Department of Energy
Savannah River Operations Office
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JUN 25 2020

Ms. Susan B. Fulmer, P. G., Manager
Federal Remediation Section
Division of Site Assessment, Remediation and Revitalization
Bureau of Land and Waste Management
South Carolina Department of Health and Environmental Control
2600 Bull Street
Columbia, South Carolina 29201

Mr. Jon Richards
Savannah River Site Remedial Project Manager
Superfund Division
U. S. Environmental Protection Agency, Region 4
61 Forsyth Street, SW
Atlanta, Georgia 30303

Dear Ms. Fulmer and Mr. Richards:

SUBJECT: RFI/RI Work Plan for the Early Construction and Operational Disposal Site N-1 (NBN), Central Shops Scrap Lumber Pile (631-2G), and Building 690-N, Process Heat Exchanger Repair Facility (aka Ford Building) Operable Unit (U) (SRNS-RP-2020-00041, Revision 1 Redline, June 2020) (Redline Pages Only) and Savannah River Site's Responses to the Regulatory Comments on the Revision 0 Document, SEMS Number: 93

In accordance with the terms of the Federal Facility Agreement, the U. S. Department of Energy (DOE) is submitting the subject information for your review. The South Carolina Department of Health and Environmental Control's (SCDHEC) and the U. S. Environmental Protection Agency's (EPA) comments on the Revision 0 document were received on April 6, 2020 and May 13, 2020, respectively. Please review the enclosures and provide your response within thirty (30) days of receipt. The effort and time that the EPA and SCDHEC have given on the subject operable unit are greatly appreciated.

Questions from you or your staff may be directed to me at (803) 952-8365.

Sincerely,

Brian T. Hennessey
SRS Remedial Project Manager
Infrastructure and Area Completion Division

IACD-20-167

Enclosures:

1. RFI/RI Work Plan for the Early Construction and Operational Disposal Site N-1 (NBN), Central Shops Scrap Lumber Pile (631-2G), and Building 690-N, Process Heat Exchanger Repair Facility (aka Ford Building) Operable Unit (U) (SRNS-RP-2020-00041, Revision 1 Redline, June 2020) (Redline Pages Only), SEMS Number: 93
2. SRS Responses to South Carolina Department of Health and Environmental Control Comments on: RFI/RI Work Plan for the Early Construction and Operational Disposal Site N-1(NBN), Central Shops Scrap Lumber Pile (631-2G), and Building 690-N, Process Heat Exchanger Repair Facility (aka Ford Building) Operable Unit (U), SEMS Number: 93 (SRNS-RP-2020-00041, Revision 0, February 2020)
3. SRS Responses to EPA comments: RFI/RI Work Plan for the Early Construction and Operational Disposal Site N-1 (NBN), Central Shops Scrap Lumber Pile (631-2G), and Building 690-N, Process Heat Exchanger Repair Facility (aka Ford Building) Operable Unit (U), SEMS Number: 93, SRNS-RP-2020-00041, Revision 0, February 2020

cc w/o encl:
H. Porter, SCDHEC-Columbia
S. French, SCDHEC-Columbia
M. Reece, SCDHEC-Columbia
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B. Cameron, SCDHEC–Aiken Environmental Affairs Office
R. H. Pope, EPA-Atlanta

cc w/ encl:
M. McRae, TechLaw, Inc.

I. GENERAL COMMENTS

1. The text in the last paragraph in the Executive Summary, Page ES-7 of ES-10 indicates a Sampling and Analysis Plan (SAP) is included in this Work Plan for the additional data needs to accomplish the remedial investigation (RI) objectives. The text further indicates the data obtained under this Work Plan will be integrated with data from previous investigations to support the Baseline Risk Assessment, contaminant fate and transport analysis, and remedial alternative selection process for the Early Construction and Operational Disposal Site (ECODS) N-1 (NBN), Central Shops Scrap Lumber Pile (CSSLP) (631-2G), and Building 690-N, Process Heat Exchanger Repair Facility (aka Ford Building) Operable Unit (OU). It is noted that the SAP for Pre-Work Plan Characterization presented in Appendix A of this RFI/RI Work Plan indicates groundwater samples were collected at select locations at the ECODS N-1, CSSLP and Ford Building subunits to evaluate and support contaminant migration evaluation conclusions. However, the RFI/RI Work Plan does not address or discuss the SAP pre-characterization groundwater sample results relative to evaluation of contaminant migration. As such, it is not clear how the SAP pre-characterization groundwater sampling results will be integrated into the RFI/RI Work Plan to support the contaminant migration evaluation conclusions. *Revise the RFI/RI Work Plan to address this issue to ensure no impacts and no problems warranting action with respect to groundwater have previously been identified, and as support for the SAP design, to demonstrate that the resulting data will meet the project objective to provide a comprehensive evaluation of contaminant migration.*

   Response: Clarification/Agree.

   Pre-Work Plan characterization groundwater data will primarily be used to support future Central Shops Groundwater Operable Unit characterization. In addition, the data will also be used in the ECODS N-1, CSSLP, Building 690-N OU RFI/RI/Baseline Risk Assessment (BRA) to support the uncertainty evaluation for any contaminant migration constituents of potential concern identified during the contaminant migration analysis. Since the Executive Summary does not provide detail on how the pre-Work Plan characterization data will be used, SRS proposes to provide additional text detail in Section 2.0, Preliminary Unit Evaluation.

   The first paragraph of Section 2.0 Preliminary Unit Evaluation will be revised as follows:

   "…. The <u>soil and concrete data</u> collected under the pre-Work Plan characterization SAP was compared to risk-based and contaminant migration (CM) thresholds and used to identify potential problems warranting action and additional data gaps for nature and extent of contamination determinations. <u>In addition, groundwater data collected during the pre-Work Plan characterization effort will be used in the combined RFI/RI/Baseline Risk Assessment (BRA)/Corrective Measures Study (CMS)/ Feasibility Study (FS) to support the uncertainty evaluation for any contaminant migration constituents of</u>

potential concern identified during the contaminant migration analysis. A summary of the unit evaluations for the three subunits is discussed in more detail below."

Contact: Terry Killeen, 803-952-6850 (terry.killeen@srs.gov)

2. The text in Section 1.3 Land Use, Page 4 of 90 states, "Land use controls (LUCs) will be part of any remedial action, as appropriate, to ensure prevention of unrestricted use (e.g., residential)". However, the text in Section 1.4.3 Ford Building (690-N), Page 8 of 90 indicates following deactivation and decommissioning (D&D) of the Ford Building (690-N), an engineered concrete cap will be installed over the existing concrete slab area extending out 0.305-m (1-ft) from the building edge and the post-decommissioning facility remnants (including the building slab) will be closed as part of the ECODS N-1, CSSLP, and Ford Building OU. As such, it appears that LUCs will also be required to maintain the integrity of the engineered concrete cap at the Ford Building (690-N) to ensure long-term protectiveness of the remedy. *Revise the text in Section 1.3 of the RFI/RI Work Plan to address this issue.*

   Response: Agree with clarification.

   SRS agrees that LUCs will be required to maintain the integrity of the engineered concrete cap to ensure long-term protectiveness if it is a component of the final remedy selected for the Ford Building (690-N) subunit. However, it is premature to identify the engineered concrete cap as the final remedy at the Work Plan stage. For this reason, the text was intentionally worded that "Land use controls (LUCs) will be part of any remedial action, as appropriate, to ensure prevention of unrestricted use (e.g., residential)" in the RFI/RI Work Plan. No change to the document is proposed

   Contact: Terry Killeen, 803-952-6850 (terry.killeen@srs.gov)

II. SPECIFIC COMMENT

3. **Section 1.4.1 ECODS N-1 (NBN), Page 5 of 90:**

   The last two sentences state, "The deep subsurface contained a relatively thick [~6.1-m (20-ft)] impermeable clay layer. Soil boring reports from the 2019 characterization effort at this subunit are attached in Appendix B." Similar text is also found in Section 1.4.3 ECODS N-1 (NBN) third paragraph, Page 9 of 90 asserting the deep subsurface contained a relatively thick impermeable clay layer. However, based on review of Appendix B Soil Boring Reports, a deep thick clay layer was not described in any of the soil boring installation reports. As such, the assertion a deep relatively thick impermeable clay layer exists in the subsurface could not be substantiated. *Revise the text of the RFI/RI Work Plan as appropriate to address this issue*

Response: Clarification/Agree.

The technical oversight field notes discuss complications* due to the very stiff clay layer, which was typically encountered between 8-12 ft bgs, that the Appendix B Soil Boring Reports fail to capture. All cores collected at the ECODS N-1 subunit as part of the RFI/RI Work Plan will be described in greater detail, including field estimates of the grain size percentages (e.g., % pebbles, % sand, % silt, % clay) and field tests for estimating soil consistency at 1-ft intervals.

The following section will be added to the fourth paragraph in section 1.4.1:

"The technical oversight field notes discuss complications due to the very stiff, high clay-content layer, which was typically encountered between 2.44 m and 3.66 m (8 and 12 ft) bgs and is approximately 6 m (20 ft) thick."

Section 4.4.1 will be revised as follows:

"Surface soils (0.0- to 0.3-m [0- to 1-ft]) will be sampled at the ECODS N-1 and evaluated through HH and ECO risk assessment screening. Shallow subsurface soils (0.3- to 1.2-m [1- to 4-ft]) will be sampled and evaluated through ECO risk assessment screening. All soil intervals, including the deep subsurface soils (2.4- to 3.0-m [8- to 10-ft] and 3.0- to 3.6-m [10- to 12-ft]), will be sampled and evaluated through CM and PTSM screening. Continuous core will be collected at each location and described in detail to a depth of 9 m (30 ft) to evaluate the extent of the clay layer below the ECODS N-1 subunit."

***From the field notes:**

8/5/19, 1430: "Clay content is making it hard to get the soil out of the DPT rods"

8/6/19, 0925: "Clay content is crushing sample liners into sample Rod. Per direction of Terry Killeen not to sample 10-12' at ECN1-33".

8/6/19, 1125: "Hydraulic fluid getting too hot from hammering through clay, Cascade breaks for lunch"

Contact: Terry Killeen, 803-952-6850 (terry.killeen@srs.gov)

SRS Responses to South Carolina Department of Health and Environmental Control Comments on: RFI/RI Work Plan for the Early Construction and Operational Disposal Site N-1(NBN), Central Shops Scrap Lumber Pile (631-2G), and Building 690-N, Process Heat Exchanger Repair Facility (aka Ford Building) Operable Unit (U), SEMS Number: 93 (SRNS-RP-2020-00041, Revision 0, February 2020) received February 13, 2020.

Comments Received on May 13, 2020

General Comments

1. The individual subunit evaluation conclusions discussed in Section 2.2 indicate that there are potential contaminant migration (CM) concerns with hexavalent chromium and/or metals in general at each subunit; however, these concerns do not appear to be consistently included in applicable sections of the Work Plan that discuss rationale, data needs, etc. The Work Plan should be revised to consistently include CM analysis where applicable, specifically but not limited to, Sections 3, 4, 5 and Tables 1 through 5.

   Response. Agree.

   CM concerns will be consistently addressed throughout the Work Plan as discussed in the specific comments below.

   Responsible Party: Terry Killeen, (803) 952-6850, terry.killeen@SRS.gov

Specific Comments

1. Section 2.2.2, CSSLP (631-2G), page 17. The last sentence of the first paragraph of this section states that none of the 2019 soil samples at Central Shops Scrap Lumber Pile (CSSLP) exceeded the nonvolatile beta trigger limit for additional analyses/speciation; yet, the PTSM screening data from Appendix D shows a few beta-emitting radionuclides that were specifically analyzed for. Additionally, it is unclear why the results of the nonvolatile beta testing are discussed while the gross alpha results are omitted. Please clarify.

   Response. Clarification/Agree.

   One sample from the Central Shops Scrap Lumber Pile pre-Work Plan characterization dataset exceeded the gross alpha screening limit of 20 pCi/g. Sample location CSSLP-19 (1-2 ft interval) had a gross alpha result of 23.7 pCi/g. Based on that exceedance, the sample was analyzed for the complete suite of alpha spectroscopy radionuclides identified in the Pre-Characterization Work Plan Sampling and Analysis Plan (Appendix A, Table 10, page A-76). Of these analytes, only Th-228 (1.56 pCi/g), Th-230 (1.12 pCi/g) and Th-232 (1.23 pCi/g) were detected. The remainder of the analytes in the alpha spectroscopy suite were non-detect.

Text will be added to the first paragraph in Section 2.2.2 as follows:

"…No soil samples for the CSSLP (631-2G) subunit exceeded the nonvolatile beta trigger limit (50 pCi/g) for additional beta-emitting radionuclide analyses (i.e., maximum nonvolatile beta result was 16.5 pCi/g). However, one sample exceeded the gross alpha screening limit of 20 pCi/g. The sample from location CSSLP-19 (1-2 ft interval) had a gross alpha result of 23.7 pCi/g; therefore, that sample was further analyzed for the suite of alpha spectroscopy constituents."

With regard to the CSSLP PTSM preliminary screening table presented in Appendix D (pages D-9, D-10, and D-11), the USEPA recommended default secular equilibrium (SE) PRGs were used to evaluate the data. The SE PRG considers all of the analytes in the decay chain (including alpha and beta emitters). As explained in footnotes 8, 9 and 10 of the table in Appendix D, the highest detected activity in the entire decay chain is used, and the daughter products are not screened separately.

Also note that the entire CSSLP dataset, including the additional samples identified in this Work Plan, will be rescreened using the most current PRGs and RSLs available prior to the formal Problem Identification Scoping Meeting. No change to the CSSLP preliminary PTSM screening table presented in Appendix D of this Workplan is proposed.

Responsible Party: Doug Martinson, (803) 952-6043,
douglas.martinson@SRS.gov

2. Section 3.1.2.1, ECODS N-1, page 28. Please include a statement in the first bullet of this section that addresses the potential of hexavalent chromium to impact groundwater as a CMCOC based on information provided in Section 2.2.1 and similar to the language provided for CSSLP in Section 3.1.2.2. See General Comment 1.

Response. Agree.

The following will be added as the second sentence in the first paragraph of Section 3.1.2.1:

"Metals, including Cr^{+6}, may be present in soils at levels that may leach to groundwater above their respective MCLs."

Responsible Party: Terry Killeen, (803) 952-6850, terry.killeen@SRS.gov

3. Section 3.1.2.2, CSSLP (631-2G), pages 29-30. The last bullet of this section discusses the data gap for background concentrations for sediment and surface water samples and states background samples will be collected at a Carolina Bay that is said to have "little or no impact from SRS operations." After observing the potentiometric map on Figure 2, page 58, it appears that the location of the Unnamed Carolina Bay is down gradient of SRS operations. Please explain how samples can be taken from the Unnamed Carolina Bay in Figure 2 and avoid influence from the subunits included in this work plan and other Central Shops activities.

Response. Clarification

The Unknown Carolina Bay is down-gradient of N Area with respect to groundwater flow direction. Because the surface elevation of the bay is approximately 269 ft-msl and groundwater is about 240 ft-msl at this location (see attached figure), the bay is not fed by groundwater discharge. Based on the location of surface water discharge point N-13A and area topography, surface water run-off from Central Shops drains into another Carolina Bay #126 to the east of the Unknown Carolina Bay. SRS believes the Unknown Carolina Bay is un-impacted from SRS operations and can be used as the sediment and surface water background location. Please note that the document will be revised to refer to the Unknown Carolina Bay as "Carolina Bay #125" based on a 1989 SREL document, "Carolina Bays of the Savannah River Plant", which will be added to Section 10. References.

The last sentence of the third paragraph of Section 3.1.2.2 will be revised and the description of Carolina Bay #125 will be added to the end of the third paragraph of Section 3.1.2.2 as follows:

"Sediment and surface water samples will also be needed at background locations~~, which will be at a unnamed Carolina Bay with little or no impact from SRS operations,~~ to compare against the CSSLP (631-2G) surface water impoundment area data. Due to the similarities in the environments, samples

from Carolina Bay #125 will be taken to identify background concentrations for the surface water impoundment area. Because the surface elevation of Carolina Bay #125 is approximately 269 ft-msl and groundwater is about 240 ft-msl at this location, the bay is not fed by groundwater discharge. Surface water run-off from Central Shops drains into another bay identified as Carolina Bay #126 located to the east of Carolina Bay #125. Therefore, Carolina Bay #125 is identified as an unimpacted bay south of N Area (Figure 2).”

Carolina Bay #125 will also replace the unnamed Carolina Bay in section 4.4.2 and section 5.2.

Responsible Party: Terry Killeen, (803) 952-6850, terry.killeen@SRS.gov

4. Section 3.1.2.3, Ford Building (690-N), page 30. Please include a statement that addresses the potential of metals to impact groundwater based on information provided in Section 2.2.3 and similar to the language provided for CSSLP in Section 3.1.2.2. See General Comment 1.

   Response. Agree.

   The following will be added as a second paragraph in Section 3.1.2.3:

   “Metals may be present in soils at levels that may leach to groundwater above their respective MCLs. Sufficient metals data was collected as part of the 2019 pre-Work Plan characterization, and these data will be used to evaluate the potential for contaminant migration to groundwater at the Ford Building subunit.”

   Responsible Party: Terry Killeen, (803) 952-6850, terry.killeen@SRS.gov

5. Section 4.4.2, CSSLP (631-2G), page 38. The second and third paragraphs of this section regarding surface sediment and surface water characterization strategies do not mention CM and PTSM screening as are mentioned for soils; yet, Tables 3 and 4 list these as data needs for these two media. See General Comment 1.

Response. Agree.

The second paragraph will be revised as follows:
"Surface sediment (0.0- to 0.3-m [0- to 1-ft]) will be sampled at the CSSLP (631-2G) surface water impoundment area as well as background locations at a Carolina Bay and evaluated through HH and ECO risk assessment screening, CM and PTSM. Subsurface sediment (0.3- to 1.2-m [1- to 4-ft]) will be sampled and evaluated for nature and extent of contamination, CM and PTSM."

The third paragraph will not be changed as SRS doesn't evaluate surface water for CM or PTSM.

Responsible Party: Terry Killeen, (803) 952-6850, terry.killeen@SRS.gov

6. Section 5.2, CSSLP (631-2G), page 40. The second paragraph of this section states that six locations inside the subunit and three locations outside of the subunit boundary will be sampled. The following sentence then states that four soil intervals will be sampled, implying that this will be done at each location which would result in a total of 36 samples; however, only 30 are proposed at the beginning of the paragraph. It appears from information in Section 3.1.3.2 and Figure 11 that two of these locations will be sampled only at the surface interval (0- to 1-ft), which would result in a total of 30 samples. Please clarify this information in this section.

Response. Agree.

This paragraph will be rewritten as follows:

"Thirty (30) soil samples will be collected from the CSSLP (631-2G) subunit. Six sample locations within the CSSLP (631-2G) subunit will target previously identified locations of elevated metal concentrations. Additionally, there will be three (3) background locations outside of the CSSLP (631-2G) subunit boundary (Figure 11). The following four soil intervals will be sampled at four of the six locations inside the CSSLP (631-2G) subunit and at all three background stations: surface samples (0.0- to 0.3-m [0- to 1-ft]), shallow subsurface samples (0.3- to 1.2-m [1- to 4-ft]), and two deep subsurface samples (2.4- to 3.0-m [8- to 10-ft] and 3.0- to 3.6-m [10- to 12-ft]). The two additional

sample locations inside the CSSLP (631-2G) subunit boundary will have surface (0.0- to 0.3-m [0- to 1-ft]) samples collected to bound an arsenic hotspot. All soil samples will be analyzed for TAL metals analyses (including Cr+6) (Table 7). All soil samples are planned to be collected by hand auger down to 1.2-m (4-ft) and deeper samples (below 1.2-m [4-ft]) will be collected by a Rotosonic drill rig.

~~**Thirty (30) soil samples will be collected from the CSSLP (631-2G) subunit. Sample locations within the subunit will target previously identified locations of elevated metal concentrations. At six (6) locations inside the CSSLP (631-2G) subunit and three (3) background locations outside of the unit boundary (Figure 11). The following four soil intervals will be sampled: surface samples (0.0- to 0.3-m [0- to 1-ft]), shallow subsurface samples (0.3- to 1.2-m [1- to 4-ft]), and deep subsurface samples (2.4- to 3.0-m [8- to 10-ft] and 3.0- to 3.6-m [10- to 12-ft]). All soil samples will be analyzed for TAL metals analyses (including Cr+6) (Table 7). All soil samples are planned to be collected by hand auger down to 1.2-m (4-ft) and deeper samples (below 1.2-m [4-ft]) will be collected by a Rotosonic drill rig.**~~

Responsible Party: Terry Killeen, (803) 952-6850, terry.killeen@SRS.gov

7. Tables 1, 2 and 5, Data Quality Objectives for the ECODS N-1 for Soil Media, Central Shops Scrap Lumber Pile for Soil Media, and Ford Building for Soil Media, pages 69, 70 and 73. These three tables do not include CM or PTSM screening as data needs; yet, these are discussed for these media in Section 4.4. Please revise and see General Comment 1.

Response. Agree.

The following sentences will be added to the Data Needs column in Tables 1 and 2:

"Determine any PTSM locations from identified COCs.
Determine if there is any contaminant migration potential through contaminant migration evaluation."

The following sentences will be added to the Data Needs column in Table 5:
"Determine any HH and ECO COCs and surficial risk due to direct exposure with contaminated soil.

Determine any PTSM locations from identified COCs.
Determine if there is any contaminant migration potential through contaminant migration evaluation."

Responsible Party: Terry Killeen, (803) 952-6850, terry.killeen@SRS.gov

8. Appendix D, Preliminary PTSM Screening For Ford Building 690-N (Soil – All Depths), page D-17. The second paragraph of Section 2.2.3 states that ten soil samples were selected for gamma spectroscopy analyses due to the maximum nonvolatile beta result of 48.0 pCi/g and the possible presence of Cs-137 in soils based on previous concrete sample data. These results are not included in Appendix D; please include.

   Response. Agree.

   The additional Cs-137 sample results will be added to the preliminary PTSM and human health risk screening tables for the Ford Building presented in Appendix D. The maximum Cs-137 concentration in surface soil is 0.153 pCi/g. The affected portions of the attached tables are highlighted in yellow.

   Also note that the entire Ford Building dataset will be rescreened using the most current PRGs and RSLs available prior to the formal Problem Identification Scoping Meeting.

   Responsible Party: Doug Martinson, (803) 952-6043,
   douglas.martinson@SRS.gov

Appendix D, Page D-17:

PRELIMINARY PTSM SCREENING FOR FORD BUILDING 690-N (Soil-All Depths)

Analyte	Maximum Concentration[1] (mg/kg)	Noncarcinogenic Hazard Estimate		Carcinogenic Risk Estimate	
		Industrial RSL[2] (mg/kg)	Industrial HQ Estimate[3]	Industrial RSL[2] (mg/kg)	Industrial Risk Estimate[4]
Radionuclides					
CESIUM-137	0.153	--	--	6.9E-02	2.2E-06
THORIUM-232[9]	3.97	--	--	1.53E-02	2.6E-04
Th-228	3.33	--	--	na[11]	na[11]
URANIUM-238[10]	2.57	--	--	2.00E-02	1.3E-04
U-233/234	1.89	--	--	na[11]	na[11]
Th-230	2.6	--	--	na[11]	na[11]
		Hazard Index	**5.2E+00**	**Cumulative Risk**	**4.0E-04**
		PTSM?[12]	**NO**	**PTSM?[13]**	**NO**

Appendix D, Page D-18:

PRELIMINARY HUMAN HEALTH COPC SCREENING FOR FORD BUILDING 690-N (Soil – 0 to 1 Feet)

Analyte	Maximum Concentration[1] (mg/kg)	Qual	Human Health Screening Value (mg/kg)	Human Health Screening Value Source[2]	Exceeds Human Health Screening Value?	2X Average Background Concentration[3] (mg/kg)	Exceeds 2X Average Background?[4]	COPC?[5]
Radionuclides								
CESIUM-137	0.153		4.6E-02	PRG	YES	0.28	NO	NO
THORIUM-232[9]	1.64		9.9E-03	~~RSL~~ PRG	YES	1.80	NO	NO
Th-228	1.58	J	na[11]		na[11]			
URANIUM-238[10]	2.6		1.2E-02	~~RSL~~ PRG	YES	1.01	YES	YES
U-233/234	1.22		na[11]		na[11]			
Th-230	2.6		na[11]		na[11]			

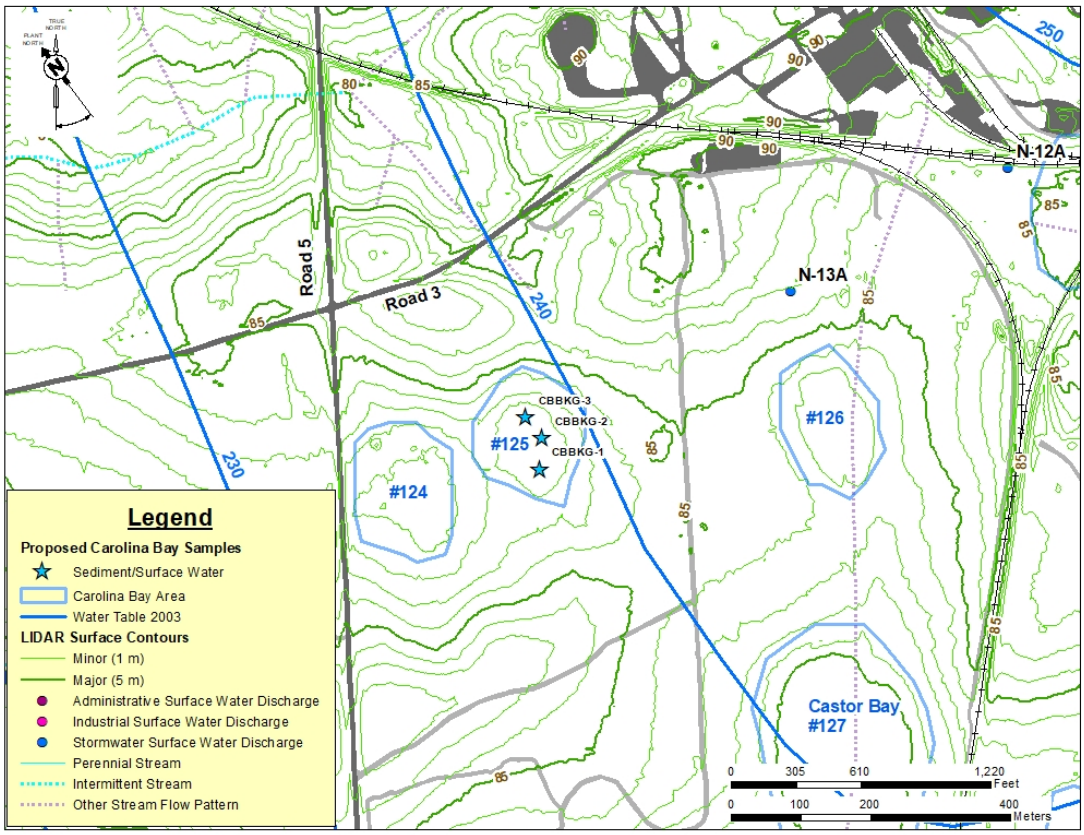

Figure 1. Carolina Bays near N-Area