



Westinghouse Electric Company
Nuclear Fuel
Columbia Fuel Fabrication Facility
5801 Bluff Road
Hopkins, South Carolina 29061
USA

SCDHEC, BLWM
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Your ref:
Our ref: LTR-RAC-24-22

March 25, 2024

Subject: Columbia Fuel Fabrication Facility Additional Middle Ditch Assessment

Mrs. Kuhn:

As requested in your January 8, 2024 response letter to the Middle Ditch Soil/Sediment Sampling Report, Westinghouse Electric Company, Inc. submits the attached additional Middle Ditch assessment plan for your review and approval.

Please let me know if you have any questions or require additional information.

Respectfully,

A handwritten signature in black ink, appearing to read 'Ray Bates'.

Ray Bates
Environmental Recovery Manager
Westinghouse Electric Company, CFFF
803.351.6629 (m)

CC: Nancy Parr, Environmental Manager
Diana Joyner, Principal Environmental Engineer
Jeremy Grant, AECOM Project Manager
ENOVIA Records



March 25, 2024

Ms. Kimberly M. Kuhn
SCDHEC
Bureau of Land and Waste Management
2600 Bull Street
Columbia, S.C. 29201

**Subject: Columbia Fuel Fabrication Facility
Additional Middle Ditch Assessment
Richland County, S.C.
Consent Agreement CA-19-02-HW
File # 51377**

Dear Ms. Kuhn:

Based upon your January 8, 2024 response letter to the Middle Ditch Soil/Sediment Sampling Report, Westinghouse Electric Company, Inc. submits the following additional Middle Ditch assessment plan for your review and approval.

Background

Westinghouse Columbia Fuel Fabrication Facility (CFFF, **Figure 1**) collected sediment samples from four locations in the Middle Ditch (**Figure 2**) during the remedial investigation (RI) and semiannually as part of the sampling requirements for their Special Nuclear Materials (SNM) operating license SNM-1107 (LOC5). Results of these samples indicated uranium (U) concentrations above the Residential Use Screening Level in the southern portion of the Middle Ditch (SED-16 and LOC5). CFFF submitted a Middle Ditch Soil/Sediment Sampling Work Plan to the South Carolina Department of Health and Environmental Control (DHEC) on July 18, 2023 to complete supplemental investigation of these legacy impacts.

Additional soil and sediment samples (14 samples total) were collected on August 3, 2023 using a hand auger to collect surficial (top 6-8 inches) soil and sediment in accordance with the site's soil sampling procedure. Stormwater outfall samples were designated with the letter "A" and ditch samples were designated with the letter "B". The Middle Ditch Soil/Sediment Sampling Report was submitted to DHEC on November 15, 2023. This report documented the development of proposed site-specific Derived Concentration Guideline Levels (DCGLs, commonly referred to as radiological clean up goals), documented the results of the soil and sediment sampling, and proposed use of modified DCGLs (conservative administrative limit of 80% of the proposed DCGLs) for decision making purposes.

Based upon the results of the additional Middle Ditch assessment, three locations exceeded the modified DCGLs sum of fractions (SOF): CB 116 outfall (CB-116A-SOIL), Echo Valve outfall (ECHO-A-SED) and in the ditch below the Echo Valve outfall (ECHO-B-SED). SOF is used to assess the cumulative potential dose of radiation exposure of the U isotopes and Tc-99 by adding the fractions of individual U isotopes and Tc-99 divided by their DCGL. Previous sediment samples were also compared to the modified DCGLs SOF and there are also exceedances at sample locations LOC5 and SED-16. Location SED-16's

DCGL SOF exceedance was bounded to the north and south during the RI by locations SED-60 and SED-61; therefore, no additional assessment is required for this location.

Based upon the sediment/soil results in the Middle Ditch, there are three general areas that need further assessment: 1) CB-116 outfall, 2) ECHO Valve area, and 3) the LOC5 area. Impact at the CB-116 outfall area is bounded by the corresponding Middle Ditch sample. The ECHO Valve area is bounded by the upstream CB-115 Middle Ditch sample. The LOC5 area is downstream from the ECHO Valve area and is bounded by the downstream SED-60 sample location. Sample locations are shown on **Figure 3**. The purpose of the additional assessment is to delineate the vertical and horizontal extent of U impact in these areas of the Middle Ditch and associated outfalls.

Vertical Soil/Sediment Profiling Methodology

Vertical solid media (soil or sediment) profiling involves obtaining samples for laboratory analyses from discrete sampling intervals. There are two methodologies that can be used to obtain these samples: 1) use a Wildco® hand core sediment sampler and 2) use a hand auger.

The Wildco® hand core sediment sampler is driven into the ground to the desired depth using an extension rod and slide hammer. Inside the sediment sampler is a dedicated, disposable acetate sleeve that fills with soil or sediment as the instrument is driven into the ground. Once the desired sampling depth is reached, the sampling device is either pulled straight out of the ground or back hammered using the slide hammer until it can be pulled out of the ground. The acetate sleeve is retrieved by unscrewing the nose cone and the top of the coring device. Following the retrieval, the sleeve can be cut into sections of sample to be composited for submittal to the analytical laboratory.

A hand auger typically advances approximately six to eight inches into the subsurface with each run before the bucket has to be removed from the ground and emptied. As the bucket slides out of or back into the borehole, sediment from shallower depths can fall to the bottom of the borehole. To minimize the potential for cross contamination from shallower depths, field personnel will measure the total depth of the borehole to calculate how much deeper the borehole was advanced and measure the length of the sediment column in the hand auger bucket. Sediment that fell to the bottom of the borehole during retrieval or reintroduction of the hand auger into the borehole will be located at the top of the bucket. Sediment in the hand auger bucket that exceeds the total amount of advancement should be discarded prior to compositing the sediment in the hand auger bucket into the sample to be submitted to the analytical laboratory. Submerged sampling locations should not use a hand auger to obtain vertical samples.

Because the sample collection using the Wildco® hand core sediment sampler is collected in one advancement and retrieval, the potential for cross contamination from different depth interval is eliminated or minimized; therefore, this is the preferred method for the collection of vertical sediment profiling samples. Westinghouse will make every effort to use this sampling method for the collection of the sediment samples.

These borings will be advanced to a depth of 2 feet below land surface with samples composited in six inch intervals (e.g., 0-6 inches and 6-12 inches) in the first foot and one foot interval thereafter or the length of the remaining sample in the acetate sleeve (e.g. 12-24 inches, 12-20 inches). Sediment from the sampling interval will be emptied onto a 3 foot by 3 foot 4-mil polyethylene plastic mixing square dedicated to the specified interval and homogenized. Composite sediment samples will be collected in general accordance with EPA Region 4 SESDPROC-200-R3 Sediment Sampling (EPA, 2014). Homogenized sediment samples will be placed in laboratory-provided sample bottles and analyzed for isotopic U.

Proposed Vertical Sediment Profiling Sample Locations

Samples will be collected from downstream to upstream within the assessment area. Shortly after LOC5, water in the Middle Ditch enters an underground pipe. Where the ditch reemerges, riprap is visible along the banks of the ditch and in the ditch itself. Two sample locations (SED-69 and SED-70) are proposed in this area before the ditch once again enters an underground pipe. Beyond this underground pipe is the location of sediment sample SED-60 collected during the RI, so these sample locations are the furthest downstream locations. Because of the presence of the observed riprap in the Middle Ditch in this area, it may not be feasible to collect samples at these two locations. If a sample(s) is unable to be collected in this area, the sequential numbering of the upstream samples will shift accordingly. For example, if no samples are able to be collected in this area, SED-69 would shift to where SED-71 sample location is proposed (**Figure 3**).

To date, LOC5 has been a surficial sediment sample only. A vertical sediment sample will be collected at LOC5. Two sample locations (SED-71 and SED-72) are proposed between LOC-5 and the Echo Valve ditch sample (ECHO-B) in the center line of the Middle Ditch. Vertical samples will also be taken at the Echo Valve outfall (ECHO-A) and associated Echo Valve ditch sample locations.

Most of the areas of the Middle Ditch have a relatively incised, well defined flow path with the incised nature of the ditch generally increasing as you move further south in the ditch. The sample location upstream (SED-74) of the Echo Valve ditch sample location (ECHO-B) is in a particularly flat area where the ditch is approximately 5 feet wide. Because U could have impacted the entire portion of the ditch in this area, three sediment sample locations (SED-73 through SED-75) are proposed: one in the center of the ditch (SED-74) and approximately 2.5 feet on either side of the center of the ditch (SED-73 and SED-75). The final proposed ditch sample (SED-76) is proposed to be taken roughly equidistant from the SED-74 sample location and the CB-115-B sample location (northern bounding sample location).

The final vertical profiling sediment sample will be taken at the CB-116 outfall. Approximately two inches of sediment lines the bottom of the stormwater pipe at the CB-116 outfall. To assess whether or not the sediment within the pipe is impacted with U, sediment will be collected approximately 1-2 feet from the end of the pipe and composited into a single sample (CB-116C-SED) using a clean, dedicated trowel.

Sample Nomenclature

Samples collected during this additional assessment will be named using the same naming protocol as used during Phase II of the RI: location-sample interval in inches. For example, sediment from location SED-72 from a depth interval of 6 to 12 inches will be SED-72-6-12 and the surficial sample from the Echo Valve outfall will be ECHO-A-0-6.

Should you have any questions regarding the information provided in this plan, please do not hesitate to contact AECOM at (803) 254-4400.

Sincerely,



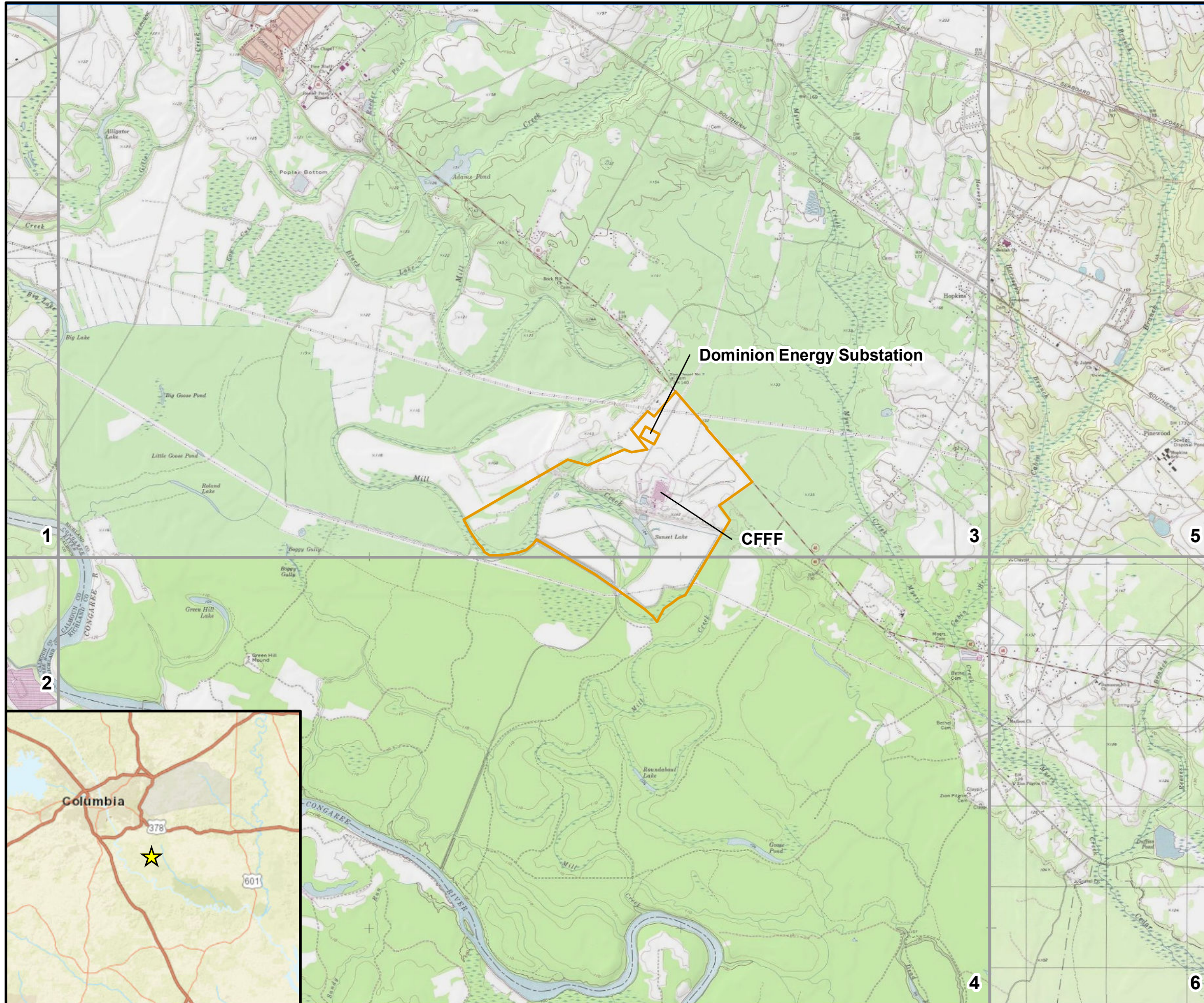
Jeremy Grant
Project Manager

Attachments: Figure 1 – Site Location Map
Figure 2 – Property Map
Figure 3 – Sediment Sampling Locations

Cc: Nancy Parr, Environmental Manager, CFFF
Diana Joyner, Principal Environmental Engineer, CFFF
Ray Bates, Environmental Project Manager, CFFF



References:

EPA, 2014. Sediment Sampling (SESDPROC-200-R3). Region 4. Science and Ecosystem Support
Division, Athens, GA. August 21, 2014



Legend

Locations

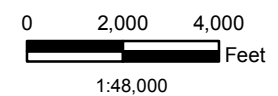
-  Property Line
-  Topographic Quadrangle Boundary

ID Topographic Quadrangle Name

- 1 Southwest Columbia
- 2 Gaston
- 3 Fort Jackson South
- 4 Saylors Lake
- 5 Congaree
- 6 Gadsden

Dominion Energy Substation

CFFF



Map Projection: NAD 1983, South Carolina State Plane, FIPS 3900, Feet

Datum: North American 1983

Data Source: Esri/USGS

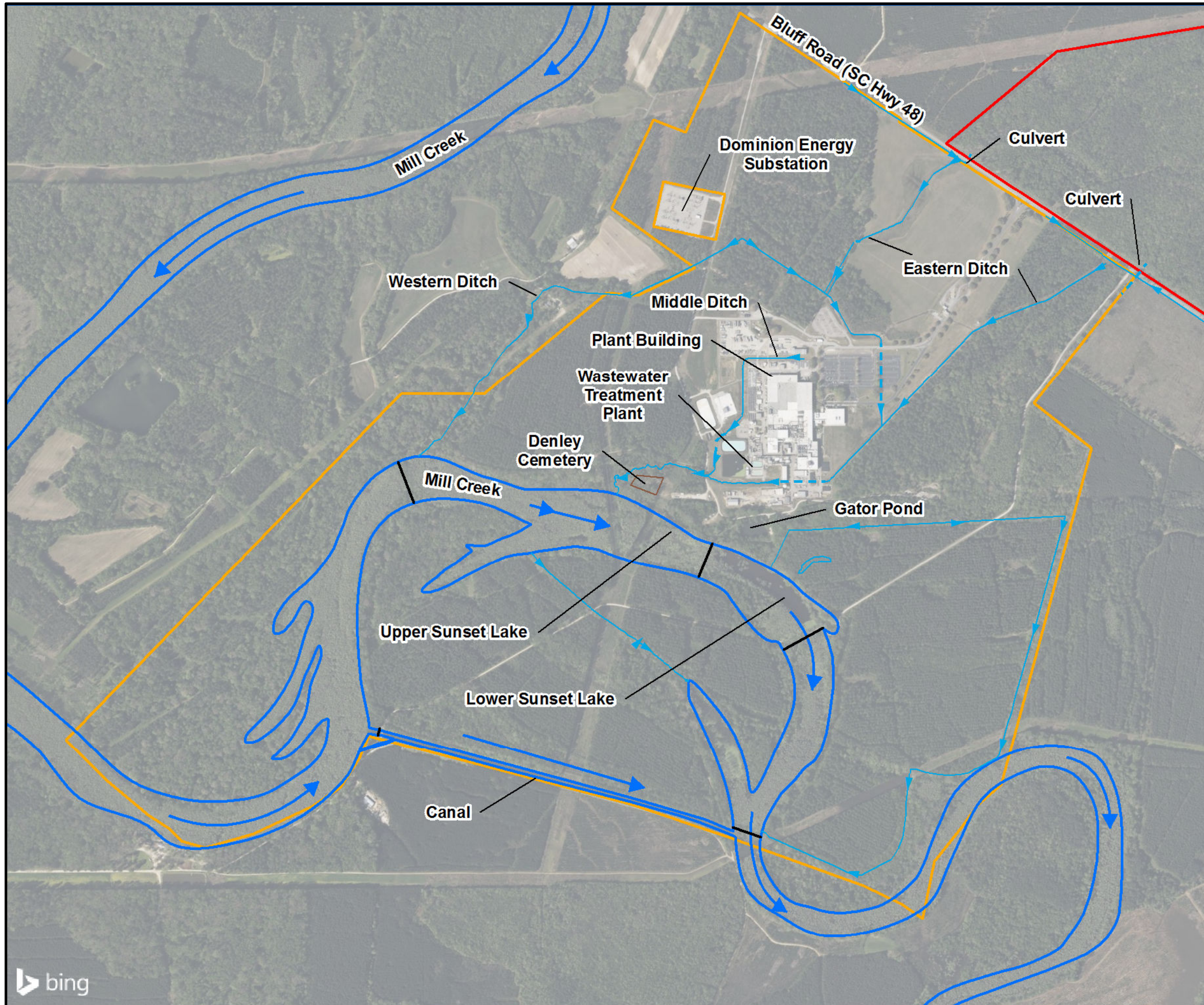


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Site Location Map

WESTINGHOUSE COLUMBIA FUEL FABRICATION FACILITY
HOPKINS, SOUTH CAROLINA

PROJECT NO. 60700386	PREPARED BY: CCS	DATE: August 2023	FIGURE 1
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- Legend**
- Mill Creek Flow Direction
 - Ditch
 - Culvert
 - Property Line
 - SCRDI Bluff Road (Superfund Site)
 - Mill Creek
 - Dike Location



Map Projection: NAD 1983, South Carolina State Plane, FIPS 3900, Feet
 Datum: North American 1983



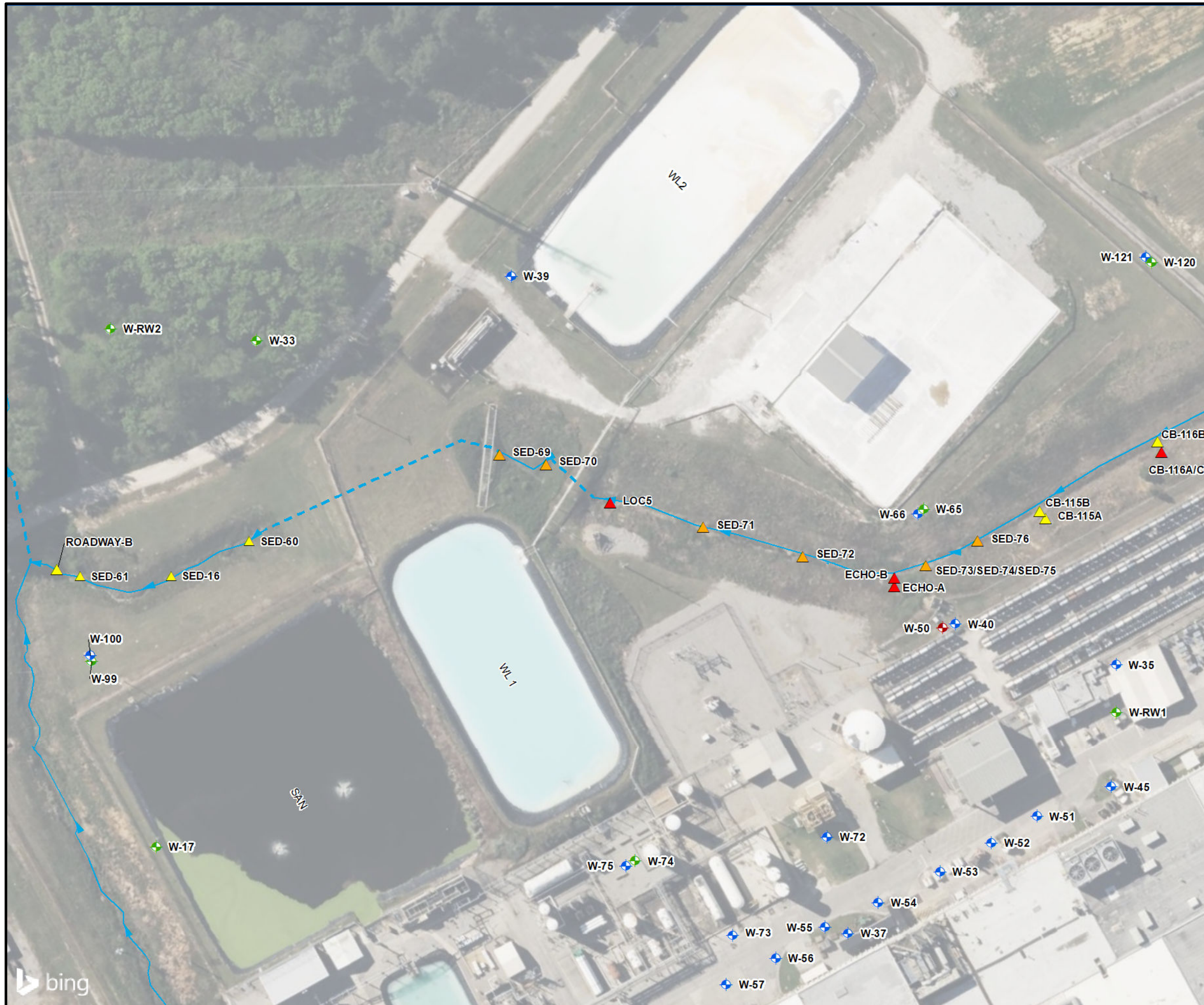
AECOM 101 Research Drive
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Property Map

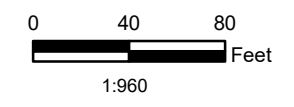
WESTINGHOUSE COLUMBIA FUEL FABRICATION FACILITY
 HOPKINS, SOUTH CAROLINA

PROJECT NO. 60700386	PREPARED BY: CCS	DATE: August 2023	FIGURE 2
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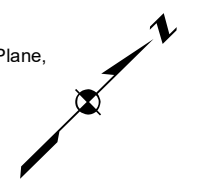




- Legend**
- Surficial Aquifer - Upper Zone Monitoring Well
 - Surficial Aquifer - Lower Zone Monitoring Well
 - Black Creek Aquifer Monitoring Well
 - Previous Sediment Sample Location
 - Proposed Vertical Profile Sediment Sample Location
 - Proposed Vertical Profile Sediment Sample Location with Known DCGL SOF Exceedance
 - Ditch
 - Culvert
 - SAN Sanitary Lagoon
 - WL1 West Lagoon I
 - WL2 West Lagoon II



Map Projection: NAD 1983, South Carolina State Plane, FIPS 3900, Feet
 Datum: North American 1983



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Sediment Sampling Locations

WESTINGHOUSE COLUMBIA FUEL FABRICATION FACILITY
 HOPKINS, SOUTH CAROLINA

PROJECT NO. 60700386	PREPARED BY: CCS	DATE: March 2024	FIGURE 3
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