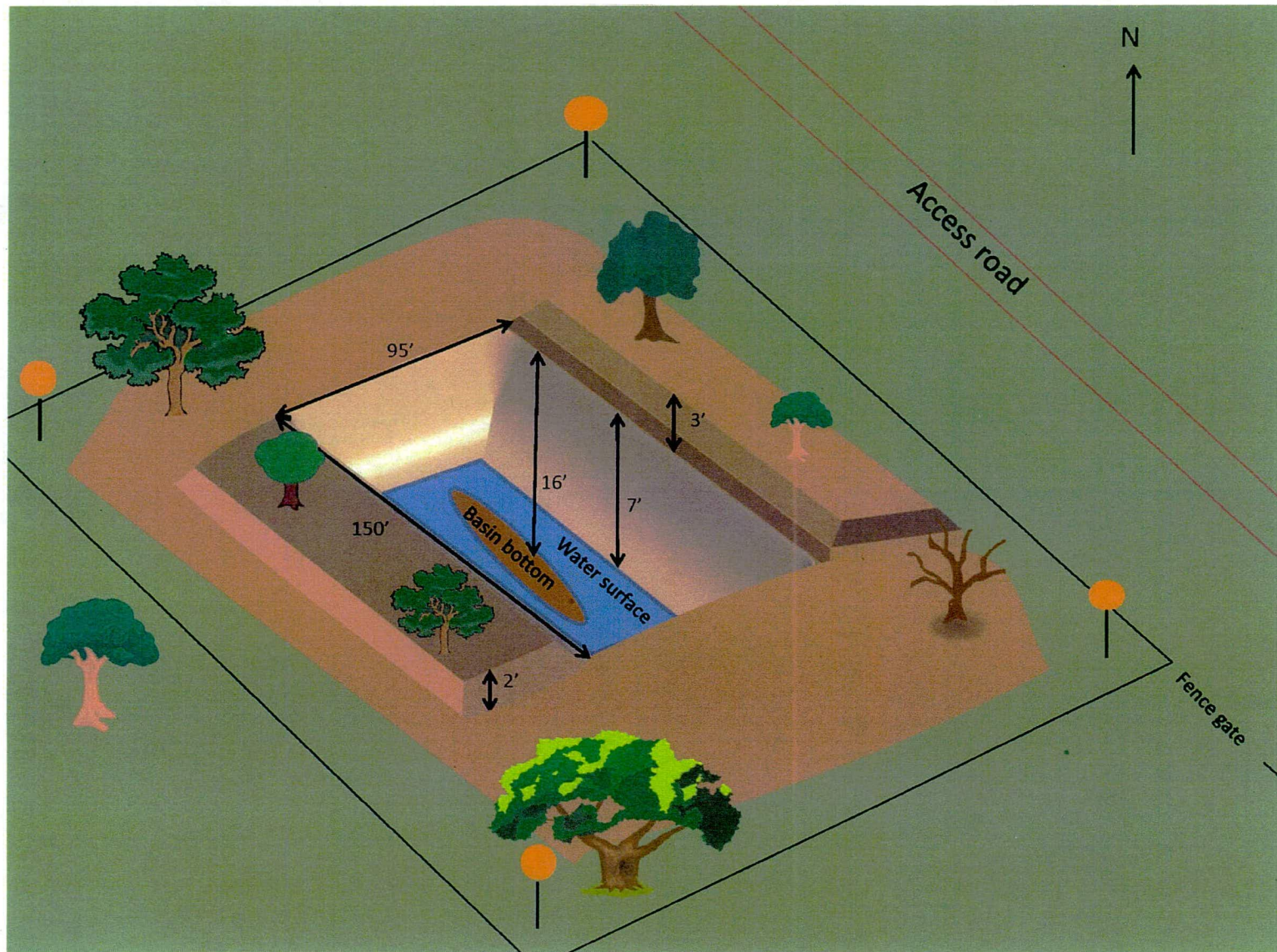


Figure 3. Schematic of GOSB

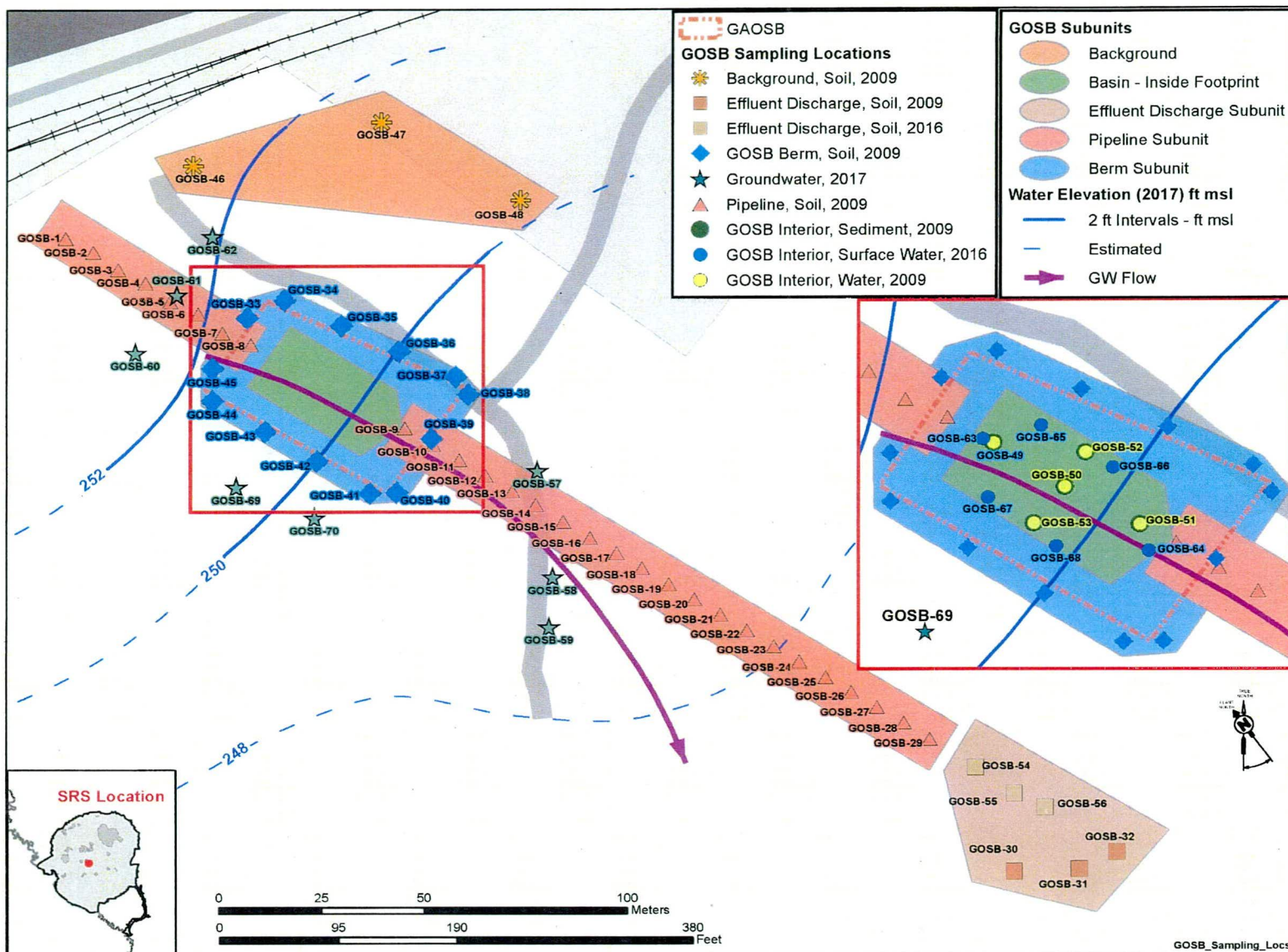


Figure 4. GOSB Subunits and Sampling Locations

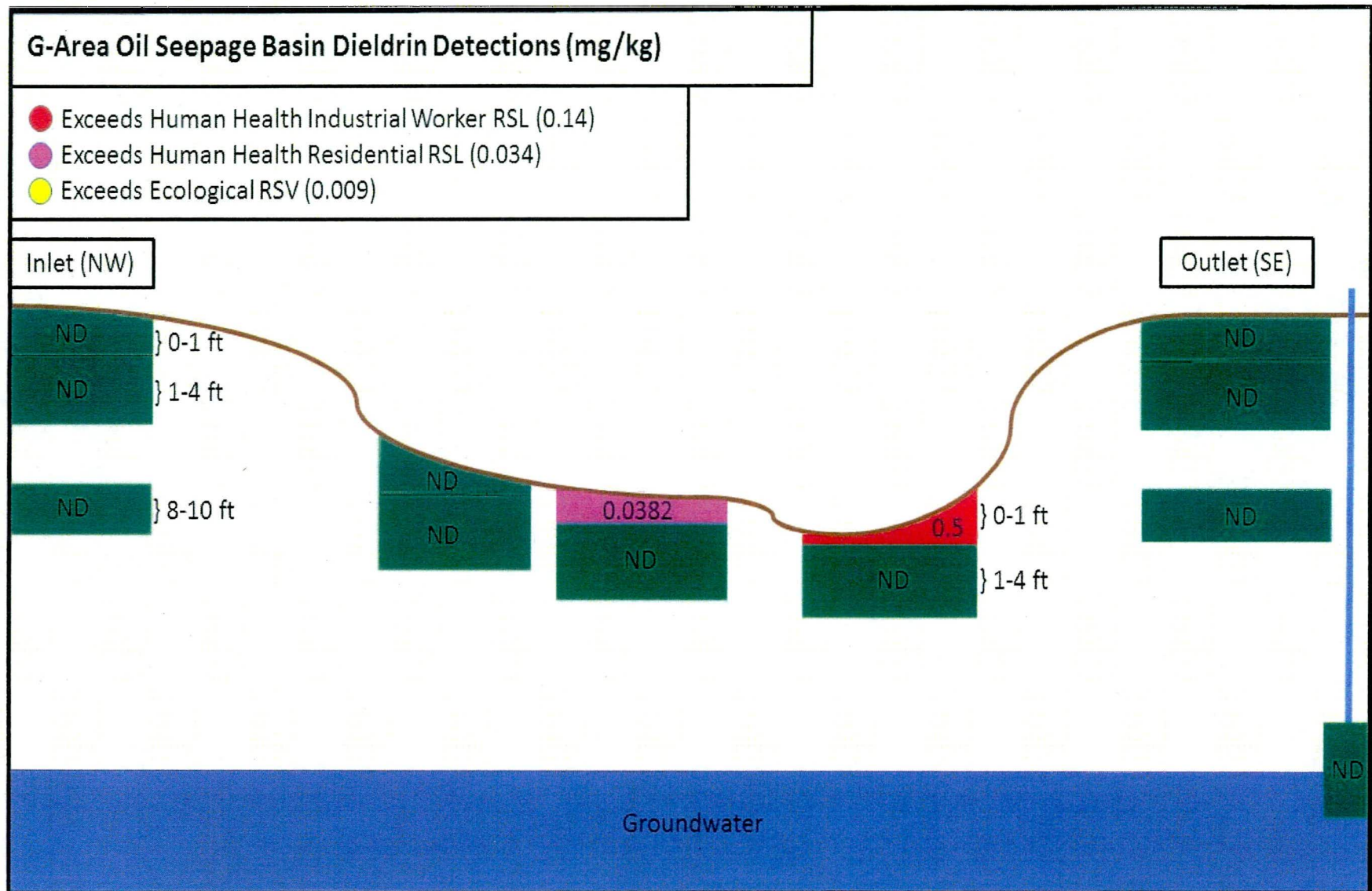


Figure 5. Cross-Section of GOSB Dieldrin Detections – Soil, Sediment, and Groundwater

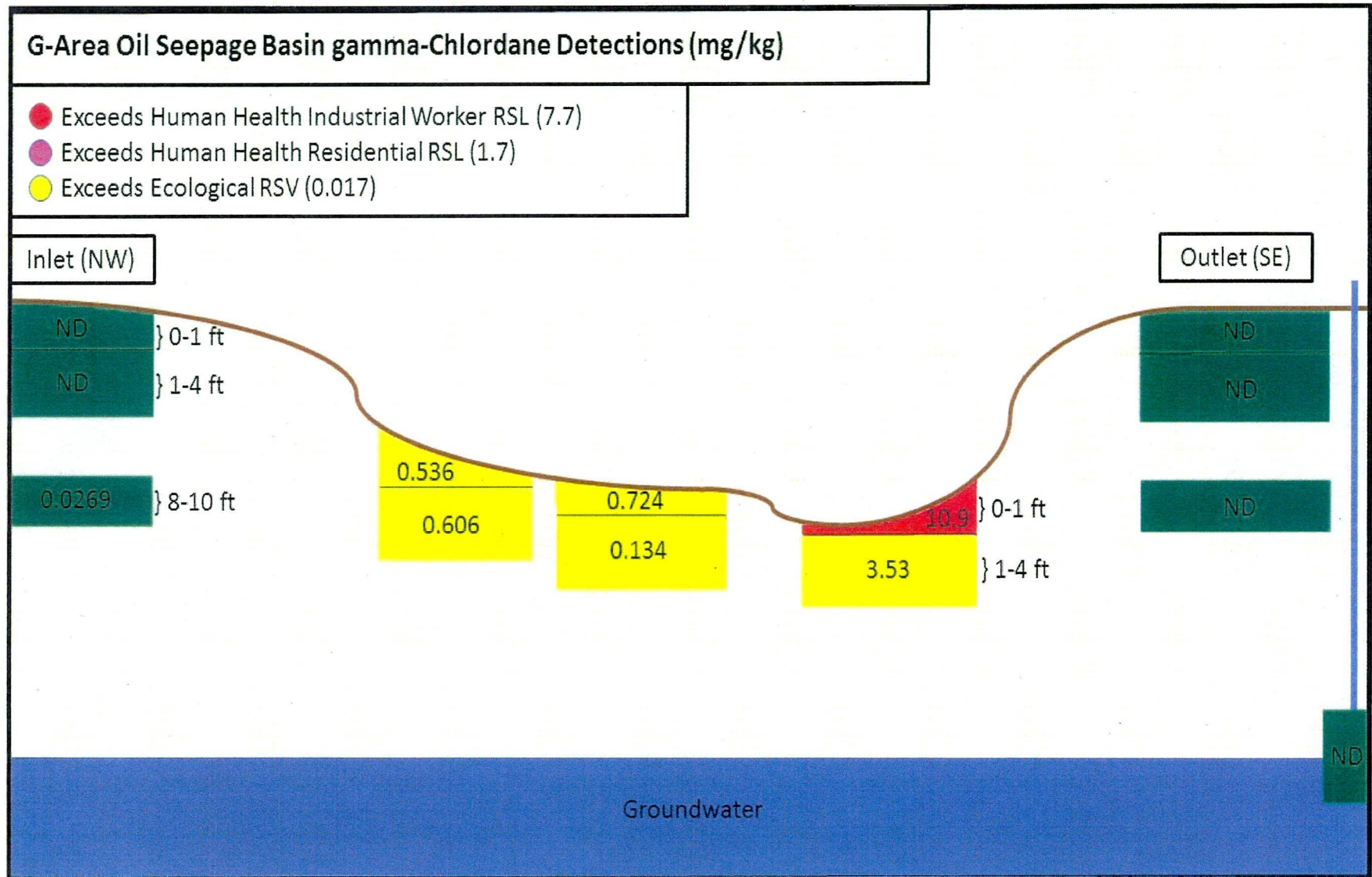
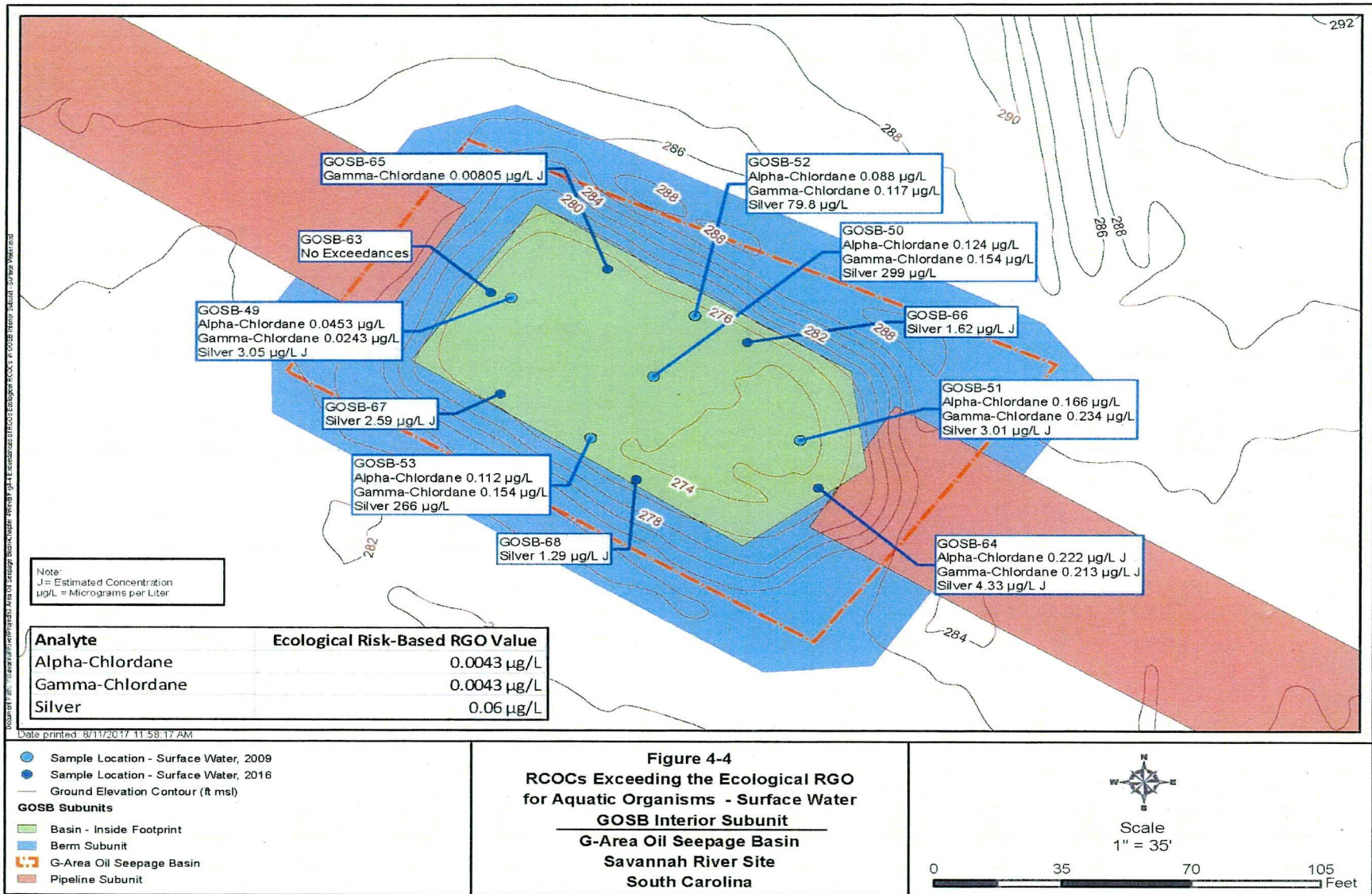


Figure 6. Cross-Section of GOSB gamma-Chlordane Detections – Soil, Sediment, and Groundwater



**Figure 7. RCOCs Exceeding the Ecological RGO for Aquatic Organisms – Surface Water**

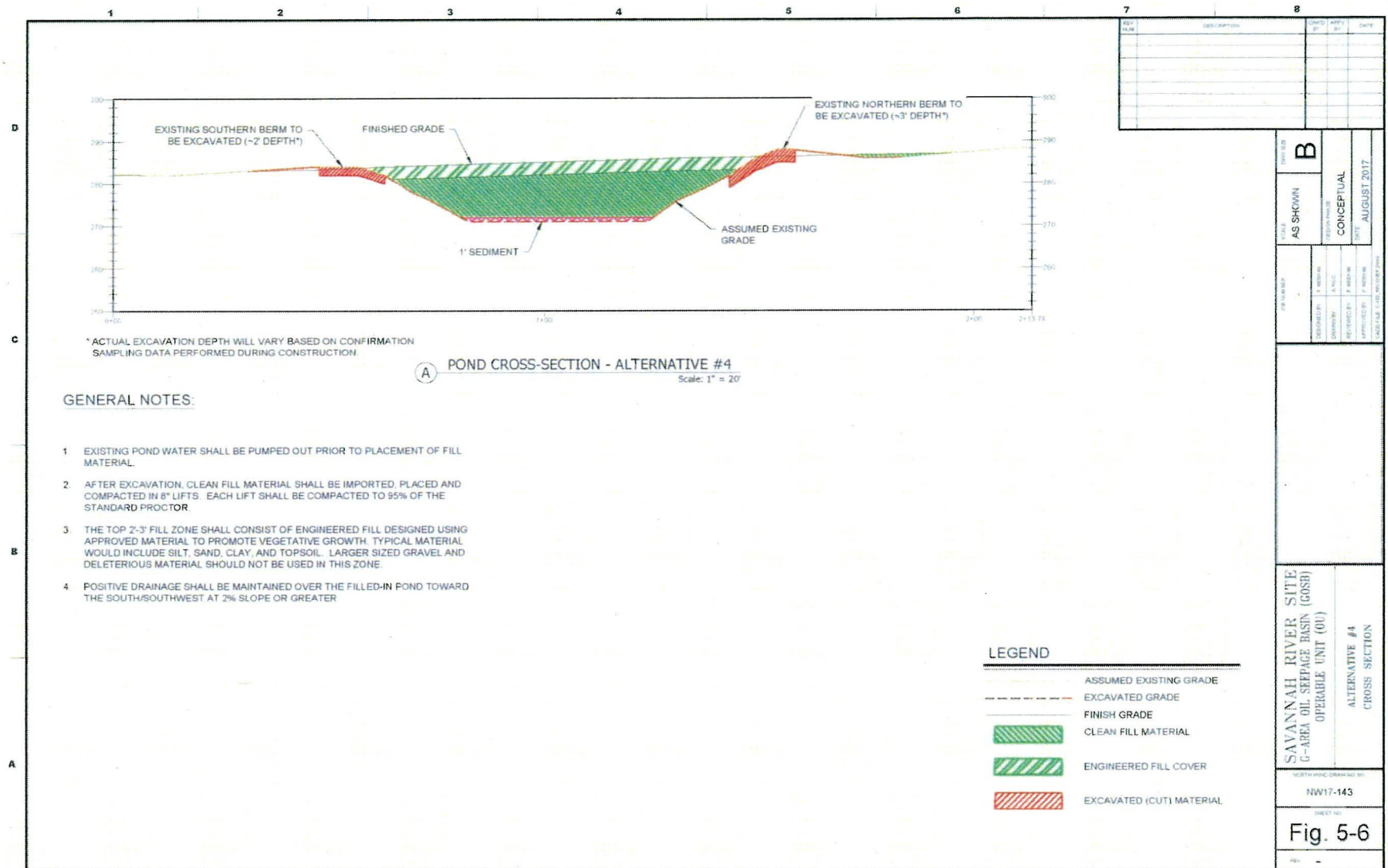


Figure 8. Cross-Section, Alternative #4

ATTACHMENT A

GOSB OU Risk Summary/Refined Constituents of Concern

Subunit	Human Health <sup>1</sup> Sediment RCOCs	Human Health Surface Water RCOCs	Human Health Soil RCOCs	PTSM RCOCs	Contaminant Migration	Ecological Sediment RCOCs	Ecological Surface Water RCOCs	Ecological Soil RCOCs
GOSB Interior Subunit	<p><u>Resident</u></p> <p>alpha-Chlordane risk = 2.6E-06 gamma-Chlordane risk = 6.4E-06 DDE risk = 2.3E-06 Dieldrin risk = 1.0E-05 Heptachlor epoxide risk = 9.1E-06 TCR<sup>2</sup> = 3.0E-05</p> <p><u>Industrial Worker</u></p> <p>Dieldrin risk = 2.4E-06 Gamma-Chlordane risk = 1.4E-06 Heptachlor Epoxide risk = 1.9E-06 TCR<sup>2</sup> = 5.7E-06</p>	None	NA	None	None	<p><u>Benthic Organisms</u></p> <p>Alpha-chlordane (HQ = 1001) DDD (HQ = 50) DDE (HQ = 278) Dieldrin (HQ = 12) Gamma-chlordane (HQ = 148) Heptachlor epoxide (HQ = 12) Silver (HQ = 40)</p>	<p><u>Aquatic Organisms</u></p> <p>Alpha-chlordane (HQ = 9) Gamma-chlordane (HQ = 9) Silver (HQ = 30)</p>	NA
GOSB Berm Subunit	NA	NA	None	None	None	NA	NA	None
Pipeline Subunit	NA	NA	NA	None	None	NA	NA	NA
Effluent Discharge	NA	NA	None	None	None	NA	NA	None

RCOC = refined constituent of concern

<sup>1</sup> human health RCOCs and risk levels identified for resident and industrial worker receptor scenarios.

<sup>2</sup> TCR = total cumulative risk

NA = Media not present in the subunit

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ATTACHMENT B

Alternative Screening for GOSB OU – Basin Interior Subunit (Sediment and Surface Water)

Alternative	Effectiveness	Implementability	Cost	Status	Comments
A-1. No Action	Not effective in reducing exposure of contaminated media to human or ecological receptors.  Alternative does not treat or remove waste.	Not Applicable	None	Required	Alternative is required by National Contingency Plan.  Influenced by risk management decision to consider impact of removal/backfill alternatives on ecosystem.
A-2. Land Use Controls	Effective in reducing exposure of contaminated media to human receptors but not ecological receptors.  Alternative does not treat or remove waste.	Installation of warning signs postings and site inspections.	Low	Removed	Action would allow for contaminated media to remain in place.  Influenced by risk management decision to consider impact of removal/backfill alternatives on ecosystem.  Requires five-year remedy reviews.
A-3. Place 2-Foot Clean Fill and Manage Surface Water	Effective in reducing exposure of contaminated media to human and ecological receptors.  Alternative may require treatment of surface water.	Involves management of surface water, backfill basin to break exposure pathway with clean soil, as needed, from onsite borrow pit using standard earth-moving equipment.	High	Retained	Includes LUCs and requires 5-year remedy review.
A-4. Backfill Basin and Manage Surface Water	Effective in reducing exposure of contaminated media to human and ecological receptors.  Alternative may require treatment of surface water.	Involves management of surface water, hauling and placing backfill, final grading and vegetative cover.	Medium	Retained (Preferred)	Remedial workers managing surface water would be exposed to contaminated media.  Does not require LUCs or five-year remedy reviews.
A-5. Excavate and Manage Surface Water	Effective in reducing exposure of contaminated media to human and ecological receptors. Alternative may require treatment of surface water.	Involves management of surface water, excavation of contaminated sediment, and disposal at offsite facility.	Medium	Retained	Remedial workers removing sediment and managing surface water would be exposed to contaminated media.  Does not require LUCs or five-year remedy reviews.

**ATTACHMENT B**  
 (Continued/End)

**Comparative Alternative Analysis for GOSB OU – Basin Interior Subunit (Sediment and Surface Water)**

<b>Response Action</b>	<b>Overall Protection of Human Health and the Environment</b>	<b>Compliance with RAOs</b>	<b>Long-Term Effectiveness and Permanence</b>	<b>Reduction of Toxicity, Mobility, or Volume Through Treatment</b>	<b>Short-Term Effectiveness</b>	<b>Implementability</b>	<b>Overall Ranking (4-16)</b>	<b>Cost</b>
A-1. No Action	No	No	1	1	1	4	7	\$0
A-3. Place 0.6-2 (2-Ft) Clean Fill Layer and Manage Surface Water	Yes	Yes	2	1	3	3	9	\$3.1M
A-4. Backfill Basin and Manage Surface Water	Yes	Yes	3	1	4	2	10	\$1.8M
A-5. Excavate and Manage Surface Water	Yes	Yes	4	1	1	1	7	\$1.7M

Note: Numeric range 1 through 4, where 1 = worst and 4 = best